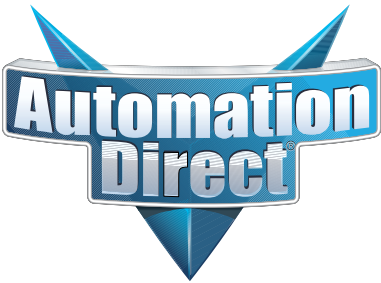


Rhino Battery Control Module PSM24-BCM360S

Operating Instructions



RHINO BATTERY CONTROL MODULE PSM24-BCM360S

Description

The module PSM24-BCM360S provides a professional battery management system to charge and monitor an external lead-acid battery. Combined with a PSM power supply and a PSM-TS temperature sensor, a perfect DC-UPS system can be configured. The connected battery will be charged and held in charge mode by the power supply. In the event of a power failure the battery will supply the output power until supply is returned or the battery is discharged. As a consequence, the output voltage of the system is equivalent to the battery voltage. To avoid overcharging the battery, an external temperature sensor (PSM-TS) adjusts the battery voltage automatically to the required end of charge voltage. This ensures a long battery life. The battery is protected against deep discharge. Mains power and the battery status are monitored regularly and failures are indicated by LEDs and signal outputs. Before connecting the input, output and sense lines (J1, J2 and J3), the potentiometer on the PSM power supply must be turned completely counterclockwise (Vout min). Afterwards, make the connection between the PSM and DC In on the PSM24-BCM360S (J1) as well as the remote sensing between these two devices using the wire supplied with the PSM24-BCM360S module (J3). Before connecting the battery, adjust the battery charging voltage as recommended by the battery manufacturer. Note that the J6 jumper must be set to match the model of PSM power supply connected to the input. Then, connect the battery to the Batt In connector (J1). Now the load can be connected to DC-Out (J2). The PSM24-BCM360S is a built-in device. The mounting position must fulfill the requirements for fireproof case 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-BCM360S is designed for mounting on a DIN rail (DIN EN 50022-35x15/7.5). The output voltage of the PSM24-BCM360S is protected against short circuit and open circuit conditions.



Warning The PSM24-BCM360S 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-BCM360S can result in death, severe personal injury or substantial property damage. The PSM24-BCM360S 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-BCM360S or the power supply. Do not open the PSM24-BCM360S 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-BCM360S and/or the power supply.

Danger: Never work on the PSM24-BCM360S 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-BCM360S or power supply can result in severe injury or death.



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

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-BCM360S; 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.

Assembly

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 clicking sound. To remove the device, pull the latch of the clip using an insulated flathead screwdriver. When clip has cleared bottom DIN rail remove the screwdriver from recess. Lift the device 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, which are included with the wall mounting kit to attach the mounting brackets to the PSM24-BCM360S (tightening torque 0.8-0.9Nm).

Connecting Cable

Only qualified personnel should carry out the installation. The device is equipped with a COMBICON connector. This reliable and easy-to-assemble connection method provides a fast connection of the device.

DC- Input (Connector J1, pin 1 & pin 2)

Make the 24 VDC connection by using the –Vin (–DC In) and +Vin (+DC In) connections following all local regulations. Properly sized wiring must be used. To achieve a reliable and shockproof connection, strip the connecting ends according to the table below. 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 voltage (24 VDC)	0.5 to 2.5	24 to 12	0.5 to 0.6	7.0
	+Bat & - Bat	Battery 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 voltage (24 VDC)	1.0 to 2.5	18 to 12	0.5 to 0.6	7.0
	+Bat & - Bat	Battery 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

Battery In (Connector J1, pin 3 and pin 4)

Make the battery connection using the “+Bat In” and “–Bat In” connections. *Make sure that the battery 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 table above. If flexible wires are used, terminate them using ferrules.

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

The 24VDC 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 table above. 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 28 VDC on the potentiometer. The device is protected against overload and short circuit.

