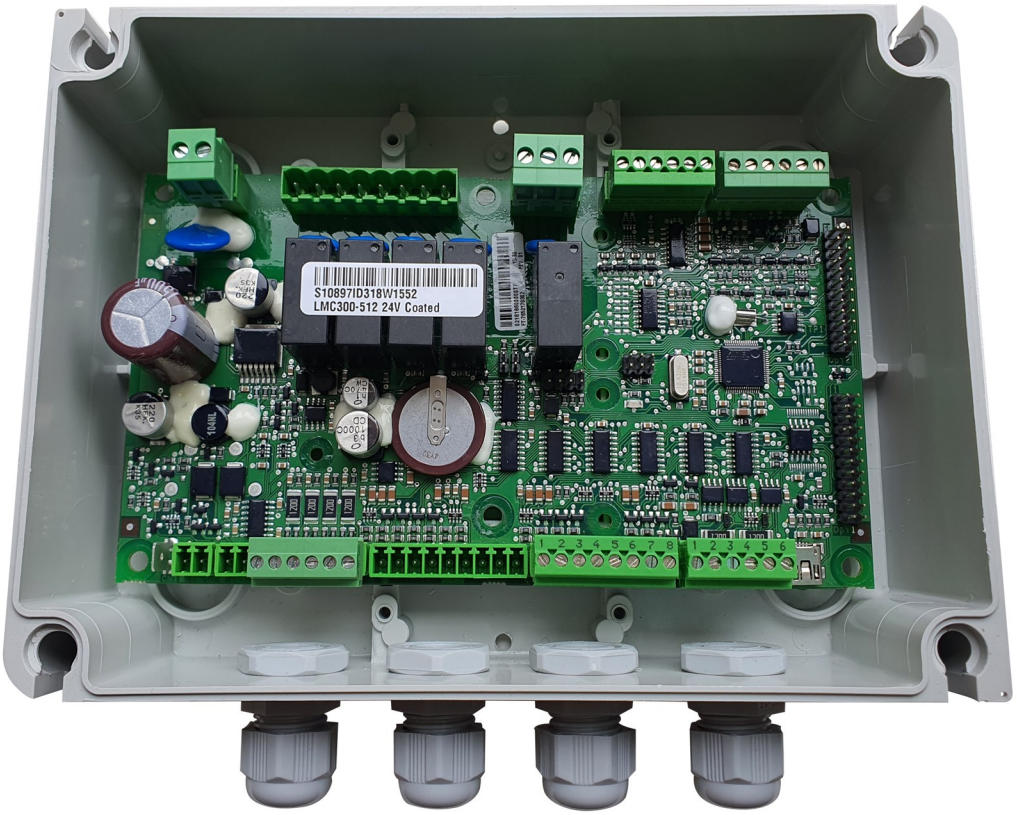
GB

# MIO2 module for EXact control system

## (Modbus Input Output)




Original instructions

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# 1. Product information

## 1.1 How the MIO2 module works

**RH/RLQ/$CO_2$/PIR/ TIMERBUTTON3**

Fan speed can be overridden by connecting one or more MIO2 modules to a VEX unit, as shown below:

| Sensor | Location | Fan speed is overridden if |
|---|---|---|
| RH sensor | Fitted in room | the relative air humidity (%RH) in the room exceeds the preset start limit |
| RLQ air quality sensor | Fitted in room | the relative air quality (%) in the room exceeds the preset start limit |
| $CO_2$ sensor | Fitted in the room or extract air duct | The $CO_2$ concentration in the room/extract air duct exceeds the preset start limit |
| PIR Motion sensor | Fitted in room | a person is detected in the room (the fan speed is overridden to comfort level) |
| TIMERBUTTON3 | Fitted in room | the “TIMERBUTTON3” is pressed. The indoor climate level changes to “Comfort”. The switch can be inserted instead of the PIR or inserted parallel to the PIR |

**AUX1/AUX2 - externally controlled operation**

| Function | Control of … |
|---|---|
| AUX1 | extract air fan via an external 0–10 V signal* |
| AUX2 | supply air fan via an external 0–10 V signal* |

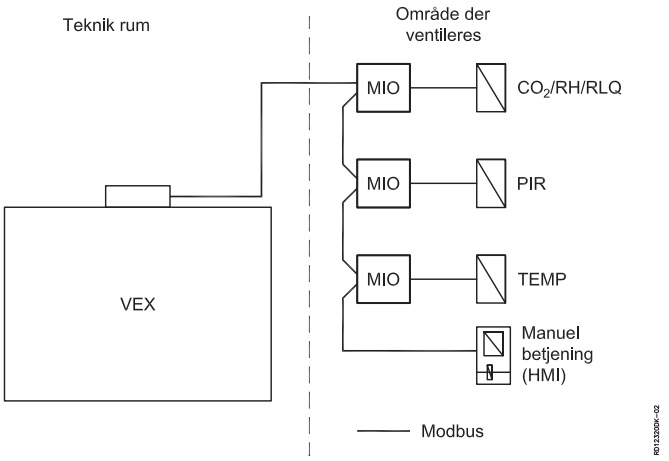
* Adjustable, see EXact2 basic instructions, section 6.4.

**Temperature sensor**

| Sensor | Location | Function |
|---|---|---|
| TSROOME/TSDUCTE Temperature sensor | Fitted in the room or supply air duct | Temperature regulation uses this sensor instead of the temperature sensor in the VEX unit. |

**MIO2 modules**

A maximum of one sensor/device per MIO2 module is connected. However, up to four motion sensors can be connected to a MIO2 module.




