

PACSystems™ RX3i Multifunction Isolated Power Supply, 24 VDC, 80 W (IC695PSD180)



Warnings and Caution Notes as Used in this Publication

WARNING

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

CAUTION

Caution notices are used where equipment might be damaged if care is not taken.

Note: Notes merely call attention to information that is especially significant to understanding and operating the equipment.

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Introduction

The PACSystems RX3i Power Supply IC695PSD180 is a multifunction 80 Watt supply that operates from an input voltage from 18 Vdc to 30 Vdc.

This power supply provides three outputs:

- +24 Vdc output used to power circuits on Output Relay modules.
- +5.1 Vdc output used internally by RX3i modules with IC695 and IC694 catalog numbers.
- +3.3 Vdc output used internally by RX3i modules with IC695 catalog numbers.

This power supply is suitable for use in load-sharing and redundancy applications. Up to three multifunction power supplies can be used in a PACSystems RX3i (IC695 catalog number) Universal Backplane. Multiple power supplies may be used for both load-sharing and redundancy applications. This power supply occupies one backplane slot.

LEDs

Four LEDs on the Power Supply indicate:

- Power (Green/Amber): When this LED is green, it indicates power is being supplied to the backplane. When this LED is amber, power is applied to the Power Supply but the Power Supply switch is off.
- P/S Fault (Red): When this LED is lit, it indicates the Power Supply has failed and is no longer supplying sufficient voltage to the backplane.
- Over Temperature (Amber): When this LED is lit, it indicates the Power Supply is near or exceeding its maximum operating temperature.
- Overload (Amber): When this LED is lit, it indicates the Power Supply is near or exceeding its maximum output capability on at least one of its outputs.

The CPU Fault Table shows a fault if any Overtemperature, Overload, or P/S Fault occurs.

Wiring Terminals

Terminals for positive (+) 24 V and negative (-) 24 V power, ground, and MOV Disconnect accept individual 14 to 22 AWG wires.

On/Off Switch

The ON/OFF switch is located behind the door on the front of the module. The switch controls the operation of the outputs of the supply. It does NOT interrupt line power.

Figure 1: Module in Door Open Position



Specifications: IC695PSD180

Specification	Description
Nominal Rated Voltage	24 Vdc
Input Voltage Range	18 to 30 Vdc
Input Power	105 W maximum at full load
Inrush Current†	10 A, 100 ms maximum
Output Power	80 W maximum total of all outputs 24 Vdc = 75 Watts maximum power rating 5.1 Vdc = 60 Watts maximum power rating 3.3 Vdc = 60 Watts maximum power rating Note: Maximum output power depends on ambient temperature. Refer to <i>Thermal Deratings: PSD180</i> for more information.
Output Voltage	24 Vdc: 21.6 to 26.4 Vdc (24 Vdc nominal) 5.1 Vdc: 4.85 to 5.25 Vdc (5.1 Vdc nominal) 3.3 Vdc: 3.25 to 3.47 Vdc (3.3 Vdc nominal)
Output Current	24 Vdc: 0 to 3.2 A 5.1 Vdc: 0 to 12 A 3.3 Vdc: 0 to 18 A
Isolation (Input to Chassis)	1500 Vac for 1 minute
Ripple (all outputs) and Noise	24 Vdc: 750 mV 5.1 Vdc: 150 mV 3.3 Vdc: 150 mV
Ride-Through Time	10 ms minimum
Turn On Time	700ms at ambient temperature 10C or higher 6000ms at ambient temperature lower than 10C
Wiring Terminals	Each terminal accepts one 14 AWG to 22 AWG wire
Terminal Current	10 A
Number of Daisy-Chain PSD180 Supplies	Up to 3 when total output power does not exceed the maximum load sharing power of 135 W
Supported number of PSD180 Supplies in Universal Backplane	Up to 3
Installation Environment	For use in Pollution Degree 2 environments only

† The inrush current specification is given as a guide for sizing the external power source for the IC695PSD180. Peak inrush current may be higher for shorter durations.

