



TIS

TRONIC 660

OPERATIONAL MANUAL

EN 

EU Declaration of Conformity nr 0054/20

Temperature regulator: Tis tronic 660 HD

meets the requirements of the following directives:

**2014/35/UE Low-voltage Directive(LVD),
2014/30/UE Electromagnetic Compatibility Directive(EMC)**

meets the requirements of the following directives:

**PN-EN 60730-1:2012
PN-EN 60730-2-9:2011**

The product is CE marked: 03/2020



1. Safety

1.1. General safety notes



Please read the following regulations before using the product. Failure to comply with them may result in personal injury or damage to the device. To ensure the safety of life and property, take the precautions contained in the following manual, as the manufacturer is not responsible for losses caused by improper use of the device or the User's negligence.

1.2. Warnings

- The regulator can't be applied with boilers operating in heating systems compliant with valid legal guidelines, including standard PN-EN 303-5. The device is intended to control operation of a C.O. (central heating) boiler with its own, independent safeguard against improper operation, e.g. excessive pressure growth in the system, or overheating of the boiler.
- Live electrical device. It is not allowed to perform any connection works when the device is connected to supply voltage, failure to follow the above information is dangerous to human health and life. Before commencing any works at the regulator, it is absolutely required to disconnect current supply, and to secure against accidental activation.
- The assembly of the device should be performed by a person having the appropriate electrician qualifications.
- Before activating the regulator, measure the earthing resistance of any electrical motors, and measure the resistance of any electrical cable insulation.
- The device may only be operated by adults.
- Incorrect wiring can damage the device!
- Owing to electromagnetic network noise that may affect operation of the microprocessor system, and for safe operation of devices fed with 230V network voltage, the regulator should be connected to a system with a protective conductor.
- The regulator may not be exposed to flooding with water or to any conditions causing steam condensation and penetration of conductive dirt and dusts into the regulator.
- Atmospheric discharges can damage the controller, therefore during a storm, it should be disconnected from the grid by pulling the power plug out of the socket.
- The unit must not be used for purposes other than those intended.
- Before and during the heating season it is necessary to check the technical condition of the cables, check the fixing of the unit, clean it from dust and other dirt.
- The manufacturer reserves the right to make changes in the software and principle of the device's operation without modification of the contents of the manual every time.

1.3 Warranty notes



- Any modifications and repairs made to the device on one's own may result in the deterioration of its operating parameters and safety of its use. Carrying them out is tantamount to losing the warranty for the device.
- Blown fuses in the device are not subject to guarantee replacement.

2. Intended use

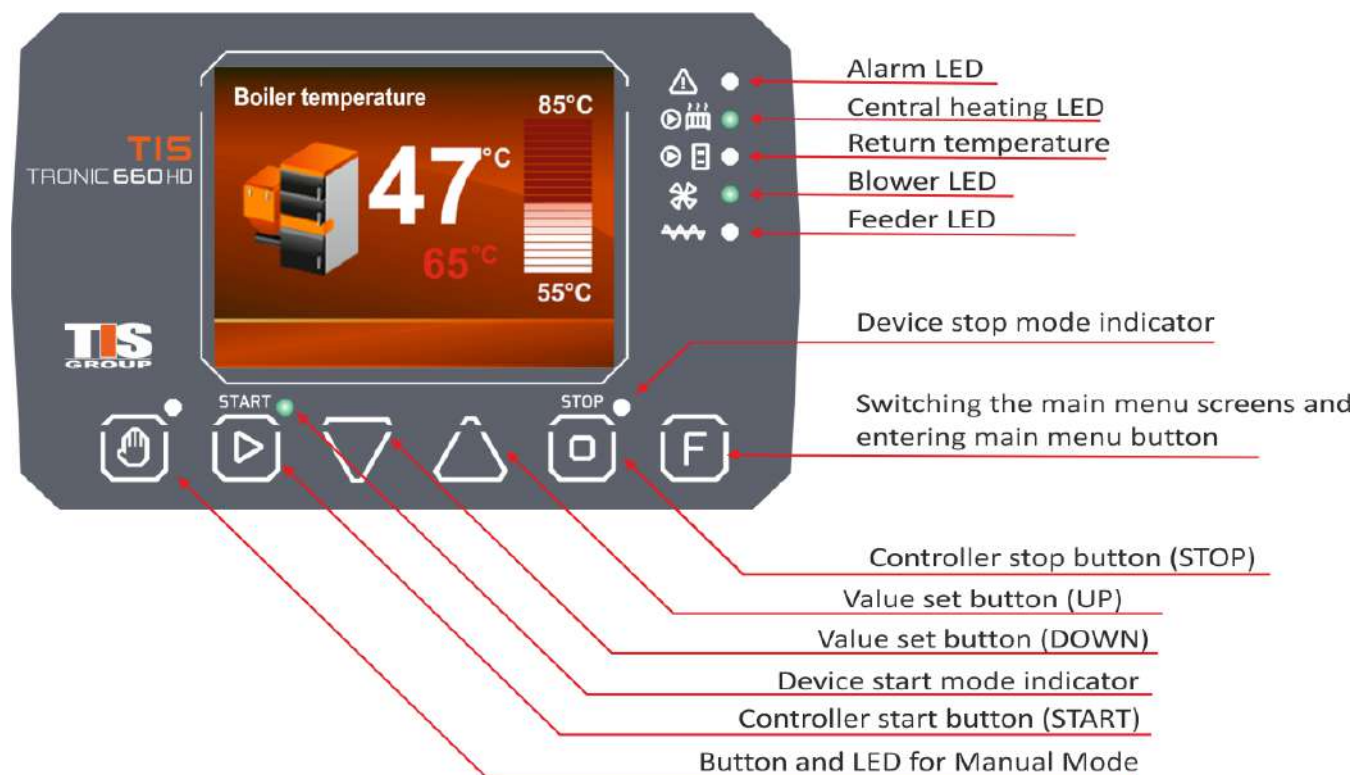
TISTRONIC660 Boiler automation is a modern device designed for comprehensive control of boiler operation and the heating system. The regulation of the boiler's thermal power is achieved through precise dosing of air and fuel supplied to the combustion process.

To ensure the required thermal comfort in heated rooms, the controller continuously monitors all operating parameters of the boiler and heating system, displaying them on a clear TFT screen.

Thanks to the ability to connect additional modules (not included in the standard equipment), the device enables control of the feeder's operation and potential blockages, as well as software-based monitoring of the fuel level in the bin. An additional advantage is the possibility of connecting the controller to the Internet using the TIS tronic 520 module. The controller features a large, colorful, and clear display with a pleasant and intuitive user interface, making boiler operation easy and convenient.

