

OPERATING INSTRUCTIONS euLINK multiprotocol gateway

Revision 06

The **euLINK** gateway is a hardware-based communication interface between a smart building system and infrastructure equipment such as air conditioning, heating, ventilation, DALI lighting, roller shutters, audio/video equipment, etc. It can also be used as a universal recorder for data gathered from sensors, meters and gauges of various physical values. It is also useful as a protocol converter, e.g. TCP/IP ↔ RS-232/RS-485 or MODBUS TCP ↔ MODBUS RTU. The **euLINK** gateway has modular design and can be upgraded with various peripheral modules (e.g. DALI ports) connected to the SPI ports or to I²C ports of the central unit. There is also an euLINK Lite version with half the RAM memory (1 GB) and a slightly slower processor.

Technical details

Supply voltage:	100-240 V AC, 50-60 Hz
Power consumption:	up to 14 W
Protections:	Slow-blow fuse 2.0 A / 250 V, polyfuse PTC 2.0 A / 5 V
Enclosure dimensions:	107 x 90 x 58 mm
Width in modules:	6 TE modules on DIN rail
IP rating:	IP20
Operating temperature:	0°C to +40°C
Relative humidity:	≤90%, no condensation

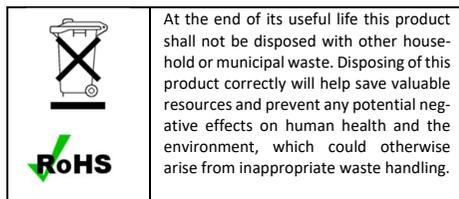
Hardware platform

Microcomputer:	euLINK: Raspberry Pi 4B euLINK Lite: Raspberry Pi 3B+
Operating system:	Linux Ubuntu
Memory card:	microSD 16 GB HC I Class 10
Display:	1.54" OLED with 2 buttons for basic diagnostics
Serial transmission:	Built-in RS-485 port with a 120 Ω termination (software-activated), galvanic separation up to 1 kV
LAN port:	Ethernet 10/100/1000 Mbps
Wireless transmission	WiFi 802.11b/g/n/ac
USB ports:	euLINK: 2xUSB 2.0, 2xUSB 3.0 euLINK Lite: 4xUSB 2.0
Communication with extension modules:	External SPI and I ² C bus ports, 1-Wire port
Power supply outlet for extensions	DC 12 V / 1 W, 5 V / 1 W

Compliance with EU Directives

Directives: RED 2014/53/EU
RoHS 2011/65/EU

	<p>Eutonomy certifies that this equipment is in compliance with the essential requirements and other relevant provisions of the above directives. The declaration of conformity is published on the manufacturer's website at: www.eutonomy.com/ce/</p>
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At the end of its useful life this product shall not be disposed with other household or municipal waste. Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Package contents

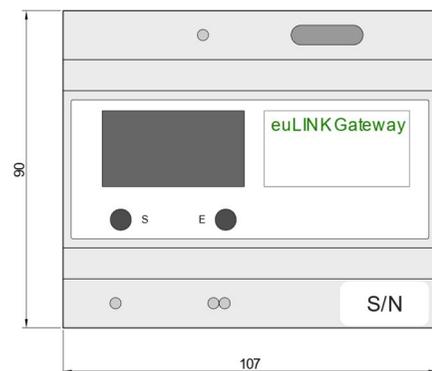
The package contains:

1. **euLINK** gateway
2. Plugs for detachable terminal blocks:
 - 1 AC supply plug with 5.08 mm pitch
 - 2 RS-485 bus plugs with 3.5 mm pitch
3. 2A fuse
4. 2 resistors 120Ω / 0.5W
5. Operating instructions

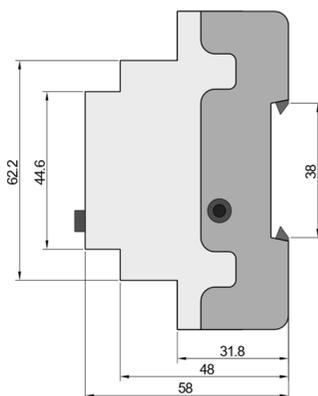
If anything is missing, please contact your seller. You can also call or e-mail us using details that can be found at the manufacturers website: www.eutonomy.com.

