

DFTZ: module with display for ambient temperature regulation

DFTZ modules allow to regulate, through the **Domino** bus, the ambient temperature of a room of the house. It is possible to install, on the same **Domino** bus, as many DFTZ modules as the number of rooms to be regulated. DFTZ is a specialized module, featuring a back-lighted graphic display showing the ambient temperature, the current setpoint and other information about its status.

DFTZ allows 3 levels of temperature setpoint: Comfort, Economy and No-Frost. The Comfort and Economy setpoint, as well as temperature differentials (hysteresis), can be independently defined for Winter and Summer.

The control of the heating or cooling device is performed via bus; as option, DFTZ can be provided with an internal relay for the direct control of the device.

DFTZ thus allows to decentralize the ambient temperature regulation, thus considerably simplifying the programming of **Domino** system and providing an integrated user interface. Four buttons on the panel allow to change the selected setpoint, to switch Comfort/Economy and to deactivate the regulation (OFF). The temperature sensor is integrated in the module.

All operating parameters of the module DFTZ can be monitored and changed via bus, then by a supervisor, touch screen terminals, via WEB (Internet, Intranet), etc.

As for almost all modules of **Domino** family, the bus itself carries the power supply for DFTZ module operation.

DFTZ module features a 2-way terminal block for the connection to the bus; when the internal relay option has been provided, there is a second 2-way terminal block.

A small push-button near to the bus terminal block allows the address programming and a green LED shows when the module is ready to receive the address itself; the same LED normally flashes every 2 seconds about to signal that the module is properly operating.

DFTZ module is suitable for installation in wall-boxes mod. 503 and it is compatible with many domestic frames through the supplied adapters (see list at the end of this manual); thus, the frame of the preferred brand can be used.

Note: this data sheet applies DFTZ module equipped with firmware 2.0 or higher.

Address programming

Due to the several available parameters, DFTZ module takes, inside the **Domino** bus, 3 input and 4 output consecutive addresses.

To set the module it is however enough to assign a single base address; in other words, assigning an address n to DFTZ module, it will take the input addresses n , $n+1$ and $n+2$, and the output addresses n , $n+1$, $n+2$ and $n+3$.

For more details about the programming, refer to the related documentation.



Module connection

DFTZ module only need the connection to the bus; if the internal relay option has been provided, there is a second 2-way terminal block connected to the normally open contact of the relay for the direct control of the heating or cooling device.

The temperature regulation

DFTZ module features two main regulation modes, one for the Winter and one for the Summer. For each one of these two seasons, the regulation takes place controlling the related point of the input section of the module (heat request in Winter and cooling request in Summer).

For each season, DFTZ features 2 setpoints which can be set in the range 10.0 to 35.5°C (these setpoints can be however limited to a minimum and a maximum value, see following paragraphs) and they can be changed in any moment through the buttons or via bus. It is also available an OFF position; in Winter, the OFF position causes the imposition of the no-frost setpoint, while in Summer it means completely OFF. The no-frost setpoint can be set, during the setting up, in the range 0 to 25.5°C.

Regulation algorithm

The temperature regulation performed by DFTZ module is the ON/OFF type with programmable hysteresis: the temperature regulation occurs comparing the ambient temperature to the current selected setpoint and taking in account the hysteresis value; the result activates or less the related point of the input section (heat or cooling request depending on the season).

The hysteresis around the setpoint can be defined, with 0.1°C resolution, during the setting up and this step needs the choice of two values, for each season, corresponding to the positive and negative delta in respect to the setpoint.

In Winter mode, when the ambient temperature exceeds the setpoint summed to the positive delta, the regulation will be switched OFF; it will be switched ON again when the temperature goes below the setpoint decreased by the negative delta; in Summer mode the algorithm is inverted.

The internal relay, if present, follows the status of the heat or cooling request (depending on the selected season); if this relay has to control both the heating and the cooling device, then an external switching circuit must be provided.

Use of the buttons

The temperature control is done through the imposition of one of the available setpoints: Comfort, Economy or No-Frost. It is possible to change Economy and Comfort setpoints by pressing the button , while the OFF mode will be selected by the button . The icons on the display shows the currently selected mode (,  or ). The values of the Comfort and Economy setpoints can be changed at any time using the buttons  and . When pushing of one of these two buttons, the value of the ambient temperature will be replaced by the value of the current setpoint for that mode; once the desired value has been chosen, some seconds after the releasing of the buttons, the ambient temperature will be shown again. This is true also for No-Frost setpoint, but in Winter mode only.

To change the season by the buttons (instead than by the bus), proceed as follows:

- Switch to OFF
- Press and hold down the button  until the icon  or  appears on the display (5 seconds about), meaning that the current selected season is Winter or Summer respectively
- Release the button  and wait until the icon  or  disappears

Note: DFTZ is not a chrono-thermostat, thus it cannot manage schedule times for switching the setpoints.

