

New York State Office Of General Services  
Procurement Services Group  
Corning Tower Building  
Empire State Plaza  
Albany, New York 12242  
<http://www.ogs.state.ny.us>

## PURCHASING MEMORANDUM

### BID SOLICITATION UPDATE

**IFB NUMBER:** 22341

**DATE:** May 11, 2011

**GROUP:** 35800 -Comprehensive Traffic Operation  
Control & Monitoring Systems: Equipment & Products;  
Systems & Components (including Hardware & Sensors;  
Options, Accessories, Parts & Supplies) (Statewide)

**PLEASE ADDRESS INQUIRIES TO  
DESIGNATED CONTACTS:**

James E. Malone  
Purchasing Officer I  
(518) 473-2428  
[James.Malone@ogs.ny.gov](mailto:James.Malone@ogs.ny.gov)

**BID OPENING:** May 25, 2011

Joseph Hodder  
Purchasing Team Leader  
(518) 474-3668  
[Joseph.Hodder@ogs.ny.gov](mailto:Joseph.Hodder@ogs.ny.gov)

**SUBJECT:** Two Administrative Issues and the NYS SFS Vendor Number

**TO PROSPECTIVE BIDDERS:**

**ISSUE #1**

An administrative concern regarding the restriction of Bid Specific or New York State Specific Price Lists that companies may not have openly published lists or have lists containing items that are featured in Appendix 5.

As noted by the previous Bid Solicitation Update (22341p1 dated April 27, 2011) – although we are striving to address their needs, this is not a Department of Transportation specific procurement, it is a STATEWIDE Award. The intent is to give all contract users a better way to obtain off-the-shelf equipment as well as items which may have more custom requirement needs such as what NYSDOT or the NYS Thruway Authority may specify.

The problem with bid targeted NYS only price lists is the inability to evaluate them in relation to other states which is a prime component in the Method of Award in ALL NYS Catalog Based Contract Awards. Products listed should be openly available and not simply a part of a custom package where pricing could not be competitively justified. However, note that there are no restrictions for you in bidding any customized item which may be a NYS DOT QPL/APL Product that may be in your catalog. The Price clause states: “...*should your product line contain PRODUCTS specifically developed for use in New York State by a NYS Agency or Authority, use of an item designation containing “New York” or “NYS” etc. will be allowed...*”. (This would include the use of NYSDOT or NYSTA).

The contention that “very few of suppliers have established, published price lists” is flawed as business requirements in the 21<sup>st</sup> century’s age of information technology requires firms to have such lists so that quotations can be obtained rapidly or so that transactions can take place almost instantly on line without delays that are caused by having to give custom quotes to every transaction. It is up to the bidder to identify the format and publication method of such lists and incorporate them into your Commercial Price List and Product Catalog.

\* \* \*

**ISSUE #2**

A second issue regarding document terminology has arisen. As noted in the IFB and reinforced in the first subsequent purchasing memorandum, Appendices 5 through 11, are supplied as informational tools relating to the purchasing needs of the NYS Department of Transportation, who also serves as the primary author of these appendices.

As previously stated in the IFB and the previous Bid Solicitation Update (22341p1 dated April 27, 2011): “**A manufacturer’s product specifications may vary from those contained within the appendices without the products being excluded from consideration for this procurement.**”; and regarding Appendix 5, “**Neither the presence of this list, nor any vendor’s lack of having a product being listed on it,**

**excludes the bidder from offering similar products to those listed.”** Please see page 27 of the IFB for complete information.

We have been made aware of possible incorrect usage of terminology in Appendix 5 product descriptions relating to products listed on Page 74 of the section, and in the title and some parts of Appendix 11, Chapter 18. The terminology as listed in the original document was solely authored by the Department of Transportation, and in no way should be construed to have been supplied by or authorized as correct for use by any of the manufacturers listed there in.

The description for Items 5 through 8, are hereby changed to read: **“Vehicle Priority Classification.”**

The description for Items 9 through 12, are hereby changed to read: **“Vehicle Priority Classification & Logging”**

Additionally, the term used by the Department in their submission for the title of Appendix 11, chapter 18, beginning on page 311 of the IFB is hereby changed to read **“Detailed Specification for an Infrared Optical Preemption and Communication System”**. Within the body of the department’s specification as listed therein, any statements relating to a “vehicle identifying feature” containing the words “will” or “shall” shall now have those instructions be replaced with the word “may”.

The New York State Department of Transportation has been made aware of this issue and will address the matter independently of this bid.

\* \* \*

With the upcoming implementation of the new State Financial System, all contractors will be required to obtain and use a New York State specific SFS Vendor Identification Number. This number must be included on all correspondence and documents submitted to the State as of October 1, 2011.

Many vendors have already been notified by the Office of the State Comptroller regarding this new requirement, and already have been provided with this number. Potential bidders who have not yet begun the process should do so immediately, by contacting the Vendor Management Unit (VMU) at the Bureau of State Expenditures of the Office of the State Comptroller. They may be reached via e-mail at VMU@osc.state.ny.us.

**Obtaining this SFS Vendor Identification number is hereby made a requirement for award in this procurement.** If you already have your company’s SFS VID# please enter it here:

NYS State Financial System Vendor Identification Number: \_\_\_\_\_

Those in the process of obtaining the number should forward it to James.Malone@ogs.ny.gov as soon as it is established and available.

\* \* \* \* \*

All other terms and conditions of the bid solicitation remain unchanged. All bids shall be considered on the basis of this amendment.

**If submitting a bid, this letter should be signed, attached to, and made a part of your bid.**

BID OF (COMPANY): \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY, STATE, ZIP: \_\_\_\_\_

SIGNATURE OF BIDDER: \_\_\_\_\_

PRINTED COPY OF SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

\* \* \* \* \*

New York State Office Of General Services  
Procurement Services Group  
Corning Tower Building  
Empire State Plaza  
Albany, New York 12242  
<http://www.ogs.state.ny.us>

## PURCHASING MEMORANDUM

### BID SOLICITATION UPDATE

**IFB NUMBER:** 22341

**DATE:** April 27, 2011

**GROUP:** 35800 -Comprehensive Traffic Operation  
Control & Monitoring Systems: Equipment & Products;  
Systems & Components (including Hardware & Sensors;  
Options, Accessories, Parts & Supplies) (Statewide)

**PLEASE ADDRESS INQUIRIES TO  
DESIGNATED CONTACTS:**

James E. Malone  
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(518) 473-2428  
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**BID OPENING:** May 25, 2011

Joseph Hodder  
Team Leader  
(518) 474-3668  
[Joseph.Hodder@ogs.ny.gov](mailto:Joseph.Hodder@ogs.ny.gov)

**SUBJECT:** Change of Designated Contact E-mail Addresses, End of Inquiry Period, Responses to Vendor Questions, and update to Supplemental Specification Appendix 11.

**TO PROSPECTIVE BIDDERS:**

Please note the changes to the email addresses for the designated contacts as noted on pages 1 and 6 of the Invitation for Bids. The e-mail address for Mr. Malone is now "James.Malone@ogs.ny.gov" and for Mr. Hodder is "Joseph.Hodder@ogs.ny.gov".

Per the terms of the Inquiry/Issuing Office clause as found on page 6 of the above noted IFB, the period for submitting questions relating to the terms and specifications of this bid is now closed. A statement addressing a major concern and our responses to inquiries received begins on page 2.

As an example of the sub-clause regarding Evolving Specifications on page 27 of the IFB, some updates have recently been made to the NYS Department of Transportation's TMES as found in Appendix 11 beginning on bid page 196. These are found herein beginning on page 4.

All other terms and conditions of the bid solicitation remain unchanged. All bids shall be considered on the basis of this amendment.

**If submitting a bid, this letter should be signed, attached to, and made a part of your bid.**

BID OF (COMPANY): \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY, STATE, ZIP: \_\_\_\_\_

SIGNATURE OF BIDDER: \_\_\_\_\_

PRINTED COPY OF SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

-continued-

ISSUE #1 -

**Potential Bidders should be aware** that this Invitation for Bids is expected to result in a **New York State OGS CENTRALIZED COMMODITY CONTRACT** for STATEWIDE use by **ANY** State Agency, authority, local governmental body or educational facility. **It is NOT a New York State Department of Transportation (NYSDOT) specific contract.**

As a means of streamlining the procurement process, the State Finance Law requires state agencies to use an OGS centralized contract to purchase commodities that meet their requirements with respect to form, function and utility rather than implement separate agency specific contracts. The State highly recommends the use of the OGS centralized contracts by State Authorities, counties and local governments for the same reason.

The NYS Department of Transportation advises the Office of General Services Procurement Services Group as to their needs and as to current conditions, trends and situations occurring in the transportation industry so that we may develop the bid. A number of NYSDOT operations groups, along with members of The NYS Thruway Authority, The NYS Bridge Authority, The MTA, county highway departments and local municipal traffic control bureaus across the State assisted in the development of the PRIMARY PRODUCT LIST found on page 29 of the bid.

As noted on page 27, the specification information offered in Appendices 6 through 11 is supplied as supplemental information **relevant only to products being sought by the NYS Department of Transportation**. The use of these appendices **by other** agencies or contract users is recommended but not mandatory. Therefore, **a manufacturer's product specifications may vary from those contained within the appendices without the products being excluded from consideration for this procurement.**

**Any specification variances between an awarded product and any of the Supplemental Specifications** found in Appendices 6 through 11 **may be discussed with the appropriate end user at NYSDOT after awards are completed and the restricted period has been closed.** This will determine if the product in question meets or exceeds the stated NYSDOT specification as well as the department's form, function and utility needs, or if adjustments are required.

Per the PRODUCT QUALIFICATION CLAUSE on IFB page 26, the same holds true for the information contained on the NYSDOT Qualified/Approved Products Lists as found in APPENDIX 5. **Neither the presence of this list, nor any vendor's lack of having a product being listed on it, excludes the bidder from offering similar products to those listed.**

As stated in the IFB on page 201, Chapter 1 of Appendix 11, **manufacturers and vendors may submit product samples** to the NYS Department of Transportation for testing and possible placement on the department's Qualified or Approved Products Lists **after awards are completed and the restricted period has been closed.** The types of products listed are fully at the discretion of the NYS Department of Transportation.

**If your products fall within the product lines noted in the PRIMARY PRODUCTS listing on page 29 of the IFB, your bid will be considered.**

\* \* \* \* \*

The following are the questions raised during the Inquiry Period along with corresponding answers. All questions have been edited for publication to reduce the possibility of identifying a potential bidder in advance of the bid opening.

**Q1.** Pricing: Because each of our customers has different product customization requirements, we develop custom products and pricing for each project as it is bid. We do not work with a publicly available catalog and price list. Because of this, can we include a simple pricing for our product?

**A1.** No. **The intent of this bid is not to obtain customized goods and services. All items being offered must be openly available for purchase, with verifiable open pricing, per the terms of the PRICE clause as found beginning on page 10 of the IFB. A freely available price list and catalog are a requirement.**

**Should equipment contained in the award be deemed insufficient to satisfy the form, function and utility needs of any project, a separate procurement addressing the custom requirements would be let.**

**Q2.** Regarding the qualifications that bidders must meet, my company is an out-of-state manufacturing representative firm. We represent a Canadian manufacturer. Are there special requirements we must meet?

**A2.** The company submitting the bid is required to meet all the stated qualifications set forth in the IFB, including all insurance, vendor responsibility and tax needs. (See IFB pages 8, 23 and 67).

If a bidding company is a reseller, all manufacturers being represented must certify that the bidder is a legal source of supply for their products and that they will stand behind both the bidder and the products throughout the contract term. (See pages 19 and 67 of the IFB for additional guidance).

**Q3.** I guess I am a little confused with this bid. I went through all of the pages but didn't find the quantities for the items that my company previously had on contract. Although they're on the product list, maybe this bid is not for them?

**A3.** This IFB uses a different format from what you have been presented by NYS in the past, with the basis being your company's standard catalog and pricelist instead of specified line items. Please refer to the PRICE clause as found beginning on page 10 and the Method of Award beginning on page 15 for clarification.

**Q4.** Our company carries a number of different manufacturers product lines. Can we submit multiple manufacturers for similar products?

**A4.** Yes.

**Q5.** Please confirm that there could be multiple awards for like items, i.e.: controllers, LED signals, radar signs.

**A5.** Yes, multiple awards are possible under this procurement per Section D of the Method of Award on page 16 of the IFB.

**Q6.** This question concerns adding equipment to our catalog after the contract is let. We are currently negotiating with a manufacturer regarding our selling their product line. They are developing a new product that hopefully will hit the market in late 2011 or early 2012. If we had a contract can we add to our catalog?

**A6.** If the new product falls within a product classification for which you were originally awarded, you may request an addition to your catalog, per the contract terms found on IFB pages 12 and 13. [i.e.: You originally submitted a bid and were awarded a contract for Message Signs. You would be able to offer new message signs as an addition.] You would still be required to provide evidence of reasonableness of price. The final decision regarding any addition is at the discretion of the State.

If the product does not fall within the scope of your original award, you be able to introduce it for consideration as a separate line during a periodic recruitment period (See page 18 of the IFB).

**Q7.** Our company is a manufacturers' distribution company carrying many product lines. If one of our manufacturers submits a bid independently of ours can we both be awarded?

**A7.** It is highly unlikely that you both would win the award. Both bids would have to be 100% identical in every aspect.

**Section A, part 5 of the Method of Award states on page 15 of the IFB:**

*In the event that **identical product line** catalogs & commercial price lists are submitted by multiple bidders the award will be made to the vendor offering the **best cumulative total unit price** to the State **after discount**.*

**Q8.** Communications fees: Annual cell phone fees for the SMS/FTP cellular services form a significant part of the overall cost of our product.

**A8.** This is a commodity contract IFB designed for obtaining physical equipment. As noted on page 28 of the IFB under the TELECOMMUNICATIONS clause, the State has in place a mechanism to provide appropriate supporting telecommunications services should the contract user wish to utilize them. Per the clause noted, vendors are welcome to participate in periodic recruitment offerings through commodity group 77017.

**Q9.** Software Escrow: Is it normal for the purchaser to require that all applicable system firmware and website software be held in escrow?

**A9.** As noted in the SOFTWARE clause on page 28 of the IFB, the States policies on software licensing will be governed by the terms laid out in APPENDIX B. Software Escrow is addressed as a term under the licensing regulations contained therein on PDF page 364 of the bid.

**Q10.** Software transfer: It is foreseeable in some large scale installations that a contract user might want to take complete control of its own website. As this is a possibility, should a price be included in the bid requirements?

**A10.** As stated above in A1, the intent of this bid is not to obtain customized goods and services. In a situation as described, a separate IT services procurement addressing the custom requirements for the development, implementation and operation of such a website would be let.

**Q11.** Does NYSDOT QPL or APL approval affect award?

**A11.** Per the **PRODUCT QUALIFICATION** clause on page 26 of the IFB, it does not affect eligibility for award. It **DOES AFFECT** the purchasing practices of the Department of Transportation and possibly other contract users **POST-AWARD**. All bids will be evaluated per the terms set forth in the **METHOD of AWARD**.

**Q12.** Is The State of New York the only one that will request samples?

**A12.** In the pre-award stage of the procurement process, should we or either of our technical partners (NYSDOT, NYS Thruway Authority) determine a need to examine or test a product sample, requests would come only from the Designated Contacts. Should a vendor receive a sample request from any other source during this time it should be forwarded immediately to the Designated Contact.

Post-award, samples may be requested by a contract user per the terms of Appendix B, wherein it states on PDF Page 352, "Requests for samples by Authorized Users require the consent of the Contractor. Where Contractor refuses to furnish a sample, Authorized User may, in its sole discretion, make a determination on the performance capability of the Product or on the issue in question."

**Q13.** What is the maximum number of samples per line the State of New York will request?

**A13.** There is no set number of samples. This would be determined on a case by case basis and we would work with the bidder to determine the amount.

**\* \* \* \* \* End of Questions \* \* \* \* \***

**Updates to APPENDIX 11 are as follows:**

**1.**

**Page 231 – Chapter 2 – Paragraph 1.1 – Sentence 2**

*The date should read: "August 16, 2002"*

**2.**

**Page 268 – Chapter 13 – Section 2 – Paragraph 3.10**

*Replace the paragraph with the following:*

3.10 The input file shall have two continuous white vinyl writable labels. One label located above the input cards and one below them. The upper label shall be printed with the odd input position numbers (e.g. 1, 3, 5 ... 27). The lower label shall be printed with the even input position numbers (e.g. 2, 4, 6 ... 28).

**3.**

**Page 269 – Chapter 13 – Section 2 – Paragraph 4**

*Connections to Pins 6 & 7 found in the chart at the bottom of the page have been updated as follows:*

<b>PIN</b>	<b>PDA-PDA3</b>	<b>CABINET SHELL-PDA3</b>
6	NC	AC- Bus Bar
7	NC	AC- Bus Bar

**4.**

**Page 269 – Chapter 13 – Section 2 – Paragraph 7.0 - Line 4**

*The sentence pertaining to the switchpacks' location should be replaced as follows:*

The switchpacks will rest on the bottom side of the enclosed area when installed.

5.

**Page 278 – Chapter 13 – Section 3 – Paragraph 2.3**

*Change the noted position of the terminal block from the “left” of the power supply connector, to the “right”.*

6.

**Page 278 – Chapter 13 – Section 3 – Paragraph 2.5**

*Change the noted example from “Figure 15.10.1” to “Figure 13.10.1”.*

7.

**Page 279 – Chapter 13 – Section 3 – Paragraph 4.1**

*Delete the phrase “covered by a Formica-type chemical-proof plastic sheet while the rear connector is being removed” from sentence 2.*

*Insert the Sentence “The drawer shall not latch in the fully extended position.” to the end of the paragraph.*

7.

**Page 280 – Chapter 13 – Section 3 – Paragraph 10.1**

*Insert the Sentence “The harness wires shall exit the shield on the B-D end of the C1 connector.” to the end of the paragraph.*

8.

**Page 280 – Chapter 13 – Section 3 – Paragraph 11.1**

*Insert the Sentence “The angles associated with the bends in the shelf cover shall be such that it prohibits the C1 connector/cable from sliding down between the shell and the cabinet.” to the end of the paragraph.*

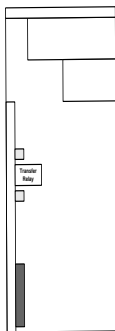
9.

**Page 282 – Chapter 13 – Section 3 – Paragraph 11.1 - Figure 13.8**

*Remove the Fixed angle value of 150° from the Shelf Cover illustration in the inset circle’s exploded view.*

**Original**

**Updated**



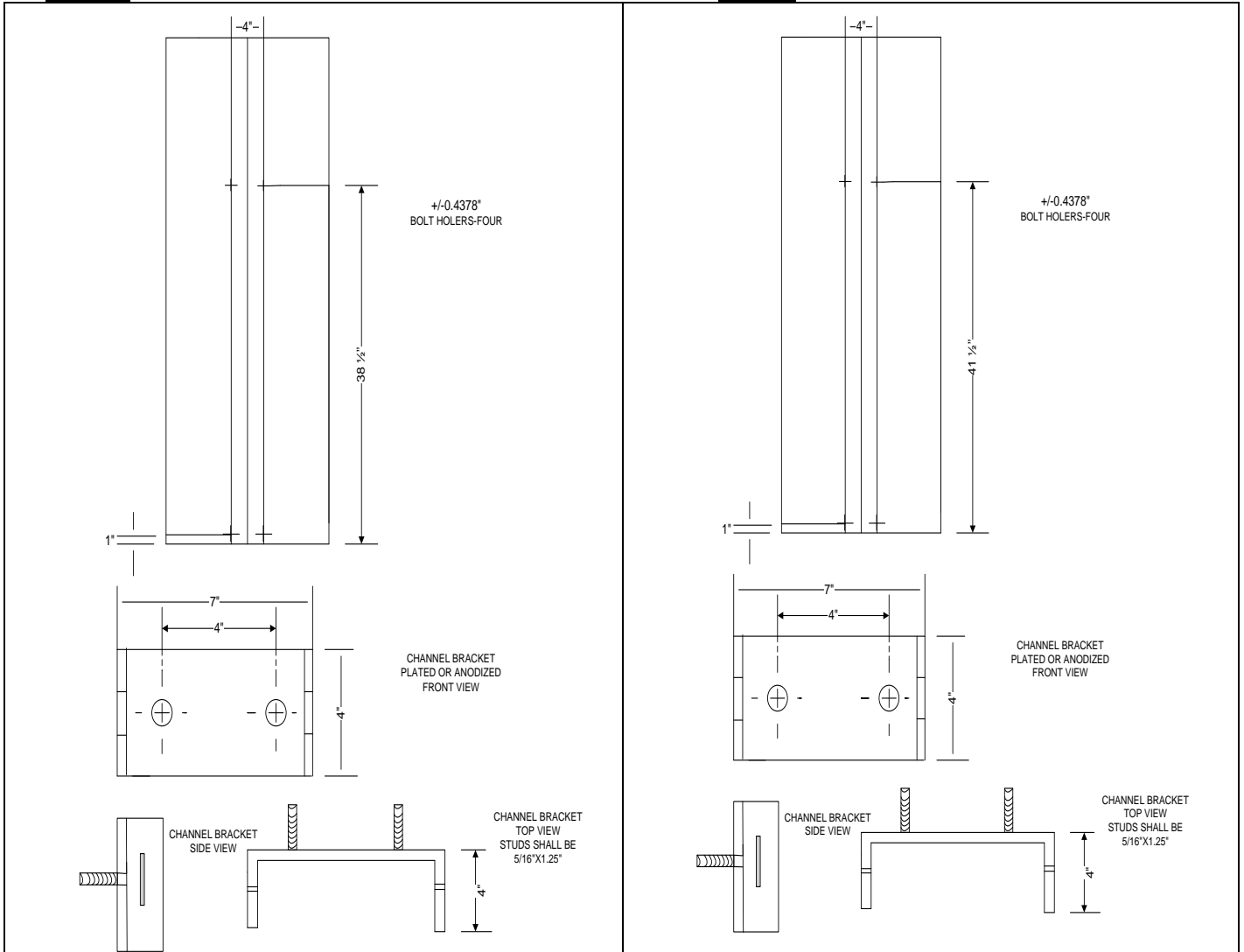
10.

**Page 289 – Chapter 13 – Section 3 – Paragraph 11.1 - Figure 13.14**

The 39 ½ inch height designated for the bolt holder position in the upper section of the drawing has been raised to a height of 41 ½ inches.

**Original**

**Revised**



\* \* \* \* \*



State of New York Executive Department  
Office of General Services - Procurement Services Group  
Corning Tower - 37<sup>th</sup> Floor  
Empire State Plaza  
Albany, NY 12242

## INVITATION FOR BIDS

**IMPORTANT: SEE "NOTICE TO BIDDERS" CLAUSES HEREIN  
BIDS MAY BE SENT TO THE ABOVE ADDRESS  
(E-Mail & Fax Bid Submissions are NOT acceptable)**

<b>BID OPENING</b> <b>DATE:</b> May 25, 2011 <b>TIME:</b> 11:00 AM	<b>TITLE: Group 35800 - Comprehensive Traffic Operation Control &amp; Monitoring Systems: Equipment &amp; Products; Systems &amp; Components (including Hardware &amp; Sensors; Options, Accessories, Parts &amp; Supplies) (Statewide)</b> Classification Code(s): 26, 32, 39, 46, 92
<b>INVITATION FOR BIDS NUMBER:</b>  <p style="text-align: center;"><b>22341</b></p>	<b>SPECIFICATION REFERENCE:</b> As Incorporated in the Invitation For Bids Replaces: 18523, 19833, 20291, 20470, 20859, 21381, 21519
<b>CONTRACT PERIOD: The start of the Next Business Day following the Approval of Awards by The New York State Office of the State Comptroller, to the end of the day on September 30, 2016</b>	
<b>DESIGNATED CONTACTS: Team #6</b>	
James E. Malone, Purchasing Officer I Telephone No. (518) 473-2428 E-mail address: james.malone@ogs.state.ny.us	Joseph Hodder, Team Leader Telephone No. (518) 474-3668 E-mail address: joseph.hodder@ogs.state.ny.us

The bid must be fully and properly executed by an authorized person. **By signing you certify your express authority to sign on behalf of yourself, your company, or other entity and full knowledge and acceptance of this INVITATION FOR BIDS, Appendix A (Standard Clauses For New York State Contracts), Appendix B (OGS General Specifications), and State Finance Law §139-j and §139-k (Procurement Lobbying), and that all information provided is complete, true and accurate. By signing, bidder affirms that it understands and agrees to comply with the OGS procedures relative to permissible contacts as required by State Finance Law §139-j (3) and §139-j (6) (b).** Information may be accessed at:  
 Procurement Lobbying: <http://www.ogs.state.ny.us/aboutOgs/regulations/defaultAdvisoryCouncil.html>

Legal Business Name of Company Bidding:	Bidder's Federal Tax Identification #: (Do Not Use SS#)
D/B/A - Doing Business As (if applicable):	
Street	City
State	Zip
County	
<b>Cash Discounts will not be considered in determining low bid, but cash discounts of any size may be considered in awarding tie bids.</b> _____ % Cash Discount for payment within 15 days of delivery and/or receipt of voucher _____ % Cash Discount for payment within 30 days of delivery and/or receipt of voucher	
If you are not bidding, place an "x" in the box and return this page only. <input type="checkbox"/> WE ARE UNABLE TO BID AT THIS TIME BECAUSE _____	
Bidder's Signature:	Printed or Typed Name:
Title:	Date:
Phone : ( ) - ext ( )	Toll Free Phone : ( ) - ext ( )
Fax : ( ) - ext ( )	Toll Free Fax : ( ) - ext ( )
E-mail Address:	Company Web Site:

**FOR PROCUREMENT SERVICES GROUP USE ONLY**

P.R. # 21930	LIT <input type="checkbox"/>	MEMO <input type="checkbox"/>	MISSING PAGES
	LET <input type="checkbox"/>	OTHER <input type="checkbox"/>	

GENERAL INFORMATION

**IMPORTANT NOTICE TO POTENTIAL BIDDERS:** Receipt of these bid documents does not indicate that the Office of General Services' Procurement Services Group has pre-determined your company's qualifications to receive a contract award. Such determination will be made after the bid opening and will be based on our evaluation of your bid submission compared to the specific requirements and qualifications contained in these bid documents.

NOTICE TO BIDDERS:

The Commissioner of General Services will receive bids pursuant to the provisions of Article XI of the State Finance Law or the provisions of the State Printing and Public Documents Law. The following procedures shall be used for bid submittals:

1. **BID PREPARATION**

Prepare your bid on this form using indelible ink. Print the name of your company on each page of the bid in the block provided. One copy of the bid is required, unless otherwise specified herein.

2. **BID DEVIATIONS**

If your bid differs from the specifications explain such deviation(s) or qualification(s); and if necessary, attach a separate sheet. See "Extraneous Terms" in Appendix B, OGS General Specifications.

3. **BID DELIVERY**

**Bidders assume all risks for timely, properly submitted deliveries.** Bidders are strongly encouraged to arrange for delivery of bids to OGS prior to the date of the bid opening. **LATE BIDS may be rejected. E-mail bid submissions are not acceptable and will not be considered.**

- **Bid envelopes and packages**

An envelope and/or package containing a bid should be clearly marked "**BID ENCLOSED**" and should state the **Bid Number, Bid Opening Date, and Time**. Failure to complete all information on the bid envelope and/or packages may necessitate the premature opening of the bid and may compromise confidentiality. See "Bid Submission" in Appendix B, OGS General Specifications. Bids shall be delivered to:

State of New York Executive Department  
Office of General Services  
Procurement Services Group  
Corning Tower - 37<sup>th</sup> Floor Reception Desk  
Empire State Plaza  
Albany, NY 12242

- **FAX transmittals**

are not permitted by this solicitation.  
See "Facsimile Submissions" in Appendix B, OGS General Specifications.

- **Hand deliveries**

Bidders must allow extra time to comply with the security procedures in effect at the Empire State Plaza when hand delivering bids or using deliveries by independent courier services. **Bidders assume all risks for timely, properly submitted deliveries.**

4. **IMPORTANT BUILDING ACCESS PROCEDURES**

To access the Corning Tower, all visitors must check in by presenting photo identification at the Information desk.

**Bidders attending bid openings are encouraged to pre-register for building access by contacting the Procurement Services Groups (PSG) receptionist at 518-474-6262 at least 24 hours prior to the bid opening.**

Visitors who are registered can check in directly with the Information Desk. Visitors who are not pre-registered will be directed to a designated phone to call the PSG Receptionist. The Receptionist will register the visitor at that time but delays may occur. Vendors who intend to deliver bids or conduct PSG business should allow extra time to comply with these procedures. Building access procedures may change or be modified at any time.

(continued)

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NON-COLLUSIVE BIDDING CERTIFICATION:

**(Reference: State Finance Law Section 139-d and Appendix A, Clause 7)**

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief:

- (1) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
- (2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
- (3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not submit a bid for the purpose of restricting competition.

In the event that the bidder is unable to certify as stated above, the bidder shall provide a signed statement which sets forth in detail the reasons why the bidder is unable to furnish the certificate as required in accordance with State Finance law Section 139-d(1)(b).

SUMMARY OF POLICY AND PROHIBITIONS ON PROCUREMENT LOBBYING:

Pursuant to State Finance Law §§139-j and 139-k, this solicitation includes and imposes certain restrictions on communications between the State and an Offerer/bidder during the procurement process. An Offerer/bidder is restricted from making contacts regarding the procurement from the earliest notice of intent to solicit offers/bids through final award and approval of the Procurement Contract by OGS and, if applicable, the Office of the State Comptroller ("the restricted period") **to other than designated staff** (*the designated contacts*) unless it is a contact that is included among certain statutory exceptions set forth in State Finance Law §139-j (3) (a). Designated staff, as of the date hereof, is identified on the first page of this solicitation. OGS employees are also required to obtain certain information when contacted during the restricted period and make a determination of the responsibility of the Offerer/bidder pursuant to these two statutes. Certain findings of non-responsibility can result in rejection for contract award and in the event of two findings within a four-year period, the Offerer/bidder is debarred from obtaining governmental Procurement Contracts. Further information about these requirements can be found on the OGS website: <http://www.ogs.state.ny.us/aboutOgs/regulations/defaultAdvisoryCouncil.html>

INQUIRIES/ISSUING OFFICE: :

All inquiries concerning this specification will be addressed to the following PSG designated contact(s) and issuing office:

**PRIMARY CONTACT**

**James E. Malone**, Purchasing Officer I  
NYS Office of General Services  
Procurement Services Group  
Corning Tower - 38th Floor  
Empire State Plaza  
Albany, New York 12242  
Phone No.: **(518)473-2428**  
E-Mail: **james.malone@ogs.state.ny.us**

**SECONDARY CONTACT**

**Joseph Hodder**, Purchasing Team Leader  
NYS Office of General Services  
Procurement Services Group  
Corning Tower - 38th Floor  
Empire State Plaza  
Albany, New York 12242  
Phone No.: **(518) 474-3668**  
E-Mail: **joseph.hodder@ogs.state.ny.us**

All questions should be submitted in writing to the PRIMARY CONTACT no later than E.O.D. April 25, 2011 (via e-mail is acceptable and recommended), citing the particular bid section and paragraph number. The prospective bidder should notify the PRIMARY CONTACT of any term, condition, etc., that precludes the vendor from submitting a compliant, responsive bid. Bidders are cautioned to **read this document thoroughly to become familiar with all aspects of the bid**. Prospective Bidders should note that all clarifications and exceptions including those relating to the terms and conditions of the contract are to be resolved prior to the submission of a bid. Bidders entering into a contract with the State are expected to comply with **all** the terms and conditions contained herein. Answers to all questions of a substantive nature will be given to all Prospective Bidders in the form of a formal addendum which will become part of the ensuing contract.

(continued)

GENERAL INFORMATION (Cont'd)

CONTRACT BILLINGS AND PAYMENTS:

a. Billings. Contractor and the dealers/distributors/resellers designated by the Contractor, if any, shall provide complete and accurate billing invoices to each Authorized User in order to receive payment. Billing invoices submitted to an Authorized User must contain all information required by the Contract and the State Comptroller or other appropriate fiscal officer. Submission of an invoice and payment thereof shall not preclude the Commissioner from requesting reimbursement or demanding a price adjustment in any case where the Product delivered is found to deviate from the terms and conditions of the Contract or where the billing was inaccurate.

Contractor shall provide, upon request of the Commissioner, any and all information necessary to verify the accuracy of the billings. Such information shall be provided in the format requested by the Commissioner and in a media commercially available from the Contractor. The Commissioner may direct the Contractor to provide the information to the State Comptroller or to any Authorized User of the Contract.

b. Payment of Contract purchases made by an Authorized User when the State Comptroller is responsible for issuing such payment. The Authorized User and Contractor agree that payments for invoices submitted by the Contractor shall only be rendered electronically unless payment by paper check is expressly authorized by the Commissioner, in the Commissioner's sole discretion, due to extenuating circumstances. Such electronic payments shall be made in accordance with ordinary State procedures and practices. The Contractor shall comply with the State Comptroller's procedures to authorize electronic payments. Authorization forms are available at the State Comptroller website at [www.osc.state.ny.us](http://www.osc.state.ny.us), by e-mail at [epunit@osc.state.ny.us](mailto:epunit@osc.state.ny.us), or by telephone at 518-486-1255. Contractor acknowledges that it will not receive payment on any invoices submitted under this Contract that are payable by the State Comptroller if it does not comply with the State Comptroller's electronic payment procedures, except where the Commissioner has expressly authorized payment by paper check as set forth above.

c. Payment of Contract purchases made by an Authorized User when the State Comptroller is not responsible for issuing such payment. The Authorized User and Contractor agree that payments for such Contract purchases shall be billed directly by Contractor on invoices/vouchers, together with complete and accurate supporting documentation as required by the Authorized User. Such payments shall be as mandated by the appropriate governing law from the receipt of a proper invoice. Such Authorized User and Contractor are strongly encouraged to establish electronic payments.

APPENDIX A:

Appendix A, Standard Clauses For New York State Contracts, dated November 2010, attached hereto, is hereby expressly made a part of this Bid Document as fully as if set forth at length herein. **Please retain this document for future reference and do not return to OGS as part of the Bid submission.**

APPENDIX B:

Appendix B, Office of General Services General Specifications, dated July 2006, attached hereto, is hereby expressly made a part of this Bid Document as fully as if set forth at length herein and shall govern any situations not covered by this Bid Document or Appendix A. **Please retain this document for future reference and do not return to OGS as part of the Bid submission.**

CONFLICT OF TERMS AND CONDITIONS:

Unless otherwise set forth in the procurement or contract documents, conflicts among documents shall be resolved in the following order of precedence:

- a. Appendix A (Standard Clauses For NYS Contracts)
- b. This Invitation For Bids
- c. Appendix B (General Specifications)
- d. Bidder's Bid

DISPUTE RESOLUTION POLICY:

It is the policy of the Office of General Services' Procurement Services Group (PSG) to provide vendors with an opportunity to administratively resolve disputes, complaints or inquiries related to PSG bid solicitations or contract awards. PSG encourages vendors to seek resolution of disputes through consultation with PSG staff. All such matters will be accorded impartial and timely consideration. Interested parties may also file formal written disputes. A copy of PSG's Dispute Resolution Procedures for Vendors may be obtained by contacting the person shown on the front of this Invitation for Bids or through the OGS website ([www.ogs.state.ny.us](http://www.ogs.state.ny.us)).

(continued)

GENERAL INFORMATION (Cont'd)

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT BUSINESS ENTITY**  
hereinafter the "Questionnaire")

OGS conducts a review of prospective contractors ("Bidders") to provide reasonable assurances that the Bidder is responsive and responsible. A Questionnaire is used for non-construction contracts and is designed to provide information to assess a Bidder's responsibility to conduct business in New York based upon financial and organizational capacity, legal authority, business integrity, and past performance history. By submitting a bid, Bidder agrees to fully and accurately complete the "Questionnaire." The Bidder acknowledges that the State's execution of the Contract will be contingent upon the State's determination that the Bidder is responsible, and that the State will be relying upon the Bidder's responses to the Questionnaire when making its responsibility determination.

OGS recommends each Bidder file the required Questionnaire online via the New York State VendRep System. To enroll in and use the VendRep System, please refer to the VendRep System Instructions and User Support for Vendors available at the Office of the State Comptroller's (OSC) website, [http://www.osc.state.ny.us/vendrep/vendor\\_index.htm](http://www.osc.state.ny.us/vendrep/vendor_index.htm) or to enroll, go directly to the VendRep System online at <https://portal.osc.state.ny.us>.

In order to assist the State in determining the responsibility of the Bidder, the Bidder should complete and certify (or recertify) the Questionnaire no more than six (6) months prior to the bid opening date. A Bidder's Questionnaire cannot be viewed by OGS until the Bidder has certified the Questionnaire. It is recommended that all Bidders become familiar with all of the requirements of the Questionnaire in advance of the bid opening to provide sufficient time to complete the Questionnaire.

OSC provides direct support for the VendRep System through user assistance, documents, online help, and a help desk. The OSC Help Desk contact information is located at <http://www.osc.state.ny.us/portal/contactbuss.htm>.

Bidders opting to complete the paper questionnaire can access this form and associated definitions via the OSC website at: [http://www.osc.state.ny.us/vendrep/forms\\_vendor.htm](http://www.osc.state.ny.us/vendrep/forms_vendor.htm).

The Bidder agrees that if it is found by the State that the Bidder's responses to the Questionnaire were intentionally false or intentionally incomplete, on such finding, OGS may terminate the Contract. In no case shall such termination of the Contract by the State be deemed a breach thereof, nor shall the State be liable for any damages for lost profits or otherwise, which may be sustained by the Contractor as a result of such termination.

**TAX LAW 5-A AMENDED APRIL 26, 2006 (APPENDIX 2)**

Section 5-a of the Tax Law, as amended, effective April 26, 2006, requires certain contractors awarded state contracts for commodities, services and technology valued at more than \$100,000 to certify to the Department of Taxation and Finance (DTF) that they are registered to collect New York State and local sales and compensating use taxes. The law applies to contracts where the total amount of such contractors' sales delivered into New York State are in excess of \$300,000 for the four quarterly periods immediately preceding the quarterly period in which the certification is made, and with respect to any affiliates and subcontractors whose sales delivered into New York State exceeded \$300,000 for the four quarterly periods immediately preceding the quarterly period in which the certification is made.

This law imposes upon certain contractors the obligation to certify whether or not the contractor, its affiliates, and its subcontractors are required to register to collect state sales and compensating use tax and contractors must certify to DTF that each affiliate and subcontractor exceeding such sales threshold is registered with DTF to collect New York State and local sales and compensating use taxes. The law prohibits the State Comptroller, or other approving agency, from approving a contract awarded to a contractor meeting the registration requirements but who is not so registered in accordance with the law.

Contractor certification forms and instructions for completing the forms are attached to this bid. Form No. ST-220-TD must be filed with and returned directly to DTF. Unless the information upon which the ST-220-TD is based changes, this form only needs to be filed once with DTF. If the information changes for the contractor, its affiliate(s), or its subcontractor(s), a new Form No. ST-220-TD must be filed with DTF.

Form ST-220-CA must be filed with the bid and submitted to the procuring covered agency certifying that the contractor filed the ST-220-TD with DTF. Proposed contractors should complete and return the certification forms within two business days of request (if the forms are not completed and returned with bid submission). Failure to make either of these filings may render a bidder non-responsive and non-responsible. Bidders shall take the necessary steps to provide properly certified forms within a timely manner to ensure compliance with the law.

Vendors may call DTF at **1-800-698-2909** for any and all questions relating to Section 5-a of the Tax Law and relating to a company's registration status with the DTF. For additional information and frequently asked questions please refer to the DTF web site: <http://www.nystax.gov>.

(continued)



GENERAL INFORMATION (Cont'd)

**MERCURY-ADDED CONSUMER PRODUCTS:**

Offerers are advised that effective January 1, 2005, Article 27, Title 21 of the Environmental Conservation Law bans the sale or distribution free of charge of fever thermometers containing mercury except by prescription written by a physician and bans the sale or distribution free of charge of elemental mercury other than for medical pre-encapsulated dental amalgam, research, or manufacturing purposes due to the hazardous waste concerns of mercury. The law further states that effective July 12, 2005, manufacturers are required to label mercury-added consumer products that are sold or offered for sale in New York State by a distributor or retailer. The label is intended to inform consumers of the presence of mercury in such products and of the proper disposal or recycling of mercury-added consumer products. Offerers are encouraged to contact the Department of Environmental Conservation, Bureau of Solid Waste, Reduction & Recycling at (518) 402-8705 or the Bureau of Hazardous Waste Regulation at 1-800-462-6553 for questions relating to the law. Offerers may also visit the Department's web site for additional information: <http://www.dec.ny.gov/chemical/8512.html>.

**CONTRACTOR REQUIREMENTS AND PROCEDURES FOR EQUAL EMPLOYMENT AND BUSINESS PARTICIPATION OPPORTUNITIES FOR MINORITY GROUP MEMBERS AND NEW YORK STATE CERTIFIED MINORITY/WOMEN-OWNED BUSINESSES**

In accordance with Article 15-A of the New York State Executive Law (Participation by Minority Group Members and Women with Respect to State Contracts) and in conformance with the Regulations promulgated by the Minority and Women's Business Development Division of the New York State Department of Economic Development set forth at 5 NYCRR Parts 140-144, the Offerer/Contractor agrees to be bound by the following to promote equality of economic opportunities for minority group members and women, and the facilitation of minority and women-owned business enterprise participation on all covered OGS contracts.

- a. **Equal Employment Opportunity Requirements**  
By submission of a bid or proposal in response to this solicitation, the Offerer agrees with all of the terms and conditions of Appendix A including Clause 12 - Equal Employment Opportunities for Minorities and Women. The contractor is required to ensure that the provisions of Appendix A clause 12 – Equal Employment Opportunities for minorities and women, are included in every subcontract in such a manner that the requirements of these provisions will be binding upon each subcontractor as to work in connection with the State contract.
- b. **Participation Opportunities for New York State Certified Minorities and Women-Owned Businesses**  
Authorized Users are encouraged to make every good faith effort to promote and assist the participation of New York State Certified Minority and Women-owned Business Enterprises (M/WBE) as subcontractors and suppliers on this contract for the provision of services and materials. To locate New York State Certified M/WBEs, the directory of Certified Businesses can be viewed at:  
[http://www.empire.state.ny.us/Small\\_and\\_Growing\\_Businesses/mwbe.asp](http://www.empire.state.ny.us/Small_and_Growing_Businesses/mwbe.asp)

**ELECTRONIC BID OPENING RESULTS :**

The Procurement Services Group (PSG) posts bid prices on the OGS/PSG web page. The web page makes available bid tabulations (i.e.: photocopies of price pages or spreadsheets) received by PSG for scheduled bid openings. Previously only available through Freedom of Information, such information is anticipated to be available online within two business days after the bid opening.

The Bid Opening Results Page is available at: <http://www.ogs.state.ny.us/purchase/bidresults/bidresults.asp>

**DEBRIEFING**

A bidder will be accorded fair and equal treatment with respect to its opportunity for debriefing. Prior to contract award, OGS shall, upon request, provide a debriefing which would be limited to review of that bidder's proposal or bid. After contract award, OGS shall, upon request, provide a debriefing to any unsuccessful bidder that responded to the solicitation, regarding the reason that the proposal or bid submitted by such bidder was not selected for a contract award. The post-award debriefing should be requested in writing within 30 days of posting of the contract award on the OGS website.

(continued)

GENERAL INFORMATION (Cont'd)

SCOPE:

This offering is to establish a comprehensive multiple manufacturer's product lines catalog contract for procurement of **Traffic Operation Control & Monitoring Systems, Equipment & Products** necessary for safe travel on the streets and highways throughout the State of New York. The contract(s) may be utilized by New York State agencies, towns, cities, and others authorized by law.

WEB Sites:

Web addresses may be included for your assistance within this document. Should you attempt to use these resources to access additional information, either through web link or by copying and pasting the information into your web browser, and are not routed to the proper location or if you receive an error message, please **notify the Primary Contact** listed on page 3, for assistance in obtaining the web information.

PRICE:

Price shall include all customs duties and charges and be net, F.O.B. destination any point in New York State as designated by the ordering agency including dock delivery and tailgating of load. Additional fees may be charged when delivery to point of use is not possible via dock or other designated receiving location when specialized service is requested in writing by the purchaser. Authorized user will not be charged for delivery to building location since price is FOB destination; authorized user must be informed of the additional cost prior to delivery and agree to the additional charge in writing. Such costs shall be prepaid by the vendor and added to the invoice.

NOTE: If it is determined the contractor is charging excessive amounts for specialized delivery services, the State may seek reimbursement for such amounts, may remove the contractor from the list of eligible bidders, and may cancel the contract.

In addition, upon mutual agreement, delivery locations may be expanded per the "Extension of Use" clause.

**All bidders shall submit 4 hard copies of an identifiable product line catalog of available products, options and accessories pertinent to this offering** with your bid. Bidders will also submit and identify the corresponding, **most recently published, dated, appropriate commercial (retail) price list(s) for the catalog and enter a discount percentage(s) at which you will supply these catalog items to our contract users.** "Zero" or "none" is not considered to be a discount rate. Per the lead paragraph of this PRICE clause, **all items are net, FOB Destination**, any point in New York State. **Price Lists will be supplied** both in **hard copy** (2 required) and **electronically** in either Excel 2003 (.xls) or Excel 2007 (.xlsx) format, either on **CD, DVD or Flash Drive**. Bidders should clearly label the media package with Bid #, Opening Date and Company name. *They should confirm, both after labeling and immediately prior to packaging, that the media has been properly formatted and burned with a readable file(s).* **Non-Readable electronic media will result in rejection of your submission.** Bidders may opt to include a backup media source, however, it must be clearly marked as backup. Should the submission include multiple undesignated media resources, the State reserves the right to designate which resource would be used.

**If the product line requires or offers user serviceable replacement parts, which may be necessary for field service or for beneficial enhancement of standard product usage, such standard service related parts may not necessarily be part of a marketing catalog, and as such may simply be included as a section of the standard commercial (retail) price list.**

**Different companies may use different terminology for the title of their price lists.** It may be referred by some as the Suggested List Price, Wholesale Price List, Dealers Price List, Retail Price List, Commercial Price List or Governmental Price List. We use the term **"Commercial Price List,"** defining it as **your master price list from which you would base a discounted quote from.** **This price list must be from your company's (or your manufacturer's or supplier's) identifiable standard price list that has been published and released in general distribution, is available to the public, and is the most recently published at the time of the bid opening.**

**Submission of price schedules developed specifically for this bid will result in disqualification from award consideration. PRICE LISTS referencing this bid, OGS, NYS DOT, or the State of NY in any way will be rejected. However, should your product line contain PRODUCTS specifically developed for use in New York State by a NYS Agency or Authority use of an item designation containing "New York" or "NYS" etc. will be allowed.**

**Whereas existing catalogs and price lists may in normal publication contain general business terms and conditions, bidder should note that through the submission of the catalog and Commercial Price List any pre-existing or pre-published terms and conditions contained there-in, are here by waived by the bidder. Also, any addition of terms and conditions added to or included with their bid by the bidder will be considered an exception to the bid and may be cause for rejection. Only the Terms and Conditions as stated within the attached Appendix A, and Appendix B, and as found in this IFB, will apply**

(continued)

GENERAL INFORMATION (Cont'd)

PRICE: (Cont'd)

The following sub-sections also apply:

**Discounts** - Prices shall be expressed as single discounts (no chain discounts) from the Commercial Price list for **either** the entire product line **or** broken down individually by model, format, style, function, design, etc. at the bidders discretion.

Bidders may offer volume discounts. Volume discounts, if offered, shall also be based on same price list. Volume discounts may be applied per purchase order, cumulatively per customer agency, and cumulatively statewide. The bidder shall indicate the basis for applying the volume discount(s) on the bid document form. Volume discounts shall be defined and applied as follows: Purchase order volume discounts shall be additional discounts applied to individual purchase orders over a specified dollar amount. Cumulative agency volume discounts shall be additional discounts applied to all future orders made by an individual agency once an established volume has been met by that agency. Cumulative statewide volume discounts shall be additional discounts applied to all future orders for all state and non-state orders once an established volume has been met under this contract.

Discount rates bid are generally to be in effect for the entire contract period. **Decreases of the discount rates bid will not be allowed at any time.** However, discount rates **may be increased** at the contractor's option on either an individual order or long term basis at any time. In the event of a long term increase in the discount rate, the Purchasing Officer should be notified as to the discount rate and duration. The discount rate would return to the rate bid at the end of any term increase.

**Multiple discounts may be offered.** However, if multiple discounts are offered, etc., the State may use the discount that is least advantageous to the bidder when evaluating.

If a situation exists where the contractor sells product to the public at large with pricing that is lower than the application of the bid/contract discount to the full list price, then the price that is charged to the public at large should be charged to contract participants. This should be clearly shown on the invoice as a "Special Value", or as "Lower Than Application of Discounts to Full List Price", or by some other phrase or identifying designation.

If bidder submits a dealer cost book/listing instead of a Commercial Price List, bidder shall clearly so state on bid and clearly identify whether there will be a discount or a percent up-charge applied. If awarded on the basis of a percent up-charge, such up-charge may not be increased during the period for the contract, but decreases may be allowed.

**Products** - Contractor shall offer products that are openly listed in their catalog and Commercial Price List. Product offerings should be consistent with the terms and technical scope of this IFB as found beginning on page 25. Bidders have the option of offering the services and support of qualified technicians or engineers to assist client agencies with installation, integration, deployment, and maintenance (beyond the normal warranty scope and period) of systems. See the clause entitled TECHNICAL SUPPORT OPTION as found beginning on page 30. Company's who offer such assistance are bound by the additional requirements as instructed in the clause.

**New products added**, as well as **discontinuations and replacement products added** to the contractors catalog **may** be accepted after review and approval by the **OGS Procurement Services Group and The Office of the State Comptroller** when they are introduced per the terms found beginning on page 12 under the **Contract Updates** sub-clause.

In the event new products are announced during the contract period, contractor agrees to furnish electronically or in triplicate hard copy any catalog amendment, showing list and net prices at which new products may be purchased. **Accepted new items placed on the market during the contract period are to be offered at the percentage discount rate that has been previously awarded.** Contractor shall notify the Purchasing Officer, in a timely fashion of any discontinuation of items covered by the catalog. The notification should include the date of loss of availability and the current inventory level for the product. If there is a catalog replacement for an item, the vendor shall again furnish electronically or in triplicate hard copy any catalog amendment, showing list and net prices at which the replacement products may be purchased. Included with their notification to the OGS Purchasing Officer, the vendor shall provide **complete information on new and replacement products** including, but not limited to: **a Specification List, Function and Feature list and Comparison of Performance.** New item notification should also include an **advisement of benefit** giving the vendors view of why acceptance of the product will be beneficial to the State.

It is the contractor's responsibility to inform the OGS Purchasing Officer of changes in a timely manner. Following the approval review, a Purchasing Memorandum notification from OGS to participating agencies will.

(continued)

GENERAL INFORMATION (Cont'd)

PRICE: (Cont'd)

**Products** (cont'd) : be published to announce any changes in the catalog, and said changes become effective on the date of memorandum publication. **Unless otherwise specified, any addition, discontinuation or substitution of product prior to receipt of a notice of approval by the Office of General Services is prohibited and may be cause for cancellation of contract.**

**Price List Updates** - Commercial Price lists submitted with the bid shall remain in effect until May 31, 2012. After that time a contractor may submit, electronically or in triplicate hard copy, new Commercial Price Lists when **normally** published by the manufacturer. Vendor shall complete and submit a Contract Update Form (as shown in Appendix #4 ) and identify and detail changes from the previous list via a cover correspondence, along with rationale explaining and justifying the changes. The effective date of new Commercial Price lists will be when they have been **reviewed and approved by OGS and a notification to participating agencies is published on the OGS website via a Purchasing Memorandum.** Review will include a comparison with market trends at the time of the submission verses those at the time of the bid opening and may include additional research data collected and published by both private sector and public sector agencies and services. This research **may include, but are not be limited to:** NYMEX/COMEX commodity futures, American Metals Market and Plastics News pricing indices for raw materials such as Aluminum, Copper, Steel, PVC, Polyethylene and other materials, metals, plastics or resins, as well as US Department of Labor, Bureau of Labor Statistics Producer Price Indices for commodities and industries including but not limited to: Transportation Equipment (Series ID:WPU14), Semiconductor Manufacturing (Series ID:PCU3344133344131); Optical Instrument and Lens Manufacturing (Series ID:PCU333314333314), Communications Equipment Manufacturing (Series ID:PCU3342), Other Communications Equipment Manufacturing - Vehicular and Pedestrian Traffic Control Equipment (Series ID:PCU3342903342902), Search, Detection, and Navigation Instruments (Series ID:PCU34511334511), Automatic Environmental Control Manufacturing (Series ID: PCU334512334512), Semiconductors & Related Device Manufacturing: Integrated microcircuits; Including: semiconductor networks, microprocessors, & MOS memories (Series ID: PCU3344133344131), Telephone Apparatus Manufacturing - Data-Comm Equipment & other telephone/telegraph apparatus (Series ID: PCU3342103342107), Electric Power & Specialty Transformer Manufacturing - Regulators, Boosters, Other Transformers & Parts (Series ID: PCU335311335311A) & Other Measuring & Controlling Device Manufacturing (Series ID:PCU3345193345197).

Should new submissions be found to be **not reasonable**, contractor will be notified and may submit a revision. Contractor should submit new Commercial Price Lists prior to publishing date if possible. **Unless otherwise specified, any change or update transacted by a contractor prior to receipt of a notice of approval by the Office of General Services is prohibited and may be cause for cancellation of contract.**

**Contract Updates - Addition and Deletion of Products:** Product changes to Contract are addressed in the following manner. In order to expedite processing of a change request that involves more than one specified category below, each request should be submitted separately to OGS.

**a) AUTO ADDS / DELETIONS** – “Auto Adds/Deletions” are Contract changes and updates made in accordance with the previously approved Contract pricing formula; e.g., a “discount from list” or pricing based on an approved GSA-based price Schedule. “Auto Adds/Deletions” include: i) adding new products within the established, previously approved pricing structure, ii) lowering pricing for Products previously incorporated under the Contract, and iii) deleting Products previously incorporated under the Contract. Contractor shall forward the updated Contract price list to OGS for prior approval before changes (additions or deletions) are made to the Contract. Contractor may not supply new product offerings until after receipt of OGS approval. While price decreases (ii) may take effect at any time, Contractor shall provide to OGS new updated price lists. For category (iii) Auto Deletions, Contractor must supply documentation supporting the unavailability of the product to the US market. Contractor should note, however, that all “Auto Adds” or Deletions approved by OGS are subject to a post audit by the Office of the State Comptroller.

**b) REGULAR ADDS** - “Regular Adds” are requests for i) price increases for Products incorporated under the Contract for other than previously approved pricing structure, and ii) addition of new products to the Contract which do not fall under the previously established price structure or discounts for Product types previously approved under the Contract. Regular Adds include but are not limited to newly added manufacturer’s product lines, re-bundled Products or Services, etc. Regular Adds must be submitted to OGS for prior approval,

(continued)

GENERAL INFORMATION (Cont'd)

PRICE: (Cont'd)

**Contract Updates - Addition and Deletion of Products** (Cont'd)

**b) REGULAR ADDS** (cont'd) and must be accompanied by a justification of reasonableness of price. Regular Adds are subject to pre-audit by the Comptroller. If approved, OGS staff will notify Contractor in writing. Contractor may not supply new product offerings until after receipt of OGS approval of the "Regular Add." When Contract pricing is based on GSA prices, the revised prices or prices of new Products must reflect current GSA prices adjusted as necessary for any additional discounts.

**c) SPECIAL ADDS** – Contract changes and updates that do not fall within either of the above categories will be processed as "Special Adds". Special Adds are changes that are not specifically covered by the terms of the Contract but inclusion is found to be in the best interest of the State. Contractor must provide a justification of reasonableness of the prices offered and a statement explaining why it is in the best interest of the State to approve the new Products. Special Adds are subject to pre-audit by the Office of the State Comptroller. If approved, OGS staff will notify Contractor in writing. Contractor may not supply new offerings until after receipt of OGS approval of the "Special Add."

**Catalog Exclusions** - The New York State Office of General Services Procurement Services Group reserves the right to delete before or after award any of the products included in the contractor's catalog. Catalog may list products covered by other State contracts as well as those available from preferred sources. It is the obligation of the agencies to order from the appropriate source. (See "Overlapping Contract Items" clause).

The Vendor also has the option to exclude from the contract any product lines contained in their catalog which may be unrelated to the commodity. This must be done in writing and be included with the bid, by noting the exclusions on page 41 of the bid

**Minimum Order** – There is no minimum dollar value or quantity requirements for this offering. All valid purchase orders for this product or for the subsequent purchase of replacement or service parts or user installed options and accessories, regardless of product quantity or dollar amount, are covered by the terms of this contract.

**Lower Pricing** - The State reserves the right to negotiate lower pricing, or to advertise for bids, whichever is in the State's best interest as determined by the Commissioner, in the event of a significant decrease in market price of any product listed. In addition, if the contractor's normal pricing to the public or to the trade in general is less than the net/contract pricing with the application of a contract discount, etc., then the normal pricing to the public or to the trade in general shall also be granted to contract participants.

**Insurance** –Price bid shall include ALL required insurance coverage costs. Each requirement should be reviewed carefully. (Please see the insurance related requirements as found on pages 23, 32 & 33 herein)

**PRODUCT DISCONTINUATION AND SUBSTITUTION:**

In the event a specified manufacturer's Product listed in the Contract becomes unavailable or cannot be supplied by the Contractor for any reason (except as provided for in the Savings/Force Majeure Clause) a product deemed in writing by the Office of General Services to be equal to or better than the specified Product must be substituted by the Contractor at no additional cost or expense to the Authorized User. It is the vendor's responsibility to inform the Office of General Services, Purchasing Officer, in a timely fashion under the conditions of the sub-clause for **Contract Updates - Addition and Deletion of Products: a) AUTO ADDS / DELETIONS** as found on page 12.

If a contractor determines that a product will be **discontinued without replacement**, notification must be given to the Purchasing Officer of Record no later than four (4) months prior to the planned date of discontinuance. However, such an action may result in the cancellation of the contract.

In **both** of the above cases, with the notification of change, the contractor must supply documentation detailing the reasons behind the need to discontinue the item(s) of note. If applicable, information pertinent to evaluating the appropriateness of any specified replacement item, as well as existing inventory status reports supporting any claims against product availability on the outgoing item(s) must be supplied.

(continued)

GENERAL INFORMATION (Cont'd)

**PRODUCT DISCONTINUATION AND SUBSTITUTION: (Cont'd)**

The notification should include the date of loss of availability and the current inventory level for the product. The contractor shall provide to OGS PSG, complete information on the replacement product including, but not limited to: a Specification List, Function and Feature list and Comparison of Performance between the new and old product.

Unless otherwise specified, any substitution of Product prior to the Commissioner's written approval may be cause for cancellation of contract. In the event that a contractor is unable to provide a replacement, it is the State's right to cancel the contract and to proceed with an award to the next lowest bidder in line

**GOVERNMENT MANDATED PROGRAM ADJUSTMENT:**

An adjustment in product and/or price may be permitted if a government mandated program, such as a new Federal Highway Administration Specification Standards, or MUTCD regulations take effect and suitable documentation is furnished to the State. The State will determine if the requested change is verifiable and is reasonable. Replacement product would be subject to NYS Department of Transportation testing and approval by the Department of Transportation, The Office of General Services and the Office of the State Comptroller. A price adjustment may be permitted for only a limited time since such an adjustment would eventually be reflected in a Producer Price Index or Industrial Standard Indices.

**DELIVERY:**

**General** - Delivery shall be expressed by the average (or usual) number of calendar days required to ship and complete the product delivery after receipt of a purchase order (ARO). Product will be required as soon as possible and delivery may be considered by an agency issuing a purchase order. (Note that the 30 day delivery provision of Appendix B, Section 45 - PRODUCT DELIVERY is modified by this part of "DELIVERY".)

**Purchase Order Instructions** - Delivery shall be made in accordance with instructions on purchase order from each agency. If there is a discrepancy between the purchase order and what is listed on the contract, it is the contractor's obligation to seek clarification from the ordering agency and, if applicable, from the Office of General Services, Procurement Services Group. (SEE ALSO: SEPARATE CLAUSE ON "PURCHASE ORDERS AND INVOICES").

**Shipping Dates And Delivery Time -**

- Contractor shall provide written acknowledgement of orders within five (5) business days after receipt of order which will include an anticipated shipping date of each order
- If shipment will not be made within the delivery time, the contractor is required to notify the agency in writing at least two weeks prior to the latest date of the original delivery obligation. This notification must include the reasons for the delay and the latest date the product will be shipped. Should the delay not be acceptable to the using agency, appropriate contract default proceedings will be initiated. Failure to supply timely written notification of delay may be cause for default proceedings.
- All correspondence on shipping dates and delivery time shall be directed to the ordering agency's contact person.

**Delivery Condition** - Contractor shall be responsible to make no shipment of the product that will be exposed to conditions during transit, detrimental to the product. Product must be delivered strictly in accordance with specifications and shall be "Ready for Use."

**Delivery Certification** - Contractor shall secure a signed receipt from agency certifying to delivery of product. In the event deficiencies are later noted and a properly signed receipt is not available, contractor will be responsible.

**ESTIMATED QUANTITIES:**

The historical State dollar value of all contracts issued under previous awards was approximately **\$2,750,000.00** annually. However, each contract shall be for the quantities or dollar values actually ordered during the contract period. The individual value of each contract is indeterminate and will depend upon the number of contracts issued and the competitiveness of the pricing offered. Agencies will be encouraged to purchase from contractors who offer the supplies, services, and pricing that best meet their needs in the most practical and economical manner. See "Estimated/Specific Quantity Contracts" and "Participation in Centralized Contracts" in Appendix B, OGS General Specifications.

(continued)

GENERAL INFORMATION (Cont'd)

METHOD OF AWARD:

**General** – Multiple Award may be made by ITEM to the lowest responsive and responsible bidder. An ITEM shall be described as a manufacturer's complete and autonomous product line, manufactured by or for a company doing business under a unique FEIN and serviced by a single contact person. A product line shall be described as products similar in nature and/or for the purpose of Traffic Monitoring, Traffic Safety and Control, and Traffic System Communications. Consolidated companies operating under the same FEIN shall be considered as one item, fulfilling the product line requirement. Award may be made on more than one product line.

**Evaluation of Bids - Criteria:**

- A. **Evaluation of Catalog and Commercial Price List**
- B. **Compliance with Bid Requirements and Vendor Responsibility**
- C. **Reasonableness of Price**
- D. **Determination of Multiple Award on Product Lines Exhibiting Similarity or Competition of Products in more than one bid submission.**

A. **Evaluation of Catalog and Commercial Price List-**

- 1. The product line fills a need within the State and contains products meeting the requirements noted in the "Detailed Product Specifications."
- 2. The Catalog and Retail Price List submitted meets the requirements of the IFB per the price clause.
- 3. There is no overwhelming conflict with a preferred source offering.
- 4. The discount offered will be equal to or better than any others offered to other government agencies. (This will be confirmed by comparison with other contracts held by the bidder.)
- 5. In the event that **identical product line** catalogs & commercial price lists are submitted by multiple bidders the award will be made to the vendor offering the **best cumulative total unit price** to the State **after discount**.
- 6. If specific samples are requested, the products sampled must pass all inspections and tests performed by the NYS Department of Transportation and the Office of General Services Procurement Services Group.

B. **Evaluation for Compliance with Bid Requirements and Vendor Responsibility** - Award Eligible Bids will be reviewed for compliance to the terms and conditions of the bid, regarding proper submission of noted bid requirements, as well as the review for vendor responsibility. Successful completion of this evaluation is required for award.

C. **Reasonableness of Price** - **ALL pricing received** under this Solicitation will need to be justified as reasonable. OGS Procurement Services Group should be able to individually evaluate every product found within a submitted price list. Bidders must be able to provide appropriate documentation to accomplish a proper review proving reasonableness and lowest pricing on their complete catalog. If a listed product is **not reviewable**, it may be excluded from the award as per the Catalog Exclusion sub clause of the PRICE clause as found on page 13 of this document.

To expedite review and award of contracts under this award, bidders **must** supply either **with its bid or within 3 business days of request** verifiable information and copies for **any & all Federal** contracts, any other **State** contracts or any **local government contracts** (population of 100,000 or more) which are either currently held for public sector procurements or have been recently completed **for all products offered**, along with the discounts offered under those contracts. Should such contracts not exist, the bidder **must** supply documentation through the submission of recent invoice copies of sales of like items and core catalog products from both private and public sector transactions. In the event that a manufacturer's marketing structure involves using a network of independent dealers in designated "restricted territories" for sales and distribution, contract and / or sales information from either the manufacturer or from such related sellers should be obtained and supplied.

**Each example must be accompanied by an attached memo detailing the comparative values between the previous contract or transaction and the value bid. It shall include any necessary analysis of price required to evaluate reasonableness as compared to FOB differences between the bid pricing and other offerings. Comparative price information with market competitive products should also be disclosed.**

The bidder is to submit any other documentation that the bidder may deem relevant to be considered. Please see "INFORMATION TO BE FURNISHED WITH BID" on page 24 for additional information. The State reserves the right to request any additional information deemed necessary for the proper evaluation of bids.

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GENERAL INFORMATION (Cont'd)

METHOD OF AWARD: (continued)

**D. Determination of Multiple Award on Product Lines Exhibiting Similarity or Competition of Products in more than one bid submission** - In instances where two or more bids are received containing product line or lines which are determined by the Office of General Services, Procurement Services Group to be of similar form, function or utility to a product line or lines found in a different bid or bids, such multiple bids may be subject to additional evaluation.

The determination of any likenesses, points of comparison and product classifications is solely at the discretion of the Office of General Services, Procurement Services Group, and will be based upon product research to be conducted as required herein, including comparative use of any and all supplied catalog specifications and information, along with possible comparison to the various State standard specifications as found herein, and any other outside sources of product information determined to be relevant to the review by the Office. Bidders should note that additional information may also be required for submission at any time by this office. Such information should be assembled and submitted within 72 hours of the request by the Designated Contact. Failure to respond in a timely manner may result in the product line in question to be excluded from award consideration or the bid in question to be rejected in its entirety.

Should multiple bid Items qualify under the above noted evaluation criteria categories A through C, award will be recommended for at least three bids received.

Should more than three similar lines be received and be determined to be qualified bids under the above noted criteria, Item pricing for principal like products as determined by the Office of General Services, Procurement Services Group will be compared and award recommendation will be made for any bidder whose cumulative net delivered price for compared products is less than or equal to the lowest cumulative total delivered price that was presented for consideration increased by 7.5%.

**Successful completion of the qualification process, under the terms posted above, will result in a recommendation of award to all eligible vendors to the Office of the State Comptroller.**

(continued)



GENERAL INFORMATION (Cont'd)

**EXTENSION OF USE:**

Any contract resulting from this bid solicitation may be extended to additional States or governmental jurisdictions upon mutual written agreement between New York State (the lead contracting State) and the contractor. Political subdivisions and other authorized entities within each participating State or governmental jurisdiction may also participate in any resultant contract if such State normally allows participation by such entities. New York State reserves the right to negotiate additional discounts based on any increased volume generated by such extensions.

**NON-STATE AGENCIES PARTICIPATION IN CENTRALIZED CONTRACTS:**

New York State political subdivisions and others authorized by New York State law may participate in contracts. These include, but are not limited to local governments, public authorities, public school and fire districts, public and nonprofit libraries, and certain other nonpublic/nonprofit organizations. See "Participation in Centralized Contracts" in Appendix B, OGS General Specifications. For purchase orders issued by the Port Authority of New York and New Jersey (or any other authorized entity that may have delivery locations adjacent to New York State), the terms of the "Price" clause shall be modified to include delivery to locations adjacent to New York State.

Upon request, all eligible non-State agencies must furnish contractors with the proper tax exemption certificates and documentation certifying eligibility to use State contracts. A list of categories of eligible entities is available on the OGS web site (<http://www.ogs.state.ny.us/purchase/snt/othersuse.asp>). Questions regarding an organization's eligibility to purchase from New York State Contracts may also be directed to OGS Procurement Services Group's Customer Services at 518-474-6717.

**CONTRACT MIGRATION:**

State Agencies or any other authorized user holding individual contracts with contractors under this centralized contract shall be able to migrate to this contract award with the same contractor, effective on the contract begin date (retroactively, if applicable). Migration by an agency or any other authorized user to the centralized contract shall not operate to diminish, alter or extinguish any right that the agency or other authorized user otherwise had under the terms and conditions of their original contract.

**CANCELLATION FOR CONVENIENCE:**

The State of New York retains the right to cancel this contract, in whole or in part without reason provided that the Contractor is given at least sixty (60) days notice of its intent to cancel. This provision should not be understood as waiving the State's right to terminate the contract for cause or stop work immediately for unsatisfactory work, but is supplementary to that provision. Any such cancellation shall have no effect on existing Agency agreements, which are subject to the same 60 day discretionary cancellation or cancellation for cause by the respective user Agencies.

**PRODUCT OFFERINGS MADE BY BIDDER (Alternate Bids):**

Bidder shall make no more than one offering (i.e., a single model and stock number) per item per bid. Bids which have more than one product offering per item may not be considered.

If a bidder wishes to make more than one product offering, such offering(s) are to be made on separate sheets and are to be listed as "alternate" bids. "Alternate" bids are to show complete information (pricing, brand, model, stock number, etc.), and will be evaluated as separate bids.

**CONTRACT PERIOD AND RENEWALS:**

It is the intention of the State to enter into a contract for the term as stated on the first page of this Invitation for Bids except that the commencement and termination dates appearing on the Invitation for Bids may be adjusted forward unilaterally by the State for any resulting contract for up to two calendar months, by indicating such change on the Contract Award Notification.

The contract dates may be adjusted forward beyond two months only with the approval of the successful bidder. If, however, the bidder is not willing to accept an adjustment of the contract dates beyond the two month period, the State reserves the right to proceed with an award to another bidder.

If mutually agreed between the Procurement Services Group and the contractor, the contract may be renewed under the same terms and conditions for additional period(s) not to exceed a total contract term of five (5) years.

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GENERAL INFORMATION (Cont'd)

**SHORT TERM EXTENSION:**

In the event the replacement contract has not been issued, any contract let and awarded hereunder by the State, may be extended unilaterally by the State for an additional period of up to one month upon notice to the contractor with the same terms and conditions as the original contract including, but not limited to, quantities (prorated for such one month extension), prices, and delivery requirements. With the concurrence of the contractor, the extension may be for a period of up to three months in lieu of one month. However, this extension terminates should the replacement contract be issued in the interim.

**PERIODIC RECRUITMENT:**

Beginning 12 months following the date of issuance of award the State reserves the right to consider additional vendors at any time determined by the State to be in its best interest. Vendors shall be required to submit an original bid document which may include an addendum containing additional applicable statutory requirements currently in effect at the time of the new bid solicitation.

Bids shall be evaluated under similar terms and conditions. Upon successful completion of the qualification process under the terms of the method of award, supplemental award(s) shall be recommended.

**RESERVATION:**

The State reserves the right to negotiate lower pricing, or to advertise for bids, any unanticipated excessive purchase. An "unanticipated excessive purchase" is defined as an unexpected order for a contract product(s) totaling more than \$150,000.00.

**EMERGENCY PURCHASING:**

In the event that a disaster emergency is declared by Executive Order under Section 28 of Article 2-B of the Executive Law, or that the Commissioner determines pursuant to his/her authority under Section 163(10)(b) of the State Finance Law that an emergency exists requiring the prompt and immediate delivery of products or services, the Commissioner reserves the right to obtain such products or services from any source, including but not limited to this contract, as the Commissioner in his/her sole discretion determines will meet the needs of such emergency. Contractor shall not be entitled to any claim or lost profits for products or services procured from other sources pursuant to this paragraph.

**SAMPLES TO BE SUBMITTED BY BIDDER/CONTRACTOR:**

The bidder/contractor may be required to submit samples. See "Samples" in Appendix B, OGS General Specifications.

**SAMPLING AND TESTING:**

The New York State Office of General Services, Procurement Services Group or the New York State Department of Transportation may monitor the contractor's deliveries to State Agencies by random selection of field samples for testing by an independent laboratory.

**WARRANTIES:**

See "Warranties" in Appendix B, OGS General Specifications.

At time of bid opening, product offered must meet all requirements of this solicitation including full commercial/retail availability. Product literature and specifications must also be available.

**RECALLS:**

The contractor must immediately notify the Office of General Services, Procurement Services Group of any recalls pertaining to product on contract.

(continued)

GENERAL INFORMATION (Cont'd)

QUALIFICATION OF BIDDER:

Bids will be accepted only from established manufacturers or their authorized dealers. Any dealer submitting a bid hereby guarantees that it is an authorized dealer of the manufacturer, that the manufacturer has agreed to supply the dealer with all quantities of products required by the dealer in fulfillment of its obligations under any resultant contract with the State, and that it will provide a certificate from the manufacturer acknowledging this level of support. (See Manufacturer's Certification on page 67 in this document.)

Bidder must maintain a business establishment with adequate inventories of the products offered, and must be capable of processing and shipping large numbers of orders to various destinations. Bidder must maintain service facilities and have trained personnel qualified to service the product furnished at the using agency within 48 hours.

The Commissioner may require a certificate from the bidder showing the number of years the bidder has been active in selling the products offered and the size and location of the inventories regularly maintained.

The Commissioner reserves the right to investigate or make any inquiry into the capabilities of any bidder to properly perform under any resultant contract. See "Performance and Responsibility Qualifications," "Disqualification for Past Performance and Findings of Non-Responsibility" and "Employees/Subcontractors/Agents" in Appendix B, OGS General Specifications.

REFERENCES:

Upon request, all bidders, excluding current contractors, must provide a minimum of five references including references from two of the bidder's largest customers. References shall be commercial or governmental accounts, and should demonstrate the ability of the vendor to perform jobs similar in scope to the size, nature and complexity of the outlined bid. The references shall include the:

- Name, address, contact person, telephone number, fax number, and number of years bidder has serviced the referenced account;
- Volume of business performed within the past three years for each referenced account.

FINANCIAL STABILITY:

If requested, bidder must document its ability to service a contract with dollar sales volume similar to scope of this bid through submission of financial statements documenting past sales history. The bidder must be financially stable and able to substantiate the financial statements of its company. In addition to sales history, current financial statements may be requested and must be provided within five business days. The state reserves the right to request additional documentation from the bidder and to request reports on financial stability from independent financial rating services. The state reserves the right to reject any bidder who does not demonstrate financial stability sufficient for the scope of this bid.

NEW YORK STATE PROCUREMENT CARD:

See "Procurement Card" in Appendix B, OGS General Specifications. All bidders shall indicate if they will accept the NYS Purchasing Card for orders not to exceed \$15,000 (see Questions at end of bid document).

PURCHASE ORDERS AND INVOICING:

**General** – All orders and invoices/vouchers should include the contract number and a line by line listing of separate charges.

**Invoices** - Contract users are instructed not to process invoices without needed information. Invoices must be detailed and include **all** of the following:

- Contract Number
- Purchase Order Number
- Item Number
  - Should not be something that is "unique" to dealer or distributor.
  - Should be something that can be tracked by a third party.
  - Preferably a manufacturer's code or identifying number.
- Line item breakdown of all charges:
- Line item breakdown of any deletion:
- 

Failure to comply may result in lengthy payment delays.

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GENERAL INFORMATION (Cont'd)

PERFORMANCE REQUIREMENTS:

**Price Lists & Catalogs** - Contractor shall be required to furnish, without charge, catalog and price lists to all authorized users which request them. Catalogs and price lists provided must reflect all products excluded from the resultant contract either through the omission of those portions or by obvious indications within the catalogs and price lists. Fulfillment of any request must be made within 14 calendar days of the request.

Catalogs and price lists may be furnished in either hard-copy or electronic format. If available in both formats, they shall be furnished in the format preferred by the requesting authorized user. Upon request the contractor shall assist authorized users in the use of catalogs and price lists. Price lists provided to contract users under this contract should contain Net Prices reflecting the proper discounts for appropriate product lines.

**Instruction of Personnel** - Within five business days of delivery of product, and at the discretion of the end user with each purchase, the contractor shall provide instruction by qualified personnel to designated personnel sufficient to ensure that the product is operated and maintained so as to perform to the full extent of its design capabilities. **Training Fees should be indicated as a separate line item in your price list.** Training is to be supplied at a place to be designated by the buyer on an order – by - order basis. Contractors **failing to list** training as a price list line item shall be required to provide appropriate training upon request **at no additional cost or charge** to the end user.

**Instruction Manuals** - Simultaneous with delivery, the contractor(s) shall furnish to the authorized user a complete instruction manual for the product and for each system or component supplied. The manual shall include complete instructions for diagrams, schematic and wiring diagrams, preventive and corrective maintenance procedures, and complete parts lists, manufacturer's catalog numbers, and ordering information, if applicable.

**Discrepancies** - The contractor shall resolve all order and invoice discrepancies (e.g., shortages, breakages, etc.) within five business days from notification.

**Product Returns, Problem Product** - Products returned because of quality problems, duplicated shipments, outdated product, etc., shall be picked up by the contractor at the contractor's expense, within five business days after notification with no restocking charge and shall be replaced with specified products or the agency shall be credited/refunded for the full purchase price.

**Product Returns, Agency Error** - Standard stock products ordered in error by agencies must be returned for credit within 15 days of receipt at the agencies' expense. Product must be in resalable condition (original container, unused). There shall be no restocking fee if returned products are resalable.

**Emergency Service Number & Contact Information** - The contractor will provide a toll free product emergency service, available seven days a week, twenty-four hours a day. Given the nature of the products, an emergency contact including name, number, cell number, fax, and email must be provided.

**Internet Websites** -The State would prefer and recommends that successful bidders have a designated NYS contract website for end users direct access. This website will be listed under the Contractor information. The website will be the responsibility of the contractor to maintain and keep updated. Changes in product line or pricing must be approved by the Procurement Services Group in accordance with any terms included in this bid prior to addition to the website. Hard copy catalog and price lists, either in paper format or electronic format, must be available to all end users who either do not have web access or prefer the optional format.

If the Contractor stores, collects or maintains personal identification data electronically as a condition of accessing State Contract information, such data shall only be used internally by Contractor for the purpose of implementing the State Contract, and shall not be disseminated to third parties or used for other marketing purposes.

**E-Mail & Telephone Contacts** - Contractors will provide active e-mail addresses and telephone numbers for all personnel assigned by the contractor to directly service the contract. Unless specifically designated as an emergency or after-hours contact the information should be adequate for the state to contact the party during normal working hours between 9am and 4:30 pm EST, Monday through Friday. A list should be submitted containing Name, Contract Responsibility, E-mail Address, Phone Number and Extension, and the emergency contact for their area of responsibility. The Information should also be posted and accessible on line in the above noted website. If bidder does not currently maintain an e-mail communication system, the bidder must be willing to establish one prior to award.

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GENERAL INFORMATION (Cont'd)

PERFORMANCE REQUIREMENTS: (Cont'd)

**Toll Free Telephone Number** - Contractors must provide a toll-free telephone number for the state's procurement usage. If bidder does not currently maintain a toll-free number, the bidder must be willing to establish one prior to award of contract.

**Technical Information & Troubleshooting** – Contractors must have available the services of a qualified, knowledgeable, technical information staff, able to assist contract users who may experience difficulty in the use of a purchased product. This resource should be readily accessible between the hours of 8:00A.M and 6:00PM Eastern Time through either the above noted Toll Free Phone Service or via another Toll Free Line. Information may also be relayed through a real-time interactive online data base such as to provide a 24 hour per day resource. Live phone service will be provided at no additional charge during an item’s warranty period. Charges for post-warranty live phone service must be included within the contractors commercial price list or will continue at no charge for the life of the product. On line and electronic information assistance shall be provided at no charge throughout a products useful life cycle.

**Service Response** – Contract users have the sole right to designate any system or item purchased under contracts resulting from this bid as “Mission Critical” to their operation. Any work, whether on site or in plant, required to resolve a problem and restore to proper working order and operation **any** “Mission Critical” equipment or system, should commence within 48 hours of notification to the contractor by the contract user. Work schedules for non-Mission Critical items should be determined between the parties at the time of need. Parties shall also determine through mutual discussion and agreement whether factory or field service needs to be performed

**Report of Contract Purchases** - Contractor shall furnish a report containing both state agency and authorized non-state agency (Statewide) contract purchases by the fifteenth of the month following the end of each six month period. Subcontractor sales are not permitted under this contract.

The report is to be submitted **electronically** in Microsoft Excel 2007 or lower format to the Office of General Services, Procurement Services Group, to the attention of the individual shown on the front page of the Contract Award Notification and shall reference the Group Number, the Award Number, Contract Number, sales period, and contractor's (or other authorized agent) name.

The reports shall be in the following format:

Sold to:	<u>Location</u>	Item #	<u>Item Description</u>	<u>Total Quantity Shipped</u>	<u>Unit Price</u>	<u>Total Sales \$</u>
						\$
				<u>Grand Total Sales</u>		\$

The outlined sales report is the minimum information required. Additional related sales information, such as supplementary monthly reports, , and/or detailed user purchases and /or shipping information may be required and must be supplied upon request.

PREFERRED SOURCE NOTE:

All bidders should note that certain legally established preferred source suppliers, such as Correctional Industries (Corcraft), Industries for the Blind of NYS, and NYS Industries for the Disabled have expressed an interest in supplying products/services covered by this solicitation. Therefore, one or more of these suppliers may be designated as a "Preferred Source" and as a result, we may issue no award for the products/services affected.

(continued)

GENERAL INFORMATION (Cont'd)

**PREFERRED SOURCE PRODUCTS:**

Section 162 of the State Finance Law requires that agencies afford first priority to the products/services of preferred source suppliers such as Correctional Industries (Corcraft), Industries for the Blind of NYS, and NYS Industries for the Disabled, when such products/services meet the form, function and utility of the agency. Some products/services in the resultant contract(s) may be available from one or more preferred sources. In the Contract Award Notification, agencies will be reminded to comply with the statutory requirements and resulting guidelines with respect to affording first priority to the preferred sources.

Resultant contractors will be required to prominently display the following language on all price lists and contract updates to agencies relative to the award:

**Agencies Note:** Some products/services in this contract may be available from one or more preferred sources. Agencies are reminded to comply with the statutory requirements under Section 162 of the State Finance Law and the guidelines issued by the State Procurement Council to afford first priority to products/services available from preferred sources which meet your form, function and utility.

**OVERLAPPING CONTRACT ITEMS:**

Products/services available in the resulting contract may also be available from other New York State contracts. Contract users will be advised to select the most cost effective procurement alternative that meets their program requirements and to maintain a procurement record documenting the basis for this selection.

**"OGS OR LESS" GUIDELINES APPLY TO THIS CONTRACT:**

Purchases of the products included in the Invitation For Bids and related Contract Award Notification are subject to the "OGS or Less" provisions of Section 163.3.a.v., Article XI, of the New York State Finance Law. This means that State agencies can purchase products from sources other than the contractor provided that such products are substantially similar in form, function or utility to the products herein and are:

1. lower in price -and/or-
2. available under terms which are more economically efficient to the State agency (e.g. delivery terms, warranty terms, etc.).

Agencies are reminded that they must provide the State contractor an opportunity to match the non-contract savings at least two business days prior to purchase.

In addition, purchases made under "OGS or Less" flexibility must meet all requirements of law including, but not limited to, advertising in the New York State Contract Reporter, prior approval of the Comptroller's Office and competitive bidding of requirements exceeding the discretionary bid limit. State agencies should refer to Procurement Council Guidelines section "OGS or Less Purchases" for complete procedural and reporting requirements.

<http://www.ogs.state.ny.us/procurecounc/pdfdoc/guidelines.pdf>

**USE OF RECYCLED OR REMANUFACTURED MATERIALS:**

New York State, as a member of the Council of Great Lakes Governors, supports and encourages vendors to use recycled, remanufactured or recovered materials in the manufacture of products and packaging to the maximum extent practicable without jeopardizing the performance or intended end use of the product or packaging unless such use is precluded due to health or safety requirements or product specifications contained herein. Refurbished or remanufactured components or products are required to be restored to original performance and regulatory standards and functions and are required to meet all other requirements of this bid solicitation. Warranties on refurbished or remanufactured components or products must be identical to the manufacturer's new equipment warranty or industry's normal warranty when remanufacturer does not offer new equipment. See "Remanufactured, Recycled, Recyclable or Recovered Materials" in Appendix B, OGS General Specifications.

**SPECIFICATION NOTE:**

“Or equal” and “Or equivalent” as stated within this specification means that any vendor equivalency has to be approved by the State after the Manufacturer provides the State with “specific details” of how and why it substantially meets/exceeds the requirements. Such products should be substantially similar in form, function or utility to the products listed herein.

(continued)

GENERAL INFORMATION (Cont'd)

**WORKERS' COMPENSATION INSURANCE AND DISABILITY BENEFITS REQUIREMENTS:**

Workers' Compensation Law (WCL) §57 & §220 requires the heads of all municipal and state entities to ensure that businesses applying for permits, licenses or contracts document it has appropriate workers' compensation and disability benefits insurance coverage. These requirements apply to both original contracts and renewals, whether the governmental agency is having the work done or is simply issuing the permit, license or contract. Failure to provide proof of such coverage or a legal exemption will result in a rejection of your bid or renewal.

**1. Proof of Compliance with Workers' Compensation Coverage Requirements:**

**An ACORD form is NOT acceptable proof of workers' compensation coverage.**

In order to provide proof of compliance with the requirements of the Workers' Compensation Law pertaining to workers' compensation coverage, a contractor shall:

- A) Be legally exempt from obtaining Workers' Compensation insurance coverage; or
- B) Obtain such coverage from an insurance carrier; or
- C) Be a Workers' Compensation Board-approved self-insured employer or participate in an authorized self-insurance plan.

A Contractor seeking to enter into a contract with the State of New York shall provide one of the following forms to the Office of General Services at the time of bid submission or shortly after the opening of bids:

- A) Form CE-200, Certificate of Attestation for New York Entities With No Employees and Certain Out of State Entities, That New York State Workers' Compensation and/or Disability Benefits Insurance Coverage is Not Required, which is available on the Workers' Compensation Board's website ([www.wcb.state.ny.us](http://www.wcb.state.ny.us)); (Reference applicable IFB/RFP and Group #s on the form.)
- B) Certificate of Workers' Compensation Insurance:
  - 1) Form C-105.2 (9/07) if coverage is provided by the contractor's insurance carrier, contractor must request its carrier to send this form to the New York State Office of General Services, or
  - 2) Form U-26.3 if coverage is provided by the State Insurance Fund, contractor must request that the State Insurance Fund send this form to the New York State Office of General Services.
- C) Form SI-12, Certificate of Workers' Compensation Self-Insurance available from the New York State Workers' Compensation Board's Self-Insurance Office.
- D) Form GSI-105.2, Certificate of Participation in Workers' Compensation Group Self-Insurance available from the contractor's Group Self-Insurance Administrator.

**2. Proof of Compliance with Disability Benefits Coverage Requirements:**

In order to provide proof of compliance with the requirements of the Workers' Compensation Law pertaining to disability benefits, a contractor shall:

- A) Be legally exempt from obtaining disability benefits coverage; or
- B) Obtain such coverage from an insurance carrier; or
- C) Be a Board-approved self-insured employer.

A Contractor seeking to enter into a contract with the State of New York shall provide one of the following forms to the Office of General Services at the time of bid submission or shortly after the opening of bids:

- A) Form CE-200, Certificate of Attestation for New York Entities With No Employees and Certain Out of State Entities, That New York State Workers' Compensation and/or Disability Benefits Insurance Coverage is Not Required, which is available on the Workers' Compensation Board's website ([www.wcb.state.ny.us](http://www.wcb.state.ny.us)); (Reference applicable IFB/RFP and Group #s on the form.)
- B) Form DB-120.1, Certificate of Disability Benefits Insurance. Contractor must request its business insurance carrier to send this form to the New York State Office of General Services; or
- C) Form DB-155, Certificate of Disability Benefits Self-Insurance. The Contractor must call the Board's Self-Insurance Office at 518-402-0247 to obtain this form.

**ALL OF THE ABOVE REFERENCED FORMS, EXCEPT CE-200, SI-12 & DB-155 MUST NAME:** The Office of General Services, Procurement Services Group, **Team 6**, 38th floor, Corning Tower, Albany NY 12242 as the Entity Requesting Proof of Coverage (Entity being listed as the Certificate Holder)

(continued)

GENERAL INFORMATION (Cont'd)

EPA ENERGY STAR PROGRAM:

The Federal EPA, in cooperation with manufacturers, continues a program to foster the manufacture of energy efficient equipment. New York State fully supports this effort and requires all products offered to comply with EPA Energy Star guidelines for energy efficiency. The State may discontinue use of and/or delete from contract selected products as mandated by any NYS energy legislation that is enacted during the term of this contract. The contractor shall have no recourse with the State for such discontinuance/deletion.

INFORMATION TO BE FURNISHED WITH BID:

The bidder shall submit either **with its bid or within 3 business days of request** four (4) detailed copies each of the specifications, instruction manuals, training materials, circulars and all necessary data on the major item products to be furnished. If the product offered differs from the provisions listed, such differences must be explained in detail. Failure to submit any of the above data may result in rejection of the bid. These materials may be submitted in either paper hard copy or electronic format as a PDF Format File on either CD, DVD, or USB 2.0 Flash Drive. or if responding upon request, transmitted as PDF format files directly to the primary contact.

Bidders **must** supply either **with its bid or within 3 business days of request**, information and three (3) copies of any federal contracts, any other State contracts (for States similar in size to NYS), and any local government contracts (population of 100,000 or more) that are currently held (or recently completed) for the products offered, along with the discounts offered under those contracts. Should such contracts not exist bidder **must** supply documentation through **invoice copies of sales of like items**. Also, the bidder is to submit any other documentation that the bidder may deem relevant to be considered. These materials may be submitted in either paper hard copy or in electronic format on either a CD, a DVD, or a USB 2.0 Flash Drive, or if responding upon request, transmitted as PDF format files directly to the primary contact.

The bidder shall indicate in the spaces provided **in this** bid document the manufacturer's name, the address where the proposed product or products will be produced, the catalog references or model number of the product or products offered and **all other information requested**.

It is recommended that bidders carefully review the full contents of this bid to ascertain all submission requirements. **Special attention should be taken in reviewing pages 10 through 13, 15 and 16, 19 through 21, 23, 24, 30 through 33, and 39 through 68.** The State, however, reserves the right to request any additional information deemed necessary for the proper evaluation of bids. Bidders are advised to **utilize & submit the checklist found on page 334** of this IFB when preparing and packaging your offer.

DIESEL EMISSION REDUCTION ACT OF 2006 (NEW REQUIREMENT OF LAW):

On February 12, 2007 the Diesel Emissions Reduction Act took effect as law (the "Law"). Pursuant to new §19-0323 of the N.Y. Environmental Conservation Law ("NYECL") it is now a requirement that heavy duty diesel vehicles in excess of 8,500 pounds use the best available retrofit technology ("BART") and ultra low sulfur diesel fuel ("ULSD"). The requirement of the Law applies to all vehicles owned, operated by or on behalf of, or leased by State agencies and State or regional public authorities. They need to be operated exclusively on ULSD by February 12, 2007. It also requires that such vehicles owned, operated by or on behalf of, or leased by State agencies and State or regional public authorities with more than half of its governing body appointed by the Governor utilize BART.

As a contract vendor the Law may be applicable to vehicles used by contract vendors "on behalf of" State agencies and public authorities. Thirty three percent (33%) of affected vehicles must have BART by December 31, 2008, sixty six percent (66%) by December 31, 2009 and one hundred percent (100%) by December 31, 2010. The Law provides a list of exempted vehicles. Regulations currently being drafted will provide further guidance as to the effects of the Law on contract vendors using heavy duty diesel vehicles on behalf of the State. The Law also permits waivers of ULSD and BART under limited circumstances at the discretion of the Commissioner of Environmental Conservation. The Law will also require reporting from State agencies and from contract vendors in affected contracts.

Therefore, the bidder hereby certifies and warrants that all heavy duty vehicles, as defined in NYECL §19-0323, to be used under this contract, will comply with the specifications and provisions of NYECL §19-0323, and any regulations promulgated pursuant thereto, which requires the use of BART and ULSD, unless specifically waived by NYSDEC. Qualification and application for a waiver under this Law will be the responsibility of the bidder.

(continued)



PRODUCT INFORMATION

SCOPE:

It is the intent of these specifications to cover the minimum comprehensive requirements for equipment, products and systems used for general traffic operations including but not limited to traffic signals and control equipment; traffic and roadway monitoring equipment, RWIS, and IT systems; traffic communications equipment, and roadway lighting. The purpose of this equipment is to provide the public with safe, efficient streets, roads and highways through the use of modern efficient traffic signals, controls, lighting and information systems. It will enable our State and local transportation professionals to effectively gather and evaluate data and information on road and traffic conditions and situations on the streets, roads, highways, expressways, as well as on entry ramps and exits of bridges and tunnels. This capability will thereby allowing traffic engineers, law enforcement officials and safety personnel to react to real time events, and to plan future adjustments and refinements to the transportation infrastructure. The equipment shall assist the client agencies and municipalities in addressing their traffic control needs, to mitigate congestion, as well as to respond to local, state and federal mandates for traffic management, reduce costs and assure continued dependability of traffic management.

PRODUCT REQUIREMENTS:

This equipment offered shall be able to operate when independently deployed, as well as when necessary, intermingled and/or integrated with existing systems currently in operation on streets, highways and roadways throughout New York State. All equipment offered must be certified by the manufacturer as being compliant with the requirements set forth by all applicable Federal, State, and local laws, directives and authorities.

The vendors product catalog offering shall contain items **directly related to the primary traffic control and monitoring product interests for this procurement as listed herein** on the following page and should contain all necessary accessories and options available for optimal use of a product. As previously noted, if the product line requires or offers user serviceable replacement parts which may be necessary for field service, such standard service parts may not necessarily be included as part of a marketing catalog, and may simply be included as a section of the standard commercial (retail) price list.

Equipment may be offered as both complete systems and as individual component items. Systems should be expandable, and weather-resistant. Systems or components which require remote or external manual input or control for operation should be wired and/or wireless communication capable with non invasive components. All equipment delivered for installation will conform to the manufacturer's testing standards at the time of purchase under this contract, and incorporate the most recent product design specification from the manufacturer as of the date of bid submission. The Products must be commercially released products and available for customer purchase through the contractor's normal marketing channels. Experimental or unannounced equipment shall not be offered. Where accessories, adjuncts or peripheral equipment are to be supplied, the Authorized User has the responsibility of providing the Contractor with sufficient specifications regarding installed, existing equipment or software to ensure that the Contractor can determine that the additions are compatible with the User's existing equipment.

Catalog offerings should contain at least one of the noted product lines found on the PRIMARY PRODUCTS chart as found on page 29, as well as other items listed in the Specification Appendices 6, 7, 9, 10 and 11 as found herein. The catalog and price list may contain products covered by other State contracts as well as those available from preferred sources. The list is meant as a guide and although expansive, it is not meant to be considered as complete, it is representative of the product catalogs we are seeking. Vendor's catalogs may likely contain **additional, related**, products. It will be at the option of either the State or the bidder as to whether or not to include or accept them as a part of the contract.

Equipment may be the same as or equal to described equipment, manufactured and/or configured by companies **such as** Actelis, Airlink, Aldis, Allmand Brothers Inc., All-Traffic Solutions, Alpha Technologies, American Signal Company, Ameri-Trak, ASTI, Atlantic Solar, Axis Communications AB, Blue-Tree, Bosch, Boschung, (The) Burke Company, Campbell Scientific, Carmanah, Cirronet, CMS, Cohu Inc., Crown Construction Equipment, Cushcraft, Daktronics, Di Highway Sign & Structure Corp., Diablo Controls, Dialight, Digi International, Digital Wireless Corp., Durant Paints Inc., Dynatron-Bondo Corp., Econolite Control Products, Eberle Design Inc., Encom, Enviro-Tech, Extreme CCTV, Extreme Copper Inc., Flagpoles, Inc., GDI Communications LLC, GE Lumination, General Devices Inc., Genrac, Glen Martin Engineering, GTT, Halliday, Hapco Company, High Sierra Electronics, Honeywell, Horizon Signal Technologies, Hukseflux USA, IFS, Imago NA, Innovative Dynamics, Intelight, Jet Industries, LLC., K & K Systems, Inc., Kipp & Zonen, Laird Technologies, Leotek, Lufft, 3M, Maxrad, McCain Inc., Morning Star, MS Sedco, M-Systems, Myers Power Products, OMJC Signal, P&K Pole Products, National Signal Inc., Naztec Inc. Nova Tech, NRG Systems, OMJC Signal, Opticom, P&K Pole Products, Panasonic, Peek Traffic, Pelco, Philips, Polara Engineering, Positron, Power Distribution & Control, Precision Solar Controls, Quixote, R. M. Young Co., Reliance Control, Reno A&E, Safetran Traffic Systems, Inc., Sensata Technologies, Sensys Network, Siemens E&A / Eagle Traffic Control Systems, Sierzega, Signal Group, Signal Sense, Inc., Simrex, Smart Tek, Solar Technology Inc., Solarex, Stony Brook Manufacturing Company,

(continued)

PRODUCT INFORMATION (Cont'd)

PRODUCT REQUIREMENTS: (cont'd)

Tassimco Technologies, Teleste, Thomtech, Tirtl, Tomar, Trafcon Industries, Inc. Traffic Sensor Corporation, Traffic Systems LLC, Traffic Systems, Inc., Traffic Technologies 2000, Trans-com, Tri-chord, Union Metal Corporation, Universal Coating Products, Vaisala, Valmont Industries Inc., Ver-Mac, Vision Systems, Wanco, Xtralis, and/or Zydax.

The preceding list is intended to be representative of various manufacturers in the Traffic Control, Traffic Monitoring and ITS industry. It is **not** all inclusive. Any and all companies and/or their authorized representatives and dealers who meet the product needs and the requirements found in this Information for Bids are welcome to present a bid under this offering.

The bidders may also offer the services and support of qualified technicians or engineers to assist the client agencies with installation, integration, and deployment, of systems and products. See the clause entitled TECHNICAL SUPPORT OPTION as found beginning on page 30.

PRODUCT QUALIFICATION:

As noted in the "EXTENSION OF USE" and "NON-STATE AGENCIES PARTICIPATION IN CENTRALIZED CONTRACTS" clauses as found on page 17 of this document, awards resulting from this procurement may be used by a wide variety of state agencies and departments, public authorities, local governments, fire and school districts, and colleges and universities.

In addition to the general terms set forth by this invitation for bids, the **NYS Department of Transportation** may designate and require specific products be prequalified and listed on a department Qualified or Approved Products List. The existence of such a designation or listing **restricts the Department's purchase of such a product to the items contained therein.**

Additionally, prior to the purchase of any **Traffic Control, Monitoring, Measurement, Communications, or Safety item** by the NYS Department of Transportation, NYSDOT reserves the right to request submission of product samples for testing, approval and possible subsequent listing on the one of the NYS Department of Transportation's Approved Lists. This requirement may be waived for products that have previously been appointed to and are currently on any of the department's approved product lists; however NYSDOT or the State may at anytime request a product be retested. Testing of these items is post award and generally requires contractors to prepare and submit two (2) copies of drawings, specifications, test reports, a letter stating that they have conformed to the standards specified therein, and any applicable Federal acceptance letters as directed by the department. The purchasing officer of record is to be copied along with the department requestor on product test requests, submissions and documentation. The actual submission contents will be determined by the NYSDOT requestor. The review process will vary by item and may require a minimum of 30 calendar days. Physical inspection of the product will also be at the request of the State and submission requirements will also be determined by the requestor or the testing facility.

Failure of a product to qualify may result in the issuance of a Purchasing Memorandum to advise buyers of the test results.

The State also reserves the right to test any product and/or material supplied by a contractor at any time for compliance to specifications, and assess to the contractor total test cost for non-compliance.

**Whereas the NYS Office of General Services and the NYS Department of Transportation highly recommend that other contract users take advantage of the benefits of the NYSDOT qualified lists, other contract users have the option to determine and purchase the items of their choice based on their own requirements of utility, form and function, whether prelisted or not.**

*It is the contractor's responsibility to make sure that all items delivered meet the submitted specifications at all times.*

A current listing of NYSDOT qualified items may be found in **Appendix 5**.

(continued)

PRODUCT INFORMATION (Cont'd)

NYS DEPARTMENT OF TRANSPORTATION SUPPLEMENTAL SPECIFICATIONS:

**General:** As a complement to the above clause explaining and designating the requirements of the NYS Department of Transportation's (NYSDOT) Qualified or Approved Product Lists, in many instances the listed products are required to conform to a custom set of specifications developed by the department which may not precisely conform to industry standard specifications for like product. Therefore the specific items listed therein by NYSDOT must **meet or exceed** the NYSDOT supplemental specifications. These supplemental product specifications are found herein: Appendix 6: NYS OGS/Department of Transportation ITS/NTCIP Specifications for Solar-Powered, Trailer-Mounted and Other Portable Dynamic Message Signs (PDMS), Extinguishable Message Signs (EMS) & Directional Arrow Panels; Appendix 7: NYS OGS/DOT ITS Specification for Speed Display Trailers; Appendix 9: OGS/NYSDOT General Traffic Signal Specifications; Appendix 10: NYSDOT General Specifications; and Appendix 11: The NYS Department of Transportation's Traffic Signal Laboratory's Transportation Management Equipment Specification (TMES).

**Evolving Specification Requirements:** The products listed in these supplemental specifications have significant impact on the overall safety and welfare of the general public. Therefore, it is necessary to have the most technologically up-to-date systems and equipment available for installation on the streets, roads and highways of the State. As such, in order to achieve such "State of the Art" status, the Department of Transportation maintains the TMES as an ever evolving specification which accounts for scientific and technical advancements in transportation management as they occur. These specifications are affected and driven by a number of sources, any of which may petition the Department of Transportation to make a change. These sources may include, but are not limited to, research and development from the transport management manufacturing community; The NYS Department of Transportation's own engineering expertise or the Department's Traffic Signal Laboratory; research and development from outside government agencies such as the United States Department of Transportation or branches thereof, including the Federal Highway Administration among others, or from other state agencies such as the California Transportation Department (CALTRANS); or from State or Federal legislative mandates.

Should there be the need for a significant change or changes in a specification for items covered under a subsequent award from this IFB or for the addition of a new product specification to supplement and enhance the performance of the items covered by any contract award subsequent to this bid, the Department of Transportation shall be responsible for submitting a specification change request to the Office of General Services, Procurement Services Group for approval by the Commissioner, and upon request in post audit by the Office of the State Comptroller. The Specification Change Request shall include proper identification of the item or items, the origin (source) or party requesting the change, an overview of the need for the change, an impact statement describing the consequential effects of both accepting or rejecting the change request, copies of both the new and existing specification and a synopsis outlining the changes made to the specification.

All such products being updated or upgraded by a change in specification must be clearly identified by the use of a revisionary suffix to be added to the item's original title and order number. The suffix should be in the form of a sequential alpha-numeric character, separated from the original by either a colon (:) or a dash (-). If using numbers, the first change will be indicated with "1" and if using a letter code, the first change will be indicated by "A". [For example, the first update to the Model 2070E Traffic Controller could be identified as 2070E-1, 2070E:1, 2070E-A, or 2070E:a.] All subsequent changes to the product must follow the same identification format as selected for use on the first revision. [Using the above example, had the identification format selected for the first update been "2070E:a" subsequent changes must be identified by 2070E:b, 2070E:c, etc.} Both the original and updated item identifications must be included in the above required request for change, and the updated identification must be used in place of the items original title at all times once the change has been approved.

The Department of Transportation shall also obtain and include a signed Statement of Concurrence and Acceptance of the proposed change from current contract holders and other known manufacturers of products based upon the affected specification. Upon review and approval by the Commissioner and the Office of the State Comptroller, a Purchasing Memorandum will be published to announce the specification change.

As a result of a specification evolution, contractors supplying affected products will be required to update their products accordingly as your original offering may no longer meet the specification requirements. Specification evolution may also trigger the necessity to introduce new items to this award. Necessary product changes to Contract will then be addressed according to the terms set forth for **Contract Updates - Addition and Deletion of Products** as found on pages 12 and 13 of this Invitation for Bids.

**In all cases, unless otherwise specified, any substitution of Product prior to the Commissioner's written approval may be cause for cancellation of contract.**

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PRODUCT INFORMATION (Cont'd)

NYS DEPARTMENT OF TRANSPORTATION SUPPLEMENTAL SPECIFICATIONS: (Cont'd)

**Quality Control and Assurance:** These supplemental specifications may also include testing and quality control procedures. Strict compliance with the NYSDOT QC/QA shall be required with all resultant contractors for. These requirements include, but are not limited to, strict penalties for non-compliance, such as back-charging for using agency costs to remove defective units, installation of replacement units, repackaging and shipping defective units to contractor, etc.

**Software Compatibility:** Vendors offering system 2070 series Traffic controllers and components should note that all controllers intended for use by NYSDOT **must be able to operate** "out of the box" with **NYSDOT/Naztec StreetWise Advanced Traffic Management Systems software** which is maintained and installed by the Traffic Signal Laboratory prior to field deployment. 2070 Controllers intended for use by NYSDOT should be offered without other traffic management system software installed, and should contain only the basic operating system required for booting and system diagnostics.

TELECOMMUNICATIONS:

Vendors offering communications equipment in their catalog, per the PRIMARY PRODUCTS chart on page 29, should note that awards under this category will be for hardware and accessories only. Awards will not be made for telecommunication services. Vendors should refer to the New York Statewide contract award for Contract Group #77017, Award #20268 for **Comprehensive Telecommunications Services. Contracts under this category are let through periodic recruitment** offerings. You may receive automatic notifications of recruitment opportunities through registration in the NYS Office of General Services, Procurement Services Group's Vendor Notification Service by registering using any of the following classification codes: 43, 45, 81 and 83.

SOFTWARE:

With the exception noted above regarding **NYSDOT 2070 series Signal Controllers**, ALL items offered for sale which require a software component to be used for the item to function at its maximum specified intent or capacity **must include the software**. Software is to be licensed to the contract user. Ancillary products, error corrections, upgrades, enhancements or new releases, and any deliverables normally due under any maintenance or service contract (e.g. patches, fixes, PTFs, programs, code or data conversion, or custom programming etc.) are to be supplied to the contract user at no additional charge throughout the items usable life cycle.

Refer to Appendix B for additional information regarding licensing.

Individual contracts for non-product integrated software products are not available through this bid. Vendors wishing to offer software products on an individual basis should contact the designated contact as listed on the cover of this bid for further instructions.

PRODUCT SELECTION:

Catalog based contract awards may present contract users with more than one purchasing option for a given need. As such, comparisons between like items will be necessary for the end user to make the additional purchasing determinations as to what item best fulfills their requirements of form, function and utility. Within this comparison and evaluation it is recommended that added consideration be given whenever feasible to open protocol, non-proprietary components and/or systems which allow easy integration with products from a variety of different manufacturers. The use of the mini-bid procedure, as found beginning on page 34, is also recommended as a tool to be used to achieve your final decision.

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PRODUCT INFORMATION (Cont'd)

**PRIMARY PRODUCTS:**

The primary traffic control and monitoring product interests for this procurement are as follows:

8" Aluminum Traffic Signal Heads	Red Conflict Monitor Interface	12"x 12" - LED Module
12" Aluminum Traffic Signal Heads	Red Conflict Monitor Ribbon Cable	Single Pedestrian Hand Only
8" Polycarbonate Traffic Signal Heads	Model 215 Bypass Cable	12" x 12" LED Module "Man/Hand" Bi-
12" Polycarbonate Traffic Signal Heads	Traffic Control Cabinet Air Filters	Modal Pedestrian
Traffic Signal Control Cabinets – including	Power Distribution Assemblies	Aluminum Pedestrian Signal Section
Cabinet Model 330SR	Traffic Signal Controllers including	Head – for use with 16" GE Lumination
Traffic Signal Cabinet Bases	the NYS/Caltrans model 2070E	M/H LED's
Traffic Signal Flasher Cabinets	Traffic Counters	16" x 18" LED Module (Size A)
Auxiliary Input Cabinets	Traffic Signal Controller Accessories,	"Man/Hand" Bi-Modal Pedestrian
Cabinet Mounting Brackets & Equipment	including all 2070 series components	(McCain, ICC & IDC housings)
Traffic Signal Control Cabinet Accessories	12" Polycarbonate Pedestrian Signal	Solid State Pedestrian Push Buttons
Traffic Control Solid State Flashers	Sections	ADA Accessible (Audible) Pedestrian
Signal Conflict Monitors:	Blue Tree Cellular Modems	Signal Stations – 9x15" - 2&4 wire
including the Model 210 NYR	8" & 12" LED Traffic Signal	formatted with MUTCD compliant M/H
Traffic Control Solid State Switch Packs	Modules – Red, Yellow & Green	& CDT Sign and LED display
Traffic Control Programming Diode Cards	12" LED Turn Signal Modules –	ADA compliant, watertight buttons
2-Channel Loop Amplifiers	Red, Yellow & Green Arrows	2 & 4 Wire Pedestrian Control Units
2-Channel D. C. Isolators	12" (300mm) Yellow & Green Bi-	Wireless Hand Held Navigator
2- Channel A. C. Isolators	Modal Arrow LED Modules	Electronic Steerable Beam Signal Head
Traffic Control Cabinet 330 to 330SR	12" X 12" LED Module: Single	Traffic Signal Software for Signal
upgrade and conversion kits	Pedestrian Walking Person Only	Systems Monitoring
Traffic Control Cabinet Power Supply Card	LED Strobe Kits	Traffic Signal Software for Signal
Signal Timing Optimization Software	Adaptive Signal Control Software	Systems Monitoring
Traffic Signal Mounting Equipment	AC & Solar Powered LED School	Acoustic Multi-Lane Traffic Monitors
Aluminum Traffic Signal Poles	Zone Flasher Beacons	Weatherproof Camera Equipment &
Steel Traffic Signal Poles	Solar Powered Flashing LED	Systems
Span Wire Poles	Blank-Out Signs	Conventional & Modular Digital Video
Pedestrian Signal Poles	VDSL Ethernet Over Copper	Production Equipment
Signal Pole Anchor Bases	Modems	Intelligent Video Analysis Equipment
Breakaway Bases for Pedestrian Poles	Wireless Vehicle Detection Systems	Modems
Top and Side Mounting Pole Brackets	Ethernet Communications Equipment	Deployable Power Supply Components
Span Wire Mount Hardware & Accessories	Spread Spectrum Radio Equipment	& Systems, Rechargeable, Photovoltaic
Microwave Vehicle Detectors	Yagi & Omni-Directional Antennas	Solar, Wind Generated and conventional
Ultrasonic Vehicle Presence Detectors	LMR Communication Cables	120/220 VAC power supply systems and
Detector Card 12 Volt AC Power Supply;	Multi-Strike Lightning Arrestors	centers for temporary and permanent use
Traffic Control Cabinet Rack Mountable	RWIS Systems and Components	Emergency Vehicle Preemption Systems
Traffic Signal Wire and Cable	ITS Systems and Components	Passive Multi-Lane Acoustic Traffic
Signal Control Cable; 600 volt, rated with	Road Surface Condition Sensors	Count Sensors
copper conductor	Infrared Imaging Equipment	Solar Powered LED Pedestrian Cross
Messenger Cable	Weather Detection	Walk Beacon
Lead in Cable – Shielded & Unshielded	& Measurement Sensors	Vision-Based Traffic Monitoring &
Inductance Loop Wire	Relay Interface Components	Control Systems
Span Wire Cable - Copper-weld Steel Wire	Communications & Data Collection	LED Street and Outdoor Lighting
Single Conductor, Stranded THHN Wire	Equipment	CCTV Equipment and Mounts
Bare Copper Ground, Stranded Wire	Traffic Equipment Cabinets	Traffic Calming Devices
Portable Solar Powered Traffic Signals	Cabinet Termination Options	Replacement Lamps and Lenses for non
Pedestrian Signal Countdown Timers	Digi WR44 Modems	LED Traffic Signal Heads
Speed Display Signs – Solar, AC, or DC	LED Arrow Boards - Solar, AC, or	Variable Dynamic Message Signs -
powered, either Permanently installed, or	DC powered, either Permanently	Solar, AC, or DC powered, either
Portable: Deployable on or with a trailer or	installed, or Portable: Deployable on	Permanently installed, or Portable:
be truck mountable	or with a trailer or be truck mountable	Deployable on or with a trailer or be
		truck mountable. (VDMS/EMS)

(continued)

PRODUCT INFORMATION (Cont'd)

TECHNICAL SUPPORT OPTION:

**General** - Authorized Users may require additional technical support from Contractor on a limited basis. As noted on page 26, vendors **may** offer such added technical support by qualified technicians or engineers to assist the contract user with installation, integration, and deployment of major equipment and systems.

In a **supplemental document**, bidders opting to include Added Technical Support in their bid must provide a justification of need for the support along with a detailed description of what the additional support needs for their product line are. This description must also include detailed information on how the bidder will provide the support to the contract users. In addition, the Bidder must provide a complete description of all maintenance and support locations from which personnel will be dispatched.

The Commercial Price List submitted shall contain full details of all pricing for the support being proposed, including breakdown of any varied levels of expertise in the work force. Any non On-Site charges shall also be included in the Commercial Price List. Bidders should note that any per diem expense prices listed in excess of the current rates established by the United States General Services Administration will be rejected as unreasonable. Bidders opting to offer additional Technical Support shall be required to provide full justification of price as noted in the **Reasonableness of Price** sub-clause as found in the METHOD OF AWARD on page 15 herein.

Added Technical Support cost may not exceed twenty (20%) percent of the total order price for equipment and technical support. "Total order price" shall be defined as the aggregate purchase order amount for equipment and added technical support placed by the Authorized User under this Contract in a twelve month period.

Added Technical support needs which exceed twenty (20%) may be procured competitively using a mini-bid process or another procurement process selected by the Authorized User. See the clause regarding "Mini-Bid Contracts" as found beginning on page 34.

Consultations for the purpose of project planning or projected or anticipated sales are not billable under the contract as Technical Support.

For discrepancies between the Bid Specifications and the Bid involving the nature, quality, or scope of supports to be furnished, it shall be assumed that the Contractor has based the bid on the more expensive manner. The final decision will rest with the Commissioner.

**ON-SITE Work:** Technical Support performed on-site by Contractor's employees, subcontractors or agents shall be rendered in accordance with these additional requirements:

1. **Notice Prior to Site Visit:** Contractor's representatives are to check with the Authorized User's designated representative seven (7) days prior to reporting to the site for permission to accomplish all work.
2. **Employee, or Agent Sign-In:** Contractor's representatives will sign in and out with the Authorized User's representative. Failure to sign in or out, whether intentional or not, shall be understood to mean that support was not performed.
3. **Job Meetings:** Prior to the start of any work, the Contractor shall be available for an initial job meeting with the Authorized User's representative. This meeting shall include:
  - a. The Contractor's submission of a schedule of work to be reviewed and approved by the Authorized User.
  - b. A review of all facility use rules.
  - c. An introduction for each respective agency organization, chain of command, etc.

Additional job meetings may be required for the following purposes:

- a. Review job progress, quality of work, and approval and delivery of materials.
- b. Identify and resolve problems that impede planned progress.
- c. Coordinate the efforts of all concerned so that the contract progresses on schedule to on time completion.
- d. Maintain a sound working relationship between the Contractor and the Authorized User, and a mutual understanding of the contract.

(continued)

PRODUCT INFORMATION (Cont'd)

TECHNICAL SUPPORT OPTION: (Cont'd)

**ON-SITE Work:** (Cont'd)

4. **Written Reports** A written report is to be submitted to the Authorized User within ten (10) working days after any on-site inspection and service. This report will include a precise description of support provided, number of technicians involved, and number of contract hours spent. This report must be signed by the Authorized User's designated representative and submitted with the invoice for payment. Payment will not be approved without this documentation.

In addition to the semi-annual sale reports required by the Office of General Services as detailed on page 21, the Contractor shall also provide a copy of all submitted technical service reports for the time period of the sales report to the Purchasing Officer of Record. This report shall detail all work completed within that period.

Failure to submit the required reports may be cause for disqualification of a Bidder for future contracts.

It is the Contractor's responsibility to maintain the equipment and materials provided for the work consistent with applicable safety and health codes. In the event any repair is found necessary, the authorized user representative is to be appraised, in writing, of the need for the repair.

No illegal drug use of any type, nor alcoholic beverages by the Contractor or its personnel shall be permitted in the performance of the contract. The State shall not be liable for any expense incurred by the Contractor as a consequence of any traffic infraction or parking violations attributable to employees of the Contractor.

The Office of General Services' interpretation of specifications shall be final and binding upon the Contractor.

**Past Performance:** Prospective Bidders opting to offer additional technical support shall submit with its bid satisfactory evidence that it has had at least three years experience in the support being bid and has adequate financial resources, and organization as herein specified to perform the type, magnitude, and quality of work required. The Bidder is advised that the State's intent in having requirements listed is to ensure that only qualified and reliable Contractors perform the work of the contract. OGS recognizes that there may be equally qualified and reliable Bidders who do not meet all of the above requirements specifically as stated, but may in fact meet the objectives and criteria intended in some other manner. However, the Bidders shall have the burden of demonstrating to the Office of General Services' satisfaction that it can in fact perform the work. This shall be in the form of written notarized statements as to the Bidder's experience, references, listing of contracts performed, financial statements, human resources, or ability to respond such that OGS can evaluate the Bidder's ability. All statements made must be able to be independently verifiable by OGS.

OGS retains the right to request any additional information pertaining to the Bidder's ability, qualifications, and procedures used to accomplish all work under this contract as it deems necessary to ensure safe and satisfactory work. The State may waive any of the above requirements if the State deems that the bidder is capable.

**Note:** Any Prospective Bidder failing to submit in whole or in part the above statements attesting to its qualifications may result in a rejection of the bid of that Bidder.

**Prevailing Wage Rate:** All Labor bid is subject to the prevailing wage rate provisions of New York State Labor Law. See "Prevailing Wage Rates - Public Works and Building Services Contracts" in Appendix B, OGS General Specifications. Any federal or State determination of a violation of any public works law or regulation, or labor law or regulation, or any OSHA violation deemed "serious or willful" may be grounds for a determination of vendor non-responsibility and rejection of the bid.

Any provisions of NYS Labor Law that are in conflict with mandatory Federal-Aid construction contract compliance requirements are superseded. Any provisions of NYS Labor Law that are not in conflict with mandatory Federal-Aid construction contract compliance requirements or the Davis-Bacon Act but are more restrictive shall apply.

The applicable Prevailing Wage Rate Schedule for this bid and subsequently awarded contracts is

**PRC #2010009608.**

The Department of Labor (DOL) Prevailing Wage Schedule for this bid, may be found on line at <http://wpp.labor.state.ny.us/wpp/doFindProject.do?method=dolt&prcNumber=2010009608>. This location may be copied and pasted into your browser. Next, click on "Original Wage Schedule" beneath the header. This schedule is in excess of 2,100 pages in length and may require several minutes to open. A pdf file of the Original Wage Schedule is also available on request from the Purchasing Officer of record for this bid as listed on the cover of this Invitation for Bids.

(continued)

PRODUCT INFORMATION (Cont'd)

TECHNICAL SUPPORT OPTION: (Cont'd)

**Prevailing Wage Rate:** (Cont'd)

Prevailing Wage Updates may also be found on the NYS Department of Labor web at [http://wpp.labor.state.ny.us/wpp/publicViewPWChanges.do?method=showIt\\_](http://wpp.labor.state.ny.us/wpp/publicViewPWChanges.do?method=showIt_) This location may be copied and pasted into your web browser. Links to schedule updates appear in the table at the bottom of the web page.

**Contractor Insurance:** In addition to the requirements detailed in the clause "WORKERS' COMPENSATION INSURANCE AND DISABILITY BENEFITS REQUIREMENTS" as found on page 23, vendors offering optional Technical Support must meet the following insurance requirements of the State:

At the time of the bid submission or shortly after the opening of bids, the Bidder shall provide to The New York State Office of General Services ("OGS") written proof of insurance **coverage** and additional insured documentation as specified herein. "Written proof" consists of certificates of insurance and/or endorsements to policies issued by an officer of an insurance company licensed or authorized to do business in New York, government self-retention funds or other self-insurance companies evidencing that the Bidder has the requisite insurance coverages. All non-standard exclusions or limitations applicable to the contract must be disclosed on the Certificate of Insurance and must be approved by The New York State Office of General Services ("OGS"). Policies providing commercial general liability, excess or umbrella liability and pollution legal liability insurance shall be specifically endorsed to name the People of the State of New York, its officers, agents, and employees as additional insureds there under. Such written proof shall be in the form and substance acceptable to The New York State Office of General Services ("OGS"). Acceptance and/or approval by The New York State Office of General Services ("OGS") of the written proof of insurance does not and shall not be construed to relieve a contractor of any obligations, responsibilities or liabilities under the Contract to obtain the required coverage. The Bidder (or their agents) shall continue to supply, to the purchasing officer of record, all appropriate documentation as noted above for any and all updates to any policy relating to this bid throughout the bid evaluation period **and** the term of an awarded contract.

**Contractor shall secure and continue to keep in force during the term of the contract**, and Contractor shall require all Subcontractors prior to commencement of an agreement between Contractor and the Subcontractor, to secure and keep in force during the term of this contract, the following insurance coverage in parenthesis:

- a) **Commercial General Liability Insurance** with minimum liability limits of not less than \$2,000,000.00 each occurrence (and minimum liability limits of not less than \$5,000,000 after notice of award). Such liability shall be written on the ISO occurrence form CG 00 01© (current edition) or a substitute form, providing equivalent coverages and shall cover liability arising from premises or operations, independent Contractors, broad form property damage, personal & advertising injury, cross liability coverage, contractual damages, and products or completed operations, if applicable (including the tort liability of another assumed in a contract), and explosion, collapse & underground coverage. If such insurance contains an aggregate limit, it shall apply separately on a per job basis. General Liability Additional Insured Endorsement shall be on Insurance Service Office's (ISO) form number **CG 2010 1185**.
- b) **Comprehensive Business Automobile Liability Insurance** with minimum liability limits of not less than \$2,000,000.00 each accident both at the time of bid and after notice of award. Such insurance shall cover liability arising out of any automobile including Owned (if any), Hired and Non-Owned automobiles.
- c) **Workers' Compensation, Employer's Liability, and Disability Benefits** meeting all New York State statutory requirements. The policy shall provide coverage for all states of operation that apply to the performance of the contract. (Refer to page 23 herein for more information). In addition, if employees will be working on, near or over navigable waters, coverage provided under the US Longshore and Harbor Workers Compensation Act must be included. Also, if the contract is for temporary staffing services or involves renting equipment with operators, the Alternate Employer Endorsement WC 00 03 01A must be included on the policy naming the People of the State of New York as the alternate employer.
- d) **OCP Insurance**\* - Owners and Contractors Protective Insurance Coverage (OCP) is required for any project being performed with in an active work zone or being performed on or near an active highway right of way.

**The OCP insurance required shall be \$1,000,000 per occurrence and \$2,000,000 in the aggregate.\***

Contractor shall provide written proof of such coverage to the Authorized User prior to commencement of work.

(continued)



PRODUCT INFORMATION (Cont'd)

TECHNICAL SUPPORT OPTION: (Cont'd)

**Contractor Insurance:** (Cont'd)

**All insurance coverage must meet the following additional requirements:**

- 1) All insurance required shall be obtained at the sole cost and expense of the Contractor, and shall be primary and non-contributing to any insurance, self-retention or self-insurance maintained by the Authorized User.
- 2) Any deductible or self-insured retention amount or other similar obligation under the policies shall be the sole responsibility of the Contractor. The amount of any deductible or self-insured retention is subject to approval by The New York State Office of General Services ("OGS").
- 3) The requisite insurance may be provided through a policy or policies of insurance which may be primary and/or excess including umbrella policies, but must be placed with an Insurer rated "A-" Class "VII" or better by the A.M. Best Company, Inc. If, during the term of the policy, an Insurer's rating falls below "A-" Class "VII", the insurance must be replaced no later than the renewal date of the policy with an Insurer rated at least "A-" Class "VII" by the A.M. Best Company, Inc. Any excess policy must follow the requirements set forth in the New York State Insurance Law for such coverage.
- 4) Contractors shall provide The New York State Office of General Services ("OGS") with updated Certificates of Insurance and as applicable amendatory endorsements at least thirty (30) days prior to the expiration or renewal date of a policy.
- 5) The insurance provided shall include an endorsement indicating that the policy and any endorsements may not be cancelled without thirty (30) days prior written notice to The New York State Office of General Services ("OGS"). In the event that the cancellation is due to non-payment of premium, ten (10) days prior written notice shall be provided.
- 6) The insurance provided shall include a blanket or specific "Waiver of Subrogation" endorsement waiving any right to recover the insurance company may have against the State.
- 7) In the block provided in the Certificate of Insurance for insertion of "Description of Operations/Locations/Vehicles/Exclusions Added by Endorsement/Special Provisions" the additional insured information and job-specific information such as the nature of the contract and either the solicitation number or the contract award number should be referenced.
- 8) Additional insured endorsements should specify the following:
  - The full legal name of the additional insured; i.e., the State of New York, its agencies, officers and employees.
  - The specific location or operations for which the coverage applies;
  - Coverage will run until the completion of the last project on this contract;
  - That notice of modification or cancellation will be provided to the additional insured at a specified name and address;
  - That the insurance company waives any right of recovery it may have against the State;
  - That the coverage required shall be primary for the State and shall not be affected by any self-insurance or other insurance or coverage obtained by the State on its own behalf;
  - That cross-liability/severability of interest coverage is provided; and
  - That the legal defense provided to the State under the policy must be free of any conflicts of interest even if retention of separate legal counsel for the State is necessary.
- 9) The insolvency or bankruptcy of the insured Contractor or Subcontractor shall not release the Insurer from payment under the policy even when such insolvency or bankruptcy prevents the insured Contractor or Subcontractor from meeting the retention limits under the policy.

Failure to provide insurance coverage as required herein and to keep the same in force during the term of the contract is a material breach of contract entitling the State to terminate the contract in accordance with the termination provisions in the contract.

(continued)

PRODUCT INFORMATION (Cont'd)

MINI BIDS

**Contracts awarded** through this IFB to are considered to be **Backdrop Contracts** for the purpose of **Mini-Bidding**. It is the mini-bid process whereby various Authorized Users shall seek bids for commodity related individual specific projects at the authorized user's discretion, or where the technical support value will exceed twenty (20%) percent of the Total order price as noted under the **General** conditions sub-clause as found within the Technical Support Option clause on page 30 here in.

**The mini-bids shall be restricted to those Contractors who hold a Backdrop contract awarded on the basis of this IFB.** Contractors shall determine their "best and final" prices based upon the Authorized User's Project Definition and shall submit a proposal in response to the Project Definition. The individual projects shall be awarded to the best value bidder who agrees to perform all work as outlined in the Project Definition and under the terms and conditions of this Backdrop Contract specification. **In no event shall either** the Contractor's **hourly rate for technical support**, or the net **price of merchandise** being purchased for the individual project **exceed the prices as awarded** in the Original (Backdrop) Contract. The Contractor shall perform services at any site set forth in the Project Definition.

The **method of award** through a mini-bid involving only the **supply** of specific merchandise will be grand total low bid per item or lot, as determined by the end user.

The **method of award** through a mini-bid involving material product with an additional **technical support requirement** shall be based upon best value. Best value is defined as, "The basis for awarding contracts for services to the offerer which optimizes quality, cost and efficiency, among responsive and responsible offerers. Such basis shall reflect, wherever possible, objective and quantifiable analysis."

**The following conditions may also apply to the mini-bid:**

Participating Contractors may be required to attend a mandatory site visit prior to a mini-bid submittal. The time and date for this site visit shall be arranged with the Authorized User representative.

1. Authorized Users shall determine the locations support is required .
  - a. Authorized Users shall contact the appropriate Backdrop Contractors and provide a copy of the project definition, which outlines the security requirements of the facility.
  - b. Authorized Users shall determine the time period the mini-bid shall cover. The mini-bid time period shall not be greater than the termination date of the Backdrop Contract.
2. Authorized Users shall designate their method of award for their best value determination in the Project Definition. According to the State Finance Law, best value is defined as the basis for awarding a contract to the offerer that optimizes quality, cost and efficiency, among responsive and responsible offerers. Such basis shall reflect, whenever possible, objective and quantifiable analysis. "Best Value Determination" may include, but is not limited to:
  - previous experience
  - source of supply
  - personnel resources
  - experience relating to agency specific requirements ability to meet agency site specific requirements

Mini-bid shall refer to the bidding of each project definition since it is a smaller, simpler form of bidding and does not need to duplicate this IFB. An example of language for awarding on a best value basis and using assigned weights is as follows: "Contracts shall be awarded to the bidder providing the best value on an evaluated basis with assigned weight being given to both the technical part of the proposal and the cost of the proposal to determine the "best value." Weights assigned to technical and cost must be predetermined prior to the mini bid.

Users shall document in the Procurement Record their choice of Contractor in accordance with their predetermined method of award based on cost, need (form, function and utility) and value (quality, cost and efficiency). Contractor may be selected on the basis of lowest cost if quality appears to be uniform among competing bidders and if user determines it to be the best value.

3. Backdrop Contractors shall develop a bid and submit it to the Authorized User by the date determined by the Authorized User.
4. Agencies shall review all bids received and shall consider the services of the best value Contractor.
5. Authorized User shall follow the contract award process as stated in the Contract Award Notice. Authorized users shall issue encumbrance documents or other written orders for work depending on the type of contract.

(continued)

PRODUCT INFORMATION (Cont'd)

MINI-BID PROCESS: (Cont'd)

6. Authorized User shall issue encumbrance documents or other written orders that are effective and binding on the Contractor when placed in the mail or faxed to the Contractor shown on the contract award notification.
7. The Authorized User shall require each Contractor, at Contractor's expense, to submit evidence with the mini-bid that it is in compliance with all requirements of insurance, certificates, permits, licenses, etc., and are up to date. Failure to do so may constitute grounds for the State to cancel or suspend the Backdrop contract or to take any other action deemed necessary by the State
8. Authorized Users shall in the Project Definition, request evidence of current insurance coverage of all Contractors submitting mini-bids, in the amounts and type set forth in the Backdrop Contract, and shall request a statement from the bidders that they will, within thirty days of mini-bid Award, provide a certificate of such insurance naming the Authorized User as an additional insured. Failure to provide such certificate within such thirty (30) day time period may result in a termination of the award.

ADDITIONAL CONTRACT INFORMATION FOR SOLAR-POWERED, TRAILER-MOUNTED &  
OTHER DYNAMIC MESSAGE SIGNS (DMS & EMS) and RELATED EQUIPMENT :

**Warranties:** The vendor shall include a warranty with each Dynamic Message Signs which covers all defects in materials and workmanship for a period of 36 months from the date of initial deployment. During the warranty period, the vendor will provide technical support, parts and service, either in house or on-site if needed, free of charge for vendor supplied items; including but not limited to: hardware, software, remote wireless communications, etc. Arrow boards will be warranted in the same manner, but, for a 24 month period from the date of acceptance. All other accessories shall be warranted for a one year period from date of delivery. At time of bid opening, products offered must meet all requirements of this solicitation including full commercial/retail availability. Product literature and specifications must also be available.

**Multiple Failures** - Any sign purchased under this contract is expected to perform per the specifications, requirements and product information. Should any sign experience repeated failure of performance of a singular nature and where repeated repairs fall short of correcting the failure, in excess of **3 times** in the **first 6 months** of use, **5 times** in the **first year** of use, or **8 times** over the first **18 months** of use, the sign will be classified as a "Lemon" and contractor shall be required to replace the unit in its entirety. See "Warranties" in Appendix B, OGS General Specifications.

**Progress Payments** - Bidders should note that at the option of the buyer, payments under the contract to be awarded hereunder may be made on a progress schedule basis. Whereas the existence of any substantial added cash discounted payment terms will be considered before exercising this option, the payment for sales of Dynamic Message Signs shall be Seventy percent (70 %) of the contract/product prices and is/are payable by the purchaser net 30 days from date of completion of required training or the receipt of invoice whichever occurs last. The final payment of the contract/product prices shall be Thirty percent (30%) and is/are payable only after a period of 40 days of trouble free deployment of the product by the purchaser. Purchaser must promptly notify the Contractor and the Purchasing Officer of Record as to date of delivery, date of initial deployment, and any operational issues causing the product to not perform as required. Date of initial deployment must be no later than 5 days after completion of training by the contractor.

Purchasers under the contract to be awarded herein may not accept requests for payments which do not adhere to these provisions and the progress payment schedule. The required payment dates for the contract to be awarded hereunder are subject to Article XI-A of the State Finance Law, interest payments on certain amounts owed by the State, and shall not accrue until the date of formal acceptance of the product, or the date of initial deployment, whichever occurs first.

**Separately invoiced orders** and deliveries of **Arrow Boards, Message Sign Parts, or other accessories** are **not subject to progress payments** and should be paid in accordance with normal payment practice of net 30 days from date of delivery or invoice, or in accordance with the terms of any additional cash discount offered.

(continued)

PRODUCT INFORMATION (Cont'd)

ADDITIONAL CONTRACT INFORMATION FOR SOLAR-POWERED, TRAILER-MOUNTED &  
OTHER DYNAMIC MESSAGE SIGNS (DMS & EMS) and RELATED EQUIPMENT: (Cont'd)

**Training:** The resulting contractors are required to be able to provide live, visual, extensive instruction by qualified personnel sufficient to ensure that the products are deployed, operated and maintained so as to perform to the full extent of its design capabilities.

**Training Charges should be indicated as a separate line item in your price list.** Although highly recommended, the purchase of training is at the discretion of the end user with each purchase. Training is to be supplied at a place to be designated by the buyer on an order by order basis. Contractors **failing to list** training as a price list line item shall be required to provide appropriate training upon request **at no additional cost or charge** to the end user.

When training is ordered, the contractor shall contact the buyer, to schedule and/or institute training. Buyer shall designate the appropriate personnel who are to receive instruction and must maintain a roster of trained personnel assigned or available to work with the product. If purchased with new units, training should take place within five business days of receipt of product.

Instruction method is up to the contractor, whether it be on-site, or remote.

Training may take the form of an Onsite Presentation or a Video Broadcast or Webcast from the manufacturer's facility, or a Video Presentation. Should training be from a remote location or prerecorded in the form of a video or DVD, it must be presented in a manner where by the trainees have the ability to interact with a live trainer, so that questions may be raised and addressed. It is recommended that on-site training be video-taped for future reference. Training must include the following areas of concentration:

- Deployment - Proper transport, placement and set up of equipment.
- Operation - Use of displays, programming, communications.
- Maintenance - Care of trailer, hydraulics and display framework, LEDs and Computer maintenance.
- Power System - Proper care, conditioning and maintenance of Solar Panels, AC system & Batteries.
- Troubleshooting - How to recognize and address problems. How to test trouble spots?  
Is the problem with the item or in the communications infra-structure?
- Service - What is user serviceable? What is not? What are the proper procedures to follow for removing and returning parts to manufacturer for service? How to recognize what can be removed and returned, or what will require an on-site visit from the contractor's service dept.

Sufficient training materials for the designated trainees should be forwarded to the user in advance of the training session. If available in electronic format training course materials should be submitted the appropriate file should be provided upon request. Should only physical training course materials be available, Four (4) sets of the course material will be required upon request.

**End user note:** Contractor is **not responsible** for operational problems caused by communications failures that are determined to be a result of a problem from the **communications carrier**. Should a Contractor be called in for on-site service and the problem is found to be the fault of said carrier, the user may be held liable for charge backs on the cost of the service call.

