

DFAM2: 2 independent multi-function analog inputs module

DFAM2 analog input module allows the detection and processing of two input signals that can be independently configurable 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 re-scaled, using the configuration panel in DCP IDE and BDTools, in any measurement unit by specifying a start value and a full scale value.

DFAM2 module features a fixed 2-way terminal block for connection to the **Domino** bus and two removable 3-way terminal block for connection to analog sources.

Near to the bus terminal block, DFAM2 module features a small pushbutton for address assignment and a green LED which normally flashes every 2 seconds about to signal that the module is properly connected to the bus.

DFAM2 module is housed in a standard 2M modular box for rail mounting.

Address programming

DFAM2 module takes 2 input addresses. The base address can be assigned by DFPRO programmer or by BDTools or DCP IDE. A white label on the front panel allows the writing of the assigned base address for an immediate visual identification. The settings of the 2 analog channels must be performed by the proper tool in DCP IDE or BDTools as will be described later in this manual.

Information reported on the bus

The two input addresses of DFAM2 module report the measurements chosen during configuration. The values of the measurements are expressed as follows:

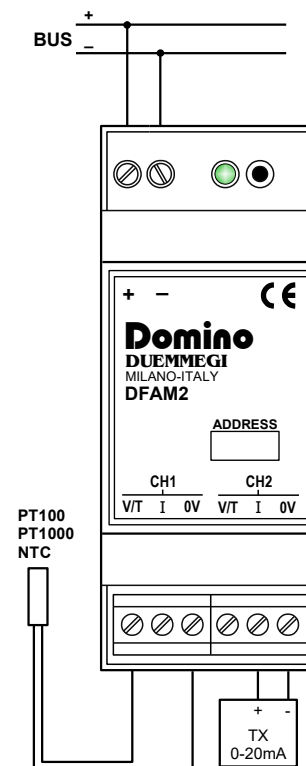
- x voltage input: by default the 0÷10V range is reported as 0÷10000 [mV]; it is however possible to redefine the scale by specifying the value that must correspond to 0V and the value that must correspond to 10V (for example 0÷5000 kg)
- x current input: by default the 0÷20mA range is reported as 0÷2000 [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, thus allowing negative numbers; the range is therefore -32768 to +32767.



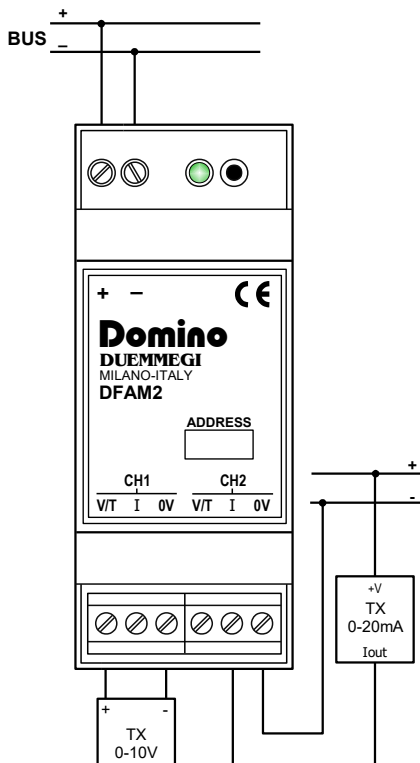
Module connection

The following schematic diagram shows the connection between DFAM2, **Domino** 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.

DFAM2



ID & Ver.: ask to DFAM2 the ID code and the firmware version.

Close: quit the configuration panel.

