

Power

Section 30



DC Power Supplies

Control and
Encapsulated
Transformers

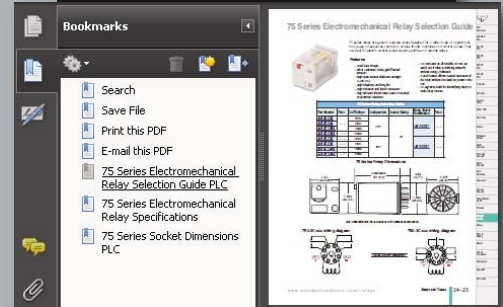


DC-to-DC
Converters

Powerline Filters and
other Accessories



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- Click on part #s to link directly to our online store for current pricing, specs, stocking information and more



Quality power products...



Rhino PSS Series Power Supplies

- Universal input voltage, 85-264 VAC / 100-375 VDC
- 24 VDC or 12 VDC outputs, 35 to 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



Rhino PSB Series Power Supplies

- Universal input voltage, 85-264 VAC / 120-375 VDC single phase or 320-575 VAC 3-phase
- 24 VDC or 12 VDC outputs, 15 to 480 Watts
- Adjustable output voltage
- Rugged plastic or aluminum housings with integral 35mm DIN rail mounting adapters
- Overload, overvoltage and thermal protection



Rhino PSM Series Power Supplies

- Industrial grade
- Sturdy metal case
- Low output ripple
- DIN rail mounting/optional wall mount
- Specialty modules for redundancy, power backup and UPS
- 12VDC from 78 to 156 watts
- 24VDC from 90 to 600 watt



Rhino PSP Slimline Power Supplies

- Compact footprint
- Plastic housing
- Universal input 85 to 264 VDC/VAC
- 20 W to 120 W
- 5 VDC, 20 W, 4 A output
- 12 VDC from 24 to 120 watts
- 24 VDC from 24 to 120 watts
- DIN rail mountable



Rhino PSC Series NEC Class 2 Power Supplies

- DIN rail mounting
- 12W to 90W
- Universal 85 to 264 VAC input voltage and output current limitation.
- Plastic-housed low-profile
- UL508 listed, UL1310 recognized for NEC Class 2 compliance, and CE marked



Rhino PS Series Power Supplies

- DIN rail mounting
- Durable metal case
- 12VDC from 50 to 75 watt
- 24 VDC from 50 to 600 watt

DC to DC Converters

DIN-rail and panel mount DC-to-DC converters

PSP series - wide input ranges of 9.5 to 18VDC and 18 to 75VDC for operation with all popular DC supply voltage systems. 5, 12 and 24 VDC adjustable output ranges.

FA-DCDC-1 - Isolated ± 10 VDC, ± 5 VDC multiple outputs. 12-24VDC input voltage range. Designed to handle many types of configuration applications.



...at great prices

Hammond Transformers

HPS Fortress™ Encapsulated Transformers starting at \$91.00

Encapsulated power transformers with electrical grade silica sand and resin compounds, which completely enclose the core and coil to seal out moisture, airborne contaminants and eliminates corrosion and deterioration.

- Inexpensive potted transformers
- Compact, efficient design
- Easy installation and hook-up, wall mounting
- 10 year warranty - Superior quality in materials and workmanship
- NEMA 3R rated commercial power transformer

HPS Imperator™ Compact Control Transformers starting at \$31.00

HPS Imperator control transformers from Hammond are specifically designed for high inrush applications requiring reliable output voltage stability. This series comes with a lifetime warranty; secondary fuse kit is included.

Four series of compact control transformers are available:

MQMJ Series - 480x240 VAC to 240x120 VAC

MGJ Series - 380x277x208 VAC to 240x120 VAC

PG Series - 240x120 VAC to 24x12 VAC

MLI Series - 480x240 VAC to 120x25 VAC



Convenience Outlet

- 15 amp rated
- NEMA 5 -15 R
- DIN rail mounting
- UL 508 listed

EAT-N
Cutler-Hammer



Open Frame Power Supplies

- DIN rail mounting
- Low cost
- 24 VDC
- Units available with 1.25 amp or 3.7 amp
- Universal inputs:
FA-24PS: 100-240 VAC/VDC
FA-24PS-90: 95-130 VAC or 190-264 VAC

Powerline Filters

- 120 or 230 VAC input single phase
- 1 to 5 amps
- Filter bandwidth 10 kHz to 50 mHz
- 5-year warranty



RHINO PSS Series Panel Mount Power Supplies

AutomationDirect's RHINO PSS series of panel mount 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 RHINO PSS series is available with universal single-phase input and with output voltages of 12 and 24 VDC from 35 to 100 Watts. The rugged aluminum housing easily screw mounts in three different mounting orientations. These high-quality power supplies include overload, overvoltage and thermal protection, and are UL 60950 recognized, CE marked and RoHS compliant.

Features

- Universal input voltage, 85-264 VAC / 100-375 VDC
- 24 VDC or 12 VDC outputs, 35 to 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
- Two year warranty



PSS Series Input Specifications								
Part No.	Price	Weight	Input Voltage	Input Frequency Range	Nominal Current	Inrush Current Limitation $I_{t @ 77^{\circ}F (+25^{\circ}C)}$ typ.	Leakage Current	Recommended Circuit Breaker*
PSS12-035	<--->	0.21 kg (0.46 lb)	85-264 VAC (DC input range 100-375 VDC)	47-63 Hz (0 Hz @ DC Input)	0.72A Max @ 115 VAC, 0.45A Max @ 230 VAC	<30A @ 115 VAC, 60A @ 230 VAC	<1 mA	16A
PSS12-050	<--->	0.26 kg (0.57 lb)			1.1A Max @ 115 VAC, 0.7A Max @ 230 VAC	<30A @ 115 VAC, 60A @ 230 VAC		
PSS12-100	<--->	0.45 kg (0.99 lb)			2.0A Max @ 115 VAC, 1.1A Max @ 230 VAC	<60A @ 115 VAC, 130A @ 230 VAC		
PSS24-035	<--->	0.237 kg (0.52 lb)			0.72A Max @ 115 VAC, 0.4A Max @ 230 VAC	<30A @ 115 VAC, 60A @ 230 VAC		10A
PSS24-050	<--->	0.255 kg (0.56 lb)			1.1A Max @ 115 VAC, 0.7A Max @ 230 VAC	<30A @ 115 VAC, 60A @ 230 VAC		16A
PSS24-100	<--->	0.410 kg (0.90 lb)			2.0A Max @ 115 VAC, 1.1A Max @ 230 VAC	<50A @ 115 VAC, 100A @ 230 VAC		

*Characteristic B

PSS Series Output Specifications									
Part No.	Output Voltage (Vnom) / Adjustment Range	Output Power	Output Current	Ripple and Noise (20MHz)	Start-Up Time	Hold-Up Time	Rise Time	Efficiency	
PSS12-035	12 VDC / 11-14 VDC	35 Watts	3 Amp	<100mVpp (@ nominal vlaues)	<2500ms @ 100% load (25°C [77°F]) and typical line input	>15ms @ 115 VAC, >80ms @ 230 VAC with 35W load (25°C [77°F])	<30ms @ 100% load (25°C [77°F])	>84% (typical)	
PSS12-050		50 Watts	4.17 Amp			>15ms @ 115 VAC, >80ms @ 230 VAC with 50W load (25°C [77°F])		>83% @ 115 VAC & >84% @ 230 VAC	
PSS12-100		100 Watts	8.33 Amp			<1000ms @ 100% load (25°C [77°F]) and typical line input		>15ms @ 115 VAC, >80ms @ 230 VAC with 100W load (25°C [77°F])	>84% (typical)
PSS24-035	24 VDC / 22-28 VDC	35 Watts	1.46 Amp	<150mVpp (@ nominal vlaues)	<2500ms @ 100% load (25°C [77°F]) and typical line input	>15ms @ 115 VAC, >80ms @ 230 VAC with 35W load (25°C [77°F])		>85% @ 115 VAC & >84% @ 230 VAC	
PSS24-050		50 Watts	2.1 Amp			>15ms @ 115 VAC, >80ms @ 230 VAC with 50W load (25°C [77°F])			>86% (typical)
PSS24-100		100 Watts	4.17 Amp			<1000ms @ 100% load (25°C [77°F]) and typical line input			

RHINO PSS Series Panel Mount Power Supply Specifications

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)
Case Cover	Aluminium (Al1100)
Signals	Green LED DC OK
MTBF	> 700,000 hrs.
Noise	Sound pressure level (SPL) < 40 dBA
Cooling	Convection
Input/Output Terminal	Terminal block 5 Pin rated 300V/20A
Shock Test	30g half sine, 3 time per direction, 6 directions, per IEC60068-2-27
Vibration	10 to 150Hz, 5g, 20 min. each axis per IEC60068-2-6

Safety and Agency Approvals	
EMC / Emissions	FCC Title 47, Class B/EN 55022;CISPR22, 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 : 3KVAC, Input to Ground : 1.5KVAC, Output to Ground : 0.5KVAC
Approvals	UR/cUR recognized to UL60950-1 (#E198298); CB test certificate and report to IEC60950-1, CE (EMC and Low Voltage directive)
RoHS Compliant	Yes
Operating Temperature	-10 °C to +70 °C* (14°F to 158°F)
Storage Temperature	-25 °C to +85 °C (-13°F 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°C to 70°C (122°F to 158°F)


Additional Data			
Part No.	Dimensions (L x W x H)	Wire Size / Torque	Chassis Mounting Torque
PSS12-035	98 mm x 97 mm x 38 mm (3.86 in x 3.82 in x 1.50 in)	0.32-2.1 mm² (AWG 22-14) / 1.3 Nm (11.3 lb-in)	0.4 to 0.8 Nm (3.5 to 7 lb-in)
PSS12-050	128 mm x 97 mm x 38 mm (5.04 in x 3.82 in x 1.50 in)		
PSS12-100	158 mm x 97 mm x 38 mm (6.22 in x 3.82 in x 1.50 in)		
PSS24-035	128 mm x 97 mm x 38 mm (5.04 in x 3.82 in x 1.50 in)	0.32-3.3 mm² (AWG 22-12) / 1.3 Nm (11.3 lb-in)	
PSS24-050	128 mm x 97 mm x 38 mm (5.04 in x 3.82 in x 1.50 in)		
PSS24-100	158 mm x 97 mm x 38 mm (6.22 in x 3.82 in x 1.50 in)		

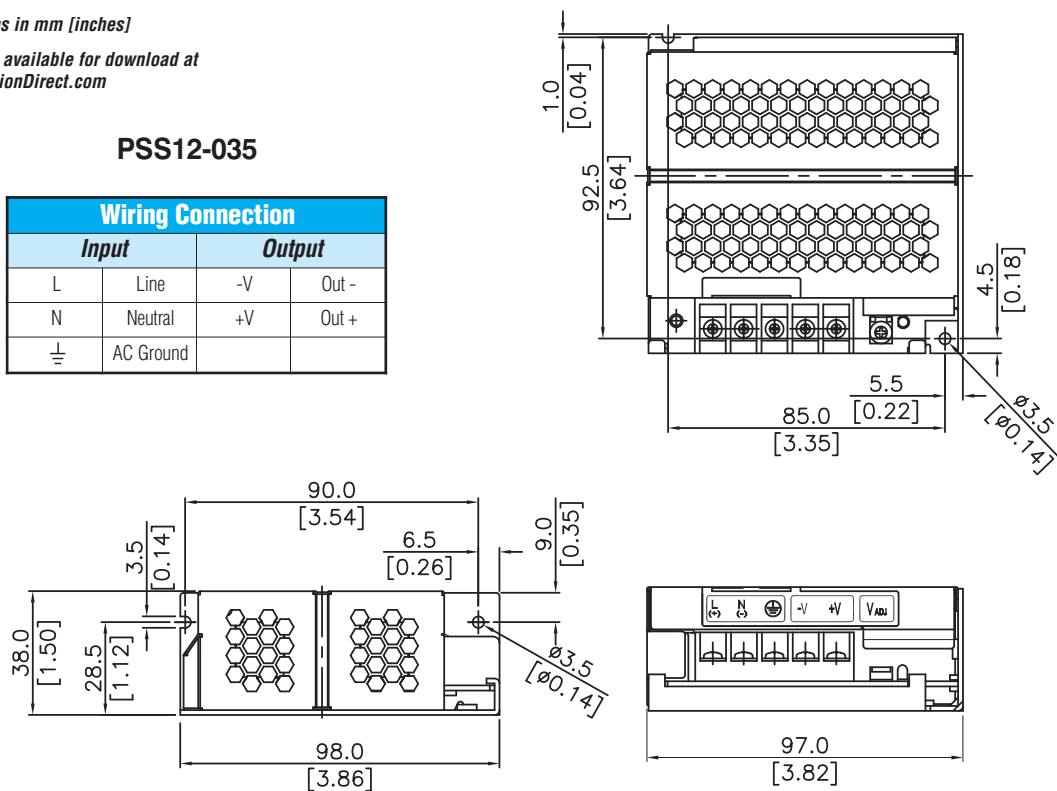
RHINO PSS Series Panel Mount Power Supply Dimensions

All dimensions in mm [inches]

Drill template available for download at
www.AutomationDirect.com

PSS12-035


Wiring Connection			
Input		Output	
L	Line	-V	Out -
N	Neutral	+V	Out +
	AC Ground		

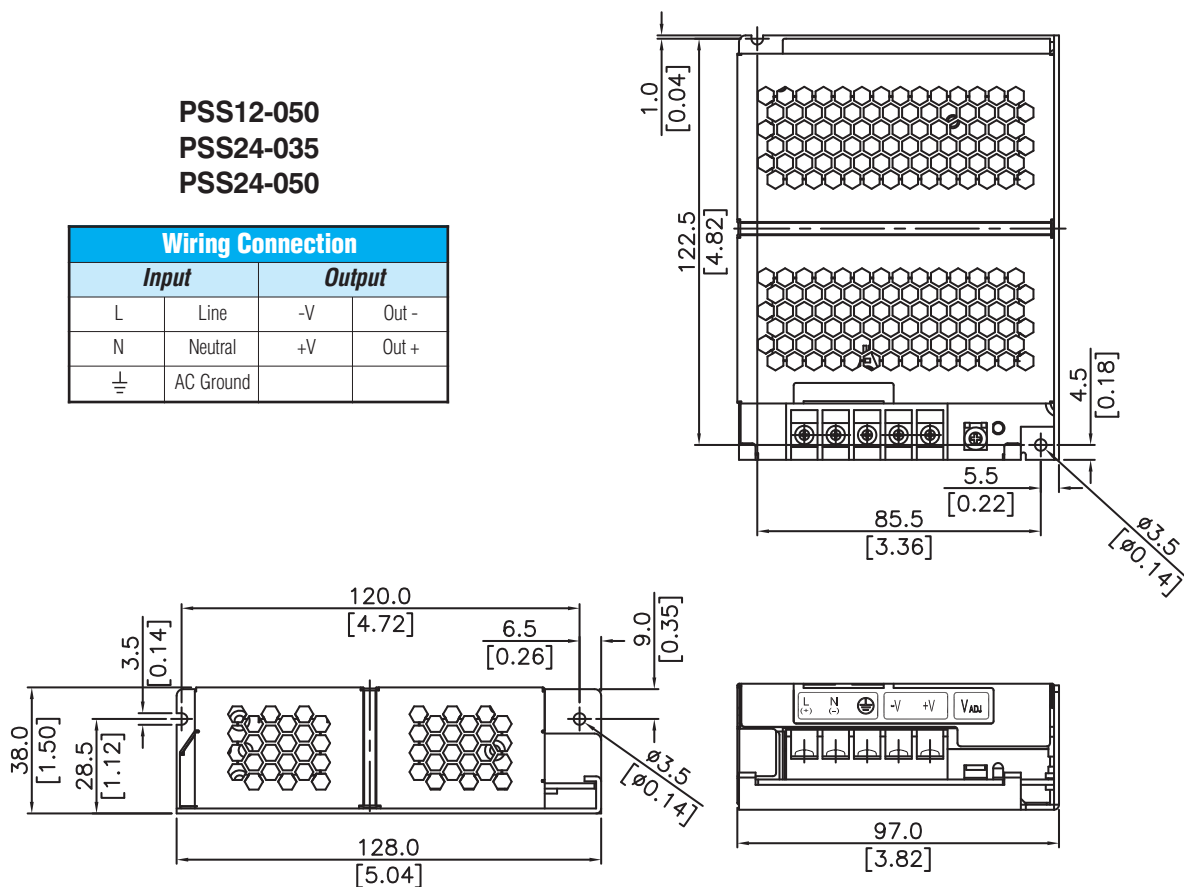


PSS12-050

PSS24-035

PSS24-050

Wiring Connection			
Input		Output	
L	Line	-V	Out -
N	Neutral	+V	Out +
	AC Ground		



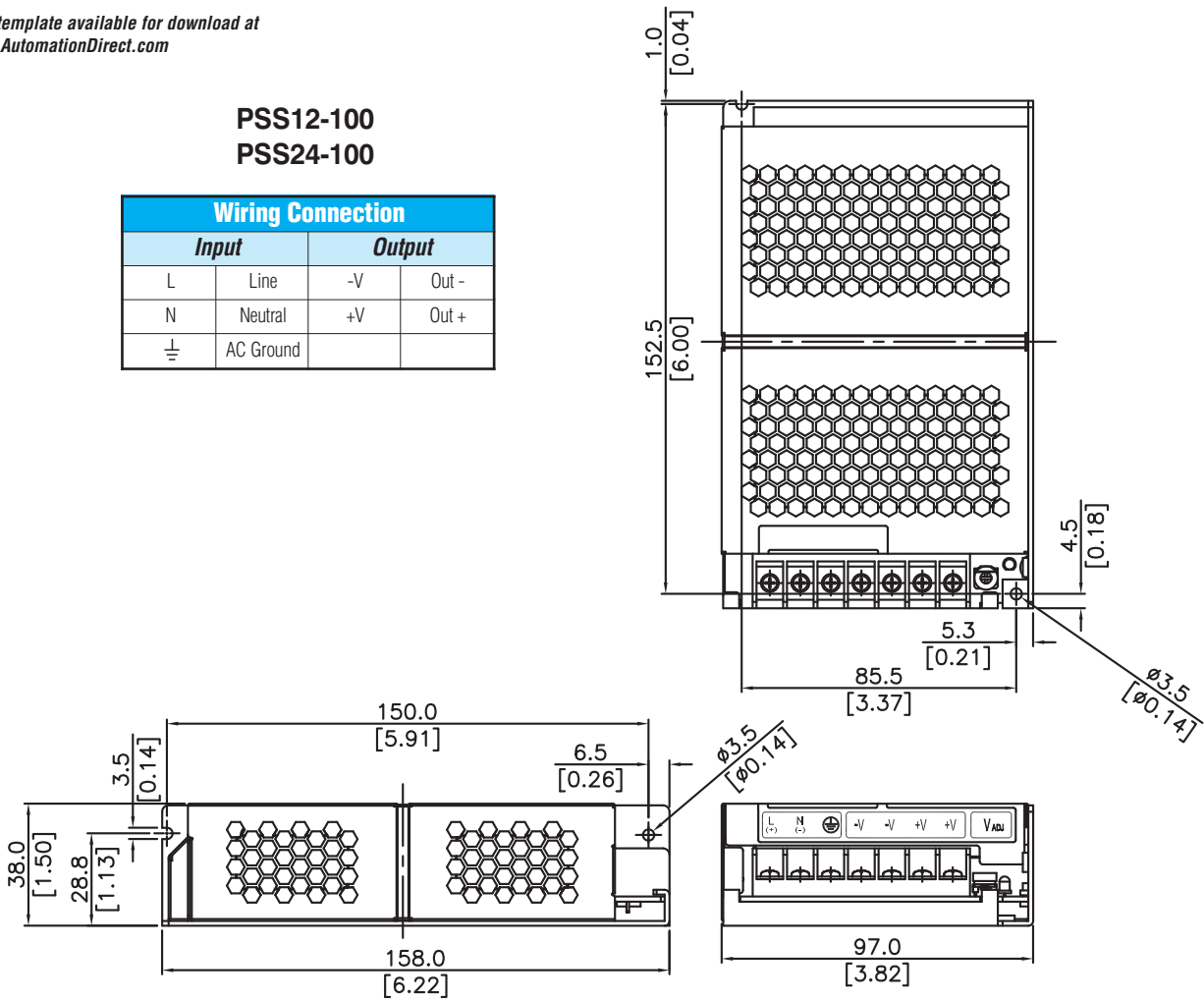
RHINO PSS Series Panel Mount Power Supply Dimensions

All dimensions in mm [inches]

Drill template available for download at
www.AutomationDirect.com

PSS12-100
PSS24-100

Wiring Connection			
Input		Output	
L	Line	-V	Out -
N	Neutral	+V	Out +
	AC Ground		



RHINO PSB Series DIN rail Power Supplies

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 RHINO PSB series is available with universal single- and three-phase input and with output voltages of 12 and 24 VDC from 15 to 480 Watts. 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.

Features

- Universal input voltage, 85-264 VAC / 120-375 VDC single phase or 320-575 VAC 3-phase
- 24 VDC or 12 VDC outputs, 15 to 480 Watts
- Adjustable output voltage
- Rugged plastic or aluminum housings with integral 35mm DIN rail mounting adapters
- Output voltage status LED
- Robust fixed-screw terminal strips with finger-safe covers
- Overload, overvoltage and thermal protection
- UL 508 listed, UL 60950 recognized, CSA certified, CE marked and RoHS compliant
- Three year warranty



PSB Single-Phase Series Input Specifications

Part No.	Price	Weight	Housing	Input Voltage	Input Frequency Range	Nominal Current	Inrush Current Limitation I_{P1} @ 77°F (+25°C) typ.	Leakage Current	Recommended Circuit Breaker*	Mains Buffering at Nominal Load (Typ.)	Turn-on Time
PSB12-015-P	<--->	0.175 kg (0.39 lb)	Plastic	85-264 VAC (DC input range 120-375 VDC); Nominal 100-240 VAC	47-63 Hz (0 Hz @ DC Input)	0.37A @ 115 VAC, 0.22A @ 230 VAC	<30A @ 115 VAC, <65A @ 230 VAC	<1 mA	6A	>22 ms @ 115 VAC, >110 ms @ 230 VAC	<2.5 sec.
PSB12-030-P	<--->	0.197 kg (0.43 lb)	Plastic			0.7A @ 115 VAC, 0.42A @ 230 VAC	<40A @ 115 VAC, <80A @ 230 VAC				
PSB12-060	<--->	0.325 kg (0.72 lb)	Aluminum			1.35A @ 115 VAC 0.8A @ 230 VAC	<50A @ 115 VAC, <100A @ 230 VAC				<600 ms
PSB12-100	<--->	0.636 kg (1.40 lb)	Aluminum			2.5A @ 115 VAC 1.5A @ 230 VAC	<100A @ 115 VAC, no damage @ 230 VAC				
PSB24-060	<--->	0.37 kg (0.82 lb)	Aluminum			1.1A @ 115 VAC 0.7A @ 230 VAC	<40A @ 115 VAC, <80A @ 230 VAC	<3.5 mA	16A	>20 ms @ 115 VAC, >125 ms @ 230 VAC	<3 sec.
PSB24-060-P	<--->	0.325 kg (0.72 lb)	Plastic			1.1A @ 115 VAC 0.7A @ 230 VAC	<40A @ 115 VAC, <80A @ 230 VAC				
PSB24-120	<--->	0.54 kg (1.19 lb)	Aluminum			1.4A @ 115 VAC 0.8A @ 230 VAC	<80A @ 115 VAC, <150A @ 230 VAC			>35 ms @ 115 VAC, >70 ms @ 230 VAC	<1 sec.
PSB24-240	<--->	1.04 kg (2.29 lb)	Aluminum			2.9A @ 115 VAC 1.5A @ 230 VAC	<40A @ 115 VAC, <100A @ 230 VAC				
PSB24-480	<--->	1.8 kg (3.97 lb)	Aluminum			5.7A @ 115 VAC 2.8A @ 230 VAC	<50A @ 115 VAC, <150A @ 230 VAC			>20 ms @ 115 VAC & 230 VAC	<1 sec.

