



Boiler controller

Installation and user manual

Versions: controller with display, controller without display, room thermostat, app and web page

fireheatlink.pages.dev

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1. About the system

1.1. What it is for

The boiler controller runs a boiler fired with **eco-pea coal**, **pellets**, or a boiler with a **blower only**. It watches the water temperature, controls the blower, the feeder (auger) and the pumps, protects the boiler, sends alarms to your phone and counts fuel consumption. You control the boiler from the screen at the boiler, from the room thermostat, from the phone app and from the web page, also when you are away from home.

1.2. System versions

The system has several parts that you can have in different sets:

Part	What it is	What it does
Controller with display	A control board with a 3.5" touch screen (480×320) at the boiler	Runs the boiler and shows its state. Full control from the screen, no phone needed
Controller without display	Just the control board in a box	Runs the boiler. Controlled from the app, the web page and one button on the board
Room thermostat	A touch panel in the room with its own temperature sensor	Measures the room temperature, sets it and can control the boiler by the room. Shows how the boiler works and its alarms
App and web page	The same app on the phone, the computer and on the home network	Full control of the boiler from anywhere on Earth

Every controller (with and without display) has the same regulation and safety functions. They differ in how you operate them.

1.3. Boiler types

During the first start (the wizard) you choose the boiler type:

- **Blower only:** a boiler without a fuel feeder.
- **Feeder and blower: eco-pea coal:** fuel dosed by the auger, manual ignition.
- **Feeder and blower: pellet:** fuel dosed by the auger, automatic ignition with an igniter (heater) and shutdown.

The available functions and cards in the app depend on the chosen type.

1.4. How the parts connect

- The controller connects to your home **WiFi** and to the server. This gives you access from the app and from the page from anywhere. **Without WiFi the controller still works**, but only locally (from the screen or on the controller's own "Boiler" network).
- The **thermostat** joins the "Boiler" network provided by the controller, or the home WiFi the controller is on. So it also works without a router and without the internet. The WiFi you enter on the thermostat is saved in the controller too.
- The **app** logs in with the data you get from the installer: the device number, the login and the password.

2. Safety

Most important. The controller is one of the boiler protections, never the only one. The boiler must be safe even when the controller is off, frozen or without power. The installation is made and accepted by a qualified installer, according to the regulations and the boiler manual.

2.1. Installation safety rules

1. **The controller should never be the only protection.** Electronics, sensors, WiFi and power can fail. The boiler must be safe even when the controller is off, frozen or without power.
2. **Safety valve.** A closed system (with an expansion vessel) needs a working safety valve rated for the pressure given by the boiler manufacturer, with a visible discharge. Open system: a free expansion vessel and a safety pipe without any valves.
3. **Thermal protection independent of power.** A cooling valve (thermal safety valve or cooling coil) according to the solid fuel boiler manual. It works without the controller and without power.
4. **Safety thermostat (STB).** Manually reset, cutting the blower and the feeder independently of the controller. The 90 °C cut in the controller is software only.
5. **Heat removal without power.** A solid fuel boiler keeps giving heat after a power failure. Provide emergency power for the pumps (UPS or a battery with an inverter), a gravity circuit or a buffer tank.
6. **Never close valves** that could cut the boiler off from the expansion vessel, the safety valve or the heat consumers. Mark this on the installation.
7. **Return and pressure.** Return protection (four-way valve or mixing pump), venting, a pressure gauge and a yearly check before the season.
8. **Burn-back into the hopper.** Embers can travel up the feeder tube into the fuel in the hopper. You need protection that works without power: a self-acting sprinkler (a thermal valve lets water into the feeder tube above a set temperature), plus a slide gate or a rotary valve or a break in the fuel line, according to the boiler manual. The controller only helps: it raises an alarm at 60 °C at the feeder, but it does not replace the sprinkler.
9. **Boiler room.** A working chimney, ventilation, a carbon monoxide detector and a fire extinguisher.
10. **Testing the protections.** Every season disconnect a sensor and check that the boiler stops, the pumps run and the notification arrives. Check the safety valve according to the manufacturer manual.
11. **Responsibility.** Installation and acceptance are done by a qualified installer according to the regulations and the boiler manual. The controller is an addition to the installation, and the installer and the user are responsible for its compliance with safety rules. Take the values (pressure, temperatures) from your boiler documentation.

2.2. What the controller does for safety

These are software protections. They work locally, also without the internet, but they do not replace the protections from point 2.1.

Situation	Controller reaction
Boiler water 90 °C or more	Cuts the blower and the feeder, the pumps run and remove heat. Returns to normal after the water drops below 80 °C, and you start the boiler manually
Loss of the boiler water sensor (longer than 15 s while running)	Stops the boiler. The pumps may run if the boiler was running within the last 2 hours
Flue gas 250 °C or more (20 s)	Stops the boiler, the pumps run
Auger 60 °C or more	Alarm. Clears after the temperature drops below 50 °C
Error of any sensor	A separate alarm for each sensor. Boiler stopped
Pellet ignition failed	A message with the reason, the boiler does not continue

After a faulty sensor is replaced the controller returns to normal operation. You then start the boiler manually.

3. Installation and wiring

Note. All work with the power disconnected, ideally by an electrician. Choose the wires according to the rating plates of the devices. Connect the metal housings of the devices to the protective earth PE.

3.1. Board terminals

Each output has three terminals: **L**, **N** and **PE**. The wires have fixed colours, matching the diagrams below:

Marking	Wire	Colour
L	Line (voltage switched by the controller)	brown
N	Neutral	blue
PE	Protective earth	green-yellow
VCC, IN, GND	Temperature sensors	red, yellow, black

Terminal on the board	You connect	Notes
POWER SUPPLY L N PE	230 V mains	Powers the whole controller
RESERVE L N PE	The pellet igniter (heater)	Pellet boiler only. With a thermal fuse in series on L. Leave empty in the other versions
BLOWER L N PE	The blower	Phase control, power 0 to 100%
AUGER MOTOR L N PE	The feeder motor	Boiler with a feeder only. Leave empty for blower only
CH PUMP L N PE	The heating circuit pump	
DHW PUMP L N PE	The hot water (cylinder) pump	
THERMOMETERS VCC IN GND	Temperature sensors	One 1-Wire bus: sensors in parallel

3.2. Diagram: pellet boiler

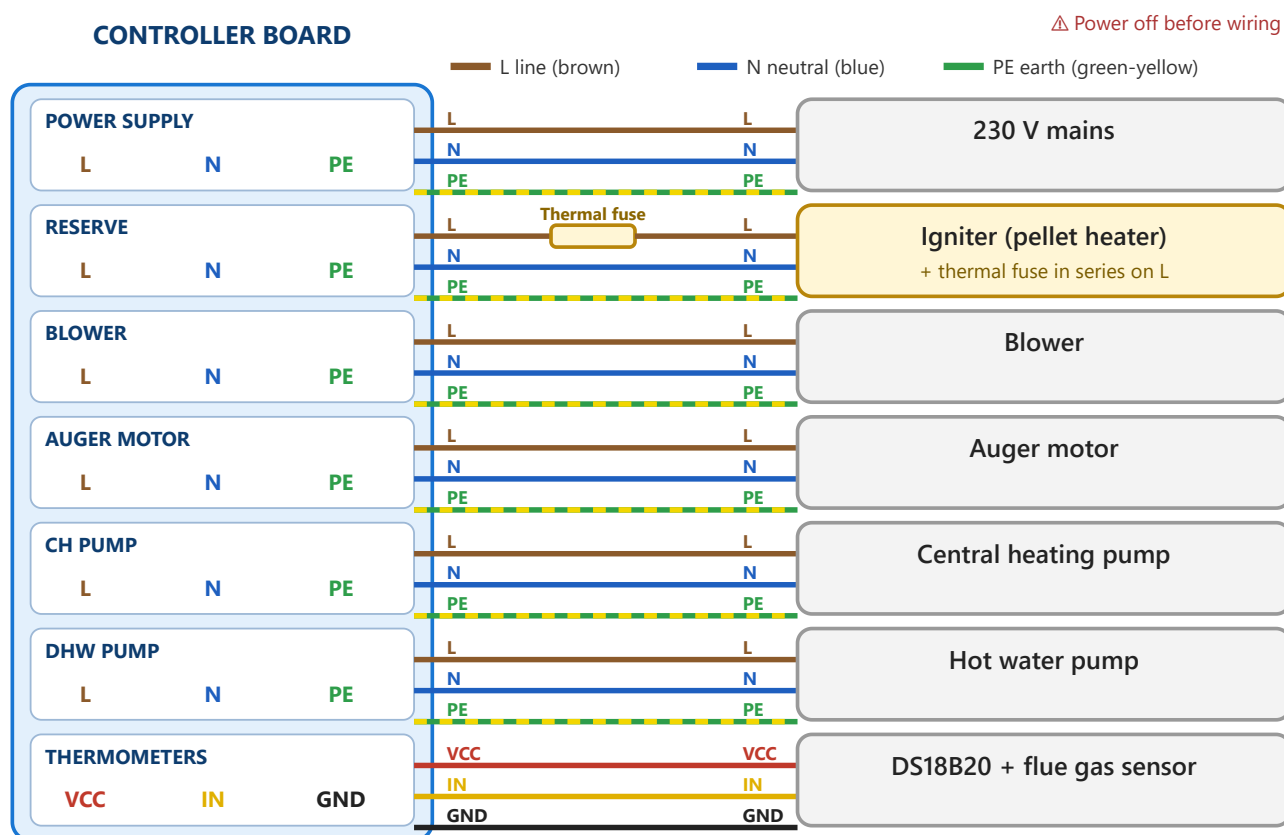


Fig. 1. Wiring diagram: pellet boiler. The letters L, N, PE sit at every wire, the colours match the terminals.

