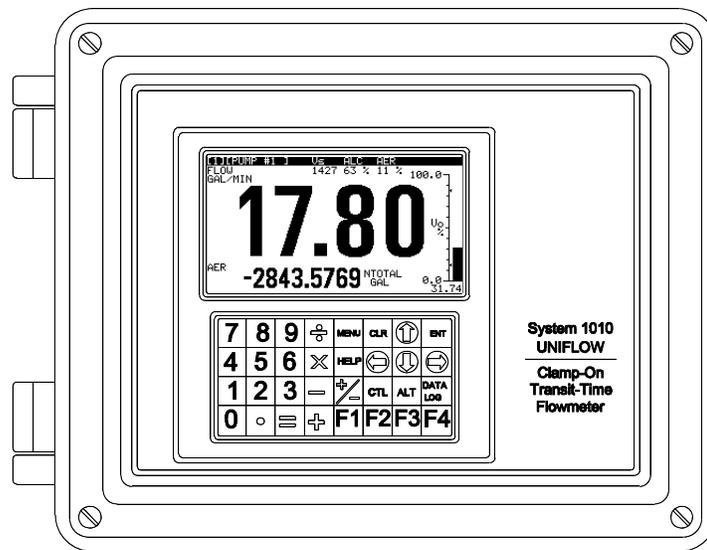


SIEMENS FIELD MANUAL

1015N-2M DIAL-UP MODEM OPTION CARD FOR SYSTEM 1010N FLOWMETERS



FOR TECHNICAL ASSISTANCE

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SIEMENS

IMPORTANT NOTICE

Controlotron is now part of:

Siemens Energy & Automation, Inc.
Process Instrumentation Business Unit (PI BU)
CoC Ultrasonic Flow

1015N-2M DIAL-UP MODEM OPTION CARD FOR SYSTEM 1010N FLOWMETERS



ATTENTION

This equipment contains components that are susceptible to electrostatic discharge (ESD). Please observe ESD control measures during the handling and connection process.

Field Manual 1015N-2MFM-1A
June 2006

For use with Operating System
Software Version 2.00.15 or later

Prepared By _____ Date _____

Reviewed By _____ Date _____

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Manual Changes

NOTE: For the latest updates and revisions to this field manual go to www.controlotron.com/downloads.htm and check the Product Manual listing.

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1015N-2MFM-1 MODEM CARD INSTALLATION INSTRUCTIONS

1. INTRODUCTION

The 1015N-2M Modem Card is one of three option cards used for remote communications within the Controlotron 1010N family of flowmeters. External communication is achieved through an on board dial-up miniature modem with asynchronous line speeds of 2400 bps, 1200 bps, or 300 bps. Implementation of Windows HyperTerminal™ or any other communication software allows for the direct control of the modem's Hayes compatible command set.

2. 1015N-2M MODEM CARD KITS

2.1 OPTION 1 MOUNTING KIT 1015N-2M-MK1

Description	Part Number	Qty
Cover, Communication Module	1010-436-1	1
Screw, Captive 6-32 x 1/2	4006M07F09	1
Label, Controlotron ID	1010-257	1
Standoff, Threaded, Cover Mount	1010-433-1	1
Standoff, Threaded, PCB Support	1010-434-1	4
Cover, Analog Input Module	1010-379	1
Installation Drawing	1015N-2M-MK-7	1
Installation, Wiring Drawing	1015N-2M-7	1
Insulator, Syscom shield, 1010N	1010-263	1

2.2 OPTION 2 MOUNTING KIT 1015N-2M-MK2

Description	Part Number	Qty
Cover, I/O Board	1010-446-1	1
Screw, Captive 6-32 x 1/2	4006M07F09	1
Label, Controlotron ID	1010-257	1
Standoff, Cover Mount	1010-447-1	1
Standoff, Threaded, PCB Support	1010-434-1	4
Installation Drawing	1015N-2M-MK-7	1
Installation, Wiring Drawing	1015N-2M-7	1

2.3 OPTION 3 MOUNTING KIT 1015N-2M-MK3

Description	Part Number	Qty
Cover, I/O Board	1010-446-2	1
Screw, Captive 6-32 x 1/2	4006M07F09	1
Label, Controlotron ID	1010-257	1
Standoff, Cover Mount	1010-447-1	1
Standoff, Threaded, PCB Support	1010-434-1	4
Installation Drawing	1015N-2M-MK-7	1
Installation Drawing	1015N	1
Installation, Wiring Drawing	1015N-2M-7	1

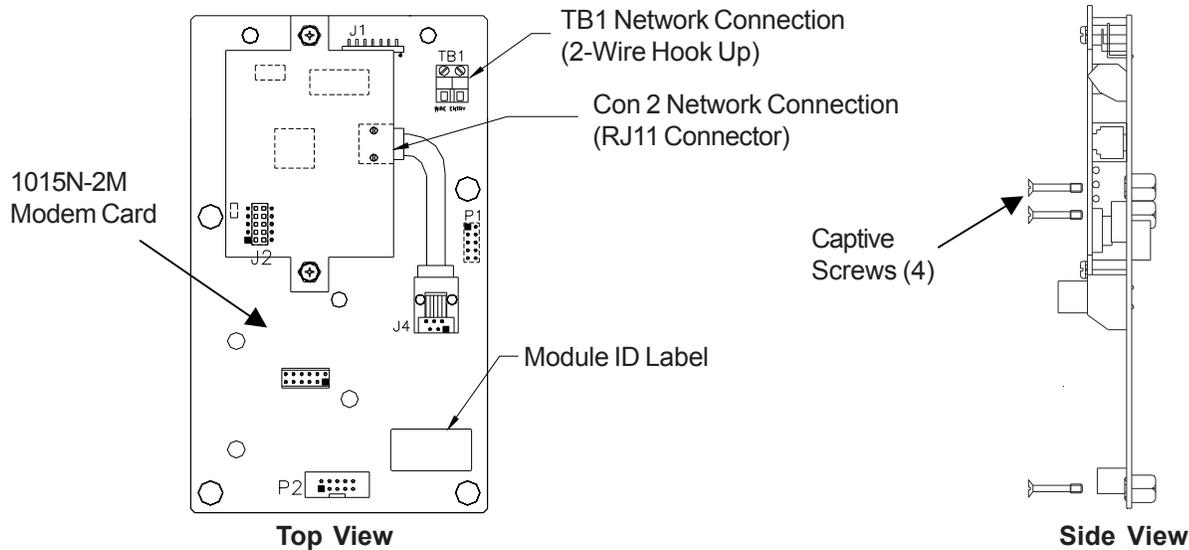


Figure 1. 1015N-2M Modem Card and Attaching Hardware

3. TECHNICAL SPECIFICATIONS

Interface:	RS-232
Supply Voltage:	5 volts DC
Supply Current:	48 mA
Modem Line Speeds:	2400, 1200 and 300 bps Asynchronous
DTE Rates:	2400, 1200, 300 bps
Modulation:	V.22bis, V.22, Bell 212A, Bell 103
Phone Line:	Dial Up or 2 Wire Leased Line
Extended Hayes Command Set Compatibility	
Error Correction / Error Detection: None	
Operating Environment:	-40 to 85 degrees C / 0 to 95% Humidity (non-condensing)

4. 1010N FLOWMETER SYSTEM REQUIREMENTS

The System 1010N Flowmeter operating system must be revision level 2.0 or later for the 1015N-2M Modem Card to function properly. In addition, the 1015N-2M Modem Card requires 1010N system hardware of the following levels in order to work. Refer to the appropriate 1010N user manual installation/outline drawings for circuit board locations.

- a. 1010N-1-5 SysCom Version 3, Revision. D2 or Higher
- b. 1010N-2K3 I/O Board A2
- c. 1010N-8M-5 I/O Board A3
- d. 1010N-7K2 Analog I/O A2

5. PRELIMINARY INSTALLATION NOTES AND CAUTIONS

CAUTION: It is highly recommended that installation be done in a static free environment or damage to the 1015N-2M Modem Card may result.

NOTE: The 1015N-2M Modem will not function if the 1010 flowmeter RS-232 port is connected to the serial port of your PC.

NOTE: The 1015N-2M Modem will only transmit and receive data when used with direct phone line connections (see paragraph 5.3 below for communication connection options).

5.1 1015N-2M MODEM CARD INSTALLATION

WARNING: Set flowmeter and instrumentation power to OFF when inserting or removing the 1015N-2M Modem Card.

Before proceeding with the following installation procedures, identify the Module Loading option and installation drawing for your Modem Card (see Appendix A). The options are as follows:

a. Module Loading Option 1

1010N-5 with 1010N-2 in 1010N/DN Type System. Use Mounting Kit 1015N-2M-MK1. Refer to Installation Drawing 1015N-2M-MK-7 (sheet 1 of 3). Proceed to paragraph 5.1.1.

b. Module Loading Option 2

1010N-2 only in 1010N/DN Type System. Use Mounting Kit 1015N-2M-MK2. Refer to Installation Drawing 1015N-2M-MK-7 (sheet 2 of 3). Proceed to paragraph 5.1.2.

c. Module Loading Option 3

1010N-8M with 1010N-2M in 1010MN Type System. Use Mounting Kit 1015N-2M-MK3. Refer to Installation Drawing 1015N-2M-MK-7 (sheet 3 of 3). Proceed to paragraph 5.1.3.

