

TECH TECH CONTROLLERS

USER MANUAL EU-48

EN



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TECH TECH CONTROLLERS

EU DECLARATION OF CONFORMITY

Hereby, we declare under our sole responsibility that **EU-48** manufactured by TECH STEROWNIKI, head-quartered in Wieprz Biała Droga 31, 34-122 Wieprz, is compliant with Directive **2014/35/EU** of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to **the making available on the market of electrical equipment designed for use within certain voltage limits** (EU OJ L 96, of 29.03.2014, p. 357), **Directive 2014/30/EU** of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to **electromagnetic compatibility** (EU OJ L 96 of 29.03.2014, p.79), Directive **2009/125/EC** establishing a framework for the setting of ecodesign requirements for energy-related products as well as the regulation by the MINISTRY OF ENTREPRENEURSHIP AND TECHNOLOGY of 24 June 2019 amending the regulation concerning the essential requirements as regards the restriction of the use of certain hazardous substances in electrical and electronic equipment, implementing provisions of Directive (EU) 2017/2102 of the European Parliament and of the Council of 15 November 2017 amending Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 305, 21.11.2017, p. 8).

For compliance assessment, harmonized standards were used:

PN-EN IEC 60730-2-9:2019-06, PN-EN 60730-1:2016-10.


PAWEŁ JURA


JANUSZ MASTER

Wieprz, 21.02.2022

1 SAFETY



Before using the device for the first time the user should read the following regulations carefully. Not obeying the rules included in this manual may lead to personal injuries or controller damage. The user's manual should be stored in a safe place for further reference. In order to avoid accidents and errors it should be ensured that every person using the device has familiarized themselves with the principle of operation as well as security functions of the controller. If the device is to be sold or put in a different place, make sure that the user's manual is there with the device so that any potential user has access to essential information about the device.

The manufacturer does not accept responsibility for any injuries or damage resulting from negligence; therefore, users are obliged to take the necessary safety measures listed in this manual to protect their lives and property.



WARNING

- High voltage! Make sure the regulator is disconnected from the mains before performing any activities involving the power supply (plugging cables, installing the device etc.)
- The device should be installed by a qualified electrician.
- Before starting the controller, the user should measure earthing resistance of the electric motors as well as the insulation resistance of the cables.
- The regulator should not be operated by children.



