Centrometal
HEATING TECHNIQUE

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ENG

TECHNICAL INSTRUCTIONS

Description and using of boiler control unit

CE

THE FIRST START-UP MUST BE DONE BY AUTHORIZED PERSON OTHERWISE PRODUCT WARRANTY IS NOT VALID

BioTec-C

TURBT-C-02-2024-v.1.12-eng

CONTENT

1.0. DESCRIPTION

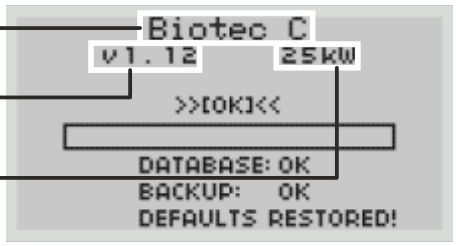
1.1. SWITCHING ON

After turning on the main switch, screen will turn on. Boiler type, power and firmware version will be shown. If language selection menu is **enabled**, after pressing any key, language selection menu is shown. Select language and press OK button. If language menu is **disabled** regulation will show for very short time boiler version, power and firmware version and automatically switch to main screen.

Language selection menu ENABLED

Main switch ON
-> Press any key

boiler model
firmware version
boiler power



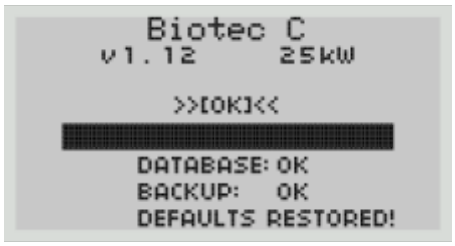
Select language
and press OK button
to enter main screen

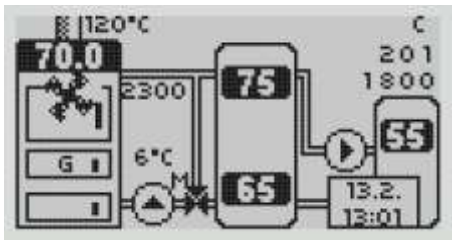
language
selection menu

LANGUAGE SELECTION MENU

Language selection menu DISABLED

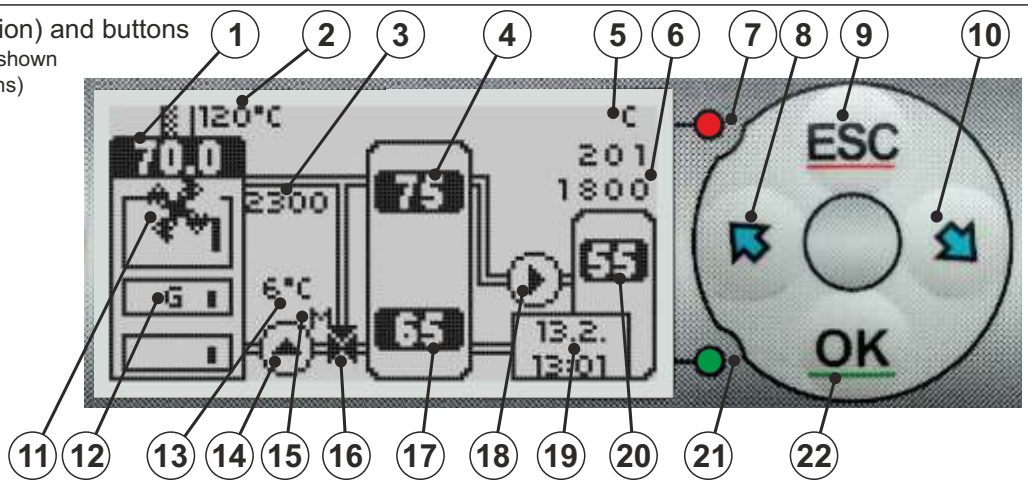
note: this screen is shown for very short time





MAIN SCREEN

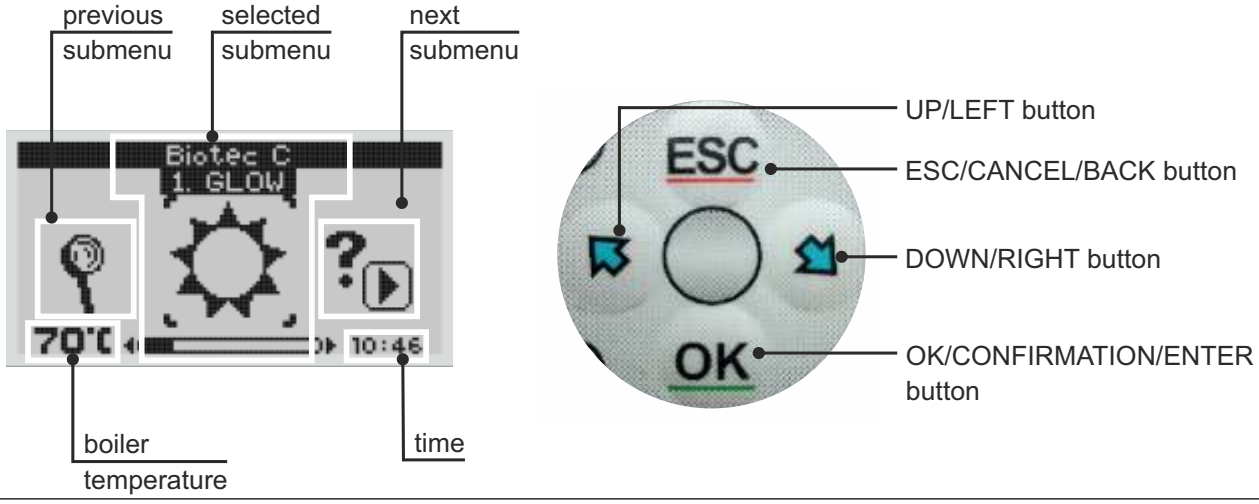
Screen (full configuration) and buttons
(NOTE: some symbols are shown only at certain configurations)



1 - Boiler temperature
2 - Flue gas temperature
3 - Flue gas fan rpm
4 - Accumulation tank upper temperature
5 - Working stage
6 - Working stage counters
7 - Error/Warning LED
8 - UP/LEFT button
9 - ESCAPE/BACK/CANCEL button
10 - DOWN/RIGHT button
11 - Flue gas fan symbol
12 - GLOW mode symbol (shown when this mode is enabled)
13 - Return flow temperature (shown only if return flow sensor is installed and enabled or if protection valve is enabled)
14 - Pump P1 symbol
15 - 3-way mixing valve actuator symbol (if configured)
16 - Mixing valve symbol
17 - Accumulation tank lower temperature
18 - DHW pump P2 symbol (if configured)
19 - Time and date
20 - DHW tank temperature (if configured)
21 - Working LED
22 - OK/CONFIRMATION/ENTER button

1.2. MAIN MENU

The main menu is used to select the desired submenu. To select a specific menu you must press ESCAPE button, with LEFT/RIGHT button select appropriate icon on the screen and press OK/CONFIRMATION/ENTER button. To go back or to cancel press ESC/CANCEL/BACK button.



LANGUAGE SELECTION

- after 1st power ON and language selection, recommended is to disable LANGUAGE SELECTION menu
- when set to DISABLE after each power ON set language will be automatically selected

main menu->OPTIONS

DISPLAY

LANGUAGE SELECTION

factory: ENABLED

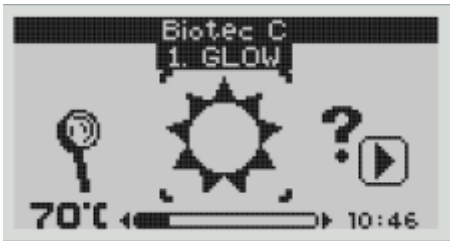
set it to: DISABLED

SCREENSAVER

- after set time of inactivity screensaver will turn on to prevent screen burn in - press any key to turn off screensaver

1.3. SUBMENUS

1.3.1. GLOW

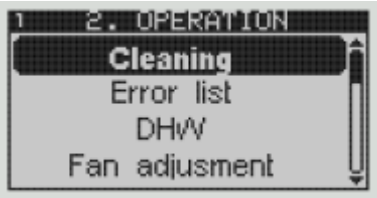


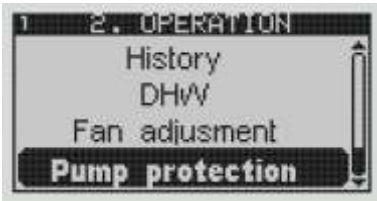
Glow mode options:

- enabled - when, on fuel load storage, remain only glow, boiler can maintain remain glow for max 8 h, depend of heating requirement and wood used

- disabled - when you want to use (spend) all fuel

1.3.2. OPERATION





CLEANING, HISTORY, DHW, FAN ADJUSTMENT, PUMP PROTECTION

Cleaning

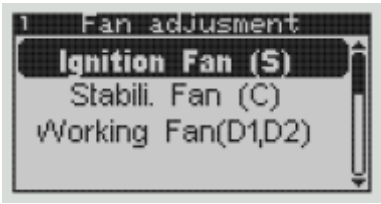
- this option is used when manually cleaning the boiler; flue gas fan is working according set rpms and for set time
  Cleaning - entering this option, flue gas fan start to work according to set rpms for set time
  Time - set the working time of the flue gas fan
  Fan - set the working rpms of the flue gas fan

