Switching Power Supplies Pro2 Series

Overview

WAGO Pro2 compact switched-mode power supplies provide a wide range of uses. These power supplies can be mounted on a 35mm DIN rail and can be configured directly via buttons on the device's face, using the WAGO USB configuration cable to connect to the integrated communication interface, or using one of the WAGO Pro2 communication modules. In addition, the WAGO Interface Configuration software (free download) can be used to record and evaluate various output parameters.

The pluggable connection technology uses WAGO CAGE CLAMP® connectors, which allow pre-wiring for quicker installations as well as quicker and easier product replacement.

For configuration, data collection, and read-out of status information, the Pro2 Power Supply can be connected to a dedicated WAGO Pro2 communication module at any time, allowing selection of the desired protocol for coupling to the automation and control system.

The LED bar chart on the front reliably indicates the current output power, as well as overloads/load reserves. Furthermore, the LEDs indicate the selected operating mode and, when needed, warnings and errors.

Features

- Power supply with TopBoost, PowerBoost and configurable overload behavior
- Configurable digital signal input and output, optical status indication, function keys
- Communication interface for configuration and monitoring
- Suitable for both parallel and series operation
- Snap on communication modules (sold separately)
- Free WAGO configuration software (download only)
- 2-year warranty

Switching Power Supplies						
Part Number	*Price*	*Output Voltage (V_{nom})*	*Output Current (I_{max})*	*Output Power (P_{max})*	*Weight grams [lb]*	*Drawing Link*
Single-Phase Input						
2787-2134	$205.00	12 VDC	10A	120W	650 [1.43]	PDF
2787-2135	$343.00		15A	180W	1000 [2.20]	PDF
2787-2144	$210.00	24 VDC	5A	120W	700 [1.54]	PDF
2787-2146	$294.00		10A	240W	1000 [2.20]	PDF
2787-2147	$425.00		20A	480W	1450 [3.19]	PDF
2787-2448	$668.00		40A	960W	1950 [4.29]	PDF
2787-2154	$322.00	48 VDC	2.5 A	120W	650 [1.43]	PDF
2787-2157	$520.00		10A	480W	1450 [3.19]	PDF
Three-Phase Input						
2787-2344	$294.00	24 VDC	5A	120W	650 [1.43]	PDF
2787-2346	$405.00		10A	240W	1000 [2.20]	PDF
2787-2347	$544.00		20A	480W	1450 [3.19]	PDF
2787-2348	$781.00		40A	960W	1980 [4.29]	PDF
2787-2357	$567.00	48 VDC	10A	480W	1400 [3.08]	PDF
2787-2358	$878.00		20A	960W	1980 [4.29]	PDF

Switching Power Supplies Accessory		
Part Number	*Price*	*Description*
750-923	$45.00	WAGO cable, 8.2ft/2.5m cable length. For use with WAGO Pro2 power supplies.



2787-2144



2787-2348



750-923

Switching Power Supplies Pro2 Series

Input Specifications								
Part Number	**Nominal Input Voltage [V_{nom}]**	**Voltage Range**	**Frequency Range**	**Input Current [Typ. @ full load]**	**Inrush Current Limitation @+25°C**	**Max Power Dissipation**	**Efficiency [Typ.]**	**Circuit Breaker [Minimum]**
Single-Phase								
2787-2134	100-240 VAC	90–264 VAC 130–373 VDC	50-60 Hz	≤ 1.3 A @ 110VAC 0.6 A @ 230VAC	≤ 9.6 A [after 1ms]	≤ 0.8 W [Standby] ≤ 1.6 W [No load] ≤ 10W [230 VAC; Nominal load]	93.8% @ 110VAC	16A
2787-2135		90–264 VAC 130–240 VDC		2.0 A @ 110VAC 0.88 A @ 230 VAC	≤ 11.4 A [after 1ms]	≤ 0.8 W [Standby] ≤ 2.3 W [No load] ≤ 14W [230 VAC; Nominal load]	95.3% @ 110VAC	
2787-2144		90–264 VAC 130–373 VDC		≤ 1A @ 240VAC ≤ 1.8 A @ 100VAC	≤ 9A [after 1ms]	≤ 1W [Standby] ≤ 2W [No load] ≤ 10W [230 VAC; Nominal load]	93% @ 110VAC 93.8% @ 230VAC	
2787-2146				≤ 1.2 A @ 240VAC ≤ 2.7 A @ 100VAC	≤ 11A [after 1ms]	≤ 1W [Standby] ≤ 2.2 W [No load] ≤ 12W [230 VAC; Nominal load]	93.5% @ 110VAC 95.2% @ 230VAC	
2787-2147				≤ 2.2 A @ 240VAC ≤ 5.9 A @ 100VAC	≤ 12A [after 1ms]	≤ 1.3 W [Standby] ≤ 2.6 W [No load] ≤ 24W [230 VAC; Nominal load]	93.9% @ 110VAC 95.4% @ 230VAC	
2787-2448	200-240 VAC	180–264 VAC 255–373 VDC		≤ 4.3 A @ 240VAC ≤ 5.1 A @ 200VAC	≤ 10A [after 1ms]	≤ 1.5 W [Standby]; ≤ 2.4 W [No load]; ≤ 40W [230 VAC; Nominal load]	96% @ 230VAC	
2787-2154	100-240 VAC	90–264 VAC 130–240 VDC		≤ 1.3 A @ 100VAC	11A [after 1ms]	≤ 0.8 W [Standby] ≤ 1.7 W [No load] ≤ 9W [230 VAC; Nominal load]	95.3% @ 110VAC	
2787-2157				5.9 A @ 100VAC 2.2 A @ 230VAC	≤ 12A [after 1ms]	≤ 1.3 W [Standby]; ≤ 2.6 W [No load]; ≤ 24W [230 VAC; Nominal load]	95.3% @ 110VAC	
Three-Phase								
2787-2344	400-500 VAC	340–550 VAC	50-60 Hz	0.4 A @ 400VAC	≤ 15A [after 1ms]	≤ 3W [Standby] ≤ 3W [No load] ≤ 18W [400 VAC; Nominal load]	92.5% @ 400VAC	16A
2787-2346				0.63 A @ 400VAC	1A [after 1ms]	≤ 3W [Standby] ≤ 3W [No load] ≤ 18W [400 VAC; Nominal load]	94.1% @ 400VAC	
2787-2347		340–550 VAC 480–780 VDC		≤ 0.8 A @ 400VAC	≤ 15A [after 1ms]	≤ 3.6 W [Standby] ≤ 4.4 W [No load] ≤ 21W [400 VAC; Nominal load]	95.9% @ 400VAC	
2787-2348				≤ 1.7 A @ 400VAC			96.3% @ 400VAC	
2787-2357		340–550 VAC		0.8 A @ 400VAC	1A [after 1ms]	≤ 3.6 W [Standby] ≤ 4.4 W [No load] ≤ 21W [400 VAC; Nominal load]	95% @ 400VAC	
2787-2358				1.6 A @ 400VAC	1A [after 1ms]	≤ 3.6 W [Standby] ≤ 4.4 W [No load] ≤ 21W [400 VAC; Nominal load]	96% @ 400VAC	

Switching Power Supplies Pro2 Series

Output Specifications									
Part Number	*Output Voltage*	*Output Voltage Adj. Range*	*Output Current (Max.)*	*Power Boost (5s)*	*Top Boost (15ms)*	*Switch on Delay*	*Line Regulation*	*Load Regulation*	*MTBF (@ 25°C) [per IEC 61709]*
Single-Phase									
2787-2134	12 VDC	12–14 VDC	10A	15A	60A	< 2.2 sec	< 0.02 %	< 2.0 %	> 1,200,000 h
2787-2135			15A	22.5 A	90A	< 1.8 sec	< 0.02 %	< 2.5 %	> 1,200,000 h
2787-2144	24 VDC	24–28 VDC	5A	7.5 A	30A	< 2.2 sec	< 0.02 %	< 2.0 %	> 1,000,000 h
2787-2146			10A	15A	60A	< 1.8 sec	< 0.02 %	< 2.0 %	> 1,200,000 h
2787-2147			20A	30A	120A	< 1.5 sec	< 0.02 %	< 2.0 %	> 800,000 h
2787-2448			40A	60A	200A	< 1.5 sec	< 0.1 %	< 2.6 %	> 900,000 h
2787-2154	48 VDC	48–56 VDC	2.5 A	3.75 A	15A	< 2.2 sec	< 0.02 %	< 1.0 %	> 900,000 h
2787-2157			10A	15A	60A	< 1.5 sec	< 0.02 %	< 1.0 %	> 800,000 h
Three-Phase									
2787-2344	24 VDC	24–28 VDC	5A	7.5 A	30A	1.5 sec	< 0.05 %	< 2.0 %	1,400,000 h
2787-2346			10A	15A	60A	1.5 sec	< 2.0 %	< 2.5 %	> 1,000,000 h
2787-2347			20A	30A	120A	< 1.4 sec	< 0.02 %	< 2.0 %	> 800,000 h
2787-2348			40A	60A	200A	< 1.5 sec	< 0.01 %	< 0.01 %	> 800,000 h
2787-2357	48 VDC	48–56 VDC	10A	15A	60A	1.6 sec	< 0.02 %	< 1.0 %	900,000 h
2787-2358			20A	30A	100A	1.6 sec	< 0.04 %	< 2.0 %	800,000 h

General Specifications	
Temperature	Operating [ambient] -25 to 70°C [-13 to 158°F] Storage [non-operating] -40 to 85°C [-40 to 185°F]
Humidity	5 to 96 % [no condensation permissible]
Overload Behavior [1]	Constant Current [Factory Default], Constant Current with Latching Mode, Hiccup, Electronic Circuit Breaker, Latching Shutdown on Thermal Overload, Power Boost, Top Boost
Status Indicators	Optical status indication [DC OK; load; warning and error states] Digital signal input and output [DI/DO]
Overvoltage Protection	Yes
Vibration	IEC 60068-2-6 [5 to 150Hz / 1g]
Shock	IEC 60068-2-27 [15g / 11ms]
Enclosure Rating	IP20
Mounting	35mm DIN rail
Connection	Cage Clamp®
Housing Material	Metal (enclosed)
Agency Approval	cULus File E255817, CE

[1] All functions are described in detail in the user manual.

Switching Power Supplies Pro2 Series

Additional Data			
Part Number	Solid Wire Size		
	Input	Output	Strip Length
2787-2134	0.08 - 2.5 mm² [28 -12 AWG]	0.08 - 2.5 mm² [28 -12 AWG]	Input/Output 8-9mm [0.31 - 0.35 in]
2787-2135			
2787-2144			
2787-2146			
2787-2147		0.50 - 10 mm² [20 -12 AWG]	Input 8-9mm [0.31 - 0.35 in] Output 13-15mm [0.51 - 0.59 in]
2787-2448			
2787-2154		0.08 - 2.5 mm² [28 -12 AWG]	Input/Output 8-9mm [0.31 - 0.35 in]
2787-2157		0.50 - 10 mm² [20 -12 AWG]	Input 8-9mm [0.31 - 0.35 in] Output 13-15mm [0.51 - 0.59 in]
2787-2344		0.08 - 2.5 mm² 28 -12 AWG]	Input/Output 8-9mm [0.31 - 0.35 in]
2787-2346			
2787-2347		0.50 - 10 mm² [20 -12 AWG]	Input 8-9mm [0.31 - 0.35 in] Output 13-15mm [0.51 - 0.59 in]
2787-2348			
2787-2357			
2787-2358			

Switching Power Supplies Pro2 Series

Digital I/O Functions

Digital I/O Functions		
Section	***Operation***	***Description***
Digital Input	Power supply standby on/off	If this checkbox is selected, the product can be switched on and off via the digital input.
	Inversion DI	If this checkbox is selected, the digital input is inverted.
	Function triggered by low/high transition	If this checkbox is selected, the digital input is activated in the event of an edge change from 0 to 1.
	Function triggered by high/low transition	If this checkbox is selected, the digital input is activated in the event of an edge change from 1 to 0.
Digital Output	DC OK	If this checkbox is selected, the digital output is set if the DC output voltage is OK.
	Load current warning level exceeded	If this checkbox is selected, the digital output is set if the overload warning threshold is exceeded.
	Electronic circuit breaker tripped	If this checkbox is selected, the digital output is set if the electronic circuit breaker has tripped.
	Power supply switched off (Latched)	If this checkbox is selected, the digital output is set if latching shutdown occurs.
	Digital output via process data/communication	If this checkbox is selected, the digital output can be controlled via the process data.
	Digital output on	If this checkbox is selected, the digital output is switched on.
	Inversion DO	If this checkbox is selected, the digital output is inverted.
Warning Thresholds (Software Config.)	Overload limit active	If this checkbox is selected, warning is triggered if the overload warning threshold is exceeded.
	Warning threshold	Here you can enter the value for current (unit: mA) at or above which a warning message is generated.
	Operating hour counter warning limit	You can enter after how many operating hours (unit: h) after which a warning message is generated.

Note: Digital I/O function checkboxes are available in the WAGO configuration software.

Operation via Buttons

Using the + and - buttons on the front of the product, you can make the following settings:

Operation via Buttons		
Button [+]	***Button [–]***	***Function***
Switch product on or off		
Hold down simultaneously for 3 seconds		The product is switched on or off.
Set output voltage		
Press once	–	The output voltage increases in steps.
Press and hold	–	The output voltage increases continuously.
–	Press once	The output voltage is reduced in steps.
–	Press and hold	The output voltage is reduced continuously.
Reset product for factory settings		
Hold down simultaneously for 10 seconds		The product is reset to the factory settings.

During ongoing operation, you can set the output voltage and reset the product to factory settings. These settings can be saved and then remain available when the product is switched off and back on.

Switching Power Supplies Pro2 Series

Safety and Agency Approvals			
Specification	***Standard***	***Document Number***	
Harmonic Limits	Harmonic Current Limits	EN 61000-3-2, Class A for limited output power	
Safety Standards	Hazardous Locations	UL Standard 121201 [File No. E198726]	
	Industrial control equipment	UL 61010-2-201 [File No. E255817]	
	Electrical equipment of machines	IEC60204-1 [over voltage category III]	
	Electronic equipment for power installation	IEC/EN 62477-1 / IEC62103	
	Safety, Transient surge voltage protection	VARISTOR	
Safety Approvals	CB-Report per IEC 60950	IEC 60950-1, IEC 61010-1, IEC 61010-2-201	
Safety Class	Degree of electrical protection Class1	Class I with GND connection	
CE	In conformance with EMC directive 2014/30/EU and low voltage directive 2014/35/EU		
RoHS Compliant	RoHS Directive [EU] 2015/863 Compliant [EN 50581]		
Electromagnetic Compatibility (EMC), Emissions	EMC, Emissions	EN55032, EN55011, EN61000-3-2 Class A, EN61000-3-3, EN61000-6-3	
Electromagnetic Compatibility (EMC), Immunity	EMC, Immunity	EN 55024, EN 61000-6-2 [EN61000-4-2, 3, 4, 5, 6, 8, 11, 12]	
	Electrostatic Discharge [ESD]	IEC 61000-4-2 Level 4 Criteria A Air Discharge: 15kV; Contact Discharge: 8kV	
	Radiated RF field immunity [80-1000 MHz]	IEC / EN 61000-4-3: 120W&240W: 80MHz-1GHz, 10V/M, 80% modulation [1kHz] 1.4GHz-2GHz, 3V/M, 80% modulation [1KHz] 2GHz-2.7GHz, 1V/M, 80% modulation [1KHz]	IEC / EN 61000-4-3: 480W: 80MHz-1GHz, 10V/ M, 80% modulation [1kHz] 1.4GHz-2GHz, 10V/M, 80% modulation [1KHz] 2GHz-2.7GHz, 10V/M, 80% modulation [1KHz]
	Electrical fast transient / burst immunity	IEC / EN 61000-4-4 Level 4 Criteria A 4kV	
	Surge immunity	IEC / EN 61000-4-5 Level 4 Criteria A Common Mode: 4kV Differential Mode: 2kV	
	Immunity to conducted RF disturbances [0.15 to 80 MHz]	IEC / EN 61000-4-6 Level 3 Criteria A 150kHz-80MHz, 10Vrms	
	Power frequency field immunity	IEC / EN 61000-4-8 30 A / m	
	Voltage dips	IEC / EN 61000-4-11[70% UN Crit. B/40%/100% UN Crit. C]	
Pollution Degree	2		

To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.

Communication Modules
Pro2 Series

Overview

WAGO Pro2 communication modules easily snap into place as an add-on to WAGO Pro2 power supplies. These modules are available for various communication protocols with their respective communication ports, allowing connectivity to PLCs for programming and monitoring. Connectivity to modules also provides accessibility to features and data from the power supplies.

Features

- Snaps on to a WAGO Pro2 Power Supply
- Modbus RTU, EtherNet/IP, Modbus TCP/IP UDP/IP or IO-Link v1.1
- 2-year warranty



2789-9015



2789-9023



2789-9052



2789-9080

Communication Modules							
Part Number	*Price*	*Port Protocol*	*Number of Ports*	*Communication Port*	*Port Speed*	*Requires*	*Drawing Link*
2789-9015 *	$76.00	Modbus RTU	2	(2) RS-485 (RJ45)	4.8 to 115.2k baud	WAGO Pro2 power supply and terminating resistor 2789-9915	PDF
2789-9023	$108.00	EtherNet/IP	2	(2) Ethernet 10/100Base-T (RJ45)	10/100 Mbps auto-detect	WAGO Pro2 power supply	PDF
2789-9052 *	$108.00	Modbus TCP/IP UDP/IP	2	(2) Ethernet 10/100Base-T (RJ45)	10/100 Mbps auto-detect	WAGO Pro2 power supply	PDF
2789-9080	$76.00	IO-Link Class A Device	1	(1) 3-position removable terminal	230.4k baud IO-Link COM3	WAGO Pro2 power supply	PDF

*** Firmware on the Pro2 Power Supply must be version 01.04 or higher.**

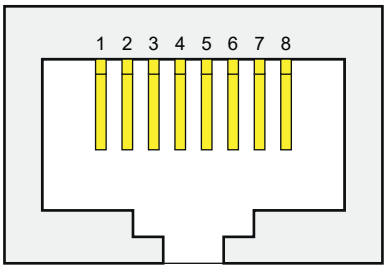
Terminating Resistor For Use With 2789-9015

Terminating Resistor						
Part Number	*Price*	*Resistance*	*Connection*	*Weight*	*For Use With*	*Drawing Link*
2789-9915	$42.00	120Ω	RJ45	35g [1.23 oz]	2789-9015	PDF



2789-9915

8-Pin RJ45



8-Pin RJ45 Pin Out	
Pin	*Description*
4	Contact "A" (D+/D1)
5	Contact "B" (D-/D0)
8	Contact "GND"

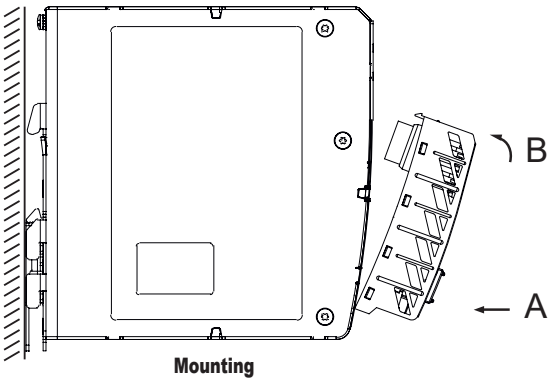
Communication Modules
Pro2 Series

Specifications				
Part Number	***2789-9015***	***2789-9023***	***2789-9052***	***2789-9080***
Communication	Modbus RTU (RS-485)	EtherNet/IP - Protocols: HTTP(S), BootP, DHCP, SNTP, MQTT	Modbus (TCP, UDP) Ethernet Protocols: HTTP(S), BootP, DHCP, SNTP	IO-Link v1.1
Nominal Input Voltage	5VDC (SELV)			24VDC (SELV; via IO-Link Master)
Input Voltage Range	4.5 to 5.5 VDC (SELV)	—		18 to 30VDC (SELV; via IO-Link Master)
Input Current	≤ 0.04 A	≤ 250mA	210mA	≤ 15mA
Power Loss (max.)	0.22 W	—	1.1 W	—
Operating Temperature	-25 to 70°C [-13 to 158°F]	-40 to 55°C [-40 to 131°F]		-25 to 70°C [-13 to 158°F]
Storage Temperature	-40 to 85°C [-40 to 185°F]	-40 to 85°C [-40 to 185°F]		-40 to 85°C [-40 to 185°F]
Relative Humidity	5 to 95% (no condensation)			5 to 96% (no condensation)
LED Indicator	1 LED PWR (Green) 1 LED RxD (Yellow) 1 LED TxD (Yellow)	1 ERR LED (Red) 1 COM OK LED (Green) 1 LED LNK/ACTx (Green) 1 LED SPEEDx (Orange)		1 COM OK LED (Green) 1 ERR LED (Red)
Baud Rate	4.8 to 115.2 kBd	10/100 Mbps auto-detect		230.4k baud
Number of Devices (max.)	247	—	—	—
Test Voltage	2 kVAC; 50Hz; 1 min	0.775 kVAC; 50Hz; 1 min	0.775 kVAC; 50Hz; 1 min	—
Test Voltage (input/output/shield)	1 kVAC; 50Hz; 1 min	—		—
Protection Class	III			
Degree of Protection	IP20 per EN 60529			
Pollution Degree	2 (according to IEC/EN 60664-1)			
Connector	(2) RJ45	(2) Ethernet 10/100Base-T (RJ45)		Push-in CAGE CLAMP ® Solid /Fine conductor 0.08 to 2.5 mm² / 28 to12 AWG Strip length: 8 to 9 mm [0.31 to 0.35 in] Cable length max: 20m [65.61 ft] (IO-Link)
Transmission Medium	Twisted pair, shielded copper cable	Ethernet: Twisted pair S-UTP; 100Ω; Cat. 5		
Mounting	Only vertical on a WAGO Pro2 Power Supply			
Weight	35g [1.23 oz]	45g [1.58 oz]	45g [1.58 oz]	35g [1.23 oz]
Agency Approval	CE, UL File E175199, UL Haz File E198726			

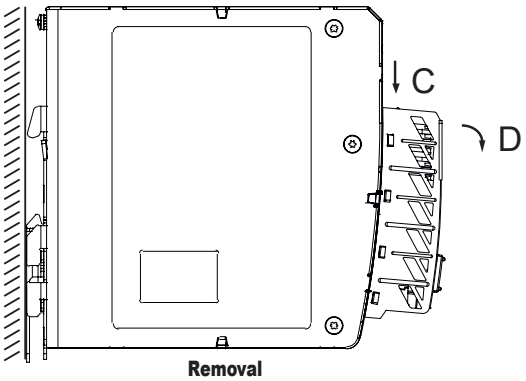
To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.

Communication Modules Pro2 Series

Mounting/Removal



Mounting



Removal

- Remove the cover for the communication interface from the WAGO Pro2 Power Supply you are using.
- Insert the bottom latches of the communication module into the bottom mounting slots of the WAGO Pro2 Power Supply [A].
- Slide the communication module toward the communication interface [B] until the top latches catch in the top mounting slots.
- Check that the communication module has correctly latched in position.

- Press in on the top locking tab of the communication module [C].
- Swing the device out to remove it from the WAGO Power Supply Pro2 [D].



Switching Power Supplies Eco2 Series

Overview

The WAGO Eco2 series is a great combination of performance and value when enhanced features are not required. The push-in connection and WAGO levers make connection with the Eco2 series quick, easy, and tool-free, saving time on wiring the power supply units. With a reduced overall width, the Eco2 saves space. With a high efficiency over 88% and the associated reduction in heat generated, the metal housing models are sustainable and durable. The built-in DC OK relay contact indicates whether the output voltage is in the nominal range. WAGO's impressive Eco2 Power Supply is an economical, reliable, robust power supply in control cabinets for 24 VDC mechanical engineering applications.



2687-2142



2687-2144

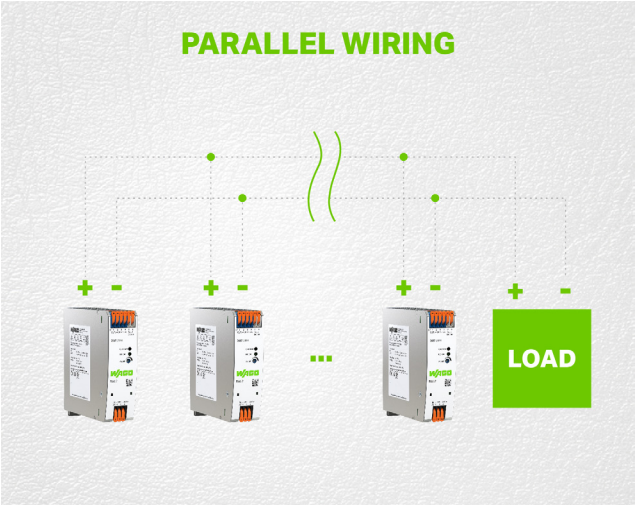
Features

- Optical status indication
- Suitable for either parallel or series operation
- Push-in Cage Clamp® technology and tool-free lever operation
- Electrically isolated output voltage (SELV/PELV) per EN 61010/UL 61010
- Rated for UL Hazardous Locations
- 2-year warranty

Switching Power Supplies									
Part Number	*Price*	*Output Voltage Range (Adjustable)*	*Nominal Input*	*Output (Adjustable)*	*Efficiency*	*MTBF (@ 25°C)*	*Circuit Breaker*	*Weight grams [oz]*	*Drawing Link*
Single Phase Input									
2687-2142	$68.00	22-29 VDC	100-240 VAC	24 VDC @ 1.25A/30W	88% @110 VAC	> 1,000,000h [per IEC 61709]	C Curve 15A	160 [5.64]	PDF
2687-2143	$93.00	22-29 VDC	120/240 VAC	24 VDC @ 2.5A/60W	90.5% @115 VAC			250 [8.81]	PDF
2687-2144	$118.00	23-28 VDC	100-240 VAC	24 VDC @ 5A/120W	90% @110 VAC			620 [21.86]	PDF
2687-2146	$198.00	23-28 VDC	100-240 VAC	24 VDC @ 10A/240W	93% @110 VAC			800 [28.21]	PDF

Wiring Diagrams





Switching Power Supplies Eco2 Series

General Specifications					
Part Number		***2687-2142***	***2687-2143***	***2687-2144***	***2687-2146***
Voltage Range		90-264 VAC			
Frequency Range		47-63 Hz			
Input Current		≤ 0.3A @ 230 VAC ≤ 0.6A @ 100 VAC	≤ 0.5A @ 230 VAC ≤ 1.1A @100 VAC	≤ 0.8A @ 230 VAC ≤ 1.5A @ 100 VAC	≤ 1.1A @ 230 VAC ≤ 2.7A @100 VAC
Inrush Current		≤ 10A [after 1ms]	≤ 20A [after 1ms]	≤ 20A [after 1ms]	≤ 25A [after 1ms]
Mains Failure Hold-Up Time		≥ 120ms (230 VAC) ≥ 15ms (110 VAC)	≥ 130ms (230 VAC) ≥ 3ms (110 VAC)	≥ 20ms (230 VAC)	≥ 25ms (230 VAC)
Residual Ripple		≤ 30mV (peak-to-peak @ 230 VAC)	≤ 20mV (peak-to-peak @ 230 VAC)	≤ 75mV (peak-to-peak)	
Overload Behavior		Constant power up to 125%; shutdown and automatic restart in the event of a short circuit	Constant power up to 130 %; shutdown and automatic restart in the event of a short circuit	Constant power up to 125%; shutdown and automatic restart in the event of a short circuit	Constant current up to 105 to 110%; shutdown and automatic restart in the event of a short circuit
Isolation	***Primary - Secondary***	3510 VAC			
	Primary - Ground	—		2200 VAC	
	Secondary - Ground	—		DC, 0.5 kV	
	Secondary Signal	—		DC, 0.5 kV	
Short-circuit Protection		Yes			
Parallel Operation		Yes			
Status Indicators		1 x LED DC OK (green)		Optical status indication (overload) Optical status indication (DC OK) Digital signal output (DO)	
Vibration (according to IEC 60068-2-6)		5Hz ≤ f ≤ 8.4 Hz: 3.5 mm, 8.4 Hz ≤ f ≤ 150Hz: 1g			
Shock (according to IEC 60068-2-27)		15g, 11ms, 3 shocks per axis (18 shocks in total)			
Temperature		Operating: -25 to 70°C [-13 to 158°F] Storage: -40 to 85°C [-40 to 185°F]			
Humidity		5 to 96% [no condensation permissible]			
Protection Rating		IP20			
Mounting		35mm DIN rail			
Housing Material		Plastic		Metal	
Connection		Push-in Cage Clamp®			
Solid or Fine Conductor		0.2 to 4mm² / 24-12AWG			
Ferrule Size		0.25 to 2.5 mm²			
Agency Approval		CE, UKCA, cULus File E255817, UL Hazardous E198726			

To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.

Switching Power Supplies
3-Phase RACPRO1 Series

Overview

The slim RACPRO1 series is a high-reliability, three-phase AC input, DIN rail mount power supply. It is specially designed for demanding applications in the harsh industrial automation field. The unique and innovative modern design with 25-degree push-in connectors allows easy tool-less installation or replacement.

Features

- Slim design with 25-degree push-in connectors
- Fast tool-less mounting and demounting
- Active inrush current limitation
- Thermal power bonus 120%/45°C
- 3-year warranty



RACPRO1-T240/24

3-Phase Switching Power Supplies								
Part Number	*Price*	*Output Voltage Range*	*Input Voltage Range*	*Output (Adjustable)*	*Efficiency*	*Dimensions H x W x D mm [in]*	*Weight gram [lb]*	*Drawing Link*
RACPRO1-T240/24	$140.00	24-28 VDC	320-575 VAC 450-815 VDC	24 VDC @ 10A/240W	94.1% @ 480 VAC	135 x 43 x 140.4 [5.3 x 1.7 x 5.5]	531 [1.17]	PDF
RACPRO1-T480/24	$190.00	24-28 VDC		24 VDC @ 20 A/480W	95% @ 480 VAC	135 x 52 x 155.7 [5.3 x 2.0 x 6.1]	768 [1.69]	PDF
RACPRO1-T480/48	$190.00	48-56 VDC		48 VDC @ 10A/480W	94% @ 480 VAC			PDF
RACPRO1-T960/24	$275.00	24-28 VDC		24 VDC @ 40A/960W	96% @ 480 VAC	135 x 80 x 155.7 [5.3 x 3.15 x 6.1]	1140 [2.51]	PDF
RACPRO1-T960/48	$275.00	48-56 VDC		48 VDC @ 20A/960W	97% @ 480 VAC			PDF

3-Phase Switching Power Supplies												
Part Number	*Input/Output Cage Clamp*								*Push-in Signal Terminal **			
	Function	*AWG*	*mm²*	*Wire Stripping Length*	*Function*	*AWG*	*mm²*	*Wire Stripping Length*	*Function*	*AWG*	*mm²*	*Wire Stripping Length*
RACPRO1-T240/24	L1, L2, L3	24-8	0.25-6	12-13mm	+1, +2 (Vout)	24-8	0.25-6	12-13mm	Signal	24-16	0.25-1.5	8-9mm
	PE				-1, -2 (Vout)							
RACPRO1-T480/24	L1, L2, L3				+1, +2 (Vout)							
	PE				-1, -2 (Vout)							
RACPRO1-T480/48	L1, L2, L3				+1, +2 (Vout)							
	PE				-1, -2 (Vout)							
RACPRO1-T960/24	L1, L2, L3				+1, +2 (Vout)	18-4	0.75-25	18-20mm	Signal (13, 14)			
	PE				-1, -2 (Vout)							
RACPRO1-T960/48	L1, L2, L3				+1, +2 (Vout)							
	PE				-1, -2 (Vout)							

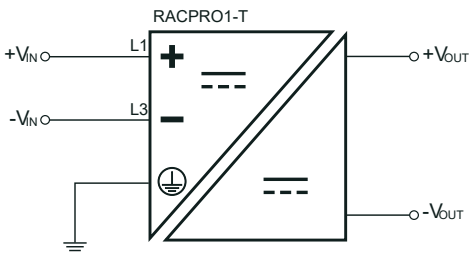
*** Do not connect to hazardous voltages.**
Ferrules are required for stranded wire.

Switching Power Supplies 3-Phase T240 Model RACPRO1 Series

Specifications		
Models		***T240***
Nominal Input Voltage		400 to 480 VAC @ 50/60 Hz
Operating Range [1]	***3-Phase***	320 to 575 VAC
	2-Phase	350 to 575 VAC
	DC Operation (Refer to Connections for DC Operation Diagram)	Continuous 450 to 815 VDC 10s maximum 850 VDC
Turn-on Voltage	***AC Operation***	Minimum 310 VAC (prevents switching on 1AC operation)
	DC Operation	Minimum 440 VDC
Turn-off Voltage	***AC Operation***	Minimum 290 VAC
	DC Operation	Minimum 410 VDC
Input Current	***400 VAC***	Maximum 3x 0.7A
	480 VAC	Maximum 3x 0.6A
	500 VDC	Maximum 0.8A
Inrush Current		Maximum 10A (3AC 400 VAC, cold start)
No Load Power Consumption		Maximum 0.8W (3AC 400 VAC) Maximum 1.1W (3AC 500 VAC)
Input Frequency Range		47 to 63 Hz
Nominal Output Voltage		Typical 24 VDC (factory set)
Minimum Load		0%
Power Factor		Minimum 0.45 at full load
Start-up Time		Typical 37ms maximum 50ms (2&3 phase operation, 400 VAC)
Rise Time		Typical 23ms maximum 30ms
Hold-up Time	***400 VAC***	Typical 15ms
	480 VAC	Typical 30ms
Internal Operating Frequency		Typical 65 kHz
Ripple and Noise		Maximum 1% of nom V_{out} (20 MHz bandwidth)
Housing Material		Polycarbonate/aluminum
Agency Approvals		cULus File NMTR.E470721, CE

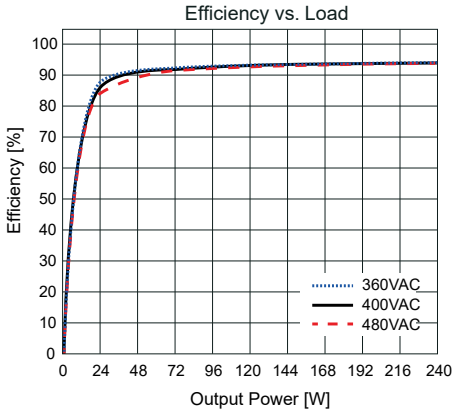
[1] The products were submitted for safety files at AC and DC-Input operation. (350V-575 VAC and 450-600 VDC) If input voltage is >500 VDC consider an external fuse according to applicable standards. 2-phase operation is not included in the safety approvals. Additional tests might be necessary when the complete application has to be approved according to UL 62368-1, 61010-1 and UL 61010-2-201

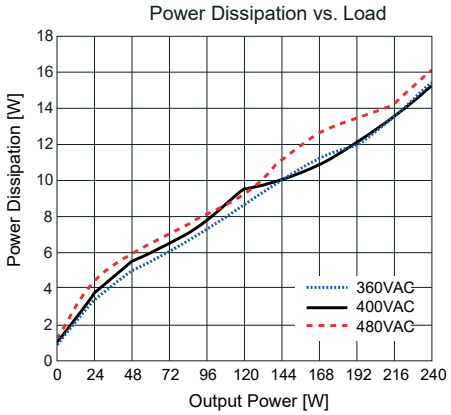
Connections for DC Operation



Switching Power Supplies 3-Phase T240 Model RACPRO1 Series

Characteristic Curves





Additional Features		
Parameter	***Condition***	***Value***
Output Voltage Adjustability (1)	On-board potentiometer	24-48 VDC
DC-OK LED	LED Green	Output voltage OK, normal mode
	LED off	Abnormal mode, no operation or failure
Signal Contact	Closed	Normal mode
	Open	Abnormal mode, no operation or failure
Signal contact Rating	Do not connect signaling contact to hazardous voltages	30 VDC / 0.1A

(1) **When input voltage is below 350 VAC, the output voltage is limited to 24 VDC.**
Make sure that the maximum rated output power will not be exceeded when trimming up.

Regulations		
Parameter	***Condition***	***Value***
Output Accuracy	—	Maximum ±1.0%
Line Regulation	Low line to high line, full load	Typical ±0.1% .
Load Regulation	0 to 100% load	Typical ±0.4%
Max. Capacitive Load (start-up)	—	20mF
Transient Response	10 to 100% load	Typical ±3.0%
	Recovery time	Typical 100ms

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up unless otherwise stated.

Switching Power Supplies 3-Phase T240 Model RACPRO1 Series

Protections		
Parameter	***Type***	***Value***
Internal Input Fuse	DC compliant	2x T15A, slow-blow
Easy Fuse Tripping	—	250% / 20ms
External Input Protection	—	16A C-characteristic circuit breaker
Short Circuit Protection (SCP)	—	Hiccup mode, auto recovery
Over Voltage Protection (OVP)	SELV output	35 VDC, latch off
Return Voltage Immunity	Continuous	35 VDC
	< 5 min	38 VDC
Absorbing Energy	—	1.5J
Over Voltage Category (OVC)	—	OVCII
Over Current Protection (OCP)	< 5 sec	> 150% of rated load current, hiccup mode, auto recovery
	< 20ms (1)	> 250% of rated load current, hiccup mode, auto recovery
Class of Equipment	—	Class I with PE connection
Isolation Voltage (safety certified) (2)	I/P to O/P (tested for 1 minute)	3.5 kVAC / 5 kVDC
	I/P to PE (tested for 1 minute)	1.6 kVAC / 2.5 kVDC
	O/P to PE (tested for 1 minute)	500 VAC / 700 VDC
Isolation Resistance	I/P to O/P	4.5 MΩ minimum
Insulation Grade	—	Reinforced
Earth Leakage Current	480 VAC / 60Hz	3.5 mA maximum

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up unless otherwise stated.
(1) V_{OUT} = 19 VDC min.
(2) For repeat Hi-Pot testing, reduce the time and or the test voltage

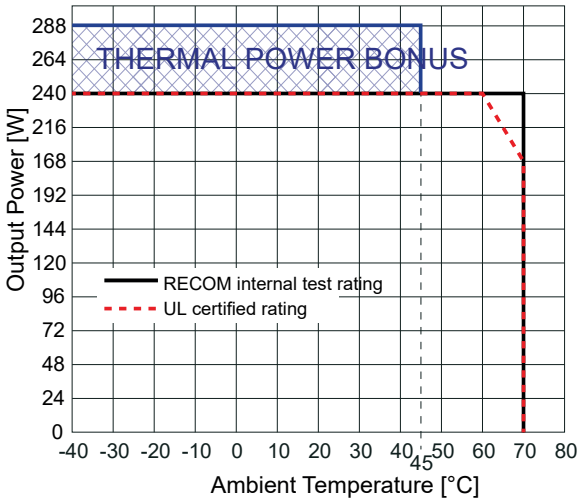
Environmental		
Parameter	***Condition***	***Value***
Operating Ambient Temperature Range	At natural convection (0.1m/s)	-40 to 70°C [-40 to 158°F]
Operating Altitude	—	Recognized by safety agency for sate operation up to 5000m. High altitude operation maybe impact the performance and lifetime.
Operating Humidity	Non-condensing	95% RH max.
Pollution Degree	—	2
IP Rating	—	IP20
Shock	According to IEC 60068-2-27 Fa (non-operating)	15G/11ms, 3 times (positive/negative) in all axis
Vibration	According to IEC 60068-2-6 Fc (non-operating)	5 - 8.4 Hz @ 3.5mm deflection 8.4 -150Hz @ 2G, 10 cycles /axis(min-max-min); 1 octave/min
MTBF	According to EN/IEC 61709 (SN29500)	1.015 x 10^3 hours
Design Lifetime	T_{AMB}= 40°C @ 100% Load	80 x 10^3 hours

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up unless otherwise stated.

Switching Power Supplies 3-Phase T240 Model RACPRO1 Series

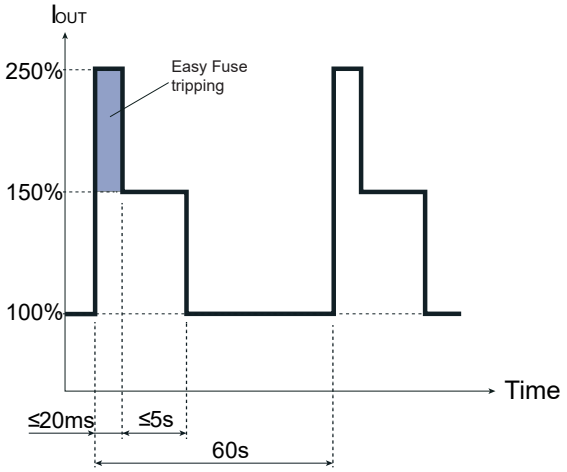
Derating Graph

(@ Chamber and natural convection 0.1m/s)



Boost Power Graph

(400-480 VAC or 500 VDC; -40°C to +60°C max.)

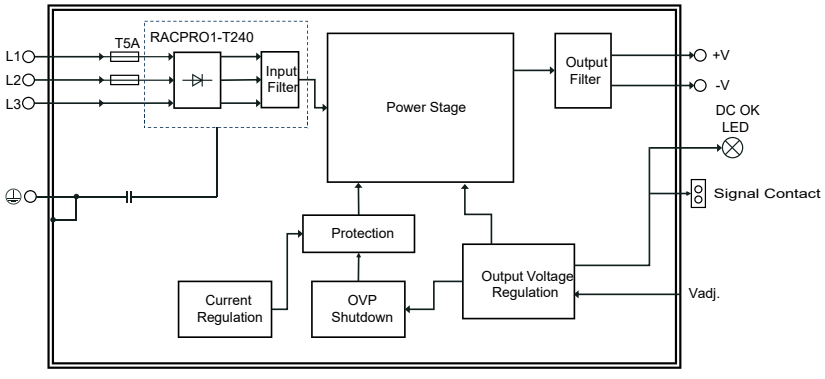


Easy fuse tripping is designed to trip a fuse in the event of a short circuit. Once the fuse has tripped, the current returns to its normal operation value. The impulse that causes easy fusing tripping happens independently of the power boost.

Phase Redundancy

If one phase fails, operation is still guaranteed. (2-phase operation)

Block Diagram



Switching Power Supplies 3-Phase T480 Model RACPRO1 Series

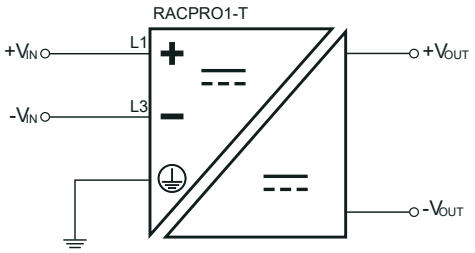
Specifications		
Models		***T480***
Nominal Input Voltage		400 to 480 VAC at 50/60 Hz
Operating Range [1]	***3-Phase***	320 to 575 VAC [2]
	2-Phase	350 to 480 VAC (max. P_{OUT} - 340W)
	DC Operation (Refer to Connections for DC Operation Diagram)	Continuous 450 to 815 VDC 10s maximum 850 VDC
Turn-on Voltage	***AC Operation***	Minimum 310 VAC (prevents switching on 1AC operation)
	DC Operation	Minimum 440 VDC
Turn-off Voltage	***AC Operation***	Minimum 280 VAC
	DC Operation	Minimum 395 VDC
Input Current	***AC Operation 400 VAC***	Maximum 3x 0.8A
	AC Operation 480 VAC	Maximum 3x 0.7A
	DC Operation 500 VDC	Maximum 1.0A
Inrush Current	***3AC 400 VAC, cold start***	Maximum 10A
No Load Power Consumption	***3AC 400VAC***	RACPRO1-T480/24 1.9W typical 3W maximum
		RACPRO1-T480/48 2.4W typical 3W maximum
	3AC 480VAC	RACPRO1-T480/24 2W typical 3W maximum
		RACPRO1-T480/48 2.9W typical 3W maximum
Input Frequency Range		47 to 63 Hz
Nominal Output Voltage (factory set)		RACPRO1-T480/24 typical 24 VDC RACPRO1-T480/48 typical 48 VDC
Minimum Load		0%
Power Factor (full load)		Typical 0.92
Start-up Time	***(2- & 3-phase operation, 400 VAC)***	Typical 98ms maximum 112ms
Rise Time		Typical 3.5ms maximum 7ms
Hold-up Time	***400 VAC***	Typical 15ms
	480 VAC	Typical 30ms
Internal Operating Frequency		Typical 83 kHz
Ripple and Noise		Maximum 1% of nom V_{out} (20 MHz bandwidth)
Housing Material		Polycarbonate/aluminum
Agency Approvals		cULus File NMTR.E470721, CE

[1] The products were submitted for safety files at AC and DC-Input operation. (350V-575 VAC and 450-600 VDC) If input voltage is >500 VDC consider an external fuse according to applicable standards. 2-phase operation is not included in the safety approvals. Additional tests might be necessary when the complete application has to be approved according to UL 62368-1, 61010-1 and UL 61010-2-201

[2] Output power derating for Line-input of less than 3AC 350VAC (derate linearly from 100% at 350 VAC to 90% at 3AC 320VAC)

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up unless otherwise stated.

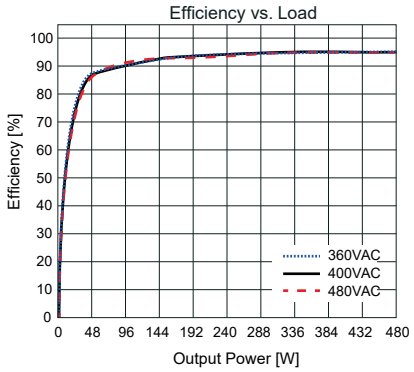
Connections for DC Operation

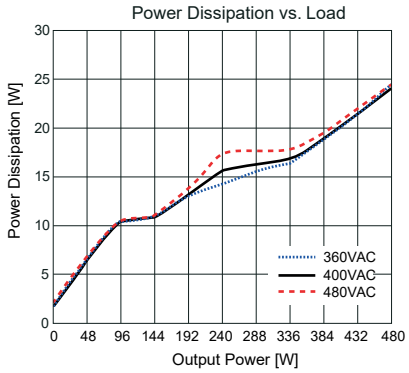


Switching Power Supplies 3-Phase T480 Model RACPRO1 Series

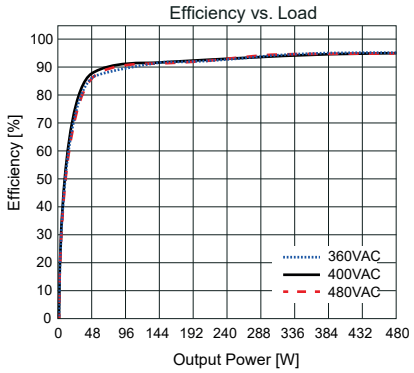
Characteristic Curves

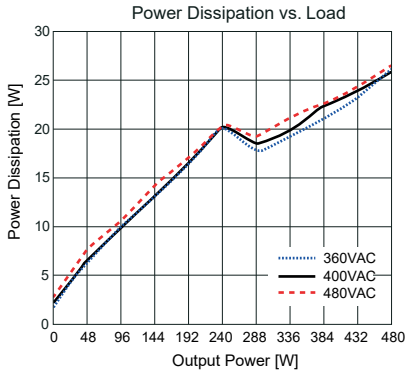
RACPRO1-T480/24





RACPRO1-T480/48





Additional Features			
Parameter	***Condition***		***Value***
Output Voltage Adjustability (1)	On-board potentiometer	RACPRO1-T480/24	24-28 VDC
		RACPRO1-T480/48	48-56 VDC
Parallel Load Share Mode	—		Refer to DIP-Switch Settings
Boost Power	Refer to Boost Power		150% for 7.5s
			250% for 20ms
Charging Mode	DIP-Switch 2 "ON"; limited to T_{AMB} max. 60°C, to maintain reliability Refer to CC/CV Mode (Charging Mode)		Typical 100% $I_{OUTLIMIT}$ continuous
Load Indication LED	LED green, refer to Load Indication LED		Normal Mode
	LED off		Abnormal mode, no operation or failure
DC-OK LED	LED Green		Output voltage OK, normal mode
	LED off		Abnormal mode, no operation or failure
Signal Contact	Closed		Normal mode
	Open		Abnormal mode, no operation or failure
Signal contact Rating	Do not connect signaling contact to hazardous voltages	RACPRO1-T480/24	30 VDC / 0.1A
		RACPRO1-T480/48	60 VDC / 0.1A

(1) **When input voltage is below 350 VAC, the output voltage is limited to 24 VDC.**
Make sure that the maximum rated output power will not be exceeded when trimming up.

Switching Power Supplies 3-Phase T480 Model RACPRO1 Series

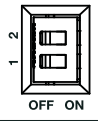
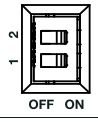
DIP-Switch Settings

Single Mode (Factory set)*
Power Boost Mode available, refer to Boost Power.

Parallel Load Share Mode**
Angled output characteristic (droop mode) for load sharing. Voltage drop from 0 to nom. I_{OUT}: 1.2 V

Charging Mode
Current Limitation strictly at nominal current. Refer to CC/CV Mode (Charging Mode)

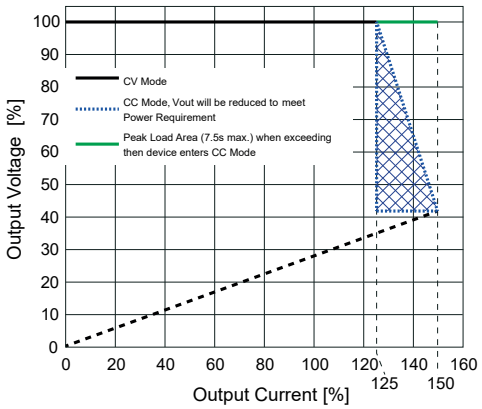
Not allowed! This would result in an output characteristic with passive load sharing and nominal output current only. This won't necessarily damage the PSU, but it will prevent the 150% boost power mode from activating. We advise against using these PSUs in this mode out of an abundance of caution.

DIP1	DIP2	
OFF	OFF	
ON	OFF	
OFF	ON	
ON	ON	

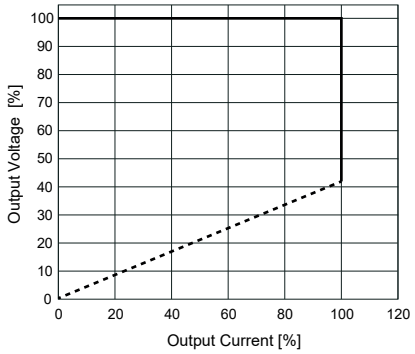
** Series operation is allowed. A setup was successfully tested without issue using three RACPRO1-T480/48 units in series for an output of 150V. If a series configuration is to be used, it is critical that proper wiring, connections, and safety measures are in place ahead of time to prevent any converters being disproportionately loaded. For series operation, best practice it to put the PSUs in Single Mode, as this would provide full power with the 150% power boost.*

*** This mode enables automatic current sharing between paralleled units by slightly decreasing the output voltage as output current increases. When 2+ supplies are operated in parallel, if one unit starts taking more load, its voltage drops a bit more, and the other unit(s) begins to supply more current in response to this voltage drop.*

U/I Factory Setting (Single Mode)



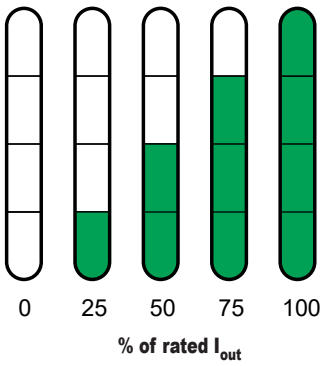
CC/CV Mode (Charging Mode)



Constant Current / Constant Voltage mode. It's useful for the battery charging mode to have the output stay at the 100% rated output current. This is applicable for just the T480 and T960.

Load Indication LED

4 LEDs displaying actual and target current of rated output current.



Regulations		
Parameter	***Condition***	***Value***
Output Accuracy	–	±1.0% maximum
Line Regulation	Low line to high line, full load	±0.1% typical
Load Regulation	0 to 100% load	±0.3% typical
Max. Capacitive Load (start-up)	RACPRO1-T480/24	40mF
	RACPRO1-T480/48	20mF
Transient Response	10 to 100% load	±3.0% typical
	Recovery time	100ms typical

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up unless otherwise stated.

Switching Power Supplies 3-Phase T480 Model RACPRO1 Series

Protections			
Parameter	***Type***		***Value***
Internal Input Fuse	DC compliant		2x T15A, slow-blow
Easy Fuse Tripping	—		250% / 20ms
External Input Protection	—		16A C-characteristic circuit breaker
Short Circuit Protection (SCP)	—		Hiccup mode, auto recovery
Over Voltage Protection (OVP)	SELV output	RACPRO1-T480/24	35 VDC, latch off
		RACPRO1-T480/48	59.8 VDC, latch off
Return Voltage Immunity	Continuous	RACPRO1-T480/24	35 VDC maximum
		RACPRO1-T480/48	63 VDC maximum
	<5 min	RACPRO1-T480/24	38 VDC maximum
		RACPRO1-T480/48	68 VDC maximum
Absorbing Energy	RACPRO1-T480/24		1.5 J
	RACPRO1-T480/48		1J
Over Voltage Category (OVC)	—		OVCII
Over Current Protection (OCP)	<7.5 sec		> 150% of rated load current, hiccup mode, auto recovery
	< 20ms (1)		> 250% of rated load current, hiccup mode, auto recovery
Class of Equipment	—		Class I with PE connection
Isolation Voltage (safety certified) (2)	I/P to O/P (tested for 1 minute)		3.5 kVAC / 5 kVDC
	I/P to PE (tested for 1 minute)		1.6 kVAC / 2.5 kVDC
	O/P to PE (tested for 1 minute)		500 VAC / 700 VDC
Isolation Resistance	I/P to O/P		4.5 MΩ minimum
Insulation Grade	—		Reinforced
Earth Leakage Current	480 VAC / 60 Hz		3.5 mA maximum

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up unless otherwise stated.
(1) V_{OUT} = 19 VDC minimum.
(2) For repeat Hi-Pot testing, reduce the time and or the test voltage

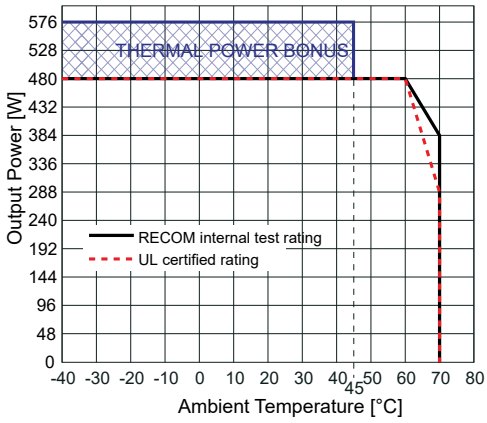
Switching Power Supplies 3-Phase T480 Model RACPRO1 Series

Environmental		
Parameter	***Condition***	***Value***
Operating Ambient Temperature Range	At natural convection (0.1m/s)	-40 to 70°C [-40 to 158°F] with derating Refer to Derating Graph for without derating
Operating Altitude	—	Recognized by safety agency for sate operation up to 5000m. High altitude operation maybe impact the performance and lifetime.
Operating Humidity	Non-condensing	95% RH max.
Pollution Degree	—	2
IP Rating	—	IP20
Shock	According to IEC 60068-2-27 Fa (non-operating)	15G/11ms, 3 times (positive/negative) in all axis
Vibration	According to IEC 60068-2-6 Fc (non-operating)	5 - 8.4Hz @ 3.5 mm deflection 8.4 -150Hz @ 2G, 10 cycles /axis(min-max-min); 1 octave/min
MTBF	According to EN/IEC 61709 (SN29500)	705 x 10^3 hours
Design Lifetime	T_{AMB}= 40°C @ 100% Load	80 x 10^3 hours

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up, unless otherwise stated.

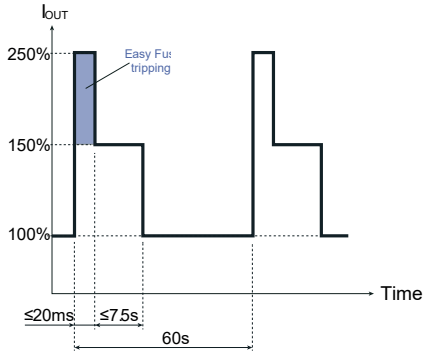
Derating Graph

(@ Chamber and natural convection 0.1m/s)



Boost Power 480W Models

(400V-480 VAC or 500 VDC, -40 t0 60°C)



Easy fuse tripping is designed to trip a fuse in the event of a short circuit. Once the fuse has tripped, the current returns to its normal operation value. The impulse that causes easy fusing tripping happens independently of the power boost.

Switching Power Supplies 3-Phase T480 Model RACPRO1 Series

Phase Redundancy

If on phase fails, operation is still guaranteed. (2-phase operation)

Parallel Operation

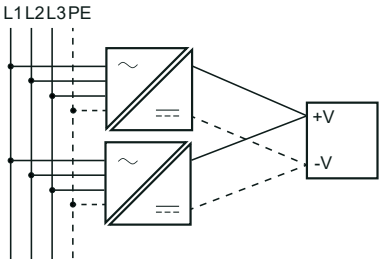
1) Make sure that the DIP-Switch 1 is “ON” to get into the Parallel Load sharing mode.

2) Adjust each power supply to the exact same output voltage with the same load and cooling conditions.

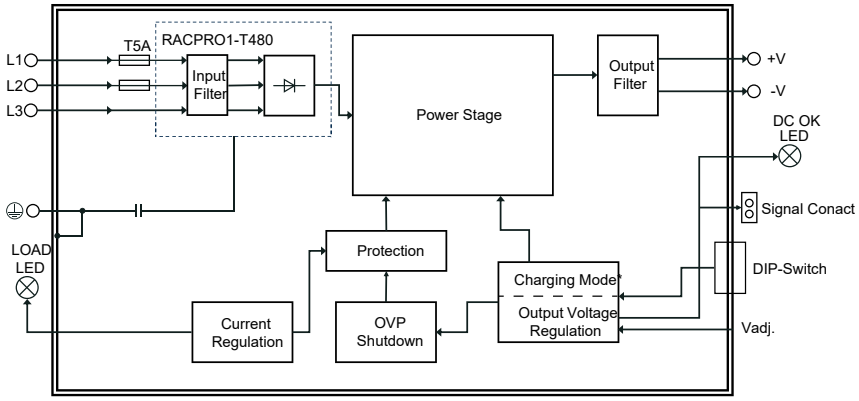
3) Use the same wire length and cable cross-section for each power supply (star connection) and energize all units at the same time to avoid triggering overload protection.

4) Do not use power supplies in parallel with mounting orientations other than the standard mounting orientation (input terminals at the bottom of the unit) or in any other condition where a derating of the output current is required (e.g. above 60°C).

5) Pay attention that leakage current, EMI, inrush current, harmonics will increase when using multiple power supplies.



Block Diagram



Switching Power Supplies 3-Phase T960 Model RACPRO1 Series

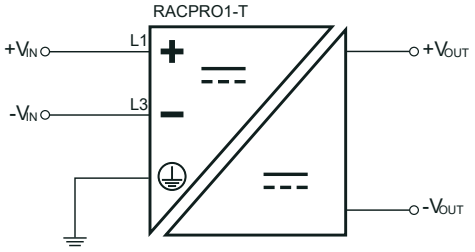
Specifications		
Models		***T960***
Nominal Input Voltage		400 to 480 VAC at 50/60 Hz
Operating Range [1]	***3-Phase***	320 to 575 VAC [2]
	2-Phase	350 to 480 VAC (max. P_{OUT} - 60W)
	DC Operation (Refer to Connections for DC Operation Diagram)	Continuous 450 to 815 VDC 10s max. 850 VDC
Turn-on Voltage	***AC Operation***	Minimum 300 VAC (prevents switching on 1AC operation)
	DC Operation	Minimum 424 VDC
Turn-off Voltage	***AC Operation***	Minimum 290 VAC
	DC Operation	Minimum 410 VDC
Input Current	***AC Operation 400 VAC***	Maximum 3x 1.6A
	AC Operation 480 VAC	Maximum 3x 1.4A
	DC Operation 500 VDC	Maximum 2.1A
Inrush Current	***3AC 400 VAC, cold start***	Maximum 10A
No Load Power Consumption	***3AC 400 VAC***	RACPRO1-T960/24 2.2W typical 3W maximum
		RACPRO1-T960/48 2.1W typical 3W maximum
	3AC 480 VAC	RACPRO1-T960/24 2.5W typical 3W maximum
		RACPRO1-T480/48 2.7W typical 3W maximum
Input Frequency Range		47 to 63 Hz
Nominal Output Voltage (factory set)		RACPRO1-T960/24RACPRO1-T960/24 typical 24 VDC RACPRO1-T960/48 typical 48 VDC
Minimum Load		0%
Power Factor (full load)		Typical 0.94
Start-up Time	***(2- & 3-phase operation, 400 VAC)***	Typical 695ms maximum 810ms
Rise Time		Typical 5ms maximum 10ms
Hold-up Time		RACPRO1-T960/24 typical 23ms
		RACPRO1-T960/48 typical 21ms
Internal Operating Frequency		Typical 83 kHz
Ripple and Noise		Maximum 1% of nom V_{out} (20MHz bandwidth)
Housing Material		Polycarbonate/aluminum
Agency Approvals		cULus File NMTR.E470721, CE

[1] The products were submitted for safety files at AC and DC-Input operation. (350V-575 VAC and 450-600 VDC) If input voltage is >500 VDC consider an external fuse according to applicable standards. 2-phase operation is not included in the safety approvals. Additional tests might be necessary when the complete application has to be approved according to UL 62368-1, 61010-1 and UL 61010-2-201

[2] Output power derating for Line-input of less than 3AC 350 VAC (derate linearly from 100% at 350 VAC to 90% at 3AC 320 VAC)

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up unless otherwise stated.

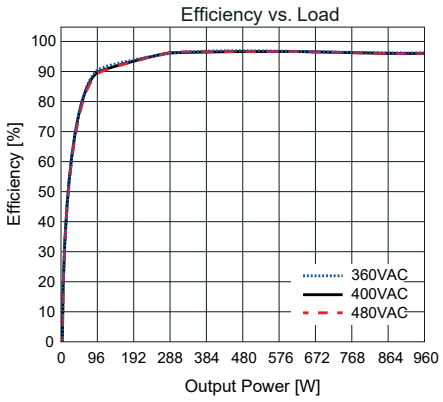
Connections for DC Operation

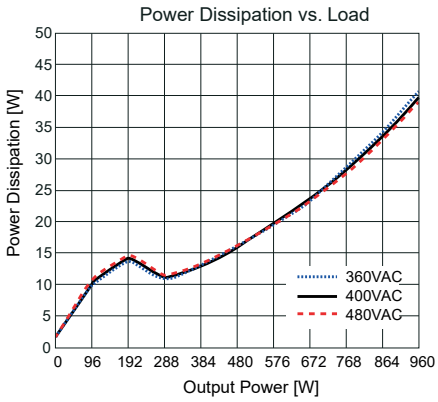


Switching Power Supplies 3-Phase T960 Model RACPRO1 Series

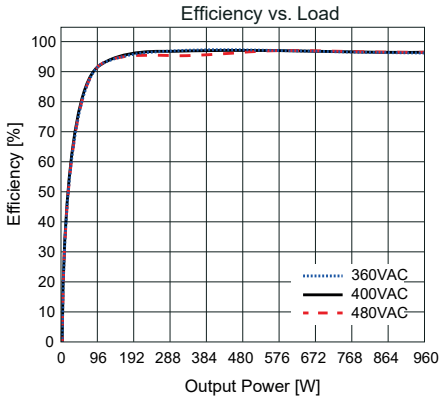
Characteristic Curves

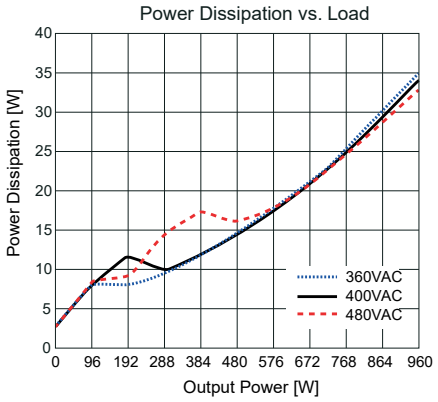
RACPRO1-T960/24





RACPRO1-T960/48





Additional Features			
Parameter	***Condition***		***Value***
Output Voltage Adjustability (1)	On-board potentiometer	RACPRO1-T960/24	24-28 VDC
		RACPRO1-T960/48	48-56 VDC
Parallel Load Share Mode	—		Refer to DIP-Switch Settings
Boost Power	Refer to Boost Power		150% for 7.5s
			250% for 20ms
Charging Mode	DIP-Switch 2 "ON"; limited to T_{AMB} max. 60°C, to maintain reliability Refer to CC/CV Mode (Charging Mode)		Typical 100% $I_{OUTLIMIT}$ continuous
Load Indication LED	LED green, refer to Load Indication LED		Normal Mode
	LED off		Abnormal mode, no operation or failure
DC-OK LED	LED Green		Output voltage OK, normal mode
	LED off		Abnormal mode, no operation or failure
Signal Contact	Closed		Normal mode
	Open		Abnormal mode, no operation or failure
Signal Contact Rating	Do not connect signaling contact to hazardous voltages	RACPRO1-T960/24	30 VDC / 0.1A
		RACPRO1-T960/48	60 VDC / 0.1A

(1) When input voltage is below 350 VAC, the output voltage is limited to 24/48 VDC.
Make sure that the maximum rated output power will not be exceeded when trimming up.

Switching Power Supplies 3-Phase T960 Model RACPRO1 Series

DIP-Switch Settings

Single Mode (Factory set) *
Power Boost Mode available, refer to Boost Power

Parallel Load Share Mode ***
Angled output characteristic (droop mode) for load sharing. Voltage drop from 0 to nom. I_{OUT}: 1.2V

Charging Mode
Current Limitation strictly at nominal current. Refer to CC/CV Mode (Charging Mode)

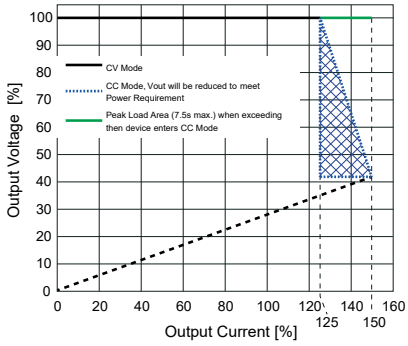
Not allowed!
This would result in an output characteristic with passive load sharing and nominal output current only. This won't necessarily damage the PSU, but it will prevent the 150% boost power mode from activating. We advise against using these PSUs in this mode out of an abundance of caution.

DIP1	DIP2	
OFF	OFF	
ON	OFF	
OFF	ON	
ON	ON	

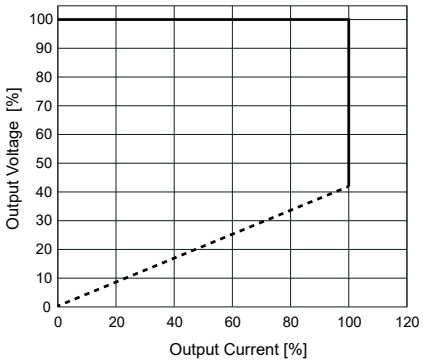
** Series operation is allowed. A setup was successfully tested without issue using three RACPRO1-T480/48 units in series for an output of 150V. If a series configuration is to be used, it is critical that proper wiring, connections, and safety measures are in place ahead of time to prevent any converters being disproportionately loaded.*
For series operation, best practice it to put the PSUs in Single Mode, as this would provide full power with the 150% power boost.

*** This mode enables automatic current sharing between paralleled units by slightly decreasing the output voltage as output current increases. When 2+ supplies are operated in parallel, if one unit starts taking more load, its voltage drops a bit more, and the other unit(s) begins to supply more current in response to this voltage drop.*

U/I Factory Setting (Single Mode)



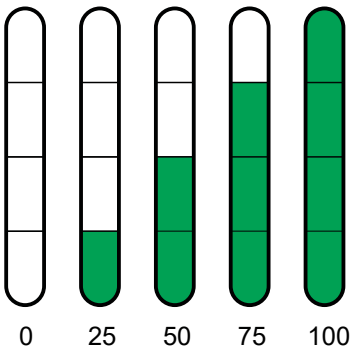
CC/CV Mode (Charging Mode)



Constant Current / Constant Voltage mode. It's useful for the battery charging mode to have the output stay at the 100% rated output current. This is applicable for just the T480 and T960.

Load Indication LED

4 LEDs displaying actual and target current of rated output current.



Regulations		
Parameter	***Condition***	***Value***
Output Accuracy	—	±1.0% maximum
Line Regulation	Low line to high line, full load	±0.1% typical
Load Regulation	0 to 100% load	±0.3% typical
Max. Capacitive Load (start-up)	RACPRO1-T960/24	40mF
	RACPRO1-T960/48	20mF
Transient Response	10 to 100% load	±3.0% typical
	Recovery time	100ms typical

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up unless otherwise stated.

Switching Power Supplies 3-Phase T960 Model RACPRO1 Series

Protections			
Parameter	***Type***		***Value***
Internal Input Fuse	DC compliant		2 x 5A, slow-blow
Easy Fuse Tripping	—		250% / 20ms
External Input Protection	—		16A C-characteristic circuit breaker
Short Circuit Protection (SCP)			Hiccup mode, auto recovery
Over Voltage Protection (OVP)	SELV output	RACPRO1-T960/24	35 VDC, latch off
		RACPRO1-T960/48	59.8 VDC, latch off
Return Voltage Immunity	Continuous	RACPRO1-T960/24	35 VDC maximum
		RACPRO1-T960/48	63 VDC maximum
	<5 min	RACPRO1-T960/24	38 VDC maximum
		RACPRO1-T960/48	68 VDC maximum
Absorbing Energy	RACPRO1-T960/24		2J
	RACPRO1-T960/48		1.5 J
Over Voltage Category (OVC)	—		OVCII
Over Current Protection (OCP)	< 6 sec		> 150% of rated load current, hiccup mode, auto recovery
	< 20ms (1)		> 250% of rated load current, hiccup mode, auto recovery
Class of Equipment	—		Class I with PE connection
Isolation Voltage (safety certified) (2)	I/P to O/P (tested for 1 minute)		3.5 kVAC / 5 kVDC
	I/P to PE (tested for 1 minute)		1.6 kVAC / 2.5 kVDC
	O/P to PE (tested for 1 minute)		500 VAC / 700 VDC
Isolation Resistance	I/P to O/P		4.5 MΩ minimum
Insulation Grade	—		Reinforced
Earth Leakage Current	480 VAC / 60 Hz		3.5 mA maximum

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up unless otherwise stated.
(1) V_{OUT} = 19 VDC minimum.
(2) For repeat Hi-Pot testing, reduce the time and or the test voltage

Switching Power Supplies 3-Phase T960 Model RACPRO1 Series

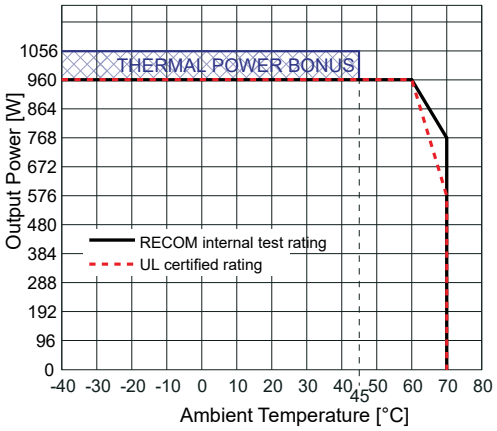
Environmental		
Parameter	***Condition***	***Value***
Operating Ambient Temperature Range	At natural convection (0.1m/s)	-40 to 70°C [-40 to 158°F] with derating Refer to Derating Graph for without derating
Operating Altitude	—	Recognized by safety agency for sate operation up to 5000m. High altitude operation maybe impact the performance and lifetime.
Operating Humidity	Non-condensing	95% RH maximum
Pollution Degree	—	2
IP Rating	—	IP20
Shock	According to IEC 60068-2-27 Fa (non-operating)	15G/11ms, 3 times (positive/negative) in all axis
Vibration	According to IEC 60068-2-6 Fc (non-operating)	5 - 8.4 Hz @ 3.5mm deflection 8.4 -150Hz @ 2G, 10 cycles /axis (min-max-min); 1 octave/min
MTBF	According to EN/IEC 61709 (SN29500)	680 x 10^3 hours
Design Lifetime	T_{AMB}= 40°C @ 100% Load	80 x 10^3 hours

Measured @ T_{AMB}= 25°C, 3AC 400 VAC full load and after warm-up, unless otherwise stated.

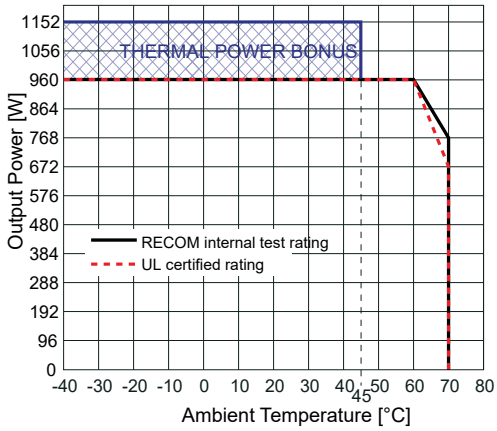
Derating Graph

(@ Chamber and natural convection 0.1m/s)

RACPRO1-T960/24

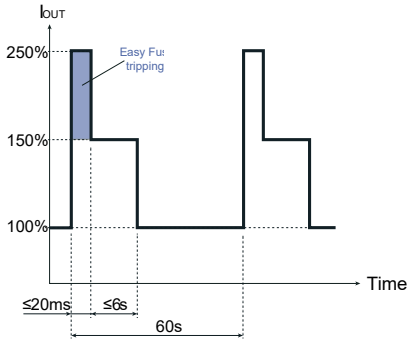


RACPRO1-T960/48



Boost Power

(400-480 VAC or 500 VDC; -40°C to +60°C max.)

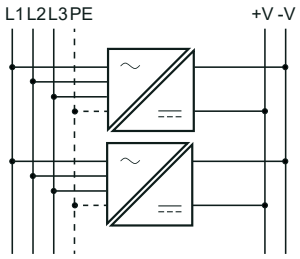


Easy fuse tripping is designed to trip a fuse in the event of a short circuit. Once the fuse has tripped, the current returns to its normal operation value. The impulse that causes easy fusing tripping happens independently of the power boost.

Switching Power Supplies 3-Phase T960 Model RACPRO1 Series

Phase Redundancy

If on phase fails, operation is still guaranteed. (2-phase operation)



Parallel Operation

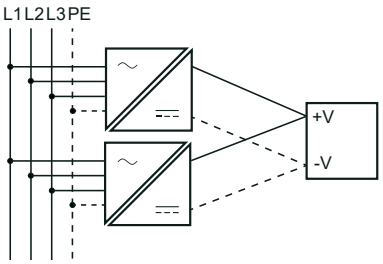
1) Make sure that the DIP-Switch 1 is “ON” to get into the Parallel Load sharing mode.

2) Adjust each power supply to the exact same output voltage with the same load and cooling conditions.

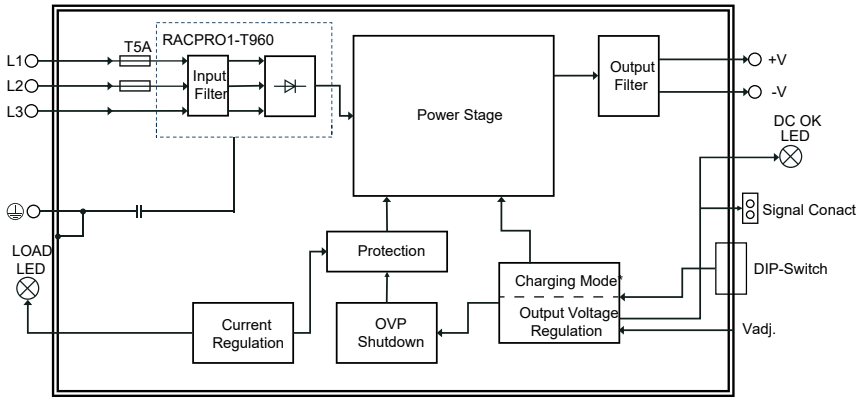
3) Use the same wire length and cable cross-section for each power supply (star connection) and energize all units at the same time to avoid triggering overload protection.

4) Do not use power supplies in parallel with mounting orientations other than the standard mounting orientation (input terminals at the bottom of the unit) or in any other condition where a derating of the output current is required (e.g. above 60°C).

5) Pay attention that leakage current, EMI, inrush current, harmonics will increase when using multiple power supplies.



Block Diagram



Switching Power Supplies 3-Phase RACPRO1 Series

Safety & Certifications RACPRO1 Series		
Certificate Type (Safety)	***Report Number***	***Standard***
Audio/Video, information and communication technology equipment - Part 1: Safety requirements (CB)	24TH0201_62368-1_0	IEC62368-1:2018 3rd Edition
Audio/Video, information and communication technology equipment - Part 1: Safety requirements		EN IEC 62368-1:2020+A11:2020
Audio/Video, information and communication technology equipment - Part 1: Safety requirements	Pending	UL62368-1:2019 3rd Edition CAN/CSA-C22.2 No. 62368-1-19 3rd Edition
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements (CB)	4TH0201_61010-1_0	IEC61010-1:2010+A1:2016 3rd Edition
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements		EN61010-1:2010+A1:2019
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements	Pending	UL61010-1:2012 3rd Edition CAN/CSA-C22.2 No. 61010-1-12 3rd Edition
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 2-201: Particular requirements for control equipment (CB)	24TH0201_61010-2-201_0	IEC61010-2-201:2017 2nd Edition
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 2-201: Particular requirements for control equipment		EN IEC 61010-2-201:2018
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 2-201: Particular requirements for control equipment	Pending	UL61010--2-201:2018 2nd Edition CAN/CSA-C22.2 No. 61010-2-201: 2018-02-01-12
RoHS2	—	RoHS 2011/65/EU + AM2015/863

EMC Compliance according to IEC/EN61000-6-4/6-2 RACPRO1 Series		
EMC Compliance according to IEC/EN61000-6-4/6-2	***Condition***	***Standard / Criterion***
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments	—	IEC/EN61000-6-2:2019
Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential area	—	IEC/EN 61000-6-3:2021
ESD Electrostatic discharge immunity test	Air: ±8kV; Contact: ±6kV	IEC61000-4-2:2008, Criteria A EN61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-6000MHz)	IEC/EN61000-4-3:2006+A2:2010, Criteria A
Fast Transient and Burst Immunity	AC Power Port ±4kV DC Output Port: ±2kV	IEC/EN61000-4-4:2012 Criteria A
Surge Immunity	AC-Power Port L1-L2-L3-L2-L3 ±2.5kV L1-PE,L2-PE, L3-PE: ± 6kV DC-/Output Port: Vout(+) - Vout(-), DC-OK(13-14): ±1kV Vout(+)-PE, Vout(-)-PE: ±2kV	IEC/EN61000-4-5:2014+A1:2017, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	10Vrms (0.15-80 MHz)	IEC61000-4-6:2013, Criteria A EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	30A/m, 50/60 Hz	EN6100-4-8:2010 Criteria A
Voltage Dips (400 VAC, 50Hz)	100% 5 cycles 70% 10 cycles 40% 25 cycles 30% 25 cycles	IEC61000-4-11:2004+A1:2017, Criteria B
Voltage Interruptions (400 VAC, 50Hz)	100% 250 cycles	IEC61000-4-11:2004+A1:2017, Criteria B
Limits of Harmonic Current Emissions	—	EN IEC 61000-3-2:2019
Limits of Voltage Fluctuations & Flicker	—	IEC61000-3-3:2013+A1:2017

LUTZE SYSTEMATIC TECHNOLOGY

Switching Power Supplies 1-Phase CPS ECO Series



CPSB1-120-24E

Overview

LUTZE ECO series power supplies were developed with technical innovations in mind. The Compact economy series power supplies are efficiently sized and offer up to 91% power conversion efficiency. Adjustable voltage outputs and DC Ok contacts are standard.

Features

- Compact footprint
- Aluminum housing
- 35mm DIN rail mount
- IP20
- 5 year warranty

c UL us LISTED CE UK CA 5 YEAR WARRANTY

Switching Power Supplies 1-Phase								
Part Number	Price	Output Voltage	Output Current	Output Power	Input Voltage	Power Boost	Dimensions (W x H x D)	Drawing Link
CPSB1-120-24E	$97.00	24VDC	5A	120W	120/240 VAC	140% for 5s	40 x 115 x 110mm [1.57 x 4.52 x 4.33 in]	PDF
CPSB1-240-24E	$150.00		10A	240W		135% for 30s	63 x 140 x 139mm [2.48 x 5.51 x 5.47 in]	PDF
CPSB1-480-24E *	$275.00		20A	480W	200/240 VAC	140% for 5s	73 x 140 x 149mm [2.87 x 5.51 x 5.86 in]	PDF

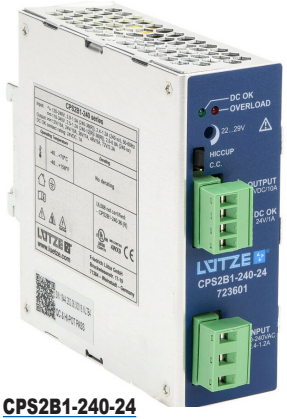
* Requires an external fuse.

1-Phase Input Specifications			
Part Number	CPSB1-120-24E	CPSB1-240-24E	CPSB1-480-24E
Operation Voltage Range	85–264 VAC 110–345 VDC	90–132 VAC 187–264 VAC 270–345 VDC	187–264 VAC 250–375 VDC
Frequency Range	47-63Hz		
Rated Current	2.1 A @ 120VAC 1.2 A @ 240VAC	4A @ 120VAC 2A @ 240VAC	2.9 A @ 200VAC 2.5 A @ 240 VAC
Inrush Current	≤ 30A / 0.72 A²s	< 40A	≤ 29A / 0.61 A²s
Power Factor Correction	> 0.6	> 0.6	> 0.90 enabled
Recommended Circuit Breaker	C-curve 6A	C-curve 10A	C-curve 6A or D-curve 4A

1-Phase Output Specifications			
Part Number	CPSB1-120-24E	CPSB1-240-24E	CPSB1-480-24E
Overload Limit In Constant Current Mode	–	–	50A
Max. Output Current	7A, 5s	13.5 A, 30s	28A 5s @ Hiccup mode
Power Dissipation	< 18W	< 35W	< 48W
Setting Range	23-28 VDC	23-27.5 VDC	23-28 VDC
Load Regulation	< 1%	< 1%	≤ 1%
Ripple And Noise	60mV	< 100mV pp	≤ 50mV rms
Hold-Up Time	> 20ms @ 120VAC 50ms @ 230VAC	> 60ms @ 120VAC 70ms @ 230VAC	≥ 50ms @ 230VAC
Parallel / Redundant Mode	Yes via external decoupling diode		
Efficiency (Typical)	> 87% @ 120VAC	> 87% @ 120VAC	> 91% @ 240VAC
Short-Circuit	Hiccup mode		
MTBF	–	–	500,000 h @ 25°C ambient full load

LUTZE SYSTEMATIC TECHNOLOGY

Switching Power Supplies 1-Phase CPS Ultra Series



CPS2B1-240-24

Overview

The Compact Ultra series power supplies are approximately 50% smaller than standard industrial power supplies. These power supplies provide maximum efficiency to 93% in housings even smaller than the ECO line.

Features

- Compact footprint
- Aluminum housing
- 35mm DIN rail mount
- IP20 rated
- Power Boost - 150% for 5s
- 5 year warranty

c UL us LISTED CE UKCA 5 YEAR WARRANTY

Switching Power Supplies 1-Phase								
Part Number	***Price***	***Output Voltage***	***Output Current***	***Output Power***	***Input Voltage***	***Power Boost***	***Dimensions (W x H x D)***	***Drawing Link***
CPS2B1-120-24	$155.00	24VDC	5A	120W	120/240 VAC	150% for 5s	35 x 103 x 126mm [1.37 x 4.05 x 4.96 in]	PDF
CPS2B1-240-24	$210.00		10A	240W			40 x 115 x 133mm [1.57 x 4.52 x 5.23 in]	PDF
CPS2B1-480-24	$335.00		20A	480W			56 x 140 x 139mm [2.20 x 5.51 x 5.57 in]	PDF

1-Phase Input Specifications			
Part Number	***CPS2B1-120-24***	***CPS2B1-240-24***	***CPS2B1-480-24***
Operation Voltage Range	90–264 VAC 110–345 VDC		
Frequency Range	47-63Hz		
Rated Current	1.4 A @ 120VAC 0.7 A @ 240VAC	2.4 A @ 120VAC 1.2 A @ 240VAC	4.8 A @ 120VAC 2.4 A @ 240 VAC
Inrush Current	≤ 32A / 0.49 A²s	≤ 34A / 0.66 A²s	≤ 23A / 0.56 A²s
Power Factor Correction	> 0.90 enabled		
Recommended Circuit Breaker	C-curve 4A	C-curve 10A	

1-Phase Output Specifications			
Part Number	***CPS2B1-120-24***	***CPS2B1-240-24***	***CPS2B1-480-24***
Overload Limit In Constant Current Mode	7.5 A	11A	21A
Maximum Output Current	7.5 A 5s @ Hiccup mode	15A 5s @ Hiccup mode	30A 5s @ Hiccup mode 21A CC mode
Power Dissipation	< 13.5 W	< 19W	< 36.5 W
Setting Range	11.5-29 VDC	22-29 VDC	22-29 VDC
Load Regulation	≤ 1%	≤ 1%	< 1.5%
Ripple And Noise	60mV pp	≤ 260mV pp	< 150mV pp
Hold-Up Time	≥ 20ms @ 120VAC ≥ 30ms @ 240VAC	≥ 20ms @ 240VAC	> 25ms @ 240VAC
Parallel / Redundant Mode	Yes, via external decoupling diode		
Efficiency (Typical)	> 90% @ 240VAC	> 93% @ 240VAC	> 93% @ 240VAC
Short-Circuit	Hiccup mode/ Current limit	Hiccup mode/ Constant current	Adjustable, Hiccup, Constant Current
MTBF	500,000h @ 25°C ambient full load	600,000h @ 25°C ambient full load	600,000h @ 25°C ambient full load

LUTZE SYSTEMATIC TECHNOLOGY

Switching Power Supplies 1/2/3 Phase CPS Universal Series



Overview

The LUTZE Universal Compact power supply series provides high efficiency, compact size, and power boost while allowing maximum installation flexibility. These models can take 1-, 2-, or 3-phase inputs to help installations in any application.