1. 230 V mains to the **POWER SUPPLY** terminal.
2. Blower, auger motor, CH pump and DHW pump: one L, N and PE wire to each device.
3. **Igniter (heater)** on the **RESERVE** output, **with a thermal fuse** in series on the L wire, mounted at the heater. Choose it for the heater working temperature (it must trip above it) and for its current.
4. Sensors: see point 3.5.

3.3. Diagram: eco-pea coal boiler

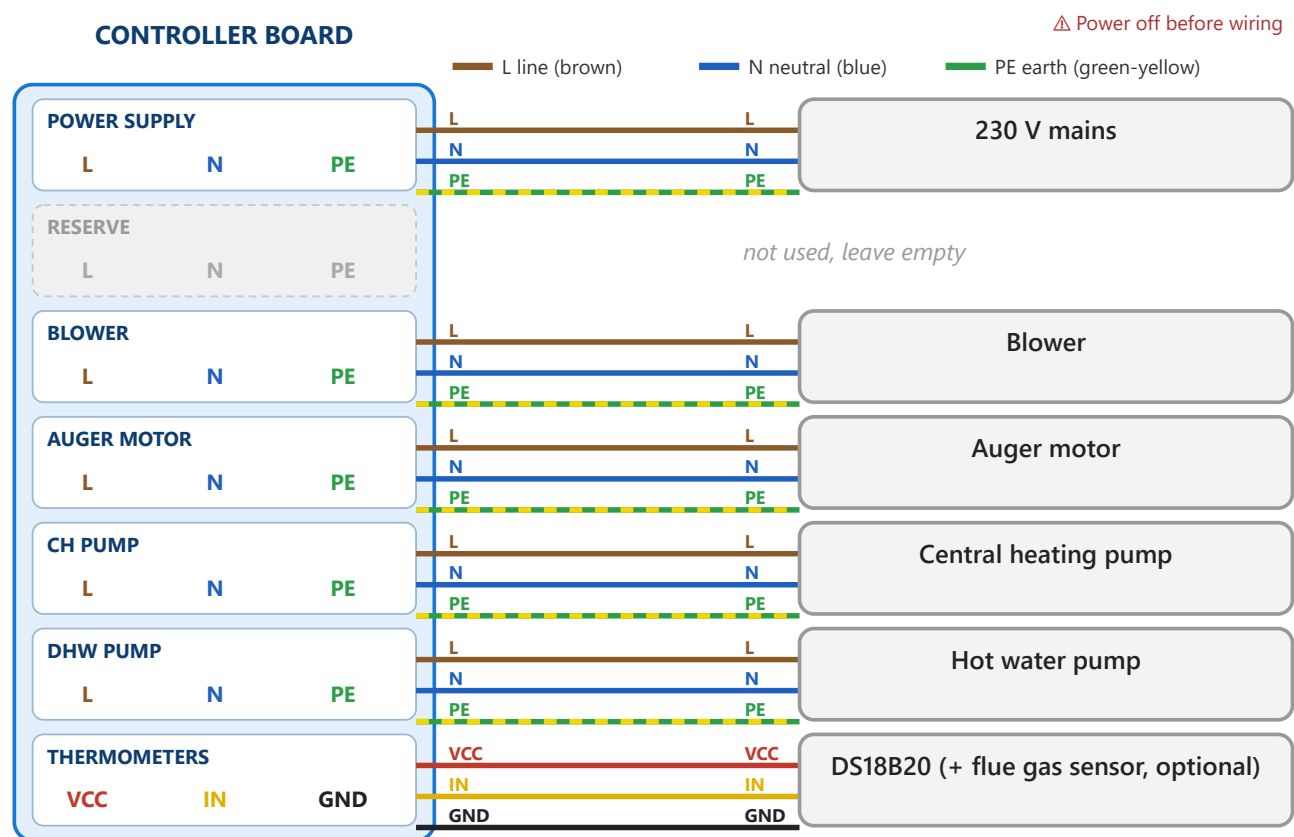


Fig. 2. Wiring diagram: eco-pea coal boiler. The RESERVE terminal is not used.

As for pellet, but **without the igniter**. The RESERVE terminal stays empty. You light the boiler manually (fuel and a match), and the controller feeds a starting dose and watches that the fire holds.

3.4. Diagram: blower only

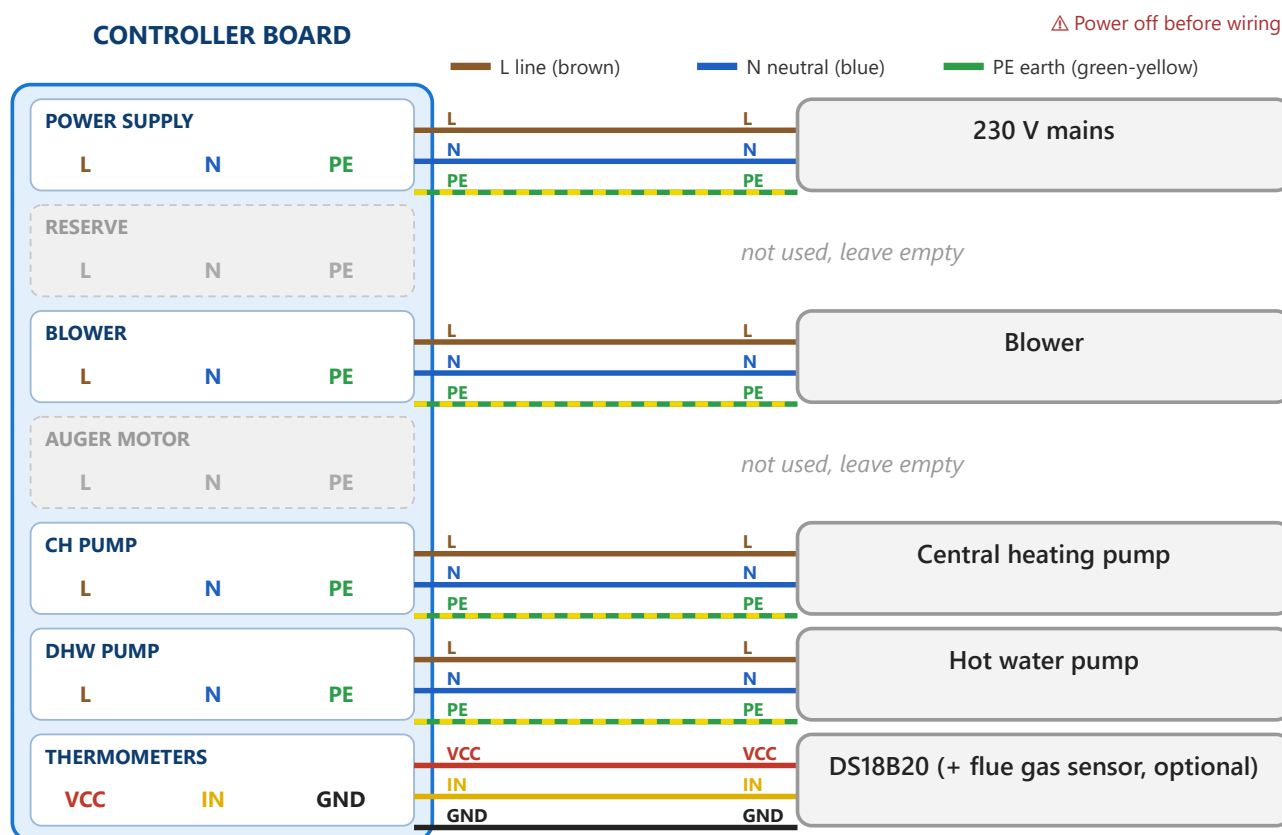


Fig. 3. Wiring diagram: boiler with a blower only. The RESERVE and AUGER MOTOR terminals are not used.

Only the blower, the pumps and the sensors. The RESERVE and AUGER MOTOR terminals stay empty.

3.5. Temperature sensors

Connect all the sensors in parallel to one bus (terminals **VCC**, **IN**, **GND**). You assign the sensor roles later in the app (the "Temperature sensors" card) or on the screen (Settings, Sensors).

Role	What it measures	If missing or faulty
Boiler water	Water temperature in the boiler. The main sensor	Alarm, boiler stopped
Hot water	Temperature in the cylinder	Alarm and the boiler stops (if the wizard says the cylinder has a sensor)
Feeder	Temperature of the feeder tube (auger)	Alarm, boiler stopped
Flue gas	Flue gas temperature (thermocouple on the same bus)	Alarm. Required for automatic pellet ignition

Every used sensor has its own alarm. Turn off a sensor you do not connect in the wizard (e.g. "No cylinder") so it does not cause an alarm.

3.6. Button and LED on the controller

Every controller has **one button** and an **LED** that shows the boiler state.

Action	Effect
Short click while the boiler is stopped	Lights the boiler. Pellet ignites automatically. Eco-pea coal: manual ignition, and when the fire burns click once more to switch to automatic mode
Short click during pellet ignition	Cancels the ignition
Hold for 2 s	Stops the boiler. The LED turns red, a white flash at the end means "release"
Hold for 30 s	Restores factory settings. After a few seconds the LED blinks purple, faster at the end. Releasing before the end cancels the reset

LED colour	Meaning
Dim blue	Boiler stopped
Orange, pulsing	Ignition
Green	Automatic operation
Yellow	Manual mode
Purple, pulsing	Shutdown or purge
Red, fast blinking	Alarm
Two red flashes	Ignition failed
White, pulsing	An update is running
Blue and white alternating	Wizard not finished
Red, growing	You are holding the button (stopping the boiler)
Purple, blinking	You keep holding: counting down to factory settings

3.7. First power-up

After wiring, switch the power on. The controller starts with the first-start wizard (a blue and white LED means "wizard not finished"). The next steps depend on the version: see chapter 4.

4. First start

In every version you reach the same wizard (point 4.4). Only the way to it differs.

4.1. Controller with display

1. Switch the power on. The wizard appears on the screen.
2. Go through the wizard (point 4.4): language, boiler type, sensors, power, autotuning.
3. On the main screen you start and stop the boiler, and see temperatures and pumps (chapter 6).
4. **The phone is optional.** Without WiFi everything works locally from the screen. To control from the phone: add WiFi (the last wizard step or Settings, WiFi), then log in on the page.

