

**SOFT CONTROLLER
LIGHTING CONTROL FOUR-CHANNEL
(DIMMER)**

DV-DM4D

Manual



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1. General description.



Dimmer DV-DM4D (hereinafter referred to as dimmer) is an electronic controller that is used to smoothly control the brightness of lamps incandescent, halogen and dimmable LED lamps. It has 4 independent control channels, the maximum load of each should not exceed 600 W. It can work autonomously, with control from a momentary button, or as part of the DIVISION Smart Home system. It is connected to the central controller via the RS485 interface. It is possible to select (by means of a jumper) the operating mode: "dimmer" mode - smooth brightness control or 0-100% mode - "switch".

Structurally, the dimmer is made in a housing for mounting on a DIN rail. The appearance of the dimmer module is shown in Picture 1.

Picture 1. Appearance of DV-DM4D dimmer.

2. Specifications.

Table 1. Specifications

| | |
|-------------------------------------|-------------------|
| Number of control channels | 4 |
| Adjustable load power per 1 channel | |
| minimum | 20W |
| working | 600W |
| short-term (no more than 5 sec) | 1200 |
| Mains voltage | 220V \pm 10% |
| Mains voltage frequency | 50Hz \pm 0.4Hz |
| Modulating level | from 30% to 100% |
| Dimmer supply voltage, V | 7.....13 |
| Consumed current, no more than | 0.1 A |
| Serial port parameters: | |
| speed, baud | 19200 |
| number of bits | 7 |
| parity | even |
| stop bit | 1 |
| Control interface | RS485 half duplex |

| | |
|------------------|--------------|
| Control Protocol | ModBus ASCII |
| Offline work | yes |
| Size | 4 DIN |
| Device weight | 86 g. |

3.Product composition.

Delivery includes:

- 1) DV-DM4D dimmer - 1 pc.;
- 2) DV-DM4D Operation Manual - 1 pc.;

4. Description of the dimmer work.

4.1. Work algorithm.

The dimmer is able to work both under the control of the DIVISION system and autonomously.

Offline work.

Each dimmer channel is autonomous and controlled from its own control button.

When controlled by a button, a short press turns on or off the lighting, holding the button performs a smooth adjustment of the lighting level.

Work as part of the "Smart Home" DIVISION system.

When the power is turned on, the dimmer performs its own settings (address, command reception rate, checking for ~220V voltage, setting zero power level), after which it is ready to receive control commands from the central controller of the DIVISION system or from control buttons.

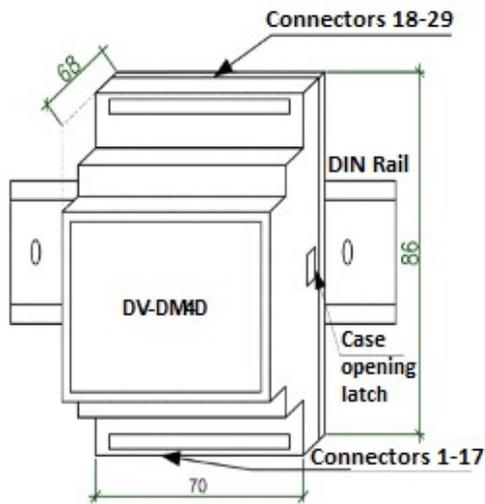
When receiving a command from the DIVISION central controller, the dimmer processes it and changes the output power level, returns a response to the central controller with the current state of the power level.

It is possible to command the dimmer to set a certain power level for a certain time. The dimmer itself will make all the necessary calculations and smoothly set the required level of brightness of incandescent lamps for a given period of time.