History

- list of all errors/warnings/informations that appeared with time and date when they happend

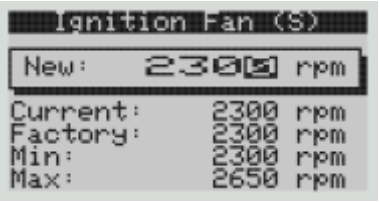
DHW

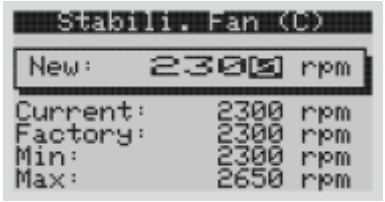
- this option is used for setting DHW
  DHW - enable/disable DHW
  Schedule - enable/disable DHW schedule
  Table - set DHW schedule time table



Fan adjustment

- this option is used to set flue gas fan rpm on boiler working stages
- fan can be adjusted for 4 stages:
  S-stage (ignition), **C-stage** (stabilisation), **D-1-stage/D-2-stage** (working stages-one setting)
- NOTE: factory setting depends of boiler power; example below is for 25 kW



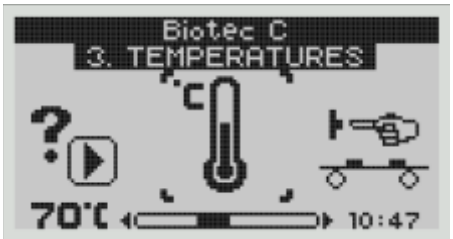


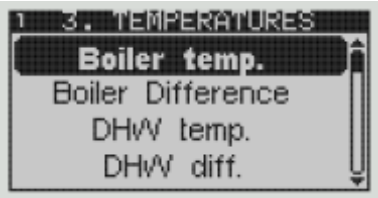
IMPORTANT: flue gas fan rpm must be increased above factory setting when firing with wood with more than 30% moisture or when flue gas connection and chimney doesn't provide enough underpressure on nominal boiler power. Flue gas fan rpm increase must be done according individual situation so flue gas temp. would not achieve to high value, but enough that boiler works correctly.

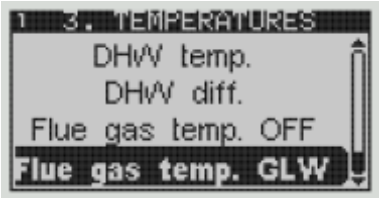
Pump protection

- this option is used to enable/disable pump protection option (default: enabled) - if any pump/mixing valve actuator is not worked in 48 h, regulation starts it for 60 sec.

1.3.3. TEMPERATURES







BOILER TEMPERATURE, BOILER DIFFERENCE, DHW TEMPERATURE, DHW DIFFERENCE FLUE GAS TEMP. OFF, FLUE GAS TEMP. GLW-OFF

Boiler temperature - set the boiler temperature
(setting range: 75°C - 90°C)

Boiler difference - set the boiler difference
(setting range: 5°C - 20°C)

DHW temperature - set the DHW temperature (if configured)
(setting range: 20°C - 85°C)

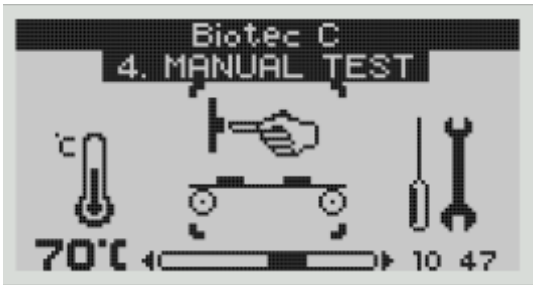
DHW difference - set the DHW difference (if configured)
(setting range: 3°C - 40°C)

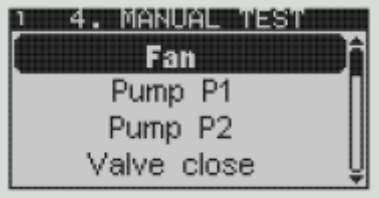
Flue gas temperature OFF - set the flue gas temperature for boiler shutdown
(setting range: 70°C - 160°C)
factory setting: 25 kW: **105**°C; 35 kW: **100**°C, 45 kW: **100**°C
- this condition is met if option is enabled and when measured flue gas temperature in D-2 stages is lower than set flue gas temperature constantly for 900 sec

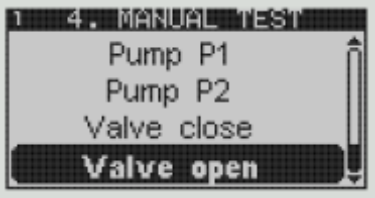
Flue gas temperature GLW - set the flue gas temperature for boiler shutdown when GLOW mode is enabled
(setting range: 80°C - 180°C)
factory setting: 25 kW: **140**°C; 35 kW: **105**°C, 45 kW: **105**°C
- this condition is met if option is enabled and when measured flue gas temperature in D-2 stages is lower than set flue gas temperature constantly for 900 sec

IMPORTAN NOTE:
FACTORY SETTINGS (FLUE GAS TEMP. OFF AND FLUE GAS TEMP. GLW) ARE ONLY AS REFERENCE, ACTUAL SETTING MUST BE ADJUSTED BY USER ACCORDING TOTHE FUEL USED AND BOILER FLUE GAS PASSAGES CONDITION (HOW CLEAN/DIRTY BOILER IS)

1.3.4. MANUAL TEST





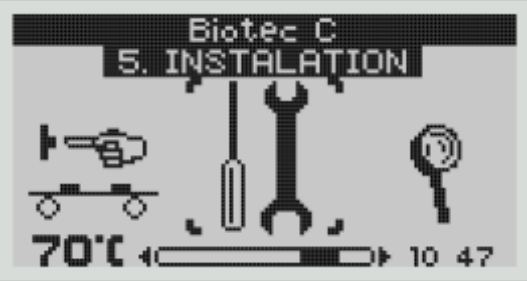


FAN, PUMP P1, PUMP P2, VALVE CLOSE, VALVE OPEN

- in this menu are options to test all boiler outputs
Fan - test working of the flue gas fan
Pump P1 - test working of the pump P1
Pump P2 - test working of the pump P2 *
Valve open - test opening the valve *
Valve close - test closing the valve *

* NOTE: this functions are always shown in this menu but will work only if they are enabled in the configuration menu

1.3.5. INSTALLATION

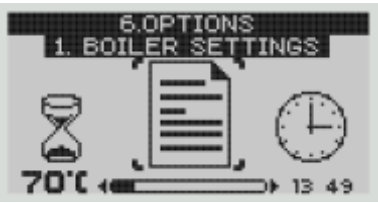


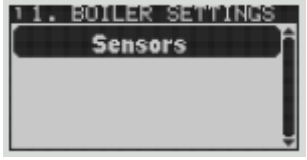
Enter PASSWORD
(only authorized serviceman)

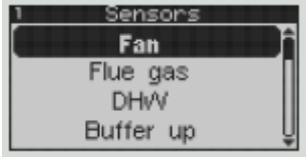
- this menu is used for setting boiler parameters - **only for authorized serviceman (PIN)**

1.3.6. OPTIONS

1.3.6.1. BOILER SETTINGS



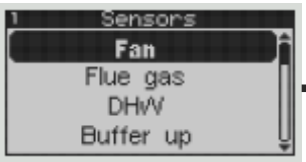




- in this menu are shown settings for temperature and flue gas fan rpm sensors and options to disable/enable them

NOTE: to change this options, user PIN must be entered **(PIN = USR)**

EXAMPLE - how to enter PIN



go to the parameter you want to change
press OK button

press OK button

PIN enter screen

with / buttons enter 1st PIN symbol press OK button to confirm it and jump to 2nd PIN symbol

with / buttons enter 2nd PIN symbol press OK button to confirm it and jump to 3rd PIN symbol

with / buttons enter 3rd PIN symbol press OK button to confirm it and enter to value change screen

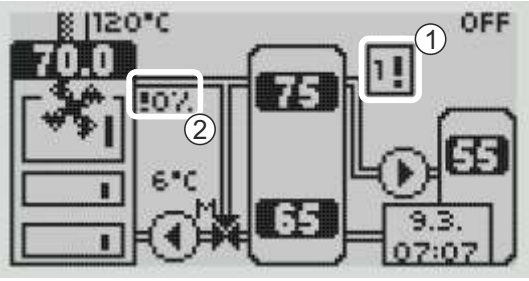
VALUE CHANGE screen
with / buttons change the value
with OK button confirm it
with ESC button cancel it

NOTE:
to go back from 3rd to 2nd and from 2nd to 1st PIN symbol press ESC button
also, to cancel PIN entering press ESC button until exit the menu