5.1.1 OPTION 1 INSTALLATION PROCEDURE (Mounting Kit 1015N-2M-MK1) 1010N-5 Module with 1010N-2 Module in 1010N/DN Type System (Refer to Installation Drawing 1015N-2M-MK-7 sheet 1 of 3)

DISASSEMBLY (see Figure 2 and Figure 3)

1. Referring to Figure 1, open the 1010 NEMA flowmeter top cover by releasing the cover latch.
2. Place the power switch to the OFF position.
3. Loosen the captive thumbscrew securing the Access Cover and remove Access Cover.

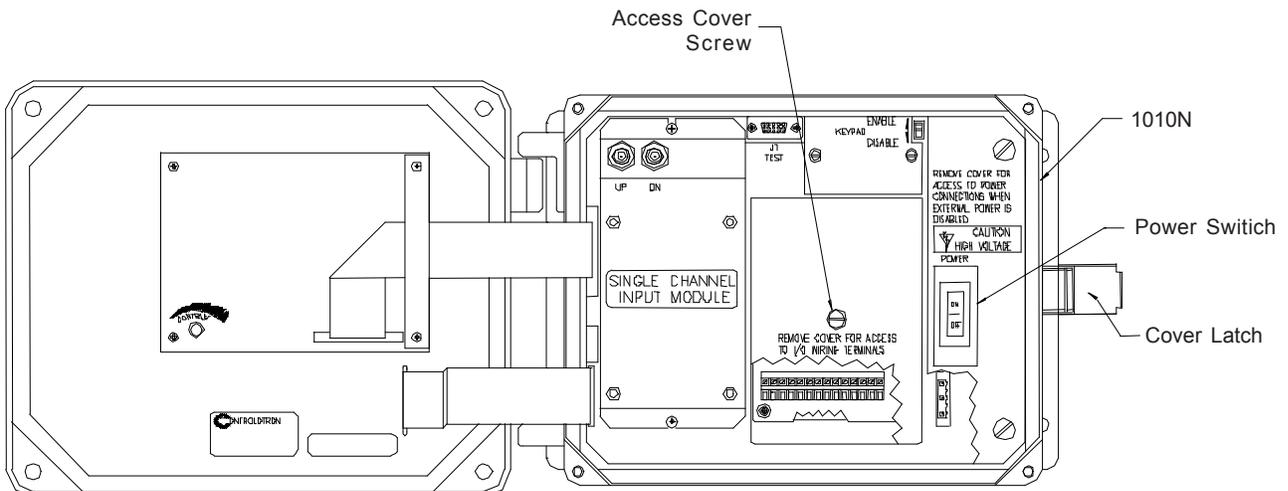


Figure 2. 1010N Flowmeter Access Cover Removal

CAUTION: Do not connect a serial data cable to J1 on the 1015N-2M Modem Card or damage to the Modem Card and flowmeter may result.

4. Loosen the four captive screws (1) at the corners of the 1010N-2 module (7) and carefully lift out the module disengaging it from the connector on the 1010N-5 module (2).
5. Lift off the shield (3) covering the 1010N-5 module (2).
6. Leave the 1010N-5 module in place. Check to assure that the four corner standoffs (4) are securely threaded in place.

ASSEMBLY (see Figure 3)

7. Install shield (5) supplied with the 1015N-2M-MK1 mounting kit and cover the 1010N-5 module. *Note: This shield replaces the shield removed in Step 5 above.*
8. Remove the four captive screws (1) from the 1010N-2 module loosened in Step 4 above. Install standoffs (6) from mounting kit in the vacant positions.
9. Install the 1010N-2 module (7) carefully engaging connector P1 to the 1010N-5 module (2). Secure by threading the four standoffs (6) installed in Step 5 above with their mates on the 1010N-5 module.
10. Check for properly alignment of P1.

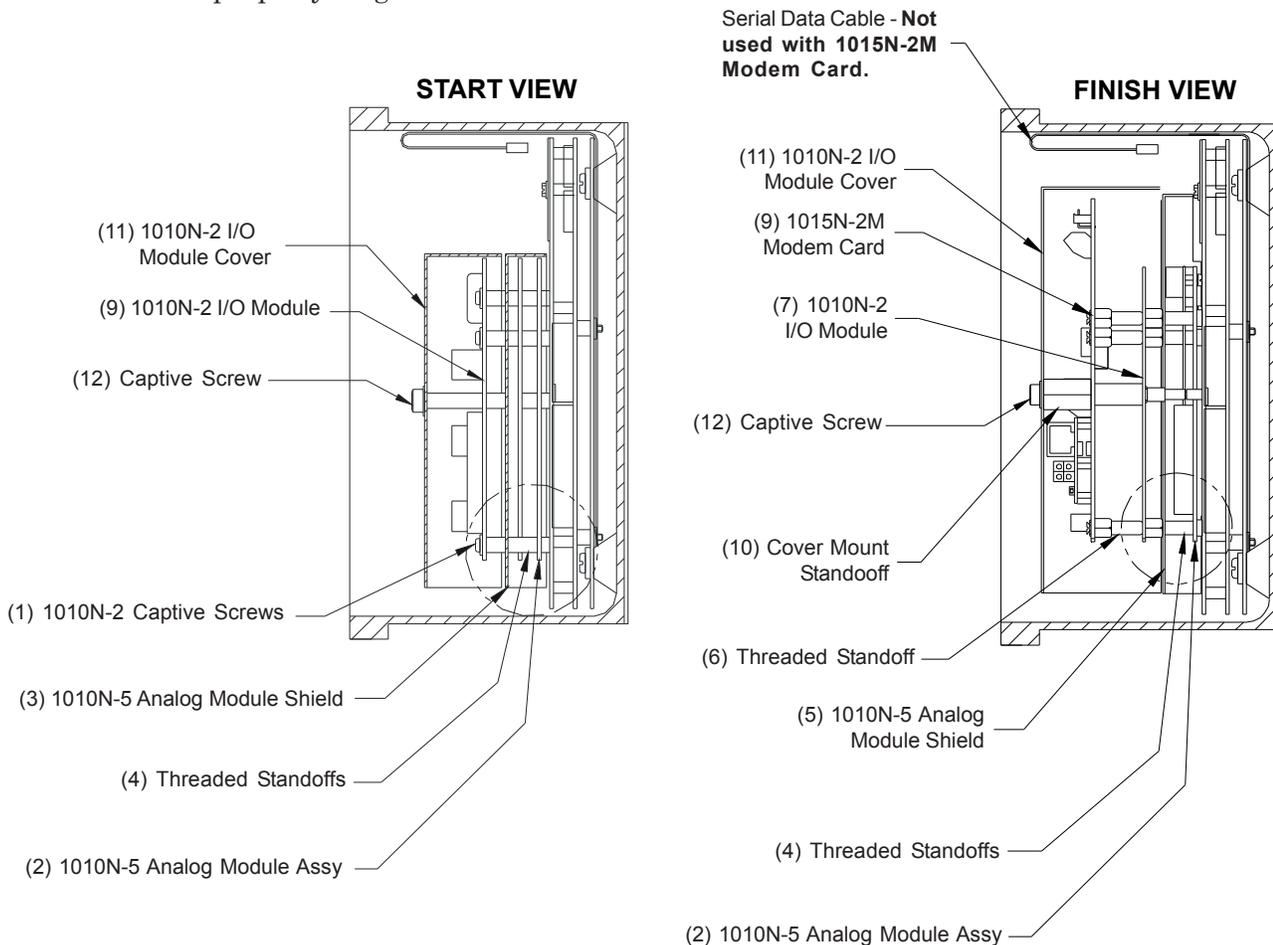


Figure 3. Option 1 Installation (side view)

11. Install the 1015N-2M Modem Card (9) on top of the 1010N-2 module (7) carefully engaging connector P1 on the 1015N-2M with its mate P1 on the 1010N-2 module. Secure the 1015N-2M by engaging its four captive screws with the four standoffs on the 1010N-2 module.
12. Install the large threaded cover mount standoff (10) from the mounting kit through the hole at the center of the 1015N-2M Modem Card (9) and into the threaded receptacle on the shield (5) previously installed in Step 7.
13. Referring to installation drawing 1015N-2M-7 (see Appendix A), plug telephone jack into J4 of the Modem Card. Thread the telephone line plug through one of the System 1010 flowmeter access holes and plug it into a standard telephone outlet (refer to paragraph 5.3 below for communication connection options).
14. Replace Access Cover and finger tighten captive thumbscrew (12).
15. Place the 1010 flowmeter power switch to the ON position.
16. Close the 1010 flowmeter top cover by locking the cover latch.
17. **Proceed to paragraph 5.2 to set 1010N flowmeter RS-232 parameters.**

5.1.2 OPTION 2 INSTALLATION PROCEDURE (Mounting Kit 1015N-2M-MK2) 1010N-2 Module only in 1010N/DN Type System (Refer to Installation Drawing 1015N-2M-MK-7 sheet 2 of 3)

DISASSEMBLY (see Figure 2 and Figure 4)

1. Referring to Figure 2 above, open the 1010 NEMA flowmeter top cover by releasing the cover latch.
2. Place the power switch to the OFF position.
3. Loosen the captive thumbscrew securing the Access Cover and remove Access Cover.

CAUTION: Do not connect a serial data cable to J1 on the 1015N-2M Modem Card or damage to the Modem Card and flowmeter may result.

4. Loosen the four captive screws (1) at the corners of the 1010N-2 module (2) and carefully lift out the module disengaging it from the connector on the 1010N-1 module.

