Trusted Power System

Product Overview

The Trusted® Power System is a high density flexible power supply designed to convert main line voltages of either 110 Vac or 240 Vac. Outputs are either 24 Vdc for Trusted product or 28 Vdc adjustable field power.

The Trusted Power System consists of a 1U Power Shelf with mechanical support, containing up to three 750 W Power Packs. The Power Packs load share in configurations using one or more Power Shelves. Each Power Pack has an individual supply connection via a mechanically retained IEC 60320 type connector. Each Power Shelf can supply 2250 W of power or 1500 W with n+1 redundancy from a single source. Multiple units can be connected for further capacity or redundancy requirements.

Diagnostic information of Power Pack status is provided via the Power Port, which connects to the rear of the Power Shelf. This device monitors input and output conditions and reports out of range faults and over-temperature/fan failure using relay contacts. The Power Port also allows connection of the optional rack mounted Power Controller for live configuration of output voltage and current, monitoring up to 12 Power Packs in 4 Power Shelves.

Features:

- Redundant and n+1 configurations.
- Hot replaceable Power Packs.
- Current sharing.
- Current limiting.
- Power factor correction.
- Diagnostic contacts.
- Configurable output voltage.
- Input/output fail diagnostics per Power Pack.

1. Product Range

Catalogue No.	Product name	Description
T8240	Power Shelf	19 inch x 1U chassis for up to 3 Power Packs. Includes Power Port + 10-way cable connector, 3 off mains plugs and retaining clips.
T8231	Power Pack 24 Vdc	750 W, universal input, 24 Vdc out.
T8232	Power Pack 28 Vdc	750 W, universal input, 28 Vdc out.
T8243	Power Port	Plug in diagnostic interface + 10-way cable connector.
T8234	Power Controller	For live adjustment of output voltage. 19 inch x 1U. 1 x 5 way ribbon cable.
T8235	Power Shield	Covers unused Power Pack positions.
TC-323	Power Shelf Interconnect	1 x 5 way ribbon cable for current sharing between shelves and connection to a Power Controller.
T8247	Power Shelf support brackets	A pair of brackets that can support up to 4 Power Shelves.

Table 1 T824X Power System Product Range



Figure 1 Front View - Power Shelf with Power Packs

2. Description

A pair of brackets mounted in to a 19 inch frame supports up to 4 Power Shelves.

Power Packs are slotted into the 1U Power Shelf with the first Power Pack in the right hand slot, as shown in Figure 2. Each Power Pack provides 750 W (31.25 A at 24 Vdc) to the DC output on the Power Shelf.

The standard AC input connection to the Power Shelf is through IEC 60320 type connectors rated at 10 A/250 Vac in Europe/Asia and 15 A/120 Vac in North America.

Output terminal blocks on each Power Shelf have three M4 screw connections. Ring type connectors should be used when connecting from the Power Shelf to system power distribution busbars.

The Power Port plugs into the back of the Power Shelf and requires a 24 V supply. The Power Port can provide monitoring and control via a 25 way D connector when connected to a Power Controller. A separate connector (CON3) provides DC and AC fail contacts. When more than one Power Shelf is used, Power Ports are linked using a Power Shelf Interconnect ribbon cable to enable current sharing.

Spare slots in the Power Shelf are normally covered by Power Shields and the appropriate fault relays are linked on the Power Port.

The 824X system includes an optional 1U Power Controller that is connected via the Power Port, using a TC-323 Power Shelf Interconnect cable, and allows online setting of output voltage. The Power Controller can monitor up to 12 Power Packs in 4 Power Shelves. Each Power Shelf is identified by the Power Controller by selecting addresses on the Power Port as described in paragraph 5.2.4.

Unused slots in the 4U brackets may be used for other equipment or fitted with blanking plates.

Unused connectors on the TC-323 cable should be tied back and left unused.

3. Power Shelf Specification

The Power Shelf is designed to operate as a key element in a complete distributed Power System.

This Power Shelf can house up to three Power Packs, provides physical protection and a number of alarm and control features.

The Power Shelf can supply up to 1500 W of n+1 redundant power or up to 2250 W of total power depending on configuration of Power Packs. Four stacked Power Shelves can provide up to 9000 W total power.