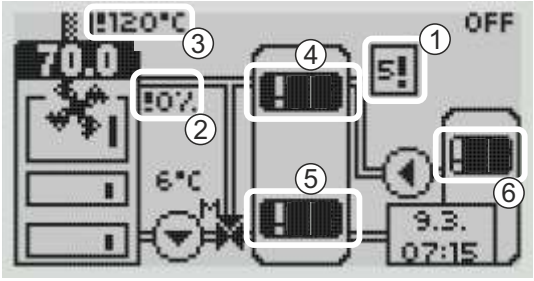
BY DISABLING ONE OR MORE SENSORS IN THIS MENU BOILER ENTERS "<u>INTERVENTION WORK</u>"

- **FLUE GAS FAN RPM SENSOR - DISABLED** - boiler will work in INTERVENTION WORK if flue gas fan is working, set flue gas fan rpm is shown as % in relation to max. fan speed
- **FLUE GAS TEMP. SENSOR - DISABLED** - boiler will work in INTERVENTION WORK without flue gas temperature control (use only in emergency because there isn't flue gas fan protection against to high temp.), flue gas temp. is NOT shown on screen
- **DHW TANK SENSOR - DISABLED** - DHW pump (P2) will work allways, DHW temp. is NOT shown on screen
- **ACCUMULATION TANK UPPER SENSOR - DISABLED** - boiler will work in INTERVENTION WORK without upper accumulation tank sensor control, pump P1 will work without control by upper accumulation tank temperature, upper accumulation tank temp. is NOT shown on screen

Example 1. Flue gas fan rpm sensor disabled



Example 2. All sensors disabled



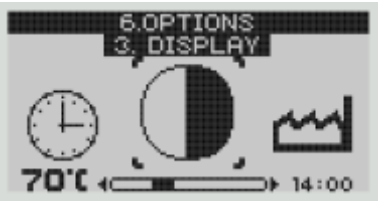
1 - Symbol of Intervention work and number of sensors disabled
2 - Flue gas fan rpm sensor disabled
3 - Flue gas temp. sensor disabled
4 - Accu. tank upper temp. sensor disabled
5 - Accu. tank lower temp. sensor disabled
6 - DHW tank temp. sensor disabled

- next to disabled sensor symbol ''!'' is shown
- history of disabled/enabled sensors is shown in the Operation/Error list menu
- when flue gas fan rpm sensor is disabled, only % of set flue gas fan rpm is shown

1.3.6.2. TIME/DATE

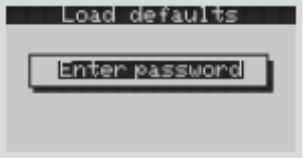
- This option is used to set the date and time. It is necessary for starting times, and the recording of errors / warnings (for the occurrence of errors / warnings, remembers the date and time of occurrence). After setting the date and time it is necessary to press the "OK" for saving date and time. If there is a significant clock delay or clock setting at 00:00 or the date on 1.1.2000. It is necessary to replace the battery on the back of the circuit board of display (battery type CR 1220). The clock could be faster/slower (the shift could be 2-3 minutes per month), which is considered normal and we recommend that you adjust it periodically.

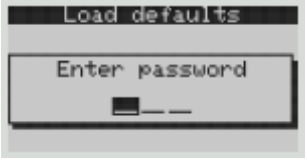
1.3.6.3. DISPLAY

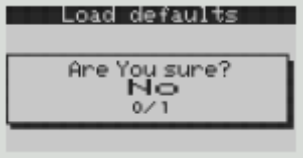


- this menu is used to set screen options
Contrast - set the screen contrast
Backlight - set the screen backlight
Screen saver - set the screensaver delay
Language selection - enable/disable language selection menu when turning on boiler on main power supply switch

1.3.6.4. FACTORY SETTING

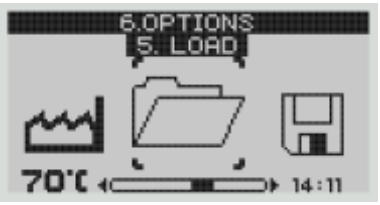


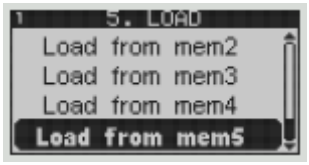


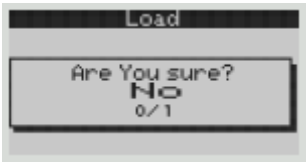


- this option is used to reset boiler regulation to the factory settings, user or serviceman PIN must be entered.

1.3.6.5. LOAD

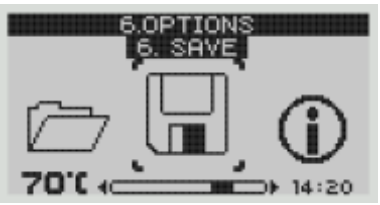


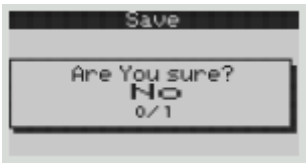




- in this menu saved boiler settings can be loaded

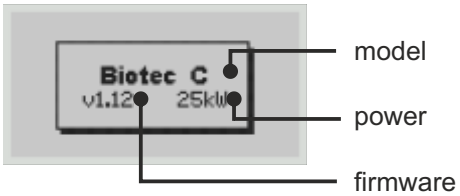
1.3.6.6. SAVE





- in this menu boiler settings can be saved

1.3.6.7. INFO



- in this menu boiler model, power and firmware version is shown

1.3.6.8. COUNTERS

1.	Fan(min)	0000072
2.	Pump P1(min)	0000072
3.	Low return temp.(min)	0000007
4.	Powerfails during running	0000015

9.	Counter 9	0000000
10.	Counter 10	0000000
11.	Counter 11	0000000
12.	Counter 12	0000000

5.	Counter 5	0000000
6.	Counter 6	0000000
7.	Counter 7	0000000
8.	Counter 8	0000000

13.	Counter 13	0000000
14.	Counter 14	0000000
15.	Counter 15	0000000
16.	Counter 16	0000000

1. Fan (min)
2. Pump P1 (min)
3. Low return temp. (min)
4. Powerfails during running
5. - 16. Counters 5 - 16

- in this menu boiler counters are shown (there are total 16 counters)

2.0. CONFIGURATIONS

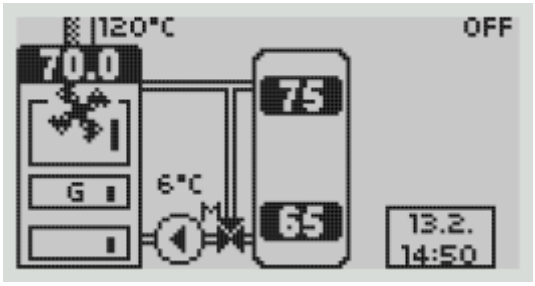
2.1. CONFIGURATION VIEW AND SCHEMES

Default configuration is **BOILER + ACCUMULATION TANK** (without 3-way mixing valve with actuator for return flow protection and without DHW tank but with return flow temp. sensor).
All other configurations can be set only by authorized serviceman (SERVICE PIN). Configuration schemes and view on the screen are shown below.

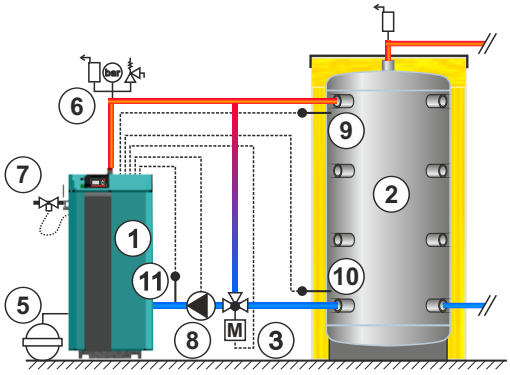
NOTE: return flow temp. sensor is ENABLED by default, recommended is to install it. If there isn't possibility to install it, it can be DISABLED by authorized serviceman (SERVICE PIN).

