

AMTECH communication box

EN

User Manual

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GETTING TO KNOW AMTECH COMMUNICATION BOX

- Developed to communicate with MiR robots and MiRFleet.
- Converts an electrical signal to a user-defined REST API or Modbus TCP software communication.
- Five programmable inputs.
- Possibility to independently define communication for logical 1 and logical 0.



- Ethernet or WiFi interface
- Power supply from PoE (Ethernet versions only) or external source
- Internal memory and real-time clock backup
- Robust metal box
- WEB interface

Application

- Controlling the robot (MiR) or MiRFleet server via REST API (PUT, POST)
- Communication with the internal PLC (MiR robot) via Modbus (Int32, Float32, Boolean)

CONNECTION

Ethernet version with PoE

Connect the device by a normal uncrossed cable for computer networks to the switch.

Ethernet version without PoE

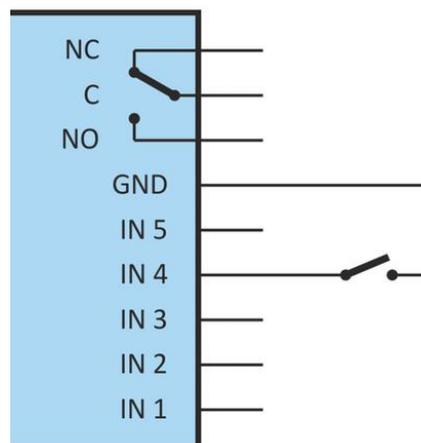
If the device cannot be powered by the switch via PoE according to the IEEE 802.3af standard, connect the power adapter to the coaxial connector next to the connector for the Ethernet. DC voltage in the range of 11-58 V is expected. (The positive pole is inside, the input for the power supply has a reverse polarity protection.)

WiFi version

Connect the power adapter to the coaxial connector next to antenna. DC voltage in the range of 11-58 V is expected. (The positive pole is inside, the input for the power supply has a reverse polarity protection.)

Inputs/ Output

Connect inputs and output. The inputs are intended to connect the contacts according to the following diagram, against GND. The output is a changeover relay contact for max. 50V 2A.



IP ADDRESS'S SETTINGS

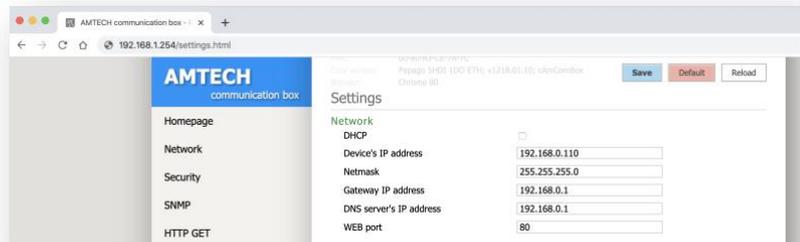
IP address's settings - Ethernet version

Now you need to set the device to the correct IP address. The factory setting is **192.168.1.254** and the network mask is 255.255.255.0.

IP address's settings by using the robot's web interface

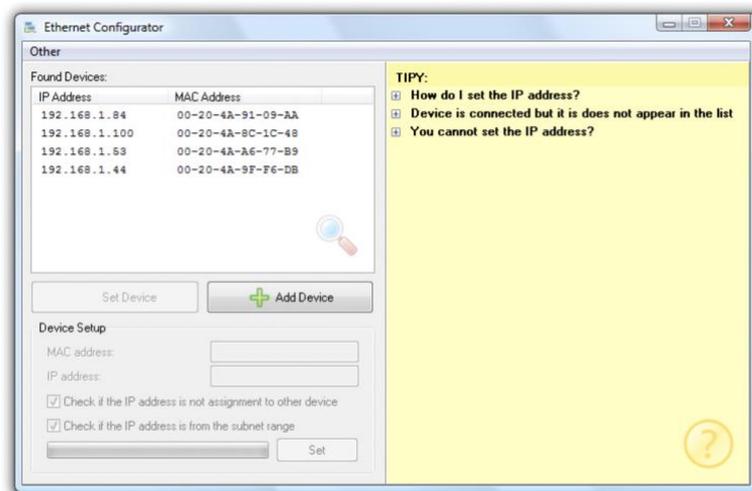
You can connect to the device by using a web browser at the address specified as follows: **http://192.168.1.254/** (an example is given for the factory default IP address)

http://192.168.1.254/ Click the gear symbol at the top right to see the configuration.