WARNING

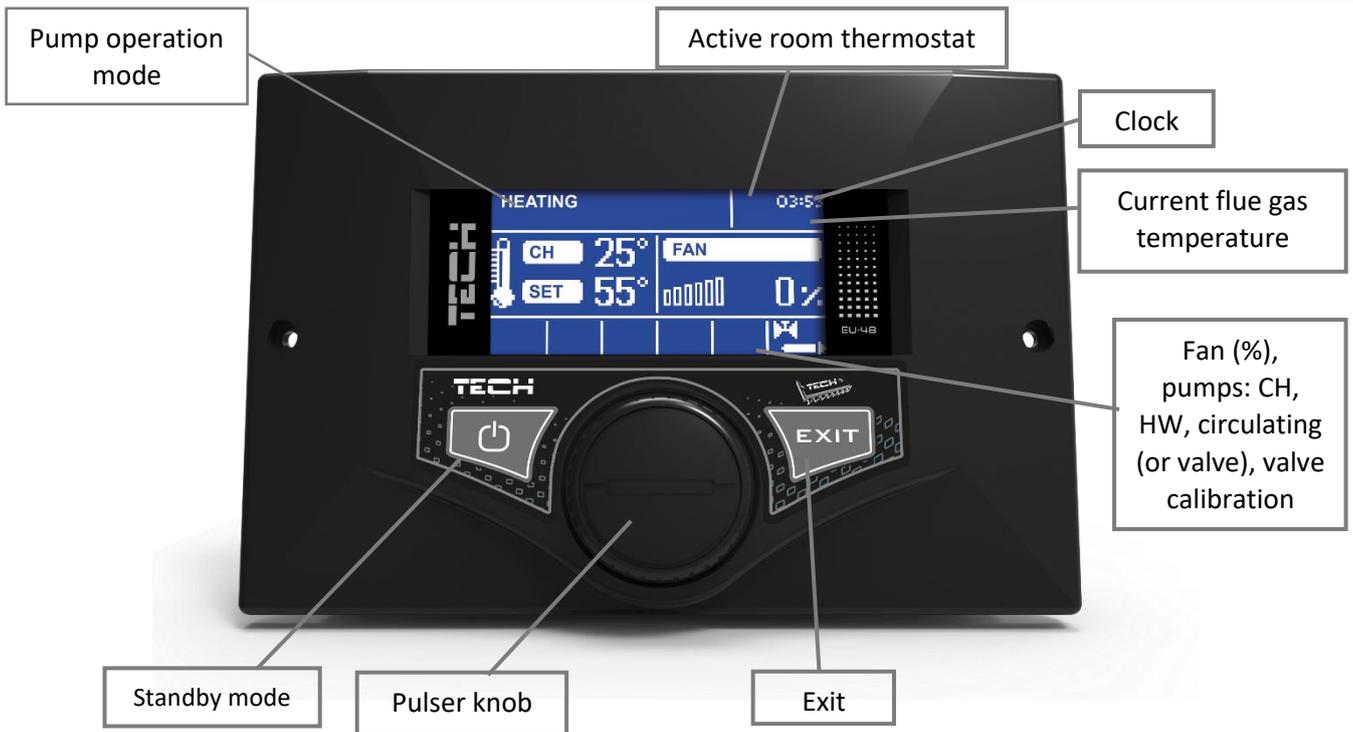
- The device may be damaged if struck by a lightning. Make sure the plug is disconnected from the power supply during storm.
- Any use other than specified by the manufacturer is forbidden.
- Before and during the heating season, the controller should be checked for condition of its cables. The user should also check if the controller is properly mounted and clean it if dusty or dirty.

Changes in the merchandise described in the manual may have been introduced subsequent to its completion on 21.02.2022. The manufacturer retains the right to introduce changes to the structure. The illustrations may include additional equipment. Print technology may result in differences in colours shown.



We are committed to protecting the environment. Manufacturing electronic devices imposes an obligation of providing for environmentally safe disposal of used electronic components and devices. Hence, we have been entered into a register kept by the Inspection For Environmental Protection. The crossed-out bin symbol on a product means that the product may not be disposed of to household waste containers. Recycling of wastes helps to protect the environment. The user is obliged to transfer their used equipment to a collection point where all electric and electronic components will be recycled.

2 DESCRIPTION



The **EU-48** temperature regulator is designed for central heating boilers. It controls the water circulation pump, the hot utility water (C.W.U.) pump, the floor heating pump, the circulation pump, the blow (fan) and the fuel feeder. Two modules controlling three-way or four-way valves can be added to the **EU-48** thermoregulator (this is an additional option).

The advantage of this controller is its simplicity in operation. The user makes all changes of parameters with the **knob of the pulse generator**. Another advantage is a large and clear graphic display, where the user can exactly see the current condition of the boiler's operation.

Any comments concerning the program should be reported to the boiler's manufacturer.

Each controller should be set individually for own needs, depending on the type of fuel used for burning as well as the type of the boiler. The TECH company does not bear any responsibility for improper controller settings.

3 FUNCTIONS OF THE REGULATOR

This chapter describes the functions of the regulator, the method of changing the settings and navigating the menu which takes place by means of **the pulse generator** (knob). The boiler's operational parameters are displayed on the main screen of the controller. The user selects the operation mode and a number of settings of the boiler according to their own needs.

The boiler manufacturer's name as well as the program version appear on the graphic display after activation of the controller. After a few seconds a message with language selection appears. In this function, the user can change the language version.