The performance of the dimmer is displayed by the indicators on the device board: the "+7-13V power supply" indicator (1 red LED) and the "power level" indicator (4 green LEDs). The "power" indicator starts to glow after the module performs self-testing and system settings when +12V power is applied. The absence of the power indicator light indicates a malfunction of the device. The installed power level indicators display the output power parameter by changing the blinking speed of the green LED of the corresponding channel;

In the DIVISION system, the dimmer is recognized as 4 independent devices. Before using the module as part of the DIVISION Smart Home complex, new personal addresses should be written to its internal memory. A new, unprogrammed module is supplied by the manufacturer with preset addresses 01, 02, 03, 04. Programming and testing of the module is carried out using the DIVISION Controllers service program.

4.2. Appearance and installation of the dimmer.



Structurally, the dimmer is made in a housing for mounting on a DIN rail. dimensions 70x86x57 mm (4 DIN).

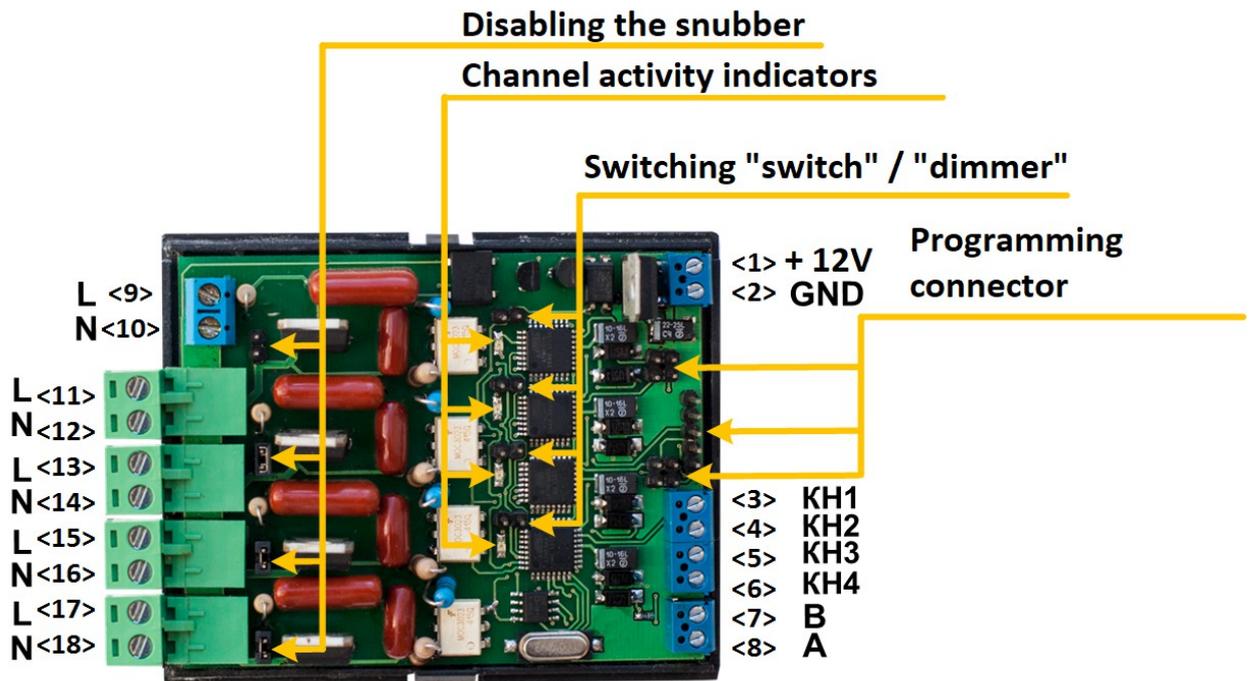
Standard installation on a DIN rail is carried out using a clip on the rear wall of the housing. The case is opened by pressing the latch on the side. Connectors for connecting the control interface and 12V power supply are located in the lower part of the case, for screw mounting with a pitch of 3.81 mm: No. 1-8. Connectors for connecting the power load and ~220V power supply are located in the upper part of the case, for screw mounting with a pitch of 5.01 mm: No. 9-18.

The module case is shown in Picture 2.