## 1.2 Positioning individual sensors

| Sensor | Optimum positioning | Avoid |
|---|---|---|
| RH sensor | Position on wall in an area where the air is the same as in the rest of the room | • areas with draughts<br>• areas with static air<br>• areas by doors, windows and sources of heat |
| RLQ air quality sensor | Position on the wall, 1.8-2.2 m above floor level, in an area where the air is the same as in the rest of the room | • areas with draughts<br>• areas with static air<br>• areas by doors, windows and sources of heat |
| $CO_2$ Carbon dioxide sensor | **Wall-mounted sensor:** Position on the wall, 1.8-2.2 m above floor level, in an area where the air is the same as in the rest of the room | • areas with draughts<br>• areas with static air<br>• areas by doors, windows and sources of heat |
| | **Duct-mounted sensor:**Position in the extract air duct, in an air line that is the same as the air in the room | |
| PIR Motion sensor | Position 2-2.5 m above floor level in the area of the room to be monitored. The PIR sensor covers a horizontal angle of approx. 90° | • areas with direct sunlight<br>• areas close to sources of heat |
| TIMERBUTTON3 | Place suitably for operation, e.g. at entrance to the room | • that it can be activated unintentionally |
| TSROOME/TSDUCTE Temperature Sensor | **Wall-mounted sensor:** Position on wall in an area where the air is the same as in the rest of the room | • areas with draughts<br>• areas with static air<br>• areas by doors, windows and sources of heat |
| | **Duct-mounted sensor:** Position in the extract air duct, in an air line that is the same as the air in the room | |

## 1.3 Design of the MIO2 Module

**Connector**

The MIO2 module has a number of styles that allow sensors/devices to be connected.

**NB:**

It is important that a sensor is connected to the correct connector and that a jumper in CN12 is correctly fitted in relation to the chosen sensor. The following section shows how each sensor is connected. The LED in the middle of the MIO2 circuit board flashes green when the module is in operation.

**Individual sensor connections**

Connecting sensors etc.:

**Table A - Sensor connection to MIO2**

| Sensor | Connect connector no. | Jumper in CN12 |
|---|---|---|
| MIO2 module (bus connection) | CN7, CN15 | |
| RH humidity sensor | CN15 and CN11 | 1 => 3 |
| RLQ sensor | CN15 and CN11 | 1 => 3 |
| $CO_2$ sensor | CN15 and CN11 | 2 => 3 |
| PIR sensor | CN15, CN11, CN6 | 4 => 6 |
| TIMERBUTTON3 | CN15, CN11, CN6 | 4 => 6 or 3 => 1 and 3 => 2 |
| TSROOME/TSDUCTE temperature sensor | CN6 | 5 => 6 |
| AUX1 | CN4, C11, CN13 | 2 => 3 |
| AUX2 | CN4, CN11, CN13 | 1 => 3 |

**Table B - Jumper programming of TIMERBUTTON3**

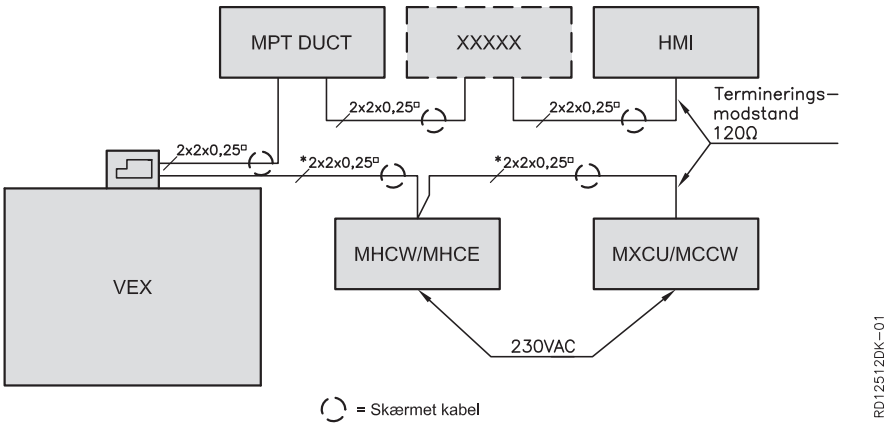
| Configuration | Time | Jumper in CN6 | | |
|---|---|---|---|---|
| Normal function | | 1-3 (RD) | 2-3 (VT) | 3-4 (BK) |
| | 30m | | | |
| | 1h | X | | |
| | 1.5h | | X | |
| | 2h | X | X | |
| Test function | 3s | | | X |
| | 6s | X | | X |
| | 12s | | X | X |
| | 24s | X | X | X |

See diagram in section 2.6 for further info.

## 1.4 Connecting the MIO2 module to the bus

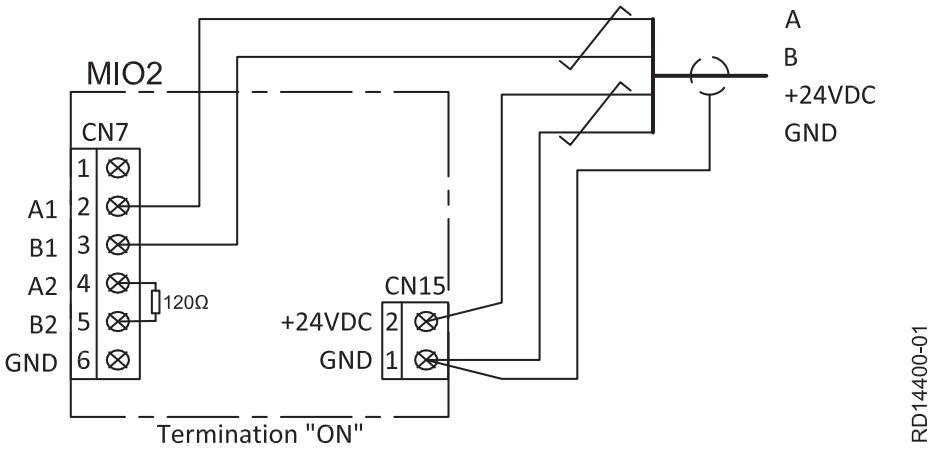
**Modbus, termination**

It is necessary to terminate the first and last devices on the bus with a 120 Ω resistor, see below

