

PSH Series DIN Rail Power Supplies

High Efficiency Power Supplies

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

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



Features

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

RHINO PRO PSH Series Specifications					
Part Number	Price	Drawing Link	Output Voltage	Maximum Output Power	Efficiency [Typ @ 115VAC]
<u>PSH-12-080</u>	\$115.00	<u>PDF</u>	12V		90%
<u>PSH-24-080</u>	\$108.00	<u>PDF</u>	24V	80W	91%
<u>PSH-48-080</u>	\$104.00	<u>PDF</u>	48V		91%
<u>PSH-12-120</u>	\$153.00	PDF	12V		91%
<u>PSH-24-120</u>	\$139.00	PDF	24V	120W	92%
<u>PSH-48-120</u>	\$152.00	<u>PDF</u>	48V		93%
<u>PSH-24-240</u>	\$182.00	PDF	24V	04014/	93%
<u>PSH-48-240</u>	\$193.00	<u>PDF</u>	48V	240W	94%
<u>PSH-24-480</u>	\$273.00	PDF	24V	400144	93%
<u>PSH-48-480</u>	\$286.00	PDF	48V	480W	94%



PSH-xx-080



PSH-xx-120



PSH-xx-240





RHINO PRO PSH-xx-080 Power Supplies

Technical Specifications				
Part Number		PSH-12-080	PSH-24-080	<u>PSH-48-080</u>
Input (AC)				
Nominal In	put Voltage		100–240VAC	
Nominal In	put Current		2–0.9 A	
Operationa	l Input Voltage Range		85–264VAC	
Input Volta	ge Frequency Range		45–65Hz	
Inrush Curi	rent (115/230 VAC)	15/30A		
Standby Po	ower Consumption		0.9/1.45 W [115/230 VAC]	
Active Pow	ver Factor Correction (PFC)		0.48/0.48 [115/230 VAC]	
Harmonic I	imits – acc. EN 61000-3-2		Class A	
Circuit Brea	aker Rating / Characteristic		6-16 A /B, C [IEC]; 20 A /B, C[USA]	
Output (DC)				
Max. Outpu	It Power		80W	
Output Volt	tage	12V	24V	48V
power" whi	It Current / Max. Output Current 4s ("Boost ich facilitates the activation of stepper lenoids, or actuators)	6.7 A / 10A	3.4 A / 5A	1.7 A / 2.5 A
Output Volt	tage Adjustment Range	11.8–15V	23.5–28V	47.5–56V
Typical Effi	iciency (@ 115/230 VAC)	90/88 %	91/89 %	91/89 %
Regulation Input Variation Load Variation		0.1 % max. [10–90 %] 0.5 % max.		
Output Power Derating - Temperature			2%/K above 60°C	
Output Power Derating - Input Voltage			3%/V below 90VAC	
Hold-up tin	ne		20/160ms min. [115/230 VAC]	
Start-up tin	ne	2s max.		
Ripple and	Noise (20MHz bandwidth) (Note 1)	100mVp-p max.	100mVp-p max.	200mVp-p max.
Output Ove	ervoltage Protection (OVP) (Note 2)	16–19V	32–35V	56–60V
Power Bac	k Immunity (Note 3)		< OVP level	
Operation Nominal Operation Peak Power Operation Constant Current (CC)		100% of lout nominal 105–150% of lout nominal 155% of lout nominal		
Duty Cycle (for peak and cc mode) (Note 4) Threshold CC or Peak Operation Timer Normal Operation / Off Period		> 105 % 4s max. [switch off] < 6s typ [automatic restart after switch off or peak and cc operation timer reset]		
Short Circuit Protection		Switch off after 4s delay, automatic restart (Note 4)		ote 4)
рс ок	Threshold for Vout	ON: > 10.9 V typ. OFF :< 10.7 V typ.	ON: > 22.5 V typ. OFF:< 21.5 V typ.	ON: > 45V typ. OFF:< 43V typ.
Signal	DC ON	Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED		
	DC OFF	•	Relay contact open, max 30V	-

Notes:

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

In case of an internal error, a second voltage regulation loop keeps the output voltage at a safe level, and the power supply turns off and restarts after 10 seconds.
 When external voltage is supplied above set output voltage and below OVP threshold, the power supply will function normally without switch off or destruction, even if

external voltage is applied continuously.

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

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PRO

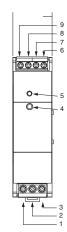
RHINO PRO PSH-xx-080 RHINO **Power Supplies**

Tec	hnical Specification	(continued)			
Part Number	<u>PSH-12-080</u>	<u>PSH-24-080</u>	<u>PSH-48-080</u>		
General Data	1				
Weight g [oz]		367 [12.95]			
Leakage Current (max.)		0.75 mA			
Network Configuration		TN-S, TN-C, TT, IT			
Enclosure Material (Chassis/Cover)		Aluminum / Stainless Steel			
Cooling		Convection cooling, no internal fan	1		
Over Temperature Protection		Switch off at over temperature			
Isolation Voltage	Input/Output 4250VDC Input/Chassis 1500VDC Output/Chassis 750VDC				
Creepage Clearance		Input/Output 8mm Input/Chassis 4mm Output/Chassis 1.5 mm			
Safety / Environmental					
Surrounding Ambient Temperature Range		-40 to 70°C [-40 to 158°F]			
Temperature Coefficient		0.02 %/K			
Humidity		5–95%, non-condensing			
Storage Temperature		-40 to 85°C [-40 to 185°F]			
Maximum Altitude		2000m			
Safety Standards	CS Safety low voltag	echnology equipment IEC/EN 60950 SA 22.2 No 60950-1-03, File No. E19 je switchgear and controlgear UL 508 s Control Equipment Haz Loc, File No ATEX © II 3 G Ex ec nC IIC T4 Gov	8298 3, File No. E197592 9. E502478		
MTBF (acc. to IEC 61709 at 25°C)		> 1,950,000 hours			
Protection Class		Class I			
Degree of Protection	on IP20				
Electromagnetic compatibility (EMC)					
Emissions	EN 61000-6-3, EN 61204-3				
Conducted RI Suppression On Input	EN 55032, EN 55011 class B,				
Radiated RI Suppression		EN 55032, EN 55011 class B,			
Immunity	EN 61000-6-2, EN 61204-3				
Railway Applications Signaling Apparatus		EN 50121-4			
Railway Applications Rolling Stock Apparatus		EN 50121-3-2			
Electrostatic Discharge (ESD)		IEC/EN 61000-4-24 kV/8 kV, criteria			
Radiated RF Field Immunity		IEC/EN 61000-4-310 V/m, criteria /	4		
Electrical Fast Transient / Burst Immunity		IEC/EN 61000-4-42 kV, criteria B			
Surge Immunity		IEC/EN 61000-4-51 kV/2 kV, criteria	В		
Immunity To Conducted RF Disturbances		IEC/EN 61000-4-610 V, criteria A			
Power Frequency Field Immunity	IEC/EN 61000-4-830 A/m, criteria A				
Mains Voltage Dips And Interruptions		IEC/EN 61000-4-11, criteria B/C			
	Yoltage Sag Immunity SEMI F47230VAC, criteria B/C				
Environment					
Railway Applications Shock and Vibration	According EN 61373				
Vibration Acc. IEC 60068-2-6-3	3 axis, 2 g sine sweep, 10–55Hz, 11 oct/min				
Shock Acc. IEC 60068-2-27		3 axis, 25g half sine, 11ms			
Approvals	CE	CB c us c c c c c c c c c c c c c c c c c			



