

**SMOOTH CONTROLLER
BRIGHTNESS CONTROL OF LED STRIPS
DV-REG**

Manual



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1. General description



The DV-REG module is an addressable controller used to smoothly control the brightness of LED strips. It has one regulation channel, with PWM output and 0 - 10V. It can work autonomously, with control from a button without fixing, or as part of the DIVISION Smart Home system (or other automation system). Has an ADC input for measuring voltage in the range 0–20V. Connects to the control server via RS485 interface. Structurally, the device is made in a housing for mounting on a DIN rail.

Appearance of the DV-REG module shown in Figure 1.

Fig.1 Appearance DV-REG

2. Specifications

Number of control channels 1,

Maximum load current:

PWM output up to 150 mA,

output 0 – 10 V to 150 mA,

Regulation level from 0% to 100%,

Supply voltage, V 12,

Current consumption, no more than 0.06 A,

Range of measured voltage at the ADC input, V 0 – 20,

Serial port parameters:

speed, baud 19200,

number of bits 7,

parity even,

stop bit 1,

control interface RS-485 half duplex,

control protocol ModBus ASCII,

Autonomous operation without connection to a PC. d A,

Indication of the control level linear scale,

Overall dimensions (WxHxD), mm 35x86x68,

Size 2 DIN,

Device weight 75 g.

3. Product composition

The product contents upon delivery include:

- 1) DV-REG module – 1 pc.;
- 2) DV-REG instruction manual – 1 pc.;

4. Description of the operation of the DV-REG module.

4.1. Work algorithm

DV-REG module is able to work both under the control of the DIVISION Smart Home system or any other automation system, and autonomously.

Offline operation

DV-REG is controlled by a regular button without locking.

A short press turns the lighting on or off, holding the button leads to smooth adjustment of the lighting level.

Work as part of the DIVISION Smart Home system (or other automation system)

Properly assembled and connected DV-REG, when the power is turned on, makes its own settings (address, speed of command reception, setting the zero brightness level), after which it is ready to receive control commands from the automation system server, or control buttons.

When receiving a command from the central controller of the automation system, DV-REG processes it, changes the output voltage level and returns a response to the central controller about the current output voltage level. The voltage value at the ADC input is also transmitted to the central controller.

The operating state of DV-REG is clearly represented by indicators on the device board: power indicator - 1 red LED and the current output voltage level - 7 yellow LEDs. The "power" indicator lights up when 12V power is supplied. If the indicator does not light, it indicates a device malfunction or lack of power. The output voltage level indicator is presented in the form of a linear scale consisting of 7 LEDs, where the turned on LED indicates the current output voltage level (in percent).

Before you start using the module as part of the DIVISION Smart Home complex, you should write a new personal address into its internal memory. A new, unprogrammed module is supplied from the factory with a preset address of 01. Programming and testing of the module is carried out using the DIVISION Controllers service program.

4.2. Appearance and installation DV-REG

Structurally, DV-REG is made in a housing for mounting on a DIN rail. dimensions 35x86x57 mm (2 DIN).

Standard installation on a DIN rail is carried out using a clip on the rear wall of the housing. The case opens 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, control devices - in the upper part of the case and are made for screw mounting with a pitch of 3.81 mm. The module housing is shown in Figure 2.

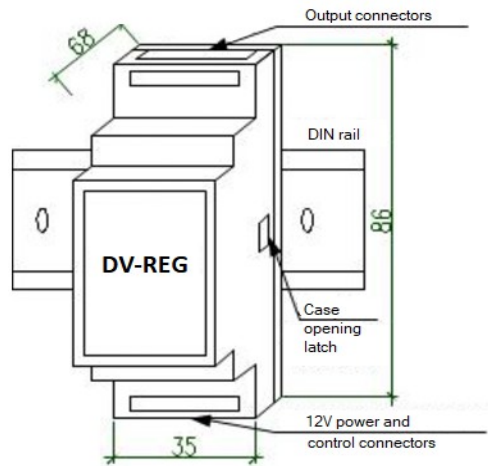


Fig.2 Module housing DV-REG

4.3. Output assignment

Figure 3 shows the device indicating the numbering of the outputs.



