

Installation Manual

OptiDrive DC Remote Power System



Contents

Background	2
General Guidelines.....	2
Hardware Overview	3
19” Rack Recommendation	4
AC Input Wiring.....	5
PDS12 Shelf AC input Connector	5
PD4000 AC Input Connector	6
DC Output Connections	7
Output Connections.....	7
Dimming Control.....	8
0-10V / 0-24V Control.....	8
Appendix A: AC Input Ratings	9
Reccomended Breaker Size.....	9
PD4000 input voltage range	9
PDS12 shelf input voltage range.....	9
Appendix B: Input Buss Bars	10
PD4000 Input Bus Bars.....	10
PDS12 Shelf Input Bus Bars.....	12
Appendix C: Output Ratings.....	13
Appendix D: Signal Connector Pinouts	14
PD4000 Module	14
PDS12 Shelf	15

Background

This manual provides instructions for the installation and electrical interconnections of the OptiDrive DC Remote Power System. Please contact customer support with any installation questions.

Thrive Agritech's OptiDrive DC Remote Power System has been designed specifically to provide a centralized current source for medium to large scale LED lighting and horticulture applications. The unique input design allows all standard AC inputs 208 VAC to 600 VAC from single to 3 phase sources. The output of each 4-kW module provides flicker free current source from 0 to 16 A at an output voltage range between 100 VDC to 300 VDC. High nominal operating voltage provides the benefits of lower cost standard wiring and higher efficiency with minimal voltage drop over long distance.

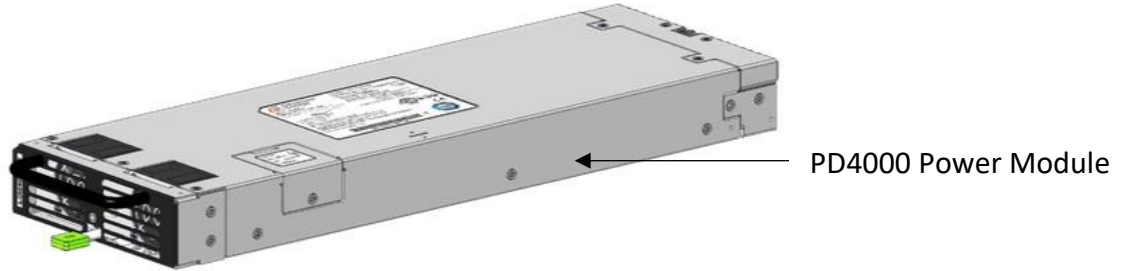
The 19" rack mount shelf is designed for hot plug replacement of the 4 kW modules insuring high reliability and simple maintenance.

General Guidelines

- *All power should be off before installation.*
- *Follow all National Electrical Codes (NEC) and local codes.*
- *Safety Standard of UL62368-1 must be complied with.*
- *Use only safety agency approved products such as circuit breakers, fuses, AC input cords and DC output wires.*
- *Maximum ambient around the power supply shall not exceed +50C*
- *The power supply shall not be located in the grow room or wet environment.*
- *Do not connect load (Lights) until power supply has been confirmed to be set to the correct configuration.*

Hardware Overview

The PD4000 is a hot-swappable, pluggable power module for use with the PDS12 shelf and RK1833KM 19" rack.



