

## DF4DV: 4 x 0÷10V output module

DF4DV module allows to control, through the **Domino** bus, 4 devices with 0÷10V input, typically dimmers or electronic ballasts, but also modulating valves and similar actuators. The module can be controlled by pushbuttons connected to **Domino** input modules or by a supervisor or by a video-terminal (e.g. touch screen).

A 2-way terminal block allows the connection of the module to the **Domino** bus. The bus itself also carries the power supply for the module operation; the current consumption has a “weight” which varies from 2 generic modules (outputs not connected) to 10 generic modules (full load).

Near to the bus terminal block, the module features a small pushbutton with double function (see the related paragraph) and a green LED that shows the operating status; the same green LED normally flashes every 2 seconds about to signal that the module is properly supplied and operating. Removing the cover of the bus terminal block, a small connector (PRG) can be accessed; this one allows the connection to the optional tester/programmer (to assign the address by DFPRO when the bus is not supplied, the 4 outputs must not be loaded).

On the other side of the module, a terminal block allows the connection to the 4 voltage 0÷10V outputs.

DF4DV module takes, inside the **Domino** bus, 4 output addresses and 4 optional input addresses.

A white label on the front panel allows the writing of the assigned module base address for an immediate visual identification. DF4DV housing is a standard DIN 3M module.

**Note: this data sheet applies DF4DV module equipped with firmware 1.0 or higher.**

### Mode of operation (dimmer section)

Each one of the 4 voltage outputs of DF4DV module can be controlled by one or more pushbuttons connected to one or more **Domino** input modules. It is possible to control the dimmer module by two pushbuttons (Up/Down) and/or by a unique pushbutton (Single command) as here bottom described.

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

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

When the output voltage is not zero, a short pulse (one-touch) on any control button (Up/Down or Single Command) will cause the complete switching OFF. When the output voltage is zero, a short pulse on any control pushbutton will cause the switching ON at the last stored level or at a fixed programmable value.



DF4DV module also allows to define one or more inputs (real and/or virtual) recalling some percentage values of output voltage; these values can be freely defined during the setting up as explained later.

These levels, called Presets, can be also set by a supervisor simply sending to the module the desired brightness level in the range 0÷100%. This feature allows to create suggestive light scenes.

### Programming

In the following paragraphs, brightness and output voltage have the same meaning. Each output of DF4DV takes an address; for instance, if the assigned base address is 1, then the 4 outputs will take addresses 1, 2, 3 and 4. DF4DV module must be explicitly declared in BDTools and DCP Ide (module equations side) as follows:

$$DF4DV = ( n )$$

where  $n$  is the assigned base address; without this declaration, a “not compatible module” error will be reported when attempting to transfer the equations to the module.

A typical equation controlling DF4DV dimmer module is like in the following example:

$$O1.1 = UI1.1 | DI1.2 | MI1.3 | P(40) I1.4$$

In this example  $O1.1$  is one output of DF4DV module,  $I1.1$  and  $I1.2$  are the inputs controlling the brightness Up and Down,  $I1.3$  is the Single command and  $I1.4$  set the brightness to 40%. More Up/Down/Single commands and Presets are allowed in the same equation.

Two Presets have a special meaning:  $P(0)$  switch off the output and stores the previous level,  $P(255)$  switch on the lamp to last stored level.

The transition from a Preset to the other one and the switching ON and OFF by one-touch function occurs according to a default ramp (in the range 1 to 60 seconds).

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The chosen ramp, which remain in memory even if a power supply failure occurs, can be specified in the equation:

$$O1.1(30) = UI1.1 | DI1.2 | P(40)I1.4$$

In this case the default ramp will be set to 30 seconds. If this value is not specified, then the default value will be 2 seconds. The ramp for the brightness regulation by Up, Down and Single commands is instead fixed.

