

### ModDMX: DMX gateway

ModDMX module allows to handle, through the **CONTATTO** bus, up to 32 DMX devices. ModDMX module makes possible the communication on the first 64 of 512 DMX channels allowed by this protocol.

ModDMX module can be successfully employed in professional and domestic lighting applications, where systems communicating by the USITT DMX-512 protocol are used, as theaters, disco clubs, architectural lighting, etc.

ModDMX module features the following characteristics:

- x all functions are managed by the module and can be controlled by any real or virtual input of the system, by supervisor or by video-terminal
- x possibility to control the DMX system from one or more pushbuttons connected to the **CONTATTO** bus
- x up to 64 sceneries are available to realize “real time” sceneries; the sceneries are stored in the non volatile memory of the module
- x management of fade times
- x management of different rooms by the same ModDMX

The module can manage up to 64 DMX channels, but the total amount of connected DMX devices may be lower than 64 if the device gets more than one channel. Moreover, the total amount of connected DMX devices may be anyway lower than 32. ModDMX module can operate exclusively in system using MCP XT controller. Up, Down and Single Command function, with or without one-touch feature, can be performed by the module from any real or virtual input of the system (see in the following of this manual); in addition, it is possible to save and recall the sceneries.

The module features a removable 5-way terminal block for the connection to the Contatto bus and a fixed 3-way terminal block for the DMX line. A green LED near to the bus terminal block shows that the module is supplied, while a yellow LED near to the 3-way terminal block shows the presence of communication on the DMX line. ModDMX is housed in a standard DIN 3M box for rail mounting.

**Note: this manual applies to ModDMX modules equipped by firmware version 2.2 or higher.**

### Address programming

ModDMX module takes 1 output address, 1-channel 16-bit. The address must be assigned by FXPRO programmer. A white label on the front panel allows the writing of the assigned address for an immediate visual identification.

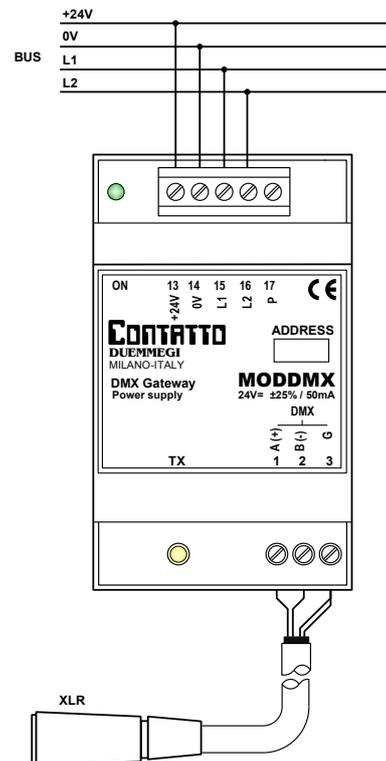
### Wiring diagram

The following schematic diagram shows the connection to be made between ModDMX module, the **CONTATTO** bus and the DMX line, using proper cables as described in the related table.

Generally, the DMX devices feature a female XLR 5-way or 3-way connector, therefore in this case the cable of the ModDMX must be properly wired to a male XLR connector (not provided) according to the specification of the manufacturer of the device.



Even if the standard specifies a maximum of 32 devices for the DMX line, as a good rule do not override a total amount of 16-20 devices. If the number of devices is higher than 20, use proper line splitters to connect the devices overriding this limit.



The following table provides some suggestions about the cables to be used for the connections and the related maximum length.

Connection	Suggested cable
<b>CONTATTO</b> bus	4 x 2.5 mmq MAX not shielded, MAX 1.5Km
DMX line	2 twisted pairs 2 x AWG22 MIN (e.g.: Belden 3107A or 9841 or CEAM CPR6003), MAX 1Km

For the DMX connections always use cables specified for EIA RS485 communication, with 120 ohm impedance and low coupling capacitance between the cores. Use a twisted pair for the lines A and B. Do not connect the shield of the DMX cable; use another pair to connect the G terminal (ground) of ModDMX and of the various connected devices. Do not connect any DMX cable (G terminal included) to the protective earth, because this can inject some disturbances causing negative effects on the communication.