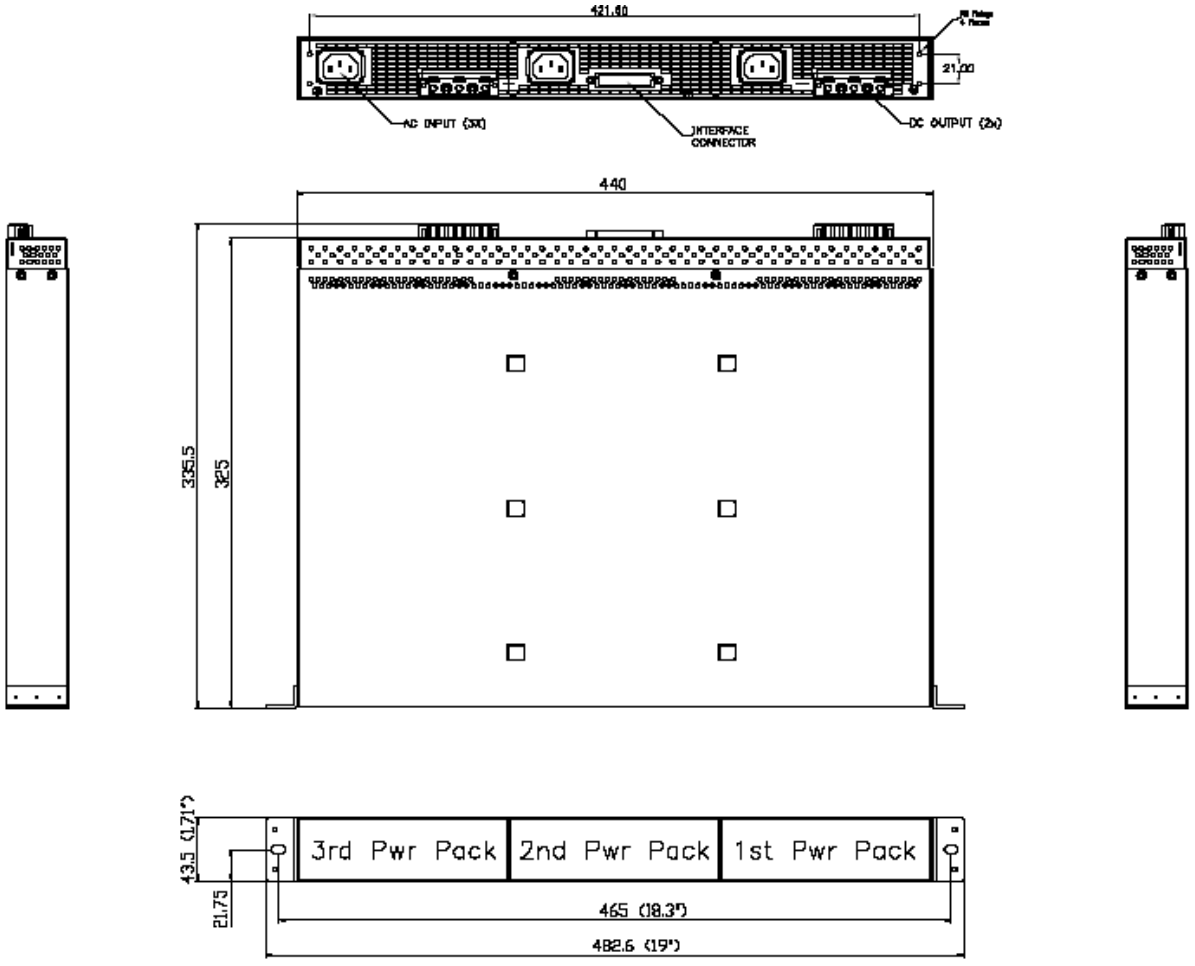

Figure 2 1U Power Shelf Mechanical Outline

3.1. Input Connector

The Power Shelf can be used with any standard global line voltages. The standard AC input connection to the Power Shelf is through three clip retained IEC 60320 type connectors rated at 10 A / 250 Vac in Europe/Asia and 15 A /120 Vac in North America.

3.2. Output Connector

The Power Shelf has two terminal blocks for DC output (each with three M4 screws). The V+ and V- are floating with respect to frame GND, either of which can be connected to GND as required.

3.3. Current Sharing

Note: If there is a low load on a Power Shelf (less than 2 A per Power Pack) then the current sharing circuit may not work correctly and 'PWR OK' LED may not illuminate on the Power Packs.

In systems where more than one Power Shelf is being used, Shelves should connect their CS terminals by using a Power Shelf Interconnect cable TC-323. This ensures that the Power Shelves current share.

