tPell

Pellet Combustion Controller

technogamma

Version 24 *06/20*

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Using the device

General view

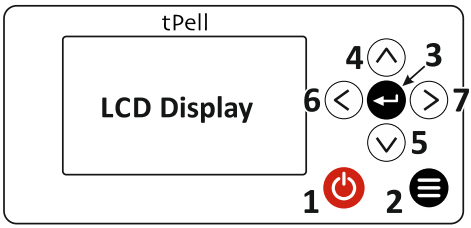

Fig 1 Panel

Buttons:

1. Power On / Off
2. Back
3. Enter
4. Up
5. Down
6. Left
7. Right

User interface

When the controller is operational, the display looks as shown on Fig 2.

Mode:

- ON (manual mode)
- AUTO (automatic mode)
- OFF

Current state:

- Ignition
- Kindle
- Burn
- Purge
- Shutdown
- Clean
- Wait
- Empty – Idle

Flame: temperature of the flue gases in degrees Celsius or intensity of the flame in % (depending on the configuration).

Temperature set point: desired temperature of the heated object (room or water) or an icon for the state of external thermostat (on or off) if used.

Current temperature: the measured temperature of the heated object.

Power: the current operating power when burning in kW or relative units.

Fumes fan: revolutions of the fan in %.

Feeder: indicates that the feeder mechanism is operational.

Clock: blinks if it is not set.

Boiler: current temperature and pump activity.

DHW: current temperature and pump activity.

State timer: elapsed / remaining time for the current state.

Week timer: trigger time of the next week timer event.

Bunker: pellets available in the bunker.

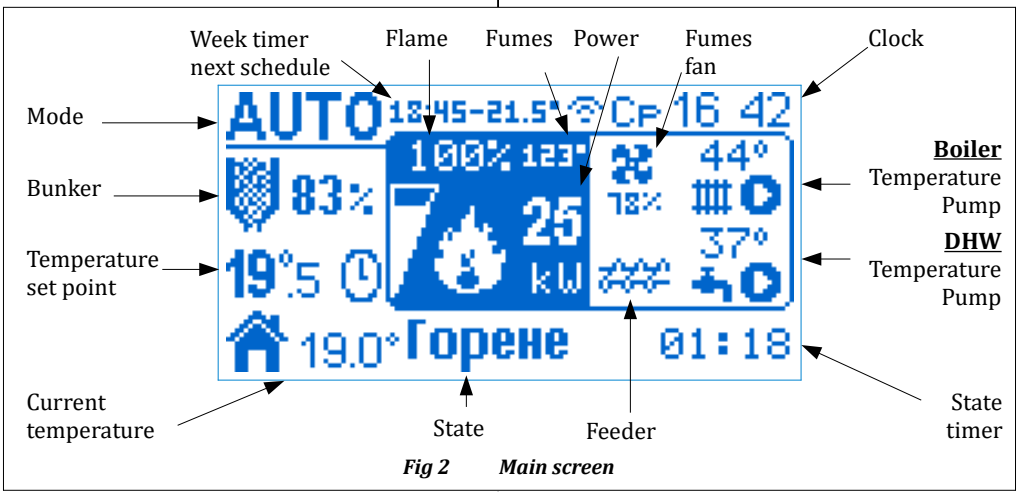

Fig 2 Main screen

Turning the device on

If the controller is in OFF mode and 60 seconds have passed since the last user interaction, the current time and temperature are shown on the display.

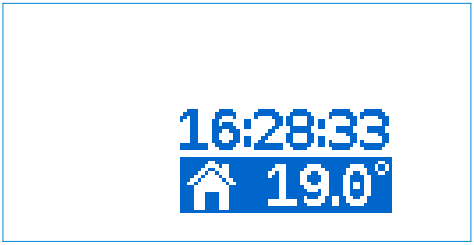

Fig 3 Controller turned off

Pressing any button shows the main screen (Fig 2).

Press and hold the power button ⏻ in order to turn on the controller. A menu showing the modes is displayed, the active is AUTO (Fig 4). Hold the ⏻ button depressed for 3 sec in order to confirm the turning on of the device. If you want to switch to ON mode, use the navigation buttons to select it, then hold the ⏻ button.

To turn the device off follow the same procedure. When the mode is changed the beeper signals the new mode is accepted.

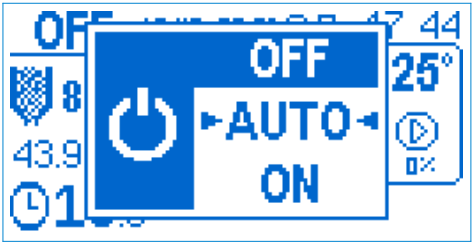

Fig 4 Turning ON

Temperature set point

If the current mode is ON, use the buttons ⌃ / ⌄ to increase / decrease the temperature set point (the icon ↕ indicates the temperature can be changed). In AUTO mode, the temperature is fixed by the week timer 🕒 or the external thermostat.

Quick menu

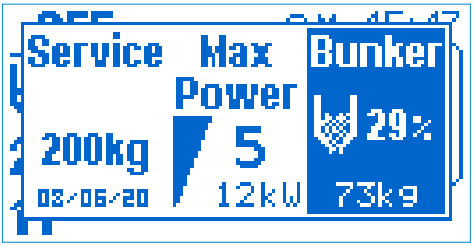

Fig 5 Quick menu

To access the **Quick menu**, press the button ⌃ from the Main screen. For navigation use the buttons ⌃ / ⌄.