Features

- Compact footprint
- Aluminum housing
- 35mm DIN rail mount
- IP20
- 5 year warranty

CPSB-123-240-24

Switching Power Supplies 1/2/3 Phase								
Part Number	*Price*	*Output Voltage*	*Output Current*	*Output Power*	*Input Voltage*	*Power Boost*	*Dimensions (W x H x D)*	*Drawing Link*
CPSB-123-240-24 *	$230.00	24VDC	10A	240W	200-500 VAC	150% for 5s	54 x 115 x 110mm [2.12 x 4.52 x 4.33 in]	PDF
CPSB-123-480-24 *	$355.00		20A	480W		140% for 5s	73 x 140 x 125mm [2.87 x 5.51 x 4.92 in]	PDF

*** Requires an external fuse.**

1/2/3 Phase Input Specifications		
Part Number	*CPSB-123-240-24*	*CPSB-123-480-24*
Operation Voltage Range	187–550 VAC 250–725 VDC	
Frequency Range	47-63Hz	
Rated Current	1-Phase/2-Phase 2.2 A @ 220VAC, 1.1 A @ 500VAC 3-Phase 1.5 A @ 220VAC, 0.8 A @ 500VAC	1-Phase/2-Phase 2.9 A @ 200VAC, 1.3 A @ 500VAC 3-Phase 1.8 A @ 200VAC, 0.8 A @ 500VAC
Inrush Current	≤ 45A / 1.31 A²s	≤ 55A / 2.16 A²s
Power Factor Correction	> 0.6 @ 230V, 0.5 @ 400V	> 0.9
Recommended Circuit Breaker	C-curve 6A or D-curve 4A	

1/2/3 Phase Output Specifications		
Part Number	*CPSB-123-240-24*	*CPSB-123-480-24*
Maximum Output Current	15A, 6A	28A, 5s
Power Dissipation	< 18W	< 42W
Setting Range	23-28 VDC	23-28 VDC
Load Regulation	< 1%	< 1%
Ripple And Noise	<100mV pp	<50mV pp
Hold-Up Time	15ms @ 230VAC > 100ms @ 500VAC	> 50ms
Parallel / Redundant Mode	Yes, via external decoupling diode	
Efficiency (Typical)	> 93% @ 240VAC	> 92% @ 240VAC
Short-Circuit	38A	50A
MTBF	500,000h	500,000h

LUTZE SYSTEMATIC TECHNOLOGY

Switching Power Supplies 3-Phase CPS Universal Series



Overview

LUTZE 3-phase Compact power supply series are reliable 24VDC and equipped with an efficiency rating of over 91%, resulting in low power loss and low heat dissipation. The integrated power boost function allows for higher peak loads to be energized for a short period of time. An advantage of the remote on/off function is the convenience to remotely switch the unit on and off, therefore significantly reducing energy consumption. Additionally, status indication via a status output relay allows for remote monitoring.

Features

- Aluminum housing
- 35mm DIN rail mount
- IP20 rated
- 5 year warranty
- Superior power output to size ratio

CPSB3-120-24

Switching Power Supplies 3-Phase									
Part Number	*Price*	*Output Voltage*	*Output Current*	*Output Power*	*Input Voltage*	*Power Boost*	*Remote On/Off Function*	*Dimensions (W x H x D)*	*Drawing Link*
CPSB3-120-24	$165.00	24VDC	5A	120W	350-575 VAC	150% for 5s	Yes	55 x 129 x 133mm [2.16 x 5.07 x 5.23 in]	PDF
CPSB3-240-24	$215.00		10A	240W					PDF
CPSB3-960-24 *	$495.00		40A	960W	400-500 VAC		No	80 x 127 x 137.5 mm [3.14 x 5 x 5.41 in]	PDF

* Requires an external fuse.

3-Phase Input Specifications			
Part Number	*CPSB3-120-24*	*CPSB3-240-24*	*CPSB3-960-24*
Operation Voltage Range	350–575 VAC	350–575 VAC	340–550 VAC 520–725 VDC
Frequency Range	47-63Hz		
Rated Current	0.35 A @ 400VAC 0.3 A @ 500VAC	0.59 A @ 400VAC 0.50 A @ 500VAC	2.4 A @ 400VAC 2.1 A @ 500VAC
Inrush Current	30A @ 400VAC 39A @ 500VAC	36A @ 400VAC 40A @ 500VAC	≤50A / 1.86 A²s
Power Factor Correction	> 0.5	> 0.6	> 0.7
Recommended Circuit Breaker	(3) B-curve 6A	(3) B-curve 6A	(3) C-curve10A

3-Phase Output Specifications			
Part Number	*CPSB3-120-24*	*CPSB3-240-24*	*CPSB3-960-24*
Maximum Output Current	7.5 A	15A	44A
	6A (Hiccup 2s)	12A (Hiccup 2s)	60A (Hiccup, 5s)
Power Dissipation	< 11.5 W, < 2.1 W (stand-by)	< 18W, < 2.0 W (stand-by)	< 78W
Setting Range	22.5-29 VDC	22.5-29 VDC	23-28 VDC
Load Regulation	max. 0.4% 350-550 VAC max. 2.9% parallel mode	max. 0.6% 350-550 VAC max. 3.1% parallel mode	<1%
Ripple And Noise	< 30mV pp	< 40mV pp	< 150mV pp
Hold-Up Time	> 23ms @ 400VAC > 43ms @ 500VAC	> 22ms @ 400VAC > 44ms @ 500VAC	> 15ms
Parallel / Redundant Mode	Yes, via external decoupling diode (max 3 devices)		Yes, via external decoupling diode (max 2 devices)
Efficiency (Typical)	91.3 % @ 400VAC 91.2 % @ 500VAC	93.1 % @ 400VAC 93.2 % @ 500VAC	> 92.5 % @ 400VAC
Short-Circuit	Hiccup, Current Limit		Adjustable, Hiccup, Current Limiting
MTBF	184,000h @ 400VAC 162,000h @ 500VAC	184,000h @ 400VAC 162,000h @ 500VAC	500,000h

LUTZE SYSTEMATIC TECHNOLOGY

Power Supplies - Switching CPS Series

General Specifications

Series	ECO Series 1-Phase	Ultra Series 1-Phase	Universal Series - 1/2/3 Phase	3-Phase Series
Overvoltage Protection	≤ 33VDC			CPSB3-120-24 <32V CPSB3-240-24 <32V CPSB3-960-24 <33VDC
Overtemperature Protection	Yes			
Status Indicators	DC ON LED (green): ≥ 21.6 V DC LOW LED (red): ≤ 21.6 V		CPSB-123-240-24 DC ON LED (green): ≥ 21.6 V DC LOW LED (red): ≥ 21.6 V CPSB-123-480-24 DC ON LED (green): ≥ 21.6 V DC LOW LED (red): I_{out} >1.1I_n	CPSB3-120-24 CPSB3-240-24 DC OK LED (green) ON U_{out} >95% U_{set} OFF U_{out} >90% U_{se} CPSB3-960-24 DC ON LED (green): ≥ 21.6 V DC LOW LED (red): ≥ 21.6 V
Humidity	5 to 95%, non-condensing			
Vibration	IEC 60068-2-6			
Shock	IEC 60068-2-27			
Protection Rating	IP20			
Mounting	35mm DIN rail (vertical)			
Housing Material	Aluminum (enclosed)			
Agency Approval	CE, UKCA, cULus E249179			

Additional Data

Part Number	Weight kg [lb]	Operating Temperature	Storage Temperature	Terminal Type	Solid Wire Size*		Tightening Torque
					Output	Input	
CPSB1-120-24E	0.45 [0.99]	-40 to 70°C [-40 to 158°F]	-40 to 80°C [-40 to 176°F]	Screw	0.20 – 2.5 mm² [AWG 24-14]	0.20 – 2.5 mm² [AWG 24-14]	0.5 – 0.6 N•m [4.42 – 5.30 lb•ft]
CPSB1-240-24E	0.75 [1.65]						
CPSB1-480-24E	1 [2.20]						
CPS2B1-120-24	0.45 [0.99]	-35 to 70°C [-31 to 158°F]	-40 to 80°C [-40 to 176°F]	Screw	0.20 – 2.5 mm² [AWG 24-14]	0.20 – 2.5 mm² [AWG 24-14]	0.5 – 0.6 N•m [4.42 – 5.30 lb•ft]
CPS2B1-240-24	0.75 [1.65]	-40 to 70°C [-40 to 158°F]					
CPS2B1-480-24	1.1 [2.42]						
CPSB-123-240-24	0.65 [1.43]	-40 to 70°C [-40 to 158°F]	-40 to 80°C [-40 to 176°F]	Screw	0.20 – 2.5 mm² [AWG 30-12]	0.20 – 2.5 mm² [AWG 30-12]	0.5 – 0.6 N•m [4.42 – 5.30 lb•ft]
CPSB-123-480-24	1 [2.20]				0.20 – 2.5 mm² [AWG 24-14]	0.20 – 2.5 mm² [AWG 24-14]	
CPSB3-120-24	0.66 [1.45]	-25 to 70°C [-13 to 158°F]	-40 to 85°C [-40 to 185°F]	Push-in	0.20 – 2.5 mm²	0.20 – 2.5 mm²	–
CPSB3-240-24	0.78 [1.71]				0.20 – 2.5 mm²	0.20 – 2.5 mm²	–
CPSB3-960-24	1.3 [2.86]	-40 to 70°C [-40 to 158°F]	-40 to 80°C [-40 to 176°F]	Screw	0.20 – 10mm² [AWG 24-14]	0.20 – 10mm² [AWG 24-14]	max. 62 N•m

*** For other types of wire please see the insert.**

BLOCK Power Supplies - Switching Mini Series 12VDC 1-Phase



PM-0112-020-0

Overview

These all-round power supply units can be utilized for various applications in the area of solar, measurement and control technology, especially plant and mechanical engineering. They are robust and adaptable in a range of applications, yet feature a light and compact design, which provides an outstanding protection against transients and high-energy interference pulses at the power input. The output voltage can be set by using the rotary potentiometer on the front panel of the device.

Features

- Compact footprint
- Push-in terminals
- 35mm DIN rail mount
- IP20
- 2A and 4A models are NEC class 2.

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Power Supplies - Switching Mini Series 1-Phase

Part Number	Price	Output Voltage	Output Current	Output Power	Input Voltage	Dimensions [W x H x D]	Drawing Link
PM-0112-020-0	$85.00	12 VDC	2A	24W	100-240 VAC	22.5 x 90 x 97.5 mm [0.89 x 3.54 x 3.84 in]	PDF
PM-0112-040-0	$85.00		4A	48W		45 x 90 x 97.5 mm [1.77 x 3.54 x 3.84 in]	PDF
PM-0112-070-0	$102.00		7A	84W		52 x 90 x 109.5 mm [2.05 x 3.54 x 4.31 in]	PDF

Power Supplies - Switching Mini Series 1-Phase Input Specifications

Part Number	PM-0112-020-0	PM-0112-040-0	PM-0112-070-0
Operation Voltage Range	85-264 VAC 120-372 VDC*		
Frequency Range	47-63Hz		
Input Voltage Derating	-2.5 % / VAC < 95 VAC		
Rated Current	0.50 A @ 100VAC 0.29 A @ 240VAC	0.86 A @ 100VAC 0.46 A @ 240VAC	1.66 A @ 100VAC 0.90 A @ 240VAC
Inrush Current	≤ 30A, NTC		
Power Up Delay	1.5 s @ 100VAC 0.4 s @ 230VAC	1.5 s @ 100VAC 0.7 s @ 230VAC	0.5 s @ 100VAC 0.3 s @ 230VAC
Mains Buffering (nominal load)	15ms @ 100VAC 120ms @ 230VAC		15ms @ 100VAC 80ms @ 230VAC
Internal Fuse	2AT	4AT	
Recommended Circuit Breaker	C-curve 6A	C-curve 10A	C-curve 16A

*** DC input voltage requires an external fuse.**

Power Supplies - Switching Mini Series 1-Phase Output Specifications

Part Number	PM-0112-020-0	PM-0112-040-0	PM-0112-070-0
Nominal Output Voltage	12 VDC +/- 1%		
Output Voltage Range	11.5-14.5 VDC		
Nominal Output Current	2A 2.1 A @ max. 40°C	4A 4.2 A @ max. 40°C	7A 7.5 A @ max. 40°C
Output Current Limitation Constant Current	typ. 2.2 - 2.4 A	typ. 4.4 - 4.8 A	typ. 7.7 - 8.0 A
Class 2 Output	(EN 60950-1)		–
Power Loss (Stand-by / Nominal Load)	< 0.7 W / 5.3 W (230VAC)	< 1W / 8W (230VAC)	< 1W / 16.2 W (230VAC)
Maximum Power Loss	5.7 W (100VAC / 12V / 2A)	9.1 W (100 VAC / 12V / 4A)	19.8 W (100 VAC / 12V / 7A)
Efficiency	82% typ.	86% typ.	
Ripple and Noise	20mVss		
Reverse Feed Max. Resistance (Nominal Load)	25VDC max.		
Internal Surge Voltage Protection (OVP)	35VDC max		

BLOCK Power Supplies - Switching Mini Series 24VDC 1-Phase



PM-0124-020-0

Overview

These all-round power supply units can be utilized for various applications in the area of solar, measurement and control technology, especially plant and mechanical engineering. They are robust and adaptable in a range of applications, yet feature a light and compact design, which provides an outstanding protection against transients and high-energy interference pulses at the power input. The output voltage can be set by using the rotary potentiometer on the front panel of the device.

Features

- Compact footprint
- Push-in terminals
- 35mm DIN rail mount
- IP20
- 1A, 2A and 3.8A models are NEC class 2.

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Power Supplies - Switching Mini Series 1-Phase							
Part Number	*Price*	*Output Voltage*	*Output Current*	*Output Power*	*Input Voltage*	*Dimensions [W x H x D]*	*Drawing Link*
PM-0124-010-0	$49.50	24 VDC	1A	24W	100-240 VAC	22.5 x 90 x 97.5mm [0.89 x 3.54 x 3.84 in]	PDF
PM-0124-020-0	$67.00		2A	48W		45 x 90 x 97.5mm [1.77 x 3.54 x 3.84 in]	PDF
PM-0124-038-0	$102.00		3.8A	91.2W		52 x 90 x 111 mm [2.05 x 3.54 x 4.37 in]	PDF
PM-0124-040-0	$93.00		4A	96W			PDF

Power Supplies - Switching Mini Series 1-Phase Input Specifications				
Part Number	*PM-0124-010-0*	*PM-0124-020-0*	*PM-0124-038-0*	*PM-0124-040-0*
Operation Voltage Range	85-264 VAC 120-372 VDC*			
Frequency Range	47-63Hz			
Input Voltage Derating	-2.5 % / VAC < 95VAC			
Rated Current	0.49 A @ 100VAC 0.28 A @ 240VAC	0.82 A @ 100VAC 0.48 A @ 240VAC	1.73 A @ 100VAC 0.95 A @ 240VAC	1.82 A @ 100VAC 0.98 A @ 240VAC
Inrush Current	≤ 30A, NTC			
Power Up Delay	2.3 s @ 100VAC 0.74 s @ 230VAC	0.5 s @ 100VAC 0.27 s @ 230VAC	0.5 s @ 100VAC 0.2 s @ 230VAC	0.24 s @ 100VAC 0.14 s @ 230VAC
Mains Buffering (nominal load)	20ms @ 100VAC 120ms @ 230VAC		15ms @ 100VAC 80ms @ 230VAC	
Recommended Circuit Breaker	C-curve 6A	C-curve 10A		

*** DC input voltage requires an external fuse.**

Power Supplies - Switching Mini Series 1-Phase Output Specifications				
Part Number	*PM-0124-010-0*	*PM-0124-020-0*	*PM-0124-038-0*	*PM-0124-040-0*
Nominal Output Voltage	24 VDC+/- 1%			
Output Voltage Range	23-28.5 VDC			
Nominal Output Current	1A 1.2 A @ max. 40°C	2A 2.2 A @ max. 40°C	3.8A	4A 4.2 A @ max. 40°C
Output Current Limitation Constant Current	typ. 1.25 - 1.4 A	typ. 2.25 - 2.4 A	typ. 3.8 - 3.2 A	typ. 4.4 A
Class 2 Output	(EN 60950-1)		(EN 60950-1, UL1310)	–
Power Loss (Stand-by / Nominal Load)	< 1W / 4W (230 VAC)	< 1W / 6W (230 VAC)	< 2.8 W / 14W (230 VAC)	< 1W / 12W (230 VAC)
Maximum Power Loss	5W (100VAC / 24V / 1A)	7W (100VAC / 24V / 2A)	20W (100 VAC / 91W)	15W (100 VAC / 24V / 4A)
Efficiency	86% typ.	89% typ.	87% typ.	89% typ.
Ripple and Noise	20mVss			
Reverse Feed Max. Resistance (Nominal Load)	35VDC max.			
Internal Surge Voltage Protection (OVP)	39VDC max	37VDC max	40VDC max	

BLOCK Power Supplies - Switching Mini Series 1-Phase

Power Supplies - Switching Mini Series 1-Phase General Specifications							
Part Number	PM-0112-020-0	PM-0112-040-0	PM-0112-070-0	PM-0124-010-0	PM-0124-020-0	PM-0124-038-0	PM-0124-040-0
Signaling							
Signaling "DC OK"	Green LED ON, Uout>10V			Green LED ON, Uout>21.5 V			
Signal Contact "DC OK"	Active High, Uout>10V max. 40mA @ 12VDC			Active High, Uout>21.5 V max. 20mA @ 24VDC			
Environmental							
Derating	-3% / K > 50°C						
Cooling Type	Natural air convection						
Current Rating at any Mounting Position	1.4 A max	2.6 A max	4.2 A max	0.7 A max.	1.3 A max	2.4 A max	
Humidity	5 to 96%, non-condensing						
Environment	For use in Pollution Degree 2 environment, no corrosive gases permitted						
Minimum Spacing	0mm side, 50mm above, 50mm below						
General Data							
Degree of Protection	IEC 60529, IP20						
Protection Class	EN 61140, Class II						
Housing Material	Plastic						
Safety Standards							
Safety	EN 61010-1, EN 61010-2-201, EN 61558-2-16, EN 60335-1						
EMC	EN 61204-3						
Safety Extra-low Voltage (SELV/PELV)	EN 61140						
CE	Conforms to 2014/30/EU						
Agency Approvals	UL 508: E219022 listed UL-Note: Output disconnecting means shall be provided during installation. UL 60950-1: E213214 recognized DNV GL classified: Temperature class B; Humidity class B Vibration class A; EMC class A*, B; Enclosure class A			UL 508: E219022 listed UL60950-1: E213214 recognized DNV GL classified: Temperature class B; Humidity class B Vibration class A; EMC class A,B**; Enclosure class A			

*** EMCA only in conjunction with the fi lter HFE 156-230/10.**
**** EMCB only in conjunction with the filter HFE 156-230/10 No ECMC for PM-0124-040-0.**

Additional Data							
Part Number	**Weight g [oz]**	**Operating Temperature**	**Storage Temperature**	**Terminal Type**	**Wire Size***		
					Bare Wire	**With Ferrule**	**Strip Length**
PM-0112-020-0	128 [4.52]	-25 to 70°C [-13 to 158°F]	-25 to 85°C [-13 to 185°F]	Push-in	0.08 – 2.5 mm^2 [AWG 28-12]	0.25 – 2.5 mm^2 [AWG 24-12]	8 – 9mm [0.31 - 0.35 in]
PM-0112-040-0	210 [7.41]						
PM-0112-070-0	384 [13.55]						
PM-0124-010-0	128 [0.99]						
PM-0124-020-0	210 [7.41]						
PM-0124-038-0	390 [13.76]						
PM-0124-040-0							

*** Use 75°C rated copper conductors only..**

PM-0624-100-0 Redundancy Module



PM-0624-100-0

The PM-0624-100-0 redundancy module used with two BLOCK matched power supplies creates redundancy to help prevent costly downtime due to power supply failure. The PM-0624-100-0 decouples the outputs of the two connected power supplies so that in case of failure, one power supply cannot overload the other.

PM-0624-100-0 Redundancy Module

Part Number	Price	Drawing Link	Input Voltage Range	Max Power per Input	Output Voltage Range	Output Current Max.	Connection
PM-0624-100-0	$98.00	PDF	2 x 10-36 VDC	144W	10-36 VDC	10A	Push-in Terminals

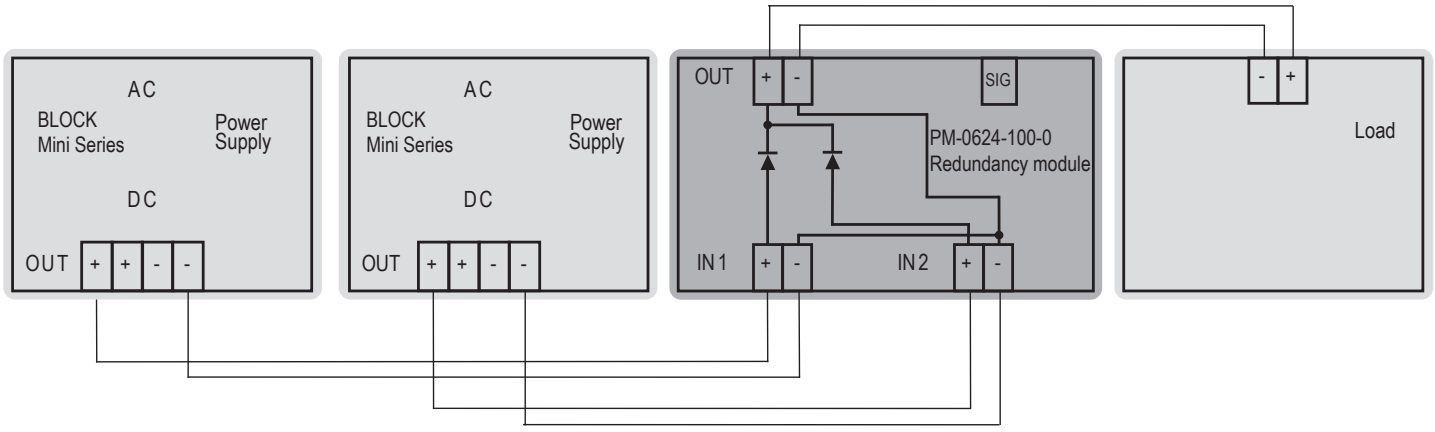
PM-0624-100-0 General Specifications

Redundancy Module Input Specifications	
Rated Input Voltage	24 VDC
Input Voltage Range	10-36 VDC
Rated Input Current	10A
Redundancy Module Output Specifications	
Rated Output Voltage	24 VDC
Rated Output Current	10A
Output Voltage Range	10-36 VDC
Power Boost	120A, 25ms / 40A, 4s / 30A, 16s
Max. Voltage Drop Between Input and Output	750mV
Max. Power Loss	7.5 W
Max. Feedback Resistance	37VDC
Efficiency	96%
Parallel Connection Possible	Yes
Signaling	
Signal Output	Relay contact
Signal Display	2x Green LED
Environment	
Climate Class According to EN 60721	3K3
Ambient Temperature	-40 to 70°C [-40 to 158°F]
Storage Temperature	-40 to 85°C [-40 to 185°F]
Humidity	5 to 96%, non-condensing
Cooling Type	Natural air convection
Minimum Spacing	0mm side, 30mm above, 30mm below
Environment	For use in Pollution Degree 2 environment, no corrosive gases permitted
Protection Class According to EN 61140	III, without PE connection
Safety Extra Low Voltage (SELV/PELV)	EN 60950 (SELV), EN 60204 (PELV)
Housing Material	Plastic

PM-0624-100-0 Redundancy Module

Weight and Dimensions			
Width mm [inches]	***Height mm [inches]***	***Depth mm [inches]***	***Weight kg [lbs]***
22 [0.87]	90 [3.54]	94 [3.70]	0.12 [0.26]

Redundancy Module Function Diagram



Switching Power Supplies PSRP Series

Overview

AutomationDirect's RHINO PRO PSRP series switching power supplies are designed for industrial applications inside a control cabinet. The PSRP series offers a sleek and space-saving design with push connectors in a rugged housing.

Features

- High efficiency
- Power Boost to start difficult loads with additional power reserve
- Hyper Boost for 20ms
- Compact, space-saving footprint
- Integral 35mm DIN rail mounting
- Integrated device protection
- Quickly connect with push-in spring clamp
- DC OK alarm contact for remote monitoring
- Internal isolating transformer with reinforced insulation



PSRP-24-120



PSRP-24-480-3

Switching Power Supplies					
Part Number	*Price*	*Output Voltage*	*Output Current*	*Output Power*	*Drawing Link*
Single-Phase					
PSRP-12-120	$225.00	12-15 VDC	10A	120W	PDF
PSRP-24-120	$170.00	24-28 VDC	5A	120W	PDF
PSRP-24-240	$229.00		10A	240W	PDF
PSRP-24-480	$335.00		20A	480W	PDF
Three-Phase					
PSRP-24-120-3	$190.00	24-28 VDC	5A	120W	PDF
PSRP-24-240-3	$213.00		10A	240W	PDF
PSRP-24-480-3	$387.00		20A	480W	PDF
PSRP-24-960-3	$525.00		40A	960W	PDF

Switching Power Supplies PSRP Series

Input Specifications

Part Number	Nominal Voltage	Input Voltage Range	Nominal Frequency	Nominal Input Current	Max. Inrush Current (after 1ms)	Nominal Watts	Efficiency [Typ.]	Circuit Breaker
Single-Phase								
PSRP-12-120	100-240 VAC 100-230 VDC	85-265 VAC 90-250 VDC	50/60 Hz ±6 %	1.3 A @ 100VAC/VDC 0.6 A @ 240VAC/VDC	6A	0.88 kW @ 230VAC	91.6% @ 115VAC 93.1% @ 230VAC	C4
PSRP-24-120						0.87 kW @ 230VAC	92.8% @ 115VAC 94.3% @ 230VAC	
PSRP-24-240				2.6 A @ 100VAC/VDC 1.1 A @ 240VAC/VDC	7A	0.95 kW @ 230VAC	93.4% @ 115VAC 94.4% @ 230VAC	
PSRP-24-480		90-265 VAC 90-250 VDC		5.3 A @ 100VAC/VDC 2.3 A @ 240VAC/VDC	26A	0.96 kW @ 230VAC	93.4% @ 115VAC 94.6% @ 230VAC	C6, B10
Three-Phase								
PSRP-24-120-3	(3) 360-500 VAC (3) 208-288 VAC	(3) 324 - 572 VAC (3) 187 - 330 VAC	50/60 Hz ±6 %	0.45 A @ (3 x 360VAC) 0.30A @ (3 x 500VAC)	9.5 A (3 x 500VAC)	0.61 kW (3 x 400VAC)	92.5% @ 3 x 400VAC 91.8% @ 3 x 480VAC	C4
PSRP-24-240-3				0.75 A @ (3 x 360VAC) 0.55 A @ (3 x 500VAC)	9A (3 x 500VAC)	0.66 kW (3 x 500VAC)	93.7% @ 3 x 400VAC 93.2% @ 3 x 480VAC	
PSRP-24-480-3				1.3 A @ (3 x 360VAC) 1.0 A @ (3 x 500VAC)	13A (3 x 500VAC)	0.65 kW (3 x 500VAC)	94.8% @ 3 x 400VAC 94.5% @ 3 x 480VAC	
PSRP-24-960-3				2.3 A @ (3 x 360VAC) 1.6 A @ (3 x 500VAC)	14A (3 x 500VAC)	0.88 kW (3 x 500VAC)	93.7% @ 3 x 400VAC 93.5% @ 3 x 480VAC	

Output Specifications

Part Number	Output Voltage Adjustable Range	Output Current	Output Current Power Boost	Output Current Hyper Boost	Output Hold Up Time (Min.)	Parallel Usage/ Serial Usage (Max.)	MTBF (@ 40°C)
Single-Phase							
PSRP-12-120	12-15 VDC	10A @ 12VDC 8A @ 15VDC	150% for min. 4s without voltage variation	350% for min. 20ms @ 60°C	30ms @ 100VAC 10A @ 12VDC	5 / 2	> 900,000h
PSRP-24-120	24-28 VDC	5A @ 24VDC 4.25 A @ 28VDC			30ms @ 100VAC 5A @ 24VDC		> 900,000h
PSRP-24-240		10A @ 24VDC 8.5 A @ 28VDC		450% for min. 20ms @ 60°C	30ms @ 100VAC 10A @ 24VDC		> 800,000h
PSRP-24-480		20A @ 24VDC 17A @ 28VDc		200% for min. 20ms @ 60°C	30ms @ 100VAC 20A @ 24VDC		> 800,000h
Three-Phase							
PSRP-24-120-3	24-28 VDC	5A @ 24VDC 4.3A @ 28VDC	7.5 A @ 24VDC > 5s	30A/20ms	25ms (3 x 360VAC) 5A @ 24VDC	3	> 1,000,000h
PSRP-24-240-3		10A @ 24VDC 8.6 A at 28VDC	15A @ 24VDC > 5s	35A/20ms	45ms (3 x 500VAC) 10A @ 24VDC		> 1,000,000h
PSRP-24-480-3		20A @ 24VDC 17.2 A @ 28VDC	30A @ 24VDC > 5s	60A/20ms	40ms (3 x 500VAC)		> 900,000h
PSRP-24-960-3		40A @ 24VDC 34A @ 28VDC	60A @ 24VDC > 5s	100A/20ms	40ms (3 x 500VAC)		> 700,000h

Switching Power Supplies PSRP Series

General Specifications									
Part Number		PSRP-12-120	PSRP-24-120	PSRP-24-240	PSRP-24-480	PSRP-24-120-3	PSRP-24-240-3	PSRP-24-480-3	PSRP-24-960-3
Temperature	**Operating**	-25 to 60°C [-13 to 140 °F]	-40 to 60°C [-40 to 140°F]			-40 to 70°C [-40 to 158 °F]			-40 to 60°C [-40 to 140°F]
	Storage	-40 to 85°C [-40 to 185°F]							
Humidity		5 to 95%, no condensing							
Line Regulation		< 1mV				10mV			
Load Regulation		200mV	220mV	210mV	180mV	Parallel mode on: 1000mV Parallel mode off: 100mV			
Start-up Time (typ)		< 400ms @ U_{Input} 100-230 VAC				< 400ms			< 600ms
Short Circuit Protection		Yes							
Leakage Current		0.3 mA		0.78 mA	2mA	(3 x 360VAC / 50Hz) 0.22 mA (3 x 500VAC / 60Hz) 0.34 mA		(3 x 360VAC / 50Hz) 1.15 mA (3 x 500VAC / 60Hz) 1.77 mA	(3 x 360VAC / 50Hz) 1.7 mA (3 x 500VAC / 60Hz) 2.1 mA
Overload Protection		Yes							
Overvoltage Shutdown		—				31VDC max.			
Status Indicators		LED (green): OK LED (red): overload, overheating or short-circuit							
Ripple		< 50 mVrms	< 50 mVeff	< 50 mVrms	< 50 mVeff	< 20 mVrms			
Spikes		< 200 mVp-p	< 200 mVss	< 200 mVp-p	< 200 mVss	-			
Vibration		IEC 60068-2-6 ; 5-17.8 Hz: 1.6mm 17.8 - 500 Hz: 2.3 g				IEC 60068-2-6; 5-17.8 Hz: 1.6mm 17.8 - 500Hz: 2g			IEC 60068-2-6 2-17.8 Hz: 7.84 mm 17.8-500 Hz: 5g
Shock		IEC 60068-2-27 [30g / 11ms]				IEC 60068-2-27 [50g / 6ms]		IEC 60068-2-27 [30g / 6ms]	IEC 60068-2-27 50g sinusoidal 8ms
Protection Rating		IP20							
Mounting		35mm DIN rail (horizontal only)							
Housing Material		Aluminum (enclosed)							
Connection		Push-in spring clamp terminals							
Weight kg [lb]		0.66 [1.45]	0.66 [1.45]	0.85 [1.87]	1.26 [2.77]	0.65 [1.43]	0.78 [1.71]	1.25 [2.75]	2.70 [5.95]
Agency Approval		UL 508 File E197592, CE							

Additional Data		
Part Number	**Solid Wire Size***	
	Output	**Input**
PSRP-12-120	1.5 - 4 mm² [16 - 12 AWG]	0.75 - 4 mm² [18 - 12 AWG]
PSRP-24-120	0.75 - 4 mm² [18 - 12 AWG]	
PSRP-24-240	1.5 - 10 mm² [16 - 8 AWG]	
PSRP-24-480	4 - 10 mm² [12 - 8 AWG]	
PSRP-24-120-3	0.2 - 4 mm² [24 - 12 AWG]	0.2 - 10 mm² [24 - 8 AWG]
PSRP-24-240-3	0.2 - 10 mm² [24 - 8 AWG]	0.2 - 10 mm² [24 - 8 AWG]
PSRP-24-480-3	0.2 - 10 mm² [24 - 8 AWG]	0.2 - 10 mm² [24 - 8 AWG]
PSRP-24-960-3	0.75 - 16 mm² [18 - 6 AWG]	0.2 - 10 mm² [24 - 8 AWG]

*** For other types of wire please see the insert.**

Switching Power Supplies PSRT Series

Overview

AutomationDirect's RHINO TOUGH PSRT series of switching power supplies are designed for industrial applications outside of the control cabinet. These field-mountable power supplies offer a compact footprint and allow machine mounting near the load.

Features

- High efficiency
- Compact size
- Integrated device protection
- Quick connection with 7/8" connectors
- Internal isolating transformer with reinforced insulation
- IP67 protection class - safe to touch even at full load



PSRT-24-100



PSRT-24-200

Switching Power Supplies

Part Number	Price	Output Voltage	Output Current	Output Power	Drawing Link
PSRT-24-100	$289.00	24VDC	3.8 A	91.2 W	PDF
PSRT-24-200	$375.00		8A	192W	PDF

Input Specifications

Part Number	Nominal Input Voltage	Input Voltage Range	Nominal Frequency Range	Max. Input Current	Max. Inrush Current (after 1ms)	Nominal Watts	Efficiency	Circuit Breaker
PSRT-24-100	120/240 VAC 100/230 VDC	90-265 VAC/VDC	50/60 Hz ±6 %	1.1 A @ 100VAC 0.5 A @ 240VAC	8.9A @ 230VAC	0.95 kW @ 230VAC	91.4% @ 115VAC 92.1% @ 230VAC	C4
PSRT-24-200		90-265 VAC 90-372 VDC		2.1 A @ 100 VAC 0.9 A @ 240 VAC	7A @ 230VAC	0.95 kW @ 230VAC	93.7% @ 115VAC 94.4% @ 230VAC	B or C

Output Specifications

Part Number	Output Voltage	Output Hold-up Time (Min.)	Output Current (Continuous 24VDC)	Output Current (Power Boost)	Output Current (Short-Circuit)	MTBF (@ 40°C)
PSRT-24-100	24VDC (SELV) ±2%	80ms (230VAC) 3.8 A (24VDC)	3.8 A (+60 °C) 2.4 A (+70 °C)	N/A	4.4 A	> 1,000,000h
PSRT-24-200		≥ 35ms (230VAC) 8A (24VDC)	8A (+60 °C) 4.8 A (+70 °C)	150% for 5s	9A	> 700,000h

Switching Power Supplies
PSRT Series

General Specifications			
Part Number		***PSRT-24-100***	***PSRT-24-200***
Temperature	***Operating***	-40 to 85°C [-40 to 185°F]	
	Storage	-40 to 85°C [-40 to 185°F]	
Humidity		4 to 100%	
Line Regulation		5mV	
Load Regulation		110mV	
Short Circuit Protection		Yes	
Leakage Current		< 1mA @ 230VAC / 50 Hz	
Start-up Time		≤ 330ms @ 100VAC ≤ 330ms @ 230VAC	≤ 500 ms
Short Circuit Protection		Yes	
Overload Protection		Yes	
Overvoltage Shutdown		N/A	
Status Indicators		LED (green): output voltage OK LED (red): overload, overheating or short-circuit No color - No input voltage	
Ripple (max.)		50 mVrms	< 30 mVeff/rms
Spikes (max.)		130 mVp-p	300 mVss/pp
Vibration		IEC 60068-2-6; 2-17.8Hz: 7.84 mm, 17.8-500 Hz: 5g	
Shock		IEC 60068-2-27 [50g / 8ms]	
Enclosure Rating		IP67	
Mounting		Chassis	
Housing Material		Aluminum (encapsulated)	
Connection		(1) 7/8in - 16 UN2 4-pin female (1) 7/8in - 16 UN2 3-pin male Diagram 1	(1) 7/8in - 16 UN2 3-pin male (1) 7/8in - 16 UN2 5-pin female Diagram 2
Tightening Torque		1.5 N•m [13.27 lb-in]	
Weight kg [lb]		1.22 [2.68]	1.65 [3.63]
Agency Approval		UL 508 File E197592, CE	

Wiring Diagrams

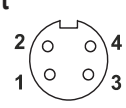
Diagram 1

Input



1 ⏚
2 L/DC+
3 N/DC-

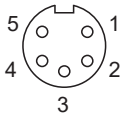
Output



1 24V ⎓
2 24V ⎓
3 0V / ⏚
4 0V / ⏚

Diagram 2

Output



1 0 VDC
2 0 VDC
3 ⏚
4 24 VDC
5 24 VDC

Input



1 ⏚
2 L / DC+
3 N / DC-

Switching Power Supplies PSA Series

Overview

AutomationDirect's AchieVe PSA series of switching power supplies are designed with essential features needed for industrial applications without compromising quality and reliability at a lower cost. These models can operate in constant current mode making them suitable for inductive and capacitive loads.

Features

- Universal AC input voltage range
- Built-in constant current circuit for reactive loads
- Quick installation by 35mm DIN rail mounting
- Adjustable output voltage via potentiometer
- 2-year warranty



PSA-24-75



PSA-24-240

Switching Power Supplies PSA Series							
Part Number	***Price***	***Nominal Output Voltage***	***Output Current***	***Output Power***	***Nominal Input Frequency***	***Housing Material***	***Drawing Link***
Single-Phase							
PSA-12-75	$25.50	12VDC	6.25 A	75W	50/60 Hz	Plastic	PDF
PSA-12-120	$32.00		10A	120W		Aluminum	PDF
PSA-12-240	$59.00		20A	240W			PDF
PSA-24-75	$25.50	24VDC	3.125 A	75W		Plastic	PDF
PSA-24-120	$29.50		5A	120W		Aluminum	PDF
PSA-24-240	$59.00		10A	240W			PDF
PSA-24-480	$118.00		20A	480W			PDF
PSA-48-120	$32.00	48VDC	2.5 A	120W			PDF
PSA-48-240	$59.00		5A	240W			PDF
PSA-48-480	$118.00		10A	480W			PDF

Switching Power Supplies PSA Series Specifications

Input Specifications

Part Number	Nominal Input Voltage	Input Voltage Range	Input Frequency Range	Max. Input Current	Max. Inrush Current (cold start)	Efficiency	Circuit Breaker (Min.)
PSA-12-75	100/240 VAC	85-264 VAC 120-375 VDC	47-63 Hz	1.4 A @ 115VAC 0.9 A @ 230VAC	50A @ 230VAC	87.5% @ 230VAC	20A B Curve
PSA-12-120		90-264 VAC		2.1 A @ 115VAC 1.3 A @ 230VAC	35A @ 230VAC	88% @ 115VAC 86% @ 230VAC	
PSA-12-240				2.5 A @ 115VAC 1.3 A @ 230VAC	40A @ 230VAC	88% @ 115VAC 86.5% @ 230VAC	
PSA-24-75		85-264 VAC 120-375 VDC		1.4 A @ 115VAC 0.9 A @ 230VAC	50A @ 230VAC	89% @ 230VAC	
PSA-24-120		90-264 VAC		2.1 A @ 115VAC 1.3 A @ 230VAC	35A @ 230VAC	88% @ 115VAC 88.5% @ 230VAC	
PSA-24-240				2.5 A @ 115VAC 1.3 A @ 230VAC	40A @ 230VAC	88% @ 115VAC 90% @ 230VAC	
PSA-24-480				4.7 A @ 115VAC 2.4 A @ 230VAC	40A @ 230VAC	91.5% @ 115VAC 93% @ 230VAC	
PSA-48-120				2.1 A @ 115VAC 1.3 A @ 230VAC	35A @ 230VAC	88% @ 115VAC 9.5% @ 230VAC	
PSA-48-240				2.5 A @ 115VAC 1.3 A @ 230VAC	40A @ 230VAC	91.5% @ 115VAC 90.5% @ 230VAC	
PSA-48-480				4.7 A @ 115 VAC 2.4 A @ 230VAC	40A @ 230VAC	91.5% @ 115VAC 93.5% @ 230VAC	

Output Specifications

Part Number	Factory Set Point Tolerance	Output Voltage Range	Rise Time @ 100% Load	Start-up Time @ 100% Load	Hold Up Time @ 100% Load	MTBF
PSA-12-75	12VDC ± 2%	10.8-13.2 VDC	30ms @ nominal input	1200ms @ 115VAC 1000ms @ 230VAC	16ms @ 115VAC 60ms @ 230VAC	> 700,000 h
PSA-12-120	12VDC ± 1%		30ms @ 115/230 VAC	500ms @ 115/230 VAC	10ms @ 115VAC 16ms @ 230VAC	
PSA-12-240	12VDC ± 1%				20ms @ 115/230 VAC	
PSA-24-75	24VDC ± 2%	21.6-26.4 VDC	30ms @ nominal input	1200ms @ 115VAC 1000ms @ 230VAC	16ms @ 115VAC 60ms @ 230VAC	
PSA-24-120	24VDC ± 1%		30ms @ 115/230 VAC	500ms @ 115/23 VAC	10ms @ 115VAC 16ms @ 230VAC	
PSA-24-240	24VDC ± 1%				20ms @ 115/230 VAC	
PSA-24-480	24VDC ± 1%	24-28 VDC			25ms @ 115/230 VAC	
PSA-48-120	48VDC ± 1%	43.2-52.8 VDC			10ms @ 115VAC 16ms @ 230VAC	
PSA-48-240	48VDC ± 1%				20ms @ 115/230 VAC	
PSA-48-480	48VDC ± 1%	48-55 VDC		800ms @ 230VAC	25ms @ 115/230 VAC	

Specifications continued on the following page.

Switching Power Supplies Specifications PSA Series

General Specifications

Part Number		PSA-12-75	PSA-12-120	PSA-12-240	PSA-24-75	PSA-24-120	PSA-24-240	PSA-24-480	PSA-48-120	PSA-48-240	PSA-48-480
Temperature	Operating	-20 to 70°C [-4 to 158°F]	-30 to 70°C [-22 to 158°F]		-20 to 70°C [-4 to 158°F]	-30 to 70°C [-22 to 158°F]					
	Storage	-40 to 85°C [-40 to 185°F]									
Humidity Non-Condensing		5 to 95% RH	20 to 90% RH		5 to 95% RH	20 to 90% RH					
Line Regulation @ 100% Load		< .05% @ 85-264 VAC	± 0.5% @ 115/230 VAC		< .05% @ 85-264 VAC	±0.5% @ 115/230 VAC					
Load Regulation @ 0-100% Load		<1%	±1%		<1%	± 0.5 %					
Start-up With Capacitive Loads (maximum)		5,000 µF	8,000 µF		5,000 µF	8,000 µF			3,000 µF		
Short Circuit Protection		Hiccup Mode, Non-Latching (Auto-Recovery when the fault is removed)									
Leakage Current		< 1mA @ 240VAC	0.5 mA @ 240VAC	0.75 mA @ 240VAC	< 1mA @ 240VAC	0.5 mA @ 240VAC	0.75 mA @ 240VAC	1.5 mA @ 240VAC	0.5 mA @ 240VAC	0.75 mA @ 240VAC	1.5 mA @ 240VAC
Overload Protection		Yes									
No Power Load Consumption		–	0.15 W @ 115/230 VAC		–	0.15 W @ 115/230 VAC	0.21 W @ 115/230 VAC	0.75 W @ 115/230 VAC	0.21 W @ 115/230 VAC	0.3 W @ 115/230 VAC	0.75 W @ 115/230 VAC
Overvoltage Latch Mode		<18V SELV	17.4 SELV		< 33.6 V SELV			< 34V SELV	<64.8 V SELV		< 68V SELV
Status Indicators		LED (green): DC OK									
Ripple		<120 mVpp @ -10 to 70°C	<120 mVpp @ 0 to 70°C		<120 mVpp @ -10 to 70°C	<150 mVpp @ 0 to 70°C			<200 mVpp @ 0 to 70°C		
		< 360 mVpp @ -10 to 30°C	< 360 mVpp @ -30 to 0°C		< 360 mVpp @ -10 to 30°C	< 450 mVpp @ -30 to 0°C			< 600 mVpp @ -30 to 0°C		
Vibration		IEC 60068-2-6									
Shock		IEC 60068-2-27									
Protection Rating		IP20									
Mounting		35mm DIN rail									
Connection		Screw terminals (see additional data on following page)									
Weight kg [lb]		0.22 [0.49]	0.45 [99.20]	0.62 [1.136]	0.22 [0.49]	0.45 [99.20]	0.62 [1.136]	0.87 [1.91]	0.45 [99.20]	0.62 [1.136]	0.87 [1.91]
Agency Approval		CE, cULus File: E197592, cURus File: E131881									

Switching Power Supplies PSA Series

Additional Data			
Part Number	Solid Wire Size		
	Input	Output	ADC Ferrule Part Number
PSA-12-75	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	0.8 - 3.3 mm² [22 -12 AWG] 0.4 N•m [3.5 lb•in]	20AWG V30AE000038 18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055
PSA-12-120	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	0.34 - 4 mm² [22 - 12 AWG] 0.4 N•m [3.5 lb•in]	18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055
PSA-12-240	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055
PSA-24-75	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	0.8 - 3.3 mm² [20 -12 AWG] 0.4 N•m [3.5 lb•in]	20AWG V30AE000038 18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055
PSA-24-120	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	0.34 - 4 mm² [22 - 12 AWG] 0.4 N•m [3.5 lb•in]	18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055
PSA-24-240	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055
PSA-24-480	2.1 - 3.3 mm² [14 -12 AWG] 0.51 N•m [4.5 lb•in]	2.1 - 3.3 mm² [14 -12 AWG] 0.51 N•m [4.5 lb•in]	14AWG V30AE000052 12AWG V30AE000055
PSA-48-120	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	0.34 - 4 mm² / 22 - 12 AWG 0.4 N•m [3.5 lb•in]	18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055
PSA-48-240	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	0.8 - 3.3 mm² [18 -12 AWG] 0.4 N•m [3.5 lb•in]	18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055
PSA-48-480	2.1 - 3.3 mm² [14 -12 AWG] 0.51 N•m [4.5 lb•in]	2.1 - 3.3 mm² [14 -12 AWG] 0.51 N•m [4.5 lb•in]	14AWG V30AE000052 12AWG V30AE000055

RHINO PRO DC To DC Converters

Overview

The RHINO PRO DC to DC Converters, designed for harsh industrial environments, feature stringent protection ratings, such as:

- High EMC immunity against surge, burst, radiated, and conducted disturbances
- High shock and vibration resistance
- High thermal shock resistance

At 100% load, the current characteristics goes from constant voltage to constant current which makes the units also suitable for battery charger applications. With protection against over-temperature, overload, short-circuit, reverse input, overvoltage and input under-voltage lock-out they are hard to destroy.

Features

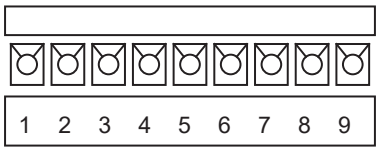
- Input voltage ranges: 9 to 36 and 18 to 75 VDC
- Constant current output characteristic for battery load applications
- Wide operating temperature range: -40 to 75°C [-40 to 167°F]
- Under voltage lock-out, overtemperature & reverse input protection
- Easy chassis and wall mounting
- 3-year warranty



PSRP-15-DC24-150

RHINO PRO DC Converters								
Part Number	*Price*	*Drawing Link*	*Input Voltage Range*	*Input Current @ No Load*	*Output Voltage*	*Output Current Max*	*Output Power*	*Efficiency typ.*
PSRP-12-DC24-150	$231.00	PDF	9-36 VDC (24VDC Nom)	100mA (24VDC Nom)	12VDC	12,500 mA	150W	86%
PSRP-15-DC24-150	$231.00	PDF			15VDC	10,000 mA		
PSRP-24-DC24-150	$231.00	PDF			24VDC	6,300 mA		87%
PSRP-28-DC24-150	$231.00	PDF			28VDC	5,400 mA		
PSRP-48-DC24-150	$233.00	PDF			48VDC	3,200 mA		86%
PSRP-12-DC48-150	$233.00	PDF	18-75 VDC (48VDC Nom)	65mA (48VDC Nom)	12VDC	12,500 mA		88%
PSRP-24-DC48-150	$233.00	PDF			24VDC	6,300 mA		89%

Wiring



PINOUT		
PIN	*Function*	*Recommended Wire*
1	+Vin	14-16 AWG
2	+Vin	14-16 AWG
3	-Vin	14-16 AWG
4	-Vin	14-16 AWG
5	Remote	14-24 AWG
6	+Vout	14-16 AWG
7	-Vout	14-16 AWG
8	Trim	14-24 AWG
9	Trim	14-24 AWG

RHINO PRO DC To DC Converters

Input Specifications	
Surge Voltage (100 sec. max.)	24 VDC models: 50VDC 48 VDC models: 100VDC
Start-Up Time	35 ms typ.
Under Voltage Lockout	24 Vin models: 7.9 - 8.5 VDC 48 Vin models: 15.6 - 16.8 VDC
Recommended Input Fuse	24 Vin models 30A (slow blow) 48 Vin models 15A (slow blow)
ESD (Electrostatic Discharge)	Air: EN 61000-4-2, ±8 kV, perf. criteria A Contact: EN 61000-4-2, ±6 kV, perf. criteria A
Radiated Emissions	EN 55032 class A (internal filter) FCC Part 15 class A (internal filter)
Reverse Voltage Protection	Parallel diode (external input fuse required)
Input Filter	Internal Pi-Type

Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Output Specifications	
Voltage Set Accuracy	±1% max
Regulation	Input Variation (Vmin - Vmax) 0.2% max. - Load Variation (0 - 100%) 0.4% max.I
Minimum Load	Not required
Temperature Coefficient	±0.02 %/K
Ripple and Noise (20MHz bandwidth)	12VDC and 15VDC models: 100 mVp-p max. 24VDC and 28VDC models: 200 mVp-p max. 48V DC models: 300 mVp-p max.
Transient Response	200 µs typ. (25% Load Step)
Overvoltage Protection	125 - 140% of Vout nom
Output Current Limitation	105 - 120% of Iout max.
Short Circuit Protection	Continuous, Automatic recovery
Capacitive Load	12VDC models: 40'000 µF max. 15VDC models: 26'000 µF max. 24VDC models: 10'000 µF max. 28VDC models: 7'600 µF max. 48VDC models: 2'600 µF max.

Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

RHINO PRO DC To DC Converters

General Specifications	
Output Voltage Adjustable Range	0% to +20% (By external trim resistor)
Output Voltage Regulation*	Input variation - 0.2% max Load variation - 0.4% max
Ripple/Noise (20MHz bandwidth)	12VDC and 15VDC models: 100 mVp-p max. 24VDC and 28VDC models: 200 mVp-p max. 48VDC models: 300 mVp-p max.
Temperature: Operating ***Storage (non-operating)***	-40 to 75°C [-40 to 167°F max] -55 to 125°C, [-67 to 257°F max]
Derating	Above 50°C -> 2.0 %/K [24VDC nom.] Above 55°C -> 2.2 %/K [48VDC nom.]
Relative Humidity	95% max. (non-condensing)
Output Power Derating (natural convection)	Natural convection
Temperature Coefficient	±0.02 %/K max.
Switching Frequency	203 - 330 kHz (PWM)
Isolation Voltage (1 min.) – Input/Output	3,000 VDC
Safety Standards	EN 60950-1, EN 62368-1, IEC 60950-1,IEC 62368-1, UL 60950-1, UL 62368-1 - Railway Applications EN 50155
Electromagnetic Compatibility (EMC)	EN 61000-4-3, 10 V/m, perf. criteria A
Parallel Operation	N/A
Pollution Degree	PD 2
Environmental Air	No corrosive gases permitted
Enclosure Rating	IP 55 [IEC 60529]
Enclosure Material	Aluminum
Mounting	Chassis mount
Mounting Orientation	Vertical only
Wiring	14-24 AWG [2.5-0.25 mm²]
Weight [g]	300
Connections	Screw terminal Recommended tightening torque 0.25 Nm [2.21 in-lb]
Short Circuit Protection	Continuous, automatic recovery
Agency Approvals	CE, cURus File E198298

*** Input variation Vin min to Vin max and load variation 0 to 100%**
Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.
To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.

RHINO PRO DC To DC Converters

Output Voltage Adjustment

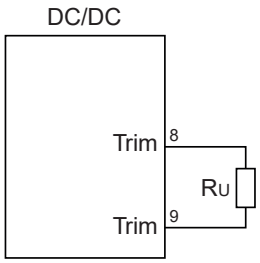
Output voltage set point adjustment allows the user to increase the output voltage set point of the module. This is accomplished by connecting an external resistor between pin 8 (Trim) and pin 9 (Trim). The external TRIM resistor needs to be at least 1/16 W of rated power.

Trim-Tables

PSRP-12-DC24-150, PSRP-24-DC48-150

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Vout [V]	12.12	12.24	12.36	12.48	12.60	12.72	12.84	12.96	13.08	13.20
R_U [kOhm]	222.64	105.09	66.35	47.06	33.51	27.83	22.34	18.23	18.23	12.48
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
Vout [V]	13.32	13.44	13.56	13.68	13.80	13.92	14.04	14.16	14.28	14.40
R_U [kOhm]	10.39	8.65	7.18	5.91	4.82	3.86	3.02	2.27	1.60	0.99

Connection of trim-up resistor



PSRP-15-DC24-150

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Vout [V]	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	16.50
R_U [kOhm]	238.62	113.62	71.95	51.12	38.62	30.29	24.33	19.87	16.40	13.62
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
Vout [V]	16.65	16.80	16.95	17.10	17.25	17.40	17.55	17.70	17.85	18.80
R_U [kOhm]	11.35	9.45	7.85	6.48	5.29	4.25	3.33	2.51	1.78	1.12

PSRP-24-DC24-150, PSRP-24-DC48-150

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Vout [V]	24.24	24.48	24.72	24.96	25.20	25.44	25.68	25.92	26.16	26.40
R_U [kOhm]	212.47	106.69	68.79	49.30	37.43	29.44	23.70	19.37	15.99	13.28
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
Vout [V]	26.64	26.88	27.12	27.36	27.6	27.84	28.08	28.32	28.56	28.80
R_U [kOhm]	11.06	9.20	7.63	6.28	5.11	4.08	3.18	2.37	1.65	1.00

PSRP-28-DC24-150

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Vout [V]	28.28	28.56	28.84	29.12	29.40	29.68	29.96	30.24	30.52	30.80
R_U [kOhm]	255.65	121.72	77.08	77.08	41.36	32.44	26.06	21.28	17.56	14.58
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
Vout [V]	31.08	31.36	31.64	31.92	32.20	32.48	32.76	33.04	33.32	33.60
R_U [kOhm]	12.14	10.11	8.40	6.93	5.65	4.53	3.55	2.67	1.89	1.10

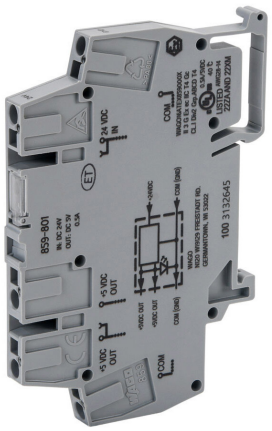
PSRP-48-DC24-150

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Vout [V]	48.48	48.96	49.44	49.92	50.40	50.88	51.36	51.84	52.32	52.80
R_U [kOhm]	268.86	127.44	80.57	57.19	43.17	33.84	27.17	22.18	18.29	15.18
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
Vout [V]	53.28	53.76	54.24	54.72	55.20	55.68	56.16	56.64	57.12	57.60
R_U [kOhm]	12.64	10.52	8.73	7.20	5.87	4.70	3.67	2.76	1.94	1.21

DC to DC Converters 859 Series

Features

- Ultra-wide input voltage range
- Overload and short circuit protection
- Low ripple and noise
- I/O-isolation 1500 VDC
- Compact, slim plastic case
- Reliable snap-on 35mm DIN rail mount
- Wall-mount bracket included
- 2-year warranty



859-801

DC to DC Converters								
Part Number	*Price*	*Input Voltage Range*	*Input Current Max. @ Vin, [Iout = 0% / 100%]*	*Output Voltage*	*Output Current Max*	*Output Power*	*Weight grams [oz]*	*Drawing Link*
859-801	$75.00	10-30 VDC	80mA / 0.15A @ 24 VDC	5 VDC	0.5A	2.5W	34.6 [1.22]	PDF
859-802	$75.00	10-30 VDC	80mA / 0.25A @ 24 VDC	10 VDC	0.5A	5W	41.1 [1.44]	PDF
859-805	$75.00	10-30 VDC	80mA / 0.29A @ 24 VDC	12 VDC	0.5A	6W	35 [1.23]	PDF

DC to DC Converters Accessory			
Part Number	*Price*	*Description*	*Drawing Link*
859-525-5	$5.00	WAGO end cover, package of 5. For use with WAGO DC to DC converters.	PDF



859-525-5

DC to DC Converters 859 Series

General Specifications	
Startup Voltage / Undervoltage Shut-down	17.2 VDC / 15.7 VDC [PSP24-DC12-1: 8.4 VDC / 7.6 VDC]
Efficiency (Typical)	859-801 70% 859-802 and 859-805 85%
Output Voltage	859-801 - 5VDC 859-802 - 10VDC 859-805- 12VDC
Overvoltage Protection, Trigger Point	859-801 ≤ 6.5 V 859-802 ≤ 24V 859-805 ≤ 42V
Output Voltage Regulation*	859-801 ≤ 0.5% 859-802 and 859-805 ≤ 0.7%
Ripple/Noise (20MHz bandwidth)	859-801 ≤ 150mV 859-802 and 859-805 ≤ 20mV
Temperature: Operating Storage (non-operating) Derating	-25 to 70°C max [-13 to 158°F max] -25 to 85°C max, [-13 to 185°F max] 1.5%/K above 50°C [122°F] for 25W models, 2%/K above 40°C [104°F] for 60W models
Humidity (Non-condensing)	95 % relative humidity max.
Temperature Coefficient	0.02%/K
Switching Frequency	20kHz [nominal]
Isolation Voltage (1 min.) – Input/Output	1500VDC
Safety Standards	
Electromagnetic Compatibility (EMC)	Emissions: EN 61000-6-3; Immunity: EN 61000-6-2
Parallel Operation	No parallel operation
Safety Class	Degree of protection class 111
Environmental Air	No corrosive gases permitted
Enclosure Rating	IP20 [per EN 60529]
Enclosure Material	Plastic FR2010-110C [UL 94V-0 rated]
Mounting	DIN rails per EN 50022-35x15/7.5 [snap-on with self-locking spring]; bracket for wall/chassis mount included
Mounting Orientation	Vertical only
Wiring	28-14 AWG [0.08-2.5 mm²]
Connections	Cage Clamp® , recommended tightening torque 0.5-0.7 Nm [4.5-6.2 in-lb]
Short Circuit Protection	Current limited at 110% typical
MTBF (IEC 61709 @ 25°C)	> 2.5 million hours
Agency Approvals*	UL 508 File E175199, CE, RoHS

*** Input variation Vin min to Vin max and load variation 0 to 100%**
**** To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.**
Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

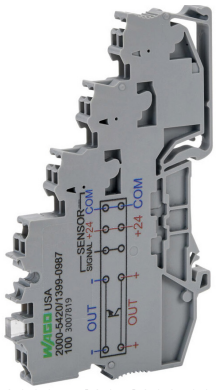
PNP/NPN Converter

Overview

The 2000-5420-1399-0987 gives the user the ability to easily convert a signal to their PLC from PNP to NPN or vice-versa simply by moving a couple of wires and changing of the internal jumper

Features

- 35mm DIN rail mount
- 2- year warranty



2000-5420-1399-0987

PNP/NPN Converter							
Part Number	*Price*	*Input Voltage Range*	*Input Current @ 24 VDC*	*Output Voltage*	*Output Current Max*	*Weight grams [oz]*	*Drawing Link*
2000-5420-1399-0987	$52.00	19.2 - 28.8 VDC	7mA	24VDC	100mA	35 [1.23]	PDF

Specifications	
Specification	
Maximum Output Current	100mA
Minimum Load on Output	1mA
Voltage Drop at Output	[24V, 100mA] 1.3 V
Input Voltage Nominal	24VDC
Input Voltage Range	19.2 - 28.8 VDC
Input Current at 24VDC	7mA
Operating Temperature	0 to 40°C [+32 to 104°F]
Isolation Voltage	500Vrms [60s, R.H. ≤ 60%]
Maximum Switching Frequency	500Hz
Housing Material	Plastic
Insulation Material	Polyamide [PA66]
Mounting	35mm DIN
LED	Green, illuminated when signal applied to input
Agency Approval *	RoHS

*** To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.**

Accessory			
Part Number	*Price*	*Description*	*Drawing Link*
2000-5491-5	$6.00	WAGO end cover, package of 5. For use with WAGO PNP/NPN converters.	PDF



2000-5491-5

RHINO Panel Mount Power Supply PSS Series

Overview

AutomationDirect's RHINO PSS panel mount power supply is perfect for applications that require a basic DC voltage power supply. The low cost power supply offers high performance and reliability without all the additional features of higher cost full-featured power supplies. The PSS0524-100 provides both a 24VDC and a 5VDC output. The rugged aluminum housing easily screw mounts in three different mounting orientations. This high-quality power supply includes overload, overvoltage and thermal protection, and is UL 60950 recognized, CE marked and RoHS compliant.

Features

- Dual 5 and 24VDC, 100 Watts
- Adjustable output voltage
- Rugged aluminum housing, screw mounts in three different orientations
- Output voltage status LED
- Robust fixed-screw terminal strips
- Overload, overvoltage and thermal protection
- UL 60950 recognized, CE marked and RoHS compliant
- 2-year warranty



Input Specifications

Part Number	Price	Weight kg [lb]	Input Voltage	Input Frequency Range	Max. Input Current	Inrush Current Limitation I2t @ 77°F [+25°C] typ.	Leakage Current	Recommended Circuit Breaker
PSS0524-100	$54.00	0.52 [1.15]	85–264 VAC [DC input range 125–375 VDC]	47–63 Hz [0Hz @ DC Input]	< 2A Max @ 115VAC, < 1.1A Max @ 230VAC	< 50A @ 115VAC, 100A @ 230VAC	< 1mA	16A "B" Curve

Output Specifications

Part Number	Output Voltage (Vnom) / Adjustment Range	Output Power	Output Current	Ripple and Noise [20MHz]	Startup with Capacitive Loads	Start-Up Time	Hold-Up Time at Nominal Load (Typ.) (Mains Buffering) @ 25°C [77°F]	Rise Time	Efficiency [Typ @115VAC]
PSS0524-100	V1: 24VDC / 22.8–26.4 VDC V2: 5VDC / Fixed	100W	V1: 2.7 A V2: 7.0 A	V1: < 200 mVpp; V2: < 80 mVpp	4000µF	< 1000ms @ 100% load 25°C [77°F] and typical line input	> 15ms @ 115VAC, >80ms @ 230VAC with 100W load	V1: < 30ms, V2: < 20ms @ 100% load 25°C [77°F]	82%

RHINO Panel Mount Power Supply Specifications PSS Series

General Specifications	
Output Line Regulation	<0.5% typical @ 85–264 VAC input, 100% load
Output Load Regulation	<1% typical @ 85–264 VAC input, 0-100% load
Overload/Short Circuit Protection	>150% of total rated output power, hiccup mode, non-latching, auto-recovery)
Overvoltage Protection	V1: <32.4 VDC max., V2: 6.75 VDC max.], hiccup mode, non-latching [auto recovery]
Case Cover	Aluminium [Al1100]
Signals	Green LED DC OK
MTBF	>700,000 hrs.
Noise	Sound pressure level [SPL] <40dBA
Cooling	Convection
Input/Output Terminal	7-Pin rated 300V/15A]
Shock Test	30g half sine, 3 times per direction, 6 directions, per IEC60068-2-27
Vibration	10 to 150Hz, 5g, 20 min. each axis per IEC60068-2-6
Operating Temperature	-10 to 70°C* [14 to158°F]
Storage Temperature	-25 to 85°C [-13 to 185°F]
Humidity at +25 °C [77°F], no condensation	<95% RH non-condensing

*** Operating to 70°C [158°F] possible with a linear derating to half power from 50 to 70°C [122 to 158°F]**

Safety and Agency Approvals	
EMC / Emissions	FCC Title 47, Class B/EN 55032;CISPR32, Class B
Immunity	EN 61000-4-2,1995; EN 61000-4-3,1998; EN 61000-4-4,1995; IEC61000-4-5,1995; EN 61000-4-6,1996; EN 61000-4-8 or IEC61000-4-12 or IEEE C62.41; EN 61000-3-2,1994
Voltage Dips	Conform to EN 61000-4-11
Galvanic Isolation	Input to Output : 3 KVAC, Input to Ground : 1.5 KVAC, Output to Ground : 0.5 KVAC
Approvals	UR/cUR recognized to UL60950-1 File no. E198298; CB test certificate and report to IEC60950-1, CE [EMC and Low Voltage directive]
RoHS Compliant	Yes

Additional Data

Part Number	***Wire Size / Torque***		***Terminal Block Type***	***Chassis Mounting Torque***	***Drawing Link***
	Input	***Output***			
PSS0524-100	0.82-2.08 mm² (AWG 18-14) / 1.3 Nm (11.3 in-lb)	0.82-2.08 mm² (AWG 18-14) / 1.3 Nm (11.3 in-lb)	Fixed screw terminals	0.4–0.8 N•m [3.5–7 lb•in]	PDF

RHINO Panel Mount Power Supplies
PSS-S Series



Overview

AutomationDirect's RHINO PSS-S low profile, panel mount, power supplies accept a universal AC input and feature a highly efficient convection cooling construction that operates from -30°C to 70°C [-22 to 158°F].

Features

- Universal AC input voltage range 90–264 VAC
- Adjustable output voltage
- No load power consumption <0.3 W
- Low profile design
- Overload, overvoltage and thermal protection
- Output voltage status LED
- Rugged aluminum housing, screw mounts in three different orientations
- Wide operating temperature -30 to 70°C (-40°C cold start) [-22 to 158°F]
- 3-year warranty

Input Specifications							
Part Number	***Price***	***Input Voltage Range***	***Input Frequency Range***	***Input Current***	***Max. Inrush Current (cold start)***	***Leakage Current***	****Recommended Circuit Breaker***
PSS12-035-S	$14.50	90 – 264 VAC	47 – 63 Hz	0.7 A typ. @ 115VAC, 0.42 A typ. @ 230VAC	45A typ. @ 230VAC	< 0.5 mA @ 240VAC	10A "B" Curve
PSS12-050-S	$16.50			0.95 A typ. @ 115VAC, 0.6 A typ. @ 230VAC	45A typ. @ 230VAC		16A "B" Curve
PSS12-100-S	$22.00			1.9 A typ. @ 115VAC, 1.2 A typ. @ 230VAC	55A typ. @ 230VAC		20A "B" Curve
PSS24-035-S	$14.50			0.7 A typ. @ 115VAC, 0.42 A typ. @ 230VAC	45A typ. @ 230VAC		10A "B" Curve
PSS24-050-S	$16.50			0.95 A typ. @ 115VAC, 0.6 A typ. @ 230VAC	45A typ. @ 230VAC		16A "B" Curve
PSS24-100-S	$22.00			1.9 A typ. @ 115VAC, 1.2 A typ. @ 230VAC	55A typ. @ 230VAC		20A "B" Curve

***Note: Input circuit breaker is based on Input and Inrush current. Defined Inrush is based on cold start at 25°C.**

Output Specifications									
Part Number	***Output Voltage (Vnom) / Adjustment Range***	***Output Power***	***Output Current***	***Ripple and Noise (20MHz)***	***Startup with Capacitive Loads***	***Start-Up Time***	***Hold-Up Time***	***Rise Time***	***Efficiency***
PSS12-035-S	10.8–13.2 VDC	35W	3A	< 120 mVpp @ 0 to 70°C 360 mVpp typ. @ -30 to 0°C	8000µF	1,000ms typ. @ 115VAC 500ms typ. @ 230VAC	16ms typ. @ 115 VAC, 70ms typ. @ 230 VAC 12ms typ. @ 115 VAC, 60ms typ. @ 230 VAC	30ms typ. @ 115VAC & 230VAC	86.0% typ.
PSS12-050-S		50W	4.2 A						85.0% typ.
PSS12-100-S		100W	8.5 A			500ms typ. @ 115VAC & 230VAC	9ms typ. @ 115 VAC, 42ms typ. @ 230 VAC		87.5% typ.
PSS24-035-S	21.6–26.4 VDC	35W	1.5 A	< 150 mVpp @ 0 to 70°C 450 mVpp typ. @ -30 to 0°C		1,000ms typ. @ 115VAC 500ms typ. @ 230VAC	16ms typ. @ 115 VAC, 70ms typ. @ 230 VAC 12ms typ. @ 115 VAC, 60ms typ. @ 230 VAC		88.5% typ.
PSS24-050-S		50W	2.2 A						88.0% typ.
PSS24-100-S		100W	4.5 A			500ms typ. @ 115VAC & 230VAC	9ms typ. @ 115 VAC, 42ms typ. @ 230 VAC		90.0% typ.

RHINO Specifications PSS-S Series

General Specifications	
Output Line Regulation	± 0.5% (@ 115VAC & 230VAC input)
Output Load Regulation	± 0.5% (@ 115VAC & 230VAC input)
Overload/Short Circuit Protection	110-175% of rated load current, Hiccup Mode, Non-Latching (Auto-Recovery when the fault is removed)
Overvoltage Protection	PSS12 - 13.2 V - 17.4 V, SELV Output, Latch Mode PSS24 - 26.4 V - 33.6 V, SELV Output, Latch Mode
Case Chassis / Cover	Aluminum / SGCC (Galvanized Steel)
Signals	Green LED (DC OK)
MTBF	> 700,000 hrs as per Telcordia SR-332 I/P: 230 Vac, O/P: 100% Load, Ta: 25°C)
Noise	Sound pressure level (SPL) < 25 dBA
Cooling	Convection
Terminal	M3.5 x 5 Pins (Rated 300V / 20A)
Shock Test	Non-Operating IEC 60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions Operating IEC 60068-2-27, Half Sine Wave: 10G for a duration of 11ms, 3 shock for each 3 directions.
Vibration	Non-Operating IEC 60068-2-6, Random: 5Hz to 500Hz (2.09G); 20 min per axis for all X, Y, Z direction Operating IEC 60068-2-6, Sine Wave: 20Hz to 500Hz (5G); 10 min per cycle, 60 min for each axis (X, Y, Z)
Operating Temperature	-30 to 70°C (-40°C Cold Start) [-22 to 158°F]
Storage Temperature	-40 to 85°C [-40 to 185°F]
Humidity	20 to 90% RH (Non-Condensing)

Safety and Agency Approvals	
EMC / Emissions	EN 55032
Immunity	EN 55035, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8
Voltage Dips	Conform to IEC 61000-4-11
Galvanic Isolation	Input to output 4.0 KVAC, Input to Ground 2.0 KVAC, Output to Ground 1.25 KVAC
Approvals	cURus File: E508040, UL 62368-1, CAN/CSA C22.2 No. 62368-1 CB scheme: IEC 62368-1, IEC 60335-1, IEC 61558-1/-2-16 CE: In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU

To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.

Additional Data

Part Number	*Wire Size / Torque*		*Terminal Block Type*	*Chassis Mounting Torque*	*Weight*	*Drawing Link*
	Input	*Output*				
PSS12-035-S	0.82-3.31 mm² [AWG 18-12] 0.78 N•m [6.94 lb•in]	0.82-3.31 mm² [AWG 18-12] 0.78 N•m [6.94 lb•in]	M3.5 x 5 Pins (Rated 300V / 20A)	0.39–0.69 N•m [3.47–6.08 lb•in]	0.165 kg [0.363 lb]	PDF
PSS12-050-S					0.176 kg [0.389 lb]	PDF
PSS12-100-S			M3.5 x 7 Pins (Rated 300V / 20A)		0.285 kg [0.628 lb]	PDF
PSS24-035-S			M3.5 x 5 Pins (Rated 300V / 20A)		0.165 kg [0.363 lb]	PDF
PSS24-050-S					0.176 kg [0.389 lb]	PDF
PSS24-100-S			M3.5 x 7 Pins (Rated 300V / 20A)		0.285 kg [0.628 lb]	PDF

RHINO DIN Rail Power Supplies PSB Series

Single-Phase Input Overview

AutomationDirect's RHINO PSB series of DIN rail power supplies is perfect for applications that require a basic DC voltage power supply. These low-cost power supplies offer high performance and reliability without all the additional features of higher-cost full-featured power supplies. The following models in the RHINO PSB series are available with universal single-phase input and with output voltages of 24VDC or 48VDC from 60 to 480 Watts. They feature removable terminal blocks, high efficiencies, conformal coated circuit boards, and approval for Class 1, Division 2 hazardous locations. The rugged plastic and aluminum housings easily install with integral 35mm DIN rail mounting adapters. These high-quality power supplies include overload, overvoltage and thermal protection, and are UL 508 listed, UL 60950 recognized, CSA certified, CE marked and RoHS compliant.

PSB48-480S is perfect for Stepper Drives, like our STP-DRV-6575, STP-DRV-4850 or STP-DRV-80100

Features

- Universal input voltage, single-phase 120/240 VAC or 120–375 VDC
- 24VDC or 48VDC outputs, 60 to 480 Watts
- Adjustable output voltage
- Rugged plastic or aluminum housings with integral 35mm DIN rail mounting adapters
- Output voltage status LED
- NEC Class2 (Model PSB24-100-N & PSB24-060S-P only)
- Removable terminal blocks (except PSB24-060S-P, PSB24-100-N, PSB24-480S and PSB48-480S) with IP20 protection
- Conformal coated circuit board for protection against demanding environments
- Overload, overvoltage and thermal protection
- UL 508 listed, UL 60950 recognized, CSA certified, approved for Class I (except PSB24-100-N) , Division 2 hazardous locations CE marked and RoHS compliant
- 3-year warranty



Input Specifications

Part Number	Price	Weight kb [lb]	Housing	Input Voltage	Input Frequency Range	Max. Input Current	Inrush Current Limitation I2t @ 77°F (+25°C) typ.	Leakage Current	Recommended Circuit Breaker	Hold-Up Time at Nominal Load (Typ.) (Mains Buffering) (100% load, 25°C)	Turn-on Time
PSB24-060S-P	$45.00	0.33 [0.73]	Plastic	85–264 VAC [DC input range 120–375 VDC] UL Approved for 100-240 VAC only	47–63 Hz [0Hz @ DC Input]	<1.5 A @ 100VAC	<40A @ 115VAC, <80A @ 230VAC	<0.5mA @ 240VAC	16A "B" Curve	>20ms @ 115VAC >125ms @ 230VAC	<3 sec.
PSB24-060S	$54.00	0.37 [0.82]	Aluminum			<1.4 A @ 115VAC, <0.8 A @ 230VAC	<20A @ 115VAC, <35A @ 230VAC	<1mA @ 240VAC	8A "B" Curve		<2 sec.
PSB24-100-N	$81.00	0.60 [1.32]				<1.00A @ 115VAC, <0.53A @ 230 VAC	<30A @ 115VAC <60A @ 230VAC	<0.5mA @ 24VAC	13A "B" Curve	>20ms @ 115VAC >30ms @ 230VAC	
PSB24-120S	$97.00	0.72 [1.59]				<2.2 A @ 115VAC, <1.2 A @ 230VAC	<35A @ 115VAC, <35A @ 230VAC	<1mA @ 240VAC	10A "B" Curve	>20ms @ 115VAC >115ms @ 230VAC	
PSB24-240S	$161.00	1.10 [2.43]				<2.5 A @ 115VAC, <1.3 A @ 230VAC			8A "B" Curve	>20ms @ 115VAC & 230VAC	<1 sec.
PSB24-480S	$248.00	1.37 [3.02]				<5A @ 115VAC, <3A @ 230VAC		<3mA @ 240VAC	6A "B" Curve		
PSB48-120S	$97.00	0.72 [1.59]				<2.2 A @ 115VAC, <1.1 A @ 230VAC		<1mA @ 240VAC	8A "B" Curve	>20ms @ 115VAC >50ms @ 230VAC	
PSB48-240S	$161.00	0.97 [2.14]				<2.5 A @ 115VAC, <1.3 A @ 230VAC			8A "B" Curve	>20ms @ 115VAC & 230VAC	
PSB48-480S	$219.00	1.37 [3.02]				<5A @ 115VAC, <3A @ 230VAC		<3mA @ 240VAC	10A "B" Curve	>20ms @ 115VAC & 230VAC	<1.5 sec.

RHINO DIN Rail Power Supplies PSB Series

Output Specifications

Part Number	Output Voltage (Vnom) / Adjustment Range	Output Power	Output Current	Ripple and Noise [20 MHz]	Startup with Capacitive Loads Max	Derating	Max. Power Dissipation Idling/Nominal Load Approx.	Efficiency [Typ @ 115VAC]	MTBF
PSB24-060S-P	24VDC ±2%/22–28 VDC [maximum power ≤60W]	60W	2.5 A	<240mVpp @ 25°C	8,000µF	>50°C de-rate power by 2.5%/°C >70°C de-rate power by 4%/°C	8W	88%	>800,000 hrs.
PSB24-060S	24VDC ±2%/24–28 VDC [maximum power ≤60W]			<150mVpp @ 25°C		>50°C de-rate power by 2.5%/°C	7.4 W	90%	>1,000,000 hrs.
PSB24-100-N	24VDC ±2%/22–24 VDC [maximum power ≤91.2W]	91.2 W	3.80A		8,000µF	>50°C de-rate power by 2.5%/°C > 70°C de-rate power by 4%/°C	12.4 W	88%	>800,000 hrs.
PSB24-120S	24VDC ±2%/24–28 VDC [maximum power ≤120W]	120W	5A		10,000µF	>50°C de-rate power by 2.5%/°C	14.8 W	89%	
PSB24-240S	24VDC ±2%/24–28 VDC [maximum power ≤240W]	240W	10A				26.5 W	90%	>500,000 hrs.
PSB24-480S	24VDC ±2%/24–28 VDC [maximum power ≤480W]	480W	20A	<150mVpp @ 25°C		>50°C de-rate power by 2.5%/°C >70°C de-rate power by 5%/°C	47W	91%	
PSB48-120S	48VDC ±1%/48–56 VDC [maximum power ≤120W]	120W	2.5 A	<200mVpp @ 25°C	6,500µF	>50°C de-rate power by 2.5%/°C	14.8 W	90%	>800,000 hrs.
PSB48-240S	48VDC ±1%/48–56 VDC [maximum power ≤240W]	240W	5A	<200mVpp @ 85VAC to 265VAC	10,000µF		25W	90%	>500,000 hrs.
PSB48-480S	48VDC ±1%/48–56 VDC [maximum power ≤480W]	480W	10A	<200 mVpp @ 85VAC to 264VAC		>50°C de-rate power by 2.5%/°C >70°C de-rate power by 5%/°C	46.5 W	91%	

General Specifications

Output Line Regulation	<0.5% @ 85–264 VAC input, 100% load
Output Load Regulation	<1% @ 85–264 VAC input, 0-100% load
	PSB24-100-N: < 1% at -25°C to +25°C < 2% at +25°C to +50°C <1% typ. @ 85–264 VAC input, 0-100% load
Parallel Operation	PSB60-REM20S / PSB60-REM40S or with ORing Diode
Case Cover	Aluminium or Plastic [Polycarbonate] for P Series
Signals	Green LED DC OK
Humidity at 25°C [77°F], no condensation	<95% RH [non-condensing]
Shock (Non-Operating)	IEC 60068-2-27, 30G [300m/S²] for a duration of 18ms, 1 time per direction, 2 times in total
Vibration (Non-Operating)	IEC60068-2-6, 10Hz to 500Hz @ 30 m/S2 [3G peak]; 60 min per axis for all X, Y, Z direction
Environmental Air	No corrosive gases permitted (PSB24-100-N) Conformal coating on PCBA to protect against chemical and dust pollutants
Pollution Degree	2
Climatic Class	3K3 according to EN 60721

Series Certification and Standards

Electrical Equipment of Machines	IEC60204-1 [over voltage category III]
Electronic equipment for use in electrical power installations	EN62477-1 / IEC62103
Safety Entry Low Voltage	PELV [EN60204], SELV [EN60950]
Industrial Control Equipment	UL/cUL listed to UL508 and CSA C22.2 No. 107.1-01 File no. E197592 CSA to CSA C22.2 No. 107.1-01
Hazardous Location	cCSAus to CSA C22.2 No. 213-M1987, ANSI / ISA 12.12.01:2007 Class I, Division 2, Group A,B,C,D T4, Ta = 25 to +80°C (PSB24-060S-P, PSB24-060S, PSB24-120S, PSB24-240S, PSB48-120S, PSB48-240S); 25 to +75°C (PSB24-480S, PSB48-480S) Vertical: > +50°C derating, File no. 249074
Class 2 Power Supply	UR/cUR Class 2 power supply recognized to UL1310 and CSA C22.2 No. 223 File no. E198298 (PSB24-060S-P and PSB24-100-N only)
CE	CE

To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.

RHINO DIN Rail Power Supplies PSB Series

Safety and Protection		
Transient surge voltage protection	Varistor	
Overvoltage	PSB24-060S-P, PSB24-060S, PSB24-100-N, PSB24-120S, PSB24-240S, PSB24-480S: <32V, SELV Output, hiccup mode, non-latching [auto-recovery]	PSB48-120S, PSB48-240S, PSB48-480S: <57V, SELV Output, hiccup mode, non-latching [auto-recovery]
Overload / Overcurrent	PSB24-060S-P, PSB24-060S, PSB24-100-N, PSB24-120S, PSB24-240S, PSB24-480S: >150% of rated load current, hiccup mode, non-latching [auto-recovery].	
	PSB24-060S-P: 110-150% of rated load current, hiccup mode, non-latching [auto-recovery].	
Isolation Voltage: ***Input/output (type test/routine test)*** ***Input/GND (type test/routine test)*** ***Output/GND (type test/routine test)***	4 kVAC / 3 kVAC 1.5 kVAC / 1.5 kVAC 1.5 kVAC / 500 VAC	
Protection Degree	IP20	
Safety Class	Class I with GND connection	

Additional Data

Part Number	***Wire Size / Torque****		***Terminal Block Type***	***Ambient Operating Temperature*****	***Storage Temperature***	***Drawing Link***
	Input	***Output***				
PSB24-060S-P	0.52–5.3 mm² [AWG 20–10] / 0.45 Nm [3.96 lb-in]		Fixed screw terminals	-25 to 80°C [-13 to 176°F]	-25 to 80°C [-13 to 176°F]	PDF
PSB24-060S	0.52–3.3 mm² [AWG 20–12] / 0.46 Nm [4.05 lb-in]		Removable screw terminals	-25 to 80°C [-13 to 176°F] Cold start at -40°C [-40°F]	-40 to 85°C [-40 to 185°F]	PDF
PSB24-100-N	0.82–3.3 mm² [AWG 18–12] / 0.91 Nm [8.1 lb-in]	0.82–3.3 mm² [AWG 18–12] / 0.61 Nm [5.4 lb in]	Fixed screw terminals			PDF
PSB24-120S	0.52–3.3 mm² [AWG 20–12] / 0.46 Nm [4.05 lb-in]		Removable screw terminals			PDF
PSB24-240S	1.3–2.1 mm² [AWG 16–14] / 0.46 Nm [4.05 lb-in]					PDF
PSB24-480S	0.82–5.3 mm² [AWG 18–10] / 0.45 Nm [3.96 lb-in]	3.3–5.3 mm² [AWG 12–10] / 0.45 Nm [3.96 lb-in]	Fixed screw terminals	-25 to 75°C [-13 to 176°F]		PDF
PSB48-120S	0.52–3.3 mm² [AWG 20–12] / 0.46 Nm [4.05 lb in]		Removable screw terminals	-25 to 80°C [-13 to 176°F]		PDF
PSB48-240S						PDF
PSB48-480S	0.82–5.3 mm² [AWG 18–10] / 0.45 Nm [3.96 lb-in]	1.3–5.3 mm² [AWG 16–10] / 0.45 Nm [3.96 lb-in]	Fixed screw terminals	-25 to 75°C [-13 to 176°F]		PDF

***Stripping length 7 mm [0.28 in]**
**** See output specifications for temperature derating**

RHINO DIN Rail Power Supplies PSB Series

Three-Phase Input Overview

AutomationDirect's RHINO PSB series of DIN rail three-phase input power supplies is perfect for applications that require a basic DC voltage power supply. These low cost power supplies offer high performance and reliability without all the additional features of higher cost full-featured power supplies. The three-phase input eliminates the need for a separate step down transformer and the output of 24VDC is available from 60 to 960 Watts. The rugged aluminum housings easily install with integral 35mm DIN rail mounting adapters. These high-quality power supplies include overload, overvoltage and thermal protection, and are UL 508 listed, UL 60950 recognized, CSA certified, CE marked and RoHS compliant. Units are covered by a three year warranty.



