

## MOD2DV : dual 1-10V output for electronic ballast driving

MOD2DV module allows the driving, through the **CONTATTO** bus, of two electronic ballast for the regulation of fluorescent lamps. The module provides 4 inputs that may be used for local commands of the module itself or as generic inputs of the system.

MOD2DV module may be controlled by one or more push-buttons connected to the module itself or via the **CONTATTO** bus. It is possible to control the module both by two push-buttons (Up/Down) and by a single pushbutton as here bottom described.

**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, while if lamp is OFF it causes the switching ON at last brightness level or at a fixed programmable value. The one-touch function can be disabled: in this case, it is possible to install some buttons allowing the regulation of the brightness level among the minimum and maximum value.

MOD2DV module performs 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
- all timing functions are accomplished by the module and it may be controlled by any real or virtual input of the system
- Up/Down and Single commands may be defined, with and without one-touch function
- the module can be used as dual channel stand-alone dimmer, controlled by pushbuttons connected to its own inputs
- two ramps for each channel, in the range 1 to 60 seconds
- minimum and maximum brightness levels can be set as required
- dynamic lights scenes can be easily implemented
- the current brightness level may be stored and recalled by the user; each output channel allows up to 9 presets which will be stored in the non-volatile memory of the module, allowing to create "real time" lighting scenes
- the brightness may be controlled by a supervisor, simply writing the desired brightness level to the module outputs
- the supervisor may read the current brightness levels of each channel
- if a bus failure occurs, the brightness will be automatically set to a user-defined level
- two internal relays allow to cut the supply to ballast in order to ensure the complete switch-off of the lamps

The module provides two removable terminal blocks for the connection to **CONTATTO** bus and to the inputs and two terminal blocks for the connection to the ballast devices. Some LEDs report the input status, the status of relays and the power-on condition.

### Module setting

**Warning:** this technical sheet applies to MOD2DV modules version F25 or higher (see the label on the back side of the module).

MOD2DV module takes 2 output addresses (one for each dimmer channel) and from 0 to 2 input addresses. A 6-pole dip-switch is located under the front panel allowing to set the module operation according to the application. The following tables resume the available settings:

SW1	SW2	SW3	SW4	Function
OFF	X	X	X	channel 1 takes an output address only
ON	OFF	X	X	channel 1 takes an output and an input address reporting the digital input status of the module; input points 5 and 6 report the status of relay K1 and K2 respectively
ON	ON	X	X	channel 1 takes an output and an input address reporting the current brightness of output 1 (0 to 100%)
X	X	OFF	X	channel 2 takes an output address only
X	X	ON	OFF	channel 2 takes an output and an input address reporting the digital input status of the module; input points 5 and 6 report the status of relay K1 and K2 respectively
X	X	ON	ON	channel 2 takes an output and an input address reporting the current brightness of output 2 (0 to 100%)

SW5 and SW6 control the stand alone mode:

SW5	SW6	Function
OFF	X	stand alone mode disabled
ON	OFF	digital input points 1 and 2 control output 1 (Up and Down); points 3 and 4 control output 2 (Up e Down)
ON	ON	input point 1: single command for output 1; point 3: single command for output 2; point 2/4: not used

In stand-alone mode, the regulation of the brightness level can be made even if a bus failure occurred.

### Setting examples

Following examples show some possible settings of the dimmer module. Last two columns in the following tables show the amount of input and output addresses required for that setting.

Note that if both input addresses are enabled to report the status of local inputs, a redundant information will be achieved because the data at the two input addresses will be the same. In this case it is suggested to enabled an input address only.

It is not possible to get information about the status of the local input and the current brightness level for the two channels at the same time.

**- 2 dimmer outputs**

SW1	SW2	SW3	SW4	SW5	SW6	OUT	IN
OFF	OFF	OFF	OFF	OFF	OFF	2	0

Input addresses and stand-alone disabled, so the local inputs of the module are not available on the bus and they are unused.