**Catalog Contents:** Catalog offerings for Dynamic Message Signs, Speed Trailers and Arrow Boards should contain appropriate products, related parts and accessories necessary to meet individual needs of form and function, as well as to enable users to perform any user serviceable maintenance and repair on both new and previously purchased equipment. Such items include (but are not limited to) Replacement Standard Batteries, Gel Cell or Upgraded Batteries, Replacement Display Covers, Replacement LED Pixels, Replacement LED Modules, Replacement Data Entry Controllers, Replacement Power Wiring Harness, Replacement AC Battery Charger & Cables, Replacement 12volt Wiring Couplers, Replacement Controller Harness, Replacement Photocells, Replacement CPU Boards, Replacement Hydraulic Pumps, Cellular Communication Devices (ie: IP Modem, Dial-up Modem, etc) configured to support a Wireless Cellular Communication Network (ex. CDMA, GSM, GPRS, EDGE, UMTS, HSDA, etc.). Additional or Replacement Solar Panels, Spare Wheel Rims, Locking Lug-nuts, Replacement Tongue Jacks, and Replacement Pad Locks.

Other recommended accessory items are listed in the NYS OGS/Department of Transportation ITS/NTCIP Specifications for Solar-Powered, Trailer-Mounted and Other Portable Dynamic Message Signs (PDMS) & Directional Arrow Panels as found here in in APPENDIX 6.

(continued)

PRODUCT INFORMATION (Cont'd)

ADDITIONAL CONTRACT INFORMATION FOR SOLAR-POWERED, TRAILER-MOUNTED & OTHER DYNAMIC MESSAGE SIGNS (DMS & EMS) and RELATED EQUIPMENT: (Cont'd)

**Custom Static Signage:** Bidders offering Speed Display Trailers should note NYSDOT incorporates custom sign requirements in their specification, as found in **APPENDIX 7**. Vendors whose catalogs do not provide the optional requirements may be limited in contract use to non NYSDOT contract users.

**Trailer Requirements:** All trailers with installed & mounted equipment shall safely transport all equipment and systems not in operation with all components properly secured. They shall be equipped for use on public highways in accordance with NYS Vehicle and Traffic Law, Article 9 - EQUIPMENT OF MOTOR VEHICLES, as found under section VAT- Article 9, as found at the following web address. This address may be copied and pasted into your browser.  
<http://public.leginfo.state.ny.us/LAWSSEAF.cgi?QUERYTYPE=LAWS+&QUERYDATA=@LLVAT+&LIST=LAW+&BROWSER=BROWSER+&TOKEN=09959385+&TARGET=VIEW>  
and as found in the NYS Department of Motor Vehicles Document #MV-529C, entitled: "Equipment Required for Trailers" as reprinted in APPENDIX 8 within this document.

**DMV Inspections, Registrations, Licenses And Insurance:** It is the responsibility of the purchasing agency or political subdivision to obtain and maintain a NYS-DMV vehicle safety inspection, and the required certifications, registrations, licenses, insurance policies and plates required for deployment of each speed trailer, per the provisions of NYS Vehicle and Traffic Law; including sections (306 Enforcement / Inspections), 371(DOT CERTIFICATES in Lieu of Insurance), 401Registrations and 402 (License Plates), as well as any other applicable sections . These laws are available for review under the VAT section at the following web address:

<http://public.leginfo.state.ny.us/LAWSSEAF.cgi?QUERYTYPE=LAWS+&QUERYDATA=@LLVAT+&LIST=LAW+&BROWSER=BROWSER+&TOKEN=09959385+&TARGET=VIEW>

This address may be copied and pasted into your browser.

COLOR STANDARDS:

In addition to any manufacturer standard paint colors, the following paint colors shall be considered standard for items offered in this procurement, the cost of which shall be included in the bid price of any unit:

**For Variable Message Sign, Speed Display, Arrow Boards, Trailers and Related Equipment:**

- **NYSDOT:** All exterior surfaces (except the sign face) will be cleaned, primed and painted with two coats of corrosion inhibited paint – **DuPont Imron Yellow 6578X** or equivalent for all units ordered for delivery to NYSDOT facilities.
- **NYS Thruway Authority:** Surfaces that are normally painted shall be suitably prepared, primed with 100% lead-free metal primer, and factory painted with at least two coats of the Thruway fleet color, which is **DuPont Centari Acrylic Auto Enamel YELLOW 224AK** (100% lead-free) or equal. If this paint is not offered, the successful bidder shall submit samples of similar lead-free yellows for selection and approval.

**\*Note:** Powder Paint is an acceptable coating alternative as long as the color requirements herein are met. Accessory components supplied by the Contractor concurrently with delivery shall be finish painted and must be an exact match of the paint used on the equipment.

**For Traffic Signal Heads and Related Equipment :**

The color of the finished coating shall be a reasonable visual match to Federal Color Standard No. 595A, Color #14056 for Dark Green or to Federal Color Standard No. 595A, Color #13538 for Traffic Yellow. Viewing shall be done under North Standard Daylight.

\* \* \* \* \*

(continued)

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PLEASE USE BLACK INK OR TYPEWRITER WHEN  
 PREPARING YOUR BID. BE SURE YOU HAVE  
 INSERTED YOUR COMPANY'S NAME IN THE BOX

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Bidder
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Is Bidder offering any additional volume discount?

YES     NO

If YES, what is the method of calculation for the  
 volume discount? (check one)

ADDITIONAL % OFF ANY SINGLE ORDER  
 MULTIPLE QUANTITY PURCHASE

ADDITIONAL % OFF BASED ON TOTAL AGENCY  
 DOLLAR VALUE OF PRODUCT PURCHASED

ADDITIONAL % OFF BASED ON TOTAL STATEWIDE  
 DOLLAR VOLUME OF PRODUCT PURCHASED

INDICATE VOLUME DISCOUNT LEVELS AND  
 CORRESPONDING DISCOUNT PERCENTAGES  
*Add additional sheets if a greater breakdown or if  
 additional information is required.*

_____	=	_____	%
_____	=	_____	%
_____	=	_____	%
_____	=	_____	%
_____	=	_____	%
_____	=	_____	%
_____	=	_____	%

DELIVERY: \_\_\_\_\_ Calendar Days A/R/O

MANUFACTURER'S WARRANTY: \_\_\_\_\_ Years

**SHIPPING INFORMATION:**

NAME OF DISTRIBUTION CENTER \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY/STATE/ZIP \_\_\_\_\_

Does the bid include participation in the **TECHNICAL  
 SUPPORT OPTION** as detailed on pages 30-33?

YES     NO

Bidder understands, acknowledges and will comply  
 with all of the requirements as stated?

YES     NO

(continued)



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Bidder
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Is your offering **all inclusive** containing **all items** contained in your catalog? YES  NO

If you checked "YES" – Skip to the Next Page  
If you checked "NO" continue and complete the following sections:

**IDENTIFY ALL CATALOG PRODUCT LINES INCLUDED AS YOUR OFFER**

<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
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<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____

*(use additional sheets if needed):*

**IDENTIFY ALL PRODUCT LINES CONTAINED IN YOUR CATALOG THAT ARE EXCLUDED FROM OFFER**

<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
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<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____

*(use additional sheets if needed):*

**PLEASE USE BLACK INK OR TYPEWRITER WHEN  
PREPARING YOUR BID. BE SURE YOU HAVE  
INSERTED YOUR COMPANY'S NAME IN THE BOX**

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Bidder
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- |  |  |
|--|--|
| <p>1. Did the bidder read and understand paragraph 9 of the Price Clause at the bottom of page 11 regarding the automatic waiving of any pre-existing, pre-printed Terms &amp; Conditions?</p>   | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>2. Has the bidder read &amp; does the bidder understand the Product Qualification and NYS Department of Transportation Supplemental Specifications Clauses as found on pages 27 &amp; 28?</p> | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>3. Does your offer include Electronic/Computerized Traffic Signal Equipment, LED Signal Modules and Traffic Control equipment?</p>  | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "YES", does your product line include items compliant with the NYSDOT TMES Supplemental Specification as found herein in Appendix 11?</p>  | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "YES" are you aware of the requirements regarding Continuous product testing and compliance as found in the TMES and agree to be held to the higher standards therein?</p>                 | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "YES", are any of the items currently listed on the NYSDOT Qualified Products List as found herein in Appendix 5?</p>  | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "NO", will your company be considering the addition of any such NYSDOT compliant products in the future?</p>   | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>4. Does your offer include Portable Deployable Variable Dynamic Message Signs?</p>  | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "YES", does your product line include items compliant with the OGS/NYS DOT ITS/NTCIP Supplemental Specifications for VDMS as found herein in Appendix 6?</p>                               | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "YES" are you aware of the additional requirements as listed on pages 35 through 37 &amp; agree to be held to the standards therein?</p>   | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "YES", are any of the items currently listed on the NYSDOT Qualified Products List as found herein in Appendix 5?</p>  | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "NO", will your company be considering the addition of any such compliant products in the future?</p>  | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>5. Does your offer include Portable Deployable Speed Display Trailers</p>   | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "YES", does your product line include items compliant with the custom signage requirement as listed on page 37?</p>  | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |
| <p>If "NO", will your company be considering the addition of any such compliant products in the future?</p>  | <p><input type="checkbox"/> YES      <input type="checkbox"/> NO</p> |

*\* = Include compliant items on the required item listing found on the next page.*

(continued)



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# Appendix 1

## Bidder Questions

Bidder shall answer all questions in the spaces provided and return with your bid.  
If additional clarification is required additional pages should be attached as needed.

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Bidder
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NOTES TO BIDDERS: FAILURE TO ANSWER THE  
 QUESTIONS WILL DELAY THE EVALUATION OF YOUR BID  
 AND MAY RESULT IN REJECTION OF YOUR BID.

- Has Bidder completed the New York State Vendor Responsibility Questionnaire?
- If Bidder completed the Questionnaire online, has Bidder certified or recertified the Vendor Responsibility Questionnaire no more than six (6) months prior to the bid opening date?
- Are prices quoted the same as or lower than those quoted other corporations, institutions and government agencies (including GSA/VA contracts) on similar products, quantities, terms and conditions? See "Best Pricing Offer" in Appendix B, OGS General Specifications. If "NO", please explain on a separate sheet.
- Do you have a contract with the General Services Administration (GSA) or Veterans Affairs (VA) for products offered? (Check all that apply.)  
  
 If yes, will you offer New York State pricing equal to or better than your GSA or VA pricing?  
  
 If yes, a copy of the GSA or VA schedule is required. Have you included a copy?
- Is this product available only on a "direct from the manufacturer basis" or can pricing be obtained from dealers or distributors? Check one:  
  
 If you are a manufacturer and have checked "Other", please attach listing of authorized dealers and distributors.
- Do you have your catalog available on the Internet?  
  
 If yes, do you have the ability to make NY pricing available along with your catalog on line?
- Does bidder offer Electronic Access Ordering (EDI)?
- If awarded a contract, will bidder accept the New York State Procurement Card for orders not to exceed \$15,000.00?

YES, filed online  
 (OR)  
 YES, paper copy attached

YES      NO

YES      NO

GSA      VA      NO

GSA      VA      NO

GSA      VA      NO

Manufacturer      Other

YES      NO

YES      NO

YES      NO

YES      NO

YES      NO

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Bidder
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NOTES TO BIDDERS: (Cont'd)

- If bidder limits the maximum acceptable card amount to less than \$15,000, please indicate the maximum amount:

\$ \_\_\_\_\_

Additional discount for purchases made with the NYS Procurement Card:

\_\_\_\_\_ %

- Are any products offered manufactured from recycled materials?

\_\_\_\_\_ YES      \_\_\_\_\_ NO

Are any products offered remanufactured (restored to its original performance standards and function)?

\_\_\_\_\_ YES      \_\_\_\_\_ NO

Are any products offered Energy Star Compliant?  
 (If YES to any of the above, please attach specifics.)

\_\_\_\_\_ YES      \_\_\_\_\_ NO

Name and contact information of the person assigned to be the **Contract Administrator** for resultant contracts from this offering:

\_\_\_\_\_

\_\_\_\_\_

Title:

( ) \_\_\_\_\_

Telephone Number:

( ) \_\_\_\_\_

Toll Free Telephone Number:

( ) \_\_\_\_\_

Fax Number:

\_\_\_\_\_

E-Mail Address:

Person or persons to contact for expediting New York State contract orders:

\_\_\_\_\_

Title:

\_\_\_\_\_

Telephone Number:

( ) \_\_\_\_\_

Toll Free Telephone Number:

( ) \_\_\_\_\_

Fax Number:

( ) \_\_\_\_\_

Toll Free Fax Number:

( ) \_\_\_\_\_

E-Mail Address:

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Bidder
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NOTES TO BIDDERS: (Cont'd)

Person or persons to contact in the event of an emergency  
occurring after business hours or on weekend/holidays:

State Normal Business Hours (Specify M-F, Sat, Sun):

Name:

Title:

Telephone Number:

Toll Free Telephone Number:

Pager Number:

Cellular Telephone Number:

E-Mail Address:

Person or persons to contact for technical information:

Name:

Title:

Telephone Number:

Toll Free Telephone Number:

Cellular Telephone Number:

E-Mail Address:

If participating in the TECHNICAL SUPPORT OPTION indicate the  
contact information for the person who will be the option coordinator:

Title:

Telephone Number:

Pager Number:

Toll Free Telephone Number:

Cellular Telephone Number:

E-Mail Address:

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PLEASE USE BLACK INK OR TYPEWRITER WHEN PREPARING YOUR BID. BE SURE YOU HAVE INSERTED YOUR COMPANY'S NAME IN THE BOX

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Bidder

BIDDERS PLEASE ANSWER THE FOLLOWING QUESTIONS:

1. Is your company a Minority or Women-Owned Business Enterprise, certified in accordance with Article 15A of the New York State Executive Law as defined below?

\_\_\_\_\_ YES \_\_\_\_\_ NO

2. Is your company listed in the Empire State Development Directory of Certified Minority and Women Owned Businesses?

\_\_\_\_\_ YES \_\_\_\_\_ NO

[http://www.empire.state.ny.us/Small\\_and\\_Growing\\_Businesses/mwbe.asp](http://www.empire.state.ny.us/Small_and_Growing_Businesses/mwbe.asp)

NOTE: Contractors certified **and** listed in the Empire State Development's Directory of Certified Minority and Women-Owned Business Enterprises\* will be identified by OGS as MBEs and/or WBEs in the OGS Contract Award Notification upon award of the contract.

- MINORITY-OWNED
- WOMEN-OWNED
- MINORITY AND WOMEN-OWNED

\*For further information and or application please contact New York State Department of Economic Development, Division of Minority and Women-Owned Business Enterprise at 518-292-5250 (Albany) or 212-803-2414 (New York City).

"Minority or Women-Owned Business Enterprise" shall mean a business enterprise, including a sole proprietorship, partnership or corporation that is:

- (a) at least fifty-one percent owned and controlled by the minority members and/or women;
- (b) an enterprise in which such minority and/or women ownership interest is real, substantial and continuing;
- (c) an enterprise in which such minority and/or women ownership has and exercises the authority to independently control the day-to-day business decisions; and
- (d) an enterprise independently owned, operated and authorized to do business in New York State.

3. Is your company a New York Small Business Concern as defined in accordance with Article 11 of the New York State Finance Law?

\_\_\_\_\_ YES \_\_\_\_\_ NO

"Small Business Concern" means a business which:

- (a) is resident in New York State;
- (b) is independently owned and operated;
- (c) is not dominant in its field; and,
- (d) employs one hundred or fewer persons.

(continued)

**PLEASE USE BLACK INK OR TYPEWRITER WHEN PREPARING YOUR BID. BE SURE YOU HAVE INSERTED YOUR COMPANY'S NAME IN THE BOX**

Bidder
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4. Total number of people employed by your business in New York State:

\_\_\_\_\_

5. **PLACE OF MANUFACTURE OF PRODUCT(S) BID:**  
((Please check either A, B or C))

- A. All NYS Manufacture
- B. All Manufactured outside NYS
- C. Manufactured In NYS and Outside NYS  
If checking C above, indicate the State or States of production and the approximate value of the product(s) bid produced therein:

**State of New York** \_\_\_\_\_ %  
 State of \_\_\_\_\_ %  
 State of \_\_\_\_\_ %  
 State of \_\_\_\_\_ %  
 State of \_\_\_\_\_ %

6. **BIDDER'S PRINCIPAL PLACE OF BUSINESS\*:**

\*"Principal Place of Business" is the location of the primary control, direction and management of the enterprise.

State of \_\_\_\_\_

7. **"NONDISCRIMINATION IN EMPLOYMENT IN NORTHERN IRELAND: MacBRIDE FAIR EMPLOYMENT PRINCIPLES"**

In accordance with Section 165 of the State Finance Law, the bidder, by submission of this bid, certifies that it or any individual or legal entity in which the bidder holds a 10% or greater ownership interest, or any individual or legal entity that holds a 10% or greater ownership interest in the bidder, either:

(Answer Yes or No to one or both of the following, as applicable),

A. have business operations in Northern Ireland:

\_\_\_\_\_ YES \_\_\_\_\_ NO

If yes,

B. shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Fair Employment Principles relating to non-discrimination in employment and freedom of workplace opportunity regarding such operations in Northern Ireland, and shall permit independent monitoring of compliance with such Principles.

\_\_\_\_\_ YES \_\_\_\_\_ NO

(continued)

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Bidder
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**BIDDER/OFFERER DISCLOSURE OF PRIOR NON-RESPONSIBILITY DETERMINATIONS**

Pursuant to Procurement Lobbying Law (SFL §139-j)

A. Has any Governmental Entity made a finding of non-responsibility regarding the individual or entity seeking to enter into the Procurement Contract in the previous four years?

\_\_\_\_\_ YES \_\_\_\_\_ NO

If yes, please answer the following question:

B. Was the basis for the finding of non-responsibility due to a violation of State Finance Law §139-j?

\_\_\_\_\_ YES \_\_\_\_\_ NO

C. If yes, was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a governmental entity?

\_\_\_\_\_ YES \_\_\_\_\_ NO

If yes, please provide details regarding the finding of non-responsibility:

Governmental Entity:

\_\_\_\_\_

Date of Finding of Non-responsibility:

\_\_\_\_\_

Basis of Finding of Non-Responsibility:  
(add additional pages if necessary)

\_\_\_\_\_  
\_\_\_\_\_

D. Has any governmental agency terminated or withheld a procurement contract with the above-named individual or entity due to the intentional provision of false or incomplete information?

\_\_\_\_\_ YES \_\_\_\_\_ NO

If yes, please provide details:

Governmental Entity:

\_\_\_\_\_

Date of Termination or Withholding of Contract:

\_\_\_\_\_

Basis of Termination or Withholding:  
(add additional pages if necessary)

\_\_\_\_\_  
\_\_\_\_\_

(continued)

## Appendix 2

New York State Department of Taxation and Finance

**Contractor Certification (ST220-TD) {Updated 01/08}**  
**Contractor Certification to Covered Agency (ST220-CA)**

**Bidder should complete both ST220-TD and ST220-CA**

**ST220-TD is to be submitted by the bidder directly to the  
New York State Department of Taxation and Finance  
as noted on the form.**

**ST220-CA is to be submitted as part of your bid.**  
(Refer to page 8 of this IFB for additional information)

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New York State Department of Taxation and Finance

**Contractor Certification**

(Pursuant to Section 5-a of the Tax Law, as amended, effective April 26, 2006)

**ST-220-TD**

(5/07)

For information, consult Publication 223, *Question and Answers Concerning Tax Law Section 5-a (see Need help? below)*.

Contractor name \_\_\_\_\_

Contractor's principal place of business \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ ZIP code \_\_\_\_\_

Contractor's mailing address (if different than above) \_\_\_\_\_

Contractor's federal employer identification number (EIN)	Contractor's sales tax ID number (if different from contractor's EIN)	Contractor's telephone number ( )
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Covered agency name <b>OGS PSG</b>	Contract number or description <b>Group 35800 - Comprehensive Traffic Operation Control &amp; Monitoring Systems, Equipment &amp; Products: Systems &amp; Components, including Hardware &amp; Sensors; Options, Accessories, Parts and Supplies" (Statewide)</b>	Estimated contract value over the full term of the contract (but not including renewals) N/A <b>TO BE DETERMINED BY OGS/PSG upon award.</b>
---------------------------------------	--	---

Covered agency address <b>38<sup>th</sup> Floor, Erastus Corning 2nd Tower, Governor Nelson A. Rockefeller Plaza, Albany, NY 12242</b>	Covered agency telephone number <b>(518) 473-2428</b>
---	--

**General information**

Section 5-a of the Tax Law, as amended, effective April 26, 2006, requires certain contractors awarded certain state contracts valued at more than \$100,000 to certify to the Tax Department that they are registered to collect New York State and local sales and compensating use taxes, if they made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000, measured over a specified period. In addition, contractors must certify to the Tax Department that each affiliate and subcontractor exceeding such sales threshold during a specified period is registered to collect New York State and local sales and compensating use taxes. Contractors must also file a Form ST-220-CA, certifying to the procuring state entity that they filed Form ST-220-TD with the Tax Department and that the information contained on Form ST-220-TD is correct and complete as of the date they file Form ST-220-CA.

All sections must be completed including all fields on the top of this page, all sections on page 2, Schedule A on page 3, if applicable, and Individual, Corporation, Partnership, or LLC Acknowledgement on page 4. If you do not complete these areas, the form will be returned to you for completion.

For more detailed information regarding this form and section 5-a of the Tax Law, see Publication 223, *Questions and Answers Concerning Tax Law Section 5-a, (as amended, effective April 26, 2006)*, available at [www.nystax.gov](http://www.nystax.gov). Information is also available by calling the Tax Department's Contractor Information Center at 1 800 698-2931.

**Note:** Form ST-220-TD must be signed by a person authorized to make the certification on behalf of the contractor, and the acknowledgement on page 4 of this form must be completed before a notary public.

Mail completed form to:

**NYS TAX DEPARTMENT  
DATA ENTRY SECTION  
W A HARRIMAN CAMPUS  
ALBANY NY 12227**

**Privacy notification**

The Commissioner of Taxation and Finance may collect and maintain personal information pursuant to the New York State Tax Law, including but not limited to, sections 5-a, 171, 171-a, 287, 308, 429, 475, 505, 697, 1096, 1142, and 1415 of that Law; and may require disclosure of social security numbers pursuant to 42 USC 405(c)(2)(C)(i).


This information will be used to determine and administer tax liabilities and, when authorized by law, for certain tax offset and exchange of tax information programs as well as for any other lawful purpose.

Information concerning quarterly wages paid to employees is provided to certain state agencies for purposes of fraud prevention, support enforcement, evaluation of the effectiveness of certain employment and training programs and other purposes authorized by law.


Failure to provide the required information may subject you to civil or criminal penalties, or both, under the Tax Law.

This information is maintained by the Director of Records Management and Data Entry, NYS Tax Department, W A Harriman Campus, Albany NY 12227.

**Need Help?**

 **Internet access:** [www.nystax.gov](http://www.nystax.gov)  
(for information, forms, and publications)


 **Fax-on-demand forms:** 1 800 748-3676

 **Telephone assistance** is available from 8:00 A.M. to 5:00 P.M. (eastern time), Monday through Friday.  
To order forms and publications: 1 800 462-8100

**Sales Tax Information Center:** 1 800 698-2909

From areas outside the U.S. and outside Canada: (518) 485-6800

**Hearing and speech impaired** (telecommunications device for the deaf (TDD) callers only): 1 800 634-2110

 **Persons with disabilities:** In compliance with the Americans with Disabilities Act, we will ensure that our lobbies, offices, meeting rooms, and other facilities are accessible to persons with disabilities. If you have questions about special accommodations for persons with disabilities, please call 1 800 972-1233.

(continued)

Page 2 of 4 ST-220-TD (5/07)

I, \_\_\_\_\_, hereby affirm, under penalty of perjury, that I am \_\_\_\_\_  
(name) (title)  
of the above-named contractor, and that I am authorized to make this certification on behalf of such contractor.

Complete Sections 1, 2, 3 below. Make only one entry in each section below.

**Section 1 - Contractor registration status**

- The contractor has made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four sales tax quarters which immediately precede the sales tax quarter in which this certification is made. The contractor is registered to collect New York State and local sales and compensating use taxes with the Commissioner of Taxation and Finance pursuant to sections 1134 and 1253 of the Tax Law, and is listed on Schedule A of this certification.
- The contractor has not made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four sales tax quarters which immediately precede the sales tax quarter in which this certification is made.

**Section 2 - Affiliate registration status**

- The contractor does not have any affiliates.
- To the best of the contractor's knowledge, the contractor has one or more affiliates having made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four sales tax quarters which immediately precede the sales tax quarter in which this certification is made, and each affiliate exceeding the \$300,000 cumulative sales threshold during such quarters is registered to collect New York State and local sales and compensating use taxes with the Commissioner of Taxation and Finance pursuant to sections 1134 and 1253 of the Tax Law. The contractor has listed each affiliate exceeding the \$300,000 cumulative sales threshold during such quarters on Schedule A of this certification.
- To the best of the contractor's knowledge, the contractor has one or more affiliates, and each affiliate has not made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four sales tax quarters which immediately precede the sales tax quarter in which this certification is made.

**Section 3 - Subcontractor registration status**

- The contractor does not have any subcontractors.
- To the best of the contractor's knowledge, the contractor has one or more subcontractors having made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four sales tax quarters which immediately precede the sales tax quarter in which this certification is made, and each subcontractor exceeding the \$300,000 cumulative sales threshold during such quarters is registered to collect New York State and local sales and compensating use taxes with the Commissioner of Taxation and Finance pursuant to sections 1134 and 1253 of the Tax Law. The contractor has listed each subcontractor exceeding the \$300,000 cumulative sales threshold during such quarters on Schedule A of this certification.
- To the best of the contractor's knowledge, the contractor has one or more subcontractors, and each subcontractor has not made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four sales tax quarters which immediately precede the sales tax quarter in which this certification is made.

Sworn to this \_\_\_\_\_ day of \_\_\_\_\_, 201 \_\_\_\_\_

\_\_\_\_\_  
(sign before a notary public)

\_\_\_\_\_  
(title)

(continued)





**Individual, Corporation, Partnership, or LLC Acknowledgment**

STATE OF \_\_\_\_\_ }  
: \_\_\_\_\_ } SS.:  
COUNTY OF \_\_\_\_\_ }

On the \_\_\_\_\_ day of \_\_\_\_\_ in the year 201\_\_\_\_, before me personally appeared \_\_\_\_\_  
known to me to be the person who executed the foregoing instrument, who, being duly sworn by me did depose and say that

\_he resides at \_\_\_\_\_ ,

Town of \_\_\_\_\_ ,

County of \_\_\_\_\_ ,

State of \_\_\_\_\_ ; and further that:

[Mark an X in the appropriate box and complete the accompanying statement.]

- (If an individual): \_he executed the foregoing instrument in his/her name and on his/her own behalf.
- (If a corporation): \_he is the \_\_\_\_\_  
of \_\_\_\_\_ , the corporation described in said instrument; that, by authority of the Board of  
Directors of said corporation, \_he is authorized to execute the foregoing instrument on behalf of the corporation for  
purposes set forth therein; and that, pursuant to that authority, \_he executed the foregoing instrument in the name of and on  
behalf of said corporation as the act and deed of said corporation.
- (If a partnership): \_he is a \_\_\_\_\_  
of \_\_\_\_\_ , the partnership described in said instrument; that, by the terms of said partnership,  
\_he is authorized to execute the foregoing instrument on behalf of the partnership for purposes set forth therein; and that,  
pursuant to that authority, \_he executed the foregoing instrument in the name of and on behalf of said partnership as the act  
and deed of said partnership.
- (If a limited liability company): \_he is a duly authorized member of \_\_\_\_\_ LLC, the  
limited liability company described in said instrument; that \_he is authorized to execute the foregoing instrument on behalf  
of the limited liability company for purposes set forth therein; and that, pursuant to that authority, \_he executed the  
foregoing instrument in the name of and on behalf of said limited liability company as the act and deed of said limited  
liability company.

\_\_\_\_\_  
Notary Public

Registration No. \_\_\_\_\_

**ST-220-CA**  
(6/06)



New York State Department of Taxation and Finance

**Contractor Certification to Covered Agency**

(Pursuant to Section 5-a of the Tax Law, as amended, effective April 26, 2006)

For information, consult Publication 223, *Question and Answers Concerning Tax Law Section 5-a (see Need Help? on back)*.

Contractor name		<i>For covered agency use only Contract number or description</i>	
Contractor's principal place of business	City State ZIP code		
Contractor's mailing address (if different than above)		<i>Estimated contract value over the full term of contract (but not including renewals)</i>	
Contractor's federal employer identification number (EIN)	Contractor's sales tax ID number (if different from contractor's EIN)		
Contractor's telephone number ( )		Covered agency name <b>NYS Office of General Services – Procurement Services Group Team 6</b>	
Covered agency address <b>38<sup>th</sup> Floor, Erastus Corning 2nd Tower, The Governor Nelson A. Rockefeller Plaza, Albany, NY 12242</b>		Covered agency telephone number <b>(518) 473-2428</b>	

I, \_\_\_\_\_, hereby affirm, under penalty of perjury, that I am \_\_\_\_\_  
(name) (title)

of the above-named contractor, that I am authorized to make this certification on behalf of such contractor, and I further certify that:  
(Mark an X in only one box)

- The contractor has filed Form ST-220-TD with the Department of Taxation and Finance in connection with this contract and, to the best of contractor's knowledge, the information provided on the Form ST-220-TD, is correct and complete.
- The contractor has previously filed Form ST-220-TD with the Tax Department in connection with \_\_\_\_\_  
(insert contract number or description)  
and, to the best of the contractor's knowledge, the information provided on that previously filed Form T-220-TD, is correct and complete as of the current date, and thus the contractor is not required to file a new Form ST-220-TD at this time.

Sworn to this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_

\_\_\_\_\_  
(sign before a notary public) (title)

**Instructions**

**General Information**

Tax Law section 5-a was amended, effective April 26, 2006. On or after that date, in all cases where a contract is subject to Tax Law section 5-a, a contractor must file (1) Form ST-220-CA, *Contractor Certification to Covered Agency*, with a covered agency, and (2) Form ST-220-TD with the Tax Department before a contract may take effect. The circumstances when a contract is subject to section 5-a are listed in Publication 223, Q&A 3. This publication is available on our Web site, by fax, or by mail. (See *Need help?* for more information on how to obtain this publication.) In addition, a contractor must file a new Form ST-220-CA with a covered agency before an existing contract with such agency may be renewed.

If you have questions, please call our information center at 1 800 698-2931.

**Note:** Form ST-220-CA must be signed by a person authorized to make the certification on behalf of the contractor, and the acknowledgement on page 2 of this form must be completed before a notary public.

**When to complete this form**

As set forth in Publication 223, a contract is subject to section 5-a, and you must make the required certification(s), if:

- i. The procuring entity is a *covered agency* within the meaning of the statute (see Publication 223, Q&A 5);
- ii. The contractor is a *contractor* within the meaning of the statute (see Publication 223, Q&A 6); and
- iii. The contract is a *contract* within the meaning of the statute. This is the case when it (a) has a value in excess of \$100,000 and (b) is a contract for *commodities* or *services*, as such terms are defined for purposes of the statute (see Publication 223, Q&A 8 and 9).

Furthermore, the procuring entity must have begun the solicitation to purchase on or after January 1, 2005, and the resulting contract must have been awarded, amended, extended, renewed, or assigned on or after April 26, 2006 (the effective date of the section 5-a amendments).

(continued)

Individual, Corporation, Partnership, or LLC Acknowledgment

STATE OF \_\_\_\_\_ }

:

SS.:

COUNTY OF \_\_\_\_\_ }

On the day \_\_\_\_\_ of \_\_\_\_\_ in the year 201\_\_\_\_, before me personally appeared \_\_\_\_\_ known to me to be the person who executed the foregoing instrument, who, being duly sworn by me did depose and say that

he resides at \_\_\_\_\_,

Town of \_\_\_\_\_,

County of \_\_\_\_\_,

State of \_\_\_\_\_; and further that:

[Mark an X in the appropriate box and complete the accompanying statement.]

- (If an individual): he executed the foregoing instrument in his/her name and on his/her own behalf.
(If a corporation): he is the \_\_\_\_\_ of \_\_\_\_\_, the corporation described in said instrument; that, by authority of the Board of Directors of said corporation, he is authorized to execute the foregoing instrument on behalf of the corporation for purposes set forth therein; and that, pursuant to that authority, he executed the foregoing instrument in the name of and on behalf of said corporation as the act and deed of said corporation.
(If a partnership): he is the \_\_\_\_\_ of \_\_\_\_\_, the partnership described in said instrument; that, by the terms of said partnership, he is authorized to execute the foregoing instrument on behalf of the partnership for purposes set forth therein; and that, pursuant to that authority, he executed the foregoing instrument in the name of and on behalf of said partnership as the act and deed of said partnership.
(If a limited liability company): he is a duly authorized member of \_\_\_\_\_ LLC, the limited liability company described in said instrument; that he is authorized to execute the foregoing instrument on behalf of the limited liability company for purposes set forth therein; and that, pursuant to that authority, he executed the foregoing instrument in the name of and on behalf of said limited liability company as the act and deed of said limited liability company.

Notary Public

Registration No.

Privacy notification

The Commissioner of Taxation and Finance may collect and maintain personal information pursuant to the New York State Tax Law, including but not limited to, sections 5-a, 171, 171-a, 287, 308, 429, 475, 505, 697, 1096, 1142, and 1415 of that Law; and may require disclosure of social security numbers pursuant to 42 USC 405(c)(2)(C)(i).

This information will be used to determine and administer tax liabilities and, when authorized by law, for certain tax offset and exchange of tax information programs as well as for any other lawful purpose.

Information concerning quarterly wages paid to employees is provided to certain state agencies for purposes of fraud prevention, support enforcement, evaluation of the effectiveness of certain employment and training programs and other purposes authorized by law.

Failure to provide the required information may subject you to civil or criminal penalties, or both, under the Tax Law.

This information is maintained by the Director of Records Management and Data Entry, NYS Tax Department, W A Harriman Campus, Albany NY 12227; telephone 1 800 225-5829. From areas outside the United States and outside Canada, call (518) 485-6800.

Need Help?



Internet access: www.nystax.gov (for information, forms, and publications)



Fax-on-demand forms: 1 800 748-3676



Telephone assistance is available from 8:00 A.M. to 5:00 P.M. (eastern time), Monday through Friday. 1 800 698-2931

To order forms and publications: 1 800 462-8100

From areas outside the U.S. and outside Canada: (518) 485-6800

Hearing and speech impaired (telecommunications device for the deaf (TDD) callers only): 1 800 634-2110



Persons with disabilities: In compliance with the Americans with Disabilities Act, we will ensure that our lobbies, offices, meeting rooms, and other facilities are accessible to persons with disabilities. If you have questions about special accommodations for persons with disabilities, please call 1 800 972-1233.

(continued)

## Appendix 3

### Required Bidder Certifications

1. Bid Acknowledgement Page (page 63)
2. Manufacturer's Affidavit Of Recycled Content (Page 65)
3. Manufacturer's Certification (page 67)

Bidders should complete **all** as instructed on the certificates and return all with your bid.

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ACKNOWLEDGMENT PAGE

The bid must be fully and properly executed by an authorized person. **By signing you certify your express authority to sign on behalf of yourself, your company, or other entity and full knowledge and acceptance of this INVITATION FOR BIDS, Appendix A (Standard Clauses For New York State Contracts), Appendix B (OGS General Specifications), and State Finance Law §139-j and §139-k (Procurement Lobbying), and that all information provided is complete, true and accurate. By signing, bidder affirms that it understands and agrees to comply with the OGS procedures relative to permissible contacts as required by State Finance Law §139-j (3) and §139-j (6) (b).** Information may be accessed at:

Procurement Lobbying: <http://www.ogs.state.ny.us/aboutOgs/regulations/defaultAdvisoryCouncil.html>

**INDIVIDUAL, CORPORATION, PARTNERSHIP, OR LLC ACKNOWLEDGMENT**

STATE OF \_\_\_\_\_ }  
: SS.:  
COUNTY OF \_\_\_\_\_ }

On the \_\_\_\_ day of \_\_\_\_\_ in the year 20 \_\_, before me personally appeared \_\_\_\_\_, known to me to be the person who executed the foregoing instrument, who, being duly sworn by me did depose and say that he resides at \_\_\_\_\_, Town of \_\_\_\_\_, County of \_\_\_\_\_, State of \_\_\_\_\_; and further that:

[Check One]

- If an individual:** he executed the foregoing instrument in his/her name and on his/her own behalf.
- If a corporation:** he is the \_\_\_\_\_ of \_\_\_\_\_, the corporation described in said instrument; that, by authority of the Board of Directors of said corporation, he is authorized to execute the foregoing instrument on behalf of the corporation for purposes set forth therein; and that, pursuant to that authority, he executed the foregoing instrument in the name of and on behalf of said corporation as the act and deed of said corporation.
- If a partnership:** he is the \_\_\_\_\_ of \_\_\_\_\_, the partnership described in said instrument; that, by the terms of said partnership, he is authorized to execute the foregoing instrument on behalf of the partnership for purposes set forth therein; and that, pursuant to that authority, he executed the foregoing instrument in the name of and on behalf of said partnership as the act and deed of said partnership.
- If a limited liability company:** he is a duly authorized member of \_\_\_\_\_, LLC, the limited liability company described in said instrument; that he is authorized to execute the foregoing instrument on behalf of the limited liability company for purposes set forth therein; and that, pursuant to that authority, he executed the foregoing instrument in the name of and on behalf of said limited liability company as the act and deed of said limited liability company.

\_\_\_\_\_  
Notary Public  
Registration No.

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**MANUFACTURER’S AFFIDAVIT OF RECYCLED CONTENT\***

*Topical information regarding additional products should be entered on separate sheets and attached to this affidavit*

STATE OF \_\_\_\_\_ )  
 ) ss.  
 COUNTY OF \_\_\_\_\_ )

I \_\_\_\_\_ of \_\_\_\_\_ being duly sworn, depose and say that the product(s) listed below will be/are manufactured to contain not less than the stated percentages of recycled content.

<u>PRODUCT</u>	<u>BRAND NAME</u>	<u>TOTAL RECYCLED CONTENT</u>	<u>POST CONSUMER CONTENT</u>	<u>SECONDARY MATERIAL FROM NYS WASTE STREAM</u>
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %
		_____ %	_____ %	_____ %

Indicate in the respective column the percentage of secondary materials generated from the waste stream in NYS that will be utilized in the manufacture of any of the above products furnished to NYS.

It is agreed that representatives of the New York State Office of General Services, Procurement Services Group shall have access to purchase and production records at any time during working hours for the purpose of verifying the actual percentage and use of recycled materials in the above product(s) furnished to New York State.

Name of Manufacturer: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Signature of Manufacturer’s Representative: \_\_\_\_\_  
 Official Title: \_\_\_\_\_ Telephone Number: \_\_\_\_\_  
 Dated: \_\_\_\_\_

Sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
 Notary Public

THIS AFFIDAVIT SHALL REMAIN IN EFFECT FOR A PERIOD OF TWO YEARS UNLESS REVISED OR WITHDRAWN BY THE CERTIFYING MANUFACTURER.

\*INFORMATION SUPPLIED PERTAINS TO THE REQUIRED MINIMUM RECYCLED CONTENT FOR THE VARIOUS MATERIALS AS LISTED IN THE INVITATION FOR BIDS. (REV. 10/07)

\* \* \* \* \*

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## MANUFACTURER'S CERTIFICATION

**NOTE TO BIDDERS:**

This "Manufacturer's Certificate" is to be removed, (duplicated as necessary) & forwarded to all manufacturers of products being offered in your catalog. Manufacturers should complete and return the certificate to the bidder. Bidder shall submit completed certificate(s) with the their offer. (See "QUALIFICATION OF BIDDER" clause as found on page 19.)

BIDDER'S COMPANY NAME: \_\_\_\_\_

STREET ADDRESS: \_\_\_\_\_

CITY, STATE ZIP: \_\_\_\_\_

The manufacturer executing this certificate by signature below does hereby attest to the accuracy and validity of the responses to the following questions:

1. Is the Bidder listed and the manufacturer of the products offered the same entity? \_\_\_\_\_ Yes \_\_\_\_\_ No
2. Is the Bidding Company listed above owned by or affiliated through common ownership or holding to the product manufacturer \_\_\_\_\_ Yes \_\_\_\_\_ No
3. Is the bidder listed above an authorized dealer or distributor? \_\_\_\_\_ Yes \_\_\_\_\_ No
4. Do you as a manufacturer agree to supply the bidder/dealer with all quantities of products ordered pursuant to any resulting contract with the State? \_\_\_\_\_ Yes \_\_\_\_\_ No
5. Is service performed by the dealer or by the manufacturer? \_\_\_\_\_ Dealer \_\_\_\_\_ Manufacturer

MANUFACTURER'S COMPANY NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_ FAX NUMBER: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_

\_\_\_\_\_  
**SIGNATURE OF AUTHORIZED  
MANUFACTURER'S REPRESENTATIVE**

\_\_\_\_\_  
**DATE**

\_\_\_\_\_  
**TITLE**

\_\_\_\_\_  
PRINTED OR TYPED COPY OF SIGNATURE

\* \* \* \* \*

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## **APPENDIX 4**

### **CONTRACT UPDATE FORM**

#### INSTRUCTIONS:

1. This form is to be used for all contract updates. The form is to be completed and submitted to the OGS Procurement Services Group for final approval. Contractor shall complete, sign, and notarize where indicated, and attach this form to a cover letter written on standard company letterhead. Any submission that is not complete will be rejected.
2. *Contractor may be required to submit the Product and price information for the update in an Excel spreadsheet format in electronically either on CD-Rom, DVD-Data, Flash Drive or via e-mail to the OGS Purchasing Officer.*
3. *To expedite the processing of updates that qualify as Auto Adds, do not combine Auto Adds with Regular or Special Adds. **If more than one type of update is being submitted, they should be submitted as totally separate requests.***
4. *The list must be dated and the format should be consistent with the original format of the price list(s) included in the Pricing Appendix of the Contract.*
5. *The contract update must be accompanied by either the GSA Price List and revised NYS Net Price List incorporating all changes or the Commercial Price List and revised NYS Net Price List incorporating all changes, whichever is applicable.*

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## Appendix 5

### NYS Department of Transportation Qualified & Approved Products Lists

See Page 26 for additional information under  
the PRODUCT QUALIFICATION clause

Note that this list is constantly reviewed and updated. It is current as of the date of publication of this bid, with the last revisions being noted on March 1, 2011

Items contained on the NYS DOT Approved Products List will be coded with “(APL)” after the items title.  
Those on the Qualified Products List will be coded with “(QPL)”

(continued)

**Listing by Product**

**PREEMPTION CONTROL HARDWARE Optically Controlled Hardware**

**Manufacturers – Tomar and GTT**

**PHASE SELECTORS/OPTICAL SIGNAL PROCESSORS (APL)**

Please note that either manufacturer's emitter will work if the user programs the unit to allow all Classifications or identifications ("0" code)

Item	Device	TOMAR Prod #	GTT Prod #
1	1 Channel Phase selector/Optical Signal Processor – No Vehicle ID or Classification	None	None
2	2 Channel Phase selector/Optical Signal Processor – No Vehicle ID or Classification	None	None
3	3 Channel Phase selector/Optical Signal Processor – No Vehicle ID or Classification	None	None
4	4 Channel Phase selector/Optical Signal Processor – No Vehicle ID or Classification	None	None
5	1 Channel Phase selector/Optical Signal Processor - Vehicle Classification Logging	3080	M452
6	2 Channel Phase selector/Optical Signal Processor - Vehicle Classification Logging	3080	M452
7	3 Channel Phase selector/Optical Signal Processor - Vehicle Classification Logging	3080	M454
8	4 Channel Phase selector/Optical Signal Processor - Vehicle Classification Logging	3080	M454
9	1 Channel Phase selector/Optical Signal Processor – Vehicle Identification Logging	3140	M752
10	2 Channel Phase selector/Optical Signal Processor – Vehicle Identification Logging	3140	M752
11	3 Channel Phase selector/Optical Signal Processor – Vehicle Identification Logging	3140	M754
12	4 Channel Phase selector/Optical Signal Processor – Vehicle Identification Logging	3140	M754

(continued)

**PREEMPTION CONTROL HARDWARE Optically Controlled Hardware (Cont'd)**  
**Manufacturers – Tomar and GTT**

**Optical Emitters (APL)**

Item	Device	TOMAR Prod #	GTT Prod #
1	Optical Emitter	EMIT20, EMIT21, EMIT3	M492, M792
2	Optical Emitter - Vehicle Classification	EMIT20, EMIT21, EMIT3	M492
3	Optical Emitter Vehicle Identification	EMIT20, EMIT21, EMIT3	M792

**Optical Detectors (APL)**

Item	Device	TOMAR Prod #	GTT Prod #
1	Optical Detector 1 Channel / 1 Direction	2090SD (Mast Arm) 2091SD (Span Wire)	M711
2	Optical Detector 1 Channel / 2 Directions	2090SD (Mast Arm) 2091SD (Span Wire)	M721
3	Optical Detector 2 Channels / 2 Directions	2090SD (Mast Arm) 2091SD (Span Wire)	M722

**Detector Cable for Optically Controlled Hardware (APL)**

Item	Device	TOMAR Prod #	GTT Prod #
1	Detector Cable	M913	M138

**SIREN CONTROLLED HARDWARE (APL) –**  
**Traffic Systems LLC**

SONEM 2000-NY Phase Selector 179-NY Siren Detector

**MICROWAVE DETECTION DEVICES – Presence Detectors (APL)**

**Naztec, Inc.**

- 500782001 Accuwave 150LX Microwave Detector Includes installation software, user manual, documentation
- 500832000 Accuwave 150LX Interface Panel Includes Mounting Hardware
- 103342000 Accuwave Cable Purchased w/ Accuwave Units w/ connector installed – priced per linear ft.
- 21350120 Accuwave Connector Only Reversed plug 12 pin
- 21170120 Accuwave Cable Clamp w/ seal
- 21450121 Accuwave Connector Pin
- 60142212 Accuwave Cable ONLY NON UV Jacket cost per linear ft.
- 304120000 Accuwave Mounting Bracket
- 102252016 Accuwave 9 socket to 25 pin RS 232 Cable (PC to Panel)
- 103342003 Accuwave 3ft Pigtail included w/ Accuwave if no cable ordered

**MS Sedco**

- TC-30 Ultrasonic Vehicle Presence Detector
- TCPS-170 Rack Mounted DC Isolation Card/Power Supply for MS-Sedco Detectors

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**MICROWAVE DETECTION DEVICES - Non-Presence Detectors (APL)**

**MS Sedco**

TC-26B Microwave Vehicle Motion Detector  
TCPS-170 Rack Mounted DC Isolation Card/Power Supply for MS-Sedco Detectors

**SPREAD SPECTRUM RADIO SYSTEM (APL)**

**Encom**

EP5100RRS232 Encom Model 5100R Wireless Interconnect Unit, RS232 Version  
EP5100RFSK BI Tran Encom Model 5100R Wireless Interconnect Unit, FSK Version for BI Trans Software  
EP5100RFSK TAPS Encom Model 5100R Wireless Interconnect Unit, FSK Version for TAPS Software  
EP5270Serial Radio Encom Model 5270 Wireless Interconnect Unit, RS232 Version TSITAGI9 Yagi Directional Antenna, 9db Gain, 900 MHZ  
TSILMR400(L) Remote Antenna Cable, LMR 400 N M to N M [specify length of cable needed (L)]

**Simrex**

DM2070-TA DataMover 2070-TA Transceiver, opto isolated  
DM2070-T DataMover 2070-T Transceiver, Non-opto isolated  
PT.LMR195-NM/TNCM-3 LMR 195 cable, N Male to TNC Male, 3 ft jumper  
AN.LA-FIL-3-FF Multistrike lightning arrester, N female connector  
PT.LMR400-NM/NM-40 LMR 400 cable, N M to N M, 40 ft  
AN.YG-915-9DBD-BLK Yagi Antenna, 9 dBd, 896-970 MHz, black w/clamp, 3 Ele

**CELLULAR MODEMS (APL)**

**BlueTree**

BT-6601 CDMA EVDO Rev. A Cellular Modem  
BT-6621 CDMA EVDO Rev. A Industrial Cellular Router

**SERIAL SERVER (APL)**

**Digi International**

Digi One IAP Haz modems

**CELLULAR MODEM/ROUTERS (APL)**

**Digi International**

Digi ConnectPort modem  
Digi 3G modem  
Digi WR 44

**PORTABLE TRAFFIC SIGNALS (APL)**

**Horizon Signal Technologies**

Model Number SQ3TS

**OMJC Signal, Inc.**

PNW 234 2070 Model: QPNW234 - Pop Up Quad 2070

(continued)

**ADA ACCESSIBLE (AUDIBLE) PEDESTRIAN PUSHBUTTON STATION (APL)**  
**Polara Engineering**

<b>Polara Part #</b>	<b>Description</b>
N49BNO-G	9"x12", 4-Wire, Navigator Accessible (Audible) Pushbutton Station, Green
PHCU4W	4-Wire Ped Control Unit
N29BNO-G	9"x12", 2-Wire, Navigator Accessible (Audible) Pushbutton Station, Green
CCU 2-Wire	2-Wire Ped Control Unit
CONFIG	Wireless Hand Held Navigator Configuration
BDLL2-Y	Latching LED Bulldog Ped Push Button - Yellow
BDLL2-B	Latching LED Bulldog Ped Push Button - Black
PBCU	Interface device for Polara Bulldog Ped Push Buttons

**AUXILIARY CABINETS (APL)**

**Traffic Systems Inc.**

MFG Part # N/A Model: NYSDOT Auxiliary Input Cabinet  
 NYSDOT Model # 311X

Description: Auxiliary Input Cabinet, complete. The 311X attaches to the 330 (series) Cabinet to provide additional inputs to the 2070 Controller. This model includes the Corbin #2 Standard Door Lock with Keyhole Cover.

**NETWORK CAMERA (APL)**

**Axis Communication AB**

Model 215 PTZ-E

**FIBER OPTIC MODEM (APL)**

**GDI Communications LLC**

Model 2070-6D

**ETHERNET OVER COPPER VDSL MODEM (APL)**

**Extreme Copper, Inc**

Model LT-300  
 Model NT-300  
 Model RP-300

**WIRELESS VEHICLE DETECTION SYSTEM (APL)**

**Sensys Network**

AP240-S	Access Point w/Contact Closure (serial) Interface
AP240-MTGS	Mounting bracket for AP240
CC170	Master Card for Type 170, Type 2070 Model Or NEMA TS1 Controllers
CC-ACC	Access Box for Contact Closure Master Card
EX-170	Extension Card for Type 170, Type 2070 or NEMA TS1 Controllers
VSN240-T	Flush Mount Wireless Sensor (freeway)
VSN240-EPX	Epoxy Tube for Installation of VSN240
VSN240-T	Flush Mount Wireless Sensor (intersection)
RP240-B	Repeater including (57Ahr) battery pack

(continued)

**PROGRAMMABLE SIGNAL HEAD (APL)**

**Intelight**

3033LCB AA22                    3 Section, Green without Visors  
ESB1000081-001                Communication Kit

**BATTERY BACKUP SYSTEM (APL)**

**Alpha Technologies**

Model FXM 1100 (No - GEL Batteries)

**Sensata Technologies**

Model 24M11-WBE

**Myers Power Products, Inc**

MP2000

**Signal Sense, Inc.**

SH1200UR

**TRAFFIC SIGNAL CONTROLLERS & Component Equipment (QPL)**

**Model 2070E Controller Unit (QPL)**

(“E” version Includes: 2070-1E CPU Module, 2070-3B Front Panel Assembly with an additional C50J Jack, 2070-2A Field I/O Module - provides serial port 3 and 5 LED indicators for Tx an Rx on its front plate, & 2070-4A Power Supply Module)

McCain Inc

**Model 2070-1E 2070 CPU Module (QPL)**

(Provides two RJ-45 Jacks on the Front Plate and network Communications access via the Model 2070 Backplane.)

McCain Inc

**Model 2070-2A 2070 Field I/O Module (QPL)**

(Provides serial port 3 and 5 LED indicators for Tx an Rx on its front plate)

McCain Inc

**Model 2070-3B 2070 Front Panel Module with an additional C50J Jack (QPL)**

McCain Inc

**Model 2070-4A 2070 Power Supply Modules (QPL)**

Econolite Control Products, Inc.  
McCain Inc  
Naztec, Inc.  
Peek Traffic Corp.  
Siemens / Eagle Traffic Control Systems

(continued)

**Model 2070-6A Async/Modem Serial Comm Module (QPL)**

GDI Communications, LLC  
Siemens / Eagle Traffic Control Systems

**Model 2070-6B Async/Modem Serial Comm Module (QPL)**

GDI Communications, LLC

**Model 2070-7A Async/Sync Serial Comm Module (QPL)**

*PRODUCTS CURRENTLY UNDERGOING TESTING APPROVALS PENDING*

**Model 200 Switch Packs (QPL)**

Eberle Design, Inc. (EDI)  
GDI Communications, LLC  
Power Distribution and Control (PDC) - Model SSS-86-3  
Traffic Sensor Corporation

**Model 204 Flashers (QPL)**

Eberle Design, Inc. (EDI)  
GDI Communications, LLC  
Power Distribution and Control (PDC) - Model SSF-86-3  
Traffic Sensor Corporation

**Model 210NYR Conflict Monitor with RED Monitoring Option (QPL)**

Eberle Design, Inc. (EDI)

**Monitor Interface Circuit Board**

Safetran Traffic Systems, Inc. / Econolite  
Siemens / Eagle Traffic Control Systems

**Model 222 Two-Channel Loop Detectors (QPL)**

Diablo Controls – Model DSP-222.  
Eberle Design Inc. (EDI)  
Peek Traffic Corp - Model 222  
Reno A&E - Model G-200-SS

**Model 231 Magnetic Probe (QPL)**

NovaTech (M-Systems)

**Model 232 Dual Magnetic Detector Amplifier (QPL)**

NovaTech (M-Systems)

**Model 242 Two-Channel DC Isolators (QPL)**

GDI Communications, LLC  
NovaTech (M-Systems)  
Power Distribution and Control (PDC) – Model DCI-90

(continued)

**Model 252 Two-Channel AC Isolators (QPL)**

GDI Communications, LLC  
 NovaTech (M-Systems)  
 Power Distribution and Control (PDC) – Model ACI-88-252

**Model 330 SR Cabinets (QPL)**

*PRODUCTS CURRENTLY UNDERGOING TESING APPROVALS PENDING*

**Service Disconnect / Generator Transfer Switch (QPL)**

Reliance Control - Model C30A4LT3 Stainless Steel Electrical Service Disconnect/Generator Transfer Switch

**Countdown Pedestrian Signal – Single Unit (12”x12”) (QPL)**

*No Products Approved at this time.*

**PED/Countdown Module(Hand & Walking Person w/Countdown Pedestrian Signal) (QPL)**

*No Products Approved at this time.*

**LED SIGNAL INDICATIONS (QPL)**

**NYS DOT Standard Units:**

These LED indications are NYSDOT Specified units that are compatible with Model 215 Current Monitor. All are compatible for use with NYS Specified Cabinets that include this Monitor.. The part numbers shown below are supplied by the manufacturers and are required to be clearly marked on each unit supplied. All units designated on this QPL conform to the latest NYSDOT specification for LED indications.

<b>NYSDOT Specification &amp; Description</b> <i>(NYSDOT Item # in italics)</i>	<b>GE Lumination Part #</b>	<b>Leotek Part #</b>	<b>Dialight Part #</b>
8" (200 mm) Red Ball <i>Item # - 680.810301M</i>	DR4-RTFB-17A-65	TSL-08R-LX-IL3-A1-NYS	433-1110-003-XLNY1
8" (200 mm) Green Ball <i>Item # - 680.810305M</i>	DR4-GCFB-17A-65	TSL-08G-LX-IL3-A1-NYS	433-2170-001-XLNY1
8" (200 mm) Yellow Ball <i>Item # - 680.810303M</i>	DR4-YCFB-17A-65	TSL-08Y-LX-IL3-A1-NYS	433-3170-901-XLNY1
12" (300 mm) Red Ball <i>Item # - 680.810101M</i>	DR6-RTFB-17A-65	TSL-12R-LX-IL3-A1-NYS	433-1210-003-XLNY1
12" (300 mm) Green Ball <i>Item # - 680.810105M</i>	DR6-GCFB-17A-65	TSL-12G-LX-IL3-A1-NYS	433-2270-001-XLNY1
12" (300 mm) Yellow Ball <i>Item # - 680.810103M</i>	DR6-YCFB-17A-65	TSL-12Y-LX-IL3-A1-NYS	433-3270-901-XLNY1
12" (300 mm) Red Arrow <i>Item # - 680.810102M</i>	DR6-RTAAN-17A-65	TSL-12RA-MF-A1-NYS	432-1314-001XODNY
12" (300 mm) Green Arrow <i>Item # - 680.810106M</i>	DR6-GCAAN-17A-65	TSL-12GA-MF-A1-NYS	432-2374-001XODNY
12" (300 mm) Yellow Arrow <i>Item # - 680.810104M</i>	DR6-YCAAN-17A-65	TSL-12YA-MF-A1-NYS	431-3374-901XODNY

(continued)



**LED SIGNAL INDICATIONS (QPL)**

**Type A Units -**

**The Type A units shown below are NYSDOT specified units that are not compatible with Model 215 Current Monitors and cannot be used with NYS Specified Cabinets that include this Monitor.**

The part numbers shown below are supplied by the manufacturers and are required to be clearly marked on each unit supplied. All units designated on this QPL conform to the latest NYSDOT specification for LED indications.

<b>NYSDOT Specification &amp; Description</b> <i>(NYSDOT Item # in italics)</i>	<b>GE Lumination Part #</b>	<b>Leotek Part #</b>	<b>Dialight Part #</b>
12" (300 mm) Yellow/Green Bi-Model Arrow	DR6-ECA6-01A-24	TSL-12BM-LD-A1- NCGC	430-6370-001N1
12"x12" PED Hand/Person Combo	PS6-CFL1-26A-24	TP12H-HM-NCGC	430-6772-001XNY
16"x18" PED Hand/Man Combo <i>Size A: 410 mm H by 450 mm W</i> (McCain, ICC and IDC Housings)	PS7-CFC1-26A-24	TSL-PED-DP-16-FS- NCGC	430-6450-001XNY (Side by Side) 430-6472-001XNY (Overlay)
12"x12" PED Single Hand	None	TP12B-EH-NCGC	None
12"x12" PED Single Person	None	TP12B-WM-NCGC	None

**The Type A units shown below are NYSDOT specified units that are not compatible with Model 215 Current Monitors and cannot be used with NYS Specified Cabinets that include this Monitor.**

They have been built as per NYSDOT specifications and are available for purchase by other agencies or municipalities from the OGS Central Supply Contract for Traffic Signals. The part numbers shown below are supplied by the manufacturers and are required to be clearly marked on each unit supplied. All units designated on this QPL conform to the latest NYSDOT specification for LED indications.

<b>NYSDOT Specification / Description</b>	<b>GE Lumination Part #</b>	<b>Leotek Part #</b>	<b>Dialight Part #</b>
8" (200 mm) Red Ball	DR4-RTFB-17A	TSL-08R-LX-IL3-A1-NCGC	433-1110-003-XLNY2
8" (200 mm) Green Ball	DR4-GCFB-17A	TSL-08G-LX-IL3-A1-NCGC	433-2170-001-XLNY2
8" (200 mm) Yellow Ball	DR4-YCFB-17A	TSL-08Y-LX-IL3-A1-NCGC	433-3170-901-XLNY2
12" (300 mm) Red Ball	DR6-RTFB-17A	TSL-12R-LX-IL3-A1-NCGC	433-1210-003-XLNY2
12" (300 mm) Green Ball	DR6-GCFB-17A	TSL-12G-LX-IL3-A1-NCGC	433-2270-001-XLNY2
12" (300 mm) Yellow Ball	DR6-YCFB-17A	TSL-12Y-LX-IL3-A1-NCGC	433-3270-901-XLNY2
12" (300 mm) Red Arrow	DR6-RTAAN-17A	TSL-12RA-MF-A1-NCGC	432-1314-001XODN1
12" (300 mm) Green Arrow	DR6-GCAAN-17A	TSL-12GA-MF-A1-NCGC	432-2374-001XODN1
12" (300 mm) Yellow Arrow	DR6-YCAAN-17A	TSL-12YA-MF-A1-NCGC	431-3374-901XODNY1

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**BREAKAWAY TRANSFORMER BASE (ALUMINUM) (723-15)<sub>1</sub> METRIC (QPL)**

SUPPLIER AND LOCATION	BASE NUMBER	MATERIALS DETAILS NO.
<b>Hapco Company Abingdon, VA</b>	TB1-AF-1315-17 I.W.	A70500-M, 4-27-95
	TB1-AF-Modified-17 I.W	A70508-M, 4-27-95
	TB2-AF-1012-17 I.W.	A70510-M, 4-27-95
	TB3-AF-1517-17 I.W.	A70520-M, 4-27-95
<b>P&amp;K Pole Products, a division of Flagpoles Inc. East Setauket, NY</b>	TB1-17-M	C-97344-M, 2/20/97
	TB2-17-M	C-97346-M, Rev. A, 6/17/97
	TB3-17-M	C-97347-M, Rev. A, 6/17/97

**BREAKAWAY TRANSFORMER BASE (ALUMINUM) (723-15)<sub>1</sub> U.S. CUSTOMARY (QPL)**

SUPPLIER AND LOCATION	BASE NUMBER	MATERIALS DETAILS NO.
<b>Flagpoles, Inc. East Setauket, NY</b>	TB1-17	3576, 5-18-92
	TB2-17	3577, 5-18-92
	TB3-17	3578, 5-18-92
<b>Hapco Company Abingdon, VA</b>	TB1-AF 1315-17 I.W.	A70500, 11-9-90
	TB1-AF Modified 17 I.W.	A70508, 11-9-90
	TB2-AF 1012-17 I.W.	A70510, 11-9-90
	TB3-AF 1517-17 I.W.	A70520, 11-9-90
<b>P&amp;K Pole Products, a division of Flagpoles Inc. East Setauket, NY</b>	TB1-17	C-97344, Rev. A 5/16/91
	TB2-17	C-97346, Rev. A, 6/17/97
	TB3-17	C-97347, Rev. A, 6/17/97
<b>Union Metal Corporation Canton, OH</b>	2849	2849-G101, Rev. 12, 11-28-90
	2850	2850-C1, Rev. 10, 1-10-90
<b>Valmont Industries, Inc. Valley, NE</b>	TB1-AF1315-17 IW	0283093, Rev. A, 9-18-90
	TB2-AF1012-17 IW	0283104, 4-25-91
	TB3-AF1517-17 IW	0283098, 9-17-90

Revised on: March 11, 2002

**NOTE:**

1. The Supplier must submit two copies of the approved Materials Details through the Contractor to the Engineer as part of the evidence of acceptability for the material at least 10 days prior to use of the product.

(continued)

**ARROW PANELS (729-15)\_(QPL)**

MODEL	EXPIRATION DATE	MANUFACTURER/LOCATION
AB25	Permanent	<b>Crown Construction Equipment Winnipeg, MB, Canada</b>
ALLMAND AB2220	07/15/2011	<b>ALLMAND BROS., INC. Holdrege, NE</b>
Aro-lite	Permanent	<b>National Signal, Inc. Fullerton, CA</b>
Aro-lite Curve	Permanent	
Sentinel - 15 Lamp	Permanent	<b>Solar Technology, Inc. Allentown, PA</b>
Sentinel - 25 Lamp	Permanent	
Sunup	Permanent	<b>National Signal, Inc. Fullerton, CA</b>
TCI-15s	10/05/2010	<b>TRAFCON Industries Inc. Mechanicsburg, PA</b>
TCI-25s	10/05/2010	
WTSP55-LSA	Permanent	<b>WANCO, Inc. Arvada, CO</b>

Revised on: June 8, 2010

**PORTABLE VARIABLE-MESSAGE SIGNS (PVMS) (729-16)\_(QPL)**

**A. ALL HIGHWAYS**

MODEL	EXPIRATION DATE	MANUFACTURER
CMS-T331NY	10/01/2011	<b>American Signal Co. Atlanta, GA</b>
CMS-T332	Permanent	
CMS-T333	Permanent	
DH1000 ALS <sub>1</sub>	04/15/2010	<b>Imago North America St. Paul, MN</b>
Silent Messenger MB-1548	Permanent	<b>Solar Technology, Inc. Allentown, PA</b>
Silent Messenger MB-4048		
Solar Messenger Center SMC-1000 HE	Permanent	<b>Precision Solar Controls Garland, TX</b>
Solar Messenger Center SMC-1000 ST	10/01/2011	
Solar Messenger Center SMC-2000 FM	Permanent	
WTLMB-SLL(A)-06	Permanent	<b>WANCO, Inc. Arvada, CO</b>
WTMMS-SKK(A)-08		

(continued)

**B. HIGHWAYS WITH PRECONSTRUCTION POSTED SPEEDS EQUAL TO, OR LESS THAN, 45MPH**

MODEL	EXPIRATION DATE	MANUFACTURER
CMS80FM	Permanent	<b>Crown Construction Equipment Winnipeg, MB, Canada</b>
CMS-T331	Permanent	<b>American Signal Co. Atlanta, GA</b>
CMS-T333		
DH1000 ALS <sub>1</sub>	Permanent	<b>Imago North America St. Paul, MN</b>
KKMB3L-240	Permanent	<b>K&amp;K Systems Tupelo, MS</b>
PCMS-1210	Permanent	<b>Vex-Mac Saint-Foy, QC, Canada</b>
PCMS-1210 QS		
PCMS-1500		
Silent Messenger	Permanent	<b>Solar Technology, Inc. Allentown, PA</b>
Silent Messenger II MB2-3048		
SM-4048		
SM2-LR-3048	Permanent	<b>Solar Technology, Inc. Allentown, PA</b>
Solar Messenger Center SMC-1000 ST	10/01/2011	<b>Precision Solar Controls Garland, TX</b>
Sunray 380	Permanent	<b>National Signal, Inc. Santa Fe Springs, CA</b>
Sunray 390		
WTMMB-S-LL(A) Full Matrix	Permanent	<b>WANCO, Inc. Arvada, CO</b>
WTMMB-S-LL(A) Three Line Messenger		
WTMMS-SKK(A)-08		

Revised on: September 23, 2010

**NOTE:1.** Pending official NTPEP notification, DH1000 ALS, manufactured by ADDCO, is approved for use, as it is expected to meet NYSDOT Standard Specifications.

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**TRAFFIC SIGNAL POLES - SPAN WIRE POLES (724-03)\_(QPL)**

MANUFACTURER	LOCATION
Di Highway Sign and Structure Corporation	New York Mills, NY
Jet Industries, LLC	Ellwood City, PA
Stony Brook Manufacturing Company, Inc.	Calverton, NY
Union Metal Corporation	Canton, OH
Valmont Industries, Inc.	Valley, NE

*Revised on: October 18, 2006*

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**ROADWAY LOOP EMBEDDING SEALER (724-22)\_(QPL)**

BRAND NAME	SUPPLIER AND LOCATION
Black 5000	3M Safety and Security St. Paul, MN
Bondo P.606	Dynatron/Bondo Corporation Atlanta, GA
Reflex Joint Filler	The Burke Company Denver, CO
Signal Embedding Resin	Universal Coating Products, Inc. Salt Lake City, UT
Stat-A-Flex	Durant Paints, Inc. Lynn, MA

*Revised on January 27, 2011*

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**Listing by Manufacturer**

Approved Code (for Barcode use)	Manufacturer Information	Product List
-	Alpha Technologies Inc. 3767 Alpha Way • Bellingham, WA 98226	BBS: FXM-1100 w/o GEL Batteries
AZ	Axis Communications Inc. 100 Apollo Drive • Chelmsford, MA 01824	Network Camera Model 215 PTZ-E
BT	Blue Tree Wireless Data, Inc. 2425 46th Avenue • Lachine, QC, Canada H8T 3C9	Models BT-6601 • BT-6621
D1	Dialight Corporation 1501 Route 34 South • Farmingdale, NJ 07727	Traffic Signal LEDs
-	Digi International 11001 Bren Road East Minnetonka, MN 55343  Diablo Controls, Inc. 2150 Rheem Drive, Suite E • Pleasanton, CA 94588	Serial Server: Digi One IAP Haz Cellular Modem/Router: Digi ConnectPort modem Digi 3G modem, Digi WR 44 Model 222
A7	Eberle Design Inc. 3819 East La Salle Street • Phoenix, AZ 85040	Models 200,204,210, 222 & 210NYR
A2	Econolite 3360 E La Palma, Anaheim, CA 92806	Models 2070L, 2070-1B, 2070-2A, 2070-3B, 2070-4A, & 2070-7A
E1	ENCOM Wireless Data Solutions Inc. #7, 640 - 42nd Ave NE • Calgary AB • CANADA T2E 7J9	Spread Spectrum Radio System
E2	Extreme Copper, Inc 996 Lawrence Drive, Suite 109 • Newbury Park, CA 91320	Ethernet Over Copper LT-300, NT-300, RP-300
G2	GDI Communications LLC 280 Interstate 80 Exit 1 PO Box 1330 Verdi, Nevada 89439 USA	Models 200,204,242 ,252 2070-6A & 2070-6B, 6D
G1	GE Lumination 1975 Noble Road • Bldg 338E East Cleveland, OH 44112-6300	Traffic Signal LEDs
G3	Global Traffic Technologies, LLC 7800 third Street North, Bldg. 100 St. Paul, MN 55128-5441	Preemption Devices(APL)
H1	Horizon Signal Technologies 216 Line Road • Malvern, PA 19355	Portable Traffic Signal Model SQ3TS
L1	Leotek Electronics USA Corporation 1330 Memorex Drive • Santa Clara, CA 95050	Traffic Signal LEDs
A8	McCain . Inc 2365 Oak Ridge Way • Vista, CA 92081	Model 330

(continued)

M3	MS SEDCO 8701 Castle Park Drive • Indianapolis, IN 46256	Models TC-26-B, TC-30 and TCPS-170
A4	Naztec, Inc. 820 Park Two Drive • Sugar Land, TX 77478-0765	Microwave Detection Devices-Presence Detectors: Models 2070L, 2070-1B, 2070-2A, 2070-3B,2070-4A & 2070-7A
-	Myers Power Products, Inc. 2950 E Philadelphia Street • Ontario, CA 91761	BBS Model : MP2000
A9	Nova Tech, LLC 184 Goose Lane • Tolland, CT 06084	Models 231, 232, 242 & 252
O1	OMJC Signal, Inc. 403 Chestnut St. • Waterloo, IA 50703	Portable Traffic Signal Model –Pop Up Quad 2070 PNW-234-2070
B1	Peek Traffic Corporation 2906 Corporate Way • Palmetto, FL 34221	Model 222, 2070L, 2070-1B, 2070-2A, 2070-3B, 2070-4A & 2070-7A
P5	Polara Engineering 9153 Stellar Court Corona, CA 92883	ADA Accessible(Audible) Pedestrian Push Button Station
P4	Power Distribution & Control, Inc. 210 Estates Drive Suite 110 • Roseville, CA 95678	Models 200, 204, 242 & 252
R2	Reliance Controls Corporation 2001 Young Court, • Racine, WI., USA 53404	Gen. Transfer Switch/Service disconnect Model C30A4LT3
R1	Reno A&E 4655 Aircenter Circle • Reno, NV 89502	Model 222
A5	Safetran Traffic Systems, Inc. (An Econolite group company) 1485 Garden of the Gods Rd. Colorado Springs, CO 80907	Model 330
-	Sensata Technologies 4467 White Bear Parkway • St. Paul, MN 55110-7626	BBS : 24M11-WBE
S5	Sensys Networks, Inc. 2560 Ninth Street, Suite 219 • Berkeley, CA 94710	Models AP240-S, AP240-MTGS, CC170, CC-ACC, EX-170, VSN240-T & VSN240-EPX
A1	Siemens Energy & Automation, Inc. 8004 Cameron Road • Austin TX 78754	Models 2070L, 2070-1B, 2070-2A, 2070-3B, 2070-4A, , 2070-6A & 2070- 7A,
-	Signal Sense, Inc. P.O. Box 760 • 878 Sussex Blvd., Bldg. #2 • Broomall, PA 19008	BBS Model : SH1200UR
S4	SIMREX Corporation 5490 Broadway St. • Lancaster, NY 14086	Models DM2070-TA, PT.LMR195-NM/TNCM-3, AN.LA-FIL-3-FF, PT.LMR400-NM/NM-40 & AN.YG-915-6DBD-BLK

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T3	Tassimco Technologies 3100 Jacob Jardon •Jerrebonne, Quebec J6X4J6	Pedestrian Countdown Timer
T5	<b>TOMAR Electronics</b> 2100 W. Obispo Avenue • Gilbert, Arizona 85233 USA	Preemption Devices(APL)
T1	Traffic Sensor Corporation 173 S G Street • San Bernardino, CA 92410-3317	Models 200, 204
T2	Traffic Systems, LLC 11445 E. Via Linda, Suite 2-403 Scottsdale, AZ 85260-2454	Preemption Devices(APL)

(continued)



## Appendix 6

NYS OGS/Department of Transportation ITS/NTCIP Specifications  
for Solar-Powered, Trailer-Mounted and Other Portable Dynamic  
Message Signs (PDMS), Extinguishable Message Signs (EMS) &  
Directional Arrow Panels

(continued)

## Solar-Powered, Trailer Mounted Portable Dynamic Message Signs

### SCOPE

It is the intent of these specifications to cover the minimum requirements for **Solar-Powered, Trailer Mounted Portable Dynamic Message Signs** and replacement parts for existing New York State Dynamic Message Signs. The purpose of these displays is to effectively communicate traffic conditions and situations to the motorists on the streets, roads, highways, expressways, as well on entry ramps and exits of bridges and tunnels, giving the driver the information needed to proceed in a safe and efficient manner.

**SPECIAL NOTE:** The PDMS standards as listed in the U.S. Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) Section 6F.55 Portable Changeable Message Signs (<http://mutcd.fhwa.dot.gov/HTM/2003r1/part6/part6f2.htm> ) must be met but does not supersede specific requirements stated herein. Equipment functionality will be thoroughly tested to verify complete compliance with all areas of these specifications.

The PDMS units shall employ solar powered LED's to display dot-matrix or equivalent characters as programmed from a computer keyboard as well as from remote locations by cellular phone. Other remote devices may be made available as **OPTIONAL EQUIPMENT** and hard-wire hookup for remote communications is acceptable as an option but shall not be a requirement for remote operations. Each unit shall include at least the following components:

- Solar Array Panels with Chargeable Batteries for a DC Power Supply System.
- Signboard and Mast with an Electric or Electro-Hydraulic Lift Mechanism System (or equal).
- Micro-Computer Controller with keyboard, LCD or Video display, Cellular Communication Device and programming Software.
- Heavy-Duty Trailer with a Structural Support System meeting the road standard requirements of The NYS Department of Motor Vehicles.
- **Lockable vandal resistant** enclosure(s) for the batteries, charger, switches and sign controller
- Technical Documentation & User Operational Manual

All electronic components shall be installed to withstand the shock and vibration expected with interstate highway traffic. They shall not require air conditioning to function within their enclosures, given the humidity and temperature ranges expected in New York State. Surge protection for electronic components is required. For assurance of legibility and functionality, a demonstration of the bid model may be required prior to making an award.

### L. E. D. SIGNBOARD:

**Dimensions:** This offering is open for PDMS panels of variable sizes.

A **Large Message Panel**, referred herein will have a minimum display panel of 48" x 96" and a maximum area of 78" x 144".

A **Small Message Panel**, referred herein will have a minimum panel size of 28" x 60."

**LED:** The color of light emitted shall be **AMBER**, with a peak wavelength centered at 590 (+/-4) nanometers.

**Illumination:** The signboards LED's shall produce brightness greater than **1,000** Candela per square meter at minimum luminous intensity.

The signboard will automatically adjust the LED's intensity to be dimmer or brighter for optimum viewing as natural ambient light conditions change throughout the course of a day. This feature will include a manual override function in the control system, allowing the operator the ability to select the level of illumination.

**Display:** The signboard shall be a **Full Matrix or Line Matrix type**.

It shall be capable of displaying three (3) lines of alphanumeric text or characters that are:

- at least 18 inches high on **large message panels**,
- at least 8 inches high for **small message panels** and
- a minimum of 8 characters per line per panel.

(continued)

**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):**

L. E. D. SIGNBOARD(Cont'd):

Note that the LED **Display** and the **Dimensions** are dependent on each other.

Each character shall be at least 7 pixels high and variable in width but use a minimum width to height character profile of approximately 70% (ex. 5 x 7 pixels per character, assuming nearly equal horizontal and vertical pixel pitch) to be in accordance with the minimum number of characters per line & character height described herein.

Each pixel shall be formed by a cluster of equally spaced LED's and the number of LED's per pixel (typically 3 or 4) shall be determined by the manufacturer as required to produce the **LED Illumination** and accepted Message Legibility as stated herein.

**Message Legibility:** Messages shall be legible from a minimum distance of 720 feet by day or night under optimum viewing conditions when displaying 18 inch characters, with a viewing angle of at least 15 degrees to the left and to the right of the signs midpoint.

**Design & Materials:** The signboard shall pivot and be lockable in any position, with 360° rotation about the vertical axis in a clockwise or counterclockwise direction. The bottom of the signboard, when raised for operation, shall be at least seven (7) feet above the ground. The face of the signboard shall be protected by a UV-stabilized, seamless, impact-resistant (Lexan™, polycarbonate, or equal) see-through cover. The entire unit, including LEDs and all electrical circuitry, shall be protected by a weatherproof and lockable vandal resistant enclosure that affords convenient access for maintenance.

**POWER SUPPLY:**

The PDMS shall operate primarily from a solar powered electrical system that consists of a battery bank and high efficiency solar array panels. Secondary power supply type shall be the capability of the unit to be operable and for the batteries to be recharged from a standard 110-120 VAC (nominal) 60-cycle source outlet. Together, the solar array panels and battery bank should supply power sufficient to operate the complete unit, including integrated accessories **YEAR ROUND** under normal conditions in New York State.

The solar panel's output capacity must keep the batteries charged to support all electrical components in full operation (mast, gauges, computers, LED's, etc). The solar power system shall be fully integrated into the unit power system and shall be in operation when the solar panels are deployed.

The battery bank itself should have the capacity to run the LED panels minimally at 40% intensity with one-third of the pixels active, **CONTINUOUSLY** for at least 21 days without recharge via the AC Recharging System. The system should require ideally four and no more than six maintenance charges per year.

Additional features required as follows:

**Warning Display:** At least five hours prior to battery discharge; the system shall display a caution symbol or other operator selected default message on the signboard and / or the control panel, to alert maintenance personnel that the batteries need recharging.

**Battery Charger:** The 110-120 volt AC charging system shall initiate charging automatically when a 110-120 volt AC service is connected. The system must fully recharge the battery bank within a 48 to 72 hour period when in a completely discharged state. The recharging system is to be designed so that a fully charged unit can remain plugged-in without damaging the system.

**Electrical Connections and Gauges:** All wiring from power sources shall utilize locking cable connectors. A voltmeter or LED low-voltage indicator and an ammeter for monitoring the DC current draw shall be provided. A standard negative ground system shall be tied to the sign chassis and lightning protection shall be supplied to the load side of the sign's system distribution power lines to withstand multiple surges in excess of 600 volts.

**Solar Panel Mounting:**

The solar panels shall be mounted in a position (preferably above the message board) where it receives the most sunlight, and is adjustable by the operator, is less susceptible to damage from debris on the road. The solar panels should be installed in such a fashion as to deter theft. Features such as vandal resistant hardware, sealed mounting trim, locking frame, non-reversible screws etc. should be utilized to the extent practical

(continued)

**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):**

**SIGN CONTROLLER:**

The PDMS shall be controllable through a computerized interface equipped with an alphanumeric QWERTY keyboard (secured in a lockable enclosure) and an LCD display screen that can be operated under all weather conditions. It shall have the capability of being addressed from a single communications link.

The primary controller may be removable from the control case to allow for short range remote operation of the panel while safely away from traffic. Secondary controllers or other control methods may be provided as options. (Please see OPTIONAL EQUIPMENT on page 101 for more information).

**Operating Software:** Four (or more as requested) sets of Software shall be provided for installation in the controller. The software shall be supplied to allow a remote operator to create, edit, and/or delete messages, and to fully control all capabilities of the system. It shall be Microsoft Windows-based 32 bit operating software consisting of Microsoft Windows 2000 or later. Items shall be compliant with all NTCIP functions specified under **Communications Requirements** as found beginning on page 96, to be eligible for listing on the NYSDOT preferred equipment list. The software sets are to be turned over to the New York State Government Agency purchasing the PDMS with non-exclusive, royalty-free, irrevocable, perpetual statewide unlimited seat licensable rights, which shall require no hardware keys for operation. The contractor shall provide free software and firmware upgrades to the most current version for a period of no less than 24 months from acceptance of the changes without any tampering or new restrictions that forbears normal usage and rights. Any required cooling fans shall be provided to dissipate heat from thermally-sensitive areas.

Additionally, the Software/Sign Controller shall be designed to:

- Allow for message programming to be displayed in a 3 line display format to utilize the full matrix capability of the sign including variable height text, 3 line display etc.
- Allow an exact animated simulation of the LED display in order to permit the dynamic visualization of the message prior to actual display.
- Automatically broadcast specific messages to at least 100 remote variable message signs, according to predetermined schedules, or immediately in case of emergencies.
- Display three sequential messages. On/Off time for each message in a sequence shall be user adjustable within a range of 0 to 5 seconds, in a minimum of half-second intervals.
- Monitor and display the battery status, solar array activities and other devices connected to the system.
- Automate system recovery and have a fail-safe prevention of improper information display after power outages or malfunctioning without any operator intervention.
- Shut down automatically if the system is reaching a perishable state or if the battery power drops below a recommended output level for proper functioning. It should also be able to automatically alert an operator on an interconnected remote device.
- Maintain an up-to-date status if operated from a remote location via a remote device.
- Retrieve all messages stored in a nonvolatile memory.
- Allow simultaneous readouts to external communication devices specified by the end user connected via EIA/TIA/RS-232 ports, Ethernet ports, USB ports or wirelessly.
- Prevent unauthorized access via operator selected password protection at multiple security levels in accordance with the **Communications Requirements** as specified and be consistent on all user consoles.
- Accommodate on board storage of a **minimum** of 300 messages. These may be either factory programmed, user-programmed, or user-reprogrammable. There shall be sufficient space included within this minimum for the creation and storage of at least 80 user programmed messages. Additionally, full matrix systems will also have within the minimum capacity, storage space for a minimum of 50 pictograms. Standard MUTCD Pictograms should be a part of the factory programmed package.

**CONTROL CASE AND HOUSINGS:**

The Control Casing and all housings on the trailer shall be fabricated as weatherproof to provide full protection from moisture intrusion to sensitive parts due to rain and snow, including road spray and ice control agents. The casings are to be tamper and vandal resistant and lockable and be designed to hold all of the necessary equipment required for the deployment of the PDMS. Ideally, it should be of aluminum construction, constructed with powder coated aluminum, however other materials may be acceptable provided the manufacturer can demonstrate to the State that it meets or exceeds these requirements. It should be of ample dimension to allow for easy access to all control and service points of service and should contain an internal illumination device to assist in the operation and service of the PDMS during evening and night time hours.

(continued)

**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):**

**CONTROL CASE AND HOUSINGS: (Cont'd)**

At the manufacturer's option, the power system and/or battery array may be self contained in a similar separate housing. Such an additional housing may be constructed of heavy duty impact and corrosion resistant plastics (or equal). All other specifications pertaining to Control Casings would still apply. Additionally, the display housing lens is to be weather proof and provide full protection for the display unit. All cases and housings are to be lockable.

**TRAILER:**

The trailer shall be a heavy-duty steel single-axle design, constructed of rectangular structural tubing (ASTM A500-B) or welded steel channel (ASTM A36) equipped with a removable tow bar (tongue), walk-on fenders, and skid resistant material on all walk-able surfaces. **NOTE:** The skid resistant material should either cover all walk-able surfaces entirely or be spaced out on all walk-able surfaces at intervals of no more than 2 inches apart. The tubular frame of the trailer shall have no openings. Trailer size and construction shall be appropriate to safely support, store and transport the PDMS and all operating systems. The trailer shall be provided with radial, 14" - 16", load range class C tires of adequate size and rating to transport the system safely at normal highway speeds of up to 55mph. The fully equipped trailers shall safely transport the entire system when the signboard is not in operation and all system components are properly secured, and shall be equipped for use on public highways in accordance with NYS Vehicle and Traffic Law, Article 9 - EQUIPMENT OF MOTOR VEHICLES, as found under section VAT- Article 9, on the web at - <http://public.leginfo.state.ny.us/menuegf.cgi> , and as found in the NYS Department of Motor Vehicles Document #MV-529C, entitled: "Equipment Required for Trailers" as reprinted in Appendix 8 of this document.

The following features and performance standards are also required:

**Structural Support:** The framework shall provide sufficient support to prevent damage to any PDMS components when the sign is in the down and locked position during normal highway travel. It also shall supply adequate support to allow complete sign operation that includes raising and lowering the sign panel, and shall remain stable during wind gusts of 75 mph when deployed in the operating position. The face of the signboard shall be a clear, impact-resistant polycarbonate Lexan™ or other similar material, subject to the approval of the State.

**Wiring & Safety:** Lights, reflectors, splash guards and wiring harness for highway towing shall be provided to comply with ICC, NYS Vehicle and Traffic Law and NYS- DMV regulations as noted above. All trailer wiring shall be continuous with no splices and all exposed runs of wire shall be enclosed in plastic flexible conduit and adequately secured, approximately every 18". All connections shall be made in a watertight junction box, using watertight light fixtures and watertight connections (Truck-Lite 50800/50400 or equal). Lamp lens and reflectors shall be Lexan™ or equal. The reflectors shall be mechanically fastened (not stick-on) with at least two red reflectors on each side and 2 amber reflectors on the front of the trailer. Wiring system shall be equal to Truck-Lite ([www.truck-lite.com](http://www.truck-lite.com)) sealed harness system. Main wiring harness shall be a 7-way cable connector and ATA socket (Pollack #11-714 round pin) or equal. All lights are to be sealed, shock mounted type.

Tail, Reverse, Signal and Brake Lights are preferred to be LED Based Arrays that meet the National and State safety guidelines and specifications (conventional incandescent light bulbs are also acceptable).

The trailer must be equipped with a standard 110-120 volt AC receptacle as well as a temperature stable 110-120 volt AC battery trickle charger. The necessary provisions shall be incorporated into the unit power system to allow switching the recharging mode between the 110-120 volt AC and the solar panel with minimal effort.

**Brakes:** Electric brakes (or equal) are required on all trailers **weighing in excess of 1,000 pounds unladen**, as well as on trailers having **a maximum gross weight in excess of 3,000 pounds**. Brakes must be adequate to control the vehicle at all times, and must comply with the standards set by the New York State Department of Motor Vehicles, Division of Vehicle Safety Services for brake efficiency.

**SYSTEMS WHICH DO NOT MEET THESE MINIMUM WEIGHTS DO NOT REQUIRE ADDITIONAL BRAKES.**

**Hitch:** A 2-inch ball type and pintle combination with safety chains and self-latching safety hooks. If surge-activated brakes are installed and preclude the use of a combination hitch, then a pintle ring will be acceptable. A tongue jack is required for removal of the trailer from the tow hitch unless the required **Stabilizing Outriggers** (see below) are sufficient to remove the trailer from the towing vehicle.

(continued)

**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):**

**TRAILER: (Cont'd)**

**Mast and Lift Mechanism:** The mast assembly shall include an electric hydraulic lift mechanism (or equal) to raise or lower the signboard and hold it securely in place, with the bottom of the signboard at a minimum of 7 feet above the ground when raised. The assembly design must also provide that in case of a loss of power to the lift or a failure in the hydraulics, authorized personnel would be able to raise or lower the mast **MANUALLY**. The mast assembly shall allow a raised signboard to rotate 360-degrees clockwise or counterclockwise about the vertical axis and lock in a desired position via a locking mechanism. A safety feature for the signboard shall be provided to prevent it from dislodging on its own when in a raised position.

**Stabilizing Outriggers:** Each corner of the trailer shall be fitted with a crank and swivel type screw jack(ideally, a total of 4 jacks)having a 2000 lb minimum capacity; adjustable from at least 18" to 32" with a large steel footpad in order to level and stabilize the trailer, when it is being placed into the operating position. The rigging must be capable of supporting and stabilizing the entire operating unit in winds gusting up to 75 mph when the sign is raised to its full working height. The outrigger jacks shall pivot to a horizontal position for transport. An alternative stabilizing system may be substituted with the approval of the purchasing agency.

**Paint:** All exterior surfaces of the PDMS and support structure shall be cleaned, primed, and painted in accordance with the paint manufacturer's recommendations for this application. All paint products are to be lead and chromate free from the same manufacturer. A minimum of two coats of lead free, chromate free, corrosion inhibited paint are to be applied. At time of delivery, Contractor must provide the MSDS, as well as written certification that notes the manufacturer, product code and lead content of all coatings. A 100% lead-free coating system (including primers, sub-coats, topcoats and clear coats) is required. The delivered product may be tested for the presence of lead. Any unit that tests positive for lead may be rejected. Such rejection will be cause for the purchase of a substitute product at the expense of the contractor.

Paint options available are to include the manufacturer's standard colors, as well as the following two options, the cost of which shall be included in the bid price of the unit:

- **NYSDOT:** All exterior surfaces (except the sign face) will be cleaned, primed and painted with two coats of corrosion inhibited paint – **DuPont Imron Yellow 6578X** or equivalent for all units ordered for delivery to NYSDOT facilities.
- **NYS Thruway Authority:** Surfaces that are normally painted shall be suitably prepared, primed with 100% lead-free metal primer, and factory painted with at least two coats of the Thruway fleet color, which is **DuPont Centari Acrylic Auto Enamel YELLOW 224AK** (100% lead-free) or equal. If this paint is not offered, the successful bidder shall submit samples of similar lead-free yellows for selection and approval.
- **Others:** For non-NYSDOT/Thruway users, the PDMS shall be furnished in either 'Omaha Orange' or other manufacturer's standard color and not NYSDOT or Thruway colors.

**\*Note:** Powder Paint is an acceptable coating alternative as long as the color requirements herein are met.

Accessory components supplied by the Contractor concurrently with delivery of a new PDMS shall be finish painted and must be an exact match of the paint used on the equipment.

**Conspicuity Marking:** The PDMS requires appropriate conspicuity marking (3M Series 983 or equal or better) on all four (4) sides of the display unit and trailer, and said marking shall be included in the price. It will be at the discretion of the purchasing agency as to whether the PDMS is to delivered with conspicuity marking sheeting pre installed **or** supplied for agency installation.

(continued)

**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):**

**COMMUNICATION REQUIREMENTS - FHWA/NYS DOT-ITS SYSTEMS**

For proper functionality, the contractor shall provide the **capability** for the system to load and operate up to **two protocols for communications** between a remote user or Data Communications Equipment (DCE) and the PDMS controller/Data Terminal Equipment (DTE).

The **contractor shall supply the main protocol**, which **will be** the National Transportation Communications for ITS Protocol (NTCIP), **or** a Protocol that **substantially fulfills** the NTCIP conformity requirements stated herein.

If the main supplied protocol only substantially fulfills NTCIP, the Manufacturer shall provide the State with documentation stating "specific details" of how and why the protocol substantially meets or exceeds NTCIP conformity requirements. The State will then determine if the protocol substantially conforms to the Communication Requirements for it to be acceptable. Systems with supplied protocol which **completely meets the NTCIP Conformity requirements stated herein will be eligible for listing on the NYSDOT preferred equipment list, provided all other specifications are also met.**

The **second communication protocol** will be a protocol of choice of the end user and is **not included as a part of the initial contract price of the PDMS**. The second choice may be supplied by the end user, **or** the contractor may offer alternative communication solutions in their catalog for purchase by the end user as the secondary communication source. If the later should occur, the contractor shall include in the user training, the programming of secondary systems into the controller.

The Communication System of the Dynamic Message Sign **shall be capable of** integrating with a plug and play Cellular Communication Device (CCD) (ie: IP Modem, Dial-up Modem, etc.), approved and configured to support a Wireless Cellular Communication Network (ie: CDMA, GSM, GPRS, EDGE, UMTS, HSDA, etc.). These devices **shall be a part of the supporting accessory catalog**, and the appropriate device will be determined and selected **as an installed option** by the end user at the time of purchase. The CCD selected by the end user shall be proven to interface with the Wireless Cellular Communication Network of the end user's choice. The Wireless Cellular Communication Network chosen is based on what is available to and/or used by the end user at the time of purchase. **The installation of the selected device shall be included in the price of the message sign.** The Cellular Communication Device and associated connections to power, the sign controller, and external antenna etc shall be adequately secured on the PDMS and be a separate entity of its own.

**NTCIP Conformity:**

- A. The PDMS Central Operating Software and Field (Remote) Controller Software shall comply with the **versions** of the NTCIP documents and all related errata sheets, as referenced herein unless otherwise stated.
- B. The NTCIP communications software shall comply with NTCIP 1101:1996, the Simple Management Framework (STMF), as well as all available subsequent Errata and Amendments, and shall conform, as a minimum, to Compliance Level 1.

***Sub-network Profile (C., D., E. & F.)***

- C. The communications hardware link between a remote user or DCE and the DTE shall include, at a **minimum**, the following connectors, separately, to conform to the standards in the table below:

<u>Connector</u>	<u>Standard</u>
Serial Port (1): EIA/TIA-232-E (DTE), Female 25-pin D-type (DB-25) that supports a Null Modem and a Cellular Communication Device.	NTCIP 2101
Serial Port (1): ANSI/EIA/TIA-232-F (DTE), DB-25 Female that supports a Null and Dial-Up Modem	NTCIP 2103
Communications Port (1): Supporting either 10BaseF (Fiber Optic Cable), 10Base5 (Thick Coax Cable), 10Base2 (Thin Coax Cable) or 10BaseT (Twisted Pair) specified by the end user at the time of purchase	NTCIP 2104

**\*Note:** A DB-9 Connector is an acceptable replacement option for the DB-25 as long as stable and sturdy port converters to a DB-25 connection is included for all applicable ports above. The contractor shall also provide an appropriate port converter for any of the communications port that is specified by the end user.

Additional connections can be supported at the manufacturer's option. At any one time, only one connection shall be in control of the PDMS control system. Other connections not in control of the PDMS control system shall have read-only status. It shall be configurable to allow an end user with administrative security privileges to override an active control connection. Controller output shall provide a visual indication of the currently active control connection. A local override control shall be provided to ensure that commands issued by personnel at the controller cabinet take precedence over remote connections.

(continued)

**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):**

**COMMUNICATION REQUIREMENTS - FHWA/NYS DOT-ITS SYSTEMS (Cont'd):**

- D. Physical layer shall conform to NTCIP 2104, both EIA/TIA-232 Serial Interfaces defined in NTCIP 2101 and NTCIP 2103, and the modem interface defined in NTCIP 2103. It shall also support the following protocols that govern approved modem communication standards and interfaces in the table below:

Hayes AT - Command Set	MNP5
MNP10	V.42bis
V.34 or an ITU-T V-Series Interface that allows speeds of at least 19.2 Kbits/s	

- E. Data Link Layer shall support the Transport and Network Layer Protocols in the Transport Profile and conform to NTCIP 2104 and the Protocols and Standards indicated in the table below:

<u>Protocol</u>	<u>Standard</u>
PMPP	NTCIP 2101
PPP	NTCIP 2103

- F. IPI implementations shall identify the protocols used at the next higher layer in the Sub-network and/or Application Profile and support the functionality indicated by the following Protocols (other protocol may be supported too) as indicated within the PPP packet (RFC 1661) and conform to their respective reference documents as shown in the table below:

<u>Protocol Name</u>	<u>Protocol Field/IPI Value (in hex)</u>	<u>Reference</u>
LCP	0xC021	NTCIP 2103
NTCITS IPI	0x00C1	NTCIP 2103
CHAP	0xC223	NTCIP 2103
STMF	0xC1	NEMA TS 3.2, NTCIP 2101 & NTCIP 2201
IP	0x21	NTCIP 2101 & NTCIP 2202
IPCP	see Reference	NTCIP 2103

**Transport Profile (G. & H.)**

- G. Network Layer Definitions shall rely on the referenced protocols in the Sub-network Profile and conform to protocols and standards indicated in the table below:

<u>Protocols</u>	<u>Standard</u>
Null	NTCIP 2201
IP, ICMP	NTCIP 2202

- H. Transport Layer Definitions shall rely on the referenced lower layer protocols conform to protocols and standards indicated in the table below:

<u>Protocols</u>	<u>Standard</u>
Null	NTCIP 2201
UDP, TCP	NTCIP 2202

**Application Profile (I. & J.)**

- I. Session Layer and Presentation Layer Definitions shall all be a NULL layer.
- J. Application layer shall conform to the rules and protocols of the STMF, NEMA TS 3.2 and rely on the referenced lower layer protocols in the Transport Profile. It shall conform to the protocols and standard indicated in the table below:

<u>Protocols</u>	<u>Standard</u>
SNMP, STMP, SFMP	NTCIP 2301 v02

(continued)



**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):**

**COMMUNICATION REQUIREMENTS - FHWA/NYS DOT-ITS SYSTEMS (Cont'd):**

- K. Software shall implement all mandatory objects of all mandatory and optional conformance groups as defined in approved versions of NTCIP 1201 and NTCIP 1203, including approved Amendment 1 to both standards. Software shall also implement optional objects to support Full, Standardized Object Range Support (FSOR) or standard requirements (shown in parenthesis) as defined in NTCIP 1201 and 1203.

<b><u>Mandatory Conformance Groups</u></b>	
Configuration	Security
Sign Configuration	Message Table
Sign Control	

**Optional Conformance Groups (Required)**

Time Management	Time-base Event Schedule	Report
VMS Configuration	Font Configuration	MULTI Configuration
Default Message	Enhanced Sign Control	Enhanced Error
Illumination/Brightness Control	MULTI Error Configuration	Sign Status
Scheduling	Pixel Error Status	Status Error
Temperature Status	GUI Appearance	Power Status
	Flashing Text	Auxiliary I/O

**Optional Objects (Required)**

globalSetIDParameter	defaultFlashOn (0.1second increments)	defaultFlashOff (0.1 second increments)
dmsSWReset	dmsMessageTimeRemaining	dmsShortPowerRecoveryMessage
dmsLongPowerRecoveryMessage	dmsResetMessage	dmsCommunicationsLossMessage
dmsTimeCommLoss	dmsPowerLossMessage	dmsEndDurationMessage
dmsMemoryMgmt (normal,clearChangeableMessages)	dmsMultiOtherErrorDescription (meaningful error messages for any vendor-specific MULTI tags)	dmsIllumLightOutputStatus
dmsCurrentSpeedLimit	watchdogFailureCount	dmsStatDoorOpen
eventConfigLogOID	eventConfigAction	dmsMessageBeacon
dmsShortPowerLossTime	signVolts (accurate to nearest 1/10 volt)	tempMinCtrlCabinet
tempMaxCtrlCabinet	tempMinAmbient	tempMaxAmbient
fanFailures (if applicable)	fanTestActivation (if applicable)	lineVolts (accurate to +/- 2 volts)
	tempMaxSignHousing	tempMinSignHousing

- L. All objects required shall support all values within a standardized range. The standardized range is defined by a size, range, or enumerated listing indicated in the objects SYNTAX field and/or through descriptive text in the object's description field of the relevant standard. The following are standard requirements for mandatory objects of the mandatory and optional conformance groups (listed above):

<b><u>Mandatory Conformance Group</u></b>	
OBJECT NAME	MINIMUM REQUIREMENTS
globalMaxModules	one row with module Type = 3 (software)
communityNamesMax	3
communityNameAccessMask	0-4294967295
dmsNumPermanentMsg	2
dmsMaxChangeableMsg	50
dmsMaxVolatileMsg	0 (volatile messages are not required)
dmsFreeVolatileMemory	0 kb (when no messages are stored)
dmsControlMode	2, 4, 5 (local, central, central override)
dmsFreeChangeableMemory	12.75 kb (when no messages are stored)
dmsMessageMultiString	Multi Tags listed (in M.) below

(continued)

**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):  
COMMUNICATION REQUIREMENTS - FHWA/NYS DOT-ITS SYSTEMS (Cont'd):**

<b>Optional Conformance Group (Required)</b>	
<b>OBJECT NAME</b>	<b>MINIMUM REQUIREMENTS</b>
MaxTimeBaseScheduleEntries	28
MaxDayPlans	15
MaxDayPlanEvents	10
MaxEventLogConfigs	50
eventConfigurationMode	onchange, greaterThanValue, smallerThanValue, periodic
MaxEventLogSize	1000
MaxEventClasses	5
NumActionTableEntries	150
NumFonts	4 (5x7 single stroke, 7x7 double stroke, 7x10 large, and a spare)
MaxFontCharacters	255
defaultBackgroundColor	0 (black)
defaultForegroundColor	9 (amber)
defaultJustificationLine	2, 3, 4 (left, center, right)
defaultJustificationPage	2, 3, 4 (top, middle, bottom)
defaultPageOnTime	all values (0.1 sec accuracy)
defaultPageOffTime	all values (0.1 sec accuracy)
defaultCharacterSet	specify value (eightBit)
maxGroupAddresses	20
dmsIllumControl	photocell and manual
dmsIllumNumBrightLevels	16
dmsIllumLightOutputStatus	255
maxAuxIODigital	0 input; 0 output; and 2 bidirectional ports
maxAuxIOAnalog	0 input; 0 output; and 2 bidirectional ports

M. The software shall implement the following tags (opening and closing where defined) of MULTI as defined in the NTCIP 1203:

<b>MULTI Tag</b>	<b>RANGE</b>
Field	speed (mph), time, temp, date (1-11); defining all display formats
Flash	0.1 second rate, word by word
Font	1, 2, 3, 4
Justification Line	left, center, right
Justification Page	top, middle, bottom
New Line	specify spacing range
New Page	3 pages total, counting the first page
Page Time	controllable at 0.1 second increments
Spacing Character	0 to 99 pixels

(continued)

Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):  
COMMUNICATION REQUIREMENTS - FHWA/NYS DOT-ITS SYSTEMS (Cont'd):

- N. Software shall be supplied with full documentation (3 copies); including a CD-ROM containing ASCII versions of the following Management Information Base (MIB) files in Abstract Syntax Notation (ASN.1) format:
- The relevant version of each official NTCIP standard MIB Module referenced by the device functionality.
  - If the device does not support the full range of any given object within a Standard MIB Module, a manufacturer specific version of the official Standard MIB Module with the supported range indicated in ASN.1 format in the SYNTAX and/or DESCRIPTION fields of the associated OBJECT TYPE macro. The filename of this file shall be identical to the standard MIB Module, except that it will have the extension “.man”.
  - A MIB Module in ASN.1 format containing any and all manufacturer-specific objects supported by the device with accurate and meaningful DESCRIPTION fields and supported ranges indicated in the SYNTAX field of the OBJECT-TYPE macros.
  - An MIB containing any other objects supported by the device and firmware/software.
- O. The Contractor shall provide the DMS controller firmware as a Non-Volatile Memory, for all protocols (NTCIP or other) supplied with the sign.
- P. The DMS shall implement the following “observable behavior” associated with NTCIP Communication:
- The powerSource object shall report the following enumerated values:
    - i) 4 – acLine; when the sign is connected to AC and the batteries are charging
    - ii) 6 – solar; when the solar panels are charging the batteries
    - iii) 7 – battery; when the solar panels are not charging the batteries
  - Pixel failure objects shall faithfully reflect the actual displayed message (visual appearance) of the sign and accurately report the number and positions of the failed pixels when a pixel failure occurs and simulate:
    - i) An LED failure into the display by removing an LED
    - ii) An LED board failure into the display by removing a LED board
    - iii) A power failure into the display by disconnecting the batteries from the LED display boards

\* \* \* \* \*

For PDMS Systems which will not require compatibility or emergency network control through the FHWA or NYS DOT-ITS Interagency Communications Net, the contractor shall provide **communication capability** for the PDMS to load and operate between a remote user or Data Communications Equipment (DCE) and the PDMS controller/Data Terminal Equipment (DTE). This should be the manufacturer’s conventional system of choice and it need not be NTCIP compliant.

The Communication System of the Dynamic Message Sign **shall be capable of** integrating with a plug and play Cellular Communication Device (CCD) (ie: IP Modem, Dial-up Modem, etc.), approved and configured to support a Wireless Cellular Communication Network (ie: CDMA, GSM, GPRS, EDGE, UMTS, HSDA, etc.). These devices **shall be a part of the supporting accessory catalog**, and the appropriate device will be determined and selected **as an installed option** by the end user at the time of purchase. The CCD selected by the end user shall be proven to interface with the Wireless Cellular Communication Network of the end user's choice. The Wireless Cellular Communication Network chosen is based on what is available to and/or used by the end user at the time of purchase. **The installation of the selected device shall be included in the price of the message sign.** The Cellular Communication Device and associated connections to power, the sign controller, and external antenna etc shall be adequately secured on the PDMS and be a separate entity of its own.

(continued)

**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):**

**OPTIONAL EQUIPMENT:**

The following items are recommended to be available as optional equipment. Note that these are **options** and **with the exception of Cellular Communication Devices**, are not mandatory for eligibility of bidding and/or for award. Optional equipment should integrate with the unit, operate within the confines of the on board power system, and perform as noted below if offered. ALL devices shall be compatible and inter-connectable with the PDMS and in some cases with each other. They shall not be subject to risk of mechanical damage during normal usage if mounted on it. Additional optional equipment not listed below may be offered by the vendor. **See pages 7 -9 for more information on the Catalog Requirements.**

**Cellular Communication Devices (CCD):** Approved and Configured communication routers such as IP Modem, Dial-up Modem, digital modems, etc. which support connection to and communications with Wireless Cellular Communication Networks such as CDMA, GSM, GPRS, EDGE, UMTS, HSD). The appropriate device will be **determined and selected based upon end user's network type in use at the time of purchase**. Contractor is **required to assist** the end user in **making the proper selection**, and **installation of the device is included in the price of the PDMS**. Should there be an **initial error with the compatibility** of the selected CCD and the Users Communications Network, **proper replacement** of the CCD is the **responsibility of the Contractor**. Should the **End User change Networks or configurations**, it will be the **responsibility of the End User** to purchase and install a compatible CCD.

**Other Communications Hardware:** These are optional external devices for message input, storage and retrieval; and for system information display monitor. Other optional devices would interconnect to monitor traffic or weather conditions and the PDMS itself as required.

**Radar Speed Detector:** A "radar gun" to determine the speed of oncoming vehicles with the option to automatically initiate a prompt display of the vehicles speed or a default warning message to the motorist. It should be a uni-directional traffic radar, operating in an "approach only" mode, such that only the speeds of approaching vehicles exceeding a user selectable "threshold" or "trigger" speed will be displayed. The Radar Unit shall be FCC Certified, reading 12-degrees with a frequency of K-Band or higher.

**Global Positioning System (GPS):** A GPS receiver to interface with the PDMS control system so that its location can be determined remotely on a central system such as a laptop, desktop, cell phone or PDA. The sign should be fitted with a GPS receiver that it is not obscured by the DMS sign (or subject to the risk of mechanical damage during normal use of the DMS), to enable the location of the DMS to be obtained remotely from the Central System. The GPS unit shall be a GARMIN GPS 18 or equivalent. The DMS control system shall interface with the GPS receiver, and populate the following NTCIP 1204 (ESS) objects with the correct data retrieved from the GPS:

- essLatitude – Latitude (OID: 1.3.6.1.4.1.1206.4.2.5.2.2.1.0)
- essLongitude – Longitude (OID: 1.3.6.1.4.1.1206.4.2.5.2.2.2.0)

Note: The Latitude and Longitude objects supported shall be from MIB 1204 Version v 2.23 and not from the 1204 Version 1 MIB that describes different OID's for these objects)

Get of essLatitude and essLongitude shall return the correct latitude and longitude of the DMS.

**Personal Data Assistant (PDA):** A PDA or handheld device with wireless cellular capabilities to control the PDMS remotely as a stand-alone system or with a computer system to monitor, change or verify messages and view system status information.

**Digital Camera System:** A portable camera unit mountable on the PDMS to monitor traffic and/or weather conditions by recording live streaming video and if capable taking snap shots of the vicinity. The camera would transmit data to a modem on the PDMS that would send the data via a cellular phone to a central computer system for deciphering.

**Solar Panel Positioning Equipment:** A motorized or manual system, independent of the sign, to reposition (tilt and rotate) the solar array for optimum reception when deployed.

(continued)

**Solar-Powered, Trailer Mounted Portable Dynamic Message Signs (Cont'd):**

OPTIONAL EQUIPMENT:

**Solar Panel Anti-Theft System:** Additional security system designed to prevent damage and removal of the solar panels.

**Gel-Cel Battery:** For systems where conventional lead-acid automotive batteries are the standard configuration, a battery bank upgrade or replacement option to Gel-Cell Batteries would be available.

**Vehicle/Truck Mounted Dynamic Message Sign (DMS)**

SCOPE :

It is the intent of these specifications to cover the minimum requirements for **Vehicle/Truck Mounted Dynamic Message Sign (DMS)** and replacement parts for existing New York State Vehicle/Truck Mounted Dynamic Message Signs. The signs display panel shall be 2 lines or 3 lines; Full Matrix with high intensity amber LED's, and shall include a mounting and lift mechanism. The purpose of these signs is to effectively communicate traffic conditions and situations to motorists, **especially for warning when driving in construction zones**, giving the driver the information needed to proceed in a safe and efficient manner. It will be utilized for temporary and/or mobile applications.

**SPECIAL NOTE:** The PCMS standards as listed in the U.S. Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) Section 6F.55 Portable Changeable Message Signs (<http://mutcd.fhwa.dot.gov/pdfs/2003r1r2/ch6f.pdf>) must be met but does not supersede specific requirements stated herein. Equipment functionality will be thoroughly tested to verify complete compliance with all areas of these specifications.

The sign and the controller shall meet SAE J1455 which requires the board not to interfere with radio frequencies. This will include 700, 800 MHZ, frequencies as well as CB radios.

Each unit shall be operable from a 12 Volts DC (nominal) vehicle electrical power system, and include User Operational Manual(s). These requirements apply throughout for both 2 Line and 3 Line Message Signs unless specified differently herein.

All electronic components shall be installed to withstand the shock and vibration expected with interstate highway traffic. They shall not require air conditioning to function within their enclosures, given the humidity and temperature ranges expected in New York State. Surge protection for electronic components is required. For assurance of legibility and functionality, a demonstration of the bid model may be required prior to making an award.

L. E. D. SIGNBOARD:

**LED:** The color of light emitted shall be **AMBER**, with a peak wavelength centered at 590 (+/-4) nanometers.

**Display:** The signboard shall be either a Full Matrix or a Line Matrix type display. It shall be capable of displaying two (2) lines or three (3) lines of alphanumeric text or characters dependent on the Dimensions of the Panel as specified below. The characters shall be a minimum **10 or 12** inches high with each Panel having a minimum of eight (8) characters per line. It shall be capable of displaying a full screen view of standard highway symbols arrows, chevrons, and 4 corner warning lights, etc. It shall be capable of displaying one line of amber colored text consisting of four characters, for example "STOP." It shall be capable of linking 3 or more messages for a sequence display.

**Dimensions:** This offering is open for Message Sign panels of two (2) sizes.

- **2 Line Message Panels** shall be at least 60" Wide x 30" High.
- **3 Line Message Panels** shall be at least 60" Wide x 40" High.

**Illumination:** The signboard shall automatically adjust the intensity of the LED's to be dimmer or brighter for optimum viewing as natural ambient light conditions change throughout the course of a day.

**Message Legibility:** Messages shall be readable by day or night under optimum viewing conditions with a viewing angle of at least 22 degrees to the left and to the right of the signs midpoint at a minimum distance of 500 feet.

(continued)

**Vehicle/Truck Mounted Dynamic Message Sign (DMS)(Cont'd):**

**L. E. D. SIGNBOARD: (Cont'd)**

**Design & Materials:** The face (display area) of the signboard shall be protected by a UV-stabilized, seamless, impact-resistant (Lexan™, polycarbonate, or equal) see-through cover. There shall be no moving parts in the display. The entire unit, including LED's and all electrical circuitry, shall be protected by a weatherproof to provide full protection from moisture intrusion to sensitive parts due to rain and snow, including road spray and ice control agents. All enclosures (if any) shall be lockable and/or vandal resistant and afford convenient access for maintenance.

The message panel frame shall be constructed of a lightweight material, such as aluminum.

The sign shall have a sealing gasket between the window and the cabinet that seal out the weather elements and minimizes window vibration shock.

The sign enclosure shall be thermostatically controlled to prevent damage and failure due to over heating. Vents and/or fan(s) shall be sealed to keep out weather elements.

Signs without thermostatic controls are acceptable however the sign must have the ability to operate in temperatures of -20 degrees F to +110 degrees F without damage to the sign or the enclosure. This must be annotated in the manufacturer's sales literature.

The State expects professional workmanship on all products purchased. With this in mind, the following finishing requirements shall be closely scrutinized:

- There shall be no welding scale, roughness, sharp corners; or rust stains on the unit
- The message panel frame shall be painted, preferably with a powder coating, with the manufacturers standard colors

**CONTROLLER & SOFTWARE:**

The DMS shall be controllable through a computerized handheld interface equipped with an LCD screen integrated with a user-friendly keypad or touch-screen capability that can be operated under all weather conditions to activate, operate and program the Signboard. The user shall be able to preview a message on the handheld interface before displaying it on the signboard. Alternative controller devices will be accepted as equal if the time needed to program the signboard in any of the signs display configurations is demonstrated to not exceed 2 minutes. A rotary switch to select pre-programmed messages **may** be incorporated into the handheld interface.

The controller software shall be compatible with the latest version of MS Windows.

The controller shall contain 50 or more standard pre-programmed messages and shall be capable of storing 40 or more user defined messages that can be edited and/or deleted.

The controller and software shall be password protectable.

**MOUNTING FRAME & LIFT MECHANISM:**

The sign shall include the manufacturer's standard mounting hardware and an actuator that utilizes a lift system capable of raising the sign to a vertical (deployed) position and lowering the sign to the horizontal (stowed or travel) position from inside the vehicle/truck. This may be either an automatic or manual system, per the manufacturers design.

The manufacturer may also provide additional mounting and deployment options either as a factory or user installed option as part of their catalog list. The sign shall **still** be capable of utilizing the manufacturer's standard mounting hardware and lifting system if the end user chooses an optional means of installation.

The mounting frame may be constructed of material such as welded and/or structural steel.

**Vehicle/Truck Mounted Dynamic Message Sign (DMS)(Cont'd):**

**PUBLICATIONS:**

The unit shall be delivered with an operator's manual or CD.

Manufacturers shall provide the Service and Parts Manuals or CDs as annotated below (provided with each unit sold).

- 1 Parts Manual or CD (Per Sign)
- 1 Service Manual or CD (Per Sign)

(continued)

OPTIONAL EQUIPMENT:

The following items are recommended to be available as optional equipment. Note that these are options and are not mandatory for eligibility of bidding and/or for award. Optional equipment should perform as noted below if offered. Additional optional equipment not listed below may also be offered by the vendor.

- **Solar Power System** - see page 92 for additional specifications
  - **Rechargeable Battery Power Packs with charging options** - See page 92 for additional information
  - **Gel-Cel Battery** - For systems where conventional lead-acid automotive batteries are the standard configuration, a battery bank upgrade or replacement option to Gel-Cell Batteries would be available.
  - **Wireless Remote Control**
  - **Personal Data Assistant (PDA)** - A PDA or handheld device with wireless cellular capabilities to control the PDMS remotely as a stand-alone system or with a computer system to monitor, change or verify messages and view system status information.
  - **Radar Speed Monitor System** - A “radar gun” to determine the speed of oncoming vehicles with the option to automatically initiate a prompt display of the vehicles speed or a default warning message to the motorist. It should be a uni-directional traffic radar, operating in an “approach only” mode, such that only the speeds of approaching vehicles exceeding a user selectable “threshold” or “trigger” speed will be displayed. The Radar Unit shall be FCC Certified, reading 12-degrees with a frequency of K-Band or higher.
  - **Digital Camera System:** A portable camera unit mountable on the PDMS to monitor traffic and/or weather conditions by recording live streaming video and if capable taking snap shots of the vicinity. The camera would transmit data to a modem on the PDMS that would send the data via a cellular phone to a central computer system for deciphering.
  - **Global Positioning System (GPS)** - A GPS receiver to interface with the PDMS control system so that its location can be determined remotely on a central system such as a laptop, desktop, cell phone or PDA. The sign should be fitted with a GPS receiver that it is not obscured by the DMS sign (or subject to the risk of mechanical damage during normal use of the DMS), to enable the location of the DMS to be obtained remotely from a Central System. The GPS unit shall be a GARMIN GPS 18 or equivalent. The DMS control system shall interface with the GPS receiver, and populate the following NTCIP 1204 (ESS) objects with the correct data retrieved from the GPS:
    - essLatitude – Latitude (OID: 1.3.6.1.4.1.1206.4.2.5.2.2.1.0)
    - essLongitude – Longitude (OID: 1.3.6.1.4.1.1206.4.2.5.2.2.2.0)
- Note:** The Latitude and Longitude objects supported shall be from MIB 1204 Version v 2.23 and not from the 1204 Version 1 MIB that describes different OID’s for these objects) Get of essLatitude and essLongitude shall return the correct latitude and longitude of the DMS.
- **Additional Mounting Options and Configurations** - such as tailgate or roof mounting options.

(continued)

## Trailer Mounted Arrow Panels, Vehicle Mounted Series A, B and C Arrow Panels

### SCOPE

It is the intent of these specifications to cover the minimum requirements for portable, solar powered Trailer-Mounted Arrow Panels; Vehicle-Mounted Series A, B and C Arrow Panels; and replacement parts for existing New York State Arrow Panels. Panels are to be 15 lamp or 25 lamp. The purpose of these panels is to provide additional warning and directional information to assist in merging and controlling road users.

**SPECIAL NOTE:** The Arrow Panel standards as listed in the U.S. Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) Section 6F.56 Arrow Panels must be met. Equipment functionality will be thoroughly tested to verify complete compliance with all areas of these specifications.

### GENERAL:

Arrow Panels are specified per each item below and continues through page 106. Series A, B & C designates different vehicle mount panel sizes.

**Trailer Mounted Arrow Panels, 15 lamp:** Arrow panels shall be transportable, self-contained units consisting of an 8 ft. x 4 ft. rectangular solid finished in non-reflective black, and shall be mounted on a heavy-duty trailer with a structural support system for the arrow panel so that the bottom of the panel is a minimum of 7 ft. above the roadway, with solar array panel(s) and chargeable batteries for a DC power supply system. Arrow panel operation controls shall be mounted in a lockable enclosure.

**Trailer Mounted Arrow Panels, 25 lamp:** Arrow panels shall be transportable, self-contained units consisting of an 8 ft. x 4 ft. rectangular solid finished in non-reflective black, and shall be mounted on a heavy-duty trailer with a structural support system for the arrow panel so that the bottom of the panel is a minimum of 7 ft. above the roadway, with solar array panel(s) and chargeable batteries for a DC power supply system. Arrow panel operation controls shall be mounted in a lockable enclosure.

**Vehicle Mounted Series A Arrow Panels, 15 lamp:** Arrow panels shall be transportable, self-contained units consisting of a 4 ft. x 2. ft solid finished in non-reflective black. Remote control arrow panel operation shall be provided.

**Vehicle Mounted Series B Arrow Panels, 15 lamp:** Arrow panels shall be transportable, self-contained units consisting of a 5 ft. x 2.5 ft. rectangular solid finished in non-reflective black. Remote control arrow panel operation shall be provided.

**Vehicle Mounted Series B Arrow Panels, 25 lamp:** Arrow panels shall be transportable, self-contained units consisting of a 5 ft. x 2.5 ft. rectangular solid finished in non-reflective black. Remote control arrow panel operation shall be provided.

**Vehicle Mounted Series C Arrow Panels, 15 lamp:** Arrow panels shall be transportable, self-contained units consisting of a 8 ft. x 4 ft. rectangular solid finished in non-reflective black. Remote control arrow panel operation shall be provided.

**Vehicle Mounted Series C Arrow Panels, 25 lamp:** Arrow panels shall be transportable, self-contained units consisting of a 8 ft. x 4 ft. rectangular solid finished in non-reflective black. Remote control arrow panel operation shall be provided.

Each unit shall include at least the following components as appropriate:

- Mechanical lift and/or an electro-mechanical lift mechanism system.
- **Lockable vandal resistant** enclosure(s) for the batteries, charger, controls, and switches.
- LED's arraigned to make a 15 lamp or 25 lamp display matrix of elements as programmed from a controller and necessary wiring and cables.
- Technical Documentation & User Operational Manual

All electronic components shall be installed to withstand the shock and vibration expected with interstate highway traffic. They shall not require air conditioning to function within their enclosures, given the humidity and temperature ranges expected in New York State. Surge protection for electronic components is required. For assurance of legibility and functionality, a demonstration of the bid model may be required prior to making an award.

(continued)



Trailer Mounted Arrow Panels, Vehicle Mounted Series A, B and C Arrow Panels (Cont'd)

L. E. D. ARROW PANEL:

**LED:** The color of light emitted shall be **AMBER**, with a peak wavelength centered at 590 (+/-4) nanometers.

**LED Illumination:** The arrow panel unit will automatically adjust the LED's intensity to be dimmer or brighter, for optimum viewing as natural ambient light conditions change throughout the course of a day. This feature will include a manual override function in the control system, allowing the operator the ability to select the level of illumination. Each lamp of the arrow panel shall be formed by a cluster of equally spaced LED's and the number of LED's per lamp shall be determined by the manufacturer as required to produce the accepted LED Illumination and accepted Legibility as referenced herein.

**Legibility:** Display shall be legible from a minimum distance as referenced in the U.S. Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) Section 6F.56 Arrow Panels with a viewing angle of at least 15 degrees to the left and to the right of the signs midpoint.

**Design & Materials:** The entire unit, including LED's and all electrical circuitry, shall be protected by a weatherproof and lockable vandal resistant enclosure that affords convenient access for maintenance.

POWER SUPPLY FOR TRAILER MOUNTED UNITS:

The arrow panel shall operate primarily from a solar powered electrical system that consists of a battery bank and high efficiency solar array panels. Secondary power supply type shall provide the capability of the unit to be operable and for the batteries to be recharged from a standard 110-120 VAC (nominal) 60-cycle source outlet.

The solar panel's output capacity must keep the batteries charged to support all electrical components in full operation (mast, gauges, LED's, etc). The solar power system shall be fully integrated into the unit power system and in operation when the solar panels are deployed.

The battery bank itself should have the capacity to run the LED panels minimally at 40% intensity with one-third of the pixels active, **CONTINUOUSLY** for a minimum of **21 days** without recharge. The system should require ideally four and no more than six maintenance charges per year.

Additional features as required for trailer mounted arrow panels are as follows:

**Warning Display:** At least five hours prior to battery discharge the system shall display on the arrow panel and/or the control panel a caution symbol to alert maintenance personnel that the batteries need recharging.

**Battery Charger:** The 110-120 volt AC charging system shall initiate charging automatically when a 110-120 volt AC service is connected. The system must fully recharge the battery bank within a 48 hour period when in a completely discharged state. There charging system is to be designed so that a fully charged unit can remain plugged-in without damaging the system.

**Electrical Connections and System Status Indicators:** All wiring from power sources shall utilize locking cable connectors. Electrical system status indicators shall be provided. A standard negative ground system shall be tied to the sign chassis and lightning protection shall be supplied to the load side of the sign's system distribution power lines to withstand multiple surges in excess of 600 volts.

**Solar Panel Mounting:**

The solar panels shall be mounted in a position (preferably above the arrow panel) where it receives the most sunlight, **or is adjustable by the operator**, and is less susceptible to damage from debris on the road. The solar panels should be installed in such a fashion as to deter theft. Features such as vandal resistant hardware, sealed mounting trim, locking frame, non-reversible screws etc. should be utilized to the extent practical.

(continued)

**Extinguishable Message Signs**

DESCRIPTION:

The Contractor shall furnish an Extinguishable Message Sign (EMS) of the type and sign face as designated in the Contract Documents and as ordered by the Engineer.

MATERIALS:

All material furnished, assembled, fabricated or installed shall be new, corrosion resistant and in strict accordance with all the details shown in the Contract Documents and in these Special Specifications.

Each EMS shall be an internally illuminated, weather tight and dust tight unit which will produce a clearly visible message only when activated and completely dark when not activated.

EMS shall use Light Emitting Diodes (LEDs) to create pixels, with the pixels forming a module and the module forming legends in nominal 10" size letters. The LED modules will be mounted within a weather tight housing. The legend text shall be as shown on the plans.

**LED Display** - The LED modules shall consist of multiple pixels in a standard 5 wide by 7 high configuration. Each pixel shall consist of at least 12 high intensity LEDs. Each pixel shall be 590 nm nominal amber in color having an initial nominal luminous intensity of 9.5 candela (cd) on the highest setting.

Each LED pixel shall consume no more than 750 mW of power. Each pixel shall be removable or replaceable on the module with a screwdriver and each module shall be removable from the housing in the same manner.

Individual LEDs shall be wired so that failure of one LED will not result in the loss of more than 1/3 of the pixel.

LEDs shall be soldered in place and the LED leads shall not be shortened or removed.

LED messages shall be steadily lit when activated. The display shall have the capability to be turned on by both one 120 VAC power/control line or two separate 120 VAC power/control lines.

The LEDs shall meet the following minimum requirements:

- Ultra bright type amber Aluminum Indium Gallium Phosphide (AlInGaP) LEDs rated for 100,000 hours of continuous operation
- LEDs shall be ultraviolet stabilized
- Must be from the same manufacturer and same color bin

**Display Housing** - The LED display shall be mounted within a ruggedly constructed housing that is rigid, weather tight, dust tight and corrosion resistant. The housing and sign face shall be sized to provide the sign text messages as shown on the plans. The maximum dimensions of the overall sign housing shall be 96" L x 48" H x 8" D.

The housing shall be constructed of Type 5052-H32 aluminum alloy sheet with clad finish. The housing reinforcing and miscellaneous parts shall be made of suitable gages and types of aluminum, except for external fasteners, machine screw parts, lock washers, hinge pins and other mechanical parts which shall be made of Type 316 Stainless Steel.

Gaskets shall be uniform and even textured and shall be highly resistant to stiffening and setting and long term deleterious effects of vehicle fumes, direct sunlight, heat, water, oils and aging.

The front of the housing shall be protected by an anti-glare polycarbonate or hardened acrylic panel contained within an extruded aluminum frame. The frame shall be hinged to allow access to the interior of the sign and have fully welded seams with a high gloss textured black finish powder coat paint meeting the color standards of the Federal specifications 595b, 17038. The front face shall have a 0.4" nominal black anodized aluminum hex cell louver having 95% open area and providing 60 degree shielding between the LED pixels and the front face to enhance resistance to sun phantom. The louver shall be secured with captive type retainers.

The housing shall be gasketed with a closed cell neoprene gasket. Stainless steel latches shall provide for quick access to the interior of the sign. The sign shall be provided with devices to retain the front face in a fully open mode during sign maintenance.

The housing shall be vented on the bottom and shall have an interior temperature controlled ventilation fan to ensure interior of the housing remains below 131° F without compromising the weather tight integrity. Washable polyester filters shall be installed over all air vents.

Terminal blocks of the molded, phenolic type shall be installed on the interior bottom of the sign housing with sufficient number and size of terminals to accommodate the input wiring as shown on the plans. Wiring shall be bundled, wrapped and permanently labeled.

(continued)

**Extinguishable Message Signs** (Cont'd)

**Photometric Requirements** - EMS pixels shall meet at least 85% of the minimum intensity requirements while operating throughout the temperature range of -34° F to 165° F.

The minimum initial luminous intensity values for the EMS pixels shall be 650 cd/ft<sup>2</sup> at 77° F. Each EMS pixel shall have horizontal and vertical viewing angle of 30° to the sign.

The measured chromatic coordinates of the EMS pixels shall conform to the chromaticity requirements of Section 5.3.2.1 and Figure C of the Equipment and Materials Standards of the ITE Publication No. ST-017A.

**Light Output Adjustment** - The EMS shall be capable of automatically adjusting its light output by means of photosensors installed in the sign housing. Light output shall be proportional to the ambient light. There shall be a minimum of three adjustable levels of luminance: 100%, 60% and 30% luminance. The signs shall have a 30% luminance manual control as shown on the plans.

**Electrical Requirements** - LED messages shall be steadily lit when activated. The EMS shall have internal power supplies and dimming capability to fully operate the sign. Power supplies shall be solid state rated at 90-135 VAC input and 12-15 VDC output.

The power consumption of the entire EMS assembly shall be 100W maximum.

The EMS power factor shall be greater than 90% and total current harmonic distortion shall be less than 25%.

The EMS shall operate at a frequency of 60Hz±3Hz AC over a voltage range from 95 to 135 Volts. The LED circuitry shall prevent any perceptible flicker over the voltage range specified. Line voltage fluctuations shall have no visible effect on the luminous intensity of the EMS. The rated voltage for measurements shall be 120 VAC.

The EMS shall include voltage surge protection to withstand high repetition noise transient as stated in Section 2.1.6 of NEMA Standard TS-2.

EMS shall meet the Federal Communications Commission (FCC) Title 47, SubPart B, Section 15 regulations concerning the emission of electronic noise.

DOCUMENTATION

**Manuals** - Six (6) advance copies of equipment manuals furnished by the manufacturer shall be submitted to the Engineer for review at least ten-days prior to the scheduled start of the first Operational Stand-Alone Test. The Engineer will verify the manufacturer's equipment manual as part of the test and integration process. The equipment manual incorporating the Engineer's corrections and comments shall be integrated by the Contractor into the operations and maintenance manual as described in the General Requirements. The manuals shall, as a minimum, include the following:

- a. Complete and accurate schematic diagrams
- b. Complete installation and operation procedures
- c. Complete performance specifications (functional, electrical, mechanical and environmental) of the unit.
- d. Complete list of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/ RETMA or EIA.
- e. Complete maintenance and troubleshooting procedures.

TESTING

**Operational Test** - After installation of the equipment in the field and prior to integration of the equipment into the system, the Contractor shall perform an operational test in the field for each of the EMS installed.

If the Operational Test fails, the equipment shall be repaired and the test shall be rerun for that site. If a component has been modified as a result of a failure, that component shall be replaced in all like units and the test shall be rerun for each unit.

(continued)

Trailer Mounted Arrow Panels, Vehicle Mounted Series A, B and C Arrow Panels (Cont'd)

ARROW PANEL CONTROLLER:

The arrow panel shall be controllable through an interface that can be operated under all weather conditions.

Additionally, the arrow panel Controller shall be designed to:

- Monitor and display the battery status and solar array activities.
- Shut down automatically if the system is reaching a perishable state or if the battery power drops below a recommended output level for proper functioning.

CONTROL CASE AND HOUSINGS:

The Control Casing and all housings on the trailer shall be fabricated as weatherproof to provide full protection from moisture intrusion to sensitive parts due to rain and snow, including road spray and ice control agents. The casings are to be tamper and vandal resistant and lockable and be designed to hold all of the necessary equipment required for the deployment of the arrow board. Ideally, it should be of aluminum construction, constructed with powder coated aluminum. It should be of ample dimension to allow for easy access to all control and service points of service and should contain an internal illumination device to assist in the operation and service of the arrow board during evening and night time hours.

At the manufacturer's option, the power system and/or battery array may be self contained in a similar separate housing. Such an additional housing may be constructed of heavy duty impact and corrosion resistant plastics. All other specifications pertaining to Control Casings would still apply. Additionally, the display housing lens is to be weather proof and provide full protection for the display unit. All cases and housings are to be lockable.

TRAILER:

The trailer shall be a heavy-duty steel single-axle design, constructed of rectangular structural tubing (ASTM A500-B) or welded steel channel (ASTM A36) equipped with a removable tow bar (tongue), walk-on fenders, and skid resistant material on all walk-able surfaces. **NOTE:** The skid resistant material shall cover all walk-able surfaces entirely or spaced out entirely on all walk-able surfaces and be no more than 2 inches apart. The tubular frame of the trailer shall have no openings. Trailer size and construction shall be appropriate to safely support, store and transport the arrow panel and all operating systems. The trailer shall be provided with radial, 14" - 16", load range class C tires of adequate size and rating to transport the system safely at normal highway speeds of up to 55mph. The fully equipped trailers shall safely transport the entire system when the arrow panel is not in operation and all system components are properly secured, and shall be equipped for use on public highways in accordance with NYS Vehicle and Traffic Law: Article 9 - EQUIPMENT OF MOTOR VEHICLES, as found under section VAT- Article 9, on the web at - <http://public.leginfo.state.ny.us/menugtf.cgi>, and as found in the NYS Department of Motor Vehicles Document #MV-529C, entitled: "Equipment Required for Trailers" as reprinted in this document.

The following features and performance standards are also required:

**Structural Support:** The framework shall provide sufficient support to prevent damage to any arrow panel components when the panel is in the down and locked position during normal highway travel. It also shall supply adequate support to allow complete arrow panel operation that includes raising and lowering the panel, and shall remain stable during wind gusts of 75 mph when deployed in the operating position.

**Wiring & Safety:** Lights, reflectors, splash guards and wiring harness for highway towing shall be provided to comply with ICC, NYS Vehicle and Traffic Law and NYS- DMV regulations as noted above. All trailer wiring shall be continuous with no splices and all exposed runs of wire shall be enclosed in plastic flexible conduit and adequately secured, approximately every 18". All connections shall be made in a watertight junction box, using watertight light fixtures and watertight connections (Vehicle-Lite 50800/50400 or equal). Lamp lens and reflectors shall be Lexan™ or equal. The reflectors shall be mechanically fastened (not stick-on) with at least two red reflectors on each side and 2 amber reflector's on the front of the trailer. Wiring system shall be equal to Vehicle-Lite ([www.Vehicle-lite.com](http://www.Vehicle-lite.com)) sealed harness system. Main wiring harness shall be a 7-way cable connector and ATA socket (Pollack #11-714 round pin). All lights are to be sealed, shock mounted type. Tail, Reverse, Signal and Brake Lights are preferred to be LED Based Arrays that meet the National and State safety guidelines and specifications. The trailer must be equipped with a standard 110-120 volt AC receptacle as well as a temperature stable 110-120 volt AC battery trickle charger and charge indicator. The necessary provisions shall be incorporated into the unit power system to allow switching the recharging mode between the 110-120 volt AC and the solar panel with minimal effort on appropriate arrow panel units.

(continued)

Trailer Mounted Arrow Panels, Vehicle Mounted Series A, B and C Arrow Panels (Cont'd)  
TRAILER: Cont'd

**Brakes:** Electric brakes are required on all trailers weighing **in excess of 1,000 pounds un-laden** as well as on trailers having a **maximum gross weight in excess of 3,000 pounds**. Brakes must be adequate to control the vehicle at all times, and must comply with the standards set by the New York State Department of Motor Vehicles, Division of Vehicle Safety Services for brake efficiency.

**Hitch:** A 2-inch ball type and pintle combination with safety chains and self-latching safety hooks. A tongue jack is required for removal of the trailer from the tow hitch unless the required "Stabilizing Outriggers" (see below) are sufficient to remove the trailer from the towing vehicle.

**Arrow Panel Lift Mechanism:** The assembly shall include a manual lift mechanism and/or an optional electro-mechanical lift mechanism to raise or lower the arrow panel and hold it securely in place. The assembly design must also provide that in case of a loss of power to the electro-mechanical lift, authorized personnel would be able to raise or lower the mast **MANUALLY**. A safety feature for the signboard shall be provided to prevent it from dislodging on its own when in a raised position.