PSB 3-Phase Series Input Specifications

Part Number	Price	Weight kg [lb]	Housing	Input Voltage	Input Frequency Range	Max. Input Current	Inrush Current Limitation I2t @ 77°F [+25°C] typ.	Leakage Current	Recommended Circuit Breaker	Hold-Up Time at Nominal Load [Typ] (Mains Buffering)	Turn-on Time
PSB24-060S-3	$76.00	0.66 [1.46]	Aluminum	Nominal 480VAC UL/CSA approved to 500VAC	47–63 Hz	<0.3 A / Phase @ 400VAC and <0.25 A / Phase @ 500VAC	<30A @ 400VAC & 500VAC @ 25°C [With 3Ph AC source capability up to 3KVA] <55A @ 400VAC & 500VAC @ 25°C [With 3Ph AC source capability up to 18KVA]	<3.5 mA	3 x circuit breakers 16A "B" Curve	>20ms @ 3 x 400VAC, >40ms @ 3 x 500VAC	<1000ms @ 100% load [25°C] and typical line input
PSB24-120S-3	$98.00					<0.5 A / Phase @ 400VAC and <0.4 A / Phase @ 500VAC	<30A @ 400VAC & 500VAC @ 25°C [With 3Ph AC source capability up to 3KVA] <60A @ 400VAC & 500VAC @ 25°C [With 3Ph AC source capability up to 18KVA]				
PSB24-240S-3	$163.00	0.89 [1.96]				<0.75 A / Phase @ 400VAC and <0.65 A / Phase @ 500VAC	<40A @ 400VAC & 500VAC @ 25°C [With 3Ph AC source capability up to 3KVA] <60A @ 400VAC & 500VAC @ 25°C [With 3Ph AC source capability up to 18KVA]				
PSB24-480S-3	$232.00	1.35 [2.98]				<0.95 A / Phase @ 400VAC and <0.75 A / Phase @ 500VAC	<50A @ 400VAC & 500VAC @ 25°C [With 3Ph AC source capability up to 3KVA] <70A @ 400VAC & 500VAC @ 25°C [With 3Ph AC source capability up to 18KVA]				
PSB24-960S-3	$343.00	2.6 [5.73]				1.7 A Max / Phase	<50A @ 500VAC @ 25°C	<3mA @ 575VAC		>20ms @ 3 x 400VAC & 3 x 500VAC	

RHINO DIN Rail Power Supplies PSB Series

Output Specifications

Part Number	Output Voltage (Vnom) / Adjustment Range	Output Power	Output Current	Ripple and Noise [20 MHz]	Startup with Capacitive Loads	Derating	Max Power Dissipation Idling / Nominal Load Approx.	Efficiency [Typ 3 @ 400VAC and 500VAC]	MTBF
PSB24-060S-3	24–28 VDC [Max power ≤60W]	60W	2.5 A [60W Max]	<150mVpp at 320VAC to 600VAC input	Max 10,000µF	>50°C de-rate power by 2.5%/°C >70°C de-rate power by 5%/°C	9.8 W	86%	>500,000 hrs
PSB24-120S-3	24–28 VDC [Max power ≤120W]	120W	5A [120W Max]				16.5 W	88%	
PSB24-240S-3	24–28 VDC [Max power ≤240W]	240W	10A [240W Max]				26.7 W	92%	>300,000 hrs
PSB24-480S-3	24–28 VDC [Max power ≤480W]	480W	20A [480W Max]				53W	91%	
PSB24-960S-3	24–28 VDC [Max power ≤960W]	960W	40A [960W Max]	<240mVpp at 320VAC to 575VAC input		>50°C de-rate power by 2.5%/°C	94W	92%	

General Specifications

Output Line Regulation	<0.5% typ. @ 320 to 600VAC input, 100% load
Output Load Regulation	<1% typical with rated input, 0 to 100% load
Parallel Operation	PSB60-REM20S* / PSB60-REM40S or with ORing Diode
Case Cover	Aluminium [Al5052]
Signals	Green LED DC OK
Humidity at +25°C [77°F], no condensation	<95% RH [non-condensing]
Shock	IEC 60068-2-27
Vibration (Non-operating)	IEC 60068-2-6
Pollution Degree	2
Climatic Class	3K3 according to EN 60721

*** Does not apply to the PSB24-960S-3**

Certification and Standards

EMC / Emissions	FCC Title 47, Class B / EN55032, CISPR32, CISPR11, Class B
Immunity	EN61000-4-2, 1995; EN61000-4-4, 1995; EN61000-4-5, 1995; IEC61000-4-12 or IEEE C62.41; EN61000-4-3, 1998; EN61000-4-8; EN61000-4-6, 1996
Voltage Dips	EN61000-4-11
Approvals	UL/cUL listed to UL508 and CSA C22.2 No. 107.1-01 File no. E197592, CSA to CSA C22.2 No. 107.1-01 File no. 249074, UR/cUR recognized to UL60950-1 and CSA C22.2 No. 60950-1 File no. E198298. CE (EMC and Low Voltage directive)

To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.

Safety and Protection

Transient Surge Voltage Protection	Varistor
Overload/Short Circuit Protection	> 150% of rated load current, auto recovery [hiccup mode]
Overvoltage Protection	<32V, w10%, SELV output, non-latching [autorecovery]
Isolation Voltage: Input/output Input/GND Output/GND	 4 KVac 1.5 KVac 1.5 KVac
Protection Degree	IP20
Safety Class	Class I with GND connection

RHINO DIN Rail Power Supplies PSB Series

Additional Data						
Part Number	Wire Size / Torque*		Terminal Block Type	Ambient Operating Temperature**	Storage Temperature	Drawing Link
	Input	Output				
PSB24-060S-3	0.82–3.3 mm² [AWG 18–12] / 0.92 Nm [8.1 lb-in]	0.82–3.3 mm² [AWG 18–12] / 0.61 Nm [5.4 lb-in]	Fixed screw terminals	-25 to 80°C [-13 to 176°F]	-25 to 85°C [-13 to 185°F]	PDF
PSB24-120S-3						PDF
PSB24-240S-3	0.82–3.3 mm² [AWG 18–12] / 0.92 Nm [8.1 lb-in]	1.3–3.3 mm² [AWG 16–12] / 0.61 Nm (5.4 lb-in)				PDF
PSB24-480S-3	0.82–8.4 mm² [AWG 18–8] / 0.92 Nm [8.1 lb-in]	3.3–5.3 mm² [AWG 12–10] / 0.92 Nm [8.1 lb-in]				PDF
PSB24-960S-3				-25 to 65°C [-13 to 149°F]		PDF

*Stripping length 7 mm [0.28 in] or use suitable lug to crimp
** See output specifications for temperature derating

PSB24-060S-3
PSB24-120S-3

Wiring Connection			
Input		Output	
L1	Line 1	+	Out +
L2	Line 2	+	Out +
L3	Line 3	-	Out -
⏚	AC Ground	-	Out -

PSB24-240S-3

Wiring Connection			
Input		Output	
L1	Line 1	+	Out +
L2	Line 2	+	Out +
L3	Line 3	-	Out -
⏚	AC Ground	-	Out -

PSB24-480S-3

Wiring Connection			
Input		Output	
L1	Line 1	+	Out +
L2	Line 2	+	Out +
L3	Line 3	-	Out -
⏚	AC Ground	-	Out -

PSB24-960S-3

Wiring Connection			
Input		Output	
L1	Line 1	+	Out +
L2	Line 2	+	Out +
L3	Line 3	-	Out -
⏚	AC Ground	-	Out -

RHINO Power Supply Accessories PSB Series

Redundancy Module Overview

The RHINO PSB60-REM series redundancy modules are used with two RHINO PSB series power supplies in parallel to create redundancy to help prevent costly downtime due to power supply failure. The redundancy module decouples the outputs of the two connected power supplies so that in case of failure, one power supply cannot overload the other. The modules can handle power supply voltages from 22 to 60VDC and provides alarm relay contacts for remote monitoring.

Features

- Provides redundancy and parallel operation of two RHINO PSB power supplies
- Wide input and output range 22–60 VDC
- Input voltage OK LED and relay alarm indication
- Corrosion resistant aluminum housing
- Approved for use in Class I, Division 2 hazardous locations
- 3-year warranty



Redundancy Modules		
Part Number	***PSB60-REM20S***	***PSB60-REM40S***
Price	$45.00	$55.00
Weight kg [lb]	0.375 [0.83]	0.515 [1.14]
Redundancy Module Input Specifications		
Nominal Input Voltage	24 / 48 VDC	
Voltage Range	22–60 VDC	
Nominal Current	20A max	40A max
Input Voltage Alarm/Relay Contacts	24V system: both Vin1 & Vin2 >18V ± 5% or < 30V max. relay contacts 48V system: both Vin1 & Vin2 >36V ± 5% or <60V max. relay contacts	
Input Voltage LED Operation	The LED will turn on when the Vin1 & Vin2 >18V± 5% (for 24V systems) or >36V ± 5% (for 48V system) and not more than 30V (for 24V systems) or not more than 60V (for 48V systems), the relay contacts will be closed. If Vin1 & Vin2 is under or over this range, the LED will turn off	
Redundancy Module Output Specifications		
Nominal Output Voltage UN / Tolerance	Vin-0.65V [Typ]	
Nominal Current	20A max	40A max
Derating above +50°C	>50°C [2.5% / K]	
Short Circuit / Over Load Limit	<25A	<50A
Efficiency	>97% typical	

Note: The overload condition must be controlled by the power supply units in parallel; The limit of input current should not be more than 25A (for 20A module) or not more than 50A (for 40A module)

Redundancy Module Certification / Standards	
Electrical Equipment of Machines	IEC60204-1 [over voltage category III]
Electrical Safety (IT equipment)	UR/cUR recognized to UL60950-1 File no. E198298, CB test certificate and report to IEC60950-1 and CE
Industrial Control Equipment	UL/cUL recognized to UL508 and CSA C22.2 No. 107.1-01File no. E197592
Hazardous Location	cCSAus to CSA C22.2 No. 213-M1987, ANSI / ISA 12.12.01:2007 [Class I, Division 2, Group A,B,C,D T4, Ta = -40 to +80°C (> +50°C derating)], File no. 249074
Electronic Equipment For Use in Electrical Power Installations	EN50178 / IEC62103
Safety Entry Low Voltage	PELV [EN60204], SELV [EN60950]
RoHS Compliant	Yes, RoHS directive, WEEE directive
Protection Against Electric Shock	DIN 57100-410

RHINO Power Supply Accessories PSB Series

Specifications (continued)	
Isolation Voltage: ***Input / PE*** ***Output / PE***	 1.5 KVAC / 1.5 KVAC 1.5 KVAC / 1.5 KVAC
Degree of Protection	IP20
Class of Protection	Class II with PE connection
MTBF	>800,000 hrs. per BELL CORE STD or IEC61709
Type of Housing	Aluminum [AL1100F]
Environmental Specifications	
Humidity at +25°C, no condensation	<95% RH
Vibration	10Hz to 500Hz @ 30 m/S2 [3G peak]; displacement of 0.35 mm; 60 min per axis for all X, Y, Z direction. Refer to IEC 60068-2-6. Note: all figures quoted are amplitudes [peak values]
Shock (in all directions)	IEC60068-2-27, 30G [300m/s2] for duration 18ms 1 Shock in 2 directions tested with fixture with EUT mounted on DIN rail in vertical and horizontal position
Pollution Degree	2 according to EN50178
Climatic Class	3K3 according to EN60721

Additional Data

Part Number	*Wire Size / Torque**		*Terminal Block Type*	*Ambient Operating Temperature***	*Storage Temperature*	*Drawing Link*
	Input	*Output*				
PSB60-REM20S	3.3–5.3 mm² [AWG 12–10] / 0.72 Nm [6.3 lb-in]	3.3–5.3 mm² [AWG 12–10] / 0.72 Nm [6.3 lb-in]	Fixed screw terminals	-25 to 80°C [-13 to 176°F]	-25 to 85°C [-13 to 185°F]	PDF
PSB60-REM40S						PDF

***Stripping length 7 mm [0.28 in] or use suitable lug to crimp**
**** See output specifications for temperature derating**

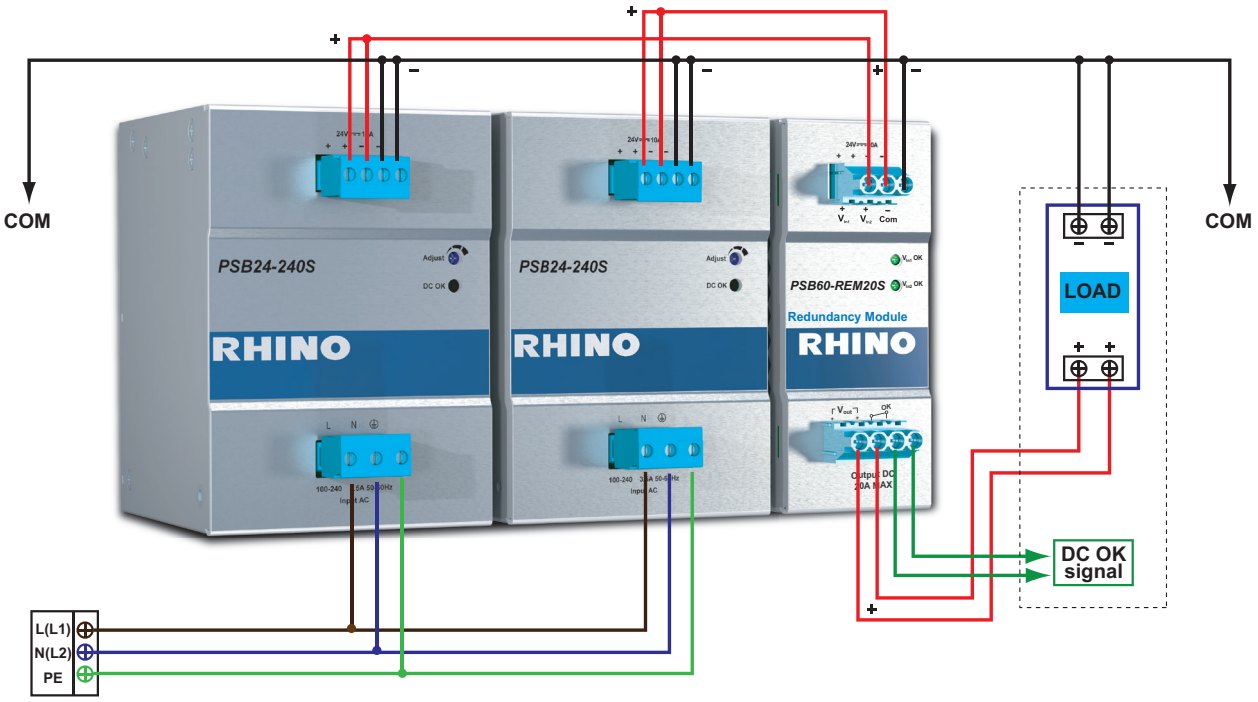
PSB60-REM20S
PSB60-REM40S

Wiring Connection

Input		*Output*	
Vin1	Line 1	Vout+	Output +
Vin2	Line 2	Vout+	Output +
Com	Common	OK	Alarm Relay
		OK	Alarm Relay

RHINO Power Supply Accessories PSB Series

Redundancy Module Wiring



Parallel Operation

When 2 power supplies are connected in parallel, they can share the load if the following steps are taken.

Step 1: Measure the output voltages at no load from Vin1 to Com of power supply 1 and Vin2 to Com of power supply 2. If the voltages are not the same, follow Step 2. If they are the same, skip to Step 3.

Step 2: Adjust the output voltages, with the help of the adjustment pot on the power supply front panel marked as ADJUST, to the same level. For example, if power supply 1 is measuring 24.15 VDC and power supply 2 is measuring 24.25 VDC, adjust the output voltage of one to be the same as the other.

Step 3: Connect the power supply to the end system load and measure the output voltages from Vin1 to Com of power supply 1 and Vin2 to Com of power supply 2. Ensure that the output voltages are the same even after the 2 power supplies are connected to load. If not, adjust them with the adjustment pot available on the front panel. A tolerance of w ± 25mV would be acceptable.

Note:
1) If the output voltage of any power supply is higher, it will take the initial load and share the maximum load.
2) If the output voltages are the same, then an equal load current sharing between the 2 power supplies can be achieved.

RHINO Power Supply Accessories PSB Series

Buffer Module

The RHINO PSB24-BFM20S buffer module is a cost effective alternative to battery-based backup systems. Utilizing electrolytic capacitors the buffer module is maintenance free and will maintain the output voltage of a 24VDC power supply system for 250 msec minimum with a 20A load and 5 sec minimum with a 1A load. A switch is provided to select the voltage level to start buffering. An inhibit input is available for remote shutdown as well as output signals for remote stand-by and buffering mode indication. The module is housed in a corrosion-resistant aluminum chassis with IP20 terminals and conformal coated circuit board for protection against demanding environments.

Features

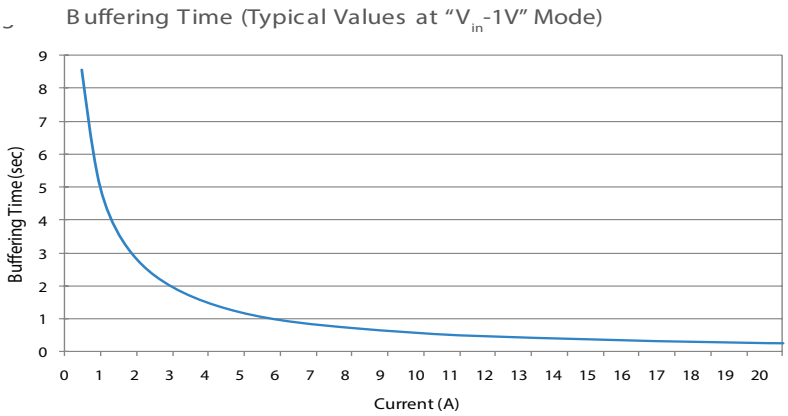
- Corrosion-resistant aluminum housing
- Long minimum buffering time of 250ms @ 24V/20A
- Units can be connected in parallel to increase buffering time
- Less than 30 second charging time locations
- P20 wiring terminals
- Overvoltage / Overcurrent / Short Circuit protections
- 3-year warranty



Buffer Module	
Part Number	***PSB24-BFM20S***
Price	$142.00
Drawing Link	PDF
Weight kg [lb]	0.76 [1.68]
Buffer Module Input Specifications	
Nominal Input Voltage	24VDC
Voltage Range	22.8 to 28.8 VDC [35VDC Max]
Input Current	Charging mode: < 0.6 A; Discharging mode: 20A Max
Input Power	2.5 W average
Maximum Signal Input (Inhibit)	35V / 10mA
Max Inrush Current	< 20A
Charging Time	< 30sec
Buffer Module Output Specifications	
Nominal Output Voltage	24VDC typ. [depends on V_{in}]
Adjustment Range Of The Voltage	22 to 28VDC Switch = "Fix 22V" - Buffering starts if terminal voltage falls below 22V Factory Setting, Switch = "V_{in} - 1V" - Buffering starts if terminal voltage is decreased by >1V
Maximum Output Voltage	35VDC
Output Current	20A max
Buffering Time	250ms Min @ 24V / 20A Load, 5sec Min @ 24V / 1A Load [Refer to Fig.1]
Maximum Signal Output	35V / 10mA
Signals	Inhibit Signal [I] - "Low" = shuts down buffer module Ready Signal [R] - "High" = buffer module is fully charged or in standby mode Buffering Signal [B] - "High" = Buffer module is discharging or in buffering mode Supply Voltage (+Vs) - Common +Vs, 35V Max
Noise and Ripple (20MHz)	<200mVpp @ 25°C [77°F] during buffering mode
Parallel Connection	Yes [requires PSB60-REM redundancy module]
Series Connection	No
Protective Device	Transient voltage suppressor [TVS] for signals

RHINO Power Supply Accessories PSB Series

Figure 1



Mechanical Specifications	
Case Cover	Aluminum
LED Indicators	Green LED Off - Unit is discharged or Vin <22VDC Green LED On - Unit is fully charged
Cooling System	Convection
Terminal	Input / Output - M3 x 2 pins [Rated 300V / 30A] Signal - M3 x 5 pins [Rated 300V / 30A]
Wire	Input / Output - AWG 12–10 [0.08–0.10 in]; Torque: 0.72 Nm [6.3 lb-in] Signal - AWG 24–10 [0.02–0.10 in]; Torque: 0.72 Nm [6.3 lb-in]
Environmental Specifications	
Operating Temperature	-25 to 75°C [-13 to 167°F]
Storage Temperature	-25 to 85°C [-13 to 185°F]
Power De-rating	>70°C [158°F] de-rate power by 5% / °C
Operating Humidity	<95% RH [Non-Condensing]
Operating Altitude	2,500 Meters
Shock Test (Non-Operating)	IEC60068-2-27, 30G [300m/S²] for a duration of 18ms
Vibration (Non-Operating)	IEC60068-2-6, 10 Hz to 500 Hz @ 30m/S2 [3G peak]; 60 min per axis for all X, Y, Z direction
Pollution Degree	2
Protection Specifications	
Overvoltage	32V ± 10%
Overload / Overcurrent	30A Max
Short Circuit	No damage
Penetration Protection	> 3.5 mm [eg. screws, small parts]
Reverse Polarity Protection	Yes
Degree of Protection	IP20
Protection Against Shock	Class I with GND connection

RHINO Power Supply Accessories PSB Series

Reliability Specifications	
MTBF (at V_{in}-1V Mode)	>2,800,000 hrs. as per Telcordia SR-332 at Standby Mode [Buffer Module in Ready State]
Expected Capacitor Life	10 years [Standby mode @ 40°C]
Safety Standards / Directives	
Electronic Equipment in Power Installations	EN50718 / IEC62103
Electrical Safety (Information Technology Equipment)	UR/cUR recognized to UL60950-1 and CSA C22.2 No. 60950-1 File no. E198298, CB scheme to IEC60950-1
Industrial Control Equipment	UL/cUL listed to UL508 and CSA C22.2 No. 107.1-01 File no. E197592, CSA to CSA C22.2 No. 107.1-01; File No. 249074
Hazardous Location	cCSAus to CSA C22.2 No. 213-M1987, ANSI / ISA 12.12.01:2007 [Class I, Division 2, Group A,B,C,D T4, Ta = -25°C to +75°C (> +70°C derating)], File No. 249074
CE	in conformance with EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC
Materials and Parts	RoHS Directive 2011/65/EU Compliant
Galvanic Isolation	Input & Output to Ground - 1.5 KVAC Signal to Ground - 1.5 KVAC
EMC Specifications	
EMC / Emissions	CISPR32, EN55032, EN55011
Component Power Supply for General Use	EN61204-3
Immunity	EN55024, EN61000-6-2
Electrostatic Discharge	EN61000-4-2
Radiated Field	EN61000-4-3
Fast Transient / Burst	EN61000-4-4
Surge	IEC61000-4-5
Conducted	EN61000-4-6
Power Frequency Magnetic Fields	EN61000-4-8
Voltage Dips	EN61000-4-11
Low Energy Pulse Test (Ring Wave)	EN61000-4-12

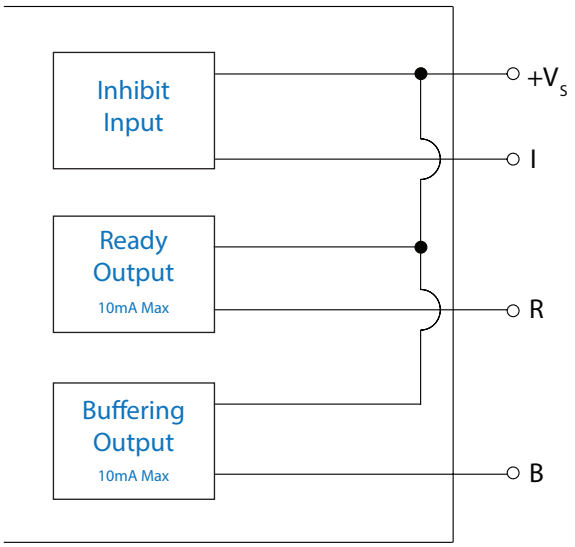
Note: Product intended to be used as Apparatus with AC-DC Power Supply, EMC compliance to be verified in correspondence to the connected units.

PSB24-BFM20S

Wiring Connection			
Input		***Output***	
+	DC+	R	Ready
-	DC+	B	Buffering
I	Inhibit	+Vs	+ Voltage Supply
		⏚	Ground

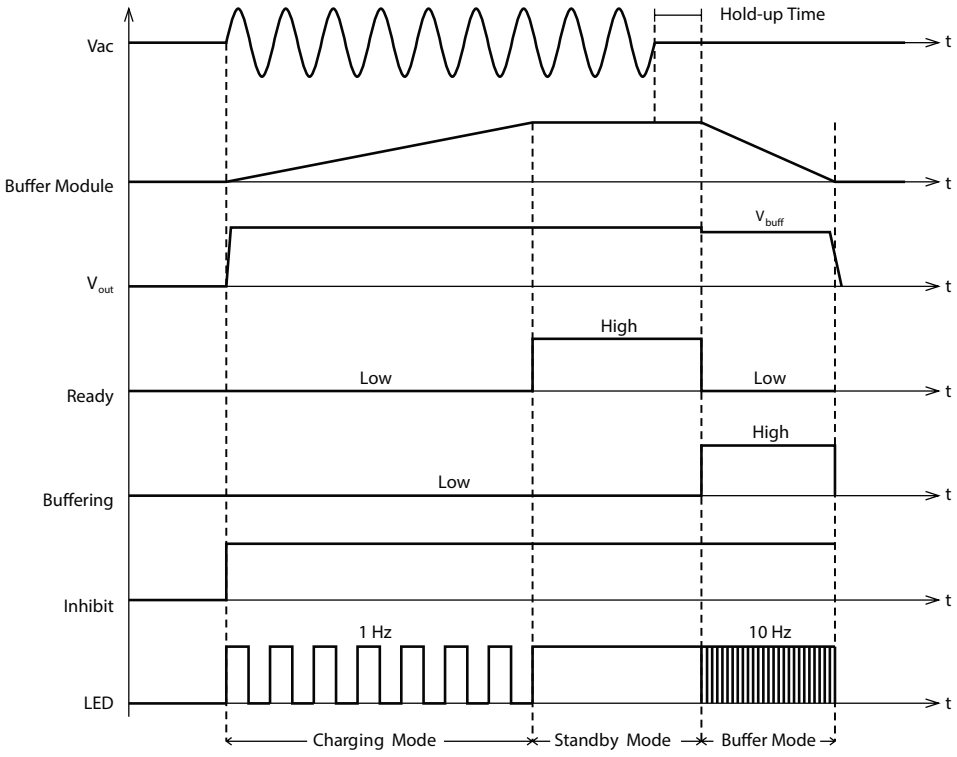
Buffering, Ready, and Inhibit Signal	
Buffering Output Signal (B)	"High" = PSB24-BFM20S is discharging or in Buffering Mode
Ready Output Signal (R)	"High" = PSB24-BFM20S is fully charged or in Standby Mode
Inhibit Input Signal (I)	"Low" = Shuts down Buffer Module
Signal Voltage	+VS: 10–35 VDC
Maximum Signal Current	10mA
Isolation (Signal to Power)	1.5 KVAC

I/O (input/output) Example



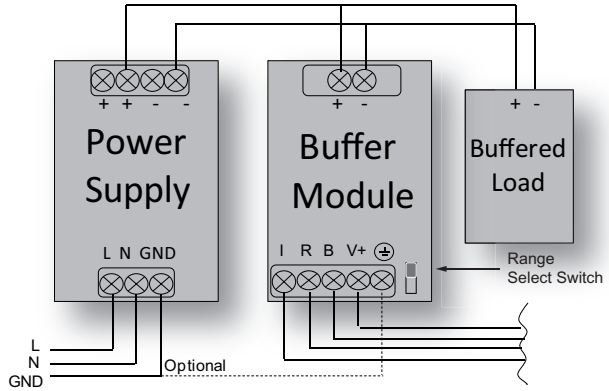
$+V_S$: 10-35VDC

Buffer Module Operations

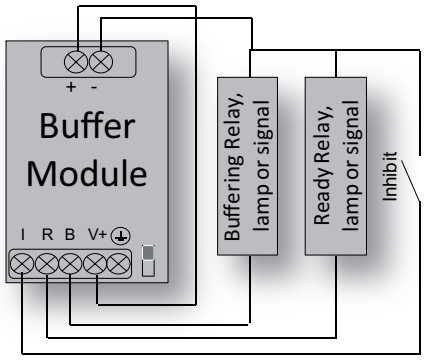


Buffer Module Wiring

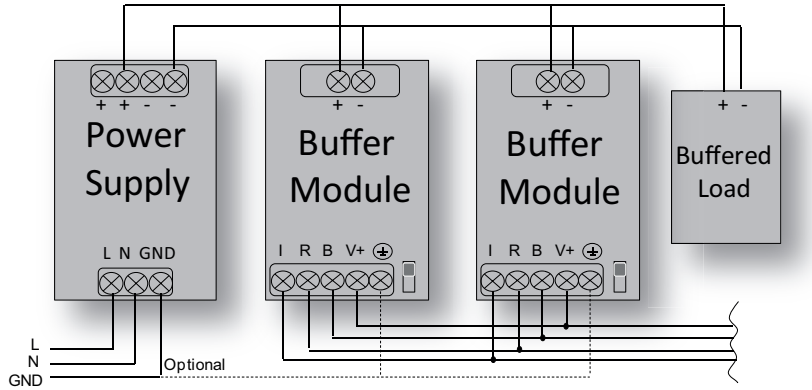
General connection / wiring diagram



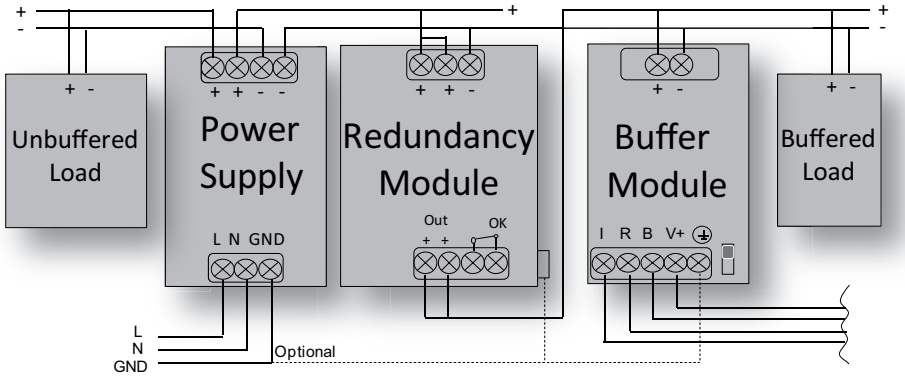
General signals wiring



Parallelling of buffer units



Decoupling of buffered branches



RHINO AUTOMATIONDIRECT

Power Supplies PSR Series

Overview

AutomationDirect's RHINO PSR Series DIN rail industrial power supply features high power density and high efficiency. The series offers overcurrent protection in constant current mode, making it suitable for charging applications. Conformal coating is applied on the printed circuit board assembly (PCBA) to protect against dust and pollutants often found in harsh industrial environments. The series electromagnetic radiated and conducted emissions are compliant with heavy industrial Class B Emission standard and Immunity standard, and complies with environmental protection standards RoHS Directive.



PSR-24-120



PSR-24-240-3

Features

- Universal AC input voltage range
- Built-in constant current circuit for charging applications
- Ultra-slim design
- 35mm DIN-rail mount
- IP20
- Long life electrolytic capacitor
- Built-in DC OK relay and LED indicator
- Conformal coating on PCBAs to protect against common dust and pollutants

Input Specifications

Part Number	Price	Input Voltage Range	Input Frequency Range	Nominal Input Current	Inrush Current Limitation (+25°C cold start)	Leakage Current	Efficiency (@100% load)	Recommended Circuit Breaker
Single Phase Input								
PSR-24-120	$69.00	90-264 VAC	47–63 Hz	1.2 A typ. @ 115VAC 0.6 A typ. @ 230VAC	40A @ 230VAC	< 0.5 mA @ 240 VAC	90.5% typ. @ 115VAC 93.5% typ. @ 230VAC	20A B Curve
PSR-24-240	$92.00			2.5 A typ. @ 115VAC 1.3 A typ. @ 230VAC			92.5% typ. @ 115VAC 94.5% typ. @ 230VAC	
PSR-24-480	$149.00			4.7 A typ. @ 115VAC 2.4 A typ. @ 230VAC		< 1.5 mA @ 240 VAC	91.5% typ. @ 115VAC 95% typ. @ 230VAC	
Three Phase Input								
PSR-24-120-3	$91.00	320-575 VAC	47–63 Hz	< 0.50 A @ (3 x 400VAC) < 0.40 A @ (3 x 500VAC)	20A @ (3 x 400VAC), 25A @ (3 x 500VAC)	< 3.5 mA @ (3 x 500 VAC)	87.5% @ (3 x 400 & 500VAC)	4A B Curve
PSR-24-240-3	$137.00			< 0.75 A @ (3 x 400VAC) < 0.65 A @ (3 x 500VAC)			89.5% @ (3 x 400 & 500VAC)	
PSR-24-480-3	$237.00			< 0.85 A @ (3 x 400VAC) < 0.73 A @ (3 x 500VAC)	35A @ (3 x 400VAC), 35A @ (3 x 500VAC)		94% @ (3 x 400 & 500VAC)	10A B Curve or 4A C Curve
PSR-24-960-3	$356.00			< 1.65 A @ (3 x 400VAC) < 1.35 A @ (3 x 500 VAC)			94.5% @ (3 x 400 & 500VAC)	

Output Specifications

Part Number	Output Voltage / Adjustment Range	Output Power (Watts)	Output Current (Amps)	Ripple and Noise (20MHz)	Startup with Capacitive Loads (µF)	Start-Up Time	Hold-Up Time (@100% load)	Rise Time	MTBF (as per Telcordia SR-332. Ta: 25°C)
PSR-24-120	24-28 VDC	120	5	< 100 mVpp @ 0°C to +70°C < 300 mVpp @ -30°C to 0°C	10,000 Max.	300ms typ. @ 115 and 230VAC	35 ms typ. @ 115VAC & 230VAC	30 ms typ. @ 115 & 230VAC	> 700,000h
PSR-24-240		240	10			300ms typ. @ 115 and 230VAC	30 ms typ. @ 115VAC & 230VAC		
PSR-24-480		480	20				25 ms typ. @ 115VAC & 230VAC		
PSR-24-120-3		120	5	< 100 mVpp		500ms typ. @ nominal input (100% load)	20ms typ. @(3 x 400VAC) 40ms typ. @(3 x 500VAC)	50 ms typ.@ nominal input (100% load)	
PSR-24-240-3		240	10			1000ms typ. @ nominal input (100% load)			
PSR-24-480-3		480	20	< 150 mVpp	20,000 Max.		20ms typ. @ (3 x 400 & 500VAC)	100 ms typ.@ nominal input (100% load)	> 600,000h
PSR-24-960-3		960	40	< 200 mVpp		2000ms typ. @ nominal input (100% load)		85 ms typ.@ nominal input (100% load)	> 500,000h

RHINO AUTOMATIONDIRECT Power Supplies PSR Series

General Specifications

Model	Single Phase	Three Phase
Operating Temperature (-40°C [40°F] Cold Start)	Vertical: -30 to +70°C [-22 to 158°F]	PSR-24-120-3 and PSR-24-240-3 Vertical mounting: -25 to 70°C [13 to 158°F] Horizontal mounting: -25 to 60°C [13 to 140°F] PSR-24-480-3 and PSR-24-960-3 Vertical mounting: -25°C to 70°C [13 to 158°F] Horizontal mounting: -25°C to 55°C [13 to 131°F]
Storage Temperature	-40 to 85°C [-40 to 185°F]	
Humidity	5 to 95% RH @ 25°C, no condensation	
Line Regulation	± 0.5% @ 115 & 230VAC	< 40mV (@ 3 x 320-575 VAC Input (100% load)
Load Regulation	± 0.5%	@ 3 x 320-575 VAC Input (100% load) PSR-24-120-3 <100mv, PSR-24-240-3 < 150mv PSR-24-480-3 < 200mv, PSR-24-960-3 < 250mv
Short Circuit Protection	Hiccup Mode, Non-Latching (Auto-Recovery when the fault is removed)	
Overvoltage Protection	< 34V, SELV Output, Latch Mode	< 35V, Hiccup Mode, Non-latching (Auto Recovery)
Overload/Overcurrent	105 - 150% of rated load current, Auto-recovery Continuous current limit Mode*1 (Vo > 80%)	PSR-24-120-3 and PSR-24-240-3 105 - 150% of rated load current, Auto-recovery Continuous current limit Mode*1 (Vo > 80%) PSR-24-480-3 and PSR-24-960-3 110 - 150% of rated load current, Auto-recovery Continuous current limit Mode*1 (Vo > 80%)
Status Indicators	Green LED (DC OK)	
Cooling System	Convection	
Vibration (operating)	IEC 60068-2-6, Sine Wave: 10-500 Hz; 4G peak; 60 min per axis for all X, Y, Z directions	IEC 60068-2-6, Sine Wave: 10-500 Hz; 3G peak; 60 min per axis for all X, Y, Z directions
Shock (non-operating)	IEC 60068-2-27, Half Sine Wave: 50G for duration of 11ms; 3 times per direction	
Protection Rating	IP20	
Pollution Degree	2	
Mounting	35mm DIN rail (Vertical input terminal block on bottom)	35mm DIN rail (Vertical: input terminal block on bottom) (Horizontal: input terminal block on left side)
Connection	Input & output terminal block connector: Screw connection DC OK relay contact: Push-in connection	
Housing Material	Metal	Aluminum
Approvals	CE, cULus File E197592, cURus: File E508040, UKCA	

***1 Constant current limit protection for inductive and capacitive load applications**

Additional Data

Part Number	Wire Size / Torque			ADC Ferrule Part Number	Terminal Block Type (Screw Terminals)	Weight	Drawing Link
	Input	Output	DC OK				
PSR-24-120	0.82-3.3 mm² [AWG 18-12] 0.51 N•m [4.5 in•lb]	0.82-3.3 mm² [AWG 18-12] 0.51 N•m [4.5 in•lb]	0.32-1.3 mm² [AWG 22-16]	20AWG V30AE000038 18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055	Input: 3-pins (600V/30A) Output: 3-pins (600V/30A) DC OK: 2-pins (300V/6A)	0.50 kg [1.10 lb]	PDF
PSR-24-240	0.82-3.3 mm² [AWG 18-12] 0.51 N•m [4.5 in•lb]	0.82-3.3 mm² [AWG 18-12] 0.51 N•m [4.5 in•lb]			Input: 3-pins (600V/30A) Output: 4-pins (600V/30A) DC OK: 2-pins (300V/6A)	0.64 kg [1.41 lb]	PDF
PSR-24-480	2.1 -3.3 mm² [AWG 14-12] 0.51 N•m [4.5 in•lb]	2.1 -3.3 mm² [AWG 14-12] 0.51 N•m [4.5 in•lb]				0.88 kg [1.94 lb]	PDF
PSR-24-120-3	0.82-5.3 mm² [AWG 18-10] 0.54 N•m [4.7 in•lb]	0.82-5.3 mm² [AWG 18-10] 0.54 N•m [4.7 in•lb]	0.52-1.3 mm² [AWG 20-16]	20AWG V30AE000038 18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055 10AWG V30AE000058	Input: 4-pins (600V/30A) Output: 4-pins (600V/30A) Signal: 2-pins (300V/12A)	0.54 kg [1.19 lb]	PDF
PSR-24-240-3	0.82-5.3 mm² [AWG 18-10] 0.54 N•m [4.7 in•lb]	1.3-5.3 mm² [AWG 16-10] 0.54 N•m [4.7 in•lb]				0.84 kg [1.85 lb]	PDF
PSR-24-480-3	0.82-5.3 mm² [AWG 18-10] 0.54 N•m [4.7 in•lb]	3.3-5.3 mm² [AWG 12-10] 0.54 N•m [4.7 in•lb]				1.20 kg [2.65 lb]	PDF
PSR-24-960-3	0.82-5.3 mm² [AWG 18-10] 0.54 N•m [4.7 in•lb]	3.3-5.3 mm² [AWG 12-6]* 1.93 N•m [17.1 in•lb]		20AWG V30AE000038 18AWG V30AE000041 16AWG V30AE000048 14AWG V30AE000052 12AWG V30AE000055 10AWG V30AE000058 8AWG V30AE000060 6AWG V30AE000062	Input: 4-pins (600V/30A) Output: 4-pins (300V/65A) Signal: 2-pins (300V/12A)	2.26 kg [4.98 lb]	PDF

***For AWG 12-10, ensure that all output terminals are connected.**

Power Supplies With Integrated UPS PSFA Series

Overview

RHINO SELECT PSFA series open frame power supplies come with integrated DC UPS function. The PSFA models will switch to battery operation (batteries not included) without interruption to prevent end-product downtime for the customer in the event of power disruption or unexpected loss of AC input power. Consequently, the PSFA series can increase operational reliability of a critical operation. Convection cooling is applied for the single phase design with wide operating temperature range from -20°C to +70°C. Diagnostic monitoring signals for AC OK and Battery Low status will alert the user of any failure through TTL open collector. Metal chassis with case cover is available for different installation preferences.

Features

- Universal AC input voltage range
- Zero switch over time from loss of AC to battery operation
- Protection against reverse polarity battery connection
- Built-in diagnostic monitoring for AC OK and Battery Low status
- Overvoltage / Overcurrent / Over Temperature / Short circuit Protections
- Built-in over current and short circuit protection in buffering (battery discharging) mode operation
- 3-year warranty



Power Supply with Integrated UPS				
Part Number	*Price*	*Output Voltage*	*Maximum Output Power*	*Drawing Link*
PSFA12-060-U	$39.00	13.8 V	60W	PDF
PSFA24-060-U	$39.00	27.6 V	60W	PDF

Power Supplies Specifications
PSFA Series

Technical Specifications

Specifications		PSFA12-060-U		PSFA24-060-U	
		V+	B+	V+	B+
Input (AC)					
Input Voltage Range		90-264 VAC			
Frequency		47-63 Hz			
Nominal Current		< 1.2 A @ 115VAC, <0.8 A @ 230VAC			
Inrush Current Limitation I2t (+25 °C) typ		< 25A @ 115VAC & 230VAC			
Leakage Current	IEC/EN 60950-1	< 0.5 mA / 1.0 mA @264VAC		TN/TT system / IT system	
	IEC/EN 62368-1	< 1.0 mA / 2.0 mA @264VAC		TN/TT system / IT system	
Recommend Circuit Breaker (Characteristic B)		10A			
Output (DC)					
Nominal Output Voltage / Adjustment Range		13.8 VDC / 13.52 - 14.00 V	13.6 VDC	27.6 VDC / 27.04 - 28.00 V	27.4 VDC
Output Power		60W max			
Output Current	Normal Mode	3.5 A [0 - 4.3 A]	0.8 A [0 - 0.8 A]	1.4 A [0 - 2.15 A]	0.75 A [0-75 A]
	Buffering Mode	–	0 - 4.3 A	–	0.215 A
PARD (20MHz)	V+	< 100mVpp			
Start-up Time	V+	< 3,000ms @ 115VAC [100% load], <1,500ms @ 230VAC [100% load]			
Hold-up Time	V+	> 10ms @ 115Vac [100% load]			
Rise Time	V+	< 50ms @ nominal input			
Efficiency		> 85.0% @ 115VAC / > 86.0% @ 230VAC		> 88.0% @ 115VAC / > 89.0% @ 230VAC	
Line Regulation	V+	< 0.5% [90-264VAC @ 100% load]			
Load Regulation	V+	< 1.0% [90-264VAC @ 0-100% load]			
Voltage Drop Between V+ and B+	Normal Mode	0.2 V typ.			
	Buffering Mode	0.4 V typ.			
General Data					
Case Chassis / Cover		SECC			
Weight		0.25 kg [0.56 lb]			
MTBF		> 700,000 hrs. as per Telcordia SR-332, I/P: 115VAC & 230VAC, Ta: 25°C, O/P: 13.8V/4.3A for 13V model and 27.6V/2.15A for 27V model			
Noise		Sound Pressure Level [SPL] < 25dBA			
Cooling		Convection			
Input / Output Terminal	Input	Terminal block 3-Pin [Rated 300V/16A]			
	Output with Signal	Terminal block 6-Pin [Rated 300V/8A]			
Wire Size / Torque	Input	AWG 22-12 / 7.0 lbf-in		AWG 24-12 / 7.0 lbf-in	
	Output with Signal	AWG 22-16 / 2.0 lbf-in		AWG 24-16/ 2.0 lbf-in	
Shock Test	Non-Operating	IEC 60068-2-27, Half Sine Wave: 50G for a duration of 11ms; 3 times per direction, 9 times in total			
	Operating	IEC 60068-2-27, Half Sine Wave: 10G for a duration of 11ms; 1 time in X axis			
Vibration	Non-Operating	IEC 60068-2-6, Random: 5-500Hz; 2.09Grms; 20 min per axis for all X, Y, Z directions			
	Operating	IEC 60068-2-6, Sine Wave: 10-500Hz; 2G peak; displacement of 0.35mm; 60 min per axis for all X, Y, Z directions			

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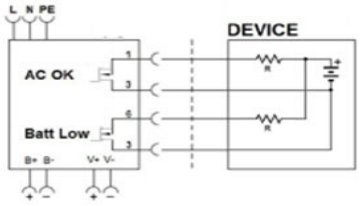
Power Supplies Specifications
PSFA Series

Technical Specifications (continued)				
Specifications	PSFA12-060-U		PSFA24-060-U	
	V+	B+	V+	B+
Safety / Environmental				
EMC / Emissions	CISPR 32, EN 55032, FCC Title 47: Class B GB9254.1			
Immunity	EN 55024, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-12			
Voltage Dips	Conform to IEC 61000-4-11			
Galvanic Isolation	Input to Output : 3.0K VAC, Input to Ground : 1.5KVac, Output to Ground : 0.5K VAC			
RoHS Compliant	Yes			
Operating Temperature	-20 to 70°C [-4 to 158°F]			
Storage Temperature	-40 to 85°C [-40 to 185°F]			
Humidity at +25 °C, no condensation	5 to 95% RH [Non-Condensing]			
Approvals	SIQ Bauart: EN 62368-1, UL 62368-1 and CSA C22.2 No. 62368-1; File No. E508040 CB scheme: IEC 62368-1 CE [In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU]			

Battery Input / Output Characteristics					
Specifications		PSFA12-060-U		PSFA24-060-U	
		V+[4]	B+	V+	B+
Nominal Battery Voltage (Battery not included with Power Supply)		12VDC SLA Sealed lead acid battery		24VDC SLA Sealed lead acid battery 2x12 VDC SLA Sealed lead acid battery	
Battery Voltage Range	Continuously Operating	11.0 - 13.8 VDC [nominal at 12V]		22.0 - 27.6 VDC [nominal at 24V]	
	Maximum Allowed Voltage	16VDC maximum		32VDC maximum	
	Battery Low Voltage [1]	11.5 VDC typ		22.5 VDC typ	
	Minimum Voltage [2]	10.0 VDC +/- 0.5 VDC		18.0 VDC +/- 0.5 VDC	
Battery Capacity		3.2AH - 15AH		3.2AH – 7AH	
Charging Time [3]		< 9hrs ± 1hr for battery 12V/7AH		< 10hrs ± 1hr for battery 24V/7AH	
Buffering Time		Approx.1hr 30mins for battery 12V/7AH		Approx.3hrs for battery 24V/7AH	
Recommended Extended Fuse for Battery		Automotive 20A / 80V, FK3 type from Littelfuse, or similar in the battery B+ path. The battery fuse protects the wires between thebattery and the unit.			
Battery Charging (Normal Mode)		CC-CV mode [constant current-constant voltage]			
End-Of-Change Voltage		The unit always charges battery to a fixed voltage value.			

1. The voltage level of battery to enable “Battery Low” function.
2. Minimum battery voltage required for power supply to detect battery in order to begin charging. Battery must be connected to power supply, with the correct polarity, across B+ and B- terminals; and, with input and output loads disconnected.
3. Charging time depends on the state/condition of battery discharge; and will depend on the amount of buffering/discharging time, and load current that battery was discharged at.
4. V+ and V- terminals are for power supply voltage output.

Wiring Diagram



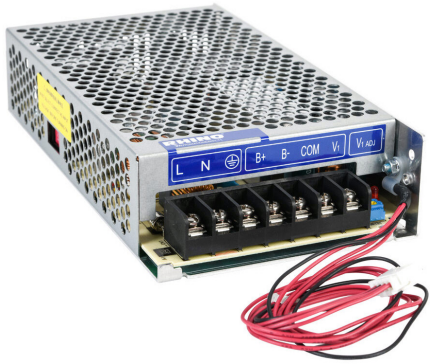
Power Supplies With Integrated UPS PSS Series

Overview

The RHINO SELECT PSS*-U panel mount power supplies, with integrated DC UPS function, prevents end-product downtime for the customer in the event of failure/disruption or unexpected loss of input AC power. The power supply will switch to battery operation (batteries not included) without interruption to increase operational reliability. The TTL compatible monitoring signals for AC OK, DC OK and Battery Low will alert the user in the event of failure. This convection-cooled single-phase power supply has a wide operating temperature range from -20ºC to + 70ºC and is suitable for security system, access control, automatic doors, alarm system and other similar products. In addition to having overvoltage, overload, over temperature, deep battery discharge, and reverse battery polarity protections on the main output, there are also short circuit and overload protections when operating in the buffering (battery discharging) mode. The PSS*-U design meets worldwide safety approvals, certified to Class B radiated and conducted emission requirements.

Features

- LED indicators for DC OK (Green) and Battery Reverse
- Zero cut-over time from loss of AC, to battery operation
- Protection against reverse polarity battery connection
- Conforms to harmonic current IEC/EN 61000-3-2, Class A
- High MTBF > 700,000 hrs. per Telcordia SR-332
- Monitoring Signals for AC OK, DC OK and Battery Low indication
- Overvoltage / Overcurrent / Over temperature / Short circuit protections
- Built-in over current and short circuit protection in buffering (battery discharging) mode operation
- Certified according to IEC/EN/UL 62368-1
- 3-year warranty



Power Supply With Integrated UPS				
Part Number	*Price*	*Output Voltage*	*Maximum Output Power*	*Drawing Link*
PSS12-155-U	$48.00	13.8 V	151W	PDF
PSS24-155-U	$48.00	27.6 V	151W	PDF

Power Supplies With Integrated UPS Specifications PSS Series

Technical Specifications					
Specifications		PSS12-155-U		PSS24-155-U	
		V+	B+	V+	B+
Input (AC)					
Input Voltage Range		90-132 VAC, 180-264 VAC [Selectable by Switch]			
Frequency		47-63 Hz			
Nominal Current		< 2.5 A @ 115VAC, < 1.5 A @ 230VAC			
Inrush Current Limitation I2t (+25 °C) typ		< 25A @ 115VAC & 230VAC			
Leakage Current		< 0.5 mA @ 264VAC			
Recommend Circuit Breaker (Characteristic B)		10A			
Output (DC)					
Nominal Output Voltage / Adjustment Range		13.8 VDC / 12 - 14 VDC	13.3 VDC	27.6 VDC / 24 - 28 VDC	27.1 VDC
Output Power		151W [max]			
Output Current	Normal Mode	905 A [0 - 11A]	1.5 A [0.5 - 1.5 A]	4.0 A [0 - 5.5 A]	1.5 A [0.5 -1.5 A]
	Buffering Mode	–	0 - 11A	–	0 - 5.5 A
PARD ripple and noise (20MHz)	V+	< 150mVpp @ 0 to -20°C < 100mVpp @ > 0 to 70°C			
Start-up Time	V+	< 1,000ms [115VAC @ 90% load, 230VAC @ 100% load]			
Hold-up Time	V+	> 20ms [115VAC @ 90% load, 230VAC @ 100% load]			
Rise Time	V+	< 50ms [100VAC @ 90% load, 200VAC @ 100% load]			
Efficiency		> 85.0% @ 115VAC / > 86.0% @ 230VAC		> 88.0% @ 115VAC / > 89.0% @ 230VAC	
Line Regulation	V+	< 0.5% [90-132VAC @ 100% load, 180-264VAC @ 100% load]			
Load Regulation	V+	< 1.0% [90-132VAC @ 0-90% load,180-264VAC @ 0-100% load]			
Voltage Drop Between V+ and B+	Normal Mode	0.5 V typ.			
	Buffering Mode	0.2 V typ.			
General Data					
Case Chassis / Cover		AL / SGCC			
Weight		0.60 kg [1.32 lb]			
MTBF		> 700,000 hrs. as per Telcordia SR-332, I/P: 115VAC, Ta: 25°C, O/P: 13.8 V/9.9 A for 13V model and 27.6 V / 4.95 A for 27V model			
Noise		Sound Pressure Level [SPL] < 30dBA			
Cooling		Convection			
Input / Output Terminal		Terminal block M3.5 x 7-Pin [Rated 300V/15A]			
Wire Size / Torque		AWG 16-14 / 11.3 lbf-in			
Status Connector		400mm length, 4-pin JST: XHP-4 Mating connector: B4B-XH-A(LF)(SN) Statuses available: DC OK, Low Battery, AC OK			
Shock Test		IEC 60068-2-27, 30G (300m/S²) for a duration of 18ms,3 times per direction, 9 times in total			
Vibration		IEC 60068-2-6, 10Hz to 150Hz @ 50m/S² (5G peak); displacement of 0.35 mm; 20 min per axis for all X, Y, Z direction			

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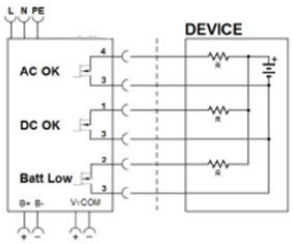
Power Supplies With Integrated UPS Specifications PSS Series

Technical Specifications				
Specifications	PSS12-155-U		PSS24-155-U	
	V+	B+	V+	B+
Safety / Environmental				
EMC / Emissions	CISPR 22, CISPR 32, EN 55022, EN 55032, FCC Title 47: Class B GB9254.1			
Immunity	EN 55024, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-12			
Voltage Dips	Conform to IEC 61000-4-11			
Galvanic Isolation	Input to Output : 3.0K VAC, Input to Ground : 1.5K VAC, Output to Ground : 0.5K VAC			
RoHS Compliant	Yes			
Operating Temperature	-20 to 70°C [-4 to 158°F]			
Storage Temperature	-40 to 85°C [-40 to 185°F]			
Humidity at +25 °C, no condensation	5 to 95% RH [Non-Condensing]			
Approvals	SIQ Bauart: EN 62368-1 UL 62368-1 and CSA C22.2 No. 62368-1; File No. E508040 CB scheme: IEC 62368-1, CE (In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU)			

Battery Input / Output Characteristics					
Specifications		PSS12-155-U		PSS24-155-U	
		V+[4]	B+	V+	B+
Nominal Battery Voltage (Battery not included with Power Supply)		12VDC SLA Sealed lead acid battery		24VDC SLA Sealed lead acid battery 2x12 VDC SLA Sealed lead acid battery	
Battery Voltage Range	Continuously Operating	11.0 to 13.8 VDC [nominal at 12V]		22.0 to 27.6 VDC [nominal at 24V]	
	Maximum Allowed Voltage	16VDC Max		32VDC Max	
	Battery Low Voltage [1]	11.5 VDC typ		22.5 VDC typ	
	Minimum Voltage [2]	9.0 VDC +/- 0.5 VDC		18.0 VDC +/- 0.5 VDC	
Battery Capacity		3.3 AH/ 7AH/ 12AH/ 15AH			
Buffering Time		Approx. 1 hr 15 mins for battery 12V/15AH		Approx. 2 hrs 30 mins for battery 24V/15AH	
Charging Time [3]		2-10 hrs @ charging current of 1.5A			
Recommended Extended Fuse for Battery		Automotive 30A / 80V FK3 type from Littelfuse, or similar, in the battery B+ path. The battery fuse protects the wires between the battery and the unit.			
Battery Charging (Normal Mode)		CC-CV mode [constant current-constant voltage] at 0 to 1.5 A			
End-Of-Change Voltage		The unit always charges battery to a fixed voltage value.			

1. The voltage level of battery to enable "Battery Low" function.
2. Minimum battery voltage required for power supply to detect battery in order to begin charging. Battery must be connected to power supply, with the correct polarity, across B+ and B- terminals; and, with input and output loads disconnected.
3. Charging time depends on the state/condition of battery discharge; and will depend on the amount of buffering/discharging time, and load current that battery was discharged at.
4. V+ and V- terminals are for power supply voltage output.

Wiring Diagram



Power Supplies PSD Series

Versatile Switching Power Supplies with LED Display & Automatic Power Boost

AutomationDirect offers the RHINO PRO PSD DIN rail power supply series with LCD display. The LCD displays output current, output voltage, peak hold current, lifetime expectancy* and ambient temperature data. The high power density product is designed according to major industrial safety standards. The PSD series provides 150% Power Boost up to 7 seconds, including the Advanced Power Boost (APB) feature. With multiple loads connected in a system, a large inrush current could be drawn (demanded) due to one fault load. This will be detected by APB. The APB will trip the circuit breaker (with appropriate rating based on the system load) on the current path of the fault load due to high current. This prevents the system from shutting down while the other connected current paths continue to operate without interruption.

Features

- Universal AC input voltage range
- Lifetime expectancy alarm* signal and monitoring
- Built-in active PFC** with up to 94% efficiency
- Power Boost of 150% up to 7 seconds
- LCD display of output current / voltage / peak current and temperature
- Advanced Power Boost (APB) – protects system to ensure continuing operation when large inrush current detected due to faulty load on a multiple load connection
- DC OK Contact and LED indicator for DC OK/ Overload
- Conformal coating on PCBAs to protect against common dust and chemical pollutants

The lifetime expectancy function indicates an approximate period of life left for the power supply unit, based on deterioration of the electrolytic capacitor.
***Active Power Factor Correction (PFC) - Active wave shaping of the input current, filtering of the high frequency switching, feedback sensing of the source current for waveform control*



PSD24-120-L



PSD24-240-L



PSD24-480-L

Industrial Power Supplies						
Part Number	*Price*	*Output Voltage [V_{nom}]*	*Output Current [I_{max}]*	*Output Power [P_{max}]*	*Weight kg [lb]*	*Drawing Link*
PSD24-120-L	$224.00	24 VDC	5.0 A	120W	0.75 [1.65]	PDF
PSD24-240-L	$311.00		10.0 A	240W	1.02 [2.25]	PDF
PSD24-480-L	$395.00		20.0 A	480W	1.45 [3.20]	PDF

Input Specifications										
Part Number	*Nominal Input Voltage*	*Input Voltage Range*	*Input Frequency Range*	*Input Current [Typ. @ full load]*		*Inrush Current Limitation [<2ms] @+25°C*		*Max Power Dissipation*	*Efficiency [Typ] @120VAC*	*Circuit Breaker [Minimum]*
				120 VAC	*230 VAC*	*120 VAC*	*230 VAC*			
PSD24-120-L	100 - 240VAC 110-300VDC	85-264VAC 88-275VDC	47-63 Hz	1.11 A	0.61 A	5.5 A	10.1 A	14W	90%	6A B- or 3A C-
PSD24-240-L		85-276VAC 88-275VDC		2.18 A	1.16 A	6.0 A	7.0 A	22.4 W	92%	6A B- or 4A C-
PSD24-480-L				4.24 A	2.29 A	9.0 A	7.0 A	46.0 W	93%	10A B- or 6A C-

RHINO PRO Power Supplies PSD Series

Output Specifications									
Part Number	*Output Voltage*	*Output Voltage Adj. Range*	*Output Current [Max]*	*Power Boost [7s]*	*Output Overvoltage Protection*	*Startup with Capacitative Loads [Max.]*	*Startup Time @120VAC*	*Relay Output*	*MTBF [@ 25°C]*
PSD24-120-L	24VDC	24-28 VDC	5.0 A	7.5 A	28.8- 35.2 V	10,000µF	750ms	DC OK = contact closed [rated: 30 VDC 1.0A]	1,444,000 hrs
PSD24-240-L			10.0 A	15.0 A		10,000µF	650ms		1,268,000 hrs
PSD24-480-L			20.0 A	30.0 A		20,000µF	1000ms		751,000 hrs

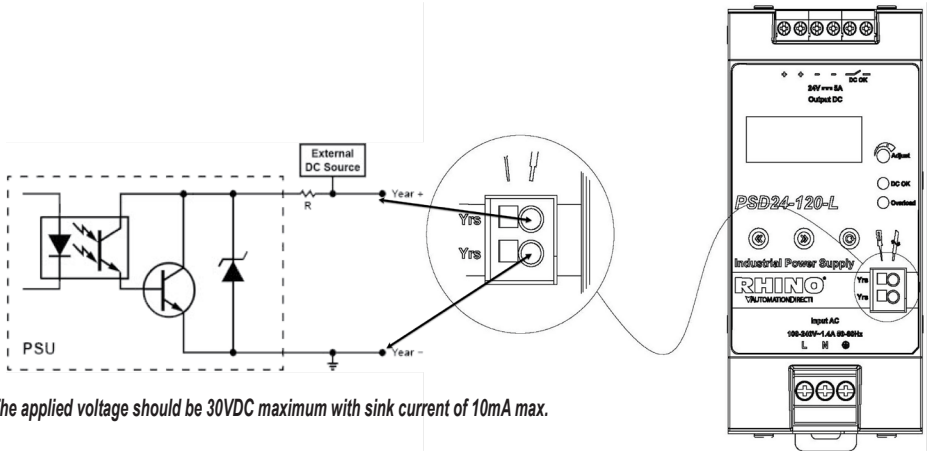
General Specifications	
Specification	*Description*
Temperature	Operating (ambient): -25 to + 70°C max [-13 to 158°F]. Above +60°C [140°F] load derating. Storage (non-operating): -40 to + 85°C max [-40 to 185°F]. Cooling: convection, no internal fan.
Humidity	5-95% [non-condensing] relative humidity maximum
Isolation	According to IEC/EN 60950, EN62477-1, EN60204, CSA
Mains Buffering at Nominal Load	See Product Insert
Output Line Regulation	120W=20mV, 240W & 480W = 10mV [100% load]
Output Load Regulation	100mV peak-to-peak typical [20MHz bandwidth]
Overload/Short Circuit Protection	Current limit: > 150% of rated load current, Constant current, Hiccup Mode [Auto-Recovery]
Overvoltage Protection	28.8 – 35.2V, SELV Output, Hiccup Mode, Non-Latching [Auto-Recovery]
Overtemperature Protection	Switch off at over-temperature, automatic restart
Status Indicators	2 color LEDs [green: DC Ok, Red: Overload]
Maximum Capacitative Load	120W & 240W=10,000uF, 480W=20,000uF
Noise (1 meter from power supply)	Sound Pressure Level [SPL] < 25dBA
Vibration	IEC 60068-2-6, sine wave: 10-500Hz; 3G peak; displacement of 0.35mm; 60 min per axis for all X, Y, Z directions
Shock	IEC 60068-2-27, half sine wave: 30G for a duration of 18ms; 3 times per direction, 6 times in total
Enclosure Rating	IP20
Enclosure Material	Aluminum and plastic
Mounting	Snap-on with self-locking spring for 35mm DIN rails
Connection	Screw terminals, See nsert for Wire size and Torque Ratings
Agency Approvals	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1; File No. E198298 , UL/C-UL listed to UL508 and CSA C22.2 No. 107.1-01; File No. E197592

Note: Unless otherwise stated all specifications are valid at nominal input voltage, full load and +25°C after warm up time.

Power Supplies PSD Series

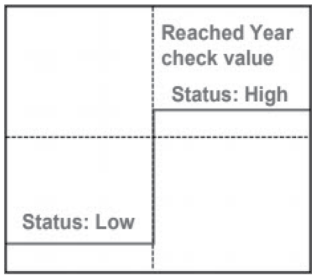
General Specifications (Continued)			
Specification	***Standard***	***Document Number***	
Harmonic Limits	Harmonic Current Limits	EN 61000-3-2, Class A for limited output power	
Safety Standards	Information technology equipment	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1; File No. E198298	
	Industrial control equipment	UL508 and CSA C22.2 No. 107.1-01; File No. E197592	
	Electrical equipment of machines	IEC60204-1 (over voltage category III)	
	Electronic equipment for power installation	IEC/EN 62477-1 / IEC62103	
	Safety, Transient surge voltage protection	VARISTOR	
Safety Approvals	CB-Report per IEC 60950	IEC 60950-1, IEC 61010-1, IEC 61010-2-201	
Safety Class	Degree of electrical protection Class1	Class I with GND connection	
CE	In conformance with EMC directive 2014/30/EU and low voltage directive 2014/35/EU		
RoHS Compliant	RoHS Directive (EU) 2015/863 Compliant (EN 50581)		
Electromagnetic Compatibility (EMC), Emissions	EMC, Emissions	EN55032, EN55011, EN61000-3-2 Class A, EN61000-3-3, EN61000-6-3	
Electromagnetic Compatibility (EMC), Immunity	EMC, Immunity	EN 55024, EN 61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11, 12)	
	Electrostatic Discharge [ESD]	IEC 61000-4-2 Level 4 Criteria A Air Discharge: 15kV; Contact Discharge: 8kV	
	Radiated RF field immunity [80-1000 MHz]	IEC / EN 61000-4-3: 120W&240W: 80MHz-1GHz, 10V/M, 80% modulation [1kHz] 1.4GHz-2GHz, 3V/M, 80% modulation [1KHz] 2GHz-2.7GHz, 1V/M, 80% modulation [1KHz]	IEC / EN 61000-4-3: 480W: 80MHz-1GHz, 10V/ M, 80% modulation [1kHz] 1.4GHz-2GHz, 10V/M, 80% modulation [1KHz] 2GHz-2.7GHz, 10V/M, 80% modulation [1KHz]
	Electrical fast transient / burst immunity	IEC / EN 61000-4-4 Level 4 Criteria A 4kV	
	Surge immunity	IEC / EN 61000-4-5 Level 4 Criteria A Common Mode: 4kV Differential Mode: 2kV	
	Immunity to conducted RF disturbances [0.15 to 80 MHz]	IEC / EN 61000-4-6 Level 3 Criteria A 150kHz-80MHz, 10Vrms	
	Power frequency field immunity	IEC / EN 61000-4-8 30 A / m	
	Voltage dips	IEC / EN 61000-4-11 [70% UN Crit. B/40%/100% UN Crit. C]	
Pollution Degree	2		

Years Alarm Signal Circuit and Wiring



**The applied voltage should be 30VDC maximum with sink current of 10mA max.*

Years Alarm Signal Status



- The years alarm signal is Low when the set value of alarm year has not been reached.
- The years alarm signal status will be changed from low to high when the set value of alarm year has been reached.

Power Supplies PSD Series

Engineering Data for RHINO PRO PSD Series Power Supplies

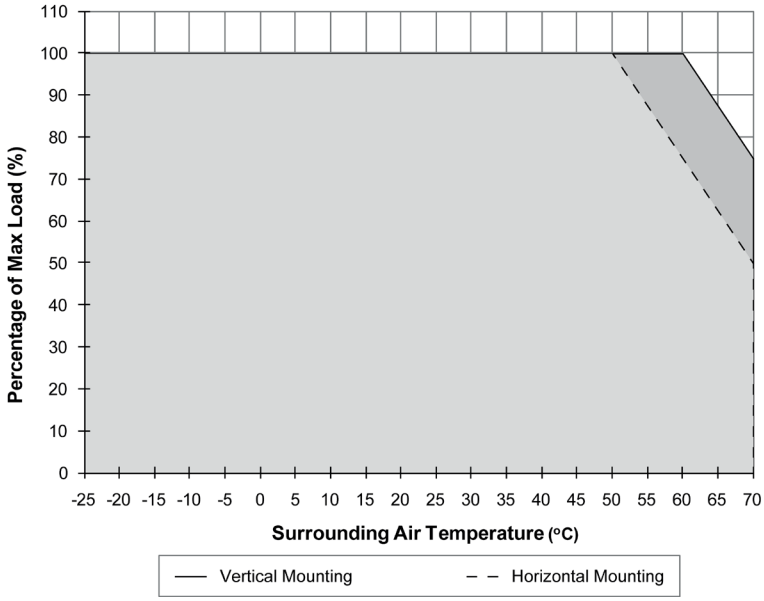
Output Load De-rating vs. Surrounding Air Temperature

Note:

- Power supply components may degrade, or be damaged, when the power supply is continuously used outside the shaded region.
- If the output capacity is not reduced when the surrounding air temperature exceeds its specification as defined under "Temperature" in the General Specifications table, the device will run into Over Temperature Protection. When activated, the output voltage will go into bouncing mode and will recover when the surrounding air temperature is lowered or the load is reduced as far as necessary to keep the device in working condition.
- In order for the device to function in the manner intended, it is also necessary to keep a safety distance as recommended in the safety instructions while the device is in operation.
- Depending on the surrounding air temperature and output load delivered by the power supply, the device can be very hot!

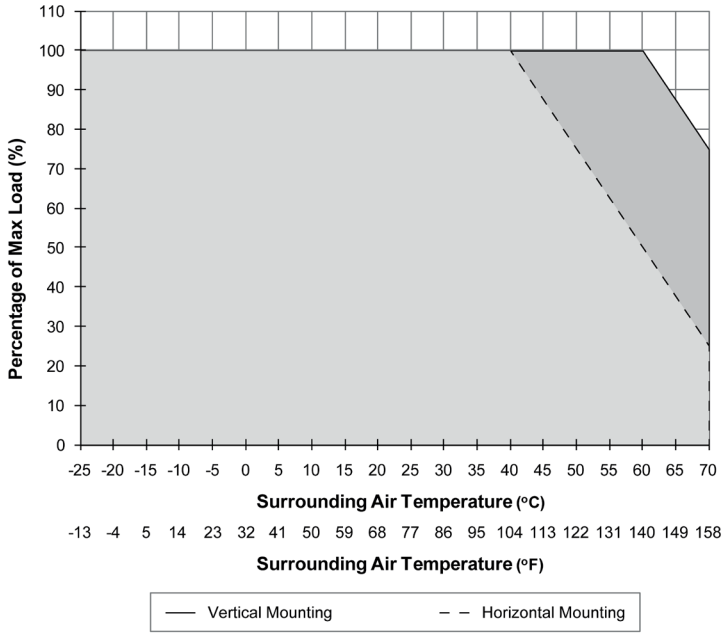
Power Derating Curve for PSD24-120-L and PSD24-240-L

PSD24-120-L, PSD24-240-L Derating	
Part Number	***Vertical or Horizontal Orientation***
PSD24-120-L	> 60°C de-rate power by 2.5% / °C
PSD24-240-L	



Power Derating Curve for PSD24-480-L

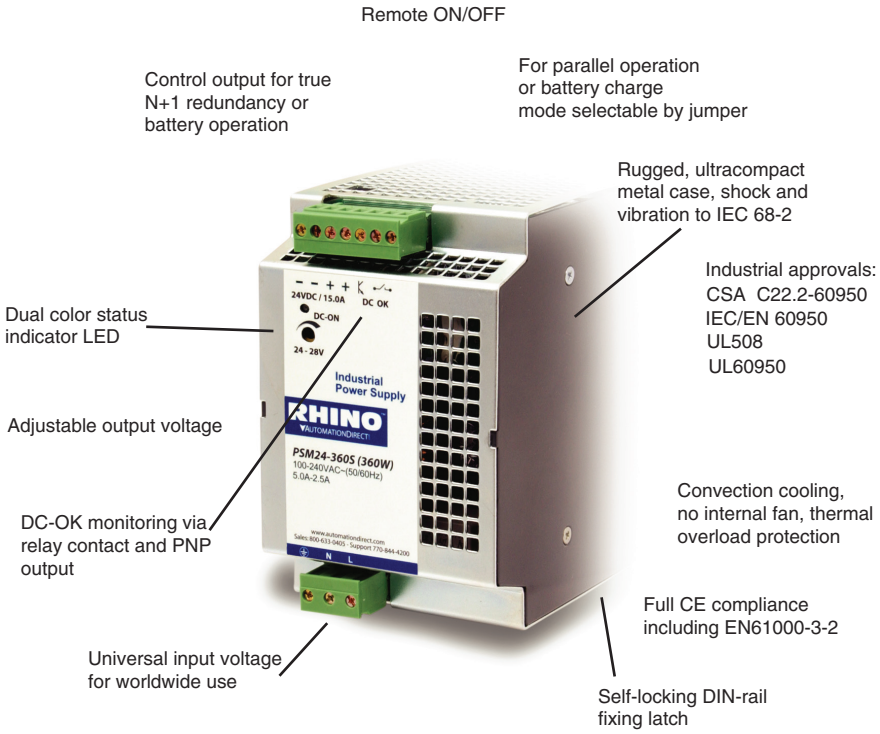
PSD24-480-L Derating	
Part Number	***Vertical or Horizontal Orientation***
PSD24-480-L	> 60°C de-rate power by 2.5% / °C



RHINO Power Supplies PSM Series

Versatile switching power supplies are DIN rail mountable

AutomationDirect offers the most practical industrial control power supplies available. The RHINO PSM series power supplies are industrial grade switching DC output supplies with a sturdy steel case to withstand harsh environments. Autoselect inputs for 115 VAC or 230 VAC and international agency approvals make the RHINO PSM series suitable for worldwide use. RHINO PSM power supplies are available in 12 or 24 VDC output, with adjustable output voltages, and feature low output ripple along with overload and overtemperature protection. The seven models offer power ratings from 78W to 600W, and up to 25A output current.



Features

- Industrial grade design
- Sturdy metal case to withstand harsh industrial environments
- Model PSM24-090S-N meets NEC Class 2
- Universal 100/230 VAC input voltage
- Adjustable output voltage
- Low output ripple
- Short-circuit, overvoltage and overtemperature protection
- Power Good signal
- Remote ON/OFF
- Optional wall mounting
- Specialty modules for redundancy, power backup and UPS
- Terminal connectors included
- 3-year warranty

Part Numbering System

PSM 24 090S-N

- NEC Class 2
- Screw Terminal Connector
- Output Watts
- Output Volts
- Series Name: PSM = metal case

Industrial Power Supplies					
Part Number	*Price*	*Drawing Link*	**Output Voltage [V_{nom}]*	***Output Current [I_{max}]*	****Output Power [P_{max}]*
PSM12-078S	$198.00	PDF	12VDC	6.0 A	78W
PSM24-090S	$147.00	PDF	24VDC	3.75 A	90W
PSM24-090S-N	$203.00	PDF	24VDC	3.75 A	90W
PSM12-156S	$236.00	PDF	12VDC	12.0 A	156W
PSM24-180S	$229.00	PDF	24VDC	7.5 A	180W
PSM24-360S	$345.00	PDF	24VDC	15.0 A	360W
PSM24-600S	$513.00	PDF	24VDC	25.0 A	600W

***12V models adjustable from 12 to14 VDC. 24V models adjustable from 24 - 28 VDC**
****Maximum current at nominal output voltage**
*****Up to an operating temperature of +40°C**

Power Supplies Specifications PSM Series

Input Specifications

Part Number	Input Voltage Range	Operating Voltage min/ max	Input Frequency Range	Input Current [Typical] at full load		Inrush Current max [<2ms] @ +25°C		Holdup Time	Efficiency [Typ @ 115VAC]	Circuit Breaker or Fuse [slo-blow]
				115 VAC	230 VAC	115 VAC	230 VAC			
PSM12-078S	100 - 240 VAC Universal Input	85 - 264 VAC	47-63 Hz	2.0 A	1.0 A	<12 A	<20 A	20 ms min. [full load 115/230 VAC]	81%	6.0 A to 16.0 A
PSM24-090S				2.1 A	1.0 A				86%	
PSM24-090S-N				2.1 A	1.0 A				85%	
PSM12-156S	100 - 120 VAC/ 220 - 230 VAC Autoselect	85 - 132 VAC/ 187 - 264 VAC		2.5 A	1.4 A	<13 A	<25 A		85%	
PSM24-180S				2.8 A	1.5 A				87%	
PSM24-360S				5.0 A	2.5 A	<16 A	<25 A		85%	10.0 A to 16.0 A
PSM24-600S				10.0 A	5.0 A	<25 A	<30 A		88%	16.0 A to 25.0 A

Output Specifications

Part Number	Output Voltage	Output Voltage Adj. Range	Output Current (Max.)	Output Power (Max.)	Output Overvoltage Protection	Power - Good Signal			MTBF (IEC 61709 @ 25°C)
						Trigger Threshold	Active Output Signal	Relay Output	
PSM12-078S	12VDC	12 - 14 VDC	6.5 A	78 watts	20V	9 - 11 V	11V ± 1V / 20mA max.	DC OK = contact closed (rated:30 VDC 1.0A)	350,000 hours
PSM24-090S	24VDC	24 - 28 VDC	3.75 A	90 watts	35V	18 - 22 V	22V ± 2V /10mA max		
PSM24-090S-N			3.75 A	90 watts	35V				
PSM12-156S	12VDC	12 - 14 VDC	13.0 A	156 watts	20V	9 - 11 V	11V ± 1V / 40mA max.		
PSM24-180S	24VDC	24 - 28 VDC	7.5 A	180 watts	35V	18 - 22 V	22V ± 2V / 20mA max		
PSM24-360S			15.0 A	360 watts	35V				
PSM24-600S			25.0 A	600 watts	35V				

General Specifications

Specification	Description
Temperature	Operating (ambient): -25 to 70°C max [-13 to 158°F]. Above +40°C [104°F] load derating Storage [non-operating]: -25 to 85°C max [-13 to 185°F]. Temperature drift: 0.02%/C. Cooling: convection, no internal fan
Humidity	95% [non-condensing] relative humidity maximum
Isolation	According to IEC/EN 60950, EN50178, EN61558-2-8, EN60204, CSA
Output Regulation	Input variation: 0.5% maximum. Load variation [10 to 100%]: 0.5% maximum
Output Voltage Ripple	100 mV peak-to-peak typical [20 MHz bandwidth], [200 mV peak to peak maximum at Imax]
Output Protection	Current limit: 110% constant current, automatic recovery, thermal protection, output rating, Voltage limit: 140% Vout nom
Over-temperature Protection	Switch off at over-temperature, automatic restart
Status Indicator	Dual color LED [green: DC Ok; Red: DC Off]
Remote ON/OFF	By external contact. DC On: -S contact open. DC Off: -S connected via 1 Kq to -Vout, (3VDC max across Vout [+] and Vout [-])
Maximum Capacitive Load	Unlimited
Vibration	IEC 60068-2-6: 3 axis, sine sweep, 10-55 Hz, 1g, 1 oct/min
Shock	IEC 60068-2-27: 3 axis, 15g half sine, 11ms
Enclosure Rating	IP20 [IEC 529]
Enclosure Material	Aluminum [chassis] / zinc plated steel [cover]
Mounting	Snap-on with self-locking spring for 35mm DIN rails per EN 50022-35x15/75, or wall mount with bracket
Connection	Pluggable screw terminals [plugs included] 2 terminals per output [not available in 600 watt unit.]
Agency Approvals	UL 508 Listed File E197592, UL 60950 Recognized File E198298; CSA C22.2-60950 File 229285; CE

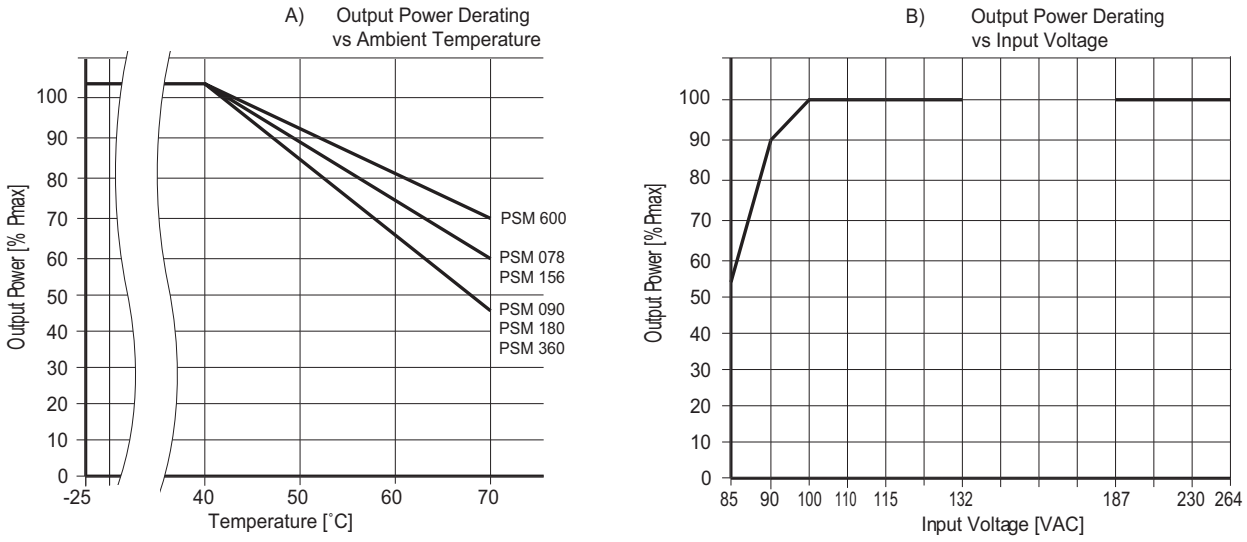
Note: Unless otherwise stated all specifications are valid at nominal input voltage, full load and +25°C after warmup time.

Power Supplies Specifications PSM Series

General Specifications (continued)		
Specification	***Standard***	***Document Number***
Harmonic Limits	Harmonic Current Limits	EN 61000-3-2, Class A for limited output power
Safety Standards	Information technology equipment	IEC/EN60950; CSA 60950-1-03/UL 60950-1
	Industrial control equipment	UL 508
	Electrical equipment of machines	EN 60204
	Electronic equipment for power installation	EN 50178
	Safety, transformers	EN 61558-2-8
	Limited power source (model PSM24-090S-N)	EN 60950 sect. 2.5 and NEC Class 2
Safety Approvals	CB-Report per IEC 60950	EN 50178, EN 60079-15 EN 61558-2-8, CSA
Safety Class	Degree of electrical protection Class1	IEC 536
Electromagnetic Compatibility (EMC), Emissions	EMC, Emissions	EN 61204-3, EN61000-6-3
	Conducted RI suppression on input	EN 55011 class B, EN 55032 class B
	Radiated RI suppression	EN 55011 class B, EN 55032 class B
Electromagnetic Compatibility (EMC), Immunity	EMC, Immunity	EN 61000-6-2, EN 61204-3
	Electrostatic Discharge [ESD]	IEC / EN 61000-4-2 4 kV [contact discharge] / 8 kV [air discharge]
	Radiated RF field immunity [80-1000 MHz]	IEC / EN 61000-4-3 10 V / m
	Electrical fast transient / burst immunity	IEC / EN 61000-4-4 2 kV
	Surge immunity	IEC / EN 61000-4-5 1 kV / 2 kV
	Immunity to conducted RF disturbances [0.15 to 80 MHz]	IEC / EN 61000-4-6 10 V
	Power frequency field immunity	IEC / EN 61000-4-8 30 A / m
	Voltage dips	IEC / EN 61000-4-11 [70% UN Crit. B/40%/100% UN Crit. C]
Pollution Degree	2*	

***Note: Normally, only non-conductive pollution occurs. Temporary conductivity caused by condensation is to be expected.**

Output Power Derating



Note: Unless otherwise stated, all specifications are valid at nominal input voltage, full load and +25°C after warmup time.