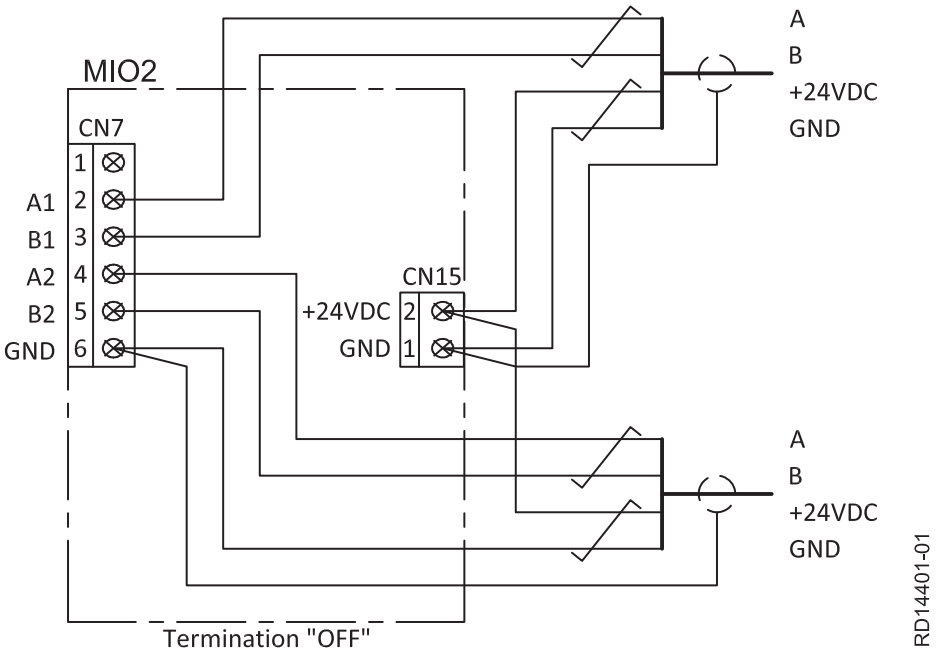



The VEX is supplied with two resistors, which are located in the drawing pocket in the door.

| If... | Then... | See diagram no. |
|---|---|---|
| The MIO2 module is the first or last device on the bus | CN7 must be terminated with a 120 Ω resistor | 1 |
| The MIO2 module is neither the first nor last device on the bus | it must be daisy-chained to the next device. (in this case, another MIO module) | 2 |




1

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# 2. Connecting to the MIO2 module

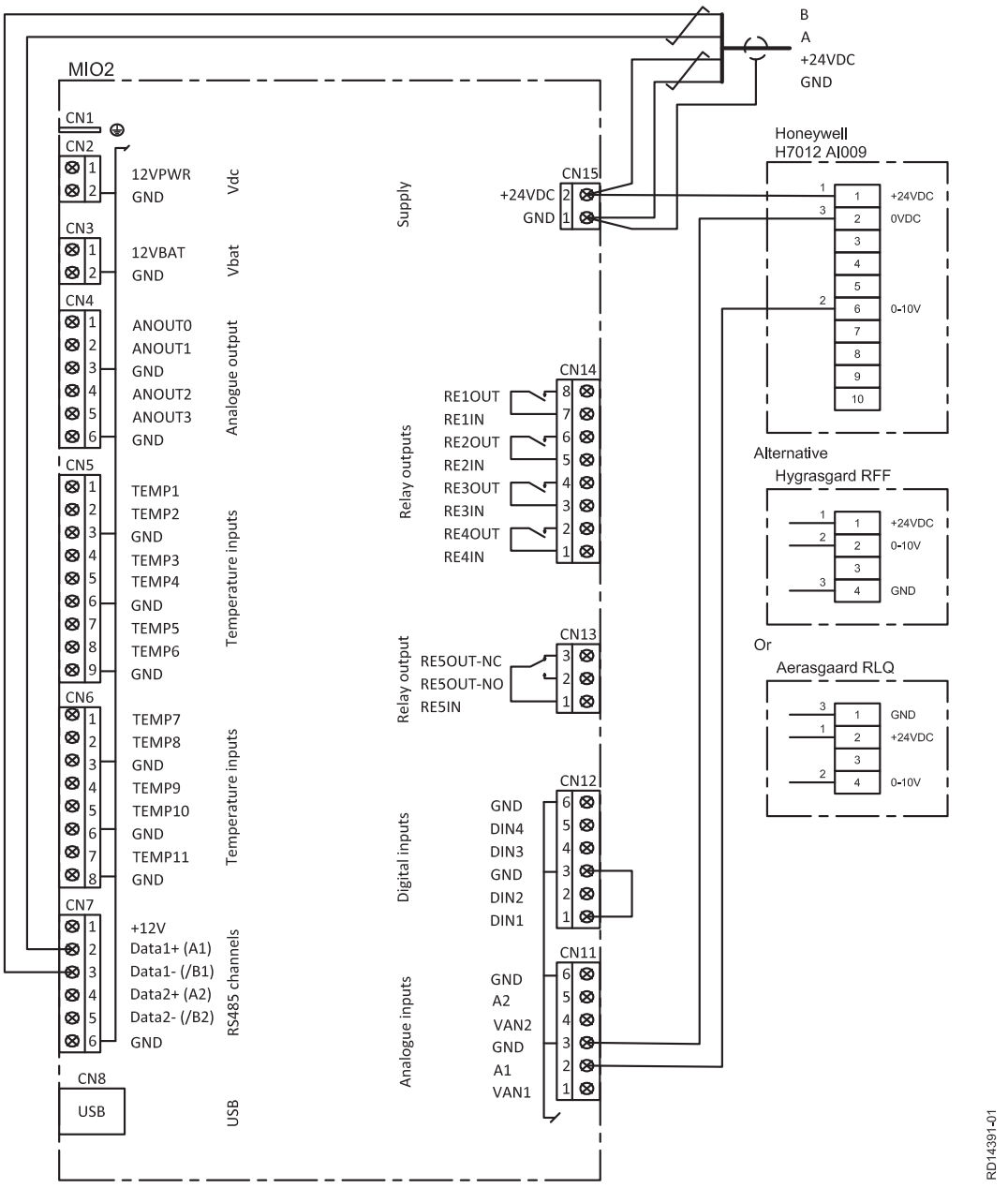
**NB:**

**The Modbus connectors must not be connected or removed while there is voltage on the sensors/units. Both Modbus units must be switched off before making changes, otherwise the units/sensors may be damaged.**

## 2.1 RH humidity sensor/RLQ air quality sensor

**How to connect RH/RLQ**

- Connect the RH humidity sensor or RLQ air quality sensor to the MIO2 module as shown below.
- Connect the jumper in CN12 as shown below.