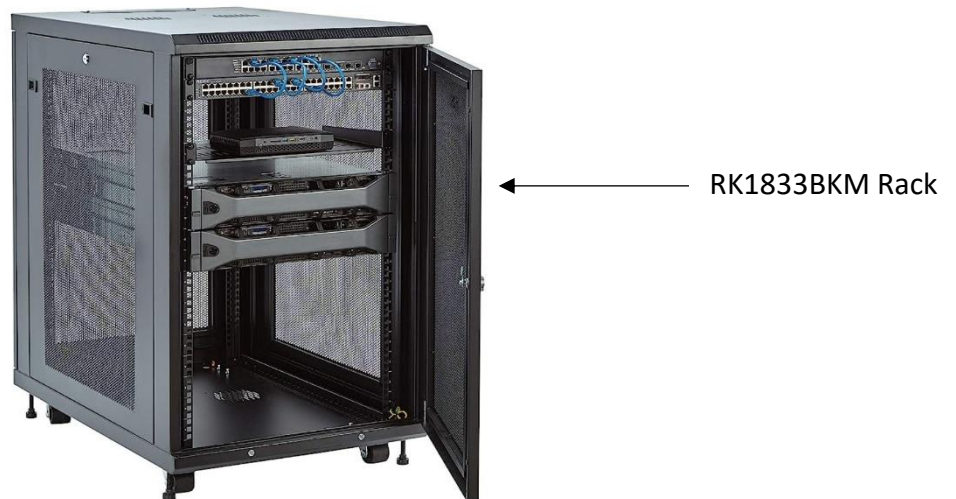
PD4000 Power Module

PD4000. 4,000W high voltage remote DC driver



PDS12 Shelf

PDS12. Shelf holds PD4000 modules



RK1833BKM Rack

RK1833BKM. 19" 18U Server Rack Cabinet holds PDS12 Shelves

19" Rack Recommendation

The recommended rack cabinet for the PDS12 shelves is a StarTech 19" 18U Server Rack Cabinet model number RK1833BKM. A link to the rack cabinet is [here](#).

It is recommended to mount the PDS12 shelves in a 19" server rack. Do not stack more than two PDS12 shelves. The recommended racking is shown below. Use one, full width support shelf for every two PDS12 shelves. Leave 3 feet of clearance in the front and rear of the rack to airflow and maintenance access.



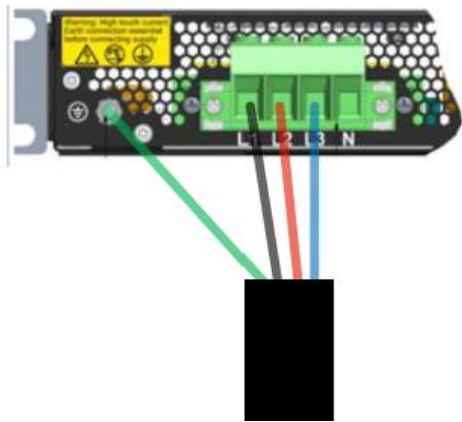
Recommended racking of PDS12 shelves in RK1833BKM Server Rack Cabinet

AC Input Wiring

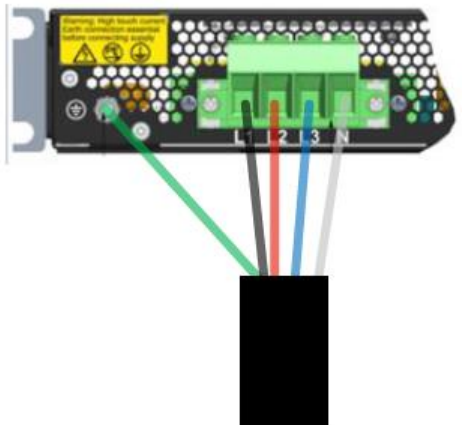
Installation shall be in accordance with the local electrical codes (NEC for USA) and the installation shall be done by a qualified electrician.

PDS12 Shelf AC input Connector

The PDS12 shelf AC input connector is a 3-phase input connector. Insert the AC input wires into the connector shown in the figures below. The connector will accept 3-phase 3-wire and 3 phase, 4-wire (3 phase + neutral). AC input breaker or disconnect must be located within 10 feet of the PDS12 shelf.