RHINO Connections PSM Series

PSM12-078S / PSM24-090S
PSM24-REM360S
PSM24-BCM360S

Wiring Connections				
Pin	*J1*	*J2*	*J3*	*J4*
1	Earth	GND [-]	S+	Normal mode
2	Neutral	Vout [+]	S-	Common
3	Line	DC-OK Signal	—	Parallel mode
4	—	DC-OK Relay contact 1	—	—
5	—	DC-OK Relay contact 2	—	—

PSM12-156S
PSM24-180S
PSM24-BFM600S

Wiring Connections				
Pin	*J1*	*J2*	*J3*	*J4*
1	Earth	GND [-]	S+	Normal mode
2	Neutral	GND [-]	S-	Common
3	Line	Vout [+]	—	Parallel mode
4	—	Vout [+]	—	—
5	—	DC-OK Signal	—	—
6	—	DC-OK Relay contact 1	—	—
7	—	DC-OK Relay contact 2	—	—

PSM24-360S

Wiring Connections				
Pin	*J1*	*J2*	*J3*	*J4*
1	Earth	GND [-]	S+	Normal mode
2	Neutral	GND [-]	S-	Common
3	Line	Vout [+]	—	Parallel mode
4	—	Vout [+]	—	—
5	—	DC-OK Signal	—	—
6	—	DC-OK Relay contact 1	—	—
7	—	DC-OK Relay contact 2	—	—

PSM24-600S

Wiring Connections					
Pin	*J1*	*J2*	*J3*	*J4*	*J5*
1	Earth	GND [-]	S+	Normal mode	DC-OK Relay contact 1
2	Neutral	GND [-]	S-	Common	DC-OK Relay contact 2
3	Line	Vout [+]	—	Parallel mode	DC-OK Signal
4	—	Vout [+])	—	—	—

RHINO PSM24-REM360S Redundancy Module

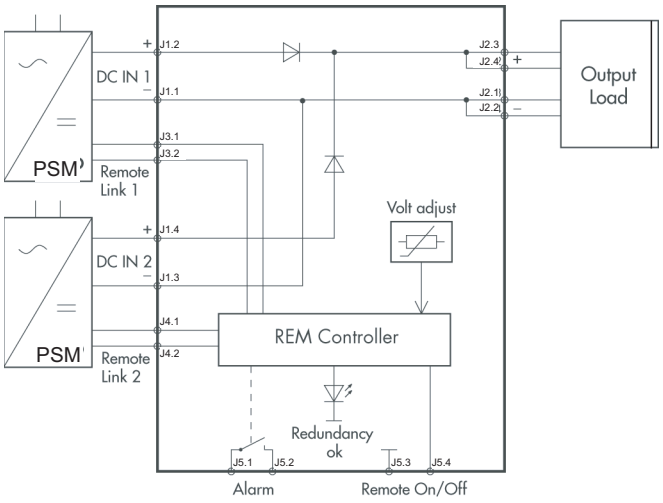
Using two PSM24 power supplies and a redundancy module, you can configure a redundant power system, featuring active current sharing, without any additional components. Even if one power supply fails or becomes disconnected, the second unit will supply full current to the load. The module has an alarm contact for monitoring of operations. The inputs are hot-swappable and can be loaded up to 15A each.



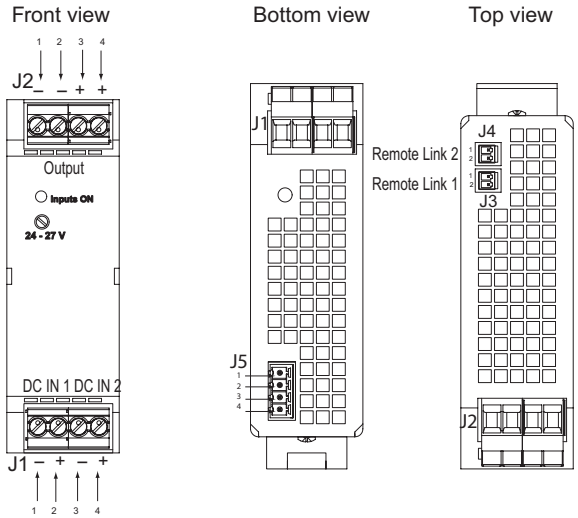
Redundancy Module						
Part Number	***Price***	***Drawing Link***	***Input***	***Max Power per Input***	***Output Voltage Adjust***	***Output Power Max***
PSM24-REM360S (includes terminal plugs)	$238.00	PDF	2 x 24VDC 2 x Control Input	2 x 360W	24VDC [24 - 27 VDC]	360W

General Specifications	
Operating Temperature	-25 to 70°C max [-13 to 158°F], derating above 40°C [104°F]
Electromagnetic Compatibility	In correspondence to connected units [no internal switching device]
Redundancy OK Signal	Trigger threshold at 18 to 22VD
Remote Link Wire 0.5m	Two cables included with PSM24-REM360S module
Remote ON/OFF	By external contact: ON = J5.3 + J5.4 not shorted OFF = J5.3 + J5.4 shorted
Alarm Contact Rating	30 VDC/1.0 A max

Redundancy Module Function Diagram



Redundancy Module Connector Positions



Note: this redundancy module only works with the PSM series. Other series of power supplies are not compatible.

Wiring Connections					
Pin	***J1***	***J2***	***J3 Voltage control 1 for Input 1***	***J4 Voltage control 2 for Input 2***	***J5***
1	Input 1 -Vin	GND [-]	S+	S+	DC-OK Signal
2	Input 1 +Vin	GND [-]	S-	S-	DC-OK Relay contact
3	Input 2 -Vin	Vout [+]	—	—	Remote ON/OFF
4	Input 2 +Vin	Vout [+]	—	—	Remote ON/OFF

RHINO PSM24-BFM600S Buffer Module



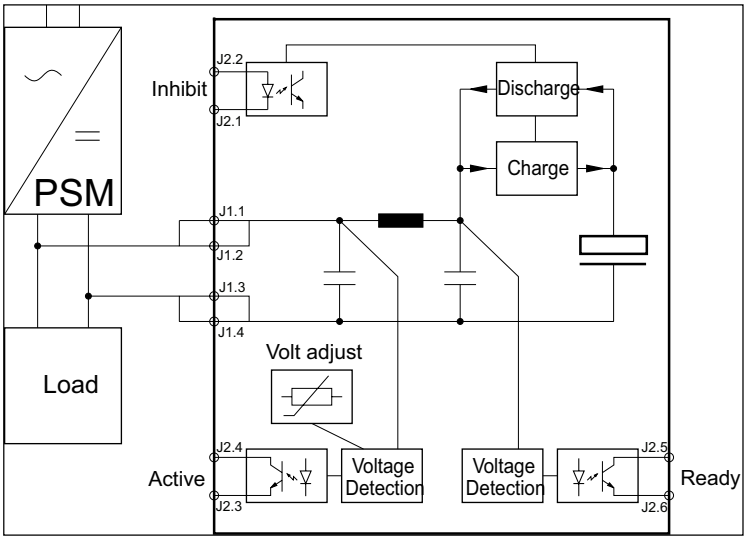
The buffer module will maintain the output voltage of a 24 VDC power supply after brownouts or voltage dips for up to 200ms at 25 amps. It is a cost effective alternative to a battery-based backup system. The operation modes are indicated by an LED on the front panel.

Storing the energy in a capacitor bank, this backup solution is completely maintenance free. Its storage capacity does not deteriorate over the lifetime of the unit.

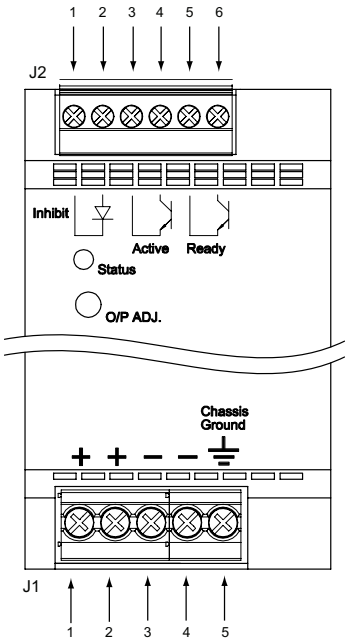
Buffer Module						
Part Number	***Price***	***Drawing Link***	***Input***	***Operating Voltage Range***	***Buffer Time***	***Output Power Max***
PSM24-BFM600S (includes terminal plugs)	$276.00	PDF	24VDC	22 to 28VDC	200 msec typical @ 25A max load 4.0 sec maximum @ 1.2A load	25.0 A [600W]

General Specifications	
Operating Temperature	-25 to 70°C max [-13 to 158°F], derating above 40°C [104°F]
Electromagnetic Compatibility	In correspondence to connected units [no internal switching device]
Buffer Voltage	Adjustable, >1 V below input voltage, min. 22 VDC
Charging	0.6 A max/30s max
Status Signals	Buffer Active, Buffer Ready [optocoupler output], dual-color LED for status indication
Inhibit Input	Optocoupler input: supply between 5VDC and 28VDC to Inhibit
Signal Output Ratings	10mA

Buffer Module Function Diagram



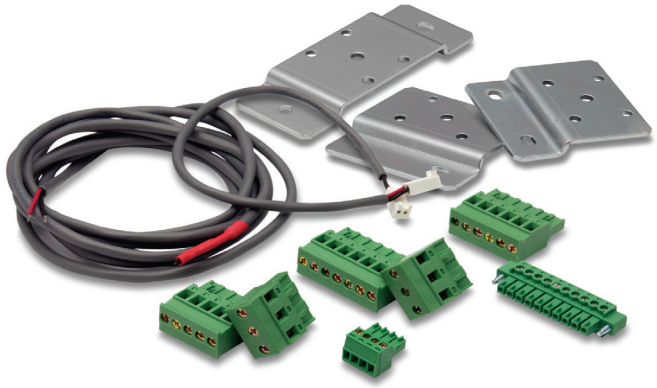
Buffer Module Connector Positions



Wiring Connections		
Pin	***J1***	***J2***
1	+ Vin	Inhibit GND
2	+ Vin	Inhibit +
3	- Vin	Active GND
4	- Vin	Active Signal
5	FG	Ready GND
6	—	Ready Signal

RHINO Power Supplies - Accessories
PSM Series

A variety of accessories is available to complement the RHINO PSM power supplies. Choose panel mounting brackets and replacement plug kits from the table below, based on the size of the power supply. There is also a temperature sensor for the battery control module and replacement link cable for the redundancy and battery control modules.



Accessories			
Part Number	***Price***	***Drawing Link***	***Description***
PSM-PANEL1	$45.50	PDF	Panel mounting bracket. 1 bracket type A includes M4-screw [DIN 74-4fA] for 78W, 90W, 156W, 180W PSM power supplies
PSM-PANEL2	$39.50	PDF	Panel mounting bracket. 2 brackets type A include M4-screws [DIN 74-4fA] for 360W, 600W PSM power supplies
PSM-PK1	$9.00	N/A	Replacement plug kit for PSM series with 78W and 90W outputs
PSM-PK2	$13.50	N/A	Replacement plug kit for PSM series with 156W, 180W and 360W outputs
PSM-TS	$40.00	N/A	Temperature sensor for PSM24-BCM360S battery control module
PSM-JC01	$9.75	N/A	Replacement link cable for PSM series redundancy module PSM24-REM360S and battery control module PSM24-BCM360S

Mounting

PSM power supplies are designed for mounting on a DIN rail. Please allow minimum free space of 80 mm (3.15") above and below, and 50 mm (1.97") on each side of the power supply for air convection. To attach unit onto the DIN rail, hook the top part of clip on DIN rail, then push down and inward until you hear the clipping sound. To remove, pull the latch of the clip using an insulated flathead screwdriver.

For wall or chassis mounting, use mounting brackets PSM-PANEL1 (for 78W to 180W PSM style power supplies) or PSM-PANEL2 (for 360W and 600W PSM power supplies). Remove the DIN clips and replace with the brackets. Use the countersink screws included with the wall mount kit to attach the brackets to the power supply.

To attach the power supply to the DIN rail

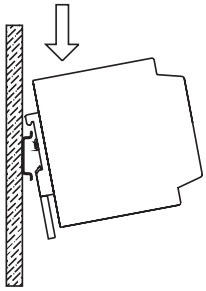


Fig. 2.1

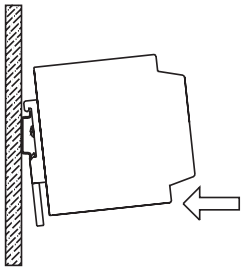


Fig. 2.2

To remove the power supply from DIN rail

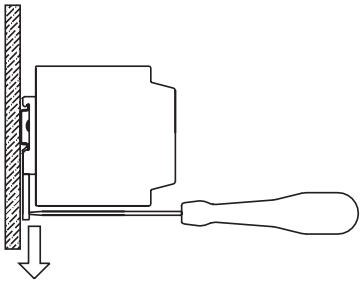


Fig. 2.3

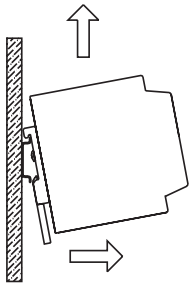


Fig. 2.4

Power Supplies PSN Series

Versatile Switching Power Supplies with Automatic Power Boost

AutomationDirect offers the RHINO PRO PSN power supply series which includes compliance with harmonic current IEC/EN 61000-3-2, class A, built-in DC OK contacts, and an LED for indicating DC OK and Overload conditions. In addition to having Power Boost of 150% up to 7 seconds, the PSN series features Advanced Power Boost (APB). With multiple loads connected in a system, a large inrush current could be drawn due to one fault load. This will be detected by APB. The APB will trip the circuit breaker (with appropriate rating based on the system load) on the current path of the fault load due to high current. This prevents the system from shutting down while the other connected current paths continue to operate without interruption.



PSN24-080



PSN24-120

Features

- Universal AC input voltage range (1 Phase Units)
- Built-in constant current circuit for charging applications (3 Phase Units)
- Built-in active PFC* with up to 96% efficiency
- Full power from -25 to +60°C @ 5,000m (16,400 ft.)
- Power Boost of 150% up to 7 seconds
- Advanced Power Boost (APB) – protects the system and ensures continuing operation when a large inrush current is detected due to faulty load on a multiple load connection
- Built-in DC OK Contact and LED indicator for DC OK/Overload
- Conformal coating on PCBAs to protect against common dust and chemical pollutants

** Active Power Factor Correction (PFC) - Active wave shaping of the input current, filtering of the high frequency switching, feedback sensing of the source current for waveform control*



PSN24-240



PSN24-480



PSN24-960



PSN24-480-3



PSN24-960-3

Industrial Power Supplies PSN Series						
Part Number	*Price*	*Output Voltage [V_{nom}]*	*Output Current [I_{max}]*	*Output Power [P_{max}]*	*Weight kg [lb]*	*Drawing Links*
PSN24-080	$107.00	24VDC	3.4 A	80W	0.50 [1.10]	PDF
PSN24-120	$142.00		5.0 A	120W	0.63 [1.39]	PDF
PSN24-240	$208.00		10.0 A	240W	0.94 [2.07]	PDF
PSN24-480	$318.00		20.0 A	480W	1.40 [3.09]	PDF
PSN24-960	$485.00		40.0 A	960W	2.87 [6.33]	PDF
PSN24-480-3	$321.00		20.0 A	480W	1.18 [2.60]	PDF
PSN24-960-3	$509.00		40.0 A	960W	2.30 [5.07]	PDF

Power Supplies PSN Series

Input Specifications

Part Number	Nominal Input Voltage Range	Operating Voltage min/max	Input Frequency Range	Input Current [Typ. @ full load]		Inrush Current Limitation [<2ms) @+25°C]		Max Power Dissipation	Efficiency [Typ]	Circuit Breaker [Minimum]
				120VAC	230VAC	120VAC	230VAC			
PSN24-080	100-240 VAC 110-300 VDC	85-276 VAC 88-375 VDC	47-63Hz	0.76 A	0.44 A	7.0 A	13.0 A	9.5 W	91% @ 120VAC	6A to 16A
PSN24-120				1.09 A	0.60 A	15.0 A	15.0 A	12.6 W	92% @ 120VAC	
PSN24-240				2.17 A	1.16 A	10.0 A	10.0 A	23.5 W	93% @ 120VAC	
PSN24-480				4.24 A	2.29 A	13A	13A	46W	93% @ 120VAC	
PSN24-960	85-264 VAC	5-276 VAC		8.60 A	4.50 A		17 A	70W	95% @ 120VAC	
PSN24-480-3	3 x 400-500 VAC	3 x 320-575 VAC		400VAC	480VAC	400VAC	480VAC	26.4 W	95% @ 480VAC	6A B-type 3A C-type
				0.78 A	0.67 A	10A	10A			
PSN24-960-3				1.53 A	1.28 A	14.2 A	17A	48.4 W	96% @ 480VAC	6A

Output Specifications

Part Number	Output Voltage	Output Voltage Adj. Range	Output Current [Max]	Power Boost [7 seconds]	Output Overvoltage Protection	Startup with Capacitative Loads [Max]	Startup Time	Relay Output	MTBF [@ 25°C]
PSN24-080	24VDC	24-28 VDC	3.4 A	5.0 A	28.8-35.2 V	8,000 µF	370ms @120VAC	DC OK = contact closed [rated:30 VDC 1.0 A]	2,164,300 hrs
PSN24-120			5.0 A	7.5 A		10,000 µF	750ms @ 120VAC		1,831,000 hrs
PSN24-240			10.0 A	15A			650ms @120VAC		1,476,000 hrs
PSN24-480			20.0 A	30A		20,000 µF	1000ms @ 120VAC		778,800 hrs
PSN24-960			40.0 A	60A		40,000 µF	800ms @ 120VAC		513,800 hrs
PSN24-480-3			20.0 A	30A	<32 V	20,000 µF	500ms @ 480VAC		750,000 hrs
PSN24-960-3			40.0 A	60A		40,000 µF	1000ms @ 480VAC		568,300 hrs

Power Supplies PSN Series

General Specifications			
Specification	***Description***		
Temperature	Operating [ambient]: -25 to 70°C max [-13 to 158°F]. Above +60°C[140°F] load derating Storage [non-operating]: -40 to 85°C max [-40 to 185°F]. Cooling: convection, no internal fan		
Humidity	5-95% [non-condensing] relative humidity maximum		
Isolation	According to IEC/EN 60950, EN62477-1, EN60204, CSA		
Mains Buffering at Nominal Load	See Product Insert		
Output Regulation	10mV [except 120W = 20mV] [100% load]		
Output Voltage Ripple	100mVpp [except 80W/120W/240W 1-Ph :50mV] [20 MHz bandwidth]		
Output Protection	1Ph models: > 150% of rated load current, Constant current, Hiccup Mode [Auto-Recovery]	480W 3Ph: 160-195% of rated load current, Constant current, Hiccup Mode [Auto-Recovery]	960W 3Ph: 150-200% of rated load current, Constant current, Hiccup Mode [Auto-Recovery]
Overtemperature Protection	Switch off at over-temperature, automatic restart		
Status Indicators	Two color LEDs [green: DC Ok, Red: Overload]		
Maximum Capacitative Load	1Ph 80W: 8,000uF, 1Ph 120W: 10,000uF, 1Ph 240W: 10,000uF, 1Ph 480W: 20,000uF, 1Ph 960W: 40,000uF, 3Ph 480W: 20,000uF, 3Ph 960W: 40,000uF		
Noise (1 meter from power supply)	Sound Pressure Level [SPL] < 25dBA		
Vibration	IEC 60068-2-6, Sine Wave: 10-500Hz; 3G peak; displacement of 0.35mm; 60 min per axis for all X, Y, Z directions		
Shock	IEC 60068-2-27, Half Sine Wave: 30G for a duration of 18ms; 3 times per direction, 6 times in total		
Enclosure Rating	IP20		
Enclosure Material	Aluminum		
Mounting	Snap-on with self-locking spring for 35mm DIN rails		
Connection	Screw terminals, See Insert for wire size and torque ratings		
Agency Approvals	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1; File No. E198298, UL/C-UL recognized to UL62368-1 and CSA C22.2 No. 62368-1; File No. E508040, UL/C-UL listed to UL508 and CSA C22.2 No. 107.1-01; File No. E197592 Single-phase only: CSA C22.2 No. 107.1-01; File No. 249074		

Note: Unless otherwise stated all specifications are valid at nominal input voltage, full load and +25°C after warm up time.

Standards/Directives		
Specification	***Standard***	***Document Number***
Harmonic Limits	Harmonic Current Limits	EN 61000-3-2, Class A for limited output power
Safety Standards	Information technology equipment	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1; File No. E198298, UL/C-UL recognized to UL62368-1 and CSA C22.2 No. 62368-1; File No. E508040
	Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No. 107.1-01; File No. E197592 CSA to CSA C22.2 No. 107.1-01; File No. E249074, except 3 Phase input.
	Electrical equipment of machines	IEC60204-1 [over voltage category III]
	Electronic equipment for power installation	IEC/EN 62477-1 / IEC62103
	Safety, Transient surge voltage protection	VARISTOR
Safety Approvals	CB-Report per IEC 60950	IEC 60950-1, IEC 61558-1, IEC 61558-2-16, IEC 61010-1, IEC 61010-2-201
Safety Class	Degree of electrical protection Class1	Class I with GND connection
CE	In conformance with EMC directive 2014/30/EU and low voltage directive 2014/35/EU	
RoHS Compliant	Yes	
Electromagnetic Compatibility (EMC), Emissions	EMC, Emissions	Generic Standards: EN 61000-6-3 CISPR 32, EN 55032, CISPR 11, EN 55011, FCC Title 47: Class B
Electromagnetic Compatibility (EMC), Immunity	EMC, Immunity	EN 55024, EN 61000-6-2
	Electrostatic Discharge [ESD]	IEC 61000-4-2 Level 4 Criteria A Air Discharge: 15kV; Contact Discharge: 8kV
	Radiated RF field immunity [80-1000 MHz]	IEC / EN 61000-4-3 80MHz-1GHz, 10V/M, 80% modulation [1kHz]; 1.4GHz-2GHz, 10V/M, 80% modulation [1kHz]; 2GHz-2.7GHz, 10V/M, 80% modulation [1kHz]
	Electrical fast transient / burst immunity	IEC / EN 61000-4-4 Level 4 Criteria A 4kV
	Surge immunity	IEC / EN 61000-4-5 Level 4 Criteria A Common Mode: 4kV Differential Mode: 2kV
	Immunity to conducted RF disturbances [0.15 to 80 MHz]	IEC / EN 61000-4-6 Level 3 Criteria A 150kHz-80MHz, 10Vrms
	Power frequency field immunity	IEC / EN 61000-4-8 30 A / m
	Voltage dips	IEC / EN 61000-4-11 [70% UN Crit. B/40%/100% UN Crit. C]
Pollution Degree	2	

Power Supplies PSN Series

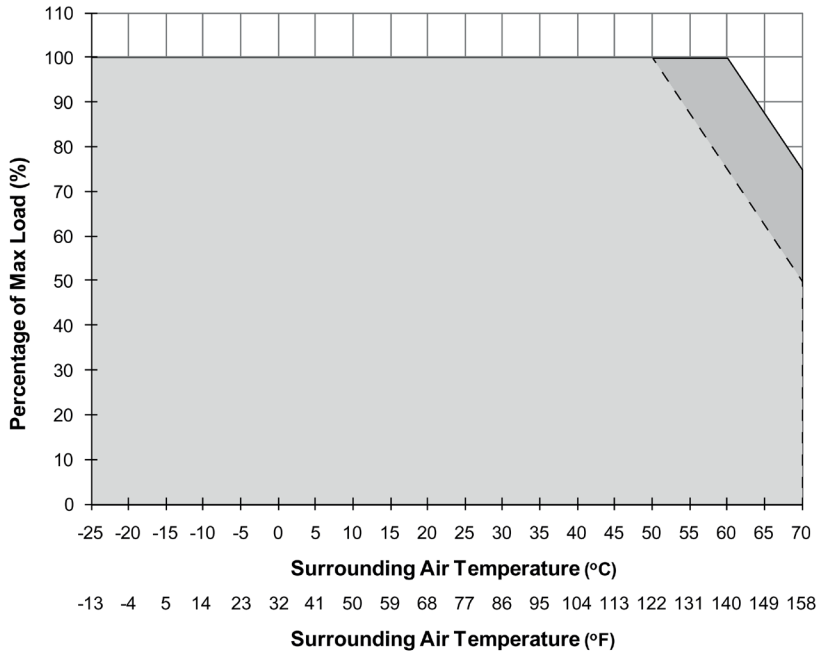
Engineering Data for RHINO PRO PSN Series Power Supplies

Output Load De-rating VS Surrounding Air Temperature

Note:

- Power supply components may degrade, or be damaged, when the power supply is continuously used outside the shaded region.
- If the output capacity is not reduced when the surrounding air temperature exceeds its specification as defined under "Temperature" in the General Specifications table, the device will run into Over Temperature Protection. When activated, the output voltage will go into bouncing mode and will recover when the surrounding air temperature is lowered or the load is reduced as far as necessary to keep the device in working condition.
- In order for the device to function in the manner intended, it is also necessary to keep a safety distance as recommended in the safety instructions while the device is in operation.
- Depending on the surrounding air temperature and output load delivered by the power supply, the device can be very hot!

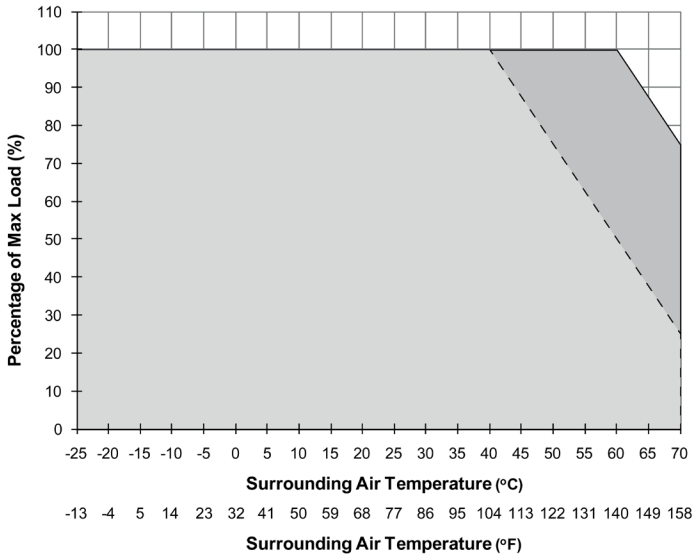
Power Derating Curve for PSN24-080, PSN24-120, PSN24-240



PSN Series Derating for Mounting Position		
Part Number	***Vertical Orientation***	***Horizontal Orientation***
PSN24-080	> 60°C de-rate power by 2.5% / °C	> 50°C de-rate power by 2.5% / °C
PSN24-120		
PSN24-240		

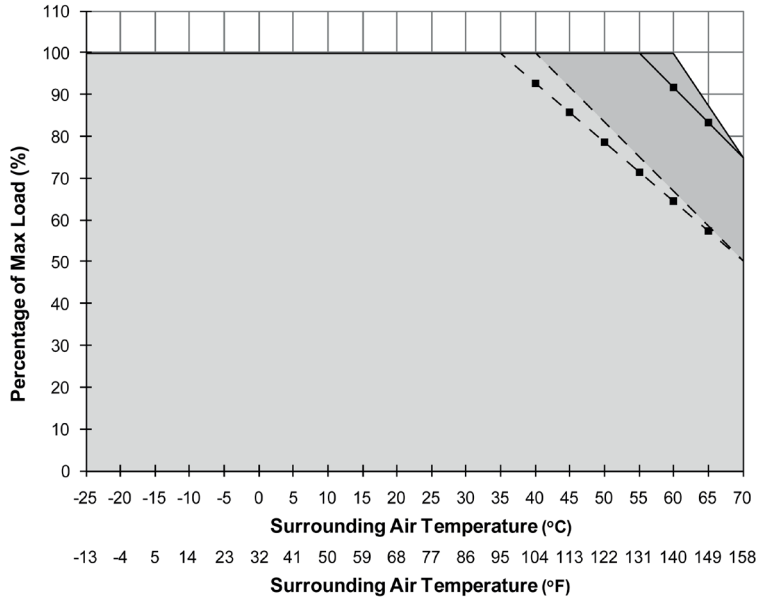
Power Supplies PSN Series

Power Derating Curve for PSN24-480



RHINO PRO PSN Series Derating for Mounting Position		
Part Number	*Vertical Orientation*	*Horizontal Orientation*
PSN-480	> 60°C de-rate power by 2.5% / °C	> 40°C de-rate power by 1.67% / °C

Power Derating Curve for PSN24-960

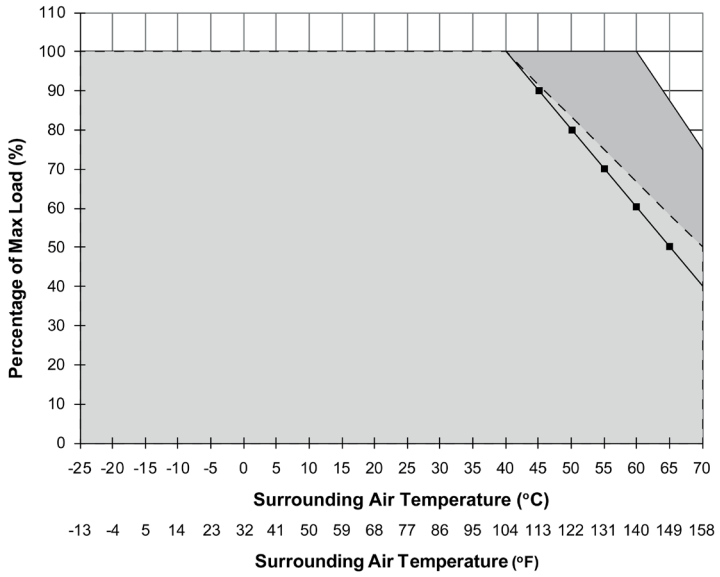


90-246 VAC	———	- - - - -
<90 VAC	—◆—	- -◆- -

Derating for Mounting Position PSN Series				
Part Number	*Vertical Orientation*		*Horizontal Orientation*	
	<90 VAC	*90-264 VAC*	*<90 VAC*	*90-264 VAC*
PSN24-960	> 55°C de-rate power by 1.67% / °C	> 60°C de-rate power by 2.5% / °C	> 35°C de-rate power by 1.43% / °C	> 40°C de-rate power by 1.67% / °C

Power Supplies PSN Series

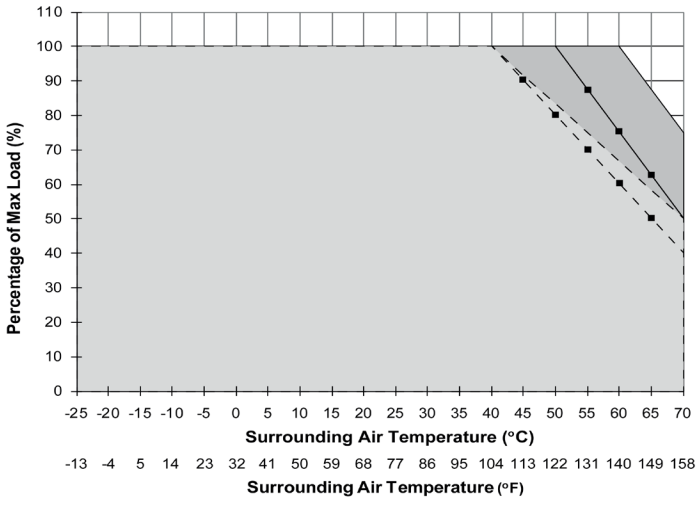
Power Derating Curve for PSN24-480-3



V_{in}	Vertical Mounting	Horizontal Mounting
3-Phase	———	- - - - -
2-Phase	—◆—	- - ◆ - -

Derating for Mounting Position PSN Series				
Part Number	*Vertical Orientation*		*Horizontal Orientation*	
	3-Phase	*2-Phase*	*3-Phase*	*2-Phase*
PSN24-480-3	> 60°C de-rate power by 2.5% / °C		> 40°C de-rate power by 1.67% / °C	> 40°C de-rate power by 2.0% / °C

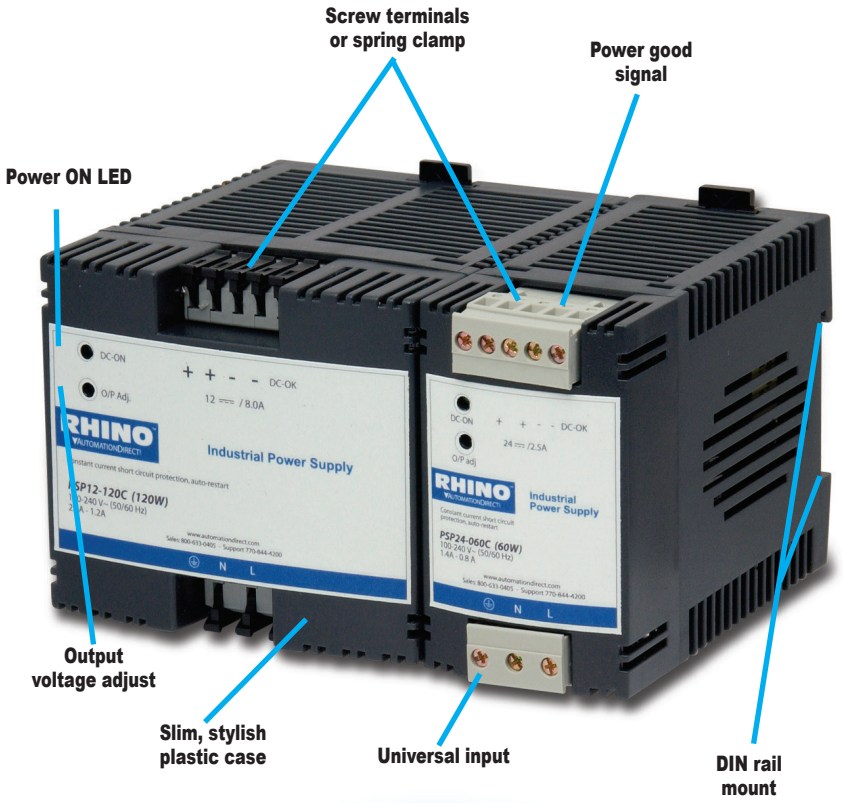
Power Derating Curve for PSN24-960-3



V_{in}	Vertical Mounting	Horizontal Mounting
3-Phase	———	- - - - -
2-Phase	—◆—	- - ◆ - -

Derating for Mounting Position PSN Series				
Part Number	*Vertical Orientation*		*Horizontal Orientation*	
	3-Phase	*2-Phase*	*3-Phase*	*2-Phase*
PSN24-960-3	> 60°C de-rate power by 2.5% / °C	> 50°C de-rate power by 2.5% / °C	> 40°C de-rate power by 1.67% / °C	> 40°C de-rate power by 2% / °C

RHINO 5,12 & 24 VDC Power Supplies
PSP Series



Slimline Power Supplies

RHINO PSP series power supplies are plastic housed ultracompact switching supplies available in 5V, 12V and 24V adjustable models. There are 13 models available with power ratings of 20W to 240W and up to 10A output current. They are DIN rail or panel-mountable and feature universal inputs, adjustable DC voltage outputs, power good signal and feature low output ripple along with short circuit, overvoltage and overload protection.

The RHINO PSP series of switching power supplies offer an excellent price/performance ratio. They provide tightly regulated output voltage for sensitive loads in industrial environments. The slim plastic case is lightweight and compact, and comes in both screw and spring clamp terminal versions. The constant-current, short-circuit protection limits the output current as the voltage is reduced, to safely protect the control components from direct shorts and device failures. Once a fault is corrected, the power supply automatically resumes supplying full-voltage power. (PSPxx-024x models have foldback current protection with auto-recovery.)

The RHINO PSP power supplies have a Power ON LED for easy visual indication of operation as well as a Power Good signal for feedback to your system controller.

With a UL 508C rating, the RHINO PSP series is the right choice for space limited applications.



Features

- Regulated switch mode type
- Ultra-compact plastic case
- Finger-safe terminals
- Reliable snap-on mounting on DIN rails
- Wall mounting bracket included
- Universal input 120/240VAC, 50/60Hz or 85-375 VDC (120 or 240VAC only for PSP24-240S input)
- Models with 5, 12 or 24 VDC output
- Output voltage adjustable
- Parallel operation up to five units (not PSP24-240S)
- Power good signal (some models)
- Low ripple and noise
- Overload and short-circuit protection
- UL/cUL 508 listed, UL/cUL 60950 recognized*
- Worldwide safety approvals
- 3-year warranty

** Note: PSP24-240S is not cUL listed. PSP05-020S, PSP12-024S, and PSP24-240S are not UL 60950 recognized.*

RHINO 5,12 & 24 VDC Power Supplies
PSP Series



PSP05-020S
PSP12-024S
PSP24-024S



PSP24-024C



PSP12-060S
PSP24-060S



PSP12-060C
PSP24-060C



PSP12-120C
PSP24-120C



PSP24-120S
PSP12-120S



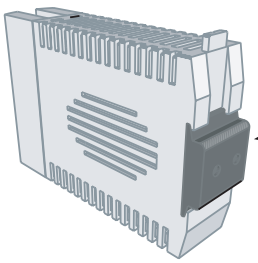
PSP24-240S

Input Specifications

Part Number	Input Voltage Range		Input Freq. Range	Input Current [Typical] at full load		Efficiency [Typ @ 115VAC]	C-Curve Circuit Breaker or Slow-blow Fuse
				115 VAC	230 VAC		
PSP05-020S	85-264 VAC 85-375 VDC UL Approved for 100-240 VAC only	30% output derating below 93 VAC/ 130 VDC	47-63 Hz	0.35 A	0.2A	82%	5.0 A
PSP12-024S		20% output derating below 93 VAC/ 130 VDC				82%	
PSP24-024S				0.35 A	0.2 A	85%	
PSP24-024C						85%	
PSP12-060S		15% output derating below 93 VAC/ 130 VDC		1.2 A	0.6 A	81%	
PSP12-060C						81%	
PSP24-060S						83%	
PSP24-060C						83%	
PSP12-120S				2.0 A	1.0 A	77%	
PSP12-120C						77%	
PSP24-120S						80%	
PSP24-120C						80%	
PSP24-240S	85-132/ 187-264 VAC	20% output derating below 93 VAC		4.7 A	2.0 A	82%	

Output Specifications

Part Number	Price	Drawing Link	Output Voltage	Output Volt. Adjust. Range	Output Current [Max]	Output Power [Max]	Hold-Up Time		MTBF [IEC 1709 @ 25°C]
							115 VAC	230 VAC	
PSP05-020S	$91.00	PDF	5.1 VDC	5-5.25 VDC	4.0 A	20W	15 ms	125 ms	2,681,000 hours
PSP12-024S	$110.00	PDF	12 VDC	12-16 VDC	2.0 A	24W			
PSP24-024S	$84.00	PDF	24 VDC	24-28 VDC	1.0 A	24W			
PSP24-024C	$89.00	PDF							
PSP12-060S	$143.00	PDF	12 VDC	12-15 VDC	4.0 A	48W @ 12VDC 60W @ 60VDC			2,947,000 hours
PSP12-060C	$162.00	PDF							
PSP24-060S	$128.00	PDF	24 VDC	24-28 VDC	2.5 A	60W			
PSP24-060C	$129.00	PDF							
PSP12-120S	$230.00	PDF	12 VDC	12-15 VDC	8.0 A	120W			1,620,000 hours
PSP12-120C	$203.00	PDF							
PSP24-120S	$201.00	PDF	24 VDC	24-28 VDC	5.0 A				
PSP24-120C	$214.00	PDF							
PSP24-240S	$270.00	PDF			10.0 A	240W			1,912,000 hours



The unit can be mounted on a chassis or wall using the included mounting bracket.

Part numbering system

PSP24-024S

- PSP: Series Name
- Output Volts
- Output Watts
- Terminal Connector Type
  - Type
  - C: Clamp
  - S: Screw

RHINO 5,12 & 24 VDC Power Supplies
PSP Series

General Specifications		
Temperature	Operating: -10 to 70°C [14 to 158°F], Derating at 93-132 VAC or 130-187 VDC: -1.10%/C above 40°C, Derating at 187-264 VAC or 265-375 VDC: -1.67%/C above 50°C, Derating at 85-93 VAC or 85-130 VDC: -1.30%/C above 30°C, Temperature Coefficient: 0.02%/C Storage: -25 to 85°C [-13 to 185°F]	
Humidity	95% [non-condensing] relative humidity max.	
Output Regulation	2.5% [1% for PSP12-060x], 10 to 90% load variation	
Switching Frequency	55 - 180 kHz depending on load	
Safety Standards	IEC/EN 60950 [output SELV], UL 60950, UL 508, EN 50178, EN 60204, EN 61558-2-8	
Output Voltage Ripple	<50 mV peak-to-peak	
Output Protection	Current Limit at 120% typ., constant current, auto recovery [PSPxx-024x foldback, auto-recovery], Voltage Limit <40 VDC	
Power Good Signal*	Trigger Point 12VDC Models: >11 V 24VDC Models: >22 V	Output Signal [reference to -Vout] 11.0 V+/- 1.0 V @ 60 mA max. 22.0 V+/- 2.0 V @ 30 mA max.
Electromagnetic Compatibility (EMC)	EN 61000-3-2, EN 61000-6-2, EN 61000-6-3	
Enclosure Rating	IP 20	
Enclosure Material	Plastic FR2010-110C [UL 94 V-O rated]	
Mounting	35mm DIN rails, snap on with self-locking spring or wall mount adapter included	
Weight g[oz]	PSP05-020S, PSP12-024S, PSP24-024x: 40 (4.9), PSPxx-060x: 265 (9.4), PSPxx-120x: 440 (15.5), PSP24-240S: 50 (33.5)	
Connection	S models: Plug-in Screw Terminals, wire stripping length 7-8mm, C Models: Clamp Terminals, wire stripping length 6mm. For 28-12 AWG wire.	
Agency Approvals	UL/cUL 508 listed; File No. E197592 (PSP24-240S not cUL), UL 60950 recognized; File No. E198298 (except PSP05-020S, PSP12-024S and PSP24-240S).	

***Note: PSP05-020S, PSP12-024S and PSP24-024x models do not have Power Good output.**
Note: All specifications are valid at nominal input voltage, full load and +25°C after warmup time, unless otherwise stated.

PSP05-020S, PSP12-024S, PSP24-024x

Input		*Output*	
1	AC Ground	1	+Vout
2	Neutral	2	-Vout
3	Line		

PSPxx-060x

Input		*Output*	
1	AC Ground	1	+Vout
2	Neutral	2	+Vout
3	Line	3	-Vout
-	-	4	-Vout
-	-	5	Power Good

PSPxx-120x

Input		*Output*	
1	AC Ground	1	+Vout
2	Neutral	2	+Vout
3	Line	3	-Vout
-	-	4	-Vout
-	-	5	Power Good

PSP24-240S

Input		*Output*	
1	AC Ground	1	+Vout
2	Neutral	2	+Vout
3	Line	3	-Vout
-	-	4	-Vout
-	-	5	Power Good

RHINO PSP24-REM240S Redundancy Module

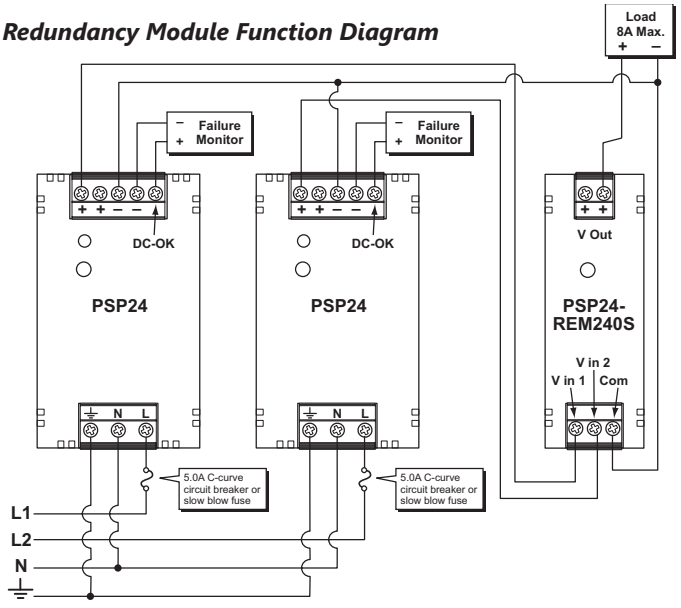
The PSP24-REM240S redundancy module used with two matched power supplies creates redundancy to help prevent costly downtime due to power supply failure. The PSP24-REM240S decouples the outputs of the two connected power supplies so that in case of failure, one power supply cannot overload the other.



PSP Redundancy Module							
Part Number	***Price***	***Drawing Link***	***Input Voltage Range***	***Max Power per Input***	***Output Voltage***	***Output Current Max.***	***Connection***
PSP24-REM240S	$71.00	PDF	2 x 5 – 60 VDC	144W	V in - 0.9 VDC	8 A	Detachable screw terminal block

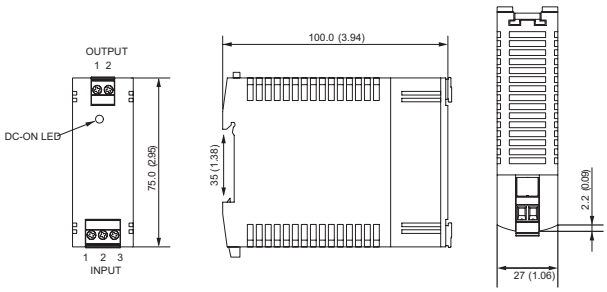
PSP24-REM240S General Specifications	
Temperature	Operating: -10 to 70°C max [14 to 158°F max], Storage: -25 to 85°C max, [-13 to 185°F max], Cooling: Natural air convection
Parallel Operation	(2) matched power supplies per module. Maximum power shall not exceed 200 watts per input.
Electromagnetic Compatibility	In correspondence with connected power supplies
Enclosure Material	Gray plastic, FR2010-110C [UL94 V-0 rated]
Mounting	Built-in snap-on connection for 35mm DIN rail or surface mount adapter included
Indication	Green LED for Output ON
Connections	Plug-in screw terminals, 0.5 to 0.7Nm [4.5 to 6.2lb-in] recommended tightening torque, wire stripping length 7-8mm
Wire Size range	24 to12 AWG [0.21 to 3.16 mm²]
Agency Approvals	UL/cUL 508 listed; File No. E197592, CE

Redundancy Module Function Diagram



Input		*Output*	
1	+Vin1	1	+Vout
2	+Vin2	2	+Vout
3	Common		

Redundancy Module Connector Positions



Recommendations for redundant PSP Series power supply applications:

- With no load connected, adjust the output voltage of both power supplies to the same value.
- Use separate input over-current protection for each power supply.
- When possible, connect the input power to each power supply to different phases or circuits.
- When available on the connected power supplies, use the DC-OK output and/or DC-ON LED on each power supply to monitor for failure. (PSP05-020S, PSP12-024S and PSP24-024x do not have DC-OK output).
- Connect all output leads together at a single distribution node using leads having the same length and cross section.

RHINO Power Supplies PSL Series

Low Cost NEC Class 2 Supplies*

The RHINO PSL series power supplies are plastic low-profile switching supplies available in 5, 12 and 24VDC output models. There are 9 models with power ratings from 7.5W to 91W. They have an integral DIN rail mounting adapter and feature universal 90VAC to 264VAC input voltage, DC-OK LED indication, and output current limitation. Some models feature adjustable DC output.

These are designed to fit in shallow depth control panels often used in the building automation industry. Screw terminals are provided for simple and speedy wiring terminations.

The RHINO PSL series is both UL508 listed for demanding industrial applications and UL60950-1 recognized for NEC Class 2* compliance in industrial, commercial, and residential applications.

Features

- Low-profile housing - only 2.15 inches (55mm) deep (MCB form factor)
- 5, 12, 24VDC outputs (adjustable models available in 12 and 24VDC)
- Output power ratings from 7.5 to 91W
- Integral DIN rail mounting adapter
- Universal input voltage range 90-264 VAC, 125-375 VDC
- DC-OK LED indication
- UL508 Listed, File No. E198298
- UL60950-1 Recognized for NEC Class 2 compliance*
- Protection Class II Double Isolation

Note: * PSL-12-090 is not NEC Class 2



PSL-05-010, PSL-12-010, PSL-24-010



PSL-12-030, PSL-24-030



PSL-12-060, PSL-24-060



PSL-12-090, PSL-24-090

Single-Phase Input

Part Number	Price	Drawing Link	Input Voltage Range	Input Frequency Range	Input Current Max [@ 115/230 VAC]	Inrush Current I2t @ 77°F [+25°C] typ [@ 115/230 VAC]	Efficiency [Typ @ 115VAC]	Recommended Backup Protection	Turn-on Time
PSL-05-010	$35.00	PDF	100-240 VAC UL Approved 90-264 VAC 125-375 VDC	47–63Hz	0.3 A / 0.2 A	<15A / <30A	81%	8A B -or 4A C characteristic circuit breaker	<3 sec
PSL-12-010	$32.00	PDF					85%		
PSL-12-030	$42.00	PDF			0.8 A / 0.6 A	<25A / 50A	86%	13A B -or 8A C characteristic circuit breaker	
PSL-12-060	$57.00	PDF			1.5 A / 1.0 A	<30A / 60A	85%	16A B -or 8A C characteristic circuit breaker	
PSL-12-090	$73.00	PDF			1.5 A / 0.9 A	<40A / <80A	87%		<1.5 sec
PSL-24-010	$35.00	PDF			0.3 A / 0.2 A	<15A / <30A	85%	16A B -or 8A C characteristic circuit breaker	<3 sec
PSL-24-030	$42.00	PDF			0.8 A / 0.6 A	<25A / <50A	88%	13A B -or 8A C characteristic circuit breaker	
PSL-24-060	$57.00	PDF			1.5 A / 1.0 A	<30A / <60A	82%	16A B -or 8A C characteristic circuit breaker	
PSL-24-090*	$73.00	PDF			2.2 A / 1.0 A	<30A / <60A	82%		<1.5 sec

***PSL-24-090 is UL Listed for 125-250 VDC input.**

Single-Phase Output

Part Number	Output Voltage	Output Voltage Range	Output Current [A]	Output Power [Max] [W]	Min. Hold-Up Time at Nominal Load [@115/230VAC]
PSL-05-010	5VDC	N/A	1.5	7.5	10ms / 30ms
PSL-12-010	12VDC	N/A	0.83	10	
PSL-12-030		11.5-14.5 VDC	2.1	25	25ms / 30ms
PSL-12-060			4.5	54	16ms / 30ms
PSL-12-090		12-14 VDC	6.0	72	18ms / 30ms
PSL-24-010	24VDC	N/A	0.42	10	10ms / 30ms
PSL-24-030		24-28 VDC	1.25	30	25ms / 30ms
PSL-24-060			2.5	60	16ms / 30ms
PSL-24-090		22-24 VDC	3.8	91.2	10ms / 30ms

RHINO Power Supplies PSL Series

General Specifications	
Enclosure Material	Plastic [PC], closed
Signals	Green LED DC OK
MTBF	> 500,000 hrs. as per Telcordia
Connection method	Screw connection
Protection Class II	to IEC/EN 60536
Leakage Current	<0.25mA @ 240VAC
Startup with capacitive loads	Max. 3,000µF
Line Regulation	< 1% typ. [@ 90-264Vac, 100% load]
Load Regulation	< 2% typ. [@ 90-264Vac, 100% load]
Residual ripple/ peak switching (20MHz) (at nominal values)	< 50mVpp / < 150mVpp
Operating Temperature (Surrounding air temperature)	-25 to 71°C [-13 to 160°F] Derate above +55°C [2.5%/°C]
Storage Temperature	-25 to 85°C [-13 to 185°F]
Humidity at 25°C, no condensation	< 95% RH
Vibration (operating)	IEC60068-2-6, Sine Wave: 10-500Hz @ 19.6m/S² [2G peak]; 10 min per cycle, 60 min for all X, Y, Z directions
Shock (operating)	IEC60068-2-27, Half Sine Wave: 4G for a duration of 22ms, 3 shocks for each 3 directions, 9 times in total
Pollution degree	Pollution degree 2
Altitude (operating)	2000m [6562ft] maximum

Certification and Standards	
Safety entry low voltage	SELV [EN60950]
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1, CB scheme to IEC60950-1, Limited Power Source [LPS] PSL-12-090 is not LPS
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No. 107.1-01; File No. E197592
Class 2 Power Supply	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1; File No. E198298 PSL-12-090 is not a Class 2 power supply
CE	In conformance with EMC directive 2014/30/EC and low voltage directive 2014/35/EC
ITE	EN55032, EN61000-3-2, EN61000-3-3, EN55024
RoHS	Yes

Additional Data

Part Number	*Weight kg [lb]*	*Wire Size / Torque**
PSL-05-010	0.06 [0.13]	26-12AWG / 0.8 N·m [7.0 lb-in]
PSL-12-010	0.06 [0.13]	
PSL-12-030	0.14 [0.31]	24-12AWG / 0.45 N·m [4.0 lb-in]
PSL-12-060	0.22 [0.49]	22-12AWG / 0.45 N·m [4.0 lb-in]
PSL-12-090	0.35 [0.77]	20-12AWG / 0.45 N·m [4.0 lb-in]
PSL-24-010	0.06 [0.13]	26-12AWG / 0.8 N·m [7.0 lb-in]
PSL-24-030	0.14 [0.31]	24-12AWG / 0.45 N·m [4.0 lb-in]
PSL-24-060	0.22 [0.49]	22-12AWG / 0.45 N·m [4.0 lb-in]
PSL-24-090	0.35 [0.77]	2x24 AWG or 22-12AWG / 0.45N·m [4.0 lb-in]

***Stripping length 7mm [0.28 in]**

RHINO Power Supplies PSC Series

NEC Class 2 Compliant Supplies

The RHINO PSC series power supplies are plastic low-profile housed switching supplies available in 5, 12 and 24 VDC adjustable output models. There are 8 models with power ratings from 12W to 90W. They have an integral DIN rail mounting adapter and feature universal 120/240 VAC input voltage, adjustable DC output, DC-OK LED indication, and output current limitation.

The RHINO PSC series of switching power supplies provide tightly regulated output voltage for sensitive loads in industrial, commercial and residential environments. The plastic housing is lightweight and low-profile, designed to fit in shallow depth control panels often used in the building automation industry. Screw terminals are provided for simple and speedy wiring terminations.

The RHINO PSC series is both UL508 listed for demanding industrial applications and UL1310 recognized for NEC Class 2 compliance in industrial, commercial and residential applications.

Features

- Low-profile housing - only 2.15 inches (55mm) deep (MCB form factor)
- 5, 12, 24VDC adjustable outputs
- Output power ratings from 12 to 90W
- Integral DIN rail mounting adapter
- Universal input voltage range 120/240 VAC
- Tight output voltage regulation
- DC-OK LED indication
- UL508 Listed
- UL1310 Recognized for NEC Class 2 compliance
- CE compliant
- RoHS compliant



PSC-05-012, PSC-12-015, PSC-24-015



PSC-12-030, PSC-24-030



PSC-12-060, PSC-24-060



PSC-24-090

Input Specifications

Part Number	Input Voltage Range	Input Frequency Range	Input Current [Typical] at full load		Efficiency [Typ @ 115VAC]	C-Curve Circuit Breaker or Slow-blow Fuse
			115 VAC	230 VAC		
PSC-05-012	100-240VAC - Nominal 85 to 264VAC - Universal [output power derating 5% / V for operation below 90 VAC]	47-63 Hz	0.25A typ.	0.17A typ.	76%	6.0 A
PSC-12-015			0.29A typ.	0.20A typ.	78%	
PSC-24-015					79%	
PSC-12-030			0.57A typ.	0.39A typ.	81%	
PSC-24-030					84%	
PSC-12-060			1.00A typ.	0.68A typ.	83%	
PSC-24-060			1.10A typ.	0.70A typ.	85%	
PSC-24-090			1.60A typ.	1.07A typ.	87%	

Output Specifications

Part Number	Price	Drawing Link	Output Voltage	Output Volt. Adjust. Range	Max Output Current [A]	Max Output Power [W]	Hold-Up Time		MTBF [IEC 1709 @ 25°C]
							115 VAC	230 VAC	
PSC-05-012	$67.00	PDF	5.0VDC	5.0 to 5.2VDC	2.4	12	minimum 10 ms	minimum 20 ms	1,600,000 hours
PSC-12-015	$67.00	PDF	12.0VDC	12.0 to 16.0VDC	1.25	15			
PSC-24-015	$65.00	PDF	24.0VDC	24.0 to 28.0VDC	0.63				
PSC-12-030	$68.00	PDF	12.0VDC	12.0 to 16.0VDC	2.5	30			1,300,000 hours
PSC-24-030	$86.00	PDF	24.0VDC	24.0 to 28.0VDC	1.25				
PSC-12-060	$86.00	PDF	12.0VDC	12.0 to 16.0VDC	4.5	54			2,100,000 hours
PSC-24-060	$103.00	PDF	24.0VDC	24.0 to 28.0VDC	2.5	60			
PSC-24-090	$127.00	PDF	24.0VDC		3.75	90			1,300,000 hours

RHINO Power Supplies PSC Series

General Specifications		
Temperature	Operating: -25 to 60°C [-13 to 140°F] max at nominal load, above +60°C [+140°F] 2.5% / °C derating up to +70°C [+185°F] Storage: -25 to 85°C [-13 to 185°F] max	
Humidity	95% [non-condensing] relative humidity max.	
Output Regulation	1%	
Protection Class II	to IEC/EN 60536	
Safety Standards	UL508, UL1310, Class 2 IEC/EN 60950-1, UL60950-1, EN50178 EN60204, EN61558-2-8	
Output Voltage Ripple	<100 mV peak-to-peak	
Output Protection	Current limitation at 100 - 150% typ. [automatic recovery]	
Electromagnetic Compatibility (EMC)	Emissions - EN61000-6-3 Conducted RI suppression on input - EN55032 class B Radiated RI suppression - EN55032 class B FCC Class B	Immunity - EN61000-6-2 EN61000-4-X
Enclosure Rating	IP 20 [IEC 60529]	
Enclosure Material	Plastic FR2010-110C [UL 94V- 0 rated]	
Mounting	DIN rails as per EN50022-35x15/735 [snap-on with self-locking springs]	
Connection	Screw terminals with combi-type screw heads for wire size 24 to 12AWG [0.20 to 3.30mm²]	
Agency Approvals	UL508 Listed, File No.E197592 UL1310 Class 2 Recognized, File No. E198298	

Wiring		
Input/Output	***Description***	***Wire size***
AC Input	all models: L, N only [2 pin terminal]	24 -12AWG / 3.30mm² max
DC Output	15 -30 Watt models: single + and - terminals	24 -12AWG / 3.30mm² max
DC Output	60 - 90 Watt models: double + and - terminals	24 -12AWG / 3.30mm² max

Weight	
Part No.	***Weight oz [g]***
PSC-05-012	3.53 [100]
PSC-12-015	3.53 [100]
PSC-24-015	3.53 [100]
PSC-12-030	5.64 [160]
PSC-24-030	5.64 160]
PSC-12-060	8.11 [230]
PSC-24-060	8.11 [230]
PSC-24-090	12.0 [340]

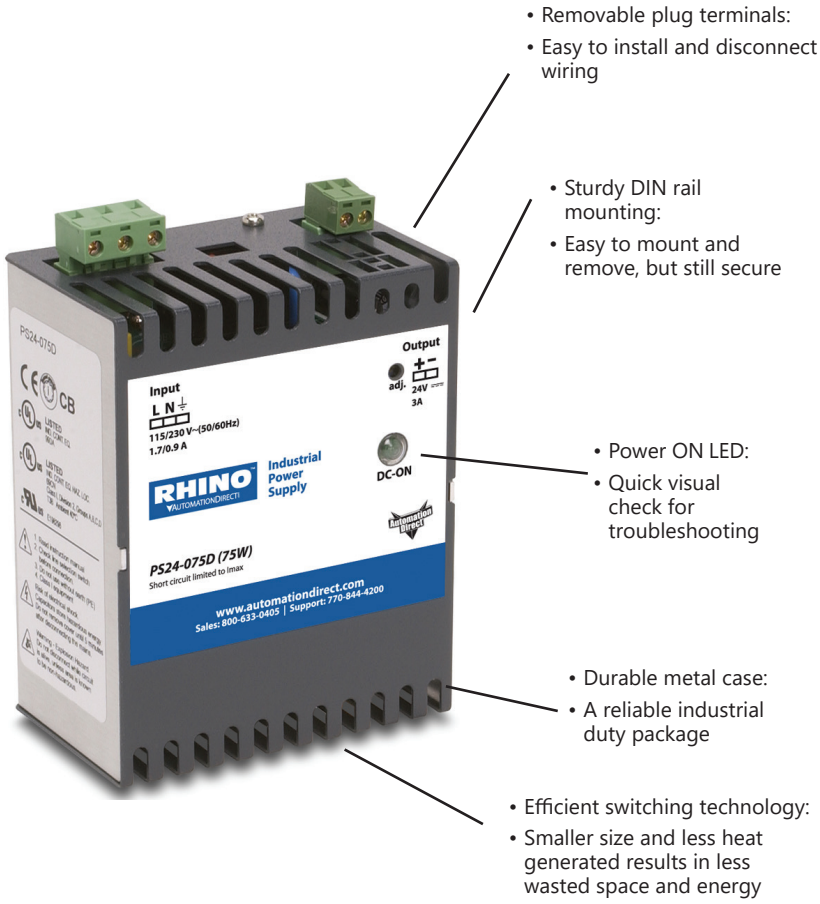
RHINO 12 VDC and 24 VDC Power Supplies PS Series

Switching power supplies at linear supply prices

The PS Series power supplies give you consistent, reliable, switched DC power at linear power supply prices.

These power supplies use efficient switching technology to produce the most power in the smallest space, while generating a minimum amount of heat. The constant-current short circuit protection limits the output current as the voltage is reduced to safely protect your control components from direct shorts and device failures. Once the short is corrected, the PS Series power supplies automatically resume supplying full-voltage power. Precisely regulated output power is suitable for battery charging applications. Extra-sturdy DIN rail mounts and removable plug connections make installation a breeze.

Meeting UL/cUL 60950, 508 and 1604* (Class I, Div. 2), our PS-D (DIN rail mounted) power supplies meet the standards required for practically any industrial control application.

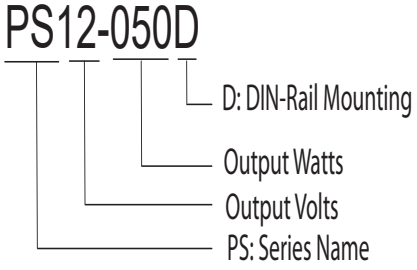


Features

- 2A - 24A at 24 VDC, 3.5A at 12 VDC
- Regulated switch mode type
- Low profile case
- Easy DIN rail mounting
- Constant-current short circuit protection
- Low ripple and noise
- Selectable input voltage (115/230 VAC)
- High EMC immunity
- EMI meets EN 55011-B and FCC Part 15, Level B
- Constant current protection with auto-recovery:
- No current spikes to damage powered devices due to improper wiring or a powered device failure
- Worldwide safety approvals: UL/cUL 508, 60950 and 1604 Class I, Div. 2, CE

*** [PS12-050D, PS24-050D and PS24-500D do not meet UL 1604 Class I Div 2]***

Part numbering system



RHINO Power Supplies Specifications
PS Series



PS12-050D
PS24-050D



PS12-075D
PS24-075D



PS24-150D



PS24-300D



PS24-500D



PS24-600D

General Specifications

Temperature	Operating [ambient]: -25 to 70°C [-13 to 158°F] max, Derating above 50°C 2%/C Storage [non-operating]: -25 to 85°C [-13 to 185°F] max, Temperature drift: 0.02%/C
Humidity	95% [non-condensing] relative humidity max
Switching Frequency	80 kHz typical [PWM]
Isolation	According to IEC/EN 60950, UL 60950, UL 508
Output Regulation	Input variation: ± 0.2% max Load variation: 50W, 75W, 150W models: ± 1% max 300W, 500W, 600W models: ± 0.3% max
Output Voltage Ripple	< 50 mV peak to peak [20 MHz bandwidth]
Output Protection	Current limit: 110% maximum output rating. Voltage limit: 140% Vout nom
Vibration	1gn 20 sweeps each axis
Shock	15gn, 11mS each axis
Enclosure Rating	IP 20
Enclosure Material	Aluminum [chassis] / stainless steel [cover]
Mounting	Snap-on with self-locking spring for 35mm DIN rails
Connection	Removable screw terminals for 22-10AWG, wire stripping length 7-8mm
Agency Approvals	UL/cUL 60950 recognized, File No. E198298, UL/cUL 508 listed File No. E197592, UL/cUL 1604 listed [Class I, Div 2, groups A,B,C, and D hazardous locations], File No. E197886, except PSxx-050D and PS24-500D, which are not UL/cUL1604 listed. CE

Note: All specifications are valid at nominal input voltage, full load and +25°C after warm-up time, unless otherwise stated.

Input Specifications

Part Number	*Input Voltage Range*	*Input Frequency Range*	*Input Current [Typical]*		*Inrush Current [<2mS]*		*Efficiency [Typ @ 115VAC]*	*C-Curve Circuit Breaker or Slow-blow Fuse*
			115 VAC	*230 VAC*	*115 VAC*	*230 VAC*		
PS12-050D	93-264 VAC	47-63 Hz	1.2 A	0.7 A	< 15 A	< 30 A	84%	5.0 A
PS24-050D	93-264 VAC		1.2 A	0.7 A			85%	
PS12-075D	93-132 VAC 187-264 VAC [switch selectable]		1.7 A	0.9 A	< 16.5 A	< 33 A	82%	
PS24-075D			1.7A	0.9 A			86%	
PS24-150D			3.0 A	1.7 A	< 35 A	< 70 A	87%	10.0 A
PS24-300D			5.4 A	3.3 A			88%	15.0 A
PS24-500D	93-132 VAC		9.5 A	N/A	< 50 A	N/A	87%	
PS24-600D	93-132 VAC 187-264 VAC [switch selectable]		10.5 A	6.4 A	< 70 A	< 80 A	88%	20.0 A

Output Specifications

Part Number	*Price*	*Drawing Link*	*Output Voltage*	*Output Voltage Adj. Range*	*Output Current [Max]*	*Output Power [Max]*	*Output Voltage Regulation**	*Hold-Up Time*		*MTBF [IEC 1709 @ 25°C]*
								115 VAC	*230 VAC*	
PS12-050D	Retired	PDF	12VDC	12-14 VDC	3.5 A	50W	1%	25mS	30mS	2,992,000 hours
PS24-050D	Retired	PDF	24VDC	24-28 VDC	2.0 A	50W				
PS12-075D	$212.00	PDF	12VDC	12-14 VDC	6.0 A	75W				1,800,000 hours
PS24-075D	Retired	PDF	24VDC	24-28 VDC	3.0 A	75W				
PS24-150D	Retired	PDF			6.0 A	150W				1,939,000 hours
PS24-300D	$292.00	PDF			12.0 A	300W	0.3%			1,913,000 hours
PS24-500D	$511.00	PDF			20.0 A	500W		20mS	N/A	1,467,000 hours
PS24-600D	$507.00	PDF			24.0 A	600W		15mS	25mS	1,434,000 hours

***Load variation (10-90%)**

Notes: Output current characteristic suitable for battery charging applications. Not recommended for redundancy or parallel operation.

RHINO AUTOMATIONDIRECT.com

Encapsulated Power Supplies PSE-S Series



PSE15-110-S

Overview

The RHINO PSE-S series offers 10-, 20-, 25-, and 50-watt AC/DC power supplies with an extended input range of 90-277 VAC. The power supplies are suitable for industrial, household, and building technology applications and are in a compact encapsulated plastic case.



PSE15-150-S

Features

- Wide input voltage range 90-277 VAC
- High efficiency up to 89%
- Compact chassis
- I/O-Isolation 4,000 VAC
- Plastic housing
- Wide operating temperature -40 to 70°C (-40°C cold start) [-40 to 158°F]
- Optional DIN rail mounting kit
- 3-year warranty

c UL us CE UK CA 3 YEAR WARRANTY

Encapsulated Power Supplies

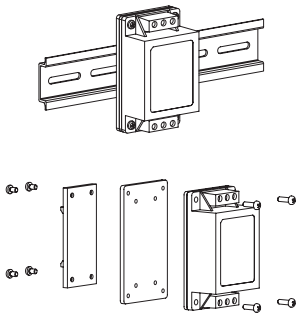
Part Number	Price	Output Power (max.)	Nominal Output Voltage	Nominal Input Voltage	Nominal Output Amperage	Efficiency @ 115VAC	Weight	Dimensions W x H x D mm [in]	Drawing Link
PSE05-110-S	$24.00	10W	5VDC	120/240 VAC	2A	81%	65g [2.29 oz]	55.1 x 43.2 x 22.9 [2.17 x 1.70 x 0.90]	PDF
PSE12-110-S	$24.00		12VDC		0.8 A	85%			PDF
PSE15-110-S	$24.00		15VDC		0.6 A	86%			PDF
PSE24-110-S	$23.00		24VDC		0.4 A	86%			PDF
PSE05-125-S	$33.00	20W	5VDC		3.9 A	84%	100g [3.52 oz]	88.4 x 38.1 x 24.1 [3.48 x 1.50 x 0.95]	PDF
PSE12-125-S	$33.00	25W	12VDC		2.1 A	88%			PDF
PSE15-125-S	$33.00		15VDC		1.6 A	88%			PDF
PSE24-125-S	$31.50		24VDC		1A	87%			PDF
PSE12-150-S	$45.00	50W	12VDC		4.1 A	89%	180g [6.34 oz]	97 x 48.3 x 25.4 [3.82 x 1.90 x 1]	PDF
PSE15-150-S	$45.00		15VDC		3.3 A	88%			PDF
PSE24-150-S	$45.00		24VDC		2.1 A	88%			PDF

Optional DIN Rail Mounting Brackets

Part Number	Price	Description	Weight	Drawing Link
PSE-BRKT-10	$8.00	RHINO DIN rail mounting bracket, aluminum. For use with 10W PSE-S series encapsulated power supplies. Mounting hardware included.	34g [1.19 oz]	PDF
PSE-BRKT-25	$8.00	RHINO DIN rail mounting bracket, aluminum. For use with 20W-25W PSE-S series encapsulated power supplies. Mounting hardware included.	39g [1.37 oz]	PDF
PSE-BRKT-50	$8.00	RHINO DIN rail mounting bracket, aluminum. For use with 50W PSE-S series encapsulated power supplies. Mounting hardware included.	46g [1.62 oz]	PDF



PSE-BRKT-25



Encapsulated Power Supplies PSE-S Series

Input Specifications

Input Specifications					
Part Number	***Input Voltage***	***Input Current (Full Load And Vin)***	***Power Consumption (No Load And Vin)***	***Input Inrush Current***	***Recommended Input Fuse***
PSE05-110-S	100-277 VAC (47-60 Hz) 100-250 VDC	140mA max @ 230VAC 230mA max @ 115VAC	100mW max @ 230VAC 100mW max @ 115VAC	60A @ 230VAC 30A @ 115VAC	1.6 A (slow blow)
PSE12-110-S					
PSE15-110-S					
PSE24-110-S					
PSE05-125-S		320mA max @ 230VAC 490mA max @ 115VAC			2.5 A (slow blow)
PSE12-125-S					
PSE15-125-S					
PSE24-125-S					
PSE12-150-S		600mA max @ 230VAC 1,000mA max @ 115VAC		90A @ 230VAC 45A @ 115VAC	2.5 A (slow blow)
PSE15-150-S					
PSE24-150-S					

Output Specifications

Output Specifications								
Part Number	***Voltage Set Accuracy***	***Ripple And Noise (20MHz)***	***Capacitive Load (max.)***	***Temperature Coefficient***	***Start-up Time (max.)***	***Hold-up Time (min.)***	***Output Current Limitation***	***Overvoltage Protection***
PSE05-110-S	±2% max.	60 mVp-p	3,500 µF	±0.02 %/K max.	60ms @ 230VAC 60ms @ 115VAC	30ms @ 230VAC	140 - 235% of Iout max.	105 - 145% of Vout nom.
PSE12-110-S		120 mVp-p	700µF					
PSE15-110-S		150 mVp-p	390µF					
PSE24-110-S		240 mVp-p	180µF					
PSE05-125-S		120 mVp-p	2,000 µF	±0.05 %/K max.	130ms @ 230VAC 130ms @ 115VAC	36ms @ 230VAC	140 - 280% of Iout max.	
PSE12-125-S		150 mVp-p	680 µF					
PSE15-125-S		160 mVp-p	220 µF					
PSE24-125-S		240 mVp-p	220 µF					
PSE12-150-S		120 mVp-p	3,500 µF			10ms @ 230VAC	130 - 215% of Iout max.	
PSE15-150-S		150 mVp-p	3,000 µF					
PSE24-150-S		240 mVp-p	2,200 µF					

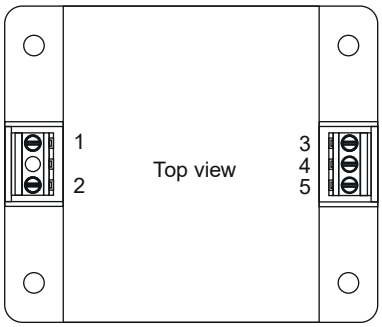
Encapsulated Power Supplies PSE-S Series

General Specifications

General Specifications			
Models	***10W***	***20/25W***	***50W***
Operating Temperature	-40 to 70°C [-40 to 158°F]		
Storage Temperature	-40 to 85°C [-40 to 185°F]		
Humidity	95% max. (non-condensing)		
Power Derating	High temperature: 2.5 %/ K above 50°C Low input voltage: 2%/ V below 100VAC	High temperature: 2.5 % /K above 50°C Low temperature: 2%/ V below -30°C Low input voltage: 2%/ V below 100VAC	High temperature: 2.5 % /K above 50°C Low input voltage: 2%/ V below 100VAC
Cooling System	Natural convection (20LFM)		
Altitude During Operation	5,000 m max. (according to IEC 62368-1) 2,000 m max. (according to IEC 60335-1)		
Short Circuit Protection	Continuous, automatic recovery		
Switching Frequency	35 - 75 kHz (PWM, PFM)	50 - 68 kHz (PWM, PFM)	55 - 90 kHz (PWM, PFM)
Protection Class	Reinforced insulation Class I & II		
Over Voltage Category	OVC II		
Working Voltage (rated)	254 VAC	311 VAC	342 VAC
Isolation Test Voltage	Input to Output, 60s; 4,000 VAC		
Leakage Current	Touch current 250 µA max.		
MTBF	450,000 h (MIL-HDBK-217F, ground benign)	400,000 h (MIL-HDBK-217F, ground benign)	300,000 h (MIL-HDBK-217F, ground benign)
Housing Material	Plastic resin (UL 94 V-0 rated)		
Potting Material	Silicone (UL 94 V-0 rated)		
Mounting Type	Chassis		
Connection Type	Screw terminal; torque: 0.3 N•m (3 kgfcm)		Screw terminal; torque: 0.2 N•m (2 kgfcm)
Shock	IEC 60068-2-27		
Vibration	IEC 60068-2-6 2g, 3 axis, 60 min, 10-500 Hz, 10 min/cycle		
Pollution Degree	PD 2		
Agency Approval	cURus File E198298 , CE, UKCA		

To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.

Wiring



Pinout	
Pin	Single
1	AC IN (N)
2	AC IN (L)
3	-Vout
4	NC
5	+Vout

NC: Not connected

Encapsulated Power Supplies PSE-S Series

EMC Specifications

EMC Specifications		
EMI Emissions	***Conducted Emissions***	EN 55032 class B (internal filter)
	Radiated Emissions	EN 550032 class B (internal filter)
	Harmonic Current Emissions	EN61000-3-2 class A
	Voltage Fluctuations & Flicker	Input to output 4.0 KVAC, Input to Ground 2.0 KVAC, Output to Ground 1.25 KVAC
EMS Immunity		EN 61000-6-2 (Generic Industrial) EN 55024 (IT Equipment) EN 55035 (Multimedia)
	Electrostatic Discharge	Air: EN 61000-4-2, ±8 kV, perf. criteria A
		Contact: EN 61000-4-2, ±4 kV, perf. criteria A
	RF Electromagnetic Field	EN 61000-4-3, 10 V/m, perf. criteria A
	EFT (Burst) / Surge	EN 61000-4-4, ±2 kV, perf. criteria A L to L: EN 61000-4-5, ±1 kV, perf. criteria A
	Conducted RF Disturbances	EN 61000-4-6, 10 Vrms, perf. criteria A
	PF Magnetic Field	Continuous: EN 61000-4-8, 30 A/m, perf. criteria A
	Voltage Dips & Interruptions	230 VAC / 50 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A 60%, 10 periods, perf. criteria A >95%, 0.5 periods, perf. criteria A >95%, 250 periods, perf. criteria B 100%, 0.5 periods, perf. criteria A 100%, 1 period, perf. criteria A 100%, 250 periods, perf. criteria B 115 VAC / 60 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A 60%, 10 periods, perf. criteria A >95%, 0.5 periods, perf. criteria A >95%, 250 periods, perf. criteria B 100%, 0.5 periods, perf. criteria A 100%, 1 period, perf. criteria A 100%, 250 periods, perf. criteria B

Safety Specifications

Safety Specifications		
Standards	***IT / Multimedia Equipment***	EN 62368-1 IEC 62368-1 UL 62368-1
	Household	EN 60335-1 IEC 60335-1
	Power Transformers	IEC 61558-1 IEC 61558-2-16

RHINO Encapsulated Power Supplies PSE Series

The PSE series are AC/DC switch mode power supplies encapsulated in an ultra-compact, low-profile housing. They are ideal for space limited applications and are easily screw mounted to a panel or equipment chassis or can be DIN rail mounted using the optional DIN rail mounting kit. The PSE series features a universal input from 120/240 VAC and single or dual outputs from 15 Watts up to 60 Watts (above 30 Watt, single output only).



Features

- Ultra compact, low profile plastic case
- Single or dual output models
- Screw terminal blocks
- Chassis mount or 35mm DIN rail mount with optional adapter
- Universal input 120/240 VAC, 47-440 Hz (60 Watt, 47-63 Hz)
- Double insulated - no external ground required
- UL508 listed, UL60950-1 recognized, CE marked
- Short circuit and overload protection
- DC on LED indicator
- 3-year warranty

Single Output Models 15 to 60 Watt						
Part Number	*Price*	*Drawing Link*	*Weight [lbs]*	*Output Power Max.*	*Output*	*Efficiency [Typ @ 115VAC]*
PSE05-115	$72.00	PDF	0.3	15W	5VDC / 3000mA	74%
PSE12-115	$71.00	PDF	0.3		12VDC / 1250mA	81%
PSE15-115	$71.00	PDF	0.3		15VDC / 1000mA	81%
PSE24-115	$71.00	PDF	0.3		24VDC / 625mA	83%
PSE05-130	$105.00	PDF	0.5	30W	5VDC / 6000mA	76%
PSE12-130	$105.00	PDF	0.5		12VDC / 2500mA	80%
PSE15-130	$105.00	PDF	0.5		15VDC / 2000mA	81%
PSE24-130	$105.00	PDF	0.5		24VDC / 1250mA	81%
PSE05-150	$127.00	PDF	0.8	51W	5.1 VDC / 10,000mA	76%
PSE12-160	$126.00	PDF	0.8	60W	12VDC / 5000mA	81%
PSE15-160	$126.00	PDF	0.8		15VDC / 4000mA	82%
PSE24-160	$126.00	PDF	0.8		24VDC / 2500mA	83%

Dual Output Models 15 to 30 Watt							
Part No.	*Price*	*Drawing Link*	*Weight [lbs]*	*Output Power Max.*	*Output 1*	*Output 2*	*Efficiency [Typ @ 115VAC]*
PSE12-215	$74.00	PDF	0.3	15W	+12VDC / 650mA	-12VDC / 650mA	82%
PSE15-215	$74.00	PDF	0.3		+15VDC / 500mA	-15VDC / 500mA	82%
PSE12-230	$108.00	PDF	0.5	30W	+12VDC / 1300mA	-12VDC / 1300mA	81%
PSE15-230	$108.00	PDF	0.5		+15VDC / 1000mA	-15VDC / 1000mA	82%

RHINO Encapsulated Power Supplies
PSE Series

Input Specifications		
Input Voltage	Nominal	120/240 VAC
	AC range [universal input]	85 - 264 VAC
	DC range	120 - 370 VDC [not for 60 Watt models]
Input Frequency	47 - 440Hz [47 - 63Hz for 60 Watt models]	
Input Current at Full Load (115VAC / 230VAC)	15 Watt models	300mA / 190mA typ.
	30 Watt models	550mA / 330mA typ.
	51/60 Watt models [typical for all]	1050mA / 670mA typ.
Input Current at No Load	15mA @ 115VAC & 20mA @ 230VAC typ.	
Inrush Current (< 2ms, cold start at 115VAC / 230VAC)	15 Watt models	15A / 30A
	30 Watt models	20A / 40A
	60 Watt models	30A / 50A
External Input Fuse Required (recommended value)	15 and 30 Watt models	1.5 A slow blow
	51/60 Watt models	3.0 A slow blow

Output Specifications				
Voltage Set Accuracy	w2%			
Regulation	Input variation	1% max.		
	Load variation	Single output models [10-100%]: 1% max. Dual output models balanced load [10-100%]: 2.5% max. Dual output models unbalanced load [20/100%]: 5.0% max.		
Minimum Load	Single and dual output models	10% of rated max. current		
Ripple and Noise (20MHz bandwidth)	5.0 VDC outputs	1.8% of Vout [mVpk-pk]		
	All other outputs	1.3% of Vout [mVpk-pk]		
Overload Protection by Current Limit	105% min. of nominal current, fold back, automatic recovery [long term overload condition may cause damage to the power supply]			
Max. Capacitive Load [µF]	***Output***	***Model Series***		
		PSE15	***PSE30***	***PSE60***
Single Output Models	5.0 VDC; 5.1 VDC	3900	8000	8000
	12 / 15 VDC	2200	3900	3900
	24VDC	1000	1500	1500
Dual Output Models	+/-12V; +/-15V	1500	1500	NA

RHINO Encapsulated Power Supplies
PSE Series

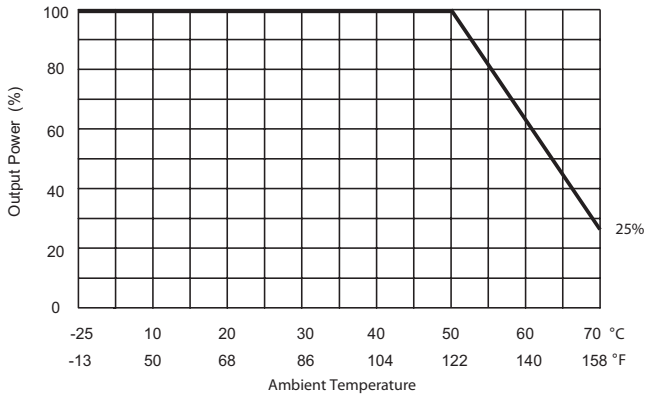
General Specifications					
	Standard/ Approval	Model Series			
		PSExx-x15	PSExx-x30	PSExx-150	PSExx-160
Operating Temperature	IEC/EN60950-1	-25 to 71°C [-13 to 159.8°F]		-10 to 40°C [14 to 104°F]	-10 to 50°C [14 to 122°F]
	UL508	-25 to 50°C [-13 to 122°F]		-10 to 40°C [14 to 104°F]	
Storage Temperature	-40 to 185°F [-40 to 85°C]				
Power Derating	3.75% per °C above +122°F [50°C] 2.5% per °C above +104°F [40°C] for PSE05-150				
Temperature Coefficient	0.02 %/°C				
Humidity (non-condensing)	95% rel. H max.				
Efficiency	78% typ.				
Switching Frequency	100kHz typ. [fixed]				
Isolation Voltage (60 sec.)	Input/Output	3,000VAC			
Isolation Resistance	Input/Output	100MΩ [@ 500VDC]			
Electromagnetic Compatibility (EMC), Emissions	EN 61000-6-3: 2007 EN61204-3: 2000, class A EN 55032, level B, FCC Part 15 level B				
Electromagnetic Compatibility (EMC), Immunity	EN61000-6-2: 2005 EN61204-3: 2000, class A				
	Electrostatic discharge ESD	EN61000-4-2 - 8kV / 4 kV, criteria B			
	RF field susceptibility	EN61000-4-3 - 10 V/m, criteria A			
	Electrical fast transient / burst immunity input	EN61000-4-4 - w2 kV, criteria B			
	Electrical fast transient / burst immunity output	EN61000-4-4 - w2 kV, criteria B			
	Surge immunity line - neutral	EN61000-4-5 - w1 kV, criteria B			
	Surge immunity output	EN61000-4-5 - w0.5 kV, criteria B			
	Immunity to conducted RF disturbances	EN61000-4-6 - 10 V, criteria B			
	Mains voltage dips and interruptions	EN61000-4-11 - 30% 10ms, criteria B, 60% 100ms, criteria C, 95% 5000ms, criteria C			
Protection Class II	to IEC/EN 60536				
Safety Standards	Information technology equipment	IEC/EN 60950-1, UL 60950-1			
Agency Approvals	UL and cUL for UL 508, Listed File No. E197592; UL and cUL for UL 60950-1, Recognized File No. E198298; CE				
RoHS Compliant	Yes				
Vibration	None				
Shock	None				
Reliability / Calculated MTBF (MIL-HDBK-217F, @ +25°C, ground benign)	15 Watt Models	>280,000 hours			
	30 Watt Models	>250,000 hours			
	60 Watt Models	>125,000 hours			
Casing Material	Plastic resin + fiberglass [UL 94V-0 rated]				
Mounting Screw Torque Specifications	4~5 in-lb [0.45~0.56 Nm]				

Note: All specifications valid at nominal input voltage, full load and +25°C [+77°F] after warm-up time unless otherwise stated.

