

PM10REL2A card

Manual

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Introduction

PM10REL2A is a dual relay output card to the PM10 panel meter series and compatible series.

This manual covers the PM10REL2A card only. The rest of the device is explained in the device manual (e.g. PM10A Manual).

PM10REL2A uses the [FreeRTOS](#) real-time operating system V8.0.1. The FreeRTOS source code is available from [Nokeval support](#) on request.

Connecting

Relay 2	NC	6
	COM	5
	NO	4
Relay 1	NC	3
	COM	2
	NO	1

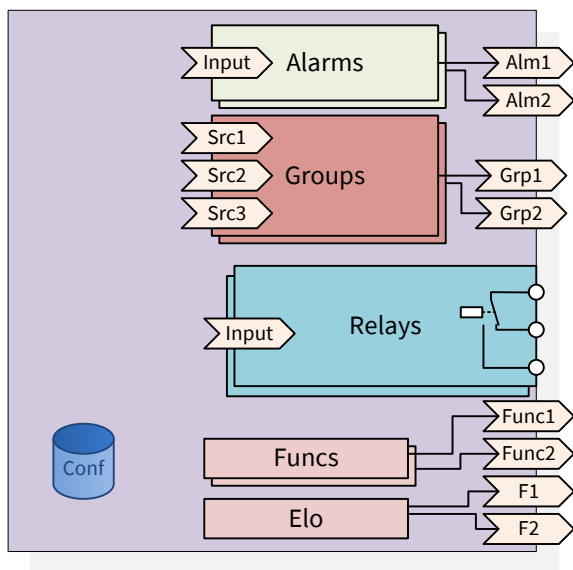
When a relay doesn't pull, it connects COM to NC. When it pulls, it connects COM to NO.

The relays are rated for 250 VAC/VDC, 2 A, Cat II. They have a reinforced insulation per EN 61010-1 to the other parts of the device. Due to the lower level insulation between the relays, it is not allowed to connect one relay to SELV circuits while the other is connected to a hazardous voltage.

Special care must be taken to prevent a loose wire carrying a hazardous voltage from touching the other connectors. Tie the wires tightly to each other as close as possible to the connector block.

When driving a heavily inductive load, an external snubber is recommended to extend the life of the relay contacts.

The blocks and the registers



Alarms

The card has ten identical alarm comparators. Each alarm comparator reads some register on some card and compares the value to a level, producing a truth value (on or off). This value is available in the Alm1 to Alm10 registers for any card in the device.

The level can be configured in the configuration menu, or it may come from some register, e.g. a user-adjustable setpoint on the display card.

The comparators have a configurable hysteresis.

Groups

The groups combine several alarms to one output, which can be used to control a relay. If any of the inputs is on, the output will be on. Moreover, each group has a configurable activation and deactivation delay to prevent false alarms.

This card has four groups, and each can have up to eight inputs. The groups may be cascaded for more complex functionality.

The groups control the Grp1 to Grp4 registers.

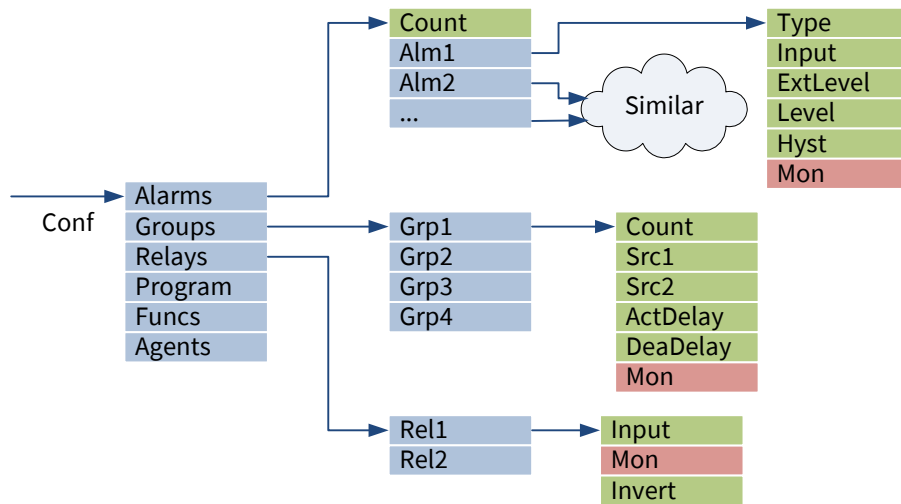
Relays

A register is selected for each relay to control it. When the register has a value 0, the relay doesn't pull, and with a value 1 it does. It is possible to invert the operation (pull when no alarm). The relays can be configured to follow almost any register in a PM10 device, however most often they use the local alarms or groups.

Funcs and Elo

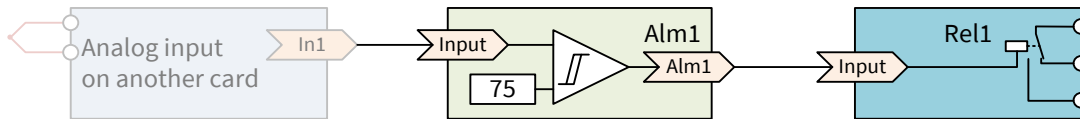
These blocks are similar in many PM10 cards. They are guided in the PM10A manual.

Configuring the card



One alarm per relay

For the simplest cases we can use an alarm comparator to directly control a relay. The groups are not used.



Configure an alarm to monitor something.