The transition from a Preset to another one may be executed according to ramps other than the default simply specifying the chosen value as in the following example:

$$O1.1(3) = MI1.1 | P(80,25)I1.2 | \backslash \\ P(0,10)I1.3$$

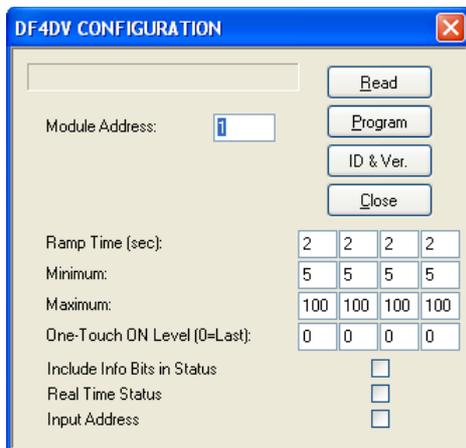
In this case the first Preset (80%) will be executed by a 25 sec ramp and the second one by a 10 sec ramp. The ramp for the ON and OFF by one-touch function will be 3 sec as specified inside the brackets after O1.1. If no value was specified for Presets, or if the specified value is zero, then the default value will be used.

The equation can also specify the minimum and maximum desired levels like in the following example:

$$O1.1(30,5,100) = UI1.1 | DI1.2$$

## Configuration

The several parameters of DF4DV module can be set by BDTools (*release 8.1.7 or higher*) selecting from main menu the option "Programming", then "Modules Configuration" and then "DF4DV"; the following window will appear:



Enter in the related text box the address of DF4DV module to be set; for each output, set the ramp time, the **Minimum** and the **Maximum** entering the desired values in the related text boxes.

The parameter "**One-Touch ON level**" allows to specify the percentage brightness value (in the range 1 to 100) to be recalled by one touch function; if the value is 0, then the last stored value will be recalled.

The option "**Include Info Bit in Status**" allows to enable or less the bit 12 (and 7) in the answer of the module to a status request, so that the bit report the output OFF condition

(bit12=0) or not OFF (bit12=1); see paragraph about the status request to a dimmer module. Activating the option "**Real Time Status**", the module sends on the bus the current value of the output level also during the ramps; on the contrary, only the final status will be sent.

"**Input Address**" allows to activate the input section (4 input addresses), with the same base address of the output section, in order to report the output level and other information (see in the following).

The Program button sends to the module the settings shown in the window. Clicking on the Read button, it is possible to check the current setting of the module.

**Warning:** the ramp setting by BDTools must be executed AFTER the transferring of the equation to the module; otherwise the ramp value will be set to the value specified in the equation.

## Automatic brightness regulation

DF4DV module, on the contrary of other dimmer modules of the **Domino** family, does not feature the automatic brightness regulation function.

## Status request to a dimmer module

DF4DV dimmer module features, for each voltage output, one output address and, if enabled, one input address; the two sections provides the information described in the following.

### Output section

If a supervisor (e.g. DFTouch) executes a status request to a dimmer module, this one will answer with the following Word:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
P	0	0	S	0	0	0	0	0	Output level						

Where :

- x P: the address programming function is activated (this point reflects the fixed ON status of the PRG LED)
- x S: output level is not zero
- x Output level: the percentage value of the output level (in the range 0 to 100)

### Input section

Each input section, if enabled, reports on the bus the same information just described for the output section; considering the points instead of bits, this information is:

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
P	0	0	S	0	0	0	0	0	Output level						

The availability of this information in the input section makes easy, particularly, the displaying of the output level on a supervisor. In addition, the point 13 (S) can be used to control a relay output that break the phase to the external electronic power supply when this one is 1-10V type; in these cases, in facts, the lamp or the LED connected to the

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electronic power supply does not go OFF never setting the control voltage to 0V.

The following equation shows an example for programming an output of a DF4RP module so that the relay opens when the voltage on the first output of DF4DV is set to zero:

**O10.1 = I1.13**

where **I1.13** is the point S of the input section of DF4DV having base address 1 and **O10.1** is an output of a DF4RP having address 10. Since the point S is 1 when the voltage on the output of DF4DV is not zero, then the relay will be closed in the same conditions.