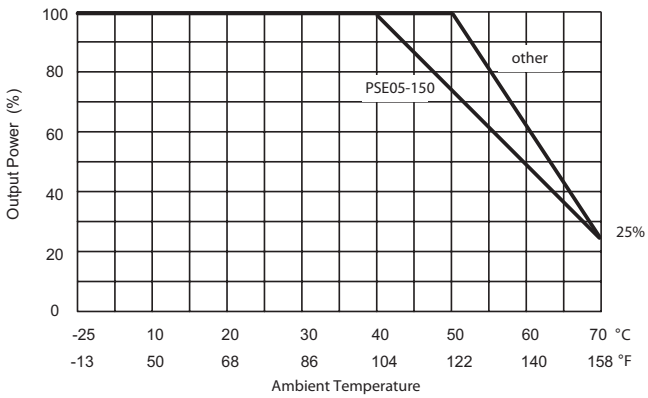
RHINO Encapsulated Power Supplies PSE Series

Derating Curves

PSE 15 & 30W Models



PSE 51 & 60W Models



PSE 15W models

Wiring Connection		
Pin	***Single***	***Dual (12V, 15V)***
1	AC[N] - AC Neutral	
2	AC[L] - AC Line	
3	NC	
4	-Vout	
5	NC	Common
6	+Vout	
7	NC	

M3 x 0.5 mm screw size, Typ

PSE 30W models

Wiring Connection		
Pin	***Single***	***Dual (12V, 15V)***
1	AC[N] - AC Neutral	
2	AC[L] - AC Line	
3	+Vout	
4	NC	
5	-Vout	Common
6	NC	
7	NC	-Vout

M3 x 0.5 mm screw size, Typ

PSE 60W models

Wiring Connection	
Pin	***Function***
1	AC[N] - AC Neutral
2	AC[L] - AC Line
3	NC
4	+Vout
5	NC
6	-Vout
7	NC

#4 screw size, Typ

Mounting Brackets

35mm DIN Rail Mounting Bracket				
Part Number	***Price***	***Drawing Link***	***Weight (lbs)***	***Description***
PSE-BRKT-1	$14.00	PDF	0.2	DIN rail mounting bracket for 15W PSE models
PSE-BRKT-2	$14.00	PDF	0.2	DIN rail mounting bracket for 30W-60W PSE models

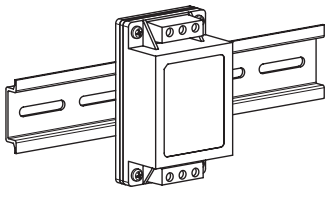
Note: Kit contains interface plate, DIN rail clip and necessary screws.

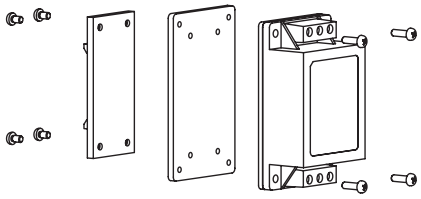


PSE-BRKT-1



PSE-BRKT-2





RHINO PRO DIN Rail Power Supplies PSH Series

High Efficiency Power Supplies

AutomationDirect's RHINO PRO PSH series DIN rail power supplies offer best-in-class efficiency, temperature performance, and agency approvals for extreme conditions. With efficiencies of up to 94% and an operating temperature range of −25°C to 70°C, RHINO PRO PSH supplies will keep going when other supplies won't. There are 10 models, with output power from 80W to 480W and output voltages from 12 to 48 VDC. They feature universal 120/240 VAC input voltage, adjustable DC output, DC-OK LED indication, and output current limitation.

Well suited for harsh environments and hazardous locations, the rugged aluminum and stainless steel housings easily install with included 35mm DIN rail mounting adapters. The DIN rail clips can be moved to the side of the power supply for side mounting in flat panels. These high-quality power supplies are backed by a 5-year warranty, UL 508 and hazardous location listed, UL 60950 recognized, ATEX certified, CE marked and RoHS compliant.

UL508 UL60950-1

Features

- 12, 24 and 48 VDC models
- −40°C start-up on all models
- ATEX & UL Class 1, Div. 2
- Battery control module available
- Alternative side-mounting for flat panels
- Very high efficiency, up to 94%
- Back power immunity
- 150% peak current for 4 sec.
- Operating temperature range: −25 to +70°C max. [Full load to 60°C]
- Adjustable output voltage
- DC-OK indicator
- Short circuit and overload protection
- 5-year warranty



PSH-xx-080



PSH-xx-120



PSH-xx-240



PSH-xx-480

DIN Rail Power Supplies					
Part Number	*Price*	*Drawing Link*	*Output Voltage*	*Maximum Output Power*	*Efficiency [Typ @ 115VAC]*
PSH-12-080	$138.00	PDF	12V	80W	90%
PSH-24-080	$129.00	PDF	24V		91%
PSH-48-080	$125.00	PDF	48V		91%
PSH-12-120	$183.00	PDF	12V	120W	91%
PSH-24-120	$166.00	PDF	24V		92%
PSH-48-120	$182.00	PDF	48V		93%
PSH-24-240	$218.00	PDF	24V	240W	93%
PSH-48-240	$231.00	PDF	48V		94%
PSH-24-480	$327.00	PDF	24V	480W	93%
PSH-48-480	$343.00	PDF	48V		94%

RHINO PRO PSH-xx-080 Power Supplies

Technical Specifications				
Part Number		***PSH-12-080***	***PSH-24-080***	***PSH-48-080***
Input (AC)				
Nominal Input Voltage		100–240VAC		
Nominal Input Current		2–0.9 A		
Operational Input Voltage Range		85–264VAC		
Input Voltage Frequency Range		45–65Hz		
Inrush Current (115/230 VAC)		15/30A		
Standby Power Consumption		0.9/1.45 W [115/230 VAC]		
Active Power Factor Correction (PFC)		0.48/0.48 [115/230 VAC]		
Harmonic limits – acc. EN 61000-3-2		Class A		
Circuit Breaker Rating / Characteristic		6-16 A /B, C [IEC]; 20 A /B, C[USA]		
Output (DC)				
Max. Output Power		80W		
Output Voltage		12V	24V	48V
Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators)		6.7 A / 10A	3.4 A / 5A	1.7 A / 2.5 A
Output Voltage Adjustment Range		11.8–15V	23.5–28V	47.5–56V
Typical Efficiency (@ 115/230 VAC)		90/88 %	91/89 %	91/89 %
Regulation ***Input Variation*** ***Load Variation***		0.1 % max. [10–90 %] 0.5 % max.		
Output Power Derating - Temperature		2%/K above 60°C		
Output Power Derating - Input Voltage		3%/V below 90VAC		
Hold-up time		20/160ms min. [115/230 VAC]		
Start-up time		2s max.		
Ripple and Noise (20MHz bandwidth) (Note 1)		100mVp-p max.	100mVp-p max.	200mVp-p max.
Output Overvoltage Protection (OVP) (Note 2)		16–19V	32–35V	56–60V
Power Back Immunity (Note 3)		< OVP level		
Operation ***Nominal Operation*** ***Peak Power Operation*** ***Constant Current (CC)***		100% of Iout nominal 105–150% of Iout nominal 155% of Iout nominal		
Duty Cycle (for peak and cc mode) (Note 4) ***Threshold*** ***CC or Peak Operation Timer*** ***Normal Operation / Off Period***		> 105 % 4s max. [switch off] < 6s typ [automatic restart after switch off or peak and cc operation timer reset]		
Short Circuit Protection		Switch off after 4s delay, automatic restart (Note 4)		
DC OK Signal	***Threshold for Vout***	ON: > 10.9 V typ. OFF :< 10.7 V typ.	ON: > 22.5 V typ. OFF:< 21.5 V typ.	ON: > 45V typ. OFF:< 43V typ.
	DC ON	Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED		
	DC OFF	Relay contact open, max 30V		

Notes:

1. Output voltage can be adjusted as indicated. However, output power has to be maintained at nominal value. This means the output nominal current has to be reduced in accordance with the increase of output voltage.

2. In case of an internal error, a second voltage regulation loop keeps the output voltage at a safe level, and the power supply turns off and restarts after 10 seconds.

3. When external voltage is supplied above set output voltage and below OVP threshold, the power supply will function normally without switch off or destruction, even if external voltage is applied continuously.

4. In case of overload or short circuit, the unit switches the output voltage off after 4 seconds and tries to restart every 10 seconds.

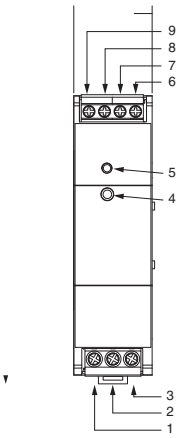
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RHINO PRO PSH-xx-080 Power Supplies

Technical Specification (continued)			
Part Number	***PSH-12-080***	***PSH-24-080***	***PSH-48-080***
General Data			
Weight g [oz]	367 [12.95]		
Leakage Current (max.)	0.75 mA		
Network Configuration	TN-S, TN-C, TT, IT		
Enclosure Material (Chassis/Cover)	Aluminum / Stainless Steel		
Cooling	Convection cooling, no internal fan		
Over Temperature Protection	Switch off at over temperature		
Isolation Voltage	Input/Output 4250VDC Input/Chassis 1500VDC Output/Chassis 750VDC		
Creepage Clearance	Input/Output 8mm Input/Chassis 4mm Output/Chassis 1.5 mm		
Safety / Environmental			
Surrounding Ambient Temperature Range	-40 to 70°C [-40 to 158°F]		
Temperature Coefficient	0.02 %/K		
Humidity	5–95%, non-condensing		
Storage Temperature	-40 to 85°C [-40 to 185°F]		
Maximum Altitude	2000m		
Safety Standards	Information technology equipment IEC/EN 60950-1, UL 60950-1 CSA 22.2 No 60950-1-03, File No. E198298 Safety low voltage switchgear and controlgear UL 508, File No. E197592 Process Control Equipment Haz Loc, File No. E502478 ATEX ⟨Ex⟩ II 3 G Ex ec nC IIC T4 Gcw		
MTBF (acc. to IEC 61709 at 25°C)	> 1,950,000 hours		
Protection Class	Class I		
Degree of Protection	IP20		
Electromagnetic compatibility (EMC)			
Emissions	EN 61000-6-3, EN 61204-3		
Conducted RI Suppression On Input	EN 55032, EN 55011 class B,		
Radiated RI Suppression	EN 55032, EN 55011 class B,		
Immunity	EN 61000-6-2, EN 61204-3		
Railway Applications Signaling Apparatus	EN 50121-4		
Railway Applications Rolling Stock Apparatus	EN 50121-3-2		
Electrostatic Discharge (ESD)	IEC/EN 61000-4-24 kV/8 kV, criteria A		
Radiated RF Field Immunity	IEC/EN 61000-4-310 V/m, criteria A		
Electrical Fast Transient / Burst Immunity	IEC/EN 61000-4-42 kV, criteria B		
Surge Immunity	IEC/EN 61000-4-51 kV/2 kV, criteria B		
Immunity To Conducted RF Disturbances	IEC/EN 61000-4-610 V, criteria A		
Power Frequency Field Immunity	IEC/EN 61000-4-830 A/m, criteria A		
Mains Voltage Dips And Interruptions	IEC/EN 61000-4-11, criteria B/C		
Voltage Sag Immunity	SEMI F47230VAC, criteria B/C		
Environment			
Railway Applications Shock and Vibration	According EN 61373		
Vibration Acc. IEC 60068-2-6-3	3 axis, 2 g sine sweep, 10–55Hz, 11 oct/min		
Shock Acc. IEC 60068-2-27	3 axis, 25g half sine, 11ms		
Approvals	CE CB Scheme c UL us UL508 c UL us UL60950-1 ⟨Ex⟩		

RHINO PRO PSH-xx-080 Power Supplies

Fig. 1





Identification of Features (Fig.1)	
1	Input Terminal L
2	Input Terminal N
3	Input Terminal GND
4	Output Voltage adjustment potentiometer
5	DC ON LED
6/7	DC OK Contact
8	Output Connection Terminal +
9	Output Connection Terminal –

Fig. 2

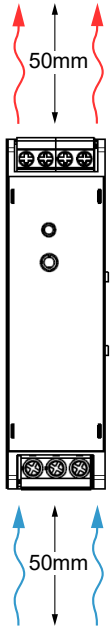


Fig. 3

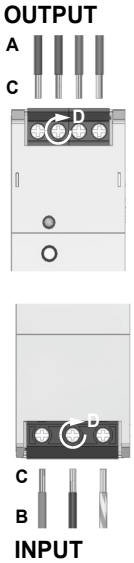


Fig. 4

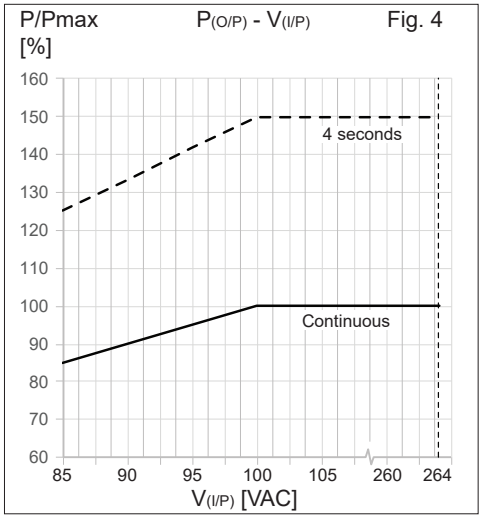
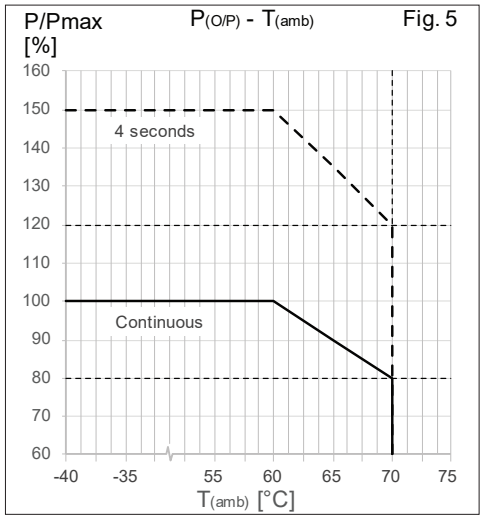


Fig. 5



Wiring Specifications (Fig. 3)		
A	Wire Size, Output	18–10 AWG
B	Wire Size, Input	18–10 AWG
C	Strip Length	10mm [0.39 in]
D	Tightening Torque	0.7 N·m [6.2 lb·in]

RHINO PRO PSH-xx-120 Power Supplies

Technical Specifications				
Part Number		**PSH-12-120**	**PSH-24-120**	**PSH-48-120**
Input (AC)				
Nominal Input Voltage		100–240 VAC		
Nominal Input Current		1.5–0.78 A		
Operational Input Voltage Range		85–264VAC		
Input Voltage Frequency Range		45–65Hz		
Inrush Current (115/230 VAC)		15/30A		
Standby Power Consumption		2.2/2.2 W [115/230 VAC]		
Active Power Factor Correction (PFC)		0.97/0.8 [115/230 VAC]		
Harmonic limits – acc. EN 61000-3-2		Class A, D		
Circuit Breaker Rating / Characteristic		6-16 A /B, C [IEC]; 20 A /B, C [USA]		
Output (DC)				
Max. Output Power		120W		
Output Voltage		12V	24V	48V
Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators)		10A / 15A	5A / 7.5 A	2.5 A / 3.75 A
Output Voltage Adjustment Range		11.8–15 V	23.5–28 V	47.5–56 V
Typical Efficiency (@ 115/230 VAC)		91/93 %	92/94 %	93/94 %
Regulation **Input Variation** **Load Variation**		0.1 % max. [10–90 %] 0.5 % max.		
Output Power Derating - Temperature		2%/K above 60°C, refer to Fig. 5		
Output Power Derating - Input Voltage		3%/V below 90 VAC, refer to Fig. 4		
Hold-up time		20ms min.		
Start-up time		2s max.		
Ripple and Noise (20MHz bandwidth) (Note 1)		100mVp-p max.	100mVp-p max.	200mVp-p max.
Output Overvoltage Protection (OVP) (Note 2)		16–19V	32–35V	56–60V
Power Back Immunity (Note 3)		< OVP level		
Operation **Nominal Operation** **Peak Power Operation** **Constant Current (CC)**		100% of Iout nominal 105–150% of Iout nominal 155% of Iout nominal		
Duty Cycle (for peak and cc mode) (Note 4) **Threshold** **CC or Peak Operation Timer** **Normal Operation / Off Period**		> 105 % 4s max. [switch off] < 10s typ [automatic restart after switch off or peak and cc operation timer reset]		
Short Circuit Protection		Switch off after 4s delay, automatic restart [Note 4]		
DC OK Signal	**Threshold for Vout**	ON: > 10.9 V typ. OFF:< 10.7 V typ.	ON: > 22.5 V typ. OFF:< 21.5 V typ.	ON: > 45V typ. OFF:< 43V typ.
	DC ON	Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED		
	DC OFF	Relay contact open, max 30V		

Notes:

1. Output voltage can be adjusted as indicated. However, output power has to be maintained at nominal value. This means the output nominal current has to be reduced in accordance with the increase of output voltage.

2. In case of an internal error, a second voltage regulation loop keeps the output voltage at a safe level, and the power supply turns off and restarts after 10 seconds.

3. When external voltage is supplied above set output voltage and below OVP threshold, the power supply will function normally without switch off or destruction, even if external voltage is applied continuously.

4. In case of overload or short circuit, the unit switches the output voltage off after 4 seconds and tries to restart every 10 seconds.

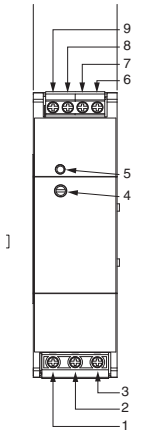
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RHINO PRO PSH-xx-120 Power Supplies

Technical Specifications (continued)			
Part Number	**PSH-12-120**	**PSH-24-120**	**PSH-48-120**
General Data			
Weight g [oz]	461 [16.26]		
Leakage Current (max.)	0.9 mA		
Network Configuration	TN-S, TN-C, TT, IT		
Enclosure Material (Chassis/Cover)	Aluminum / Stainless Steel		
Cooling	Convection cooling, no internal fan		
Over Temperature Protection	Switch off at over temperature		
Isolation Voltage	Input/Output 4250VDC Input/Chassis 1500VDC Output/Chassis 750VDC		
Creepage Clearance	Input/Output 8mm Input/Chassis 4mm Output/Chassis 1.5 mm		
Safety / Environmental			
Surrounding Ambient Temperature Range	-40 to 70°C [-40 to 158°F]		
Temperature Coefficient	0.02 %/K		
Humidity	5–95%, non-condensing		
Storage Temperature	-40 to 85°C [-40 to 185°F]		
Maximum Altitude	2000m		
Safety Standards	Information technology equipment IEC/EN 60950-1, UL 60950-1 CSA 22.2 No 60950-1-03, File No. E198298 Safety low voltage switchgear and controlgear UL 508, File No. E197592 Process Control Equipment Haz Loc, File No. E502478 ATEX ⟨Ex⟩ II 3 G Ex ec nC IIC T4 Gcw		
MTBF (acc. to IEC 61709 at 25°C)	> 1,450,000 hrs		
Protection Class	Class I		
Degree of Protection	IP20		
Electromagnetic compatibility (EMC)			
Emissions	EN 61000-6-3, EN 61204-3		
Conducted RI Suppression On Input	EN 55032, EN 55011 class B,		
Radiated RI Suppression	EN 55032, EN 55011 class B,		
Immunity	EN 61000-6-2, EN 61204-3		
Railway Applications Signaling Apparatus	EN 50121-4		
Railway Applications Rolling Stock Apparatus	EN 50121-3-2		
Electrostatic Discharge (ESD)	IEC/EN 61000-4-24 kV/8 kV , criteria A		
Radiated RF Field Immunity	IEC/EN 61000-4-310 V/m , criteria A		
Electrical Fast Transient / Burst Immunity	IEC/EN 61000-4-42 kV , criteria B		
Surge Immunity	IEC/EN 61000-4-51 kV/2 kV , criteria B		
Immunity To Conducted RF Disturbances	IEC/EN 61000-4-610 V , criteria A		
Power Frequency Field Immunity	IEC/EN 61000-4-830 A/m , criteria A		
Mains Voltage Dips And Interruptions	IEC/EN 61000-4-11criteria B/C		
Voltage Sag Immunity	SEMI F47 230VAC, criteria B/C		
Environment			
Railway Applications Shock and Vibration	According EN 61373		
Vibration Acc. IEC 60068-2-6-3	3 axis, 2g sine sweep, 10–55Hz, 11 oct/min		
Shock Acc. IEC 60068-2-27	3 axis, 25g half sine, 11ms		
Approvals	CE CB Scheme c UL us UL508 c UL us UL60950-1 Ex		

RHINO PRO PSH-xx-120 Power Supplies

Fig. 1





Identification of Features (Fig.1)	
1	Input Terminal L
2	Input Terminal N
3	Input Terminal GND
4	Output Voltage adjustment potentiometer
5	DC ON LED
6/7	DC OK Contact
8	Output Connection Terminal +
9	Output Connection Terminal –

Fig. 2

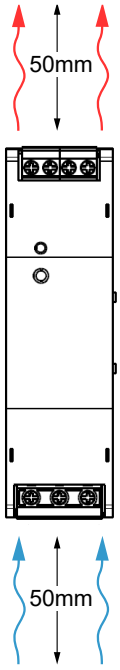
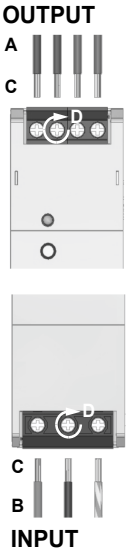


Fig. 3



Wiring Specifications (Fig. 3)		
A	Wire Size, Output	18–10AWG
B	Wire Size, Input	18–10AWG
C	Strip Length	10mm [0.39 in]
D	Tightening Torque	0.7 N·m [6.2 lb·in]

Fig. 4 $P_{(O/P)}$ - $V_{(I/P)}$

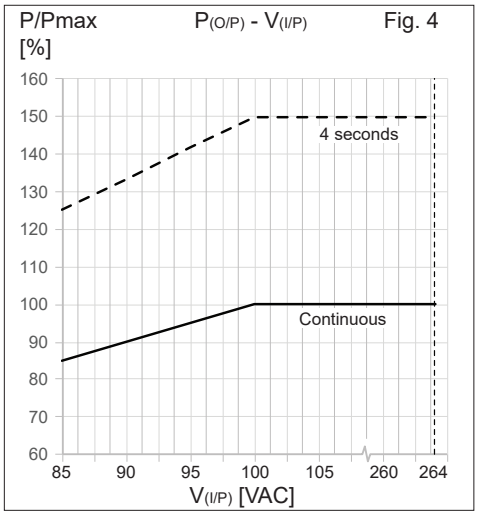
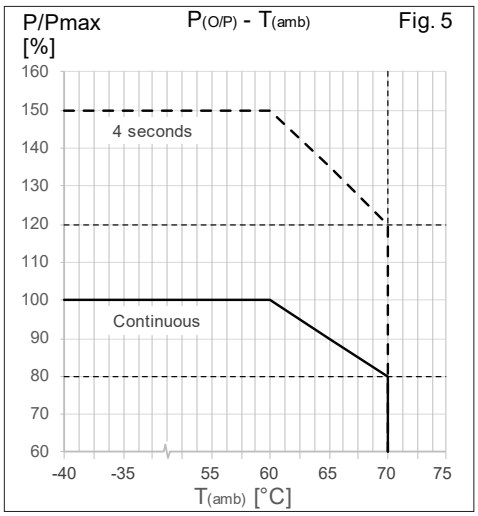


Fig. 5 $P_{(O/P)}$ - $T_{(amb)}$



RHINO PRO PSH-xx-240 Power Supplies

Technical Specifications			
		PSH-24-240	PSH-48-240
Input (AC)			
Nominal Input Voltage		100–240 VAC	
Nominal Input Current		2.89–1.27 A	
Operational Input Voltage Range		85–264VAC	
Input Voltage Frequency Range		45–65Hz	
Inrush Current (115/230 VAC)		15/30A	
Standby Power Consumption		2.3/2.3 W [115/230 VAC]	
Active Power Factor Correction (PFC)		0.98/0.92 [115/230 VAC]	
Harmonic limits – acc. EN 61000-3-2		Class A, D	
Circuit Breaker Rating / Characteristic		6-16 A /B, C [IEC]; 20 A /B, C [USA]	
Output (DC)			
Max. Output Power		240W	
Output Voltage		24V	48V
Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators)		10A / 15A	5A / 7.5 A
Output Voltage Adjustment Range		23.5–28 V	47.5–56 V
Typical Efficiency (@ 115/230VAC)		93/95 %	94/95 %
Regulation *Input Variation* *Load Variation*		0.1 % max. [10–90 %] 0.5 % max.	
Output Power Derating - Temperature		2%/K above 60°C, refer to Fig. 5	
Output Power Derating - Input Voltage		3%/V below 90 VAC, refer to Fig. 4	
Hold-up time		20 ms min.	
Start-up time		2s max.	
Ripple and Noise (20MHz bandwidth) (Note 1)		100 mVp-p max.	200 mVp-p max.
Output Overvoltage Protection (OVP) (Note 2)		32–35V	56–60V
Power Back Immunity (Note 3)		< OVP level	
Operation *Nominal Operation* *Peak Power Operation* *Constant Current (CC)*		100% of Iout nominal 105–150% of Iout nominal 155% of Iout nominal	
Duty Cycle (for peak and cc mode) (Note 4) *Threshold* *CC or Peak Operation Timer* *Normal Operation / Off Period*		> 105 % 4s max. [switch off] < 10s typ [automatic restart after switch off or peak and cc operation timer reset]	
Short Circuit Protection		Switch off after 4s delay, automatic restart (Note 4)	
DC OK Signal	*Threshold for Vout*	ON: > 22.5 V typ. OFF: < 21.5 V typ.	ON: > 45V typ. OFF: < 43V typ.
	DC ON	Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	
	DC OFF	Relay contact open, max 30V	

Notes:

1. Output voltage can be adjusted as indicated. However, output power has to be maintained at nominal value. This means the output nominal current has to be reduced in accordance with the increase of output voltage.

2. In case of an internal error, a second voltage regulation loop keeps the output voltage at a safe level, and the power supply turns off and restarts after 10 seconds.

3. When external voltage is supplied above set output voltage and below OVP threshold, the power supply will function normally without switch off or destruction, even if external voltage is applied continuously.

4. In case of overload or short circuit, the unit switches the output voltage off after 4 seconds and tries to restart every 10 seconds.

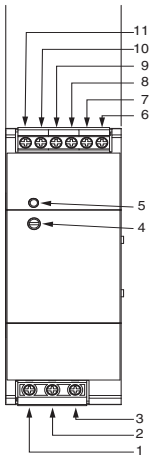
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RHINO PRO PSH-xx-240 Power Supplies

Technical Specifications (continued)		
	PSH-24-240	PSH-48-240
General Data		
Weight g [oz]	643 [22.68]	
Leakage Current (max.)	1.2 mA	
Network Configuration	TN-S, TN-C, TT, IT	
Enclosure Material (Chassis/Cover)	Aluminum / Stainless Steel	
Cooling	Convection cooling, no internal fan	
Over Temperature Protection	Switch off at over temperature	
Isolation Voltage	Input/Output 4250VDC Input/Chassis 1500VDC Output/Chassis 750VDC	
Creepage Clearance	Input/Output 8mm Input/Chassis 4mm Output/Chassis 1.5 mm	
Safety / Environmental		
Surrounding Ambient Temperature Range	-40 to 70°C [-40 to 158°F]	
Temperature Coefficient	0.02 %/K	
Humidity	5–95%, non-condensing	
Storage Temperature	-40 to 85°C [-40 to 185°F]	
Maximum Altitude	2000m	
Safety Standards	Information technology equipment IEC/EN 60950-1, UL 60950-1 CSA 22.2 No 60950-1-03, File No. E198298 Safety low voltage switchgear and controlgear UL 508, File No. E197592 Process Control Equipment Haz Loc, File No. E502478 ATEX ⟨Ex⟩ II 3 G Ex ec nC IIC T4 Gcw	
MTBF (acc. to IEC 61709 at 25°C)	> 1,300,000 hrs	
Protection Class	Class I	
Degree of Protection	IP20	
Electromagnetic compatibility (EMC)		
Emissions	EN 61000-6-3, EN 61204-3	
Conducted RI Suppression On Input	EN 55032, EN 55011 class B,	
Radiated RI Suppression	EN 55032, EN 55011 class B,	
Immunity	EN 61000-6-2, EN 61204-3	
Railway Applications Signaling Apparatus	EN 50121-4	
Railway Applications Rolling Stock Apparatus	EN 50121-3-2	
Electrostatic Discharge (ESD)	IEC/EN 61000-4-24 kV/8 kV , criteria A	
Radiated RF Field Immunity	IEC/EN 61000-4-310 V/m , criteria A	
Electrical Fast Transient / Burst Immunity	IEC/EN 61000-4-42 kV , criteria B	
Surge Immunity	IEC/EN 61000-4-51 kV/2 kV , criteria B	
Immunity To Conducted RF Disturbances	IEC/EN 61000-4-610 V , criteria A	
Power Frequency Field Immunity	IEC/EN 61000-4-830 A/m , criteria A	
Mains Voltage Dips And Interruptions	IEC/EN 61000-4-11criteria B/C	
Voltage Sag Immunity	SEMI F47 230VAC, criteria B/C	
Environment		
Railway Applications Shock and Vibration	According EN 61373	
Vibration Acc. IEC 60068-2-6-3	3 axis, 2g sine sweep, 10–55Hz, 11 oct/min	
Shock Acc. IEC 60068-2-27	3 axis, 25g half sine, 11ms	
Approvals	CE CB Scheme c UL us UL508 c UL us UL60950-1 ⟨Ex⟩	

RHINO PRO PSH-xx-240 Power Supplies

Fig. 1





Identification of Features (Fig.1)	
1	Input Terminal L
2	Input Terminal N
3	Input Terminal GND
4	Output Voltage adjustment potentiometer
5	DC ON LED
6/7	DC OK Contact
8	Output Connection Terminal +
9	Output Connection Terminal +
10	Output Connection Terminal –
11	Output Connection Terminal –

Fig. 2

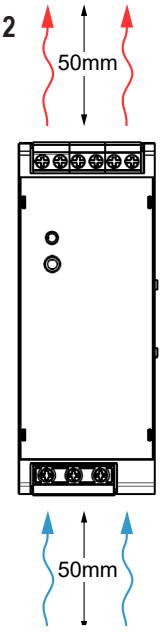


Fig. 3

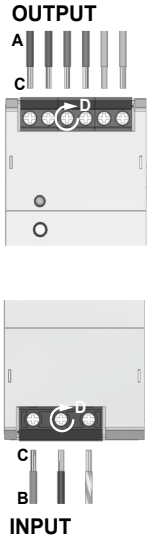


Fig. 4

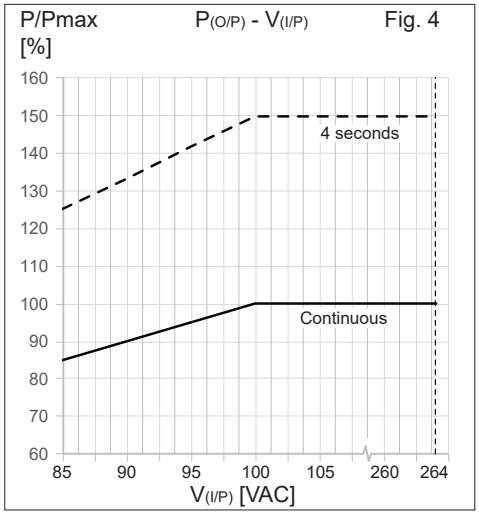
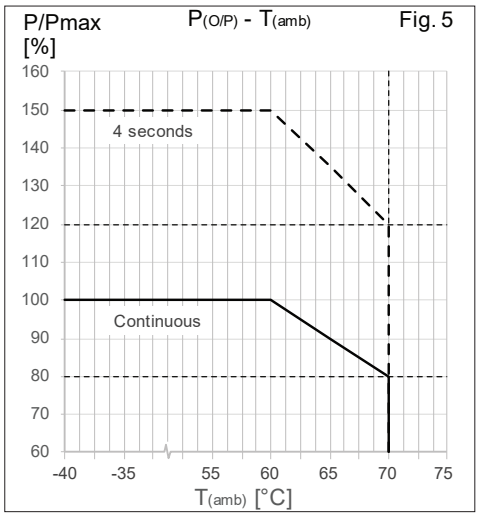


Fig. 5



Wiring Specifications (Fig. 3)		
A	Wire Size, Output	16–10AWG
B	Wire Size, Input	18–10AWG
C	Strip Length	10mm [0.39 in]
D	Tightening Torque	0.7 N·m [6.2 lb·in]

RHINO PRO PSH-xx-480 Power Supplies

Technical Specifications			
Part Number		***PSH-24-480***	***PSH-48-480***
Input (AC)			
Nominal Input Voltage		100–240 VAC	
Nominal Input Current		5.8–2.5 A	
Operational Input Voltage Range		85–264VAC	
Input Voltage Frequency Range		45–65Hz	
Inrush Current (115/230 VAC)		15/30A	
Standby Power Consumption		4.8/3.8 W [115/230 VAC]	
Active Power Factor Correction (PFC)		0.99/0.97[115/230 VAC]	
Harmonic limits – acc. EN 61000-3-2		Class A, D	
Circuit Breaker Rating / Characteristic		6-16 A /B, C[IEC]; 20 A /B, C [USA]	
Output (DC)			
Max. Output Power		480W	
Output Voltage		24V	48V
Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators)		20A / 30A	10A / 15A
Output Voltage Adjustment Range		23.5–28 V	47.5–56 V
Typical Efficiency (@ 115/230 VAC)		93/95 %	94/95 %
Regulation	***Input Variation*** ***Load Variation***	0.1 % max. [10–90 %] 0.5 % max.	
Output Power Derating - Temperature		2%/K above 60°C, refer to Fig. 5	
Output Power Derating - Input Voltage		3%/V below 90 VAC, refer to Fig. 4	
Hold-up time		20ms min.	
Start-up time		2s max.	
Ripple and Noise (20MHz bandwidth) (Note 1)		100 mVp-p max.	200 mVp-p max.
Output Overvoltage Protection (OVP) (Note 2)		32–35V	56–60V
Power Back Immunity (Note 3)		< OVP level	
Operation	***Nominal Operation*** ***Peak Power Operation*** ***Constant Current (CC)***	100% of Iout nominal 105–150% of Iout nominal 155% of Iout nominal	
Duty Cycle (for peak and cc mode) (Note 4) ***Threshold*** ***CC or Peak Operation Timer*** ***Normal Operation / Off Period***		> 105 % 4s max. [switch off] < 10s typ [automatic restart after switch off or peak and cc operation timer reset]	
Short Circuit Protection		Switch off after 4s delay, automatic restart (Note 4)	
DC OK Signal	***Threshold for Vout***	ON: > 22.5 V typ. OFF: < 21.5 V typ.	ON: > 45V typ. OFF: < 43V typ.
	DC ON	Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	
	DC OFF	Relay contact open, max 30V	

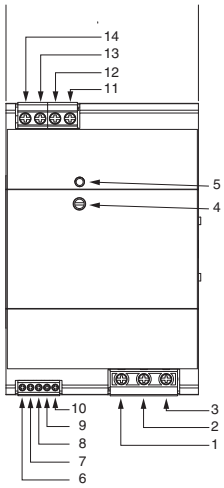
1. Output voltage can be adjusted as indicated. However, output power has to be maintained at nominal value. This means the output nominal current has to be reduced in accordance with the increase of output voltage.
2. In case of an internal error, a second voltage regulation loop keeps the output voltage at a safe level, and the power supply turns off and restarts after 10 seconds.
3. When external voltage is supplied above set output voltage and below OVP threshold, the power supply will function normally without switch off or destruction, even if external voltage is applied continuously.
4. In case of overload or short circuit, the unit switches the output voltage off after 4 seconds and tries to restart every 10 seconds.
Continued on next page.

RHINO PRO PSH-xx-480 Power Supplies

Technical Specifications (continued)		
Part Number	***PSH-24-480***	***PSH-48-480***
General Data		
Weight g [oz]	1018 [35.91]	
Leakage Current (max.)	2.3 mA	
Network Configuration	TN-S, TN-C, TT, IT	
Enclosure Material (Chassis/Cover)	Aluminum / Stainless Steel	
Cooling	Convection cooling, no internal fan	
Over Temperature Protection	Switch off at over temperature	
Isolation Voltage	Input/Output 4250VDC Input/Chassis 1500VDC Output/Chassis 750VDC	
Creepage Clearance	Input/Output 8mm Input/Chassis 4mm Output/Chassis 1.5 mm	
Remote On/Off	The unit can be controlled by external relay contact or open collector signal.	
Contact Rating	Open: 15V; leakage current max 100µA Close: 0.3 V; max drop at 15mA	
Safety / Environmental		
Surrounding Ambient Temperature Range	-40 to 70°C [-40 to 158°F]	
Temperature Coefficient	0.02 %/K	
Humidity	5–95%, non-condensing	
Storage Temperature	-40 to 85°C [-40 to 185°F]	
Maximum Altitude	2000m	
Safety Standards	Information technology equipment IEC/EN 60950-1, UL 60950-1 CSA 22.2 No 60950-1-03, File No. E198298 Safety low voltage switchgear and controlgear UL 508, File No. E197592 Process Control Equipment Haz Loc, File No. E502478 ATEX ⟨Ex⟩ II 3 G Ex ec nC IIC T4 Gcw	
MTBF (acc. to IEC 61709 at 25°C)	> 1,000,000 hrs	
Protection Class	Class I	
Degree of Protection	IP20	
Electromagnetic compatibility (EMC)		
Emissions	EN 61000-6-3, EN 61204-3	
Conducted RI Suppression On Input	EN 55032, EN 55011 class B,	
Radiated RI Suppression	EN 55032, EN 55011 class B,	
Immunity	EN 61000-6-2, EN 61204-3	
Railway Applications Signaling Apparatus	EN 50121-4	
Railway Applications Rolling Stock Apparatus	EN 50121-3-2	
Electrostatic Discharge (ESD)	IEC/EN 61000-4-2 4 kV/8 kV, criteria A	
Radiated RF Field Immunity	IEC/EN 61000-4-3 10 V/m, criteria A	
Electrical Fast Transient / Burst Immunity	IEC/EN 61000-4-4 2 kV, criteria B	
Surge Immunity	IEC/EN 61000-4-5 1 kV/2 kV, criteria B	
Immunity To Conducted RF Disturbances	IEC/EN 61000-4-6 10 V, criteria A	
Power Frequency Field Immunity	IEC/EN 61000-4-8 30 A/m, criteria A	
Mains Voltage Dips And Interruptions	IEC/EN 61000-4-11 criteria B/C	
Voltage Sag Immunity	SEMI F47 230VAC, criteria B/C	
Environment		
Railway Applications Shock and Vibration	According EN 61373	
Vibration Acc. IEC 60068-2-6-3	3 axis, 2g sine sweep, 10–55Hz, 11 oct/min	
Shock Acc. IEC 60068-2-27	3 axis, 25g half sine, 11ms	
Approvals	CE CB Scheme c UL us UL508 c UL us UL60950-1 ⟨Ex⟩	

RHINO PRO PSH-xx-480 Power Supplies

Fig. 1

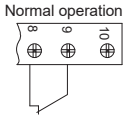




Identification of Features (Fig.1)	
1	Input Terminal L
2	Input Terminal N
3	Input Terminal GND
4	Output Voltage adjustment potentiometer
5	DC ON LED
6/7	DC OK Contact
8–10	Remote On/Off
11	Output Connection Terminal –
12	Output Connection Terminal –
13	Output Connection Terminal +
14	Output Connection Terminal +

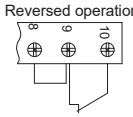
Remote On/Off

Normal operation



ON = open
OFF = closed

Reversed operation



ON = closed
OFF = open

Fig. 4

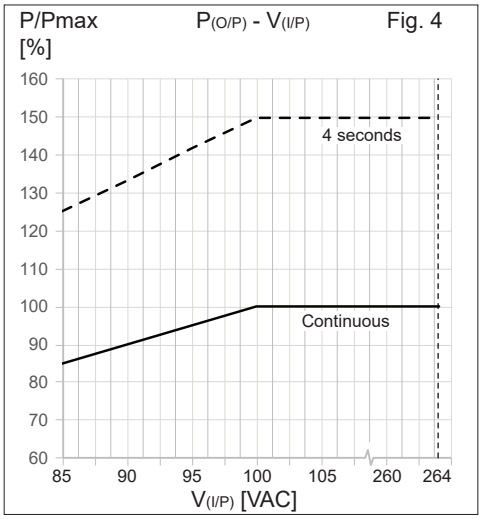


Fig. 2

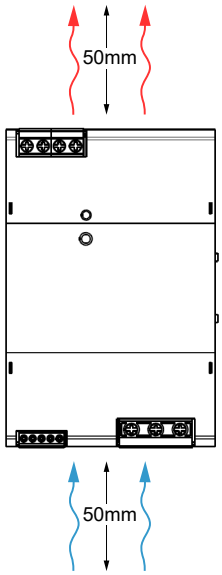
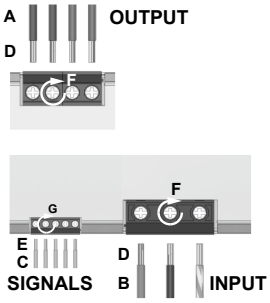
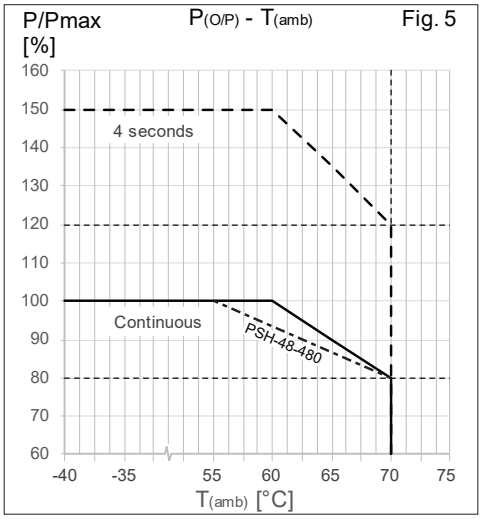


Fig. 3



Wiring Specifications (Fig. 3)		
A	Wire Size, Output	12–10AWG
B	Wire Size, Input	18–10AWG
C	Wire Size, Signal	30–16AWG
D	Strip Length, Input/Output	10mm [0.39 in]
E	Strip Length, Signal	5mm [0.20 in]
F	Tightening Torque, Input/Output	0.7 N·m [6.2 lb·in]
G	Tightening Torque, Signal	0.2 N·m [1.8 lb·in]

Fig. 5



RHINO Power Supplies PSX Series

Ruggedized Power Supplies

AutomationDirect's RHINO PSX series of ruggedized power supplies are Class I, Div. 2 hazardous location rated. There are 2 models available, with 12 and 24VDC output voltages. They feature universal 120/240 VAC input voltage, adjustable DC output, DC-OK LED indication, and output current limitation.

The rugged aluminum housings offer IP67 and NEMA 4X ratings for harsh outdoor environments. These high-quality power supplies are UL 508 listed, UL 60950 recognized, CE marked and RoHS compliant.

CE IP67 cULus
UL 508

Features

- Ruggedized for harsh outdoor environments
- IP67 and NEMA 4X rated (dust, water, ice and oil resistant enclosure)
- Connection via waterproof I/O plug connectors
- Shock & vibration per IEC 60068
- Operating temperature range: -40°C to 85°C
- Universal input 85 to 264 VAC
- Output voltage adjustable
- DC-OK indicator
- Worldwide safety approvals
- Hazardous location Class I, Div 2
- 3-year warranty



Power Supplies					
Part Number	***Price***	***Drawing Link***	***Output Voltage***	***Maximum Output Power***	***Efficiency (Typ @ 115VAC)***
PSX-12-100	$372.00	PDF	12V	96W	82
PSX-24-120	$346.00	PDF	24V	120W	82

RHINO Power Supplies PSX Series

Technical Specifications			
Part Number		**PSX-12-100**	**PSX-24-120**
Input (AC/DC)			
Nominal Input Voltage		100–240 VAC	
Nominal Input Current (115/230VAC)		2.0 A / 1.0 A	2.4 A / 1.2 A
Power Consumption (115/230VAC)		114W/112W typ.	140W/136W typ.
Operational Input Voltage Range		85–264 VAC, 85*–375 VDC [*see derating chart for PSX-24-120]	
Input Voltage Frequency Range		47–63 Hz	
Circuit Breaker Rating / Characteristic		5.0 A /C	
Output (DC)			
Max. Output Power		96W	120W
Output Voltage		12V	24V
Max. Output Current		8.0 A	5.0 A
Output Voltage Adjustment Range		12.0–15.0 V	24.0–28.0 V
Output Regulation		[10–90 % load variation] 2.5 % max.	
Output Power Derating - Temperature		2%/K above 60°C [140°F]	
Hold-up time		20 ms min.	
Ripple and Noise (20MHz bandwidth)		<50 mVp-p max.	
Output Overvoltage Protection (OVP)		<40V	
Short Circuit Protection		Current limitation at 110% typ., automatic restart	
Parallel Operation		Only parallel redundancy is possible, with external decoupling diode. [See diagram on next page.]	
Indicator LED		DC-OK	
General Data			
Weight		1000g [35.3 oz]	
Network Configuration		TN-S, TT, IT	
Enclosure Material (Chassis/Cover)		Die-cast Aluminum	
Cooling		Convection cooling, no internal fan	
Power Connectors	**Input Connector:**	ADC p/n PSX-CON1, Binder Circular Connector Series 693: 99-4222-14-04	
	Output Connector:	ADC p/n PSX-CON2, Binder Circular Connector Series 693: 99-4217-160-07	
Wiring		Input: 3 x 18–14AWG (1 x Live, 1 x Neutral, 1 x Protective Earth Ground) Output: 7 x 18–16AWG (3 x +Vout, 3 x -Vout, 1 x Protective Earth Ground)	

Continued on next page

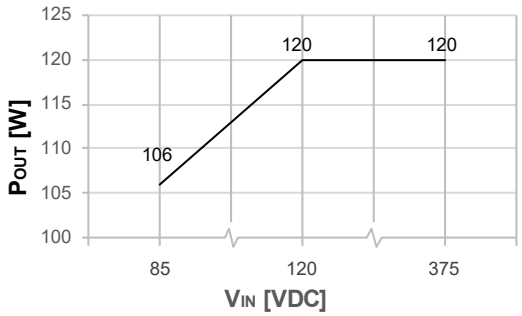
RHINO Power Supplies PSX Series

Technical Specifications (continued)		
Part Number	***PSX-12-100***	***PSX-24-120***
Safety / Environmental		
Surrounding Ambient Temperature Range (Natural Air Convection Cooling)	-40 to 85°C [-40 to 185°F] [Observe derating] ATEX: -40 to 70°C [-40 to 158°F] [Observe derating]	
Humidity	Up to 100%, with condensation	
Storage Temperature	-40 to 85°C [-40 to 185°F]	
Maximum Altitude	3000m	
MTBF (acc. to IEC 61709 at 40°C)	> 900,000 hrs	
Protection Class	Class I	
Degree of Protection	IP67 (IEC 60529), NEMA 6P, UL50 4X Test to: Water intrusion, Dust, Icing, Oil exclusion, Salt spray, Gasket aging, Hosedown.	
Safety Standards	Information technology equipment IEC/EN 60950-1 Control equipment for hazardous location UL File No. E197886 (Class I, Division 2, group A, B, C & D, T4) Electrical equip. for potentially explosive atmospheres IEC/EN 60079-15 (Class I, Zone 2, EEx nA IIC T4) Industrial control equipment UL 508, File No. E197592 CSA (Tested to 61010), File No. 229285 Electrical equip. for measurement, control, laboratory IEC/EN 61010-1, C22.2 61010-1-12, UL 61010-1 3rd Electrical equipment for machines EN 60204-3 Electronic equipment for power installation EN 50178 Safety transformers EN 61558-2-8	
Environmental Compliance	Reach, RoHS directive 2011/65/EU	
Electromagnetic compatibility (EMC)		
Emissions	EN 61000-6-3	
Conducted RI Suppression On Input	EN 55032 class B	
Radiated RI Suppression	EN 55032 class B	
Harmonic Limits	EN 61000-3-2, class A	
Immunity	EN 61000-6-2	
Electrostatic Discharge (ESD)	IEC/EN 61000-4-2 8 kV/ 15 kV, perf criteria A	
Radiated RF Field Immunity	IEC/EN 61000-4-3 10 V/m, perf criteria A	
Electrical Fast Transient / Burst Immunity	Input: IEC/EN 61000-4-4 4 kV, perf criteria A Output: IEC/EN 61000-4-4 2 kV, perf criteria A	
Surge Immunity	Line–Neutral: IEC/EN 61000-4-5 4 kV, perf criteria A Line–Ground: IEC/EN 61000-4-5 2 kV, perf criteria A Neutral–Ground: IEC/EN 61000-4-5 4 kV, perf criteria A Output: IEC/EN 61000-4-5 0.5 kV, perf criteria A	
Immunity To Conducted RF Disturbances	IEC/EN 61000-4-6 10 V, perf criteria A	
Mains Voltage Dips And Interruptions	IEC/EN 61000-4-11 30%/10mS, criteria B; 60%/100mS, criteria C	
Environment		
Vibration Acc. IEC 60068-2-6-3	3 axis, 1g sine sweep, 10–55Hz, 1 oct/min	
Shock Acc. IEC 60068-2-27	3 axis, 15g half sine, 11ms	
Safety Approvals and Certifications	CE CB Scheme IP67 cULus UL 508 CSA 229285	

RHINO Power Supplies PSX Series



PSX-24-120 Output Power Derating (with DC Input Voltage)

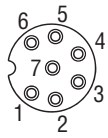


Connector Pinouts	
Input	
1	Input Terminal L
2	Input Terminal N
3	Input Terminal PE (GND)
Output	
1	Output Connection Terminal –
2	Output Connection Terminal –
3	Output Connection Terminal –
4	Output Connection Terminal +
5	Output Connection Terminal +
6	Output Connection Terminal +
7	Case Ground



INPUT

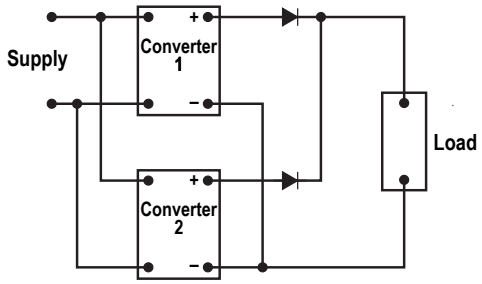
1 L
2 N
⏚ PE



OUTPUT

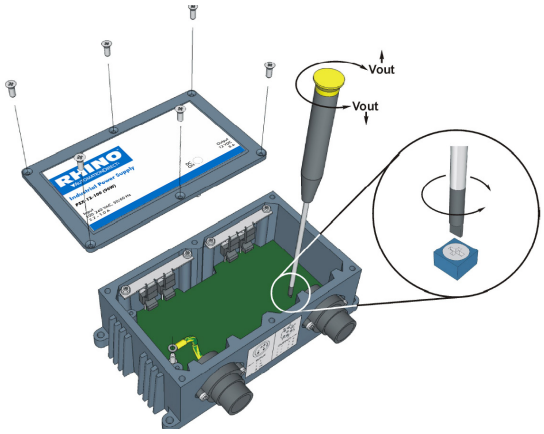
1 – 4 +
2 – 5 +
3 – 6 +
7 case

Parallel Redundancy Wiring



Note:

1. The total current draw should not exceed the rated current of the power supply.
2. O-Ring diode current and voltage rating should be selected accordingly.



Note: The integrity of the seal cannot be guaranteed and warranty is void once the cover has been removed in the field!

To adjust the output voltage, the case cover must be removed. Carefully loosen and remove all six screws, then remove the cover. The output voltage of the unit can be adjusted by turning the potentiometer screw, using an insulated screwdriver. By turning the screw clockwise (cw) the output voltage will increase; by turning the screw counter-clockwise (ccw), the output voltage will decrease. The output voltage level should only be adjusted with the output connected to a load, (similar to the load used in the application). After adjusting the output voltage to the required value, the case must be carefully reassembled. Place the cover over the case and ensure that the rubber-sealing gasket is undamaged and is correctly positioned. Secure the lid with the six screws. Tighten the screws gradually, moving diagonally from one to another. The recommended tightening torque is 0.6 N·m [5.310 lb·in].

Accessories

Part Number	*Price*	*Description*
PSX-CON1	$42.00	AC Input connector: Binder 3-pin female circular plug 99-4222-14-04
PSX-CON2	$42.00	DC Output connector: Binder 7-pin male circular plug 99-4225-160-07

RHINO DIN Rail Power Supplies
PSV Series

Economical Power Supplies

Features

15–100W Models

- Ultra-compact size
- Up to 89% efficiency and built-in active PFC
- Universal AC input voltage
- Full power from −10°C to +55°C
- Low earth leakage current < 0.5 ma @ 264VAC
- Extreme low temperature cold start at −40°C
- NEC Class 2 / Limited Power Source (LPS) certified
- Plastic housing
- UL/cUL 508
- UL/cUL Recognized 60950-1
- CE
- Three year warranty

UL508 UL60950-1

120–480W Models

- Universal AC input voltage
- Built-in constant current circuit for reactive loads
- Up to 89% efficiency
- Full power from −10°C to +50°C
- Compliance to SEMI F47 @ 200VAC voltage sag immunity
- Metal housing
- UL/cUL 508
- UL/cUL Recognized 60950-1
- CE
- 3-year warranty



DIN Rail Power Supplies					
Part Number	*Price*	*Drawing Link*	*Output Voltage*	*Maximum Output Power [W]*	*Efficiency [Typ @ 115VAC]*
PSV5-15S	$29.50	PDF	5V	15	79%
PSV5-25S	$45.00	PDF	5V	25	82%
PSV12-50S	$45.00	PDF	12V	48	88%
PSV24-30S	$29.50	PDF	24V	30	87.5%
PSV24-50S	$42.00	PDF	24V	50	89%
PSV24-100S	$55.00	PDF	24V	91.2	87%
PSV24-120S	$66.00	PDF	24V	120	85%
PSV24-240S	$96.00	PDF	24V	240	88%
PSV24-480S	$169.00	PDF	24V	480	85%
PSV48-120S	$66.00	PDF	48V	120	89%

RHINO PSV5-15S Power Supply

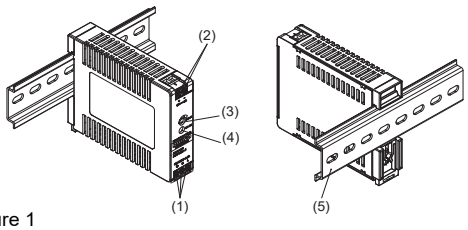


Figure 1

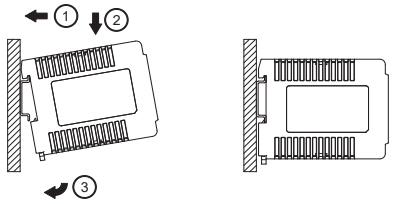


Figure 2

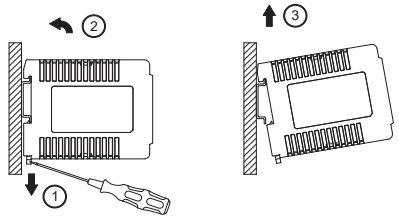


Figure 3



Figure 4

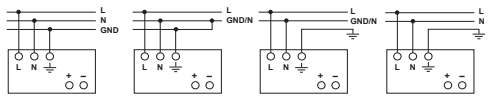


Figure 5

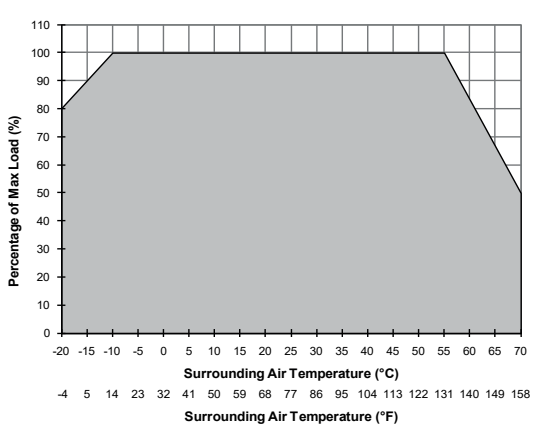


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- To guarantee sufficient convection cooling, please keep a distance of >40mm above and >20mm below the device as well as a lateral distance of >15mm to other cold source or heat source.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. The device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
Input	0.32-3.3	22-12	0.51	4.5
Output	0.52-3.3	20-12	0.51	4.5

To secure reliable and shock proof connections, the stripping length should be 4-5mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2).

In accordance to EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60°C/75°C for USA or at least 90°C for Canada.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above. Thus, if an external protective device is necessary, or utilized, a minimum value of 10A B- or 6A C- characteristic breaker should be used.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 5VDC connection. The output provides 5VDC. The output voltage can be adjusted from 5 to 5.5 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 6.325-7.425 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of a short circuit or overload the output voltage and current collapses (I_O = 110-150%). The secondary voltage is reduced and bounces until short circuit or overload on the secondary side has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. At -10°C to -20°C [14°F to -4°F], the output capacity has to be reduced by 2% per degree Celsius increase in temperature.
2. Above +55°C [131°F], the output capacity has to be reduced by 3.33% per degree Celsius increase in temperature.

If the output capacity is not reduced when T_{Amb} > 55°C [131°F], the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

FOR TECHNICAL ASSISTANCE CALL 770-844-4200

RHINO PSV5-15S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	< 0.5 A @ 115VAC, < 0.3 A @ 230VAC
Inrush current limitation (+25°C, cold start)	< 35A @ 115VAC, < 65A @ 230VAC
Mains buffering at nominal load (typ.)	20ms typ. @ 115VAC (100% load) 100ms typ. @ 230VAC (100% load)
Turn-on time	< 3s @ 115VAC, < 1.5 s @ 230VAC (100% load)
Internal fuse	T 3.15 A / 250V (non-replaceable)
Recommended backup protection	10A B- or 6A C- characteristic circuit breaker
Leakage current	< 1mA @ 240VAC
Output (DC)	
Nominal output voltage U_N / tolerance	5VDC ± 2 %
Voltage adjustment range	5-5.5 VDC (maximum power ≤ 15W)
Nominal current	3A
Derating	Refer to Fig. 6 -10°C to -20°C (2%/°C), > 55°C (3.33%/°C) in vertical orientation
Startup with capacitive loads	Max. 3,000µF
Max. power dissipation idling / nominal load approx.	0.3 W / 4 W
Efficiency at 100% load	78.0% typ. @ 115VAC, 79.0% typ. @ 230VAC
PARD (20MHz) at 100% load	< 75 mVpp
General Data	
Type of housing	Plastic (PC), enclosed
LED signals	Green LED DC OK
MTBF	> 350,000 hrs. as per Telcordia
Dimensions (L x W x H)	75mm x 21mm x 89.5 mm [2.95 in x 0.83 in x 3.52 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	0.11 kg [3.9 oz]
Connection method	Screw connection
Stripping length	4-5mm [0.16-0.20 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s²; displacement of 0.35 mm, 60min per axis for all X, Y, Z directions Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1, Limited Power Source (LPS)
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
Class 2 power supply	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11)
Emission	EN55032, EN55011, EN61000-3-3, EN61000-6-3, EN61000-6-4
CE 3PET c UL E197592 US LISTED Ind. Cont. Eq. c UL us E198298	
RoHS Compliant	Yes
Safety and Protection	
Surge voltage protection against internal surge voltages	No
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 3kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

1st Edition, 01/2019

RHINO PSV5-25S Power Supply

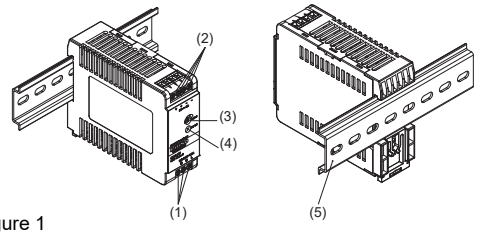


Figure 1

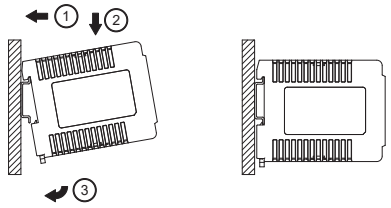


Figure 2

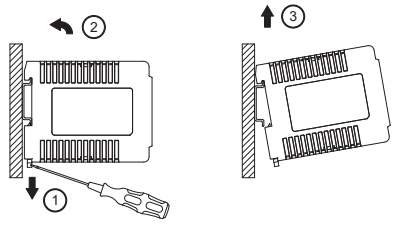


Figure 3

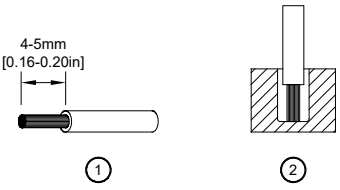


Figure 4

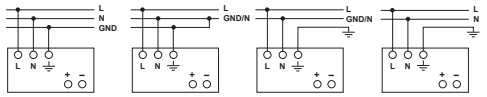


Figure 5

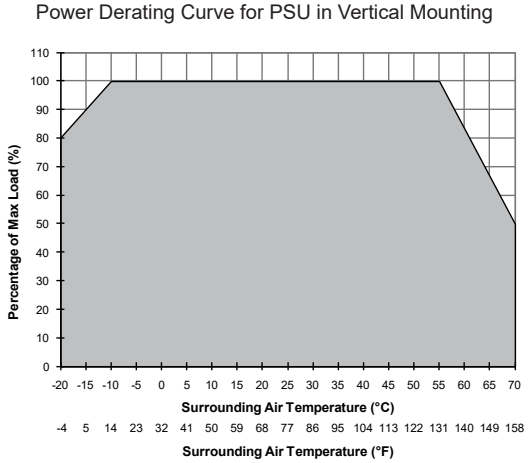


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- To guarantee sufficient convection cooling, please keep a distance of >40mm above and >20mm below the device as well as a lateral distance of >15mm to other cold source. In case the adjacent device is a heat source, the lateral distance will be >25mm.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. The device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
Input	0.32-3.3	22-12	0.51	4.5
Output	0.82-3.3	18-12	0.51	4.5

To secure reliable and shock proof connections, the stripping length should be 4-5mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2).

In accordance to EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60°C/75°C for USA or at least 90°C for Canada.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above. Thus, if an external protective device is necessary, or utilized, a minimum value of 20A B- or 10A C- characteristic breaker should be used.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 5VDC connection. The output provides 5VDC. The output voltage can be adjusted from 5 to 5.5 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 6.325-7.425 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of a short circuit or overload the output voltage and current collapses (I_O = 110-160%). The secondary voltage is reduced and bounces until short circuit or overload on the secondary side has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. At -10°C to -20°C [14°F to -4°F], the output capacity has to be reduced by 2% per degree Celsius increase in temperature.
2. Above +55°C [131°F], the output capacity has to be reduced by 3.33% per degree Celsius increase in temperature.

If the output capacity is not reduced when T_{Amb} > 55°C [131°F], the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

FOR TECHNICAL ASSISTANCE CALL 770-844-4200

RHINO PSV5-25S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	< 0.8 A @ 115VAC, < 0.5 A @ 230VAC
Inrush current limitation (+25°C, cold start)	< 35A @ 115VAC, < 60A @ 230VAC
Mains buffering at nominal load (typ.)	20ms typ. @ 115VAC (100% load) 100ms typ. @ 230VAC (100% load)
Turn-on time	< 3s @ 115VAC, < 1.5 s @ 230VAC (100% load)
Internal fuse	T 3.15 A / 250V (non-replaceable)
Recommended backup protection	20A B- or 10A C- characteristic circuit breaker
Leakage current	< 1mA @ 240VAC
Output (DC)	
Nominal output voltage U_N / tolerance	5VDC ± 2 %
Voltage adjustment range	5-5.5 VDC (maximum power ≤ 25W)
Nominal current	5A
Derating	Refer to Fig. 6 -10°C to -20°C (2%/°C), > 55°C (3.33%/°C) in vertical orientation
Startup with capacitive loads	Max. 3,000µF
Max. power dissipation idling / nominal load approx.	0.4 W / 8 W
Efficiency at 100% load	79.0% typ. @ 115VAC, 80.0% typ. @ 230VAC
PARD (20MHz) at 100% load	< 75 mVpp
General Data	
Type of housing	Plastic (PC), enclosed
LED signals	Green LED DC OK
MTBF	> 350,000 hrs. as per Telcordia
Dimensions (L x W x H)	75mm x 30mm x 89.5 mm [2.95 in x 1.18 in x 3.52 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	0.16 kg [5.6 oz]
Connection method	Screw connection
Stripping length	4-5mm [0.16-0.20 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s²; displacement of 0.35 mm, 60min per axis for all X, Y, Z directions Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1, Limited Power Source (LPS)
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
Class 2 power supply	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11)
Emission	EN55032, EN55011, EN61000-3-3, EN61000-6-3, EN61000-6-4
CE 3PET c UL E197592 US LISTED Ind. Cont. Eq. c UL us E198298	
RoHS Compliant	Yes
Safety and Protection	
Surge voltage protection against internal surge voltages	No
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 3kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

1st Edition, 01/2019

RHINO PSV12-50S Power Supply

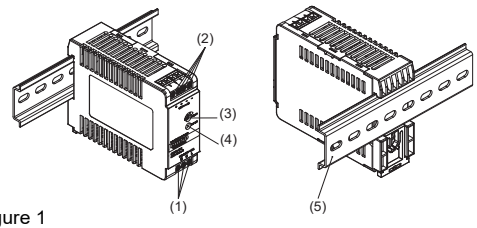


Figure 1

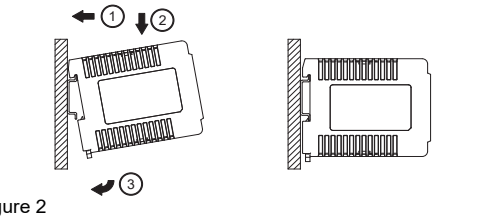


Figure 2

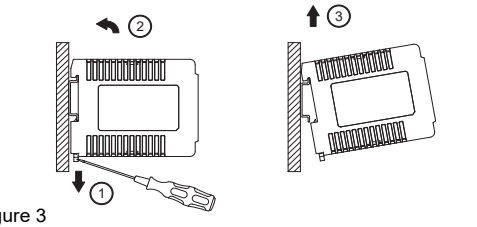


Figure 3

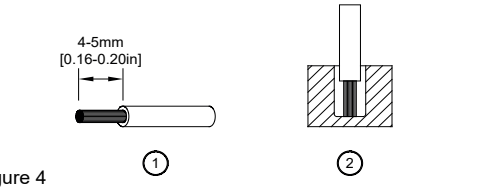


Figure 4

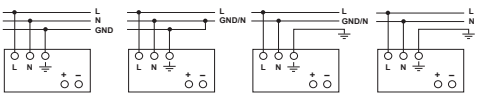


Figure 5

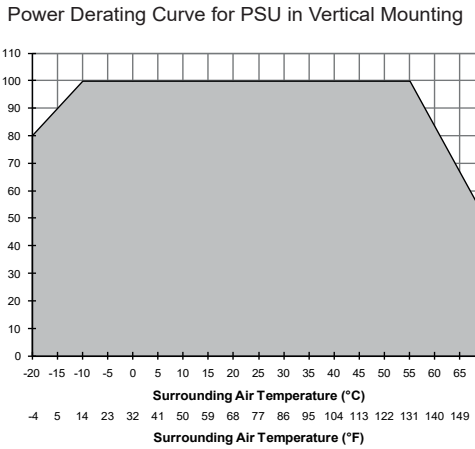


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- To guarantee sufficient convection cooling, please keep a distance of >40mm above and >20mm below the device as well as a lateral distance of >15mm to other cold source. In case the adjacent device is a heat source, the lateral distance will be >25mm.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. The device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
Input	0.52-3.3	20-12	0.51	4.5
Output	0.52-3.3	20-12	0.51	4.5

To secure reliable and shock proof connections, the stripping length should be 4-5mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2).

In accordance to EN60950 / UL60950 and EN62368 / UL62368, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60°C/75°C for USA or at least 90°C for Canada.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above. Thus, if an external protective device is necessary, or utilized, a minimum value of 20A B- or 13A C- characteristic breaker should be used.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 12 VDC connection. The output provides 12 VDC. The output voltage can be adjusted from 12 to 15 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 16-18.7 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of a short circuit or overload the output voltage and current collapses (I_O = 110-150%). The secondary voltage is reduced and bounces until short circuit or overload on the secondary side has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. At -10°C to -20°C [14°F to -4°F], the output capacity has to be reduced by 2% per degree Celsius increase in temperature.
2. Above +55°C [131°F], the output capacity has to be reduced by 3.33% per degree Celsius increase in temperature.

If the output capacity is not reduced when T_{Amb} > 55°C [131°F], the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

FOR TECHNICAL ASSISTANCE CALL 770-844-4200

RHINO PSV12-50S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	< 1.0 A @ 115VAC, < 0.6 A @ 230VAC
Inrush current limitation (+25°C, cold start)	< 35A @ 115VAC, < 60A @ 230VAC
Mains buffering at nominal load (typ.)	20ms typ. @ 115VAC (100% load) 90ms typ. @ 230VAC (100% load)
Turn-on time	< 3s @ 115VAC, < 1.5 s @ 230VAC (100% load)
Internal fuse	T 3.15 A / 250V (non-replaceable)
Recommended backup protection	20A B- or 13A C- characteristic circuit breaker
Leakage current	< 1mA @ 240VAC
Output (DC)	
Nominal output voltage U_N / tolerance	12VDC ± 2 %
Voltage adjustment range	12-15 VDC (maximum power ≤ 48W)
Nominal current	4A
Derating	Refer to Fig. 6 -10°C to -20°C (2%/°C), > 55°C (3.33%/°C) in vertical orientation
Startup with capacitive loads	Max. 3,000µF
Max. power dissipation idling / nominal load approx.	0.5 W / 7 W
Efficiency at 100% load	86.0% typ. @ 115VAC, 88.0% typ. @ 230VAC
PARD (20MHz) at 100% load	< 75 mVpp
Parallel operation	With ORing Diode
General Data	
Type of housing	Plastic (PC), enclosed
LED signals	Green LED DC OK
MTBF	> 350,000 hrs. as per Telcordia
Dimensions (L x W x H)	75mm x 30mm x 89.5 mm [2.95 in x 1.18 in x 3.52 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	0.18 kg [6.3 oz]
Connection method	Screw connection
Stripping length	4-5mm [0.16-0.20 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s²; displacement of 0.35 mm, 60min per axis for all X, Y, Z directions Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1, UL/C-UL recognized to UL62368-1 and CSA C22.2 No. 62368-1 (File No. E508040), CB scheme to IEC62368-1, Limited Power Source (LPS)
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
Class 2 power supply	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11)
Emission	EN55032, EN55011, EN61000-3-3, EN61000-6-3, EN61000-6-4
CE 3PET c UL E197592 US LISTED Ind. Cont. Eq. c US E198298 E508040	
RoHS Compliant	Yes
Safety and Protection	
Surge voltage protection against internal surge voltages	No
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 3kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

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RHINO PSV24-30S Power Supply

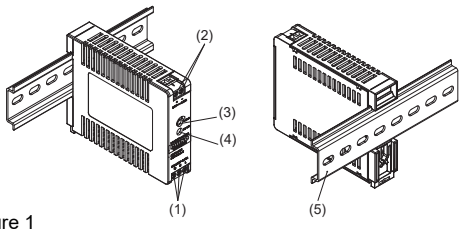


Figure 1

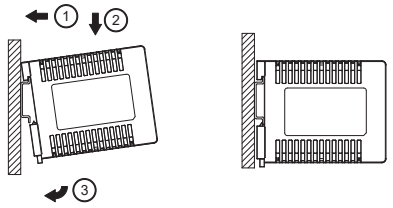


Figure 2

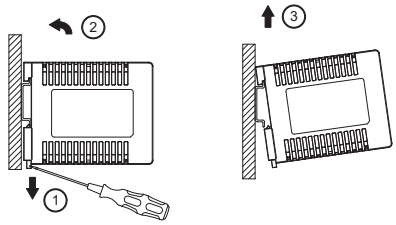


Figure 3

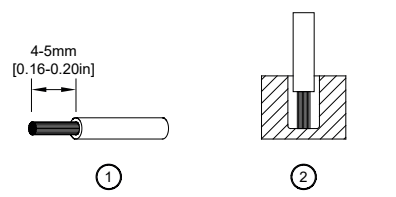


Figure 4

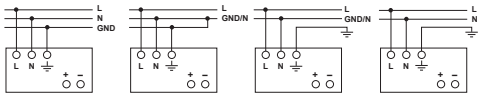


Figure 5

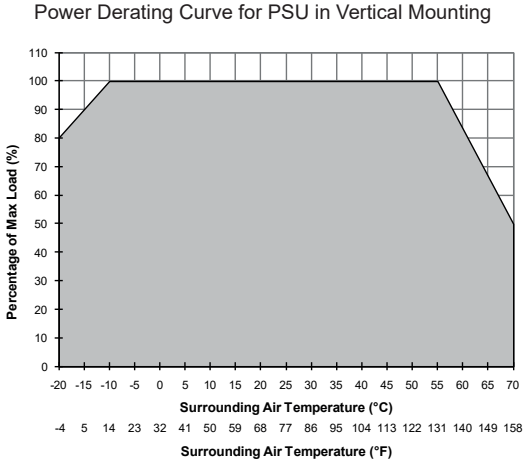


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- To guarantee sufficient convection cooling, please keep a distance of >40mm above and >20mm below the device as well as a lateral distance of >10mm to other cold source. In case the adjacent device is a heat source, the lateral distance will be >25mm.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. The device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
Input	0.32-3.3	22-12	0.51	4.5
Output	0.52-3.3	20-12	0.51	4.5

To secure reliable and shock proof connections, the stripping length should be 4-5mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2).

In accordance to EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60°C/75°C for USA or at least 90°C for Canada.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above. Thus, if an external protective device is necessary, or utilized, a minimum value of 13A B- or 8A C- characteristic breaker should be used.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 24VDC connection. The output provides 24VDC. The output voltage can be adjusted from 24 to 28 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 30-34.8 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of a short circuit or overload the output voltage and current collapses (I_O = 110-150%). The secondary voltage is reduced and bounces until short circuit or overload on the secondary side has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. At -10°C to -20°C [14°F to -4°F], the output capacity has to be reduced by 2% per degree Celsius increase in temperature.
2. Above +55°C [131°F], the output capacity has to be reduced by 3.33% per degree Celsius increase in temperature.

If the output capacity is not reduced when T_{Amb} > 55°C [131°F], the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

FOR TECHNICAL ASSISTANCE CALL 770-844-4200

RHINO PSV24-30S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	< 0.8 A @ 115VAC, < 0.4 A @ 230VAC
Inrush current limitation (+25°C, cold start)	< 35A @ 115VAC, < 60A @ 230VAC
Mains buffering at nominal load (typ.)	20ms typ. @ 115VAC (100% load) 100ms typ. @ 230VAC (100% load)
Turn-on time	< 3s @ 115VAC, < 1.6 s @ 230VAC (100% load)
Internal fuse	T 3.15 A / 250V (non-replaceable)
Recommended backup protection	13A B- or 8A C- characteristic circuit breaker
Leakage current	< 1mA @ 240VAC
Output (DC)	
Nominal output voltage U_N / tolerance	24VDC ± 2 %
Voltage adjustment range	24-28 VDC (maximum power ≤ 30W)
Nominal current	1.25 A
Derating	Refer to Fig. 6 -10°C to -20°C (2%/°C), > 55°C (3.33%/°C) in vertical orientation
Startup with capacitive loads	Max. 3,000µF
Max. power dissipation idling / nominal load approx.	0.5 W / 4.5 W
Efficiency at 100% load	87.0% typ. @ 115VAC, 88.0% typ. @ 230VAC
PARD (20MHz) at +25°C, 100% load	< 75 mVpp
Parallel operation	PSB60-REM20S / PSB60-REM40S or with ORing Diode
General Data	
Type of housing	Plastic (PC), enclosed
LED signals	Green LED DC OK
MTBF	> 350,000 hrs. as per Telcordia
Dimensions (L x W x H)	75mm x 21mm x 89.5 mm [2.95 in x 0.83 in x 3.52 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	0.11 kg [3.9 oz]
Connection method	Screw connection
Stripping length	4-5mm [0.16-0.20 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s²; displacement of 0.35 mm, 60min per axis for all X, Y, Z directions Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1, Limited Power Source (LPS)
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
Class 2 power supply	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11)
Emission	EN55032, EN55011, EN61000-3-3, EN61000-6-3, EN61000-6-4
CE 3PET c UL E197592 US LISTED Ind. Cont. Eq. c UL us E198298	
RoHS Compliant	Yes
Safety and Protection	
Surge voltage protection against internal surge voltages	No
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 3kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

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RHINO PSV24-50S Power Supply

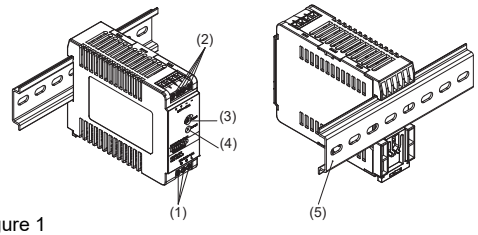


Figure 1

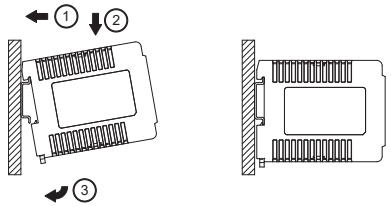


Figure 2

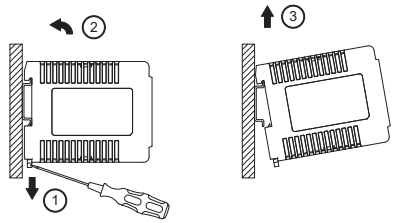


Figure 3

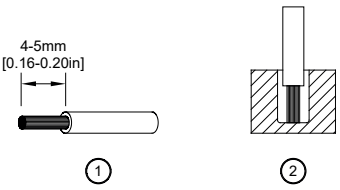


Figure 4

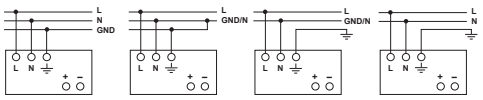


Figure 5

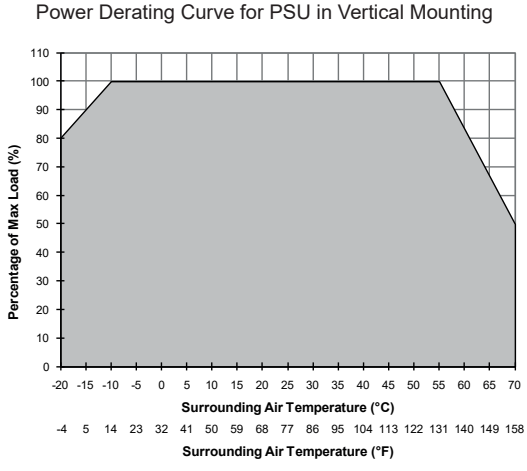


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- To guarantee sufficient convection cooling, please keep a distance of >40mm above and >20mm below the device as well as a lateral distance of >15mm to other cold source. In case the adjacent device is a heat source, the lateral distance will be >25mm.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. The device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
Input	0.32-3.3	22-12	0.51	4.5
Output	0.52-3.3	20-12	0.51	4.5

To secure reliable and shock proof connections, the stripping length should be 4-5mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2).

In accordance to EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60°C/75°C for USA or at least 90°C for Canada.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above. Thus, if an external protective device is necessary, or utilized, a minimum value of 20A B- or 13A C- characteristic breaker should be used.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 24VDC connection. The output provides 24VDC. The output voltage can be adjusted from 24 to 28 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 30-34.8 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of a short circuit or overload the output voltage and current collapses (I_O = 110-150%). The secondary voltage is reduced and bounces until short circuit or overload on the secondary side has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. At -10°C to -20°C [14°F to -4°F], the output capacity has to be reduced by 2% per degree Celsius increase in temperature.
2. Above +55°C [131°F], the output capacity has to be reduced by 3.33% per degree Celsius increase in temperature.

If the output capacity is not reduced when T_{Amb} > 55°C [131°F], the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

FOR TECHNICAL ASSISTANCE CALL 770-844-4200

RHINO PSV24-50S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	< 1.0 A @ 115VAC, < 0.6 A @ 230VAC
Inrush current limitation (+25°C, cold start)	< 35A @ 115VAC, < 60A @ 230VAC
Mains buffering at nominal load (typ.)	20ms typ. @ 115VAC (100% load) 90ms typ. @ 230VAC (100% load)
Turn-on time	< 3s @ 115VAC, < 1.5 s @ 230VAC (100% load)
Internal fuse	T 3.15 A / 250V (non-replaceable)
Recommended backup protection	20A B- or 13A C- characteristic circuit breaker
Leakage current	< 1mA @ 240VAC
Output (DC)	
Nominal output voltage U_N / tolerance	24VDC ± 2 %
Voltage adjustment range	24-28 VDC (maximum power ≤ 50W)
Nominal current	2.1 A
Derating	Refer to Fig. 6 -10°C to -20°C (2%/°C), > 55°C (3.33%/°C) in vertical orientation
Startup with capacitive loads	Max. 3,000µF
Max. power dissipation idling / nominal load approx.	0.5 W / 7W
Efficiency at 100% load	86.0% typ. @ 115VAC, 88.0% typ. @ 230VAC
PARD (20MHz) at +25°C, 100% load	< 75 mVpp
Parallel operation	PSB60-REM20S / PSB60-REM40S or with ORing Diode
General Data	
Type of housing	Plastic (PC), enclosed
LED signals	Green LED DC OK
MTBF	> 350,000 hrs. as per Telcordia
Dimensions (L x W x H)	75mm x 30mm x 89.5 mm [2.95 in x 1.18 in x 3.52 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	0.18 kg [6.3 oz]
Connection method	Screw connection
Stripping length	4-5mm [0.16-0.20 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s²; displacement of 0.35 mm, 60min per axis for all X, Y, Z directions Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1, Limited Power Source (LPS)
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
Class 2 power supply	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11)
Emission	EN55032, EN55011, EN61000-3-3, EN61000-6-3, EN61000-6-4
CE 3PET c UL E197592 US LISTED Ind. Cont. Eq. c UL us E198298	
RoHS Compliant	Yes
Safety and Protection	
Surge voltage protection against internal surge voltages	No
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 3kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

1st Edition, 01/2019

RHINO PSV24-100S Power Supply

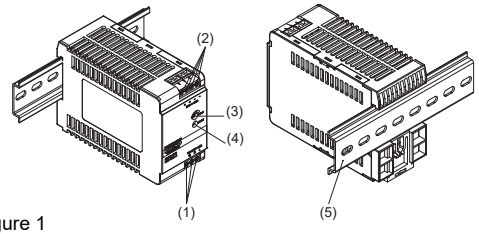


Figure 1

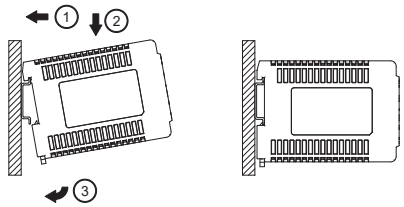


Figure 2

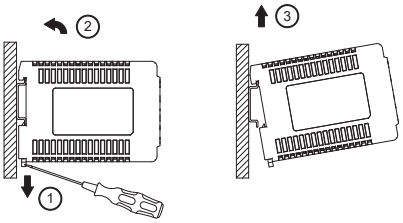


Figure 3

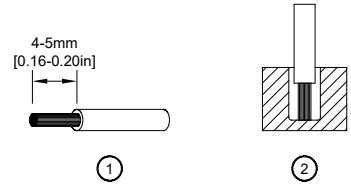


Figure 4

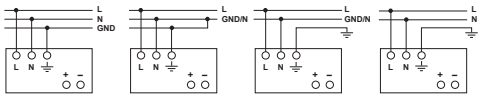


Figure 5

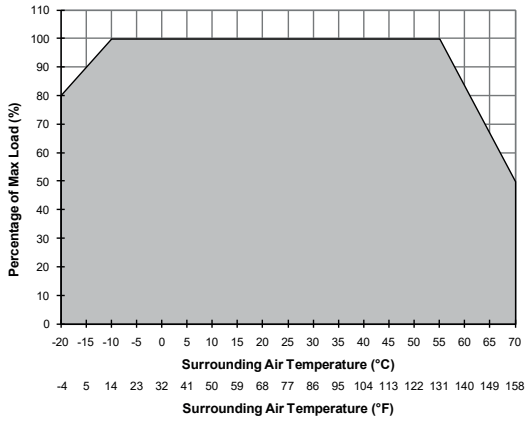


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- To guarantee sufficient convection cooling, please keep a distance of >40mm above and >20mm below the device as well as a lateral distance of >25mm to other cold source or heat source.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. The device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
Input	0.32-3.3	22-12	0.51	4.5
Output	0.52-3.3	20-12	0.51	4.5

To secure reliable and shock proof connections, the stripping length should be 4-5mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2).

