

Distributed Power Front-End



FXP6000 Front and Rear Views

Features

- Three-phase AC input
- Suitable for 3U or 5U height mounting
- Single-wire current share or Droop current share
- Remote voltage adjust and current monitoring
- Overtemperature, overload, and overvoltage protection
- LED supply status indicators
- Current-share control for up to 30 units
- Standard & customized rack adaptors available
- Front panel selectable-input-range model availability
- (For higher power requirements, see FXP7000)
- (For chassis-mount requirements, see FXP6000 OR FXP7000)

Description

The FXP6000 Series of rack-mounted power systems provides AC front-end capability to automatic test equipment, telecom, data communications, and other distributed power designs. The FXP systems may be paralleled up to 180 kW of output power. The FXP family is hot pluggable and includes paralleling (OR-ing) diodes. These power supplies provide excellent protection against input voltage transients.

The FXP family power supplies may be plugged into or removed from an operating system when used in a redundant power configuration. Access to interfaces for remote sensing, remote voltage adjust, current sharing, current monitoring, power supply status, standby voltage and inhibit, as well as power connections, is through a connector at the rear of the supply. The FXP has its fan, handles, voltage adjust, and indicator lights on the front panel and a single hot-plug connector on the rear. Airflow is from the front through the rear. Alarm, monitoring, and control signals are floating from the main output and can be referenced to the positive or negative output or sense line of the power supply. The output is floating with respect to the chassis and may be used as a positive or negative polarity supply.

The FXP6000 Series meets international safety requirements and is CE Marked to the Low Voltage Directive. This series operates on three-phase European voltages as well as (up to) 480VAC, delta or wye.

Hot-Pluggable Model Selections

| MODEL | OUTPUT VOLTAGE | INPUT VOLTAGE RANGE 3-PHASE (VAC) | ADJUSTMENT RANGE | MAXIMUM OUTPUT CURRENT | LINE REGULATION | LOAD REGULATION (NOTE 1) | INITIAL SETTING ACCURACY |
|-----------------------|----------------|-----------------------------------|------------------|------------------------|-----------------|--------------------------|--------------------------|
| FXP6000-32-S (NOTE 2) | 32V | 180 to 264 or 342 to 528 | 30.5 to 33.5V | 175A | 0.2% | 0.2% | 31.93V to 32.07V |
| FXP6000-48-S (NOTE 2) | 48V | 180 to 264 or 342 to 528 | 45.6V to 50.4V | 125A | 0.15% | 0.2% | 47.90V to 48.10V |

NOTES: 1) With Remote Sense connected.

2) User-selectable input voltage ranges.

Input Specifications

| PARAMETER | DESCRIPTION/CONDITIONS | MIN | NOM | MAX | UNITS |
|----------------------|---|----------------------------------|-----|-----|-------|
| Input Voltage - AC | 3-phase delta low input range, nominal. | 200 | | 240 | VAC |
| | 3-phase delta high input range, nominal. | 380 | | 480 | |
| | Continuous deviation from the above nominals. | -10 | | +10 | % |
| Input Current | Per phase at full rated load. | FXP6000 at 180 VAC: | | | ARMS |
| Inrush Surge Current | Internally limited. | Vin = 264VAC (one cycle). 25° C: | | | 38 |
| | | Vin = 528VAC (one cycle). 25° C: | | | 38 |
| Input Frequency | AC input. | 50 | | 60 | Hz |
| Hold-up Time | After last AC line peak at full power. | 208 VAC: | 20 | | ms |
| | | 410 VAC: | 20 | | |
| Operating Frequency | Switching frequency, fixed. | | 100 | | kHz |
| Power Factor | | 0.90 | | | W/VA |