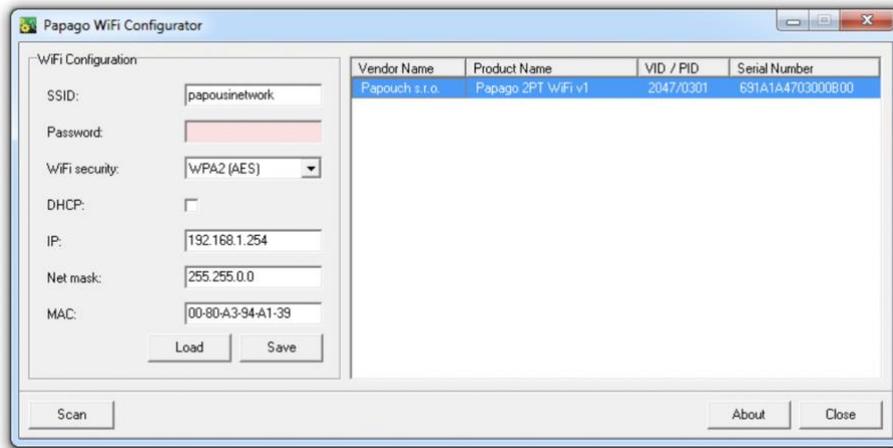
IP address's settings by using Ethernet configurator

If your network is not compatible with this range, set the device address suitable for your network using the Ethernet configurator.



IP address's settings - WiFi version

Connect the AMTECH communication box to your Windows computer by using the supplied microUSB cable. Run the WiFi Configurator software on the PC. In this program set the parameters of your WiFi network and also the IP address to which the device should be available.



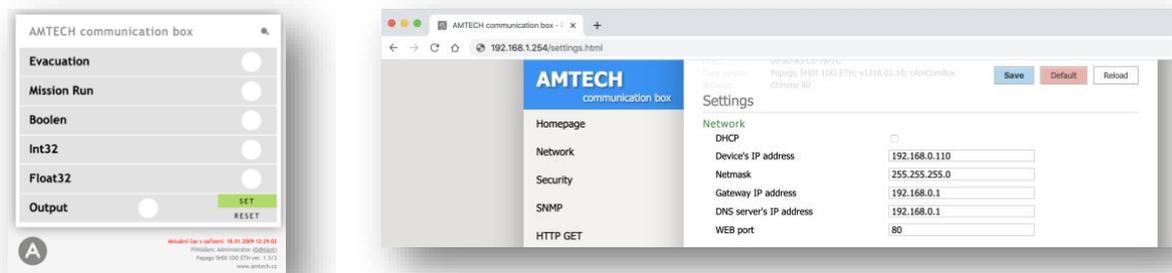
CONFIGURATION

Configuration is done via a web interface. The basic network parameters can also be set via Telnet (see page 16). The web interface is accessible on the IP address of the device. (The default address is 192.168.1.254.)

After entering the IP address, the main page will appear the latest measured values.

The web interface is secured with a username and password. You can choose a separate password for the user (who can only display the values on the main page) and for the administrator (who can also change settings).

The configuration is displayed when you click on the icon of gears in the upper right corner. The configuration is divided into sections according to the types of settings and is available in English and Czech.



Network

This section contains the configuration of network parameters.

Network

DHCP	<input type="checkbox"/>
Device's IP address	<input type="text" value="192.168.0.110"/>
Netmask	<input type="text" value="255.255.255.0"/>
Gateway IP address	<input type="text" value="192.168.0.1"/>
DNS server's IP address	<input type="text" value="192.168.0.1"/>
WEB port	<input type="text" value="80"/>

If the box for assigning addresses via DHCP is ticked, the fields for *Device's IP address*, *Netmask*, *Gateway IP address* and *DNS server's IP address* are reset and upon reloading the settings they are filled again with data obtained from the DHCP server.

