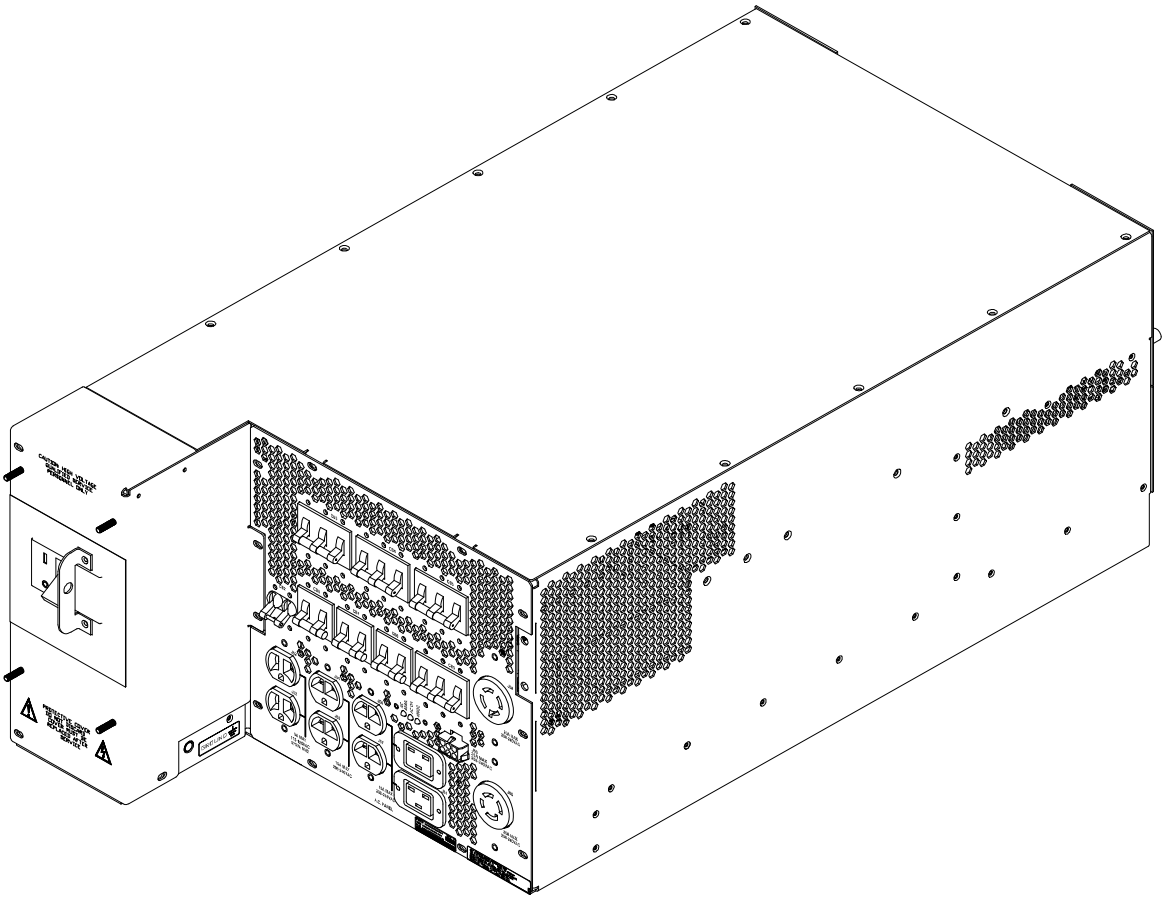
TRANSISTOR DEVICES, INC



UltraFLEX HD User Manual

708401 Rev B

ULTRAFLEX HD PDU

User Manual

Rev B

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Table of Contents

List of Figures

List of Tables

List of Graphs

Chapter 1

1.0 System Overview

Refer to Figure 1 and Figure 2 below for front and rear views of the PDU respectively. The major components of the PDU are shown on the diagrams.

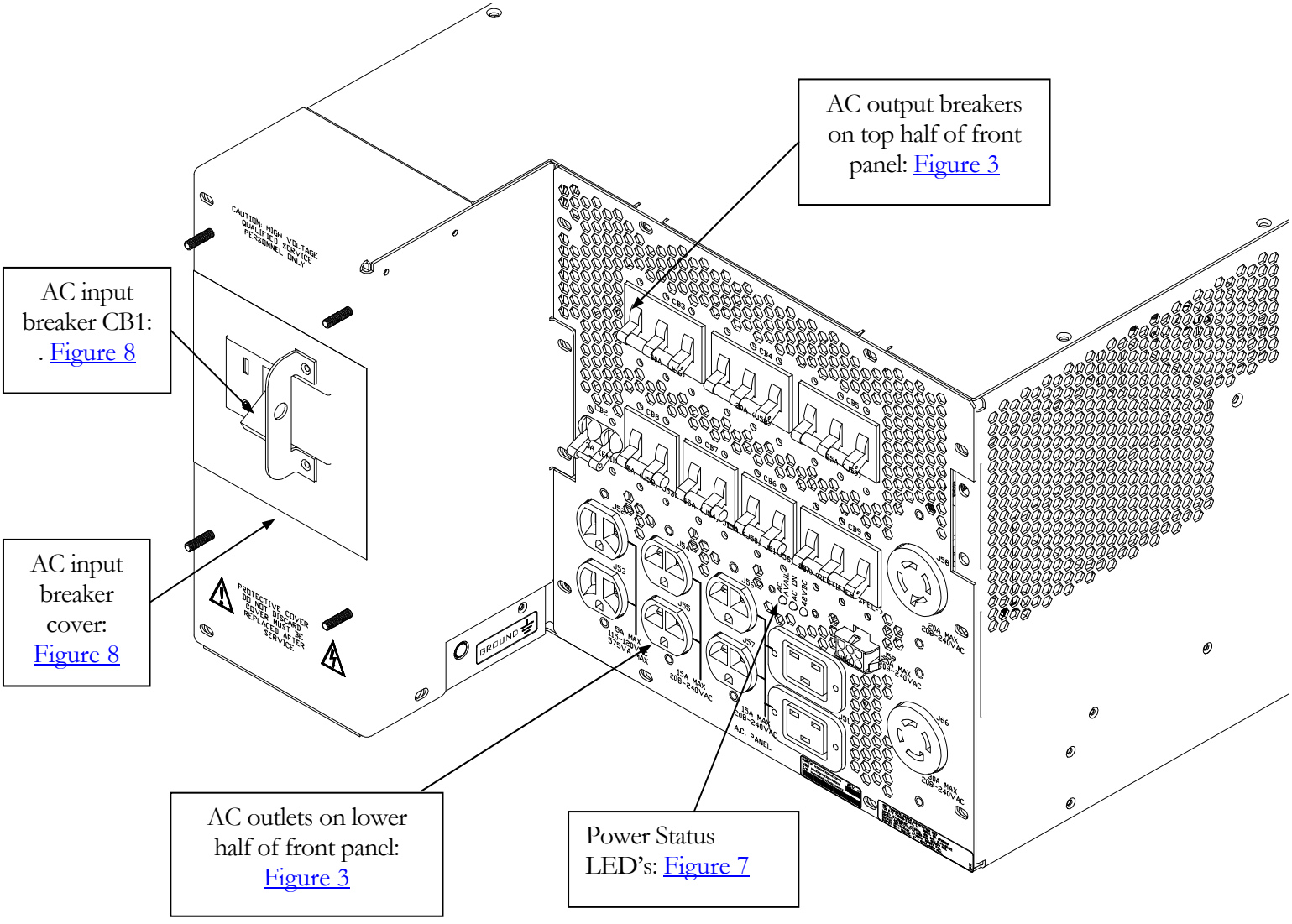


Figure 1– Front view of PDU

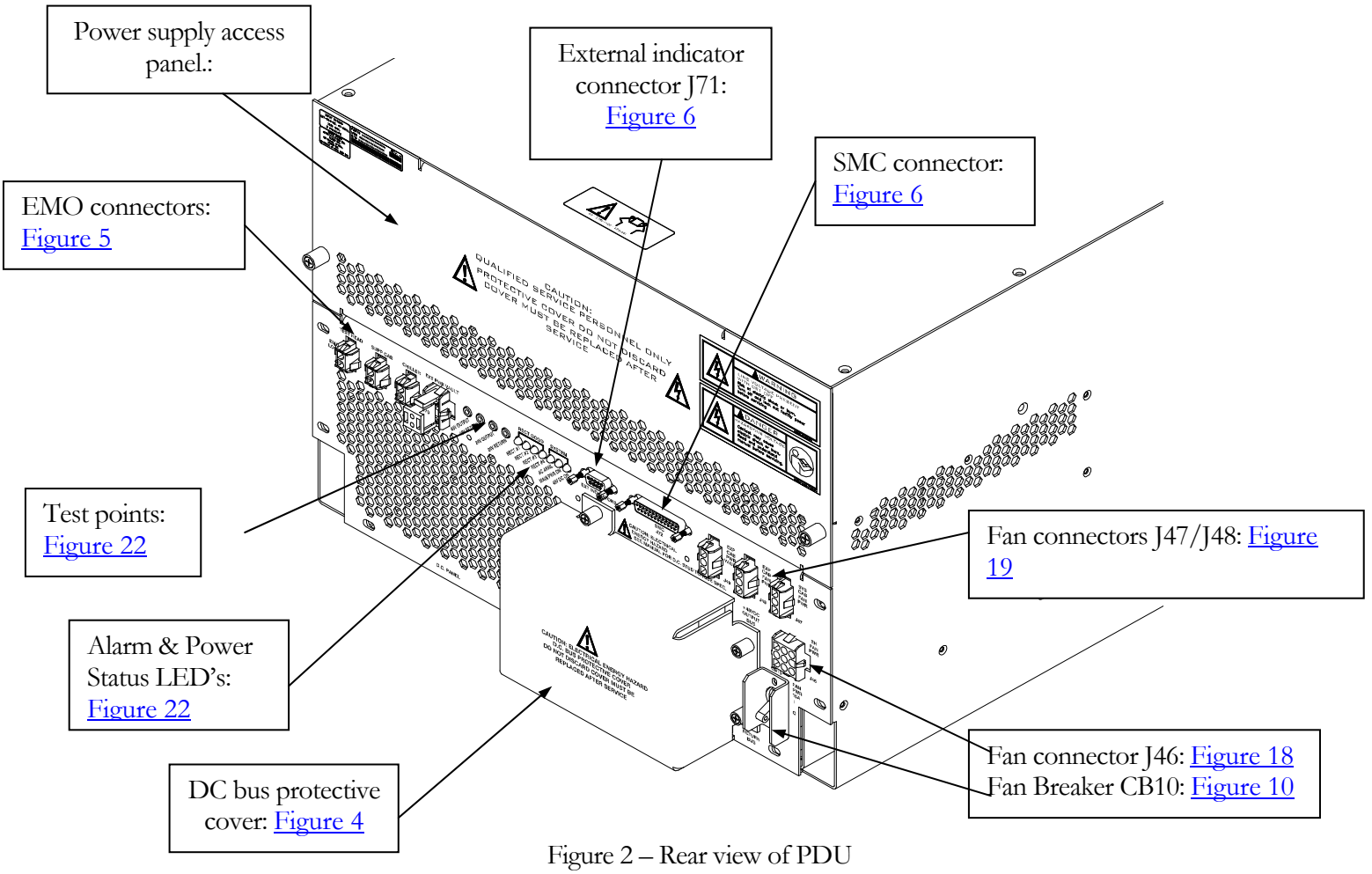


Figure 2 – Rear view of PDU

1.1 AC Input Warnings

WARNING: HIGH TOUCH CURRENT. EARTH CONNECTION ESSENTIAL BEFORE CONNECTING SUPPLY.