Output Specifications

| PARAMETER | DESCRIPTION/CONDITIONS | | MIN | NOM | MAX | UNITS |
|------------------------|--|---------------------------|------|-----|---------------------------|---------|
| Output Voltage | An additional 1.0 Volt is provided to the output terminals to provide for load lead losses. | 32V Models: | 30.4 | 32 | 33.6 | V |
| Adjustment Range | | 48V Models: | 45.6 | 48 | 50.4 | |
| Output Power | Continuous duty rating. | 32V Models: | | | 5600 | Watts |
| | | 48V Models: | | | 6000 | |
| Output Current | Continuous duty rating. | 32V Models: | | | 175 | A |
| | | 48V Models: | | | 125 | |
| Efficiency | Full rated load (208Vac). | 32V Models: | 85 | 88 | | % |
| | | 48V Models: | 88 | 91 | | |
| Regulation | Load, Maximum deviation with 0 to 100% load change: With Remote Sense connected: With Remote Sense not connected: Utilizing Droop Current Share: Line, Under all specified operating conditions. | | | | 0.2 0.75 2.0 0.2 | % |
| Ripple & Noise | Measured at mating connector w/ 0.01µF + 10µF Tant. | 20 MHz BW: 100 MHz BW: | | | 1 2 | % p-p |
| Overshoot / Undershoot | Output voltage overshoot/undershoot at turn-on. | | | | 0 | % |
| Minimum Loads | Minimum loading required to maintain regulation. | | 0 | | | A |
| Transient Response | Maximum recovery time, to within 1% of initial set point due to a 25% load change, 1A/µs. | Time: Deviation: | | | 400 3 | µs % |
| Turn-On Delay | Time required for initial output voltage stabilization after power-up. | | | | 3 | s |
| Turn-on Rise Time | Time required for output voltage to rise from 10% to 90%. | | | | 100 | ms |

Interface Signals and Protection

| PARAMETER (NOTE 1,2) | DESCRIPTION/CONDITIONS | | MIN | NOM | MAX | UNITS |
|---|---|--------------------------------------|--------------|--------------|--------------|-------|
| AC Power Fail Warning | Warning provided prior to Vout dropping 5% after loss of AC input. | | 5 | | | ms |
| Auxiliary Power | Output voltage - diode isolated. Inclusive of line, load, and initial tolerances. | | 11.5 | 12.0 | 12.7 | V |
| | Output current. | | | | 500 | mA |
| Current Monitor | Monitor output current over a compliance range of 0-10V. | | | | | |
| | Nominal full load output: | | | 12.5 | | mA |
| | 50-100% load tolerance: | | -315 | 0 | 315 | µA/A |
| | <50% load tolerance: | | -250 | 0 | 500 | µA/A |
| Current Share | Static sharing deviation as a percent of full-load rating for loads >10%. | Active: Passive: | | | 5 10 | % |
| Input Range Select Status | Maximum signal resistance in high input voltage range selection. | | | | 0.10 | Ω |
| Loss of Phase Warning | Warning provided prior to protective reduction in current limit. | | 500 | | | ms |
| Output Inhibit | Voltage required to enable supply (0.5 mA sink). (NOTE 3) | | | | 1.0 | V |
| Output Interlock | Voltage required to enable supply (6 mA sink). (NOTE 3) | | | | 1.0 | V |
| Output Overload Protection | Straight line current limit (above approx. 5V Vout). | 32V Models: 48V Models: | 180 129 | | 188 134 | A |
| Output Overload Warning | Signal level on overload. | | 2.2 | | | V |
| Output Short Circuit Protection | Occurs on overload when Vout is below approx. 5V. May operate in burst-mode. | 32V Models lavg: 48V Models lavg: | 30 21 | | 105 65 | A |
| Output Voltage Fault Signal | Deviation from adjusted Vout that is considered as a fault. | | ±3 | ±4 | ±5 | % |
| Output Voltage Margin | Output voltage swing available through Margin pin (analog). | | ±4.8 | ±5.0 | ±5.2 | % |
| Overtemperature/ Fan Failure Warning | Time between fault warning and shutdown. Latching shutdown. | | 100 | | | ms |
| Overvoltage Protection | Latch style overvoltage protection. | FXP6000-32: FXP6000-48: | 36.3 55.2 | 38.4 57.6 | 40.5 60.0 | V |
| Power Supply Present Signal | Resistance to logic ground upon insertion of supply. | | | 1000 | | Ω |
| Remote Sense | Maximum load lead loss compensation (round trip). | | | | 1.0 | V |

- NOTES:**
- 1) All logic outputs listed below feature a standard active pull-down output with 0.4V max at 40 mA sink capability, and a 100k pull-up to 5V.
 - 2) In addition to those listed below, signals and front-panel LEDs are provided to indicate: overtemperature/fan fault, AC phase imbalance, output good, interlock open, and supply inhibited. The FXP also provides 4 LED's indicating output loading.
 - 3) **Both signals must be pulled to logic ground for the unit to operate.** Enables are 100% redundant internally for applications where redundant inhibit is desirable. Contact factory for additional design details.

