Macurco™ RR-24

Modbus Remote Relay

Installation & Operation Manual

IMPORTANT: Keep these user instructions for reference.

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1 General Safety Information

1.1 List of warnings

⚠ WARNING
Each person using this equipment must read and understand the information in this User manual before use. Use of this equipment by untrained or unqualified persons or use that is not in accordance with this user manual, may adversely affect product performance.
RR-24 may not function effectively below 32°F (0°C) or above 104°F (40°C). Using the equipment outside of this temperature range may adversely affect product.
Immediately exit any environment that causes an alarm condition on the sensor.
Do not disassemble unit or attempt to repair or modify any component of this instrument. This instrument contains no user serviceable parts, and substitution of components may adversely affect product performance and void product warranty.

2 Use Instructions and Limitations

2.1 RR-24 General Description

The RR-24 is a remote relay box that allows flexibility for applications needing more relays. Using modbus communication you can control one or both SPDP onboard relays. The RR-24 requires 24VDC to operate. The RR-24 can be used to engage or disengage other equipment such as: fans, louvers, horns, strobes, gas valves, etc.

2.2 Features

- Modbus Addressable Relay
- Compatible with Macurco DVP-1200 Control Panel
- Wall mount NEMA 4X Enclosure
- 2 - 10A SPDT Dry Contact Relays

2.3 Specifications

- Size: 8.48” x 6.36” x 3.94”
- Weight: 2.2 lbs.
- Enclosure: NEMA 4X
- Operating Temperature: -32 to 104°F (0-40°C) ambient
- Operating humidity: 0-95% RH non-condensing
- Power Input: 24 VDC, 0.5A
- Relay Rating (2): 250 VAC, 10A
- Status Indicators (LED): Power, Communication, Relay 1, Relay 2

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3 Installation Instructions

3.1 Location & Mounting

Macurco RR-24 is shipped with mounting brackets and screws. Install the mounting brackets on the back four corner of the enclosure. RR-24 should be mounted with sufficient space all round for access to conduit entry holes provide on the top and bottom side of the unit.

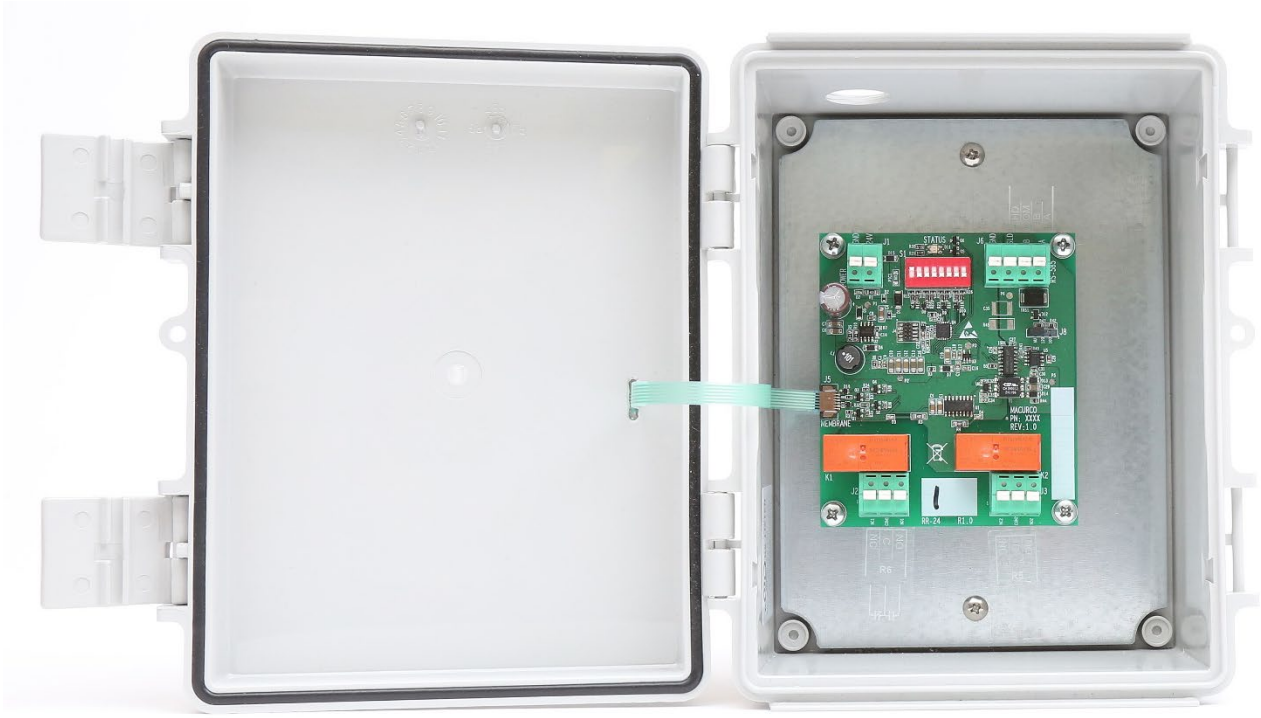

Figure 3-1 – Internal view

3.2 Installation

3.2.1 General Wiring Information

All the connectors in RR-24 are spring tightening and will accept wire from 14 to 24 AWG. To connect the wires to terminals, press down the white button of the connector (use flat-headed screwdriver), insert bare wire into respective wire cavity of the connector and release the white button. Ensure that the wire cannot be easily pulled from the connector. Refer to figure 3-2 - below for location of different connectors in RR-24.