All DMX devices must be connected in sequential way; absolutely avoid star connections. The DMX line must be terminated at its start and at its end by a 120 ohm resistor (not provided), as recommended by RS 485 specifications.

### Bus commands

As said before, ModDMX takes 1 output address, 1-channel 16-bit, inside **CONTATTO** bus. The following table describes the meaning of the data field:

Bit	Data field at the output address
1	Value or Scenery Number or Channel Number
2	
3	
4	
5	
6	
7	
8	Command Code
9	
10	
11	
12	
13	
14	
15	
16	

### Command Code

Granted that DMX channel are numbered 1 to 64, the same DMX channels will be managed through the output address of ModDMX module.

Considering the 16 bits as group of 2 bytes, the most significant byte represents the command code to be executed, while the less significant byte set the value or the scenery number or the channel number depending on the specific command to be executed.

The following table lists the allowed command codes.

DEC	HEX	Function
0	0x00	No operation (stop Up/Down and Single Command)
1 + 64	0x01 + 0x40	Select DMX channel on which the value specified by the low byte has to be written
101	0x65	Save the current status of the (included) channels into the scenery specified by the low byte
102	0x66	Include the channel specified by the low byte in the next scenery that will be saved; if the low byte is 0, then all channels will be included
103	0x67	Exclude the channel specified by the low byte in the next scenery that will be saved; if the low byte is 0, then all channel will be excluded
111	0x6F	Recall the scenery specified by the low byte
112	0x70	Disable the DMX flux; the value of the low byte has not influence
113	0x71	Enable the DMX flux; the value of the low byte has not influence
125	0x7D	Up command without one-touch on the CH specified by the low byte
126	0x7E	Down command without one-touch on the CH specified by the low byte
127	0x7F	Single command without one-touch on the CH specified by the low byte
128	0x80	No operation (stop Up/Down and Single Command)
129	0x81	Up command with one-touch on the CH specified by the low byte
130	0x82	Down command with one-touch on the CH specified by the low byte
131	0x83	Single command with one-touch on the CH specified by the low byte
133	0x85	Switch off (write zero) the DMX channel specified by the low byte and store the last value
134	0x86	Recall the last stored value on DMX channel specified by the low byte (switch on to last value)
135	0x87	Set as DMX minimum level the value specified by the low byte
136	0x88	Set as DMX maximum level the value specified by the low byte
140	0x8C	Set as ramp time the value specified by the low byte, according to the table reported in the following
255	0xFF	Broadcast command: send to all DMX channels the value specified by the low byte

Some of the more used codes will be described in the following of this paragraph.

### Writing a value on a channel

For codes 1+64 (write a value on a channel) the allowed range for the value is 0 to 255, taking in account the type of the connected DMX device, which can be a RGB spot, a rotating light machine or others. For this reason, regarding the meaning of each value, always refer to the manual of the connected DMX devices.

To send a well defined value to a well defined DMX channel at the pushing of a button connected to an input module of **CONTATTO** bus, supposed to have assigned the address 127 to ModDMX module, the simplest way is to insert in the program of MCP XT an equation similar to the following:

```
AO127:1 = P(0x0164)I1.1 & P(0x0100)I1.2 & \
          P(0x0200)I1.3 & P(0x02FF)I1.4 & \
          P(0x0300)I1.5 & P(0x03FF)I1.6
```

where **I1.1..I1.6** are the inputs connected to pushbuttons and **AO127:1** is the channel 1 of ModDMX module (supposing 127 as address).

The values loaded by the Preset (P) function at the activation of an input, in the 16-bit hexadecimal format, will be interpreted as follows: the high byte shows the DMX channel on which the value specified by the low byte has to be loaded. Therefore, at the activation of the input **I1.1** the value 0x0164 will be sent to the module, corresponding to load the value 100 (decimal equivalent of 0x64) on the DMX channel 1. In the same way, at the activation of input **I1.4**, the value 255 (0xFF) will be loaded on the DMX channel 2 DMX, and so on. The values allowed for DMX channels, as said before, must be in the range 0 to 255, and the meaning depends on the type of connected DMX device.