3.1 BASIC DEFINITIONS

Operation – after activation of the controller, it switches to the *operation cycle* and the following message is shown on the display: "**OPERATION**". This is the basic functioning condition of the regulator, in which the blow power and the working time and the pause time of the fuel feeder takes place in accordance with the user's settings. If the temperature of the boiler increases above the set value, the so-called *support mode* is activated.

Support mode – this mode will activate automatically, if the temperature is equal or higher than the set temperature. The following message will appear on the display: "SUPPORT". In such a case, the circulating water regulator should feed the fuel more slowly, so as to smoothly reduce the water temperature. To reduce the temperature correctly, the pause time and the working time in the support mode should be configured.

3.2 HOMEPAGE

During normal operation of the regulator, the *Main page* is visible on the **graphic** display. Depending on the operation mode, the relevant main screen is displayed.

Pressing the **knob of the pulse generator** brings the user to the first level menu. The first three menu options are shown on the display. Go to subsequent options by rotating the knob. The knob should be pressed to select a given function. A similar procedure is followed when changing parameters. In order to enter changes, it is necessary to approve them by pressing the pulse generator when the **CONFIRM** message is displayed. If the user does not want to make any changes in a given function, they should press the pulse generator when the **CANCEL** message is displayed. To exit the menu or cancel introduction of a change, select the **<<exit <<** option in the menu or press the **exit** button on the controller.

Pressing the **knob** of the **pulse generator** brings the user to the first level menu. The first three menu options are shown on the display. Turn the knob to move to subsequent options. Press the knob to select a given function. Similar actions are made when changing parameters. To introduce changes it is necessary to approve them by pressing the pulse generator when the **APPROVE** message is shown. If the user does not want to make any changes in a given function, they should press the pulse generator when the **CANCEL** message is shown. To exit the menu select the **exit** option.

3.3 MANUAL OPERATION

For the user's convenience, the regulator has been equipped with a **Manual operation** module. In this function, each executive device (feeder, blow-in, CH pump, hot utility water pump, circulation pump, floor pump) is switched and deactivated independently of the others.

Pressing the **pulse generator** activates the engine of the chosen device. This device remains activated until **the pulse generator** is pressed again.

Additionally, the *blow force* option, in which the user has the possibility to set any rotational speed of the fan in manual operation is available.

3.4 OPERATION OF THE ADDITIONAL FURNACE

Tetmo-Tech boilers are equipped with two furnaces:

- retort furnace which is fed in sequences with the fuel from the container using a worm feeder,
- additional (grate) furnace which is used to support combustion in the event of a long-term pause in supply of electric power and periodical incineration of wood.

If the *operation of the additional furnace* function is switched off, the boiler operates on the basic grillage with automatic feeding of fuel. In the case of activation of this function, the feeder is disconnected and fuel feeding is carried out manually, just like in the case of backfill boilers.

NOTE

If this function is activated, the options in the menu marked with (*) are not present.

3.5 FEEDING TIME*

This option is used to set the operation time of the fuel feeder. The operation time should be set depending on the used fuel and the type of the boiler.

3.6 FEEDING PAUSE*

The pause time is used to set the feeder's operation pause. The pause should be adjusted to the type of fuel combusted in the boiler. Incorrect selection of the operation time and the pause time may result in flawed functioning of the boiler, i.e.. the fuel cannot be reheated or the boiler cannot achieve the set temperature. Selection of proper times allows correct operation of the boiler.

3.7 BLOW FORCE

This function controls the rotational speed of the fan. The adjustment range is between 1 and 100%, (it can be assumed that they are the gears of the fan). The higher the gear the faster the fan is operating, where 1% is the minimum speed of the fan and 100% is the maximum speed at which the fan can operate.

3.8 OPERATION MODES

In this function, the user selects one of four boiler operation options.

3.8.1 House heating

When this option is selected, the regulator switches to heating the house only. The central heating pump starts to work above the pump activation threshold (preset at 40 ° C). Below this temperature, the pump stops working.