Safety, Regulatory, and EMI Specifications

| PARAMETER | CONDITIONS/DESCRIPTION | MIN | NOM | MAX | UNITS |
|------------------------------|---|--------|-----|--------------|-------|
| Agency Approvals | UL60950/CSA60950-00 (cULus), IEC60950, EN60950 (TÜV), CE marked for the Low Voltage Directive | | | | |
| Electromagnetic Interference | FCC CFR title 47 Part 15 Sub-Part B - Conducted. EN55022 / CISPR 22 Conducted. | A A | | | Class |
| ESD Susceptibility | Per EN61000-4-2, level 4. | 8 | | | kV |
| Radiated Susceptibility | Per EN61000-4-3, level 3. | 10 | | | V/M |
| EFT/Burst | Per EN61000-4-4, level 4. | ±4 | | | kV |
| Input Transient Protection | Per EN61000-4-5. Line-to-Line: Line-to-Ground: | 4 3 | | | kV |
| Voltage Sag Immunity | Per SEMI F47-0200 FXC/FXP7000 | | | Pending | |
| Leakage Current | Per UL60950 and EN60950: FXP6000 at 240 VAC, 60 Hz: FXP6000 at 400 VAC, 50 Hz: FXP6000 at 480 VAC, 60 Hz: | | | 5 7 10 | mA |