Picture 2. Dimmer

4.3. Assignment of outputs.

Picture 3 shows a board with the assignment of contacts, jumpers and dimmer operation indicators.



Picture 3. Assignment of dimmer contacts

The dimmer board has four pairs of terminal blocks with a pitch of 3.08 mm, which they are connected to: 12V dimmer power, control buttons and interface lines RS485. There are also four pairs of plug-in blocks and one screw block with a pitch of

5.01 mm, which are used to connect the device to a ~220V power network and connect lighting lamps.

The purpose of the terminal contacts is given in table 2.

Table 2. Assignment of terminal contacts.

| Contact numbers | Pin assignment |
|------------------------|-------------------------------|
| one | Module power input +12V. |
| 2 | Common power wire |
| 3 | Button input 1 |
| 4 | Button input 2 |
| 5 | Button input 3 |
| 6 | Button input 4 |
| 7 | Channel B RS485 |
| 8 | Channel A RS485 |
| 9 | entrancepower network ~220V L |
| 10 | entrancepower network ~220V N |
| 11 | Channel #1 Out L |
| 12 | Channel #1 output N |
| 13 | Channel #2 Out L |
| 14 | Channel 2 output N |
| 15 | Channel #3 output L |
| 16 | Channel #3 output N |
| 17 | Channel #4 output L |
| 18 | Channel 4 output N |

4.4. Operating modes.

The DV-DM4D dimmer has three modes of operation:

- autonomous,
- testing and addressing,
- as part of the DIVISION system.

Offline mode: can be used to manually dim incandescent lamps or to connect a motion sensor. In this case, wires of the RS-485 interface are not connected to the control block of the dimmer. Using jumpers DJ1-DJ4, you can select the control logic for each channel, respectively - smooth power control or "switch" mode. The "switch" mode is used in cases where, for some reason, smooth brightness control is impossible or undesirable (for example, the use of certain types of energy-saving lamps). Closed jumper - "switch" mode, open - dimming mode.

Jumpers SV1-SV4 are used to open the "snubber" circuit of the corresponding channel in the case of using a dimmer to control power supplies for LED lamps.

Testing and addressing mode: used when checking the dimmer's performance, as well as for writing an address into it. Setting the address is necessary for further identification of the dimmer in the DIVISION system. Any address from 1 to 235 is allowed.

When working as part of the DIVISION system, the functionality of the dimmer is used to the fullest extent. The dimmer is connected to the central controller via the RS485 interface. The central controller allows you to implement various control functions:

- precisely in percent to set the level of brightness of illumination;
- smoothly change the level of lighting brightness in a given range for a given period of time;
- automatically set the brightness level, turn on and off the lighting for any event or a specified time.

For example: you can set the brightness of the lamps to 40% when the lighting is turned on at night (soft light) and 100% - in the evening, as well as switch on the lighting by a motion sensor, execute scenarios, for example, "guests" (maximum brightness), "departure" (turning off lighting), "rest" (soft light).

The dimmer operation scenarios are laid in the DIVISION Constructor editor program, when configuring the DIVISION Smart Home system. The logic of the dimmer in the system can be arbitrarily complex and is limited practically only by the customer's imagination. At the same time, the possibility of manual control using the buttons remains.

Detailed instructions for setting up and connecting the dimmer for each mode of operation are given in section 5 of this manual.

As part of the DIVISION system: a description is given in section 4.1 of this manual.