**- 2 dimmer outputs with stand-alone**

SW1	SW2	SW3	SW4	SW5	SW6	OUT	IN
OFF	OFF	OFF	OFF	ON	OFF	2	0

Input addresses disabled and stand-alone enabled: local inputs of the module, even if they cannot be read by the bus, allow the regulation of the brightness level both during the normal operation and during a bus failure.

The function of the local inputs of the module are:

- input point 1 and 2: Up and Down output 1
  - input point 3 and 4: Up and Down output 2
- Switching SW6 to ON, the local inputs act as single command:
- input point 1: single command for output 1
  - input point 3: single command for output 2

**- 2 dimmer outputs and 4 standard digital inputs**

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

The channel 1 has one output address and one input address, this last one reporting the status of the 4 local inputs and the status of the relays; the channel 2 has an output address only. Enabling the stand-alone mode (SW5=ON), then the local inputs will control directly the dimmer module (and these inputs will be also available on the bus).

**- 2 dimmer outputs and 2 analog inputs**

SW1	SW2	SW3	SW4	SW5	SW6	OUT	IN
ON	ON	ON	ON	OFF	OFF	2	2

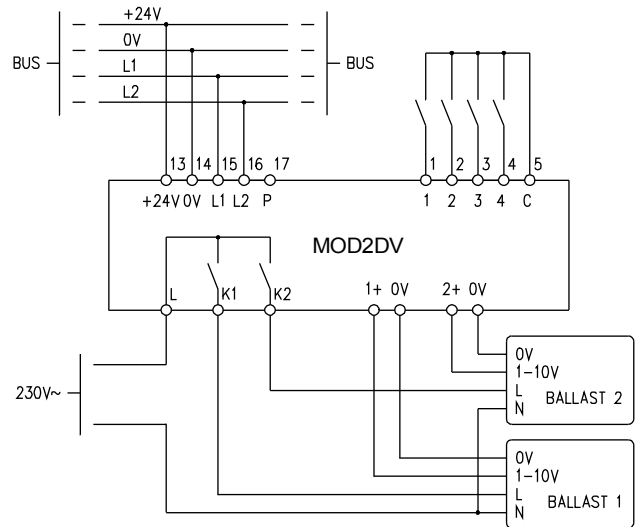
Both channels 1 and 2 have one output address and one input address, this last one reporting the brightness level as percentage value 0-100%. Enabling the stand-alone mode (SW5=ON), then the local inputs will control directly the dimmer module (but the status of these inputs will not be available on the bus).

**Note:** for any setting with stand-alone mode *disabled*, a user-defined brightness level will be forced to the outputs when a bus failure occurs (see in the next sections).

**Address programming**

Assigning, by FXPRO programmer, a base address **n**, the module will automatically take the addresses **On**, **On+1** and, depending on SW1+SW4 settings, **In** and **In+1**. Four white labels on the front panel allow writing of assigned addresses for an easy visual identification.

**Wiring diagram**



**Installation hints**

To set the dip-switch, disconnect both 24V and 230V power supplies and remove the front panel; to do this, lift it delicately using a small screwdriver inserted into the slit on the middle of each short side of the panel.

The dip-switch is placed on the printed circuit board and each pole 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-switch 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**

At the input address of a dimmer channel it is possible to read the digital status or the current brightness level at the output. To enable the address input of a dimmer channel switch SW1 (or SW3) to ON SW1.

If the input section was set to read the digital status of local inputs (SW2 and/or SW4 OFF), and supposing to have assigned the address **n** to a channel, then MOD2DV module will provide by bus the following information:

In.1	Status of input 1	In.5	Status of relay K1
In.2	Status of input 2	In.6	Status of relay K2
In.3	Status of input 3	In.7	Not used
In.4	Status of input 4	In.8	Not used

**Note:** if both input addresses were enabled for reading the digital status, the information reported on the two addresses is the same; in this case only one input address may be enabled.

If the input address was enabled for reading the current brightness level of the related dimmer channel (SW2 and/or SW4 ON), then MOD2DV module will provide by bus a value in the range 0 e 100 that is the percentage level of the brightness at the output (0-100%).

