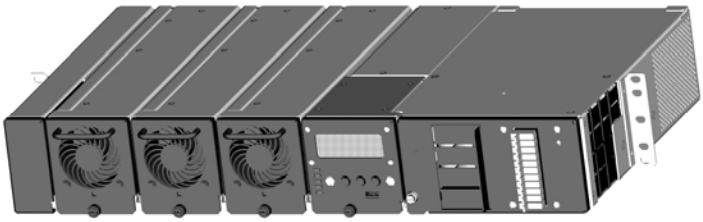
LXP INTRODUCTION

LXP is Emerson Network Power's next generation small power platform.



MODEL XP4890 OVERVIEW

Model XP4890 is a –48VDC Integrated Power System that operates with LXP Power Conversion Units (PCUs) powered from 120/208/240 VAC and featuring constant-power design.

This single-shelf Power System provides up to 5250 watts of power conversion and distribution.

PCUs:

The heart of this system is the LXP Power Conversion Unit (PCU). Available in three output ratings, the LXP PCU operates at 0.99 power factor and with less than 5% THD. Designed for positive ground applications, the PCU normal output voltage ranges from 47 to 58 volts, with an equalize voltage adjustable down to 47 volts, and a test voltage adjustable down to 45 volts.

Each PCU monitors the input voltage and automatically selects one of two operating modes. Full output is available for nominal 208/240VAC operation. A reduced power mode provides half power for nominal 120VAC input. For 208/240V applications, the reduced-power mode means that the PCU does not inhibit at low line, but reduces its output to half.

The system can be set by the user to operate the PCUs in either the Power Limit or Current Limit mode.

Power Limit Mode: With the system set to the Power Limit mode, the PCUs will operate as a constant-voltage source or a constant-power source, depending upon load demands. Transition between source types is completely automatic.

- **Constant Voltage Source:** For any initial output voltage setting from 47 to 58 volts, output voltage remains constant regardless of load. This is the normal operating condition, in which loads are being supplied and batteries are float charged. PCUs will operate as a constant-voltage source unless load increases to the point where the product of load current and output voltage equals the specified full output power rating.
- **Constant Power Source:** As load increases above specified full output power rating, output current continues to increase, but output voltage decreases as required to maintain constant output power. This will continue until output current reaches a predetermined (non-adjustable) limit. Load demands above this point result in output voltage dropping rapidly to maintain current and power within their limits.

Current Limit Mode: With the system set to the Current Limit mode, the PCUs will operate as a constant-voltage source or a constant-current source, depending upon load demands. Transition between source types is completely automatic.

- **Constant Voltage Source:** For any initial output voltage setting from 47 to 58 volts, output voltage remains constant regardless of load. This is the normal operating condition, in which loads are being supplied and batteries are float charged. PCUs will operate as a constant-voltage source unless load current increases to the user-adjustable current limit setpoint (maximum is 110% of full load rating).
- **Constant Current Source:** If load current increases above the current limit setting, output voltage decreases linearly to maintain output current at current limit.

PCUs will continue to operate in higher ambient temperatures at reduced power. Refer to Paragraph 2.3.6(C) for further information regarding thermal power and current limiting.

MCA:

The Model LXC300 MCA controls the steady state output voltage to within 0.5% of any setting, from no load to full load.

The MCA provides a two-line vacuum fluorescent display and keypad for local user interface, as well as an integrated Web Interface for remote access via an Ethernet connection.

Distribution:

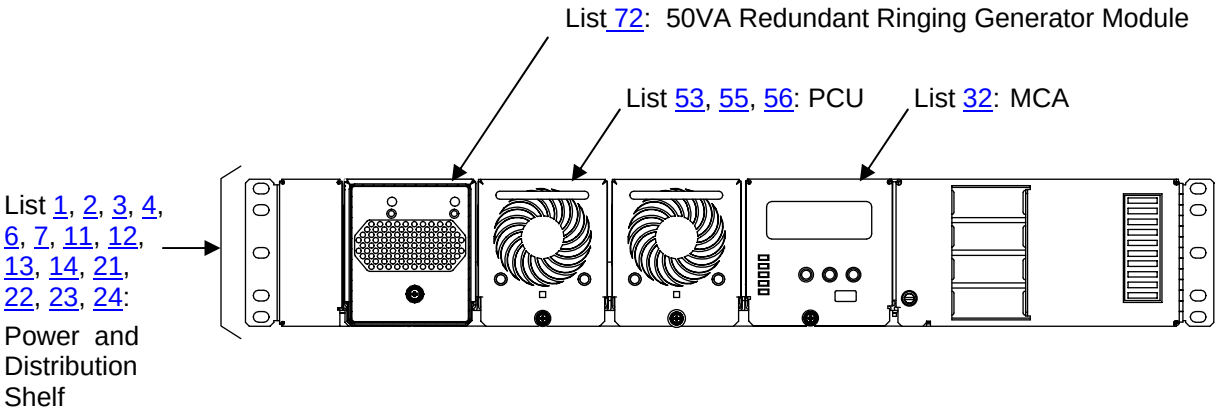
Power distribution is provided through up to (4) bullet nose circuit breakers or TPS/TLS fuses, as well as up to (10) GMT alarm-type fuses. Battery protection is available through Low Voltage Load Disconnect or Low Voltage Battery Disconnect options.

Ringing:

An in-shelf ringing generator option provides 50VA of continuous ringing power with built-in redundancy and transfer capability.

Family:	LXP
Spec. No.:	589200300
Model:	XP4890
Output Voltage:	–48VDC, nominal
Output Capacity:	
System:	114 Amperes, 5,250 Watts max. (208/240V) 49 Amperes, 2250 Watts max. (120V)
List 53 PCU (LXP1000)	16.7A @ -58.0VDC to 21.7A @ -46VDC, 1000 Watts max. (208/240V) 8.35 @ -58.0VDC to 10.85A @ -46VDC, 500 Watts max. (120V)
List 55 PCU (LXP1500):	25A @ -58.0VDC to 32.6A @ -46VDC, 1500 Watts max. (208/240V) 12.5 @ -58.0VDC to 16.3A @ -46VDC, 750 Watts max. (120V)
List 56 PCU (LXP1750):	29.2A @ -58.0VDC to 38.0A @ -46VDC, 1750 Watts max. (208/240V) 12.5 @ -58.0VDC to 16.3A @ -46VDC, 750 Watts max. (120V)
Total Distribution:	**List 1, 2, 3, 4, 21, 22, 23, 24:** 100 Amperes max. **List 6, 7:** 80 Amperes @ 50C° or less ambient 60 Amperes @ above 50C° ambient. **List 11, 12, 13, 14:** 100 Amperes @ 50C° or less ambient 90 Amperes @ above 50C° ambient.
Agency Approval:	UL 60950 Recognized, CAN/CSA 22.2
Framework Type:	Equipment Shelf for Relay Rack Mounting
Mounting Width:	23”
Mounting Depth:	12”
Mounting Height:	3.5”
Front Projection:	5”
Access:	**List 1, 2, 3, 4, 21, 22, 23, 24:** Front, sides, top for installation, front for operation and maintenance. **List 6, 7:** Front, sides for installation, front for operation and maintenance. **List 11, 12, 13, 14:** Front for installation, operation and maintenance.
Expansion Shelves Available:	None
Control:	Microprocessor
Color:	Textured Cool Gray
List Options:	120V Line Cord Kit, 208/240V Line Cord Kit, Local Computer Access Cable, MCA Control Bus Cable, Analog Battery Temperature Probe, Digital Battery Temperature Probe, Battery Temperature Probe Concentrator Module, 50 VA Redundant Ringing Generator Module
Accessory Options:	Circuit Breakers, Fuses, Lugs, Replacement MCA Control Bus Termination Plug, Load Shed Card, Ringing Distribution Module, AP6C57EA/EB Ring & Distribution Module, Field-Replaceable Components
Environment:	
Specification Compliant Full Output:	-20°C to +65°C (-4°F to +149°F)
Reduced Load:	+65°C to +80°C (+149°F to +176°F)

589200300



Other Options…

List 40: AC Line Cord Kit, 120VAC, for List 1, 2, 3, 4, 6, 7, 21, 22, 23, 24

List 41: AC Line Cord Kit, 208/240VAC, for List 1, 2, 3, 4, 6, 7, 21, 22, 23, 24

List 42: Molex Connecor AC Input Option for List 6, 7

List 43: AC Vertical Feed Assembly

List 46: Molex Connecor AC Input Option for List 6, 7

List 47: AC Line Cord Kit, 120VAC, for List 11, 12, 13, 14

List 48: AC Line Cord Kit, 240VAC, for List 11, 12, 13, 14

List 50: Blank Module

List 73: Replacement Ringing Generator for List 72

List 80: Cable, Local Computer Access

List 81: Cable, MCA Control Bus

List 90: Battery Temperature Probe

List 91, 93: Battery Temperature Probe

List 92: Battery Temperature Probe Concentrator Module (TXM)

List 94: TXM Interface Cable-10 ft.

List 95: TXM Interface Cable-15 ft.

See *ACCESSORY INFORMATION* Section for…

Distribution Devices

Recommended Wire Sizes, Branch Circuit Protection, and Lugs

TXM Extension Cable

Load Shed Card

Ringing Distribution Module

AP6C57EA/EB Ring & Distribution Module

TABLE OF CONTENTS

System Overview | Picture | Ordering Information: List Descriptions, Accessory Descriptions | List of Parts | Specifications | Physical Size Information | Related Documentation

ORDERING INFORMATION

List Options

Order the following by the items Part Number as specified in the following table.

When viewing electronically, click on the *List #* to jump to the detailed description page.

List No.	Part Number	Description	Mounting Positions (1U = 1-3/4")
1	58920030001	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Load Shunt, dual AC feed.	2U
2	58920030002	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Load & Battery Shunts, dual AC feed.	2U
3	58920030003	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Load & Battery Shunts & LVLD, dual AC feed.	2U
4	58920030004	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Load & Battery Shunts & LVBD, dual AC feed.	2U
6	58920030006	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Battery Protective Device and Battery Shunt, dual AC feed.	2U
7	58920030007	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Battery Protective Device, Battery Shunt & BLVD, dual AC feed.	2U
11	58920030011	23" Integrated Power & Distribution Shelf, All Front Access Connections, up to 114 Amps (5250W) of power conversion, equipped with Load Shunt, dual AC feed.	2U
12	58920030012	23" Integrated Power & Distribution Shelf, All Front Access Connections, up to 114 Amps (5250W) of power conversion, equipped with Load & Battery Shunts, dual AC feed.	2U
13	58920030013	23" Integrated Power & Distribution Shelf, All Front Access Connections, up to 114 Amps (5250W) of power conversion, equipped with Load & Battery Shunts & LVLD, dual AC feed.	2U
14	58920030014	23" Integrated Power & Distribution Shelf, All Front Access Connections, up to 114 Amps (5250W) of power conversion, equipped with Load & Battery Shunts & LVBD, dual AC feed.	2U
21	58920030021	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Load Shunt, single AC feed.	2U
22	58920030022	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Load & Battery Shunts, single AC feed.	2U
23	58920030023	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Load & Battery Shunts & LVLD, single AC feed.	2U

List No.	Part Number	Description	Mounting Positions (1U = 1-3/4")
24	58920030024	Integrated Power & Distribution Shelf, 23", up to 114 Amps (5250W) of power conversion, equipped with Load & Battery Shunts & LVBD, single AC feed.	2U
32	58920030032	LXC300 Meter, Control, Alarm Assembly (MCA), with Ethernet	--
40	58920030040	AC Line Cord Kit, (1) 14.5 ft. cord, 120VAC, NEMA L5-30P Plugs, for List 1, 2, 3, 4, 21, 22, 23 and 24.	--
41	58920030041	AC Line Cord Kit, (1) 14.5 ft. cord, 208/240VAC, NEMA L6-30P Plugs, for List 1, 2, 3, 4, 21, 22, 23 and 24.	--
42	58920030042	AC Input Option, Molex connectors on harness, for List 6 & 7.	--
43	58920030043	AC Input Vertical Feed Assembly	--
46	58920030046	AC Input Option, shelf-mounted Molex connectors, for List 6 & 7.	--
47	58920030047	AC Line Cord Kit, (2) 120VAC, NEMA 5-15P Plugs, 6- and 10-ft. length available, for List 11, 12, 13, and 14 only	--
48	58920030048	AC Line Cord Kit, (2) 240VAC, NEMA 6-20P Plugs, 6- and 10-ft. length available, for List 11, 12, 13, and 14 only	--
50	58920030050	Blank Module	--
53	58920030053	Model LXP1000 Power Conversion Unit (PCU), 1000W, 48V, 120/208/240VAC	--
55	58920030055	Model LXP1500 Power Conversion Unit (PCU), 1500W, 48V, 120/208/240VAC	--
56	58920030056	Model LXP1750 Power Conversion Unit (PCU), 1750W, 48V, 120/208/240VAC	--
72	58920030072	Redundant Ringing Generator Module, 50VA, In-shelf	--
73	58920030073	Replacement Ringing Generator for List 73	--
80	58920030080	Cable, Local Computer Access	--
81	58920030081	Cable, RJ-45, MCA Control Bus	--
90	58920030090	Battery Temperature Probe, Analog	--
91	58920030091	Battery Temperature Probe, Digital, 25 ft. cord	--
92	58920030092	Temperature Probe Concentrator Module (TXM)	--
93	58920030093	Battery Temperature Probe, digital, 2-1/2 ft. cord	--
94	58920030094	Cable, interface, TXM to MCA, 10 ft. long.	--
95	58920030095	Cable, interface, TXM to MCA, 15 ft. long.	--

Accessory Options

Order the following by the items Part Number as specified in the following table.

When viewing electronically, click on the *link* to jump to the detailed description page.

Description	Part Number
Recommended Wire Sizes, Branch Circuit Protection, and Lugs	See ACCESSORY DESCRIPTIONS Section
Distribution Devices	
Replacement Cables	
TXM Extension Cable (Part No. 514153)	
Load Shed Card (Part No. 528927)	
Ringing Distribution Module (Part No. 528608)	
Field-Replaceable Components	

LIST DESCRIPTIONS

List 1: 23" Power and Distribution Shelf with Load Shunt, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and up to 100A of distribution.
- Provides (4) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 40 amperes.***
- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current).
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via front-access terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

Not a direct replacement for earlier versions of List 1. Earlier versions of List 1 provided a single AC feed. To replace a single-feed version of List 1, order List 21.

Ordering Notes

1) Order one (1) List 32 MCA.
2) Order PCUs per List 53, 55 or 56 as required.
3) Order Ringing Generators per List 72 as required.
4) If AC line cords are required, order two (2) List 40 (120VAC) or two (2) List 41 (208/240VAC) per List 1 Power Shelf.
5) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
6) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
7) For bullet nose distribution positions, order fuses, as required, per Table 6.
8) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
9) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (two-hole, 1/4" bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.
10) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.
11) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, and 4 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 2: 23" Power and Distribution Shelf with Load and Battery Shunts, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and up to 100A of distribution.
- Provides (4) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 40 amperes.***
- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current) and one (1) battery shunt.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via front-access terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

Not a direct replacement for earlier versions of List 2. Earlier versions of List 2 provided a single AC feed. To replace a single-feed version of List 2, order List 22.

Ordering Notes

1) Order one (1) List 32 MCA.
2) Order PCUs per List 53, 55 or 56 as required.
3) Order Ringing Generators per List 72 as required.
4) If AC line cords are required, order two (2) List 40 (120VAC) or two (2) List 41 (208/240VAC) per List 2 Power Shelf.
5) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
6) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
7) For bullet nose distribution positions, order fuses, as required, per Table 6.
8) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
9) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (two-hole, 1/4" bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.
10) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.
11) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, and 4 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 3: 23" Power and Distribution Shelf with Load and Battery Shunts, Low Voltage Load Disconnect, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and up to 100A of distribution.
- Provides (4) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 40 amperes.***
- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current), one (1) battery shunt, and Low Voltage Load Disconnect.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via front-access terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

Not a direct replacement for earlier versions of List 3. Earlier versions of List 3 provided a single AC feed. To replace a single-feed version of List 3, order List 23.

Ordering Notes

1) Order one (1) List 32 MCA.
2) Order PCUs per List 53, 55 or 56 as required.
3) Order Ringing Generators per List 72 as required.
4) If AC line cords are required, order two (2) List 40 (120VAC) or two (2) List 41 (208/240VAC) per List 3 Power Shelf.
5) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
6) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
7) For bullet nose distribution positions, order fuses, as required, per Table 6.
8) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
9) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (two-hole, 1/4" bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.
10) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.

11) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, and 4 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 4: 23" Power and Distribution Shelf with Load and Battery Shunts, Low Voltage Battery Disconnect, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and up to 100A of distribution.
- Provides (4) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 40 amperes.***
- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current), one (1) battery shunt, and Low Voltage Battery Disconnect.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via front-access terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

Not a direct replacement for earlier versions of List 4. Earlier versions of List 4 provided a single AC feed. To replace a single-feed version of List 4, order List 24.

Ordering Notes

1) Order one (1) List 32 MCA.
2) Order PCUs per List 53, 55 or 56 as required.
3) Order Ringing Generators per List 72 as required.
4) If AC line cords are required, order two (2) List 40 (120VAC) or two (2) List 41 (208/240VAC) per List 4 Power Shelf.
5) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
6) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
7) For bullet nose distribution positions, order fuses, as required, per Table 6.
8) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
9) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (two-hole, 1/4" bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.

10) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.

11) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, and 4 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 6: 23" Power and Distribution Shelf with Battery Shunt, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and 80A of distribution at ambient temperatures of 50°C or less and 60A at ambient temperatures above 50°C.
- Provides (3) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 50 amperes.***

- Provides (1) mounting position for bullet nose Battery Disconnect Fuseholder or Circuit Breaker (3 to 100A TPS/TLS-Type Fuse or 1 to 100A Bullet Nose Type Circuit Breaker).

  Caution: ***A circuit breaker with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device. A fuse with a rating greater than 70 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker used in ambient temperatures above +50°C ambient SHALL BE 75 amperes. The maximum size fuse used in ambient temperatures above +50°C ambient SHALL BE 70 amperes.***

- Provides (5) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).

  Caution: ***The maximum size fuse used in ambient temperatures above +50°C ambient SHALL BE 10 amperes.***

- Provides five (5) GMT Fuse Distribution Cables, one per fuse position. Each cable is 12' long, 16 AWG, terminated on one end with a mating connector that plugs into the shelf GMT fuse connector, and left un-terminated at the remaining end for connection to customer loads.
- Provides (1) battery shunt.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via front-access terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Included are two control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

None.

Ordering Notes

1) Order one (1) List 32 MCA.
2) Order PCUs per List 53, 55 or 56 as required.
3) Order Ringing Generators per List 72 as required.
4) If AC line cords are required, order two (2) List 40 (120VAC) or two (2) List 41 (208/240VAC) per List 6 Power Shelf.
5) If Molex connector AC input is required, order one (1) List 42 or 46 per List 6 Power Shelf.
6) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
7) For bullet nose distribution and battery disconnect positions, order circuit breakers, as required, per Table 5. ***Note:*** *For battery disconnect positions, Electrical Trip (white handle) circuit breakers are not recommended.*
8) For bullet nose distribution and battery disconnect positions, order fuses, as required, per Table 6.
9) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
10) Order one (1) Load lug (two-hole, No. 10 bolt clearance holes on 5/8" centers) and one (1) Load Return lug (two-hole, No. 10 bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.
11) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.
12) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, 4, 6 and 7 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 7: 23" Power and Distribution Shelf with Battery Shunt, Low Voltage Battery Disconnect, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and 80A of distribution at ambient temperatures of 50°C or less and 60A at ambient temperatures above 50°C.
- Provides (3) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 50 amperes.***

- Provides (1) mounting position for bullet nose Battery Disconnect Fuseholder or Circuit Breaker (3 to 100A TPS/TLS-Type Fuse or 1 to 100A Bullet Nose Type Circuit Breaker).

  Caution: ***A circuit breaker with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device. A fuse with a rating greater than 70 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Caution: ***The maximum size circuit breaker used in ambient temperatures above +50°C ambient SHALL BE 75 amperes. The maximum size fuse used in ambient temperatures above +50°C ambient SHALL BE 70 amperes.***

- Provides (5) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).

Caution: ***The maximum size fuse used in ambient temperatures above +50°C ambient SHALL BE 10 amperes.***

- Provides five (5) GMT Fuse Distribution Cables, one per fuse position. Each cable is 12' long, 16 AWG, terminated on one end with a mating connector that plugs into the shelf GMT fuse connector, and left un-terminated at the remaining end for connection to customer loads.
- Provides one (1) battery shunt.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via front-access terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Included are two control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

None.

Ordering Notes

1) Order one (1) List 32 MCA.
2) Order PCUs per List 53, 55 or 56 as required.
3) Order Ringing Generators per List 72 as required.
4) If AC line cords are required, order two (2) List 40 (120VAC) or two (2) List 41 (208/240VAC) per List 7 Power Shelf.
5) If Molex connector AC input is required, order one (1) List 42 or 46 per List 6 Power Shelf.
6) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
7) For bullet nose distribution and battery disconnect positions, order circuit breakers, as required, per Table 5. ***Note:*** *For battery disconnect positions, Electrical Trip (white handle) circuit breakers are not recommended.*
8) For bullet nose distribution and battery disconnect positions, order fuses, as required, per Table 6.
9) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
10) Order one (1) Load lug (two-hole, No. 10 bolt clearance holes on 5/8" centers) and one (1) Load Return lug (two-hole, No. 10 bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.
11) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.
12) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, 4, 6 and 7 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 11: 23" Front Access Power and Distribution Shelf with Load Shunt, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power and Distribution Shelf rated for up to 114A (5250W) of power conversion, and 100A of distribution at ambient temperatures of 50°C or less and 90A at ambient temperatures above 50°C.
- All installer's connections are front-access.
- Provides (3) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other circuit breaker or fuse.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 50 amperes. A circuit breaker or fuse located in the mounting position adjacent to a 40 ampere or 50 ampere circuit breaker or fuse SHALL BE a maximum of 30 amperes. Where two 40 ampere or 50 ampere circuit breakers or fuses are used, an empty mounting space SHALL BE provided between them.***
- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current).
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Provides connections for three (3) battery strings via locking-type plugs.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- All installer's connections are made through the front.
- See Physical Size Information for dimensions.

Restrictions

Shelf accommodates max. two (2) PCUs when List 47 is included.

Ordering Notes

1) Order one (1) List 32 MCA.
2) Order PCUs per List 53, 55 or 56 as required.
3) Order Ringing Generators per List 72 as required.
4) If AC line cords are required, order one (1) List 47 (120VAC) or 48 (240VAC) per shelf as required for voltage and cord length. ***Note:*** *List 47 120VAC line cords are restricted to powering one (1) PCU each.* Also available are List 40 and 41.
5) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
6) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
7) For bullet nose distribution positions, order fuses, as required, per Table 6.
8) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.

9) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (one-hole, 1/4" bolt clearance) as required for each bullet nose distribution position per Table 2.

10) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.

11) Order Battery connectors as required per Battery Wire Sizes and Connectors—List 11, 12, 13, and 14 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

12) For ringing and DC distribution in imbedded subscriber loop carrier systems (such as SLC-96 or SLC Series-5), order one (1) AP6C57EA/EB Ring & Distribution Module. (See "Accessory Information".)

List 12: 23" Front Access Power and Distribution Shelf with Load and Battery Shunts, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power and Distribution Shelf rated for up to 114A (5250W) of power conversion, and 100A of distribution at ambient temperatures of 50°C or less and 90A at ambient temperatures above 50°C.
- All installer's connections are front-access.
- Provides (3) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other circuit breaker or fuse.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 50 amperes. A circuit breaker or fuse located in the mounting position adjacent to a 40 ampere or 50 ampere circuit breaker or fuse SHALL BE a maximum of 30 amperes. Where two 40 ampere or 50 ampere circuit breakers or fuses are used, an empty mounting space SHALL BE provided between them.***
- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current) and one (1) battery shunt.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Provides connections for three (3) battery strings via locking-type plugs.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- All installer's connections are made through the front.
- See Physical Size Information for dimensions.

Restrictions

Shelf accommodates max. two (2) PCUs when List 47 is included.

Ordering Notes

1) Order one (1) List 32 MCA.

2) Order PCUs per List 53, 55 or 56 as required.

3) Order Ringing Generators per List 72 as required.

4) If AC line cords are required, order one (1) List 47 (120VAC) or 48 (240VAC) per shelf as required for voltage and cord length. ***Note:*** *List 47 120VAC line cords are restricted to powering one (1) PCU each.* Also available are List 40 and 41.

5) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.

6) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.

7) For bullet nose distribution positions, order fuses, as required, per Table 6.

8) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.

9) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (one-hole, 1/4" bolt clearance) as required for each bullet nose distribution position per Table 2.

10) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.

11) Order Battery connectors as required per Battery Wire Sizes and Connectors—List 11, 12, 13, and 14 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

12) For ringing and DC distribution in imbedded subscriber loop carrier systems (such as SLC-96 or SLC Series-5), order one (1) AP6C57EA/EB Ring & Distribution Module. (See "Accessory Information".)

List 13: 23" Front Access Power and Distribution Shelf with Load and Battery Shunts, Low Voltage Load Disconnect, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power and Distribution Shelf rated for up to 114A (5250W) of power conversion, and 100A of distribution at ambient temperatures of 50°C or less and 90A at ambient temperatures above 50°C.
- All installer's connections are front-access.
- Provides (3) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other circuit breaker or fuse.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 50 amperes. A circuit breaker or fuse located in the mounting position adjacent to a 40 ampere or 50 ampere circuit breaker or fuse SHALL BE a maximum of 30 amperes. Where two 40 ampere or 50 ampere circuit breakers or fuses are used, an empty mounting space SHALL BE provided between them.***

- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current), one (1) battery shunt, and Low Voltage Load Disconnect.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Provides connections for three (3) battery strings via locking-type plugs.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)

- All installer's connections are made through the front.
- See Physical Size Information for dimensions.

Restrictions

Shelf accommodates max. two (2) PCUs when List 47 is included.

Ordering Notes

1) Order one (1) List 32 MCA.
2) Order PCUs per List 53, 55 or 56 as required.
3) Order Ringing Generators per List 72 as required.
4) If AC line cords are required, order one (1) List 47 (120VAC) or 48 (240VAC) per shelf as required for voltage and cord length. ***Note:*** *List 47 120VAC line cords are restricted to powering one (1) PCU each.* Also available are List 40 and 41.
5) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
6) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
7) For bullet nose distribution positions, order fuses, as required, per Table 6.
8) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
9) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (one-hole, 1/4" bolt clearance) as required for each bullet nose distribution position per Table 2.
10) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.
11) Order Battery connectors as required per Battery Wire Sizes and Connectors—List 11, 12, 13, and 14 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.
12) For ringing and DC distribution in imbedded subscriber loop carrier systems (such as SLC-96 or SLC Series-5), order one (1) AP6C57EA/EB Ring & Distribution Module. (See "Accessory Information".)

List 14: 23" Front Access Power and Distribution Shelf with Load and Battery Shunts, Low Voltage Battery Disconnect, Dual AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power and Distribution Shelf rated for up to 114A (5250W) of power conversion, and 100A of distribution at ambient temperatures of 50°C or less and 90A at ambient temperatures above 50°C.
- All installer's connections are front-access.
- Provides (3) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other circuit breaker or fuse.***

Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 50 amperes. A circuit breaker or fuse located in the mounting position adjacent to a 40 ampere or 50 ampere circuit breaker or fuse SHALL BE a maximum of 30 amperes. Where two 40 ampere or 50 ampere circuit breakers or fuses are used, an empty mounting space SHALL BE provided between them.***

- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current), one (1) battery shunt, and Low Voltage Battery Disconnect.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides two (2) AC input circuits via terminal block connections. Conduit openings are provided on side panel in front of mounting angle.
- Provides connections for three (3) battery strings via locking-type plugs.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- All installer's connections are made through the front.
- See Physical Size Information for dimensions.

Restrictions

Shelf accommodates max. two (2) PCUs when List 47 is included.

Ordering Notes

1) Order one (1) List 32 MCA.
2) Order PCUs per List 53, 55 or 56 as required.
3) Order Ringing Generators per List 72 as required.
4) If AC line cords are required, order one (1) List 47 (120VAC) or 48 (240VAC) per shelf as required for voltage and cord length. ***Note:*** *List 47 120VAC line cords are restricted to powering one (1) PCU each.* Also available are List 40 and 41.
5) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
6) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
7) For bullet nose distribution positions, order fuses, as required, per Table 6.
8) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
9) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (one-hole, 1/4" bolt clearance) as required for each bullet nose distribution position per Table 2.
10) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.
11) Order Battery connectors as required per Battery Wire Sizes and Connectors—List 11, 12, 13, and 14 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.
12) For ringing and DC distribution in imbedded subscriber loop carrier systems (such as SLC-96 or SLC Series-5), order one (1) AP6C57EA/EB Ring & Distribution Module. (See "Accessory Information".)

List 21: 23" Power and Distribution Shelf with Load Shunt, Single AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and up to 100A of distribution.
- Provides (4) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified,

circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 40 amperes.***

- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current).
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides one (1) AC input circuit via front-access terminal block connections. Conduit opening is provided on side panel in front of mounting angle.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

None.

Ordering Notes

1) Direct replacement for earlier versions of List 1. Earlier versions of List 1 provided a single AC feed. To replace a single-feed version of List 1, order List 21.
2) Order one (1) List 32 MCA.
3) Order PCUs per List 53, 55 or 56 as required.
4) Order Ringing Generators per List 72 as required.
5) If an AC line cord is required, order one (1) List 40 (120VAC) or one (1) List 41 (208/240VAC) per List 21 Power Shelf.
6) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
7) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
8) For bullet nose distribution positions, order fuses, as required, per Table 6.
9) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
10) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (two-hole, 1/4" bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.
11) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.
12) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, and 4 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 22: 23" Power and Distribution Shelf with Load and Battery Shunts, Single AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and up to 100A of distribution.

- Provides (4) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 40 amperes.***

- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current) and one (1) battery shunt.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides one (1) AC input circuit via front-access terminal block connections. Conduit opening is provided on side panel in front of mounting angle.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

None.

Ordering Notes

1) Direct replacement for earlier versions of List 2. Earlier versions of List 1 provided a single AC feed. To replace a single-feed version of List 2, order List 22.
2) Order one (1) List 32 MCA.
3) Order PCUs per List 53, 55 or 56 as required.
4) Order Ringing Generators per List 72 as required.
5) If an AC line cord is required, order one (1) List 40 (120VAC) or one (1) List 41 (208/240VAC) per List 22 Power Shelf.
6) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
7) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
8) For bullet nose distribution positions, order fuses, as required, per Table 6.
9) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
10) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (two-hole, 1/4" bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.
11) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.
12) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, and 4 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 23: 23" Power and Distribution Shelf with Load and Battery Shunts, Low Voltage Load Disconnect, Single AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and up to 100A of distribution.
- Provides (4) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 40 amperes.***
- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current), one (1) battery shunt, and Low Voltage Load Disconnect.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides one (1) AC input circuit via front-access terminal block connections. Conduit opening is provided on side panel in front of mounting angle.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

None.

Ordering Notes

1) Direct replacement for earlier versions of List 3. Earlier versions of List 3 provided a single AC feed. To replace a single-feed version of List 3, order List 23.
2) Order one (1) List 32 MCA.
3) Order PCUs per List 53, 55 or 56 as required.
4) Order Ringing Generators per List 72 as required.
5) If an AC line cord is required, order one (1) List 40 (120VAC) or one (1) List 41 (208/240VAC) per List 23 Power Shelf.
6) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
7) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
8) For bullet nose distribution positions, order fuses, as required, per Table 6.
9) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.
10) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (two-hole, 1/4" bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.
11) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.

12) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, and 4 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 24: 23" Power and Distribution Shelf with Load and Battery Shunts, Low Voltage Battery Disconnect, Single AC Feed

List of Parts

Features

- Provides common equipment for one (1) Integrated Power & Distribution Shelf rated for up to 114 Amperes (5250W) of power conversion and up to 100A of distribution.
- Provides (4) mounting positions for bullet nose Load Distribution Fuseholders or Circuit Breakers (3 to 100A TPS/TLS-Type Fuses or 1 to 100A Bullet Nose Type Circuit Breakers). Unless otherwise specified, circuit breakers or fuses will be mounted from top to bottom, starting with the highest capacity and working to the lowest capacity.

  Caution: ***A circuit breaker or fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

  Caution: ***The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 40 amperes.***
- Provides ten (10) mounting positions for GMT-type distribution fuses (30A max. total, 1-15A fuses).
- Provides one (1) load shunt (total distribution current), one (1) battery shunt, and Low Voltage Battery Disconnect.
- Provides mounting positions for one (1) MCA and up to three (3) PCUs.
- Provides one (1) AC input circuit via front-access terminal block connections. Conduit opening is provided on side panel in front of mounting angle.
- Included are two (2) control bus termination plugs. (All control bus ports in the system must be filled, with either a cable or a termination plug.)
- Mounts in a standard 23" relay rack.

Restrictions

None.

Ordering Notes

1) Direct replacement for earlier versions of List 4. Earlier versions of List 4 provided a single AC feed. To replace a single-feed version of List 4, order List 24.
2) Order one (1) List 32 MCA.
3) Order PCUs per List 53, 55 or 56 as required.
4) Order Ringing Generators per List 72 as required.
5) If an AC line cord is required, order one (1) List 40 (120VAC) or one (1) List 41 (208/240VAC) per List 24 Power Shelf.
6) If battery charge temperature compensation is required, order a Battery Temperature Probe as required, order per List 90. For multiple probes, order One (1) List 92 TXM and List 91 probes as required.
7) For bullet nose distribution positions, order circuit breakers, as required, per Table 5.
8) For bullet nose distribution positions, order fuses, as required, per Table 6.
9) Order one (1) Part No. 117201 fuseholder per fuse ordered in 7) above.

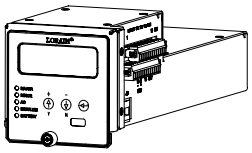
10) Order one (1) Load lug (one-hole, 1/4" bolt clearance hole) and one (1) Load Return lug (two-hole, 1/4" bolt clearance holes on 5/8" centers) as required for each bullet nose distribution position per Table 2.

11) For GMT alarm type fuse distribution positions, order fuses, as required, per Table 7.

12) Order Battery lugs as required per Battery Wire Sizes and Lugs—List 1, 2, 3, and 4 Power and Distribution Shelves in the *ACCESSORY INFORMATION* section.

List 32: Model LXC300 Meter, Control and Alarm Assembly (MCA)

List of Parts



Features

- Consists of one (1) Model LXC300 Meter, Control and Alarm assembly (MCA). Refer to SPECIFICATIONS for a description of MCA functions.
- Mounts in Main Power Shelf. Controls and monitors the following LXP equipment:

Component	Maximum Number*
PCU	17 in up to 3 shelves
Distribution Cabinet (DSM)	4
List 72 Redundant Ringing Generator Module	4 (2 generators ea.)
Load Shed Card, P/N 528927	4

* MCA maximum—quantities may be otherwise restricted in your system.

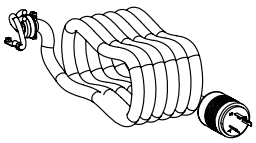
- Standard equipment includes a local user interface as well as a Web Interface for browser-based remote access via an Ethernet port.
- Can be equipped with a **Battery Reserve Time Prediction Option**. With this software option installed, the MCA monitors battery voltage during discharge, and uses a Telcordia-defined adaptive algorithm to predict remaining time before a user-selectable voltage is reached. A "Battery Reserve Low" alarm alerts user when the predicted remaining time is less than a user-selectable alarm setpoint. The option also provides a "Battery Health Alarm", which alerts user when batteries are nearing end-of-life.
- Can be equipped with an **SNMP Option**. With this software option installed, the MCA supports SNMP v2 (Simple Network Management Protocol) interface in a TCP/IP network. Communications to and from the MCA is accomplished with a MIB (Management Information Base) browser via the MCA Ethernet port.

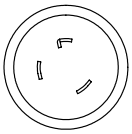
Ordering Notes

1) Order one (1) List 32 for each List 1, 2, 3, 4, 11, 12, 13, 14, 21, 22, 23, or 24 ordered.
2) Order one (1) List 80 if local PC access to Web Interface is required.
3) Order **Battery Reserve Time Prediction Option** if required.
4) Order **SNMP Option** if required.

List 40: AC Line Cord Kit, 120VAC

List of Parts





NEMA 5L-30P

Features

- Provides one (1) 14.5 ft. long AC input cord, equipped with a NEMA L5-30P, 30A twist-lock plug.
- Cord is factory installed.

Restrictions

For 120 VAC only. See List 41 for 208/240 VAC applications.

Not available with List 43 AC Input Vertical Feed Assembly.

Not available on List 6 or 7 if equipped with List 42 or 46.

Ordering Notes

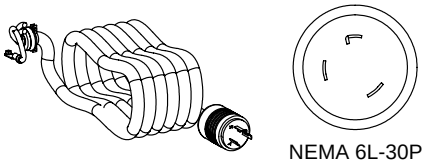
1) For 120VAC operation in List 21, 22, 23 or 24 shelves, order one (1) List 40 per Power Shelf.
2) For 120VAC operation in all other List number shelves, order two (2) List 40 per Power Shelf.

List 41: AC Line Cord Kit, 208/240VAC

List of Parts

Features

- Provides one (1) 14.5 ft. long AC input cord equipped with a NEMA L6-30P, 30A twist-lock plug.
- Cord is factory installed.



Restrictions

For 208/240 VAC only. See List 40 for 120 VAC applications.

Not available with List 43 AC Input Vertical Feed Assembly.

Not available on List 6 or 7 if equipped with List 42 or 46.

Ordering Notes

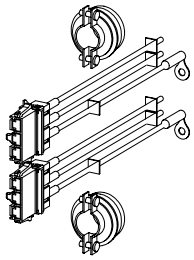
1) For 208/240VAC operation in List 21, 22, 23 or 24 shelves, order one (1) List 40 per Power Shelf.
2) For 208/240VAC operation in all other List number shelves, order two (2) List 40 per Power Shelf.

List 42: AC Input Molex Connector Option, 120/208/240VAC

List of Parts

Features

- Provides two (2) six-inch long AC input cables terminated with Molex connectors. Cables extend from left-hand side of shelf in front of mounting angle.
- One cable feeds PCUs in mounting positions 1 and 3; the other cable feeds mounting position 2.
- For 120/208/240 VAC.
- Option is factory installed.



Restrictions

For use on List 6 and 7 shelves only.

Not available with List 43 AC Input Vertical Feed Assembly.

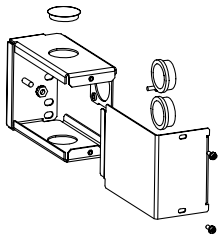
Mating connectors are required.

Ordering Notes

1) For Molex AC input connectors on cables, order one (1) List 42 per List 6 or 7 shelf.
2) For mating AC input connectors, order from Table 1E.

List 43: AC Input Vertical Feed Assembly

List of Parts



Features

- Provides top or bottom feed of AC input wiring into the Power Shelf.

Restrictions

Not available with List 40, 41, 47 or 48 AC Line Cord options.

Not available on List 6 or 7 if equipped with List 42 or 46.

Ordering Notes

1) For top or bottom AC feed, order (1) List 43.

List 46: AC Input Molex Connector Option, 120/208/240VAC

List of Parts

Features

- Provides two (2) Molex connectors in a housing on the left-hand side of the shelf in front of the mounting angle.
- One connector feeds PCUs in mounting positions 1 and 3; the other connector feeds mounting position 2.
- For 120/208/240 VAC.
- Option is factory installed.

Restrictions

For use on List 6 and 7 only.

Not available with List 43 AC Input Vertical Feed Assembly.

Mating connectors are required.

Ordering Notes

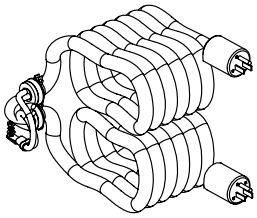
1) For chassis-mounted Molex AC input connectors, order one (1) List 42 per List 6 or 7 shelf.
2) For mating AC input connectors, order from Table 1E.

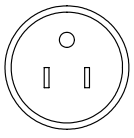
List 47: AC Line Cord Kit, 120VAC

List of Parts

Features

- Provides two (2) AC input cords, each equipped with a NEMA 5-15P straight blade plug. Each cord powers one (1) PCU.
- Cords are factory installed.
- Blank Module is included to cover one (1) unused PCU mounting position.





NEMA 5-15P

Restrictions

For List 11, 12, 13, and 14 only. Cannot be used with List 1, 2, 3, 4, 6 or 7.

Each cord assembly is rated to power one (1) PCU only (limits shelf to two (2) PCUs total).

For 120 VAC only.

Not available with List 43 AC Input Vertical Feed Assembly.

Ordering Notes

1) For 120VAC operation, order one (1) List 47 per Power Shelf. Order the required length from the following table.

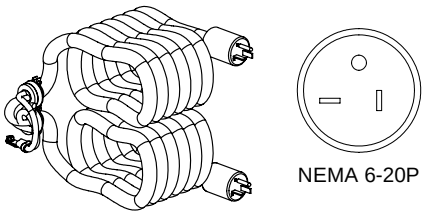
Length	Part Number
6 ft.	534841
10 ft.	534840

List 48: AC Line Cord Kit, 240VAC

List of Parts

Features

- Provides two (2) AC input cords, each equipped with a NEMA 6-20P straight blade plug.
- Cords are factory installed.



Restrictions

For List 11, 12, 13, and 14 only. Cannot be used with List 1, 2, 3, 4, 6 or 7.

For 240 VAC only.

Not available with List 43 AC Input Vertical Feed Assembly.

Ordering Notes

1) For 240VAC operation, order one (1) List 48 per Power Shelf. Order the required length from the following table.

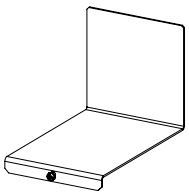
Length	Part Number
6 ft.	534843
10 ft.	534842

List 50: Blank Module

List of Parts

Features

- Fills one PCU mounting position.



Ordering Notes

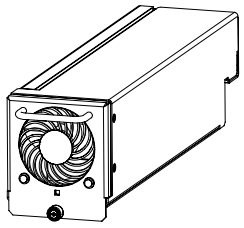
1) Order as required.

List 53: 1000 Watt Power Conversion Unit (PCU)

List of Parts

Features

- Consists of one (1) Model LXP1000 PCU, Spec. No. 486534800.



Ordering Notes

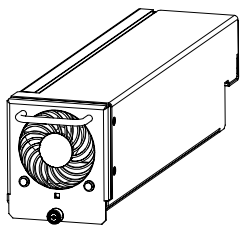
1) Shelf accepts up to three (3) PCUs.

List 55: 1500 Watt Power Conversion Unit (PCU)

List of Parts

Features

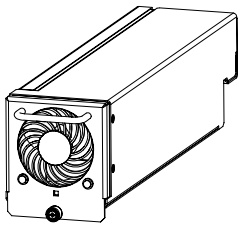
- Consists of one (1) Model LXP1500 PCU, Spec. No. 486534204.



Ordering Notes

1) Shelf accepts up to three (3) PCUs.

List 56: 1750 Watt Power Conversion Unit (PCU) List of Parts



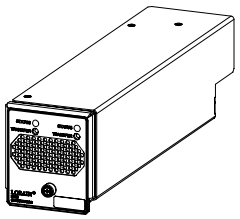
Features

- Consists of one (1) Model LXP1750 PCU, Spec. No. 486534600.

Ordering Notes

1) Shelf accepts up to three (3) PCUs

List 72: Model LXR050 Redundant Ringing Generator Module List of Parts



Features

- Provides (1) Model LXR050, Spec. No. 487112200 Redundant Ringing Generator Module.
- Module accepts (2) 50 VA Ringing Generators. Ringing Generators are included.
- Operates from the Power Shelf -48VDC output bus to provide a redundant single frequency ringing system with transfer capability.
- Provides up to 50 VA of continuous ringing power.
- Uses no rack space. Mounts in one PCU mounting position in the Power Shelf.
- Either ringing generator in the module can be selected to supply the load (main generator), with the other becoming the standby generator. If a failure occurs in the main generator, the ringing load will automatically transfer to the standby generator. A failed ringing generator can be replaced without interrupting ringing power to the load.
- Controlled and monitored by system's MCA. MCA supports up to (4) List 72.

Restrictions

Provides bulk ringing output only. Distribution must be external.

MCA interfaces with a maximum of (4) List 72s.

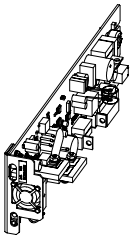
Outputs from multiple List 72s cannot be paralleled.

MCA version 4.0 or newer required for full compatibility.

Ordering Notes

1) Order one (1) List 72 for up to 50 VA of redundant bulk ringing power.
2) For external ringing distribution, order Part No. 528608 Ringing Distribution Module.

List 73: Replacement Ringing Generator List of Parts



Features

- Field replacement for one of the two Part No. 487112100 Ringing Generators that are provided with List 72.

Ordering Notes

1) Order as a replacement part only. Two Ringing Generators are included with each List 72 ordered.

List 80: Local Computer Access Cable

Features

- Category 5 Crossover cable terminated at each end with an RJ-45 plug.
- Required for **local** PC access to the MCA's Web interface.
- Plugs into MCA's Ethernet connector on the Power Shelf.
- Cable identification color is **yellow**.

Ordering Notes

1) Order the required length from the following table.

Length	Part Number
36 inches	514642
4 feet	514643
6 feet	514644
15 feet	524726

Length	Part Number
25 feet	514645
50 feet	514646
100 feet	514647

List 81: RJ-45 MCA Control Bus Cable

Features

- Category 5 Straight Through cable terminated at each end with an RJ-45 plug.
- Required for MCA control bus interconnections.
- Cable identification color is **blue**.

Restrictions

Maximum combined MCA control bus cable length must not exceed 125 feet.

Ordering Notes

1) Order the required length from the following table.

Length	Part Number
5 inches	524409
6 inches	509070
10 inches	528520
15 inches	509071

Length	Part Number
2 feet	524410
3 feet	514639
4 feet	509900
25 feet	514640

List 90: Battery Temperature Probe (Analog Output)

List of Parts

Features

- Senses battery internal temperature via mounting on negative (–) battery terminal. Mounting hole provides clearance for 5/16" bolt.
- Provides MCA with data required for battery temperature-related functions (temperature-compensated output voltage, high and low battery temperature alarms).
- Plugs into Distribution Sense Module (DSM) (no temperature-compensated output voltage) or into List 92 Temperature Concentrator Module.

- 15 ft. long cable
- See Physical Size Information for probe dimensions.

Restrictions

Not for connection to MCA digital probe jack J3. For single-probe applications, order List 91 or List 93.

Ordering Notes

1) Order up to eight (8) List 90 per List 92 ordered.

List 91: Battery Temperature Probe (Digital Output)

List of Parts

Features

- Mounts near the battery to sense battery ambient temperature. Plugs into J3 on the MCA.
- Provides MCA with data required for battery temperature-related functions (temperature-compensated output voltage, high and low battery temperature alarms).
- 25 ft. long cable
- Same as List 93 except for cable length.
- See Physical Size Information for probe dimensions.

Restrictions

For use in single-probe applications only. Cannot be used with a List 92 (TXM). For multiple-probe applications with a TXM, order List 90 probes.

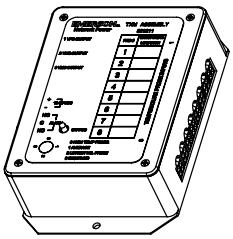
Ordering Notes

1) Order one (1) List 91 or List 93 per system.

List 92: Temperature Concentrator Module (TXM)

List of Parts

Features



- Provides the system MCA with a means of monitoring up to eight (8) List 90 battery temperature probes. Plugs into J3 on the MCA.
- System MCA can be set to compensate on the hottest probe, the average temperature of all connected probes, or the lowest numbered probe connected.
- Mounts externally.
- Includes 25 ft. cable for interface to MCA connector J3.
- See Physical Size Information for TXM dimensions.
- See TXM Installation and User Instructions (Section 5940) for complete specifications.

Restrictions

Requires List 90 temperature probes. **Cannot** be used with List 91 temperature probes.

Ordering Notes

1) Order one (1) List 92 per system.
2) Order up to eight (8) List 90 analog probes as required.
3) For a shorter interface cable, also order List 94 (10 ft.) or 95 (15 ft.).

List 93: Battery Temperature Probe (Digital Output)

List of Parts

Features

- Mounts near the battery to sense battery ambient temperature. Plugs into J3 on the MCA.
- Provides MCA with data required for battery temperature-related functions (temperature-compensated output voltage, high and low battery temperature alarms).
- 2-1/2 ft. long cable.
- Same as List 91 except for cable length.
- See Physical Size Information for probe dimensions.

Restrictions

For use in single-probe applications only. Cannot be used with a List 92 (TXM). For multiple-probe applications with a TXM, order List 90 probes.

Ordering Notes

1) Order one (1) List 93 or List 91 per system.

List 94: TXM-MCA Interface Cable

List of Parts

Features

- Cable, interface, connects between the output connector on the TXM and MCA connector J3.
- 10 ft. long
- Can be used in place of the 25 ft. interface cable provided with the List 92 TXM when a shorter cable is needed.

List 95: TXM-MCA Interface Cable

List of Parts

Features

- Cable, interface, connects between the output connector on the TXM and MCA connector J3.
- 15 ft. long
- Can be used in place of the 25 ft. interface cable provided with the List 92 TXM when a shorter cable is needed.

ACCESSORY DESCRIPTIONS

Recommended Wire Sizes and Branch Circuit Protection

AC Input Wire Sizes, Branch Circuit Protection

Features

- Screw-compression type terminals are provided for connection of AC input wiring. These terminals are accessed through the front of the Power Shelf.
- A threaded stud (8-32) is provided for installation of frame ground wiring. The stud is accessed through the front of the Power Shelf.

Ordering Notes

1) For Lists 1, 2, 3, 4, 6, 7, 11, 12, 13, and 14, refer to Tables 1A (120VAC) and 1B (208/240VAC) for recommended wire sizes and branch circuit protection.
2) For Lists 21, 22, 23, and 24, refer to Tables 1C (120VAC) and 1D (208/240VAC) for recommended wire sizes and branch circuit protection.
3) Notes referenced in tables are found after Table 1E.

1, 2, 3, 4, 6, 7, 11, 12, 13, 14 120 VAC Input (Two AC Input Circuits)							
Ambient Operating Temperature (1)	Feed	Recm Branch Circuit Protection (Amperes) (2, 5)	Line Terminals (6)			Line	Ground (3, 6)
			Capacity	Type	Recm Torque	Recm 90°C Wire Size (1)	Recm 90°C Wire Size (4)
30°C	#1	20	20 to 6 AWG	Screw Clamp	10.62 to 13.30 in-lbs	12 AWG	12 AWG
	#2	20					
40°C	#1	20					
	#2	20					
50°C	#1	20					
	#2	20					
65°C	#1	20				10 AWG	
	#2	20					

Table 1A
Recommended AC Input Branch Circuit Protection and Wire Size Selection
120 VAC Input, Two AC Input Circuits

1, 2, 3, 4, 6, 7, 11, 12, 13, 14 208/240 VAC Input (Two AC Input Circuits)							
Ambient Operating Temperature (1)	Feed	Recm Branch Circuit Protection (Amperes) (2)	Line Terminals (6)			Line	Ground (3, 6)
			Capacity	Type	Recm Torque	Recm 90°C Wire Size (1)	Recm 90°C Wire Size (4)
30°C	#1	25	20 to 6 AWG	Screw Clamp	10.62 to 13.30 in-lbs	10AWG	10 AWG
	#2	25					
40°C	#1	25					
	#2	25					
50°C	#1	25					
	#2	25					
65°C	#1	25				8 AWG	
	#2	25					

Table 1B
Recommended AC Input Branch Circuit Protection and Wire Size Selection
208/240 VAC Input, Two AC Input Circuits

List 21, 22, 23, 24, 120/240 VAC Input (One AC Input Circuit)						
Ambient Operating Temperature (1)	Recm Branch Circuit Protection (Amperes) (2)	Line Terminals			Line	Ground (3)
		Capacity	Type	Recm Torque	Recm 90°C Wire Size (1)	Recm 90°C Wire Size (4)
30°C	30	20 to 6 AWG	Screw Clamp	10.62 to 13.30 in-lbs	10 AWG	10 AWG
40°C	30					
50°C	30					
65°C	30				8 AWG	

Table 1C
Recommended AC Input Branch Circuit Protection and Wire Size Selection
List 21, 22, 23, 24, 208 VAC, One AC Input Circuit

List 21, 22, 23, 24, 208 VAC Input (One AC Input Circuit)						
Ambient Operating Temperature (1)	**Recm Branch Circuit Protection (Amperes) (2)**	**Line Terminals**			**Line**	**Ground (3)**
		Capacity	**Type**	**Recm Torque**	**Recm 90°C Wire Size (1)**	**Recm 90°C Wire Size (4)**
30°C	35	20 to 6 AWG	Screw Clamp	10.62 to 13.30 in-lbs	8 AWG	10 AWG
40°C	35					
50°C	35					
65°C	35				6 AWG	

Table 1D
Recommended AC Input Branch Circuit Protection and Wire Size Selection
List 21, 22, 23, 24, 208 VAC, One AC Input Circuit

Vendor	**Housing**	**Contact (7)**		
		Wire Capacity	**Part No.**	**Hand Crimp Tool (Molex Part No.)**
Molex	0428160312	10-12 AWG	42815-0012	63811-1600
Emerson Network Power	133302		--	
Molex	0428160312	8 AWG	42815-0032	63811-1500
Emerson Network Power	133302		133301	

Table 1E
List 42 and 46 Mating Connectors (6)

Notes for Tables 1A, 1B, 1C, 1D and 1E

1 Wire sizes are based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). **Table 310-16** for copper wire at **90°C** conductor temperature, operating in ambients of **30°C**, **40°C, 50°C** and **65°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.

2 The AC input branch circuit protective device should be of the time-delay or high inrush type.

3 Equipment grounding conductors must be provided with the AC input conductors supplied to the shelf. Frame ground terminals must be connected to earth ground, not power system neutral. A ring lug must be provided.

4 Equipment grounding conductor size is based on recommendations of the NEC Table 250-122 for copper wire. If aluminum or copper clad aluminum grounding conductor is used, refer to Table 250-122 for increased conductor size. For operation in countries where the NEC is not recognized, follow applicable codes.

[5] When List 11, 12, 13, or 14 is ordered with List 47 AC cords (120VAC only, restricted to 1 PCU per cord) recommended branch circuit protection is 15 amperes.

[6] When List 6 or 7 is equipped with List 42 or 46, refer to Tables 1A (120VAC) and 1B (208/240VAC) for recommended wire sizes and branch circuit protection. Refer to Table 1E for mating connector information.

[7] Contacts should be crimped to the specifications given in the manufacturer's instructions furnished with the crimp tool or connector.

Distribution (Load) Wire Sizes and Lugs—Bullet Nose Breakers and TPS/TLS Fuseholders

Features

- The installer connects lug-terminated load and return conductors to the distribution device mounting positions and the ground busbar. Refer to the following table for the lug mounting provisions of the available shelves.

Shelf List No.	Each Load Connection	Each Return Connection (Ground Busbar)
1, 2, 3, 4, 21, 22, 23, 24	(1) 1/4-20 threaded hole	(1) 1/4-20 x 1/2" threaded stud & (1) alignment pin, 5/8" centers
6, 7	(2) 10-32 threaded holes, 5/8" centers	(1) 10-32 x 1/2" threaded stud & (1) alignment pin, 5/8" centers
11, 12, 13, 14	(1) 1/4-20 threaded hole	(1) 1/4-20 x 1/2" threaded stud

- Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.
- For lug mounting hole size and spacing dimensions, refer to the illustrations provided in the Physical Size Information section.

Restrictions

All lugs for customer connections must be ordered separately.

Ordering Notes

1) The rating of the distribution device determines the wire size requirements. For wire size and lug selection, refer to Table 2.
2) For other available lugs and hardware, refer to drawings 031110100 through 031110300.

Load Distribution Wiring—GMT Fuses

Features

- **List 1, 2, 3, 4, 11, 12, 13, 14, 21, 22, 23, 24:** Screw-compression type terminals are provided for connection of Load and Load Return conductors to the GMT alarm type distribution fuse positions. Terminals accept 14 AWG max.
- **List 6, 7:** Latching type connectors are provided for connection of Load and Load Return conductors to the GMT alarm type distribution fuse positions. Mating cables, 12 ft. long, 16 AWG are furnished.

Restrictions

None.

Ordering Notes

1) The rating of the distribution device determines the wire size requirements. For wire size, refer to Table 2.
2) **List 6, 7 only:** Order one (1) Part No. 535206 load cable for each GMT fuse distribution position.

Fuse/Circuit Breaker Amperage	Recm 90°C Wire Size [1]						
	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	4 AWG	2 AWG
	Loop Length (feet) [2]						
1, 3, 5, 6, 10A	37 [3, 4, 5]	58 [3, 4, 5]	93 [3, 4, 5]	148 [3, 4, 5]	236 [3, 4, 5]	376 [3, 4, 5]	597 [3, 4, 5]
15A	24 [3, 4]	39 [3, 4, 5]	62 [3, 4, 5]	99 [3, 4, 5]	157 [3, 4, 5]	250 [3, 4, 5]	398 [3, 4, 5]
20A	--	29 [3, 4]	46 [3, 4, 5]	74 [3, 4, 5]	118 [3, 4, 5]	188 [3, 4, 5]	298 [3, 4, 5]
25A	--	--	37 [3, 4,]	59 [3, 4, 5]	94 [3, 4, 5]	150 [3, 4, 5]	239 [3, 4, 5]
30A	--	--	31 [3, 4]	49 [3, 4, 5]	78 [3, 4, 5]	125 [3, 4, 5]	199 [3, 4, 5]
35A	--	--	--	42 [3, 4]	67 [3, 4, 5]	107 [3, 4, 5]	170 [3, 4, 5]
40A	--	--	--	37 [3, 4]	59 [3, 4, 5]	94 [3, 4, 5]	149 [3, 4, 5]
45A	--	--	--	33 [3, 4]	52 [3, 4]	83 [3, 4]	132 [3, 4]
50A	--	--	--	29 [3]	47 [3, 4,]	75 [3, 4]	119 [3, 4]
60A	--	--	--	--	39 [3, 4]	62 [3, 4]	99 [3, 4]
70A	--	--	--	--	--	53 [3, 4]	85 [3, 4]
75A	--	--	--	--	--	50 [3, 4]	79 [3, 4]
80A	--	--	--	--	--	47 [3]	74 [3, 4]
90A	--	--	--	--	--	--	66 [3, 4]
100A	--	--	--	--	--	--	59 [3, 4]
Recommended Crimp Lug [6, 7]							
1-Hole, 1/4" bolt clearance	245312200	245312400	245312400	245350400	245350600	245350700	245350800
2-hole, 1/4" bolt clearance	245342300	245342300	245342300	245390200	245346700	245346800	245346900
2-hole, No. 10 bolt clearance	245390100			245346600	245346500	--	--

Table 2
Recommended Distribution Wire Size and Lug Selection (Load and Load Return)

Notes for Tables 2:

1 Wire sizes are based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). **Table 310-16** for wire rated at **90°C** conductor temperature operating in ambient temperatures of **40°C**, **50°C**, and **65°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.

2 Recommended wire sizes are sufficient to restrict voltage drop to 1.0 volt or less at listed branch current for the loop lengths shown. Loop length is the sum of the lengths of the positive and negative leads.

[3] Wire Size / Loop Length Combination Calculated using 40°C Ambient Operating Temperature.

[4] Wire Size / Loop Length Combination Calculated using 50°C Ambient Operating Temperature.

[5] Wire Size / Loop Length Combination Calculated using 65°C Ambient Operating Temperature.

[6] One-hole lugs are 1/4" bolt clearance. Two-hole lugs are 1/4" or No. 10, as shown, bolt clearance, on 5/8" centers. Refer to drawing 031110100 for lug crimping information.

[7] Use 1-hole lugs for Load connections on List 1, 2, 3, 4, 11, 12, 13 and 14. Use 2-hole lugs for Load connections on List 6 and 7. Use 1-hole lugs for Load Return connections on List 11, 12, 13 and 14. Use 2-hole lugs for Load Return connections on List 1, 2, 3, 4, 6 and 7.

Battery Wire Sizes and Lugs—List 1, 2, 3, 4, 21, 22, 23 and 24 Power and Distribution Shelves

Features

- The installer connects lug-terminated battery conductors to the terminals provided. Captive nuts, (1/4-20 on 5/8" centers) are provided for installation of customer-furnished two-hole lugs. These terminals are accessed through the cabinet top or rear panel.
- For lug mounting hole size and spacing dimensions, refer to the illustration provided in the Physical Size Information section.

Restrictions

All lugs for customer connections must be ordered separately.

Ordering Notes

1) Battery wire size varies depending on load, therefore no specific information is provided for wire size. Refer to Table 5 for recommended wire sizes and lugs at rated maximum total distribution load (100 amperes). When making connections, observe correct polarity.

2) For other available lugs and hardware, refer to drawings 031110100 through 031110300.

Maximum Current (Amps)	Ambient Operating Temperature [1]	Loop Length (Ft) 1.0 Volt Drop [2]	Loop Length (Ft) 0.25 Volt Drop [2]	Recm 90°C Wire Size [1]	Recommended Crimp Lug [3]
100	40°C	59	14	(1) 2 AWG	(1) 245346900
		119	29	(2) 2 AWG	(2) 245346900
	50°C	59	14	(1) 2 AWG	(1) 245346900
		119	29	(2) 2 AWG	(2) 245346900
	65°C	75	18	(2) 4 AWG	(2) 245346800
		112	28	(3) 4 AWG	(3) 245346800

Table 3A
Recommended Battery Wire Size and Lug Selection

Notes for Tables 3:

[1] Wire sizes are based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). **Table 310-16** for wire rated at **90°C** conductor temperature operating in ambient temperatures of **40°C**, **50°C** and **65°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.

[2] Recommended wire sizes are sufficient to restrict voltage drop to the voltage shown in the column heading, or less, at rated full load output current of the shelf for the loop lengths shown in this column. Loop length is the sum of the lengths of the positive and negative leads.

[3] Two-hole lug, 1/4" bolt clearance hole, 5/8" centers. Refer to drawing 031110100 for lug crimping information.

Battery Wire Sizes and Lugs—List 6 and 7 Power and Distribution Shelves

Features

- The installer connects lug-terminated battery conductors to the disconnect device mounting position and the ground busbar. The disconnect device mounting position provides (2) 10-32 threaded holes on 5/8" centers for installation of a customer-furnished two-hole lug. The ground busbar provides (1) 10-32 x 1/2" threaded stud and (1) alignment pin on 5/8" centers for installation of a customer-furnished two-hole lug.
- Maximum size of wire to be connected is 2 AWG.
- For lug mounting hole size and spacing dimensions, refer to the illustration provided in the Physical Size Information section.

