

**DEFRO**<sup>®</sup>  
heating technology

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operating manual

controller

**NG01 HYDRO**

with control panel K100

adapted for operation with HYDROPELL dry stoves fired with pellet



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# Introduction

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NG01 is a control system for stoves fired with pellet and is available in two versions: Air and Hydro.

It is characterized by:

- easy installation and user,
- simple and intuitive user functions,
- reliable and flexible operation of the software with proven technology from TiEmme elettronica,
- advanced functions available for designers allowing adaptation to the various stoves and systems.

**Product composition:**

- electronic board with durable and safe 4-point fixing
- removable connections
- flue gas temperature sensor
- ambient probe
- mainboard - control panel connecting cable
- control panel with antistatic cover

**Safety notice**

Prior to installation user should acquire knowledge of:

- Environmental and safety standards.
- Follow all local regulations, inclusive of these given in the national and European standards.
- Follow all applicable safety standards.
- This instruction is intended only for technical personnel



## DECLARATION OF CONFORMITY

**Applied regulations:** EN 60730-1 50081-1 EN 60730-1 A1 50081-2.

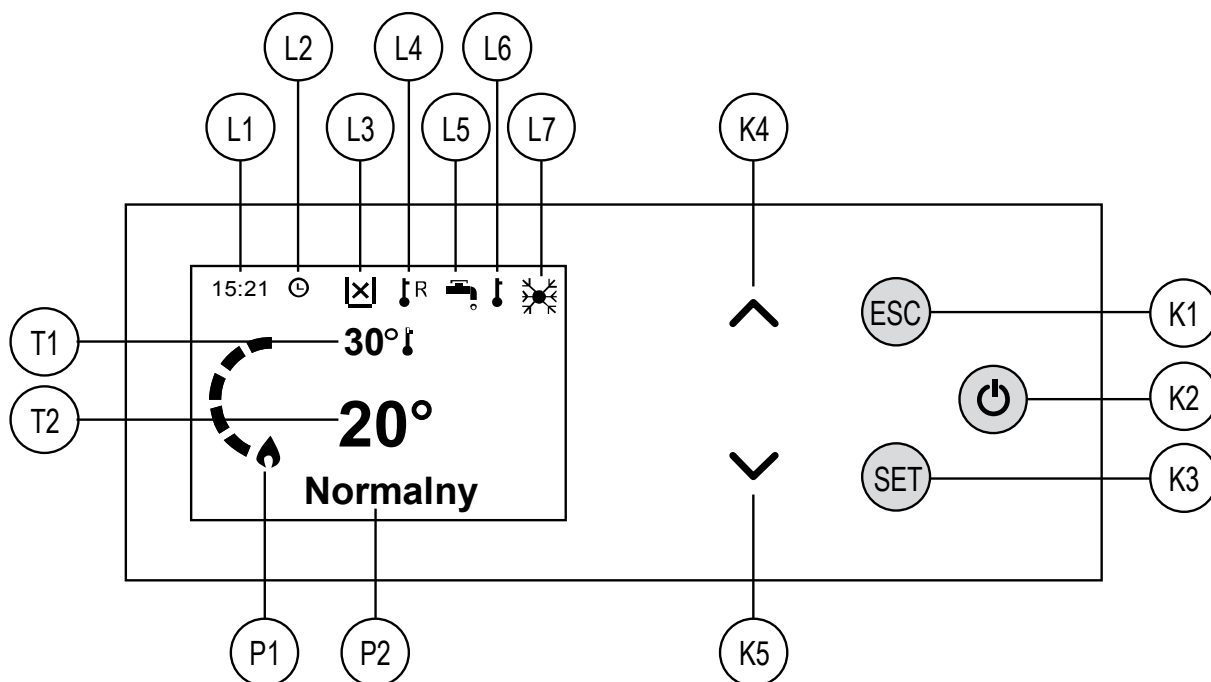
This manual has been prepared with due care, but information may not be complete, exhaustive or may contain errors. Therefore, design and information may be changed without prior notice.

