

ModAM2: 2 independent multifunction

analog inputs module

ModAM2 analog input module allows the detection and processing of two input signals that can be independently configurable configured as:

- x voltage 0÷10V
- x current 0÷20mA
- x temperature for PT100 sensors
- x temperature for PT1000 sensors
- x temperature for NTC sensors

The temperature values are reported on the bus as degrees centigrade multiplied by 10 and in two's complement format, so as to be able to transmit also negative temperature values. The voltage and current values, on the other hand, can be rescaled, using the configuration panel in MCP IDE, in any measurement unit by specifying a start value and a full scale value.

ModAM2 module features a removable 5-way terminal block for connection to the **CONTATTO** bus and two removable 3-way terminal block for connection to analog sources. A green LED next to the bus terminal block indicates that the module is powered; two red LEDs on the bus terminal side (one per channel) indicate possible anomalies like out of scale or probe failure depending on the chosen configuration (for future use). ModAM2 is housed in a modular DIN 2M box for rail mounting.

Note: ModAM2 can work only in plants where MCP XT or MCP 4 controller has been installed.

Address programming

ModAM2 module takes only one input address featuring 2-channels 16-bit each one. The address has to be assigned by FXPRO programmer. A white label on the front panel allows writing the assigned address.

The settings of the 2 analog channels must be performed by the proper tool in MCP IDE application as will be described later in this manual.

Information reported on the bus

The input address of ModAM2 module reports, on 2 16-bit channels, the measurements chosen during configuration. The values of the measurements are expressed as follows:

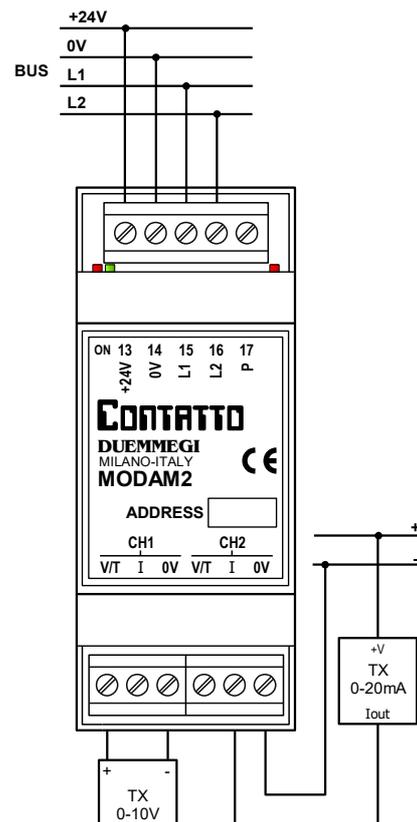
- x voltage input: by default the 0÷10V range is reported as 0÷10000 [mV]; it is however possible to redefine the scale by specifying the value that must correspond to 0V and the value that must correspond to 10V (for example 0÷5000 kg)
- x current input: by default the 0÷20mA range is reported as 0÷2000 [mA x 100]; it is however possible to redefine the scale by specifying the value that must correspond to 0mA and the value that must correspond to 20mA (for example -1000÷1000mbar)
- x temperature inputs: the measuring range is reported in tenths of a degree (°C x 10)

All the listed measurements are reported in two's complement format so that negative numbers can also be represented; the maximum values that can be transmitted on the bus are therefore from -32768 to +32767.

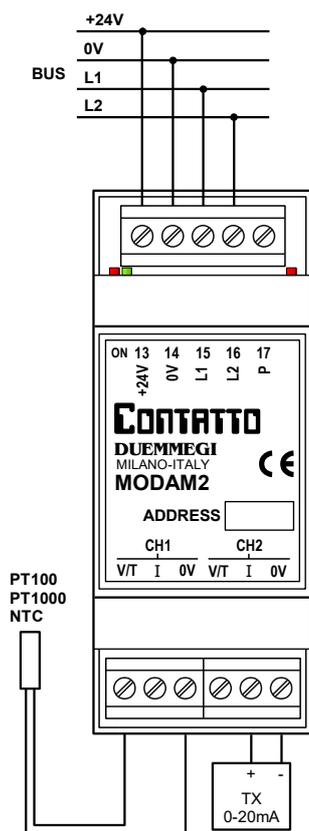


Wiring diagram

The following schematic diagram shows the connection between ModAM2, **CONTATTO** bus, a 0÷10V transmitter and a 4÷20mA 2-wire transmitter.