3.2.2 Power Connection

The power connections to the RR-24 should be size AWG18 (minimum) for short runs. For longer run follow recommended power wire gauge guidelines. Match the polarity for power connection.

3.2.3 RS-485 Communication Connection

For RS-485 or communication connection it is recommended to always use a twisted wire to reduce noise and allow for reliable data communication over greater distances. For best performance use shielded 3-conductor wire with one twisted pair providing a pair for signal (A & B), common (COM) and shield ground (SHD) connection.

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NOTE: Running the RS-485 cable adjacent to or in the same conduit with high voltage wires is not recommended as there may be interference from the high voltages.

RR-24 provide integral termination for end of line resistors (EOL). The termination uses 4-pin connector (labeled J8) to select termination. Place the EOL jumper on one of the following positions:

- NU = No termination (default)
- 120 = 120 Ohm
- 100 = 100 Ohm

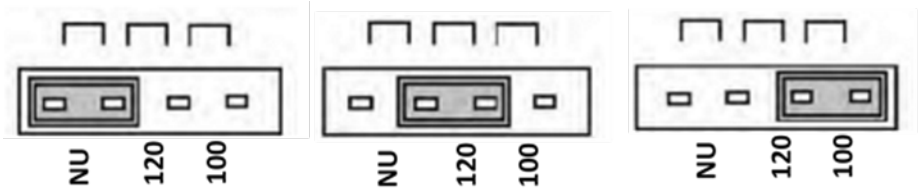

Figure 3-2 – EOL Jumper Placement

3.2.4 Relay Connection

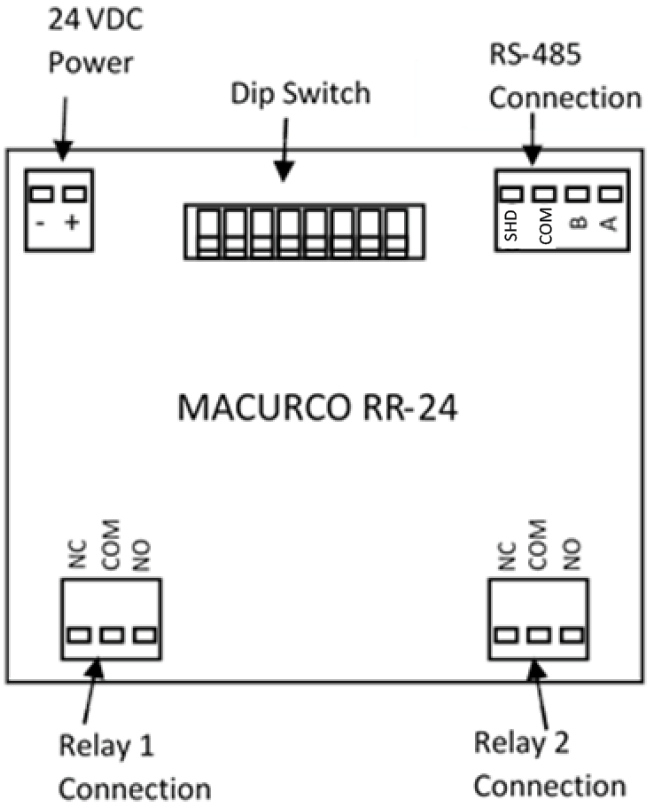

Figure 3-3 – RR-24 Board Diagram

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4 Operations

4.1 Power up

Power LED will light up green to indicate the unit is operational. TX LED will flash blue to indicate the unit is communicating. RELAY 1 and RELAY 2 LED will light up red when corresponding relay is activated. Refer to Figure 3-3 above for location of Relay 1 and Relay 2.

4.2 Initial Operating Mode

4.2.1 RR-24 Settings

The DIP switches are used to set the Modbus address and are also used to change the communication settings. Valid Modbus addresses for RR-24 are from 1 to 192 where switch 1 is the least significant bit (LSB) and switch 8 is the most significant bit (MSB). Address 254 is used to place the RR-24 in programming mode.

4.2.2 Programming Mode

When the RR-24 is powered with address set to 254, it enters programming mode. The STATUS LED will be flashing RED and GREEN alternatively every 200 milliseconds to indicate that RR-24 is ready and waiting for the user to enter new communication settings using 8 dip switches. Using the 8 dip switches, use can change the communication settings like baud rate and parity.

When looking at the switches with “Address” marking on top, the switches are defined from left to right.

- Switch 8, switch 7 and switch 6 are used to modify baud rate
- Switch 5 and switch 4 are used to modify parity
- Switch 1 is used to request to save the new settings
- Switch 3 and 2 are unused and should be left in ON position.

Switch 8	Switch 7	Switch 6	Description
OFF	OFF	OFF	Default baud rate (19200 Bd)
OFF	OFF	ON	4800 Bd
OFF	ON	OFF	9600Bd
OFF	ON	ON	19200 Bd (Default value)
ON	OFF	OFF	38400 Bd
ON	OFF	ON	57600 Bd
ON	ON	OFF	115200 Bd
ON	ON	ON	Do not change

Table 4-1 – Baud Rate Configuration

Switch 5	Switch 4	Description
OFF	OFF	Default Parity EVEN (Default Value)
OFF	ON	Parity is ODD
ON	OFF	Parity is NONE
ON	ON	Do not change

Table 4-2 – Parity Configuration

Set the switches to the desired value and then set switch 1 to ON and then OFF, and the new settings will be saved in EEPROM.

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The result of saving operation is displayed on STATUS LED. Alternating GREEN/OFF every 200 milliseconds indicates saving new settings passed and alternating RED/OFF every 200 milliseconds indicates that saving new settings failed. Once the new settings have passed, disconnect power from the unit, set the address for the device using the address switches and apply power back to unit.

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5 Appendix A – Table of Figures

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6 Appendix B – Modbus Registry

Function Code	Register Address	Register	Parameter	Description / Comments	Command/Response (HEX)
0x03	1	1	Map version	Returns map version in ASCII "1"	C: 01 03 00 00 00 01 84 0A R: 01 03 02 00 31 79 90
0x03	2	4	Vendor name	Returns vendor name in ASCII "MACURCO"	C: 01 03 00 01 00 04 15 C9 R: 01 03 08 4D 41 43 55 52 43 4F 00 D6 D9
0x03	6	8	Product code	Returns product code in ASCII "70X---"	C: 01 03 00 05 00 08 54 0D R: 01 03 10 37 30 58 2D 2D 2D 00 00 00 00 00 00 00 00 00 00 4B DE
0x03	14	8	Revision number	Returns revision number in ASCII "V1.00"	C: 01 03 00 0D 00 08 D5 CF R: 01 03 10 56 31 2E 30 30 00 00 00 00 00 00 00 00 00 00 00 85 4D
0x03	22	8	Vendor url	Returns vendor url in ASCII "www.macurco.com"	C: 01 03 00 15 00 08 55 C8 R: 01 03 10 77 77 77 2E 6D 61 63 75 72 63 6F 2E 63 6F 6D 00 A2 D6
0x03	30	4	Product name	Returns product name in ASCII "RR-24"	C: 01 03 00 1D 00 04 D4 0F R: 01 03 08 52 52 2D 32 34 00 00 00 53 7E
0x06	34	1	Fail safe	Writes failsafe configuration Payload: (high byte first) bit11-bit0 (timeout value) bit12 = 1 state ON, state OFF bit13 = 1 failsafe active, 0 failsafe inactive	C: 01 06 00 21 3A AF 8B 1C R: 01 06 00 21 3A AF 8B 1C timeout = 0xAAF = 2735 state = ON failsafe=active
0x06	35	1	Command Relays	Command control relays Payload: (high byte first) 00 = turn off relays K1/K2 01 = turn on relay K1, turn off relay K2 02 = turn off relay K1, turn on relay K2 11 = turn on relay K1/K2	C: 01 06 00 22 00 00 29 C0 R: 01 06 00 22 00 00 29 C0 C:01 06 00 22 00 01 E8 00 R:01 06 00 22 00 01 E8 00

Note: If Failsafe is active, then the remote relay has to receive a message in a period equal or less than the failsafe timeout, otherwise failsafe will be activated and relays will be placed in the failsafe position.

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7 Macurco Gas Detection Product limited warranty

Macurco warrants the RR-24 gas detector will be free from defective materials and workmanship for a period of two (2) years from the date of manufacture (indicated on inside cover of the RR-24), provided it is maintained and used in accordance with Macurco instructions and/or recommendations. If any component becomes defective during the warranty period, it will be replaced or repaired free of charge, if the unit is returned in accordance with the instructions below. This warranty does not apply to units that have been altered or had repair attempted, or that have been subjected to abuse, accidental or otherwise. The above warranty is in lieu of all other express warranties, obligations or liabilities. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED TO A PERIOD OF TWO (2) YEARS FROM THE PURCHASE DATE. Macurco shall not be liable for any incidental or consequential damages for breach of this or any other warranty, express or implied, arising out of or related to the use of said gas detector. The manufacturer or its agent's liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are the return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts.

*Modbus is a trademark or registered trademark of Schneider Automation Inc.

Macurco Gas Detection

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