Restrictions

All lugs for customer connections must be ordered separately.

Ordering Notes

1) The rating of the disconnect device determines the wire size requirements. For wire size and lug selection, refer to Table 2.
2) For other available lugs and hardware, refer to drawings 031110100 through 031110300.

Battery Wire Sizes and Connectors—List 11, 12, 13, and 14 Power and Distribution Shelves

Features

- Battery connections are made to locking-type plugs. Connections are provided for three (3) battery strings. These connections are accessed through the front of the cabinet.

Restrictions

Maximum wire size is 6 AWG.

Mating plugs are not provided with the shelf, and must be ordered separately.

Ordering Notes

1) Battery wire size varies depending on load, therefore no specific information is provided for selecting a wire size. Refer to Table 3B for recommended wire sizes and connectors at rated maximum total distribution load (100A at or below 50°C ambient, 90A above 50°C ambient). Current is shown evenly distributed between two battery strings (N+1 redundancy).

Current per Battery String (Amps)	Ambient Operating Temper-ature [1]	Loop Length (Ft) 1.0 Volt Drop [2]	Loop Length (Ft) 0.25 Volt Drop [2]	Recm 90°C Wire Size [1]	Housing with 75 Amp Contact [3]	
					Emerson Network Power Part No.	Anderson Part No.
50	40°C	47	11	6 AWG	247108670 (Red) 247108671 (Black)	1300G3 (Red) 1300G4 (Black)
	50°C	47	11	6 AWG		
45	65°C	52	13	6 AWG		

Table 3B
Recommended Battery Wire Size and Lug Selection—
List 11, 12, 13, and 14 Power and Distribution Shelves

Notes for Tables 3B:

1. Wire sizes are based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). **Table 310-16** for wire rated at **90°C** conductor temperature operating in ambient temperatures of **40°C**, **50°C** and **65°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.
2. Recommended wire sizes are sufficient to restrict voltage drop to the voltage shown in the column heading, or less, at the current shown in the "Current per Battery String" column for the loop lengths shown in this column. Loop length is the sum of the lengths of the positive and negative leads.
3. Use hand crimping tool, Anderson Part No. 1309G4. Contacts should be crimped to the specifications given in the manufacturer's instructions furnished with the crimp tool or connector.

External Alarm, Reference, and Control Wire Sizes

Features

- External Alarm, Reference, and Control connections are made to TB1 on the MCA.

Terminals		Recm Wire Size
Capacity	Type	
28 to 16 AWG	Screw Clamp	22 AWG for Loop Lengths Up to 200 ft. 18-20 AWG for Loop Lengths Over 200 ft.

Table 4
Recommended Alarm, Reference, and Control Wire Size
(TB1 and TB2 on MCA)

Distribution Devices

Bullet Nose Type Circuit Breakers

Each circuit breaker plugs into a single mounting position.

Ordering Notes

1) Order circuit breakers per Table 5.

   Note: *Load should not exceed 80% of device rating.*

   Caution: ***All Shelves: A circuit breaker with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

   Caution: ***List 1, 2, 3, 4, 21, 22, 23, 24 only: The maximum size circuit breaker used in ambient temperatures above +50°C ambient SHALL BE 40 amperes.***

   Caution: ***List 6, 7 only: The maximum size circuit breaker used in ambient temperatures above +50°C ambient SHALL BE 50 amperes for distribution and 75 amperes for battery disconnect.***

   Caution: ***List 11, 12, 13, 14 only: The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 50 amperes. A circuit breaker or fuse located in the mounting position adjacent to a 40- or 50-ampere circuit breaker or fuse SHALL BE a maximum of 30 amperes. Where two 40- or 50-ampere circuit breakers or fuses are used, an empty mounting space SHALL BE provided between them.***

2) Unless otherwise specified, circuit breakers shall be mounted from top to bottom starting with the highest capacity and working to the lowest capacity

3) For lug and wire size selection, refer to Table 2.

BULLET NOSE TYPE CIRCUIT BREAKER PART NUMBERS

Rating in Amps	Provides alarm for this trip condition:		Rating in Amps	Provides alarm for this trip condition:	
	Electrical or Manual (Black Handle)	Electrical Only (White Handle)		Electrical or Manual (Black Handle)	Electrical Only (White Handle)
1	101596	102272	40	101605	102281
3	101597	102273	45	121997	121998
5	101598	102274	50	101606	102282
10	101599	102275	60	101607	102283
15	101600	102276	70	101608	102284
20	101601	102277	75	101609	102285
25	101602	102278	80	121995	121996
30	101603	102279	100	101610	102286
35	101604	102280			

Unless otherwise specified, circuit breakers shall be mounted from top to bottom starting with the highest capacity and working to the lowest capacity.

Table 5

TPS/TLS-Type Fuses

A single fuseholder provides for installation of a 3 to 100 ampere Bussmann TPS-type or Littelfuse TLS-type fuse. This fuseholder plugs into a single mounting position. This fuseholder also provides a GMT-A alarm type fuse, which operates open to provide an alarm indication if the distribution fuse opens.

Ordering Notes

1) Order fuses per Table 6.

   Note: *Load should not exceed 80% of device rating.*

   Caution: ***All Shelves: A fuse with a rating greater than 75 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

   Caution: ***List 1, 2, 3, 4, 21, 22, 23, 24 only: The maximum size fuse used in ambient temperatures above +50°C ambient shall be 40 amperes.***

   Caution: ***List 6, 7 only: The maximum size fuse used in ambient temperatures above +50°C ambient SHALL BE 50 amperes for distribution and 70 amperes for battery disconnect.***

   Caution: ***List 11, 12, 13, 14 only: The maximum size circuit breaker or fuse used in ambient temperatures above +50°C ambient SHALL BE 50 amperes. A circuit breaker or fuse located in the mounting position adjacent to a 40- or 50-ampere circuit breaker or fuse SHALL BE a maximum of 30 amperes. Where two 40- or 50-ampere circuit breakers or fuses are used, an empty mounting space SHALL BE provided between them.***

2) Order one (1) Part No. 117201 TPS/TLS-type fuseholder for each fuse.

3) For lug and wire size selection, refer to Table 4.

TPS/TLS-TYPE FUSES			
Rating in Amps	**Part Number**	**Rating in Amps**	**Part Number**
3	248230900	40	248233300
5	248231000	50	248233900
6	248231200	60	248234200
10	248231500	70	248234500
15	248231800	80	118413
20	248232100	90	118414
25	248232400	100	118415
30	248232700	TPS/TLS-Type Fuseholder*	117201

* Fuseholders are not furnished and must be ordered as required. Order (1) Part No. 117201 for each fuse position required. Fuseholder includes (1) alarm fuse (Bussmann GMT-A 18/100 amp; Emerson Network Power 248610301) and (1) alarm fuse safety cover (Emerson Network Power P/N 248898700).

Unless otherwise specified, fuses shall be mounted from top to bottom starting with the highest capacity and working to the lowest capacity.

Table 6

Plug-In Alarm-Type Fuse Distribution Assembly (Part No. 529034)
(6) GMT Alarm-Type Fuse Positions (for List 1, 2, 3, 4 Power and Distribution Shelves)

Features

- Mounts in (2) bullet nose distribution positions of a List 1, 2, 3, 4., 21, 22, 23 or 24.
- 30A Maximum Capacity.
- Provides (6) Load Distribution Fuse Positions (0.25 to 15A GMT Alarm-Type Fuses).
- Screw clamp type terminals.
- Includes (6) dummy fuses equipped with safety fuse covers.

Restrictions

For List 1, 2, 3 4., 21, 22, 23 or 24 only.

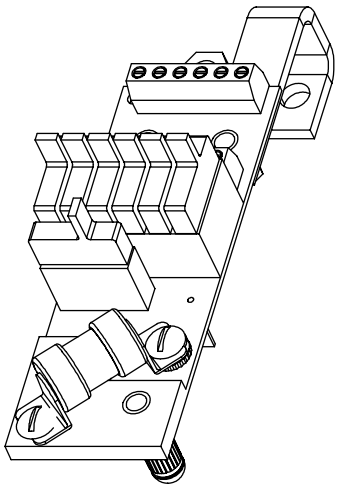
When factory-ordered, assembly will be installed in the two bottom-most bullet nose positions, unless otherwise specified.

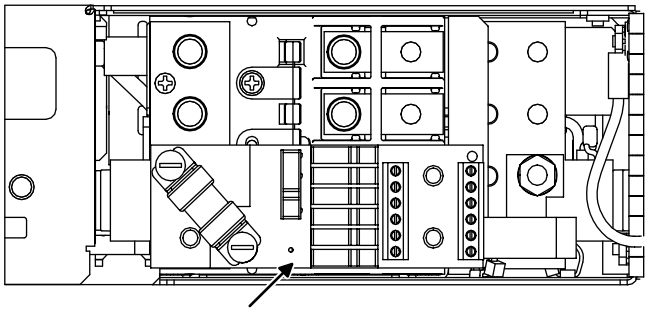
Maximum size of wire to be connected to a single fuse position is 14 AWG.

Fuses are not included.

Ordering Notes

1) For List 1, 2, 3 4., 21, 22, 23 or 24, order Part No. 529034. Provides one Part No. 528958 alarm fuse distribution assembly, one Part No. 529033 ground return link, and hardware.
2) Order fuses, as required, per Table 7.





Mounting Position for GMT
Assembly When Factory-Installed

Alarm-Type Fuses

Note: *When used for power distribution, load should not exceed 80% of device rating, except 10 and 15 amp fuses, for which load should not exceed 70% of device rating.*

BUSSMANN GMT ALARM-TYPE FUSES		
AMPERE RATING	**PART NUMBER**	**FUSE COLOR**
18/100 GMT-A	248610301	---
1/4	248610200	VIOLET
1/2	248610300	RED
3/4	248610500	BROWN
1-1/3	248610700	WHITE
2	248610800	ORANGE
3*	248610900	BLUE
5*	248611000	GREEN
7-1/2*	248611300	BLACK-WHITE
10*	248611200	RED-WHITE
15*	248611500	RED-BLUE
Replacement Safety Fuse Cover	248898700	---
Replacement Dummy Fuse	248872600	---

* - These fuses not recommended for use in P/N 528608 Ringing Distribution Module

Table 7

Replacement Cables

MCA Control Bus Termination Plug

Features

- Plug must be installed in unused MCA control bus port J10.
- One plug is furnished with each Integrated Power/Distribution Shelf ordered.

Ordering Notes

1) For a replacement plug, order P/N 524651.

RJ-45 MCA Control Bus Termination Plug

Features

- Plug must be installed in unused RJ-45 MCA control bus port J3.
- One plug is furnished with each Integrated Power/Distribution Shelf ordered.

Ordering Notes

1) For a replacement plug, order P/N 524653.

Bulk Output Cable for List 72 Ringing Generator

Features

- 6 ft. long cable connects to rear of List 72 Ringing Generator Module to provide ringing output connection. Also provides DC power connection for a Part No. 528608 Ringing Distribution Module.

Ordering Notes

1) For a replacement cable, order Part No. 529059.

GMT Distribution Cable for List 6 and 7

Features

- 12 ft. long cable connects to one GMT distribution fuse connector on a List 6 or List 7 shelf. Conductors are 16 AWG, terminated on one end with mating connector* and left un-terminated at the remaining end for connection to customer loads.

  * Consists of Molex housing P/N 39-01-2025 and terminals P/N 44476-3112 (loose) or 44476-3111 (reel).

Ordering Notes

1) For one (1) replacement cable, order Part No. 535206.

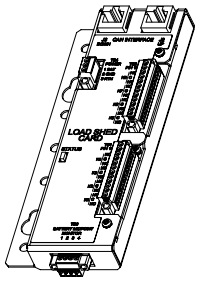
TXM Extension Cable (Part No. 514153)

Features

- Can be used between a List 90 Battery Temperature Probe cable and the List 92 TXM or to extend a Part No. 521228 TXM-to-MCA interface cable.
- 25 ft. long.

Load Shed Card (Part No. 528927)

Features



- Provides eight (8) relays that can be individually configured as additional alarm relays or as Low Voltage Disconnect control relays for reducing the system load (load shed). If configured for load disconnect, control of the relays can be based upon either system voltage or battery discharge elapsed time.
- Provides four (4) battery midpoint monitoring inputs.
- All functions are configured and controlled by the system MCA.
- External mounting.
- Includes one (1) 2 ft. MCA control bus cable (P/N 524410) and one (1) control bus termination plug (P/N 524653).
- See Physical Size Information for Load Shed Card dimensions.
- See Load Shed Card Installation and Operating Instructions (Section 5985) for complete specifications.

Restrictions

Load shed contactors are not included.

A system battery shunt is required for timed Load Shed.

MCA version 3.0 or newer is required.

Maximum number of Load Shed Cards supported by MCA is four (4).

Maximum combined MCA control bus cable length must not exceed 125 feet.

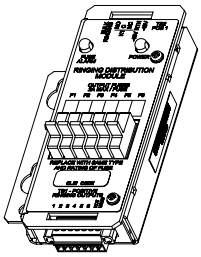
Ordering Notes

1) Where MCA control bus cable lengths other than the furnished 2 ft. cable are required, order per List 81.

Ringing Distribution Module (Part No. 528608)

Features

- Designed to accept a bulk ringing input signal and provide six (6) fused ringing distribution outputs.
- Local and external fuse alarm circuits are provided.
- Designed to mount on a wall or relay rack rail.
- Includes six dummy fuses and six fuse safety covers. Distribution fuses are not included and must be ordered separately.
- See Physical Size Information for Ringing Distribution Module dimensions.
- Ringing Input: 67.5 to 105 VAC, RMS; 100 VA max; 20/25/30 Hz.
- Ringing Output: Six outputs, each fused at 2A. max.
- See Ringing Distribution Module Installation and Operating Instructions (Section 5991) for complete specifications.



Restrictions

Maximum recommended distribution fuse size is 2A.

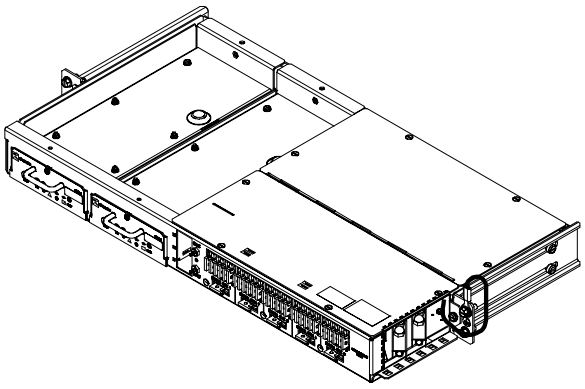
Ordering Notes

1) Order ringing distribution fuses as required from Table 7.

AP6C57EA/EB Ring & Distribution Module

Features

- When used with List 11, 12, 13, or 14, this module is designed to supply a filtered and regulated –48 VDC source and a continuous 20 Hz ringing supply source to imbedded subscriber loop carrier telecommunication systems (such as SLC-96 or SLC Series-5) requiring up to 45 A of load capacity.
- Designed to mount in a 23” relay rack, the module is one rack unit high, with 5” front projection.
- Includes two (2) 50VA ringers with automatic transfer capability (N+1 redundancy).
- Provides 35 DC distribution fuse positions, configured in five groups of seven, feeding five channel banks. Includes 35 dummy fuses.
- Connectorized cables are available for SLC-96 or SLC Series-5 applications. Required DC distribution fuses are included with each cable assembly ordered.



- An Order Wire Option provides a connection interface for an analog communication link over a metallic pair, with surge protection.
- See Ring & Distribution Module Installation and User Manuals (IM6C57E and UM6C57E) for complete specifications.

Restrictions

Use with List 11, 12, 13, or 14 only.

Ordering Notes

1) For a Ring & Distribution Module equipped with two (2) 50VA ringers only, order AP6C57EA (A7000626).
2) For a Ring & Distribution Module equipped with two (2) 50VA ringers and the Order Wire option, order AP6C57EB (A7000796).
3) Order distribution cable assemblies as required, from the following table. Order up to five (5) cable assemblies (one per channel bank). Required fuses are included with each cable assembly. Cable assemblies can be mixed.

ORDERING CODE	DESCRIPTION
P7000858	Cable assy for one SLC96 channel bank (8 ft.)
P7001139	Cable assy for one SLC96 channel bank (20 ft.)
P7000859	Cable assy for one SLC5 channel bank (8 ft.)
P7001136	Cable assy for one SLC5 channel bank (20 ft.)
P7000937*	Cable assy for one channel bank, generic applications (8 ft.)

*Note: Each channel bank position on the panel has a maximum capacity of 11A.

4) Order Part No. 535133 DC power cable kit, as required. Provides two (2) 12” long cables to connect between a List 11, 12, 13, or 14 power shelf and the DC input terminals of one (1) Ring & Distribution Module.
5) For SLC-96 or SLC Series-5 applications, order battery cable kits as required, from the following table. These mate with the battery connectors provided on the power shelf.

ORDERING CODE	DESCRIPTION
P7000529	Anderson connector kit (for 1 battery string - rated up to 60A), Up to 3 kits can be installed in the power shelf.
P7001140	Battery cable kit for SLC96 legacy power shelf (Molex connectors) - for 2 battery strings, Up to 3 cable kits can be installed in the power shelf.
P7001142	Battery cable for SLC5 legacy power shelf (Molex connectors) - for 2 battery strings, Up to 3 cable kits can be installed in the power shelf.

6) Spare parts for the AP6C57EA/EB Ring & Distribution Module can be ordered as required from the following table.

ORDERING CODE	DESCRIPTION
A0885525	1.33A Alarm SAN-O Fuse
A0885530	3A Alarm SAN-O Fuse
A0885531	5A Alarm SAN-O Fuse
A0885532	10A Alarm SAN-O Fuse
A7000627 (AP8C55AA)	50VA Ring Generator

Field-Replaceable Components

Ordering Notes

1) **MCA:** Order via List 32.
2) **PCU:** Order via List 53 (Model LXP1000), List 55 (Model LXP1500) or List 56 (Model LXP1750).
3) **Fan, for List 53 (LXP1000) PCU:** Order Part No. 534444.
4) **Fan, for List 55 (LXP1500) PCU:** Order Part No. 534444.
5) **Fan, for List 56 (LXP1750) PCU:** Order Part No. 534444.
6) **DSM:** Order Part No. 524520
7) **Ringing Generator (P/N 487112100) for List 72:** Order via List 73.
8) **Kit, Fan Replacement, for Part No. 487112100 Ringing Generator**: Order Part No. 534637. (Kit includes (1) P/N 534365 fan, (3) P/N 130823 mounting pins, (3) P/N 534571 washers.)

Home

LIST OF PARTS

Note: *This stocklist may not show every component contained in each List Number.*

Note: *See also Field-Replaceable Components.*

List Number	Qty.	Part Number	Description
1	1	528171	Assembly, shelf, 2U ISD
	1	528229	Shunt, DC, 175A, 25 mV
	1	528242	Kit, Mounting, 2U ISD
	1	528259	Busbar, w/o LVD, 2U ISD
	1	528277	Assembly, cable, distribution, 2U ISD
2	1	528171	Assembly, shelf, 2U ISD
	1	528229	Shunt, DC, 175A, 25 mV
	1	528242	Kit, Mounting, 2U ISD
	1	528262	Busbar, link, 2U ISD
	1	528277	Assembly, cable, distribution, 2U ISD
3	1	528171	Assembly, shelf, 2U ISD
	1	528229	Shunt, DC, 175A, 25 mV
	1	528242	Kit, Mounting, 2U ISD
	1	528260	Busbar, link, 2U ISD
	1	528277	Assembly, cable, distribution, 2U ISD
	1	128824	Contactor, 1C, SPST, 150A, 48V
4	1	528171	Assembly, shelf, 2U ISD
	1	528229	Shunt, DC, 175A, 25 mV
	1	528242	Kit, Mounting, 2U ISD
	1	528261	Busbar, link, 2U ISD
	1	528277	Assembly, cable, distribution, 2U ISD
	1	128824	Contactor, 1C, SPST, 150A, 48V
6	1	534950	Assembly, shelf, 2U ISD
	1	535009	Busbar, link, 2U ISD
	1	535280	Kit, Mounting, 2U ISD
7	1	534950	Assembly, shelf, 2U ISD
	1	128824	Contactor, 1C, SPST, 150A, 48V
	1	535280	Kit, Mounting, 2U ISD
11	1	536650	Assembly, shelf, 2U ISD
	1	528229	Shunt, DC, 175A, 25 mV
	1	536647	Busbar, load batt
	2	534749	Busbar, link
	1	534621	Assembly, cable, distribution, 2U ISD
12	1	536650	Assembly, shelf, 2U ISD
	1	528229	Shunt, DC, 175A, 25 mV
	1	536647	Busbar, load batt
	2	534749	Busbar, link
	1	534621	Assembly, cable, distribution, 2U ISD
13	1	536650	Assembly, shelf, 2U ISD
	2	528229	Shunt, DC, 175A, 25 mV
	2	536637	Busbar, com, link
	1	536638	Busbar, LVLD link
	1	534621	Assembly, cable, distribution, 2U ISD
	1	128824	Contactor, 1C, SPDT, 150 Amp, 48VDC

List Number	Qty.	Part Number	Description
14	1 2 2 1 1 1	536650 528229 534748 534749 534621 128824	Assembly, shelf, 2U ISD Shunt, DC, 175A, 25 mV Busbar, link Busbar, link Assembly, cable, distribution, 2U ISD Contactor, 1C, SPDT, 150 Amp, 48VDC
21	1 1 1 1 1	535190 528229 528242 528259 528277	Assembly, shelf, 2U ISD Shunt, DC, 175A, 25 mV Kit, Mounting, 2U ISD Busbar, w/o LVD, 2U ISD Assembly, cable, distribution, 2U ISD
22	1 1 1 1 1	535190 528229 528242 528262 528277	Assembly, shelf, 2U ISD Shunt, DC, 175A, 25 mV Kit, Mounting, 2U ISD Busbar, link, 2U ISD Assembly, cable, distribution, 2U ISD
23	1 1 1 1 1 1	535190 528229 528242 528260 528277 128284	Assembly, shelf, 2U ISD Shunt, DC, 175A, 25 mV Kit, Mounting, 2U ISD Busbar, link, 2U ISD Assembly, cable, distribution, 2U ISD Contactor, 1C, SPST, 150A, 45V
24	1 1 1 1 1 1	535190 528229 528242 528261 528277 128284	Assembly, shelf, 2U ISD Shunt, DC, 175A, 25 mV Kit, Mounting, 2U ISD Busbar, link, 2U ISD Assembly, cable, distribution, 2U ISD Contactor, 1C, SPST, 150A, 45V
32	1	433800284	MCA
40	2	524769	Cord, AC input, NEMA L5-30P, 8AWG, 14.5 ft.
41	2	524770	Cord, AC input, NEMA L6-30P, 8AWG, 14.5 ft.
42	1 2	535213 246836600	Jumpers, AC, 3-positions Molex Cable clamp
43	1	525102	Kit, AC vertical feed input assembly
46	2 1 1 1 1	244823100 541191 535214 525075 535211	Bushing, snap, 1.3/32 Jumpers, AC, 3-positions Molex Cover, flat, connector plate Cover, C-shape, AC input Bracket, U + flange, connector
47	2 2 1	534840 534841 525008	Cord, AC input, NEMA 5-15, 10AWG, 10 ft. Cord, AC input, NEMA 5-15, 10AWG, 6 ft. Blank module
48	2 2	534842 534843	Cord, AC input, NEMA 6-20, 10AWG, 10 ft. Cord, AC input, NEMA 6-20, 10AWG, 6 ft.
50	1	525008	Blank module
53	2	486534800	PCU, 1000W, 48VDC, 120/208/240VAC
55	1	486534204	PCU, 1500W, 48VDC, 120/208/240VAC
56	1	486534600	PCU, 1750W, 48VDC, 120/208/240VAC

List Number	Qty.	Part Number	Description
72	1	487112200	Ringing Generator Module, complete, includes (2) P/N 487112100 Ringing Generators
73	1	487112100	Replacement Ringing Generator, complete
90	1	521262	Probe, battery temp., analog, 15 ft.
91	1	107021	Probe, battery temp., digital, 25-ft.
92	1	521211	TXM, Temperature Concentrator Module
93	1	528287	Probe, battery temp., digital, 2-1/2 ft.
94	1	528286	Cable, interface, TXM to MCA, 10 ft.
95	1	534415	Cable, interface, TXM to MCA, 15 ft.

SPECIFICATIONS

Note: *For all Part No. 528927 Load Shed Card specifications, refer to Section 5985. Section 5985 can be accessed via the CD (Electronic Documentation Package) furnished with your system.*

1. SYSTEM

1.1 Environmental Ratings

1.1.1 Operating Ambient Temperature Range:

(A) Operational: -40°C to +80°C (-40°F to +176°F)

(B) Start: -30°C to +80°C (-22°F to +176°F)

(C) Specification Compliant, Full Output: -20°C to +65°C (-4°F to +149°F)

(D) Reduced Load: +65°C to +80°C (+149°F to +176°F)

1.1.2 Storage Ambient Temperature Range: -40°C to +85°C (-40°F to +185°F)

1.1.3 Humidity: This system is capable of operating in an ambient relative humidity range of 0% to 95%, non-condensing.

1.1.4 Altitude: The maximum operating ambient temperature should be derated by 10°C at an elevation of 10,000 feet above sea level. For elevations between 3,000 feet and 10,000 feet, derate the maximum operating ambient temperature linearly.

1.1.5 Heat Dissipation: See input data tables under Paragraph 2.2, *Input Ratings*.

1.1.6 Ventilation Requirements: The PCUs and optional Ringing Generators are fan cooled and utilize front to back forced ventilation. Each Power Shelf must be mounted so ventilating openings are not blocked and temperature of the air entering the PCUs does not exceed the Operating Ambient Temperature Range stated above.

In addition, the distance from the rear of each Power Shelf to a wall or other solid structure must not be less than one inch. This will assure proper airflow through the PCUs. See also Paragraph 1.1.12 (Mounting).

1.1.7 Audible Noise: The audible noise at any point one meter from any vertical surface of the Power Shelf (with one PCU installed and fan operating) does not exceed 55 dBA (typical) when ambient temperature is below 32°C (89.6°F) and 65 dBA (typical) when ambient temperature is above 32°C (89.6°F). A Sound Level Meter conforming to ANSI S1.4 was used.

1.1.8 EMI/RFI Suppression: PCUs operating in a Power Shelf conform to the requirements of FCC rules Part 15, Subpart B, Class B for Radiated and Conducted emissions limits.

1.1.9 Surge Protection: Compliance with EN61000-4-5 Installation Class 4, and capable of withstanding surges per ANSI/IEEE C 62.41-1991 Category B across the input terminals.

Note: *This level of protection is a widely used standard for telecommunications power equipment. As with all such equipment, it is the end user's responsibility to provide an adequately sized Surge Suppression Device at the commercial power service entrance of the building that reduces all incoming surges to levels below the classes/categories stated for the equipment.*

1.1.10 ESD Protection: Complies with EN61000-4-2 Level 4 (8kV contact).

1.1.11 Electrical Fast Transient / Burst Immunity: Complies with EN61000-4-4 Level 4.

1.1.12 Mounting: Front and side access are required for wiring. Recommended minimum aisle space clearance is 2'6" for the front of the Power/Distribution System.

1.2 Compliance Information

1.2.1 Safety Compliance:

(A) This unit meets the requirements of UL 60950, Standard for Information Technology Equipment, and is UL Recognized as a power supply for use in Telephone, Electronic Data Processing or Information Processing Equipment.

(B) This unit meets the requirements of CAN/CSA 22.2, No. 60950-00 and is tested and Certified by UL ("c UR") as a Component Type Power Supply.

1.3 Local Controls and Indicators

See specifications for PCU and MCA.

2. PCU

2.1 Output Ratings

2.1.1 Voltage: Nominal -48 volts DC, Positive Ground.

(A) Without Battery Charge Temperature Compensation: Float voltage is adjustable from 47.00 to 58.00 volts DC. Equalize voltage is adjustable from 47.00 to 58.00 volts DC. Battery Test voltage is adjustable from 45.00 to 58.00 volts DC. Float, Equalize, and Battery Test voltages are factory set at 54.00 volts, unless otherwise specified. The output voltage temperature coefficient does not exceed 0.01% per degree centigrade from -40°C to +65°C.

(B) With Battery Charge Temperature Compensation Probe: With an optional battery temperature probe installed, the MCA automatically increases or decreases the output voltage as battery temperature decreases or increases, respectively. Float voltage is factory set at approximately 54.48 volts at 25°C battery temperature. The Float, Equalize and Battery Test voltage ranges are the same as without battery charge temperature compensation. Using battery and equipment manufacturers' recommendations, the user selects the following temperature compensation curve parameters via the MCA. Figure 1 details a user defined Temperature Compensation Curve.

(1) The temperature compensation slope in volts/°C. Adjustable from zero to 200 millivolts/°C. Factory set at 0V/°C (NO TEMPERATURE COMPENSATION).

(2) The maximum voltage limit in volts DC. Adjustable from float up to 58.00 volts DC, but automatically limited to one volt below the High Voltage Shutdown setting. Factory set at 56.50 volts DC.

(3) The minimum voltage limit in volts DC. Adjustable from float down to 47.00 volts DC. Factory set at 52.00 volts DC.