**TiEmme elettronica** shall not be responsible for incomplete or incorrect information.

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# Control panel



Picture 1 View of control panel K100

## Keys

Key	Description
K1	<ul style="list-style-type: none"> <li>exit from menu/submenu</li> </ul>
K2	<ul style="list-style-type: none"> <li>ignition/damping (press for 3 sec.)</li> <li>errors reset (press for 3 sec.)</li> <li>activation/lock of the clock (chrono)</li> </ul>
K3	<ul style="list-style-type: none"> <li>entry to menu/submenu of the user 1</li> <li>entry to user menu 2 (press for 3 sec.)</li> <li>save of settings</li> </ul>
K4	<ul style="list-style-type: none"> <li>exit to information screen,</li> <li>value increase</li> </ul>
K5	<ul style="list-style-type: none"> <li>exit to information screen,</li> <li>value decrease</li> </ul>

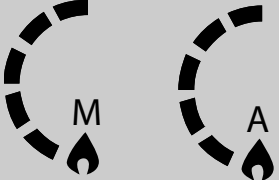
## Diodes

Designation	Icon	Description
L1	15:21	clock, current time
L2		signalling of activation of chrono mode
L3		signalling of empty pellet container
L4		signalling of reaching remote temperature
L5		signalling of hot water demand in DHW (temperature in container below 55°C, while this value may be changed by the fitter).
L6		signalling of reaching local temperature
L7		operation modes <ul style="list-style-type: none"> <li> - summer</li> <li> - winter</li> </ul>

## Temperature indicators

Designation	View	Description
T1	30°!	Local temperature set
T2	20°	Current temperature set

## Indicators

Designation	View	Description
P1		Combustion power level. M letter stands for manual level setting, A letter stands for automatically selected level (usually it is a maximum level).
P2	Normal	Current operating state

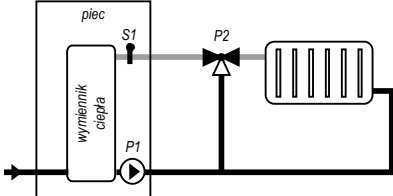
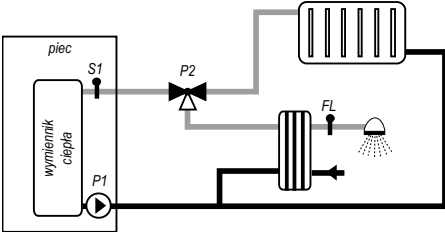
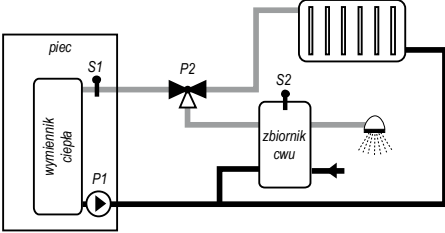
## Configuration made by the fitter

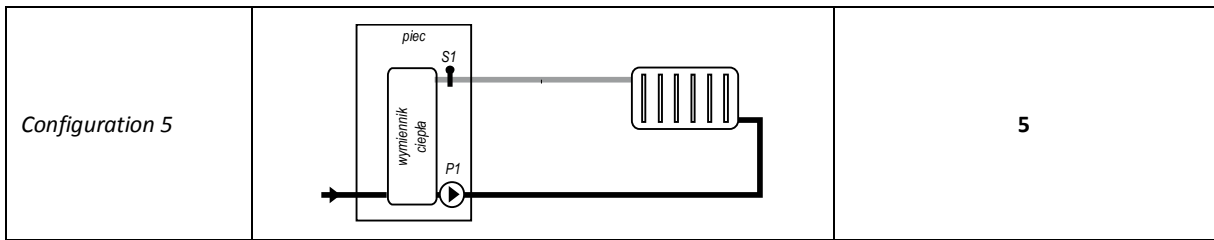
The fitter is obliged to configure the controller after installation of the pellet stove in the central heating system. The configuration comprises of three stages:

- Selection of hydraulic system,
- Selection of controlled device by output **V2** (P44),
- Selection of devices connected to inputs **IN2** (P77), **IN3** (P75), **IN6**(P78) and **IN7** (P82),

## Configuration of operation in central heating system

A first step it selection of hydraulic system by parameter **P26** in option **Konfiguracja (Configuration)** in **Menu Systemu (System)** (access from **Menu Modyfikacje (Modifications) Menu**).

Configuration	Scheme of the system	P26 parameter value
Configuration 0		0
Configuration 0		0
Configuration 2		2



## V2 output configuration

Next step is the configuration of output **V2 (P44)** specifying the equipment, which should be controlled by this output.

Device	Parameter	Output V2(P44)
<i>None - output blocked</i>	0	<input checked="" type="checkbox"/>
<i>Pellet safety valve</i>	1	<input checked="" type="checkbox"/>
<i>Loading motor</i>	2	<input checked="" type="checkbox"/>
<i>Output under thermostat</i>	3	<input checked="" type="checkbox"/>
<i>Flue gas fan 2</i>	5	<input checked="" type="checkbox"/>
<i>Hot air fan</i>	6	<input checked="" type="checkbox"/>
<i>Air valve</i>	7	<input checked="" type="checkbox"/>
<i>Error message</i>	11	<input checked="" type="checkbox"/>
<i>Solenoid valve with 2 wires</i>	15	<input checked="" type="checkbox"/>
<i>Screw conveyor 2</i>	17	<input checked="" type="checkbox"/>
<i>Cleaning motor</i>	25	<input checked="" type="checkbox"/>

## Inputs configuration

The last stage of configuration is the definition of equipment connected to IN2, IN3, IN6, IN7 inputs.

Device	Parameter r	Inputs			
		IN2 (P77)	IN3 (P75)	IN6 (P78)	IN7 (P82)
<i>None - input not connected</i>	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Door sensor</i>	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Pellet thermostat</i>	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Ambient thermostat</i>	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Flow switch</i>	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Pellet level sensor</i>	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Domestic hot water probe</i>	9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Limit switch for cleaning the motor</i>	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Ambient probe</i>	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Primary air flow controller</i>	16	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>External clock (Chrono)</i>	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Input of encoder of conveying screw</i>	28	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Water pressure sensor</i>	29	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

## Operation status

Name of operating states is displayed on controller display during operation.

Status	Code
<i>Switched off</i>	-
<i>Checking</i>	<i>ChEc</i>
<i>Firing up</i>	<i>On 1</i>
<i>Stabilization</i>	<i>On 5</i>
<i>Normal</i>	-
<i>Modulation</i>	<i>Mod</i>
<i>Standby</i>	<i>Stby</i>
<i>Damping</i>	<i>OFF</i>
<i>Sond</i>	<i>ChEc</i>
<i>Operation</i>	<i>Alt</i>
<i>Firing up repeat</i>	<i>rEc</i>