*Characteristic B

RHINO PSB Series DIN rail Power Supplies

PSB Single-Phase Series Output Specifications									
Part No.	Output Voltage (Vnom) / Adjustment Range	Output Power	Output Current	Ripple and Noise (20MHz)	Startup with Capacitive Loads	Derating above 50°C (122°F)	Max Power Dissipation Idling / Nominal Load Approx.	Efficiency (at 400 VAC and Nominal Values)	MTBF
PSB12-015-P	12 VDC ±2%/11-14VDC (maximum power <15W)	15 Watt	1.25A	<100mV	Max 5,000 µF	2.5%/°C. (>70°C [158°F] 4%/°C)	≤ 3.2 Watts	83.5% Min @ 115VAC & 83% Min @ 230VAC	>300,000 hrs.
PSB12-030-P	12 VDC ±2%/11-14VDC (maximum power ≤30W)	30 Watt	2.5A		Max 6,600 µF		≤ 5.6 Watts	84.5% Min @ 115VAC & 230VAC	
PSB12-060	12 VDC ±2%/11-14VDC (maximum power ≤60W)	60 Watt	5A		Max 8,000 µF		≤ 10.2 Watts	85.5% Min @ 115VAC & 230VAC	
PSB12-100	12 VDC ±2%/11-14VDC (maximum power ≤100W)	100 Watt	8.33A		Max 10,000 µF		≤ 16.3 Watts	86% Min @ 115VAC & 87% Min @ 230VAC	
PSB24-060	24 VDC ±2%/22-28VDC (maximum power ≤60W)	60 Watt	2.5A	<50mV / <240mVpp	Max 8,000 µF	2.5%/°C. (<0° [32°F] 1%/°C)	10 Watts	>85% typical	>800,000 hrs.
PSB24-060-P	24 VDC ±2%/22-28VDC (maximum power ≤60W)	60 Watt	2.5A						
PSB24-120	24 VDC ±2%/22-28VDC (maximum power ≤120W)	120 Watt	5A		Max 10,000 µF	2.5%/°C.	22.5 Watts	>84% typical	>300,000 hrs.
PSB24-240	24 VDC ±2%/22-28VDC (maximum power ≤240W)	240 Watt	10A			2.5%/°C. (>70° [158°F] 4%/°C)	42.5 Watts		
PSB24-480	24 VDC ±2%/22-28VDC (maximum power ≤480W)	480 Watt	20A	2.5%/°C.		72 Watts	>86% typical		

PSB Single-Phase 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)
Parallel Operation	With decoupling diode
Case Cover	Aluminium (Al5052) or Plastic (PC), for P Series (closed)
Signals	Green LED DC OK
Humidity at 25°C (77°F), no condensation	<95% RH
Shock	30g half sign, 3 times per direction, 6 directions, per IEC60068-2-27
Vibration (Non-Operating)	10 to 150Hz, 5 g, 90 min. each axis per IEC60068-2-6
Pollution Degree	2
Climatic Class	3K3 according to EN 60721

PSB Single-Phase Series Certification and Standards	
Electrical Equipment of Machines	IEC60204-1 (over voltage category III)
Electronic Equipment for use in Electrical Power Installations	EN 50178 / IEC62103
Safety Entry Low Voltage	PELV (EN 60204), SELV (EN 60950)
Electrical Safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 (#E198298), CSA C22.2 No.60950-1 (#249074), CB scheme to IEC60950-1
Industrial Control Equipment	UL listed to UL508 (#E197592), CSA to CSA C22.2 No.107.1-01 (#249074)
Protection Against Electric Shock	DIN 57100-410
CE	In conformance with EMC directive 2004/108/EC and low voltage directive 2006/95/EC

PSB Single-Phase Series Safety and Protection	
Transient surge voltage protection	VARISTOR
Current Limitation at Short-circuits Approx.	$I_{\text{surge}} = 150\%$ of P_{Omax} typically
Surge Voltage Protection Against Internal Surge Voltages	Yes
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	IPX0
Safety Class	Class I with GND connection

RHINO PSB Series DIN rail Power Supplies

Additional Data				
Part No.	Dimensions (L x W x H)	Wire Size / Torque*	Ambient Operating Temperature	Storage Temperature
PSB12-015-P PSB12-030-P	100 mm x 32 mm x 100 mm (3.94 in x 1.26 in x 3.94 in)	0.32-2.1 mm ² (AWG 22-14) / 0.79Nm (7.0 lb-in)	-20°C to 50°C (-4°F to 122°F)	-25°C to 85°C (-13°F to 185°F)
PSB12-060	121 mm x 32 mm x 120 mm (4.76 in x 1.26 in x 4.72 in)	0.52-2.1 mm ² (AWG 20-14) / 0.78-0.98Nm (6.94-8.68 lb-in)		
PSB12-100	121 mm x 50 mm x 118.2 mm (4.76 in x 1.97 in x 4.65 in)	0.82-2.1 mm ² (AWG 18-14) / 0.78-0.98Nm (6.94-8.68 lb-in)		
PSB24-060	121 mm x 32 mm x 120 mm (4.76 in x 1.26 in x 4.72 in)	0.32-2.1 mm ² (AWG 22-14) / 0.78-0.98Nm (6.94-8.68 lb-in)	-20°C to 75°C (>50°C [122°F] derating) [-4°F to 167°F]	-25°C to 85°C (-13°F to 185°F)
PSB24-060-P	126 mm x 32 mm x 113 mm (4.96 in x 1.26 in x 4.45 in)			
PSB24-120	121 mm x 50 mm x 118.2 mm (4.76 in x 1.97 in x 4.65 in)			
PSB24-240	121 mm x 85 mm x 118.2 mm (4.76 in x 3.35 in x 4.65 in)			
PSB24-480	121 mm x 160 mm x 115 mm (4.76 in x 6.30 in x 4.53 in)	(1) 1.3-2.1mm ² (AWG 16-14) (2) 3.5-5.3mm ² (AWG 12-10) / 1.18-1.57Nm (10.41-13.89 lb-in)		

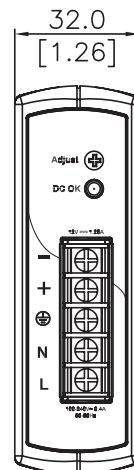
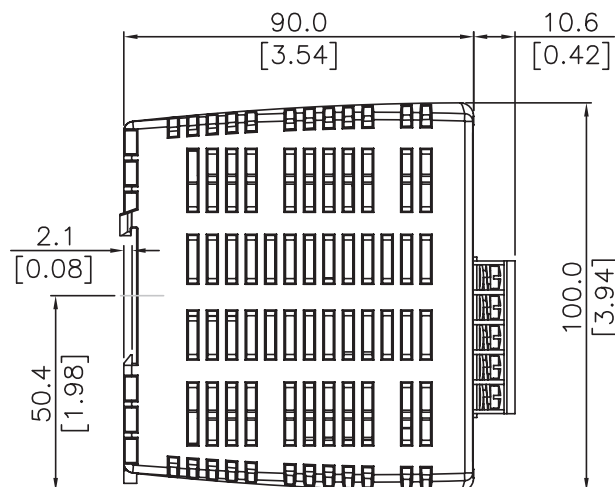
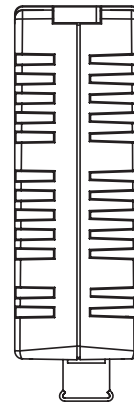
*Stripping length 7 mm (0.28 in) or use suitable lug to crimp

Dimensions

All dimensions in mm [inches]

PSB12-015-P
PSB12-030-P

Wiring Connection			
Input		Output	
L	Line	+	Out +
N	Neutral	-	Out -
⊥	AC Ground		



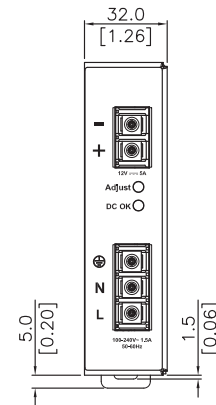
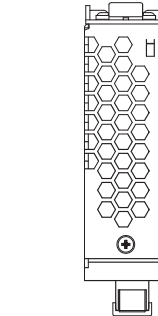
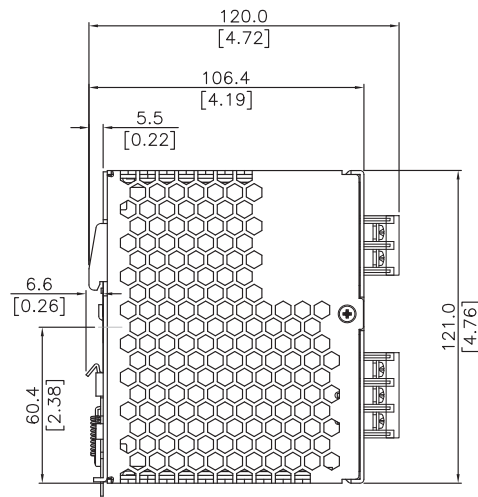
RHINO PSB Series DIN rail Power Supply Dimensions

PSB12-060

PSB24-060

Wiring Connection

Input		Output	
L	Line	+	Out -
N	Neutral	-	Out +
	AC Ground		

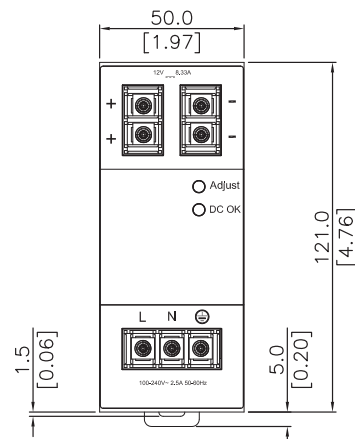
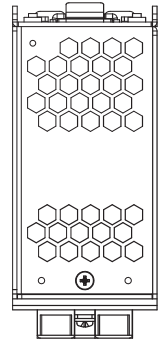
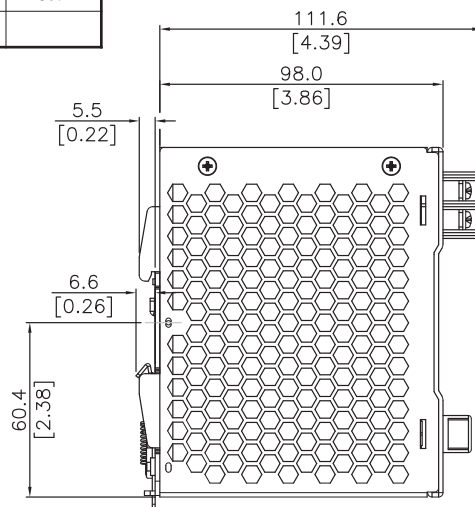


PSB12-100

PSB24-120

Wiring Connection


Input		Output	
L	Line	+	Out +
N	Neutral	-	Out -
	AC Ground		

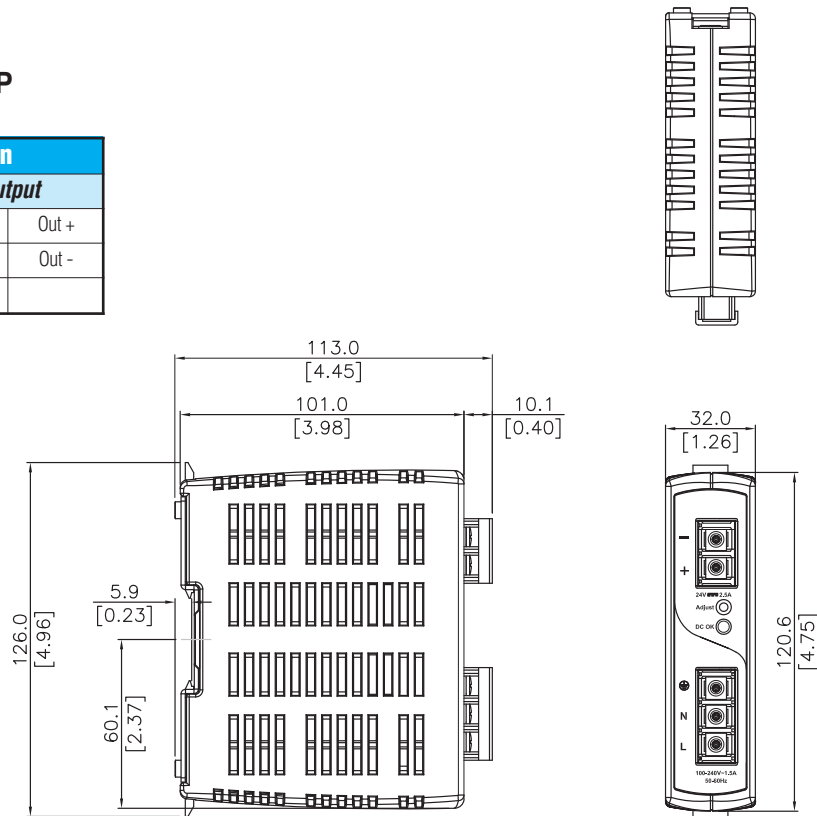


All dimensions in mm [inches]


RHINO PSB Series DIN rail Power Supply Dimensions

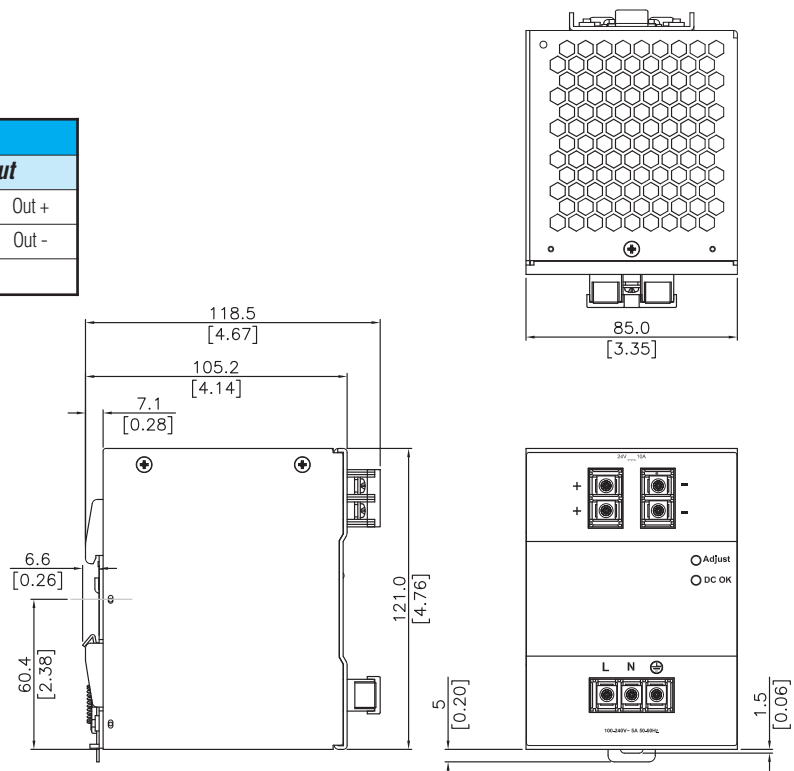
PSB24-060-P

Wiring Connection			
Input		Output	
L	Line	+	Out +
N	Neutral	-	Out -
	AC Ground		



PSB24-240

Wiring Connection			
Input		Output	
L	Line	+	Out +
N	Neutral	-	Out -
	AC Ground		

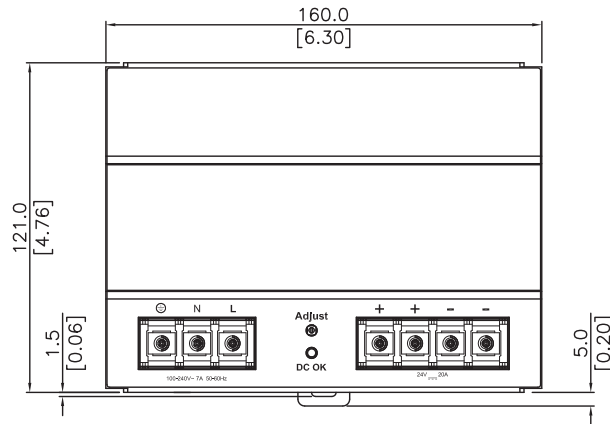
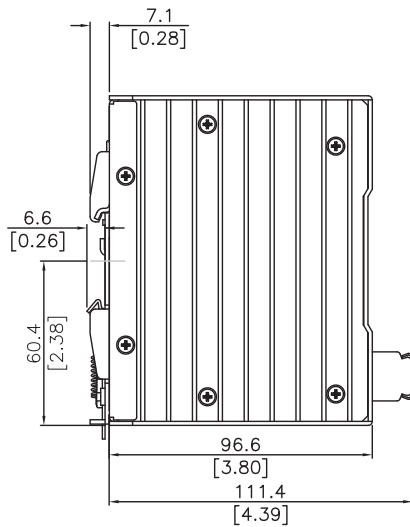
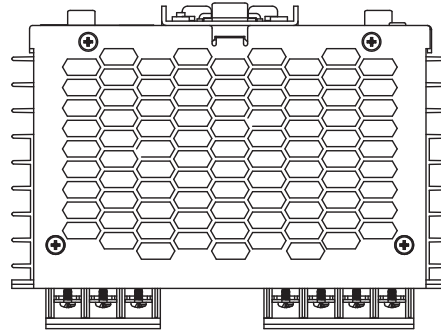


All dimensions in mm [inches]

RHINO PSB Series DIN rail Power Supply Dimensions

PSB24-480

Wiring Connection			
Input		Output	
L	Line	+	Out +
N	Neutral	-	Out -
\perp	AC Ground		



All dimensions in mm [inches]

RHINO PSB Series DINrail Power Supplies

Three-Phase PSB Series Units

AutomationDirect's RHINO PSB series of DINrail 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 24 VDC is available from 60 to 480 Watts. The rugged aluminum housings easily install with integral 35mm DINrail mounting adapters. These high-quality power supplies have a 3-year warranty, 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 3-year warranty.



PSB Three-Phase Series Input Specifications

Part No.	Price	Weight	Housing	Input Voltage	Input Frequency Range	Nominal Current	Inrush Current Limitation I_{st} @ 77°F (+25°C) typ.	Leakage Current	Recommended Circuit Breaker*	Mains Buffering at Nominal Load (Typ.)	Turn-on Time
PSB24-060-3	<--->	0.56kg (1.23 lb)	Aluminum	320 to 575 VAC (DC input range 450 to 800 VDC), Nominal 3 x 400-500 VAC	47 - 63 Hz (0 Hz @ DC Input)	0.3A @ 400 VAC approx.	<30A @ 400 VAC	<3.5mA	3 x circuit breakers 16A	>30ms @ 3 x 400 VAC, >60ms @ 3 x 500 VAC	<2 sec.
PSB24-120-3	<--->	0.72kg (1.59 lb)	Aluminum			0.5A @ 400 VAC approx.				>35ms @ 3 x 400 VAC, >70ms @ 3 x 500 VAC	
PSB24-240-3	<--->	0.99 kg (2.18 lb)	Aluminum			0.8A @ 400 VAC approx.			3 x circuit breakers or fuses, 16A	>35ms @ 3 x 400 VAC, >60ms @ 3 x 500 VAC	<1 sec.
PSB24-480-3	<--->	1.71 kg (3.77 lb)	Aluminum			1.6A @ 400 VAC approx.				>25ms @ 3 x 400 VAC, >50 ms @ 3 x 500 VAC	

*Characteristic B

PSB Three-Phase Series Output Specifications

Part No.	Output Voltage (Vnom) / Adjustment Range	Output Power	Output Current	PARD (ripple and noise) (20MHz)	Startup with Capacitive Loads	Derating above +50°C (122°F)	Max Power Dissipation Idling / Nominal Load Approx.	Efficiency (at 400 VAC and Nominal Values)	MTBF
PSB24-060-3	24 VDC $\pm 2\%$ / 22-28 VDC ($\leq 60W$)	60 Watt	2.5A	<50mV / <240 mVpp	Max 10,000 μF	2.5%/°C	9 Watts	86% min @ 3x400 VAC 85% min @ 3x500 VAC	>500,000 hrs.
PSB24-120-3	24 VDC $\pm 2\%$ / 22-28 VDC ($\leq 120W$)	120 Watt	5A				18 Watts		
PSB24-240-3	24 VDC $\pm 2\%$ / 22-28 VDC ($\leq 240W$)	240 Watt	10A			2.5%/°C, (>70°C [158°F] 4%/°C)	36 Watts	87% min @ 3x400 VAC 86% min @ 3x500 VAC	>300,000 hrs.
PSB24-480-3	24 VDC $\pm 2\%$ / 22-28 VDC ($\leq 480W$)	480 Watt	20A			2.5%/°C	72 Watts	86% min @ 3x400 VAC 85% min @ 3x500 VAC	

PSB Three-Phase Series General Specifications

Output Line Regulation	<0.5% typical (@ 320-575 VAC input, 100% load)
Output Load Regulation	<1% typical (@ 320-575 VAC input, 0-100% load)
Parallel Operation	With decoupling diode
Case Cover	Aluminium (Al5052)
Signals	Green LED DC OK
Humidity at +25°C (77°F), no condensation	<95% RH
Shock	30g half sign, 3 times per direction, 6 directions, per IEC60068-2-27
Vibration (Non-operating)	10 to 150Hz, 5 g, 90 min. each axis per IEC60068-2-6
Pollution Degree	2
Climatic Class	3K3 according to EN 60721

RHINO PSB Series DIN rail Power Supplies

PSB Three-Phase Series Certification and Standards

Electrical Equipment of Machines	IEC60204-1 (over voltage category III)
Electronic Equipment for use in Electrical Power Installations	EN 50178 / IEC62103
Safety Entry Low Voltage	PELV (EN 60204), SELV (EN 60950)
Electrical Safety (of information technology equipment)	UL/C-UL recognized to UL60950-1(#E198298), CSA C22.2 No.60950-1 (#249074), CB scheme to IEC60950-1
Industrial Control Equipment	UL listed to UL508 (#E197592), CSA to CSA107.1-01 (#249074)
Protection Against Electric Shock	DIN 57100-410
CE	In conformance with EMC directive 2004/108/EC and low voltage directive 2006/95/EC
EMC for ITE	EN 55022, EN 61000-3-2, EN 61000-3-3, EN 55024
EMC for Industrial	EN 55011
Limitation of Mains Harmonic Currents	EN 61000-3-2

PSB Three-Phase Series Safety and Protection

Transient Surge Voltage Protection	VARIATOR
Current limitation at Short-Circuits Approx.	Isurge = 150 % of P _o max typically
Surge Voltage Protection Against Internal Surge Voltages	Yes
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	IPX0
Safety Class	Class I with GND connection

Additional Data

Part No.	Dimensions (L x W x H)	Wire Size / Torque*	Ambient Operating Temperature	Storage Temperature
PSB24-060-3	121 mm x 70 mm x 118.5 mm (4.76 in x 2.76 in x 4.67 in)	0.82-2.1mm² (AWG 18-14) / 1.18-1.57 Nm (10.41-13.89 lb-in)	-20°C to +75°C (>50°C [122°F] derating) [-4°F to 167°F]	-25°C to +85°C (-13°F to 185°F)
PSB24-120-3		0.82-8.4mm² (AWG 18-8) / 1.18-1.57 Nm (10.41-13.89 lb-in)		
PSB24-240-3	121 mm x 85 mm x 120.5 mm (4.76 in x 3.35 in x 4.74 in)			
PSB24-480-3	121 mm x 160 mm x 115 mm (4.76 in x 6.3 in x 4.53 in)	Input - 0.82-2.1mm² (AWG 18-14) / 1.18-1.57 Nm (10.41-13.89 lb-in) Output - 3.3 - 5.3mm² (AWG12-10) / 1.18-1.57 Nm (10.41-13.89 lb-in)		

*Stripping length 7 mm (0.28 in) or use suitable lug to crimp

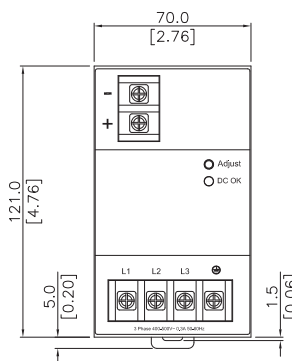
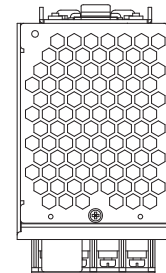
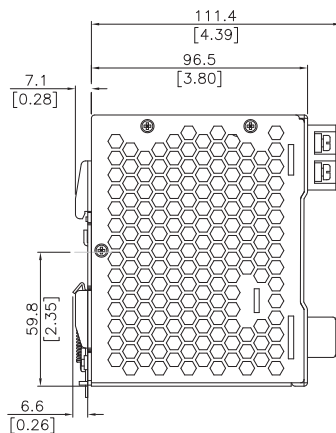
Dimensions

All dimensions in mm [inches]