Installation Information for Hazardous Areas

For hazardous area information please refer to GFK-3069, *PACSystems RX3i Installation and Maintenance Requirements*.

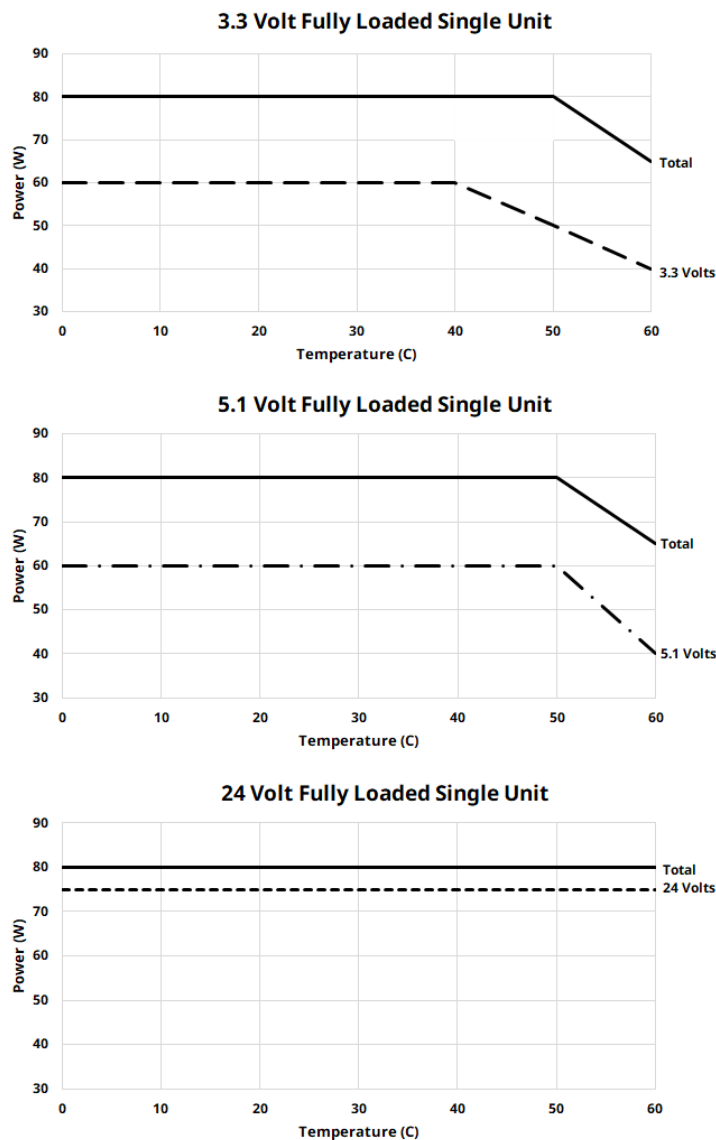
Thermal Deratings: PSD180

The maximum output power for Power Supply PSD180 depends on the surrounding air temperature, as shown below.

Single Unit Derating

The following graphs display derating curves for a system with one PSD180 unit at full load.

Figure 2: Thermal Derating Curves for Single Unit PSD180

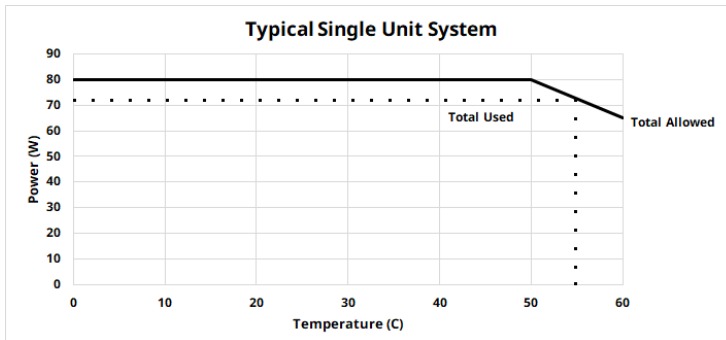


A typical system with a single PSD180 unit is shown below. The configuration would use 35.7 W of 3.3 V power, 33.8 W of 5 V power, and 2.4 W of 24 V power for a total of 71.9 W. While the individual derating charts would suggest that there would be no derating, the unit would need to be limited to an operating temperature of 56°C to prevent throttling or failure. This stems from the total power derating at 71.9 W.