Signaling (Connector J5, pins 1, 2, 3, 4, 5 & 6)

The DC Input-OK, Battery-OK and DC Output-OK are alarm contacts that monitor the functionality of the PSM24-BCM360S, the connected PMS power supply and the connected lead acid battery. The DC Input-OK alarm contact (connector J5, pins 1 and 2) is monitoring the PMS power supply input at the DC IN. This contact is closed when the power supply is present. The Battery OK alarm contact (connector J5, pins 3 and 4) is monitoring the Battery Input at the battery input terminals. This contact is closed when the battery is present. The DC Output OK alarm contact (connector J5 pins 5 and 6) is monitoring the output voltage of the PSM24-BCM360S. This contact is closed when an output is present. Three LEDs also enable a visual evaluation of the functions of PSM24-BCM360S, mains and battery directly on site and are parallel to the signal relay contacts.

LED Color	Alarm	ON State	OFF State
Green	DC Input - OK	DC input present	DC input failure
Red	Battery - OK	Battery present	Battery failure
Red	DC Output - OK	Normal operation	Output failure

PSM Model (Jumper J6, positions 1, 2, and 3)

The PSM24-BCM360S module is designed to provide the remaining output current for battery charging up to a maximum of 15A. To assure the connected PSM power supply is not overloaded, even if a discharged battery is connected, the jumper J6 must be set properly. The factory setting (position 1) is for use with a PSM24-360S. The jumper J6 must be set to position 2 for use with a PSM24-180S and position 3 for use with a PSM24-090S.

Remote ON/OFF Function

The PSM24-BCM360S device provides an external remote ON/OFF function using pin 7 and pin 8 at connector J5. Using a switch, a connection must be made between connector J5 pin 7 and connector J5 pin 8, to switch off the power supply and PSM24-BCM360S. At open connection between J5 pin 7 and J5 pin 8 the device is providing the adjusted output voltage. A switch is available on the PSM24-BCM360S to switch off the system on site (in the control cabinet).

Battery test

The PSM24-BCM360S module is designed to monitor the battery's condition. The battery is loaded with a sudden current pulse as long as the main power is present to monitor the battery's condition. The time between the current pulses can be set to either 15 seconds (J4, Pin 1 & 2) or to 10 minutes (J4, Pin 2 & 3)

Temperature sensing (optional)

The PSM24-BCM360S module is designed to operate with temperature compensation required for proper operation of the battery. The temperature is detected using an external NTC sensor, PSM-TSK (10k), connected to the signal connector J5 pin 9 and pin 10. If the sensor is not connected, the device automatically switches to +25°C constant temperature operation mode. Before connecting the sensor you must set the battery voltage as recommended for +25°C ambient using the potentiometer. When the sensor is connected, the device will automatically detect it and will start adjusting the correct voltage for the battery.

Compliance to UL 508C

The PSM24-BCM360S is a built-in device and to comply with UL 508C it must be installed in a cabinet with minimum dimensions of 400mm (width) x 500mm (height) x 200mm (depth).

Operating Temperature Ranges and Load Derating

Operating temperature ranges and load derating depend on the PSM power supply connected to the PSM24-BCM360S. Please see operating temperature range and load derating listed in the PSM power supplies data sheet or PSM operating instructions.