3. Control panel

3.1. Visualization of a display, panel and marking of signaling diode



FAULT -  Icon indicates any fault, e.g. boiler water overheating, temperature sensor failure, etc

CH PUMP DIODE -  Icon signals central heating pump operation

RETURN PUMP -  Icon signals return pump operation

BLOWER -  Icon signals blower operation

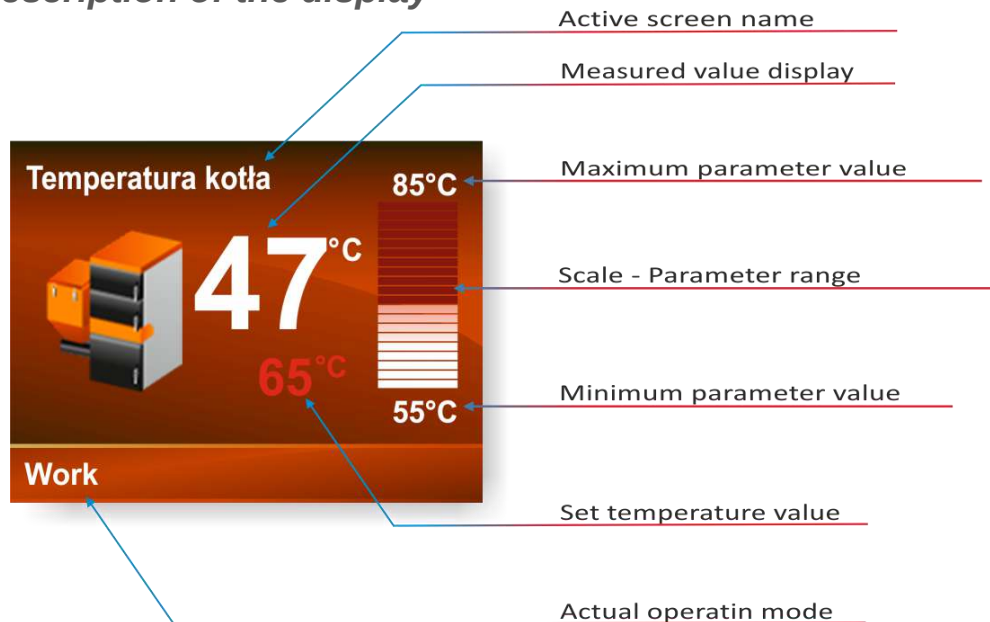
FEEDER -  Icon signals the operation of the feeder

MANUAL MODE – Button and LED to activate manual mode.

START- Pulsation of the diode indicates ongoing firing up process of the boiler, while continuous light of the diode indicates automatic operation of the whole Appliance.

STOP - This LED signals whether the machine has stopped working.

3.2. View and description of the display



3.3. Button functions

F **Function** - this button has three modes of action: in the normal operating mode, it serves to switch previews of the operation of individual modules (*the number of modules depends on the type of regulator*); The second mode: by holding down the **F** button for 3 seconds, you can enter the regulator menu. In this mode, parameter changes can be made using the ∇ and $\triangle$ buttons, which increase and decrease their values. In the third mode: when editing a parameter, pressing this button lets you exit the configuration mode to view the operation of individual modules. Turning of the regulator on causes the screen with the boiler temperature to become visible.

▶ **START/OPERATION**- this button is used to make the regulator enter the operating status with the main screens (*temperature*) visible. This button in this appliance, which has got a manual mode, serves also to switch the feeder on and off. In the regulator's menu, the START/OPERATE button (*on the YES screen*) is used to edit the selected parameter, and once the changes are made, to approve them.

□ **STOP**- this button is used to stop the operation of the regulator and to turn off the operation of connected devices (except the emergency thermostat) in the mode where the main screen (temperature) is visible. In the regulator menu, the STOP button (*on the NO screen*) cancels the selection of the parameter without saving the changes. Pressing it again will move you back one level in the menu.

▽ ▴ **NAVIGATION AND PARAMETER VALUE CHANGE BUTTONS**- regardless of the screen/parameter you are at, these buttons function the same - they navigate and change the value of the selected parameter. For example, in programming mode, by pressing the ∇ button you can increase the value of the selected parameter by one unit. Similarly, by pressing the $\triangle$ button you would decrease the value of the selected parameter also by one unit. If you press and hold the button, you'd cause the value of the parameter to change faster while pressed. These buttons also serve to navigate through the appliance menu.

4. Handling of the regulator

4.1 First start-up

After starting the **TIS**TRONIC660 Controller with the switch located on the back of its housing, the display will show a welcome screen, followed by one of the main screens of the Controller. The Controller is in inactive mode (no external devices such as a blower or burner are running). This status is indicated by the caption "STOP" located on the front panel

You can configure the Controller according to your needs at any time: set the values of all editable parameters.

In order to facilitate the operation of the unit, the most important settings and temperature readings are located on the main screens which can be switched by pressing **[F]** button (Fig. 1).

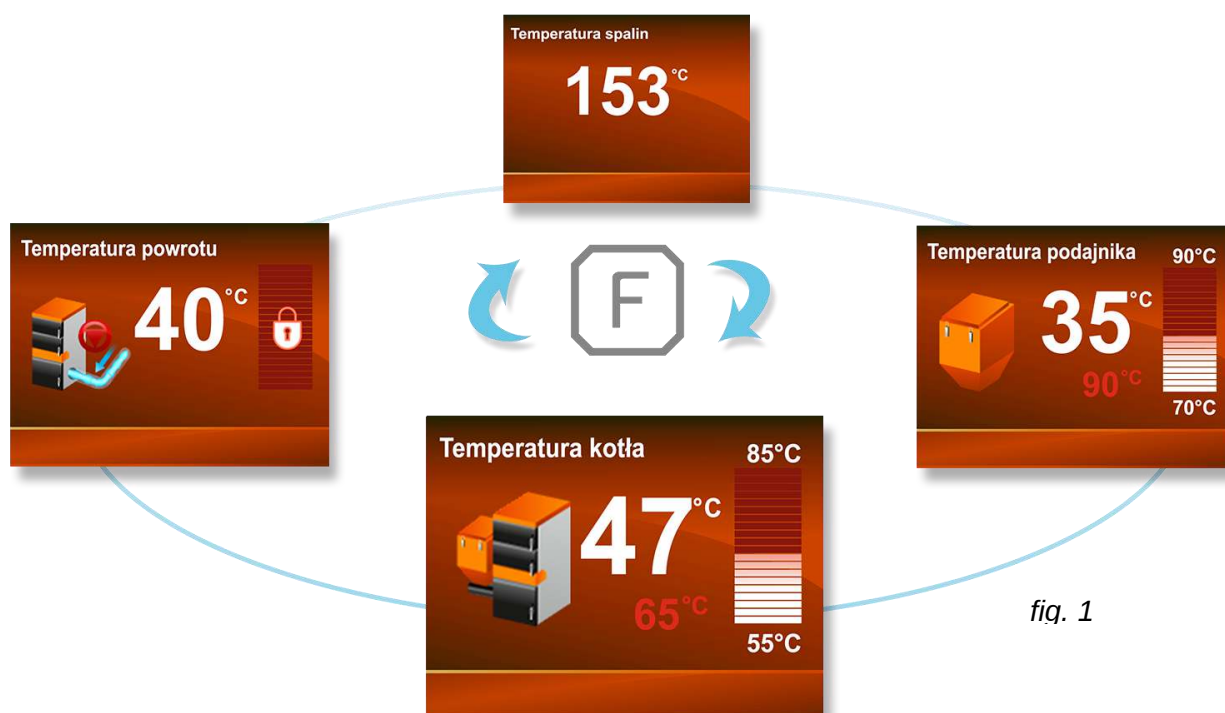


fig. 1

The main screens, except displaying the current parameters, also have the ability to change the basic settings. An example screen (Figure 2) shows boiler temperature and the basic parameters related to it. Increase and decrease of the temperature setpoint value can be done with the $\triangle$ ∇ buttons, while the parameter itself stays visible on the screen (value 47°C on the example screen). Above this value there's the current boiler temperature reading shown. The digits above and below the bargraph indicate the available range, within which the values of the boiler temperature can be set.