Figure 3: Example of Typical Single PSD180 System



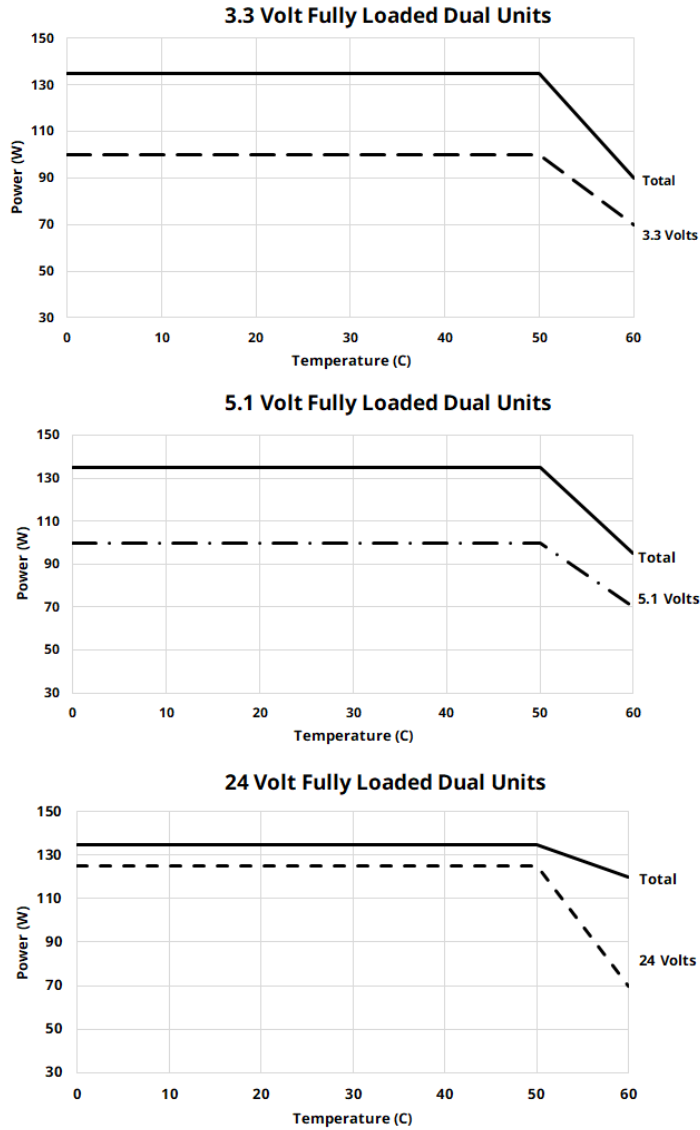
Figure 4: Typical PSD180 Single Unit System Derating



Dual Unit Derating

The following graphs display derating curves for a system with two PSD180 units at full load.