Drawings of kit components

All dimensions are given in millimeters.
Gateway front view:



Gateway side view:



Concept and use of the euLINK gateway

Modern smart home automation systems communicate not only with their own components (sensors and actors) but also with the LAN and the Internet. They could also communicate with devices included in the **facility infrastructure** (e.g. air conditioners, recuperator, etc.), but, as for now, only a small percentage of these devices have ports enabling communication with the LAN. The predominant solutions use serial transmission (e.g. RS-485, RS-232) or more unusual buses (e.g. KNX, DALI) and protocols (e.g. MODBUS, M-BUS, LGAP). The purpose of the **euLINK** gateway is to create a bridge between such devices and the smart home controller (e.g. FIBARO or NICE Home Center). For this purpose, the **euLINK** gateway is equipped with both LAN (Ethernet and WiFi) ports and various serial bus ports. The design of the **euLINK** gateway is modular, so its hardware capabilities can be easily extended with further ports. The gateway runs under Linux Debian operating system, giving access to an unlimited number of programming libraries. This makes it easy to implement new communication protocols along with numerous protocols already embedded in the gateway (such as MODBUS, DALI, TCP Raw, Serial Raw). The installer has to make a physical connection between the device and the **euLINK** gateway, select the template appropriate for this device from the list, and enter several specific parameters (e.g. device address on the bus, transmission speed, etc.). After verifying connectivity with the device, the **euLINK** gateway brings a unified representation to the configuration of the smart home controller, enabling the bi-directional communication between the controller and the infrastructure equipment.

Considerations and cautions

	<p>Please read the instructions carefully prior to installation. The instructions contain important guidelines which, when ignored, can lead to danger to life or health. The manufacturer of the equipment shall not be responsible for any damage resulting from the use of the product in a manner non-compliant with the operating instructions.</p>
	<p>DANGER Electrocution risk! The equipment is intended for operation in the electrical installation. Incorrect wiring or use can result in a fire or an electric shock. All installation works can be performed only by a qualified person holding licenses issued in accordance with the regulations.</p>
	<p>DANGER Electrocution risk! Before carrying out any rewiring works on the equipment, it is mandatory to disconnect it from the power mains using a disconnect or a circuit breaker in the electrical circuit.</p>
	<p>The equipment is intended for indoor use (IP20 rating).</p>

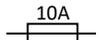
Place of installation of the euLINK gateway

The device can be installed in any power distribution board equipped with a DIN TH35 rail. If possible, it is recommended to select a location in the distribution board with even the slightest

air flow through the ventilation openings in the **euLINK** enclosure, since even simple cooling slows down the processes of ageing of electronic components, ensuring trouble-free operation for many years.

If using radio transmission to connect to a LAN (such as built-in WiFi), please note that the metal enclosure of the distribution board can effectively impede the propagation of radio waves. An external WiFi antenna cannot be connected to the **euLINK** gateway.

Installation of euLINK gateway and its peripheral modules

	<p>NOTE! The installed device can be connected to the power mains only by a person qualified to carry out electrical works, holding licenses issued in accordance with the regulations.</p>
	<p>Before commencing any installation works, please make sure that the mains power supply is disconnected at the distribution board by means of an over-current circuit breaker dedicated for the equipment.</p>
	<p>If there are reasonable grounds to suspect that the equipment is damaged and cannot be operated safely, do not connect it to the power mains and protect it against accidental powering.</p>

It is recommended to find the optimal installation location for the **euLINK** gateway and peripheral modules on the DIN rail before engaging the lower rail holder, as moving the gateway will be much more difficult when it is secured. Peripheral modules (e.g. DALI port, relay output module, etc.) are connected to the **euLINK** gateway using a multi-wire ribbon cable with Micro-MaTch connectors supplied with the module. The ribbon length does not exceed 30 cm, so the peripheral module must be located in the immediate vicinity of the gateway (on either side).