ASSEMBLY (see Figure 4)

5. Remove four captive screws (1) from the 1010N-2 module (2) loosened in Step 4 above. Install standoffs (3) from the mounting kit in the vacant positions.
6. Install the 1010N-2 module (2) carefully engaging connector P1 to the 1010N-1 module. Secure module by threading the four standoffs (3) installed in Step 5 above with their mates on the 1010N-1 module.
7. Check for properly alignment of P1.
8. Install the 1015N-2M Modem Card (4) on top of the 1010N-2 module (2) carefully engaging connector P1 on the 1015N-2M with its mate P1 on the 1010N-2 module. Secure the 1015N-2M by engaging its four captive screws (1) with the four standoffs (3) on the 1010N-2 module.

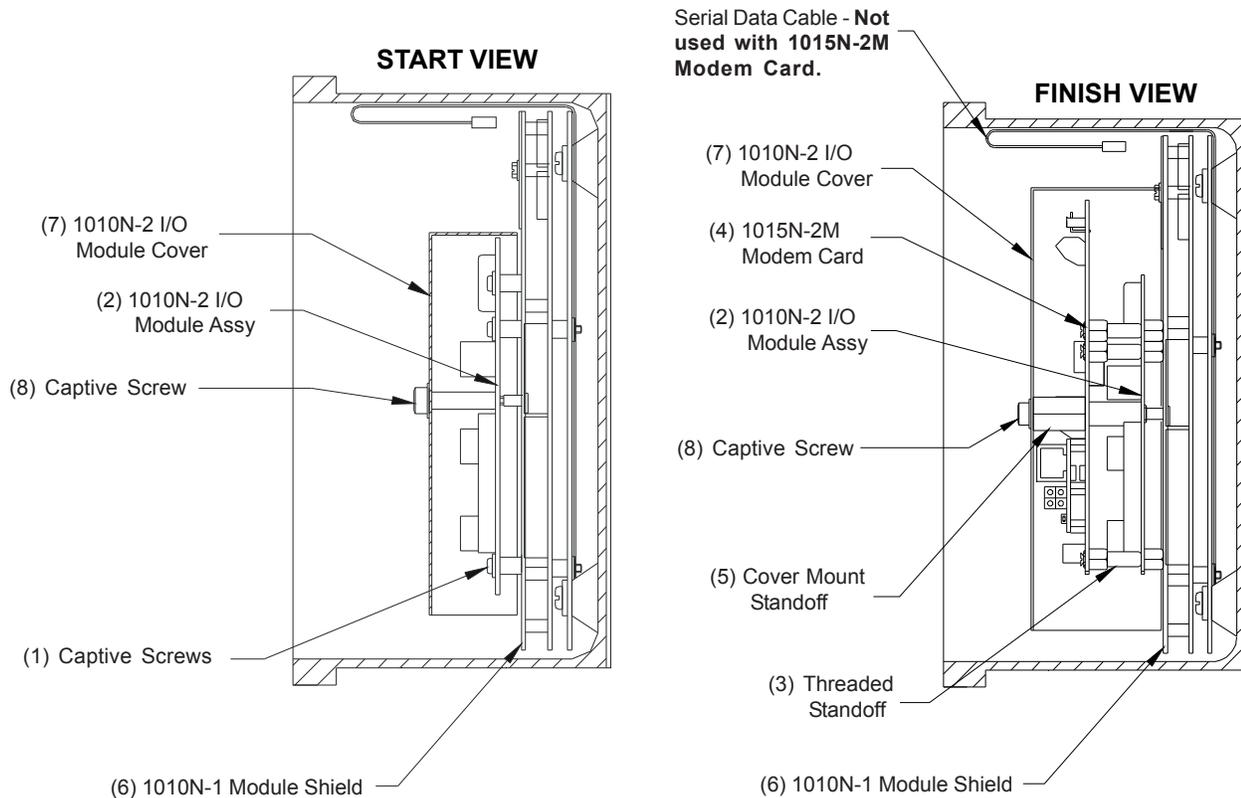


Figure 4. Option 2 Installation (side view)

9. Install the large threaded cover mount standoff (5) from the mounting kit through the hole at the center of the 1015N-2M Modem Card, through the spacer on the 1010N-2 module and then into the threaded receptacle on the 1010N-1 module shield (6).
10. Referring to installation drawing 1015N-2M-7 (see Appendix A), plug a telephone jack into J4 of the Modem Card. Thread the telephone line plug through one of the System 1010 flowmeter access holes and plug it into a standard telephone outlet (refer to paragraph 5.3 below for communication connection options).
11. Replace Access Cover (7) and finger tighten captive thumbscrew (8).
12. Place the 1010 flowmeter power switch to the ON position.
13. Close the 1010 flowmeter top cover by locking the cover latch.
14. Proceed to paragraph 5.2 to set 1010N flowmeter RS-232 parameters.

5.1.3 OPTION 3 INSTALLATION PROCEDURE (Mounting Kit 1015N-2M-MK3) 1010N-8N Module with 1010MN Type System (Refer to Installation Drawing 1015N-2M-MK-7 sheet 3 of 3)

DISASSEMBLY (see figure 2 and figure 5)

1. Referring to Figure 2 above, open the 1010 NEMA flowmeter top cover by releasing the cover latch.
2. Place the power switch to the OFF position.
3. Loosen the captive thumbscrew securing the Access Cover and remove Access Cover.

4. Loosen the four captive screws (1) at the corners of the 1010N-8M module (2) and carefully lift out the module disengaging it from the ribbon cable connecting it to the 1010N-2M module (3).
5. Leave the 1010N-2M module in place. Check to assure that the four corner standoffs (4) are securely threaded in place.

CAUTION: Do not connect a serial data cable to J1 on the 1015N-2M Modem Card or damage to the Modem Card and flowmeter may result.

ASSEMBLY (see Figure 5)

6. Remove the four captive screws (1) from the 1010N-8M module (2) in Step 4 above and discard. Install standoffs (5) from the mounting kit in the vacant positions, replacing the four 4-40 hex nuts to secure the standoff.
7. Install the 1010N-8M module (2) carefully engaging the ribbon cable connector (6) and dressing the cable for the best fit. Secure cable by threading the four standoffs (5) installed in Step 6 above with their mates on the 1010N-2M module (3).

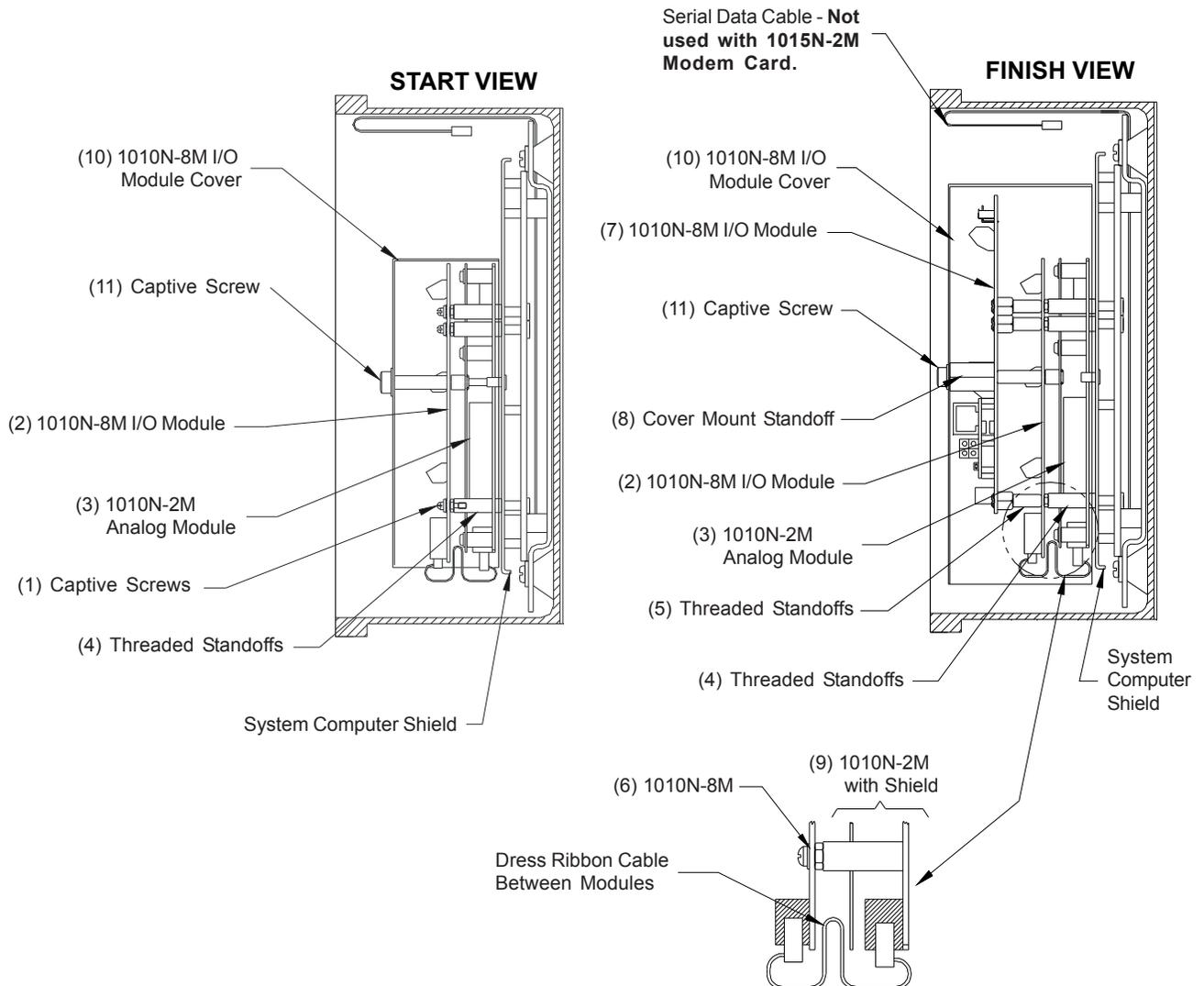


Figure 5. Option 3 Installation (side view)