fig. 2

The return temperature screen on the main screen is locked by default (Fixed Operation), however, it'd be possible to change that temperature on the screen after switching the boiler pump operation mode to "Return Temperature" in the "Boiler Pump Settings" menu.



fig. 3

4.2 Initial configuration

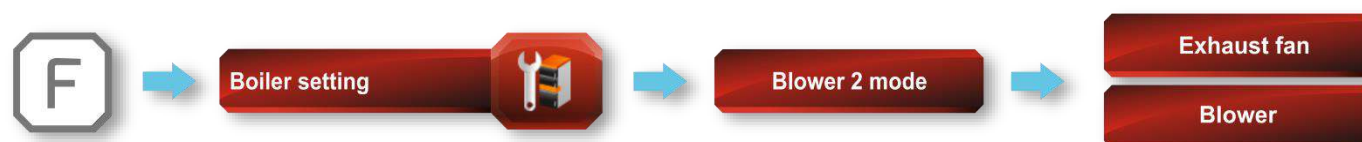
You can enter the main menu by pressing the **F** button for the 3 sec..

The most important configuration settings of the **TIS TRONIC 660** controller available in the main menu include:

Blower efficiency setting



Specifying the operating mode of blower 2



Pump switch on temperature



Boiler pump activation temperature



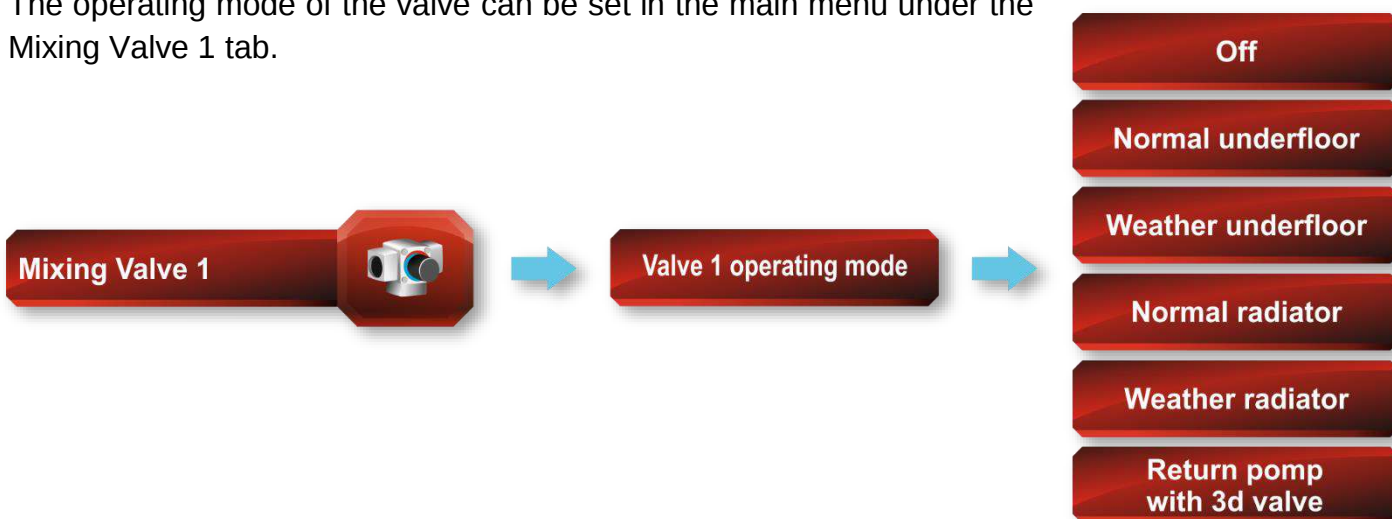
Maximum exhaust gas temperature



4.3 Activation and operation of mixing valves

The **TIS**TRONIC660 controller is equipped with outputs for operating the valve pump and the valve actuator. The grey valve screen indicates that the valve's operating mode has not been specified.

The operating mode of the valve can be set in the main menu under the Mixing Valve 1 tab.



From this point, the main screen is available for valve operation control, where we can directly set the temperature value that the valve will aim to maintain. There is also a menu with settings that includes a range of functions characterizing the valve's operation.

Warning!!! When the valve is set to weather-dependent mode, the temperature setting option is locked, which is indicated by the display of a padlock in place of the bar graph.

Valve operating modes:

Normal radiator - This mode is designed for monitoring of water temperature in radiator installation, temperature setting range has been extended to 75°C. In the normal mode in case of exceeding of the water temperature above the value set in the Maximum boiler temperature function, the valve is opened unconditionally until the temperature in the boiler is stabilized.

Normal underfloor - This mode is designed for monitoring the water temperature in the floor system; the maximum temperature setting is limited to 45°C. In Normal underfloor mode, the priority is to protect the installation from too high a temperature, so in emergency situations the valve closes.

Weather radiator and weather underfloor - These modes are designed to work with an external temperature sensor, after selecting one of these modes, the preset valve temperature is divided into three values:

- Setpoint at outdoor temperature: -10°C
- Setpoint at outdoor temperature: 0°C
- Setpoint at outdoor temperature: +10°C

Depending on the outdoor temperature, the controller automatically calculates the temperature value for the valve based on the declared setpoint values (-10, 0, +10).

The difference between the Weather radiator and the Weather underfloor lies in the different valve operation in emergency situations - in the radiator mode the valve is opened and in underfloor it is closed.

Return protection with 3d valve - Return protection valve – The valve, through the return temperature sensor, monitors the temperature on the return line. If the temperature is too low, the valve restricts the water flow from the system, limiting it, and the water circulates in the boiler on a short circuit.

The flow restriction in the system should not be complete, so the valve maintains approximately 20% of the minimum opening for flow in the system. Every 12 hours, a valve position calibration procedure is performed.

If the return temperature drops below the set level, the valve gradually opens, approaching the set value. Once this value, defined as the "**Valve 1 operating range above setting**" is exceeded, the valve will fully open.

In the event of boiler overheating or a return sensor failure, the valve will open fully.

The following valve settings are available for the normal and weather modes:

Valve 1 fully open time- This is the time required for the actuator to fully open the valve (from 0% position to 100% position). This value should be read from the actuator's nameplate. (Available range: 20 - 250 seconds, factory setting: 120 seconds).

Valve 1 temp. measurement waiting time - The parameter sets the interval between the next activations of the valve actuator (available range: 5 - 30 seconds, factory setting: 20 seconds).

Valve 1 range above setting - The value specifies how many degrees the temperature on the valve can rise at most. Once this value is exceeded, the valve starts to close and remains in this state until the temperature on the valve drops below the value set in this function (available range: 1 – 10°C, factory setting: 5°C).

