ModMETEO: meteorological data detection module for Contatto bus

ModMETEO module allows the detection of several meteorological data. The module interfaces, on one side, to the Contatto bus and, on the other side, to a special sensor trough a dedicated communication line.

ModMETEO module reports the value of three parameters:

- ✗ temperature
- ✗ daylight
- ✗ wind speed

ModMETEO module also provides 9 digital points to inform about the following conditions:

- ✗ Rain
- ✗ Twilight
- ✗ Temperature ≥ Threshold
- ✗ Daylight ≥ Threshold
- ✗ Wind speed ≥ Threshold
- ✗ Light from South
- ✗ Light from West
- ✗ Light from East
- ✗ Sensor failure

The module features a 5-way removable terminal block for the connection to Contatto bus and a 3-way fixed terminal block for the connection, through lines A and B, to the meteorological sensor.

A green LED near to the bus terminal block informs that the module is properly supplied, while a red LED near to the 3-way terminal block signals the presence of the communication with the meteorological station.

ModMETEO module is housed in a DIN 3M modular box for rail mounting.

Address programming

ModMETEO module takes 1 output address and, if enabled by the configuration panel of MCP IDE, 1 output address with the same value. The address must be assigned by FX-PRO programmer. A white label on the front panel allows the writing of the assigned address for an immediate visual identification.

Wiring diagram

The schematic diagram in Figure 1 shows the connections to be made between ModMETEO module and Contatto bus and the meteorological station (terminals A and B).

The meteorological station must be supplied by 24Vdc voltage; the same power supply of Contatto system can be used for this purpose.

The meteorological station has a 5-way removable terminal block with a premounted diode for reverse polarity protection; however, pay attention to the connection of the meteo station because, in the opposite case, it could be irreversibly damaged. The connections must be executed before to apply the power supply.

For the connection of the meteorological station use a cable with 2 twisted pairs, with proper section (for instance 2x2x0,8mmq); use a pair for the power supply and the other pair for the communication line (A e B). If the chosen cable provides the shield, connect it to the terminal 3 (G) of ModMETEO module, leaving it unconnected on the side of meteorological station. The maximum allowed length for this cable is 100 meters.

Information reported on the bus

Input section:

As said above, ModMETEO takes, inside Contatto bus, 1 input address with 4 channels 16-bit format, reporting the following information:

Point	CH1	CH2	CH3	CH4
1				Rain
2				Twilight
3				Temp.>= Th..
4				Daylight>= Th.
5			Wind speed value in tenth of meters per second (m/s multiplied by 10)	Wind>= Th.
6	Temperature value in tenth of °K (Kelvin degrees multiplied by 10)	Daylight value in tens of LUX (LUX divided by 10)		Light fr. South
7				Light fr. West
8				Light fr. East
9				
10				
11				-
12				-
13				-
14				-
15				Sensor failure
16				-

Channels CH1, CH2 and CH3 of the input address report respectively:

- ✗ measurement of the temperature in °K multiplied by 10; called X the value in channel 1, to convert it to °C use the formula (X–2730)/10. The temperature in MCP Visio will be instead directly displayed in °C.

- ✗ measurement of the daylight value in tenth of lux; called Y the value in the CH2, to convert it to lux

multiply Y by 10. The daylight in MCP Visio will be instead directly displayed in lux (0 to 99000 lux)

✗ measurement of the wind speed in m/s multiplied by 10 (0.0m/s to 70.0m/s). The wind speed in MCP Visio is instead directly displayed in m/s.

Channel CH4 reports 9 digital points that, when activated, signals the presence of the following conditions:

✗ Rain
✗ Twilight
✗ Temperature ≥ Threshold
✗ Daylight ≥ Threshold
✗ Wind speed ≥ Threshold
✗ Light from South
✗ Light from West
✗ Light from East
✗ Sensor failure

The points related to the light direction will be enabled only if the daylight is greater than 20000 lux. The digital point related to the rain status will be disabled, from when this meteorological condition is no more true, with a delay of 6 minutes about. The digital point related to the twilight status is activated when the daylight is lower than 15 lux and deactivated in the opposite case.