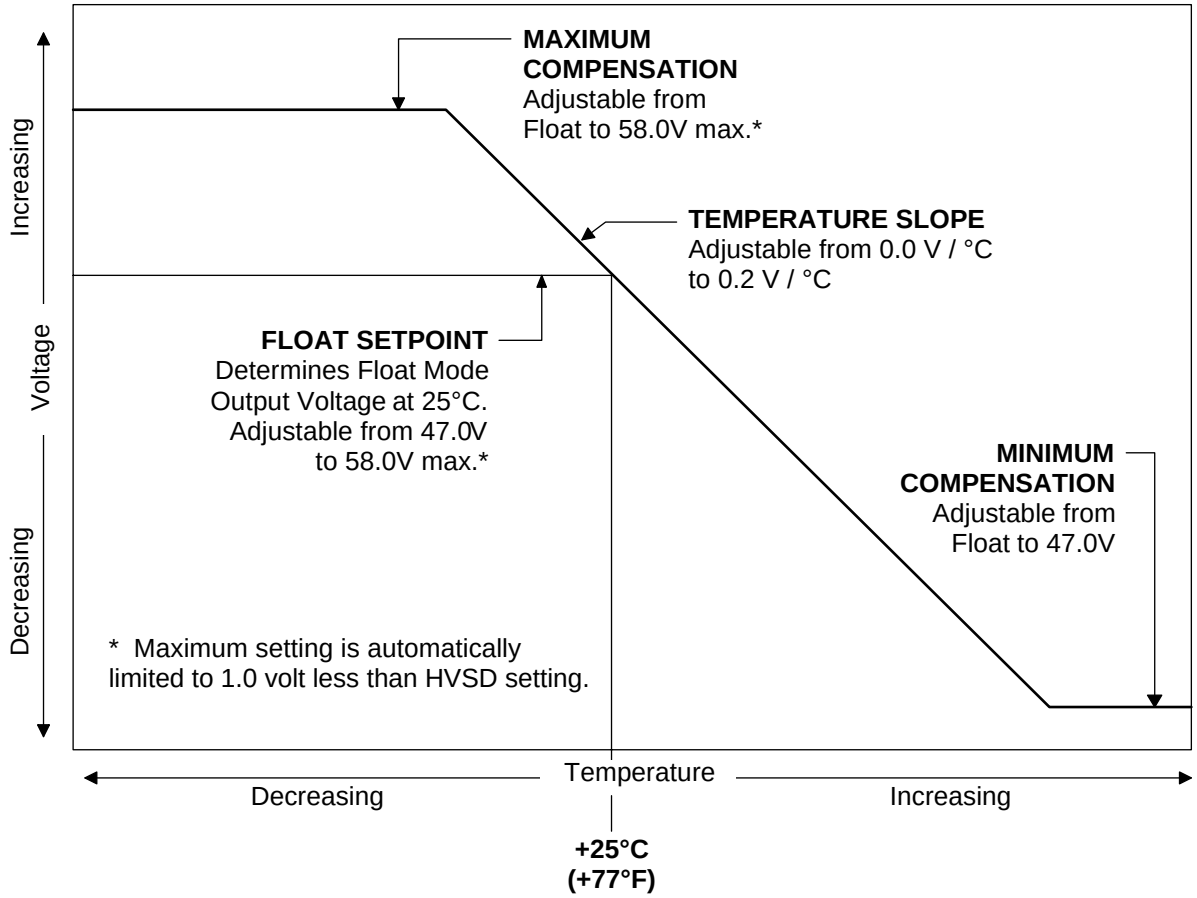


Figure 1
Typical Float Charge Thermal Characteristics
Using Optional Battery Temperature Probe

2.1.2 Current:

No. of PCUs	Full Load Rated Current (Amps)											
	List 53 (LXP1000) PCUs				List 55 (LXP1500) PCUs				List 56 (LXP1750) PCUs			
	120V In		208/240V In		120V In		208/240V In		120V In		208/240V In	
	58.0V Out	46.0V Out	58.0V Out	46.0V Out	58.0V Out	46.0V Out	58.0V Out	46.0V Out	58.0V Out	46.0V Out	58.0V Out	46.0V Out
1	8.3	10.87	16.7	21.74	12.5	16.3	25	32.6	12.5	16.3	30	38
2	16.67	21.74	33.33	43.48	25	32.6	50	65.2	25	32.6	60	76
3	25.0	32.61	50.00	65.22	37.5	48.9	75	97.8	37.5	48.9	90	114

2.1.3 Regulation

(A) Static: The associated MCA controls the steady state output voltage to within ±0.5% of any voltage setting within the range of 47.0 to 58.0 volts DC for any and all combinations of load from no load to full load, input voltage, and input frequency at a constant ambient

temperature. If the MCA's regulation feature is disabled for any reason, steady state regulation is ±1% as controlled within the PCUs.

(B) Dynamic Response: For any step load change within the range of 20% to 100% of rated output current, per Telcordia GR-947-CORE, the maximum voltage transient will not exceed ±5% of the initial steady state voltage. Recovery to within ±0.7% of the initial steady state voltage does not exceed 30 milliseconds, recovery to within ±0.5% of the initial steady state voltage does not exceed five seconds, and recovery to within ±0.02% of the initial steady state voltage does not exceed 20 seconds.

2.1.4 Filtering (with or without battery): Typical readings were taken at nominal input voltage, nominal output voltage, 50% load, and 25°C (77°F) ambient.

(A) Voice Band Noise: Complies with Telcordia GR-947-CORE.

(1) Typically 13 dBrn with C-message weighting. Does not exceed 26 dBrn C.

(2) Typically 0.100 millivolt psophometric. Does not exceed 1 millivolt psophometric.

(B) Wide Band Noise: Complies with Telcordia GR-947-CORE.

(1) Typically 150 millivolt peak-to-peak. Does not exceed 250 millivolt peak-to-peak.

(2) Typically 10 millivolts rms. Does not exceed 100 millivolt rms.

2.2 Input Ratings

2.2.1 Voltage:

(A) Nominal 120/208/240 volts AC, single phase, 50/60 Hz, with an operating range of 90-175 volts (Reduced Power Mode) and 176-264 volts (Full Power Mode). Acceptable input frequency range is 45 to 65 Hz.

2.2.2 Harmonic Content: Meets EN 61000-3-2

2.2.3 Inrush Current: Peak does not exceed 2 times the RMS input current at full load, nominal input voltage, and for any duration of AC input interrupts. Under the above conditions, standard AC distribution circuit breakers will not trip.

2.2.4 Typical Input Data—List 53 (Model LXP1000) PCU: 50 Hz input, 25°C ambient.

(A) Output initially adjusted to 54.48 volts DC as measured at the shelf output terminals at 50% of full load and nominal input. "Percent of Full Load" refers to percent of 16 Amperes per PCU with nominal 208/240V input, or percent of 8 Amperes per PCU with nominal 120V input.

Note: *At 120V nominal input, PCUs operate in the Reduced Power Mode. In the Reduced Power Mode, PCUs provide 1/2 the output current and power available in Full Power Mode.*

Number of PCUs Installed	Nominal Input Voltage	Percent of Full Load	Input Current (Amperes)	Input VA	Input Watts	Power Factor	Efficiency %	Heat Dissipation BTU/Hr
1	120	0	0.70	83	71	0.850	--	241
		25	1.57	187	177	0.944	64.2	216
		50	2.48	298	291	0.975	78.1	217
		100	4.49	537	533	0.991	85.1	270
		110	4.90	585	582	0.993	85.9	280
		120	5.32	635	631	0.994	86.4	292
		128	5.42	647	642	0.994	86.5	296
		Max.	5.43	648	644	0.994	86.3	301
	208	0	0.70	145	69	0.477	--	237
		25	1.54	319	284	0.889	80.1	193
		50	2.67	553	519	0.936	87.5	222
		100	4.92	1025	1004	0.978	90.4	328
		110	5.39	1121	1101	0.981	90.7	349
		120	5.69	1183	1164	0.982	90.8	367
		128	5.70	1187	1166	0.982	90.5	378
		Max.	5.72	1188	1170	0.982	90.2	392
	240	0	0.73	175	68	0.388	--	232
		25	1.44	344	283	0.814	80.2	191
		50	2.34	559	516	0.920	87.9	213
		100	4.33	1035	1000	0.965	90.8	314
		110	4.72	1130	1098	0.970	91.0	339
		120	4.96	1192	1160	0.973	91.0	356
		128	4.97	1194	1162	0.973	90.8	365
		Max.	4.98	1197	1165	0.973	90.5	378

(B) Maximum Input Current: At 100% of full load with output adjusted to 58 volts DC as measured at the output bus.

List 53 (Model LXP1000) PCUs, 50 Hz. Input, 25°C Ambient			
Nominal Input Voltage	**Input Voltage**	**Number of PCUs Installed**	**Input Current (Amperes)**
120	90	1	7.28
208/240	176		6.71

2.2.5 Typical Input Data—List 53 (Model LXP1000) PCU: 60 Hz input, 25°C ambient.

(A) Output initially adjusted to 54.48 volts DC as measured at the shelf output terminals at 50% of full load and nominal input. "Percent of Full Load" refers to percent of 16 Amperes per PCU with nominal 208/240V input or percent of 8 Amperes per PCU with nominal 120V input.

Note: *At 120V nominal input, PCUs operate in the Reduced Power Mode. In the Reduced Power Mode, PCUs provide 1/2 the output current and power available in Full Power Mode.*

Number of PCUs Installed	Nominal Input Voltage	Percent of Full Load	Input Current (Amperes)	Input VA	Input Watts	Power Factor	Efficiency %	Heat Dissipation BTU/Hr
1	120	0	0.72	87	70	0.808	--	240
		25	1.59	190	176	0.925	64.5	213
		50	2.49	299	290	0.968	78.2	216
		100	4.50	538	533	0.989	85.3	268
		110	4.91	586	581	0.991	86.0	279
		120	5.32	635	630	0.992	86.5	291
		128	5.42	647	642	0.992	86.6	295
		Max.	5.44	649	644	0.992	86.4	300
	208	0	0.79	164	70	0.425	--	237
		25	1.60	332	285	0.856	79.5	199
		50	2.72	564	520	0.918	87.3	226
		100	4.99	1032	1005	0.973	90.3	334
		110	5.42	1128	1101	0.976	90.7	350
		120	5.72	1189	1166	0.979	90.7	369
		128	5.73	1192	1167	0.978	90.6	376
		Max.	5.75	1196	1171	0.979	90.2	392
	240	0	0.83	200	69	0.342	--	234
		25	1.53	369	293	0.768	77.5	224
		50	2.39	574	517	0.899	87.8	215
		100	4.37	1047	1001	0.956	90.7	317
		110	4.76	1141	1097	0.961	91.0	336
		120	5.01	1202	1161	0.964	91.1	354
		128	5.02	1204	1162	0.965	90.9	363
		Max.	5.03	1217	1166	0.965	90.5	378

(B) Maximum Input Current: At 100% of full load with output adjusted to 58 volts DC as measured at the output bus.

List 53 (Model LXP1000) PCUs, 60 Hz. Input, 25°C Ambient			
Nominal Input Voltage	**Input Voltage**	**Number of PCUs Installed**	**Input Current (Amperes)**
120	90	1	7.28
208/240	176		6.72

2.2.6 Typical Input Data—List 55 (Model LXP1500) PCU: 50 Hz input, 25°C ambient.

(A) Output is initially adjusted to 54.48 volts DC as measured at the shelf output terminals at 50% of full load and nominal input. "Percent of Full Load" refers to percent of 25 Amperes per PCU with nominal 208/240V input or percent of 12.5 Amperes per PCU with nominal 120V input.

Note: *At 120V nominal input, PCUs operate in the Reduced Power Mode. In the Reduced Power Mode, PCUs provide 1/2 the output current and power available in Full Power Mode.*

Number of PCUs Installed	Nominal Input Voltage	Percent of Full Load	Input Current (Amperes)	Input VA	Input Watts	Power Factor	Efficiency %	Heat Dissipation BTU/Hr
1	120	0	0.60	80	68	0.844	--	233
		25	2.09	250	241	0.967	70.6	241
		50	3.45	414	409	0.987	83.3	233
		100	6.50	781	777	0.995	87.6	329
		110	7.14	855	852	0.995	87.9	352
		120	7.56	907	904	0.996	88.0	371
		128	7.59	908	905	0.996	87.8	377
		Max.	7.60	910	907	0.996	87.5	387
	208	0	0.69	144	68	0.473	--	231
		25	2.08	432	402	0.929	84.8	208
		50	3.76	782	756	0.965	90.1	255
		100	7.26	1511	1495	0.989	91.1	454
		110	7.97	1658	1642	0.990	91.2	491
		120	8.18	1700	1685	0.991	90.9	523
		128	8.21	1706	1691	0.991	90.5	547
		Max.	8.23	1711	1695	0.990	90.2	568
	240	0	0.72	173	67	0.385	--	228
		25	1.87	447	400	0.893	85.2	202
		50	3.33	798	756	0.957	90.1	256
		100	6.30	1512	1486	0.982	91.7	423
		110	6.91	1661	1637	0.985	91.5	474
		120	7.08	1701	1678	0.985	91.3	498
		128	7.10	1707	1683	0.986	91.0	520
		Max.	7.12	1710	1686	0.986	90.6	541

(B) Maximum Input Current: At 100% of full load with output adjusted to 58 volts DC as measured at the output bus.

List 55 (Model LXP1500) PCUs, 50 Hz. Input, 25°C Ambient			
Nominal Input Voltage	**Input Voltage**	**Number of PCUs Installed**	**Input Current (Amperes)**
120	90	1	10.25
208/240	176		9.65

2.2.7 Typical Input Data—List 55 (Model LXP1500) PCU: 60 Hz input, 25°C ambient.

(A) Output initially adjusted to 54.48 volts DC as measured at the shelf output terminals at 50% of full load and nominal input. "Percent of Full Load" refers to percent of 25 Amperes per PCU with nominal 208/240V input or percent of 12.5 Amperes per PCU with nominal 120V input.

Note: *At 120V nominal input, PCUs operate in the Reduced Power Mode. In the Reduced Power Mode, PCUs provide 1/2 the output current and power available in Full Power Mode.*

Number of PCUs Installed	Nominal Input Voltage	Percent of Full Load	Input Current (Amperes)	Input VA	Input Watts	Power Factor	Efficiency %	Heat Dissipation BTU/Hr
1	120	0	0.71	86	68	0.796	--	233
		25	2.03	244	233	0.955	72.9	215
		50	3.47	416	409	0.983	83.3	233
		100	6.50	781	777	0.994	87.7	326
		110	7.14	856	852	0.995	88.0	348
		120	7.56	907	903	0.995	88.0	369
		128	7.58	908	906	0.995	87.7	379
		Max.	7.60	910	907	0.995	87.5	386
	208	0	0.78	163	68	0.418	--	233
		25	2.13	443	402	0.908	84.7	210
		50	3.82	794	760	0.957	89.7	268
		100	7.28	1514	1493	0.986	91.2	447
		110	7.99	1661	1643	0.988	91.2	494
		120	8.20	1704	1687	0.988	90.8	527
		128	8.23	1711	1691	0.988	90.5	547
		Max.	8.24	1713	1695	0.989	90.2	565
	240	0	0.82	197	67	0.338	--	229
		25	1.93	463	400	0.861	85.1	203
		50	3.39	811	756	0.931	90.1	255
		100	6.32	1521	1489	0.977	91.5	433
		110	6.94	1669	1635	0.981	91.6	468
		120	7.11	1708	1678	0.982	91.3	497
		128	7.13	1713	1684	0.982	91.0	519
		Max.	7.15	1718	1688	0.982	90.6	539

(B) Maximum Input Current: At 100% of full load with output adjusted to 58 volts DC as measured at the output bus.

List 55 (Model LXP1500) PCUs, 60 Hz. Input, 25°C Ambient			
Nominal Input Voltage	**Input Voltage**	**Number of PCUs Installed**	**Input Current (Amperes)**
120	90	1	10.25
208/240	176		9.66

2.2.8 Typical Input Data—List 56 (Model LXP1750) PCU: 50 Hz input, 25°C ambient.

(A) Output initially adjusted to 54.48 volts DC as measured at the shelf output terminals at 50% of full load and nominal input. "Percent of Full Load" refers to percent of 29.2 Amperes per PCU with nominal 208/240V input or percent of 12.5 Amperes per PCU with nominal 120V input.

Note: *At 120V nominal input, PCUs operate in the Reduced Power Mode. In the Reduced Power Mode, PCUs provide less than 1/2 the output current and power available in Full Power Mode.*

Number of PCUs Installed	Nominal Input Voltage	Percent of Full Load	Input Current (Amperes)	Input VA	Input Watts	Power Factor	Efficiency %	Heat Dissipation BTU/Hr
1	120	0	0.63	76	70	0.913	--	239
		25	1.97	238	232	0.976	73.4	210
		50	3.43	412	409	0.991	83.3	233
		100	6.53	780	777	0.997	87.6	328
		110	7.16	855	853	0.997	87.9	354
		120	7.57	904	902	0.997	87.8	375
		128	7.58	905	903	0.997	87.7	378
		Max.	7.59	906	904	0.997	87.6	383
	208	0	0.54	111	69	0.619	--	235
		25	2.32	481	460	0.955	86.5	212
		50	4.32	898	882	0.982	90.2	295
		100	8.84	1759	1747	0.993	91.0	534
		110	9.34	1934	1924	0.994	91.0	594
		120	9.49	1967	1956	0.994	90.6	630
		128	9.53	1976	1965	0.994	90.0	668
		Max.	9.54	1977	1966	0.994	89.9	676
	240	0	0.54	129	67	0.531	--	230
		25	2.02	485	459	0.945	86.6	210
		50	3.76	904	878	0.972	90.6	283
		100	7.33	1755	1739	0.990	91.5	504
		110	8.06	1929	1913	0.991	91.5	557
		120	8.19	1960	1945	0.992	91.1	594
		128	8.22	1967	1953	0.992	90.6	627
		Max.	8.23	1970	1955	0.992	90.5	637

(B) Maximum Input Current: At 100% of full load with output adjusted to 58 volts DC as measured at the output bus.

List 56 (Model LXP1750) PCUs, 50 Hz. Input, 25°C Ambient			
Nominal Input Voltage	**Input Voltage**	**Number of PCUs Installed**	**Input Current (Amperes)**
120	90	1	10.3
208/240	176		11.2

2.2.9 Typical Input Data—List 56 (Model LXP1750) PCU: 60 Hz input, 25°C ambient.

(A) Output initially adjusted to 54.48 volts DC as measured at the shelf output terminals at 50% of full load and nominal input. "Percent of Full Load" refers to percent of 29.2 Amperes per PCU with nominal 208/240V input or percent of 12.5 Amperes per PCU with nominal 120V input.

Note: *At 120V nominal input, PCUs operate in the Reduced Power Mode. In the Reduced Power Mode, PCUs provide less than 1/2 the output current and power available in Full Power Mode.*

Number of PCUs Installed	Nominal Input Voltage	Percent of Full Load	Input Current (Amperes)	Input VA	Input Watts	Power Factor	Efficiency %	Heat Dissipation BTU/Hr
1	120	0	0.65	79	70	0.887	--	239
		25	1.98	239	232	0.969	73.6	209
		50	3.43	412	408	0.988	83.3	232
		100	6.53	780	777	0.996	87.6	328
		110	7.16	855	853	0.997	87.9	354
		120	7.56	903	901	0.997	88.0	368
		128	7.58	905	902	0.997	87.8	376
		Max.	7.60	906	904	0.997	87.6	384
	208	0	0.59	122	70	0.568	--	237
		25	2.35	489	461	0.843	86.3	216
		50	4.35	901	882	0.977	90.2	296
		100	8.45	1760	1748	0.992	91.0	535
		110	9.29	1933	1922	0.993	91.0	587
		120	9.45	1967	1957	0.993	90.5	635
		128	9.48	1974	1962	0.993	90.2	658
		Max.	9.57	1979	1960	0.993	90.2	654
	240	0	0.59	143	69	0.478	--	234
		25	2.05	493	459	0.930	86.5	212
		50	3.80	911	879	0.962	90.5	284
		100	7.34	1758	1738	0.989	91.5	502
		110	8.07	1929	1912	0.990	91.5	553
		120	8.17	1960	1945	0.990	91.1	594
		128	8.20	1968	1951	0.990	90.5	629
		Max.	8.21	1974	1956	0.990	89.5	704

(B) Maximum Input Current: At 100% of full load with output adjusted to 58 volts DC as measured at the output bus.

List 56 (Model LXP1750) PCUs, 60 Hz. Input, 25°C Ambient			
Nominal Input Voltage	**Input Voltage**	**Number of PCUs Installed**	**Input Current (Amperes)**
120	90	1	10.3
208/240	176		11.2

2.3 Standard Features

2.3.1 Type of Power Conversion Circuit: High frequency.

2.3.2 Float Charging Output Mode: In this mode of operation, system output voltage is constant and output current does not exceed the current limit setting. During normal operation, the battery is not required to furnish load current and remains in a fully charged condition.

The float voltage setting can be checked and/or adjusted without removing a PCU or affecting the load. One adjustment changes the output of all PCUs.

Note: *If the current demanded by the load exceeds the current limit setting of the system, the battery is required to furnish the difference in load current and begins discharging.*

Note: *If the system is used with a battery temperature probe, the MCA automatically adjusts system output. This ensures proper voltage to the battery as battery ambient temperature fluctuates.*

2.3.3 Equalize Charging Output Mode:

(A) This mode of operation is used if higher output voltage is required for equalizing the charge on all battery cells of a conventional flooded cell battery, or for recharging the battery following a commercial power failure.

The Equalize voltage setting can be checked and/or adjusted without removing a PCU or affecting the load. One adjustment changes the output of all PCUs.

Note: *If the system is used with a battery temperature probe, equalize mode of operation is not used.*

(B) There are three methods of placing the system from the Float mode to the Equalize mode.

(1) Method 1 (Manual Equalize): A user manually places the system into the Equalize mode via the MCA interface. A user must manually return the system to the Float mode via the MCA interface.

(2) Method 2 (Manually Initiated Timed Equalize): A user manually places the system into the Equalize mode via the MCA interface. The system automatically returns to the Float mode after a preset programmable time-period.

(3) Method 3 (Automatic Equalize):

THE AUTOMATIC EQUALIZE FEATURE IS INTENDED FOR USE ONLY WITH WET CELL BATTERIES. USING THIS FEATURE WITH VALVE REGULATED BATTERIES IS NOT RECOMMENDED.

This feature can be enabled or disabled by a user via the MCA. The default state is disabled.

The Automatic Equalize feature is a time based function that is controlled by a customer selectable multiplier and by the Battery on Discharge (BOD) alarm setpoint. The MCA's default setting is for a multiplier of zero, which disables the Automatic Equalize feature.

When the Automatic Equalize feature is enabled, if system voltage drops to less than the BOD alarm setpoint, the MCA initiates a timing cycle to measure the discharge time-period. The MCA requires at least 15 minutes of continuous BOD alarm in order to prevent nuisance equalization cycles. When system voltage rises to above the BOD alarm setpoint, the MCA ends the discharge timing cycle and (assuming a minimum of 15 minutes has elapsed) places the PCUs into the equalize mode for a customer selectable multiple of the discharge time period (the discharge time period includes the initial 15 minutes).

The equalize time period can be set for 0 to 15 times the discharge time period, up to a maximum of 300 hours. A zero (0) setting disables the feature.

2.3.4 Battery Test Output Mode:

(A) This mode of operation is used if lower output voltage is required for battery plant testing. The Battery Test voltage setting can be checked and/or adjusted without removing a PCU or affecting the load. One adjustment changes the output of all PCUs.

(B) There are two methods of placing the system in the Battery Test mode.

(1) Method 1 (Manual Battery Test): A user manually places the system into the Battery Test mode via the MCA interface. A user must manually return the system to the Float mode via the MCA interface.

(2) Method 2 (Manually Initiated Timed Battery Test): A user manually places the system into the Battery Test mode via the MCA interface. The system automatically returns to the Float mode after a preset programmable time-period, or when the "end battery test" voltage is reached, whichever occurs first.

2.3.5 Input Protection: Lists 1, 2, 3 and 4 each provide connections for one AC input branch circuit. Customer to provide AC input branch circuit protection.

(A) Low AC Input Voltage Protection:

(1) 120V Operation: If AC input voltage decreases below approximately 90 volts (non-adjustable), each PCU's power conversion circuitry inhibits, disabling system output. When AC input voltage increases to approximately 90 volts (non-adjustable), the PCU automatically restarts.

(2) 208/240V Operation: If AC input voltage decreases to within the range of approximately 90-175 volts (non-adjustable), the PCUs continue to operate, but at a reduced maximum output (500W for LXP1000, 750W for LXP1500 and LXP1750). When AC input voltage increases to approximately 176 volts (non-adjustable), the PCU automatically switches to full output power.

If AC input voltage decreases below approximately 90 volts (non-adjustable), the PCU's power conversion circuitry inhibits, disabling system output. When AC input voltage increases to within the range of approximately 90 - 176 volts (non-adjustable), the system automatically restarts and operates in the reduced power mode.

(B) High AC Input Voltage Inhibit: If AC input voltage increases to a preset non-adjustable value, the PCU's power conversion circuitry inhibits, disabling system output. When AC input voltage decreases to another preset non-adjustable value, the system automatically restarts.

Designed to inhibit at approximately 285 volts AC, and to restart at approximately 264 volts AC.

2.3.6 Output Protection

(A) Power or Current Limiting: The system can be set for Power Limiting or Current Limiting. Factory default is for Power Limiting.

(1) Power Limiting: When the system is set for Power Limiting, the maximum power delivered by each PCU is limited the value shown in the following table.

PCU Model	208/240V In	120VAC In
LXP1000W	1000W	500W
LXP1500W	1500W	750W
LXP1750W	1750W	750W

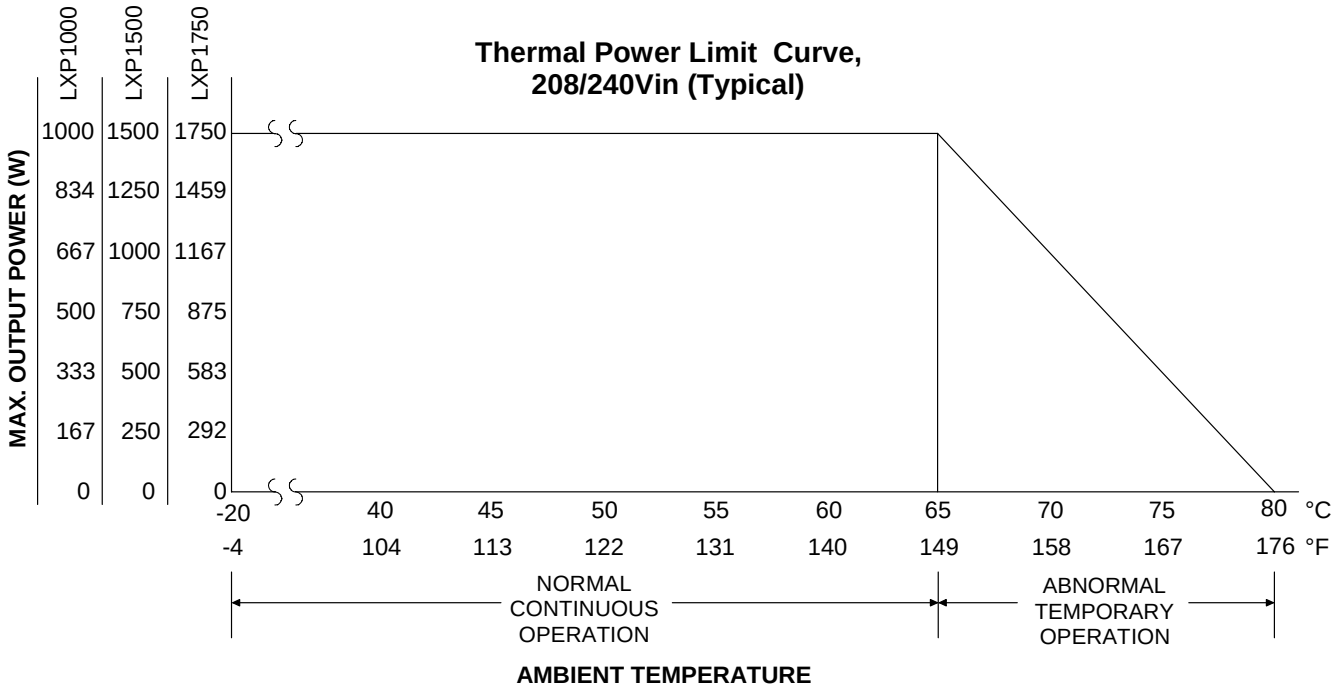
(2) Current Limiting: When the system is set for Current Limiting, the maximum current delivered by the system can be programmed from 10% to 110% of total system capacity. The MCA automatically adjusts the current limit circuit on each PCU so that this value is not exceeded. If a PCU fails, the MCA automatically resets each remaining PCU's current limit point to maintain this value. The MCA also ensures that the current limit circuit on any PCU is not set above 110% of its capacity. The default current limit setting in the Current Limit mode is the sum of each installed PCU's output rating. One adjustment changes the setting of all PCUs.

(B) Output Fusing: Output fusing is provided in each PCU. If a fuse opens, local and remote PCU Fail Alarms activate. This fusing is not customer replaceable.

(C) Thermal Power Limiting: Each PCU continuously monitors the ambient temperature surrounding the power conversion unit circuit. If this temperature for any reason (such as a high ambient office temperature) increases above approximately +65°C (+149°F), the PCU will not shut down. Rather, the PCU will limit its maximum output power to maintain the temperature of the power conversion circuit within design parameters. Full power capability is restored when the temperature decreases to below approximately +65°C (+149°F). Figure 2 illustrates typical operating parameters.

Warning: The PCU is rated for continuous operation at full output power up to +65°C (+149°F). Operation between +65°C and +80°C (+149°F and +176°F) is considered abnormal and should be used on a temporary[1] basis only.

[1] **Temporary Operation at Abnormal Temperature:** Temporary operation refers to a period of not more than eight consecutive hours per day, and a total of not more than 15 days in a year. (This refers to a total of 120 hours in any given year, but no more than 15 occurrences in that one year period.)



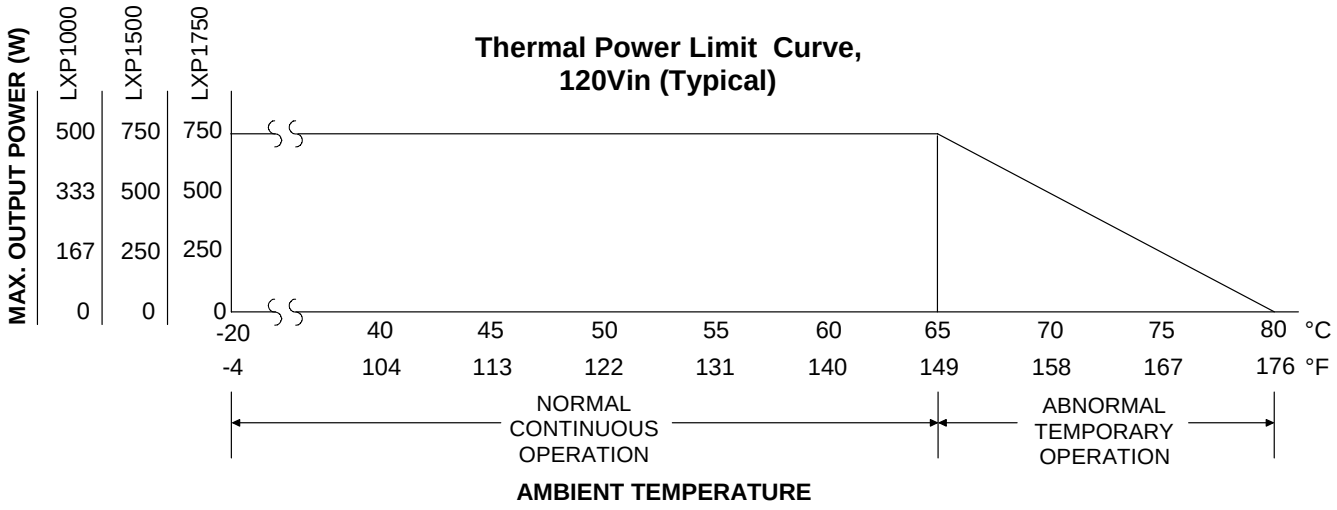
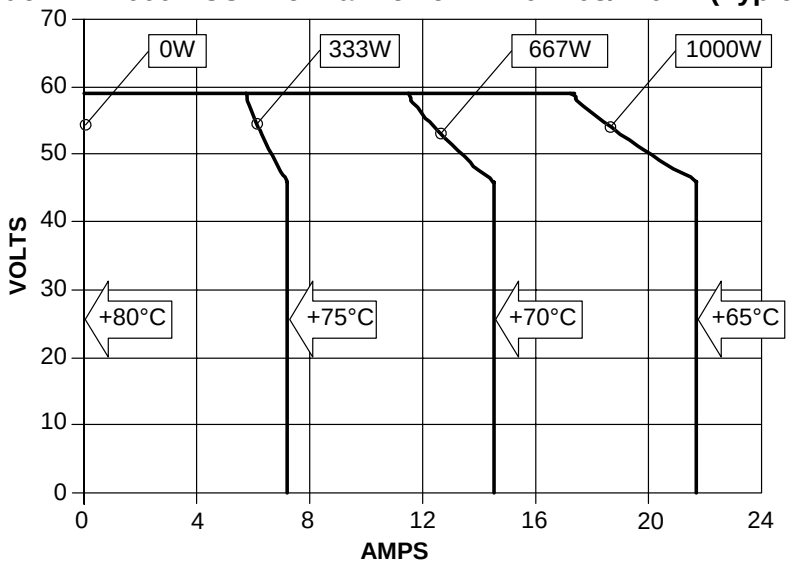


Figure 2

(D) Refer to Figure 3 for a curve that represents the typical LXP1000 output power characteristics at various ambient temperatures. Output voltage and current limit are set to maximum.