Maximum power

The controller modulates the current operating power so the temperature set point is reached. The maximum power can be limited (5 – maximum, 1 – minimum). Use the buttons ⌃ / ⌄ to decrease / increase the maximum power. Pressing the button ↵ sets the maximum value.

Bunker

The fuel level inside the bunker declines as the device is operating. In order to change the fuel level after loading it with pellets, use the buttons ⌃ / ⌄ to increase / decrease the fuel level by 5%. Press the button ↵ to increase the pellets level by 15 kg (1 bag).

Service

Indicates the remaining pellets quantity remaining to the next servicing of the device, alongside with the last date of servicing. Negative value means that the service period is overdue, indicated on the main screen by blinking icon 🔧.

When you have serviced the device, press ↵ to reset the counter and the date.

Fuel consumption

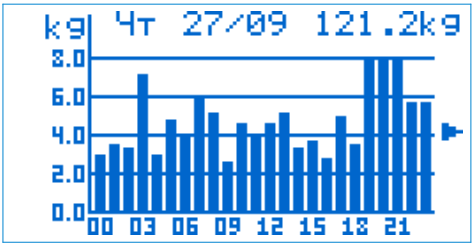

Fig 6 Fuel consumption

Press (>) from Main screen to see information regarding the fuel consumption. From the sub-menu you can choose to access per day or per month statistic. A graphic shows the consumed pellets for every day / month. Use the buttons (<) / (>) to select a particular period and press button (↵) to switch do detailed view. In daily mode a chart per hour is shown, as in monthly mode per day. The top part of the detail view displays date / month selected, as well as the total fuel consumed for the particular period.

Main Menu

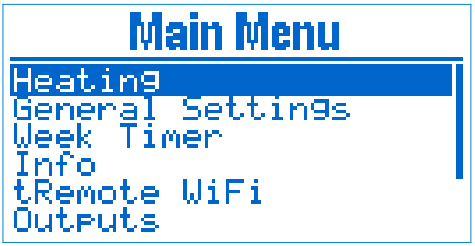

Fig 7 Main menu

From main screen, press button (≡) to enter the main menu.

Use buttons (^) / (v) to navigate and button (↵) to select the current menu item. Press (≡) in order to go back one level, from the main menu you go back to the main screen. The button (⏻) takes you directly to the main screen.

Press (↵) to edit a parameter. In edit mode the parameter value blinks. Use (<) / (>) to increase / decrease the value by 1 unit, or (^) / (v) to change by 10 units. When done editing, press (↵) to save the change or (≡) to cancel the modification and revert to the previous value.

Heating

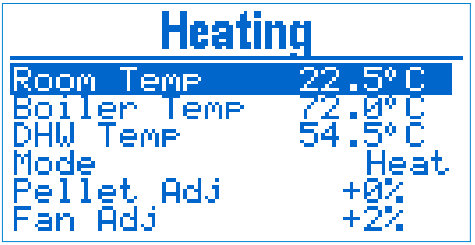

Fig 8 Heating

- **Boiler Temp** – boiler temperature set point. The power is modulated in order to achieve the temperature set point.
- **DHW Temp** – DHW temperature set point.
- **Mode** – device heating mode.
  - **Heat** – just the main heating is working and its temperature is monitored
  - **DHW** – just the DHW heating is working and the DHW temperature is monitored
  - **Heat+DHW** – both heating circuits are active
  - **DHW+Heat** – both heating circuits are active, as the DHW one is with higher priority. When the DHW pump is running, the main one is stopped.
- **Pellet Adj** – adjusts the fuel quantity that is being fed, depending on the fuel quality. The quantity is increased or decreased in percents of the nominal quantity.
- **Fan Adj** – adjust the fumes fan relative to the service settings.

The parameters shown in the menu, depend on the device configuration.

General Settings

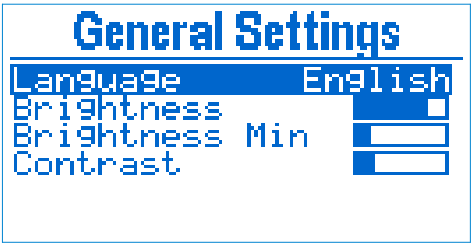

Fig 9 General settings

- **Language** – user interface language
- **Brightness** – set the display brightness in active mode.
- **Brightness Min** – set the display brightness in idle mode. Idle mode occurs when 60 sec have passed since the last button press.

- **Contrast** – display contrast.

Week Timer

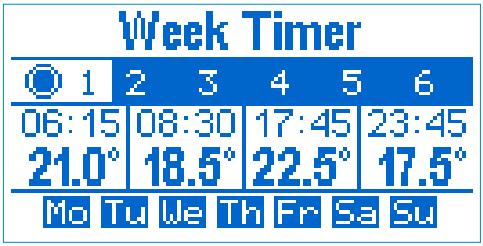

Fig 10 Week timer

Using the week timer, the user can specify a temperature for a particular time interval of the day for a given day of the week. It consists of 6 programs, each one having 4 timers that specifies time and temperature. The time of every next timer must be after the previous one, as a value of **--:--** means that the timer is not active. For example the timer configuration on **Fig 11** specifies the following temperatures and periods:

- **07:45 - 08:44 21.0°C**
- **08:45 - 17:44 18.5°C**
- **17:45 - 23:44 22.5°C**
- **23:45 - 07:44 17.5°C**

Every program can be active and applied to specific days of the week. In case more than one program is active for a given day of the week, the higher priority program is the one with bigger number.