**Stabilizing Outriggers:** Each corner of the trailer shall be fitted with a support mechanism having an appropriate minimum support capacity, and be adjustable from at least 18" to 32" with a large steel footpad in order to level and stabilize the trailer when it is placed into the operating position. The rigging must be capable of supporting and stabilizing the entire operating unit in winds gusting up to 75 mph when the panels are raised to full working height. The support mechanism shall be movable to provide a clear position for transport. An alternative stabilizing system may be substituted with the approval of the purchasing agency.

**Paint:** Components supplied by the Contractor shall be finish-painted and must be an exact match of the paint used on the equipment. See the clause "COLOR STANDARDS" as found on page 37

**Conspicuity Marking:** The arrow panel and trailer requires appropriate conspicuity marking (3M Series 983 or equal or better) on all four (4) sides of the display unit and trailer, and said marking shall be included in the price. It will be at the discretion of the purchasing agency as to whether the unit is to be delivered with conspicuity marking sheeting pre-installed **or** supplied for agency installation.

#### OPTIONAL EQUIPMENT:

The following items are recommended to be available as optional equipment. Note that these are options and are not mandatory for eligibility of bidding and/or for award. Optional equipment should perform as noted below if offered. Additional optional equipment not listed below may be offered by the vendor.

**Solar Panel and Battery Options for Vehicle Mounted Arrow Panels:** Solar panel upgrade options, battery upgrade options, 110-120 volt battery charger options.

**Hitch Options for Trailer Mounted Arrow Panels:** Removable combination coupler (2-inch ball and pintle ring), or adjustable height coupler (2-inch ball and/or pintle ring).

**Mounting Options for Vehicle Mounted Arrow Panels:** Various types of vehicle mounting systems and panel lifting systems.

(continued)

## MUTCD compliant, foldable lightweight multi-purpose LED Portable Signboard

### SCOPE:

This specification is for the procurement of a **MUTCD compliant, foldable lightweight multi-purpose LED Portable Signboard**, capable of rapid deployment, with multiple mount capability.

### PORTABLE SIGNBOARD:

**Dimensions:** The Message Panel, referred herein will have a minimum deployed panel size of 28" x 60."

Transportable, the panel should fold to at least half of the width, so as to enable transportation in the trunk of a standard mid size automobile.

**LED:** The color of light emitted shall be **AMBER**, on black background with a 30° angle of view.

**Illumination:** The signboard will automatically adjust the LED's intensity to be dimmer or brighter for optimum viewing as natural ambient light conditions change throughout the course of a day.

**Display:** The signboard shall be a **Full Matrix or Line Matrix type**. It shall be capable of displaying three (3) lines of alphanumeric text or characters that are at least 7 inches high.

**Power:** The product should operate on 12 VDC and be adaptable for use with multiple power sources from 10-30 VDC.

**Operating Range:** Panel should be operational within a temperature range of -20°F to 160°F.

**Message Control:** The panel shall be controllable through a computerized handheld interface (PDA), a PC or Laptop, either wireless that can be operated under all weather conditions to activate, operate and program the Signboard. The user shall be able to preview a message on the handheld interface before displaying it on the signboard. A switch to select pre-programmed messages **may** be incorporated into the handheld interface or the sign panel itself. The controller shall have the capacity to store a minimum of 20 standard user defined messages that can be edited and/or deleted with a function to set and restore a default message.

### PUBLICATIONS:

The unit shall be delivered with an operator's manual or CD.

Manufacturers shall provide the Service, and Parts Manuals or CD's as annotated below (provided with each unit sold).

- 1 Parts Manual or CD (Per Sign)
- 1 Service Manual or CD (Per Sign)

### OPTIONAL EQUIPMENT:

The following items are recommended to be available as optional equipment. Note that these are options and are not mandatory for eligibility of bidding and/or for award. Optional equipment should perform as noted below if offered.

Additional optional equipment not listed below may be offered by the vendor.

- **Mounting Options and Configurations:** Panel should have a variety of mounting options available to the end user. Roof Top or Trunk Lid Stand supports, Hitch mounts, Free Standing Telescopic Poles, and Trailer mounting are advisable options
- **DC Power supply adapters** - for "plug and run" use with common Automotive connections
- **Solar Power System** - for use with a trailer mounting option
- **Battery Power Pack** - for extended use
- **Gel-Cel or NiMH Battery** - for higher efficiency
- **Wireless Remote Control**
- **Traffic Monitoring Equipment**
- **Radar Speed Monitor Systems**
- **Remote Communications Software**

(continued)

## Portable LED Arrow Mat

### SCOPE:

This specification is for the procurement of a low cost **portable LED Arrow Mat**, which can be rapidly deployed with high visibility as a means of alerting oncoming traffic to a safety hazard.

### LED Arrow Mat:

**Dimensions:** Mat should be a minimum of 34x19 when deployed.

**Properties:** The Arrow mat will be constructed of a lightweight flexible nylon, weighing no more than five (5) pounds, which can be rolled to form a compact tube shaped parcel, for storage and transport. The mat will have installed four (4) metal grommets, & four (4) magnets evenly spaced along each 34" edge, for use in deployment of the mat.

When deployed, the mat unrolls and would adhere to a metal surface such as the wall or door of a panel truck or van or door or trunk of an automobile or SUV through the use of magnets. Additionally the mat may be hung on prepositioned hooks via the grommets. Using either application, it can be positioned to operate facing any chosen direction.

The mat will have visual composition of four (4) reflective, in-line Arrow Head shaped Chevrons, facing a single direction on a background of either Matte Black or Safety Orange. In the instance of the black background the chevrons shall be Yellow and each Chevron shall contain nine (9) Amber LED's. For the Orange background, the chevrons shall be white and each shall contain nine (9) Red LEDs.

**Power & Control:** The mat shall be powered by two (2) 1.5 volt AA size Batteries, and operated by a simple on off switch, installed into the center of the mat. The batteries may be either disposable or rechargeable. Alkaline or Lithium disposable and NiMH Rechargeable batteries would all be appropriate for use as power supplies. The wiring and controls should be shock and vibration resistant and solid state in nature.

**LEDs:** The LEDs will actuate in a repetitive sequence simulating each chevron to be illuminated in order of position along the line and should be of the intensity that in combination the chevrons will produce a total brightness level of a minimum 3750 candelas. The mat should have a visibility range of 500' when in full sunlight. The LEDs should have an average life span in excess of 75,000 hours.

### OPTIONAL EQUIPMENT:

The following items are recommended to be available as optional equipment. Note that these are options and are not mandatory for eligibility of bidding and/or for award. Optional equipment should perform as noted below if offered. Additional optional equipment not listed below may be offered by the vendor:

- **Replacement Batteries**
- **Upgraded Batteries**
- **Grommets**
- **Magnets**

\* \* \* \* \*

(continued)

# Appendix 7

## NYS Department of Transportation ITS Specification for Speed Display Trailers

(continued)



SCOPE:

This specification defines the characteristics and features of an all LED, two digit, trailer-mounted speed display sign. The system shall be equipped with traffic radar operating in an "approach only" mode such that only the speeds of approaching vehicles will be displayed. The unit must be capable of displaying all speeds greater than a lower practical limit of ten miles per hour (10 mph), but less than or equal to ninety-nine miles per hour (99 mph). The system shall provide for the display of a static speed limit sign meeting the requirements of the specifications listed herein, mounted above or adjacent to the LED display.

CHANGEABLE DISPLAY:

- 1) **Description:** The changeable display shall be mounted within an industry standard reflective white sheeting meeting the requirements of ASTM D4956-04 Type III or Type IX. The sign panel must match the static sign panel described below. The text of the sign shall be the words "YOUR" and "SPEED", and shall be placed above the changeable LED display in black lettering, 6" high and letter series E. The word "YOUR" shall be placed above the word "SPEED". The words "YOUR" and "SPEED" shall be horizontally centered on the panel. The space between the word "YOUR" and the top of the panel shall be 6". The space between the word "YOUR" and the word "SPEED" shall be 5". The space between the word "SPEED" and the top of the changeable LED display shall be 5". There shall be a 5/8" wide black border around the perimeter of the panel, and that border shall be inset 3/8" from the edge of the panel. The space between the bottom of the LED display and the bottom of the panel shall be 6".

The changeable display shall consist of an LED pixel matrix meeting the following requirements:

- a. Two (2) Individual Characters are to be a minimum of 18" high each
- b. LED's shall be Amber colored (Flourescent yellow optional)
- c. Minimum of 4 High Intensity LED's per pixel
- d. LED Characters must be visible from 900'
- e. LED Characters must be visible from a 15° (degree)
- f. 100% Solid state configuration with no moving parts
- g. The LED matrix shall have a protective cover such as Lexan or similar.
- h. Brightness control of the LED's which can be automatically or manually adjusted for daytime/nighttime use.

A flashing strobe light shall NOT be allowed on the system.

For the purposes of this specification, the "Display Panel" refers to the combination of the changeable LED display and the sign panel it is mounted within.

DISPLAY CONTROL UNIT:

**Description:** The display control unit shall be 100% solid state with no moving parts or switches, shall be operable in 0-95% non-condensing humidity conditions at temperatures from minus 20° (degrees) F to 150° (degrees) F, and shall include provision(s) for protection against damage should the DC power source be incorrectly connected with the leads reversed.

**Mounting:** The display control unit shall be mounted in such a manner as to minimize potential damage from the elements, including road salt and road spray. The LED display unit is to be contained in a vandal resistant housing. Any specialty tools required to access the vandal-resistant housing of the unit shall be provided to the purchaser at no additional cost.

**Wiring:** For ease of maintenance, the control unit shall contain all of the terminal connectors for the display panel wiring harnesses and the keyboard terminal harness. All wiring is to be sufficiently protected from wear and fatigue due to transport and use of the Speed Display trailer, including wear associated with folding or telescoping the Sign Support Structure. All connectors are to be waterproof, and contain gold plated pins.

(continued)

DISPLAY OPERATING SOFTWARE:

**Description:** The display operating software shall provide for operator interaction with the sign system and must include industry standard levels of security and access. Password protection and/or access codes are to be included in order to limit access to the sign control menus to authorized persons.

**Diagnostics:** The display operating software shall provide sufficient diagnostic monitoring for the following elements:

- a. LED Status – Including LED brightness (as % of maximum) for corresponding photocell ambient light levels.
- b. Sign Status – Diagnostic information on the power system and sign performance.
- c. Radar Status - Raw (serial) data from the radar unit for diagnostic purposes.
- d. Solar Status – System Diagnostic information (For units provided with a Solar Powered Option)

**Main Menu:** The software shall provide full control of the LED display. The software and control keys shall include the ability to perform the following:

- a. User-defined “minimum” and “maximum” speed to display.
- b. Control of LED display to provide “Steady burn” and at least one “flash” mode.
- c. Allow for a minimum of two (2) “trigger” speeds to be preset. When the trigger speeds are reached, the display shall automatically switch to a user-set display mode, which may include, flash mode 1, flash mode 2, “Blank-out”, and displaying “X X”, as well as other display modes.
- d. Display control that allows the sign to be automatically powered up and down based on time and date. An additional preferred control is a 7-day programmable feature which allows pre-set control of the sign based on a 7-day repeating schedule.
- e. A flashing strobe light shall NOT be allowed on the system.
- f. Radar data logging capabilities must be incorporated into the system which allows, at a minimum, the collection of the following:
  - Average speeds
  - Number of readings within specified ranges
  - Number of violations
  - Highest speeds

RADAR SYSTEM:

The system shall be equipped with a single directional traffic radar, operating in an “approach only” mode, such that only the speeds of approaching vehicles exceeding the user selectable “threshold” or “trigger” speed will be displayed. The Radar Unit shall be FCC Certified, reading 12-degrees with a frequency of K-Band or higher.

STATIC SPEED LIMIT SIGN:

The system shall provide for the display of a Regulatory static speed limit sign above, or adjacent to, the Display Panel. The speed limit sign shall be a minimum of 36 inches in width by forty-eight inches in height (36” X 48”) with interchangeable numerals to allow the display of speed limits ranging from fifteen miles per hour (15 mph) to sixty-five miles per hour (65 mph) in five miles per hour (5 mph) increments. The mounting system for the interchangeable numerals shall be provided with vandal resistant connectors.

The speed limit sign shall be an industry standard reflective white sign panel. The words “SPEED” and “LIMIT” shall be alpha text of the sign and shall be in black lettering, 6” high, and letter Series E. The word “LIMIT” shall be placed above the interchangeable numerals. The word “SPEED” shall be placed above the word “LIMIT”. The words “SPEED” and “LIMIT” shall be horizontally centered on the panel. The space between the word “SPEED” and the top of the panel shall be 6”. The space between the word “SPEED” and the word “LIMIT” shall be 5”. The space between the word “LIMIT” and the top of the interchangeable numerals shall be 5”. The interchangeable numerals shall be black lettering, 14” high letter series E. The numerals shall be horizontally centered on the panels. The space between the bottom of the numerals and the bottom of the panel shall be 6”. There shall be a 5/8” wide black border around the perimeter of the panel, and that border shall be inset 3/8” from the edge of the panel.

(continued)

SIGN SUPPORT STRUCTURE:

The configuration of the sign support structure shall be such that the static sign and the display panel will remain in place during all weather conditions that the display trailer is likely to incur, including wind gusts up to 75 mph. The static speed limit sign shall be affixed to the support with a positive connection, similar to a permanent roadside installation. The static speed limit sign and Display Panel must be mounted to meet the following minimum heights when the unit is fully deployed:

- a. *Static Speed Limit above Display Panel:*  
*Speed Limit – 7'-6"    Display Panel – 4'-6"*
- b. *Static Speed Limit Adjacent to Display Panel:*  
*Speed Limit – 5'-6"    Display Panel – 5'-6"*

*Note: Minimum Heights are measured from the ground surface below the sign/panel to the bottom of each.*

When mounted adjacent to the Display Panel, the static sign must be mounted on the left-side, as viewed by oncoming traffic. The sign support structure shall have the capability to be re-configured and secured for easy transport, such as a folding support system or a telescoping mounting unit. When the unit is fully deployed, the support structure shall be stabilized and locked into position.

POWER SYSTEM:

**General:** The operational power system for the Speed Display Trailer is to be a DC battery array system, with integrated dual charging capabilities.

**Charging System:** The charging components are to be arranged; in such a manner, as to easily facilitate recharging of the DC battery array. It will be a dual charge system powered by wired 110 volt AC or by integrated Solar Panels. The 110 volt AC charging system shall initiate charging automatically when 110 volt AC service is connected, and must be capable of completely charging the battery pack within a 48 to 72 hour time period. The recharging system is to be designed so that a fully charged unit can remain plugged-in without damaging the system. The trailer must also be equipped with a standard 110 volt AC receptacle as well as a temperature stable 110 volt AC battery trickle charger and ammeter. The necessary provisions shall be incorporated into the unit power system to allow switching the recharging mode between the 110 volt AC and the solar panel with minimal effort. The solar power system shall be fully integrated into the unit power system and in operation when the solar panels are deployed.

**Display Power Supply:** The power supply for the LED display and radar system is to be sufficient to operate the LED pixels and radar "gun" for both daylight and nighttime conditions, be suitably regulated and temperature-stable, and fully operational in the temperature range of (minus)-20°F to +150°F. In addition, the power supply shall satisfy the following requirements:

- a. All wiring to be comprised of standardized wiring harnesses and locking connectors.
- b. Self-contained DC battery system operated with sufficient power to operate the sign for a period of 14 consecutive days before requiring a recharge. The system must be designed to minimize maintenance.
- c. A solar charging system shall be integrated into the unit power system to supplement recharging.

CASE AND HOUSINGS:

**Description:** The sign case and all housings on the Speed Display Trailer shall be of all aluminum construction, with powder coated aluminum and be fabricated to provide full protection from moisture intrusion to sensitive parts due to rain and snow, including road spray.

The lens and/or cover of the LED displays are to be weather proof and provide full protection for the display unit. The lens and/or cover shall be modular and interchangeable. All cases and housings are to be vandal resistant and lockable.

(continued)

TRAILER:

**General:** The trailer is to be constructed of rectangular structural tubing (ASTM A500-B) or welded steel channel (ASTM A36). It shall feature hydraulic surge-activated brakes with free backing; heavy duty safety chains with safety latch hooks; four (4) leveling jacks (min. 2000 lb. capacity) with crank type swivel; tongue jack adjustable from 18" to 32"; 4 ply, load range, 13" - 15" class C tires; and a removable A-combination coupler, which incorporates both a 2" ball type hitch, and a 3" pintle hook (or both a ball and pintle may be provided separately with each unit provided each is easily removable). The trailer shall be designed for safe transport at normal highway speeds of 55 mph and shall be equipped for use on public highways in accordance with NYS Vehicle and Traffic Law; Article 9 - EQUIPMENT OF MOTOR VEHICLES, as found under section VAT- Article 9, on the web at <http://public.leginfo.state.ny.us/menugtf.cgi>, and as found in the NYS Department of Motor Vehicles Document # MV-529C, entitled: "Equipment Required for Trailers" as reprinted in Appendix 8 of this document.

Lights, reflectors, and splash guards shall be provided to comply with NYS Vehicle and Traffic Law and NYS- DMV regulations as noted above. Lamp lens and reflectors shall be Lexan or equal. Wiring shall be continuous with no splices, and shall be adequately secured approximately every 18" with all connections to be made in a watertight junction box, using watertight light fixtures and watertight connections (Truck-Lite 50800/50400 or equal). Reflectors shall be mechanically fastened (not stick-on).

Wiring system shall be equal to Truck-Lite ([www.truck-lite.com](http://www.truck-lite.com)) sealed harness system. All lights are to be sealed, shock mounted type. Clearance and marker lamps are to be Truck-Lite # 30200R or #30200Y with 30700 or #30702 grommet, or equal. Tail-stop and turn signal lamps are to be Truck-Lite #40002R or #40002Y with #40700 grommet, or equal. Main wiring harness shall be a 7-way cable and ATA socket (Pollack #11-724), or equal. Provisions are to be made for four bolt license plate mounting, with Truck-Lite 15009 lamp or equal.

**Stabilizing Outriggers:** Each corner of the trailer shall be fitted with a screw jack, in order to level and stabilize the trailer, when it is being placed into the operating position. The screw jacks shall pivot to a horizontal position for transport. An alternative stabilizing system may be substituted with the approval of the purchasing agency.

**Paint:** All exterior surfaces of the Speed Display Trailer and support structure shall be cleaned, primed, and painted in accordance with the paint manufacturer's recommendations for this application. All paint products are to be lead free from the same manufacturer. A minimum of two coats of lead free, corrosion inhibited paint are to be applied.

Any unit that tests positive for lead may be rejected. Paint options available to the purchasing agency are to include the manufacturer's standard colors, as well as the following two options, the cost of which shall be included in the bid price of the unit:

- a. NYS Thruway Authority Paint Scheme – The paint shall be DuPont 224AW2 or equivalent.
- b. NYS - DOT Paint Scheme - The Paint shall be DuPont Chrome Yellow LF6578A or equivalent.

DMV INSPECTIONS, REGISTRATIONS, LICENSES and INSURANCE:

It is the responsibility of the purchasing agency or political subdivision to obtain and maintain a NYS-DMV vehicle safety inspection, and the required certifications, registrations, licenses, insurance policies and plates required for deployment of each speed trailer, per the provisions of NYS Vehicle and Traffic Law; including sections (306 Enforcement / Inspections), 371(DOT CERTIFICATES in Lieu of Insurance), 401Registrations and 402 (License Plates), as well as any other applicable sections . These laws are available for review under the VAT section at <http://public.leginfo.state.ny.us/menugtf.cgi>,

(continued)

# Appendix 8

NYS Department of Motor Vehicles  
Document #MV-529C

(continued)



**EQUIPMENT REQUIRED FOR TRAILERS**



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New York State Department of Motor Vehicles

Division of Vehicle Safety Service

**REQUIRED LIGHTING**

**All devices must be of a type approved by the Commissioner of Motor Vehicles.**

DEVICES & REFLECTORS ..... A combination lighting unit may be used to satisfy more than one purpose.

ITEM	NUMBER REQUIRED	LOCATION (Heights specified are measured in inches from road surface to center of item).
Red Tail Lamps	2	Rear- One each side, at the same height (not less than 15" nor more than 72"), and as far apart as practicable.
Red Stop Lamps	2	Rear- Same as tail lamp above.
White Number Plate Lamp	1	Rear- Located to illuminate registration number plate from top or side.
Red Reflex Reflectors*	2	Rear- One each side of the vertical centerline, as far apart as practicable.
	2	Sides- As far to the rear as practicable.
Amber Reflex Reflectors*	2	Sides- As far to the front as practicable.
	2	Sides- At or near the center, only on vehicles 30 feet or more in length.
Red Side Marker Lamps**	2	Sides- As far to the rear as practicable.
Amber Side Marker Lamps**	2	Sides- As far to the front as practicable.
	2	Sides- At or near the midpoint, only on vehicles 30 feet or more in length.
Red or Amber Turn Signal Lamps	2	Rear- As far apart as possible, not less than 15" or more than 83" high.
Identification Lamp (3 lamp cluster) for vehicles 80" or more in width (including wheels)	1	Rear- As close as practicable to the top of vehicle at vertical centerline. Lamp centers should be spaced not less than 6" or more than 12" apart.
Red Clearance Lamps for vehicles 80" or more in width (including wheels)	2	Rear- As near to top and as far apart as practicable.
Amber Clearance Lamps for vehicles 80" or more in width (including wheels)	2	Front- As near to top and as far apart as practicable.

\* Note: Red and amber reflex reflectors should be mounted at same height, not less than 15" nor more than 60" high.

\*\* Note: Red and amber side marker lamps should be mounted at same height, not less than 15" nor more than 60" high.

HAZARD WARNING	1966 and newer trailers must have two rear turn signal lamps that operate in conjunction with the towing vehicle hazard warning system
SPLASH GUARDS	Trailers towed by commercial vehicles must be constructed or equipped with splash guards to prevent water or other road surface substances from being thrown by the rearmost wheels beyond the extreme rear of the trailer, and to minimize side spray.
TRAILER ATTACHMENT	Every trailer must be attached to prevent its wheels from being deflected more than six inches from the path of the towing vehicle's wheels. Every trailer, except semi-trailers, must be attached to the towing vehicle by a device, including safety chains, of a type approved by the Commissioner
TIRES	Trailers must be equipped with tires in safe operating condition. A tire is deemed to be in unsafe operating condition if there is a visual break, a cut in excess of one inch, a bump, a bulge, ply or cord exposure, tread design completely worn or tread depth (when measured with a tire gauge) is less than 2/32 of an inch.
BRAKES	Trailers weighing over 1,000 pounds un-laden, and trailers having a maximum gross weight in excess of 3,000 pounds, must be equipped with brakes Brakes must be adequate to control the vehicle at all times, be in good working order and must comply with the standards set by the Commissioner for brake efficiency Commercially used trailers must have an emergency brake-away system, which will hold the trailer stationary for at least 15 minutes.

MV-529C (11/07)

(continued)

## Appendix 9

NYS Office of General Services /NYS Department of Transportation  
General Traffic Signal Specifications

(continued)

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**CELLULAR MODEMS FOR USE WITH CLOSED LOOP TRAFFIC SIGNAL SYSTEMS**

**SCOPE:**

The intent of this specification is to provide the requirements for a field hardened cellular modem to be installed in the field to provide reliable high speed data communications to remote locations over a variety of communications topologies and manufactured by **Blue Tree Wireless Data, Inc., 30111 Settle, Chapel Hill, North Carolina 27517** (www.bluetreewireless.com) or Digi WR44s.

**1. ENCLOSURE**

- 1.1 The enclosure shall be constructed of a sturdy steel or aluminum type material.
- 1.2 The maximum dimensions shall be 6"x 5"x 2".

**2. POWER, RADIO FREQUENCY, ENVIRONMENTAL**

- 2.1 The unit shall be able to be powered by an external DC source between 8 – 30 Volts by means of a terminal block. The maximum current draw shall be 500ma during the Transmit Mode and 250ma in the Standby Mode. An AC adapter with an appropriate plug and electrical ratings shall be included. In addition, the unit shall be capable of being powered over Ethernet (PoE).
- 2.2 The unit shall be capable of operating in an environmental range between -40 to +150 F.
- 2.3 It shall be approved to conform with the standard shock test IEC60068-2-27 & the vibration test IEC60068-2-6 or military specification MIL-STD818/202.
- 2.4 The operational humidity range shall be 5% - 95% (non-condensing).
- 2.5 The unit shall pass the FCC Part 15 and 22 Class A specifications and electrical Specification UL/508/CSA22.2. Also, it shall be listed as UL Class 1, Div. 2.
- 2.6 It shall be a dual band CDMA2000 EVDO Rev. A type (with diversity) operating at a maximum rate of 3 Mbps when downloading, 1.75 Mbps when uploading with RF power of 0.2 Watt @800/1900Mhz. and sensitivity of -100dB.
- 2.7 It shall be a reliable "Always On" serial type server that provides industry standard TCP/IP access to remote devices and real time data collection and capable of 20 port forwarding.
- 2.8 The RS-232 port shall have a baud rate between 9600bps and 115200bps.

**3. EXTERNAL CONNECTIONS AND INDICATORS**

- 3.1 The unit shall have the following connectors:
  - 1 - RS-232 Serial female DB9
  - 1 - USB2.0 mini.
  - 1 - Terminal block for connecting the DC power source
  - 1 - SMA type, female antenna bulk head jack
  - 1 - A reset button to provide a hard reset of the unit
  - 1 - Power jack for an AC adapterand **EITHER:**
  - 1 - RJ45 Ethernet 10/100 (auto-sensing) port **or** 5 - RJ45 Ethernet 10/100 (auto-sensing) ports
- 3.2 Easily visible "LED" indicators for Power, WAN, Signal, RS232 & Ethernet Link & Activity shall be provided.

**4. ANTENNA AND CABLING**

- 4.1 A dual band, Omni Directional "hockey puck" style antenna shall be included. The antenna shall be an AntennaPlus brand Model AP85/18 or an approved equal, with the following specifications.
  - Frequency - 800/1900 MHz
  - VSWR - 1.5 : 1 or less
  - Gain - 3.0 db
  - Polarization - Vertical
  - Mount - Adhesive plus a 3/4" long threaded stud with washer and nut
  - Cable Length - 15 feet
  - Connector Type - SMA male
- 4.2 Also included shall be a 3 foot Ethernet, Cat5e, "cross-over" cable with RJ-45 male ends and a 3 foot "straight thru" DB-9 cable with male ends.

(continued)



## SIGNAL HEADS & HARDWARE

This section describes the technical requirements for Vehicle & Pedestrian Signal Heads and accessories to be furnished statewide.

### SCOPE:

This specification describes the requirements for vehicular traffic signal heads for use by the State, as well as by Counties and local municipalities .

All vehicular traffic control signal heads shall conform to the most recently published edition of the Institute of Transportation Engineers (ITE) Standard ST-008B, as amended herein.

The amendments contained in this specification are numbered in accordance with the format of the most recently published edition of the ITE Standard, and shall replace or modify those specifications, as appropriate. In the event of a conflict between the ITE standard and this specification, the requirements contained in this specification shall apply.

### 2.01 DEFINITIONS:

**Mounting Hardware** - A combination of pipe, brackets, fittings and other necessary connecting parts used to mount a traffic signal face alone, or in combination with other signal faces. Unless otherwise indicated in the Item Description, all mounting hardware shall be supplied for span wire mounting.

Mounting hardware shall be divided into the following items:

- A. One way - All hardware necessary to mount a single traffic signal head.
- B. Two way - All hardware necessary to mount two traffic signal heads at 180° to each other.
- C. Three way - All hardware necessary to mount three traffic signal heads at 120° to each other.
- D. Four way - All hardware necessary to mount four traffic signal heads at 90° to each other.

**Type 1 Traffic Signal Section** - A Type 1 Traffic Signal section is a standard aluminum or polycarbonate traffic signal section without reflector, lens or lamp receptacle.

**Type 1 Traffic Signal Head** - A Type 1 Traffic Signal Head is a three (3) section head with two type 1 traffic signal sections for the green and red indications and one standard section for the yellow indication. In addition to items applicable to standard Traffic Signal Heads, the following additional requirements apply to Type 1 Traffic Signal Heads:

1. All necessary hardware and provisions shall be included in the type 1 section to easily attach the LED signal module to the door without removing the door. Hardware supplied shall be stainless steel.
2. A one piece "U" shaped neoprene lens gasket shall be provided with each type 1 section to provide a water tight seal between LED module and section door.

### 4.03 VISORS:

Unless otherwise specified in the Item Description all signal heads shall be provided with cap-type visors. Visors shall mount to the signal head through the use of four slotted mounting tabs which integrate with the mounting screws on the signal housing door.

### 4.04 MATERIALS AND FABRICATION:

The door shall be provided with four visor mounting holes, located equidistant about the lens opening to allow the mounting of the visor in either a vertical or horizontal position. The holes shall be drilled and tapped, and provided with stainless steel mounting screws. Plastic is not acceptable as material for housing, doors, or visors.

5.00 OPTICAL UNIT: Optical requirements are provided via the LED Signal Module (available separately)

### 6.01 HARDWARE:

1. All span wire signal mounting hardware shall include a span wire clamp, balance adjuster, and wire outlet fitting. A Disconnect hanger may be required and supplied as a separate item.

The span wire clamp shall consist of a shoe, lock bar, two "U" or "J" bolts, and a clevis pin with cotter pin, as well as nuts, washers, etc., as necessary. (Note: The clevis pin shall be supplied with a sufficient number of washers to take up the sideways movement of the pin in the span wire clamp).

Disconnect hangers are terminal boxes made integral with the signal hanger. The disconnect hanger assembly is permanently mounted on the span wire. A terminal strip for attaching the signal feed wires is provided in the box, and a multi-pin plug and socket allows for easy replacement of the signal head itself.

(continued)

**VEHICLE & PEDESTRIAN SIGNAL HEADS & HARDWARE** (Cont'd)

**6.01 HARDWARE** (Continued)

The balance adjuster shall consist of a body with threaded eye-bolt, a jam nut with lock washer, a tightening bolt, a clevis pin with cotter pin, as well as nuts, washers, etc., as necessary. (Note: The clevis pin shall be supplied with a sufficient number of washers to take up the sideways movement of the pin in the balance adjuster.

The wire outlet fitting shall have a continuous opening of a minimum nominal diameter of 38.1 mm for insertion of signal head wiring. The upper opening shall have a weatherproof insulating cover that provides for the insertion of the wiring. The cover shall be securely mounted to the fitting. The bottom opening shall be threaded, and provided with two stainless steel square or hex drive set screws, located at 180° to each other. The bottom of the fitting shall have integral cast serrations, or shall be notched and provided with a serrated locking ring, or shall be provided with a slotted check nut and serrated locking ring.

2. Mounting hardware for a one-way signal head shall be provided as shown in Figures 1 and 2. In addition to the requirements contained in paragraph 6.01-1, the hardware shall also include a 38.1 mm galvanized nipple with cast head, gasket, and steel washer for the connection between the wire outlet fitting and top of the signal head.

A weather-resistant cap/plug shall be provided for the unused hole in the bottom of the head. The cap/plug shall be of a threaded or flanged design.

3. Mounting hardware for multi-way (2, 3 and 4-way) signal heads shall be provided as shown in Figure 3. In addition to the requirements contained in paragraph 6.01-1, the hardware shall also include a center junction hub and pipe arms with tee or cross end connectors. Tee and cross connectors shall be notched for, and supplied with, a serrated locking ring. No pipe/nipple shall be provided for the connection between the center junction hub and the wire outlet fitting. A 38.1 mm galvanized nipple with cast head, gasket and steel washer shall be supplied for the connection between the tee or cross connector and the top of the signal head. Tees or crosses will not be accepted in place of the center junction hub. Center junction hubs shall have a threaded openings on the top and sides. The bottom of the hub shall be essentially fully open, except for the necessary thickness of the housing, and shall be securely covered by a flat plate of weather-resistant design. The plate shall be held in place by a minimum of two stainless steel screws. Center junction hubs shall be provided with a stainless steel square or hex drive set screw on all threaded openings, except that the top opening shall be provided with two set screws, located at 90° to each other. Center junction hubs shall have a minimum nominal opening of 57.2 mm in diameter for round openings, or 57.2 mm square for rectangular openings. Tees or crosses shall have threaded openings to accept the necessary pipe arm/signal head connections, plus at least one additional threaded opening to facilitate wiring. The extra opening shall be closed with a stainless steel threaded metal pipe cap. All threaded openings on the tees and crosses shall be provided with a square or hex drive set screw.

4. Threaded openings on pipe arms shall be tapered. Threaded openings on other pipe fittings shall be national pipe straight threads. Flat arms or spiders shall be provided for the bottoms of multi-way signal heads, except that bottom hardware shall be omitted for multi-way one section head assemblies. Connections between the bottoms of the signal heads and the arm/spider shall be flanged or threaded to provide a locking, weather-resistant connection.

Details for assembling typical multi-way signal head combinations are shown in Figure 4.

**6.02 MATERIALS:**

1. All wire outlet fittings, span wire clamps, balance adjusters, center junction hubs, and the galvanized nipple with cast head that is supplied for the connection between the signal mounting hardware and the top of the signal head shall be made of malleable iron in accordance with ASTM A47 (Latest revision). Note that if the wire outlet fitting is provided with a serrated locking ring/slotted check nut, the locking ring and check nut may be constructed of die cast aluminum per the requirements of Item 4 of this paragraph.
2. The following items shall be made of non-magnetic stainless steel, Type 303 or 304, in accordance with the most recently published edition of the ASTM A296 :
  - A. All set screws.
  - B. The U/J bolts, clevis pin and their related nuts, washers and cotton in the span wire clamp.
  - C. The clevis pin, tightening bolt and their related nuts, washers and cotter pin in the balance adjuster

(continued)

**VEHICLE & PEDESTRIAN SIGNAL HEADS & HARDWARE** (Cont'd)

**6.02 MATERIALS:** (Continued)

3. Pipe arms shall be made of steel pipe in accordance with the most recently published edition of the ASTM A120.
  
4. All remaining suspension components, including brackets, clamps arms, elbows, crosses and other remaining connection devices not listed in Paragraphs 1, 2 and 3 shall be made of one of the following materials:
  - A. Malleable iron in accordance with ASTM A47 (latest revision).
  - B. Steel pipe in accordance with ASTM A120 (latest revision).

**7.02 EXTERIOR FINISH :**

Signal heads, mountings and assemblies shall be supplied as painted either Dark Green or Federal Yellow as required and specified by the end user on their purchase order. All aluminum traffic signal heads, bracket arms and mounting attachments shall be painted by first applying a chromate conversion coating conforming to the most recently published edition of the ASTM B449-CLASS 2, and then electrostatically, applying a polyester powder coating.

Threads and threaded parts shall not be coated and shall be protected from the coating process at the time of application.

The conversion coating shall be allowed to dry thoroughly and shall be free of entrapped air and contaminants. After drying, the chromated surface shall be coated with a polyester powder coating.

The polyester powder shall be electrostatically applied and cured in accordance with the coating manufacturers recommendations. If preheating of aluminum substrate is required, care shall be taken to prevent damage to the chromate coated surface by not exceeding a preheat temperature of 71°C. The polyester coating shall be applied at a uniform thickness between 0.060 mm - 0.090 mm. The polyester powder used shall have the following properties:

Property	ASTM Test Method	Requirements
Specific Gravity	D3451	1.2, minimum
Impact Resistance	D2794	16 N-m, minimum
Pencil hardness	B3363	H - 2H

The color of the finished polyester coating shall be such that a properly prepared color chip shall be a reasonable visual match to Federal Color Standard No. 595A, Color #14056 for Dark Green and to Federal Color Standard No. 595A, Color #13538 for Traffic Yellow. Viewing shall be done under North Standard Daylight.

**14.00 MISCELLANEOUS:**

**14.01 MATERIAL DOCUMENTATION:**

Materials documentation will be required of the low bidder(s). This documentation will be requested in writing after the bid opening. The documentation must be provided within 14 calendar days of receipt of the request. The documentation must include a listing of the materials used in the construction of the major components of the signal heads. The listing must be detailed enough to clearly show compliance as follows:

Housings, Doors and Visors: Paragraph 4.04

Mounting Assemblies: Paragraphs 6.02-1, 6.02-2, 6.02-3 and 6.02-4

Failure to submit this documentation within the time allowed may be consider just cause for rejection of the bid.

**14.02 SAMPLES:**

Samples may be required of the low bidder(s). In the event that samples are required, they will be requested in writing after the bid opening. The appropriate samples must be provided within 14 calendar days of receipt of the request. Failure to submit samples within the time allowed may be considered just cause for rejection of the bid.

(continued)

**VEHICLE & PEDESTRIAN SIGNAL HEADS & HARDWARE** (Cont'd)

**14.03 SHIPPING:**

Signal heads shall be delivered disassembled, as one-way, three section signal face, complete with reflectors, lenses, etc. Mounting hardware and visors may be supplied separately, with pipe arm assemblies already constructed. The shipping cartons shall be clearly marked on the outside to identify the contents. Packing materials should be able to maintain their contents, in perfect condition, for at least two years of storage.

At the time of material delivery, the manufacturer shall also provide each delivery point with a set of up-to-date catalog cuts identifying the components, with part numbers, of the materials supplied

**POLYCARBONATE SIGNAL HEADS**

**GENERAL:**

The performance of the traffic signals shall conform to the requirements of the most recently published edition of the "Vehicle Traffic Control Signal Heads" published by the Institute of Transportation Engineers (ITE).

**MATERIALS:**

The traffic signal housing, visor and door shall be made of injection molded polycarbonate resin which shall be capable of withstanding a 95 N-m impact without fracture or permanent deformation.

Material used in the construction of the signal housing door, and visor shall be resistant to heat generated by and LED Signal Module. No deformation or discoloration shall be evidenced modules are used in twelve inch signal sections. The plastics shall be ultra-violet and heat stabilized and flame retardant.

The signal housing, door and visor shall be shall be a reasonable visual match to Federal Color Standard No. 595A, Color #14056 for Dark Green or to Federal Color Standard No. 595A, Color #13538 for Federal Yellow. Viewing shall be done under North Standard Daylight and the color shall be fully impregnated into the polycarbonate resin..

**HOUSING:**

The housing shall have a minimum thickness of 1/10<sup>th</sup> inch. The housing shall be of one piece construction. Both the 8 inch and the 12 inch housings are to be designed in the same manner, so when used in combination heads the design will match each other.

The top and bottom openings on each housing, shall have integral serrated bosses that will provide positive positioning of the signal head to eliminate undesirable rotation or misalignment of the signal head between sections. Each opening accommodates standard 1-1/2 inch pipe fittings and brackets.

**DOORS:**

Doors shall be hinged by two lugs and mounted to the housing using stainless steel pins. The door of each signal section shall be one-piece with a minimum thickness of 1/10<sup>th</sup> inch.

A neoprene gasket shall be provided between the body of the housing and the door. The doors shall be forced tightly against the gasket and housing by a simple stainless steel locking device. A slotted air cored neoprene lens gasket shall provide a positive seal between the LED module and the signal door. The gasket shall be an unbroken circular gasket with "U" shaped cross section. The gasket and module shall be held tightly into the door by four stainless steel clips and screws that shall allow easy removal of the module and gasket from the door without removal of the door in the field.

**REINFORCING PLATES:**

To increase the strength and reduce the possibility of the polycarbonate signal head from fracturing when mounted in an installation using span wire, each polycarbonate signal head shall be supplied with one reinforcing plate. This plate will be installed between the head of the cast nipple and the inside top surface of the top section of the signal head assembly. The plate shall be made of metal and fit the contour of both the bottom and top inside surfaces of the signal section. Signal Sections that have a reinforcing structure integrated into the section itself during the sections manufacturing process will also be allowed as a substitute for an external plate. Design of the reinforcing structure is subject to approval by NYSDOT. Lock nipples with a length of 1.75" to 2.00 inches will also be supplied

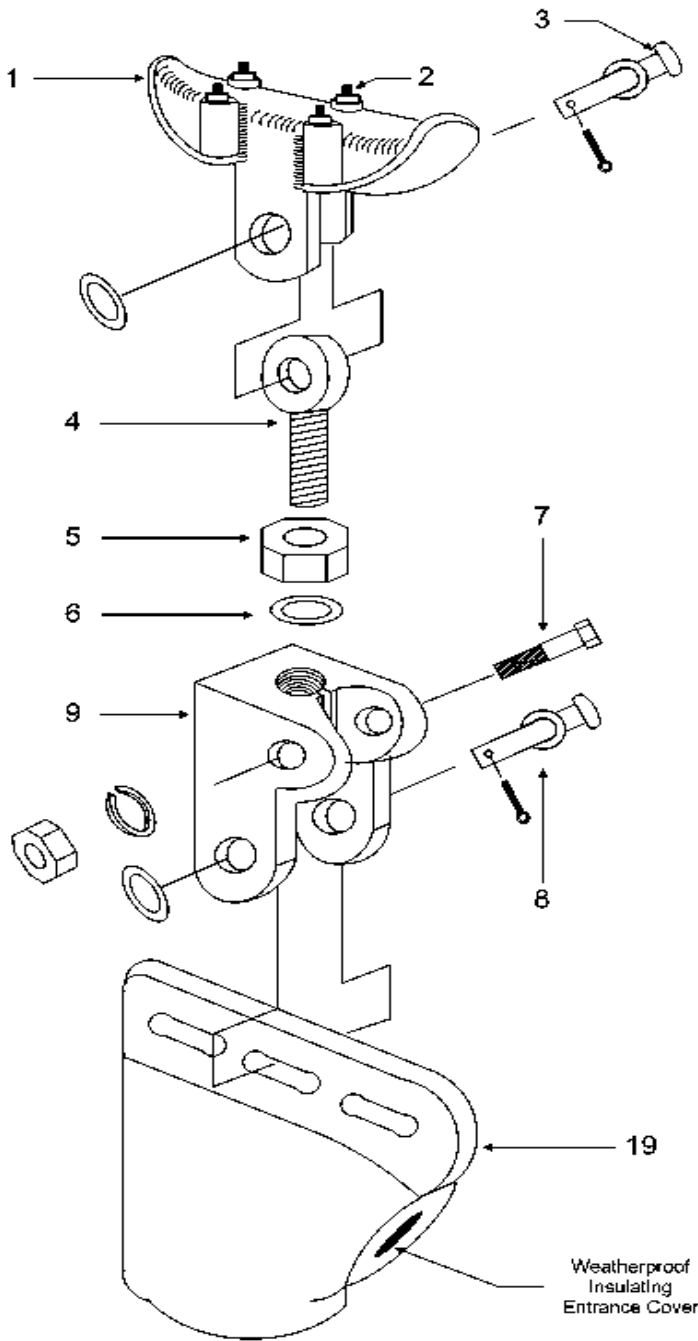
**VISOR:**

Visor shall be made of one piece with a minimum thickness of 2.03 mm. The rear edge of the visor shall be provided with four mounting lugs for attaching the visor to the door using screws. The inside of the visor shall be dull black in color. Unless otherwise specified all signal heads shall be provided with cap-type visors.

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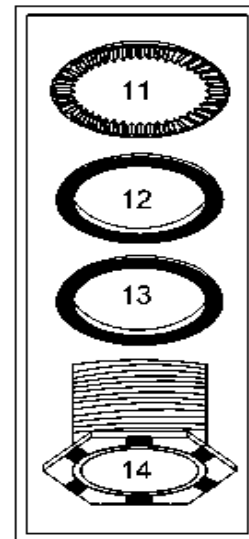
Signal head mounting

**FIGURE - 1**



ITEM	DESCRIPTION
1	Span Wire Clamp
2	U or J Bolts W/ Nuts & Lock Washers
3	Headed Clevis Pin With Cotter Pin and Washers
4	Eyebolt
5	Jam Nut
6	Lockwasher (External Tooth)
7	Tightening Bolt W/ Nut & Washer
8	Headed Clevis Pin With Cotter Pin and Washers
9	Balance Adjuster
10	Checknut (If Necessary)
11	Serrated Lockring (If Necessary)
12	Gasket
13	Washer
14	Cast Nipple
15	Conduit Locknipple
16	Octagonal Cap
17	Flanged Closure (Option to # 15 & 16)
18	Not Included
19	Wire Outlet Body W/ Entrance Cover & Stainless Steel Set Screws
20	Not Included
21	2, 3 or 4 Way Center Junction Hub W / Stainless Steel Set Screws
22	Pipe Arm W / Tapered Threads
23	Tee W / Stainless Steel Set Screws
24	Octagonal Closure Cap
25	2, 3 or 4 Way Lower Arm

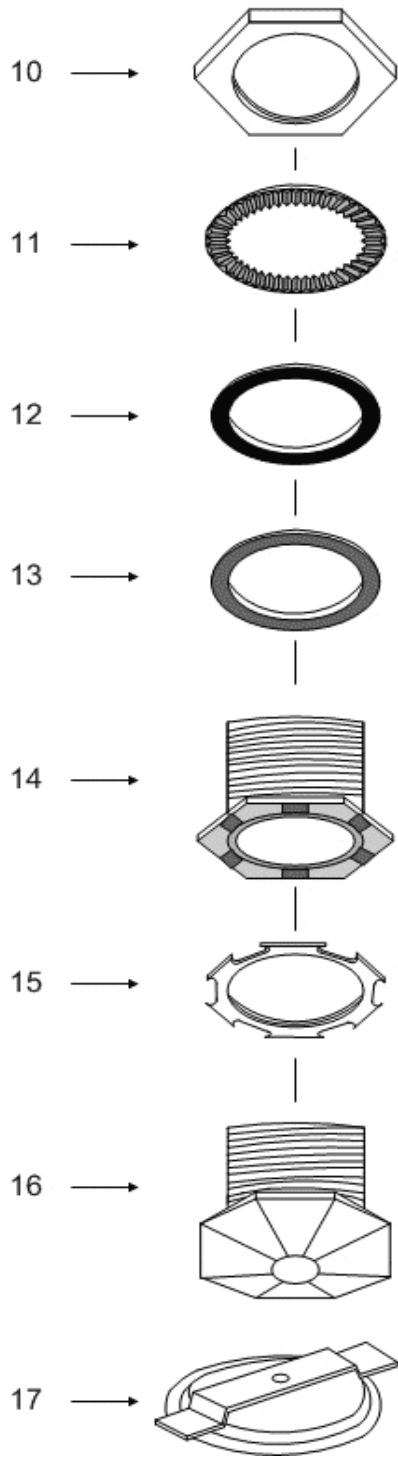
Assembly Used to attach  
 Signal Head to Hub  
 and/or Wire Outlet Body



(continued)

Signal head mounting

**FIGURE - 2**

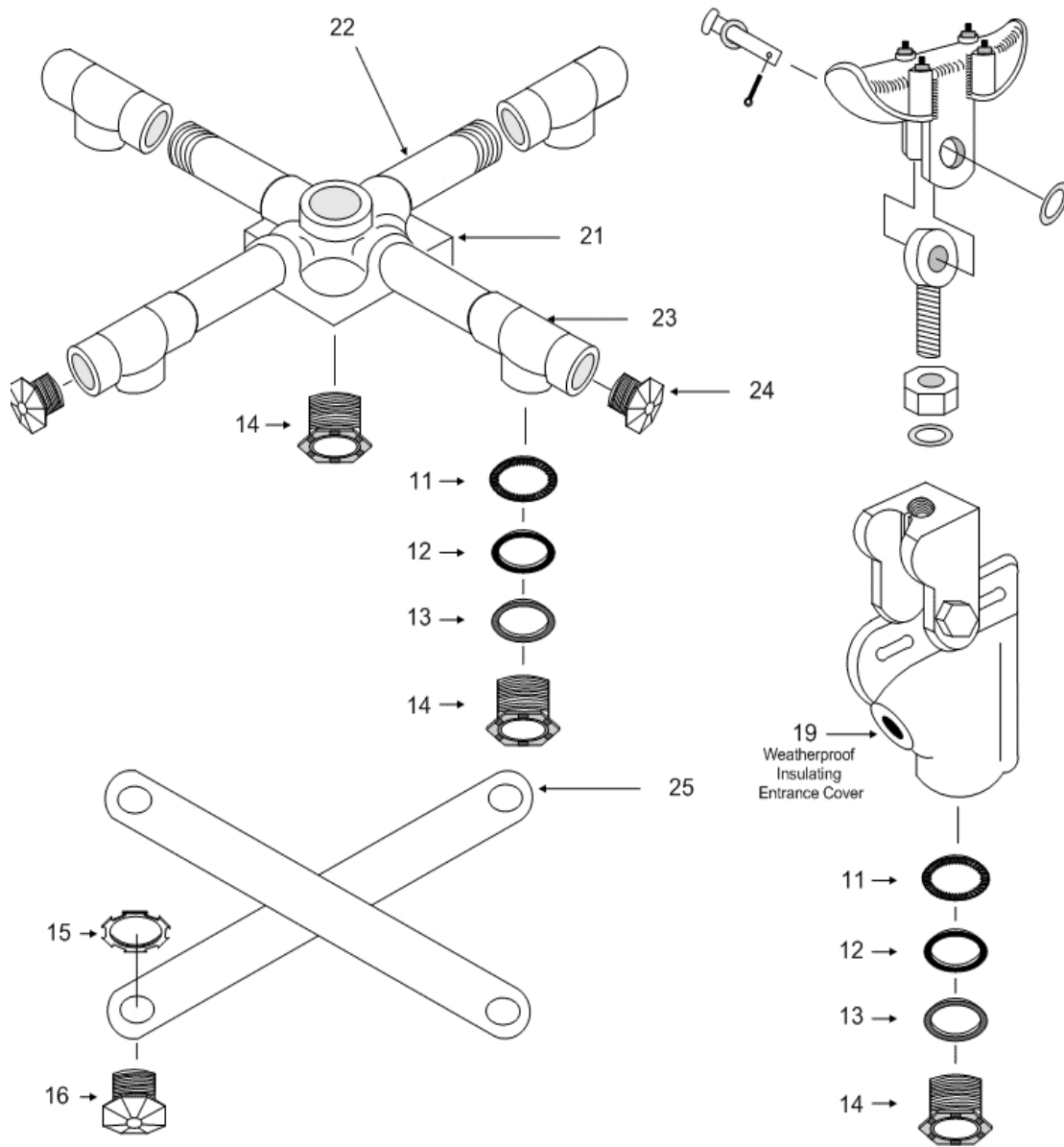


ITEM	DESCRIPTION
1	Span Wire Clamp
2	U or J Bolts W/ Nuts & Lock Washers
3	Clevis Pin W/Cotter Pin and Washers
4	Eyebolt
5	Jam Nut
6	Lockwasher (External Tooth)
7	Tightening Bolt W/ Nut & Washer
8	Clevis Pin W/Cotter Pin and Washers
9	Balance Adjusters
10	Checknut (If Necessary)
11	Serrated Lockring (If Necessary)
12	Gasket
13	Washer
14	Cast Nipple
15	Conduit Locknipple
16	Octagonal Cap
17	Flanged Closure (Option to # 15 & 16)
18	Not Included
19	Wire Outlet Body W/ Entrance Cover & Stainless Steel Set Screws
20	Not Included
21	2, 3 or 4 Way Center Junction Hub W / Stainless Steel Set Screws
22	Pipe Arm W / Tapered Threads
23	Tee W / Stainless Steel Set Screws
24	Octagonal Closure Cap
25	2, 3 or 4 Way Lower Arm

(continued)

Signal head mounting

**FIGURE - 3**



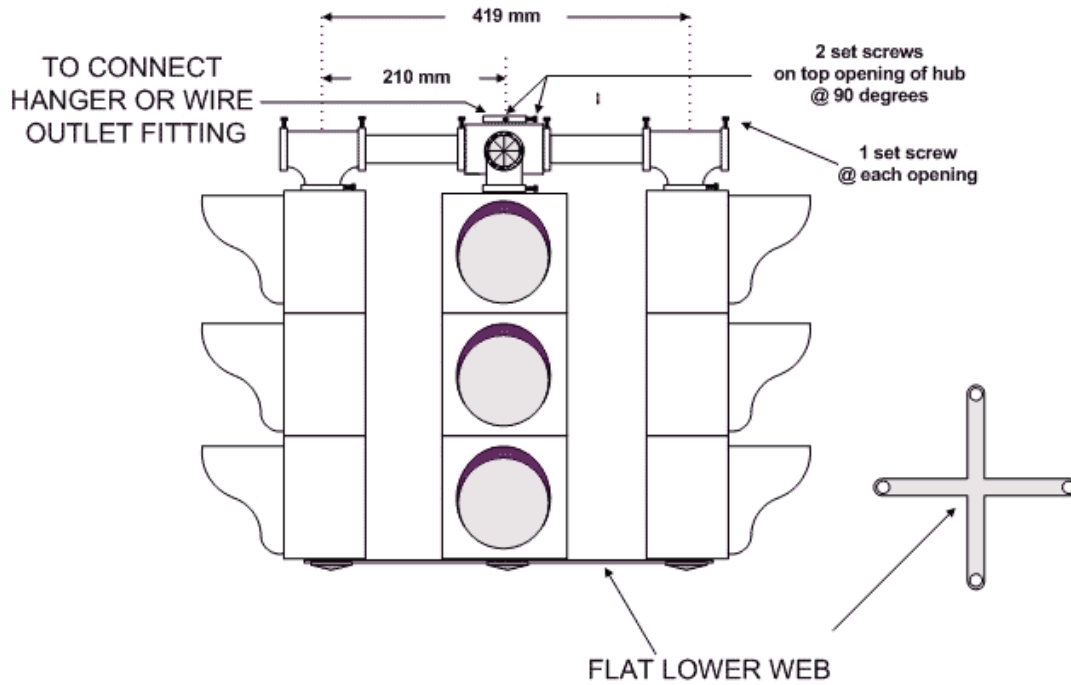
**NOTES:**

1. DETAILS SHOWN ARE TYPICAL ONLY, AND NOT INTENDED TO INDICATE THE PRODUCT OF ANY SPECIFIC MANUFACTURER.
2. WIRE OUTLET FITTINGS, JUNCTION HUBS AND TEES SHALL BE EQUIPPED WITH STAINLESS STEEL SET SCREWS. THE BOTTOM OF THE WIRE OUTLET FITTING AND THE TOP OF THE CENTER JUNCTION HUB SHALL HAVE TWO SET SCREWS, LOCATED AT 90 DEGREES TO ONE ANOTHER.
3. THREADS ON PIPE ARMS SHALL BE TAPERED. ALL OTHER FITTINGS SHALL HAVE NATIONAL PIPE STRAIGHT THREADS.
4. NOTE THAT PART NUMBER 17 IS NOT AN OPTION FOR MULTI-WAY SIGNAL HEADS.

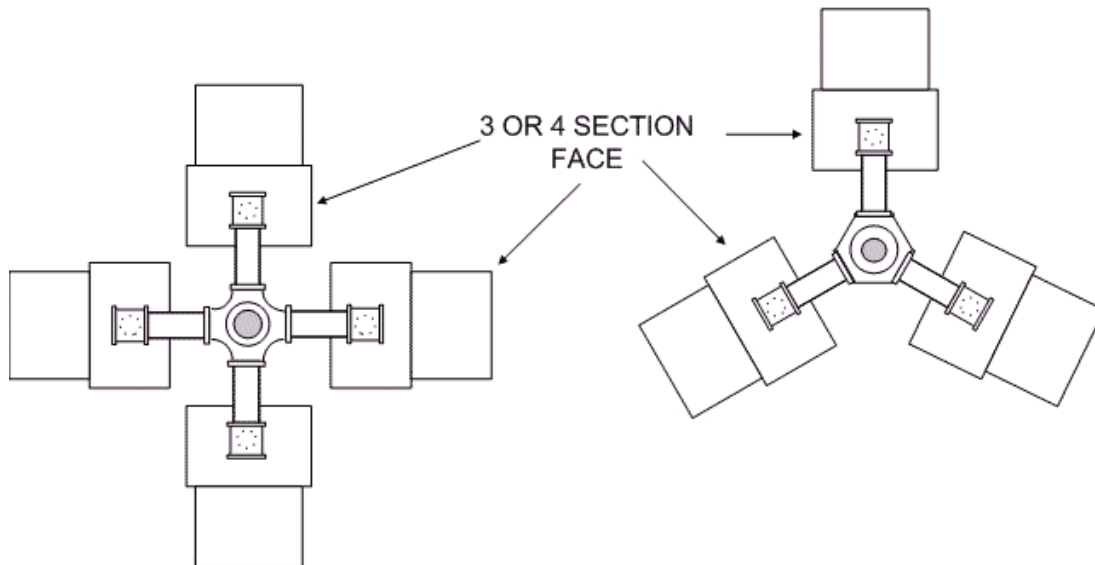
(continued)

Signal head mounting

**FIGURE - 4**



NOTE: STANDARD PIPE  
ARM LENGTH IS 210 mm



**MULTI - WAY SIGNAL MOUNTING DETAILS**

(continued)



**VEHICLE & PEDESTRIAN SIGNAL HEADS & HARDWARE** (Cont'd)

**TYPE 1 – ONE & TWO SECTION PEDESTRIAN SIGNAL HEAD**

This specification is for Pedestrian Signal "MAN" AND "HAND" display heads. The pedestrian signal heads shall be designed for the exclusive purpose of controlling pedestrian traffic. The indications shall consist of the illuminated displays "MAN" and "HAND". Pedestrian signal head construction and indications shall conform to the current ITE Standard for Pedestrian Traffic Control Signal Indicators and any applicable items from the current NYS specification for Vehicle Signal Heads, including but not limited to: exterior finish, materials, and documentation; with the following modifications:

1. The head shall be either a single section or a two (2) section unit, where the upper section is for the "HAND" indication and the lower section for the "MAN" indication.
2. Illumination shall be designed for the use of LED Pedestrian Signal Modules. No modules shall be supplied with the head. Fixtures shall not be wired in series.
3. Signal head shall be supplied with an 18 AWG, color coded wiring harness, and a four position, barrier type terminal block.
4. Signal head shall be provided without mounting hardware, but with upper and lower openings suitable for post top and side mounting.

A Type 1 Pedestrian Signal Section is a standard aluminum or polycarbonate section supplied without a lens, reflector, or lamp. This section is to be used with a bi-modal or LED pedestrian signal module. In addition to items noted above, the following additional requirements apply to Type 1 pedestrian signal sections:

- A. A four (4) terminal double row, closed back, flat mount heat resistant terminal block rated for 20 Amp (min) shall be supplied and securely attached to the inside rear of each section. The terminal block shall utilize 8-32 plated binder head screws for connection to the block. One side of the double row terminal block shall be furnished with 45 deg, 1/4 inch wide, uninsulated male tabs for connection to the block using female quick disconnects.
- B. All necessary hardware and provisions shall be included in the section to easily attach the LED module to the door without removing the door. Hardware supplied shall be stainless steel.
- C. A 12" x 12" one piece "U" shape neoprene lens gasket shall be provided with each to supply a water tight seal between LED module and section door.
- D. Reinforcing Plates to increase the strength and reduce the possibility of the polycarbonate signal head from fracturing when mounted in an installation using span wire, each polycarbonate signal head shall be supplied with one reinforcing plate. This plate will be installed between the head of the cast nipple and the inside top surface of the top section of the signal head assembly. The plate shall be made of metal and fit the contour of both the bottom and top inside surfaces of the signal section. Signal Sections that have a reinforcing structure integrated into the section itself during the sections manufacturing process will also be allowed as a substitute for an external plate. Design of the reinforcing structure is subject to approval by NYSDOT. Lock nipples with a length of 1.75" to 2" inches will also be supplied.

**POLE MOUNTING BRACKETS AND PEDESTRIAN STATIONS**

**TWO-WAY TOP MOUNT POLE BRACKET:**

The 2-way top mount pole bracket shall be designed for mounting two pedestrian signal heads to the top of a standard pedestrian pole (See Figure "B"). All necessary hardware for the proper mounting shall be included. Pole top brackets, elbows and tees shall be provided with set screws.

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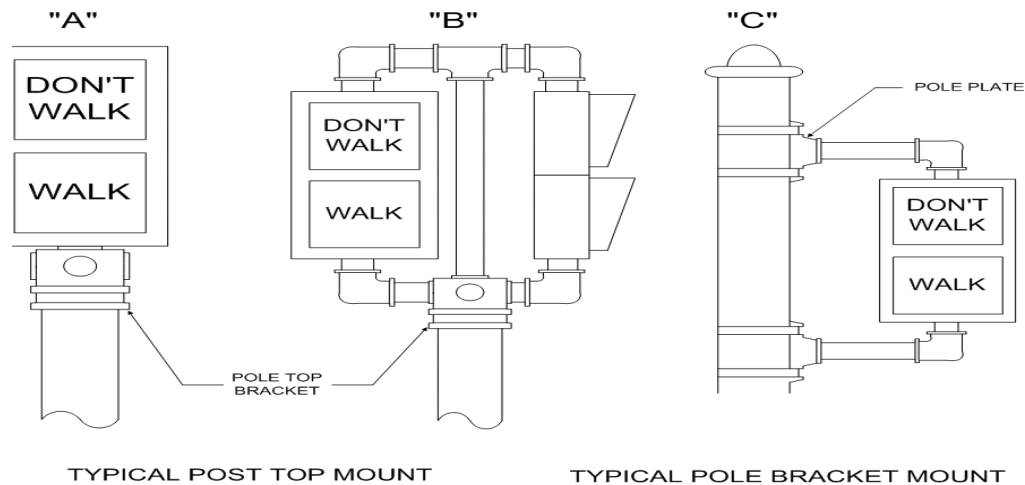
**VEHICLE & PEDESTRIAN SIGNAL HEADS & HARDWARE** (Cont'd)

**ONE-WAY SIDE MOUNT POLE BRACKET:**

The 1-way side mount pole bracket shall be supplied with adjustable stainless steel straps for mounting a single pedestrian signal head around a circular pole (See Figure "C"). All necessary hardware for the proper mounting shall be included. Pole plates, elbows and tees shall be supplied with ¼ inch stainless steel set screws. Hardware, with the exception of the stainless steel straps, shall be supplied painted with a baked enamel finish, using either color #14056, or #13538 according to Federal Color Standard No. 595A as specified by the purchasing organization at the time of ordering. Strapping for side mount brackets shall be 1/3 inch thick x ¾ inch wide x 16 feet long per set of brackets. Strapping may be supplied in rolls equal to total amount needed for total brackets per region.

**ONE-WAY TOP MOUNT POLE BRACKET:**

The 1-way top mount pole bracket shall be designed for mounting a single pedestrian signal head to the top of a standard pedestrian pole (See Figure "A"). All necessary hardware for proper mounting shall be included. The pole top bracket shall be supplied with set screws.



**PEDESTRIAN PUSH BUTTON STATIONS AND SIGNS:**

The pedestrian push button stations must be designed to accept **either** a 9" x 12" sign that conforms to the Federal MUTCD **R6-12 sign** (see illustration D below) **or** a 9" x 15" sign that conforms to the Federal MUTCD **R6-20 sign** (see illustration E below). These two signs shall conform to the Federal MUTCD standard (including orange hands and CDT seconds remaining) except that the arrow depicted in the federal standard is deleted and additional space is provided to include a street name in its place. The signs shall come equipped with adjustable mounting staves.

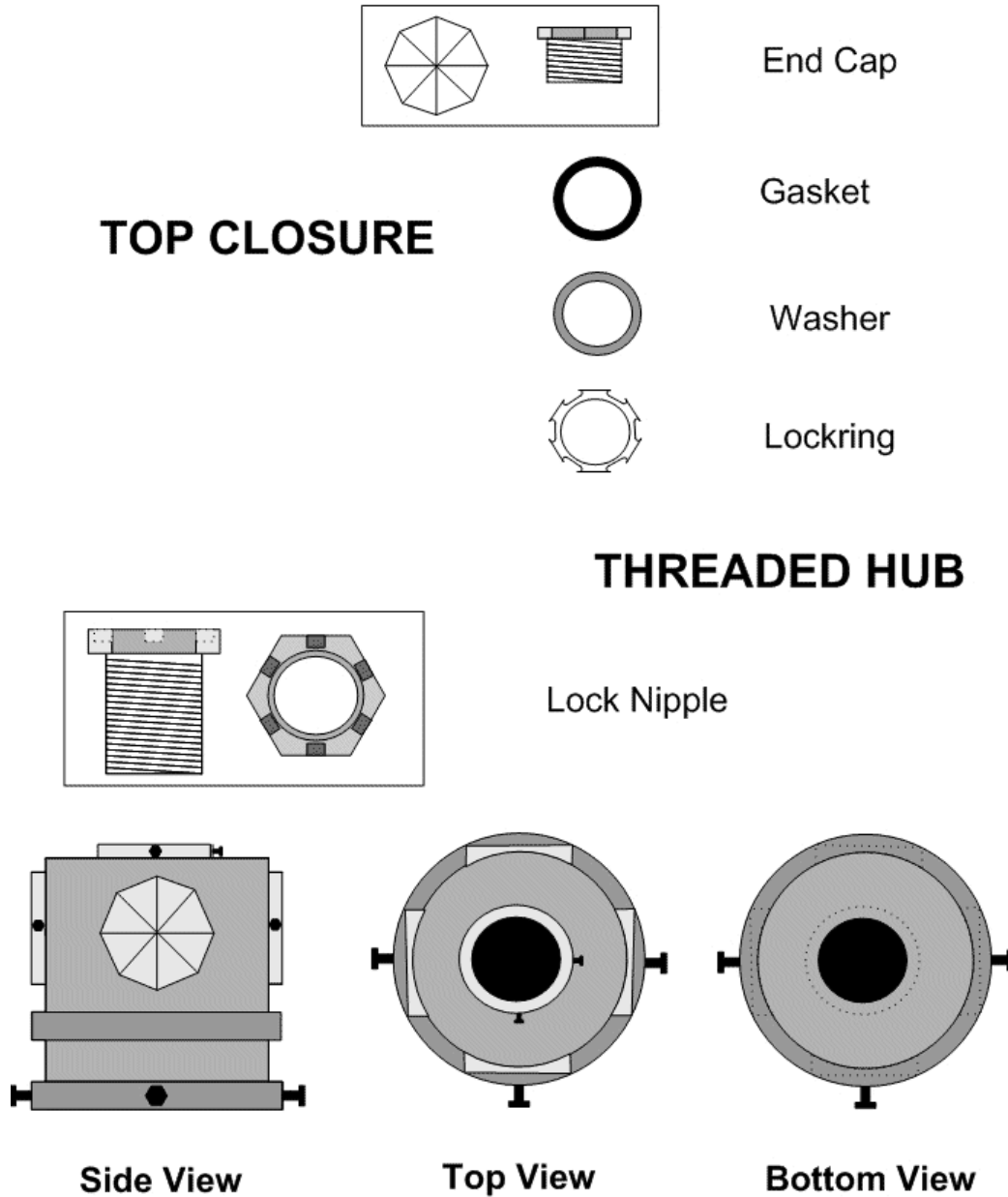
The pushbutton must be ADA compliant watertight, and conform to other ADA requirements. The push button shall utilize screw terminals, which are compatible with spade lug wire terminations. Plastic wire nuts are not acceptable. The wire nuts shall have electrical conducting, spiral screw threads to reduce the electrical resistance of the connection. Soldered leads, which may have a tendency to break near the connections, are not acceptable. The push button assembly shall include threaded pipe plugs, which are intended to plug off the unused wire entry.

The Pedestrian Station shall be supplied painted with a baked enamel finish, using **either** Color #14056 Dark Green, or Color #13538 Traffic Yellow, according to Federal Color Standard No. 595A. Color will be determined at the time of order by the ordering agency or department.

The Federal MUTCD can be found on line at: <http://mutcd.fhwa.dot.gov/>. The ADA regulation is found at [www.fta.dot.gov/transit\\_data\\_info/reports\\_publications/publications/project\\_construction\\_management\\_guidelines/1599\\_11102\\_ENG\\_HTML.htm](http://www.fta.dot.gov/transit_data_info/reports_publications/publications/project_construction_management_guidelines/1599_11102_ENG_HTML.htm)

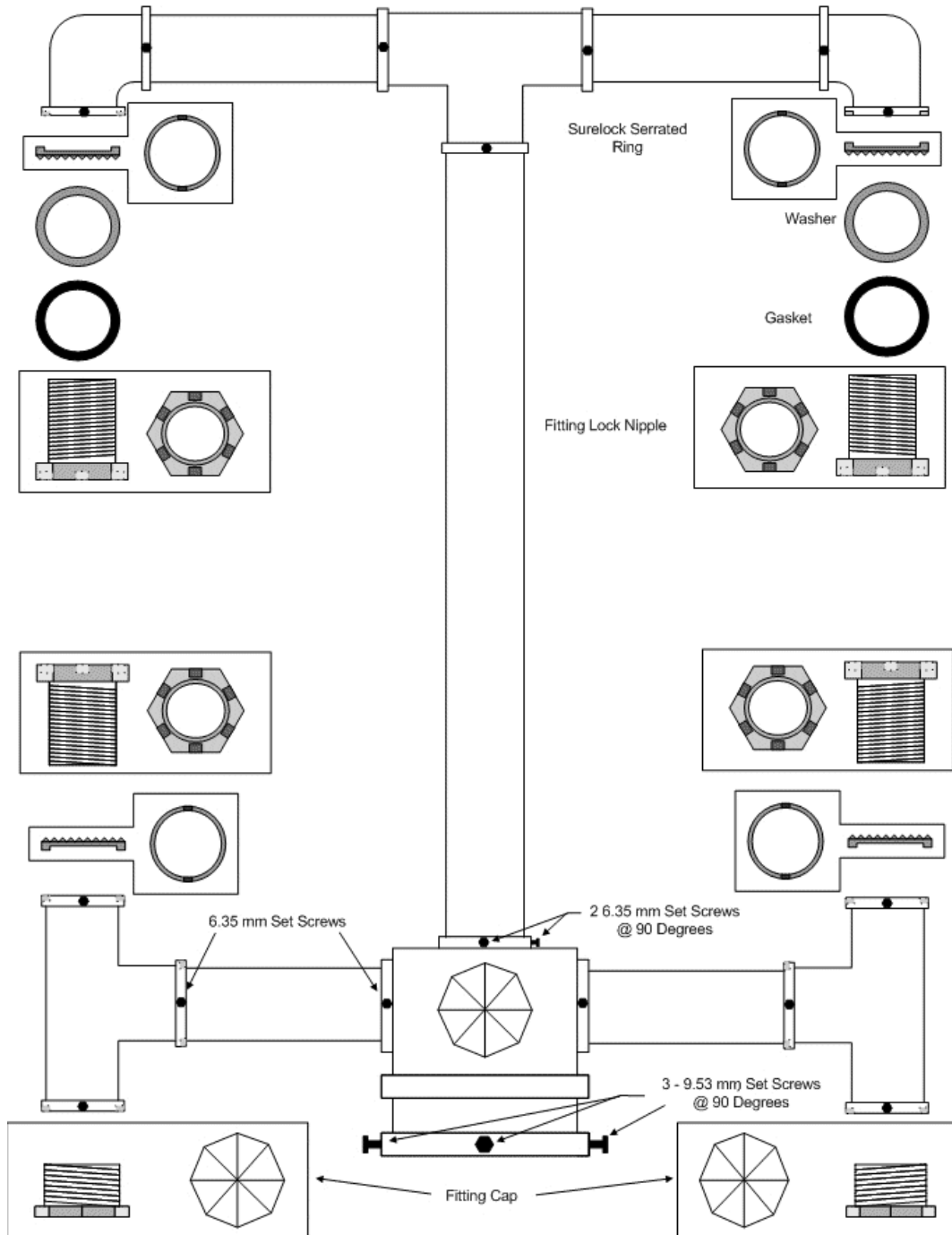
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**FIGURE "A"**



(continued)

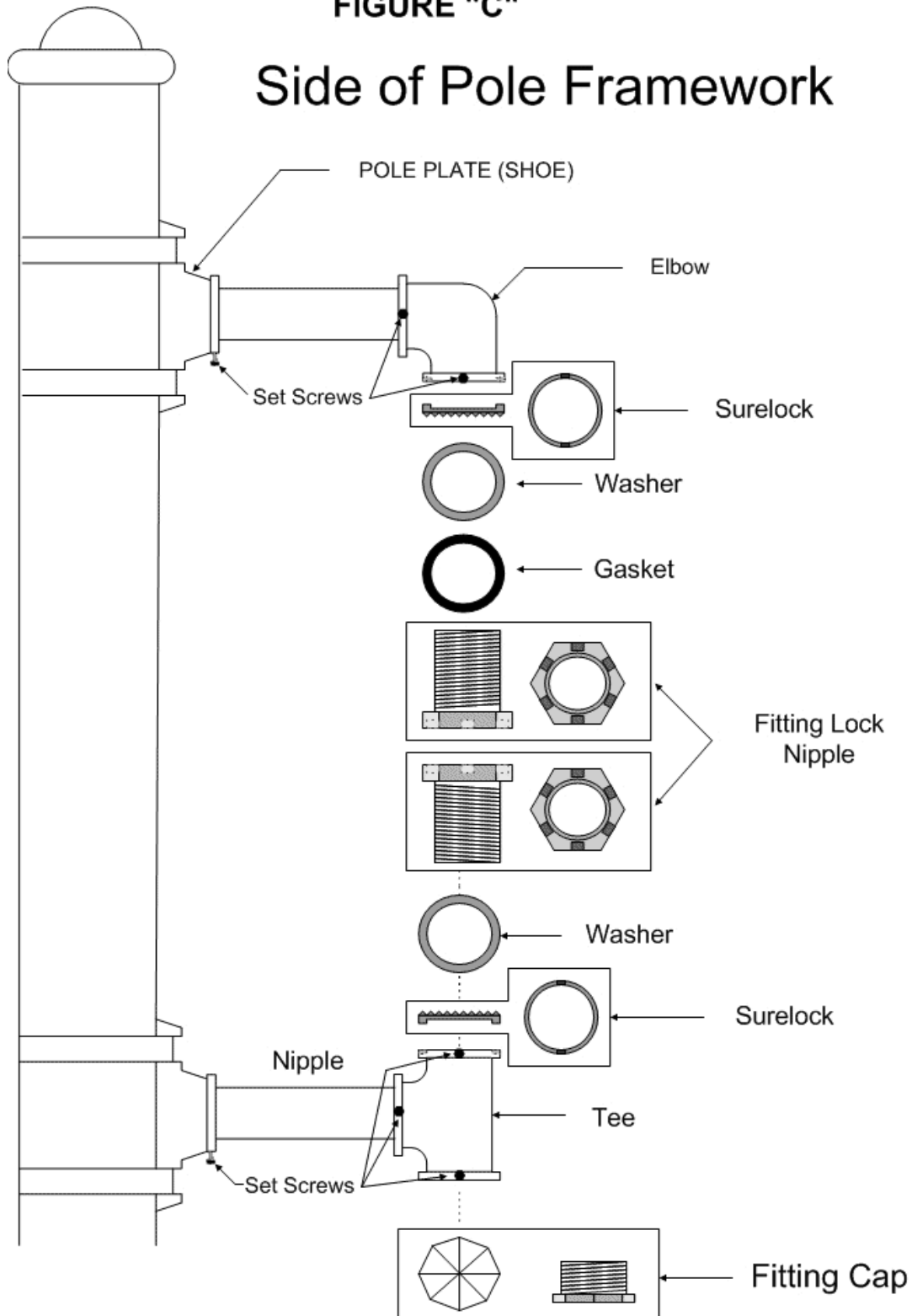
**FIGURE "B"**  
**Two Way Post Top Mount**



Metric Conversion: 6.35mm Set screws = 1/4 inch Set Screws  
 9.53mm Set Screws = 7/16 inch Set Screws

(continued)

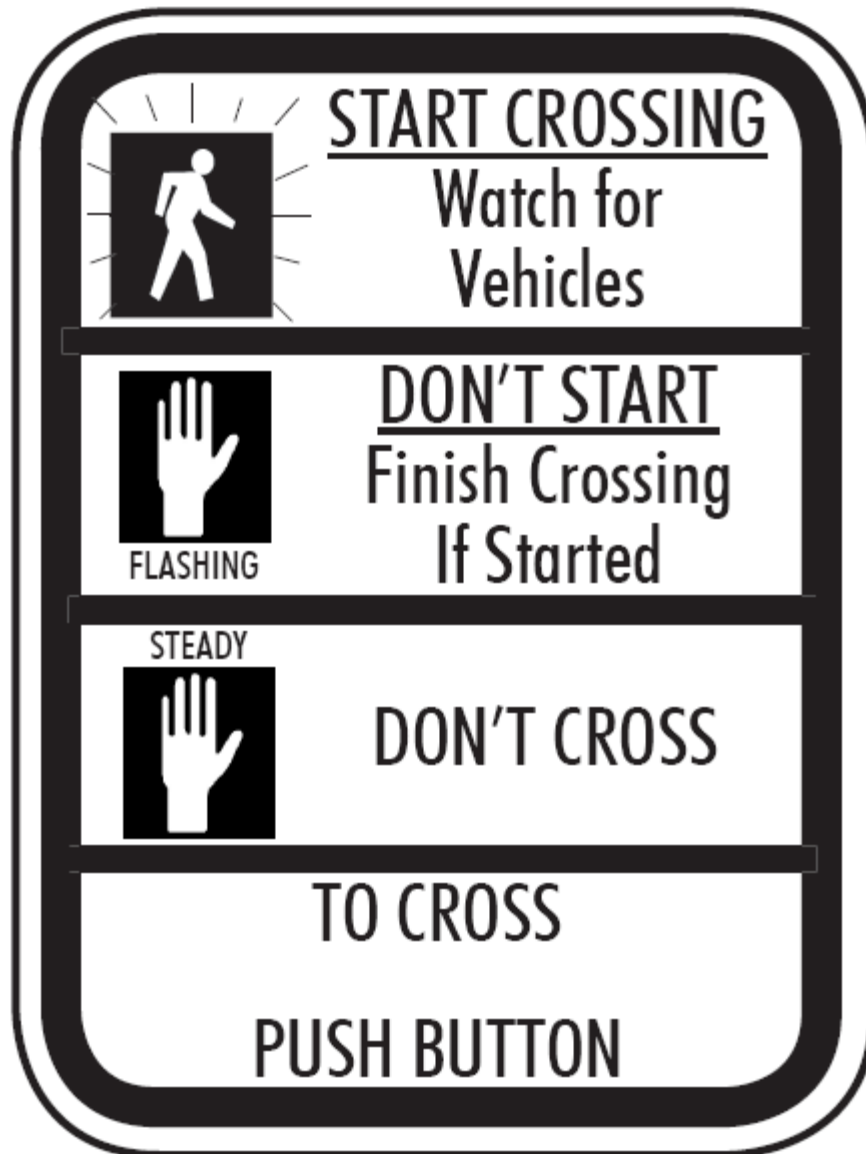
**FIGURE "C"**  
**Side of Pole Framework**



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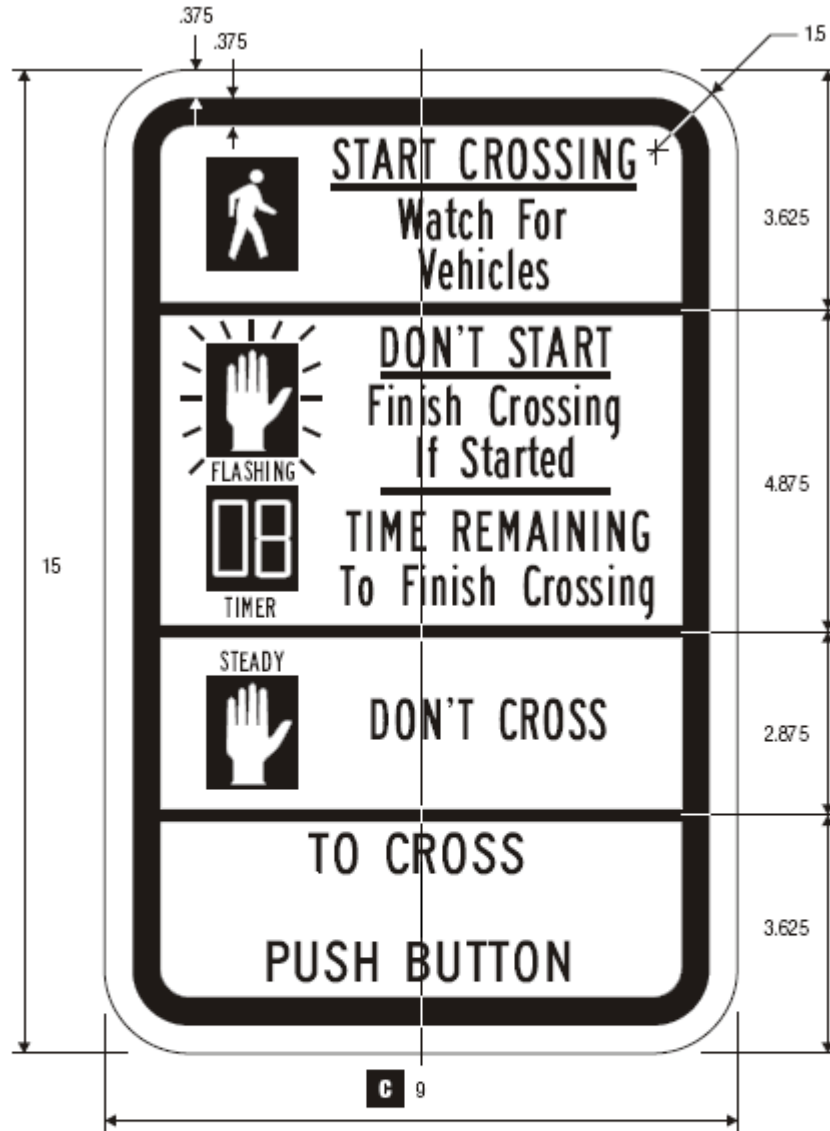
DETAILED SPECIFICATIONS (Cont'd)

FIGURE D



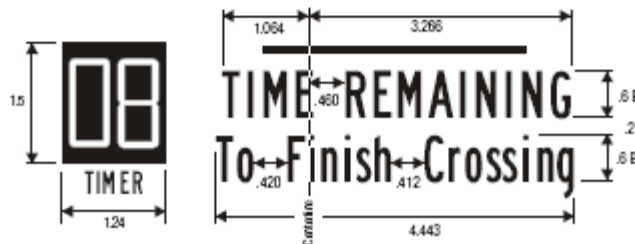
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FIGURE E



R10-3e

COUNT-DOWN PEDESTRIAN



COLORS: LEGEND — BLACK  
 BACKGROUND — WHITE (RETROREFLECTIVE)  
 08, HAND SYMBOL — ORANGE (RETROREFLECTIVE)

(continued)

**18' STEEL POST TOP MOUNT ANCHOR BASE SIGNAL POLE, W/ ANCHOR BASE & BOLTS**

SCOPE:

This specification covers the material requirements and fabrication details for poles used for traffic signals.

GENERAL

**A. Post Top Mount**

Post top mount poles are used for mounting traffic signals directly on the top of the pole.

**B. Design Criteria**

The poles shall be designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (1994), except as modified by this specification. The following elements of a pole shall be designed for the most critical orientation of the loads, applied to a traffic signal pole:

- Any tubular segments of the structure.
- Hand hole reinforcement and other hole reinforcement.
- Device used to connect cable to pole.
- Base plate.
- Mast arm to pole connections.
- Anchor bolts.

The design shall be approved, stamped and signed by a professional engineer licensed in the State of New York.

All necessary holes in the pole below the load attachment point and greater than 3/4 inch in diameter shall be made by the manufacturer and reinforced according to the fabrication details and contract documents. Hand holes shall be located ninety (90°) degrees clockwise, top view, from the direction of the cable load, unless otherwise specified.

For those poles on which a traffic signal cabinet will be mounted the pole manufacturer will be required to weld a cabinet wiring access coupling into the pole as part of the pole manufacturing process. This coupling shall be centered 12 inches from the bottom of the base plate and 90° clockwise (top view) from the axis of the hand hole. The coupling shall be designed to accept a standard chase nipple on the inside of the pole, and to accept 1 1/2 inches of a standard 4 inch diam. galvanized pipe from the outside of the pole, and shall protrude no more than 1/2 inch on the out side of the pole. An insulated chase nipple shall be installed in the coupling on the inside of the pole. The coupling shall be designed to reinforce the hole in which it is installed.

**C. Wind Loads**

Poles and attachments thereto covered by this specification shall be designed for the following wind speeds in accordance with the AASHTO standard in DESIGN CRITERIA above:

- 80 mph - Counties of Allegany, Bronx, Cattaraugus, Chautauqua, Erie, Genesee, Kings, Livingston, Monroe, Nassau, New York, Niagara, Orleans, Ontario, Queens, Richmond, Rockland, Suffolk, Wayne, Westchester and Wyoming.
- 70 mph - All other counties.

MATERIAL REQUIREMENTS:

The following materials, or approved alternates, as determined by the NYS D.O.T. Deputy Chief Engineer, Office of Design, shall be used for fabrication. Span Wire Mast Arm and Bracket poles shall be galvanized steel. Post top poles may be either galvanized steel or aluminum. Acceptable aluminum materials are those contained in the current AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (1994).

Additionally, some of the products bid are subject to the Qualified Manufacturers requirements of the Material Division of the NYS Department of Transportation, and must be supplied through manufacturing facilities (and processes) approved by the Material Division. Approved manufacturers are listed for the production of Span Wire Poles and for Aluminum Breakaway Transformer Bases in Appendix5.

(continued)



**18' STEEL POST TOP MOUNT ANCHOR BASE SIGNAL POLE, W/ ANCHOR BASE & BOLTS** (Cont'd)

Refer to the master clause concerning QUALIFIED MATERIAL AND PRODUCT / APPROVED PRODUCT /MANUFACTURER REQUIREMENTS as found on in APPENDIX 5.

The following are the acceptable steel materials for the signal pole components.

**A. Poles:** The finished pole shall be galvanized in accordance with section 719-01 Galvanized Coatings and Repair Methods,

Type 1, and be made of one of the following:

- 1) ASTM A500, Grade B or ASTM A501.
- 2) ASTM A53, Grade B pipe
- 3) ASTM A53, Grade B pipe, with a minimum yield of 48,000 psi guaranteed by the manufacturer and documented by the submission of certified copies of physical tests performed on the lots of material from which the poles were manufactured.
- 4) ASTM A252, Grade 2 or Grade 3.
- 5) ASTM A252, Grade 2, with a minimum yield of 48,000 psi guaranteed by the manufacturer and documented by the submission of certified copies of physical tests performed on the lots of material from which the poles were manufactured.
- 6) ASTM A572M, Grades 40, 50, 60 or 65.
- 7) ASTM A595, Grade A.
- 8) ASTM A618, Grade I, II or III.
- 9) ASTM A588.
- 10) ASTM A513, with a minimum yield of 36,000 psi guaranteed by the manufacturer and documented by the submission of certified copies of physical tests performed on the lots of material from which the poles were manufactured.
- 11) AASTM A1008/A1008M Grade 60 Class 2
- 12) AASTM A1011/A1011M Grade 60 Class 2 EI 02-030

**B. Bases:** The base shall be galvanized under the same specification as the pole, and made of one of the following:

- 1) ASTM A27M, Grade 65-35, mild to medium strength carbon steel castings.
- 2) ASTM A36M.
- 3) ASTM A588.
- 4) ASTM A572, Grade 290, 345, 415 or 450.
- 5) ASTM A633M (Any Grade).

**C. Anchor Bolts, Nuts and Washers:** Bolts and nuts shall meet the requirements of one of the following specifications:

- 1) ASTM F568 Class 4.6 (Bolts and Nuts).
- 2) ASTM F568 Class 8.8 (Bolts)
- 3) ASTM A576 (Bolts) Grades 1021 and 1025 with a minimum elongation of 18 percent in 2 inches tested in accordance with ASTM A370. The guaranteed minimum yield strength shall be stated by the manufacturer.
- 4) ASTM A675M Grades 485 through 620 (Bolts).
- 5) ASTM A563M Grads A, B, C, D, or DH (Nuts).
- 6) ASTM F1554 Grades 36, 55 or 105 (Bolts).
- 7) ASTM A36M (Bolts) modified to a minimum yield of 55,000 psi, minimum tensile of 65,000 psi and minimum elongation of 18 percent in 2 inches, tested in accordance with ASTM A370.
- 8) ASTM A194, Grade 2H (Nuts)The type and grade of steel for nuts shall be compatible and of comparable strength to the steel used for the bolts. Washers shall be plain hardened washers. Nuts, washers and a minimum of the top of 12 inches of anchor bolts shall be hot-dipped galvanized, in accordance with the requirements of the current D.O.T. Standard Specifications, Section 719-01, Galvanized Coatings and Repair Methods, Type II

**D. Correction Devices:**

- 1) ASTM A36M.
- 2) ASTM A588M.
- 3) ASTM A325M

(continued)

**18' STEEL POST TOP MOUNT ANCHOR BASE SIGNAL POLE, W/ ANCHOR BASE & BOLTS** (cont'd)

**MATERIAL REQUIREMENTS** (Cont'd)

**E Pole Caps and Anchor Bolt Covers:**

Pole caps shall be galvanized steel, galvanized cast iron, aluminum or zinc alloy AG40A. Anchor bolt covers shall be galvanized steel, galvanized cast iron, or aluminum. Galvanizing shall be done in accordance with the requirements of the current D.O.T. Standard Specifications, Section 719-01, Galvanized Coatings and Repair Methods, Type II.

**FABRICATION:**

**Bases and Hardware:**

The base plate shall be welded to the pole by an acceptable weld in accordance with the New York State Steel Construction Manual.

All anchor bolts, nuts and washers required for each pole shall be supplied by the pole manufacturer. Anchor bolts shall be designed for the most critical orientation of the pole. Anchor bolts are to be anchored using double nuts and plates or threaded plates and shall be long enough to embed at least 30 bolt diameters into the concrete foundation. "L" bends will not be allowed. Each pole shall be designed to have four (4) bolts. Each anchor bolt shall be equipped with 2 nuts and one or more washers for attaching the pole plus those necessary to provide end anchorage to the anchor bolt. (See Figure "C")

Washers will be required when the holes on the base plate are within the following tolerances:

- Hole diameter not more than 1/8 inch greater than the bolt, bolt diameters less than 1 inch.
- Hole diameter not more than 1/4 inch greater than the bolt, bolt diameters equal to or greater than 1 inch.
- Hole diameter not more than 3/8 inch greater than the bolt, bolt diameters equal to or greater than 2 inches.

Anchor bolt covers shall be furnished. These shall be affixed to the base or shaft with stainless steel cap screws. Shafts and arms shall be equipped with end caps secured with stainless steel set screws.

**Poles (Shafts):**

Poles shall be round or multi-sided shapes.

Poles shall be equipped with hand holes except for poles intended for transformer base mounting. Hand holes shall be centered approximately 2 feet above the base end of the pole. The maximum hand hole size shall not exceed 4 x 6 1/2 inches. Poles shall be equipped with a grounding terminal accessible through the hand hole. Grounding terminals are not necessary if there is no hand hole.

Holes for wiring fittings shall consist of a pipe coupling of the specified diameter and where feasible shall be shop installed. Hand holes and holes for wiring fittings located near the base of the pole shall be reinforced with metal at least equal to the area removed.

Poles may be fabricated in any of the following shapes and styles:

- 1) Round Continuously Tapered  
Poles shall be fabricated with not more than one longitudinal seam which shall be continuously welded and ground or rolled flush. Poles shall have a uniform wall thickness and shall taper uniformly, starting at the butt end, decreasing in diameter at the rate of not more than 1/2 inch, but not less than 1/4 inch per yard of length.
- 2) Round Step Tapered Construction  
Poles shall be fabricated from round pipe sections with not more than one longitudinal seam, joined by a hot-swaged shrink fit, continuously seal welded to prevent entrance of water. Stepped, round poles shall achieve a tapered effect equal to a maximum rate of 1/2 inch and a minimum of 1/4 inch per yard of length by use of decreasing diameter round pipe sections.
- 3) Multi-sided Continuously Tapered Construction  
The multi-sided pole shall conform to the requirements as set forth above under round continuously tapered construction, except that it shall have no more than 2 longitudinal seams which shall be continuously welded and ground or rolled flush. Square or hexagonal poles will not be allowed.
- 4) Round Un-tapered (*not allowed for Span Wire poles*)  
Poles 26 feet or less in length may be round un-tapered with not more than one longitudinal seam.

(continued)

**18' STEEL POST TOP MOUNT ANCHOR BASE SIGNAL POLE, W/ ANCHOR BASE & BOLTS** (Cont'd)

**FABRICATION:** (Cont'd)

**Welding:**

All welding shall be performed in accordance with the New York State Steel Construction Manual.

**Post Top Mount and Bracket Mount Traffic Signal Poles:**

These poles shall be proportioned for the combination of loads producing the maximum effect, using unit stresses increased as indicated for the material and group loads as described in section 1.2.6 of the AASHTO standard specifications for "Structural Supports for Highway Signs, Luminaries and Traffic Signals"(1994). The wind speed, location, weights, dimensions and projected areas shall be as shown in Figure A or given in the bid documents. Post top mount poles of 13 feet or less in length may be manufactured in a manner such that they are continuously tapered from the top to the vicinity of the base, and the taper rate may be between ¼ inch and 5/8 inch per yard of length.

**BASIS OF ACCEPTANCE:**

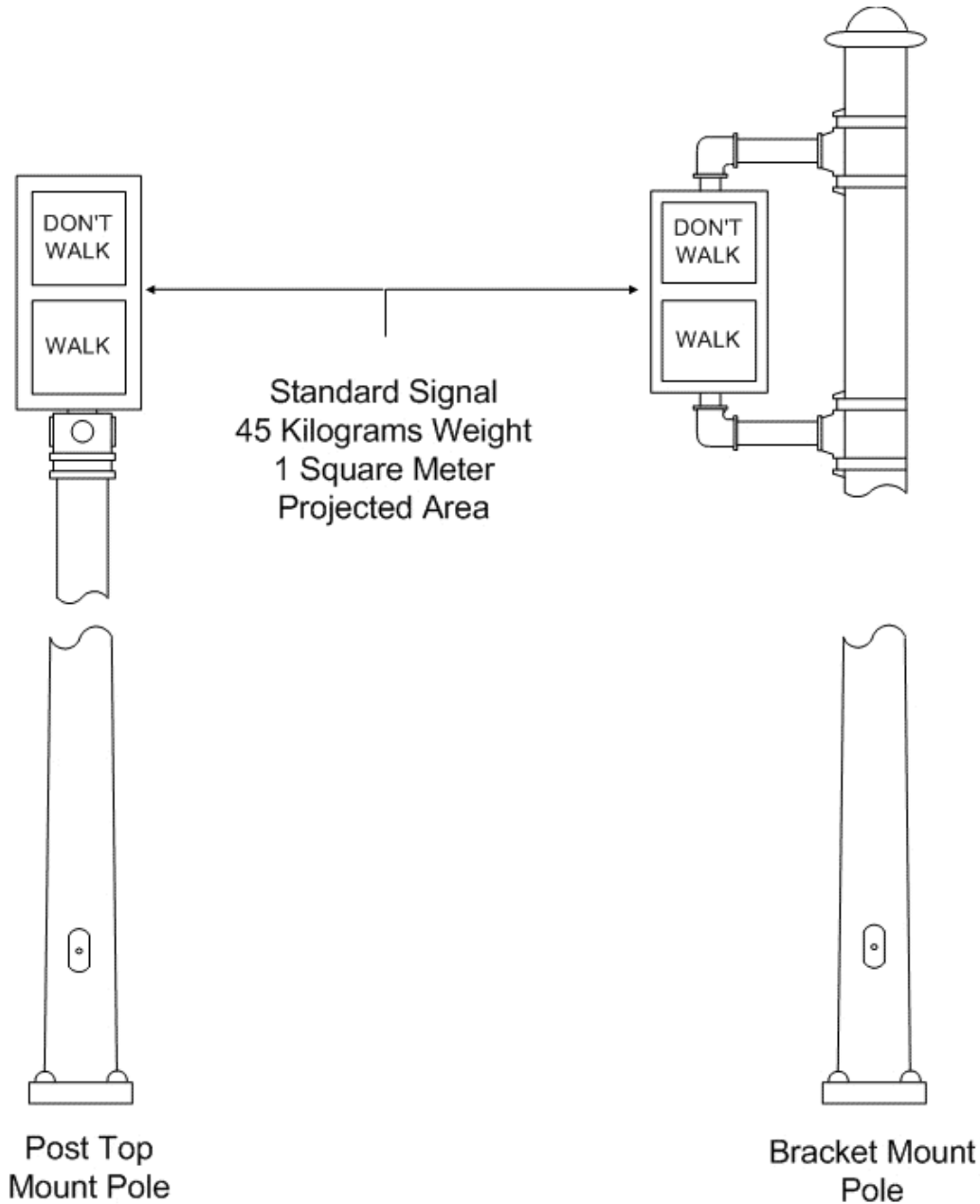
Acceptance for poles and mast arms covered by this specification will be based on the following, as appropriate:

**All Poles**

Submission of fabrication details for each pole intended for a worst case configuration of the load as specified in the contract documents approved, stamped and signed by a Professional Engineer licensed and registered to practice in New York State.

Submission of the manufacturer's certificate of compliance with these specification requirements and the approved fabrication details. The information required above shall be submitted within 10 calendar days of receipt of an order or written request for such. The manufacturer shall not commence fabrication of the poles until written approval of the poles is received from the purchasing authority.

(continued)



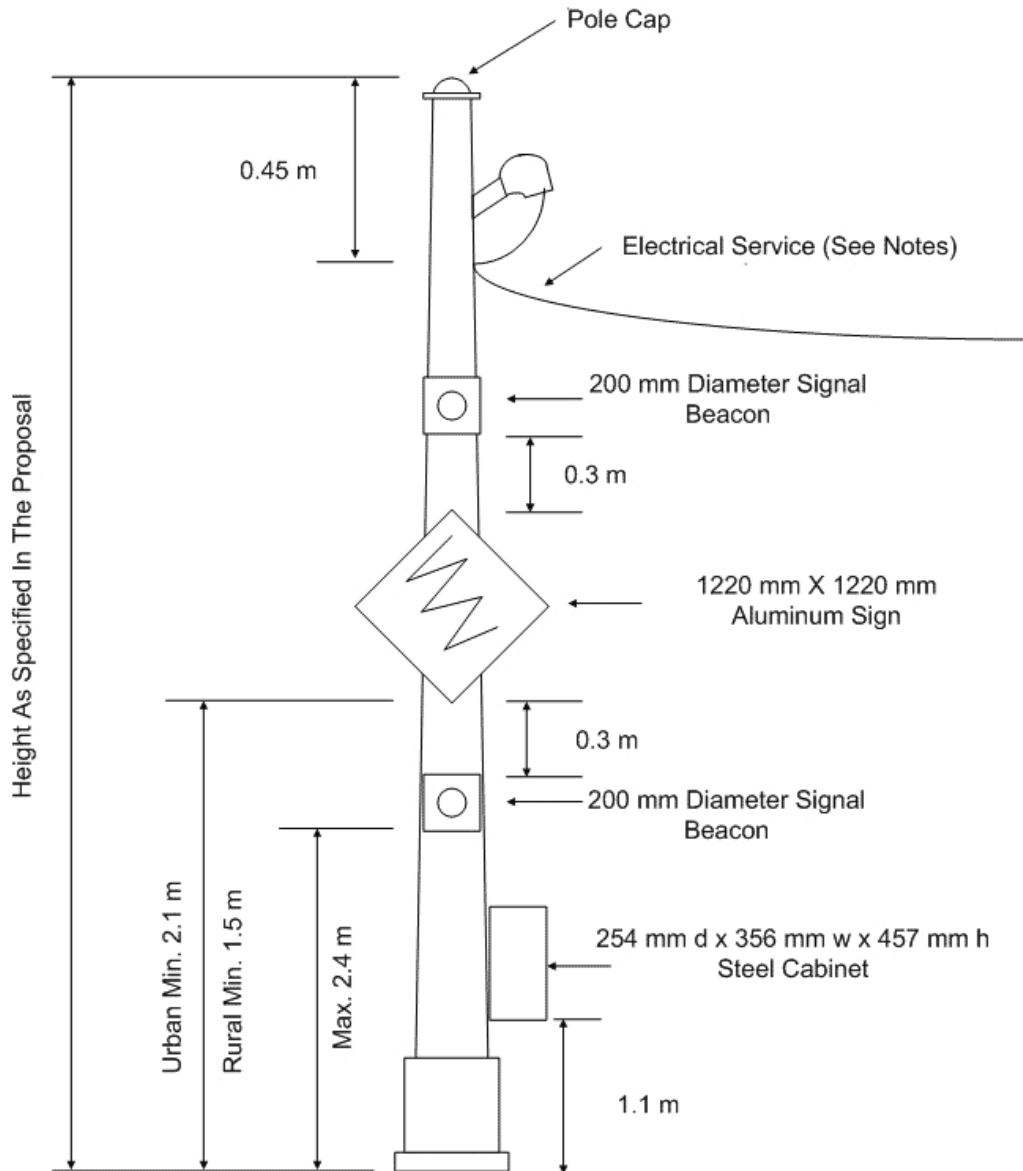
**DESIGN LOAD CONFIGURATION FOR  
POST TOP & BRACKET MOUNT POLES.  
POLES MUST BE DESIGNED TO  
SUPPORT EITHER LOAD CONFIGURATION**

FIGURE "A"

Drawing Not To Scale

\* Metric Conversion : 45 Kilogram = 99.2 pounds  
1 Square Meter = 1.2 square yards

(continued)



NOTES: \* ELECTRIC SERVICE CABLE: 300 GRAMS PER METER, 60 METERS MAX CABLE RUN, 1% SAG

\* BREAKAWAY TRANSFORMER BASE TO BE SUPPLIED ONLY WHEN SPECIFIED IN THE ITEM DESCRIPTION IN THE PROPOSAL.

## AUXILIARY POLES

FIGURE "B"

METRIC CONVERSION : 11.8 inch (0.45m) from Electrical Service Tie down to Top of Pole Cap, 8 inch (200mm) Diameter Signal Beacon positioned 11.8 inches from top of the 48 x 48 inch sign, which is centered 11.8 inches above a second 8 inch Beacon and at least 59 inches above ground in rural installations and 82-11/16 inches above ground in urban installations with the lower beacon that is positioned no higher than 94-1/2 inches above ground surface. A 10 inch deep, 18 inch high x 14 inch wide steel cabinet is added 43-1/3 inches above ground. Electrical Service Cable has a maximum run of 65yard -1 foot-10 inches, at 1% sag.

(continued)

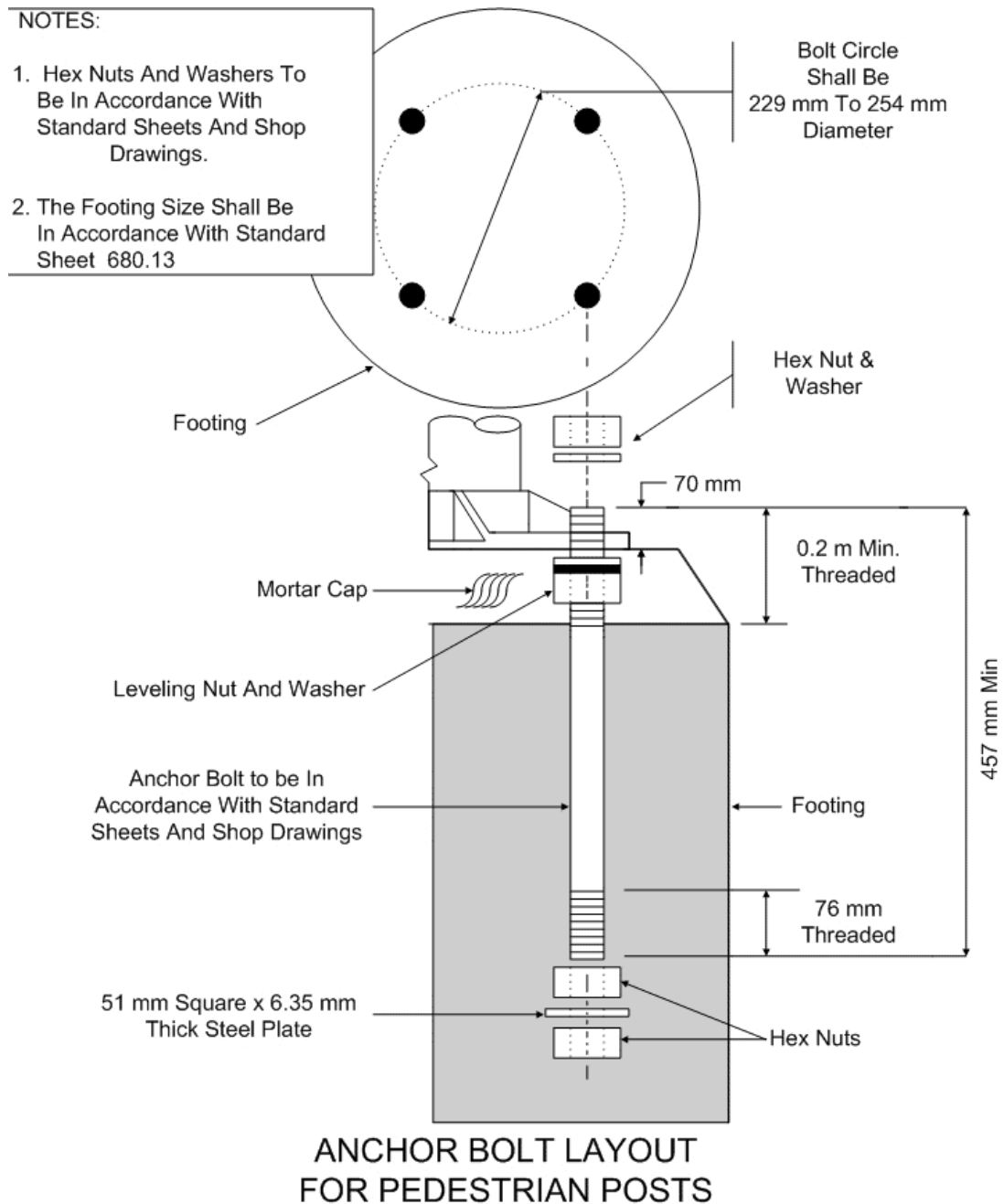


FIGURE "C"

Drawing Not To Scale

Metric Conversion: BOLT CIRCLE 9 to 10 inch diameter.

BOLD Height – 18 inch minimum with 3inch threaded bottom section and a minimum 8-7/8 inch treaded top section

2 inch square ¼ inch thick Steel Plate

(continued)

**ALUMINUM BREAKAWAY TRANSFORMER BASES**

**Scope:** This specification (NYS DOT Standard Specification #723-15) is as follows covers the material and quality requirements for Breakaway Aluminum Transformer Bases for Lighting Standards.

**General:** Transformer bases shall be one-piece aluminum alloy sand or aluminum alloy permanent mold castings. The bases shall be equipped with a removable, aluminum or plastic, trapezoidal shaped door (approximately 12 inches high; 7 inches wide (top); 9 inches wide (bottom)). Each door shall be secured to the base with a stainless steel screw(s). For attachment to the shaft anchor base, each transformer base shall be supplied with four (4) loose bearing plates or other acceptable bearing surfaces and four (4) 1 inch diameter by 3-3/4 inch long or longer hot-dipped galvanized hex head machine bolts. A grounding connection, accommodating a 1/2 inch threaded bolt or nut shall be provided inside each transformer base.

Transformer bases shall be so designed as to minimize the possibility of hooking or snagging an impacting vehicle.

**Material Requirements:** Transformer bases shall be cast of Aluminum-Alloy 356.0-T6 (SG70A-T6) in conformance with ASTM B26M, Aluminum-Alloy Sand Castings or ASTM B108, Aluminum-Alloy Permanent Mold Castings. The trapezoidal shaped door shall be fabricated from B443.0 (S5A) or 356.0-T6 (SG70A-T6) Aluminum Alloy. Transformer bases and doors may be made of an Aluminum Alloy equivalent to 356.0-T6 (SG70AT6) upon approval of the Materials Bureau.

To determine acceptable breakaway characteristics, transformer bases shall be subjected to dynamic laboratory testing. The test shall apply to transformer bases accommodating poles of less than 700 pounds in weight (including luminaire and bracket) and poles of less than 50 foot mounting height only. A full size pole, together with luminaire or a suitable weight to simulate the luminaire, shall be mounted on the transformer base. A ballistic pendulum, equipped with a crushable nose, as approved by FHWA, and weighing 1800 pounds, shall be swung in such a manner so as to strike the transformer base at a velocity of 20 miles per hour. The point of impact shall be at a height of 20 inches from the bottom of the transformer base. Transformer bases shall be considered to have acceptable breakaway features if they produce a change in velocity of 18 feet per second or less. For further specific information concerning the test equipment and procedure, contact the Materials Bureau.

**Basis of Acceptance:** The Department requires the submission of Materials Details. The manufacturer or supplier shall prepare and submit the appropriate material in accordance with the "EI05011 procedural directives of the Materials Bureau. Upon approval by the Materials Bureau, the name of the product and/or supplier, and the reference number assigned to the approved Materials Details will be placed on the Approved List. Such products shall then be accepted on the basis of their brand name and conformance to the approved materials details. The supplier shall submit two copies of the approved Materials Details through the Contractor to the Engineer as part of the evidence of acceptability of the material at least ten days prior to the use of the product.

Per the terms of the Product Qualification clause, as found on page 26, Bidders may only supply products to NYSDOT from the approved list as found in Appendix 5

**TRAFFIC SIGNAL & SPAN WIRE CABLE**

**1.0 - SCOPE:**

This document describes the requirements for various types of traffic signal control cable and span wire to be delivered to any point in New York State.

**2.0 - GENERAL TECHNICAL REQUIREMENTS:**

All cable and wire shall conform to the most recently published edition of the IMSA (International Municipal Signal Assoc.) standards cited for each item. The cable shall be rated for 600-volt service, and all conductors shall be stranded copper. Lengths offered shall be within standard industry tolerances of +/- 10%. Greater deviations in length are unacceptable.

**SIGNAL CONTROL CABLE**

**ITEM # 4 - SIGNAL CONTROL CABLE:**

All cable shall be 14-gauge stranded copper conductor delivered in 305 meter (1,000 foot) reels and conforming to the most recently published edition of the IMSA Specification 20-1, with these options: each conductor shall have seven strands of 14-gauge copper and be covered with polyethylene insulation.

All cable shall have the following information printed or indented clearly every two feet (or less) on the jacket surface. The manufacturer, the year of manufacture, the IMSA spec number, and the voltage rating (600 V).

(continued)

**TRAFFIC SIGNAL & SPAN WIRE CABLE** (Cont'd)

Each reel shall bear the following information, printed clearly and permanently: length of cable on the reel, number of conductors, conductor wire gauge, and date of shipment from the factory.

A certified report of the tests conducted on the cable shall show spec-compliance prior to shipment and shall accompany each shipment of cable.

**MESSENGER CABLE :**

All cable shall be 14-gauge, 5-conductor delivered in 305 meter (1,000 foot) reels.

All cable shall conform to the most recently published edition of the IMSA Specification 19-3.

**SHIELDED/UNSHIELDED LEAD-IN CABLE AND INDUCTANCE LOOP WIRE :**

All cable shall be 14-gauge stranded copper-conductor, delivered in 762 meter (2,500 foot) reels.

**TWO-CONDUCTOR & FOUR-CONDUCTOR SHIELDED/UNSHIELDED LEAD-IN CABLES :**

All cable shall conform to the most recently published edition of the IMSA Specification 50-2, with these particulars. The conductor shall be 19 x 27 stranded tinned copper, each 19-strand conductor insulated with polyethylene compound. The insulated conductors shall be twisted into pairs, compacted, and bound with aluminum Mylar tape applied around each pair. The drain wire shall lay-in the core interstice outside the Mylar tape and under the polyethylene jacket.

All cable shall be 14-gauge stranded copper-conductor, delivered in 762 meter (2,500 foot) reels.

**INDUCTANCE LOOP WIRE, IN TUBE:**

Loop shall be 1-conductor wire and shall conform to the most recently published edition of the IMSA Specification 51-5, with these particulars: the conductor shall include 19 strands and insulated with polyvinyl chloride compound. The insulated conductor shall be completely enclosed in a nylon jacket and loosely encased in a tube of polyethylene compound.

The insulation on the conductor shall conform to the NEC standard for type THHN-THWN or XHHW. This wire shall be supplied in 2500 foot reels.

**SPAN WIRE :**

All span wire shall meet the to the most recently published edition of the standards of ASTM B228, Grade 30 EHS, and be accompanied by a certificate of compliance by the manufacturer to that standard. Deliveries shall be in 500 foot reels, and are subject to

**SINGLE CONDUCTOR, STRANDED THHN WIRE**

Shielded THHN Grade - single conductor wire to be supplied on 500 foot reels with both Black and White sheathing and in both #6 and #8 gauge wire.

**BARE COPPER GROUND, STRANDED WIRE**

Unshielded copper wire to be supplied in both 6-gauge spooled on 315 foot reels, and 4-gauge spooled on 200 foot reels

(continued)



**SCHOOL ZONE FLASHING SIGN BEACON ASSEMBLY – SOLAR POWERED:**

**General:**

This specification defines the minimum requirements for a School Zone Flashing Sign Beacon Assembly – Solar Powered. The unit shall be fully integrated to provide two flashing signal sections and a remotely programmable time clock capable of activating and deactivating the assembly by time of day or by command.

The unit shall be provided with all necessary software and hardware necessary to provide a fully functional, standard 4 ½” round beacon pole mountable, Solar Powered, School Zone Flashing Sign Beacon Assembly.

**Software Specifications:**

**Scheduler:**

- Each beacon shall have the ability to receive and store the annual flash schedule.
- Scheduled events shall be programmable by year, month, day, start time, duration, and day of the week.
- The system shall provide programming flexibility to include morning and afternoon flash cycles, early dismissal days, holidays and special events. Scheduled events shall be easily overwritten with a temporary schedule such as unscheduled early dismissals and snow days.

**System Administration:**

Central Secure Web Based System management for multiple users, each user shall have a password and user jurisdiction allowing users to be assigned individual field devices or groups of devices. The System Administrator shall have the ability to add, delete, modify and view the following user parameters:

- Create New Users
- Create User Passwords
- Reset Passwords
- Edit Existing Users
- Delete Users
- Set Permission Levels
  - System Groups
  - Scheduler Access
  - View Schedules
  - Modify Schedules
  - Send Schedules
- Add Devices
- View Devices
- Modify Devices

**Hardware Specifications:**

**Flash Pattern:**

“½ Second “ON”, ½ Second “OFF” - per the requirements set forth in the most recently published edition of the Manual on Uniform Traffic Control Devices of the US Department of Transportation, Federal Highway Administration.”

**Communications:**

- Long-range instructions shall be via SMS and/or FTP using cellular modem technology integrated into the sign beacon assembly. The master beacon shall have the ability to communicate to a minimum of four (4) satellite beacons which shall have the ability to receive communications from the master beacon utilizing short range communications.
- Short-range, inter-beacon communication shall be provided by 902-928 MHz spread spectrum radio modems.

(continued)

**SCHOOL ZONE FLASHING SIGN BEACON ASSEMBLY – SOLAR POWERED:** (Cont'd)

**Hardware Specifications:** (Cont'd)

**Environmental Requirements:**

- Operating Temperature: -25 to +155°F
- Operates at rated usage for a minimum of 30 Days without solar charging at a ambient air temperature of 23°F.
- Battery and solar panel sizing shall be based on no more than 3.5 kWh/m<sup>2</sup> per day of solar insolation.

**Materials:**

- Signal sections shall be Dual 8" Polycarbonate sections, mountable vertically, as per the Federal MUTCD; in Dark Green or Traffic Zone Yellow as specified on the Purchase order, mountable by the end user. The color shall be fully impregnated into the polycarbonate resin. The color shall be such that a properly prepared color chip shall be a reasonable visual match to Federal Color Standard No. 595A, Color #14056 for Dark Green and to Federal Color Standard No. 595A, Color #13538 for Traffic Zone Yellow. Viewing shall be done under North Standard Daylight. Mounting brackets shall be ductile iron or 6061-T6 powder coated aluminum painted to match the signal head color.
- Visors shall be Polycarbonate cutaway, exterior to match signal sections, interior shall be flat black.
- The solar panel assembly shall be adjustable so as to enable a south orientation without any additional hardware.
- Battery and Electronics shall be enclosed in a ventilated anodized or powder coated aluminum enclosure (Cabinet) constructed of at least 1/8 inch in thickness.
- The system shall be designed to be mounted to a standard 4 1/2" round beacon pole.

**Cabinet**

- Hinges shall be a continuous type and shall be made of 14 gauge stainless steel with a 1/8 inch diameter stainless steel hinge pin.
- Venting shall be covered by wire mesh to prevent the intrusion of insects.
- Solar panel housing shall be anodized or powder coated aluminum
- The cabinet shall be equipped with a self-locking heavy duty 5 pin tumbler cylinder rim type lock, keyed to a Corbin #2 standard, and shall be provided with a keyhole cover for protection. Two keys shall be provided with each cabinet. The door, when closed and locked, shall provide an adequate seal to prevent the entrance of rain or snow into the cabinet, and at a minimum meet the requirements of NEMA 3R for weather resistance.
- The enclosure shall be designed to allow it to be securely fastened to a standard 4 1/2" round beacon pole with set screws or stainless steel banding.

**Electrical**

- Each beacon shall be equipped with a easily accessible manual override, which shall provide the ability to manually turn on or off the sign beacon. This manual override shall be in a locked enclosure, keyed with a standard police key
- Solar panels and battery system shall be 12 Volt DC.
- The unit shall be supplied with 12VDC 8 inch Yellow LEDs, conforming to the latest ITE specifications.
- All wiring shall be at least 7 strand #14 gauge wire.
- The enclosure shall be equipped with a grounding lug, and shall be tied to earth ground by a #6 stranded wire.
- Wire routing shall be internal to the unit and pole attachment; no exposed conductors shall be permitted.

**WARRANTY**

The system and its associated components shall carry a manufactures warrantee of not less than 2 years; batteries shall carry a warrantee of not less than 1 year.

(continued)

The following specification is for replacement parts for use where municipalities have not yet converted to LED signal technology. It is unlikely that The NYS Department of Transportation will utilize these items in the future.

TRAFFIC SIGNAL LAMPS, STANDARD AND LONG LIFE

1.0-SCOPE:

These detailed specifications describe the technical requirements for "standard" and "long life" traffic signal lamps for statewide delivery.

2.0-GENERAL:

Lamps shall meet or exceed the minimum requirements of the "Traffic Signal Lamp Standard" as most recently published by the Institute of Transportation Engineers (ITE).

3.0-SPECIFIC REQUIREMENTS:

- 3.1 Lamps shall be rated to operate at 120 volts, 60 Hz.
- 3.2 "Standard" lamps shall have a **minimum** average rated life of 8,000 hours, and "Long Life" lamps shall have a **minimum** average rated life of 16,000 hours.
- 3.3 Lamps base shall be non-corroding brass medium screw type.
- 3.4 Bulb shall be clear and shall be marked to show manufacturer's name, rated voltage, rated watts and rated average life.
- 3.5 "Standard" and "Long Life" lamps shall comply with the following:

	8 inch Vehicular Head	12 inch Vehicular Head	12 inch Pedestrian Head
Minimum Rated lumens	595	1750	1260
Max Overall length (inches)	4-3/8	4-11/16	4-3/8
Light Center Length (inches)	2-7/16	3	2-7/16
Approximate Wattage *	70	150 (135 for "standard")	115
Voltage	120	120	120
Filament	C, C-11V	C, C-11V	C, C-11V

\*Lamps of lower wattage meeting all other aspects of these specifications will be considered.

4.0-REQUIRED CERTIFICATIONS:

The following items **must** be submitted with the vendor's bid for each lamp type.

- 4.1 Manufacturer's latest dated printed brochure which shall contain complete specifications to enable the Department to compare and determine if the article offered complies with the intent of the specifications and will be satisfactory for the work to be accomplished.
- 4.2 Certification from a recognized independent testing laboratory, certifying that, for a representative sample of lamps, the specifications herein have been met (including rated voltage, wattage, lumens and lamp life).

5.0-LAMP QUALITY:

- 5.1 All lamps supplied must be new and of the latest design. They shall be of current manufacture, i.e., within the 12 month period preceding delivery. Models offered must be in current production. Discontinued models or used lamps will not be accepted.
- 5.2 The using agency reserves the right to return to Contractor at Contractor's cost, any unused portion of lamps remaining in stock. Lamps may be returned based on, but not limited to the following reasons: High burn-out rate once installed in traffic signal fixtures, defective lamps found in production lots.

6.0-WARRANTY:

Standard lamps shall have a minimum warranty of one year from the date of delivery, and Long Life lamps shall have a minimum warranty of two years from the date of delivery. Defective lamps or lamps that do not comply with the warranty shall be replaced at no cost to the using agency.

(continued)

# Appendix 10

## NYS Department of Transportation General Specification Groups

(continued)

Appendix 10  
NYS Department of Transportation - General Specification Section 723  
SECTION 723 - LIGHTING

**723-01 ALUMINUM LIGHT STANDARDS AND ARMS**

**SCOPE.** This specification covers the material and quality requirements for aluminum light standard shafts and aluminum bracket arms.

**MATERIAL REQUIREMENTS**

**General.** All light standards and arms shall be designed in accordance with the latest edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. The ARTBA Guide to Standardized Highway Lighting Pole Hardware may be used in conjunction with the AASHTO Standard Specifications in lieu of actual design computations. Wind pressure for design purposes shall be determined in accordance with the above AASHTO Standard Specifications, utilizing the wind speeds listed below. In addition, the dimensions of all lighting hardware shall also be consistent with the requirements of the appropriate maintenance agency.

**Shaft.** The shaft shall be a one-piece, seamless, round tapered spun aluminum tube of alloy 6063. The aluminum shaft shall be heat treated for its full length to produce a T6 temper, and an anchor base shall be welded to the bottom of the shaft. Shafts, which are to be mounted without transformer bases, shall be equipped with a 4 inch wide by 6 inch to 8 inch high reinforced hand hole centered 14 to 18 inches above the base of the shaft, and located 90 degrees from the plane of the arm and on the side away from traffic if possible. Each hand hole shall have a cover with stainless steel attachment screws to secure the cover. A grounding nut shall be provided inside the shaft opposite the hand hole to accommodate a 1/2 inch threaded bolt or stud. The shaft shall have a satin finish accomplished by mechanical rotary grinding. An anchor base shall be joined to the shaft by means of complete circumferential welds, externally at top of anchor base and internally at bottom of shaft. The anchor base shall be a one-piece permanent mold casting, aluminum alloy 356-T6 provided with four (4) slots to receive 1 inch diameter bolts. The casting shall be free of cracks, pits, blow holes and non-metallic inclusions. Each anchor base shall be provided with four anchor bolt covers fabricated from aluminum alloy with stainless steel screws for attaching the covers.

If bracket arm light standards are proposed, a removable ornamental cast aluminum pole cap with stainless steel setscrews to hold it in place shall be provided and installed on the top of each shaft. A 1 1/2 inch diameter hole shall be furnished near the top of each shaft where the arm is to be attached to provide a cable entrance from the shaft into the bracket arm. The opening shall have an approved metal or rubber grommet placed to provide a smooth cable guide for pulling the electrical cable through. The pole cap and hole are not required for davit arm light standards. Wall thickness and tube diameters for 80 mph wind zones shall conform to Table 723-01-1 Light Standard Dimensions.

**Truss Arms.** The upper and lower members shall be fabricated from seamless tubing of 6063-T6 or 6061-T6 aluminum alloy. The upper member shall be the continuous or wiring member and shall have a 1/8 inch minimum wall thickness. Truss bracket arms shall be designed with the upper and lower members joined near the luminaire end of the arm. The arms shall be braced with one or two vertical pipe struts depending on the arm length. Each truss bracket arm shall be equipped with a 2 inch pipe size slip fitter tenon projecting 5 inches from the luminaire end. The arm shall be secured to the shaft with a bolt type or clamp type attachment similar to those shown in drawings ASA 2-1 or ASA 2-2 of the ARTBA Guide to Standardized Highway Lighting Pole Hardware. Attachments that require welding a fitting directly onto the shaft, similar to ARTBA drawing SPS 2-1, will not be allowed on aluminum light pole shafts. Bolts and nuts shall be fabricated from AISI Type 302 stainless steel according to ANSI B1.1. Washers shall be fabricated from AISI 300 series stainless steel according to the requirements of ANSI B18.21.2. In projects where arm lengths are intermixed, the rise for each length is to be set to keep the upper chord of all arms at approximately equal slopes.

**Single Bracket Arms.** 4 to 8 feet. The single member arms shall be fabricated from seamless tubing of 6063-T6 or 6061-T6 aluminum alloy. Wall thickness shall not be less than 1/8 inch. The arms shall be designed in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Each arm shall be equipped with a 2 in. diam. pipe size slip fitter tenon projecting 6 - 8 inches from the luminaire end. The arms shall be secured to the shaft with a bolt type or clamp type attachment similar to those shown in drawings ASA 2-1 or ASA 2-2 of the ARTBA Guide to Standardized Highway Lighting Pole Hardware. Attachments that require welding a fitting directly onto the shaft, similar to ARTBA drawing SPS 2-1, will not be allowed on aluminum light pole shafts. Bolts and nuts shall be fabricated from AISI Type 302 stainless steel according to ANSI B1.1 Washers shall be fabricated from AISI 300 series stainless steel according to the requirements of ANSI B18.21.2.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Section 723 (Cont'd)**

**TABLE 723 -01-1 LIGHT STANDARD DIMENSIONS**

Maximum Pole Height (ft-in)	Maximum Arm Lengths (ft)	Minimum Wall Thickness (in)	Minimum Diameter Bottom x Top (in)
26	15	3/16	8x6
29-6	20	3/16	8x6
29-6	15	1/4	9x6
36	20	3/16	8x6
36	15	1/4	10x6
42-6	20	3/16	10x6
42-6	15	1/4	10x6
46	15	1/4	10x6
52-6	15*	1/4	10x6
26	15*	3/16	8x6
29-6	15*	1/4	8x6
36	15*	1/4	10x6
42-6	15*	1/4	10x6
46	15*	5/16	10x6
52-6	15*	1/4	12x6

NOTE: \*Twin-Arm.

**Bracket Arms for Wood Utility Poles.** Bracket arms to be mounted on wooden utility poles shall be tapered, seamless tube aluminum with a 1/8 inch minimum wall thickness. The bracket arm shall be welded to an appropriate connection plate at the pole end and have a 2 inch slip-fitter tenon at the luminaire end. A 1 1/4 inch cable opening on the underside near the pole shall be protected with a rubber grommet. Arms over 6 feet long shall be trussed, with upper and lower members securely joined by means of vertical strut(s). All aluminum shall be alloy 6063-T6 and all connecting hardware such as nuts, bolts, etc. shall be stainless steel. Davit Arm Poles. For davit arm poles the top of the shaft shall terminate in a tenon (or twin tenons for double arm poles) and be equipped with a friction fit outer sleeve to produce a flush joint with the arms(s). The davit arms(s) shall be constructed of the materials and methods specified for the shaft and as dimensioned on the drawings. The davit arm(s) shall be secured to the shaft in a flush connection with two stainless steel bolts, nuts and lock-washers. The davit arms(s) shall terminate in a cast or fabricated flush tenon for a slip fit connection to the luminaire. The tenon shall be secured to the davit arm by stainless steel bolts.

**SHIPPING.** Shafts and arms shall be tire-wrapped with a heavy water resistant paper, for protection during shipping and installation. All small parts shall be boxed.

**Wind speeds.** Poles, arms and attachments covered by this specification shall be designed for the following wind speeds in accordance with the AASHTO Standard mentioned above.

- **80 mph** - Counties of Allegany, Bronx, Cattaraugus, Chautauqua, Erie, Genesee, Kings, Livingston, Monroe, Nassau, New York, Niagara, Orleans, Ontario, Queens, Richmond, Rockland, Suffolk, Wayne, Westchester & Wyoming.
- **70 mph** - All Other Counties.

**Welding.** All aluminum welding on light standards shall be performed in the shop, using the inert metal-arc welding process. Filler metal shall conform to the A.W.S. Specification A5-10. Welders shall be certified by A.S.M.E. Section 9 or A.W.S. D 1.2. Vibration Shims. Vibration shims (dampeners) shall be provided by the pole manufacturer for all aluminum poles 30 feet or longer. Vibration shims shall also be provided for poles installed in excessively windy locations or on viaducts with continuous vibration.

**BASIS OF ACCEPTANCE.** Acceptance of the shaft, anchor base, truss bracket arms, and single member arms covered by this specification will be based on the Manufacturer's certification of compliance with these specification requirements.

- Submission, to the Engineer, of design and fabrication details for each shaft, anchor base and arm intended for a particular design load as specified in the contract documents. The design and fabrication details being submitted shall have been approved and signed by a professional engineer licensed to practice in New York State. This submission shall be sent in time to be received at least 10 working days prior to the date the Contractor orders the poles, anchor bases and arms

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Section 723 (Cont'd)**

723-02 HIGH MAST POLE, HEAD FRAME ASSEMBLY WITH LUMINAIRE RING & LOWERING DEVICE

**SCOPE.** This specification covers the material and quality requirements for the pole and head frame assembly with luminaire ring and lowering device to be used in a high mast lighting system.

**MATERIAL REQUIREMENTS**

**General.** The steel pole, head frame assembly, luminaire ring and lowering system shall be designed to meet or exceed AAASHTO Standard Specifications, for Structural Supports for Highway Signs, Luminaires and Traffic Signals. The design wind loading shall be chosen to be consistent with the location of the structure and the height factor. See '723-01 Aluminum Light Standards and Arms. It shall be the contractor's responsibility to obtain verification of all necessary weights and effective projected areas as required in the plans.

**Poles.** The steel pole shall be capable of supporting the combined weight and projected area of both lowering system and number of luminaires with built-in ballast as shown on the contract plans. The pole shall consist of sections of tapered steel tubes, round or polygonal (8 or more equal sides) in cross section, which telescope into each other with an overlap of 1.5 diameters. Steel used in fabricating the shaft shall have a minimum yield strength of 50,000 psi after all fabricating operations have been completed.

In the base of the pole will be located an adequate size hand hole complete with a weatherproof cover and lock. A plate shall be welded opposite the hand hole for mounting the lowering system winch (unless externally mounted on the portable power drive), circuit breakers and other hardware. The hand hole area shall have a 6 feet reinforcing sleeve. The hand hole and plate shall be designed to accommodate the required High Mast Head Frame and Lowering Assembly.

The finished pole shall be galvanized in accordance with '719-01 Coating and Repair Methods, Type 1. If A588 weathering steel is used for the pole, all slip joints shall have a barrier coating conforming to the requirements of the Materials Bureau or as stated in the proposal.

**Anchor Base.** The anchor base shall be fabricated of steel meeting or exceeding the yield strength of ASTM A36. The anchor base shall telescope the butt end of the pole and be welded on the inside bottom and outside top. Anchor bolts, nuts, and washers. Anchor bolts and nuts shall be fabricated of steel meeting or exceeding ASTM A572 (minimum yield strength 50,000 psi). The top of the anchor bolts shall have minimum of 9 inches of thread and a minimum of 12 inches of galvanizing in accordance with ASTM A153. Each bolt shall be furnished with two (2) heavy duty, galvanized, hex nuts with a strength equal to or exceeding the proof load of the bolts. The Contractor may wish to install pre-assembled anchor bolt cages, subject to approval by the Engineer, in lieu of the design shown on the plans. Washers shall be plain hardened washers. Nuts, washers and a minimum of the top 12 inches of the anchor bolts shall be hot-dipped galvanized in accordance with the requirements of '719-01 Galvanized Coating and Repair Method, Type II.

The pole manufacturer shall design the anchor bolts and nuts in accordance with AAASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

**Welding.** Pole sections shall have no more than two longitudinal welded seam and no transverse seams. All welding shall be performed in accordance with the N.Y.S. Steel Construction Manual. Longitudinal welds shall have a minimum 60% penetration. All circumferential welds for slip joints and shaft to base shall be 100% penetration. All 100% welds shall be inspected ultrasonically by the State.

**Reinforcing sleeve.** The reinforcing sleeve shall be fabricated of steel meeting or exceeding AISI 1020 steel. The sleeve shall be galvanized under the same ASTM specification as the pole.

**Head Frame.** The head frame shall be capable of supporting the combined weight and projected areas of the luminaire ring assembly and luminaires with built in ballast as shown on the plans. The luminaire ring shall be designed to use the number and configuration of luminaires shown on the plans. The head frame shall be equipped with a suitable weather resistant and bird proof cover. The head frame shall be a zinc-coated steel structure attached to the pole by means of a steel slip fitter and secured by at least four (4) stainless steel set screws. The head frame shall provide at least three point suspension for the luminaire ring assembly.

For raising and lowering the luminaire ring assembly, three 7x19 aircraft-grade stainless steel, hoisting cables, of sufficient size to support the load shall be included. Hoisting cable sheaves shall be grooved to the exact diameter of the hoisting cable for 180° bearing surface and be equipped with suitable guides to prevent jumping the sheaves. Sheave bearings shall be permanently lubricated on stainless steel shafts.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Section 723 (Cont'd)**

Permanently lubricated power cable sheave(s) shall be provided over a stainless steel shaft. The grooved diameter of the sheave(s) shall be coordinated with the power cable diameter and be equipped with guides to prevent jumping the sheave(s).

The power cable supplied shall be a minimum of 20 feet longer than the street lighting pole installed. It shall be a water proof cable with the necessary number of conductors and sized to properly operate the street lighting system.

Three latching devices shall be provided to support the luminaire ring assembly when in the latched position. There will be no tension on the hoisting cables when the luminaire ring is in the latched position. The latches shall be actuated from the ground. Locking of the luminaire ring shall be signaled by indicators visible from the ground. All moving parts of the latch mechanism shall be serviceable from the ground. The latching mechanism shall not be impaired by the formation of ice and shall not require adjustment. Each of the latches, independently, shall be strong enough to support eight times the weight of the luminaire ring assembly and all luminaires installed.

**Lowering System and Luminaire Assembly.** The luminaire ring assembly shall be fabricated of steel with the appropriate number of 2 inch nominal steel pipe mounting arms. It shall be zinc plated and prewired to distribute the power to the required number of luminaires. Power cables shall be positively attached to the ring assembly through a watertight wiring chamber, with watertight cable connectors. A 600 volt terminal block, completely prewired shall be included in the watertight wiring chamber. A watertight twist lock power receptacle shall be installed in the luminaire ring to allow testing of the luminaires at ground level. A cable support shall be provided to hold the power cable in the luminaire ring.

Attached to the luminaire ring assembly shall be a spring loaded roller contact guidance mechanism with a minimum of three arms that maintain positive contact with the pole surface, centering and guiding the ring assembly during lowering to prevent jamming. Rollers shall be made of water resistant non-marking material with permanently lubricated bearings on stainless steel shafts.

Winch Assembly, if permanently mounted in the pole, shall be a worm-gear self locking type (Torque rated) and designed for both hand operation or operation by means of a portable power unit. Winch Cable shall be 1/4 inch or greater diameter. stainless steel aircraft cable to support the load. There shall be a take-up guide on the winch assembly to eliminate cable 'fall-off'. Compression springs shall be used in the connection of the hoisting cables to the luminaire ring assembly, but ultimate support of the luminaire ring will not be sacrificed by individual or total compression spring failure. The lowering system shall also include circuit breaker assembly, twist-lock receptacle and plugs for the power cable.

**BASIS OF ACCEPTANCE:** Acceptance of the steel poles and appurtenances will be based on the delivery, by the Contractor to the Engineer, of the manufacturer's certification, signed by a N.Y. State P.E., of compliance with the specification requirements and the details of the poles and their appurtenances as indicated in the contract documents. As a condition of acceptance, the Contractor shall submit five copies of the shop drawings, used to fabricate the poles and appurtenances, to the Engineer along with the required certification as per '670-3.02.