These options are available as an Authentication method: Open, WEP (open), WEP (shared), WPA (TKIP), WPA (AES), WPA2 (TKIP), WPA2 (AES), WPA2 (Mixed).

Security

The section for setting the password of the user (can only access the main page) and the administrator (has access to both the main page and the settings).

Security

User password	<input type="text" value="Not set"/>
Confirm user password	<input type="text"/>
Administrator's password	<input type="text" value="Not set"/>
Confirm administrator's password	<input type="text"/>
Current Administrator's password	<input type="text"/>

After saving, the passwords are no longer displayed for security reasons. The fields for entering the password show Not set, if the password has not been entered, or Keep original password, if the password has been entered but is not to be displayed.

SNMP

Here you can configure communication via SNMP used for data collection in large networks.

SNMP

Allow trap sending	<input type="checkbox"/>
Send SNMP trap upon change	<input type="checkbox"/>
Periodical sending of measured-out values	<input type="text" value="0"/>
SNMP manager's IP address	<input type="text" value="0.0.0.0"/>
Read community name	<input type="text" value="public"/>
Write community name	<input type="text" value="private"/>

HTTP GET

This section is used to set the sending of measured data to a remote server.

HTTP GET

Allow HTTP GET sending	<input type="checkbox"/>
Send HTTP GET upon change	<input type="checkbox"/>
Sending interval	<input type="text" value="0"/>
WEB server's address	<input type="text" value="0.0.0.0"/>
WEB Port	<input type="text" value="0"/>
Folder containing scripts	<input type="text"/>
Script name	<input type="text"/>
GUID	<input type="text"/>
Encryption Key	<input type="text" value="Not set"/>
Retype Key	<input type="text"/>

Inputs / Output

The following settings are available for inputs and output:

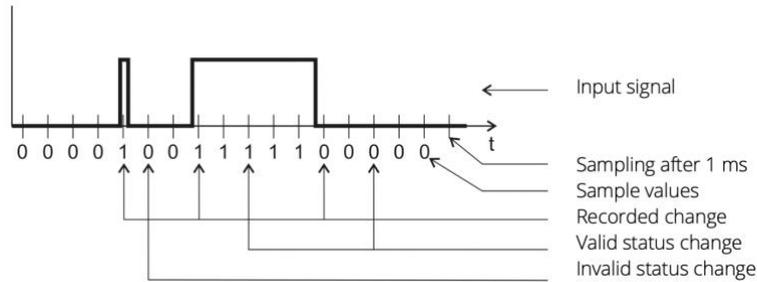
Inputs and output configuration

Input sampling rate

Input and output configuration

Input sampling rate	<input type="text" value="20"/>
---------------------	---------------------------------

The sampling rate of the inputs is common to all inputs and set when the input pulse should be recorded as valid. Other settings are individual for each input.



The input value is sampled with a period of 1 ms. The input state is considered valid if the same value is read several times in succession. That, how many times the same value must be read in order to record, is set as the Input Sampling Rate.

Common

Sending method

Choice of communication method

- RESR API – states are sent via the REST API
- Modbus TCP – states are sent via the Modbus TCP

Input 1: Common

Sending method	<input type="text" value="Rest API"/>
AP address and port	<input type="text" value="192.168.0.44:80"/>

IP address and port

- IP address of the device to which the status is to be sent (eg MiR robot, MiRFleet, WISE)
 - The REST API typically uses port 80
 - Modbus TCP typically uses port 502

Counter

Possibility to name the input with setting the counter. Visualization of the counter is on *the Homepage*.