Information from and to DFTZ module

As said before, DFTZ module takes, inside the **Domino** system, 3 input addresses and 4 output addresses. Through the **Domino** bus, it is possible to read some information from the input addresses and to perform some commands writing to the output addresses.

The meaning of the data field of input and output addresses will be here described.

Input section n

The input address n provides the digital information as described in the following table.

| Point | Description |
|-------|----------------------------|
| 1 | Heat request |
| 2 | Cooling request |
| 3 | - |
| 4 | - |
| 5 | - |
| 6 | - |
| 7 | - |
| 8 | Temperature sensor failure |
| 9 | Read status of Comfort SP |
| 10 | Read status of Economy SP |
| 11 | - |
| 12 | Read OFF status |
| 13 | - |
| 14 | - |
| 15 | Read status of Summer |
| 16 | - |

The meaning of these points will be here described.

- **Point 1:** point=1 means that the regulator requires to switch ON the heating device (in Winter).
- **Point 2:** point=1 means that the regulator requires to switch ON the cooling device (in Summer).
- **Point 8:** point=1 means temperature sensor failure (opened or in short circuit).
- **Point 9, 10, 12:** mutually exclusive points; point=1 means that DFTZ is regulating at the related setpoint (Comfort, Economy or OFF).
- **Point 15:** point=1 means that DFTZ is set to Summer; point=0 means that it is set to Winter.

The points of the base address input section must be used in the programming of the **Domino** system in order to perform the desired actions. Assuming to have assigned the address 41 to DFTZ, the command to the heating device must be implemented, for example in an output module, by a simple equation like the following one:

$$O31.1 = I41.1$$

where **O31.1** is the relay output connected to the heating device and **I41.1** is the related point of DFTZ.

Input section n+1

The input address n+1 reports the information related to the **ambient temperature** detected by the sensor of DFTZ. The temperature is given in °Kx10; for instance 2980 means: $(2980 - 2730) / 10 = 25.0^{\circ}\text{C}$.

Note: if the value reported by the module at the address n+1 is 0 (corresponding to -273.0°C), then the temperature sensor is unconnected (or broken); if instead the temperature value reported by the module at the address n+1 is 32767 (corresponding to 3003.7°C), then the temperature sensor is short circuited.

Input section n+2

The input address n+2 reports the information related to the **value of the current selected setpoint**. This value too is given in °Kx10; for instance 2980 means: $(2980 - 2730) / 10 = 25.0^{\circ}\text{C}$. If DFTZ is set to OFF, this address will return the value of the no-frost setpoint regardless of the selected season (Winter or Summer).

DFTZ

Output section n

The output address n provides digital points allowing to set the several operation modes of DFTZ module, as described in the following table.

| Point | Description |
|-------|----------------------|
| 1 | - |
| 2 | - |
| 3 | - |
| 4 | - |
| 5 | - |
| 6 | - |
| 7 | - |
| 8 | - |
| 9 | Switch to Comfort SP |
| 10 | Switch to Economy SP |
| 11 | - |
| 12 | Switch to OFF |
| 13 | - |
| 14 | - |
| 15 | Set season to Summer |
| 16 | - |

The meaning of these points will be here described.

- **Points 9, 10, 12:** mutually exclusive points; when activating one of these points, DFTZ switches to the related setpoint (Comfort, Economy and OFF). This points can be written but also read in order to have the information about the currently activated setpoint.
- **Point 15:** setting this point to 1, DFTZ will be set to Summer operation; setting it to zero, DFTZ will be set to Winter operation. This point can be written but also read in order to have the information about the currently selected Summer/Winter operation.

Output section n+1

Set and report the value of **Comfort setpoint for the currently selected season**, as °Kx10 (e.g. 2980 means (2980-2730)/10= 25.0°C).

Output section n+2

Set and report the value of **Economy setpoint for the currently selected season**, as °Kx10 (e.g. 2980 means (2980-2730)/10= 25.0°C).

Output section n+3

The value written to this address has two different meanings depending on the currently selected season:

- **SUMMER:** limiting value for the lower setpoint; the user cannot specify setpoints lower than this value
- **WINTER:** limiting value for the upper setpoint; the user cannot specify setpoints greater than this value

The limiting values apply when changing the setpoint by panel pushbutton and via bus; in this last case, the limiting value must be written as °Kx10 (e.g. 2980 means (2980-2730)/10= 25.0°C).

Setting up

This paragraph describes the setting of DFTZ parameters; this procedure, to be executed during the setting up of the plant, allows to adjust the operation of DFTZ module according to the requirements of the application.

To execute the setting of the parameters, BDTools or DCP Ide program is required. From main menu of BDTools or DCP Ide, select "Programming", "Modules Configuration" and "DFTZ"; the window shown in Figure 1 will appear. On the left top side, the text box **Module Address** allows to enter the base address of DFTZ module to be configured and/or to be read.