PSB24-060-3 PSB24-120-3

Wiring Connection

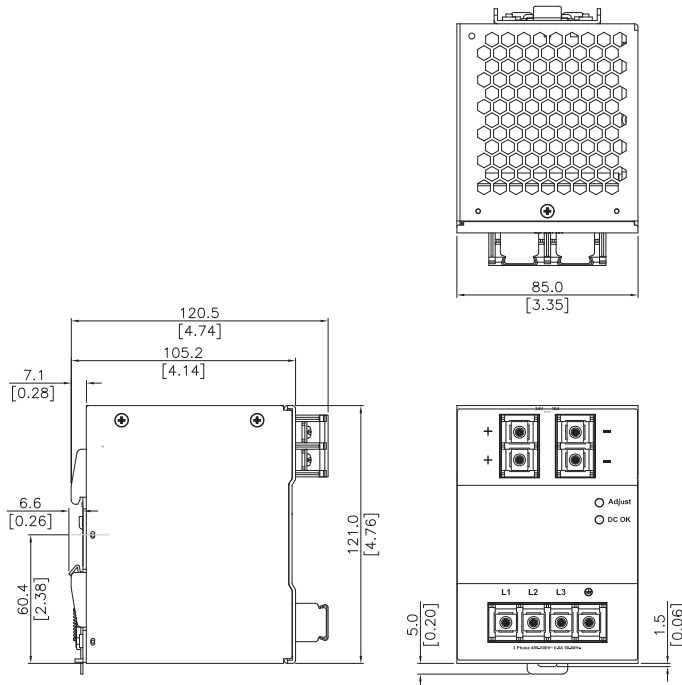
Input		Output	
L1	Line 1	-V	Out -
L2	Line 2	+V	Out +
L3	Line 3		
⏏	AC Ground		



RHINO PSB Series DIN rail Power Supply Dimensions

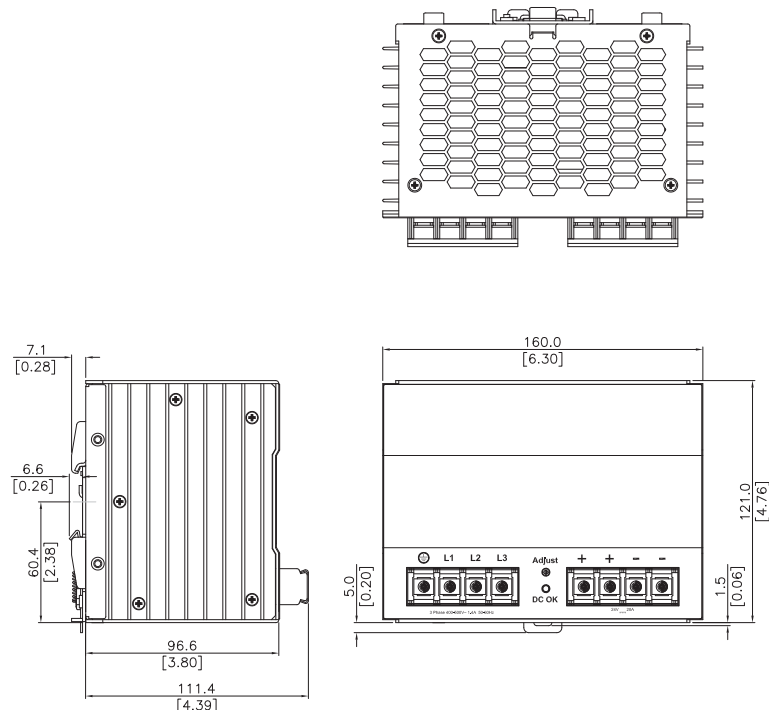
PSB24-240-3

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



PSB24-480-3

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



All dimensions in mm [inches]

PSB Power Supply Accessories

PSB Series Power Supply Accessories		
Part No.	Price	Description
PSB-CVR	<--->	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



AutomationDirect HQ and mega-warehouse, just north of Atlanta, GA USA



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We were originally founded as PLCDirect in 1994 and have grown from a tiny PLC company to one of the best value choices in the industry.

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In 1999, we changed our name to AutomationDirect.com, and brought that "pass along the value" philosophy online. We have been serving tens of thousands of satisfied customers ever since.

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2009 IEN Web Reviews March 2009
Automation Direct: Overall Rating 94%
"Very, very thorough site; one of the best industrial sites we've reviewed."

2009 Control Design magazine Readers' Choice Awards

2008 Control Design magazine Readers' Choice Awards

2007 IEN Best Brands Winners 2007

2007 Control Design magazine Readers' Choice Awards

2006 Control Design magazine Readers' Choice Awards

2006 Design News magazine Readers' Choice Awards

2005 Control Design magazine Readers' Choice Awards

2005 Control Design magazine Readers' Choice Awards

2004 Control Design magazine Editors' Choice Award

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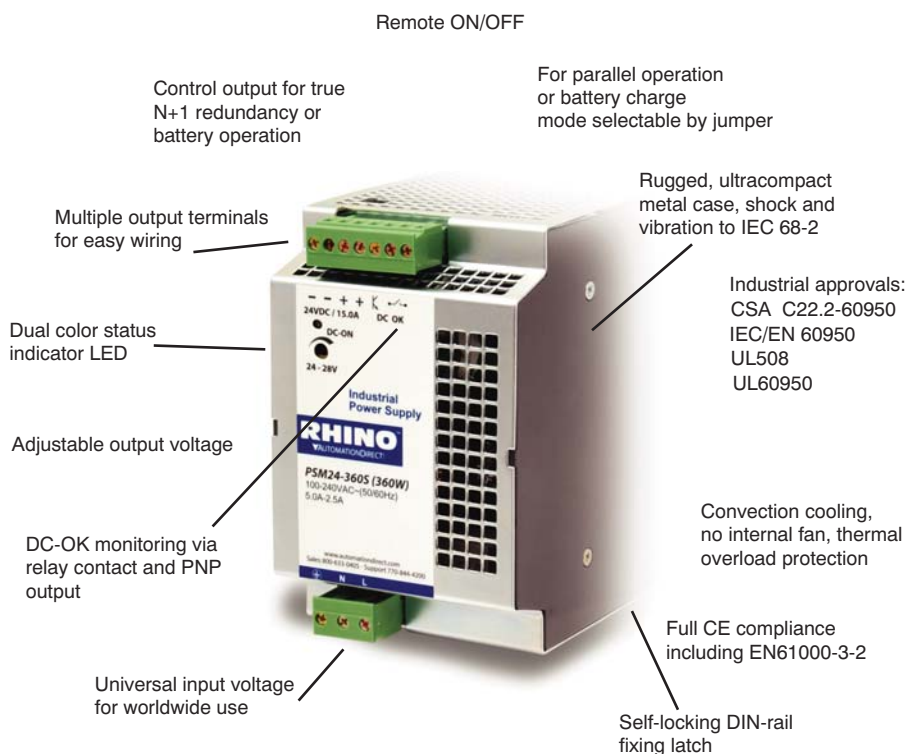
RHINO PSM Series Power Supplies

Versatile switching power supplies are DIN-rail mountable

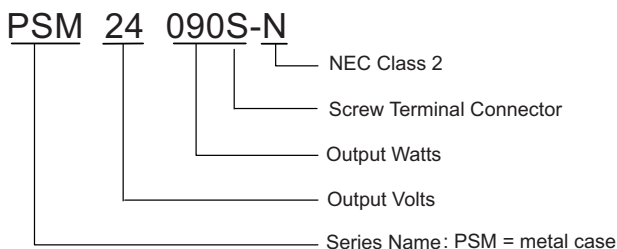
AUTOMATIONDIRECT offers the most practical industrial control power supplies available. The RHINO PSM series power supplies are industrial grade switching DC output supplies with a sturdy steel case to withstand harsh environments. Autoselect inputs for 115 VAC or 230 VAC and international agency approvals 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 product warranty



Part Numbering System



RHINO PSM Industrial Power Supplies			
Part Number	*Output Voltage (V_{nom})	**Output Current (I_{max})	***Output Power (P_{max})
PSM12-078S	12 VDC	6.5 A	78 W
PSM24-090S	24 VDC	3.75 A	90 W
PSM24-090S-N	24 VDC	3.75 A	90 W
PSM12-156S	12 VDC	13.0 A	156 W
PSM24-180S	24 VDC	7.5 A	180 W
PSM24-360S	24 VDC	15.0 A	360 W
PSM24-600S	24 VDC	25.0 A	600 W

*12V models adjustable from 12 to 14 VDC. 24V models adjustable from 24 - 28 VDC

**Maximum current at nominal output voltage

***Up to an operating temperature of +40°C

RHINO PSM Series Power Supplies Specifications

Input Specifications									
Part Number	Input Voltage Range	Input Frequency Range	Input Current (Typical) at full load		Inrush Current max (<2ms) @ +25°C		Holdup Time	Efficiency (Typical) @ 115VAC	Circuit Breaker or Fuse (slo-blo)
			115 VAC	230 VAC	115 VAC	230 VAC			
PSM12-078S	100 - 240 VAC 85 - 264 VAC (47 - 63 Hz)	47-63 Hz	2.0 A	1.0 A	<12 A	<20 A	20 ms min. (full load 115/230 VAC)	82%	6.0 A to 16.0 A
PSM24-090S			2.1 A	1.0 A				85%	
PSM24-090S-N			2.1 A	1.0 A				85%	
PSM12-156S	100 - 120 VAC/ 220 - 230 VAC		2.5 A	1.4 A	<13 A	<25 A		85%	
PSM24-180S	85 - 132 VAC/ 187 - 264 VAC		2.8 A	1.5 A				88%	
PSM24-360S	(47 - 63 Hz) Autoselect		5.0 A	2.5 A				<16 A	<25 A
PSM24-600S				10.0 A	5.0 A	<25 A		<30 A	89%

Output Specifications										
Part Number	Price	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	<--->	12 VDC	12 - 14 VDC	6.5 A	78 watts	20 V	9 - 11 V	11 V ± 1 V/20 mA max.	DC OK = contact closed (rated:30 VDC 1.0A)	350,000 hours
PSM24-090S	<--->	24 VDC	24 - 28 VDC	3.75 A	90 watts	35 V	18 - 22 V	22 V ± 2 V/10 mA max		
PSM24-090S-N	<--->			3.75 A	90 watts	35 V		22 V ± 2 V/10 mA max		
PSM12-156S	<--->	12 VDC	12 - 14 VDC	13.0 A	156 watts	20 V	9 - 11 V	11 V ± 1 V/40 mA max.		
PSM24-180S	<--->	24 VDC	24 - 28 VDC	7.5 A	180 watts	35 V	18 - 22 V	22 V ± 2 V/20 mA max		
PSM24-360S	<--->			15.0 A	360 watts	35 V				
PSM24-600S	<--->			25.0 A	600 watts	35 V				

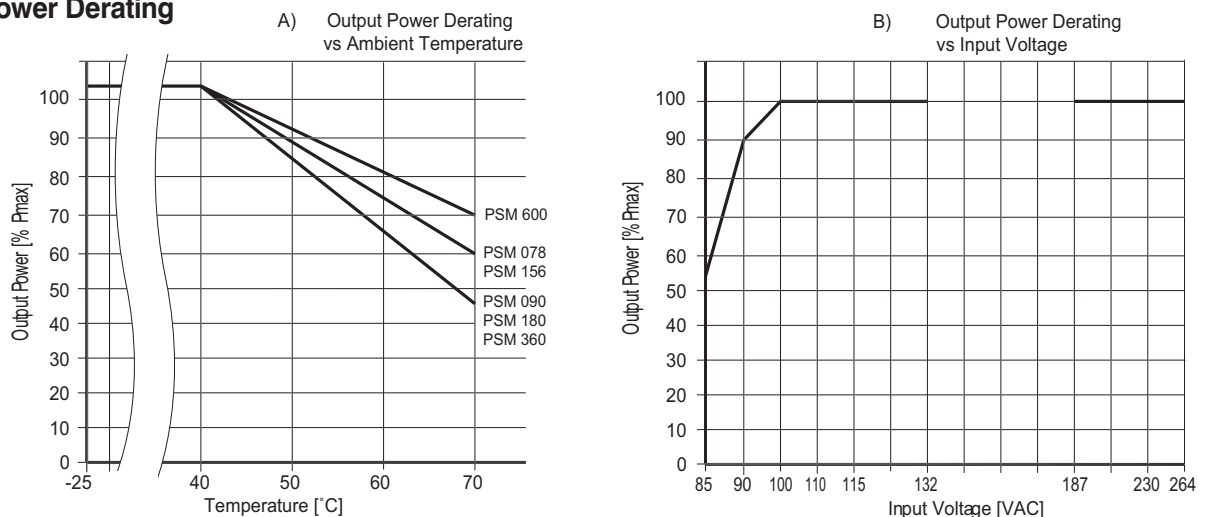
General Specifications	
Specification	Description
Temperature	Operating (ambient): -25°C to +70°C max (-13°F to 158°F). Above +40°C(104°F) load derating Storage (non-operating): -25°C to +85°C max (-13°F to 185°F). Temperature drift: 0.02%/°C. Cooling: convection, no internal fan
Humidity	95% (non-condensing) 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 - peak maximum at I _{max})
Output Protection	Current limit: 110% constant current, automatic recovery, thermal protection, output rating, Voltage limit: 140% V _{out} 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 KΩ to -V _{out} , [3VDC max across V _{out} (+) and V _{out} (-)]
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.	

RHINO PSM Series Power Supplies Specifications

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 55022 class B
	Radiated RI suppression	EN 55011 class B, EN 55022 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



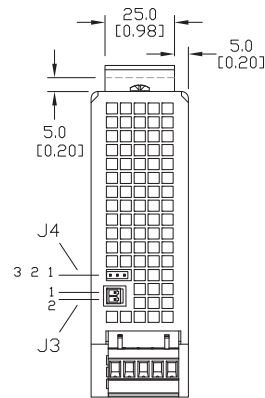
Note: Unless otherwise stated, all specifications are valid at nominal input voltage, full load and +25°C after warmup time.

RHINO PSM Series Dimensions/Connections

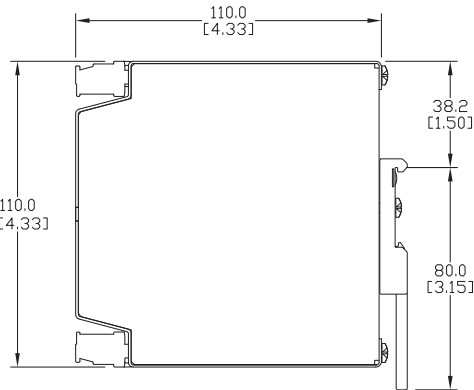
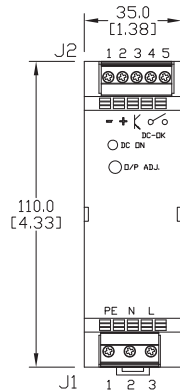
PSM12-078S/PSM24-090S

PSM24-REM360S

PSM24-BCM360S

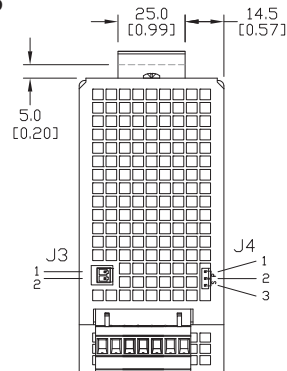


	J1	J2	J3	J4
Pin 1	Earth	GND (-)	S+	Normal mode
Pin 2	Neutral	Vout (+)	S-	Common
Pin 3	Line	DC-OK Signal	—	Parallel mode
Pin 4	—	DC-OK Relay contact 1	—	—
Pin 5	—	DC-OK Relay contact 2	—	—

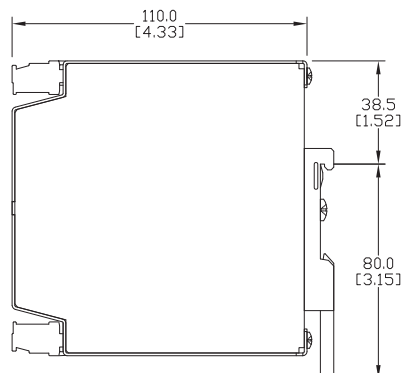
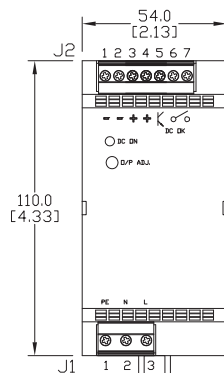


PSM12-156S/PSM24-180S

PSM24-BFM600S

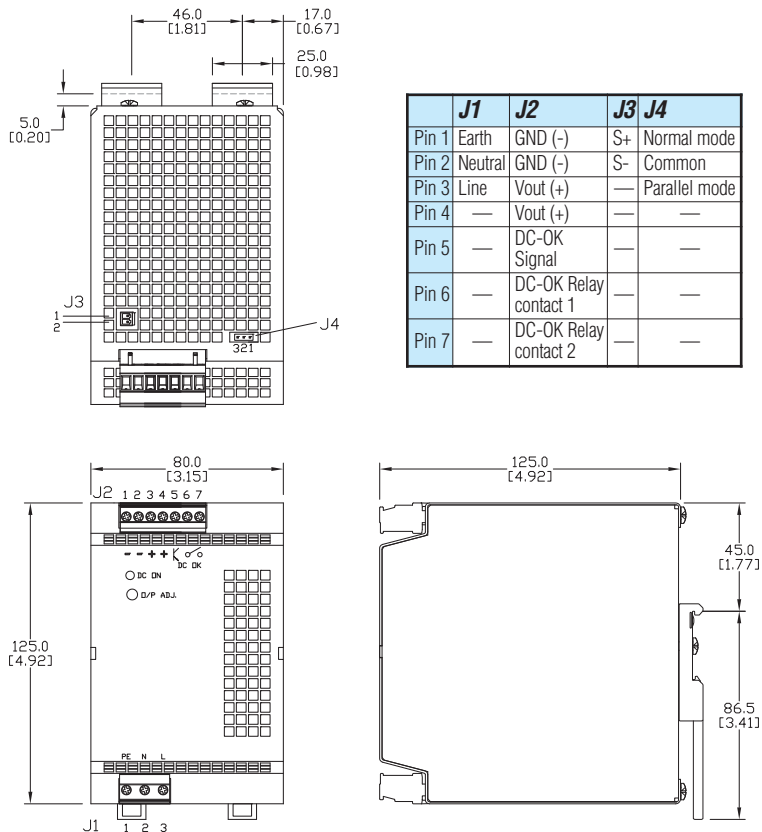


	J1	J2	J3	J4
Pin 1	Earth	GND (-)	S+	Normal mode
Pin 2	Neutral	GND (-)	S-	Common
Pin 3	Line	Vout (+)	—	Parallel mode
Pin 4	—	Vout (+)	—	—
Pin 5	—	DC-OK Signal	—	—
Pin 6	—	DC-OK Relay contact 1	—	—
Pin 7	—	DC-OK Relay contact 2	—	—

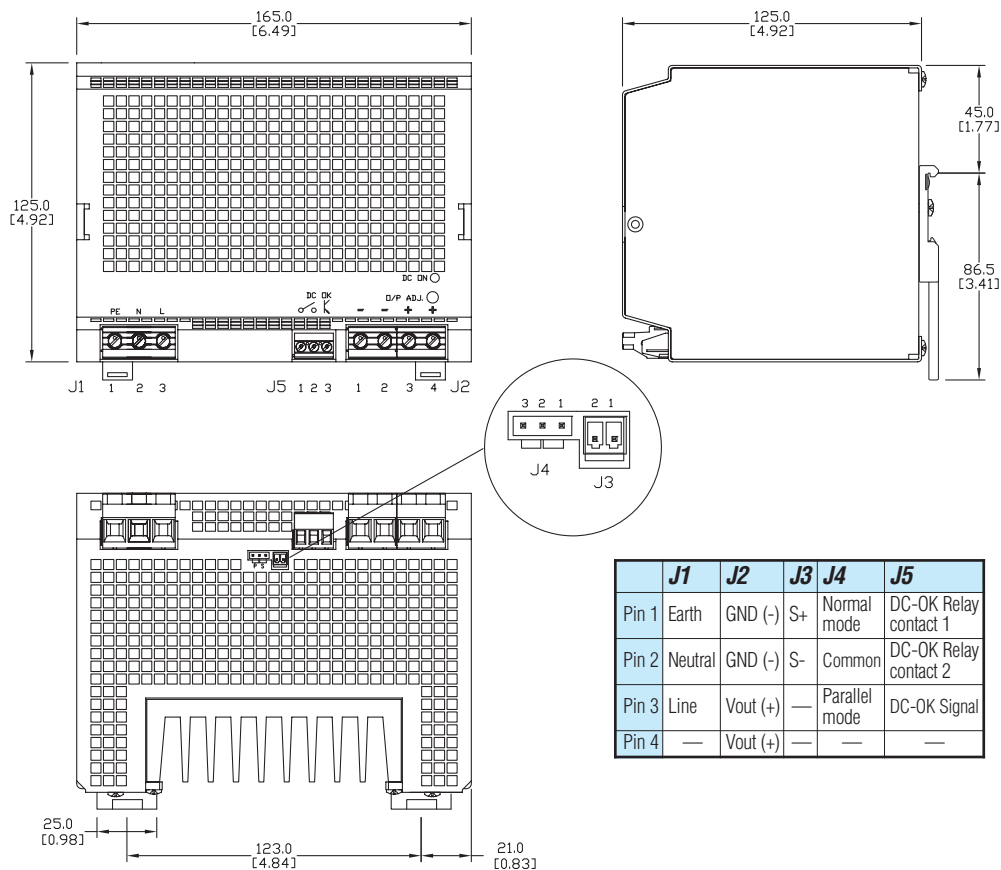


RHINO PSM Series Dimensions/Connections

PSM24-360S



PSM24-600S



RHINO PSM24-REM360S Redundancy Module

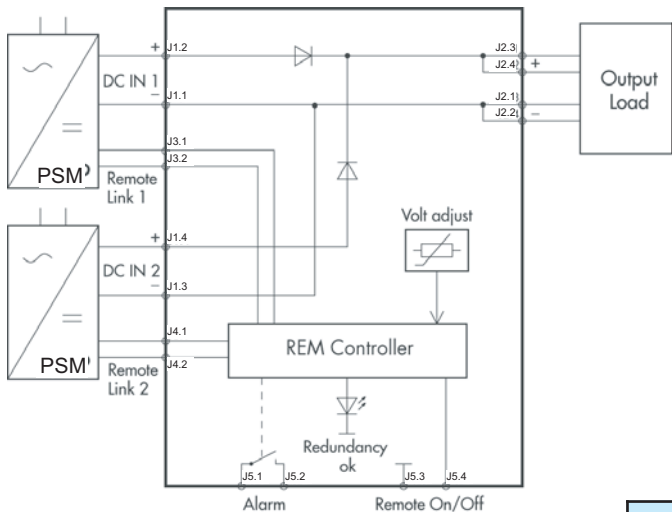
Using two PSM24 power supplies and a redundancy module, you can configure a redundant power system, featuring active current sharing, without any additional components. Even if one power supply fails or becomes disconnected, the second unit will supply full current to the load. The module has an alarm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



Redundancy Module					
Part Number	Price	Input	Max Power per Input	Output Voltage Adjust	Output Power Max
PSM24-REM360S (includes terminal plugs)	<--->	2 x 24 VDC 2 x Control Input	2 x 360 W	24 VDC (24 - 27 VDC)	360 W

General Specifications	
Operating Temperature	-25°C to +70°C max (-13°F 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 22 VDC. Contact closed if one or both inputs failed
Dimensions	Same as model PSM24-090S (see dimensions page)
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

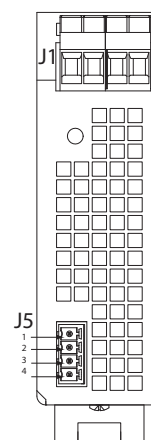


Redundancy Module Connector Positions

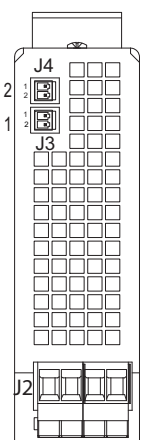
Front view



Bottom view



Top view



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

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

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 (sold separately) automatically adjusts the battery voltage to the required end of charge voltage. This configuration extends the battery life.