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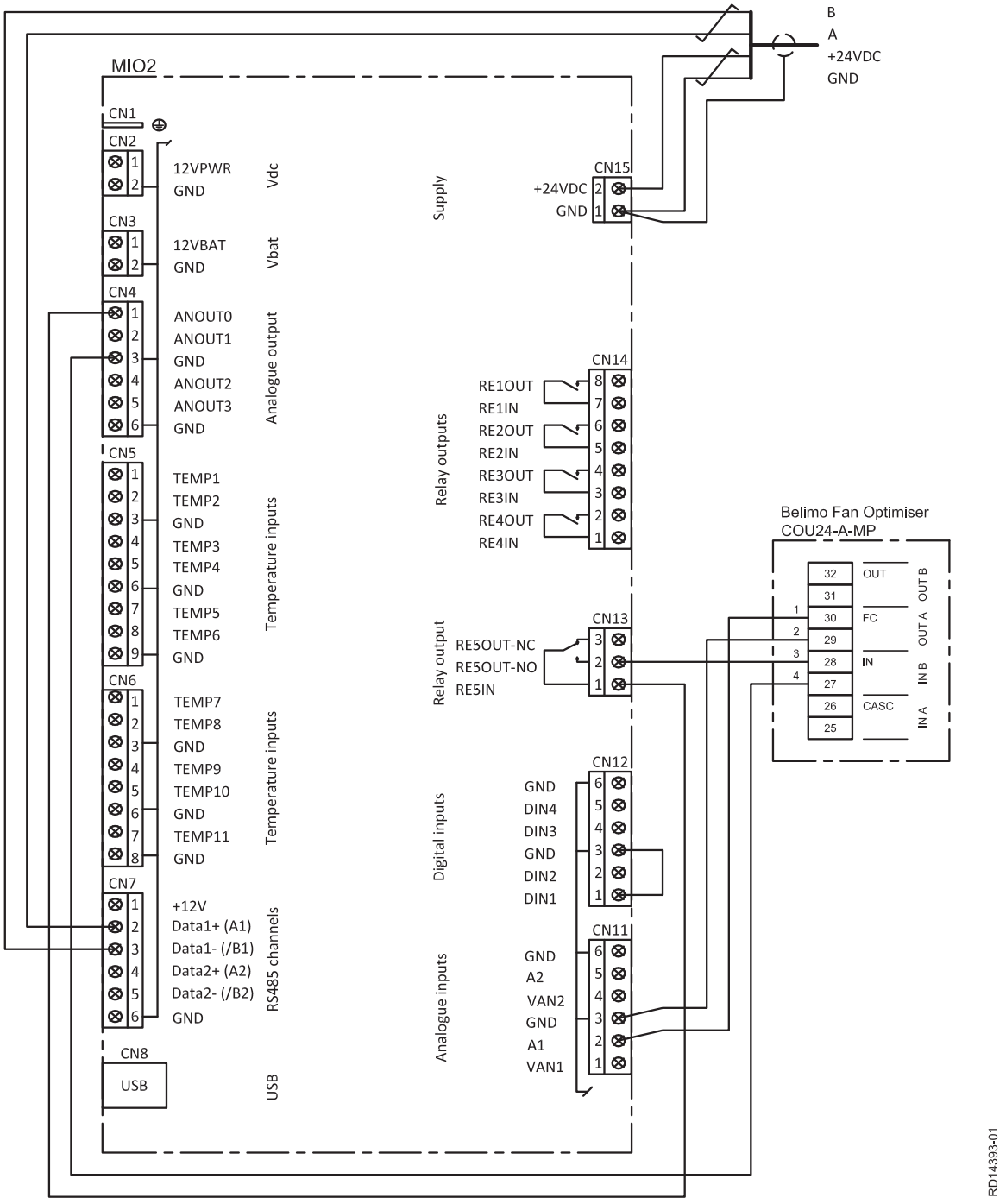
## 2.2 AUX2

**How to connect AUX2**

- Connect the Belimo Fan Optimiser or similar external control as shown below.
- Connect the jumper in CN12 as shown below.