Use the navigation buttons to select the current element you want to edit (program, time, temperature and day of week). Parameter editing is initiated by pressing button ↵. While editing time, using the buttons < / > you decrease / increase the time by **15 min**, as with ∨ / ∧ by **1 hour**. While editing temperature, using the buttons < / > you decrease / increase the temperature by **0.5** °C, as with ∨ / ∧ by **2** °C.

Info

Fig 11 Information

On this screen usage information is displayed:

- **Pellet** – counter for the pellets burned from the last reset. In order to reset it, hold the button < until you hear a sound signal. The counter is reset and the date is set to the current one.
- **Version** – firmware version
- **Starts** – controller power on count
- **Feeder** – total feeder work time (HH:MM)
- **Lighter** – total lighter work time (HH:MM)
- **Work total** – device total work time (DddHH:MM)
- **First Start** – date of first start

Outputs

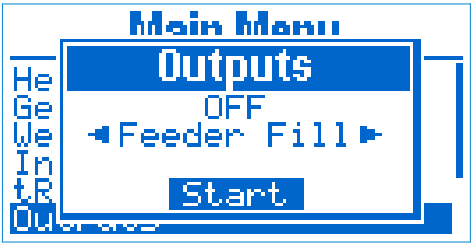

Fig 12 Outputs

You can manually control the outputs **Feeder** and **Fan**. This is only possible if the device is in **OFF** mode.

Use the buttons < / > to choose the output you want to control and press ↵ to start / stop it. When an output is activated, a 4 min timer will stop it automatically when it expires.

- **Feeder Fill**

The Feeder Fill function is used when the device is first powered on, or if the pellets have run out during normal operation.

In case the feeder is empty, turn it on until some pellets start coming down in the work area. If the feeder is not full, then during the ignition phase less pellets will be fed, which may lead to ignition failure.

- ***Fan***

Fan function can be used for cleaning the burning chamber from ashes.

Date & Time

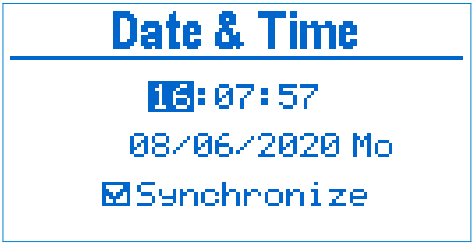

Fig 13 Date and time

Set the controller's time and date. The time format is HH:MM:SS and the date format is DD:MM:YYYY. Pressing ↵ over the seconds zeroes them. All other elements can be edited the way all parameters are edited. The day of week is automatically calculated, based on the entered date.

The internal clock has an internal battery, that keeps it running even when the controller is not powered.

If the device is connected to the internet, the date and time can be automatically synchronized if you activate the option **Synchronize**.

Errors / Actions

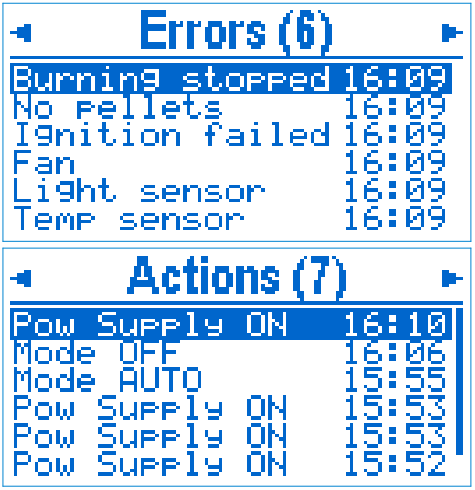

Fig 14 Errors/Actions

List of errors/actions that have occurred during controller operation. A maximum of 40 errors are saved and when the memory is full, the new error overwrites the oldest one. Next to the screen title in brackets **Errors (6)** the number of the registered errors is shown.

Press ↵ over selected element to get detailed information about it.

To switch between views, use the buttons < / >.

- **Errors**

The error list alleviates the troubleshooting of all problems that might occur during operation. The user can get help remotely, simply by reading the error to technical person and thus avoiding the need of visit.

- **Actions**

User actions during the device operation are logged, for example mode change, turning device on/off, power loss and others.

Service Menu

Warning! This menu should be used only by authorized personnel! The improper modification of parameters in this menu can hamper the correct device operation and lead to dangerous situations!

Fig 15 Password for the service menu

This menu is protected by 4 digit password. Use the buttons < and > to choose a digit to edit and use v / ^ to increase / decrease it. Press ↵ to enter the password and access the service menu.

Principle of operation

Work mode

Depending on the mode, the controller goes through series of states, so it reaches the final state for the mode. Changing the mode, makes the controller enter sequence of states, guaranteeing the correct power up or shutdown.

The boiler pump is always active, as long as the conditions for its operation are met, independent of the current mode. Exception of this rule is the case of working DHW pump and temperature of the room being reached, then the boiler pump is turned off.

ON / AUTO

Final state: *Burn*

When Burn state is reached, the process is controlled so that the heat needed by the system is generated.