Output section:

The module can feature, as said above, 1 output address for setting the thresholds through the bus; this address has to be enabled, if required, by the ModMETEO configuration panel, as described in the following. The information mapped on the output section are the following:

Point	CH1	CH2	CH3	CH4
1	Set the temperature threshold in tenth of Kelvin degrees	Set the daylight threshold in tens of lux (LUX divided by 10)	Set the wind speed threshold in tenth of meters per second (m/s divided by 10)	-
2				
3				-
4				-
5				-
6				-
7				-
8				-
9				-
10				-
11				-
12				-
13				-
14				-
15				-
16				-

Figure 1: wiring connections

Channels CH1, CH2 and CH3 of the output address report respectively:

- ✗ Temperature threshold in °K multiplied by 10; called X the desired value in °C, to convert it to °K multiplied by 10 use the formula (X+273)x10. The threshold in MCP Visio will be instead directly set in °C.
- ✗ Daylight threshold in LUX divided by 10; called Y the desired value, the value to be written in the output channel 2 is Y divided by 10. The threshold in MCP Visio will be instead directly set in LUX.
- ✗ Wind speed threshold in m/s multiplied by 10; called K the desired value, the value to be written in the output channel 3 is K multiplied by 10. The threshold in MCP Visio will be instead directly set in m/s.

Channel CH4 of the output address is not used.

Masking times and thresholds

As will be described in the following, the ModMETEO configuration panel of MCP Visio allows to set the masking times (or delay times) and the desired threshold values.

The masking times are applied to the following measurements:

- ✗ Daylight
- ✗ Wind speed

These masking times are used to delay the deactivation of the bits of input channel CH4 related to the just listed measurements. The switching from 0 to 1 is instead instantaneous in respect to the overcoming of the related threshold.

The thresholds can be set by the configuration panel or by the output address as described in the previous paragraph, and they apply to the following meteorological measurements:

- ✗ Temperature
- ✗ Daylight
- ✗ Wind speed

Setting a value for each of these measurements, a threshold will be set on the activation of the related bits of CH4.

Installation of the meteorological station

Position

Choose an installation position in the building where wind, rain and sun can be easily measured from any direction by the sensors. The meteorological station must not be installed underneath any structural parts from which water can still drip onto the rain sensor after it has stopped raining or snowing. The meteorological station must be oriented toward the SUD direction and it must not be shaded by anything, such as building structures or trees. At least 60 cm of free space underneath the meteorological station are mandatory to allow it to measure the wind correctly and to avoid malfunctions caused by the snow.

View inside the sensor

1. Connector for the wires of the rain sensor
2. Connector for the wiring of:
   - ✗ 1: +24Vdc
   - ✗ 2: GND
   - ✗ A: Communication line +
   - ✗ B: Communication line -
3. Not used
4. Not used

Mounting

The meteorological station must be mounted onto a vertical wall or pole.
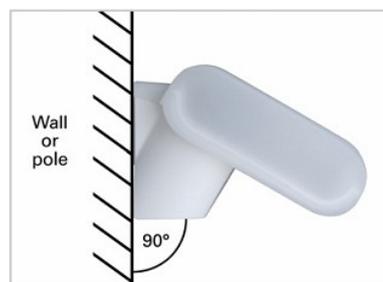
The meteorological station must be mounted horizontally in the lateral direction.

Positioning the support for meteorological station

The meteorological station comes with a combination wall/pole mount. Mount the support vertically on the wall or on the pole as described in the following.