AVERTISSEMENT: HAUTE TENSION DE CONTACT. LA MISE A LA TERRE EST ESSENTIELLE AVANT DE BRANCHER L'ALIMENTATION.

1.2 AC Input Ratings

SPS5809-4 (708355-4)	System, PDU supplied with 4 rectifiers Input: 200-208VAC, 50-60Hz, 125A Max Output: 48Vdc, 320A Max, 15,200W Max. (4 rectifiers) Output: 208-230VAC, 50-60Hz, 19,000W Max Output 115VAC, 50-60Hz, 575W Max AMBIENT: 30°C Max.

1.3 Mounting Equipment

1.3.1 Introduction

The PDU was specifically designed for installation into the Teradyne cabinet. Since there are no mechanical mounting features on the PDU, it must be installed in a shelf within the Teradyne cabinet. Mounting of the PDU to the shelf to be specified by Teradyne. Refer to Teradyne service documentation for installation of PDU into the UltraFLEX HD system.

1.3.2 Weight

The weight of the PDU is approximately 125 Lbs. Do not attempt to lift the PDU without assistance or use of mechanical lift.

1.4 AC Input

The AC input required is a separately protected 200/208 VAC three phase input with a dedicated ground wire. The AC input can be configured as a 3 Phase Delta (with or without one leg grounded) or a 3 Phase Wye (Neutral not used). The AC feed must be capable of supplying a continuous current of 150A. The frequency range for the input is 47-63 Hz. All AC wiring should be performed by a licensed electrician and in accordance with local and regional electrical codes. Before starting any cabling, verify the AC feed breaker CB1 is turned off and follow the facility LOTO (Lock Out Tag Out) procedure.

1.5 AC Outputs

All AC connections are located on the front of the PDU next to the AC input circuit breaker. Refer to Table 1 and Figure 3 for descriptions of the connections.

Use	Outlet Number	Circuit Breaker	Breaker Rating (A)
Expansion Cabinet Vault	J58	CB4	20
DC-PM	J66	CB3	30
CDU	J59	CB5	25
SMC	J50	CB6	15
Spare	J51		
Manipulator	J56		
Spare	J57		
External IEC Spare	J54	CB7	15
External IEC Spare	J55		
External IEC (CPU & Monitor)	J52	CB8	5
External IEC (DSP)	J53		

Table 1 – AC Output table

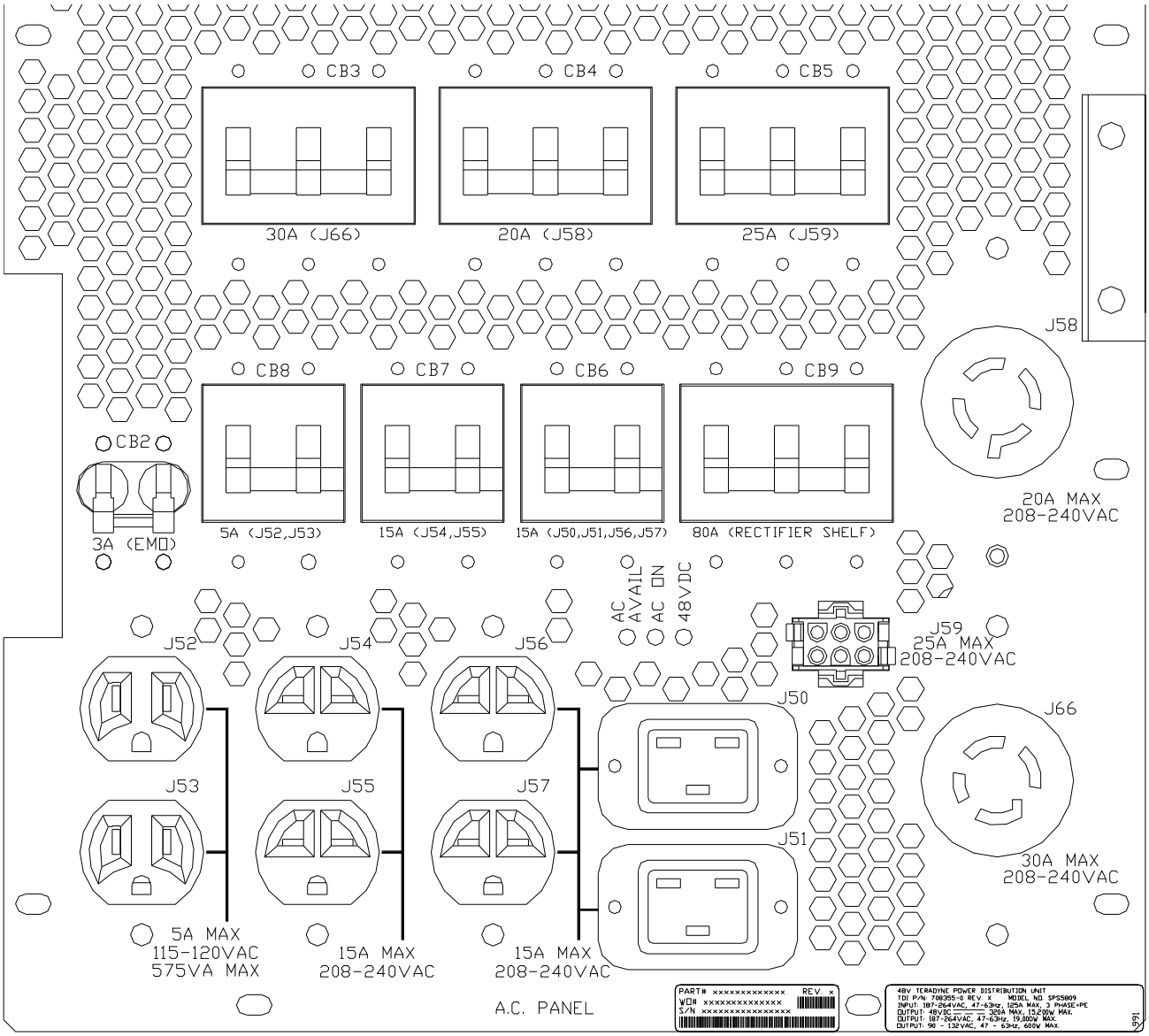


Figure 3 – AC distribution on PDU

1.6 DC Connections

All DC connections are located on the rear of the PDU. The DC connections include the 48V DC output and fan power.

1.6.1 Fans

All fan connectors are located on the rear of the PDU as shown in Figure 4. In addition, refer to Table 2 below for descriptions of the connectors.

Use	Outlet Number	Circuit Breaker	Breaker Rating (A)
Testhead Fans	J46	CB10	15
System Cabinet Fan	J47		
Expansion Cabinet Fan	J48		
Expansion cabinet power control	J49		

Table 2 – DC Fan connection table

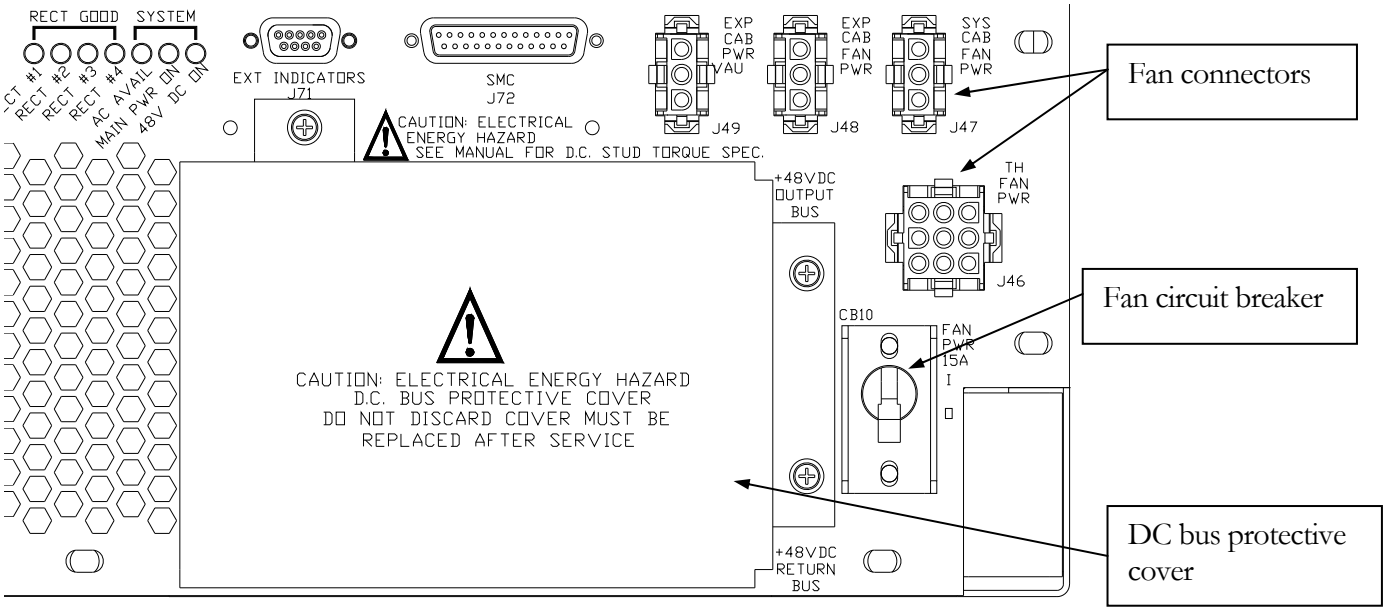


Figure 4 – DC fan connector detail

1.7 EMO Loop

The PDU contains 4 EMO loop connectors on the rear of the PDU directly to the left of the test points. Supplied with the PDU is an EMO loop connector installed in J70. If an external power vault is used, remove the jumper installed in J70 and connect the power vault EMO. If power vault is used, the J70 jumper must remain installed. Refer to Figure 2 for where the EMO connectors are located and Figure 5 below for a detailed view of the EMO connectors on the rear of the PDU.

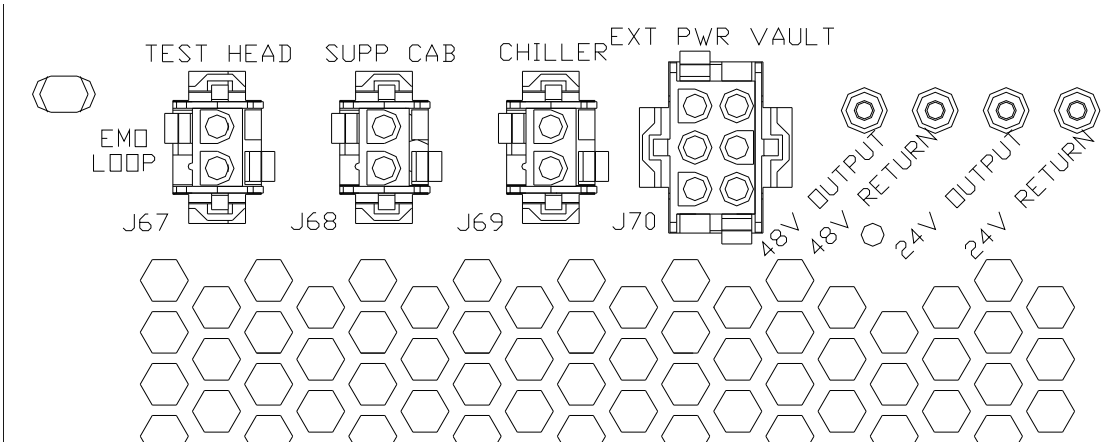


Figure 5 – EMO loop connector detail

1.8 SMC Connection J72

The SMC connector is also located on the rear of the PDU. Refer to Figure 2 for the location of the SMC connector and Figure 6 below for a detailed view. The pinout of the SMC connector is detailed in Table 3.