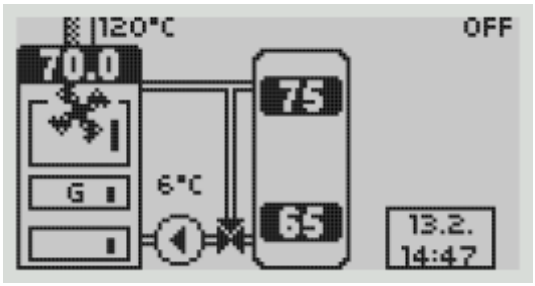
Scheme 1. - General scheme of closed central heating system with 1 accumulation tank

1 - Boiler BioTec-C
2 - CAS accumulation tank
3 - Return flow protection 3-way mixing valve with actuator (60°C) - **RECOMMENDED**
4 - Return flow protection 3-way thermic valve (60°C) (VTC 531, LTC 261/271, Laddomat 21)
5 - Expansion vessel for closed systems (min. 10% of the total volume of installation
6 - Safety airvent unit
7 - Thermal safety valve
8 - Pump P1 (boiler pump)
9 - Accumulation tank sensor (upper)
10 - Accumulation tank sensor (lower)
11 - Return flow sensor

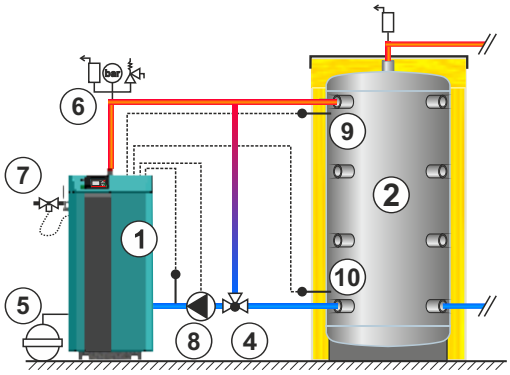


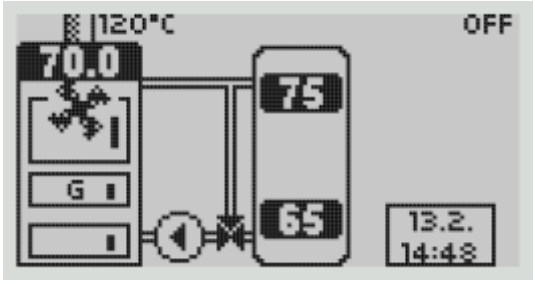
- return flow protection with 3-way mixing valve with actuator and temp. sensor



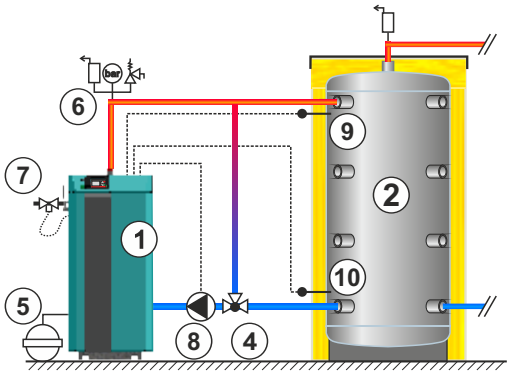


- return flow protection with 3-way thermostatic valve and return flow temp. sensor ENABLED



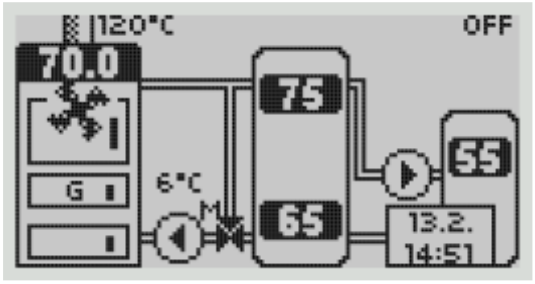


- return flow protection with 3-way thermostatic valve and return flow temp. sensor DISABLED

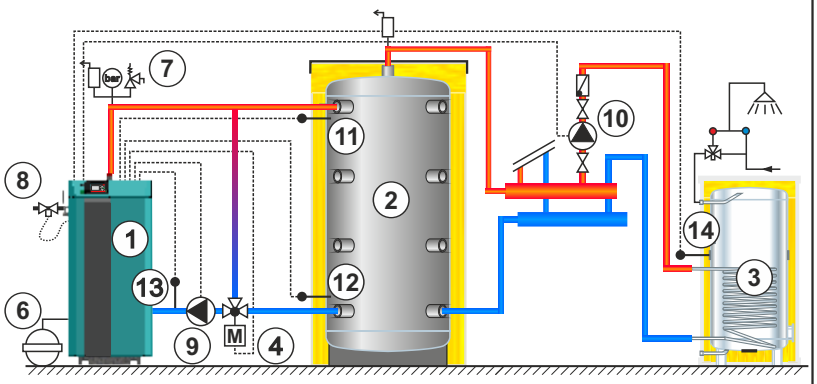


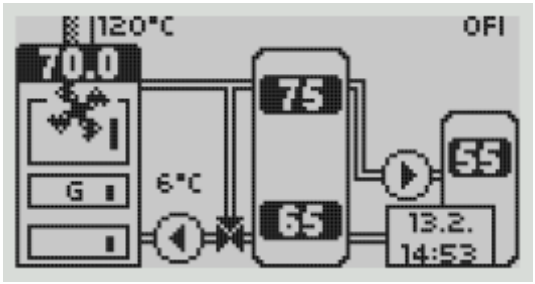
Scheme 2. - General scheme of closed central heating system with 1 accumulation tank and DHW tank

1 - Boiler BioTec-C
2 - CAS accumulation tank
3 - DHW tank
4 - Return flow protection 3-way mixing valve with actuator (60°C) - **RECOMMENDED**
5 - Return flow protection 3-way thermic valve (60°C) (VTC 531, LTC 261/271, Laddomat 21)
6 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
7 - Safety airvent unit
8 - Thermal safety valve
9 - Pump P1 (boiler pump)
10 - Pump P2 (DHW pump)
11 - Accumulation tank sensor (upper)
12 - Accumulation tank sensor (lower)
13 - Return flow sensor
14 - DHW tank sensor

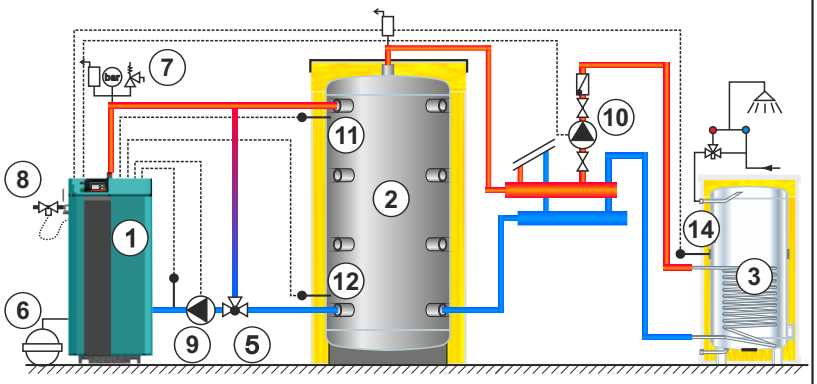


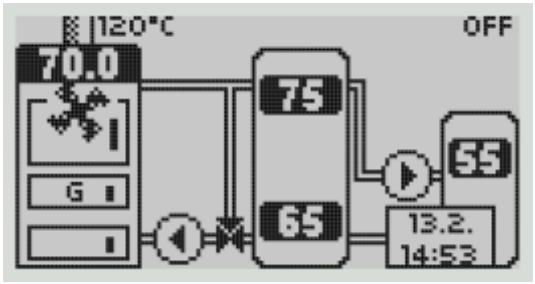
- return flow protection with 3-way mixing valve with actuator and return flow temp. sensor



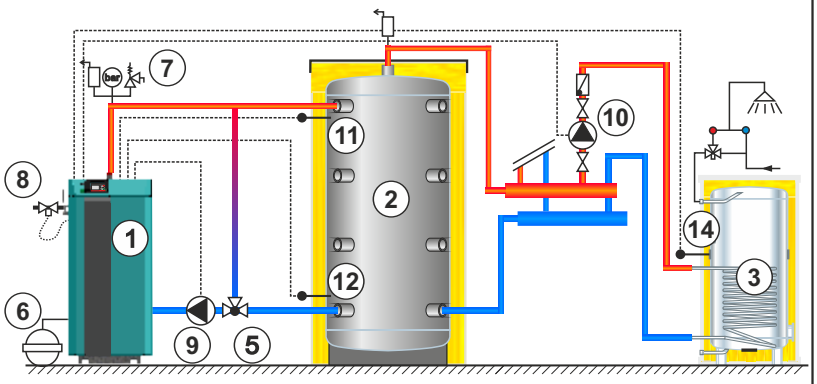


- return flow protection with 3-way thermostatic valve and return flow temp. sensor ENABLED





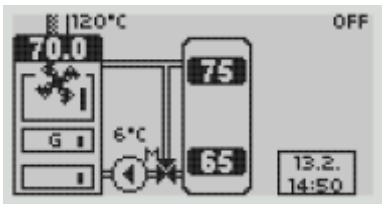
- return flow protection with 3-way thermostatic valve and return flow temp. sensor DISABLED



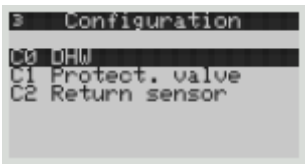
2.2. SETTING THE CONFIGURATIONS

Boiler configurations can be set in the Installation/Configuration menu (only authorized serviceman; PIN)

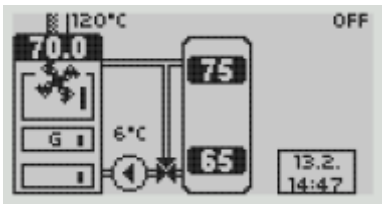
Configuration**:** boiler + accumulation tank + protection valve + return flow sensor