5. Operation of the dimmer.

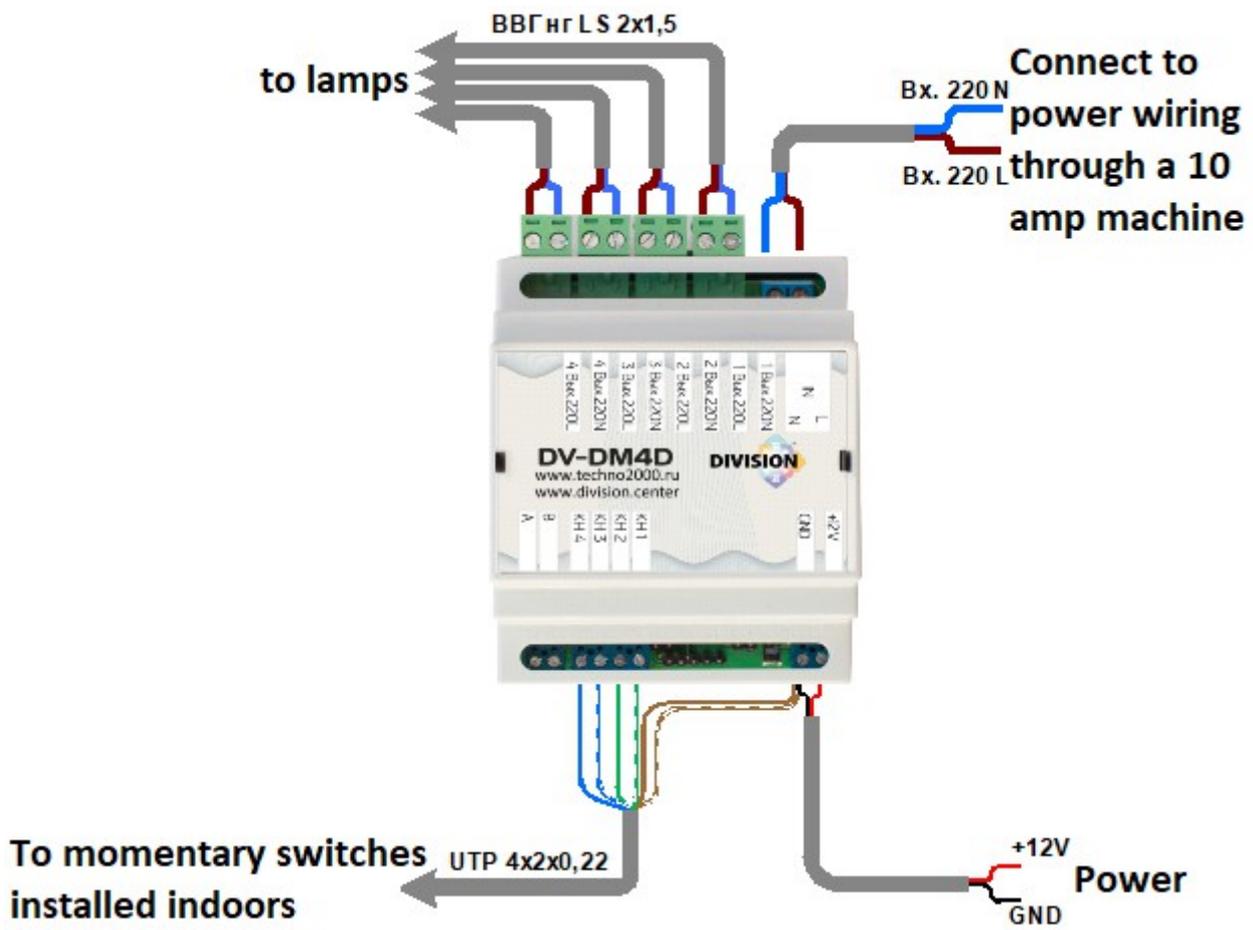
5.1. Offline mode.

The dimmer can work offline without being connected to a central controller. In this case, the control is carried out using the button. The choice of the mode of smooth adjustment or the "switch" mode is possible.

The choice of control logic for each channel is carried out by installing a jumper on the dimmer board. The dimmer is shipped with jumper 1-2 open (jumpers DJ1-DJ4) (see Picture 3), which corresponds to the smooth control mode. If you need to select the "switch" mode, you need to open the dimmer case and install the jumper (Jumper DJ1-DJ4) of the corresponding channel. The body of the dimmer is opened using latches on the sides (see Picture 2).