In accordance to EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60°C/75°C for USA or at least 90°C for Canada.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above. Thus, if an external protective device is necessary, or utilized, a minimum value of 20A B- or 10A C- characteristic breaker should be used.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 24VDC connection. The output provides 24VDC. The output voltage can be adjusted from 22 to 24 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 30-34.8 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of a short circuit or overload the output voltage and current collapses (I_O = 110-150%). The secondary voltage is reduced and bounces until short circuit or overload on the secondary side has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. At -10°C to -20°C [14°F to -4°F], the output capacity has to be reduced by 2% per degree Celsius increase in temperature.
2. Above +55°C [131°F], the output capacity has to be reduced by 3.33% per degree Celsius increase in temperature.

If the output capacity is not reduced when T_{Amb} > 55°C [131°F], the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

RHINO PSV24-100S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	< 1.2 A @ 115VAC, < 0.6 A @ 230VAC
Inrush current limitation (+25°C, cold start)	< 35A @ 115VAC, < 60A @ 230VAC
Mains buffering at nominal load (typ.)	25ms typ. @ 115VAC (100% load) 50ms typ. @ 230VAC (100% load)
Turn-on time	< 3s @ 115VAC, < 1.5 s @ 230VAC (100% load)
Internal fuse	T 3.15 A / 250V (non-replaceable)
Recommended backup protection	20A B- or 10A C- characteristic circuit breaker
Leakage current	< 1mA @ 240VAC
Output (DC)	
Nominal output voltage U_N / tolerance	24VDC ± 2 %
Voltage adjustment range	22-24 VDC (maximum power ≤ 91.2 W)
Nominal current	3.8 A
Derating	Refer to Fig. 6 -10°C to -20°C (2%/°C), > 55°C (3.33%/°C) in vertical orientation
Startup with capacitive loads	Max. 3,000µF
Max. power dissipation idling / nominal load approx.	0.4 W / 10W
Efficiency at 100% load	87.0% typ. @ 115VAC, 89.0% typ. @ 230VAC
PARD (20MHz) at +25°C, 100% load	< 75 mVpp
Parallel operation	PSB60-REM20S / PSB60-REM40S or with ORing Diode
General Data	
Type of housing	Plastic (PC), enclosed
LED signals	Green LED DC OK
MTBF	> 350,000 hrs. as per Telcordia
Dimensions (L x W x H)	75mm x 45mm x 100mm [2.95 in x 1.77 in x 3.94 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	0.325 kg [11.5 oz]
Connection method	Screw connection
Stripping length	4-5mm [0.16-0.20 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s²; displacement of 0.35 mm, 60min per axis for all X, Y, Z directions Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1, Limited Power Source (LPS)
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
Class 2 power supply	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11)
Emission	EN55032, EN55011, EN61000-3-3, EN61000-6-3, EN61000-6-4
CE 3PET c UL E197592 US LISTED Ind. Cont. Eq. c UL us E198298	
RoHS Compliant	Yes
Safety and Protection	
Surge voltage protection against internal surge voltages	No
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 1.5 kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

1st Edition, 01/2019

RHINO PSV24-120S Power Supply

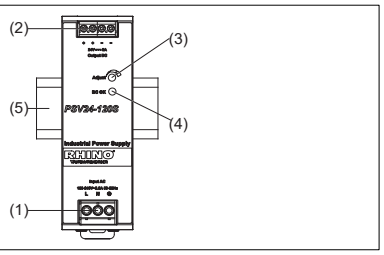


Figure 1

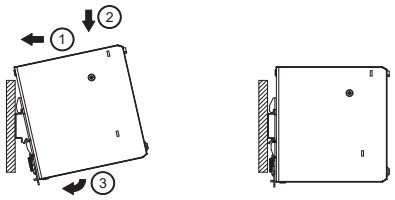


Figure 2

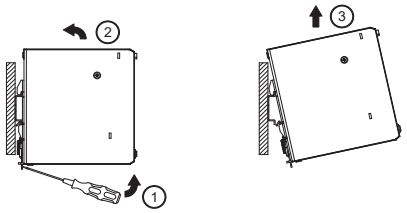


Figure 3

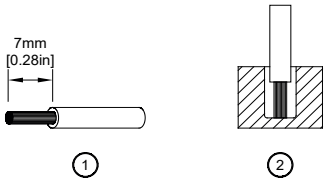


Figure 4

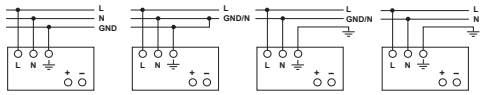


Figure 5

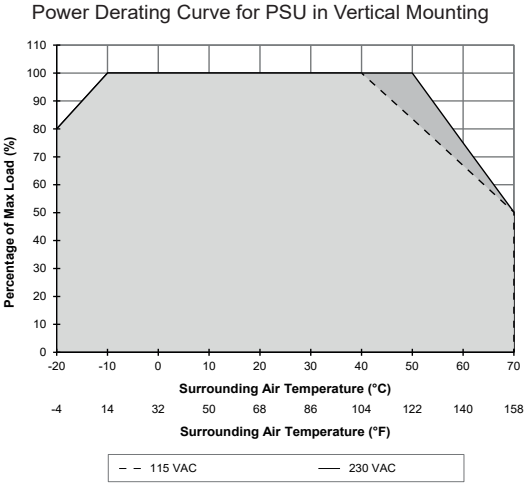


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- If the unit is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- To guarantee sufficient convection cooling, please keep a distance of 50mm above and 18cm below the device as well as a lateral distance of 10mm to other units.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. For vertical mounting, the device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
Input	0.823-8.365	18-8	1.01	9
Output	0.20-3.3	24-12	0.68	6

To secure reliable and shock proof connections, the stripping length should be 7mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2). All wire strands must be fully inserted into the terminals with the screws securely fastened in order to ensure safety and maximum contact.

In accordance to EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60˚C/75˚C or more to fulfill UL requirements.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 24VDC connection. The output provides 24VDC. The output voltage can be adjusted from 22 to 28 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 28.8-35.2 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of an overload (I_O = 105-150%) the output voltage will start to droop until overload has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. At -10˚C to -20˚C [14˚F to -4˚F], the output capacity must be reduced by 2% per ˚C temperature increase.
2. Above +40˚C [104˚F] (115VAC), the output capacity must be reduced by 1.67% per degree Celsius temperature increase.
3. Above +50˚C [122˚F] (230VAC), the output capacity must be reduced by 2.5% per degree Celsius temperature increase.

If the output capacity is not reduced when T_{Amb} > 40˚C (115VAC) or > 50˚C (230VAC), the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

FOR TECHNICAL ASSISTANCE CALL 770-844-4200

RHINO PSV24-120S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	2.2 A typ. @ 115VAC, 1.2 A typ. @ 230VAC
Inrush current limitation (+25°C, cold start)	20A typ. @ 115VAC, 40A typ. @ 230VAC
Mains buffering at nominal load (typ.)	20ms typ. @ 115VAC (100% load) 90ms typ. @ 230VAC (100% load)
Turn-on time	200ms typ. @ 115VAC & 230VAC (100% load)
Internal fuse	T 4A / 250V (non-replaceable)
Leakage current	< 0.25 mA @ 264VAC
Output (DC)	
Nominal output voltage U_N / tolerance	24VDC ± 2 %
Voltage adjustment range	22-28 VDC (maximum power ≤ 120W)
Output current	5A
Derating	Refer to Fig. 6 -10°C to -20°C (2%/°C), > 40°C (1.67%/°C) @ 115VAC -10°C to -20°C (2%/°C), > 50°C (2.5%/°C) @ 230VAC
Startup with capacitive loads	Max. 8,000µF
Max. power dissipation idling / nominal load approx.	0.65 W / 13.3 W
Efficiency at 100% load	88.0% typ. @ 115VAC, 90.0% typ. @ 230VAC
PARD (20MHz) at 100% load	< 120 mVpp
Parallel operation	PSB60-REM20S / PSB60-REM40S or with ORing Diode
General Data	
Type of housing	SGCC (Case Cover) / Aluminum (Case Chassis)
LED signals	Green LED DC OK
MTBF	> 700,000 hrs. as per Telcordia
Dimensions (L x W x H)	123.6 mm x 40mm x 117.6 mm [4.87 in x 1.57 in x 4.63 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	0.54 kg [19 oz]
Connection method	Screw connection
Stripping length	7mm [0.28 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s² (2G peak); 10min per cycle, 60min for X direction Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m for industrial application 5000m for ITE application
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11, 12)
Emission	EN55032, EN55011, EN61000-3-2 Class A, EN61000-3-3, EN61000-6-3, EN61000-6-4
Voltage Sag Immunity	SEMI F47 – 0706 @ 200VAC
	CE 4ZW4 c UL E197592 US LISTED Ind. Cont. Eq. c UL us E198298
RoHS Compliant	Yes
Safety and Protection	
Transient surge voltage protection	Varistor
Current limitation at short-circuits approx.	I_{surge} = 105-150% or Po_{max} typically
Surge voltage protection against internal surge voltages	Yes
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 2kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

1st Edition, 01/2019

RHINO PSV24-240S Power Supply

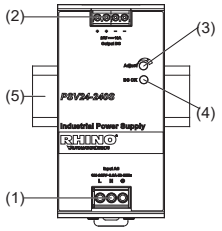


Figure 1

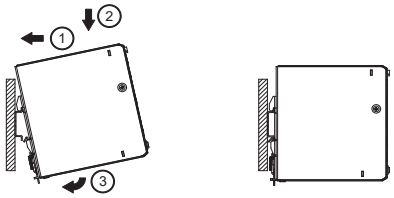


Figure 2

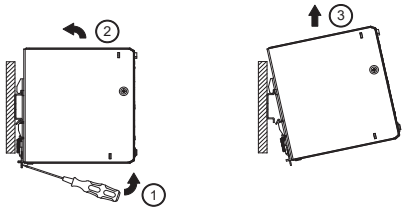


Figure 3

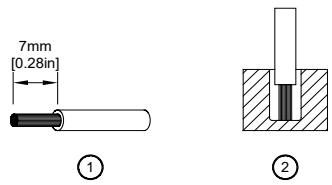


Figure 4

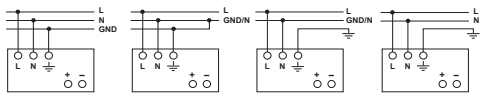


Figure 5

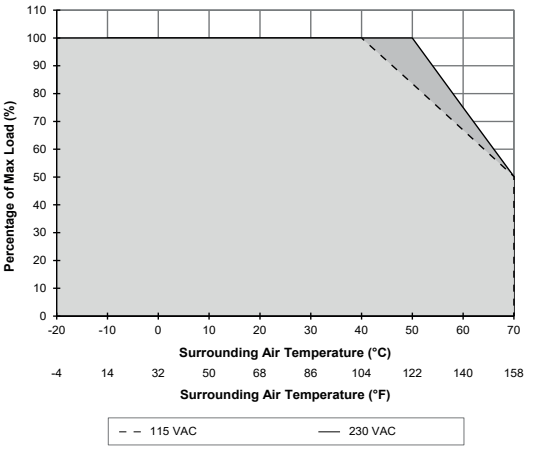


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- If the unit is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- To guarantee sufficient convection cooling, please keep a distance of 50mm above and 18cm below the device as well as a lateral distance of 10mm to other units.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. For vertical mounting, the device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
Input	1.3-3.3	16-12	1.01	9
Output	1.3-3.3	16-12	0.68	6

To secure reliable and shock proof connections, the stripping length should be 7mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2). All wire strands must be fully inserted into the terminals with the screws securely fastened in order to ensure safety and maximum contact.

In accordance to EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60°C/75°C or more to fulfill UL requirements.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 24VDC connection. The output provides 24VDC. The output voltage can be adjusted from 22 to 28 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 28.8-35.2 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of an overload (I_O = 105-150%) the output voltage will start to droop until overload has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. Above +40°C [104°F] (115VAC), the output capacity has to be reduced by 1.67% per degree Celsius increase in temperature.
2. Above +50°C [122°F] (230VAC), the output capacity has to be reduced by 2.5% per degree Celsius increase in temperature.

If the output capacity is not reduced when T_{Amb} > 40°C [104°F] (115VAC) or > 50°C [122°F] (230VAC), the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

RHINO PSV24-240S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	2.8 A typ. @ 115VAC, 1.4 A typ. @ 230VAC
Inrush current limitation (+25°C, cold start)	20A typ. @ 115VAC, 40A typ. @ 230VAC
Mains buffering at nominal load (typ.)	10ms typ. @ 115VAC (100% load) 16ms typ. @ 230VAC (100% load)
Turn-on time	1000ms typ. @ 115VAC & 230VAC (100% load)
Internal fuse	T 6.3 A / 250V (non-replaceable)
Leakage current	< 1mA @ 264VAC
Output (DC)	
Nominal output voltage U_N / tolerance	24VDC ± 2 %
Voltage adjustment range	22-28 VDC (maximum power ≤ 240W)
Output current	10A
Derating	Refer to Fig. 6 > 40°C (1.67%/°C) @ 115VAC (90-229 VAC) > 50°C (2.5%/°C) @ 230VAC (230-264 VAC)
Startup with capacitive loads	Max. 8,000µF
Max. power dissipation idling / nominal load approx.	4.62 W @ 115VAC (0% load) 2.14 W @ 230VAC (0% load) 31.53 W @ 115VAC (100% load) 25.44 W @ 230VAC (100% load)
Efficiency at 100% load	88.0% typ. @ 115VAC, 90.0% typ. @ 230VAC
PARD (20MHz) at 100% load	< 120mVpp @ -10°C to +70°C < 240mVpp @ -20°C to -10°C
Parallel operation	PSB60-REM20S / PSB60-REM40S or with ORing Diode
General Data	
Type of housing	SGCC (Case Cover) / Aluminum (Case Chassis)
LED signals	Green LED DC OK
MTBF	> 700,000 hrs. as per Telcordia
Dimensions (L x W x H)	123.6 mm x 60mm x 117.6 mm [4.87 in x 2.36 in x 4.63 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	0.80 kg [28 oz]
Connection method	Screw connection
Stripping length	7mm [0.28 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s² (2G peak); 10min per cycle, 60min for X direction Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m for industrial application 5000m for ITE application
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11, 12)
Emission	EN55032, EN55011, EN61000-3-2 Class A, EN61000-3-3, EN61000-6-3, EN61000-6-4
Voltage Sag Immunity	SEMI F47 – 0706 @ 200VAC
CE 4ZW4 c UL E197592 US LISTED Ind. Cont. Eq. c UL us E198298	
RoHS Compliant	Yes
Safety and Protection	
Transient surge voltage protection	Varistor
Current limitation at short-circuits approx.	I_{surge} = 105-150% or Po_{max} typically
Surge voltage protection against internal surge voltages	Yes
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 2kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

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RHINO PSV24-480S Power Supply

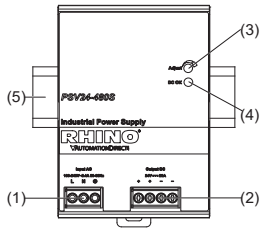


Figure 1

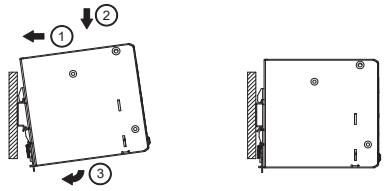


Figure 2

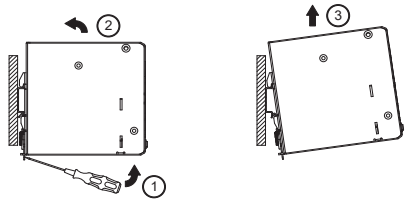


Figure 3

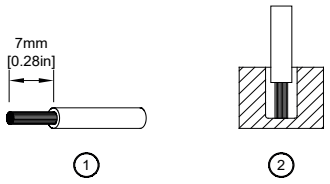


Figure 4

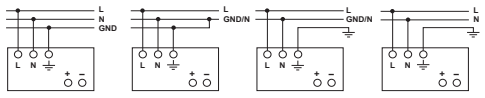


Figure 5

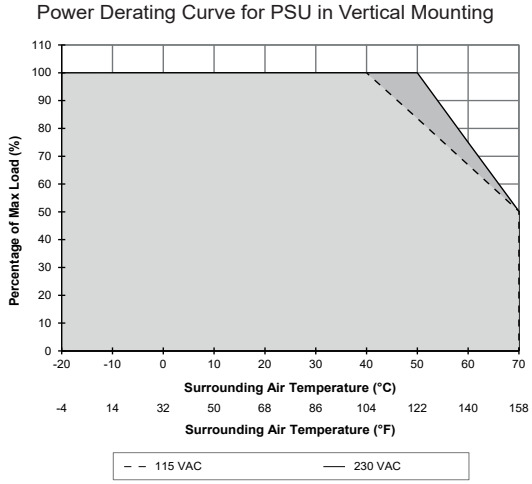


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- If the unit is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- To guarantee sufficient convection cooling, please keep a distance of 50mm above and 18cm below the device as well as a lateral distance of 10mm to other units.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. For vertical mounting, the device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
Input	1.3-3.3	16-12	1.01	9
Output	1.3-3.3	16-12	0.68	6

To secure reliable and shock proof connections, the stripping length should be 7mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2). All wire strands must be fully inserted into the terminals with the screws securely fastened in order to ensure safety and maximum contact.

In accordance to EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60°C/75°C or more to fulfill UL requirements.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 24VDC connection. The output provides 24VDC. The output voltage can be adjusted from 22 to 28 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 28.8-35.2 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of an overload (I_O = 109-130%) the output voltage will start to droop until overload has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. Above +40°C [104°F] (115VAC), the output capacity has to be reduced by 1.67% per degree Celsius increase in temperature.
2. Above +50°C [122°F] (230VAC), the output capacity has to be reduced by 2.5% per degree Celsius increase in temperature.

If the output capacity is not reduced when T_{Amb} > 40°C [104°F] (115VAC) or > 50°C [122°F] (230VAC), the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

RHINO PSV24-480S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	5.4 A typ. @ 115VAC, 2.7 A typ. @ 230VAC
Inrush current limitation (+25°C, cold start)	40A typ. @ 115VAC, 80A typ. @ 230VAC
Mains buffering at nominal load (typ.)	10ms typ. @ 115VAC (100% load) 16ms typ. @ 230VAC (100% load)
Turn-on time	1000ms typ. @ 115VAC & 230VAC (100% load)
Internal fuse	F 10 A / 250V (non-replaceable)
Leakage current	< 1mA @ 264VAC
Output (DC)	
Nominal output voltage U_N / tolerance	24VDC ± 2 %
Voltage adjustment range	22-28 VDC (maximum power ≤ 480W)
Output current	20A
Derating	Refer to Fig. 6 > 40°C (1.67%/°C) @ 115VAC (90-229 VAC) > 50°C (2.5%/°C) @ 230VAC (230-264 VAC)
Startup with capacitive loads	Max. 8,000µF
Max. power dissipation idling / nominal load approx.	5W @ 115VAC (0% load) 4W @ 230VAC (0% load) 50W @ 115VAC (100% load) 40W @ 230VAC (100% load)
Efficiency at 100% load	85.0% typ. @ 115VAC, 88.0% typ. @ 230VAC
PARD (20MHz) at 100% load	< 120mVpp @ -10°C to +70°C < 240mVpp @ -20°C to -10°C
Parallel operation	PSB60-REM40S or with ORing Diode
General Data	
Type of housing	SGCC (Case Cover) / Aluminum (Case Chassis)
LED signals	Green LED DC OK
MTBF	> 700,000 hrs. as per Telcordia
Dimensions (L x W x H)	123.6 mm x 85.5 mm x 128.5 mm [4.87 in x 3.37 in x 5.06 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	1.30 kg [45.9 oz]
Connection method	Screw connection
Stripping length	7mm [0.28 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s² (2G peak); 10min per cycle, 60min for X direction Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m for industrial application 5000m for ITE application
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11, 12)
Emission	EN55032, EN55011, EN61000-3-2 Class A, EN61000-3-3, EN61000-6-3, EN61000-6-4
Voltage Sag Immunity	SEMI F47 – 0706 @ 200VAC
CE 4ZW4 c UL E197592 US LISTED Ind. Cont. Eq. c UL us E198298	
RoHS Compliant	Yes
Safety and Protection	
Transient surge voltage protection	Varistor
Current limitation at short-circuits approx.	I_{surge} = 109-130% or Po_{max} typically (continuous current)
Surge voltage protection against internal surge voltages	Yes
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 2kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

1st Edition, 01/2019

RHINO PSV48-120S Power Supply

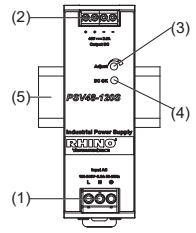


Figure 1

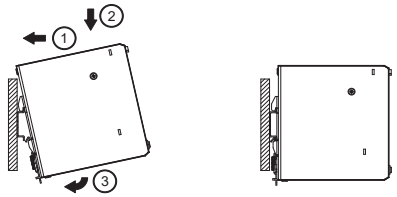


Figure 2

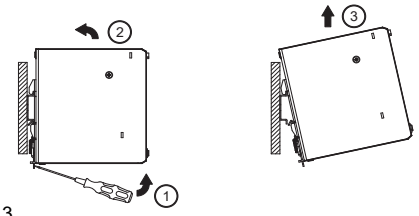


Figure 3

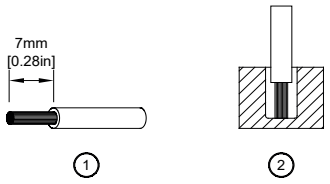


Figure 4

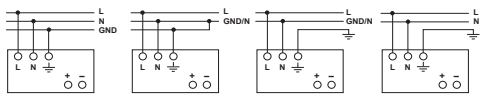


Figure 5

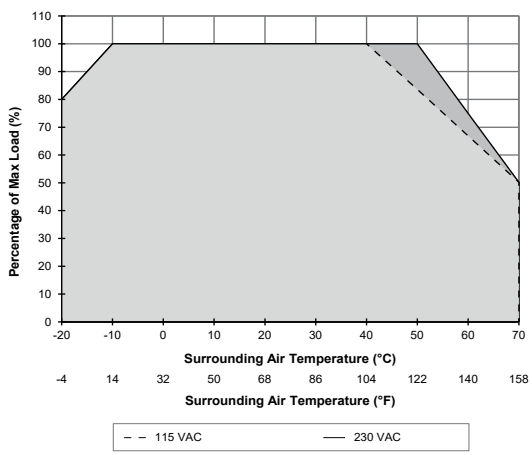


Figure 6

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

1. Safety instructions

- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- If the unit is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- To guarantee sufficient convection cooling, please keep a distance of 50mm above and 18cm below the device as well as a lateral distance of 10mm to other units.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built-in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The unit must be installed in an IP54 enclosure or cabinet in the final installation.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

2. Device description (Fig. 1)

(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting rail system

3. Mounting (Fig. 2)

The power supply unit can be mounted on 35mm DIN rails in accordance with EN60715. For vertical mounting, the device should be installed with input terminal block on the bottom.

Each device is delivered ready to install.

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

4. Dismounting (Fig. 3)

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

5. Connection

The terminal block connectors allow easy and fast wiring.

You can use flexible (stranded wire) or solid cables with cross sections:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N-m*	*lb-in*
Input	0.823-8.365	18-8	1.01	9
Output	0.20-3.3	24-12	0.68	6

To secure reliable and shock proof connections, the stripping length should be 7mm (see Fig. 4 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 4 (2). All wire strands must be fully inserted into the terminals with the screws securely fastened in order to ensure safety and maximum contact.

In accordance to EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60˚C/75˚C or more to fulfill UL requirements.

5.1. Input connection (Fig. 1, Fig. 5)

Use L, N and GND connections of input terminal connector (see Fig. 1 (1)) to establish the 100-240 VAC connection. Typical connection methods are shown in Figure 5.

The unit is protected with an internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above.

The internal fuse must not be replaced by the user.

5.2. Output connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 48 VDC connection. The output provides 48 VDC. The output voltage can be adjusted from 44 to 56 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 56-67.2 VDC.

5.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of an overload (I_O = 105-150%) the output voltage will start to droop until overload has been removed.

5.4. Thermal behavior (Fig. 6)

In the case of ambient temperatures:

1. At -10˚C to -20˚C [14˚F to -4˚F], the output capacity has to be reduced by 2% per degree Celsius increase in temperature.
2. Above +40˚C [104˚F] (115VAC), the output capacity has to be reduced by 1.67% per degree Celsius increase in temperature.
3. Above +50˚C [122˚F] (230VAC), the output capacity has to be reduced by 2.5% per degree Celsius increase in temperature.

If the output capacity is not reduced when T_{Amb} > 40˚C [104˚F] (115VAC) or > 50˚C [122˚F] (230VAC), the device will engage thermal protection by switching off, i.e., the output voltage will go into latch-off mode until the component temperature cools down and the AC power is recycled.

RHINO PSV48-120S Power Supply

Technical Specifications	
Input (AC)	
Nominal input voltage / frequency	100-240 VAC / 50-60 Hz
Voltage range	85-264 VAC
Frequency	47-63 Hz
Nominal current	2.2 A typ. @ 115VAC, 1.2 A typ. @ 230VAC
Inrush current limitation (+25°C, cold start)	20A typ. @ 115VAC, 40A typ. @ 230VAC
Mains buffering at nominal load (typ.)	20ms typ. @ 115VAC (100% load) 90ms typ. @ 230VAC (100% load)
Turn-on time	200ms typ. @ 115VAC & 230VAC (100% load)
Internal fuse	T 4A / 250V (non-replaceable)
Leakage current	< 0.25 mA @ 264VAC
Output (DC)	
Nominal output voltage U_N / tolerance	48VDC ± 2 %
Voltage adjustment range	44-56 VDC (maximum power ≤ 120W)
Output current	2.5 A
Derating	Refer to Fig. 6 -10°C to -20°C (2%/°C), > 40°C (1.67%/°C) @ 115VAC -10°C to -20°C (2%/°C), > 50°C (2.5%/°C) @ 230VAC
Startup with capacitive loads	Max. 4,000µF
Max. power dissipation idling / nominal load approx.	1.21 W / 13.3 W
Efficiency at 100% load	89.0% typ. @ 115VAC, 90.0% typ. @ 230VAC
PARD (20MHz) at 100% load	< 150 mVpp
Parallel operation	PSB60-REM20S / PSB60-REM40S or with ORing Diode
General Data	
Type of housing	SGCC (Case Cover) / Aluminum (Case Chassis)
LED signals	Green LED DC OK
MTBF	> 700,000 hrs. as per Telcordia
Dimensions (L x W x H)	123.6 mm x 40mm x 117.6 mm [4.87 in x 1.57 in x 4.63 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight	0.54 kg [19 oz]
Connection method	Screw connection
Stripping length	7mm [0.28 in]
Operating temperature (surrounding air temperature)	-20°C to +70°C [-4°F to +158°F] (Refer to Fig. 6)
Storage temperature	-40°C to +85°C [-40°F to +185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration	Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6m/s² (2G peak); 10min per cycle, 60min for X direction Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09 Grms); 20 min. per axis for all X, Y, Z directions
Shock	Operating: IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis) Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree	2
Altitude (operating)	2000m for industrial application 5000m for ITE application
Certification and Standards	
Safety entry low voltage	SELV (EN60950)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN55024, EN61000-6-1, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11, 12)
Emission	EN55032, EN55011, EN61000-3-2 Class A, EN61000-3-3, EN61000-6-3, EN61000-6-4
Voltage Sag Immunity	SEMI F47 – 0706 @ 200VAC
CE 3PET c UL E197592 US LISTED Ind. Cont. Eq. c UL us E198298	
RoHS Compliant	Yes
Safety and Protection	
Transient surge voltage protection	Varistor
Current limitation at short-circuits approx.	I_{surge} = 105-150% or Po_{max} typically
Surge voltage protection against internal surge voltages	Yes
Isolation voltage: Input / output Input / PE Output / PE	 3kVAC 2kVAC 0.5 kVAC
Protection degree	IP20
Safety class	Class I with PE connection

1st Edition, 01/2019

RHINO Battery Control Modules Overview

A battery control module (BCM), in combination with an external sealed lead acid battery, can be added to a DC power supply to create a DC uninterruptible power supply (UPS) that will maintain power to a connected load upon loss of mains power.

The battery control module performs several key functions in the DC UPS system. Under normal conditions, it monitors the status of the DC input power, monitors and controls charging of the external lead acid battery, and provides status/alarm contacts to allow remote monitoring of the state of the UPS.

In the event that the DC power supply voltage drops out, the BCM monitors and supplies power to the load from the battery and monitors the battery during discharge.

Several battery control modules, with a range of features, are available for use with RHINO power supplies. Key differentiating features of the battery control modules are delineated in the following table.

Battery Control Module Selection Guide

Part Number	PSH-BCM360S	PSB24-BCM960S	PSL-24-BCM240	PSM24-BCM360S
Price	$290.00	$73.00	$38.00	$235.00
Drawing Link	PDF	PDF	PDF	PDF
Highlights	Most versatile	Highest power Lowest cost/watt Conformal coating	Lowest cost	Legacy
Nominal Output Voltage	24/48 VDC	24 VDC	24 VDC	24 VDC
Amperage Rating	15A at 24 VDC, 7.5 A at 48 VDC	40A	10A	15A
Number of Power Inputs	Redundant inputs for two independent power supplies	One power supply	One power supply	One power supply
Battery Type	12V sealed lead acid	24V sealed lead acid	24V sealed lead acid	24V sealed lead acid
Protection Type	Over voltage, Over current, Deep discharge, Reverse polarity, Battery overcharge, Over temperature			
Battery Temperature Compensation	Yes	No	No	Yes
Compatibility	Universal	Universal	Universal	Requires RHINO PSM24 power supply









RHINO Battery Control Module PSH-BCM360S

Safety Instructions

- ***Read these instructions carefully and completely before installation.***
- These instructions cannot account for every possible condition of installation, operation or maintenance. The equipment must be installed and put into service by qualified personnel only.
- Before any installation, maintenance or modification work ensure that the main switch is switched off and prevented from being switched on again. Non-observance, touching of any live components or improper handling of this power supply can result in death, severe personal injury or substantial property damage. Proper and safe operation is dependent on proper storage, handling, installation and operation.
- Compliance with the relevant national and local regulations must be ensured. Before operation is started the following conditions must be ensured:
  - When stranded wires are used, all strands must be fastened in the terminal blocks. (Potential danger of contact with the case.)
  - Power supply and mains cables must be sufficiently fused.
  - All output wires must be rated for the equipment output current and must be connected with the correct polarity.
  - Sufficient cooling must be ensured.
- ***Never work on the equipment if power is supplied!*** Risk of electric arcs and electrical shock, which can cause death, severe personal injury or substantial property damage.
- ***Warning:*** Hazardous voltages and components storing a very substantial amount of energy are present in this power supply during normal operating conditions. However, these are inaccessible. Improper handling may result in an electric shock or serious burns!
- Do not open the equipment.
- Do not introduce any objects into the equipment.
- Adjustment potentiometer(s) may only be actuated using an insulated screwdriver.
- Keep away from fire and water.

Recycling

The unit contains elements that are suitable for recycling, and components that need special disposal. You are therefore requested to make sure that the power supply will be recycled in an environmentally friendly manner at the end of its service life.

FOR TECHNICAL ASSISTANCE CALL 770-844-4200



Features

- Universal battery controller module for interruptible 24VDC and 48VDC bus voltage
- Redundant inputs for two independent sources
- Battery protection for over voltage, deep discharge, short circuit and reverse connection
- Alarm outputs for input, output and battery condition
- Remote On/Off for battery
- Controlled end of charge voltage by optional temperature sensor

General Description

The PSH-BCM360S module provides a professional battery management system to charge and monitor an external 12V lead-acid battery with a capacity greater than 2.5 Ah. This module is a standalone unit and is designed to function with any 24VDC or 48VDC power supply output regulated to 1% or better. Together with one or a pair of 24VDC or 48VDC power supplies a perfect DC-UPS system can be configured.

The load voltage is configured through the means of a jumper on the unit with selectable 24VDC or 48VDC voltage levels. No other signals are required between the PSH-BCM360S and the connected power supplies for correct operation of the module.

The connected battery will be charged and held in charged mode by the power supply. In the event of a mains power failure the battery will supply output power without interruption.

A step up converter is used to maintain the selected output voltage level, Vnom – 6% (typical). To avoid overcharging the battery, an optional external temperature sensor can be used to adjust the battery voltage automatically to the required end-of-charge voltage. This can extend the battery life.

The battery is protected against deep discharge. Mains power and battery status are monitored regularly and failures indicated by corresponding LEDs and alarm outputs.

The module also offers the unique feature of redundant inputs as well as the battery backup. Redundancy is achieved by two internal decoupling diodes which allow operation with two independent voltage sources in order to increase the reliability of the output even further.

Mechanical Installation

This equipment is designed for professional indoor systems. In operation the equipment must not be accessible.

The correct mounting position for optimal cooling performance must be observed. Mount the equipment upright on horizontal DIN rail. Do not cover any ventilation holes. Leave a free space of minimum 80mm [3.15 in] above and below the power supply and on each side of the power supply leave a minimum space of 25mm [0.98 in] which allows air convection. Observe power derating.

To attach the module to the DIN rail, hook top part of clip on the DIN rail, then push down and inward until you hear a clicking sound. To remove the device, pull the latch of the clip using an insulated flathead screwdriver. When the clip has cleared the bottom of the DIN rail remove the screwdriver from recess. Lift the device off the DIN rail.

Electrical Installation

Only qualified personnel should carry out the installation. Following correct mounting of both the power supply and the BCM, the following steps must be followed to ensure correct connection and commissioning of the system.

1. Make sure the mains power is switched off, secured against switch on and not yet connected to the power supply.
2. Connect the power supply output to DC input of the BCM.
3. Ensure the blade fuse is correctly inserted into the BCM.
4. Configure the BCM module for your power supply voltage by choosing the jumper position J6 (see Figure 1).
5. Exercising caution, the AC power wires should now be connected to the power supply. Ensure that AC power is disabled by external isolation switch or circuit breaker.
6. When AC supply connection wires are connected and safe isolation is verified, AC power can now be switched on.
7. The potentiometer on the BCM is set by the factory to suit the recommended valve regulated lead acid battery from Panasonic and equivalent types and should not be adjusted by the user, unless lead acid batteries of different voltage temperature characteristics are connected. If a non recommended battery is used, the output voltage of the BCM module needs to be adjusted to the correct "End of Charge Voltage" obtained from battery manufacturer. Refer to the Battery Remote On/Off section to disconnect the battery, and set the required voltage using the potentiometer and a voltmeter.
8. If used, the temperature sensor should now be fixed to the battery and connected to the TS input on the BCM (Figure 2).
9. The battery wires should be connected on the BCM module; DO NOT connect to the battery first.
10. Then connect the battery wires on the battery.
11. For proper operation, a new system should always start up with a fully charged battery. If a fully charged battery is not connected, the battery should be charged in full over night before any load is applied to the output of the BCM module.
12. To verify proper functionality, switch off the input AC power at the external circuit breaker and output power should be supplied from the battery if a fully charged battery has been connected.
13. The system is now fully operational and the output load can be connected.

Operation

Battery Backup for UPS Operation

The PSH-BCM360S module extends any 24VDC or 48VDC power supply to perform as an uninterruptible DC power supply. This is achieved by connecting a 12V lead-acid battery to the BATT_IN connector of the unit. During normal operation, the connected power supply provides energy to load with a voltage level of Vin –0.5 V (typical, 0.5 V loss due to internal decoupling diodes) as well as charging the connected battery. If the connected supply fails, the battery is then connected to the load (battery power mode), a step up converter is used to maintain the selected output voltage level, Vnom – 6% (typical).

Dual Inputs for Redundancy

The module provides two inputs to connect two power supplies to facilitate a redundant system. If one of the two connected sources fails then the second supply will provide energy to load maintaining the desired operation of the unit. The unit is designed to work with any type of fully stabilized 24V or 48V power supply.

Output Voltage Level and Efficiency

The PSH-BCM360S module functions with both 24VDC (15A) and 48VDC (7.5 A) supplies. The desired voltage is selectable by means of a jumper located on the side of the unit. It also offers very high efficiencies with up to 96% and 98% efficiency in normal mode for 24V and 48V modes respectively. In the battery power mode efficiencies are as high as 92% and 89% for 24V and 48V modes respectively.

Configuration Jumpers

One set of configuration jumpers (J6) are located on the top of the module (Figure 1).

Configuration Jumper Settings			
Jumper	***Parameter***	***Fitted***	***Not Fitted***
A	Battery test period	15 sec	10 min (default)
B	Output voltage setting	24V (default)	48V
C	Not in use (spare jumper fitted)		

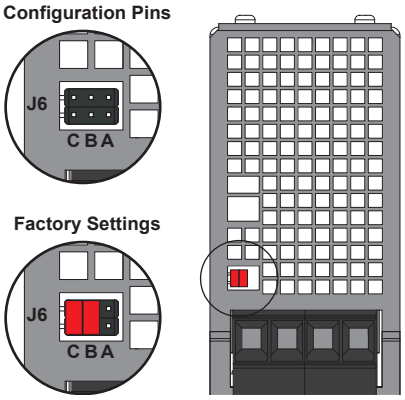


Figure 1 – Configuration Jumpers (Top of Unit)

Signals

The PSH-BCM360S module provides three signals to the user as an indication of the status of the unit; these signals are made available as LED indicators and corresponding isolated relay contacts (Figure 2) and are as follows.

Status Signals	
Signal	***Description***
DC-IN-OK	The DC-IN-OK LED will illuminate and relay will close if at least one of the inputs is present and has a voltage within +20% / –3% tolerance.
BATT-OK	The BATT-OK LED will illuminate and relay will close if the battery is charged and has a low internal resistance. During battery discharge operation this signal monitors the output voltage and will switch off the LED and open the relay when the battery approaches the disconnection voltage.
DC-OUT-OK	The DC-OUT-OK LED will illuminate and relay will close if the output voltage of the unit is higher than 85–90% of the nominal output voltage.

Note: All Signal Relay contacts are rated for 30VDC/1A, 60VDC/0.5 A.

Indicator LEDs – Status at a Glance			
DC-IN-OK	BATT-OK	DC-OUT-OK	
●	●	●	The BCM is operating normally.
○	●	●	Battery is supplying power to the load, and has sufficient charge.
○	○	●	Battery is supplying power to the load, but the battery voltage has dropped to near its threshold level.
○	○	○	NO power provided to the load. The battery is discharged below its operating threshold and no DC input power is present.

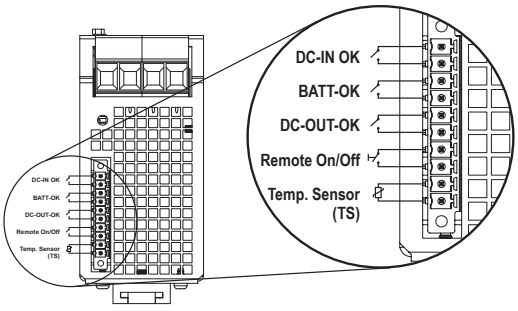


Figure 2 – Signal Connector Pinout (Bottom of Unit)

Battery Remote On/Off

The PSH-BCM360S module provides a Battery Remote On/Off input (2 pins on signal connector) intended to facilitate using the potentiometer to set a new battery charge voltage level.

Battery Remote On/Off Input		
Battery State	***Battery Remote On/Off Pins***	***Voltage***
Connected	Open Circuit	5V
Disconnected	Short Circuit	<1V

If this input is short circuited (switch closed in Figure 3) the battery will be disconnected from the unit by means of an internal relay. A voltage of 1V or less across the Battery Remote On/Off terminals will disconnect the battery from the unit. If the Battery Remote On/Off signal is set to off (short between pins) this will not affect the output of the unit in normal mode, however the battery will be disconnected, hence it will not charge. If the unit enters battery power mode while the Battery Remote On/Off signal is off, the battery will remain disconnected, hence no energy will be supplied to the load.

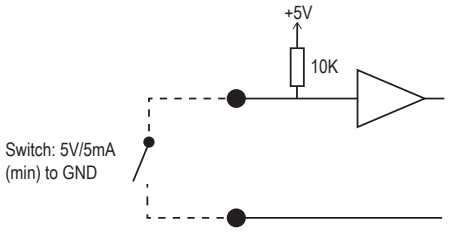


Figure 3 – Simplified Battery Remote On/Off Circuitry

Battery

When the input DC voltage is present, the PSH-BCM360S unit will automatically charge the connected battery to a set end of battery charge voltage level, factory set for 25ºC for lead-acid batteries, using a constant current charging method of 1A (typical). As the battery voltage approaches the end of battery charge voltage level, the current will decrease proportionality; this characteristic is shown in Figure 4. If the battery specs differ from the 25ºC default setting and the temperature sensor is not used, the user can adjust the set end of battery charge voltage level by means of the "Battery Voltage Adjust" potentiometer.

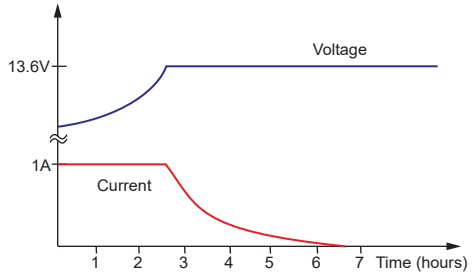


Figure 4 – Battery Charge Characteristics

Note: For Cycle Use (repeated charging and discharging of battery), we recommend a charge current of 0.4 CA or smaller (C = battery capacity), therefore batteries with a capacity of 2.5 Ah or less should not be used with this module.

Temperature Sensor

The module also provides an input connector for an optional temperature compensation probe (part #PSM-TS). If this probe is connected, the unit will automatically compensate the end of battery charge voltage level depending on the measured temperature. The connection of the temperature probe also eliminates the need to change the potentiometer to compensate for a new temperature. The battery end voltage compensation curve is shown in Figure 5. (Applicable to factory setting of 13.6V/ 25ºC)

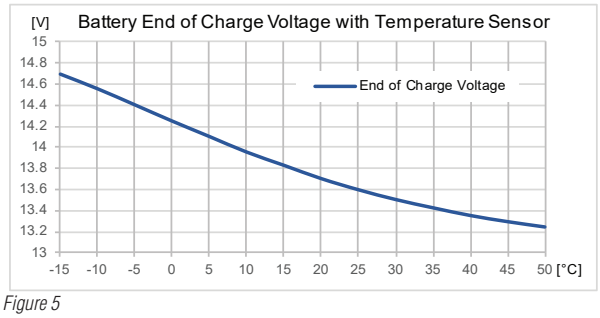


Figure 5

Battery Protection

The PSH-BCM360S module protects the connected battery against short circuit and overload by the means of a built in 40A fuse. This fuse is a standard 40A blade type fuse, which is accessible from the front panel of the unit for ease of replacement should the fuse be damaged during operation. The module also prevents deep discharge of the battery by disconnecting the battery from the load once the voltage level of battery has dropped below a defined threshold. An early warning of this disconnection is given to the user by the BATT-OK signal. The BATT-OK signal will switch off when the battery voltage is roughly 1V above the deep discharge threshold.

Ambient temperature and power rating

The PSH-BCM360S module operates at temperatures between –25°C and +70°C, with a minimum start-up temperature of –25°C. In normal mode the module can deliver full power up to 60°C. Refer to lead-acid battery spec sheet suggested operating temperature range and charge and discharge instructions below 0°C.

In Battery Power mode, a current derating of 2%/°C is required for 24V applications above 50°C. The boost current of 15A is available at ambient temperatures up to 40°C for a duration of 10 minutes as shown in Figure 6.

In Battery Power mode, a current derating of 2%/°C is required for 48V applications above 40°C. The boost current of 7.5 A is available at ambient temperatures up to 40°C for a duration of 3 minutes as shown in Figure 7.

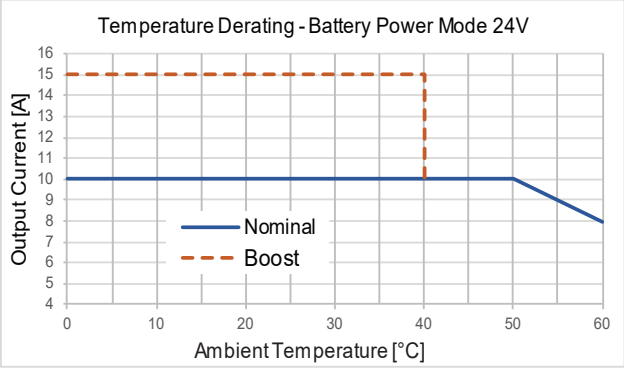


Figure 6

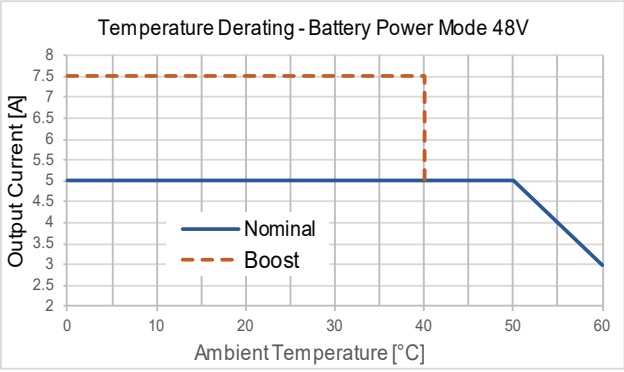


Figure 7

Technical Specifications

Technical Specifications		
Input Specifications		
Inputs		2 x 360W, for any single or two identical 24VDC or 48VDC sources
Input Voltage Range		24–28VDC or 48–56VDC (range selection with jumper)
Output (DC)		
Max. Output Power		360W
Output Voltage / Current	Normal Mode	24VDC mode: Vin – (0.4–0.8 V); 15A max. 48VDC mode: Vin – (0.4–0.7 V); 7.5 A max.
	Battery Power Mode	24VDC mode: 22.2–22.9 V; 10A (15A in boost mode for 10 min) 48VDC mode: 44.6–45.3 V; 5A (7.5 A in boost mode for 3 min)
Efficiency (load >50% of I_{out} max.)		Normal mode: 94–98% (battery charged) Battery power mode: 87–92%
General Specifications		
Backup Battery		12V lead-acid battery with a capacity greater than 2.5 Ah (purchased separately)
Battery Protection		Against over voltage, deep discharge, overcharge, short circuit and reverse connection (built-in 40A user-replaceable blade fuse)
Signals	Status	DC OK input, DC OK output, BAT OK all relay contact closed and LED on at status OK
	Contact Rating	30VDC / 1.0 A max. 60VDC / 0.5 A max.
Battery Charging Current		0.8 – 1.2 A
Nominal Battery Voltage (at 25°C)		13.6 VDC (factory setting)
Battery Voltage Adjustment Range		13.2 – 14.4 VDC
BCM Over-temperature Protection		100°C at back of BCM housing
Battery Resistance Test		100mOhm min. (normal mode at 25°C)
Battery Test Current		2.5A / 60ms typ. (normal mode at 25°C)
Battery Test Interval (Jumper Setting)		15s or 10min
Battery Warning		10.4 – 11.4 VDC (battery power mode only)
Battery Disconnection		9.1 – 9.7 VDC (battery power mode only)
Battery Remote Off		disconnects battery, prevents battery power mode
Automatic Battery Temperature Compensation Range		–15°C to +50°C [+5°F to +122°F]
Enclosure Material (Chassis/Cover)		Aluminum / Stainless Steel
Weight		730g [25.8 oz]
Mounting		DIN rail (EN 50022-35x15/7.5), snap-on self-locking spring
Connections	Input, Output, Battery	Screw terminal (plug included)
	Signal, Control	Detachable screw terminals (plugs included)
Safety / Environmental		
Operating Temperature	Normal Mode	–25°C to +60°C [–13°F to +140°F] max. (without derating)
	Battery Power Mode, Nominal	24VDC mode: derating above +50°C: 2.0 %/K 48VDC mode: derating above +40°C: 2.0 %/K
	Battery Power Mode, Boost	24VDC mode: up to +40°C for 10 minutes max. 48VDC mode: up to +40°C for 3 minutes max.
Storage Temperature		–25°C to +85°C [–13°F to +185°F] max.
Temperature Coefficient		0.02 %/K
Humidity		95% relative humidity max., non-condensing
Maximum Altitude		2000m
Safety Standards		IEC/EN 60950-1, UL 60950-1 (2nd) + Am1:2011, UL508 requirements
MTBF (acc. to IEC 61709 at 25°C)		> 1,500,000 hrs
Protection Class		Class I
Degree of Protection		IP20 (IEC/EN 60529)
Electromagnetic compatibility (EMC)		Based on connected unit (no internal switching device)
Vibration Acc. IEC 60068-2-6		3 axis, 1 g sine sweep, 10–55 Hz, 1 oct/min
Shock Acc. IEC 60068-2-27		3 axis, 15 g half sine, 11ms
Safety Approvals		CSA (tested to UL60950, UL508), File 229285 CB test certificate IEC 60950-1 (SIQ for EN)

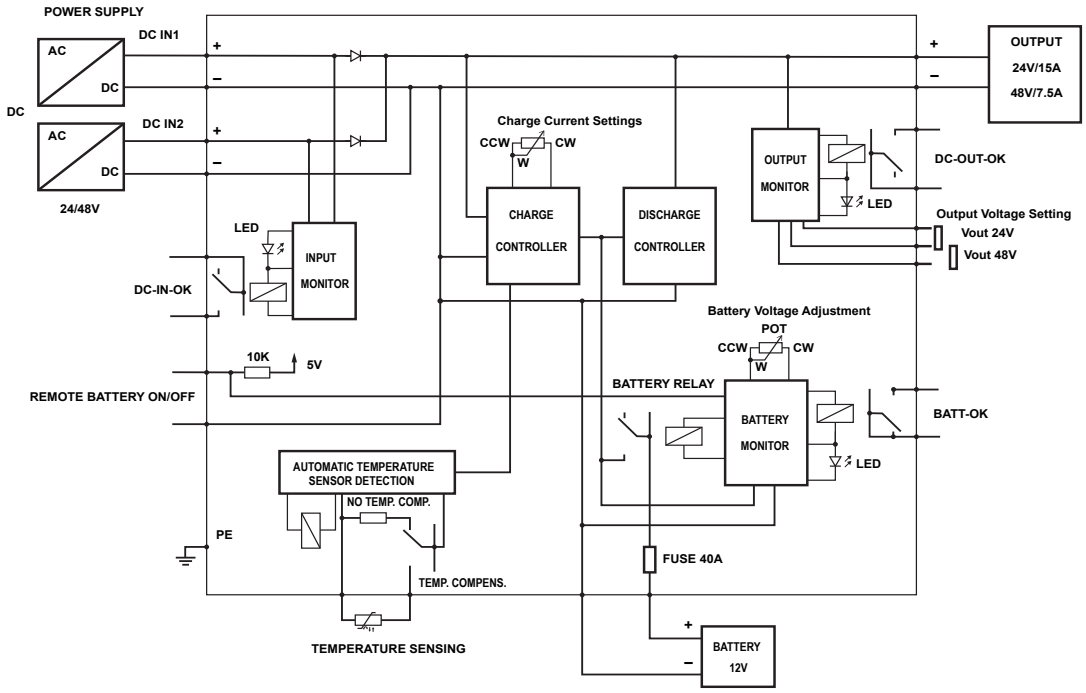
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Electrical Connections and Wire Size

Electrical Connections and Wire Size		
	24V	***48V***
Input & Output*	14–7 AWG Max resistance 20mΩ	17–7 AWG Max resistance 40mΩ
Battery Input	11–7 AWG; Max resistance 10mΩ	
Status and Control Signals	32–12 AWG	
Tightening Torque	Input, Output, Battery: 1.76 N·m Status and Control Signals: 0.19 N·m	
Stripping Length	7.0 mm	

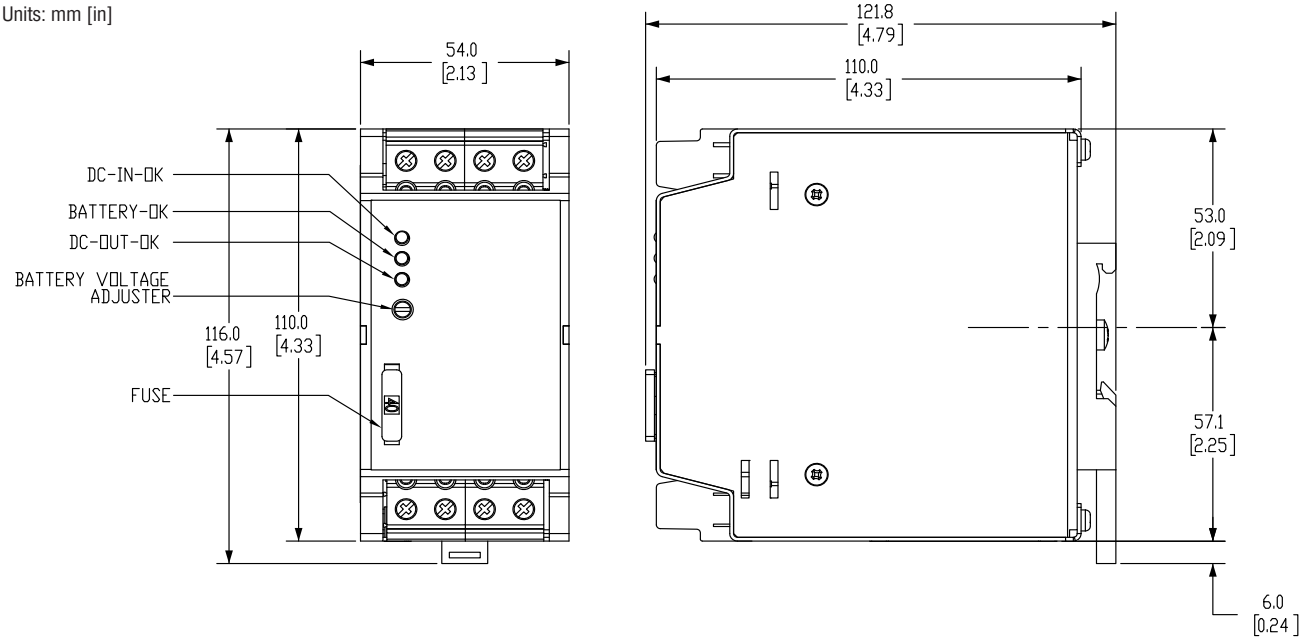
**** Input cable (from power supply) and Output cable (to load) must be the same gauge wire.***

Functional Diagram



Outline Dimensions

Units: mm [in]



The correct mounting position for optimal cooling performance must be observed: Mount upright on horizontal DIN rail. Do not cover any ventilation holes. Leave a free space of minimum 80mm [3.15 in] above and below the power supply and on each side of the power supply a minimum space of 25mm [0.98 in] which allows air convection.

RHINO PSB24-BCM960S Battery Control Module



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Overview

The PSB24-BCM960S battery control module is designed to support a 24V system with up to 40A output and 4.5 minutes back up time for 15AH battery capacity. It offers a wide input voltage from 24-28V and a wide operating temperature range from -20°C to 60°C. This product comes with dry contacts for battery management signals and LED indicator for battery status. The rugged compact aluminum case is shock and vibration resistant according to IEC 60068-2.

Features

- Full corrosion resistant Aluminum chassis
- Suitable for 24V system up to 40A
- Built-in diagnostic monitoring for DC OK, Discharge and Battery Fail by relay contacts
- LED indicator for DC OK, Battery Fail, DC Input, Battery Reverse Polarity and Battery Discharge
- High MTBF > 500,000 hrs as per Telcordia SR-332
- Wide operation temperature range from -20 to 60°C
- Conformal coating on PCBA to protect against chemical and dust pollutants

Device description (Fig. 1)

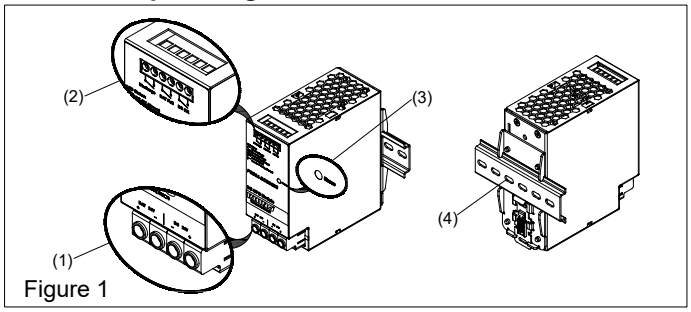


Figure 1

1. Input & Output/Battery terminal block connector
2. Signal terminal block connector
3. LED display status
4. Universal mounting rail system

RHINO PSB24-BCM960S Battery Control Module

Mounting

The unit can be mounted on 35mm DIN rails in accordance with EN60715. For vertical mounting, the device should be installed with Input & Output/Battery terminal block on the bottom. For horizontal mounting, the device should be installed with Input & Output/Battery terminal block on the left side.

Each device is delivered ready to install.

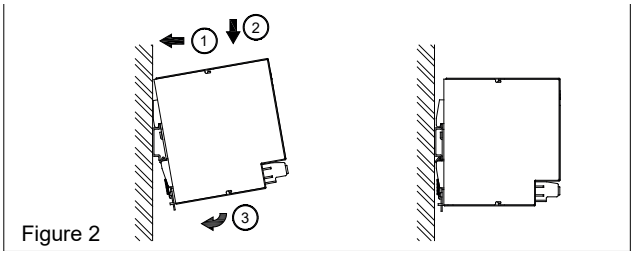


Figure 2

Snap on the DIN rail as shown in Fig. 2:

1. Tilt the unit slightly upwards and put it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

Dismounting

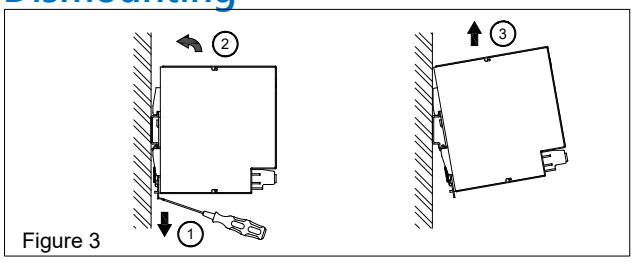


Figure 3

To uninstall, use a flat screwdriver to pull or slide down the latch as shown in Fig. 3. Then, slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

Orientation

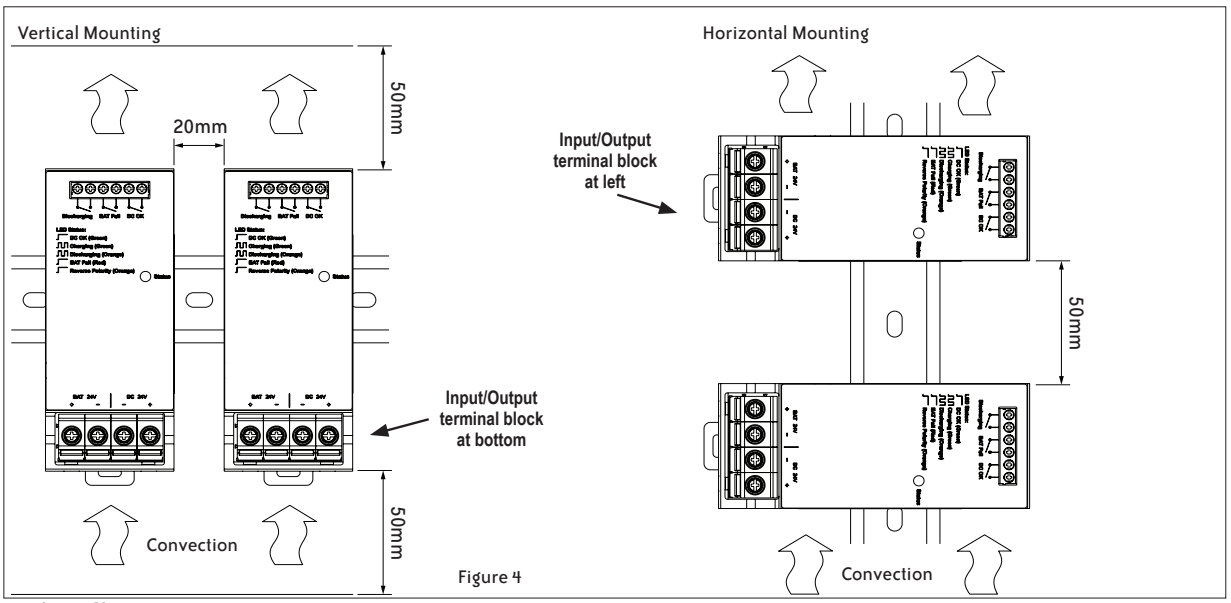


Figure 4

Connection

The terminal block connectors allow easy and fast wiring. The terminal block is IP20 compliant and thus provides the user safety and protection from electrical shock hazards.

You can use flexible (stranded wire) or solid cables as follows:

Electrical Connections and Wire Size

	Stranded / Solid		Torque		Remarks
	mm²	AWG	N·m	lb·in	
Battery	3.3-13.3	12-6	1.52	13.5	Load: 0-20A
DC In/Out	8.4-13.3	8-6	1.52	13.5	Load: 20-40A
Signal	0.2-3.3	24-12	0.61	5.4	-

Wires between the battery control module and battery must not be longer than 2m [6.5 ft]. For reliable and shockproof connections, the wire stripping length should be 10mm for Input & Output/Battery terminal block connector and 7mm for Signal terminal block connector (see Fig. 5 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 5 (2).

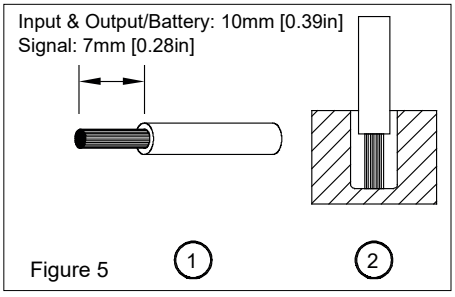


Figure 5

In accordance with EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60°C/75°C for USA or at least 90°C for Canada.

RHINO PSB24-BCM960S Battery Control Module

Signal Wiring Diagram

Contact current: Imax = 1A
Contact voltage: Vmax = 24VDC/VAC (Secondary circuit)
No polarity requirement.

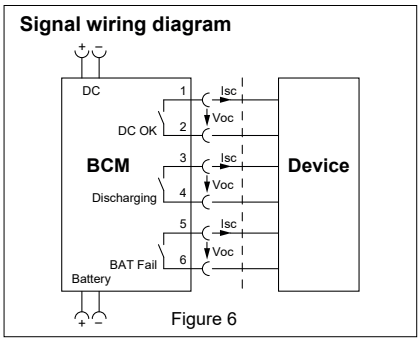


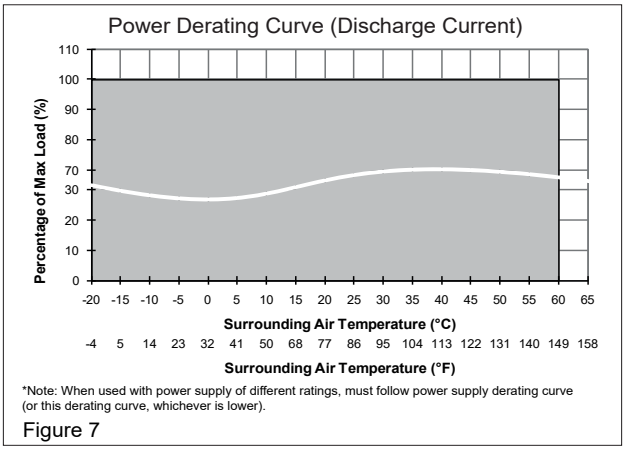
Figure 6

Status Indicators				
BCM Status	Relay Output Connector			LED Display Status
	Discharging	BAT Fail	DC OK	
Battery Fully Charged	Open	Open	Closed	Green LED On
Battery Charging	Open	Open	Closed	Green LED Flashing
Battery Discharging* [Buffering Mode]	Closed*	Open	Closed	Orange LED Flashing
No Battery Connected	Open	Closed	Open	Red LED On
Output Shutdown	Open	Open	Open	No Light

*** With output current 3A to 40A.**

Buffering Time			
Output Current	7.5 AH	12AH	15AH
2.5 A	6,500s	14,500s	19,000s
5A	3,000s	7,000s	9,000s
10A	1,200s	2,400s	3,200s
20A	400s	1,100s	1,500s
30A	120s	450s	600s
40A	25s	200s	280s

Power Derating



*Note: When used with power supply of different ratings, must follow power supply derating curve (or this derating curve, whichever is lower).
Figure 7

Buffering Time

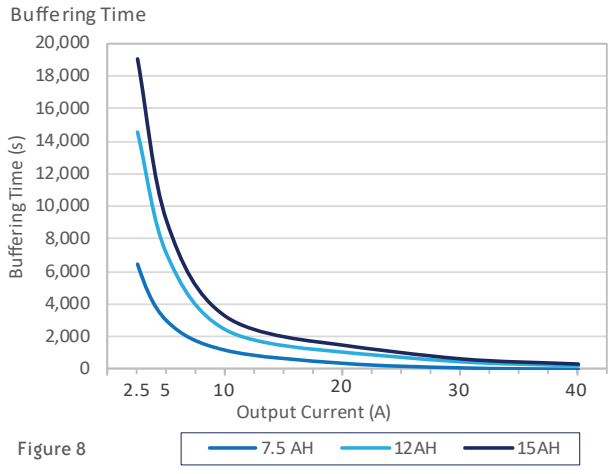


Figure 8

Typical Application Notes

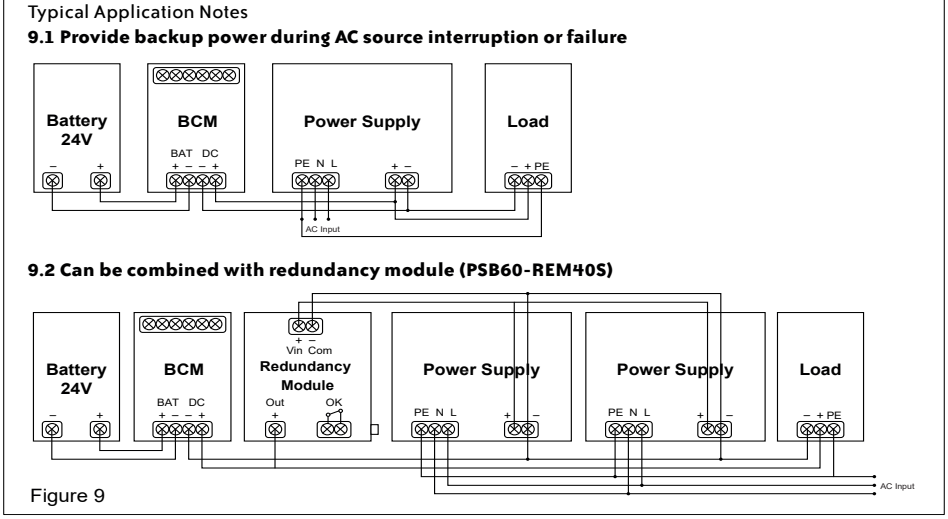


Figure 9

RHINO PSB24-BCM960S Battery Control Module

Technical Specifications	
Input (DC)	
Nominal input voltage	24VDC
Voltage range	24-28VDC
Maximum input voltage	30 ± 0.5 VDC
Input current	Charging Mode: 2.0 ± 1.0 A [25°C], Discharging Mode: 40A Max.
Maximum inrush current (cold start)	< 45A [25°C]
Charging time	< 3 hr ± 1 hr [25°C]
Efficiency	Charging Mode: > 70.0%, Discharging Mode: > 99.0%
Output (DC)	
Nominal output voltage	24VDC typ. [depends on Vin]
Discharging voltage	23-28 VDC
Maximum output voltage	30 ± 0.5 VDC
Output current	40A Max.
Derating	Refer to Fig. 7
Component derating	Vin = 28.0 VDC, Max. load
Short circuit / Overload	No damage
Batteries	
Recommended battery types	24V VRLA or 2 x 12V VRLA
Recommended battery capacity	7.2-15.0 Ah
Battery voltage range	23-28VDC [continuous operating], 30VDC Max [maximum voltage that will not cause damage to the unit] 14VDC Min [voltage level of battery to enable "BAT Fail" function]
Battery fuse	Auto 50A / 80V, FK3 [Littelfuse] or similar in the battery path [protects the wires between the battery and the battery control module]
General Data	
Type of housing	Aluminum
LED signals	Green LED On = Unit is fully charged Green LED Flashing = Unit is charging Orange LED Flashing = Unit is discharging Red LED On = Battery fail (no battery is connected) Orange LED On = Battery 24 V or DC 24 V reverse polarity
Signal relay contacts	DC OK = Contact is closed when battery is fully charged and the unit is ready to discharge/buffer. DISCHARGING = Contact is closed when the unit is discharging/buffering with output current of 3-40 A. BATTERY FAIL = Contact is closed when the battery fails to function.
MTBF	> 500,000 hrs. as per Telcordia
Weight	0.39 kg [14 oz]
Connection method	Screw connection
Stripping length	Input & Output/Battery terminal block connector: 10mm [0.39 in] Signal terminal block connector: 7mm [0.28 in]
Operating temperature (surrounding air temperature)	-20 to 60°C [-4 to 140°F] [Refer to Fig. 7]
Storage temperature	-25 to 85°C [-13 to 185°F]
Humidity at +25°C, no condensation	< 95% RH
Vibration (non-operating)	10Hz to 500Hz @ 30m/S² [3G peak]; displacement of 0.35mm; 60 min per axis for all X, Y, Z direction. Refer to IEC60068-2-6. Note: all figures quoted are amplitudes [peak values]
Shock (in all directions)	30G [300m/S²] in all directions according to IEC60068-2-27
Pollution degree	2
Altitude (operating)	3000m

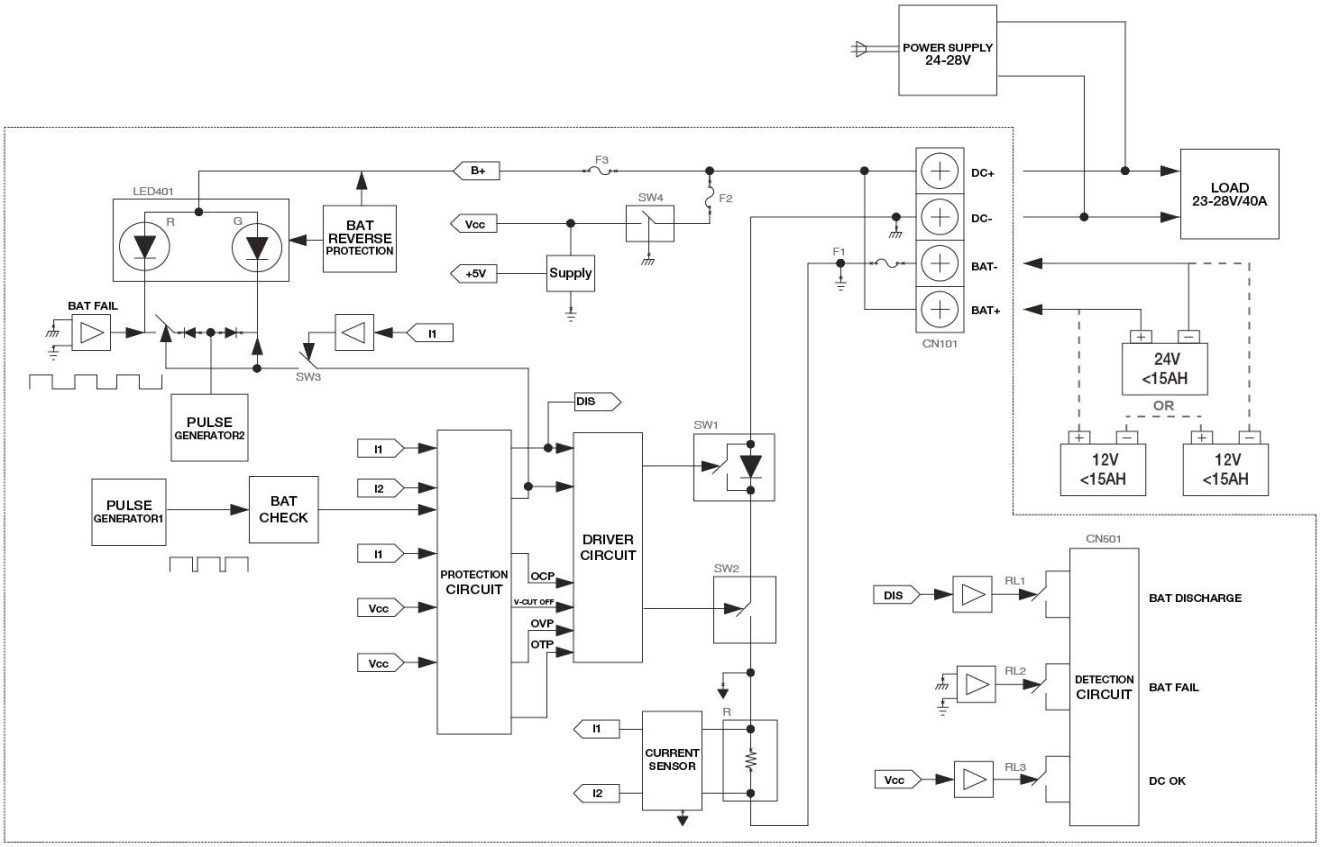
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RHINO PSB24-BCM960S Battery Control Module

Technical Specifications (continued)		
Certification and Standards		
Electrical equipment of machines		IEC60204-1
Electronic equipment for use in electrical power installations		EN50178 / IEC62103
Safety entry low voltage		PELV [EN60204], SELV [EN60950]
Electrical safety (of information technology equipment)		UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 File No. E198298, CB scheme to IEC60950-1
Industrial control equipment		UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01, CSA to CSA C22.2 No.107.1-01 File No. 249074
Protection against electric shock		DIN57100-410
CE		In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use		EN61204-3
Immunity		EN55024, EN61000-6-2 [EN61000-4-2, 3, 4, 5, 6, 8]
Emission		EN55032, EN55011
Agency Approvals		CE; 3PET c UL E197592 US LISTED Ind. Cont. Eq.; c UL us E198298; 249074 CSA
RoHS Compliant		Yes
Safety and Protection		
Isolation voltage:	***Input & Output / PE***	1kVAC
	Signal / PE	1kVAC
	Input & Output / Signal	1kVAC
Polarity protection		Yes
Protection degree		IP20
Safety class		Class III

RHINO PSB24-BCM960S Battery Control Module

Block Diagram



RHINO PSL-24-BCM240 Battery Control Module

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE. KEEP FOR FUTURE REFERENCE.

General Description

The PSL-24-BCM240 battery control module is designed to use in small cabinets where space is very critical. It requires less installation space due to its flat body with depth of only 55.6 mm, 71mm wide and 91mm tall. The tough plastic case is flame retardant, certified to UL 94V-0 specification. The module supports 24VDC systems with external battery up to 12AH capacity and comes with contacts for battery management signals and an LED indicator for battery status. The highly efficient convection cooled design is certified to major safety approvals including IEC/EN/UL 60950-1 for ITE and UL 508 for Industrial, which allows the module to be used reliably in most industrial applications.

IMPORTANT SAFETY INSTRUCTIONS

- Retain these instructions. This manual contains important safety instructions.
- When replacing batteries, only use the same type of batteries as described in the Specifications.
- Proper disposal of batteries is required. Refer to the relevant local codes for disposal requirements.
- Switch main power off before connecting or disconnecting the device. Danger of explosion!
- If the orange status LED is on steady, this indicates a failure in the installation. In this case, do not turn on power supply while the battery is connected. Danger of explosion!
- To guarantee sufficient convection cooling, keep a distance of 20mm above and below the device as well as a lateral distance of 5mm to other units. See Figure 4.
- Please note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The mains power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- This is a built-in unit and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- **CAUTION: FOR USE IN A CONTROLLED ENVIRONMENT.**

Risk of electrical shock, fire, personal injury or death.

1. Turn power off before working on the device.
2. Make sure the wiring is correct by following all local and national codes.
3. Do not modify or repair the unit.
4. Use caution to prevent any foreign objects from entering into the housing.
5. Do not use in wet locations.
6. Do not use the unit in area where moisture or condensation can be expected.



3PET E197592 LISTED Ind. Cont. Eq.

E198298

Highlights & Features

- Suitable for 24V system up to 10A
- Zero switch over time from loss of DC input to battery operation
- Built-in diagnostic monitoring for DC OK, Discharge and Battery Fail by relay contacts
- Full power over entire operating temperature range from -20°C to +60°C
- LED indicators for DC OK, Battery Charging, Battery Discharging, Battery Fail and Battery Reverse Polarity
- High MTBF > 500,000 hrs. as per Telcordia SR-332
- Overvoltage, overcurrent, over temperature, short circuit protections
- Powered systems may include unbuffered loads

Device description (Fig. 1)

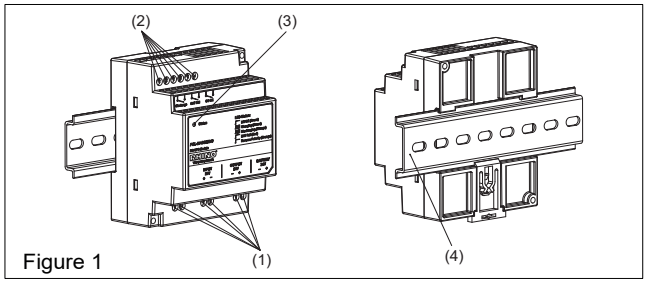


Figure 1

(1) Input/Output/Battery terminal block connector
(2) Signal terminal block connector
(3) LED display status
(4) Universal mounting rail system

FOR TECHNICAL ASSISTANCE CALL 770-844-4200

Mounting

The unit can be mounted on 35mm DIN rails in accordance with EN60715. For vertical mounting, the device should be installed with Input/Output/Battery terminal block on the bottom.

Each device is delivered ready to install.

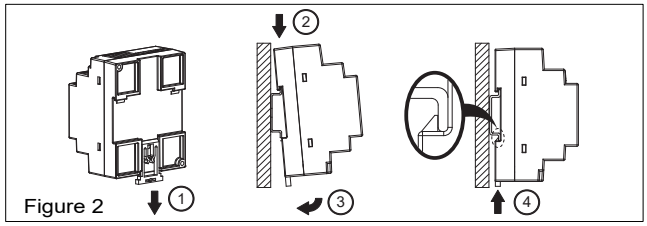


Figure 2

Snap on the DIN rail as shown in Fig. 2:

1. Pull the unit's DIN rail latch DOWN.
2. Tilt the unit slightly upwards, hook the top end onto the DIN rail and push downwards until stopped.
3. Position the bottom front end against the DIN rail.
4. Push the unit's latch DIN rail UP to lock.

Dismounting

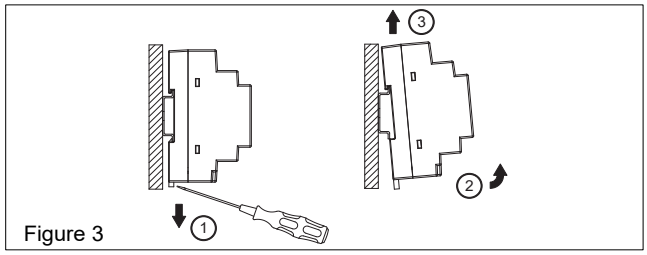


Figure 3

To uninstall:

1. Use a flat screwdriver to pull or slide down the latch as shown in Fig. 3.
2. Tilt the bottom part of the unit out.
3. Push the unit up and pull out from the DIN rail.

Orientation

To guarantee sufficient convection cooling, keep a distance of 20mm (0.79 inch) above and below the device as well as a lateral distance of 5mm (0.2 inch) to other units.

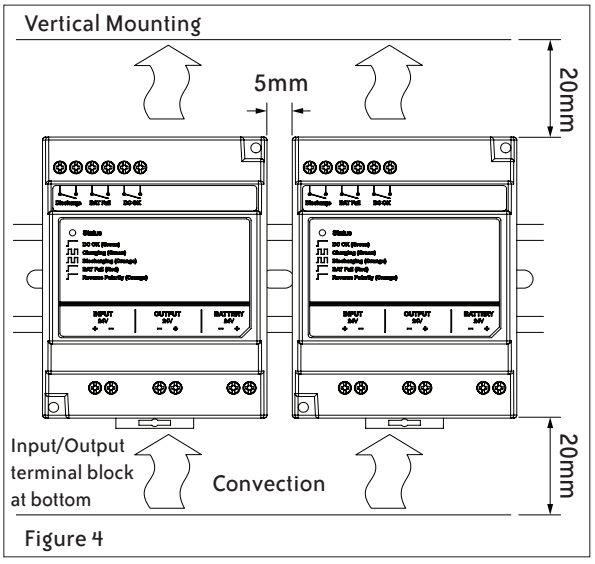


Figure 4

Connection

The terminal block connectors allow easy and fast wiring. You can use flexible (stranded wire) or solid cables as follows:

Electrical Connections and Wire Size				
	Stranded / Solid		*Torque*	
	mm²	*AWG*	*N·m*	*lb·in*
In/Out/Battery	2.1-3.3	14-12	0.62	5.4
Signal	0.21-3.3	24-12	0.62	5.4

The wires between the battery control module and battery must not be longer than 2 x 2m (cord length 2m). For reliable and shock proof connections, the wire stripping length should be 7mm (see Fig. 5 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 5 (2).

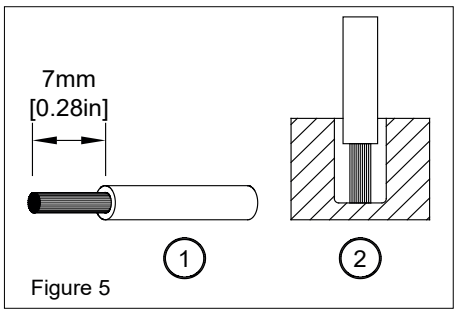
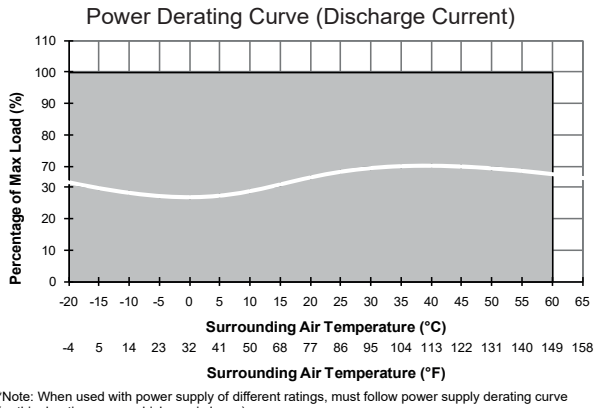


Figure 5

In accordance with EN60950 / UL60950, flexible cables require ferrules.

Use appropriate copper cables that are designed to sustain operating temperature of at least 60˚C/75˚C for USA or at least 90˚C for Canada.

Power Derating



*Note: When used with power supply of different ratings, must follow power supply derating curve (or this derating curve, whichever is lower).

Figure 6

Signal wiring diagram

Contact relay rating: 1A/30VDC.
No polarity requirement.

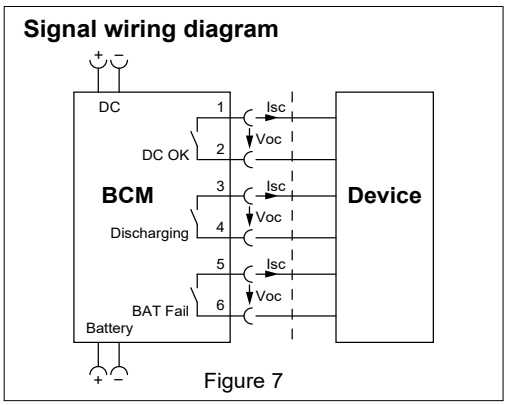


Figure 7

Buffering Time

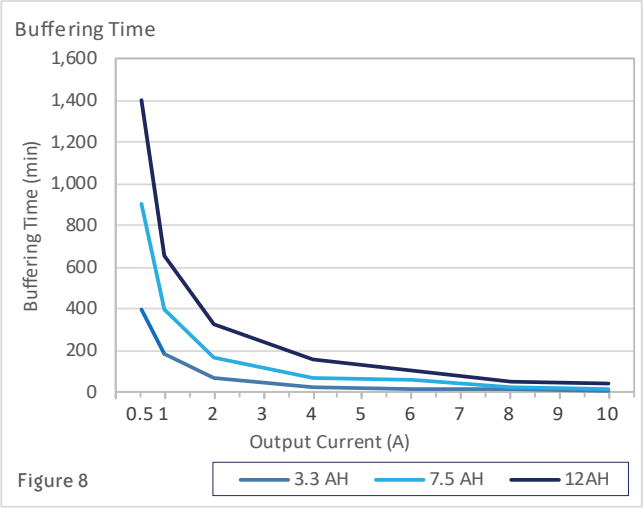


Figure 8

Status Indicators				
BCM Status	Relay Output Connector			LED Display Status
	Discharging	BAT Fail	DC OK	
Battery Fully Charged	Open	Open	Closed	Green LED On
Battery Charging	Open	Open	Closed	Green LED Flashing
Battery Discharging* (Buffering Mode)	Closed*	Open	Closed	Orange LED Flashing
No Battery Connected	Open	Closed	Open	Red LED On
Output Shutdown	Open	Open	Open	No Light

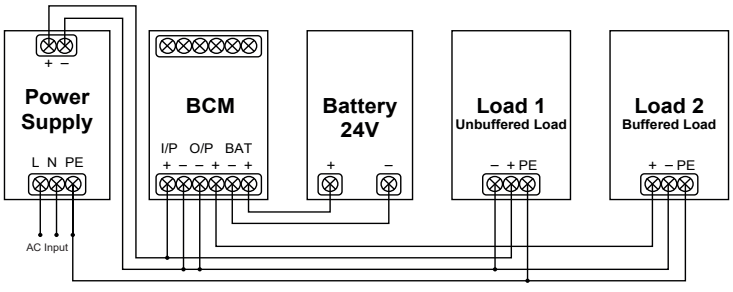
* With output current 0.1 A to 10A.