1. Navigate to the Alarms submenu in the configuration menu.
2. Increase Count by one to expose one new alarm comparator.
3. Advance to that submenu, e.g. Alm1.
4. Configure the alarm:

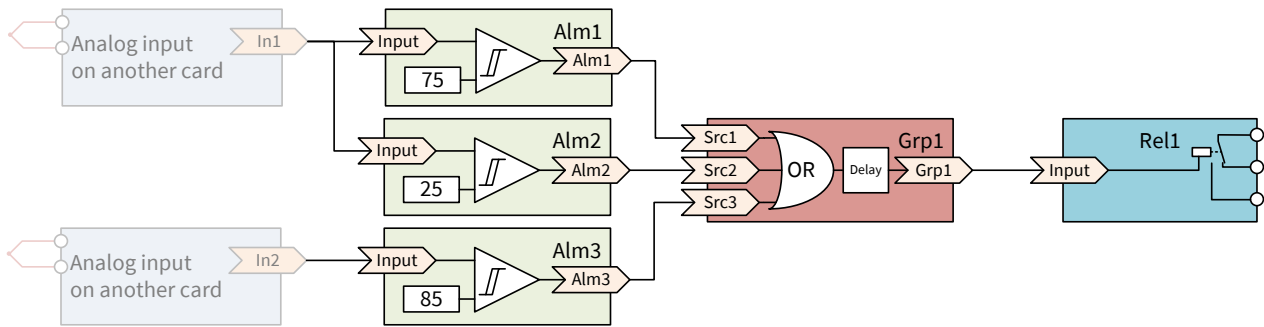
Type	Select the alarm Type: <ul style="list-style-type: none">• Lo: Goes on when the input goes below Level. Goes off when the input goes above Level+Hyst.• Hi: Goes on above the Level. Goes off at Level-Hyst.• Heat: Goes on below Level - Hyst / 2. Goes off above Level + Hyst / 2. Used for on-off control. (Available in firmware V0.4 onwards.)• Cool: Goes on above Level + Hyst / 2. Goes off below Level - Hyst / 2. Used for on-off control. (Available in firmware V0.4 onwards.)
Input	Select what the alarm is monitoring. Typically an analog input on another card.
ExtLevel	Ensure this is set to None to have a “fixed” level.
Level	Define the alarm level, or limit. See Type for explanation.
Hyst	Define the hysteresis. It affects when the alarm goes off. See Type.
Mon	If possible, check the current state of the alarm. Or manually override it for testing.

Then configure one of the relays to “obey” this alarm:

1. Navigate to the Relays submenu in the configuration menu.
2. Go to one of the Rel submenus.
3. Set the Input to point to the alarm configured above, e.g. Reg -> This -> Alm1.

Multiple alarms per relay

To combine several alarms (“rules”) to one relay, use a group.



Configure several alarms as in the previous section.

Use a group to combine the alarms together, and/or apply a delay. Navigate to one of the Grp submenus of the Groups menu in the configuration menu. Configure it:

Count	Select the number of alarms to combine.
Src1, Src2...	Select the alarms to combine, e.g. Reg -> This -> Alm1, Reg -> This -> Alm2... It is possible to select other sources too, e.g. another group, or an alarm from another card.
ActDelay	Set the activation delay in seconds (0 to disable, max 6553). One of the inputs must be continuously on for this time before the group output goes on.
DeactDelay	Set the deactivation delay. All inputs must be off for this time before the group output goes off.
Mon	Check the current state of the group output, or manually override it for testing.

Finally configure one of the relays to follow this group:

1. Navigate to the Relays submenu in the configuration menu.
2. Go to one of the Rel submenus.
3. Set the Input to point to the group configured above, e.g. Reg -> This -> Grp1.

Controlling the alarm level externally

The cases above assume a “fixed” alarm level, set in the configuration menu. If the level must be adjusted frequently, use a setpoint on the display card to control the level.

1. On the display card (Master), set up one Float setpoint. Select proper limits for it.
2. Further on the display card, define one page to show the setpoint. Give a descriptive tag.
3. On this relay card, on one of the Alm submenus, set ExtLevel to point to the setpoint (Reg -> Master -> Setp1 for example).
4. The Level setting is hidden and Offset revealed. The offset is added to the setpoint, allowing one setpoint to control several alarms with individual offsets (e.g. warning/critical). Set to 0 if no offset is required.

Instead of a setpoint, the ExtLevel setting can refer to a serial bus controlled register, a function output register, an Elo register, or almost any.

Overriding manually for testing

It is possible to temporarily “simulate” the output of an alarm comparator, a group, or a relay. To do so:

1. Give a Lock command for the Mon item in the appropriate menu. In Mekuwin, click the L button.
2. Write a value in Mon, 0 or 1.
3. See how the other blocks or the relays react.
4. Return to normal operation by giving a Free command (F in Mekuwin).

Using a front panel indicator

It may be convenient to reflect the state of an alarm or a group in the front panel of the device. Configure one of the indicators, selecting one of the registers of this card as its source. The register may be an individual alarm or a group.

Fault input

When an alarm comparator (Alm1 to Alm10) input value indicates fault, e.g. a failed sensor, the Lo and Hi alarms will go on. The Heat and Cool alarms will go off.

Maintenance

The card doesn't need maintenance.

Troubleshooting

Use the overriding option ([page 8](#)) to test the relays and groups to find where the problem is.

Specifications

Environmental

Storage temperature	-40...+70 °C
Operating temperature	-30...+70 °C
Weight	35 g

Relays

Max voltage	250 VAC/VDC Cat II
Max current	2 A resistive
Galvanic isolation	Reinforced insulation per EN 61010-1:2010 to the other cards. The insulation between the relays not classified.
Connectors	2.5 mm ²

Warnings



Read this manual carefully before using the device, especially page 3 if any hazardous voltages are involved.



The device must not be disposed with household waste. Observe local regulations concerning electronic waste recycling.

Manufacturer

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