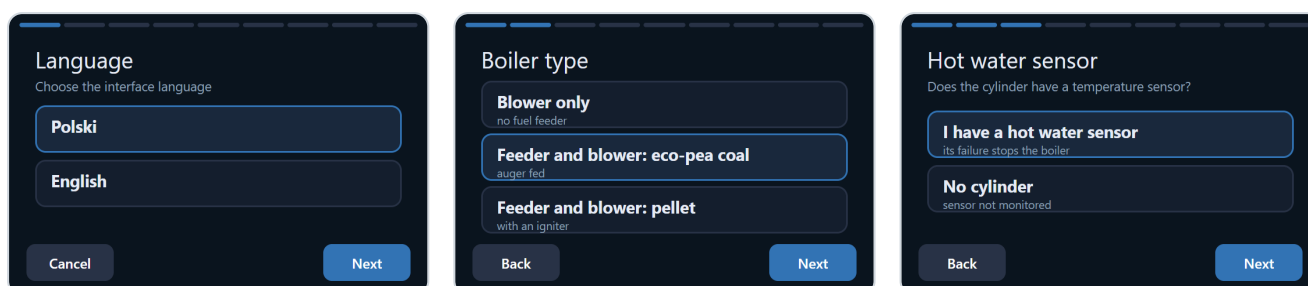


Fig. 4. Wizard steps on the controller screen (simulated screen).

4.2. Controller without display

You need a phone for the first setup.

1. Switch the power on. The controller starts its own WiFi network called **"Boiler"**. Network password: ____ (from the sticker or from the installer).
2. In the phone open the WiFi settings and pick the **"Boiler"** network. The phone may say the network has no internet. That is normal, stay connected.
3. The controller page opens. If not, tap "Sign in to the network" or type **192.168.4.1** in the browser.
4. Choose the green **"Run the setup wizard"** button. From here the wizard guides you (point 4.4).
5. **The last wizard step is WiFi.** Pick your network from the list ("Scan again" refreshes it), enter the password and tap "Connect to WiFi". The controller restarts and joins your network.
6. Switch the phone back to your own WiFi (the "Boiler" network disappears). Open the page, "Login" and the data from the installer, then add the page to the home screen.
7. If the wizard does not open in the portal window, choose "Use this network as is" in the browser menu (:), or open **http://192.168.4.1/full** in Chrome.

The start page has three buttons: "Run the setup wizard" (recommended), "Enter my WiFi now" (you can run the wizard later) and "Open the local page" (the full controller app, without the internet).

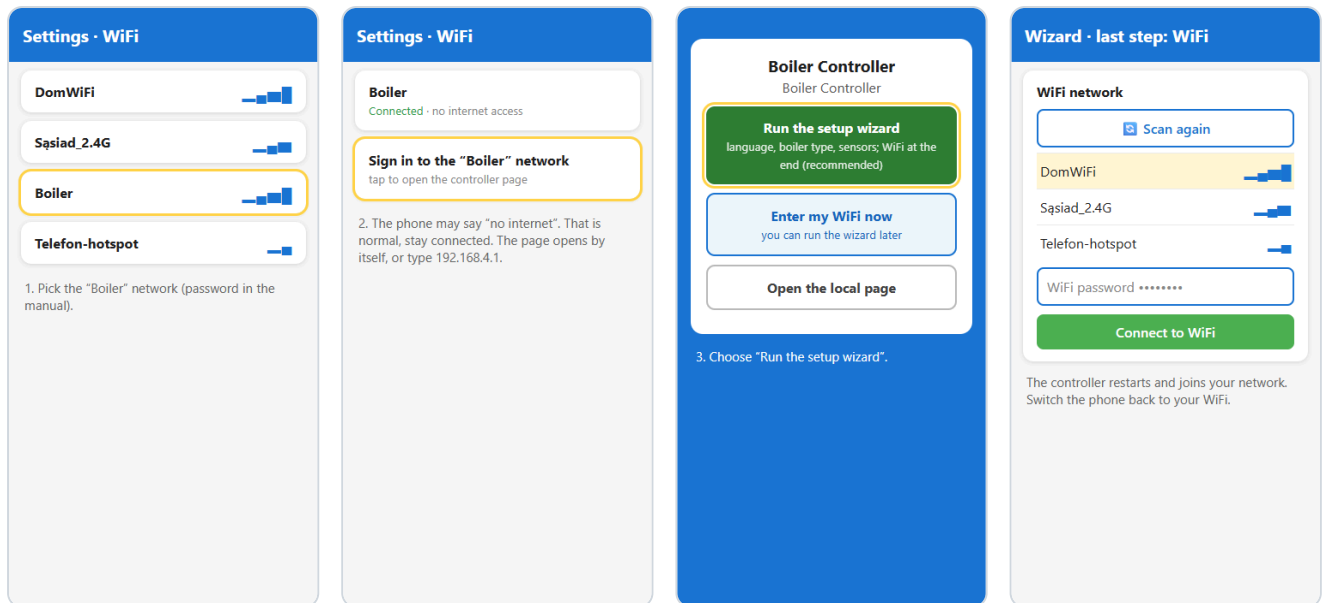


Fig. 5. From picking the “Boiler” network to the last wizard step (WiFi). Illustration.

4.3. Room thermostat

1. The boiler controller has to be running first, within reach of the thermostat.
2. Switch the thermostat power on. If no network is saved yet, the thermostat **joins the “Boiler” network** provided by the controller by itself. In the top right corner you see the amber **“Boiler: via AP”**.
3. Open **Settings**, then **WiFi**, tap “Scan”, pick your home network and enter the password on the on-screen keyboard. **The thermostat saves this network in the controller too**, so you enter it only once and both devices move to the home WiFi. You can remove a wrong network with “Forget network”.
4. The controller has to see the chosen network. If it does not (it is out of its range), the thermostat shows an error and changes nothing.
5. When the controller is already on the home WiFi, the thermostat simply picks the same network and finds the boiler by itself. The green **“Boiler: connected”** means it is ready.
6. Set the room temperature with plus and minus. Turn on **Room control** if the boiler should follow it.

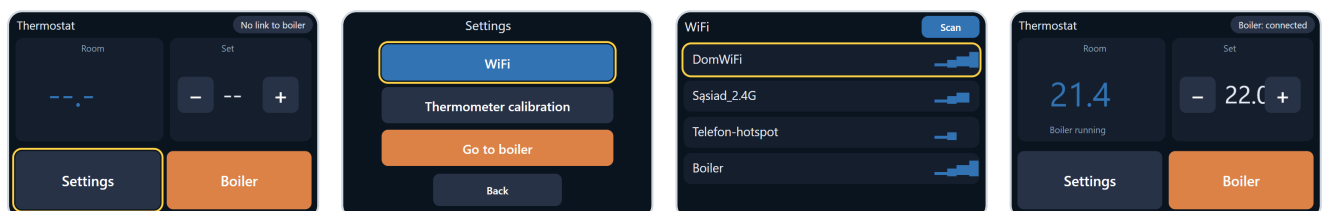


Fig. 6. Thermostat screens (simulated): no link, menu, network choice, the screen after connecting.

4.4. First-start wizard

The wizard is the same on the controller screen and on the page. At every step you can go back (“Back”) or cancel (“Cancel”: the choices made earlier stay, and the wizard can be started again from Settings).

Language
Choose the interface language. It also applies to the touch panel and the thermostat.

Polski

English

Cancel Next

Boiler type
What does your boiler have?

Blower only
no fuel feeder

Feeder and blower: eco-pea coal
auger fed

Feeder and blower: pellet
auger fed, lower flue gas temperature

Cancel Back Next

Hot water sensor
Does the installation have a domestic hot water tank (boiler) with a temperature sensor? A failure of any sensor in use stops the boiler.

I have a hot water sensor
tank with a sensor: its failure stops the boiler

No hot water tank
no hot water sensor: it is not monitored

Cancel Back Next

Fig. 7. The wizard on the page: language, boiler type, hot water sensor.

Step	What you choose	Description
Language	Polish or English	The language applies to the page, the touch panel and the thermostat
Boiler type	Blower only, eco-pea coal or pellet	The next steps and the available functions depend on it
Profile name	The name of the settings set	A suggested name that you can change. You can have up to 5 profiles. You can also pick an existing profile to edit
Hot water sensor	Whether the cylinder has a temperature sensor	If yes, its failure stops the boiler. If "No cylinder", the sensor is not monitored
Flue gas temperature sensor	Whether you have a flue gas sensor	Control is more accurate with it, because the flue gas reacts to the blower within tens of seconds and the water after ten minutes or more. For pellet: a question about automatic ignition with the igniter (needs the flue gas sensor) or manual ignition
Boiler power	Power in kW	Used to work out the dosing and to compare with other users' settings. For blower only it is the last step with power
Fuel dosing	"Calculate dosing"	The controller works out the feeder run and pause from the boiler power, nothing has to be weighed. Reference: eco-pea coal, 17 kW boiler: 6 s run and 35 s pause. For pellet the values are estimates
Automatic dosing trim	Yes or no	Every 10 minutes the controller checks the blower: if it is almost always at maximum, there is too little fuel and the pause shortens; if at minimum, the pause lengthens. Changes of 8% at a time, within 60 to 160% of the calculated pause
Autotuning	"Start autotuning" or "Skip"	Picks the blower PID settings for the boiler. Takes from ten minutes to several dozen. The boiler must be lit and running, water at least 50 °C, flue gas at least 90 °C (with a flue gas sensor). The wizard has buttons for ignition and for manual control of the blower and the auger
Blow-through	Yes or no	From time to time the blower runs at high speed and cleans the burner of ash. The feeder stands still meanwhile. You set: every how many minutes of operation, blow-through time, blower power

Step	What you choose	Description
WiFi network	Network and password	Only on the controller without display in the “Boiler” network mode. Can be skipped and done later

Without a flue gas sensor the control works by the boiler water on the default settings: PID 9 / 0.01 / 8, auger by the dosing worked out from the power, blower max 75% and 0% at 6° before the setpoint, falling-trend boost: band 1 °C, power 80%. You can change them in the settings.