Do not connect the TC-323 cable between 'A' and 'B' supplies or between two sets of Shelves which connect to separate busbars. The supplies will attempt to share current between the two busbars, which may damage the power packs and Shelves' sensing circuits.

Unused connectors on the TC-323 cable should be tied back and left unused.

3.4. Interface Connector

The Power Shelf has an optional DSB, 25-pin, female interface connector on the back. The Power System can be monitored and controlled through this interface, by a Power Controller, using a Power Shelf Interconnect. AC and DC fail alarms are available from a separate connector on the Power Port.

Pin Number	Signal Name	Description
1	DC Fail_2	DC Fail signal of the second Power Pack *
2	A2	I^2C address bit 2
3	A3	I^2C address bit 3
4	ON SYNC	Not Used
5	SDA	I^2C Serial data bus
6	SCL	I^2C Clock
7	NC	No connection
8	On/Off_1	Remote on off control for the first Power Pack - Not Used
9	OTP_1	Fan Fail or Over-Temperature signal for the first Power Pack *

Pin Number	Signal Name	Description
10	On/Off_2	Remote on off control for the second Power Pack - Not Used
11	V_{aux}	Not Used
12	DC Fail_1	DC Fail signal of the first Power Pack *
13	AC Fail_3	AC Fail signal of the third Power Pack *
14	OTP_3	Fan Fail or Over-Temperature signal of the third Power Pack *
15	DC Fail_3	DC Fail signal of the third Power Pack *
16	INT BUS	Not used *
17	AC Fail_1	AC Fail signal of the first Power Pack *
18	On/Off_3	Remote on off control for third Power Pack - Not Used
19	SRTN	Signal return and V_{aux} return
20	RS-	Remote sense for V-
21	OTP_2	Fan Fail or Over-Temperature signal of the second Power Pack *
22	RS+	Remote sense for V+
23	AC Fail_2	AC Fail signal of the second Power Pack *
24	CS	A single wire interface for current sharing
25	V-	V-

* opto-isolated, open collector

Table 2 Pin Assignment of the Interface Connector

Refer to Figure 2 1U Power Shelf Mechanical Outline for the locations of Power Pack 1, 2 and 3.