When the Contractor proposes to use a shape of pole and/or appurtenances different from that indicated in the contract documents, written approval of the change in shape must be received from the Engineer prior to fabrication of the poles and/or appurtenances. Where the pole and/or appurtenances to be used are not as indicated in the contract documents, the manufacturer shall certify, in writing, to the Engineer, that the pole and/or appurtenances are equal to or superior to the pole and/or appurtenances indicated in the contract documents. Additionally, the differences shall be highlighted on the shop drawings submitted to the Office of Structures Division for approval.

It will be the responsibility of the Contractor to ensure that the required certifications and shop drawing copies are received by the Engineer prior to the arrival of the poles and/or appurtenances on the site. The Engineer will require ten (10) working days, measured from the date of receipt, to approve any request for a change in shape of poles and/or appurtenances.

**723-03 PORTABLE POWER DRIVE FOR HIGH MAST LUMINAIRE LOWERING SYSTEM**

**SCOPE.** This specification covers the functional requirements for a portable power drive unit, and winch when necessary, issued for a High Mast Luminaire Lowering System.

**MATERIAL REQUIREMENTS.** The portable power drive unit shall be a heavy duty reversing electric drill motor and drive shaft coupled with a torque limiter which shall supply all of the necessary driving power to the winch. A portable winch assembly shall be included with the portable power drive unit unless the winch has been permanently installed in the base of the high mast pole. The power drive shall be provided with a step down transformer and a remote control cord which will enable the operator to stand at least 16 feet 6 inches from the pole. The unit shall be designed so as to be simply strapped to the base of the pole with a quick-connect securing mechanism that will accommodate any size or shape pole. The unit shall be capable of raising or lowering the lowering ring and luminaires at an approximate rate of 10 feet per minute. All aspects of the power drive shall be compatible with the detailing of the pole base and the lowering system for which it is to be used.

(continued)



**Appendix 10**  
**NYS Department of Transportation - General Specification Section 723 (Cont'd)**

Detail specifications, parts lists, instruction sheets and shop drawings of the portable power drive shall be submitted in accordance with '670-3.02 Shop Drawings.

**BASIS OF ACCEPTANCE:** Acceptance of the portable power drive will be based on the manufacturer's certificate of compliance with these specification requirements, and the Engineer's approval of the detail specifications and shop drawings.

723-04 THRU 723-09 (VACANT)

**723-10 ANCHOR BASE (ALUMINUM)**

**SCOPE.** This specification covers the material and quality requirements for cast aluminum anchor bases for lighting standards.

**MATERIAL REQUIREMENTS.** Aluminum anchor bases shall be a one piece casting of 356.0 aluminum alloy. The casting shall be free of cracks, pits, blow holes and non-metallic inclusions. Each anchor base shall be provided with four anchor bolt covers fabricated from B443.0 aluminum alloy with stainless steel screws for attaching the covers.

**BASIS OF ACCEPTANCE.** Anchor bases will be accepted upon the manufacturer's certification that they meet the requirements of this section.

723-11 THRU 723-14 (VACANT)

**723-15 BREAKAWAY TRANSFORMER BASE (ALUMINUM)**

**SCOPE.** This specification covers the material and quality requirements for Breakaway Aluminum Transformer Bases for Lighting Standards.

**GENERAL.** Transformer bases shall be one-piece aluminum alloy sand or aluminum alloy permanent mold castings. The bases shall be equipped with a removable, aluminum or plastic, trapezoidal shaped door (approximately 12 inches high; 7 inches wide (top); 9 inches wide (bottom)). Each door shall be secured to the base with a stainless steel screw(s).

For attachment to the shaft anchor base, each transformer base shall be supplied with four (4) loose bearing plates or other acceptable bearing surfaces and four (4) 1 inch diameter by 3 3/4 inch long or longer hot-dipped galvanized hex-head machine bolts.

A grounding connection, accommodating a 1/2 inch threaded bolt or nut shall be provided inside each transformer base.

The light pole manufacturer shall obtain the base and bolt circle dimensions from the plans and shall then provide the Contractor with a template print, giving complete information for setting the anchor bolts. Transformer bases shall be so designed as to minimize the possibility of hooking or snagging an impacting vehicle.

**MATERIAL REQUIREMENTS.**

Transformer bases shall be cast of Aluminum-Alloy 356.0-T6 (SG70A-T6) in conformance with ASTM B26M, Aluminum-Alloy Sand Castings or ASTM B108, Aluminum-Alloy Permanent Mold Castings. The trapezoidal shaped door shall be fabricated from B443.0 (S5A) or 356.0-T6 (SG70A-T6) Aluminum Alloy.

Transformer bases and doors may be made of an Aluminum Alloy equivalent to 356.0-T6 (SG70AT6) upon approval of the Materials Bureau.

**TESTS.** To determine acceptable breakaway characteristics, transformer bases shall be subjected to dynamic laboratory testing. The test shall apply to transformer bases accommodating poles of less than 700 pounds in weight (including luminaire and bracket) and poles of less than 50 foot mounting height only.

A full size pole, together with luminaire or a suitable weight to simulate the luminaire, shall be mounted on the transformer base. A ballistic pendulum, equipped with a crushable nose, as approved by FHWA, and weighing 1800 pounds, shall be swung in such a manner so as to strike the transformer base at a velocity of 20 mph. The point of impact shall be at a height of 20 inches from the bottom of the transformer base.

Transformer bases shall be considered to have acceptable breakaway features if they produce a change in velocity of 18 feet per second or less. For further specific information concerning the test equipment and procedure, contact the Materials Bureau.

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**Appendix 10**  
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**BASIS OF ACCEPTANCE.**

The Department requires the submission of Materials Details. The manufacturer or supplier shall prepare and submit the appropriate material in accordance with the procedural directives of the Materials Bureau. Upon approval by the Materials Bureau, the name of the product and/or supplier, and the reference number assigned to the approved Materials Details will be placed on the Approved List. Such products shall then be accepted on the basis of their brand name and conformance to the approved Materials Details. The supplier shall provide two copies of the approved Materials Details through the Contractor to the Engineer as part of the evidence of acceptability for the material at least 10 days prior to the use of the product.

723-16 THRU 723-18 (VACANT)

**723-19 RIGID PLASTIC CONDUIT  
SCOPE.**

This specification covers the material requirements for rigid plastic conduits (PVC and High Density PE) for use as raceway for wires or cables of an electrical system. Rigid plastic conduit is acceptable for up to 167OF wiring service. Rigid PVC (polyvinyl chloride) conduit is suitable for installation above or below ground and with or without concrete encasement; high-density PE (polyethylene) conduit is intended for below ground installations only, and with or without concrete encasement.

**GENERAL.** Under these requirements either Class 1, Heavy Wall PVC or Class 2, High Density PE conduit may be supplied for underground installation. For above ground use, only Class 1 conduit shall be allowed.

**MATERIAL REQUIREMENTS.**

Rigid plastic conduit shall conform to the requirements of UL 651A. All fittings, couplings and expansion fittings shall conform to the applicable requirements of UL514A. Solvent cement for joining Class 1 conduit and conduit fittings shall meet the requirements of ASTM D2564, or alternately be of the type recommended by the conduit manufacturer. Unless otherwise recommended by the manufacturer, fittings for Class 2 conduit shall be of a drive-on type and solvent cement will not be needed for Ajointing.@

**BASIS OF ACCEPTANCE.**

Rigid plastic conduit shall be accepted upon the basis of the manufacturer's certification that it meets the requirements of this specification, as well as being Underwriters Laboratory Listed. Fittings, couplings and solvent cement shall be accepted upon the manufacturer's certification that they meet the requirements of this specification.

**723-20 METAL STEEL CONDUIT, ZINC COATED**

**SCOPE.** This specification covers the material requirements for zinc coated rigid metal steel and intermediate metal steel conduits, used as raceways for wires or cable of an electrical system. Steel conduit may be embedded in concrete or earth; or may be used under all atmospheric conditions, including those locations classified as hazardous; and may be used in high voltage (over 600 volts) installations.

**GENERAL.** Under these requirements, either Class 1, Rigid Metal Steel Conduit or Class 2 Intermediate Metal Steel Conduit may be supplied. In addition, Class 1 and Class 2 conduits may be interchanged in the same run, providing the ends of both of the conduits are reamed, so as to create beveled edges and a smooth area over which the wires and cables will pass. Where conduit is to be jacked or exposed to the atmosphere, only Class I, Rigid Metal Steel Conduit, is permitted. Additionally, conduit exposed to the atmosphere shall be PVC coated.

**MATERIAL REQUIREMENTS.**

The zinc coated metal steel conduit shall conform to the requirements of UL 6, Class 1 - Rigid Metal Conduit: or UL 1242, Class 2 - Intermediate Metal Conduit. All fittings, couplings and expansion fittings shall be zinc coated and shall meet the same specifications as the conduits. Conduits shall be gasketed and shall be furnished with stainless steel or brass screws for the cover. Expansion fittings shall be metallicly connected for continuity of grounding on either side. The zinc coating on the outside surfaces shall be equivalent to a minimum thickness of 0.8 mil.

**BASIS OF ACCEPTANCE.**

Metal steel conduit may be accepted upon the manufacturer's certification that it meets the requirements of this section.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Section 723 (Cont'd)**

723-21 AND 723-22 (VACANT)

**723-23 P.V.C. COATED GALVANIZED STEEL CONDUIT**

**SCOPE.**

This specification covers the material and quality requirements for P.V.C. coated galvanized steel conduit.

**GENERAL.** P.V.C. Coated Galvanized Steel Conduit. The hot-dipped galvanized Rigid Steel Conduit; prior to plastic coating, shall conform to N.E.M.A. Standards Publication No. RN 1, and ANSI C80.1. Elbows in standard and special radii shall be coated as above except that no coupling will be coated with the elbow. Separate couplings will be furnished as required and ordered.

**BASIS OF ACCEPTANCE.**

P.V.C. coated galvanized steel conduit will be accepted upon manufacturer's certification that it meets the requirements of this section.

**723-24 FLEXIBLE LIQUID-TIGHT STEEL CONDUIT**

**SCOPE.**

This specification covers the material and quality requirements of flexible liquid-tight steel conduit.

**GENERAL.** The flexible liquid-tight steel conduit shall be of the size indicated on the plans. It shall conform to the requirements of Underwriters' Laboratory specification UL 360 and shall be listed with Underwriters' Laboratory Inc. Connectors furnished under this specification shall be standard liquid-tight connectors.

**BASIS OF ACCEPTANCE.**

Flexible liquid-tight steel conduit will be accepted upon manufacturer's certification that it meets the requirements of this section.

723-25 AND 723-26 (VACANT)

**723-27 HIGH PRESSURE SODIUM VAPOR LUMINAIRES (STANDARD MOUNT)**

**SCOPE.**

This specification covers the material and quality requirements for high pressure sodium vapor luminaires.

**MATERIAL REQUIREMENTS.**

The luminaires shall be of the high pressure sodium vapor type designed for use with high pressure sodium vapor lamps, color corrected or clear, and fully weatherproof. The luminaires shall be constructed so they cover a complete self contained insect resistant and shock resistant unit. The entire luminaire assembly shall be completely pre-wired, at the factory, requiring only the connection of the primary circuit wires to the electric power source for its operation. All metallic component parts of the luminaire shall be made of a rust-resistant alloy or coated with an approved rust resistant finish. Weep holes shall be provided for drainage. Easy access to the lamp and major electrical components shall be provided requiring no special tools to gain entrance for maintenance purposes.

The luminaire shall be provided with a means to prevent accidental exposure of the inner electrical components and accidental separation of the component parts. The luminaire shall be equipped with an adjustable lamp socket to simplify beam angle setting and an appropriate refractor for the wattage and lighting distribution specified. The luminaire casing shall be precision die-cast aluminum for the wattage of the lamps specified, and painted inside and out with a coat of baked on epoxy enamel, or polyester powder, virtually pinhole free, leaving no exposed metal. The underside of the luminaire shall be marked with the standard NEMA decal, visible from the ground, indicating the type and wattage of the lamp.

The luminaire shall contain a complete ballast assembly to which are mounted the necessary electrical components for multiple operation including ballast, solid state starting aid, capacitors, adjustable twist-lock three prong receptacle for photo-electric control when specified, and a dead back terminal board with pressure type terminals.

The ballast shall be a high power factor (exceeding 90%) 3 coil lag type (magnetic regulator) capable of operation on a 120 volt, 60 cycle, multiple circuit (unless otherwise shown on the plans) and able to operate the lamp in an open or short-circuit condition for six months without significant loss of ballast life.

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**Appendix 10  
NYS Department of Transportation - General Specification Section 723 (Cont'd)**

The ballast assembly shall be capable of starting and operating the lamp at a temperature of -20°F. The entire ballast assembly shall be readily removable as a single unit and utilize quick disconnect plugs. The slip fitter shall be suitable for mounting on a 2 inch standard pipe bracket and capable of securely fastening flush to the mounting brackets without the need of separate mounting parts or rearrangement of mounting components. Leveling and clamping of the luminaire to the bracket shall be accomplished by the tightening of bolts and capable of adjusting the luminaire at least three degrees above and below horizontal. Bird shields shall be supplied and installed on all slipfitter installations.

The optical assembly shall consist of a die cast aluminum lens holder with a glass or aluminum 'Alzak' finished, hydroformed, gasketed reflector, a heat and impact resistant refractor, and a porcelain or polyester enclosed mogul socket. The mogul socket shall be equipped with lamp grip and a spring type center contact.

If a photo-electric control is specified, the receptacle shall be provided with a fully weatherproof covering that is readily removable without tools.

Luminaires shall be complete with compatible high pressure sodium lamps having the following characteristics:

% Mean lumens at 10 hours/start	90%
Warm-up time	3 to 4 minutes
Restart time	1 minute
Maximum power variance around design center	±5%
Lowest ambient starting temperature	-20 °F

The unit shall be supplied with an ANSI-IES vertical light distribution as specified on the plans. It shall be adjustable for a Type II, III or IV lateral light distribution and set at the factory for the distribution shown on the plans. For high mast installations a Type V distribution shall be provided. The downward light efficiency shall be at least 73%.

**BASIS OF ACCEPTANCE.**

Acceptance of the roadway luminaire will be based on manufacturer's certification of compliance with these specification requirements and on inspection by the Engineer that no damage or defects are evident.

**723-28 LOW PRESSURE SODIUM VAPOR LUMINAIRES (UNDERDECK MOUNT)**

**SCOPE.**

This specification covers the material and quality requirements for Low Pressure Sodium Vapor Under Deck Luminaires.

**MATERIAL REQUIREMENTS.**

The luminaire shall be of the low pressure sodium vapor type suitable for under deck or wall mounting, designed for use with a horizontally mounted lamp, fully weatherproof and watertight. The luminaire shall operate satisfactorily with any appropriately sized low pressure sodium lamp now commercially available. The luminaire shall be equipped with a built-in ballast, and shall be designed for operation on a 120 volt, 60 hz. multiple circuit unless otherwise shown on the plans.

The luminaire shall provide efficient even illumination and shall be optically sealed and gasketed. It shall be mechanically strong and easy to maintain. The ballast components shall be mounted in a structurally sound manner within the housing of the luminaire, with provision made for optimum heat dissipation of the ballast. The reflector, socket, terminal board, fuse and ballast components shall be readily accessible. When closed for operation, the optical assembly shall be sealed against the entry of all contaminants.

The luminaire shall withstand severe outdoor conditions due to radical seasonal changes in temperature and shall be structurally capable of operating satisfactorily in winds of 80 mph. All exposed electrical live parts shall be protected to observe adequate safety precautions, subject to approval of the Engineer.

The whole luminaire assembly shall be completely prewired requiring only the connection of the primary circuit wires for its operation. All components shall be corrosion resistant. Metals in contact with each other shall be compatible to prevent corrosion. Screws washers and nuts shall be stainless steel.

The luminaire housing shall be constructed of either heavy duty aluminum or heavy duty plastic and shall support the ballast, capacitor component, socket, lamp support, fuse, and terminal board. Those portions of the housing which support the ballast, and to which are connected the mounting hardware and the conduit, shall be aluminum. The underside of the housing shall be marked with the standard NEMA decal indicating the type and wattage of the lamp. All mounting hardware required for attaching the luminaire to the under deck structure and for adjusting the luminaire about its longitudinal axis through an angle of 45 degrees from horizontal, shall be furnished with the luminaire when required.

(continued)

**Appendix 10  
NYS Department of Transportation - General Specification Section 723 (Cont'd)**

The luminaire shall be capable of being mounted flush against underdeck or, when required, suspended by rods from the under deck. The mounting hardware shall be made of stainless steel, prevent rotation of the luminaire, and be capable of adequately supporting the luminaire in winds of 80 mph.

The reflector shall be fabricated from an aluminum alloy sheet mechanically polished and electrochemically processed to a specular finish. It shall not darken to the extent that it cannot be wiped clean with a soft cloth. The refractor shall be formed of clear, heat resistant, ultra-violet stabilized polycarbonate plastic, free from imperfections and capable of being removed without the use of tools. It shall be equipped with a latching arrangement and shall be hinged to the housing of the luminaire. Provisions shall be made to prevent accidental detachment of the refractor or any other luminaire part.

The ballast shall be a modified constant wattage type with high power factor (over 90%) and capable of regulating the output power within  $\pm 5\%$  when the input voltage fluctuates  $\pm 10\%$ . The ballast and lamp shall be capable of starting and operating at ambient temperatures of  $-20^{\circ}\text{F}$ .

The lamp socket shall be bayonet type provided with a means to hold the lamp against vibration and achieve close contact between lamp and socket terminals.

A means shall be provided to reduce entrance of foreign material through the wiring opening into the optical system.

The terminal board shall be equipped with two clamp type pressure terminals for connection to the phase leg and neutral of the primary circuit. The terminals shall be properly identified for connection, with notations on terminal board, color coding, or wiring diagram. The fuse holder shall be gasketed and provide external access to the fuse. Photometric distribution shall be symmetric or asymmetric as specified.

**BASIS OF ACCEPTANCE.**

Low pressure sodium vapor under deck luminaires will be accepted upon the manufacturers certification that they meet the requirements of this section and are U.L. approved and on inspection by the Engineer that no damage or defects are evident.

**723-29 HIGH PRESSURE SODIUM VAPOR LUMINAIRES (UNDERBRIDGE MOUNT)**

**SCOPE.**

This specification covers the material and quality requirements for High Pressure Sodium Vapor Luminaires (Under-bridge Mount).

**MATERIAL REQUIREMENTS.**

The luminaires shall be of the high pressure sodium vapor under bridge type designed for use with high pressure sodium vapor lamps.

The luminaires shall be constructed to be a complete self contained waterproof and shock resistant unit. The entire luminaire assembly shall be completely pre-wired, at the factory, requiring only the connection of the primary circuit wires to the electric power source for its operation. All metallic component parts of the luminaire shall be made of a rust-resistant alloy or coated with an approved rust resistant finish.

Easy access to the lamp and major electrical components shall be provided requiring no special tools to gain entrance for maintenance purposes. The luminaire shall be provided with a means to prevent accidental exposure of the inner electrical components and accidental separation of the component parts.

The luminaire casing shall be precision die-cast aluminum for the wattage of the lamps specified, and marked with the standard NEMA decal, visible from the ground, indicating the type and wattage of the lamp.

The ballast shall be a high power factor (exceeding 90%) 3 coil lag type (magnetic regulator) capable of operation on a 120 volt, 60 cycle, multiple circuit (unless otherwise shown on the plans) and able to operate the lamp in an open or short-circuit condition for six months without significant loss of ballast life. The ballast assembly shall be capable of starting and operating the lamp at a temperature of minus twenty nine degrees Celsius.

All mounting hardware required for attaching the luminaire to the underdeck structure and for adjusting the luminaire about its longitudinal axis shall be furnished with the luminaire. The luminaire shall be capable of being mounted flush against underdeck or suspended from the underdeck. The mounting hardware shall prevent rotation of the luminaire and be capable of adequately supporting the luminaire in winds of 80 mph.

The optical assembly shall consist of a die cast aluminum lens holder with a glass or aluminum 'Alzak finished, hydroformed, gasketed reflector, a heat and impact resistant refractor, and a porcelain or a polyester enclosed mogul socket. The mogul socket shall be equipped with lamp grip and a spring type center contact.

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**Appendix 10**  
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Luminaires shall be complete with compatible high pressure sodium lamps having the following characteristics:

% Mean lumens at 10 hours/start	90%
Warm-up time	3 to 4 minutes
Restart time	1 minute
Maximum power variance around design center	±5%
Lowest ambient starting temperature	-20°F
Bulb finish	Clear

The unit shall be specifically designed and set to produce an ANSI-IES cutoff, type IV light distribution unless otherwise specified on the plans or ordered by the engineer. The downward light efficiency shall be at least 73%.

**BASIS OF ACCEPTANCE.** Acceptance of the under deck luminaire will be based on manufacturer's certification of compliance with these specification requirements and on inspection by the Engineer that no damage or defects are evident.

**723-30 MERCURY VAPOR LUMINAIRES (STANDARD MOUNT)**

**SCOPE.**

This specification covers the material and quality requirements for Mercury Vapor Luminaires.

**GENERAL.** The luminaire shall be of the mercury vapor type designed for use with a horizontally mounted mercury vapor lamp, color corrected or clear and shall be fully weatherproof. The luminaire and lamp combination shall produce Type II, III, or IV light distribution conforming to ASA Standards, and as shown on the plans. The luminaires shall be equipped with a built-in ballast for the wattage and operating voltage shown on the plans. The components comprising the assembly of the upper half of the luminaire shall include a reflector, a porcelain enclosed mogul socket, a twist-lock three prong receptacle for a photo-electric control, and a ballast.

**BASIS OF ACCEPTANCE.**

Mercury vapor luminaires will be accepted upon the manufacturer's certification that they meet the requirements of this section.

**723-31 MERCURY VAPOR LUMINAIRES (UNDERBRIDGE MOUNT)**

**SCOPE.**

This specification covers the material and quality requirements for Mercury Vapor Luminaires (Underbridge Mount).

**GENERAL.** The luminaire shall be complete for surface or pendent mounting, as shown on the plans. The luminaire shall be equipped with a prismatic refractor, be shock resistant, and protected with a cast guard. The door and guard assembly shall be equipped with stainless steel pressure latches and a safety chain. The housing shall be gasketed against which the door shall seat when closed. The luminaire shall provide a maximum candela beam of 60 degrees from the vertical for roadways up to 50 feet in width, and 70 degrees for wider roadways and approximately 180 degrees horizontal spread. The ballast shall be an integral part of the luminaire and shall be capable of operating a 175 watt or 250 watt mercury vapor lamp at -20°F. The lamps shall be included with the luminaire.

**BASIS OF ACCEPTANCE.**

Mercury Vapor Luminaires will be accepted upon the manufacturer's certification that they meet the requirements of this section.

723-32 THRU 723-39 (VACANT)

**723-40 CAST-IRON JUNCTION BOX**

**SCOPE.**

This specification covers the material and quality requirements for Cast-Iron Junction Boxes.

**GENERAL.** Junction boxes shall be hot-dipped galvanized cast-iron with a hot-dipped galvanized cast iron cover. The cover shall be fastened to the box with brass or stainless steel screws. The box shall be so constructed that when the installation is complete and the cover is secured the box will be water tight. Galvanizing shall be as specified in '719-01, Type II. The Manufacturer shall refer to the plans for details and dimensions.

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**Appendix 10**  
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**BASIS OF ACCEPTANCE.**

Junction boxes will be accepted upon the manufacturer's certification that they meet the requirements of this section.

723-41 THRU 723-44 (VACANT)

**723-45 PRECAST REINFORCED CONCRETE FOUNDATIONS AND PULLBOXES**  
**SCOPE.**

This specification covers the material and quality requirements for precast concrete foundations and pull boxes.

**MATERIAL REQUIREMENTS.**

The Material Requirements contained in §704-03\* shall apply.

**DRAWINGS.** The Drawing requirements contained in §704-03\* shall apply.

**FABRICATION.** The Fabrication requirements contained in §704-03\* shall apply.

**SAMPLING AND TESTING.** The Sampling and Testing requirements contained in §704-03\* shall apply.

**MARKING.** The Marking requirements contained in §704-03\* shall apply except as noted herein. Markings shall be placed on the inside face of all pull boxes. Instead of marking the contract number on each unit they may be marked with "NYSDOT".

**FINAL PRODUCTION INSPECTION.** The Final Production Inspection requirements contained in §704-03\*- shall apply.

**SHIPPING.** The Shipping requirements contained in §704-03\* shall apply.

**BASIS OF ACCEPTANCE.**

The Basis of Acceptance requirements contained in §704-03\* shall apply.

\* = NYS DOT Specification §704-03 has been included in this document at the end of this appendix

723-46 THRU 723-49 (VACANT)

**723-50 PHOTOELECTRIC CONTROL**  
**SCOPE.**

This specification covers the material and quality requirements for Photoelectric Controls.

**MATERIALS REQUIREMENTS.**

Photoelectric controls shall function to energize artificial lighting when natural lighting falls to a preset value, and to de-energize when natural lighting rises to a preset value. The photoelectric control shall be factory calibrated to energize the luminaire at approximately 3 foot-candles and de-energize at approximately 3 foot-candles. The photoelectric controls shall be adjustable by means of an outside adjustment system. The adjustment mechanism shall be easily accessible and provide a precise foolproof light level adjustment. Photoelectric controls which cannot be adjusted while the unit is in service or have to be disconnected while making adjustments will not be acceptable.

Photoelectric controls shall be suitable for mounting in all three-pronged locking type receptacles that conform to Electrical Engineering Institute (EEI) or National Electrical Manufacturers Association (NEMA) Standard Specifications. In the event of failure of any component of the control system, the artificial lighting shall be energized. The housing for the photoelectric control shall be weather resistant and shall be unaffected by ultraviolet rays. A neoprene sponge gasket shall be cemented to the bottom of the base to seal out weather, dust and insects, and shall conform to EEI-NEMA Standards. The photocell shall be hermetically sealed to prevent electrolysis from moisture. The manufacturer shall certify that each cell has had 24 hours of light preconditioning before assembly. The photoelectric control shall be solid state and shall be capable of being faced in any direction except south. Generally, it is recommended that the photo sensitive device face north, as this affords maximum spectrum response. The photoelectric controls shall have an operating voltage range of 105-285 volts, 50/60 cycle and shall be suitable for operation on nominal distribution voltages of 120, 208, 240, and 277 volts. The controls shall be temperature compensated, and shall be suitable for operation from -40°F to +160°F and shall be completely unaffected by humidity. The switch mechanism shall be snap acting of sufficient capacity to adequately handle loads of 1000 watts of incandescent lighting, or 1800 volt amperes of ballasted lighting. The photoelectric control shall be able to withstand an inrush current of a maximum of 170 amperes. Time delay devices shall be built into the photoelectric control to prevent switching of artificial lighting due to transient lighting changes. The photoelectric controls shall also be equipped with a built-in expulsion-type surge and lightning protection arrester.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Section 723 (Cont'd)**

**BASIS OF ACCEPTANCE.**

Photoelectric controls will be accepted upon the manufacturer's certification that they meet the requirements of this section.

723-51 THRU 723-59 (VACANT)

**723-60 ANCHOR BOLTS**

**SCOPE.**

This specification covers the material and quality requirements for anchor bolts.

**MATERIALS REQUIREMENTS**

Anchor bolts shall meet the requirements of ASTM F568 Class 8.8, or ASTM A449, or they may be manufactured from steel meeting the requirements of ASTM A576, Grades 1020 through 1050 inclusive, having a minimum yield strength of 50,000 psi. A hex nut, lock washer, and flat washer shall be supplied with each anchor bolt and their dimensions shall be shown on the plans. The hex nut and flat washer shall be manufactured in accordance with ASTM A325M or A325 and the lock washer shall be manufactured in accordance with Table 730-22-1 Steel Fasteners.

The nuts, washers and the top 12 inches of the anchor bolts shall be galvanized in accordance with the requirements for Type II or Type V galvanizing as stated in section 719-01, Galvanized Coatings and Repair Methods. The anchor bolt dimensions shall be shown on the plans.

**SHIPPING.** Anchor bolts, hex nuts, and washers shall be shipped to the construction site at a time convenient to the masonry construction.

**BASIS OF ACCEPTANCE.**

Anchor bolts will be accepted upon the manufacturer's certification that they meet the requirements of this section.

723-61 THRU 723-69 (VACANT)

**723-70 SINGLE CONDUCTOR CABLE**

**SCOPE.**

This specification covers the material and quality requirements for single conductor cable used in highway lighting.

**MATERIAL REQUIREMENTS.**

Single conductor cable shall be copper, Type THW, RHW-2, or XHHW-2 (XLP) as designated by Underwriter's Laboratory Specifications. The single conductor cable shall have heat and moisture resistant insulation for a maximum operating temperature of 165OF, in wet and dry conditions.

**BASIS OF ACCEPTANCE.**

Single conductor cable shall be accepted upon the manufacturer's certification that it meets the requirements of this specification as well as being Underwriter's Laboratory approved.

**723-71 SINGLE CONDUCTOR DIRECT BURIAL CABLE**

**SCOPE.**

This specification covers the material and quality requirements for direct burial 600V type USE cable for use in conduit or in trenches as shown on the plans and as directed by the Engineer.

**MATERIAL REQUIREMENTS.**

Cable shall bear Underwriters Laboratories Label for type USE. It shall consist of copper conductor and insulation constructed to conform to ICEA (Insulated Cable Engineers Association) Pub. S-95-658 and NEMA Pub. No. 7C-70 (Nonshielded 0-2kV Cables) or their equivalent. Cable shall consist of 7 copper strands up to and including #2 AWG and shall be constructed of 19 copper strands for sizes larger than #2 AWG. Insulation shall be chemically cross-linked (vulcanized) polyethylene insulating compound. Cable shall be mechanically spliced and insulated using the highest quality poured splices available for underground 600V cables. Cable shall be factory or shop twisted in a duplex or a triplex configuration in accordance with the publications listed above or as shown in the contract documents.

(continued)



**Appendix 10**  
**NYS Department of Transportation - General Specification Section 723 (Cont'd)**

**BASIS OF ACCEPTANCE.**

Single Conductor Direct Burial Cable will be accepted upon the manufacturer's certification that it meets the requirements of this specification as well as being Underwriter's Laboratory approved.

723-72 THRU 723-74 (VACANT)

**723-75 GROUND WIRE**

**SCOPE.**

This specification covers the material and quality requirements for ground wire used in highway lighting.

**MATERIAL REQUIREMENTS.**

Ground wire shall be #6, soft-drawn bare copper wire, 7 strand single conductor.

**BASIS OF ACCEPTANCE.**

Ground wire shall be accepted upon the manufacturer's certification that it meets the requirements of this specification.

**Appendix 10**  
**NYS Department of Transportation - General Specification Section 724**  
**SECTION 724 - TRAFFIC SIGNALS**

**724-01 SIGNAL CABLE**

**SCOPE.**

This specification covers the material requirements for signal cable for use with traffic signal systems and for installation in underground ducts or as an aerial cable supported by a messenger.

**MATERIALS REQUIREMENTS.**

The cable shall conform to the requirements of the International Municipal Signal Association (IMSA) Specification 20-1. The gauge and number of conductors shall be as specified in the plans. The conductors shall be stranded copper wire.

**BASIS OF ACCEPTANCE.**

Acceptance of material will be based on the manufacturer's certification of compliance with these specification requirements.

**724-02 SPAN WIRE**

**SCOPE.**

This specification covers the material requirements for span wires used in the suspension of traffic signal heads. Span wires may be used as a single span wire or a dual span wire including a tether wire. The same wire may be used as messenger wires or guy wires.

**MATERIALS REQUIREMENTS.** Span wire shall meet the requirements of ASTM B228, Grade 30 EHS.

**BASIS OF ACCEPTANCE.**

Acceptance of span wire will be based on the manufacturer's certificate of compliance with these specification requirements, together with supplementary sampling and testing at the discretion of the Materials Bureau.

**724-03 TRAFFIC SIGNAL POLES**

**SCOPE.**

This specification covers the material requirements and fabrication details for poles used for traffic signals. Traffic signal poles are classified according to the following applications:

- A. Span Wire. Span wire poles are used for supporting a steel cable or cables to which are attached traffic signals and overhead signs.
- B. Mast Arm. Mast arm poles consist of a vertical shaft and an approximately horizontal arm to which are attached traffic signals and overhead signs. These poles may also be equipped with more than one mast arm.
- C. Post Top Mount Post top mount poles are used for mounting traffic signals directly on the top of the pole.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 724 (Cont'd)**

D. Bracket Mount Bracket mount poles are used to support traffic signals and other items bracketed from or attached to the side of the pole. Traffic Signal Poles with Lighting Arms - Lighting arms may also be attached to all pole types except post top mount.

**DESIGN CRITERIA.** The poles shall be designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (1994), except as modified by this specification.

The following elements of a pole shall be designed for the most critical orientation of the loads, applied to a traffic signal pole:

- Any tubular segments of the structure.
- Hand hole reinforcement and other hole reinforcement.
- Device used to connect cable to pole.
- Base plate.
- Mast arm to pole connections.
- Anchor bolts.

The design shall be approved, stamped and signed by a professional engineer licensed in the State of New York.

All necessary holes in the pole below the load attachment point and greater than 11/16 inch in diameter shall be made by the manufacturer and reinforced according to the fabrication details and contract documents. Hand holes shall be located ninety (90) degrees clockwise, top view, from the direction of the cable load, unless otherwise specified. For those poles on which a traffic signal cabinet will be mounted the pole manufacturer will be required to weld a cabinet wiring access coupling into the pole as part of the pole manufacturing process. This coupling shall be centered 12 inches from the bottom of the base plate and 90 degrees clockwise (top view) from the axis of the hand hole. The coupling shall be designed to accept a standard chase nipple on the inside of the pole, and to accept 1 1/2 inches of a standard 4 inch diam. galvanized pipe from the outside of the pole, and shall protrude no more than 1/2 inch on the out side of the pole. An insulated chase nipple shall be installed in the coupling on the inside of the pole. The coupling shall be designed to reinforce the hole in which it is installed.

**Wind Loads.** Poles and attachments thereto covered by this specification shall be designed for the following wind speeds in accordance with the AASHTO standard in DESIGN CRITERIA above:

- 80 mph - Counties of Allegany, Bronx, Cattaraugus, Chautauqua, Erie, Genesee, Kings, Livingston, Monroe, Nassau, New York, Niagara, Orleans, Ontario, Queens, Richmond, Rockland, Suffolk, Wayne, Westchester and Wyoming.
- 70 mph - All other counties.

**MATERIAL REQUIREMENTS.**

The following materials, or approved alternates, as determined by the Deputy Chief Engineer, Office of Design Division, shall be used for fabrication. Span Wire, Mast Arm and Bracket poles shall be galvanized steel. Post top poles may be either galvanized steel or aluminum. Acceptable aluminum materials are those contained in the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (1994). The following are the acceptable steel materials for the signal pole components. Poles and Arms. The finished pole shall be galvanized in accordance with subsection 719-01 Galvanized Coatings and Repair Methods, Type 1, and be made of one of the following:

- ASTM A500, Grade B or ASTM A501.
- ASTM A53, Grade B pipe.
- ASTM A53, Grade B pipe, with a minimum yield of 48,000 psi guaranteed by the manufacturer and documented by the submission of certified copies of physical tests performed on the lots of material from which the poles were manufactured.
- ASTM A252, Grade 2 or Grade 3.
- ASTM A252, Grade 2, with a minimum yield of 48,000 psi guaranteed by the manufacturer and documented by the submission of certified copies of physical tests performed on the lots of material from which the poles were manufactured.
- ASTM A572, Grades 40, 50, 60 or 65.
- ASTM A595, Grade A.
- ASTM A618, Grade I, II or III.
- ASTM A588.
- ASTM A513, with a minimum yield strength of 36,000 psi guaranteed by the manufacturer, and documented by the submission of certified copies of physical tests performed on the lots of material from which the poles were manufactured.

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**Appendix 10**  
**NYS Department of Transportation - General Specification Group 724 (Cont'd)**

- ASTM A1008/A1008M Grade 60 Class 2.
- ASTM A1011/A1011M Grade 60 Class 2.

**Bases.** The base shall be galvanized under the same specification as the pole, and made of one of the following:

- ASTM A27M, Grade 65-35, mild to medium strength carbon steel castings.
- ASTM A36.
- ASTM A588.
- ASTM A572, Grade 40, 50, 60 or 65.
- ASTM A633M (Any Grade).

**Anchor Bolts, Nuts and Washers.** Bolts and nuts shall meet the requirements of one of the following specifications:

- ASTM F568M Class 4.6 (Bolts and Nuts)
- ASTM F568M Class 8.8 (Bolts)
- ASTM A576 (bolts) Grades 1021 and 1025 with a minimum elongation of 18 percent in 2 inches tested in accordance with ASTM A370. The guaranteed minimum yield strength shall be stated by the manufacturer.
- ASTM A675M Grades 485 through 620 (Bolts).
- ASTM A563M Grades A, B, C, D, or DH (Nuts).
- ASTM F1554 Grades 36, 55 or 105 (Bolts).
- ASTM A36 (Bolts) modified to a minimum yield of 55,000 psi, minimum tensile of 65,000 psi and minimum elongation of 18 percent in 2 inches, tested in accordance with ASTM A370.
- ASTM A194, Grade 2H (Nuts)

The type and grade of steel for nuts shall be compatible and of comparable strength to the steel used for the bolts. Washers shall be plain hardened washers. Nuts, washers and a minimum of the top 12 inches of anchor bolts shall be hot-dipped galvanized, in accordance with the requirements of subsection 719-01, Galvanized Coatings and Repair Methods, Type II. Connection Devices

- ASTM A36.
- ASTM A588.
- ASTM A325.

**Pole Caps and Anchor Bolt Covers.** Pole caps shall be galvanized steel, galvanized cast iron, aluminum or zinc alloy AG40A. Anchor bolt covers shall be galvanized steel, galvanized cast iron, or aluminum. Galvanizing shall be done in accordance with the requirements of 719-01, Galvanized Coatings and Repair Methods, Type II.

## **FABRICATION**

**Bases and Hardware.** The base plate shall be welded to the pole by an acceptable weld in accordance with the New York State Steel Construction Manual. All anchor bolts, nuts and washers required for each pole shall be supplied by the pole manufacturer. Anchor bolts are to be anchored using double nuts and plates or threaded plates and shall be designed by the fabricator. Anchor bolts shall be long enough to embed at least 30 bolt diameters into the concrete foundation. "L" bends will not be allowed. The number of anchor bolts and the bolt circle diameter shall be determined by the fabricator unless specified in the contract documents. Each anchor bolt shall be equipped with 2 nuts and one or more washers for attaching the pole plus those necessary to provide end anchorage to the anchor bolt. Washers will not be required when the holes on the base plate are within the following tolerances:

- Hole diameter not more than 1/8 inch greater than the bolt, bolt diameters less than 1 inch.
- Hole diameter not more than 1/4 inch greater than the bolt, bolt diameters equal to or greater than 1 inch.
- Hole diameter not more than 3/8 inch greater than the bolt, bolt diameters equal to or greater than 2 inches.

Anchor bolt covers shall be furnished. These shall be affixed to the base or shaft with stainless steel cap screws. Shafts and arms shall be equipped with end caps secured with stainless steel set screws.

**Shafts.** Shafts shall be round or multi-sided shapes. Shafts shall be equipped with hand holes except for poles intended for transformer base mounting. Hand holes shall be centered approximately 2 feet above the base end of the pole. The maximum hand hole size shall not exceed 4 x 6 1/2 inches. Poles shall be equipped with a grounding terminal accessible through the hand hole. Grounding terminals are not necessary if there is no hand hole. Holes for wiring fittings shall consist of a pipe coupling of the specified diameter and where feasible shall be shop installed. Hand holes and holes for wiring fittings located near the base of the pole shall be reinforced with metal at least equal to the area removed.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 724 (Cont'd)**

Shafts may be fabricated in any of the following shapes and styles:

A. Round Continuously Tapered. Shafts shall be fabricated with not more than one longitudinal seam which shall be continuously welded and ground or rolled flush. Shafts shall have a uniform wall thickness and shall taper uniformly, starting at the butt end, decreasing in diameter at the rate of not more than 1/2 inch, but not less than 1/4 inch per yard of length.

B. Round Step Tapered Construction. Shafts shall be fabricated from round pipe sections with not more than one longitudinal seam, joined by a hot-swaged shrink fit, continuously seal welded to prevent entrance of water. Stepped, round shafts shall achieve a tapered effect equal to a maximum rate of 1/2 inch and a minimum of 1/4 inch per yard of length by use of decreasing diameter round pipe sections.

C. Multi-sided Continuously Tapered Construction. The multi-sided pole shall conform to the requirements as set forth above under round continuously tapered construction, except that it shall have no more than 2 longitudinal seams which shall be continuously welded and ground or rolled flush. Square or hexagonal shafts will not be allowed.

D. Round Untapered. Poles 26 feet or less in length may be round untapered with not more than one longitudinal seam.

**Welding.** All welding shall be performed in accordance with the New York State Steel Construction Manual.

**Poles with Lighting Arms.** Poles with lighting arms shall be constructed in accordance with the configuration in the contract documents and this specification. Except for bracket-mount traffic signal poles, lighting arms may be of either the single member type or of the truss type if type is not specified. When specified for bracket-mount traffic signal poles, lighting arms shall be of truss-type design with upper and lower members joined near the luminaire end of the arm. Lighting arms of the truss-type design with upper and lower members joined near the luminaire end of the arm shall be braced with one or two vertical struts depending on the length of the arm. Arms may be either galvanized steel or aluminum.

**Span Wire Poles**

A. Design Load. The design load for span wire poles shall be the Group II or III load per AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (1994) Section 1.2.6, given in the contract documents and applied at a point 1 foot 6 inches below the top of the pole. Allowable unit stresses shall be as specified in the above AASHTO specification.

B. Physical and Mechanical Properties. Span Wire poles shall conform to the following requirements.

- Minimum Wall Thickness - 0.1196 inch
- Maximum Deflection - To be computed at a point 18 inches from the top of the pole, shall be a maximum of 0.6 inch per foot of pole length and a maximum deflection rate of 0.6 inch per 100 pounds.
- Maximum Pole Diameter at the Base - 0.7 inch per foot of pole length.

C. Pole Marking. The following information shall be stamped on the base plate or ground sleeve in 1/2 inch letters to such a depth as to be clearly visible through subsequent galvanizing:

Desired Information	Example
Pole Length in whole foot	28 feet
Load in 1000 lb Increments	8000 lbs
Manufacturers Name or Logo -	ABC Corp.
Month and Year of Manufacture	1104

D. Span Wire Connecting Hardware. The manufacturer shall supply the necessary device for connecting each span wire to the pole. For polygonal poles this device may be either a galvanized thimble eyebolt or a circumferential pole clamp. For round poles, only thimble eyebolts shall be used. The design strength shall be 70% of yield strength of the

connecting device. The yield strength shall be determined using a cable load aligned 85 degrees to the vertical axis of the pole.

**Mast Arm Traffic Signal Poles**

A. Design Loads. Each part of the structure shall be proportioned for the combination of loads producing the maximum effect, using unit stresses increased for the material and group loads as described in section 1.2.6 of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (1994). The wind speed, locations, dimensions, weights, and projected areas of the signals, signs, and supports shall be as specified in the contract documents.

B. Mast Arm Shapes. Arms shall be round or multi-sided shapes and have the same crosssectional shape as the shaft.

C. Arm Construction. Mast arms of any length may be constructed by any of the methods indicated under Material Requirements Shafts. They may be of two piece construction with a telescoping joint secured by thru-bolt and locknut.

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**Appendix 10**  
**NYS Department of Transportation - General Specification Group 724 (cont'd)**

**D. Mast Arm to Shaft Connection.** The mast arm shall be secured to the shaft by a minimum of four bolts. The mast arm shall be equipped with a flange plate welded to the butt end of the mast arm. A flange plate shall be attached to the shaft using vertical and horizontal gusset plates both top and bottom and at each side. Flange plates on shaft and mast arms shall have a hole with a smooth cable guide for wiring.

**E. Physical and Mechanical Properties.** Mast arms and shafts shall conform to the following requirements:

- Minimum Wall Thickness - 0.1196 inch.
- Maximum Deflection at Design Load.
- Shaft - 1/2 inch per foot of length.
- Arm - 1/2 inch per foot of length.
- Maximum Diameter at base of shaft or arm.
- Shaft - 0.7 inch per foot of length.
- Arm - 0.7 inch per foot of length.

**F. Poles with Multiple Arms.** Poles with multiple arms shall be constructed in accordance with the arm configuration in the contract documents.

**G. Pole Marking.** The following information shall be stamped on the top of the base plate or ground sleeve in 1/2 inch letters to such a depth as to be clearly visible through subsequent galvanizing.

Desired Information	Example
Wall Thickness	0.312 inch
Minimum Yield Strength	55 ksi
Manufacturers Name or Logo -	ABC CORP.
Month and Year of Manufacture	1004

**Post Top Mount and Bracket Mount Traffic Signal Poles.** These poles shall be proportioned for the combination of loads producing the maximum effect, using unit stresses increased as indicated for the material and group loads as described in section 1.2.6 of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (1994). The wind speed, location, weights, dimensions and projected areas shall be as given in the contract documents.

**BASIS OF ACCEPTANCE.**

Acceptance for poles and mast arms covered by this specification will be based on the following, as appropriate:

**All Poles and Arms**

- Submission of fabrication details for each pole intended for a worst case configuration of the load as specified in the contract documents approved, stamped and signed by a Professional Engineer licensed and registered to practice in New York State.
- Submission of the manufacturer's certificate of compliance with these specification requirements and the approved fabrication details.

**Span Wire Poles**

- The acceptance requirements for All Poles and Arms, given above, shall apply.
- Submission of mill certifications for all structural materials.
- Appearance of the manufacturer's name on the Department's list of approved manufacturers.

**724-04 TRAFFIC SIGNAL HEADS**

**SCOPE.**

This specification covers the material and fabrication requirements for vehicular and pedestrian traffic signal heads, including flashing signals and flashing beacons.

**STANDARD SIGNAL HEADS**

**Material Requirements.** Only virgin metal shall be used in making either sand castings or die castings, and where specified, the manufacturer shall furnish standard test bars, poured of the metal of which the castings are made, and a certified chemical analysis of the ingot from which the castings are made.

**A. Housing.** Unless otherwise specified, all traffic signal head housings shall be made of Aluminum alloy of one of the following compositions:

1. Aluminum Sand Castings. All aluminum sand castings shall be made of ingot, in accordance with ASTM B26, Alloy B443.0 or AC72A.
2. Aluminum Die Castings. All aluminum die castings shall be made of ingot, in accordance with ASTM B85, Alloys SC84A, SC84B, SG100A, SG100B, or S12B.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 724 (Cont'd)**

**B. Suspension Components.** All suspension components, brackets, clamps, trunnions, arms, elbows, crosses, etc., shall be made of one of the following materials:

1. Malleable iron. Malleable iron material shall be made in accordance with ASTM A47/A47M.
2. Steel pipe. Steel pipe shall be made in accordance with ASTM A53.
3. Aluminum Sand Castings. Aluminum sand castings shall be made in accordance with ASTM B26, Alloy 356-T-6.
4. Aluminum Die Castings. Aluminum die castings shall be made in accordance with ASTM B85, Alloy SC 84B.
5. Aluminum pipe. All aluminum pipe shall be made in accordance with ASTM B429.

**C. Fasteners.** The following items shall be made of non-magnetic stainless steel, Type 303 or 304, in accordance with ASTM A296 (latest revision).

- All set screws.
- The U/J-bolts, rivet and their related nuts, washers and cotter pin in the span wire lamp.
- The eye-bolt, rivet, tightening bolt and their related nuts, washers, and cotter pin in the balance adjuster.

**D. Pipe Arms.** Pipe arms shall be made of steel pipe in accordance with ASTM A120 (latest rev.) Wind Load. Signal heads, mounting brackets, attachments and fittings shall be designed for a wind load pressure for at least a 90 mph wind in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (1994).

**Painting.** All aluminum traffic signal heads, bracket arms, and mounting attachments shall be painted by first applying a chromate conversion coating and then electrostatically applying a polyester powder coating. Threads and threaded parts shall not be coated and shall be protected from the coating process at the time of application. The chromate conversion coating shall be applied and conform to the requirements of ASTM B449, Standard Practice for Chromate Treatments on Aluminum, Class 2 coating. The conversion coating shall be allowed to dry thoroughly and shall be free of entrapped air and contaminants. After drying the chromated surface shall be coated with a polyester powder coating.

The polyester powder shall be electrostatically applied and cured in accordance with the coating manufacturers recommendations. If preheating of the aluminum substrate is required, care shall be taken to prevent damage to the chromate coated surface by not exceeding a preheat temperature of 160°F. The polyester coating shall be applied at a uniform thickness between 2 and 4 mils. The polyester powder used shall have the following properties:

<b>Property</b>	<b>ASTM Test Method</b>	<b>Test Value</b>
Specific Gravity	D3451	1.2 Minimum
Impact Resistance	D2794	16 NCm Minimum
Pencil Hardness	B3363	H - 2H

The color of the finished polyester coating shall be such that a properly prepared color chip shall be a reasonable visual match to Federal Color Standard No. 595A, Color 14056. Viewing shall be done under North Standard Daylight.

**Signal Indications.** Signal indications shall be as indicated in the proposal or as shown on the plans.

**Wiring.** All wiring shall consist of No. 18 AWG stranded copper wire with thermoplastic insulation and a 600 volt rating.

**Electrical Characteristics.** All equipment shall be designed for operation on 115 volts  $\pm$ 30 volts, 60 Hertz, single phase A.C. power unless otherwise indicated.

**Mounting.** Signal heads shall be arranged for mounting on span wires, mast arms, post tops or vertical pole bracket mounts as specified in the contract documents. For a span wire mounting the signal head shall be provided with a span wire clamp, balance adjuster and wire outlet fitting. The span wire clamp shall consist of a shoe, lockbar, two AU@ or AJ@ bolts, and a rivet, with cotter pin, nuts, washers, etc., as necessary. The balance adjuster shall consist of a body with threaded eye-bolt, a tightening bolt and a rivet, with cotter pin, nuts washers, etc., as necessary. The wire outlet fitting shall have a continuous opening of a minimum nominal diameter of 1 1/2 inches for insertion of signal head wiring. The upper opening shall have a weatherproof insulating composition cover that provides for the insertion of the wiring. The cover shall be securely mounted to the fitting. The bottom opening shall be threaded, and provided with two square or hex drive set screws, located at 180 degrees to each other. The bottom of the fitting shall have integral cast serrations, or shall be notched and provided with a serrated locking ring, or

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 724 (Cont'd)**

shall be provided with a slotted check nut and serrated locking ring. A 12 or 18 circuit disconnect hanger shall be supplied if specified in the contract documents. The head shall be assembled so that it hangs plumb.

**A. One-way Signal Head.** Mounting hardware for a one-way signal head shall also include a 1 1/2 inch galvanized nipple with cast head, gasket, and steel washer for the connection between the wire outlet fitting and the top of the signal head. A metal weather-resistant cap/plug shall be provided for the unused hole in the bottom of the head. The cap/plug shall be of a threaded or flanged design.

**B. Multi-way Signal Head.** Mounting hardware for multi-way (2, 3 and 4-way) signal heads shall also include a center junction hub and pipe arms with tee or cross end connectors. Tee and cross connectors shall be notched for, and supplied with a serrated locking ring. No pipe/nipple shall be provided for the connection between the center junction hub and the wire outlet fitting. A 1 1/2 inch galvanized nipple with cast head, gasket and steel washer shall be supplied for the connection between the tee or cross connector and the top of the signal head. Tees and crosses will not be accepted in place of the center junction hub.

Center junction hubs shall have a threaded openings on the top and sides. The bottom of the hub shall be essentially fully open, except for the necessary thickness of the housing, and shall be securely covered by a flat plate of weather-resistant design. The plate shall be held in place by a minimum of two screws. Center junction hubs shall be provided with a square or hex drive set screw on all threaded openings, except that the top opening shall be provided with two set screws, located at 90 degrees to each other. Center junction hubs shall have a minimum nominal opening of 3 1/2 inches in diameter for round openings, or a minimum nominal side length of 3 1/2 inches for rectangular openings.

Tees or crosses shall have threaded openings to accept the necessary pipe arm/signal head connections, plus at least one additional threaded opening to facilitate wiring. The extra opening shall be closed with a threaded metal pipe cap. All threaded openings on the tees and crosses shall be provided with a square or hex drive set screw.

Threaded openings on pipe arms shall be tapered. Threaded openings on other pipe fittings shall be pipe straight threads.

Flat arms or spiders shall be provided for the bottoms of multi-way signal heads, except that bottom hardware shall be omitted for multi-way one section head assemblies. Connections between the bottoms of the signal heads and the arm/spider shall be flanged or threaded to provide a locking, weather-resistant connection.

Signal heads for mast arm mounting shall be furnished with a mount consisting of upper and lower horizontal arms attaching to the top and bottom of the signal head housing. The horizontal arms shall attach to a vertical member which in turn clamps to the mast arm. The mast arm mount shall have provision for adjusting the vertical, angular and rotational positioning of the head in relation to the mast arm so that it is plumb, in line with other signal heads and properly oriented in relation to traffic. Wiring shall be concealed within the mount.

Post top signal heads shall be furnished with a post top type sliplifter mounting. Vertical pole bracket mount signal heads shall be equipped with upper and lower horizontal brackets equipped with pole plates for attachment to the pole with stainless steel bands.

**Housing.** The housing for each face shall be of unitized sectional construction and shall consist of as many sections as necessary to provide the indications shown on the plan. All sections shall be rigidly and securely fastened together into one weather-tight signal face. An adjustable traffic signal head shall consist of two or more signal faces fastened to and supported by a pipe assembly and suitable entrance fitting.

Each housing shall be arranged with openings in the top and bottom so that it may be rotated about a vertical axis between waterproof supporting brackets or trunnions and shall be capable of being securely fastened at increments of not more than 7 degrees of rotation. The top and bottom of each housing shall have integrally cast locking rings or other provisions to provide positive interlocking and indexing.

The top and bottom of each housing shall be provided with tees or crosses equipped with pipe-plug knobs or caps which can be removed to assist in wiring.

Flat arms or spiders will be accepted as an alternative for use on the bottom of adjustable signals. One-section adjustable beacons may be supplied without bottom bracket arms.

Each housing shall be so designed that additional sections may be added. The construction shall permit the assembly of 12 inch signal sections with 8 inch sections of the same manufacturer. The assembly shall permit the joining of 8 inch sections either above or below the 12 inch sections.

(continued)

**Appendix 10**  
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**Doors.** The door shall be of cast aluminum alloy and shall be provided with four visor mounting holes located equidistant about the lens opening to allow the mounting of the visor in either a vertical or horizontal position. The holes shall be drilled and tapped, and provided with stainless steel mounting screws. Neoprene gasketing shall be provided between the body of the housing and the doors. The doors shall be suitably hinged and shall be forced tightly against the gasket and the housing by simple stainless steel locking devices. All other exterior hardware such as hinge pins, lens clips, etc. shall be of stainless steel. The locking device shall be capable of being operated without the use of tools. Hinges shall be arranged to allow convenient relamping. On the outside of the door, there shall be a rim encircling the lens opening to prevent any light leakage between optical systems.

**Visors.** The visors shall be separate and removable from the doors, held in place by stainless steel fastenings attached to the door in such a manner as to prevent the possibility of any light leakage between the door and hood which might be discernible from the side. Visors shall be of sheet aluminum, not less than 0.050 inches, and shall mount to the signal head through the use of four slotted mounting tabs which inter-mate with the mounting screws on the signal housing door. Unless otherwise specified in the contract documents all signal heads shall be provided with cap-type visors. The insides of visors and the entire surface of louvers or fins used in front of signal lenses shall be painted a flat black to minimize light reflection to the sides of the signals. Visors shall tilt down from the horizontal a minimum of 3.5° and shall be a minimum of 9 1/2 inches in length for 12 inch diameter lenses and 7 inches in length for 8 inch diameter lenses.

**Connection Blocks.** Each signal face shall be equipped with a 5-point heat resistant terminal block. It shall have five terminals with connectors for receptacle leads and screw terminals for field wires. The individual connection blocks in the separate faces of a signal head shall be interconnected. In one face of each multi-face head, there shall be an additional nine terminal block to which all field wires are connected. All socket leads of all signal faces shall terminate at this nine terminal block.

**Dust-Tight Optical System.** The optical system shall be properly gasketed to exclude dust and dirt from the reflecting surface of the reflector and the inner surface of the lens. Gaskets shall be placed between the reflector and supporting member, and between the reflector holder and the inner surface of the lens.

**Reflectors.** Reflectors shall conform to the requirements of "Vehicle Traffic Control Signal Heads" published by the Institute of Transportation Engineers (ITE) in ST-017B (Equipment and Material Standards). Reflectors shall be made of a material that will not distort when subjected to the heat of the specified lamp. Reflectors may be either silvered glass or specular aluminum with anodic coating. Metalized plastic reflectors will not be accepted. The reflecting surface before coating shall be free of flaws. The reflective coating and the reflector shape shall be such that the light distribution and candle power intensity of the combined lamp lens reflector assembly shall meet the specification requirements in "Vehicle Traffic Control Signal Heads."

**Reflector Rings.** No plastic material will be accepted for the reflector bracket or reflector ring. The reflector ring and complete reflector and socket assembly shall be pivoted between two (2) stainless steel pins in such a manner that it can be swung open for ease in servicing the signal without the use of any tools.

**Lenses.** Each traffic signal head shall be supplied with traffic signal lens. Lenses shall be red, yellow, or green. Lens shall be made of glass and shall conform to the requirements of "Vehicle Traffic Control Signal Heads" published by the Institute of Transportation Engineers. Except for multilane use control signals and pedestrian signals, all lenses shall be circular in shape with nominal diameters of either 8 or 12 inches. Each 12 inch lens shall be standard wide angle and clearly marked as such.

**Lamp Receptacles.** Lamp Receptacles shall conform to the requirements of "Vehicle Traffic Control Signal Heads" published by the Institute of Transportation Engineers. Lamps. The lamp for the illumination of an 8 inch lens shall be a clear traffic signal lamp which produces a minimum of 595 lumens with an average minimum initial lumen rating of 550 lumens at a working voltage of 120-125 volts AC, has a rated life of at least 8,000 hours and is rated at no more than 60 watts. The lamp for the illumination of a 12 inch lens shall be a clear traffic signal lamp which produces a minimum of 1750 lumens with an average minimum initial lumen rating of 1650 lumens at a working voltage of 120-125 volts AC, has a rated life of at least 7000 hours and is rated at no more than 135 watts. Lamps and the intensity and distribution of light from each illuminated signal lens shall conform to the requirements of "Vehicle Traffic Control Signal Heads", and "Standards for Traffic Signal Lamps." Both publications are available from the Institute of Transportation Engineers.

(continued)



**Appendix 10**  
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**OPTICALLY PROGRAMMED SIGNAL HEADS.**

The following additional requirements apply to Optically Programmed Signal Heads.

**General.** The optically programmed signal head shall permit the visibility zone of the indication to be determined optically and require no hoods or louvers. The projected indication may be selectively visible or veiled anywhere within 150 of the optical axis. No indication shall result from external illumination nor shall one light unit illuminate a second.

**Optical System.** The optical system shall accommodate projection of diverse, selected indicia to separate portions of the roadway such that only one indication will be simultaneously apparent to any viewer. The projected indication shall conform to ITE transmittance and chromaticity standards. The following components shall comprise the optical system:

**A. Lamp and Lamp Collar.** The lamp shall be nominal 150 watt, 120 volt AC, three prong, sealed beam having an integral reflector with stippled cover and an average rated life of at least 6000 hours. An equivalent 75 watt lamp shall be used with pedestrian indications. The lamp shall be coupled to the diffusing element with a collar including a specular inner surface.

**B. Optical limiter-diffuser.** The diffusing element may be discrete or integral with the convex surface of the optical limiter. The optical limiter shall provide an accessible imaging surface at focus on the optical axis for objects 900 to 1200 feet distant, and permit an effective veiling mask to be variously applied as determined by the desired visibility zone. The optical limiter shall be provided with positive indexing means and composed of heat resistant glass.

**C. Objective lens.** The objective lens shall be a high resolution, planar incremental lens hermetically sealed within a flat laminant of weather-resistant acrylic or approved equal. The lens shall be symmetrical in outline and may be rotated to any 90° orientation about the optical axis without displacing the primary image.

**Construction.** Signal case and lens holder shall be predrilled for backplates and visors. Hinge and latch pins shall be stainless steel. All access openings shall be sealed with weather-resistant rubber gaskets.

**Mounting.** The signal shall mount to standard 1 1/2 inch fittings as a single section, as a multiple section face, or in combination with other signals. The signal section shall be provided with an adjustable connection that permits incremental tilting from 0 to 10 degrees above or below the horizontal while maintaining a common vertical axis through couplers and mounting. Terminal connection shall permit external adjustment about the mounting axis in 5 degree increments. The signal shall be constructed such that it can be installed with ordinary tools and serviced with no tools.

Attachments such as visors, back plates or adapters shall conform and readily fasten to existing mounting surfaces without affecting water and light integrity of the signal.

The programmed signal head shall be arranged for rigid mounting to either a mast arm or a dual span wire assembly. It is important for proper operation of the signal that it be mounted as rigidly as practical to maintain its optical orientation with the roadway. In those cases where span wires are used it should be securely tethered to the lower span wire.

**Electrical.** Lamp fixture shall comprise a separately accessible housing and integral lamp support, indexed ceramic socket and self-aligning, quick-release lamp retainer. Electrical connection between case and lamp housing shall be accomplished with an interlock assembly which disconnects lamp housing when opened. Each signal section shall include a covered terminal block for clip or screw attachment of field wires. Concealed No. 18 AWG, stranded and coded wires shall interconnect all sections to permit field connection within any section.

**Photo Controls.** Each signal section shall include integral means for regulating its intensity between limits as a function of individual background illumination. Lamp intensity shall not be less than 97% of uncontrolled intensity at 1000 fc and shall reduce to 1.4 fc  $\pm$ 2% of maximum at less than 1 fc over the applied voltage and ambient temperature range. Response shall be proportional and essentially instantaneous to any detectable increase from darkness to 1000 fc and damped for any decrease from 1000 fc.

The intensity controller shall comprise an integrated, directional light sensing and regulating device interposed between lamp and field wires. The device shall be responsive over an applied voltage of 95 to 130V, 60 Hz. temperature range of -40°F to 165°F and may provide phase controlled output voltage but shall have a nominal open circuit terminal impedance of

(continued)

**Appendix 10**  
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1500 ohms. The Photo Control shall not produce sufficient electrical noise or interference to adversely affect the operation of solid state electronic equipment used on traffic signal controllers and associated auxiliary equipment and shall not cause falsetripping of conflict monitors.

**STANDARD PEDESTRIAN SIGNAL HEADS.**

In addition to applicable items in STANDARD SIGNAL HEADS the following requirements apply to Standard Pedestrian Signal Heads

**General.** Pedestrian signal indications are traffic indications intended for the exclusive purpose of controlling pedestrian traffic. These indications consist of the illuminated words WALK and DON'T WALK.

When specified, these messages can be replaced with the "MAN" and "HAND" display. The indications shall be single faced and rectangular in shape with letters made visible by internal illumination and with the legend DON'T WALK above or integral with the legend WALK.

When illuminated, the WALK indication shall be lunar white. When illuminated, the DON'T WALK indication shall be portland orange. All except the letters shall be obscured by an opaque material.

When not illuminated, the WALK and DON'T WALK indications shall not be distinguishable by pedestrians at the far end of the controller crossing. Pedestrian signal construction and indications shall conform to the requirements of "Pedestrian Traffic Control Signal Indications" published by the Institute of Transportation Engineers, with the following modifications:

- Unless otherwise specified, the head shall be a two section unit. Lettering shall be a minimum of 4-1/2 inches.
- Lamps for the illumination of each section shall be a clear traffic signal lamp with an average initial rating of 1280 lumens at a working voltage of 120-125 volts with a rated life of at least 8000 hours. Lamp fixtures shall not be wired in series.
- Signal head shall be supplied with an 18 AWG, color coded wiring harness, and a four position, barrier type terminal block.
- Lenses shall be made of plastic.

**FIBEROPTIC PEDESTRIAN SIGNAL HEADS.**

In addition to applicable items in STANDARD SIGNAL HEADS and STANDARD PEDESTRIAN SIGNAL HEADS the following requirements apply to Fiberoptic Pedestrian Signal Heads.

**General.** The unit shall consist of a matrix of fiberoptic bundles forming two displayed messages on a rectangular background facing the same direction. One message shall indicate WALK and the other shall indicate DON'T WALK. Both messages shall have a minimum letter height of 4 1/2 inches using a series B width. If the "MAN" and "HAND" display are specified both messages shall have a minimum symbol height of 10 1/2 inches and 6 1/2 inches width.

The messages shall be clearly legible and shall attract the attention of pedestrians and be readable, under any lighting conditions varying from total darkness to bright sunlight or where high intensity background lighting is present, at distances from 9 feet to the width of the area to be crossed. A visor or hood shall not be required for legibility, but shall be provided with the housing.

The messages shall be visible at full intensity anywhere within a 90 degree cone centered about the optical axis and perpendicular to the surface of the matrix display. When not energized, the signal shall be blanked out (unreadable) with no phantom images, regardless of solar intensity or direction.

The messages shall be bright in color against a flat black background.

The displays shall be made from a single row of fiber-optic bundles with a nominal 1/2 inch spacing between centers.

The light source shall be designed and constructed so that in case of an electrical or mechanical failure of the word DON'T the word WALK in the DON'T WALK message will remain dark.

Each message shall be displayed separately and never concurrently.

**Material Requirements.** One 42 watt, 10.8 volt lamp type EPT or equivalent with a rated average life expectancy of 10,000 hours shall be as the light source for each display. The lamp shall be a multi-mirror reflector quartz halogen bulb operating at an approximate color temperature of 2900°K.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 724 (Cont'd)**

**Optical System.** The optical system shall consist of the following:

- Weatherproof housing, door, gaskets, and visor
- Fiber optic module with individual output attached
- Color filters for desired message colors
- Light sources
- Transformers
- Protective back cover for the module
- Electrical system including wiring

**Optical Requirements.** The optics shall have a glass-on-glass fiber with an 83% core to 17% cladding ratio. Bundled fiber strands shall be kept free from the contamination of water and polishing agents. Maximum fiber breakage per fiber bundle shall not exceed 3%. A minimum of five spare fiber optic output bundles shall be provided for each lamp and built into the unit. Damaged output bundles shall be replaceable using these spares. Individual fiber optic bundles shall not be jacketed or encased.

Color filters shall be optical quality glass. The filters shall be color fast and in accordance with the I.T.E. Signal Color Specification for Chromaticity.

The prismatic polycarbonate lens shall be mounted at a pre-focused distance in the door, away from the fiber optic panel.

All optical fiber utilized in the production of the fiberoptic unit shall be tested for:

- Core to clad fusion
- Size
- Roundness of fiber
- Optical transmission
- Brittleness

Results of these tests shall be available upon request.

**Construction.** The front panel shall be flat black aluminum alloy, minimum 1/8 inch thick, and shall have a maintenance-free black anodized, acid tested finish or an equivalent weather resistant polycarbonate.

A heavy plastic mylar water shield shall be used to prevent possible water leaks from dropping onto the lamps.

All fiberoptic transformers and lamps shall be mounted on the door of the unit. All screws, washers, nuts and bolts shall be corrosion resistant. All components shall be readily accessible when the door is opened. The only tool required for maintenance or replacement of components shall be a standard screwdriver.

No moving parts are permitted in the optical system.

**Electrical.** Electrical connection shall be provided by a barrier-type terminal strip for connecting field wires.

Transformers shall be used to reduce the incoming 120 volts AC to 10.8 volts AC.

Transformers shall be rated at 48.5 volt-amperes and shall have Class A insulation impregnated with a double coating of epoxy resin so as to preclude intrusion of moisture.

A separate transformer and bulb shall be used for each color, to allow connection with existing controller wiring and conflict monitors.

The transformer bracket shall be an extruded aluminum member and shall provide adequate heat sinking of transformers.

**Environmental Conditions.** The unit shall be capable of continuous operation over a temperature of -34°F to 167°F.

**FIBEROPTIC DUAL INDICATION ARROW.**

In addition to applicable items in STANDARD SIGNAL HEADS, the following additional requirements apply to Fiberoptic Dual Indication 12 inch Turn Arrow.

**General.** The unit shall display alternate indications, consisting of either a green or yellow directional arrow. The indication shall be clearly legible and shall attract the attention of motorists and be visible, under any lighting conditions varying from total darkness to bright sunlight or where high intensity background lighting is present, at a distance of at least 1475 feet under normal atmospheric conditions. A visor or hood shall not be required for legibility.

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**Appendix 10**  
**NYS Department of Transportation - General Specification Group 724 (Cont'd)**

The indication shall be visible at full intensity anywhere within a 60-degree cone centered about the optical axis and perpendicular to the surface of the display.

When not energized, the signal shall be blanked out (unreadable) with no phantom images, regardless of solar intensity or direction.

The indication shall be bright in color against a flat black background.

Each indication shall be displayed separately and never concurrently.

The borderline arrow indications shall be comprised of a dual row of fiber bundles. The indication shall be in total conformance with I.T.E. standards for Vehicle Control Signal Heads.

**Material Requirements.** One 42 watt, 10.8 volt lamp type EPT or equivalent with a rated average life expectancy of 10 000 hours shall be used as the light source for each indication. The lamp shall be a multi-mirror reflector quartz halogen bulb operating at an approximate color temperature of 2900°K.

**Optical System.** The optical system shall consist of the following:

- Weatherproof housing, door, gaskets, and visor
- Fiberoptic module with individual output attached
- Color filters for desired message colors
- Light sources
- Transformers
- Protective back cover for the module
- Electrical system including wiring

**Optical Requirements.** The optics shall have a glass-on-glass fiber with a 83% core to 17% cladding ratio. Bundled fiber strands shall be kept free from the contamination of water and polishing agents. Maximum fiber breakage per fiber bundle shall not exceed 3%. At least two (2) spare fiberoptic output bundles shall be provided for and built into each unit. Damaged output bundles shall be replaceable using these spares. A minimum of 56 bundles shall be provided. All optical fiber shall be fully bias randomized by individual fiber with approximately 50% fiber allocated to the green arrow indication and 50% to the amber arrow indication for balanced and corrected color output. Individual fiberoptic bundles shall not be jacketed or encased.

Color filters shall be optical quality glass. The filters shall be color fast and in accordance with I.T.E. Signal Color Specification for Chromaticity. Any combination of colors shall be available by changing color filters installed in the unit.

All optical fiber utilized in the production of the fiberoptic units shall be tested for:

- Core to clad fusion
- Size
- Roundness of fiber
- Optical transmission
- Brittleness

Results of these tests shall be available upon request.

**Construction.** Complete unit shall be supplied mounted in standard 12 inch vehicle signal section. The front panel shall be either flat black aluminum alloy, minimum 1/8 inch thick having a maintenance-free black anodized, acid tested finish or an equivalent weather resistant polycarbonate. Output bundles shall be mounted on the front panel at 90 degrees to the surface. Mounting shall be consistent in manufacture and shall be watertight. A heavy plastic Mylar (or equivalent) water shield shall be used to prevent possible water leaks from dripping onto the lamps.

All fiber-optic transformers and lamps shall be mounted on the door of the unit. All screws, washers, nuts and bolts shall be corrosion resistant. All components shall be readily accessible when the door is opened. The only tool required for maintenance or replacement of components shall be a standard screwdriver.

No moving parts are permitted in the optical system.

Front panel, with fiber-optic indication shall be rotatable to form a right, left, or vertical arrow.

**Electrical.** Electrical connection shall be provided by a barrier type terminal strip for connecting field wires.

Transformers shall be used to reduce the incoming 120 volts AC to 10.8 volts AC.

Transformers shall be rated at 48.5 volt-amperes and shall have a Class A insulation impregnated with a double coating of epoxy resin so as to preclude intrusion of moisture..

(continued)

**Appendix 10**

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A separate transformer and bulb shall be used for each color, to allow connection with existing controller wiring and conflict monitors

**Environmental Conditions.** The unit shall be capable of continuous operation over a temperature range of -34°F to 167°F.

**STROBING SIGNAL INDICATION.**

In addition to applicable items in STANDARD TRAFFIC HEADS the following additional requirements apply to Strobing Signal Indications.

**General.** The unit shall consist of a standard red signal indication with the addition of a white bar strobe presented horizontally across the red face. The strobe shall flash at a rate of approximately once per second. The indication shall be single faced and the strobe bulb, control circuitry, and all necessary appurtenances shall be enclosed in and be an integral part of a standard 12 inch aluminum signal housing. The bar strobe shall attract the attention of motorists and be visible, under any lighting conditions varying from total darkness to bright sunlight or where high intensity background lighting is present, at a distance of at least 1/2 mile under normal atmospheric conditions.

When the bar strobe is not energized, the indication shall operate and appear as a standard red indication.

**Optical System.** The optical system shall consist of the following:

- Weatherproof housing, door, gaskets, and visor.
- Alzak parabolic reflector or equivalent. No plastic material will be accepted for the reflector or reflector bracket.
- One bar strobe bulb with a minimum 5000 hours duty life enclosed in a dustproof, shockproof and watertight enclosure.
- 12 inch glass red lens.
- Power supply.
- Electrical system including wiring and control circuitry.
- The strobe bulb shall be a minimum of 9 1/2 inches in length to effectively span the width of the lens.

**Construction.** The unit shall consist of a standard 12 inch red vehicle signal section with a bar strobe light interposed in front of the red lens.

All power supplies and control circuitry for the strobe shall be mounted to the visor assembly and contained within a watertight enclosure(s) which shall not interfere with mounting additional signal sections to form a multiple section signal head.

The strobe bulb shall be enclosed in a dustproof, shockproof and watertight housing securely mounted in front of the red lens. The strobe housing shall contain only the strobe bulb, terminal strips and necessary connecting wires, and shall not interfere with the general visibility of the red lens, nor the ability to change the red lens in the normal manner.

All screws, washers, nuts and bolts shall be stainless steel.

All components shall be readily accessible. The only tool required for maintenance or replacement of all components shall be a standard screwdriver.

**Electrical.** Electrical connection shall be provided by a barrier type terminal strip for connecting field wires. The power supply shall be of a capacitive discharge type sufficient to fire the bar strobe bulb at a rate of approximately once per second. The power supply shall be encased in a temperature stable epoxy so as to preclude intrusion of moisture. A door switch shall be provided so that when the housing door is opened the switch shall disconnect AC power to the strobe power supply and circuitry and shall also completely discharge the high voltage DC capacitive charge within 10 seconds.

The high voltage power supply shall be fused using a time delay fuse. The current rating of the fuse shall be no more than 50% above the maximum current expected at 135 V AC. The fuse shall be mounted in the housing and located before the door switch in the strobe circuitry.

The barrier type terminal strip shall be equipped with male quick connect spade terminals. Insulated female spade receiver terminals shall be required for the connection of the strobe circuitry to the terminal strip.

**Labeling.** A CAUTION or WARNING label should be affixed to the visor assembly near the housing door opening, notifying maintenance or repair personnel of the presence of a high voltage capacitive charge within the visor assembly and that the quick disconnect should be disconnected and a check for AC or DC voltage across the strobe bulb should be performed before servicing the strobe bulb or circuitry.

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NYS Department of Transportation - General Specification Group 724 (Cont'd)

**STANDARD POLYCARBONATE TRAFFIC SIGNAL HEADS**

**General.** In addition to applicable material requirements for STANDARD SIGNAL HEADS and STANDARD PEDESTRIAN SIGNAL HEADS, the following additional requirements apply to Polycarbonate Traffic Signal Heads.

**Material Requirements.** The traffic signal housing, visor and door shall be made of injection molded polycarbonate resin which shall be capable of withstanding a 70 ft-lb impact without fracture or permanent deformation.

Material used in the construction of the signal housing door, visor and lens shall be resistant to heat generated by the signal bulb. No deformation or discoloration shall be evidenced when 116 watt bulbs are used in 8 inch signal sections and 150 watt bulbs are used in 12 inch signal sections. The plastics shall be ultra-violet and heat stabilized and flame retardant.

The signal housing, door and visor shall be dark green and the color shall be fully impregnated into the polycarbonate resin.

Visor shall be made of one piece with a minimum thickness of 1/16 inch. The rear edge of the visor shall be provided with four mounting lugs for attaching the visor to the door using screws. The inside of the visor shall be dull black in color. Unless otherwise specified all signal heads shall be provided with cap-type visors.

**Construction.** The housing shall have a minimum thickness of 1/16 inch. The housing shall be of one piece construction and the door shall be of one piece construction.. Both the 8 inch & 12 inch housings are to be designed in the same manner so when used in combination heads the design will match each other.

The top and bottom opening of each housing shall have integral serrated bosses that will provide positive positioning of the signal head to eliminate undesirable rotation or misalignment of the signal head between sections. Each opening accommodates standard 1 1/2 in. diam. pipe fittings and brackets.

Doors shall be hinged by two lugs and mounted to the housing using stainless steel pins. The door of each signal section shall be one-piece with a minimum thickness of 1/16 inch.

A neoprene gasket shall be provided between the body of the housing and the door. The doors shall be forced tightly against the gasket and housing by simple stainless steel locking devices. A slotted air cored neoprene lens gasket shall provide a positive seal between the lens and the signal door and between the lens and the reflector holder. The gasket shall be an unbroken circular gasket with a "U" shaped cross section.

The gasket and lens shall be held tightly into the door by four stainless steel clips and screws that shall allow easy removal of the lens and gasket from the door without removal of the door in the field.

The reflector shall be Alzak aluminum. Reflector rings shall be manufactured from die cast aluminum, hinged from one side to allow the reflector assembly to open without use of tools. The lamp receptacle shall be permanently focused to the reflector and held in place by a corrosion-resistant wire spring bail so that it can be removed without the use of tools. The center section shall contain a terminal barrier block having quick-disconnect terminals for the lamp receptacle leads and screw terminals for field wires.

**LED TRAFFIC SIGNAL MODULES.**

In addition to applicable material requirements for STANDARD SIGNAL HEADS, and STANDARD PEDESTRIAN SIGNAL HEADS, the following additional requirements apply to Ball, Arrow, and Pedestrian LED Traffic Signal modules.

**General.** This specification refers to definitions and practices described in the Institute of Transportation Engineers (ITE) publication ST-017B "Vehicle Traffic Control Signal Heads" (referred to in this document as "VTCSH"), and "Pedestrian Traffic Control Signal Indications" (referred to in this document as "PTCSI"). LED traffic signal modules designed as retrofit replacements for existing signal lamps shall not require special tools for installation. They shall be a single, self-contained device, not requiring onsite assembly for installation into an existing traffic signal housing. The module shall be sealed to provide a weather tight enclosure and an insulating covering for all electrical connections and electronic components and shall fit securely in the housing. A one piece "U-shaped" cross section rubber gasket shall be provided with each module. This gasket shall fit around the perimeter of the module to ensure a weather tight fit between the door and the housing of the module. The module shall connect directly to existing electrical wiring by means of 1/4 inch female quick connect push on type terminals.

**Material Requirements.** Materials used for the lens and signal module construction shall conform to ASTM specifications for those materials.

Each LED signal module shall be identified on the back side with the manufacturer's trade mark, serial number, voltage rating, Volt-Ampere rating, power consumption (watts and volt amperes) and, if applicable, a vertical indexing indicator

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**Appendix 10**  
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(i.e., "up arrow", or the word "UP" or "TOP"). Each LED signal module shall also be identified on the back side with the part number as shown in the NYSDOT LED Traffic Signal Module QPL and the date of manufacture (month and year minimum). Single units shall have identification markings as to the type and color of the module. Bi-Modals shall be marked with model type. Each LED signal module shall have a permanent sticker stating compliance to FCC Title 47, Subpart B, Section 15 regulations. The sticker will be located on the rear exterior of the unit.

**A. Ball and Arrow Modules (Single and Bi-Modal) Only.** Retrofit replacement LED signal modules shall fit into existing traffic signal housings built to the VTCSH Standard without modification to the housing. Installation of the retrofit replacement LED signal module into an existing signal housing shall only require the removal of the existing lamp components ( i.e., lens, lamp module, gaskets, and reflector).

Red LED signal module lenses shall be tinted with the appropriate color to enhance on/off contrast. The material used to tint the lens shall not affect the luminous intensity or chromaticity and shall be uniform across the face of the lens. The Yellow and Green units shall be supplied with a clear lens. If a polymeric lens is used, a surface coating or chemical surface treatment shall be used to provide front surface abrasion resistance. The module lens shall be replaceable without the need for replacing the complete module unit.

The Arrow LED signal modules shall produce a pattern that conforms to the VTCSH standard for color, size and shape. The Arrow LED signal modules shall not require a specific orientation or have a variance in light output, pattern or visibility for any mounting orientation.

The lens of the LED signal module shall be capable of withstanding ultraviolet light (direct sunlight) exposure for a minimum time period of five years without exhibiting evidence of deterioration. Each Ball LED shall have a sticker attached stating compliance to the ITE Standard for Color and Luminous Intensity and each Arrow LED shall have a sticker attached stating compliance to the ITE Standard for Color as specified in the VTCSH.

**B. Pedestrian Modules (Single & Bi-Modal) Only.** Pedestrian LED traffic signal modules shall be designed as a retrofit replacement for the message bearing surface of a 12 inch by 12 inch or approximately 16 inch by 18 inch (with a 2 3/8 inch corner radius), pedestrian traffic signal housing built to the PTCSI Standard. The Single Pedestrian module shall be designed to display either a "HAND" or "WALKING MAN" symbol that complies with PTCSI standard for this symbol for the size specified. The Bi-Modal Pedestrian module shall be designed to display both "HAND" and "WALKING MAN" symbols that comply with the PTCSI standard for these symbols for the size specified.

The "HAND" and "MAN" symbols for both the Single and Bi-Modal Pedestrian shall be designed so that the entire area comprising the symbol appears illuminated. Outlined shapes will not be accepted. The LED signal module shall fit into existing Pedestrian signal housings without the need to modify the housing. Installation of the retrofit replacement Pedestrian LED signal module into pedestrian signal housing shall only require the removal of the existing message bearing surface, existing lamp components (i.e., lens, lamp module, gaskets, and reflector), and insertion of the retrofit replacement into the area once occupied by the removed assembly. Each pedestrian module shall have a sticker attached stating compliance to the ITE standard for chromaticity as defined in the PTCSI.

**Optical.**

**A. Ball and Arrow Modules (Single & Bi-modal) Only.** The measured chromaticity coordinates of Ball and Arrow LED signal modules shall conform to the chromaticity requirements of Section 8.04, Limits of Chromaticity Coordinates and the associated Figure 1 of the VTCSH standard. The light output distribution for Ball LED traffic signal modules shall be as defined in Section 11.04 and Table 1 of the VTCSH standard. The minimum luminous intensity values for Ball LED traffic signal modules shall be, at a line voltage of  $120 \pm 3$  volts rms, as listed in Table 1 of the VTCHS standard. Variations in operating line voltage of between 80 and 135 volts rms shall have minimal effect (less than  $\pm 10\%$ ) on luminous output of the signal module. Minimum Initial Luminous Intensities of units supplied shall equal or exceed, at 36°F, 117.5% of the values defined in Table 1-Maintained Minimum Luminous Intensity Table-of the VTCSH standard for LED signal modules.

Ball LED signal modules, except for yellow modules. shall be designed so that when operated over the specified operating ambient temperature and voltage ranges during the luminous intensity warranty period, the luminous intensity of the unit shall exceed or equal the values shown in Table 1, "Maintained Minimum Luminous Intensity Table" of the VTCSH standard for LED signal modules. Yellow modules shall be designed so that when operated at 77°F over the specified voltage range during the luminous intensity warranty period, the luminous intensity of the unit shall equal or exceed the values shown for the color Green. Arrow LED signal modules shall be designed so that when operated over the specified ambient temperature and voltage ranges, the signal is clearly visible and attracts attention for a distance of at least 1/4 mile under normal atmospheric conditions.

(continued)

**Appendix 10**  
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B. Pedestrian Modules (Single & Bi-Modal) Only. The measured chromaticity coordinates of Pedestrian LED signal modules shall conform to the chromaticity requirements of Section 5.3, Color and the associated Figure C of the PTCSI standard. Pedestrian LED signal modules shall be designed so that when operated over the specified ambient temperature and voltage ranges, the signal shall attract the attention of, and be readable to, a viewer (at both day and night) at all distances from 9 feet to the full distance to be crossed.

**Performance Tests**

**A. All LED Modules.** Prior to shipment, the vendor shall energize (burn in) each LED signal module for a minimum of 24 hours, at rated voltage, and at a 100 percent on-time duty cycle. This test shall be conducted at the rated voltage in an ambient temperature of 140°F. Any failure within an LED signal module occurring during burn-in shall be cause for rejection. After burn-in procedure is completed, the following additional tests shall be performed. These tests shall be performed at rated operating voltage and at 77°F unless otherwise specified. All units shall be powered off for a period of 1 second and then powered back on. Any unit failing to turn on after power restoration shall be rejected. This test shall be performed a minimum of 10 times. A sample of 10% of units of each configuration, Balls or Arrows or Pedestrian signal modules, on the order shall be randomly selected and tested by the vendor in a flashing mode of operation, at 50 percent duty cycle with a 0.5 sec on time, and for a 24 hour period at 140°F. Any unit failing to function properly shall result in failure of the entire lot from which the sample was selected. Should this occur, the entire quantity ordered shall be tested as described above, and units not functioning properly shall be rejected. Each LED signal module shall be visually inspected for any exterior physical damage or assembly anomalies. Careful attention shall be paid to the surface of the lens to ensure there are no scratches (abrasions), cracks, chips, discoloration, or other defects. Each LED signal module shall be tested to ensure light output at 80 and 135 volts without adverse operational effects. Each LED signal under test shall be operated at each voltage level for a time period of five minutes. Signal modules illuminating with any adverse operational effects shall be rejected. Contractors shall provide, with each shipment, a Manufacturer's Certification of compliance. The certification shall certify that the LED signal modules comply with the requirements of these specifications. In addition to the certification, the modules shall be supplied with a list of the serial numbers of the units, copies of all applicable test reports on the LED signal modules, and signature of the person responsible for certifying the tests.

**B. Ball Modules only.** Each Ball LED signal module shall be tested for rated initial intensity. A single point measurement (at -2.5E V, 2.5E R or L) with a correlation to the minimum intensity requirements specified herein may be used. This test shall be performed after the burn-in procedure is completed, at rated operating voltage and at 77°F unless otherwise specified.

**Electrical:**

**A. All LED modules.** All wiring and terminal blocks shall meet the requirements of Section 13.02 Wiring of the VTCSH standard. Each wire shall be approximately 3 feet long. Units shall be supplied with color coded wires as defined below:

Red Balls & Red Arrows-Red & White  
Yellow Balls & Yellow Arrows-Yellow & White  
Green Balls & Green Arrows-Brown & White  
Bi-Modal Arrows- Brown (Green Arrow), Yellow & White (Common)  
Bi-Modal Pedestrians- Red (Hand), Brown (Man) & White (Common)  
Single Pedestrians (Hand)- Red & White  
Single Pedestrians (Walk Man)- Brown & White

The LED signal module shall operate with AC line voltage ranging from 80 volts to 135 volts rms  $60 \pm 3$  Hz. The boards used in the module shall be coated with a conformal coating containing an ultraviolet tracer. All unit types shall be operationally compatible with the traffic signal equipment that each type is designed and intended to interface with. This equipment includes all controllers, conflict monitors, current monitors, switchpack and flashers currently in use by the Department.

**B. NYSDOT Standard & Type A LED Module Definitions.** NYSDOT Standard Units shall be designed so that a normally functioning signal module will generate the needed current to prevent a Model 215 Current Monitor from detecting a loss of current over the voltage range of between 95 and 135 volts rms. The minimum current required to prevent the Model 215 monitor from detecting a loss of current is a 500 milliamp peak AC or pulsed current with a

(continued)



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minimum pulse width of 3 msec. Signal modules designed to specifically generate current pulses to prevent the monitor from tripping shall, as a minimum, generate 6 pulses per second. Generated current pulses shall be evenly spaced, with the first pulse generated within 100 msec after the application of AC power. (Additional information regarding the operation of the Model 215 Current Monitor can be obtained in the latest "New York State Transportation Management Equipment Specifications").

NYSDOT Standard Units shall incorporate circuitry to reliably detect the total loss of LED current due to failures such as, but not limited to, open circuits and power supply problems. Upon detection of this failure, this circuit will disable any current generating circuitry within 400 msec to allow detection of this failure by a Model 215 current monitor.

Type "A" units shall be supplied without the necessary circuitry to function with a Model 215 current monitor.

Total harmonic distortion (current and voltage) induced into an AC power line for Type A units operating at rated voltage shall not exceed 20 percent for units consuming greater than 15 watts at 77°F and 40 percent for units consuming less than 15 watts at 77°F.

All Ball and Single Arrow LED modules may be procured using this specification as either NYSDOT Standard or Type A units. Single Pedestrian, Bi-Modal Pedestrian, and Bi-Modal Arrows will be procured as Type A only.

The maximum power consumption shall not exceed the following wattages at 77 degrees F:

12 inch Balls	Red-14 Yellow-24 Green-18
8 inch Balls	Red-10 Yellow-13 Green-13
12 inch Arrows	Red-10 Yellow-10 Green-10
Bi-Modal Arrows	Yellow-10 Green-10
12 inch by 12 inch Signal Pedestrian	Hand-9 Man-9
12 inch by 12 inch Bi-Modal Pedestrian	Hand-9 Man-9
16 inch by 18 inch Bi-Modal Pedestrian	Hand-12 Man-12

NYSDOT standard units supplied will meet the same low distortion standards without the current generating circuitry included in the measurement.

LED signal modules supplied in conformance with this specification shall have power factors of 0.90 or greater without the current generating circuitry included in the calculations for power factors for NYSDOT Standard units.

**C. Pedestrian Modules (Single & Bi-Modal) Only.** The maximum power consumed by a pedestrian LED unit shall not exceed 15 volt-amps (VA) at  $120 \pm 3$  volts rms.

**Environmental.** All LED signal modules shall be rated for use in the ambient temperature range of -40°F to 165°F. LED signal modules shall be sealed against dust and moisture intrusion per the requirements of NEMA Standard 250-1991 for Type 4 enclosures to protect all internal LED and electrical components. LED signal modules shall be capable of operating at rated voltage in an environment of 165°F /85% RH for 1000 hours without the formation of internal condensing moisture.

**BASIS OF ACCEPTANCE.** Acceptance of signal heads, sections, and/or LED signal modules will be based on manufacturer's certification of compliance with these specification requirements, a list of serial numbers of the units being supplied, copies of all applicable test reports on the signal modules, and signature of the person responsible for certifying the tests. In addition, LED module model number and manufacturer's name must be listed on the NYS Signal Qualified Products List (QPL). The QPL can be obtained from the NYSDOT website.

724-05 THRU 724-07 (VACANT)

**724-08 SHIELDED COMMUNICATION CABLE**

**SCOPE.** This specification covers the material requirements and fabrication details of shielded communication cable for use with traffic signal systems.

(continued)

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**MATERIALS AND CONSTRUCTION.** The cable shall conform to the requirements of the International Municipal Signal Association (IMSA) specification 20-2 for polyethylene insulated, polyethylene jacketed communication cable with electrical shielding. The gauge and number of conductors shall be as specified in the plans. The conductors shall be stranded copper wire.

**BASIS OF ACCEPTANCE.** Acceptance of material will be based on the manufacturer's certification of compliance with these specification requirements.

**724-09 SIGNAL CABLE WITH INTEGRAL MESSENGER**

**SCOPE.** This specification covers the material requirements for signal cable with integral messenger for use with traffic signal systems and for aerial installations.

**MATERIALS AND CONSTRUCTION.** The cable shall conform to the requirements of the International Municipal Signal Association (IMSA) Specification 20-3. The gauge and number of conductors shall be as specified in the plans. The conductors shall be stranded copper wire.

**BASIS OF ACCEPTANCE.** Acceptance of material will be based on the manufacturer's certification of compliance with these specification requirements.

**724-10 SHIELDED COMMUNICATION CABLE WITH INTEGRAL MESSENGER**

**SCOPE.** This specification covers the material requirements for shielded communication cable with integral messenger for use with traffic signal systems and for aerial installations.

**MATERIALS AND CONSTRUCTION.** The cable shall conform to the requirements of the International Municipal Signal Association (IMSA) Specification 20-4. The gauge and number of conductors shall be as specified in the plans. The conductors shall be stranded copper wire.

**BASIS OF ACCEPTANCE.** Acceptance of material will be based on the manufacturer's certification of compliance with these specification requirements.

724-11 THRU 724-14 (VACANT)

**724-15 FIRE PRE-EMPTION TELL-TALE LIGHT**

**SCOPE.** This specification covers the material requirements for fire pre-emption tell-tale light.

**MATERIALS AND CONSTRUCTION.** The fire pre-emption tell-tale light shall consist of a Xenon flash tube rated at 10.76 Mlx and 2000 hours life. The flash rate shall be 60 to 80 flashes per minute. The tell-tale light shall be capable of normal operation between outside temperature from - 46°C to +60°C. The tell-tale light shall be contained in a vandal resistant weatherproof housing and mounting with a blue heat resistant and shatterproof globe. It shall be visible through 3600 horizontally. The fire pre-emption tell-tale light shall operate from a 115 volt 60 Hz. single phase power source.

**BASIS OF ACCEPTANCE.** Acceptance of the fire pre-emption tell-tale light shall be based on the manufacturer's certification of compliance with these specification requirements.

724-16 THRU 724-19 (VACANT)

**724-20 INDUCTANCE LOOP WIRE**

**SCOPE.** This specification covers the material requirements for wire used in inductance loop vehicle detectors.

**MATERIALS AND CONSTRUCTION.** Loop wire shall be one conductor No. 14 AWG wire loosely encased in a tube in conformance to the requirements of the International Municipal Signal Association (IMSA) Specification 51-5.

(continued)

**Appendix 10  
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**BASIS OF ACCEPTANCE.** Acceptance of material will be based on the manufacturer's certification of compliance with these specification requirements.

**724-21 SHIELDED LEAD-IN CABLE**

**SCOPE.** This specification covers the material requirements for shielded lead-in cable used with inductance loop vehicle detectors.

**MATERIALS AND CONSTRUCTION.** The cable shall consist of No. 14 AWG conductors in conformance to the requirements of the International Municipal Signal Association(IMSA) Specification 50-2.

**BASIS OF ACCEPTANCE.** Acceptance of material will be based on the manufacturer's certification of compliance with these specification requirements.

**724-22 ROADWAY LOOP EMBEDDING SEALER**

**SCOPE.** This specification covers the material requirements for Roadway Loop Embedding Sealer used when installing inductance loops.

**MATERIALS AND CONSTRUCTION.** Roadway Loop Embedding Sealer shall be used to encapsulate Traffic Signal Loop Wires embedded in highway materials. The sealer shall be cold applied and may be a one or two component system, the viscosity of which shall be sufficient to allow the material to be either poured or placed under pressure and fully encapsulate the loop wires. The sealer shall be curable at temperatures of 40°F and above. When the sealer is bonded to common paving materials, it shall have sufficient strength and resiliency to withstand stresses due to vibrations and differences in expansion and contraction as a result of temperature changes or traffic conditions. The sealer shall be compatible with the sheathing or covering of loop inductance wires.

**TABLE 724-22-1 ROADWAY LOOP EMBEDDING SEALER PROPERTIES**

Property	Test Method	Flexible		Hard	
		Min.	Max.	Min.	Max.
Hardness, Shore	ASTM D2240	A15	A40	A50	D65
Pot Life @70OF, minutes	NYSDOT 724-40E	15		15	
Curing Time (tack free surface) @70°F, hours	NYSDOT 724-40E		2		2
Tensile Strength, psi	ASTM D412	50		400	
Elongation, percent	ASTM D412	150		20	
Water Absorption, percent	NYSDOT 724-40E		1.0		1.0
Adhesion to Asphalt Concrete, lbs	NYSDOT 724-40E	200		500	
Adhesion to Concrete, lbs	NYSDOT 724-40E	50		300	
Extension, inches	NYSDOT 724-40E	1/4		1/8	
Accelerated Weathering Flexible requires additional bend test)	NYSDOT 724-40E				No cracking, checking, chalking, or shrinking

**Chemical Resistance.** Cured sealer shall be resistant to most chemicals and solvents, including salts, acids, hydrocarbons, etc. Packaged stability of each component in original unopened containers, stored in temperatures between 32OF and 100OF shall be a minimum of six months.

**MATERIAL REQUIREMENTS.** The material shall meet the requirements of either the Flexible or Hard designation in Table 724-22-1. Materials designated Flexible require a 180° mandrel bend test @ 80°F with no breaking as part of the accelerated weathering testing.

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**Appendix 10**  
**NYS Department of Transportation - General Specification Group 724 (Cont'd)**

**BASIS OF ACCEPTANCE.** Applications for approval of Roadway Loop Embedding Sealer shall be submitted to the Materials Bureau by the manufacturer accompanied by a 1 gallon sample of the product and all pertinent sealer information including, but not limited to, manufacturer's sealant test results, sealant application procedures and safety precautions. Upon approval by the Materials Bureau, the name of the product will be placed on an "approved list" of Roadway Loop Embedding Sealers for use on asphalt and/or concrete pavements based on the compatibility of the sealer with the pavement material. The product may then be accepted on the basis of the name brand labeled on the container.

**724-23 PEDESTRIAN PUSH BUTTON AND SIGN**

**SCOPE.** This specification covers the material requirements for pedestrian push button and sign.

**MATERIAL AND CONSTRUCTION.** The push button unit shall be a direct push type having a cast aluminum housing. The unit shall be strongly constructed, rugged, abuse and tamper proof and suitable for operation under all weather conditions. It shall be provided with one normally-opened contact with ample contact area. The contacts shall be a material which will provide low contact resistance throughout the life of the device. The housing shall be of a design or be provided with adaptors to facilitate mounting on poles of different diameters. The unit shall have a convenient means of wiring. The sign may be either reflectorized or non-reflectorized, with legend as specified on the plans and in accordance with Chapter 2B of the MUTCD.

**BASIS OF ACCEPTANCE.** Pedestrian push button and sign shall be accepted upon the manufacturer's certification of compliance with these specification requirements.

**GROUP 729**

**729-15 ARROW PANELS**

**SCOPE.** This specification covers the material and performance requirements for arrow panels. Arrow panels are defined by NCHRP 350 as a Category IV device.

**MATERIAL REQUIREMENTS.** Arrow panels shall be signs with a matrix of illuminated elements capable of either flashing or sequential arrow displays that meets the requirements of the MUTCD. Arrow panels shall be equipped with a sign control console, mounted in a lockable, weather-resistant compartment. Arrow panels shall not bear any advertising message or any other message that is not related to traffic control. A non-retro-reflective logo or name and telephone number of the contractor or supplier may be located on the back of the arrow panel or on the arrow panel trailer. The logo shall not exceed 1 square foot. The name and telephone number shall not exceed 2 inch height. The rear face of the arrow panel shall contain one or more clear lamp(s) to indicate that the arrow board is operating properly.

Truck-Mounted Series B. Arrow panels consist of a 60 inch x 30 inch rectangular panel mounted at a minimum of 5 feet above the roadway. The arrow display shall be legible at a minimum distance of  $\frac{3}{4}$  mile on a bright, sunny day or a clear night when the sight line is unobstructed.

Trailer-Mounted or Truck-Mounted Series C. Arrow panels consist of a 96 inch x 48 inch rectangular panel mounted at a minimum of 7 feet above the roadway for trailer mounted arrow panels and 5 feet above the roadway for truck mounted arrow panels. Arrow panels shall be powered by self-contained engine-driven generator systems, capable of energizing the arrow displays for 72 hours unattended and shall be capable of being powered by 110V AC supply; solar-powered, capable of energizing the arrow displays continuously for 21 days unattended; or powered by a truck. Arrow panel operation controls shall be mounted in a lockable enclosure. The arrow display shall be legible at a minimum distance of 1.0 mi on a bright, sunny day or a clear night when the sight line is unobstructed.

**TESTING.** Manufacturers or material suppliers desiring to have Truck-Mounted Series B arrow panels considered for inclusion on the Approved List shall submit a material certification that the arrow panel conforms to this specification and the requirements of the MUTCD, and provide an arrow panel to the Director, Materials Bureau in Albany for initial field testing. Field testing will include evaluation of arrow panel operation during various light conditions for brightness, legibility, and angularity. The review process requires a minimum of 30 calendar days.

Manufacturers or material suppliers desiring to have Trailer-Mounted or Truck-Mounted Series C arrow panels considered for inclusion on the Approved List shall submit test results from the AASHTO National Transportation Product Evaluation Program (NTPEP), a material certification that the arrow panel conforms to this specification and the requirements of the MUTCD, and provide an arrow panel to the Director of the Materials Bureau in Albany for initial field testing. Field testing

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 729 (Cont'd)**

will include evaluation of arrow panel operation during various light conditions for brightness, legibility, and angularity. The review process requires a minimum of 30 calendar days

**BASIS OF APPROVAL.** Truck-Mounted Series B arrow panels meeting the requirements of this specification and having satisfactory initial field test results will be placed on the Approved List.

Trailer-Mounted or Truck-Mounted Series C arrow panels meeting the requirements of this specification and satisfactory initial field test results, as well as satisfactory NTPEP test results will be placed on the Approved List. Trailer-Mounted or Truck-Mounted Series C arrow panels for which NTPEP test results have not been submitted may be provisionally placed on the Approved List for a maximum of one year. Arrow panels on the Approved List that have repeated poor evaluations will be removed from the Approved List.

**BASIS OF ACCEPTANCE.** Arrow panels will be accepted on the basis of the product appearing on the Approved List and a material certification that the product meets this specification and is the same as the one appearing on the Approved List.

**729-16 PORTABLE VARIABLE-MESSAGE SIGNS (PVMS)**

**SCOPE.** This specification covers the material and performance requirements for variable-message signs. Variable-message signs are defined by NCHRP 350 as a Category IV device.

**MATERIAL REQUIREMENTS.** Portable variable-message signs (PVMS) shall be tested by the National Transportation Product Evaluation Program (NTPEP) of the American Association of State and Highway Transportation Officials (AASHTO) demonstrating the arrow panel meets the requirements of this specification and the MUTCD. The PVMS shall be trailer mounted and equipped for use on public highways in accordance with NYS Vehicle and Traffic Law. The unit shall operate primarily from a solar-powered electrical system and shall be capable of energizing the message display for a minimum of 21 days without auxiliary charge. The electrical system shall consist of batteries and a solar array panel and on-board auxiliary charging system to enable the batteries to be recharged via a 110V AC connection.

The PVMS shall have a 3 line display with a minimum of 8 characters per line, and shall be capable of displaying 3 separate messages in a cyclical sequence. Characters shall be a minimum of 18 inches high. PVMS messages shall be legible from a distance of 900 feet or more in advance of the PVMS on highways with a posted pre-construction speed limit of 50 mph or greater. PVMS messages shall be legible from a distance of 680 feet or more in advance of the PVMS on highways with a posted preconstruction speed limit of 45 mph or less. PVMS shall not bear any advertising message or any other message that is not related to traffic control. A non-retroreflective logo or name and telephone number of the contractor or supplier may be located on the back of the PVMS or on the PVMS trailer. The logo shall not exceed 1 square foot. The name and telephone number shall not exceed 1/2 inch in height.

The PVMS shall be equipped with a sign control console, mounted in a lockable, weather-resistant compartment. The sign controller shall have programmable memory capable of storing messages pertinent to planned construction activities, including emergency messages. The controller shall be equipped with 14 day calendar programming capability, providing the ability to start and stop the display of a minimum of three (3) different messages on a repeating schedule without an operator present. The controller shall be capable of producing an accurate log of all messages and the times they were displayed. The controller shall have programmable messages, display rate, and display interval settings. The controller shall blank the sign if the output voltage drops below the manufacturer's recommended output level.

The PVMS shall be equipped with control software using a Microsoft Windows operating system. The Contractor shall supply the Engineer with two copies of operating instructions for the PVMS and the control software. Electronic copies of software instructions are acceptable.

**A. Light-Emitting Diode (LED) Type.** The LED type PVMS shall have light-emitting diodes arranged in arrays and the arrays shall be arranged in a matrix for each character to be 7 pixels high by 5 pixels wide. The LED display shall have the ability to display characters at a minimum height of 18 inches. The controller shall provide a means of dimming the pixels.

**B. Hybrid Flip-Disk Type.** The hybrid, flip-disk type PVMS shall have pixels consisting of individual electromagnetic disks with at least two (2) high-output amber LEDs. The disk face shall be covered with yellow prismatic retroreflective sheeting or an approved equal. The PVMS shall operate using both flip-disk and light-emitting diode (LED) during nighttime and low-light periods. The hybrid flip disk type shall be arranged in a matrix 7 disks high by 5 disks wide for each character at a minimum height of 18 inches.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 729 (Cont'd)**

**C. Cellular Communications Option.** The PVMS with cellular communications shall be equipped with a cellular telephone with cellular service and a modem capable of remotely operating the control software. The phone numbers for PVMS on a contract shall be sequential whenever possible to facilitate remote control of multiple devices. The unit shall accept a land line telephone connection mode without rewiring or modification. PVMS units with cellular communications shall be equipped with communications and control systems that are National Transportation Communications for ITS Protocol (NTCIP) compliant.

**D. Radar Option.** The PVMS with radar shall be equipped with a radar speed detection option, providing the system with the ability to determine the speed of an approaching vehicle and interrupt the programmed sequence with a special default message displaying the vehicle's speed. The unit shall collect and store vehicle speed data for retrieval.

**E. NTCIP Communication Protocol Option.** PVMS units that will be operated by the Department, typically from a Transportation Management Center (TMC) shall be equipped with communications and control systems that are National Transportation Communications for ITS Protocol (NTCIP) compliant.

**TESTING.** Manufacturers or material suppliers desiring to have PVMS considered for inclusion on the Approved List shall submit test results from the AASHTO National Transportation Product Evaluation Program (NTPEP), a material certification that the PVMS conforms to this specification and the requirements of the MUTCD, and provide a PVMS to the Director, Materials Bureau in Albany for initial field testing. Field testing will include evaluation of PVMS operation during various light conditions for brightness, legibility, and angularity. The initial testing process requires a minimum of 30 calendar days.

**BASIS OF APPROVAL.** PVMS meeting the specification, having satisfactory NTPEP test results, and having satisfactory initial field test results will be placed on the Approved List. PVMS meeting the specification and having satisfactory initial field test results, that do not have NTPEP test results may be provisionally placed on the Approved List for a maximum of one year. PVMS on the approved list that have repeated poor evaluations will be removed from the Approved List.

**BASIS OF ACCEPTANCE.** PVMS will be accepted on the basis of the product appearing on the Approved List and a material certification that the product meets this specification and is the same as the one appearing on the Approved List.

**729-17 TEMPORARY GLARE SCREENS**

**SCOPE.** This specification covers the material and performance requirements for temporary glare screens. Glare screens are not defined separately by NCHRP 350, but rather are considered a system component.

**MATERIAL REQUIREMENTS.** Temporary glare screens shall consist of a opaque screen on a horizontal base which is, in turn, mounted on a concrete barrier. The system shall be modular to allow flexible use and ease of maintenance.

The screen shall be constructed of durable, lightweight, flexible, weather-resistant and impact resistant materials of a single, uniform dark color. The minimum height of the screen shall be approximately 24 inches. The screen shall be reflectorized at a uniform maximum spacing of 40 feet. If barrier delineation is blocked, the screen shall be reflectorized on both sides by a 3 inch wide by 6 inch high (minimum) piece of reflective sheeting, ASTM Type I or ASTM Type III. Yellow reflective sheeting shall be used facing traffic which is to pass to the right of the glare screen. White reflective sheeting shall be used facing traffic which is to pass to the left of the glare screen.

Individual temporary glare screen modules shall not span a joint between concrete barrier sections, and bases shall not overhang the face of the barrier. Temporary glare screens shall not have any horizontal rigid members that could potentially spear an impacting vehicle, or shall be NCHRP 350 approved if the system has horizontal rigid members.

The base shall have sufficient rigidity to facilitate ease of handling and proper screen support and position. The connection of the base to the vertical components shall prevent unintentional screen rotation or dislocation. The base shall be properly secured to prevent it from being dislodged upon impact.

**BASIS OF ACCEPTANCE.** Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

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Appendix 10  
NYS Department of Transportation - General Specification Group 729 (Cont'd)

**729-18 WARNING LIGHTS**

**SCOPE.** This specification covers the material and performance requirements for warning lights. Warning lights are not defined separately by NCHRP 350, but rather are considered a system component.

**MATERIAL REQUIREMENTS.** Warning lights shall be NCHRP 350 certified as a part of the system to which they are attached. Warning lights shall be Type A (low-intensity flashing), Type B (high-intensity flashing), or Type C (steady-burning). Warning lights shall meet the requirements of the MUTCD, shall have a minimum nominal diameter of 7 inches and shall emit yellow light. Flashing warning lights shall flash between 55 and 75 times per minute. Flashing warning lights required to operate 24 hours per day shall be Type B. Steady-burning lights shall have a minimum beam intensity of two candelas maintained within an angle of 9° on each side of the vertical axis, and within an angle of 5E above and below the horizontal axis. The hours of operation of steady-burning warning lights shall be from one-half hour after sunset to one-half hour before sunrise. Warning lights shall be powered by batteries, line power, or solar cells adequate to maintain the required luminance during all periods of required operation.

**BASIS OF ACCEPTANCE.** Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

**GROUP 730**

**730-27 PERMANENT VARIABLE MESSAGE SIGNS**

**SCOPE.** This specification gives minimum material, fabrication, fatigue and strength requirements of variable message signs for permanent installation. Other requirements are in the Contract Documents. Within this specification, "overhead" shall mean to be mounted over the traveled way, or what the plans indicate will become the traveled way.

**MATERIAL REQUIREMENTS**

**Housing.** The enclosure housing shall be constructed of aluminum alloy 3003-H14, 6061-T6, 5154-H38 or as specified on approved shop drawings. The minimum thickness shall be 1/8 inch. Seams shall be continuously welded by an inert gas process only in the shop.

The housing shall be completely sealed to prevent the entry of water, insects, dust, dirt and corrosion. Neoprene gaskets shall be utilized as necessary.

Readily-available, changeable filtration devices shall be provided at drain holes and at all points where forced air enters the enclosure.

All hinged access panels and windows shall be equipped with hold-open devices which shall not release accidentally or by the action of wind. The hold-open devices shall not interfere with the operation of the display, nor with the repair or replacement of user serviceable components.

**Stiffeners, Hardware and Mounting Brackets.** Hardware, framing members and mounting brackets shall meet the requirements of 730-22, unless indicated otherwise on the manufacturer's shop drawings approved by the Engineer.

Framing structural members shall be made of aluminum alloy 6061-T6 or an approved equivalent. All hardware shall be corrosion-resistant steel or protected from corrosion by suitable plating. Fasteners for securing access panels shall be captive.

**MANUFACTURING**

**General.** Fabrication shall be such that performance will not be impaired after the equipment has been subjected to shock and vibration caused by normal installation, transportation and maintenance handling. Particular attention shall be given to neatness and thoroughness of soldering, wiring, welding, plating, riveting, finishes and machine operations. All parts shall be free from burrs and sharp edges or any other defect that could make the part or equipment unsatisfactory for the operation or function intended in this specification.

Modules shall be designed such that major portions may easily be replaced. Modules of unlike functions shall be mechanically keyed to prevent insertion into the wrong socket or connector. All modules and assemblies shall be clearly identified with name, model number, serial number and any other pertinent information required to facilitate equipment maintenance. They shall be readily accessible for inspection and maintenance, using simple hand-held tools and standard meters.

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**Housing.** The sign enclosure including doors and access panels shall be designed and constructed so as to present a clean, neat appearance; be smooth with exterior corners rounded; be weatherproof and vandal-resistant; and be free of burrs, blemishes and unspecified holes.

Drainage holes shall be drilled near each corner of the base of the enclosure.

The enclosure shall have internal lighting sufficient for all maintenance activity requirements of the VMS and 120 volt power receptacles every 10 feet mounted on the rear interior panels.

If the variable message sign is designated as "walk-in," then its access door shall be a minimum of 24 inches wide x 60 inches high.

**Environmental**

**A. Temperature.** Internal temperature shall be continuously monitored whenever electric power is applied to the sign. The internal temperature of the enclosure shall be reported to the local and central controller upon request. Ventilation shall be automatically turned on and off at internal temperatures specified in the Proposal. Exhaust and intake ports shall be protected by filter screens against moisture, dust and insect intrusion. The ventilation system shall be sufficient to circulate three times the volume of air inside the enclosure per minute. Multiple fans or blowers shall be used to provide the specified venting and shall be located within the enclosure to minimize heat stratification.

**B. Adverse Conditions.** The equipment shall meet all of its specified functions during and after subsection to any combination of the following conditions:

1. Ambient Temperature. Range of -22°F to +145°F.
2. Temperature Shock. 60°F per hour, during which the relative humidity shall not exceed 95%.
3. Relative Humidity Range. 0 to 95% over the temperature range of 40°F to 110°F.
4. Moisture Condensation. On all surfaces.

**C. Ambient Light.** The variable message sign shall be equipped with light sensors so that the display shall be able to automatically adapt its level of light output to maintain readability under varying ambient light conditions. There shall be a minimum of eight (8) levels of dimming, linearly spaced from nighttime to daylight brightness. The sign's automatic dimming control shall be overridable by central control. The dimming circuitry shall automatically compensate for variations in the AC line voltage to maintain the light output constant for the selected brightness level. The levels of lighting shall produce luminance measured on the optic axis, as follows:

1. Daylight. A minimum of 14 candela per pixule for typical daylight environment.
2. Nighttime. Between 1.5 and 2 candela per pixule for nighttime environment.

**Electrical Protection.** The equipment shall contain readily-accessible, normally resettable or replaceable circuit protection devices (such as circuit breakers or fuses) for equipment and power source protection.

**Electronic Components.** All components shall be UL listed. All printed circuit boards shall be FR4 or G10 fiberglass epoxy material, with 2 oz. copper, double-sided with plated through-holes.

All etched connector fingers are to be plated with a minimum thickness of 100 micro-inches of gold over nickel.

Board connectors that are not an integral part of the printed circuit are to be plated with a minimum thickness of 15 micro-inches of gold over nickel.

**Sign Face.** In order to increase contrast, the pixules shall be arranged on a black, non-glossy background. All electronic components visible from outside the sign shall be of black color or coated with black, non-glossy paint.

The front of the sign shall be enclosed by a protective, weathertight face, 1/4 inch thick.

Variable spacing between letters shall approximate the recommended spacing for 18 inch Series E sign text found in the Federal Highway Administration Standard Alphabets for Highway Signs.

(continued)



Appendix 10  
NYS Department of Transportation - General Specification Group 730 (Cont'd)

**DESIGN CRITERIA**

**All Permanent Variable Message Signs.** The equipment shall be designed such that the failure of one part shall not cause the failure of any other part. In the event of a power failure of 500 milliseconds or less, proper operation of the equipment shall commence after restoration of power, without creating false information.

Shop drawings and calculations that show the sign's ability to withstand the design loads shall be submitted to the Office of Traffic Engineering and Highway Safety Division Safety and Mobility for approval, and shall be signed by a Professional Engineer licensed and registered to practice in New York State. If the drawings and calculations are approved by the Department, the manufacturer will be notified, and the manufacturer's name and drawing numbers will be placed on the Approved List.

Approved shop drawings shall be submitted to the Engineer prior to delivery of any variable message signs. The Contractor shall develop and deliver shop drawings signed by a licensed New York State Professional Engineer which illustrate in detail, how to mount and connect the variable message sign enclosure to the structure shown on the Plans.

All variable message signs covered by this specification shall be designed to withstand the following loads, combined in groups in accordance with the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Each member and connection shall be designed for the maximum stress of all the different combinations, with the allowable stress increased as indicated in the AASHTO Group Loading table. Unless noted otherwise, "Ice" load in the table shall mean "Ice and Snow loads simultaneously."

**Non-Overhead Permanent Variable Message Signs**

**A. Dead Load.** The weight of the variable message sign including all components, plus consideration of loads imposed during maintenance.

**B. Live Load.** Variable message signs designated as "walk-in," or otherwise intended to support personnel in service, shall be designed to support a live load of 100 psf applied to the service platform.

**C. Ice Load.** The ice load shall be 3 psf, unless historical accretion data for the location the variable message sign will be installed, the slope of a panel, or shielding hoods and the like indicate a different load. This load shall be considered on individual panels and the members and connections supporting only one panel. The load on members and connections supporting more than one panel shall be designed to support an ice load on:

1. The one end panel, and
2. Either the front or back panel, after considering panel slope and/or shielding hoods, which produces the largest load in the member or connection.

**D. Snow Load.** The snow load shall be 40 psf, unless historical accretion data for the location the variable message sign will be installed, or the shape of a panel indicate that a different load is appropriate. This load shall be applied to the top panel and any hood or other nearly horizontal projection.

**E. Wind Load.** The Base Wind Load shall be as specified in '645-3.01 A., including adjustments for drag, height and the gust factor. Drag coefficients shall be from the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. "Wind Drag Coefficients" table.

**1. Individual non-horizontal panels.** Panels, members and connections carrying loads from only one non-horizontal panel shall be designed for 100% of the Base Wind Load acting normal to the panel along with 20% of the Base Wind Load acting transverse to the panel.

**2. Adjacent non-horizontal panels.** Panels, members and connections carrying wind loads from two adjacent, non-horizontal panels perpendicular to each other shall be designed to withstand a wind load acting on both panels. For the purposes of determining direction of forces, the term "paramount" refers to the panel contributing the greatest load, and the adjacent panel termed the "adjoining" panel. If it is not clear which panel will contribute the greatest load, then analyze with one panel assumed to be paramount, and the adjacent one adjoining, then do a separate analysis with the roles reversed. The center of action of the wind loads shall be the centroid of the panel on which it acts. The magnitude of the components shall be:

- a. Normal to the paramount panel. 100% of the Base Wind Load on the paramount panel, plus 30% of the base wind load on the adjoining panel;
- b. Transverse to the paramount panel. 20% of the Base Wind Load on the paramount panel, plus 60% of the base wind load on the adjoining panel.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 730 (Cont'd)**

Members and connections carrying wind loads from adjacent, non-horizontal panels at angles other than perpendicular to each other shall be designed to withstand an appropriate wind load coming from the direction producing the greatest stress in the member or connection.

**Overhead Permanent Variable Message Signs.** Variable message signs to be mounted over a traveled way, or over what the contract documents indicate will become a traveled way, shall be designed for the fatigue loads and using the allowable stresses given in the current version of the NYSDOT Standard Specifications for Overhead Sign Structures.

**DELIVERY AND INSTALLATION**

The contractor shall deliver, store, handle, and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance. Material to be stored shall be stored in a clean and dry location free from construction dust, precipitation, and condensing moisture. Any part of the equipment damaged during transportation, handling, or installation shall be repaired, or if determined by the Engineer as unfit for use in the finished work, shall be removed from the site and replaced by the Contractor at no additional cost.

All materials shall be delivered and stored in the manufacturer's original unopened protective packages and protected against soiling, physical damage, or wetting, before and during installation. Unloading and unpacking of all materials shall be done in a manner to prevent misalignment or damage.

The installation shall be performed by factory certified personnel. Installation shall be complete in all respects, including all framing and all related fastenings and anchors required for a complete installation. Equipment shall be placed in accordance with the general arrangement as shown on the Drawings. The general arrangement may be modified only as required to suit specific equipment. Modifications shall not affect the design of components. Layout dimensions as shown on the Drawings may be modified to improve operating efficiency.

**MARKING.**

The contract number, pay-item number, and month and year of installation shall be marked using permanent ink, paint, or stamping into the wall. Characters shall be 1 to 1 3/4 inches high, horizontal when the variable message sign is in its final position, and be located in the following locations:

- The end panel of the vms, so as to be visible from the shoulder closest to the variable message sign.
- On the inside of a "walk-in" variable message sign, near the middle of the panel opposite the door.

Also, the manufacturer's name, product name, model number, serial number, and city and state or province of manufacture shall be permanently marked on the outside and an easily accessible location inside the variable message sign. These markings shall not be visible when viewing the front of the variable message sign straight-on.

**TESTS**

**Design Approval.** In order to get on the Approved list, design approval tests shall be conducted by the fabricator on one (1) or more samples of each equipment type, as approved by the Traffic Engineering and Highway Safety Director, to determine if the design of the equipment meets the requirements of this specification. In the case of standard product line equipment, the Traffic Engineering and Highway Safety Director may waive the design approval tests if:

- The manufacturer's written specifications (functional and environmental) are equal to or better than those specified in the contract documents and the manufacturer so states in writing; or
- The manufacturer provides certification by an independent testing laboratory that these design approval tests have been previously satisfactorily completed.

**Performance.** If specified in the Contract Documents, each variable message sign shall pass these performance tests both alone and fully integrated in the system:

- Factory Tests
- Installation Tests
- Pre-Acceptance Tests
- Project Acceptance Tests

A complete list of all equipment and system tests to be performed, including the testing plan and detailed testing procedures for each type of equipment, shall be submitted to the Engineer for approval. Test procedures shall be in accordance with the manufacturer's recommendations and shall demonstrate all functional requirements.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 730 (Cont'd)**

A minimum of two (2) weeks written notification will be provided for the witnessing of all testing, after approval of the testing plan and the appropriate testing procedures.

If a unit has been modified as a result of a test failure, a report shall be prepared and delivered to the Engineer prior to re-testing of the equipment. The report shall describe the nature of the failure and the corrective action taken. If the Engineer determines that a failure pattern exists, then design and construction modifications shall be made to all equipment without additional cost to the State or extension of the contract period. The Engineer will forward copies of the reports of modifications to the Regional Traffic and Safety Engineer, and to the Materials Bureau.

Rejected equipment may be offered again for retest provided all non-compliances have been corrected and retested by the Contractor. The contractor shall submit evidence that the sign(s) have passed, to the Engineer with the request and the schedule to re-witness the performance tests.

**BASIS OF ACCEPTANCE.**

Variable message signs will be accepted based on the following:

- The manufacturer's name, product name or model number, and drawing number and date, appearing on the Department's Approved List.
- Submission of approved shop drawings, for each different variable message sign supplied.
- Manufacturer's written certification of compliance to these specifications and the approved shop drawings.
- If required by the Engineer or the approved shop drawings, submission of mill certifications for structural materials.
- Passing all performance tests in the specification.

Final inspection and acceptance of equipment shall be made after installation at the locations specified on the plans

\* \* \* \* \*

*The following specification is included as a supplement to the specification listed on herein on page 161 for Group 723-45 PRECAST REINFORCED CONCRETE FOUNDATIONS AND PULLBOXES ONLY*

*It does not infer any other procurement needs of other concrete products being included through this Invitation for Bids. CONCRETE or Other Concrete products ARE NOT A SPECIFIED PRODUCT NEED OF THIS SOLICITATION*

**704-03 PRECAST CONCRETE – GENERAL**

**SCOPE.** This specification covers the general material and quality requirements for precast concrete items produced in accordance with the current Materials Procedure for precast concrete QC/QA titled "Procedures For Achieving And Maintaining Precast Concrete Manufacturer's Approved List Status". It is intended for use in conjunction with the individual item specifications.

**MATERIAL REQUIREMENTS.** The Portland Cement Concrete shall meet the requirements in §501, Portland Cement Concrete - General; §501-2.02, §501-2.03 and §501-3.02 except as noted herein.

Type 1, 2 or 3 cement may be used. The manufacturer may substitute pozzolans up to a maximum of 20% by weight of the total amount of cement plus pozzolan in the mix. Certain aggregates appear in the Approved List of Sources of Fine & Coarse Aggregates that have use limitations with a high alkali Portland cement. When requested, the Materials Bureau may approve this combination when 15-20% by weight of the cement in the mix is replaced with fly ash.

The concrete shall have an air content of 5.0 to 9.0%. Unless noted otherwise in the contract documents, approved fabrication drawings or item specification, the minimum compressive strength of concrete used in precast units shall be 3000 psi @ 28 days.

Threaded inserts used to connect reinforcing steel to precast concrete shall be non-corrosive and shall have a tensile capacity of at least 50% of the yield strength of the reinforcing steel.

The use of galvanized reinforcing in place of specified epoxy coated reinforcing is allowed. If galvanized reinforcing is used, all reinforcing in the unit must be galvanized. The use of galvanized dowels to attach secondary pours, requires all reinforcing in secondary pours to be galvanized. When galvanized wire fabric for concrete reinforcement is used, it shall be galvanized in accordance with ASTM A123. Fabrication, including bending of fabric, shall be performed prior to galvanizing.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 704 (Cont'd)**

Additional materials, listed below, shall meet the requirements of the following subsections:

- Concrete Repair Material 701-04
- Bar Reinforcement, Grade 60 709-01
- Wire Fabric For Concrete Reinforcement 709-02
- Epoxy Coated Bar Reinforcement, Grade 60 709-04
- Epoxy Coated Wire Fabric Reinforcement 709-08
- Cold-Drawn Wire For Concrete Reinforcement 709-09
- Mechanical Connectors for Reinforcing Bar Splices (Epoxy Coated) 709-10
- Galvanized Bar Reinforcement 709-11
- Quilted Covers (for curing) 711-02
- Plastic Coated Fiber Blankets (for curing) 711-03
- Polyethylene Curing Covers (White Opaque) 711-04
- Membrane Curing Compound (Clear w/Fugitive Dye) 711-05
- Burlap 711-06
- Corrosion Inhibitor 711-13

**DRAWINGS.** Precast concrete units shall be fabricated to conform to the details contained in the plans and contract documents. Fabrication Drawings shall be one of the following:

**A. Contract Plan Sheets.** When the contract plans contain enough detail to properly fabricate and inspect the precast element they may be used as the fabrication drawings. The Materials Bureau will determine whether or not the contract plans contain enough detail.

**B. Department Standard Sheets.** When Department Standard Sheets are referenced in, and are in compliance with the contract plans, the Standard Sheet shall be used as the fabrication drawing.

**C. Fabricator Working Drawings.** When the contract plans do not contain enough detail to be used as fabrication drawings and there is no Department Standard Sheet for the precast element or the Standard Sheet is not in compliance with the contract plans, Fabricator Working Drawings shall be used as the fabrication drawings.

**D. Fabricator Standard Drawing.** Fabricator Standard Drawings, previously approved by the Director, Materials Bureau, which meet the requirements of the contract plans, may be used as the fabrication drawings in place of Contract Plan Sheets, Department Standard Sheets or Fabricator Working Drawings. Fabrication Drawings shall be prepared and processed in accordance with the current Materials Procedure for Preparing And Processing Fabrication Drawings For Precast Concrete Products.

**FABRICATION.** The manufacturer shall produce precast units that conform to the details of the approved fabrication drawings. The precast units shall be uniform in appearance. All concrete surfaces which will be exposed to view after installation shall be flat and smooth, free from irregularities and uniform in color and texture. The Department, and its representatives, shall have free access to the manufacturing facility and all products produced for the Department.

**Formwork.** Concrete shall be cast in rigidly constructed forms which will maintain the units within specified tolerances to the shapes, lines and dimensions shown on the approved fabrication drawings. Forms shall be constructed from flat, smooth, non-absorbent material and shall be sufficiently tight to prevent the leakage of mortar. When wood forms are used all faces in contact with the concrete shall be laminated with a non-absorbent material. All worn or damaged forms which cause irregularities on the concrete surface or damage to the concrete during form removal shall be repaired or replaced before being reused. Form coatings, appearing on the Department's Approved List, shall be applied to all forms.

**Lifting Devices.** Lifting devices shall be a recessed type designed for use in precast concrete. The precast manufacturer shall ensure that the lifting devices selected for use have an adequate capacity to safely handle the precast product. Reinforcing steel shall not be used as a lifting device. Lifting devices that are used for turning or rotating a unit at the precast facility but are not necessary for further handling or installation shall be filled with concrete repair material before the unit is shipped. All other lifting devices shall be filled with concrete repair material after the unit is installed.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 704 (Cont'd)**

**Reinforcing.** Shall meet the requirements in §556, Reinforcing Steel for Concrete Structures; §556- 3.01B and C, §556-3.02A and §556-3.03A through §556-3.03C. Unless noted otherwise in approved fabrication drawings or item specification, the minimum concrete cover over reinforcing steel shall be 1-1/2 inch. Reinforcing steel shall be tied and supported to keep it in position during the concrete placement. The ends of chairs or spacers, used to support or locate reinforcing steel, that bear on the faces of forms, shall be made of, or coated with, non-corrosive material so that no discoloration will show on the face of the units. Chairs, tie wires and other devices used to support, position or fasten epoxy coated or galvanized reinforcement shall be made of or coated with a dielectric material. Tack welding or any other welding of specified steel reinforcement will not be allowed. Welding for cage stability will be permitted provided that redundant steel is added in each direction and tied to the cage. The redundant steel shall be thirty (30) bar diameters, minimum, in length and shall be positioned so that the midpoint is located at the weld.

**Corrosion Inhibitor.** When allowed by the individual item specification, corrosion inhibitor may be used in lieu of epoxy coated reinforcing. When corrosion inhibitor is selected for use it shall be clearly noted on the fabricator working drawing or in the fabrication request when standard sheets, contract plan sheets, etc are used as the fabrication drawings. When selected for use, corrosion inhibitor shall be used in all units produced to the referenced fabrication drawings. The corrosion inhibitor shall be added to the concrete as an aqueous solution at a dosage rate of 4 gal/cy.

The calcium nitrite, which acts as an accelerator, may be used in conjunction with compatible retarding admixtures to control setting time and workability of the concrete, however the use of a formulation of calcium nitrite solution which includes a set control ingredient may be used if setting times and increased water demands are of concern, consult the manufacturer of the product. The corrosion inhibitor must be added to the mix immediately after air entraining and retarding admixtures have been introduced into the batch.

When a batching problem exists or is perceived the Department reserves the right to test the hardened concrete at any time to verify the quantity of calcium nitrite present. Units with less than the specified amount of calcium nitrite shall be subject to rejection. If hardened concrete is tested, 4 inches diameter cores shall be drilled by the manufacturer under the supervision of a Department representative. Cores shall be a minimum of 4 inches in length unless otherwise approved by the Materials Bureau. Core holes shall be plugged and repaired in accordance with the requirements of repair indicated below.

**Concrete Placement And Consolidation.** Suitable means shall be used for placing concrete to prevent segregation. The concrete shall be thoroughly consolidated by external or internal vibrators or a combination of both, unless otherwise approved by the Materials Bureau. Vibrators shall not be used to move concrete within the forms. Concrete shall be placed and consolidated in a way that minimizes the presence of surface voids or bug holes on the formed surfaces.

**Cold Weather.** When concrete is cast in ambient temperatures less than 50°F the following requirements shall apply:

- A. Immediately before concrete placement the minimum temperature inside the forms shall be 40°F.
- B. Immediately following completion of the placement the requirements of the chosen curing method shall be followed.
- C. Concrete temperatures required by the chosen curing method shall be maintained by means of an external indirect heat supply or by utilizing the heat of hydration. Curing temperatures shall not exceed 85°F unless units are steam cured in accordance with this specification. When an external heat supply is used the enclosure shall be properly vented to prevent surface disintegration of the fresh concrete due to an accumulation of carbon dioxide gas.
- D. The plastic concrete shall not be exposed to freezing temperatures after it has been placed into the forms or during the curing period.

**Dimensional Tolerances.** The following tolerances shall apply, unless noted otherwise in the contract documents, approved fabrication drawings or item specification:

- Unit dimensions  $\pm 1/2$  inch
- Variations in required spacing of reinforcing steel, not cumulative.  $\pm 2$  inches
- Concrete cover over reinforcing steel  $+5/8$  inch  
 $-1/4$  inch
- All reinforcing steel fabrication tolerances shall conform to ACI 117 sec 2.1.
- All reinforcing steel embedded and lap length tolerances shall conform to ACI 117 sec 2.2.8.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 704 (Cont'd)**

The application of fabrication tolerances shall not impact the proper fit, alignment or function of the assembled precast item, nor shall it negatively impact the appearance of precast items which are exposed to view after installation.

**Architectural Treatments**

*A. Architectural Patterned And Textured Precast Concrete.* The architectural pattern or textured effect called for in the contract plans shall be obtained by using form liners, stamping equipment or other texturing tools recommended by the manufacturer. Details of the architectural pattern or texture and the fabrication method used shall be shown on the fabrication drawings for the precast item. Concrete surfaces treated with form liners or by stamping shall have a repeatable, seamless pattern such that when installed the units will form a continuous, natural looking, matching and repeatable pattern. Surfaces treated with texturing tools shall be uniform in appearance. When form liners are used, a high quality release agent compatible with the form liner material shall be used. Form liners which are worn or damaged resulting in a non-uniform appearance or damage to the concrete during form removal shall be replaced. Fabrication drawings shall clearly show the design thickness of the precast element and the thickness being added by the architectural pattern or texturing. The architectural pattern or texturing shall not penetrate into the required concrete cover over the reinforcing steel at any point.

*B. Exposed Aggregate Precast Concrete.* Coarse aggregate shall meet the color and size requirements in the plans. When no size is specified a Type CA1 gradation, or equal approved by the Director, Materials Bureau, shall be used. A set retarder designed for use in exposed aggregate applications shall be used. Surfaces requiring an exposed aggregate finish shall be uniform in appearance with the surface completely covered with exposed aggregate. A set retarder shall be applied, in accordance with the manufacturers recommendations, to the surfaces receiving the exposed aggregate finish. Alternate methods of obtaining the exposed aggregate finish require prior approval of the Director, Materials Bureau. Unless otherwise shown in the contract plans, the depth of exposure shall be 30% of the primary size of the coarse aggregate. The depth of exposure shall be measured by laying a straight edge across the plane of the concrete face and measuring back to the concrete matrix.

*C. Integral Coloring.* Integrally colored concrete shall be produced by use of a pigment coloring system meeting the requirements of ASTM C979. For each color used the pigment shall be from the same batch or lot unless otherwise approved by the Director, Materials Bureau. Pigment will be approved based on a manufacturers certification of compliance with these requirements. Type 6 white cement, meeting the requirements of §701-01, may be used to achieve the desired color. Coloring pigment shall be added to the concrete mix per manufacturer's recommendations, at a dosage rate to achieve the desired color as specified in the contract documents. The manufacturer's recommended maximum dosage rate shall not be exceeded.

*D. Visual Standards.* The Contractor shall construct visual samples that are the same general size and shape as the production units they represent. The samples must be submitted to the Regional Landscape Architect for written approval. Each of the patterns, textures and colors identified in the plans shall be represented by the samples. Only one pattern or texture shall be used per sample face. When multiple patterns or textures are called for, additional samples will be required. Materials and fabrication techniques used in the samples, including curing, concrete pigment and sealers, shall be the actual materials and techniques to be used in the construction of the final product. If the samples are rejected by the Landscape Architect, the Contractor shall construct additional samples as required to obtain the Landscape Architect's approval. The approved samples shall be made available at the precast plant, for use by the inspector as visual standards, throughout production of the units. When surface coatings are to be field applied additional samples, without the surface coatings, shall be prepared and retained at the precast plant for use as visual standards. The fabrication of precast concrete units shall not begin until written approval of the visual standards has been received from the Department.