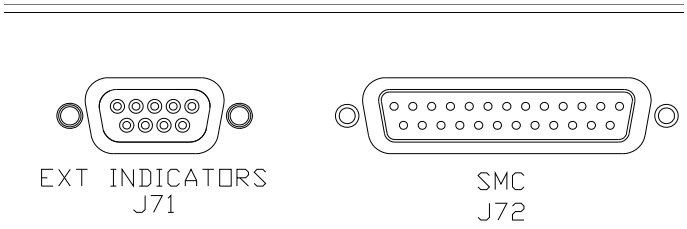


Figure 6 – SMC connector detail

Pin Number	Signal	Notes
1	Not-Used	
2	Fan Speed Control 1	From J46 pin 4
3	PUMA ID bit	Jumper to J72 pin 4
4	Common	Jumper to J72 pin 3
5	48V current monitor	Output to SMC
6	48V current monitor return	Output to SMC
7	Not-Used	
8	Not-Used	
9	Not-Used	
10	Not-Used	
11	5V from SMC to PDU	Input from SMC
12	Not-Used	
13	48V DC Enable	Input from SMC
14	Not-Used	
15	Not-Used	
16	Not-Used	
17	Not-Used	
18	Not-Used	
19	48V DC power fault	Output to SMC
20	48V DC power fault return	Output to SMC
21	Not-Used	
22	Not-Used	
23	Not-Used	
24	Fan Speed Control 1 return	From J46 pin 5
25	48V DC Enable return	Input from SMC

Table 3 – SMC connector Pinout (J72)

1.9 External Indicators Connection J71

The external indicator connector is located on the rear of the PDU next to the SMC connector; refer to Figure 2 for location of external indicator connector and Figure 6 for a detailed view. The pinout of the external indicator connector is detailed in Table 4.

Pin Number	Signal
1	AC Available
2	Not-Used
3	Main Power On
4	48V DC On
5	Not-Used
6	AC Available return
7	Not-Used
8	Main Power On return
9	48V DC On return

Table 4 – J72 Pinout

Chapter 2

2.0 System Start-up

Verify all AC and DC circuit breakers are turned off. Before applying power, it is recommended to fully read the User Manual portion of this document to become familiar with all the components and functions of the system. If any problems are encountered during the start-up of the system, press one of the systems EMO switches to shut down the system.

2.1 System turn-on

2.1.1 EMO breaker CB2

Turn on EMO breaker CB2 located on the front panel of the PDU; refer to Figure 7 for actual location. To turn on CB2, rotate the handle on the breaker up toward the top of the PDU. If the handle if down toward the bottom (as shown in Figure 7), the breaker is off. With CB2 on, it will allow the EMO supply to turn on as soon as the AC input is energized. Refer to Figure 7 for a view of EMO breaker CB2.

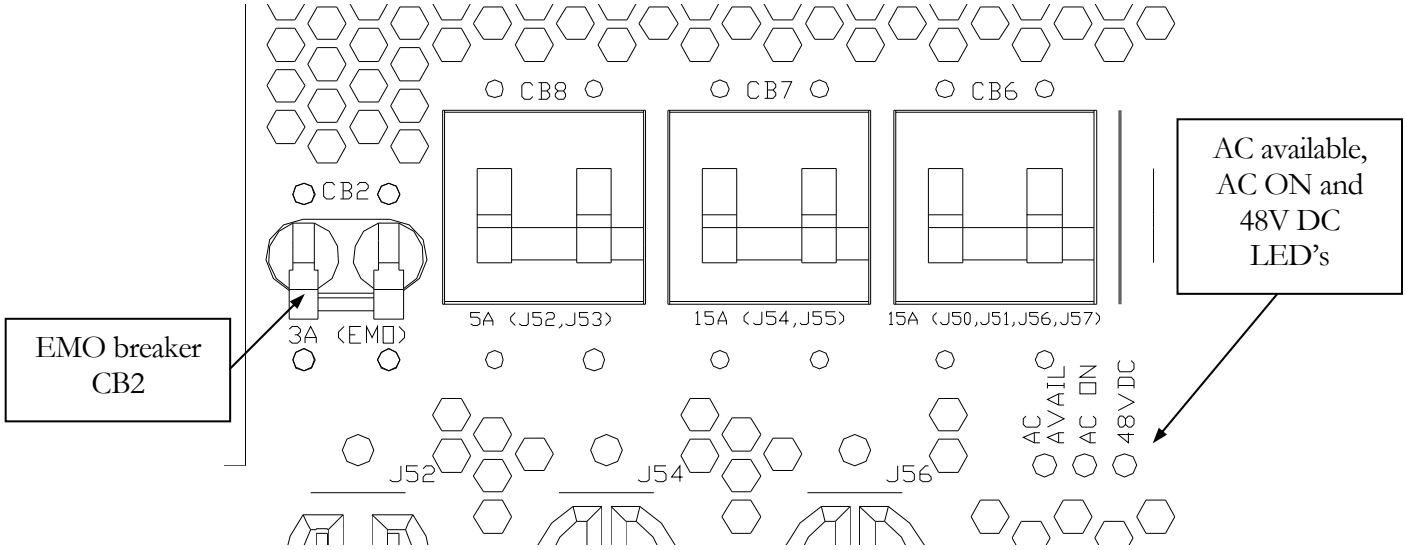


Figure 7 – Detail of EMO breaker CB2 (shown in OFF position)

2.1.2 Energize AC input

Energize the AC input to the PDU by turning on the facility circuit breaker. Once the AC input is energized, the AC Available LED should be illuminated green, refer to Figure 7 above for the location of the AC available LED. If the AC Available LED is not illuminated, verify the EMO breaker CB2 is on and that the AC input is within the operating range (187 – 253 VAC).

2.1.3 Input breaker CB1

Once the AC is energized, the AC input breaker can be turned on. Turn on the AC input breaker CB1 located on the front of the PDU by pushing the breaker handle upward. If the breaker handle is facing the bottom of the PDU (as shown in Figure 8), the breaker is off. Once the input breaker is on, the Main Power On LED is illuminated green, refer to Figure 7 for the location of the Main Power On LED. If the Main Power On LED is not illuminated, verify all EMO loop connectors are plugged in and no EMO buttons are depressed. With an open EMO loop, the input breaker cannot be turned on. Refer to Figure 8 for a view of input breaker CB1.

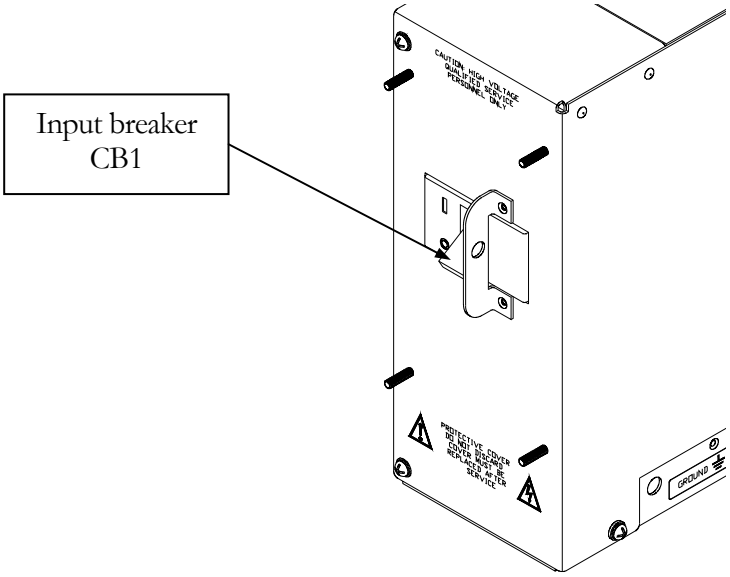


Figure 8 – Detail of input breaker CB1

2.1.4 AC Loads

Once the AC input breaker is on, the AC loads can be connected, refer to Figure 1 for the location of the AC load breakers and Figure 9 for a detail view. Turn on the AC load breakers CB3, CB4, CB5, CB6, CB7 and CB8 one at a time. Note: All breakers shown in Figure 9 are in the off position.

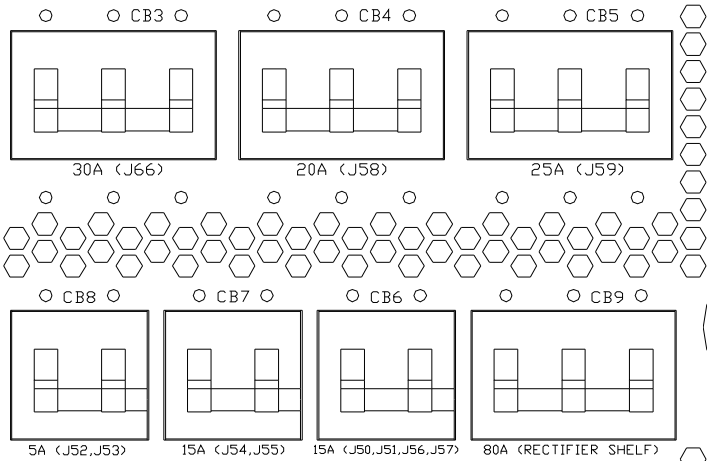


Figure 9 – Detail of AC load breakers CB3 – CB8

2.1.5 Fan breaker CB10

Turn on fan breaker CB10 located on the rear of the PDU, refer to Figure 2. Without this breaker turned on, the cabinet fans cannot power up. Refer to Figure 10 for a view of CB10. Note: Breaker CB10 shown below is in the off position.

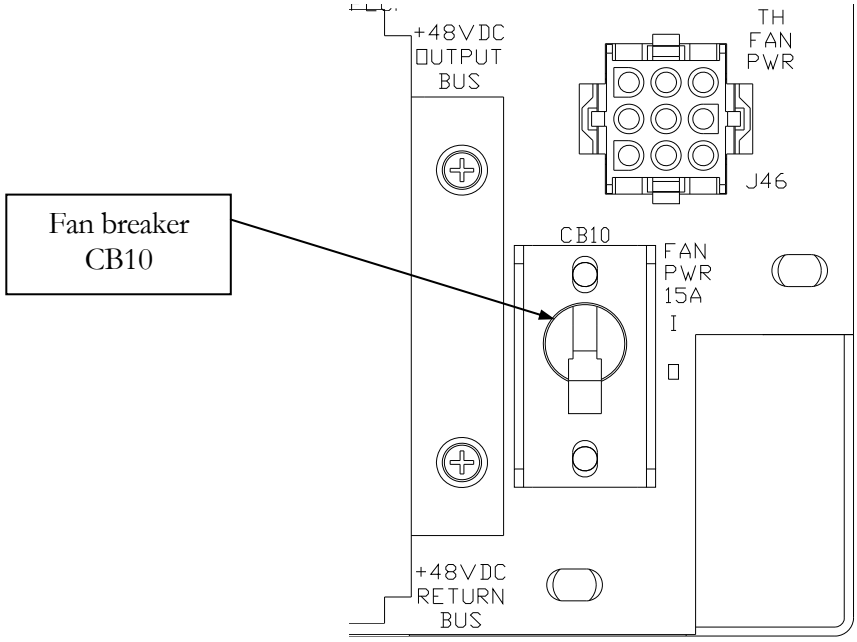


Figure 10 – Detail of Fan breaker CB10

2.1.6 48V Power Supply AC input breaker CB9

Turn the power supply AC input breaker CB9 located on the front panel of the PDU, refer to Figure 1. Once the breaker is turned on the AC input will be fed into the power supplies. Although the DC output of the power supplies will be off, you may hear a "clicking" noise. This noise is normal and is a result of the magnetics in the supplies operating in a no-load condition. Refer to Figure 11 for a view of CB9. Note: Breaker CB9 shown below is in the off position.