Model LXP1000 PCU Thermal Power Limit - 208/240Vin (Typical)



Model LXP1000 PCU Thermal Power Limit - 120Vin (Typical)

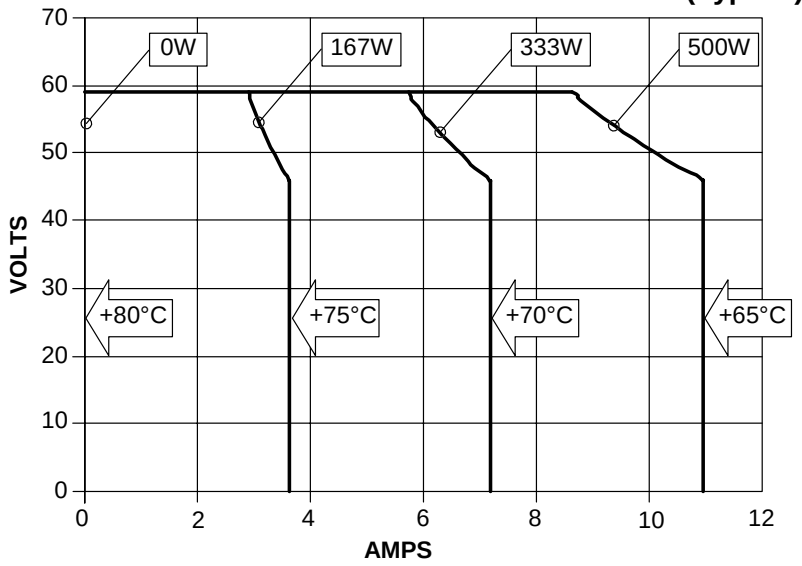


Figure 3

(E) Refer to Figure 4 for a curve that represents the typical LXP1500 output power characteristics at various ambient temperatures. Output voltage and current limit are set to maximum.

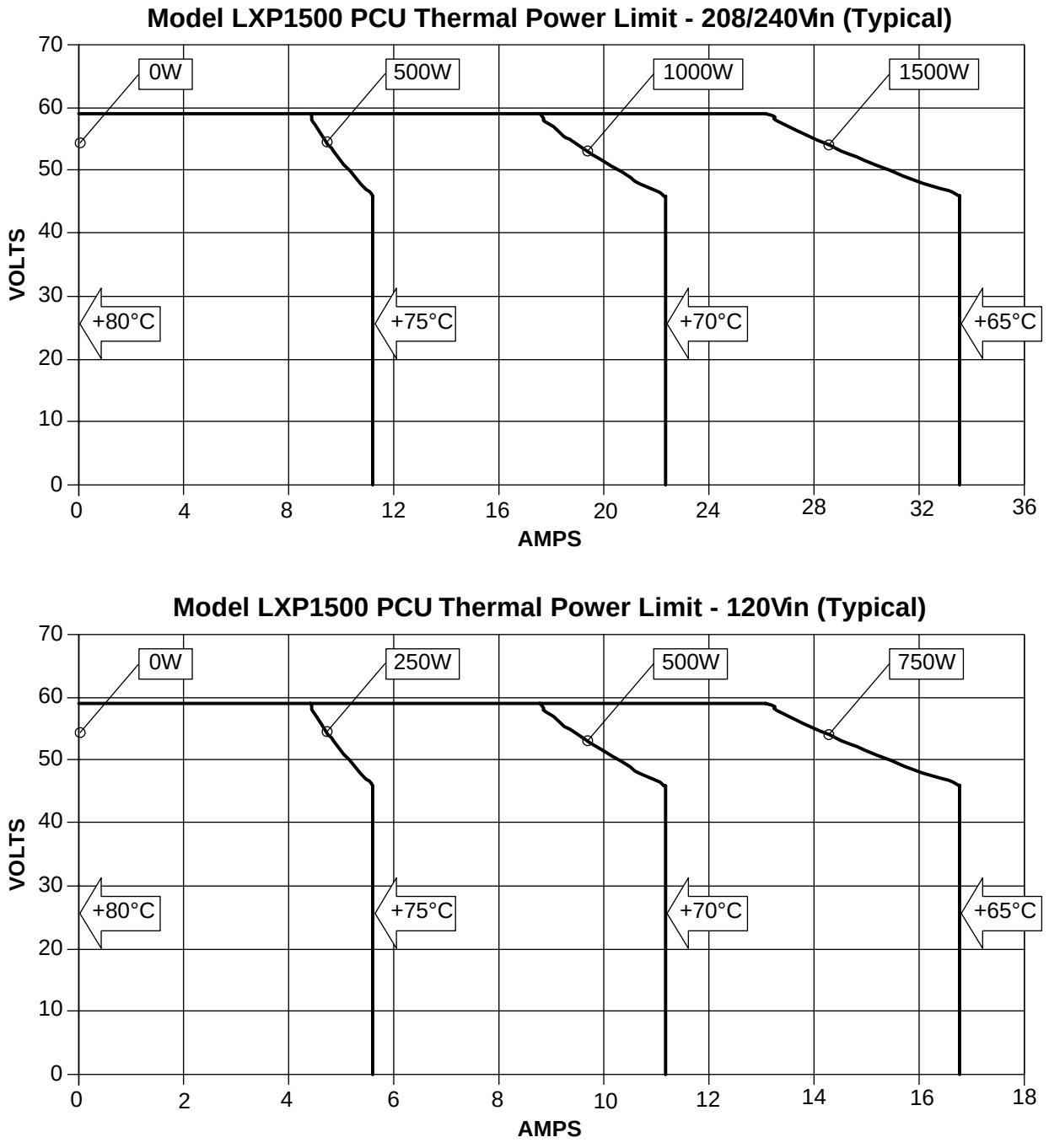
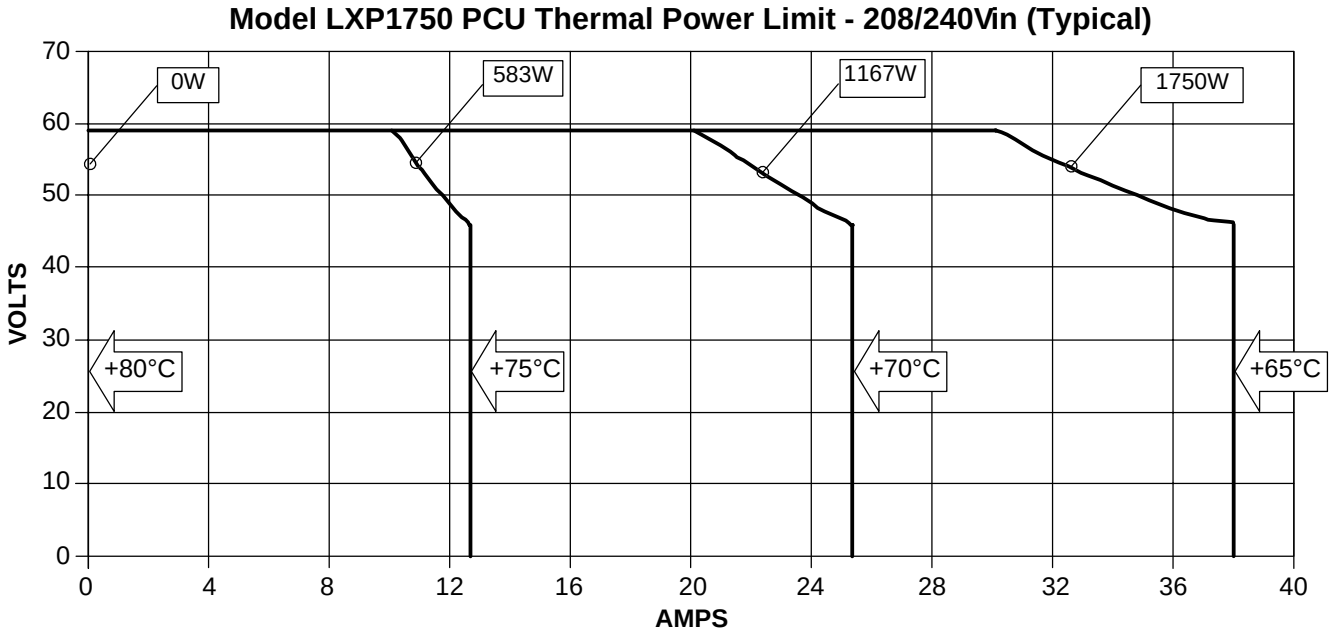


Figure 4

(F) Refer to Figure 5 for a curve that represents the typical LXP1750 output power characteristics at various ambient temperatures. Output voltage and current limit are set to maximum.



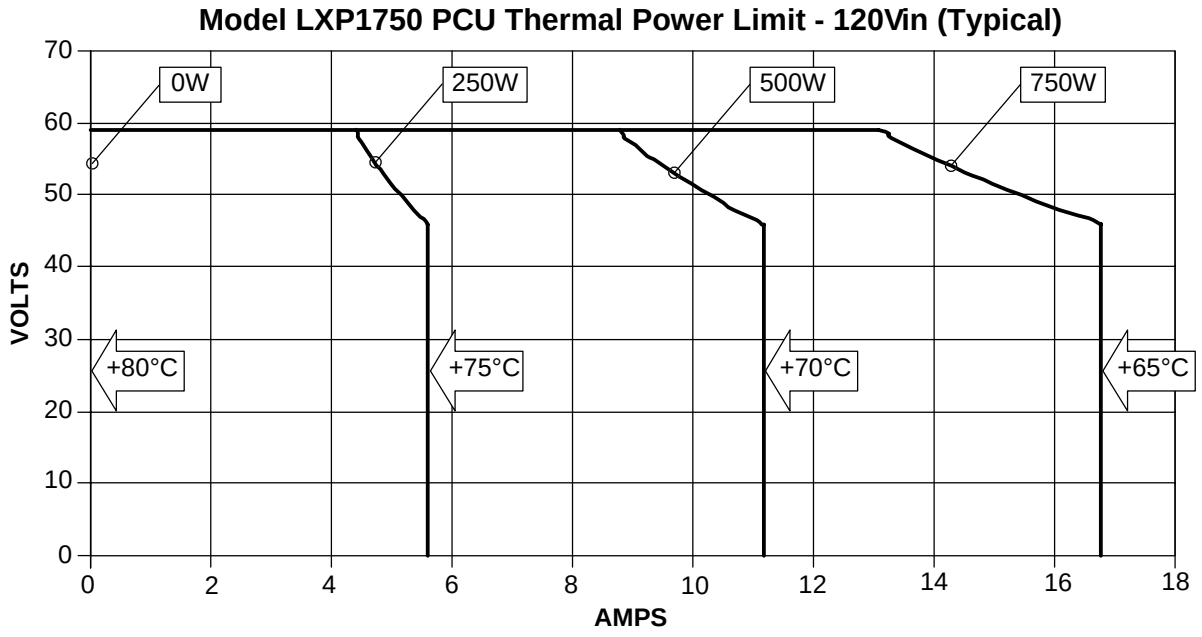


Figure 5

(G) High Voltage Shutdown

(1) Internal: If PCU output voltage exceeds an adjustable preset value and is delivering more than 10% of its rated current, the PCU shuts down.

After approximately 3 seconds, the PCU automatically restarts. If PCU output voltage again exceeds the high voltage shutdown value within 5 minutes, the PCU shuts down and locks out. Manual restart is then required. If the PCU does not experience a high voltage condition within the 5-minute time-period, the restart circuit is reset.

If two or more PCUs are installed in the Power Shelf, or if the Power Shelf is paralleled with other Power Shelves, only the PCU causing the high voltage condition shuts down.

The high voltage shutdown point can be checked and/or adjusted without removing a PCU. One adjustment changes the setting of all PCUs.

Adjustable from 48.00 to 59.50 volts DC. Factory set at 57.50 volts, unless otherwise specified.

(2) Remote: See Paragraph 3.1.9 (B).

(3) Backup: If PCU output voltage exceeds a second (non-adjustable) value, the PCU shuts down and locks out regardless of load. Manual restart is then required.

2.3.7 DC/DC Converter Failure: If a PCU's DC/DC converter fails, the PCU shuts down. After approximately 30 seconds, the PCU automatically restarts. If a DC/DC converter failure condition occurs again within 5 minutes, the PCU again shuts down, and again restarts in approximately 30 seconds. If a failure condition occurs a third time within 5 minutes, the PCU shuts down and locks out. Manual restart is then required. If the PCU does not experience a DC/DC converter failure condition within the 5-minute time-period, the restart circuit is reset.

2.3.8 Power Factor Corrector Converter Failure: If a PCU's power factor corrector converter fails, the PCU shuts down. After approximately 30 seconds, the PCU automatically restarts.

2.3.9 Paralleling: This system may be connected in parallel with any rectifier of the same polarity and adjusted to the same output voltage.

2.3.10 Load Sharing: The MCA load sharing feature automatically balances the load to within ±1% of the PCUs rated output currents. If the MCA's load sharing feature is disabled for any reason, pre-programmed slope control in each PCU balances the load to within ±10% of their rated output currents. The MCA will balance a system of up to 17 PCUs within 5 minutes. The MCA's load sharing feature is disabled whenever the system is in current limit, the system is delivering more than 97% capacity, or the system is delivering less than 3% capacity.

2.3.11 Output Current Walk-In: Output current gradually increases after the system is switched on, or AC service is initially supplied or restored as indicated below.

Load Current %	Minimum Elapsed Time (seconds)
20	-
50	2.5
75	5.0
90	8.0

2.3.12 Cooling: Forced Convection Cooling. A three-speed fan control circuit is provided. When the feature is enabled, fan operation is determined by ambient temperature and load current, as shown in the following table. Values shown are typical.

Ambient (°C)	Fan Operation	LXP1000		LXP1500		LXP1750	
		Vin = 120	Vin = 240	Vin = 120	Vin = 240	Vin = 120	Vin = 240
	Always high speed	—	—	—	—	—	—
+35							
	Go to medium speed if now low speed & currrent:	> 5.7A	> 11.0A	> 8.6A	> 16.54A	> 8.6A	> 19.32A
+32							
	Go to medium speed if presently high speed	—	—	—	—	—	—
	Go to medium speed if current:	> 5.7A	> 11.0A	> 8.6A	> 16.54A	> 8.6A	> 19.32A
	Go to low speed if current:	< 5.33A	< 10.25A	< 8.0A	< 15.38A	< 8.0A	< 17.96A
-7							
	Go to medium speed if currrent:	> 5.7A	> 11.0A	> 8.6A	> 16.54A	> 8.6A	> 19.32A
-10							
	Always medium speed	—	—	—	—	—	—
-17							
	Hold present speed	—	—	—	—	—	—
-20							
	Always high speed	—	—	—	—	—	—

The fan control feature can be enabled or disabled by a user via the MCA. When disabled, the fans operate at high speed at all times. The default state is disabled.

Should a PCU fan fail, the STATUS indicator will go red, and the MCA will generate a fan fail alarm.

Note: *When the fan speed control feature is enabled, the PCUs individually use their internal temperatures and output currents to control fan speed. It is therefore possible that, in a system with many PCUs and under certain conditions, fans in the various PCUs will operate at different speeds.*

2.3.13 Local Controls: None.

2.3.14 Local Status and Alarm Indicators:

Location	Name	Type
PCU	STATUS	LED: Green = AC OK, Operation Normal Yellow (blinking) = Being ID'd by MCA or communication with MCA lost Red = PCU Fail

3. MCA

3.1 Standard Features

3.1.1 MCA Interface:

(A) Local: Via the MCA's Control Panel.

(B) Remote: Via the MCA's Web Interface. See Paragraph 3.2.

3.1.2 MCA Local Display: Provides digital metering of system load voltage and current, individual PCU current, and individual load shunts. Also displays system alarm messages and adjustment information, as detailed in Paragraph 3.1.8 (*MCA Display*).

3.1.3 MCA Meter Accuracy: ±0.01 V, ±0.005% / °C

3.1.4 MCA Universal Adjustment Circuit: Provides single point control of float, equalize, battery test, thermal runaway management output voltages, high voltage shutdown, and current limit adjustments.

Note: *Should the MCA fail, the PCUs remember the float and high voltage shutdown settings last delivered by the MCA. The current limit control of each PCU goes to constant power mode.*

Provides adjustments for all MCA alarm and control circuits. Adjustment ranges and factory settings as follows.

All adjustments can be performed locally via the MCA Control Panel, and most can be performed remotely via the MCA's Web Interface.

See Tables 4 and 5 for adjustment parameters.

Parameter	Max.	Min.	Factory Default
Float Mode Output (Volts)	58.00	47.00	54.48
High Voltage Shutdown (Volts)	59.50	48.00	58.50
Current Limit (% Full Load)	128	10	Power Limit Mode
High Voltage #1 Alarm (Volts)	59.00	48.00	55.50
High Voltage #2Alarm (Volts)	59.00	48.00	56.50
Low Voltage #1 Alarm (Volts)	56.00	40.00	51.00
Low Voltage #2Alarm (Volts)	56.00	40.00	47.00
System Total Current Alarm	30000	0	150
Loss of Redundancy Alarm (times the full output rating of 1 PCU)	2	0	1
PCU Sequencing Delay (Seconds)	20	0	0
Relay Test Interval (Seconds)	120	5	45
Number of Redundant PCUs	2	0	0

Table 4
MCA Basic Settings

Parameter	Max.	Min.	Factory Default
Battery Charge Current Alarm (Amps)	30000	0	150
Battery Thermal Runaway Management Mode Output (Volts)	57.00	45.00	48.00
Equalize Mode Output (Volts)	58.00	47.00	56.50
Equalize Time (hh:mm:ss)	99:59:00	00:1:00	01:00:00
Auto Equalize Multiplier	15	0	0
Temp Comp Slope (mV/°C)	200	0 (Off)	0 (Off)
Temp Comp Max. (Volts)	58.00	47.00	56.40
Temp Comp Min. (Volts)	58.00	47.00	52.00
Battery Test End Setpoint (Volts)	57.00	45.00	46.00
Battery Test Sample Interval (Seconds)	3600	1	60
Battery Test Duration (hh:mm:ss)	99:59:00	00:1:00	01:00:00
Battery End Of Reserve Setpoint (Volts)	51.60	39.60	42.00
Battery Health Setpoint (%)	99	0	75
Battery Reserve Low Setpoint (Minutes)	600	0	60
Expected Battery Reserve Setpoint (hh:mm)	99:59	00:00	8:00
No Alarm on Recharge Setpoint (Hours)	24	1	12
Battery High Temp #1 Alarm (°C)	100	-50	100
Battery High Temp #2 Alarm (°C)	100	-50	100
Battery Low Temp #1 Alarm (°C)	100	-50	-50
Battery Low Temp #2 Alarm (°C)	100	-50	-50
Battery Halfstring Δ1 Setpoint (Volts)	5.000	0	5.000
Battery Halfstring Δ2 Setpoint (Volts)	5.000	0	5.000
Halfstring Alarm Delay Setpoint (Seconds)	240	0	120
LVD Disconnect (Volts)	50.00	37.00	42.00
LVD Reconnect (Volts)	56.00	44.00	49.00

Table 5
MCA Battery-Related Settings

3.1.5 Remote On/Off (TR): The operation of any or all PCUs can be inhibited (TR) via the MCA's Control Panel or Web Interface. A PCU fail alarm is NOT issued.

3.1.6 Local Controls: See User Manual for complete descriptions.

Location	Name	Description	Type
MCA Control Panel	↑	Function Select Up / Increase / Function Set Yes	Pushbutton Switch
	↓	Function Select Down / Decrease / Function Set No	Pushbutton Switch
	↵	Function Set Enter	Pushbutton Switch

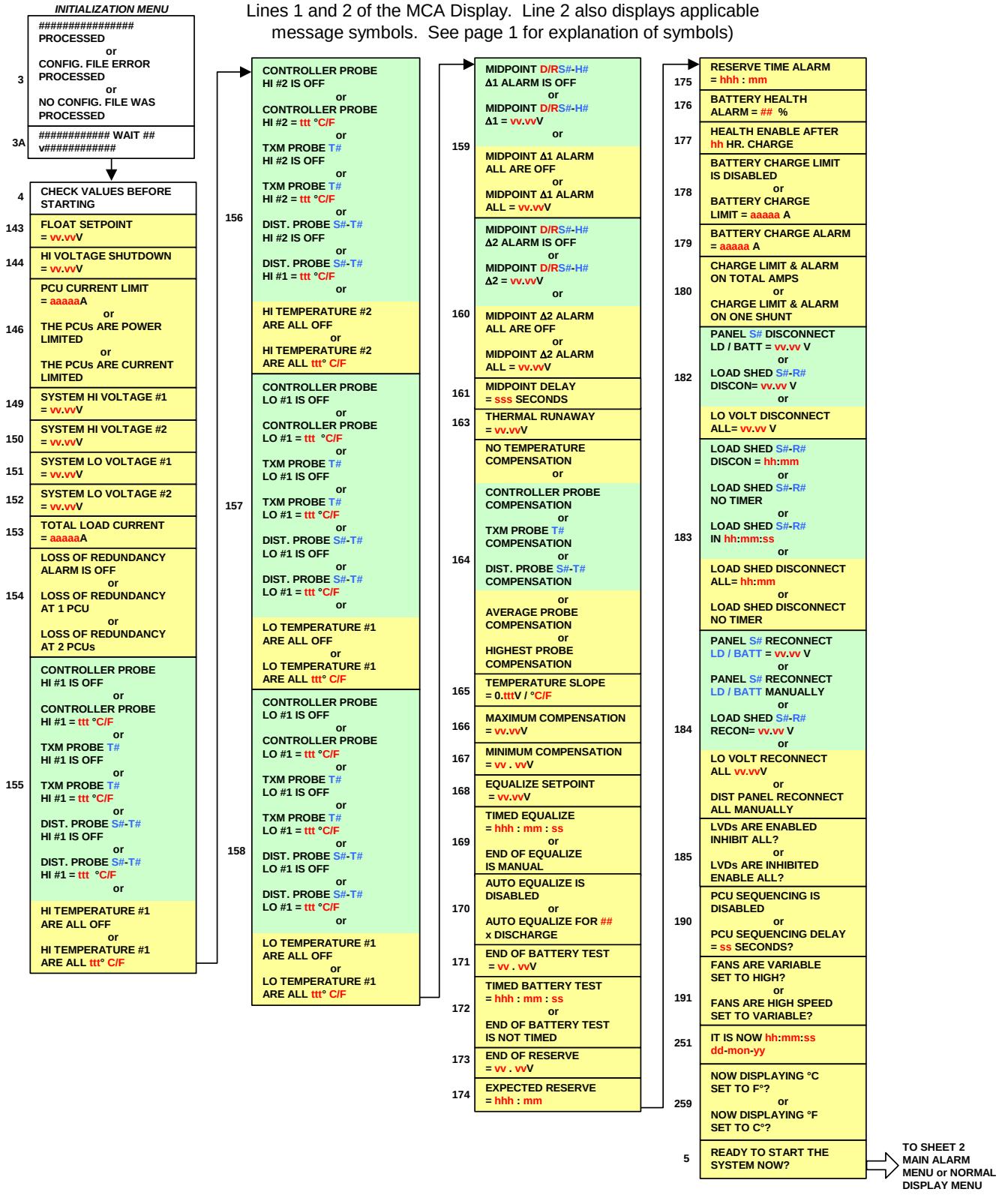
3.1.7 Local Status and Alarm Indicators: See User Manual for complete descriptions.

Location	NAME / Description	Type
MCA Control Panel	Message Display, Shows... • Active Alarms or "SYSTEM OK" • Various Measurement Items and Values • Various Inventory Items • Various Adjustment Items and Values • Various Operation Items • Various Configuration Items and Settings See Paragraph 3.1.8 "*MCA Display*"	---
	MAJOR	LED - flashing red
	MINOR	LED - red
	AC	LED - green/red
	EQ	LED - yellow
	BATTERY	LED – yellow/red

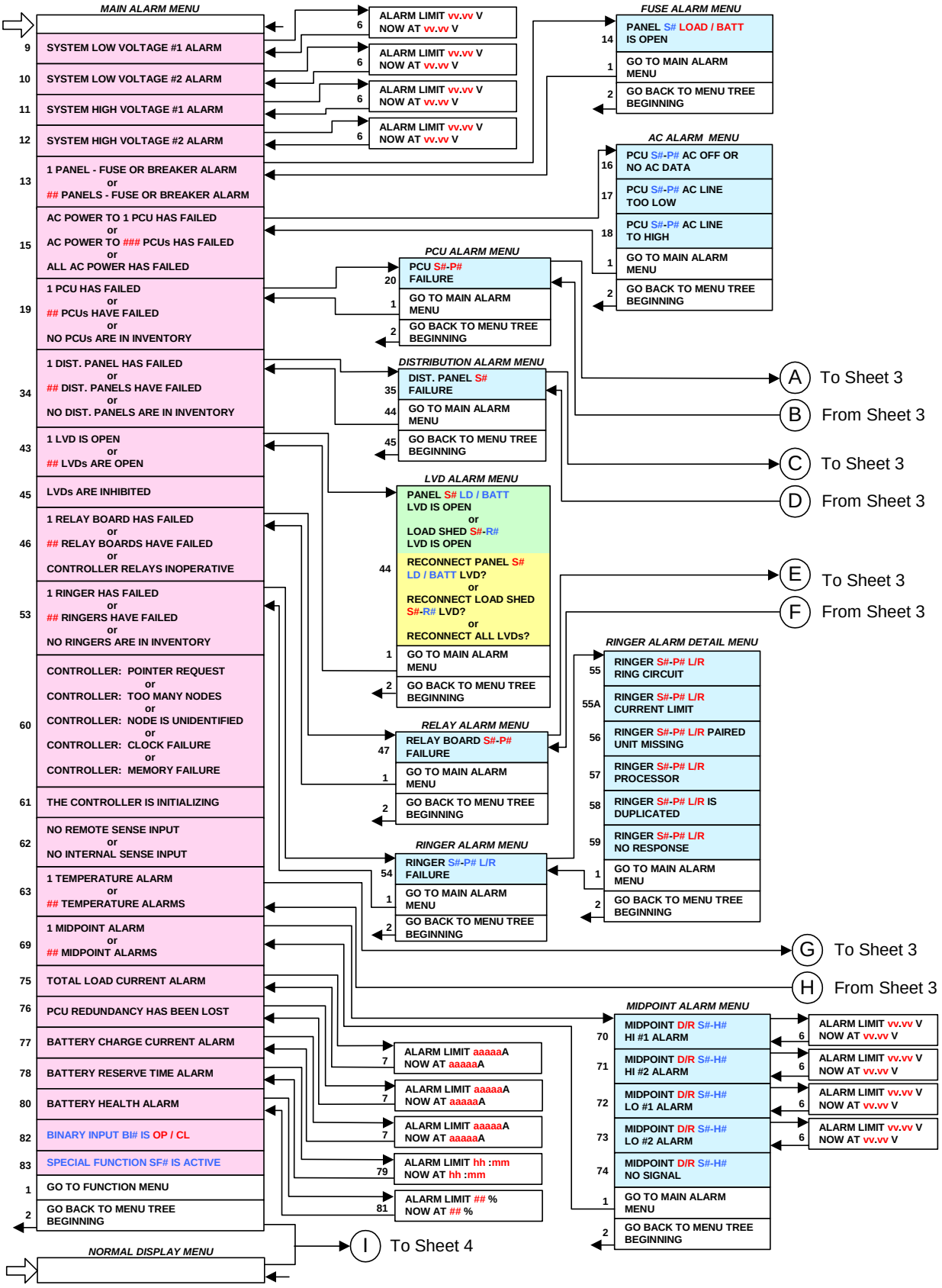
3.1.8 MCA Display: Presented next are illustrations from the MCA Menu Tree (Section 5956). Refer to the latest version of Section 5956 for the most recent MCA Menu Tree. See Operation section of the System's User Manual for complete descriptions of menu items.