Fig.3 Purpose of controller outputs DV-REG

The assignment of terminal contacts is given in Table 1.

Table 1. Assignment of terminal contacts.

Contact numbers	Assigning contacts
1	Module power input +12V.
2	Common power wire
3	-
4	Control button input
5	Channel A RS485
6	Channel B RS485
7	Common wire GND for ADC
8	Entrance ADC
9	+12V for test LED
10	PWM output
eleven	Common wire GND for PWM or 0 – 10 V

4.4. Operating modes

ControllerDV-REGhas three operating modes:

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

Offline mode:can be used for manual brightness controlled LED strips. In this case, you do not need to use control via the RS485 interface.

Test and addressing mode:used when checking the device for functionality and assigning an address to it. Setting the address is necessary for further identification in the DIVISION or other automation system. The address can be in the range from 1 to 235.

When working as part of a DIVISION automation system, controller functionalityDV-REGare used most fully. It connects to the management server via the RS485 interface.

The management server allows you to implement various management functions:

- accurately set the lighting brightness level (in percentage);
- automatically set the brightness level based on an event or at a given time. For example, you can set the brightness to 40% when the lights are turned on at night (soft light) and 100% in the evening; turn on the lighting using a motion sensor, perform various scenarios, such as: “guests” (maximum brightness), “departure” (turn off the lights), “rest” (soft light);
- use the measured voltage level at the ADC input in scenarios (for example, a light sensor).

Scenarios are configured using the programDIVISION Constructor, for operation as part of the DIVISION automation system, while the logic of DV-REG operation can be as complex as desired and is limited only by the customer’s imagination. At the same time, the possibility of manual control using a button is retained.

Detailed setup and connection instructions for each operating mode are provided in Section 5 of this manual.

5. Module operationDV-REG.

5.1. Offline mode

DV-REGcan work in standalone mode without connecting to a central controller. In this case, control is carried out using a button without fixing.

- source of single-phase alternating voltage ~220V;
- button for closing without fixing;
- USB/RS485 interface converter;
- personal computer with Windows 7 or higher;
- DIVISION Controllers testing and addressing program.

In testing mode, the module is connected to a personal computer, load and power supply according to the diagram in Figure 5. In the address setting mode, there is no need to connect the control button.

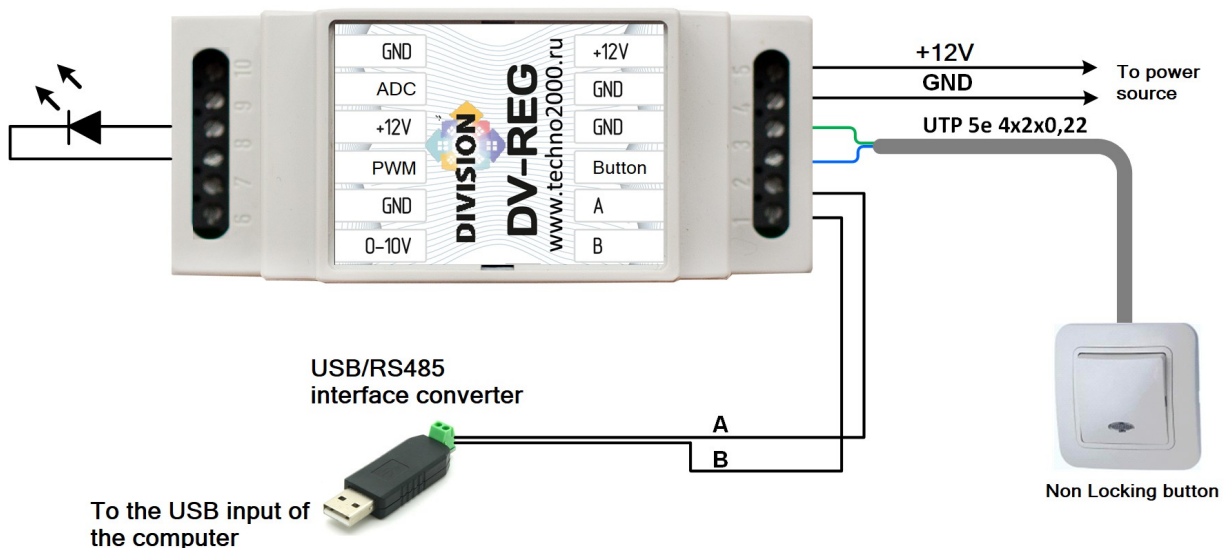


Fig.5. Connection diagram DV-REG to the computer's USB input for test trials

The DIVISION Controllers program is installed on a personal computer, which can be downloaded from the Techno Group website: www.division.business → Shop → Software → DIVISION controllers. In the same section of the site there is a description of the program. Before using the DIVISION Controllers program, you must read this description.