PDS12 Shelf AC Input Connector 3-Phase, 3 Wire



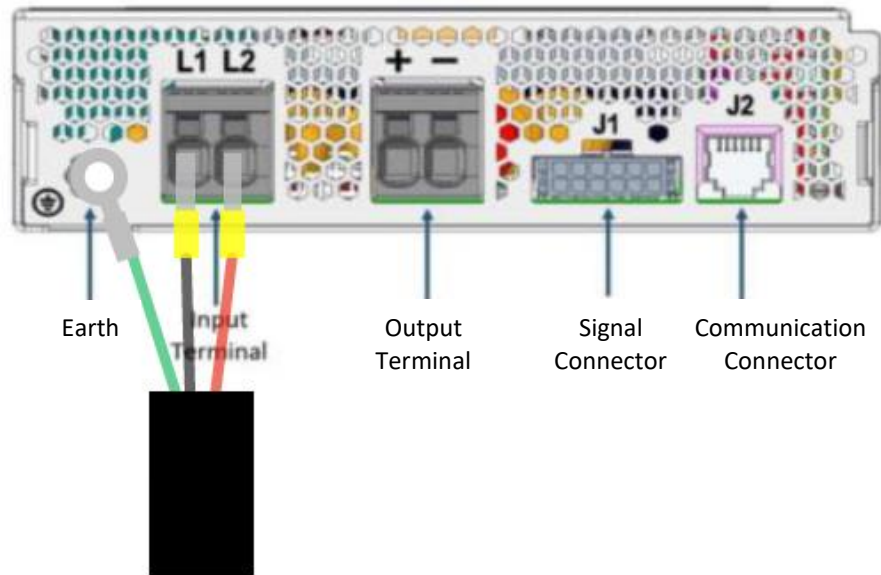
PDS12 Shelf AC Input Connector 3-Phase, 4 Wire

PD4000 AC Input Connector

The PD4000 module is a single-phase AC input. Insert the AC input wires into the connector shown in the figure below. For stranded wires, use ferrules on the L1 and L2 connection. Use a 4 mm ring terminal on the GND connection.

L1/L2 Ferrules reference PN PANDUIT FSD76-8-D or similar.

Earth GND connection reference PN STA-KON B14-4 or similar.



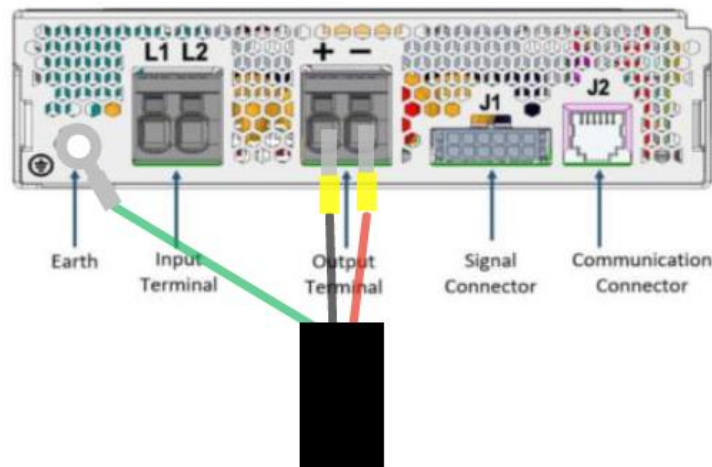
PD4000 AC Input Connector

DC Output Connections

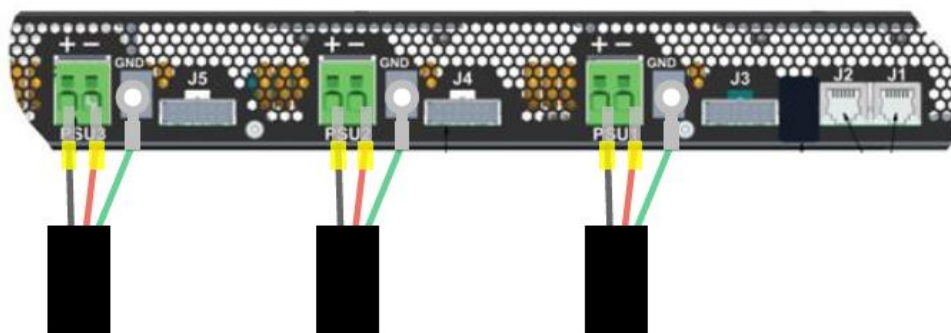
The PD4000 module is 4000W, 250VDC, 16A nominal and can operate as a programmable voltage source or current source. The voltage or current can be programmed using 0-10V controls or MODBUS digital control.