Figure 5: Thermal Derating Curves for Dual Unit PSD180

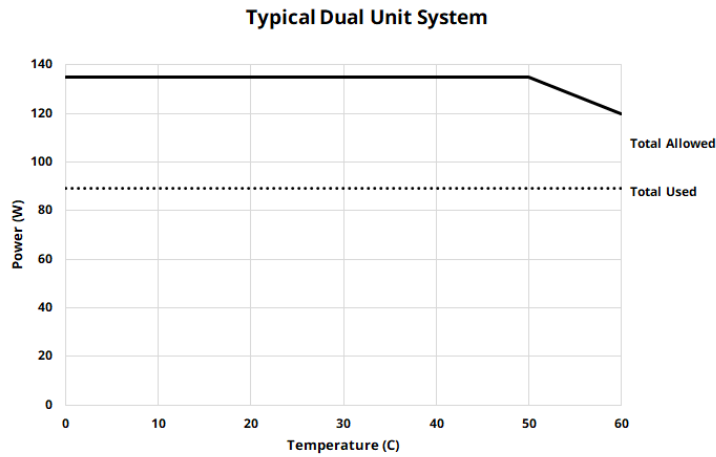


A typical system with dual PSD180 units is shown below. The configuration would use 41.6 W of 3.3 V power, 45.3 W of 5 V power, and 2.4 W of 24 V power for a total of 89.3 W. This load would not result in derating and no thermal limiting is needed.

Figure 6: Example of Typical Dual PSD180 System



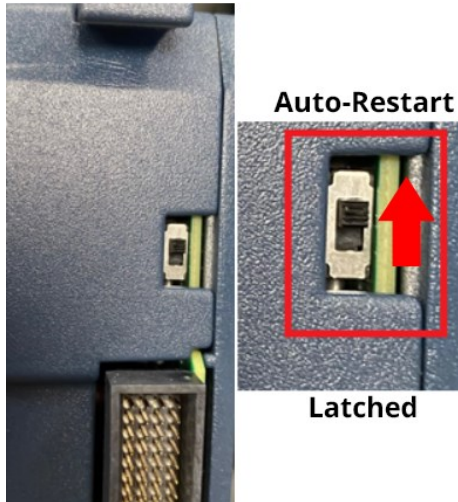
Figure 7: Typical PSD180 Dual Unit System Derating



Overcurrent Protection

The 5.1 Vdc output is electronically limited to 13.2 Amps. The 3.3 Vdc output is limited to 19.8 Amps. If an overload (including short circuits) occurs, it is sensed internally and the Power Supply shuts down. Because it is designed for redundancy applications, this Power Supply latches “OFF” in fault conditions and will not automatically try to restart. Input power must be cycled to clear a latched fault. However, if the Power Supply is used in a non-redundant application, the latched fault behavior can be changed to automatically attempt a restart.

Figure 8: Switch Set to Auto-Restart



In a non-redundancy application, where automatic restarting may be appropriate, the switch on the back of the module as shown in Figure 8 should be put in the auto-restart position. The module must be removed from the backplane to change the switch.

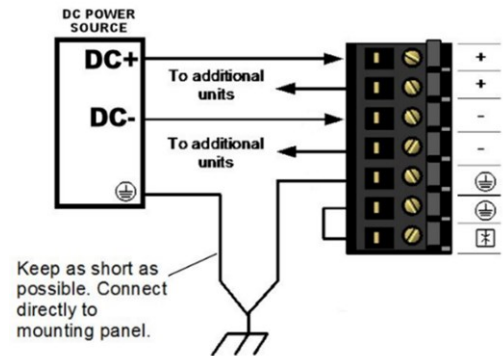
An internal non-repairable fusible link in the input line is provided as a backup protection measure. The Power Supply is designed to shut down before the fusible link blows. The fusible link protects against internal supply faults. The CPU Fault Table shows a fault if any Overtemperature, Overload, or P/S Fault occurs. There is no additional indication if the Power Supply fusible link blows.

Field Wiring: IC695PSD180

The wires from the power source and ground connect to the terminals on the power supply as shown in Figure 9. Each terminal accepts one 14 to 22 AWG wire.

When tightening the screw terminals, do not exceed the maximum torque limit of 0.5 Nm (4.5 in-lb.).

Figure 9: Field Wiring



⚠ WARNING

If the same external DC power source is used to provide power to two or more power supplies in the system, connection polarity must be identical at each RX3i power supply. A resulting difference in potential can injure personnel or cause damage to equipment. Also, each backplane must be connected to a common system ground.