Procedure for carrying out performance testing.

1. Install DV-REG to the test bench.
2. Switch and connect the control button between the GND pin, terminal 3, and, accordingly, terminal 4.
3. Connect the USB/RS485 interface converter to terminals No. 5,6 (B and A, respectively), and plug it into the computer port.
4. Connect the LED to pin 9 plus and pin 10 minus to the device.
5. Connect the +12 V power supply to the device at terminals 1-2.

5.3.1. Checking the light level control from the button.

1. Connect the device to the computer according to the diagram in the figure 5.
2. Apply 12V power.

3. Initial state of the device: one red LED on the indication scale is lit, there is no output voltage (the LED is not lit).
4. Press and hold the button. After 0.5 seconds, the load LED will begin to increase brightness from minimum to maximum and back.
5. Set the brightness to approximately 50% of the nominal value and release the button. The load LED should glow evenly, without fluctuations in the lighting level.
6. Briefly press the button. The LED should go out within 1.5 seconds. When pressed again, the lighting brightness will be adjusted to the maximum value in 0.5 seconds.
7. Briefly press the button again, thereby extinguishing the load LED, then press the button and hold. After 1.5 seconds, the load will begin to increase brightness, from minimum to maximum and back.

5.3.2. Checking controllability and interface.

1. Connect the device to the computer according to the diagram in the figure 5.
2. Apply 12V power.
3. Launch the DIVISION CONTROLLERS program on your computer.

In the program window, from the "Device COM port" list, select the port to which the interface converter is connected, or select the "Auto search" menu item, click the "Device search" button.

DefaultDV-REG has address 01. If the program does not find the device, then check that the RS-485 interface lines and power are connected correctly. To assign an addressDV-REG select the required address in the program window from the "Address to be set" list, then click on the "Write address" icon. Search for your device again to make sure thatDV-REG remembered the new address. The address can be anything in the range from 1 to 235.

From the "Command" list, select "channel adjustment". In the windowAfter the program, a horizontal progress bar will appear, with which you can adjust the output voltage (light brightness). Holding the left mouse button, move the cursor right - left, inside the progress bar, the brightness of the LED should change. The lower progress bar "Channel Status" in the program window displays the set output voltage level.

In normal operation mode, the selected lighting level is instantly set; the "Channel Status" progress bar duplicates all lighting level settings without delay.

Checking the voltage meter:

From the "Command" list, select "enable status polling". Connect the power supply to the ADC input (terminals 9–10), observing the polarity. Change the supplied voltage within the range of 0-20 V. The Uin= indicator of the DIVISION CONTROLLERS program will display the voltage value.

5.4. Working as part of the systemDIVISION

UsageDV-REG as part of the Smart Home system, DIVISION provides the greatest functionality: control of buttons, execution of scenarios from touch control panels (including via the Internet, using an iPad). The module connection diagram as part of the DIVISION Smart Home system is shown in Figure 6.