**NB: Belimo Fan Optimiser is an example of a solution.**



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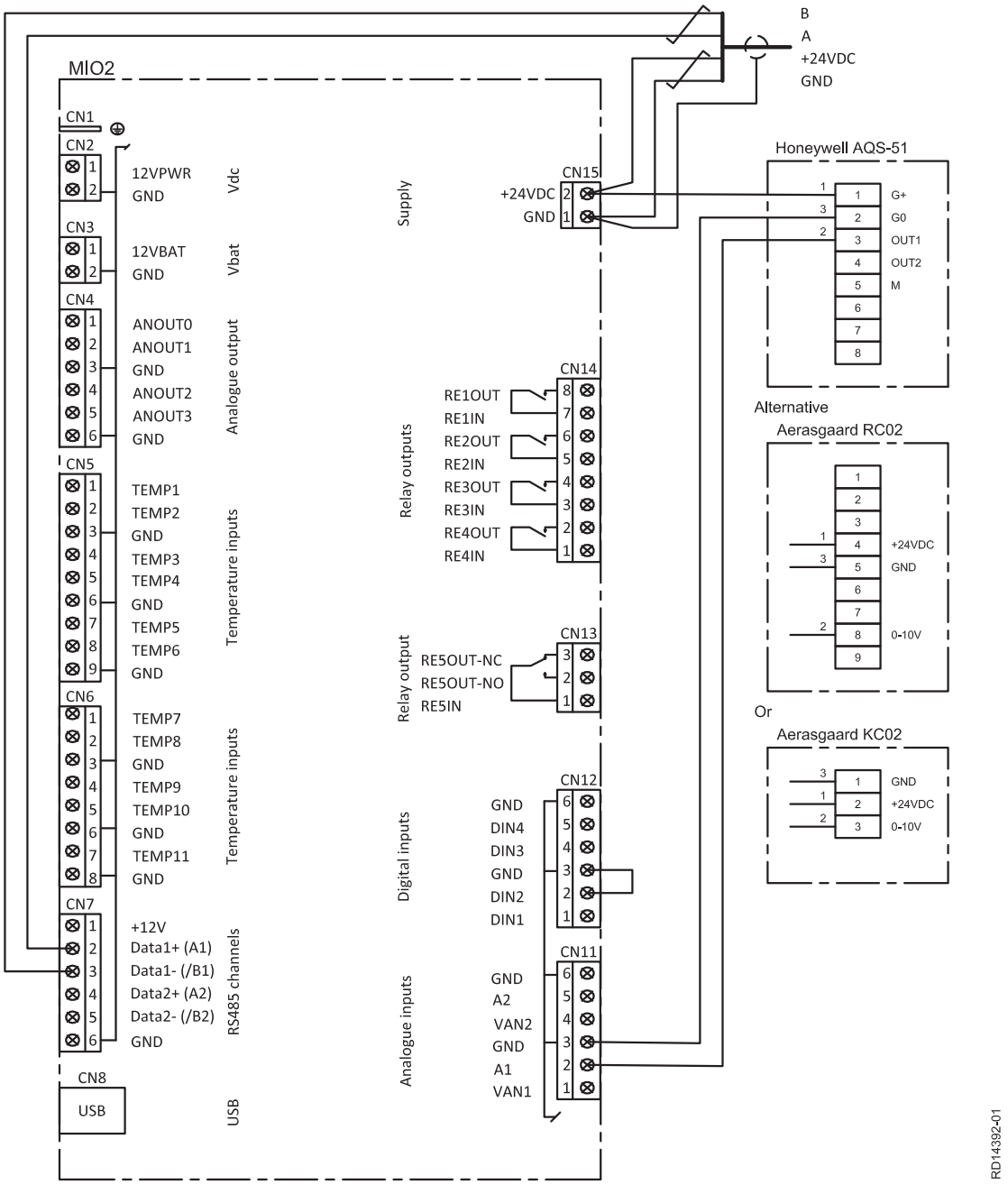
## 2.3 CO2 sensor

**How to connect $CO_2$ sensor**

- Connect the $CO_2$ sensor to the MIO2 module as shown below.
- Connect the jumper in CN12 as shown below.



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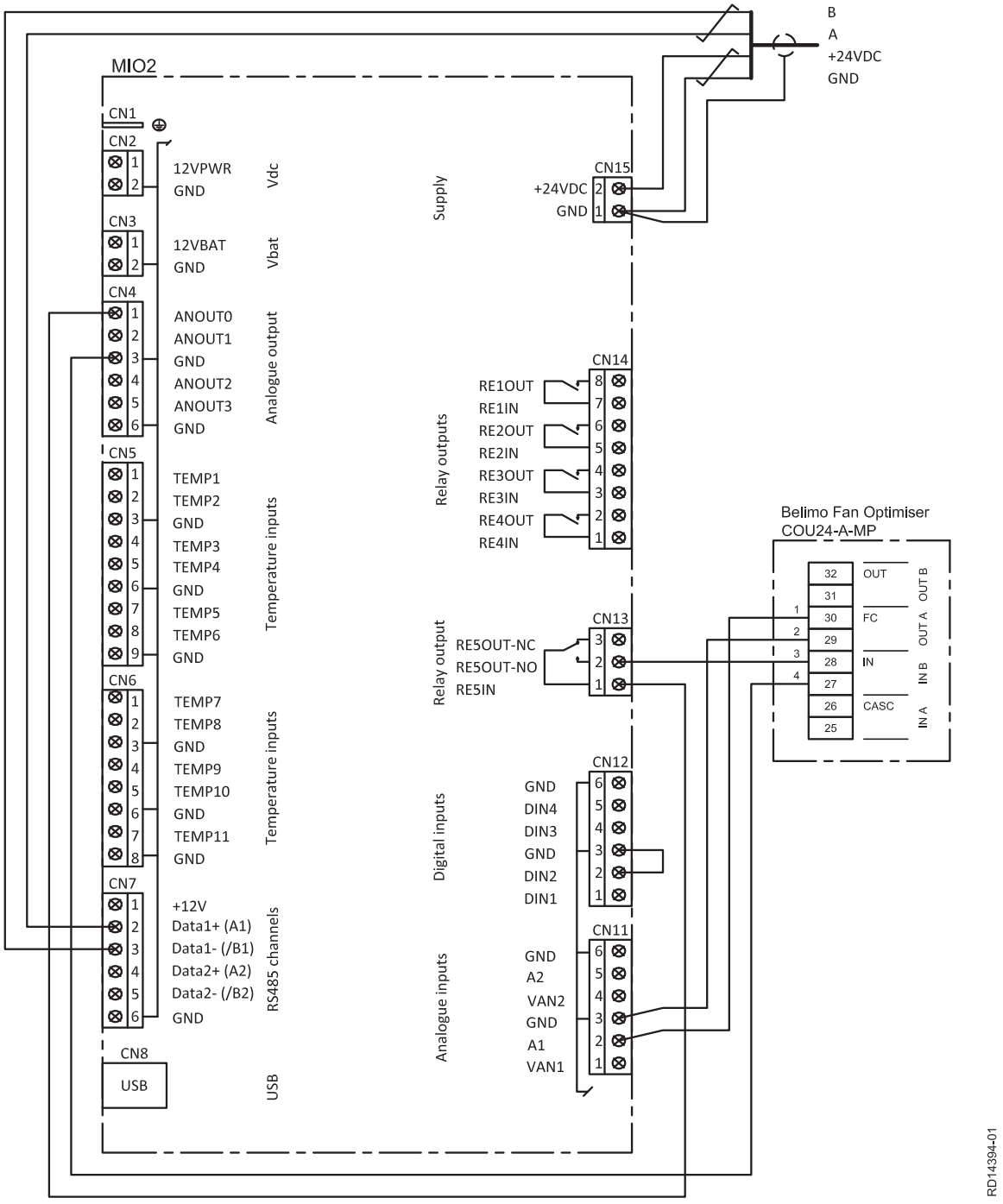
## 2.4 AUX1

**How to connect AUX1**

- Connect the Belimo Fan Optimiser or similar external control as shown below.
- Connect the jumper in CN12 as shown below.