*E. Visual Evaluation.* When comparing production units against the visual standards there shall be minimal color and texture variations, from the standard, when viewed in good typical lighting at a 20 foot distance. When viewed alone, production units shall show no obvious imperfections or evidence of repairs other than minimal color and texture variations when viewed in good typical lighting at a 20 foot distance.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 704 (Cont'd)**

**Curing.** All precast concrete units shall be subjected to curing by any one of the methods described in the following paragraphs. The manufacturer shall provide minimum/maximum temperature thermometers to monitor curing temperatures unless otherwise specified. If, at any time, curing temperatures fall below the specified minimum for the chosen curing procedure, the curing period shall be increased accordingly.

Except as noted under D. Moisture Retention Curing, no unit shall be subjected to freezing temperatures until the following two conditions are met:

- The chosen curing cycle has been completed.
- The specified 28 day compressive strength or 3000 psi, whichever is less, has been reached.

Cylinders shall be cured in the same manner and maintained in the same temperature and environmental conditions as the units they represent until being tested.

**A. Steam Curing.** The units shall be cured in a suitable enclosure. The enclosure shall be designed to minimize the loss of heat and moisture while allowing for the uniform circulation of steam around the entire unit. The interior surfaces of the enclosure and the surface of the unit shall be moist at all times. Steps shall be taken to prevent localized "hot spots" caused by the steam lines. The enclosure shall be free from outside drafts.

Steam curing shall not begin until a preset period has been completed. The preset period begins when the last concrete has been placed and continues until the concrete obtains initial set. Prior written approval from the Director, Materials Bureau is required when preset periods of less than two hours are to be used. During the preset period, moderate heat may be applied to the enclosure to maintain the initial temperature of the concrete. The maximum temperature inside the enclosure during the preset period shall be the initial temperature of the concrete +10°F.

After the preset period is complete, steam shall be injected into the curing enclosure. The temperature inside the enclosure shall not be increased at a rate greater than 40°F per hour. A moist atmosphere shall be maintained at a temperature between 105°F and 185°F for a period of not less than 12 hours. The temperature inside the enclosure shall then be decreased at a rate not exceeding 40°F per hour until the ambient temperature outside the enclosure is reached. The manufacturer shall provide automatic temperature recorders to continuously record the curing temperature inside the enclosure.

**B. Water Spray Curing.** Curing shall begin as soon as the concrete has hardened sufficiently to prevent surface damage from the water spray but not more than 2 hours after the completion of finishing. All exposed surfaces of the precast unit shall be kept wet with a continuous fine spray of water in an enclosure maintained at a temperature of not less than 70°F for a period of not less than 72 hours. Additional curing time may be necessary to meet the 28 day strength requirements.

**C. Saturated Cover Curing.** The saturated covers used under this method shall be burlap. Curing shall begin as soon as the concrete has hardened sufficiently to prevent surface damage from the saturated burlap but not more than 2 hours after the completion of finishing. All exposed concrete surfaces on the precast unit shall be covered with burlap, saturated with water before applying. The burlap shall be kept saturated and the units kept at a temperature of not less than 70°F for a period of not less than 72 hours. Additional curing time may be necessary to meet the 28 day strength requirements.

**D. Moisture Retention Curing.** Units cured in accordance with these methods shall be maintained at a temperature of not less than 45°F for a period of not less than 7 days except as noted below. Additional curing time may be necessary to meet the 28 day strength requirements. When the specified 28 day compressive strength or 3000 psi, whichever is less, has been reached the unit may be exposed to freezing temperatures however the membrane curing compound or curing covers must still be maintained for a minimum of 7 days.

**1. Membrane Curing Compound.** The membrane curing compounds used under this method must appear on the Department's current Approved List of Membrane Curing Compounds under B. Clear (with fugitive dye). The compound shall be properly agitated immediately before each use. A minimum coverage rate of one gallon per 150 square feet shall be used.

The membrane curing compound shall be applied to the concrete surface after finishing as soon as the free water on the surface has disappeared and no water sheen is visible, but not so late that the liquid curing compound will be absorbed into the concrete. When curing compound cannot be applied within the above requirements, the manufacturer shall instead immediately begin curing the unit in accordance with one of the other curing methods contained in this specification, until curing compound can be applied.

(continued)

**Appendix 10**  
**NYS Department of Transportation - General Specification Group 704 (Cont'd)**

If the forms are left on for a minimum of 7 days, curing compound is not required on any formed surfaces. When the forms are removed prior to 7 days, the exposed concrete surfaces shall be wet with water within one half hour of form removal and shall be kept moist until the curing compound is applied. Before application, the concrete shall be allowed to reach a uniformly damp appearance with no free water on the surface and then the compound shall be applied immediately.

This method of curing shall not be used on any concrete surface which is to have plastic concrete, grout or mortar bonded to it or on any concrete surface that will have a penetrating or coating type treatment such as a sealer or stain applied to it. Another approved method of curing shall be used when this condition exists.

2. Curing Covers. The curing covers used under this method shall be either Plastic Coated Fiber Blankets, §711-03, appearing on the Department's Approved List or Polyethylene Curing Covers meeting the requirements of §711-04. Curing covers shall be placed immediately following the finishing operation or form removal, whichever is applicable. Care shall be taken not to damage any exposed concrete surfaces during cover placement. Curing covers shall be placed and secured and be of such condition as to minimize the loss of moisture and temperature. When it is necessary to use more than one curing cover the edges shall be lapped a minimum of 12 inches.

**E. Other Methods.** Other Methods of curing are subject to approval by the Director, Materials Bureau.

**Repair.** Precast concrete units that contain minor defects caused by manufacture or mishandling shall be repaired at the manufacturing site. In addition, units that contain minor defects caused by mishandling during shipment or installation shall be repaired at the project site. When repairs are made to a unit that has been sprayed with curing compound, the compound must be removed from the repair area before making the repair as it will act as a bond breaker between the precast concrete and the repair material.

Major defects and non repairable defects in a unit will be cause for rejection of the unit. Defects are defined as follows:

**A. Surface Defects.** Surface voids or bug holes which are less than 5/8 inch in diameter and less than 1/4 inch deep are acceptable, except as noted under D. of this section. Surface defects need not be repaired.

**B. Minor Defects.** Minor defects are defined as: spalls, honeycombing and surface voids which have no dimension greater than 12 inches, when measured along a straight line, and do not expose the reinforcing steel. Minor defects shall be repaired by removing all unsound concrete from the defect, square cutting the edges of the defect to prevent feather edging of the repair and then filling the void with concrete repair material meeting the requirements of §701-04. Concrete repair material shall have a color similar to that of the precast unit. The repair shall be finished to the proper shape and cured in accordance with the repair material manufacturer's recommendations. It shall withstand a moderate blow with a 16 oz hammer. The blow shall produce a sharp ring indicating proper bonding of the repair.

**C. Major Defects.** Major defects are defined as: spalls, honeycombing and surface voids which have any dimension greater than 12 inches, when measured along a straight line, or expose the reinforcing steel. Cracks which go through the section or are greater than 0.01 inch in width are also major defects.

No major defect shall be repaired without prior approval of the Department. Requests to repair major defects shall be made in accordance with the requirements contained in the current Materials Procedure for precast concrete.

**D. Non Repairable Defects.** Non repairable defects are defined as: cracks in a concrete surface, which will be exposed to view after installation, that are visible when viewed in good typical lighting with the naked eye at a 10 foot distance; minor defects which in total make up more than 5% of the surface area of the unit and excessive surface defects on more than 5% of the surface area which will be exposed to view after installation.

(continued)



**Appendix 10  
NYS Department of Transportation - General Specification Group 704 (Cont'd)**

**SAMPLING AND TESTING.** Sampling and testing shall be done by the precast manufacturer in accordance with Materials Bureau requirements contained in the current Materials Procedure for precast concrete.

**MARKING.** All precast units shall be clearly marked with permanent waterproof paint. Unless noted otherwise in the item specification, units shall be marked on an inside or back surface which will not be exposed to view after installation. The following information shall be included:

- Name or trademark of the manufacturer.
- Date of manufacture.
- Unique piece identification number.
- NYS Contract number.

**FINAL PRODUCTION INSPECTION.** A final production inspection shall be performed by the precast manufacturer on every precast unit produced for the Department. An inspection will be considered satisfactory when it verifies that the precast unit is in compliance with the appropriate Department specifications. The specific requirements and procedures for the inspection are contained in the precast manufacturer's Department approved Quality Control Plan.

**SHIPPING.** Upon completion of a satisfactory final production inspection the precast unit may be shipped from the manufacturing location except that units produced between the dates of October 31<sup>st</sup> and April 1<sup>st</sup> shall not be shipped for a minimum of 72 hours following the completion of casting.

**BASIS OF ACCEPTANCE.** Precast units will be accepted at the job site based on the following: The manufacturer's name must appear on the Department's Approved List for the item being supplied. A manufacturer's certification. An acceptable product evaluation made by the Engineer.

(continued)

# Appendix 11

## NYS Department of Transportation Traffic Signal Laboratory Transportation Management Equipment Specification (TMES)

This is a **reformatted** edition of the revised NYS DOT TMES MARCH 25, 2010 edition and is up to date as of April 5, 2011.  
This edition has twenty-three chapters. The chapters are grouped according to functionality.

Note that this specification has all measurements converted to English (USCU) standards. This conversion is a "soft" conversion to ensure consistency with previously purchased equipment.

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#### Chapter 2

- Microcomputer Requirements

#### Chapters 3 - 12

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- Portable Solar Powered Traffic Signal
- Traffic Signal Electrical Service Disconnect / Generator Transfer Switch
- ADA Solid State Pedestrian Push Button Assembly
- School Zone Flashing Sign Beacon Assembly Solar Powered
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NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION

TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

**Chapter 1**  
**General Requirements for Traffic Signal Control Equipment**

This specification defines the minimum general technical requirements applicable to discrete electronic components, mechanical and electrical design and construction, and the auxiliary and associated electronic apparatus. These requirements shall apply in all cases to solid-state electronic equipment used in traffic signal controls and the testing of the end product. The intent of this specification is to set forth the general product qualifications, quality assurance guidelines, ambient conditions within which the equipment must operate satisfactorily and reliably, the general material, details by the means by which equipment as a whole shall be tested to determine whether it shall so operate.

**SECTION I**  
**QUALIFICATION**

**1. Sample Qualification**

Samples may be submitted to the procuring agency at any time by mutual written agreement between the manufacturer wishing to have his samples placed on the Qualified Products List (QPL) and the NYS DOT Traffic Signal Laboratory. Except in response to an Office of General Services (OGS) Bid Advertisement, DOT may have to limit the submittal of samples depending upon its Laboratory workload. **Samples shall not be submitted during the period between bid advertisement by the Office of General Services and bid award for a particular product, except as directed by the Office of General Services.**

- 1.1 Unless otherwise directed a minimum of two (2), maximum of five (5), samples of the product, together with the appropriate number of copies of the Operation and Maintenance Manual, as described herein, shall be submitted in accordance with the preceding.
- 1.2 Samples shall be submitted to:  
**NYSDOT Traffic Signal Laboratory**  
**16 Avis Drive**  
**Latham, New York 12110**
- 1.3 Appointments for product submittal may be arranged by calling the NYS DOT Traffic Signal Laboratory at (518)-783-7746 between the hours of 9:00 A.M. and 3:00 P.M. Monday through Friday, except State holidays.
- 1.4 Upon written request by the NYSDOT Traffic Signal Laboratory, except between bid advertisement and award by the Office of General Services, samples submitted shall be removed, at the expense of the manufacturer, from the Traffic Signal Laboratory, within ten (10) calendar days. Upon expiration of this period, the samples shall be deemed abandoned by the NYSDOT Traffic Signal Laboratory and the deserted product shall be disposed of in the best interests of the State.
- 1.5 Upon acceptance of a certain product, the manufacturer shall furnish the State thirty-three (33) additional copies of the operation and maintenance manual and/or provide the state eleven (11) copies of the manual on electronic media such as a CD ROM. A preliminary draft of the manual shall be submitted to the Engineer for approval prior to final printing.
- 1.6 The procuring agency shall be responsible for determining whether or not a particular sample meets the requirements of these specifications. As such samples shall be required to demonstrate their ability to meet the requirements and tests specified herein. Samples having successfully passed shall be placed on the "Qualified Products List". All equipment furnished under these specifications must be listed on the "Qualified Products List".
  - 1.6.1 Product Additions to the Qualified Products List  
Any manufacturers, who want their assemblies or units tested so as to be added to the QPL, should submit a written request to the Traffic Signal Coordinator. This will begin the product evaluation process

(continued)

1.6.2 Evaluation of Product

1.6.2.1

The Traffic Signal Laboratory staff will evaluate the application provided by the manufacturer. The timeframe for this evaluation will be solely based on NYSDOT Signal Lab workload and personnel availability.

1.6.2.2

A meeting may be scheduled in Albany to meet with the principals of the manufacturer to discuss quality control and quality assurance.

1.6.2.3

A minimum of two, maximum of five samples, will be tested by Department's laboratory to assure conformance to the specification. At no cost to the Department, manufacturers may choose third party testing and submit all test documentation from an independent third party quality control laboratory for NYSDOT review. If a third party laboratory is used, the credentials shall be provided for consideration to the Traffic Signal Coordinator. All laboratories certified by UL, ETL or NEMA will be considered acceptable after review of their test documentation. Please note: NYSDOT reserves the right to do its own testing.

1.6.2.4

The manufacturer's third-party laboratory test results will be provided to the Traffic Signal Laboratory for evaluation to assure conformity with the specifications and reasonable uniformity to each other. Upon request, the Traffic Signal Laboratory's test results will be provided to the manufacturer's quality control representative.

1.6.2.5

NYSDOT reserves the right to send a representative to visit the manufacturing facility to verify that the quality control plan, provided by the manufacturer (see item 2 below), is administered as stated in their quality control, quality assurance documentation. In particular NYSDOT suggests the following guidelines.

1.6.2.5.1

Random audits may be performed by Department representatives to verify the product quality is being determined and properly documented in conformance with the approved quality control plan. Note: If the manufacturer is routinely audited by a certifying agency, the Department may consider reviewing the results of that audit in lieu of an audit by Department representatives.

1.6.2.5.2

The Department's representative, performing the audit, may select a sample of certified products at the time of the audit. The selected sample(s) will be used to perform laboratory testing to assure reasonable uniformity with the manufacturer's results (if testing is required in the QC plan) and verification of specification compliance.

1.6.2.5.3

Audit findings will be reported to the manufacturer's quality control representative upon written request.

1.6.2.5.4

All audit findings not in conformance with the quality control plan and/or product specifications must be investigated by the manufacturer immediately to assure continued appearance on

1.6.2.6

The sample submission by the manufacturer shall conform to the following milestones (Suggested completion dates for each task is as follows and is based on NYSDOT Signal Lab workload and personnel availability):

(continued)

**SAMPLE SUBMISSION MILESTONES**

Week 0	NYSDOT receives written request to be added to QPL <sup>1</sup>
Week 2	Manufacturer supplies documentation regarding qualifications, Quality Assurance Procedures, and attends meeting with NYSDOT to discuss product and sample evaluation process. NYSDOT provides manufacturer with product diagnostic test software if available <sup>2</sup>
Week 8	Manufacturer submits preliminary equipment schematics
Week 9	NYSDOT provide comments on preliminary schematics <sup>3</sup>
Week 10	Manufacturer submits final schematics
Week 12	NYSDOT provides comments on final schematics <sup>3</sup>
Week 20	Manufacturer submits complete prototype for complete sample evaluation including environmental test <sup>4</sup>
Weeks 20-24	NYSDOT conducts final acceptance testing, and notifies manufacturer of deficiencies as appropriate.
Week 24	If the sample passes acceptance testing, NYSDOT notifies manufacturer of such. If the sample has not completely passed acceptance testing, NYSDOT notifies manufacturer of the reasons for rejection. The manufacturer is then allowed to resubmit the sample until it passes acceptance testing.
Weeks 24-32	Manufacturers passing the laboratory test may be placed on the Qualified Products List, pending completion of a field test. NYSDOT may ask the vendor for a minimum of two, maximum of five, samples to be placed in the field for up to an 8 week test. If there are no field problems, NYSDOT will place the product on its QPL and notify the manufacturer. If the sample(s) fails in the field, the manufacturer is then allowed to resubmit the sample(s) until it passes field testing.

<sup>1</sup> REQUIRED WRITTEN REQUEST DOCUMENTATION – The submission of the following documentation to the satisfaction of NYSDOT shall include the following:

- a. Product name (if different from NYSDOT part number)
- b. Supplier/manufacturer name and address
- c. Contact person (name and telephone number) and e-mail address
- d. Manufacturer name (when different from supplier’s name)
- e. Address of actual manufacturing location(s) proposed for supply to NYSDOT
- f. NYSDOT specification number (if applicable)
- g. Product data sheet and any safety related data sheet
- h. Product label (if used)
- i. Supporting test data relevant to NYSDOT specifications and test methods
- j. Identify the marketing plan for supply to Department projects and a list of your primary customers with any customer contact names that you may have.
- k. Provide a general overview of your company’s financial viability by discussing such topics as profitability, sales growth for past three years, your assets vs. liabilities and cash flow.

<sup>2</sup> CONTRACTOR’S QUALITY ASSURANCE PROCEDURES – The manufacturer shall submit to NYSDOT in writing or in electronic form, quality control and factory test procedures for the products that you provide to the State of New York. In particular please submit your Quality Control plan, any quality control plan certifications from outside organizations and assurance methods/frequency of verification, certifications and/or accreditations of individuals directly responsible for QC at the plant, and any records to support Certification of processes. These procedures will require approval from NYSDOT prior to the item being placed on the QPL. Refer to Chapter 1 Section 1 of the New York State Transportation Management Equipment Specifications for NYSDOT requirements.

(continued)

<sup>3</sup> NYSDOT comments on manufacturer's schematics, drawings and diagrams are provided for manufacturer convenience only. They will not constitute approval, nor will they in any way alleviate the manufacturer from complying with any and all aspects of the specification. The ultimate acceptance of the sample will be based upon its meeting the specifications and passing the final acceptance and field testing.

<sup>4</sup> At the appropriate time, a minimum of two (2), maximum of five (5) samples of the Item, complete as per the specifications and including schematics and operator's manuals, must be submitted to the address listed below:

**NYS Department of Transportation  
Traffic Signal Laboratory  
16 Avis Drive  
Latham, NY 12110  
Attn: Signal Lab Supervisor**

1.7 Products furnished to these specifications shall be the same as and equal to the samples tested and placed on the "Qualified Products List", and shall be exact duplicates of the particular sample purchased by the procuring agency upon placement on the "Qualified Products List". This shall not exclude the use of like discrete components.

1.8 NYSDOT shall have the right to retain and purchase the sample of the unit tested and accepted for placement on its Qualified Products List. The purchase price for the sample unit shall not exceed the latest DOT procurement price for a similar product as bid by OGS.

1.9 Qualification of all equipment for placement on the New York State Traffic Signal Qualified Products List shall include a laboratory test to determine compliance with this hardware specification. In addition up to an eight (8) week field test will be required as directed by NYSDOT. Manufacturers passing the laboratory test may be placed on the Qualified Products List, pending completion of a field test. In order to obtain sufficient sample exposure during the field test, the manufacturer may be required, upon written request by NYSDOT to supply up to five (5) sample devices for field testing.

1.10 Each manufacturer will be required to submit their Quality Assurance Procedures/ Quality Control Plan for each item that they have listed on the QPL for review and approval. These procedures will be requested in writing for all new items added to the QPL and periodically, at the request of NYSDOT, for existing QPL items. Failure to submit these Quality Assurance Procedures or failure of these procedures to be approved by NYSDOT will result in the removal of the item from the QPL. See item 2 below for further details.

1.11 Each manufacturer is responsible for re-submitting, to NYSDOT, the Quality Assurance Procedures for their products in this QPL whenever they are revised. Failure to submit these Quality Assurance Procedures or failure of these procedures to be approved by NYSDOT will result in the removal of the item from the QPL.

1.12 Failure of a manufacturer to perform satisfactorily on purchase orders by failing to meet delivery schedules or maintain a high rate of acceptance as depicted in the specification will result in the item being removed from the QPL.

## **2. Quality Assurance Procedures/ Quality Control Plan**

2.1 Manufacturer Quality Control Plan Application. Each manufacturer shall provide a quality control (QC) plan for any product purchased by NYSDOT which conforms to these specifications. Updates to the plan shall be transmitted when changes occur. An annual letter shall be sent to the Department (to the Traffic Signal Coordinator, unless otherwise directed) assuring the manufacturer's commitment in following the QC plan as submitted. The QC plan must be resubmitted in its entirety at least once every two years. The QC plan shall contain the following minimum information:

- a. Name and location of the manufacturing and/or supply location(s)
- b. Identify any certifications to support the evaluation of the manufacturer's ability to manufacture and control the quality of the finished product (i.e. ISO, UL, ETL, etc.) Note: If certifying agencies require a quality control plan for review and approval prior to certification, the Department may consider the transmission of those plans as satisfactorily complying with the Department's requirements for a QC plan. This is contingent on identifying the entries with the corresponding requested response as detailed herein.

(continued)

- c. The name, telephone number, FAX number and e-mail address of the manufacturer's primary contact responsible for the product quality at their location.
- d. An organization chart showing the person responsible for quality control and identification of the authority and managerial relationship with other principals of the manufacturer, particularly as it relates to production management.
- e. The specific processes used to control the quality of the provided product and assurances of the continued acceptability from component and/or raw material supply, manufacture, storage and transport to end use.
- f. Identify the location (and name if different from the manufacturer) of the laboratory used to control the quality and/or to assure the acceptability of the product.
- g. Identify the assurance methods (**i.e. specific test procedures**) and frequency of verification of laboratory performance directly related to the test for certification of the finished product. This may include an inter-laboratory round robin testing program and/or inspection and verification.
- h. Identify the person, by name and title responsible, for the review and evaluation of the laboratory's performance and the authority to take prompt corrective action.
- i. Identify any certifications or accreditations awarded to individuals directly related to assuring the quality and certification of the finished product. Include the certifying agency, date of the certification and expiration date.
- j. Identify the specific basis (testing, in process inspection, automated controls, etc.) to certify conformance of the finished product.
- k. Identify the location of records to support the certification of the product.
- l. Identify the process to assure communication relating to the quality of the finished product to the individual(s) responsible to prepare and complete a certification of compliance.
- m. Identify the process used to investigate, document, notify and/or recall products supplied based upon certification and subsequently found to be unsatisfactory. (i.e. This may be the result of a communication breakdown between production and clerical staff, subsequent findings of laboratory deficiencies that may have been present prior to certification, notification of certified component material improperly certified, etc.)

(continued)

**SECTION II  
PRODUCT ACCEPTANCE, TESTING AND GUARANTEES**

**1. Manufacturer Responsibilities**

Unless otherwise directed by NYSDOT, all items purchased by NYSDOT, as per these specifications, shall conform to the quality testing, quality control, quality assurance, product acceptance, testing requirements and guarantees described in this chapter. Model and Serial Numbers must be provided on each item as per the details in Section VII, paragraph 4 of this chapter.

All equipment provided by the manufacturer to NYSDOT shall be tested by the manufacturer prior to shipping according to the Quality Assurance and Control Plan submitted to and approved by the Department. See Section I of this chapter for further details on Quality Plans and Paragraph 6 of this section for specific manufacturer test requirements for all controller units.

**2. Manufacturer Quality Control**

The measures listed below shall be taken by the manufacturer during the production process to insure a high standard of quality. As stated Section I of this chapter, the manufacturer shall provide NYSDOT a quality assurance plan which provides the guidelines and responsibilities in effect, to ensure the delivery of products that meet or exceed the New York State Specifications. In particular:

2.1 Components. All components shall be lot sampled to assure a consistent high conformance standard to the design specification of the unit.

2.2 Sub assembly or module

A. Visual inspections shall be performed on all modules, printed circuits and sub assemblies to determine any physical defects such as cracking, scaling, poor fastening, incorrect component values, etc.

B. Complete electrical testing shall be performed on each module, printed circuit or sub assembly to determine its compliance to the manufacturer's design function.

C. Housing, chassis, and connection terminals shall be inspected for mechanical sturdiness and harnessing to sockets shall be electrically tested for proper wiring sequence.

2.3 Units

A. The completely assembled unit shall be submitted to a full cycling and a timing test (where applicable).

B. The unit shall be visually inspected to assure proper placement, mounting, and compatibility of sub assemblies.

2.4 Pre-delivery Repair. The procedures listed below shall be followed in repair of equipment before shipment.

A. Any defects or deficiencies found in the internal inspection system involving general mechanical structure and general harness wiring shall be fed back through the manufacturing process (or special repair process) for correction.

B. Defects in printed circuit boards or electronic circuit components shall be specially treated as follows:

i. A printed circuit board may be flow soldered a second time if copper runs and joints are not satisfactorily coated on the first run. Care shall be taken to observe Section IX 2.2f.

ii. Under no circumstances shall a printed circuit board be flow soldered more than twice.

iii. Hand soldering using the technique of wicking away excess solder with a stranded wire may be used for printed circuit repair.

iv. Unacceptable solder peaks and uncoated copper runs may be corrected using hand soldering techniques.

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### 3. Quality Acceptance of Products during Normal Supply

Once NYSDOT receives any product from the manufacturer, it will verify it via auditing the manufacturer quality control process as well as sample testing the product for proper operation as discussed below.

#### 3.1 Verification of Product

A verification process is required to assure that manufacturers appearing on the Qualified Products List properly evaluate, supply and certify the product as approved in the application process and as specified. This is accomplished by auditing the quality control process and/or actively monitoring the quality of the finished product by inspection and/or sampling for test.

3.1.1 Manufacturer auditing (Quality Assurance Procedures/ Quality Control Plan) is described in Section I paragraph 1.6.2.5 of this chapter.

##### 3.1.2 Sample Testing (Monitoring) Samples

The Traffic Signal Laboratory will actively monitor the quality of the finished product to verify the manufacturer is controlling the quality of the product as certified and the product's quality remains as specified at the time of use or installation. While the Department reserves the right to test all delivered products, the Department expects to ordinarily test the products by sample testing a limited portion of the products upon manufacture and delivery. Therefore, random samples may be taken during the audit as detailed in 3.1.1 above and/or at the Traffic Signal Laboratory or any NYSDOT regional location. The size of the sample will be based on the ANSI Z1.4/MIL STD-105E Lot Random Sampling requirements. The NYSDOT Sampling Plan Chart is shown on Table 1.2 below. **NOTE: Due to the public safety requirements of all equipment specified in this document, NYSDOT will strictly follow the Critical Sampling Requirements noted in the NYSDOT Sampling Plan Chart.**

##### 3.1.2.1

After the Traffic Signal Laboratory or NYSDOT Regional location receives a lot of units from the manufacturer, sample(s) will be tested by NYSDOT (normally by the Traffic Signal Laboratory staff).

##### 3.1.2.2

The test results will be evaluated to confirm specification compliance.

##### 3.1.2.3 Test results

##### 3.1.2.3.1

Any test that results in other than normal and expected operation shall be considered a test failure. The manufacturer, distributor, or their authorized representative shall be permitted to repair or replace products up to the AQL limit of failures (refer to the Table 1.2: NYSDOT Sampling Plan Chart). The repair or replacement must follow the warranty/guarantee procedures defined in items 4 and 5 at the end this section. The repairer shall document the repairs made and submit this documentation with the equipment to be retested. Repaired items will be retested by the Department.

##### 3.1.2.3.2

If the percentage of product failures exceeds the AQL (refer to the Table 1.2: NYSDOT Sampling Plan Chart), sample testing on the lot will cease and the entire lot shall be sent back to the manufacturer for repair or replacement at their facility before the lot is resubmitted for additional tests. The manufacturer shall reimburse NYSDOT for any shipping costs and retesting required during reacceptance. Please refer to the NYSDOT Estimated Reimbursement Table 1.1 below.

##### 3.1.2.3.3

If a lot of a given product is installed in the field and subsequently a failure or failures from that lot occur during the warranty period due to design or quality problems, NYSDOT may choose to sample the lot according to Table 1.2: NYSDOT Sampling Plan Chart, by removing units from the field and testing them. If the sample has a number of failures greater than the Acceptance Level (ACC), NYSDOT shall be reimbursed by the vendor for the costs of sampling and testing the existing lot, otherwise NYSDOT will absorb this cost. If the products in the problem lot must be removed and replaced from its field installation, based on test results that prove product failure, the manufacturer shall reimburse NYSDOT for such removal and replacement as defined in the warranty/guarantee procedures defined in items 4 and 5 at the end this section. The cost for replacement will be calculated on a per unit cost which is based on the estimated time and operating costs required to perform the work. Please refer to Table 1.1: NYSDOT Estimated Reimbursement Table below.

(continued)

**TABLE 1.1: NYSDOT ESTIMATED REIMBURSEMENT TABLE**

The manufacturer will reimburse NYSDOT for **each unit** that is tested, replaced and/or removed by the NYSDOT Laboratory, Regional Staff or its representatives when products fail based on these specifications. The cost to the manufacturer will solely be based on the per unit cost listed below. That cost was calculated by assessing the time and charges incurred by NYSDOT or its representatives.

THE COST TO THE MANUFACTURER FOR NYSDOT SERVICES IS:

**50% of NYSDOT's purchase price of the unit  
 up to a maximum of \$150.**

**TABLE 1.2: NYSDOT Sampling Plan Chart  
 (Based on ANSI/ASQ Z1.4-2003 Sampling Procedures and Tables for Inspection by Attributes)**

ITEM	Lot or Shipment Size	Testing Sample Size	Critical Sampling for Acceptance Testing		
			AQL: (maximum % failures within a lot)	ACC: (maximum number of failures to accept lot)	REJ: (Minimum number of failures to reject lot)
<b>Models:</b> 200, 204, 210NYR, 2070E, 2070-1E, 2070-2A, 2070-6B, 2070-7A, 2070-3B, 2070-4A, 330SR, LED modules, Flasher Cabinet, Transfer Switch, PDA 24V, Aux Cabinet	2-8	2	1	0	1
	9-15	3	1	0	1
	16-25	5	1	0	1
	26-50	8	1	0	1
	51-90	13	1	0	1
	91-150	20	1	0	1
	151-280	32	1	1	2
	281-500	50	1	1	2
<b>Models</b> 222, 232, 242, 252	2-8	2	4	0	1
	9-15	3	4	0	1
	16-25	5	4	0	1
	26-50	8	4	1	2
	51-90	13	4	1	2
	91-150	20	4	2	3
	151-280	32	4	3	4
	281-500	50	4	5	6
	501-1200	80	4	7	8
1201-3200	125	4	10	11	

**AQL** - Acceptable Quality Level. This is the maximum acceptable percentage failure of units within a lot.

**ACC** - Acceptable Units. This is the maximum number of failed units allowed to accept lot.

**REJ** - Rejected Units. This is the minimum number of unit failures to reject lot.

(continued)



3.1.3 **Disqualification of Manufacturer** - Test results found to be outside the Accepted Quality Level (AQL) listed in Table 1.2: NYSDOT Sampling Plan Chart above may result in the rejection of the product as per the procedures listed below. If rejected, the product shall be removed from the Qualified Products List and be replaced with an acceptable product from another manufacturer at no additional cost to the Department, i.e. the current supplier/manufacturer will accept responsibility of reimbursing the Department for any cost difference between products. The following describes the process that NYSDOT will follow.

3.1.3.1 **Notification.-** When the verification process results in unsatisfactory findings, the Traffic Signal Laboratory will provide written notification of the findings to the manufacturer.

3.1.3.2 **Required Action.** The manufacturer shall conduct a prompt investigation into the findings. The results of the investigation and identified corrective action shall be provided to the Traffic Signal Laboratory, in writing, within 15 days of the notification. Alternately, the manufacturer may dispute the unsatisfactory findings. Within 5 days of the Department's notification to the manufacturer of the unsatisfactory findings, the manufacturer shall provide written notification of the intent to dispute those findings. The letter shall include the intended approach as detailed below:

The manufacturer shall provide evidence supporting the manufacturer's position. The manufacturer may arrange for and provide "third party" laboratory test results to provide technical support. If a third party laboratory is used, the credentials shall be provided for consideration to the Traffic Signal Coordinator. All laboratories certified by UL, ETL or NEMA for the specific test properties will be considered acceptable once NYSDOT reviews the test documentation.

Due consideration will be provided based upon presentations and/or laboratory test results by the Department's testing, the manufacturer's testing and third party laboratory results if provided. The Traffic Signal Coordinator or designee will be the final arbitrator of disputes.

3.1.3.3 **Resolution of Unsatisfactory Verification Findings.-** The Department will evaluate the manufacturer's investigation findings and any corrective actions and/or dispute supporting data. At the completion of this evaluation the manufacturer will be notified, in writing, of the Department's resolution to the unsatisfactory verification findings. Resolution will typically be one of the following:

3.1.3.3.1 - The data supports the need for the manufacturer to further investigate the problem and/or make modifications to the quality control processes (see Section IV). As a result, at the discretion of the Traffic Signal Coordinator, routine Department supply can continue in accordance with the quality control plan and any approved revisions.

3.1.3.3.2 - The manufacturer's name and location are removed from the Department's Qualified Products List. When removed from the Qualified Products List, supply must cease immediately and the Department will replace the product with an acceptable product from another manufacturer at no additional cost to the Department, i.e. the current supplier/manufacturer will accept responsibility of reimbursing the Department for any cost difference between products. The following identifies factors that shall result in the removal of a manufacturer's name from the Qualified Products List:

**A.** Serious fraudulent infractions, which may include falsifying records or deliberate shipment of noncompliant product.

**B.** Failure to provide a timely response to notifications of unsatisfactory findings. Typically investigative reports in excess of 30 days, subsequent to Department notification as identified in the Department's letter of notification, will be considered delinquent.

**C.** Repetitious unsatisfactory findings without appropriate corrective action.

**D.** Samples tested which have consistent deficiencies shall be removed from the Qualified Products List. Only a product which has passed both acceptance and field testing and has no deficiencies will be placed on the permanent Qualified Products List. Deficiencies may include but are not limited to any of the following examples:

- Physical dimensions not in accordance with the specifications.
- Input or output connectors and/or keying not in compliance with the specifications.
- Operational or timing sequence which does not meet minimum specification requirements.
- Improper Input Output voltage or current levels.
- User programming switches or push buttons or potentiometers not in accordance with the specification.
- Indicator lights or character displays not in accordance with the specification.
- Circuit components not of the quality and/or construction called for in the specification.
- Failure as a result of specified temperature and/or humidity tests.

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- Failure as a result of line voltage, transient or lightning tests.
  - User programming switches or push buttons or potentiometers which cannot be readily manipulated by the ungloved human hand.
  - Inadequate cabinet ventilation and weatherproofing.
  - Failure as a result of physical tests such as shock or vibration.
  - Unacceptable quality assurance/control procedures.
- E. Failure to Reimburse NYSDOT for the cost of replacement of equipment.

3.1.3.4 **Reinstatement of Product to the Qualified Products List.**- The Traffic Signal Coordinator or designee will give consideration for manufacturers that appeared on the Qualified Products List that have been removed and may give them an opportunity to be reinstated on the Qualified Products List after the deficiencies are resolved. Product reinstatement will be based on NYSDOT laboratory staff workload and personnel availability. The attempt to reinstate the vendor will be provided to give the manufacturer the opportunity to maintain previous relationships with the Department while reestablishing quality control. Products manufactured prior to date of manufacturer removal from the Qualified Products List will not be considered acceptable without specific technical basis provided by the manufacturer and written approval by the Traffic Signal Coordinator or designee. The requirements for reinstatement are as follows:

3.1.3.4.1 - **Application.** - A formal application shall be provided to the Traffic Signal Coordinator seeking reinstatement. The application shall include details of the “Quality Control Plan” modifications and “Supplemental Evaluation Resource” as detailed below.

3.1.3.4.2 - **Quality Control Plan.** - When certified products are found not to conform to the specification requirements, either the approved quality control plan was not followed as required or the approved quality control plan does not sufficiently address the problems found. Prior to consideration for reinstatement, the following must be accomplished:

A. Identify the portion of the quality control plan that was not followed or not followed sufficiently to assure the product conforms to the specification or provide modifications to the approved quality control plan to provide assurance that the problems found are unlikely to occur again. A review of current test procedures must be included.

B. Provide written confirmation assuring the implementation of the modifications identified above. The document shall include the specific date of implementation

3.1.3.4.3 - **Supplemental Evaluation Resource.** The Qualified Products List manufacturer must provide an interim evaluation resource to adequately satisfy the Department that corrective measures to the quality control plan, as detailed above, are adequate to assure the product’s specification conformance. The supplemental evaluation resource(s) shall openly communicate with Department representatives. This includes free access to all documentation related to the services provided. Examples of supplemental evaluation resources follow:

A. Additional testing, either by in-house staff or by a third party laboratory, to test and verify specification conformance as well as the adequacy of the modifications to the QC plan. If a third party laboratory is used, the credentials of the laboratory and the proposed frequency of test shall be provided to the Traffic Signal Coordinator for review and approval. All costs for the laboratory services will be the manufacturer’s responsibility.

B. Additional inspection team, either in-house staff or a third party inspection manufacturer to verify specification conformance as well as the adequacy of the modifications to the QC plan. The credentials of the inspection manufacturer and the proposed evaluation process shall be provided to the Traffic Signal Coordinator for review and approval. All costs for the inspection services will be the manufacturer’s responsibility.

3.1.3.4.4 - **Department’s Role.** The Department will continue to provide quality assurance as administered by the Traffic Signal Laboratory. The verification process (es) detailed in this procedure will continue to be used. If quality problems continue to persist, the approval to supply may be immediately rescinded by the Traffic Signal Coordinator or designee and the product will be removed from the Qualified Products List.

3.1.3.4.5 - **Restoration of the product to the Qualified Products List.** The Traffic Signal Coordinator will consider requests to restore the manufacturer’s Qualified Products List status when evidence is provided and confirmed by the Department that the cause for the action has been corrected and is unlikely to occur again.

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#### **4. Product Warranty/Guarantee**

4.1 The following paragraphs, 4.1.1 to 4.1.5 define the minimum detailed Warranty/Guarantee requirements for all Traffic Management Equipment specified in this specification.

- 4.1.1 A minimum Warranty/Guarantee of twenty-four (24) months shall start from the date of receipt of all equipment specified in this specification and delivered to NYSDOT except that the warranty shall never be less than twelve (12) months from the date of unit acceptance. Exceptions to the twenty-four month Warranty/Guarantee are for LED Traffic Signal Modules and Pedestrian LED Countdown Timer Modules. These units shall have a Warranty/Guarantee of sixty (60) months from the date of field installation
- 4.1.2 All units which fail during the warranty period due to faulty design, quality issues, component failures or failure to meet any of the detailed specifications for that unit shall be repaired or replaced by the manufacturer in a timely manner. Shipping arrangements and costs for the return of any equipment under warranty are the responsibility of the manufacturer.
- 4.1.3 If a unit fails during the warranty period due to faulty design, quality issues, component failures or failure to meet any of the detailed specifications for that unit during the warranty period NYSDOT shall be reimbursed by the manufacturer for its services to test, remove and replace the item. The cost for replacement will be based on the estimated time and operating costs required to perform the work. Please refer to Table 1.1: NYSDOT Estimated Reimbursement Table above for details. In addition the manufacturer shall reimburse NYSDOT for any shipping costs incurred to repair the equipment.
- 4.1.4 If a manufacturer fails to Reimburse NYSDOT for the cost of replacement of equipment NYSDOT shall remove them from its QPL.
- 4.1.5 NYSDOT will render the final determination to the nature of the failure, if a unit fails during the warranty period.

#### **5. Repair of Product under Warranty/Guarantee**

5.1 The following paragraphs, 5.1.1 to 5.1.4, define the minimum detailed Repair requirements for all Traffic Management Equipment specified in this specification.

- 5.1.1 A printed circuit board may be factory repaired not more than two (2) times during the warranty period of the unit that contains the board. A third failure shall result in the replacement of the entire unit with a new unit at no cost to NYSDOT. The warranty for the replacement unit shall be equivalent to the remainder of the warranty period of the replaced unit or 12 months, whichever is greater.
- 5.1.2 A unit where a printed circuit board component/s, conductors/traces are damaged while undergoing warranty repair shall be replaced by an entirely new unit at no cost to NYSDOT. The warranty for the replacement unit shall be equivalent to the remainder of the warranty period of the replaced unit or 12 months, whichever is greater.
- 5.1.3 Factory repairs shall be described and reported in detail on a form to be furnished by the State.
- 5.1.4 Agency performance records of equipment shall be accepted for determinations involving questions concerning but not limited to the number of factory repairs rendered to a given unit.

#### **6. Required Environmental Testing (By Manufacturer)**

The following Environmental Test procedures are required to be done by the manufacturer for all controller units purchased by NYSDOT. NYSDOT reserves the right to require these tests for all other items described in these specifications. NYSDOT will notify the manufacturer prior to procurement if these tests are required for those products.

- 6.1 Each controller unit specified shall be environmental tested by the manufacturer to ensure proper operation over the full range of environmental conditions. During the test each unit is run at high, normal and low line voltage while subjected to temperatures ranging from 165 to -30 degrees Fahrenheit. A comprehensive diagnostic test program shall test each controller unit, as to memory and input/output circuits. Finally, the system maintains a printed log of test results.
- 6.2 The test system consists of four (4) major subsystems:
  - an environmental chamber whose temperature can be controlled automatically
  - a diagnostic test program,
  - an auto-transformer to regulate the AC line voltage supply for the test units and
  - A printer may be used to log detailed information regarding all test errors and failures or said errors and failures may be logged manually for the controller under test.
  - Summary printouts and test certifications for units which have passed all tests shall be recorded by the manufacturer and passed onto the NYSDOT Traffic Signal Laboratory for review.

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- 6.3 The internal diagnostic program to be run on each controller shall be comprehensive on both RAM and PROM memory and on the unit's inputs and outputs. The contractor shall submit his diagnostics for approval if other than NYS approved diagnostics is used.
- 6.4 The final component in the test system is an auto-transformer to regulate the AC line voltage supply for the test units. It stabilizes the line voltage within 0.5 volt of the level commanded by the data collector or contractor. It can supply up to 3 amperes per controller unit.
- 6.5 Environmental Test Cycle (By Manufacturer)
- 6.5.1 Room Temperature. Each controller unit shall be tested using Acceptance Test software, approved by the Agency, at room temperature for a minimum of 100 hours. This test may be performed before or after the High/Low temperature cycling tests. Successful testing will result in all equipment continuing its intended operation after being subjected to the following minimal testing requirements:
- 6.5.2 High/Low Temperature Cycling Tests. Each controller unit shall go through a minimum of 50 hours of temperature cycling as outlined below. Also refer to the Fig-1.1 at the end of this section.
- 6.5.2.1 High Temperature Test.
- A. With the item functioning (i.e. running diagnostic software) in its intended operation at an operational line voltage of 120 +/- 3 VAC, the ambient temperature shall be raised from room temperature (70 degrees F) to 165 degrees F at a rate of not more than 32 degrees F per hour.
- B. The item shall operate at 165 degrees F for a minimum of 12 hours up to a maximum of 24 hours. Except for the power down test, each unit shall be powered on and operating under the control of the Diagnostic test program. At the maximum temperature, the unit shall be operated for a minimum of two hours at a line voltage of 98 VAC and a minimum two hours at a line voltage of 135 VAC. Throughout this voltage variation test section, the unit should be examined to insure that the unit diagnostic software is operating properly and error free. This includes such diagnostic tests as:
- i. The time clock functioned properly
  - ii. Data in RAM was retained
  - iii. IO wraparound tests functions properly
  - iv. Communications tests functions properly
- C. After returning the unit to the normal operational voltage (120 +/-3 VAC), the high temperature test shall conclude with each unit being subjected to a two hour power down test where power is removed from the unit. When power is restored, the unit should be examined to insure the following:
- i. The unit started up properly
  - ii. The down time clock functioned properly
  - iv. Data in RAM was retained
- D. The temperature shall then be lowered to 20 degrees C at the rate of not more than 18 degreesC per hour.
- 6.5.2.2 Room Temperature Test.
- A. Once at room temperature (70 degrees F), the item shall operate for a minimum of 8 hours at an operating line voltage of 120 +/-3 VAC. Each unit shall remain powered on and operating under the control of the Diagnostic test program. Throughout this section, the unit should be examined to insure that the unit diagnostic software is operating properly and error free. This includes such diagnostic tests as:
- i. The time clock functioned properly
  - ii. Data in RAM was retained
  - iii. IO wraparound tests functions properly
  - iv. Communications tests functions properly

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6.5.2.3 Low Temperature Test Cycle.

- A. With the item functioning in its intended operation (i.e. running diagnostic software) at an operational line voltage of 120 +/-3 VAC, the ambient temperature shall be lowered from room temperature (70 degrees F) to -35 degrees F at a rate of not more than 64 degrees F per hour.
- B. The item shall operate at -35 degrees F for a minimum of 12 hours up to a maximum of 24 hours. Except for the power down test, each unit shall be powered on and operating under the control of the Diagnostic test program. At the minimum temperature, the unit shall be operated for a minimum of two hours at a line voltage of 98 VAC and a minimum two hours at a line voltage of 135 VAC. Throughout this voltage variation test section, the unit should be examined to insure that the unit diagnostic software is operating properly and error free. This includes such diagnostic tests as:
  - i. The time clock functioned properly
  - ii. Data in RAM was retained
  - iii. IO wraparound tests functions properly
  - iv. Communications tests functions properly
- C. After returning the unit to the normal operational voltage (120 +/-3 VAC), the low temperature test shall conclude with each unit being subjected to a two hour power down test where power is removed from the unit. When power is restored, the unit should be examined to insure the following:
  - i. The unit started up properly
  - ii. The down time clock functioned properly
  - iii. Data in RAM was retained
- D. The temperature shall then be raised to 70 degrees F at the rate of not more than 32 degrees F per hour.

6.5.2.4 Final Room Temperature Test.

- A. Once at room temperature (70 degrees F), the item shall operate for a minimum of 8 hours at an operating line voltage of 120 +/-3 VAC. Each unit shall remain powered on and operating under the control of the Diagnostic test program. Throughout this section, the unit should be examined to insure that the unit diagnostic software is operating properly and error free. This includes such diagnostic tests as:
  - i. The time clock functioned properly
  - ii. Data in RAM was retained
  - iii. IO wraparound tests functions properly
  - iv. Communications tests functions properly

6.6 - Summary printouts and test certifications for each controller unit documenting all above tests shall be recorded by the manufacturer and passed onto the NYSDOT Traffic Signal Laboratory for review

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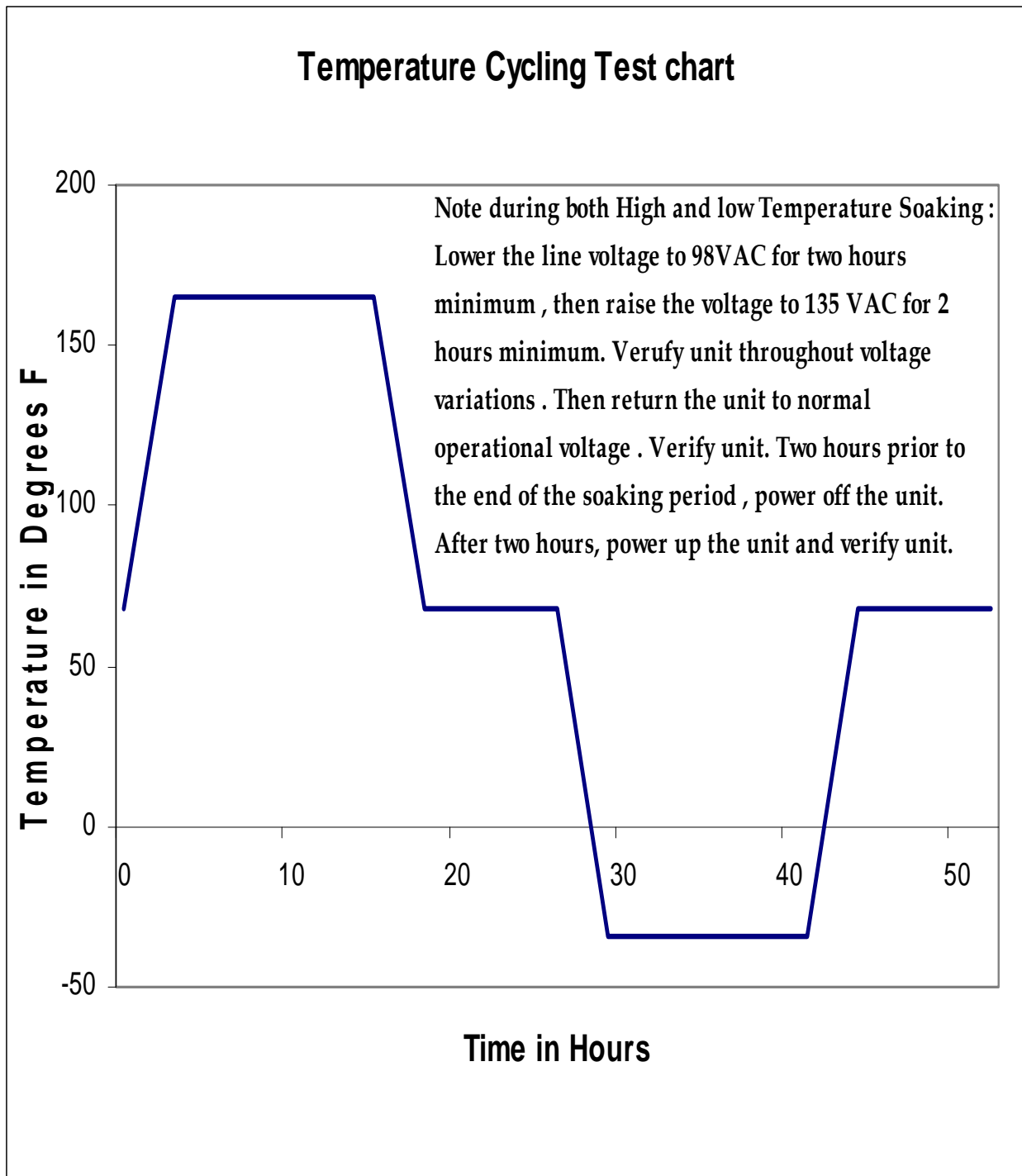


Fig -1.1: Temperature Cycling Test Chart

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**SECTION III  
GENERAL REQUIREMENTS**

**1. Solid-State Design**

All equipment furnished under these specifications shall be of the solid-state design. The use of vacuum or gaseous tubes or electromechanical devices within the equipment will not be acceptable unless otherwise indicated.

**2. Requirements**

Requirements outlined in Chapter 1 are applicable to auxiliary and associated solid-state electronic field apparatus whether or not set forth in a detailed specification.

**3. Manual Outline**

Operation and Maintenance Manuals shall be supplied for all items required under Departmental contract. Operation and Maintenance Manuals shall include the following:

- A. Table of Contents
- B. Glossary
- C. General Description
- D. General Characteristics
- E. Installation
- F. Adjustments
- G. Theory of Operation
  - i. Systems Description (include block diagram).
  - ii. Detailed Description of Circuit Operation.
- H. Maintenance
  - i. Preventive Maintenance.
  - ii. Trouble Analysis. (Field and Bench)
  - iii. Trouble Shooting Sequence Chart.
  - iv. Wave Forms.
  - v. Voltage Measurements with Charts.
  - vi. Alignment Procedures.
- I. Parts List (include circuit and board designation, part type and class, power rating, component manufacturer, mechanical part manufacturer, data specification sheets for special design components and original manufacturer's part number).
- J. Electrical Interconnection Details & Drawings.
- K. Schematic and Logic Diagram.
- L. Assembly Drawings and a pictorial diagram showing physical locations and identification of each component or part.
- M. The date, serial numbers and revision numbers of equipment covered by the manuals shall be printed on the front cover of the manuals.

**4.** The design of all equipment shall incorporate only those pins which have a pre-designated function as per the connector assignment in the detailed specification.

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**SECTION IV  
OPERATIONAL REQUIREMENTS**

**1. Indicator Lights and Character Displays**

1.1 Indicator lights and character displays are associated with the processor and auxiliary equipment.

1.2 All Indicators in character displays shall have a cone of visibility of +/- 45 degrees from an axis perpendicular to the front panel. The indicator shall be readily visible at a radius of up to 4 ft within the cone of visibility when the indicator is subjected to 9000 ft-candles of white light equivalent to bright sunlight) at 45 degrees to the front panel. The following indicator types are acceptable:

- 1.2.1 Indicator lights may be light emitting diodes (LEDs) or neons with a design life of 250,000 hours per bit of information.
- 1.2.2 Indicator lights may be the commercially available incandescent type, with a design life of 5000 hours per bit of information. All incandescent indicator lamps shall be replaceable from the front of the equipment. Character displays shall be socket mounted and easily replaceable.

**2. Specifications**

All contact material shall be silver/cadmium alloy, gold alloy, or gold plate for dry circuit operation. For contact load level exceeding 20 volts and 1 ampere, contact material shall be cadmium, silver, platinum, or rhodium plated.

**3. Quality Control**

Equipment will be tested by the State to all applicable parts of this specification, and notation will be made of passage or failure. A log of each and every deficiency will be kept by the State.

**SECTION V  
ELECTRICAL REQUIREMENTS**

**1. Constancy of Intervals**

1.1 All equipment shall be designed so that the length of any timed period shall be within the maximum allowable timing deviations. As the applied line voltage varies between 95 and 135 volts, and ambient temperature within the cabinet housing the equipment varies between -35°F and +165°F, and the humidity varies between 5 and 95%, this performance shall include cold and hot starts, and shall be obtained without the use of any heating or cooling elements.

1.1.1 Humidity - The relative humidity shall not exceed 95 percent non-condensing over the temperature range of -35 degrees F to +165 degrees F. Above +115 degrees F, constant absolute humidity shall be maintained. This will result in the relative humidity shown below for dynamic testing.

**TABLE 1.3: AMBIENT TEMPERATURE VERSUS RELATIVE HUMIDITY AT  
BAROMETRIC PRESSURES (29.92 In. Hg.) (NON-CONDENSING)**

<i>Ambient Temperature/ Dry Bulb (in degrees F.)</i>	<i>Relative Humidity (in percent)</i>	<i>Ambient Temperature/ Wet Bulb (in degrees F.)</i>
-35.0 to +35	10	-1 to +109
+35 to +115	95	+109
+120	70	+109
+130	50	+109
+140	38	+109
+150	28	+109
+160	21	+109
+165	18	+109

1.1.2 The storage temperature range of all specified equipment shall be from -49 degrees F to +185 degrees F.

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## 2. Applied Power

- 2.1 All circuits shall be functionally operational with regard to the following parameters:
- 2.1.1 Frequency of 57 to 63 hertz.
  - 2.1.2 Applied voltage of 95 to 135 volts single phase.
  - 2.1.3 Ambient temperature of -35° to +165° Fahrenheit.
  - 2.1.4 Humidity of 5 to 95% (as per Table-1.3 given in this section).
- 2.2 All circuits shall commence operation on or before 100 volts as the applied voltage is brought from 50 to 100 volts at a rate of 2 (+/- 0.5) volts per second.
- 2.3 All equipment when housed within a Model 330SR Cabinet shall be unaffected by transient voltages normally experienced on commercial power lines. Equipment, both normally supplied with the cabinet and purchased separately from it, will be tested for compliance as specified in paragraphs 2.3.1 thru 2.3.3
- 2.3.1 With the equipment under test housed in a Model 330SR Cabinet with surge protection specified herein, a 25 microfarad capacitor charged to +/- 2000 volts shall be discharged onto the AC line of the cabinet at its Main breaker. The capacitor shall be discharged at the specified voltage, a total of 50 times, at a rate of once every 10 seconds. The equipment, under test to be in compliance, will function normally during and after the test. Applied line voltage for this test shall be 120 +/- 12 VAC.
  - 2.3.2 With the equipment under test housed in a Model 330SR Cabinet with its surge protectors removed, a transient voltage of +/- 300 volts shall be synchronously applied to the AC line of the cabinet at its Main breaker. The transient voltage shall be moved uniformly over the full AC waveform once every second. The transient voltage may also be applied constantly at any point on the AC waveform. The transient voltage shall have a peak noise power of 5 kilowatts with a pulse rise time of 500 ns. The applied line voltage for this test shall be 120 +/- 12 VAC. The equipment that is being tested to be in compliance will function normally during and after the test
  - 2.3.3 Equipment housed indirectly in the cabinet such as the Model 400 modem, will be housed, when tested, in the equipment that they are designed to operate in.
- 2.4 All equipment shall be capable of normal operation following rapid opening and closing of contacts in series with the applied line voltage for any number of occurrences.
- 2.5 All equipment shall be capable of normal operation having been in a dry cold state when a minimum of 100 volts is applied. A dry cold state is here defined as having been placed in a state of -35 degrees Fahrenheit and less than 10% humidity for a period of at least five (5) hours without applied power.

## 3. Electrical Connections

**Electrical connections to and from all equipment shall be in accordance with the detailed specification.**

- 3.1 All connectors, with the exception of the Model 210NYR Conflict Monitor cabinet connector, shall be keyed (molded keys for edge connectors) to prevent accidental insertion of the wrong connector or printed circuit card.
- 3.2 All cable connectors shall have cable hoods or shields and strain relief clamps.
- 3.3 Printed circuit card edge connectors shall have bifurcated gold-plated contacts and shall be keyed to prevent accidental insertion of the wrong printed circuit card.
- 3.3.1 The printed circuit connector shall meet or exceed the following:
    - Operating Voltage:** 600 VAC (RMS) at sea level
    - Current rating:** 5 amperes
    - Insulation resistance:** 5000 mega ohms
    - Contact material:** copper alloy plated with 0.00005" of nickel and 0.000015" or greater of gold on top of nickel
    - Contact resistance:** 0.006 ohms

(continued)

3.4 All pin and socket connectors furnished shall utilize the same contact insertion tool, contact extraction tool and contact crimping tool.

3.5 Pin and socket contacts shall be beryllium copper construction sub plated with 0.00005” nickel and plated with 0.00003” gold. Pin diameter shall be 0.062”.

**4. Power Supply**

4.1 An integral and regulated power supply shall be designed to generate all DC voltages required for operation of all equipment when necessary. This power supply shall provide the internal and external voltage and current requirements for normal operation of the equipment supplied.

4.2 The maximum DC voltage generated within any and all equipment shall not exceed 45 volts except when used for indicator displays.

4.3 The primary side of all power supply circuits used within the equipment supplied shall be fused with an MDL type time delay fuse. The secondary side of the power supply circuits may be fused with either MDL or AGC type fuse.

4.4 Transient Voltage Protection shall be added to the inputs and outputs of all solid-state voltage regulation devices found within the power supply as shown in Fig-1.2. The devices used shall have specifications equal to or exceeding the specification of the JEDEC IN6267-IN6303A series of transient suppressors. The particular device used for the regulator outputs shall have a maximum breakdown voltage of no more than 1.5 times the maximum voltage specified for that supply. The particular device used for the input to the regulator devices shall have a maximum breakdown voltage of no more than twice that of the maximum voltage expected at a line voltage of 135 VAC.

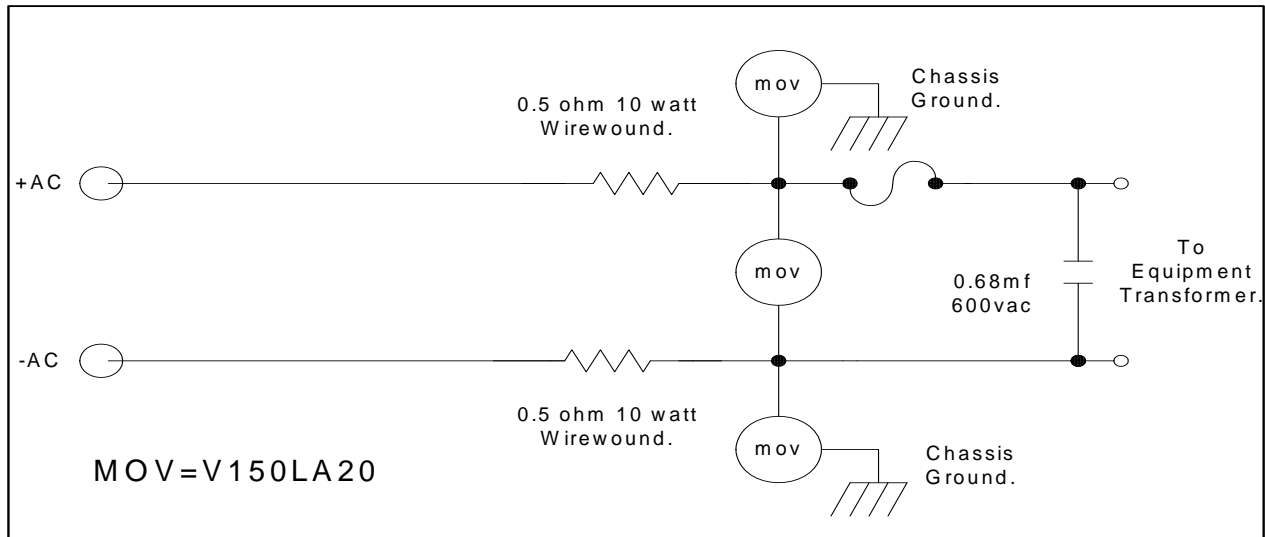


Fig-1.2: AC line surge protector for 24V power supply

**5. Cabinet Wiring**

All wiring within the cabinet shall be neat and firm and shall be color coded or have numbered leads and terminals. Insulation parts and wire insulation shall be of suitable materials and insulated for a minimum of 600 volts and shall conform to Military Specification, MIL-W-16878D, Type B or D, Vinyl-Nylon Jacket, or Irradiated cross-linked polyvinyl chloride, or UL Type THHN. Wire size shall be no smaller than No. 14 AWG stranded copper conductor, except that circuits carrying less than 0.25 - amperes shall be No. 26 AWG or larger stranded copper conductor. The four wires terminating at connector C1P pins 1, 14, 92 and 104 shall each have a No. 14 AWG stranded copper conductor.

(continued)

**SECTION VI  
COMPONENTS**

**1. Design**

No component shall be of such design, fabrication, nomenclature, or other identification as to preclude the purchase of said component from any wholesale electronics distributor, or from the component manufacturer, except as noted.

1.1 Except as noted in paragraph 1.2 below, when integrated circuits are provided, which are of such special design or programming that they preclude the off-the-shelf purchase of identical components from any wholesale electronics distributor or component manufacturer, one (1) exact duplicate integrated circuit shall be furnished with every twenty (20) integrated circuits provided.

1.1.1 When address decoding is accomplished using a manufacturer programmed address decoder a GO/NO-GO means of testing the address decoder shall be supplied. In addition a written copy of the code housed within the address decoder shall be provided.

1.1.2 When any MPU is supplied as part of a manufacturers equipment, the manufacturer shall provide separate diagnostic firmware and a source listing of the firmware used to run that MPU. This diagnostic firmware shall continuously run to determine if the MPU is functioning properly.

1.2 Whenever Model 222/224 Dual/Quad Loop Vehicle Detectors are supplied which include special integrated circuits as described in paragraph 1.1 above, one (1) exact duplicate integrated circuit shall be furnished for every twenty (20) integrated circuits provided.

**2. Socket Requirements:**

2.1 Any electronic component having more than one (1) lead shall not be socket mounted except as noted in the following paragraph.

2.2 Components classified as CPU shall be mounted in an AMP Type 2-641606-2 or equal. Components classified as EPROM or NOV RAM shall be mounted in an AMP Type 2-641605-2 or equal. These sockets shall have the following minimum features:

**Dual leaf gold plated wiping contacts**

**Anti-stress walls**

**Large Target area for easy insertion**

2.2.1 The socket contact receptacles shall meet or exceed the following:

**Operating Voltage: 600 VAC (RMS) at sea level**

**Current rating: 0.5 amperes**

**Insulation resistance: 500 mega ohms**

**Contact material: Beryllium/copper plated with 0.000030" or greater of gold**

**Contact resistance: 0.01 ohms or less**

Contacts, when closed, shall grip the smooth, flat side of the IC legs.

3. All circuits shall be designed for reliability and maximum performance. Electrolytic capacitors shall not be used when capacitance values are less than 1.0 microfarad. Components shall be arranged so they are easily accessible for testing and maintenance.

4. All components, such as resistors, capacitors, diodes, transistors and integrated circuits, shall be individually replaceable.

5. All components shall be down rated by 20% with regard to applied voltage and power dissipation so material shortening of life or shift in values is minimized.

(continued)

**6. Component Design Life**

6.1 No component shall be provided where the manufactured date is three years older than the contract award date.

6.2 The design life of all components, under twenty-four (24) hours a day operating condition in their circuit application, shall be a minimum of fifteen (15) years.

7. The circuit reference symbol for each component part shall be clearly marked.

**8. High quality electronic components shall be used.**

8.1 The State, at its option, may require the equipment manufacturer to submit detailed engineering technical data on any component part. A signed letter from the component manufacturer may be submitted with the detailed engineering data when the proposed application of the component alters the technical data. The letter certifies that the component application meets specification requirements.

**9. Capacitors**

9.1 The DC and AC voltage ratings as well as the dissipation factor of a capacitor shall meet the worst case design parameters of the circuitry.

9.2 The effect of change in capacitance due to environmental changes shall not cause circuit malfunctions.

9.3 A capacitor which may be damaged by shock or vibration (see Section XI) shall be supported mechanically by a clamp or fastener.

9.4 The capacitor encasement shall be resistant to cracking, peeling and discoloration due to humidity and temperature changes.

9.5 Capacitors used shall be of the best quality industrial grade, available for the application and shall have a design life of at least fifteen (15) years.

9.6 All capacitors must operate continuously at a temperature of -35 to +165 degrees Fahrenheit.

9.7 All capacitors shall be insulated and shall be marked with their capacitance value, working voltage and when applicable indicate polarity.

**10. Potentiometers**

10.1 Potentiometers with power ratings of from one (1) to two (2) watts shall be the commercial equivalent of Military Type RV4.

10.2 Potentiometers (excluding trimmer type potentiometers) of less than one (1) watt power rating shall not be used.

10.3 The power rating of any potentiometer used shall be at least 100% greater than the maximum power requirements of the circuit.

10.4 Potentiometers used shall be the best quality industrial grade, and shall have a design life of at least fifteen (15) years.

10.5 Potentiometers used, except those used for the Front Panel adjustments of the various input modules, shall be 10 turn minimum type pots.

10.6 All potentiometers used on the Controller Front Panel must be recessed so that they do not protrude more than 1/8".

**11. Resistors**

11.1 Fixed carbon film, deposited carbon, or composition insulated resistors shall be used conforming to the performance requirements of MIL-R-11 or MIL-R-22684.

11.1.1 All resistors shall be insulated and shall be marked with their resistance value. Resistance values may be indicated by the Electronics Industries Association (EIA) color codes.

11.2 Resistors used shall be of 10% tolerance or less.

(continued)

11.3 The value of the resistors shall not vary by more than 5% between the ranges of -35 and +165 degrees Fahrenheit.

11.4 No resistors of a power rating exceeding two (2) watts shall be used unless special ventilation or heat sinking is provided. When used, they shall be insulated from the printed circuit.

11.5 Resistors used shall be of the best quality industrial grade, and shall have a design life of at least fifteen (15) years.

## **12. Semiconductor Devices**

12.1 All power, as well as forward and reverse current and voltage ratings of semiconductor devices used shall be at least 20% greater than the actual maximum design requirements of the circuit with regard to the parameter specified in Section IV-2.

12.2 Semiconductor devices used shall be the best quality industrial grade, available for the application and shall have a design life of at least fifteen (15) years.

12.3 The Integrated Circuit manufacturer fan-out rating shall not be exceeded.

12.4 All solid-state devices shall be of the silicon type, except as noted in paragraph 12.6 below.

12.5 All transistors, integrated circuits, and diodes, when used, shall be equal to a standard type listed by EIA (Electronic Industries Association) and clearly identifiable to this standard.

12.6 Germanium diodes will be permitted only when a low forward voltage drop is required in logic circuit applications. Justification of this use must be furnished.

12.7 Pin 1 location of all LSI sockets shall be properly marked on the board adjacent to the socket.

12.8 Any integrated circuit, except for those specified below, that is directly connected to the 24 VDC supply of the cabinet shall be protected from transient surge voltages. Protection devices include, but are not limited to, devices such as transorbs and zener diodes. Devices that may be connected to cabinet 24 VDC supply without protection are:

- Devices designed for isolation purposes such as opto-couplers
- Devices use for voltage regulation
- Devices with open collector outputs that are used as buffers may have these collectors tied to the 24 VDC line with the proper current limiting.

## **13. Transformers and Inductors**

13.1 Transformers shall have the manufacturer's part number clearly and legibly printed on the case or frame. All leads of the transformer shall be color coded with approved RETMA color code or numbered in a manner so as to facilitate proper installation.

13.2 All inductors and transformers shall have their windings insulated and shall be impregnated to exclude moisture. All wire leads shall be numbered marked, or color coded.

## **14. Circuit Breaker**

14.1 Circuit breakers shall be approved and listed by UL. The trip and frame size shall be plainly marked. They shall be magnetic type breakers with their overload trip points unaffected by temperature. Breakers shall have a short trip delay characteristic unless otherwise noted in this specification. Contacts shall be silver alloy and enclosed in an arc-suppressing chamber. Minimum interrupting capacity shall be 5000 Amperes, RMS.

14.2 Multi-pole circuit breakers shall be the common-trip type

## **15. Component Grade**

It is recommended that all manufacturers consider the use of military or industrial grade components or component which have been prescreened to ensure proper operation through the temperature range of -35 to +165 degrees Fahrenheit.

(continued)

**16. Batteries**

The use of batteries to perform any power function shall hereby be precluded from all designs specified herein, unless encapsulated within a component such as a Dallas 1228 NOV RAM.

**17. Make-and-Break Device**

Resistor Capacitor snubber networks shall be placed across the fan thermostat and all AC relay coils. Diodes shall be placed across all DC relay coils.

**18. Front Panel Mounted Fuses**

Fuse holders to be mounted on the exterior of equipment shall be a low profile type holder.

**19. Ribbon Cables**

Ribbon connectors may be used between any two (2) boards providing they have at least 0.1" between pins. These connectors must comply with Chapter 1 gold plating (Section 5, paragraph 3.3.1) and have twice the current carrying capability required by the circuit design.

**20. Jumpers**

Two (2) pin jumpers are required. A slide-on jumper between two adjacent pins shall complete or bypass the circuit. Pins shall also be required for each jumper that may need storage during its useful field life

**SECTION VII  
MECHANICAL REQUIREMENTS**

**1. Metal Case**

1.1 All equipment shall be enclosed in a sheet metal case with a protective finish. The case shall be designed to provide convenient access to the entire interior assembly and permit the removal of printed circuit boards or modules without the use of special tools.

**2. Modular or Printed Circuit Design**

2.1 Module or printed circuit assemblies shall incorporate plug-in techniques, and be easily replaceable. To facilitate interchangeability a guide or track shall be provided for each assembly. All assemblies shall be mechanically secured so as to retain the assemblies in their proper position under conditions of shock and vibration.

2.2 Assemblies shall be provided with two (2) guides for each plug-in printed circuit board or associated device except relays. The guides shall extend to within 3/4" from the face of either the socket or connector.

2.3 Where less than 0.25" lateral separation is provided between the printed circuit board and any metal surface, a 0.0625" (+/- 0.005") plastic cover shall be provided to protect the printed circuit board.

2.4 Each printed circuit board connector shall be chamfered at 30 degrees from the board side planes. The key slots shall also be chamfered so that the connector key shall not be extracted upon removal of the board or jammed upon insertion.

2.5 Each printed circuit board shall be conformal coated with a UV tracer. This coating shall conform to the configuration of this object coated, applied on the completed board assembly.

**3. Inspection**

3.1 An inspection, both physical and visual, shall include mechanical dimensions and assembly conformance to all parts of this specification. Workmanship shall be in accordance with the highest industry standards.

**4. Model Numbers**

4.1 The manufacturer's model number, serial number, circuit issue or revision number, and date of shipment (month and year) shall appear in an easily visible location on all equipment and modules supplied.

(continued)

4.2 Except for the Model 330SR Cabinet, in addition to any assignment of model numbers by the manufacturer, model numbers (NYSDOT suggests a minimum of 4 digits, NYSDOT model number and Manufacturer ID) shall be displayed on the front panel in bold type, at least 3/8" high. NYSDOT assigned model numbers are supplied in the Table-1.4.

For the Model 330SR Cabinet, seven (7) digits shall be displayed on the inside of the front door, at least 3/8" high. The first three (3) digits are "330SR". Four (4) additional digits can be assigned by the State or manufacturer at such time as a particular sample is qualified as acceptable.

4.3 All like items, provided by the manufacturer, shall be electrically and mechanically interchangeable as to their printed circuit assembly irrespective of the time of manufacture.

**5. Tolerances**

5.1 The following tolerances shall be adhered to unless specifically noted elsewhere in these specifications:

<b>Sheet metal:</b>	+/-	<b>0.0525"</b>
<b>PC Board:</b>	+0,	<b>-0.010"</b>
<b>Edge guides</b>	+/-	<b>0.0150"</b>

**6. Input Cards**

6.1 All input cards designed to be used in the Model 330SR detector rack (input file) shall be mounted on an edge-connected, printed circuit board of the following dimensions:

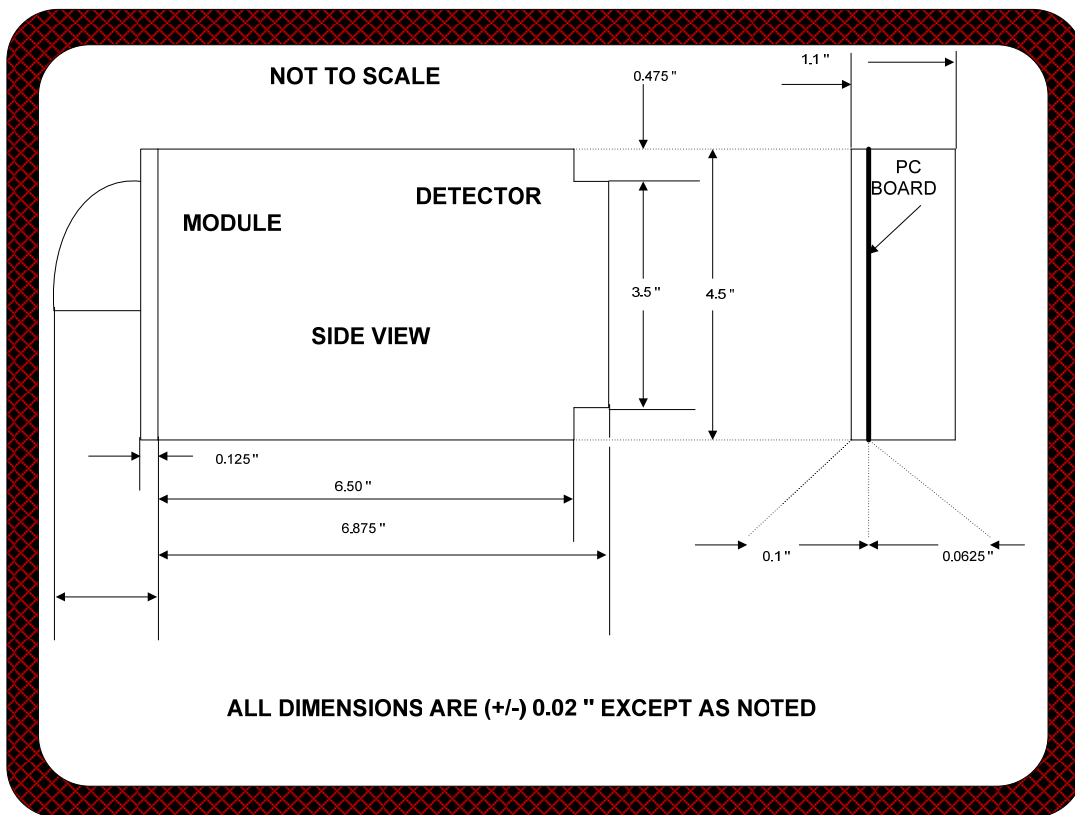


Figure-1.3: Model 330SR detector rack (Input card)

6.2 To avoid interference with the detector rack card guides, there shall be a 0.1" minimum clearance between the entire top and bottom of the PC board and any protruding hardware such as washers, screws, Front Panel mounting brackets or circuit components.

(continued)

**TABLE 1.4: MODEL NUMBER ASSIGNMENT TABLE**

<b>Model #</b>	<b>Item Description</b>
<b>200</b>	Solid-State Switch pack
<b>204</b>	Solid-State Flasher
<b>210</b>	Solid-State Monitor
<b>210NYR</b>	NY Red Conflict Monitor
<b>215</b>	Solid-State Current Monitor
<b>222</b>	Dual Loop Vehicle Detector Module
<b>222</b>	Dual Magnetic Detector Amplifier Module
<b>242</b>	Dual Isolation Module (DC)
<b>252</b>	Dual Isolation Module (AC)
<b>330</b>	Pole Mounted Cabinet with wiring harness330R
<b>330R</b>	Pole Mounted Red Monitor Cabinet with wiring harness
<b>330SR</b>	Pole Mounted Red Monitor Stretch Cabinet with wiring harness allowing mercury and Solid State switch
<b>2070</b>	68360 Based Controller Unit
<b>2070L</b>	<b>2070 Lite</b>
<b>2070E</b>	<b>2070E</b>
<b>1E</b>	<b>2070E CPU Module</b>
<b>1B</b>	<b>2070L CPU Module (LITE)</b>
<b>2A</b>	Field I/O Module
<b>3A</b>	2070 Front Panel Interface
<b>3B</b>	2070 Front Panel Interface
<b>4A</b>	2070-4A Power Supply Unit
<b>6A</b>	Modem Card (Async/Modem Serial Comm Module- Baud Rate 300 to 1200)
<b>6B</b>	Modem Card (Async/Modem Serial Comm Module-Baud Rate 0 to 9600)
<b>7A</b>	2070 RS-232 Card (EIA-232 Serial Port)

(continued)



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**SECTION VIII  
MAINTENANCE**

**1. Design**

Equipment shall be designed for field maintenance (isolation of malfunctions to particular modules of printed circuit cards) by non-engineering personnel working under difficult conditions.

1.1 Isolation of a fault (soft failure) within the microcomputer system shall take place during normal program cycling. Sequential self-test of the microcomputer shall take place within normal programming. These isolation tests shall be used for the diagnosis of a fault within the following subsystems:

- a) Vehicle sensors
- b) Communications interface

**2. Test Points**

Test points shall be provided for monitoring all power supply voltages. All test points shall be readily accessible when equipment is opened in service position.

**3. Installation and Maintenance**

The equipment shall be designed so that it can be easily installed and maintained. Fault location, accessibility and serviceability features which will lead to simplified maintenance shall be a prime consideration. Modules or components which are found to be not accessible under simulated field maintenance conditions shall be reason for non-acceptance.

**IX  
ENGINEERING**

**1. Human Engineering**

To the highest practicable degree, the unit shall be engineered for simplicity and ease of human operation and maintenance. This shall include the following specific points:

- 1.1 No more than two (2) potentiometers may be mounted concentrically. Knobs for such mountings shall have diameters in a ratio of 2:1 lower to upper. The lower knob shall have a diameter of at least 1”.
- 1.2 Tuning knobs shall be of large enough diameter (at least 0.5” diameter) and of great enough separation (at least 0.5” edge to edge) to assure ease of adjustment without disturbance of adjacent knobs.
- 1.3 All fuses shall be easily accessible and shall be replaceable without the use of any tools.
- 1.4 Modules shall slide smoothly in their tracks while being inserted into or removed from the frame and shall fit snugly into the plug-in printed circuit connectors.
  - 1.4.1 Modules shall require a force of no less than 5 lbs and no greater than 50lbs for insertion or removal.

**2. Design Engineering**

The following practices shall be employed in the design of solid-state equipment circuitry.

- 2.1 The design shall be inherently temperature compensated to prevent excessive drifting in the detector circuits or controller timing circuits (see Section IV Electrical Requirements).

The circuit design shall include such compensation as is necessary to overcome adverse effects due to temperature in the specified environmental range.

- 2.2 For reasons of personal safety, personnel shall be protected from all potentially dangerous voltages.
- 2.3 Any component called for the circuit design which has special or unique characteristics (except temperature variation of value) which would limit that component to certain manufacturers or suppliers shall be made available by the bidder, so as to facilitate rapid field repair of a unit.

**3. Generated Noise**

No item or subassembly supplied on these specifications shall emit audible noise greater than 40 db (A)

(continued)

**SECTION X**  
**CONSTRUCTION OF PRINTED CIRCUIT BOARDS**

**1. Design, Fabrication and Mounting**

- 1.1 All printed circuit solid-state component boards shall incorporate gold plated connector tabs.
- 1.2 Printed circuit design shall be such that components shall be removed and replaced without permanent damage to boards or tracks.
- 1.3 Fabrication of printed circuit boards shall be in compliance with MIL-P-13949 (latest revision at time of bid opening) with the following changes:
  - 1.3.1 Only NEMA G-10 glass cloth base epoxy resin copper clad laminates 1/16" minimum thickness shall be used. Intercomponent wiring shall be by laminated copper clad track having a minimum weight of 2.0 ounces per square ft with an adequate cross-section for current to be carried. All copper tracks shall be plated or soldered to provide complete coverage of all exposed copper track.
  - 1.3.2 Section 3.3.3. of MIL-P-13949 shall read "Pits and Dents. Grade of pits and dents shall be of Grade B quality (3.3.3.2) or better."
  - 1.3.3 Section 3.3 of MIL-P-13949 shall be omitted.
  - 1.3.4 Section 3.4 of MIL-P-13949 shall read "Warp or Twist. Class of permissible warp or twist shall be Class A (Table II) or better."
  - 1.3.5 Sections 4.2 through 6.6 of MIL-P-13949 (inclusive) shall be omitted except as referenced in previous sections of this specification.
- 1.4 The design and fabrication of Printed Circuit and the mounting of parts and assemblies thereon shall conform to MIL-STD-275 (latest revision) except as follows:
  - 1.4.1 All semiconductor devices required to dissipate more than 250 milliwatts or any case temperature that is 52 degrees Fahrenheit above ambient shall be mounted with spacers or transpads to prevent direct contact with the printed circuit board.
  - 1.4.2 When completed, all residual flux shall be removed from the Printed Circuit Board.
  - 1.4.3 The resistance between any two (2) isolated, independent conductor paths shall be at least 100 mega ohms when a 500 VDC potential is applied.
  - 1.4.4 Where less than 0.25" lateral separation is provided between the printed circuit board and any metal surface, a 0.0625" (+/- 0.005") thick plastic cover shall be provided to protect the printed circuit board.
- 1.5 Printed circuit board connector edge shall be chamfered at 45 degrees from board side planes. The key slots shall also be chamfered so that the connector keys shall not be extracted upon removal of board or jammed upon insertion. The key slots shall be 0.045" (+/-0.005") for 0.1" spacing and 0.055" (+/-0.005") for 0.156" spacing.

**2. Soldering**

- 2.1 Hand soldering shall comply with the MIL-P-55110.
- 2.2 Automatic flow soldering shall conform to the following conditions:
  - a) Constant speed conveyor system.
  - b) Conveyor speed shall be the optimum to minimize solder peaks or points which form at component terminals.
  - c) Temperature control shall be within +/- 10 degree Fahrenheit the optimum range.
  - d) The soldering process shall result in the complete coverage of all copper runs, joints and terminals with solder except that which is covered by an electroplating process.
  - e) Wherever clinching is not used, a method of holding the components in the proper position for the flow process shall be provided.
  - f) If exposure to the temperature bath is of such a time-temperature duration as to come within 80% of any component's maximum specified time-temperature exposure, that component shall be hand soldered to the printed circuit board AFTER the flow process has been completed.

**3. Definitions**

Definitions for the purpose of this specification shall be taken from MIL-STD-429 as amended.

**4. Board tolerance**

Board tolerance shall be +/-0.005"

(continued)

SECTION XI  
NEW YORK STATE YEAR 2000 WARRANTY STANDARD

**Definitions**

For purposes of this warranty, the following definitions shall apply:

- a) "Product" shall include, without limitation: any piece or component of equipment, hardware, firmware, middleware, custom or commercial software, or internal components or subroutines therein which perform any date/time data recognition function, calculation, comparing or sequencing. Where such services are being furnished, e.g. consulting, systems integration, code or data conversion or data entry, the term "Product" shall include resulting deliverables.
- b) "Vendor" Product" shall include all Product delivered under this Agreement by Vendor other than Third Party Product.
- c) "Third Party Product" shall include all product manufactured or developed by a corporate entity independent from Vendor and provided by Vendor on a non-exclusive licensing or other distribution agreement with the third party manufacturer. "Third Party Product" does not include product where Vendor is: a) a corporate subsidiary or affiliate of the third party manufacturer/developer; and/or b) the exclusive re-seller or distributor of product manufactured or developed by said corporate entity.

**Warranty Disclosure**

At the time of bid or Product quote, Vendor is required to disclose the following information in writing to the Authorized User:

- a) ***For Vendor Product and for Products (including, but not limited to, Vendor and/or Third Party Products and/or Authorized User's Installed Product) which have been specified to perform as a system:*** Compliance or non-compliance of the Products individually or as a system with the Warranty Statement set forth below; and
- b) ***For Third-Party Product Not Specified as Part of a System:*** Third Party Manufacturer=s statement of compliance or non-compliance of any Third Party Product being delivered with Third Party Manufacturer/Developer=s Year 2000 Warranty. If such Third Party Product is represented by Third Party Manufacturer/Developer as compliant with Third Party Manufacturer/Developer's Year 2000 Warranty. Vendor shall pass through said Third Party Warranty from the Third Party Manufacturer to the Authorized User but shall not be liable for the testing or verification of Third Party=s compliance statement.

**Warranty Statement**

Year 2000 warranty "compliance" shall be defined in accordance with the following warranty statement:

*Vendor warrants that Product(s) furnished pursuant to this agreement shall, when used in accordance with the Product documentation, be able to accurately process date/time data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000, including leap year calculations. Where a purchase requires that specific Products must perform as a package or system, this warranty shall apply to the products as a system.*

*In the event of any breach of this warranty, Vendor shall restore the Product to the same level of performance as warranted herein, or repair or replace the Product with conforming Product so as to minimize interruption to Authorized User's ongoing business processes, time being of the essence, at Vendor's sole cost and expense. This warranty does not extend to Authorized User=s errors in data entry or data conversion.*

*This warranty shall survive beyond termination or expiration of the agreement. Nothing in this warranty shall be construed to limit any rights or remedies otherwise available under this agreement.*

(continued)

**SECTION XII  
BAR-CODING, LABELING and ELECTRONIC DOCUMENTATION**

**1.0 The following items detailed in this Specification shall be bar-coded:**

- Model 2070E Controller and all sub-components of the Model 2070E assembly that are either supplied with the Model 2070E or supplied separately: Model-4A Power Supply; Model-1E CPU; Model-3B Front Panel Assembly; Model-2A Field I/O; Models 6A and 6B Modems; and Model 7A Serial Card
- Model 330SR Cabinet and all sub-components of the Cabinet assembly that are supplied with the model 330SR cabinet : Model 24 VDC Power Supply; and PDA unit of Cabinet.
- Model 210NYR Red Conflict Monitor
- Auxiliary Input cabinet
- Flasher Cabinet
- LED Traffic Signal Modules
- Pedestrian LED Countdown Timer

**2.0 Bar-coding Requirements.**

All equipment, specified in this paragraph shall be bar-coded using Barcode type 128. Barcodes shall be printed on Simon 15026 or approved equal quality polyester label where the print on the label and the adhesion qualities of the label shall be weather, UV and temperature resistant. Size of the label shall be 0.5 inches wide by 1.75 inch long minimum. All barcodes printed must be printed entirely on the label, centered on the label and be completely legible and readable by the all barcode readers used by NYSDOT. Text of the barcode information shall also be legibly printed on the label underneath the barcode.

Information on the barcode shall be separated into the following four parts and printed on the label in the order shown and without spaces:

Model Number - 2 digit Assignments					
Code	ITEM	Code	Item	Code	Item
02	Model 2070E Controller/Chassis	09	Model 330S Cabinet	Y8	8" (200 mm) Yellow Ball
20	Model 2070E Controller/Chassis	04	Model 215 Current Monitor	RA	12" (300 mm) Red Arrow
4A	Model 2070-4A 10A Power supply Unit	07	24 VDC Power Supply	R1	12" (300 mm) Red Ball
7A	Model 2070-7A Communications Module	06	PDA unit of Cabinet	GA	12" (300 mm) Green Arrow
6A	Model 2070-6A Modem	03	Model 210 Conflict Monitor	YA	12" (300 mm) Yellow Arrow
6B	Model 2070-6B Modem	13	Model 210NYR Red Conflict Monitor	YG	12" (300 mm) Bi-Modal Arrow
6D	Model 2070-6D Fiber Optic Modem	15	330R Red Monitor Cabinet	H1	12" X 12" (305 Mm X 305 Mm) Single Pedestrian-Hand Only
LT	VDSL Copper over Ethernet Modem LT-300	25	Auxiliary Cabinet	WP	12" X 12" (305 mm X 305 mm) Single Pedestrian-Walking Person Only
NT	VDSL Copper over Ethernet Modem NT-300	35	Flasher Cabinet	CS	12" X 12" (305 mm X 305 mm) Bi-Modal Pedestrian
RP	VDSL Copper over Ethernet Modem RP-300	45	330SR Red Monitor Stretch Cabinet allowing both mercury and solid state switch	CL	16" X 18" (410 mm X 450 mm) Bi-Modal Pedestrian
1E	Model 2070-1E CPU Module	55	330SR Red Monitor Stretch Cabinet allowing only mercury switch	CT	Pedestrian LED Countdown Timer
1B	Model 2070-1B CPU Module	R8	8" (200 mm) Red Ball	WM	WAN Modem
2A	Model 2070-2A FIO Module	G1	12" (300 mm) Green Ball	WS	WAN Modem and Switch
3B	Model 2070-3B Front Panel Module	G8	8" (200 mm) Green Ball	SS	Serial server
05	Model 330 Cabinet	Y1	12" (300 mm) Yellow Ball	RT	Router

(continued)

**Manufacturer - 2 digits assigned**

See current NYS APL/QPL Manufacturer address ([www.nysdot.gov/tmes](http://www.nysdot.gov/tmes)) for listing of these Manufacturer codes. These codes are assigned upon Product Qualification and may be found in Appendix 5.

**Date of Manufacture - 4 digits assigned**

First two digits represent Month of Manufacture, and second two digits represent Year of Manufacture

**Serial Number - minimum 6 digits assigned, maximum 10 digits assigned**

An example of the information printed on a barcode label for a Model 2070L controller/chassis manufactured in June of 2008 with a serial number of 01833567 by a company whose manufacturers= code is XX would be: 02XX060801833567.

Another example of the information printed on the barcode label for a NYSDOT STANDARD 12"(300mm) Red Ball LED module manufactured in June of 2005 and received by NYSDOT in June of 2006 with a serial number of 000183 by a company whose manufacturers' code is XX would be R1XX0605000183.

**3.0 Samples and Locations of Barcode Labels on Equipment.**

All Barcode labels used by the manufacturer must be approved by the NYS Traffic Signal Equipment Lab prior to use. Samples of the physical label with barcode information printed on the label must be submitted to the Traffic Signal Equipment Lab prior to use. Any subsequent changes of this label must also get approval before use.

Location or placement of the Barcode Labels on the equipment specified in this paragraph is determined by NYSDOT. Location and Sample information of Barcode Labels can be obtained from the Supervisor, NYSDOT Traffic Signal Equipment Lab after award.

**4.0 Barcode Labels on Shipping Boxes.**

Model 2070E Shipping Box - Barcode labels, identical to the ones placed on the 2070E controller and its sub-components, shall also be placed on the outside of the 2070E shipping box. The labels shall be located on the upper right hand corner on the wide side of the box and placed in a column in the following order:

- Model 2070E Controller/Chassis Barcode Label
- Model-4A 10 Amp Power Supply Barcode Label
- Model-1E CPU Barcode Label
- Model-2A Field I/O Barcode Label
- Model-3B Front Panel Assembly

**Model 330SR Cabinet Protective Shipping Cover** - Barcode labels, identical to the ones placed on the Cabinet and sub-components of the cabinet shall also be placed on the outside of the cabinet protective shipping cover. The barcodes shall be located on the side of the cover that protects the left side of the cabinet. The barcodes shall be placed in a column in the following order:

- Model 330SR Barcode Label
- 24 VDC Power Supply Barcode Label
- PDA Unit Barcode Label

**Model 210NYR Conflict Monitors** – Barcode labels, meeting the same requirements of the labels specified in this section for these items, shall be placed on the outside of any box that may contain an individual Conflict Monitor. Barcode labels shall also be placed on all shipping boxes that contain multiple Monitors. For example, if a shipping box contains 20 individual monitors, barcode labels for all of the 20 modules shall be affixed to the outside of the box. The labels shall also be grouped together so that they can be easily and quickly scanned by a barcode reader.

**LED Traffic Signal Modules & Pedestrian LED Countdown Timer** - Barcode labels, meeting the same requirements of the labels specified in this section for these items, shall also be placed on the outside of all shipping boxes. Example: Should the shipping box contain six LED modules, individual barcode labels for all of the six modules inside the box shall be affixed to the outside of the box. The labels shall also be grouped together so that they can be easily and quickly scanned by a barcode reader.

**Auxiliary Input and Flasher Cabinet** – Barcode Labels, meeting the same requirements of the labels specified in this section for these items, shall be placed on the outside of any shipping box that may contain these items.

(continued)

**5.0 Electronic Documentation**

An electronic file, Excel Spreadsheet, shall be provided for all deliveries of equipment that are specified in this Section and purchased by NYSDOT. This electronic file shall be supplied to the NYSDOT Traffic Signal Equipment Lab. Information on the recipient of this file can be obtained by contacting the NYS DOT Traffic Signal Equipment Lab at the phone number listed in this Section. Individual components not included in a Model 2070E, Model 330SR assembly and shipped on any NYSDOT Purchase Order shall have the following "Field" format for its spreadsheet:

Field 1 – NYSDOT's PO Number

Field 2 - Region No. of Region receiving shipment (1 thru 10). For shipments to the Signal Equipment Lab, these shall be noted as Lab in the Region No field. Note: Region numbers can usually be found on the distribution schedule that accompanies each issued Purchase Order

Field 3 – Assigned 2 Digit Model Number as listed herein

Field 4 – NYSDOT's Barcode ID number. This number is the "Text of the Barcode Information" as specified in this paragraph  
Units classified as Assemblies, Model 2070E, Model 330SR shipped on any NYSDOT Purchase Order shall have the following "field" format for its spreadsheet:

**Model 2070E with Model-4A, Model-1E, Model-3B and Model-2A**

Field 1 –NYSDOT's PO Number

Field 2 -Region No. of Region receiving shipment (1 thru 10). For shipments to the Signal Equipment Lab, these shall be noted as Lab in the Region No. field. Note: Region numbers can usually be found on the distribution schedule that accompanies each issued Purchase Order

Field 3 -Assigned 2 Digit Model Number as listed herein for the Model 2070E controller/Chassis

Field 4 –NYSDOT's Barcode ID number for the Model 2070E Controller/Chassis. This number is the "Text of the Barcode Information" as specified in this paragraph.

Field 5 -Assigned 2 Digit Model Number as listed herein for the Model-4A 10 Amp Power Supply

Field 6 –NYSDOT's Barcode ID number for the Model-4A 10 Amp Power Supply. This number is the "Text of the Barcode Information" as specified in this paragraph

Field 7 -Assigned 2 Digit Model Number as listed herein for the Model-2A FIO unit

Field 8 –NYSDOT's Barcode ID number for the Model-2A FIO

Field 9 -Assigned 2 Digit Model Number as listed herein for the Model- 1E CPU

Field 10 –NYSDOT's Barcode ID number for the Model-1E CPU

Field 11 -Assigned 2 Digit Model Number as listed herein for the Model-3B FPA

Field 12 –NYSDOT's Barcode ID number for the Model-3B FPA

**Model 330SR, 24 VDC Power Supply and PDA unit**

Field 1 – NYSDOT's PO Number

Field 2 - Region No. of Region receiving shipment (1 thru 10). For shipments to the Signal Equipment Lab, these shall be noted as Lab in the Region No. field. Note: Region numbers can usually be found on the distribution schedule that accompanies each issued Purchase Order

Field 3 - Assigned 2 Digit Model Number as listed herein for the Model 330SR

Field 4 – NYSDOT's Barcode ID number for the Model 330R or 330SR Cabinet. This number is the "Text of the Barcode Information" as specified in this paragraph

Field 5 - Assigned 2 Digit Model Number as listed herein for the 24 VDC Power Supply

Field 6 - NYSDOT's Barcode ID number for the 24 VDC Power Supply

Field 7 - Assigned 2 Digit Model Number as listed herein for the PDA unit

Field 8 – NYSDOT's Barcode ID number for the PDA unit

\* \* \*

(continued)

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

Chapter 2

MICROCOMPUTER REQUIREMENT

CHAPTER 2

**Detailed Specifications for Model 2070E Traffic Signal Controller and Components**

This specification defines the requirements of the Model 2070E Traffic Signal Controller, its individual components and auxiliary modules. This specification shall supplement the General Technical Requirements within Chapter 1 for Microcomputer Traffic Signal Control Equipment and in the case of conflict this detailed specification shall govern.

**1. Main Specifications for Model 2070E and Components**

1.1 The Model 2070E Traffic Controller is an enhanced version of the Model 2070L Traffic Controller and includes the following modules: 2070-1E CPU, 2070-2E FIO, 2070-3B Front Panel Assembly and 2070-4A Power Supply. Model 2070L's that were purchased in the past by NYSDOT were based on Caltrans TEES specifications dated August 16 2002 and addenda's applicable to that specification. The Model 2070L is no longer supported by current Caltrans Traffic Controller specifications and it has been superseded by the model 2070E. Following are some of the differences between the Model 2070E and Model 2070L:

- 2070-1E CPU Module provides for a dedicated Network switch for improved network performance.
- 2070-1E CPU Module has a larger amount of memory for the /R2 drive. Increased from the 1 Mbytes specified for the Model 2070-1B to 2 Mbytes.
- 2070-1E CPU Module provides two RJ-45 Jacks on the Front Plate.
- 2070-3B Front Panel Assembly with an additional C50J Jack.
- 2070-2E Field I/O Module - provides serial port LED indicators for Tx and Rx on its front plate.

1.2 All Model 2070E controllers, its included components listed in item 1.1 above, and its auxiliary modules: 2070-1C, 2070-6A, 2070-6B, and 2070-7A modules, built and purchased to this specification shall adhere to the latest CALTRANS Transportation Electrical Equipment Specifications (TEES) and all related errata, and to the NYSDOT additions/exceptions to the TEES specifications defined in this Chapter.

**2. NYSDOT Additions and Exceptions**

**2.1 Model 2070-2E FIO**

Upon power up, the Model 2070-2E FIO firmware shall begin toggling of the Watchdog Output Pin (Pin 103 of connector C1) On/Off within 0.750 seconds. The firmware shall also turn on all 16 switchpack Red outputs of the C1 connector within 0.750 seconds. These outputs are listed in Table 13.1 of the Model 330SR Traffic Signal Cabinet specification herein. FIO firmware shall continue the toggling of the Watchdog Output and outputting of the Red outputs until control is turned over for these outputs by established communications with the user-supplied software running on the CPU module of the 2070E. The maximum time for establishing communications and control with user supplied software shall be 10 seconds. Should communications or control not be established within this time with the user supplied software, the FIO firmware shall stop toggling the Watchdog Output and turn off the switchpack Red outputs

**2.2 Model 2070-1E CPU**

A file named Startup shall be include on the /f0 directory of the Model 2070-1E CPU. This file shall include the following text program:

```
/f0/sys/startspf  
ifconfig enet0 10.20.70.51 netmask 0xfffff00 broadcast 10.20.70.255  
shell -l <>>>/sp4 &
```

**2.3 Model 2070-3B Front Panel**

The display of the Model 2070-3B Front Panel shall be supplied with a LED backlight.

(continued)

**2.4 Miscellaneous**

**2.4.1 Model 2070E's supplied to this specification shall have the chassis openings for any unused Motherboard connectors covered with the appropriate cover plates so that the entire rear of the controller is covered and closed.**

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**NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)**

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 3**

***Detailed Specification on Dual Loop Vehicle Detector Modules Model 222***

This specification defines the minimum detailed requirements applicable to dual loop vehicle detector modules. The intent is to set forth the electrical and mechanical design parameters, the requirements within which the equipment shall operate, and the means by which the equipment shall be tested to determine whether it shall so operate. This specification shall supplement the General Technical Requirements within Chapter 1 for Traffic Signal Control Equipment, and, in case of conflict, this detailed specification shall govern.

**SECTION I  
GENERAL DESCRIPTION**

**1. Vehicle Detector Modules**

The dual loop vehicle detector modules are units containing two (2) detector channels. The modules shall be compatible with and mate to the cabinet input files. The detector channels working independently will produce output signals when vehicles pass over or remain within wire loops embedded in the roadway.

The vehicle detector module is of purely solid-state design. The method of detection shall be based upon a design philosophy that shall render reliable detection when a conductive metallic mass entering a loop causes a 0.01% or greater change in detector input inductance.

**SECTION II  
FUNCTIONAL REQUIREMENTS**

**1. Operational Specifications**

1.1 Each detector channel shall be capable of detecting all types of licensed motor vehicles except mopeds at a distance of up to 800 feet from the loop to the detector module.

1.2 The detector module shall be mounted on an edge-connected, printed circuit board of the following dimensions (see Fig – 3.1 below):

(continued)



1.2.1 To avoid interference with the detector rack card guides, there shall be a 0.1” minimum clearance between the entire top and bottom of the PC board and any protruding hardware such as washers, screws, Front Panel mounting brackets or circuit components

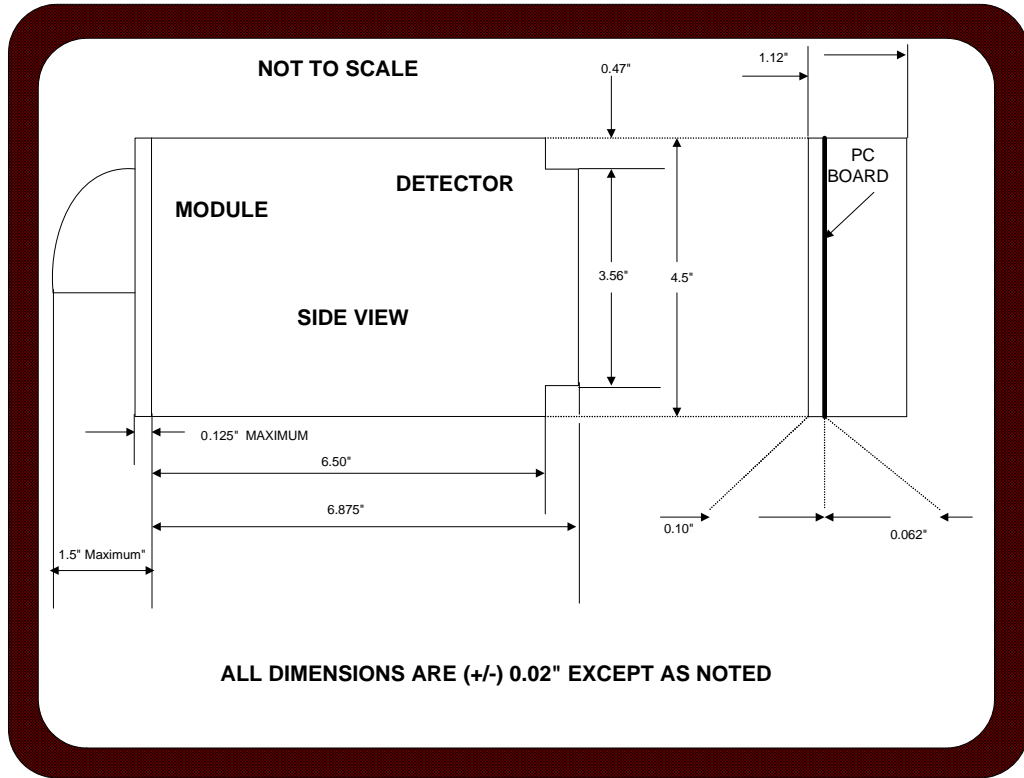


Fig – 3.1 : Detector Module dimensions

(continued)

- 1.3 Each detector channel shall not draw more than 100 milliamperes from the +24 VDC cabinet power supply for its operating power.
- 1.4 The detector module front panel shall be provided with a hand pull to facilitate insertion and removal from the input file.
- 1.5 Each detector channel shall have a front panel mounted indicator to provide visual indication of each vehicle detection.
- 1.6 Detector tuning may be automatic, self-tuning. Only front panel controls shall be used in the manual tuning operation.
- 1.7 The detectors shall be capable of operating in compliance with all performance requirements herein specified when connected to an inductance (loop plus lead-in) of from 50 to 1000 microhenrys with a Q-parameter as low as five (5) at the detector operating frequency. Each detector shall be capable of providing reliable detection information when connected to loops which are shorted or leaky to ground.
- 1.8 Each detector channel output shall be an Opto-isolated NPN open collector capable of sinking 50 milliamperes at 30 volts. This output shall be compatible with the controller unit inputs (see Chapter 2).  
Each output line shall have blocking diodes installed to prevent the sensor unit from "sourcing" power into the controller inputs.
- 1.9 Loop inputs to each channel shall be transformer isolated.

## **2. Tuning**

The vehicle detector circuits shall be so designed that drift which occurs with regard to the environment and applied power shall not cause an actuation.

## **3. Mode Selection Requirements**

- 3.1 Each detector channel shall have two selectable modes of detection - Pulse and Presence.
- 3.2 Pulse Mode
  - 3.2.1 In pulse mode, each new vehicle presence within the zone of detection shall initiate a detector channel output pulse of 125 (+/- 25) milliseconds in duration.
  - 3.2.2 Should a vehicle remain in a portion of the zone of detection for a period in excess of two seconds, the detector channel shall automatically "tune out" the presence of said vehicle. The channel shall then be capable of detection of another vehicle entering the same zone of detection. This response time between the first vehicle pulse and channel capability to detect another vehicle shall be three (3) seconds maximum.
- 3.3 Presence Mode
  - 3.3.1 In presence mode, the detector channel shall recover to normal sensitivity within one (1) second after termination of vehicle presence in the zone of detection regardless of the duration of the presence.
  - 3.3.2 With the detector channel in its most sensitive setting, the presence of a vehicle in the zone of detection shall be detected a minimum of three (3) minutes for a vehicle causing 0.02 percent inductance change and a minimum of ten (10) minutes for a vehicle causing 0.60 percent inductance change.
  - 3.3.3 The detector channel in the lowest sensitivity setting (OCC) shall indicate the continuous presence for four (4) minutes minimum of a vehicle causing 1% or more inductance change.

## **4. Sensitivity**

- 4.1 Each detector channel shall be equipped with panel selectable sensitivity setting(s) in both presence and pulse modes to accomplish the following under operational and environmental requirements of this specification:

(continued)

4.1.1 Each detector channel shall respond to an inductance change of 0.02% while connected to the following three turn loop configurations.

- (1)Single 6 feet by 6 feet loop with 50 feet lead in
- (2)Single 6 feet by 6 feet loop with 800 feet lead in
- (3)Four 6 feet by 6 feet loops connected in series/parallel with 250 feet lead in
- (4)Four 6 feet by 6 feet loops connected in series with 800 feet lead in

4.1.2 Shall respond to Occupancy (OCC) setting(s) to a nominal change in inductance between 0.15% to 0.4% while connected to the above loop configurations. This setting shall not respond to an inductance change of less than 0.1%.

4.2 The detector channel shall not detect vehicles, moving or stopped at distances 3 feet or more from any loop perimeter.

4.3 All sensitivity settings shall not differ more than +/- 40% from the nominal value chosen.

**4.4 A minimum of seven sensitivity settings (not including "off") shall be provided for each channel.**

## 5. Response Timing

5.1 Response time of the detector channel for the OCC setting shall be less than 20 milliseconds. That is, for any negative inductive change which exceeds its sensitivity threshold, the channel shall output a ground true logic level within 20 milliseconds. When such change is removed, the output shall become an open circuit within 20 milliseconds. For test purposes, the negative change of inductance will be maintained for a minimum of 100 milliseconds and a maximum of 600 milliseconds after it is applied. When the difference between the length of time the inductance change is applied, and the corresponding ground true output time are averaged over ten (10) trials, the value that average difference shall not exceed 10 milliseconds.

5.2 The response time of the detector channel for the most sensitive setting shall be less than 250 milliseconds for a 1.0% inductance change.

## SECTION III ELECTRICAL REQUIREMENTS

### 1. Application of power

1.1 The detector channels shall begin normal operation within thirty (30) seconds after the application of power or the reset signal.

### 2. Interference

2.1 The separate channels contained within a given module shall include means to prevent cross-talk with one another.

2.2 Each module shall include means to prevent cross-talk with other modules. If the prevent means is manual the control for it shall be located on the front panel of the unit. No additional external wiring shall be required to implement the prevent means.

### 3. Lightning Protection

Lightning protection shall be installed across all input pairs of the detector/input card. The protection shall be designed to enable the device to withstand a 10mF capacitor, charged to +/- 1000 VDC, being placed, for a period of one (1) second, directly across the input pins or between either input pin and Chassis Ground of the detector/input card with no load present.

### 4. Tracking Rate

4.1 The detector shall be capable of compensating or tracking for an environmental change up to 1 x 10% change in inductance per second. This requirement must be met within two (2) hours after initial application of operating power.

(continued)

**5. Tracking Range**

5.1 The detector shall be capable of normal operation as the input inductance is changed +/- 5.0% from the quiescent tuning point regardless of internal circuit drift.

5.2 The detector shall be capable of normal operation as the input resistance is changed +/- 0.5% from the quiescent tuning point regardless of internal circuit drift.

**6. Temperature Change.**

6.1 The operation of the detector module shall not be affected by changes in the inductance of the loop caused by environmental changes with the rate of temperature change not exceeding 1 1/2 degrees Fahrenheit per three (3) minutes. The opening or closing of the controller cabinet door with a differential temperature of 30 degrees Fahrenheit between the inside and outside shall not affect the proper operation of the detector.

**7. Board Edge Connector Pin Assignment**

<b>PIN</b>	<b>FUNCTION</b>	<b>PIN</b>	<b>FUNCTION</b>	<b>PIN</b>	<b>FUNCTION</b>
<b>A</b>	DC Ground	<b>J</b>	Loop #2 Input	<b>S</b>	N/A
<b>B</b>	+24 VDC	<b>K</b>	Loop #2 Input	<b>T</b>	N/A
<b>C</b>	Detector Reset	<b>L</b>	Chassis Ground	<b>U</b>	N/A
<b>D</b>	Loop #1 Input	<b>M</b>	AC-	<b>V</b>	N/A
<b>E</b>	Loop #1 Input	<b>N</b>	AC+	<b>W</b>	Loop #2 Output(C)
<b>F</b>	Loop #1 Output (C)	<b>P</b>	N/A	<b>X</b>	Loop #2 Output(E)
<b>H</b>	Loop #1 Output (E)	<b>R</b>	N/A	<b>Y</b>	N/A
				<b>Z</b>	N/A
:Slotted for Keying (C): Collector (E): Emitter N/A: Not Assigned					

**8. Reset**

8.1 The detector module shall respond to a ground reset signal of 15 microseconds and begin normal operation within thirty (30) seconds after the reset command.

\* \* \*

**NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)**

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 4**

***Detailed Specification on Magnetic Detector Probe Model 231 and Dual Magnetic Detector Amplifier Modules Model 232***

This specification defines the minimum detailed requirements applicable to magnetic detector amplifier probes and to dual magnetic detector amplifier modules. The intent is to set forth the requirements within which the equipment shall operate, and the means by which the equipment shall be tested to determine whether it shall so operate. This specification shall supplement the General Technical Requirements with Chapter 1 for Microcomputer Traffic Signal Control Equipment, and, in case of conflicts, this detailed specification shall govern.

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**SECTION I  
GENERAL DESCRIPTION**

**1. Design**

The dual magnetic detector modules are units that contain two (2) magnetic detector channels, which plug into the rack enclosure. The detectors, working independently, while associated with their magnetic detector probe, will produce signals when vehicles pass over the magnetic detector probe embedded in the roadway.

The magnetic detector module is of purely solid-state design. The method of detection shall be based upon a design philosophy that shall render reliable detection when any licensed vehicle enters the field of the probe.

**SECTION II  
FUNCTIONAL REQUIREMENTS**

**1. Magnetic detector amplifier requirements (Model 232)**

1.1 The magnetic detector module shall be mounted on an edge-connected printed circuit board whose dimensions are the same as those found within the dual loop vehicle detector module.

1.1.1 The magnetic detector module shall be directly interchangeable with a loop detector module (magnetic probe must be used with magnetic detector module).

1.2 Each magnetic detector channel shall not draw more than 60 milliamps from the +24 VDC supply for its operating power.

1.3 The detector module front panel shall be provided with a hand pull to facilitate insertion and removal from the rack enclosure.

1.4 Each detector channel shall have a front panel mounted indicator to provide visual indication of each vehicle detection.

1.5 All controls required for tuning, including sensitivity shall be readily adjustable and front panel mounted.

1.6 The detector modules shall be capable of operating in compliance with all performance requirements herein specified. When connected to a magnetic detector probe with 1000 feet of lead-in cable, they shall detect a 'Honda 100' passing within 18" of the sensing element installed 18" below the top of the pavement at all speeds between 3 and 80 miles per hour.

1.7 Each detector channel output shall be an NPN open collector capable of sinking 50 milliamperes at 30 volts. The output shall be compatible with the inputs for the processor specification. Each output shall have blocking diodes installed to prevent the sensor unit from sourcing power into the processor input. The output shall indicate the passage of a vehicle by saturating the NPN transistor or optical isolator, with no more than 0.6 VDC across the output circuit. It shall remain saturated for no less than 100 nor more than 150 milliseconds.

1.8 The magnetic detector amplifier module shall:

- a) Operate with substantially no change in gain or frequency response within a range of 10% (+/-) from rated power line voltage
- b) Operate on a single cycle of 0.10 hertz sine wave with an amplitude of 5 millivolts
- c) Operate on a single cycle of a sine wave between 0.25 hertz and 1.0 hertz inclusive with an amplitude of 2 millivolts
- d) Not operate with a sinusoidal 60 hertz wave applied to the input having an amplitude of 1.0 volt
- e) Not give multiple pulses of output from single input voltage cycles

1.9 A momentary switch shall be provided to place a call on each channel on an individual basis

(continued)

1.10 Lightning protection shall be installed across all input pairs of the detector/input card. The protection shall be designed to enable the device to withstand a 10mF capacitor, charged to +/- 1000 VDC, being placed, for a period of one (1) second, directly across the input pins or between either input pin and Chassis Ground of the detector/input card with no load present.

1.11 The magnetic detector amplifier shall include a switch to allow the user to set a minimum of four timed periods between 0.25 and 2.0 seconds following an output pulse during which the ability to issue subsequent output pulses would be inhibited. The purpose of this switch is to eliminate the issuance of multiple calls from one vehicle.

The switch shall be marked over a range of 0 to 3 3/4 seconds in 1/4 second increments. A separate switch shall be provided for each channel and shall be located on the amplifier printed circuit board. The switch shall be prominently labeled as to its function, channel and timing settings.

**2. Magnetic detector probe requirements (Model 231)**

2.1 Each magnetic detector probe shall be designed for installation in a 3” PVC conduit. The bottom of the conduit shall be placed 18” below the top of the pavement.

2.2 The case of the probe shall be constructed of nonferrous material suitable for use in the environment in which it will operate and shall be sealed to prevent the entrance of moisture. No moving parts or active components, i.e. transistors, shall be contained in the probe.

2.3 Each probe shall be designed for ease of installation, repositioning and removal. It shall be no larger than 2.25” in diameter and shall have no sharp edges along its length. The overall length shall not exceed 18”.

2.4 Each probe shall be supplied with a minimum of 75 feet of two conductor PVC jacketed cable. The conductors shall consist of 18 AWG stranded, PVC coated wire rated at 300 V. The cable shall be designed for operating over a temperature range of -4 degrees through 180 degrees Fahrenheit.

2.5 The passage of a 'Honda 100' motorcycle within 75 feet of the sensing element, at speeds from 3 to 80 miles per hour, shall provide a sufficient signal to operate a Model 232 amplifier with 1000 feet of lead-in cable between the amplifier and the sensing element.

2.6 The magnetic detector probe shall be moisture proof and capable of withstanding exposure to high concentrations of salt in water and earth without degradation of leakage resistance. Leakage resistance shall be a minimum of 10 megohms when tested with a 400 VDC between lead wires and the fluid of a salt water bath after the unit, including lead wire entrance, has been entirely immersed in the salt water for a period of twenty-four (24) hours.

**SECTION III  
CONNECTOR REQUIREMENTS**

**1. The Printed Circuit Board Edge Connector** shall mate with the Cabinet Input Files as called out under Chapter 3 and Chapter 13.

**2. Connector Pin Assignments** are as follows:

<b>PIN</b>	<b>FUNCTION</b>	<b>PIN</b>	<b>FUNCTION</b>	<b>PIN</b>	<b>FUNCTION</b>
<b>A</b>	DC Ground	<b>J</b>	Detector #2 Probe	<b>S</b>	N/A
<b>B</b>	+24 VDC	<b>K</b>	Detector#2 Probe	<b>T</b>	N/A
<b>C</b>	NC	<b>L</b>	Chassis Ground	<b>U</b>	N/A
<b>D</b>	Detector #1 Probe	<b>M</b>	AC-	<b>V</b>	N/A
<b>E</b>	Detector #1 Probe	<b>N</b>	115 V AC+	<b>W</b>	Director #2 Output(C)
<b>F</b>	Detector #1 Output (C)	<b>P</b>	N/A	<b>X</b>	Director #2 Output(E)
<b>H</b>	Detector #1 Output (E)	<b>R</b>	N/A	<b>Y</b>	N/A
				<b>Z</b>	N/A
:Slotted for Keying (C): Collector (E): Emitter N/A: Not Assigned					

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NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 5**  
***Detailed Specification on DC Dual Isolation Modules Model 242***

This specification defines the minimum detailed requirements applicable to dual isolation modules. The intent is to set forth the electrical and mechanical design parameters, the requirements within which the equipment shall operate, and the means by which the equipment shall be tested to determine whether it shall so operate. This specification shall supplement the General Technical Requirements within Chapter 1 for Microcomputer Traffic Signal Control Equipment, and in case of conflict, this detailed specification shall govern.

**SECTION I**  
**GENERAL DESCRIPTION**

**1. Design**

The dual isolation modules are units which contain two (2) isolation channels, which plug into the detector rack. Each isolation channel, working independently, shall provide isolation between electrical contacts external to the module (pedestrian push-buttons, preemption, etc.) and the microcomputer input.

The isolation module is of purely solid-state design. The method of isolation shall be based upon a design philosophy which shall render reliable operation.

**SECTION II**  
**FUNCTIONAL REQUIREMENTS**

**1. Operational Specifications**

1.1 The isolation module shall be mounted on an edge-connected printed circuit board (see Chapter 3 Fig-3.1 for dimensions).

1.2 Each isolation channel shall not draw more than 400 milliamperes from the 24 VDC cabinet supply for its operating power.

1.3 The isolation module front panel shall be provided with a hand-pull to facilitate insertion and removal from the rack enclosure.

1.4 The isolation channel shall have a front panel mounted indicator to provide visual indication of each electrical contact closure and a test switch to place an input to the isolation channel. Both indicator and switch shall be on the input side of the optical coupler. Test switch shall be a single pole-double throw, three (3) position switch; momentary ON, OFF and one (1) maintained ON positions. The contacts shall be either silver or coin silver with gold over nickel plate rated for 5 ampere at 115 VAC.

1.5 Each isolation channel output shall be an opto-isolated NPN open collector capable of sinking 50 milliamperes at 30 volts. This output shall be compatible with the Model 2070 Controller Unit (see Chapter 2s). Each isolation channel shall present ground true logic to the Controller Unit inputs.

1.6 Front panel of module shall be labeled as to model number and titled "DC DUAL ISOLATION MODULE".

**2. Rack Enclosure**

2.1 See Chapter 3 and Chapter 13, for details on Detector Rack Enclosure wiring.

(continued)

**SECTION III  
 ELECTRICAL REQUIREMENTS**

**1. Electrical input interface**

1.1 Each isolation channel input shall be turned on (true) when the resulting contact closure causes an input voltage less than 8 VDC, and shall be turned off (false) when the resulting contact opening causes the input voltage to exceed 12 VDC. Each input shall deliver no less than 15 nor more than 20 milliamperes to an electrical contact closure or short from the internal 24 volt supply.

**2. Isolation**

2.1 The minimum isolation shall be 1 billion ohms and 2500 VDC from input to output.

**3. Lightning Protection**

Lightning Protection shall be installed across all input pairs of the detector/input card. The protection shall be designed to enable the device to withstand a 10mF capacitor, charged to +/- 1000 VDC, being placed, for a period of one (1) second, directly across the input pins or between either input pin and Chassis Ground of the detector/input card with no load present.

**4. Board Edge Connector Pin Assignment**

PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
A	DC Ground	J	Input #2	S	N/A
B	+24 VDC	K	--	T	N/A
C	--	L	Chassis Ground	U	N/A
D	Input #1	M	--	V	--
E	--	N	--	W	Output #2 (C)
F	Output #1 (C)	P	N/A	X	Output #2 (E)
H	Output #1 (E)	R	--	Y	N/A
				Z	N/A
-- : Slotted for Keying (C): Collector (E): Emitter N/A: Not Assigned					

\* \* \*

**NEW YORK STATE  
 DEPARTMENT OF TRANSPORTATION  
 TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)**

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 6**

***Detailed Specification on Dual AC Isolation Modules Model 252***

This specification defines the minimum detailed requirements applicable to dual AC Isolation Modules. The intent is to set forth the electrical and mechanical design parameters, the requirements within which the equipment shall operate, and the means by which the equipment shall be tested to determine whether it shall so operate. This specification shall supplement the General Technical Requirements within Chapter 1 for Microcomputer Traffic Signal Control Equipment, and in the case of conflict, this detailed specification shall govern.

**SECTION I  
 GENERAL DESCRIPTION**

**1. Design**

The dual AC Isolation Module is a unit that contains two (2) isolation channels, which plug into the detector rack (see Chapter 5). Each isolation channel, working independently, shall provide isolation between 120 VAC input circuits and the microcomputer input.

(continued)



## **2. Isolation Module**

The isolation module is of purely solid-state design. The method of isolation shall be based on a design philosophy that shall render reliable operation.

## **SECTION II FUNCTIONAL REQUIREMENTS**

### **1. Operational Specifications**

- 1.1 The isolation module shall be mounted on an edge-connected printed circuit board. (See Chapter 13 Fig-3.13 for dimensions).
- 1.2 Each isolation channel shall not draw more than 2.5 watts of power from the 24 VDC cabinet supply.
- 1.3 The isolation module front panel shall be provided with a hand pull to facilitate insertion and removal from the input rack enclosure.
- 1.4 Each isolation channel shall have a front panel-mounted indicator to provide visual indication of an output to the controller unit, and a test switch to simulate a valid input. The test switch shall be a single pole-double throw, three-position switch; momentary ON, OFF and maintained ON positions. The contacts shall be either silver or coin silver with gold over nickel plate rated for 5 amperes at 120 VAC.
- 1.5 Each isolation channel output shall be an opto-isolated NPN open collector capable of sinking 50 milliamperes at 30 volts. This output shall be compatible with the Traffic Controller Unit. Each isolation channel shall present ground true logic to the controller unit inputs. A switch to invert each isolation channel logic to a ground false logic shall be provided on the printed circuit card.
- 1.6 Front panel of the isolator unit shall be labeled as to the model number and titled "AC ISOLATION MODULE".
- 1.7 A valid input to the isolation channel shall cause a channel output of 100 (+/- 50) milliseconds minimum duration. The channel shall reset within 100 (+/- 50) milliseconds after the input signal decays below the valid input level or the opening of the test switch.

## **SECTION III ELECTRICAL REQUIREMENTS**

### **1. Electrical Input Interface**

- 1.1 Each isolation channel input shall be capable of accepting input voltages of up to 135 VAC.
- 1.2 Each isolation channel input shall have a turn on (true) voltage of 80 (+/- 5) VAC. If a voltage equal to or greater than the turn on voltage is applied to the channel input, the isolation module will present a ground at its output 100 (+/- 50) milliseconds after this voltage was applied.
- 1.3 Each isolation channel input shall be designed so that for all voltages less than 75 VAC, the isolation module will be turned off (false). Upon application of an AC voltage to turn the device off, the output of the device will remain turned on for a period of 100 (+/- 50) milliseconds before turning off.
- 1.4 The input impedance of each input shall not be less than 6000 ohms nor greater than 15,000 ohms at 60 hertz.

### **2. Isolation**

- 2.1 The minimum isolation shall be 1000 megohms between the input and output terminals at 500 VAC applied voltage.

(continued)

**3. Board Edge Connector Pin Assignment**

PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
<b>A</b>	DC Ground	<b>J</b>	Input #2	<b>S</b>	N/A
<b>B</b>	+24 VDC	<b>K</b>	Input #2 Common	<b>T</b>	N/A
<b>C</b>	N/A	<b>L</b>	Chassis Ground	<b>U</b>	N/A
<b>D</b>	Input #1	<b>M</b>	AC-	<b>V</b>	N/A
<b>E</b>	Input #1 Common	<b>N</b>	AC+	<b>W</b>	Output #2 (C)
<b>F</b>	Output #1 (C)	<b>P</b>	N/A	<b>X</b>	Output # 2 (C)
<b>H</b>	Output #1 (E)	<b>R</b>	N/A	<b>Y</b>	Output #2 (E)N/A
				<b>Z</b>	N/A
: Slotted for Keying (C): Collector (E): Emitter N/A: Not Assigned					

**4. Lightning Protection**

Lightning Protection shall be installed across all input pairs of the detector/input card. The protection shall be designed to enable the device to withstand a 10mF capacitor, charged to +/- 1000 VDC, being placed, for a period of one (1) second, directly across the input pins or between either input pin and Chassis Ground of the detector/input card with no load present.

\* \* \*

**NEW YORK STATE  
 DEPARTMENT OF TRANSPORTATION  
 TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)**

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 7  
 Detailed Specification on Solid State Flasher Relay and Solid State Switch  
 Model 204**

This specification defines the minimum detailed requirements applicable to solid-state Flasher Relays. The intent is to set forth the electrical and mechanical design parameters, the requirements within which the equipment shall operate, and the means by which the equipment shall be tested to determine whether it shall so operate. This specification shall supplement the General Technical Requirements within Chapter 1 for Microcomputer Traffic Signal Control Equipment, and in case of conflict, the detailed specification shall govern.

**SECTION I  
 GENERAL DESCRIPTION**

**1. Design**

A solid-state Flasher Relay is a plug-in device containing a flasher control circuit and two switches of solid-state design. This shall be used for alternate opening and closing connections between the applied power and the lamps required for flashing operation.

**SECTION II  
 FUNCTIONAL REQUIREMENTS**

**1. Capabilities**

- 1.1 The solid-state Flasher Relay shall be supplied as required with each wiring harness.
- 1.2 The Model 204 shall have an internal power supply for logic and control.
- 1.3 The unit shall commence flashing operation when AC power is applied to the input terminals.
- 1.4 The Flasher Relay shall provide fifty (50) to sixty (60) flashes per minute with a 50% duty cycle.

(continued)

- 1.5 There shall be a Cinch-Jones connector, Type #P-406-SB on the relay, an AC plus, an AC common, a flasher output #1, a flasher output #2, a signal ground and a chassis ground.
- 1.6 The flasher shall be capable of operating as a single or dual flasher.

### SECTION III ELECTRICAL REQUIREMENTS

#### 1. Requirements

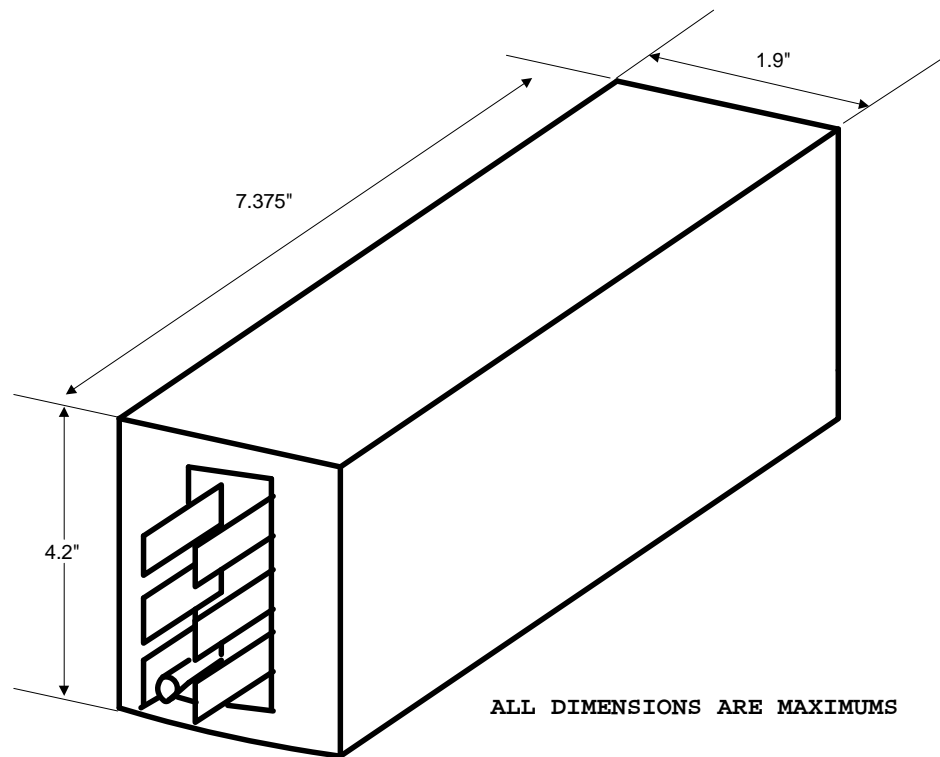
- 1.1 The solid-state Flasher Relay shall draw all of its power from the input AC Line and internal circuitry shall be run from this source through a suitable power supply internal to the unit.
- 1.2 The solid-state output switch of the unit shall have an off state dv/dt rating of 200 volts per microsecond or better.
- 1.3 The output switch shall be capable of withstanding a peak inverse voltage of 500 volts.
- 1.4 Each output switch shall be capable of switching any current from 0.2 to 15 amperes of tungsten lamp load at 120 volts, 60 hertz, or 15 amperes at a power factor of 0.85.
- 1.5 Each output switch shall turn on within +/- 5 degrees of the zero voltage point of the AC sinusoidal line, and shall turn off within +/- 5 degrees of the zero current point of the alternating current sinusoidal line. The zero voltage turn on may be within +/- 10 degrees of the zero voltage point only during the first half cycle of line voltage during which an input control signal is applied.
- 1.6 The output switches shall have a mean time between failure of 30 million operations or greater when switching a tungsten filament load of 2000 watts, 1000 watts per switch.
- 1.7 The output switches shall have a one (1) cycle surge rating of 175 amperes RMS or 247.5 amperes peak and a one (1) second surge rating of 40 amperes RMS.
- 1.8 The output switches shall have isolation between input and output of 2000 VDC or better and 10,000 million ohms DC. The unit shall also have 50 million ohms DC resistance from output to ground.
- 1.9 There shall be mounted on the flasher unit a visual indication to indicate when each output is on and off.
- 1.10 A MOV, Harris V150LA20B or equal shall be provided between +AC (pin 11) and Flashing Out (pins 7 & 8).
- **Recurrent peak voltage 212 volts**
  - **Energy rating maximum 20 joules**
  - **Power dissipation, average 0.85 watts**
  - **Peak current for pulses 2000 amperes less than 6 microseconds**
  - **Stand by current less than 1 milliamp**
- 1.11 All printed circuit boards used in the Flasher Assembly shall be covered with a waterproof/dielectric coating or encapsulated in a potting compound suitable for use with electronic components.
- 1.12 The impedance of the switch in the off state shall be a minimum of 15,000 ohms at 60 hertz.
- 1.13 To improve the thermal conductivity of the Flasher Assembly, a thermally conductive substance, such as heat sink compound, shall be applied between all surfaces that are used as a heat sink.

(continued)

**SECTION IV  
MECHANICAL REQUIREMENTS**

**1. Dimensions**

The overall dimensions of the solid-state Flasher Relay shall comply with the following drawing (Fig-7.1)



**Fig 7.1-Solid State Flasher relay Dimensions**

(continued)

**2. Dimensions**

The flasher shall be so constructed that its lower surface will be 2.1 inch to 2.05 inch below the centerline and that no part will extend more than 0.85 inch to the left and 1.05 inch to the right of the centerline of the connector configuration.

**3. Assembly**

All electrical parts of the Flasher Assembly shall be enclosed and protected against physical damage by either a dust resistant metal enclosure or a suitable potting compound.

**4. Caution**

When the unit is in place, no electrically energized parts will be exposed, thereby preventing shock hazards.

**5. Handle or Gripping Device**

A handle or gripping device shall be provided on the front panel of the Flasher Unit.

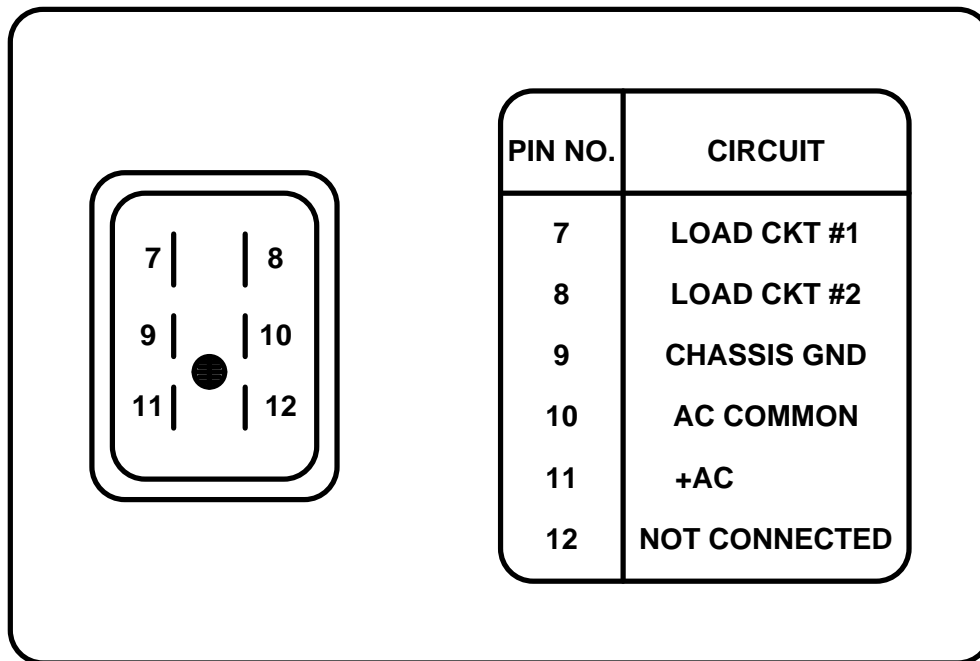
**SECTION V  
CONNECTOR**

**1. Electrical Connections**

All electrical connections into and out of the solid-state Flasher Relay shall be through a multi-terminal connector, Cinch-Jones type #P-406-SB or equal. The connector shall be rigidly fixed to the rear or base of the flash relay.

**2. Mate**

The solid state Flasher Relay shall mate with a Cinch Jones type #S 406 SB or equal socket as follow ( Fig-7.2)



**Fig – 7.2 Front View of Flasher Mating Socket**

(continued)

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 8**  
***Detailed Specification on Solid State Switch Model 200***

This specification defines the minimum detailed requirements applicable to solid-state switch. The intent is to set forth the electrical and mechanical design parameters of the modules and their rack enclosures, the requirements within which the equipment shall operate, and the means by which the equipment shall be tested to determine whether it shall so operate. This specification shall supplement the General Technical Requirements within Chapter 1 for Microcomputer Traffic Signal Control Equipment and in case of conflict the Detailed Specification shall govern.