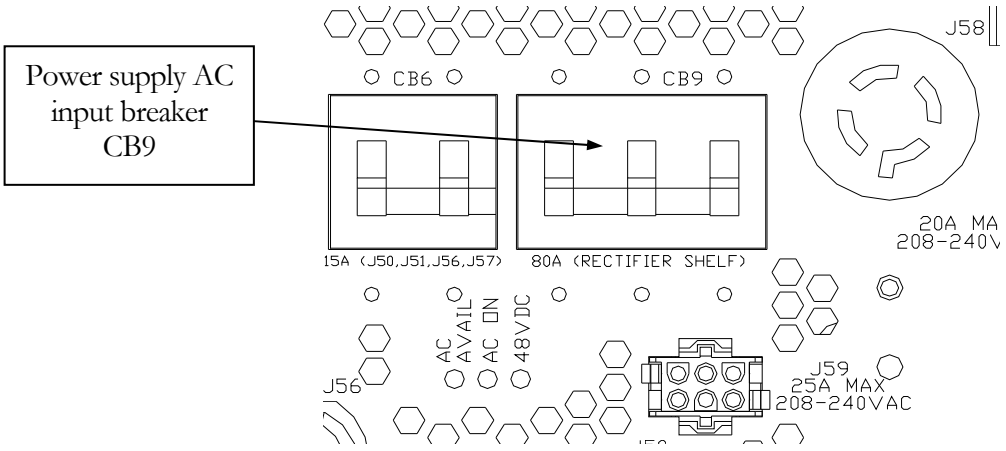


Figure 11 – Detail of Power supply AC input breaker CB9

2.1.7 48V DC bus turn-on

After all breakers have been turned on, the 48V DC bus can be enabled via the SMC controller. Once the 48V DC output is energized, the 48V On LED will be illuminated green. If the 48V does not turn on verify the power supply AC input breaker CB9 is turned on and power supplies are installed. Refer to Service Manual for troubleshooting.

2.2 System Functionality

Once the PDU is operational it is ready for system testing. If any portion of the system is found to be non functional or there are active alarms, refer to the Troubleshooting section in the Service Manual for assistance.

Chapter 3

3.0 User Manual

This section provides an overview of the PDU system functionality. Also detailed in this section are the system specifications, connector designations and connector pinouts.

3.1 System Overview

The PDU is designed to provide overcurrent protected AC distribution and a 48V DC output. The 48V DC output is derived from modular power supplies. The only cooling within the PDU are the fans on the individual power supply modules. Other features of the PDU include alarm indications, EMO shutdown feature, test points for troubleshooting and connections for the SMC controller. Refer to Figure 12 for an overall view of the PDU.

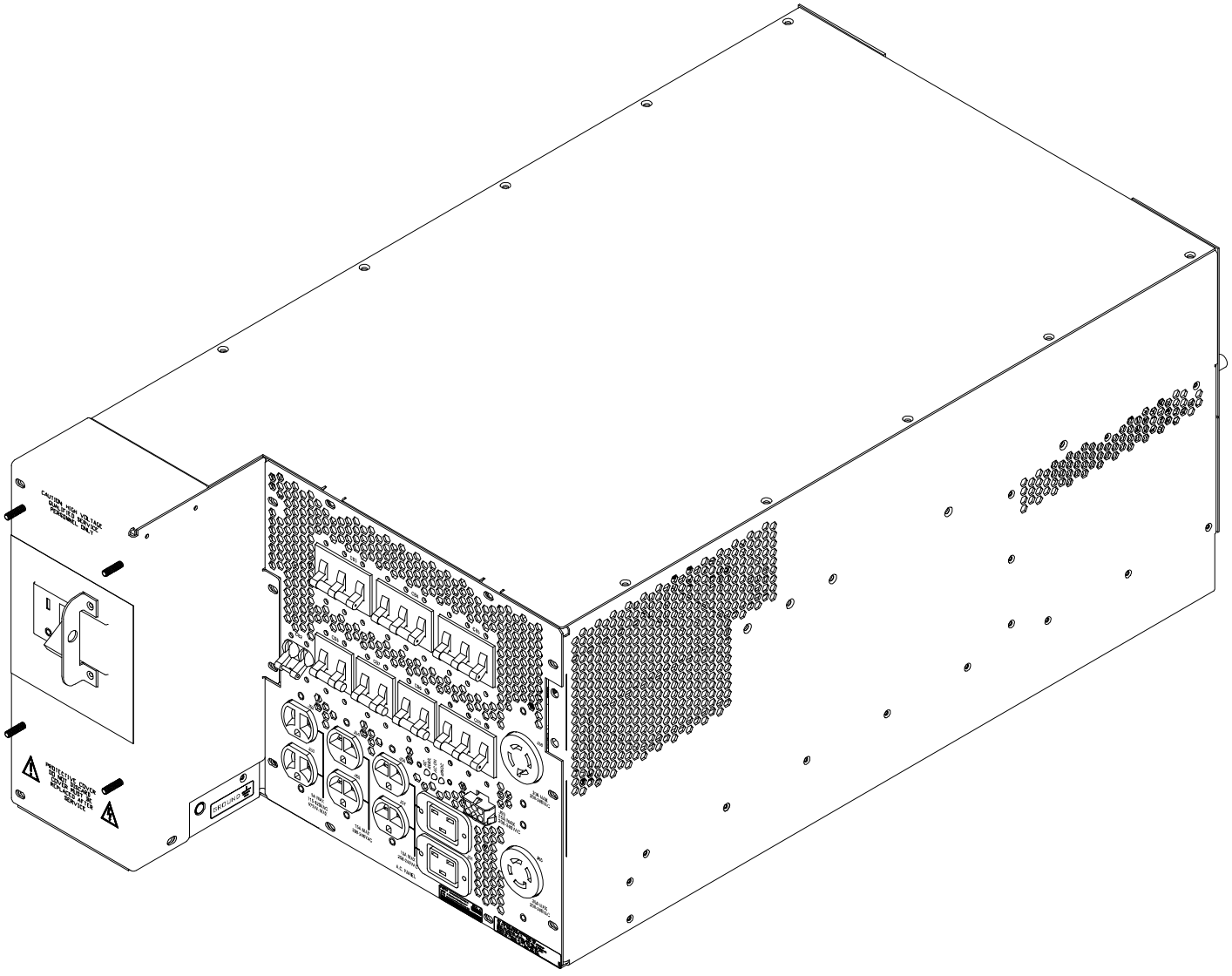


Figure 12 – Overall front view of PDU

3.2 AC Input

The AC input to the PDU can be configured as a 3 Phase Delta (with or without one leg grounded) or a 3 Phase Wye (Neutral not used). The AC feed must be capable of supplying a continuous current of 150A. Voltage and frequency ratings are specified below.

3.2.1 Voltage

Power Supply operating voltage range is 187 – 253 VAC.
AC input operating range is 200/208 VAC.

3.2.2 Frequency

Frequency range is 47 – 63 Hz.

3.3 EMO supply

The PDU contains a 24V EMO supply that is wired directly to the AC input (before AC input breaker CB1). This allows the EMO supply to be on as soon as the AC to the PDU is energized. The EMO supply is protected by a 3A breaker (CB2) on the front panel of the PDU. The EMO supply is used to power the interface PCB as well as the UVR (under voltage release) on the input circuit breaker CB1.

3.4 AC Input breaker

The AC input breaker is a three-phase 150A thermal magnetic circuit breaker and contains a UVR (under voltage release). The UVR will not allow the breaker to be turned on unless 24V from the EMO supply is provided to the breaker through the EMO loop. Conversely, the breaker will trip if the supplied 24V to the breaker drops below 16 volts or the EMO loop is opened.

3.4.1 Lock Out Feature

The AC breaker can be locked in the off position by installing a padlock through the hole in the lockout bracket. This will prevent anyone from turning on the PDU. Refer to Figure 13 for a view of a lock installed.

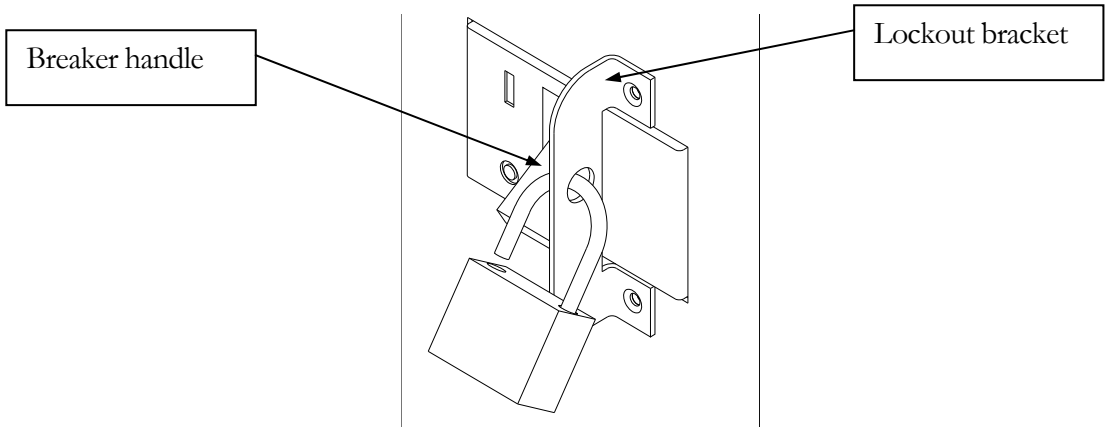


Figure 13 – AC breaker lockout

3.5 AC Distribution

All the AC distribution is provided on the front panel of the PDU. Refer to Figure 14 for a detailed view of the AC distribution. The AC loads are distributed as evenly as possible across the three phases. The system wiring is optimized for the least current phase imbalance for the system. For more detailed information on the AC distribution refer to the System Interconnect drawing.

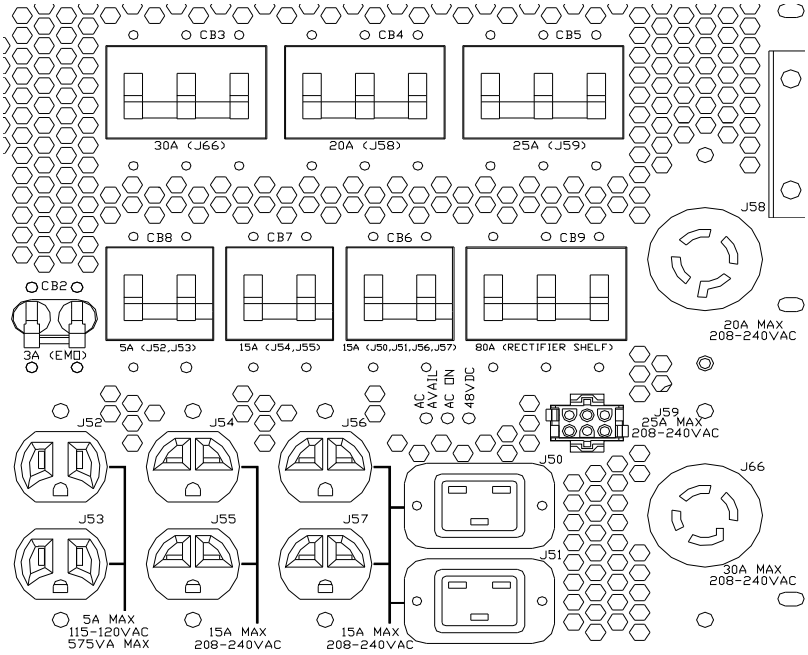


Figure 14 – Detail view of AC distribution

3.5.1 AC connectors

Table 5 below details the specifications on the AC distribution connectors.