3.8.2 Reboiler priority

In this mode the reboiler pump (C.W.U.) is turned on first, until the set temperature is reached. After reaching the set temperature of the reboiler, the central heating pump shuts down and causes activation

of the CH pump. Operation of the CH pump proceeds all the time, until the moment when the temperature it falls below the set value in the reboiler. Then the CH pump shuts down and the hot utility water pump is activated.

In this mode, operation of the fan and the feeder is limited to the temperature of 62 degrees in the boiler because this prevents the boiler from overheating.

Note: The boiler should have return valves mounted on the circuits of CH and HUW pumps. The valve mounted on the HUW pump prevents hot water from being pulled out from the reboiler.

3.8.3 Parallel pumps

In this mode, both pumps work simultaneously above the pump activation threshold temperature (preset at 40° C).

The CH pump works continuously and the HUW pump shuts down after reaching the temperature set at the reboiler. Re-activation of the HUW pump will take place after the reboiler temperature drops below the set value (see *HUW hysteresis* in the installer menu).

NOTE: In this mode, one should install a three-way valve or another mixing valve causing maintenance of a different temperature of in reboiler and of a different in the house.

3.8.4 Summer mode

After activation of this function, only the HUW pump, whose tasks is to additionally heat the reboiler, operates. This pump is activated above the set activation threshold (see *the pump activation temperature* function) and operates until the set temperature is reached. The pump will activate again when the temperature falls below the set value and set hysteresis. In the summer mode only the set temperature is set at the boiler which additionally heats the water in the reboiler (the set temperature of the boiler is at the same time the set temperature of the reboiler).

3.9 SET CH TEMPERATURE

This option is used to set the set temperature of the boiler. The user may change the temperature range at the boiler from 45 °C to 80 °C. The set CH can also be changed directly from the main controller screen by rotating the knob of the pulse generator.

3.10 SET HUW TEMPERATURE

This option is used to set the set hot utility water temperature. The user may change this temperature in the range from 40° C to 75° C.

3.11 WORK IN SUPPORT*

This option is used to set the operation time of the feeder and the blow in the support mode (above the set temperature).

3.12 SUPPORT PAUSE*

This option is used to set the time of pause in operation of the feeder during support.

Note: Incorrect setting of this option may result in constant temperature increase! **The pause in support** should not be too short.

3.13 FAN IN SUPPORT

In this function, the user sets the operation time and the pause time of the fan at work in the support cycle.

3.14 FACTORY SETTINGS

The regulator is pre-configured for operation. However, it should be adjusted to own needs. Return to the factory settings is possible at any moment. By activating the factory settings option, the user loses all own boiler settings for the settings saved by the manufacturer of the boiler. From that moment, the own boiler parameters can be set again.

3.15 SCREEN VIEW

In this function, the user can select one of the three thermoregulator's main operation screens. They are:

- CH screen (the current operation mode of the boiler is displayed),
- valve 1 (displays operation parameters of the first valve),
- valve 2 (displays operation parameters of the second valve).

NOTE

To make the views with the valve parameters active, the valves must be earlier accordingly installed and configured by the installer.

3.16 INSTALLER MENU

The functions in the installer menu should be set by the person installing the boiler or by the manufacturer's service.

3.16.1 Valve 1

NOTE

Controlling the valve is possible after purchasing of an additional **ST-61** control module, which is not attached to the controller in the standard option, and connecting it to the controller. To control two valves, two **ST-61** modules should be connected

In order to ensure that the valve works correctly and in accordance with the user's expectations, it should be first **registered** by entering the module number (this is the valve number according to the documentation) and then several parameters should be set.

3.16.2 1. Temperature control

This parameter determines the sampling (control) frequency of the water temperature behind the valve for the CH or the HUW installation. If the sensor indicates a change in temperature (deviation from the set value), then the electric valve will open or close itself by the set stroke to return to the set temperature.