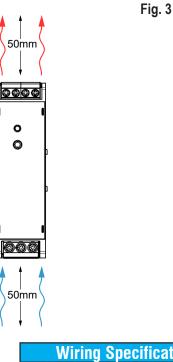
RHINO PRO PSH-xx-080 Power Supplies

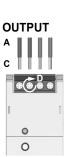
Fig. 1

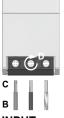


	Identification of Features (Fig.1)		
1	Input Terminal L		
2	Input Terminal N		
3	Input Terminal GND		
4	Output Voltage adjustment potentiometer		
5	DC ON LED		
6/7	DC OK Contact		
8	Output Connection Terminal +		
9	Output Connection Terminal –		

Fig. 2



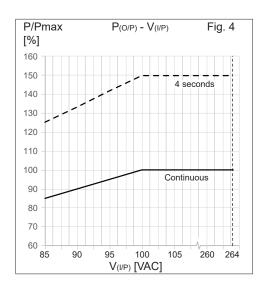


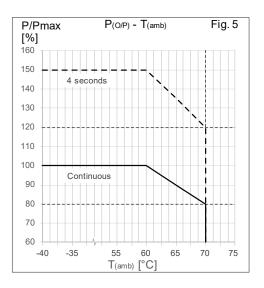


INPUT	

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









RHINO PRO PSH-xx-120 Power Supplies

Input (AC) 100-240 VAC Nominal Input Voltage 100-240 VAC Nominal Input Voltage Range 85-264VAC Input Voltage Frequency Range 45-65Hz Inrush Current (115/230 VAC) 1530A Standby Power Consumption 2.212.2 W [115/230 VAC] Active Power Factor Correction (PFC) 0.9708.8 [115/230 VAC] Cicuit Breaker Rating / Characteristic 6-16 A.B. C [IEC]; 20 A.B. C (USA) Dulput Voltage 120W Output Voltage Rating / Characteristic 6-16 A.B. C [IEC]; 20 A.B. C (USA) Dulput Voltage 120W Output Voltage Adjustment Range 11.8-15 V 2.3 5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 91/93 % 93/94 % 93/94 % Regulation Input Voltage Adjustment Range 11.8-15 V 2.3 5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 91/93 % 93/94 % 93/94 % Regulation Input Voltage 3%/V below 90 VAC; refer to Fig. 5 004/put Voltage Adjustment Range 1.8-15 V 2.3 5-28 V 47.5-56 V Output Power Derating - Input Voltage 3%/V below 90 VAC; refer to Fig. 5 004/put Voltage Adjustment Range 1.8-15 V 2.3 5-28 V 5		Technical Specifications				
Nominal Input Voltage 100-240 VAC Nominal Input Current 1.5-73R. Operational Input Voltage Range 85-264VAC Inrush Current (115/230 VAC) 15530A Standby Power Consumption 2.202.2 W [115/230 VAC] Active Power Factor Correction (PFC) 0.9770.8 [115/230 VAC] Harmonic limits – acc. EN 61000-3-2 Class A, D Circuit Breaker Rating / Characteristic 6-16 A, B, C [ICC]: 20 A, B, C [USA] Upput (Voltage 12V 2.40 V Max. Output Power 120W 2.5A/3.75A Output Voltage 12V 2.4V 48V Max. Output Current / Max. Output Current 4's ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A / 15A 5A / 7.5 A 2.5A / 3.75 A Output Voltage Adjustment Range 11.8-15 V 2.35-28 V 47.5-56 V 17/5-66 V Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % 93/94 % Regulation Imput Voltage 2%/K above 60°C, refer to Fig. 5 0utput Power Darating - Temperature 2%/K above 60°C, refer to Fig. 5 0utput Power Darating - Temperature 2%/K above 60°C, refer to Fig. 4 Ho	Part Number		<u>PSH-12-120</u>	PSH-24-120	<u>PSH-48-120</u>	
Nominal Input Vurrent 1.5-0.78 Å Operational Input Voltage Range 85-264VAC Input Voltage Frequency Range 45-65Hz Inrush Current (115/230 VAC) 15330 A Standby Power Consumption 2.2/2 W [115/230 VAC] Active Power Factor Correction (PFC) 0.970.8 [115/230 VAC] Harmonic IIIIINEs - acc. EN 61000-3-2 Class A, D Circuit Breaker Rating / Characteristic 6-16 A fB, C [IEC]; 20 A fB, C [USA] Output Voltage 12V 24V Output Voltage Correction (PFC) 100/15 Å Output Voltage 12V 24V Output Voltage Adjustment Range 112-15 Å 2.5 A / 3.75 Å Output Voltage Adjustment Range 11.8-15 V 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % Cutput Power Derating - Imput Voltage 3%/V below 90 VAC; refer to Fig. 5 0 Output Power Derating - Imput Voltage 3%/V below 90 VAC; refer to Fig. 4 Hold-up time 20mmking 20mVp-p max. Start-up time 20mVp-p max. 200mVp-p max. Output Power Deration 100/Wp p max. 200mVp-p max. <t< th=""><th>Input (AC)</th><th></th><th>·</th><th></th><th></th></t<>	Input (AC)		·			
Operational Input Voltage Range 85-264VAC Input Voltage Frequency Range 45-264VAC Inrush Current (115/230 VAC) 1500A Standby Power Consumption 2.2/2.2 W [115/230 VAC] Active Power Factor Correction (PFC) 0.9708 [115/230 VAC] Class A, D Class A, D Circuit Breaker Rating / Characteristic 6-16 A/B, C [IEC]; 20 A/B, C [USA] Output Voltage 120W Output Voltage Adjustment Range 12V Max. Output Power 120W Output Voltage Adjustment Range 118-15 V Standor J, or actuators) 10A / 15A Output Voltage Adjustment Range 11.8-15 V Typical Efficiency (@ 115/230 VAC) 9193 % Regulation Imput Voltage 118-15 V Input Voltage Informace 2%K above 60°C, refer to Fig. 5 Output Voltage Protection (0 VP) (Note 1) 100mV/p-p max. Output Voltage Input Voltage 2%K above 60°C, refer to Fig. 4 Output Power Derating - Temperature 2%K above 60°C, refer to Fig. 4 Output Power Derating - Input Voltage 2%K above 60°C, refer to Fig. 4 Output Power Output Power Output Forection (OVP) (Note 2	Nominal In	put Voltage		100–240 VAC		
Input Voltage Frequency Range 45-65Hz Inrush Current (115/330 VAC) 1530A Standby Power Consumption 2.2/2.2 W [115/230 VAC] Active Power Factor Correction (PFC) 0.970.8 [115/230 VAC] Harmonic limits – acc. EN 61000-3-2 Class A, D Circuit Breaker Rating / Characteristic 6-16.4 /B, C [EC]; 20.4 /B, C [USA] Output Voltage 12/V Max. Output Power 120W Output Voltage 12/V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper molors, solenoids, or actuators) 10A / 15A Output Voltage Adjustment Range 11.8-15 V 2.35-28 V 47.5-56 V Typical Efficiency (@, 115/230 VAC) 91/93 % 92/94 % 93/94 % Regulation Input Variation 0.1 % max. 10.4 % max. 10.4 % max. Load Variation 2.5 M / 3.55 M max. 00.4 % max. 200mVp-p max. Output Voltage 3% V below 90 VAC, refer to Fig. 5 000 Vuput Power Derating - Input Voltage 3% V below 90 VAC, refer to Fig. 5 Output Overvoltage Protection (OVP) (Note 2) 16-19V 32-35V 56-60V Output Overvoltage	Nominal In	out Current		1.5–0.78 A		
Inrush Current (115/230 VAC) 15/30A Standby Power Consumption 2.22.2 W [115/230 VAC] Active Power Factor Correction (PFC) 0.9708 [115/230 VAC] Active Power Factor Correction (PFC) 0.9708 [115/230 VAC] Active Power Factor Correction (PFC) 0.9708 [115/230 VAC] Circuit Breaker Rating / Characteristic 6-16 A/B, C [IEC]; 20 A/B, C [USA] Output Voltage 120W Output Voltage 120W Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A/15A Output Voltage Adjustment Range 118-15 V 23.5-28 V 47.5-66 V Typical Efficiency (@ 115/230 VAC) 91/83 % 92/94 % 93/94 % Regulation Input Voltage 0.1 % max. 0.1 % max. 0.1 % max. Load Variation 0.1 % max. 0.1 % max. 0.0 % lo.5 % max. 0.0 % lo.5 % max. Output Power Derating - Temperature 2% K above 60°C, refer to Fig. 5 0.0 Wolvp. max. 0.0 Wolvp. max. 0.0 Wolvp. max. Output Power Derating - Imput Voltage 3% V below 90 VAC, refer to Fig. 5 0.0 Wolvp. max. 0.0 Wolvp. max. 0.0 Wolvp. max. Ripple and Noise (20MHz bandwidth) (Note 1) <th>Operationa</th> <th>I Input Voltage Range</th> <th></th> <th>85–264VAC</th> <th></th>	Operationa	I Input Voltage Range		85–264VAC		
Standby Power Consumption 2.212.2 W [115/230 VAC] Active Power Factor Correction (PFC) 0.97/0.8 [115/230 VAC] Harmonic limits – acc. EN 61000-3-2 Cless A, D Circuit Breaker Rating / Characteristic 6-16 A/B, C [EC]; 20 A/B, C [USA] Output (DC) 120W Max. Output Power 120W Output Voltage 12V 24V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A/15A 5A/7.5 A 2.5A/3.75 A Output Voltage Adjustment Range 11.8–15 V 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % Regulation 0.1 % max. 10-9/96 % max. 0.1 % max. Load Variation 0.1 % max. 10-9/96 % max. 0.1 % max. Load Variation 2.8 max. 20mVp-p max. 00mVp-p max. Output Power Derating - Input Voltage 3%/ Velow 90 VAC, refer to Fig. 5 00tput Power Derating - Input Voltage 2 max. Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp-p max. 100mVp-p max. 000mVp-p max. Output Overvoltage Protection 105-169 % of lout nominal 2 max	Input Volta	ge Frequency Range		45–65Hz		