## Operation from the bus

Assigned the address  $n$  to dimmer module, the executed function depends on the value of the byte written on output  $On$  (or  $On+1$  for the second channel) as here bottom listed:

Data written to $On$	Function
0÷100	Set the brightness to 0÷100% according to current ramp
101÷109	Save the current brightness to Preset 1÷9
110	Save the current ramp as default primary ramp
111÷119	Recall the brightness from Preset 1÷9 according to current ramp
120	Save the current ramp as secondary ramp
121	Enable one-touch function for local inputs (both for bus and stand-alone mode)
122	Enable one-touch function for local inputs (both for bus and stand-alone mode)
123	Recall Preset 8 but only if, at the arriving of this code, the output was completely OFF. When a different code arrives, but only if this code have an effect on the output (exactly codes 1÷100, 111÷119, 125÷127, 129, 130÷134), the command associated to this new code will be executed. If code 255 arrives from the bus and the previous received code was 123 (and in this case only), then the output will be switched OFF (but without the storing of the last level). The ramp used by this code is the secondary ramp
124	As for code 123, but recalling Preset 9
125	Up command without one-touch function
126	Down command without one-touch function
127	Single command without one-touch function
128	No operation
129	Up command with one-touch function
130	Down command with one-touch function
131	Single command with one-touch function
132	Switch ON to MAX according to secondary ramp
133	Set the brightness to 0 according to secondary ramp and store last value
134	Set the brightness to last level value according to secondary ramp
135	Set the current brightness as MIN value
136	Set the current brightness as MAX value
137	Reset MIN level to default (10%)
138	Reset MAX level to default (100%)
139	Save the current brightness as level to be loaded during bus failure condition
140 ÷ 170	Set the current ramp to 0 ÷ 30 seconds (1 second steps)
171 ÷ 173	Set the current ramp to 40 ÷ 60 seconds (10 seconds steps)
174	Set the current brightness as value to be recalled from one-touch function; if 0 the one-touch recalls the last value
255	See codes 123 and 124

Two ramps are available for changing from a brightness value to another: these are called current ramp (or primary) and secondary ramp.

The current ramp must be set by the codes 140 ÷ 173; the code 110 allows to save the current value as default primary ramp and the code 120 allows to save the current value as secondary ramp. These values are stored in a non-volatile memory, avoiding the loss when a power supply failure occurs.

When powering-up the module, the default value of the primary ramp become the current value; this value concerns all the brightness changes with the exception of switching ON and OFF by codes 132, 133 and 134 (for these codes the value of the secondary ramp will be used).

The using of two distinct ramps allows, for example, the possibility to control the outputs according to a (current) slow ramp to create light scenes, dynamic lights and automatic light controls and to have quick switching ON and OFF commands according to the (secondary) fast ramp.

The code 139 saves in the non-volatile memory of the module the current brightness value that will be automatically recalled when a bus failure occurs (or generally during an interruption of the communication between the dimmer module and MCP controller); the condition for this automatic loading is that the stand-alone is disabled (on the contrary the brightness level will remain at the value applied before the bus failure).

### Notes:

- the switching ON and OFF by one-touch function is made according to the current ramp
- the ramp used for the brightness control by Up, Down and Single command pushbuttons is fixed and cannot be modified

To send commands and values from MCP to the dimmer channel, use the counter registers as in these examples:

### MCP MOD or MCP Plus:

$V1 = !(I1.1 | I1.2 | I1.3)$

$V100 = C0=1 P[129]I1.1 \& P[130]I1.2 \& \backslash P[50]I1.3 \& P[128]V1 \& O1$

where  $I1.1$  and  $I1.2$  are Up and Down inputs and  $O1$  is the dimmer output 1;  $I1.3$  will cause the setting of brightness to 50%. At releasing of each button, the counter will be set to 128 (no operation). The value of the counter, for each variation, will be transferred to the dimmer output ( $O1$ ). To drive simultaneously more channels or modules, add other " $\& Ox$ " terms to the equation in above example.