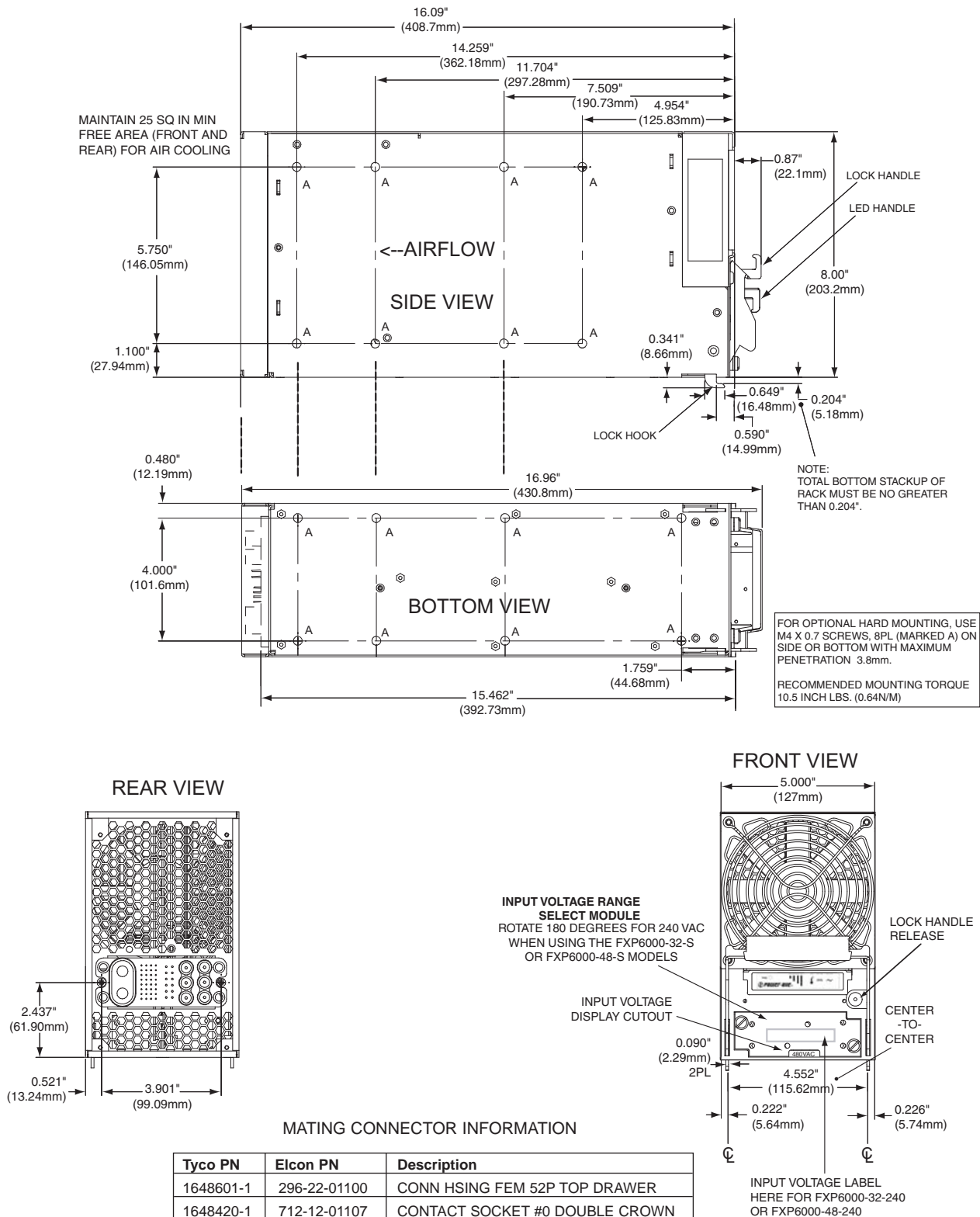
Environmental Specifications

| PARAMETER | CONDITIONS/DESCRIPTION | MIN | NOM | MAX | UNITS |
|-------------------------|---|-----|--------------------------|------------|--|
| Altitude | Operating. Non-Operating. | | | 10k 40k | ASL Ft. |
| Operating Temperature | At 100% load: At 60% load: | 0 | | 50 70 | °C |
| Storage Temperature | | -40 | | 85 | °C |
| Temperature Coefficient | 0°C to 70°C (after 15-minute warm-up). | | | .02 | %/°C |
| Relative Humidity | Non-Condensing. | | | 95 | %RH |
| Shock | Operating: half-sine 10 ms, 3 axis Non-operating: half-sine 10 ms, 3 axis | | | +20 +40 | GPK |
| Vibration | Operating: swept sine 5-2000-5 Hz, 5-32 Hz, 0.02iDA, 32-2000 Hz Non-operating: random 10-2000 Hz | | | 1 6.15 | GPK Grms |
| Airflow | Airflow provided through the supply from front to rear. | | 135 3.8 483 2.5 | | cfm m ³ /min lfm m/s |
| Weight | | | | 29 13 | lb kg |

NUCLEAR AND MEDICAL APPLICATIONS - Power-One products are not designed, intended for use in, or authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the respective divisional president of Power-One, Inc.

TECHNICAL REVISIONS - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

FXP6000 Overall Size: 16.96" x 8.00" x 5.00" (430.8mm x 203.2mm x 127.0mm)





NOTE:
FXP6000 POWER SUPPLIES ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY AND ARE NOT INCLUDED AS PART OF POWER SHELF ASSEMBLY.



5/16-18 STUD 2 PL
ACCOMMODATES RING
LUG 1.08 MAX WIDTH

UNIT LABEL

2.74" (69.6mm)
4.38" (111.25mm)

5.215" (132.46mm)

3.56" (90.4mm)
2 PL

0.61" (15.5mm)

0.000

0.000

J1

9.42" (239.27mm)

PIN 1

50-PIN SIGNAL HEADER
WITH KEYING AND LATCHES
(AMP PN: 1-499141-0)

15.14" (384.56mm)

15.44" (384.56mm)

17.14" (435.34mm)

16.84" (427.74mm)