Output Connections

The wire size from the PD4000 to the lights is dependent on the distance to the lights, the power rating of the lights and the local electrical code. The output terminal on the PD4000 and PDS12 shelf are push-in, spring connections. When using stranded wire, a ferrule must be used. Ferrules reference PN PANDUIT FSD76-8-D or similar. When the lighting system has an earth ground connection, connect the ground wire to the GND stud with a 4 mm ring terminal PN STA-KON B14-4 or similar.



PD4000 Output Connector



PDS12 Output Connectors

Dimming Control

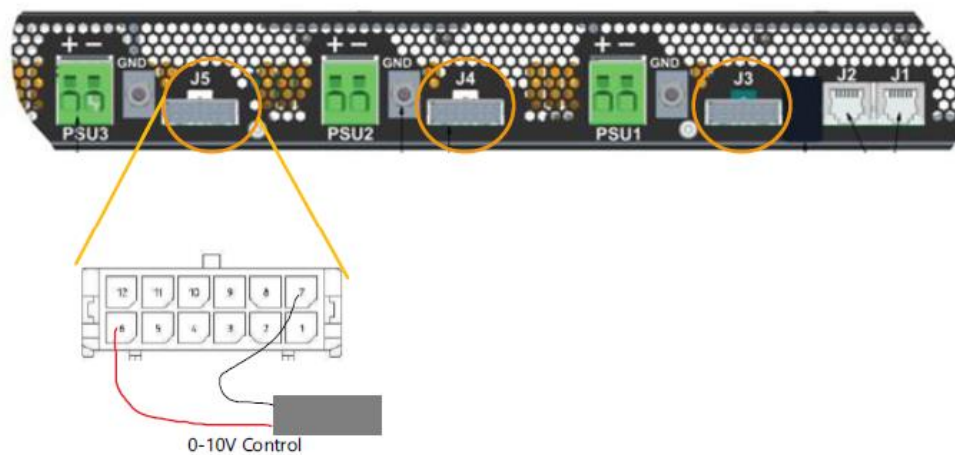
The PD4000 power module and PDS12 Shelf support traditional 0-10V and 0-24V dimming and MODBUS RTU digital control.

0-10V / 0-24V Control

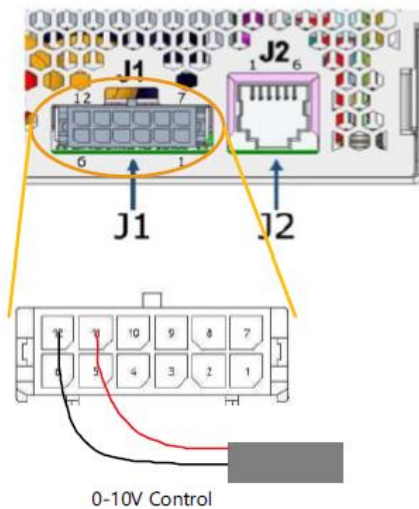
Each module can be independently controlled or connected to a common controller using either the 0-10V or 0-24V standard. Connect the controller using a Molex Micro-Fit connector with 18 AWG – 22 AWG twisted pair wire or shielded wire.