SHEET 1

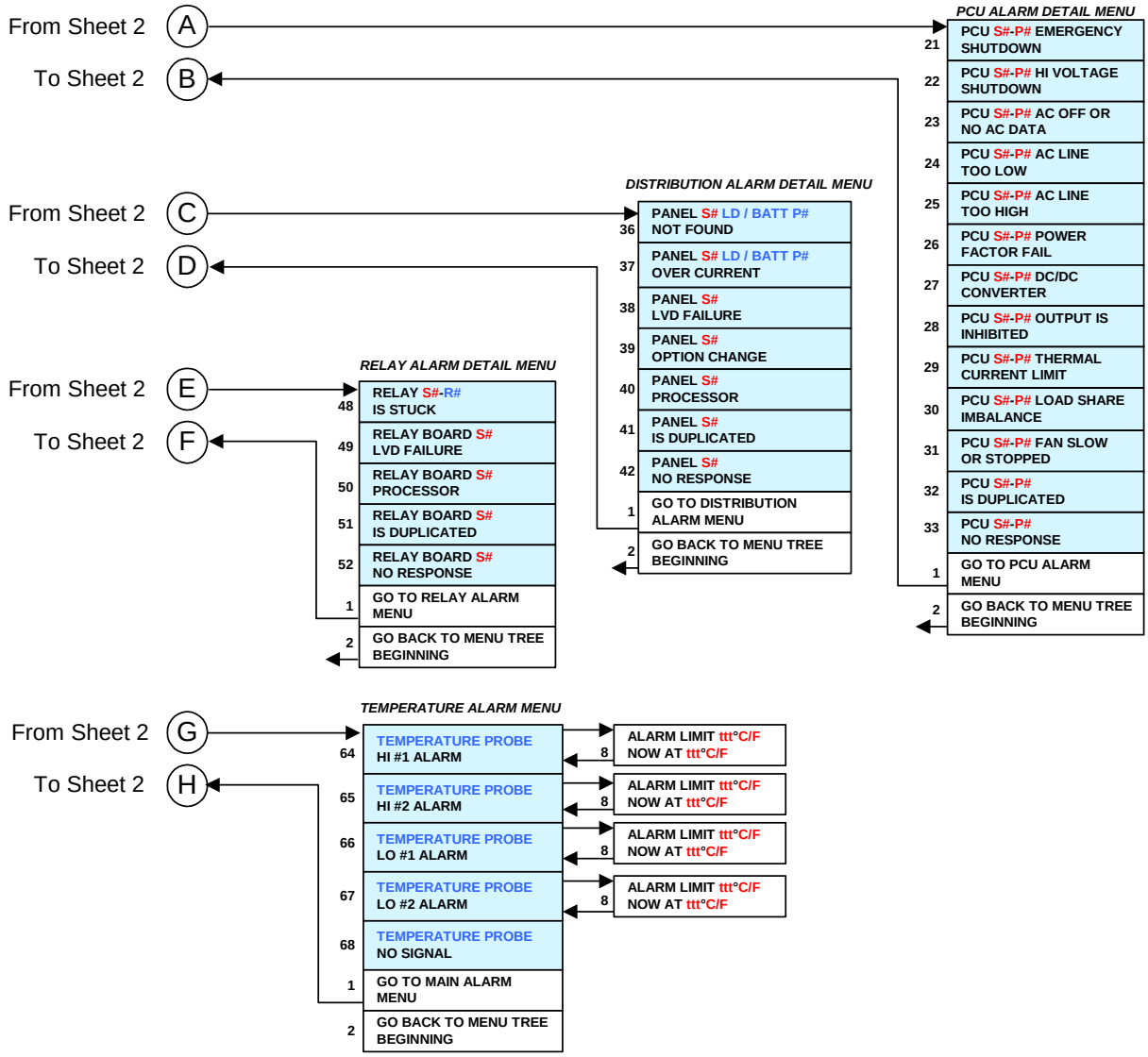
The user navigates the MCA Display using the Keypad on the MCA Control Panel. (These pages indicate the actual text shown on Lines 1 and 2 of the MCA Display. Line 2 also displays applicable message symbols. See page 1 for explanation of symbols)



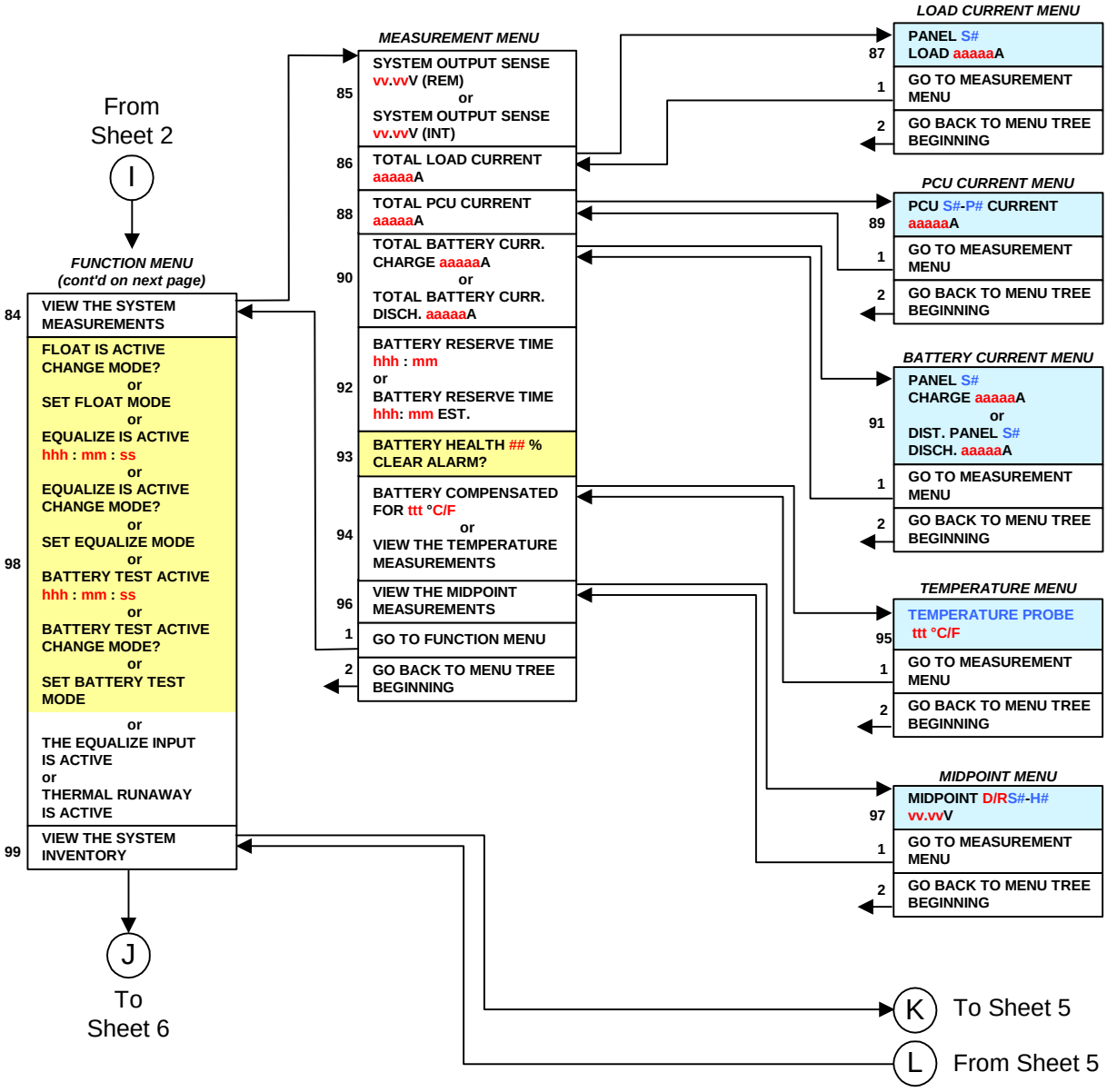
SHEET 2



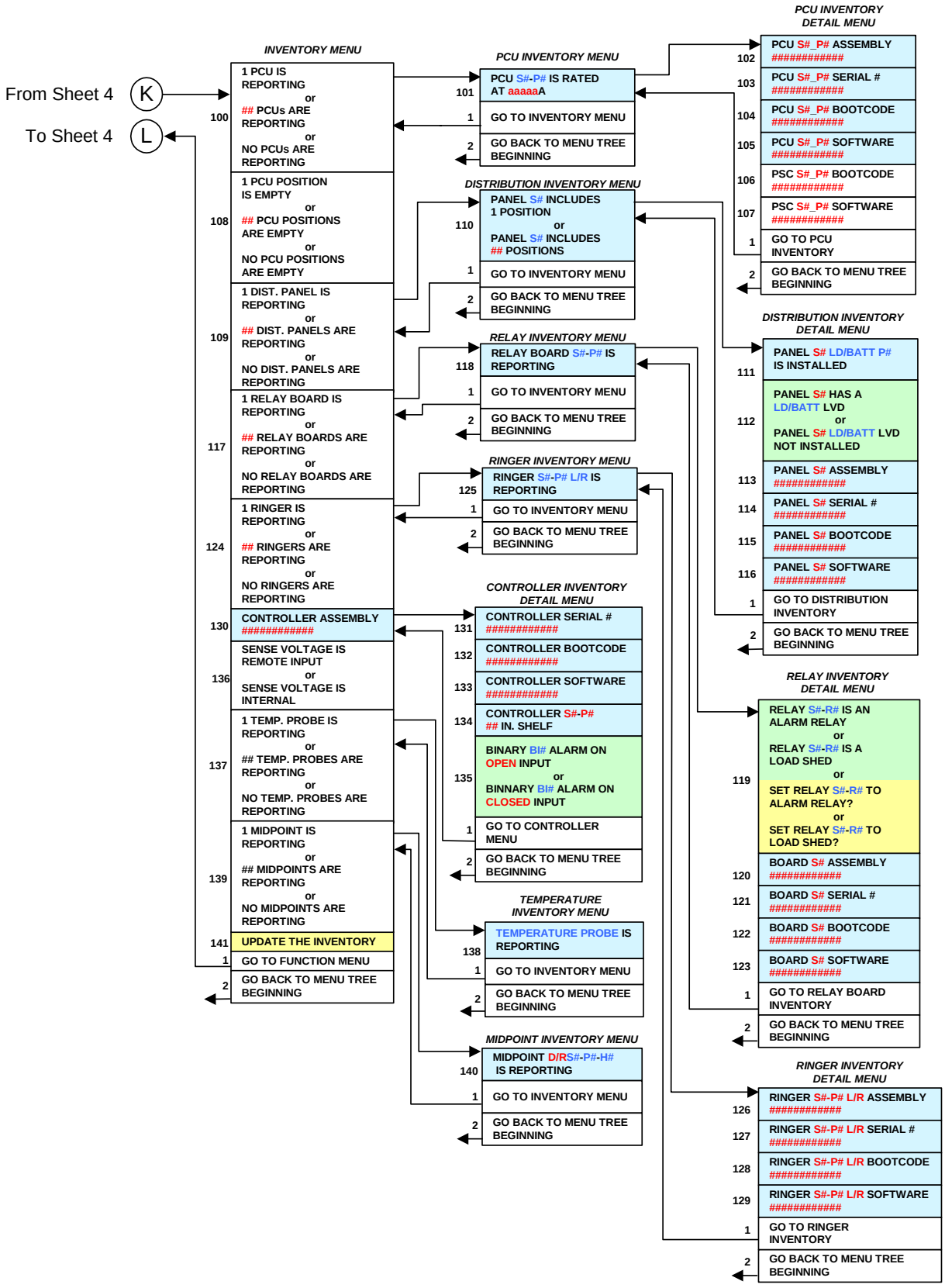
SHEET 3



SHEET 4

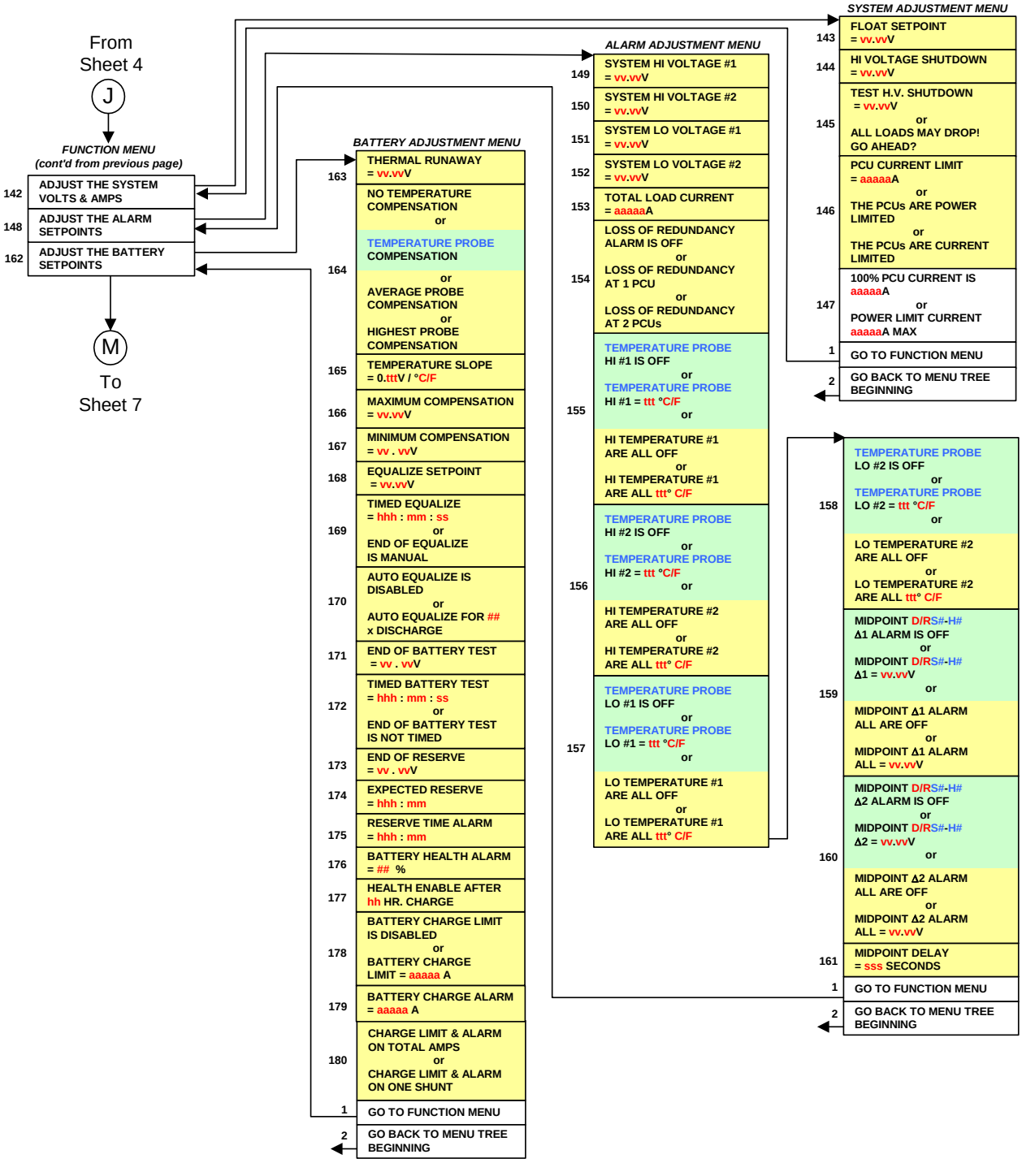


SHEET 5

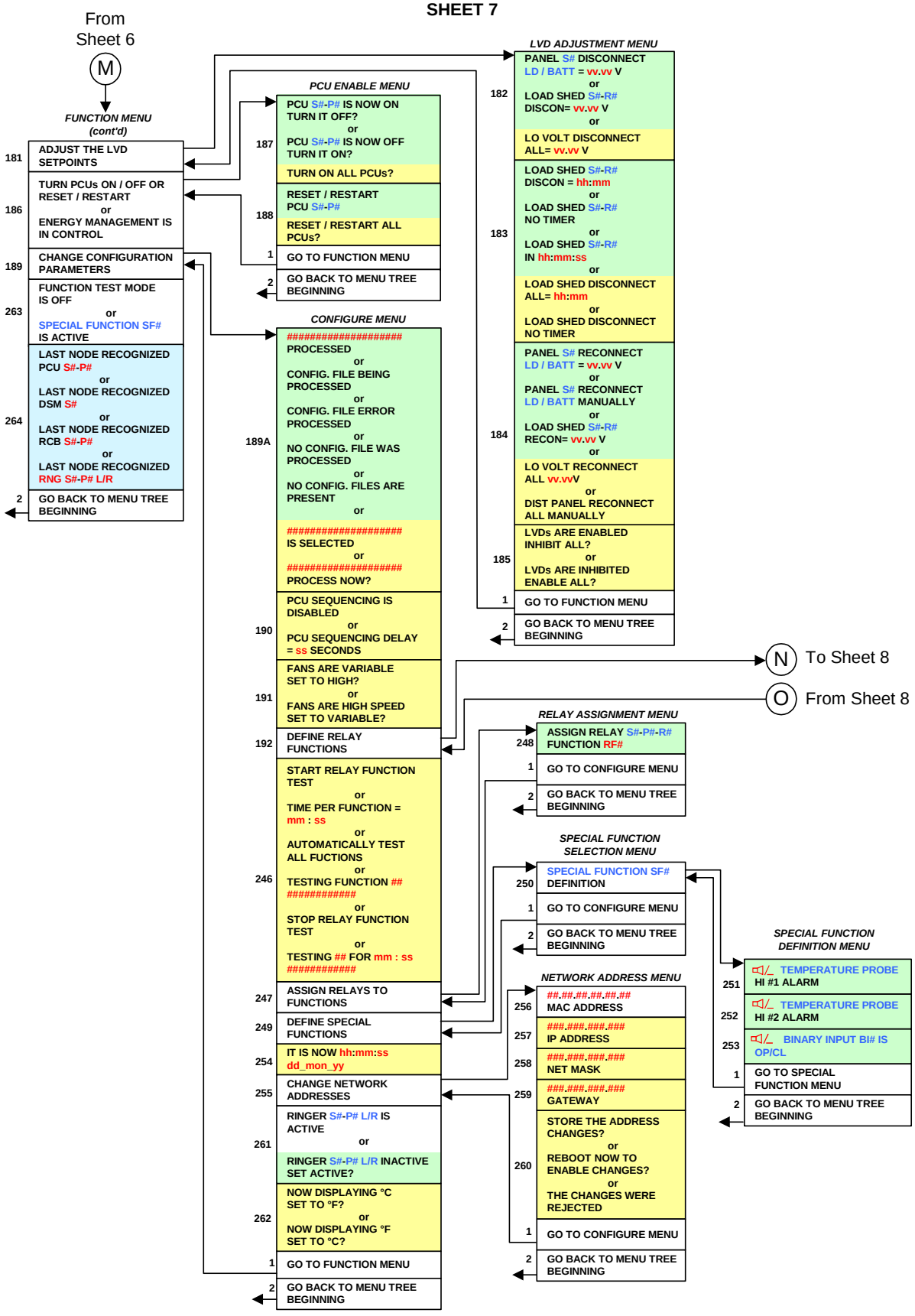


Home

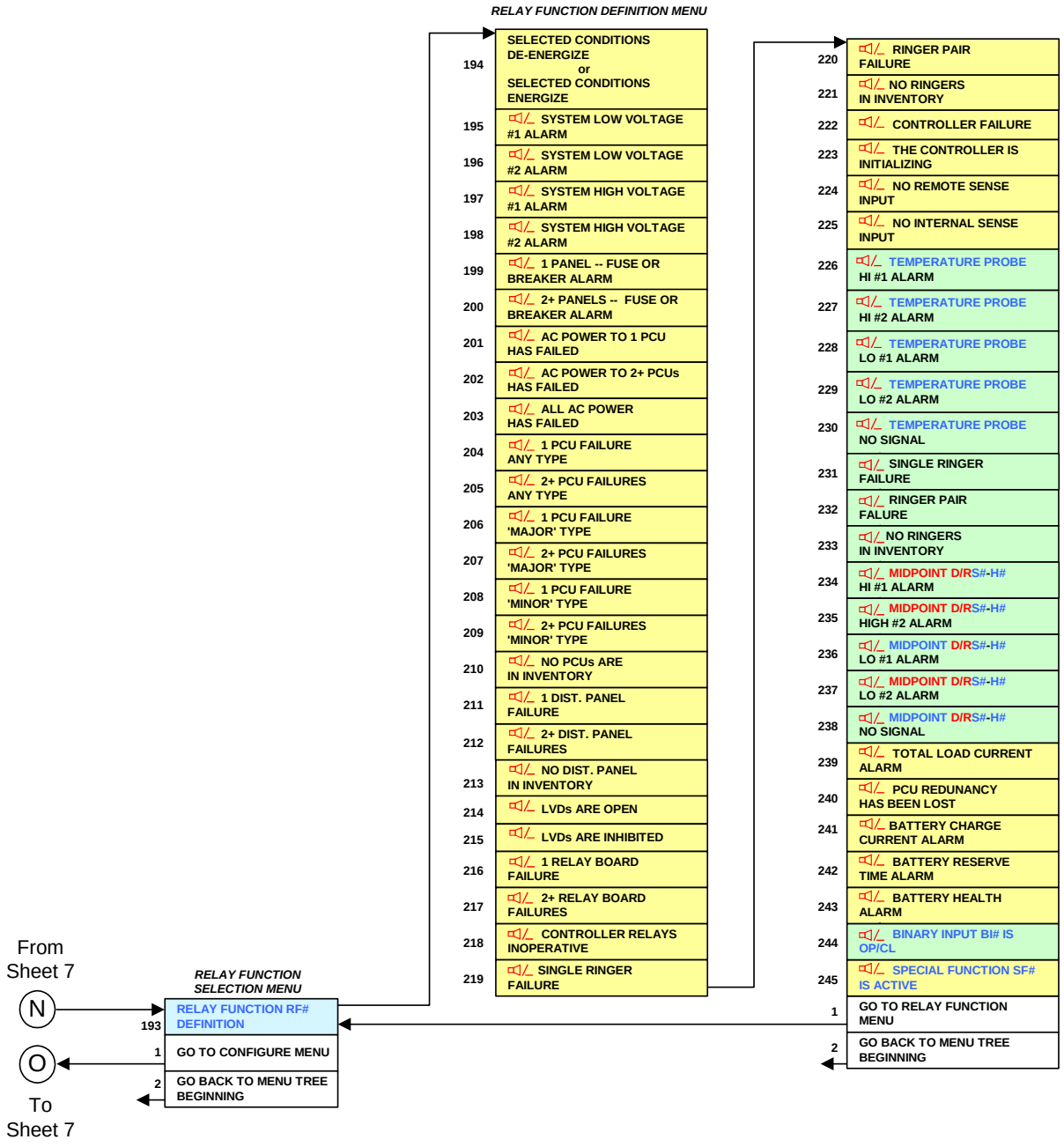
SHEET 6



SHEET 7



SHEET 8



3.1.9 External Control Circuits:

(A) Binary Inputs: The MCA provides four (4) Binary Inputs for external control of system functions. The inputs must be mapped by the user to the Special Functions that they are to control. The following Special Functions are available.

(1) Emergency Stop: Activation of an associated condition inhibits operation of all PCUs.

(2) High Voltage Shutdown: Activation of an associated condition activates the HVSD circuit.

(3) Thermal Runaway: Activation of an associated condition places all PCUs in the Battery Thermal Runaway Management mode of operation.

(4) Equalize: Activation of an associated condition places all PCUs in the Equalize mode of operation.

(5) Battery Test: Activation of an associated condition places all PCUs in the Battery Test mode of operation.

(6) Function Test Mode: Activation of an associated condition blocks activation of any other Special Function definitions. Permits testing of special functions such as High Voltage Shutdown or Emergency Stop without affecting operation of the system.

The binary inputs can be configured by the user to activate when contacts open or when contacts close.

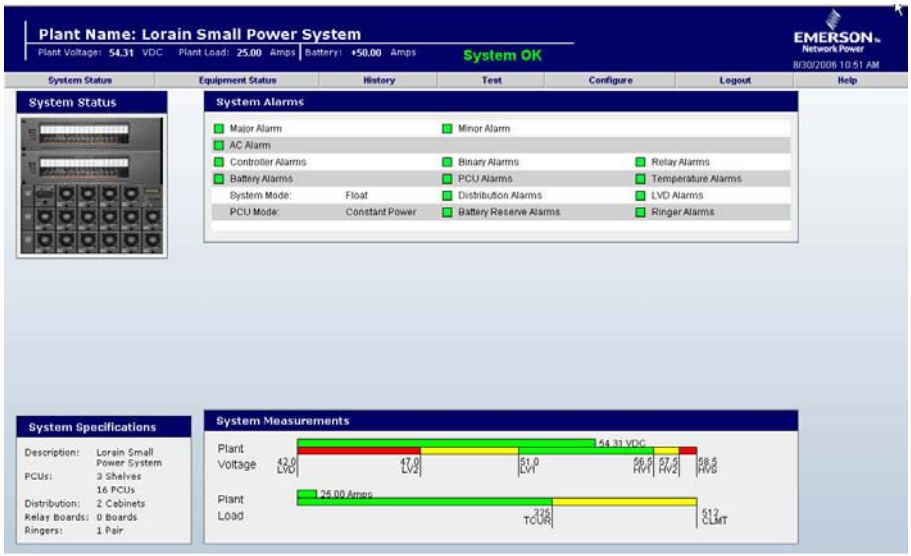
(B) External "System Voltage" Meter Reading: Leads can be extended from the MCA to an external voltage source. This is the voltage source the MCA monitors for system alarms and displays as "System Output Voltage".

3.1.10 External Alarm Circuits: The MCA provides six (6) external alarm relays, each with one set of Form-C contacts.

(A) Contact Rating: 2A at 30 VDC.

(B) Description of Operation: The MCA provides 10 programmable Alarm Definitions. Each Alarm Definition is programmed to alarm for selected conditions, then each external alarm relay is programmed to change state if a specific Alarm Definition alarms.

3.2 Web Interface



3.2.1 Description: The Web Interface provides remote access to the system monitoring and control functions that are available locally at the MCA control panel. See Chapter 5, *Using the Web Interface* in the System's User Manual for complete descriptions of all Web Interface functions.

3.2.2 Connection: Ethernet, RJ-45 10BaseT jack. This jack has a standard Ethernet pin configuration scheme, twisted pair. Use shielded Ethernet cable, grounded at both ends. (The LXP's RJ-45 jack is connected to chassis ground.) The Ethernet port is suitable for connection to intra-building or non-exposed wiring or cabling only.

3.2.3 Web Browser: Microsoft® Internet Explorer 5.0 or newer is required.

3.2.4 Screen Resolution: 1024 x 768 or greater is required.

3.2.5 Users: 64, maximum

3.2.6 Security:

(A) Password Protection: When logging onto the system, the user is prompted to enter a "User Password".

(B) Page Access Levels: User configurations provide a "Page Access Level" which can be used to limit the functions available to a particular user. Eight Page Access Levels are available.

4. LIST 72 REDUNDANT RINGING GENERATOR SYSTEM

4.1 Output Ratings

4.1.1 Power: 50 VA

4.1.2 Frequency:

(A) Nominal: 20 Hz.

(B) Accuracy: The initial frequency is ± 15% with output variation from no load to full load over the specified temperature and input voltage range.

(C) Distortion: Total harmonic distortion (THD) is less than 5% of the fundamental frequency.

4.1.3 Voltage

(A) Nominal: 86 VAC RMS

(B) Regulation: ± 5% from no load to full load within the specified input voltage range.

4.2 Input Ratings:

4.2.1 Voltage: Negative 44 to 58 volts DC (positive ground). Negative 60 volts DC, maximum transient.

4.2.2 Current:

(A) No Load: 90 milliamperes at 48V

(B) Full Load: 1.28 amperes at 48V

4.2.3 Filtering: Noise fed back to a 50 ampere-hour battery is less than 32 dBrnC. Noise with no battery and one PCU as the source does not exceed 50dBrnC at any ambient temperature.

4.3 Environmental Ratings

4.3.1 Operating Ambient Temperature Range:

(A) Operational: -40°C to +80°C (-40°F to +176°F)

(B) Start: -30°C to +80°C (-22°F to +176°F)

(C) Specification Compliant, Full Output: -20°C to +65°C (-4°F to +149°F)

(D) Reduced Load: +65°C to +80C (+149°F to +176°F)

4.3.2 Storage Temperature Range: -40°C to +85°C (-40°F to +185°F)

4.3.3 Humidity: Capable of operating in an ambient relative humidity range of 0% to 95%, non-condensing.

4.3.4 Altitude: The maximum operating ambient temperature should be derated by 10°C at an elevation of 10,000 feet above sea level. For elevations between 3,000 feet and 10,000 feet, derate the maximum operating ambient temperature linearly.

4.3.5 Heat Dissipation, BTUs (Typical):

Percentage of Full Load	Mode		Total
	Active	Standby	
0	15	15	30
50	25	15	43
100	41	15	56

4.4 Standard Features

4.4.1 Input Protection:

(A) Fusing: An internal, non-replaceable, 5 ampere fuse is provided in the negative input lead of each Ringing Generator.

(B) Low Voltage Inhibit: If input voltage decreases below approximately 38 volts (non-adjustable), the Ringing Generator will inhibit. Operation will automatically resume when input voltage increases to within normal input voltage range.

4.4.2 Output Protection:

(A) Current Limiting: Output current is limited to approximately 110% of rated full load (non-adjustable).

(B) Thermal Current Limiting: Each Ringing Generator continuously monitors the ambient temperature surrounding the power conversion unit circuit. If, for any reason (such as a high ambient office temperature), this temperature increases above approximately +65°C (+149°F), the Ringing Generator will not shut down. Rather, the Ringing Generator will limit its maximum output current to maintain the temperature of the power conversion circuit within design parameters. Full current capability is restored when the temperature decreases to below approximately +65°C (+149°F).

Warning: ***The Ringing Generators are rated for continuous operation at full output power up to +65°C (+149°F). Operation between +65°C and +80°C (+149°F and +176°F) is considered abnormal and should be used on a temporary[1] basis only.***

[1] **Temporary Operation at Abnormal Temperature:** Temporary operation refers to a period of not more than eight consecutive hours per day, and a total of not more than 15 days in a year. (This refers to a total of 120 hours in any given year, but no more than 15 occurrences in that one-year period.)

(C) High Voltage Shutdown: The Ringing Generator will shut down and lock out if output voltage exceeds approximately 105 VAC, RMS (non-adjustable). Manual restart is required. Can be restarted locally or via Web Interface.

4.4.3 Over-temperature Protection: If internal Ringing Generator component temperatures increase above a preset value the Ringing Generator will inhibit. When the temperature decreases to a safe level the Ring Generator will automatically resume operation.

4.4.4 Load Transfer Function

(A) Automatic: If the output voltage of the active Ringing Generator decreases below approximately 65 VAC, RMS (non-adjustable) for any reason except an overload condition, the load will immediately transfer to the standby Ringing Generator.

(B) Manual: The load can be transferred from one Ringing Generator to the other by means of local controls or from a remote location via the system MCA Web Interface.

4.4.5 Indicators: A STATUS indicator is provided on each of the two Ringing Generators in the Ringing Generator Module. This three-color LED illuminates as follows:

(A) Green – Output available, this generator selected to supply load.

(B) Amber – Output available, this generator in standby mode.

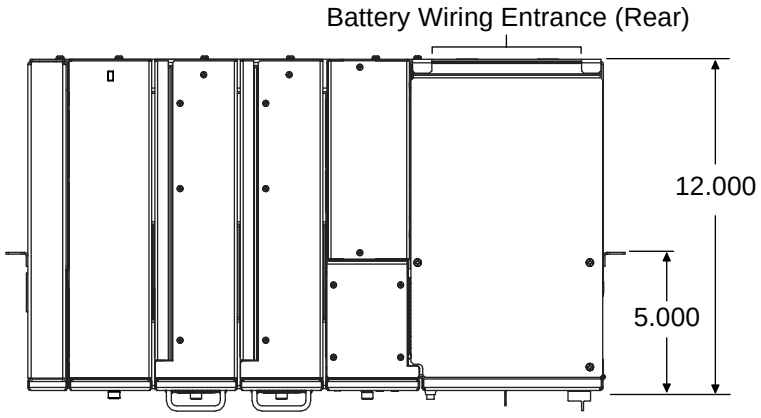
(C) Flashing Amber – Operating in current limit or thermal current limit, this generator selected to supply load.

(D) Red – Failure condition, this generator output not available. Failure conditions include:

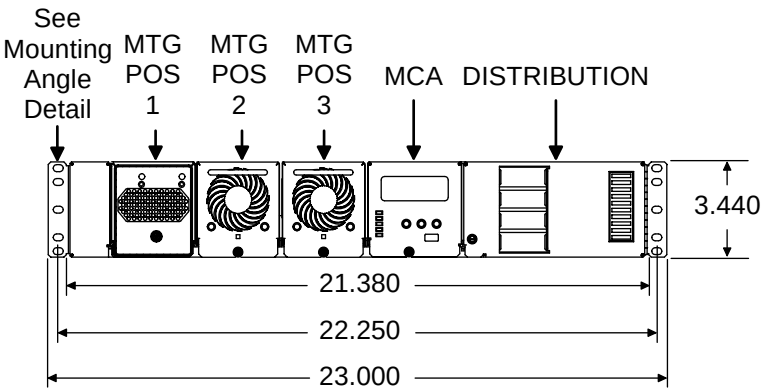
- Low output voltage (due to generator failure)
- Output voltage exceeds approximately 105 VAC (HVSD).
- Low input voltage (Low Voltage Inhibit)
- Internal temperature exceeds a predetermined limit (Over-temperature Inhibit).
- Cooling fan failure or fan rotor blocked.

