Controller BRKV-04 air conditioner rotation and ventilation control unit

USER MANUAL

Content

1. Purpose

The "BRKV-04" device (air conditioning rotation and ventilation control unit) is designed for use in monitoring, dispatching, status monitoring, and control systems for air conditioners and split systems in automatic or manual mode. The device can control any type of air conditioner equipped with an infrared receiver.

The main purpose is to control two air conditioners, thereby solving the problem of ensuring uniform consumption of the mechanical resource of the air conditioners by rotating at a given time interval.

The main functional capabilities of the BRKV device:

– the ability to “train” the BRKV to control messages from the standard air conditioner remote control;

– automatic maintenance of room temperature by controlling split systems via an IR channel;

– room temperature monitoring;

– ventilation control (using an additional device – URV02, connected via RS485).

The kit includes a BRKV device (in a DIN rail housing), two infrared emitters for controlling air conditioners, two temperature sensors for providing feedback from air conditioners and an additional sensor for monitoring the temperature inside the room.

2. Appearance, description of the device

The device is housed in a durable plastic case. Inside the case is a circuit board with a microcontroller, memory, and an RS-485, RS-232, and Ethernet interface node. On the outside of the case are connectors for interface cables, LED indicators for power and diagnostics of the device's current status.

Configuration and control of the device's operation are possible both locally and remotely via the WEB interface over Ethernet.

The following communication interfaces can be used to connect external equipment to the device and communicate with it remotely: RS-485, RS-232, Ethernet.

The design of the device allows it to be placed in electrical cabinets with the possibility of mounting on a DIN rail.

The appearance of the device is shown in Figure 1.

Figure 1 – The BRKV-04 device

3. Technical specifications

The technical characteristics of the device are given in Table 1.

Table 1. Technical specificationsBRKV-04

Name of the characteristic	Meaning
Power supply of the device	12-60 V (DC)
Power consumption	no more than 10 W
Voltage for powering external devices	12V (DC), 8V (DC), 5V (DC)
operating system	Linux
User interface for customization	Web interface
Ethernet interface	2 ports
Data transfer rate via 10\100 Base T interface	up to 100 Mbit/s
Number of RS485 interfaces with galvanic isolation	1 pc.
Number of RS232 interfaces with galvanic isolation	1 pc.
Galvanic isolation voltage for RS485, RS232 interfaces	1000 V (DC)
Data transfer rate via interfaces (RS485, RS232)	1200-115200 bps
Support for temperature sensor with 1-wire digital interface	+
Indication (LEDs)	nutrition, statuses
Operating temperature range	-40 to + 55 °C
Built-in hardware watchdog circuit	+
Type of power supply connectors, interfaces, sensors	Screw terminal connectors
Ethernet connector types	RJ45
Frame	Plastic
Installation	on a 35 mm DIN rail
Overall dimensions	105x51x65
Weight of the device	no more than 0.8 kg
Mean time between failures	at least 150,000 hours
Service life	20 years

4. Indicator lights

The device body contains the following indicator lights that display the status and operating

modes:

- "Power" – constantly on after power is applied. Indicates the presence of power supply voltage;
- "Status" – turns on after the device begins booting. The indicator indicates the device's operating modes;

5. Description of the device's operating algorithm

After the device boots, the main algorithm starts once per minute, monitoring the temperature using a temperature sensor with a 1-wire interface. The main algorithm also controls the air conditioners via IR transmitters connected to the RS-485 interface. When one of the air conditioners is turned on, the temperature is checked every 5 minutes using the temperature sensors connected to the IR transmitters. If the temperature has not changed, an alarm is generated in the air conditioner's status field. If only one temperature sensor is connected to the IR transmitter, or if the temperature sensor is faulty and unable to read the values, an alarm is set for the specified sensor. All statuses can be viewed through the device's web interface (Section 6.2.2 "Status").

The second algorithm, executed on the device, starts every 5 minutes after startup. It checks whether the TCP-MODBUS server is running on the device. If it isn't, it restarts it. The IP address for connecting to the server corresponds to the IP address specified in the web interface settings (Section 6.2.1 "Device Settings"). The default port for connecting to the server is 3011.