**SECTION I**  
**SOLID-STATE SWITCH PACK (MODEL 200)**

**1. Description**

A solid-state switch pack is an assembly containing three channels of solid-state switch outputs with each output controlled by a DC voltage input. The switch outputs are used for opening and closing connections between applied power and the traffic signals. Both vehicle and pedestrian traffic signals are controlled.

1.1 Each channel shall be designed so that the switch output shall be on when an input voltage of between 16 and 26 VDC is applied to the input terminals of that channel (i.e., pins 6 and 9 for the Red channel). The switch output shall be off when a voltage of between 0 and 6 VDC is applied.

1.2 Each channel's switch output shall have the following characteristics

1.2.1 Each switch shall have a minimum capability of switching any current from 0.05 to 10 amperes of tungsten lamp load at 120 volts, 60 hertz, or 10 amperes at a power factor of 0.85.

1.2.2 Each switch shall not draw more than 20 milliamps DC when an input of between 16 and 26 volts is applied across the input terminals. Each switch shall turn on within +/- 5 degrees of the zero voltage point of the AC wave-form. However, after a power restoration the zero voltage turn-on may be within +/- 10 degrees of the zero voltage point only during the first half-cycle of line voltage during which an input signal is applied. Each switch shall turn off within +/- 5 degrees of the zero current point of the AC wave-form. Both the turning on and off of the switch shall occur within 8.33 ms following application of the proper input levels to do either.

1.2.3 Each switch shall have a mean time between failure of 30 million operations or greater while switching a tungsten filament load of 1000 watts. Each switch shall have a one (1) cycle surge rating of 175 amperes RMS (247.5 amperes peak) and a one (1) second surge rating of 40 amperes RMS.

1.2.4 Each switch shall have isolation between input and output of 2000 VDC, or better, and 10,000 million ohms DC.

1.2.5 The input circuit of each switch shall have reverse polarity protection.

1.2.6 Each switch shall have an off state dv/dt rating of 100 volts per microsecond. Each switch shall be capable of withstanding a peak inverse voltage of 500 volts.

1.2.7 The output of each switch, when open, shall be 15,000 ohms. minimum "at 60 Hertz".

1.3 Both the turning on and off of the switch output shall occur within 8.3 msec. following application of the proper input levels to do either.

(continued)

## **2. Dimensions**

The overall physical dimensions of the switch pack case shall be 7 3/8" +/- 1/8" from the panel surface holding the mating connector to the front of the switch pack. The switch pack shall be no wider than 1.90" and no higher than 4.20". The switch pack shall be provided with a connector Cinch-Jones, type #P2412-SB or equivalent and mate with Cinch-Jones, type #S2412-SB or equivalent.

2.1 All electrical parts of the switch pack shall be enclosed and protected against physical damage by either a dust resistant metal enclosure or a potting compound suitable for use with electronic components.

## **3. Indicator Lights**

The front panel of the module assembly shall be provided with three (3) indicator lights to indicate the exercise of controller circuits "Red, Yellow, and/or Green". Indicator lights shall be labeled or color coded and mounted as follows: "Red" at top, "Yellow" in the middle, and "Green" at bottom.

3.1 While an intersection is in the flash mode, the indicator lights on the solid-state switch pack shall display the controllers output status.

3.2 Each switch pack shall have reverse polarity protection.

3.3 Each channels input shall not draw more than 20 milliamps DC when an input voltage of between 16 and 26 VDC is applied across the input terminals of that channel.

## **4. Load**

Not more than one (1) circuit, solid-state switch output, shall be simultaneously energized at any one time within any module assembly unless the combined load current on the energized circuits does not exceed 10 amperes.

## **5. Safety**

Each switch pack shall be so designed that persons inserting or removing the assembly will not be exposed to any parts having live voltage, and shall not be required to insert hands or fingers into any loading rack housing other modular assemblies. A handle or gripping device shall be attached to the front of each switch pack.

## **6. Dimensions**

The switch pack shall be so constructed that its lower surface will be between 2.10 and 2.05 in below the centerline and that no part will extend more than 0.9 in to the left and 1.10 in to the right of the centerline of the connector configuration.

## **7. Conductor**

A thermally conductive substance, such as heat sink compound, shall be applied between any surfaces in the unit that are intended to transmit heat between each other.

## **8. Waterproofing**

All printed circuit boards used in the Flasher assembly shall be coated with a waterproof coating, or encapsulated in a potting compound suitable for use with electronic components.

(continued)

**SECTION II  
 CONNECTOR**

**1. Electrical Connections**

All electrical connections into and out of the solid-state switch pack shall be through a multi-terminal connector, Cinch-Jones type #P-2412-SB or equal. The connector shall be rigidly fixed to the rear or base of the switch pack.

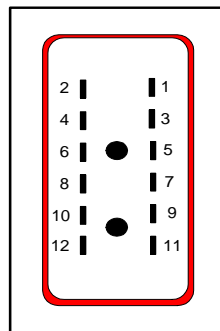
**2. Connector**

The mating female connector, #S-2412-SB or equal shall be at the rear of the load rack housing the switch packs. The Front View of Male Mating Connector is shown in Fig -8.1

**3. Pin Assignments**

All pins designated as spare shall be assigned and fixed as to the operating parameters and functions on or before approval.

PIN	FUNCTION	Level to Operate	PIN	FUNCTION	Level to Operate
1	+115 VAC, 60 Hz	115 VAC	7	C Output (G, W)	115 VAC
2	Chassis Ground	Gnd	8	B Input (Y)	Gnd
3	A Output (R, DW)	115VAC	9	+24 VDC	+24 VDC
4	Spare		10	C Input (G, W)	Gnd
5	B Output (Y)	115 VAC	11	Spare	
6	A Input (R, DW)	Gnd	12	Spare	



**Fig - 8.1 Front View of Male Mating Connector**

(continued)



NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 9**  
***Detailed Specification on 12 Volt Rack Mountable AC Power Supply Card***

This specification describes the requirements for a 12 volt Rack Mountable AC Power Supply which is used for Microwave Detector Card Combination Unit. This card will be installed in a Model 330SR Traffic Control Cabinet Detector Rack.

**SECTION I**  
**REQUIREMENTS**

**1. General Technical Requirements**

- 1.1 The components on this card shall be mounted on an edge-connected printed circuit board that conforms to the specifications shown on the two detector card drawings (See Fig-9.1 and Fig-9.2) included in this specification.
- 1.2 The module shall be provided with a hand-pull to facilitate insertion and removal from the detector rack enclosure.
- 1.3 The module shall have a front panel mounted indicator to provide visual indicating of each electrical contact closure. A test switch shall be provided to place an input to the controller unit. Both indicator and switch shall be on the input side of the optical coupler. The test switch shall be a single pole-double throw, three (3) position switch; momentary on, off and one (1) maintained on positions. The contacts shall be either silver or coin silver with gold over nickel plate rated for 5 amperes at 115 VAC.
- 1.4 The front panel of the module shall be labeled to indicate usage of all indicators and switches.
- 1.5 The unit shall be keyed (slotted) between pins B&C and M&N on the edge connector.
- 1.6 Operation and Maintenance Manuals shall be supplied with each unit. These manuals shall include the following information:
  - a) General Description
  - b) General Characteristics
  - c) Installation Procedure
  - d) Adjustments
  - e) Theory of Operation
  - f) Schematic and Logic Diagram
  - g) Parts List (to include part type, part number, manufacturer and ratings)

“A minimum of two Operation and Maintenance Manuals shall be sent to the address listed in paragraph 3.2.

**2. Electrical Requirements**

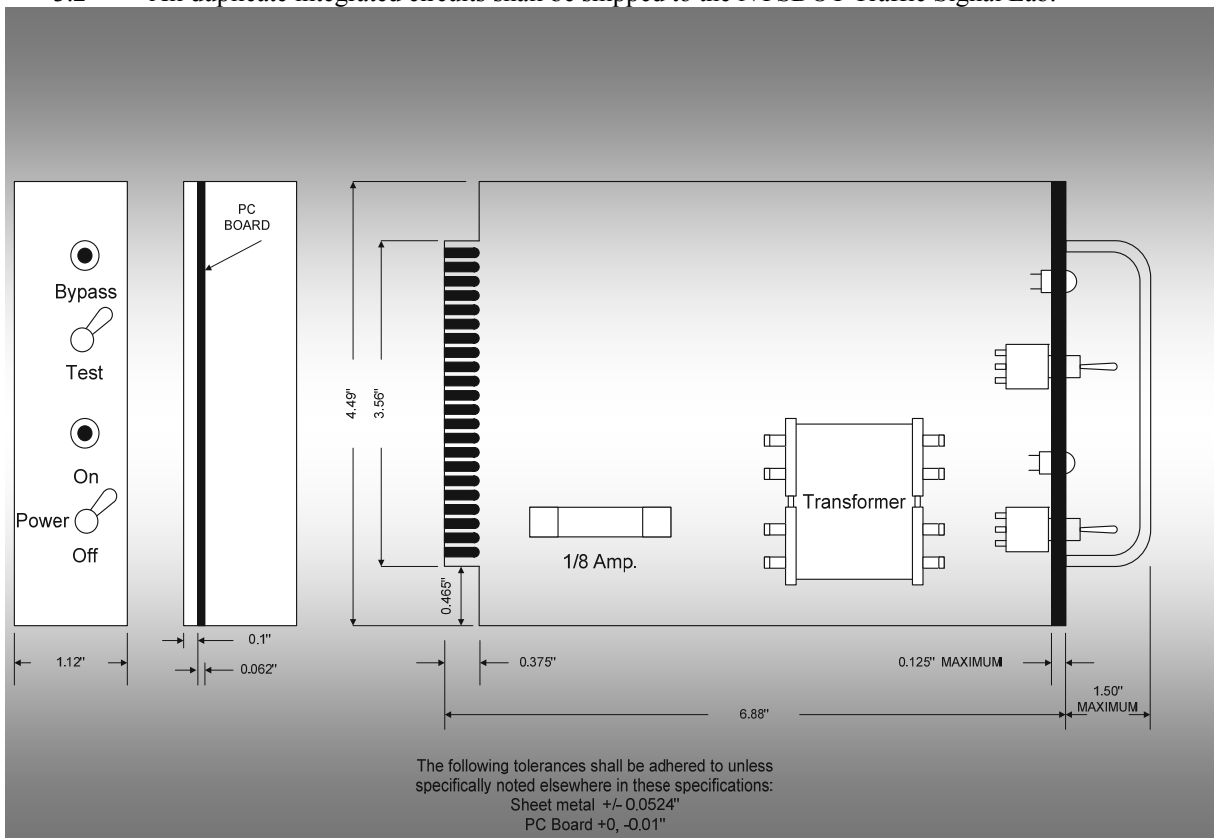
- 2.1 The output channel of the detector circuitry shall be an opto-isolated NPN open collector capable of sinking 50 milliamperes at 30 volts. The output channel shall be compatible with New York State 2070 controller inputs and shall present ground true logic to these inputs.
- 2.2 The detector circuitry shall be powered using the 24 VDC supplied in a Model 330SR traffic control cabinet detector rack. The detector circuitry shall not draw more than 100 milliamperes.
- 2.3 The module shall provide ground true logic to the controller when pins D & E of the edge connector are shorted and provide logic high when pins D & E are opened.

(continued)

- 2.4 The front panel shall be connected to chassis ground.
- 2.5 The input shall deliver no less than 15 or more than 20 milliamperes to a contact closure across pins D&E of the edge connector.
- 2.6 The unit shall be capable of supplying 12 VAC across pins F & H of the edge connector. This voltage shall be supplied by a transformer with a secondary rated at 12 volt amps. Power to the primary side of the transformer shall be provided by the Model 330SR Cabinet through pins M & N of the edge connector. The primary shall be fused at 1/8 ampere with a time delay fuse.
- 2.7 Lightning protection shall be installed across all input pairs of the detector/input card. The protection shall be designed to enable the device to withstand a 10mF capacitor, charged to +/- 1000 VDC, being placed for period of one.
  - (1) second, directly across the input pins or between either input pin and Chassis ground of the detector/input card with no load present
- 2.8 To avoid interference with the detector rack card guides, there shall be a 0.1" minimum clearance between the entire top and bottom of the PC board and any protruding hardware such as washers, screws, Front Panel mounting brackets or circuit components.

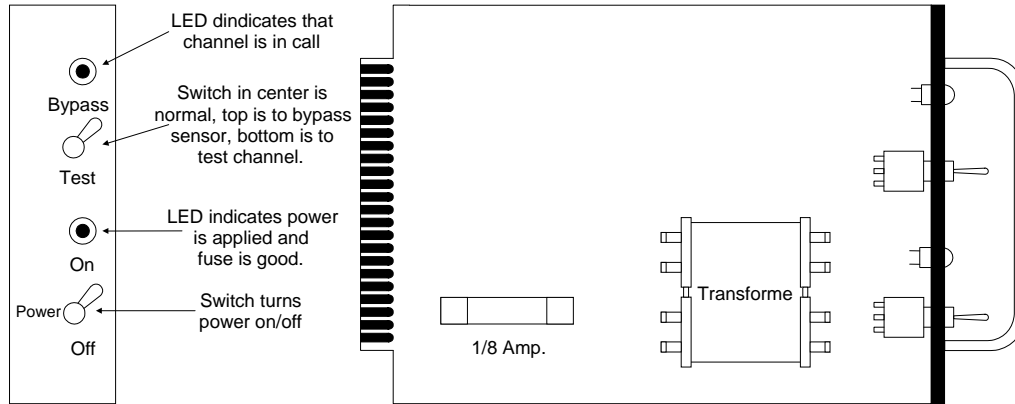
**3. Manufacturer Operations**

- 3.1 When integrated circuits are provided which are of such special design or programming that they preclude the off-the-shelf purchase of identical components from any wholesale electronics distributor or component manufacturer, one (1) exact duplicate integrated circuit shall be furnished with every fifteen (15) integrated circuits provided.
- 3.2 All duplicate integrated circuits shall be shipped to the NYSDOT Traffic Signal Lab.



**Fig - 9.1 12 Volt AC Supply Card Dimensions**

(continued)



**PIN**

**NOTES:**

1. The Bypass/Test switch is normally in the middle position. The Test position momentarily tests the card, Bypass allows a constant call.
2. The Power switch turns power to the unit on or off.
3. The edge connector contacts shall be gold plated

PIN	FUNCTION	PIN	FUNCTION
A	DC Ground	M	AC -
B	+24 VDC	*N	AC+
*C	Not Used	P	Not Used
D	Input	R	Not Used
E	Input	S	Not Used
F	Output	T	Not Used
H	Output	U	Not Used
J	12 VAC Output	V	Not Used
K	12 VAC Output	W	Not Used
L	Chassis Ground	X	Not Used
		Y	Not Used
		Z	Not Used

\*Key slots between B&C and M&N

**9.2 12 Volt AC Supply Card Pin Assignment**

**Fig Fig -**

(continued)

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 10**  
***Detailed Specification on Microwave Vehicle Detectors***

This specification describes the requirements for an overhead microwave vehicle motion detector, capable of sensing vehicle movements in one direction only. The direction of detection desired shall be selectable by a switch.

**SECTION I**  
**REQUIREMENTS**

**1. General Technical Requirements**

- 1.1 The unit shall be capable of detecting directional motion (approach only or departing only), from overhead, for all directional motion of 2 miles per hour or more.
- 1.2 The unit shall be capable of detecting every type of vehicle that is licensed to date (including mopeds).
- 1.3 The range of the unit shall be from one 3.28 ft (1 meter) to 200 ft (61 meters) for automobiles or smaller vehicles (including mopeds).
- 1.4 The pattern spread of the unit shall be determined by an antenna, acting as a waveguide, at a fixed cone of 16° (i.e. at 16.16 ft, the pattern will be 4.375 ft wide).
- 1.5 The unit shall have two switch adjustments. One being “range” (high-gain or low-gain) and the other being “directional selection” (approach or depart).
- 1.6 Operation and Maintenance Manuals shall be supplied with each unit. These manuals shall include the following information:
  - a) General Description
  - b) General Characteristics
  - c) Installation Procedure
  - d) Adjustments
  - e) Theory of Operation
  - f) Schematic and Logic Diagram
  - g) Parts List (to include part type, part number, manufacturer and ratings)

A minimum of two Operation and Maintenance Manuals shall be sent to the address listed in Chapter 1.

**2. Functional Requirements**

- 2.1 The microwave detector must have a FCC (Federal Communication Commission) identifier number assigned to it with the number affixed to the unit. The unit shall also comply with FCC Rules, Part 15 and be labeled stating complicity to these rules.
- 2.2 The unit shall operate in the microwave region of the electromagnetic spectrum.
- 2.3 The unit shall be self-contained with the exception that power will be supplied to the detector unit from an external source. The maximum power consumption of the unit shall be 4.5 watts at 12 VAC.
- 2.4 The unit shall have an electro-mechanical relay (rated at 5 amperes at 24 VDC) to provide an output signal to devices that interface with the unit. The output signal shall be at ground level when the unit has detected a valid vehicle movement and an open circuit for a non-detected condition.

(continued)

2.5 The unit must employ a monitoring circuit to supervise the Gunn and mixer diodes and fail-safe the relay to the closed position (ground level) in the event of a transceiver or power failure.

2.6 The unit shall be self-tuning with the exception of the high-low range selection switch. A five minute warm-up period shall be allowed for the unit to stabilize and operate properly.

2.7 The unit shall have, on the PC board, an LED indicator to demonstrate activation of the electro-mechanical relay.

**3. Mechanical Construction Requirements**

3.1 Each unit shall be enclosed in a corrosion and water resistant case without the use of silicone gel or any other materials that could deteriorate with exposure to ultra-violet rays.

3.2 Size of detector shall be:

- Height.....4.375" (Maximum)
- Width.....4.375" (Maximum)
- Depth.....7.375" (Maximum)
- Weight.....approximately 3.5 lb

**4. Environmental Operation Requirements**

4.1 The detector shall be capable of continuous operation over a temperature range of -31°F to 170°F.

**5. Manufacturer Operations**

5.1 The manufacturer shall test all units to FCC specifications (FCC Rules, Part 15). Test reports to be furnished to NYSDOT upon request.

5.2 When integrated circuits are that are used in the units that are of such special design or programming that they preclude the off-the-shelf purchase of identical components from any wholesale electronics distributor or component manufacturer, one (1) exact duplicate integrated circuit shall be furnished with every fifteen (15) integrated circuits provided in the purchase.

5.3 All duplicate integrated circuits shall be shipped to the NYSDOT Traffic Signal Laboratory.

5.4 The manufacturer shall be required to supply a medical statement as to the safety of the unit to the general public, specifically to those persons who have medical implants (i.e., pace-makers), when requested.

\* \* \*

**NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)**

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 11  
Detailed Specification on Ultrasonic Vehicle Presence Detectors**

This specification describes the requirements for a side-of-road (parallel) or overhead mounted ultrasonic presence sensor.

(continued)

**SECTION I  
REQUIREMENTS**

**1. General Technical Requirements**

- 1.1 The Ultrasonic Presence Detector shall operate in the ultrasonic region of the frequency spectrum and shall detect the continuous presence of any object (vehicular or pedestrian) within its detection pattern.
- 1.2 The presence sensor shall detect any object within its programmed zone and hold that detection until the object (vehicle or pedestrian) has left the zone.
- 1.3 The range of the sensor shall be from one 4 ft(1.22 meter) to 24 ft (7.32 meters) from the front face (plane) of the sensor, adjustable by use of a range control.
- 1.4 The pattern of detection shall measure 4 ft in diameter at 24 ft from the front face (plate) of the sensor. The shape of the pattern shall be conical.
- 1.5 Operation and maintenance manuals shall be supplied with each unit. These manuals shall include the following information:
  - a) General Description
  - b) General Characteristics
  - c) Installation Procedures
  - d) Adjustments
  - e) Theory of Operation
  - f) Schematic and Logic Diagram
  - g) Parts list (to include part type, part number, manufacturer and rating).

**2. Functional Requirements**

- 2.1 The unit shall be self-contained with the exception that power will be supplied to the detector unit from external source. The maximum power consumption of the unit shall be 4.5 watts at 12VAC.
- 2.2 The sensor shall have an electro-mechanical relay (rated at 5 amperes at 24 VDC) to provide an output signal to devices that interface with the unit. The output signal shall be at ground level when the unit has detected a valid vehicle movement and an open circuit for a non-detected condition. The sensor shall be capable of delaying the output to the detector card by one-half (0.5) to ten (10) seconds by the use of a variable time delay control.
- 2.3 The sensor must employ circuitry to put the relay to a fail-safe (ground level) position in the event of a power failure.
- 2.4 The sensor shall work either as a side of road (parallel) detector, or overhead mast arm (overhead) detector, mounted at a height of 8 ft to 24 ft.
- 2.5 The sensor shall have, on the PC board, an LED indicator to demonstrate activation of the electro-mechanical relay.

**3. Mechanical Construction Requirements**

- 3.1 Each unit shall be enclosed in a corrosion and water resistant case without the use of silicone gel or any other materials that could deteriorate with exposure to ultra-violet rays.
- 3.2 Size of detector shall be:

Height.....	4.375" (Maximum)
Width.....	5" (Maximum)
Depth.....	7.25" (Maximum)
Weight.....	approximately 3.5 lb
- 3.3 The sensor shall be furnished with a mounting bracket designed to be mounted in both side of road (parallel) or overhead mast arm (overhead) installations, using either a banding device or lag bolts

**4. Environmental Operation Requirements**

- 4.1 The detector shall be cable of continuous operation over a temperature range of -31°F to 170°F.

**5. Manufacturer Operations**

- 5.1 When integrated circuits are provided which are of such special design or programming that they preclude the off-the-shelf purchase of identical components from any wholesale electronics distributor or component manufacturer, one (1) exact duplicate integrated circuit shall be furnished with every fifteen (15) integrated circuits provided.

All duplicate integrated circuits shall be shipped to the New York State Department of Transportation Traffic Signal Lab.

(continued)

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 12**

**Detailed Specification on Model 210NYR Conflict Monitor with Red  
Monitoring Option**

This specification defines the minimum detailed requirements applicable to the Model 210NYR Conflict Monitor Module. The intent is to set forth the electrical and mechanical design parameters, the requirements within which the equipment shall operate, and the means by which the equipment shall be tested to determine whether it shall so operate. This specification shall supplement the General Technical Requirements within Chapter 1 for Microcomputer Traffic Signal Control Equipment and in case of conflict this detailed specification shall govern.

**1. General Requirements**

This specification defines the minimum requirements for a rack-mountable, sixteen channel, solid-state 210NYR Conflict Monitor to be used in a NYS Model 330SR Cabinet. The monitor will interface to the Model 330SR Cabinet's Monitor rack. The Conflict Monitor shall be capable of monitoring sixteen switchpack channels consisting of a Green output, a Yellow output, and a Red output for each channel. The Red Switchpack outputs will be supplied to the Monitor Inputs through the Model 330SR's Red Conflict Monitor Interface.

- 1.1 **Environmental and Power Supply Requirements:** Line Voltage Operation – 80 to 135 VAC  
Line Frequency Operation – 57 to 63 Hz  
Operating Temperature Range - -37 deg to 74 deg C

**2. Monitor Operation**

- 2.1 **Output Relay and Stop-Time Output.** - The output relay coil of the Monitor that controls the flash operation of the cabinet shall be energized by the monitor's circuitry when in a non-fault condition and when the line voltage of the monitor is above 103 +/- 2 VAC. In a fault condition, or when the line voltage falls below 98 +/- 2 VAC, the output relay coil of the Monitor shall become energized by the monitor's circuitry and will connect the AC voltage present on Pin 28 of its edge connector to Pin EE of its edge connector. Electrical ratings of the relay's contacts should be minimum of 3 amperes at 125VAC.

The Stop-Time Output shall be disabled/off by the monitor's circuitry when in a non-fault condition and when the line voltage is above 103 +/- 2 VAC. In a fault condition, or when the line voltage falls below 98 +/- 2 VAC, the Stop-Time Input will be enabled/on by the monitor's circuitry. The Stop-Time Output shall be derived from a solid state device, be compatible with the input interface of a Model 2070 2B FIO Module, be capable of sinking 100 ma DC minimum when enabled, and have DC breakdown voltage of at least 30 VDC.

- 2.2 **Conflict Monitoring** - The Conflict Monitor shall be able to detect the presence of conflicting green or yellow signal voltages on the switchpack output terminals of a Model 330SR Cabinet between two or more conflicting outputs as determined by the Program Card configuration. A Conflict fault shall de-energize the output relay and enable the Stop-Time input. A Conflict fault shall also be a latching type fault and only resettable/cleared through a reset signal issued to the Monitor.

2.2.1 **Conflict Recognition Time and Active Voltage Levels** - The Conflict Monitor shall detect a Conflict fault when active voltages on any conflicting outputs are present for more than 500 ms. The Monitor shall not detect a Conflict fault when active switchpack output voltages on any conflicting outputs are present for less than 200 ms. Conflicting outputs sensed for more than 200 ms and less than 500 ms may or may not be detected as a fault. The active monitor voltage levels for Conflict sensing are: All voltages, both full wave and half wave rectified, above 25 VAC on any switchpack output as active and all voltages less than 15 VAC as inactive

- 2.3 **24VDC Monitoring** - The Conflict Monitor shall be able to detect that the cabinet's +24 Vdc supply has fallen below 18 VD. A 24VDC fault shall de-energize the output relay and enable the Stop-Time input. A 24VDC failure shall be a latching fault and only resettable through a reset signal issued to the Monitor.

2.3.1 **24VDC Recognition Time** - The Monitor shall detect a 24VDC fault when the voltage on the +24V input is below 18 Vdc for more than 500 ms. The Monitor shall not detect a 24VDC fault when the voltage on the +24V input is below 18 Vdc for less than 200 ms. The Monitor may detect voltages between 18Vdc and 22Vdc for more than 500 ms, but not less than 200 ms as fault. All voltages above level of +22 Vdc shall not be detected as a fault

(continued)

**2.4 Controller Watchdog Monitoring** - The Conflict Monitor shall detect a Watchdog fault should the Watchdog input not detect a signal transition from the controller within the selected Watchdog Recognition time period. A Watchdog fault shall de-energize the output relay and enable the Stop-Time input.

2.4.1 Controller Watchdog Latch Option - An option, provided by a switch or jumper, to select a Watchdog fault as a latching or non-latching type fault shall be provided. For the latching type fault option, the Watchdog fault and Indicator can only be cleared by a Reset signal issued to the Monitor. For the non-latching type fault option, the Watchdog fault will be cleared, output relay energized, if the AC line voltage falls to any line voltage below the "Brownout" level of 98 +/- 2 VAC and after the AC line voltage is restored to above 103 +/- 2 VAC. Under this option the Watchdog indicator will remain illuminated until a Reset signal is issued to the Monitor. Default for the Monitor will be that a Watchdog fault is latching type fault. 2.4.2 Controller Watchdog Recognition Time - An option, provided by a switch or jumper, shall set the maximum Watchdog recognition time to 1000 +/- 100 ms or 1500 +/- 100 ms. Default time for the Monitor shall be 1500 +/- 100 ms

2.4.3 Controller Watchdog Inhibit Function - The Watchdog monitoring function shall be inhibited when the AC Line voltage drops below 98 +/- 2 Vac for greater than 50 +/- 17 ms. When the AC Line rises above 103 +/- 2 Vac for greater than 50 +/- 17 ms, monitoring of the Watchdog input shall resume. A minimum of 5 Vac shall be maintained between the inhibit voltage level and the enable voltage level.

2.4.4 Controller Watchdog Enable Switch - An Watchdog On/Off switch shall be provided to disable the Watchdog monitoring function. The switch shall also be labeled as to its function. Placement of the switch in the OFF position shall cause monitoring of the Watchdog to be disabled. Default for the Monitor is "On".

## 2.5 AC Line Monitoring

2.5.1 AC Line Brownout Recognition - The Monitor shall be able to detect that the AC Line has fallen below 98 +/- 2 Vac for greater than 80 +/- 17 ms. This shall force the output Relay to the de-energized state, enable the Stop-Time output, and cause the AC Power Indicator to flash at a 2 Hz rate. The unit shall maintain this state until the AC Line voltage rises above 103 +/- 2 Vac, Restore Level, for greater than 80 +/- 17 ms. Both the output relay and Stop-Time outputs will return to their "No fault" states – Output Relay Energized and Stop-Time Off.

2.5.2 AC Line Power Response - When AC Line power is first applied, the Signal Monitor shall immediately energize the Output Relay and place the Stop Time output to the "Off" state.

**2.6 Red Fail Monitoring** - The Conflict Monitor shall be able to detect the absence of an active voltage being present on the outputs of a switchpack channel. The monitor shall include an option to enable Red Fail Monitoring on a per channel basis using Dip switches that are clearly labeled for each channel. A Red Fail fault shall de-energize the output relay and enable the Stop-Time input. A Red Fail fault shall also be a latching type fault and only resettable/cleared through a reset signal issued to the Monitor. The Red Fail monitoring function shall be enabled for all channels programmed for Red Fail except when the Red Enable input is not active, or pin #EE is active, or Special Function #1 input is active, or Special Function #2 input is active. The active voltage levels for the above four inhibit inputs are: All voltages above 70 VAC on any inhibit input as active and all voltages less than 50 VAC as inactive.

2.6.1 Red Fail Recognition Time and Active Voltage Levels - The Monitor shall detect a Red Fail fault when an active voltage is absent on all three outputs of a switchpack channel for more than 1500 ms. The Monitor shall not detect a Red Fail fault when an active voltage is absent on all three outputs of a switchpack channel for less than 1200 ms. Switchpack channels without active voltages sensed for more than 1200 ms and less than 1500 ms may or may not be detected as a fault. The active monitor input voltage levels for Red Fail sensing are: All voltages above 70 VAC as active and all voltages less than 50 VAC as inactive

2.6.2 Red Interface Cable Fault - An option, provided by a switch or jumper, to select the operation of the Signal Monitor to enter or not enter the fault mode causing the Output relay contacts to close and enabling the Stop-Time output to the controller without the Red Interface Cable connected to the Monitor shall be provided. To indicate this fault mode the front panel Red Fail Indicator will illuminate and the all channel indicators shall be off. The default for the monitor will be that the Signal Monitor will enter the fault mode should the Red Interface Cable not be connected.

(continued)



## 2.7 Dual Indication Monitoring

2.7.1 GYR Dual Indication Monitoring - The Monitor shall be able to detect the presence of a simultaneous active voltages on the green and yellow, green and red, or yellow and red outputs of a switchpack channel. A GYR fault shall de-energize the output relay and enable the Stop-Time input. A GYR Dual Indication fault shall also be a latching type fault and only resettable/cleared through a reset signal issued to the Monitor. This function shall be enabled on a per channel basis using Dip switches that are clearly labeled for each channel. The GYR Dual Indication monitoring function shall be enabled for all selected channels except when the Red Enable input is not active or pin #EE is active.

2.7.2 GY Dual Indication Monitoring - The Monitor shall be able to detect the presence of active voltage on the green and yellow outputs of a channel. A Conflict fault shall de-energize the output relay and enable the Stop-Time input. A GY Dual Indication fault shall also be a latching type fault and only resettable/cleared through a reset signal issued to the Monitor. This function shall be enabled with a switch. When the switch is in the ON position, all channels shall be monitored for simultaneous active green and yellow outputs on a switchpack channel. GY Dual Indication monitoring function shall be disabled when the Red Enable input is not active or pin #EE is active.

2.7.3 Dual Indication Recognition Time and Active Voltages - The Monitor shall detect a Dual Indication fault when multiple outputs are active on a switchpack channel for more than 500 ms. The Monitor shall not detect a Dual indication fault when multiple outputs are active on a switchpack channel for less than 200 ms. Channels with multiple outputs active for more than 200 ms and less than 500 ms may or may not detect a Dual Indication fault. To increase the reliability of sensing LED signal failures, the active monitor input sensing voltages for all channels for the Dual Indication Monitor function shall be: All voltages above 25 VAC on any channel as active and all voltages less than 15 VAC as inactive

**2.8 Sequence (Short or Absent Yellow) Monitoring** - The Monitor shall be able to detect that a switchpack channel has not provided an adequate Yellow Clearance output following a Green interval output for that switchpack channel. A Sequence fault shall de-energize the output relay and enable the Stop-Time input. A Sequence fault shall also be a latching type fault and only resettable/cleared through a reset signal issued to the Monitor. This function shall be enabled on a per channel basis using dip switches. The Sequence monitoring function shall be enabled for all selected channels except when the Red Enable input is not active or pin #EE is active. A minimum Yellow Clearance detect time of 2.7 +/- 0.1 seconds shall be provided.

**2.9 Configuration Change Monitoring** - Any change in the configuration parameters of the monitor shall cause the Monitor to enter the fault mode causing the Output relay contacts to close and enabling the Stop-Time output to the controller. Examples of changes to configuration parameters would be changes to switch or jumper settings on the Monitor or changes to the Programming Card Diodes or Jumpers. An indication of this fault shall be provided on the front panel of the monitor. Depressing the Front Panel Reset button for a minimum of 5 seconds shall be required to clear this fault and log in the new configuration parameters into memory.

**2.10 Program Card Detection** - When the Programming Card is removed or not seated properly, the Monitor shall force the Output Relay to the de-energized "fault" state, enable the Stop-Time output, and illuminate an indicator dedicated for this fault on the front panel. A reset command from the front panel Reset switch or External Reset input shall be required once the Program Card is in place.

**2.11 Switchpack Channel Display Functions** - The switchpack channel front panel indicators of the monitor shall be illuminated for each active Switchpack output (Green, Yellow or Red) during non fault operation. When the Monitor is latched in a fault state it shall also be possible, through the switchpack channel indicators, to alternately view both the active switchpack outputs at the time of the fault and the outputs that caused the fault.

**2.12 Event Logging** - The monitor shall provide Event Logging capabilities that can be viewed and downloaded to a Personal Computer through an EIA-232 serial interface. The event logging should include, as a minimum, time stamped logs of Current Configurations, Current Monitor Status, AC line Status/Events and Previous Faults showing the type of fault and individual switchpack output status at the time of fault and identifying the switchpack outputs causing the fault.

(continued)

**2.13 Special Function Preemption Inputs** - The Special Function Preemption inputs #1 and #2 shall provide an AC input to the Monitor which shall disable Red Fail Monitoring (Absence of Output) when either input is sensed as active. A switch shall be provided to invert the active logic state of the AC signal needed to disable Special Function #1. With this option enabled, a voltage, above 70 VAC applied to Special Function #1 input will enable the Function and a voltage below 50 VAC will disable it

**2.14 Red Interface Connector** - This 20 pin connector, mounted on the front panel of the monitor, provides the required inputs for the unit to monitor the Red field signal outputs. It shall be a 3M #3428-5302 type or equivalent and be polarized to insure proper mating with the cable. Ejector latches shall be included to facilitate removal and prevent the cable from inadvertently disconnecting

The pin assignments shall be as shown below.

PIN	FUNCTION	PIN	FUNCTION
1	CHANNEL 15 RED	11	CHANNEL 9 RED
2	CHANNEL 16 RED	12	CHANNEL 8 RED
3	CHANNEL 14 RED	13	CHANNEL 7 RED
4	CHASSIS GROUND	14	CHANNEL 6 RED
5	CHANNEL 13 RED	15	CHANNEL 5 RED
6	SPECIAL FUNCTION #2	16	CHANNEL 4 RED
7	CHANNEL 12 RED	17	CHANNEL 3 RED
8	SPECIAL FUNCTION #1	18	CHANNEL 2 RED
9	CHANNEL 10 RED	19	CHANNEL 1 RED
10	CHANNEL 11 RED	20	RED ENABLE

\*A jumper option shall be provided to allow the connection of Pin #4 to be made with Chassis Ground.

**2.15 Front Panel** - The front panel shall be constructed of sheet aluminum with a minimum thickness of 0.090", and shall be finished with an anodized coating.

**2.16 Indicators** - All display indicators shall be mounted on the front panel of the Signal Monitor and shall be Super Bright type LEDs to increase visibility. All fault LEDs shall be red except the AC POWER indicator which shall be green. The following minimum indicators shall be provided on the front panel and labeled as to their function:

- 1) AC Power Indicator. This indicator shall flash when the unit has detected a low voltage/brownout condition as described in this specification. It shall illuminate when the AC Line voltage level is restored above the brownout level. The indicator shall extinguish when the AC Line voltage is less than 80 Vac.
- 2) 24 VDC Failed Indicator. This indicator shall illuminate when a 24VDC fault condition is detected. This indicator remains extinguished if the monitor has not detected by a 24VDC fault.
- 3) Watchdog Error Indicator. This Indicator shall illuminate when a controller Watchdog fault is detected. If the Watchdog On/Off switch on the monitor is placed in the OFF position to disable Watchdog monitoring the Watchdog Error indicator shall flash.
- 4) Conflict Indicator. This indicator shall illuminate when a conflicting signal fault is detected.
- 5) Diagnostic Indicator. This indicator shall illuminate when an internal fault is detected.
- 6) Red Fail Indicator. This indicator shall illuminate when a Red Fail fault is detected on a channel(s) that is being monitored for Red Fail. If the Red Enable input is not active, or a Special Function input is active, or the EE input is active, the Red Fail indicator shall flash ON/OFF.
- 7) Dual Indications Indicator. This indicator shall illuminate when a GY-Dual or GYR-Dual Indication fault is detected on a channel(s) that is being monitored for Dual Indications.
- 8) Sequence Indicator. This Indicator shall illuminate when the minimum Yellow Clearance time has not been met on a channel(s) following a green interval.
- 9) Program Card Detection Indicator. This Indicator shall illuminate if the Program Card is absent or not properly seated.
- 11) Switchpack Channel Status Indicators. During normal operation the 16 Switchpack Channel Status indicators, one indicator for each switchpack output, shall display all active Signals (Green, Yellow and Red).

(continued)

**2.17 Monitor Reset** - A momentary SPST Reset switch shall be provided and labeled on the Monitor's front panel to reset the monitor circuitry to a non-failed state. The monitor may also be reset by issuing a reset pulse to Pin Z of its circuit board's edge connector. The monitors reset detection method shall be that a reset pulse issued to the monitor, for reset purposes, is recognized as a one time event. Any reset pulse, either issued by the front panel switch or externally through its edge connector, for a period greater than 500 ms will not prevent the Monitor in detecting faults.

**2.18. Indicator Display Test with Configuration Switch Settings Check.** -This test shall be initiated by the activation of the front panel reset switch and will illuminate all front panel front panel LEDs for 500 msec minimum to allow users to verify their operation. The test will also, following the LED test, flash for two seconds minimum the Red channel LEDs for any channel that is switch configured to monitor for Red Fail. Following the Red Fail configuration check, the test will flash for two seconds minimum the Yellow channel LEDs for any channel that is switch configured to monitor for RYG Dual Indication. Activation of the external reset shall not produce the Red Fail/RYG Dual Indication Configuration Switch Settings Check.

**2.19 RMS Voltage Sampling** - High speed sampling techniques shall be used to determine the true RMS value of all AC inputs to the Monitor that are measured for detecting faults. Each AC input shall be sampled at least 32 times per cycle. The RMS voltage measurements shall not be affected by phase, frequency, or distortion of the waveform. All voltages specified as VAC in this detailed specification are RMS Voltages.

**2.20 Internal Watchdog Monitoring** - Microprocessors shall be used for all timing, control functions and AC voltage measurement. Operation of the central microprocessor utilized in the Monitor design shall be verified by an independent monitor circuit, which shall force the Output Relay to the de-energized "fault" state, enable the Stop-Time output, and illuminate the Diagnostic indicator if a pulse is not received from the microprocessor within a specified time period. An Internal Watchdog Failure shall be a latching fault. The unit shall remain latched in the fault state until a reset signal is issued to the Monitor or if the Monitor AC Line Voltage is removed and then reapplied to the Monitor

**2.21 Diagnostics** - In addition to Internal Watchdog Monitoring, the monitor shall be capable of performing other Internal Diagnostics and Performance Monitoring of its operation. As a minimum they include:

1. Monitoring of All Supply Voltages
2. Volatile and Non-Volatile Memory Diagnostics
3. Monitoring the operation of all secondary Microprocessors used in the Design
4. Indicator Display Test initiated by a Front Panel Switch activation.

Except for the Indicator Display Test, the diagnostic indicator, or some other defined indicator, shall illuminate should the diagnostic testing find a fault. These faults are a latching type fault and can only be cleared by either a Reset issued to the Monitor or removal of AC line voltage and reapplication of AC line voltage to the monitor.

**2.22 Configuration Parameters** - User-programmed configuration settings shall be selected using switches or jumpers mounted on the printed circuit board of the unit. Designs requiring a Personal Computer, or some other device connected to the Monitor's communication port, to program or verify the configuration parameters detailed in this specification is not acceptable. User-programmed configuration settings which are transferred to memory shall be stored in a programmable read-only memory (PROM or EEPROM). Designs using a battery to maintain configuration data shall not be acceptable.

**2.23 Input Impedance of Field Terminal Inputs** - All AC field terminal inputs of the Monitor shall provide an input impedance (resistive) of 150K +/- 50K ohms to the load connected to the each switchpack channel output. Resistors used to set this impedance shall be discrete resistors having a power dissipation rating of 0.5 Watts or greater.

### **3. Programming Card.**

Each Monitor shall be equipped with a Programming Card to configure conflicting Switchpack outputs of all 16 Switchpack channels and to disable Yellow outputs that will not be monitored. Conflict configuration shall be done through a diode matrix. The card shall be supplied with all channel outputs programmed as conflicting. Yellow outputs shall be disabled through jumpers. The card will be supplied with a Yellow outputs enabled. The Program Card's physical dimensions and edge connector functions shall be the same as the Model 210NYR Conflict Monitor specified herein.

### **4.Physical Dimensions**

The physical dimensions of the Monitor, printed circuit board and face plate, shall be the same as the Model 210NYR Conflict Monitor specified herein. Mounting location of the printed circuit board to the face plate shall be the same as the Model 210NYR Conflict Monitor specified herein

(continued)

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

*Chapters 13 - 16*

*CABINET REQUIREMENTS*

**CHAPTER 13**

***Detailed Specification for Model 330SR Pole Mounted Traffic Signal Cabinet***

This specification defines the minimum detailed requirements applicable to Traffic Signal Cabinets. The intent of this specification is to set forth the minimum acceptable electrical and mechanical design and requirements within which all equipment must operate satisfactorily and reliably, and the means by which the equipment shall be tested to determine whether it shall so operate. This specification shall supplement the General Specification for Microcomputer Traffic Signal Control Equipment, and in case of conflict, the Detailed Specification shall govern.

**SECTION I  
CABINETS AND HOUSING**

**1. Cabinets and Housings**

1.1 All equipment shall be housed within a weatherproof, rainproof, outdoor pole-mounted cabinet. The cabinet shall be clean-cut in design and appearance and have minimum interior dimensions as follows:

<b>Depth</b>	<b>Width</b>	<b>Height</b>
<b>17 5/8" (1)</b>	<b>21" (1)*</b>	<b>62" (2)</b>

*Tolerances are (+/-) 1/8" - (1) Minimum dimension - (2) Maximum dimension \* Including door opening*

The maximum exterior dimensions, including the door, shall be as follows:

<b>Depth</b>	<b>Width</b>	<b>Height</b>
<b>19"</b>	<b>23"</b>	<b>64"</b>

1.2 Cabinet housings shall be fabricated from sheet aluminum Grade 5052-H32. The sheet aluminum shall be 0.188" thick and adequately reinforced. Sheet aluminum for the cabinet door may be 1/8" if reinforcing supports are welded to the inside of the door to prevent the warping or twisting of the door. All construction shall be free of dents, scratches, weld burn through and abrasions harmful to the strength and general appearance. All seams shall be of continuously welded construction or alternative weatherproof construction consisting of non-continuous welds provided the connection is mechanically sound and weather resistant because of material overlap when approved by the procuring agency.

1.3 A certificate of compliance from the manufacturer shall be furnished certifying that the material use in the construction of the cabinet housing complies with the requirements of paragraph 1.2.

1.4 The housing shall have a door, securely gasketed, which shall include substantially the full area of the front of the cabinet.

1.4.1 A gasket shall be provided on all door openings. All gaskets shall be of dust-tight permanent type that will not peel off or deteriorate. Gaskets shall be closed cell neoprene and shall be installed with contact cement for a permanent bond. The mating surface of all gaskets shall be sprayed with a silicone lubricant to prevent sticking to the mating surface.

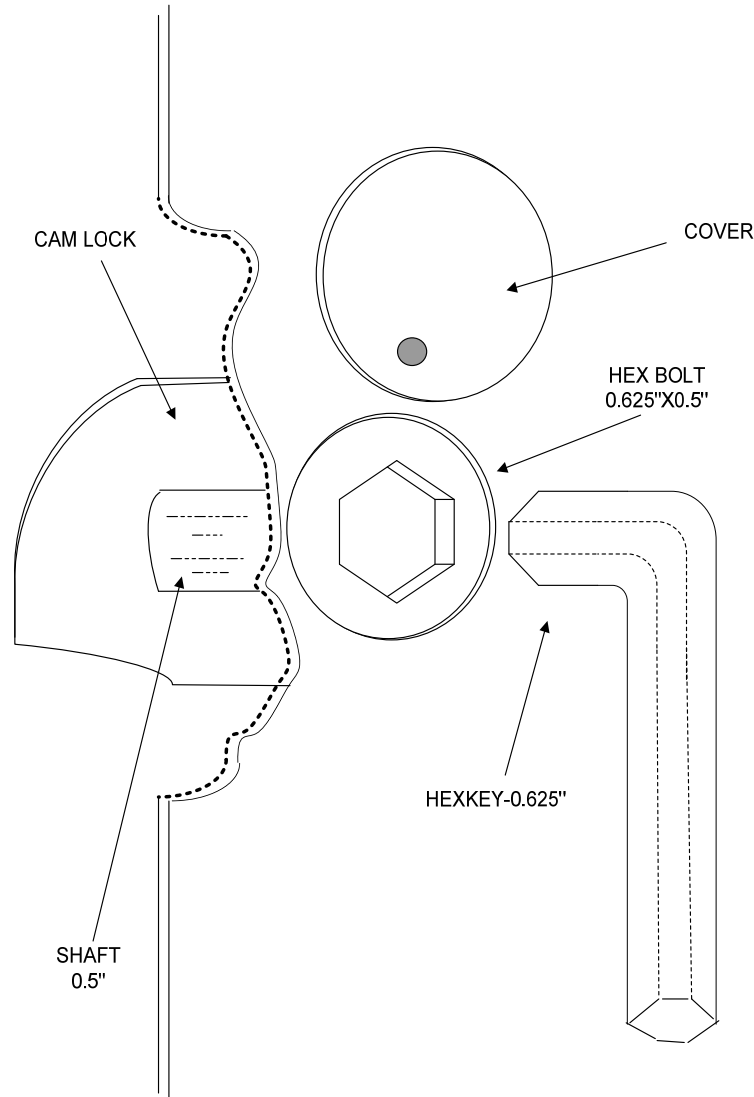
1.4.2 The lock for the front door shall be of the self-locking heavy duty five (5) pin tumbler cylinder rim type. It shall be keyed to a Corbin #2 standard.

1.4.3 When the door is closed and latched, with the key removed, the door shall lock. The door shall be furnished with a three point positive latching mechanism.

1.4.4 The three point locking mechanism shall be fabricated so that it may be actuated by rotating a removable 5/8" hex key. The hex socket and locking cam shall rotate on a 1/2" minimum diameter shaft. The socket, shaft and hex key shall be fabricated from stainless steel, grade 2011P3 aluminum, or other material plated to prevent corrosion. The socket and shaft shall be field replaceable with common tools. The socket head shall be protected from being rotated with a pipe wrench or similar tool. Designs shall be subject to approval by the procuring agency prior to fabrication. A suggested design is shown on the following page (Fig-13.1). One (1) hex wrench shall be provided with each cabinet.

(continued)

- 1.4.5 No part of the cabinet shell assembly including any protrusions from the power supply, power distribution assembly and police panel shall extend further than 7/8" in front of the plane formed by the front of the cabinet shell.
- 1.4.6 No part of the cabinet door or any attachment to it shall extend further than 1.25" from the door into the areas of the controller, cabinet drawer, detector rack, power supply, or power distribution areas, when the door is closed.
- 1.4.7 No part of the cabinet door or any attachment to it shall extend further than 2.25" in other areas except as specified for the police compartment, when the door is closed. The EIA mounting racks shall be installed 2 5/8" back from the front plane of the cabinet housing. Tolerance for all the above dimensions is +/- 1/8".



**Fig 13.1 330SR Cabinet Door Locking Mechanism**

(continued)

- 1.5 The cabinet shall be equipped with a automatic, self-engaging catch to hold the door open at 100 degrees +/-5 degrees and 135 degrees +/- 5 degrees. The catch shall be capable of holding the door open in a 60 MPH wind coming at an incidence angle of 90 degrees referenced to the plane of the door. The front door shall have at least three 6” hinges/pins made of Type 304 stainless steel along the right edge when viewed from the front. The hinges shall be crimped or welded to prevent removal of the hinge pins. The cabinet door hinges shall be bolted to the cabinet housing in a manner that prevents unauthorized personnel from removing the door with commonly available tools when the door is closed.
- 1.6 Each cabinet shall be provided with louvered vents in the front door with a removable and reusable metal air filter 16 by 12 by .875” deep. The filter shall be an UL classified air filter-Class 2 type with the following performance specifications based on tests done per the ASHRAE 5276 Dust Test:

<b>ASHRAE 5276 Dust Test</b>		
	<b>At 350fpm</b>	<b>At 520fpm</b>
<b>Avg. Arrestance</b>	54%	48%
<b>Clean Resistance</b>	0.045" w.g	0.09" w.g
<b>Dust-Holding Capacity</b>	3.35 oz/sq.ft	2.36 oz/sq.ft

- 1.6.1 The filter shall overlap the vents by at least 1” and shall be held firmly in place with bottom and side brackets and a spring loaded upper clamp. Provisions shall be made in the design of the vents to prevent snow and rain from being blown through the vents into the cabinet, as shown in the Fig 13.12 at the end of this chapter
- 1.6.2 The bottom filter bracket shall be formed into a waterproof sump with drain holes to the outside. The louvered vents shall be designed and constructed so that a stream of water from a pressure head, such as a Rain Bird sprinkler or other type sprinkler, will not enter the cabinet. The louvered area shall be less than the filtered area. The cabinet top shall be crowned or sloped to prevent standing water, and shall be constructed to shield the top of the cabinet door to prevent water from entering between the top door gasket and the cabinet.
- 1.7 Each cabinet shall be equipped with an electric fan, Comair Rotron No. MU2B1 or equal, with ball bearings and a capacity not less than 100 cubic ft per minute.
- 1.7.1 The cabinet shall be provided with a 30 square inch minimum screened exhaust vent. The area between the exhaust vent and the exhaust fan shall be designed to prevent snow or rain from reaching the fan area and from entering the cabinet’s main area. Design of this area should include baffling to block the entrance of moisture yet provide adequate ventilation. This area should also be sloped, to drain any moisture that may get into this area, to the outside of the cabinet.
- 1.7.2 The opening for the fan into the exhaust vent area shall be designed so that it is only opened when the fan is operating. The design of this assembly will be such that this assembly can be removed or replaced from inside of the cabinet’s main area with ordinary hand tools.
- 1.7.3 The fan shall be thermostatically controlled and shall be manually adjustable to turn on between 90 and 150 degrees Fahrenheit with a differential of not more than 25 degrees Fahrenheit between automatic turn on and turn off.
- 1.7.4 The cabinet fan/light circuit shall be fused with a 3 amp fuse located on the front of the PDA between the flasher and controller fuse holders. Thermostat and fan terminals shall be insulated or covered so that no parts having line voltage are exposed.
- 1.7.5 The thermostat shall be located in the vicinity of the fan and shall be attached to the cabinet housing.
- 1.7.6 A series RC network consisting of a 400V 0.01MF capacitor and a 100 ohm 2 watt resistor shall be connected across the thermostat terminals to suppress switching transients produced by the fan motor. Fan connections should be made with push on insulated terminals.

- 1.8 Each cabinet shall have bolt holes drilled in it and shall be furnished with one pair of zinc-plated channel brackets suitable for welding to a steel pole (See “Cabinet Bolt Hole Locations and Channel Bracket Mounting Details” drawing shown at the end of the chapter). Each bracket shall be made of 10-gauge cold rolled anodized steel with 5/16” studs pressed or welded into the bracket. Each channel bracket shall be supplied with four (4) flat metal washers, two (2) rubber washers and two (2) locking type nuts for use in mounting the cabinet to the channel brackets. The washers and nuts shall be sized for use on the 5/16” studs. To accommodate a 0.75” wide metal band, each bracket shall include a 0.250” wide by 1” long slot located approximately in the center of each “ear” section of the bracket. Mounting brackets and hardware shall be shipped inside the cabinet.

(continued)

- 1.9 The Main Front Door of the cabinet shall contain a Police Compartment Door. When opened, this door shall expose two (2) toggle switches located in the equipment rack. A hinged, swing out Police Panel Compartment shall be dimensioned and located as shown below and in the sketch at the end of this chapter.
- 1.9.1 A "Signal-Off" switch, so labeled, mounted in the switch panel shall be accessible through the Police Compartment. The switch, when placed in the "Off" position, shall energize the mercury contactor coil or Solid State Relay and prevent the flash relay from energizing the flash transfer relays.
- 1.9.2 A "Signal-Flash" switch, so labeled, mounted in the switch panel shall be accessible through the Police Compartment and shall operate per paragraph 4.6 Section II of this chapter.
- 1.9.3 The police compartment door shall be constructed on the Main Front Door so that it is flush with the front surface of the main front door. The door shall be keyed to accept a Corbin Key No. R4266 or equal and be designed to be easily closed without the use of this key.
- 1.9.4 The swing out police panel shall be located on a slide out panel. This will allow the police panel to be slid out a minimum of 6" in front of the cabinet shell, and slid back a minimum of 1/4" behind the cabinet shell, as shown in the Fig-15.11 at the end of this chapter.
- 1.9.5 The two (2) switches accessible through the Police Compartment shall be Double-Pole, Double-Throw Toggle type rated at 15 amperes, 120 volts AC.
- 1.9.6 Both switches accessible through the Police Compartment Door shall be available on the front of the rack assembly when the Main Front Door is opened. Only those two (2) switches shall be accessible through the Police Compartment Door when the Main Front Door is closed.
- 1.9.7 An area shall be provided in the police compartment or on the compartment door to store the hex wrench that opens the main door.
- 1.10 An 8" by 8" square cutout shall be provided on the cabinet floor. The cutout shall be centered laterally on the cabinet floor, and located longitudinally with its center 8.5" in front of the rear outside surface of the cabinet. (See ABottom View of Cabinet@ diagram Fig-13.19 at the end of this chapter.)
- 1.11. Two 12" by 12" adaptor plates shall be provided which can be mounted to the bottom of the cabinet when necessary (See "Adaptor Plate" diagram Fig-13.20 at the end of this chapter). The plates shall be constructed of the same type and gauge aluminum used for the cabinet. One plate shall have a 3 5/8" hole for the use of 3" conduit, the other a 4 5/8" hole for the use of 4" conduit. The holes in both plates shall be centered on the adaptor plate. The position of both plates when mounted to the bottom of the cabinet shall be that the centers of the holes in both plates are directly over the center of the 8" by 8" square cutout described above. The plates shall be attached to the bottom of the cabinet using 1/4" - 20 plated screws with nylon lock nuts in each corner of the adaptor plate. Adapter plates shall be shipped inside the cabinet.
- 1.12 The cabinet shall be constructed with metal mounting rails running approximately the entire depth of the cabinet along the lower left and right hand bottom of the cabinet. The cabinet shell shall rest on these rails when installed in its normal position and slide along these rails when installed or removed. The rails shall be capable of supporting the weight of the cabinet shell and shall be installed at a height of 5 1/2 inches from the bottom of the cabinet floor.
- 1.13 The cabinet shall be constructed such that there is approximately 1" of clearance between the bottom of the door when closed, and the bottom of the cabinet. This will allow the door to be opened and closed when the cabinet is sitting flush on a flat surface.
- 1.14 The cabinet shall be provided with two (2) lifting eyes to be used when mounting the cabinet on a pole or base. The lifting eyes shall be centered on each side of the top of the cabinet and shall be bolted with two (2) bolts each to the side of the cabinet. Each eye shall have a minimum diameter of 0.750" and shall be capable of lifting 1000 lb.

(continued)

- 1.15 A fluorescent light fixture shall be supplied in the cabinet. The fixture shall utilize a forward facing fluorescent lamp with a F8T5/CW designation. The fixture shall be mounted to the top inside of the cabinet in the area between the front of the cabinet and the fan and top controller receptacle.
- 1.15.1 The light fixture shall be protected with the same fuse as the fan, located on the front of the panel of the PDA labeled "FAN/LIGHT". Power to the fixture shall be supplied by Pin 4 of Cabinet connector PDA 3 and wiring connections to the fixture shall be made through a connector to facilitate removal of the fixture for maintenance.
- 1.15.2 The light fixture shall be controlled by a switch, rated at 5 amperes -120 volts - with contact material of either silver or coin silver, mounted on the Conflict Monitor/Fluorescent Light/Door Open Switch Assembly that is specified in Section 2.
- 1.16 A momentary, normally closed, pushbutton type switch shall be located on the same bracket as the light and conflict monitor door switches. This switch shall be used to send an "open door" alarm to the 2070 controller and shall be labeled "Door Alarm".
- 1.16.1 One terminal of this switch shall be connected to the 24vdc "ground" in the PDA via connected PDA-3, pin#8. The other terminal shall be connected PDA-3, pin#9 and then internally PDA-2, pin#13 to C1 harness pin # 63.
- 1.17 **Switchpack 24V Control Relay (S24CR)** - The 24V connection to Pin 9 of all 16 switchpacks shall be routed and switched through a relay mounted in the area between the input file and cabinet drawer and located on the right side of this area – see 330SR Cabinet Details figure for location of the relay and its mating socket.
- The relay shall be designated and marked as S24CR and shall be a Tyco Electronics SPDT KUP series relay or equal with contact ratings of 10 amps. The coil of this relay shall be connected to a connection point in the Cabinet shell that connects to the Mercury Contact coil or to the control signal of the Solid State Relay so that any time the Cabinet goes into Flash operation or is turned off via the Police Panel ON/OFF switch the 24V connection to Pin 9 of the switchpacks will be interrupted by opening the set of contacts on this relay. The relay will have a mechanical hold down clamp/spring to secure the relay into its socket. See Line Diagram Figures for schematic of this relay circuit
- 1.18 **24V Access Terminal.** - A one position, two pole, feed-through, barrier type connector shall be installed in the area between the input file and cabinet drawer and located on the right side of this area – see 330SR Cabinet Details figure for location of the connector. The connector will provide access to the Cabinets 24VDC and 24Gnd for auxiliary equipment usage. The terminal block will be horizontally installed and properly labeled (24VDC, 24VGnd) and shall include a removable plastic cover for protection. The connector shall be rated to supply a minimum 5 amps DC.

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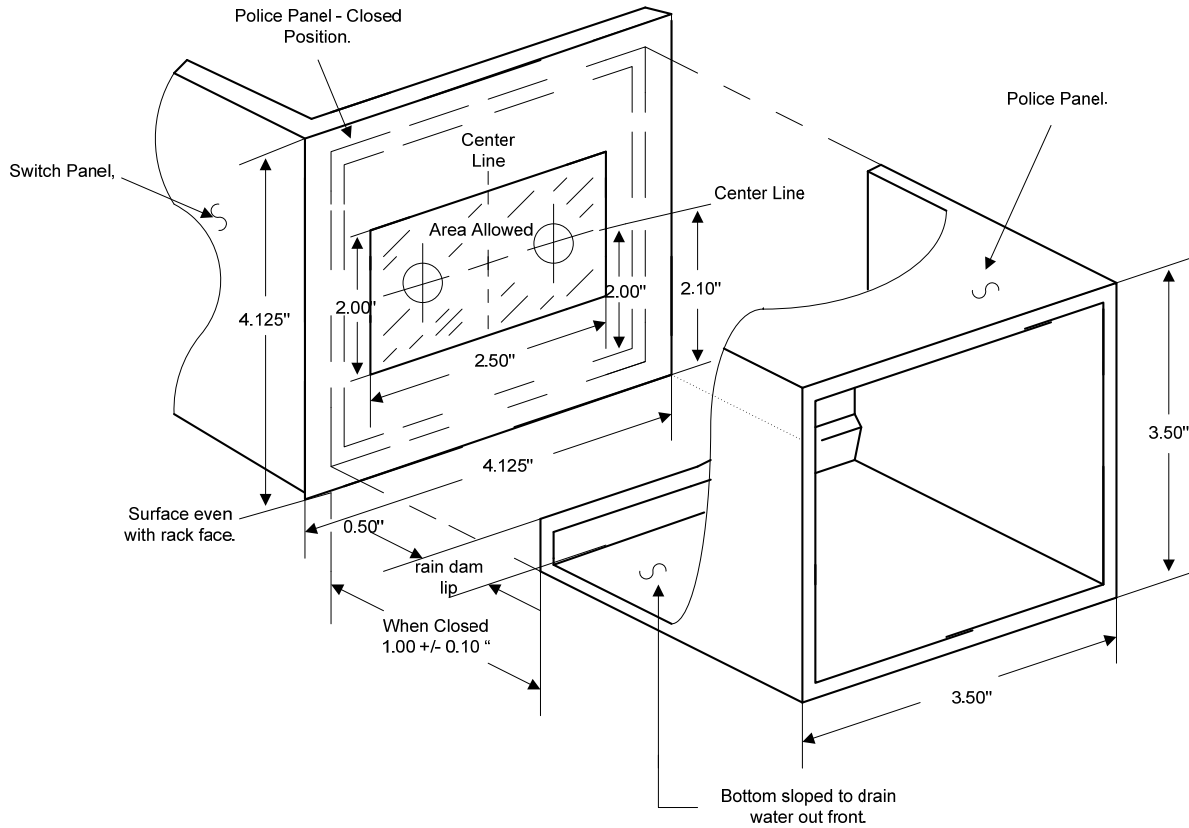


Fig -13.2 330SR Police Compartment

(continued)

## SECTION II PERIPHERAL HARDWARE

### 1. Rack

A standard EIA 19" rack shall be provided inside the cabinet housing for mounting the Traffic Controller, Cabinet Shell and Removable Ventilated Shelf. The height of this rack shall be 53 inches minimum and it shall begin just above the cabinet shell mounting rails. The cabinet shell shall contain a swing out power supply, a removable detector rack, a removable power distribution assembly, a conflict monitor rack, a load rack, a pullout drawer, field terminals police panel switches and Traffic Controller supporting angles. The rack shall conform to EIA-STD-RS-310-B. It shall consist of two continuous, adjustable equipment mounting angles of 0.1875" nominal thickness aluminum tapped with 10-32 threaded holes with EIA universal spacing in the angle surfaces that are above the shell's pullout drawer when the cabinet shell is installed. For angle surfaces below the drawer only the necessary 10-32 threaded holes to fasten the cabinet shell to the rack need to be provided. Traffic Controller supporting angles, mentioned above, shall be supplied to distribute and support the weight of the controller unit and shall be located just above the pull out drawer. Each angle shall be 10" deep and 3" wide. A removable, ventilated shelf, 12" deep minimum capable of supporting 50 lbs minimum shall also be furnished. This shelf shall be installed two inches above the Traffic Controller area and shall fasten only to the rails of the EIA rack so that it may be removed and repositioned on the rails. The purpose of this shelf is to support either auxiliary equipment or a second Traffic Controller. (See Figs 13.10.1 and 13.10.2 for additional details)

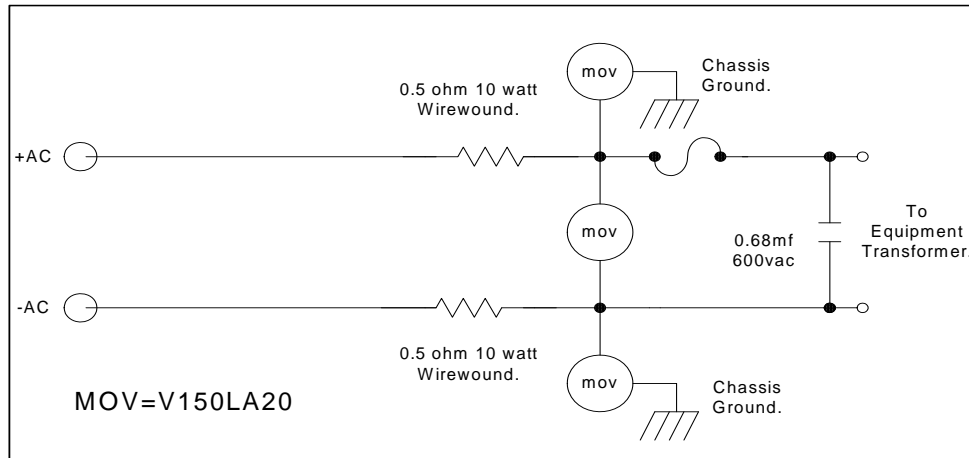
### 2. Swing Out D.C. Power Supply

- 2.1 A swing out power supply of Ferro-resonant design, having no active components, shall be provided to operate all peripheral hardware installed in the cabinet. The power supply shall be hinged on the left hand side of the cabinet as shown in the in Fig-13.13. The hinge shall be secured to the cabinet shell using pressed-in threaded mounting studs, installed in the shell, and cap nuts. The power supply connecting cable shall run from the left hand rear of the power supply and join to the cabinet as shown in Fig-13.13. The power supply connecting cable shall terminate in a MOLEX 03-09-2151 plug or equal. It shall be provided with male pins wired as follows: Pin#1→AC+, Pin#2→chassis Gnd, Pin#3→AC-, Pin#14→+24 VDC, Pin 15→DC Gnd. This plug shall be labeled PS1 on both the cabinet rack and the plug.
- 2.2 The power supply shall be provided with a 15.250" wide by 4.375" high front panel, as shown in the diagram labeled "Power Supply Detail" drawing at the end of this chapter. Two (2) captive 8-32 thumbscrews shall be provided on the right side of the power supply. These shall attach the power supply front panel to the bracket on the conflict monitor housing. The thickness of this bracket shall be 0.1" minimum. The left side of the front panel shall be firmly bolted to a hinge mounted on the cabinet shell using two ¼"-20 X.50" plated hex head bolts with cap nuts. The location of the captive thumbscrews and bolt holes on the power supply's front panel shall be as shown on the diagram referenced above. The power supply hinge shall be of sufficient strength to support the power supply horizontally while swinging out, and the hinge shall be crimped, preened, or welded to prevent the hinge pin from vibrating out.
- 2.3 The actual power supply shall be a maximum of 12.25" wide by 5.50" deep, by 3.25" high, and shall be mounted to the front panel within the area shown in the in the Fig-15.15 in this chapter.
- 2.4 The power supply shall be constructed with a solid top. Venting should be provided through the back, sides and/or bottom.
  - 2.4.1 The power supply shall be capable of the following:
    - 2.4.1.1 - Regulation: Minimum Voltage 23.0 VDC, Maximum Voltage 26.3 VDC. These voltages are specified for all AC line voltages between 95 VAC and 135 VAC and all DC load currents from 0.5 amps to 5.0 amps.
    - 2.4.1.2 - Design Voltage: +24.6 VDC
    - 2.4.1.3 - Full Load Current: 5 Amperes
    - 2.4.1.4 - Ripple Noise: 2 volts P-P & 500 mV rms at full load
    - 2.4.1.5 - Efficiency: 60% minimum
    - 2.4.1.6 - Temperature Coefficient: 32 Degrees Fahrenheit
    - 2.4.1.7 - Over voltage protection: A IN6284A Transorb shall be connected between +24 VDC and GND.
    - 2.4.1.8 - Primary Fuse : 3 Amp Time Delay fuse  
Secondary Fuse: 5 Amp Time Delay fuse - located before Over voltage protection
    - 2.4.1.9 - A +24 VDC and a D.C. ground test point shall be provided on the power supply front panel. The +24 VDC testpoint (Through a 1KΩ ½ W resistor) shall be taken off the load side of the secondary fuse.
    - 2.4.1.10 An indicator light shall be provided to indicate that the 24 volt supply is putting out its required voltage

(continued)

2.4.1.11 The 24 volt supply shall have an AC line surge protector as shown in Fig-13.3

**Fig -13.3 AC Line Surge protector for 24 Volt power Supply**



### 3. Detector Rack (Input File)

3.1 Each detector rack shall utilize 5.25" of rack-mounting height. The detector rack shall be capable of housing fourteen (14) dual detector modules or seven (7) quad detector modules described elsewhere in these specifications. The detector rack shall be mounted as shown in the sketch at the end of this chapter.

3.2 The detector rack shall provide card guides (top and bottom) and a 22-pin edge-connector on 0.156" centers, mounted vertically for each detector. The detector rack shall allow air circulation through the top, bottom, and rear of the detector rack.

3.3 Four (4) pins (D, E, J, K) on each detector module edge connector shall be wired to four (4) field terminals to provide for two (2) loop detector channels or one magnetometer channel as follows:

- PIN D - lower channel terminal A (e.g. CH1)**
- PIN E - lower channel terminal B (e.g. CH1)**
- PIN J - higher channel terminal A (e.g. CH2)**
- PIN K - higher channel terminal B (e.g. CH2)**

3.4 Loop 1 and 2 output collectors and emitters (pin F, H, W and X) for each slot shall connect to the proper processor unit inputs in the connector C1S wiring harness.

3.5 The detector rack shall be connected as shown on the "Input Rack Wiring Diagram" in Fig-13.13. Wiring between the rack and field terminals shall be shielded or twisted pair.

3.6 The edge connectors shall be double-sided connectors with the numbered side of each pin shorted to its respective lettered side internally.

3.7 Output circuit emitters shall have a common junction and be grounded only by connection to C1P, pin 104, "DC Input Ground".

3.8 The detector rack shall be constructed in a modular manner and shall be removable from the cabinet shell without the use of special tools. The harness running from the detector rack to the cabinet shell shall be hard wired to the rear of the detector rack, and plug connected to the face of the cabinet shell. All plug connectors shall be identified in an appropriate manner for mating purposes.

3.9 The Detector Rack shall interface with (7) plugs (Molex # 03 -06-2151 or equal) to the cabinet shell located directly behind the assembly, they shall mate with (7) sockets (Molex #03-06-1151 or equal) labeled from left to right(IF1-IF7). Pin assignments are located in the Table-13.2 at the end of this chapter.

(continued)

3.10 The input file shall have two continuous white vinyl, writable labels. One label located above the input cards and one below them. The upper label shall be printed with the input position number. (E.g. 1/2,3/4-27/28)

#### **4. Power Distribution Assembly**

The Power Distribution Assembly (PDA) shall be constructed in a completely modular manner. The units shape and size shall be in accordance with the detailed diagram at the end of this chapter. The PDA shall be mounted to the cabinet shell using two (2) 10-32 nuts with split-type lock-washers. Two (2) pressed in threaded studs, protruding from the cabinet shells mounting ears shall be provided for mounting purposes.

Connections between the PDA and the Cabinet/Cabinet shell, except for Main AC +, Surge Protector AC- and Surge Protector Earth Ground shall be made via four (4) connectors identified and labeled as PDA1, PDA2, PDA3 and PDA4. In addition to labeling, these connectors shall also be color coded as follows: PDA1 - Blue, PDA2 - Yellow, PDA3 - White, PDA4 - White. Wire harnesses extending 1" to 3" beyond the rear of the PDA unit and terminating into connectors PDA1, PDA2 and PDA4(Molex #03-06-2151 or equal) shall mate with cabinet shell connectors PDA1, PDA2 and PDA4(Molex #03-06-1151 or equal). Connectors PDA1, PDA2 and PDA4 shall be rigidly mounted to the shell directly behind the PDA. The distance of cabinet shell PDA1 from the bottom of the shell shall be approximately 8 1/2"; for PDA4 approximately 6 1/2"; for PDA2 approximately 4 1/2". Connector PDA3 (Molex #03-06-1151 or equal) shall be rigidly mounted to the lower side of the PDA facing the ground busses, approximately 5 1/2" from the front of the unit.

A wire harness terminating into Cabinet PDA3 shall mate with PDA connector PDA3. The wire harness shall have sufficient slack to provide adequate strain relief when the connectors are mated. In addition, wires in this harness from the door switch, controller receptacle and LIGHT/FAN switch shall be routed behind the cabinet shell. Pin functions for PDA1, PDA2, PDA3 and PDA4 are on the following page. The inside surface of the PDA cover shall be covered with an electrical insulating materials. The PDA cover shall be securely fastened and easily removed without the use of hand tools. All neutral and ground connections in the PDA shall terminate at the appropriate bus bars only through the large #6 AWG, green and white wires

(continued)

**List of Connections between PDA and Cabinet Shell**

<b>PIN</b>	<b>PDA-PDA1</b>	<b>CABINET SHELL-PDA1</b>	<b>PDA-PDA2</b>	<b>CABINET SHELL-PDA2</b>
1	Circuit Breaker 1	AC for Swpks 1,2	PDA3-12	24V DC Gnd/ Conf Monitor Pin. 25
2	Circuit Breaker 3	Swpks 5,4	FR-Coil Gnd	Conf. Monitor. Pin 24
3	Circuit Breaker 4	Swpks 7,8	MC Coil	Conf Monitor Pin EE
4	NC	NC	FTR Drive Volt	FTR Pin 1
5	Circuit Breaker 2	Swpks 3,4	NC	+24 Volt Supply
6	NC	NC	NC	C1-99
7	AC+	Aux Pwr Term	AC+	AC+ *
8	AC-	Aux Pwr Term	AC-	AC- *
9	Flasher AC+	Flasher Power	Earth Gnd	Earth Gnd *
10	NC	NC	AC+	AC+
11	Circuit Breaker 1	Swpks 13,14	MC Coil	To Signal on-off & Police Flash Switch
12	MC Coil	CC3-9	NC	NC
13	Circuit Breaker 4	Swpks 9,10	PDA-3, PIN#9	C1 Harness, PIN#63
14	Circuit Breaker 3	Swpks 11,12	NC	NC
15	Circuit Breaker 2	Swpks 15,16	NC	NC

**List of Connections between PDA and Cabinet Shell**

<b>PIN</b>	<b>PDA-PDA4</b>	<b>CABINET-SHELL-PDA4</b>
5	FR-Coil +24V	+24 Volt Supply

**List of Connections between PDA and Cabinet Shell**

<b>PIN</b>	<b>PDA-PDA3</b>	<b>CABINET SHELL-PDA3</b>
1	AC+ out from Series portion of Surge Protector	Controller Receptacles AC+
2	AC- out from Series portion of Surge Protector	Controller Receptacles AC-
3	Earth Gnd	Earth Gnd bus Bar
4	Fan/Light Fuse.	Fan/Fluorescent Light
5	NC	NC
6	AC-	AC- Bus Bar
7	AC+	Aux Pwr Term
8	PDA2-PIN#1(DC Gnd)	“Door Open Switch”
9	PDA2-PIN# 13	“Door Open Switch”
10	NC	NC
11	Fr-Coil Gnd	Door Switch
12	PDA2-Pin 1(DC Gnd)	Door Switch
13	Earth Gnd	Earth Gnd Bus Bar
14	NC	NC
15	NC	NC

\* = To Cabinet Shell

(continued)

- 4.1 The following equipment shall be installed in the Power Distribution Assembly and shall be readily accessible for replacement
  - 4.1.1 - One hybrid power line surge protector (See section 4.4)
  - 4.1.2 - Main circuit 30 Amp breaker - mounted on front panel
  - 4.1.3 - Equipment circuit breaker (controls the G. F. I. and the auxiliary AC terminals described in Section III, Paragraph 2.1.1) - mounted on the front panel
  - 4.1.4 - Duplex equipment receptacles with ground fault detection - mounted on front panel
  - 4.1.5 - Mercury contactor or Solid state relay
  - 4.1.6 - Connector PDA3, which feeds the fan/light, and controller receptacles.
  - 4.1.7 - Four(4) 15 Amp switch pack circuit breakers with an Auxiliary Switch Feature - mounted on front panel
  - 4.1.8 - A signal-flash switch - mounted on the front panel
  - 4.1.9 - Fifteen(15) Amp MDA Time Delay fuse for the Model 204 flasher -mounted on the front panel
  - 4.1.10-Ten(10) Amp MDA Time Delay fuse for the controller receptacles mounted on the front panel and labeled "CNTRLR PWR"
  - 4.1.11 - Miscellaneous cabinet control relays including the flasher relay and the conflict monitor door switch relay.
  - 4.1.12 - Three(3) Amp MDA Time Delay fuse for the fan/light mounted on the front panel and labeled "FAN/LIGHT" located between the flasher and controller fuse holder.
  - 4.1.13 - Flash Relay, "FR"

**4.2 Circuit Breakers**

- 4.2.1 All circuit breakers used in the cabinet should be approved and listed by UL. The trip and frame size shall be plainly marked. They shall be magnetic type breakers with their overload trip points unaffected by temperature. Contacts shall be silver alloy enclosed in an arc-suppressing chamber. Minimum interrupting capacity shall be 5000 Amperes, RMS.
- 4.2.2 The equipment circuit breaker, labeled "GFI/AUX C.B.", shall be a single pole automatic trip, short delay and trip indicating type, rated at 15 amperes at 125 VAC.
- 4.2.3 The switch pack breakers shall consist of 4 single pole 15 ampere circuit breakers with an Auxiliary Switch Feature and Medium Trip Delay Characteristic (Carlingswitch A Series or equal). The four breakers shall be wired per the line Diagrams Figures located at the end of this specification(Fig 13.16 & 13.17). The auxiliary circuits shall be wired in parallel so that any tripped breaker shall energize the Mercury Contactor Coil or Solid State Relay . The breakers auxiliary contacts shall be rated at 5 amperes (min) at 120 VAC (min). These breakers shall be labeled "Signal Head C.B.". Each switch pack shall receive power from one breaker and in the following manner:

S.P. 1, 2, 13, 14	C.B. #1
S.P. 3, 4, 15, 16	C.B. #2
S.P. 5, 6, 11, 12	C.B. #3
S.P. 7, 8, 9, 10	C.B. #4
- 4.2.4 The main circuit breaker, labeled "Main C.B." shall be a single pole automatic trip, short delay and trip indicating type, rated for 30 amperes. However, the cabinet wiring shall be rated for 40 amperes. The electrical service shall be connected to the main breaker using a setscrew type plated lug. This lug shall be capable of accepting wire sizes in the range of AWG # 4 to AWG 14 gauge. The lugs mounting method to the breaker shall include provisions to prevent the lug from turning when torqued. The lug shall also be positioned so that its opening faces the bottom of the cabinet. The bottom of the PDA unit shall be open directly below the lug to facilitate the insertion/removal of the service wire.

**4.3 Receptacles**

- 4.3.1 The equipment receptacle in the PDA shall be a duplex type, rated for 15 amps, and have a ground fault circuit interruption as defined in the National Electrical Code.
- 4.3.2 Two duplex type Traffic Controller receptacles, rated for 15 amps, shall be provided. One shall be located in the top right rear corner of the cabinet housing the other in the rear of upper right hand corner of the area shown as Traffic Controller Area in the 330SR Cabinet Details Figure (See Fig 13.10.1 and Fig 13.10.2). Both receptacles shall be mounted in a grounded metal enclosure in such a way that connections to the receptacle are not exposed and that no shock hazard is present.
- 4.3.3 AC+ and AC- of both controller receptacles shall be tied to the series portion of the power line surge protector through PDA3 and via a shielded cable, Belden No. 83336 or equal. The earth ground (green) wire and shield leader of the cable shall be directly connected to the cabinet earth ground bus bar.

(continued)

4.4 - An integrated series and parallel hybrid power line surge protector (EDCO NO. SHA 1210 or Equal) shall be installed as shown on the one line diagram. The surge protector shall be capable of reducing the effect of Transient voltages applied to the AC line. Gas-discharge devices shall not be used in the protector. The surge protector shall attach to the appropriate bus bars through #6 AWG wires.

4.4.1 The protector shall meet or exceed the following specifications.

**Normal Mode Surge Protection (Line to Neutral)**

Peak Current	20KAmps (8x20 msec wave shape)
Life Test	5X maximum voltage clamp change before and after 25 20KAmp surges (8x20 msec wave shape)
Clamp Voltage	300 Volts Max at 20KAmp surge
Response Time	Voltage across device never exceeds 300V during surge

**Common Mode Surge Protection Neutral to Earth Ground**

Clamp Voltage 700 Volts may at 20KAmp maximum (8x20 msec wave shape)

**Operating Characteristics**

Temperature Range	-	40 to 185 Fahrenheit
Continuous Service Current		10Amps maximum at 120VAC 60Hz through Series Filter

**MIL-STD 220 Insertion loss Specification for Series Filter**

Frequency of Applied Signal	Insertion loss (db)
<b>60Hz</b>	<b>0</b>
<b>10KHz</b>	<b>34</b>
<b>50KHz</b>	<b>55</b>
<b>100KHz</b>	<b>76</b>
<b>500KHz</b>	<b>76</b>
<b>2MHz</b>	<b>68</b>
<b>5MHz</b>	<b>58</b>
<b>10MHz</b>	<b>58</b>
<b>20MHz</b>	<b>63</b>

b) Protector must be epoxy-encapsulated in a flame-retardant material and enclosed in the PDA.

c) The line surge protector shall be wired in on the load side of the main circuit breaker. Wiring to and from the surge protector shall be kept as short as possible and shall be routed separate from all other PDA wiring.

4.5 The mercury contactor or Solid State Relay shall be normally closed and capable of switching 50 amperes at 120 volts AC.

4.6 A "Signal-Flash" Switch so labeled shall be provided on the power distribution assembly. This switch, when placed in the "Flash" position (down) shall energize the mercury contactor coil or Solid State Relay. See line wiring Diagrams Figures located at the end of this specification (Fig 13.16 & 13.17). When the switch is placed in the "Signal" (up) position, the processor unit shall resume control via the switch pack outputs to the field.

4.7 The FLASH RELAY, FR, contacts shall be of silver alloy designed for 1/4 to 10 amp loads at 120 VAC and shall be rated for the following:

- **insulation resistance greater than 1500 megohms,**
- **life expectancy greater than 100,000 operations,**
- **dielectric breakdown 1500 VAC RMS 60Hz other than contact element**

4.8 All electrical connections within the PDA shall be either solder connections, self-locking connectors or made with a screw and lock nut.

4.9 The entire inside area of the PDA removable cover (top and side) shall be covered with an insulating material to prevent contact between the metal cover and live terminals in the PDA when removing or replacing the cover.

4.10 Cabinet wiring shall be in accordance with the Line Diagrams shown in Figs 13.16 and 13.17.

(continued)

**5. Conflict Monitor Module Rack**

- 5.1 The conflict monitor module described elsewhere in this specification shall be mounted in this rack as shown in the 330SR Cabinet Details Figure (Fig 13.10.1) at the end of this chapter and be readily serviceable without special tools. The rack shall contain sufficient vent holes to provide for air circulation around the monitor module.
- 5.2 Card guides shall be provided to guide and support the printed circuit board of the monitor module.
- 5.3 A rigidly supported printed circuit board edge connector, having two rows of 28/56 interdependent bifurcated gold plated contacts on 0.156" centers, shall be provided. The connector shall mate with the monitor unit described elsewhere in these specifications. This connector shall not be supplied with a key.
- 5.3.1 The connector shall meet or exceed the following requirements:
- |                              |  |
|------------------------------|--|
| <b>Operating Voltage</b>     | <b>600 volts AC (RMS)</b>  |
| <b>Current Rating</b>        | <b>5 amperes</b>   |
| <b>Insulation Resistance</b> | <b>500 megohms</b>   |
| <b>Contact Material</b>      | <b>copper alloy plated with 0.00050" of nickel and 0.000015" or greater of gold on top of nickel</b> |
| <b>Board Thickness</b>       | <b>0.059" to 0.066"</b>  |
| <b>Contact Resistance</b>    | <b>0.006 ohms</b>  |
- 5.4 A normally open 24 VDC relay, designated "FR" and mounted in the Power Distribution Assembly (PDA), shall be provided to reverse the relay logic of the monitor module. Servicing the relay shall not require any special tools other than a screwdriver and the relay shall be provided with a retaining clip or spring.
- 5.4.1 - Relay Connections. The coil of the relay shall be wired in series with both the door switch and pins 24 and 25 of the conflict monitor. Conflict Monitor Pin 25 shall be wired to DC ground inside of the cabinet shell and then connected to Pin 1 of connector PDA 2. Conflict Monitor Pin 24 shall be connected to Pin 2 of PDA 2. The door switch connections shall be connected to Pins 11 and 12 of connector PDA 3. The relay will receive its 24 VDC supply from Pin 5 of PDA 4. For legacy purposes 24VDC shall also be provided to pin 5 of PDA 2 (See Line Diagram Figures for schematic of this circuit and List of Connections between PDA and Cabinet Shell in this Section for connections into the PDA for Pins 24 and 24 of the Conflict Monitor and the Door Switch).
- 5.5 Door Switch. The door switch mentioned above shall function and have the features described in this paragraph.
- 5.5.1- Closing of the front cabinet door with the monitor unit removed shall cause the intersection to go into flashing operation. The cabinet shall contain a conspicuous warning against operation with the monitor unit removed.
- 5.5.2 - The door switch shall be a single pole, single throw switch rated at 5 amperes, 120 volts, with contact material of either silver or coin silver
- 5.5.3 - The door switch for the conflict monitor shall be mounted on the Conflict Monitor/Fluorescent Light/"Open Door" Switch Assembly. The switch assembly/bracket shall be mounted in the upper right front corner of the cabinet and mounted so that this bracket does not interfere with installation of a Traffic Controller on the removable shelf.
- 5.6 The stop timing output of the conflict monitor shall go to pin 65 of the C1 connector.

**6. Load Rack (Output File – Switchpacks 1 – 14 and Flasher)**

- The load rack shall mate with the solid-state switch pack and flasher described elsewhere. It shall be located as shown in the 330SR Cabinet Detail Figure at the end of this chapter. It shall be capable of containing fourteen switch packs, one flasher, seven flash transfer relays, fourteen programming plugs to select emergency flashing output on each switch pack, and a conflict monitor. A shelf shall be provided in the rack to support the installed switch packs and flasher unit. Dimensional spacing between the Switchpacks and Flasher shall be as shown in the Switchpack Rack Spacing (Swpks 1 – 14) Fig-13.4a.
- 6.1 On the primary side of the flasher there shall be a 15 ampere MDL type time delay fuse. Fuses shall be readily serviceable without special tools and live parts shall be covered. Fuses shall be located on the power distribution assembly. Additional flashers will require additional fusing.
- 6.2. The required number of solid-state switch packs and flasher shall be housed within a rack.
- 6.3. The rack shall comply with outline connector mounting dimensions in the Fig-13.4a below. A means to support and retain the switch packs and flasher shall be provided.
- 6.4. Each rack shall be completely equipped and wired for the required complement of solid-state switch packs and a flasher, so that no additional hardware or wiring to the rack is required
- 6.5. The load rack shall have a continuous white vinyl, writable label located below the switch packs. The label shall be printed with the switch pack locations (E.g. SP1,SP2-SP14), leaving room for any field crew markings.

(continued)



### **7.0 Load Rack (Output File –Switchpacks 15 and 16)**

The load rack shall mate with the solid-state switch pack described elsewhere. It shall be located in the area between the input file and cabinet drawer as shown in the 330SR Cabinet Detail Figure at the end of this chapter. This area shall be enclosed on four sides – rear, right, left and bottom and shall have the typical height and width opening dimensions shown in Fig 13.4b. The switchpacks will rest on the bottom side when installed. The outputs of these switchpacks will not be switched through flash transfer relays. Both the green and yellow outputs will be connected directly to their output terminals and the appropriate input terminals on the Conflict Monitor connector. The red outputs directly to their output terminals and to the appropriate connections on the Red Monitor Interface specified herein. Dimensional Spacing between the two connectors for these two switchpacks shall be as shown in the Switchpack Rack Connector Spacing (Swpks 15-16) figure, Fig 13.4b. The positions of the Switchpacks 15 and 16 shall be labeled as SP15, SP16. The labels can be placed right above the mating female connectors.

### **8.0 Flash Transfer Relay**

Electromechanical or solid-state relays may be used for opening and closing traffic signal field circuits. These shall be rated for constant duty.

8.1 Relays used for this purpose shall be enclosed with a removable clear plastic cover.

8.2 All contact points which make, break, and carry current to the signal lamps shall be of silver-cadmium, coin silver or superior alternative material. Contacts shall be capable of making, breaking, and carrying a current of 20 amperes, 120 volts, without undue pitting. 120-volt AC relay coils shall be used and shall have a power consumption of 10 volt amperes or less and shall be designed for continuous duty.

8.3 The transfer relay shall withstand potential of 1500 volts at 60 hertz between insulated parts and between current carrying parts and grounded and non-current carrying parts.

8.4 Each flash transfer relay shall have a one cycle surge rating of 175 amperes RMS (247.5 amperes peak).

8.5 Each transfer relay shall be unaffected by electrical noise, having a rise time of up to 200 volts per microsecond. Each relay shall be unaffected by the 500 volt power noise transient test when the dv/dt herein specified is not exceeded.

8.6 The flash transfer relay shall transfer field signal light circuits (for switch packs 1 through 14) from the processor unit to flasher and shall permit flashing lights as programmed on the main street or highway and on the cross street or streets. Operation of the flash transfer relay circuit shall not prohibit the operation of the processor, but shall prohibit operation of the field signal light circuits by the processor. The flash transfer relays shall not be energized when the signal is operating in the 3-color mode.

8.7 The flash transfer relay shall be Midtex part no. 136-62T200 or equal, and shall be provided with a connector Cinch Jones, type #P-408-SB or equal and mate with Cinch Jones, type #S-408-SB or equal(see Fig-13.5).

(continued)

Fig 13.4a Switchpack Rack Connector Spacing (Swpks 1-1)

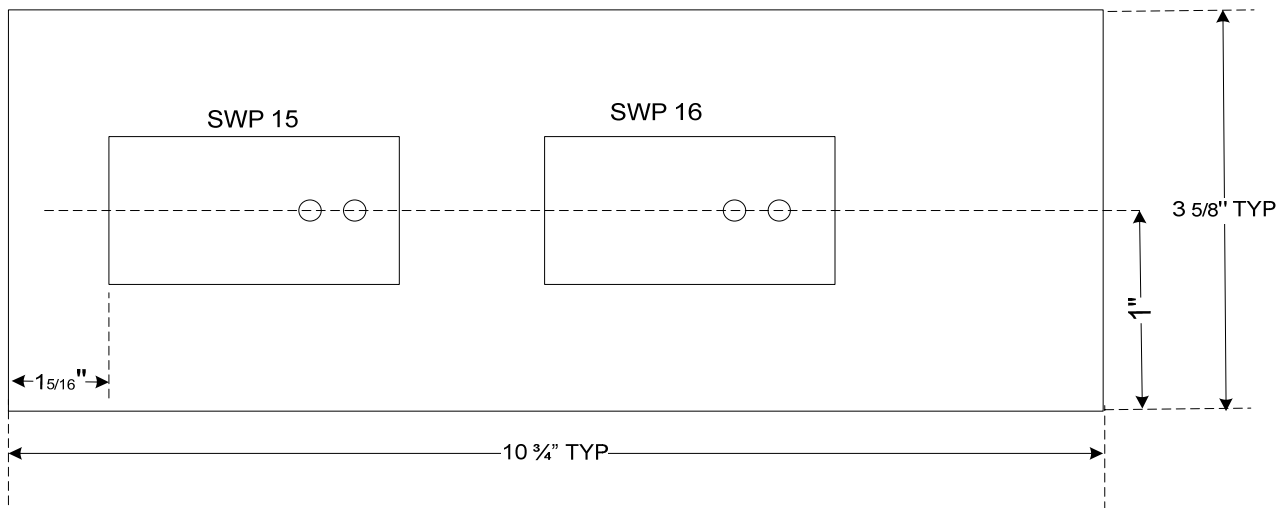
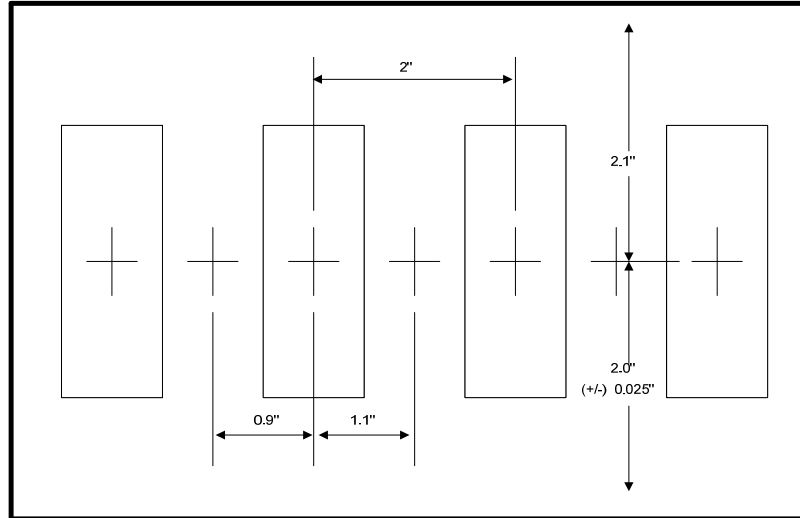
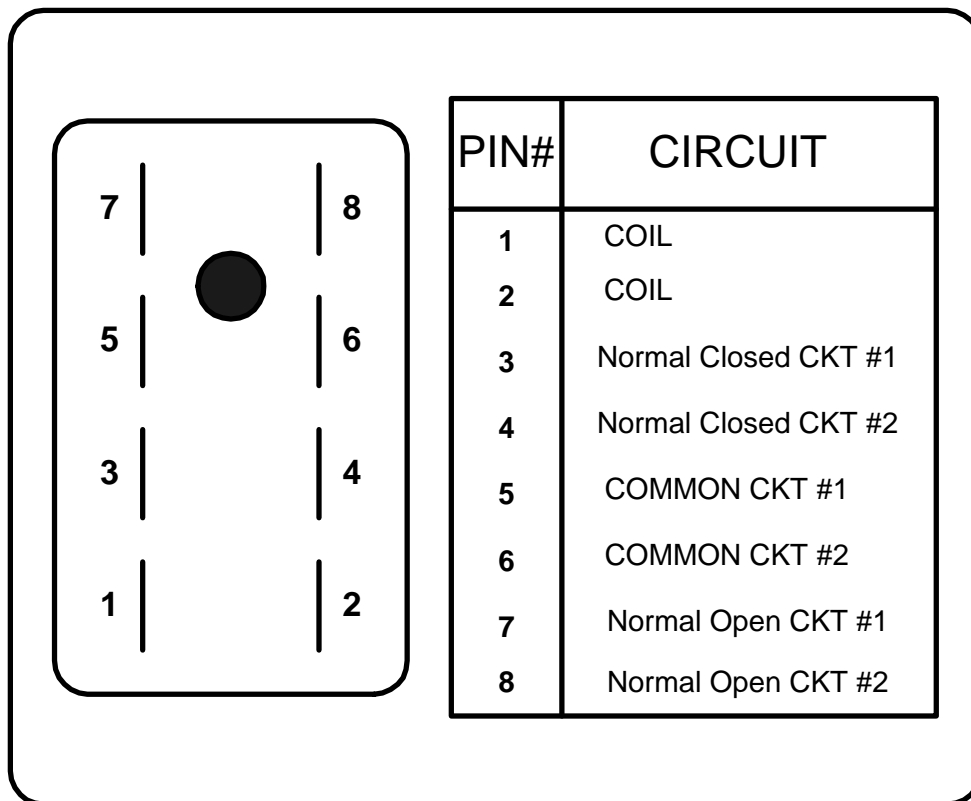


Fig13.4B Switchpack-Rack Connector Spacing(Swpks 15-16)

(continued)

Fig 13.5 Flash Transfer Relay

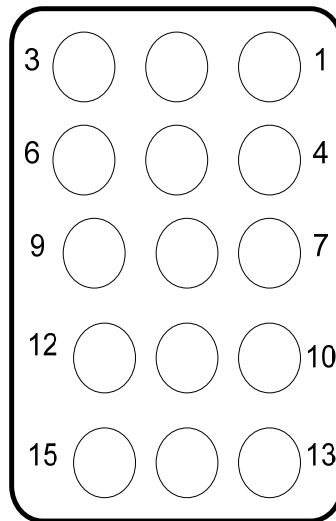


(continued)

**9.0 Flasher Programming**

A programming means shall be provided to alter whether flashing yellow, flashing red or absence of flash (white plug) appears on the output field terminals of Switchpacks 1 thru 14. Flasher programming shall be provided by way of a Molex type 1375 receptacle without locking detents, and mate with a Molex type 1375 plug. Six (6) Red, four (4) Yellow, and four (4) white programming plugs shall be provided (see Fig-13.6). Flash programming shall be in compliance with the following:

- 9.1 Red programming plugs shall contain three (3) jumper wires connecting pins 9 and 15, 1 and 3, 7 to 13.
- 9.2 Yellow programming plugs shall contain three (3) jumper wires connecting pins 1 and 7, 3 and 9, 13 and 15.
- 9.3 White programming plugs shall contain two (2) jumper wires connecting pins 1 and 3, 13 and 15.
- 9.4 Programming plug jumper wires shall be 14 AWG wire.



**FRONT VIEW**

**Fig 13.6 Flash Programming Plug**

(continued)

**10.0 Switchpack -- Flasher Interconnection**

The following Table shall determine the interconnection between the Solid-State Flasher and the switch packs. Each switch pack shall be assigned to one of the two Solid-State Flasher load circuits as follows:

<b>Load Circuit #1</b>	<b>Load Circuit #2</b>
S.P.1	S.P.4
S.P.2	S.P.5
S.P.3	S.P.6
S.P.8	S.P.7
S.P.9	S.P.11
S.P.10	S.P.12
S.P.13	S.P.14

**11. Red Conflict Monitor Interface.**

11.1 - Each cabinet shall be supplied with a Red Conflict Monitor interface. This interface shall be a 20 Pin Ejector Header connector with Gold Plated pins - 0.1 X 0.1 inch Grid pin arrangement with locking latches. The function of this connector is to make available the Red Switchpack outputs of the Model 330SR Cabinet, Red Enable Input and Chassis Ground to the front panel connector of a Model 210NYR Red Monitoring type Conflict Monitor for processing of these signals. Location of this connector will be in the area between the input file and cabinet drawer and located on the right side of this area- see 330SR Cabinet Details figure for location of the connector.

Pin functions of this connector are as follows.  
Connector Designation: CCS

<b>PIN OUTS/FUNCTIONS/CONNECTIONS FOR CCS</b>			
<b>Pin No</b>	<b>Function/Connection</b>	<b>Pin No</b>	<b>Function/Connection</b>
1	Swpk Red Output 15	11	Swpk Red Output 9
2	Swpk Red Output 16	12	Swpk Red Output 8
3	Swpk Red Output 14	13	Swpk Red Output 7
4	Chassis Ground	14	Swpk Red Output 6
5	Swpk Red Output 13	15	Swpk Red Output 5
6	NC	16	Swpk Red Output 4
7	Swpk Red Output 12	17	Swpk Red Output 3
8	NC	18	Swpk Red Output 2
9	Swpk Red Output 10	19	Swpk Red Output 1
10	Swpk Red Output 11	20	*Red Enable
*Red Enable shall be connected to Line Side of the Signal Breaker Buss			

11.2 The Red Conflict Monitor Interface shall be supplied with a standard ribbon cable of the appropriate length, and with the necessary connectors, to connect the Red Monitor Interface to the Red Interface Connector of the Model 210NYR Conflict Monitor specified herein. This cable shall be routed on the right side of the cabinet (close to the mounting rail). To hold the ribbon cable in place, cable clips shall be used to support the cable to the side of the cabinet. The cable shall also be protected by braided, expandable sleeving, SPC Brand #8465-0231 or approved equal, to within 1.5 inches of either end. The lower end of the cable shall be secured by a nylon cable clamp, Panduit Brand, #CCS31-S8-M, or approved equal and be attached by the shell mounting bolt located above the PDA assembly. One UV rated plastic wire tie shall be installed at each end of the sleeving and one immediately above the cable clamp.

11.2.1 To further protect the monitor from accidentally shorting to ground upon removal, the entire left side interior of the conflict monitor enclosure shall be covered with insulating material similar to that used on the PDA cover. This material shall wrap around and cover the front right mounting bracket of the 24vdc supply.

(continued)

**SECTION III  
MISCELLANEOUS**

**1. Harness Wiring**

- 1.1 All cabinet wiring harnesses shall be neat, firm and routed to minimize cross talk and electrical interference. Printed circuit motherboards may be used to eliminate or reduce cabinet wiring.
  - 1.1.1 Wiring containing AC shall be routed and bundled separately by function, or shielded separately by function, from all low voltage control circuits.
  - 1.1.2 All electrical connections on the back of the cabinet rack shall be soldered or made with locking type connectors.
- 1.2 All conductors and live terminals or parts, which could be hazardous to maintenance personnel, shall be covered with suitable insulating material.
- 1.3 Within the cabinet wiring, the DC ground and earth ground shall be electrically isolated from the AC neutral by 500 megohms.
- 1.4 Conductors within the cabinet between the AC service terminals and the switch pack circuit breakers, including the switch pack circuit breakers and signal light neutral, shall be rated so as to withstand short circuits on any field output line without any detectable deterioration.
- 1.5 Two (2) seventeen (14) terminal plated solid copper or brass bus bars with through pressure (screw) connectors shall be provided on the floor of the cabinet housing. These bus bars shall be capable of accepting wire sizes in the range of AWG #6 to AWG #16 gauge. Each bus bar shall be supplied with a plated copper or brass lug capable of accepting a AWG # 4 to AWG #14 gauge wire. The lug shall be connected to one pole of each bus bar and be UL approved, and marked as such, for connection to either copper or aluminum wire.
  - 1.5.1 One (1) bus bar shall function as an AC minus (common) bus bar. This bus bar shall be located on the front side of the (closest to the cabinet door) cabinet floor and positioned parallel to the cabinet door. The bus bar shall be securely mounted to and electrically isolated from the floor of the cabinet. The bar shall be connected to the chassis ground bus bar by a AWG #6 wire.
  - 1.5.2 One (1) bus bar shall function as an AC chassis (earth ground) bus bar. This bus bar shall be securely fastened to the floor of the cabinet and located near the front, parallel to the AC neutral bus bar.
- 1.6 The controller interconnect cable, which terminates in the C1P connector, shall extend at least 20" in front of the drawer with the drawer pushed in.

**2. Terminal Blocks**

- 2.1 All terminal blocks specified in this paragraph shall be rotation resistant square type terminals to prevent the terminals from loosening if excess torque is applied to the terminals (Magnum A4000 Series or equal).
- 2.2 Seven (7) terminal blocks, for Switchpacks 1 thru 14 and Detector Inputs 1 thru 28, located as shown in the 330SR Cabinet Details Figure at the end of this chapter, shall be one-position, fourteen pole, feed-through, barrier type.
- 2.3 A one –position, six pole, feed-through, barrier type terminal block located to the left of the 24 VDC supply cabinet connector shall be provided for switchpacks 15 and 16 (See 330SR Cabinet Details Figure)
- 2.4 Terminal blocks used for field wiring connections (field terminals) shall be rated for 20 amperes RMS and be capable of securing conductors with a 8-32 or larger soft nickel plated brass binder head screw.
- 2.5 A one-position, three-pole, feed through barrier type terminal block shall be located to the right of the output terminal block for switchpacks 15 and 16 and as shown the in the 330SR Cabinet Details Figure, Fig-15.10.1, to provide spare AC+ ,and AC- and AC Ground. This shall be fused from the equipment breaker in the power distribution assembly. These two terminals shall be provided with a plastic shield and shall be labeled "AC+, AC-" and AC Ground.

(continued)

2.6 Field wiring terminal blocks shall be labeled as shown below:

<b>Field Wiring Terminal Block</b>						
1	2	3	4	5	6	7
SP1R	SP5G	SP10Y	1A	8A	15A	22A
SP1Y	SP6R	SP10G	1B	8B	15B	22B
SP1G	SP6Y	SP11R	2A	9A	16A	23A
SP2R	SP6G	SP11Y	2B	9B	16B	23B
SP2Y	SP7R	SP11G	3A	10A	17A	24A
SP2G	SP7Y	SP12R	3B	10B	17B	24B
SP3R	SPYG	SP12Y	4A	11A	18A	25A
SP3Y	SP8R	SP12G	4B	11B	18B	25B
SP3G	SP8Y	SP13R	5A	12A	19A	26A
SP4R	SP8G	SP13Y	5B	12B	19B	26B
SP4Y	SP9R	SP13G	6A	13A	20A	27A
SP4G	SP9Y	SP14R	6B	13B	20B	27B
SP5R	SP9G	SP14Y	7A	14A	21A	28A
SP5Y	SP10R	SP14G	7B	14B	21B	28B

**3. Connectors** are described elsewhere in the Specification.

**4. Pull-out Drawer**

4.1 A pull-out, hinged-top drawer, having sliding tracks, and quick-disconnect feature, or equivalent -- shall be provided as shown in the cabinet drawings. The pull-out drawer shall extend a minimum of 13" order to facilitate removal of the controller by providing the processor with an aluminum platform covered by a formica-type chemical-proof plastic sheet while the rear connector is being removed. It shall be possible to lift this hinged platform in order to gain access to the interior of the drawer. Minimum interior dimensions of the drawer shall be 1" high, 12" deep, and 16" wide. The drawer shall be capable of supporting a 40 lb controller when fully extended. The drawer slides shall not extend past the rear edge of the cabinet shell.

**5. Cabinet Wiring Diagrams**

Two (2) sets of cabinet wiring diagrams and equipment layout shall be supplied with each cabinet. The diagrams shall be non-proprietary and shall identify all circuits in such a manner as to be readily interpreted. These diagrams shall be placed within the pull-out hinged-top drawer.

**6. Cabinet Line Diagrams**

6.1 Line Diagrams (Figs 13.16 and 13.17) show the electrical interrelationship between the various components described in the 330SR specification.

**7. Conflict Monitor Reset Line**

7.1 A conflict monitor reset line shall be provided in the cabinet to facilitate automatic testing of Conflict Monitors in each cabinet. A circuit shall be provided from connector C1 - PIN 97 to the conflict monitor reset line, Pin Z of the monitor connector, through a standard three (3) conductor 0.250" diameter plated conductor stereo phone jack. The connection will be made when a mating plug with the tip and ring shorted together is inserted into the jack. The jack shall be labeled ACFM Reset@ and be isolated from chassis ground. No part of the jack shall be made of plastic.

**8. Relay Transient Protection**

8.1 All AC relays used in the cabinet shall have a resistor-capacitor snubber network placed across their coils. This network shall be designed to suppress the high voltage transients generated by the relay coil. The parallel combination of the six flash transfer relays shall have only one of these networks. All DC relays shall have diodes placed across their coils to suppress switching transients

(continued)

**9. Cabinet Rack Removable Access Panel Cover**

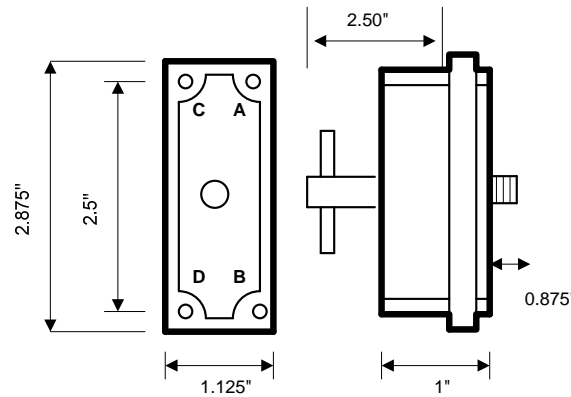
9.1 A removable panel 8" wide by 6" long shall be provided in the bottom left-hand side of the cabinet rack. This side panel shall be held in place by four removable screws located in each corner of the plate. A 4"X7" access opening, located under the cover, shall be provided.

**10. C1 Connector Harness Wiring**

10.1 The C1 connector shall be an AMP connector block (See Fig- 13.9) with T-Handle, Part No. 201692-4, or equivalent. It shall be supplied with a Pin Hood (AMP No. 202119-2 or equal), a 45 Deg. outlet shield with cable clasp (AMP No. 202110-1 or equal), guide pins (AMP No. 202173-5 or equal) and guide sockets (AMP No. 204099-2 or equal). The guide pins shall be installed in connector holes B & C, the guide sockets installed in connector holes A & D.

10.2 The C1 connector harness shall be wired as shown in Table 13.1 below.

**Fig- 13.7 C1 Connector Block Dimensions**



Corner Guides

C1P - Pins B & C - Sockets A and D

(continued)



TABLE 13.1 - C1 CONNECTOR WIRING

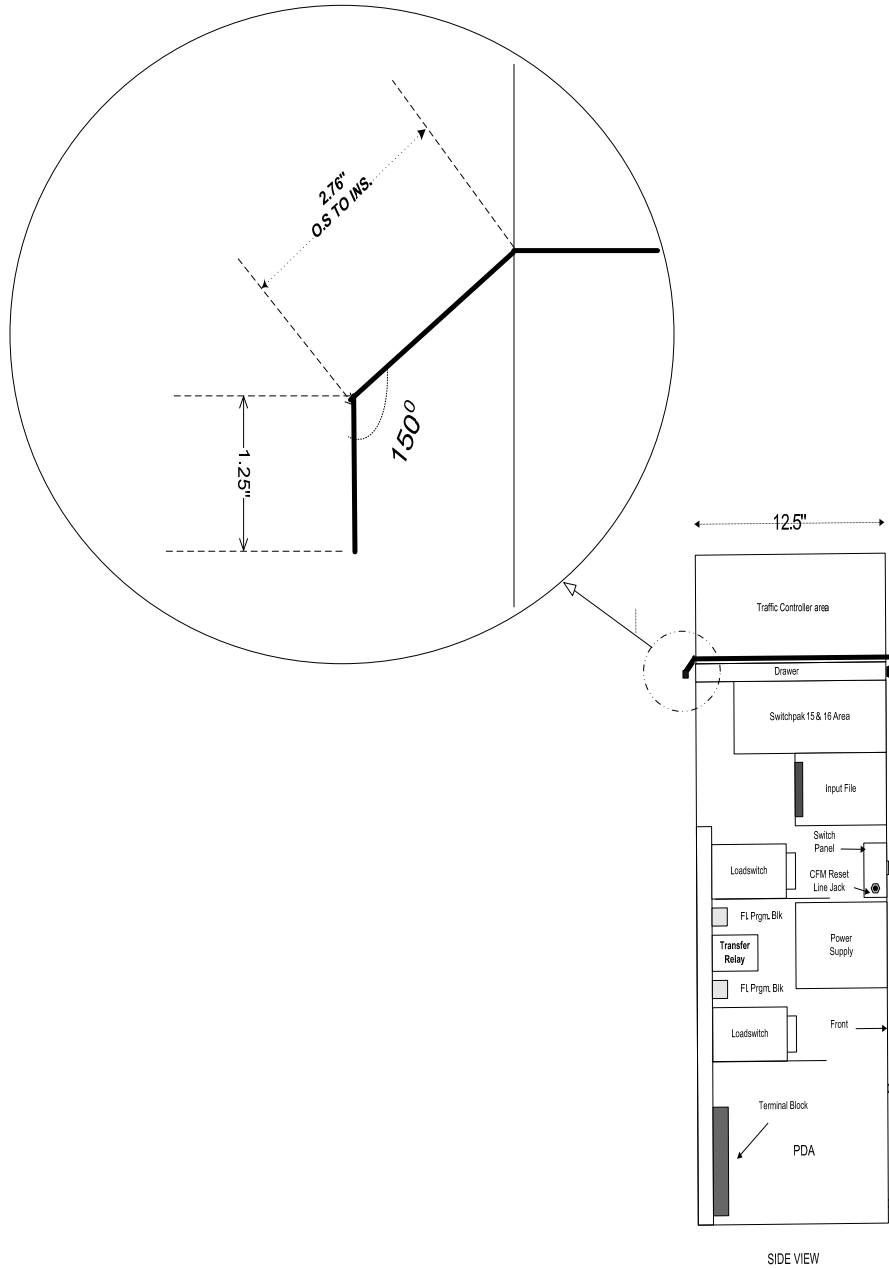
CI-PIN#	PORT#-BIT	I/O	FUNCTION	CI-PIN#	PORT#-BIT	I/O	FUNCTION
1	DC GND	-	OUTPUT GND	53	1002-7	I	Detector #15
2	1001-1	O	SW1-Red	54	1002-8	I	Detector #16
3	1001-2	O	SW1-Green	55	1003-1	I	Detector #17
4	1001-3	O	SW2-Red	56	1003-2	I	Detector #18
5	1001-4	O	SW2-Yellow	57	1003-3	I	Detector #19
6	1001-5	O	SW2-Green	58	1003-4	I	Detector #20
7	1001-6	O	SW3-Red	59	1003-5	I	Detector #21
8	1001-7	O	SW3-Yellow	60	1003-6	I	Detector #22
9	1001-8	O	SW3-Green	61	1003-7	I	Detector #23
10	1002-1	O	SW4-Red	62	1003-8	I	Detector #24
11	1002-2	O	SW4-Green	63	1004-5	I	Door Open Alarm
12	1002-3	O	SW5-Red	64	1004-6	I	N.C.
13	1002-4	O	SW5-Yellow	65	1004-7	I	CUR/CON.MON.Stop Time
14	DC-GND	-	Output GND	66	1004-8	I	Police Flash
15	1002-5	O	SW5-Green	67	1005-1	I	Detector #25
16	1002-6	O	SW6-Red	68	1005-2	I	Detector #26
17	1002-7	O	SW6-Yellow	69	1005-3	I	Detector #27
18	1002-8	O	SW6-Green	70	1005-4	I	Detector #28
19	1003-1	O	SW7-Red	71	1005-5	-	N.C.
20	1003-2	O	SW7-Green	72	1005-6	-	N.C.
21	1003-3	O	SW8-Red	73	1005-7	-	N.C.
22	1003-4	O	SW8-Yellow	74	1005-8	-	N.C.
23	1003-5	O	SW8-Green	75	1006-1	-	N.C.
24	1003-6	O	SW9-Red	76	1006-2	-	N.C.
25	1003-7	O	SW9-Yellow	77	1006-3	-	N.C.
26	1003-8	O	SW9-Green	78	1006-4	-	N.C.
27	1004-1	O	SW10-Red	79	1006-5	-	N.C.
28	1004-2	O	SW10-Green	80	1006-6	-	N.C.
29	1004-3	O	SW11-Red	81	1006-7	-	N.C.
30	1004-4	O	SW11-Yellow	82	1006-8	-	N.C.
31	1004-5	O	SW11-Green	83	1006-1	-	N.C.
32	1004-6	O	SW12-Red	84	1006-2	-	N.C.
33	1004-7	O	SW12-Yellow	85	1006-3	O	SW13-Red
34	1004-8	O	SW12-Green	86	1006-4	O	SW13-Yellow
35	1005-1	O	SW4-Yellow	87	1006-5	O	SW13-Green
36	1005-2	O	SW10-Yellow	88	1006-6	O	SW14-Red
37	1005-3	O	SW1-Yellow	89	1006-7	O	SW14-Yellow
38	1005-4	O	SW7-Yellow	90	1006-8	O	SW14-Green
39	1001-1	I	Detector #1	91	1007-1	-	SW16-Yellow
40	1001-2	I	Detector #2	92	DC GND	-	OUTPUT GND
41	1001-3	I	Detector #3	93	1007-2	-	SW16-Red
42	1001-4	I	Detector #4	94	1007-3	-	SW16-Green
43	1001-5	I	Detector #5	95	1007-4	O	Detector Reset 17-22
44	1001-6	I	Detector #6	96	1007-5	O	Detector Reset 23-28
45	1001-7	I	Detector #7	97	1007-6	-	CON MONITOR RESET*
46	1001-8	I	Detector #8	98	1007-7	-	CUR MONITOR RESET*
47	1002-1	I	Detector #9	99	1007-8	-	SW15-Red
48	1002-2	I	Detector #10	100	1005-5	O	SW15-Yellow
49	1002-3	I	Detector #11	101	1005-6	O	SW15-Green
50	1002-4	I	Detector #12	102	1005-7	O	Det.Reset CH 1-16
51	1002-5	I	Detector #13	103	1005-8	O	Watch Dog
52	1002-6	I	Detector #14	104	DC GND	-	INPUT GND

\* Normally Open

(continued)

**11. Shelf Cover**

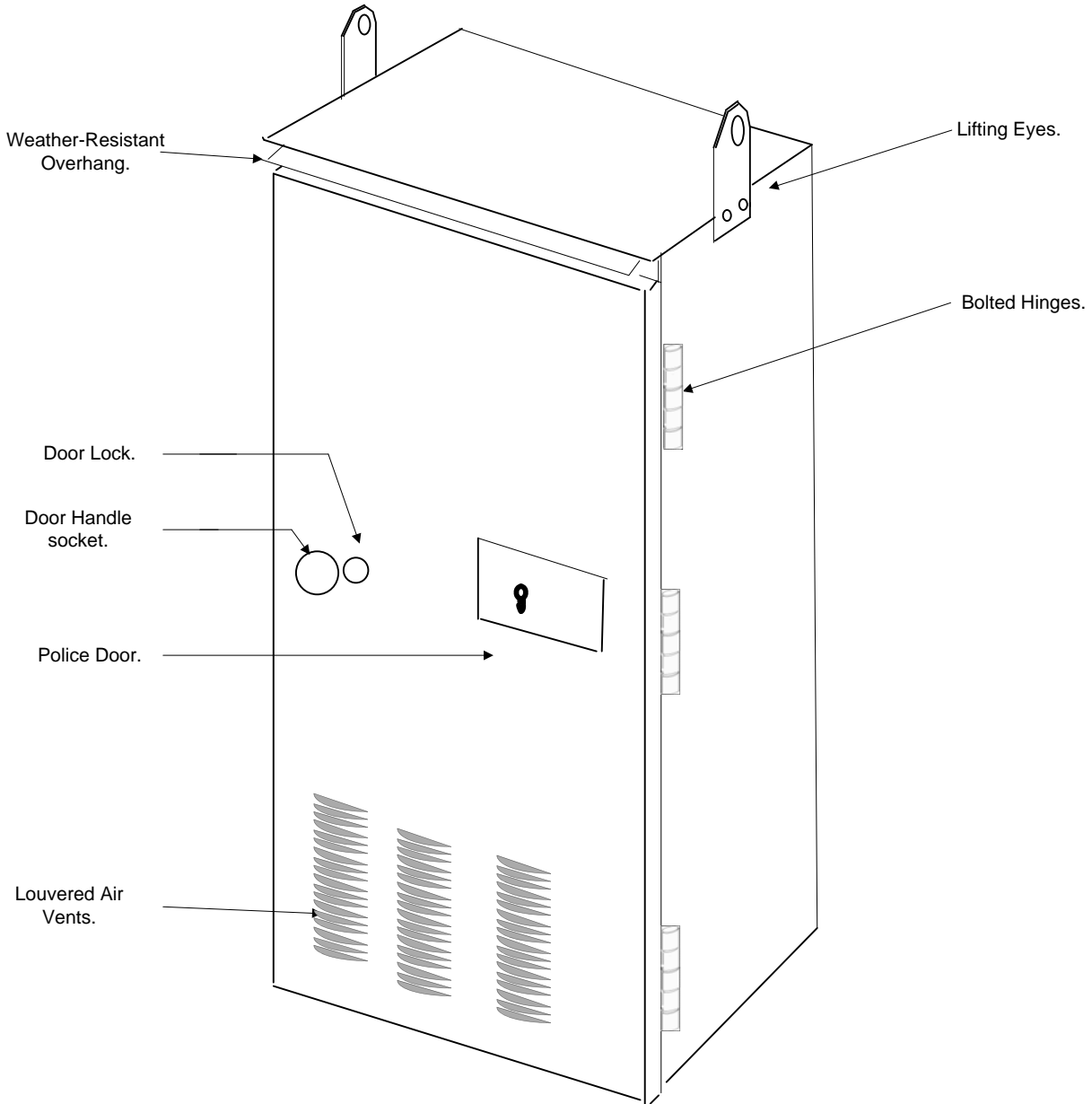
11.1 A permanent cabinet shelf cover as shown in Fig-13.8 below shall be provided. The shelf cover shall be fabricated from a 14 gauge sheet aluminum.



**Fig – 13.8 Shelf Cover 330SR Cabinet**

(continued)

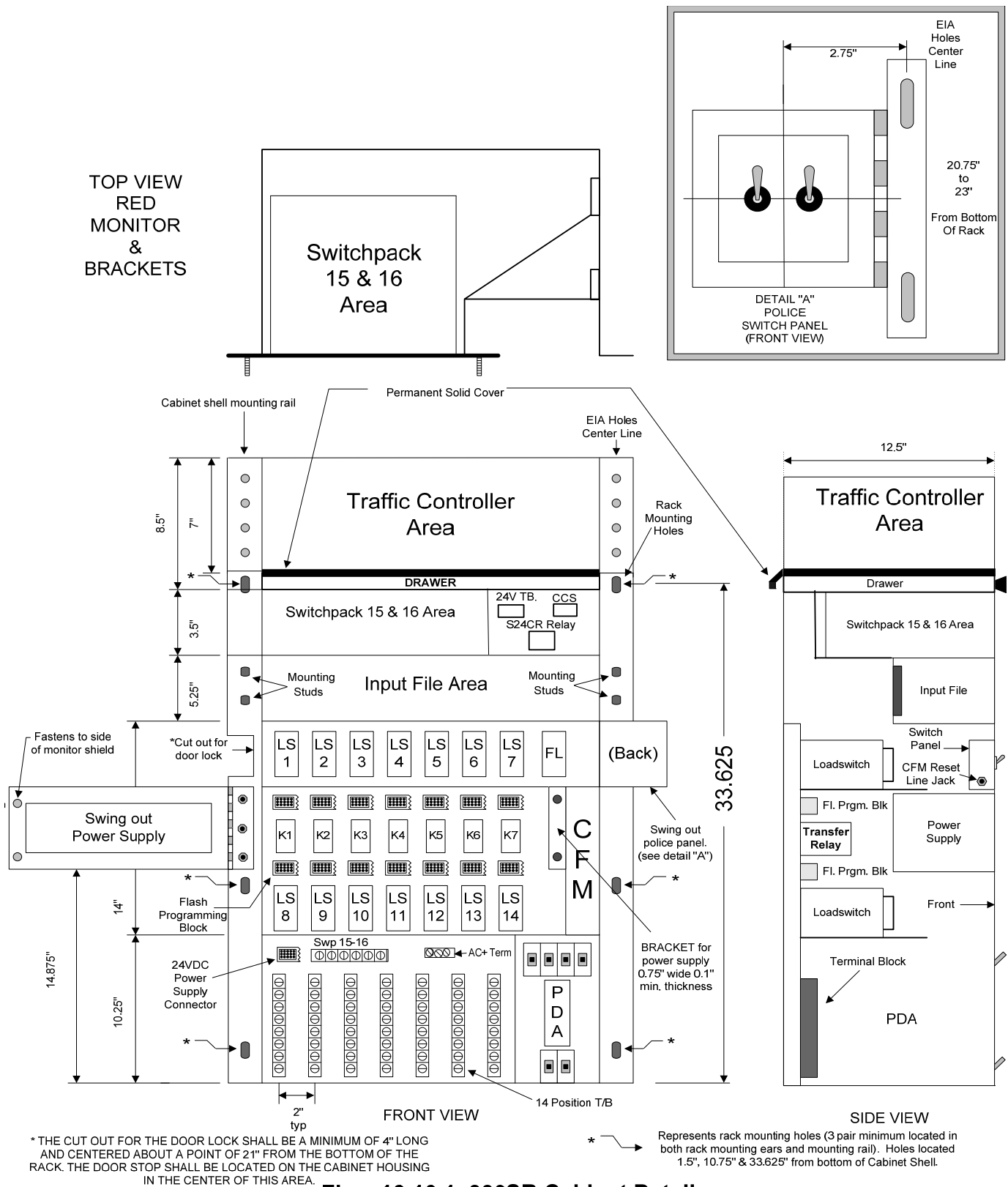
Fig 13.9 Model 330SR Pole Mounted Cabinet Diagram.



**12. Shipping Pallet Lag Screws:**

The cabinet shall be fastened, with lag screws, to the shipping pallet no longer than two inches wider than the cabinet, measured from any side.

(continued)



**Fig - 13.10.1 330SR Cabinet Details**

(continued)

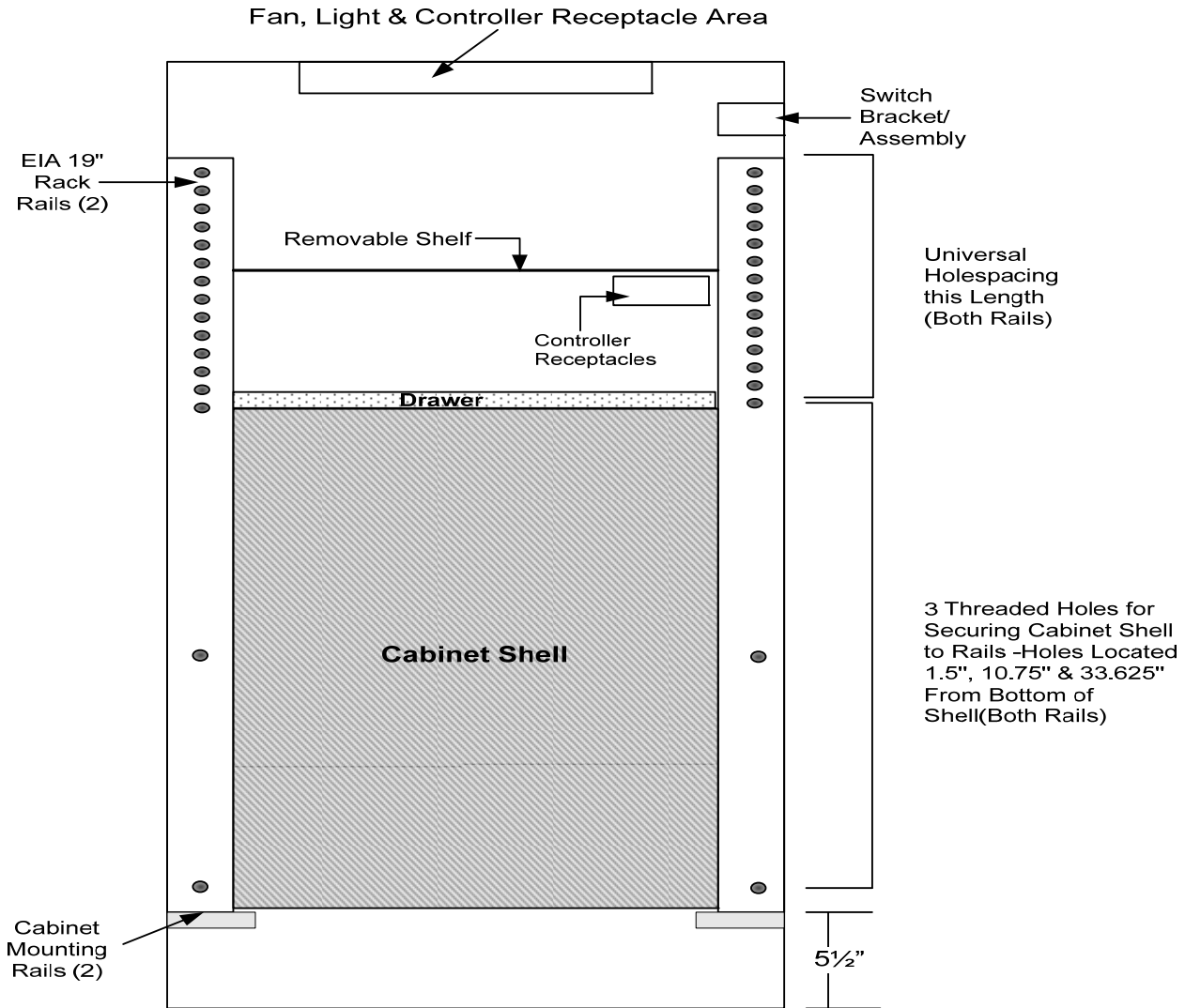
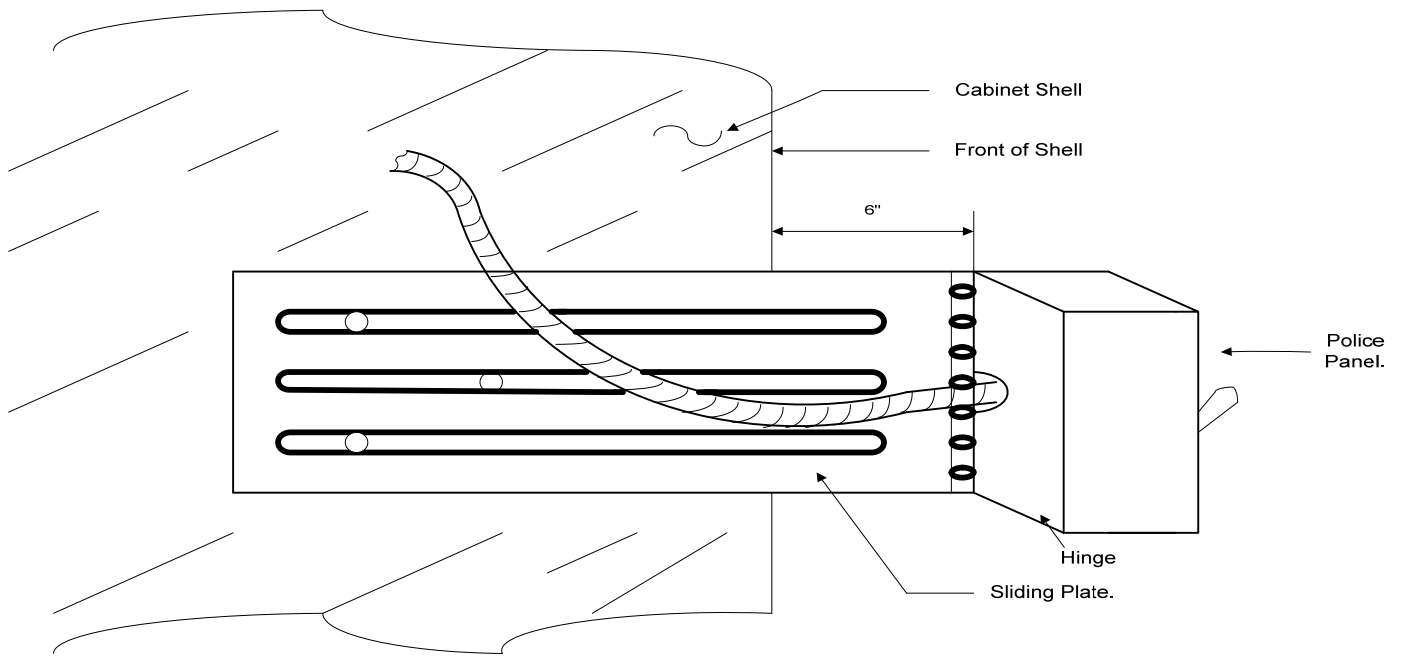


Fig 13.10.2 Internal Cabinet Layout

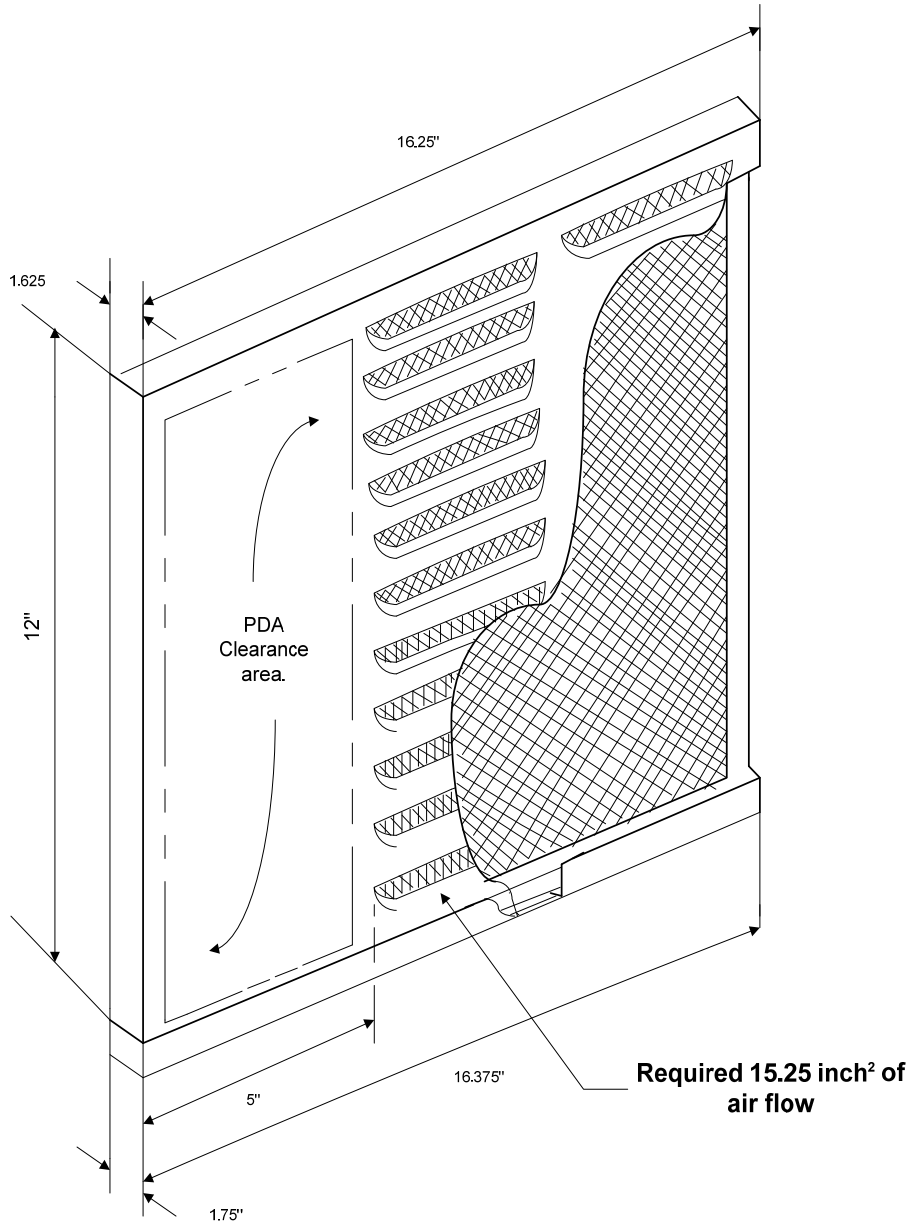
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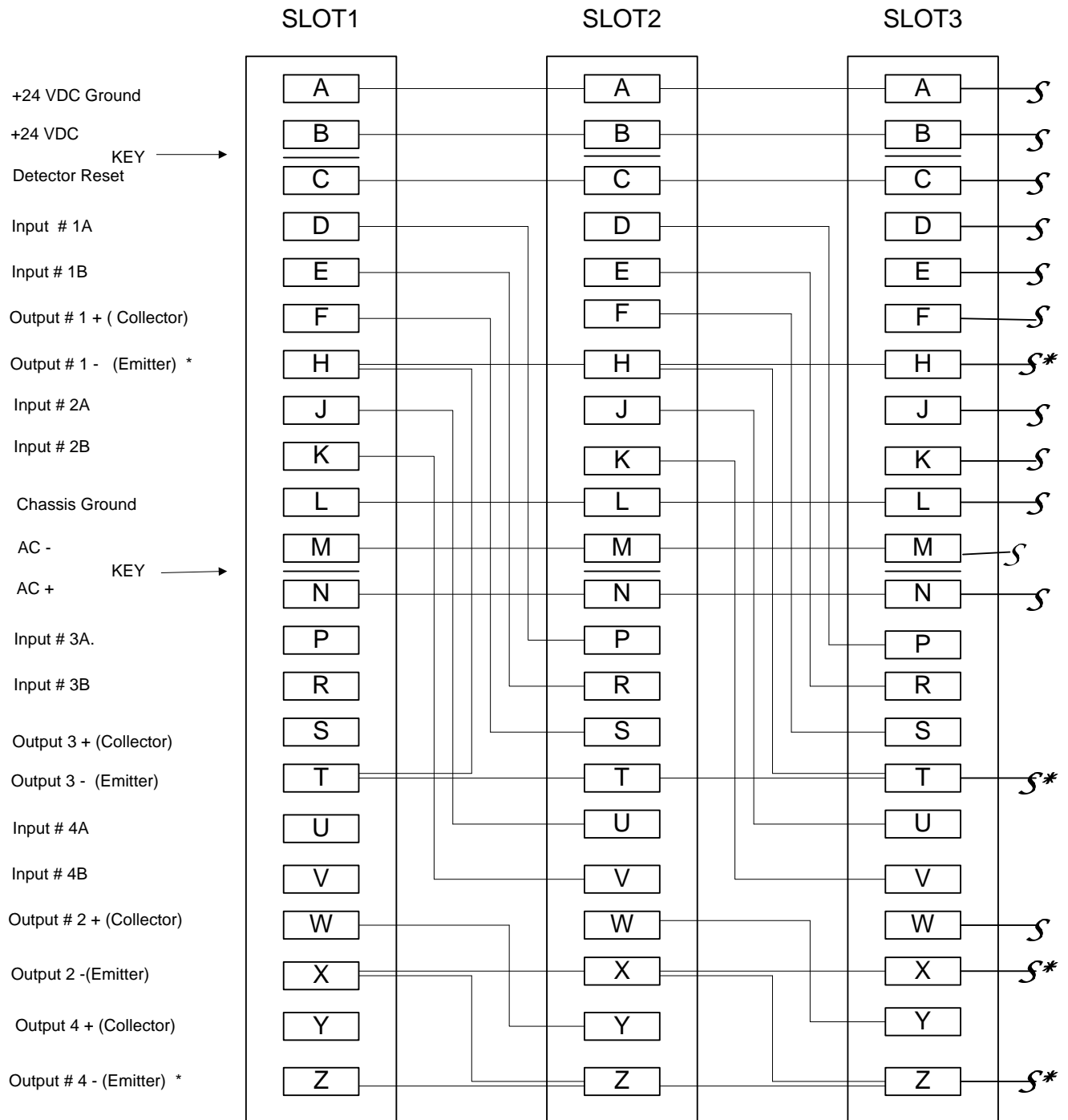
**Fig – 13.11 Police Panel Side View**

(continued)

Fig – 13.12 Cabinet Door Intake Vent - Inside View.