If a 3-channels RGB device is connected, this taking the first 3 DMX channels, different values loaded on these channels could allow, for instance, to reproduce  $256^3 = 16.777.216$  colors.

In this same example, to generate a succession of random colors, the following simple script and equation can be used, and this shows the potentiality of MCP XT controller and of ModDMX module. **V1** simply generates a "clock" to recall the script every 1 second.

```
script 1
  trigger = V1
  R0 = RANDOM(0)
  R0 = R0 & 0X00FF
  R0 = R0 | 0x0100
  AO127:1 = R0

  R0 = RANDOM(0)
  R0 = R0 & 0X00FF
  R0 = R0 | 0x0200
  AO127:1 = R0

  R0 = RANDOM(0)
  R0 = R0 & 0X00FF
  R0 = R0 | 0x0300
  AO127:1 = R0
endscript

V1 = TIMER(!V1,5,5)
```

### Up, Down and Single Command functions

These control functions, with one-touch feature, are those typical of the conventional dimmer modules of the **Domino** family and they will be described here in the following.

**Up/Down** pushbuttons: pushing and holding Up (Down) button, the brightness increases (decreases) until the max (min) value is reached. When the brightness has reached the desired level, release the button to hold it.

**Single Command:** holding down the button, the brightness increases until the max value is reached and, after 1 second about, the brightness decreases to the min value, then it increases again and so on. Release the button at the desired level to hold it.

When the lamp is ON, a short pulse (one-touch) on any control button will cause the complete switching OFF. When the lamp is OFF, a short pulse on any control pushbutton will cause the switching ON at the last brightness level.

In the following example, at the pushing of one of the 3 buttons, the single command code (0x83) will be sent to the channel specified by the low byte (01, 02 or 03). When releasing the button, the stop code (0x80, 0x00 can be also used) will be sent **to the same channel**, allowing the module to understand that the button has been released.

```
AO127 = P(0x8301)I1.1 & P(0x8001)!I1.1 & \
        P(0x8302)I1.2 & P(0x8002)!I1.2 & \
        P(0x8303)I1.3 & P(0x8003)!I1.3
```

To use the Up and Down functions instead of the single command, simply use the related codes (0x81 and 0x82 respectively).

### Ramp or fade time

For ramp, or fade time, it is intended the time required to change a channel value from 0 to 255. The allowed fade times are in the range 0 to 255; it is possible to set the desired fade time according to the following relationship:

$$\text{Fade Time} = \text{Value} \times 255 \times 0,01 \text{ [seconds]}$$

The fade time is always the same for all the 64 DMX channels; to set it, use the command 140.

The Fade Time is given in seconds. The following table shows the relationship between some values that can be written at the output address +1 and the related fade time.

Set value	Fade time [sec]
0	0
1	2,55
2	5,10
3	7,65
....	....
255	650,25 (10' and 50" about)

**Note 1:** it is not possible to set a different fade time for each channel; in other words, the fade time is a global parameter.

**Note 2:** the regulation through Up, Down and Single Command uses a fixed ramp time, so it cannot be modified.

**Sceneries, inclusion and exclusion of channels**

The function for inclusion and exclusion of a channel from a scenery allows the independent management of different rooms using the same ModDMX module. In other words, this feature allows to recall a scenery, e.g. related to a room to which some DMX channels have been reserved, avoiding to influence the current status of the other rooms to which some other channels have been reserved.

The codes 102 and 103 (0x66 and 0x67) allow to select which DMX channels will be included in the scenery under construction. The less significant byte written at the output address specifies the number of the DMX channel to be included or excluded.

The codes 101 and 111 (0x65 and 0x6F) allow to store and recall up to 64 sceneries. The less significant byte written at the output address specifies the number of the scenery to be saved or recalled.