7. Training IR Transmitters

To conduct the initial training of the BRKV to control messages from the standard air conditioner remote control, it is necessary:

7.1 Connect the BRKV to the PC.

7.2 Connect IR transmitters to the BRKV.

7.3 Go to the “IR port” tab (web interface).

7.4 Prepare the remote control for training. To do this, set the required modes on the remote control: cooling mode (the "snowflake" symbol) and the temperature setpoint at which the air conditioner will operate.

7.5 Click the “Enable learning mode” button on the “IR port” tab.

7.6 Click the “Enable Receive Mode” button on the “IR Port” tab.

7.7 Point the remote control at the BRKV IR signal receiver and, by pressing the button on the remote control, send a command to turn on or off.

7.8 In the "Air Conditioner Number Assignment" field, select the desired number. In the "Control Function Assignment" window, select the desired function (on or off). Click the "Save Command" button.

7.9 Point the IR transmitter at the air conditioner (no more than 10 cm), press the “Play command” button, make sure that the air conditioner is working.

7.10 Similarly, train the second IR Transmitter for the second air conditioner.

The result should be a record of 4 commands:

- turning on air conditioner No. 1;
- turning off air conditioner No. 1;
- turning on air conditioner No. 2;

- turning off air conditioner No. 2.

8. Installation

8.1. Install the BRKV module on the DIN rail.

8.2. Carry out installation in accordance with the appendix.

8.3. Secure the temperature sensor (3 m) inside the room.

8.4. Secure the “IR Transmitter” modules using brackets opposite the air conditioner’s IR receiver at a distance of no more than 10 cm.

8.5. Mount temperature sensors 1 and 2 close to the air conditioner flaps, or, if possible, insert the sensors inside the air conditioner. When turned on, the air conditioner should only cool its temperature sensor.