3.16.3 2. Opening time

In this function, the valve opening time is set, in other words, how long takes it the valve to open to the value of 100%. This time should be selected according to the owned valve servomotor (specified on the rating plate).

3.16.4 3. Unit stroke

In this function, the unit percentage valve opening stroke is set, that is which minimum opening or closing percent is expected to be made by the valve.

3.16.5 4. Minimum opening

In this function, the minimum valve opening value is set. Below this value, the valve will not close any further.

3.16.6 5. Valve type

Using this option, the user selects the type of the valve: CH or floor.

3.16.7 Valve 2

If the user wants to control two valves, like in the previous case, valve 2 should be registered and all settings accordingly configured in the same manner as in the case of valve 1.

3.16.8 Pump activation temperature

This option is used to set the threshold activation temperature of CH and HUW pumps (this is the temperature measured in the boiler). Above the set temperature, the pumps operate according to the selected operation mode. Deactivation of the pumps will happen after a drop of temperature in the boiler below the activation temperature (minus hysteresis e.g. 2 °C).

3.16.9 Temperature alarm

The time after elapse which the temperature alarm will be activated is set using this function. If the boiler temperature does not increase by the set time to *the set temperature*, the alarm will be activated. After pressing the **knob of the pulse generator**, the alarm is turned off and the regulator returns to the recently set operation mode

3.16.10 Room regulator

After connection EU-48 controller to the room controller, its type should be marked:

- standard (two-state regulator),

After additional heating of the room to the set temperature, the room regulator opens the contact and the boiler controller switches into the support phase (regardless of whether the set temperature has been reached).

- TECH regulator (extended device allowing to control several parameters simultaneously).

When using this type of regulator, the user has a possibility to change the set temperature of the boiler, the reboiler and the mixing valves.

After activation of the **Room regulator** option, the letter "P" will appear on the main screen of the controller at the top part of the display. A blinking letter "P" , indicates that the rooms are under-heated; when the set temperature in the flat is reached, "P" will glow constantly.

Note: No external power source should be connected to the output of the room regulator.

3.16.11 Boiler hysteresis

This option is used to set the hysteresis of the set temperature. This is a difference between the temperature of entering the support cycle and the temperature of return to the operation cycle (for example: when the set temperature has the value of 60°C, and the hysteresis is 3°C, switching into the support cycle will proceed when the temperature increases to 60°C, while return to the operation cycle will proceed when the temperature decreases to 57°C).

3.16.12 HUW hysteresis

This option is used to set the hysteresis of the set temperature in the reboiler. It is the maximum difference between the set temperature (that is required in the reboiler) and the current temperature in the reboiler at which the HUW pump will activate. (for example: when the set temperature has the value of 55° C and the hysteresis is 5° C. After reaching the set temperature, that is 55° C, the HUW shuts down and causes activation of the CH pump. Re-activation of the HUW pump will proceed when the temperature decreases to 50° C).

3.16.13 Floor pump

This function is used to control floor heating. The user sets the floor heating temperature in the range of 30° C – 55° C. After activation of the floor pump should be set, the minimum (threshold) pump activation temperature (measured in the boiler) and the maximum (set) floor heating temperature (measured on the pump sensor).

The floor pump does not operate below the minimum temperature. Above this temperature, the pump is activated until the maximum set temperature is reached.

After reaching the set temperature, the pump shuts down. Re-activation of the floor pump will proceed when the temperature decreases by 2° C below the set value.

3.16.14 Circulation pump

This function is used to control the hot water mixing pump between the boiler and the hot utility water receivers. After activation of this function, the user sets the pump's daily activation or standstill cycle with the accuracy to 30 minutes.

3.16.15 Timer

By setting the timer, the user defines the current hour and the day of the week.

3.16.16 Language selection

Using this function, the user selects the language in which the controller will be operated.

3.16.17 About the program

After activation of this option, the display will show the boiler manufacturer's logo along with the regulator's software version.