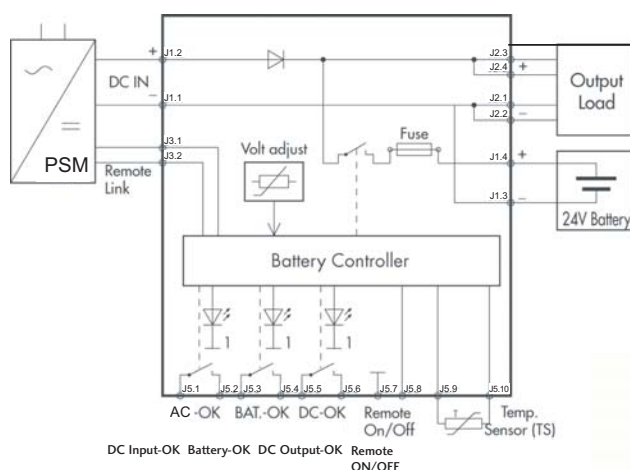


Battery Control Module					
Part Number	Price	Input	Input Power Max	Output Voltage Nom	*Output Power Max
PSM24-BCM360S (includes terminal plugs)	<--->	24 VDC power supply and 24 VDC battery	360 W	24 VDC	360 W

*reduce maximum output current by battery charging current.

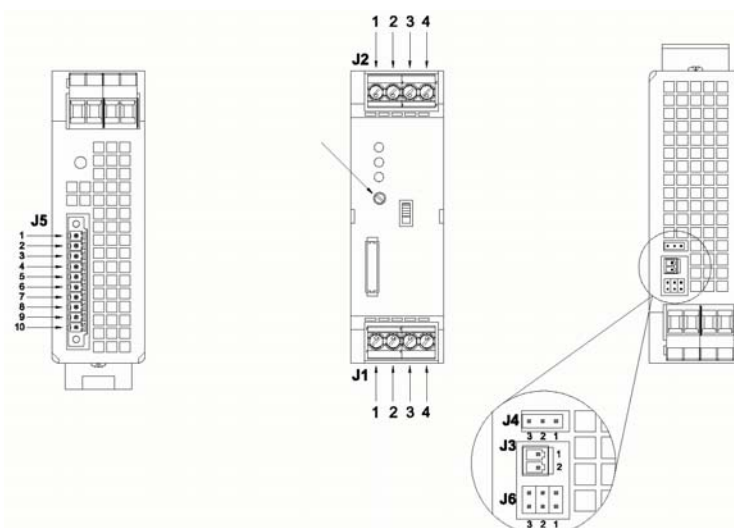
General Specifications	
Operating Temperature	-25°C to +70°C max (-13°F to +158°F) 1.5%/K, derating above 40°C (104°F)
Electromagnetic Compatibility	In correspondence to connected units (no internal switching device)
Battery Protection	Over voltage, deep discharge, short-circuit and reverse connection (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.
Dimensions	Same as model PSM24-090S (see dimensions page)
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



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

Battery Control Module Connector Positions



RHINO PSM24-BFM600S Buffer Module

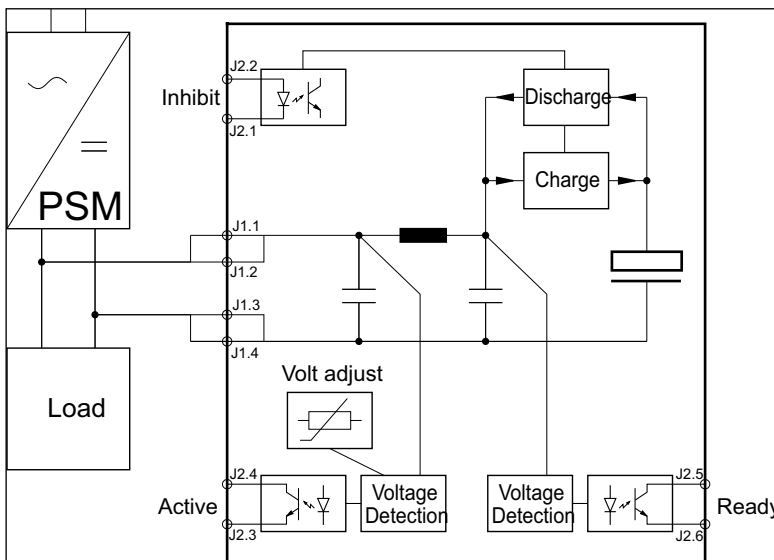


The buffer module will maintain the output voltage of a 24 VDC power supply after brownouts or voltage dips for up to 200 ms at 25 amps. It is a cost effective alternative to a battery-based backup system. The operation modes are indicated by an LED on the front panel.

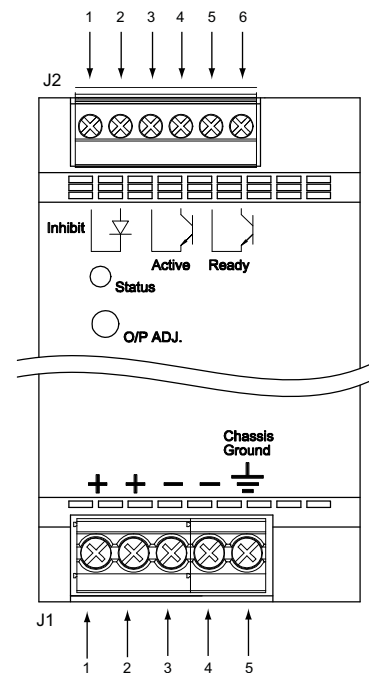
Storing the energy in a capacitor bank, this backup solution is completely maintenance free. Its storage capacity does not deteriorate over the lifetime of the unit.

Buffer Module					
Part Number	Price	Input	Operating Voltage Range	Buffer Time	Output Power Max
PSM24-BFM600S (includes terminal plugs)	<--->	24 VDC	22 to 28 VDC	200 msec typical @ 25A max load 4.0 sec maximum @ 1.2A load	25.0 A (600 W)
General Specifications					
Operating Temperature	-25°C to +70°C max (-13°F 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 5 VDC and 28 VDC to Inhibit				
Dimensions	Same as model PSM12-156S (see dimensions page)				
Signal Output Ratings	10 mA				

Buffer Module Function Diagram



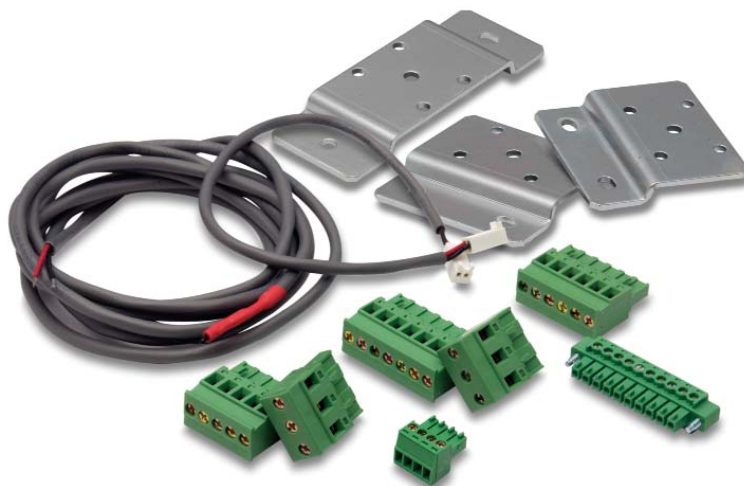
Buffer Module Connector Positions



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

RHINO PSM Power Supplies - Accessories

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	Description
PSM-PANEL1	<--->	Panel mounting bracket. 1 bracket type A includes M4-screw (DIN 74-4fA) for 78W, 90W, 156W, 180W PSM power supplies
PSM-PANEL2	<--->	Panel mounting bracket. 2 brackets type A include M4-screws (DIN 74-4fA) for 360W, 600W PSM power supplies
PSM-PK1	<--->	Replacement plug kit for PSM series with 78W and 90W outputs
PSM-PK2	<--->	Replacement plug kit for PSM series with 156W, 180W and 360W outputs
PSM-PK3	<--->	Replacement plug kit for PSM series redundancy module
PSM-PK4	<--->	Replacement plug kit for PSM series buffer module
PSM-PK5	<--->	Replacement plug kit for PSM series battery control module
PSM-TS	<--->	Temperature sensor for PSM24-BCM360S battery control module
PSM-JC01	<--->	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 flat-head 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

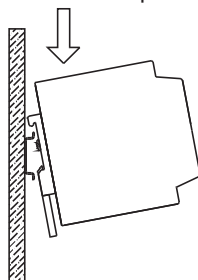


Fig. 2.1

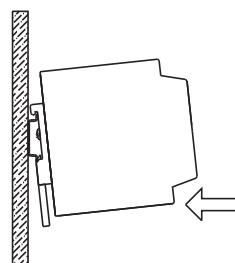


Fig. 2.2

To remove the power supply from DIN rail

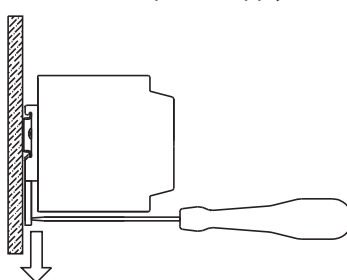


Fig. 2.3

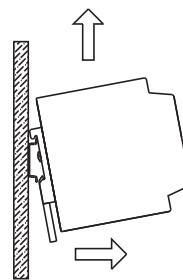
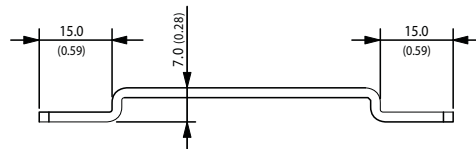
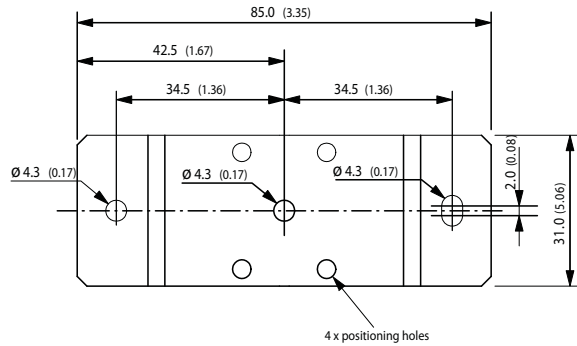


Fig. 2.4

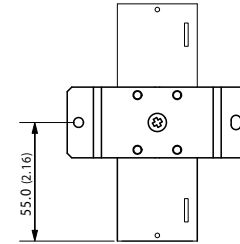
RHINO PSM Panel Mounting Bracket Dimensions

PSM-PANEL1

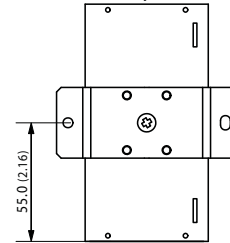


Material: 2 mm Mild Steel
Tolerance: $\pm 0.1\text{mm}$ (± 0.004)

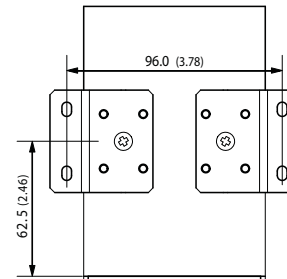
PSM12-078S, PSM24-090S



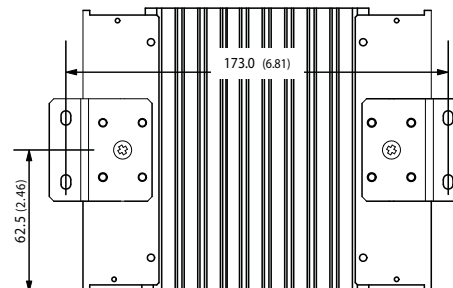
PSM12-156S, PSM24-180S



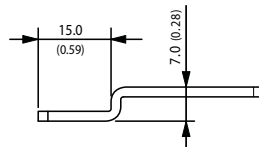
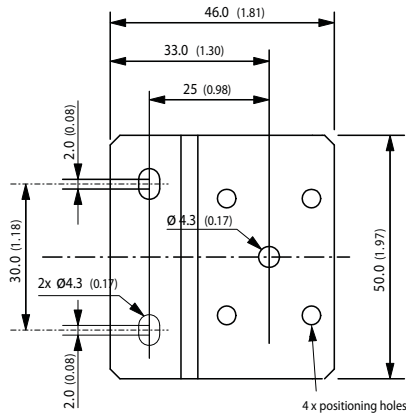
PSM24-360S



PSM24-600S



PSM-PANEL2



Material: 2 mm Mild Steel
Tolerance: $\pm 0.1\text{mm}$ (± 0.004)

Dimensions: [mm] () = Inch

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Note that the 2-day transit time does not apply for LTL shipping of heavy items or drop-shipped items. (We cannot ship heavy items to Hawaii or Puerto Rico. To determine if an item is excluded, check the "Availability" column of the printed price list.)

For orders under \$300, you may request that your order ship via the 2-day (transit) method; shipping charges will be added to invoice.

For complete details on shipping methods and charges, see Terms and Conditions pages TC-4 to 6.

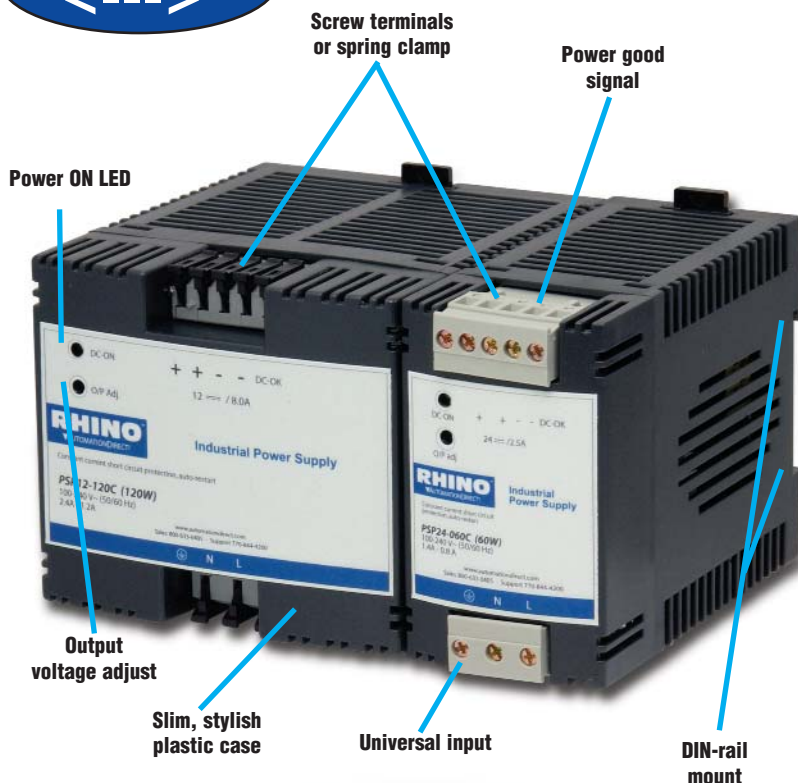
*** We do not guarantee delivery times of the carriers.** AutomationDirect is not responsible for carrier delays due to weather, mechanical failures or other issues.



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RHINO PSP Series 5,12 & 24 VDC Power Supplies

Starting at



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 85-264 VAC/DC 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 85-264 VAC, 50/60 Hz or 85-375 VDC (no DC input on PSP24-240S)
- 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 product warranty

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



RHINO PSP Series Power Supplies Specifications



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



PSP24-024C



PSP12-060S
PSP24-060S



PSP12-060C
PSP24-060C



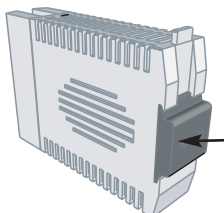
PSP12-120C
PSP24-120C



PSP24-120S
PSP12-120S



PSP24-240S



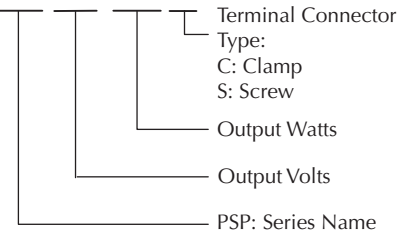
The unit can be mounted on a chassis or wall using the included mounting bracket.

Input Specifications							
Part Number	Input Voltage Range		Input Freq. Range	Input Current (Typical) at full load		Efficiency (Typ.)	C-Curve Circuit Breaker or Slow-blow Fuse
				115 VAC	230 VAC		
PSP05-020S	85-264 VAC 85-375 VDC	30% output derating below 93 VAC/ 130 VDC	47-63 Hz	0.35 A	0.2A	88%	5.0 A
PSP12-024S		20% output derating below 93 VAC/ 130 VDC					
PSP24-024S							
PSP24-024C							
PSP12-060S		15% output derating below 93 VAC/ 130 VDC		1.2 A	0.6 A	88%	
PSP12-060C							
PSP24-060S							
PSP24-060C							
PSP12-120S				2.0 A	1.0 A	88%	
PSP12-120C							
PSP24-120S							
PSP24-120C							
PSP24-240S	85-132/ 187-264 VAC	20% output derating below 93 VAC	3.3 A	1.7 A			

Output Specifications									
Part Number	Price	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	<---	5.1 VDC	5-5.25 VDC	4.0 A	20 W	15 ms	125 ms	2,681,000 hours	
PSP12-024S	<---	12 VDC	12-16 VDC	2.0 A	24 W				
PSP24-024S	<---	24 VDC	24-28 VDC	1.0 A	24 W				
PSP24-024C	<---								
PSP12-060S	<---	12 VDC	12-15 VDC	4.0 A	60 W			2,947,000 hours	
PSP12-060C	<---								
PSP24-060S	<---	24 VDC	24-28 VDC	2.5 A	120 W				1,620,000 hours
PSP24-060C	<---								
PSP12-120S	<---	12 VDC	12-15 VDC	8.0 A					
PSP12-120C	<---								
PSP24-120S	<---	24 VDC	24-28 VDC	5.0 A				1,912,000 hours	
PSP24-120C	<---								
PSP24-240S	<---			10.0 A	240 W				

Part numbering system

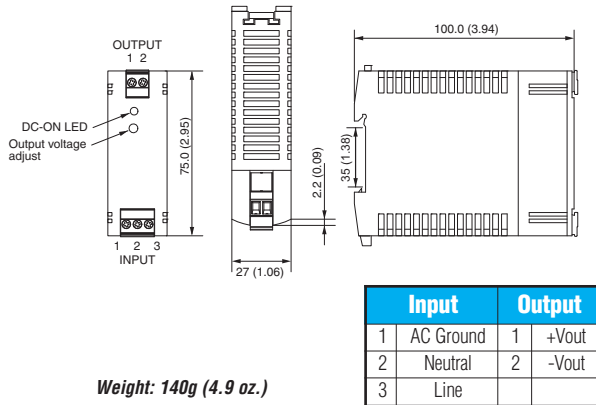
PSP24-024S



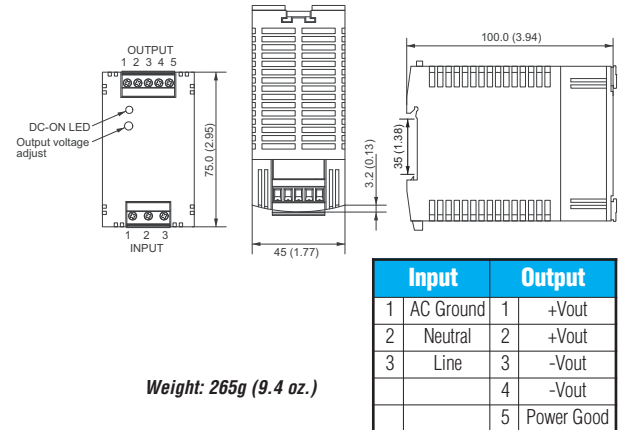
RHINO PSP Series Power Supplies Dimensions

General Specifications		
Temperature	Operating: -10°C to +70°C (14°F 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°C to +85°C (-13°F 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	Output Signal (reference to -Vout)
	12 VDC Models: >11 V	11.0 V+/- 1.0 V @ 60 mA max.
	24 VDC Models: >22 V	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	35 mm DIN rails, snap on with self-locking spring or wall mount adapter included	
Connection	S models: Plug-in Screw Terminals, C Models: Clamp Terminals. For 28-12 AWG wire	
Agency Approvals	UL/cUL 508 listed File E197592(PSP24-240S not cUL), UL 60950 recognized, file 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



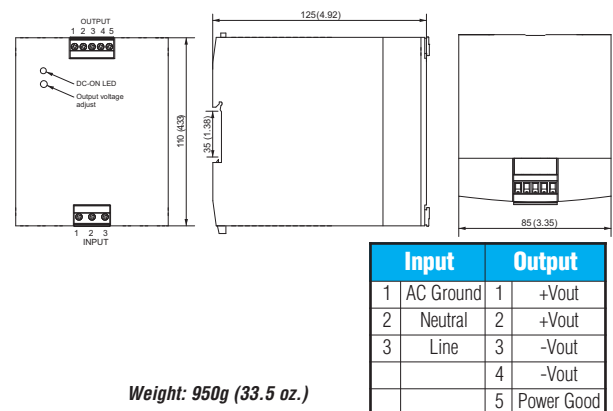
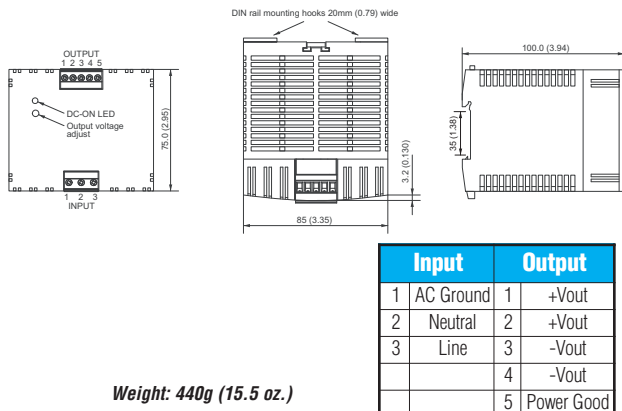
PSPxx-060x



PSPxx-120x

Note: All dimensions are in millimeters (inches).

PSP24-240S



RHINO PSP24-REM240S Redundancy Module

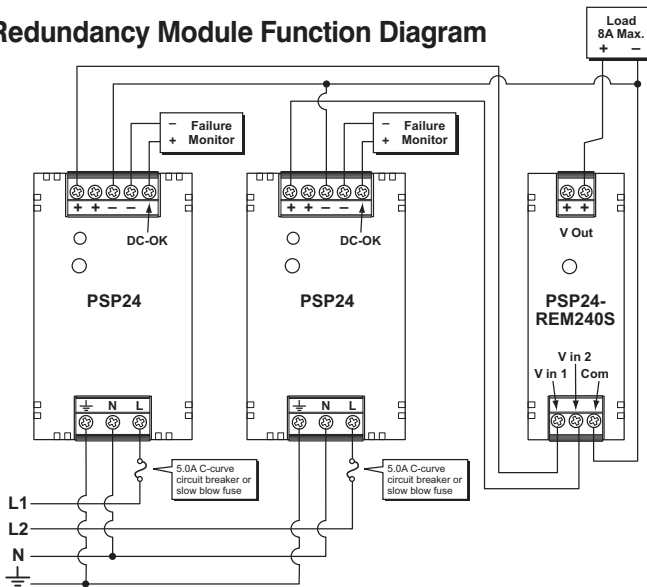
The PSP24-REM240S redundancy module used with two Rhino PSP Series power supplies creates redundancy to help prevent costly downtime due to power supply failure. The PSP24-REM240S decouples the outputs of the two connected power supplies so that in case of failure, one power supply cannot overload the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



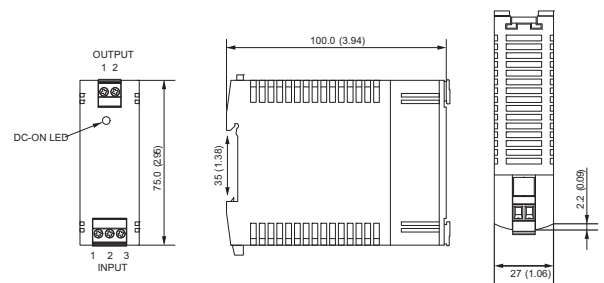
PSP Redundancy Module						
Part Number	Price	Input Voltage Range	Max Power per Input	Output Voltage	Output Current Max.	Connection
PSP24-REM240S	<--->	2 x 5 – 60 VDC	144 W	V in – 0.9 VDC	8 A	Detachable screw terminal block

PSP24-REM240S General Specifications	
Temperature	Operating: -10°C to +70°C max (14°F to +158°F max), Storage: -25°C to +85°C max, (-13°F to +185°F max), Cooling: Natural air convection
Parallel Operation	(2) Rhino PSP power supplies (except PSP24-240S) per module
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 Size range	24 to 12 AWG (0.21 to 3.16 mm ²)
Dimensions	HxWxD 2.95" x 1.06" x 3.94" (75 x 27 x 100mm)
Agency Approvals	UL/cUL 508 listed, File E197592, CE

Redundancy Module Function Diagram



Redundancy Module Connector Positions



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

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.
- 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 PSC Series Power Supplies Specifications

Company
InformationSystems
OverviewProgrammable
Controllers

Field I/O

Software

C-more &
other HMI

Drives

Soft
StartersMotors &
GearboxSteppers/
ServosMotor
ControlsProximity
SensorsPhoto
SensorsLimit
Switches

Encoders

Current
SensorsPressure
SensorsTemperature
SensorsPushbuttons/
Lights

Process

Relays/
Timers

Comm.