Molex 12 position connector: PN 0430251208

Female Crimp Terminal: 43030



PDS12 Shelf 0-10V Control



PD4000 Shelf 0-10V Control

Appendix A: AC Input Ratings

Reccomended Breaker Size

PDS12 Shelf 3-Phase AC input

Nominal Vin (Vac)	Range (Vac)	Remarks	Recommended Breaker
480	432 - 528	Derived from 3P 480 Vac Mains (Line to Line)	20
380	342 - 418	Derived from 3P 380 Vac Mains (Line to Line)	25
346	311 - 381	Derived from 3P 600 Vac Mains (Line to Neutral)	30
208	187 - 229	Derived from 3P 208 Vac Mains (Line to Line)	50

PD4000 Module 1-Phase input

Nominal Vin (AC)	Range (Vac)	Remarks	Recommended Breaker
220	198 - 242	Derived from 1P 240 Vac Mains	15
240	216 - 264	Derived from 1P 220 Vac Mains	15

PD4000 input voltage range

LOW INPUT LINES

208Vac (nominal) Voltage Range: 187Vac to 230Vac

220Vac (nominal) Voltage Range: 198Vac to 242Vac

240Vac (nominal) Voltage Range: 216Vac to 264Vac

HIGH INPUT LINES

347Vac (nominal) Voltage Range: 312Vac to 382Vac

380Vac (nominal) Voltage Range: 342Vac to 418Vac

480Vac (nominal) Voltage Range: 432Vac to 528Vac

PDS12 shelf input voltage range

LOW INPUT LINES

208 Vac (nominal) Voltage Range: 187 – 229Vac

HIGH INPUT LINES

346 Vac (nominal) Voltage Range: 311 – 381Vac

380 Vac (nominal) Voltage Range: 342 – 418Vac

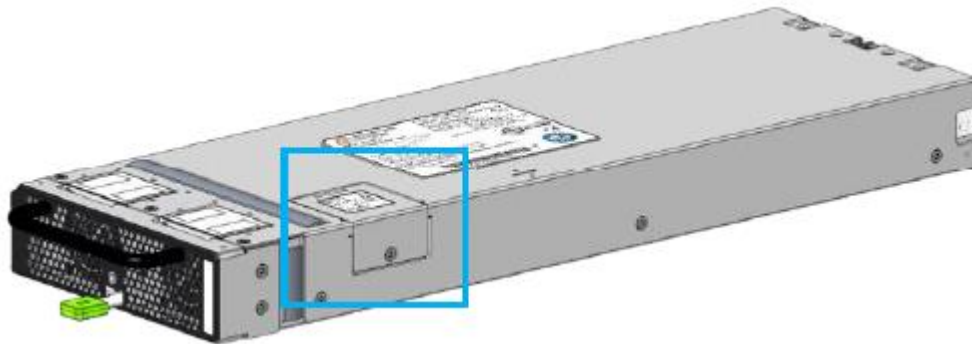
480 Vac (nominal) Voltage Range: 432 – 528Vac

Appendix B: Input Buss Bars

The PD4000 module and PDS12 shelf have configurable inputs to accommodate low line and high line input voltage ranges.

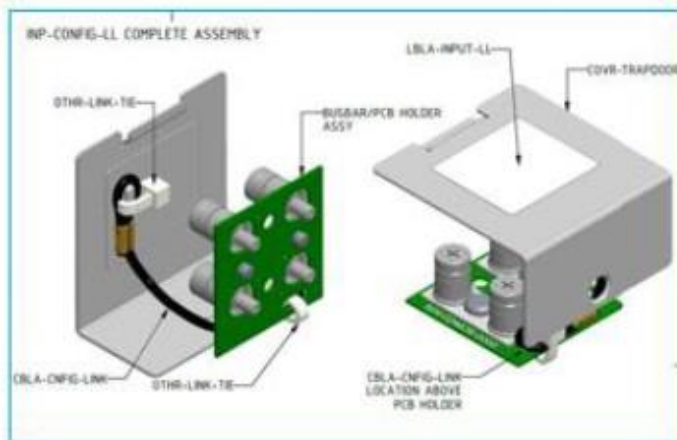
PD4000 Input Bus Bars

The PD4000 input voltage bus bars are located inside the chassis opening shown. The bus bar configuration is printed on the opening cover.