Warning!!! - The controller is compatible only with mixing valve actuators with a 220V power supply, L L N connection type, and equipped with built-in limit switches. The use of other actuators is prohibited.

4.4 Manual operation mode

To facilitate the ignition process, the controller is equipped with a manual mode function that allows independent activation of the feeder and blower. Switching to manual mode is only possible when the controller is in the STOP state and is done by pressing the  button. A flashing yellow LED and a dedicated main screen (Fig. 4) indicate that manual mode is active. This screen displays an additional menu for controlling the feeder and blower.

To exit manual mode, press the  button again. In manual mode, the  button is responsible for turning the feeder on and off. A single press activates the feeder for 60 seconds. (The feeder can be turned off at any time by pressing the same button again).



fig. 4

The  button is responsible for activating the blower. Once turned on, the blower operates until the button is pressed again or until the boiler reaches the set temperature. The status of the activated blower and feeder is indicated by dedicated LEDs located on the front panel of the controller.

4.5 Boiler pump settings

The **TIS**TRONIC 660 controller is equipped with an additional output for controlling the boiler pump (boiler return circuit). Two operating modes for the boiler pump are available:

- **Constant work**
- **Return temperature (Boiler return temperature control)**

Constant work – The pump activates depending on the boiler temperature (parameter "Boiler pump activation temperature"), operates continuously, and turns off when the temperature drops 5°C below the set value.

Boiler pump activation temperature – The parameter allows setting the initial boiler water temperature at which the boiler pump will be activated.



Return temperature – The pump activates when the temperature set in the "Pump switch on temperature" parameter is reached on one of the temperature sensors (boiler sensor or return sensor). (Available range: 10 – 60°C, factory setting: 50°C).



The **"Boiler Pump Hysteresis"** parameter defines how many degrees Celsius below the return temperature setting the measured temperature must drop for the controller to turn off the boiler pump. The return pump will also be turned off when the return temperature rises above the set value. For example, if the return temperature is set to 45°C and the hysteresis is set to 4°C, the pump will turn off when the return temperature reaches 49°C. (Available range: 2 - 10°C, factory setting: 4°C).

Warning!!! – To turn off the boiler pump, the temperature must drop on both the boiler sensor and the return sensor.

4.6 Ash removal setting

The TIS **TIS**TRONIC660 controller is equipped with an additional output responsible for ash removal in the boiler. The connector for connecting the ash removal system is labeled Q7 on the board. The ash removal function can be activated in the main menu of the controller under the Ash Removal tab.



Delay of turning on the ash remover – This parameter allows you to set the delay time for activating the ash removal function after the boiler starts operating. (Available range: 1–6 hours, factory setting: 1 hour).

Ash removal operation time – This parameter allows you to set the duration for which the ash removal function will be active (Available range: 1 – 300sek, factory setting: 5 sek)

Ash removal pause time – This parameter allows you to set the pause time between consecutive activations of the ash removal function (available range: 1 – 300 min, factory setting: 10 min).

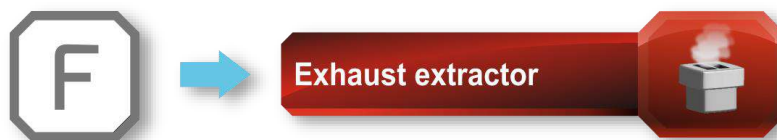
4.7 Exhaust fan setting

In the **TIS**TRONIC660 controller, it is possible to use the output intended for blower 2 as an exhaust fan, which is activated simultaneously with the main blower.

To configure the output in Exhaust Fan mode, go to the main menu of the controller and find the 'Blower 2 mode' function under the 'Boiler Settings' tab.



If the operation mode is activated, a configuration block responsible for exhaust fan settings will appear in the main menu



Exhaust fan activation in advance – This parameter defines how many seconds after the main blower starts, the exhaust fan will be activated (available range: 0 – 15 seconds, factory setting: 10 seconds).

Exhaust fan deactivation delay - This parameter defines how many seconds after the blower starts, the exhaust fan will be deactivated (available range: 0 – 100 seconds, factory setting: 10 seconds).

Exhaust fan efficiency - This parameter defines efficiency of the exhaust fan (available range: 1 – 100%, factory setting: 15%).

Exhaust fan efficiency in sustain mode - This parameter defines the exhaust fan efficiency when the boiler switches from work mode to sustain mode. (Available range: 1 – 100%, factory setting: 50%).

Allowed exceeding boiler setting – During the operation of the exhaust fan, the temperature on the boiler is constantly monitored. If it increases above the set value by the amount defined in this parameter, the exhaust fan will be turned off. (Available range: 0 – 10°C, factory setting: 10°C).

Minimal exhaust fan speed in sustain mode - The parameter sets the exhaust fan efficiency when the boiler switches from work mode to sustain mode. (Available range: 1 – 100%, factory setting: 10%).

4.8 Ignition in the boiler

The ignition process in the boiler and the activation of the controller in automatic mode can be divided into three main stages:

Fuel loading → **Fuel ignition** → **Activation of automatic mode.**

To ensure the proper amount of fuel is in the combustion chamber, it is best to use manual mode, which can be activated using the  button.

In manual mode, turn on the feeder using the  button until the proper amount of fuel is on the grate. Then, place the firestarter and ignite the fuel. While in manual mode, you can turn on the blower at any time using the  button to enhance the fire.

When the boiler temperature rises to approximately 35°C, you can exit manual mode by pressing  the button again and start automatic mode using the  button. Automatic mode is indicated by the flashing START diode.



fig. 5

The set temperature value on the boiler can be adjusted directly on the main screen Boiler Temperature (Fig. 5) using the   buttons. Once the boiler reaches the set temperature, the START diode will light up continuously, and the controller will switch to sustain mode.

From this moment, a properly configured controller ensures:

- ✓ Maintaining the set temperature in the boiler
- ✓ Reading all installed temperature sensors
- ✓ Managing the boiler and heating system pumps
- ✓ Controlling the boiler and feeder operation
- ✓ Overheating protection for the boiler and feeder
- ✓ Exhaust fan control
- ✓ Water flow monitoring*
- ✓ Low water pressure monitoring*
- ✓ High water pressure monitoring*
- ✓ Additional equipment control

*Optional, available from version V2.03.

4.15 Change and explanation of configuration parameters

Entering into the controller menu is possible by holding down the  button for 3 seconds. In order to make the menu easier to navigate, it has been divided into thematic blocks. The   buttons allow us to move through the menu. In order to go one step forward in the setting you are interested in, press  , and after to exit press  . You can return to the main screen at any time by pressing and briefly holding the  button.



Fuel feeding pause – This parameter determines the time interval between successive feeder activations (*Available range: 3 - 999 seconds, factory setting: 55 seconds*)

Fuel feeding time – The parameter specifies how many seconds the feeder will stay switched on to deliver fuel to the boiler. (*Available range: 1 - 60 Seconds, factory setting: 10 seconds*)

Fuel feeding count in sustain mode - This value determines every which blower activation the feeder will turn on. By setting this parameter, e.g. to 3, the feeder will be activated every third blower pause for such a time as set in the **"fuel feeding time"** parameter. The feeding count function would be implemented only when the temperature on the boiler is higher than the one set by the User.

