

### **MOD4-4S: 4 digital input and 4 power relay output multifunction module**

MOD4-4S module provides 4 inputs and 4 relay outputs with 1 changeover contact.

MOD4-4S module provides the following main features:

- 4 digital inputs to be used either for local control of the module or as general purpose inputs of the system
- 4 generic outputs or 2 shutter outputs
- all timing functions are accomplished by the module and they may be controlled by any real or virtual input of the system and by a supervisor
- Open/Close local and remote commands (shutter mode)
- possibility to operate even in bus failure condition (stand-alone mode) through its 4 inputs

The module provides two 5-way removable terminal blocks for the connection to **CONTATTO** bus and a 12-way removable terminal block for the connection to the outputs. Some LEDs on the front panel report the input status, the status of relays and the power-on condition.

MOD4-4S may be set for several operation modes as here bottom described.

#### **4 inputs and 4 outputs generic module**

In this case the module behaves as a generic 4IN-4OUT module of **CONTATTO** family. In addition, it is possible to choose if, in bus failure condition, the inputs of the module have to control the outputs by Toggle function (stand-alone); this choice may be made separately for outputs 1-2 and 3-4. It is also possible to disable, if not used, the input section in order to save one input address, however maintaining the stand-alone feature.

#### **2 shutters control module**

In this case the module itself controls all the specific functions required for driving two shutters (or similar devices), highly simplifying the programming of MCP controller. Opening and closing of the shutter may be controlled by two or more pushbuttons connected to the module itself or through the **CONTATTO** bus.

A short pulse on Open or Close button causes the full automatic opening or closing (the shutter moves to the upper or lower limit or until a defined time elapses (timeout)); a longer pushing on Open or Close button causes instead the manual opening or closing (the shutter moves until the buttons is held down). If required by safety reasons, the automatic function may be disabled by the bus.

Pushing down the Open or Close button during the automatic movement will stop the shutter.

Group (or centralized) commands may be sent to the module in order to open or close more shutters in the installation; on the contrary of standard Open/Close commands, the group commands have the priority over the other ones (in other words, they are always executed regardless of the previous condition of the shutter, thus if a shutter was opening, a Close group command will cause the closing instead of the stop as for "normal" command).



Finally, it is possible to define Halt commands which unconditionally stop the shutter. Through the bus it is possible to control the opening or closing for a variable time, in order to perform partial opening or closing of the shutter.

The shutters may be directly controlled by the input of the module itself (stand-alone mode, that can be enabled separately for each shutter); in addition, the commands from the module inputs (stand-alone) and from the bus can co-exist. In this case too, the input section, if not required, may be disabled in order to save an input address, however maintaining the stand-alone feature.

#### **Combined shutter and 2 generic outputs module**

In this case the module combines the two previous operating modes: two outputs will be used for the shutter control and the other two outputs will be used as generic ones. In this case too the stand-alone mode may be enabled or disabled (separately for shutter and generic outputs) and the input section, if not required, may be enabled or disabled according to the application requirements.

#### **Address programming**

MOD4-4S module, depending on the chosen setting, requires 1 or 2 output addresses and 0 or 1 input address. Assigning, by FXPRO programmer, an output "base" address *n*, the module will be set as *On* and, if the chosen setting requires two output addresses, as *On+1*.

If the chosen setting also requires an input address, *this one must be separately assigned*. Three white labels on the front panel allow writing of assigned addresses for an easy visual identification.

**Note:** before to assign the addresses, be sure to have properly set the dip-switches according to the chosen operating mode.

#### **Module setting**

MOD4-4S module requires 1 or 2 output addresses and 0 or 1 input address, depending on the chosen setup.