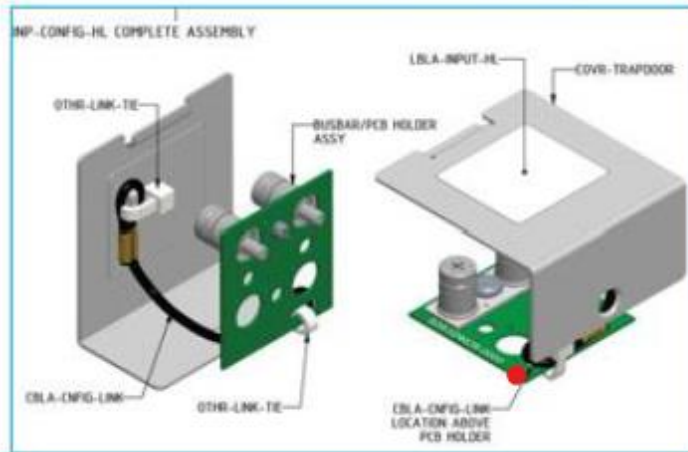


PD4000 AC input bus bar location

There are two options for module buss bars, low line (parallel) and high line (series).



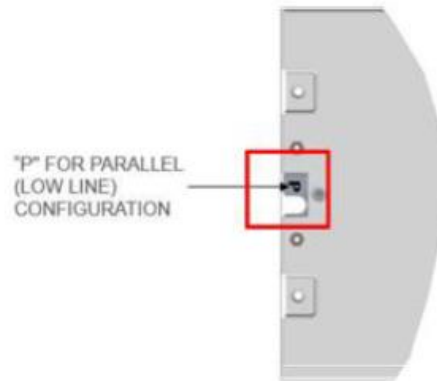
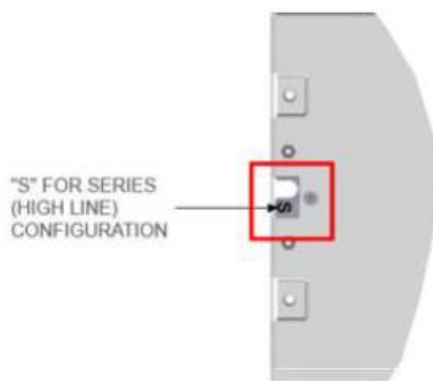
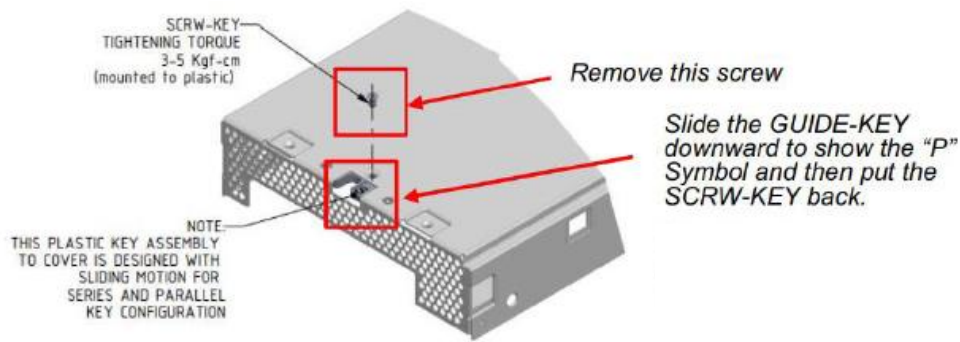
PD4000 Module Low Line Bus Bar



INPUT:
 346-480V, 15A,
 1~, 2W+PE,
 50/60Hz



PD4000 Module High Line Bus Bar



PDS12 Shelf Input Bus Bars

The PDS12 Shelf also has input voltage configuration bus bars similar to the PD4000 modules. The access door is located on the top side of the chassis near the input connector. The bus bar configuration is printed on the opening cover.

