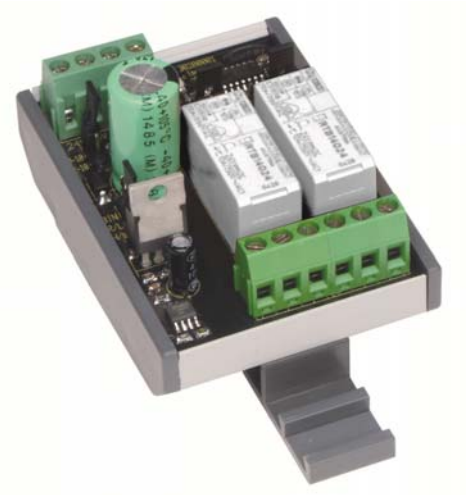
IO-RM2

2-Stage Relay Module



Features:

- Link selectable modes raise/lower, hi/low or binary
- On/Off/Auto links for ease of commissioning
- DIN Rail mounting

Benefits:

- Fault finding LED indication
- Relay status LED indication

Technical Overview

The IO-RM2 is intended for use with BMS controllers to convert an analogue control output to a raise/lower, high/low or binary relay output pair.

Applications include the control of raise/lower valve and damper actuators, and pump changeover. LEDs indicate correct operation and Hand/Off/Auto jumpers ease commissioning. Low current draw from 0-10Vdc controller output means that the IO-RM2 can work successfully with most BEMS controllers.

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Specification:

Input signal	0-10Vdc 1mA min. into 22kΩ impedance
Output contacts	8A at 230Vac (resistive load)
Power supply:	
	24Vac ±15% @ 50Hz or
	24Vdc +15% -6%, 65mA max.
Hysteresis	±0.2Vdc about switching points
Operating modes:	
	Hi/Lo
	1 raise/lower pair
	Binary
LED indication:	
	Supply OK
	Supply voltage low
	Supply voltage high
	Relay Status
	Hi input voltage
	Incorrect input mode jumper selection
	Low input voltage (only in 2-10Vdc mode)
Manual override	On/Off/Auto jumper selectable
Electrical terminals	Rising cage connectors for 0.5-2.5mm² cables
Ambient range:	
Temperature	-10 to +40°C (14 to 107°F)
RH	0-80% non-condensing
Dimensions (H x W x H)	72 x 49.5 x 55 (2.83 x 1.95 x 2.17")
Country of origin	UK

CE

The products referred to in this data sheet meet the requirements of EU 2004/108/EC and 2006/95/EC

Part Codes:

IO-RM2
2-Stage relay module

Warning!
When installed, the output relay contacts may carry 240Vac. Special care must be taken to isolate the switched voltages prior to any work being undertaken.

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Installation:

Antistatic precautions must be observed when handling these modules. The PCB contains circuitry that can be damaged by static discharge.

1. The IO-RM2 should only be installed by a competent, suitably trained technician, experienced in installation with hazardous voltages. (>50Vac & <1000Vac or >75Vdc & 1500Vdc)

2. Ensure that all power is disconnected before carrying out any work on the IO-RM2.

3. Maximum cable is 2.5mm², care must be taken not to over tighten terminals.

4. When mounting the IO-RM2 care should be taken not to stress the PCB when fitting to the DIN rail. If it is necessary remove the module from the DIN rail, be sure to use a flat bladed screwdriver to release the DIN clips.

5. The IO-RM2 is designed to operate from a 24Vac/dc supply (so that power can be drawn from a 24Vac transformer used for other purposes if a 24Vdc supply is not available). In either case one side of the supply is common to the signal ground from the BEMS controller.

6. The relay outputs are single Pole Change Over (SPCO) so they can be wired as Normally Open (N/O) or Normally Closed (N/C).

7. The 0-10Vdc signal input requires a minimum of 1mA to operate.

LED Status:

Power supply

Normal:

The green LED indicates the supply power condition. If power supply is normal (between 22V and 40V ±0.2V hysteresis) the green LED is ON continuously, showing that the IO-RM2 is powered correctly.

Low Supply Voltage:

If power supply falls below about 21.8V the green LED double flashes twice a second;

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The low power condition clears at about 22.0V. The relays behave as normal.

High Supply Voltage:

If the power supply is above 40V the green LED flashes 6 times a second;

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All the relays are switched off (except when forced ON by jumper settings) as excessive voltage might overload the voltage regulator.

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LED Status (continued):

The relays are switched off:

- For 2 seconds after power-up
- When the supply is greater than 40V
- For 2 seconds after any over 40V condition clears

This prevents the relays from switching on and off during power-up or power failure with an over voltage power supply.