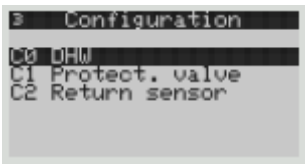
OPTIONS:
- **DHW:** disabled
- **Protection valve:** enabled
- **Return sensor:** auto enabled (when enabling protection valve, return sensor is automaticaly enabled)

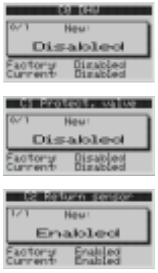


Default configuration: boiler + accumulation tank + return flow sensor

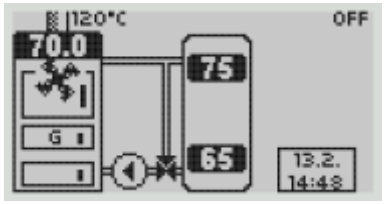


OPTIONS:
- **DHW:** disabled
- **Protection valve:** disabled
- **Return sensor:** enabled

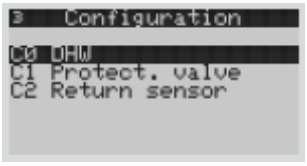




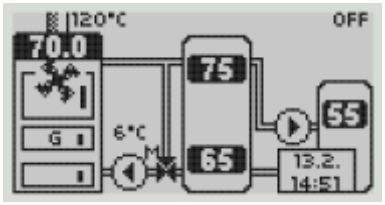
Configuration: boiler + accumulation tank (without retun flow sensor)



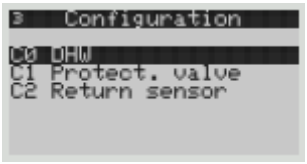
OPTIONS:
- **DHW:** disabled
- **Protection valve:** disabled
- **Return sensor:** disabled

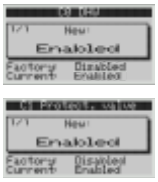


Configuration**:** boiler + accumulation tank + protection valve + return flow sensor + DHW

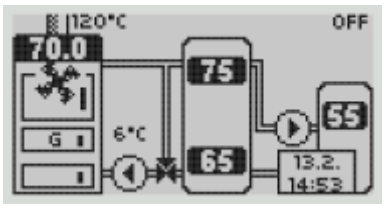


OPTIONS:
- **DHW:** enabled
- **Protection valve:** enabled
- **Return sensor:** auto enabled (when enabling protection valve, return sensor is automaticaly enabled)

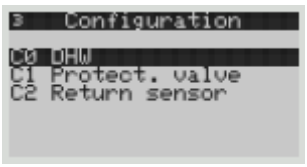


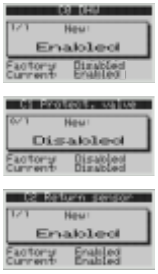


Configuration**:** boiler + accumulation tank + return flow sensor + DHW

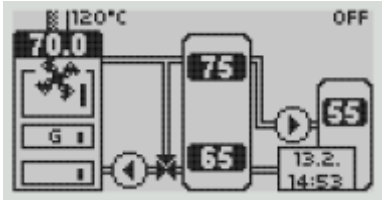


OPTIONS:
- **DHW:** enabled
- **Protection valve:** disabled
- **Return sensor:** enabled

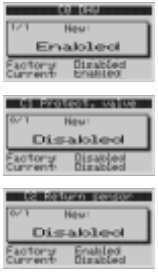




Configuration**:** boiler + accumulation tank (without return flow sensor) + DHW



OPTIONS:
- **DHW:** enabled
- **Protection valve:** disabled
- **Return sensor:** disabled



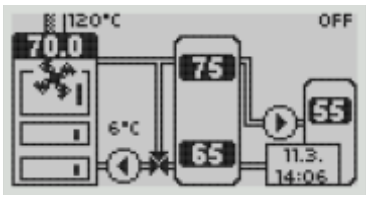
NOTE:

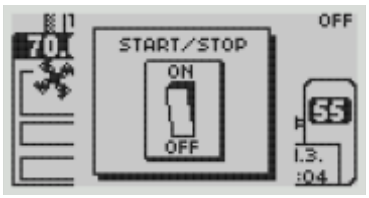
- after enabling protection valve, new menu will be shown automatically. In this menu opening/closing time of 3-way mixing valve actuator must be set. Set time depends of installed actuator.

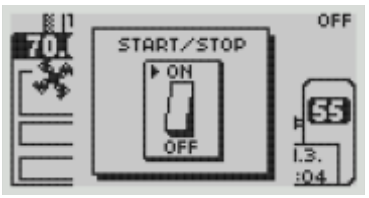
3.0. USING THE BOILER

3.1. BOILER WORKING STAGES

3.1.1. S - STAGE (IGNITION)

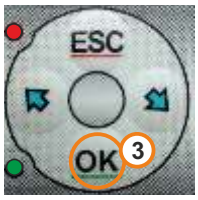






1. press OK button

2. press UP button



3. press OK button
- boiler fan will start -

Procedure for boiler start:

1. IGNITION STAGE AND FIRST FILLING

1 - open upper boiler door (and close lower boiler door if they are open).
2 - switch on main switch (if it was switched off).
3 - on control panel press OK button, on screen STAR/STOP switch with OFF position will appear, press right button to switch it to START position and confirm it with OK button - regulation will enter S stage (start stage) and flue gas fan start to work, on screen, normal view and startup view will be switching.
4 - cover the refractory stone with one row of wood logs (be careful to not plug hole on refractory stone (detail A).
5 - cover the wood logs with fine chopped wood (use enough fine chopped wood to cover wood logs below).
6 - height of fine chopped wood layer must conform a approx. height of first row of wood logs
7 - cover the fine chopped wood with crumped paper (use enough crumpled paper to cover fine chopped wood) (detail B).
8 - place the wood logs on crumpled paper.
9 - fill the fuel loading chamber with wood logs (detail C).
10 - close upper and lower doors.
11 - leave middle door opened.
12 - ignite the fire throuh middle boiler door (detail C).
13 - after few minutes, after fine chopped wood is on fire close middle boiler door.
14 - press OK button again to enter next working stage C (stabilisation).
15 - **only BioTec-C 25** - set button RP to the max. position, or to the position based on the individual expirience according to used wood (this button is not related with the regulation).
16 - **only BioTec-C 25** - leave button RP to the previously set position at least 1 hour or maximum to the next wood loading cycle.

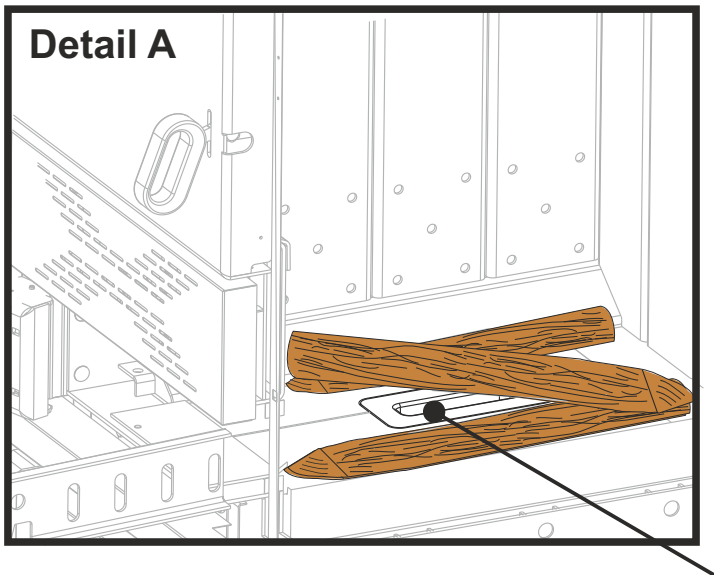
Upper procedure is related to the start/stabilisation stages from cold start (with GLOW mode disabled).

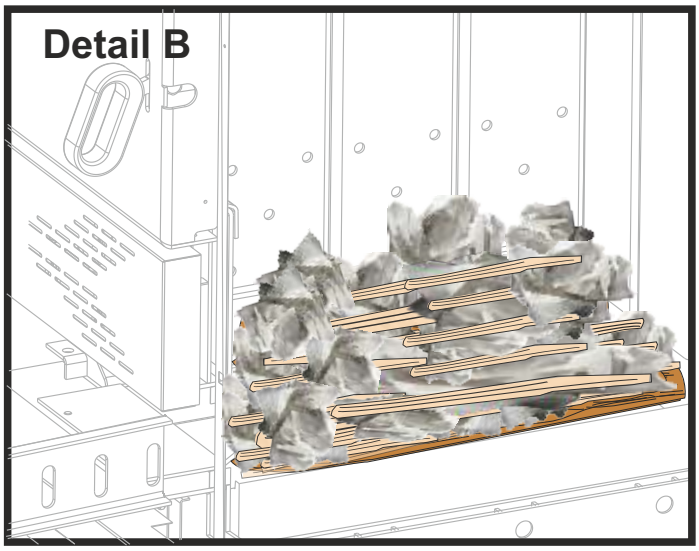
This procedure must be done always at cold start or when there isn't enough glow and wood filling is wanted.