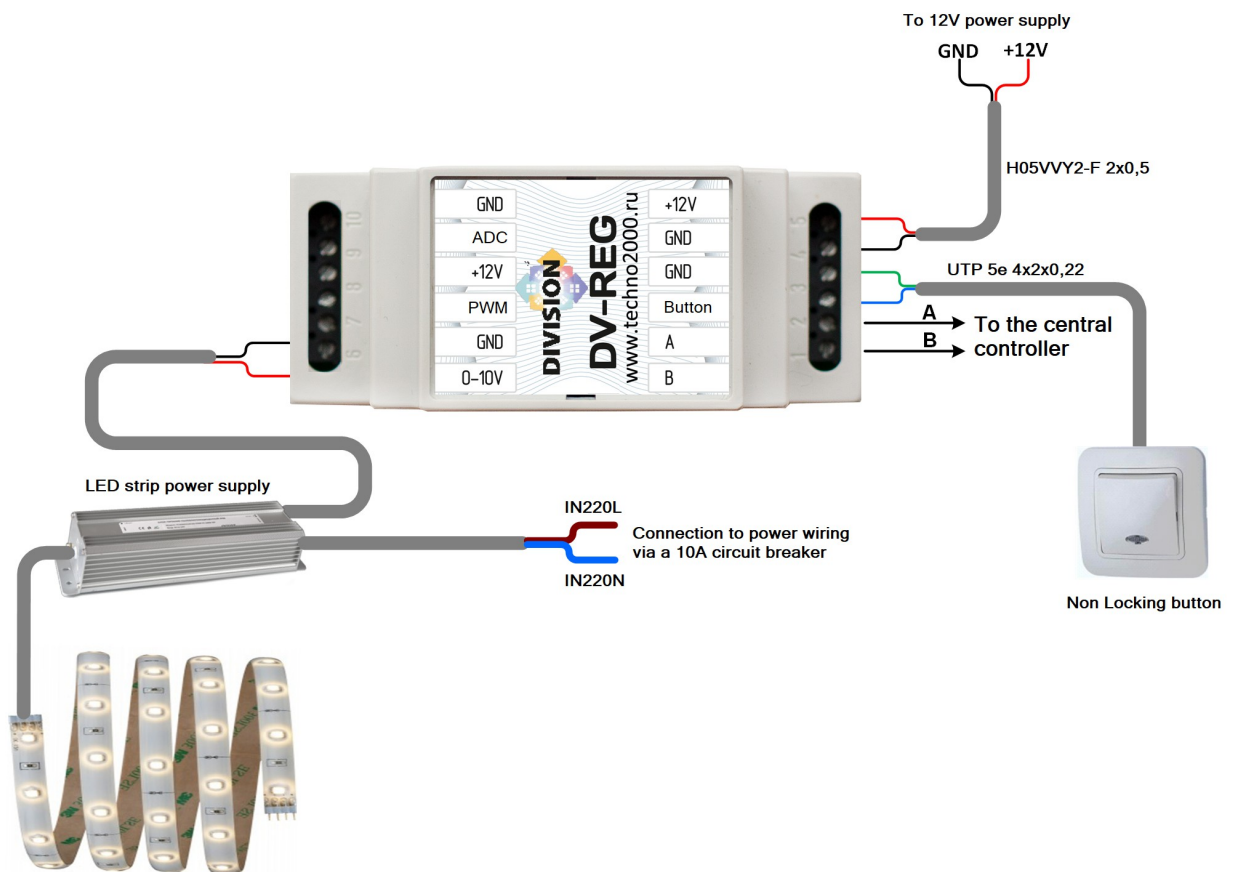


Fig.6 Connection DV-REG when working as part of the system "Smart Home" DIVISION

When using the device as part of the DIVISION Smart Home system, you must first write the required address into the device (see clause 5.3.3). The new DV-REG module is supplied by the manufacturer with address 01. The address of each device in the DIVISION Smart Home system is configured in the DIVISION Constructor editor. DV-REG control scenarios are also configured there (for example, by time or some event) and the ability to control from touch panels is set.

After setting the required address, the device is connected to the central controller according to the diagram in Figure 7.