3.5. Stacked-up Assembly

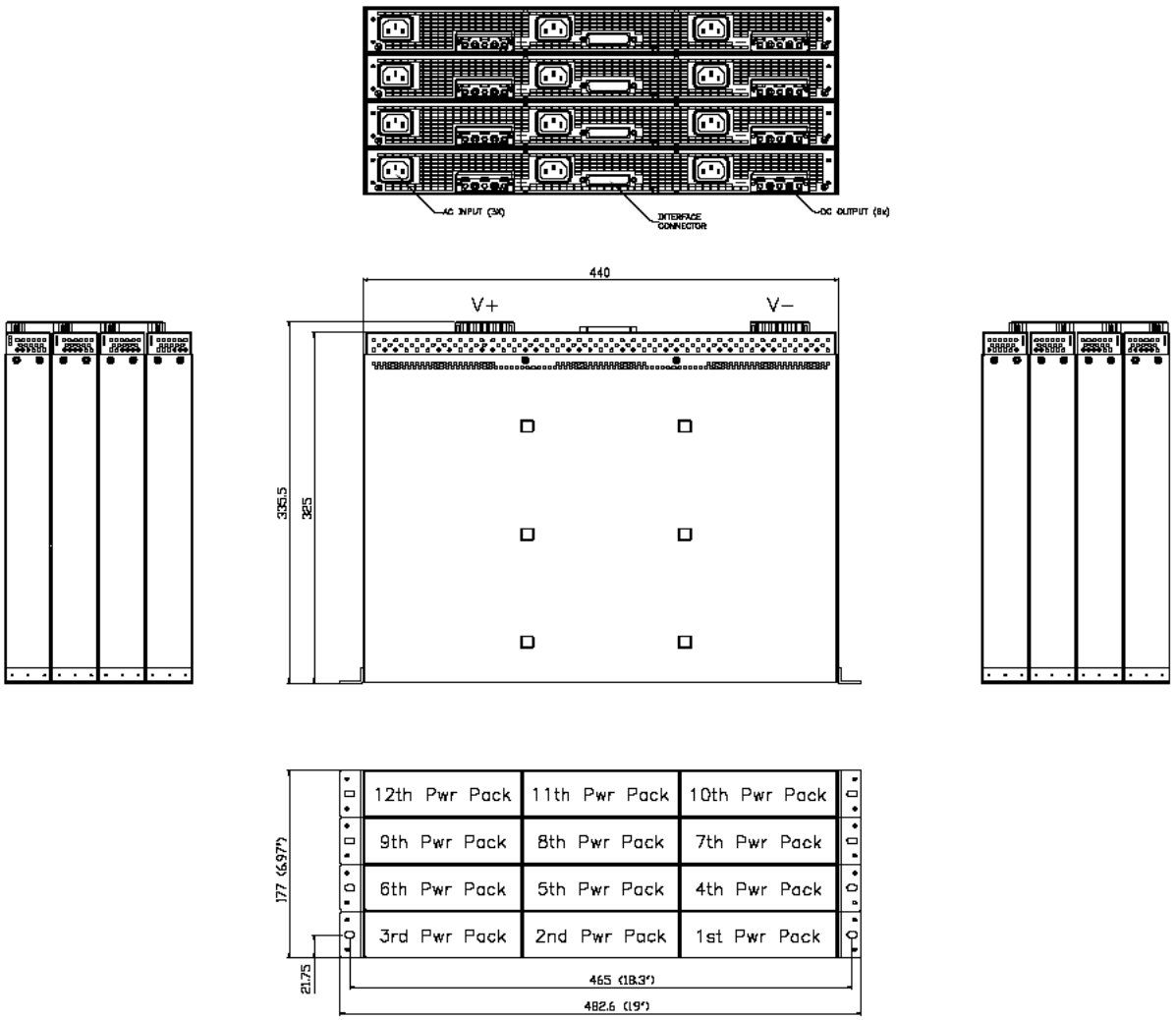

Figure 4 4U Stacked-up Assembly

5. Power Port

5.1. General Description

The Power Port is an accessory that fits onto the rear of the Power Shelf. It converts alarm signals produced by the Power Packs and Power Shelf into volt-free alarm contacts for use by the system. It consists of a printed circuit board (PCB) fitted with connectors, relays and miscellaneous electronic components. The shape and size of the Power Port is shown in Figure 8 Power Port Outline Drawings.

The alarm contacts are made available on a connector for ease of wiring into the system. The system provides a supply for the Power Port, which is wired to the same connector. The connector pin-outs are shown in section 5.3.

The Power Shelf is fitted with a 25 way D female connector to which the Power Port connects. The Power Port is retained to the Power Shelf by means of the Dsub jack screws. The Power Port is fitted with a 25 way D female connector to allow the Power Shelf connectivity to be extended to a Power Controller, or to other Shelves to current share, using a Power Shelf Interconnect cable.

The Power Controller is powered from the Power Port 24 V supply via pin 7, when connecting CON 2 on the Power Port to the Power Controller.

5.2.4. Jumpers

There are two jumpers, J1 and J2.

J1 and J2 set the Power Shelf address lines for the I^2C control bus. With J1 and J2 fitted the Pack addresses are 1, 2 and 3, which is the default. Other addresses may be set by removing one or both of J1 and J2, up to 4 Shelves worth (or 12 Power Packs).

Power Shelf	J1	J2
1	fitted	fitted
2	fitted	removed
3	removed	fitted
4	removed	removed

Table 8 Power Shelf Addressing

5.3. Mechanical

5.3.1. Pin-out CON 1, CON 2

CON 1 on the Power Port connects to the Power Shelf. The pin-out details are shown in Table 2 Pin Assignment of the Interface Connector.

CON 2 is used to connect to other Power Shelves to current share or to connect to a Power Controller.

Number	Signal Name	Description
1		
2		
3		
4	ON SYNC	Not Used
5	SDA	I2C Serial data bus
6	SCL	I2C Clock
7	24v	Supply from Power Port
8		

8. Power Shelf Interconnect

A ribbon cable is required to connect Power Shelves together in order to current share, or to connect shelves to a Power Controller.

The supplied ribbon cable has 5 connectors, to allow the maximum of 4 Shelves and a Power Controller to be connected.

Do not connect the TC-323 cable between ‘A’ and ‘B’ supplies or between two sets of Shelves which connect to separate busbars. The supplies will attempt to share current between the two busbars, which may damage the Power Packs and Shelves’ sensing circuits.

Unused connectors on the TC-323 cable should be tied back and left unused.