The following diagram shows the case in which a temperature probe is connected to channel 1 (PT100, PT1000 or NTC); the connection of these probes is 2-wire technique, therefore without automatic compensation of the cable length (particularly for the PT100). Using the configuration panel it is however possible to compensate possible measurement offset due to the resistance of the the cables.



Warning: the temperature probes and the voltage transmitters must be connected to the terminals marked as V/T and 0V, while the current transmitters must be connected to the I and 0V terminals; the positive terminal is V/T in the first case and I in the second one. Connections of voltage outputs or high currents to terminal I may damage the module.

ModAM2 configuration panel

The ModAM2 configuration panel available in MCP IDE allows to configure the module as desired. The module configuration is performed via the **CONTATTO** bus as described below.

All ModAM2 modules installed in the plant must be declared in the configuration of MCP XT or MCP 4, specifying the addresses as in the following example (supposing to have a single ModAM2 module with base address 22):

MODAM2 = (**I22**)

From the main menu of MCP IDE select Configuration, Input Modules and then MODAM2; the window in Figure 1 will be shown and the meaning of the various items is:

- Module Address:** it is the address of ModAM2 module to be configured or to be read.
- Read:** transfer the current configuration of ModAM2 to the configuration window.
- Program:** transfer the configuration currently displayed in the window to ModAM2.

ID & Ver.: ask to ModAM2 the ID code and the firmware version.
Close: quit the configuration panel.

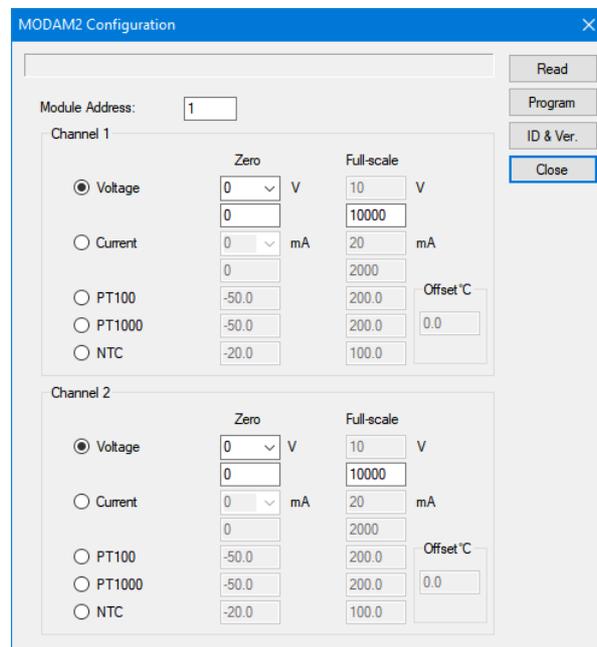


Figure 1

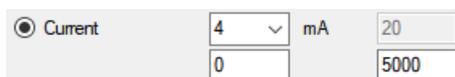
The configuration panel has two equal sections for each of the two channels, allowing to choose from the following options:

- Voltage:** voltage input, nominally 0÷10V, maximum measurable voltage 12V.
- Current:** current input, nominally 0÷20mA, maximum measurable current 25mA.
- PT100:** for standard PT100 temperature probe with two-conductor connection technique.
- PT1000:** for PT1000 standard temperature probe with two-conductor connection technique..
- NTC:** for NTC temperature probe 10kΩ at 25°C, B-value 3435K (available on request from **DUEMMEGI**).

For each one of the two channels, relatively to the temperature settings, it is possible to enter an Offset value to correct and compensate for any measurement errors due to the length of the cables; the offset value is added to the measurement and can be either positive or negative (from -12.8 to + 12.7°C).

Concerning voltage and current measurements, it is possible to specify the value corresponding to the lower limit of the measurement and the value corresponding to the upper one; while the upper limit is fixed at 10V for the voltage and 20mA for the current, the lower one can be chosen between 0 and 1V, or between 0 and 4mA, acting on the related combo box. The two values of start scale and full scale must be entered in the relevant boxes and can assume values between -32768 and 32767. The module will rescale the measurement in the specified field.

For example, to configure channel 1 as current input with a value of 0kg at 4mA and 5000kg at 20mA, the settings to be entered will be:



When programming the module, the tool however calculates the "virtual" value that would have the measurement when the input current (or voltage if set for voltage input) is zero; therefore, if a readout of an already configured module is performed, the value shown as the start of scale is always the value relative to zero input.

The temperature values are instead fixed and transmitted in tenths of a degree (°C x 10); for example, 82.3°C will be transmitted on the bus as 823.

In all cases the value sent on the bus is a Word in two's complement format; all supervisor systems are able to manage and convert this representation of numbers.