(continued)



NOTE: Connector pin functions are the same for all slots. \* Controller DC input Ground.

Fig - 13.13 Input Rack Wiring Diagram

(continued)



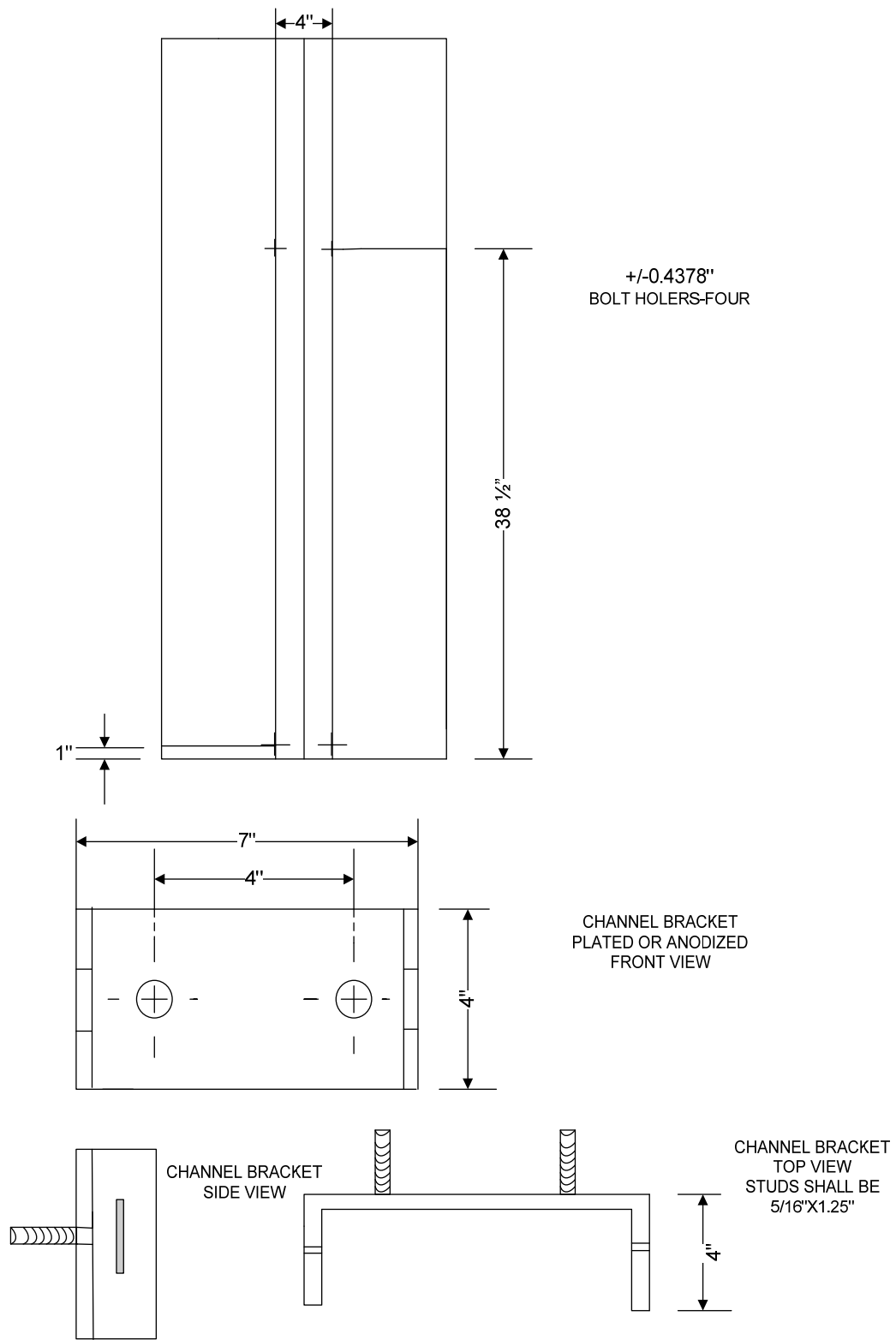
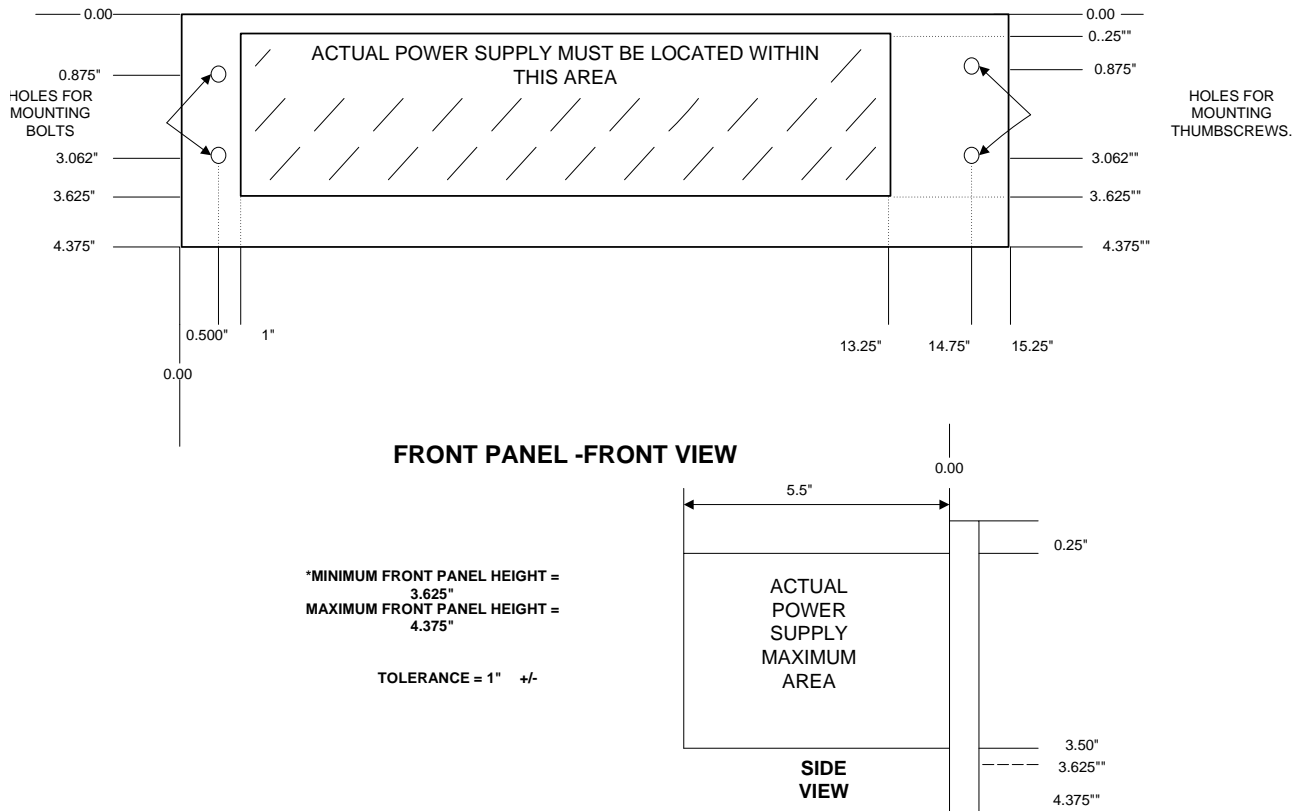


Fig – 13.14 Cabinet Bolt Hole Locations and Channel Mounting Bracket details

(continued)

Fig - 13.15 Power Supply Detail



(continued)

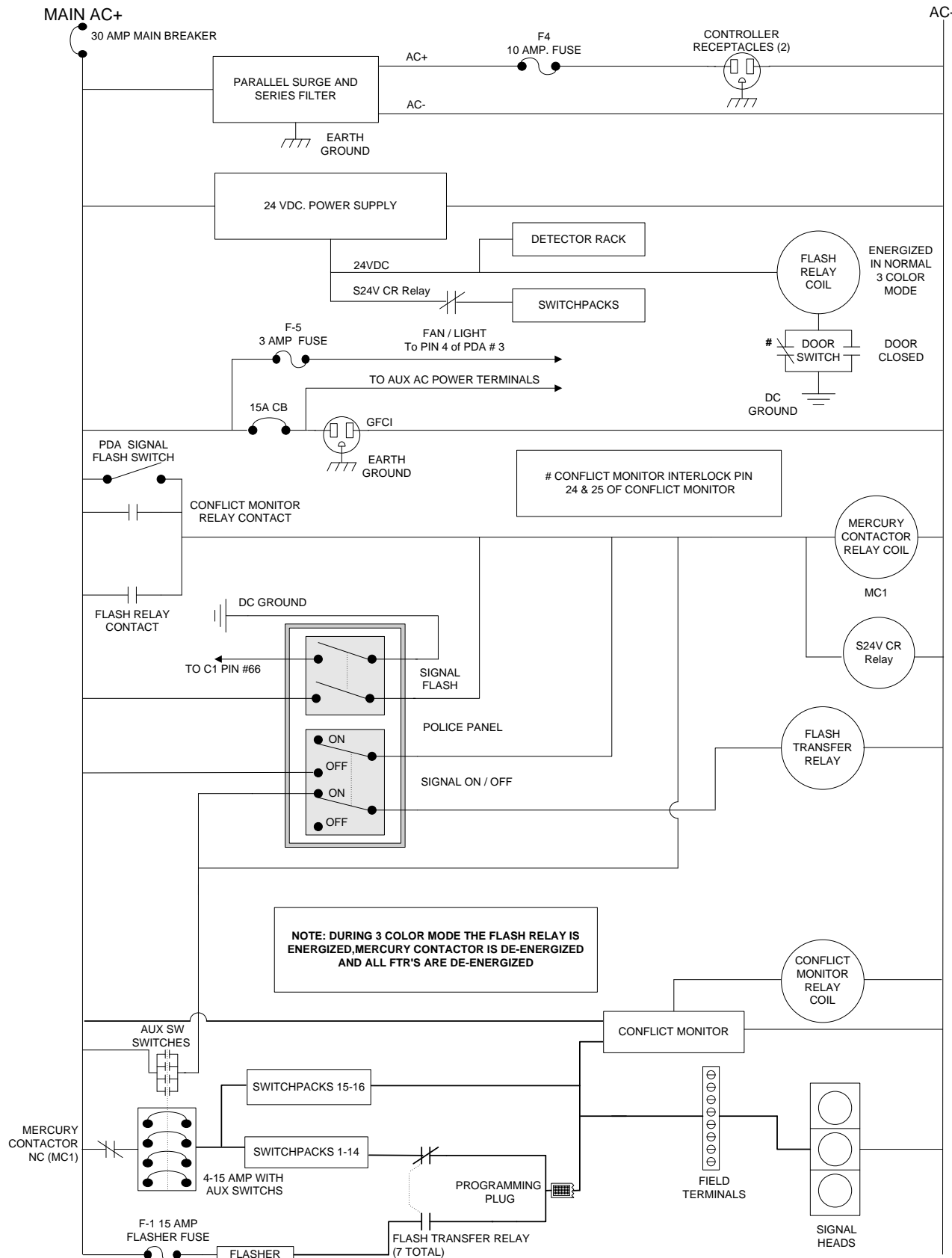


Fig - 13.16 3-Color Mode - Line Diagram

(continued)

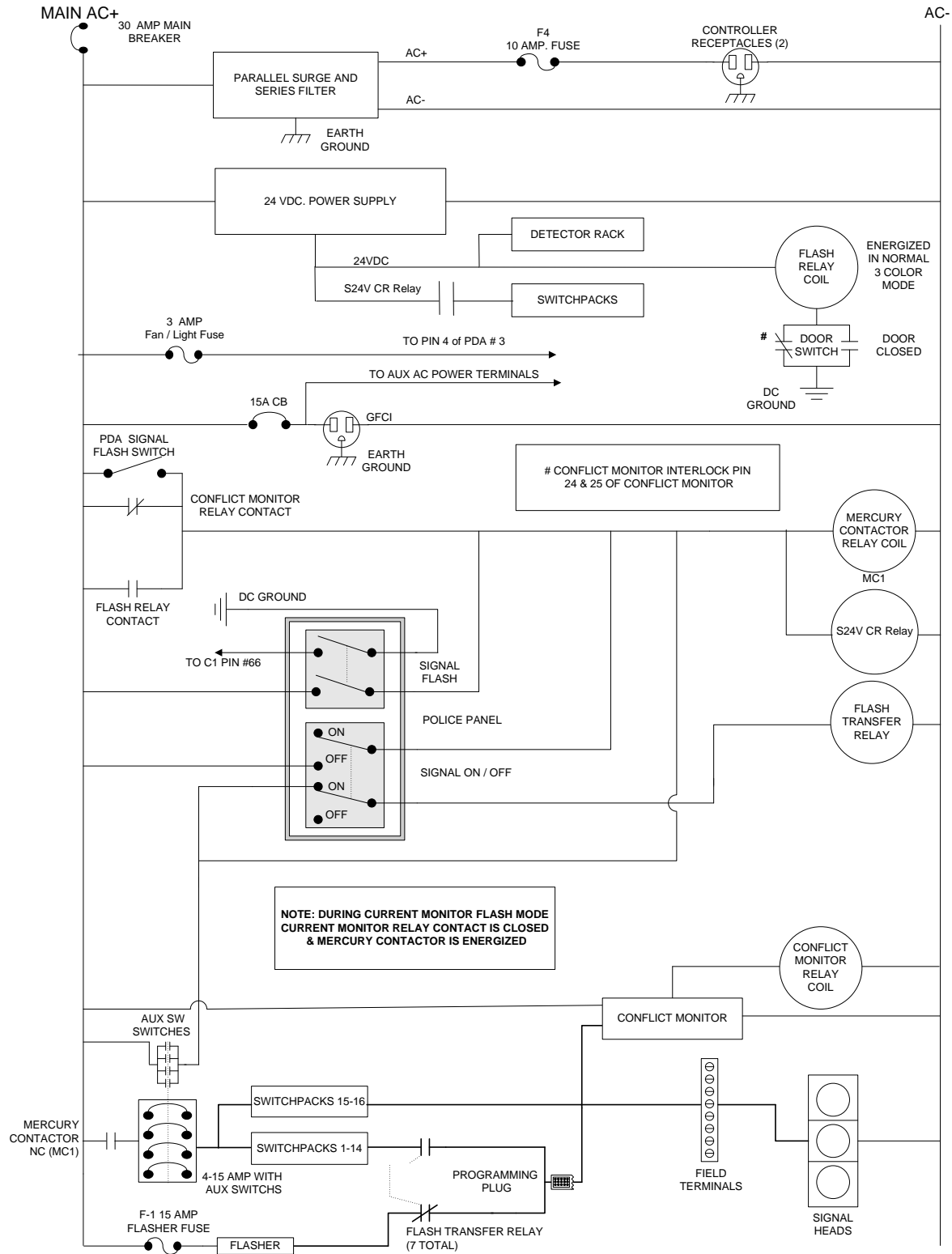
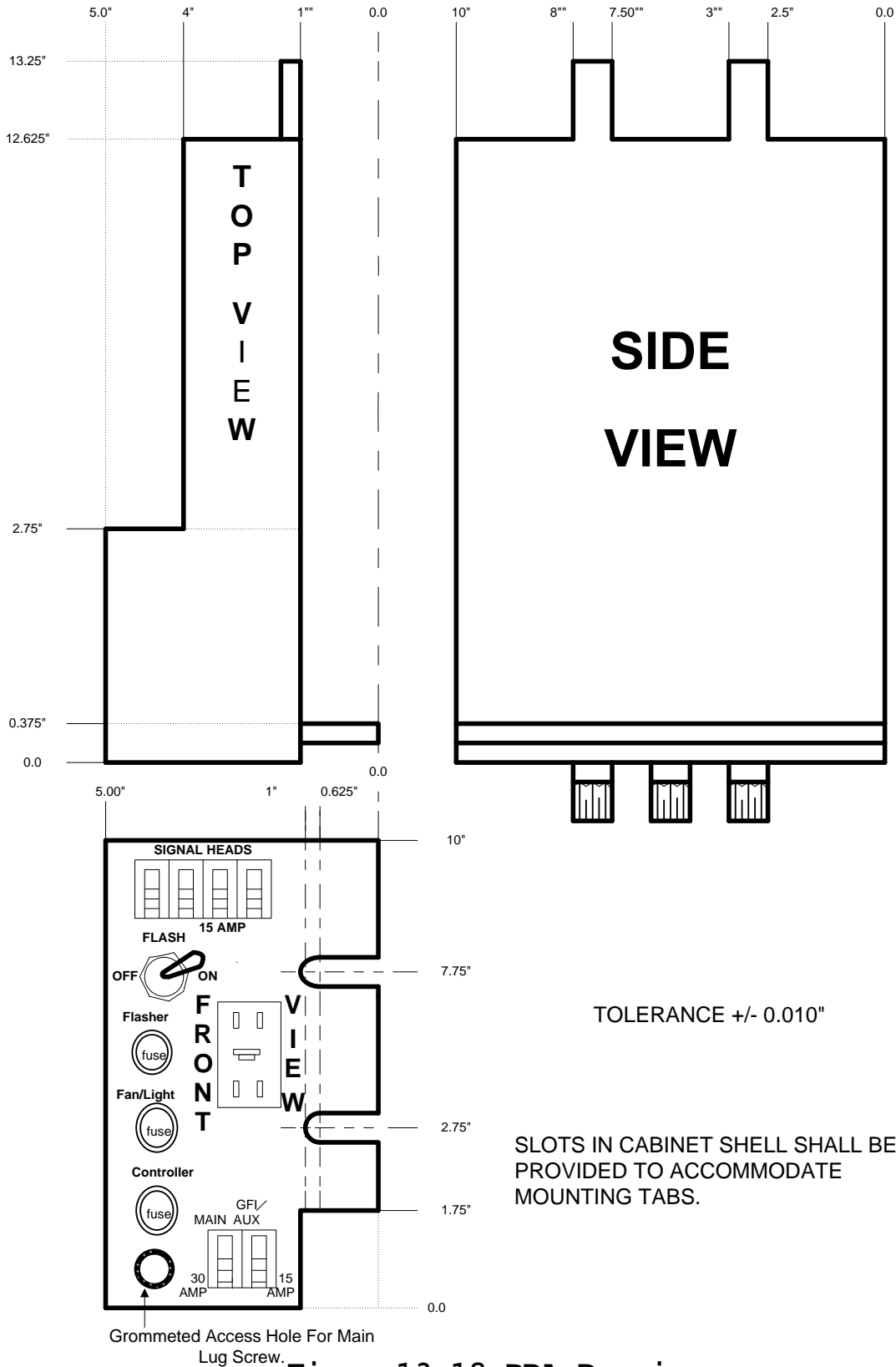


Fig - 13.17 Flash Mode - Line Diagram

(continued)



**Fig - 13.18 PDA Drawing**

(continued)

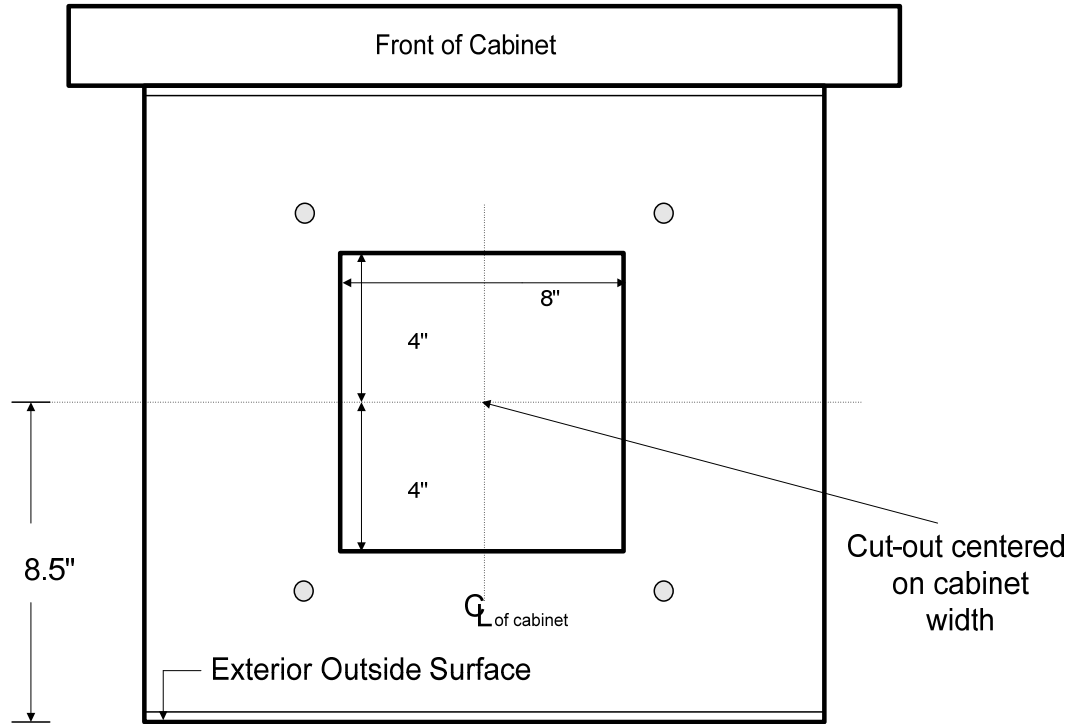


Fig - 13.19 Bottom View of Cabinet

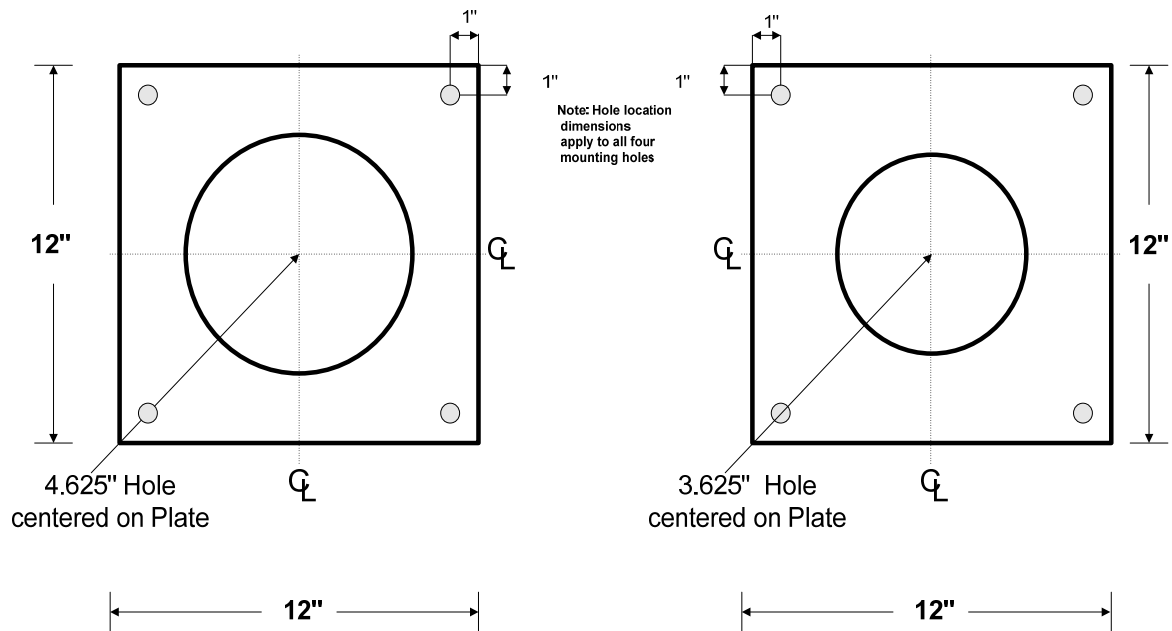


Fig - 13.20 Adaptor Plates

(continued)

Table 13.2 Input File to Cabinet Interface

P1		P2		P3	
Pin #	Channel/Function	Pin #	Channel/Function	Pin #	Channel/Function
1	Input #1B	1	Input #6B	1	Input #11B
2	Input #1A	2	Input #6A	2	Input #11A
3	Detector Call #1*	3	Detector Call #6*	3	Detector Call #11*
4	Input #2B	4	Input #7B	4	Input #12B
5	Input #2A	5	Input #7A	5	Input #12A
6	Detector Call #2*	6	Detector Call #7*	6	Detector Call #12*
7	Input #3B	7	Input #8B	7	Input #13B
8	Input #3A	8	Input #8A	8	Input #13A
9	Detector Call #3*	9	Detector Call #8*	9	Detector Call #13*
10	Input #4B	10	Input #9B	10	Input #14B
11	Input #4A	11	Input #9A	11	Input #14A
12	Detector Call #4*	12	Detector Call #9*	12	Detector Call #14*
13	Input #5B	13	Input #10B	13	Input #15B
14	Input #5A	14	Input #10A	14	Input #15A
15	Detector Call #5*	15	Detector Call #10*	15	Detector Call #15*
P4		P5		P6	
Pin #	Channel/Function	Pin #	Channel/Function	Pin #	Channel/Function
1	Input #16B	1	Input #21B	1	Input #26B
2	Input #16A	2	Input #21A	2	Input #26A
3	Detector Call #16*	3	Detector Call #21*	3	Detector Call #26*
4	Input #17B	4	Input #22B	4	Input #27B
5	Input #17A	5	Input #22A	5	Input #27A
6	Detector Call #17*	6	Detector Call #22*	6	Detector Call #27*
7	Input #18B	7	Input #23B	7	Input #28B
8	Input #18A	8	Input #23A	8	Input #28A
9	Detector Call #18*	9	Detector Call #23*	9	Detector Call #28*
10	Input #19B	10	Input #24B	10	Detector Reset 17-22
11	Input #19A	11	Input #24A	11	Detector Reset 23-28
12	Detector Call #19*	12	Detector Call #24*	12	DC Ground
13	Input #20B	13	Input #25B	13	Detector Reset 1-16
14	Input #20A	14	Input #25A	14	DC Ground
15	Detector Call #20*	15	Detector Call #25	15	+24VDC
P7					
Pin#	Channel/Function				
2	AC Neutral				
8	AC Earth Ground				
14	AC+				
* - Denotes Collectors					

(continued)

NEW YORK STATE  
 DEPARTMENT OF TRANSPORTATION

TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

PERIPHERAL EQUIPMENT REQUIREMENTS

**CHAPTER 14**  
**Detailed Specification on Flasher Cabinet**

This specification defines the minimum requirements for a Traffic Signal Cabinet to be used at locations where only a flashing signal indication is needed. A Model 204 flasher will be used in the cabinet to provide the flashing outputs to the signal heads.

**1. Flasher Receptacle and Harness Assembly**

The flasher receptacle shall be mounted in the cabinet in a permanent and rigid manner to allow easy insertion and removal of the flasher unit. A means to support the flasher unit when installed shall also be provided.

A harness assembly shall be provided for all electrical connections into and out of the flasher unit. The assembly shall be composed of five single conductors of 7 strand #14 gauge wire. The assembly shall connect to the flasher receptacle at one end and shall be terminated at the other end with spade terminals. The harness assembly conductors shall be clearly identified and labeled as to their circuit function (see Pin No./Circuit table below).

The harness assembly shall be wired to the flasher receptacle as in the Fig 14.1 below:

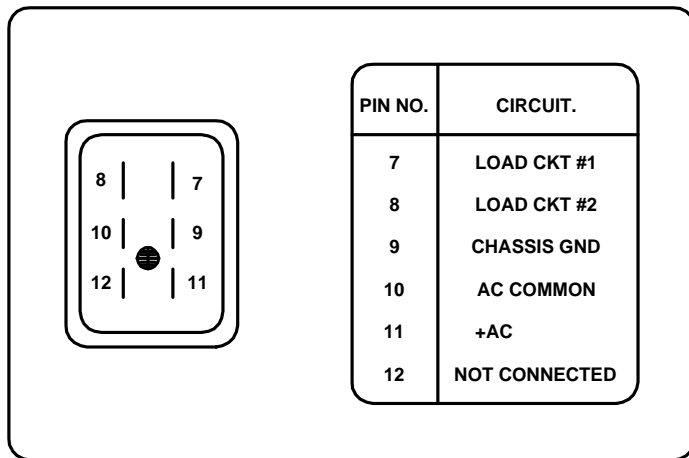


Fig – 14.1 Harness Assembly to Flasher Receptacle Wiring

**2. Cabinet**

The cabinet shall be constructed of 0.125” thick aluminum type 5052-H32 and shall have the following interior dimensions:

Height	Width	Depth
18”	14”	10”
Tolerance for above dimensions: +/- 0.125”		

Cabinet seams shall be welded in such a manner to insure that the cabinet is structurally sound. All seams shall be weather tight. The cabinet finish shall be natural and shall have the following additional features and equipment:

2.1 - **Door.** The main door of the cabinet shall include substantially the full area of the front of the cabinet and shall be furnished as a single full door. The door shall be sealed to prevent moisture from entering the cabinet with a closed cell neoprene gasket that is securely cemented to the door. The mating surface of the gasket shall be coated with a silicone lubricant

(continued)



to prevent the gasket from sticking to the area contacted by the gasket. The door hinge shall be a continuous type and be made of 14 gauge stainless steel with a 0.125" diameter steel hinge pin.

(continued)

- 2.2 - **Mounting.** The cabinet shall be furnished with two mounting plates that are suitable for welding to steel poles. These mounting plates shall be attached to the top and bottom of the rear of the cabinet in a manner to support the weight of the cabinet when mounted to the pole. Mounting plates shall also be designed or provided to allow the cabinet to be securely banded to or screwed into a pole at two locations. The plates shall be designed to accept an 0.5" lag screw and also have a slot 1.00" long to accept 0.752" banding.
- 2.3 - **Ventilation.** The cabinet shall provide adequate natural ventilation to reduce the amount of heat buildup and be designed to prevent the entrance of rain and snow.
- 2.4 - **Locks.** The door lock shall be of the self-locking heavy duty 5 pin tumbler cylinder rim type keyed to a Corbin #2 standard and be provided with a keyhole cover for Protection. The door when closed and locked will provide an adequate seal to prevent the entrance of rain and snow into the cabinet. Two keys shall be provided with each cabinet.
- 2.5 **Main Circuit Breaker.** A 15 Amp circuit breaker shall be rigidly mounted in the cabinet. The breaker shall be an UL approved magnetic type. The breaker terminal that is to be used to connect the incoming Main AC+ shall be supplied with a single barrel copper lug with a slotted set screw. The lug shall be capable of accepting a wire range of between a No. 14 and No. 6 wire. The lug and set screw shall be easily accessible so that the main AC+ can easily be connected/disconnected from the breaker.
- 2.6 **Convenience Outlet.** A duplex type convenience outlet with GFI protection shall be supplied and rigidly mounted in the cabinet.
- 2.7 **Ground Busses.** Two Solid Platted Brass or copper ground bus bars capable of accepting a wire range of between a No. 14 and No. 6 wire shall be provided. The bus bars shall have through type pressure (screw) connectors. The AC- bus bar shall be 10 position minimum and be isolated from chassis ground. The chassis bus bar shall be 4 position minimum and be connected directly to the cabinet housing.
- 2.8 **Terminal Block.** A 20 AMP rms, double row, 10 terminal minimum, barrier type terminal-block with shorting bars between the rows shall be supplied and mounted securely in the cabinet. The terminal block will be supplied with 8-32 nickel or cadmium plated brass binder head screws. This terminal block will be used as an interface between the signal head wiring and the flasher wiring.
- 2.9 **Surge Protection.** The cabinet shall be supplied with both common mode (AC+ to chassis, AC- to chassis) and differential mode (AC+ to AC-) surge protection to reduce the effect of transients on the AC line. This protection shall be connected to the load side of the main breaker. The surge protection shall meet the following requirements:
- |                               |   |
|-------------------------------|---|
| Continuous RMS Voltage        | 150 VAC min.  |
| Energy Dissipation Capability | 80 joules min (10 by 1000 microsecond current waveform)       |
| Maximum Clamping Voltage      | 360 volts (I = 100 amps 8 by 20 microsecond current waveform) |
| Peak Current Capability       | 6500 amps min (8 by 20 microsecond current waveform)          |
- 2.10 **Conduit Hole\Knockout.** A hole or knockout to accept a 1.50" electrical conduit shall be provided approximately in the center of the floor of the cabinet.

### **3. Miscellaneous**

- 3.1 Positioning of the electrical hardware in the cabinet such as the terminal block, ground busses and main breaker shall be done in a manner so that wiring going to these devices can be easily connected/disconnected.
- 3.2 Lock washers shall be used on all bolts or studs securing the back panel, door lock and door hinges.

(continued)

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 15**  
***Detailed Specification on Model 330SR Cabinet Base***

This specification describes the technical requirements for a microcomputer traffic signal cabinet base for the Model 330SR cabinet.

**1. Description**

The microcomputer traffic signal cabinet base shall be a sheet aluminum base unit designed for use in mounting a NYS Model 330SR Microcomputer Traffic Signal Cabinet to a concrete pad for base-mounted traffic signal installations.

The base shall be designed to be bolted to the base. Field wiring, detector wiring, etc. are to be brought into and out of the cabinet through the round hole in the top of the base.

This base has its overall size and bolt-hole locations in the flange designed to allow it to be directly retrofitted over certain concrete pads and anchor bolts existing in the field.

**2. Material Requirements**

The base shall be constructed of Grade 5052-H32 aluminum, with full weld seams and shall conform in all respects to the attached drawing.

The top plate of the base shall be constructed of 0.188" aluminum and shall have one 8" hole cut into it, as shown on the attached drawing.

The base plate of the cabinet shall be constructed of 0.187" aluminum and shall be constructed to form a flange with the sides so that the bottom of the base is completely open. Four 1.25" anchor bolt holes shall be cut into the base plate as shown on the attached drawing.

The sides of the base shall be constructed of 0.188" aluminum. A door shall be constructed in the front of the base by attaching a piece of 0.25" aluminum inside the base to form a one in lip. The door shall be constructed of 0.188" aluminum and shall fit flush to the front of the base, against the lip. The door shall be secured at the top and bottom with 0.25" allen screws.

A 1/2" - 13 NC hex nut to be used for grounding purposes shall be welded to the inside of the front of the base (see drawing).

The base shall be untreated and unpainted aluminum.

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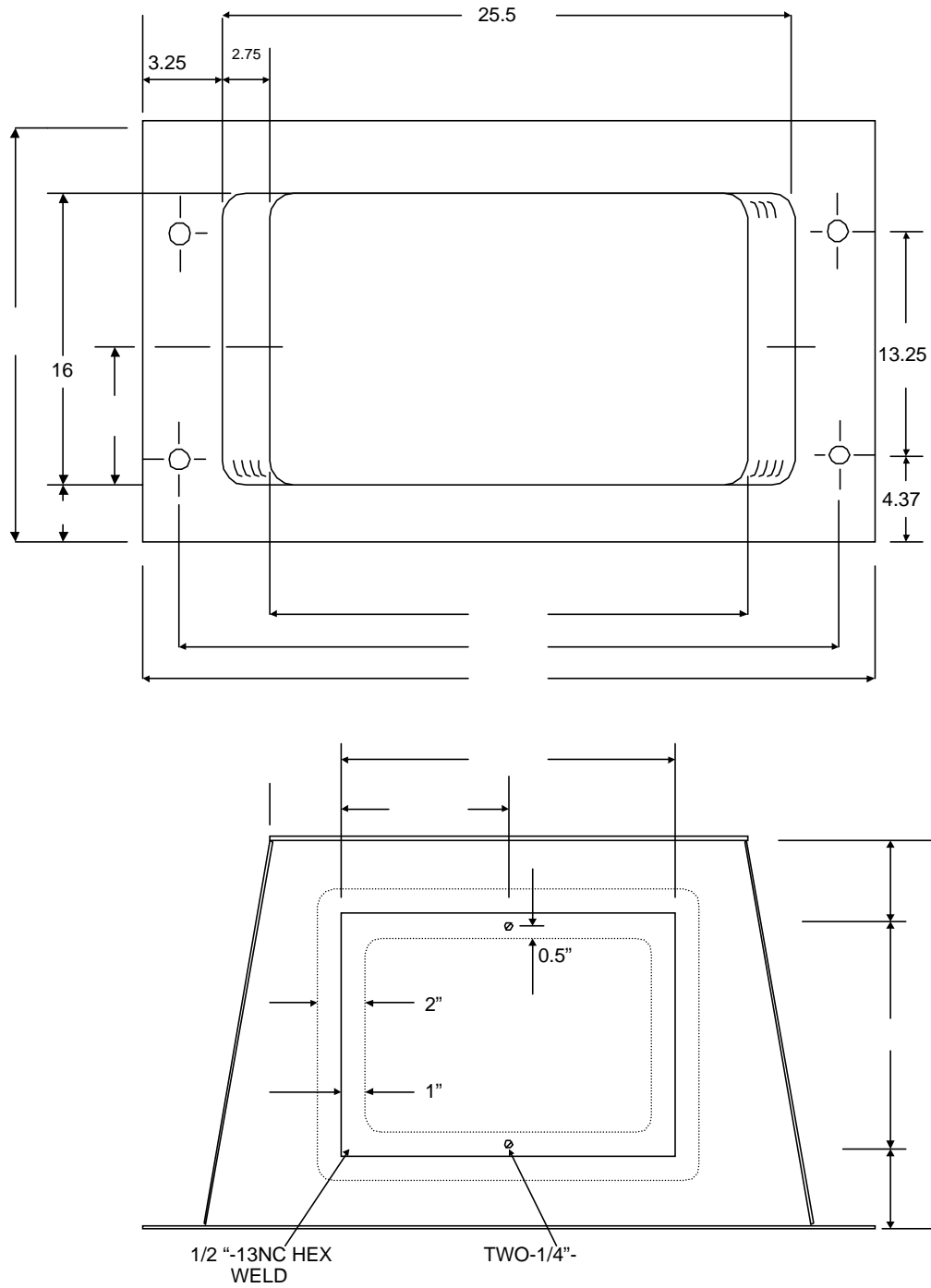


Fig - 15.1 Model 330SR Cabinet Base

(continued)

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

*PERIPHERAL EQUIPMENT REQUIREMENTS*

**CHAPTER 16**

***Detailed Specification on Auxiliary Input Cabinet***

The intent of this specification is to provide the requirements for an auxiliary input cabinet for the Model 330SR traffic signal cabinet. This cabinet will provide additional inputs.

**1. ENCLOSURE**

See attached drawings for references to the specifications listed below.

- 1.1 The enclosure shall be constructed of 0.125" thick aluminum alloy type 5052-H32, with screened louvered vents, Apex Enclosures Model TCSM261715 or approved equal. The enclosure shall be rated NEMA 3R and the door lock shall be a self-locking, heavy duty 5 pin rim type keyed to a Corbin #2 standard and be provided with a keyhole cover for protection. Two keys shall be provided. The continuous door hinge and pin shall be made from stainless steel and be attached with stainless steel carriage bolts. Facing the front of the enclosure, the door shall be hinged on the left side.
- 1.2 A removable, aluminum inside back panel shall be provided and mounted 1.5" off of the enclosure's backplane in the four corners with #8-32 stainless steel screws. The approximate size of the panel shall be 25"H x 14.75"W. All sockets, terminal blocks and wiring shall be attached to this plate and the panel shall be easily removed as a single unit with simple hand tools.
- 1.3 Facing the back of the enclosure a three inch conduit hole shall be centered 5" from the bottom edge and 5" inches from the left side. Facing the right side (opposite the hinge side), a two inch conduit hole shall be centered 6" inches from the top and 7" from the right edge. This 2" conduit hole shall be supplied with an assembly that consists of an aluminum "close nipple" and a weatherproof type hub (Myers Hub Model ST-6 or approved equal) attached to each end. The threads shall have waterproofing compound applied.
- 1.4 A 12 inch wide "L-shaped" mounting bracket shall be attached to the right side of the enclosure's bottom plate. It shall be attached to the enclosure with three (3) #10-32 stainless steel bolts and locking type nuts. The bracket shall be constructed of 0.125" aluminum. (See attached drawing for additional dimensions and placement)  
The interconnect shall be made via a three inch conduit between the back of the input cabinet and the base mount assembly of the Model 330SR cabinet. A two inch conduit between the right side of the input cabinet and the left side of the Model 330SR cabinet shall provide a means to connect to the controller and also the 24vdc power supply.  
The input cabinet shall use a removable, standard Model 330SR cabinet input file assembly.

**2. REMOVABLE BACK PLATE**

- 2.1 Three vertical, 14 position terminal blocks (Magnum A4000 Series or approved equal) shall be located six (6) inches down from the top edge and one and one half inches from the right edge. The blocks shall be spaced one and one-quarter (1¼) inches apart
- 2.2 A two inch conduit hole shall be centered five inches from the top edge and four inches from the right edge. A three inch conduit hole shall be placed in the lower right hand corner and shall be centered on the back panel three inch conduit hole. The edges of the holes shall have protective covers.
- 2.3 Two 11.5"H x 5"W brackets spaced 17.5" apart shall be placed four inches from the left edge of the back plate. The brackets shall be constructed of 0.064" aluminum. These brackets will be used to support a State provided, standard NYS Model 330SR cabinet input file assembly and input cards.
- 2.4 Five vertical sockets (Molex # 03-09-1154 or approved equal) shall be installed between the mounting brackets, centered and equally spaced.
- 2.5 A panel mounted fuse holder with a 3AG 2 amp SB fuse shall be installed below TB10 to protect the 24vdc supply.

(continued)

**3. ELECTRICAL**

- 3.1 A #24AWG, 25 conductor stranded cable (Belden #9543 or approved equal) shall extend from the two inch conduit assembly. The cable shall be 48” in length and one end shall terminate with a circular plug (Amp #206305-1), shell/ cable amp assembly (Amp #206138-1) and pins (Amp #1-66099-4). The other end shall go through the two inch conduit hole in the back plate and terminate as shown on the “Aux. Input Cabinet Pin Assignment” page. This circular plug will be designated as “C11P”.
- 3.2 A #16AWG, 2 conductor stranded cable (Belden #8780 or approved equal) shall extend through the two inch conduit holes. The cable shall be 60” in length and terminate in the enclosure as shown on the “Aux. Cabinet Pin Assignment” page. The other end shall terminate in a “Tee” arrangement between a plug and a socket ( Molex #03-09-1157 and #03-09-2158) as indicated on the “24vdc Pin Assignment” page, located on the associated drawing.
- 3.3 All wiring between AUX S1- AUX S4 and terminal blocks TB8, TB9 and TB10 shall be #16AWG, 2 conductor stranded, twisted pair wire (Belden #8780 or approved equal).
- 3.4 A three position, double row terminal block shall be placed on the rear of the removable back plate. This block shall terminate the 24vdc supply and C11P ground wires.

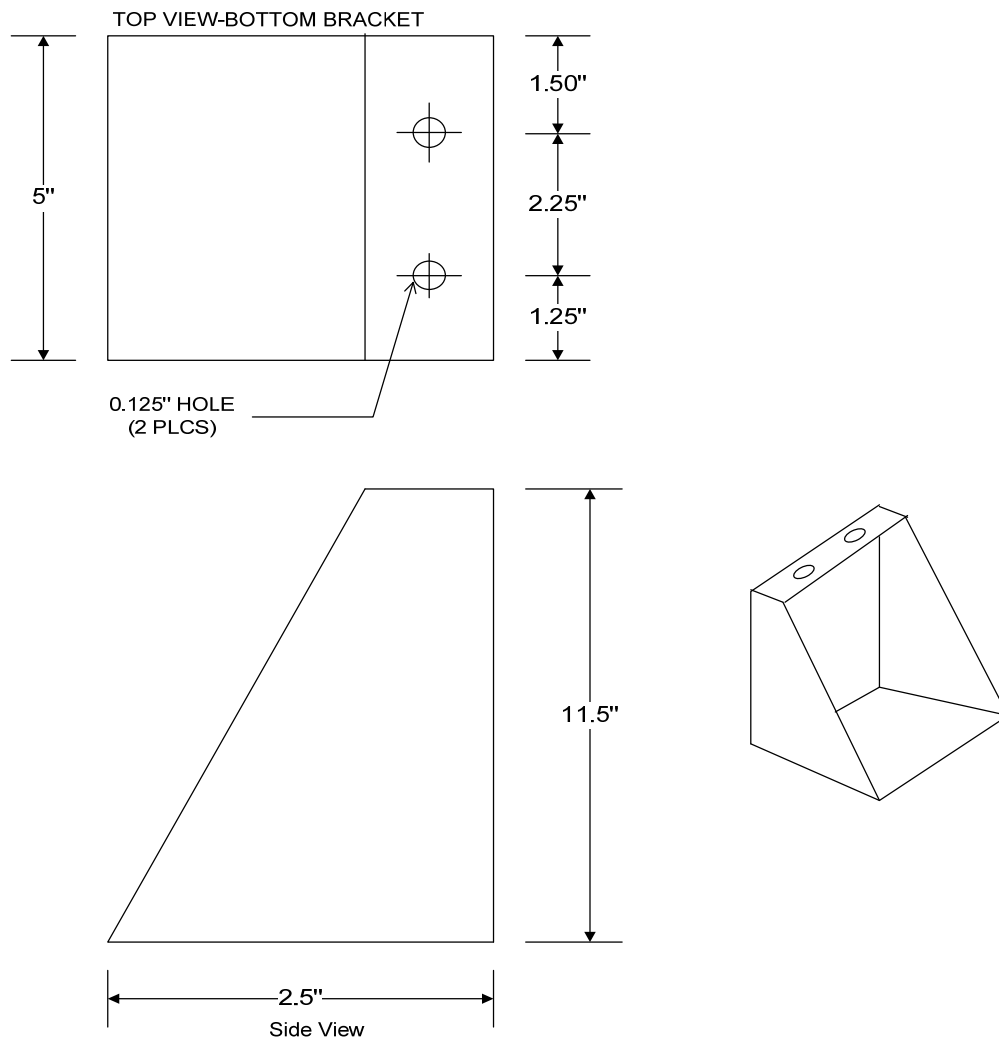
**4. LABELING**

- 4.1 Starting at the bottom of the column of sockets, a label shall be placed to the right of each one. They shall be labeled as follows: AUX-S1 through AUX-S5.
- 4.2 The fuse holder shall be labeled as follows: 24VDC Supply-2 Amp SB
- 4.3 From left to right, the three vertical terminal blocks shall be labeled TB8, TB9 and TB10. Starting at the top, TB8 shall be labeled as follows: 29A, 29B, 30A, 30B... and so on. TB9 shall be labeled as follows: 36A, 36B, 37A, 37B...and so on. TB10 shall be labeled as follows: 43A, 43B, 44A, 44B... and so on. The last two screws on TB10 shall be labeled - 24VDC and +24VDC. The labels shall be placed on the left side of each terminal block.
- 4.4 The plug on the end of the 60” cable shall be labeled “Cabinet 24vdc Socket”. The socket on the same end shall be labeled “24vdc Supply”.
- 4.5 A label shall be placed on the removable backplate, under the input file assembly as follows:  
“INSTALLER: DO NOT USE THE FIFTH PLUG OR THE AC PLUG FROM THE INPUT FILE ASSEMBLY”

**AUXILIARY INPUT CABINET PIN ASSIGNMENTS**

AUX	C11P	TB8	AUX	C11P	TB9	AUX	C11P	TB10
S1-2		29A	S2-8		36A	S3-14		43A
S1-1		29B	S2-7		36B	S3-13		43B
S1-3	10		S2-9	18		S3-15	25	
S1-5		30A	S2-11		37A	S4-2		
S1-4		30B	S2-10		38A	S4-1		
S1-6	11		S2-12	19		S4-3	26	
S1-8		31A	S2-14		38A	S4-5		
S1-7		31B	S2-13		38B	S4-4		
S1-9	12		S2-15	20		S4-6	27	
S1-11		32A	S3-2		39A	S4-8		
S1-10		32B	S3-1		39B	S4-7		
S1-12	13		S3-3	21		S4-9	28	
S1-14		33A	S3-5		40A	S4-11		
S1-13		33B	S3-4		40B	S4-10		
S1-15	15		S3-6	22		S4-12	29	
S2-2		34A	S3-8		41A	S3-14		
S2-1		34B	S3-7		41B	S3-13		
S2-3	16		S3-9	23		S3-15	30	
S2-5		35A	S3-11		42A			
S2-4		35B	S3-10		42B			
S2-6	17		S3-12	24				
			<b>AUX-S5 Pin Assignments</b>					
			Pin #12	24 Volt DC Ground				
			Pin #14	C111P DC Grounds (Pins #9, #14, #31, #37)				
			Pin #15	24 Volt DC Positive				

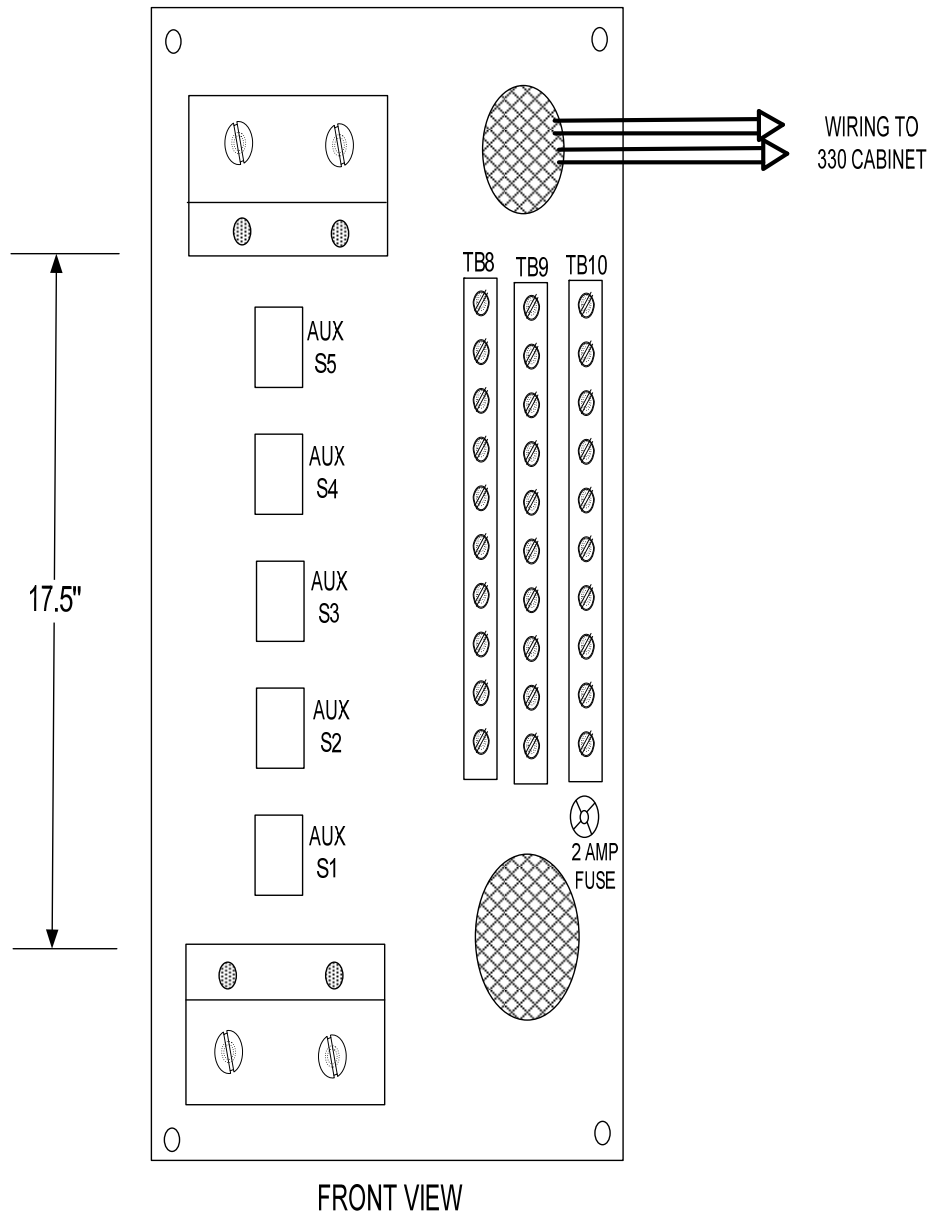
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\* NOT TO SCALE

Fig - 16.1 Input File Assembly Mounting Bracket

(continued)



\*WITHOUT MODEL 330 CABINET INPUT FILE  
ASSEMBLY INSTALLED

**Fig - 16.2 Removable Back Plate**

(continued)



**24VDC PIN ASSIGNMENT**

P1	S1	AUX. CAB. 2 WIRE
1	1	
2	2	
3	3	
14	14	+24
15	15	-24

ALL WIRE SHOULD BE  
 #16 AWG STRANDED

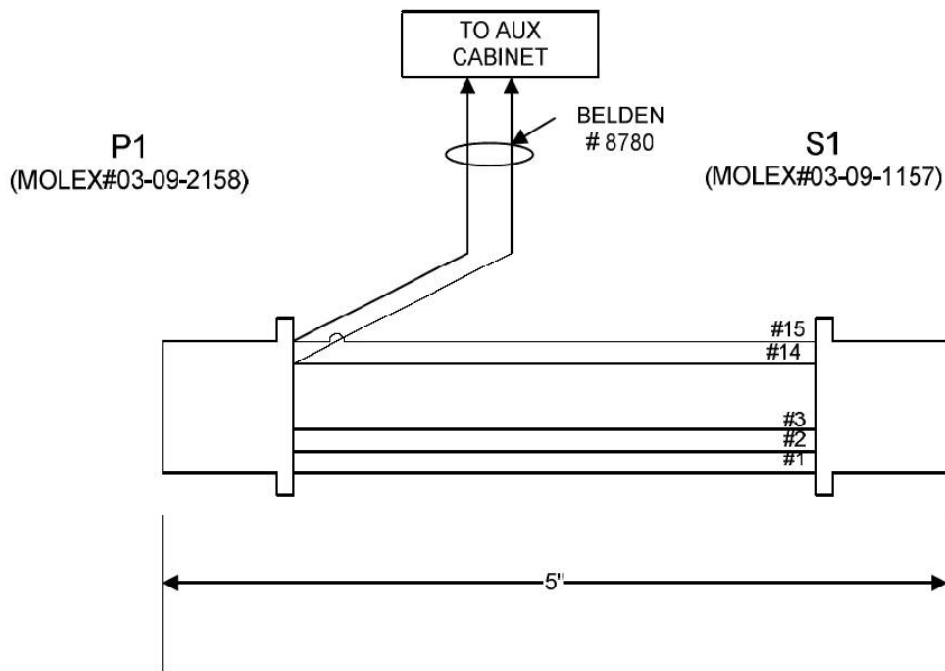


Fig – 16.3 Pin Assignment for 24 Volt

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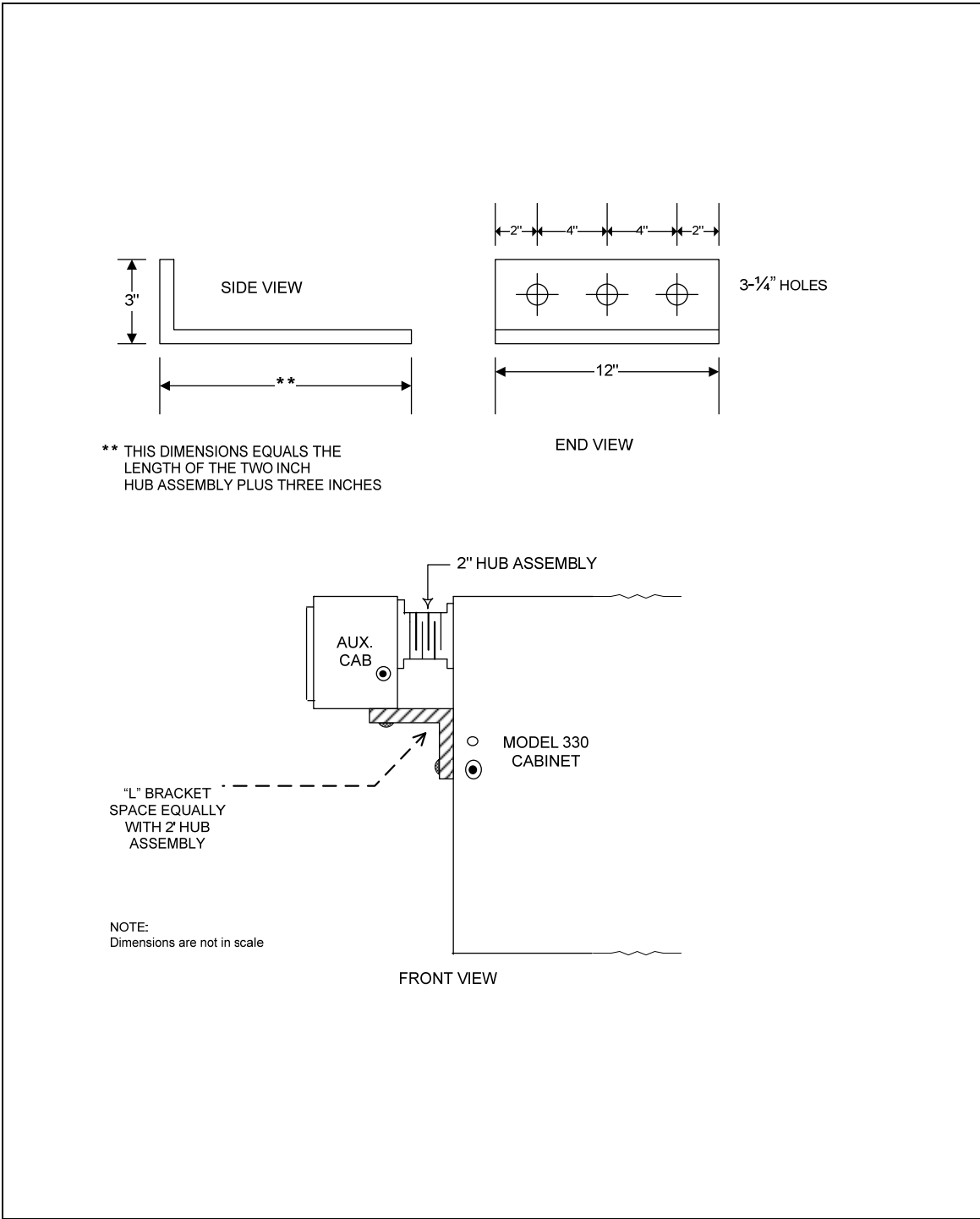


Fig – 16.4 “L” Bracket Dimensions and Placement

(continued)

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

*Chapters 17*  
*LED MODULES & PED LED COUNTDOWN TIMER*

**CHAPTER 17**  
**Detailed Specification for LED Traffic Signal Modules**

The purpose of this specification is to provide the minimum performance requirements for the following LED Traffic Signal Modules:

- **Circular Ball**
- **Arrow** - Single and Bi-Modal (Yellow and Green Arrow incorporated into one unit)
- **Pedestrian** - Single (Hand or Walking Person) and Bi-Modal (Hand and Walking Person incorporated into one unit)
- **Countdown Pedestrian Signal** – Single Unit and Ped/Countdown Module (Hand and Walking Person with Countdown Pedestrian Signal)

This specification refers to definitions and practices described in “Vehicle Traffic Control Signal Heads” referred to in this document as “VTCSH.” and “Pedestrian Traffic Control Signal Indications”, referred to in this document as “PTCSP”, published in the Equipment and Materials Standards of the Institute of Transportation Engineers.

Ball and Single Arrow LEDs are specified in this specification as either NYSDOT Standard **or** Type “A” - See Paragraph 5.0 (NYSDOT Standard LED Module Definitions) for detailed features. Single Pedestrian, Bi-Modal Pedestrian, Countdown Pedestrian Signals (Single Unit and Ped/Countdown Module) and Bi-Modal Arrows are specified as Type “A” only.

All unit types designed to this specification shall be operationally compatible with the traffic signal equipment that each type is designed and intended to interface with. This equipment includes all controllers, conflict monitors, current monitors, switchpacks and flashers currently in use by the New York State Department of Transportation.

**1. Circular Ball Specifications**

Circular Ball Modules shall be designed, built and tested per the currently in effect ITE performance specification titled “Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement”. Minimum maintained luminous intensity values shall be per Table 1 of the specification. Circular Ball Modules shall also conform to the additions and exceptions to specifications noted herein.

**2. LED Arrow (Single And Bi-Modal) Specifications**

Led Arrow Modules shall be designed, built and tested per the currently in effect ITEs performance specification titled “Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Vehicle Arrow Supplement”. Minimum maintained luminous intensity values shall be per Table 3 (Omni Directional) of the specification. The Single LED Arrow module shall be designed to display an Arrow of either a Yellow or Green color. The Bi-Modal LED Arrow module shall be designed to display both a Yellow and Green Arrow in the same unit. Led Arrow Modules shall also conform to the additions and exceptions to specifications noted herein.

**3. LED Pedestrian Signal Modules (Single and Bi-Modal) and Countdown Pedestrian Signal Specifications**

Led Pedestrian and Countdown Pedestrian Signal Modules shall be designed, built and tested per the currently in effect ITE performance specification titled “Pedestrian Traffic Control Signal Indicators - Light Emitting Diode (LED) Signal Modules”. Single LED Pedestrian Signal modules shall be designed to display either a “HAND” or “WALKING PERSON”. Bi-Modal LED Pedestrian Signal modules shall be designed to display both the “HAND” and “WALKING PERSON” in the same module. Countdown Pedestrian Signal Modules shall either be Single Units displaying only digits for Pedestrian clearance timing or Combination Units (Ped/Countdown Module) that include a Hand and Walking Person Indication. Led Pedestrian and Countdown Pedestrian Signal Modules shall also conform to the additions and exceptions to specifications noted herein.

LED Pedestrian and Countdown Pedestrian Signal Modules shall be designed as either having Message Bearing Surfaces of 12 inches by 12 inches or 16 inches by 18 inches.

(continued)

Message Bearing Surfaces for the Model Types are as follows:

12"x 12"	Single Hand, Single Walking Person, Bi-Modal Hand/Walking Person and Single Unit Countdown Pedestrian Signal
16: x 18"	Bi-Modal Hand/Walking Person and Ped/Countdown Module (Hand and Walking Person with Countdown Pedestrian Signal)

The 16 inch by 18 inch modules shall be built to the dimensions shown below and fit into pedestrian signal housings of the manufacturers listed.

<b>Height</b>	<b>WIDTH</b>	<b>CORNER RADIUS</b>	<b>FITS HOUSINGS DESIGNED BY</b>
16 in	17.7 in	2.36 in	ICC, IDC & McCAIN

**4.0 Additions and Exceptions to Specifications for All Modules except where noted**

4.1 A one piece "U" shaped cross section rubber gasket or other suitable means shall be provided with each module to insure a weather tight fit between the door of the signal housing and the module. The quality of gasketing supplied, and any method used to adhere the gasketing to the module if the gasketing is affixed to the module using adhesive, shall be such that the gasketing and adhesion technique shall not appreciably deteriorate over the life of the module when the module is used in its intended application.

4.2 Wiring for electrical connections to the module shall be terminated with insulated 0.250 inch female quick disconnect push on terminals.

4.3 Each signal module shall be identified on the back side with the following:

- Manufacturer's Name or Trade Mark and Manufacturer's Model Number
- Part number as shown in the NYS DOT's LED Traffic Signal Module QPL
- Serial number
- Voltage rating
- Power consumption (Watts and Volt-Ampere)
- Vertical indexing indicator (i.e., "up arrow", or the word "UP" or "TOP") if specific orientation of the module is required.
- Date of Manufacture (minimum information required -month & year)
- Single units shall have identification markings as to the type and color of the module. Bi-Modals shall be marked with module type.

4.4 All "Red" LED signals module lenses supplied to this specification shall be tinted with the appropriate color to enhance on/off contrast. The material used to tint the lens shall not affect the luminous intensity or chromaticity and shall be uniform across the face of the lens. The "Yellow" and "Green" units shall be supplied with untinted lenses.

4.5 All wiring and terminal blocks shall meet the requirements of Section 13.02 Wiring of the VTCSH standard. Each wire shall be approximately 1 m long. All wiring shall be rated for use over the temperature range of -40 deg F to +165 deg F. Under normal handling of the module over the specified temperature range, the wiring insulation shall not crack or fray along its entire length.

Units shall be supplied with colored coded wires as defined below:

- Red Balls & Red Arrows - Red & White (Common)
- Yellow Balls & Yellow Arrows - Yellow & White (Common)
- Green Balls & Green Arrows - Brown & White (Common)
- Bi-Modal Arrows – Brown (Green Arrow), Yellow (Yellow Arrow) & White (Common)
- Bi-Modal Pedestrians – Orange (Hand), Blue (Person)& White (Common)
- Single Pedestrians-Hand - Orange & White (Common)
- Single Pedestrians-Walking Person - Blue & White (Common)
- Countdown Pedestrian Signal (Single Unit and Ped/Countdown Module) - Orange (Connection to Pedestrian Hand Switchpack output), Blue (Connection to Pedestrian Walking Person Switchpack output) & White(Common)

(continued)

- 4.6 All modules shall contain filtering dedicated to prevent inducing electronic noise into the AC power lines
- 4.7 Failed State Impedance. Failed State Impedance shall be 1 Megohm minimum across the input power leads.
- 4.8 Yellow Ball and Yellow Arrow Modules supplied to this specification shall only be required to meet the Minimum Maintained Luminous Intensities of the applicable specification for that device at 77 deg F.
- 4.9 Initial Luminous Intensities of the Modules built to this specification shall equal or exceed the Minimum Maintained Luminous Intensities applicable for that device at 77 deg F as follows.
- Circular Ball Modules:
    - Red - 125% of the Minimum Maintained Luminous Intensity values
    - Green - 115% of the Minimum Maintained Luminous Intensity values
    - Yellow - 110% of the Minimum Maintained Luminous Intensity values
  - Led Arrow Modules:
    - Red - 125% of the Minimum Maintained Luminous Intensity values
    - Green - 115% of the Minimum Maintained Luminous Intensity values
    - Yellow - 110% of the Minimum Maintained Luminous Intensity values
  - Led Pedestrian Modules:
    - Walking Person - 150% of the Minimum Maintained Luminous Intensity values
    - Hand - 120% of the Minimum Maintained Luminous Intensity values
- 4.10 - All modules shall be fused. Fuse selection shall be such that it provides reliable operation for its intended operation. The fuse shall be located before any electronic component used in the module and placed in series with the colored wire of the unit. If multiple fuses are used in the design of the module, the main surge protection fuse shall be placed in the location above. The main surge protection fuse can be internal or external to the unit. Should fusing be external to the unit by placing inline fuse holders into the wiring of the unit, the fuse holder shall be installed so that it is between six to ten inches from the housing of the unit. The fuse holders, should they be utilized, shall be a two piece type that employs a threaded connection to join the two pieces.
- 4.11 - Countdown Pedestrian Signal Operation. Countdown Pedestrian Signals (Single Unit and Ped/Countdown Module) shall comply with the following Operational Requirements.
- 4.11.1 The unit will be designed to countdown to zero only the “Clearance” time of the Pedestrian Interval. During the Steady Don’t Walk Indication the display will always be dark.
  - 4.11.2 The unit, when connected to the appropriate Pedestrian switch pack outputs, shall have an automatic learn mode in order to learn and store the Pedestrian clearance times in its memory and to self-adjust for subsequent changes in Pedestrian Clearance time.
  - 4.11.3 Following power restoration to the unit after a power outage of greater than two seconds the unit will remain dark for one pedestrian cycle maximum to learn and acquire the current pedestrian clearance timing and replace any values that were stored in memory prior to the power outage with the newly acquired values. The unit shall display the newly acquired times on the next pedestrian cycle following the learn cycle.
  - 4.11.4 The unit shall detect changes in pedestrian clearance timing during normal operation and act upon them as described below:
    - 4.11.4.1 The unit will automatically re-program itself should it detect any increase in Pedestrian clearance timing. The increased timing shall be displayed on the subsequent pedestrian cycle.
    - 4.11.4.2 The unit will detect any reductions in pedestrian clearance timing (such as those occurring during a traffic Preemption cycle) and display on the subsequent pedestrian cycle the timing stored in its memory prior to the shortened pedestrian cycle.
    - 4.11.4.3 The unit will re-program itself should it detect two consecutive identical shortened pedestrian clearance cycles and display this timing on the next pedestrian cycle.
  - 4.11.5 The unit shall be designed to suspend any timing and go dark when, for any reason, the timing of the Ped Clearance cycle is terminated before reaching the “zero” count and the clearance switchpack output reverts to a steady “On” condition
  - 4.11.6 The unit shall be capable of timing consecutive complete Pedestrian cycles outputted by the traffic control system.
  - 4.11.7 The unit shall be designed to retain the Pedestrian timing stored in its memory for all power outages of less than one second and to continue timing of the Pedestrian timing if the traffic control system has resumed Pedestrian timing following this duration outage. For outages of between one and two seconds memory may or

(continued)

may not be retained. For all power outages greater than two seconds the unit will resume operation as described in Paragraph 4.11.3.

#### **5.0 NYSDOT Standard and Type A LED Module Definitions.**

**5.1 NYSDOT Standard units** shall be designed so that a normally functioning signal module will generate current pulses. The frequency of the current pulses shall be 6 pulses per second, and be evenly spaced over this time interval, with the first pulse generated within 100 msec after application of AC power. The minimum current required shall be 500 milliamp peak AC or pulsed current with a minimum pulse width of 3 msec. The pulse width shall be measured at the 500 milliamp level. These levels shall be maintained over the voltage range of between 95 and 135 volts rms.

Type "A" units shall be supplied without the necessary circuitry to generate the current pulses.

All Ball and Single Arrow LED modules may be procured using this specification as either NYSDOT Standard or Type A units. Single Pedestrian, Bi-Modal Pedestrian, Bi-Modal Arrows and Countdown Pedestrian Signals (Single Unit and Ped/Countdown Module) will be procured as Type A only.

**5.2 Power Factor.** LED signal modules supplied to this specification shall have power factors of 0.90 or greater. Power Factors for NYSDOT Standard units shall also be 0.90 or greater when measured without the current generating circuitry included in the measurements.

**5.3 Harmonic Distortion.** Harmonic Distortion induced into the AC power line for Type A units operating at 120V rms shall not exceed 20 percent. NYSDOT Standard units supplied will meet the same low distortion standards without the current generating circuitry included in the measurements.

**5.4 Electronic Noise.** Type A units supplied to this specification shall meet the requirements of the Federal Communication Commission Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise by Class A digital devices. Standard units shall meet the same requirements except without the current generating circuitry included in the measurements.

#### **6.0 Production Tests & Inspections**

Production Tests and Inspections shall be per the ITE specifications for the particular device except as follows:

**6.1 Luminous Intensity.** Modules shall be tested for luminous intensity. A single point measurement, with a correlation to the Initial Luminous Intensity requirements specified in paragraph 4.0 of this document may be used. Failure of a module to meet the requirements for the Initial Luminous Intensity specified or Maximum Permissible Luminous Intensity shall be cause for rejection of the module.

**6.2. Current Consumption Measurement:** All modules (Standard and Type "A" Units) shall be measured for current flow in Amperes. The measured current values shall be compared against the design current values for the unit. A measured current consumption in excess of 120% of the design current value for an ambient temperature of 77 deg F shall be cause for rejection of the module.  
**6.3 Power Factor.** All modules (Standard and Type "A" Units) shall be measured for Power Factor. The measured values for Type "A" units shall be greater than 0.90, for "Standard" units the approximate design value for that device.

**6.4 Current Monitor Compatibility (Standard Units Only).** All Standard type modules shall be tested to ensure that the unit is generating the necessary current for compatibility with the Model 215 Current Monitor. Test to be performed at 77 deg F and 120 V rms.

**6.5 Visual Inspection:** All modules shall be visually inspected for any exterior physical damage or assembly anomalies. Careful attention shall be paid to the surface of the lens to ensure there are no scratches (abrasions), cracks, chips, discoloration, or other defects. The presence of any such defects shall be cause for rejection of the module.

#### **7. Miscellaneous**

7.1 Independent Laboratory Test Reports shall be required for all products that are placed on New York State Department of Transportation Management Equipment Qualified Products List for LED Signal Indications. Test reports demonstrating the following requirements shall be provided:

- —Lens Abrasion
- —Chromaticity
- —Initial Luminous Intensities as defined in Paragraph 4.0 of this specification

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NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION MANAGEMENT EQUIPMENT SPECIFICATIONS (TMES)

Chapters 18 – 23

*Infrared Optical Preemption and Communication System*

Portable Solar Powered Traffic Signal  
Traffic Signal Electrical Service Disconnect / Generator Transfer Switch  
ADA Solid State Pedestrian Push Button Assembly  
School Zone Flashing Sign Beacon Assembly Solar Powered  
Battery Back-Up System

**CHAPTER 18**  
***Detailed Specification for Vehicle Identifying Infrared Optical Preemption  
and Communication System***

The purpose of this specification is to provide the minimum performance requirements for the following Optical Preemption and Communication System:

**1. System Description**

The required priority control system will employ infrared communications technology to identify the presence of authorized emergency and transit vehicles within the priority control system. A log record of system users with vehicle subgroups and identification numbers may be created. Vehicles emitting the standard base frequencies of 14.035 +/- 0.003 Hz (Emergency Band) and or 9.639 +/- 0.003 Hz (Transit Band) and not emitting an approved manufacturers infrared vehicle encoded message shall be recorded in all system log records as code (0) and shall actuate the associated Optical Signal Processor/Phase Selector as specified in section 2.4 below. A single given traffic intersection within a complete priority control system shall consist of a matched set of optical detectors, optical signal processor/phase selector, system software and applicable system accessories from a single manufacturer. System emitters will be capable of generating a user programmable infrared data encoded signal as well as the standard base frequency for emergency and transit bands. The data-encoded signal will be detected and recognized by the infrared detectors at or near the intersection over a line-of-sight path of up to 2,500 feet (762m) under clear atmospheric conditions. The infrared optical signal processor/phase selector will process the electrical signal from the detector to ensure that the communication (1) is the valid standard base frequency or (2) is correctly data encoded and (3) is within user-settable range. If these conditions are met, the signal processor will generate a priority control request to the traffic controller for the appropriate intersection approach to request a “green light” for system vehicles. The system will require no action from the vehicle operator other than activation of the infrared emitter. The system will operate on a first come, first served basis. The system shall interface with NEMA TS1, NEMA TS2, 170, 179 and 2070 traffic control equipment and their associated cabinet systems.

**2. System Components**

**2.1. Optical Emitter**

- 2.1.1. The optical emitter shall generate the optical signal required to activate the receiver equipment in all approved brands of intersections. The light pulses shall consist of either a fixed frequency base signal for standard preemption systems or a modulated or interleaved base frequency signal for fully coded systems, to transmit information.
- 2.1.2. The optical emitter power supply shall be powered by the vehicle’s electrical system. The emitter power supply shall operate from 10 to 30VDC.
- 2.1.3. The optical emitter shall perform three functions:
  - 2.1.3.1. The first function shall be to transmit the industry standard carrier frequency for Emergency band signals, (14.035 +/- 0.003Hz) or for Transit Band signals (9.639 +/- 0.003 Hz), which shall represent Code 0 to the optical signal processor/phase selector at each intersection.
  - 2.1.3.2. The second function shall be to transmit a vehicle identification signal, added to the carrier frequency either by modulating the carrier frequency or by interleaving extra pulses between the standard carrier frequency pulses.

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- 2.1.3.3. The third function shall be to effect range adjustment of the system using either coded or non-coded optical emitters positioned at the desired distance, while the optical signal processor/phase selector range adjustment features are activated in the traffic cabinet. The range of each system intersection approach shall be adjustable between 200 feet (90m) and 2500 feet (762m).
- 2.1.3.4. The optical emitter shall conduct self-diagnostics and display its status. The diagnostic status display shall be of simple design and easily interpreted by the user. For example, status via a single indicator light located on the control switch is acceptable.
- 2.1.4. The optical emitter shall operate over a temperature range of - 30 °F (-34 °C) to +165 °F (+74 °C). The optical emitter shall operate over a range of 5% to 95% relative humidity.
- 2.1.5. The optical emitter shall have a cutout option, which can be wired to disable the emitter automatically when the vehicle is in park, or neutral

**2.2. Optical Detector**

- 2.2.1. The optical detector shall be manufactured from black glass-filled, UV stabilized polycarbonate suitable for all weather use. The detector shall be designed and sealed to prevent the entrance of rain, sleet and snow.
- 2.2.2. The optical detector shall sense and transform optical energy from optical emitters into electrical signals to be decoded by the optical signal processor/phase selector.
- 2.2.3. The optical detector shall sense optical emitter signals over an adjustable range of up to 2500 feet (762m) in optimum atmospheric conditions.
- 2.2.4. The optical detector shall transmit electrical signals to the optical signal processor/phase selector via up to 1000 feet of optical detector cable.
- 2.2.5. The optical detector shall have an internal terminal strip with wiring label for convenient positive connection to the detector cable.
- 2.2.6. The optical detector shall have as a minimum a conical eight (8) degree or greater field of view centered about the view port normal axis. Should wider viewing fields be necessary, the vendor shall supply the equipment/hardware to achieve the detection area that is needed for the specific application.
- 2.2.7. The optical detector shall be of single channel, single direction or two directions, dual channel configuration, with a ½ inch or ¾ inch FNPT mounting connection. Other configurations will also be considered by NYSDOT. Hardware shall be available from the manufacturer to allow mounting the optical detector to mast arm, span wire, and various other possible intersection mounting configurations.

**2.3. Optical Detector Cable**

- 2.3.1. General – Either three (3) or four (4) conductor shielded control cable, with foil shield overall and ground wire. Meets the requirements of IPCEA-S-61-402/NEMA WC5, Section 7.4, 600-Volt Control Cable, rated for 75 degrees Celsius, Type B, and the following:

2.3.1.1. Conductors

Wire Quantity	3	4
Wire Gauge	AWG #20 (7 x 28) stranding	AWG #20 (7 x 28) stranding
Conductor Material	Individually tinned copper strands	Individually tinned copper strands
Insulation	PVC, 80C, 600V, 25-mil minimum average thickness	PVC, 80C, 600V, 25-mil minimum average thickness
Wire Color	1 Blue, 1 Orange, and 1 Yellow	Blue, Orange, Yellow, and Other

- 2.3.1.2. Aluminized polyester film or approved equal, applied with a nominal 20% overlap to provide 100% shield coverage

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- 2.3.1.3. Drain Wire
  - 2.3.1.3.1. Gauge - AWG #20 (7 x 28) stranding
  - 2.3.1.3.2. Material - Individually tinned copper strands
  - 2.3.1.3.3. Non-insulated and in contact with the shield conductive surface
- 2.3.1.4. Electrical Characteristics
  - 2.3.1.4.1. Drain and conductor DC resistance shall not exceed 11.0 ohms per thousand feet
  - 2.3.1.4.2. Capacitance from 1 conductor to the other 2 conductors and shield shall not exceed 48 pf/ft at 1000 Hz.
- 2.3.1.5. Jacket
  - 2.3.1.5.1. Minimum average wall thickness - .045"
  - 2.3.1.5.2. Temperature rating - 80C
  - 2.3.1.5.3. Voltage Rating - 600V
  - 2.3.1.5.4. Material - PVC, Black
  - 2.3.1.5.5. Nominal O.D. over jacket - .35" maximum
- 2.3.2. The optical detector cable shall be of durable construction to allow the following types of installation:
  - 2.3.2.1. Direct burial
  - 2.3.2.2. Conduit and mast arm pull
  - 2.3.2.3. Exposed overhead, as with span wire.

#### **2.4. Optical Signal Processor/Phase Selector**

- 2.4.1. The optical signal processor/phase selector shall be installed in the traffic controller cabinet to decode the electrical signals from optical detectors. The optical signal processor/phase selector shall interface directly with NYSDOT/CALTRANS 170/179 and newer 2070 series controllers with compatible software, and NEMA TS-1 and TS-2 with suitable system interface equipment and software and associated cabinet systems.
- 2.4.2. The optical signal processor/phase selector shall be powered from 115 VAC (95VAC to 135VAC), 60Hz mains and have an on board, power supply that supports up to 10 optical detectors.
- 2.4.3. The optical signal processor/phase selector shall come standard with the following:
  - 2.4.3.1. Up to four channel inputs, each capable of receiving and decoding up to 10 coded emergency or transit band signals from system vehicles simultaneously. There shall be a minimum of one detector per channel input.
  - 2.4.3.2. A real-time clock, that provides a battery or super capacitor backed-up on board source for time and date stamp information during event logging. The real-time clock shall be read and set via the RS-232 port. Battery backup life shall be a minimum of 96 hours with system power off and shall be recharged when power is restored.
  - 2.4.3.3. A main processor which shall arbitrate priority between the channels, log events, and provide RS-232 communication with the outside world for system configuration during installation, and real time communication with the traffic controller or central system during operation.
  - 2.4.3.4. The non-volatile memory for storage of configuration parameters and event logs. Retention time for the non-volatile memory shall be a minimum of 10 years with system power off or on.
- 2.4.4. The optical signal processor/phase selector front panel shall have the following features:
  - 2.4.4.1. A power on/off switch with corresponding indicator.
  - 2.4.4.2. Panel Indicators for emergency and transit band reception status, for each of four channels.
  - 2.4.4.3. Test switches for activating internal diagnostics.
  - 2.4.4.4. The ability to set range via system software interface or using a range arm switch to enabling range setting using front panel switches.
  - 2.4.4.5. A standard data communications port.
  - 2.4.4.6. The following log entries shall be recorded in the signal processor card if user selected:
    - 2.4.4.6.1 - Vehicle subgroup or class
    - 2.4.4.6.2 - Vehicle ID number
    - 2.4.4.6.3 - Vehicle Frequency Band
    - 2.4.4.6.4 - Direction
    - 2.4.4.6.5 - Call duration
    - 2.4.4.6.6 - Final greens at end of call
    - 2.4.4.6.7 - Duration of final greens
    - 2.4.4.6.8 - Time and date call started
    - 2.4.4.6.9 - Time and date call ended
    - 2.4.4.6.10- Near or far vehicle approach
    - 2.4.4.6.11 - Maximum signal strength

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- 2.4.4.6.12 - Priority output response (Yes/No) for preemption
- 2.4.4.7 The optical signal processor/phase selector will include the following control timers to modify priority control conditions by use of system software through IBM type computer or laptop if user selected:
  - 2.4.4.7.1 - Max Call Time: Sets the maximum allowable activation time of a channel
  - 2.4.4.7.2 - Call Hold Time: Sets time a call is held by a channel after vehicle signal is lost.
  - 2.4.4.7.3 - Call Delay Time: Sets time a call is recognized before channel is activated.
- 2.4.4.8 - The optical signal processor/phase selector will include one optically isolated output per channel that provide the following electrical signal to the appropriate pin on the card edge connector:
  - 2.4.4.8.1 - 6.25Hz +/- 0.1Hz 50% on/duty square wave in response to Transit Calls.
  - 2.4.4.8.2 - A steady ON in response to Emergency Calls.
- 2.4.5. Programming the optical signal processor/phase selector and retrieving data stored in it via it's data port shall be accomplished using an IBM PC-compatible computer either locally or remotely via a modem.
- 2.4.6. The optical signal processor/phase selector shall be capable of decoding 10,000 separate vehicle identification codes in Emergency Band and the same in Transit Band.
- 2.4.7. The optical signal processor/phase selector shall log and store a minimum of 1,000 events in non-volatile memory. When the log is full, the oldest entry shall drop off to allow the newest entry to be logged.
- 2.4.8. There shall also be a complete set of green timers for transit band signals.

### **2.5. System Software**

- 2.5.1. Optical signal processor/phase selector configuration software shall be provided on CD-ROM. It shall run on IBM compatible computers with Windows 95, 98, NT 4.0, Windows 2000 and Windows XP software (when available).
- 2.5.2. The software shall provide windows and menus for setting vehicle ID subgroups and codes, range settings, intersection and channel names, timing parameters, desired green signal indications during priority control operation, and for viewing and downloading logged information.

### **3. Environmental**

- 3.1. All equipment supplied as part of the optical preemption traffic control system intended for use in the controller cabinet shall meet the electrical and environmental specifications spelled out in the NEMA Standards Publications TS2-1992 Part 2 where applicable:
  - 3.1.1. Line voltage variations per NEMA TS2 1992, 2.1.2
  - 3.1.2. Primary power interruptions per NEMA TS2 1992, 2.1.04.A.1
  - 3.1.3. Power Source frequency per NEMA TS2 1992, 2.1.3
  - 3.1.4. Power source noise transients per NEMA TS2 1992, 2.16.1
  - 3.1.5. Power Source high-energy transients per NEMA TS2 1992, 2.1.6.1
  - 3.1.6. Non-destructive transient immunity per NEMA TS2 1992, 2.1.8
  - 3.1.7. Input-output noise immunity per NEMA TS2 1992, 2.1.7
  - 3.1.8. Temperature range per NEMA TS2 1992, 2.1.5.1
  - 3.1.9. Humidity per NEMA TS2 1992, 2.1.5.2
  - 3.1.10. Shock test per NEMA TS2 1992, 2.1.13
  - 3.1.11. Vibration per NEMA TS2 1992, 2.1.12

### **4. Qualifications**

- 4.1. The manufacturer or their qualified agents shall supply a list of at least three preemption system users having experience with the various types of preemption system components available from the manufacturer for a minimum of three years.
- 4.2. The manufacturer shall be able to demonstrate the ability to provide on going technical and product warranty support.
- 4.3. A tour of the manufacturer's production facilities shall be made available for a maximum of two inspectors from the purchasing agency upon request.
- 4.4. The manufacturer shall have an independent quality control department that has complete authority to monitor product integrity and is answerable only to a senior officer of the manufacturing organization.

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**5. Responsibilities**

- 5.1. The manufacturer or the manufacturer's representative shall provide responsive service before, during and after the installation of the priority control system. The manufacturer or the manufacturer's representatives shall provide training to the system installer and maintenance department of the purchasing agency. Training shall consist of proper installation and operating procedures for the system hardware and software.
- 5.2. The manufacturer or the manufacturer's representative shall, at the request of the purchasing agency, assist with field surveys of the traffic system intersections to insure that all traffic control system equipment shall interface with the manufacturers preemption system components. The necessary number of preemption channels and the appropriate location of the optical detectors, for optimum system operation shall be determined at this inspection.
- 5.3. The manufacturer or the manufacturer's representative shall assist the installer or the purchasing agency's traffic department to insure that all traffic controllers are properly programmed for preemption system interface. Preemption system maintenance and operational manuals shall be provided to the purchasing agency and system installer.
- 5.4. The manufacturer or the manufacturer's representative shall provide an Emergency Vehicle Driver Training Course to all qualified personnel who will use the preemption system, at the request of the purchasing agency. At least one copy of the materials used for the driver training course shall be provided to the purchasing agency for future review.
- 5.5. The manufacturer shall warrant, provided the preemption system components have been properly installed, operated, and maintained, that matched system components that fail due to material flaws or workmanship shall be replaced or repaired under manufacturers published warranty provisions. The protection period against system component failure shall have a total duration of not less than 10 full years (1 year for emitter lamps) according to provisions set forth in the manufacturers published warranty.
- 5.6. The manufacturer shall provide, upon request, a certificate of product liability insurance for \$5,000,000.
- 5.7. The manufacturer of the preemption system shall certify on request from the purchasing agency that all the component products in their system are designed, manufactured, and tested as a system of matched components and shall meet or exceed the requirements of the specification.

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**CHAPTER 19**  
***Detailed Specification for Portable Solar Powered Traffic Signal***

**1.0 SCOPE:**

These specifications describe Solar-Powered Portable Trailer-Mounted Three Color Traffic Signal (PTS) System (two trailers per system).

The unit shall comply with the requirements for Portable Traffic Control Signals as defined in the Federal Manual of Uniform Traffic Control Devices (MUTCD), Part IV, including specifically the requirements pertaining to signal heads, lamps, and spacing of signals, clearance, and number of signal faces. The PTS System units shall utilize L.E.D. traffic signal indications meeting the Institute of Traffic Engineers specifications. Each PTS System delivered shall contain the trailer, structural support system, mast arm assembly; lift mechanism, regulated power supply, batteries, solar charging system, trailer-mounted traffic signal controller, signal heads, microwave detector, all necessary wire and cable and all ancillary equipment. The PTS System shall be able to function continuously, independent of utility power sources.

The system trailers shall conform to applicable sections of the New York State Vehicle and Traffic Law governing trailers, including lighting to highway standards.

**2.0 - GENERAL:**

PTS System construction, materials, and operation shall conform to the ITE, NFPA, ULI, and NEC. The unit shall be a trailer mounted and equipped with a mechanically lifted mast and arm. It shall be equipped to display (2) 12" (300 mm), 3 section traffic signal heads with back plates. Vehicle heads shall be dark green or federal yellow in color.

**3.0 - TRAILER:**

The trailer shall be designed for safe transport at normal highway speeds of 55 mph. Lights, reflectors, and splash guards shall be provided to comply with ICC and NYS regulations. The PTS System shall be delivered with 3M reflective tape, or State approved equal, installed on all four (4) sides of the trailer. Each side of the trailer shall have the minimum equivalent of 72 square inches (465 square centimeters) of reflective tape.

**4.0 - STRUCTURAL SUPPORT:**

The deployed structure shall supply adequate support to allow complete traffic signal operation, including raising and lowering of the mast arm, and shall remain stable during wind gusts of 80 mph when stationary.

**5.0 – LIFT MECHANISM:**

(A) The lift mechanism shall be an electric or electrically-assisted hydraulic or mechanically assisted manual mechanism capable of raising and lowering the mast arm.

(B) The mechanism shall be capable of being lowered manually.

(C) A safety feature shall be provided to prevent the mast arm from lowering once in the raised position. If a safety bolt is used, a self-locking mechanism shall be incorporated into the safety bolt which prevents it from being inadvertently dislodged.

(D) The mast arm of the unit shall extend a minimum of 9 feet (2.7 m) from the side of the trailer, and provide a minimum clearance of 17 feet (5.2 m) over the baseline established by the jacks.

**6.0 – ELECTRICAL:**

(A) The PTS System shall operate primarily from a solar powered electrical system. Secondary power supply type shall provide capability to accept existing 120V commercial electric service.

(B) This system shall consist of a battery power system and solar array panels, and shall be capable of operating the PTS System for at least 14 consecutive days on batteries alone at 70°F (17.7°C). The system shall be designed to operate continuously within New York State, January thru December. Should weather conditions preclude the use of pure solar power the PTS System shall be equipped with an on-board auxiliary charging system to enable the batteries to be recharged via a 120 Volt AC connection.

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**7.0 - TRAFFIC SIGNAL OPERATION:**

The traffic signal controller shall be enclosed in a cabinet mounted on each trailer. The controller shall be furnished with a keypad and LCD display screen; the use of a PC or laptop only for programming is not acceptable. The controller keyboard or key pad shall be capable of allowing the signal operator to program the signal under all weather conditions. The traffic signal controller shall also:

- (A) Be capable of operating over a -30° to +150°F (-34° to +66°C) range and in a 20% to 100% humidity range.
- (B) Be capable of performing normal traffic signal operations as defined in the following table:

<b>ITEM #</b>	<b>MINIMUM REQUIREMENT DESCRIPTION</b>
1.1	Software Installation Documents/Scripts or Imbedded software
1.2	Real Time Conflict Monitor
<b>2. Phasing</b>	
2.1	Minimum of 4 phases (Capable of operating 4 PTS units sequential, non-actuated, semi-actuated or fully actuated)
2.2	2 Rings (i.e.: concurrent service of 1 or 2 phases)
<b>3. User Programmable Timings Per Phase (Basic)</b>	
3.1	Initial (Minimum) Green (0-255 seconds)
3.2	Passage (Extension) Time (0-10.0 seconds)
3.3	Maximum Green I (3-250 seconds)
3.4	Yellow Change (3.0 – 6.0 seconds)
3.5	Red Clearance (1-250 seconds)
<b>5. Phase Options</b>	
5.1	Vehicle Phases Permitted
5.3	Yellow Lock Phases
5.4	Minimum Recall Phases
5.5	Maximum Recall Phases
5.6	Red Rest Phases
<b>6. Detector Inputs</b>	
6.1	4 Programmable Detector Inputs
<b>7. General Information</b>	
7.1	This Date and Time Information shall be made available through the controller's front panel
<b>8. Time of Day (TOD) Events and Functions</b>	
8.1	5 Time of day total events
8.2	Time clock events includes access to Date, Day of Week, Hour and Minute programming
8.3	Control Rest in Red by Time of Day
8.4	Control Max in Green by Time of Day
<b>9. Miscellaneous Parameters and Functions</b>	
9.1	via Hard wire interconnect
9.2	via Radio Modem Interconnect
9.3	Date/Tune Programming of Controller
9.4	Security Function and Access Codes
<b>10. Status Displays – These Real-time displays should be able to be accessed</b>	
10.1	Phase Status Display – Displays current running phases and Phase Next
10.2	Phase Timing Status – Displays timer interval currently running and time
10.3	Director Call Status – Displays phase calls, other calls
10.4	Unit Display – Displays current version of software, date/time programmed
10.5	Hardware Status – Displays items such as Current Status, Conflict Monitor Flash, etc.

(continued)

- (C) To avoid the possibility of conflicting signal indications, or absence of signal voltages, the traffic signal system shall be either hard-wired or controlled by radio signals, and in either case shall employ the use of a conflict monitors, or similar electronic technology that is typically used in traditional traffic signal operations which will not allow conflicting signal displays.
- (D) In the event that a conflict is detected the signal heads shall display flashing red indications, and the system shall require the malfunction to be manually reset.
- (E) Retain programs in the controller's memory in the event of power failure.
- (F) Be capable of automatic system recovery after power outages without operator intervention.
- (G) Place the signal into programmed flashing operation when the output voltage drops below the manufacturer's recommendations.
- (H) Be contained in a weatherproof, lockable housing, and insulated to protect against excessive vibration and temperature. The housing shall have a lockable door latch.
- (I) Have the ability to be programmed with a password, to help prevent unauthorized access to the controller software in the field.
- (J) The controller software provided with the PTS System shall not contain any computer code that would disable such software or system or impair in any way its operation based on the elapsing of a period of time, exceeding an authorized number of copies, advancement to a particular date or other numeral, or other similar self-destruct mechanisms, (sometimes referred to as "time bombs", "time locks", or "drop dead" devices), or that would permit contractor to access the Product to cause such disablement or impairment (sometimes referred to as a "trap door" device).

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## **CHAPTER 20**

### ***Detailed Specification for Traffic Signal Electrical Service Disconnect / Generator Transfer Switch***

#### **1.0 SCOPE:**

The intent of this specification is to provide a service disconnect, and a generator transfer switch within a stainless steel NEMA 3R enclosure. The unit shall be designed to satisfy the ANSI requirements for service equipment, and for generator transfer switches. All electrical components shall be UL listed or recognized for their intended function.

#### **2.0 ENCLOSURE:**

The enclosure shall be constructed of .060" stainless steel, and shall be at least 9" H x 6" W x 6" D but no larger than 12" H x 10" W x 8" D. The enclosure shall be rated NEMA 3R with a 1.5" bottom rear flange with two vertical 1" x 0.25" slots, 0.75" to the right and left of the center line. The flange shall have a 3/8" hole centered between the slots. A 3/8" hole shall be supplied on the back of the enclosure, centered on the width of the enclosure and located 1" down from the top.

The back of the enclosure shall have concentric 3/4" and 1" diameter conduit knockouts which shall be centered on the width and positioned approximately 3" above the enclosures bottom.

The top of the enclosure shall have a one inch conduit hole to be centered on the width, and close to the back of the enclosure and still be able to mount a watertight hub, Myers brand ST-3 or approved equal. This hole to be plugged with a knockout seal, Heyco model KOS-LT1 or approved equal.

The enclosure shall have a hinged interior switch panel to allow for the access to the field wiring. This panel shall be hinged with stainless steel rivets or approved equal stainless steel tamper-proof fasteners.

When not in use the inlets shall be covered with a hinged stainless steel cover. This cover shall be lockable with the enclosure door.

The outside locking front cover shall latch in the "up" position. The locking mechanism shall be a police door style warded lock and key, Pelco SM-1012 or equal. The enclosure door shall be capable of being locked while the generator power cord is connected to the inlet flange. A keyhole cover shall automatically protect the keyhole when the key is removed.

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### 3.0 ELECTRICAL:

The service disconnect shall be a 30 amp type HACR single pole breaker installed to disconnect utility power, and shall be a Siemens Type QP130 or approved equal. The breaker shall have a minimum interrupt rating of 10,000 amps.

The unit shall be capable of transferring power from the utility to one of the user selectable generator inlet connectors via two single pole double throw switches which have been ganged together. One switch shall transfer the AC+ from utility power to generator power. The second switch shall turn a green LED pilot light "on" when the transfer switch is in the generator position and utility power is available. When the ganged switches are switched to utility power, this second switch turns the LED pilot light off. The pilot light shall be visible only when the hinged inlet cover is open. The gang switch handles shall be "up" when set in the "LINE" position. All screws used in the transfer switch shall have lock washers installed or the screws should be a binding head type. A third switch shall select which one of the two flanged inlets (AC+ pole) is connected to the generator.

The bottom of each unit shall be supplied with two covered flanged inlets. One shall be a three wire two pole 125V twist lock plug NEMA L5-30, Hubbell brand HBL4716c or approved equal. The second shall be a three wire two pole 125V straight blade plug NEMA 5-15P, Hubbell brand HBL5278c or approved equal. All mounting screws shall be stainless steel.

All switches to comply with UL1008 ANSI specification for manual generator transfer switches, and shall have a transfer rate of 250 ms or less.

One, three position barrier type terminal strip shall be mounted on the inside back of the enclosure to receive up to # 6 AWG utility power wire and traffic cabinet power wires (+AC), Cooper Bussmann-Magnum TS Series or approved equal. It shall be located as close as possible to the left cabinet side. The conductors from the circuit breaker to the terminal strips shall be #8 AWG. The conductors to and from the switches, except the pilot light switch, shall be #10 AWG. The wires from the 15A inlet shall be #12 AWG. The unit shall be equipped with one (minimum five position) ground bus bar, sized for # 6 AWG wire, mounted on the right inside back panel of the enclosure. A ground wire from one of the positions shall be connected to the inside fold down access panel for bonding purposes and a #10 AWG wire shall be connected to the third position of the terminal strip which connects to the neutrals of the pilot light and the generator inlets.

### 4.0 LABELING:

The inlets, switch positions, breaker positions shall all be clearly labeled.

The manufacturer's model number, electrical ratings and a statement "**SUITABLE FOR USE AS SERVICE EQUIPMENT**" shall appear in an easily visible location when the front door is in the open position.

The 30 amp breaker shall also be labeled as: "**SERVICE DISCONNECT**".

The pilot light shall be labeled as follows:

**"SERVICE DISCONNECT BREAKER MUST BE IN THE "ON" POSITION FOR PILOT LIGHT TO FUNCTION"**

The outside of the front cover shall be labeled as follows:

**"SERVICE DISCONNECT AND GENERATOR TRANSFER SWITCH"**.

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**CHAPTER 21**  
**Detailed Specification for ADA Solid State Pedestrian Push Button**  
**Assembly**

**1.0 General**

- 1.1. Shall have a 2" diameter ADA compliant push button
- 1.2. Shall be pressure activated with essentially no moving parts
- 1.3. Shall incorporate a solid state switch requiring between 1-3 lbs of force to activate
- 1.4. Shall be highly vandal resistant
- 1.5. Shall have a minimum operating life of 100 million actuations
- 1.6. Shall be compatible with all 242 DC Isolation Units as defined at Chapter 5.

**2.0 Housing**

- 2.1. Shall be high impact cast or machined aluminum or polycarbonate
- 2.2. Shall have powder coat paint and be dark green in color
- 2.3. Shall be equipped with a pole mounting housing which will enable the flexibility of choice to mount the button both to a flat and a convex surface
- 2.4. Shall have a gasket between the button housing and the mounting housing
- 2.5. Shall be assembled with tamper resistant stainless steel hardware

**3.0 Electrical**

- 3.1. Operation voltage: 15 to 24V DC or 12 to 24V AC
- 3.2. On Resistance 10 Ohms (When the button is activated and placing a call)
- 3.3. Standby Current 10 micro amps typical
- 3.4. Shall require only two conductors be run from the traffic signal cabinet to the push button to operate
- 3.5. Shall have a solid state electronic piezo switch rated for 100 million cycles with no moving plunger or moving electrical contacts

**4.0 Environmental**

- 4.1. Shall operate at temperatures between -25F to 155F
- 4.2. Shall be able to be completely immersed in water for 5 minutes. The button shall operate immediately after being removed from the water.

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**CHAPTER 22**  
**Detailed Specification for School Zone Flashing Sign Beacon Assembly –**  
**Solar Powered**

**1.0 General:**

This specification defines the minimum requirements for a School Zone Flashing Sign Beacon Assembly – Solar Powered. The unit shall be fully integrated to provide two flashing signal sections and a remotely programmable time clock capable of activating and deactivating the assembly by time of day or by command.

The unit shall be provided with all necessary software and hardware necessary to provide a fully functional, standard 4 ½” (inch) round beacon pole mountable, Solar Powered, School Zone Flashing Sign Beacon Assembly.

**2.0 Software Specifications:**

**2.1 Scheduler:**

Each beacon shall have the ability to receive and store the annual flash schedule. Scheduled events shall be programmable by year, month, day, start time, duration, and day of the week. The system shall provide programming flexibility to include morning and afternoon flash cycles, early dismissal days, holidays and special events. Scheduled events shall be easily overwritten with a temporary schedule such as unscheduled early dismissals and snow days.

**2.2 System Administration:**

Central Secure Web Based System management for multiple users, each user shall have a password and user jurisdiction allowing users to be assigned individual field devices or groups of devices. The System Administrator shall have the ability to add, delete, modify and view the following user parameters:

- Create New Users
- Create User Passwords
- Reset Passwords
- Edit Existing Users
- Delete Users
- Set Permission Levels
  - System Groups
  - Scheduler Access
  - View Schedules
  - Modify Schedules
  - Send Schedules
- Add Devices
- View Devices
- Modify Devices

**3.0 Hardware Specifications:**

**3.1 Flash Pattern**

½ Second “ON”, ½ Second “OFF” - per the requirements set forth in the most recently published edition of the Manual on Uniform Traffic Control Devices of the US Department of Transportation, Federal Highway Administration.

**3.2 Communications**

Long-range instructions shall be via SMS and/or FTP using cellular modem technology integrated into the sign beacon assembly.

The master beacon shall have the ability to communicate to a minimum of four (4) satellite beacons which shall have the ability to receive communications from the master beacon utilizing short range communications.

Short-range, inter-beacon communication shall be provided by 902-928 MHz spread spectrum radio modems.

(continued)

#### **4.0 Environmental Requirements**

Operating Temperature: -25° to +155°F

Operates at rated usage for a minimum of 30 Days without solar charging at an ambient air temperature of 23°F.

Battery and solar panel sizing shall be based on no more than 3.5 kWh/m<sup>2</sup> per day of solar insolation.

#### **5.0 Materials**

Signal sections shall be Dual 8”(inch) Polycarbonate sections, mountable vertically as per the Federal MUTCD; in Dark Green or Traffic Zone Yellow as specified on the purchase order. The color shall be fully impregnated into the polycarbonate resin. The color shall be such that a properly prepared color chip shall be a reasonable visual match to Federal Color Standard No. 595A, Color #14056 for Dark Green and to Federal Color Standard No. 595A, Color #13538 for Traffic Zone Yellow. Viewing shall be done under North Standard Daylight.

Visors shall be Polycarbonate cutaway, exterior to match signal sections, interior shall be flat black.

Solar panels shall be tilted for operation. The solar panel assembly shall be adjustable so as to enable a south orientation without any additional hardware.

Battery and Electronics shall be enclosed in a ventilated anodized or powder coated aluminum enclosure (Cabinet) constructed of at least 1/8” (inch) in thickness.

The system shall be designed to be mounted to a standard 4 1/2" (inch) round beacon pole. Mounting brackets shall be ductile iron or 6061-T6 powder coated aluminum painted to match the signal head color.

#### **6.0 Cabinet**

Hinges shall be a continuous type and shall be made of 14 gauge stainless steel with a 1/8” (inch) diameter stainless steel hinge pin.

Venting shall be covered by wire mesh to prevent the intrusion of insects.

Solar panel housing shall be anodized or powder coated aluminum

The cabinet shall be equipped with a self-locking heavy duty 5 pin tumbler cylinder rim type lock, keyed to a Corbin #2 standard, and shall be provided with a keyhole cover for protection. Two keys shall be provided with each cabinet.

The door, when closed and locked, shall provide an adequate seal to prevent the entrance of rain or snow into the cabinet., and at a minimum meet the requirements of NEMA 3R for weather resistance.

The enclosure shall be designed to allow it to be securely fastened to the above noted pole with set screws or stainless steel banding.

#### **7.0 Electrical**

Each beacon shall be equipped with an easily accessible manual override, which shall provide the ability to manually turn on or off the sign beacon. This manual override shall be in a locked enclosure, keyed with a standard police key

Solar panels and battery system shall be 12 Volt DC.

The unit shall be supplied with 12VDC, 8” (inch) Yellow LEDs, conforming to the latest ITE specifications.

All wiring shall be at least 7-strand, #14 gauge wire.

The enclosure shall be equipped with a grounding lug, and shall be tied to earth ground by a #6 gauge stranded wire.

Wire routing shall be internal to the unit and pole attachment; no exposed conductors shall be permitted.

#### **8.0 Basis of Acceptance**

Equipment supplied under this item should be listed in the NYSDOT Signal Lab Qualified Products List.

#### **9.0 Warranty**

The system and its associated components shall carry a manufactures warrantee of not less than 2 years; batteries shall carry a warrantee of not less than 1 year.

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**CHAPTER 23**  
**Specification For Battery Back-Up System for Traffic Signals Utilizing**  
**Light Emitting Diodes (Led)Traffic Signal Modules**

**GENERAL**

This specification establishes the minimum requirements for a complete emergency battery backup system for use with Light Emitting Diode (LED) Traffic Signal Modules. The BBS shall provide reliable emergency power to a traffic signal system (Vehicle and Pedestrian Traffic) in the event of a power failure or interruption.

The Battery Backup System (BBS) shall include, but not be limited to the following: Batteries, Inverter/Charger, Power Transfer Relay (internal or external to the Inverter/Charger), a manually operated non-electronic Bypass Switch that is external to the Inverter/Charger and all necessary hardware and interconnect wiring. (See **Figure 23.1 – BBS Block Diagram**) In addition, the manually operated non-electronic Bypass Switch must also be a separate functional unit from the Power Transfer Unit but both may share a common external enclosure.

The BBS shall be designed for outdoor applications, in accordance with this current New York State Transportation Management Equipment Specifications (TMES), Chapter 1 requirements.

**1. OPERATION**

**1.1 Compatibility**

The BBS shall be compatible for full run time operation with all Traffic Signal Cabinets and internal components of the Cabinet, all Traffic Controllers and all Traffic Signal LED Modules specified by this current New York State Transportation Management Equipment Specifications.

**1.2 Run-Time**

At ambient temperature (70°F ) the BBS shall provide a minimum of four(4) hours of full three-color run-time traffic intersection operation plus two(2) hours of flash time (50% Flash Duty Cycle) operation when connected to a load configured to consume 4 Amp rms. The load shall be constructed using the components mentioned in Paragraph 1.1

**1.3 Output Capacity**

The BBS shall be able to provide a minimum of 700W/1000VA @ +70°F, continuous active output capacity, with 80% minimum inverter efficiency while running in Backup Mode (on batteries).

**1.4 Output Voltage**

When operating in Backup mode, the BBS output shall be 120 VAC  $\pm$  5 VAC, pure sine wave output,  $\leq$  3% THD, 60 Hz  $\pm$  0.05 Hz.

**1.5 Transfer Time**

The maximum transfer time allowed, from disruption of normal utility line voltage to stabilized Backup Mode line voltage, shall be no greater than 65 milliseconds. The same maximum allowable transfer time shall also apply when switching from Backup Mode line voltage back to utility line voltage.

**1.6 Operating Temperature**

The operating temperature for the inverter/charger, power transfer relay and manual bypass switch shall be  $-35^{\circ}\text{F}$  to  $+165^{\circ}\text{F}$ . Additionally, all components and parts used shall, at the very least, be rated for that temperature range.

**1.7 AC Feedback**

The BBS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.

**1.7.1 Feedback Level**

In the event that the AC service feeding the BBS is severed, or there is a utility black-out, the AC voltage measured at the AC inputs to the BBS (Line to Neutral), shall be less than 1 VAC.

**1.8 Surge Protection**

The BBS shall have lightning surge protection compliant with IEEE/ANSI C.62.41 and must be able to withstand 2000 volt surges applied 50 times across line and neutral. These surges shall not cause the BBS to transfer to Backup mode.

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**1.9 Power & Control Connections** The BBS shall be easily installed, replaced, or removed by using easily removable cables for AC input, AC output, DC input, external transfer relay control and battery temperature sense.

**1.9.1 AC Connection** The AC input and output shall be panel mounted plug / receptacles that allow no possibility of accidental exposure to dangerous voltages (male receptacle for AC Input and female receptacle for AC Output). The receptacles shall utilize some form of locking mechanism or hold down clamps to in order to prevent any accidental disconnects.

**1.9.2 DC Connection** The DC connection shall be a recessed one or two piece Anderson style receptacle.

**1.9.3 Relay / Temperature Probe Connections**

The external power transfer relay control and the battery temperature sense inputs shall be heavy duty panel-mounted style connectors.

**1.9.4** All connections shall provide mechanically and electrically secure connections without the use of a screwdriver. The only exception will be the 18-position Relay Terminal Block which shall require a small screwdriver for holding down the relay wires.

**1.10 Relay / Switch Ratings** The Power Transfer Relay and Manual Bypass Switches shall be rated at 240VAC/30 amps, minimum.

**1.11 Unit Failure** In the event of inverter/charger failure, battery failure or complete battery discharge, the power transfer relay shall revert to the NC (and de-energized) state, where utility line power is connected to the cabinet.

**1.12 Overload** The BBS must be able to shutdown in order to protect against internal damage in the event of an overload at the output.

**1.13 Bypass** Placing the Manual Bypass Switch into “Bypass” shall cut AC Utility power to the Inverter/Charger and route it directly to the signal Cabinet. In this condition, if the inverter is then disabled and the batteries disconnected from the system, the Inverter/Charger unit shall be completely de-energized and shall be safe to remove from the intersection system, while still allowing the intersection to function normally.

**2. FUNCTIONALITY, DISPLAYS AND CONTROLS**

The BBS system shall be provided with three modes of operation: Standby Mode, Buck/Boost “Line-Interactive” Mode and Backup Mode.

**2.1 Standby Mode** The BBS shall be provided with a STANDBY mode. In this mode, the utility AC Voltage shall be passed directly to the output. The system will transfer to Backup mode at factory default, low and high cutoff voltage level transfer set points between 90 and 135 VAC (the default shall be 100 and 130 VAC). The BBS will automatically apply a 5 VAC difference for the return transfer points

**2.1.1 Low & High Cutoff** When the BBS is in “Standby” modes (Buck / Boost is Disabled), the BBS shall bypass the utility line power whenever the utility line voltage is outside of the transfer set points ( $\pm 2$  VAC).

**2.1.2 Low Restore** In cases of low (below the low voltage transfer set point), or absent utility line voltage, when the utility line voltage has been restored at or above 5 VAC  $\pm 2$  VAC of the low transfer set point for more than 30 seconds (or the user configured line qualify time), the BBS shall transfer from Backup Mode back to Utility Line Mode.

**2.1.3 High Restore** In cases of high (above the high voltage transfer set point) utility line voltage, when the utility line voltage has been restored at or below 5 VAC  $\pm 2$  VAC of the high transfer set point for more than 30 seconds (or the user configured line qualify time), the BBS shall transfer from Backup Mode back to Utility Line Mode.

**2.2 Buck / Boost “Line-Interactive” Mode** The Buck / Boost mode of the BBS shall have a minimum range of 90 – 150 VAC. There shall not be any user configurable transfer set point for the Buck / Boost mode. Whenever Buck / Boost mode is selected, the output of the system shall be regulated between 100 – 130 VAC. When the output of the system can no longer be maintained within that range, the BBS shall transfer to Backup Mode.

**2.3 Backup Mode** In Backup Mode the BBS shall provide regulated power to the output of the system from its Batteries.

**2.4 Line Qualify Time** The BBS shall have a user adjustable line qualify time. In Backup Mode Line Qualify Time is the time required for the BBS system to return to providing power from the utility line voltage to the system when the utility line voltage returns to acceptable levels. There will be a minimum of three (3) settings possible. The minimum settings shall be 3 seconds, 10 seconds, and 30 seconds. The default value shall be 30 seconds.

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**2.5 Display** The BBS shall have a backlit LCD type display that is easily seen in both bright sunlight and in darkness. The screen shall be large enough to display the following minimum information:

- Operating Mode (Normal, Generator, Buck/Boost)
- Utility Input Voltage
- BBS Output Voltage
- Charger Status
- Percent Battery Charge
- Battery Voltage
- BBS Status (Standby, Backup, Buck, Boost)
- Any Alarms and Faults
- Relay Status information

Display backlight shall extinguish automatically when no key is pressed for a specific time which is not more than 300 seconds.

**2.6 Keypad** The BBS shall use a well defined keypad that includes arrow, enter and escape keys so that the user can efficiently navigate the menu system to make system programming changes and gather other status information.

**2.7 Status LED's** In addition to the LCD display the BBS shall be provided with discrete status LED indicators. As a minimum, the Red "Fault" LED indicator shall be provided. The purpose of the indicators is to draw the user's attention to the LCD.

**2.8 Event Log & Counters** The BBS shall keep track of the number of times that the unit was in Standby, Backup, Buck and Boost modes and the total number of hours and minutes that the unit has operated in those modes since last reset. This information shall be displayed through the LCD and shall be available for viewing via the EIA-232 port and the Ethernet Interface. The BBS shall also keep a running event log with a minimum of 100 latest events. For each event, the log shall contain as a minimum, a date/time stamp, the current operating mode, and what the event was.

**2.9 Programmable Relay Contacts** The BBS shall provide the user with six (6) programmable dry relay contacts. These relay contacts shall be rated for a minimum of 1 amp @ 125 VAC. When any relay is energized, it shall show up on the main screen of the LCD. As a minimum, the programming options will be, On Battery, Low Battery, Timer, Alarm, Fault, and Off.

**2.9.1 On Battery Relay Contacts** The dry relay contacts that are configured for "On Battery" shall only energize when the Inverter is operating in Backup Mode.

**2.9.2 Timer Relay Contacts** The BBS shall have a timer that will energize the dry relay contacts (when configured for "Timer") after the user configured time has elapsed. This timer is started when the BBS is in the Backup mode. The user can configure the timer from 0 to 480 minutes, in a minimum of 15 minute increments. The default setting will be 120 minutes.

**2.9.3 Low Battery Relay Contacts** The BBS shall have an adjustable low battery relay setting. This setting shall be adjustable so that the user can set the point at which the low battery relay energizes. This setting applies to any dry contact relay that is configured for "Low Battery".

**2.9.4 Relay Contact Terminals** The relay contacts shall be made available on the front panel of the BBS via an 18-position, screw hold-down, printed circuit board mounted terminal block. Additional terminals are allowed so long as they are adequately identified and labeled.

**2.9.4.1 Terminal Type** - The relay contact terminal blocks shall conform to On-Shore Technology, type ED2200/22, or Phoenix Contact type FRONT 2,5-H/SA 5, or WECO type 180-A-111, or approved equal. The spacing between each terminal shall be 0.197" (5 mm), with the hold-down screw and wire entrance both on the same face, facing forward and in the horizontal axis. See **Figure 3** for additional information.

**2.9.4.2 Contacts** - Each relay shall have their own common and their own set of normally open (NO) and normally closed (NC) terminals. The terminals for each relay shall be oriented as NO-C-NC, on the terminal block.

**2.9.4.3 Labeling** - The contacts of the terminal block shall be labeled 1...18, left to right. Additionally, each set of contacts shall be labeled with the NO-C-NC designation, as well as C1...C6, again, from left to right. Any remaining contacts on the terminal block shall be labeled as "Spare", unless used for some other purpose, in which case they shall be labeled as to their actual use.

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## 2.10 Ventilation

There shall be adequate clearance in front of all BBS intakes and exhaust vents, and fans. Specifically, any venting on the back panel must be able to maintain adequate airflow through the Inverter/Charger, by utilizing a method to prevent the back panel from being placed directly against the cabinet enclosure.

## 2.11 Battery Voltage Jacks

There shall be standard meter probe (0.08") input jacks (+RED) and (- BLACK) made available on the BBS front panel used to measure battery voltage externally.

## 2.12 Circuit Breakers

The BBS shall be equipped with an input only breaker or both input and output breaker and with either a DC circuit breaker or fused battery harness.

## 2.13 Batteries

Battery Types supplied shall be Absorbed Glass Mat Batteries (AGM) type Batteries

**2.13.1 Battery Charger** - The BBS shall have an integral charger. The charger shall be appropriate for AGM type batteries and a 3-step "Smart Charger" utilizing bulk, absorption and float charging techniques,. The charger must prevent destructive discharge and overcharge. Recharge time for the battery, from "protective low-cutoff" to 80% or more of full battery charge capacity, shall not exceed twenty (20) hours.

**2.13.2 Temperature Compensation** - The integral 3-Step "Smart Charger" shall use temperature compensation. The charging system shall compensate over a range of 2.5 – 4.0 mV/cell/°C.

**2.13.3 Temperature Probe** - A temperature sensor probe which plugs into the front panel of the BBS shall be used to monitor the internal temperature of the batteries. The temperature sensor wiring shall be at least 6'6" in length. The sensor shall be imbedded in a heavy duty 3/8" ring lug which can then be attached to one of the battery terminal posts.

**2.13.4 Battery Temperature** - The batteries shall not be recharged whenever the battery temperature exceeds 122+/- 5 °F.

**2.13.4 Battery Capacity and Temperature** -Batteries shall be certified by the manufacturer to operate over a temperature range of -35 °F to 165 °F. At -25 °F battery capacity (Ah) shall not go below 50% of the battery's ambient (70 °F) capacity.

### 2.13.5 Battery String Voltage

Nominal string voltage of the batteries shall be 24VDC or 48VDC.

**2.13.6 Battery Age.** Batteries supplied with the system shall have a date code showing that they are not more that 6 months old.

## 3.0 INTERCONNECTING WIRING

Interconnecting cabling shall be provided between the Power Transfer Relay, Bypass Switch, and Inverter/Charger. Battery interconnect cabling/harness shall be supplied to connect the batteries to each other and to the Inverter/Charger

### 3.1 Battery Harness

**3.1.1 Wiring Type** - All battery harness interconnect wiring shall be via a two-part modular harness consisting of UL Style 1015 CSA TEW or Welding Style Cable, or equivalent. Wiring shall be of proper gauge with respect to design current and with sufficient strand count for flexibility and ease of handling.

**3.1.2 Power Pole Connectors** - The Harness assembly shall be equipped with insulated, mating, one or two-piece Power Pole style connectors. When two-piece Power Pole style connectors are used, the positive terminal (+) shall be red, and the negative terminal (-) shall be black. Additionally, the two-piece connectors shall us a locking pin to prevent the connectors from separating.

**3.1.3 Harness Construction** - The Battery Harness and all Power Pole connectors shall be assembled to ensure proper polarity and circuit configuration throughout the entire harness.

**3.1.4 Harness Part I – Battery Side** - Part I of the harness shall consist of appropriate lengths of appropriately colored (black for negative terminal, red for positive terminal), cable with 3/8" ring lug terminals on one end, for connecting to the battery terminals, and the appropriately colored one or two-piece power pole connector on the other side.

**3.1.5 Harness Part II – BBS Side** - Part II of the harness shall consist of multiple insulated power pole connectors for mating to the battery side harness (Part I), and a single insulated power pole connector for connecting to the BBS unit.

**3.1.6 Harness Length** - The harness length shall be a minimum of 12 inches between batteries and 72 inches between BBS unit and the first battery.

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#### **4.0 MOUNTING / CONFIGURATION**

##### **4.1 EIA 19" Rack**

All references made to EIA rail or EIA 19" rack shall conform to Electronic Industries Standards EIA-310-D, Racks, Panels, and Associated Equipment with 10-32 "Universal Spacing" threaded holes.

##### **4.2 BBS Dimensions, Mounting Method and Space**

The size of the entire Battery Backup system shall be that it can fit into the inside of a NYS Specified Cabinet that has its equipment rack removed and replaced with shelving for the batteries and other components comprising the Battery Backup System (Information regarding cabinets can be seen at Chapter 13 of this specification). The Inverter/Charger, Power Transfer Relay and Bypass Switch Assembly shall be designed to be both shelf mounted or rack mounted to the cabinet's standard EIA rails. The available space for Inverter/Charger, Power Transfer Relay and Bypass Switch inside of the cabinet with its equipment rack removed is 19"W x 14.5"D x 20" H. Batteries supplied with the system shall have dimensions no greater than 7"W x 13.5"D x 9.5"H. See Figure 23.4 for the available space inside of a cabinet for the complete BBS system.

##### **4.3 –Paragraph not included for use in this version**

##### **4.4 Included Hardware**

All necessary hardware for mounting shall be included. This shall include EIA mounting brackets, bolt and washers.

###### **4.4.1 Bolt and Washer Requirements** - Bolts and washers shall meet the following requirements:

- Screw Type: Pan Head Phillips machine screw
- Size and Thread Pitch: 10-32
- Material: 18-8 stainless steel (Type 316 stainless steel is acceptable as an alternate)
- Washer: Use one flat washer (18-8 stainless steel) under the head of each 10-32 screw

##### **4.5 Relay Contact Wiring**

Three (3) sets of relay contact wiring shall be provided. Each set shall be two twisted insulated conductors of UL Style 1015 CSA TEW 18 AWG wire, same ratings as above, except 16 strands of 30 AWG tinned copper.

#### **5.0 COMMUNICATIONS: The BBS shall have RS-232 and Ethernet communications as standard.**

**5.1** - All BBS Configuration and System menus shall be accessible and programmable from the RS-232 port and from the Ethernet port. Additionally, all log files shall be available through these ports.

**5.2** - The user serial port shall be an EIA-232 (DB9-Female) connector.

**5.3** - The Ethernet Port shall be an RJ45, EIA 568B Pin Out connector.

**5.4** - The Ethernet IP address shall be user configurable.

#### **6.0 WARRANTY**

Manufacturers shall provide a two (2) year factory-repair warranty for parts and labor on the BBS from date of acceptance by the State. Batteries shall be warranted for full replacement for two (2) years from date of purchase. The warranty shall be included in the total bid price of the BBS.

#### **7.0 QUALITY ASSURANCE**

**7.1** - Each BBS shall be manufactured in accordance with a manufacturer Quality Assurance (QA) program. The QA program shall include two Quality Assurance procedures: (1) Design QA (see 7.4 below) and (2) Production QA. The Production QA shall include statistically controlled routine tests to ensure minimum performance levels of BBS units built to meet this specification and a documented process of how problems are to be resolved.

**7.2** - QA process and test results documentation shall be kept on file for a minimum period of seven years.

**7.3** - Battery Backup System designs not satisfying Design QA Testing and Production QA Testing requirements shall not be labeled, advertised, or sold as conforming to this specification.

##### **7.4: DESIGN QUALIFICATION TESTING**

**7.4.1 Design Changes** - The manufacturer, or an independent testing lab hired by the manufacturer, shall perform Design Qualification Testing on new BBS system(s) offered, and when any major design change has been implemented on an existing design. A major design change is defined as any modification, either in material, electrical, physical or theoretical, that changes any performance characteristics of the system, or results in a different circuit configuration. Where a dispute arises in determining if a system is a new design or if the system has had a major design change, the State will make the final determination if Design Qualification Testing is required prior to production consideration.

(continued)

- 7.4.2 Submittals** - A quantity of two units for each design shall be submitted for Design Qualification Testing.
- 7.4.2.1** - Test units shall be submitted to NYS DOTs Traffic Signal Lab after the manufacturer's testing is complete.
  - 7.4.2.2 Test Data Submittal** Manufacturer's testing data shall be submitted with test units for NYSDOT's verification Design Qualification Testing.
- 7.4.3 Burn-In** - The sample systems shall be energized for a minimum of 5 hours, at full rated load, at temperatures of 155 °F and -25 °F, excluding batteries, before performing any design qualification testing.
- 7.4.4** - Any failure of the BBS, which renders the unit non-compliant with the specification after burn-in, shall be cause for rejection.
- 7.4.5 Testing** - For Design Qualification Testing, all specifications will be measured including, but not limited to:
- 7.4.5.1** - Minimum of four hours of run time while operating in Backup Mode, at full load at room temperature (70 °F)
  - 7.4.5.2** - Proper operations of all relay contacts
  - 7.4.5.3** - Inverter output voltage, frequency, harmonic distortion, and efficiency, when in Backup Mode.
  - 7.4.5.4** - All power transfer voltage levels and all modes of operation.
  - 7.4.5.5** - Power transfer time from loss of utility line voltage to stabilized inverter line voltage from batteries.
  - 7.4.5.6** - Backfeed voltage to utility when in Backup Mode.
  - 7.4.5.7** - IEEE/ANSI C.62.41 compliance.
  - 7.4.5.8** - Battery charger operation.
  - 7.4.5.9** - Event counter and runtime meter accuracy.
  - 7.4.5.10** - Ability to control, monitor, get reports, and configure the system through the standard RS-232 and Ethernet ports.
  - 7.4.5.11** - Complete physical inspection of the system for quality workmanship.

#### **7.5: PRODUCTION QUALITY CONTROL TESTING**

- 7.5.1** - Production Quality Control tests shall consist of all of the above listed tests and shall be performed on each new system prior to shipment. Failure to meet requirements of any of these tests shall be cause for rejection. The manufacturer shall retain test results for seven years.
- 7.5.2** - Each BBS shall be given a minimum 100-hour burn-in period to eliminate any premature failures. The burn-in period can be a combination of running in Backup Mode with a full load and running in Charger Mode.
- 7.5.3** - Each system shall be visually inspected for any exterior physical damage or assembly anomalies. Any defects shall be cause for rejection.

#### **7.6 NYS DOT QUALITY ASSURANCE TESTING**

- 7.6.1** - NYS DOT will perform random sample testing on all shipments, consistent with ANSI/ASQ Z1.4-2003 Sampling Procedures and Tables for Inspection by Attributes.
- 7.6.2** - Sample testing will normally be completed within 30 days after delivery to the NYS DOT Laboratory, barring deficiencies in the shipment, which would reset the clock.
- 7.6.3** - All parameters of the specification may be tested on the shipment sample.
- 7.6.4** - The number of units tested (sample size) shall be determined by the quantity in the shipment. The sample size and acceptance or rejection of the shipment shall conform to ANSI/ASQ Z1.4-2003.