Active Power Factor Correction (PFC) 0.97/0.8 [115/230 VAC] Harmonic limits – acc. EN 61000-3-2 Circuit Breaker Rating / Characteristic 0.15(15/230 VAC) Max. Output Power 120 Max. Output Voltage 12V 24V 48V Max. Output Current / Max. Output Current 4s ("Boost power Which facilitates the activation of stepper motors, solenoids, or actuators) 0.0tput Voltage Adjustment Range 11.8–15 V 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % 93/94 % Regulation 10-1 % max. 10-90 %) 0.5 % max. 0.0tput Power Derating - Imput Voltage 0.1 % max. 10-90 %) 0.5 % max. 10-90 % 0.5 % of lout nominal 105–150% of lout nominal 105–150% of lout nominal 105–150% of lout nominal 105% of lou	Inrush Curi	rent (115/230 VAC)	15/30A			
Harmonic limits – acc. EN 61000-3-2 Circuit Breaker Rating / Characteristic Circuit Protection Circuit Protecti	Standby Po	ower Consumption		2.2/2.2 W [115/230 VAC]		
Circuit Breaker Rating / Characteristic 6-16 A/B, C [IEC]: 20 A/B, C [USA] Output (DC) 120W Max. Output Power 120W Output Voltage 12V Asc. Output Current / Max. Output Current 45 ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A / 15A Output Voltage Adjustment Range 11.8–15 V 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % Regulation input Variation 0.1 % max. 104-90 %) 0.5 % max. 0.1 % max. Load Variation 0.1 % max. 104-90 %) 0.5 % max. 0.1 % max. Output Power Derating - Imperature 2%/K above 60°C, refer to Fig. 5 00 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. 58-60V Start-up time 2 58-60V Power Back Immunity (Note 3) 00% fout nominal 105–150% of lout nominal 105–150% of lout nominal 105–150% of lout nominal 105–50% of lout nominal 105–510% of lout n	Active Pow	er Factor Correction (PFC)		0.97/0.8 [115/230 VAC]		
Output (DC) 120W Max. Output Voltage 12V 24V 48V Max. Output Voltage 10A/15A 5A/7.5A 2.5 A/3.75 A Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A/15A 5A/7.5 A 2.5 A/3.75 A Output Voltage Adjustment Range 11.8–15 V 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % Regulation Input Variation 0.1 % max. 0.1 % max. 0.1 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 0utput Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. 5tart-up time 20ms min. Start-up time 20ms min. 200mVp-p max. 00mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) < <0VP level Operation Nominal Operation / OF previde >100% of lout nominal >100% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) 105	Harmonic I	imits – acc. EN 61000-3-2		Class A, D		
Max. Output Voltage 120W Output Voltage 12V 24V 48V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A / 15A 5A / 7.5 A 2.5 A / 3.75 A Output Voltage Adjustment Range 11.8–15 V 23.5–28 V 47.5–66 V Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % Regulation Input Variation Load Variation 0.1 % max. [10–90 %] 0.5 % max. 0.1 % max. Load Variation 0.1 % max. 100-0 %] 0.5 % max. Output Power Derating - Temperature 2% K above 60°C, refer to Fig. 4 Hold-up time 20ms min. 20ms min. Start-up time 2 start-up time 2 start-up time Output Overvoltage Protection (OVP) (Note 2) 16–19V 32-35V 56–60V Power Back Immunity (Note 3) < OVP level 00mVp-p max. 200mVp-p max. Output Overooltage Prote	Circuit Brea	aker Rating / Characteristic		6-16 A /B, C [IEC]; 20 A /B, C [USA]		
Output Voltage 12V 24V 48V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A / 15A 5A / 7.5 A 2.5 A / 3.75 A Output Voltage Adjustment Range 11.8–15 V 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % Regulation Input Variation 0.1 % max. [10–90 %] 0.5 % max. 0.1 % max. [10–90 %] 0.5 % max. Load Variation 0.1 % max. [10–90 %] 0.5 % max. 200mVp. Dutput Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 25 max. Start-up time 2 s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp.p max. 200mVp.p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) < OVP level Operation 100% of lout nominal 105–56% of lout nominal Cor Paek Operation / CC) Sof lout nominal > 10	Output (DC)					
Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A / 15A 5A / 7.5 A 2.5 A / 3.75 A Output Voltage Adjustment Range 11.8-15 V 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % Regulation Input Variation 0.1 % max. [10-90 %] 0.5 % max. 93/94 % Coutput Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 5 Output to user Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 5 Output to user Derating - Temperature 20ms min. Start-up time 20ms min. Start-up time 20ms min. Output Overvoltage Protection (OVP) (Note 2) 16-19V Operation 100% of lout nominal 105-150% of lout nominal Power Operation 100% of lout nominal 105% of lout nominal Power Operation 100% of lout nominal 105% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) Threshold >105 % 4 smax, [switch off] Cor Peak Operation Timer >105 % Normal Operation / Off Period Short Circuit Protection Short Circuit Protection Switch off after 4s delay, automatic restart filter switch off of peak and cc operation timer reset] Short C	Max. Outpu	t Power		120W		
power* which facilitates the activation of stepper motors, solenoids, or actuators) 10A / 15A 5A / 7.5 A 2.5 A / 3.75 A Output Voltage Adjustment Range 11.8–15 V 23.5–28 V 47.5–56 V 7ypical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % Regulation Input Variation Load Variation Output Power Derating - Temperature 0.1 % max. 10–90 %] 0.5 % max. 0.1 % max. Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp-p max. 100mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) Operation 100% of lout nominal 105% of lout nominal Poser Back Were Operation 105% of lout nominal 1055% of lout nominal Corstant Current (CC) Short Circuit Protection Timer > 105% > 105 % Short Circuit Protection Switch off after 4 selay. automatic rester] > 105% Short Circuit Protection ON: > 10.9 V/typ. OF: < 21.5 V/typ. ON: > 45.5 V/typ. Shord Circuit Protection ON: > 10.9 V/typ. <th>Output Volt</th> <th>lage</th> <th>12V</th> <th>24V</th> <th>48V</th>	Output Volt	lage	12V	24V	48V	
Typical Efficiency (@ 115/230 VAC) 91/93 % 92/94 % 93/94 % Regulation Input Variation 0.1 % max. [10-90 %] 0.5 % max. 0.1 % max. [10-90 %] 0.5 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp-p max. 100mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) < Operation Nominal Operation 100% of lout nominal 105–150% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) Threshold > 105 % 4 s max. [switch off] < 105 % Short Circuit Protection Switch off after 4 s delay, automatic restart after switch off or peak and cc operation timer reset] Switch off after 4 s delay, automatic restart after switch off or Switch ofFi< < 105 % 0FF: < 43 V typ. Cor Peak Operation / Off Period Switch off after 4 s delay, automat	power" whi	ch facilitates the activation of stepper	10A / 15A	5A / 7.5 A	2.5 A / 3.75 A	
Regulation Input Variation 0.1 % max. [10-90 %] 0.5 % max. Load Variation [10-90 %] 0.5 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp-p max. 100mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) < OVP level Operation Nominal Operation 100% of lout nominal 105–150% of lout nominal Peak Power Operation Timer > 105 % 4 s max. [switch off] Normal Operation / Off Period > 105 % 4 s max. [switch off] Normal Operation / Off Period > 105 % 4 s max. [switch off] Short Circuit Protection Switch off after 4s delay, automatic restart [Note 4] DC OK Threshold for Vout ON: > 10.9 V typ. ON: > 21.5 V typ. ON: > 45V typ. DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED ON: > 100 V typ. OFF: < 1.5 V typ. OFF: < 43V typ.	Output Volt	tage Adjustment Range	11.8–15 V	23.5–28 V	47.5–56 V	