In the box **Season** it is possible to select Winter or Summer (this choice can also be made via bus). The **Ext. Probe** check-box, when enabled, allows to use the temperature sensor of another module (for instance DFRHT) instead of the internal sensor of DFTZ, specifying the address in the related text box.

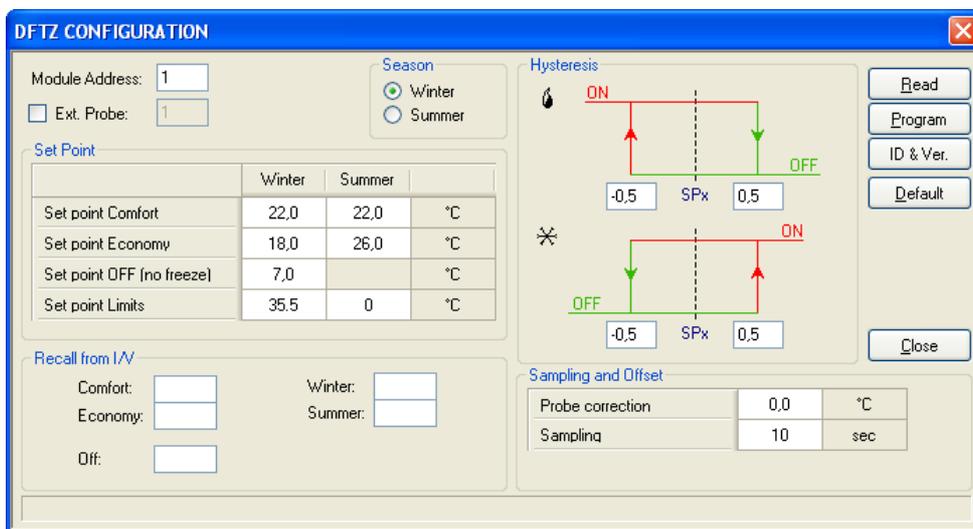


Figure 1: DFTZ configuration window

DFTZ

The **Set Points** section lists the several setpoints to be used in Winter and Summer operation. Allowed values are in the range 10.0 to 35.5°C for Comfort and Economy and 0.0 to 25.5°C for no-frost setpoint.

The two **Set point Limits** are the maximum and minimum value that can be assigned to the setpoints (no frost setpoint included), respectively for Winter and Summer; allowed values are in the range 0 to 35.5°C.

The section **Commands from I/V** is useful when the settings of DFTZ module have to be changed, for instance, acting on pushbuttons or other similar device connected to **Domino** bus.

In other words, this section allows to specify some optional input points (real or virtual) that, when activated, must recall a well defined setting.

In practice, some input points can be specified for the execution of the following functions:

- Switch to Comfort
- Switch to Economy
- Switch to OFF
- Switch to Winter
- Switch to Summer

DFTZ module then maps an input (real or virtual) to each of the listed actions; take in account that all these actions must be controlled by momentary input (in other words they work on pulse).

As example of the application of these points, think to the possibility to switch the setpoint by a DFCK3 so that to add the scheduler function to DFTZ, or the possibility to switch the setpoint by GSM module (DFGSMIII). These input points are optional: an empty box means that no control from bus input point is required for the related function.

The section **Hysteresis** allows to define, with the help of an effective graphical representation and separately for Winter and Summer seasons, the two values of the temperature delta in respect to the current setpoint (Spx) which the regulator uses to switch ON and OFF the heating or the cooling device. These values must be in the range -12.8 to +12.7°C. The values of the hysteresis depend on the particular application, but the default values (± 0.5 °C) should be suitable for the majority of cases.

The section **Sampling and Offset** allows to change the time between consecutive readings of the temperature probe (it is recommended to leave this parameter at the default value of 10s) and to change the value read by the probe itself. In certain situations, it may be necessary to correct the temperature read by the sensor; this correction is possible by entering the desired value in the box Probe Correction (allowed value are between -12.8 and +12.7 degrees).

For example, entering the value 0.2, DFTZ will add the value 0.2 to the temperature "read" by the sensor; if the sensor measures 25.3°C, then the temperature value sent on the bus will be:

$$25.3 + 0.2 = 25.5^{\circ}\text{C}$$

Setting instead the offset to -0.2, then the temperature value sent on the bus will be:

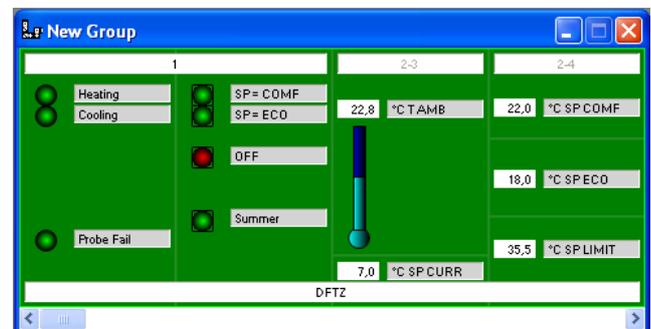
$$25.3 - 0.2 = 25.1^{\circ}\text{C}$$

Once entered all wanted parameters, press the button "Program" to send to DFTZ module the parameters displayed on the configuration window.