Use	Outlet Number	Circuit Breaker	Breaker Rating (A)	# phases	Used Phases	Voltage (VAC)	Connector type
External IEC	J52	CB8	5	2	B & C	115	5-15R
External IEC (DSP)	J53						5-15R
External IEC Spare	J54	CB7	15	2	B & C	208-230	6-15R
External IEC Spare	J55						6-15R
SMC	J50	CB6	15	2	A & B	208-230	60320-C20
Spare	J51						60320-C20
Manipulator	J56						6-15R
Spare	J57						6-15R
Expansion Cabinet Vault	J58	CB4	20	3	A, B & C	208-230	L15-20R
CDU	J59	CB5	25	3	A, B & C	208-230	Amp mate-n-lok
DC-PM	J66	CB3	30	3	A, B & C	208-230	L15-30R

Table 5 – AC Distribution details

3.5.2 AC outlet J52/J53

As shown in Table 5 above, the output of AC outlet J52/J53 is 115VAC. This output is provided through a step-down transformer within the PDU. Refer to install section 1.1.2 in the service manual for proper configuration for this AC output.

3.5.3 J59 Pinout

Refer to Figure 15 and Table 6 below for details on CDU connector J59: Connector used is Amp Mate-N-Lok series, part number 770027-1 with sockets 193797-1 and key plugs 770377-1. Recommended mating part numbers are housing 770020-1 with pins 193796-1.

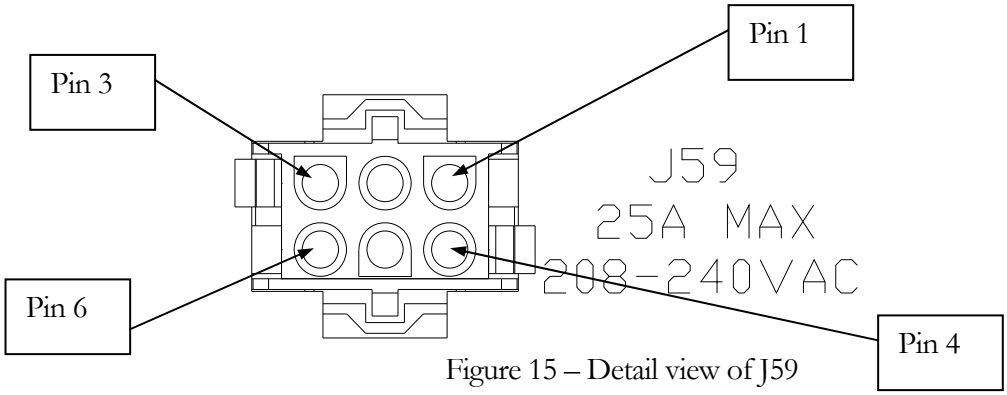


Figure 15 – Detail view of J59

Pin Number	Pin type	Description
1	Plug 770377-1	Key plug
2	Plug 770377-1	Key plug
3	Socket 193797-1	Ground
4	Socket 193797-1	Phase A
5	Socket 193797-1	Phase B
6	Socket 193797-1	Phase C

Table 6 – J59 Pinout

3.5.4 Internal AC wiring

Internal AC wiring is required for the AC feed to the EMO supply as well as the power supplies. Refer to Table 7 for details on the input AC wiring.

Use	Circuit Breaker	Breaker Rating (A)	# phases	Used Phases
EMO supply	CB2	3	2	A & B
Power supply 1	CB9	80	2	A & B
Power supply 2			2	B & C
Power supply 3			2	A & C
Power supply 4			2	A & C

Table 7 – Internal AC Distribution

3.6 Grounding

3.6.1 PDU Facility Ground Connection

The main AC input ground is located close to the input circuit breaker CB1. Refer to section 1.1.4 in the service manual for details on connections to the AC ground.

3.6.2 PDU Frame ground

A frame ground connection is provided on the PDU near the main AC input. Refer to section 1.1.5 in the service manual for details on connecting the frame ground.

3.6.3 DC Grounding

The 48V DC return is connected to chassis ground within the PDU. The connection is made between the power supply output and chassis on the power supply backplane (PCB the power supplies plug into).

3.7 DC Distribution

The PDU provides a main 48V DC output as well as a 48V output for system fans. The 48V power supplies in the PDU receive AC as soon as the main AC breaker (CB1) and power supply AC input breaker (CB9) are turned on. The 48V output is inhibited (off) until commanded to turn on by the SMC controller. The 48V output is inhibited (off) even if SMC is not present or is disconnected. While the power supplies are inhibited, you may hear a "clicking" noise. This noise is normal and is a result of the magnetics in the power supply operating in a no-load condition.

3.7.1 DC Ratings

Refer to Table 8 below for the DC output ratings of the PDU. Refer to Fan Power section 3.7.3 below for pinout details on the fan power connectors.

DC Output	Output connector	Max Current	Max Power
Main 48V Output	Bus bars	300 A	14,400 W
Testhead Fans	J46	7.5 A (running)	360 W
		9.5 A (locked rotor)	456 W
Cabinet Fan	J47	1.75 A (running)	84 W
		2.25 A (locked rotor)	108 W
Expansion cabinet fan	J48	1.75 A (running)	84W
		2.25 A (locked rotor)	108 W
Expansion cabinet power	J49	-	15 W

Table 8 – DC Output Ratings

3.7.2 48V DC Output

The main 48V output bus bars are located on the rear of the PDU under a protective cover. Refer to Figure 16 for a view of the DC output bus bars with the cover removed. The 48V output bus (positive) is on the top and the 48V return bus (negative) is on the bottom as shown in Figure 16. To prevent incorrect connections to the bus bars, the center-to-center spacing is 1.0" on the output bus and 1.375" on the return bus.

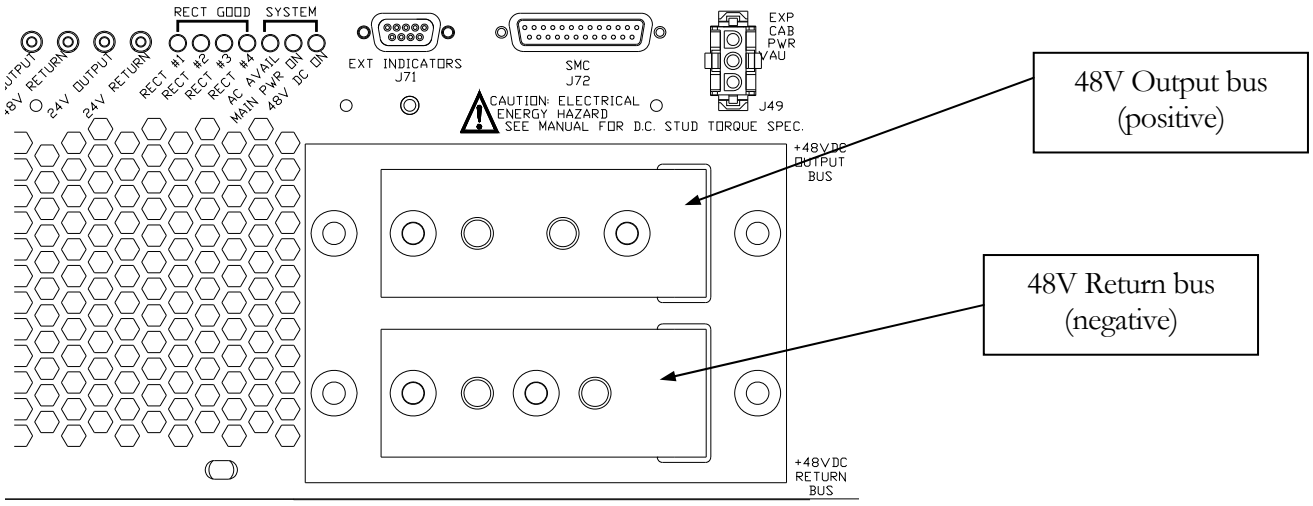


Figure 16 – 48V DC output bus bars

3.7.3 Fan Power

Connectors for the Test Head Fantray, system cabinet fan, expansion cabinet fan and expansion cabinet power vault are provided on the rear of the PDU. Refer to Figure 17 for a view of fan connectors J46, J47, J48 and expansion cabinet power vault connector J49. Pinout details for each connector are provided below. Power to the fan connectors is protected by a 15A circuit breaker CB10 located below the fan connectors as shown in Figure 17.

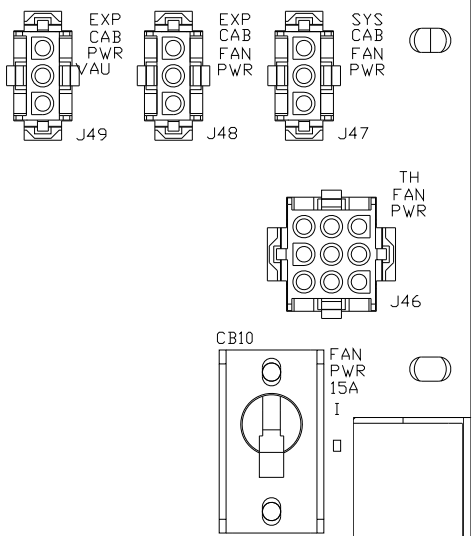


Figure 17 – Fan power connectors

3.7.3.1 Testhead Fan connector J46

Refer to Figure 18 and Table 9 below for details on testhead fan connector J46: Connector used is Amp Mate-N-Lok series, part number 770028-1 with sockets 194213-1 for fan power and sockets 1-770253-0 for the fan speed control wires. Recommended mating part numbers are housing 770021-1 with pins 194212-1 for fan power and pins 1-770252-0 for the fan speed control wires.

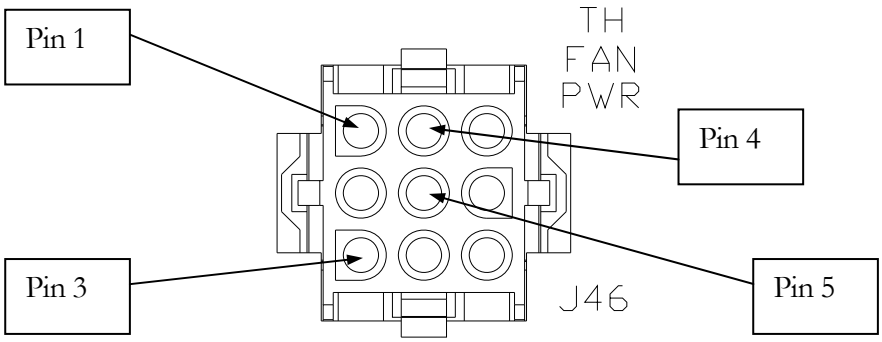


Figure 18 – Testhead fan connector J46

Pin Number	Pin type	Description
1	Socket 194213-1	+48V DC output
2	Socket 194213-1	+48V DC return
3	Socket 194213-1	Chassis Ground
4	Socket 1-770253-0	Fan speed control 1
5	Socket 1-770253-0	Fan speed control 1 return
6	-	No contact
7	-	No contact
8	-	No contact
9	-	No contact

Table 9 – J46 Pinout

3.7.3.2 Cabinet Fan connectors J47/J48

Refer to Figure 19 and Table 10 below for details on the cabinet fan connectors J47 and J48. The pinout for both connectors is identical. Connector used is Amp Mate-N-Lok series, part number 770025-1 with sockets 194213-1. Recommended mating part numbers are housing 770018-1 with pins 194212-1.