Input Variation 0.1 % max. [10-90 %] 0.5 % max. Output Power Derating - Temperature 2%/K above 60 °C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp-p max. 100mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) < CVP level 0 Operation 100% of lout nominal 100% of lout nominal Nominal Operation 100% of lout nominal 105–150% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) > 105 % 4s max. [switch off] Threshold Switch off Period > 105 % Short Circuit Protection Switch off after 4s delay, automatic restart [Note 4] DC OK ON:> 10.9 V tp. ON:> 22.5 V tp. ON:> 45V tp. OFF:< 21.5 V tp. OFF:< 43V tp. OFF:< 43V tp. OFF:< 43V tp.	Typical Effi	ciency (@ 115/230 VAC)	91/93 %	92/94 %	93/94 %	
Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp-p max. 100mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) < <0VP level 0 Operation 100% of lout nominal 105–150% of lout nominal 105–150% of lout nominal Power Operation 1005 % of lout nominal 105% of lout nominal 105% of lout nominal Constant Current (CC) 20 for peak and cc mode) (Note 4) >105 % ds max. [switch off] <105 % ds max. [switch off] Normal Operation / Off Period <10s typ [automatic restart after switch off or peak and cc operation timer reset] Short Circuit Protection Short Circuit Protection ON: > 10.9 V typ. ON: > 22.5 V typ. ON: > 45V typ. DC OK Threshold for Vout ON: > 10.9 V typ. OF: < 21.5 V typ. OF: < 43V typ. DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	Regulation Input Variation Load Variation					
Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp-p max. 100mVp-p max. 200mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) < OVP level Operation Nominal Operation 100% of lout nominal 105–150% of lout nominal Peak Power Operation 100% of lout nominal 105–150% of lout nominal Constant Current (CC) 155% of lout nominal 155% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) > 105 % Threshold Switch off after 4s delay, automatic restart after switch off or peak and cc operation timer reset] Short Circuit Protection Short Circuit Protection ON: > 10.9 V typ. ON: > 21.5 V typ. ON: > 45V typ. DC OK Threshold for Vout OF: > 10.7 V typ. OF: > 21.5 V typ. OF: < 43V typ. DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	Output Power Derating - Temperature			2%/K above 60°C, refer to Fig. 5		
Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp-p max. 100mVp-p max. 200mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) <0VP level Operation 100% of lout nominal Nominal Operation 100% of lout nominal 105–150% of lout nominal Peak Power Operation 105–150% of lout nominal 155% of lout nominal Poty Cycle (for peak and cc mode) (Note 4) 115% of lout nominal > 105 % CC or Peak Operation / Off Period > 105 typ [automatic restart after switch off] < 105 % Short Circuit Protection Switch off after 4s delay, automatic restart [Note 4] Switch off after 4s delay, automatic restart [Note 4] DC OK Threshold for Vout ON: > 10.9 V typ. ON: > 22.5 V typ. ON: > 45V typ. DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED OFF: < 11.7 V typ. OFF: < 21.5 V typ. OFF: < 43V typ.	Output Power Derating - Input Voltage			3%/V below 90 VAC, refer to Fig. 4		
Ripple and Noise (20MHz bandwidth) (Note 1) 100mVp-p max. 100mVp-p max. 200mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) < OVP level	Hold-up tin	10		20ms min.		
Output Overvoltage Protection (OVP) (Note 2) 16–19V 32–35V 56–60V Power Back Immunity (Note 3) < OVP level Operation 100% of lout nominal 100% of lout nominal Nominal Operation 100% of lout nominal 105–150% of lout nominal Peak Power Operation Constant Current (CC) 155% of lout nominal 105% Duty Cycle (for peak and cc mode) (Note 4) > 105 % Threshold > 105 % CC or Peak Operation Timer > 105 % Normal Operation / Off Period < 10s typ [automatic restart after switch off or peak and cc operation timer reset] Short Circuit Protection Switch off after 4s delay, automatic restart [Note 4] DC OK Intreshold for Vout ON: > 10.9 V typ. ON: > 22.5 V typ. ON: > 45V typ. DC OK DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	Start-up tin	10	2s max.			
Power Back Immunity (Note 3) < OVP level Operation Nominal Operation Peak Power Operation Constant Current (CC) 100% of lout nominal 105–150% of lout nominal 105–150% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) Threshold CC or Peak Operation Timer Normal Operation / Off Period > 105 % 4s max. [switch off] Short Circuit Protection Switch off after 4s delay, automatic restart [Note 4] DC OK Signal ON: > 10.9 V tp. DC ON ON: > 10.9 V tp. OFF: < 10.7 V tp. ON: > 22.5 V tp. OFF: < 13.5 V tp. OFF: < 30V tp.	Ripple and	Noise (20MHz bandwidth) (Note 1)	100mVp-p max.	100mVp-p max.	200mVp-p max.	
Operation 100% of lout nominal Nominal Operation 105–150% of lout nominal Peak Power Operation 105–150% of lout nominal Constant Current (CC) 155% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) > 105 % CC or Peak Operation Timer > 105 % Normal Operation / Off Period < 10s typ [automatic restart after switch off] Short Circuit Protection Switch off after 4s delay, automatic restart [Note 4] DC OK Threshold for Vout OR: > 10.9 V typ. ON: > 22.5 V typ. ON: > 45V typ. Signal DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	Output Ove	rvoltage Protection (OVP) (Note 2)	16–19V	32–35V	56–60V	
Nominal Operation Peak Power Operation Constant Current (CC) 100% of lout nominal 105–150% of lout nominal 105–150% of lout nominal 155% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) Threshold CC or Peak Operation Timer Normal Operation / Off Period > 105 % 4s max. [switch off] < 10s typ [automatic restart after switch off or peak and cc operation timer reset] Short Circuit Protection Switch off after 4s delay, automatic restart [Note 4] DC OK Signal Threshold for Vout ON: > 10.9 V typ. OFF: < 10.7 V typ. ON: > 22.5 V typ. OFF: < 10.7 V typ. ON: > 22.5 V typ. OFF: < 43V typ.	Power Back	k Immunity (Note 3)	< OVP level			
Threshold > 105 % CC or Peak Operation Timer 4s max. [switch off] Normal Operation / Off Period < 10s typ [automatic restart after switch off or peak and cc operation timer reset] Short Circuit Protection Switch off after 4s delay, automatic restart [Note 4] DC OK Threshold for Vout ON: > 10.9 V typ. OFF:< 10.7 V typ. ON: > 22.5 V typ. OFF:< 21.5 V typ. ON: > 45V typ. OFF:< 43V typ. DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	Operation Nominal Operation Peak Power Operation Constant Current (CC)		105–150% of lout nominal			
DC OK Signal Threshold for Vout ON: > 10.9 V typ. OFF: < 10.7 V typ.	Duty Cycle (for peak and cc mode) (Note 4) Threshold CC or Peak Operation Timer Normal Operation / Off Period		4s max. [switch off]		operation timer reset]	
DC OK OFF:< 10.7 V typ.	Short Circu	it Protection	Switch	off after 4s delay, automatic restart [Note 4]	
Signal DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	рс ок	Threshold for Vout	51		51	
DC OFF Relay contact open, max 30V	Signal	DC ON	Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED			
		DC OFF	Relay contact open, max 30V			