Input 1: Counter

Input name	<input type="text" value="Evacuation"/>
Method of operation	<input type="text" value="Counter off"/>
After this number of recorded impulses:	<input type="text" value="1"/>
...add this value to the counter:	<input type="text" value="1"/>
Decimal count	<input type="text" value="0"/>
Unit	<input type="text"/>

REST API

The setting is active at Sending method - **REST API**

Input 1: Rest API

Sending method	<input type="text" value="PUT"/>
Path for 1	<input type="text" value="/api/v2.0.0/fire_alarms/1"/>
Path for 0	<input type="text" value="/api/v2.0.0/fire_alarms/1"/>
Authorization string	<input type="text" value="YWRtaW46OGM2OTc2ZTViNTQxMDQxNWJkZTkxOGJkNGRlZTE1ZGZiMTY3YTljODczZmM0YmI4YTgxZjZmMmFiNDQ4YTkwOA=="/>
Request body for 1	<pre>{ "alarm_on": true }</pre>
Request body for 0	<pre>{"alarm_on": false}</pre>

Sending method

PUT or POST can be selected.

Path for 1/ Path for 0

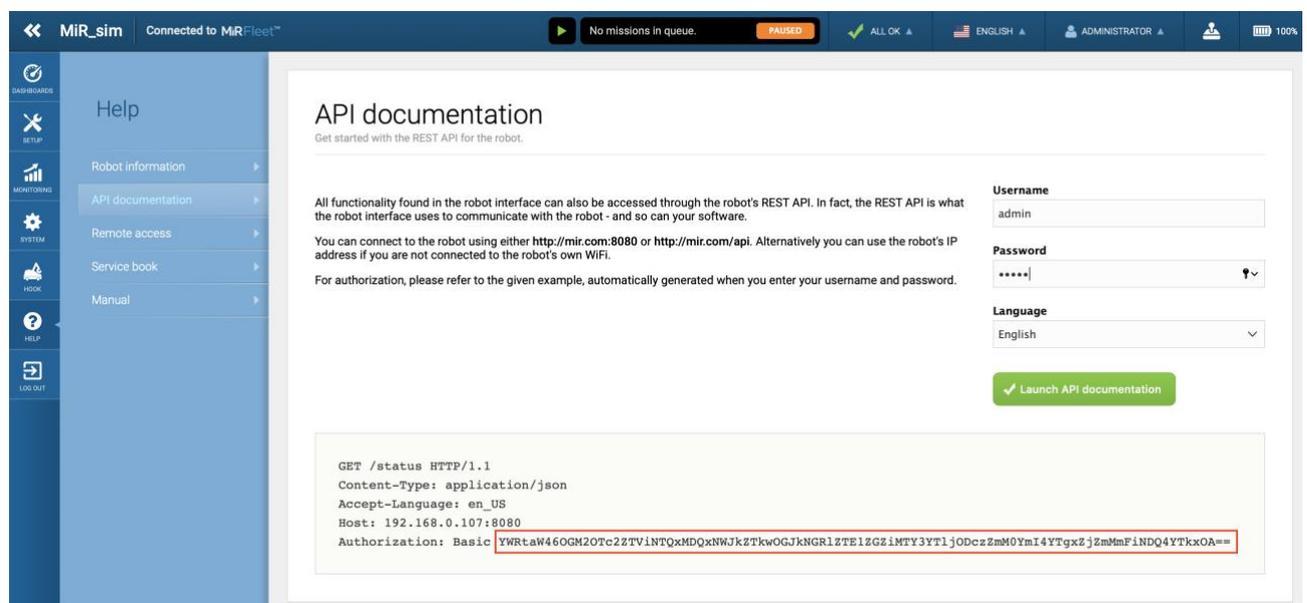
Path for logical 1/0 without specifying IP address and port (example: /api/v2.0.0/fire_alarms/1)

The maximum string length is 30 characters.

Authorization string

Copy from robot web interface or MiRFleet (*Help-API documentation*)

The maximum string length is 120 characters.



ATTENTION!! Copy only the code behind Basic.

example:

`YWRtaW46OGM2OTc2ZTViNTQxMDQxNWJkZTkxOGJkNGRlZTE1ZGZiMTY3YTljODczZmM0YmI4YTgxZjZmMmFiNDQ4YTkwOA==`

Request body for 1/ Request body for 0

Request body (REST API) for logic 1/0.

The maximum string length is 100 characters.