**Special codes**

A supervisor or a touch screen video-terminal can set the brightness level of a dimmer module simply sending the wanted value (in the range 0 to 100) to the address of the module itself. In addition the supervisor can execute special commands (e.g. set the ramp value) sending to DF4DV module some special codes as listed in the following table:

Code	Function
0	Switch off and store the previous level
101 ÷ 110	Set ramp to 1 ÷ 10 sec (1 sec step)
111 ÷ 120	Set ramp to 12 ÷ 30 sec (2 sec step)
121 ÷ 123	Set ramp to 40 ÷ 60 sec (10 sec step)
124	Switch on to last stored level
127	Save current ramp value as default

**Equations with extended notation**

The dimmer module DF4DV allows the extended notation in the equations. In other words, the number of input point (real or virtual) placed on the right side of the “=” symbol in a dimmer equation can be in the range 1 to 16.

For instance, the following equation is valid:

**O1.1 = UI1.1 | DI1.5 | MI1.7 | P(40)I1.8**

This notation allows the compatibility with special modules and with future **Domino** modules.

**Mapping**

DF4DV module can be displayed on the map of BDTools or DCP Visio as shown in Figure 1; to activate the displaying of the input sections (provided that the module has been properly set), check the IN box. On the contrary the input section will be hidden.

As for all **Domino** modules, the background of the module is in green color if the module is connected and properly working, otherwise the background is in red color.

Each input section shows the output “Level” in numerical format (0..100) and the “Output Status” (point 13).

Each output section shows a bar graph corresponding to the related output level of the module, and the number over the bar shows the same value in numerical format 0-100. To change the output level, click on the bar graph using the left button of the mouse, enter the desired value and then push Enter button.

**Functions of the local pushbutton**

The pushbutton on the module has a double function: pushing it for a time lower than 3 seconds, the module switches to the addressing mode, during which the LED on the module is fixed lighted; the addressing mode will be active until the module receives the address and anyway no more than 10 seconds from the last release of the pushbutton. When the module enters the addressing mode, all outputs will be switched off.

Holding down the pushbutton for more than 3 seconds, the module switches to the test mode; the LED signals this condition by a regular blinking (1s ON and 1s OFF). At any successive pushing of the button, the voltage outputs will be alternatively switched between 0V and 10V. The module exits the test mode after 30 seconds from the last release of the pushbutton.