J2 AC INPUTS J3

3 PHASE 3 WIRE + PE

ATTACH EARTH GND BEFORE AC CONNECTORS

1.86" (47.24mm) 2 PL

0.66" (16.76mm) 2 PL

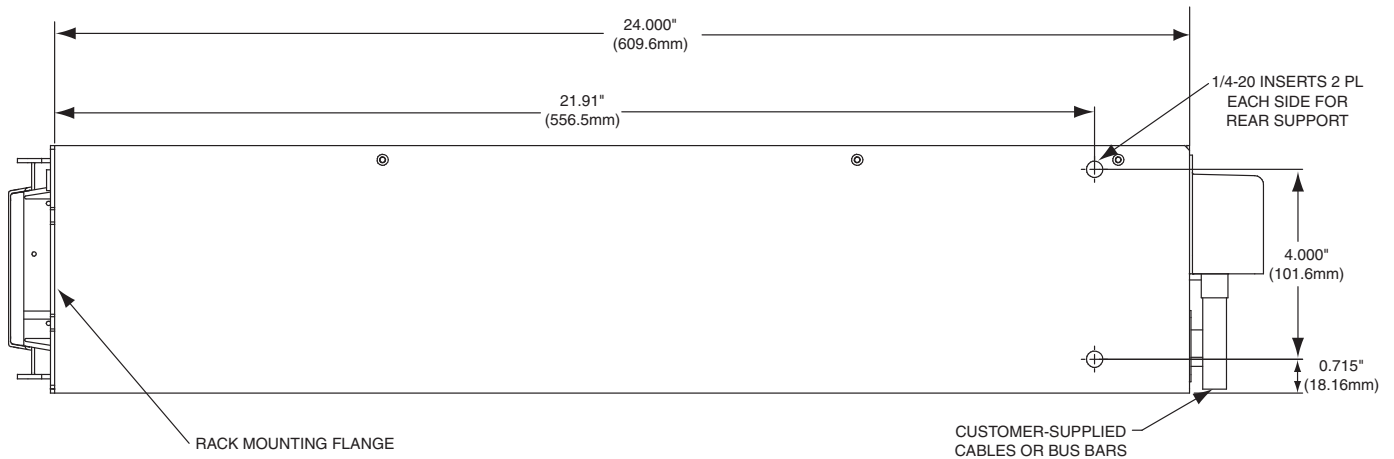
19.000" (482.6mm)

10/32 GROUND
STUD 2 PL

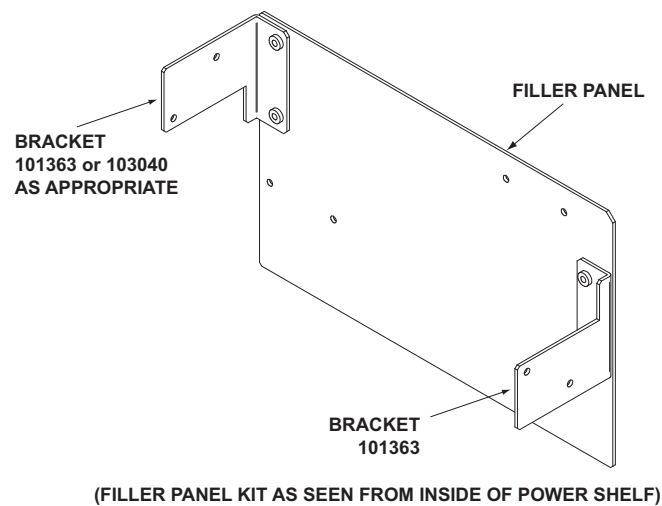
AMP PN 213581-1
WITH SILVER-PLATED
CONTACTS

NOTES:
1. FOR CLARITY, FINGER GUARD FOR DC OUTPUT
TERMINALS IS NOT SHOWN IN THIS ILLUSTRATION.

FRH7000 POWER SHELF, RIGHT-SIDE VIEW



This kit is used to cover an unused right-side slot of the FRH7000 Power Shelf (as viewed from the front of the FRH7000). The kit can be installed before, or after installation of the power shelf into the rack.