(Available range: 1 - 10, factory default: 2).

Fig.18 shows the actions of the feed count function in sustain mode with the following parameters:

(Feed count in sustain mode: 2, Fuel feeding pause: 10min)

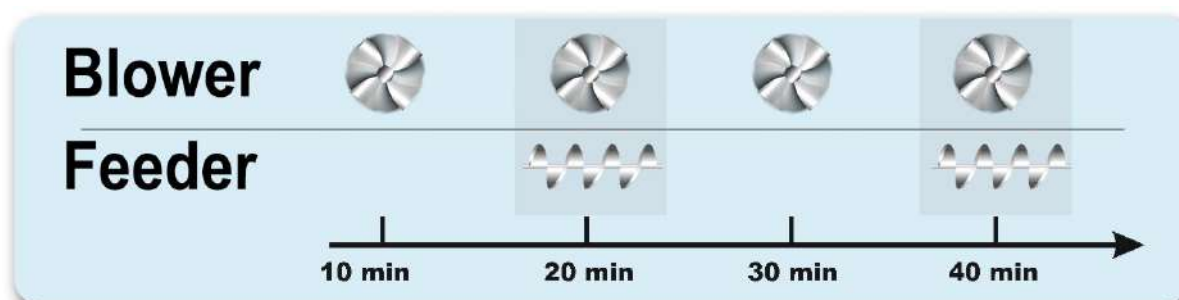


fig. 6

The first threshold of the feeder protection - This parameter defines the critical feeder temperature reading. If exceeded, the "Fuel feeding Time" parameter value will be doubled to protect the fuel tank. This state is indicated by a flashing Alarm LED and an overheat alarm for the feeder. Despite the alarm activation, the controller operation will not be interrupted. (Available range: 50 - 70°C, factory setting: 70°C).

Second threshold of the feeder protection - This parameter defines the critical temperature value at which the controller, in order to protect the fuel bin, activates the feeder in emergency mode, pushing all burning coal from the feeder towards the combustion chamber. Once the alarm state occurs, the controller switches to STOP mode, and the Feeder Overheat alarm is displayed on the screen. The occurrence of this alarm indicates an incorrect configuration of the feeder's basic operating parameters. (Available range: 70 - 90°C, factory setting: 90°C)

Fuel transfer time in emergency mode - This parameter defines the duration for which the feeder will operate in the event of an alarm state. The alarm state occurs when the temperature exceeds the value set in the **"Second threshold of the Feeder Protection"** parameter. (Available range: 1 - 30 minutes, factory setting: 7 minutes)

The feeder temperature reading is continuously visible on one of the main screens (Fig. 7). Using the   buttons, it is possible to change the maximum feeder temperature value (**Second threshold of the Feeder Protection**).



fig. 7

Blower menu



Blower efficiency - With this setting you can adjust the blower power. This parameter is active when the boiler's goal is to reach the set temperature.

(Available range: 1 - 100%, factory default: 20%)

Secondary blower efficiency - With this setting you can adjust the blower power. This parameter is active when the boiler's goal is to reach the set temperature.

(Available range: 1 - 100%, factory default: 20%)

Blower pause in sustain mode - When the boiler has reached the temperature set by the User, the blower goes into cyclic start mode to sustain the combustion process. Thanks to this setting it is possible to determine the length of pauses between these starts. (Available range: 1 - 60 minutes, factory default: 10 minutes)

Blower operation time in sustain mode - The parameter determines for how long (how many seconds) the blower will be on. That function is available once the temperature set by the user is reached by the boiler. (Available range: 5 - 60 seconds, factory default: 20 seconds).

Blower speed increase - In this setting, it is possible to increase the power of the blower while the feeder delivers another dose of fuel to the boiler. Setting this parameter to 10% means that the overall blower power (blower efficiency parameter) will be increased by 10%.

(Available range: 0 – 20%, factory default: 10%)

Blower efficiency in sustain mode - Using this parameter, we can set the blower power when the boiler has reached the set temperature with cyclic blower actions being implemented.

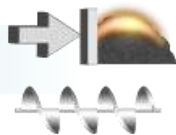
(Available range: 1 – 100%, factory default: 8%)

Boiler pump setting



This menu contains functions responsible for managing the boiler pump module. Detailed operation and configuration is described in section 4.5.

Ash remover



This menu contains functions responsible for managing the Ash remover. Detailed operation and configuration is described in section 4.6.

Boiler setting



Boiler hysteresis - When the Controller switches from the standby mode to the work mode (temperature drops below the setpoint), the hysteresis value determines with what delay (how many degrees Celsius) the Controller will re-enter the work mode (start the blower and burner). For example, if the preset boiler temperature is 60°C and the hysteresis is set to 2°C, the boiler will switch from standby to work mode after the temperature drops to 58°C. (Available range: 1 - 3°C, factory default: 2°C)

Maximum boiler temperature - This setting defines the highest limit of boiler water temperature that can be set by the user. If water in the boiler exceeds this temperature, the Controller treats it as a condition in which the operation of peripheral devices are ignored, and the Controller seeks to stabilize the boiler operation. Moreover, when the maximum boiler temperature is exceeded, the blower and feeder management functions are disabled. (Available range: 70 - 90°C, factory default: 85°C)

Boiler switch off temperature - When the temperature on the boiler drops below this value, the regulator will turn off all peripheral devices (pumps, blower, feeder) and enter STOP mode, which is indicated by: yellow LED on the front panel and message in the lower left part of the screen.

Shutting down of the regulator can occur when the fuel in the bin runs out, when the boiler is disturbed by improper settings, or when there is a power outage.
(Available range: 30 – 45°C, factory default: 35°C)

Warning!!! - Improper manipulation of advanced boiler settings can lead to disruption of the combustion process and consequently shut down the regulator.

Pump switch on temperature - This parameter determines the temperature value for the boiler, at which all available pumps in the controller will be activated. A switch of the pumps off takes place when the temperature falls 5°C below the **Pump switch on temperature**. (Available range: 10- 60°C, factory setting: 40°C)

Warning - If the Pump switch-on temperature is lower than the Boiler switch-off temperature, the pumps will also be disabled when the Controller enters STOP mode.

Maximum exhaust gas temperature – The **TIS**TRONIC660 controller is equipped with an additional output for connecting a Exhaust gas temperature sensor. When a sensor is connected, the flue gas temperature reading is continuously displayed on one of the main screens.

When the maximum flue gas temperature is exceeded, the Controller will report the " Maximum exhaust gas temperature exceeded" alarm. (Available range 80 - 200°C, factory default: 200°C)

Warning!!! - The exhaust gas temperature sensor (PT 1000) is not supplied with the basic Controller setup.

Exhaust fan operation mode – Setting this parameter to "Enabled" activates the Q10 output (closing/opening of the potential-free Q10 contact), allowing control of, for example, the exhaust fan operation. The exhaust fan starts when the START button is pressed and stops when the STOP button is pressed or in case of a fuel feed failure.