8. Install the 1015N-2M Modem Card (7) on top of the 1010N-8M module (2) carefully engaging connector P1 on the 1015N-2M with its mate P2 on the 1010N-8M module. Secure the 1015N-2M by engaging its four captive screws (1) with the four standoffs (4) on the 1010N-8M module.
9. Install the large threaded cover mount standoff (8) from the mounting kit through the hole at the center of the 1015N-2M Modem Card, through the standoff on the 1010N-8M module and then into the threaded receptacle on the 1010N-2M module shield (9).
10. Referring to installation drawing 1015N-2M-7 (see Appendix A), plug a telephone jack into J4 of the Modem Card. Thread the telephone line plug through one of the System 1010 flowmeter access holes and plug it into a standard telephone outlet (refer to paragraph 5.3 below for communication connection options).
11. Replace Access Cover (10) and finger tighten captive thumbscrew (11).
12. Place the 1010 flowmeter power switch to the ON position.
13. Close the 1010 flowmeter top cover by locking the cover latch.
14. **Proceed to paragraph 5.2 to set 1010N flowmeter RS-232 parameters.**

5.2 SETTING 1010N FLOWMETER RS-232 PARAMETERS

Set the RS-232 parameters on the 1010N flowmeter to match the 1015N-2M Modem Card as follows:

- Baud Rate: 2400
- Parity: Odd
- Data Bits: 7
- Line Feed: Yes

5.3 TELEPHONE LINE CONNECTIONS

The 1015N-2M Modem Card contains an FCC-approved Data Access Arrangement (DAA) and may be connected to your conventional subscriber telephone line. It is suggested that you consult with your phone service provider and/or telecommunications specialist when connecting the modem to other types of telephone networks.

If the equipment is installed in a location where lightning strikes are possible, reduce this risk by providing your phone line and AC-power input with surge and lightning protection.

Connection to the telephone line is made in one of the follows ways:

1. Directly plug your telephone line into the modular connector RJ11 on PE2400 of the Modem Card (refer to Figure 1 and installation drawing 1015N-2M-7), or
2. Connect the two modular connectors together on the Modem Card with the supplied Modem Cable Assembly (P/N 1015-154) and then plug your telephone line to the 2-wire terminal block TB1 on the Modem Card (refer to drawing 1015N-2M-7 in Appendix B).

NOTE: When connecting your telephone line observe the following:

Connect the Green wire (Ring Signal) to TB1-1 and the Red wire (TIP) to TB1-2.

Once the telephone line connection is completed, simply turn the 1010N flowmeter power on and the modem is ready for use. The modem's communications parameters are re-loaded every time power is applied.

6. COMMUNICATIONS CONFIGURATION

The 1015N-2M Modem Card has been pre-configured at the factory to allow for proper interface with Controlotron's System 1010N flowmeters.

CAUTION: The 1015N-2M Modem Card will not function properly if the pre-configured settings are altered. If the settings are altered, refer to reconfiguration procedure below.

7. WINDOWS HyperTerminal™ SETUP

- Step 1. Invoke HyperTerminal™ (generally found in the Program Files / Accessories Folder).
- Step 2. Give your connection a name in the space provided.
- Step 3. Type in your meter's telephone number.
- Step 4. Then click on *Modify*, then *Configure* and select 2400 baud as the modem speed.
- Step 5. Now click on *Advanced* Tab and set Data Bits to 7 and Parity to Odd. You may leave Stop Bits at 1.
- Step 6. Then click on *Settings, Terminal Setup* and pick VT-100 as your preferred terminal emulation. Then click *OK*.
- Step 7. Now click on *Dial* and your modem should dial up the flowmeter.
- Step 8. Once your modem answers (you should hear the carrier tones while the modems are negotiating), click on "?" to see the list of available direct execute commands from the meter.
- Step 9. If you wish to use the meter menu, just type: Menu.
- Step 10. You can direct HyperTerminal™ to save the contents of your session to a named file by clicking on *Transfer* and then *Capture Text*. You may use the default file name to capture the flow meter data, which may then be copied to another file using your text editor.
- Step 11. To hang up, simply terminate HyperTerminal™ and the remote modem will hang up automatically and ready itself for the next call.

1015N-2M Reconfiguration Procedure

To reconfigure the 1015N-2M Modem Card to factory settings (see Appendix A for commands), proceed as follows:

1. Set up HyperTerminal™ as in the *first six steps of Section 7 above*.
2. Type: AT &F &W0 &W1 and press <ENTER> key. (Modem prints out: OK.)
3. Type: AT E0 M0 Q1 &C1 S0=1 &W0 &W1 and press <ENTER> key.
4. Type: AT &V and press <ENTER> key. Verify on the terminal that the following commands are individually stored in:

```
Active Profile: E0 M0 Q1 &C1 S0=1 &W0 &W1
Stored Profile 0: E0 M0 Q1 &C1 S0=1 &W0 &W1
Stored Profile 1: E0 M0 Q1 &C1 S0=1 &W0 &W1
```

5. Complete steps 7 through 11 of Section 7 above.

APPENDIX A

“AT” COMMAND SET and “S” REGISTERS

The command set for the 1015N-2M modems is fully compatible with the Hayes AT command set.

The modem is controlled and configured by the AT (attention command). Each command consists of the following elements (with exception of the A/and the +++ command which will be discussed later).

1. The two character sequence AT
2. A command
3. A command parameter
4. A carriage return

A command is not entered until a carriage return <ENTER> is entered. Spaces entered are ignored. For example, to enter the command ‘Answer’, type ATA and <ENTER>.

Some commands do not have parameters. Any missing parameters in a command are assigned the value zero, which may be a valid parameter for the command. AT <ENTER> without a command serves as a wake up code and an “OK” appears on the screen.

The modem queues commands in a 40-character command line. The command line begins with AT and can have several commands. A separator is not required between the commands.

The command line format is:

AT command (parameter) command (parameter) ... (enter)

When a carriage return is received, (which terminates the command line), the commands are performed in the order in which they are sent to the modem. If more than 40 characters are sent to the modem, an error occurs and all commands must be re-entered.

The tables on the following pages provide the AT and S-Register commands for the PE2400.

A single asterisk (*) indicates the command is not supported by the PE2400.

A double asterisk (**) indicates that the command has a different meaning for the PE2400.

“AT” Commands

Command	Function	Command	Function
Basic AT Commands			
AI	Re-execute command.	X0	Report basic call progress result codes, i.e., OK, CONNECT, RING, NO CARRIER (also, for busy, if enabled, and dial tone not detected), NO ANSWER and ERROR.
A	Go of(-hook and attempt to answer a call.	X1	Report basic call progress result codes and connections speeds (OK CONNECT, RING, NO CARRIER (also, for busy, if enabled, and dial tone not detected), NO ANSWER, CONNECT XXXX, and ERROR.
B0	Select V.22 connection at 1200 bps.	X2	Report basic call progress result codes and connections speeds, i.e., OK CONNECT, RING, NO CARRIER (also, for busy, if enabled, and dial tone not detected), NO ANSWER, CONNECT XXXX, and ERROR.
B1	Select Bell 212A connection at 1200 bps.	X3	Report basic call progress result codes and connection rate, i.e., OK CONNECT, RING, NO CARRIER, NO ANSWER, CONNECT XXXX, BUSY, and ERROR.
C1	Return OK message.	X4	Report all call progress result codes and connection rate, i.e., OK CONNECT, RING, NO CARRIER, NO ANSWER, CONNECT XXXX, BUSY, NO DIAL TONE and ERROR.
Dn	Dial modifier.	YO	Disable long space disconnect before on-hook.
E0	Turn off command echo.	Y1	Enable long space disconnect before on-hook.
E1	Turn on command echo.	Z0	Restore stored profile 0 after warm reset.
F0	Select auto-detect mode (equivalent to N1).	Z1	Restore stored profile 1 after warm reset.
F1	Select V.21 or Bell 103.	\G0	Disable modem to modem flow control.
F3	Select V23 line modulation.	\G1	Enable modem to modem flow control.
F4	Select V.22 or Bell 212A 1200 bps line speed.	\Kn	Controls break handling during three states: When modem receives a break from the DTE:
F5	Select V22 bis line modulation.	\K0,2,4	Enter on-line command mode, no break sent to the remote modem.
H0	Initiate a hangup sequence.	\K1	Clear buffers and send break to remote modem.
H1	If on-hook, go off-hook and enter command mode.	\K3	Send break to remote modem immediately.
10	Report product code.	\K5	Send break to remote modem in sequence with transmitted data.
11	Report precomputed checksum from ROM.		When modem receives \B in on-line command state:
12	Compute checksum and report status.	\K0,1	Clear buffers and send break to remote modem.
13	Report firmware revision, model, and interface type	\K2,3	Send break to remote modem immediately.
14	Report response programmed by an OEM.	\K4,5	Send break to remote modem in sequence with transmitted data.
15	Report the country code number.		When modem receives break from the remote modem:
16	Report modem data pump model.	K0,1	Clear data buffers and send break to DTE.
L0	Set low speaker volume.	\K2,3	Send a break immediately to DTE.
L1	Set low speaker volume.	\K,5	Send a break with received data to the DTE.
L2	Set medium speaker volume.	W0	Select normal speed buffered mode.
L3	Set high speaker volume.	W1	Select direct mode
M0	Turn speaker off.	W2	Select reliable link mode.
M1	Turn speaker on during handshaking and turn speaker off while receiving carrier.	W3	Select auto reliable mode.
M2	Turn speaker on during handshaking and while receiving carrier.	W4	Force LAPM mode.
M3	Turn speaker off during dialing and receiving carrier and turn speaker on during answering.	W5	Force MNP mode.
N0	Turn off automode detection.		
N1	Turn on automode detection.		
00	Go on-line.		
01	Go on-line and initiate a retrain sequence.		
P	Force pulse dialing.		
Q0	Allow result codes to DTE.		
Q1	Inhibit result codes to DTE.		
Sn	Select S register as default.		
Sn?	Return the value of S register n.		
=v	Set default S register to value v.		
?	Return the value of default S register.		
T	Force DTMF dialing.		
V0	Report short form (terse) result codes.		
V1	Report long form (verbose) result codes.		
W0	Report DTE speed in EC mode.		
W1	Report line speed, EC protocol and DTE speed.		
W2	Report DCE speed in EC mode.		