The PDS12 Shelf also has a keying feature to ensure that the module and the shelf have compatible input configurations. Only modules marked with “P” can be plugged into a shelf configured for “P” and the same goes for “S”. Note, all slots on the PDS12 must be configured to the same input voltage level.

<p>LOW INPUT LINES</p> <ul style="list-style-type: none"> • 3P3W 187 – 229Vac 		<p>INPUT: 3P3W, 208 Vac, 45A , 50/60Hz</p>	
<p>HIGH INPUT LINES</p> <ul style="list-style-type: none"> • 3P3W 380 – 480 Vac 		<p>INPUT: 3P3W, 380-480 Vac, 25A , 50/60Hz</p>	
<p>HIGH INPUT LINES</p> <ul style="list-style-type: none"> • Neutral Line • 3P4W • 540Y/311-660Y/381Vac 		<p>INPUT: 3P4W, 600Y/347 Vac, 17A , 50/60Hz</p>	

PDS12 Shelf Input Voltage Bus Bars

Appendix C: Output Ratings

PD4000 Output – Module in Voltage Source Mode

Nominal Output Voltage	250 VDC
Maximum Output Current	16 A
Maximum Output Power	4000W
Output voltage adjustment range	100 VDC to 300 VDC

PD4000 Output – Module in Current Source Mode

Maximum Output Current	16 A
Output Voltage Range	100 VDC to 300 VDC
Maximum Output Power	4000W
Output current adjustment range	0.48 A to 16A (less than 0.48A will be considered 0A or OFF)

Appendix D: Signal Connector Pinouts

PD4000 Module

Pin Number	J1/J2	Description
1	SPARE	SPARE
2	SPARE	SPARE
3	RTN_RS485	Communication lines RTN for RS485
4	SPARE	SPARE
5	RS485_A_EXT	Communication lines for RS485
6	RS485_B_EXT	Communication lines for RS485

PD4000 Module MODBUS Connector J2

Pin Number	J3/J4/J5	Description
1	SPARE	SPARE
2	SPARE	SPARE
3	AC_OK#1	Global AC_OK
4	DC_OK#1	Global DC_OK
5	ALERT#1	Alert signal
6	PS_ON#1	Output remote on/off
7	ISO_RTN	Isolated signal return
8	ISO_RTN	Isolated signal return
9	5V_ISO	5V_ISO standby power
10	0-24V_PROG1_1	0-24V programming (-)
11	0-10V_PROG1_1	0-10V programming (+)
12	ISO_RTN	Isolated signal return

PD4000 Module J1 Connector Pinout

PDS12 Shelf

Pin Number	J1/J2	Description
1	SPARE	SPARE
2	SPARE	SPARE
3	RTN_RS485	Communication lines RTN for RS485
4	SPARE	SPARE
5	RS485_A_EXT	Communication lines for RS485
6	RS485_B_EXT	Communication lines for RS485

PDS12 Shelf MODBUS Connector J1/J2

Pin Number	J3/J4/J5	Description
1	PS_ON#1	Output remote on/off
2	PSU_PRESENT#1	
3	ALERT#1	Alert signal
4	AC_OK#1	Global AC_OK
5	DC_OK#1	Global DC_OK
6	0-10V_PROG1_1	0-10V programming (+)
7	ISO_RTN	Isolated signal return
8	0-24V_PROG1_1	0-24V programming (+)
9	ISO_RTN	Isolated signal return
10	SPARE	SPARE
11	SPARE	SPARE
12	SPARE	SPARE

PDS12 Shelf J3, J4, J5 Connector Pinout