

Rhino Redundancy Module PSM24-REM360S

Operating Instructions



RHINO REDUNDANCY MODULE PSM24-REM360S

Description

With this module and two power supplies of the PSM series (78, 90, 156, 180 and 360 watt models), a highly reliable, truly redundant power system can be configured without any additional components. This module forces each power supply to share the output current equally. The system is fully redundant and provides power to the output even if one power supply has completely failed (e.g., by short circuit on the output). If one power supply fails or is disconnected, the second device will automatically supply the full current to the load. The redundancy of the system is monitored, and, if lost, indicated by an alarm output. The inputs are hot-swappable and can be loaded up to 15 A each. The output of the PSM24-REM360S should not be overloaded to provide a proper $n+1$ redundancy system. The maximum output current is also 15 A. Both PSM power supplies have to be adjusted to $V_{out} = 24.00$ to 24.05 VDC before connecting them to the PSM24-REM360S. Afterward, the connection between the PSM power supplies and Input 1 (+Vin and -Vin; J1 pin 1 & pin 2) as well as Input 2 (+Vin and -Vin; J1 pin 3 & pin 4) and the remote sensing (J3 & J4) between these two devices and the PSM24-REM360S using the wire supplied with the PSM24-REM360S module can be made. Now the load can be connected to DC-Out (J2 pin 1, pin 2, pin 3 & pin 4). The output voltage on the PSM24-REM360S can be adjusted between 24 and 27 VDC using the potentiometer on the module. The PSM24-REM360S is a built-in device. The mounting position must fulfill the requirements for fireproof enclosure according to UL60950, IEC/EN 60950 or other appropriate national standard. The relevant UL regulations or equivalent national regulations must be observed during installation. The PSM24-REM360S is designed for mounting on a DIN rail (DIN EN 50022-35x15/7.5). The output voltage of the PSM24-REM360S is protected against short circuit and open circuit conditions.



Warning The PSM24-REM360S built-in module is designed especially for use in process automation and other industrial applications. Components with dangerously high voltage and high stored energy are located in the device; however, these are inaccessible. Failure to properly maintain the PSM24-REM360S can result in death, severe personal injury or substantial property damage. The PSM24-REM360S should be installed and put into operation by qualified personnel only. The corresponding national regulations (e.g. UL, ANSI, VDE, DIN) must be observed. The successful and safe operation of this module is dependent on proper storage, handling, installation and operation. The potentiometer to adjust the output voltage must be actuated using only an insulated screwdriver, because accidental contact may be made with parts inside the power supply carrying dangerous voltages.



Caution: Risk of electrical shock and electrical discharge. Only qualified and trained personnel should open the PSM24-REM360S or the power supply. Do not open the PSM24-REM360S or the power supply until at least 5 minutes after complete disconnection of the main power. Electrostatic sensitive device. In case of non-observance or exceeding the limiting value mentioned in these instructions, the function and electrical safety can be impaired and can destroy the PSM24-REM360S and/or the power supply.

Danger: Never work on the PSM24-REM360S or power supplies if power is applied! Before installation ensure that the main switch is switched off and locked out. Touching of any live components or improper usage of PSM24-REM360S or power supply can result in death or fatal injury.



Warning: To minimize the risk of potential safety problems, follow all applicable local and national codes regulating the installation and operation of this equipment. These codes vary from area to area and it is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation are in compliance with the latest revision of these codes. Failure to follow all applicable codes, or exceeding the limiting value can impair the function and electrical safety and destroy the power supply. Serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication to be suitable for your particular application, nor do we assume any responsibility for your product design, installation or operations.

Before operating

- Read these operating instructions carefully and completely.
- Check that the input wiring is sufficiently protected and is the correct size.
- Check that the output wiring is rated for the maximum output current, and connected with the correct polarity.
- Verify that sufficient cooling is assured.
- Caution: The temperature of the housing can become very high, depending on the ambient temperature and load.

Installation

Assembly

A sufficiently strong DIN rail, such as DN-R35S1, must be used. Observe the correct mounting position for optimal cooling performance. A minimum free space of 80 mm [3.15 in.] is required above and below the PSM24-REM360S; leave a minimum space of 50 mm [1.97 in.] (which allows air convection) on each side. The air temperature, as measured 10 mm [0.39 in.] below the device, must not exceed the specified values in these instructions. The power derating above ambient temperatures of 40°C is the same as specified for the PSM power supplies.

To attach the module to the DIN rail, hook top part of clip on DIN rail, then push down and inward until you hear a clipping sound. To remove the device, pull the latch of the clip using an insulated flathead screwdriver. When clip has cleared the bottom DIN rail, remove the screwdriver from the recess. Lift the module off DIN rail. Wall mounting or chassis mounting can be achieved by use of optional mounting bracket, PSM-PANEL1. Remove the DIN-clips by removing the screw and place the mounting brackets in the same place as the DIN-clips. Use the countersink screws included with the wall mounting kit to attach the mounting brackets to the PSM24-REM360S (tightening torque 0.8-0.9Nm).

Connecting cable

Allow only qualified personnel to install the module. The device is equipped with a COMBICON connector. This reliable and easy-to-assemble connection method provides a fast connection of the device.

Input 1 and Input 2 Connector (J1, pin 1, pin 2, pin 3 & pin 4)

The connection is made by using the -Vin and +Vin connections at Input 1 as well as at Input 2 and must be done in accordance with the local codes and regulations. Choose correct wiring size from the Connections and Terminal Assignment table below. To achieve a reliable and shockproof connection, strip the connecting ends as listed in the following table. If flexible wires are used, terminate them using ferrules.

Connections and Terminal Assignments

Device	Terminals	Function	Solid or Stranded Wires		Torque Nm	Stripping Length mm
			mm ²	AWG		
PSM24-090S PSM24-180S	-Vin & + Vin	Input 1 Input voltage (24 VDC)	0.5 to .2.5	24 to 12	0.5 to 0.6	7.0
	-Vin & + Vin	Input 2 Input voltage (24 VDC)	0.5 to .2.5	24 to 12	0.5 to 0.6	7.0
	+Vout & - Vout	Output voltage (24 VDC)	0.5 to .2.5	24 to 12	0.5 to 0.6	7.0
	Signal	Relay inputs and relay outputs	0.2 to 2.5	32 to 12	0.5 to 0.6	7.0
PSM24-360S	-Vin & + Vin	Input 1 input voltage (24 VDC)	1.0 .to-2.5	18 .to 12	0.5 to 0.6	7.0
	-Vin & + Vin	Input 2 input voltage (24 VDC)	1.0 .to-2.5	18 .to 12	0.5 to 0.6	7.0
	+Vout & - Vout	Output Voltage (24 VDC)	1.0 .to-2.5	18 .to 12	0.5 to 0.6	7.0
	Signal	Relay inputs and relay outputs	0.2 to 2.5	32 to 12	0.5 to 0.6	7.0

Output (Connector J2, pin 1, pin 2, pin 3 & pin 4)

The 24 VDC connection is made using the “+Vout” and “-Vout” terminals. All output terminals should be connected to the load. Make sure that all output lines are sized according to the maximum output current (see Connections and Terminal Assignments table above) or are separately protected. The wires on the secondary side should have large cross sections in order to keep the voltage drops on these lines as low as possible. To achieve a reliable and shockproof connection strip the connecting ends according to the above Connections and Terminal Assignments table. If flexible wires are used, terminate them using ferrules. At delivery, the output voltage is 24 VDC. The output voltage can be set (using an insulated screwdriver) from 24 to 27 VDC on the potentiometer. The device is protected against overload and short circuit.

Signaling (Connector J5, pin 1 & pin 2)

The DC OK outputs facilitate monitoring of the functions of the two PSM power supplies. The Alarm signal contacts (connector J5, pin 1 & pin 2) are monitoring if the output voltage is present in both of the PSM power supplies, which are connected to the PSM24-REM360S Input 1 and Input 2. If one of the devices is disconnected or damaged (e.g., in the event of a power supply’s internal short circuit), the alarm is generated. The contact on the relay will switch off (relay contact = open). If both PSM power supplies provide at least an output voltage of 21.5 VDC, the relay contact is closed and signals that both power supplies are in operation. If the output voltage of the PSM24-REM360S is present, the relay contact (30 VDC / 1A) is closed. It is detected by measuring the PSM24-REM360S input voltage at Input 1 as well as at Input 2.

Inputs-ON LED

The Inputs-ON LED is a green LED that indicates the status of the PSM24-REM360S inputs and enables visual evaluation of the function locally in the control cabinet.

Status LED Function	
Inputs-ON LED Green ON	Both power supplies are supplying the PSM24-REM360S with 24 VDC
Inputs-ON LED Green OFF	One or both power supplies failed

Remote ON/OFF Function:

The PSM24-REM360S device provides an external remote on/off function by use of pin 3 & pin 4 at connector J5. To switch off the power supply and PSM24-REM360S a connection between connector J5 pin 3 and connector J5, pin 4 by use of a switch or similar has to be made. At open connection between J5 pin 3 and J5 pin 4 the device is providing the adjusted output voltage.

PSM Power Supply Configuration:

The PSM power supply should be configured for “normal” operation mode. Connector J4 should be set with the jumper between 1 and 2.

Compliance to UL 508C

The PSM24-REM360S is a built-in device. To comply with UL508C, the device must be installed in a cabinet with minimum dimensions of: 400 mm (width) x 500 mm (height) x 200 mm (depth)

Operating Temperature Ranges and load derating:

Operating temperature ranges and load derating depend on the PSM power supplies connected to the PSM24-REM360S. Please see operating temperature ranges and load derating values listed in the datasheet or PSM operating instructions for the applicable PSM power supplies, available on our website at www.automationdirect.com.

Technical Specifications



Input Specifications				
Part Number	Input	Max. Input Power	* Output Voltage	**Max. Output Current
PSM24-REM360S	2 x 24 VDC 2 x control input	2 x 360 Watt	24 VDC	360 W (15.0 A)

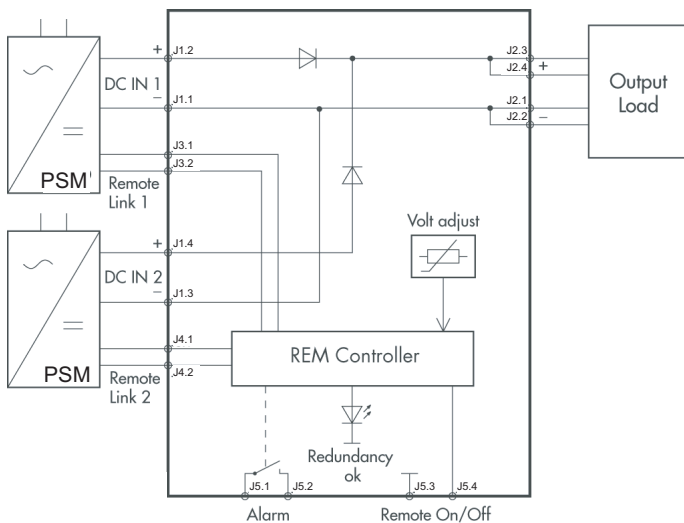
*Output voltage adjustable

**Maximum current at Vout nom.

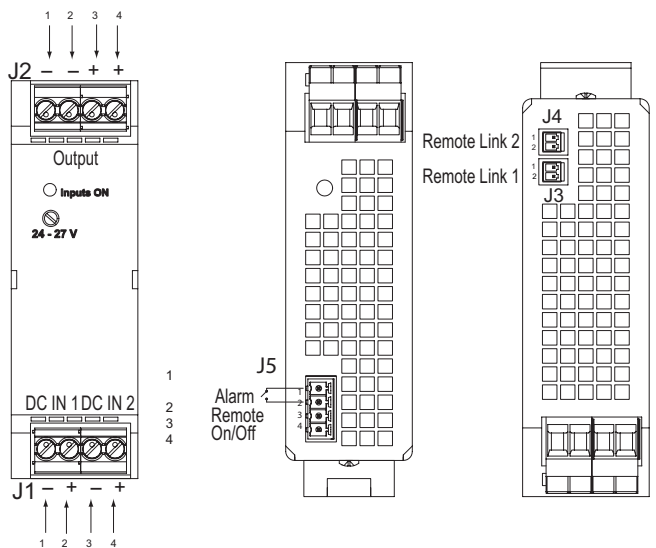
Output Specifications		
Output Voltage Adjustable Range with Potentiometer		24 to 27 VDC
Ripple and Noise (20MHz Bandwidth)	At V_{in} nom and I_{out} max	230 mV peak-to-peak max
Maximum Capacitive Load		unlimited

*Outputs are short-circuit protected.

Redundancy Module Function Diagram



Redundancy Module Connector Positions



	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

General Specifications	
Specification	Description
Input	2 x 24 VDC, 2 x Control Input
Max Power per Input	2 x 360 W
Output Voltage Adjust	24 VDC (24 to 27 VDC)
Output Power Max	360 W (15 A)
Temperature	Operating Temperature (ambient): -25°C to +70°C max (-13°F to 158°F). Above +40°C(104°F) load derating Storage Temperature (non-operating): -25°C to +85°C max (-13°F to 185°F). Temperature drift: 0.02%/K Cooling: convection, no internal fan
Reliability, Calculated MTBF	In accordance with IEC 61709 > 350,000 hours
Electromagnetic Compatibility	In correspondence to connected units (no internal switching device)
Redundancy Alarm Signal	Trigger threshold at 18 to 22 VDC. Contact closed if one or both inputs failed
Dimensions	WxHxD 35.0 mm (1.30 in) x 110.0 mm (4.33 in) x 110.0 mm (4.33 in)
Remote Link Wire 0.5m	Two cables included with PSM24-REM360S module
Alarm Contact Rating	30 VDC/1.0 A max
Humidity	95% (non-condensing) relative humidity maximum
Isolation	According to IEC/EN 60950, UL 60950, UL 508C, EN50178, EN61558-2-8, EN60204
Status Indicator	Green LED: Green On: both PSM power supplies working Green Off: one or two power supplies failed, or Off
Remote ON/OFF	By external contact: OFF - J5, Pin 3 and Pin 4 shorted ON - J5, Pin 3 and Pin 4 open
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)

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

General Specifications – Safety Standards		
Specification	Standard	Document Number
Harmonic Limits	Harmonic Current Limits:	EN 61000-3-2, Class A for limited output power
Safety Class	Degree of electrical protection Class1	IEC 536
Electromagnetic Compatibility (EMC), Emissions	EMC, Emissions	Corresponds to connected units (no internal switching device)
Electromagnetic Compatibility (EMC), Immunity	EMC, Immunity	Corresponds to connected units (no internal switching device)
Pollution Degree	2	