The difference between automatic AUTO and manual ON mode is the way of determining the temperature set point. In automatic mode, the week timer or the external thermostat is used, as in manual, the user manually sets the desired temperature, ignoring the week timer or external thermostat.

OFF

Final state: *Idle*

When the mode is set to OFF the device will safely discontinue burning and will reach the Idle state. The system will not automatically turn itself from OFF to ON mode.

States

The state sequence is as follows:

0 Idle
1 Clean
2 Ignition
3 Kindle
4 Burn
  4.1 Purge
5 Shutdown
6 Clean
7 Wait

An ongoing error monitoring (sensors or state specific) is performed during operation in all states. When an error is detected, the burning is discontinued in the appropriate sequence.

Clean

When cleaning, the cleaner mechanism is activated for a fixed time. The cleaning is performed when the device is powered on and off.

Ignition

A preset quantity of fuel is loaded and the lighter is activated. The device waits until the fuel is ignited by monitoring the temperature of flue gases or the flame intensity (depending on configuration). On successful ignition, it passes to the next state. If the ignition time runs out before ignition is detected, then another attempt is made, restarting the ignition process and loading 50% less fuel. When the maximum number of attempts is reached, the controller shuts down, and registers an error.

Kindle

Waiting for the burning process to stabilize. The flue temperature should raise over a set threshold or the intensity of the flame should be stable for a time above a set threshold. Meanwhile fuel is being periodically fed (if configured). If the ignition time expires and no stable burning is detected, then a next ignition attempt will be committed.

Burn

After a stable burning is detected, the controller goes to burning state. The power (combination of supplied air and fuel) is determined by the control algorithm according to temperature(s) set point and / or external thermostat. By varying the power, the generated heat is adjusted, satisfying the current needs of heating in the system.

The burning is interrupted in the following cases:

- User: pressing power button ⏻.
- Clean time out: if a periodic clean is configured, then a shutdown is performed followed by clean and ignition, completing the restart cycle.
- Week timer: if there is a time set for turning off.
- No need of heating: when the power has been at minimum for a set time or the regulated temperature is exceeded, then the controller shuts down and transitions to WAIT mode.
- Loss of flame: flue gases temperature or flame intensity go below threshold. An error is registered.

Purge

During the burn state, periodically a purge is committed for a fixed time. The feeder is stopped and the fan power is increased, thus cleaning the burn chamber. After the purge time expires, the controller goes back to Burn.

Shutdown

The fuel is stopped and the fan power is set according to its shutdown setting. The controller waits for all the remaining fuel to burn out by monitoring the flame detector to go below the set threshold (flue temperature or flame intensity). After the Shutdown is complete, the controller transitions to Clean state.

Wait

As in OFF mode, the device is safely transitioned to an Idle state. However, the device will automatically transition to ON mode when the system needs to generate heat.

The device is in standby, awaiting for some of the heated objects to need heating. When all the current temperatures are above the set ones (or external thermostat), then the system should not generate any more heat and therefore stays in WAIT mode.

When the heating system cools down and a temperature drops below the set one, the device awaits a predefined time to transition back to burning and keep the system as close as possible to the temperature set.

Service parameters

Structure

- Global
- Boiler
- DHW
- Hardware Setup
- Temperature Control
- Fuel
- Clean
- Ignition
- Kindle
- Burn
- Shutdown
- Purge
- Opto Calibration
- Change Password
- Stop Work
- Outputs Test

Parameter menus

In the table below is a description of all service parameters. They are grouped into sub menus, noted in table column **Menu**.

The fumes fan power is set in percents of the maximal revolutions, as 100% = **`Fan Max`** and 0% = 0 rpm.

Fuel feeding (operation of the feeder mechanism) is set in seconds with a precision of 0.1 sec and the stop time is determined of the total period as the sum of **on time** + **stop time** = **`Feeder Period`**.

Menu	Parameter	Description
Global		
	`Feeder Period`	Total time (run + pause). **Feeder** = run. *All parameters listed below, that set the feeder time, have the meaning of **Feeder**.*
	`Fan Max`	Maximum revolutions per minute of the fumes fan. It is used to calculate the percents, that set the fan power.
	`Flue Max`	Maximum flue gas temperature. Exceeding it, registers the error *Overheat Flue* (if flue gases are used to detect flame).
	`Feeder Current`	Maximum feeder current. Exceeding it, registers the error *Feeder Blocked*.
	`Restore Power`	If there is a power break for a period less than the parameter's value, then when the power is restored, the controller returns to Burn state. Otherwise it goes to Shutdown state and the error *Power failure* is registered if the parameter **`Power Failure`** is set.
	`Power Failure`	Weather to register error, if the conditions, described for parameter **`Restore Power`**, are met. Registering an errors turns the work mode to OFF.