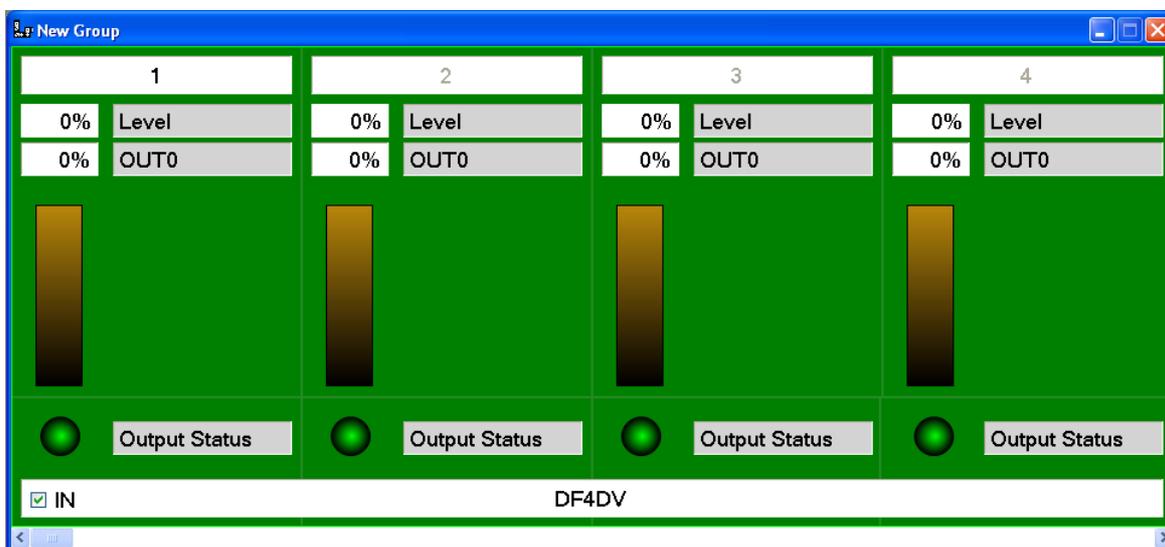
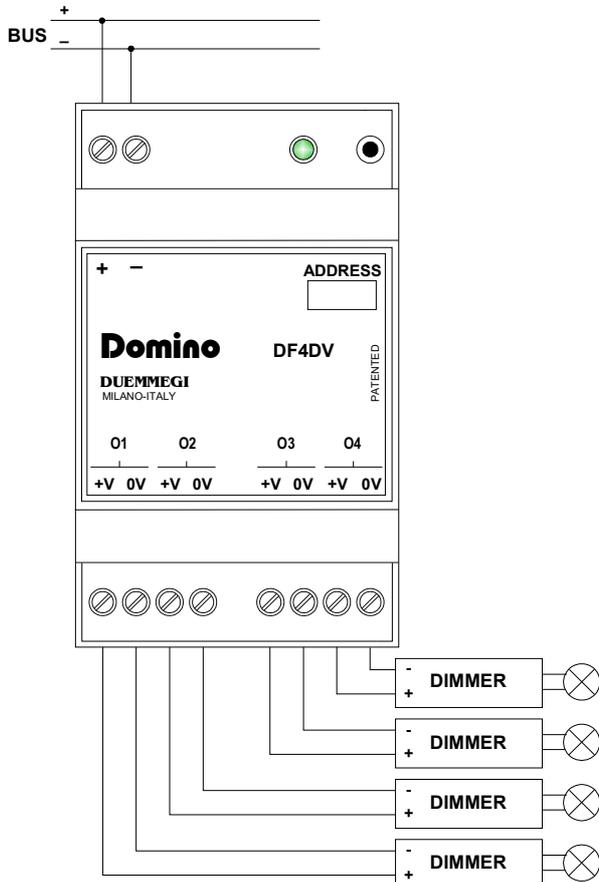


Figure 1

## Module connection

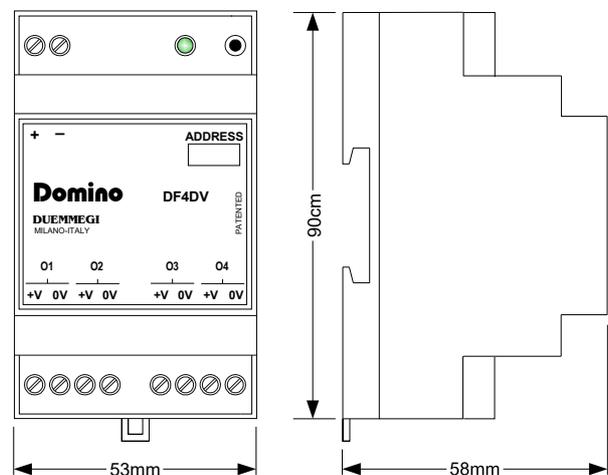
Df4DV module must be connected to 4 external devices having 0÷10V input.



## Technical characteristics

Power supply (bus side)	By specific centralized power supply Mod. DFPW2
Current consumption on bus side: - MAX load on outputs: - No load on outputs:	= 10 standard <b>Domino</b> modules = 2 standard <b>Domino</b> modules
Analog voltage outputs	0÷10V / 10mA for each one of the 4 outputs
Housing	DIN standard 3M
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:

- 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.