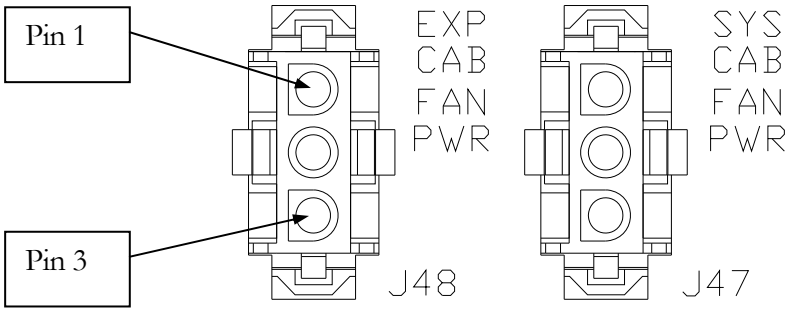


Figure 19 – Cabinet fan connectors J47/J48

Pin Number	Pin type	Description
1	Socket 194213-1	+48V DC output
2	Socket 194213-1	+48V DC return
3	-	No contact

Table 10 – J47/J48 Pinout

3.7.3.3 Expansion Cabinet power connector J49

Refer to Figure 20 and Table 11 below for details on the expansion cabinet power connector J49. Connector used is Amp Mate-N-Lok series, part number 770025-1 with pins 194212-1. Recommended mating part numbers are housing 770018-1 with sockets 194213-1.

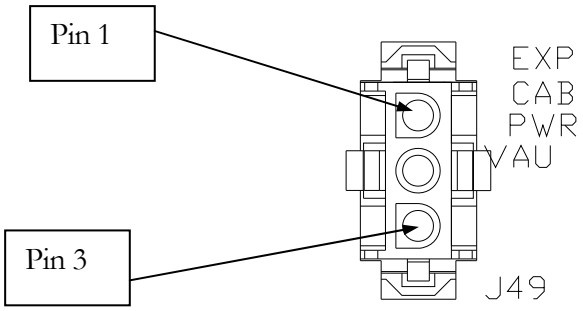


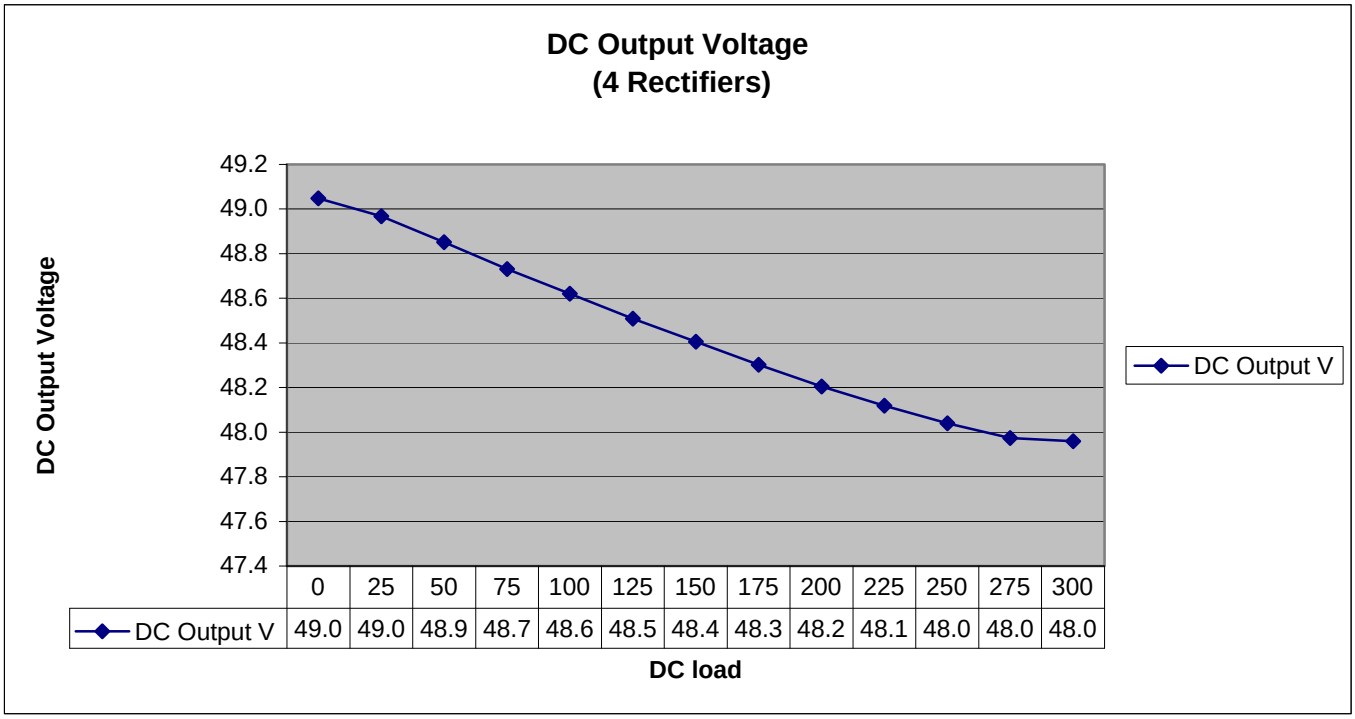
Figure 20 – Expansion cabinet power connector J49

Pin Number	Pin type	Description
1	-	No contact
2	Pin 194212-1	+48V DC return
3	Pin 194212-1	+48V DC output

Table 11 – J49 Pinout

3.7.4 48V DC Output Voltage

The output voltage will vary slightly with load. The output voltage of the PDU is 48V @ full load. Refer to Graph 1 below for the output voltage at various loads. The output voltage range over entire load range is 48.5V +/- 0.5V. External adjustments of the 48V output are not available.



Graph 1 – Output V vs. load graph

3.8 EMO loop

The PDU contains an EMO loop which will shut down the PDU if the loop is broken. When the EMO loop is broken CB1 is opened. The EMO supply still remains powered up. The EMO connectors on the PDU are J67, J68, J69 and J70 and are located on the rear of the PDU. A jumper is provided in J70 on all PDU's since an external power vault is not always used. When the EMO loop is broken, the 24V EMO voltage to the UVR on the input breaker is lost resulting in the circuit breaker tripping which shuts down the PDU. The EMO loop connectors used for J67, J68 and J69 are housing 770024-1 with sockets 1-770008-0. Recommended mating connector for J67, J68 and J69 is housing 770017-1 with pins 1-770007-0. The EMO loop connector used for J70 is housing 770027-1 with sockets 1-770008-0 and1-770006-0. Recommended mating connector for J70 is housing 770020-1 with pins 1-770007-0. Refer to Figure 21 and Table 12 below for details on the EMO connectors.

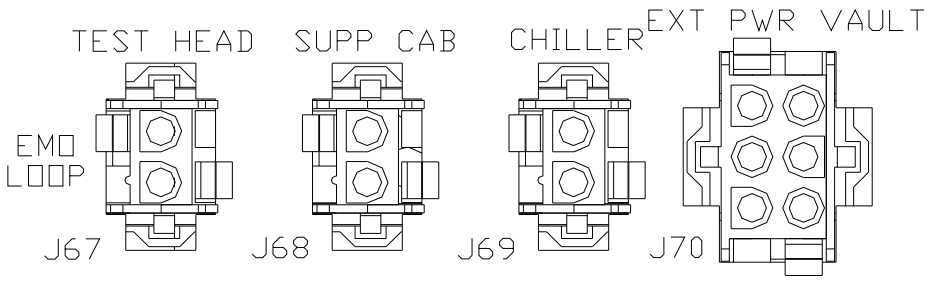


Figure 21 – EMO loop connectors

EMO location	Connector number	Supplied with PDU
Test head	J67	No
Support Cabinet	J68	No
Chiller	J69	No
External Power Vault	J70	Yes

Table 12 – EMO connectors

3.9 Monitor & Control

Monitoring and control of the PDU is accomplished via the interface PCB mounted at the rear of the PDU. The interface PCB contains test points, alarm LED's and connections for external alarms and the SMC. The interface PCB also contains a filter for the 48V DC fan output and connections for the EMO loop. See below for details on the interface PCB. Refer to Figure 22 for a detailed view of the interface PCB connections on the rear of the PDU.

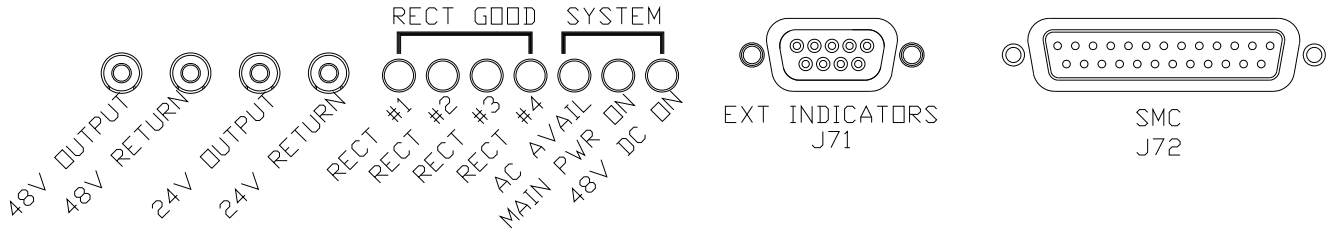


Figure 22 – Interface PCB connections

3.9.1 SMC Interface J72

The SMC interface connector is J72 on the PDU and is a 25-pin D-sub connector. The pinout is detailed in Table 13 below. Details provided below for the 48V current monitor, 48V DC enable, and 48V DC power fault signals.

Pin Number	Signal	Notes
1	Not-Used	
2	Fan Speed Control 1	From J46 pin 4
3	PUMA ID bit	Jumper to J72 pin 4
4	Common	Jumper to J72 pin 3
5	48V current monitor	Output to SMC
6	48V current monitor return	Output to SMC
7	Not-Used	
8	Not-Used	
9	Not-Used	
10	Not-Used	
11	5V from SMC to PDU	Input from SMC
12	Not-Used	
13	48V DC Enable	Input from SMC
14	Not-Used	
15	Not-Used	
16	Not-Used	
17	Not-Used	
18	Not-Used	
19	48V DC power fault	Output to SMC
20	48V DC power fault return	Output to SMC
21	Not-Used	
22	Not-Used	
23	Not-Used	
24	Fan Speed Control 1 return	From J46 pin 5
25	48V DC Enable return	Input from SMC