Low pressure sensor polarity – The function allows changing the contact polarity in the idle state from **Normally Closed (NC)** to **Normally Open (NO)**.

High pressure sensor polarity – The function allows changing the contact polarity in the idle state from **Normally Closed (NC)** to **Normally Open (NO)**.

Water flow sensor polarity – The function allows changing the contact polarity in the idle state from **Normally Closed (NC)** to **Normally Open (NO)**.

Additional equipment control polarity – The function allows changing the contact polarity in the idle state from **Normally Closed (NC)** to **Normally Open (NO)**.

Water flow control delay time – The flow meter monitors whether water is flowing in the system. The parameter "**Water flow control delay time**" helps eliminate the time delay that may occur during the first few seconds after the pumps are started. (Available range: 5 – 120 seconds, factory setting: 10 seconds)

Blower 2 mode – The function allows changing the operating mode of Blower 2. The available options are Blower 2 or Exhaust Fan. A detailed description and operation of the exhaust fan can be found in section 4.7.

Exhaust extractor



This menu contains functions responsible for managing the exhaust extractor. Detailed operation and configuration is described in section 4.7.

Output test



With this option, it is possible to check the operation and correct connection of all devices controlled by the regulator (feeder, blower, Blower 2, return pump, and central heating pump).

Software version



The function is informational and allows reading the current version of the software installed in the controller.

Restore setting



In case of misconfiguration of the controller, this option allows restoring the default settings.

Language settings



The menu allows changing the language of the controller's interface.

5. Device parameters

5.1 Working conditions of the regulator

Parameter	Value/Range
Power supply	230V/50Hz AC
Humidity range	30 - 75%
Ambient temperature	5 - 40°C
Maximum operating temperature of temperature sensors	100°C
Current output load capacity:*	
Blower	5A
Blower 2	5A
Feeder	5A
Central heating pump	5A
Boiler pump (return)	1A
Alarm output 230V	1A
Exhaust fan	1A
Power consumption without connected external devices	4,5W

*The maximum total output load capacity must not exceed 15A

5.2 List of device parameters

Feeder menu	
Fuel feeding time	Fuel feeding pause
Fuel feeding count in sustain mode	The first threshold of the feeder protection
Second threshold of the feeder protection	Fuel transfer time in emergency mode

Blower menu	
Blower efficiency	Blower 2 efficiency
Blower operation time in sustain mode	Blower pause time in sustain mode
Blower speed increase	Blower efficiency in sustain mode
Exhaust fan efficiency in sustain mode	

Boiler pump setting	
Boiler pump hysteresis	Boiler pump activation temperature
Boiler pump operating mode	

Mixing valve	
Valve 1 operating mode	Valve fully open time
Valve temp. measurement waiting time	Valve pause above setting
Valve 1 operating range above setting	Valve 1 setting, if -10°C outside
Valve 1 setting, if +10°C outside	Valve 1 setting, if 0°C outside

Ash removal	
Delay of turning on the ash remover	Ash removal operating time
Ash removal pause time	

Boiler setting	
Boiler hysteresis	Maximum boiler temperature
Boiler switch off temperature	Pump switch on temperature

Maximum exhaust gas temperature	Exhaust fan operation mode
Low pressure sensor polarity	High pressure sensor polarity
Water flow sensor polarity	Additional equipment control polarity
Water flow control delay time	Blower 2 mode

Language setting	
Language setting	

Exhaust extractor	
Exhaust fan activation in advance	Exhaust fan deactivation delay
Exhaust fan efficiency	Exhaust fan efficiency in sustain mode
Allowed exceeding boiler setting	Minimal exhaust fan speed in sustain mode

6. Alarms

6.1 Alarm handling

During the operation of the regulator, emergency situations and alarm states may occur. Alarms are displayed directly in the main screen of the regulator (*Fig.8*). In addition, alarm conditions are indicated for you by a flashing red LED on the right side of the front panel. With the  button we launch the screen that displays the list of problems that have occurred (*Fig.9*). In case of multiple errors, the  buttons can scroll through the list, while the  button is responsible for deleting errors.



fig. 8



fig. 9

The following failures may occur in the regulator:

- Boiler temp. measurement error - missing or damaged sensor
- Return temp. measurement error - missing or damaged sensor
- Feeder temp. measurement error - missing or damaged sensor
- Valve 1 temp. measurement error - missing or damaged sensor

- Boiler emergency threshold exceeded– boiler temperature above 94°C (the device enters the boiler protection mode)
- Oververhitting STB - the external safety thermostat has tripped. The alarm can be canceled after the boiler temperature drops below 60 ° C
- Flue gas temperature measurement error - means missing or damaged sensor
- Feeder overheat
- EEPROM error - software error - contact the device manufacturer.

6.2 *Optional emergency sensors*

The **TIS**TRONIC660 regulator has been empowered with the ability to connect additional emergency sensors, such as:

Water flow failure – The input is intended for connecting a device that monitors water flow in the boiler. Supplying voltage to the input is not allowed, as it is designed as a normally closed contact. Control over the device is active only when the "Boiler pump operating mode" is set to "Return temperature".

The control operates according to the following algorithm:

The control starts when the "Boiler return pump" is activated based on the return temperature sensor readings. To avoid false alarms, the control is disabled after the boiler pump stops upon reaching the required return temperature and is reactivated with the next pump startup.

In the event of a "Water flow failure," the operation of the feeder, agitator, and blowers are stopped, while all pumps connected to the controller are activated. Additionally, the emergency 230V output is enabled, and the message "Water flow failure" appears on the controller panel, while the Exhaust fan remains active.

Low water pressure – The input is intended for connecting a device monitoring low water pressure in the boiler. Supplying voltage to the input is not allowed, as it is designed as a normally closed contact

In the event of a "Failure," the operation of the feeder, agitator, and blowers are stopped, and all active pumps connected to the controller are turned off. Additionally, the emergency 230V output is activated, and an alarm message is displayed on the controller panel.

High water pressure – The input is intended for connecting a device that monitors high water pressure in the boiler. Supplying voltage to the input is not allowed, as it is designed as a normally closed contact.

In the event of a "Failure," the operation of the feeder, agitator, and blowers are stopped, while all active pumps connected to the controller are turned on. Additionally, the emergency 230 V output is activated, and the message "Failure – High Water Pressure" is displayed on the controller panel. The "Exhaust Fan" remains active.

Feeder/Agitator Failure – The input is designed to monitor the status of the feeder and fuel agitator. Supplying voltage to the input is not allowed, as it is designed as a normally closed contact

The connection must be made using a cable of appropriate cross-section by using an additional control cabinet for fuel feeding, which is supplied with the controller.

- **Styki 11–12: Feeder alarm**
- **Styki 13–14: Agitator alarm**

In the event of exceeding the load current of the agitator or feeder, the protective switch is turned off, and the contacts 11–12 or 13–14 are interrupted

In the event of a "Failure," the operation of the feeder, agitator, and blowers are stopped, while all active pumps connected to the controller are turned on. Additionally, the emergency 230 V output is activated, and a message appears on the controller panel: Feeder failure or Agitator alarm. The exhaust fan remains inactive.