Possible way of writing.

```
{
  "alarm_on": true
}
```

or

```
{"alarm_on":true}
```

Tip: In the robot interface or MiRFleet Help / API Documentation you have examples of structure.

The screenshot shows the API documentation for the `PUT /fire_alarms/{id}` endpoint. Key elements include:

- Path / Cesta:** `/api/v2.0/fire_alarms/1`
- Authorization string / Autorizační řetězec:** `Basic YWRtaW46OGM2OTc2ZTVINTQxMDQxNWJkZTkxOGJkNGRIZTE1ZGZIMTY3YTJjODczZmM0Yml4YTgxZjZmMmFINDQ4YTlxOA==`
- Request body / Tělo požadavku:** `{"alarm_on": true, ...}`

Modbus TCP

The setting is active at Sending method – Modbus TCP

Input 3: Modbus TCP

Modbus ID	<input type="text" value="1"/>
Number type for 1	<input type="text" value="Boolean"/>
Register for 1	<input type="text" value="1"/>
Value written for 1	<input type="text" value="1"/>
Number type for 0	<input type="text" value="Boolean"/>
Register for 0	<input type="text" value="1"/>
Value written for 0	<input type="text" value="0"/>

Modbus ID

Settings Modbus ID

Number type for 1/ Number type for 0

Selection of register number type for logical 1/0

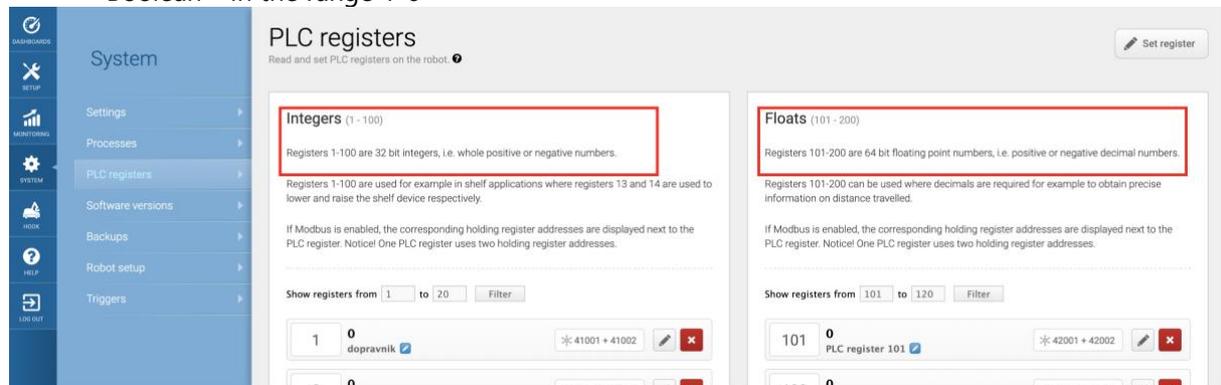
- Int32
- Float32

- Boolean

Register for 1/0

Selection of register for logical 1/0

- Int32 – in the range 1-100
- Float32 – in the range 101-200
- Boolean – in the range 1-6



Action commands

Title	Description	Permission	Data type	Coils
Continue robot	Address of the coil used to trigger the Continue action on the robot	R/W	Boolean	[1]
Pause robot	Address of the coil used to trigger the Pause action on the robot	R/W	Boolean	[2]
Cancel current mission	Address of the coil used to cancel the ongoing mission, if any	R/W	Boolean	[3]
Clear mission queue	Address of the coil used to clear the entire mission queue	R/W	Boolean	[4]
Clear error	Address of the coil used to clear the errors on the robot.	R/W	Boolean	[5]
Continue robot	Address of the coil used to trigger the Continue action on the robot	R/W	Boolean	[6]

Value written for 1/0

The value to be written for logical 1/0.

Other settings

In this section you can set the time, the language of the website, etc. You can select Czech or English as the language. The setting "Name of device" can be used to search the AMTECH communication box on the network. Just enter the AMTECH communication box name in the browser address bar. If the name contains a space, it is not possible to use the name to search the AMTECH communication box on the network!