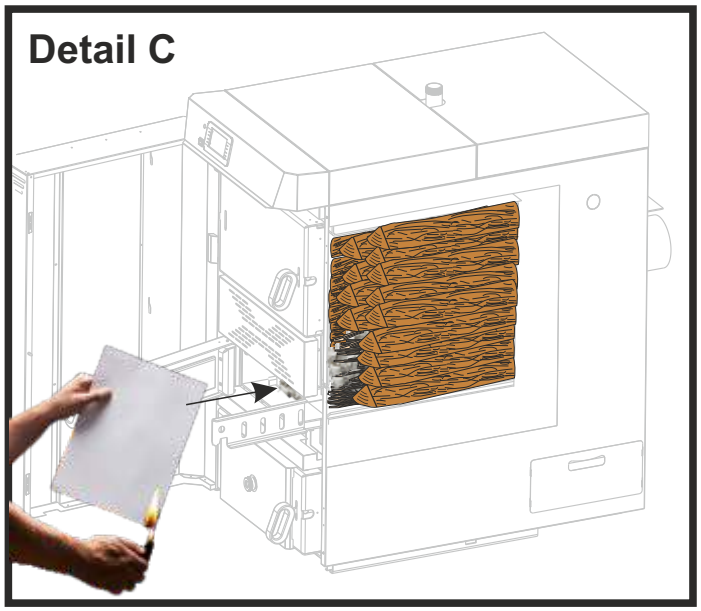
When boiler notifies GLW-OFF stage (NO FUEL information - symbol of wood logs with cross) is necessary to check and estimate if there is enough glow to fill combustion chamber with wood logs (if burning process must be continued) or for continue of burning process is neccessary to start with the ignition (insert kindling wood, paper...).
If estimation is that there is enough glow for continue with burning process, upper combustion chamber must be filled with wood logs.
In both ignition modes (continue with enough glow or with new ignition) main switch must be switch on, press OK button, turn switch on the screen to START and press OK button. Regulation enters S stage (start stage) and flue gas fan start to work.

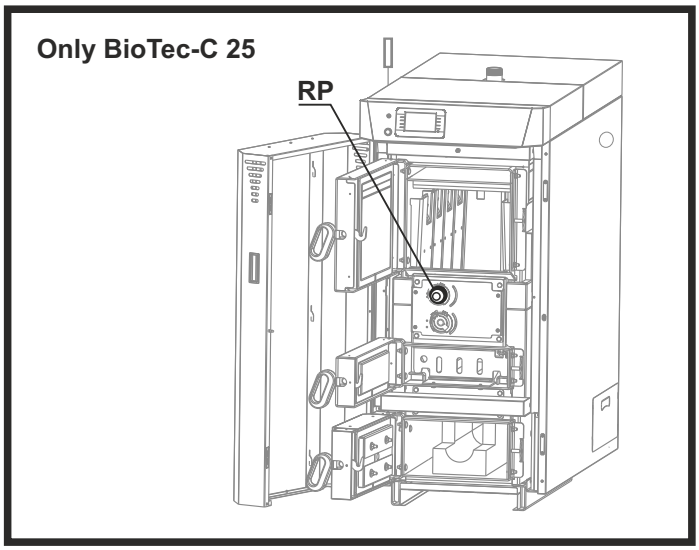
2. CONTINUE WITH BURNING PROCESS

1 - on control panel press OK button, on screen START/STOP switch with OFF position will appear, press right button to switch it to START position and confirm it with OK button - regulation will enter S stage (start stage) and flue gas fan start to work, on screen, normal view and startup view will be switching
2 - open upper boiler door
3 - align glow with the scraper
4 - fill the upper combustion chamber with wood logs (recommended is to completely fill it)
5 - close upper boiler door
6 - press OK button again to enter next working stage C (stabilisation).









S - stage:
- time counter is shown on screen (counts stage duration).
- by 2nd pressing OK button, regulation enters C - stage (stabilisation stage) or if OK button is not pressed 2nd time from the 1st flue gas fan start, after set time regulation enters next stage but every stage has sufix ''S1'' (example: ''D-1 S1'').
- if in next stages conditions for entering to OFF or GLW-OFF stage are fullfilled, on screen is shown OFF-S1 or GLW-OFF S1 and boiler stops (flue gas fan is off).

NOTE:
boiler will not start (turn on flue gas fan) if measured boiler temp. is higher than set boiler temp. - set boiler difference. When trying to start the boiler message ''BOILER TEMPERATURE!!!'' will appear.

3.1.2. C - STAGE - BOILER STABILISATION

After succesfull ignition boiler enters C - stage (stabilisation stage).
C - stage:
- time counter is shown on screen (counts stage duration).
- after set time regulation enters to D1 - stage (boiler work stage).
- in this stage flue gas temperature is not monitored (depending of GLOW mode enable/disabled and it's conditions or NO FUEL conditions).

3.1.3. D-1 - STAGE - BOILER WORK

After C stage, regulation enters D-1 stage
D-1 - stage:
- time counter is shown on screen (counts stage duration).
- after set time regulation enters to D2 - stage (boiler work stage).
- in this stage flue gas temperature is not monitored (depending of GLOW mode enable/disabled and it's conditions or NO FUEL conditions).

3.1.4. D-2 - STAGE - BOILER WORK

After D-1 stage, regulation enters D-2 stage
D-2 - stage:
- time counter is shown on screen (counts stage duration).
- in this stage flue gas temperature is monitored to stop the boiler (flue gas fan) depending of GLOW mode enabled/disabled or NO FUEL conditions.
- boiler can be switched OFF by manual shutdown.
- when boiler shuts down because NO FUEL condition = OFF - stage.
- when boiler shut down because GLOW mode ON and it's condition = GLW-OFF - stage.
- after OFF or GLW-OFF stages, next stage can be S stage (ignition stage).

3.1.5. PAUSE - STAGE

If conditions for OFF or GLW-OFF are not met and boiler set temp. is reached, boiler enters PAU-stage (pause). In this stage boiler remains until boiler temp. falls down for set boiler difference. When boiler temp. falls down for set difference, boiler enters C-stage (stabilisation stage.)
In this stage regulation doesn't monitor flue gas temp. for OFF and GLW-OFF (GLOW mode ON) conditions.

3.1.6. OFF - STAGE

If GLW-OFF mode is disabled and conditions below are met, boiler enters OFF - stage

Flue gas temperature OFF - set the flue gas temperature for boiler shutdown
(setting range: 70°C - 160°C)
factory setting: 25 kW: **105**°C; 35 kW: **100**°C, 45 kW: **100**°C
- this condition is met if option is enabled and when measured flue gas temperature in D-2 stages is lower than set flue gas temperature constantly for 900 sec (factory settings).

IMPORTAN NOTE:
FACTORY SETTINGS (FLUE GAS TEMP. OFF AND FLUE GAS TEMP. GLW-OFF) ARE ONLY AS REFERENCE, ACTUAL SETTING MUST BE ADJUSTED BY USER ACCORDING TOTHE FUEL USED AND BOILER FLUE GAS PASSAGES CONDITION (HOW CLEAN/DIRTY BOILER IS)

3.1.7. GLW-OFF - STAGE

If GLW-OFF mode is enabled and conditions below are met, boiler enters GLW-OFF stage

- Flue gas temperature GLW-OFF - set the flue gas temperature for boiler shutdown when GLOW mode is enabled (setting range: 80°C - 180°C)
factory setting: 25 kW: **140**°C; 35 kW: **105**°C, 45 kW: **105**°C
- this condition is met if option is enabled and when measured flue gas temperature in D-2 stages is lower than set flue gas temperature constantly for 900 sec (factory settings).

IMPORTAN NOTE:
FACTORY SETTINGS (FLUE GAS TEMP. OFF AND FLUE GAS TEMP. GLW-OFF) ARE ONLY AS REFERENCE, ACTUAL SETTING MUST BE ADJUSTED BY USER ACCORDING TOTHE FUEL USED AND BOILER FLUE GAS PASSAGES CONDITION (HOW CLEAN/DIRTY BOILER IS)

3.1.8. PF-XXXX - STAGE

After power supply failure and power supply return, boiler enters in one of possible stages. Boiler continues to work if power supply occurs in:
- S-stage (stabilisation)
- D-1/D-2 stage (work)
- PAU-stage(pause) and boiler has demand to work (boiler difference)

Boiler starts in the same way as when boiler starts after reaching demand from boiler diference (set boiler temp. - boiler difference) with C-stage (stabilisation)

Every working stage after power supply off/on has next to working stage name and designation, added designation of power supply failure/return ''PF'' (PF-xxxx)

- ''PF'' = power failure/power return
- ''xxxx'' = one of stages described above (for example PF-D2)
- Appears after a power off/power on in case of power supply failure
- The prefix "PF" disappears with new start of the boiler

3.1.9. ERR-OFF - STAGE

When during boiler working occurs error that causes boiler to stop (OFF-stage), boiler enters ERR-OFF stage (indication that boiler has shut down because of error).

3.1.10. W4-OFF - STAGE

When warning W-04 occurs and boiler is waiting for conditions for flue gas fan to start, boiler enters W4-OFF-stage.