“AT” Commands

Command	Function	Command	Function
&C0	Force CD active regardless of the carrier state.	&T0	Terminate any test in progress.
&C1	Allow CD to follow the carrier state.	&T1	Initiate local analog loopback.
&D0	Interpret DTR ON-to-OFF transition per &Qn: &Q0, &Q5, &Q6 The modem ignores DTR. &Q1, &Q4 The modem hangs up. &Q2, &Q3 The modem hangs up.	&T2	Returns ERROR result code.
&D1	Interpret DTR ON-to-OFF transition per &Qn: &Q0, &Q1, &Q4. &Q5, &Q6 Asynchronous escape. &Q2, &Q3 The modem hangs up.	&T3	Initiate local digital loopback.
&D2	Interpret DTR ON-to-OFF transition per &Qn: &Q0 thru &Q6 The modem hangs up.	&T4	Allow remote digital loopback.
&D3	Interpret DTR ON-to-OFF transition per &Qn: &Q0, &Q1, &Q4. &Q5, &Q6 The modem performs soft reset. &Q2, &Q3 The modem hangs up.	&T5	Disallow remote digital loopback request.
&F	Recall (restore) factory profile.	&T6	Request an RDL without self-test
&G0	Disable guard tone.	&T7	Request an RDL with self-test.
&G1	Disable guard tone.	&T8	Initiate local analog loop with self-test.
&G2	Enable 1800 Hz guard tone.	&V	Display current configurations.
&J0	Set S register response only for compatibility.	&W0	Store the active profile in NVRAM profile 0.
&J1	Set S register response only for compatibility.	&W1	Store the active profile in NVRAM profile 1.
&K0	Disable DTE/DCE flow control.	&X0	Select internal timing for the transmit clock.
&K3	Enable RTS/CTS DTE/DCE flow control.	&X1	Select external timing for the transmit clock.
&K4	Enable XON/XOFF DTE/DCE low control.	&X2	Select slave receive timing for the transmit clock.
&L0	Select dial up line operation.	&Y0	Recall stored profile 0 upon power up.
&L1	Select leased line operation.	&Y1	Recall stored profile 1 upon power up.
&M0	Select direct asynchronous mode.	&Zn=x	Store dial string x (to 40) to location n (0 to 19).
&M1	Select sync connect with async off-line command mode.	%D	Refer to Percent (AT%) Commands table.
&M2	Select sync connect with async off-line command mode and enable DTR dialing of directory zero.	%E0	Disable line quality monitor and auto retrain.
&M3	Select sync connect with async off-line command mode and enable DTR to act as Talk/Data switch.	%E1	Enable line quality monitor and auto retrain.
&P0	Set 10 pps pulse dial with 39%/61% make/break.	%L	Return received line signal level.
&P1	Set 10 pps pulse dial with 33%/67% make/break.	%Q	Report the line signal quality.
&P2	Set 20 pps pulse dial with 39%/61% make/break.	%TTn	PTT certification test signals.
&P3	Set 20 pps pulse dial with 33%/67% make/break.	#CID=0	Disable Caller ID.
&Q0	Select direct asynchronous mode.	#CID=1	Enable Caller ID with formatted presentation.
&Q1	Select sync connect with async off-line command mode.	#CID=2	Enable Caller ID with unformatted presentation.
&Q2	Select sync connect with async off-line command mode and enable DTR dialing of directory zero.	ECC AT Commands	
&Q3	Select sync connect with async off-line command mode and enable DTR to act as Talk/Data switch.	%C0	Enable data compression.
&Q4	Select Hayes AutoSync mode.	%C1	Enable MNP 5 data compression.
&Q5	Modem negotiates an error corrected link.	%C2	Enable V.42 bis data compression.
&Q6	Select asynchronous operation in normal mode.	%C3	Enable both V.42 bis and MNP 5 compression.
&R0	CTS tracks FITS (async) or acts per V.25 (sync).	VA0	Set maximum block size in MNP to 64.
&R1	CTS is always active.	VA1	Set maximum block size in MNP to 128.
&S0	DSR is always active.	VA2	Set maximum block size in MNP to 192.
&S1	DSR acts per V.25.	VA3	Set maximum block size in MNP to 256.
		\Bn	Transmit Break to remote.
		\L0	Use stream mode for MNP
		\L1	Use block mode for MNP.
		MNP 10 AT Commands.	
		JM0	Disable MNP 10 link negotiation power adjustment.
		JM1	Enable MNP 10 link negotiation power adjustment.
		*H0	Select MNP 10 link negotiation at highest rate.
		*H1	Select MNP 10 link negotiation at 1200 bps
		-K0	Disable MNP 10 extended services.
		-K1	Enable MNP 10 extended services.
		-K2	Enable MNP 10 extended services detection only.
		-Q0	Disable MNP 10 fallback to V22 bis/ V.22.
		-Q1	Enable MNP 10 fallback to V22 bis/V.22.
		@M0	Select initial transmit level.
		:E0	Disable the compromise equalizer.
		:E1	Enable the compromise equalizer.

“S” Registers

Register	Function
S0	Rings to auto-answer*
S1	Ring counter
S2	Escape character*
S3	Carriage return character
S4	Line feed character
S5	Backspace character
S6	Maximum time to wait for dial tone*
S7	Wait for carrier*
S8	Pause time for dial delay modifier*
S9	Carrier detect response time*
S10	Carrier loss disconnect time*
S11	DTMF Tone Duration*
S12	Escape code guard time*
S13	Reserved
S14	General bit mapped options*
S15	Reserved
S16	Test mode bit mapped options (&T)*
S17	Reserved
S18	Test timer*
S19-S20	Reserved
S21	V24/general bit mapped options*
S22	Speaker/results bit mapped options*
S23	General bit mapped options*
S24	Sleep inactivity timer
S25	Delay to DTR (CT108) off*
S26	RTS-to-CTS (CT105-to-CT106) delay*
S27	General bit mapped options*
S28	General bit-mapped options
S29	Flash modifier time
S30	Inactivity timer*
S31	General bit-mapped options
S32	XON character
S33	XOFF character
S34-S35	Reserved
S37	Line connection speed*
S38	Delay before forced hangup*
S39	Flow control*
S40	General bit-mapped options
S41	General bit-mapped options
S42-545	Reserved
S91	PSTN transmit attenuation level
S92	Fax transmit attenuation level
S95	Result code messages control*
S99	Leased line transmit level
S202	Remote access escape character
ECC S Registers	
S36	LAPM failure control'
S46	Data compression control*
S48	V.42 negotiation control'
S62	Break handling control
S86	Call failure reason code
Cellular Registers	
S201	Cellular transmit level
<i>'Register value may be stored in one of two user profiles with the AT&W command.</i>	

“AT” COMMANDS and “S” REGISTERS EXCLUSIVE TO THE PE2400

Dial Modifiers

Command	Factory Default	Parameters/Description
; (semicolon)		Return to Idle State. “;” forces the modem to remain in the command state after dialing a number without disconnecting. The semicolon must be placed at the end of the dial command. Parameters: none
@		Wait for Quiet Answer Command. “@” causes the modem to look for rings followed by 5 seconds of silence before processing the next symbol in the dialing string. The S7 register value determines the maximum wait time. If quiet answer is detected, the dial modifiers following the command are executed. If busy is detected, the modem returns a BUSY result code and goes to the hang-up process, aborting further execution of commands. Parameters: none
!		Flash Hook Command. “!” causes the modem to go on-hook for 0.75 seconds. Parameters: none
, (comma)	2 seconds	Pause Command. “,” causes the modem to pause for a specified time during dialing. The S8 register value determines the pause time. Multiple commas may be used to increase the pause time. Parameters: none
0 to 9, A to D, #, *		Dial Digits/Characters. Characters 0 to 9, A, B, C, D, #, and * are valid. Characters A, B, C, D, #, and * represent specific tone pairs and, therefore, can be used only when tone dialing is selected. Parameters: none
W	30 seconds	Wait for Dial Tone. W causes the modem to wait up to a specified time for the dial tone to occur. The telephone number is dialed immediately upon dial tone detection. The S7 register value determines the maximum wait time. If a busy signal is detected instead of dial tone, the modem returns a BUSY result code and goes on-hook, abandoning subsequent instructions on the command line. Parameters: none