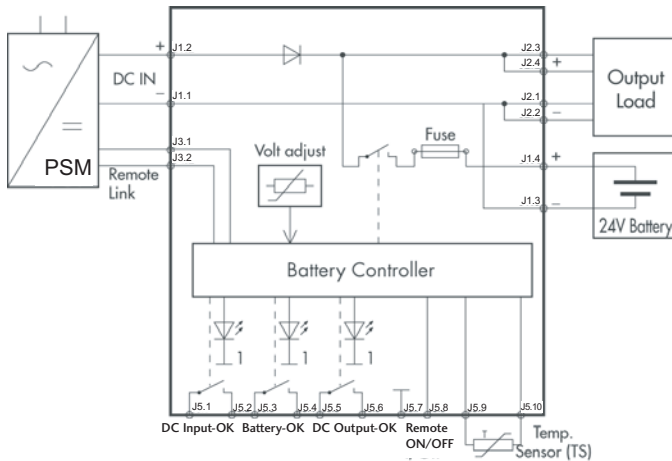


Technical Specifications

Input Specifications					Output Specifications		
Part Number	Input	Max. Input Power	* Output Voltage	**Max. Output Current	Output Voltage Adjustable Range with Potentiometer		
PSM24-BCM360S (includes terminal plugs)	24 VDC power supply and 24 VDC battery	360 Watt	24 VDC	15.0 A 360 W	24 to 28 VDC		
					Ripple and Noise (20 MHz Bandwidth)		
					at V_{in} nom and I_{out} max		
					Maximum Capacitive Load		
					unlimited		

*Output voltage adjustable ** Maximum current at V_{out} nom.

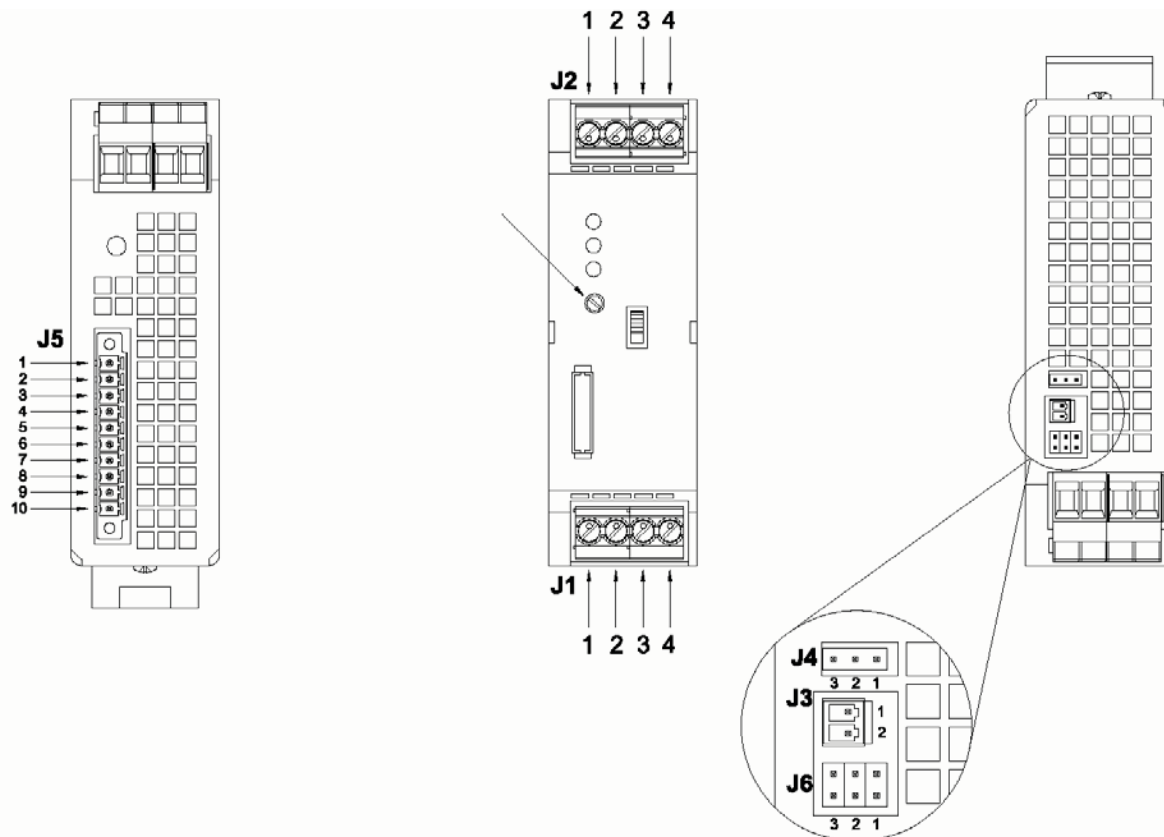
Battery Control Module Function Diagram



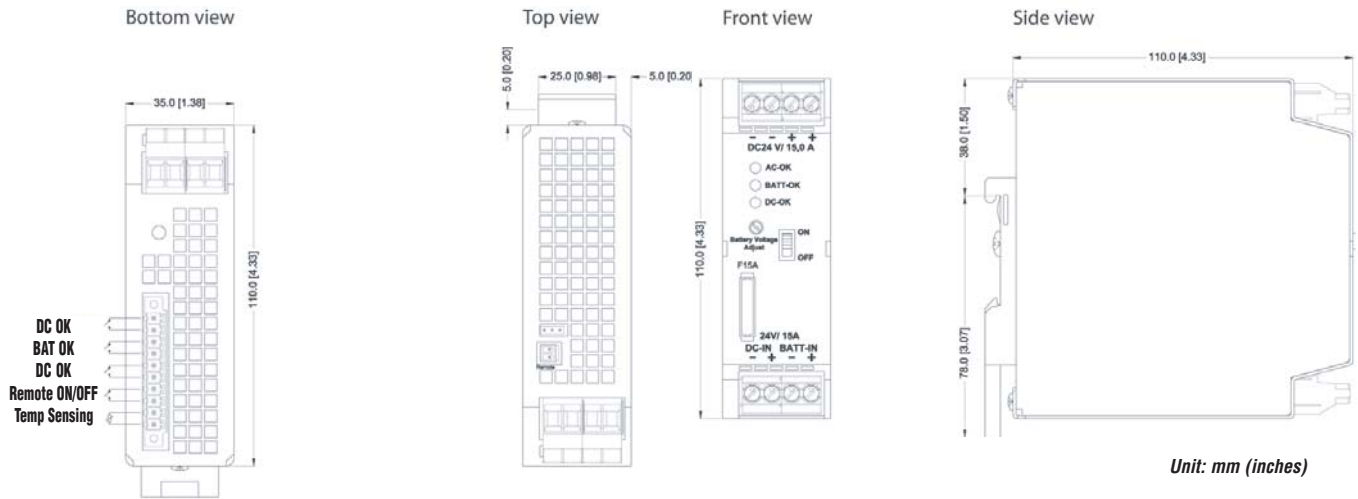
Jumper Table

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

Battery Control Module Connector Positions



PSM24-BCM360S Dimensions



General Specifications

General Specifications	
Electromagnetic Compatibility	in correspondence to connected units (no internal switching device)
Battery Protection	Over voltage, deep discharge, short-circuit and reverse connection (built-in fuse)
Status Signals	DC-OK input, DC-OK output, BAT OK all relay contact closed at status OK
Rating per Relay Contact	30 VDC / 1.0 A max.
Dimensions	WxHxD 35.0 mm (1.38 in) x 110.0 mm (4.33 in) x 110.0 mm (4.33 in)
Remote Link Wire 0.5m	One cable included with PSM24-BCM360S module
Remote ON/OFF	by external contact: ON = J5.7 + J5.8 not shorted OFF = J5.7 + J5.8 shorted
Temperature	Operating (ambient): -25°C to +70°C max (-13°F to 158°F). Above +40°C(104°F) load derating Storage (non-operating): -25°C to +85°C max (-13°F to 185°F). Temperature drift: 0.02%/C. Cooling: convection, no internal fan
Reliability, Calculated MTBF	In accordance with IEC 61709 > 350,000 hours
Humidity	95% (non-condensing) relative humidity maximum
Isolation	According to IEC/EN 60950, UL 60950, UL 508C, EN50178, EN61558-2-8, EN60204
over-temperature Protection	Switch off at over-temperature, automatic restart
Status Indicator	Dual color LED (green: DC OK; Red: DC OFF)
Remote ON/OFF	2-pin connector. J5 pin 7 and pin 8 connect via switch Device OFF
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 (PSM-PANEL1 sold separately)
Connection	Pluggable screw terminals (plugs included) 2 terminals per output

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 Class 1	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	