3.1.11. XXXS1 - STAGE

If in S - stage (ignition) wasn't done 2nd pressing of OK button into the set time, the boiler working proces automaticaly enters C - stage (stabilisation stage) marked as CS1 and every next stage has sufix "S1" (example: "D-1 S1").

If in some "D-2 S1" stages conditions for entering to OFF or GLW-OFF stage are fullfilled, on screen is shown OFFS1 or GLWOFFS1 and boiler stops (flue gas fan is off).

3.2. VARIOUS BOILER CONDITIONS

3.2.1. PUMP P1 CONDITION

Conditions for **PUMP P1** for return flow protection with **3-way mixing valve, actuator and return flow sensor:**
- **boiler is working** (flue gas fan is working): P1 works when boiler temperature is above 65°C.
- **boiler is not working** (flue gas fan is not working): P1 works when boiler temperature is for 3°C higher than temperature in the accumulation tank (upper sensor).

Conditions for **PUMP P1** for return flow protection with **3-way thermostatic valve (60°C), with or without return flow sensor:**
- **boiler is working** (flue gas fan is working): P1 works when boiler temperature is above 65°C.
- **boiler is not working** (flue gas fan is not working): P1 works when boiler temperature above 65°C and boiler temperature is for 3°C higher than temperature in the accumulation tank (upper sensor).

3.2.2 PUMP P2 CONDITION

Conditions for **PUMP P2** (DWH):
- pump P2 is working when accumulation tank temperature (upper sensor) is for 5°C higher than DHW temperature.

3.2.3. BOILER COOLING CONDITION

Condition for **BOILER COOLING** activation:
- if boiler temperature reaches 92°C, pump P1 is started and 3-way mixing valve is open to 100% (regardless of the demand) to cool down the boiler.

3.3. TEMPERATURES

- Boiler temperature - set the boiler temperature
(setting range: 75°C - 90°C)

- Boiler difference - set the boiler difference
(setting range: 5°C - 20°C)

- DHW temperature - set the DHW temperature
(setting range: 20°C - 85°C)

- DHW difference - set the DHW difference
(setting range: 3°C - 40°C)

- Flue gas temperature OFF - set the flue gas temperature for boiler shutdown
(setting range: 70°C - 160°C)
factory setting: 25 kW: **105**°C; 35 kW: **100**°C, 45 kW: **100**°C
- this condition is met if option is enabled and when measured flue gas temperature in D-2 stages is lower than set flue gas temperature constantly for 900 sec

- Flue gas temperature GLW-OFF - set the flue gas temperature for boiler shutdown when GLOW mode is enabled (setting range: 80°C - 180°C)
factory setting: 25 kW: **140**°C; 35 kW: **105**°C, 45 kW: **105**°C
- this condition is met if option is enabled and when measured flue gas temperature in D-2 stages is lower than set flue gas temperature constantly for 900 sec

IMPORTAN NOTE:
FACTORY SETTINGS (FLUE GAS TEMP. OFF AND FLUE GAS TEMP. GLW-OFF) ARE ONLY AS REFERENCE, ACTUAL SETTING MUST BE ADJUSTED BY USER ACCORDING TOTHE FUEL USED AND BOILER FLUE GAS PASSAGES CONDITION (HOW CLEAN/DIRTY BOILER IS)

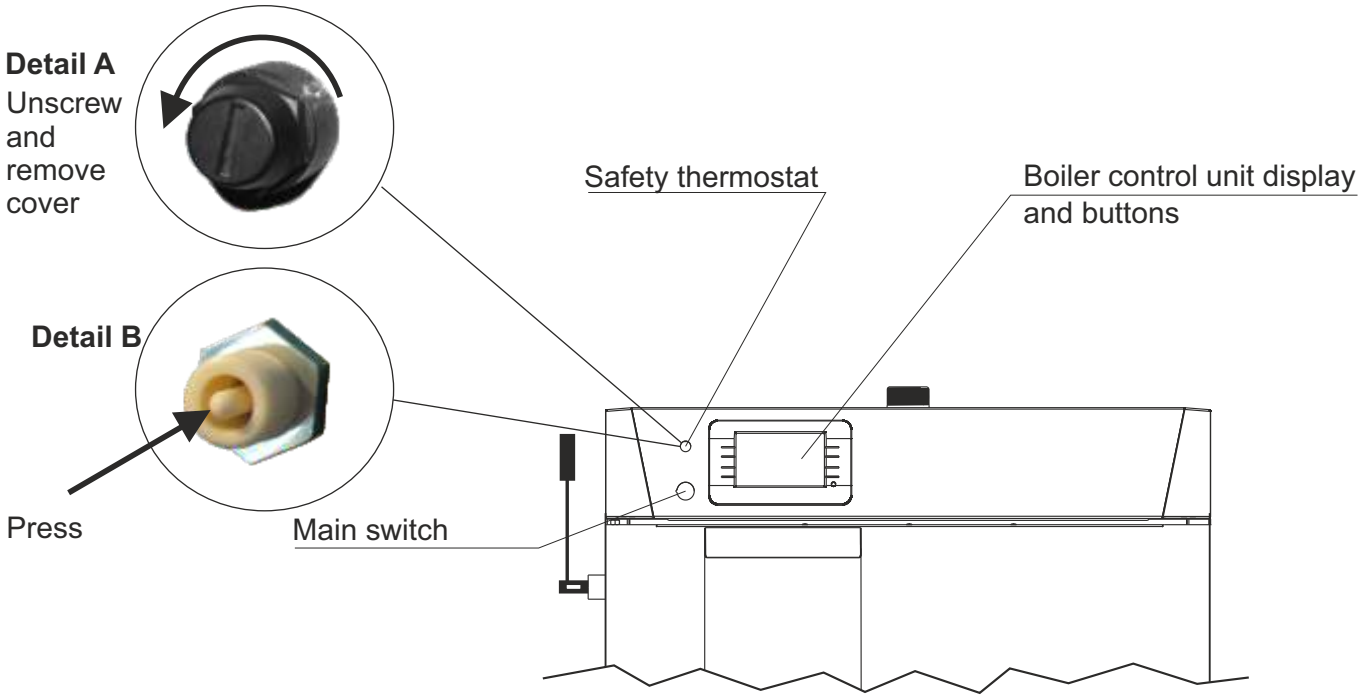
4.0. BOILER INTERRUPTION

4.1. SAFETY THERMOSTAT

Safety thermostat interrupt work of flue gas fan if boiler temperature cross max. permitted temperature (110°C – 9°C). On boiler display will be displayed error E-09, boiler will be work like is described in error list.
For safety thermostat (STB) re-start is necessary to do next things:

- Wait until boiler temperate is lower than 70°C.
- Unscrew and remove safety thermostat cover (detail A).
- Press button for safety thermostat re-start (detail B).
- After pressing button for re-start safety thermostat error will be removed and boiler will be ready for work.
- Boiler start must be done like is described in point **"Ignition"**. It's necessary to give more attention on boiler work especially filling accumulation tank with energy. If you have the same problem in first next firing or the problem persist in next firings, please contact authorized serviceman.

Figure - Safety thermostat



ATTENTION!!!
If safety thermostat persist turning off flue gas fan, contact authorized serviceman.

5.0. HISTORY

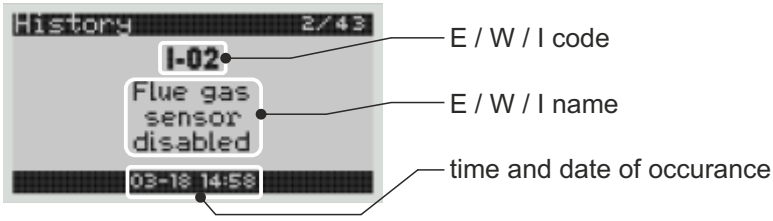
5.1. ERRORS

At boiler working, various errors (E), warnings (W) and informations (I) can appear. Some errors will stop boiler working and prevent it's working until error is resolved, others will only influence some boiler functions or working of some devices (eg. pump working), warnings will notice you there is some problem you must address and resolve (they will not stop boiler working) and informations are to inform you of some occurances (e.g. enabled/disabled some sensor). History of errors, warnings and informations can be seen under Main menu/Operation/History.

Example of active warning on main screen

When some error/warning occurs, it's shown on the main screen. To remove this info from screen press ESC button. Info will appear back again after few sec. until problem is resolved.

To check all errors / warnings / informations go to Main menu / Operation / History (**E=error / W=warning / I= information**)



ERROR E-00

Error	Boiler status
communication error with motherboard	CAN'T WORK -> **OFF-stage**

Possible causes:

Interruption on el. connections between display and mainboard.

What to do?

Press „OK" button to confirm error. Contact authorized serviceman. Authorized serviceman can check connection between display and mainboard.

ERROR E-01

Error	Boiler status
boiler sensor error	CAN'T WORK -> **ERR-OFF-stage**

Possible causes:

Interruption on el. connections between mainboard and boiler sensor. Broken boiler sensor.
Broken sensor input on mainboard.

What to do?