**“AT” COMMANDS and ‘S’ REGISTERS
EXCLUSIVE TO THE PE2400**

Ampersand (AT&) Commands

Command	Factory Default	Parameters / Description
&Dn	n = 0	<p>Data Terminal Ready Option. &Dn controls the Data Terminal Ready (DTR) options.</p> <p>Parameters: n = 0, 1, 2, 3</p> <p>n = 0 Modem ignores DTR (factory default)</p> <p>n = 1 Modem assumes command state when ON-to-OFF transition is detected on DTR.</p> <p>n = 2 Modem hangs up, assumes command state and disables auto-answer upon detecting ON-to-OFF transition on DTR.</p> <p>n = 3 Modem assumes initialization state upon detecting an ON-to-OFF transition on DTR.</p> <p>Result codes: OK</p>
&Jn	n = 0	<p>Auxiliary Relay Control. &Jn determines how the auxiliary relay is controlled.</p> <p>Parameters: n = 0,1</p> <p>n = 0 The auxiliary telco relay is commanded to stay open. Suitable for RJ-11, RJ-41 S, or RJ-45S type phone jack (factory default).</p> <p>n = 1 The auxiliary telco relay is controlled by off-hook/on-hook. If the modem is off-hook, the relay is commanded to close (connecting A to A1); if the modem is on-hook, the relay is commanded to open (disconnecting A from A1). Suitable for RJ-12 or RJ-13 type phone jacks.</p>

Percent (AT%) Commands

Command	Factory Default	Parameters / Description
%Dn	n = 0	<p>DTMF Attenuation. %Dn command sets the DTMF transmit level attenuation.</p> <p>n = 0 0 dB attenuation</p> <p>n = 1 2 dB attenuation</p> <p>n = 2 4 dB attenuation</p> <p>n = 3 6 dB attenuation</p> <p>n = 4 8 dB attenuation</p> <p>n = 5 10 dB attenuation</p> <p>n = 6 12 dB attenuation</p> <p>n = 7 14 dB attenuation</p>
%Ln	n = 0	<p>Transmit Attenuation. %Ln command sets the transmit level attenuation.</p> <p>n = 0 0 dB attenuation</p> <p>n = 1 2 dB attenuation</p> <p>n = 2 4 dB attenuation</p> <p>n = 3 6 dB attenuation</p> <p>n = 4 8 dB attenuation</p> <p>n = 5 10 dB attenuation</p> <p>n = 6 12 dB attenuation</p> <p>n = 7 14 dB attenuation</p>

“AT”COMMANDS and “S” REGISTERS EXCLUSIVE TO THE PE2400

“S” Registers

Register	Range	Units	Default	Description
S17	0-250	4 ms increments	00	Fax Mode Null Byte Timer
S20	0-127	seconds	00	Fax Mode Inactivity Timer
S22*	Bit Mapped	none	76 hex	Bit Mapped Options Register

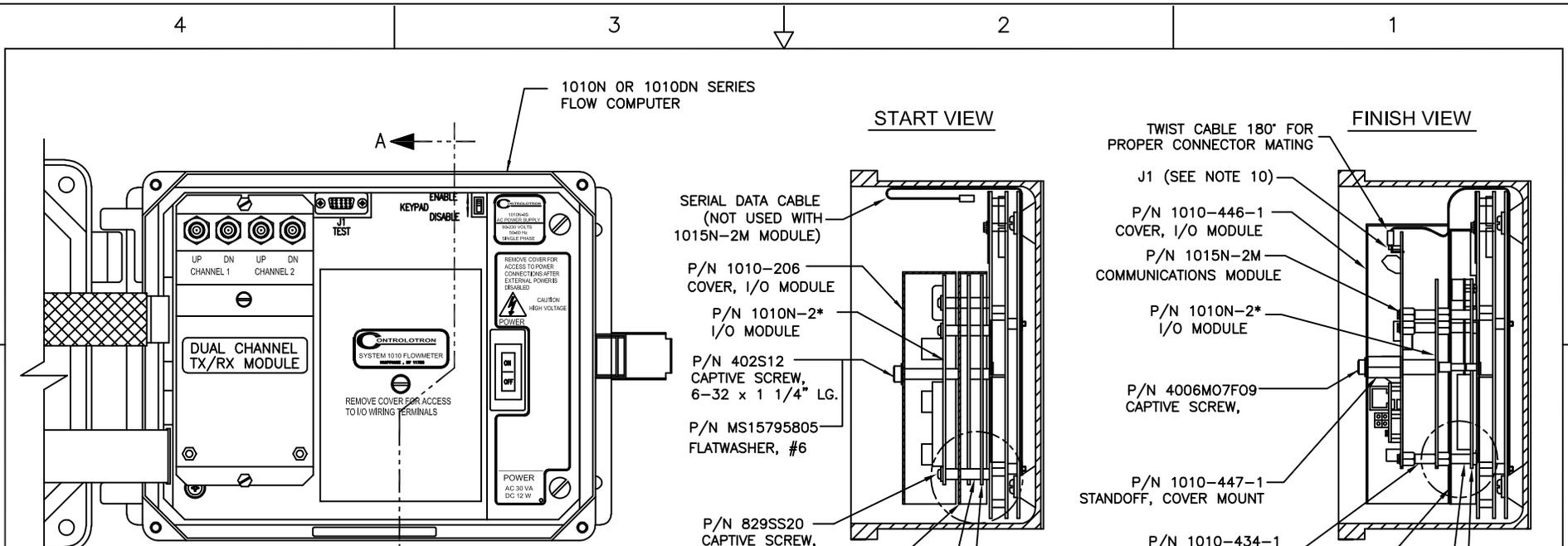
Notes:

*This S-Register is stored in the modem NVRAM upon receipt of the &W command so that the contents are preserved when modem power is removed.

APPENDIX B

ENGINEERING DRAWINGS

1015N-2M-MK-7 Assembly, 1015N-2M Module in 1010 Series Flow and Energy Computers
1015N-2M-7 Installation Drawing, Communications Module



DISASSEMBLY/ASSEMBLY PROCEDURE

- DISASSEMBLY:**
1. LOOSEN (1) CAPTIVE SCREW P/N 402S12 AND LIFT OFF I/O MODULE COVER P/N 1010-206.
 2. LOOSEN (4) CAPTIVE SCREWS P/N 829SS20 AT CORNERS OF THE 1010N-2* MODULE AND CAREFULLY LIFT OUT THE MODULE, DISENGAGING IT FROM THE CONNECTOR ON THE 1010N-5* MODULE.
 3. LIFT OFF THE SHIELD P/N 1010-247 COVERING THE 1010N-5* MODULE.
 4. LEAVE THE 1010N-5* MODULE IN PLACE. CHECK TO ASSURE THAT THE (4) CORNER STANDOFFS P/N 1010-246 ARE SECURELY THREADED IN PLACE.
- ASSEMBLY:**
5. INSTALL SHIELD P/N 1010-379 SUPPLIED WITH THE 1015N-2M-MK1 MOUNTING KIT COVERING THE 1010N-5* MODULE. THIS SHIELD REPLACES 1010-247 REMOVED IN STEP 3 ABOVE.
 6. REMOVE THE (4) CAPTIVE SCREWS P/N 829SS20 FROM THE 1010N-2* MODULE REMOVED IN STEP 2 ABOVE. INSTALL STANDOFFS P/N 1010-434-1 FROM THE MOUNTING KIT IN THE VACANT POSITIONS.
 7. INSTALL THE 1010N-2* MODULE, CAREFULLY ENGAGING THE CONNECTOR ON THE 1010N-5* MODULE BELOW. SECURE BY THREADING THE (4) STANDOFFS INSTALLED IN STEP 6 ABOVE WITH THEIR MATES ON THE 1010N-5* MODULE.
 8. INSTALL THE 1015N-2M MODULE ATOP THE 1010N-2* MODULE, CAREFULLY ENGAGING CONNECTOR P1(SERIAL INPUT) ON THE 1015N-2M WITH ITS MATE P1 ON THE 1010N-2*. SECURE THE 1015N-2M BY ENGAGING ITS (4) CAPTIVE SCREWS WITH THE (4) STANDOFFS ON THE 1010N-2*.
 9. INSTALL THE LARGE THREADED SPACER FROM THE MOUNTING KIT P/N 1010-447-1 THROUGH THE HOLE AT THE CENTER OF THE 1015N-2M MODULE INTO THE THREADED RECEPTACLE ON THE SHIELD P/N 1010-379 INSTALLED IN STEP 5.
 10. AFTER WIRING IS INSTALLED (SEE DRAWING 1015N-2M-7) INSTALL COVER P/N 1010-446-1 FROM THE MOUNTING KIT AND SECURE BY ENGAGING CAPTIVE SCREW P/N 4006M07F09 (PREASSEMBLED TO COVER) WITH THREADED SPACER P/N 1010-447-1 INSTALLED IN STEP 9.