## Alarms

Code	Description
<b>Er01</b>	Intervention of safety pressure switch HV1: signalling even when combustion fan is WYŁ./OFF
<b>Er02</b>	Intervention of safety pressure switch HV2: signalling when combustion fan is WŁ./ON
<b>Er03</b>	Damping due to decrease of flue gases temperature
<b>Er04</b>	Damping due to the excessive temperature of water
<b>Er05</b>	Damping due to excessive flue gases temperature
<b>Er06</b>	Pellet thermostat opened (return of flame from brazier)
<b>Er07</b>	Combustion fan encoder: lack of encoder signal (if <b>P25 = 1 or 2</b> )
<b>Er08</b>	Combustion fan encoder: failure of fan speed adjustment (if <b>P25 = 1 or 2</b> )
<b>Er09</b>	Low pressure of water (is system is WYŁ./OFF or in mode Blok (Block) and pump P1 is switched off then the error is not reported
<b>Er10</b>	High pressure of water
<b>Er11</b>	Incorrect values of time/data after prolonged mains power failure
<b>Er12</b>	Ignition failed
<b>Er15</b>	Mains supply interruption
<b>Er16</b>	RS485 communication error
<b>Er17</b>	Air flow adjustment failed
<b>Er18</b>	No fuel
<b>Er23</b>	Boiler of DHW sensor opened
<b>Er25</b>	Cleaning motor damaged
<b>Er39</b>	Damaged sensor of flowmeter
<b>Er41</b>	Minimum flow of air in Control/Checking modes has not been reached
<b>Er42</b>	Maximum flow of air exceeded ( <b>FL40</b> )
<b>Er44</b>	Doors error
<b>Er47</b>	Conveying screw encoder: lack of encoder signal (if <b>P81 = 1 or 2</b> )
<b>Er48</b>	Conveying screw encoder error: speed adjustment failed (if <b>P81 = 1 or 2</b> )
<b>Service</b>	Service error. Informs that the hours planned for Maintenance 1 function (parameter T66) have been reached. Contact the authorized service center.

## Messages

Code	Description
<b>PRob</b>	Fault during inspection of sensor during Checking/Inspection stage
<b>Clean</b>	Informs that the hours planned for operation (parameter T67) have been reached.
<b>Door</b>	Doors are open
<b>Ignition Block</b>	Message appears if the system is switched off during ignition (after preliminary loading) by external device: system stops only when it switches to <b>Pracy/Work</b> mode.
<b>Link Error</b>	Lack of communication of the LCD panel and control board
<b>Cleaning On</b>	Periodic cleaning in progress

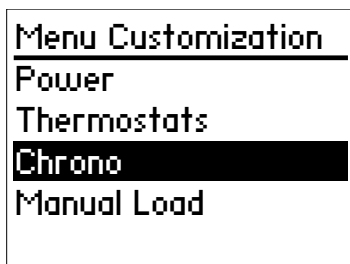



# User menu

## Menu Customization

**Menu Customization** is intended for control of current operation of the stove by:

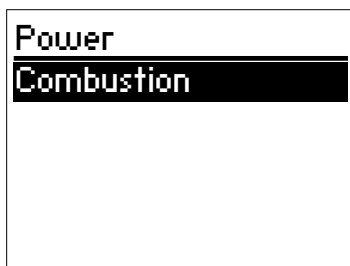
- power adjustment - **Power**,
- thermostats settings menu - **Thermostats**,
- working time programming - **Chrono**,
- forcing of endless screw loading – **Manual Load**.






**Customization Menu** will be displayed after pressing  key.

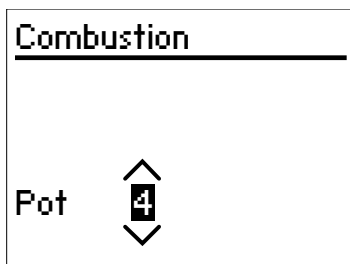
### Menu Customization → Power

Content of this screen depends on configuration of the hydraulic system. For the simplest configuration there is only an option to adjust combustion power.



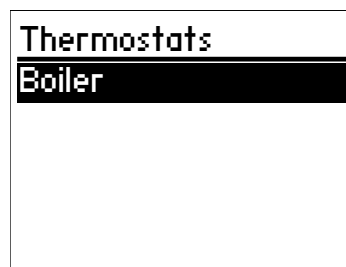
**Combustion** menu is used to adjust power of the stove in the range of six levels (from 1 to 6). First stage corresponds to minimum power of the stove (approx. 40% of nominal power) and the last one to the nominal power.

- Select required level with a key  .
- Confirm the selection with a key .