(continued)



## Battery Back Up System Block Diagram

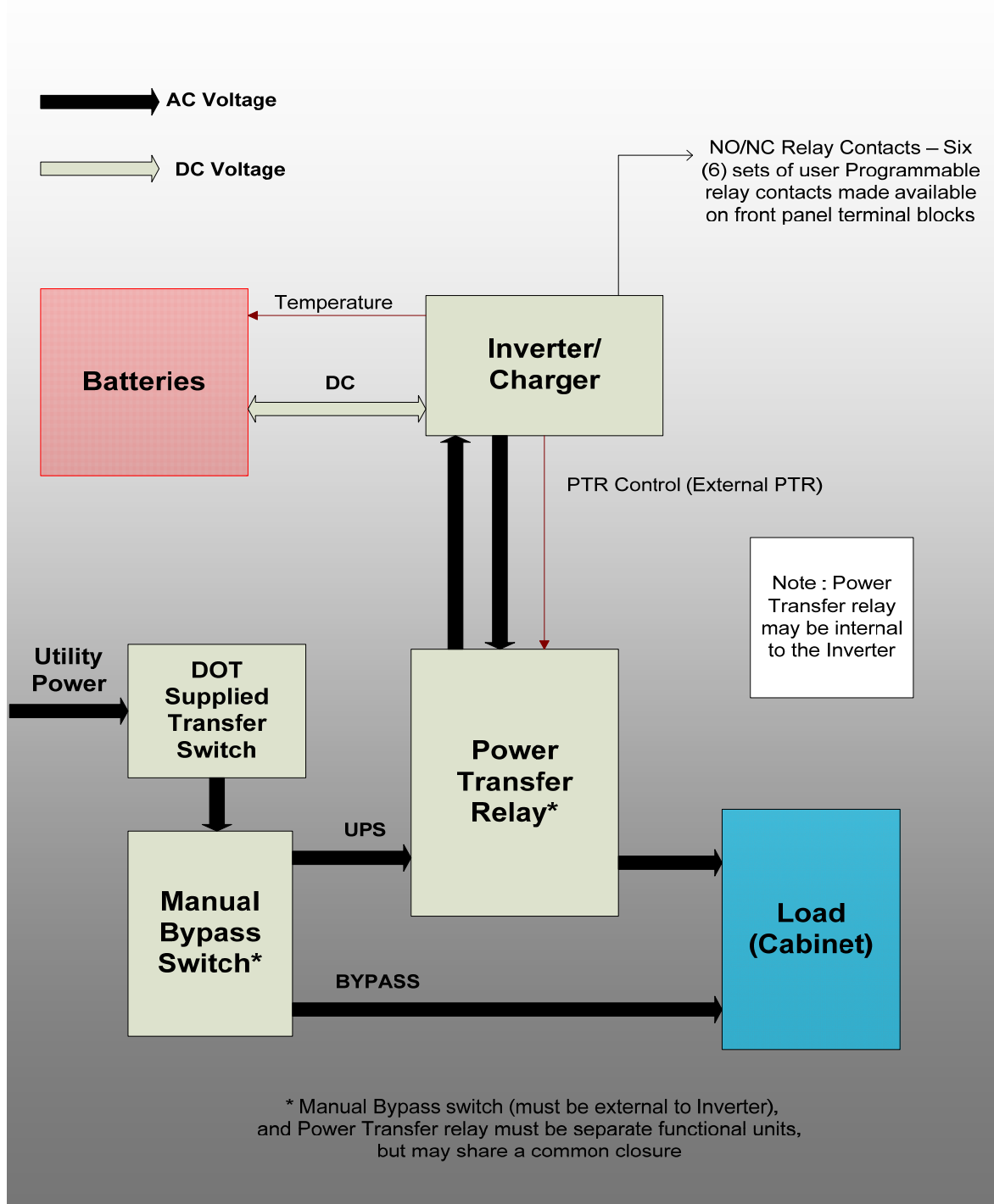


Fig 23.1 - BBS Block Diagram

(continued)

## BBS Utility Power Connection Diagram

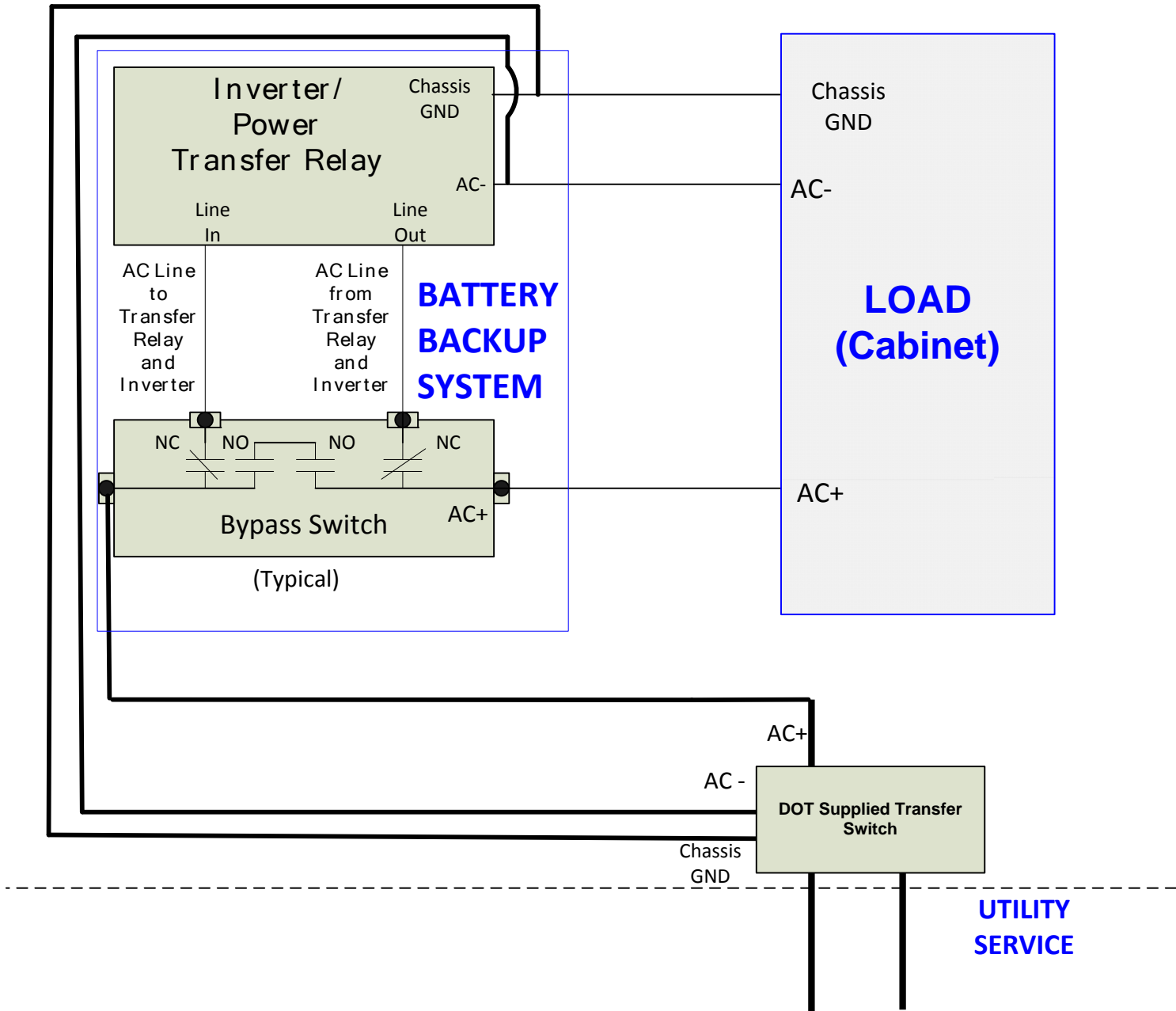


Fig 23.2- BBS Utility Power Connection Diagram

(continued)

Relay Contact

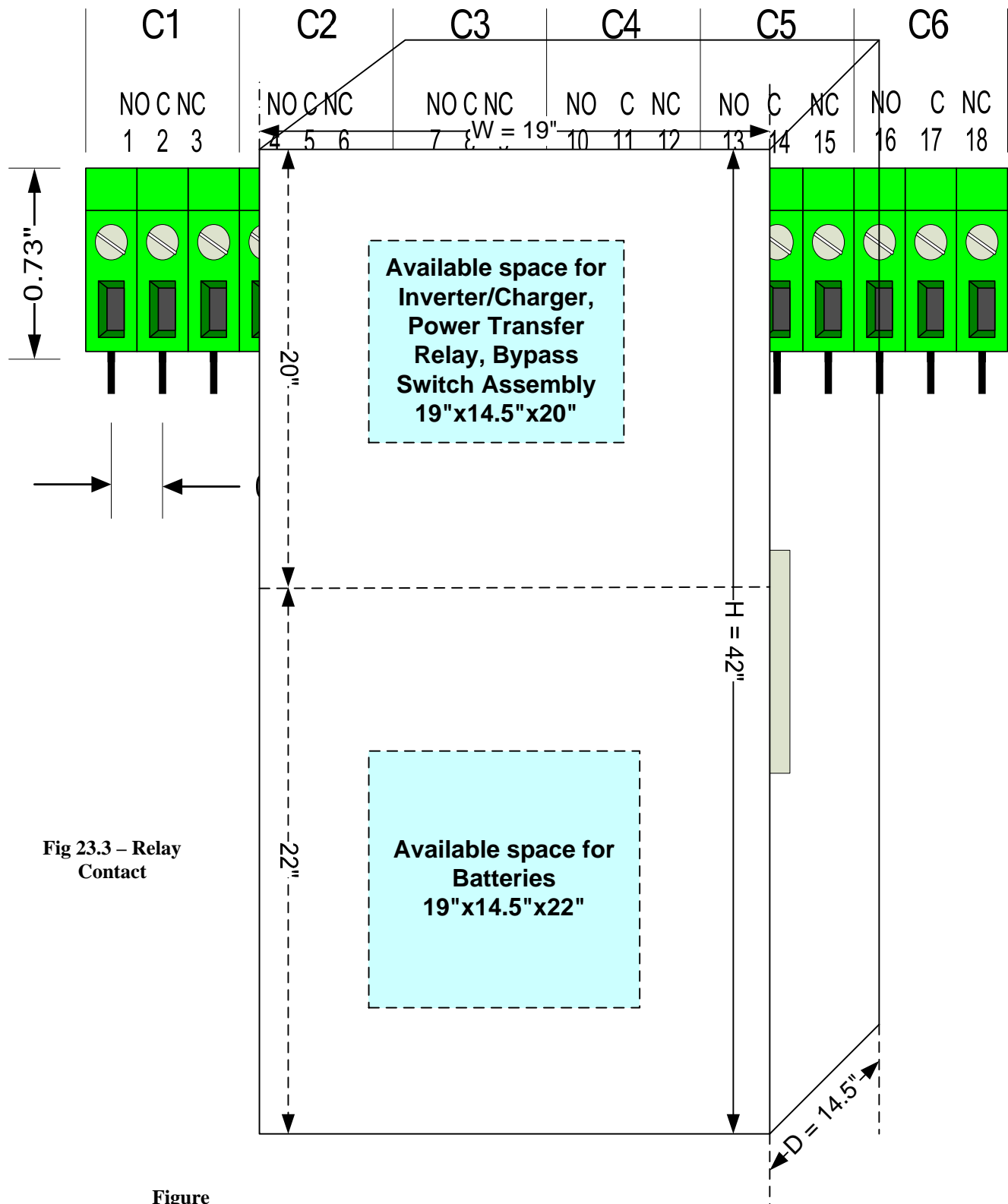


Fig 23.3 – Relay Contact

Figure 23.4- Internal available space of Cabinet Shell allowed for BBS

(continued)

**GLOSSARY -Wherever in these specifications the following terms or abbreviations are used, the intent and meaning shall be interpreted as follows:**

A	-	Ampere
AC	-	Alternating Current
AC+	-	120 Volts AC, 60 hertz ungrounded power source
AC-	-	120 Volts AC, 60 hertz grounded return to the power source
ACIA	-	Asynchronous Communications Interface Adapter
AGENCY	-	Purchasing Government Agency
ANSI	-	American National Standard Institute
ASCII	-	American Standard Code for Information Interchange
Assembly	-	A complete machine, structure or unit of a machine that was manufactured by fitting together parts and/or modules
ASTM	-	American Society for Testing and Materials
AWG	-	American Wire Gage
Baud	-	Unit measurement of transmission speed usually equivalent to bits per second (bps) and often used interchangeably
BPS	-	Bits Per Second; A measure of data transmission speed; 1200 BPS equals approx. 120 characters transmitted each second
Buffer	-	A temporary storage location for data. The buffer accumulates backed - up information for later release
Bus	-	A common channel between internal hardware devices, such as between CPU and disk controller.
C	-	Celsius
C Language	-	The ANSI C Programming Language
Cabinet	-	An outdoor enclosure generally housing the controller unit and associated equipment
Certificate of Compliance	-	A certificate signed by the manufacturer of the material or the manufacturer of assembled materials stating that the materials involved comply in all respects with the requirements of the specifications
Channel	-	An information path from a discrete input to a discrete output
Central	-	The chip that controls all computer operations and Processing performs computations. Also may refer to the entire Unit (CPU) physical unit housing the chip.
CMOS	-	Complementary Metal Oxide Semiconductor
Component	-	Any electrical or electronic device
Contractor	-	The person or persons, manufacturer, firm, partnership, corporation, vendor or combination thereof, who have entered into a contract with the AGENCY, as party(s) of the second part or legal representative
Controller Unit	-	That portion of the controller assembly devoted to the operational control of the logic decisions programmed into the assembly
CR	-	Control Register
CPU	-	Central Processing Unit of a controller
CRC	-	Cyclic Redundancy Check
DAT Program	-	CALTRANS Diagnostic and Acceptance Test Program
dB	-	Decibel
DC	-	Direct Current
Detector Rack	-	Input File
DIN	-	Deutsche Industrie Norm
DMA	-	Direct Memory Access
Dollar Sign	-	"\$" found preceding two (2) or four (4) characters means the number represented is in hexadecimal notation; throughout this entire text
DTA	-	Down Time Accumulator
EG	-	Equipment Ground
EIA	-	Electronic Industries Association
EMI	-	Electro Magnetic Interference
Engineer	-	The AGENCY director, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them
EPROM	-	Ultraviolet Erasable, Programmable, Read Only Memory Device
EEPROM	-	Electrically Erasable, Programmable, Read Only Memory Device

(continued)

**Glossary (Continued)**

Equal	-	Connectors: comply with physical dimensions, contact material, plating and method of connection. Devices: conforming to function, pin out, electrical and operating parameter requirements, access times and interface parameters of the specified device
ETL	-	Electrical Testing Laboratories, Inc.
Fig	-	Figure
Firmware	-	A computer program or software stored permanently in PROM, EPROM, ROM or semi-permanently in EEPROM
FIO	-	Field Input/output of a controller
FLASH	-	A +5 VDC powered IC Memory Device with nonvolatile, electrically erasable, programmable, 100K read/write minimum cycles and fast access time features
FPA	-	Front Panel Assembly
HEX	-	Hexadecimal
Hz	-	Hertz
IC	-	Integrated Circuit
I.D.	-	Identification
IEEE	-	Institute of Electrical and Electronics Engineers
ISO	-	International Standards Organization
Jumper	-	A means of connecting or disconnecting two or more conductive by soldering or de-soldering a conductive wire or by PCB post jumper
K	-	(KB) or kilobytes; 1 thousand bytes (actually $2^{10}$ or 1,024bytes). Computer RAM memories are usually defined in terms of kilobytes. Thus when a computer has 128K of memory, it has 131,072 bytes of memory.
KB	-	Kilobytes
Laboratory	-	The established laboratory of the AGENCY or other laboratories authorized by the AGENCY to test materials involved in the contract
LED	-	Light Emitting Diode; lights usually produce a red glow. Found on disk drives, modems, some calculator displays, etc.
LOGIC	-	Negative Logic Convention (Ground True) State
LSB	-	Least Significant Byte
Lsb	-	Least Significant Bit
MA or ma	-	Milliamperere
MB	-	Megabyte
MSB	-	Most Significant Byte
msb	-	Most Significant Bit
m	-	Milli
MCU/MPU/IMP	-	Micro Controller Unit, Microprocessor Unit, or Integrated Multiprotocol Processor
Megabyte (M, MB)	-	One million bytes (actually $2^{20}$ or 1,048,576 bytes). Used to define a large volume of data, hard disk storage capacity is measured in megabytes.
MIL	-	Military Specifications
MODEM	-	Modulation/Demodulation Unit
Module	-	A functional unit that plugs into an assembly
Motherboard	-	A printed circuit connector interface board with no active or passive components
MOS	-	Metal-Oxide Semiconductor
MOV	-	Metal-Oxide Varistor
MS	-	Military Standards
N	-	Newton: SI unit of force
N	-	Nano
N.C.	-	Normally closed contact
N.O.	-	Normally open contact
NA	-	Presently Not Assigned. Cannot be used by the contractor for other purposes
NEMA	-	National Electrical Manufacturer's Association
NETA	-	National Electrical Testing Association, Inc
NLSB	-	Next Least Significant Byte

(continued)

**Glossary (Continued)**

nlsb	-	Next Least Significant Bit
NMSB	-	Next Most Significant Byte
nmsb	-	Next Most Significant Bit
ns	-	Nanosecond
NYSDOT	-	New York State Department of Transportation
PCB	-	Printed Circuit Board
PLA/PAL	-	Programmable Array Logic Device
Port	-	A channel (outlet) that connects the computer to outside sources. It may be parallel or serial
PROM	-	Programmable Read Only Memory
Power Conditions	-	16.7 ms (one 60 Hz cycle) reaction period is allowed to be included in the 50 ms timing or added to (67 ms duration). The hysteresis between power failure and power restoration voltage settings shall be a min. of 5 VAC with a threshold drift of no more than 0.2 VAC.
Power Failure	-	A Power Failure is said to have occurred when the incoming line voltage falls below 92 +/- 2 VAC for 50 ms See "Power Conditions".
Power Restoration	-	Power is said to be restored when the incoming line voltage equals or exceeds 97 +/- 2 VAC for 50ms. See "Power Conditions"
ppm	-	Parts per million
PWM	-	Pulse Width Modulation
QPL	-	New York State Department of Transportation Qualified Products List.
RAM	-	Random Access Memory is the memory which is accessible by the computer. The computer has the ability to change or customize the information stored in the RAM.
RDR	-	ACIA Receiver Data Register
RF	-	Radio Frequency
RMS	-	Root-Mean-Square
ROM	-	Read Only Memory Device
RTS	-	Request to Send
SCC	-	Serial Communications Controller
SCI	-	Serial Communications Interface
SDLC	-	Synchronous Data Link Control
S	-	Logic State
S	-	second
Second Sourced	-	Produced by more than one manufacturer
Serial Interface	-	A device which processes information one (1) bit at a time from the computer to a printer or other peripheral units
SR	-	Status Register
SRAM	-	Static Random Access Memory Device
State	-	State of New York
SW	-	Switch
Swpk	-	Switchback
Swpks	-	Switchpacks
TOD	-	Time Of Day Clock
TDR	-	Transmit Data Register
TTL	-	Transistor-Transistor Logic
μ	-	Micro
UL	-	Underwriter's Laboratories, Inc.
VAC	-	Voltage Alternating Current
VDC	-	Voltage Direct Current
VME	-	Versa Module Euro card, VMEbus Standard IEEE P1014/D1.2
X	-	Number Value
XX	-	Manufacturer's Option
WDT	-	Watchdog Timer: A monitoring circuit, external to the device watched, which senses an Output Line from the device and reacts.

**End**

(continued)

**PLEASE USE BLACK INK OR TYPEWRITER WHEN PREPARING YOUR BID. BE SURE YOU HAVE INSERTED YOUR COMPANY'S NAME IN THE BOX**

Bidder
--------

**BID SUBMISSION CHECK-OFF:**

The following identifies some of the requirements for this solicitation.

Bidder is to check submissions made.

“M” in parenthesis next to page number indicates a **mandatory** requirement.

The page in the Invitation for Bids with related information ( ).

If a specific form has been supplied for your use, its location page in the IFB is bracketed [ ].

**Completed and Enclosed:**

**Face page of IFB - (1; M) [1]:**

**Bid Deviations - (2):**

**BID PAGES: Catalog Identification Pages Containing Quoted Discount Rates & product line information- (10-13; M) [38-43]:**

**Four (4) hard copies each of Catalog (s) Bid (10; M):**

**Two (2) hard copies each of applicable Price List(s), (10; M):**

**CD, DVD, or USB 2.0 Flash Drive containing a readable Excel format file of Retail Price List - (10; M):**

**Reasonable Price Information – (15; M) (this may be deferred until requested by PO.)**

Information & copies of recent contracts that bidder holds with large Government entities

copies of sales records of major products sold Evidence of discount (or up-charge) structure:  *Included*  *Deferred*

**APPENDIX 1 - [45-52] (M) REQUIRED BIDDER QUESTIONS**

**APPENDIX 2 - [59-60] (8; M):Contractor Certification to Covered Agency {ST-220-CA}:**   
 {Submit ST-220-TD [53-58] Directly to NYS Dept. of Tax & Finance under separate cover}

**APPENDIX 3 – [61-67] (M) REQUIRED BIDDER CERTIFICATIONS**

Has bidder **entered & certified** their **vendor responsibility questionnaire online** with the Office of the State Comptroller at the OSC Vend Rep website ([http://www.osc.state.ny.us/vendrep/info\\_vrsystem\\_vendor.htm](http://www.osc.state.ny.us/vendrep/info_vrsystem_vendor.htm))?  **YES**  **NO**

**If “NO”,** has bidder downloaded from the site, filled out and is returning a questionnaire with the Bid ?  **YES**  **NO**  
 (9; M)

Has bidder arranged with their Insurance Providers and Agents to supply all mandated Workers Compensation Insurance and Disability Insurance policy certifications as specified to the Designated Contact? (23; M)  **YES**  **NO**

**IF** submitting a bid where your company **intends to participate** in the **Technical Support Option Plan** have you included **all additional documentation and insurance information as detailed on pages 30 through 33**  **YES**  **NO**

**Bid Submission Check - Off page (THIS PAGE) :**

**Bidder should retain in their possession: Pages 2 through 38, Appendices A & B, & Appendices 4 through 11. DO NOT RETURN THESE PAGES WITH YOUR BID**

**Bidder should retain copies of ALL submitted pages for future reference.**

\*\*\*\*\*

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APPENDIX A

STANDARD CLAUSES FOR NEW YORK STATE CONTRACTS

PLEASE RETAIN THIS DOCUMENT  
FOR FUTURE REFERENCE.

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**STANDARD CLAUSES FOR NYS CONTRACTS**

The parties to the attached contract, license, lease, amendment or other agreement of any kind (hereinafter, "the contract" or "this contract") agree to be bound by the following clauses which are hereby made a part of the contract (the word "Contractor" herein refers to any party other than the State, whether a contractor, licensor, licensee, lessor, lessee or any other party):

1. **EXECUTORY CLAUSE.** In accordance with Section 41 of the State Finance Law, the State shall have no liability under this contract to the Contractor or to anyone else beyond funds appropriated and available for this contract.

2. **NON-ASSIGNMENT CLAUSE.** In accordance with Section 138 of the State Finance Law, this contract may not be assigned by the Contractor or its right, title or interest therein assigned, transferred, conveyed, sublet or otherwise disposed of without the State's previous written consent, and attempts to do so are null and void. Notwithstanding the foregoing, such prior written consent of an assignment of a contract let pursuant to Article XI of the State Finance Law may be waived at the discretion of the contracting agency and with the concurrence of the State Comptroller where the original contract was subject to the State Comptroller's approval, where the assignment is due to a reorganization, merger or consolidation of the Contractor's business entity or enterprise. The State retains its right to approve an assignment and to require that any Contractor demonstrate its responsibility to do business with the State. The Contractor may, however, assign its right to receive payments without the State's prior written consent unless this contract concerns Certificates of Participation pursuant to Article 5-A of the State Finance Law.

3. **COMPTROLLER'S APPROVAL.** In accordance with Section 112 of the State Finance Law (or, if this contract is with the State University or City University of New York, Section 355 or Section 6218 of the Education Law), if this contract exceeds \$50,000 (or the minimum thresholds agreed to by the Office of the State Comptroller for certain S.U.N.Y. and C.U.N.Y. contracts), or if this is an amendment for any amount to a contract which, as so amended, exceeds said statutory amount, or if, by this contract, the State agrees to give something other than money when the value or reasonably estimated value of such consideration exceeds \$10,000, it shall not be valid, effective or binding upon the State until it has been approved by the State Comptroller and filed in his office. Comptroller's approval of contracts let by the Office of General Services is required when such contracts exceed \$85,000 (State Finance Law Section 163.6.a).

4. **WORKERS' COMPENSATION BENEFITS.** In accordance with Section 142 of the State Finance Law, this contract shall be void and of no force and effect unless the Contractor shall provide and maintain coverage during the life of this contract for the benefit of such employees as are required to be covered by the provisions of the Workers' Compensation Law.

5. **NON-DISCRIMINATION REQUIREMENTS.** To the extent required by Article 15 of the Executive Law (also known as the Human Rights Law) and all other State and Federal statutory and constitutional non-discrimination provisions, the Contractor will not discriminate against any

employee or applicant for employment because of race, creed, color, sex, national origin, sexual orientation, age, disability, genetic predisposition or carrier status, or marital status. Furthermore, in accordance with Section 220-e of the Labor Law, if this is a contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this contract shall be performed within the State of New York, Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, disability, sex, or national origin: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. If this is a building service contract as defined in Section 230 of the Labor Law, then, in accordance with Section 239 thereof, Contractor agrees that neither it nor its subcontractors shall by reason of race, creed, color, national origin, age, sex or disability: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. Contractor is subject to fines of \$50.00 per person per day for any violation of Section 220-e or Section 239 as well as possible termination of this contract and forfeiture of all moneys due hereunder for a second or subsequent violation.

6. **WAGE AND HOURS PROVISIONS.** If this is a public work contract covered by Article 8 of the Labor Law or a building service contract covered by Article 9 thereof, neither Contractor's employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days stated in said statutes, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the State Labor Department in accordance with the Labor Law. Additionally, effective April 28, 2008, if this is a public work contract covered by Article 8 of the Labor Law, the Contractor understands and agrees that the filing of payrolls in a manner consistent with Subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to payment by the State of any State approved sums due and owing for work done upon the project.

7. **NON-COLLUSIVE BIDDING CERTIFICATION.** In accordance with Section 139-d of the State Finance Law, if this contract was awarded based upon the submission of bids, Contractor affirms, under penalty of perjury, that its bid was arrived at independently and without collusion aimed at restricting competition. Contractor further affirms that, at the time Contractor submitted its bid, an authorized and responsible person executed and delivered to the State a non-collusive bidding certification on Contractor's behalf.

8. **INTERNATIONAL BOYCOTT PROHIBITION.** In accordance with Section 220-f of the Labor Law and Section 139-h of the State Finance Law, if this contract exceeds \$5,000, the Contractor agrees, as a material condition of the contract, that neither the Contractor nor any substantially owned or affiliated person, firm, partnership or corporation has participated, is participating, or shall participate in an international boycott in violation of the federal Export

Administration Act of 1979 (50 USC App. Sections 2401 et seq.) or regulations thereunder. If such Contractor, or any of the aforesaid affiliates of Contractor, is convicted or is otherwise found to have violated said laws or regulations upon the final determination of the United States Commerce Department or any other appropriate agency of the United States subsequent to the contract's execution, such contract, amendment or modification thereto shall be rendered forfeit and void. The Contractor shall so notify the State Comptroller within five (5) business days of such conviction, determination or disposition of appeal (2NYCRR 105.4).

**9. SET-OFF RIGHTS.** The State shall have all of its common law, equitable and statutory rights of set-off. These rights shall include, but not be limited to, the State's option to withhold for the purposes of set-off any moneys due to the Contractor under this contract up to any amounts due and owing to the State with regard to this contract, any other contract with any State department or agency, including any contract for a term commencing prior to the term of this contract, plus any amounts due and owing to the State for any other reason including, without limitation, tax delinquencies, fee delinquencies or monetary penalties relative thereto. The State shall exercise its set-off rights in accordance with normal State practices including, in cases of set-off pursuant to an audit, the finalization of such audit by the State agency, its representatives, or the State Comptroller.

**10. RECORDS.** The Contractor shall establish and maintain complete and accurate books, records, documents, accounts and other evidence directly pertinent to performance under this contract (hereinafter, collectively, "the Records"). The Records must be kept for the balance of the calendar year in which they were made and for six (6) additional years thereafter. The State Comptroller, the Attorney General and any other person or entity authorized to conduct an examination, as well as the agency or agencies involved in this contract, shall have access to the Records during normal business hours at an office of the Contractor within the State of New York or, if no such office is available, at a mutually agreeable and reasonable venue within the State, for the term specified above for the purposes of inspection, auditing and copying. The State shall take reasonable steps to protect from public disclosure any of the Records which are exempt from disclosure under Section 87 of the Public Officers Law (the "Statute") provided that: (i) the Contractor shall timely inform an appropriate State official, in writing, that said records should not be disclosed; and (ii) said records shall be sufficiently identified; and (iii) designation of said records as exempt under the Statute is reasonable. Nothing contained herein shall diminish, or in any way adversely affect, the State's right to discovery in any pending or future litigation.

**11. IDENTIFYING INFORMATION AND PRIVACY NOTIFICATION.** (a) FEDERAL EMPLOYER IDENTIFICATION NUMBER and/or FEDERAL SOCIAL SECURITY NUMBER. All invoices or New York State standard vouchers submitted for payment for the sale of goods or services or the lease of real or personal property to a New York State agency must include the payee's identification number, i.e., the seller's or lessor's identification number. The number is either the payee's Federal employer identification number or Federal social security number, or both such numbers when the payee has both such numbers. Failure to include this number or numbers may delay payment. Where the payee does not have such number or numbers, the payee, on

its invoice or New York State standard voucher, must give the reason or reasons why the payee does not have such number or numbers.

(b) **PRIVACY NOTIFICATION.** (1) The authority to request the above personal information from a seller of goods or services or a lessor of real or personal property, and the authority to maintain such information, is found in Section 5 of the State Tax Law. Disclosure of this information by the seller or lessor to the State is mandatory. The principal purpose for which the information is collected is to enable the State to identify individuals, businesses and others who have been delinquent in filing tax returns or may have understated their tax liabilities and to generally identify persons affected by the taxes administered by the Commissioner of Taxation and Finance. The information will be used for tax administration purposes and for any other purpose authorized by law. (2) The personal information is requested by the purchasing unit of the agency contracting to purchase the goods or services or lease the real or personal property covered by this contract or lease. The information is maintained in New York State's Central Accounting System by the Director of Accounting Operations, Office of the State Comptroller, 110 State Street, Albany, New York 12236.

**12. EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITIES AND WOMEN.** In accordance with Section 312 of the Executive Law, if this contract is: (i) a written agreement or purchase order instrument, providing for a total expenditure in excess of \$25,000.00, whereby a contracting agency is committed to expend or does expend funds in return for labor, services, supplies, equipment, materials or any combination of the foregoing, to be performed for, or rendered or furnished to the contracting agency; or (ii) a written agreement in excess of \$100,000.00 whereby a contracting agency is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; or (iii) a written agreement in excess of \$100,000.00 whereby the owner of a State assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project, then:

(a) The Contractor will not discriminate against employees or applicants for employment because of race, creed, color, national origin, sex, age, disability or marital status, and will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. Affirmative action shall mean recruitment, employment, job assignment, promotion, upgradings, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation;

(b) at the request of the contracting agency, the Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the contractor's obligations herein; and

(c) the Contractor shall state, in all solicitations or advertisements for employees, that, in the performance of the State contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.

Contractor will include the provisions of "a", "b", and "c" above, in every subcontract over \$25,000.00 for the construction, demolition, replacement, major repair, renovation, planning or design of real property and improvements thereon (the "Work") except where the Work is for the beneficial use of the Contractor. Section 312 does not apply to: (i) work, goods or services unrelated to this contract; or (ii) employment outside New York State; or (iii) banking services, insurance policies or the sale of securities. The State shall consider compliance by a contractor or subcontractor with the requirements of any federal law concerning equal employment opportunity which effectuates the purpose of this section. The contracting agency shall determine whether the imposition of the requirements of the provisions hereof duplicate or conflict with any such federal law and if such duplication or conflict exists, the contracting agency shall waive the applicability of Section 312 to the extent of such duplication or conflict. Contractor will comply with all duly promulgated and lawful rules and regulations of the Governor's Office of Minority and Women's Business Development pertaining hereto.

**13. CONFLICTING TERMS.** In the event of a conflict between the terms of the contract (including any and all attachments thereto and amendments thereof) and the terms of this Appendix A, the terms of this Appendix A shall control.

**14. GOVERNING LAW.** This contract shall be governed by the laws of the State of New York except where the Federal supremacy clause requires otherwise.

**15. LATE PAYMENT.** Timeliness of payment and any interest to be paid to Contractor for late payment shall be governed by Article 11-A of the State Finance Law to the extent required by law.

**16. NO ARBITRATION.** Disputes involving this contract, including the breach or alleged breach thereof, may not be submitted to binding arbitration (except where statutorily authorized), but must, instead, be heard in a court of competent jurisdiction of the State of New York.

**17. SERVICE OF PROCESS.** In addition to the methods of service allowed by the State Civil Practice Law & Rules ("CPLR"), Contractor hereby consents to service of process upon it by registered or certified mail, return receipt requested. Service hereunder shall be complete upon Contractor's actual receipt of process or upon the State's receipt of the return thereof by the United States Postal Service as refused or undeliverable. Contractor must promptly notify the State, in writing, of each and every change of address to which service of process can be made. Service by the State to the last known address shall be sufficient. Contractor will have thirty (30) calendar days after service hereunder is complete in which to respond.

**18. PROHIBITION ON PURCHASE OF TROPICAL HARDWOODS.** The Contractor certifies and warrants that all wood products to be used under this contract award will be in

accordance with, but not limited to, the specifications and provisions of Section 165 of the State Finance Law, (Use of Tropical Hardwoods) which prohibits purchase and use of tropical hardwoods, unless specifically exempted, by the State or any governmental agency or political subdivision or public benefit corporation. Qualification for an exemption under this law will be the responsibility of the contractor to establish to meet with the approval of the State.

In addition, when any portion of this contract involving the use of woods, whether supply or installation, is to be performed by any subcontractor, the prime Contractor will indicate and certify in the submitted bid proposal that the subcontractor has been informed and is in compliance with specifications and provisions regarding use of tropical hardwoods as detailed in §165 State Finance Law. Any such use must meet with the approval of the State; otherwise, the bid may not be considered responsive. Under bidder certifications, proof of qualification for exemption will be the responsibility of the Contractor to meet with the approval of the State.

**19. MACBRIDE FAIR EMPLOYMENT PRINCIPLES.**

In accordance with the MacBride Fair Employment Principles (Chapter 807 of the Laws of 1992), the Contractor hereby stipulates that the Contractor either (a) has no business operations in Northern Ireland, or (b) shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Fair Employment Principles (as described in Section 165 of the New York State Finance Law), and shall permit independent monitoring of compliance with such principles.

**20. OMNIBUS PROCUREMENT ACT OF 1992.** It is the policy of New York State to maximize opportunities for the participation of New York State business enterprises, including minority and women-owned business enterprises as bidders, subcontractors and suppliers on its procurement contracts.

Information on the availability of New York State subcontractors and suppliers is available from:

NYS Department of Economic Development  
Division for Small Business  
30 South Pearl St -- 7<sup>th</sup> Floor  
Albany, New York 12245  
Telephone: 518-292-5220  
Fax: 518-292-5884  
<http://www.empire.state.ny.us>

A directory of certified minority and women-owned business enterprises is available from:

NYS Department of Economic Development  
Division of Minority and Women's Business Development  
30 South Pearl St -- 2nd Floor  
Albany, New York 12245  
Telephone: 518-292-5250  
Fax: 518-292-5803  
<http://www.empire.state.ny.us>

The Omnibus Procurement Act of 1992 requires that by signing this bid proposal or contract, as applicable, Contractors certify that whenever the total bid amount is greater than \$1 million:

(a) The Contractor has made reasonable efforts to encourage the participation of New York State Business Enterprises as suppliers and subcontractors, including certified minority and women-owned business enterprises, on this project, and has retained the documentation of these efforts to be provided upon request to the State;

(b) The Contractor has complied with the Federal Equal Opportunity Act of 1972 (P.L. 92-261), as amended;

(c) The Contractor agrees to make reasonable efforts to provide notification to New York State residents of employment opportunities on this project through listing any such positions with the Job Service Division of the New York State Department of Labor, or providing such notification in such manner as is consistent with existing collective bargaining contracts or agreements. The Contractor agrees to document these efforts and to provide said documentation to the State upon request; and

(d) The Contractor acknowledges notice that the State may seek to obtain offset credits from foreign countries as a result of this contract and agrees to cooperate with the State in these efforts.

**21. RECIPROCITY AND SANCTIONS PROVISIONS.** Bidders are hereby notified that if their principal place of business is located in a country, nation, province, state or political subdivision that penalizes New York State vendors, and if the goods or services they offer will be substantially produced or performed outside New York State, the Omnibus Procurement Act 1994 and 2000 amendments (Chapter 684 and Chapter 383, respectively) require that they be denied contracts which they would otherwise obtain. NOTE: As of May 15, 2002, the list of discriminatory jurisdictions subject to this provision includes the states of South Carolina, Alaska, West Virginia, Wyoming, Louisiana and Hawaii. Contact NYS Department of Economic Development for a current list of jurisdictions subject to this provision.

**22. COMPLIANCE WITH NEW YORK STATE INFORMATION SECURITY BREACH AND NOTIFICATION ACT.** Contractor shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law Section 899-aa; State Technology Law Section 208).

**23. COMPLIANCE WITH CONSULTANT DISCLOSURE LAW.** If this is a contract for consulting services, defined for purposes of this requirement to include analysis, evaluation, research, training, data processing, computer programming, engineering, environmental, health, and mental health services, accounting, auditing, paralegal, legal or similar services, then, in accordance with Section 163 (4-g) of the State Finance Law (as amended by Chapter 10 of the Laws of 2006), the Contractor shall timely, accurately and properly comply with the requirement to submit an annual employment report for the contract to the agency that awarded the contract, the Department of Civil Service and the State Comptroller.

**24. PROCUREMENT LOBBYING.** To the extent this agreement is a "procurement contract" as defined by State Finance Law Sections 139-j and 139-k, by signing this agreement the contractor certifies and affirms that all disclosures made in accordance with State Finance Law

Sections 139-j and 139-k are complete, true and accurate. In the event such certification is found to be intentionally false or intentionally incomplete, the State may terminate the agreement by providing written notification to the Contractor in accordance with the terms of the agreement.

**25. CERTIFICATION OF REGISTRATION TO COLLECT SALES AND COMPENSATING USE TAX BY CERTAIN STATE CONTRACTORS, AFFILIATES AND SUBCONTRACTORS.**

To the extent this agreement is a contract as defined by Tax Law Section 5-a, if the contractor fails to make the certification required by Tax Law Section 5-a or if during the term of the contract, the Department of Taxation and Finance or the covered agency, as defined by Tax Law 5-a, discovers that the certification, made under penalty of perjury, is false, then such failure to file or false certification shall be a material breach of this contract and this contract may be terminated, by providing written notification to the Contractor in accordance with the terms of the agreement, if the covered agency determines that such action is in the best interest of the State.

**APPENDIX B**  
**GENERAL SPECIFICATIONS**

**PLEASE RETAIN THIS DOCUMENT FOR FUTURE REFERENCE**

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**GENERAL**

1. **APPLICABILITY** The terms and conditions set forth in this Appendix B are expressly incorporated in and applicable to the resulting procurement contracts let by the Office of General Services Procurement Services Group, or let by any other Authorized User where incorporated by reference in its Bid Documents. Captions are intended as descriptive and are not intended to limit or otherwise restrict the terms and conditions set forth herein.

2. **GOVERNING LAW** This procurement, the resulting contract and any purchase orders issued hereunder shall be governed by the laws of the State of New York except where the Federal supremacy clause requires otherwise, and actions or proceedings arising from the contract shall be heard in a court of competent jurisdiction in the State of New York.

3. **ETHICS COMPLIANCE** All Bidders/Contractors and their employees must comply with the requirements of Sections 73 and 74 of the Public Officers Law, other State codes, rules, regulations and executive orders establishing ethical standards for the conduct of business with New York State. In signing the Bid, Bidder certifies full compliance with those provisions for any present or future dealings, transactions, sales, contracts, services, offers, relationships, etc., involving New York State and/or its employees. Failure to comply with those provisions may result in disqualification from the Bidding process, termination of contract, and/or other civil or criminal proceedings as required by law.

4. **CONFLICT OF TERMS** Unless otherwise set forth in the procurement or contract documents, conflicts among documents shall be resolved in the following order of precedence:

- a. **Appendix A** (Standard Clauses for NYS Contracts)
- b. **Mini-Bid Project Definition** if applicable and in accordance with the terms and conditions of the Back-Drop Contract.
- c. **Contract and other writing(s)** setting forth the final agreements, clarifications and terms between the Bid Documents and Contractor's Bid. In the latter circumstance, clarifications must specifically note in writing what was offered by the Contractor and what was accepted by the State. If not, such clarifications shall be considered last in the order of precedence under this paragraph.
- d. **Bid Documents** (Other than Appendix A).
  - i. Bid Specifications prepared by the Authorized User.
  - ii. Appendix B (General Specifications).
  - iii. Incorporated Contract Appendices, if any, following the order of precedence as stated for Contract above.
- e. **Contractor's Bid or Mini-Bid Proposal.**
- f. **Unincorporated Appendices** (if any).

5. **DEFINITIONS** Terms used in this Appendix B shall have the following meanings:

**AFFILIATE** Any individual or other legal entity, (including but not limited to sole proprietor, partnership, limited liability company, firm or corporation) that effectively controls another company in which (a) the Bidder owns more than 50% of the ownership; or (b) any individual or other legal entity which owns more than 50% of the ownership of the Bidder. In addition, if a Bidder owns less than 50% of the ownership of another legal entity, but directs or has the right to direct such entity's daily operations, that entity will be an Affiliate.

**AGENCY OR AGENCIES** The State of New York, acting by or through one or more departments, boards, commissions, offices or institutions of the State of New York.

**ATTORNEY GENERAL** Attorney General of the State of New York.

**AUTHORIZED USER(S)** Agencies, or any other entity authorized by the laws of the State of New York to participate in NYS centralized contracts (including but not limited to political subdivisions, public authorities, public benefit corporations and certain other entities set forth in law), or the State of New York acting on behalf of one or more such Agencies or other entities, provided that each such Agency or other entity shall be held solely responsible for liabilities or payments due as a result of its participation.

**BID OR BID PROPOSAL** An offer or proposal submitted by a Bidder to furnish a described product or a solution, perform services or means of achieving a practical end, at a stated price for the stated Contract term. As required by the Bid Documents, the Bid or proposal may be subject to modification through the solicitation by the Agency of best and final offers during the evaluation process prior to recommendation for award of the Contract.

**BIDDER/OFFERER** Any individual or other legal entity (including but not limited to sole proprietor, partnership, limited liability company, firm or corporation) which submits a Bid in response to a Bid Solicitation. The term Bidder shall also include the term "offeror." In the case of negotiated Contracts, "Bidder" shall refer to the "Contractor."

**BID DOCUMENTS** Writings by the State setting forth the scope, terms, conditions and technical specifications for a procurement of Product. Such writings typically include, but are not limited to: Invitation for Bids (IFB), Request for Quotation (RFQ), Request for Proposals (RFP), addenda or amendments thereto, and terms and conditions which are incorporated by reference, including but not limited to, Appendix A (Standard Clauses for NYS Contracts), Appendix B, (General Specifications). Where these General Specifications are incorporated in negotiated Contracts that have not been competitively Bid, the term "Bid Documents" shall be deemed to refer to the terms and conditions set forth in the negotiated Contract and associated documentation.

**BID SPECIFICATION** A written description drafted by the Authorized User setting forth the specific terms of the intended procurement, which may include: physical or functional characteristics, the nature of a commodity or construction item, any description of the work to be performed, Products to be provided, the necessary qualifications of the Bidder, the capacity and capability of the Bidder to successfully carry out the proposed Contract, or the process for achieving specific results and/or anticipated outcomes or any other requirement necessary to perform work. Where these General Specifications are incorporated in negotiated Contracts that have not been competitively Bid, the term "Bid Specifications" shall be deemed to refer to the terms and conditions set forth in the negotiated Contract and associated documentation.

**COMMISSIONER** Commissioner of OGS, or in the case of Bid Specifications issued by an Authorized User, the head of such Authorized User or their authorized representative.

**COMPTROLLER** Comptroller of the State of New York.

**CONTRACT** The writing(s) which contain the agreement of the Commissioner and the Bidder/Contractor setting forth the total legal obligation between the parties as determined by applicable rules of law, and which most typically include the following classifications of public procurements:

**a. Agency Specific Contracts** Contracts where the specifications for a Product or a particular scope of work are described and defined to meet the needs of one or more Authorized User(s).

**b. Centralized Contracts** Single or multiple award Contracts where the specifications for a Product or general scope of work are described and defined by the Office of General Services to meet the needs of Authorized Users. Centralized Contracts may be awarded through multiple awards or through adoption of another jurisdiction's contract or on a sole source, single source, emergency or competitive basis. Once established, procurements may be made from the selected Contractor(s) without further competition or Mini-Bid unless otherwise required by the Bid Specifications or Contract Award Notification.

**c. Back-Drop Contracts** Multiple award Centralized Contracts where the Office of General Services defines the specifications for a Product or general scope of work to meet the needs of Authorized Users. Bids may be submitted either at a date and time certain or may be accepted on a continuous or periodic recruitment basis, as set forth in the Bid Specifications. Selection of a Contractor(s) from among Back-Drop contract holders for an actual Product, project or particular scope of work may subsequently be made on a single or sole source basis, or on the basis of a Mini-Bid among qualified Back-Drop contract holders, or such other method as set forth in the Bid Document.

**d. Piggyback Contract** A Contract let by any department, agency or instrumentality of the United States government, or any department, agency, office, political subdivision or instrumentality of any state or state(s) which is adopted and extended for use by the OGS Commissioner in accordance with the requirements of the State Finance Law.

**e. Contract Letter** A letter to the successful Bidder(s) indicating acceptance of its Bid in response to a solicitation. Unless otherwise specified, the issuance of a Letter of Acceptance forms a Contract but is not an order for Product, and Contractor should not take any action with respect to actual Contract deliveries except on the basis of Purchase Orders sent from Authorized User(s).

**CONTRACT AWARD NOTIFICATION** An announcement to Authorized Users that a Contract has been established.

**CONTRACTOR** Any successful Bidder(s) to whom a Contract has been awarded by the Commissioner.

**DOCUMENTATION** The complete set of manuals (e.g., user, installation, instruction or diagnostic manuals) in either hard or electronic copy, which are necessary to enable an Authorized User to properly test, install, operate and enjoy full use of the Product.

**EMERGENCY** An urgent and unexpected requirement where health and public safety or the conservation of public resources is at risk.

**ENTERPRISE** The total business operations in the United States of Authorized User (s) without regard to geographic location where such operations are performed or the entity actually performing such operations on behalf of Authorized User.

**ENTERPRISE LICENSE** A license grant of unlimited rights to deploy, access, use and execute Product anywhere within the Enterprise up to the maximum capacity stated on the Purchase Order or in the Contract.

**ERROR CORRECTIONS** Machine executable software code furnished by Contractor which corrects the Product so as to conform to the applicable warranties, performance standards and/or obligations of the Contractor.

**GROUP** A classification of Product, services or technology which is designated by OGS.

**INVITATION FOR BIDS (IFB)** A type of Bid Document which is most typically used where requirements can be stated and award will be made based on lowest price to the responsive and responsible Bidder(s).

**LICENSED SOFTWARE** Software transferred upon the terms and conditions set forth in the Contract. "Licensed Software" includes error corrections, upgrades, enhancements or new releases, and any deliverables due under a maintenance or service contract (e.g., patches, fixes, PTFs, programs, code or data conversion, or custom programming).

**LICENSEE** One or more Authorized Users who acquire Product from Contractor by issuing a Purchase Order in accordance with the terms and conditions of the Contract; provided that, for purposes of compliance with an individual license, the term "Licensee" shall be deemed to refer separately to the individual Authorized User(s) who took receipt of and who is executing the Product, and who shall be solely responsible for performance and liabilities incurred. In the case of acquisitions by State Agencies, the Licensee shall be the State of New York.

**LICENSE EFFECTIVE DATE** The date Product is delivered to an Authorized User. Where a License involves Licensee's right to copy a previously licensed and delivered Master Copy of a Program, the license effective date for additional copies shall be deemed to be the date on which the Purchase Order is executed.

**LICENSOR** A Contractor who transfers rights in proprietary Product to Authorized Users in accordance with the rights and obligations specified in the Contract.

**MINI-BID PROJECT DEFINITION** A Bid Document containing project specific Bid Specifications developed by or for an Authorized User which solicits Bids from Contractors previously qualified under a Back-Drop Contract.

**MULTIPLE AWARD** A determination and award of a Contract in the discretion of the Commissioner to more than one responsive and responsible Bidder who meets the requirements of a specification, where the multiple award is made on the grounds set forth in the Bid Document in order to satisfy multiple factors and needs of Authorized Users (e.g., complexity of items, various manufacturers, differences in performance required to accomplish or produce required end results, production and distribution facilities, price, compliance with delivery requirements, geographic location or other pertinent factors).

**NEW PRODUCT RELEASES (Product Revisions)** Any commercially released revisions to the licensed version of a Product as may be generally offered and available to Authorized Users. New releases involve a substantial revision of functionality from a previously released version of the Product.

**OGS** The New York State Office of General Services.

**PROCUREMENT RECORD** Documentation by the Authorized User of the decisions made and approach taken during the procurement process and during the contract term.

**PRODUCT** A deliverable under any Bid or Contract which may include commodities, services and/or technology. The term "Product" includes Licensed Software.

**PROPRIETARY** Protected by secrecy, patent, copyright or trademark against commercial competition.

**PURCHASE ORDER** The Authorized User's fiscal form or format that is used when making a purchase (e.g., formal written Purchase Order, Procurement Card, electronic Purchase Order, or other authorized instrument).

**REQUEST FOR PROPOSALS (RFP)** A type of Bid Document that is used for procurements where factors in addition to cost are considered and weighted in awarding the contract and where the method of award is "best value," as defined by the State Finance Law.

**REQUEST FOR QUOTATION (RFQ)** A type of Bid Document that can be used when a formal Bid opening is not required (e.g., discretionary, sole source, single source or emergency purchases).

**RESPONSIBLE BIDDER** A Bidder that is determined to have financial and organizational capacity, legal authority, satisfactory previous performance, skill, judgment and integrity, and that is found to be competent, reliable and experienced, as determined by the Commissioner. For purposes of being deemed responsible, a Bidder must also be determined to be in compliance with Sections 139-j and 139-k of the State Finance Law relative to restrictions on contacts during the procurement process and disclosure of contacts and prior findings of non-responsibility under these statutes.

**RESPONSIVE BIDDER** A Bidder meeting the specifications or requirements prescribed in the Bid Document or solicitation, as determined by the OGS Commissioner.

**SINGLE SOURCE** A procurement where two or more Bidders can supply the required Product, and the Commissioner may award the contract to one Bidder over the other.

**SITE** The location (street address) where Product will be executed or services delivered.

**SOLE SOURCE** A procurement where only one Bidder is capable of supplying the required Product.

**SOURCE CODE** The programming statements or instructions written and expressed in any language understandable by a human being skilled in the art which are translated by a language compiler to produce executable machine Object Code.

**STATE** State of New York.

**SUBCONTRACTOR** Any individual or other legal entity, (including but not limited to sole proprietor, partnership, limited liability company, firm or corporation) who has entered into a contract, express or implied, for the performance of a portion of a Contract with a Contractor.

**TERMS OF LICENSE** The terms and conditions set forth in the Contract that are in effect and applicable to a Purchase Order at the time of order placement.

**VIRUS** Any computer code, whether or not written or conceived by Contractor, that disrupts, disables, harms, or otherwise impedes in any manner the operation of the Product, or any other associated software,

firmware, hardware, or computer system (such as local area or wide-area networks), including aesthetic disruptions or distortions, but does not include security keys or other such devices installed by Product manufacturer.

## **BID SUBMISSION**

**6. INTERNATIONAL BIDDING** All offers (tenders), and all information and Product required by the solicitation or provided as explanation thereof, shall be submitted in English. All prices shall be expressed, and all payments shall be made, in United States Dollars (\$US). Any offers (tenders) submitted which do not meet the above criteria will be rejected.

**7. BID OPENING** Bids may, as applicable, be opened publicly. The Commissioner reserves the right at any time to postpone or cancel a scheduled Bid opening.

**8. BID SUBMISSION** All Bids are to be packaged, sealed and submitted to the location stated in the Bid Specifications. Bidders are solely responsible for timely delivery of their Bids to the location set forth in the Bid Specifications prior to the stated Bid opening date/time.

A Bid return envelope, if provided with the Bid Specifications, should be used with the Bid sealed inside. If the Bid response does not fit into the envelope, the Bid envelope should be attached to the outside of the sealed box or package with the Bid inside. If using a commercial delivery company that requires use of their shipping package or envelope, Bidder's sealed Bid, labeled as detailed below, should be placed within the shipper's sealed envelope to ensure that the Bid is not prematurely opened.

All Bids must have a label on the outside of the package or shipping container outlining the following information:

**"BID ENCLOSED** (bold print, all capitals)

- Group Number
- IFB or RFP Number
- Bid Submission date and time"

In the event that a Bidder fails to provide such information on the return Bid envelope or shipping material, the receiving entity reserves the right to open the shipping package or envelope to determine the proper Bid number or Product group, and the date and time of Bid opening. Bidder shall have no claim against the receiving entity arising from such opening and such opening shall not affect the validity of the Bid or the procurement.

Notwithstanding the receiving agency's right to open a Bid to ascertain the foregoing information, Bidder assumes all risk of late delivery associated with the Bid not being identified, packaged or labeled in accordance with the foregoing requirements.

All Bids must be signed by a person authorized to commit the Bidder to the terms of the Bid Documents and the content of the Bid (offer).

**9. FACSIMILE SUBMISSIONS** Unless specifically prohibited by the terms of the Bid Specifications, facsimile Bids may be SUBMITTED AT THE SOLE OPTION AND RISK OF THE BIDDER. Only the FAX number(s) indicated in the Bid Specifications may be used. Access to the facsimile machine(s) is on a "first come, first serve" basis, and the Commissioner bears no liability or responsibility and makes no guarantee whatsoever with respect to

the Bidder's access to such equipment at any specific time. Bidders are solely responsible for submission and receipt of the entire facsimile Bid by the Authorized User prior to Bid opening and must include on the first page of the transmission the total number of pages transmitted in the facsimile, including the cover page. Incomplete, ambiguous or unreadable transmissions in whole or in part may be rejected at the sole discretion of the Commissioner. Facsimile Bids are fully governed by all conditions outlined in the Bid Documents and must be submitted on forms or in the format required in the Bid Specifications, including the executed signature page and acknowledgment.

**10. AUTHENTICATION OF FACSIMILE BIDS** The act of submitting a Bid by facsimile transmission, including an executed signature page or as otherwise specified in the Bid Documents, shall be deemed a confirming act by Bidder which authenticates the signing of the Bid.

**11. LATE BIDS** For purposes of Bid openings held and conducted by OGS, a Bid must be received in such place as may be designated in the Bid Documents or if no place is specified in the OGS Mailroom located in the Empire State Plaza, Albany, New York 12242, at or before the date and time established in the Bid Specifications for the Bid opening. For purposes of Bid openings held and conducted by Authorized Users other than OGS, the term late Bid is defined as a Bid not received in the location established in the Bid Specifications at or before the date and time specified for the Bid opening.

Any Bid received at the specified location after the time specified will be considered a late Bid. A late Bid shall not be considered for award unless: (i) no timely Bids meeting the requirements of the Bid Documents are received or, (ii) in the case of a multiple award, an insufficient number of timely Bids were received to satisfy the multiple award; and acceptance of the late Bid is in the best interests of the Authorized Users. Bids submitted for continuous or periodic recruitment contract awards must meet the submission requirements associated with their specifications. Delays in United States mail deliveries or any other means of transmittal, including couriers or agents of the Authorized User shall not excuse late Bid submissions. Similar types of delays, including but not limited to, bad weather, or security procedures for parking and building admittance shall not excuse late Bid submissions. Determinations relative to Bid timeliness shall be at the sole discretion of the Commissioner.

**12. BID CONTENTS** Bids must be complete and legible. All Bids must be signed. All information required by the Bid Specifications must be supplied by the Bidder on the forms or in the format specified. No alteration, erasure or addition is to be made to the Bid Documents. Changes may be ignored by the Commissioner or may be grounds for rejection of the Bid. Changes, corrections and/or use of white-out in the Bid or Bidder's response portion of the Bid Document must be initialed by an authorized representative of the Bidder. Bidders are cautioned to verify their Bids before submission, as amendments to Bids or requests for withdrawal of Bids received by the Commissioner after the time specified for the Bid opening, may not be considered.

**13. EXTRANEOUS TERMS** Bids must conform to the terms set forth in the Bid Documents, as extraneous terms or material deviations (including additional, inconsistent, conflicting or alternative terms) may render the Bid non-responsive and may result in rejection of the Bid.

Extraneous term(s) submitted on standard, pre-printed forms (including but not limited to: product literature, order forms, license agreements, contracts or other documents) that are attached or referenced with submissions shall not be considered part of the Bid or

resulting Contract, but shall be deemed included for informational or promotional purposes only.

Only those extraneous terms that meet all the following requirements may be considered as having been submitted as part of the Bid:

- a. Each proposed extraneous term (addition, deletion, counter-offer, deviation, or modification) must be specifically enumerated in a writing which is not part of a pre-printed form; and
- b. The writing must identify the particular specification requirement (if any) that Bidder rejects or proposes to modify by inclusion of the extraneous term; and
- c. The Bidder shall enumerate the proposed addition, counter offer, modification or deviation from the Bid Document, and the reasons therefore.

No extraneous term(s), whether or not deemed "material," shall be incorporated into a Contract or Purchase Order unless submitted in accordance with the above and the Commissioner or Authorized User expressly accepts each such term(s) in writing. Acceptance and/or processing of the Bid shall not constitute such written acceptance of Extraneous Term(s).

#### **14. CONFIDENTIAL/TRADE SECRET MATERIALS**

**a. Contractor** Confidential, trade secret or proprietary materials as defined by the laws of the State of New York must be clearly marked and identified as such upon submission by the Bidder. Marking the Bid as "confidential" or "proprietary" on its face or in the document header or footer shall not be considered by the Commissioner or Authorized User to be sufficient without specific justification as to why disclosure of particular information in the Bid would cause substantial injury to the competitive position of the Bidder. Bidders/Contractors intending to seek an exemption from disclosure of these materials under the Freedom of Information Law must request the exemption in writing, setting forth the reasons for the claimed exemption. Acceptance of the claimed materials does not constitute a determination on the exemption request, which determination will be made in accordance with statutory procedures. Properly identified information that has been designated confidential, trade secret, or proprietary by the Bidder will not be disclosed except as may be required by the Freedom of Information Law or other applicable State and federal laws.

**b. Commissioner or Authorized User** Contractor further warrants, covenants and represents that any confidential information obtained by Contractor, its agents, Subcontractors, officers, distributors, resellers or employees in the course of performing its obligations, including without limitation, security procedures, business operations information, or commercial proprietary information in the possession of the State or any Authorized User hereunder or received from another third party, will not be divulged to any third parties. Contractor shall not be required to keep confidential any such material that is publicly available through no fault of Contractor, independently developed by Contractor without reliance on confidential information of the Authorized User, or otherwise obtained under the Freedom of Information Act or other applicable New York State laws and regulations. This warranty shall survive termination of this Contract. Contractor further agrees to take appropriate steps as to its agents, Subcontractors, officers, distributors, resellers or employees regarding the obligations arising under this clause to insure such confidentiality.

**15. RELEASE OF BID EVALUATION MATERIALS** Requests concerning the evaluation of Bids may be submitted under the Freedom of Information Law. Information, other than statistical or

factual tabulations or data such as the Bid Tabulation, shall only be released as required by law after Contract award. Bid Tabulations are not maintained for all procurements. Names of Bidders may be disclosed after Bid opening upon request. Written requests should be directed to the Commissioner.

**16. FREEDOM OF INFORMATION LAW** During the evaluation process, the content of each Bid will be held in confidence and details of any Bid will not be revealed (except as may be required under the Freedom of Information Law or other State law). The Freedom of Information Law provides for an exemption from disclosure for trade secrets or information the disclosure of which would cause injury to the competitive position of commercial enterprises. This exception would be effective both during and after the evaluation process. If the Bid contains any such trade secret or other confidential or proprietary information, it must be accompanied in the Bid with a written request to the Commissioner to not disclose such information. Such request must state with particularity the reasons why the information should not be available for disclosure and must be provided at the time of submission of the Bid. Notations in the header, footer or watermark of the Bid Document will not be considered sufficient to constitute a request for non-disclosure of trade secret or other confidential or proprietary information. Where a Freedom of Information request is made for trademark or other confidential or proprietary information, the Commissioner reserves the right to determine upon written notice to the Bidder whether such information qualifies for the exemption for disclosure under the law. Notwithstanding the above, where a Bid tabulation is prepared and Bids publicly opened, such Bid tabulation shall be available upon request.

**17. PREVAILING WAGE RATES - PUBLIC WORKS AND BUILDING SERVICES CONTRACTS** If any portion of work being Bid is subject to the prevailing wage rate provisions of the Labor Law, the following shall apply:

**a. “Public Works” and “Building Services” - Definitions**

**i. Public Works** Labor Law Article 8 applies to contracts for public improvement in which laborers, workers or mechanics are employed on a “public works” project (distinguished from public “procurement” or “service” contracts). The State, a public benefit corporation, a municipal corporation (including a school district), or a commission appointed by law must be a party to the Contract. The wage and hours provision applies to any work performed by Contractor or Subcontractors.

**ii. Building Services** Labor Law Article 9 applies to Contracts for building service work over \$1,500 with a public agency, that: (i) involve the care or maintenance of an existing building, or (ii) involve the transportation of office furniture or equipment to or from such building, or (iii) involve the transportation and delivery of fossil fuel to such building, and (iv) the principal purpose of which is to furnish services through use of building service employees.

**b. Prevailing Wage Rate Applicable to Bid Submissions** A copy of the applicable prevailing wage rates to be paid or provided are annexed to the Bid Documents. Bidders must submit Bids which are based upon the prevailing hourly wages, and supplements in cash or equivalent benefits (i.e., fringe benefits and any cash or non-cash compensation which are not wages, as defined by law) that equal or exceed the applicable prevailing wage rate(s) for the location where the work is to be performed. Bidders may not submit Bids based upon hourly wage rates and supplements below the applicable prevailing wage rates as established by the New York State Department of Labor. Bids that fail to comply with this requirement will be disqualified.

**c. Wage Rate Payments / Changes During Contract Term** The wages to be paid under any resulting Contract shall not be less than the prevailing rate of wages and supplements as set forth by law. It is required that the Contractor keep informed of all changes in the Prevailing Wage Rates during the Contract term that apply to the classes of individuals supplied by the Contractor on any projects resulting from this Contract, subject to the provisions of the Labor Law. Contractor is solely liable for and must pay such required prevailing wage adjustments during the Contract term as required by law.

**d. Public Posting & Certified Payroll Records** In compliance with Article 8, Section 220 of the New York State Labor Law:

**i. Posting** The Contractor must publicly post on the work site, in a prominent and accessible place, a legible schedule of the prevailing wage rates and supplements.

**ii. Payroll Records** Contractors and Subcontractors must keep original payrolls or transcripts subscribed and affirmed as true under the penalties of perjury as required by law. For public works contracts over \$25,000 where the Contractor maintains no regular place of business in New York State, such records must be kept at the work site. For building services contracts, such records must be kept at the work site while work is being performed.

**iii. Submission of Certified Payroll Transcripts for Public Works Contracts Only** Contractors and Subcontractors on public works projects must submit monthly payroll transcripts to the Authorized User that has prepared or directs the preparation of the plans and specifications for a public works project, as set forth in the Bid Specifications. For Mini-Bid solicitations, the payroll records must be submitted to the entity preparing the agency Mini-Bid project specification. For “agency specific” Bids, the payroll records should be submitted to the entity issuing the purchase order. For all other OGS Centralized Contracts, such records should be submitted to the individual agency issuing the purchase order(s) for the work. Upon mutual agreement of the Contractor and the Authorized User, the form of submission may be submitted in a specified disk format acceptable to the Department of Labor provided: 1) the Contractor/Subcontractor retains the original records; and, (2) an original signed letter by a duly authorized individual of the Contractor or Subcontractor attesting to the truth and accuracy of the records accompanies the disk. This provision does not apply to Article 9 of the Labor Law building services contracts.

**iv. Records Retention** Contractors and Subcontractors must preserve such certified transcripts for a period of three years from the date of completion of work on the awarded contract.

**Day’s Labor** Eight hours shall constitute a legal day’s work for all classes of employees in this state except those engaged in farm and domestic service unless otherwise provided by law.

No laborers, workmen or mechanics in the employ of the Contractor, Subcontractor or other person doing or contracting to do all or part of the work contemplated by the Contract shall be permitted or required to work more than eight hours in any one calendar day or more than five calendar days in any one week except in cases of extraordinary emergency including fire, flood or danger to life or property. “Extraordinary emergency” shall be deemed to include situations in which sufficient laborers, workers and mechanics cannot be employed to carry on public work expeditiously as a result of such restrictions upon the number of hours and days of labor and the immediate commencement or prosecution or completion without undue delay of the public work is necessary in the judgment of the NYS

Commissioner of Labor for the preservation of the Contract site or for the protection of the life and limb of the persons using the Contract site.

### 18. TAXES

a. Unless otherwise specified in the Bid Specifications or Contract, the quoted Bid price includes all taxes applicable to the transaction.

b. Purchases made by the State of New York and certain non-State Authorized Users are exempt from New York State and local sales taxes and, with certain exceptions, federal excise taxes. To satisfy the requirements of the New York State Sales tax exemption, either the Purchase Order issued by a State Agency or the invoice forwarded to authorize payment for such purchases will be sufficient evidence that the sale by the Contractor was made to the State, an exempt organization under Section 1116 (a) (1) of the Tax Law. Non-State Authorized Users must offer their own proof of exemption upon request. No person, firm or corporation is, however, exempt from paying the State Truck Mileage and Unemployment Insurance or Federal Social Security taxes, which remain the sole responsibility of the Bidder/Contractor.

c. Pursuant to Revised Tax Law 5-a, Contractor will be required to furnish sales tax certification on its behalf and for its affiliates, and subcontractors for Contracts with a value greater than \$100,000 in accordance with provisions of the law.

d. Purchases by Authorized Users other than the State of New York may be subject to certain taxes which were not included in the Bid price, and in those instances the tax should be computed based on the Contract price and added to the invoice submitted to such entity for payment.

19. EXPENSES PRIOR TO CONTRACT EXECUTION The Commissioner and any Authorized User(s) are not liable for any costs incurred by a Vendor, Bidder or Contractor in the preparation and production of a Bid, Mini-Bid or best and final offers or for any work performed prior to Contract execution.

20. ADVERTISING RESULTS The prior written approval of the Commissioner is required in order for results of the Bid to be used by the Contractor as part of any commercial advertising. The Contractor shall also obtain the prior written approval of the Commissioner relative to the Bid or Contract for press or other media releases.

### 21. PRODUCT REFERENCES

a. “Or Equal” In all Bid Specifications the words “or equal” are understood to apply where a copyrighted, brand name, trade name, catalog reference, or patented Product is referenced. References to such specific Product are intended as descriptive, not restrictive, unless otherwise stated. Comparable Product will be considered if proof of compatibility is provided, including appropriate catalog excerpts, descriptive literature, specifications and test data, etc. The Commissioner’s decision as to acceptance of the Product as equal shall be final.

b. Discrepancies in References In the event of a discrepancy between the model number referenced in the Bid Specifications and the written description of the Products which cannot be reconciled, with respect to such discrepancy, then the written description shall prevail.

22. REMANUFACTURED, RECYCLED, RECYCLABLE OR RECOVERED MATERIALS Upon the conditions specified in the Bid Specifications and in accordance with the laws of the State of New York, Contractors are encouraged to use recycled, recyclable or

recovered materials in the manufacture of Products and packaging to the maximum extent practicable without jeopardizing the performance or intended end use of the Product or packaging unless such use is precluded due to health, welfare, safety requirements or in the Bid Specifications. Contractors are further encouraged to offer remanufactured Products to the maximum extent practicable without jeopardizing the performance or intended end use of the Product and unless such use is precluded due to health, welfare, safety requirements or by the Bid Specifications. Where such use is not practical, suitable, or permitted by the Bid Specifications, Contractor shall deliver new materials in accordance with the “Warranties” set forth below.

Items with recycled, recyclable, recovered, refurbished or remanufactured content must be identified in the Bid or Bidder will be deemed to be offering new Product.

23. PRODUCTS MANUFACTURED IN PUBLIC INSTITUTIONS Bids offering Products that are manufactured or produced in public institutions will be rejected.

### 24. PRICING

a. Unit Pricing If required by the Bid Specifications, the Bidder should insert the price per unit specified and the price extensions in decimals, not to exceed four places for each item unless otherwise specified, in the Bid. In the event of a discrepancy between the unit price and the extension, the unit price shall govern unless, in the sole judgment of the Commissioner, such unit pricing is obviously erroneous.

b. Net Pricing Unless otherwise required by the Bid Specifications, prices shall be net, including transportation, customs, tariff, delivery and other charges fully prepaid by the Contractor to the destination(s) indicated in the Bid Specifications, subject to the cash discount.

c. “No Charge” Bid When Bids are requested on a number of Products as a Group or Lot, a Bidder desiring to Bid “no charge” on a Product in the Group or Lot must clearly indicate such. Otherwise, such Bid may be considered incomplete and be rejected, in whole or in part, at the discretion of the Commissioner.

d. Educational Pricing All Products to be supplied for educational purposes that are subject to educational discounts shall be identified in the Bid and such discounts shall be made available to qualifying institutions.

e. Third Party Financing If Product acquisitions are financed through any third party financing, Contractor may be required as a condition of Contract Award to agree to the terms and conditions of a “Consent & Acknowledgment Agreement” in a form acceptable to the Commissioner.

f. Best Pricing Offer During the Contract term, if substantially the same or a smaller quantity of a Product is sold by the Contractor outside of this Contract upon the same or similar terms and conditions as that of this Contract at a lower price to a federal, state or local governmental entity, the price under this Contract, at the discretion of the Commissioner, shall be immediately reduced to the lower price.

Price decreases shall take effect automatically during the Contract term and apply to Purchase Orders submitted on or after:

(i) GSA Changes: Where NYS Net Prices are based on an approved GSA Schedule, the date the approved GSA Schedule pricing decreases during the Contract term; or

(ii) Commercial Price List Reductions: Where NYS Net Prices are based on a discount from Contractor’s list prices, the date Contractor

lowers its pricing to its customers generally or to similarly situated government customers during the Contract term; or

**(iii) Special Offers/Promotions Generally:** Where Contractor generally offers more advantageous special price promotions or special discount pricing to other customers during the Contract term for a similar quantity, and the maximum price or discount associated with such offer or promotion is better than the discount or Net Price otherwise available under this Contract, such better price or discount shall apply for similar quantity transactions under this Contract for the life of such general offer or promotion; and

**(iv) Special Offers/Promotions to Authorized Users:** Contractor may offer Authorized Users, under either this Contract or any other Contracting vehicle, competitive pricing which is lower than the NYS Net Price set forth herein at any time during the Contract term and such lower pricing shall not be applied as a global price reduction under the Contract pursuant to the foregoing paragraph (iii).

Unless otherwise specified in the Bid Specifications, Contractor may offer lower prices or better terms (see Modification of Contract Terms) on any specific Purchase Order(s) from any Authorized User without being in conflict with, or obligation to comply on a global basis, with the terms of this clause.

**g. Best and Final Prices** As specified in the Bid Documents and Contract, a Contractor may be solicited at the time of issuance of a Purchase Order or Mini-Bid award for best and final pricing for the Product or service to be delivered to the Authorized User. Contractors are encouraged to reduce their pricing upon receipt of such request.

## **25. DRAWINGS**

**a. Drawings Submitted With Bid** When the Bid Specifications require the Bidder to furnish drawings and/or plans, such drawings and/or plans shall conform to the mandates of the Bid Documents and shall, when approved by the Commissioner, be considered a part of the Bid and of any resulting Contract. All symbols and other representations appearing on the drawings shall be considered a part of the drawing.

**b. Drawings Submitted During the Contract Term** Where required to develop, maintain and deliver diagrams or other technical schematics regarding the scope of work, Contractor shall do so on an ongoing basis at no additional charge, and must, as a condition of payment, update drawings and plans during the Contract term to reflect additions, alterations, and deletions. Such drawings and diagrams shall be delivered to the Authorized User's representative.

**c. Accuracy of Drawings Submitted** All drawings shall be neat and professional in manner and shall be clearly labeled as to locations and type of product, connections and components. Drawings and diagrams are to be in compliance with accepted drafting standards. Acceptance or approval of such plans shall not relieve the Contractor from responsibility for design or other errors of any sort in the drawings or plans, or from its responsibility for performing as required, furnishing product, services or installation, or carrying out any other requirements of the intended scope of work.

**26. SITE INSPECTION** Where a site inspection is required by the Bid Specifications or Project Definition, Bidder shall be required to inspect the site, including environmental or other conditions for pre-existing deficiencies that may affect the installed Product, equipment, or environment or services to be provided and, which may affect Bidder's ability to properly deliver, install or otherwise provide the required Product. All inquiries regarding such conditions shall be made in writing. Bidder shall be deemed to have knowledge of any deficiencies or conditions which such inspection or inquiry might have disclosed. Bidder must provide a detailed explanation with its Bid if

additional work is required under this clause in order to properly complete the delivery and installation of the required Product or provide the requested service.

**27. PROCUREMENT CARD** The State has entered into an agreement for purchasing card services. The Purchasing Card enables Authorized Users to make authorized purchases directly from a Contractor without processing a Purchase Order or Purchase Authorizations. Purchasing Cards are issued to selected employees authorized to purchase for the Authorized User and having direct contact with Contractors. Cardholders can make purchases directly from any Contractor that accepts the Purchasing Card.

The Contractor shall not process a transaction for payment through the credit card clearinghouse until the purchased products have been shipped or services performed. Unless the cardholder requests correction or replacement of a defective or faulty Product in accordance with other Contract requirements, the Contractor shall immediately credit a cardholder's account for products returned as defective or faulty.

## **28. SAMPLES**

**a. Standard Samples** Bid Specifications may indicate that the Product to be purchased must be equal to a standard sample on display in a place designated by the Commissioner and such sample will be made available to the Bidder for examination prior to the opening date. Failure by the Bidder to examine such sample shall not entitle the Bidder to any relief from the conditions imposed by the Bid Specifications.

**b. Bidder Supplied Samples** The Commissioner reserves the right to request from the Bidder/Contractor a representative sample(s) of the Product offered at any time prior to or after award of a contract. Unless otherwise instructed, samples shall be furnished within the time specified in the request. Untimely submission of a sample may constitute grounds for rejection of Bid or cancellation of the Contract. Samples must be submitted free of charge and be accompanied by the Bidder's name and address, any descriptive literature relating to the Product and a statement indicating how and where the sample is to be returned. Where applicable, samples must be properly labeled with the appropriate Bid or Contract reference.

A sample may be held by the Commissioner during the entire term of the Contract and for a reasonable period thereafter for comparison with deliveries. At the conclusion of the holding period the sample, where feasible, will be returned as instructed by the Bidder, at the Bidder's expense and risk. Where the Bidder has failed to fully instruct the Commissioner as to the return of the sample (i.e., mode and place of return, etc.) or refuses to bear the cost of its return, the sample shall become the sole property of the receiving entity at the conclusion of the holding period.

**c. Enhanced Samples** When an approved sample exceeds the minimum specifications, all Product delivered must be of the same enhanced quality and identity as the sample. Thereafter, in the event of a Contractor's default, the Commissioner may procure a Product substantially equal to the enhanced sample from other sources, charging the Contractor for any additional costs incurred.

**d. Conformance with Sample(s)** Submission of a sample (whether or not such sample is tested by, or for, the Commissioner) and approval thereof shall not relieve the Contractor from full compliance with all terms and conditions, performance related and otherwise, specified in the Bid Specifications. If in the judgment of the Commissioner the sample or product submitted is not in accordance with the specifications or testing requirements prescribed in the Bid

Specifications, the Commissioner may reject the Bid. If an award has been made, the Commissioner may cancel the Contract at the expense of the Contractor.

**e. Testing** All samples are subject to tests in the manner and place designated by the Commissioner, either prior to or after Contract award. Unless otherwise stated in the Bid Specifications, Bidder samples consumed or rendered useless by testing will not be returned to the Bidder. Testing costs for samples that fails to meet Contract requirements may be at the expense of the Contractor.

**f. Requests For Samples By Authorized Users** Requests for samples by Authorized Users require the consent of the Contractor. Where Contractor refuses to furnish a sample, Authorized User may, in its sole discretion, make a determination on the performance capability of the Product or on the issue in question.

### **BID EVALUATION**

**29. BID EVALUATION** The Commissioner reserves the right to accept or reject any and all Bids, or separable portions of offers, and waive technicalities, irregularities, and omissions if the Commissioner determines the best interests of the State will be served. The Commissioner, in his/her sole discretion, may accept or reject illegible, incomplete or vague Bids and his/her decision shall be final. A conditional or revocable Bid which clearly communicates the terms or limitations of acceptance may be considered, and Contract award may be made in compliance with the Bidder's conditional or revocable terms in the offer.

**30. CONDITIONAL BID** Unless the Bid Specifications provides otherwise, a Bid is not rendered non-responsive if the Bidder specifies that the award will be accepted only on all or a specified group of items or Product included in the specification. It is understood that nothing herein shall be deemed to change or alter the method of award contained in the Bid Documents.

**31. CLARIFICATIONS / REVISIONS** Prior to award, the Commissioner reserves the right to seek clarifications, request Bid revisions, or to request any information deemed necessary for proper evaluation of Bids from all Bidders deemed to be eligible for Contract award. Failure to provide requested information may result in rejection of the Bid.

**32. PROMPT PAYMENT DISCOUNTS** While prompt payment discounts will not be considered in determining the low Bid, the Commissioner may consider any prompt payment discount in resolving Bids which are otherwise tied. However, any notation indicating that the price is net, (e.g., net 30 days), shall be understood to mean only that no prompt payment discount is offered by the Bidder. The imposition of service, interest, or other charges, except pursuant to the provisions of Article 11-A of the State Finance Law, which are applicable in any case, may render the Bid non-responsive and may be cause for its rejection.

**33. EQUIVALENT OR IDENTICAL BIDS** In the event two offers are found to be substantially equivalent, price shall be the basis for determining the award recipient. If two or more Bidders submit substantially equivalent Bids as to pricing or other factors, the decision of the Commissioner to award a Contract to one or more of such Bidders shall be final.

**34. PERFORMANCE AND RESPONSIBILITY QUALIFICATIONS** The Commissioner reserves the right to investigate or inspect at any time whether or not the Product, services,

qualifications or facilities offered by the Bidder/Contractor meet the requirements set forth in the Bid Specifications/Contract or as set forth during Contract negotiations. Contractor shall at all times during the Contract term remain responsible and responsive. A Bidder/Contractor must be prepared, if requested by the Commissioner, to present evidence of legal authority to do business in New York State, integrity, experience, ability, prior performance, organizational and financial capacity as well as where applicable, a statement as to supply, plant, machinery and capacity of the manufacturer or source for the production, distribution and servicing of the Product offered/Bid. If the Commissioner determines that the conditions and terms of the Bid Documents, Bid Specifications or Contract are not complied with, or that items, services or Product proposed to be furnished do not meet the specified requirements, or that the legal authority, integrity experience, ability, prior performance, organization and financial capacity or facilities are not satisfactory, the Commissioner may reject such Bid or terminate the Contract.

**35. DISQUALIFICATION FOR PAST PERFORMANCE AND FINDINGS OF NON-RESPONSIBILITY** Bidder may be disqualified from receiving awards if Bidder, or anyone in Bidder's employment, has previously failed to perform satisfactorily in connection with public Bidding or contracts or is deemed non-responsive.

**36. QUANTITY CHANGES PRIOR TO AWARD** The Commissioner reserves the right, at any time prior to the award of a specific quantity Contract, to alter in good faith the quantities listed in the Bid Specifications. In the event such right is exercised, the lowest responsible Bidder meeting Bid Specifications will be advised of the revised quantities and afforded an opportunity to extend or reduce its Bid price in relation to the changed quantities. Refusal by the low Bidder to so extend or reduce its Bid price may result in the rejection of its Bid and the award of such Contract to the lowest responsible Bidder who accepts the revised qualifications.

**37. TIMEFRAME FOR OFFERS** The Commissioner reserves the right to make awards within sixty (60) days after the date of the Bid opening or such other period of time as set forth in the Bid Documents, during which period, Bids must remain firm and cannot be withdrawn. Pursuant to Section 163(9)(e) of the State Finance Law and Section 2-205 of the Uniform Commercial Code when applicable, where an award is not made within the sixty (60) day period or other time specified as set forth in the Bid Documents, the Bids shall remain firm until such later time as either a Contract is awarded or the Bidder delivers to the Commissioner written notice of the withdrawal of its Bid. Any Bid which expressly states therein that acceptance must be made within a shorter specified time, may at the sole discretion of the Commissioner, be accepted or rejected.

### **TERMS & CONDITIONS**

**38. CONTRACT CREATION / EXECUTION** Except for contracts governed by Article 11-B of the State Finance Law, subject to and upon receipt of all required approvals as set forth in the Bid Specifications a Contract shall be deemed executed and created with the successful Bidder(s), upon the Commissioner's mailing or electronic communication to the address on the Bid/Contract of: (i) the final Contract Award Notice; (ii) a fully executed Contract; or (iii) a Purchase Order authorized by the Commissioner.

**39. PARTICIPATION IN CENTRALIZED CONTRACTS** The following shall not limit or inhibit the OGS Commissioner's authority under State Finance Law, Section 163 (10) (e) (Piggybacking):



**a. Agencies** All State Agencies may utilize and purchase under any state Centralized Contract let by the Commissioner, unless the Bid Documents limit purchases to specific State Agencies.

**b. Non-State Agency Authorized Users** Authorized Users other than State Agencies are permitted to make purchases through state Centralized Contracts where permitted by law, the Contract or the Commissioner.

**c. Voluntary Extension** Purchase Orders issued against a State Centralized Contract by any Authorized User not provided for in the Bid Specifications shall be honored by the Contractor at its discretion and only with the approval of the OGS Commissioner and any other approvals required by law. Contractors are encouraged to voluntarily extend service Contracts to those additional entities authorized to utilize commodity Contracts under Section 163 (3) (iv) of the State Finance Law.

**d. Responsibility for Performance** Participation in state Centralized Contracts by Authorized Users is permitted upon the following conditions: (i) the responsibility with regard to performance of any contractual obligation, covenant, condition or term thereunder by any Authorized User other than State Agencies shall be borne and is expressly assumed by such Authorized User and not by the State; (ii) a breach of the Contract by any particular Authorized User shall neither constitute nor be deemed a breach of the Contract as a whole which shall remain in full force and effect, and shall not affect the validity of the Contract nor the obligations of the Contractor thereunder respecting non-breaching Authorized Users, whether State or otherwise; (iii) for a breach by an Authorized User other than a State Agency, the State specifically and expressly disclaims any and all liability for such breach; and (iv) each non-state agency Authorized User and Contractor guarantees to save the State, its officers, agents and employees harmless from any liability that may be or is imposed by their failure to perform in accordance with its obligations under the Contract.

**e. Contract Migration** Authorized Users holding individual Contracts with a Contractor at the time that Contractor is awarded a Centralized Contract for the same Products or services shall be permitted to migrate to that Centralized Contract effective with its commencement date. Such migration shall not operate to diminish, alter or eliminate any right that the Authorized User otherwise had under the terms and conditions of their individual Contract.

**40. MODIFICATION OF CONTRACT TERMS** The terms and conditions set forth in the Contract shall govern all transactions by Authorized User(s) under this Contract. The Contract may only be modified or amended upon mutual written agreement of the Commissioner and Contractor.

The Contractor may, however, offer Authorized User(s) more advantageous pricing, payment, or other terms and conditions than those set forth in the Contract. In such event, a copy of such terms shall be furnished to the Authorized User(s) and Commissioner by the Contractor at the time of such offer.

Other than where such terms are more advantageous for the Authorized User(s) than those set forth in the Contract, no alteration or modification of the terms of the Contract, including substitution of Product, shall be valid or binding against Authorized User(s) unless authorized by the Commissioner or specified in the Contract Award Notification. No such alteration or modification shall be made by unilaterally affixing such terms to Product upon delivery (including, but not limited to, attachment or inclusion of standard pre-printed

order forms, product literature, "shrink wrap" terms accompanying software upon delivery, or other documents) or by incorporating such terms onto order forms, purchase orders or other documents forwarded by the Contractor for payment, notwithstanding Authorized User's subsequent acceptance of Product, or that Authorized User has subsequently processed such document for approval or payment.

**41. SCOPE CHANGES** The Commissioner reserves the right, unilaterally, to require, by written order, changes by altering, adding to or deducting from the Bid Specifications, such changes to be within the general scope of the Contract. The Commissioner may make an equitable adjustment in the Contract price or delivery date if the change affects the cost or time of performance. Such equitable adjustments require the consent of the Contractor, which consent shall not be unreasonably withheld.

**42. ESTIMATED / SPECIFIC QUANTITY CONTRACTS** Estimated quantity contracts are expressly agreed and understood to be made for only the quantities, if any, actually ordered during the Contract term. No guarantee of any quantity(s) is implied or given. Purchases by Authorized Users from Contracts for services and technology are voluntary.

With respect to any specific quantity stated in the contract, the Commissioner reserves the right after award to order up to 20% more or less (rounded to the next highest whole number) than the specific quantities called for in the Contract. Notwithstanding the foregoing, the Commissioner may purchase greater or lesser percentages of Contract quantities should the Commissioner and Contractor so agree. Such agreement may include an equitable price adjustment.

**43. EMERGENCY CONTRACTS** In the event that a disaster emergency is declared by Executive Order under Section 28 of Article 2-B of the Executive Law, or the Commissioner determines pursuant to his/her authority under Section 163 (10) (b) of the State Finance Law that an emergency exists requiring the prompt and immediate delivery of Product, the Commissioner reserves the right to obtain such Product from any source, including but not limited to this Contract(s), as the Commissioner in his/her sole discretion determines will meet the needs of such emergency. Contractor shall not be entitled to any claim or lost profits for Product procured from other sources pursuant to this paragraph. The reasons underlying the finding that an emergency exists shall be included in the procurement record.

**44. PURCHASE ORDERS** Unless otherwise authorized in writing by the Commissioner, no Product is to be delivered or furnished by Contractor until transmittal of an official Purchase Order from the Authorized User. Unless terminated or cancelled pursuant to the authority vested in the Commissioner, Purchase Orders shall be effective and binding upon the Contractor when placed in the mail or electronically transmitted prior to the termination of the contract period, addressed to the Contractor at the address for receipt of orders set forth in the Contract or in the Contract Award Notification.

All Purchase Orders issued pursuant to Contracts let by the Commissioner must bear the appropriate Contract number and, if necessary, required State approvals. As deemed necessary, the Authorized User may confirm pricing and other Product information with the Contractor prior to placement of the Purchase Order. The State reserves the right to require any other information from the Contractor which the State deems necessary in order to complete any Purchase Order placed under the Contract. Unless otherwise specified, all Purchase Orders against Centralized Contracts will be placed by Authorized Users directly with the Contractor and any discrepancy between the terms stated on the vendor's order form, confirmation or acknowledgment, and the Contract terms shall be resolved in favor of

the terms most favorable to the Authorized User. Should an Authorized User add written terms and conditions to the Purchase Order that conflict with the terms and conditions of the Contract, the Contractor has the option of rejecting the Purchase Order within five business days of its receipt but shall first attempt to negotiate the additional written terms and conditions in good faith with the Authorized User, or fulfill the Purchase Order. Notwithstanding the above, the Authorized User reserves the right to dispute any discrepancies arising from the presentation of additional terms and conditions with the Contractor.

If, with respect to an Agency Specific Contract let by the OGS Commissioner, a Purchase Order is not received by the Contractor within two weeks after the issuance of a Contract Award Notification, it is the responsibility of the Contractor to request in writing that the appropriate Authorized User forward a Purchase Order. If, thereafter, a Purchase Order is not received within a reasonable period of time, the Contractor shall promptly notify in writing the appropriate purchasing officer in OGS. Failure to timely notify such officer may, in the discretion of the OGS Commissioner and without cost to the State, result in the cancellation of such requirement by the OGS Commissioner with a corresponding reduction in the Contract quantity and price.

**45. PRODUCT DELIVERY** Delivery must be made as ordered to the address specified on the Purchase Order and in accordance with the terms of the Contract or Contract Award Notice. Unless otherwise specified in the Bid Documents, delivery shall be made within thirty calendar days after receipt of a Purchase Order by the Contractor. The decision of the Commissioner as to compliance with delivery terms shall be final. The burden of proof for delay in receipt of Purchase Order shall rest with the Contractor. In all instances of a potential or actual delay in delivery, the Contractor shall immediately notify the Commissioner and the Authorized User, and confirm in writing the explanation of the delay, and take appropriate action to avoid any subsequent late deliveries. Any extension of time for delivery must be requested in writing by the Contractor and approved in writing by the Authorized User. Failure to meet such delivery time schedule may be grounds for cancellation of the order or, in the Commissioner's discretion, the Contract.

**46. WEEKEND AND HOLIDAY DELIVERIES** Unless otherwise specified in the Bid Specifications or by an Authorized User, deliveries will be scheduled for ordinary business hours, Monday through Friday (excluding legal holidays observed by the State of New York). Deliveries may be scheduled by mutual agreement for Saturdays, Sundays or legal holidays observed by the State of New York where the Product is for daily consumption, an emergency exists, the delivery is a replacement, delivery is late, or other reasonable circumstance in which event the convenience of the Authorized User shall govern.

**47. SHIPPING/RECEIPT OF PRODUCT**

**a. Packaging** Tangible Product shall be securely and properly packed for shipment, storage and stocking in appropriate, clearly labeled shipping containers and according to accepted commercial practice, without any extra charges for packing materials, cases or other types of containers. The container shall become and remain the property of the Authorized User unless otherwise specified in the Contract documents.

**b. Shipping Charges** Unless otherwise stated in the Bid Specifications, all deliveries shall be deemed to be freight on board (F.O.B.) destination tailgate delivery at the dock of the Authorized User. Unless otherwise agreed, items purchased at a price F.O.B. Shipping point plus transportation charges shall not relieve the

Contractor from responsibility for safe and proper delivery notwithstanding the Authorized User's payment of transportation charges. Contractor shall be responsible for ensuring that the Bill of Lading states "charges prepaid" for all shipments.

**c. Receipt of Product** The Contractor shall be solely responsible for assuring that deliveries are made to personnel authorized to accept delivery on behalf of the Authorized User. Any losses resulting from the Contractor's failure to deliver Product to authorized personnel shall be borne exclusively by the Contractor.

**48. TITLE AND RISK OF LOSS** Notwithstanding the form of shipment, title or other property interest, risk of loss shall not pass from the Contractor to the Authorized User until the Products have been received, inspected and accepted by the receiving entity. Acceptance shall occur within a reasonable time or in accordance with such other defined acceptance period as may be specified in the Bid Specifications or Purchase Order. Mere acknowledgment by Authorized User personnel of the delivery or receipt of goods (e.g., signed bill of lading) shall not be deemed or construed as acceptance of the Products received. Any delivery of Product that is substandard or does not comply with the Bid Specifications or Contract terms and conditions, may be rejected or accepted on an adjusted price basis, as determined by the Commissioner.

**49. RE-WEIGHING PRODUCT** Deliveries are subject to re-weighing at the point of destination by the Authorized User. If shrinkage occurs which exceeds that normally allowable in the trade, the Authorized User shall have the option to require delivery of the difference in quantity or to reduce the payment accordingly. Such option shall be exercised in writing by the Authorized User.

**50. PRODUCT SUBSTITUTION** In the event a specified manufacturer's Product listed in the Contract becomes unavailable or cannot be supplied by the Contractor for any reason (except as provided for in the Savings/Force Majeure Clause) a Product deemed in writing by the Commissioner to be equal to or better than the specified Product must be substituted by the Contractor at no additional cost or expense to the Authorized User. Unless otherwise specified, any substitution of Product prior to the Commissioner's written approval may be cause for cancellation of Contract.

**51. REJECTED PRODUCT** When Product is rejected, it must be removed by the Contractor from the premises of the Authorized User within ten calendar days of notification of rejection by the Authorized User. Upon notification of rejection, risk of loss of rejected or non-conforming Product shall remain with Contractor. Rejected items not removed by the Contractor within ten calendar days of notification shall be regarded as abandoned by the Contractor, and the Authorized User shall have the right to dispose of Product as its own property. The Contractor shall promptly reimburse the Authorized User for any and all costs and expenses incurred in storage or effecting removal or disposition after the ten-calendar day period.

**52. INSTALLATION** Where installation is required, Contractor shall be responsible for placing and installing the Product in the required locations. All materials used in the installation shall be of good quality and shall be free from any and all defects that would mar the appearance of the Product or render it structurally unsound. Installation includes the furnishing of any equipment, rigging and materials required to install or place the Product in the proper location. The Contractor shall protect the site from damage for all its work and shall repair damages or injury of any kind caused by the Contractor, its employees, officers or agents. If any alteration, dismantling or excavation, etc. is required to effect installation, the Contractor shall thereafter promptly restore the structure or site. Work shall be

performed to cause the least inconvenience to the Authorized User(s) and with proper consideration for the rights of other Contractors or workers. The Contractor shall promptly perform its work and shall coordinate its activities with those of other Contractors. The Contractor shall clean up and remove all debris and rubbish from its work as required or directed. Upon completion of the work, the building and surrounding area of work shall be left clean and in a neat, unobstructed condition, and everything in satisfactory repair and order.

**53. REPAIRED OR REPLACED PARTS / COMPONENTS**

Where the Contractor is required to repair, replace or substitute Product or parts or components of the Product under the Contract, the repaired, replaced or substituted Products shall be subject to all terms and conditions for new parts and components set forth in the Contract including Warranties, as set forth in the Additional Warranties Clause herein. Replaced or repaired Product or parts and components of such Product shall be new and shall, if available, be replaced by the original manufacturer's component or part. Remanufactured parts or components meeting new Product standards may be permitted by the Commissioner or Authorized User. Before installation, all proposed substitutes for the original manufacturer's installed parts or components must be approved by the Authorized User. The part or component shall be equal to or of better quality than the original part or component being replaced.

**54. ON-SITE STORAGE** With the written approval of the Authorized User, materials, equipment or supplies may be stored at the Authorized User's site at the Contractor's sole risk.

**55. EMPLOYEES, SUBCONTRACTORS & AGENTS** All employees, Subcontractors or agents performing work under the Contract must be trained staff or technicians who meet or exceed the professional, technical and training qualifications set forth in the Bid Specifications or the Bid Documents, whichever is more restrictive, and must comply with all security and administrative requirements of the Authorized User. The Commissioner reserves the right to conduct a security background check or otherwise approve any employee, Subcontractor or agent furnished by Contractor and to refuse access to or require replacement of any personnel for cause based on, including but not limited to, professional, technical or training qualifications, quality of work or change in security status or non-compliance with Authorized User's security or other requirements. Such approval shall not relieve the Contractor of the obligation to perform all work in compliance with the Contract terms. The Commissioner reserves the right to reject and/or bar from the facility for cause any employee, Subcontractor, or agents of the Contractor.

**56. ASSIGNMENT** The Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of the contract or its right, title or interest therein, or its power to execute such contract to any other person, company, firm or corporation in performance of the contract without the prior written consent of the Commissioner or Authorized User (as applicable). Failure to obtain consent to assignment from the Authorized User shall revoke and annul such Contract. Notwithstanding the foregoing, the State shall not hinder, prevent or affect assignment of money by a Contractor for the benefit of its creditors. Prior to a consent to assignment of monies becoming effective, the Contractor shall file a written notice of such monies assignment(s) with the Comptroller. Prior to a consent to assignment of a Contract, or portion thereof, becoming effective, the Contractor shall submit the request to assignment to the Commissioner and seek written agreement from the Commissioner which will be filed with the Comptroller. The Commissioner reserves the right to reject any proposed assignee in his/her discretion.

Upon notice to the Contractor, the Contract may be assigned without the consent of the Contractor to another State Agency or subdivision of the State pursuant to a governmental reorganization or assignment

of functions under which the functions are transferred to a successor Agency or to another Agency that assumes OGS responsibilities for the Contract.

**57. SUBCONTRACTORS AND SUPPLIERS** The Commissioner reserves the right to reject any proposed Subcontractor or supplier for bona fide business reasons, which may include, but are not limited to: they are on the Department of Labor's list of companies with which New York State cannot do business; the Commissioner determines that the company is not qualified; the Commissioner determines that the company is not responsible; the company has previously provided unsatisfactory work or services; the company failed to solicit minority and women's business enterprises (M/WBE) Bidders as required by prior Contracts.

**58. PERFORMANCE / BID BOND** The Commissioner reserves the right to require a Bidder or Contractor to furnish without additional cost, a performance, payment or Bid bond or negotiable irrevocable letter of credit or other form of security for the faithful performance of the Contract. Where required, such bond or other security shall be in the form prescribed by the Commissioner.

**59. SUSPENSION OF WORK** The Commissioner, in his/her sole discretion, reserves the right to suspend any or all activities under this Contract, at any time, in the best interests of the Authorized User. In the event of such suspension, the Contractor will be given a formal written notice outlining the particulars of such suspension. Examples of the reason for such suspension include, but are not limited to, a budget freeze or reduction on State spending, declaration of emergency, contract compliance issues or other such circumstances. Upon issuance of such notice, the Contractor is not to accept any Purchase Orders, and shall comply with the suspension order. Activity may resume at such time as the Commissioner issues a formal written notice authorizing a resumption of performance under the Contract.

An Authorized User may issue a formal written notice for the suspension of work for which it has engaged the Contractor for reasons specified in the above paragraph. The written notice shall set forth the reason for such suspension and a copy of the written notice shall be provided to the Commissioner.

**60. TERMINATION**

**a. For Cause:** For a material breach that remains uncured for more than thirty (30) days or other specified period after written notice to the Contractor, the Contract or Purchase Order may be terminated by the Commissioner or Authorized User at the Contractor's expense where Contractor becomes unable or incapable of performing, or meeting any requirements or qualifications set forth in the Contract, or for non-performance, or upon a determination that Contractor is non-responsible. Such termination shall be upon written notice to the Contractor. In such event, the Commissioner or Authorized User may complete the contractual requirements in any manner it may deem advisable and pursue available legal or equitable remedies for breach.

**b. For Convenience:** By written notice, this Contract may be terminated at any time by the State for convenience upon sixty (60) days written notice or other specified period without penalty or other early termination charges due. Such termination of the Contract shall not affect any project or Purchase Order that has been issued under the Contract prior to the date of such termination. If the Contract is terminated pursuant to this subdivision, the Authorized User shall remain liable for all accrued but unpaid charges incurred through the date of the termination. Contractor shall use due diligence and provide any outstanding deliverables.

**c. For Violation of the Sections 139-j and 139-k of the State Finance Law:** The Commissioner reserves the right to terminate the Contract in the event it is found that the certification filed by the Bidder in accordance with Section 139-k of the State Finance Law was intentionally false or intentionally incomplete. Upon such finding, the Commissioner may exercise its termination right by providing written notification to the Contractor in accordance with the written notification terms of the Contract.

**d. For Violation of Revised Tax Law 5a:** The Commissioner reserves the right to terminate the contract in the event it is found that the certification filed by the Contractor in accordance with §5-a of the Tax Law is not timely filed during the term of the Contract or the certification furnished was intentionally false or intentionally incomplete. Upon such finding, the Commissioner may exercise its termination right by providing written notification to the Contractor.

**61. SAVINGS/FORCE MAJEURE** A force majeure occurrence is an event or effect that cannot be reasonably anticipated or controlled. Force majeure includes, but is not limited to, acts of God, acts of war, acts of public enemies, strikes, fires, explosions, actions of the elements, floods, or other similar causes beyond the control of the Contractor or the Commissioner in the performance of the Contract which non- performance, by exercise of reasonable diligence, cannot be prevented. Contractor shall provide the Commissioner with written notice of any force majeure occurrence as soon as the delay is known.

Neither the Contractor nor the Commissioner shall be liable to the other for any delay in or failure of performance under the Contract due to a force majeure occurrence. Any such delay in or failure of performance shall not constitute default or give rise to any liability for damages. The existence of such causes of such delay or failure shall extend the period for performance to such extent as determined by the Contractor and the Commissioner to be necessary to enable complete performance by the Contractor if reasonable diligence is exercised after the cause of delay or failure has been removed.

Notwithstanding the above, at the discretion of the Commissioner where the delay or failure will significantly impair the value of the Contract to the State or to Authorized Users, the Commissioner may:

**a.** Accept allocated performance or deliveries from the Contractor. The Contractor, however, hereby agrees to grant preferential treatment to Authorized Users with respect to Product subjected to allocation; and/or

**b.** Purchase from other sources (without recourse to and by the Contractor for the costs and expenses thereof) to replace all or part of the Products which are the subject of the delay, which purchases may be deducted from the Contract quantities without penalty or liability to the State; or

**c.** Terminate the Contract or the portion thereof which is subject to delays, and thereby discharge any unexecuted portion of the Contract or the relative part thereof.

In addition, the Commissioner reserves the right, in his/her sole discretion, to make an equitable adjustment in the Contract terms and/or pricing should extreme and unforeseen volatility in the marketplace affect pricing or the availability of supply. "Extreme and unforeseen volatility in the marketplace" is defined as market circumstances which meet the following criteria: (i) the volatility is due to causes outside the control of Contractor; (ii) the volatility affects the marketplace or industry, not just the particular Contract source of supply; (iii) the effect on pricing or availability of supply is substantial; and (iv) the volatility so affects Contractor's performance

that continued performance of the Contract would result in a substantial loss.

**62. CONTRACT BILLINGS** Contractor and the distributors/resellers designated by the Contractor, if any, shall provide complete and accurate billing invoices to each Authorized User in order to receive payment. Billings for Authorized Users must contain all information required by the Contract and the State Comptroller. The State Comptroller shall render payment for Authorized User purchases, and such payment shall be made in accordance with ordinary State procedures and practices. Payment of Contract purchases made by Authorized Users, other than Agencies, shall be billed directly by Contractor on invoices/vouchers, together with complete and accurate supporting documentation as required by the Authorized User.

Submission of an invoice and payment thereof shall not preclude the Commissioner from reimbursement or demanding a price adjustment in any case where the Product delivered is found to deviate from the terms and conditions of the Contract or where the billing was inaccurate.

Contractor shall provide, upon request of the Commissioner, any and all information necessary to verify the accuracy of the billings. Such information shall be provided in the format requested by the Commissioner and in a media commercially available from the Contractor. The Commissioner may direct the Contractor to provide the information to the State Comptroller or to any Authorized User of the Contract.

**63. DEFAULT – AUTHORIZED USER**

**a.** Breach of Authorized User Not Breach of Centralized Contract. An Authorized User's breach shall not be deemed a breach of the Centralized Contract, rather it shall be deemed a breach of the Authorized User's performance under the terms and conditions of the Centralized Contract.

**b.** Failure to Make Payment. In the event a participating Authorized User fails to make payment to the Contractor for Products delivered, accepted and properly invoiced, within 60 days of such delivery and acceptance, the Contractor may, upon 10 days advance written notice to both the Commissioner and the Authorized User's purchasing official, suspend additional shipments of Product or provision of services to such entity until such time as reasonable arrangements have been made and assurances given by such entity for current and future Contract payments.

**c.** Notice of Breach. Notwithstanding the foregoing, the Contractor shall, at least 10 days prior to declaring a breach of Contract by any Authorized User, by certified or registered mail, notify both the Commissioner and the purchasing official of the breaching Authorized User of the specific facts, circumstances and grounds upon which a breach will be declared.

**d.** It is understood, however, that if the Contractor's basis for declaring a breach is insufficient, the Contractor's declaration of breach and failure to service an Authorized User shall constitute a breach of its Contract and the Authorized User may thereafter seek any remedy available at law or equity.

**64. INTEREST ON LATE PAYMENTS**

**a. State Agencies** The payment of interest on certain payments due and owed by Agency may be made in accordance with Article 11-A of the State Finance Law (SFL §179-d et. Seq.) and Title 2 of the New York Code of Rules and Regulations, Part 18 (Implementation of Prompt Payment Legislation -2 NYCRR §18.1 et seq.).

**b. By Non-State Agencies** The terms of Article 11-A apply only to procurements by and the consequent payment obligations of Agencies. Neither expressly nor by any implication is the statute applicable to Non-State Authorized Users. Neither OGS nor the State Comptroller is responsible for payments on any purchases made by a Non-State Agency Authorized User.

**c. By Contractor** Should the Contractor be liable for any payments to the State hereunder, interest, late payment charges and collection fee charges will be determined and assessed pursuant to Section 18 of the State Finance Law.

**65. REMEDIES FOR BREACH** It is understood and agreed that all rights and remedies afforded below shall be in addition to all remedies or actions otherwise authorized or permitted by law:

**a. Cover/Substitute Performance** In the event of Contractor's material breach, the Commissioner may, with or without formally Bidding: (i) Purchase from other sources; or (ii) If the Commissioner is unsuccessful after making reasonable attempts, under the circumstances then existing, to timely obtain acceptable service or acquire replacement Product of equal or comparable quality, the Commissioner may acquire acceptable replacement Product of lesser or greater quality.

Such purchases may, in the discretion of the Commissioner, be deducted from the Contract quantity and payments due Contractor.

**b. Withhold Payment** In any case where a question of non-performance by Contractor arises, payment may be withheld in whole or in part at the discretion of the Commissioner. Should the amount withheld be finally paid, a cash discount originally offered may be taken as if no delay in payment had occurred.

**c. Bankruptcy** In the event that the Contractor files a petition under the U.S. Bankruptcy Code during the term of this Centralized Contract, Authorized Users may, at their discretion, make application to exercise its right to set-off against monies due the Debtor or, under the Doctrine of Recoupment, credit the Authorized User the amounts owed by the Contractor arising out of the same transactions.

**d. Reimbursement of Costs Incurred** The Contractor agrees to reimburse the Authorized User promptly for any and all additional costs and expenses incurred for acquiring acceptable services, and/or replacement Product. Should the cost of cover be less than the Contract price, the Contractor shall have no claim to the difference. The Contractor covenants and agrees that in the event suit is successfully prosecuted for any default on the part of the Contractor, all costs and expenses expended or incurred by the Authorized User in connection therewith, including reasonable attorney's fees, shall be paid by the Contractor.

Where the Contractor fails to timely deliver pursuant to the guaranteed delivery terms of the Contract, the ordering Authorized User may rent substitute equipment temporarily. Any sums expended for such rental shall, upon demand, be reimbursed to the Authorized User promptly by the Contractor or deducted by the Authorized User from payments due or to become due the Contractor on the same or another transaction.

**e. Deduction/Credit** Sums due as a result of these remedies may be deducted or offset by the Authorized User from payments due, or to become due, the Contractor on the same or another transaction. If no deduction or only a partial deduction is made in such fashion the Contractor shall pay to the Authorized User the amount of such claim

or portion of the claim still outstanding, on demand. The Commissioner reserves the right to determine the disposition of any rebates, settlements, restitution, liquidated damages, etc., which arise from the administration of the Contract.

**66. ASSIGNMENT OF CLAIM** Contractor hereby assigns to the State any and all its claims for overcharges associated with this Contract which may arise under the antitrust laws of the United States, 15 USC Section 1, et. seq. and the antitrust laws of the State of New York, General Business Law Section 340, et. seq.

**67. TOXIC SUBSTANCES** Each Contractor furnishing a toxic substance as defined by Section 875 of the Labor Law, shall provide such Authorized User with not less than two copies of a material safety data sheet, which sheet shall include for each such substance the information outlined in Section 876 of the Labor Law.

Before any chemical product is used or applied on or in any building, a copy of the product label and Material Safety Data Sheet must be provided to and approved by the Authorized User agency representative.

**68. INDEPENDENT CONTRACTOR** It is understood and agreed that the legal status of the Contractor, its agents, officers and employees under this Contract is that of an independent Contractor, and in no manner shall they be deemed employees of the Authorized User, and therefore are not entitled to any of the benefits associated with such employment. The Contractor agrees, during the term of this Contract, to maintain at Contractor's expense those benefits to which its employees would otherwise be entitled by law, including health benefits, and all necessary insurance for its employees, including worker's compensation, disability and unemployment insurance, and to provide the Authorized User with certification of such insurance upon request. The Contractor remains responsible for all applicable federal, state and local taxes, and all FICA contributions.

**69. SECURITY** Contractor warrants, covenants and represents that it will comply fully with all security procedures of the Authorized User(s) in performance of the Contract including but not limited to physical, facility, documentary and cyber security rules, procedures and protocols.

**70. COOPERATION WITH THIRD PARTIES** The Contractor shall be responsible for fully cooperating with any third party, including but not limited to other Contractors or Subcontractors of the Authorized User, as necessary to ensure delivery of Product or coordination of performance of services.

**71. CONTRACT TERM - RENEWAL** In addition to any stated renewal periods in the Contract, any Contract or unit portion thereof let by the Commissioner may be extended by the Commissioner for an additional period(s) of up to one year with the written concurrence of the Contractor and Comptroller. Such extension may be exercised on a month to month basis or in other stated periods of time during the one year extension.

**72. ADDITIONAL WARRANTIES** Where Contractor, product manufacturer or service provider generally offers additional or more advantageous warranties than set forth below, Contractor shall offer or pass through any such warranties to Authorized Users. Contractor hereby warrants and represents:

**a. Product Performance** Contractor warrants and represents that Products delivered pursuant to this Contract conform to the manufacturer's specifications, performance standards and documentation, and the documentation fully describes the proper procedure for using the Products.

**b. Title and Ownership Warranty** Contractor warrants, represents and conveys (i) full ownership, clear title free of all liens, or (ii) the right to transfer or deliver perpetual license rights to any Products transferred to Authorized User under this Contract. Contractor shall be solely liable for any costs of acquisition associated therewith. Contractor fully indemnifies the Authorized User for any loss, damages or actions arising from a breach of said warranty without limitation.

**c. Contractor Compliance** Contractor represents and warrants to pay, at its sole expense, for all applicable permits, licenses, tariffs, tolls and fees to give all notices and comply with all laws, ordinances, rules and regulations of any governmental entity in conjunction with the performance of obligations under the Contract. Prior to award and during the Contract term and any renewals thereof, Contractor must establish to the satisfaction of the Commissioner that it meets or exceeds all requirements of the Bid/Contract and any applicable laws, including but not limited to, permits, insurance coverage, licensing, proof of coverage for worker's compensation, and shall provide such proof as required by the Commissioner. Failure to do so may constitute grounds for the Commissioner to cancel or suspend this Contract, in whole or in part, or to take any other action deemed necessary by the Commissioner.

**d. Product Warranty** Unless recycled or recovered materials are available in accordance with the "Recycled or Recovered Materials" clause, Product offered shall be standard new equipment, current model or most recent release of regular stock product with all parts regularly used with the type of equipment offered; and no attachment or part has been substituted or applied contrary to the manufacturer's recommendations and standard practice.

Contractor further warrants and represents that components or deliverables specified and furnished by or through Contractor shall individually, and where specified and furnished as a system, be substantially uninterrupted or error-free in operation and guaranteed against faulty material and workmanship for the warranty period, or for a minimum of one (1) year from the date of acceptance, whichever is longer ("Project warranty period"). During the Project warranty period, defects in the materials or workmanship of components or deliverables specified and furnished by or through Contractor shall be repaired or replaced by Contractor at no cost or expense to the Authorized User. Contractor shall extend the Project warranty period for individual component(s), or for the System as a whole, as applicable, by the cumulative period(s) of time, after notification, during which an individual component or the System requires servicing or replacement (down time) or is in the possession of the Contractor, its agents, officers, Subcontractors, distributors, resellers or employees ("extended warranty").

Where Contractor, the Independent Software Vendor "ISV," or other third party manufacturer markets any Project Deliverable delivered by or through Contractor with a standard commercial warranty, such standard warranty shall be in addition to, and not relieve the Contractor from, Contractor's warranty obligations during the project warranty and extended warranty period(s). Where such standard commercial warranty covers all or some of the Project warranty or extended warranty period(s), Contractor shall be responsible for the coordination during the Project warranty or extended warranty period(s) with ISV or other third party manufacturer(s) for warranty repair or replacement of ISV or other third party manufacturer's Product.

Where Contractor, ISV or other third party manufacturer markets any Project Deliverable with a standard commercial warranty which goes

beyond the Project warranty or extended warranty period(s), Contractor shall notify the Authorized User and pass through the manufacturer's standard commercial warranty to Authorized User at no additional charge; provided, however, that Contractor shall not be responsible for coordinating services under the third party extended warranty after expiration of the Project warranty and extended warranty period(s).

**e. Replacement Parts Warranty** If during the regular or extended warranty period's faults develop, the Contractor shall promptly repair or, upon demand, replace the defective unit or component part affected. All costs for labor and material and transportation incurred to repair or replace defective Product during the warranty period shall be borne solely by the Contractor, and the State or Authorized User shall in no event be liable or responsible therefor.

Any part of component replaced by the Contractor under the Contract warranty shall be replaced at no cost to the Authorized User and guaranteed for the greater of: a) the warranty period under paragraph (d) above; or b) if a separate warranty for that part or component is generally offered by the manufacturer, the standard commercial warranty period offered by the manufacturer for the individual part or component.

**f. Virus Warranty** The Contractor represents and warrants that Licensed Software contains no known viruses. Contractor is not responsible for viruses introduced at Licensee's site.

**g. Date/Time Warranty** Contractor warrants that Product(s) furnished pursuant to this Contract shall, when used in accordance with the Product documentation, be able to accurately process date/time data (including, but not limited to, calculating, comparing, and sequencing) transitions, including leap year calculations. Where a Contractor proposes or an acquisition requires that specific Products must perform as a package or system, this warranty shall apply to the Products as a system.

Where Contractor is providing ongoing services, including but not limited to: i) consulting, integration, code or data conversion, ii) maintenance or support services, iii) data entry or processing, or iv) contract administration services (e.g., billing, invoicing, claim processing), Contractor warrants that services shall be provided in an accurate and timely manner without interruption, failure or error due to the inaccuracy of Contractor's business operations in processing date/time data (including, but not limited to, calculating, comparing, and sequencing) various date/time transitions, including leap year calculations. Contractor shall be responsible for damages resulting from any delays, errors or untimely performance resulting therefrom, including but not limited to the failure or untimely performance of such services.

This Date/Time Warranty shall survive beyond termination or expiration of this contract through: a) ninety (90) days or b) the Contractor's or Product manufacturer/developer's stated date/time warranty term, whichever is longer. Nothing in this warranty statement shall be construed to limit any rights or remedies otherwise available under this Contract for breach of warranty.

**h. Workmanship Warranty** Contract warrants that all components or deliverables specified and furnished by or through Contractor under the Project Definition/Work Order meet the completion criteria set forth in the Project Definition/Work Order and any subsequent statement(s) of work, and that services will be provided in a workmanlike manner in accordance with industry standards.

**i. Survival of Warranties** All warranties contained in this Contract shall survive the termination of this Contract.

**73. LEGAL COMPLIANCE** Contractor represents and warrants that it shall secure all notices and comply with all laws, ordinances, rules and regulations of any governmental entity in conjunction with the performance of obligations under the Contract. Prior to award and during the Contract term and any renewals thereof, Contractor must establish to the satisfaction of the Commissioner that it meets or exceeds all requirements of the Bid and Contract and any applicable laws, including but not limited to, permits, licensing, and shall provide such proof as required by the Commissioner. Failure to comply or failure to provide proof may constitute grounds for the Commissioner to cancel or suspend the Contract, in whole or in part, or to take any other action deemed necessary by the Commissioner. Contractor also agrees to disclose information and provide affirmations and certifications to comply with Sections 139-j and 139-k of the State Finance Law.

**74. INDEMNIFICATION** Contractor shall be fully liable for the actions of its agents, employees, partners or Subcontractors and shall fully indemnify and save harmless the Authorized Users from suits, actions, damages and costs of every name and description relating to personal injury and damage to real or personal tangible property caused by any intentional act or negligence of Contractor, its agents, employees, partners or Subcontractors, without limitation; provided, however, that the Contractor shall not indemnify for that portion of any claim, loss or damage arising hereunder due to the negligent act or failure to act of the Authorized Users.

**75. INDEMNIFICATION RELATING TO THIRD PARTY RIGHTS** The Contractor will also indemnify and hold the Authorized Users harmless from and against any and all damages, expenses (including reasonable attorneys' fees), claims, judgments, liabilities and costs that may be finally assessed against the Authorized Users in any action for infringement of a United States Letter Patent, or of any copyright, trademark, trade secret or other third party proprietary right except to the extent such claims arise from the Authorized Users gross negligence or willful misconduct, provided that the State shall give Contractor: (i) prompt written notice of any action, claim or threat of infringement suit, or other suit, (ii) the opportunity to take over, settle or defend such action, claim or suit at Contractor's sole expense, and (iii) assistance in the defense of any such action at the expense of Contractor.

If usage shall be enjoined for any reason or if Contractor believes that it may be enjoined, Contractor shall have the right, at its own expense and sole discretion to take action in the following order of precedence: (i) to procure for the Authorized User the right to continue Usage (ii) to modify the service or Product so that Usage becomes non-infringing, and is of at least equal quality and performance; or (iii) to replace said service or Product or part(s) thereof, as applicable, with non-infringing service or Product of at least equal quality and performance. If the above remedies are not available, the parties shall terminate the Contract, in whole or in part as necessary and applicable, provided the Authorized User is given a refund for any amounts paid for the period during which Usage was not feasible.

The foregoing provisions as to protection from third party rights shall not apply to any infringement occasioned by modification by the Authorized User of any Product without Contractor's approval.

In the event that an action at law or in equity is commenced against the Authorized User arising out of a claim that the Authorized User's use of the service or Product under the Contract infringes any patent, copyright or proprietary right, and Contractor is of the opinion that the allegations in such action in whole or in part are not covered by the indemnification and defense provisions set forth in the Contract, Contractor shall immediately notify the Authorized User and the

Office of the Attorney General in writing and shall specify to what extent Contractor believes it is obligated to defend and indemnify under the terms and conditions of the Contract. Contractor shall in such event protect the interests of the Authorized User and secure a continuance to permit the Authorized User to appear and defend its interests in cooperation with Contractor, as is appropriate, including any jurisdictional defenses the Authorized User may have. This constitutes the Authorized User's sole and exclusive remedy for patent infringement, or for infringement of any other third party proprietary right.

**76. LIMITATION OF LIABILITY** Except as otherwise set forth in the Indemnification Paragraphs above, the limit of liability shall be as follows:

a. Contractor's liability for any claim, loss or liability arising out of, or connected with the Products and services provided, and whether based upon default, or other liability such as breach of contract, warranty, negligence, misrepresentation or otherwise, shall in no case exceed direct damages in: (i) an amount equal to two (2) times the charges specified in the Purchase Order for the Products and services, or parts thereof forming the basis of the Authorized User's claim, (said amount not to exceed a total of twelve (12) months charges payable under the applicable Purchase Order) or (ii) one million dollars (\$1,000,000), whichever is greater.

b. The Authorized User may retain such monies from any amount due Contractor as may be necessary to satisfy any claim for damages, costs and the like asserted against the Authorized User unless Contractor at the time of the presentation of claim shall demonstrate to the Authorized User's satisfaction that sufficient monies are set aside by the Contractor in the form of a bond or through insurance coverage to cover associated damages and other costs.

c. Notwithstanding the above, neither the Contractor nor the Authorized User shall be liable for any consequential, indirect or special damages of any kind which may result directly or indirectly from such performance, including, without limitation, damages resulting from loss of use or loss of profit by the Authorized User, the Contractor, or by others.

**77. INSURANCE** Contractor shall secure and maintain insurance coverage as specified in the Bid Documents and shall promptly provide documentation of specified coverages to the Authorized User. If specified, the Contractor may be required to add the Authorized User as an additional insured.

**THE FOLLOWING CLAUSES PERTAIN TO TECHNOLOGY & NEGOTIATED CONTRACTS**

**78. SOFTWARE LICENSE GRANT** Where Product is acquired on a licensed basis the following shall constitute the license grant:

a. **License Scope** Licensee is granted a non-exclusive, perpetual license to use, execute, reproduce, display, perform, or merge the Product within its business enterprise in the United States up to the maximum licensed capacity stated on the Purchase Order. Product may be accessed, used, executed, reproduced, displayed or performed up to the capacity measured by the applicable licensing unit stated on the Purchase Order (i.e., payroll size, number of employees, CPU, MIPS, MSU, concurrent user, workstation). Licensee shall have the right to use and distribute modifications or customizations of the Product to and for use by any Authorized Users otherwise licensed to use the Product, provided that any modifications, however extensive, shall not diminish Licensor's proprietary title or interest. No license, right or

interest in any trademark, trade name, or service mark is granted hereunder.

**b. License Term** The license term shall commence upon the License Effective Date, provided, however, that where an acceptance or trial period applies to the Product, the License Term shall be extended by the time period for testing, acceptance or trial.

**c. Licensed Documentation** If commercially available, Licensee shall have the option to require the Contractor to deliver, at Contractor's expense: (i) one (1) hard copy and one (1) master electronic copy of the Documentation in a mutually agreeable format; (ii) based on hard copy instructions for access by downloading from the Internet (iii) hard copies of the Product Documentation by type of license in the following amounts, unless otherwise mutually agreed:

- Individual/Named User License - one (1) copy per License
- Concurrent Users - 10 copies per site
- Processing Capacity - 10 copies per site

Software media must be in a format specified by the Authorized User, without requiring any type of conversion.

Contractor hereby grants to Licensee a perpetual license right to make, reproduce (including downloading electronic copies of the Product) and distribute, either electronically or otherwise, copies of Product Documentation as necessary to enjoy full use of the Product in accordance with the terms of license.

**d. Product Technical Support & Maintenance** Licensee shall have the option of electing the Product technical support and maintenance ("maintenance") set forth in the Contract by giving written notice to Contractor any time during the Centralized Contract term. Maintenance term(s) and any renewal(s) thereof are independent of the expiration of the Centralized Contract term and will not automatically renew.

Maintenance shall include, at a minimum, (i) the provision of error corrections, updates, revisions, fixes, upgrade and new releases to Licensee, and (ii) Help Desk assistance with locally accessible "800" or toll free, local telephone service, or alternatively on-line Help Desk accessibility. Contractor shall maintain the Products so as to provide Licensee with the ability to utilize the Products in accordance with the Product documentation without significant functional downtime to its ongoing business operations during the maintenance term.

Authorized User shall not be required to purchase maintenance for use of Product, and may discontinue maintenance at the end of any current maintenance term upon notice to Contractor. In the event that Authorized User does not initially acquire or discontinues maintenance of licensed Product, it may, at any time thereafter, reinstate maintenance for Product without any additional penalties or other charges, by paying Contractor the amount which would have been due under the Contract for the period of time that such maintenance had lapsed, at then current NYS net maintenance rates.

**e. Permitted License Transfers** As Licensee's business operations may be altered, expanded or diminished, licenses granted hereunder may be transferred or combined for use at an alternative or consolidated site not originally specified in the license, including transfers between Agencies ("permitted license transfers"). Licensee(s) do not have to obtain the approval of Contractor for permitted license transfers, but must give thirty (30) days prior written notice to Contractor of such move(s) and certify in writing that the Product is not in use at the prior site. There shall be no additional

license or other transfer fees due Contractor, provided that: i) the maximum capacity of the consolidated machine is equal to the combined individual license capacity of all licenses running at the consolidated or transferred site (e.g., named users, seats, or MIPS); or ii) if the maximum capacity of the consolidated machine is greater than the individual license capacity being transferred, a logical or physical partition or other means of restricting access will be maintained within the computer system so as to restrict use and access to the Product to that unit of licensed capacity solely dedicated to beneficial use for Licensee. In the event that the maximum capacity of the consolidated machine is greater than the combined individual license capacity of all licenses running at the consolidated or transferred site, and a logical or physical partition or other means of restricting use is not available, the fees due Contractor shall not exceed the fees otherwise payable for a single license for the upgrade capacity.

**f. Restricted Use By Outsourcers / Facilities Management, Service Bureaus / or Other Third Parties** Outsourcers, facilities management or service bureaus retained by Licensee shall have the right to use the Product to maintain Licensee's business operations, including data processing, for the time period that they are engaged in such activities, provided that: 1) Licensee gives notice to Contractor of such party, site of intended use of the Product, and means of access; and 2) such party has executed, or agrees to execute, the Product manufacturer's standard nondisclosure or restricted use agreement which executed agreement shall be accepted by the Contractor ("Non-Disclosure Agreement"); and 3) if such party is engaged in the business of facility management, outsourcing, service bureau or other services, such third party will maintain a logical or physical partition within its computer system so as to restrict use and access to the program to that portion solely dedicated to beneficial use for Licensee. In no event shall Licensee assume any liability for third party's compliance with the terms of the Non-Disclosure Agreement, nor shall the Non-Disclosure Agreement create or impose any liabilities on the State or Licensee.

Any third party with whom a Licensee has a relationship for a state function or business operation, shall have the temporary right to use Product (e.g., JAVA Applets), provided that such use shall be limited to the time period during which the third party is using the Product for the function or business activity.

**g. Archival Back-Up and Disaster Recovery** Licensee may use and copy the Product and related Documentation in connection with: i) reproducing a reasonable number of copies of the Product for archival backup and disaster recovery procedures in the event of destruction or corruption of the Product or disasters or emergencies which require Licensee to restore backup(s) or to initiate disaster recovery procedures for its platform or operating systems; ii) reproducing a reasonable number of copies of the Product and related Documentation for cold site storage. "Cold Site" storage shall be defined as a restorable back-up copy of the Product not to be installed until and after the declaration by the Licensee of a disaster; iii) reproducing a back-up copy of the Product to run for a reasonable period of time in conjunction with a documented consolidation or transfer otherwise allowed herein. "Disaster Recovery" shall be defined as the installation and storage of Product in ready-to-execute, back-up computer systems prior to disaster or breakdown which is not used for active production or development.

**h. Confidentiality Restrictions** The Product is a trade secret, copyrighted and proprietary product. Licensee and its employees will keep the Product strictly confidential, and Licensee will not disclose or otherwise distribute or reproduce any Product to anyone other than as



authorized under the terms of Contract. Licensee will not remove or destroy any proprietary markings of Contractor.

**i. Restricted Use by Licensee** Except as expressly authorized by the terms of license, Licensee shall not:

- (i) Copy the Product;
- (ii) Cause or permit reverse compilation or reverse assembly of all or any portion of the Product;
- (iii) Export the Licensed Software in violation of any U.S. Department of Commerce export administration regulations.

**79. PRODUCT ACCEPTANCE** Unless otherwise provided by mutual agreement of the Authorized User and the Contractor, Authorized User(s) shall have thirty (30) days from the date of delivery to accept hardware products and sixty (60) days from the date of delivery to accept all other Product. Where the Contractor is responsible for installation, acceptance shall be from completion of installation. Failure to provide notice of acceptance or rejection or a deficiency statement to the Contractor by the end of the period provided for under this clause constitutes acceptance by the Authorized User(s) as of the expiration of that period. The License Term shall be extended by the time periods allowed for trial use, testing and acceptance unless the Commissioner or Authorized User agrees to accept the Product at completion of trial use.

Unless otherwise provided by mutual agreement of the Authorized User and the Contractor, Authorized User shall have the option to run testing on the Product prior to acceptance, such tests and data sets to be specified by User. Where using its own data or tests, Authorized User must have the tests or representative set of data available upon delivery. This demonstration will take the form of a documented installation test, capable of observation by the Authorized User, and shall be made part of the Contractor's standard documentation. The test data shall remain accessible to the Authorized User after completion of the test.

In the event that the documented installation test cannot be completed successfully within the specified acceptance period, and the Contractor or Product is responsible for the delay, Authorized User shall have the option to cancel the order in whole or in part, or to extend the testing period for an additional thirty (30) day increment. Authorized User shall notify Contractor of acceptance upon successful completion of the documented installation test. Such cancellation shall not give rise to any cause of action against the Authorized User for damages, loss of profits, expenses, or other remuneration of any kind.

If the Authorized User elects to provide a deficiency statement specifying how the Product fails to meet the specifications within the testing period, Contractor shall have thirty (30) days to correct the deficiency, and the Authorized User shall have an additional sixty (60) days to evaluate the Product as provided herein. If the Product does not meet the specifications at the end of the extended testing period, Authorized User, upon prior written notice to Contractor, may then reject the Product and return all defective Product to Contractor, and Contractor shall refund any monies paid by the Authorized User to Contractor therefor. Costs and liabilities associated with a failure of the Product to perform in accordance with the functionality tests or product specifications during the acceptance period shall be borne fully by Contractor to the extent that said costs or liabilities shall not have been caused by negligent or willful acts or omissions of the Authorized User's agents or employees. Said costs shall be limited to the amounts set forth in the Limitation of Liability Clause for any liability for costs incurred at the direction or recommendation of Contractor.

**80. AUDIT OF LICENSED PRODUCT USAGE** Contractor shall have the right to periodically audit, no more than annually, at Contractor's expense, use of licensed Product at any site where a copy of the Product resides provided that: (i) Contractor gives Licensee(s) at least thirty (30) days advance written notice, (ii) such audit is conducted during such party's normal business hours, (iii) the audit is conducted by an independent auditor chosen on mutual agreement of the parties. Contractor shall recommend a minimum of three (3) auditing/accounting firms from which the Licensee will select one (1). In no case shall the Business Software Alliance (BSA), Software Publishers Association (SPA), Software and Industry Information Association (SIIA) or Federation Against Software Theft (FAST) be used directly or indirectly to conduct audits, or be recommended by Contractor; (iv) Contractor and Licensee are each entitled to designate a representative who shall be entitled to participate, and who shall mutually agree on audit format, and simultaneously review all information obtained by the audit. Such representatives also shall be entitled to copies of all reports, data or information obtained from the audit; and (v) if the audit shows that such party is not in compliance, Licensee shall be required to purchase additional licenses or capacities necessary to bring it into compliance and shall pay for the unlicensed capacity at the NYS Net Price in effect at time of audit, or if none, then at the Contractor's U.S. Commercial list price. Once such additional licenses or capacities are purchased, Licensee shall be deemed to have been in compliance retroactively, and Licensee shall have no further liability of any kind for the unauthorized use of the software.

**81. OWNERSHIP/TITLE TO PROJECT DELIVERABLES**

**a. Definitions**

(i) For purposes of this paragraph, "Products." A deliverable furnished under this Contract by or through Contractor, including existing and custom Products, including, but not limited to: a) components of the hardware environment, b) printed materials (including but not limited to training manuals, system and user documentation, reports, drawings), whether printed in hard copy or maintained on diskette, CD, DVD or other electronic media c) third party software, d) modifications, customizations, custom programs, program listings, programming tools, data, modules, components, and e) any properties embodied therein, whether in tangible or intangible form (including but not limited to utilities, interfaces, templates, subroutines, algorithms, formulas, source code, object code).

(ii) For purposes of this paragraph, "Existing Products." Tangible Products and intangible licensed Products that exist prior to the commencement of work under the Contract. Contractor bears the burden of proving that a particular product was in existence prior to the commencement of the Project.

(iii) For purposes of this paragraph, "Custom Products." Products, preliminary, final or otherwise, which are created or developed by Contractor, its Subcontractors, partners, employees or agents for Authorized User under the Contract.

**b. Title to Project Deliverables** Contractor acknowledges that it is commissioned by the Authorized User to perform the services detailed in the Purchase Order. Unless otherwise specified in writing in the Bid or Purchase Order, the Authorized User shall have ownership and license rights as follows:

**(i) Existing Products:**

**1. Hardware** - Title and ownership of Existing Hardware Product shall pass to Authorized User upon Acceptance.

**2. Software** - Title and ownership to Existing Software Product(s) delivered by Contractor under the Contract that is normally commercially distributed on a license basis by the Contractor or other independent software vendor proprietary owner ("Existing Licensed

Product”), whether or not embedded in, delivered or operating in conjunction with hardware or Custom Products, shall remain with Contractor or the proprietary owner of other independent software vendor(s) (ISV). Effective upon acceptance, such Product shall be licensed to Authorized User in accordance with the Contractor or ISV owner’s standard license agreement, provided, however, that such standard license, must, at a minimum: (a) grant Authorized User a non-exclusive, perpetual license to use, execute, reproduce, display, perform, adapt (unless Contractor advises Authorized User as part of Contractor’s proposal that adaptation will violate existing agreements or statutes and Contractor demonstrates such to the Authorized User’s satisfaction) and distribute Existing Licensed Product to the Authorized User up to the license capacity stated in the Purchase Order or work order with all license rights necessary to fully effect the general business purpose(s) stated in the Bid or Authorized User’s Purchase Order or work order, including the financing assignment rights set forth in paragraph (c) below; and (b) recognize the State of New York as the licensee where the Authorized User is a state agency, department, board, commission, office or institution. Where these rights are not otherwise covered by the ISV’s owner’s standard license agreement, the Contractor shall be responsible for obtaining these rights at its sole cost and expense. The Authorized User shall reproduce all copyright notices and any other legend of ownership on any copies authorized under this paragraph.

(ii.) **Custom Products:** Effective upon creation of Custom Products, Contractor hereby conveys, assigns and transfers to Authorized User the sole and exclusive rights, title and interest in Custom Product(s), whether preliminary, final or otherwise, including all trademark and copyrights. Contractor hereby agrees to take all necessary and appropriate steps to ensure that the Custom Products are protected against unauthorized copying, reproduction and marketing by or through Contractor, its agents, employees, or Subcontractors. Nothing herein shall preclude the Contractor from otherwise using the related or underlying general knowledge, skills, ideas, concepts, techniques and experience developed under a Purchase Order, project definition or work order in the course of Contractor’s business. Authorized User may, by providing written notice thereof to the Contractor, elect in the alternative to take a non-exclusive perpetual license to Custom Products in lieu of Authorized User taking exclusive ownership and title to such Products. In such case, Licensee on behalf of all Authorized Users shall be granted a non-exclusive perpetual license to use, execute, reproduce, display, perform, adapt and distribute Custom Product as necessary to fully effect the general business purpose(s) as stated in paragraph (b)(i)(2), above.

c. **Transfers or Assignments to a Third Party Financing Agent** It is understood and agreed by the parties that a condition precedent to the consummation of the purchase (s) under the Contract may be the obtaining of acceptable third party financing by the Authorized User. The Authorized User shall make the sole determination of the acceptability of any financing proposal. The Authorized User will make all reasonable efforts to obtain such financing, but makes no representation that such financing has been obtained as of the date of Bid receipt. Where financing is used, Authorized User may assign or transfer its rights in Licensed Products (existing or custom) to a third party financing entity or trustee (“Trustee”) as collateral where required by the terms of the financing agreement. Trustee’s sole rights with respect to transferability or use of Licensed Products shall be to exclusively sublicense to Authorized User all of its Licensee’s rights under the terms and conditions of the License Agreement; provided, further, however, in the event of any termination or expiration of such sublicense by reason of payment in full, all of Trustee’s rights in such Licensed Product shall terminate immediately and Authorized User’s prior rights to such Existing Licensed Product shall be revived.

d. **Sale or License of Custom Products Involving Tax-Exempt Financing (i.e., Certificates of Participation - COPS)** The Authorized User’s sale or other transfer of Custom Products which were acquired by the Authorized User using third party, tax-exempt financing may not occur until such Custom Products are, or become, useable. In the event that the Contractor wishes to obtain ownership rights to Custom Product(s), the sale or other transfer shall be at fair market value determined at the time of such sale or other transfer, and must be pursuant to a separate written agreement in a form acceptable to the Authorized User which complies with the terms of this paragraph.

e. **Contractor’s Obligation with Regard to ISV (Third Party Product)** Where Contractor furnishes Existing Licensed Product(s) as a Project Deliverable, and sufficient rights necessary to effect the purposes of this section are not otherwise provided in the Contractor or ISV’s standard license agreement, Contractor shall be responsible for obtaining from the ISV third party proprietary owner/developer the rights set forth herein to the benefit of the Authorized User at Contractor’s sole cost and expense.

82. **PROOF OF LICENSE** The Contractor must provide to each Licensee who places a Purchase Order either: (i) the Product developer’s certified License Confirmation Certificates in the name of such Licensee; or (ii) a written confirmation from the Proprietary owner accepting Product invoice as proof of license. Contractor shall submit a sample certificate, or alternatively such written confirmation from the proprietary developer. Such certificates must be in a form acceptable to the Licensee.

83. **PRODUCT VERSION** Purchase Orders shall be deemed to reference Manufacturer’s most recently released model or version of the Product at time of order, unless an earlier model or version is specifically requested in writing by Authorized User and Contractor is willing to provide such version.

84. **CHANGES TO PRODUCT OR SERVICE OFFERINGS**

a. **Product or Service Discontinuance** Where Contractor is the Product Manufacturer/Developer, and Contractor publicly announces to all U.S. customers (“date of notice”) that a Product is being withdrawn from the U.S. market or that maintenance service or technical support provided by Contractor (“withdrawn support”) is no longer going to be offered, Contractor shall be required to: (i) notify the Commissioner, each Licensee and each Authorized User then under contract for maintenance or technical support in writing of the intended discontinuance; and (ii) continue to offer Product or withdrawn support upon the Contract terms previously offered for the greater of: a) the best terms offered by Contractor to any other customer, or b) not less than twelve (12) months from the date of notice; and (iii) at Authorized User’s option, provided that the Authorized User is under contract for maintenance on the date of notice, either: provide the Authorized User with a Product replacement or migration path with at least equivalent functionality at no additional charge to enable Authorized User to continue use and maintenance of the Product.

In the event that the Contractor is not the Product Manufacturer, Contractor shall be required to: (i) provide the notice required under the paragraph above, to the entities described within five (5) business days of Contractor receiving notice from the Product Manufacturer, and (ii) include in such notice the period of time from the date of notice that the Product Manufacturer will continue to provide Product or withdraw support.

The provisions of this subdivision (a) shall not apply or eliminate Contractor’s obligations where withdrawn support is being provided by an independent Subcontractor. In the event that such Subcontractor

ceases to provide service, Contractor shall be responsible for subcontracting such service, subject to state approval, to an alternate Subcontractor.

**b. Product or Service Re-Bundling** In the event that Contractor is the Product manufacturer and publicly announces to all U.S. customers (“date of notice”) that a Product or maintenance or technical support offering is being re-bundled in a different manner from the structure or licensing model of the prior U.S. commercial offering, Contractor shall be required to: (i) notify the State and each Authorized User in writing of the intended change; (ii) continue to provide Product or withdrawn support upon the same terms and conditions as previously offered on the then-current NYS Contract for the greater of: a) the best terms offered by Contractor to any other customer, or b) not less than twelve (12) months from the date of notice; and (iii) shall submit the proposed rebundling change to the Commissioner for approval prior to its becoming effective for the remainder of the Contract term. The provisions of this section do not apply if the Contractor is not the Product manufacturer.

**85. NO HARDSTOP/PASSIVE LICENSE MONITORING**

Unless an Authorized User is otherwise specifically advised to the contrary in writing at the time of order and prior to purchase, Contractor hereby warrants and represents that the Product and all Upgrades do not and will not contain any computer code that would disable the Product or Upgrades or impair in any way its operation based on the elapsing of a period of time, exceeding an authorized number of copies, advancement to a particular date or other numeral, or other similar self-destruct mechanisms (sometimes referred to as “time bombs,” “time locks,” or “drop dead” devices) or that would permit Contractor to access the Product to cause such disablement or impairment (sometimes referred to as a “trap door” device). Contractor agrees that in the event of a breach or alleged breach of this provision that Authorized User shall not have an adequate remedy at law, including monetary damages, and that Authorized User shall consequently be entitled to seek a temporary restraining order, injunction, or other form of equitable relief against the continuance of such breach, in addition to any and all remedies to which Authorized User shall be entitled.

**86. SOURCE CODE ESCROW FOR LICENSED PRODUCT**

If Source Code or Source Code escrow is offered by either Contractor or Product manufacturer or developer to any other commercial customers, Contractor shall either: (i) provide Licensee with the Source Code for the Product; or (ii) place the Source Code in a third party escrow arrangement with a designated escrow agent who shall be named and identified to the State, and who shall be directed to release the deposited Source Code in accordance with a standard escrow agreement acceptable to the State; or (iii) will certify to the State that the Product manufacturer/developer has named the State, acting by and through the Authorized User, and the Licensee, as a named beneficiary of an established escrow arrangement with its designated escrow agent who shall be named and identified to the State and Licensee, and who shall be directed to release the deposited Source Code in accordance with the terms of escrow. Source Code, as well as any corrections or enhancements to such source code, shall be updated for each new release of the Product in the same manner as provided above and such updating of escrow shall be certified to the State in writing. Contractor shall identify the escrow agent upon commencement of the Contract term and shall certify annually that the escrow remains in effect in compliance with the terms of this paragraph.

The State may release the Source Code to Licensees under this Contract who have licensed Product or obtained services, who may use such copy of the Source Code to maintain the Product.

**FOR NEGOTIATED CONTRACTS THE FOLLOWING CLAUSES ARE RESERVED BECAUSE BIDDING DOES NOT APPLY:**

**Clauses: 7, 8, 9, 10, 11, 12, 13, 16, 15, 21, 25, 26, 28, 29, 30, 31, 32, 33, 36, 49, 50, 52, 54 and 37**

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