The embedded bus communicating with the infrastructure equipment is galvanically separated from the micro-computer of the **euLINK** gateway and from its power supply. Thus, upon the first start-up of the gateway, they even do not have to be connected, it is only necessary to supply AC power to the supply port, bearing in mind the overcurrent protection of the circuit.

Using the built-in OLED display

There is an OLED display with two buttons on the front plate of the gateway. The display shows the diagnostic menu and the buttons are used for easily navigating through the menu. The display shows reading approx. 50 s after energizing. The functions of the buttons can change, and the current action of the button is explained by the wording on the display directly above the button. Most often, the left button is used to scroll down the menu items (in a loop) and the right button is used to confirm the selected option. It is possible to read the gateway IP address, serial number and software version from the display as well as to request the gateway upgrade, open the SSH diagnostic connection, activate the WiFi access, reset the network configuration, restart the gateway, and even remove all data from it and restore its default configuration. When not in use, the display is turned off and can be woken up by pressing any key.

Connection of the euLINK gateway to LAN and Internet

LAN connection is necessary for the **euLINK** gateway to communicate with the smart home controller. Both wired and wireless

gateway connection to the LAN are possible. However, a hard-wired connection is recommended due to its stability and high immunity to interference. A cat. 5e or better LAN cable with RJ-45 connectors may be used for hard-wired connection. By default, the gateway is configured to get an IP address from the DHCP server over a wired connection. The assigned IP address can be read from the OLED display in the "Network status" menu. The IP address read must be entered in a browser on a computer connected to the same LAN to launch the configuration wizard. By default, login details are as follows:

login: **admin** password: **admin**

You can also select the language for communication with the gateway before logging in. The wizard will check for updates and allow you to change the configuration of the network connections. For example, you can set a static IP address or search for available WiFi networks, select the target network, and enter its password. Upon confirming this step, the gateway will be restarted and then it should connect to the network with the new settings.

If the local network has no device that assign IP addresses, or if the gateway is to have only wireless connection, select "WiFi wizard" from the menu. Once confirmed, a temporary WiFi access point is created and its details (SSID name, IP address, password) appear on the OLED display. When the computer logs on to this temporary WiFi network, its IP address (read from the OLED display) must be entered in the browser address bar to access the wizard described above and enter the parameters of the target network. Then the device is restarted.

The gateway does not require Internet connectivity for normal operation, only for downloading device templates and software upgrades or remote diagnostics by the manufacturer's technical support in the event of a device failure. The **euLINK** gateway can set up SSH diagnostic connection with the manufacturer's server only at the owner's request, given on the OLED display or in the gateway's administration portal (in the "Help" menu). The SSH connection is encrypted and can be closed at any time by the **euLINK** gateway owner. This ensures the utmost security and respect for gateway user privacy.

Basic configuration of the euLINK gateway

Once the network configuration is finished, the wizard will ask you to name the gateway, select the log detail level, and enter the administrator's name and email address. The wizard will then ask for access data (IP address, login and password) to the primary smart home controller. The wizard can facilitate this task by searching the LAN for running controllers and their addresses. You can skip the configuration of the controller in the wizard and return to the configuration later on.

At the end of the wizard, you will need to specify the parameters for the built-in RS-485 serial port (speed, parity, and number of data and stop bits).

It is recommended to start implementing the system with the creation of several sections (e.g. ground floor, first floor, backyard) and individual rooms (e.g. living room, kitchen, garage) in each section using the "Rooms" menu. You can also import a list of sections and rooms from the smart home controller if you have already configured access to it.

Then new communication buses (e.g. DALI) can be modified or added from the "Configuration" menu. Additional buses can also be implemented by connecting various converters (e.g. USB ↔ RS-485 or USB ↔ RS-232) to USB ports of the **euLINK** gateway. If they are Linux compatible, the gateway should recognize them and allow them to be named and configured.

At any time the configuration can be copied to the local storage or to the cloud backup. The backups are also initiated automatically due to the significant changes and just before the software upgrades. An additional protection is a USB reader with a microSD card, on which the main memory card is cloned every day.

Connecting the gateway to communication buses

Physical connection of the **euLINK** gateway to each bus requires compliance with its topology, addressing and other specific parameters (e.g. transmission speed, use of termination or bus supply).