Terminal
Blocks &
Wiring

Power

Circuit
Protection

Enclosures

Tools

Pneumatics

Appendix

Product
IndexPart #
Index

NEC Class 2 Compliant Supplies

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

PSC-12-030, PSC-24-030

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 85 to 264 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.



PSC-12-060, PSC-24-060



PSC-24-090

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 85-264VAC
- Tight output voltage regulation
- DC-OK LED indication
- UL508 Listed
- UL1310 Recognized for NEC Class 2 compliance
- CE compliant
- RoHS compliant



Input Specifications

Input Specifications							
Part Number	Input Voltage Range	Input Frequency Range	Input Current (Typical) at full load		Efficiency (Typ.)	C-Curve Circuit Breaker or Slow-blow Fuse	
			115 VAC	230 VAC			
PSC-05-012	100-240VAC - Nominal	47-63 Hz	0.25A typ.	0.17A typ.	73%	6.0 A	
PSC-12-015			0.29A typ.	0.20A typ.	79%		
PSC-24-015					81%		
PSC-12-030	85 to 264VAC - Universal (output power derating 5% / V for operation below 90 VAC)		0.57A typ.	0.39A typ.	81%		
PSC-24-030			1.00A typ.	0.68A typ.	83%		
PSC-12-060					83%		
PSC-24-060					85%		
PSC-24-090			1.60A typ.	1.07A typ.	86%		

Output Specifications

Output Specifications								
Part Number	Price	Output Voltage	Output Volt. Adjust. Range	Output Current (Max.)	Output Power (Max.)	Hold-Up Time		MTBF (IEC 1709 @ 25°C)
						115 VAC	230 VAC	
PSC-05-012	<--->	5.0VDC	5.0 to 5.2VDC	2.4A	12 Watt	minimum 10 ms	minimum 20 ms	1,600,000 hours
PSC-12-015	<--->	12.0VDC	12.0 to 16.0VDC	1.25A	15 Watt			
PSC-24-015	<--->	24.0VDC	24.0 to 28.0VDC	0.63A				
PSC-12-030	<--->	12.0VDC	12.0 to 16.0VDC	2.5A	30 Watt			1,300,000 hours
PSC-24-030	<--->	24.0VDC	24.0 to 28.0VDC	1.25A				
PSC-12-060	<--->	12.0VDC	12.0 to 16.0VDC	4.5A	54 Watt			2,100,000 hours
PSC-24-060	<--->	24.0VDC	24.0 to 28.0VDC	2.5A	60 Watt			
PSC-24-090	<--->	24.0VDC		3.75A	90 Watt			

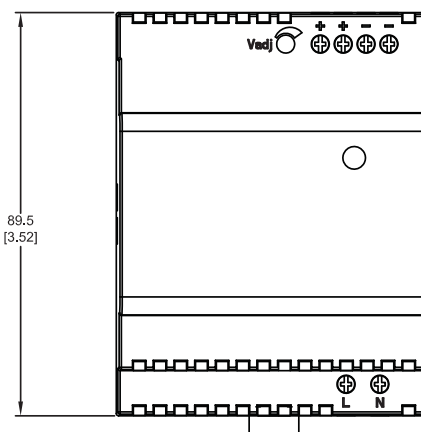
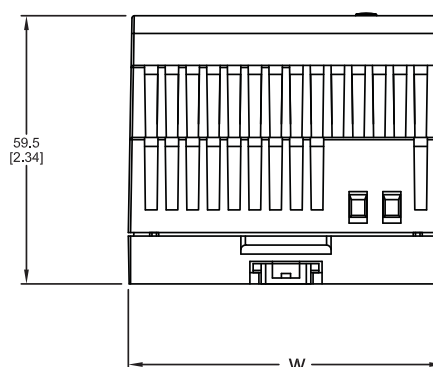
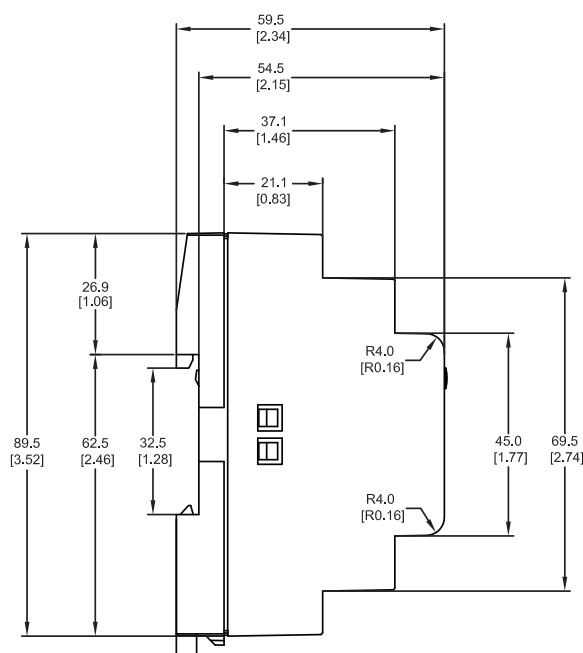
RHINO PSC Series Power Supplies

Specifications and Dimensions

General Specifications	
Temperature	Operating: -25°C (-13°F) to +60°C (+140°F) max at nominal load, above +60°C (+140°F) 2.5% / °C derating up to +70°C (+185°F) Storage: -25°C (-13°F) to +85°C (+185°F) max
Humidity	95% (non-condensing) relative humidity max.
Output Regulation	1%
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 - EN55022 class B Radiated RI suppression - EN55022 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 12 AWG (0.20 to 3.30mm ²)
Agency Approvals	UL508 Listed, file #E197592 UL1310 Class 2 Recognized, file #E198298

Dimensions		
Part No.	Width (W) - mm [inches]	Weight oz [g]
PSC-05-012	26.3 [1.04]	3.53 [100]
PSC-12-015	26.3 [1.04]	3.53 [100]
PSC-24-015	26.3 [1.04]	3.53 [100]
PSC-12-030	52.5 [2.07]	5.64 [160]
PSC-24-030	52.5 [2.07]	5.64 [160]
PSC-12-060	70.0 [2.76]	8.11 [230]
PSC-24-060	70.0 [2.76]	8.11 [230]
PSC-24-090	105.0 [4.13]	12.0 [340]

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



TOLERANCE +/- 0.5mm [0.02"]

PS Series 12 VDC and 24 VDC Power Supplies

Switching power supplies at linear supply prices

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

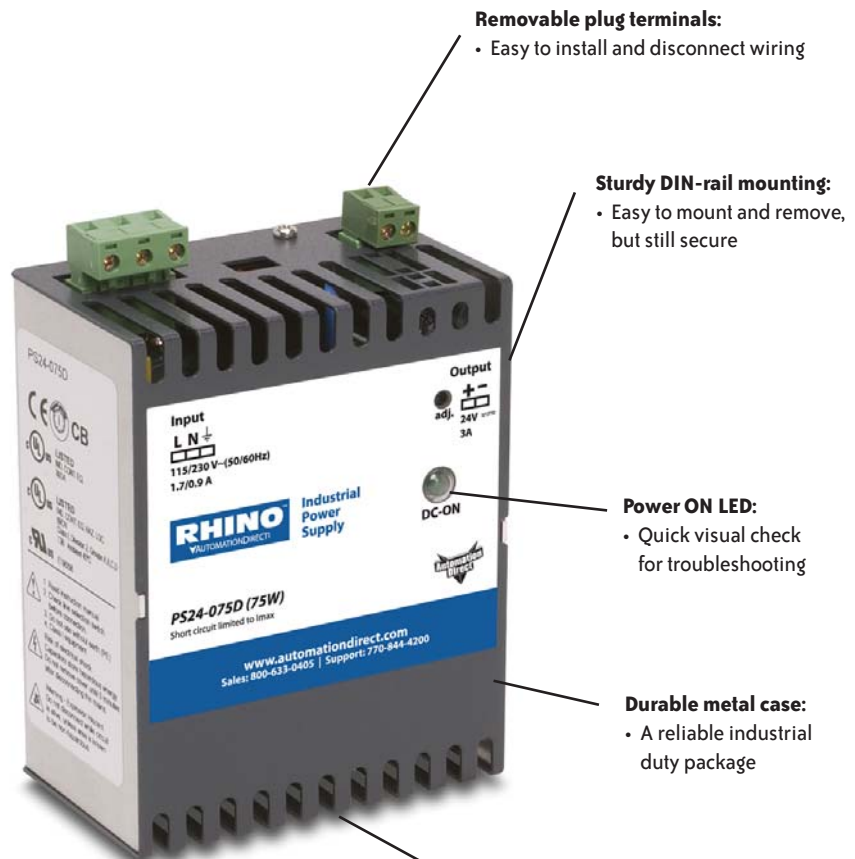
These power supplies use efficient switching technology to produce the most power in the smallest space, while generating a minimum amount of heat. The constant-current short circuit protection limits the output current as the voltage is reduced to safely protect your control components from direct shorts 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
- 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),



Constant current protection with auto-recovery:

- No current spikes to damage powered devices due to improper wiring or a powered device failure

Efficient switching technology:

- Smaller size and less heat generated results in less wasted space and energy

Part numbering system

PS12-050D

- D: DIN-Rail Mounting
- Output Watts
- Output Volts
- PS: Series Name

Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Appendix

Product Index

Part # Index

PS Series Power Supplies Specifications



PS12-050D
PS24-050D



PS12-075D
PS24-075D



PS24-150D



PS24-300D



PS24-500D



PS24-600D

General Specifications	
Temperature	Operating (ambient): -25°C to +70°C (-13°F to 158°F) max, Derating above 50°C 2%/C Storage (non-operating): -25°C to +85°C (-13°F 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: $\pm 0.2\%$ max Load variation: 50 W, 75 W, 150 W models: $\pm 1\%$ max 300 W, 500 W, 600 W models: $\pm 0.3\%$ 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 22-10 AWG
Agency Approvals	UL/cUL 60950 recognized, file E198298, UL/cUL 508 listed File E197592, UL/cUL 1604 listed (Class I, Div 2, groups A,B,C, and D hazardous locations), File E197886, except PSxx-050D and PS24-500D , which are not UL/cUL1604 listed. CE
<i>Note: All specifications are valid at nominal input voltage, full load and +25°C after warm-up time, unless otherwise stated.</i>	

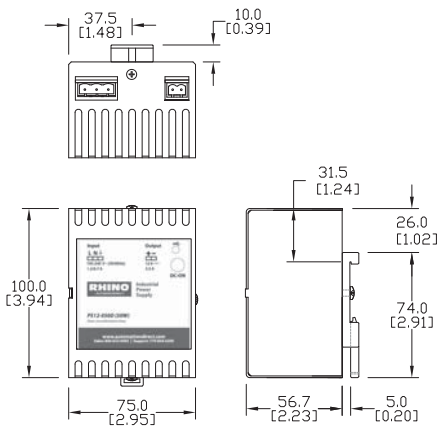
Input Specifications								
Part Number	Input Voltage Range	Input Frequency Range	Input Current (Typical)		Inrush Current (<2mS)		Efficiency (Typ.)	C-Curve Circuit Breaker or Slow-blow Fuse
			115 VAC	230 VAC	115 VAC	230 VAC		
PS12-050D	93-264 VAC	47-63 Hz	1.2 A	0.7 A	<15 A	<30 A	84%	5.0 A
PS24-050D	93-264 VAC		1.2 A	0.7 A			87%	
PS12-075D	93-132 VAC 187-264 VAC (switch selectable)		1.7 A	0.9 A	<16.5 A	<33 A	83%	
PS24-075D			1.7A	0.9 A			85%	
PS24-150D			3.0 A	1.7 A	<35 A	<70 A	84%	10.0 A
PS24-300D			5.4 A	3.3 A			87%	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%

Output Specifications									
Part Number	Price	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	<--->	12 VDC	12-14 VDC	3.5 A	50 W	1%	25 mS	30 mS	2,992,000 hours
PS24-050D	<--->	24 VDC	24-28 VDC	2.0 A	50 W				1,800,000 hours
PS12-075D	<--->	12 VDC	12-14 VDC	6.0 A	75 W				
PS24-075D	<--->	24 VDC	24-28 VDC	3.0 A	75 W	0.3%	20 mS	N/A	1,939,000 hours
PS24-150D	<--->			6.0 A	150 W				1,913,000 hours
PS24-300D	<--->			12.0 A	300 W				1,467,000 hours
PS24-500D	<--->			20.0 A	500 W	0.3%	15 mS	25 mS	
PS24-600D	<--->			24.0 A	600 W				
*Load variation (10-90%)				Notes: Output current characteristic suitable for battery charging applications. Not recommended for redundancy or parallel operation.					

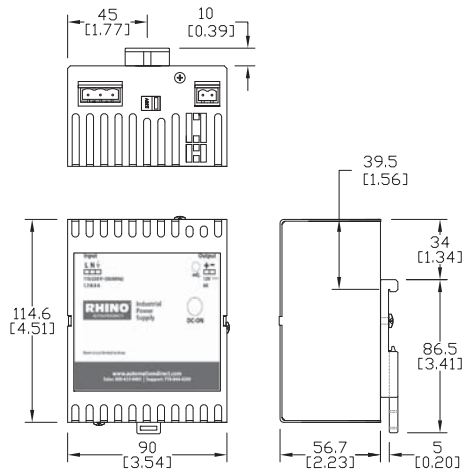
Replacement terminal blocks are available. See price list.

PS Series Power Supplies Dimensions

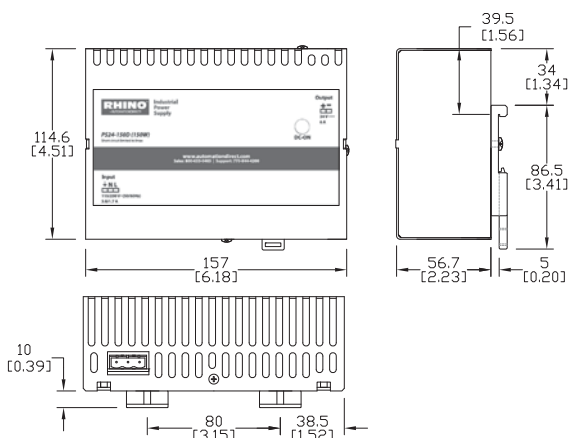
PS12-050D, PS24-050D



PS12-075D, PS24-075D

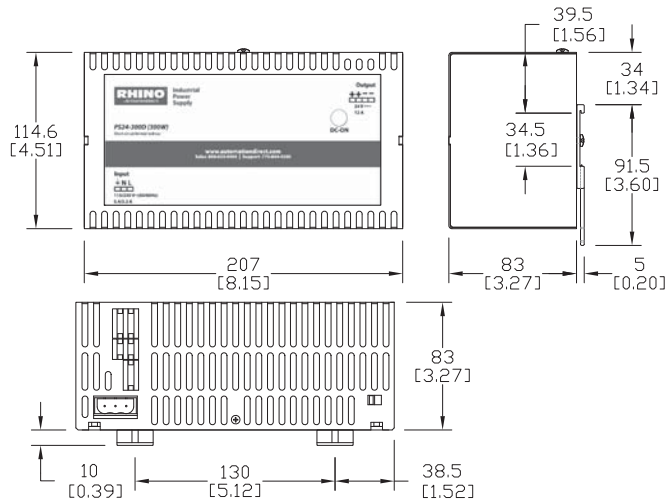


PS24-150D

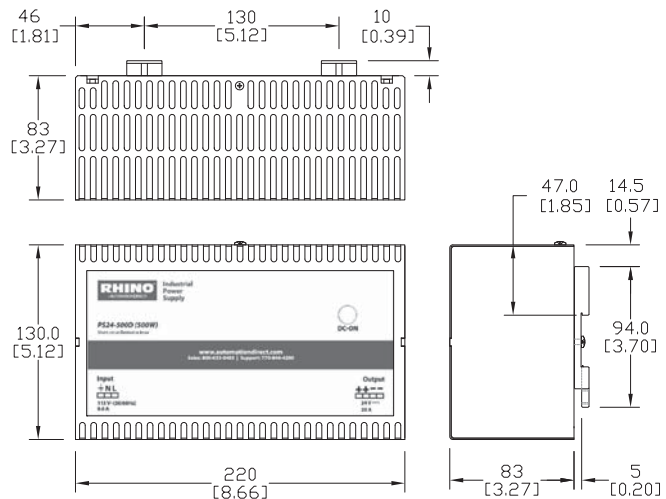


PS24-300D

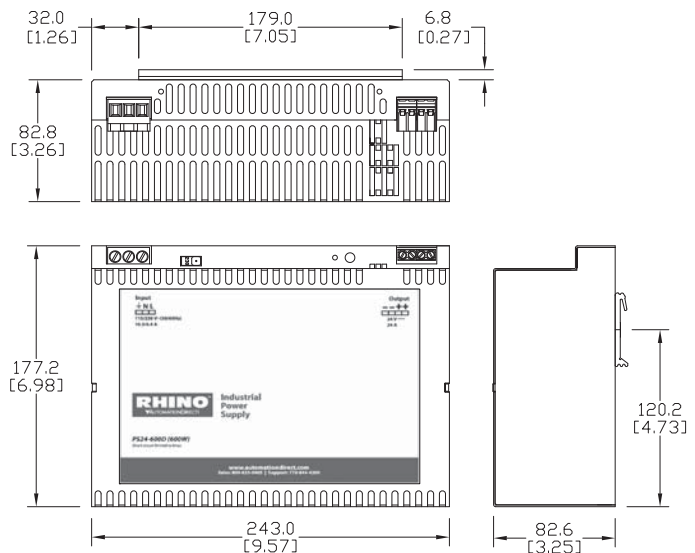
Note: All dimensions are in millimeters (inches).
Tolerances $\pm 0.5\text{mm}$



PS24-500D



PS24-600D



RHINO DC to DC Converters

Four models for DC input voltage are available in the PSP series of DIN-rail DC-to-DC converters. Wide input ranges of 9.5 to 18VDC and 18 to 75VDC allow these models to be operated 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 mounting on DIN rails and detachable screw terminal block.

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 mount on 35mm DIN rail
- Wall-mount bracket included
- 3-year warranty



PSP12-DC24-2



PSP24-DC12-1



PSP05-DC24-5



PSP24-DC24-1

Input Specifications					
Part Number	Input Voltage Range	Input Power (no load)	Startup Voltage	Undervoltage Shut-down	Efficiency (Typical)
PSP24-DC12-1	9.5 – 18.0 VDC	1.0 W. max	8.4 VDC	7.6 VDC	86%
PSP05-DC24-5	18 – 75 VDC		17.2 VDC	15.7 VDC	
PSP12-DC24-2					
PSP24-DC24-1					

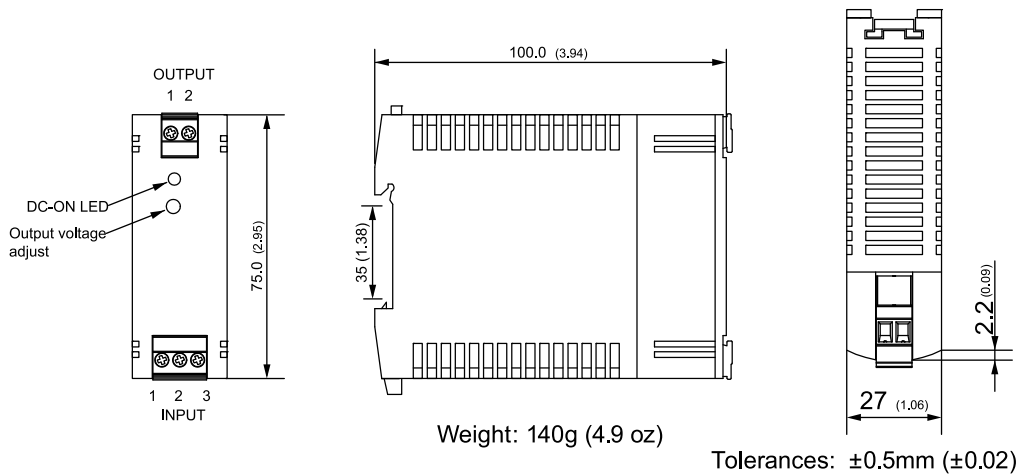
Output Specifications									
Part Number	Price	Output Voltage	Output Voltage Adj. Range	Output Current (Max.)	Ripple/ Noise	Output Voltage Regulation*	Overvoltage Protection, Trigger Point	Short Circuit Protection	MTBF (IEC 1709 @ 25°C)
PSP24-DC12-1	<—>	24 VDC	24.0 - 28.0 VDC	1 A	<50mV peak to peak	±0.5 % max	<42 V	Current limited at 110% typical	2.5 million hours
PSP05-DC24-5	<—>	5 VDC	5.0 - 5.25 VDC	5 A			<6.5 V		
PSP12-DC24-2	<—>	12 VDC	12.0 - 15.0 VDC	2 A			<24 V		
PSP24-DC24-1	<—>	24 VDC	24.0 - 28.0 VDC	1 A			<42 V		

*Note: Input variation V_{in} min to V_{in} max and load variation 0 to 100%

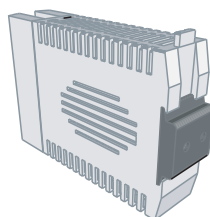
RHINO DC to DC Converters

General Specifications	
Temperature: Operating Storage (non-operating) Derating	-10°C to 70°C max (14°F to 158°F max) -25°C to 85°C max, (-13°F to 185°F max) 1.5%/K above 50°C (122°F)
Humidity (Non-condensing)	95 % relative humidity max.
Temperature Coefficient	0.02 %/K
Switching Frequency	55 – 180 kHz depending on load (frequency modulation)
Isolation Voltage (1 min.) – Input/Output	1500 VDC
Reliability, Calculated MTBF @ 25°C	>2.5 Mio h (according to IEC-1709)
Safety Standards	IEC 60950-1, EN 60950-1 (output SELV), UL/cUL 60950-1, EN 60204
Electromagnetic Compatibility (EMC), Emissions	EN 61000-6-3
Electromagnetic Compatibility (EMC), Immunity	EN 61000-6-2
Parallel Operation	Up to 5 power supplies possible (standard unit). PSP24-240S cannot be paralleled.
Safety Class	Degree of protection class 1
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
Agency Approvals UL Approval CB Report	UL/cUL 508 Listed, File E197592, CE
Note: All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.	

Dimensions



	Input		Output
1	Ground	1	+Vout
2	-Vin	2	-Vout
3	+Vin		



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

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, $\pm 10\text{VDC}$, $\pm 5\text{VDC}$ isolated power supply, with each output rated at 125mA. The $\pm 10\text{V}$ and $\pm 5\text{V}$ outputs are fixed at 1.0% regulation. The input voltage range is 12-24V DC $\pm 15\%$ at approximately 6.7 Watts.