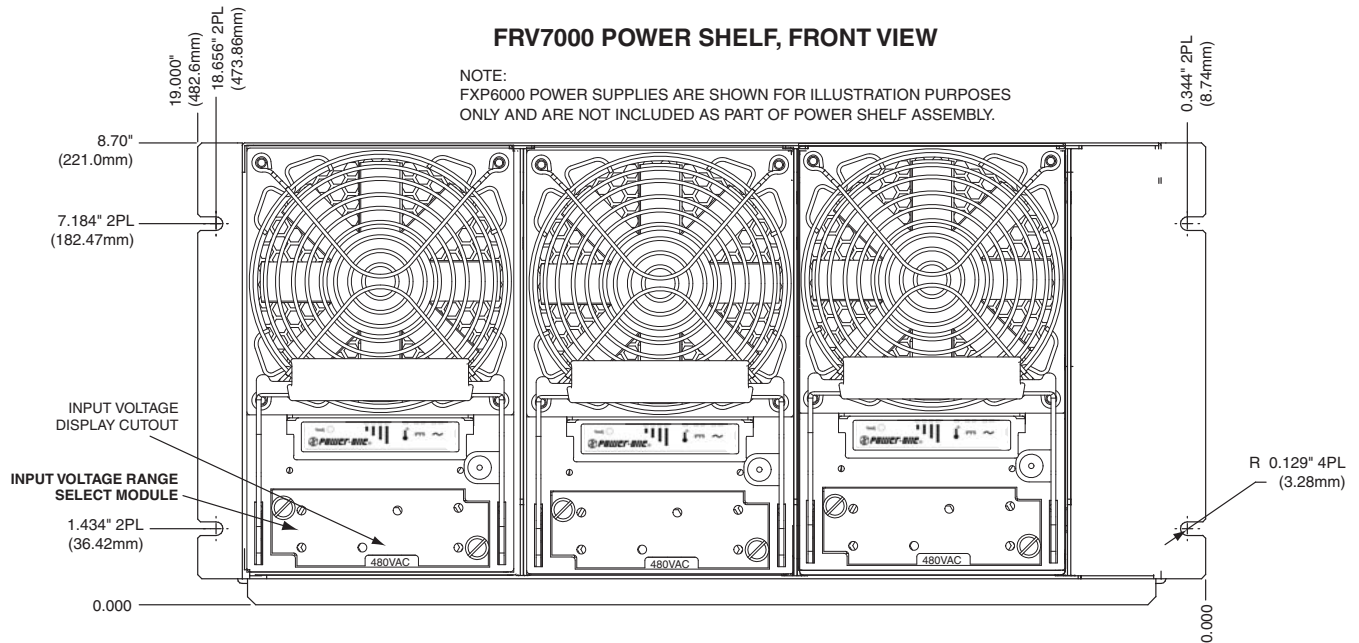


FRV7000 Power Shelves are Not Recommended for New Designs

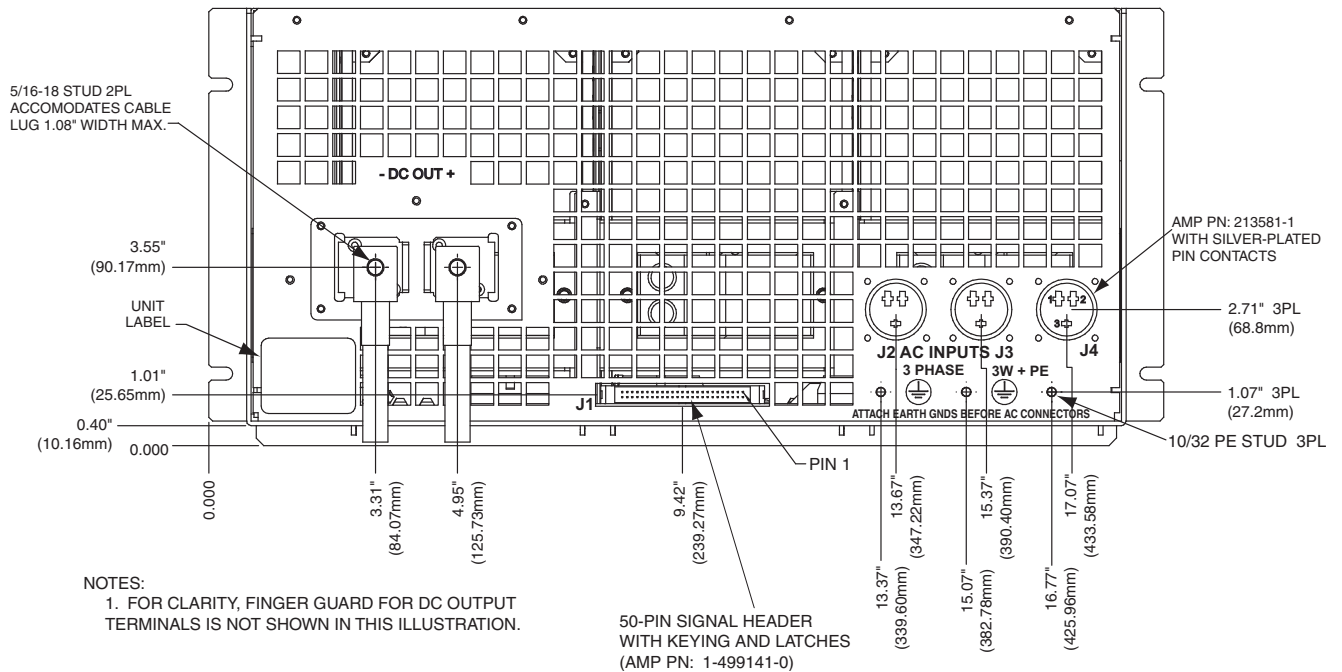


FRV7000 POWER SHELF, FRONT VIEW

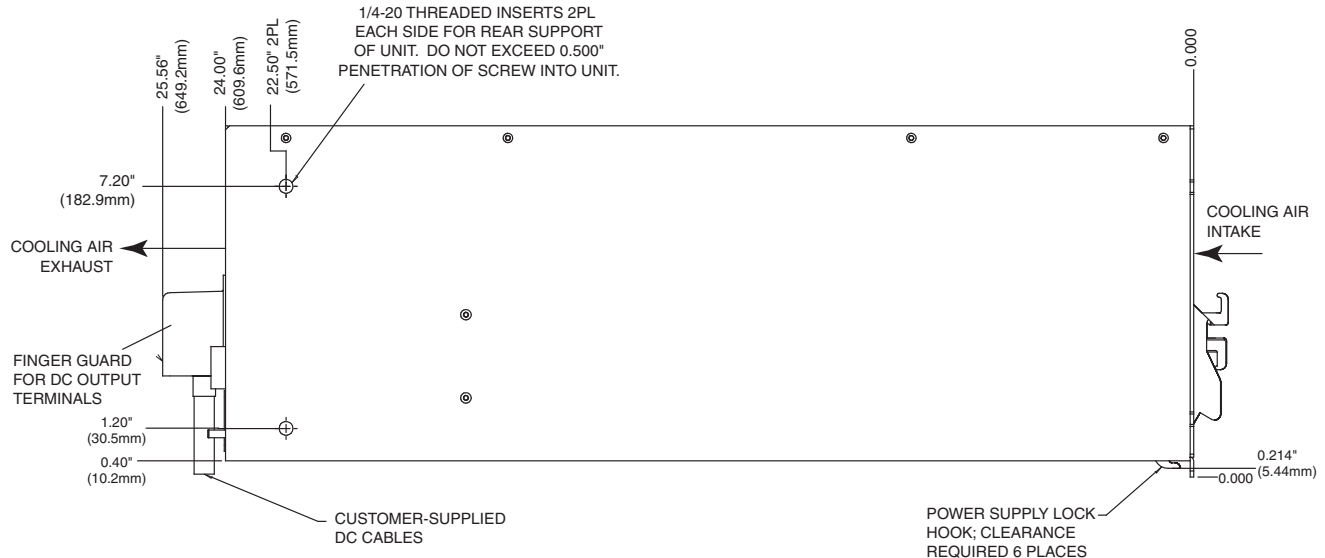
NOTE:
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FRV7000 POWER SHELF, REAR VIEW



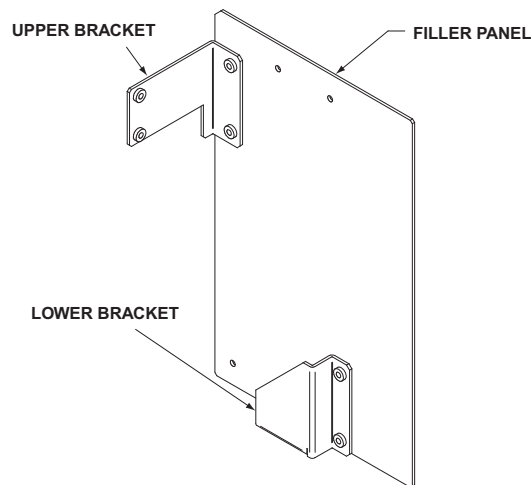
FRV7000 POWER SHELF, LEFT-SIDE VIEW



Filler Panel Kit, PN: 088-101348

(Used with FRV7000 Power Shelf)

This kit is used to cover an unused left or center slot of the FRV7000 Power Shelf (as viewed from the front of the FRV7000). One kit is required per slot. Kits can be installed before, or after installation of the power shelf into the rack.



(FILLER PANEL KIT AS SEEN FROM INSIDE OF POWER SHELF)