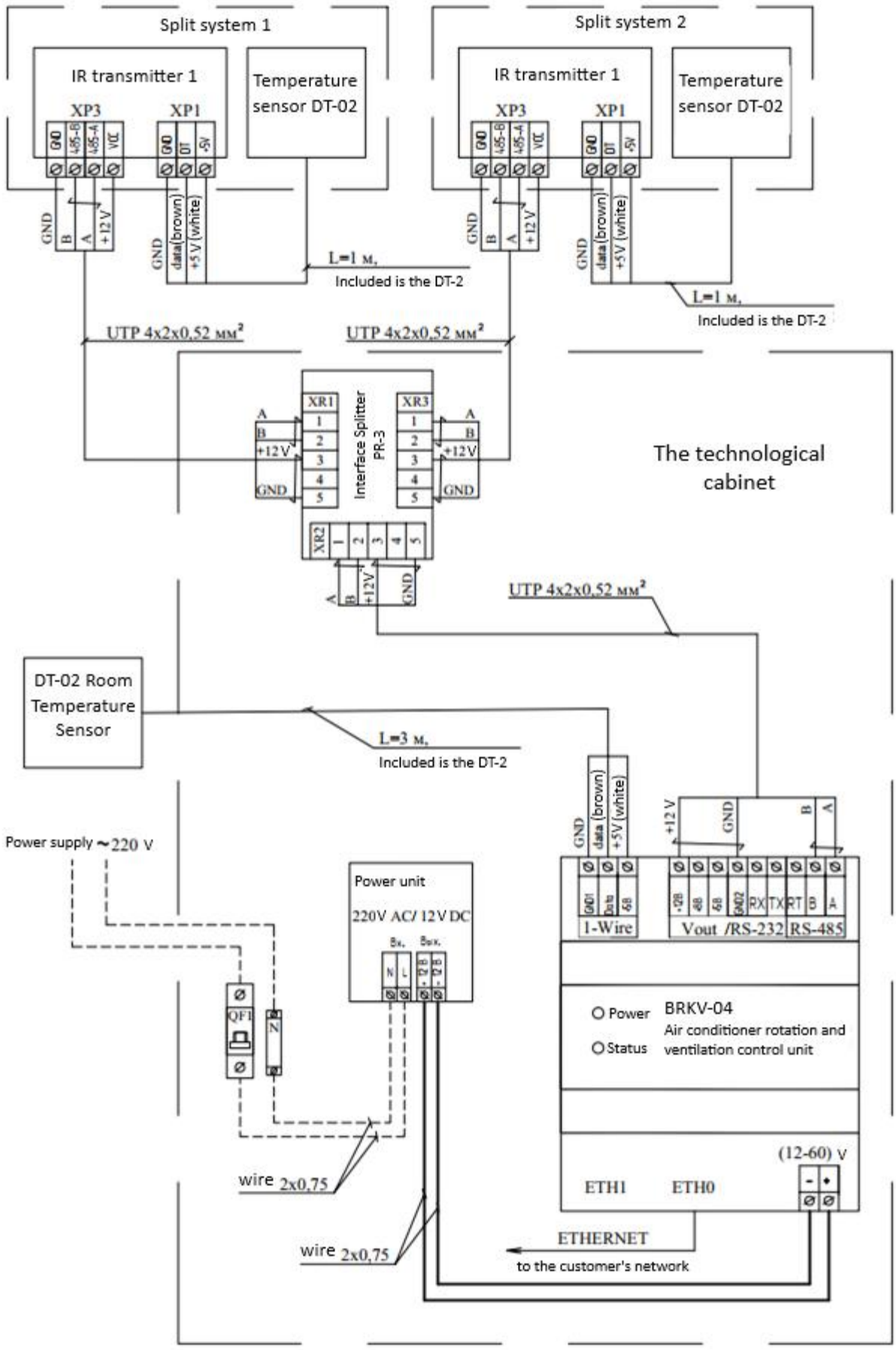

Figure 6 – Connection diagram of BRKV-04

9. Completeness

Table 4 – BRKV-04 set

Name	Quantity
BRKV-04 device	1 pc.
User manual	1 piece per batch
Passport/Label	1 pc./ 1 pc. per batch
Package	1 piece per batch

Note: The batch size is determined by the company.

Table 5 – Additional equipment

Name	Quantity
IR transmitter for BRKV-04	2 pcs.
Temperature sensor DT-02 (1 meter for IR transmitter)	2 pcs.
IR transmitter bracket for BRKV-04	2 pcs.
Temperature sensor DT-02 (3 meters) for BRKV-04	1 pc.
PR-3 interface splitter (optional)	1 pc.
Technological cabinet (optional)	1 pc.
Power supply 220V AC/12V DC (optional)	1 pc.

10. Maintenance

The device is maintenance-free and designed to operate indefinitely under the following operating conditions: stable power supply within the specified voltage range, proper humidity and temperature, non-aggressive gas environment, and absence of shock and vibration. There are no parts inside the device's housing that require periodic inspection and/or maintenance.

11. Storage and transportation rules

Climatic conditions for transportation must meet the following conditions:

– ambient air temperature from minus 40°C to plus 55°C;

– relative air humidity up to 98% at 25°C;

– atmospheric pressure from 84.0 to 107.0 kPa (from 630 to 800 mmHg).

The device can be transported by all types of transport (in covered wagons, closed vehicles, containers).

The device must be stored only in the manufacturer's packaging in heated rooms at temperatures ranging from -40°C to +55°C and relative humidity no more than 80%. Storage areas must be free of aggressive impurities (such as acid or alkali vapors) that could cause corrosion.

12. Manufacturer's (supplier's) warranties

The warranty period is 12 months from the date of transfer of the product to the buyer, provided that the conditions of transportation, storage, installation and operation are observed.

During the warranty period, the manufacturer has the right to supervise the correct operation

in order to improve the quality and efficiency of operation.

Product components that fail during the warranty period are subject to replacement or repair by the manufacturer at the manufacturer's expense.

The user loses the right to free repairs during the warranty period in the event of broken seals, mechanical damage by the user, or if the product was repaired by a person who is not authorized to perform repairs and maintenance.

Note:

Jcom-IoT reserves the right to make changes to the manual without prior notice to reflect improvements to hardware and software, as well as to correct typos and inaccuracies.