

Operating Manual FIBARO RGBW Controller FGRGBWM-441 v2.1 - v2.3.

Fibaro RGBW Controller is a universal, Z-Wave compatible RGB / RGBW controller. Fibaro RGBW Controller uses PWM output signal, which enables it to control LED, RGB, RGBW strips, halogen lights and fans. Controlled devices may be powered by 12 or 24 VDC. In addition the device supports up to four, 0V - 10V analog sensors, such as temperature sensors, humidity sensors, wind sensors, air quality sensors, light sensors etc. All IN and OUT terminals may be user configured for LED control or 0V-10V signal readouts.

Specifications

Power Supply:	12 V DC 24 V DC
Rated output power:	combined 12A (sum of all connected output channels); 6A for single output channel
PWM output frequency:	244 Hz
Electricity consumption:	0,3W
Radio signal power:	1mW
For installation in boxes:	Ø50 mm
Max load (e.g. halogen bulbs):	at 12V - 144W combined, at 24V - 288W combined.
In accordance with EU standards:	EMC 2004/108/EC R&TTE 199/5/WE
Radio protocol:	Z-Wave
Radio frequency:	868,4 MHz EU; 908,4 MHz US; 921,4 MHz ANZ; 869,2 MHz RU;
Range:	up to 50m outdoors / up to 30m indoors; depending on terrain and building structure
Operational temperature:	0 - 40°C
Dimensions (L x W x H):	42 x 37 x 17 mm

Technical Information

- Controlled by Fibaro System devices or any Z-Wave controller
- Microprocessor controlled
- Executive element: transistor
- Active and historic (average) power consumption measuring

I General Information About Fibaro System

Fibaro is a wireless system, based on Z-Wave technology. Fibaro provides many advantages when compared to similar systems. In general, radio systems create a direct connection between the receiver and transmitter. However, the radio signal is weakened by various obstacles located in its path (apartment walls, furniture, etc.) and in extreme cases it fails to transfer required data. The advantage of Fibaro System is that its devices, apart from being transmitters and signal receivers, also duplicate signal. When a direct connection path between the transmitter and the receiver cannot be established, the connection may be achieved through other intermediate devices.

Fibaro is a bi-directional wireless system. This means that the signal is not only sent to the receivers but also the receivers send the confirmation of its reception. This operation confirms their status, which checks whether they are active or not.

Safety of the Fibaro System transmission is comparable to the safety of transmission in data bus wired systems. Fibaro operates in the free bandwidth for data transmission. The frequency depends on radio regulations in individual countries. Each Fibaro network has its own unique network identification number (home ID), which is why it is possible to co-operate two or more independent systems in a single building without any interference.

Although Z-Wave is quite a new technology, it has already become recognized and officially a binding standard, similarly to Wi-Fi. Many manufacturers in various industries offer solutions based on Z-Wave technology, guaranteeing their compatibility. This means that the system is open and it may be extended in the future. Find more information at www.fibaro.com.

Fibaro generates a dynamic network structure. After Fibaro System is switched on, the location of its individual components is automatically updated in real-time through status confirmation signals received from devices operating in a "mesh" network.

II Device Applications

Fibaro RGBW Controller may control:

- 12 / 24VDC powered RGB strips
- 12 / 24VDC powered RGBW strips
- 12 / 24VDC powered LED strips, bulbs, etc.
- 12 / 24VDC powered halogen lights
- 12 / 24VDC powered low output power fans

Additional features:

- 0-10V sensors signal readouts,
- 0-10V potentiometer signal readouts, and managing outputs accordingly,
- controlled by momentary or toggle switches

III Installing the device

- Before installation ensure the voltage supply is disconnected.
- Connect Fibaro RGBW Controller according to wiring diagram. First, connect outputs (R,G,B,W) RGB/RGBW/LED diodes or Halogen lights, or inputs (I1-I4). Second, connect voltage supply. Note the device must be powered by a dedicated stabilized power adapter.
- Arrange the antenna (find tips below wiring diagrams).
- Turn the voltage on.
- Include the module into the Z-Wave network.