Menu	Parameter	Description
Boiler		
	Pump Min Temp	Minimum threshold temperature to turn on the circulation pump.
	Pump Hyst	Hysteresis for turning on and off the circulation pump. Turn on temperature = **Pump Min Temp** + **Pump Hysteresis**. Turn off temperature = **Pump Min Temp** – **Pump Hysteresis**.
	Boiler Max	Maximum boiler temperature. Exceeding it, registers the error *Overheat Water*.
	Pump Modulation	Enable circulation pump modulation.
	Pump Range	Working temperature range, in which the pump power is being modulated proportionally between **Pump Min Power** and **Pump Max Power.**
	Pump Min Power	Minimum modulation pump power, for boiler temperature <= **Pump Min Power**.
	Pump Max Power	Maximum modulation pump power, for boiler temperature >= **Pump Min Power** + **Pump Range**.
DHW		
	Pump Min Temp	Minimum threshold temperature to turn on the DHW pump.
	Delta Temp	The boiler temperature should be this many degrees higher than the DHW temperature in order to turn the pump on.
	Pump Hyst	Hysteresis for turning on and off the DHW pump. Turn on temperature = **Pump Min Temp** + **Pump Hyst**. Turn off temperature = **Pump Min Temp** – **Pump Hyst**.
	Wait DHW ON	Temperature difference below the set temperature in order to exit from **Wait** state.
	Wait DHW OFF	Temperature difference above the set temperature in order to enter **Wait** state.
	Low Priority	In heating mode **Heat+DHW**, the DHW pump is not activated until the main heating circuit reaches the set temperature.
Hardware Setup		
	DHW	General enable of DHW functionality.
	AUX Output	AUX output function: ■ **OFF**: Not in use ■ **Alarm**: Activated upon error registration ■ **Refill**: Fuel refill ■ **Feeder2**: Secondary feeder ■ **Flap**: Flue gases flap
	Clean Output	Clean output function: ■ **Clean**: Cleaning mechanism, activated during the **Clean** state ■ **Chimney**: Chimney fan, activated always when the main fumes fan is active.
	Chimney Fan	Power in percent for the Clean output, when it is configured as a chimney fan.
	Level Input	Level input function: ■ **OFF**: Not in use ■ **Pellet**: Level of the pellets inside the bunker ■ **Clean**: Feedback for the position of the cleaning mechanism.
	E1 Clean	Goes directly to Clean state if an error is detected on **E1** input
	E1 Invert	Invert the active state of the **E1** input (normally closed sensor).

Menu	Parameter	Description
	E2 Input	**E2** input function (registers error on active state of the input): ■ Chimney: Chimney pressure sensor. ■ Door: The door is opened. When the door is opened, the state is set to idle and when is closed, the previous state is restored.
	E2 Invert	Invert the active state of the **E2** input (normally closed sensor).
	Boiler t1	Heater temperature is sensed from physical input t1 instead of the default t2.
	Refill	Running time of the refill output when a pellet bunker low level is registered.
Temperature Control		
	Thermostat	Thermostat is controlled by: ■ Room: Room temperature. ■ Boiler: Boiler temperature (water). ■ Ext NO: External thermostat Normally-Opened. ■ Ext NC: External thermostat Normally-Closed.
	Wait Time ON	Time to transition to **Burn** from **Wait** state. If the device is in **Wait** state and there is a need of heating more than the time specified, the ignition is started.
	Wait Time OFF	Time to transition to **Wait** from **Burn** state. If the device is in **Burn** state and is working in minimal power more than the time specified, the shutdown is started.
	Wait Temp ON	Difference between the current and set temperature, under which the device immediately transitions from **Wait** to **Burn** state.
	Wait Temp OFF	Difference between the current and set temperature, over which the device immediately transitions from **Burn** to **Wait** state.
	Wait Boiler	Exceeding the set boiler temperature by this, forces a transition to **Wait** state.
	Power Levels	Number of power levels. Temperature control maximum power adjustment step is 2. Increasing the number of power levels effects in more fluid modulation, as decreasing it results in more rapid one.
	Fuzzy Period	Period for calculating the power change (modulation step). The more inertia the regulated object has, the bigger the period has to be and vice versa. If the work power oscillates between minimum and maximum, when the set point is reached, increase the period. In case of a significant overshoot of the set point, decrease the period.
	Flue Temp	Flue gases temperature set point. Temperature control algorithm alters the power, so this set point is not exceeded. Keeping the flue gases temperature guarantees that the overall efficiency of the unit will not drop below a certain limit.

Menu	Parameter	Description
Fuel		
	`Feeder Flow`	Feeder fuel delivering capability measured in pellets kg passed per minute.
	`Bunker Volume`	Bunker volume in kg, used to calculate the bunker fuel level.
	`Service`	Quantity of pellets burned after which a servicing is needed.
	`Energy`	Energy density of the fuel in **kWh/kg**.
	`Show KW`	Allow the user to view the current power in absolute units (kW).
Ignition		
	`Duration`	Ignition attempt time. Includes the combined time for states Ignition and Kindle. After the attempt time expires, another retry is performed.
	`Retries`	Number of ignition attempts. Exceeding it registers error *Ignition failed*.
	`Flame Detect`	■ Flame detection method: ■ `Opto`: Light sensor, monitoring the flame intensity of the flame. ■ `Flue`: Temperature of the flue gases.
	`Fan`	Fumes fan power during the Ignition state.
	`Load Pellets`	Feeder work time for the loading process in Ignition state.
	`Flue Delta`	Relative temperature raise of flue gases compared to the start of ignition. Exceeding this temperature raise is considered for successful ignition.
	`Light Level`	Light sensor level, exceeding it is considered for successful ignition.
	`Feeder2`	Secondary feeder work time in percent, compared to main feeder. For example if the parameter is set to 200%, then the secondary feeder will work twice longer than the main feeder.
Kindle		
	`Fan`	Fan power during Kindle state.
	`Feeder`	Feeder time during Kindle state.
	`Flue Burning`	Flue gases temperature, exceeding it marks successful Kindle state.
	`Light Time`	Time, during which the level of the light sensor is constantly above `Ignition → Light Level`. When time lapses, Kindle state is successful and over.
	`Lighter`	*Time to have the lighter output active in Kindle state.* *The minimum value of the parameter is OFF.*
Burn		
	`Min Fan`	Fan power on minimal work power.
	`Min Feeder`	Feeder time on minimal work power.
	`Max Fan`	Fan power on maximal work power.
	`Max Feeder`	Feeder time on maximal work power.
	`Feeder2`	Secondary feeder work time in percent, compared to main feeder. For example if the parameter is set to 200%, then the secondary feeder will work twice longer than the main feeder.