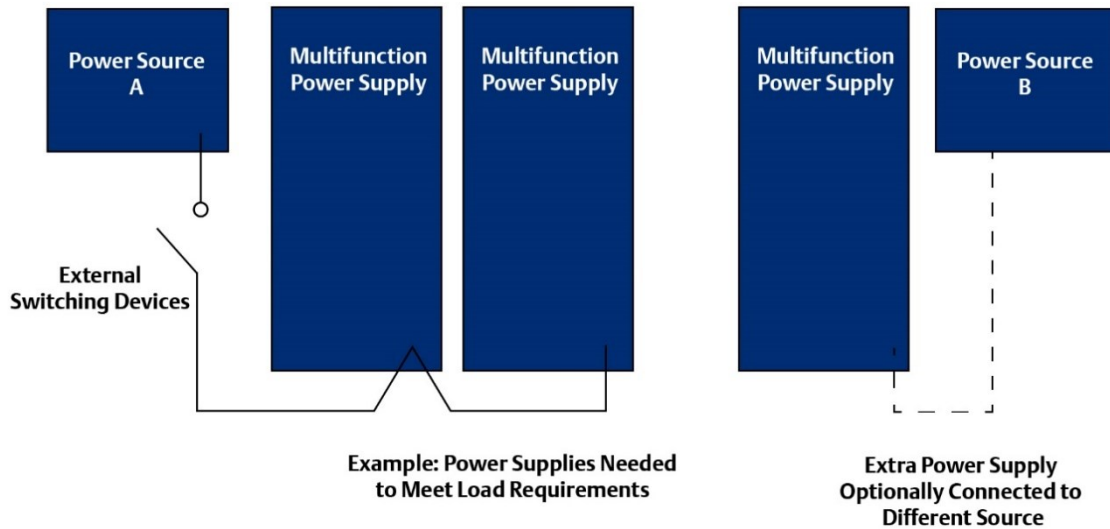
Overtemperature Protection

The power supply features protection in an overtemperature fault condition. The power supply is equipped with a thermal shutdown circuit which detects excessive internal temperatures and is capable of powering the unit down. In the event of an overtemperature condition, the unit protects itself by providing a warning signal for 10 seconds (typical) and then shutting off. Once the power supply goes into overtemperature shutdown, it will cool before attempting to automatically restart.

Connections for Load Sharing

In load-sharing installations, additional multifunction power supplies above the minimum required for the system load may be wired to the same power source, or a different source.