Flue gas temperature sensor

The flue gas sensor reacts to the blower within tens of seconds while the boiler water takes over ten minutes, so control is more accurate. The flue gas sensor is a thermocouple on the 1-Wire bus.

I have a flue gas sensor
control by flue gas, water only guards the set temperature

No sensor
control by boiler water temperature (default settings)

Flue gas reading: **158.0 °C**

The flue gas setpoint will be picked automatically during autotuning.

Cancel Back Next

Fuel dosing

The controller calculates the feeder run and pause times from the boiler power, nothing to weigh. The reference is eco-pea coal on a 17 kW boiler: 6 s on and 35 s off. For pellets the values are estimates (lower calorific value), so enabling the trim in the next step is worthwhile. You can change them in Settings.

Boiler power (kW)

Calculate dosing

The result appears after calculation.

Cancel Back Next

Automatic dosing trim (optional)

Every 10 minutes the controller checks how hard the blower works. If it sits at maximum almost all the time, there is too little fuel and the pause shortens. If it sits at minimum almost all the time, there is too much fuel and the pause lengthens. Changes are small (8% at a time) and stay within 60% to 160% of the calculated pause.

Yes, enable trim
trim based on blower activity

No, fixed dosing
the pause stays as calculated

Cancel Back Next

Autotuning

Autotuning picks the blower settings for your boiler. It takes from about ten to a few dozen minutes. The boiler must be lit and running, with water at least 50 °C.

Done. Settings saved.

All conditions met - you can start autotuning.

✓ Boiler running
✓ Flue gas at least 90 °C (now 158 °C)

Start autotuning

Cancel Back Next

Blow-through

Some controllers periodically run the blower at high speed to clear ash from the burner. The feeder stops meanwhile. Do you want this function? You can change it later in Settings.

Yes, enable blow-through
AUTO mode only, while the boiler is running

No blow-through
function off

Every how many minutes of operation

Blow-through time (s)

Blower power (%)

Cancel Back Finish

Fig. 8. Further wizard steps: flue gas sensor, dosing, trim, autotuning, blow-through.

5. App and web page

5.1. Logging in

Open the controller page: **<https://fireheatlink.pages.dev>** (no "www", nothing added). You see a start screen with two tiles: **Login** and **Information**. In "Login" enter the **login**, the **password** and the **device number** (you get them from the installer). The "Remember me on this device" box remembers the data, so next time you go straight to your boiler. Do not tick it on someone else's computer. The "Log out" button in Settings removes the remembered password.

The **Information** tile shows a description of the system and a short first-use guide. It also has the **demo**: the full app with simulated data in which you can safely try everything. In the demo nothing is sent to the real boiler or to the community.

5.2. Installing the app on the phone

The app needs no store. Open the page and choose "**Add to home screen**":

- **iPhone (Safari)**: the Share button, then "Add to Home Screen".
- **Android (Chrome)**: menu :, then "Install app" (or "Add to home screen"). The "**Install app**" button is also in Settings.

The app has its own icon, opens already logged in, updates itself and works in Polish or English (the name: "Piec CO" or "Boiler", depending on the language).

5.3. Main screen

The page consists of cards that you can collapse and expand by tapping the header. In Settings (point 5.20) you turn the cards on and off.

Temperatures

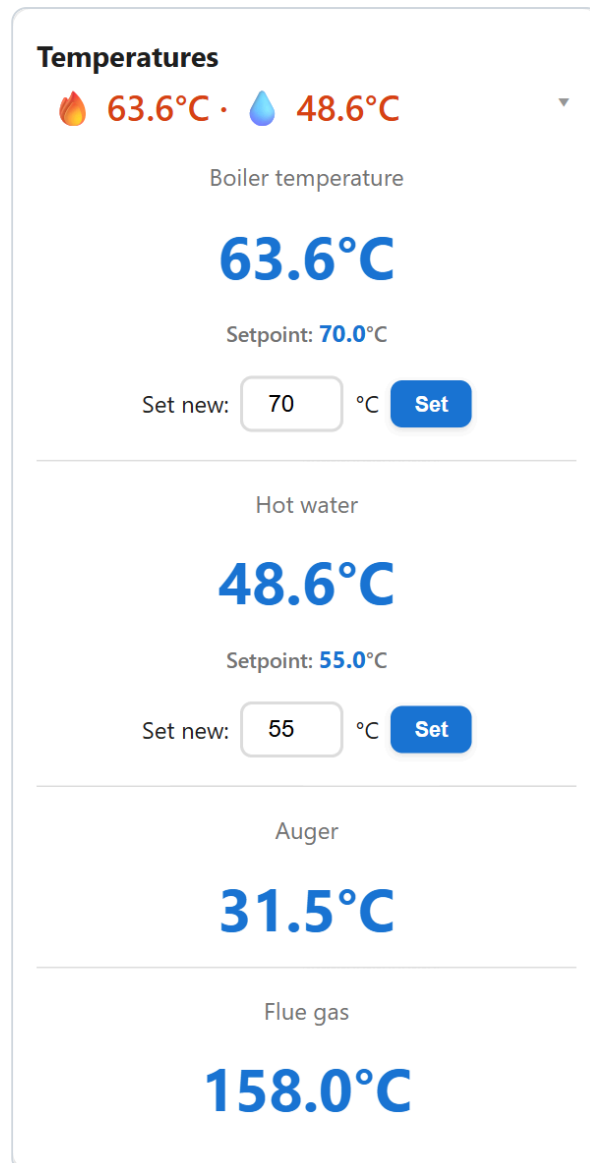


Fig. 9. The Temperatures card.

The header shows live the boiler (🔥) and hot water (💧) temperatures. Expanded: the boiler temperature with the **setpoint** (you set a new one with the field and the “Set” button, range 40 to 90 °C), hot water with its setpoint (30 to 60 °C), the auger (feeder) temperature and the flue gas (if there is a sensor). When a sensor does not answer you see “ERR” instead of a number.

Control

The Control card interface is a vertical panel with a light gray background. At the top, the title 'Control' is in bold. Below it, 'System status:' is followed by a green pill-shaped button labeled 'RUNNING'. A horizontal line separates this from the 'Mode:' section, which has two buttons: 'AUTO' and 'MANUAL'. Another horizontal line follows. Below that are two buttons: 'Ignite' and 'Shut down'. A third horizontal line is next. Then, 'Blower:' is followed by a slider bar with a blue knob at 40%. Below the slider are four buttons arranged in a 2x2 grid: 'Heating pump' (green), 'DHW pump', 'Auger', and 'Igniter'. A final horizontal line is next. At the bottom, 'DHW only mode' is followed by a toggle switch, with the text 'house pump off' below it.

Fig. 10. The Control card.

- **System status:** RUNNING, STOPPED, ALARM or EMERGENCY STOP.
- **Start** and **Stop** (eco-pea coal and blower only) or **Ignition** and **Shut down** (pellet): start and stop the boiler.
- **AUTO and MANUAL mode:** in AUTO the controller runs the blower and the feeder itself. In MANUAL the **Blower** slider (0 to 100%) unlocks, together with the buttons for manually switching the auger and, for a pellet boiler, the igniter. Manual control is for ignition and service. The “Start the boiler” button returns to automatic.
- **Indicators:** Heating pump, DHW pump, Auger, Igniter (pellet): show what is running now.
- **DHW only mode:** the heating circuit pump stays off, you heat only the hot water.

The CH pump runs when the boiler is above 35 °C and switches off below 32 °C (hysteresis). After a normal stop the pumps switch off at once. The exceptions are pellet shutdown (the CH pump runs until the boiler water drops below 32 °C) and the overheating and hot flue gas alarms (the pumps remove heat).

5.4. Auger settings (AUTO mode)

Auger settings (AUTO mode) ▾

Times set how often the auger feeds fuel in automatic mode

[How does it work?](#)

Current: Run=6s Pause=35s Threshold=3°C

Run time (s): 1-60 seconds

Pause (s): 5-300 seconds

Temperature threshold (°C):

0.5-10°C below setpoint

[Save auger parameters](#)

Fig. 11. The Auger settings card.

Defines how often the auger adds fuel in automatic mode.

Parameter	Range	Default	Meaning
Run time (s)	1 to 60	6	How long the auger feeds fuel in one cycle
Pause (s)	5 to 300	35	The break between doses
Temperature threshold (°C)	0.5 to 10	3	The auger feeds when the temperature is below the setpoint by more than the threshold

The “How does it work?” button shows a short explanation. The wizard works out the starting dosing from the boiler power.

5.5. Blower (AUTO mode)

Blower (AUTO mode) ▼

Maximum blower power in automatic control

Current: Max AUTO power: 75% • 0% at 6° before setpoint

Blower 0% before setpoint: enabled ☒

Max AUTO power (%): 10-100%

Blower 0% ... °C before setpoint:

0 = zero at setpoint; e.g. 8 = zero 8° before (the boiler coasts on inertia)

Save blower parameters

Fig. 12. The Blower card.

Parameter	Range	Default	Meaning
Blower 0% before setpoint: on	yes/no	yes	Whether the blower switches off before the temperature reaches the setpoint
Max AUTO power (%)	10 to 100	75	The highest blower power in automatic mode
Blower 0% at ... °C before setpoint	0 to ...	6	0 = zero power only at the setpoint. E.g. 8 = zero power 8 °C earlier, because the boiler coasts on its inertia

5.6. PID controller

PID controller

Blower controller parameters [How does it work?](#)

Current: $K_p=9.000$ $K_i=0.01000$ $K_d=8.00$

K_p (proportional):

K_i (integral):

K_d (derivative):

Sample time (ms): 1000ms=1s, 5000ms=5s

[Save parameters](#) [Auto-tuning](#)

Fig. 13. The PID controller card.