Menu	Parameter	Description
Clean		
	`Period`	Clean reset period. When the device is in Burn state and the set time expires, a reset procedure is conducted (shutdown, clean and re-ignition). *The minimum value of the parameter is OFF.*
	`Fan`	Fan power during Clean state.
	`Duration ON`	Duration of Clean state when the device is turned on.
	`Duration OFF`	Duration of Clean state when the device is turned off.
	`Output`	Active time for the cleaner output. *The minimum value of the parameter is OFF.*
Purge		
	`Period`	Purge period. When the device is in Burn state and the set time expires, it transitions to Purge state. Upon completion it returns back to Burn state. *The minimum value of the parameter is OFF.*
	`Time`	Duration of Purge state.
	`Fan`	Fan power during Purge state.
	`Clean`	Activate the Clean output without changing the fan power.
Shutdown		
	`Fan`	Fan power during Shutdown state.
	`Light Level`	Light sensor level, below which the countdown of **`Light Time`** begins.
	`Light Time`	Time, during which the level of the light sensor is constantly below **`Shutdown → Light Level`**. When time lapses, Shutdown state is over.

Additional menus

Opto Calibration

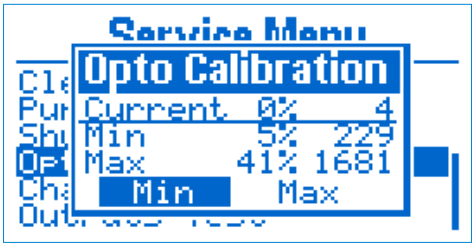

Fig 16 Flame sensor calibration

Here you can set the minimum and maximum value for the light sensor level. They define the limits, that are used to calculate the flame intensity in percents (0% = **Min**, 100% = **Max**).

The table shown on display, constitutes of the following columns:

- Reading:
  - **Current**: reading of the light sensor in the current moment
  - **Min**: value set for minimum intensity (0%)
  - **Max**: value set for maximum intensity (100%)
- Percent from the whole measured range
- Value in absolute units (from 0 to 4095), corresponding to the light sensor input voltage (I1).

Use the navigation buttons to choose a parameter to edit or action:

- **Absolute value Min/Max** – edit the absolute value, used to set the min/max limits.
- **Current value Min/Max** – choosing some of the buttons, the according parameter takes the current value of the light sensor and is saved.

Change Password

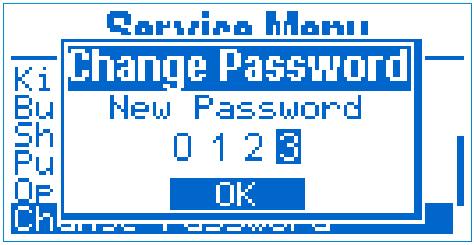

Fig 17 Service menu password change

You can change the password for accessing the service menu from here. Enter a new password two times, as the second time the password should match the first one. Only then it will be accepted and saved.

After changing the service password, you will be asked again for it in order to access the service menu.

Stop Work

Fig 18 Stop Work

The device can be forced to stop, ignoring the conditions for needed to complete a shutdown procedure. If the device is working, first a transition to **Clean** state is made, as a repetition of Stop Work command switches the device to **OFF** mode.

Outputs Test

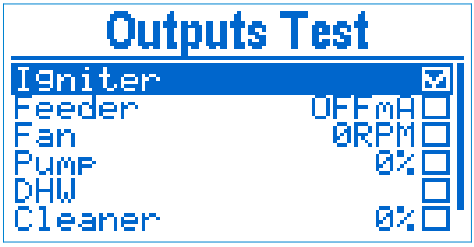

Fig 19 Outputs test

Warning! Improper activation of the controller's outputs can lead to dangerous situation!

Every single one of the controller's outputs can be manually activated. This screen is only accessible if the controller is in OFF mode and in Idle state.

Use the buttons ⌄ and ⌃ to choose an output to activate. Press ↵ to toggle on and off the current output. The check box on the right side of the screen indicates its current condition.

There is additional information, located next to the check box, for the following outputs:

- **Feeder**: Feeder current consumed, measured by a current sensing detector in the controller. This value can be used to establish the normal work current as well as the block current of the feeder.
- **Fan**: Revolutions per minute measured by the hall sensor (I2). Tests the correct operation of the sensor and determines the maximum speed of the fan installed.

- **Pump**: Pump power in percent. Use the buttons ⟨ / ⟩ to decrease / increase the power, when the output is on.

Errors

When an error is registered, the controller goes to shutdown state if it is in Burn state.

The only exception is error **Overheat Bunker**. When it occurs, the controller goes straight to Clean state even if the work mode is OFF.