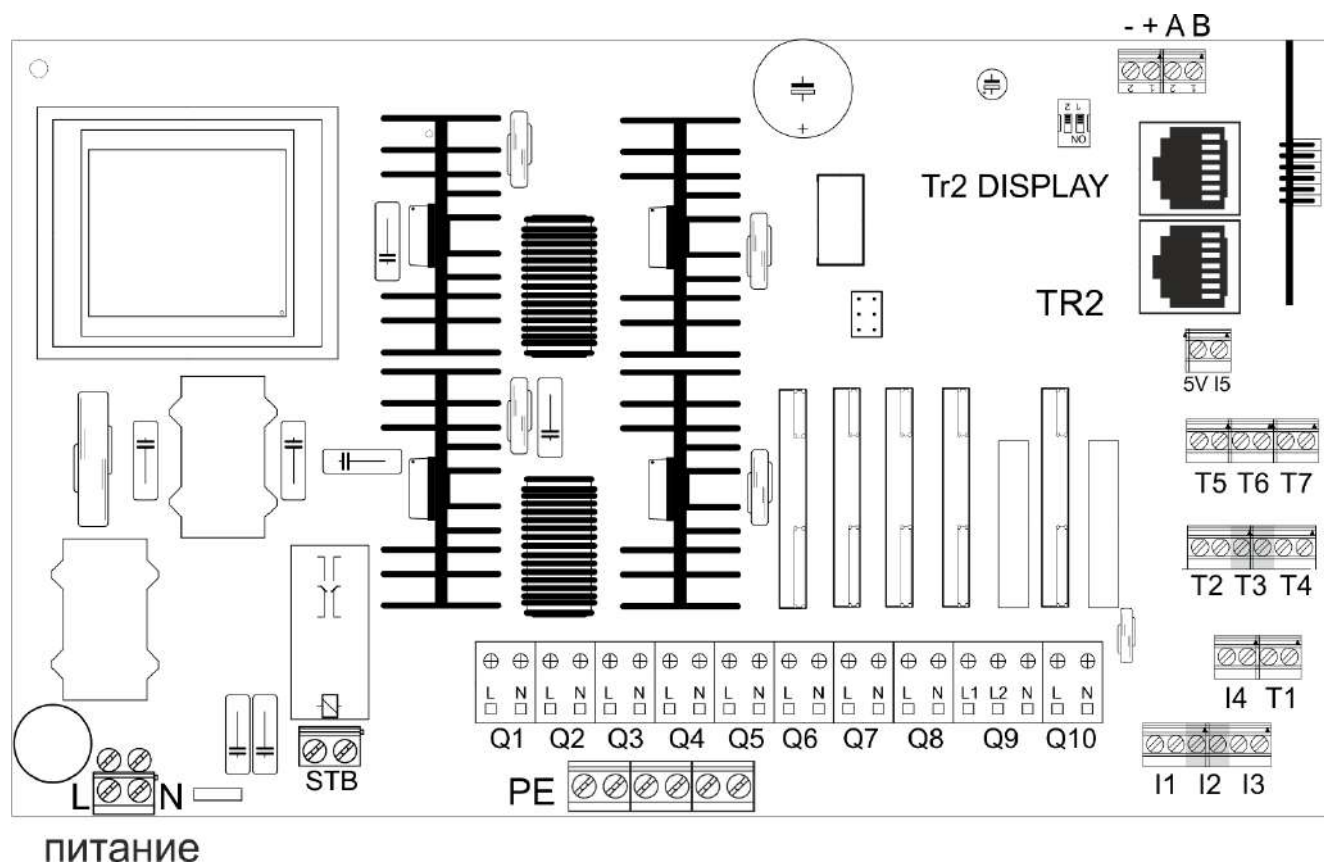
Additional equipment control – The input is designed to monitor external devices. Supplying voltage to the input is not allowed, as it is designed as a normally closed contact

In the event of a "Failure," the operation of the feeder, agitator, and blowers are stopped, while all active pumps connected to the controller are turned on. Additionally, the emergency 230 V output is activated, and a message appears on the controller panel: Failure Additional equipment control appears on the controller panel. The exhaust fan remains active."

Warning!!! The water flow failure, low water pressure, high water pressure control and additional equipment control outputs have the ability to change polarity and can be set as normally closed or normally open, depending on the requirements.

7. Maintenance and assembly of the device

7.1 View of the board and list of the connectors

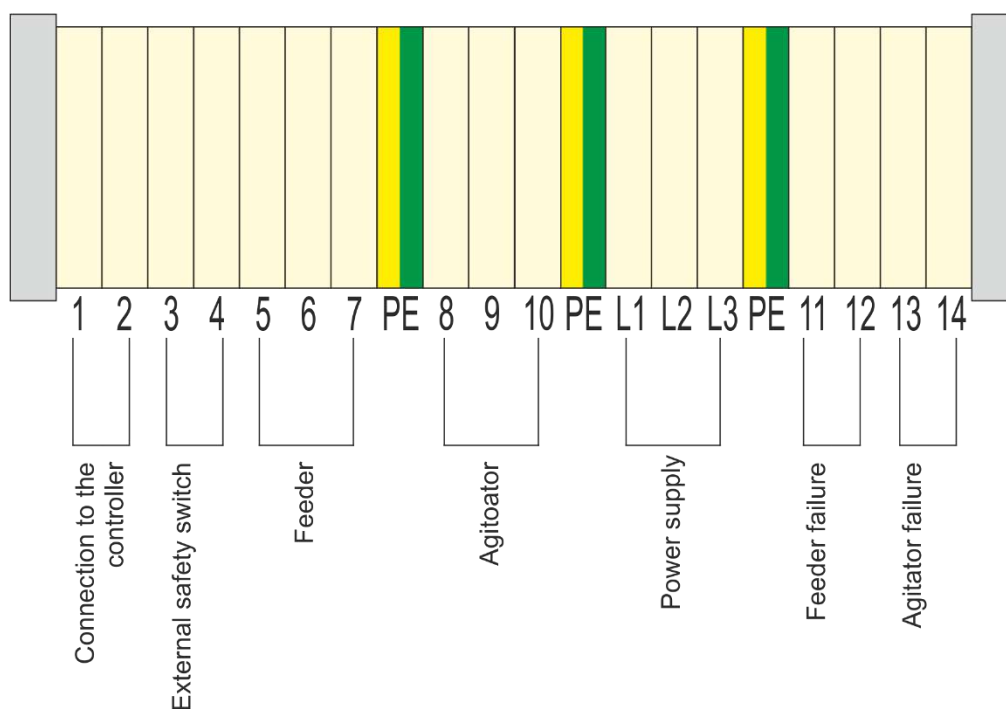


Symbol	Description
STB	STB thermostate
Q1	Blower output
Q2	Secondary blower output
Q3	Central heating Pump output
Q4	Feeder Output
Q5	Return pump output
Q6	Alarm output 230V
Q7	Ash remover output
Q8	Valve 1 pump output
Q9	Mixing valve 1 output
L1+N	Opening of mixing valve 1

L2+N	Closing of mixing valve 1
Q10	Exhaust fan output
I1	Water flow failure
I2	Low water pressure
I3	High water pressure
I4	Feeder alarm
I5	Agitator alarm
T1	Exhaust gas temperature sensor
T2	Boiler temperature sensor
T3	Return temperature sensor
T4	Feeder temperature sensor
T5	Valve 1 temperature sensor
T6	Outdoor temperature sensor
T7	Additional equipment control
TR2	Add-on module connectors
TR2_DISP	Panel connectors
TR2	Add-on module connectors
- + AB	Alternative add-on connectors

7.2 Wiring diagram for the fuel feeder power supply cabinet

The connection description in the power supply cabinet is shown in Figure 10



DEVICES NAME	CONNECTOR NUMBER	CONNECTION TO HD1	ELEMENTS SYMBOL	COMMENTS
Connection to the Controller	1, 2	Q4		
External safety switch	3, 4			
Feeder	5, 6, 7			3x400VAC
Agitator	8, 9, 10			3x400VAC
Power supplu	L1, L2, L3			3x400VAC
Feeder failure	11, 12	I4		
Agitator failure	13, 14	I5		

fig. 10

Wiring diagram in the power supply cabinet., fig. 11.