**Note: Belimo Fan Optimiser is an example of a solution.**



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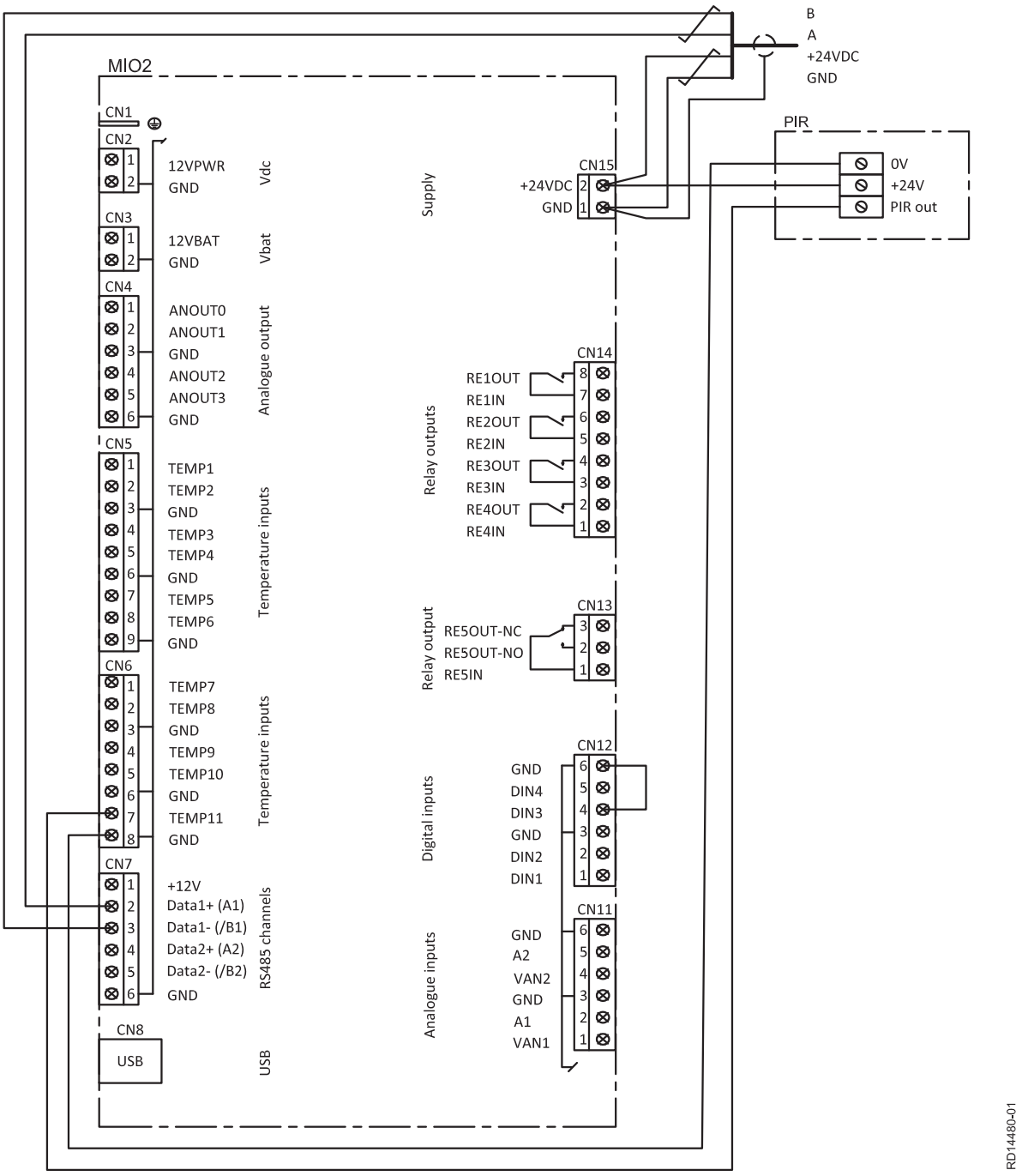
## 2.5 PIR (motion sensor)