MODULE LOADING OPTION 1 : 1010N-5* WITH 1010N-2* IN 1010N/DN TYPE SYSTEM
USE MOUNTING KIT 1015N-2M-MK1

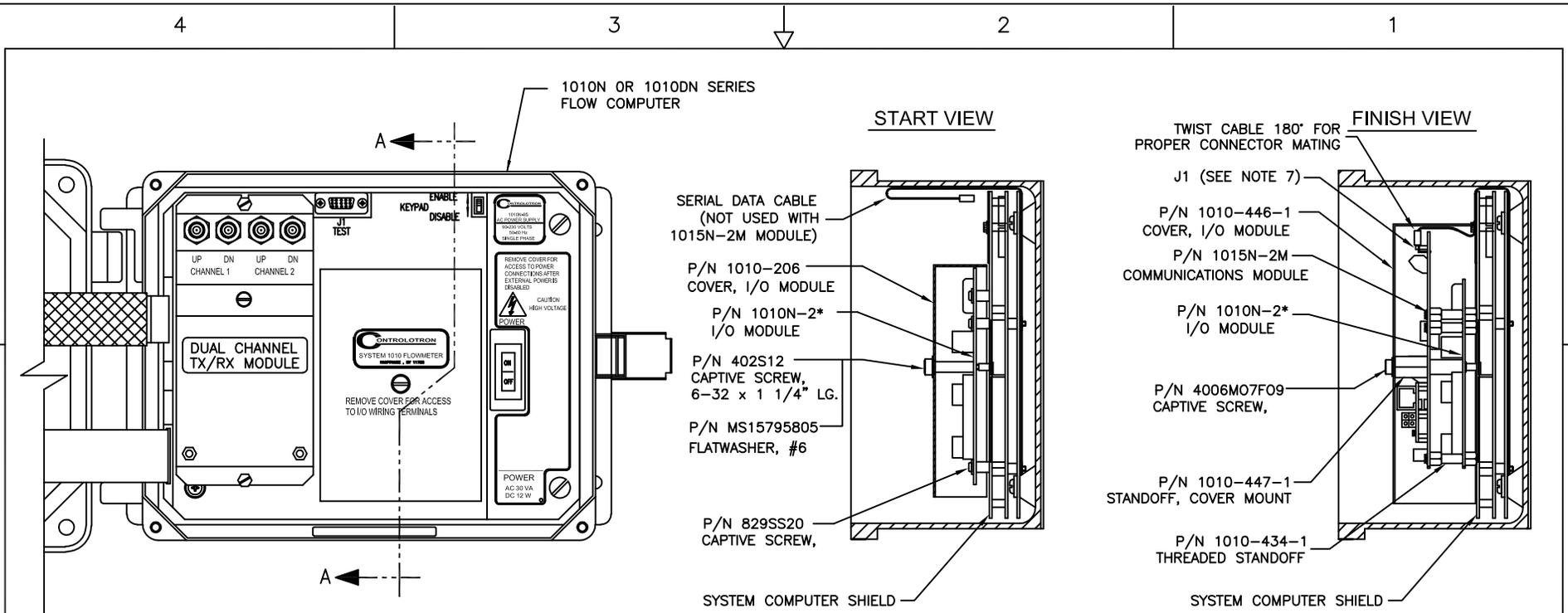
CAUTION: STATIC SENSITIVE ELECTRONIC DEVICES

CONTROLTRON
HAUPPAUGE, NY 11788

**ASS'Y, 1015N-2M MODULE
IN 1010 SERIES FLOW AND
ENERGY COMPUTERS**

DO NOT SCALE THIS DRAWING	CONTRACT NO.
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON- FRACTIONS- DECIMALS- ANGLES- +/- 1/64" XX+/-0.01 +/--0'30"	DR. M.KEENAN DATE 5/6/04
MATERIAL:	CHK _____ DATE _____
FINISH:	ENG _____ DATE _____
	PROD _____ DATE _____
	APPD _____ DATE _____
	CERTIFIED _____
	DATE _____

SIZE	CODE IDENT NO.	REV.
C	21614	B
1015N-2M-MK-7		
SCALE: NONE	WT.	SHEET 1 OF 3



DISASSEMBLY/ASSEMBLY PROCEDURE

DISASSEMBLY:

1. LOOSEN (1) CAPTIVE SCREW P/N 402S12 AND LIFT OFF I/O MODULE COVER P/N 1010-206.
2. LOOSEN (4) CAPTIVE SCREWS P/N 829SS20 AT CORNERS OF THE 1010N-2* MODULE AND CAREFULLY LIFT OUT THE MODULE, DISENGAGING IT FROM THE CONNECTOR ON THE 1010N-1* SYSTEM COMPUTER MODULE.

ASSEMBLY:

3. REMOVE THE (4) CAPTIVE SCREWS P/N 829SS20 FROM THE 1010N-2* MODULE REMOVED IN STEP 2 ABOVE. INSTALL STANDOFFS P/N 1010-434-1 FROM THE MOUNTING KIT IN THE VACANT POSITIONS.
4. INSTALL THE 1010N-2* MODULE, CAREFULLY ENGAGING THE CONNECTOR ON THE SYSTEM COMPUTER MODULE BELOW. SECURE BY THREADING THE (4) STANDOFFS INSTALLED IN STEP 3 ABOVE WITH THEIR MATES ON THE SYSTEM COMPUTER MODULE.
5. INSTALL THE 1015N-2M MODULE ATOP THE 1010N-2* MODULE, CAREFULLY ENGAGING CONNECTOR P1 ON THE 1015N-2M WITH ITS MATE P1 ON THE 1010N-2*. SECURE THE 1015N-2M BY ENGAGING ITS (4) CAPTIVE SCREWS WITH THE (4) STANDOFFS ON THE 1010N-2*.
6. INSTALL THE LARGE THREADED SPACER FROM THE MOUNTING KIT P/N 1010-447-1 THROUGH THE HOLE AT THE CENTER OF THE 1015N-2M MODULE, THROUGH THE SPACER ON THE 1010N-2* MODULE INTO THE THREADED RECEPTACLE ON THE SYSTEM COMPUTER SHIELD.
7. AFTER WIRING IS INSTALLED (SEE DRAWING 1015N-2M-7) INSTALL COVER P/N 1010-446-1 FROM THE MOUNTING KIT AND SECURE BY ENGAGING CAPTIVE SCREW P/N 4006M07F09 (PREASSEMBLED TO COVER) WITH THREADED SPACER P/N 1010-447-1 INSTALLED IN STEP 6.

MODULE LOADING OPTION 2 : 1010N-2* ONLY IN 1010N/DN TYPE SYSTEM
USE MOUNTING KIT 1015N-2M-MK2

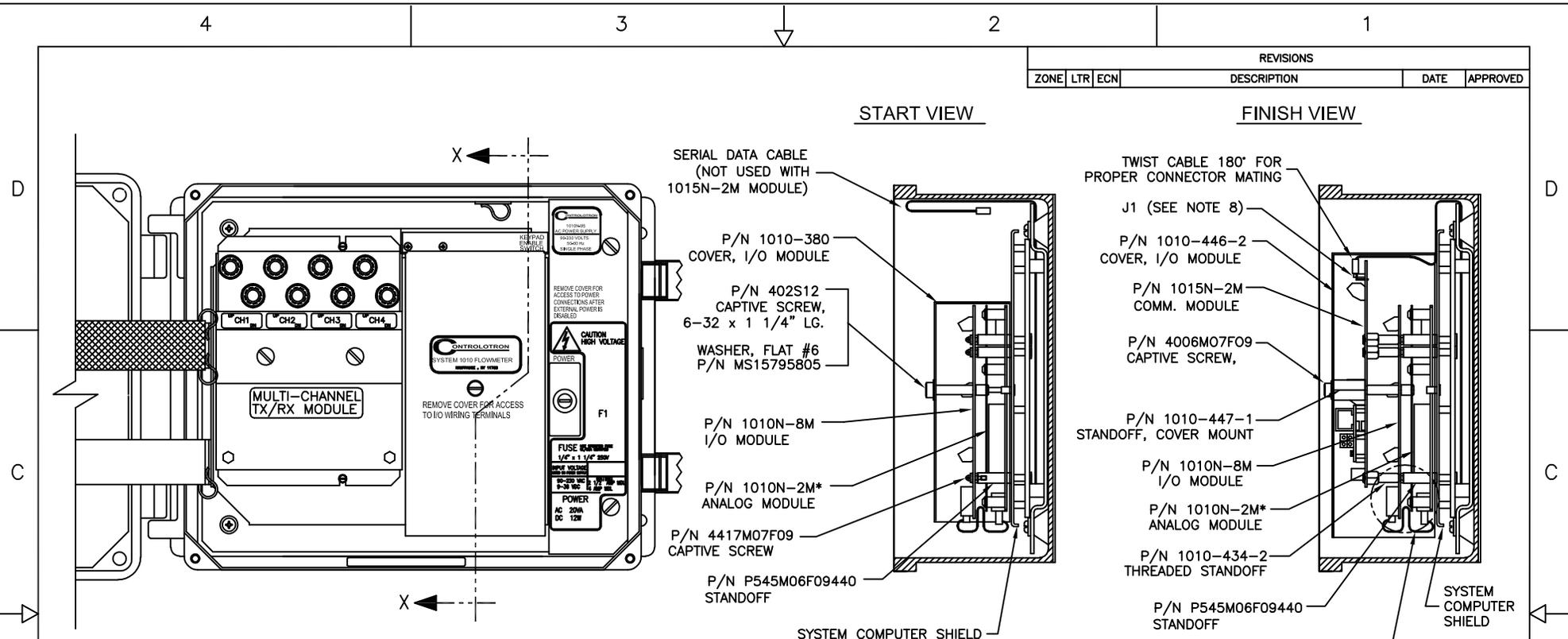
CAUTION: STATIC SENSITIVE ELECTRONIC DEVICES

DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON— FRACTIONS— DECIMALS— ANGLES— +/- 1/64" XX+/-0.01 +/--0°30' MATERIAL: FINISH:	CONTRACT NO. DR. H.J. DATE 11/26/02 CHK. DATE ENG. DATE PROD. DATE APPD. DATE CERTIFIED DATE	CONTROLTRON HAUPPAUGE, NY 11788		
	ASS'Y, 1015N-2M MODULE IN 1010 SERIES FLOW AND ENERGY COMPUTERS			
	SIZE C	CODE IDENT NO. 21614	1015N-2M-MK-7	REV. B
	SCALE: NONE	WT.	SHEET 2 OF 3	

REVISIONS					
ZONE	LTR	ECN	DESCRIPTION	DATE	APPROVED

START VIEW

FINISH VIEW



DISASSEMBLY/ASSEMBLY PROCEDURE

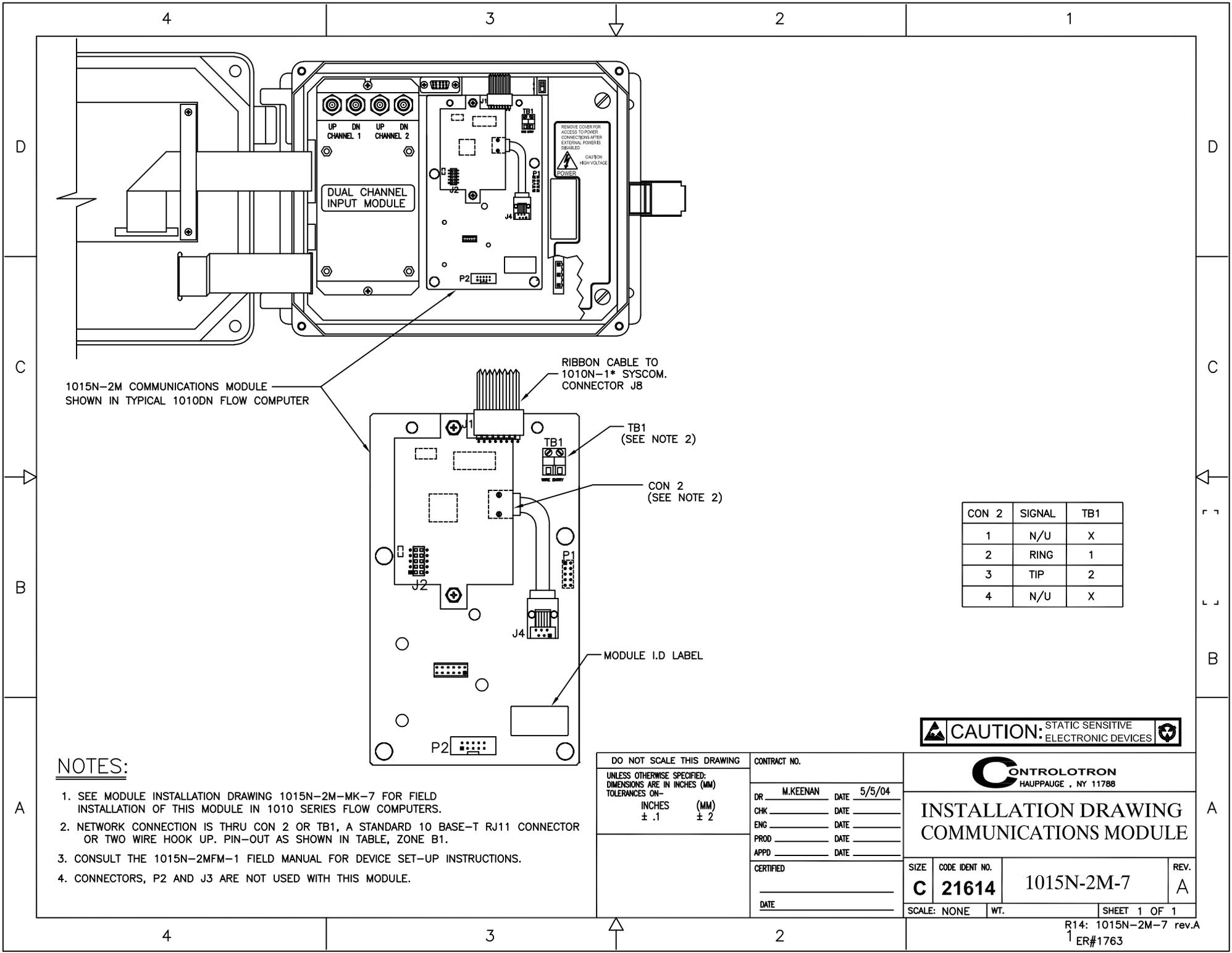
- DISASSEMBLY:**
1. LOOSEN (1) CAPTIVE SCREW P/N 402S12 AND LIFT OFF I/O MODULE COVER P/N 1010-380.
 2. LOOSEN (4) CAPTIVE SCREWS P/N 4417M07F09 AT CORNERS OF THE 1010N-8M MODULE AND CAREFULLY LIFT OUT THE MODULE, DISENGAGING IT FROM THE RIBBON CABLE CONNECTING IT TO THE 1010N-2M MODULE. SEE ZONE B1.
 3. LEAVE THE 1010N-2M MODULE IN PLACE. CHECK TO ASSURE THAT THE (4) CORNER STANDOFFS P/N P545M06F09440 ARE SECURELY THREADED IN PLACE.
- ASSEMBLY:**
4. REMOVE THE (4) CAPTIVE SCREWS P/N 4417M07F09 FROM THE 1010N-8M MODULE REMOVED IN STEP 2 ABOVE AND DISCARD. INSTALL STANDOFFS P/N 1010-434-2 FROM THE MOUNTING KIT IN THE VACANT POSITIONS, REPLACING THE (4) 4-40 HEX. NUTS TO HOLD THE STANDOFF CAPTIVE.
 5. INSTALL THE 1010N-8M MODULE, CAREFULLY ENGAGING THE RIBBON CABLE CONNECTOR AND DRESSING THE CABLE FOR THE BEST FIT. SECURE BY THREADING THE (4) STANDOFFS INSTALLED IN STEP 4 ABOVE WITH THEIR MATES ON THE 1010N-2M MODULE.
 6. INSTALL THE 1015N-2M MODULE ATOP THE 1010N-8M MODULE, CAREFULLY ENGAGING CONNECTOR P1 ON THE 1015N-2M WITH ITS MATE P2 ON THE 1010N-8M. SECURE THE 1015N-2M BY ENGAGING ITS (4) CAPTIVE SCREWS WITH THE (4) STANDOFFS ON THE 1010N-8M.
 7. INSTALL THE LARGE THREADED SPACER FROM THE MOUNTING KIT, P/N 1010-447-1 THROUGH THE HOLE AT THE CENTER OF THE 1015N-2M MODULE, THROUGH THE SPACER ON THE 1010N-8M MODULE INTO THE THREADED RECEPTACLE ON THE 1010N-2M MODULE SHIELD.
 8. AFTER WIRING IS INSTALLED (SEE DRAWING 1015N-2M-7) INSTALL COVER P/N 1010-446-2 FROM THE MOUNTING KIT AND SECURE BY ENGAGING CAPTIVE SCREW P/N 4006M07F09 (PREASSEMBLED TO COVER) WITH THREADED SPACER P/N 1010-447-1 INSTALLED IN STEP 7.

MODULE LOADING OPTION 3 : 1010N-8M WITH 1010N-2M* IN 1010MN TYPE SYSTEM
USE MOUNTING KIT 1015N-2M-MK3



DO NOT SCALE THIS DRAWING	CONTRACT NO.
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON— FRACTIONS— DECIMALS— ANGLES— +/- 1/64" XX+/-0.01 +/--0°30'	DR. M. KEENAN DATE 5/604
MATERIAL:	CHK _____ DATE _____
FINISH:	ENG _____ DATE _____
	PROD _____ DATE _____
	APPD _____ DATE _____
	CERTIFIED _____

CONTROLOTRON HAUPPAUGE, NY 11788	
ASS'Y, 1015N-2M MODULE IN 1010 SERIES FLOW AND ENERGY COMPUTERS	
CODE IDENT NO. C 21614	REV. B
NONE	3 OF 3



CON 2	SIGNAL	TB1
1	N/U	X
2	RING	1
3	TIP	2
4	N/U	X

NOTES:

1. SEE MODULE INSTALLATION DRAWING 1015N-2M-MK-7 FOR FIELD INSTALLATION OF THIS MODULE IN 1010 SERIES FLOW COMPUTERS.
2. NETWORK CONNECTION IS THRU CON 2 OR TB1, A STANDARD 10 BASE-T RJ11 CONNECTOR OR TWO WIRE HOOK UP. PIN-OUT AS SHOWN IN TABLE, ZONE B1.
3. CONSULT THE 1015N-2MFM-1 FIELD MANUAL FOR DEVICE SET-UP INSTRUCTIONS.
4. CONNECTORS, P2 AND J3 ARE NOT USED WITH THIS MODULE.

DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES (MM) TOLERANCES ON-	CONTRACT NO.
	DR. M. KEENAN DATE 5/5/04
INCHES (MM) ± .1 ± 2	CHK _____ DATE _____
	ENG _____ DATE _____
	PROD _____ DATE _____
	APPD _____ DATE _____
	CERTIFIED _____
	DATE _____

CAUTION • STATIC SENSITIVE • ELECTRONIC DEVICES

CONTROLTRON
HAUPPAUGE, NY 11788

**INSTALLATION DRAWING
COMMUNICATIONS MODULE**

SIZE	CODE IDENT NO.	REV.
C	21614	A
1015N-2M-7		
SCALE: NONE	WT.	SHEET 1 OF 1