Table 13 – J72 Pinout

3.9.1.1 48V DC Enable

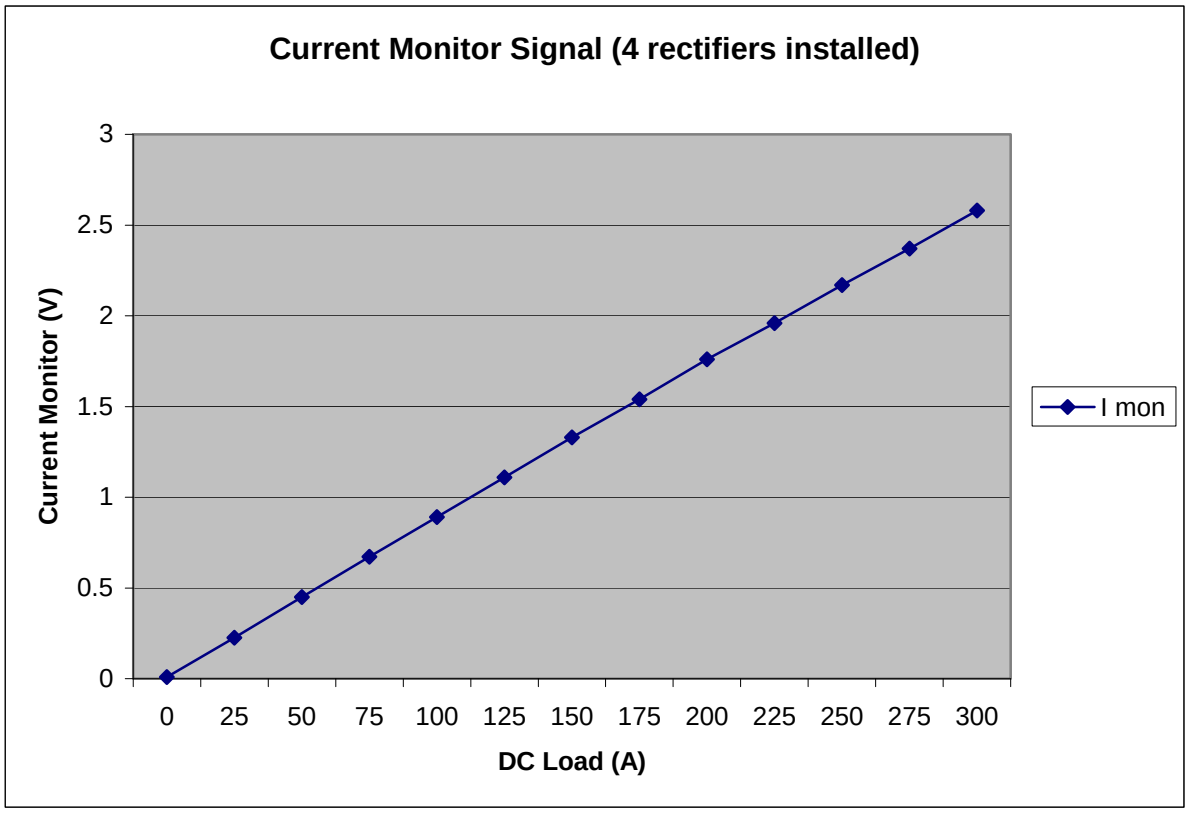
The 48V DC enable is a signal from the SMC to enable the 48V DC output. With no connections to J72, the 48V DC output will be off. To enable the 48V DC output, a 5V signal must be applied between pin 13 (positive) and pin 25 (negative) on J72. The 5V signal drives the diode side of an optocoupler to enable the 48V DC output. The 48V DC enable must be capable of providing a minimum current of 12mA to enable the power supplies.

3.9.1.2 48V DC Power Fault

The 48V DC power fault is a common fault signal for all the 48V power supplies installed in the system. The fault signals of all the power supplies are tied together so any single fault will generate a 48V DC power fault signal. The 48V DC power fault will also be generated when no rectifiers are installed. Rectifier good LED's are provided for visual indication of a failed power supply. The 48V DC power fault output is the transistor side of an optocoupler. Maximum recommended current draw through the optocoupler is 3mA. A 48V DC power fault will be active when the 48V bus is disabled or when any of the power supplies have failed.

3.9.1.3 DC current monitor

The interface PCB provides a DC current monitor signal to the SMC controller. The current monitor signal is designed to produce 2.7V across a 158 Ohm resistor with a load of 300A. Refer to Graph 2 below showing the DC current monitor signal for various load conditions.



Graph 2 – Current monitor signal vs. load graph

3.9.2 LED Indicators & Alarm outputs

LED indicators are provided on the interface PCB for AC available, Main power on, 48V DC on, and power supply status. LED's for AC available, Main power on and 48V DC on are also provided on the front of the PDU. Alarm outputs are also provided for AC available, Main power on and 48V DC on connector J71. Refer to Figure 22 for a view of the LED indicators and alarm output connector J71 on the rear of the PDU.

3.9.2.1 Alarm output connector J71

The alarm output connector is J71 and is a 9-pin D-sub connector. These alarm outputs can be used for external LED's. Refer to Table 14 below for the pinout on J71. The alarm outputs are open collectors as shown in Figure 23. Logic level for all alarms is TTL high = Normal, TTL low = Fault. The maximum recommended current through the transistor is 50mA.

Pin Number	Signal
1	AC Available
2	Not-Used
3	Main Power On
4	48V DC On
5	Not-Used
6	AC Available return
7	Not-Used
8	Main Power On return
9	48V DC On return

Table 14 – J71 Pinout

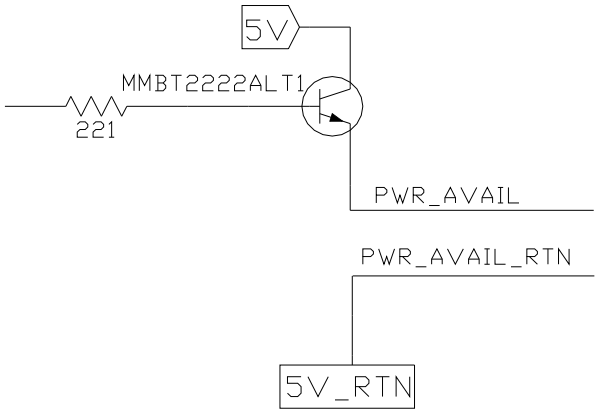


Figure 23 – Alarm output (typical for all alarms)

3.9.2.2 AC Available

The AC available signal monitors phases B & C of the AC from the input side of circuit breaker CB1. The AC available LED's will be illuminated green provided that both EMO breaker CB2 is on and the AC voltage is above 170 VAC.

WARNING: IF EMO BREAKER IS OFF, THERE WILL BE NO INDICATION AC IS PRESENT WITHIN THE PDU. WHENEVER WORKING ON THE PDU ALWAYS FOLLOW LOCK OUT TAG OUT PROCEDURES AND MEASURE FOR VOLTAGES BEFORE PERFORMING ANY WORK.

3.9.2.3 Main Power On

The Main power on signal monitors phases B & C of the AC on the output side of circuit breaker CB1. The Main power on LED will be illuminated green provided that both input breaker CB1 is on and the AC voltage is above 170 VAC.

3.9.2.4 48V DC on

The 48V DC on signal monitors the 48V DC output. The 48V DC on LED will be illuminated green whenever the 48V DC output voltage is above 44 VDC.

3.9.2.5 Power Supply LED's

The interface PCB contains LED's to show the status of the power supplies. When the 48V DC bus is enabled, all installed power supplies should have their corresponding LED illuminated green. If a power supply is not installed or failed, the corresponding LED will be off. All power supply LED's will be off when the 48V bus is inhibited (off). Refer to Figure 22 for a view of the rectifier good LED's.

3.9.3 Test Points

Test points are provided on the interface PCB as shown in Figure 22. There is one set of test points for the 24V EMO supply output and one set for the 48V DC output. The test points are protected against short circuit by re-settable fuses. For all test points, red is positive and black is negative.

3.9.4 Thermostat

A normally closed thermostat is located on the interface PCB which will shut down the PDU due to extreme temperatures. The thermostat is rated 45°C +/- 5°C and is installed in the positive leg of the 24V EMO power to the EMO loop. If the temperature reaches the thermostat set-point, the thermostat will open and trip input breaker CB1 resulting in the shut down the PDU. The thermostat will automatically reset after the temperature has reached about 35 degrees C, but the PDU will remain off since the input breaker will need to be turned on. The thermostat should re-set within 1 minute as long as the temperature is 4 degrees below the trip range (trip range is 40C - 50C). The PDU will not be able to be turned on until the thermostat has reset. As shown in Figure 24, the thermostat is located on the interface PCB, behind the test points. To check if the thermostat is open/closed, refer to section 2.1 (item 7) of the Service Manual.

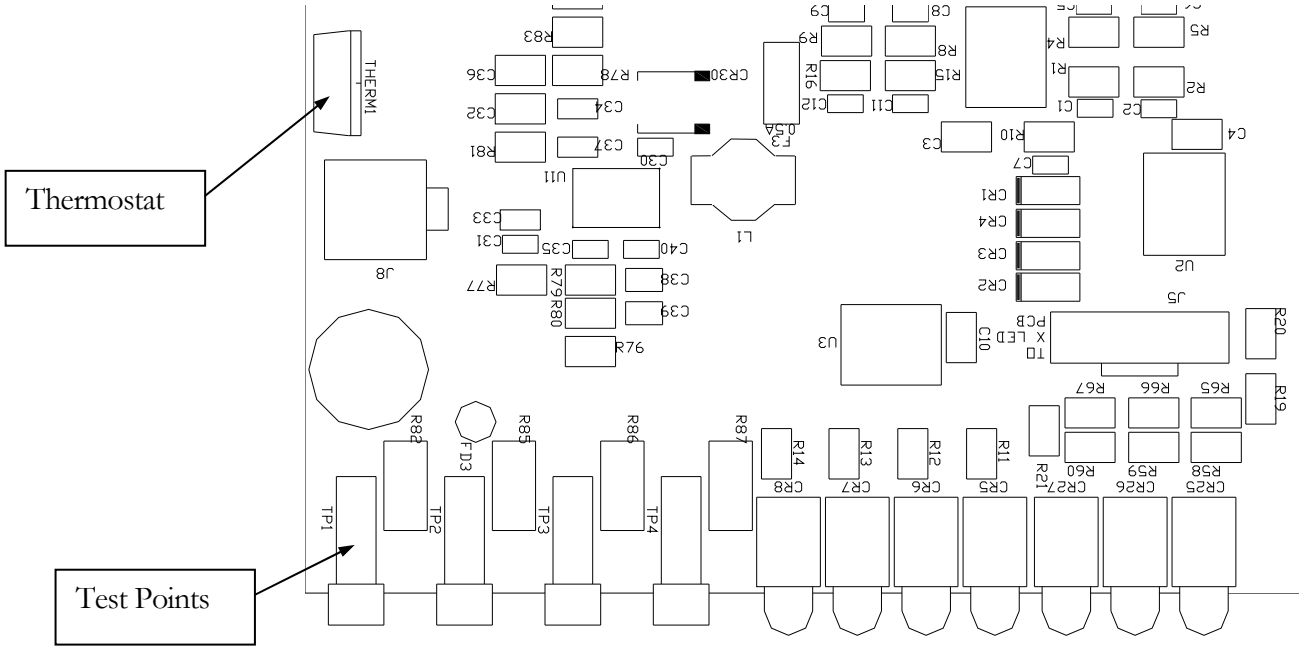


Figure 24 – Thermostat location on interface PCB

Chapter 4

4.0 System Ratings Summary

4.1 AC Input

Description	Rating
AC input	3 phase delta (3 wire plus ground) or 3 phase wye (3 wire plug gnd, neutral not used)
PDU AC Input Range	200/208 VAC
AC frequency	47 – 63 Hz
Power Factor	>.95
System efficiency	> 90%
Max AC input current (@187VAC input full load)	110 A
AC circuit breaker rating	150 A

4.2 AC Distribution

Outlet Number	Circuit Breaker	Breaker Rating (A)	AC type	Voltage (VAC)	Frequency
J52/J53	CB8	5	Single phase	115	47 – 63 Hz
J54/J55	CB7	15	Single phase	208-230	47 – 63 Hz
J50/J51/J56/J57	CB6	15	Single phase	208-230	47 – 63 Hz
J58	CB4	20	Three phase	208-230	47 – 63 Hz
J59	CB5	25	Three phase	208-230	47 – 63 Hz
J66	CB3	30	Three phase	208-230	47 – 63 Hz

4.3 DC Distribution

Output connector	Circuit Breaker	Breaker Rating (A)	Max Current
Bus bars	-	-	300 A
J46	CB10	15 A	7.5 A (running)
			9.5 A (locked rotor)
J47			1.75 A (running)
			2.25 A (locked rotor)
J48			1.75 A (running)
			2.25 A (locked rotor)
J49			-