The button "Read" executes the reverse operation. Of course, before to begin the transfer, the communication with BDTools or DCP Ide must be enabled. The button "ID & Ver." asks to the connected DFTZ the loaded firmware version, while the button "Default" restores the default values in the window (not in the module).

Mapping

BDTools and DCP Visio allow to display the map of DFTZ module as in the following figure.



The first section refers to the digital input and output points; The status of the digital points is shown by a green "dot" if the point is not active or red if the point is active

The second section reports the values of the ambient temperature and of the currently selected setpoint. Finally, the last section reports the values of the 2 main setpoints and the limiting value for the currently selected season; double-clicking with the mouse in these 3 boxes, the related value can be modified.

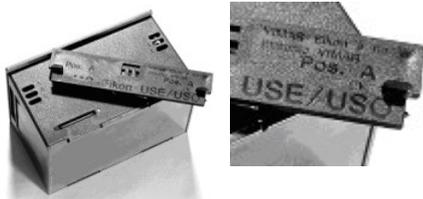
As usual, the background of the represented module is displayed in green color when it is connected and properly operating, otherwise the background will be in red color.

Installation hints

DFTZ module is compatible with the main frames available on the market through the provided adapters.

Mounting

Select and cut the 2 required adapters (the name of the related mounting frame is printed on each adapter).



The adapter also reports the recommended position: A, B or C. Thus insert an adapter on the top side of the box and another

one on the bottom side in the recommended position, inserting pins in the matching holes of the box.

Note 1:

The provided accessories also include an additional frame to be eventually used with Bticino Axolute, Gewiss Top System and Gewiss Chorus to have a better finishing.

Note 2:

The provided accessories also include two lateral cavity covers to be eventually used with Vimar Idea to have a better finishing.

Insert the couple of adapters related to the brand/model of used frame in the recommended places; insert the module, after having connected the terminal block on the rear side, in the frame until it clicks (*).



Finally apply the chosen finishing frame.



Disassembly

Remove the finishing frame.



Release the module from the frame by inserting a screwdriver on the central hook (**).



(*) For the model VIMAR IDEA it is necessary that the coupling with the frame takes place from the back before to fix it in the wall box.

(**) For model VIMAR IDEA the release from the holder is allowed after removing it from the wall box

List of compatible frames

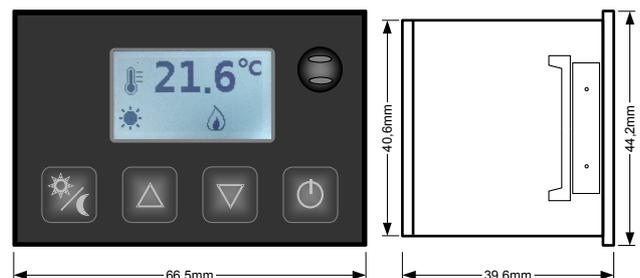
DFTZ module is compatible with the main frames available on the market through the provided adapters, as specified in the following list:

- ABB Chiara
- Bticino Living and Light
- Bticino Axolute
- Gewiss Top System
- Gewiss Chorus
- Vimar Idea
- Vimar Plana
- Vimar Eikon

Technical characteristics

| | |
|------------------------------------|--|
| Power supply (bus side) | By specific centralized power supply mod. DFPW2 |
| Display | LCD graphic type, with timed back-light |
| Temperature sensor | NTC integrated in the panel |
| Displayed Temperature | 0.0 ÷ +40.0 °C |
| Temper. measurement resolution | 0.1 °C |
| Linearity | ±0.5 °C |
| MAX error | ±0.5 °C |
| Number of regulated zones | 1 |
| Type of regulation | ON/OFF with hysteresis |
| Regulation range: | |
| Comfort | 10.0 ÷ 35.5 °C |
| Economy | 10.0 ÷ 35.5 °C |
| No-Frost | 0.0 ÷ 25.5 °C |
| Hysteresis | Programmable and separated for Summer and Winter |
| Characteristics of optional relay: | |
| MAX voltage | 24V~ or 24V= |
| MAX current | 2A resistive, 1A inductive |
| Operating temperature | -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 the essential requirements of the following directives:

2004/108/CE (EMC)
2006/95/CE (Low Voltage)
2002/95/CE (RoHS)

Note

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