3.16.18 Language selection

Using this function, the user selects the language in which the controller will be operated.

3.16.19 Pulse generator sensitivity

Using this setting, one can change the sensitivity of the knob of the pulse generator in the range from 1 to 3 (where 1 is the highest sensitivity). Servicing menu

To access the servicing functions of the controller, enter a four-digit code. Such code is in possession of the manufacturer of the boiler as well as the TECH company.

4 PROTECTIONS

To ensure maximally safe and unfailing operation, the regulator has a number of protections. In the case of an alarm, a sound signal is activated and an appropriate message is shown on the display.

To make the controller return to operation, press **the pulse generator**.

4.1 TEMPERATURE ALARM

This protection is activated only in the **operation** mode (that is when the boiler temperature is lower than *the set temperature*). If the boiler temperature does not increase throughout the period set by the user, the alarm is activated, the feeder and the blow-in are deactivated (the water pump is turned on regardless of the boiler temperature) and a sound signal is activated. An appropriate message will be shown on the display.

The alarm will be disabled after pressing **the knob of the pulse generator**. The regulator returns to the recently set operation mode.

4.2 THERMAL PROTECTION

It is an additional bimetallic mini-sensor (located at the boiler temperature sensor), disconnecting the fan and the feeder in the event of exceeding the alarm temperature: 85° C. Its activation prevents the water in the installation from boiling, in the event when the boiler overheats or the controller is damaged. After activation of this protection, when the temperature goes down to a safe value, the sensor will unlock automatically and the alarm will be deactivated. In the case of damage or overheating of this sensor, the fan and feeder will be disconnected.

4.3 AUTOMATIC SENSOR CONTROL

In the event of damage of each of the sensors the sound alarm is activated, additionally signalling the defect on the relevant display, e.g.: "**CH sensor damaged**". The feeder and the blow-in is disabled. The pumps operate according to the set temperatures, regardless of alarms.

*In the case of damage of the CH sensor or the feeder, the alarm will be active until the sensor is replaced with a new one. If the HUW sensor is damaged, one should press the **menu** button, which will turn off the alarm and the controller will return to the one pump (CH) operation mode. In order to ensure that the boiler will be able to work in all modes, the sensor must be replaced with a new one.*

4.4 PROTECTION AGAINST BOILING OF WATER IN THE BOILER

This protection applies only to **reboiler priority** operation mode. When the set reboiler temperature is e.g. 55° C and the actual temperature in the boiler increases up to 62° C (this is the so-called the priority temperature), then the controller will turn off and the feeder and the fan. If the temperature in the boiler still increases up to 80° C, the CH pump will be activated. When the temperature still increases, then the alarm will be activated at the temperature of 85° C. Most often such a condition may appear when the reboiler is damaged, the sensor is improperly fitted or the pump is damaged. However, when the temperature drops, then at the threshold of 60° C the controller will turn on the feeder and the blow-in and will run in the operating mode until the temperature of 62° C is reached.

4.5 TEMPERATURE PROTECTION

The regulator has an additional protection in the event of damage of the bimetallic sensor. After exceeding the temperature of 85°C, the alarm is activated, signalling the following on the display: "**Temperature too high**". Despite damage of the bimetallic sensor, the controller receives information on the current temperature in the boiler from the electronic sensor. In the case of exceeding the alarm temperature, the fan is turned off and, at the same time, both pumps begin to operate in order to distribute hot water across the house installation.

4.6 FUEL CONTAINER PROTECTION

On the fuel feeder there is an additional temperature measuring sensor. In the event of its significant increase (above 70° C), the alarm is activated; the feeder is activated every 10 minutes, which causes pushing the fuel to the combustion chamber. This way the feeder sensor protects against fuel ignition in the container.

The regulator has a WT 6.3A tubular fuse insert, protecting the network. Using a fuse with a higher value can cause damage to the existing controller

4.7 FUSE

The regulator has a WT 6.3A tubular fuse insert, protecting the network.