The PID controller picks the blower power so that the temperature holds the setpoint. It shows the current values (K_p , K_i , K_d) and lets you change them.

Run “Auto-tuning” first. The controller picks the values for your boiler itself. Change values by hand one at a time, by a small step, and watch the temperature for 20 to 30 minutes.

Parameter	What it does	When to raise	When to lower
K_p (proportional)	How strongly the blower reacts to the difference between the set and the actual temperature	The boiler reaches the temperature very slowly	The blower jumps or the temperature swings up and down
K_i (integral)	Removes a constant offset	The temperature stays below or above the set value and will not settle	The temperature slowly swings around the set value
K_d (derivative)	Brakes changes that are too fast	The boiler overshoots the set temperature while heating quickly	The blower is nervous and reacts to small fluctuations
Sample time (ms, 100 to 120000, default 5000)	How often the controller checks and corrects the blower power	Large, slow boilers	A small, fast boiler

The **Auto-tuning** button starts the automatic tuning. It takes from ten minutes to several dozen, and the boiler must be lit and running. You can stop it with “Stop autotuning”.

5.7. Flue gas (advanced)

Flue gas (advanced)

The flue gas setpoint is picked automatically during autotuning. You can change it manually here. Works only with a flue gas sensor.

Flue gas setpoint (°C):

160

100-250 °C

Save flue gas setpoint

Fig. 14. The Flue gas card.

The card works only with a flue gas sensor. The flue gas setpoint is picked automatically during autotuning (default 160 °C). Here you can change it manually (100 to 250 °C). The card is off by default in Settings.

5.8. Falling-trend boost

Falling-trend boost

When the temperature is falling and just above the setpoint, the blower starts gently ahead of time (compensating boiler inertia).

Current:

Window 1°C • Power 80%

Falling-trend boost: enabled

Window above setpoint (°C):

1

starts this many °C before setpoint (0-15)

Blast power (%):

80

0-100%

Save boost parameters

Fig. 15. The Falling-trend boost card.

When the temperature is falling and is just above the setpoint, the blower switches on lightly ahead of time to compensate the boiler inertia.

Parameter	Range	Default	Meaning
Band above setpoint (°C)	0 to 15	1	How many degrees above the setpoint the boost begins

Parameter	Range	Default	Meaning
Blast power (%)	0 to 100	80	Blower power in that band

5.9. Ignition

The card is hidden by default. Turn it on with the “Ignition” switch in Settings. It shows only for a boiler with a feeder.

Eco-pea coal (manual ignition: with the button on the controller or the **Start** button on the screen). The sequence:

1. The auger feeds the **starting dose** (the blower stands still).
2. You light the fuel yourself (e.g. with a match). The blower runs weakly (the power remembered from manual mode, 30% by default).
3. The controller switches to **automatic mode** when the flue gas stays above the threshold for 30 s (without a flue gas sensor: when the water rises by 5 °C), or when you click the button a second time (“I have fire”).
4. If no fire appears within the set time, the ignition fails and the boiler stops.

Ignite

Eco-pea coal: you light the boiler with the button on the controller (or the ignition button on the screen). The controller feeds a starting dose, switches the blower on and waits for the fire.

Starting dose (s)

How many seconds the auger feeds fuel at the start. 0 = no dose, e.g. when you place the fuel in the firebox yourself.

Maximum ignition time (min)

If no fire appears in this time, the ignition fails and the boiler stops.

Fire detection threshold (°C)

When the flue gas exceeds this temperature the controller decides the boiler has lit. Without a flue gas sensor it looks for a 5 °C rise of the water temperature.

Save ignition parameters

Fig. 16. The Ignition card: eco-pea coal.

Parameter	Range	Default	Meaning
Starting dose (s)	0 to 300	60	How many seconds the auger feeds fuel at the start. 0 = no dose

Parameter	Range	Default	Meaning
Maximum ignition time (min)	5 to 60	20	After this time without fire the ignition fails and the boiler stops
Fire detection threshold (°C)	60 to 150	90	Flue gas above this temperature means the boiler has lit. Without a flue gas sensor: a water rise of 5 °C

Pellet (automatic ignition with the igniter; needs a flue gas sensor). The phases: filling, ignition with the igniter, observation after the igniter switches off, stabilization, run. A failed attempt is repeated once (with a smaller dose), then a purge follows and an alarm.

Ignite

Pellet: the controller ignites automatically with the igniter and checks from the flue gas temperature that the flame holds. It needs a flue gas sensor. Choose the values according to the burner manufacturer's recommendations.

Starting pellet dose (s)

How many seconds the feeder drops pellets into the burner before the igniter switches on.

Dose on retry (s)

A smaller dose for the second ignition attempt.

Maximum igniter time (min)

How long the igniter may heat in one attempt. A longer time wears the igniter more.

Observation after the igniter switches off (s)

During this time the flame has to hold on its own. This tells a real ignition from a hot puff of air.

Stabilization run (s)

Low-power run before the regulator takes over.

Blower during ignition (%)

Blower power while the igniter is heating.

Blower during observation (%)

Blower power after the igniter switches off.

Blower during stabilization (%)

Blower power during the stabilization run.

Blower during shutdown (%)

Blower power while the remaining pellets burn out.

Flue gas rise counted as a flame (°C)

How much the flue gas temperature has to rise after the start to decide the pellets have lit.

Maximum shutdown time (min)

After this time the shutdown ends regardless of the flue gas temperature.

Save ignition parameters

Restore defaults

Fig. 17. The Ignition card: pellet.

Parameter	Range	Default	Meaning
Starting pellet dose (s)	5 to 300	45	How many seconds the feeder drops pellets into the burner before the igniter switches on
Dose on retry (s)	5 to 300	20	A smaller dose for the second attempt
Max igniter time (min)	2 to 10	8	How long the igniter may heat in one attempt
Observation after the igniter switches off (s)	30 to 300	90	The flame has to hold on its own. This tells a real ignition from a hot puff of air
Stabilization run (s)	30 to 900	180	Low power before the regulator takes over
Blower during ignition (%)	10 to 100	20	Power while the igniter is heating
Blower during observation (%)	10 to 100	30	Power after the igniter switches off
Blower during stabilization (%)	10 to 100	35	Power during the stabilization run
Blower during shutdown (%)	10 to 100	50	Power while the remaining pellets burn out
Flue gas rise counted as a flame (°C)	10 to 80	35	How much the flue gas temperature has to rise after the start
Max shutdown time (min)	5 to 60	25	After this time the shutdown ends regardless of the flue gas temperature

The “Restore defaults” button restores the factory pellet ignition settings. The igniter also has a hard run-time limit in the controller (12 minutes), independent of these settings. Choose the values according to the burner manufacturer’s recommendations.

5.10. Blow-through

Blow-through

Every so often the blower runs at high speed and clears ash from the burner. The feeder stops meanwhile. Works only in AUTO mode while the boiler is running.

Blow-through enabled ☒

Every how many minutes of operation: 5-600 minutes

Blow-through time (s): 3-120 seconds

Blower power (%): 30-100%

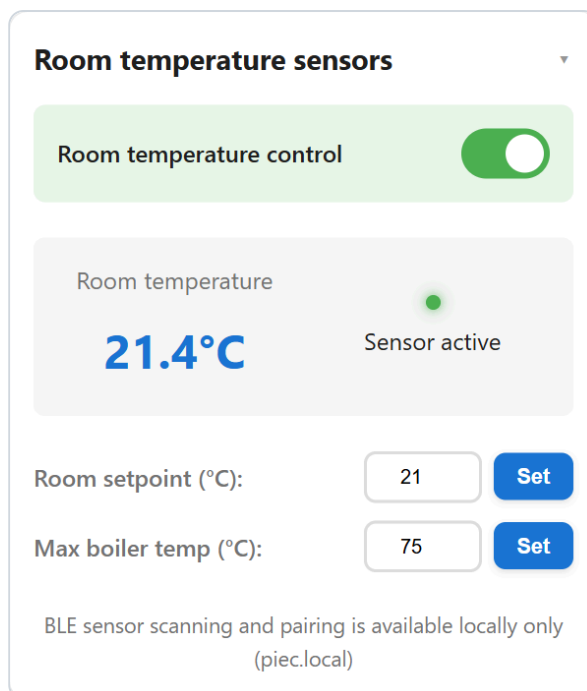
[Save blow-through parameters](#)

Fig. 18. The Blow-through card.

From time to time the blower switches on at high speed and cleans the burner of ash. The feeder stands still meanwhile. It works only in AUTO mode while the boiler is running.

Parameter	Range	Default
Every how many minutes of operation	5 to 600	45
Blow-through time (s)	3 to 120	20
Blower power (%)	30 to 100	100

5.11. Room control (Room temperature sensors)



The card is titled "Room temperature sensors" with a dropdown arrow. It features a green toggle switch for "Room temperature control". Below this, a grey box displays "Room temperature" as "21.4°C" with a green dot and the text "Sensor active". At the bottom, there are two rows of controls: "Room setpoint (°C):" with a value of "21" and a "Set" button, and "Max boiler temp (°C):" with a value of "75" and a "Set" button. A note at the very bottom states "BLE sensor scanning and pairing is available locally only (piec.local)".

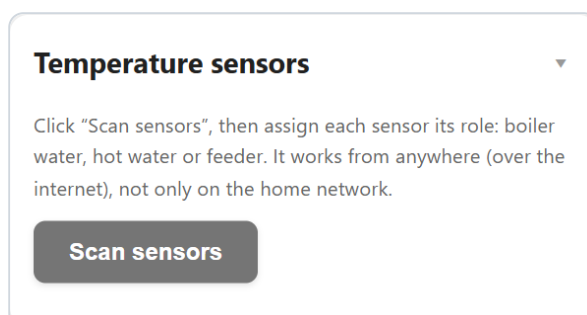
Fig. 19. The Room temperature sensors card.

The boiler can adjust its temperature to the room temperature. The temperature source is the thermostat sensor or a BLE room sensor.