Press „OK" button to confirm error. Contact authorized serviceman. Authorized serviceman can check connection between mainboard and boiler sensor. Replace boiler sensor.

ERROR E-02

Error	Boiler status
flue gas sensor error	CAN'T WORK -> **ERR-OFF-stage**

Possible causes:

Interruption on el. connections between mainboard and flue gas sensor. Broken flue gas sensor.
Broken sensor input on mainboard.

What to do?

Press „OK" button to confirm error. Contact authorized serviceman. Authorized serviceman can check connection between mainboard and flue gas sensor. Replace flue gas sensor.
User or authorized serviceman can DISABLE flue gas sensor
USER/SERVICEMAN PIN -> **BOILER INTERVENTION WORK**

ERROR E-04

Error	Boiler status
DHW sensor error	WORKS (DHW pump can't works)

On boiler screen error is shown but boiler continues to work normaly. Info screen about this error can be remove by pressing ESC button but it will appear after few sec. until error is resolved.

Possible causes:
Interruption on el. connections between mainboard and DHW sensor. Broken DHW sensor.
Broken sensor input on mainboard.

What to do?
Press „OK" button to confirm error. Contact authorized serviceman. Authorized serviceman can check connection between mainboard and DHW sensor. Replace DHW sensor. Replace mainboard.
User or authorized serviceman can disable DHW sensor (by this DHW pump is enabled to work always)
USER/SERVICEMAN PIN -> **BOILER INTERVENTION WORK**

ERROR E-05

Error	Boiler status
return line sensor error	option 1: CAN'T WORK -> **ERR-OFF-stage** option 2: WORKS

Possible causes:

Interruption on el. connections between mainboard and return sensor. Broken return line sensor.
Broken sensor input on mainboard.

Configuration 1: **CAN'T WORK -> ERR-OFF-stage** (return line protection is done by 3-way mixing valve with actuator (protection valve is ENABLED and return line sensor is automatic enabled
boiler can't work without this sensor in this configuration
Configuration 2: **WORKS/ERROR is only SHOWN** (return line protection is done by 3-way thermostatic valve and (protection valve is DISABLED, return line sensor is enabled)

What to do?
Configuration 1 and 2:
Press „OK" button to confirm error. Contact authorized serviceman. Authorized serviceman can check connection between mainboard and return line sensor. Replace return line sensor.
Configuration 2:
authorized serviceman can disable return flow sensor under installation menu (PIN)

ERROR E-06

Error	Boiler status
buffer tank upper sensor error	situation 1: WORKS situation 2: CAN'T WORK

Possible causes:

Interruption on el. connections between mainboard and buffer tank upper sensor. Broken buffer tank upper sensor. Broken sensor input on mainboard.

Situation 1: error occurs during boiler working (flue gas fan is working) - **WORKS/ERROR is only SHOWN**
Situation 2: when boiler don't work (flue gas fan is not working) - **CAN'T WORK** (boiler can't start), pump P1 doesn't work except if there are safety functions active

What to do?

Press „OK" button to confirm error. Contact authorized serviceman. Authorized serviceman can check connection between mainboard and buffer tank upper sensor. Replace buffer tank upper sensor.
User or authorized serviceman can disable buffer tank upper sensor
USER/SERVICEMAN PIN -> **BOILER INTERVENTION WORK (P1 works all the time)**

ERROR E-07

Error	Boiler status
buffer tank lower sensor error	WORKS

Possible causes:

Interruption on el. connections between mainboard and buffer tank lower sensor. Broken buffer tank lower sensor. Broken sensor input on mainboard.

What to do?

Press „OK" button to confirm error. Contact authorized serviceman. Authorized serviceman can check connection between mainboard and buffer tank lower sensor. Replace buffer tank lower sensor.
User or authorized serviceman can disable buffer tank upper sensor
USER/SERVICEMAN PIN -> **BOILER INTERVENTION WORK**

ERROR E-08

Error	Boiler status
flue gas fan error	CAN'T WORK -> **ERR-OFF-stage**

Possible causes:

Interruption on el. connections between mainboard and flue gas fan. Broken flue gas fan. Broken flue gas fan rpm sensor. Broken rpm sensor input on mainboard. Broken fan output on mainboard.

What to do?

Press „OK" button to confirm error. Contact authorized serviceman. Authorize serviceman can check connection between mainboard and flue gas fan power supply or flue gas fan rpm sensor. Replace flue gas fan.
User or authorized serviceman can disable flue gas fan rpm sensor
USER/SERVICEMAN PIN -> **BOILER INTERVENTION WORK**

ERROR E-09

Error	Boiler status
safety thermostat error	CAN'T WORK

Possible causes:

Activation of the safety thermostat due to boiler overheating.

What to do?

Press „OK" button to confirm error. Wait for boiler temp. to fall down and manually reset safety thermostat (see part "SAFETY THERMOSTAT"). Clean the boiler. Check working of the pumps. If error continous to occur, contact authorized serviceman.

ERROR E-10

Error	Boiler status
unknown boiler power	CAN'T WORK

Possible causes:

Missing boiler code key.

What to do?

Contact authorized serviceman.Check if code key is installed. Install correct code key.

ERROR E-11

Error	Boiler status
wrong boiler power	CAN'T WORK

Possible causes:

Installation of the wrong code key.

What to do?

Contact authorized serviceman. Install correct code key.

5.2. WARNINGS

WARNING W-00

Warning	Boiler status
power up	STANDBY

Possible causes:
Information of return of the power supply after power supply failure.

What to do?
Nothing. Boiler works normal. Boiler enters PF-C-stage or PF-CS1-stage depending of boiler stage before power failure occurs (stages without or with S1 sufix). If boiler was in OFF or GLW-OFF stage, after power return boiler remains in one of this stages with sufix PF.

WARNING W-01

Error	Boiler status
factory setting loaded	STANDBY

Possible causes:
Factory setting is loaded.

What to do?
Set boiler configuration according installation type. Boiler works normal.

WARNING W-02

Error	Boiler status
wrong date and time	WORKS NORMAL

Possible causes:
Date and time is not set. Battery is empty.

What to do?
Boiler work normal. Set date and time (important for time tables). Replace the battery.

WARNING W-03

Error	Boiler status
low return temperature	WORKS NORMAL

Possible causes:
Return line sensor is not in the correct possition. Return line protection is not installed correctly (3-way mixing valve or/and actuator). Mixing valve actuator doesn't work (damaged actuator, el. interruption between mainboard and actuator, actuator output on the mainboard is damaged.)

What to do?
Check possition of the return line sensor. Contact authorized serviceman. Authorized serviceman can check el. connection between mainboard and actuator, check if 3-way mixing valve and actuator are correct installed, check working of the actuator, check actuator output on the mainboard.

WARNING W-04

Warning	Boiler status
fan protection	ERROR / CAN'T WORK

Possible causes:

Flue gas temperature is too high. Boiler stops flue gas fan. Boiler stops.

What to do?

Clean the boiler (heat exchanger and flue gas passages). Contact authorized serviceman.
Authorized serviceman can check if the flue gas sensor is not damaged. Check the flue gas sensor input on the mainboard. Replace flue gas sensor.

Automatic actions:

- if meassured flue gas temp. reaches => 250°C - flue gas fan works with 70% of set value
- if meassured flue gas temp. falls to =< 210°C - flue gas fan returns to set value

- if meassured flue gas temp. reaches => 300°C - flue gas fan stops (boiler switches W4 - OFF)
- if boiler is in OFF-stage because flue gas temp. reached =>300°C, it will automatic start again when flue gas temp. falls to <220°C and boiler measured temp. is below set boiler temp - set boiler difference

5.3. INFORMATIONS

INFORMATIONS

Informations, I-XX are messages about various sensors change (disable/enable).

I-0 - RPM sensor disabled
I-1 - Flue gas sensor disabled
I-2 - DHW sensor disabled
I-3 - Return sensor disabled
I-4 - Buffer tank up sensor disabled
I-5 - Buffer tank down sensor disabled

I-6 - RPM sensor enabled
I-7 - Flue gas sensor enabled
I-8 - DHW sensor enabled
I-9 - Return sensor enabled
I-10 - Buffer tank up sensor enabled
I-11 - Buffer tank down sensor enabled

IMPORTANT !

- The fuel to be used is only wood logs under 25% humidity content (wood dried min. 1 year).
- The return flow temperature always has to be over 60°C. This can be reached by obligatory connection of the 3-way mixing valve with actuator and return flow sensor (60°C)**- recommended** or 3-way thermic valve ESBE VTC 512 (60°C), VTC 531 (60°C), LTC 141 (60°C), Laddomat 21 (63°C) which keeps return flow temp. to the boiler min. 60°C.
- The connection of CAS water accumulation tanks is obligatory. It is recommended to connect min. 50 liters water accumulation to each 1 kW of boiler power (or see local regulation).
- To the closed central heating system an expanding vessel has to be connected (the volume of the expanding vessel is min. 10% of the installation volume).
- To the open central heating system an open expanding vessel has to be conneced (OPC), which volume has to be min. 7% of the installation volume.

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