Communication with robot via Modbus TCP Boolean

Continue action on the robot

Input 3: Common

Sending method
 AP address and port

Input 3: Modbus TCP

Modbus ID
 Number type for 1
 Register for 1
 Value written for 1
 Number type for 0
 Register for 0
 Value written for 0

The screenshot shows the MiR_sim software interface. On the left is a navigation menu with options like 'Help', 'Robot information', 'API documentation', 'Remote access', 'Service book', and 'Manual'. The main area displays a table of PLC triggers and other system information.

Title	Description	Permission	Data type	Registers
PLC integer	Value of PLC register	R/W	int32	[41001,41002]...[41199, 41200]
PLC float	Value of PLC register	R/W	float32	[42001,42002]...[42199, 42200]

Title	Description	Permission	Data type	Coils
Trigger name	Description of trigger	R/W	Boolean	[1001]...[2000]

Title	Description	Permission	Data type	Coils
Continue robot	Address of the coil used to trigger the Continue action on the robot	R/W	Boolean	[1]
Pause robot	Address of the coil used to trigger the Pause action on the robot	R/W	Boolean	[2]
Cancel current mission	Address of the coil used to cancel the ongoing mission, if any	R/W	Boolean	[3]
Clear mission queue	Address of the coil used to clear the entire mission queue	R/W	Boolean	[4]
Clear error	Address of the coil used to clear the errors on the robot.	R/W	Boolean	[5]
Continue robot	Address of the coil used to trigger the Continue action on the robot	R/W	Boolean	[6]

Communication with robot via Modbus TCP Int32

Setting value 1 for register 3 / logic 1 and setting value 0 for register 4 / logic 0

Integers (1 - 100)

Registers 1-100 are 32 bit integers, i.e. whole positive or negative numbers.

Registers 1-100 are used for example in shelf applications where registers 13 and 14 are used to lower and raise the shelf device respectively.

If Modbus is enabled, the corresponding holding register addresses are displayed next to the PLC register. Notice! One PLC register uses two holding register addresses.

Show registers from 1 to 20 Filter

1	0	dopravnik	* 41001 + 41002		
2	0	PLC register 2	* 41003 + 41004		
3	1	PLC register 3	* 41005 + 41006		
4	1	PLC register 4	* 41007 + 41008		

Communication with robot via Modbus TCP Float32

Setting value 1.5 for register 103 / logic 1 and setting value 1.5 for register 104 / logic 0.

Floats (101 - 200)

Registers 101-200 are 64 bit floating point numbers, i.e. positive or negative decimal numbers.

Registers 101-200 can be used where decimals are required for example to obtain precise information on distance travelled.

If Modbus is enabled, the corresponding holding register addresses are displayed next to the PLC register. Notice! One PLC register uses two holding register addresses.

Show registers from 101 to 120 Filter

101	0	PLC register 101	* 42001 + 42002		
102	0	PLC register 102	* 42003 + 42004		
103	1.5	PLC register 103	* 42005 + 42006		
104	1.5	PLC register 104	* 42007 + 42008		

Input 4: Common

Sending method

Modbus TCP

AP address and port

192.168.0.107:502

Input 4: Modbus TCP

Modbus ID

1

Number type for 1

Int 32

Register for 1

3

Value written for 1

1

Number type for 0

Int 32

Register for 0

4

Value written for 0

1

Input 5: Common

Sending method

Modbus TCP

IP address and port

192.168.0.107:502

Input 5: Modbus TCP

Modbus ID

1

Number type for 1

Float 32

Register for 1

103

Value written for 1

1.5

Number type for 0

Float 32

Register for 0

104

Value written for 0

1.5

INDICATIONS:

Two LEDs integrated in the Ethernet connector:

Yellow – LINK: lights when the device is connected by cable to a switch or PC.