- **Room temperature control:** the switch.
- **Room setpoint:** 15 to 30 °C (default 21).
- **Max boiler temp:** 60 to 85 °C (default 75). This is the safety limit of the room control.

How it works: when the room is colder than the setpoint by more than 0.5 °C, the boiler setpoint rises proportionally (50 °C plus 15 °C for every degree of difference), but not above "Max boiler temp". When the room is warmer by more than 0.5 °C, the boiler setpoint falls to the minimum. Within ± 0.5 °C it stays unchanged (hysteresis). If the room sensor disappears for more than 2 minutes, a warning "No room sensor" appears. Pairing BLE sensors is possible only locally (on the home network).

5.12. Temperature sensors



The card is titled "Temperature sensors" with a dropdown arrow. It contains a text instruction: "Click 'Scan sensors', then assign each sensor its role: boiler water, hot water or feeder. It works from anywhere (over the internet), not only on the home network." Below the text is a dark grey button labeled "Scan sensors".

Fig. 20. The Temperature sensors card.

Click "Scan sensors", then assign each sensor its role: boiler water, hot water or feeder. The card works from anywhere (over the internet), not only on the home network. Every sensor is recognised by its number, so after replacing a sensor assign its role again.

5.13. Firmware update (OTA)

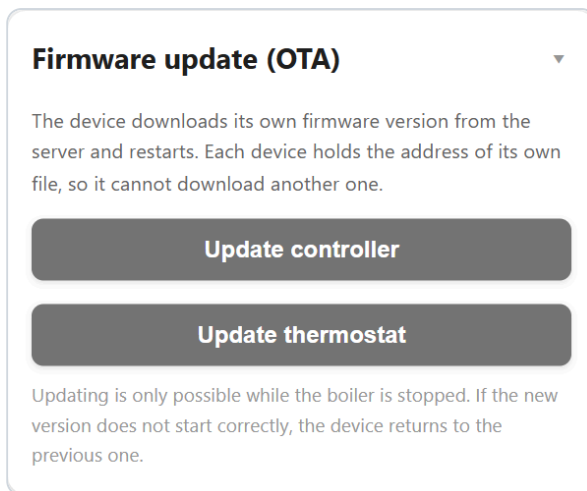


Fig. 21. The Firmware update card.

The device downloads its own software version from the server by itself and restarts. Each device holds the address of its own file, so it will not download someone else's. The files are encrypted. Buttons: **Update controller** and **Update thermostat**. The update is possible only with the boiler stopped. If the new version does not start correctly, the device returns to the previous one by itself. The progress is shown on the page and on the screen.

5.14. Profiles

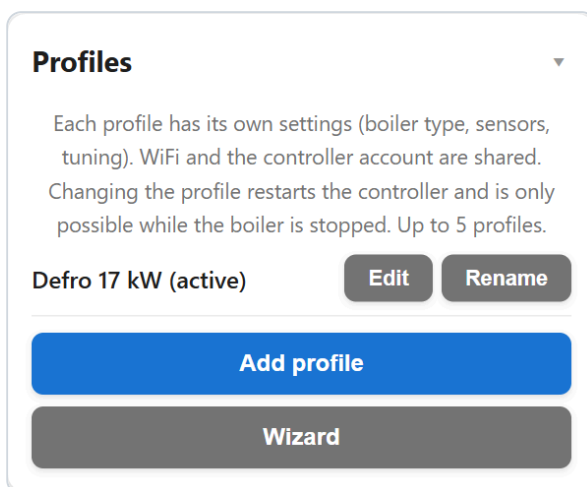


Fig. 22. The Profiles card.

Each profile has its own settings (boiler type, sensors, values). WiFi and the controller account are shared. You can have up to 5 profiles, e.g. for different fuels or seasons. Changing the profile restarts the controller and is possible only with the boiler stopped. Buttons: **Edit** (starts the wizard for the profile), **Rename**, **Add profile**, **Wizard**, deleting a profile.

5.15. WiFi

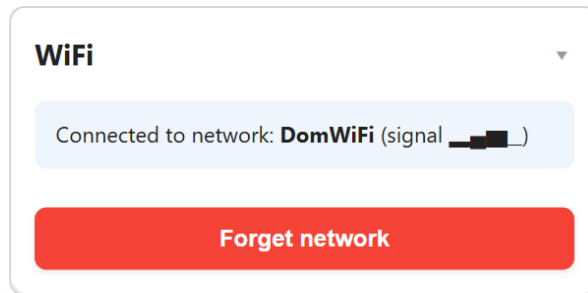


Fig. 23. The WiFi card.

Shows the network the controller is connected to and the signal strength (bars). **Forget network** removes the saved WiFi (the controller returns to its own "Boiler" network). Changing the network and scanning are available locally (on the home network or on the "Boiler" network).

5.16. Fuel consumption

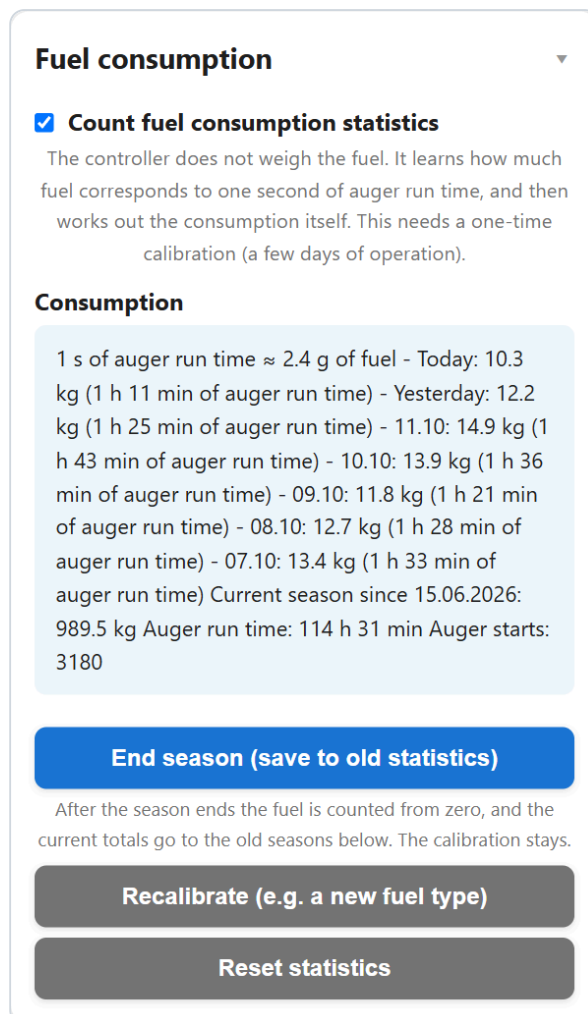


Fig. 24. The Fuel consumption card.

The controller does not weigh the fuel. It learns how much fuel corresponds to one second of auger run time, and then works out the consumption itself.

Calibration (once, a few days of operation):

1. Turn on "Count fuel consumption statistics".
2. **Mark the fuel level** in the hopper (e.g. with tape or a marker). You do not have to empty it.
3. **Add a known amount of fuel** (weigh it) and enter it in kg.
4. Click "**Fuel added**". The controller counts how many times and how long the auger ran.
5. When after a few days the fuel level **drops back to the marked line**, click "**Fuel reached the mark**". If you added more in the meantime, use "Fuel added" with the next amount.

Thanks to the marked level, fuel that is already in the auger and in the tube does not distort the result.

Statistics: consumption today, yesterday and over the last days, the current season, the auger run time and the number of auger starts. The "**End season**" button saves the current totals in the old seasons (up to 10), and the new season is counted from zero. The calibration stays. "Recalibrate" is for changing the fuel type, "Reset statistics" zeroes the counters.

5.17. Community

Community

Happy with how your boiler runs? Publish your settings to help others. Below are settings from other users who went through the wizard the same way as you (boiler type and flue gas sensor).

Settings come from users and have not been checked by the manufacturer. You use them at your own risk. They are saved in a new profile, so your current settings are kept.

Settings from others

Loading...

Publish my settings 0 / 4

Boiler name (3–24 characters)

np. Defro Eko

Description (optional, up to 120 characters)

np. kocioł Defro, palnik retortowy, groszek 8 mm

Publish

You publish a copy of the settings of the active profile (without WiFi, name or account data). You can have up to 4 published settings. Delete one if you have better ones.

Fig. 25. The Community card.

You see the settings of other users who went through the wizard the same way you did (boiler type and flue gas sensor). With one click you save them to a **new profile**, so your current settings are not lost. You can rate settings with stars. If your boiler works well, **publish** your settings (boiler name 3 to 24 characters and an optional description up to 120 characters). A copy of the active profile settings is published, without WiFi, the name and the account data. You can have up to 4 published settings. The settings come from users and have not been checked by the manufacturer: you use them at your own risk.

5.18. Phone notifications

Tapping the red alarm bar on the page opens a window with the **list of active alarms and warnings**. You can clear warnings with the acknowledge button. Under the link **“How to get notifications: details”** there is the choice of how to be notified. The **“Notifications”** button in Settings opens the same window with the instructions already expanded.

There are two ways:

1. **The ntfy app (recommended, iPhone and Android).** Alarms arrive with sound, even when the page is closed.
2. Download the “ntfy” app (free) from the store.
3. Open it and tap “+” (Subscribe to topic).
4. In the “Topic name” field paste your code from the notification window and tap “Subscribe”. Leave the server at the default (ntfy.sh).
5. Check: tap “Send test notification”. If it arrived, turn on ntfy alarms. The code is secret: whoever knows it can receive your alarms.
6. **Notifications from the app (without ntfy).** The phone sometimes blocks them, which is why ntfy is recommended.
7. **Install the app:** open the page and choose “Add to home screen” (point 5.2). Then open it from the icon on the home screen. On iPhone, notifications need iOS 16.4 or newer.
8. **Turn on notifications in the app:** in the notification window tap “Turn on notifications” and choose “Allow”.
9. **Allow in the phone permissions:** in the phone settings open this app and allow its notifications. Android: Settings, Apps, Piec CO or Boiler, Notifications, Allow. iPhone: Settings, Notifications, Piec CO or Boiler, Allow Notifications. Also turn off battery saving for this app, then the alarms arrive more reliably.
10. **Check:** tap “Show test notification”. If the permission window does not show or “Block” was chosen, in Chrome tap the padlock icon next to the address, Site settings, Notifications, Allow.