Using a fuse with a higher value can cause damage to the existing controller.

5 MAINTENANCE

Technical condition of wires should be checked in the **ST-48** controller before the heating season starts and across its duration. One should also check fastening of the controller and clean it from dust and other dirt. The earthing effectiveness of the engines (of the CH pump, the HUW pump, the blow-in, the feeder, the floor pump, the circulation pump)should also be measured.

TECHNICAL DATA

Power supply	230V ±10% /50Hz
Maximum power consumption	11W
Ambient working temperature	5÷50°C
Pump max. output load	0,5A
Valve max. output load	0,5A
Fan max. output load	0,6A
Temperature measurement accuracy	1°C
Sensor thermal resistance	-30÷99°C
Fuse	6,3A

Installation

NOTE: installation should be performed by a person with relevant licenses! At that time, the device **must not** be at live voltage (it is necessary to ensure that the plug is disconnected from the electrical grid)!

NOTE: Incorrect connection of wires can cause damage to the regulator!

NOTE: the **EU-48** controller must be used for installation of the boiler, so that there is no access to cable installation slats.

The regulator cannot work in a closed central heating system. Safety valves, pressure valves and a levelling tank protecting the boiler against boiling of water in the central heating system must be installed.

5.1 SCHEME OF CONNECTION OF CABLING TO THE CONTROLLER

Please pay special attention during installation of the controller cabling to correct connection of earthing wires.

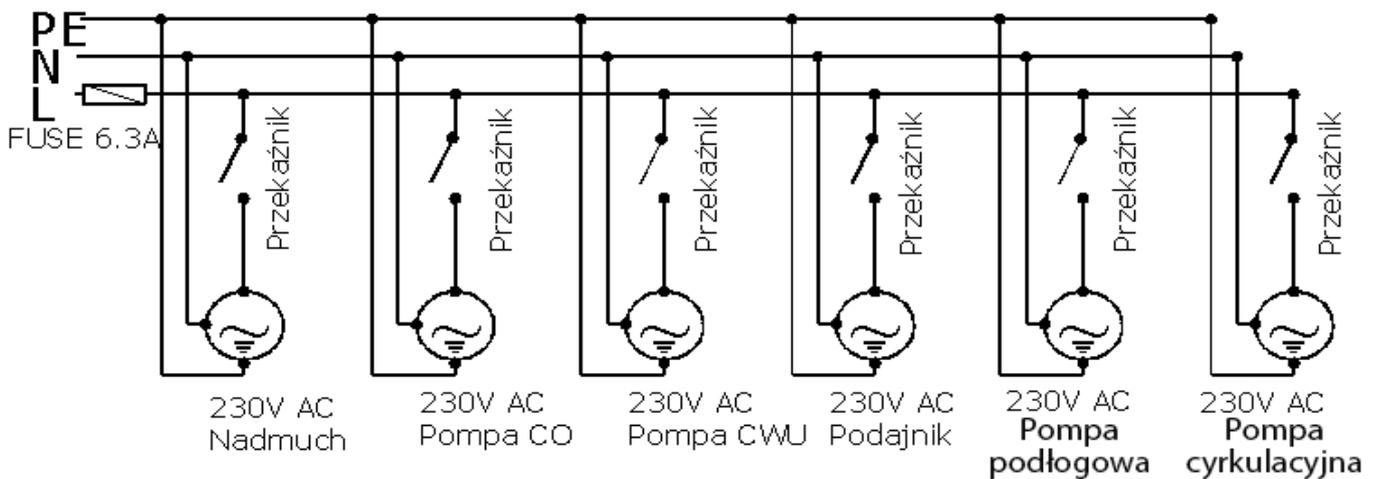


Figure 1: Scheme of connection of cabling to EU-48

PE- EARTHING SYSTEM (YELLOW-GREEN)

N - NEUTRAL (BLUE)

L- PHASE (BROWN)

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