4.4 Mechanical Ratings

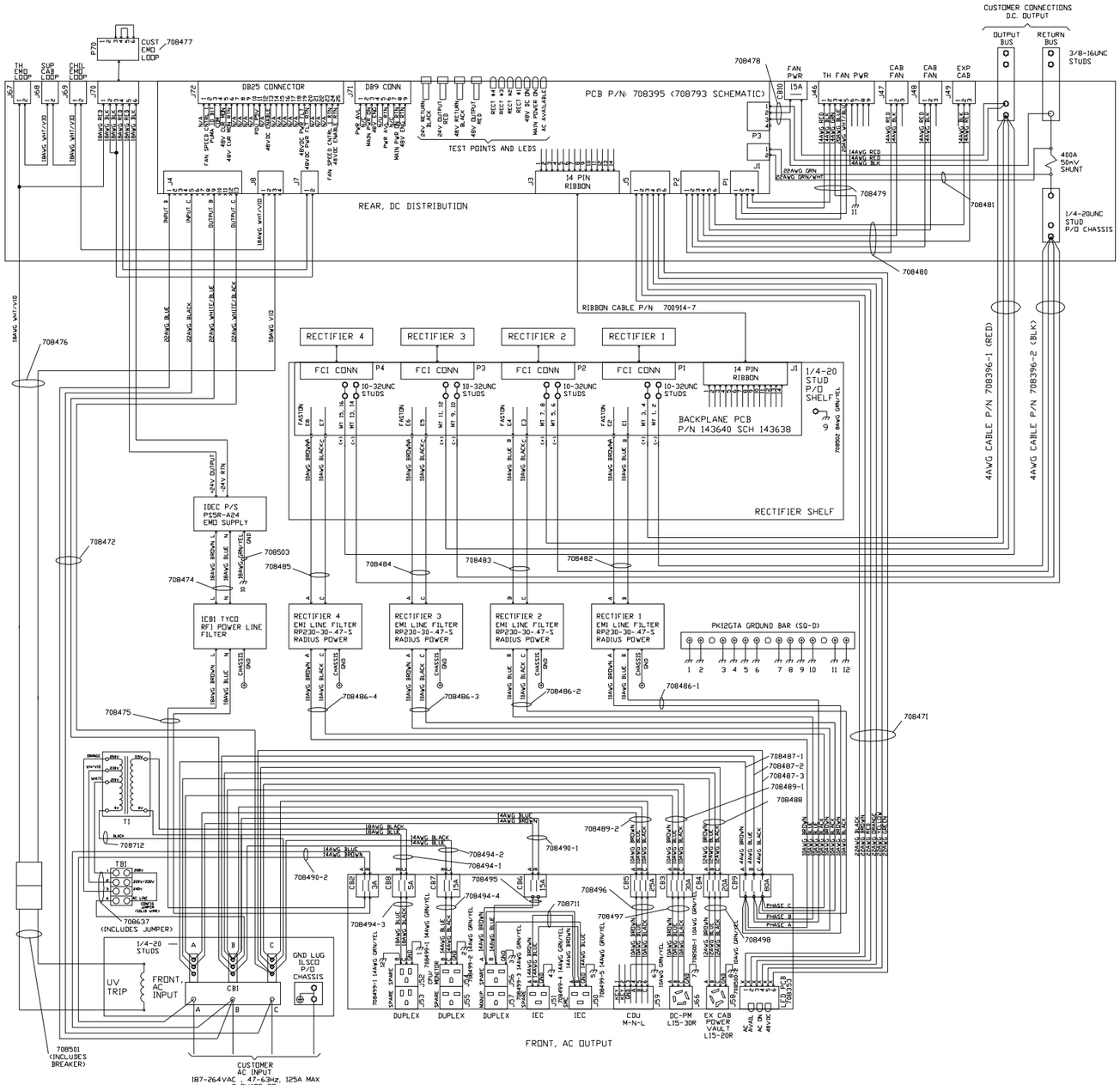
Description	Rating
PDU Dimensions	19"W x 35.5"D x 12.1"H
PDU Weight (including 4 power supplies)	125 Lbs
Individual power supply weight	6 Lbs

4.5 Environmental Ratings

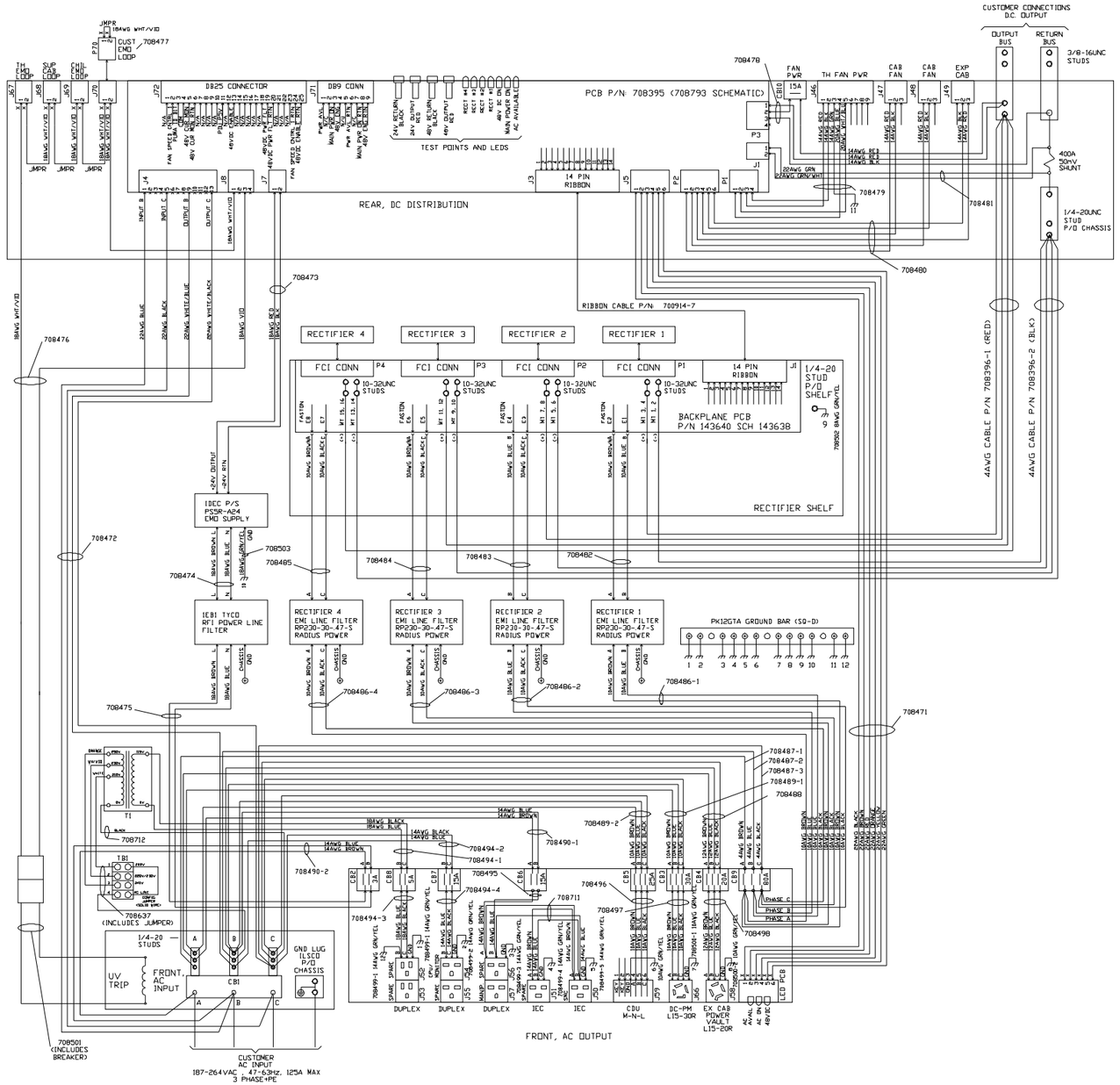
Description	Rating
Temperature range (operating)	20C – 30C
Temperature range (storage)	-40C – 85C
Humidity (operating)	30% - 70% non condensing
Humidity (storage)	5% - 95% non condensing
Ambiant Noise	62dBa

Chapter 5

5.1 System Interconnect for revision A or higher units



5.2 System Interconnect for revisions prior to revision A



Chapter 6

6 Vendor Support and Service

6.1 Sales Support

All sales support for purchases, proposals, spares, etc. is provided from our Hackettstown, New Jersey facility. Normal hours of operation are 8:00 a.m. to 5:00 p.m. Monday through Friday. If you should have an urgent requirement for products or services after these hours, a message may be left with our answering service at (908) 979-0088, and one of our representatives will return your call.

6.2 Service for GFS and Customers

Contact 1-900-Teradyne as with any other Teradyne part.

6.3 Service Support for GCS

TDI provides 24-hour response to your technical service needs utilizing our infrastructure of offices and representatives strategically located throughout the United States. Should an emergency arise during normal business hours, please call (908) 979-0088 and request service or technical assistance.
If you are calling after our normal business hours, please use one of the following technical assistance numbers:

1-888-575-8875
Or when calling internationally
1-973-283-7236

Your call will be returned as soon as possible by one of our technical service technicians.
As stated previously in the General Terms and Conditions, all components of the TDI DC power plant are warranted to be free of defects in material and workmanship for a period of two (2) years from date of shipment to the original purchaser. In the unlikely event a component of the TDI DC power plant should fail, the following procedures should be followed to expedite the repair and/or replacement of the failed module.

1. Contact the authorized TDI repair facility at the address and phone number shown below to obtain a **Return Authorization Number** for the failed unit.

TDI - Telecommunication Power Systems Division
RMA# _____
36 Newburgh Road
Hackettstown, NJ 07840
(908) 979-0088

2. Please have the following information available when you call:
- Description of component including serial no. (If available)
- In service date
- Nature of the failure

3. The TDI authorized factory representative will determine the method of return/replacement based upon the information provided.
4. Ship the failed unit back to the designated repair facility per the instructions from the authorized representative, transportation charges PREPAID.

Components which fail after the warranty period has expired, or which fail due to misuse or abnormal operating conditions, will be repaired at the purchaser's expense. In such cases, an estimate will be made and submitted prior to repair. In cases where it is determined that no fault or malfunction exists in the returned unit, there will be a nominal handling and verification charge.

Chapter 7

7 Revision History

Revision	ECN #	Description of Change	Date	Change By	Checked By
P1	-	Created Document	08/13/07	FQ	
P2	-	Updated per Teradyne mark-ups Change to User Manual only Updated interconnect drawing Updated front views of PDU to show new breaker arrangement	11/27/07	FQ	
P3	-	Updated per Teradyne review of P2.	12/4/07	FQ	
P4	-	Change input breaker and AC input from 125A to 150A. Added AC line configurations. Correct typing & table of contents field.	12/5/07	FQ	
P5	-	Change current monitor signal from 2.5V to 2.7V @ 300A. Update Graph 2 based on data taken from updated PDU.	1/22/08	FQ	
P6		Added internal links, added section for Service Support – GFS and customers to contact 1-800-Teradyne	5/4/08	AO	
A	28901	Update EMO loop information is 3.8, Figures 2, 5 & 21. Update interconnect drawing for new EMO loop. Release to rev A.	5/14/08	F.Q.	
		Changed AC input range to 200/208 VAC			

7.1 Document updates

This document is supplied to Teradyne for complete review. Teradyne can edit this document as needed to incorporate into their system documentation. TDI will maintain the revision of this document and make updates agreed between Teradyne and TDI when questions arise about the content or lack thereof.

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Subject:	
Author:	tdi
Keywords:	
Comments:	
Creation Date:	5/14/2008 11:25:00 AM
Change Number:	12
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Last Saved By:	naponem
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