For example, for the **RS-485 bus**, the installer has to:

- Configure the same parameters (speed, parity, number of bits) on all devices on the bus
- Activate 120Ω terminations on the first and last bus device (if the **euLINK** is one of the extreme devices, then termination is activated in the RS-485 menu)
- Observe the assigning of wires to the A and B contacts of the serial ports
- Ensure that there are less than 32 devices on the bus
- Give the devices unique addresses from 1 to 247
- Ensure that the bus length does not exceed 1200 m

If it is not possible to assign common parameters to all devices or if there is a concern about exceeding the permissible length, the bus can be divided into several smaller segments where it will be possible to observe the said rules. Up to 5 such buses can be connected to the **euLINK** gateway using RS-485 ↔ USB converters. It is recommended to connect no more than 2 RS-485 buses to the **euLINK Lite** gateway.

For the **DALI bus**, the installer has to:

- Ensure bus supply (16 V, 250 mA)
- Give DALI fixtures unique addresses in from 0 to 63
- Ensure that the bus length does not exceed 300 m

If the number of luminaires exceeds 64, the bus can be divided into several smaller segments. Up to 4 DALI peripheral modules can be connected simultaneously to the **euLINK** gateway. It is recommended to connect no more than 2 DALI peripheral ports to the **euLINK Lite** gateway.

Useful descriptions of common buses and the links to extensive reference materials are published by the manufacturer at the web page www.eutonometry.com.

The diagrams of the connection of the **euLINK** gateway with sample buses (RS-485 serial with **Modbus RTU** protocol and **DALI**) are attached to these instructions.

Selection and configuration of infrastructure equipment

The equipment connected to individual buses is added to the system under the "Devices" menu. Once the device is named and assigned to a particular room, the category, manufacturer and model of the device are selected from the list. Selecting a device will display its parameter template, indicating the default settings that can be confirmed or modified. Once the communication parameters are established, the **euLINK** gateway will indicate which of the available buses have the parameters matching those required by the device. If the bus requires manual addressing, the equipment address can be specified (e.g. Modbus Slave ID). Once the device configuration is validated by tests, you can allow the gateway to create an equivalent device in the smart home controller. Then, the infrastructure device becomes available to the user applications and scenes defined in the smart home controller.

Adding new infrastructure equipment to the list

If the infrastructure equipment is not on the pre-saved list, you can download the appropriate device template from the on-line **euCLOUD** database or create it on your own. Both of these tasks are carried out using the built-in device template editor in the **euLINK** gateway. Creating individual template requires some proficiency and access to the documentation of the infrastructure device manufacturer (e.g. to the Modbus registers map of the new air conditioner). The extensive manual for the template editor can be downloaded from the website: www.eutonometry.com. The editor is very intuitive and has many tips and facilitations for various

communication technologies. You can use the template you have created and tested for your needs as well as make it available in the **euCLOUD** to participate in valuable benefit programs.

Service

	Do not perform any repairs on the device. All repairs shall be performed by a specialist service designated by the manufacturer. Improperly performed repairs endanger the safety of users.
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In case of erratic device operation, we kindly ask you to inform the manufacturer about this fact, either via an authorized seller or directly, using e-mail addresses and telephone numbers published at: www.eutonometry.com. Apart from the description of the observed malfunction, please provide the serial number of the **euLINK** gateway and the type of peripheral module connected to the gateway (if any). You can read the serial number from the sticker on the gateway enclosure and in the "Device info" menu on the OLED display. The serial number has the value of the MAC address suffix of the Ethernet port of the **euLINK**, so it can also be read over the LAN. Our Service Department will do their best to solve the problem or your device will be admitted for guarantee or post-guarantee repair.