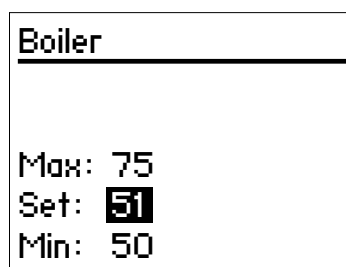
### Menu Customization → Thermostats

This menu allows changing values of temperature of stove thermostat.



Boiler - set value is within the determined limits between the given **Max** and **Min** values:

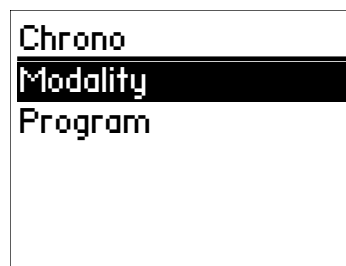
- Select required value of water temperature in boiler using keys  and .
- Confirm the setting with a key .



### Menu Customization → Chrono






Chrono, that is time programmer allows setting and activation of a programme controlling the duration of stove operation.

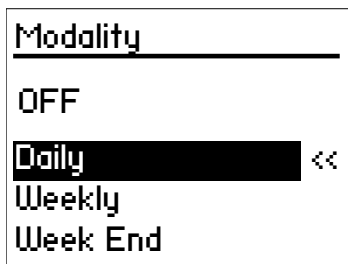
- **Modality** menu is used to select mode of programme operation,
- **Program** menu is used to set operating times for each mode.



### Chrono → Modality

It allows selecting one of the modes or locking operation of the program.

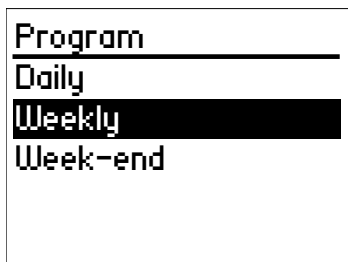
- enter to the mode with a key ,
- select required mode **Daily**, **Weekly** or **Week-end** using keys  ,
- Switching **ON/OFF** (program switch on/off) option by pressing  button,
- confirm new settings pressing the key .



## Chrono → Program

This menu can be used to program each of program modes by determining times of switching on and off of the stove:

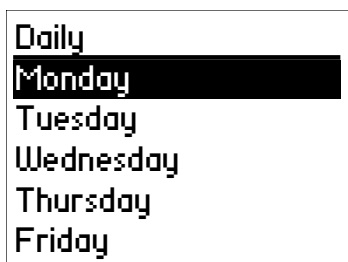
- select the mode with a keys  $\wedge$   $\vee$ ,
- enter the programming with a key **SET**.



## Chrono → Program → Daily

**Daily** mode allows setting stove switching on/off times individually for each day of the week. The other days of the week (Saturday, Sunday) will be displayed after pressing  $\wedge$   $\vee$  keys, when the currently selected day is **Monday** or **Friday**, respectively, (first or last item on the list).

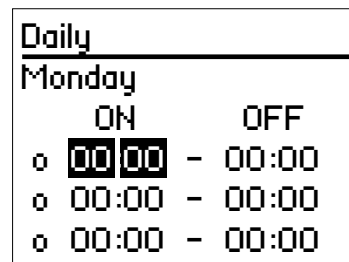
- select day using  $\wedge$   $\vee$  keys, for which you want to specify times of switching on and switching off,
- press button **SET**.



Screen, where you can set maximum three operation cycles during the day, will be displayed after selection of a day.

- Choose selected field of time (00:00) with keys  $\wedge$   $\vee$ . Switching on time is entered in **ON** column, while switching off time in **OFF** column
- Press **SET** key, to confirm selection of hours or minutes field.
- Select hour and minutes (with 15-minutes interval) with the keys  $\wedge$   $\vee$
- Confirm selected value with a key **SET**.