Buffering Time (minutes)			
Output Current	3.3 AH	7.5 AH	12AH
0.5 A	400	900	1400
1A	180	398	654
2A	70	165	323
4A	28	72	160
6A	19	55	103
8A	11	22	49
10A	7	18	37

Typical application notes

Typical Application Notes

9.1 Provide backup power during AC source interruption or failure



9.2 Can be combined with redundancy module (PSB60-REM20S)

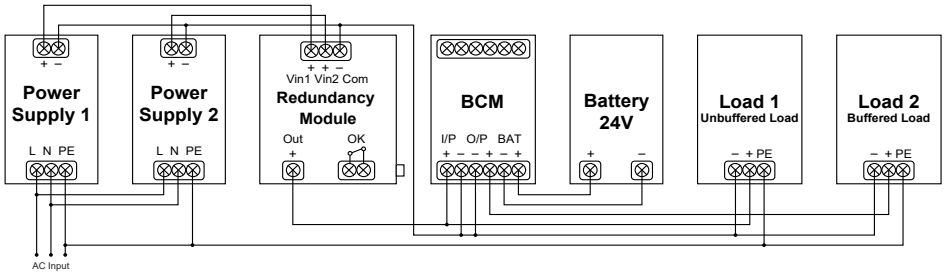


Figure 9

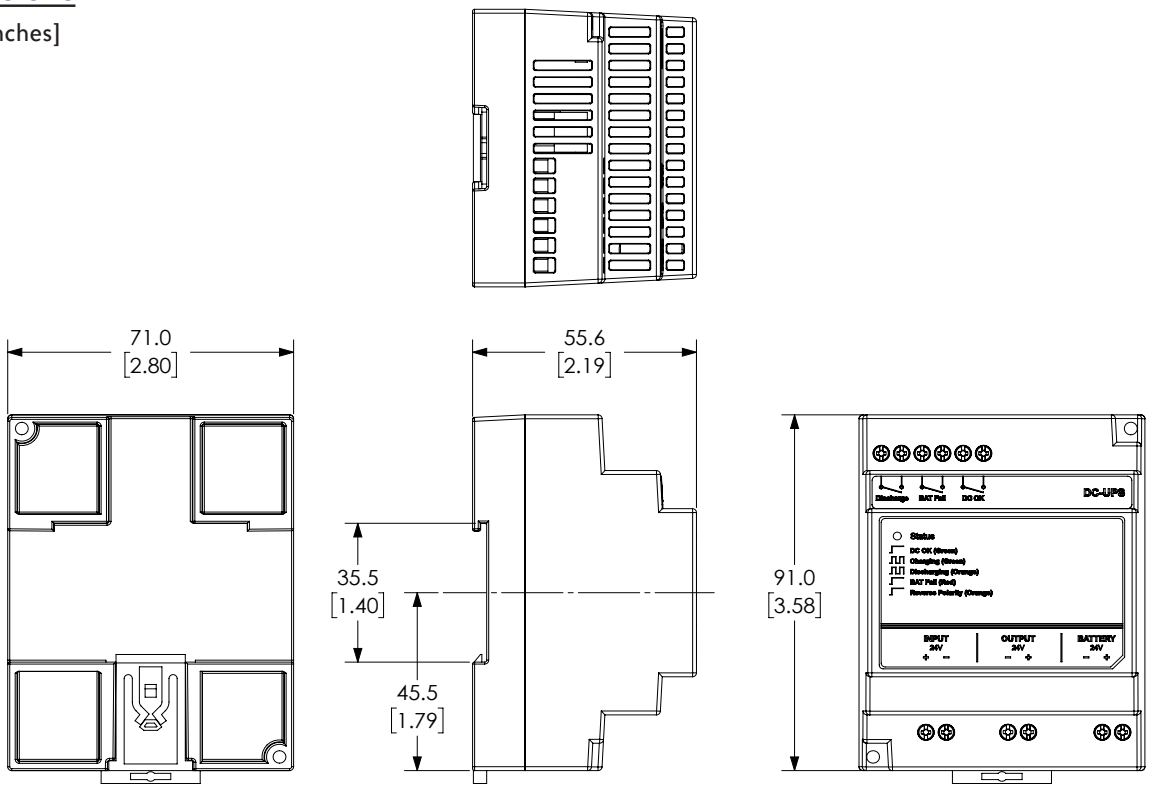
RHINO PSL-24-BCM240 Battery Control Module

Technical Specifications		
Input (DC)		
Nominal input voltage		24VDC
Voltage range		24-28 VDC
Maximum input voltage		< 33 VDC
Input current		Charging Mode: 0.5 ± 0.1 A (25°C) Discharging Mode: 10A Max.
Charging time		< 30 hr ± 5 hr (25°C) for battery 24V/12AH
Efficiency		Charging Mode: > 80.0% Discharging Mode: > 99.0%
Output (DC)		
Nominal output voltage		24VDC typ. (depends on Vin)
Discharging voltage		22-28 VDC
Maximum output voltage		< 33 VDC
Output current		10A Max.
Derating		Refer to Fig. 6
Component derating		Vin = 28.0 VDC, Max. load
Short circuit / Overload		Discharging Mode: Shutdown and no damage
Recommended Batteries		
Battery types		24 V, VRLA 2 x 12V, VRLA
Battery capacity		3.3-12.0 Ah
Battery voltage range		23-28VDC (continuous operating), 33VDC Max (maximum voltage that will not cause damage to the unit) 20VDC Min (voltage level of battery to enable "BAT Fail" function)
Battery fuse		Auto 15A / 58V, MINI (Littelfuse) or similar in the battery path (protects the wires between the battery and the battery control module)
General Data		
Type of housing		Plastic (PC), enclosed
LED signals		Green LED On = Unit is fully charged Green LED Flashing = Unit is charging Orange LED Flashing = Unit is discharging Red LED On = Battery fail (no battery is connected) Orange LED On = Battery 24 V or DC 24 V reverse polarity
Signal relay contacts		DC OK = Contact is closed when battery is fully charged and the unit is ready to discharge/buffer. DISCHARGING = Contact is closed when the unit is discharging/buffering with output current of 5mA-10 A. BATTERY FAIL = Contact is closed when the battery fails to function.
MTBF		> 500,000 hrs. as per Telcordia
Dimensions (L x W x H)		91mm x 71mm x 55.6 mm [3.58 in x 2.80 in x 2.19 in] (See www.AutomationDirect.com for complete engineering drawings.)
Weight		0.14 kg [4.9 oz]
Connection method		Screw connection
Stripping length		7mm [0.28 in]
Operating temperature (surrounding air temperature)		-20°C to +60°C [-4°F to +140°F] (Refer to Fig. 7)
Storage temperature		-25°C to +85°C [-13°F to +185°F]
Humidity at +25°C, no condensation		5 to 95% RH
Vibration		Operating: IEC60068-2-6, Sine Wave: 10Hz to 500Hz @ 19.6 m/s² (2G peak); 10 min per cycle, 60 min for all X, Y, Z directions Non-Operating: IEC60068-2-6, Random: 5Hz to 500Hz (2.09Grms); 20 min per axis for all X, Y, Z directions
Shock (in all directions)		Operating: IEC60068-2-27, Half Sine Wave: 4G for a duration of 22ms, 3 shocks for each 3 directions Non-Operating: IEC60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions
Pollution degree		2
Altitude (operating)		3000m
Certification and Standards		
Electrical equipment of machines		IEC60204-1
Electronic equipment for use in electrical power installations		EN62477-1 / IEC62103-1
Safety entry low voltage		PELV (EN60204), SELV (EN 60950)
Electrical safety (of information technology equipment)		UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), CB scheme to IEC60950-1
Industrial control equipment		UL/C-UL listed to UL508 and CSA C22.2 No.107.1-01 (File No. E197592)
CE		In conformance with EMC directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Component power supply for general use		EN61204-3
Immunity		EN55024, EN61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8)
Emission		EN55032, EN55011
		CE 3PET c UL E197592 US LISTED Ind. Cont. Eq. c RU US E198298
RoHS Compliant		Yes
Safety and Protection		
Isolation voltage:	Input & Output / PE Signal / PE Input & Output / Signal	1kVAC 1kVAC 1kVAC
Polarity protection		Yes
Protection degree		IP20
Safety class		Class III

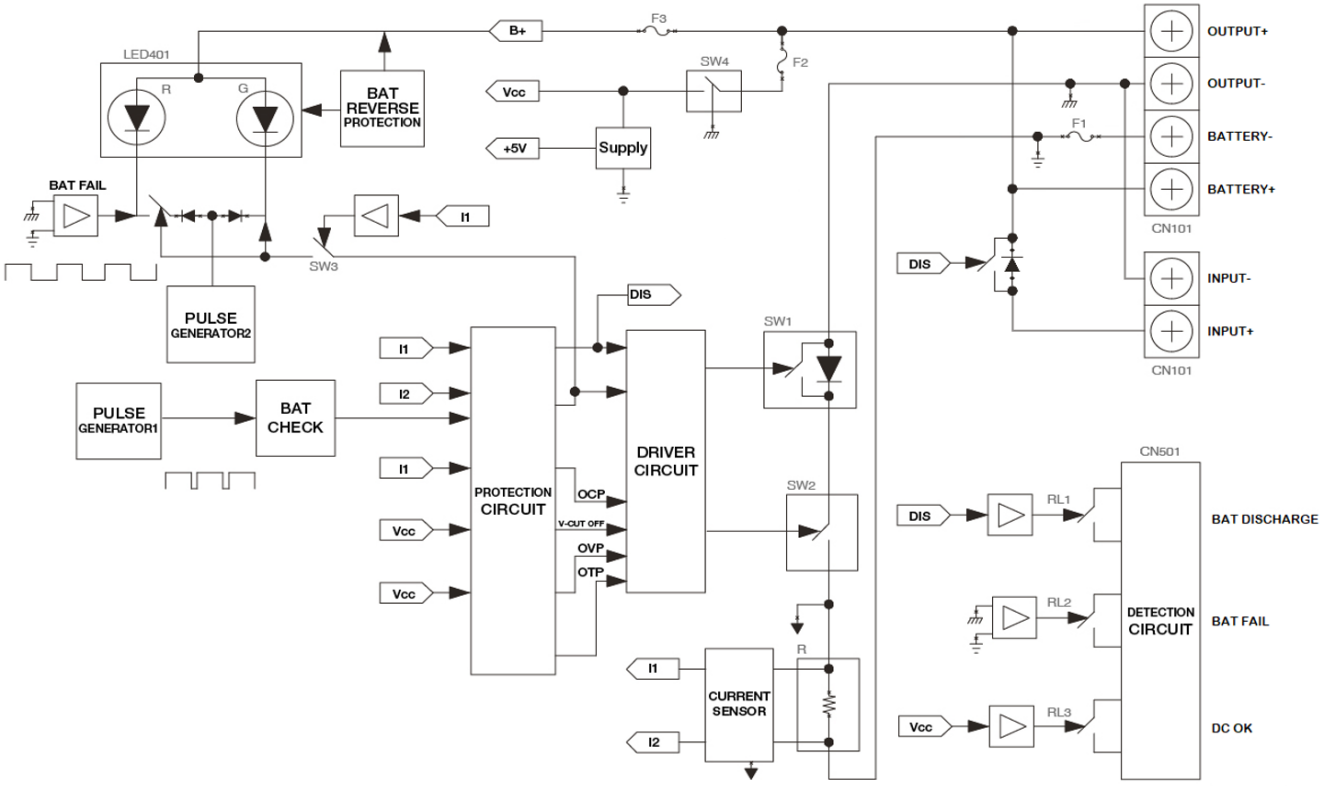
RHINO PSL-24-BCM240 Battery Control Module

Dimensions

mm [inches]



Block Diagram



Troubleshooting

Troubleshooting		
Problem	***Possible Cause***	***Suggestion***
Orange LED is ON Steady	Input connection or battery connection is reverse polarity.	Check polarity of input connection and battery connection and make corrections.
BCM does not operate in charging mode after input is applied	Input wiring is open or no input voltage to the BCM is supplied.	Check wiring and voltage of input supply.
	Internal fuse is opened.	Replace the battery control module.
BCM does not operate in buffering mode after input voltage drops	Battery wiring is not connected or is opened.	Check battery wiring and compare with Typical Application Notes in this BCM datasheet. Make corrections as needed.
	Battery has not had enough time to be charged and it is still below the continuous operating voltage range.	Check battery voltage and compare with minimum required battery voltage provided in this BCM document.
	Protection mode enabled.	Check for overvoltage, overcurrent, over temperature, or short circuit condition, and correct.

RHINO PSM24-BCM360S Battery Control Module

The battery control module, when combined with a PSM24 power supply, makes a perfect DC-UPS system by providing the means to charge and monitor an external lead acid battery. The power supply charges the connected battery and keeps it in a charged mode.

Consequently, the output voltage of the system is equivalent to the battery voltage. To avoid overcharging the battery, an external temperature sensor automatically adjusts the battery voltage to the required end of charge voltage. This configuration extends the battery life.

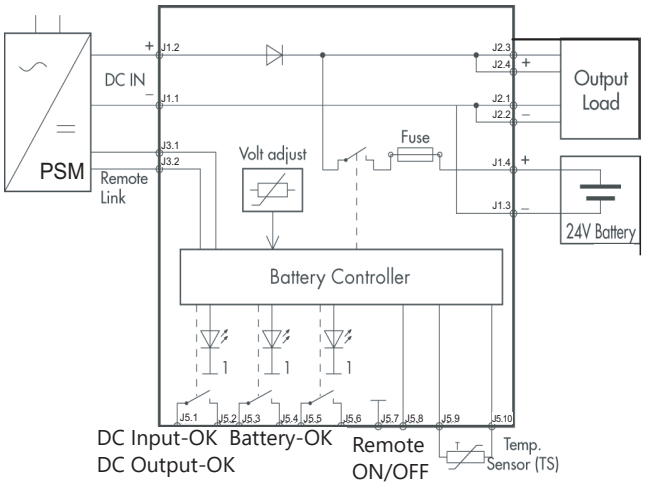


Battery Control Module						
Part Number	***Price***	***Drawing Link***	***Input***	***Input Power Max***	***Output Voltage Nom***	****Output Power Max***
PSM24-BCM360SPSM24-BCM360S (includes terminal plugs)	$235.00	PDF	24VDC power supply and 24VDC battery	360W	24VDC	360W

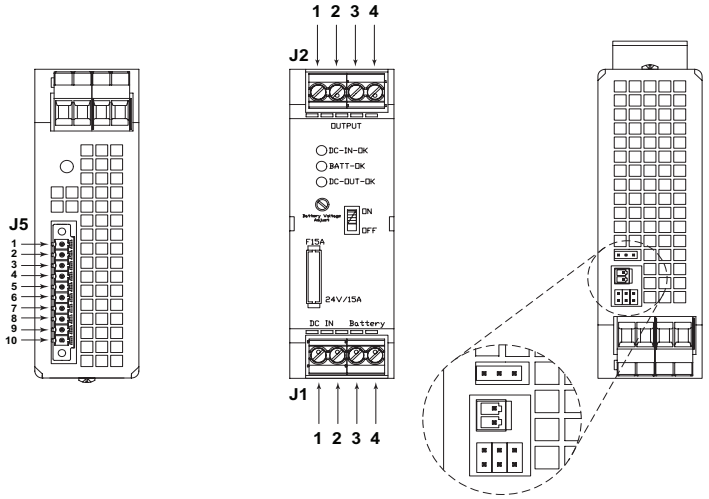
***reduce maximum output current by battery charging current.**

General Specifications	
Operating Temperature	-25 to 70°C max [-13 to 158°F] 1.5%/K, derating above 40°C [104°F]
Electromagnetic Compatibility	In correspondence to connected units [no internal switching device]
Battery Protection	Over voltage, deep discharge, short-circuit and reverse connection [built-in fuse]
Status Signals	DC-OK input, DC-OK output, BAT OK [all relay contacts closed at status OK]
Rating per Relay Contact	30 VDC / 1.0 A max.
Remote Link Wire 0.5m	One cable included with PSM24-BCM360S module
Remote ON/OFF	By external contact: ON = J5.7 + J5.8 not shorted OFF = J5.7 + J5.8 shorted

Battery Control Module Function Diagram



Battery Control Module Connector Positions



PIN	*J1*	*J2*	*J3*	*J4*	*J5*	*J6*
1	- Vin [DC In]	GND [-]	S+	15 sec test	DC-IN-OK Signal	PSM24-360S [factory setting]
2	+ Vin [DC In]	GND [-]	S-	Common	DC-IN-OK Relay contact	PSM24-180S
3	- Bat in	Vout [+]	—	10 min test	Bat-OK Signal	PSM24-090S
4	+ Bat in	Vout [+]	—	—	Bat-OK Relay Contact	—
5	—	—	—	—	DC-OUT-OK Signal	—
6	—	—	—	—	DC-OUT-OK Relay Contact	—
7	—	—	—	—	Remote ON/OFF	—
8	—	—	—	—	Remote ON/OFF	—
9	—	—	—	—	Temperature Sensing	—
10	—	—	—	—	Temperature Sensing	—

RHINO DC to DC Converters PSP Series

Overview

Both 25W and 60W DC-DC converters are available in the Rhino PSP DIN rail series. Wide input ranges of 9.5 to 18VDC and 18 to 75VDC allow these models to operate from all popular DC supply voltage systems. With tightly regulated output voltage these DC-DC converters provide a reliable power source for sensitive loads in industrial process controls, factory automation and other equipment exposed to a critical industrial environment. They can be used to isolate a specific load from the 24 volt bus voltage, and offer easy installation with snap-on DIN rail mounting and detachable screw terminal blocks.



PSP 25 Watt DC-DC Converters



PSP 60 Watt DC-DC Converters

Features

- Ultra-wide input voltage range
- Output voltage adjustable
- Overload and short circuit protection
- Low ripple and noise
- I/O-isolation 1500 VDC
- Compact, slim plastic case
- Reliable snap-on 35mm DIN rail mount
- Wall-mount bracket included
- 3-year warranty

RoHS c UL us CE CSA

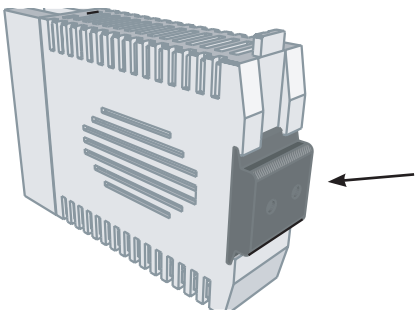
DC-DC Converters

Part Number	Price	Drawing Link	Input Voltage Range	Input Current Max. @ Vin, [Iout = 0% / 100%]	Output Voltage [Adjustable]	Output Current Max	Output Power	Weight [lbs]
PSP24-DC12-1	$120.00	PDF	9.5 - 18.0 VDC	80mA / 2.5 A @ 12VDC	24VDC	1A	25W	0.31
PSP05-DC24-5	$117.00	PDF	18.0 - 75.0 VDC	80mA / 1.3 A @ 24VDC 60mA / 0.7 A @ 48VDC	5VDC	5A		0.31
PSP12-DC24-2	$96.00	PDF			12VDC	2A		0.31
PSP24-DC24-1	$115.00	PDF			24VDC	1A		0.31
PSP12-DC24-5	$136.00	PDF		31mA / 2.9 A @ 24VDC 19mA / 1.4 A @ 48VDC	12VDC	5A	60W	0.59
PSP24-DC24-2	$140.00	PDF		45mA / 3.1 A @ 24VDC 25mA / 1.54 A @ 48VDC	24VDC	2.5 A		0.59

RHINO DC to DC Converters PSP Series

General Specifications	
Startup Voltage / Undervoltage Shut-down	17.2 VDC / 15.7 VDC [PSP24-DC12-1: 8.4 VDC / 7.6 VDC]
Efficiency (Typical)	86%
Output Voltage Adjustable Range	5VDC model: 5.0 - 5.25 VDC 12VDC models: 12.0 - 15.0 VDC 24VDC models: 24.0 - 28.0 VDC
Overvoltage Protection, Trigger Point	5VDC model: <6.5 V 12VDC models: <24V 24VDC models: <42V
Output Voltage Regulation*	0.5% max
Ripple/Noise (20MHz bandwidth)	<50mV [pk-pk]
Temperature: Operating ***Storage (non-operating)*** ***Derating***	-25 to 70°C max [-13 to 158°F max] -25 to 85°C max, [-13 to 185°F max] 1.5%/K above 50°C [122°F] for 25W models, 2%/K above 40°C [104°F] for 60W models
Humidity (Non-condensing)	95 % relative humidity max.
Temperature Coefficient	0.02%/K
Switching Frequency	55 – 180kHz depending on load [frequency modulation]
Isolation Voltage (1 min.) – Input/Output	1500VDC
Safety Standards	IEC 60950-1, EN 60950-1 [output SELV], UL 60950-1, EN 60204, CSA 22.2 60950-1-07, EN50178, UL 508
Electromagnetic Compatibility (EMC)	Emissions: EN 61000-6-3; Immunity: EN 61000-6-2
Parallel Operation	No parallel operation
Safety Class	Degree of protection class 1
Environmental Air	No corrosive gases permitted
Enclosure Rating	IP 20 [IEC 60529]
Enclosure Material	Plastic FR2010-110C [UL 94V-0 rated]
Mounting	DIN rails per EN 50022-35x15/7.5 [snap-on with self-locking spring]; bracket for wall/chassis mount included
Mounting Orientation	Vertical only
Wiring	12-24 AWG [3.16-0.21 mm²]
Connections	Screw type plug-in connector [standard], Recommended tightening torque 0.5-0.7 Nm [4.5-6.2 in-lb]
Short Circuit Protection	Current limited at 110% typical
MTBF (IEC 61709 @ 25°C)	>2.5 million hours
Agency Approvals**	UL/cUL 508 listed, File No. E197592; CSA File 229285; CE; Reach; RoHS

*** Input variation Vin min to Vin max and load variation 0 to 100%**
****To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.automationdirect.com**
Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

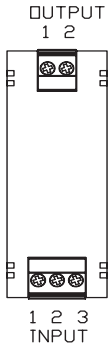


The unit can be mounted on a chassis or wall using the included mounting bracket.

RHINO DC to DC Converters PSP Series

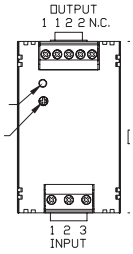
Part Numbers:
PSP24-DC12-1
PSP05-DC24-5
PSP12-DC24-2
PSP24-DC24-1

Input		Output	
1	Ground	1	+Vout
2	-Vin	2	-Vout
3	+Vin		



Part Numbers:
PSP12-DC24-5
PSP24-DC24-2

Input		Output	
1	Ground	1	+Vout
2	-Vin	2	-Vout
3	+Vin	NC	No Connect



RHINO DC to DC Converters PSE Series

Overview

The Rhino PSE Series DC-DC converters offers a compact, reliable power source for industrial process controls, factory automation, and equipment in harsh environments. Ultra-wide input voltage ranges of 9.5-36 VDC and 18-75 VDC allow these models to operate from all popular DC supply voltage systems. With tightly regulated and highly accurate output voltage these DC-DC converters provide a reliable power source for sensitive loads where AC power is not accessible. Remote on/off control, input polarity protection, and overload protection make them extremely rugged and versatile. They offer easy installation with chassis or DIN rail mounting options.



Features

- Fully encapsulated low profile plastic case
- Ultra-wide input voltage range
- Reverse polarity, overload and short circuit protection
- I/O-isolation 2500VDC
- Operating temperature range: -40 to 85°C [-40 to 185°F]
- Chassis mount or 35mm DIN rail mount with optional adapter
- No minimum load required
- Remote On/Off
- DC on LED indicator
- 3-year warranty

DC-DC Converters									
Part Number	*Price*	*Drawing Link*	*Input Voltage Range*	*Input Current Typ. @ Vin [No Load]*	*Output Voltage [VDC]*	*Output Current Max.*	*Output Power Max.*	*Efficiency*	*Weight [lb]*
PSE05-DC12-40	$99.00	PDF	9.5 - 36.0 VDC	90mA @ 24VDC	5.1	8A	40W	90%	0.48
PSE12-DC12-40	$99.00	PDF			12	3.33 A		90%	
PSE24-DC12-40	$99.00	PDF			24	1.67 A		90%	
PSE05-DC24-40	$105.00	PDF	18.0 - 75.0 VDC	55mA @ 48VDC	5.1	8A		89%	
PSE12-DC24-40	$105.00	PDF			12	3.33 A		91%	
PSE24-DC24-40	$105.00	PDF			24	1.67 A		92%	
PSE05-DC12-60	$118.00	PDF	9.5 - 36.0 VDC	100mA @ 24VDC	5.1	12A	60W	90%	0.66
PSE12-DC12-60	$118.00	PDF		100mA @ 24VDC	12	5A		91%	
PSE24-DC12-60	$118.00	PDF		110mA @ 24VDC	24	2.5 A		91%	
PSE48-DC12-60	$118.00	PDF		60mA @ 24VDC	48	1.25 A		91%	
PSE05-DC24-60	$123.00	PDF	18.0 - 75.0 VDC	40mA @ 48VDC	5.1	12A		91%	
PSE12-DC24-60	$123.00	PDF		60mA @ 48VDC	12	5A		92%	
PSE24-DC24-60	$123.00	PDF		60mA @ 48VDC	24	2.5 A		91%	
PSE48-DC24-60	$123.00	PDF		50mA @ 48VDC	48	1.25 A		91%	

Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

RHINO DC to DC Converters PSE Series

Input Specifications		
Series	***40 Watt***	***60 Watt***
Surge Voltage (100 msec. max.)	PSExx-DC12 Models: 50V max. PSExx-DC24 Models: 100V max.	
Start-Up Time	30ms max.	50ms max.
Conducted Noise (Input)	EN 55022 class A, FCC part 15 class A [without external components]	
Start-Up Voltage / Under Voltage Shut Down	PSExx-DC12 Models: 9VDC max. / 7.5 VDC typical PSExx-DC24 Models: 18VDC max. / 16VDC typical	
ESD (Electrostatic Discharge)	EN 61000-4-2, air ±8kV, contact ±4KV, perf. criteria A	
Radiated Immunity	EN 61000-4-3, 10 V/m, perf. criteria A	
Fast Transient / Surge (With External Input Capacitor)	EN61000-4-4, ±2kV, perf. criteria A EN61000-4-5, ±2kV, perf. criteria A	
Conducted Immunity	EN61000-4-6, 10Vrms, perf. criteria A	

Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Output Specifications		
Series	***40 Watt***	***60 Watt***
Voltage Set Accuracy	±2.0% max.	
Regulation	Input variation [Vin min. to Vin max.]: 0.5% max. Load Variation 0 - 100%: 1.0% max.	Input variation [Vin min. to Vin max.]: 1.5% max. Load Variation 0 - 100%: 1.0% max.
Minimum Load	Not required	
Temperature Coefficient	±0.02 %/K	
Ripple and Noise (20MHz bandwidth)	5.1 VDC models: 100 mVpk-pk. typical 12 & 24VDC models: 150 mVpk-pk. typical 48VDC models: 200 mVpk-pk. typical	
Transient Response	250µs typical [Alignment to 1% at load step change 75% to 100%]	
Over Voltage Protection	120% of Vout [Zener diode clamp]	
Output Current Limitation	At 150% of Iout max.	
Short Circuit Protection	Hiccup mode, automatic recovery	
Capacitive Load	5.1 VDC models: 13,600µF max. 12VDC models: 2,400µF max. 24VDC models: 600µF max. 48VDC models: 150µF max.	5.1 VDC models: 20,000µF max. 12VDC models: 3,540µF max. 24VDC models: 890µF max. 48VDC models: 220µF max.

Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

RHINO DC to DC Converters PSE Series

General Specifications			
Series Specification		***40 Watt***	***60 Watt***
Temperature Range	***Operating Ambient with Natural Convection (20LFM)***	-40 to 85°C [-40 to 185°F] [with derating]	
	IEC/EN/UL60950-1 Approved Ambient	+65°C max. [+149°F max] [without derating]	+60°C max. [+140°F max] [without derating]
	Case Temperature	+95°C max. [+203°F max.]	
	Storage	-50 to +125°C [-58 to +257°F]	
Load Derating (with Natural Convection 20LFM)		4.5 %/K above +70°C [+158°F]	3.3 %/K above +70°C [+158°F]
Thermal Impedance (with Natural Convection 20LFM)		4.75 °C/W	3.5 °C/W
Humidity (non condensing)		95% relative humidity max	
Reliability, Calculated MTBF (MIL-HDBK-217F, @ +25°C, ground benign)		>644,290 hours	>242,029 hours
Isolation Voltage (60 sec.) Input/Output		2500VDC	
Isolation Capacitance Input/Output		2400pF max [100kHz, 1V]	3000pF [100kHz, 1V]
Isolation Resistance Input/Output		>1000MΩ [500VDC]	
Switching Frequency		285kHz typical	210kHz typical
Remote On/Off	***On***	3.5 to 12VDC on terminal 1 reference to -Vin or open circuit	
	Off	0 to +1.2 VDC on terminal 1 reference to -Vin	
	Off Idle Current	3mA typical	
Environmental Air		No corrosive gasses permitted	
Casing Material		Plastic resin [UL 94V-0 rated]	
Connections		Screw type connector (standard), Recommended tightening torque 0.5-0.6Nm [4.5-5.35 in-lb], wire stripping length 7-8mm	
Wiring		16-26 AWG [1.5-0.14 mm²]	
Soldering Temperature		Max. 260°C [500°F] / 10 seconds [1.5 mm from casing]	
Safety Standards		UL/cUL 60950-1 2nd edition, CSA C22.2 No. 60950-1-07, 2nd edition	
Agency Approvals		UR/cUR, File No. E198298; CE; Reach; RoHS	

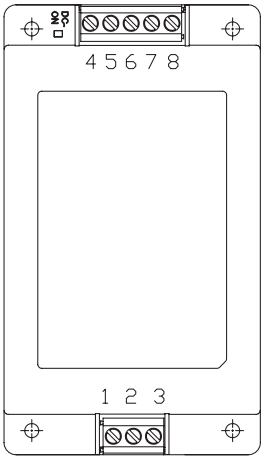
Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

RHINO DC to DC Converters PSE Series

PSE05-DC12-40, PSE12-DC12-40, PSE24-DC12-40, PSE05-DC24-40 PSE12-DC24-40, PSE24-DC24-40

Wiring Connection	
Pin	***Signal***
1	Remote On/Off*
2	-Vin (GND)
3	+Vin (Vcc)
4	+Vout
5	NC
6	-Vout
7	NC
8	NC

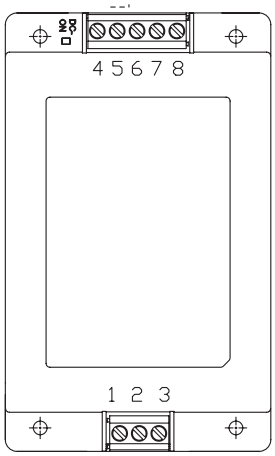
*** Refer to specifications for voltage requirements**
M3 x 0.5mm screw size, Typ



PSE05-DC12-60, PSE12-DC12-60, PSE24-DC12-60, PSE48-DC12-60, PSE05-DC24-40, PSE12-DC24-60, PSE24-DC24-60, PSE48-DC24-60

Wiring Connection	
Pin	***Signal***
1	Remote On/Off*
2	-Vin (GND)
3	+Vin (Vcc)
4	NC
5	+Vout
6	NC
7	-Vout
8	NC

*** Refer to specifications for voltage requirements**
M3 x 0.5mm screw size, Typ



RHINO DC to DC Converters PSE Series

Mounting Bracket

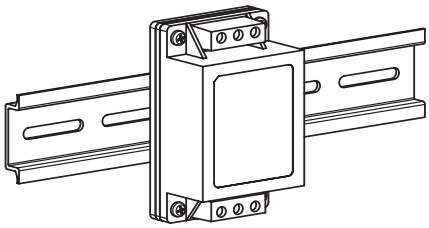
35mm DIN Rail Mounting Bracket				
Part Number	*Price*	*Drawing Link*	*Weight (lbs)*	*Description*
PSE-BRKT-2	$14.00	PDF	0.2	DIN rail mounting bracket for 30W-60W PSE models

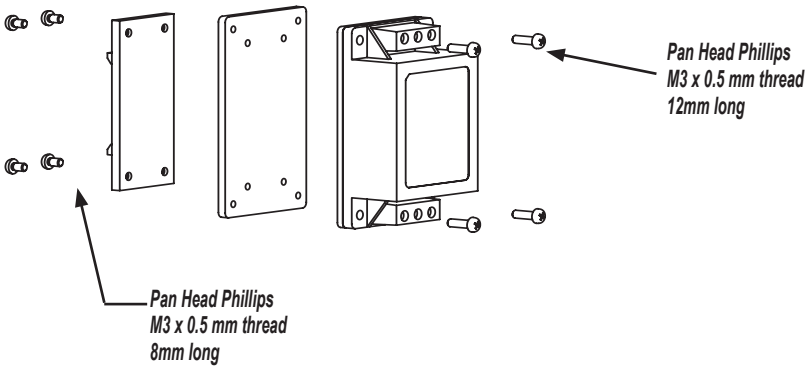
Note: Kit contains interface plate, DIN rail clip and necessary screws.



PSE-BRKT-2

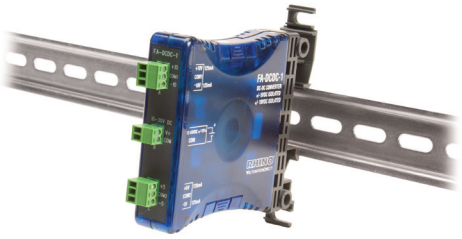
Installation Example





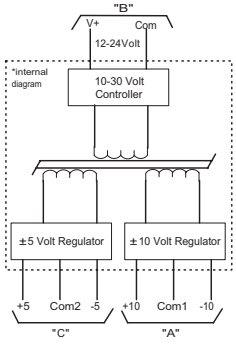
RHINO DC to DC Isolated Converter

This isolated DC to DC power supply is used for eliminating ground loops or addressing isolation issues when interfacing to PLC analog I/O modules. The design features handle many types of configuration problems. The FA-DCDC-1 is a DIN rail mount, ±10VDC, ±5VDC isolated power supply, with each output rated at 125mA. The input voltage range is 12-24V DC ±15% at approximately 6.7 Watts.

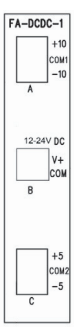


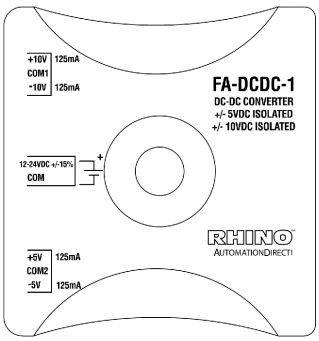
General Specifications	
Part Number [1]	FA-DCDC-1
Price	$116.00
Drawing Link	PDF
Input Voltage Range	12V to 24VDC ± 15%
Input Power [2]	6.7 Watts, Vin 27.6V, 125mA load each channel
Output Voltage [3] ***(25°C)***	+5V ±1%, 125mA load,-5V ±1% 125mA load +10V ±1% typical, ±2% maximum; -10V ±1% typical, ±2% maximum
Output Current	125mA [per output voltage]
Output Ripple	±5V channels: <10mV peak to peak, Vin 10.2V 125mA load on both channels ±10V channels: <25mV peak to peak, Vin 10.2V, 125mA load on both channels
Line Regulation [4]	±5V channels: <10mV, Vin 10.2V to 27.6V, 125mA load on both channels ±10V channels: <20mV, Vin 10.2V to 27.6V, 125mA load on both channels
Load Regulation [5]	±5V channels: <20mV, Vin 10.2V, 0 - 125mA load variation ±10V channels: <40mV, Vin 10.2V, 0 - 125mA load variation
Isolation	Input to Output: 1500V; ±5V to ±10V: 1500V
Inrush Current (50ms)	970mA, Vin 10.2V, 125mA load all channels
Holdup Time (all channels)	30mS minimum, Vin 10V, 125mA load all channels
Overshoot Protection	No overshoot - Turn on and turn off of Vin
Input Protection (reverse DC input voltage)	Up to -50V reverse. ± Vin reverse polarity connection.
Overload Protection	Auto shutdown. Short circuit. Cycle Vin post event
Output Protection	Indefinite duration. ±5V tied to ±10V
Peak Line Transient Voltage	100V for 10mS. Voltage spike on input
Operating Temperature	0 to 60°C [32 to 140°F] full rated
Storage Temperature	-20 to 70°C [-4 to 158°F]
Enclosure	Clear Lexan 221-111 with UN5016 transparent blue colorant
Mounting	35mm wide DIN rail: part # DN-R35S1 or DN-R35HS11; surface mount
Connection	3.5 mm screw terminal, 28-16 AWG, 1.7 lb-in torque
Relative Humidity	5 to 90% [non-condensing]
Environmental Air	No corrosive gases permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304
Agency Standards and Approvals	UL/cUL listed, UL File No. E200031, UL508/CSA - C22.2 No. 142-M1987 for ordinary locations. Class I, Division 2, Groups A, B, C, D Hazardous Locations

Notes: [1] **All specifications are over the full operating temperature range [0°C to 60°C] unless stated otherwise.**
[2] **"Channel" means Output Voltage. For example: +5V is one channel and -10V is another.**
[3] **All output voltage channels are independent of each other. Changing loading on one will have no effect on the other voltage outputs.**
[4] **LINE Regulation: varying the Input Voltage over entire range [12V to 24V ± 15%] and the resultant change in the Output Voltage(s) under worst case load conditions [all output channels drawing 125mA].**
[5] **LOAD Regulation: varying the output loads from no-load to a worst case 125mA load and measuring the resultant change in the Output Voltage(s) under a worst case minimum Input Voltage [10.2V] condition.**



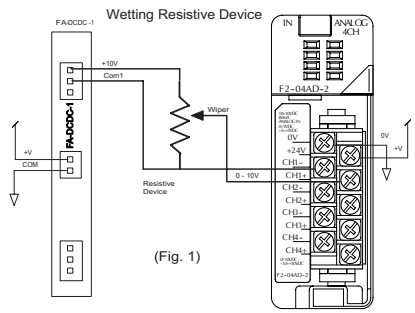






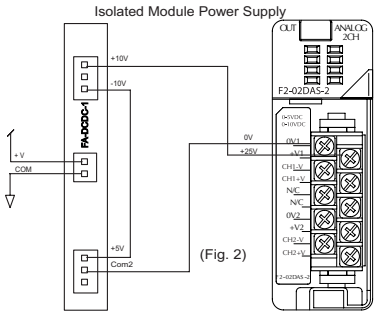
RHINO DC to DC Isolated Converter

Applications



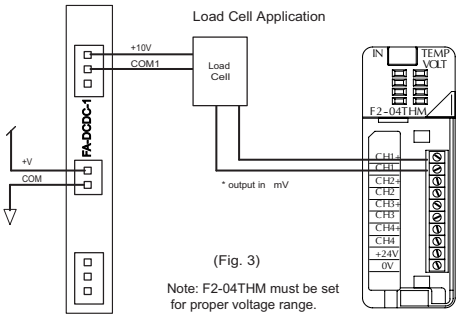
(Fig. 1)

When using a linear potentiometer, the +10V connects to the high side of the potentiometer and the COM1 becomes the zero volt reference. The wiper connects to the analog input. The result is 0 to 10V at the analog module input. (Fig. 1)



(Fig. 2)

Use in a solar/battery application where unregulated 12VDC is available and the analog module requires 24VDC for operation, connect the +10V to +24V module power, connect the -10V to the +5V and the COM2 to the 0V module power. (Fig. 2)



(Fig. 3)

Note: F2-04THM must be set for proper voltage range.

Use to power a load cell application. (Fig. 3)

THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2/ZONE 2, GROUPS A, B, C AND D, OR NON-HAZARDOUS LOCATIONS ONLY.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.
WARNING - EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT CONNECTORS OR OPERATE SWITCHES WHILE CIRCUIT IS LIVE UNLESS THE AREA IS KNOWN TO BE NON HAZARDOUS.

INTERNATIONAL POWER
DC POWER SUPPLIES

Linear Power Supplies - Regulated

Overview

International Power IH series regulated open frame power supplies are designed to operate over a wide range of AC power sources.

Features

- VDE transformer construction
- 100/120/220/230-240 VAC input
- Overvoltage protection on 5V outputs
- +/- 0.05% regulation
- Chassis notched for AC input
- 2-year warranty





IHB5-3-OVP

MADE IN USA

Regulated Linear Power Supplies						
Power Supply		***IHB5-3-OVP***	***IHCC512***	***IHBB15-1.5***	***IHDD15-5***	***IHB24-1.2***
Price		$77.00	$173.00	$120.00	$236.00	$80.00
Drawing		PDF	PDF	PDF	PDF	PDF
VAC Input		100/120/220/240 VAC, +10 / - 13% Tolerance for 230VAC, Operation is +15 / -10% Frequency range: 47-63 Hz				
VDC Output	***Output 1***	5VDC @ 3A	5VDC @ 6A	± 12VDC @ 1.7 A	± 12VDC or ± 15VDC @ 5A	24VDC @ 1.2 A
	Output 2	–	12 to 15 VDC @ 2.5 A	± 15VDC @ 1.5 A	–	–
Overvoltage Protection		Provided, factory set @ 6.2 VDC, ± 0.4 VDC	Provided on the 5VDC output	Not provided		
Short Circuit Protection		Automatic foldback				
Overload Protection		Automatic current limit				
Line Regulation		± 0.05% for a 10% line change				
Load Regulation		+/- 0.05% for a 50% load change (Derate output current 10% for 50Hz operation.)				
Output Ripple		5.0 mV PK-PK max				
Transient Response		< 50 µsec per 50% load change				
Operating Temperature		0 to 50°C [32 to 122°F] full rated; derated linearly to 40% at 70°C [158°F]				
Storage Temperature		-40 to 85°C [-40 to 185°F]				
Temperature Coefficient		Typical: 0.01% / Degree C; Maximum: 0.03% / Degree C				
Stability		+/- 0.3% for 24 hours after 1 hour warm-up				
Efficiency (typical)		45%				60%
Vibration		MIL-STD-810G, Method 514.6, Category 1, Procedure1 Random vibration 10Hz - 2KHz, 6.15 grams (3-axis)				
Shock		MIL-STD-810G, Method 514.6, Procedure 3 Operating: 20GPK				
Remote Sensing		Provided	Provided - both outputs	Provided		
EMI / RFI		Inherit low conducted and radiated noise levels EMI: FCC CFR Title 47 part 15 subpart B RFI: EN55022/CISPR22-Level B compatibility				
Humidity		95% relative humidity maximum				
Cooling Method		High heat temperature environment, recommended forced air at 100W, 50CFM required at 250W or higher				
Mounting		No restrictions				
Weight (lb [kg])		2 [0.90]	7 [3.17]	4 [1.81]	10 [4.53]	2 [0.90]
Housing Material		Aluminum				
Connections		Input accepts 0.110 x 0.32 fast-ons or solder connection				
Agency Approvals		UR (File # E133338), CE				

To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.
Continued on next page.

INTERNATIONAL POWER
DC POWER SUPPLIES

Linear Power Supplies - Regulated

Continued from previous page

Regulated Linear Power Supplies					
Power Supply		***IHC24-2.4***	***IHD24-4.8***	***IHTAA-16W***	***IHBAA-40W***
Price		$103.00	$168.00	$117.00	$139.00
Drawing		PDF	PDF	PDF	PDF
VAC Input		100/120/220/240 VAC, +10 / - 13% Tolerance for 230VAC, Operation is +15 / -10% Frequency range: 47-63 Hz			
VDC Output	***Output 1***	24VDC @ 2.4 A	24VDC @ 4.8 A	5VDC @ 2A	5VDC @ 3A
	Output 2	–	–	+12VDC or +15V @ 0.4 A	12VDC @ 1A or 15VDC @ 0.8
	Output 3	–	–	-12 VDC or -15VDC @ 0.4 A or -5V @ 0.4 A	12VDC @ 1A, or 15VDC @ 0.8 A or 5V @ 0.4 A
Overvoltage Protection		Not provided		Provided on the 5VDC output	
Short Circuit Protection		Automatic foldback			
Overload Protection		Automatic current limit			
Line Regulation		± 0.05% for a 10% line change			
Load Regulation		+/- 0.05% for a 50% load change (Derate output current 10% for 50Hz operation.)			
Output Ripple		5.0 mV PK-PK max			
Transient Response		< 50 µsec per 50% load change			
Operating Temperature		0 to 50°C [32 to 122°F] full rated; derated linearly to 40% at 70°C [158°F]			
Storage Temperature		-40 to 85°C [-40 to 185°F]			
Temperature Coefficient		Typical: 0.01% / Degree C; Maximum: 0.03% / Degree C			
Stability		+/- 0.3% for 24 hours after 1 hour warm-up			
Efficiency (typical)		45% / 55%	60%	45%	
Vibration		MIL-STD-810G, Method 514.6, Category 1, Procedure 1 Random vibration 10Hz - 2KHz, 6.15 grams (3-axis)			
Shock		MIL-STD-810G, Method 514.6, Procedure 3 Operating: 20GPK			
Remote Sensing		Provided			
EMI / RFI		Inherit low conducted and radiated noise levels EMI: FCC CFR Title 47 part 15 subpart B RFI: EN55022/CISPR22-Level B compatibility			
Humidity		95% relative humidity maximum			
Cooling Method		High heat temperature environment, recommended forced air at 100W, 50CFM required at 250W or higher			
Mounting		No restrictions			
Weight (lb [kg])		4 [1.81]	7.5 [3.40]	2 [0.90]	5 [2.26]
Housing Material		Aluminum			
Connections		Input accepts 0.110 x 0.32 fast-ons or solder connection			
Agency Approvals		UL (File # E133338), CE			

To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.

INTERNATIONAL POWER
DC POWER SUPPLIES

Linear Power Supplies - Regulated

Input Jumpering and Fusing Requirements

IHB5-3-OVP				
For use at	100VAC	120VAC	220VAC	230/240VAC
Jumper	1&3, 2&4	1&3, 2&4	2&3	2&3
Apply AC	1&5	4&1	1&5	4&1
Max Current/Fuse Rating	0.5 A		0.25 A	

IHBB15-1.5				
For use at	100VAC	120VAC	220VAC	230/240VAC
Jumper	1&3, 2&4	1&3, 2&4	2&3	2&3
Apply AC	1&5	1&4	1&5	1&4
Max Current/Fuse Rating	1A		0.5 A	

IHB24-1.2				
For use at	100VAC	120VAC	220VAC	230/240VAC
Jumper	1&3, 2&4	1&3, 2&4	2&3	2&3
Apply AC	1&5	4&1	1&5	1&4
Max Current/Fuse Rating	0.75 A		0.375 A	

IHD24-4.8				
For use at	100VAC	120VAC	220VAC	230/240VAC
Jumper	1&3, 2&4	1&3, 2&4	2&3	2&3
Apply AC	1&5	1&4	1&5	1&4
Max Current/Fuse Rating	2A		1A	

IHBAA-40W				
For use at	100VAC	120VAC	220VAC	230/240VAC
Jumper	1&3, 2&4	1&3, 2&4	2&3	2&3
Apply AC	1&5	1&4	1&5	1&4
Max Current/Fuse Rating	1.5 A		0.75 A	

Negative output @ -5VDC @ 0.4 A, Jumper E1 and E2 & Reset R26. For ±15VDC, cut Jumpers VW1 and VW2

IHCC512				
For use at	100VAC	120VAC	220VAC	230/240VAC
Jumper	1&3, 2&4	1&3, 2&4	2&3	2&3
Apply AC	1&5	1&4	1&5	1&4
Max Current/Fuse Rating	3A		1.5 A	

IHDD15-5				
For use at	100VAC	120VAC	220VAC	230/240VAC
Jumper	1&3, 2&4	1&3, 2&4	2&3	2&3
Apply AC	1&5	1&4	1&5	1&4
Max Current/Fuse Rating	3A		1.5 A	

For +/-12VDC @ 5A, move wires at XFMR Pins B-B to A-A & adjust R26 & R29

IHC24-2.4				
For use at	100VAC	120VAC	220VAC	230/240VAC
Jumper	1&3, 2&4	1&3, 2&4	2&3	2&3
Apply AC	1&5	4&1	1&5	4&1
Max Current/Fuse Rating	1.5 A		0.75 A	

IHTAA-16W				
For use at	100VAC	120VAC	220VAC	230/240VAC
Jumper	1&3, 2&4	1&3, 2&4	2&3	2&3
Apply AC	1&5	1&4	1&5	1&4
Max Current/Fuse Rating	0.75 A		0.375 A	

Negative output @ -5VDC @ 0.4 A, Jumper E1 and E2 & Reset R25

INTERNATIONAL POWER
DC POWER SUPPLIES

Linear Power Supplies - Unregulated

Overview

International Power IP500U series unregulated power supplies are designed for low-cost, high-current applications when full regulation is not required. This rugged, highly reliable power supply line is ideal for applications such as powering solenoids, relays, DC motors, battery chargers, and DC to DC converters.

Features

- High surge current capabilities
- Isolated AC input
- Computer-grade capacitors
- Floating output
- Full rated to 55°C [131°F]
- Open frame construction
- Secondary fuse protection
- 50A, 200V full bridge rectifier
- 2-year warranty





IP500U36

MADE IN USA

Unregulated Linear Power Supplies			
Power Supply	***IP500U36***	***IP500U48***	***IP500U75***
Price	$350.00	$350.00	$364.00
Drawing	PDF	PDF	PDF
VAC Input	100/240 VAC, +10%, (Primary taps provided) Frequency range: 47-63 Hz		
VDC Output @ nominal line	36.1 VDC @ 13.3 A full load 38.2 VDC @ half load 42.8 VDC @ 0A	48.8 VDC @ 13.3 A full load 52.8 VDC @ half load 56.6 VDC @ 0A	74.8 VDC @ 6.6 A full load 78.2 VDC @ half load 85.5 VDC @ 0A
DC Connections	+Out 0.250 x 0.032 fast-on at fuse block -Out (DC return) 10-32 screw/solder terminal at minus side of the capacitor		
Efficiency (typical)	75% to 80% full load		
Short Circuit Protection	Output fused @ 15A		
Line Regulation	Equal to % line change		
Load Regulation @ nominal line	9% for a 50% to 100% load change (Derate output current for 10% for 58 Hz operation)		
Output Ripple	At full load 3% RMS max		
Operating Temperature	0 to 55°C [32 to 131°F] full rated; derated linearly to 40% at 70°C [158°F]		
Storage Temperature	-40 to 95°C [-40 to 203°F]		
EMI / RFI	Inherit low conducted and radiated noise levels EMI: FCC CFR Title 47 part 15 sub-part B RFI: EN55022/CISPR22-Level B compatibility		
Vibration	MIL-STD-810G, Method 514.6, Category 1, Procedure 1 Random vibration 10Hz - 2KHz, 6.15 grams (3-axis)		
Shock	MIL-STD-810G, Method 514.6, Procedure 3 Operating: 20GPK		
Humidity	95% relative humidity maximum		
Cooling Method	High heat temperature environment, recommended forced air at 100W, 50CFM required at 250W or higher		
Mounting	No restrictions		
Weight (lb [kg])	18 [8.16]		
Housing Material	Aluminum		
Agency Approvals	UR (File # E133338), CE		

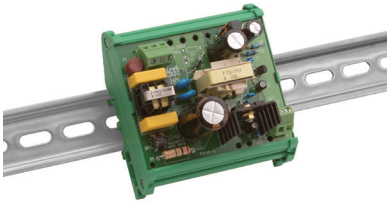
To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.

Input Jumpering and Fusing Requirements

IP500U36, IP500U48, IP500U75						
For use at	108VAC	120VAC	132VAC	216VAC	240VAC	264VAC
Jumper	1&5, 2&6	1&5, 3&7	1&5, 4&8	2&5	3&5	4&5
Apply AC	1&2	1&3	1&4	1&6	1&7	1&8
Max Current/Fuse Rating	8A	8A	8A	4A	4A	4A

Power Supplies: Open Frame

The most economical choice for 24 VDC power

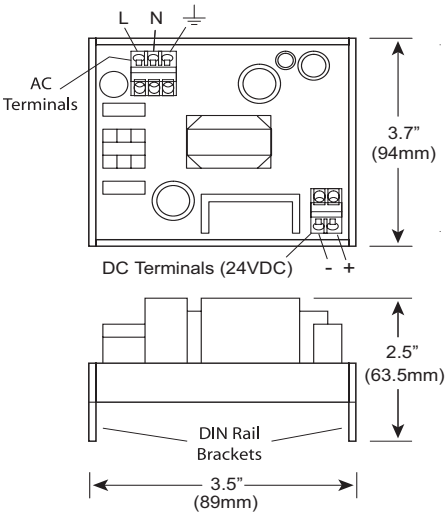


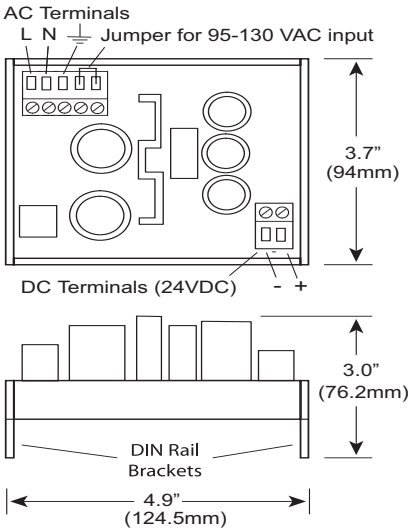
These power supplies are especially useful when an inexpensive external supply is required.

The FA-24PS compact switching power supply accepts 120/240VAC or 100-240VDC input and provides up to 1.25A (30 watts) output current at 24VDC.

The FA-24PS-90 supplies 3.7 A (90 watts) at 24VDC and its input is jumper selectable between 120 or 240VAC.

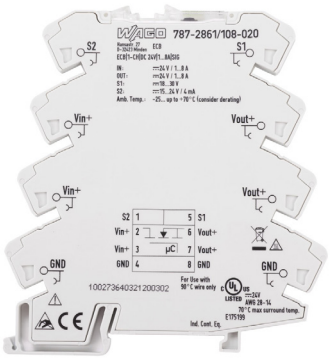






General Specifications		
Part Number	***FA-24PS***	***FA-24PS-90***
Price	$73.00	$101.00
Drawing Link	PDF	PDF
Input Voltage Range	100-240VAC/DC	95-130VAC or 190-264VAC, jumper selectable
Input Voltage Frequency	47 to 63Hz	47 to 63Hz
Input Power	40VA	112VA
Output Voltage	24VDC ±5%	24VDC ±5%
Output Current	1.25 A maximum continuous	3.7 A maximum continuous, subject to derating
Output Ripple	± 200mV maximum	± 200mV maximum
Temperature Rating	0 to 60°C full rated	0 to 30°C full rated; derate current 1.1% per degree above 30°C; 60°C max
Transient Response	Output stays within 1% for a load current change from 75% [0.9A] to either 50% [0.6A] or 100% [1.25A]	Output stays within 1% for a load current change from 75% [2.8A] to either 50% [1.8A] or 100% [3.7A]
Mounting	DIN rail, 35mm wide; Models DN-R35S1 or DN-R35HS1	DIN rail, 35mm wide; Models DN-R35S1 or DN-R35HS1
Screw Terminals	Wire Size: 18-12AWG Rec. Screw Torque: 4.4 in•lb or 0.5 Nm	Wire Size: 18-12AWG Rec. Screw Torque: 4.4 in•lb or 0.5 Nm
Insulation Resistance	10 MΩ at 500V minimum	10 MΩ at 500V minimum
Dielectric Withstand Voltage	L or N Input to Output: 500 V min; Ground Input to Output: 250V min	L or N Input to Output: 500 V min; Ground Input to Output: 250V min
Brown-out Protection	Provides temporary regulation down to 85VAC at full load	Provides temporary regulation at 95VAC at full load
Input Protection	The power supply has an internal fuse for the AC input line, rated at 3.15 amps; not user replaceable; external input fusing required.	The power supply has an internal fuse for the AC input line, rated at 3.15 amps; not user replaceable; external input fusing required.
Overload Protection	Protects power supply from overload and short circuit conditions. Includes automatic recovery upon removal of the overload condition	Protects power supply from overload and short circuit conditions. Includes automatic recovery upon removal of the overload condition
Inrush Current (2mS)	115V <12.5 A / 230VAC <13.9 A	115VAC <79A / 230VAC <37A
Overshoot Protection	No overshoot on turn-on or turn-off	No overshoot on turn-on or turn-off
Agency Standards and Approvals	UL 508; Class I, Div 2, Groups A, B, C, D hazardous locations; CUL, UL Listed File No. E200031	

Single Channel Electronic Circuit Breakers



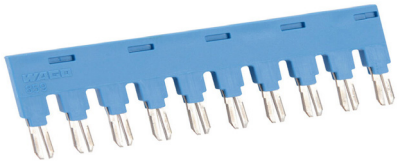
787-2861-108-020

Features

- Space-saving ECB with one channel
- This model safely and reliably stops power in the event of an overload or if it short circuits on the secondary side
- The switch on capacity is >50,000 µF
- Minimizes wiring via two voltage outputs and maximizes commoning options in both input and output sides
- Switch the breaker on or off via remote input, or a local switch
- Prevents power supply overload due to total inrush current thanks to time delayed switching on during interconnected operation
- Bus up to 10 units together with the use of Jumper Bars

Single Channel Electronic Circuit Breaker							
Part Number	*Price*	*Quantity Per Pack*	*Nominal Output Current*	*Mounting*	*Connection*	*Wiring*	*Drawing Link*
787-2861-100-000	$59.00	1	1A [Fixed Setting]	35mm DIN rail	Push-In CAGE CLAMP©	Diagram 1	PDF
787-2861-200-000	$59.00	1	2A [Fixed Setting]				PDF
787-2861-400-000	$59.00	1	4A [Fixed Setting]				PDF
787-2861-600-000	$59.00	1	6A [Fixed Setting]				PDF
787-2861-800-000	$59.00	1	8A [Fixed Setting]				PDF
787-2861-108-020	$67.00	1	1 – 8A [Adjustable]				PDF

Single Channel Electronic Circuit Breaker Accessories						
Part Number	*Price*	*Description*	*Quantity Per Pack*	*Color*	*Nominal Current*	*Drawing Link*
60432948	$12.00	10 Pole Jumper Bar	5	Blue	18A	PDF
60432947	$12.00		5	Red		PDF



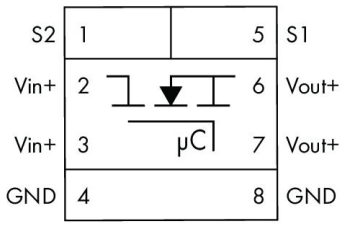
60432948

Single Channel Electronic Circuit Breakers

Single Channel ECB Specifications	
Nominal Input Voltage	24VDC
Input Voltage Range	18 – 30VDC
Total Number of Channels	1
Nominal Output Voltage	24VDC
Output Voltage Range	18 – 30VDC
Voltage Drop	less than or equal to 50mV
Nominal Output Current	See Selection Chart
Trip Time	4ms to 100s [Load-Dependent]
Switch-On Capacity	50,000uf per channel
Switch-On Behavior	Time-delayed channel switching [Load-dependent, minimum]
Active Current Limitation	No
Signaling	1 x Status LED [green/yellow/red/blue] 1x Control input 1 x active signal output [Ui max. 4mA]
Operation Status Indicator	See LED Operation Table
Remote Input	18 to 30VDC signal, switches on/off and resets the channel
Fuse Protection	15A [Internal Fuse]
Isolation Voltage	DC 0.5 kV
Protection Type	IP20 [per EN 60529]
Reverse Voltage Protection	No
Transient Suppression	Suppressor diode [33V]
Series/Parallel Operation of Single Channels	Not Permitted
Tightening Torque	N/A
Weight g [oz]	3.79 [0.0083]
Connectors	Push-In CAGE CLAMP©, Solid Conductor 28-14 AWG, Stranded Conductor 22-14 AWG
Agency Approvals	EN 61000-6-2; EN 61000-6-3; UL 61010-2-201; CE; RoHS
Surrounding Air Temperature (Operation)	-25 to 70°C [-13 to 158°F]
Surrounding Air Temperature (Storage)	-40 to 85°C [-40 to 185°F]
Relative Humidity	10 to 95% [no condensation permissable]
Derating	No derating
Pollution Degree	2

LED Operation	
Explanation	*Status LED*
Initialization of the device(boot routine)	Off
Channel switched ON	Green
Channel switched ON *Load current > 90% nominal current*	Green flashing [1Hz]
Channel switched ON *Load current > 100% nominal current (overload)*	Green flashing [5Hz]
Channel switched OFF manually or through input S1	Red
Channel tripped *Wait for temperature to return to normal*	Red flashing [1Hz]
Channel tripped *Temperature returned to normal.* *Channel can be switched ON again*	Yellow flashing [1Hz]
Channel tripped *Undervoltage with simultaneous overcurrent*	Blue flashing [1Hz]
Channel tripped,undervoltage	Blue flickering [1Hz]
Channel tripped,overvoltage	Red flickering [1Hz]
Device error, wiring error, feedback voltage	Red/blue flashing [1Hz]

Diagram 1



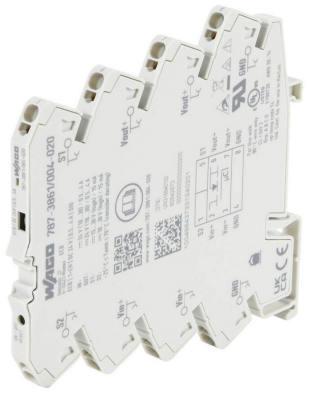
Single-Channel Electronic Circuit Breakers 787-3861 Series

Overview

WAGO's 24 VDC, single-channel ECBs improve operations and offer significant cost savings. The 787-3861 series has the ability to configure the S2 output on all variants and to report 7 different states including triggered or manually switched OFF along with early load warnings. All models have an easy to access reset button. Adjustable current models are easily programmed with discrete settings.

Features

- Space-saving 6mm wide one-channel ECB
- This series reliably removes power in the event of an overload or short circuit on the secondary side
- Two voltage inputs and two voltage outputs maximize commoning options and reduce wiring
- Switch the breaker ON or OFF via remote input, or a local switch
- Time-delayed activation during interconnected operation prevents overloads due to inrush current



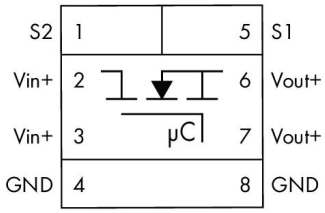
787-3861/004-020

Single-Channel Electronic Circuit Breakers 787-3861 Series Selection Chart

Part Number	Price	Quantity Per Pack	Amperage Rating	Voltage	Voltage Drop	Trip Time	NEC Class 2	Wiring	Weight grams	Drawing Link
787-3861/004-020	$35.00	1	Adjustable 0.5-4A	18-30 VDC	≤40mV (0.5A) ≤80mV (1A) ≤120mV (1.5A) ≤160mV (2A) ≤200mV (2.5A) ≤240mV (3A) ≤280mV (3.5A) ≤20mV (4A)	10ms to 90s (load-dependent)	No	Diagram 1	55.7	PDF
787-3861/004-1020	$36.00						Yes	Diagram 1	55.7	PDF
787-3861/050-000	$32.00		0.5A		≤40mV	4ms to 100s (load-dependent)	No	Diagram 1	55.6	PDF
787-3861/050-1000	$33.00						Yes	Diagram 1	55.6	PDF
787-3861/100-000	$32.00		1A		≤80mV		No	Diagram 1	55.6	PDF
787-3861/100-1000	$33.00						Yes	Diagram 1	55.6	PDF
787-3861/108-020	$35.00		Adjustable 1-8A		≤80mV (1A) ≤160mV (2A) ≤240mV (3A) ≤20mV (4A) ≤150mV (5A) ≤180mV (6A) ≤210mV (7A) ≤240mV (8A)	10ms to 90s (load-dependent)	No	Diagram 1	53.0	PDF
787-3861/200-000	$32.00		2A		≤160mV	4ms to 100s (load-dependent)	No	Diagram 1	55.6	PDF
787-3861/200-1000	$33.00						Yes	Diagram 1	53.0	PDF
787-3861/400-000	$32.00		4A		≤320mV		No	Diagram 1	55.6	PDF
787-3861/400-1000	$33.00						Yes	Diagram 1	53.0	PDF
787-3861/600-000	$32.00		6A		≤180mV		No	Diagram 1	55.6	PDF
787-3861/800-000	$32.00		8A		≤ 240 mV		No	Diagram 1	55.6	PDF

Wiring Diagram

Diagram 1



Single-Channel Electronic Circuit Breakers 787-3861 Series

Single-Channel Electronic Circuit Breakers 787-3861 Series Specifications	
Nominal Input Voltage	24 VDC
Input Voltage Range	18-30 VDC
Total Number of Channels	1
Nominal Output Voltage	24VDC
Output Voltage Range	18-30 VDC
Switch-On Behavior	Time-delayed channel switching (load dependent, min. 0 ms/max. 500ms)
Current Limitation	No
Signaling	1 x Status LED (green/yellow/red) 1 x Signal output (18- 30 VDC, max.0.015 A), Default setting: triggered
Operation Status Indicator	Green LED (channel OK) Red LED (channel switched OFF)
Remote Input	1 x Control input (15-30 VDC) (active high); 0-5 VDC (active low); max. 0.015 A)
Isolation Voltage	DC 0.5 kV
Protection Type	IP20 (per EN 60529)
Reverse Voltage Protection	No
Transient Suppression	Suppressor diode (33V)
Series/Parallel Operation of Single Channels	Not permitted
Tightening Torque	N/A
Connectors	Push-In CAGE CLAMP®, Solid Conductor 26-14 AWG [0.08-2.5 mm²], Stranded Conductor 22-14 AWG [0.34-2.5 mm²]
Mounting	35mm DIN rail
Surrounding Air Temperature (Operation)	-25 to 70°C [-13 to 158°F]
Surrounding Air Temperature (Storage)	-40 to 85°C [-40 to 185°F]
Relative Humidity	10 to 95% (no condensation permissable)
Derating	No derating
Pollution Degree	2
Agency Approvals	cULus File E175199,, CE, UKCA

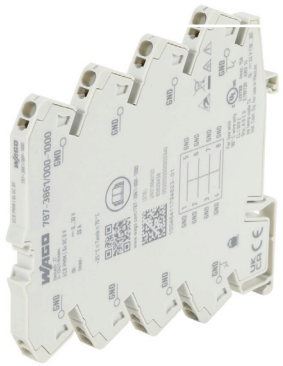
To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.

LED Operation	
Explanation	***Status LED***
Initialization of the device(boot routine)	Off
Channel switched ON	Green
Channel switched ON Load current > 90% nominal current	Green flashing (1Hz)
Channel switched ON Load current > 100% nominal current (overload)	Green flashing (5Hz)
Channel switched OFF manually or through input S1	Red
Channel tripped - Wait for temperature to return to normal	Red flashing (1Hz)
Channel tripped - Temperature returned to normal Channel can be switched ON again	Yellow flashing
Channel tripped - Undervoltage	Red/Yellow flashing (1Hz)
Channel tripped - Overvoltage	Red/Yellow flashing (5Hz)
Device error, wiring error, feedback voltage	Red/Yellow/Green One after the other (1Hz)

Single-Channel Electronic Circuit Breakers 787-3861 Series

Overview

Distribution modules allow expansion of terminals from the 787-3861 series single-channel electronic circuit breakers. Models available for Vout, GND, or both. Can be used with WAGO push-in jumpers for easy installation.



787-3861/000-1000

Potential Distribution Modules									
Part Number	*Price*	*Quantity Per Pack*	*Amperage Rating*	*Channels*	*Operating Voltage*	*Mounting*	*Wiring*	*Weight grams*	*Drawing Link*
787-3861/000-1000	$11.00	1	20A	(8) 0 VDC	0 VDC	35mm DIN rail	Diagram 1	55.7	PDF
787-3861/000-2000	$11.00		20A	(8) 24 VDC	24 VDC		Diagram 2	55.7	PDF
787-3861/000-3000	$11.00		20A	(4) 0 VDC/(4) 24 VDC	0-24 VDC		Diagram 3	55.7	PDF

Wiring Diagrams

Diagram 1

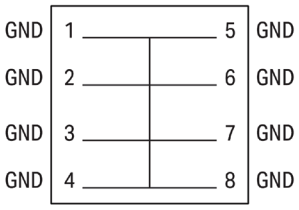


Diagram 2

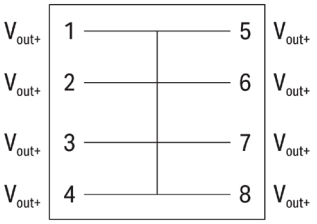
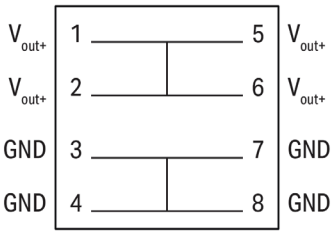


Diagram 3



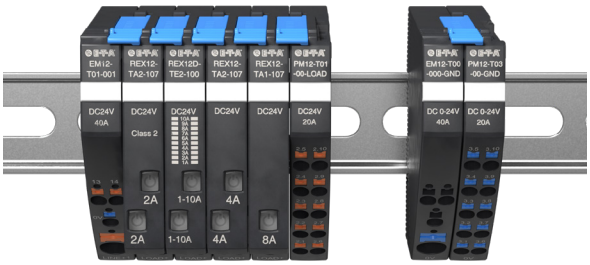
Specifications	
Limiting Continuous Current	20A; 15A (UL)
Protection Type	IP20 (per EN 60529)
Tightening Torque	N/A
Connectors	Push-In CAGE CLAMP®, Solid Conductor 26-14 AWG [0.08-2.5 mm²], Stranded Conductor 22-14 AWG [0.34-2.5 mm²]
Mounting	35mm DIN rail
Surrounding Air Temperature (Operation)	-25 to 70°C [-13 to 158°F]
Surrounding Air Temperature (Storage)	-40 to 85°C [-40 to 185°F]
Relative Humidity	10 to 95% (no condensation permissable)
Pollution Degree	2
Agency Approvals	cULus File E175199,, CE, UKCA

To obtain the most current agency approval information, see the Agency Approval Compliance & Certifications Checklist section on the specific part number's web page.

E-T-A ENGINEERING TECHNOLOGY Modular Circuit Protectors REX Series

Features

- Modular design using power supply, overcurrent protection, and power distribution modules
- No tools required for assembly
- Circuit protection via electronic trip curve
- Slim 12.5 mm module width
- 1 to 10A fixed and adjustable operating current
- Integral fail-safe element, adjusted to max. current rating
- Circuit protection rated for capacitive loads up to 20,000 µF
- Manual ON/OFF/reset switch
- LED status indication with auxiliary contact output
- Push-in terminal connections with release buttons



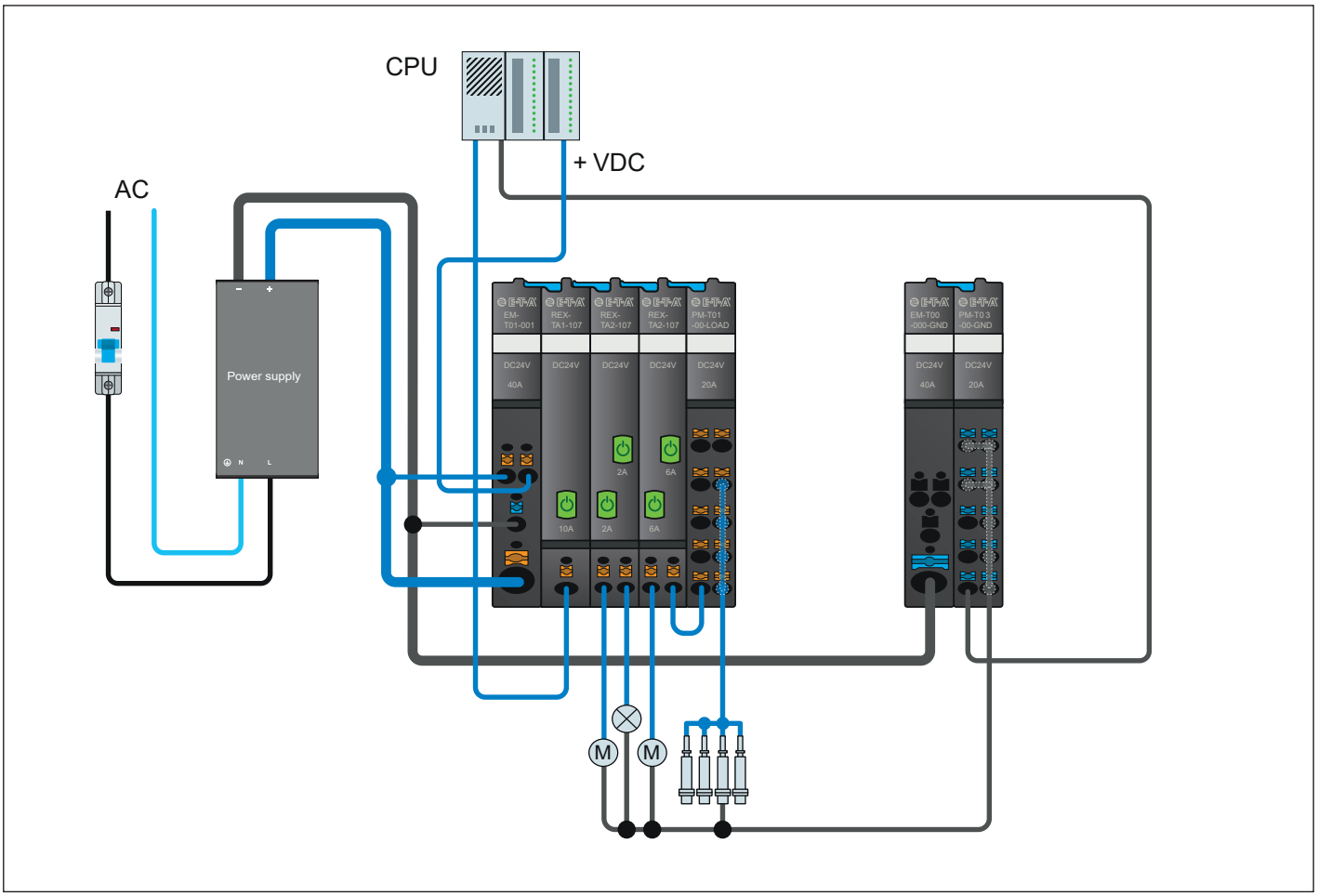
Modular Circuit Protectors

Part Number	Price	Module Type	Number of Channels	Operating Current	Voltage Rating	Operating Voltage	Input Voltage	Output Voltage	Weight g [oz]	Drawing Link	Agency Approvals
Entrance Modules											
EM-T01-001-24-40A *	$28.00	Mains supply	—	40A	24VDC	24VDC	24VDC	–	52 [1.83]	PDF	CE, UL Recognized E320024
EM-T00-000-GND-40A	$12.00	Ground supply 0V	—	40A		0VDC	0VDC	–	40 [1.41]	PDF	CE, UL Recognized E335289
Potential Modules											
PM-T01-00-LOAD-20A	$32.00	Load distribution	8	20A	24VDC	24VDC	24VDC	24VDC	52 [1.83]	PDF	CE, UL Recognized E335289
PM-T03-00-GND-20A	$29.50	Ground distribution	8	20A		0VDC	0VDC	0VDC	52 [1.83]	PDF	
Circuit Protector Modules											
REXD-TE2-24-1A-10A	$58.00	Overcurrent protection	2 independent	Adjustable 1-10A	24VDC	–	–	24VDC	62 [2.18]	PDF	CE, UL Recognized E320024, UL Listed E492388
REX-TA1-24-10A	$44.50		1	10A		–	–		57 [2.01]	PDF	
REX-TA1-24-8A	$44.50		1	8A		–	–		57 [2.01]	PDF	
REX-TA2-24-6A	$49.50		2 independent	6A		–	–		58 [2.04]	PDF	
REX-TA2-24-4A	$49.50		2 independent	4A		–	–		58 [2.04]	PDF	
REX-TA2-24-3A-N	$62.00		2 independent	3A		–	–		58 [2.04]	PDF	CE, UL Recognized E320024 UL Listed E492388, NEC Class 2
REX-TA2-24-2A	$49.50		2 independent	2A		–	–		58 [2.04]	PDF	

*** 1 EM-T01-001-24-40A is required for each system.**
Maximum 16 modules or 40A max per system.

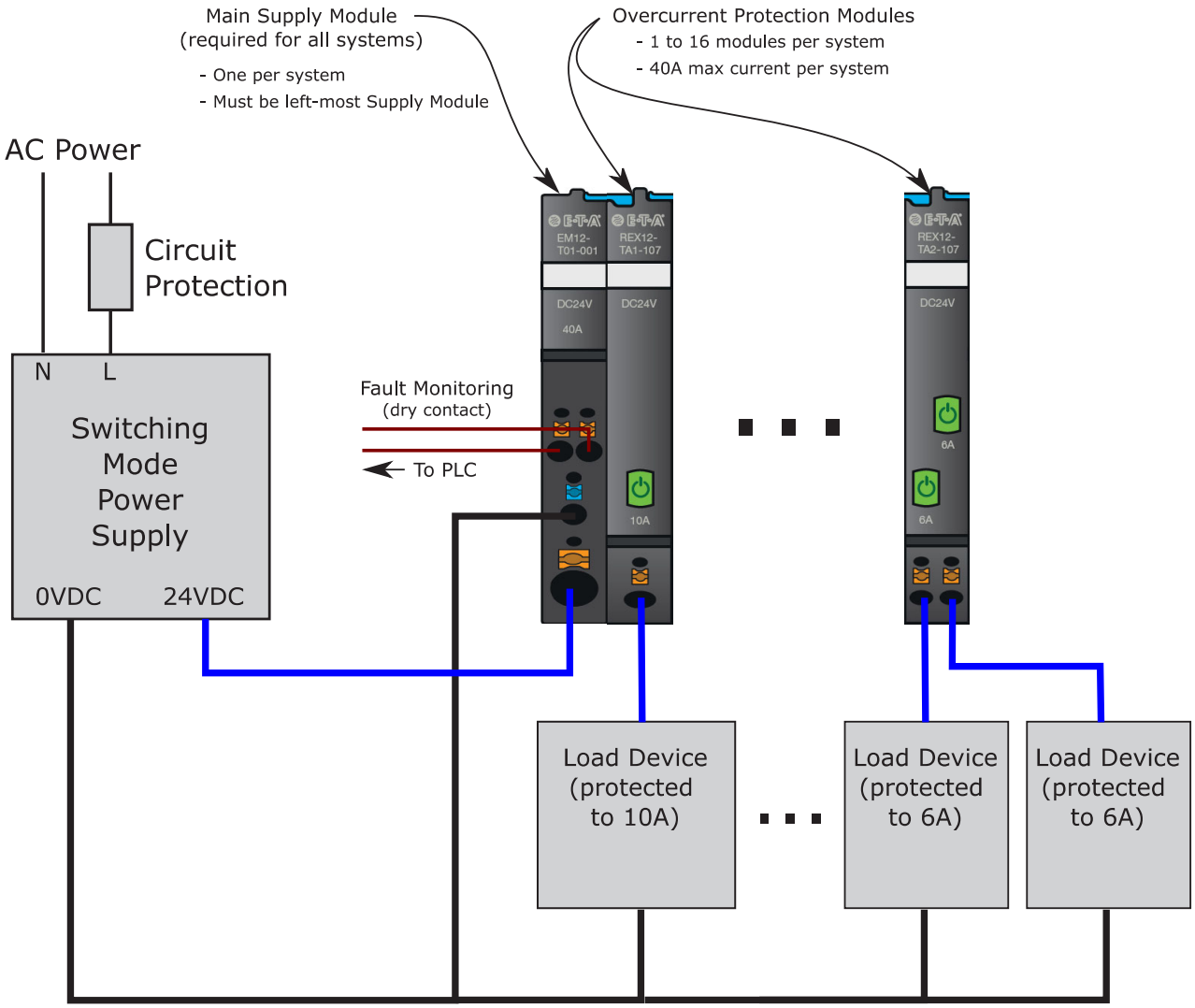
Application Example

Application example: EM-T … with REX-TAx… and PM-T…



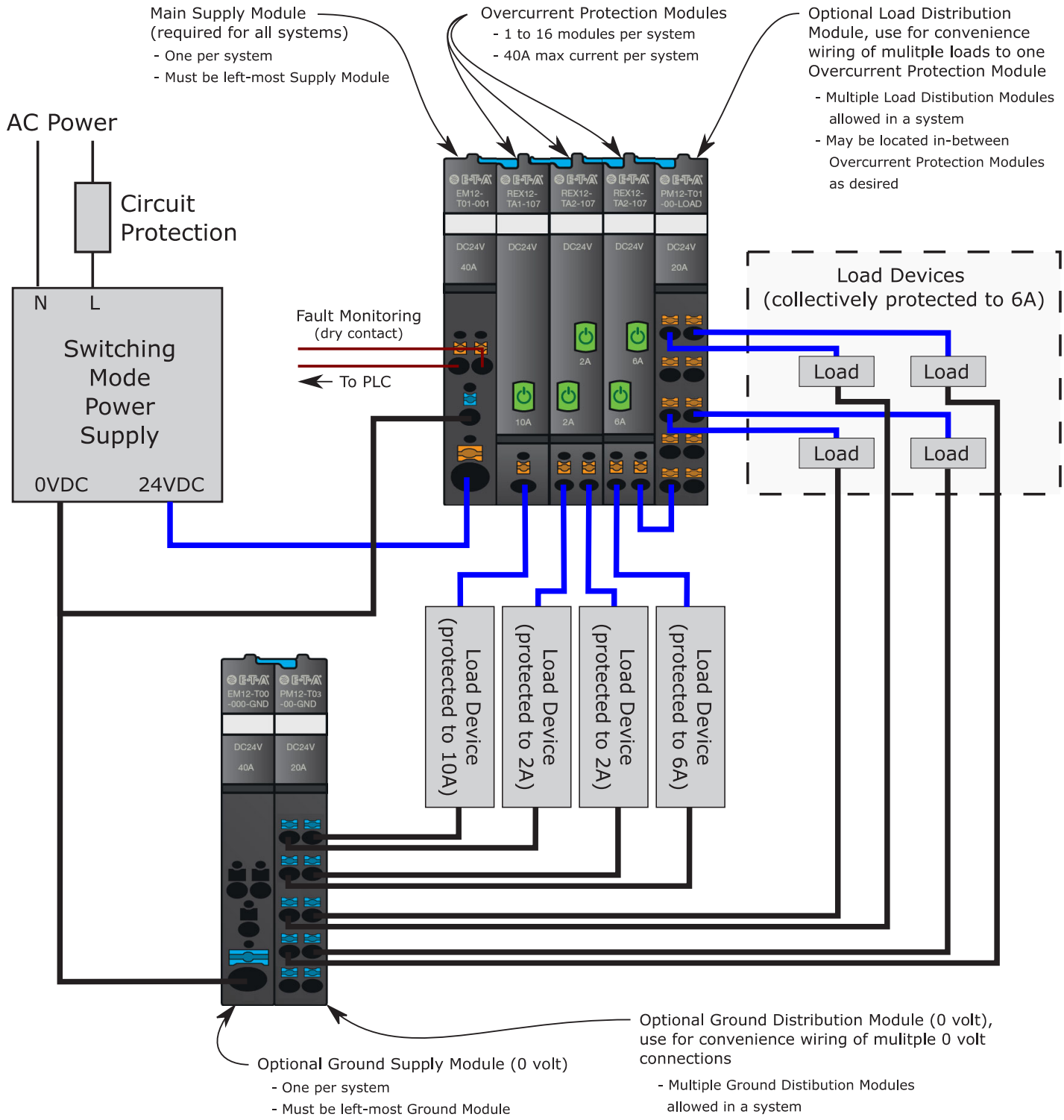
Modular Circuit Protectors REX Series

Basic Architecture



Modular Circuit Protectors REX Series

Full-Featured Architecture



REX Series Modular Circuit Protectors

Specifications

Specifications	
Housing Material	Wellamid
Mounting	Symmetrical rail to EN 60715- 35 x 7.5, horizontal
Ambient Temperature T_U	-25 to 60°C [-13 to 140°F] (Without condensation, cf. EN 60204-1)
Storage Temperature	-40 to 70°C [-40 to 158°F]
Operating Temperature	5 to 60°C [41 to 140°F]
Humidity	96 hrs / 95% RH/40°C to IEC 60068-2-78-Cab climate class 3K3 to EN 60721
Altitude	2,000m above sea level 3,000m above sea level up to +55 °C 4,000m above sea level up to +50 °C
Operation Pressure	4 bar above atmospheric pressure
Vibration	5g test to IEC 60068-2-6, test Fc
Degree of Protection (IEC 60529, DIN VDE 0470)	IP20 EM and PM modules IP30 REX modules
EMC Requirements (EMC Directive, CE logo)	Noise emission EN 61000-6-3 Susceptibility: EN 61000-6-2
Insulation co-ordination (IEC 60934)	0.5 kV / pollution degree 2
Dielectric Strength (max.)	30 VDC (load circuit)
Insulation Resistance (OFF condition)	N/A, only electronic disconnection
Agency Approvals	See selection chart table

To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.