Wall mounting: flat surface on wall, collar upward; lock on with screws (not provided).
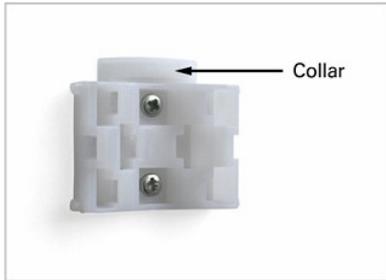
Pole mounting: curved side on pole, collar downward; lock on with metallic fasteners (not provided).
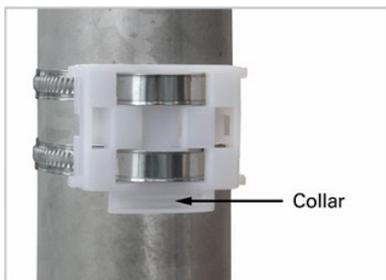
Preparing the meteorological station
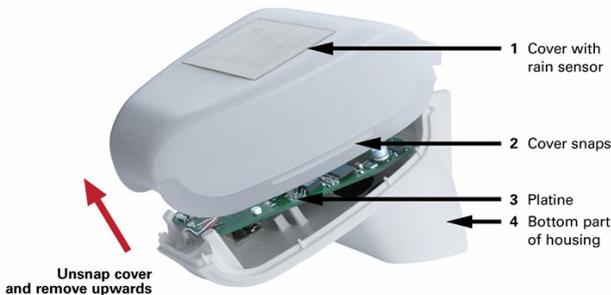
The meteorological station cover with the rain sensor snaps in on the left and right along the bottom edge. Remove the meteorological station cover. Proceed carefully, so as not to pull off the wire connecting the PCB in the bottom part with the rain sensor in the cover (wire with push-connector).

Push the connection cable through the rubber seal on the bottom of the meteorological station and connect the power and communication cables to their related terminals. The connection is by typical telephone cable (J-Y(ST)Y 2 × 2 × 0.8).

Mounting the meteorological station

Close the housing by putting the cover back over the bottom part. The cover must snap in on the left and right with a definite click.

Make sure the cover and bottom part are properly snapped together. The following figure shows the meteorological station closed in correct way (bottom view).
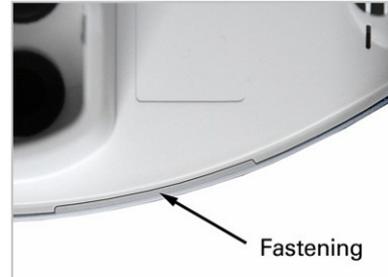
Push the meteorological station from above into the fastened mount. The bumps on the mount must snap into the rails in the housing.

To remove it, the meteorological station can be simply pulled upwards out of the mount, against the resistance of the fastening.

Notes on installation

Do not open the meteorological station if water (rain) could get in: even a few drops could damage the electronics inside. When mounting, take care not to damage the temperature sensor (small PCB on the bottom of the housing). Also, the wire connecting the PCB with the rain sensor must not be pulled off or kinked at the terminal.

Note: it will take 30 seconds after applying the power before the wind measurement will be output.

Maintenance

The meteorological station must be checked for dirt on a regular, twice-yearly basis and cleaned if necessary. A dirty meteorological station can lead to strange results, such as the wind sensor failing to work, the station constantly announcing rain, or failure to detect sunlight.

ModMETEO configuration panel

The configuration panel available in MCP Visio (release 2.1.3 or higher) allows to set ModMETEO module. The details will be described in the following. From the main menu of MCP Visio select Configuration and then ModMETEO; the following window will be shown:
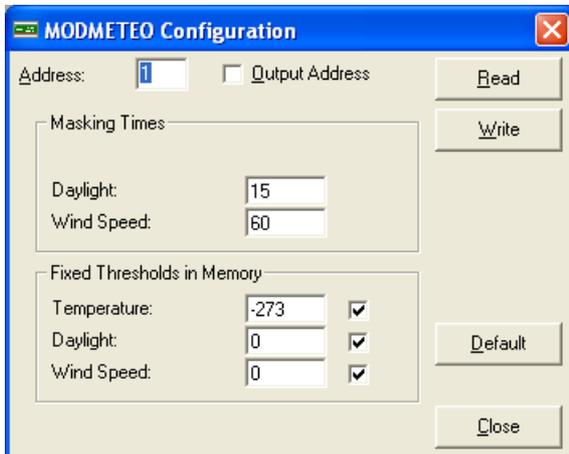
Address: it is the address of ModMETEO module to be configures or to be read.