Warning!

- Fibaro RGBW Controller is dedicated to operate in low voltage circuits of 12VDC or 24VDC. Connecting higher voltage load may result in Fibaro RGBW Controller damage.
- Fibaro RGBW Controller must be powered by the same voltage as the connected light source. I.e. if controlling 12V LED strip, the module must be connected to 12V power supply. Similarly, if controlling 24V RGBW strip, Fibaro RGBW Controller must be powered by 24V voltage supply.
- Fibaro RGBW Controller has 0-10V input. There is no 0-10V output. Output is controlled by PWM at 244Hz.
- Fibaro RGBW Controller must be powered by 12VDC or 24 VDC stabilized power supply with outputs load capacity matched to loads voltage.
- Sensors using 0-10V interface use wire connection to inputs I1 - I4. Maximum length of 0-10V connection line is 10 m. Observe sensor's manufacturer recommendations towards 0-10V line diameter.
- In case of connecting long RGBW/RGB/LED strips voltage drops may occur, resulting in lower light brightness further from R/G/B/W outputs. To eliminate this effect it's recommended to connect few shorter strips in serial connection instead of one long strip connected parallel. Maximum recommended wire length, used to connect R/G/B/W outputs with a RGBW/RGB/LED strip is 10 m. Observe connected loads manufacturer recommendations towards connection wire diameter.

IV Z-Wave network inclusion

Fibaro RGBW Controller may be included into Z-Wave network using B-button or any switch key connected to I1-I4 inputs. The device has an auto-inclusion function implemented and can be included into the Z-Wave network automatically, by simply connecting the voltage supply.

Adding Fibaro RGBW Controller to the Z-Wave network in auto-inclusion mode:

- Make sure Fibaro RGBW Controller is not connected to voltage supply and located within direct range of the main controller.
- Set the Z-Wave network main controller into learning mode (see Z-Wave network controller operating manual).
- Connect voltage supply to auto-include Fibaro RGBW Controller.
- Fibaro RGBW Controller will be automatically recognized and included in the Z-Wave network. To disable auto-inclusion press the B-button briefly, after connecting Fibaro RGBW Controller to voltage supply.

Adding Fibaro RGBW Controller to the Z-Wave network in manual inclusion mode:

- Connect Fibaro RGBW Controller to voltage supply.
- Set the Z-Wave network main controller into learning mode (see Z-Wave network controller operating manual).
- Triple click the B-button or any switch connected to I1-I4 inputs.
- Fibaro RGBW Controller will be automatically recognized and included in the Z-Wave network.

V Z-Wave network exclusion

Excluding the Fibaro RGBW Controller from the Z-Wave network:

- Connect Fibaro RGBW Controller to voltage supply.
- Set the Z-Wave network main controller into learning mode (see Z-Wave network controller operating manual).
- Triple click the B-button or any switch connected to I1-I4 inputs.

VI Resetting Fibaro RGBW Controller

Reset procedure clears the Fibaro RGBW Controller's memory, including Z-Wave network controller information, energy consumption data and 5 user-defined programs.

Resetting Fibaro RGBW Controller:

- Disconnect voltage supply.
- Press and hold the B-button located inside Fibaro RGBW Controller's casing.
- Connect voltage supply still holding the B-button.
- Release the B-button.
- B channel will turn on (blue channel).
- Disconnect power supply.



Warning!

Resetting the RGBW Controller does not mean it has been removed from Z-Wave network controller's memory. Remove the RGBW Controller from Z-Wave network controller's memory before carrying out the resetting procedure.