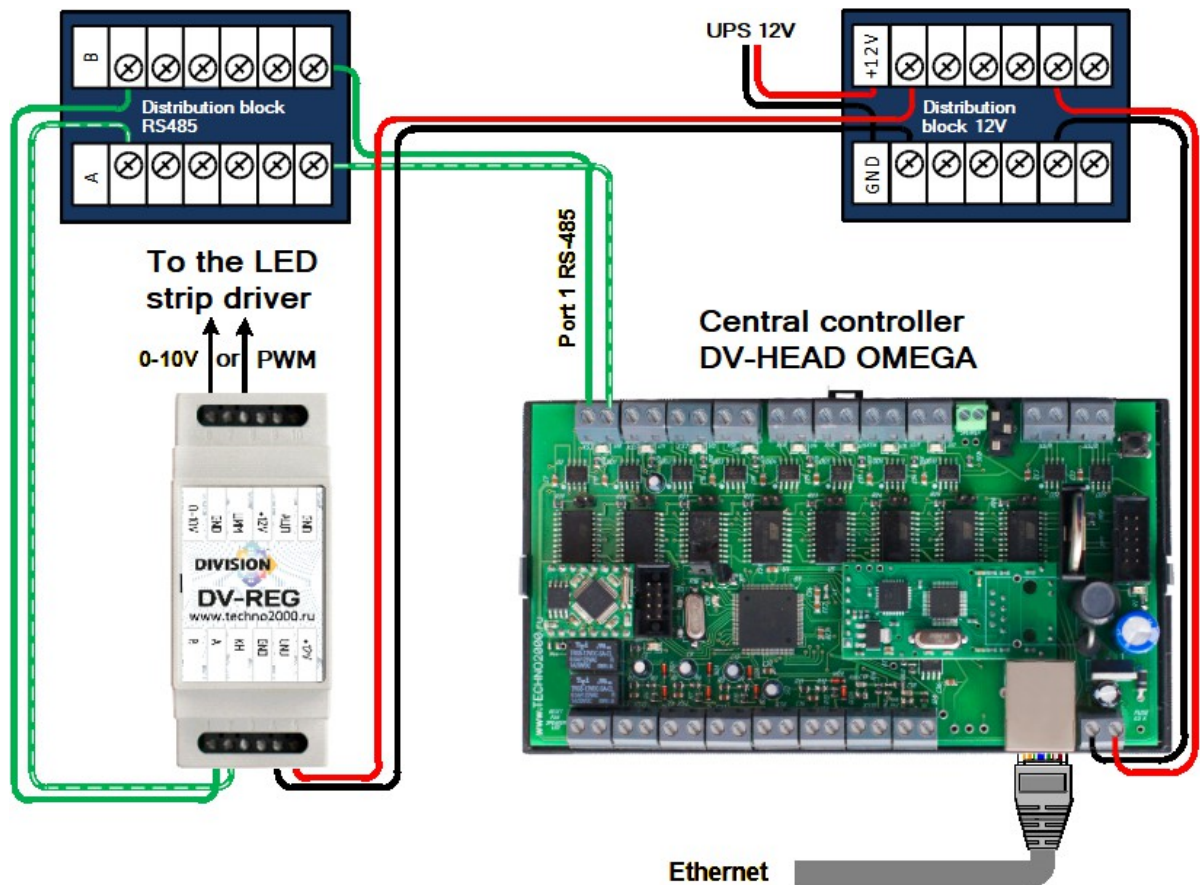


Fig.7 Standard controller connection diagram DV-REG in system DIVISION to RS-485 central controller DV-HEAD OMEGA

DIVISION system controllers are connected to the DIVISION HEAD controller directly via the RS-485 interface line. No more than 30 devices can be connected to one RS-485 interface line.

In addition to software control, there is always the possibility of manual control of DV-REG from a button. The choice of operating logic and connection of the button is carried out in the same way as in offline mode (see paragraph 5.1). If at the moment execution of any script received from the automation system (DIVISION), a control signal is received from the button, then the action of the script is interrupted and the command from the control button is executed.

5.5. Maintenance.

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

- ! checking the external condition of the device;
- ! performance check in accordance with clause 5.3. 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^oFrom up to +50C.

When storing the module in rooms with a negative temperature range, it is necessary to keep the device at room temperature (+20^{oC}).

The storage rooms for the module should not contain vapors of acids, alkalis, corrosive gases and other harmful impurities that cause corrosion.

7. Manufacturer's warranty.

The manufacturer guarantees the operability of the device if the consumer complies with the rules of transportation, storage, installation and operation.

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

When sending a product for repair, it must be accompanied by a report describing the possible malfunction.

8. Manufacturer information

DVC Technologies Website: www.division.business.

9. Certificate of acceptance and packaging

Controller for smooth brightness control of LED stripsDV-REG manufactured and accepted in accordance with the current technical documentation, declared fit for use and packaged by Electronic Interiors LLC.

Responsible for receiving and packaging

Quality Control Department

MP _____

FULL NAME. year, day, month