ATTENTION!!! There is a dangerous voltage ~220V on the dimmer board. Therefore, all manipulations inside the case can only be performed when the voltage is off.

In the absence of input voltage ~220V, manual control of the dimmer from the button is not performed, while the LEDs for indicating the dimmer channels are constantly on.



Picture4. DV-DM4D dimmer connection diagram for stand-alone operation (control from buttons - buttons without fixation, close the dimmer input to a common wire)

5.2. Manual control from the button.

The connection of the dimmer in manual control mode is shown in Picture 4. Control buttons - buttons without fixation, are connected via two low-voltage wires with a cross section of at least 0.25 mm. Pressing the button with holding (more than 1.5 seconds) leads to a cyclical smooth change in the brightness of the lighting from the minimum value to the maximum and back (a full cycle is about 10-12 seconds). When the button is released, the selected brightness level is set. When the light is on, a quick press on the button turns it off. When the lighting is off, a quick press on the button turns the lighting on to the maximum brightness level. Holding the button when the lighting is off, smoothly increases the brightness from the minimum value.

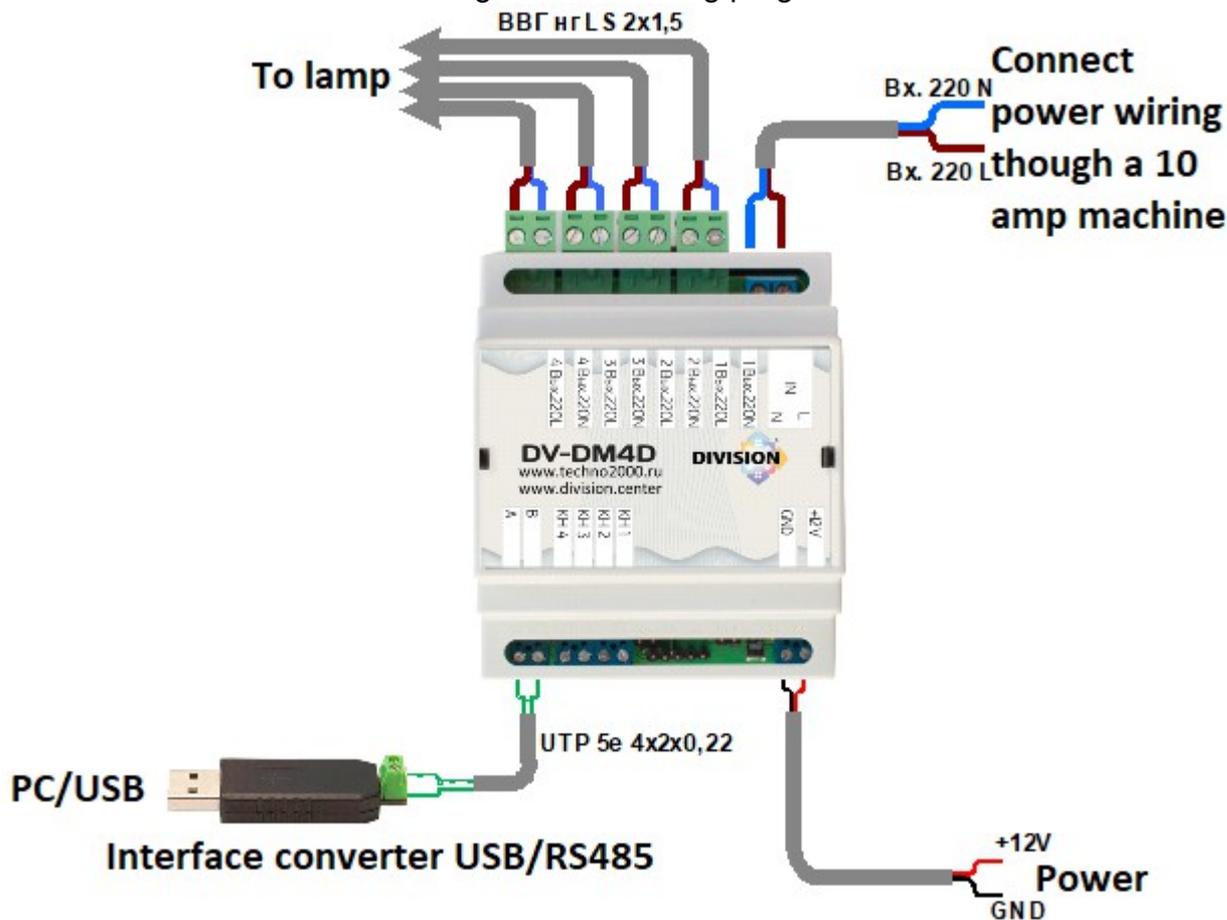
5.3. Testing and addressing mode.