FA-DCDC-1



FA-DCDC-1 General Specifications¹

Input Voltage Range	12V to 24VDC $\pm 15\%$
Input Power²	6.7 Watts, Vin 27.6V, 125mA load each channel
Output Voltage³ (25°C)	+5V $\pm 1\%$, 125mA load, -5V $\pm 1\%$ 125mA load +10V $\pm 1\%$ 125mA load, -10V $\pm 1\%$ 125mA load
Output Current	125mA (per output voltage)
Output Ripple	$\pm 5\text{V}$ channels: <10mV peak to peak, Vin 10.2V 125mA load on both channels $\pm 10\text{V}$ channels: <25mV peak to peak, Vin 10.2V, 125mA load on both channels
Line Regulation⁴	$\pm 5\text{V}$ channels: <10mV, Vin 10.2V to 27.6V, 125mA load on both channels $\pm 10\text{V}$ channels: <20mV, Vin 10.2V to 27.6V, 125mA load on both channels
Load Regulation⁵	$\pm 5\text{V}$ channels: <20mV, Vin 10.2V, 0 - 125mA load variation $\pm 10\text{V}$ channels: <40mV, Vin 10.2V, 0 - 125mA load variation
Isolation	Input to Output: 1500V; $\pm 5\text{V}$ to $\pm 10\text{V}$: 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. \pm Vin reverse polarity connection.
Overload Protection	Auto shutdown. Short circuit. Cycle Vin post event
Output Protection	Indefinite duration. $\pm 5\text{V}$ tied to $\pm 10\text{V}$
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-35HS1; surface mount
Connection	5mm screw terminal
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 E200031, UL508/CSA - C22.2 No. 142-M1987 for ordinary locations. Class I, Division 2, Groups A, B, C, D Hazardous Locations

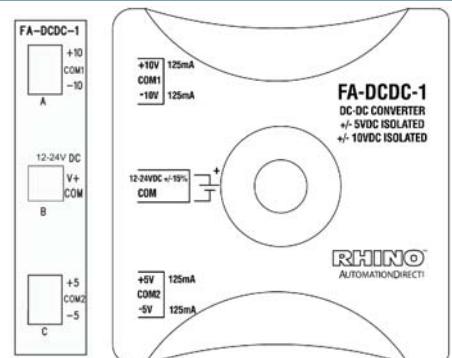
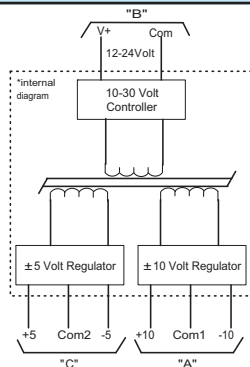
Notes: 1. All specifications are over the full operating temperature range (0°C to 60°C) unless stated otherwise.

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 $\pm 15\%$) 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.

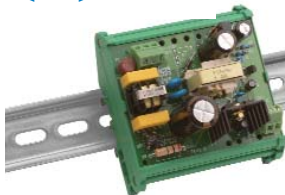


Power Supplies: Open Frame

The most economical choice for 24 VDC power

FA-24PS

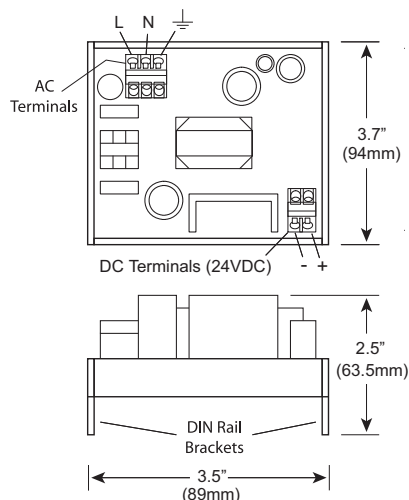
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These power supplies are especially useful when an inexpensive external supply is required.

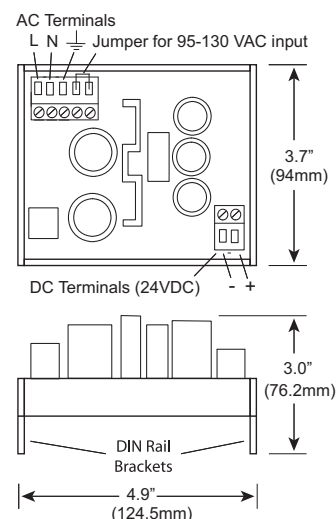
The FA-24PS compact switching power supply accepts 100-240 VAC or DC input and provides up to 1.25A (30 watts) output current at 24 VDC.

The FA-24PS-90 supplies 3.7A (90 watts) at 24 VDC and its input is jumper selectable between 95-130 or 190-264 VAC.



FA-24PS-90

<--->



General Specifications		
Part Number	FA-24PS	FA-24PS-90
Input Voltage Range	100-240 VAC/DC	95-130 VAC or 190-264 VAC, jumper selectable
Input Voltage Frequency	47 to 63 Hz	47 to 63 Hz
Input Power	40 VA	112 VA
Output Voltage	24 VDC $\pm 5\%$	24 VDC $\pm 5\%$
Output Current	1.25 A maximum continuous	3.7 A maximum continuous, subject to derating
Output Ripple	± 200 mV maximum	± 200 mV maximum
Temperature Rating	0°C to 60°C full rated	0°C 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: 18-12 AWG Rec. Screw Torque: 4.4 in•lb or 0.5 Nm	Wire Size: 18-12 AWG Rec. Screw Torque: 4.4 in•lb or 0.5 Nm
Insulation Resistance	10 M Ω at 500 V minimum	10 M Ω at 500 V minimum
Dielectric Withstand Voltage	L or N Input to Output: 500 V min; Ground Input to Output: 250 V min	L or N Input to Output: 500 V min; Ground Input to Output: 250 V min
Brown-out Protection	Provides temporary regulation down to 85 VAC 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)	115 V <12.5 A / 230 VAC <13.9 A	115 VAC <79 A / 230 VAC <37 A
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 E200031	

Hammond Transformers



Get years of reliable service from a quality transformer at a practical price

HPS Imperator™ control transformers for industrial applications

HPS Imperator control transformers from Hammond are specifically designed for high inrush applications requiring reliable output voltage stability. Designed to meet industrial applications where electromagnetic devices such as relays, solenoids, etc. are used, they maximize inrush capability and output voltage regulation when electromagnetic devices are initially energized.

HPS Imperator control transformers use Mylar, Nomex and other high-quality insulating materials. Insulation is used to electrically insulate turn-to-turn windings, layer-to-layer windings, primary-to-secondary windings and ground. These transformers are vacuum impregnated with VT polyester resin and oven-cured, which seals the surface and eliminates moisture. Filling the entire unit provides a strong mechanical bond and offers protection from the environment. This design utilizes superior insulation systems and is constructed with high quality silicon steel laminations, which provide optimum performance and reliability.

The custom injection-molded cover, with its unique fin-shaped design, provides excellent cooling properties while protecting the coils and terminations from moisture, dirt and other industrial airborne contaminants.

The heavy steel mounting feet are welded to the core, providing maximum strength and low noise in a compact design.

The HPS Imperator's unique terminal block design (patent pending) allows for the quick and easy installation of standard secondary or optional primary 13/32" x 1 1/2" midjet/type CC fuse clips on every unit. This is the simplest and most inexpensive fusing installation provided on any industrial control transformer in the market today.

The windings and internal terminations of the HPS Imperator are encapsulated, which protects them from moisture, dirt and other airborne contaminants. The custom molded coil covers with their unique 'fin shaped' design combine superior transformer cooling properties with a clean bold look.



The HPS Imperator utilizes custom serrated terminals, in combination with standard SEMS washer screws making assembly easier and quicker to install; and provides superior connection strength when connecting with bare, solid, or stranded wire. It also allows for ring or spade termination connectors.

HPS Fortress™ commercial potted transformers

The HPS Fortress commercial potted transformers provide an innovative design with commercial applications where quality, ease of installation, and low cost are key.

All Fortress units are encapsulated with electrical grade silica sand and resin compounds, which completely enclose the core and coil to seal out moisture, airborne contaminants and eliminates corrosion and deterioration.

Superior quality and value

- Compact, efficient design
- Easy installation and hook-up
- Inexpensive while maintaining superior quality in materials and workmanship
- Wall mounting

Applications

- Shopping centers
- Schools
- Sports complexes
- Office buildings
- Lighting

Control Transformer Selection

Control transformer selection

To select the proper transformer, you must first determine three characteristics of the load circuit. They are: total steady-state (sealed) VA, total inrush VA, and inrush load power factor.

Total steady-state “sealed” VA is the total amount of VA that the transformer must supply to the load circuit for an extended length of time. Calculate by adding the total steady-state VA of all devices in your control circuit. *(The operating VA data for the devices should be available from the manufacturers.)*

The **inrush VA** is the amount of VA that the transformer must supply for all components in the control circuit that are energized together. Consideration for the start-up sequence may be required. *(Inrush VA data should be obtained from the device manufacturers.)*

The **inrush load power factor** is difficult to determine without detailed vector analysis of all the control components. In the absence of such information, we recommend that a 40% power factor be utilized.

Six easy steps

Once the three load circuit variables have been determined, follow these steps to select the proper transformer.

1. Determine your primary (supply) and secondary (output) voltage requirements, as well as the required frequency (i.e. 60 Hz).
2. Calculate the total sealed VA of your circuit by adding the total sealed VA of all devices in the control circuit.
3. Calculate the inrush VA by adding the inrush VA of all components being energized together. Remember to add the sealed VA of all components that do not have inrush VA (lamps, timers, etc.), as they do present a load to the transformer during maximum inrush. If the inrush for your components is unknown, assume a 40% inrush power factor.

$$A \quad \text{Total Inrush VA} = \sqrt{(VA \text{ sealed})^2 + (VA \text{ inrush})^2}$$

or

$$B \quad \text{Total Inrush VA} = VA \text{ Sealed} + VA \text{ Inrush}$$

4. Calculate the total inrush VA using one of two methods:
Method B will result in slightly larger transformer selected.
5. If the nominal supply voltage does not fluctuate more than 5%, then reference the 90% secondary voltage column in the Regulation Data Table for the correct VA rating.
If the supply voltage varies up to 10%, the 95% secondary voltage column should be used to size the transformer. The 85% secondary voltage column gives minimum values for proper electromagnetic device operation and should only be used as a reference.

6. Using the regulation data table below, select the appropriate VA rated transformer:
 - A. With a continuous VA rating that is equal to or greater than the value in Step 2.
 - B. With a maximum inrush VA equal to or greater than the value obtained in Step 4.

Note: See over-current protection chart for transformers at the end of this section.

HPS Imperator Transformer Regulation Data Table			
Continuous VA Transformer Nameplate	Inrush VA @ 40% Power Factor		
	85% Secondary Voltage	90% Secondary Voltage	95% Secondary Voltage
50	330	259	192
75	350	258	170
100	620	467	321
150	895	699	512
250	1596	1229	880
350	2464	1889	1345
500	3939	2854	1819
750	6422	4778	3228
1000	9842	7102	4530
1500	12797	9018	5489

Note: It is recommended that a control transformer be sized at a 40% power factor. Some components in a circuit, such as electromagnetic devices, typically operate at that level due to their inherently lower power factor. Selecting a transformer at 40% power factor will more than adequately size the unit for all the various loads in the circuit.

HPS Imperator™ 480x240 / 240x120 VAC Control Transformers Specifications

Features

- 600V class, machine tool rated industrial control transformers
- 50/60 Hertz
- VA range from 50 VA up to 1500 VA
- Constructed with high quality silicon steel laminations that provide optimum performance and reliability
- Encapsulated coils, encased in a custom injection molded cover, protect coils and terminations from moisture, dirt and other industrial airborne contaminants.

- Terminated with #8/32 slot/Phillips terminal screws complete with SEMS washer (suitable for 18 AWG to 14 AWG solid or 14 AWG stranded wire)
- Insulation system:
 - 50 - 150VA, temperature rise 55°C (131°F), insulation class 105°C (221°F),
 - 250 - 1500VA, temperature rise 80°C (176°F), insulation class 130°C (266°F)
- SEMS (standard machine screw with lock washer) standard
- Standard secondary fuse kits utilizing 13/32" x 1 1/2" midget class CC fuse clips included with all transformers.

Fuses are not included. (See Edison fuse section for HCTR fuses.)

- Optional primary fuse kits available utilizing 13/32" x 1 1/2" midget class CC fuse clips
- Optional finger-safe terminal covers
- LIFETIME warranty (limited to mfg. defects)

Agency Approvals

- UL Listed (approved for U.S. and Canada) File E50394
- CE Mark standard on all units
- RoHS Compliant



HPS Imperator 480x240/240x120 Control Transformer Specifications

Part Number	Wt/Lbs	Price	Volt-Amp Rating*	Mtg. Fig.	Output Current Amps	Primary Voltage (50/60Hz)	Secondary Voltage	Impedance %		Total Heat Dissipation (Watts)**
								VA	%z	
PH50MQMJ	3.50	<--->	50	A	0.42/0.21	240x480 230x460 220x440	120x240 115x230 110x220	50	8.3	11
PH75MQMJ	3.54	<--->	75	A	0.63/0.31			75	8.7	14
PH100MQMJ	4.50	<--->	100	A	0.83/0.42			100	8.4	14
PH150MQMJ	5.70	<--->	150	B	1.25/0.63			150	8.0	18
PH250MQMJ	7.50	<--->	250	B	2.08/1.04			250	7.8	29
PH350MQMJ	10.1	<--->	350	B	2.92/1.46			350	7.0	33
PH500MQMJ	14.2	<--->	500	B	4.17/2.08			500	5.0	40
PH750MQMJ	16.6	<--->	750	B	6.25/3.13			750	4.9	54
PH1000MQMJ	23.6	<--->	1000	B	8.33/4.17			1000	3.9	69
PH1500MQMJ	34.0	<--->	1500	B	12.5/6.25			1500	3.9	101

Note: *VA capacity rated at the output of the transformer.

** Heat dissipation calculated based on full rated load on transformer.

Dimensions

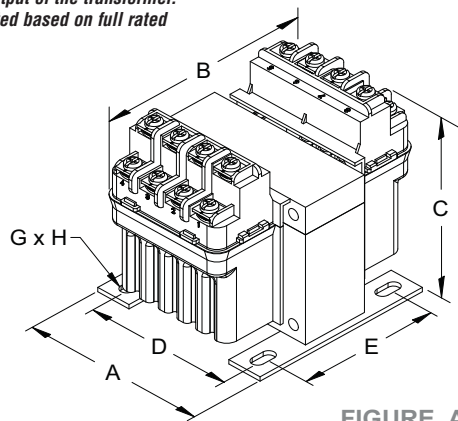


FIGURE A
(100VA and less)

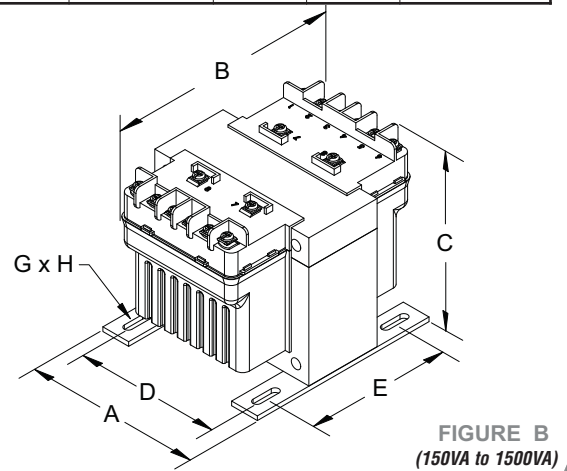


FIGURE B
(150VA to 1500VA)

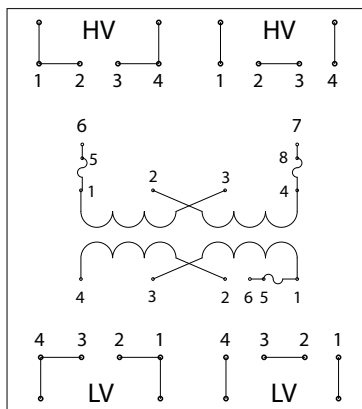
HPS Imperator 480x240/240x120 Control Transformer Dimensions

Part Number	Mtg. Fig.	Overall Dimensions inches (mm)			Mounting Centers inches (mm)		Mounting Slot inches (mm)	Height with Finger Guard inches (mm)	Depth with Finger Guard inches (mm)
		A	B	C	D	E			
PH50MQMJ	A	3.00 (76.2)	4.38 (111.3)	3.19 (81.0)	2.50 (63.5)	2.25 (57.2)	0.22 x 0.44 (5.6 x 11.2)	4.00 (101.6)	5.82 (147.8)
PH75MQMJ	A	3.25 (82.6)	3.88 (98.5)	3.56 (90.4)	2.63 (66.8)	2.50 (63.5)	0.22 x 0.44 (5.6 x 11.2)	4.37 (111.0)	5.32 (135.1)
PH100MQMJ	A	3.25 (82.6)	4.19 (106.4)	3.63 (92.2)	2.63 (66.8)	2.63 (66.8)	0.22 x 0.44 (5.6 x 11.2)	4.44 (112.8)	5.63 (143.0)
PH150MQMJ	B	4.00 (101.6)	4.94 (125.5)	3.81 (96.8)	3.38 (85.9)	2.75 (69.9)	0.22 x 0.75 (5.6 x 19.1)	4.31 (109.5)	6.44 (163.6)
PH250MQMJ	B	4.50 (114.3)	5.44 (138.2)	3.81 (96.8)	3.75 (95.3)	3.13 (79.5)	0.22 x 0.75 (5.6 x 19.1)	4.31 (109.5)	6.94 (176.3)
PH350MQMJ	B	4.50 (114.3)	5.19 (131.8)	4.44 (112.8)	3.75 (95.3)	3.75 (95.3)	0.22 x 0.75 (5.6 x 19.1)	4.94 (125.5)	6.69 (169.9)
PH500MQMJ	B	4.75 (120.7)	5.94 (150.9)	4.31 (109.5)	4.06 (103.1)	3.81 (96.8)	0.31 x 0.94 (7.9 x 23.9)	4.81 (122.2)	7.44 (189.0)
PH750MQMJ	B	5.13 (130.3)	6.69 (169.9)	4.31 (109.5)	4.38 (111.3)	4.31 (109.5)	0.31 x 0.81 (7.9 x 20.6)	4.81 (122.2)	8.19 (208.1)
PH1000MQMJ	B	5.25 (133.4)	6.81 (173.0)	4.94 (125.5)	4.50 (114.3)	4.44 (112.8)	0.31 x 0.81 (7.9 x 20.6)	5.44 (138.2)	8.31 (211.1)
PH1500MQMJ	B	5.25 (133.4)	8.19 (208.0)	4.94 (125.5)	4.50 (114.3)	6.06 (153.9)	0.38 x 1.00 (9.7 x 25.4)	5.44 (138.2)	9.69 (246.1)

Note: All dimensions are ±0.06 inches unless otherwise noted.

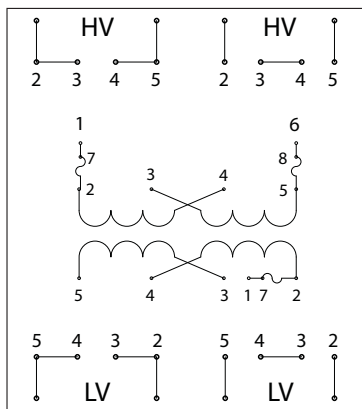
HPS Imperator™ 480x240 / 240x120 VAC Control Transformers Wiring Specifications

Wiring



PH***MQMJ Schematic for 50, 75 and 100VA Units

High Voltage (HV) (Primary Volts)	Install Jumpers/Links Between Lines	Supply Lines Connect To	Install Fuse Clips To
240 230 220	1-2, 3-4	1, 4	
480 460 440	2-3	1, 4	
240 230 220	1-2, 3-4	6, 7	1-5, 4-8
480 460 440	2-3	6, 7	1-5, 4-8
Low Voltage (LV) (Secondary Volts)	Install Jumpers/Links Between Lines	Load Lines Connect To	Install Fuse Clips To
120 115 110	3-4, 1-2	1, 4	
240 230 220	2-3	1, 4	
120 115 110	3-4, 1-2	4, 6	1-5
240 230 220	2-3	4, 6	1-5



PH***MQMJ Schematic for 150VA to 1500VA Units

High Voltage (HV) (Primary Volts)	Install Jumpers/Links Between Lines	Supply Lines Connect To	Install Fuse Clips To
240 230 220	2-3, 4-5	2, 5	
480 460 440	3-4	2, 5	
240 230 220	2-3, 4-5	1, 6	2-7, 5-8
480 460 440	3-4	1, 6	2-7, 5-8
Low Voltage (LV) (Secondary Volts)	Install Jumpers/Links Between Lines	Load Lines Connect To	Install Fuse Clips To
120 115 110	4-5, 2-3	2, 5	
240 230 220	3-4	2, 5	
120 115 110	4-5, 2-3	1, 5	2-7
240 230 220	3-4	1, 5	2-7

Notes

- FUSES NOT INCLUDED (see Edison fuse section for HCTR fuses).
- Secondary fuse clips supplied but not installed. Order fuses and primary fuse clips separately.
- Jumper links to make primary/secondary series/parallel connections supplied, but not installed.

HPS Imperator™ 380x277x208 / 240x120 VAC Control Transformers Specifications

Features

- 600V class, machine tool rated industrial control transformers
- 50/60 Hertz
- VA range from 50 VA up to 500 VA
- Constructed with high quality silicon steel laminations that provide optimum performance and reliability
- Encapsulated coils, encased in a custom injection molded cover, protect coils and terminations from moisture, dirt and other industrial airborne contaminants.

- Terminated with #8/32 slot/Phillips terminal screws complete with SEMS washer (suitable for 18 AWG to 14 AWG solid or 14 AWG stranded wire)
- Insulation system:
 - 50 - 150VA, temperature rise 55°C (131°F), insulation class 105°C (221°F),
 - 250 - 500VA, temperature rise 80°C (176°F), insulation class 130°C (266°F)
- SEMS (standard machine screw with lock washer) standard
- Standard secondary fuse kits utilizing 13/32" x 1 1/2" midget class CC fuse clips included with all transformers.

Fuses are not included. (See Edison fuse section for HCTR fuses.)

- Optional primary fuse kits available utilizing 13/32" x 1 1/2" midget class CC fuse clips
 - Optional finger-safe terminal covers
 - LIFETIME warranty (limited to mfg. defects)
- ## Agency Approvals
- UL Listed (approved for U.S. and Canada) File E50394
 - CE Mark standard on all units
 - RoHS Compliant



HPS Imperator 380x277x208/240x120 Control Transformer Specifications

Part Number	Wt/Lbs	Price	Volt-Amp Rating*	Mtg. Fig.	Output Current Amps	Primary Voltage (50/60Hz)	Secondary Voltage	Impedance %		Total Heat Dissipation (Watts)**
								VA	%Z	
PH50MGJ	3.5	<--->	50	A	0.42/0.21	208x277x380	120x240	50	8.3	11
PH75MGJ	4.5	<--->	75	A	0.63/0.31			75	8.7	14
PH100MGJ	5.2	<--->	100	A	0.83/0.42			100	8.4	14
PH150MGJ	7.6	<--->	150	B	1.25/0.63			150	8.0	18
PH250MGJ	8.3	<--->	250	B	2.08/1.04			250	7.8	29
PH350MGJ	11.0	<--->	350	B	2.92/1.46			350	7.0	33
PH500MGJ	16.3	<--->	500	B	4.17/2.08			500	5.0	40

Note: *VA capacity rated at the output of the transformer.