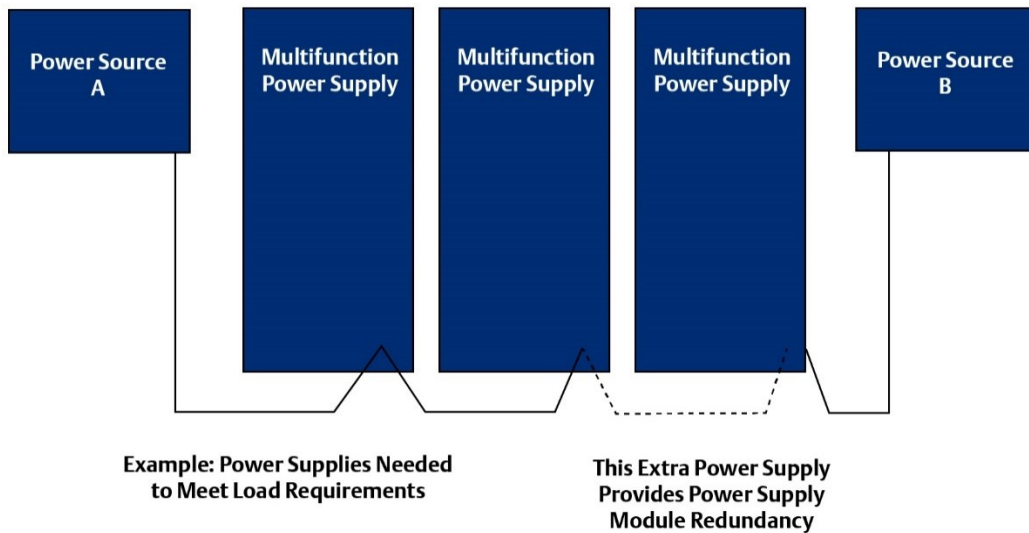
Figure 10: Load Sharing



Connections for Power Supply Redundancy

Power Supply redundancy can be provided by using one additional multifunction power supply above the minimum required for the system power load. In this type of installation, all multifunction power supplies contribute a share of the backplane power and run at a correspondingly reduced load. This also results in longer life for each individual power supply. In addition, should one power supply module fail, system operation is not interrupted. The front panel switch can be used to remove a redundant unit. Note that this type of system does not provide protection against loss of the input power source to the non-redundant pair of supplies. If more than one power supply is switched off, the remaining power supplies may become overloaded and shut down. An External switching device must be used to remove power from more than one power supply at a time in the power supply redundancy mode.

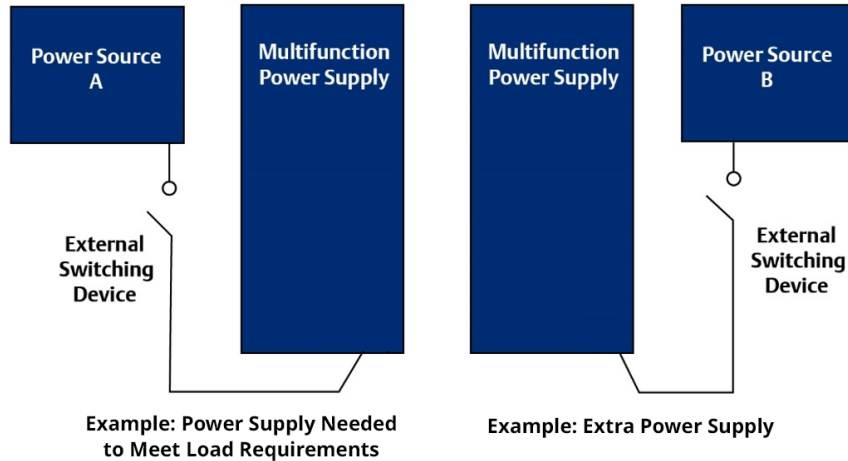
Figure 11: Power Supply Redundancy



Power Source Redundancy

If the overall power needs of the system can be met using one multifunction power supply, then power source redundancy can be provided by using a second multifunction power supply. In this type of system, one of the multifunction power supplies must be connected to one power source and the other must be connected to a separate source. This arrangement provides all the advantage of a Basic Redundancy system, as described above, plus power source redundancy. The front panel switch may be used to remove an individual power supply as long as the minimum number of units remain powered up.

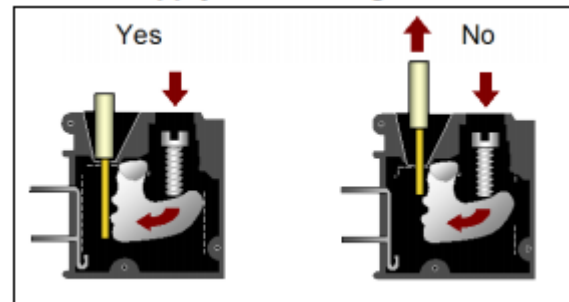
Figure 12: Power Source Redundancy



Power Supply Field Wiring Terminals

Each terminal accepts one 14 to 22 AWG wire. The end of each wire should be stripped at least 9 mm (3/8 in). The terminal can accept a wire that is stripped up to 11 mm (0.433 in) while providing full seating of the insulator. The wire must be fully inserted as shown in Figure 13, so that the insulation meets the insulation stop position inside the terminal. Tightening the terminal screw pivots the clamp firmly against the stripped end of the wire, holding it in place. If the wire is not fully inserted as shown in Figure 13, tightening the terminal screw could push the wire upward so that it is not connected.

Figure 13: Connecting the Terminals



Revision History

Version	Date	Details
IC695PSD180-AAAA IC695PSD180CA-AAAA	August 2023	Initial Release

Problems Resolved by this Revision

None - Initial Release.

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