This mode is used to check the functionality of the dimmer and/or assign a personal address to it. Assigning an address to a dimmer is required for its operation as part of the DIVISION Smart Home complex.

The following equipment is required to perform the test:

- DC source 12V, 1A;

- load - 4 incandescent lamps 220 V, 60W, connected to the output connectors of the dimmer;
- connecting wires.
- source of single-phase alternating voltage 220 V, connected to the input connector of the dimmer;
- 4 buttons for closing without fixation;
- USB/RS485 interface converter;
- personal computer with Windows 7 and above;
- DIVISION Controllers testing and addressing program.



Picture5. Connection diagram of DV-DM4D dimmer to test operation

In test mode, the dimmer is connected to a personal computer, load and power according to the diagram in Picture5. In address setting mode, there is no need to connect control buttons.

The DIVISION Controllers program is installed on a personal computer, which can be downloaded from the website of the Techno Group of Companies: division.business → Shop → *Hardware and software* → *Software* → *DIVISION controllers*. In the same section of the site is a description of the program. Please read this manual before using DIVISION Controllers.

How to perform efficiency:

Install the dimmer in the test bench in such a way that it is impossible to touch parts carrying life-threatening voltage.

Switch and connect 4 control buttons between the GND-common contact and, respectively: terminals No. 3-6.

Connect the USB/RS485 interface converter to terminals No. 7-8 (B and A, respectively), plug it into the computer port.

Connect +12 V power supply to terminals 1-2.

Connect the load lamps and the power supply circuit to the dimmer.

Make sure jumpers DJ1-DJ4 are open and jumpers SV1-SV4 are closed.

5.3.1. Checking controllability from the button

Apply a supply voltage of 12V and a voltage of ~220V to the dimmer.

In this mode, one blue one blue LED is lit, the load lamps are not lit.

Press and hold KH1. After 1.5 seconds, the lamp of the corresponding 1st channel will begin to increase the brightness from the minimum value to the maximum and vice versa. If you hold the button, then the brightness alternately decreases or increases, while the LED of the corresponding 1st channel increases or decreases the flickering speed.

Set the brightness to about 50% of the nominal and release the button, the load lamp should glow, at the set brightness, evenly without fluctuations in luminosity.

Briefly press the KH1 button. The lamp should go out within 1.5 seconds. when pressed again, the brightness will be set to the maximum value in 0.5 seconds. Check the operation of the remaining channels 2-4 in the same way, controlling them using the KH2-KH4 buttons, respectively.

5.3.2. Checking the "Switch" mode

Turn off the dimmer.

Close jumpers DJ1-DJ4.

Close case.

Connect lamps.

Apply a supply voltage of 12V and a voltage of ~220V to the dimmer.

In this mode, one blue LED lights up, the load lamp does not light up, while the dimmer simulates the operation of the switch and turns the load on and off without delays and adjustments.

In the off state of the lamps, briefly press the buttons KN1-KN4. The lamp of the corresponding channel will turn on at full brightness without delay. Pressing the buttons again will turn off the lamps also without delay

5.3.3. Testing controllability and interface.

Apply a supply voltage of 12V and a voltage of ~220V to the dimmer.