Control Input Voltage

The red LED indicates input voltage condition, normally the red LED is off

High Input:
If the input voltage exceeds 11V, ±0.2V hysteresis, the red LED goes on continuously. The relays behave as if 10Vdc were applied. The input voltage should settle on one 'voltage band'. Voltage is deemed to have settled after it has been within one band for 250ms. If it has not settled for 500ms it is deemed to be unstable. If it is unstable the red LED flashes 6 times a second:

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The relay outputs remain at their last settled value.

Mode Select Error:
If the mode select jumper is missing or there is an inconsistent setting (such as connecting 2 jumpers) then this is an error. The red LED does triple flashes:

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The relays are switched off.

Low Input:
If the input voltage goes below 1.5Vdc, ±0.2Vdc hysteresis, when 2Vdc to 10Vdc input mode is selected then the red LED does double flashes:

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Input Mode:

2Vdc to 10Vdc input mode:

This works the same as the normal 0-10Vdc input mode except that the input voltages are taken from 20% to 100% of the full range, and are consequently more closely spaced. The bottom 20% is regarded as an error (see LED indications), and will cause all relays to be off (unless jumpers force them on). Hysteresis around changeover voltages are 80% of the normal 0.2Vdc = 0.16Vdc.

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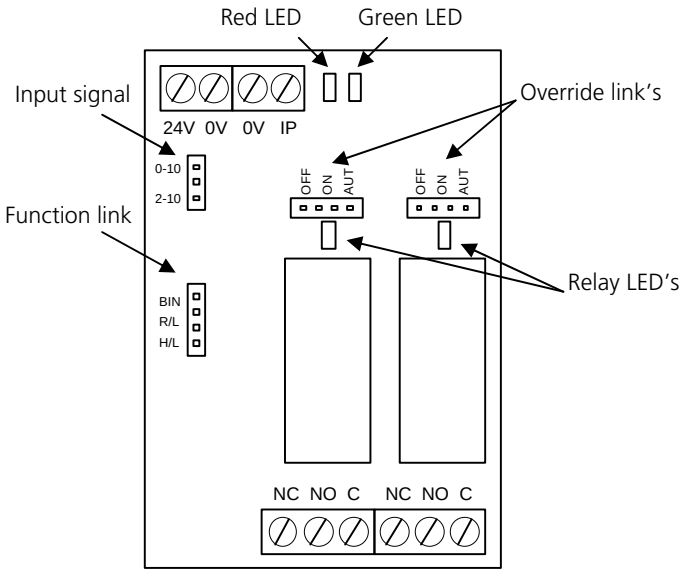
Connections:

Inputs;

24V	24Vac/dc
0V	0V
0V	0V
IP	0(2) to 10Vdc

Outputs;
Relay

NC	Normally open
NO	Normally closed
C	Common



It is important not to mix SELV (safety extra low voltage) and non-SELV loads on the same IO-RM module. Consult BS 7671 for full details of SELV and non-SELV

Jumper Settings:

Function:

Binary

Raise/Lower

High/Low

Input signal:

0-10Vdc

2-10Vdc

Override:

On

Off

Auto

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Switching Sequences:

Binary:

Input Voltage	Nominal	Relay 1	Relay 2
0Vdc - 3Vdc	0Vdc	OFF	OFF
3Vdc - 5.5Vdc	4Vdc	**ON**	OFF
5.5Vdc - 8Vdc	7Vdc	OFF	**ON**
8Vdc - 10Vdc	10Vdc	**ON**	**ON**

Raise/Lower:

Input Voltage	Nominal	Relay 1	Relay 2
0Vdc - 3Vdc	0Vdc	OFF	OFF
3Vdc - 5.5Vdc	4Vdc	**ON**	OFF
5.5Vdc - 8Vdc	7Vdc	OFF	OFF
8Vdc - 10Vdc	10Vdc	OFF	**ON**

High/Low:

Input Voltage	Nominal	Relay 1	Relay 2
0Vdc - 3Vdc	0Vdc	OFF	OFF
3Vdc - 7.5Vdc	5Vdc	**ON**	OFF
7.5Vdc - 10Vdc	10Vdc	**ON**	**ON**

Tech Tip:

Electrical Noise

By far the most common cause of electrical noise on a typical HVAC site is the contactor. Little, if any, electrical noise is produced when the contactor coil is energized, but significant noise is produced when the coil de-energizes, and may exceed 700Vac P-P. Typically, the contactor coil is switched by the C & N/O contacts of an IO-RM module relay.

Fitting an "RF snubber" across the contactor coil is a good way of greatly reducing the electrical noise pulse produced when the coil de-energizes. The ROXBURGH flying lead RC network type XEB1201 (Farnell part code 1187659) is a tried and trusted component for this purpose. Alternatively, a suitable MOV (metal oxide varistor) across the IO-RM C & N/O relay contacts will also help to prevent electrical noise being induced."

Whilst every effort has been made to ensure the accuracy of this specification, Sontay cannot accept responsibility for damage, injury, loss or expense from errors or omissions. In the interest of technical improvement, this specification may be altered without notice.

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