The following simple equation stores 3 sceneries (1, 2 and 64) at the pushing of 3 different buttons (I1.1..I1.3) and it recalls them by other 3 buttons (I1.4..I1.6):

```
AO3:1 = P(0x6501) I1.1 & P(0x6502) I1.2 & \
        P(0x6540) I1.3 & P(0x6F01) I1.4 & \
        P(0x6F02) I1.5 & P(0x6F40) I1.6
```

To include the channel NN in the scenery, send the command 0x66NN. If NN = 0 then all the channels will be included.

To exclude the channel NN in the scenery, send the command 0x67NN. If NN = 0 then all the channels will be excluded.

**Enable and disable DMX flux**

To enable and disable the communication (or flux) from ModDMX to the connected DMX devices, commands 113 and 112 can be respectively used (0x71 and 0x70). This allows to execute a sequence of DMX commands in a unique flux, in order to avoid undesired effects. The following script shows an example of the using of this command for the control of DMX flux.

```
script 1
  trigger = I1.1
  AO3 = 0x7000
  AO3 = 0x01FF
  AO3 = 0x02FF
  AO3 = 0x03FF
  AO3 = 0x7100
endscript
```

At the activation of the input I1.1 the script executes, in the sequence, the following functions:

- x disabling of DMX flux
- x loading in the memory of ModDMX of 3 values into 3 different DMX channels (but these ones will not be still sent to the connected devices because the flux is disabled)

- x enabling of DMX flux: at this point ModDMX will transfer the value of the channels to the connected devices

**Set minimum and maximum value**

The commands 135 and 136 (0x87 and 0x88) allow to set a minimum and a maximum value on all DMX channel for the functions Up, Down and Single Command.

**Broadcast command**

The command 255 allows to send a value to all DMX channels at the same time.

**Sceneries management by MCP IDE**

As said, ModDMX module can store and recall up to 64 sceneries. This paragraph describes the management of these sceneries and other functions by the specific configuration panel (or tool) inside MCP IDE software package (**release 3.0.0 or higher**); in this case the management of ModDMX will be executed by a PC connected to the **CONTATTO** bus through MCP XT.

**Notes:**

- x *ModDMX module can work only if the MCP XT controller has been installed; the configuration and the programming of MCP XT requires the software package MCP IDE release 3.0.0 or higher.*
- x *Take in account that the main purpose of DMXTools program is for the sceneries management during the setting up and the maintenance of the plant; it is also useful as "evaluation program" to get confidence with ModDMX module, but the "real" management of the plant must be executed by a proper supervision program taking in account the global requirements of the structure property.*

To use the tools, all ModDMX modules installed in the plant must be declared in the MCP XT configuration, specifying the addresses as in the following example:

```
MODDMX = ( 0100 )
MODDMX = ( 0101 )
MODDMX = ( 0102 )
... ..
```

From the menu of MCP IDE select Programming, then Module Configuration and then MODDMX 2.x. The window in Figure 1 will be shown.

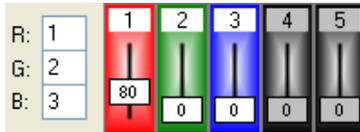
This panel features 64 sliders, each one related to the first DMX channels, and an additional slider (T) for the adjustment of the "Fade" or ramp time. The text box on the upper left corner of the window (  ) allows to enter the address of the module to be managed.



Each slider reports the number of the DMX channel to which it is referred (1 in the example of the figure on this left side) and it allows to change the value of the channel playing by the mouse on the cursor of the slider (holding down the left button); the value of the channel is also displayed by the number on the slider (80 in the example). As an alternative, it is possible to double click on the value to enter the desired value and then press Enter on the keyboard.

By a double click on the channel label, the background of this will assume white or gray color, respectively meaning the inclusion or the exclusion of that channel.

In the following figure the channels 1, 2 and 3 are included, while the channels 4 and 5 are excluded.

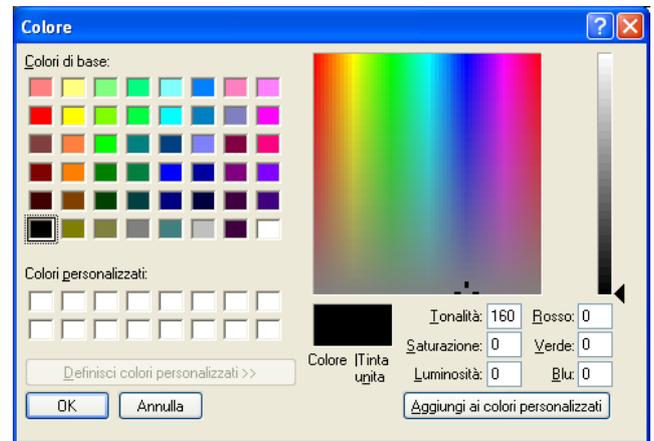


To simplify the management of RGB spot, it is possible to assign these 3 colors to different channels (1, 2 and 3 in the previous figure). The numbers of the channels to which the RGB colors have been assigned are also shown in the 3 text box on the left in the previous figure; the RGB assignment to different channels can be done also writing directly in those text boxes.

As an alternative, by double clicking on the background of a slider, the RGB colors will be assigned to that channel and to the following two.

The just seen RGB assignment allows to easily set on the RGB spot the desired color chosen on the color palette that will be opened by clicking on the colored square under the RGB text boxes.

The following figure shows the classic color palette (the language depends on the operating system).



The buttons 1 to 64 near to the icon  allow to transfer the values currently displayed in the window to ModDMX and to store the current situation as scenery whose number is equal to the number of the pressed button.

In analogous way, the buttons 1 to 64 near to the icon  allow to recall the related scenery stored in the ModDMX module memory. These functions also include the fade time for each scenery and information about the included and excluded channels.

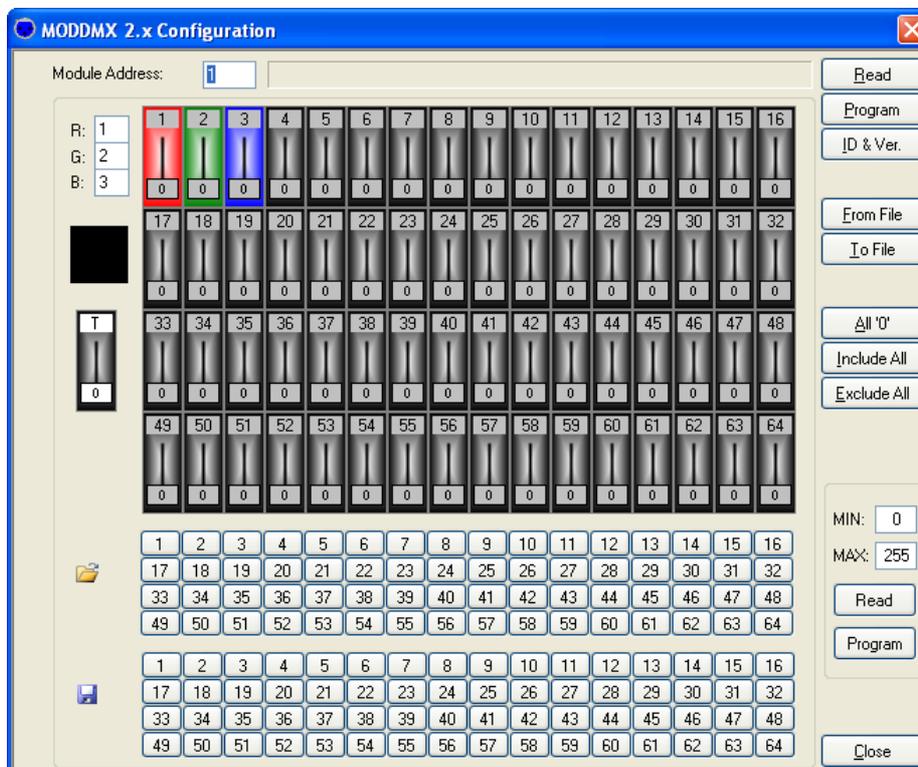


Figure 1: Tool for ModDMX

It is also possible to save into a file the scenery currently displayed in the window (button To File); each file can contain only one scenery, thus, if more sceneries have to be saved, it is required to create more files; these ones must have .DMX extension.

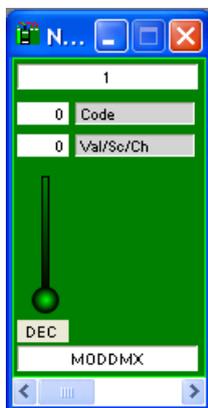
To recall a scenery from a file and display it on the window, use the button From File.

On the right side of the window can be found the following controls:

- x Read and Program respectively to read the current situation of ModDMX and report it into the window and to transfer the values currently displayed on the window to ModDMX module
- x ID & Ver. To show the FW version of ModDMX module
- x From File and To File respectively to open a file containing a scenery and to save the scenery currently displayed in the window into a file
- x All '0' to reset to 0 all the sliders
- x Include All and Exclude All respectively to include or exclude all channels from a scenery
- x MIN and MAX to read (Read) or write (Program) respectively the minimum and the maximum value assigned to ModDMX module
- x Close to close the ModDMX tool

### Mapping

MCP Ide allows to show the map of ModDMX module as in the following figure:



The first text box on the top (1 in the example) is the address of ModDMX which is communicating with MCP Ide.

**Code** is the value of the code to be sent to ModDMX module (high byte of the Word to be sent, see the bus command table).

**Val/Sc/Ch** is the value or the scenery number or the channel associated to the just explained Code (low byte of the Word to be sent to the module).

The box DEC allows to change the entering method for **Code** and **Val/Sc/Ch** among decimal and hexadecimal; with the mouse pointer on this box, right click and perform the desired choice.

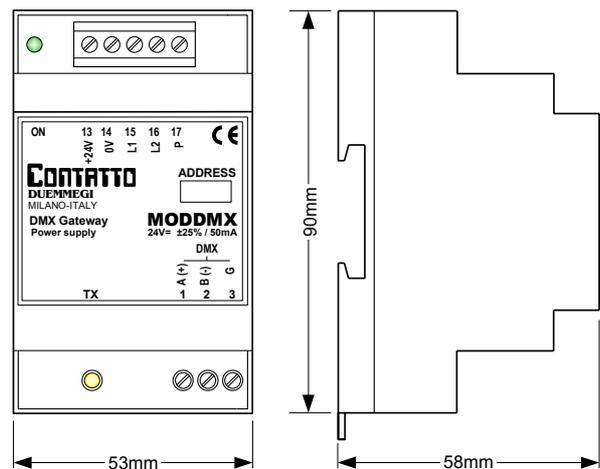
The command to the module (**Code + Val/Sc/Ch**) will be sent only after the value for **Val/Sc/Ch** has been written and confirmed by Enter on the keyboard.

As usual, the symbol of the module in the map will have green background if it is connected and properly operating, on the contrary the background will be in red color.

### Technical characteristics

Supply voltage	24V $\pm$ 25% SELV
MAX current consumption	50mA
DMX channels	64
Managed DMX devices	32 MAX, suggested 16
Number of sceneries	64
Fade time	0 to 650.25 seconds, step 2.55 seconds
Operating temperature	-10 $\div$ +50 °C
Storage temperature	-30 $\div$ +85 °C
Protection degree	IP20

### Outline dimensions



**Correct disposal of the 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 documentation indicates that the product and its electronic accessories 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. Business users should contact their supplier and check the terms and conditions of the purchase contract. Adequate disposal of the decommissioned equipment for recycling, treatment and environmentally compatible disposal contributes in preventing potentially negative effects on the environment and health and promotes the reuse and/or recycling of equipment materials. Abusive product disposal by the user is punishable by law with administrative sanctions.

**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 **CONTATTO** 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.

**Setting up**

The physical address must be assigned with the specific programmer and the setting of parameters (if any) must be performed by the specific configuration softwares; for more details refer to the specific data sheet of the product. For the first installation of the device, generally and unless otherwise specified on the specific data sheet of the product, 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**

The devices belonging to **CONTATTO** line comply 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.