Notes:

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

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

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

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

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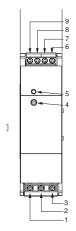
RHINO PRO PSH-xx-120 Power Supplies

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



RHINO PRO PSH-xx-120 Power Supplies

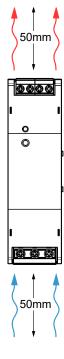
Fig. 1

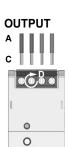


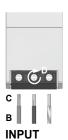
Identification of Features (Fig.1)			
1	Input Terminal L		
2	Input Terminal N		
3	Input Terminal GND		
4	Output Voltage adjustment potentiometer		
5	DC ON LED		
6/7	DC OK Contact		
8	Output Connection Terminal +		
9	Output Connection Terminal –		

Fig. 3

Fig. 2

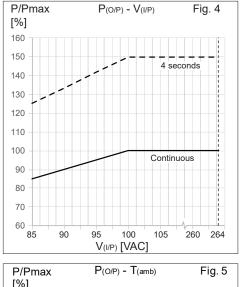


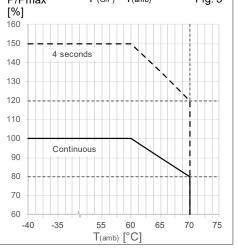




Wiring Specifications (Fig. 3)				
Α	Wire Size, Output	18–10AWG		
В	Wire Size, Input	18–10AWG		
C Strip Length		10mm [0.39 in]		
D	Tightening Torque	0.7 N·m [6.2 lb·in]		









RHINO PRO PSH-xx-240 Power Supplies

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

Notes:

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

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

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

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

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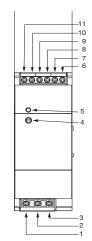
RHINO PRO PSH-xx-240 Power Supplies

Technical Specifications (continued)				
	PSH-24-240 PSH-48-240			
General Data				
Weight g [oz]	643 [22.68]			
Leakage Current (max.)	1.2 mA			
Network Configuration	TN-S, TN-C, TT, IT			
Enclosure Material (Chassis/Cover)	Aluminum / Stainless Steel			
Cooling	Convection cooling, no internal fan			
Over Temperature Protection	Switch off at over temperature			
Isolation Voltage	Input/Output 4250VDC Input/Chassis 1500VDC Output/Chassis 750VDC			
Creepage Clearance	Input/Output 8mm Input/Chassis 4mm Output/Chassis 1.5 mm			
Safety / Environmental				
Surrounding Ambient Temperature Range	-40 to 70°C [-40 to 158°F]			
Temperature Coefficient	0.02 %/K			
Humidity	5–95%, non-condensing			
Storage Temperature	-40 to 85°C [-40 to 185°F]			
Maximum Altitude	2000m			
Safety Standards	Information technology equipment IEC/EN 60950-1, UL 60950-1 CSA 22.2 No 60950-1-03, File No. E198298 Safety low voltage switchgear and controlgear UL 508, File No. E197592 Process Control Equipment Haz Loc, File No. E502478 ATEX I 3 G Ex ec nC IIC T4 Gcw			
MTBF (acc. to IEC 61709 at 25°C)	> 1,300,000 hrs			
Protection Class	Class I			
Degree of Protection	IP20			
Electromagnetic compatibility (EMC)				
Emissions	EN 61000-6-3, EN 61204-3			
Conducted RI Suppression On Input	EN 55032, EN 55011 class B,			
Radiated RI Suppression	EN 55032, EN 55011 class B,			
Immunity	EN 61000-6-2, EN 61204-3			
Railway Applications Signaling Apparatus	EN 50121-4			
Railway Applications Rolling Stock Apparatus	EN 50121-3-2			
Electrostatic Discharge (ESD)	IEC/EN 61000-4-24 kV/8 kV , criteria A			
Radiated RF Field Immunity	IEC/EN 61000-4-310 V/m , criteria A			
Electrical Fast Transient / Burst Immunity	IEC/EN 61000-4-42 kV , criteria B			
Surge Immunity	IEC/EN 61000-4-51 kV/2 kV , criteria B			
Immunity To Conducted RF Disturbances	IEC/EN 61000-4-610 V , criteria A			
Power Frequency Field Immunity	IEC/EN 61000-4-830 A/m , criteria A			
Mains Voltage Dips And Interruptions	IEC/EN 61000-4-11criteria B/C			
Voltage Sag Immunity	SEMI F47 230VAC, criteria B/C			
Environment	Accessing EN 04070			
Railway Applications Shock and Vibration	According EN 61373			
Vibration Acc. IEC 60068-2-6-3	3 axis, 2g sine sweep, 10–55Hz, 11 oct/min			
Shock Acc. IEC 60068-2-27	3 axis, 25g half sine, 11ms			
Approvals	CECB Scheme UL508 CASUS (EX)			

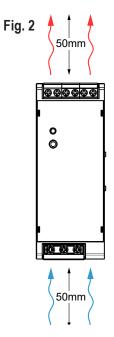


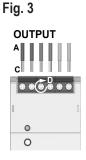
RHINO PRO PSH-xx-240 Power Supplies

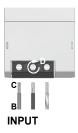
Fig. 1



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

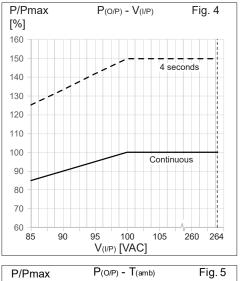


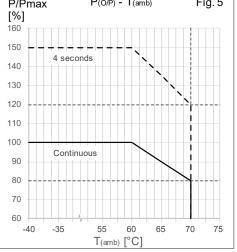




Wiring Specifications (Fig. 3)				
Α	Wire Size, Output	16–10AWG		
В	Wire Size, Input	18–10AWG		
С	Strip Length	10mm [0.39 in]		
D	Tightening Torque	0.7 N·m [6.2 lb·in]		









RHINO PRO PSH-xx-480 Power Supplies

Input (AC) Nominal Input Voltage 100–240 VAC Nominal Input Voltage Range 5.8–2.5 A Operational Input Voltage Range 6.8–2.54 VAC Input Voltage Frequency Range 45–65Hz 15/30A 15/30A Standby Power Consumption 4.8/3.8 W [115/230 VAC] Active Power Factor Correction (PFC) 0.99/17/15/230 VAC] Active Power Factor Correction (PFC) 0.99/17/15/230 VAC] Class A, D Circuit Breaker Rating / Characteristic 6-16 A/B. C[IEC]: 20 A/B. C [USA] Dutput Voltage 24V 480W Output Voltage 24V 49V Max. Output Power 480W 10A / 15A Dower * which facilitates the activation of stepper 20A / 30A 10A / 15A motors, solenoids, or actuators) 235–28 V 47.5–56 V Output Voltage 235–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 9395 % 9495 % Output Power Derating - Input Voltage 334/V below 90 VAC, refer to Fig. 5 Output Power Derating - Input Voltage 34/V below 90 VAC, refer to Fig. 5 Output Power Derating - Input Voltage 32-35V 56-60V Power Back (20MHz bandwidth) (Note 1) 100 mVp-p max.	Technical Specifications				
Nominal Input Voltage 100–240 VAC Nominal Input Current 5.8–2.5 A Operational Input Voltage Range 85–264VAC Input Voltage Requency Range 45–65Hz Inrush Current (115/230 VAC) 15/30A Standby Power Consumption 4.83.8 W [115/230 VAC] Active Power Factor Correction (PFC) 0.990.97[115/230 VAC] Atmomic limits – acc. EN 61000-3-2 Class A, D Circuit Breaker Rating / Characteristic 6-16 A/B, C[IEC]: 20 A/B, C [USA] Output Voltage 24V 480W Output Voltage 24V 480W Output Voltage 20A / 30A 10A / 15A power* which faciilitates the activation of stepper 20A / 30A 10A / 15A Output Voltage Adjustment Range 2.35–28 V 47.5–66 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Output Voltage Adjustment Range 2.0–28 V 47.5–66 V Output Voltage Input Variation 0.1 % max. 0.0 ± 10 M / 15A Load Variation 10–90 % [0.5 % max. 0.0 ± 10 0 M / 15A Output Voltage Covere Derating - Input Voltage 3%/V below 90 VAC, re	Part Number		PSH-24-480	<u>PSH-48-480</u>	
Nominal Input Current 5.8–2.5 A Operational Input Voltage Range 85–264/NC Input Voltage Frequency Range 45–65Hz Inrush Current (115/230 VAC) 15/30A Standby Power Consumption 4.8/3.8 W [115/230 VAC] Active Power Factor Correction (PFC) 0.990.87[115/230 VAC] Circuit Breaker Rating / Characteristic 6-16 A/B, C[IEC]; 20 A/B, C [USA] Dutput OD 480W Wax. Output Power 480W Output Voltage Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A / 30A 10A / 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V 10A / 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V 10A / 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V 10A / 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V 10A / 15A Output Power Derating - Imperature 2%/K above 60°C, refer to Fig. 5 004 / 10A / 15A Output Power Derating - Imput Voltage 3%/V below 90 VAC, refer to Fig. 4 Output Power Derating - Imput Voltage 2%/K above 60°C, refer to Fig. 4 Output Power Derating - Imput Voltage	Input (AC)				
Operational Input Voltage Range 85-264VAC Input Voltage Frequency Range 45-66Hz Inrush Current (115/230 VAC) 15/30A Standby Power Consumption 4.8/3.8 W[115/230 VAC] Active Power Factor Correction (PFC) 0.99/0.97[115/230 VAC] Active Power Factor Correction (PFC) 0.99/0.97[115/230 VAC] Active Power Factor Correction (PFC) 0.99/0.97[115/230 VAC] Max. Output Breaker Rating / Characteristic 6-16 A/B, C[IEC]; 20 A/B, C [USA] Dulput (DC) 480W Max. Output Power 480W Output Voltage 24V 48V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A / 15A Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Output Voltage Adjustment Range 23.5-28 V 94/95 % Input Variation Load Variation Load Variation (10-90 %) 0.5 % max. 0.1 % max. Output Power Derating - Temperature 2% Above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 200 mVp-p max. 000 mVp-p max. Outpu	Nominal Input Voltage		100–240 VAC		
Input Voltage Frequency Range 45-65Hz Inrush Current (115/230 VAC) 15/30A Standby Power Consumption 4.8/3.8 W [115/230 VAC] Active Power Factor Correction (PFC) 0.900.97(115/230 VAC] Active Power Factor Correction (PFC) 0.900.97(115/230 VAC] Active Power Factor Correction (PFC) 0.900.97(115/230 VAC] Class A, D Class A, D Circuit Breaker Rating / Characteristic 6-16 A/B, C[EC]; 20 A/B, C [USA] Dutput IDP 480W Output Voltage 24V Max. Output Power 480W Output Voltage 24V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A / 15A Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Regulation [Input Variation [10-90 %] 0.5 % max. 10A / 15A Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20 ms min. 21 Staru-up time 2 max. 20 mVp-p max.	Nominal Input Current				
Inrush Current (115/230 VAC) 15/30A Standby Power Consumption 4.8/3.8 W [115/230 VAC] Active Power Factor Correction (PFC) 0.9/0.9/115/230 VAC] Harmonic limits – acc. EN 61000-3-2 Class A, D Circuit Breaker Rating / Characteristic 6-16 A/B, C[IEC]: 20 A/B, C [USA] Dutput (DC) 480W Max. Output Power 480W Output Voltage 24V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 10A/ 15A Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 5 00/11 % max. Output Power Derating - Input	Operational Input Voltage Range		85-	-264VAC	
Standby Power Consumption 4.8/3.8 W [115/230 VAC] Active Power Factor Correction (PFC) 0.99/0.97[115/230 VAC] Harmonic limits – acc. EN 61000-3-2 Class A, D Circuit Breaker Rating / Characteristic 6-16 A/B, C[IEC]; 20 A/B, C [USA] Udput (IDC) 480W Max. Output Power 480W Output Voltage 24V Max. Output Current / Max. Output Current 45 ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A / 30A Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Class A, D [10-90 %] 0.5 % max. 104 / 15A Output Voitage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 5 Output Power Derating - Input Voltage 20m min. 58 Start-up time 20 mVp-p max. 20 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32-35V 58-60V Power Back Immunity (Note 3) < OVP level 100 mVp-p max. Output Overvoltage Protection (OV	Input Voltage Frequency Range		4	5–65Hz	
Active Power Factor Correction (PFC) 0.99/0.97[115/230 VAC] Harmonic limits – acc. EN 61000-3-2 Class A, D Circuit Breaker Rating / Characteristic 6-16 A/B, C[IEC]: 20 A/B, C [USA] Dutput (DC) 480W Max. Output Power 480W Output Voltage 24V 48V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A / 30A 10A / 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Output Voltage Adjustment Range 23.5–28 V 47.5–56 V Max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 01/1 % max. Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 5 01/1 % max. Output Power Derating - Input Voltage 20m mm. 200 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level 100 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level 100% of lout nominal <th>Inrush Current (115/230 VAC)</th> <th></th> <th></th> <th>15/30A</th>	Inrush Current (115/230 VAC)			15/30A	
Harmonic limits – acc. EN 61000-3-2 Class A, D Circuit Breaker Rating / Characteristic 6-16 A/B, C[IEC]: 20 A/B, C [USA] Dutput (DC) 480W Max. Output Power 480W Output Voltage 24V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A / 30A Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Regulation Input Variation Load Variation 10-90 %] 0.5 % max. Output Voltage Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Vower Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32-35V 56-60V Power Back Immunity (Note 3) < OVP level Nominal Operation 100-5% % flout nominal constant Current (CC) Duty Cycle (for peak and cc mode) (Note 4) > 105 % flout nominal Constant Current (CC) Short Circuit Protection Switch offit res delay, automatic restart (Note 4) Normal Operation / Off Pe	Standby Power Consumption		4.8/3.8 W	[115/230 VAC]	
Circuit Breaker Rating / Characteristic 6-16 A/B, C[IEC]; 20 A/B, C [USA] Dutput (DC) Max. Output Power 480W Output Voltage 24V 480W Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A/30A 10A/15A Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Regulation Input Variation 0.1 % max. Load Variation 0.1 % max. 100-90 %] 0.5 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20 m win. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. 200 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32-35V 66-60V Power Back Immunity (Note 3) < OVP level 60-60V Operation Mominal Operation Post of lout nominal Constant Current (CC) 100% of lout nominal 105-50% of lout nominal 105-50% of lout nominal 105-50% of lout nominal 105-50% of lout nominal 105% of lout nominal 105-50% of lout nominal 105% o	Active Power Factor Correction (PFC)		0.99/0.97	[115/230 VAC]	
Dutput (DC) 480W Max. Output Power 480W Output Voltage 24V 48V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A/ 30A 10A/ 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Input Variation Load Variation 0.1 % max. [10–90 %] 0.5 % max. 0.1 % max. [10–90 %] 0.5 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 0utput Power Derating - Imput Voltage Start-up time 20m smin. 21 max. Start-up time 20m smin. 20m VP-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level 100% of lout nominal Operation Nominal Operation Constant Current (CC) 1005–150% of lout nominal Dutyc Cycle (for peak and cc mode) (Note 4) > 105% of lout nominal Threshold for Vout ON: > 22.5 V typ. Short Circuit Protection Switch off at fler switch off or peak and cc operation timer reset] <	Harmonic limits – acc. EN 61000-3-2		CI	ass A, D	
Max. Output Power 480W Output Voltage 24V 480W Output Voltage 24V 48V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A / 30A 10A / 15A Output Voltage Adjustment Range 23.5-28 V 47.5-56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Regulation Input Variation Load Variation 0.1 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20m min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32-35V Power Back Immunity (Note 3) < OVP level Power Operation 100% of lout nominal Operation Nominal Operation Power Operation 105 % Power Operation / Off Period > 105 % Short Circuit Protection Swi	Circuit Breaker Rating / Characteristic		6-16 A /B, C[IE	C]; 20 A /B, C [USA]	
Output Voltage 24V 48V Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A / 30A 10A / 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Regulation Load Variation Load Variation Load Variation 0.1 % max. [10–90 %] 0.5 % max. 0.1 % max. [10–90 %] 0.5 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 00utput Voltage Output Overvo Torating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 40/d-up time Start-up time 20m min. 200 msmin. 200 msm. Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level 00% of lout nominal Operation 100% of lout nominal 105 % of lout nominal Cor Peak Operation Timer > 105 % < 105 % Cor Peak And cc mode) (Note 4) Switch off after 4s delay, automatic restart after switch off < 105 % Cor Peak Operation Timer > 20.5 V Up. ON: > 22.5 V Up. OFF: < 43V Up.	Output (DC)				
Max. Output Current / Max. Output Current 4s ("Boost power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A / 30A 10A / 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Regulation Input Variation Load Variation 0.1 % max. Coutput Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 20 ms min. Start-up time 200 mVp-p max. Output Overvoltage Protection (OVP) (Note 1) 100 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V Power Back Immunity (Note 3) < OVP level Operation 100% of lout nominal 105–150% of lout nominal 105–150% of lout nominal 105–50% of lout nominal 105–50% of lout nominal 105–50% of lout nominal 105–50% of lout nominal 1055% di lout nominal 105% di lout nominal 105% di lout nominal 105% of lout nominal 105% di lout nominal 1055% di lout nominal 1055% di lout nominal 105% di lout no	Max. Output Power			480W	
power" which facilitates the activation of stepper motors, solenoids, or actuators) 20A / 30A 10A / 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Regulation Load Variation Load Variation 0.1 % max. 10A / 15A Output Voltage Adjustment Range 23.5–28 V 47.5–56 V Negulation Load Variation 0.1 % max. 10A / 98 % Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20 ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. 200 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level 0VP level Operation 100m Np-p max. 100 mVp-p max. 200 mVp-p max. Output Cycle (for peak and cc mode) (Note 4) 105–150% of lout nominal > 105 % CC or Peak Operation Timer > 105 % 450 motor for peak and cc operation timer reset] Short Circut Protection Switch off after 4s delay, automatic re	Output Voltage		24V	48V	
Typical Efficiency (@ 115/230 VAC) 93/95 % 94/95 % Regulation Input Variation Load Variation 0.1 % max. [10–90 %] 0.5 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V Power Back Immunity (Note 3) < OVP level Operation Nominal Operation Peak Power Operation Constant Current (CC) Duty Cycle (for peak and cc mode) (Note 4) Threshold > 105 % Stort Curcut Protection Switch off after 4s delay, automatic restart (Note 4) Normal Operation / Off Period Switch off after 4s delay, automatic restart (Note 4) DC OK Threshold for Vout ON: > 22.5 V typ. OFF: < 21.5 V typ. ON: > 45V typ. OFF: < 43V typ.			20A / 30A	10A / 15A	