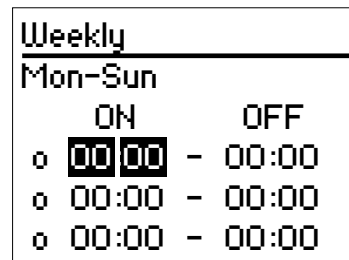
- Repeat operations for the other fields.
- Each cycle can be activated or blocked pressing a button . Active time interval is marked by filling a bullet preceding each of the cycles (● - active, ○ - inactive).



## Chrono → Program → Weekly

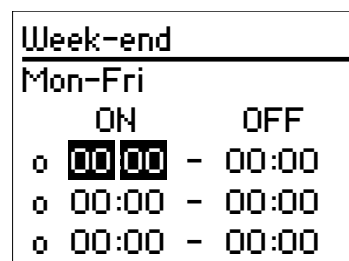
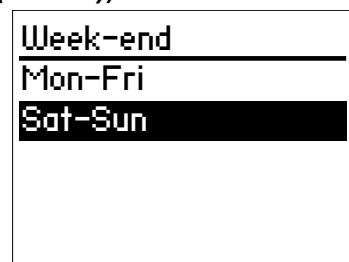
**Weekly** mode allows setting only one set of times for switching on and off the stove, which will be applicable for each day of the week.

Intervals are set in the same way as previously described for **Daily (Codzienny)** mode.



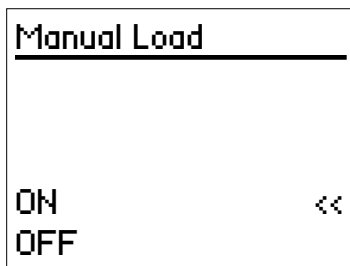
## Chrono → Program → Week-end

Intervals are set in the same way as previously described for **Daily (Codzienny)** mode.



## MenuCustomization → Manual Load

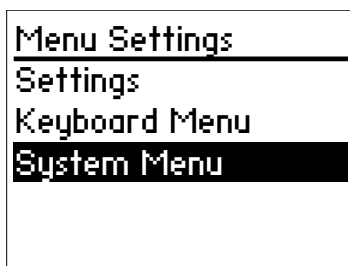
The procedure forces load of pellet. Loading is automatically stopped after 300 seconds. To activate this function it is required to select previously **OFF** option. Only for local panel.



## Menu Settings

This menu contains three options:

- **Settings** – additional configuration of stove operation
- **Keyboard Menu**– setting of display operation parameters
- **System Menu** – access after entering the password; menu contains options set by the fitter or service technician.



## Menu Settings → Settings

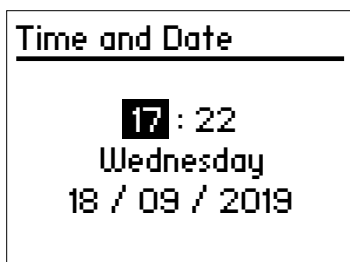
Configuration contains:

- **Time and Date**
- **Language**
- **Remote control**
- **Auger Calibration**
- **Fan Calibration**
- **Summer-Winter**
- **Automatic Power**

## Settings → Time and Date

Setting of current data and time.

- Select field with the keys  $\wedge$   $\vee$ ,
- Confirm selection **SET**,
- Using the keys  $\wedge$   $\vee$  set the values for: hour, minute, day, month or year.



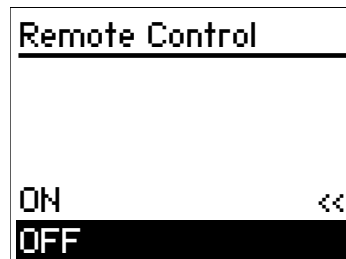
## Settings → Language

Selection of language for the messages from the controller.