The possible errors are:

- **Temp sensor**: Temperature sensor (from t1 to t4) is either broken or shorted (according to the error description).
- **Ignition failed**: The device failed to ignite.
- **No pellets**: The pellet level sensor has determined that there is no more fuel and refill time has expired.
- **Cleaner**: The cleaner mechanism is not in the right position according to the level input sensor (**I3**).
- **Burning stopped**: In Burn state, a loss of flame is detected according to the flue gases temperature or light intensity.
- **Power failure**: The power was cut for time exceeding the recovery time.
- **Feeder blocked**: The current, consumed by the feeder is above the threshold.
- **Fume pressure**: error input **E2** activated.
- **Clock**: Error occurred in the real time clock module. Does not force the device shutdown.
- **Overheat**: Overheating is registered in some of the following modules (according to error description):
  - **Water**: boiler temperature exceeded the maximum.
  - **Flue**: flue gases temperature exceeded maximum.
  - **Bunker**: error input **E1** activated.

Actions

The possible errors are:

- **Pow Supply ON**: Device connected to power.
- **Pow Supply OFF**: Device disconnected from power.
- **Mode ON**: Device switched to ON mode.
- **Mode AUTO**: Device switched to AUTO mode.
- **Mode OFF**: Device switched to OFF mode.
- **Service Menu**: Service menu accessed.
- **Service**: Device serviced.

Connection

It is mandatory to use mains switch and fuses for connecting the device to mains power (L and N) and the total power consumption of all modules should be taken into account!

The whole product including all of inside electric units should be earthed (connected to PE)!

Inputs		
Pt1000	**t1**	Temperature sensor flue gases
NTC 10K	**t2**	Temperature sensor boiler
NTC 10K / On - Off	**t3**	Temperature sensor room temperature / thermostat
NTC 10K	**t4**	Temperature sensor DHW
Light sensitive	**i1**	Light sensor flame intensity
Active level	**i2**	Hall sensor for fan revolutions counting
GND	**i3**	Capacitive / inductive sensor for pellet level / position of cleaner mechanism
Opto-insulated input 230V AC	**e1**	Error Bunker fire (Overheat Bunker)
	e2	Error Fume pressure / Door
230V 50Hz	**MAINS**	Mains power, internally fused 3.15A
Outputs		
Relay	**O3**	Lighter
Triac	**O1**	Feeder main(fuel feeding mechanism)
	O2	Feeder internal
	O4	Fumes fan
	O5	Boiler pump (water pump / fan)
	O6	DHW pump
	O7	Clean / Chimney fan