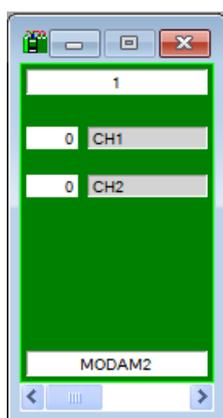
For completeness of information, a very simple method to convert a two's complement Word to the equivalent decimal number with sign is the following: called b the two's complement number, the decimal equivalent d will be:

- x d = b if b is between 0 and 32767 (included)
- x d = b-65536 if b is greater than or equal to 32768

The values shown in MCP Visio are already converted to the signed decimal value.

Mapping

The map of ModANA-M module can be displayed by MCP IDE as shown in the following figure.



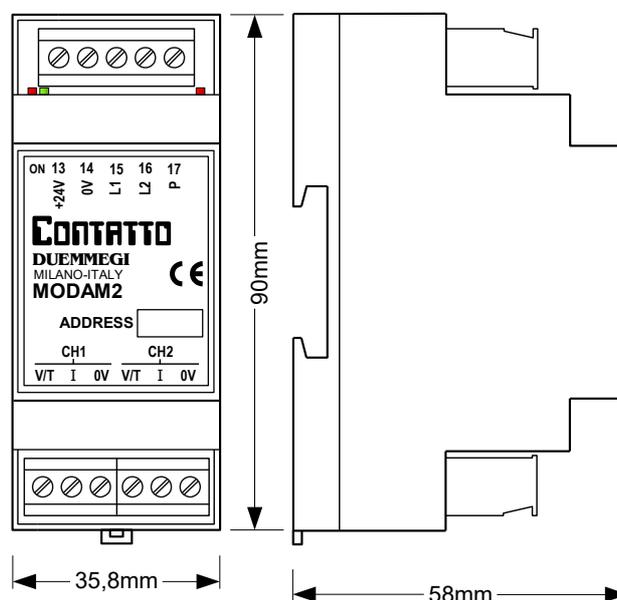
Like for all the groups that can be displayed by MCP Visio, it is possible to place labels near to each measurement for an immediate visual identification.

The values shown in MCP Visio are already converted to the signed decimal value.

Technical characteristics

Power supply, bus side	24V \pm 25% SELV
MAX current consumption bus side	35mA
Voltage inputs	0+10V, max limit 12V
Current inputs	0+20mA, 4+20mA, max limit 25mA
Temperature inputs (2-wire connection technique)	PT100, PT1000, NTC 10k Ω at 25°C B-value 3435K
Voltage input impedance	>10k Ω
Current input impedance	90 Ω
Operating temperature range	-10 ÷ +50 °C
Storage temperature	-30 ÷ +70 °C
Protection degree	IP20

Outline dimensions



Correct disposal of this product



(Waste Electrical & Electronic Equipment)
(Applicable in the European Union and other European countries with separate collection systems). This marking on the product, accessories or literature indicates that the product should not be disposed of with other household waste at the end

of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources. Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

Installation and use restrictions

Standards and regulations

The design and the setting up of electrical systems must be performed according to the relevant standards, guidelines, specifications and regulations of the relevant country. The installation, configuration and programming of the devices must be carried out by trained personnel.

The installation and the wiring of the bus line and the related devices must be performed according to the recommendations of the manufacturers (reported on the specific data sheet of the product) and according to the applicable standards.

All the relevant safety regulations, e.g. accident prevention regulations, law on technical work equipment, must also be observed.

Safety instructions

Protect the unit against moisture, dirt and any kind of damage during transport, storage and operation. Do not operate the unit outside the specified technical data.

Never open the housing. If not otherwise specified, install in closed housing (e.g. distribution cabinet). Earth the unit at the terminals provided, if existing, for this purpose. Do not obstruct cooling of the units. Keep out of the reach of children.

Setting up

The physical address assignment and the setting of parameters (if any) must be performed by the specific softwares provided together the device or by the specific programmer. For the first installation of the device proceed according to the following guidelines:

- Check that any voltage supplying the plant has been removed
- Assign the address to module (if any)
- Install and wire the device according to the schematic diagrams on the specific data sheet of the product
- Only then switch on the 230Vac supplying the bus power supply and the other related circuits

Applied standards

This device complies with essential requirements of the following directives and norms:

- 2014/30/UE (EMC)
- 2014/35/UE (Low Voltage)
- 2011/65/UE (RoHS)

Note

Technical characteristics and this data sheet are subject to change without notice.