A 6-way dip-switch is located under the front panel allowing to set the module operation according to the application. The meaning of each dip-switch is the following:

	OFF	ON
<b>SW1</b>	OUT1 and 2: generic	OUT1 and 2: shutter
<b>SW2</b>	OUT3 and 4: generic	OUT3 and 4: shutter
<b>SW3</b>	No stand-alone on OUT1 and 2	Stand-alone on OUT1 and 2. In generic mode the stand-alone will be enabled in bus failure condition only, in shutter mode it is always enabled
<b>SW4</b>	No stand-alone on OUT3 and 4	Stand-alone on OUT3 and 4. In generic mode the stand-alone will be enabled in bus failure condition only, in shutter mode it is always enabled
<b>SW5</b>	Input address disabled	Input address enabled
<b>SW6</b>	In bus failure condition, the outputs will be maintained OFF	In bus failure condition, the outputs can be controlled by local inputs

**Setting examples**

The following examples refer to outputs 1-2 and output 3-4 as CHA and CHB respectively. Last two columns in the following tables show the addresses required for that setting. In all cases, SW6 allows, when a bus failure occurs, to switch off the outputs or to left them in the previous status.

**- generic 4 inputs-4 outputs**

SW1	SW2	SW3	SW4	SW5	SW6	Ind. OUT	Ind. IN
OFF	OFF	OFF	OFF	ON	OFF	1	1

SW3 and SW4 allow to choose that, *in bus failure condition and in this case only*, each input of the module control the related output according to Toggle function. If the input section is not used, its address may be saved setting SW5 to OFF.

**- 2 shutters and 4 generic inputs**

SW1	SW2	SW3	SW4	SW5	SW6	Ind. OUT	Ind. IN
ON	ON	OFF	OFF	ON	OFF	2	1

SW3 and SW4 allow to choose that, *in any case*, inputs 1-2 be the Open-Close local command of CHA and inputs 3-4 be those of CHB. If the input section is not used, its address may be saved setting SW5 to OFF.

**- 1 shutter, 2 generic outputs and 4 generic inputs**

SW1	SW2	SW3	SW4	SW5	SW6	Ind. OUT	Ind. IN
ON	OFF	OFF	OFF	ON	OFF	2	1

SW3 allows to choose that, *in any case*, inputs 1-2 be the Open-Close local command of CHA and SW4 allows to choose that, *in bus failure condition and in this case only*, input 3-4 of the module control the related output according to Toggle function. If the input section is not used, its address may be saved setting SW5 to OFF.

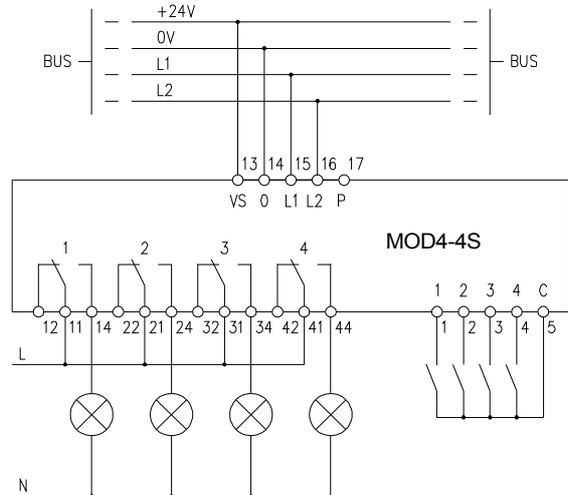
**- 2 generic outputs, 1 shutter and 4 generic inputs**

SW1	SW2	SW3	SW4	SW5	SW6	Ind. OUT	Ind. IN
OFF	ON	OFF	OFF	ON	OFF	2	1

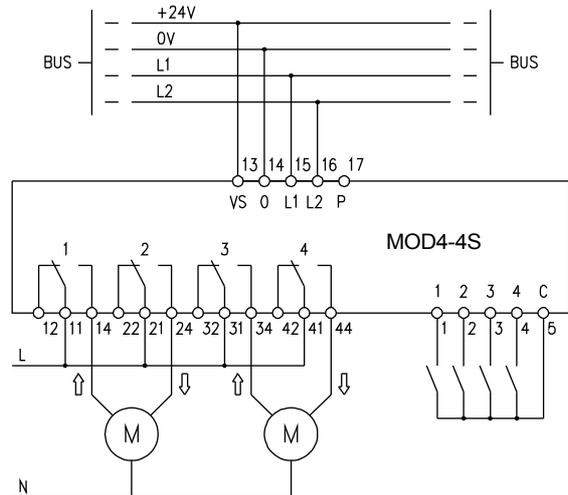
As for the previous example, inverting CHA and CHB.