VII Fibaro RGBW Controller operating modes

The device may be controlled by momentary or toggle switches. Fibaro RGBW Controller may serve as 0-10V input module and operate with any 0-10V sensor, e.g. temperature sensors, wind speed/direction sensors, air quality sensors, light sensors, etc. Fibaro RGBW Controller offers fully configurable operating modes, described in pt. X, user defined in parameter 14. Operating mode is set during first configuration in Home Center 2 interface. Other main controllers require dedicated setting of parameter 14. Refer to p.VIII and IX for operating modes detailed description. Fibaro RGBW Controller's operating modes:

- RGB/RGBW** - controlling RGBW/RGB/LED strips or Halogen lights based on signals from switches connected to I1-I4 inputs. User may precisely set illumination colour.
- IN/OUT** - all inputs and outputs may be freely configured by the user. All inputs I1 - I4 and outputs R, G, B, W may be independently configured by the user. Depending on configuration the device will be presented in Home Center 2 interface as sensors or dimmers. User defines sensor type and its operating range. If a given channel operates in OUT mode, user may control e.g. LED or Halogen lamp brightness.

All of the operating modes are described in fig. 5

VIII Manual RGB/RGBW operating mode

Fibaro RGBW Controller has 4 controllable inputs I1-I4, configured by default to work with push buttons. Each input controls designated channel, i.e.:

- I1 controls R channel.
- I2 controls G channel.
- I3 controls B channel.
- I4 controls W channel.

Controlling I1-I4 inputs is achieved by connecting ground wire (GND) to specified channel (see scheme).

Further, parameter's 14 settings allow for following type of manual control:

- NORMAL mode** - controlling output assigned to given input terminal. In this setting outputs will be controlled independently from one another, e.g. allowing for free adjusting each colours saturation. Double click will set a given channel's saturation to 100%. This operating mode works with momentary and toggle switches.
- BRIGHTNESS mode** - all outputs are controlled together, i.e. one switch controls brightness of all channels at the same time. This operating mode works with momentary and toggle switches.
- RAINBOW mode** - 3. mode - all outputs are controlled together giving a transition of full colours spectrum. RAINBOW mode works with momentary switches only.

IX IN/OUT mode - 0-10V inputs, PWM outputs

Fibaro RGBW Controller has 4 controllable, analog inputs I1 - I4, allowing for 0-10V analog signal interpretation. This functionality may be used in operation with analog sensors and potentiometers. What's more, in IN/OUT mode all inputs and outputs may be configured independently, e.g. I1 may be configured as 0-10V sensor input and I2-I4 may control LED strip or Halogen lamps.

Another option is to configure I1 as 0-10V input and connect 0-10V potentiometer to it, and connecting Halogen lamps to R output. At the same time, other inputs may work with 0-10V sensors.

X First configuration. Operating through the Z-Wave network

After inclusion to the Z-Wave network, Home Center 2 interface will present the module as un-configured device.



Fig 1 - Un-configured RGB device icon

To configure the device please follow the steps below:

- Specify controlled device - RGBW, RGB, IN/OUT (further described in pt. IX)

Controlled device: RGB

If RGBW/RGB mode is chosen, device icon will be as follows:

Control window description:

- Currently chosen colour.
- ON/OFF button.
- Colours slider - allows for choosing any colour in RGB scale, white colour saturation and all colours brightness.
- Favourite colours section.
- Predefined colour programs.

- As described in pt. IX IN/OUT mode allows for configuring each IN/OUT independently.

Fig 3 shows an example configuration: I1 configured as a light intensity sensor; I2 configured as a dimmer, e.g. controlling LED strip; I3 configured as a temperature sensor; I4 configured as a dimmer, e.g. controlling halogen lamp.

As shown in Fig.3 inputs set to work in analog mode require following configuration:

- Actual voltage range (e.g. 0-10V, 1-10V, 0-5V)
- Measured unit range (e.g. 0-50°C for temperature sensor)

Above information can be found in sensor's operating manual.

Device icons in the main controllers interface will reflect the above configuration settings, e.g. light sensor, temperature sensor, two OUT devices i.e. LED strips or Halogen bulbs, as shown in fig.4.

XI Associations

Through an association Fibaro RGBW Controller may control another Z-Wave network device, e.g. another RGBW Controller, Wall Plug, Dimmer, Relay Switch or Roller Shutter. Such a control is done via switch keys connected to I1-I4 outputs only. Operation through the Z-Wave network doesn't trigger the associated devices.



Note!