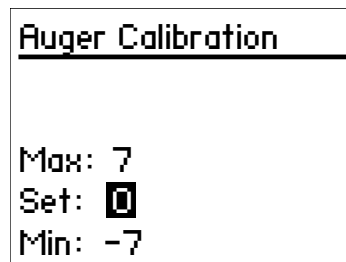
## Settings → Remote control

Switching on or switching off the control by remote module.



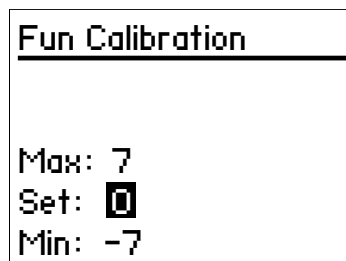
## Settings → Auger Calibration

Calibration of endless screw allows changing speed of operation or duration of operation of drive of the conveying screw. Factory setting is 0, while value set by the user should be between -7 to 7.



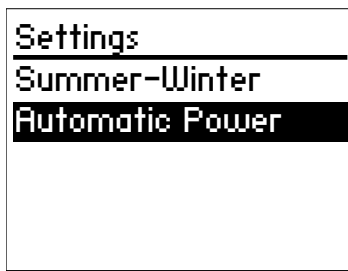
## Settings → Fun Calibration

Fan calibration is intended for changing of flue gas fan speed from -7 to 7 in relation to the factory settings (value 0).



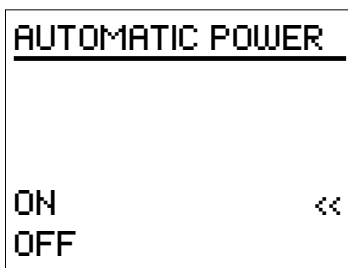
## Settings → Summer-Winter

This setting allows selecting operating mode of the hydraulic system depending on the season.



### Settings → Automatic Power

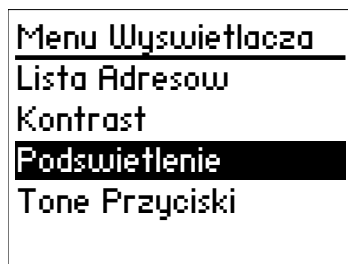
This setting allows selecting mode of power modulation. Selecting option **ON** the stove system will choose power (automatic mode). In this case don't appear **Menu Customization → Power → Combustion**. Setting **OFF** option allow user choose the power level in **Customization Level → Power → Combustion**.



### Menu Settings → Keyboard Menu

Display menu contains functions responsible for control of its operations:

- Lista Adresow (Address list)
- Contrast
- Backlight
- Tone Przyciski (Buttons tone)



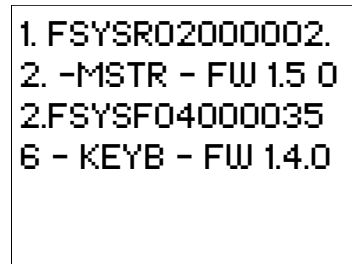
### Modyfikacje (Modifications) Menu → Menu wyświetlacza (Display menu) → Lista Adresów (Address list)

**Address list** contains list of cooperating devices connected with the controller. Each item of the list contains address, type and version of software.

Designation of types:

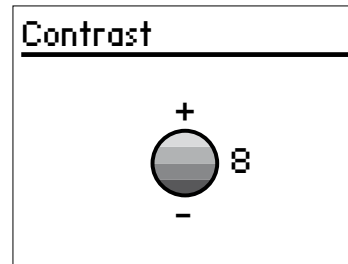
- **MSTR** – master device
- **INP** – input
- **KEYB** – Keyboard
- **OUT** – output
- **CMPS** – complex equipment
- **SENS** – sensor

- **COM** – communication link



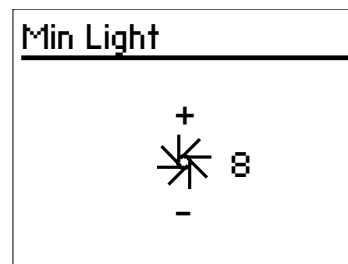
### Keyboard Menu → Contrast

This option is used to adjust contrast of the display



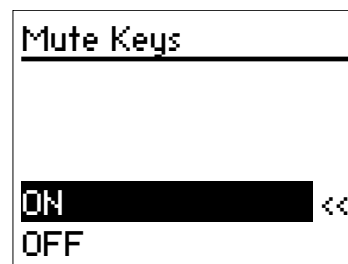
### Keyboard Menu → Min Light

This screen can be used to set a degree of screen backlight.