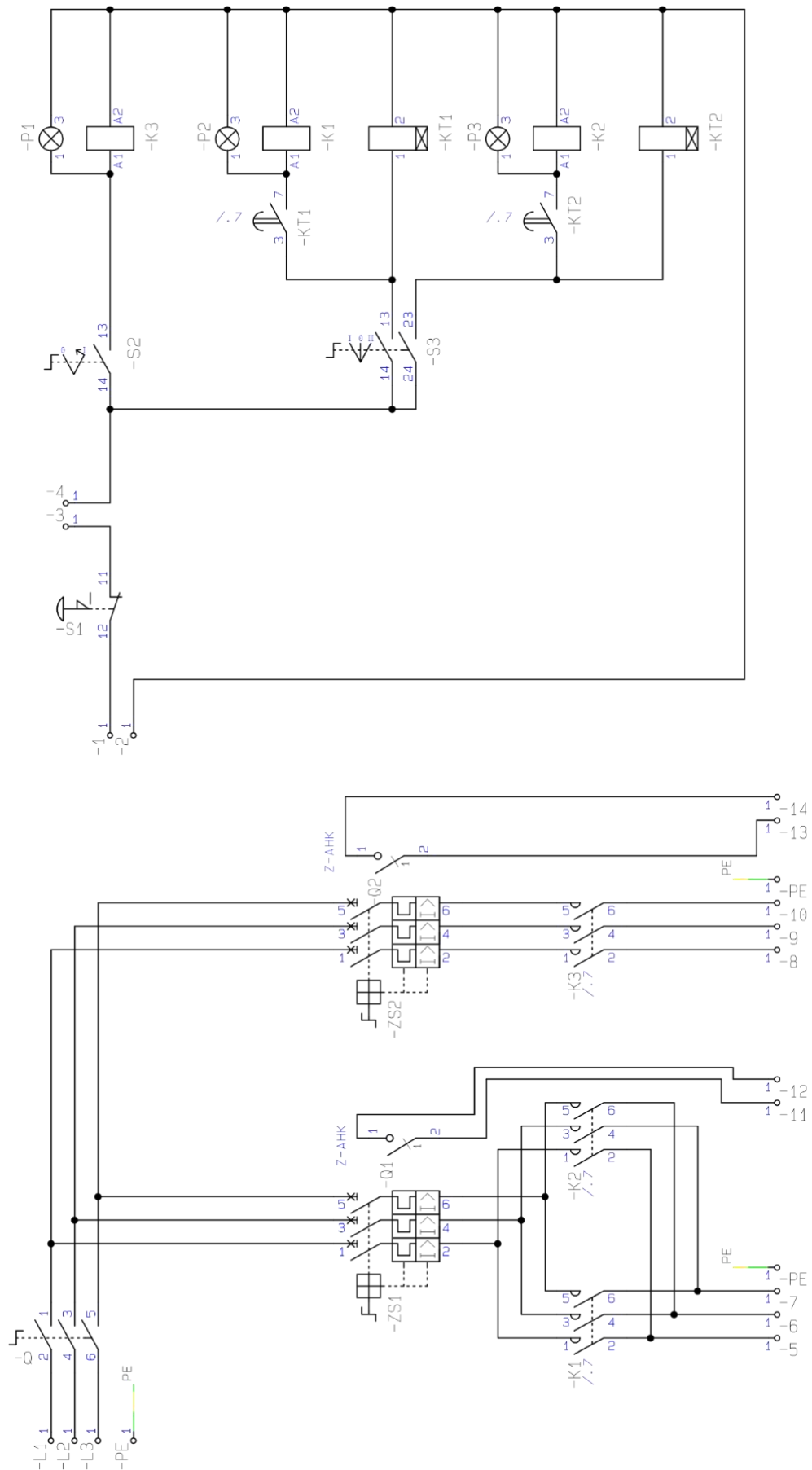


fig. 11

7.3 Connecting and replacing temperature sensors



Before performing any work inside the controller, it is essential to disconnect it from the power supply by unplugging it from the mains socket

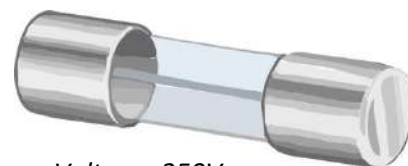
After disconnecting the plug from the power outlet, tighten the retaining screws located on the housing and then remove the top cover. The sensors used in the Controller have no polarity, i.e. the order of connecting the wires is not important. Using the schematic diagram, find the connector you are interested in and using a screwdriver mount the sensor.

Sensor name	Length	Type
CH sensor (Boiler)	3 meter	Kty-81-210
Feeder sensor	3 meter	Kty-81-210
STB thermostat	2.5 meter	Bimetal

Warning!! - The sensor must be mounted dry, i.e. without oil, water, etc

7.4 Fuse replacement

If a fuse blows, it is possible to replace it with a new one without losing warranty rights. The receptacle housing the fuse is located on the controller main board. Please note that the new fuse should have the same specifications as the damaged fuse.. The specifications and dimensions of the fuse are shown in Figure 12.



Voltage: 250V
Current: 15A
Diameter: 5mm
Length: 20mm

fig. 12



Before and during the heating season it is necessary to check the technical condition of the cables, check the fixing of the unit, clean it from dust and other dirt

Disposal of electrical and electronic waste



V1.00

Taking care of the natural environment is our top priority. Awareness that we produce electronic devices obliges us to dispose of waste electronic components and devices in a nature-friendly way. Therefore, the company received a registration number assigned by the Chief Inspector of Environmental Protection.

000002627

The symbol of a crossed-out waste container on a product means that the product must not be disposed of in normal waste bins. By sorting recyclable waste we help to protect the environment. It is the user's responsibility to deliver the waste equipment to a designated collection point for recycling of waste from electrical and electronic equipment.

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Warranty repair annotations

Date of repair	Description of the fault	Signature

Notes

[illegible]

.....

Device warranty certificate

.....
Symbol and serial number

.....
Date of manufacture

.....
(Date of sale)

.....
(Seller's stamp)

Warranty claims and inquiries regarding the
controller should be addressed to the manufacturer: