

# RHINO Installation Instructions for PSN24-960-3 Power Supply



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

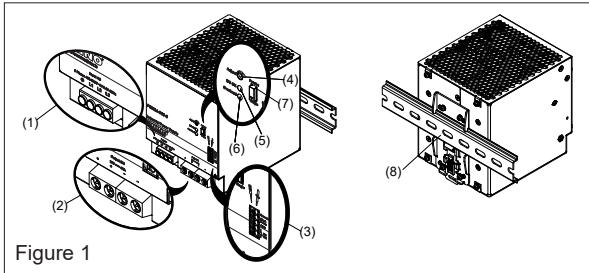


Figure 1

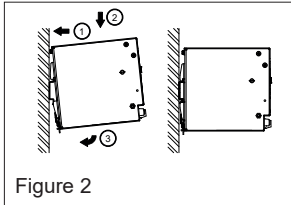


Figure 2

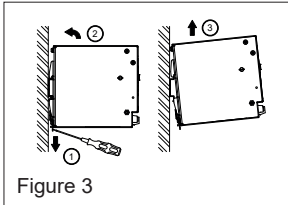


Figure 3

	Overload LED	DC OK LED	DC OK Contact
Normal mode	OFF	ON	Closed
During Power Boost	OFF	ON	Closed
Overload ( $V_{out} < 90\%$ )	Flashing	OFF	Open
Output short circuit	Flashing	OFF	Open
Temperature shut down	Flashing	OFF	Open
No input power	OFF	OFF	Open
Active shut down input	Flashing	OFF	Open

Figure 4

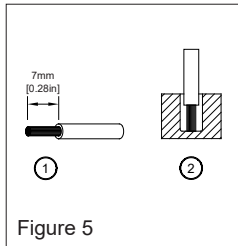


Figure 5

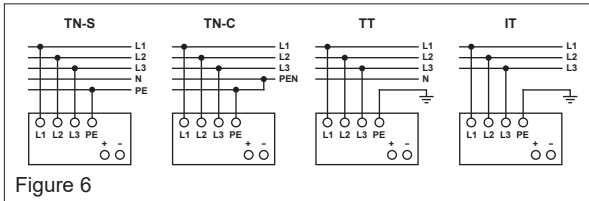


Figure 6

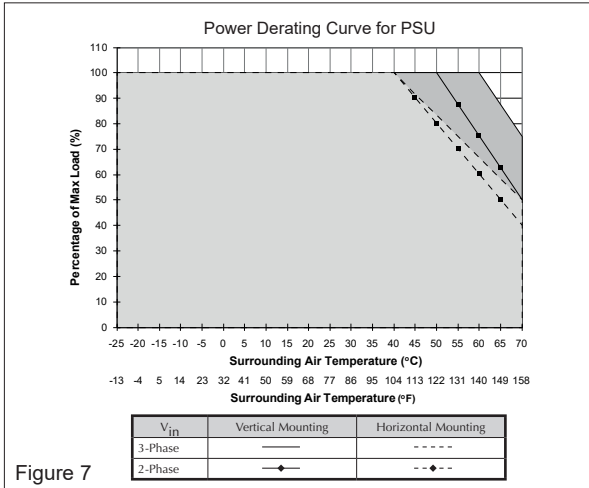


Figure 7

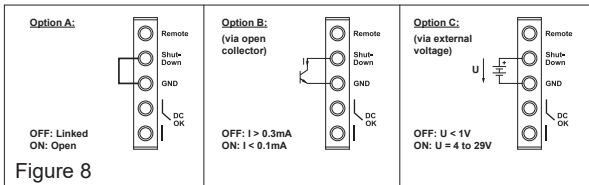


Figure 8

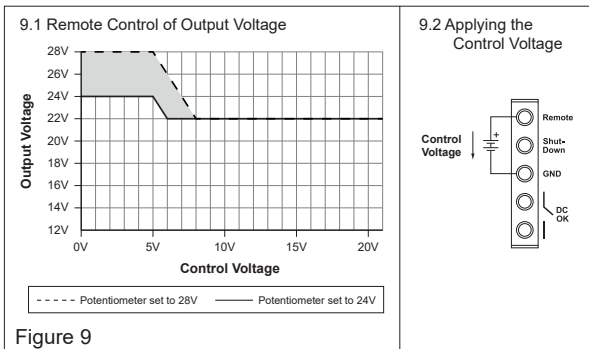


Figure 9

## 1. Safety instructions

- An easily accessible disconnecting device shall be provided to disconnect the unit from the mains supply for servicing.
- Switch main power off before connecting or disconnecting the device. Risk of explosion!
- If the unit is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- To guarantee sufficient convection cooling, please refer to the following instructions to ensure sufficient clearance around the device.
  - Vertical Mounting: 80 mm [3.15 in] above and 40 mm [1.57 in] below the device as well as a lateral distance of 5 mm [0.20 in] to other units. In case the adjacent device is a heat source, the lateral distance will be 50 mm [1.97 in].
  - Horizontal Mounting: 80 mm [3.15 in] above and 40 mm [1.57 in] below the device as well as a lateral distance of 40 mm [1.57 in] to other units.
- The external enclosure where the unit will be installed shall meet the requirements for mechanical, electrical and fire enclosure.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Risk of burns!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- Do not introduce any objects into the unit!
- Dangerous voltage present for at least 5 minutes after disconnecting all sources of power.
- The power supplies are built in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.
- The power supply is approved for the connection to 3-phase TN, TT and IT power grids (star networks) with a maximum phase-to-phase voltage of 500 VAC.
- CAUTION:** "For use in a controlled environment".

## 2. Device description (Fig. 1)

- (1) Input terminal block connector
- (2) Output terminal block connector
- (3) Signal terminal block connector (see Fig. 8-9)
- (4) DC voltage adjustment potentiometer
- (5) DC OK control LED (green)
- (6) Overload LED (red)
- (7) Select jumper (operation mode)
- (8) 35mm DIN rail mounting (DIN rail sold separately)

## 3. Mounting and dismantling (Fig. 2, Fig. 3)

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

Each device is delivered ready to install.

- Tilt the unit slightly upwards and put it onto the DIN rail. Snap on the DIN rail as shown in Fig. 2.
- Push downwards until stopped.
- Press against the bottom front side for locking.
- Shake the unit slightly to ensure that it is secured.
- To uninstall, pull or slide down the latch as shown in Fig. 3. Then, slide the PSU in the opposite direction, release the latch and pull out the PSU from the rail.

## 4. Connection

The terminal block connectors allow easy and fast wiring.

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

Table 1 Refer to Fig. 1:	Standard / Solid		Torque	
	(mm <sup>2</sup> )	(AWG)	(Nm)	(lb in)
(1)	0.82-8.4	18-8	0.91	8.1
(2)	3.3-13	12-6*	2.09	18.5
(3)	0.52-1.3	20-16	-	-

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

To secure reliable and shock proof connections, the stripping length should be 7 mm [0.28 in] (see Fig. 5 (1)). Please ensure that wires are fully inserted into the connecting terminals as shown in Fig. 5 (2). All wire strands must be fully inserted into the terminals with the screws securely fastened in order to ensure safety and maximum contact.

In accordance to EN 60950 / UL 60950 and EN 62368 / UL 62368, flexible wires require ferrules.

Use appropriate copper wire that is designed to sustain operating temperature of:

- USA: At least 60°C (140°F) for ambient not exceeding 40°C (104°F), and 75°C (167°F) for ambient exceeding 40°C (104°F).
- Canada: At least 75°C (167°F) for ambient not exceeding 40°C (104°F), and 90°C (167°F) for ambient exceeding 40°C (104°F).
- IEC/EN61010-1, IEC/EN61010-2-201: At least 90°C (194°F) for ambient not exceeding 40°C (104°F), and 105°C (221°F) for ambient exceeding 40°C (104°F).

### 4.1. Input connection (Fig. 1, Fig. 6)

Use L1, L2, L3 and PE connections of input terminal connector (see Fig. 1 (1)) to establish the 3 x 400-500 VAC connection. Fig. 6 shows the connection to the various network types.

In the event of a phase failure, unrestricted operation is possible with nominal capacity.

The unit is protected with internal fuse (not replaceable) at L1, L2 and L3 pins, which have been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above. Thus, if an external protective device is necessary, or, utilized, a minimum value of 6A B- or C- characteristic breaker should be used.



The internal fuse must not be replaced by the user.

### 4.2. Output Connection (Fig. 1 (2))

Use the "+" and "-" screw connections to establish the 24 VDC connection. The output provides 24 VDC. The output voltage can be adjusted from 24 to 28 VDC on the potentiometer. The green LED DC OK displays correct function of the output (Fig. 1 (4)). The device has a short circuit and overload protection and an overvoltage protection limited to 32 VDC.

### 4.3. Output characteristic curve

The device functions normal under operating line and load conditions. In the event of an over load ( $I_o > 150\%$ ) the output voltage will start to droop and bounce until over load has been removed. If the loads are in short circuit, the secondary voltage will bounce and recover once the short circuit has been removed.

### 4.4. Indicators and relay contacts (Fig. 4)

### 4.5. Thermal behavior (Fig. 7)

If the output capacity is beyond what is recommended in Fig. 7, the device will run into thermal protection by switching off i.e. device will go in bouncing mode and will recover when ambient temperature is lowered or load is reduced as far as necessary to keep device in working condition.

### 5. Single/Parallel selection (Fig. 1 (7))

This select jumper on the front of the power supply unit enables load sharing when power supplies are connected in parallel. When the jumper is in parallel mode, the output voltage will droop down around 4% from no load to maximum load. If the jumper is not plugged in, the power supply unit functions in single mode. Default factory setting jumper is in single mode.

Instructions for Parallel Mode: Ensure that output voltage is adjusted to  $V_o + 1V (\pm 0.1V)$  in "Parallel Mode" at no load conditions on all units.  $V_o$  = output voltage at maximum load conditions in parallel mode.

Example:  $V_o$  at maximum load = 24V. The output voltage adjusted for parallel mode at no load should be  $(V_o + 1V) 24 + 1 = 25V (\pm 0.1V)$ .

### 6. Shutdown (Fig. 8)

This pin allows user to switch off the power supply with a control switch or external voltage. The shutdown function has no safety feature included. In a shutdown condition, the output voltage is < 2V and the output power is < 0.5W. Therefore, there is a risk of shock hazard when coming in contact with the power supply. The shutdown occurs immediately while the turn-on is delayed by 350 ms.

### 7. Remote (Fig. 9)

Remote pin function is to control the output voltage. A control voltage applied on this pin reduces the adjusted output voltage.

Instructions:

- Set the unit into "Single Use" mode.
- Set the output voltage adjustment to the maximum desired voltage.
- Apply a control voltage to reduce the output voltage.

FOR TECHNICAL ASSISTANCE CALL 770-844-4200

# Technical Data For PSN24-960-3

<b>Input (AC)</b>	
Nominal input voltage / frequency	3 x 400-500 VAC / 50-60Hz
Voltage range	3 x 320-600 VAC or 2 x 380-600 VAC
Frequency	47-63Hz
Nominal current	< 1.65 A @ 3 x 400 VAC
Inrush current limitation (+25°C, cold start)	14.2 A typ. @ 3 x 400 VAC, 17.7A typ. @ 3 x 500 VAC
Mains buffering at nominal load (typ.)	25 ms typ. @ 3 x 400 VAC & 3 x 500 VAC
Turn-on time	600 ms typ. @ 3 x 400 VAC & 3 x 500 VAC
Internal fuse	T 4 A / 500V
Leakage current	TN/TT-system / IT-system: < 0.62 mA / 0.64 mA @ 3 x 400 VAC, 50Hz TN/TT-system / IT-system: < 0.68 mA / 0.78 mA @ 3 x 440 VAC, 50Hz TN/TT-system / IT-system: < 0.86 mA / 0.91 mA @ 3 x 480 VAC, 60Hz TN/TT-system / IT-system: < 0.95 mA / 1.20 mA @ 3 x 528 VAC, 60Hz
<b>Output (DC)</b>	
Nominal output voltage $U_N$	24 VDC
Adjustment range of the voltage	24-28 VDC
Nominal current	40 A (Vout = 24 VDC) 34.3 A (Vout = 28 VDC) 60 A (for 4 s, Vout = 24 VDC) 51.5 A (for 4 s, Vout = 28 VDC)
Derating	3-Phase: > 60°C [140°F] (2.5% / °C) in Vertical, > 40°C [104°F] (1.67% / °C) in Horizontal 2-Phase: > 50°C [122°F] (2.5% / °C) in Vertical, > 40°C [104°F] (2% / °C) in Horizontal
Startup with capacitive loads	40,000 µF typ.
Max. power dissipation idling / nominal load approx.	9.8W / 48.4W
Efficiency	95.3% typ. @ 3 x 400 VAC, 95.2% typ. @ 3 x 500 VAC
PARD (20MHz) at 100% load	< 100 mVpp
Max. relay contact rating	30V (SELV) / 1 A resistive load
Parallel operation	Yes, refer to section 5. Single/Parallel Selection
<b>General Data</b>	
Type of housing	Aluminum
Signals	Green LED DC OK Red LED Overload
MTBF	> 550,000 hrs. as per Telcordia SR-332 (I/P: 3 x 400 VAC; O/P: 24V, 40 A; Ta: 25°C)
Dimensions (L x W x H)	124 mm x 110 mm x 128.6 mm [4.88 in x 4.33 in x 5.06 in]
Weight	2.3 kg [5.07 lb]
Connection method	Screw connection
Wire size / torque	See Table 1
Stripping length	7 mm [0.28 in]
Operating temperature (surrounding air temperature)	-25°C to +70°C [-13°F to 158°F] (Refer to Fig. 7)
Storage temperature	-40°C to +85°C [-40°F to 185°F]
Humidity at +25°C, no condensation	5 to 95% RH
Vibration (non-operating)	10 to 500Hz @ 30m/S <sup>2</sup> (3G peak); displacement of 0.35mm; 60 min. per axis for all X, Y, Z directions in acc. with IEC60068-2-6
Shock (non-operating, in all directions)	30G (300m/S <sup>2</sup> ) in all directions according to IEC60068-2-27
Pollution degree	2
Altitude (operating)	IEC/EN62477-1, EN60204-1 and IEC62103-1: Max. 2500m for OVC III, Max. 6000m for OVC II IEC/EN61558-1 and IEC/EN61558-2-16: Max. 3000m for OVC II IEC/EN60950-1, IEC/EN62368-1, IEC/EN61010-1 and IEC/EN61010-2-201: Max. 5000m for OVC II
<b>Certification and Standards</b>	
Electrical equipment of machines	IEC60204-1 (over voltage category III)
Electronic equipment for use in electrical power installations	IEC/EN 62477-1 / IEC62103
Safety entry low voltage	PELV (EN 60204-1), SELV (EN 60950-1)
Electrical safety (of information technology equipment)	UL/C-UL recognized to UL60950-1 and CSA C22.2 No. 60950-1 (File No. E198298), UL/C-UL recognized to UL62368-1 and CSA C22.2 No. 62368-1 (File No. E508040), CB scheme to IEC 60950-1, IEC 62368-1, IEC 61558-1, IEC 61558-2-16, IEC 61010-1, IEC 61010-2-201 UL/C-UL listed to UL508 and CSA C22.2 No. 107.1-01 (File No. E197592)
Industrial control equipment	UL/C-UL listed to UL508 and CSA C22.2 No. 107.1-01 (File No. E197592)
CE	In conformance with EMC directive 2014/30/EU and low voltage directive 2014/35/EU
Component power supply for general use	EN61204-3
Immunity	EN 55024, EN 55035, EN 61000-6-2 (EN61000-4-2, 3, 4, 5, 6, 8, 11, 12)
Emission	EN55032, EN55011, EN61000-3-2 Class A, EN61000-3-3, EN61000-6-3
  	
RoHS Compliant	Yes
<b>Safety and Protection</b>	
Transient surge voltage protection	VARISTOR
Current limitation at short-circuits approx.	I <sub>surge</sub> = 150 % of Pomax typically (hiccup mode)
Surge voltage protection against internal surge voltages	Yes
Isolation voltage:	
Input / Output	4.86 kVAC
Input / PE	2.92 kVAC
Input / DC OK*	4.86 kVAC
Output / PE	1.50 kVAC
Output / DC OK	0.50 kVAC
DC OK / PE	1.50 kVAC
Protection degree	IP20
Safety class	Class I with GND connection

\*Recommend connecting DC OK pins to output pins.