**Wiring diagram**

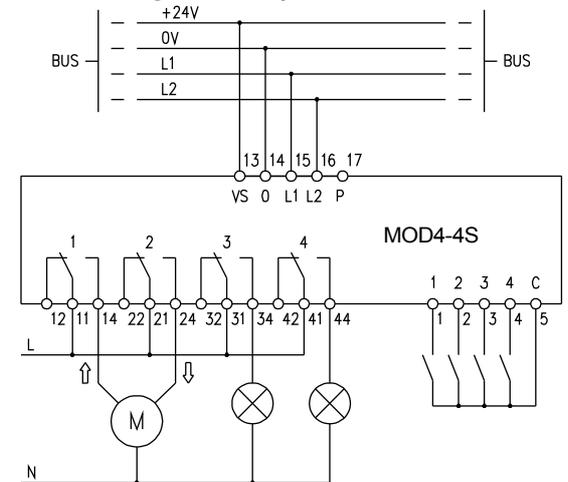
**Generic outputs:**



**2 shutters:**



**1 shutter and 2 generic outputs:**



### Installation hints

To set the dip-switches, disconnect the power supply and remove the front panel; to do this, lift it carefully using a small screwdriver inserted into the slit on the middle of each short side of the panel. The dip-switches are placed on the printed circuit board and each one is numbered, left to right, from 1 to 6, with ON position toward the top side.

To avoid damages due to electrostatic discharges, it is strongly recommended to not touch any other component on the circuit. After the dip-switches setting according to the application, put back the front panel inserting one of its two short sides at first, and then pushing the other side toward the module, levering on the slit on the same side by the screwdriver.

### Reading the input section from the bus

Assigned an input address *n* (if enabled), MOD4-4S module provides on the bus the following information:

In.1	Status of input 1	In.5	Status of relay 1
In.2	Status of input 2	In.6	Status of relay 2
In.3	Status of input 3	In.7	Status of relay 3
In.4	Status of input 4	In.8	Status of relay 4

### Operation from the bus

The following description refers to a single channel (intended as outputs 1-2 or 3-4) of the module, because the operation is similar for both channels. **The following description applies to Mod4-4S version FW >= F23.**

#### Generic outputs

When the channel is set as generic outputs, these ones will be controlled by the standard functions of MCP through direct addressing.

**Note:** this rule **must** be applied even if the outputs are controlled by the local inputs of the module itself, both with stand-alone mode enabled and disabled.

After having assigned the output address *n* to MOD4-4S module, the relationship between the generic outputs and the related address/point, in the allowed configurations, is:

Setting	OUT1	OUT2	OUT3	OUT4
4 generic outputs	On.1	On.2	On.3	On.4
1 shutter + 2 gen. outs	-	-	O(n+1).3	O(n+1).4
2 gen. outs + 1 shutter	On.1	On.2	-	-
2 shutters	-	-	-	-

#### Shutter outputs

When the channel is set for shutter control, then these outputs must be controlled by MCP using both direct commands to the address/point or extended commands by writing a value (byte) to the address of that channel as described in the following.

**Note: if the stand-alone mode is enabled for a shutter channel and then the local inputs of the module itself are used, then these inputs **must NOT** be used by MCP to control that same shutter; on the contrary some contentions may occur. If stand-alone mode is disabled, instead, all commands **must** be controlled by MCP.**

**1- Direct commands:** assigned an output address *n* to a shutter channel, the meaning of the points (for that channel) is the following:

Open	On.1
Close	On.2
Group Opening	On.3
Group Closing	On.4
Unconditional Halt	On.5

**Note:** if point 5 remains activated (unconditional Halt), then all other commands are disabled.

**2- Extended commands:** the writing of a value to the shutter output address (e.g. using the counter function) will cause the execution of a command.