Guarantee Terms and Conditions

GENERAL PROVISIONS

1. The device is covered with a guarantee. Terms and conditions of the guarantee are outlined in this guarantee statement.
2. The guarantor of the Equipment is Eutonometry Sp. z o.o. Sp. Kandytowa based in Łódź (address: ul. Piotrkowska 121/3a; 90-430 Łódź, Poland), entered into the Register of Entrepreneurs of the National Court Register kept by the District Court for Łódź-Śródmieście in Łódź, XX Commercial Division of the National Court Register, under no. 0000614778, Tax ID No PL7252129926.
3. The guarantee is valid for a period of 24 months from the date the Equipment was purchased and covers the territory of EU and EFTA countries.
4. This guarantee shall not exclude, limit or suspend the Customer rights resulting for the warranty for defects of the purchased goods.

OBLIGATIONS OF THE GUARANTOR

5. During the guarantee period the Guarantor is liable for defective operation of the Equipment resulting from physical defects thereof disclosed during the guarantee period.
6. The Guarantor's liability during the guarantee period includes the obligation to eliminate any disclosed defects free of charge (repair) or supply the Customer with the Equipment that is free of defects (replacement). Whichever of the above is chosen remains at sole Guarantor's discretion. If repair is not possible, the Guarantor reserves the right to replace the Equipment with a new or regenerated Equipment with parameters identical to a brand-new device.
7. If repair or replacement with the same type of the Equipment is not possible, the Guarantor can replace the Equipment with another one bearing identical or higher technical parameters.
8. The Guarantor does not reimburse the cost of purchasing the Equipment.

LODGING AND PROCESSING COMPLAINTS

9. All complaints shall be lodged by telephone or via e-mail. We recommend using the telephone or on-line technical support provided by the Guarantor prior to entering a guarantee claim.
10. The proof of purchase of the Equipment is a basis for any claims.

11. After entering a claim via telephone or e-mail the Customer will be notified what reference number has been assigned to the claim.

12. In case of correctly entered complaints a representative of the Guarantor will get in touch with the Customer in order to discuss the details of delivering the Equipment to the service.

13. The Equipment the Customer is complaining about shall be made accessible by the Customer complete with all components and the proof of purchase.

14. In case of unjustified complaints the costs of delivery and receipt of the Equipment from the Guarantor shall be borne by the Customer.

15. The Guarantor can refuse to accept a complaint in the following cases:

- a. In case of incorrect installation, improper or unintended use of the Equipment;
- b. If the Equipment made accessible by the Customer is not complete;
- c. If it is disclosed that a defect had been caused not by a material or manufacturing defect;
- d. If the proof of purchase is missing.

GUARANTEE REPAIR

16. Subject to Clause 6, defects disclosed during the guarantee period will be eliminated within 30 working days of the date of delivering the Equipment to the Guarantor. In exceptional cases, e.g. missing spare parts or other technical obstacles, the period for performing a guarantee repair can be extended. The Guarantor will notify the Customer about any such situations. The guarantee period is extended by the time during which the Customer could not use the Equipment due to its defects.

EXCLUSION OF GUARANTOR'S LIABILITY

17. The Guarantor's liability stemming from the granted guarantee is limited to the obligations specified in this guarantee statement. The Guarantor will not be liable for any damages caused by defective operation of the Equipment. The Guarantor shall not be liable for any indirect, incidental, special, consequential or punitive damages, or for any other damages, including but not limited to loss of profits, savings, data, loss of benefits, claims by third parties and any property damage or personal injuries arising from or related to the use of the Equipment.

18. The guarantee shall not cover natural wear and tear of the Equipment and its components as well as product defects not arising from reasons inherent in the product – caused by improper installation or use of the product contrary to its intended purpose and instructions for use. In particular the guarantee shall not cover the following:

- a. Mechanical damages caused by impact or fall of the Equipment;
 - b. Damages resulting from Force Majeure or external causes – also damages caused by malfunctioning or malicious software running on the installer's computer hardware;
 - c. Damages resulting from operation of the Equipment in conditions different than recommended in the instructions for use;
 - d. Damages caused by incorrect or faulty electrical installation (not consistent with the instructions for use) in the place of Equipment operation;
 - e. Damages resulting from carrying out repairs or introducing modifications by unauthorized persons.
19. If a defect is not covered by the guarantee, the Guarantor reserves the right to carry out repair at its sole discretion by replacement of damaged components. Post-guarantee servicing is provided against payment.

Trademarks

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