**How to connect the PIR**



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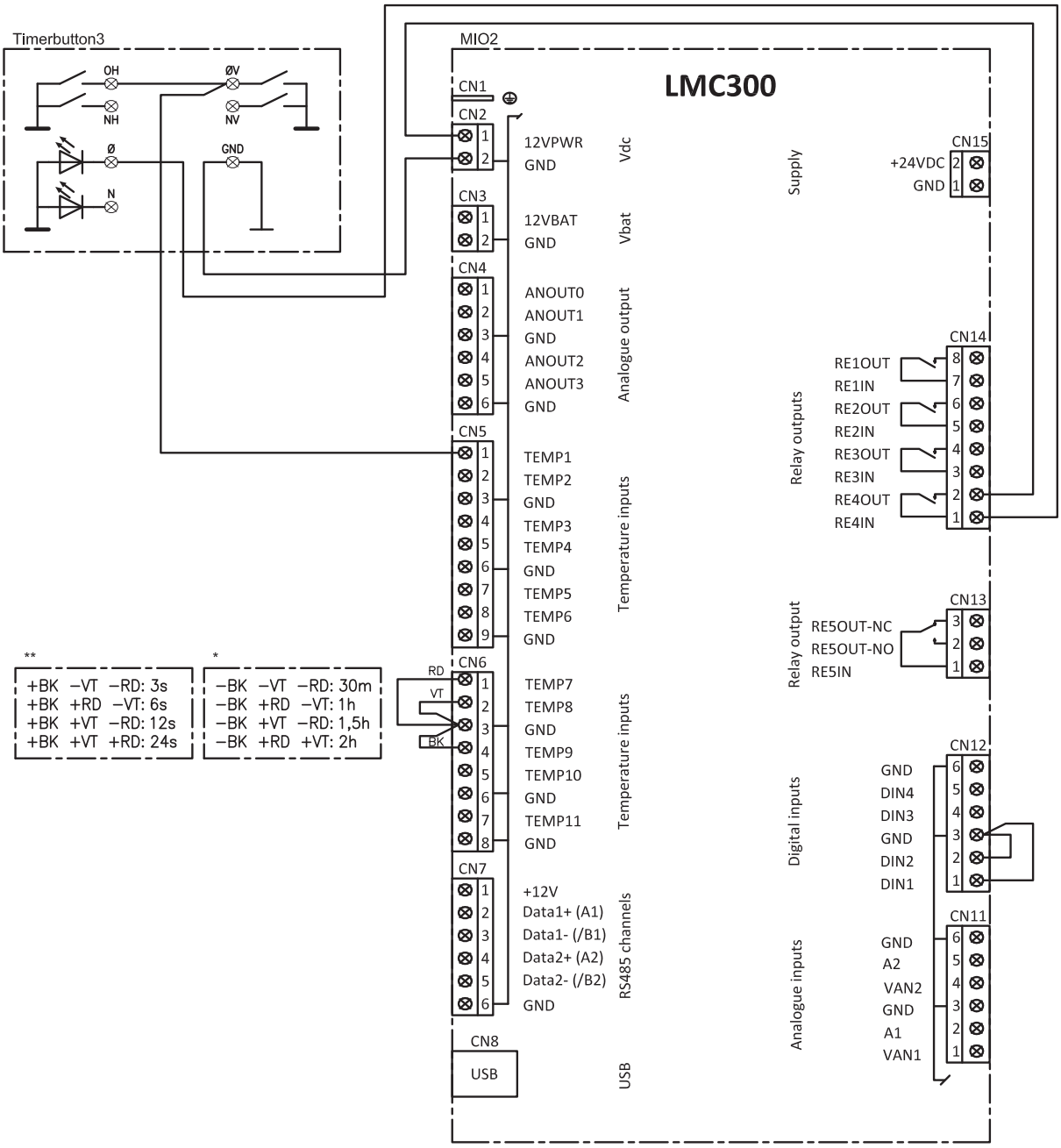
**NB PIR**

| If | Then |
|---|---|
| multiple PIR sensors or switched must be connected to the same MIO2 module | the relay contacts in the PIR sensors/switches must be connected in parallel. A maximum of 4 sensors/switches are connected to one MIO2 module |
| TIMERBUTTON3 must be used to override the VEX to comfort level | the switch can be: - inserted instead of the PIR sensor or – inserted parallel over the PIR sensor |

## 2.6 TIMERBUTTON3

**How to connect TIMERBUTTON3**




*: Normal function

**: Test function



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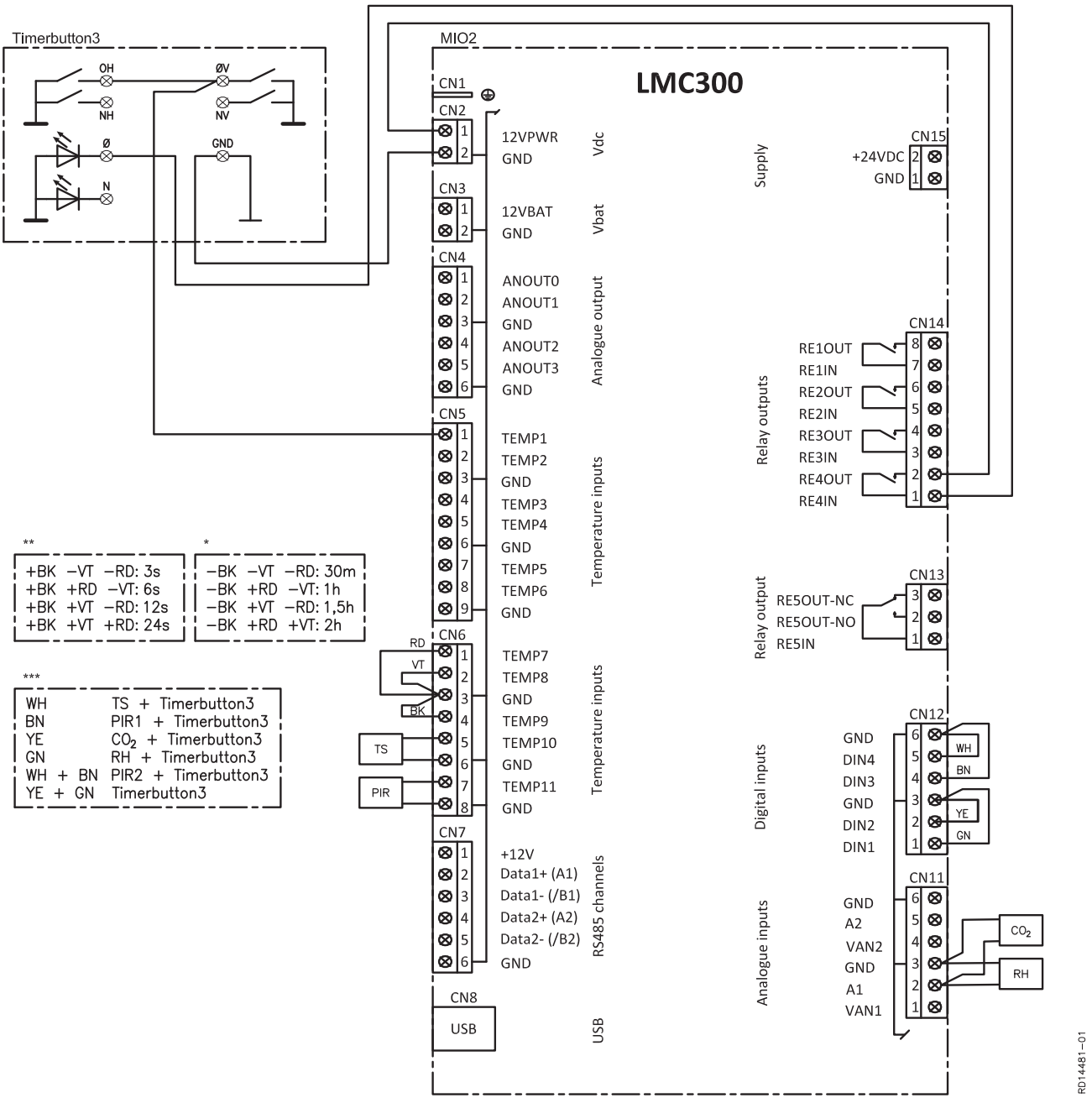
## 2.7 TIMERBUTTON3 combined with other sensor