Modular Circuit Protectors REX Series

EM-T01-001-24-40A Overview

A 24VDC switch-mode power supply powers the EM-T01-001-24-40A supply module, which distributes the power through the backplane to the circuit protection modules. The supply module also provides an auxiliary, dry contact status output to signal fault conditions to a connected device such as a PLC input protector, e.g. to the PLC input.

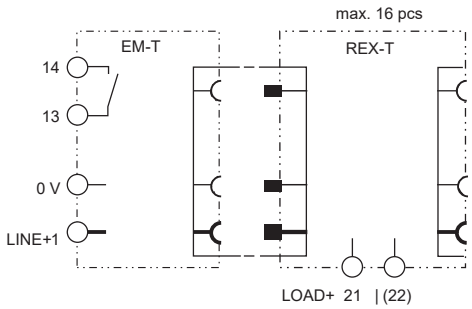
Specifications

EM-T01-001-24-40A Specifications	
Operating Voltage U_B	24VDC 18-30VDC
Operating Current I_B (max)	40A
Reverse Polarity Protection	Yes
Signaling	Only EM-T01-001-24-40A
Quiescent Current I_0	Typically 10mA
Potential-free Auxiliary (max) (Change over contact)	30VDC / 0.5 A min., 10V / 1mA
Group Signaling contact - (13) / (14)	Auxiliary contact, make contact
Group Signaling Normal Conditions	Auxiliary contact closed based on all protection modules - when ON, load output connected - when OFF, load output disconnected
Group Signaling Fault Conditions	Auxiliary contact open based on one or more protection modules - after overload or short circuit trip - after undervoltage release of operating voltage in ON condition with autoreset - at no operating voltage U_B in supply module
Insulation Co-ordination	0.5 kV / pollution degree 2
Power Failure Buffering Time	10ms max
LINE + Push-in Terminal PT 10	0.5 to 10mm² flexible 24-8 AWG rigid stripping length 18mm
0V / 13 / 14 Push-in Terminal PT 2.5	0.14 to 2.5 mm² flexible 24-24 AWG rigid stripping length 8 to 10mm

(1) EM-T01-001-24-40A is required for each system.
Maximum 16 modules or 40A max per system.
Circuit protectors can be mounted side-by-side: REX-TA1-24-xx, REX-TA2-24-xx or REXD-TE2-24-1A-10A

Wiring Diagram

EM-T01-001-24-40A



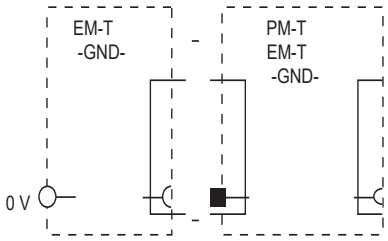
Modular Circuit Protectors REX Series

Specifications

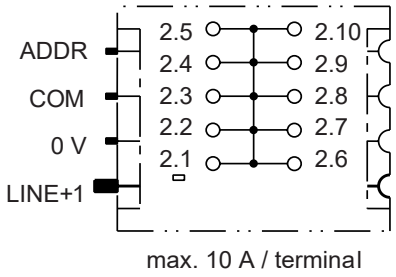
Specifications			
Part Number	***EM-T00-000-GND-40A***	***PM-T01-00-LOAD-20A***	***PM-T03-00-GND-20A***
Operating Voltage U_B OV	24VDC 0-30VDC		
Operating Current I_B (max)	40A	20A	20A
Line Terminal	0V - GND	NA	0V - GND
Insulation Co-ordination	NA	0.8 kV / pollution degree 2	NA
LINE +	Push-in terminal PT 10 0.5 to 10 mm² flexible 24-8 AWG rigid stripping length 18mm	Push-in terminal PT 2.5 0.14 to 2.5 mm² flexible 24-14 AWG rigid stripping length 8 to 10mm	Push-in terminal PT 2.5 0.14 to 2.5 mm² flexible 24-14 AWG rigid stripping length 8 to 10mm

Wiring Diagrams

EM-T00-000-GND-40A

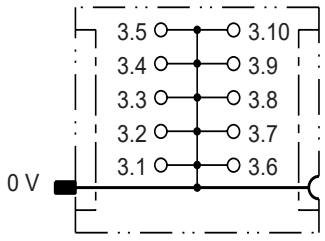


PM-T01-00-LOAD-20A



max. 10 A / terminal

PM-T03-00-GND-20A



max. 10 A / terminal

REX Series Modular Circuit Protectors

Specifications

Specifications				
Part Number	***REXD-TE2-24-1A-10A***	***REX-TA1-24-xx***	***REX-TA2-24-xx***	***REX-TA2-24-3A-N***
Operating Voltage U_B	24 VDC (18 to 30 VDC)			
Closed Circuit Current	1A-10A ON condition: typically 12mA	ON condition: typically 5mA	ON condition: typically 8mA	
Reverse Polarity Protection	Yes			
Power Failure Buffering Time	Up to 10ms			
Rated Current	1A – 10A condition upon delivery max. current rating	8A, 10A	2 A/2A, 4A/4A, 6A/6A	
LED Status	Green: Load circuit connected Green/orange blinking: load current warning limit reached 90 % Orange: overload or short circuit until disconnection Red: - after disconnection due to overload or short circuit - after undervoltage release of operating voltage in ON condition with auto-reset OFF: Device switched off by means of ON/OFF momentary switch or no operating voltage			
Load Output	Power MOSFET switching output (plus switching)			
Load Current Warning Limit (I_W Limit)	Typically 0.9 x I_N			
Hysteresis	Typically 5%			
Overload Current	Disconnection ($I_{ÜL}$) typically I_{OL}: I_N x 1.05 t_{OL}: 3s typically I_{OL}: I_N x 1.35 t_{OL}: 0,5s With trip times ($t_{ÜL}$) typically I_{OL}: I_N x 2.00 t_{OL}: 0.1s typically I_{OL}: I_N x 2.50 t_{OL}: 0.012 s Short circuit typically at short circuit (I_{SC}) t_{SC}: 0.002 s²)			
Voltage Drop I_N	1A typically 30mV, 70% typically 28mV 2A typically 39mV, 70% typically 34mV 3A typically 48mV, 70% typically 40mV 4A typically 57mV, 70% typically 46mV 5A typically 66mV, 70% typically 52mV 6A typically 74mV, 70% typically 59mV 7A typically 83mV, 70% typically 65mV 8A typically 92mV, 70% typically 71mV 9A typically 101mV, 70% typically 77mV 10A typically 110mV, 70% typically 83mV	2A (CL2) typically 110mV, 70% typically 80mV 3A (CL2) typically 130mV, 70% typically 90mV 4A typically 115mV, 70% typically 80mV 6A typically 170mV, 70% typically 110mV 8A typically 160mV, 70% typically 105mV 10A typically 180mV, 70% typically 120mV		
Fail-safe Element Integral Blade Fuse Adjusted to Related Current Rating I_N	8A fail-safe 8A 10A fail-safe 10A 2A/2A (CL2) fail-safe 2A/2A 3A/3A (CL2) fail-safe 4A/4A 4A/4A fail-safe 4A/4A 6A/6A fail-safe 6.3 A / 6.3 A 1A-10A fail-safe 16A			
Operating Voltage Monitoring re Undervoltage	OFF at typically U_B < 16.0 V ON at typically U_B > 19.0 V hysteresis typically 2V with automatic OFF and ON switching			
ON Delay With Power ON	Channel 1: typically 1,500ms Channel 2: typically 1,600ms	Channel 1: typically 100ms Channel 2: typically 200ms		
ON Delay When Switching on With ON/OFF Switch	Channel 1: typically 5ms Channel 2: typically 100ms			
ON Delay After Undervoltage	Channel 1: typically 5ms Channel 2: typically 5ms			
Disconnection Of Load Current	Manually on the device with the ON/OFF momentary switch After an overload / short circuit disconnection with storage (no automatic reset) Temporarily at undervoltage At no operating voltage			

Continued on following page.

Modular Circuit Protectors REX Series

Continued from previous page

Specifications				
Part Number	***REXD-TE2-24-1A-10A***	***REX-TA1-24-xx***	***REX-TA2-24-xx***	***REX-TA2-24-3A-N***
Switch-on of Load Circuit	Momentary switch ON/OFF: Device can only be switched on when operating voltage is applied. Applying operating voltage: The device starts up with the condition last stored.			
Reset Function	A blocked load output (blocked by overload / short circuit) can externally be reset by the ON/OFF momentary switch.			
Leakage Current in Load Circuit if OFF Condition	Typically < 1mA			
Capacitive Loads	Up to 20,000 µF: Depending on cable attenuation, power supply used, load current and current rating			
Free-wheeling Diode	External free-wheeling circuit at inductive load (rating according to load)			
Parallel Connection of Several Load Outputs	Not allowed			
Status Output SM	Status indicator in REX system			
Electrical Data	Minus switching signal output Group signaling is implemented in connection with EM-T01-001-24-40A supply module.			
Terminals LOAD+	Push-in terminal PT 2.5: 0 to 14mm² [2 to 5mm² flexible] 24-14 AWG rigid Stripping length 8 to 10mm			

Inquiry Mode REXD-TE2-24-1A-10A

Use Inquiry Mode to determine the current setting of the REXD-TE2-24-1A-10A module. Inquiry Mode is possible in all operating conditions (ON, OFF, UNDERVOLTAGE and TRIPPED).

1. Press and hold the button for 2 to 5 seconds to enter inquiry mode.
2. When the button is released, the LED will turn RED for 333ms to indicate that the module is in Inquiry Mode.
3. Then the LED will blink ORANGE at a pulse rate of 1Hz to indicate the current setting (number of pulses = current setting).
4. After the last pulse, the LED will turn RED for 333ms and flash the current setting again.
5. Press the button or wait for five indication cycles to exit Inquiry Mode.

Adjustment Mode REXD-TE2-24-1A-10A

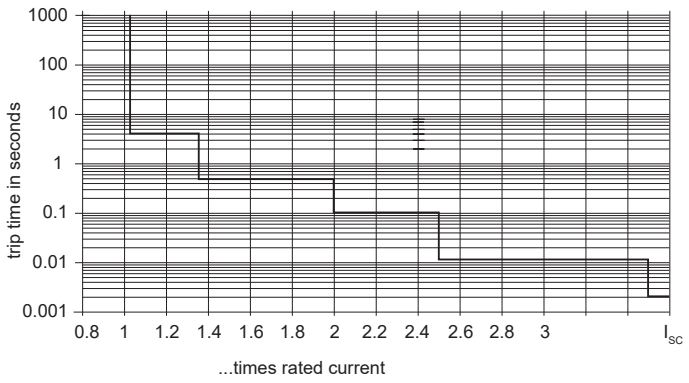
Use Adjustment Mode to set the REXD-TE2-24-1A-10A module to the desired current setting. Adjustment Mode is possible in all operating conditions (ON, OFF, UNDERVOLTAGE and TRIPPED).

1. Press and hold the button for at least 5 seconds to enter Adjustment Mode.
2. When the button is released, the LED will turn RED for 333ms to indicate that the module is in Adjustment Mode.
3. The LED will blink GREEN at a pulse rate of 0.6 Hz for the desired current setting (number of pulses = current setting).
4. Once the maximum value is indicated, the LED will turn RED for 333ms and repeat the cycle.
5. To select a current setting, wait for the LED to flash the desired number of times, then press the button (for example, pressing the button after seven pulses will change the setting to 7A).
6. Adjustment Mode will be exited when a setting is selected or if no selection is made after five indication cycles.

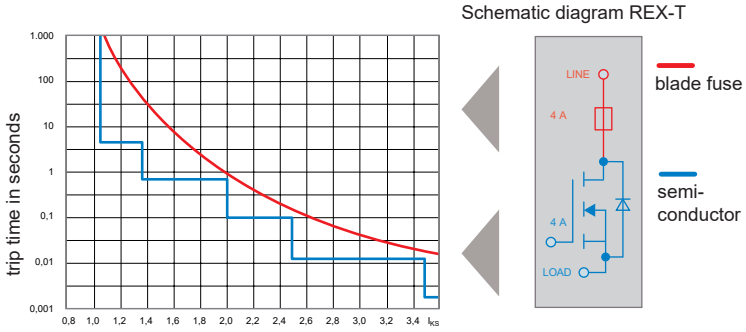
Modular Circuit Protectors REX Series

Typical Time/Current Characteristic

(T_{amb} = +23°C, UB - 24VDC)



Basic Trip Curve and Schematic Diagram REX-T



... times rated current trip curve REX-T

Temperature Factor / Continuous Duty

The time/current characteristic depends on the ambient temperature. To determine the maximum load current, please multiply the current rating with the temperature factor and consider the factor for side-by-side mounting.

Temperature Factor Table						
Ambient Temperature [°C]	0	10	23	40	50	60
Temperature Factor	1	1	1	0.95	0.90	0.85

Note:

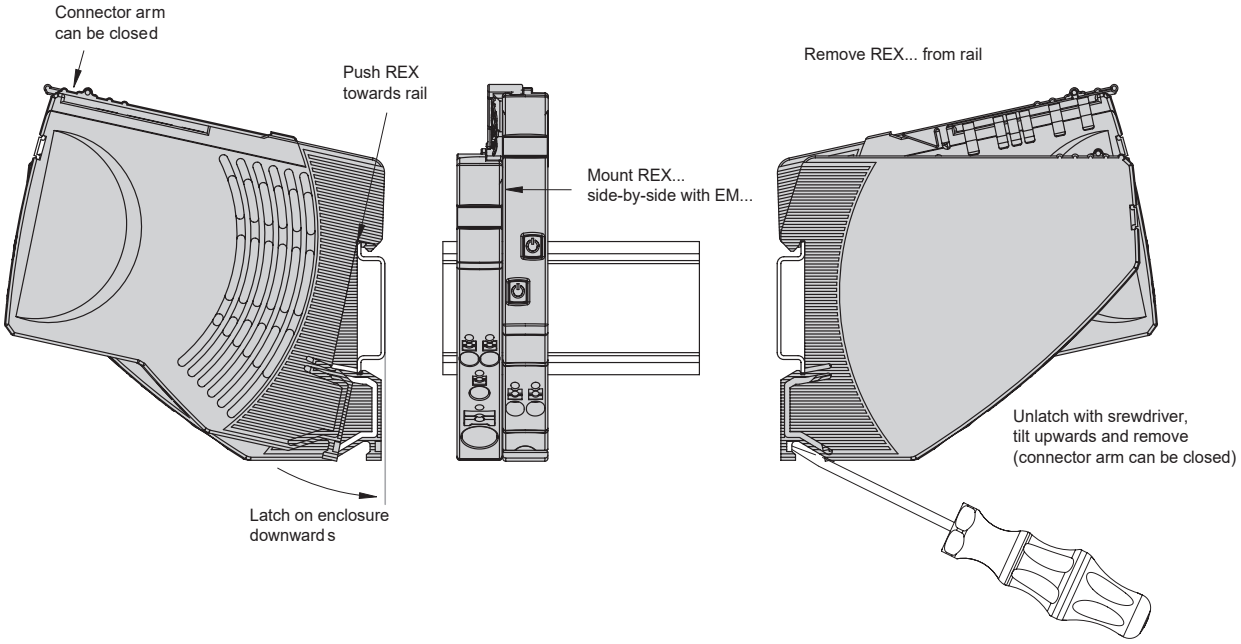
When mounted side-by-side, the devices can carry a maximum of 80% of their rated load or a different rating must be selected.

With high temperatures, the load current warning threshold “warn limit typically 0.9 x IN” will be reduced in accordance with the temperature factor.

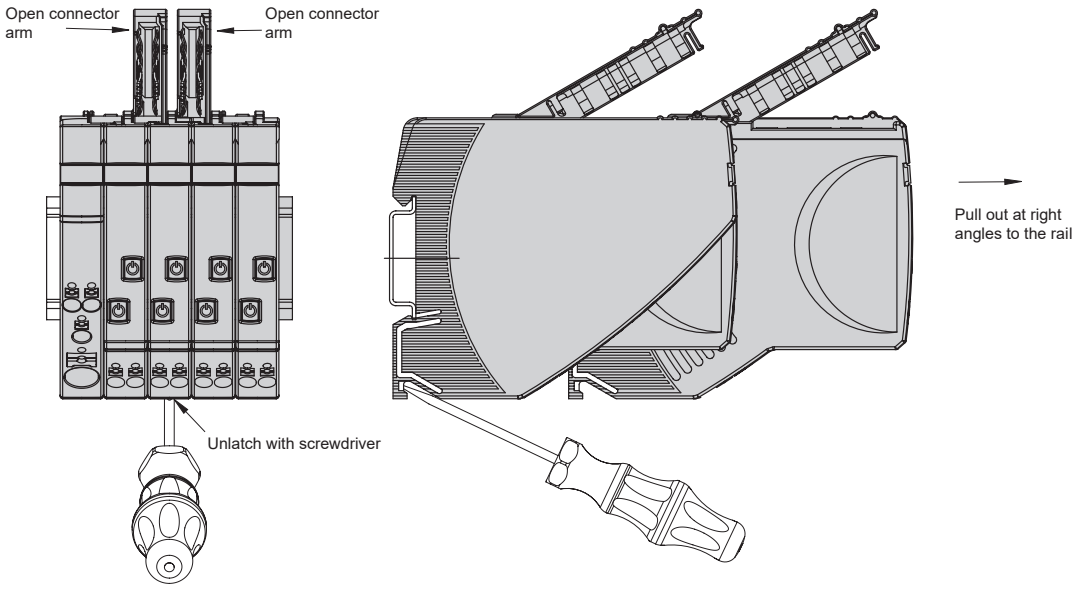
Selection of current rating of the circuit protector ≤ rating of power supply.

Modular Circuit Protectors REX Series

Mounting Diagram



Replacement Diagram



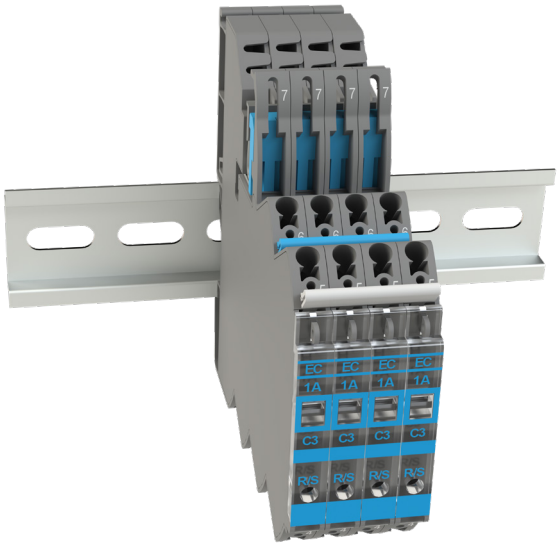
Gladiator from AutomationDirect Circuit Protectors GECP Series

Electronic Circuit Protectors Overview

The Gladiator electronic circuit protectors (ECP's), provide reliable load monitoring and protection in 24VDC control circuits. The GECP-1CH-1-10A features include adjustable trip current range (1-10A), patented adjustable characteristics fast, medium, slow 1, slow 2, and slow 3. All ECP's output alarm signal at 90% of the load setting, remote set/reset. In addition to factory floor applications, the ECP's serve well in remote locations and other hard to access applications. Narrow construction ensures compact design even with multi-channel configurations. No derating required as Gladiator ECP's function independently of ambient temperature.

Features

- LED status indicator at 90% of the overload ratio
- Output trip alarm
- LED status indicator on/off/alarm
- Remote Set/Reset
- Ideal for remote locations
- Independent of ambient temperature, no derating required
- 35mm DIN rail mounting
- 5-year warranty





GECP-1CH-1-10A

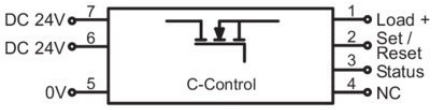
Single Channel Electronic Circuit Protectors										
Part Number	*Price*	*Voltage Rating*	*Amperage Rating*	*Number Of Channels*	*Input Voltage*	*Output Voltage*	*Trip Curve*	*Connection*	*Mounting*	*Drawing Link*
GECP-1CH-1-10A	$44.00	12/24 VDC	1-10A Adjustable	1	10-30 VDC	10-30 VDC	Selectable	Spring terminals	35mm DIN rail	PDF
GECP-1CH-1A	$29.50	12/24 VDC	1A	1	10-30 VDC	10-30 VDC	Slow 1 curve	Spring terminals	35mm DIN rail	PDF
GECP-1CH-2A	$29.50	12/24 VDC	2A	1	10-30 VDC	10-30 VDC	Slow 1 curve	Spring terminals	35mm DIN rail	PDF
GECP-1CH-4A	$29.50	12/24 VDC	4A	1	10-30 VDC	10-30 VDC	Slow 1 curve	Spring terminals	35mm DIN rail	PDF
GECP-1CH-6A	$29.50	12/24 VDC	6A	1	10-30 VDC	10-30 VDC	Slow 1 curve	Spring terminals	35mm DIN rail	PDF
GECP-1CH-8A	$29.50	12/24 VDC	8A	1	10-30 VDC	10-30 VDC	Slow 1 curve	Spring terminals	35mm DIN rail	PDF

Max 40A per system when using with supply set GECP-24V-SS.

Gladiator from AutomationDirect Circuit Protectors GECP Series

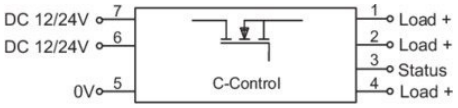
Wiring Diagrams

GECP-1CH-1-10A



1: + Output
2: Control input (Set/Reset)
3: Status output
4: NC
5: 0V
6: + Supply (alternative)
7: + Supply

GECP-1CH-1A, GECP-1CH-2A, GECP-1CH-4A, GECP-1CH-6A, GECP-1CH-8A



1: + Output
2: + Output
3: Status output
4: + Output
5: 0V
6: + Supply (alternative)
7: + Supply

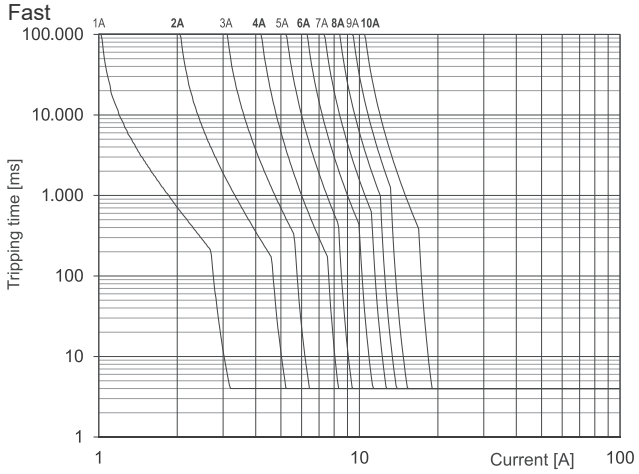
LED Operation	
Status LED	***Explanation***
LED Green, [ON]	Function is OK*
LED Green, Flashing 1Hz [Overload]	Load about 90% of 1 nominal
LED Green, Flashing 5Hz [Overload]	Load above 100% of 1 nominal
LED Red, [OFF]	Module switched off or acknowledged*
LED Red, Flashing 1Hz [Overload]	Output off due to overload/short circuit*
LED Red, Flashing 5Hz [Error]	Wiring error - feedback (internal error)
LED Red, Flashing Shortly [OFF]	Output off via remote set/reset
LED Red/Green, Flashing 1Hz [ON]	Target settings via rotary switch deviate from actual settings: NOTICE: Switching off and on via pushbutton required.
Button [ON/OFF]***	Nominal operation: ON/OFF Load monitoring tripped: 1st push: acknowledge 2nd push: ON
Rotary Switch (I) - Switch Position*	GECP-1CH-1-10A - current adjustment 1-10A
Rotary Switch (C) - Switch Position*	Characteristic: 1: Fast, 2: Medium, 3: Slow-1, 4: Slow-2, 5: Slow-3

*** If the operating voltage is switched off, the last status is saved. (Default)**
**** Accept the setting - after switching on again via the button, not by Remote Set/Reset.**
***** Master Function - switch off via pushbutton, can only be switched on again via pushbutton.**

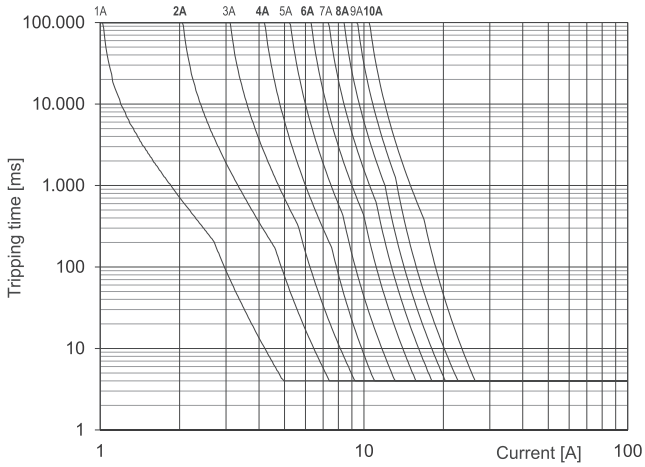
Characteristic Curves

NOTICE: Standard characteristics are shown here.

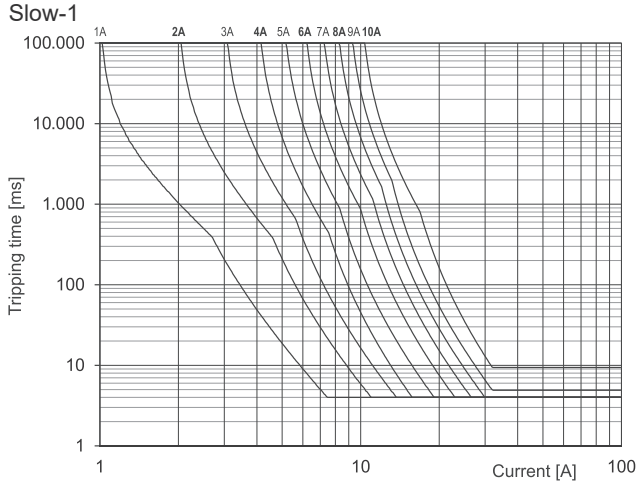
Fast



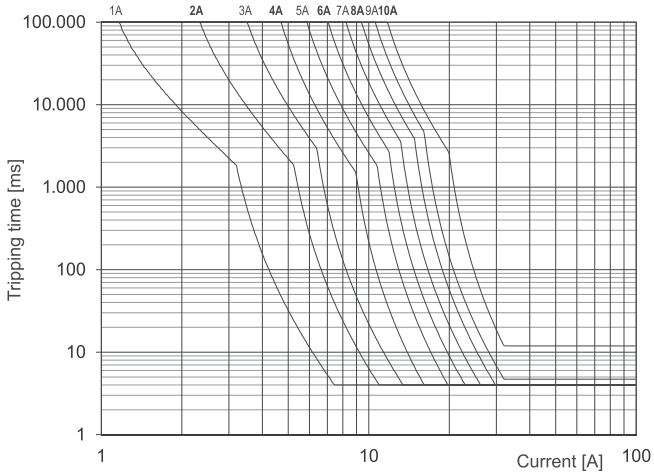
Medium



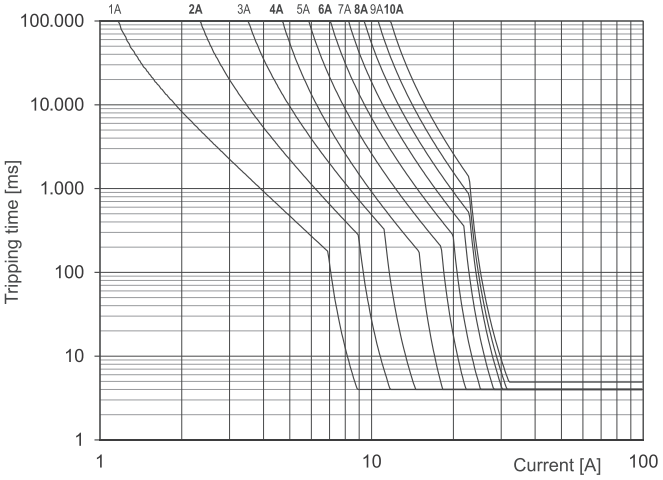
Slow-1



Slow-2



Slow-3



Technical Data

NOTICE: Always refer to the respective current data sheet.
This can be found on the product page of the product.

Gladiator from AutomationDirect GECP Series Circuit Protectors

Supply Terminals

Overview

The GECP-24V-SS is used to supply 24V to the Electronic Circuit Protectors (ECP's) via 4- or 8-pin busbar, or by jumpering to the ECP's in the system.

The GECP-0V-TERM is used to bus together 0V signal to the ECP's in the system.

Features

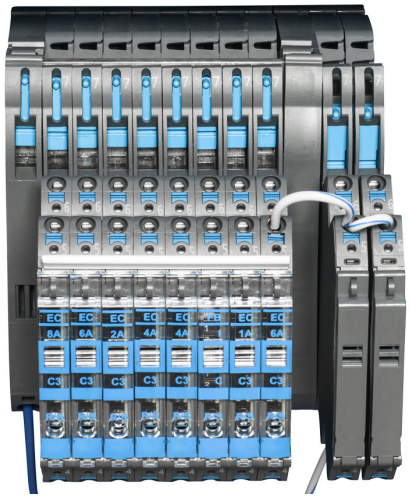
- Single-channel design
- 40A maximum amperage rating
- 0VDC or 24VDC operating voltage
- 35mm DIN rail mounting



GECP-24V-SS



GECP-0V-TERM

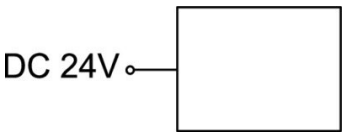


Supply Terminals					
Part Number	*Price*	*Amperage Rating*	*Operating Voltage*	*Mounting*	*Drawing Link*
GECP-24V-SS	$20.00	40A	24VDC	35mm DIN rail	PDF
GECP-0V-TERM	$30.00	40A	0VDC		PDF

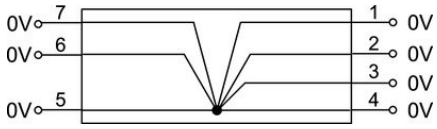
Note: End block included with GECP-24V-SS.

Wiring Diagrams

GECP-24V-SS



GECP-0V-TERM



Gladiator® from AutomationDirect GECP Series Specifications

Specifications				
Part Number	**GECP-1CH-1-10A**	**GECP-1CH-xA**	**GECP-0V-TERM**	**GECP-24V-SS**
Input				
Voltage Rating U_N	12/24 VDC		12/24 VDC	12/24/48 VDC
Operation Voltage Range	10-30 VDC		—	
Total Number of Channels	1		—	
Rated Current I_N	DC 10A		DC 10A 6 x max	DC 40A max
Supply Current	DC 40A over Cu-rails 10 x 3 mm		—	
Reverse Voltage Protection	Internal electronics		No	
Connection Type Input	Screwless contact slide		—	Push-in 0.5 mm² – 10mm² UL Values/stranded 14-8 AWG
Conductor Cross Section	—			Single-wire: max. 10mm² Finely stranded: max 10mm² Finely stranded with AEH: max 6mm²
Control Input (Set/Reset)				
Signal Level	12/24 VDC according to EN 61131	—		
OFF	Pulse with falling edge > 100ms, < 800ms	—		
ON	Pulse with falling edge > 1s	—		
Output				
Voltage Rating U_n	—			12/24/48 VDC
Switching Element	MOSFET		—	
Output Current	DC 10A max		DC 40A max	
Voltage Drop	215 mV max (10A)		—	
Status Display Output	LED green: operating voltage present - no error LED red: error in load circuit		—	
Switch-on Capacity	10,000 µF		—	
Current Range	1 to 10A (Adjustable)	1 to 8A (see selection chart)	—	
Characteristic	Fast (1), Medium (2), slow 1(3), slow 2 (4), slow 3 (5)		—	
Connection Type Output	—			Screwless Contact Slide
Copper Bus Bar	—			3 x 10mm
Signal Output				
Signal Level	12–24VDC: operating voltage on standby, no error 0VDC: error, output switched off or manual "OFF"		—	
Switching Element	Transistor, collector with pull-up resistance		—	
General				
Housing Material	PA 6.6 (UL 94 V-0, NFF I2, F2)			
Housing Color	Gray			
Mounting	35mm DIN rail mountable (EN 60715)			
Mounting Position	Any			
Degree Of Protection	IP20			
Connection Type	Push-In 0.25 – 2.5 mm² [24-14 AWG]			Push-In single wire/fine wire 0.50 – 10.0 mm² [22-7 AWG] Fine stranded wire with ferrule, Finely stranded, ferrule with plastic collar 0.5 – 6mm² [22-9 AWG] UL Values 14-8 AWG
Weight	0.102 kg [0.22 lbs]	0.105 kg [0.23 lbs]	0.102 kg [0.22 lbs]	0.07 kg [0.15 lbs]
Operating Temperature	-25 to 70°C [-13 to 158°F]	-25 to 50°C [-13 to 122°F]		
Storage Temperature	-40 to 85°C [-40 to 185°F]			
Relative Air Humidity	10 – 95% RH			
Vibration Resistance	4g according to EN 60068-2-6			
Shock resistance	15g according to EN 60068-2-27			
Certifications / Standards	CE, UKCA, UR (E530981), cULus (E191072), EN 61000-6-2, EN 61000-6-3, EN 61131-2 UL 60947-5-1	UR (E530981), cULus (E191072), EN60950-1, EN61131-1,2 EN61000, EN60947-4-1 EN55022	CE,UKCA, UR (E530981), cULus (E191072), EN 60947-1	CE, UKCA, UR (E530981), cULus (E191072) UL 60947-5-1

Gladiator from AutomationDirect GECP Series Circuit Protectors

Busbar Features

- For busing power between 4 or 8 ECPs
- Copper with tin-plated surface
- 40A amperage rating
- 4- or 8-pin units available
- Must be used with 24V supply set part number GECP-24V-SS



GECP-BB-4

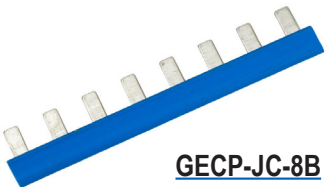
Busbars

Part Number	Price	Amperage Rating	Number Of Pins	Material	Dimensions LxHxD mm [inch]	Operating And Storage Temperature	Weight	Drawing Link
GECP-BB-4	$4.00	40A	4	CU, Copper tin-plated surface	50.4 x 10.0 x 3.0 [1.98 x 0.39 x 0.11]	-40 to 80°C [-40 to 176°F]	0.013 kg [0.02 lbs]	PDF
GECP-BB-8	$5.00	40A	8		82.8 x 10.0 x 3.0 [3.25 x 0.39 x 0.11]		0.022 kg [0.04 lbs]	PDF

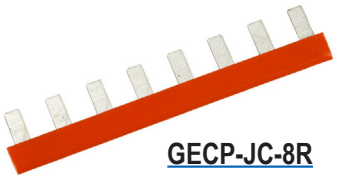
Note: Cut to length permitted.

Jumper Comb Features

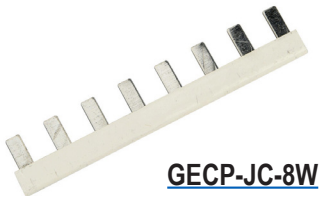
- For jumpering status outputs, 0V input, or for the set / reset terminals
- 6A amperage rating
- Push-in terminals
- 8-pole
- PVC material with FeZn contacts
- Blue - normally used for 24V
- Red - normally used for signal
- White - normally used for 0V



GECP-JC-8B



GECP-JC-8R



GECP-JC-8W

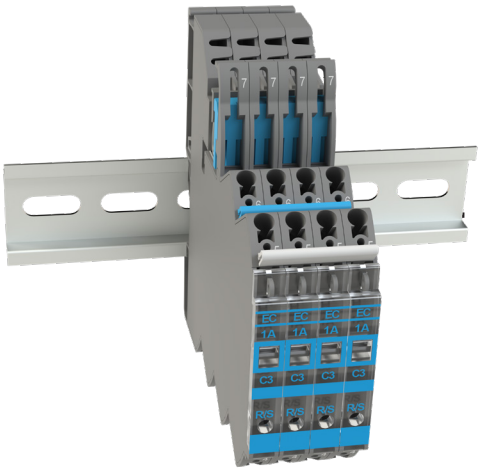
Insulated Jumper Combs

Part Number	Price	Quantity	Amperage Rating	Type	Number Of Poles	Material	Operating Temperature	Storage Temperature	Weight	Color	Drawing Link
GECP-JC-8B	$5.00	1	6A	Push-in	8	PVC	-25 to 50°C [-13 to 122°F]	-40 to 85°C [-40 to 185°F	0.003 kg [0.0006 lbs]	Blue	PDF
GECP-JC-8R	$5.00	1	6A	Push-in	8					Red	PDF
GECP-JC-8W	$5.00	1	6A	Push-in	8		-40 to 85°C [-40 to 185°F			White	PDF

Note: Cut to length permitted.

Gladiator from AutomationDirect GECP Series Circuit Protectors

Standalone System



1-Channel Protection Modules
Fixed - 1, 2, 4, 6 and 8A
Adjustable: 1-10A

Protection modules are standalone or can be integrated into a modular system using supply and ground modules

-See below

Modular System

Optional 24VDC Supply Set GECP-24-SS

Optional busbars provide supply power to 4 or 8 protection modules

Switches allow quick toggling of power on and off the bus bar

Optional Ground Supply Module GECP-OV-TERM

Easy-to-wire push-in terminals with release buttons

1-Channel Protection Modules
Fixed - 1, 2, 4, 6 and 8A
Adjustable: 1-10A

(Protection modules integrated into a modular system using supply and ground modules)

Remote reset and remote ON/OFF functions



Insulated Jumper Combs Available in Red, White, or Blue

Multi-Channel Electronic Circuit Breakers



Features

- Space saving ECB's with two, four, and eight channels
- Models range from 0.5-10A nominal current, adjustable for each channel via sealable selector switch
- One illuminated, three color button per channel simplifies switching (on/off), resetting, and on-site diagnostics
- Time-delayed switching of channels
- NEC Class 2 3.8 A fixed models available
- Remote input resets tripped channels or switches on/off any number of channels via pulse sequence.
- Easy to use Push-In CAGE CLAMP© terminals.

Applications

- 24VDC Circuit Protection
- PLC Input Power
- PLC I/O points
- Sensors
- Motor Controlled Circuits
- Control Instrumentation
- Relays
- Actuators
- Valves

Overview

The electronic circuit breaker distributes and monitors the load current over several circuits. They reliably recognize overloads and short circuits on an output. The circuit breakers' electronics permit brief current peaks and switch longer overloads off. The rated current for each output can be individually set with a current selector switch, which is accessible from the front. The outputs are time-delay and load-dependant activated to avoid overload current. If the rated current is exceeded for a set time, the output will be switched off automatically and can be switched on after a waiting time (thermal relaxation) using the pushbutton or the remote signal-input S1. The pushbutton can also be used to switch the output manually. The state of each output is also indicated with a multi-colored LED. Upon overload, the remaining circuits are separated from the defective current path without reverse feed, thanks to Active Current Limiting. A drop in voltage will not hinder the reliability of the respective circuit.

Multiple Channel Electronic Circuit Breaker

Part Number	Price	Channel Units	Weight g [lbs]	Nominal Output Current (Per Channel)	Mounting	Output Voltage	Active Current Limitation	Connection	Wiring	Drawing Link
787-1662-004-1000	$283.00	2	200 [0.44]	3.8 A	35mm DIN rail	24VDC	Yes, NEC Class 2	Push-in CAGE CLAMP©	Diagram 2	PDF
787-1662-006-1000	$254.00	2	170 [0.37]	0.5-6 A			Yes		Diagram 1	PDF
787-1662-106-000	$204.00	2	170 [0.37]	1-6 A I			No		Diagram 3	PDF
787-1662	$204.00	2	200 [0.44]	2-10 A			No		Diagram 4	PDF
787-1664-004-1000	$397.00	4	205 [0.45]	3.8 A			Yes, NEC Class 2		Diagram 6	PDF
787-1664-006-1000	$350.00	4	170 [0.37]	0.5-6 A			Yes		Diagram 5	PDF
787-1664-106-000	$263.00	4	210 [0.46]	1-6 A			No		Diagram 7	PDF
787-1664	$251.00	4	170 [0.37]	2-10 A			No		Diagram 8	PDF
787-1668-006-1000	$598.00	8	440 [0.97]	0.5-6 A			Yes		Diagram 9	PDF
787-1668-106-000	$421.00	8	490 [1.08]	1-6 A			No		Diagram 10	PDF
787-1668	$421.00	8	440 [0.97]	2-10 A			No		Diagram 11	PDF

Multi-Channel Electronic Circuit Breakers

Multiple Channel ECB Specifications	
Nominal Input Voltage	24VDC
Input Voltage Range	18 – 30VDC
Total Number of Channels	See Selection Chart
Nominal Output Voltage	24VDC
Output Voltage Range	18 – 30VDC
Voltage Drop	See Product Insert
Nominal Output Current	See Selection Chart
Trip Time	16ms to 5s [Load-dependent]
Switch-On Capacity	See Product Insert
Switch-On Behavior	Time-delayed channel switching [Load-dependent, min. 50ms / max. 5s]
Active Current Limitation	See Selection Chart
Signaling	2,4, or 8 x Status LED [green/yellow/red] 1 x Control input 2 x active signal output [Ui max. 4 mA]
Operation Status Indicator	See LED Operation Table Below
Remote Input	18 – 30VDC signal, for 500ms switches on/off and resets the tripped channels
Fuse Protection	15A [Internal Fuse]
Isolation Voltage	DC 0.5 kV
Protection Type	IP20 [per EN 60529]
Reverse Voltage Protection	No
Transient Suppression	Suppressor diode [33V]
Series/Parallel Operation of Single Channels	Not Permitted
Tightening Torque	N/A
Weight	See Selection Chart
Connectors	Push-In CAGE CLAMP©, Input [+] 20-8 AWG, Input [-], Output, Signaling 28-12 AWG
Agency Approvals	EN 60950; EN 61000-6-2; EN 61000-6-3; UL 508; UL 2367; DNV GL; CE; RoHS
Surrounding Air Temperature (Operation)	-25 to 70°C [-13 to 158°F]
Surrounding Air Temperature (Storage)	-25 to 85°C [-13 to 185°F]
Relative Humidity	5 to 96% [no condensation permissable]
Derating	No derating Models **787-1664 & 787-1668 [greater than or equal to 50°C [122°F]; see instruction manual]
Pollution Degree	2

LED Operation		
State/Description	***Output***	***LED***
Initialization	Off	Off
Output on, function OK	On	Green
Output Current > rated current	On	Green flashing
Output was switched off manually or through signal input S1	Off	Red
Output was switched off automatically (over current), thermal relaxation active	Off	Red flashing
Output was switched off automatically (over current), thermal relaxation finished	Off	Orange flashing
Output malfunction (internal fuse blown)	Off	Red flashing fast

Multi-Channel Electronic Circuit Breakers

Wiring Diagrams

Diagram 1

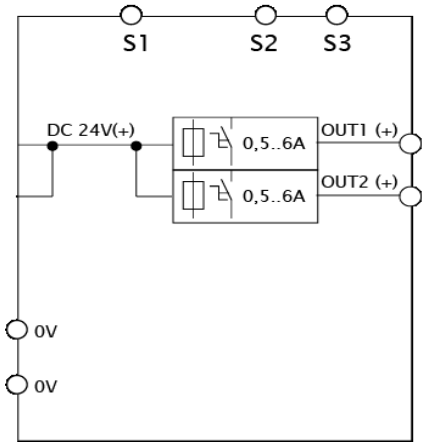


Diagram 2

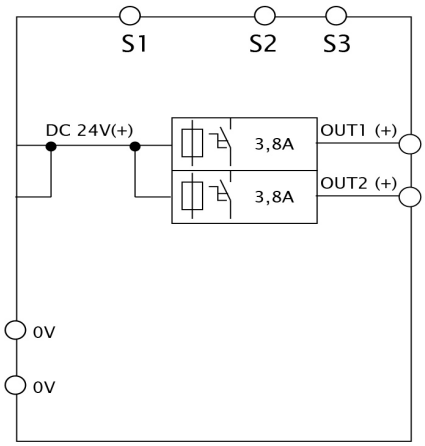


Diagram 3

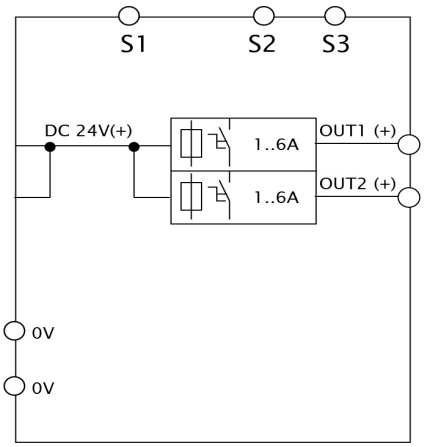


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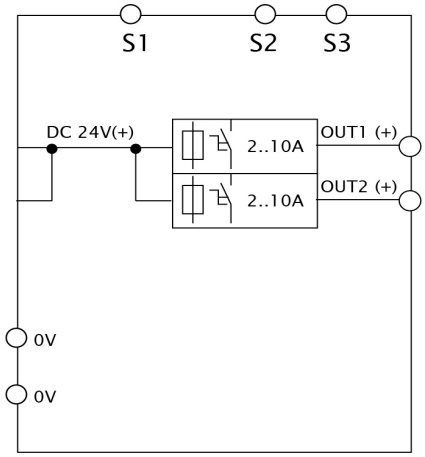


Diagram 5

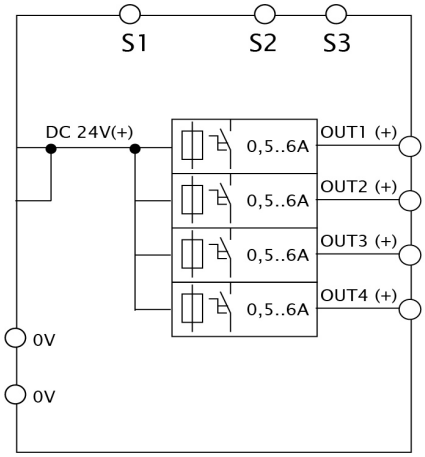
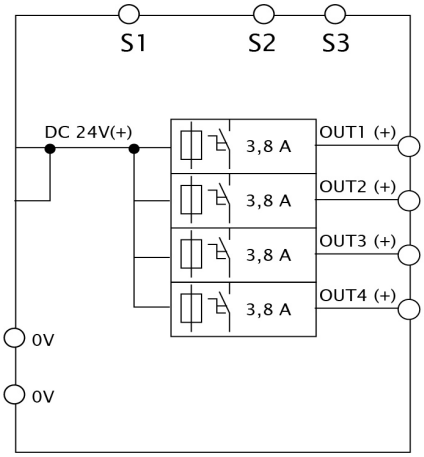


Diagram 6



Multi-Channel Electronic Circuit Breakers

Wiring Diagrams

Diagram 7

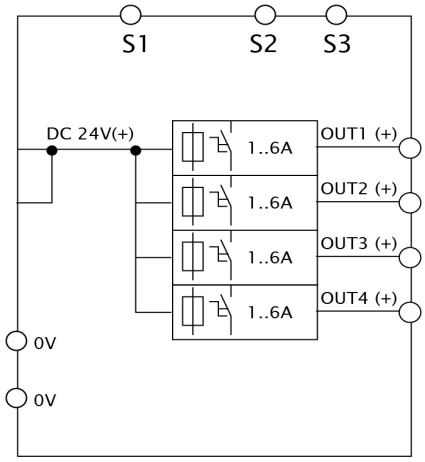


Diagram 8

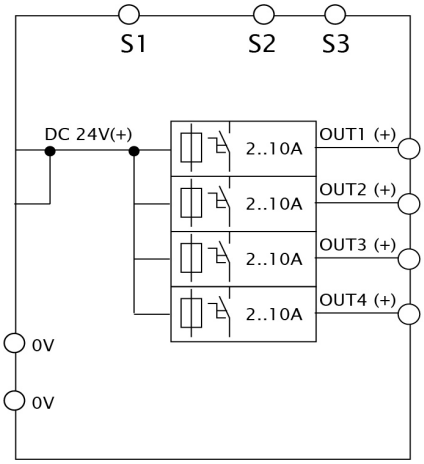


Diagram 9

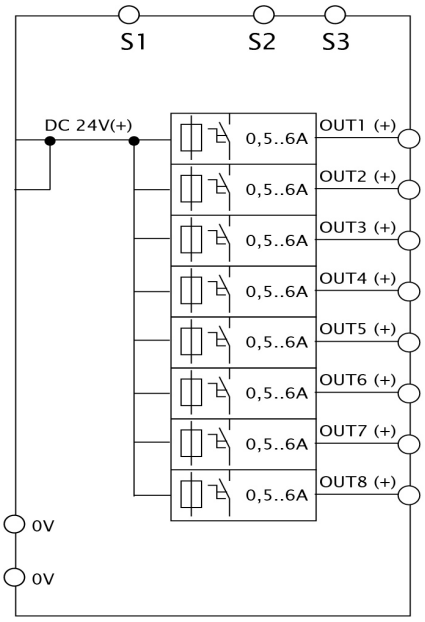


Diagram 10

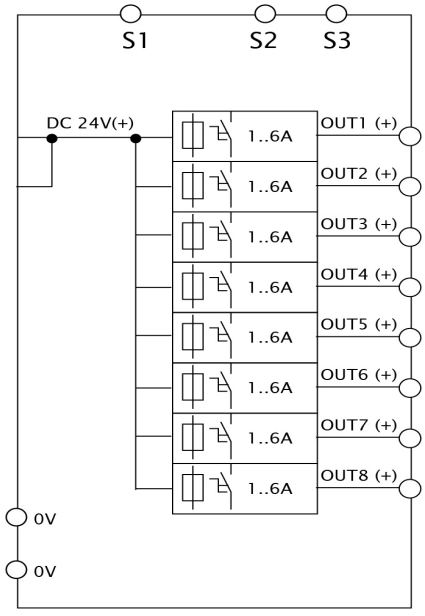
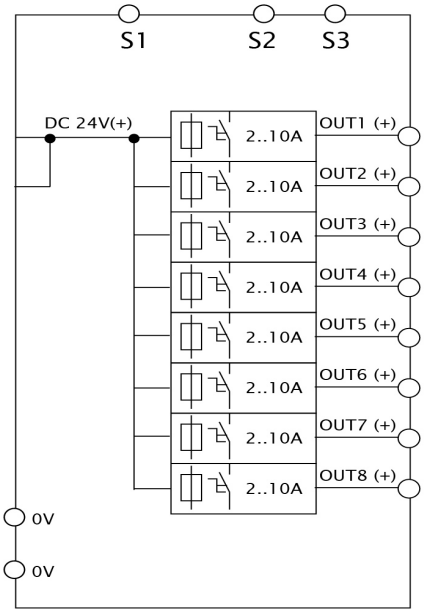


Diagram 11



Electronic Circuit Protectors RACPRO1 Series

Overview

The RACPRO1-4SP series are 4-channel electronic fuse (e-Fuse) load switches with independent overcurrent limit control and real-time output current indication. Each channel is separately protected so that overload or fault conditions on an individual load do not affect overall system reliability or function. The useful LED indicators show the output current and change from green to yellow (current within limit) to orange (current at limit) to red (overcurrent or short-circuit). A voltage-free DC-OK output can be used to monitor system function. Each channel can also be switched ON or OFF to ease fault diagnostics or for maintenance.

Features

- Push-in connectors for tool-less wiring
- Start-up delay adjustable by switch
- Adjustable power limit & load indication by LED
- Individual ON/OFF and OCP limit for each channel
- Short circuit protection & power boost 150%/5s
- Easy daisy chaining of multiple modules
- Paired input & output (+, -) connectors included
- 3-year warranty



RACPRO1-4SP/24V/10A

Electronic Circuit Protectors RACPRO1 Series										
Part Number	Price	Current Limiting	Amperage Rating	Channels	Input Voltage	Output Voltage	NEC Class 2	Dimensions H x W x D mm [in]	Weight gram [lb]	Drawing Link
RACPRO1-4SP/24V/5A	$103.00	Yes	Adjustable 1.75-5.75A	4 independent	22-28 VDC	24 VDC nominal	Yes	110.2 x 72.0 x 61.9 [4.34 x 2.83 x 2.44]	250 [0.55]	PDF
RACPRO1-4SP/24V/10A	$118.00		Adjustable 3.5-11.5A				No	111.0 x 72.0 x 61.9 [4.37 x 2.83 x 2.44]		PDF

Electronic Circuit Protectors RACPRO1 Series												
Part Number	Input Cage Clamp				Push-in Output Terminal				Push-in Signal Reset Terminal *			
	Function	AWG	mm^2	Wire Stripping Length	Function	AWG	mm^2	Wire Stripping Length	Function	AWG	mm^2	Wire Stripping Length
RACPRO1-4SP/24V/5A	+Vin	24-8	0.25-6	12-13mm	-Vout	20-12	0.5-4	10-11mm	Signal	28-16	0.25-1.5	8-9mm
	-Vin				+ Vout							
RACPRO1-4SP/24V/10A	+Vin	18-4	0.75-25	18-20mm	-Vout							
	-Vin				+ Vout							

*** Do not connect to hazardous voltages.**
Ferrules are required for stranded wire.

Electronic Circuit Protectors
RACPRO1 Series

Specifications			
Part Number		***RACPRO1-4SP/24V/5A***	***RACPRO1-4SP/24V/10A***
Nominal Input Voltage		Typical 24 VDC	
Operating Input Range		Minimum 22 VDC	22 VDC - 28 VDC
Absolute Input Voltage		Maximum 28 VDC	
Turn-on Voltage		Typical 21.5 VDC	
Turn-off Voltage	***Channel 1***	Typical 17.5 VDC	
	Channel 2	Typical 18.5 VDC	
	Channel 3	Typical 19.5 VDC	
	Channel 4	Typical 20.5 VDC	
Input Current		Maximum 20.1A (5A Mode, nom. V_n = 24 VDC)	Maximum 40.1 A (nom. V_n = 24 VDC)
		Typical 14.87A (NEC Class 2 mode)	—
No Load Power Consumption		Typical 1.5 W (nom. V_n = 24 VDC)	
Internal Consumption		Typical 60mA	
Nominal Output Voltage		Typical 24 VDC	
Nominal Output Current (per Channel)		Typical 5A (5A Mode, nom. V_n = 24 VDC)	Typical 10A (nom. V_n = 24 VDC)
		Maximum 3.7 A (NEC Class 2 mode nom. V_n = 24 VDC)	—
Output Current Range (via potentiometer at each channel, % of nominal Iout)		1.75A to 5.75A (5A mode)	3.5A to 11.5A
		1.3A to 3.7A (NEC Class 2 mode, 22-26 VDC)	—
		1.3A to 3.3A (NEC Class 2 mode, > 26 VDC	—
Voltage Drop Input to Output		Typical 205mV (5A mode)	Maximum 250mV
		Typical 150mV (NEC Class 2 mode)	
Minimum Load		0%	
Sequential Switch-ON Delay		5ms or 200ms selectable via Dip-switch	5ms, 25ms, 200ms, or 500ms
Remote Reset Input [1]		Yes by applying 22-28 VDC (referred to input ground)	
Ripple and Noise		Maximum 105mVp-p (20 MHz bandwidth)	
Maximum Capacitive Load		Maximum 15mF	Maximum 30mF
Housing Material		Polycarbonate	
Agency Approvals		cURus QQJQ2.E224736, CE	

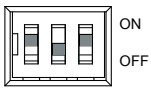
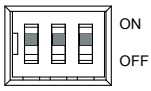
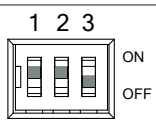
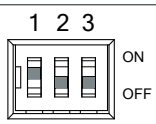
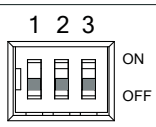
[1] **Do not connect remote reset input to hazardous voltages.**

Electronic Circuit Protectors
RACPRO1 Series

DIP Switch Settings:

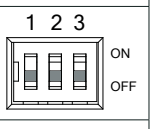
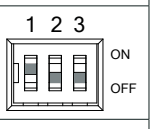
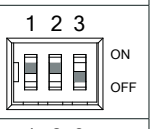
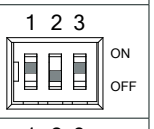
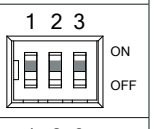
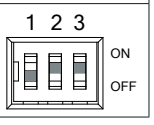
RACPRO1-4SP/24V/5A

DIP1: Setting the overcurrent shutdown mode
(ON=Latch off mode; OFF=Hiccup mode)
DIP2: Setting the time delay
(ON=200ms; OFF=5ms) from Channel [k+1] to Channel [K]
DIP3: Setting the device mode
(ON-5A mode; OFF=NEC Class 2 mode

	DIP-Switch
Overcurrent shutdown latching 5ms time delay Device in 5A mode	
Overcurrent shutdown latching 200ms time delay Device in 5A mode	
Overcurrent shutdown latching 200ms time delay Device in NEC Class 2 mode	
Overcurrent shutdown latching 5ms time delay Device in NEC Class 2 mode	
Overcurrent shutdown hiccup mode 5ms time delay Device in NEC Class 2 mode	

RACPRO1-4SP/24V/10A

DIP1: Setting the overcurrent shutdown mode
(ON=Latch off mode; OFF=Hiccup mode)
DIP2: Setting the time delay
from Channel [k+1] to Channel [K]
DIP3: Setting the device mode
from Channel [k+1] to Channel [K]

	DIP-Switch
Overcurrent shutdown hiccup mode 5ms time delay	
Overcurrent shutdown latching 5ms time delay	
Overcurrent shutdown latching 25ms time delay	
Overcurrent shutdown latching 200ms time delay	
Overcurrent shutdown hiccup mode 500ms time delay	
Overcurrent shutdown hiccup mode 500ms time delay	

Protections		
Parameter	***Type***	***Value***
Interrupt Input Fuse	Per Channel	T15A, slow-blow
Short Circuit Protection (SCP)	Selectable via Dip-switch, refer to DIP-SWITCH SETTINGS	Latch off or hiccup mode
Over Voltage Protection (OVP)	SELV output	35 VDC, latch off
Return Voltage Immunity	—	35 VDC maximum
Over Current Protection (OCP) (latch off or hiccup mode, selectable via Dip-switch; refer to DIP-SWITCH SETTINGS)	5A and 10A mode; >5s	110-150% of rated Output Current (RACPRO1-4SP/24V/5A only)
	5A mode; 100ms typical	>150% of rated Output Current
	NEC Class 2; 100ms typical >110% of rated Output Current	>110% of rated Output Current (RACPRO1-4SP/24V/5A only)
Tripping Characteristic	At short circuit	120ms maximum
	5A mode	5s maximum (at 150% load) (RACPRO1-4SP/24V/5A only)
	NEC Class 2 mode	5s maximum (at 150% load) (RACPRO1-4SP/24V/5A only)
Tripping Delay	—	115ms typical
Class of Equipment	—	Class III

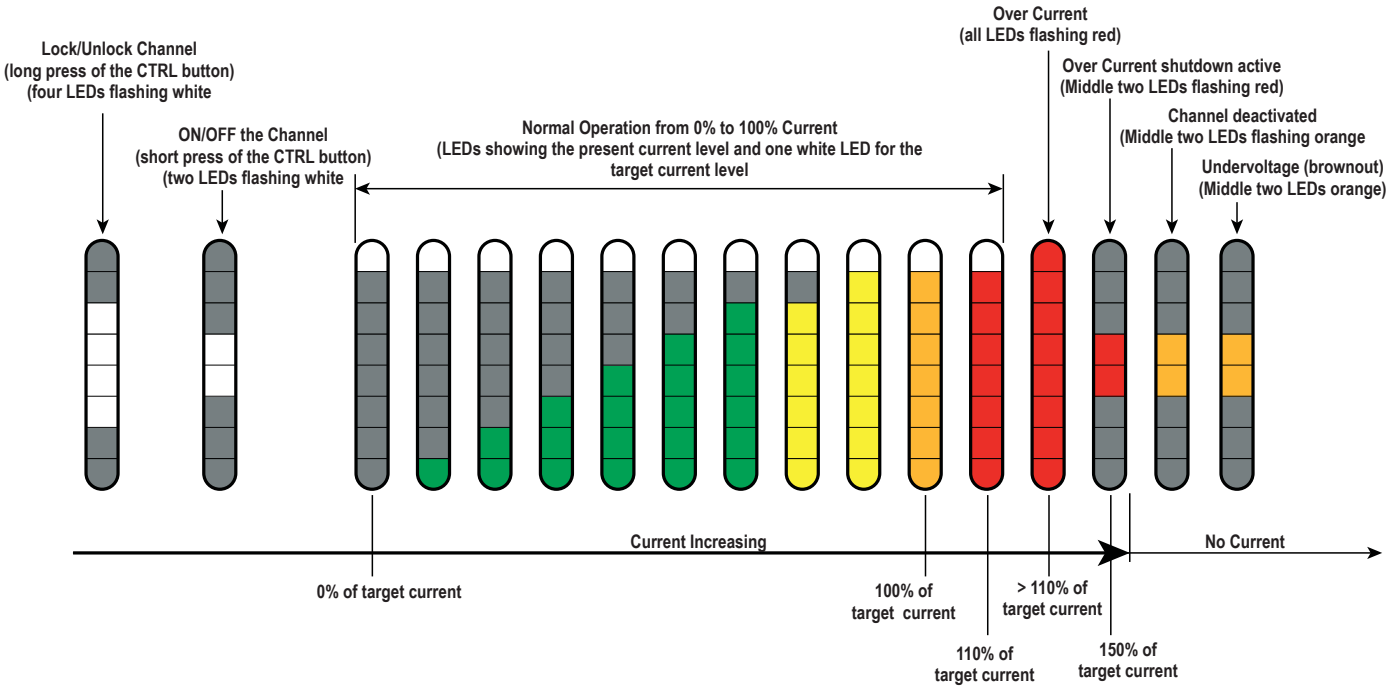
Measured @ T_{AMB}= 25°C, nom VIN= 24 VDC, rated load, unless otherwise stated.

Electronic Circuit Protectors
RACPRO1 Series

Load Indication LED

8 LEDs/channel for displaying actual and target current or various status messages of the corresponding channel.

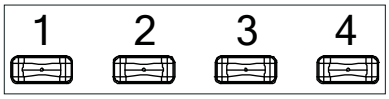
Gray LEDs represent deactivated LEDs.



Actual current: Colored LEDs indicate the actual current of 0-110% in relation to the set maximum current. In the picture above the target current is set to it's maximum.
Power Boost: During Operation in >110% and <150% Target Current Level the device stays in Overcurrent for about 5s before the Overcurrent shutdown gets active. If the 150% margin is surpassed (e.g. a short) the over current shutdown will get active after around 110ms.
For the NEC Class 2 Variant: Here the device won't have any power boost behavior and thus by exceeding the ~110% margin the over current shutdown will get active after about 110ms. (So the Step where all LEDs are flashing red wont happen here) RACPRO1-4SP/24V/5A only
Target current: White LED indicates the maximum allowable current, which is set by the user via the potentiometer. In above picture the target current is currently set at its maximum value, the nominal current per channel of the device.
Maximum current (Over Current): When actual current > target current, all LEDs from the corresponding channel flash red.
Channel deactivated: When the channel is deactivated, the two middle LEDs flash orange.
Undervoltage: In the event of a brownout (undervoltage), the two middle LEDs light up orange, and the device attempts to automatically restart in a hiccup mode once the voltage is restored.

Control Button

Control Button	
Description	***Function***
Short Press	ON/OFF the channel (during operation) or to restart in latching mode after a short circuit
Long Press (5s)	Lock/Unlock the channel button



Load LED Indication

Button lock after long press of the button: If the button has been locked/unlocked the four middle LEDs indicate it by flashing white.

Button locked and interaction with the button: If the button has been locked and the button is pressed for a short amount of time (e.g. to disable/enable a channel), the two middle LEDs indicate it by flashing white, but no action on the channel.

Electronic Circuit Protectors
RACPRO1 Series

Environmental		
Parameter	***Condition***	***Value***
Operating Ambient Temperature	At natural convection (0.1 m/s)	-40 to 70°C [-40 to 158°F]
Operating Altitude	—	Recognized by safety agency for safe operation up to 5000m High altitude operation may impact the performance and lifetime
Operating Humidity	Non-condensing	5-95% RH max.
Pollution Degree	—	PD2
IP Rating	—	IP20
Shock	According to IEC 60068-2-27 Fa (non-operating)	15G/11ms, 3 times (positive/negative) in all axis
Vibration	According to IEC 60068-2-6 Fc (non-operating)	5 - 8.4 Hz @ 3.5 mm deflection 8.4 -150Hz @ 2G, 10 cycles /axis(min-max-min); 1 octave/min
MTBF	According to EN/IEC 61709 (SN29500)	770 x 10^3 hours
Design Lifetime	T_{AMB}= 40°C @ 100% Load	80 x 10^3 hours

Measured @ T_{AMB}= 25°C, nom VIN= 24VDC, rated load, unless otherwise stated.

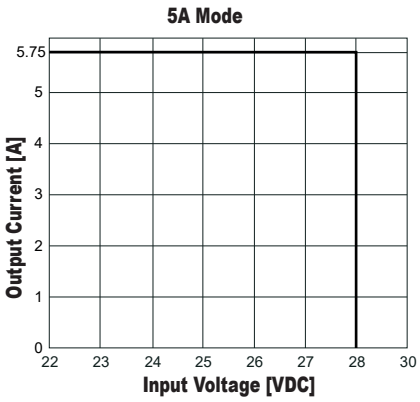
Safety & Certifications		
Certificate Type (Safety)	***Report Number***	***Standard***
Audio/Video, information and communication technology equipment - Part 1: Safety requirements (CB)	24TH0298_62368-1_0	IEC62368-1:2018 3rd Edition
Audio/Video, information and communication technology equipment - Part 1: Safety requirements		EN IEC 62368-1:2020+A11:2020
Audio/Video, information and communication technology equipment - Part 1: Safety requirements	E224736-A6030-UL	UL62368-1:2019 3rd Edition CAN/CSA-C22.2 No. 62368-1-19 3rd Edition
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements (CB)	24TH0298_61010-1_0	IEC61010-1:2010+A1:2016 3rd Edition
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements		EN61010-1:2010+A1:2019
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 2-201: Particular requirements for control equipment (CB)	24TH0298_61010-2-201_0	IEC61010-2-201:2017 2nd Edition
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 2-201: Particular requirements for control equipment		EN IEC 61010-2-201:2018
RoHS2	—	RoHS 2011/65/EU + AM2015/863

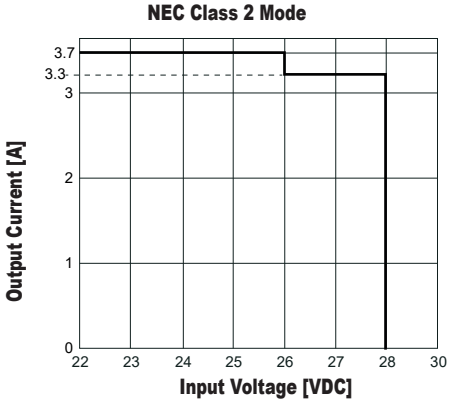
EMC Compliance According to IEC/EN61000-6-2/6-3		
Certificate Type (Safety)	***Condition***	***Standard / Criterion***
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments	—	IEC/EN61000-6-2:2019
Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential area	—	IEC/EN 61000-6-3:2021
ESD Electrostatic discharge immunity test	Air: ±8kV; Contact: ±6kV	IEC61000-4-2:2008, Criteria A EN61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-6000MHz)	IEC/EN61000-4-3:2006+A2:2010, Criteria A
Fast Transient and Burst Immunity	DC-Input/Output Ports: ±1kV	IEC/EN61000-4-4:2012 Criteria A
Surge Immunity	DC-Input/Output Port: V(+) - V(-), DC-OK(13-14): ±1kV V(+)-PE, V(-)-PE: ±2kV	IEC/EN61000-4-5:2014+A1:2017, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	10Vrms (0.15-80MHz)	IEC61000-4-6:2013, Criteria A EN61000-4-6:2014, Criteria A

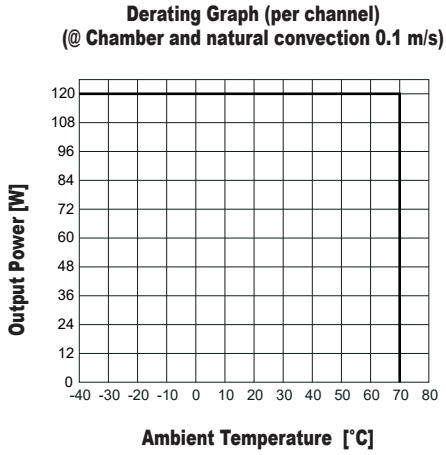
Electronic Circuit Protectors
RACPRO1 Series

RACPRO1-4SP/24V/5A

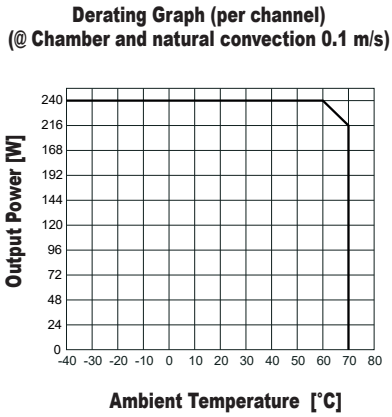
Output Current vs. Input Voltage





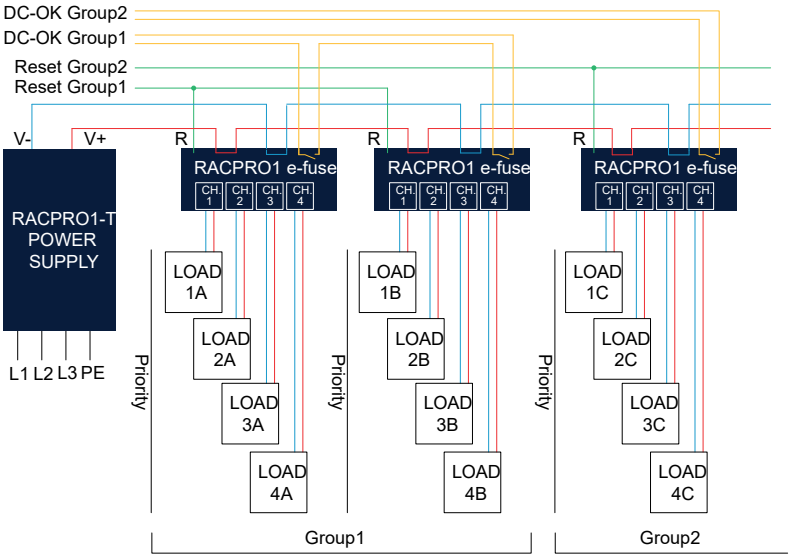


RACPRO1-4SP/24V/10A



Application Example

Daisy Chaining of multiple modules



- Voltage-free relay contact for DC-OK signal (closed when all active channels are "OK", open in error mode (one channel or several channels switched off due to overload or UVL)
- DC-OK can be connected in series with other e-fuse modules for group monitoring
- In latch mode, the e-fuses can be switched on again by remote resets
- RECOM e-fuses therefore offer easy integration into all standard programmable logic controllers (PLC) and SCADA systems

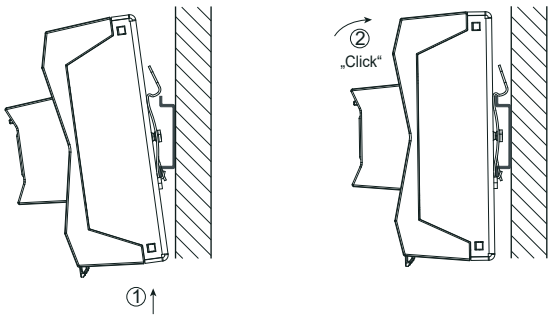
Electronic Circuit Protectors
RACPRO1 Series

Installation

Mounting Instruction

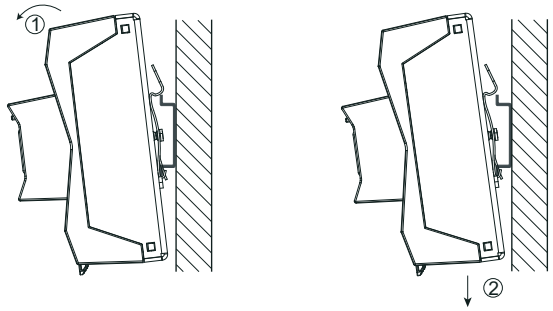
Mounting rail: Standard 35mm DIN rail in accordance with EN60715.

No space above, below, and between the devices is required.



Mounting

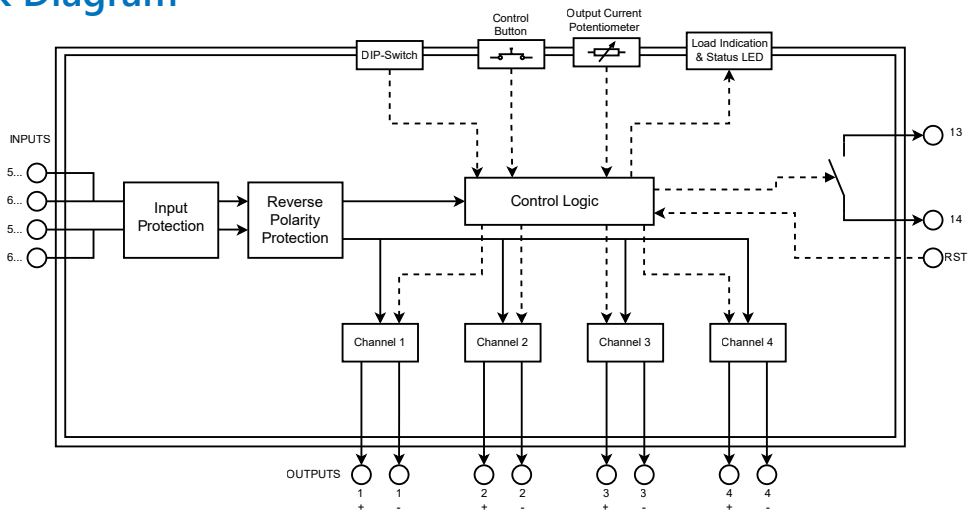
1. Place the device on the DIN rail with a slight downward tilt.
2. Tilt the device upwards until it reaches the upper part of the DIN rail. Snap the device into the DIN rail.



Release

1. Press the upper part of the device forwards to release it from the DIN rail.
2. Pull the device away from the DIN rail by pushing it down.

Block Diagram



RHINO Accessories PSB Series

PSB Power Supply Accessories

Power Supply Accessories PSB Series		
Part Number	***Price***	***Description***
PSB-CVR	$6.00	Universal replacement terminal cover kit for all RHINO PSB series power supplies. Universal kit includes (9) terminal covers to replace all terminal covers on any PSB power supply model



Gladiator® from AutomationDirect

DIN Rail Receptacles

Overview

Quad-receptacle DIN rail or panel mounted AC outlets are used for powering laptop computers and test equipment. GR-REC4 is a standard 125VAC, 15A quad-receptacle, and GR-REC4-GFCI is a 125VAC, 15A ground-fault circuit interrupter protected quad-receptacle.



GR-REC4-GFCI

Quad Straight Blade Receptacles									
Part Number	*Price*	*Current Rating [1]*	*Voltage Rating*	*Circuit Protection*	*Number of Phases*	*Number of Poles*	*Number of Wires*	*Outlet Type*	*Drawing Link*
GR-REC4	$53.00	15A	125VAC	N/A	1	2	3	2X Standard Duplex Receptacle, Black, NEMA 5-15R	PDF
GR-REC4-GFCI	$74.00	15A	125VAC	Ground-fault circuit interruption	1	2	3	1X Standard Duplex Receptacle [2], 1X GFCI Duplex Receptacle, Black, NEMA 5-15R	PDF

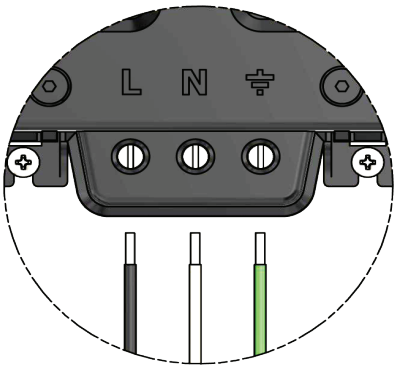
Note: [1] Combined current capacity of all four outlets.
Note: [2] All receptacles are protected by a single GFCI circuit.

Specifications	
Wire Size Capacity	14-12 AWG [2.5 - 4.0 mm^2]
Wire Strip Length	0.20 - 0.31 in [5 - 8mm]
Wire Type	Copper or Copper Clad
Tightening Torque	4.5 lb-in [0.51 N•m]
Operating Temperature [1]	32 to 140°F [0 to 60°C]
Maximum Ambient Temperature [2]	32 to 104°F [0 to 40°C]
Housing Material	Polyamide 66, glass filled (FR370)
Mounting	Panel mount or 35mm DIN rail
Agency Approvals	cURus File E531313, RoHS

[1] Maximum ambient temperature plus temperature rise of outlet wiring under load.
[2] Maximum ambient temperature rating per UL 508.

Wiring Instructions

- Check the correct wiring termination below and make sure they match your electrical wiring.
- Make sure the terminal screws are properly tightened before powering the outlet on.



"L" Symbol for LINE/BLACK connection
"N" Symbol for NEUTRAL/WHITE connection
"⏚" Symbol for GROUND/GREEN connection

Gladiator® from AutomationDirect

DIN Rail Receptacles

Installation

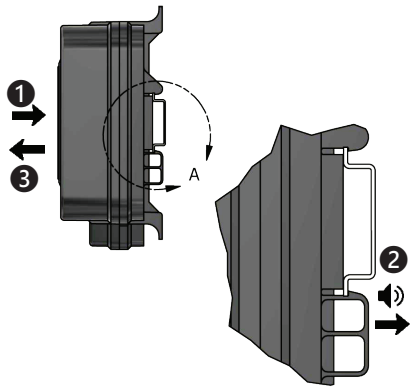
- Hold the device against the DIN rail, parallel to the mounting surface.
- Apply even pressure against the DIN rail until the device is secured to the rail. -❶
- You should hear a definite “click” to indicate that the device has locked onto the DIN rail. - ❷
- Apply pressure by pulling the device away from the mounting surfaced to ensure that the device is secure. -❸

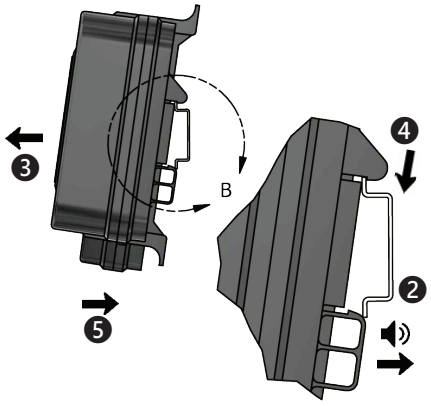
Alternate Installation

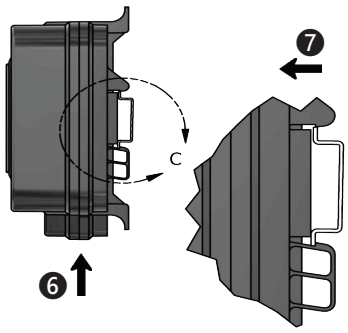
- Tilt the device slightly to hang the upper clamp onto the DIN rail. -❹
- Apply pressure to the bottom end of the device to snap the bottom clamp onto the rail. -❺
- You should hear a definite “click” to indicate that the device has locked onto the DIN rail. - ❷
- Apply pressure by pulling the device away from the mounting surfaced to ensure that the device is secure. -❸

Removal

- Turn off power to the device and unplug any equipment left connected to the device.
- Disconnect all power wiring.
- To remove the device from the DIN rail, apply upward pressure to the bottom of the device until the top clamp releases from the rail. -❻
- Pull the top away from the mounting surface.
- The device can then be lowered from the rail and pulled away. -❼







DIN Rail Receptacles

Overview

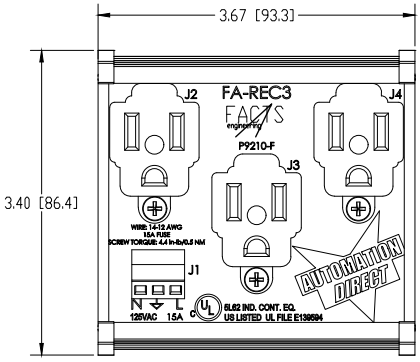
The FA-REC3 is a triple straight blade AC receptacle, 15A, 125VAC used for powering laptop computers and test equipment. This unit can be mounted on 35mm, 32mm, or 15mm DIN rail.

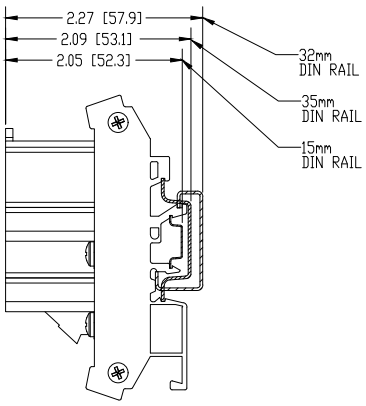


DIN Rail Receptacles Specifications	
Part Number	***FA-REC3***
Price	$36.00
Output Voltage	125VAC
Outlet Type	NEMA 5-15R
Output Current	15A maximum
Total Current	Must not exceed 15A if all outlets are used
GFCI	None
Number of Phases	1
Number of Poles	2
Number of Wires	3
Mounting	35mm, 32mm, or 15mm DIN rail
Wire Capacity	14 to 12 AWG
Screw Torque	0.5 N·m [4.4 lbf·in]
Operating Temperature	0 to 60°C [32 to 140°F]
Circuit Protection	None
Housing Material	Plastic
Agency Approval	cULus E139594

Dimensions

inches [mm]





See our website: www.automationdirect.com for complete engineering drawings.

DIN Rail Receptacles

Overview

Duplex straight blade AC receptacles are 35mm DIN Rail or panel mounted used for powering laptop computers and test equipment. The FA-REC2 is a standard 125VAC, 15A receptacle and FA-GFCI is a 125VAC, 15A Ground-Fault Circuit Interrupter.

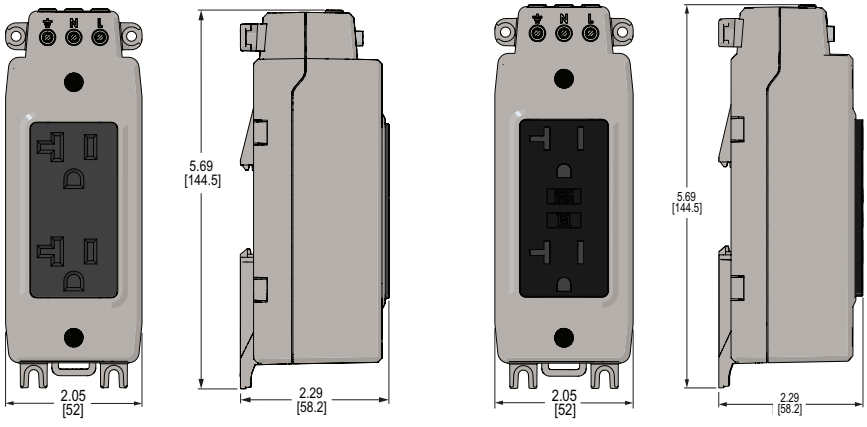


FA-GFCI

DIN Rail Receptacles Specifications		
Part Number	***FA-REC2***	***FA-GFCI***
Price	$43.50	$62.00
Output Voltage	125VAC	
Output Type	NEMA 5-15	
Output Current	15A Maximum	
Circuit Protection	No	Yes
Mounting	Panel Mount or 35mm DIN Rail	
Number of Phases	1	
Number of Poles	2	
Number of Wires	3	
Wire Capacity	14–12 AWG (solid or stranded)	
Wire Strip Length	6–7 mm	
Tightening Torque	0.51 N·m [4.5 lbf·in]	
Operating Temperature	0 to 60°C [32 to 140°F]	
Circuit Protection	None	Ground-fault circuit interruption
Wire Type	Copper or Copper Clad	
Housing Material	PA66/6, Nylon	
Weight	180g [6.35 oz]	230g [8.11 oz]
Agency Approval	cULus E139594	

Dimensions

inches [mm]



FA-REC2 FA-GFCI

See our website: www.automationdirect.com for complete engineering drawings.