### MCP XT:

$V1 = !(I1.1 | I1.2 | I1.3)$

$AO1:1 = P(129)I1.1 \& P(130)I1.2 \& \backslash P(50)I1.3 \& P(128)V1$

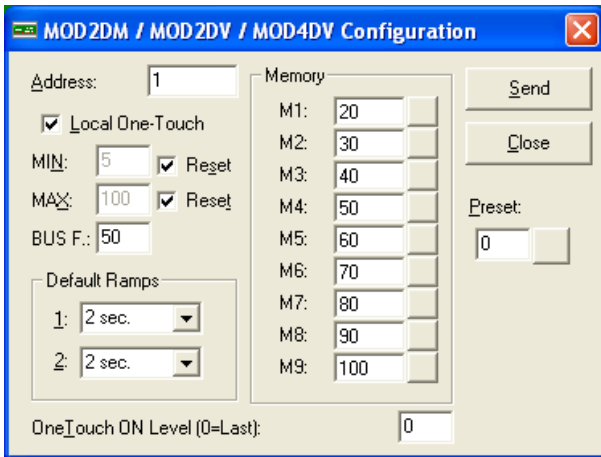
where the meaning of the terms is similar to that described in the previous example.

**Note: if the stand-alone mode is enabled and the local input of the module are therefore used for the brightness regulation, then these inputs *MUST NOT* be used by MCP to control the same dimmer module, otherwise some conflicts may occurs issuing a command to the module. These inputs can be instead used to control other dimmer modules. On the other hand, if the stand-alone is disabled, all the commands *MUST* be handled by MCP.**

**Settings of operating parameters**

MCPTools (rel. 4.0.5 or higher) and MCP Visio (rel. 2.1.5 or higher) allow to set the operating parameters of each dimmer channel during the installation setup.

From the main menu of MCPTools select *Supervision* and then *Show Maps*. Select then, from the MAP menu, *Configuration* (or *Configuration* from the main menu of MCP Visio) and then *MOD2DM/MOD2DV/MOD4DV*; the following window will appear.



The required parameters in this window are:

- Address: output address of the dimmer channel to be set
- Local One-Touch: if selected, it enables the one-touch function for the local inputs of the module
- MIN: minimum brightness level; select Reset checkbox to restore the default value (10%)
- MAX: maximum brightness level; select Reset checkbox to restore the default value (100%)
- BUS F.: the brightness level (%) to be loaded to the output when a bus failure occurs and the stand-alone is disabled
- Default Ramps: the value of the primary and secondary ramps
- Memory: the values to be loaded to the 9 Presets; the pushbutton on the right side of each value allows to recall the related Preset currently stored in the module
- Preset: writing a value in the range 0 to 100 and clicking on the button on the right side, the brightness level will be forced to that value
- One Touch ON level: this value is the ON level loaded by a one touch command (0 means last value)

Fill out this windows with the wanted values and then click on the *Send* button to transfer the shown configuration to the dimmer channel.

**Factory setting**

MOD2DV module is factory set with both input addresses and stand-alone mode disabled. The factory assigned base address is 1. The factory setting of the dip-switches is then the following:

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

The factory setting of the other parameters is the following:

Parameter	Factory setting
MIN	10%
MAX	100%
Primary ramp	2 seconds
Secondary ramp	2 seconds
Local One-Touch	Enabled
Switch on value from one-touch	Last value
9 Preset	20+100%, step10%
Brightness level in bus failure condition and stand-alone mode disabled	50%

**Technical characteristics**

Supply voltage	24V $\pm$ 25% SELV
MAX current consumption (@ 24V)	110mA
Output (each channel)	1-10V / 20mA
Relays contact:	
Rating	12A @ 250V cos $\Phi$ =1
Nominal power	3000W resistive load, 1000VA inductive load
Nominal input voltage on digital inputs	24Vdc
Current for each digital input	5mA @ 24Vcc
Operating temperature	-10 $\div$ +50 °C
Storage temperature	-30 $\div$ +85 °C
Protection degree	IP20

**Outline dimensions**