5.19. Information

The “Information” button in Settings opens the system description, the first-use guide, the diagrams and the demo without logging you out. Return with “Back to the system”.

5.20. Settings

Settings

Auger settings (AUTO mode)

Blower (AUTO mode)

PID controller

Ignite

Blow-through

Flue gas (advanced)

Profiles

WiFi

Fuel consumption

Community

Room sensors

Temperature sensors

Falling-trend boost

Firmware update

Language / Język

English

Install app

Notifications

Information

Log out

Fig. 26. The Settings card with the card switches.

The switches show or hide the cards. By default, on the first login these are on: Auger settings, Profiles, WiFi, Community, Fuel consumption and Firmware update. These are off: Blower, PID controller, Ignition,

Blow-through, Flue gas, Room sensors, Temperature sensors and Falling-trend boost. Your choice is remembered in the browser. Below: **Language**, **Install app**, **Notifications**, **Information**, **Log out**.

6. Controller with display: operation

The screen is landscape 480×320 and works by touch. The screens below are simulations made according to the layout of the controller screens.

6.1. Main screen

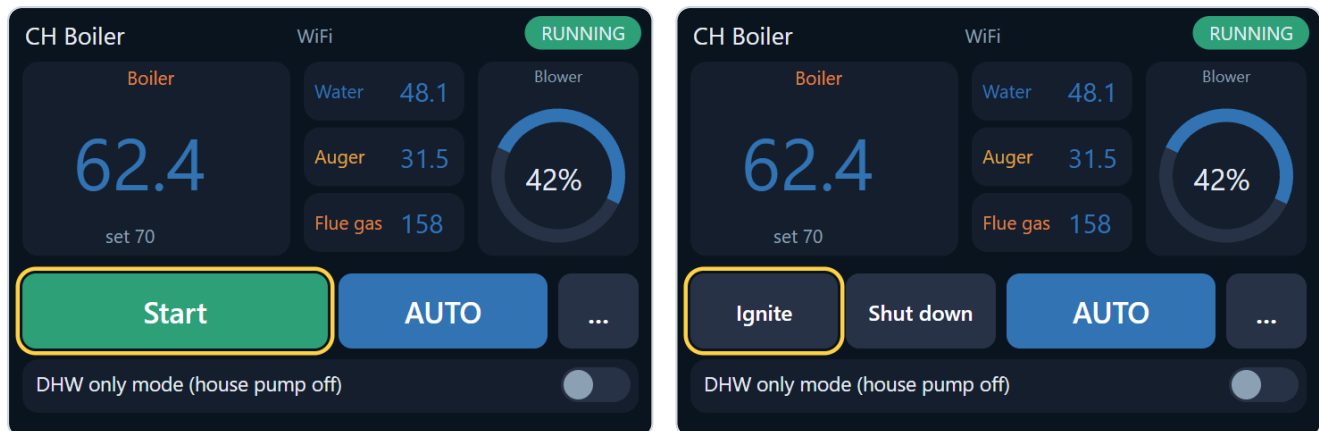


Fig. 27. The main screen: eco-pea coal boiler (Start) and pellet boiler (Ignite, Shut down).

- **Header:** the name, the label “WiFi” or “AP MODE” (working in the “Boiler” network) and the **state badge** (STOPPED, RUNNING, ALARM, EMERGENCY STOP). Tapping the badge shows the reason for the alarm or state. For pellet the badge also shows the phase (Filling, Igniting, Stabilising, Burn-out, Purging), and for eco-pea coal “Feeding fuel” and “Light the boiler”.
- **Boiler tile:** temperature and setpoint. **Tap** to change the setpoint (40 to 90 °C).
- **Water tile:** hot water temperature. **Tap** to change the setpoint (30 to 60 °C).
- **Auger tile** (if there is a feeder): the feeder temperature. In MANUAL mode the tile is an ON/OFF button for the auger.
- **Flue gas tile** (if there is a flue gas sensor).
- **Blower tile:** the ring shows the power. In MANUAL mode tap to set the power.
- **Start / Stop** (eco-pea coal, blower only) or **Ignite / Shut down** (pellet).
- **AUTO / MANUAL:** switches the mode.
- **“...”:** opens Settings.
- **DHW only mode:** the switch at the bottom. Turns off the heating circuit pump.

For eco-pea coal the **Start** button begins the ignition (described in point 5.9). The badge first shows “Feeding fuel” and then “Light the boiler”: you then light the fuel yourself, and the controller keeps a weak blast and waits for fire.

6.2. Settings

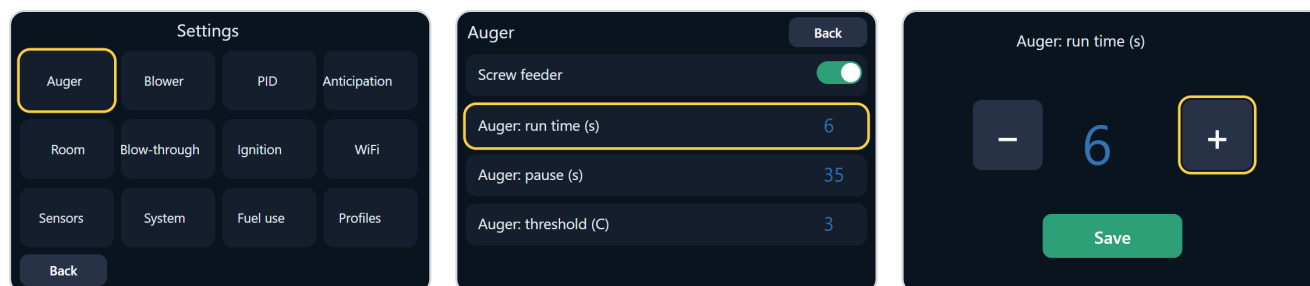


Fig. 28. Settings: category tiles, the parameter list, changing a value.

Settings are category tiles. The “Ignition” and “Pellet ignition” tiles depend on the boiler type, and “Fuel consumption” appears only for a boiler with a feeder. In a category you tap a parameter and change it with the – and + buttons, then **Save**. At the top of the list there is sometimes a function switch.

Category	Contents
Auger	The “Screw feeder” switch; run time, pause, threshold
Blower	The “Cut to 0% before setpoint” switch; max AUTO power, 0% before setpoint
PID	Kp, Ki, Kd, sample time, flue gas setpoint; PID autotuning and “Stop autotuning”
Anticipation	A switch; band and power
Room	The “Control by room temp” switch; room setpoint, max boiler temp; thermostat state (Online, No link, Online, no sensor)
Blow-through	A switch; every how many minutes of operation, time, blower power
Ignition	Eco-pea coal and blower only: starter feed, max ignition time, flue gas threshold
Pellet ignition	Pellet boiler only: 11 parameters (starting dose and dose on retry, max igniter time, observation after the igniter, stabilization, blower power in four phases, flue gas rise counted as a flame, max shutdown time)
Fuel consumption	Boiler with a feeder only. The “Count fuel statistics” switch. Calibration: amount of fuel added, “Fuel added (start calibration)”, “Fuel reached the mark”, “Cancel calibration”. Statistics: grams per second of auger run time, today, yesterday, season, auger run time and number of starts; “End season” and “Recalibrate”
WiFi	Network scan, network choice, password on the keyboard; state: Connected, AP mode (Boiler), No networks
Sensors	Bus scan; tap a sensor to assign its role (“Assign as”)
System	Controller update (OTA), language, thermostat update (OTA), factory settings. Screen: “Screen sleep” (switch, on by default), “Sleep time” (1 to 120 min, default 10) and “Rotate screen 180 deg.” (on by default, changing it restarts the device)
Profiles	Choose, edit (wizard), add a profile

The ranges and default values of the parameters are the same as on the page (chapter 5). Changing the language in System changes the language of the whole device. **Factory settings** need the boiler stopped

and erase WiFi, profiles and settings.

6.3. Update and other

Update: Settings, System, "Update firmware (OTA)". The boiler must be stopped. After the download (30 to 60 s) the controller restarts. You update the thermostat from the same menu ("Update thermostat"). The screen shows the progress.

7. Room thermostat: operation

7.1. Construction

The thermostat is a touch panel with a 480×320 screen, its own **room temperature sensor** (DS18B20) and one **button** with an LED. Power it according to the device description. Install it where it represents the room temperature: not at a window, a radiator or in the sun.

Button: a short click starts or stops the boiler (START/STOP). Holding for 3 s switches AUTO and MANUAL. Touching it wakes the screen.

LED: blue: boiler not running. Green: boiler running in AUTO. Yellow: boiler running in MANUAL. Red blinking: alarm.

