

BATTERY BACKED POWER SUPPLY RIP-24 mod.06 (RIP-24-4/40M3-R)

ICO 9001

INSTRUCTION MANUAL



1 TECHNICAL DATA

1.1 General

1.1.1 The battery backed power supply RIP-24 mod.06 (RIP-24-4/40M3-R) (hereinafter referred to as the RIP) is designed to provide continuous operating power to a group of detectors and control and indication equipment of a fire or intrusion alarm system which require 24 Volts of DC.

1.1.2 The RIP provides round-the-clock operation with specified output parameters and automatic monitoring and recharging of sealed backup batteries (hereinafter referred to as the batteries). The RIP provides shutting off the batteries from a load to avoid their invalid discharge.

1.1.3 The RIP provides light and sound indication of current conditions, including condition of mains power, the battery charge, missed batteries, shutting off the batteries in case of their discharge, a short circuit failure, or an overload of the output.

1.1.4 Being powered either from mains or by batteries, the RIP provides protecting its output against overvoltage and short circuit failures with recovering output voltage automatically after repairing the failures.

1.1.5 The RIP provides monitoring battery conditions for each battery separately and protects the batteries against overcharge.

1.1.6 The RIP must be operated within premises where it will be protected against atmospheric fallouts and mechanical damage. The RIP must NOT be used in explosion-hazardous premises.

1.1.7 The RIP is designed for operating temperatures minus 10°C to +40°C and relative humidity up to 90 % at +25°C.

1.1.8 The RIP withstands vibrations with frequencies of 1 to 35 Hz for accelerations up to 0.5 g.

1.2 Specifications

1.2.1 The main power supply is the mains power 150 V to 250 V, 50 Hz.

1.2.2 The backup power supply is two batteries Delta DTM1240 (12 V, 40 Ah) or DTM1226 (12 V, 26 Ah), or another batteries with similar characteristics.

1.2.3 The rated output voltage is 27.2 V \pm 0.6 V in case of powering by mains power provided that the batteries are charged. The minimum output voltage while powering by mains and batteries being discharged is 21 V.

1.2.4 The rated load current is 4 A.

1.2.5 The maximum load current is 5 A (for short time of about 10 minutes once per an hour in case of normal mains power and operative batteries).

1.2.6 The pre-operation time for the RIP after powering up is 6 s max.

1.2.7 The maximum power consumed from the mains at 220 V voltage and rated load current is 225 VA.

1.2.8 The maximum current consumed from mains at 150 V and rated load current is 1.5 A.

1.2.9 The current consumed by the RIP itself from the batteries doesn't exceed 70 mA.

1.2.10 Ripples of the output voltage (peak-to-peak) at normal load current don't exceed 0.2 V (Class VR1).

1.2.11 The low battery shutdown voltage is (20.4 ± 0.6) V.

1.2.12 The backup operating time of the RIP in case of two fully charged batteries is at least 8 hours if the load current is 4 A and the ambient temperature is $+20^{\circ}\text{C}$.

1.2.13 The time of full charging of two discharged 12 V, 40 Ah batteries doesn't exceed 48 hours.

1.2.14 The RIP provides monitoring for mains power voltage, output voltage, and battery voltage as well as sending status messages by means of galvanically isolated solid state relays K1, K2, and K3. The maximum switched voltage and current are respectively 80 V and 50 mA. The resistance of the closed output circuits doesn't exceed 50 ohms (their states are shown in Table 1, Clause 3.6).

1.2.15 The RIP is equipped with a tamper switch with the contacts galvanically isolated from other circuits. The contacts are closed when the RIP door (cover) is closed.

1.2.16 The RIP can operate in silent mode (see Clause 4.4 f).

1.2.17 The average lifetime of the RIP is at least 10 years provided that the batteries are replaced no less than once per 5 years.

1.2.18 The insulating strength of the live parts of the RIP is at least 1,500 V (50 Hz) between circuits connected to mains 220 V and the RIP enclosure as well as between circuits connected with mains and any circuits not connected with mains power.

1.2.19 The electrical insulation resistance between the circuits mentioned above is at least 20 mega ohms.

1.2.20 The ingress protection rating of the RIP is IP30.

1.2.21 The overall dimensions of the power supply are no more than 450 mm \times 400 mm \times 210 mm.

1.2.22 The weight of the power supply along with two DTM1240 batteries doesn't exceed 36 kg.

1.3 Standard Delivery

- | | |
|--|----------|
| 1) RIP-24 mod.06 (RIP-24-4/40M3-R) Battery Backed Power Supply | – 1 pc. |
| 2) Instruction Manual | – 1 pc. |
| 3) RBS-41-BK Rubber Cushion | – 4 pcs. |
| 4) Woodscrew | – 4 pcs. |
| 5) 12 \times 60 S Wall Plug | – 4 pcs. |
| 6) Key | – 2 pcs. |
| 7) Package | – 1 pc. |

Note: No batteries are included into the standard delivery

2 SAFETY PRECAUTIONS

2.1 The current carrying circuits powered by 220 V mains are a source of potential hazard. These circuits are covered by a protective housing on the RIP printed circuit board.

Also a hazardous thing is the resettable fuse within the battery circuit which is located at the bottom left corner and which temperature in “tripped” state exceeds 100°C.

2.2 The following protective measures are required:

- 1) Verify proper grounding of the RIP;
- 2) Do always shut off mains utility power before opening the RIP door;
- 3) Never remove the protective housing;
- 4) Never touch the resettable fuse.

2.3 While operating, the RIP must be grounded properly in accordance with your national and local standards, codes, regulations, and ordinances.

2.4 Do always shut off mains utility power before mounting, wiring, and maintaining the RIP.

2.5 Only qualified staff can mount and maintain the RIP.

3 MAIN OPERATION PRINCIPLES

3.1 The RIP-24 mod.06 (RIP-24-4/40M3-R) Battery Backed Power Supply consists of a high-frequency pulse voltage converter, a microprocessor system of monitoring for RIP, indication, and control conditions, and a module to connect and to protect batteries.

3.2 The high-frequency pulse voltage converter is equipped a built-in automatic protection against short circuit failures at the dc output and output overload. In these emergency situations it approximately once per second checks whether there is no malfunction and automatically restores operation after all malfunctions are repaired.

The voltage converter is equipped with a built-in automatic protection against a failure due to a too high/low input voltage. In these cases it switches off and automatically restores operation as soon as the current input voltage is within its normal range.

For safety reasons, the power converter is closed by a plastic protective cover.

3.3 The microprocessor monitors power parameters both for the power supply itself and for the load by continuous monitoring of mains voltage, voltage at each of the two batteries, and output voltage.

3.4 Both for normal operation and emergency situations, the microprocessor messages about current conditions of the RIP (being powered or not powered by mains, presence or missing of one or two batteries, shutting off the batteries in case of discharge, short circuits or overload at the dc output) by means of light and sound indication.

The visual indicators (LEDs) indicate states of mains voltage, backup power (for each battery individually), and output voltage as well as occurrence of emergency situations.

The POWER indicator shows if the mains power voltage is in normal range or out of range (only if the batteries are available).

The indicators BAT1 and BAT2 indicate if the voltage at the relevant battery is in the normal range. When the batteries are being charged, BAT1 and BAT2 LEDs periodically temporary turn off.

Upon reaching the threshold of invalid discharge (when the total voltage at the batteries is 20.4 V) the batteries are disconnected from the load to avoid their death.

The FAULT indicator provides information about a failure if it occurs.

The indicator 24 V is directly connected to the RIP output.

The visual indicators change their state in some time after the RIP has changed its state (no more than in 60 s).

Fault messages (mains shut off or being out of normal range, overload or short circuits at the dc output, essential or invalid discharge of the batteries) are also indicated by various sounds. In case of no mains voltage and shutting off the batteries from the load, the power supply sounder is heard steady (within first two hours and then – see Table 2). The sounder of the RIP can be disabled (see Clause 4.4 f)).

3.5 The microprocessor provides shutting off the batteries to protect them against overvoltage and invalid discharge.

3.6 The microprocessor generates messages about dc output conditions and ac input conditions for both power inputs (main and backup) and translates these messages to external circuits via three galvanically isolated solid state relays. Additionally, the difference between the voltages at the two batteries is estimated.

The output circuits of the solid relay are field-effect transistors. The maximum switched voltage and current are 80 V and 50 mA respectively. States of the solid state relay are changed since some time (no more than 60 s) after relevant changes of RIP states are. The resistance of the output circuits in closed state is no more than 50 ohms and their states are shown in Table 1.

Table 1

Circuit	Destination	Contact Condition	
K1	Output voltage monitoring	Output voltage Norm ¹⁾ – closed	Output voltage Out-of-tolerance ²⁾ – open
K2	Battery voltage monitoring	Battery voltage Norm ¹⁾ – closed	Battery voltage Out-of-tolerance ²⁾ (not connected) or the difference between the voltage values at BAT1 and BAT2 exceeds 2 V – open
K3	Mains voltage monitoring	If the RIP operates from mains – closed	If the RIP is powered by batteries – open

Notes:

¹⁾ Norm: The power voltage is between 20 V and 29 V;

²⁾ Out-of-tolerance: The voltage is below or above the thresholds mentioned above in ¹⁾.

3.7 The batteries are connected in series via the circuits on the printed circuit board and are connected to the output through a relay. **The total capacity of two batteries connected in series is the same as a capacity of one of the connected batteries.** For instance, if two DTM1240 batteries are used within the RIP their total capacity is 40 Ah. The load and the RIP are protected against polarity reversal and short circuit failures of the circuits of the batteries or the load by the resettable fuse.

The RIP output is protected against over voltage (above 32 V) by means of a thyristor. When it is open and the output is closed, protection of the pulse voltage converter or the resettable fuse is tripped.

There are no one-time fuses within the RIP.

3.8 The RIP input is equipped with a two-pole circuit breaker and a grounding terminal block which are connected to the mains.

A tamper switch which contacts are closed when the RIP door is closed is located on the sidewall of the RIP.

4 MOUNTING AND OPERATING

4.1 Mounting

4.1.1 The RIP must be used in places protected against atmospheric fallouts, mechanical damage, and unauthorized access (see Clause 1.1.6).

4.1.2 The RIP is to be installed on walls or other structures which can withstand the weight of the RIP along with the batteries.

4.1.3 Securely attach the RIP at a convenient place. The overall dimensions and the places to stick the cushions are shown in Figure 1.

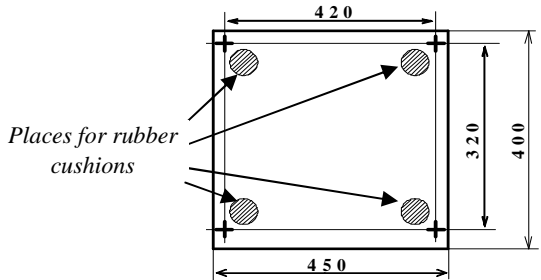


Figure 1

WARNING:

The RIP along with the batteries weighs 36 kg

4.2 Connecting

4.2.1 In accordance with the RIP-24 mod.06 (RIP-24-4/40M3-R) connection diagram:

a) **Ground the RIP** by connecting **XT3** terminal block with the grounding circuit;

b) Connect the AC cable to the **QF1** circuit breaker provided that the circuit breaker must be switched off;

c) Connect the load to the output terminal block **XT1** at the PCB observing proper polarity (by interconnected terminals **XT1/6,7,8** to the «+» and by the interconnected terminals **XT1/3,4,5** to the «-»).

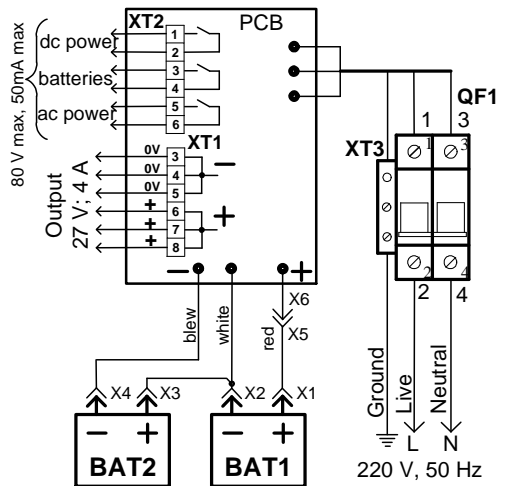


Figure 2

WARNING:

Connecting mains power 220 V to the QF1 circuit breaker, it is necessary to observe proper polarity of connecting the circuits Live and Neutral. Connect the circuits as shown in Figure 2.

Note: The rated load current is 4 A. The RIP can operate at a load current up to 5 A for a short time (10 minutes once per an hour, being powered by mains and provided that the batteries are connected) when sound alarms, fixed fire-fighting system, executive devices are activated.

WARNING

If the RIP operates at a load current above the rated value for a long time, it stops charging the batteries and the batteries begin to discharge even if mains power is connected and normal.

d) To provide remote indication of mains power conditions, output power conditions, and battery conditions, connect the outputs of the solid state relays K1, K2, and K3 (see Figure 2) with the relevant alarm loops of the relevant devices.

4.2.2 The recommended cross section areas of the wires connected to the RIP are the following:

1) To connect the RIP to mains power 220 V (QF1 circuit breaker): 0.75...2.5 mm² for stranded wires or 1...2 mm in diameter for solid wires;

2) To connect the load (the XT1 terminal block): 0.75...2.5 mm² for stranded wires or 1...2 mm in diameter for solid wires taking into account the maximum voltage drop on wires at maximum load current (the minimum allowable voltage at the load).

If several load circuits are to be connected, it is recommended to use Bolid manufactured BZK power distribution modules.

4.2.3 The external circuit breaker must feature the rating current at least 3 A and tripping characteristic of the Type C.

4.3 Switching the RIP On

a) Ensure the RIP is mounted correctly.

b) Connect the terminals to the batteries observing polarity (the red wires are to be connected to the positive leads of the batteries) and tighten the bolts securely.

Connecting each battery, please avoid coupling not connected leads together or with other parts of the RIP.

To shut off the batteries, use disconnectors of the red wires.

c) Switch mains power 220 V, 50 Hz on.

d) Switch the QF1 circuit breaker on.

4.4 Operating the RIP

a) In 3 s after powering the RIP up the indicators POWER, 24V, BAT1, BAT2 shall turn on; the sound signaling shall be off.

Note: The indicators BAT1 and BAT2 are lit steady if the batteries are charged (the summarized voltage at the batteries exceeds 26 V).

b) If after powering up the RIP no battery is connected (or the total voltage at the batteries is below 14 V), then the RIP sounder issues interrupted sounds for 3...6 seconds.

Then the sounder silences while BAT1 LED and BAT2 LED begin flashing once per second until batteries are connected.

While operating, the RIP periodically (once per a minute) inspects if the batteries are operative. When a battery is not detected, the relevant indicator (BAT1 or BAT2) begins flashing once per second.

In case of an irregular charge/discharge of the batteries (the difference between the voltage values at the batteries exceeds 2 V) the indicators BAT1 and BAT2 flashes once per second alternately while the RIP sounder issues a beep once per two seconds (POWER LED and 24V are on and FAULT LED is off).

If this indication occurs after operating from the batteries for a long time then after restoring mains power it is advised to ensure there is no such messages upon expiration of 4 days. Otherwise, measure the voltage at each battery and, if necessary, replace both batteries by new batteries from the same batch.

c) If an overload or a short circuit failure has happened at the dc output (in case of powering from mains and connected batteries), the RIP begins to switch on for a short time once per second until the trouble is repaired. In this case FAULT LED switches on and off twice per second, the sounder switches on for a short time once per 1...2 s, BAT1 and BAT2 LEDs are switched on. The RIP automatically restores its operation after repairing the overload or short circuit at the output.

d) In case of an outage of mains power or its being out of the normal range, the backup batteries are activated to supply power to the load circuit; an interrupted sound signal goes off warning about the mains failure; POWER LED and FAULT LED are off; indicators BAT1, BAT2, and 24V are on.

If the total voltage of the batteries has dropped to 22 V, the RIP begins to issue interrupted sounds five to ten times frequently. Immediate measures must be taken to provide mains power to the RIP.

Then, if the total battery voltage has dropped to 20 V, the RIP shuts down the batteries to avoid their invalid discharge. In this case the indicators POWER, FAULT, and 24V are off while the indicators BAT1 and BAT2 flashes once per second and the RIP sounder plays solid sound within first two hours. Upon expiration of two hours the RIP begins to operate in the energy save mode; the indicators POWER, 24V, BAT1, BAT2 are off; the indicator FAULT and the sounder switch on for a short time every 10 s.

After disconnecting the batteries from the load and when the mains power is restored, you are recommended to verify battery cycle. If on expiring 48 hours after repairing mains power voltage indicators BAT1 and BAT2 don't show solid light then it is necessary to verify battery operability.

e) If mains power 220 V is expected to be off for more than 30 days, then disconnect the batteries from the RIP board (by means of the disconnectors on the red wires, see Clause 4.3 b) to avoid invalid battery discharge.

f) To disable the RIP sounder, press the button on the RIP board three times shortly and once for a long time ("*shortly*" means holding the button pressed for 0.1...0.5 s; "*for a long time*" means holding the button pressed for at least 1.5 s. Pauses between presses should be at least 0.1 s and no more than 1 s). A repeated combination of presses mentioned above will re-enable sound indication.

Behavior of the visual indicators and the sounder along with human actions depending on current situations is shown in Table 2. If RIP indication doesn't match any of the patterns described below, please contact customer support service of the Bolid Company.

Table 2

Current RIP Condition	LEDs					Sounder	Human Action
	POWER	24V	FAULT	BAT1	BAT2		
	<i>green</i>	<i>green</i>	<i>yellow</i>	<i>green</i>	<i>green</i>		
1. Mains utility power is starting up, the batteries are not connected	+	+	—	+/- 1 Hz		ON/0.4 s 7 times	Connect the batteries
2. Normal mains power, the batteries are not charged	+	+	—	OFF/3 s		—	—
3. Normal mains power, the batteries are charged	+	+	—	+		—	—
4. Normal mains power, the battery BAT1 is not available	+	+	+/- 1 Hz		+	—	Connect BAT1
5. Normal mains power, the battery BAT2 is not available	+	+	+/- 1 Hz	+	+/- 1 Hz	—	Connect BAT2
6. Normal mains power, the batteries are charged, an overload or a short circuit at the dc output	+	*	+/- 2 Hz	+		ON/1.5 s two times	Ensure mains power is on; disconnect the load wires; repair the short circuit
7. Mains power is disabled, the battery voltage is still above 22 V	—	+	—	+		ON/5 s	Check QF1 for normal operation, repair mains power
8. No mains power, the battery voltage has dropped below 22 V	—	+	—	+		ON/0.4 s	Provide mains power

Current RIP Condition	LEDs					Sounder	Human Action
	POWER	24V	FAULT	BAT1	BAT2		
	green	green	yellow	green	green		
9. No mains power, the battery voltage has dropped below 20.4 V (the first two hours)	—	—	—	+/- 1 Hz		+	
10. Mains power is shut down, the battery voltage has dropped below 20.4 V (upon the expiry of two hours)	—	—	ON/10 s	—		ON/10 s	
11. Mains power voltage has dropped below 150 V (provided that the batteries are available)	+/- 0.5 Hz	+	+/- 0.5 Hz	+		ON/2 s	
12. Mains power voltage has exceeded 260 V (provided that the batteries are available)	+/- 2 Hz	+	+/- 2 Hz	+		ON/2 s	
13. Normal mains power, the batteries are connected, the difference between the voltage values at BAT1 and BAT2 has exceeded 2 V	+	+	—	Switch on alternately once per second		ON/2 s	Disconnect both batteries and connect them again in a minute. Then check the indicator status
14. Output overvoltage	+/- 4 Hz	+		+/- 4 Hz		ON/0.4 s	

Notes:

1) Indicator status:

«+»: On;

«-»: Off;

«+/- X Hz»: Switches on and off alternately with the frequency of X Hz;

«ON/5 s»: Switches on for a short time once per 5 s;

«OFF/3 s»: Switches off for a short time once per 3 s.

2) * Depending on the overload level the indicator can show solid light, flash or be off.

4.5 Switching the RIP Off

- a) Switch the QF1 circuit breaker off.
- б) Switch the mains power 220 V off.
- в) Disconnect the batteries.
- г) Disconnect the load circuit(s).

5 MAINTENANCE

The RIP must be inspected and maintained at least annually by a competent service engineer. The works must include:

- 1) Checking the RIP for contaminations and mechanical damage;
- 2) Measuring the output dc voltage when the load is connected in accordance with Clause 1.2.3 of this Manual and measuring the output voltage when the RIP is powered from batteries, and inspecting proper operation of the visual indicators and the sounder (in accordance with Table 2 of this Manual);
- 3) Checking the RIP for secure mounting and conditions of the wires and the contacts;
- 4) Replacing the batteries (if necessary or on schedule, not less than once every 5 years).



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