** Heat dissipation calculated based on full rated load on transformer.

Dimensions

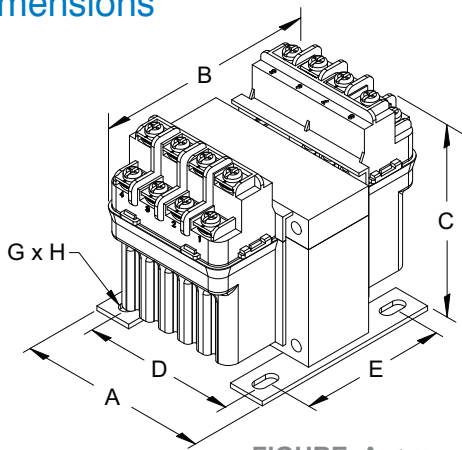


FIGURE A (100VA and less)

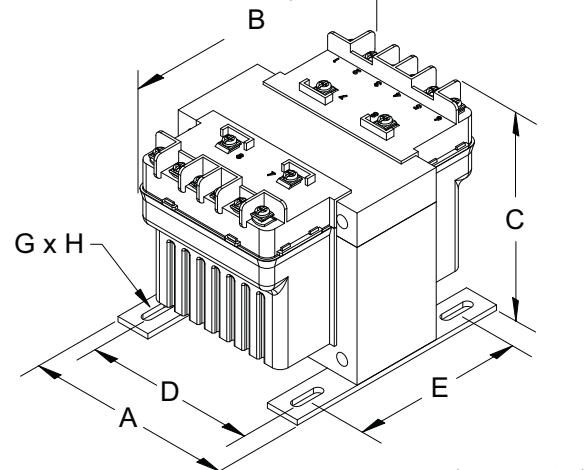


FIGURE B (150VA to 500VA)

HPS Imperator 380x277x208/240x120 Control Transformer Dimensions

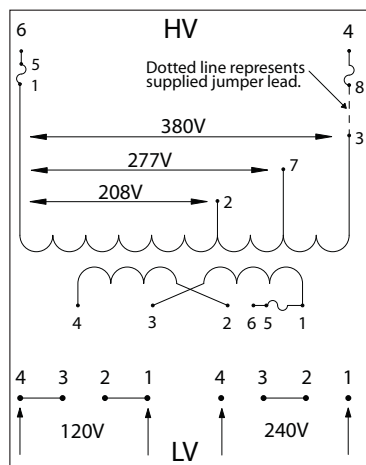
Part Number	Mtg. Fig.	Overall Dimensions inches (mm)			Mounting Centers inches (mm)		Mounting Slot inches (mm)	Height with Finger Guard, inches (mm)	Depth with Finger Guard inches (mm)
		A	B	C	D	E	G X H		
PH50MGJ	A	3.25 (82.6)	3.88 (98.6)	3.56 (90.4)	2.63 (66.8)	2.50 (63.5)	0.22 x 0.44 (5.6 x 11.2)	4.37 (111.0)	5.32 (135.1)
PH75MGJ	A	3.25 (82.6)	4.19 (106.4)	3.63 (92.2)	2.63 (66.8)	2.63 (66.8)	0.22 x 0.44 (5.6 x 11.2)	4.44 (112.8)	5.63 (143.0)
PH100MGJ	A	3.25 (82.6)	4.69 (119.1)	3.63 (92.2)	2.63 (66.8)	2.63 (66.8)	0.22 x 0.44 (5.6 x 11.2)	4.44 (112.8)	6.13 (155.7)
PH150MGJ	B	4.00 (101.6)	5.44 (138.2)	3.81 (96.8)	3.38 (85.9)	2.75 (69.9)	0.22 x 0.75 (5.6 x 19.1)	4.50 (114.3)	6.94 (176.3)
PH250MGJ	B	4.50 (114.3)	4.88 (124.0)	4.44 (112.8)	3.75 (95.3)	3.75 (95.3)	0.22 x 0.75 (5.6 x 19.1)	4.94 (125.5)	6.38 (162.1)
PH350MGJ	B	4.50 (114.3)	5.56 (141.2)	4.44 (112.8)	3.75 (95.3)	3.75 (95.3)	0.22 x 0.75 (5.6 x 19.1)	4.94 (125.5)	7.06 (179.3)
PH500MGJ	B	4.75 (120.7)	6.69 (169.9)	4.31 (109.5)	4.06 (103.1)	4.50 (114.3)	0.31 x 0.94 (7.9 x 23.9)	4.81 (122.2)	8.19 (208.0)

Note: All dimensions are ±0.06 inches unless otherwise noted.

HPS Imperator™ 380x277x208 / 240x120 VAC Control Transformers Wiring Specifications

Wiring

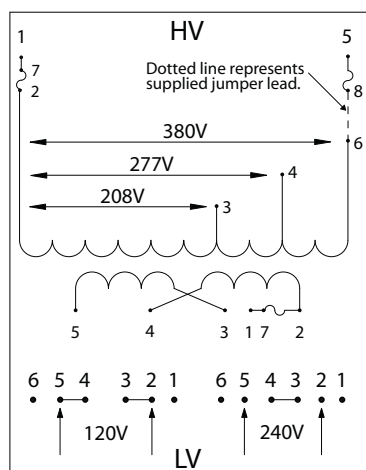
PH***MGJ Schematic for 50, 75 and 100VA Units



High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
380	None	1, 3	Unfused
277	None	1, 7	Unfused
208	None	1, 2	Unfused
380	3-8	6, 4	1-5, 4-8
277	8-7	6, 4	1-5, 4-8
208	2-8	6, 4	1-5, 4-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	3-4, 1-2	1, 4	Unfused
240	2-3	1, 4	Unfused
120	3-4, 1-2	4, 6	1-5
240	2-3	4, 6	1-5

PH***MGJ Schematic for 150VA to 1000VA Units



High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
380	None	2, 6	Unfused
277	None	2, 4	Unfused
208	None	2, 3	Unfused
380	8-6	1, 5	2-7, 5-8
277	4-8	1, 5	2-7, 5-8
208	3-8	1, 5	2-7, 5-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	4-5, 2-3	2, 5	Unfused
240	3-4	2, 5	Unfused
120	4-5, 2-3	1, 5	2-7
240	3-4	1, 5	2-7

Notes

- **FUSES NOT INCLUDED** (see Edison fuse section for HCTR fuses).
- Secondary fuse clips supplied but not installed. Order fuses and primary fuse clips separately.
- Jumper links to make primary/secondary series/parallel connections supplied, but not installed.

HPS Imperator™ 240x120 / 24x12 VAC Control Transformers Specifications

Features

- 600V class, machine tool rated industrial control transformers
- 50/60 Hertz
- VA range from 50 VA up to 1000 VA
- Constructed with high quality silicon steel laminations that provide optimum performance and reliability
- Encapsulated coils, encased in a custom injection molded cover, protect coils and terminations from moisture, dirt and other industrial airborne contaminants.

- Terminated with #8/32 slot/Phillips terminal screws complete with SEMS washer (suitable for 18 AWG to 14 AWG solid or 14 AWG stranded wire).
- Insulation system:
 - 50 - 150VA, temperature rise 55°C (131°F), insulation class 105°C (221°F),
 - 250 - 1000VA, temperature rise 80°C (176°F), insulation class 130°C (266°F)
- SEMS (standard machine screw with lock washer) standard (not on PH750PG or PH1000PG)
- Standard secondary fuse kits utilizing 13/32" x 1 1/2" midget class CC fuse clips included with all transformers.

Fuses are not included. (See Edison fuse section for HCTR fuses.)

- Optional primary fuse kits available utilizing 13/32" x 1 1/2" midget class CC fuse clips
- Optional finger-safe terminal covers
- LIFETIME warranty (limited to mfg. defects)

Agency Approvals

- UL Listed (approved for U.S. and Canada) File E50394
- CE Mark standard on all units
- RoHS Compliant



HPS Imperator 240x120/24x12 Control Transformer Specifications

Part Number	Wt/Lbs	Price	Volt-Amp Rating*	Mtg. Fig.	Output Current Amps	Primary Voltage (50/60Hz)	Secondary Voltage	Impedance %		Total Heat Dissipation (Watts)**
								VA	%Z	
PH50PG	3.5	<--->	50	A	0.417/2.08	120x240 115x230 110x220	12x24 11.5x23 11x22	50	8.3	11
PH75PG	3.5	<--->	75	A	6.25/3.13			75	8.7	14
PH100PG	4.5	<--->	100	A	8.33/4.17			100	8.4	14
PH150PG	5.7	<--->	150	B	12.5/6.25			150	8.0	18
PH250PG	7.5	<--->	250	B	20.8/10.4			250	7.8	29
PH350PG	10.1	<--->	350	B	29.2/14.6			350	7.0	33
PH500PG	14.2	<--->	500	B	41.7/20.8			500	5.0	40
PH750PG	16.6	<--->	750	B	62.5/31.3			750	4.9	54
PH1000PG	23.6	<--->	1000	B	83.3/41.7			1000	3.9	69

Note: *VA capacity rated at the output of the transformer.

** Heat dissipation calculated based on full rated load on transformer.

Dimensions

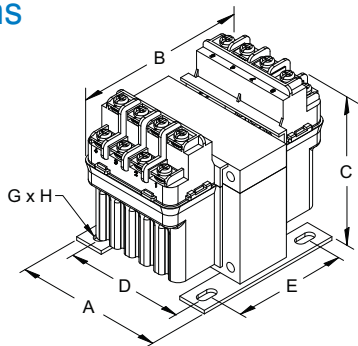


FIGURE A (100VA and less)

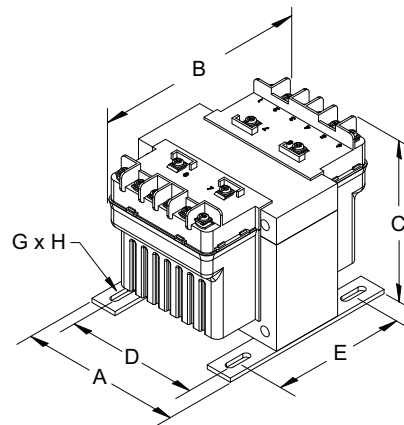


FIGURE B (150VA to 1000VA)

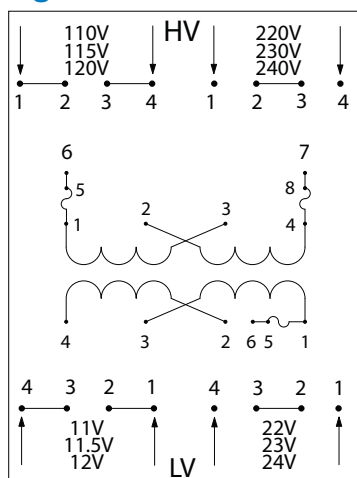
HPS Imperator 240x120/24x12 Control Transformer Dimensions

Part Number	Mtg. Fig.	Overall Dimensions inches (mm)			Mounting Centers inches (mm)		Mounting Slot inches (mm)	Height with Finger Guard, inches (mm)	Depth with Finger Guard inches (mm)
		A	B	C	D	E	G X H		
PH50PG	A	3.00 (76.2)	4.38 (111.3)	3.19 (81.0)	2.50 (63.5)	2.25 (57.2)	0.22 x 0.44 (5.6 x 11.2)	4.00 (101.6)	5.82 (147.8)
PH75PG	A	3.25 (82.6)	3.88 (85.9)	3.56 (90.4)	2.63 (66.8)	2.50 (63.5)	0.22 x 0.44 (5.6 x 11.2)	4.37 (111.0)	5.32 (135.1)
PH100PG	A	3.25 (82.6)	4.19 (106.4)	3.63 (92.2)	2.63 (66.8)	2.63 (66.8)	0.22 x 0.44 (5.6 x 11.2)	4.44 (112.8)	5.63 (143.0)
PH150PG	B	4.00 (101.6)	4.94 (125.5)	3.81 (96.8)	3.38 (85.9)	2.75 (69.9)	0.22 x 0.75 (5.6 x 19.1)	4.31 (109.5)	6.44 (163.6)
PH250PG	B	4.50 (114.3)	5.44 (138.2)	3.81 (96.8)	3.75 (95.3)	3.13 (79.5)	0.22 x 0.75 (5.6 x 19.1)	4.31 (109.5)	6.94 (176.3)
PH350PG	B	4.50 (114.3)	5.19 (131.8)	4.44 (112.8)	3.75 (95.3)	3.75 (95.3)	0.22 x 0.75 (5.6 x 19.1)	4.94 (125.5)	6.69 (169.9)
PH500PG	B	4.75 (120.7)	5.94 (150.9)	4.31 (109.5)	4.06 (103.1)	3.81 (96.8)	0.31 x 0.94 (7.9 x 23.9)	4.81 (122.2)	7.44 (189.0)
PH750PG	B	5.13 (130.3)	6.69 (169.9)	4.31 (109.5)	4.38 (111.3)	4.31 (109.5)	0.31 x 0.81 (7.9 x 20.6)	4.81 (122.2)	8.19 (208.1)
PH1000PG	B	5.25 (133.4)	6.81 (173.0)	4.94 (125.5)	4.50 (114.3)	4.44 (112.8)	0.31 x 0.81 (7.9 x 20.6)	5.44 (138.2)	8.31 (211.1)

Note: All dimensions are ±0.06 inches unless otherwise noted.

HPS Imperator™ 240x120 / 24x12 VAC Control Transformers Wiring Specifications

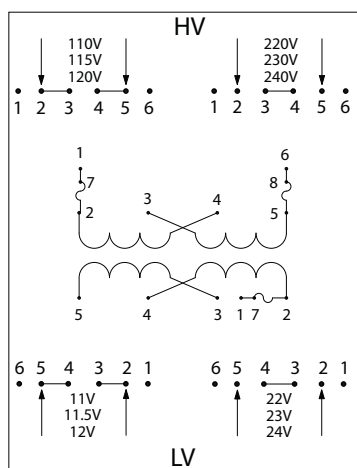
Wiring



PH***PG Schematic for 50, 75 and 100VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Links Between Terminals	Supply Lines Connect To	Install Fuse Clips To
120 115 110	1-2, 3-4	1, 4	Unfused
240 230 220	2-3	1, 4	Unfused
120 115 110	1-2, 3-4	6, 7	1-5, 4-8
240 230 220	2-3	6, 7	1-5, 4-8

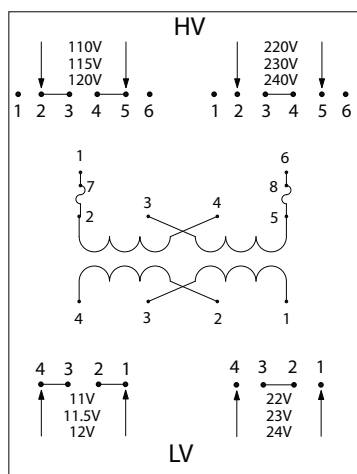
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
12 11.5 11	3-4, 1-2	1, 4	Unfused
24 23 22	2-3	1, 4	Unfused
12 11.5 11	3-4, 1-2	4, 6	1-5
24 23 22	2-3	4, 6	1-5



PH***PG Schematic for 150VA to 500VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Links Between Terminals	Supply Lines Connect To	Install Fuse Clips To
120 115 110	2-3, 4-5	2, 5	Unfused
240 230 220	3-4	2, 5	Unfused
120 115 110	2-3, 4-5	1, 6	2-7, 5-8
240 230 220	3-4	1, 6	2-7, 5-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
12 11.5 11	4-5, 2-3	2, 5	Unfused
24 23 22	3-4	2, 5	Unfused
12 11.5 11	4-5, 2-3	1, 5	2-7
24 23 22	3-4	1, 5	2-7



PH***PG Schematic for 750VA and 1000VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Links Between Terminals	Supply Lines Connect To	Install Fuse Clips To
120 115 110	2-3, 4-5	2, 5	Unfused
240 230 220	3-4	2, 5	Unfused
120 115 110	2-3, 4-5	1, 6	2-7, 5-8
240 230 220	3-4	1, 6	2-7, 5-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
12 11.5 11	3-4, 1-2	1, 4	Unfused
24 23 22	2-3	1, 4	Unfused

Note: secondary fuse clips not available on PH750PG or PH1000PG.

Notes

- - FUSES NOT INCLUDED (see Edison fuse section for HCTR fuses).
- Jumper links to make primary/secondary series/parallel connections supplied, but not installed.
- Secondary fuse clips supplied but not installed. Order fuses and primary fuse clips separately.

HPS Imperator™ 480x240 / 120x25 VAC Control Transformers Specifications

Features

- 600V class, machine tool rated industrial control transformers
- 50/60 Hertz
- VA range from 50 VA up to 500 VA
- Constructed with high quality silicon steel laminations that provide optimum performance and reliability
- Encapsulated coils, encased in a custom injection molded cover, protect coils and terminations from moisture, dirt and other industrial airborne contaminants.

- Terminated with #8/32 slot/Phillips terminal screws complete with SEMS washer (suitable for 18 AWG to 14 AWG solid or 14 AWG stranded wire)
- Insulation system:
 - 50 - 150VA, temperature rise 55°C (131°F), insulation class 105°C (221°F),
 - 250 - 500VA, temperature rise 80°C (176°F), insulation class 130°C (266°F)
- SEMS (standard machine screw with lock washer) standard
- Standard secondary fuse kits utilizing 13/32" x 1 1/2" midget class CC fuse clips included with all transformers.

Fuses are not included. (See Edison fuse section for HCTR fuses.)

- Optional primary fuse kits available utilizing 13/32" x 1 1/2" midget class CC fuse clips
- Optional finger-safe terminal covers
- LIFETIME warranty (limited to mfg. defects)

Agency Approvals

- UL Listed (approved for U.S. and Canada) File E50394
- CE Mark standard on all units
- RoHS Compliant



HPS Imperator 480x240/120x25 Control Transformer Specifications										
Part Number	Wt/Lbs	Price	Volt-Amp Rating*	Mtg. Fig.	Output Current Amps	Primary Voltage (50/60Hz)	Secondary Voltage	Impedance %		Total Heat Dissipation (Watts)**
								VA	%Z	
PH50MLI	4.0	<--->	50	A	0.43/2.08	240x480 208x230x460 200x220x440	25x120 24x115 23x110	50	8.3	11
PH100MLI	5.2	<--->	100	A	0.87/4.17			100	8.4	14
PH250MLI	10.1	<--->	250	B	2.17/10.42			250	7.8	29
PH350MLI	11.0	<--->	350	B	3.04/14.58			350	7.0	33
PH500MLI	16.3	<--->	500	B	4.35/20.83			500	5.0	40

Note: *VA capacity rated at the output of the transformer.

** Heat dissipation calculated based on full rated load on transformer.

Dimensions

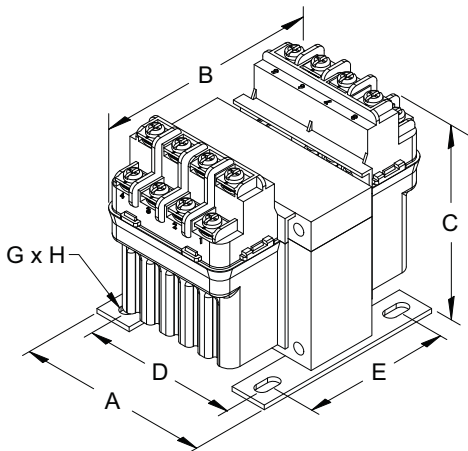


FIGURE A (100VA and less)

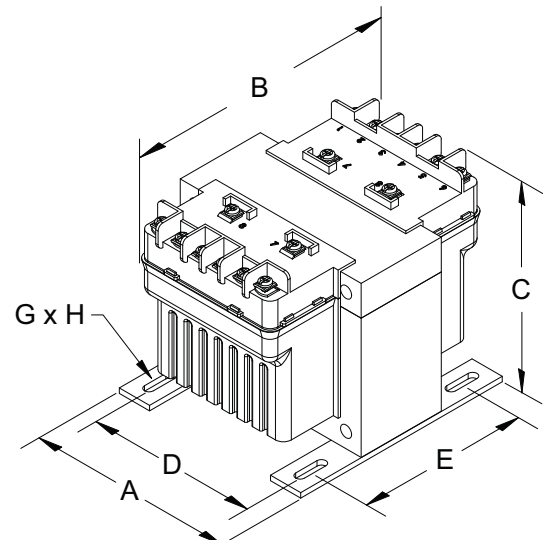


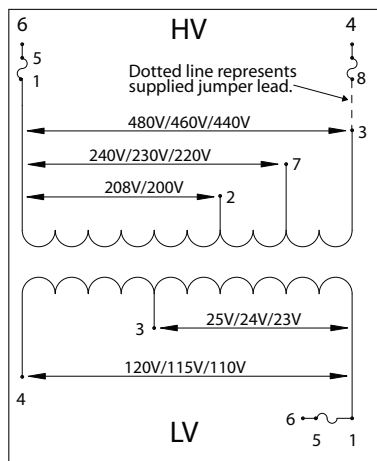
FIGURE B (150VA to 500VA)

HPS Imperator 480x240/120x25 Control Transformer Dimensions									
Part Number	Mtg. Fig.	Overall Dimensions inches (mm)			Mounting Centers inches (mm)		Mounting Slot inches (mm)	Height with Finger Guard, inches (mm)	Depth with Finger Guard inches (mm)
		A	B	C	D	E	G X H		
PH50MLI	A	3.25 (82.6)	4.06 (103.1)	3.56 (90.4)	2.63 (66.8)	2.50 (63.5)	0.22 x 0.44 (5.6 x 11.2)	4.37 (111.0)	5.32 (135.1)
PH100MLI	A	3.25 (82.6)	4.69 (119.1)	3.63 (92.2)	2.63 (66.8)	2.63 (66.8)	0.22 x 0.44 (5.6 x 11.2)	4.44 (112.8)	6.13 (155.7)
PH250MLI	B	4.50 (114.3)	5.19 (131.8)	4.44 (112.8)	3.75 (95.3)	3.75 (95.3)	0.22 x 0.75 (5.6 x 19.1)	4.94 (125.5)	6.38 (162.1)
PH350MLI	B	4.50 (114.3)	5.56 (141.2)	4.44 (112.8)	3.75 (95.3)	3.75 (95.3)	0.22 x 0.75 (5.6 x 19.1)	4.94 (125.5)	7.06 (179.3)
PH500MLI	B	4.75 (120.7)	6.69 (169.9)	4.31 (109.5)	4.06 (103.1)	4.50 (114.3)	0.31 x 0.94 (7.9 x 23.9)	4.81 (122.2)	8.19 (208.0)

Note: All dimensions are ±0.06 inches unless otherwise noted.

HPS Imperator™ 480x240 / 120x25 VAC Control Transformers Wiring Specifications

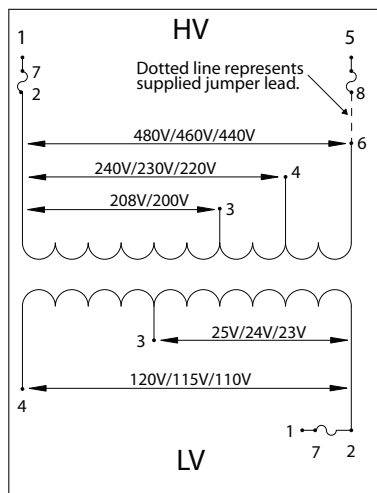
Wiring



PH***MLI Schematic for 50, 75 and 100VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
480 460 440	None	1, 3	Unfused
240 230 220	None	1, 7	Unfused
208 200	None	1, 2	Unfused
480 460 440	3-8	6, 4	1-5, 4-8
240 230 220	8-7	6, 4	1-5, 4-8
208 200	2-8	6, 4	1-5, 4-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Jumpers Between Terminals	Load Lines Connect To	Install Fuse Clips To
120 115 110	None	1, 4	Unfused
25 24 23	None	1, 3	Unfused
120 115 110	None	4, 6	1-5
25 24 23	None	3, 6	1-5



PH***MLI Schematic for 150VA to 500VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
480 460 440	None	2, 6	Unfused
240 230 220	None	2, 4	Unfused
208 200	None	2, 3	Unfused
480 460 440	8-6	1, 5	2-7, 5-8
240 230 220	4-8	1, 5	2-7, 5-8
208 200	3-8	1, 5	2-7, 5-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Jumpers Between Terminals	Load Lines Connect To	Install Fuse Clips To
120 115 110	None	2, 4	Unfused
25 24 23	None	2, 3	Unfused
120 115 110	None	1, 4	2-7
25 24 23	None	1, 3	2-7

Notes

- FUSES NOT INCLUDED (see Edison fuse section for HCTR fuses).
- Secondary fuse clips supplied but not installed. Order fuses and primary fuse clips separately.
- Jumper links to make primary/secondary series/parallel connections supplied, but not installed.
- Transformers secondary is NOT designed for dual voltages. Secondary voltage is either 25/24/23V or 120/115/110V.

HPS Imperator™ Transformers

Accessories – Terminal Covers and Fuse Kits

Finger-safe terminal covers

These one-piece molded terminal covers are a quick and easy way to provide safety and protection in the workplace. They protect operators from potential shock hazards and guard against accidental contact with the fuses.

Fuse Kits

These optional primary side fuse kits contain four fuse clips, four mounting screws, and complete instructions.

The table below makes it easy to choose the correct terminal covers and fuse kits for your Hammond control transformer.