Output Address: enabling these parameter, the output address of ModMETEO will be activated (the value of the output address will be the same assigned to input section).

Read: this option allows to read the current configuration of the selected ModMETEO module.

Write: this option allows to write, into the memory of the module, the desired values for the masking times and the thresholds.

Default: this option restores the default values in the configuration panel; these ones are:

- ✗ Address: 1
- ✗ Output address: disabled
- ✗ Masking times:
  - ○ Daylight: 15sec
  - ○ Wind speed: 60sec
- ✗ Fixed thresholds in memory:
  - ○ Temperature: -273
  - ○ Daylight: 0
  - ○ Wind speed: 0

Close: quit the configuration panel.

Masking times

Daylight: entering a value in this field, a delay in seconds will be introduced before the deactivation of the digital point related to Daylight >= Threshold.

Wind speed: entering a value in this field, a delay in seconds will be introduced before the deactivation of the digital point related to Wind Speed >= Threshold.

Note: no masking time is featured for the deactivation of the digital point related to Temperature >= Threshold, because a 1 °C hysteresis is already provided.

Fixed thresholds stored in memory

Temperature: setting the threshold value to -273°C, the comparison will be disabled and the related digital points will be always '0'. Setting a different value, a threshold will be fixed for the digital point related to the temperature.

Daylight: setting this parameter to '0', the digital point related to daylight measurement will not have any threshold. Setting a value greater than '0', a threshold will be fixed for the related digital point.

Wind speed: setting this parameter to '0', the digital point related to the wind speed will not have any threshold. Setting a value greater than '0', a threshold will be fixed for the related digital point.

The check box near to the threshold value will enable (if checked) the comparison with the related values, otherwise the comparison will be executed with the value sent via bus through the output address.

N.B.: *for default the thresholds values shown in the configuration panel are all enabled. If these fixed thresholds in memory are used, the changing of the threshold values through the output address of ModMETEO will not take any effect and the thresholds will not be modified. To use the thresholds sent via bus, disable the related check boxes.*

Mapping

MCP Visio allows to display the map of ModMETEO module as in the following figure.

N.B.: *if the output address has not been enabled, the bottom side of the symbol in the map (where the thresholds are displayed) will be shown in red color.*

Temperature: this is the temperature value measured by the meteorological station (°C).

Daylight: this is the daylight value measured by the meteorological station (Lux).

Wind speed: this is the wind speed value measured by the meteorological station (m/s).

Temperature Threshold: this is the current threshold sent via bus (°C).

Daylight Threshold: this is the current threshold sent via bus (Lux).

Wind Speed Threshold: this is the current threshold sent via bus (m/s).

Digital points:

- ✗ Rain
- ✗ Twilight
- ✗ Temperature ≥ Threshold
- ✗ Daylight ≥ Threshold
- ✗ Wind speed ≥ Threshold
- ✗ Light (Sun) from South
- ✗ Light (Sun) from West
- ✗ Light (Sun) from East
- ✗ Sensor failure

Note: The failure sensor condition will be activated with a delay of 10 seconds; this delay time is fixed and cannot be modified.

Technical characteristics

ModMETEO module supply voltage	24V $=$ ± 25% SELV
ModMETEO module MAX current consumption	50mA
Meteo station supply voltage	24V $=$ ± 15%
Meteo station MAX current consumption	100mA
Temperature range	-30 ÷ +50 °C
Daylight range	0 ÷ 99000 lux
Wind speed range	0 ÷ 70 m/s
ModMETEO module operating temperature	-10 ÷ +50 °C
Meteo station operating temperature	-30 ÷ +50 °C
Storage temperature (ModMETEO + sensor)	-30 ÷ +85 °C
Protection degree of module ModMETEO	IP20
Protection degree of sensor	IP44

Outline dimensions