### Keyboard Menu → Mute Keys

**Buttons Tone** menu allows switching on and off a sound during pressing of panel control buttons



## Information screens

Information on current parameters of boiler operation are displayed on two screens titled **Informacja (Information)**, which are recalled by ^ v buttons.

**Screen displayed with a button v:**


**Exhaust T.** – temperature of flue gas

**Boiler T.** – water temperature in heat exchanger

**Buffer T.** – water temperature in buffer tank (DHW) (if installed)

- Fan [rpm]** – rotational speed of flue gas fan
- Auger [s]** – operation time of endless screw

Informations	
Exhaust T. [°C]	101
Boiler T. [°C]	65
Buffer T. [°C]	36
Fan [rpm]	0
Auger [s]	0.0

Screen displayed with a button :


- Pressure [mbar]** – water pressure in central heating system
- Work time [h]** – operating time of stove in *Normal*, *Modulation* modes.
- Ignitions** – number of firing up cycles
- Prod.Code.** – product code

Informations	
Pressure [mbar]	0
Work time [h]	65
Ignitions	11
Prod. Code:	562 0


## Control of stove operation

### First start-up of the stove

During first start-up of the stove or when it is stated after refuelling resulting from complete combustion of pellet.

- Turn on the power
- Switch on pellet endless screw *Menu Customization* → *Manual Load* using option **ON**, when you hear a sound of falling pellet, switch off using **OFF** option.
- Switch on Rozpalanie/Firing up with  button.
- The stove will switch to firing up and will continue operation in automatic mode.

### Stove start-up

- Turn on the power.
- Press button .
- The stove will switch to firing up and will continue operation in automatic mode.

### Operating power setting

In *Menu customization* → *Power* → *Combustion* there is a 7-stage controller, which can be used for control of stove maximum power. The stove is operating on power 6 by default, that is it uses whole power for heating of

water. This status is indicated by a letter **A** on **P1** indicator of controller display. When user decreases power in the menu it will be reflected in **P1** index, letter **M** will appear instead of letter **A**. Decreasing combustion power results in prolongation of time for reaching of set water temperature, decreasing at the same time portions of supplied pellet.


### Work cycle

After initiation of the firing the stove switches successively to the following operation modes:

- **Checking**
- **Probe**
- **Firing up**
- **Stabilization**
- **Operation**
- **Modulation**
- **Standby**
- **Damping**

Presented cycle is repeated automatically to maintain constant power of the stove and temperature of water in stove. During operation temperature of water may increase or decrease, but it always should oscillate around the set value.

### Stove shutdown

Stove, in any operating mode, can be switched off by button , what results in automatic switching to **Damping** mode. After completion of this cycle the stove switches to **Off mode** and in this mode you can safely shutdown supply of the stove.

### Stove emergency shutdown

In case of emergency the stove can be immediately switched off by disconnecting power supply - using switch or pulling out the plug from a supply socket. A small part of pellet in burner will be combusted during several seconds and flame will be damped.

### Working time programming

The stove can be programmed for scheduled operation using *Menu Customization* → *Chrono* → *Modality*. Selected mode causes switching on and off the stove in accordance with the periods set in *Menu Customization* → *Chrono* → *Program* with a programme corresponding to the given mode. Time programming details are described in the chapter *Menu Customization*, subsection *Chrono*.





**DEFRO**<sup>®</sup>  
heating technology

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