Assigned the address *n* to the shutter channel, the executed function depends on the byte value written to output *on* as described in the following table:

Data written to <i>on</i>	Function
1	Open
2	Close
4	Group Opening
8	Group Closing
16	Unconditional Halt
50 ÷ 69	Set the delay time from the "Group Opening" or "Group Closing" to 0 ÷ 19 seconds (default value: 0) (Note 2)
80 ÷ 89	Set the opening and closing timeout to 15 ÷ 150 seconds with steps of 15 seconds (the default value is 45 seconds) (Note 3)
121	Enable the automatic operation for normal command (not group commands) (Note 4)
122	Disable the automatic operation for normal command (not group commands) (Note 4)
128	No operation
131 ÷ 190	Open for 1 ÷ 60 seconds (Note 5)
191 ÷ 250	Close for 1 ÷ 60 seconds (Note 5)

**Note 1:** since it is not possible to have two codes active at the same time, then the Halt command, in this case, cannot disable successive commands

**Note 2:** the module stores the delay from the group commands and this value will become the new default value; the delay from the group commands may be set using MCPTools or MCP Ide program during the installation setup (see next paragraph).

**Note 3:** the module stores the timeout and this value will become the new default value; the timeout may be set using MCPTools or MCP Ide program during the installation setup (see next paragraph).

**Note 4:** the module stores the automatic/manual operating mode and this setting will become the new default mode; the operating mode may be set using MCPTools or MCP Ide program during the installation setup (see next paragraph).

**Note 5:** the time dependent opening and closing commands have the priority over other commands in execution (in other words these commands are always executed regardless of the previous condition of the shutter, thus if a shutter is opening, a time dependent closing command will cause the closing instead of the stop as for a "normal" command).

**Note 6:** other codes not listed in the table will be ignored by the shutter channel and they will be handled as "no operation".

If the application does not require extended commands, the easier way to control to the shutter channel is the following:

```
O1.1 = I18.1 // Open
O1.2 = I18.2 // Close
O1.3 = I18.3 // Group Opening
O1.4 = I18.4 // Group Closing
O1.5 = I18.5 // Unconditional Halt
```

where **I18.1** and **I18.2** are Open and Close commands, **I18.3** and **I18.4** are the Group Opening and Closing commands, **I18.5** is the Halt command and **O1** is a shutter channel of MOD4-4S module.

If extended commands have to be sent to the module, e.g. the timed opening and closing commands, the counter of MCP has to be used as in the following examples.

#### MCP MOD or MCP Plus

```
V1 = !(I14.1 | I14.2 | I20.1 | I20.2)
V100 = C0=1 P[1]I14.1 & P[2]I14.2 & \
      P[140]I20.1 & P[200]I20.2 & \
      P[128]V1 & O1
```

where **I14.1** and **I14.2** are Open and Close commands, **I20.1** and **I20.2** are the timed Opening and Closing commands and **O1** is a shutter channel of MOD4-4S module. When releasing each button, the counter will be loaded with 128 (no operation) by **V1**. The counter value, for each variation, will be transferred to the shutter output address (**O1**).

To control simultaneously more shutters (parallel operation), add other terms “& **Ox**” to the previous equation.

#### MCP XT:

```
V1 = !(I14.1 | I14.2 | I20.1 | I20.2)
AO1 = P(1)I14.1 & P(2)I14.2 & \
      P(140)I20.1 & P(200)I20.2 & \
      P(128)V1
```

where the meaning of the terms is equivalent to that seen in the previous example.

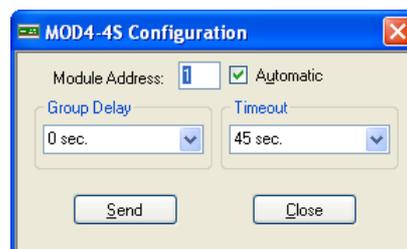
If the application requires only normal and group opening and closing commands, the first method (Direct Commands) may be preferred because it is very easy to use; the other commands for the initial configuration (delay from group commands, timeout and auto/man mode) may be set once during the installation setup by MCPTools or MCP Ide (see next paragraph).