PHYSICAL SIZE INFORMATION

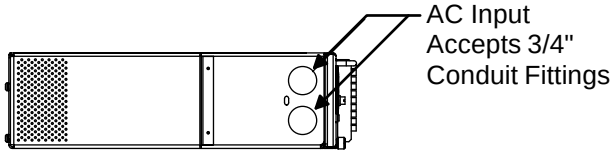
Overall Dimensions – List 1, 2, 3, 4, 21, 22, 23, 24 Power Shelves



TOP VIEW



FRONT VIEW—All Lists



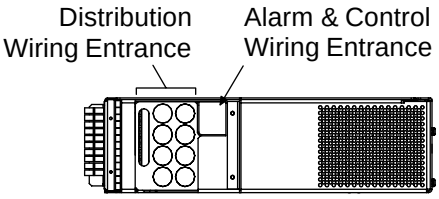
LEFT SIDE VIEW

NOTES :

1. All dimensions are in inches.
2. Weight (In Pounds).

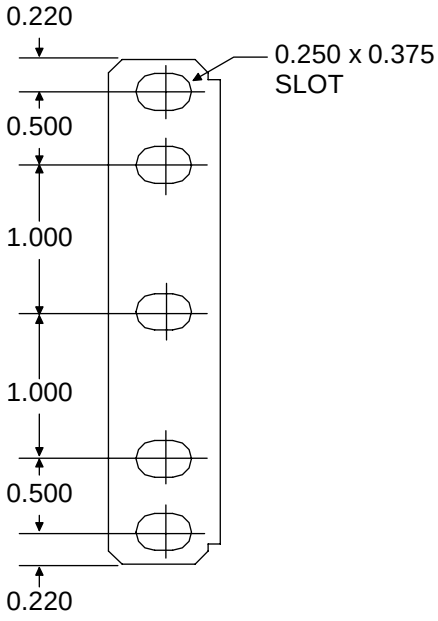
	Net	Shipping
Shelf	19 lb. 12 oz.	25 lb. 4 oz.
MCA	2 lb. 14 oz.	4 lb. 9 oz.
PCU	5 lb. 4 oz.	7 lb. 13 oz.
Ring Gen	3 lb. 8 oz	5 lb. 0 oz

3. Finish :
   Shelf and Module Bodies: Bright Zinc
   Front Panels: Textured Cool Gray (M500-146)
4. Mounting Position 1 shown with optional List 72 Ringing Generator (recommended position).



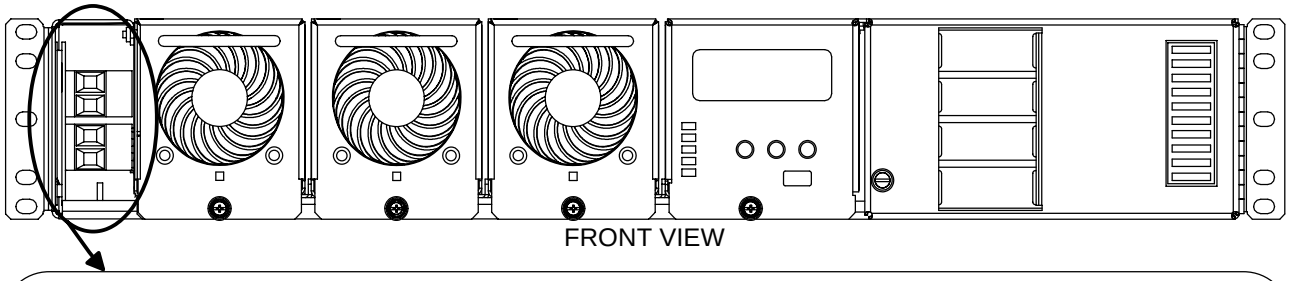
RIGHT SIDE VIEW

MOUNTING ANGLE DETAIL

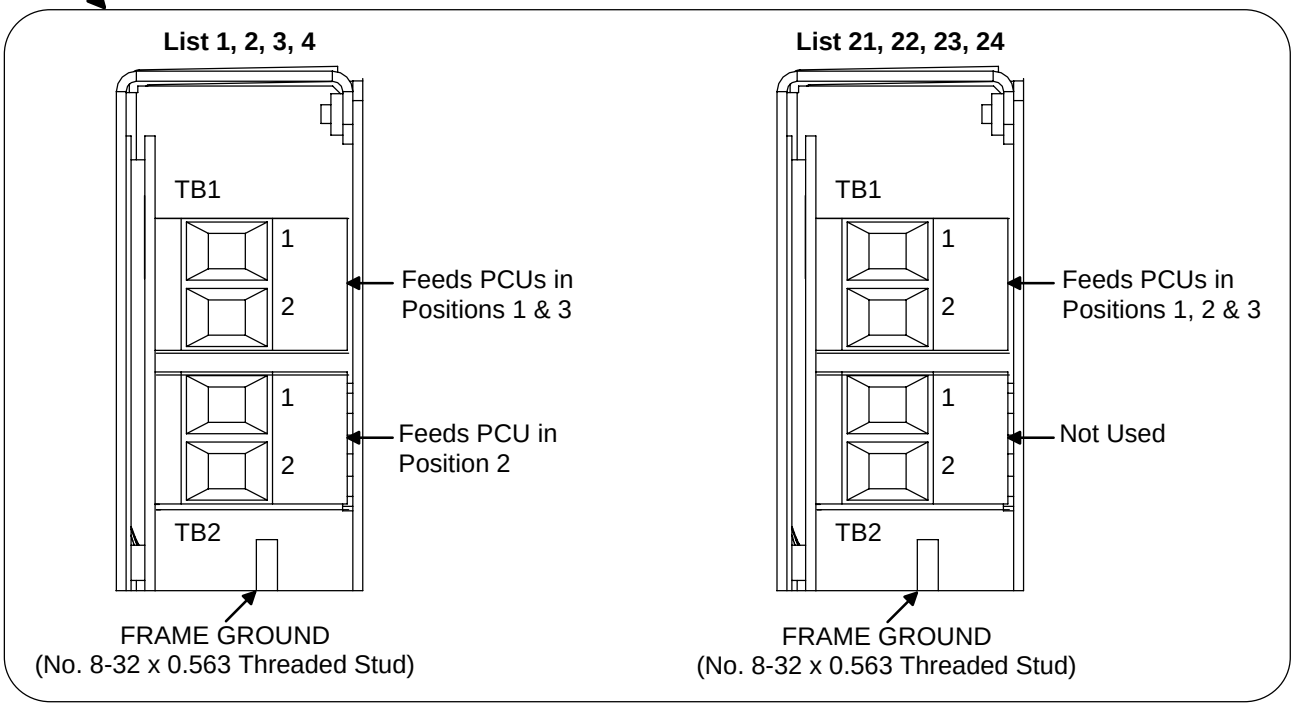


Installer's Connections Locations and Dimensions – List 1, 2, 3, 4, 21, 22, 23, 24 AC Input, Alarm, Control & Reference

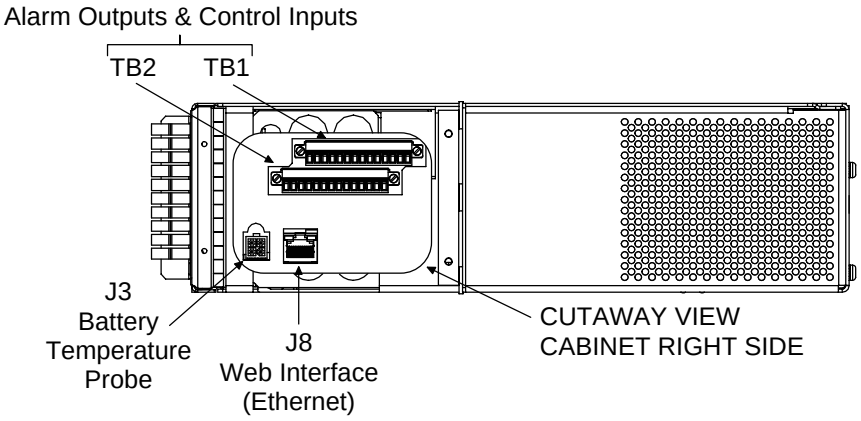
AC INPUT
(Cover Removed)



FRONT VIEW

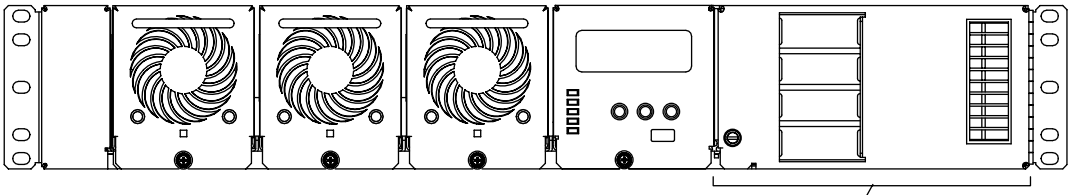


ALARM, REFERENCE & CONTROL
(Located on MCA inside the cabinet)



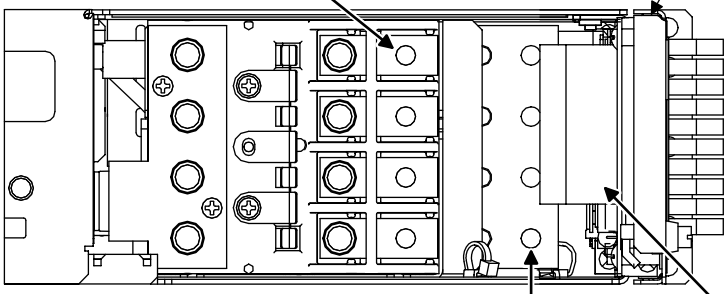
Note: *All dimensions are in inches.*

Installer's Connections Locations and Dimensions – List 1, 2, 3, 4, 21, 22, 23, 24 Distribution



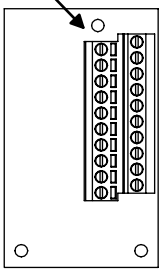
Load Connections
1/4-20 Threaded Hole
1 Place per Distribution Position
(Factory supplies lug mounting hardware.)

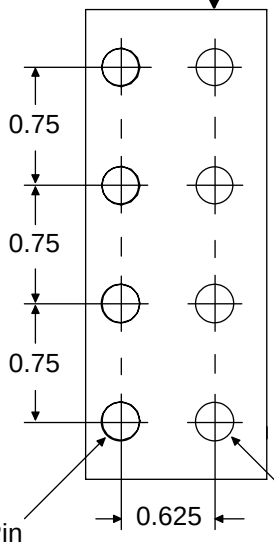
View with Door Open



Load Return Connections

GMT Distribution Fuse Load and Load Return Connections
TB1(on back of door)



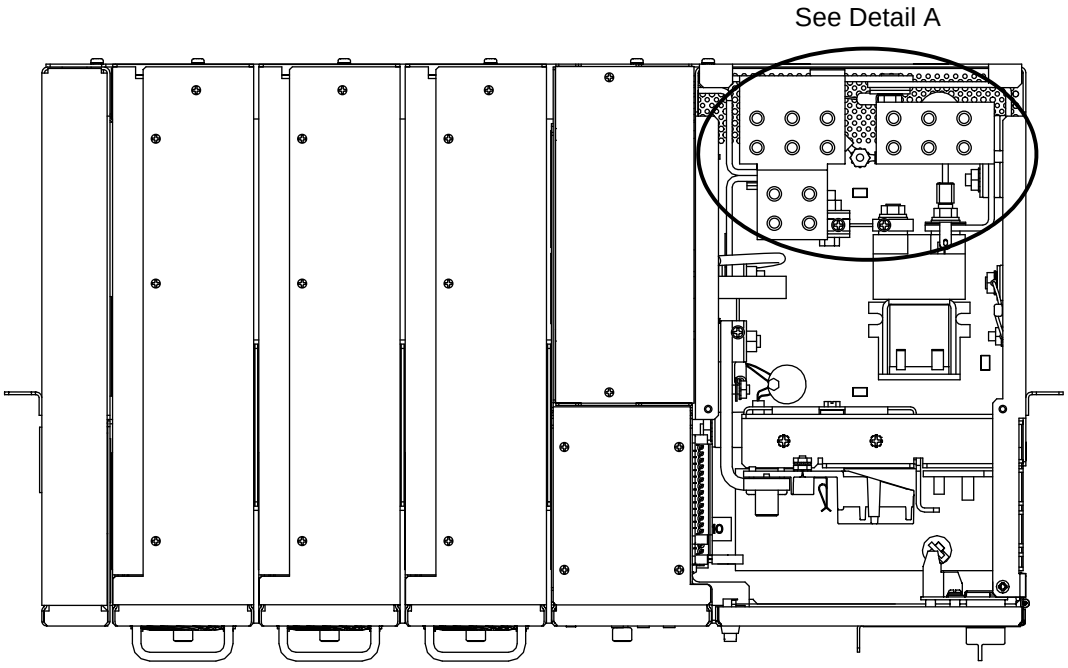


Note: *All dimensions are in inches.*

Lug Alignment Pin
1 Place per Distribution Position

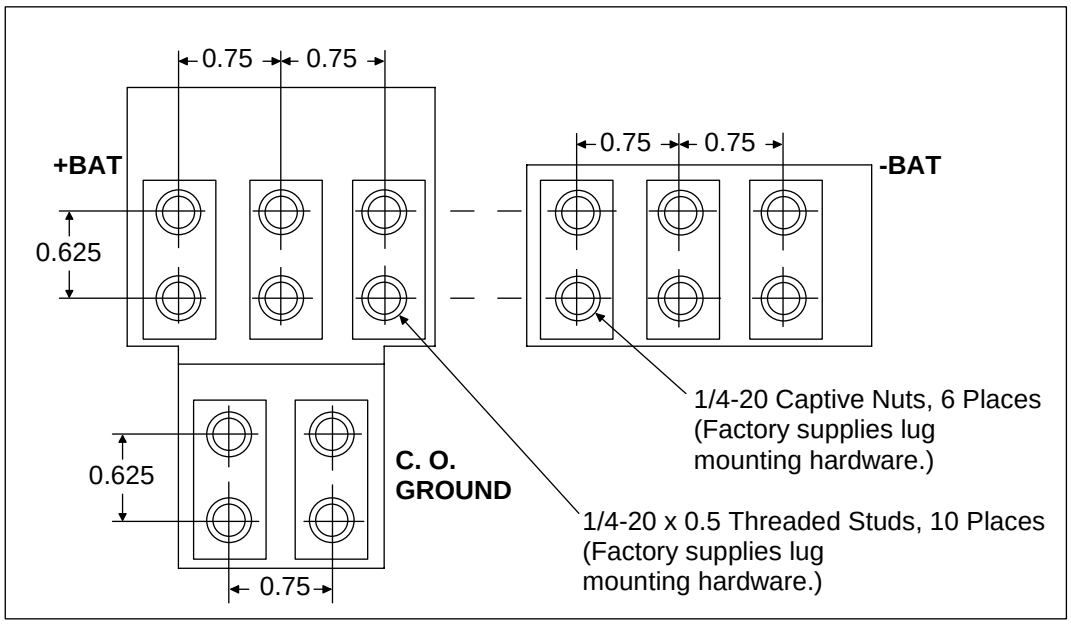
1/4-20 x 1/2" Threaded Stud
1 Place per Distribution Position
(Factory supplies lug mounting hardware.)

Installer's Connections Locations and Dimensions – List 1, 2, 3, 4, 21, 22, 23, 24 Battery



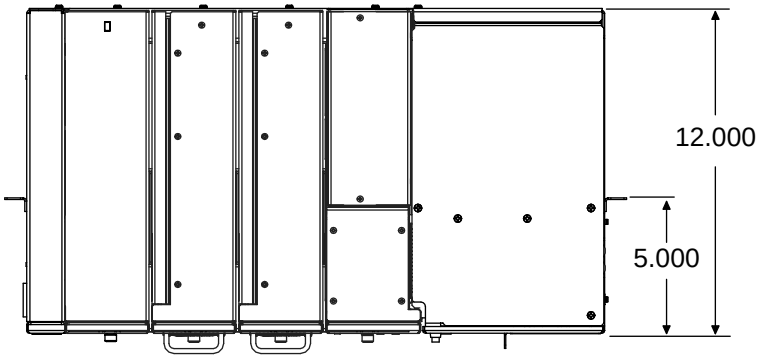
TOP VIEW (ACCESS COVER REMOVED)

DETAIL A



Note: *All dimensions are in inches.*

Overall Dimensions – List 6, 7 Power and Distribution Shelves



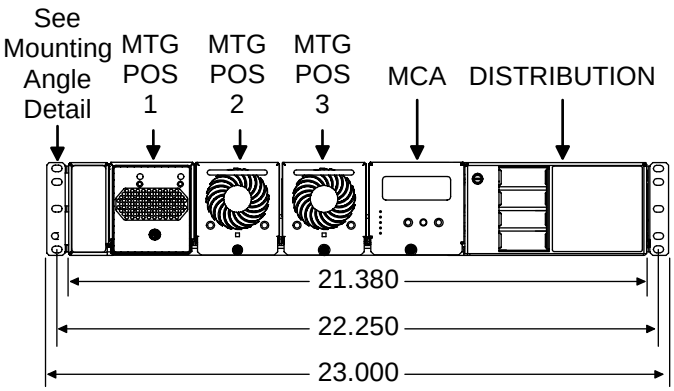
TOP VIEW

NOTES :

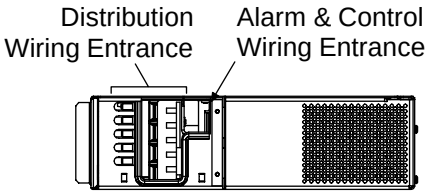
1. All dimensions are in inches.
2. Weight (In Pounds).

	Net	Shipping
Shelf	19 lb. 12 oz.	25 lb. 4 oz.
MCA	2 lb. 14 oz.	4 lb. 9 oz.
PCU	5 lb. 4 oz.	7 lb. 13 oz.
Ring Gen	3 lb. 8 oz	5 lb. 0 oz

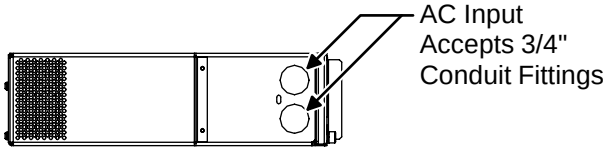
3. Finish :
   Shelf and Module Bodies: Bright Zinc
   Front Panels: Textured Cool Gray (M500-146)
4. Mounting Position 1 shown with optional List 72 Ringing Generator (recommended position).



FRONT VIEW

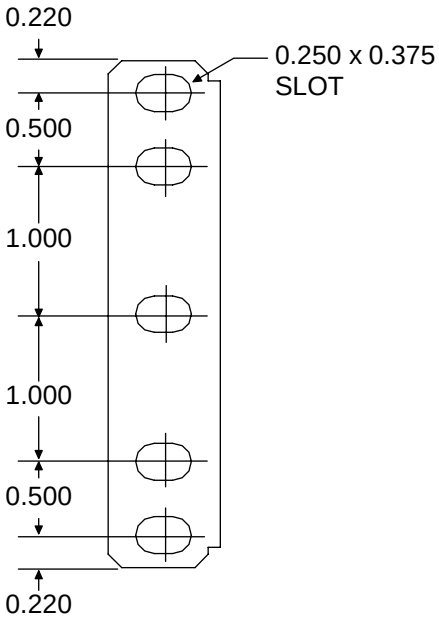


RIGHT SIDE VIEW

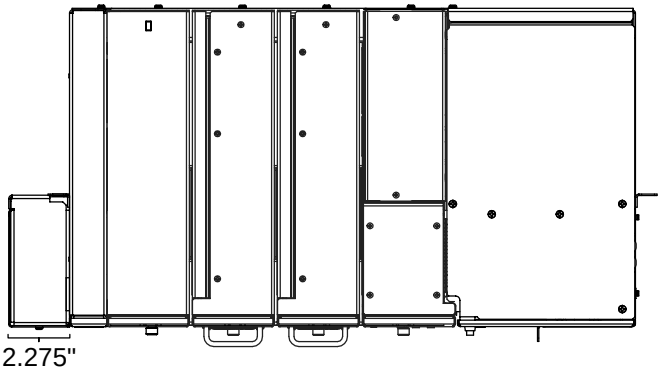


LEFT SIDE VIEW

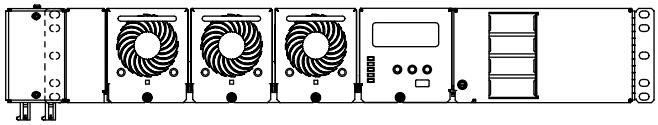
MOUNTING ANGLE DETAIL



Additional Dimensions –
List 6, 7 Power and Distribution Shelves When Equipped With List 46



TOP VIEW

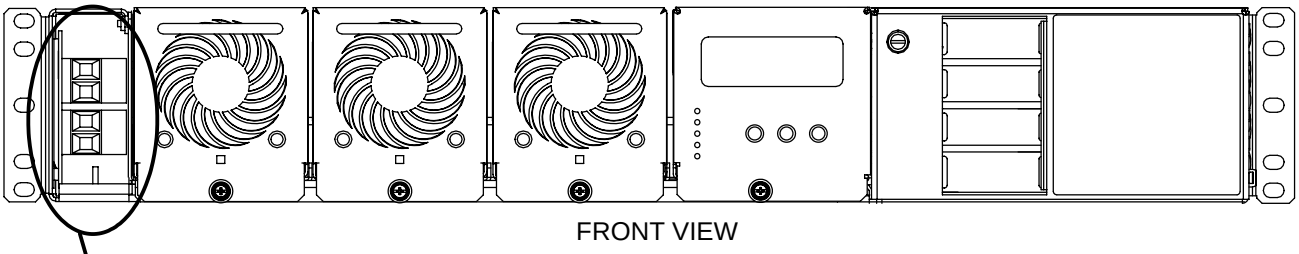


FRONT VIEW

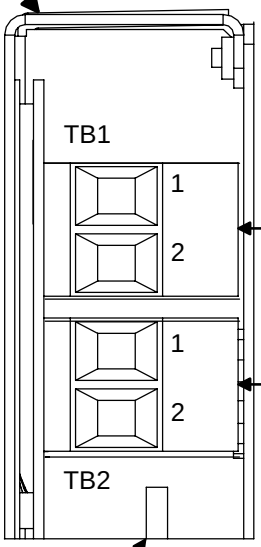
Installer's Connections Locations and Dimensions – List 6, 7 AC Input, Alarm, Control & Reference

Note: *See next page for List 6 and 7 equipped with List 46 AC option.*

AC INPUT
(Cover Removed)



FRONT VIEW

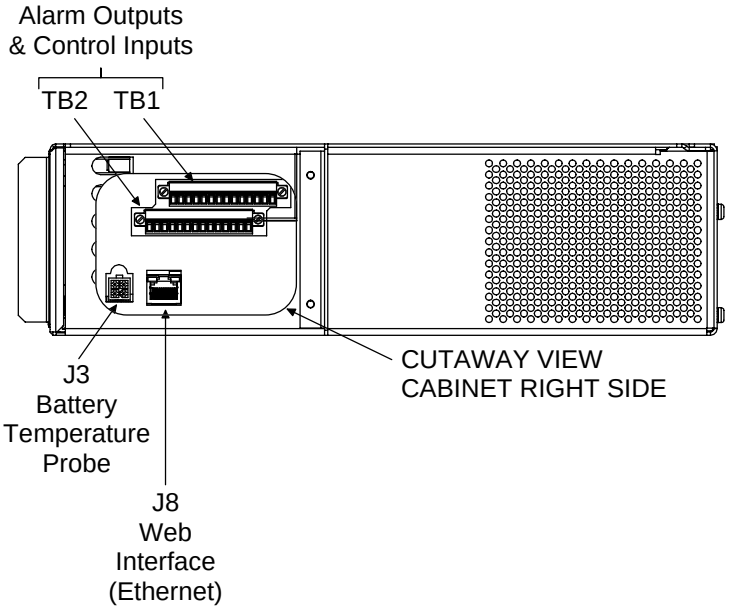


Feeds PCUs in Positions 1& 3

Feeds PCU in Position 2

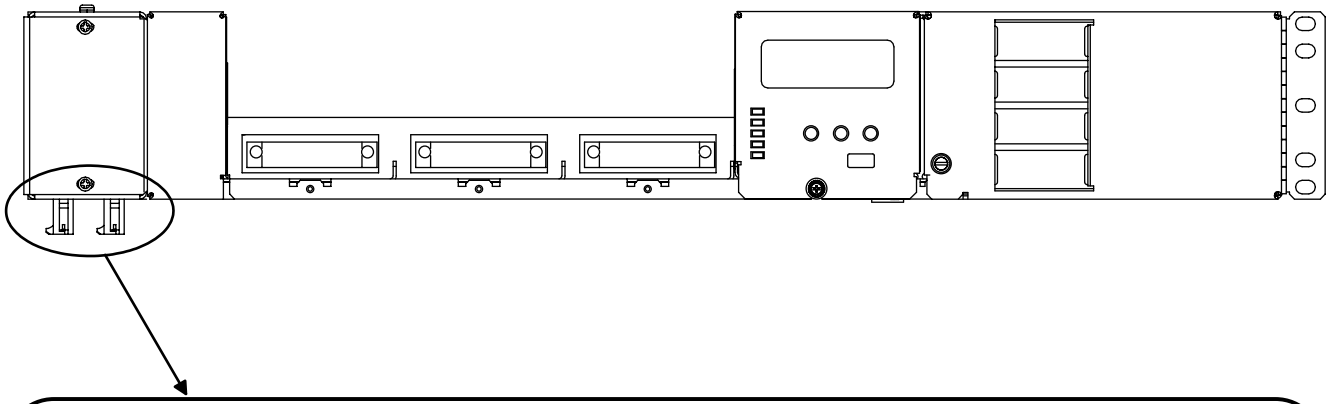
FRAME GROUND
(No. 8-32 x 0.563 Threaded Stud)

ALARM, REFERENCE & CONTROL
(Located on MCA inside the cabinet)



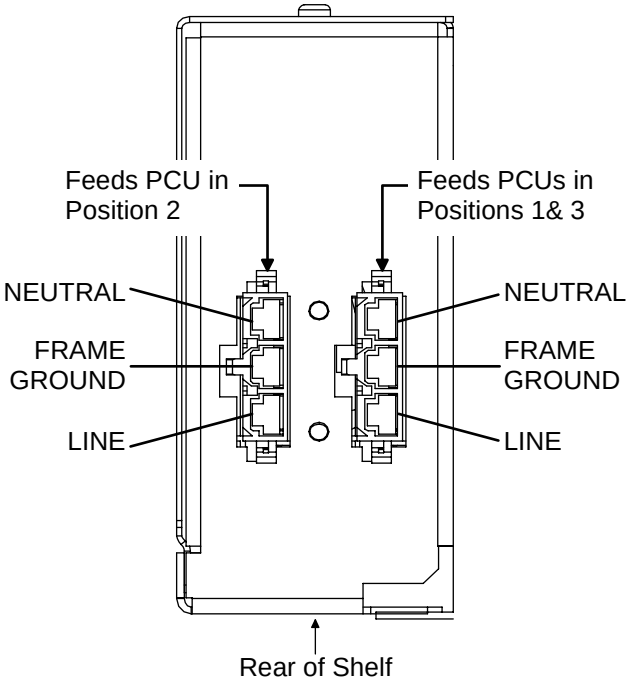
Note: *All dimensions are in inches.*

Installer's Connections Locations and Dimensions – List 6, 7 AC Input When Equipped With List 46



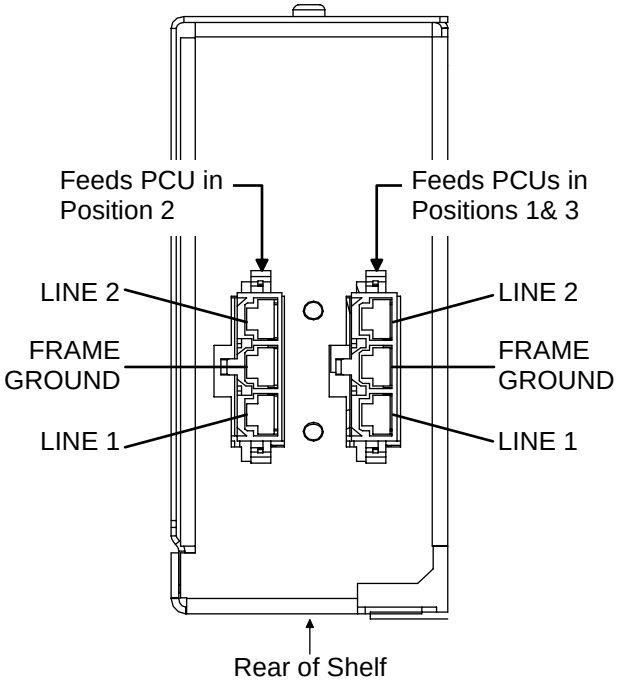
Connections for AC Input dervied from **LINE TO NEUTRAL** Service

Bottom View

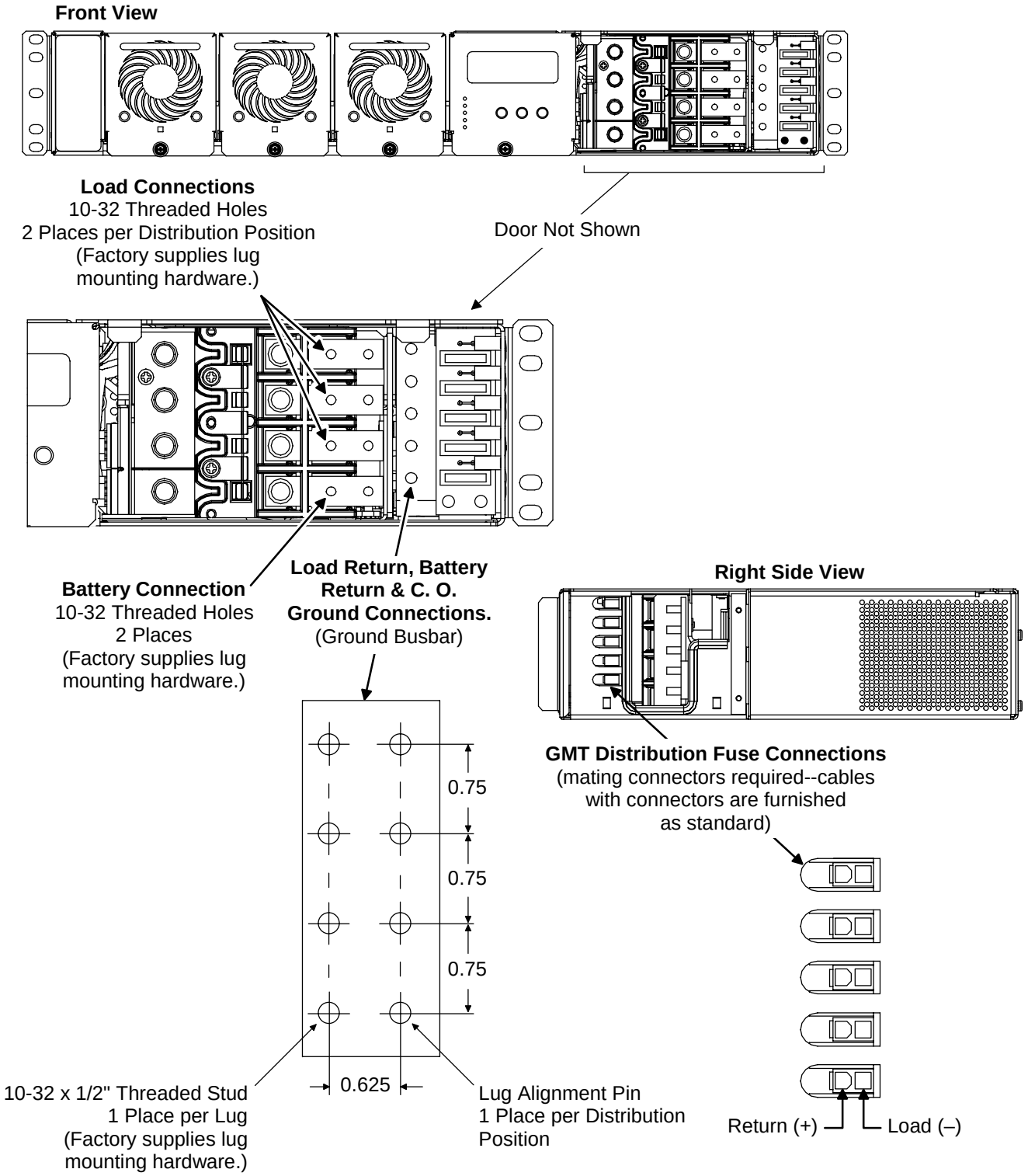


Connections for AC Input dervied from **LINE TO LINE** Service

Bottom View

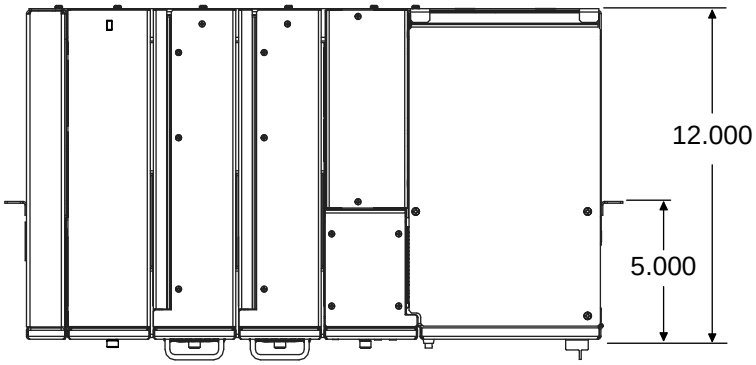


Installer's Connections Locations and Dimensions – List 6, 7 DC Distribution and Battery

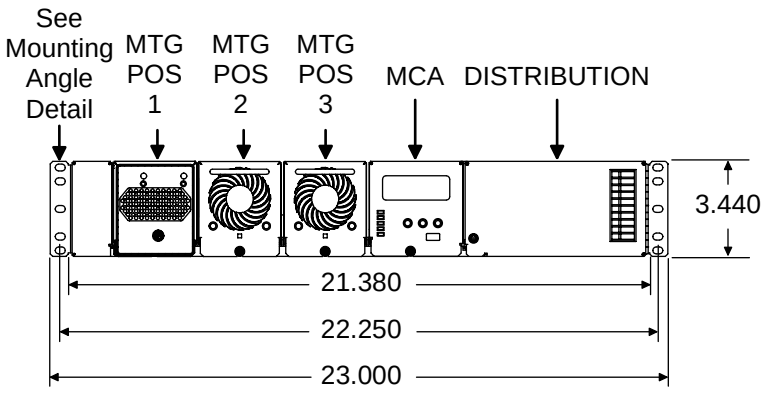


Note: *All dimensions are in inches.*

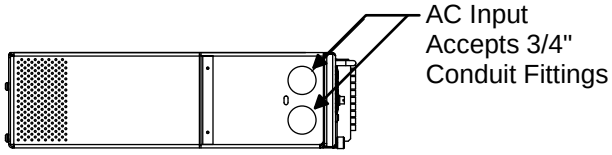
Overall Dimensions – List 11, 12, 13, 14 Power Shelves



TOP VIEW



FRONT VIEW



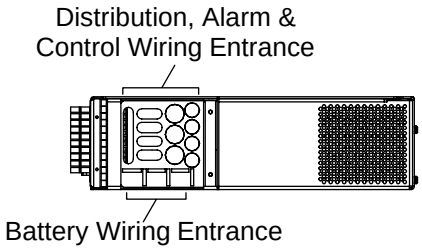
LEFT SIDE VIEW

NOTES :

1. All dimensions are in inches.
2. Weight (In Pounds).

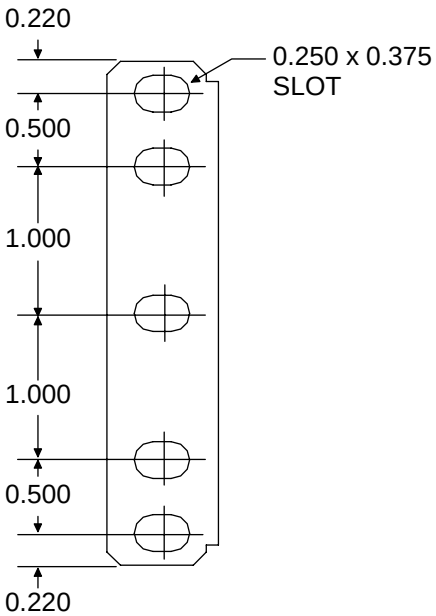
	Net	Shipping
Shelf	19 lb. 12 oz.	25 lb. 4 oz.
MCA	2 lb. 14 oz.	4 lb. 9 oz.
PCU	5 lb. 4 oz.	7 lb. 13 oz.
Ring Gen	3 lb. 8 oz	5 lb. 0 oz

3. Finish :
   Shelf and Module Bodies: Bright Zinc
   Front Panels: Textured Cool Gray (M500-146)
4. Mounting Position 1 shown with optional List 72 Ringing Generator (recommended position).