Association allows for direct communication between Z-Wave network devices. Main controller does not take part in such communication. Using this mechanism, Fibaro RGBW Controller may communicate with other devices even when the main controller is damaged, e.g. in fire.

Fibaro RGBW Controller provides five association groups:

I association group assigned to I1 input - sends control frame to associated devices each time the device state changes. (ON / OFF)

II association group assigned to I2 input - sends control frame to associated devices each time the device state changes. (ON / OFF)

III association group assigned to I3 input - sends control frame to associated devices each time the device state changes. (ON / OFF)

IV association group assigned to I4 input - sends control frame to associated devices each time the device state changes. (ON / OFF)

V association group reports device status. Only one device may be assigned to this group, main controller by default. It's not recommended to modify this group's settings. Fibaro RGBW Controller allows for controlling up to 5 regular devices (opposed to multi channel devices) per each association group, out of which 1 field is reserved for the main controller. To add an association, (using Home Center 2 interface) go to device settings and click the following icon:

Select the "device options" tab. Then specify to which group and what devices are to be associated. Sending relevant information to devices added to association groups may take even a few minutes.

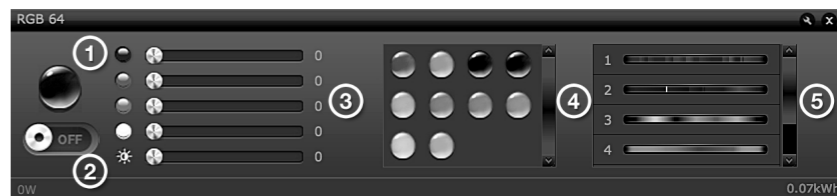


Fig. 2 Fibaro RGBW Controller control window

Choose input / output

- Input: Light sensor. Nazwa: Light sensor. Start: 0 V 0 lux. End: 5 V 100 lux.
- Output: Dimmer. Keys: Momentary switch.
- Input: Temperature sensor. Nazwa: Temperature sensor. Jednostka: Unit. Start: 0 V 0 °C. End: 10 V 50 °C.
- Output: Dimmer. Keys: Toggle switch with state memory.

Fig 3 - IN / OUT mode settings screen



Fig 4 - IN / OUT controlled devices icons

Home Center 2 controller allows for choosing command frame sent to associated devices:

Normal (Dimmer) - synchronization with dimmer

Normal (RGBW) - synchronization with other producers RGBW controllers

Normal (RGBW-FIBARO) - synchronization with Fibaro RGBW Controllers

XII Current load and energy consumption

1) Fibaro RGBW Controller allows for the current load and power consumption monitoring. Data is sent to the main controller, e.g. Home Center 2. Measuring is carried out by an independent microprocessor dedicated exclusively for the purpose, assuring maximum accuracy and precision. The microprocessor is factory calibrated.

Electric power - power consumed by an electric device in an instant, in Watts (W).

Electric energy - energy consumed by a device through a time period. Most commonly measured in kilowatt-hours (kWh). One kilowatt-hour is equal to one kilowatt of power consumed over a period of one hour, 1kWh = 1000 Wh.



Note!

- Please contact your local supplier for the current rates.
- Fibaro RGBW Controller stores consumed electricity data on its memory, which means disconnecting the module from voltage supply does not erase the data.

Resetting electricity consumption memory - reset the device (see pt. VI) or choose reset electricity consumption memory option from the main controller's menu.

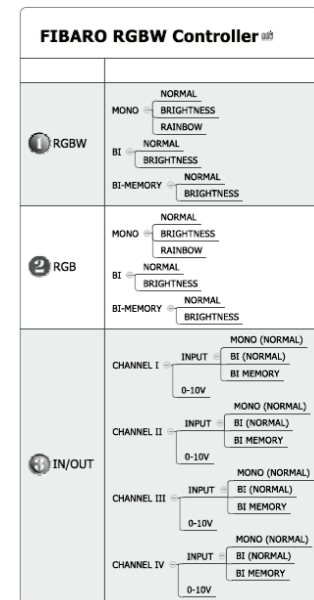


Fig 5 - Modes of operation