7.2. Room screen

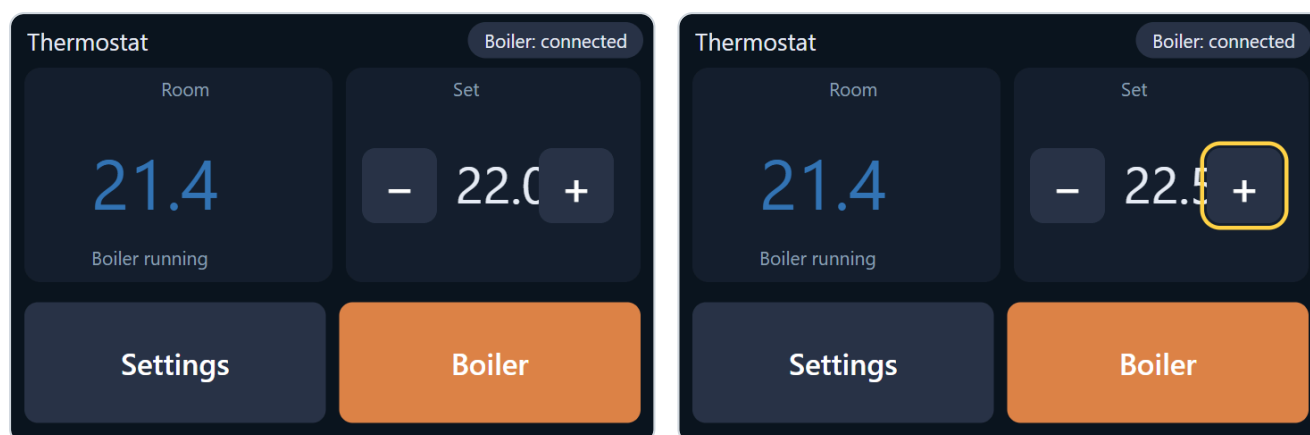


Fig. 29. The room screen: temperature, setpoint, room control, boiler temperatures.

- **The “Thermostat” title and the link badge** in the top right: **No WiFi** (red), **No link to boiler** (red), **Boiler: via AP** (amber: connection through the “Boiler” network), **Boiler: connected** (green). Tapping a red badge opens the WiFi settings.
- **Room:** the room temperature (the big number) and the state: “Boiler running”, “Boiler off” or “No temperature sensor”. **Tap the temperature** to calibrate the sensor: enter the real room temperature (measured with another thermometer) and the thermostat remembers the correction.
- **Setpoint:** the room setpoint. The + and – buttons change it, and the value is sent to the boiler 0.8 s after the last tap.
- **Alarm:** when the controller has an alarm or a warning, the “Setpoint” tile turns into a big red **ALARM** or an amber **WARNING**. Tap to see the description and what to do.
- **Room control:** a switch. When it is on, the boiler adjusts its temperature to the room (point 5.11).
- **Boiler / Water:** the current boiler and hot water temperatures.
- **Settings:** opens the menu.

7.3. Settings menu

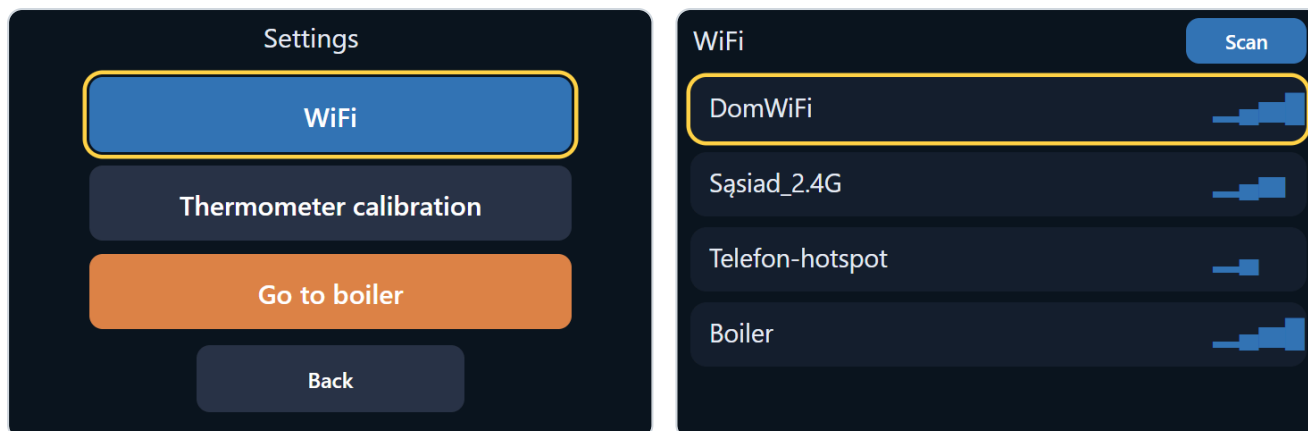


Fig. 30. The Settings menu and the WiFi network list (simulated).

- **WiFi:** choose the network and enter the password on the on-screen keyboard. When the thermostat is connected to the "Boiler" network, the entered network is saved in the controller too (the controller has to see it, otherwise an error appears). "Forget network" removes the saved network.
- **Thermometer calibration:** as above (you can also tap the room temperature).
- **Go to boiler:** a boiler panel similar to the controller screen (chapter 6). From it you change the **boiler settings** (auger, blower, PID, anticipation, room, blow-through, WiFi, system, profiles), start and stop the boiler, and watch its operation and alarms. There is also a **Sensors** tile: the thermostat asks the controller to scan the temperature sensors and assign their roles (boiler water, hot water, feeder). For a pellet boiler there is a **Pellet ignition** tile (11 parameters), and for a boiler with a feeder **Fuel consumption** (statistics and calibration), the same as on the controller screen. For eco-pea coal and blower only there is an **Ignition** tile (starter feed, max ignition time, flue gas threshold). In Settings, System you find the **thermostat screen** settings: screen sleep (a switch and the time in minutes) and rotating the screen by 180 degrees.
- **Back.**

7.4. How the thermostat connects to the boiler

The thermostat looks for the boiler in this order:

1. When no network is saved or it is not visible, and the "Boiler" network is in range: the thermostat **joins the "Boiler" network at once** and fetches the home network data from it, if the controller already has it.
2. When a home network is saved: it joins it and **finds the boiler in the network by itself** (the name boiler.local).
3. When the home network fails: it goes back to the "Boiler" network.
4. If there is nothing at all: **Bluetooth**. The boiler can pair the thermostat and enter the network data for it.

The WiFi entered on the thermostat is saved in the controller too, if the thermostat is connected to the "Boiler" network at that moment.

The room temperature is sent to the boiler, which controls by it (point 5.11). The thermostat updates from the server (OTA) and shows the progress on the screen.

8. Alarms and warnings

Message	Cause	What the controller does	What to do
Water overheating (90 °C or more)	The boiler water is too hot	Blower and feeder off, pumps run	Wait until the water drops below 80 °C, check the installation (heat removal, valves, pumps). Start the boiler manually
Loss of the boiler water sensor	A faulty or disconnected sensor	Boiler stopped, pumps may run	Replace or connect the sensor. The controller returns to normal operation
Flue gas too hot (250 °C or more)	Firing too hard	Boiler stopped, pumps run	Check the draught, the blower and the settings, wait for it to cool
Auger too hot (60 °C or more)	Burn-back, an over-hot feeder	Alarm	Check the firebox and the feeder (chapter 2, point 8). It clears below 50 °C
Feeder emergency stop	A hazard detected at the feeder	Feeder stopped	Check the feeder, the sprinkler and the firebox before restarting
Sensor error: boiler water, hot water, feeder, flue gas	A faulty or disconnected sensor	Boiler stopped. A separate alarm for each sensor	Replace or connect the sensor. If you do not have it, turn it off in the wizard
Pellet ignition failed	No ignition	A message with the reason, the boiler does not continue	Check the igniter, the pellets, the blower, the ignition parameters
Warning: water temperature not rising	Despite running, the temperature does not rise	The boiler keeps running	Add fuel, check the fire
Warning: no room sensor	Room control without a sensor	The boiler keeps running	Check the thermostat and the sensor
Warning: frequent emergency restarts	A power or board problem	The boiler keeps running	Check the power, contact the installer
Warning: the boiler started by itself after a power failure	The power returned	The boiler resumed operation	Check the boiler. You can clear the warning

Warnings do not stop the boiler and can be cleared in the notification window. Alarms clear after the cause is removed.

9. Troubleshooting

Problem	What to check
I do not see the “Boiler” network	The controller must be on and without a saved network (or after “Forget network”). Wait a minute. Check the power
The wizard does not open on the phone	Choose “Use this network as is” in the browser menu or open http://192.168.4.1/full in Chrome
The page does not open when I type the address (but the link works)	Most often the phone is still connected to the “Boiler” network, which has no internet. Switch the phone to your home WiFi, or turn WiFi off and use mobile data. Type exactly <code>fireheatlink.pages.dev</code> (no “www”, no “.com”). You can also copy the address from the controller screen (Settings, System) or open it from a link
I cannot log in	Check the login, the password and the device number (lower case, no spaces). The controller must be connected to WiFi and the internet
Thermostat “No link to boiler”	The boiler must be on and on the same network, or within reach of the “Boiler” network. Check the thermostat WiFi (Settings, WiFi)
The thermostat does not accept a WiFi network (error)	The controller does not see that network (it is out of its range). Choose a network visible to both devices or move the controller closer to the router
A sensor alarm after power-up	The sensor is faulty, disconnected or not needed. In the wizard turn off the sensors you do not have (e.g. the cylinder)
A pump runs after the boiler stopped	Usually: pellet shutdown (down to 32 °C), an overheating or hot flue gas alarm, or a sensor loss after recent operation. Check the alarms in the notification window
Pellet ignition fails	Increase the starting dose, check the igniter and the flue gas sensor, lengthen the observation
The blower “hunts”	Run PID autotuning or lower Kp (point 5.6)
Notifications do not arrive	Check the subscription in ntfy (the code from the notification window) and send a test notification
The page in the app does not update	Close and open the app. The app updates itself on the next start with the internet
I want to return to factory settings	Hold the controller button for 30 s or Settings, System, Factory settings (boiler stopped). Needs a new setup

10. Updates and data security

- **The update** is one-button and encrypted. If the new version does not start, the device returns to the previous one by itself.
- **The connections to the server are encrypted** and the accounts are separated: each user sees only their own boiler.
- **The access data** (device number, login, password, notification code) are secret. Do not share them.
- On production units the controller memory may be encrypted: a program or passwords copied from the board are then useless.
- The “Boiler” network is only for configuration. After connecting to your home WiFi the controller does not need it.

11. Access data and installer notes

Device number	
Login	
Password	
"Boiler" network password	
Boiler type	
Installation date	
Installer (contact)	