On the contrary, if more complex commands have to be performed (e.g. the timed opening and closing commands), then the use of the counter to send commands is needed.

### Parameters setting

MCPTools (rel. 4.0.4 or higher) and MCP Visio (rel. 3.0.7 or higher) allow to set the operating parameters of each shutter channel during the installation setup.

From main menu of MCP Ide select *Programming* and then *Modules Configuration*. Select then MOD4-4S; the following window will be shown:



Enter the wanted parameter values and then press *Send* button. The address identify the shutter channel to be set; of course this procedure is valid if that channel was properly set for shutter operation.

### Precautions

MOD4-4S module **must be properly set before the installation**. When connecting a shutter to a MOD4-4S module set for generic outputs, the shutter motor may be damaged if the two relays connected to it will be simultaneously activated. This cannot happen if the module was properly set because the two relays, in this case, are electronically interlocked. This interlock also protects the motor against sudden inversions of the movement direction.

### Factory setting

MOD4-4S module is factory set for 4 inputs/4outputs operation with stand-alone function disabled and outputs switching off when a bus failure occurs. The values of the factory assigned addresses are IN1 and OUT1. The factory setting of the dip-switches is then the following:

SW1	SW2	SW3	SW4	SW5	SW6
OFF	OFF	OFF	OFF	ON	OFF

The factory setting related to the shutter mode (both channels) are:

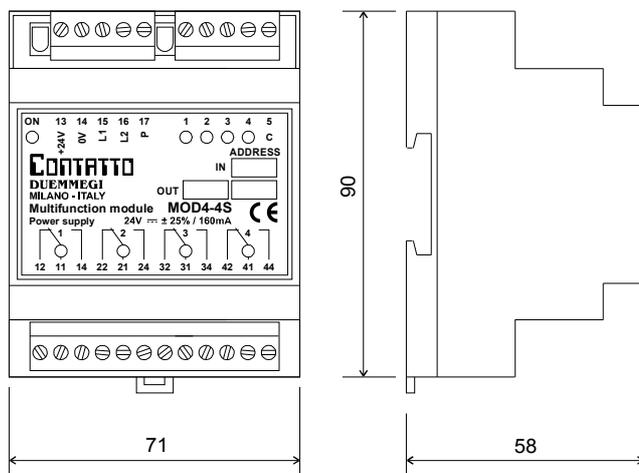
Parameter	Factory setting
Delay time from the Group Opening or Group Closing commands	0 sec
Opening and Closing Timeout	45 sec
Automatic operation	enabled

## Technical characteristics

Supply voltage	24V $\pm$ 25% SELV
MAX current consumption	160mA @ 24V
Relays contact:	
Rating for res. load	12A @ 250V~ MAX
MAX switching current	30A (500ms)
MAX peak current	150A (20ms)
Relay MAX rating:	
Fluorescent lamps $\cos\phi=1$	750W
Fluorescent lamps $\cos\phi<1$	1000W
Incandescent lamps	2000W
Halogen lamps	2000W
Metal iodure lamps	150W
Single phase motor	550W (0.75HP)
Nominal input voltage on digital inputs	24V
Current for each digital input	5mA @ 24V
Operating temperature	-10 $\div$ +50 °C
Storage temperature	-30 $\div$ +85 °C
Grado di protezione	IP20

**Warning:** connection of capacitive loads or loads with power factor correction capacitor on normally closed contacts of relays must be absolutely avoided. Above characteristics are guaranteed for normally open contacts only.

## Outline dimensions



## 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:

- I. Check that any voltage supplying the plant has been removed
- II. Assign the address to module (if any)
- III. Install and wire the device according to the schematic diagrams on the specific data sheet of the product
- IV. 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)

### 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.