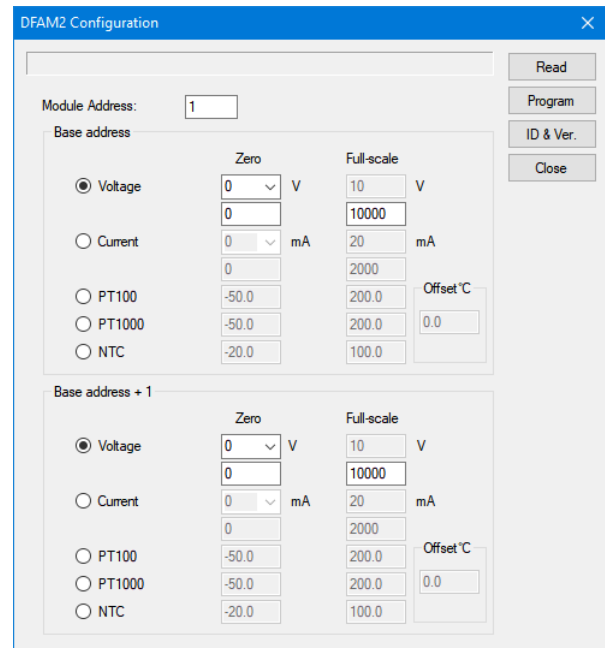


Figure 1

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.

DFAM2 configuration panel

The configuration panel DFAM2 available in BDTools and DCP IDE allows the setting up of the module as required. The configuration of the module is performed through the **Domino** bus as described in the following.

When using DCP IDE, all DFAM2 modules installed in the plant must be declared in the configuration of DFCP, specifying the addresses as in the following example (supposing to have a single DFAM2 module with base address 22):

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DFAM2 = ( I22, I23 )
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From the main menu of DCP IDE select Configuration, Input Modules and then DFAM2; the window in Figure 1 will be shown, where:

Module Address: it is the address of DFAM2 module to be configured or to be read.

Read: transfer the current configuration of DFAM2 to the configuration window.

Program: transfer the configuration currently displayed in the window to DFAM2.

The configuration panel has two equal sections for each of the two channels ("Base address" and "Base address + 1"), 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 re-scale 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.

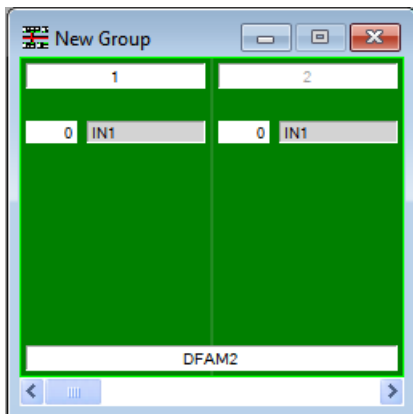
For completeness of information, a very simple method to convert a two's complement Word to the equivalent decimal number with sign is the following: called b the two's complement number, the decimal equivalent d will be:

- 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 DCP Visio and BDTools are already converted to the signed decimal value.

Mapping

The map of DFAM2 module can be displayed by BDTools or DCP IDE as shown in the following figure.

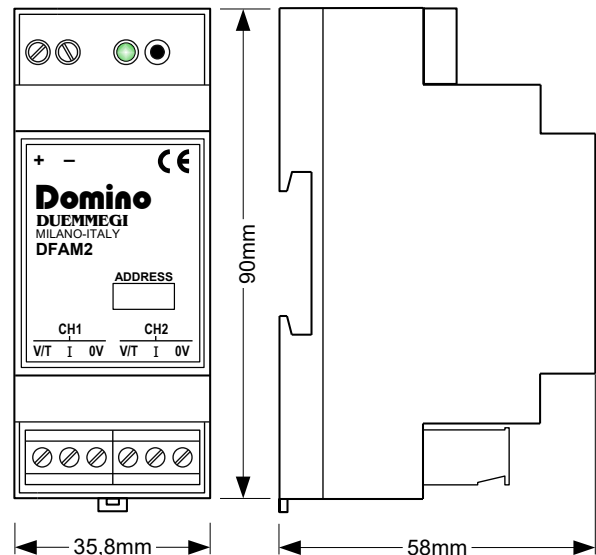


Like for all the group that can be displayed in the map, it is possible to place labels near to each measurement for an immediate visual identification. The values shown in the map are already converted to the signed decimal value.

Technical characteristics

Power supply, bus side	By specific centralized power supply mod. DFPW2
MAX current consumption bus side	Equivalent to 3 standard modules
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 10kΩ at 25°C B-value 3435K
Voltage input impedance	>10kΩ
Current input impedance	90Ω
Operating temperature range	-5 ÷ +50 °C
Storage temperature	-20 ÷ +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.