Launch the DIVISION Controllers program.

In the COM port window, select the desired port (to which the interface converter is connected) or use the "Auto Search" menu item and click the "Device Search" button. A serviceable and correctly connected device responds immediately, if there is no answer, check the correct connection of the RS-485 A and B interface lines.

When shipped from the factory, the device is set to addresses 01-04. To record new personal addresses, you need to select the channel to be changed in the program,

click the "Address to be set" button, select the address to be set in the drop-down menu, for example 7, click "write address". After writing the address, it is necessary to perform the device search again, make sure that the corresponding modified device channel responds to the newly set address. Any address from 1 to 235 is allowed.

To control the dimmer power adjustment, you need to select the channel to be checked, select "channel adjustment" in the "command" window, select 0 in the "setting time" window. - to the left. The blue bar shows the brightness level to be set. The dimmer lamp, when the pointer moves, the progress bar should instantly work out the set brightness, in the lower window "channel status", the red bar should without delay duplicate all the brightness settings set by the blue bar, while the synchronous movements of the red bar show the dimmer's response to the specified "channel adjustment" .

5.4. Work in the system DIVISION.

The use of a dimmer as part of the DIVISION smart home system provides the greatest functionality: button control, script execution, control from the touch panels of the system.

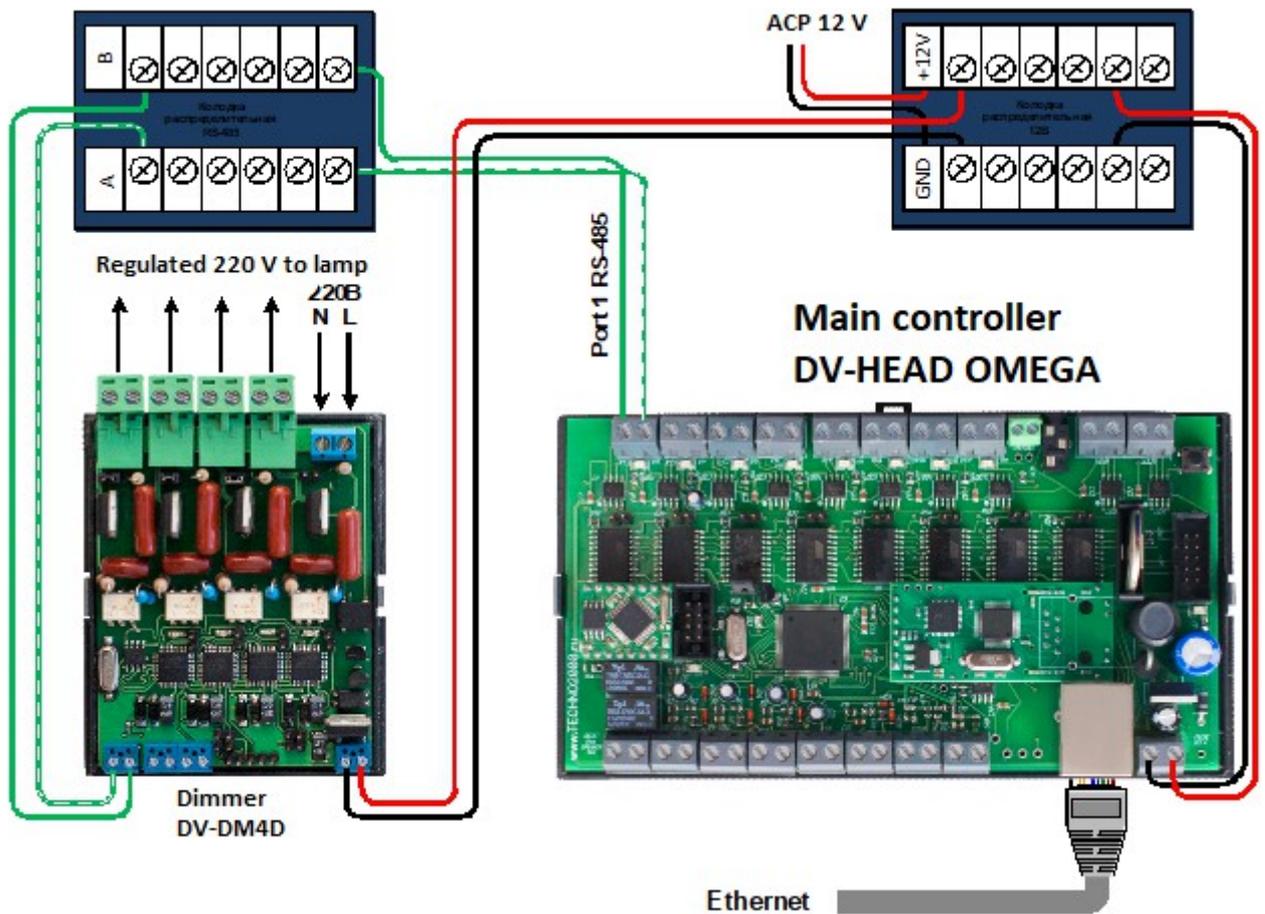
When using a dimmer as part of a smart home complex, first, in the testing and addressing mode (according to clause 5.3 of this manual), write the selected address to each channel of the device. The address of each system device is selected when programming the smart home complex in the DIVISION Constructor editor. The DIVISION Constructor also defines program scripts for controlling the dimmer (for example, by time or some event) and determines the possibility of control from touch panels. An unprogrammed dimmer is supplied by the manufacturer with addresses 01-04.