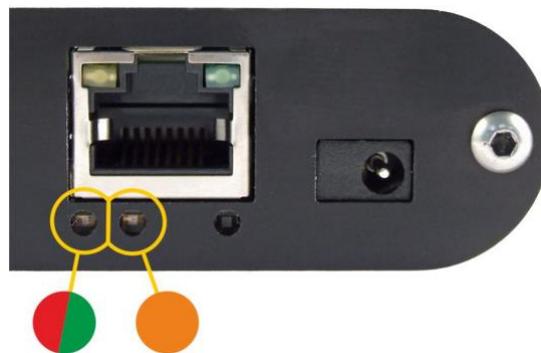
Green – ACT: indicates communication over the Ethernet.

Two LEDs to the left under the Ethernet connector:

Yellow (right): lights when the connection is established via Spinel or Modbus.

Red-green (left):

- the green light is lit and the red light flashes when the device is working properly and is connected to one sensor at least
- the green and red LEDs are lit when the device works, but is not connected to any sensor
- the red LED lights to indicate an error



Inputs and output status indicators:

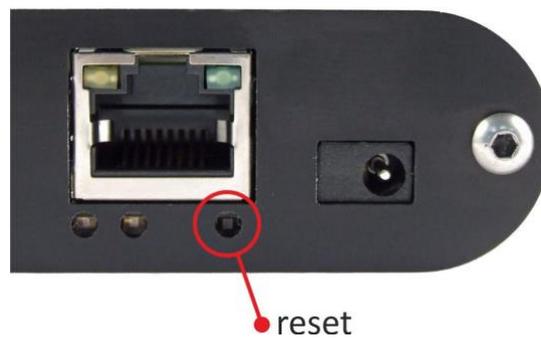
There are red LEDs above each input which indicate that the input contact is closed.



RESET

Follow the instructions below to restore the default configuration set by the manufacturer. Unlike when the reset is performed via the web interface or using the Telnet protocol, the IP address is also reset to the default value of 192.168.1.254.

1. Disconnect the device from the power supply.
2. Press the button located in a small hole on the right side under the Ethernet connector.
3. Turn on the power and wait for about 10 seconds until the yellow light below the Ethernet connector flashes 4 times.
4. Release the button.



TECHNICAL PARAMETERS

Inputs

Type	for contact
Number	5
Contact closed current	13 mA
Working voltage	24 V
Maximum sampling frequency	1 kHz
Connector	removable screw terminal block

Output

Type	changeover contact of relay
Maximum switching voltage AC	50 V
Maximum switching voltage DC	85 V
Maximum switching current	2 A
Maximum switching power of resistive load	62,5 VA / 60 W
Protective varistor	$U_{AC} = 60 \text{ V}$; $E_{MAX} = 5 \text{ J}$; $C = 0,64 \text{ nF}$
Connector	removable screw terminal block

Ethernet interface

Connection	TBase 10/100 Ethernet
Connector	RJ45
GET encryption	128 bit AES; Rijndael; CFB method

WiFi interface

Specification	IEEE 802.11 b/g a IEEE 802.11n (single stream)
Operating frequency	2,4 GHz
Antenna connector	SMA RP

Clock circuit and internal memory

Clock backup method (RTC)	capacitor (not replaceable by the user)
RTC backup time after power outage	5 days (if the device was previously connected to a power source for three hours without interruption at least)

Device electronics

PoE power supply	according to IEEE 802.3af
Power supply from an external source	11 - 58 V DC (with reverse polarity protection)
Current consumption from ext. source at 15 V	typ. 120 mA <i>WiFi version:</i> 31 mA
Current consumption from ext. source at 24 V	typ. 72 mA <i>WiFi version:</i> 20 mA
Current consumption from PoE	typ. 32 mA
Consumption	typ. 1,8 W

Power connector	coaxial 3,8 × 1,3 mm; + is inside
Operating temperature range	-20 to +70 °C
Dimensions (without connectors)	88 × 70 × 25 mm
Housing material	anodized aluminium
Degree of protection	IP30

Other parameters

Weight	typ. 145 g
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Default settings of the Ethernet

IP address	192.168.1.254
MASK	255.255.255.0 (8 bits; mask C)
IP address of the gateway	0.0.0.0

Available designs

Mountable on 35 mm DIN rail	optional accessory
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Do not hesitate to contact us if you have any other requirements concerning the design and functions of AMTECH communication box.