Transformer	Finger-Safe Terminal Covers				Primary Side Fuse Kits		
Part Number	Part Number	Pcs/Pkg	Price	Description.	Part Number	Pcs/Pkg	Price
PH50MQMJ PH50PG	FG1	1 cover	<---	Finger-safe cover for 50VA unfused control transformers. Cover fits primary side or secondary side.	PFK1	4 fuse clips, 4 mounting screws	<---
	FGF1	1 cover	<---	Finger-safe cover for 50VA fused control transformers. Cover fits primary side or secondary side.			
PH75MQMJ PH75PG	FG2	1 cover	<---	Finger-safe cover for 75VA and 100VA unfused control transformers. Cover fits primary side or secondary side.			
PH75MQMJ PH75PG PH100MQMJ PH100PG	FGF2	1 cover	<---	Finger-safe cover for 75VA and 100VA fused control transformers. Cover fits primary side or secondary side.			
PH150MQMJ PH150PG PH250MQMJ PH250PG	FG3	1 cover	<---	Finger-safe cover for 150VA and 250VA fused and unfused control transformers. Cover fits primary side or secondary side.	PFK2	4 fuse clips, 4 mounting screws	<---
PH350MQMJ PH350PG PH500MQMJ PH500PG PH750MQMJ	FG4	1 cover	<---	Finger-safe cover for 350VA and 500VA fused and unfused control transformers. Also for use with PH750MQMJ. Cover fits primary side or secondary side.	PFK3	4 fuse clips, 4 mounting screws	<---
PH1000MQMJ PH750PG PH1500MQMJ PH1000PG	FG5	1 cover	<---	Finger-safe cover for 750VA (PH750PG only), 1kVA and 1.5kVA fused and unfused control transformers. Cover fits primary side or secondary side.		4 fuse clips, 4 mounting screws	<---
PH50MLI PH50MGJ	FG1	1 cover	<---	Finger-safe cover for 50VA unfused control transformers. Cover fits primary side or secondary side.	PFK4	4 fuse clips, 4 mounting screws 1 cover	<---
	FGF1	1 cover	<---	Finger-safe cover for 50VA fused control transformers. Cover fits primary side or secondary side.			
PH100MGJ PH100MLI	FG2	1 cover	<---	Finger-safe cover for 75VA and 100VA unfused control transformers. Cover fits primary side or secondary side.	PFK5	4 fuse clips, 4 mounting screws 1 cover	<---
	FGF2	1 cover	<---	Finger-safe cover for 75VA and 100VA fused control transformers. Cover fits primary side or secondary side.			
PH150MGJ	FG3	1 cover	<---	Finger-safe cover for 150VA fused and unfused control transformers. Cover fits primary side or secondary side.	PFK6	4 fuse clips, 4 mounting screws	<---
PH250MGJ PH250MLI PH350MJG PH500MJG PH350MLI PH500MLI	FG4	1 cover	<---	Finger-safe cover for 350VA and 500VA fused and unfused control transformers. Also for use with PH750MQMJ. Cover fits primary side or secondary side.	PFK7	4 fuse clips, 4 mounting screws	<---

1. Torque all terminal screws between 12 and 14 in-lbs.

2. For all bare wire connections, the recommended wire size range is 18 AWG to 14 AWG for solid wire, and 14 AWG for stranded. A ring or spade connector must be used if using a wire size outside the range listed above.

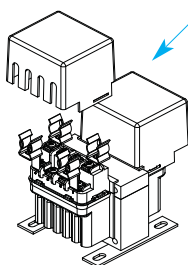
3. Ensure mounting screws used for transformer installation (not supplied) are properly sized for transformer weight.

4. When mounting fuse clips, remove the appropriate captive washer screw(s) from terminal block and install fuse clip(s) and new terminal screw(s).

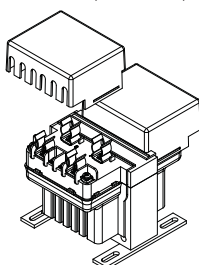
5. Please refer to wiring instructions included with the Hammond control transformer for connection details.

Finger-safe Cover accessories

Sample Assembly Drawing for Finger Guard Installation (for 50, 75 and 100VA)

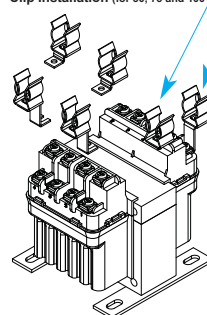


Sample Assembly Drawing for Finger Guard Installation (for 150VA to 1500VA)

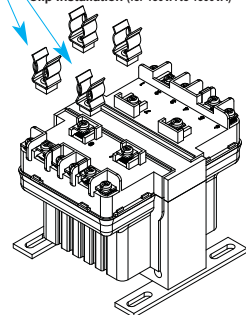


Fuse Clips accessories

Sample Assembly Drawing for Fuse Clip Installation (for 50, 75 and 100VA)



Sample Assembly Drawing for Fuse Clip Installation (for 150VA to 1500VA)



Standard secondary fuse kits utilizing 13/32" x 1 1/2" midjet class CC fuse clips included with all transformers. Fuses are not included. (See Edison fuse section for HCTR fuses.)

Recommendations for Overcurrent Protection UL and CSA (North American) Standards

UL and CSA (North American) Standards

North American standards, including UL 508, National Electric Code 450, and the Canadian Electrical Code, Part 1, require overcurrent protection on all control circuit transformers. There are two options for overcurrent protection:

Option 1 (Primary only Protection)

Provide an overcurrent device in the primary circuit rated to the current of the transformer. The overcurrent limits are as follows:

- Primary 9 Amps or more: no more than 125% of rated current
- Primary 2 to 9 Amps: no more than 167% of rated current
- Primary less than 2 Amps: no more than 300% of rated current for power circuits; no more than 500% of rated current for control circuits

Note: This method is considered less desirable, as start-up inrush to the transformer can frequently surpass the current rating of the device and result in nuisance interruptions.

Option 2 (Primary and Secondary Protection)

The second option is to install overcurrent devices in both the primary and secondary circuits of the transformer. In this option, the secondary device must be rated no more than 125% of rated current of the transformer and the primary no more than 250%. The Canadian Electrical Code permits 300% overcurrent on the primary for this option.

In both options listed, it is recommended that time delay fuses be considered to avoid unnecessary interruptions.

REFERENCES:

UL 508
UL 845
NEC 430-72
NEC 450-3
CEC Part 1, 26-256

Recommendations for Overcurrent Protection UL and CSA (North American) Standards, continued

PRIMARY (UL and CSA)

To assist in the selection of fuses, the following chart recommends the maximum primary fuse rating in amperes. The first number shown is the maximum overcurrent protection when the primary current is less than 2 amps and the overcurrent protection device is rated for 300%. The second number (shown in brackets) is recommended when the primary is less than 2 amps and the overcurrent device is to be rated at 500% of rated current. Where only one number is indicated, the primary is 2 amps or more and one rating of overcurrent protection is shown as optimal. Choose the next higher fuse rating if these numbers do not correspond with standard fuse selections.

HCTR Current Limiting Class CC Fuses				
Part Number	AMP Rating	Pcs/Pkg	Weight	Price
HCTR-25	0.25	10/1	0.2 lb	<--->
HCTR-5	0.5	10/1	0.2 lb	<--->
HCTR-75	0.75	10/1	0.2 lb	<--->
HCTR1	1	10/1	0.2 lb	<--->
HCTR1-25	1.25	10/1	0.2 lb	<--->
HCTR1-5	1.5	10/1	0.2 lb	<--->
HCTR2	2	10/1	0.2 lb	<--->
HCTR2-5	2.5	10/1	0.2 lb	<--->
HCTR3	3	10/1	0.2 lb	<--->
HCTR3-5	3.5	10/1	0.2 lb	<--->
HCTR4	4	10/1	0.2 lb	<--->
HCTR5	5	10/1	0.2 lb	<--->
HCTR6	6	10/1	0.2 lb	<--->
HCTR7-5	7.5	10/1	0.2 lb	<--->
HCTR8	8	10/1	0.2 lb	<--->
HCTR10	10	10/1	0.2 lb	<--->
HCTR15	15	10/1	0.2 lb	<--->
HCTR20	20	10/1	0.2 lb	<--->
HCTR25	25	10/1	0.2 lb	<--->
HCTR30	30	10/1	0.2 lb	<--->

Note: See HCTR fuse catalog page for characteristic curves.

Recommended Maximum Primary Fuse Ratings in Amps Where Primary Current is less than 2 Amps.

Primary Voltage	Overload Protection	Hammond Transformers VA RATING													
		50	75	100	150	250	350	500	750	1000	1500	2000	3000	5000	
115	300%	1.25	1.8	2.5	3.5	4.0	5.0	8.0	10.0	15.0	20.0	25.0	—	—	
	500%	(2.0)	(3.2)	(4.0)	(6.5)	—	—	—	—	—	—	—	—	—	
120	300%	1.25	1.8	2.25	3.5	4.0	5.0	8.0	10.0	15.0	15.0	20.0	—	—	
	500%	(2.0)	(3.2)	(4.0)	(6.5)	—	—	—	—	—	—	—	—	—	
220	300%	0.6	1.0	1.25	2.0	3.2	4.5	4.0	6.0	8.0	12.0	15.0	20.0	30.0	
	500%	(1.125)	(1.6)	(2.25)	(3.2)	(5.6)	(7.5)	—	—	—	—	—	—	—	
208	300%	0.6	1.0	1.4	2.0	3.5	5.0	4.0	6.0	8.0	12.0	15.0	20.0	30.0	
	500%	(1.125)	(1.8)	(2.25)	(3.5)	(6.0)	(8.0)	—	—	—	—	—	—	—	
230	300%	0.6	0.8	1.25	1.8	3.2	4.5	4.0	6.0	8.0	10.0	15.0	20.0	30.0	
	500%	(1.0)	(1.6)	(2.0)	(3.2)	(5.0)	(7.5)	—	—	—	—	—	—	—	
240	300%	0.6	0.8	1.25	1.8	3.0	4.0	3.5	5.0	7.0	10.0	15.0	15.0	30.0	
	500%	(1.0)	(1.5)	(2.0)	(3.0)	(5.0)	(7.0)	—	—	—	—	—	—	—	
277	300%	0.5	0.8	1.0	1.6	2.5	3.5	5.0	5.0	6.0	9.0	12.0	15.0	25.0	
	500%	(0.8)	(1.25)	(1.8)	(4.5)	(6.25)	(9.0)	—	—	—	—	—	—	—	
380	300%	0.3	0.5	0.75	1.125	1.8	2.5	3.5	5.6	4.5	6.25	9.0	15.0	20.0	
	500%	(0.6)	(0.8)	(1.25)	(1.8)	(3.2)	(4.5)	(6.25)	(9.0)	—	—	—	—	—	
440	300%	0.3	0.5	0.6	1.0	1.6	2.25	3.2	5.0	4.0	6.0	8.0	12.0	15.0	
	500%	(0.5)	(0.8)	(1.125)	(1.6)	(2.8)	(3.5)	(5.6)	(8.0)	—	—	—	—	—	
460	300%	0.3	0.4	0.6	0.8	1.6	2.25	3.2	4.5	3.5	6.0	8.0	12.0	15.0	
	500%	(0.5)	(0.8)	(1.0)	(1.6)	(2.5)	(3.5)	(5.0)	(8.0)	—	—	—	—	—	
480	300%	0.3	0.4	0.6	0.8	1.5	2.0	3.0	4.5	3.5	5.0	7.0	10.0	15.0	
	500%	(0.5)	(0.75)	(1.0)	(1.5)	(2.5)	(3.5)	(5.0)	(7.5)	—	—	—	—	—	

Recommendations for Overcurrent Protection UL and CSA (North American) Standards, continued

SECONDARY

The overcurrent protection listed below, in amperes, is 125% of the rated current of the transformer. Choose the next higher fuse rating if these numbers do not correspond with standard fuse selections.

MEN General Purpose Midget Class Fuses				
Part Number	AMP Rating	Pcs/Pkg	Weight	Price
MEN-5	0.5	10/1	0.2 lb	<--->
MEN-6	0.6	10/1	0.2 lb	<--->
MEN1	1	10/1	0.2 lb	<--->
MEN1-4	1.4	10/1	0.2 lb	<--->
MEN1-5	1.5	10/1	0.2 lb	<--->
MEN2	2	10/1	0.2 lb	<--->
MEN2-5	2.5	10/1	0.2 lb	<--->
MEN3	3	10/1	0.2 lb	<--->
MEN3-5	3.5	10/1	0.2 lb	<--->
MEN4	4	10/1	0.2 lb	<--->
MEN5	5	10/1	0.2 lb	<--->
MEN6	6	10/1	0.2 lb	<--->
MEN7	7	10/1	0.2 lb	<--->
MEN8	8	10/1	0.2 lb	<--->
MEN10	10	10/1	0.2 lb	<--->
MEN12	12	10/1	0.2 lb	<--->
MEN15	15	10/1	0.2 lb	<--->
MEN20	20	10/1	0.2 lb	<--->
MEN25	25	10/1	0.2 lb	<--->
MEN30	30	10/1	0.2 lb	<--->

Note: See MEN fuse catalog page for characteristic curves.

Recommended Maximum Secondary Fuse Ratings in Amps.

Secondary Voltage	Overload Protection	Hammond Transformers VA RATING												
		50	75	100	150	250	350	500	750	1000	1500	2000	3000	5000
12	125%	5.3	7.9	11.0	16.0	27.0	—	—	—	—	—	—	—	—
24	125%	2.7	4.0	5.3	7.9	14.0	19.0	27.0	—	—	—	—	—	—
110	125%	0.6	0.9	1.2	1.8	2.9	4.0	5.7	8.6	12.0	18.0	23.0	—	—
115	125%	0.6	0.9	1.1	1.7	2.8	3.9	5.5	8.2	11.0	17.0	22.0	—	—
120	125%	0.6	0.8	1.1	1.6	2.7	3.7	5.3	7.9	11.0	16.0	21.0	—	—
220	125%	0.3	0.5	0.6	0.9	1.5	2.0	2.9	4.3	5.7	8.6	12.0	18.0	29.0
230	125%	0.3	0.5	0.6	0.9	1.4	2.0	2.8	4.1	5.5	8.2	11.0	17.0	28.0

HPS Fortress™ 480x240 / 240x120 VAC Commercial Potted Transformers Specifications

Features

- **Ratings:** 1 phase from 0.50kVA thru to 5kVA; 60 Hz
- **Electrostatic Shield:** Standard on all single phase units over 0.75kVA
- **Quality Design:** All units are encapsulated with electrical grade silica sand and resin compounds which completely enclose the core and coil to seal out moisture, airborne contaminants and eliminates corrosion and deterioration.
- **Insulation:** Offering UL class 130°C (266°F) insulation, 80°C (176°F) temperature rise up to 1kVA on single phase; 180°C (°F) insula-

tion, 115°C (°F) temperature rise on all units over 1kVA on single phase. Quiet operation with sound levels below NEMA standards.

- **Enclosures:** NEMA 3R enclosures meet or exceed listing criteria including NEMA, ANSI, and OSHA standards for indoor and outdoor service.
- **Rear and side entry** into an easily accessible and roomy wiring compartment.
- **Wiring compartment:** Provides tinned copper lead wire terminations and standard ground lug assembly for easy cable installation.

- **Installation made quick and easy:** Via keyhole mounting slots. Wall mounting available on single phase units from 0.50kVA to 5kVA. Lifting provisions are included on all single phase units.
- **10 year warranty** (limited to mfg. defects)

Agency Approvals

- UL Listed File No. E50394 (Type Q)
- CSA File No. LR3902 (Type Q)



C1FC50LE



C1F1C5LES



C1F005LES

HPS Fortress 480x240/240x120 Encapsulated Transformer Specifications

Part Number	Wt/Lbs	Price	kVA Rating	Mtg. Fig.	Output Current Amps	Primary Voltage (60Hz)	Secondary Voltage	Impedance %		Total Heat Dissipation (Watts)*
								VA	%Z	
C1FC50LE	15.0	<--->	0.50	A	4.17/2.08	240x480	120x240	500	7.6	35.8
C1FC75LES	18.0	<--->	0.75	A	6.25/3.13			750	5.6	57.2
C1F1C0LES	22.0	<--->	1.0	A	8.33/4.17			1000	4.8	75.3
C1F1C5LES	25.0	<--->	1.5	A	12.5/6.25			1500	4.1	100
C1F002LES	40.0	<--->	2.0	A	16.7/8.33			2000	4.3	121.6
C1F003LES	55.0	<--->	3.0	A	25.0/12.5			3000	3.7	160.8
C1F005LES	90.0	<--->	5.0	B	41.7/20.8			5000	4.2	314

Note: * Heat dissipation calculated based on full rated load on transformer.

HPS Fortress™ 480x240 / 240x120 VAC Commercial Potted Transformers Specifications and Wiring

Dimensions

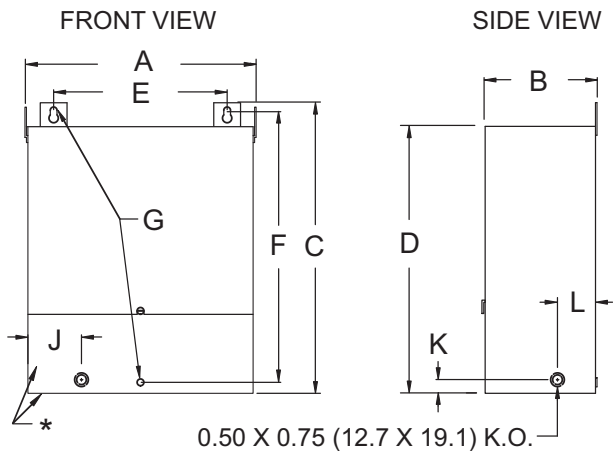


FIGURE A (300VA and less)

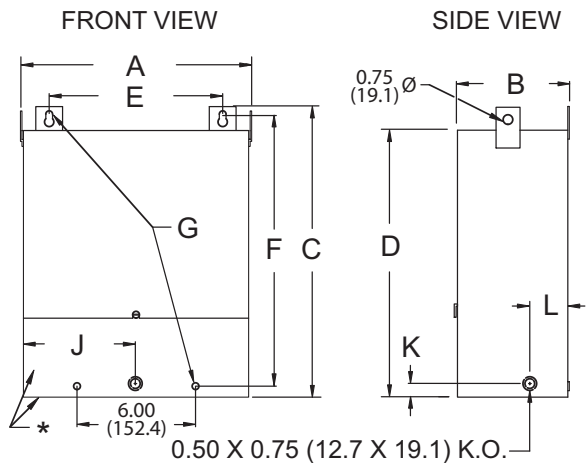


FIGURE B (500VA)

* Front & bottom panel is hinged for access to terminals, bottom mounting holes and rear knockout.

HPS Fortress 480x240/240x120 Control Transformer Dimensions											
Part Number	Mfg. Fig.	Overall Dimensions inches (mm)				Mounting Holes inches (mm)		Mounting Hole Dia. inches (mm)	Knock Out Dimensions inches (mm)		
		A	B	C	D	E	F		J	K	L
C1FC50LE	A	5.00 (127.0)	4.75 (120.7)	9.25 (235.0)	8.25 (209.6)	3.88 (98.6)	7.75 (196.9)	0.22 (5.6)	1.00 (25.4)	1.50 (38.1)	2.00 (50.8)
C1FC75LES	A	5.00 (127.0)	4.75 (120.7)	9.25 (235.0)	8.25 (209.6)	3.88 (98.6)	7.75 (196.9)	0.22 (5.6)	1.00 (25.4)	1.50 (38.1)	2.00 (50.8)
C1F1C0LES	A	5.88 (149.4)	5.50 (139.7)	10.00 (254.0)	8.50 (215.9)	4.13 (104.9)	8.25 (209.6)	0.28 (7.1)	1.25 (31.8)	1.50 (38.1)	2.00 (50.8)
C1F1C5LES	A	5.88 (149.4)	5.50 (139.7)	10.00 (254.0)	8.50 (215.9)	4.13 (104.9)	8.25 (209.6)	0.28 (7.1)	1.25 (31.8)	1.50 (38.1)	2.00 (50.8)
C1F002LES	A	7.00 (177.8)	6.50 (165.1)	11.25 (285.8)	9.75 (247.7)	5.38 (136.7)	9.50 (241.3)	0.28 (7.1)	1.50 (38.1)	1.50 (38.1)	2.00 (50.8)
C1F003LES	A	7.00 (177.8)	6.50 (165.1)	11.25 (285.8)	9.75 (247.7)	5.38 (136.7)	9.50 (241.3)	0.28 (7.1)	1.50 (38.1)	1.50 (38.1)	2.00 (50.8)
C1F005LES	B	10.00 (254.0)	7.75 (196.9)	17.25 (438.2)	15.25 (387.4)	7.38 (187.5)	15.38 (390.7)	0.44 (11.2)	4.00 (101.6)	2.00 (50.8)	2.00 (50.8)

Note: All dimensions are ± 0.06 inches unless otherwise noted.

Wiring

SCHEMATIC		CONNECTIONS		
		Primary Volts	Connect lines to	Inter-connect
		480 240	H1, H4 H1, H4	H2-H3 H1-H3, H2-H4
		Secondary Volts	Connect lines to	Inter-connect
		240 120/240 120	X1, X4 X1, X2, X4 X1, X2	X2-X3 X2-X3 X2-X4, X1-X3

Note: Lower secondary voltages are not available, only 120/240 VAC.

Cutler-Hammer Powerline Filters



Three stages of protection

1. Suppressors shunt high energy surges to ground
2. LC filter provides noise and voltage clamping
3. Bi-directional protection stops voltage surges and noise traveling upstream or downstream through the APF

Low **let-through** feature clamps voltage transients at levels just over operating voltage to protect equipment from cumulative damage.

High-end noise attenuation inductor-capacitor (L-C) circuitry grabs EMI/RFI noise before it gets into your system.

High-surge current capability of up to 39,000 a.mps (L-N or L-G) handles the surges your electronics can't.

The filters feature lightning fast response of less than one nanosecond.

DIN rail mounting requires no special mounting hole patterns. Unit comes with short DIN rail for mounting in non-DIN installations.

Low-cost protection for your control system

The Automation Powerline Filter (APF) is a high-performance surge filter designed to protect electronic loads from surges, transients and noise. The APF diverts these disturbances away from the load with a low impedance path to ground. This compact unit is ideal for PLCs, industrial PCs, robotics and other automation equipment.

Features

- 120 or 230 VAC input voltage, single phase
- One, three and five amp models
- 50/60 Hz operation
- Protection modes — L-N, L-G, N-G
- Five-year product warranty
- Internally fused
- Status indication
- UL, CSA approvals
- Tested to ANSI/IEEE Cat. B3 Ringwave and C1 Impulse waveforms

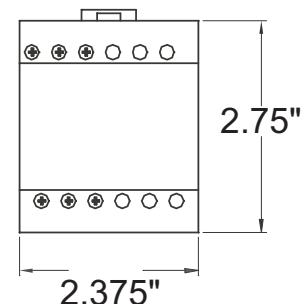
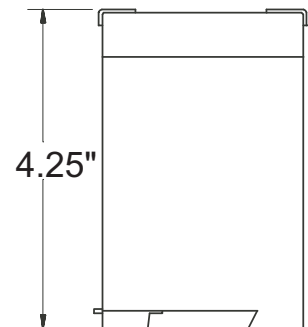
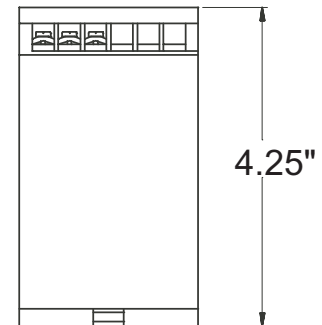
Benefits

- Low "let-through voltage" ensures significantly better protection than other suppressors
- Excellent LC noise filter reduces operating glitches and disruptions
- High surge current capability protects against lightning induced surges
- Small footprint, DIN-rail mounted (DIN rail section included) — easy to install in control cabinet or OEM application

APF specifications

Input voltage	120, 230 VAC, single phase (L,N,G or L,L,G)
Amperage	1, 3, 5 Amp
Frequency	50/60 Hz
Protection modes	L-N, L-G, N-G
MCOV	150, 320 V
Noise attenuation: (Normal mode)	55dB @ 100 kHz
Filter bandwidth	10 kHz to 50 MHz
Peak surge current	39,000 Amps per phase
Internal thermal fuses	
Fault current rating: (AIC rating per UL)	500A
Operating temp.	-40 to +50 °C
Response time	Less than 1ns
Agency approvals	UL 1449 2nd Ed., CSA
Warranty	Five years
Test waveforms	IEEE C62.41 (1991)

Automation Powerline Filter		
Part Number	Description	Price
APF120N01	110/120V, 1 Amp	<--->
APF120N03	110/120V, 3 Amp	<--->
APF120N05	110/120V, 5 Amp	<--->
APF230L01	230/240V, 1 Amp	<--->
APF230L03	230/240V, 3 Amp	<--->
APF230L05	230/240V, 5 Amp	<--->



Note: Cutler-Hammer products available to North America locations only.

Convenience Outlet

The hard way



The convenient way



Need power in your panel?

Have you ever needed to plug in your laptop or oscilloscope at the control enclosure only to find there was no outlet available?

Our customers asked us for a solution to this problem. We turned to our friends at FACTS Engineering for help. To install the FA-REC3 outlet, snap the outlet on the DIN rail, terminate three wires, and that's it! It doesn't get much more convenient than that. Practically every enclosure installed these days has DIN rail incorporated into the control design. Instead of buying metallic boxes, covers, outlets, and strain reliefs, why not just install one of our convenience outlets?



Specifications

- 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
- Mounting: 35mm DIN rail
- Wire capacity: 14 to 12 AWG
- Tightening torque: 6 in-lbs.
- Operating temp.: 0 to 60° C (32 to 140°F)
- Circuit protection: None
- UL 508 listed

FA-REC3