Input Variation Load Variation 0.1 % max. [10-90 %] 0.5 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. 200 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level Mominal Operation Peak Power Operation Constant Current (CC) 100% of lout nominal 105–150% of lout nominal 105–150% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) Threshold > 105 % 4s max. [switch off] Short Circuit Protection Switch off after 4s delay, automatic restart (Note 4) DC OK Threshold for Vout ON: > 22.5 V typ. OFF: < 21.5 V typ. ON: > 45V typ. OFF: < 43V typ.	Output Voltage Adjustment Range		23.5–28 V	47.5–56 V	
Regulation [10–90 %] 0.5 % max. Output Power Derating - Temperature 2%/K above 60°C, refer to Fig. 5 Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 25 max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. 200 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level Nominal Operation Deparation Constant Current (CC) 100% of lout nominal 105–150% of lout nominal 105–150% of lout nominal 1055% of lout nominal 1055% of lout nominal 105% of lout nominal 100% of lou	Typical Efficiency (@ 115/230 VAC)		93/95 %	94/95 %	
Output Power Derating - Input Voltage 3%/V below 90 VAC, refer to Fig. 4 Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32-35V Power Back Immunity (Note 3) < OVP level Nominal Operation 100% of lout nominal Peak Power Operation 105–150% of lout nominal Corstant Current (CC) 105 % Duty Cycle (for peak and cc mode) (Note 4) + 105 % Threshold Short Circuit Protection Short Circuit Protection ON: > 22.5 V typ. ON: > 22.5 V typ. OFF: < 21.5 V typ. OFF: < 21.5 V typ. OFF: < 21.5 V typ. ON: > 22.5 V typ. ON: > 22.5 V typ. OFF: < 21.5 V typ. OFF: < 430 V typ.					
Hold-up time 20ms min. Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. 200 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level	Output Power Derating - Temperature		2%/K above 60°C, refer to Fig. 5		
Start-up time 2s max. Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. 200 mVp-p max. Output Ov=roltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level Nominal Operation Peak Power Operation Constant Current (CC) 100% of lout nominal 105–150% of lout nominal 105–150% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) Threshold > 105 % 4s max. [switch off] Short Circuit Protection Switch off after 4s delay, automatic restart (Note 4) DC OK Signal Threshold for Vout ON: > 22.5 V typ. OFF: < 21.5 V typ. ON: > 45V typ. OFF: < 43V typ.	Output Power Derating - Input Voltage		3%/V below 90 VAC, refer to Fig. 4		
Ripple and Noise (20MHz bandwidth) (Note 1) 100 mVp-p max. 200 mVp-p max. Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level Operation Nominal Operation Peak Power Operation Constant Current (CC) 100% of lout nominal 105–150% of lout nominal 105–50% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) Threshold > 105 % 4s max. [switch off] Short Circuit Protection Switch off after 4s delay, automatic restart (Note 4) DC OK Signal Threshold for Vout ON: > 22.5 V typ. OFF: < 21.5 V typ. ON: > 45V typ. OFF: < 43V typ.	Hold-up time		20ms min.		
Output Overvoltage Protection (OVP) (Note 2) 32–35V 56–60V Power Back Immunity (Note 3) < OVP level Nominal Operation 100% of lout nominal Operation Peak Power Operation Constant Current (CC) 105–150% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) > 105 % Threshold > 105 % CC or Peak Operation Timer > 105 % Normal Operation / Off Period < 10s typ [automatic restart after switch off] Short Circuit Protection Switch off after 4s delay, automatic restart (Note 4) DC OK Threshold for Vout ON: > 22.5 V typ. ON: > 45V typ. Signal DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	Start-up time		2s max.		
Power Back Immunity (Note 3) < OVP level Operation Nominal Operation Peak Power Operation Constant Current (CC) 100% of lout nominal 105–150% of lout nominal 105–150% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) Threshold > 105 % 4s max. [switch off] CC or Peak Operation Timer Normal Operation / Off Period > 105 % 4s max. [switch off] Short Circuit Protection Switch off after 4s delay, automatic restart (Note 4) DC OK Signal Threshold for Vout ON: > 22.5 V typ. OFF: < 21.5 V typ. ON: > 45V typ. OFF: < 43V typ.	Ripple and Noise (20MHz bandwidth) (Not	e 1)	100 mVp-p max.	200 mVp-p max.	
Nominal Operation 100% of lout nominal Operation 100% of lout nominal Peak Power Operation 105–150% of lout nominal Constant Current (CC) 155% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) > 105 % CC or Peak Operation Timer > 105 % Normal Operation / Off Period < 10s typ [automatic restart after switch off] Short Circuit Protection Switch off after 4s delay, automatic restart (Note 4) DC OK Threshold for Vout ON: > 22.5 V typ. ON: > 45V typ. DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	Output Overvoltage Protection (OVP) (No	te 2)	32–35V	56–60V	
Operation Constant Current (CC) 105–150% of lout nominal 155% of lout nominal Duty Cycle (for peak and cc mode) (Note 4) Threshold CC or Peak Operation Timer Normal Operation / Off Period > 105 % 4s max. [switch off] < 10s typ [automatic restart after switch off or peak and cc operation timer reset] Short Circuit Protection Switch off after 4s delay, automatic restart (Note 4) DC OK Signal Threshold for Vout ON: OFF: > 22.5 V typ. 21.5 V typ. ON: OFF: > 45V typ. 243V typ.	Power Back Immunity (Note 3)				
Threshold > 105 % CC or Peak Operation Timer 4s max. [switch off] Normal Operation / Off Period < 10s typ [automatic restart after switch off or peak and cc operation timer reset] Short Circuit Protection Switch off after 4s delay, automatic restart (Note 4) DC OK ON: > 22.5 V typ. JC ON ON: > 21.5 V typ. DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	Operation Peak Power Operation		105–150% of lout nominal		
DC OK Threshold for Vout ON: > 22.5 V typ. ON: > 45V typ. DC ON OFF: < 21.5 V typ. OFF: < 43V typ. DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	Duty Cycle (for peak and cc mode) (Note 4) Threshold CC or Peak Operation Timer Normal Operation / Off Period		4s max. [switch off]		
DC OK OFF: < 21.5 V typ.	Short Circuit Protection		Switch off after 4s delay, automatic restart (Note 4)		
Signal DC ON Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED	DC OK				
DC OFF Relay contact open max 30V			Relay contact closed, max. 1A, < 100mOhm, also indicated by green LED		
	DC OFF		Relay contact open, max 30V		

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

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

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

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



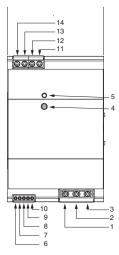
RHINO PRO PSH-xx-480 Power Supplies

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



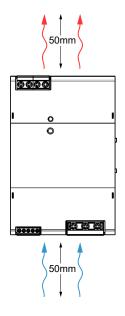
RHINO PRO PSH-xx-480 Power Supplies

Fig. 1



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

Fig. 2



Remote On/Off



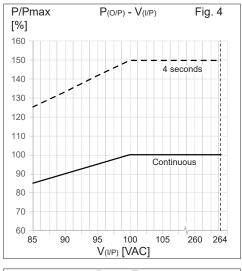


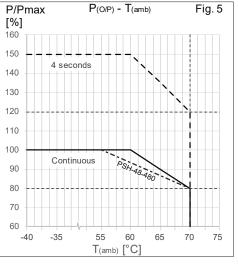


G	• (F 5. 0
E C SIGNALS	D B	INPUT

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







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