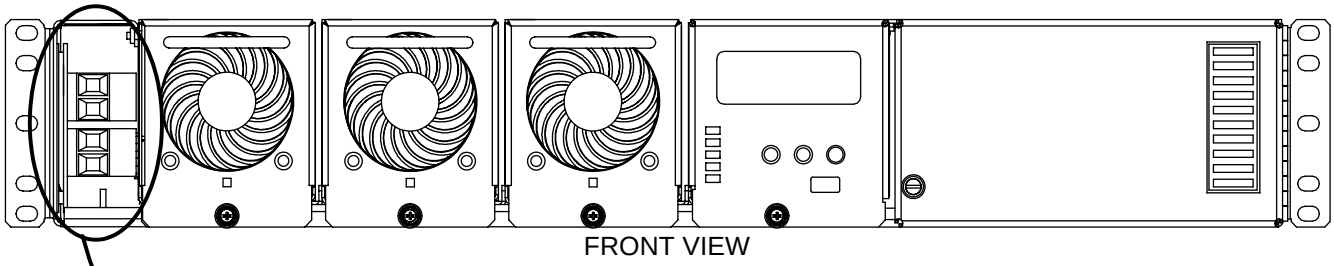
RIGHT SIDE VIEW

MOUNTING ANGLE DETAIL

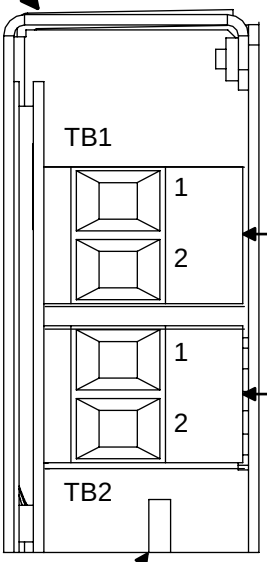


Installer's Connections Locations and Dimensions – List 11, 12, 13, 14 AC Input, Alarm, Control & Reference

AC INPUT
(Cover Removed)



FRONT VIEW

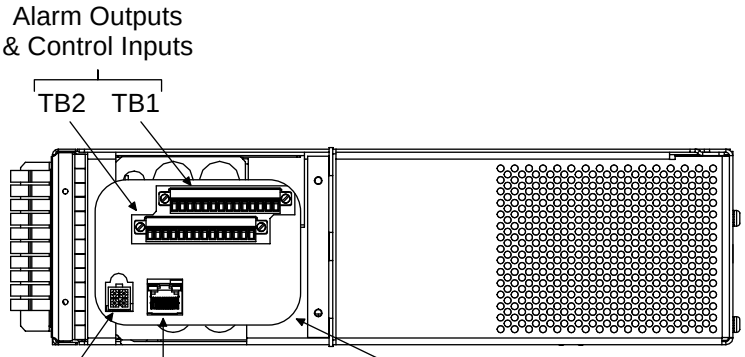


Feeds PCUs in Positions 1& 3

Feeds PCU in Position 2

FRAME GROUND
(No. 8-32 x 0.563 Threaded Stud)

ALARM, REFERENCE & CONTROL
(Located on MCA inside the cabinet)



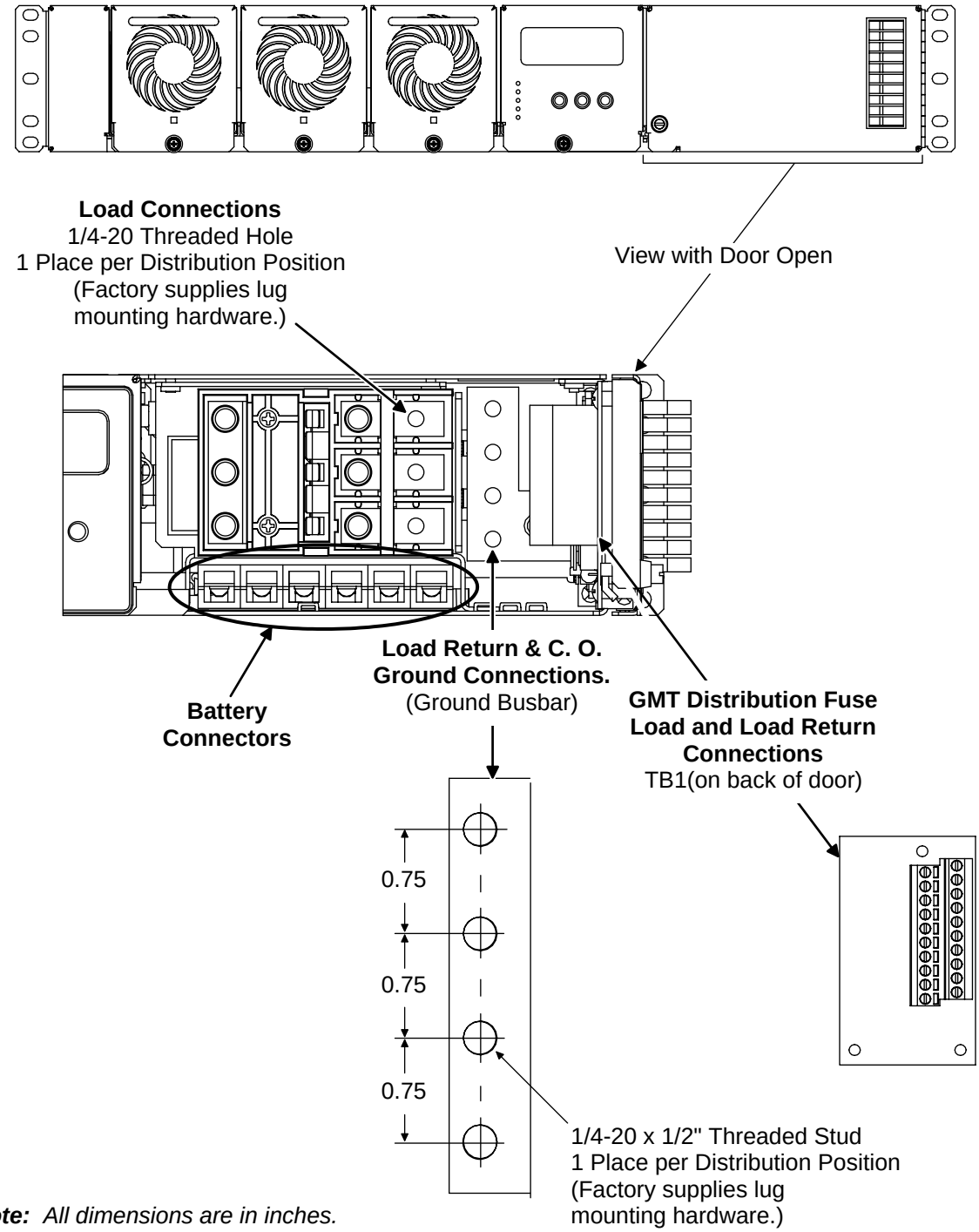
CUTAWAY VIEW
CABINET RIGHT SIDE

J3
Battery
Temperature
Probe

J8
Web
Interface
(Ethernet)

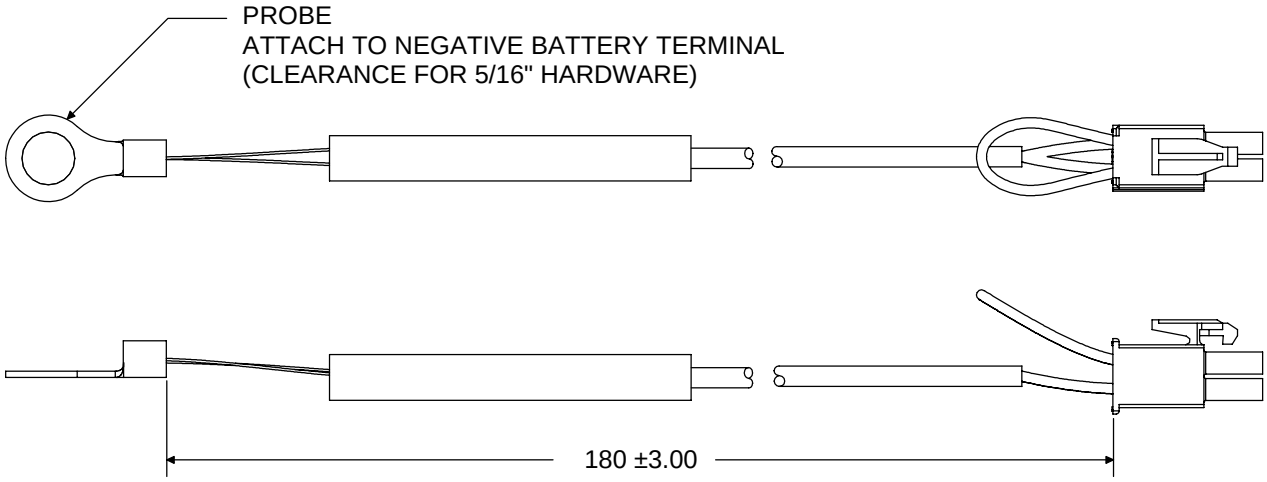
Note: *All dimensions are in inches.*

Installer's Connections Locations and Dimensions – List 11, 12, 13, 14 Distribution and Battery

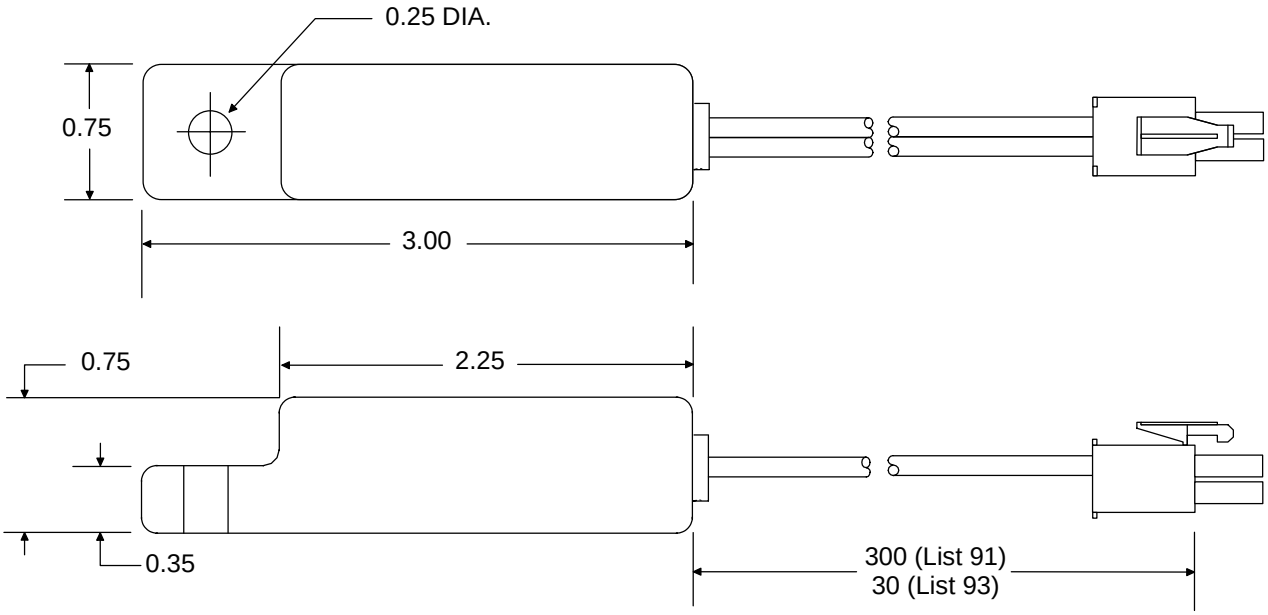


Note: *All dimensions are in inches.*

Overall Dimensions –
List 90, 91, 93 Battery Temperature Probes



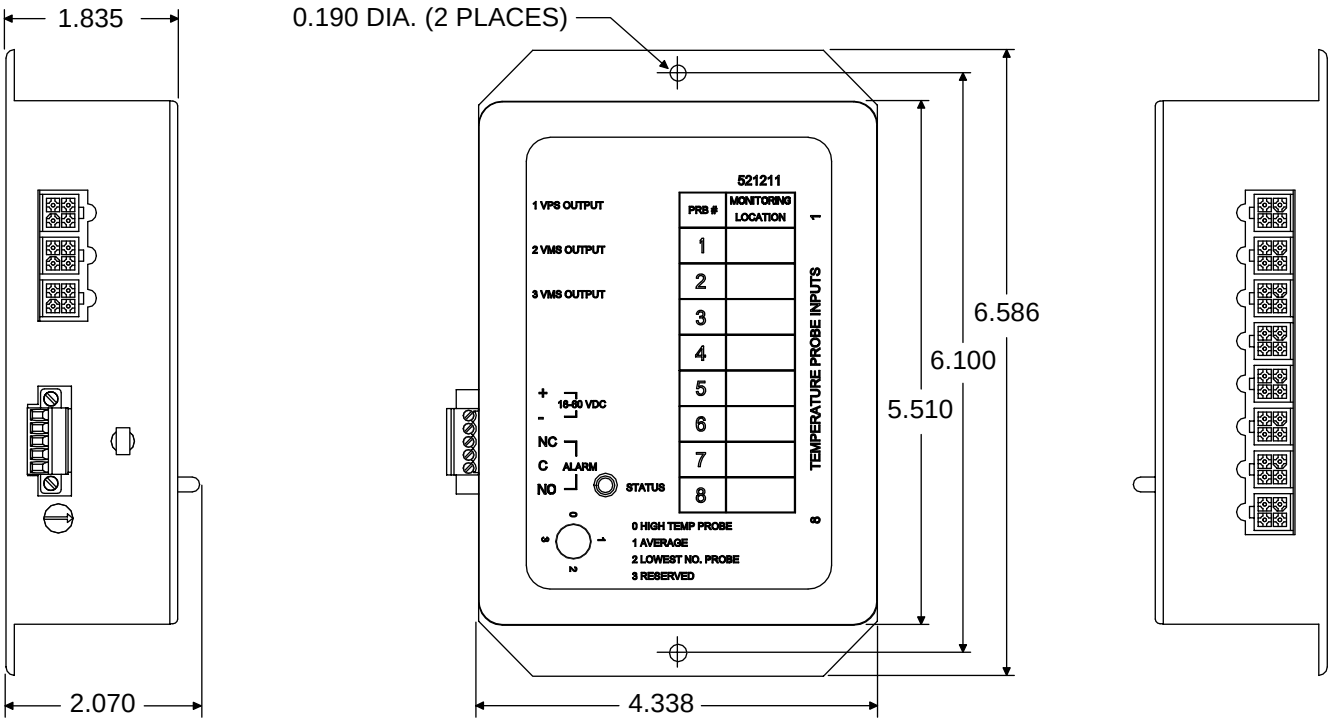
LIST 90 ANALOG PROBE



LIST 91, 93 DIGITAL PROBE

NOTE: *All dimensions are in inches.*

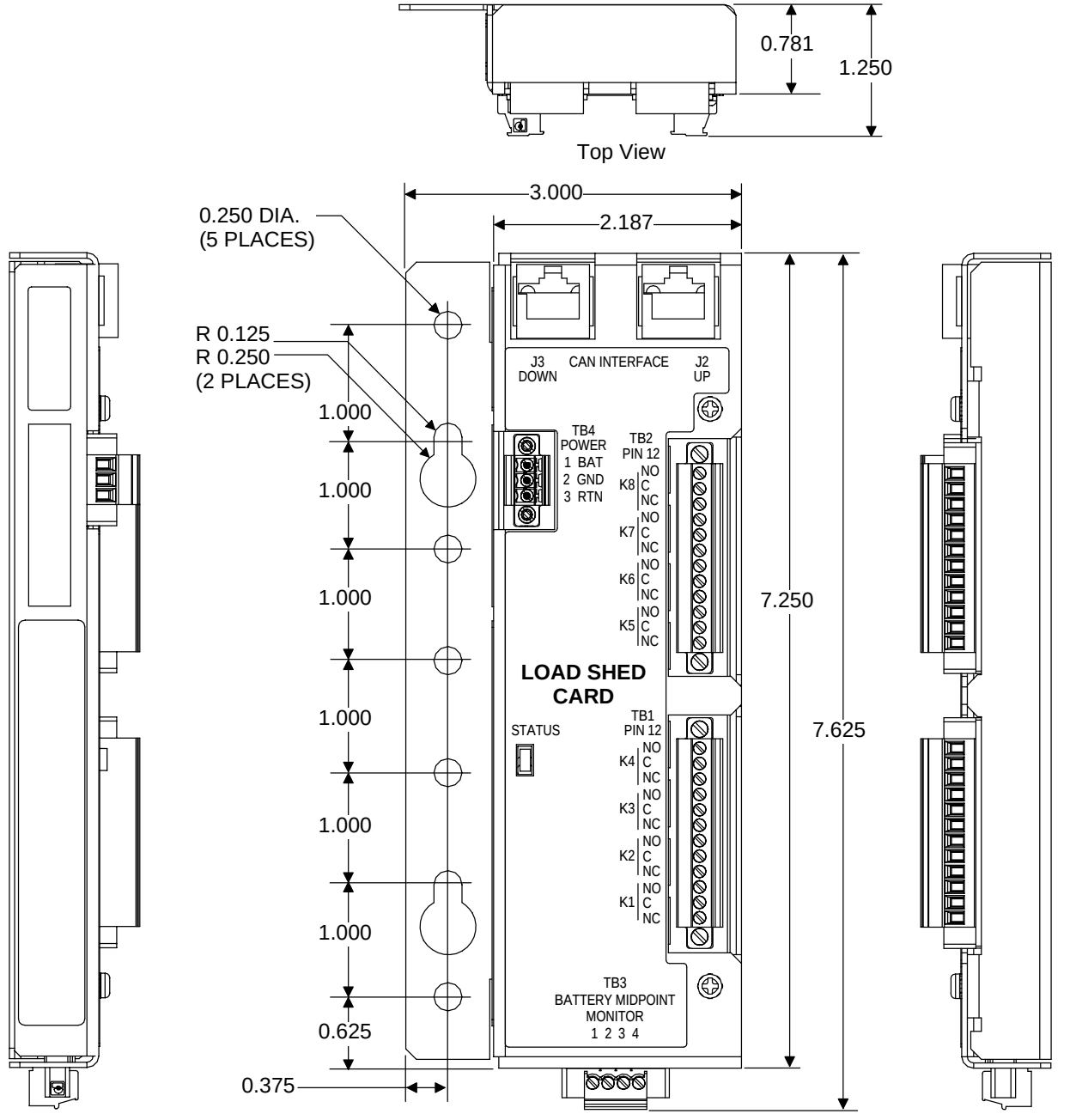
Overall Dimensions –
List 92 Temperature Concentrator Module (TXM)



Notes:

1. All dimensions are in inches.
2. Weight in lbs:
   Net: 9 oz.
   Shipping: 2 lbs. 8 oz.
3. Finish: Off White

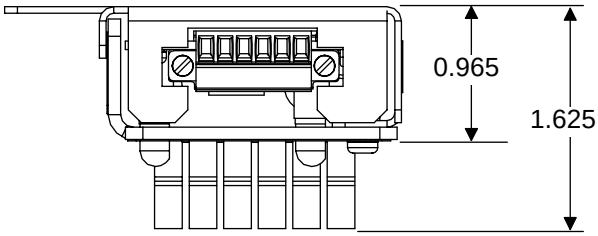
Overall Dimensions –
Part No. 528927 Load Shed Card



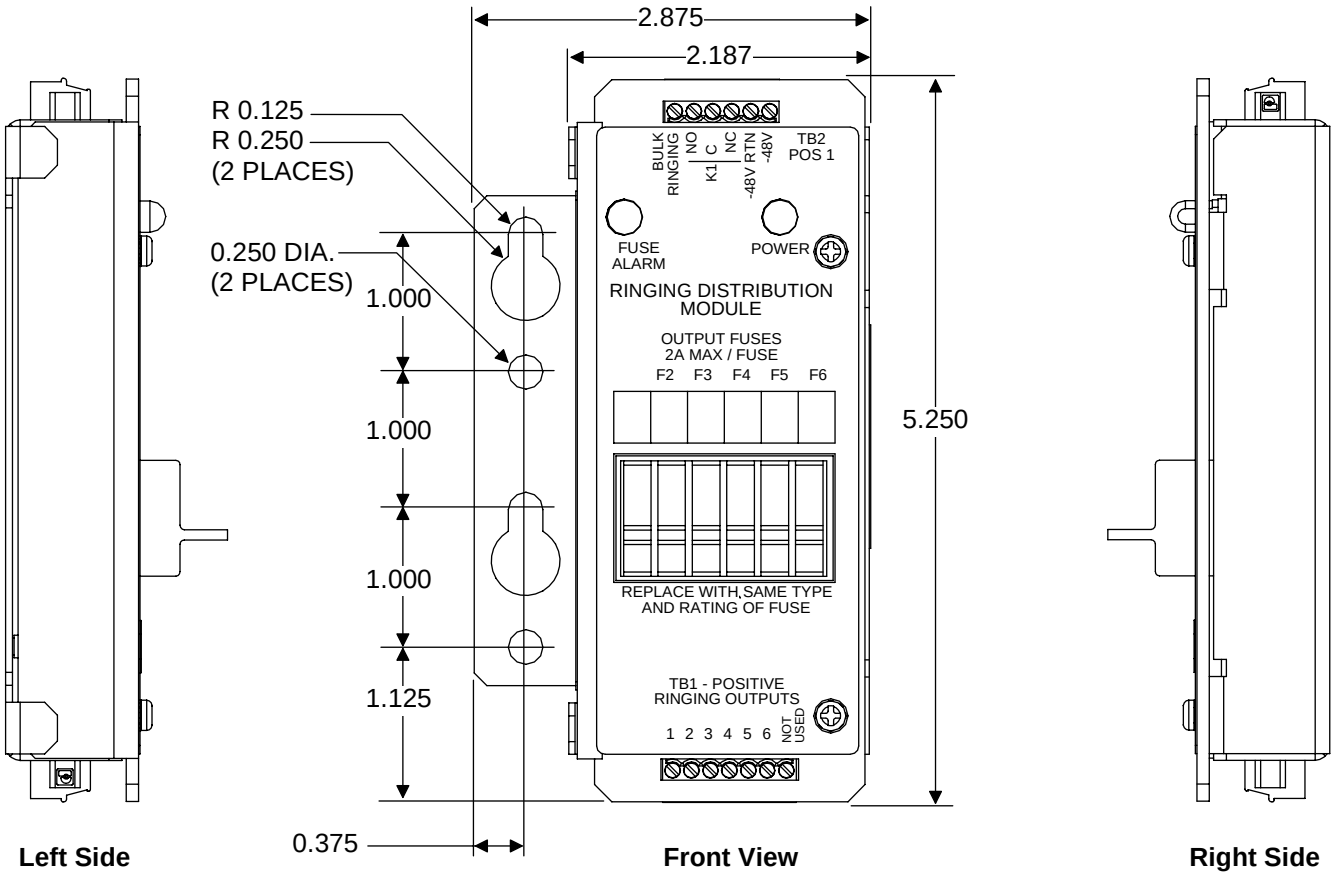
NOTES

1. All Dimensions are in Inches Unless Otherwise Specified
2. Finish: Bright Zinc (Lorain Spec. M500-53)
3. Weight:
   Net: 12.7 oz.
   Shipping: 24 oz.

Overall Dimensions –
Part No. 528608 Ringing Distribution Module



Top View



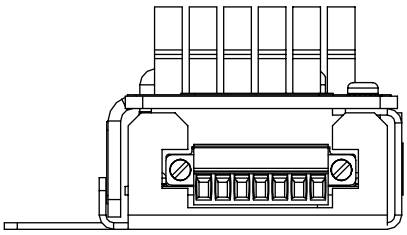
Left Side View

Front View

Right Side View

NOTES

1. All Dimensions are in Inches Unless Otherwise Specified
2. Finish: Clear Zinc (Lorain Spec. M500-53)
3. Weight:
   Net: 8 oz.
   Shipping: 16 oz.



Bottom View

RELATED DOCUMENTATION

Installation Instructions:	Section 5978
User Instructions:	Section 5979
Color MCA Menu Tree:	Section 5956
TXM Instructions:	Section 5940
Load Shed Card Instructions:	Section 5985
Ringing Distribution Module Instructions:	Section 5991
Schematic Diagram:	SD589200300
Wiring Diagram:	T589200300
Lug Detail Drawings:	031110100, 031110200, 031110300

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REVISION RECORD

Issue	Change Number (ECO)	Description of Change	Date	Approved
AA	LLP205185	New.	2/24/06 2/14/06	J. Kirkpatrick J. Rader
AB	LLP205652	Added Part No. 528927 Load Shed Card. Added tables to List 80 and 81 descriptions. Updated MCA Menu Tree to version 3.0.	5/1/06 5/1/06	J. Kirkpatrick J. Jasko
AC	LLP206112	Added List 95. Added Part No. 110982 fuse to Field-Replaceable Components.	5/17/06 5/17/06	J. Kirkpatrick F. Clause
AD	LLP206694	Added List 72 and 73. Added Part No. 528608 and 529034 to Accessories. Revised Menu Tree to MCA version 3.1. Added MCA version requirement to P/N 528927 Load Shed Card description.	10/19/06 10/19/06	J. Kirkpatrick M. Valerian
AE	LLP207301	Added SNMP option. Expanded List 32 MCA feature and ordering information. Revised Menu Tree to MCA version 4.0. Updated contents of P/N 534637 fan kit. Corrected List 72 frequency tolerance.	1/28/07 1/29/07	J. Kirkpatrick J. Jasko
AF	LLP208124	Revised Menu Tree to MCA version 4.1.0.x.	4/4/07 4/4/07	J. Kirkpatrick J. Jasko
AG	LLP208425	Added Lists 11, 12, 13, 14, 47, 48.	5/9/07 5/9/07	J. Kirkpatrick J. Jasko
AH	LLP208652	Added AP6C57EA/EB Ring & Distribution Module to Accessories.	6/19/07 6/19/07	J. Kirkpatrick J. Jasko
AJ	LLP208807	Added List 6, 7, 53, 56. List 55 was P/N 486534200. List 1-4 now dual AC feed. List 40 and 41 now two cords each. Removed input data for multiple PCUs. P/N 534903 GMT fuse assembly in List 1, 2, 3, 4, 11, 12, 13 and 14 was P/N 528185. Ventilation rear spacing requirement now one inch.	3/4/08 3/4/08	J. Kirkpatrick J. Jasko
AK	LLP210314	Added List 21, 22, 23, 24, 42, 46. List 40 and 41 now one cord each.	04/29/08	J. Kirkpatrick
AL	LLP210958	List 90 Temp Probe part number corrected.	06/17/08	John Jasko
AM	LLP212945	List 6 and 7 Load Return changed from two threaded studs to a threaded stud and an alignment pin.	09/21/09	John Jasko John Jasko Oct 7, 2009 Oral Lyons Oct 8, 2009

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