After setting the address, the dimmer is connected to the control circuits and to the central controller according to the diagram in Picture 6.

An RS485 interface converter is used to connect to the port of the central controller. The I/O module connects directly to the central controller via the RS485 interface. When connecting several devices to one line, the requirements for load capacity and line matching must be observed. No more than 30 controllers should be connected to one port.

The DIVISION configuration installed on the central controller automatically recognizes the dimmer as 4 devices according to the addresses stored in it.

When using a dimmer as part of the DIVISION smart home system, it is additionally possible to control the dimmer channels using buttons. The choice of manual control logic and the connection of buttons is made in the same way as in offline mode (according to clause 5.1 of this manual). If at the moment of execution of any script of the central controller a control signal is received from the buttons, then the action of the script is interrupted and the commands from the buttons are executed.



Picture6. Standard DV-DM4D Dimmer Wiring Diagram in DIVISION System to RS-485 central controller DV-HEAD OMEGA

5.5. Maintenance.

Maintenance of the module is carried out according to a preventive system. Maintenance work includes:

- checking the external state of the device;
- performance check in accordance with clause 5.1 of this manual;
- checking the reliability of the module fastening, the condition of external mounting wires and contact connections

6. Storage.

Module storage temperature range from -40°C to $+50^{\circ}\text{C}$.

When storing the module in rooms with a negative temperature range, it is necessary to keep the device at room temperature ($+20^{\circ}\text{C}$)

The module storage rooms must be free of acid vapors, alkalis, corrosive gases and other harmful impurities that cause corrosion.

7. Manufacturer's warranties.

The manufacturer guarantees the operability of the device provided that the consumer observes the rules of transportation, storage, installation and operation.

The warranty period of operation is 36 months from the date of commissioning, but not more than 40 months from the date of shipment.

When sending the product for repair, an act with a description of a possible malfunction must be attached to it.

8. Manufacturer information

DVC Technologies Site: division.business

9. Certificate of acceptance and packaging.

The DV-DM4D module is manufactured and accepted in accordance with the current technical documentation, recognized as fit for use and packed by DVC Technologies.

Responsible for receiving and packaging

OTK

MP _____

FULL NAME. year, day, month