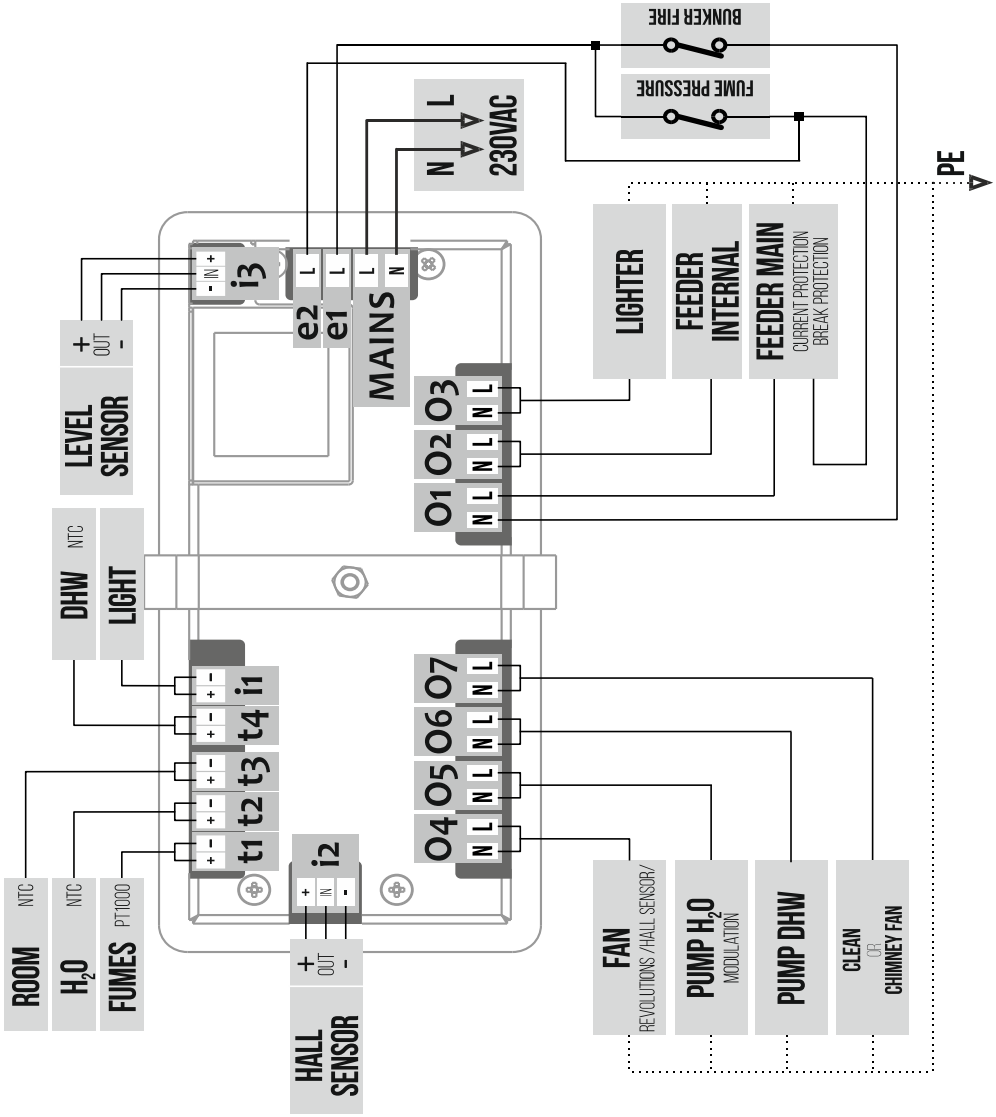

Fig 20 Connection

Mounting

The controller should be mounted on a flat surface with square opening sized 128 x 57 mm.

To mount the controller, first unscrew the mounting bracket, then put the controller in the opening. Fix it in place by putting the bracket on the back side and fasten the screw (Fig 22).

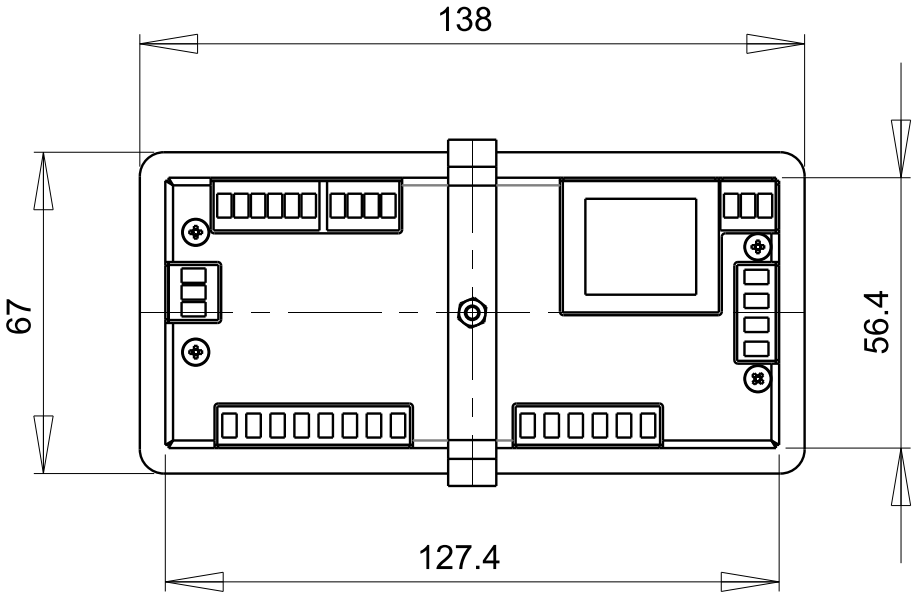

Fig 21 Dimensions

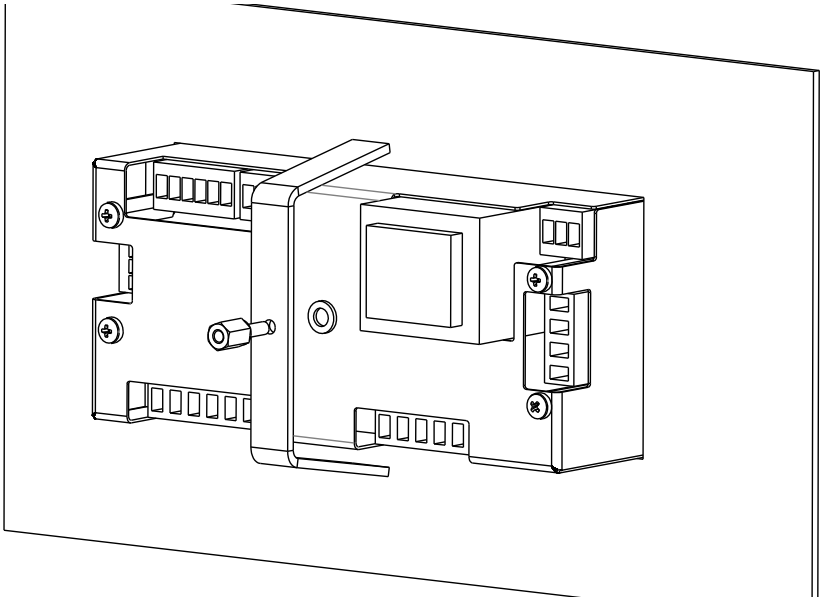

Fig 22 Mounting

Technical data

Voltage	230 V, 50 Hz
Controller power consumption	3.6 VA
Outputs total current	6.3 A
Operating temperature	0 ... 40 °C
Protection rating	IP 20
Dimensions	138 x 67 x 52 mm
Display	LCD 128 x 64 px
Temperature sensor Pt1000	-40 ... 250 °C
Temperature sensor NTC	-40 ... 125 °C

Limited Warranty

The warranty term is 24 months from date of sale. The guarantee is not valid in following cases:

- Incorrect installation
- Attempts to make repairs and/or modifications of equipment by the customer
- Visible damages of housing and/or the inner parts of the product
- Damages caused by storm (lighting)
- Use in inappropriate conditions (temperature and humidity)

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