**How to connect TIMERBUTTON3 to other sensor**




*: Normal function

**: Test function

***: Jumper programming to another sensor connected to the MIO2 module.



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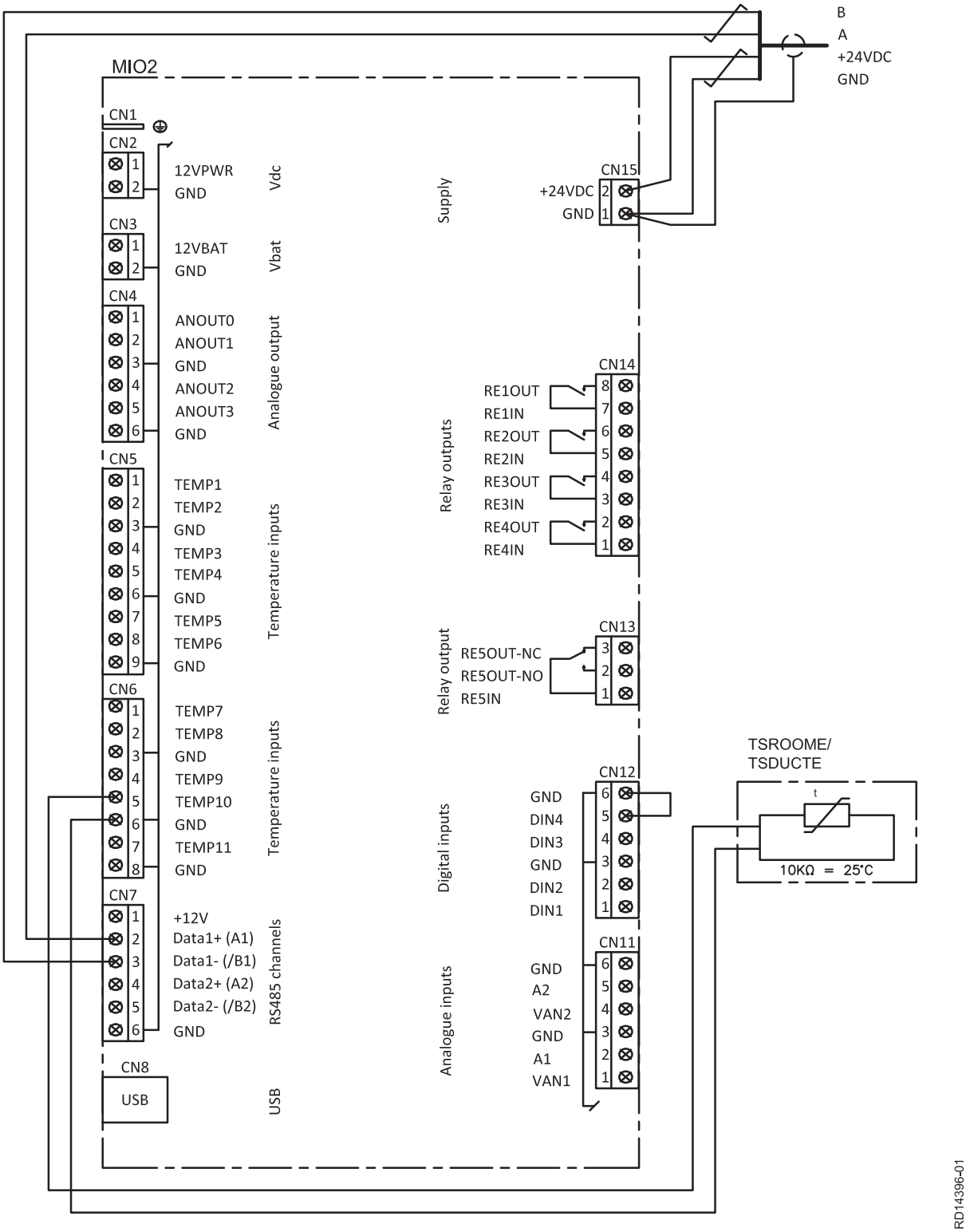
## 2.8 TSROOME/TSDUCTE, temperature sensor

**TSROOME/ TSDUCTE, temperature sensor**

- Connect the TSROOME/TSDUCTE temperature sensor to the MIO2 module as shown below.
- Connect the jumper in CN12 as shown below.



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# 3. Activation and settings of sensors

## 3.1 Activation and settings of sensors

**Detection**

Once the desired sensor(s) has/have been installed, they are automatically detected by the EXact control system.

**Activation of sensor**

Activate the desired sensor(s) by:

- the VEX unit remote control (HMI) or
- a connected PC

See the instructions “EXact control system basic instructions” & “ EXact control system Menu guide”

**Setting the individual sensors**

The table below shows the setting options for the individual sensor, and reference to the menu no. in the EXact control system.

| Sensor | Configuration | EXact menu no. | NB: |
|---|---|---|---|
| RH sensor | Set start and max. limit | 3.1.2 | Indication: 0 – 100% relative air humidity |
| RLQ air quality sensor | Set start and max. limit | 3.1.2 | Indication: 0 – 100 air quality |
| Carbon dioxide sensor | Set start and max. limit | 3.3 | Indication: 0 - 2000 ppm. |
| PIR sensor | Set start and max. limit | 3.3 | The PIR sensor automatically disconnects after 10 minutes if it has not registered a person in the room during that time. |
| TSROOME/ TSDUCTE Temperature sensor | The MIO2 module with temperature sensor is automatically detected by EXact | 3.3 | NTC 10 k Ω @ 25°C |
| TIMERBUTTON3 | See table B (1.3) | 3.3 | The override of the VEX can be stopped by pressing the timer again.<br>When the timer function is active, the LED lights up green. |
| AUX | Setting of control signal | 3.1.1.4 | Requires that airflow control method 8 is selected |

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