„ELECTRONICS"

MICROPROCESSOR
TEMPERATURE CONTROLLER

SP-24

LOGIC

SERVICE MANUAL

CE

1.   Front panel description

Controller view with marked functions

1. Turning on (hold ENTER button for 2 sec.).
2. LCD display.
3. Indicator lights.
4. Device control buttons.
5. Airflow start up indicator.
6. Central heating pump start up indicator.
7. Hot service water pump start up indicator.
8. Floor pump start up indicator.
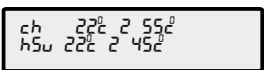9. Loader start up indicator.
10. 7A fuse.

2. Application

Controller is equipped with innovative, intelligent Logic control system. This system consists in automatic adjustment of boiler power to current operating conditions. All regulation process is based on measurement of central heating temperature. Due to innovative solution enabling optimal fuel combustion in the boiler, it has the effect of reduction of harmful oxides emission into the atmosphere. With proper oxides aftercombustion and no overshoots , boiler equipped with our device can use up to 30% less fuel than standard solutions.

3. Controller operation

To start up the controller hold ENTER button. After controller start up, main page with following information is displayed on LCD:

Central heating (CH) temperatures - current and set up
Hot service water (HSW) temperatures - current and set

From the main page you have the access to several functions, pressing (▲) enters into central heating temperature adjusting mode, you set up desired temperature with (▼) and (▲). When temperature decreases below 35ºC (--) and ENTER button is pressed, central heating pump turns off. Controller enters SUMMER MODE, with only hot service water function.

However, if (▼) is pressed as first, you enter into setting up hot service water temperature. By pressing (▲) and (▼) you set up desired temperature. When temperature decreases below 35ºC (--) and ENTER button is pressed, hot service water pump turns off.
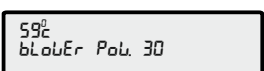
Caution!!!
If installation is not equipped wit hot service water pump you should turn off water heating function.

Pressing ENTER button confirms selected parameter and pressing EXIT button exits without saving previously made changes.

CH Temperature
Blower power

FUNCTIONS

- MANUAL OPERATION function is to fire up the
  boiler, it enables independent start up of
  controller outputs.

| ПAnUAL oPErAt lon |

| bLoᴜEr |

Pressing ENTER button turns on one of the outputs. With (▲) and (▼) you
change output to be turned on or off. Pressing EXIT returns to set up
menu.

- HSW hysteresis that function is to set up service
  water hysteresis, it consists in delaying HSW
  pump start up by set up number of degrees, i.e.
  hystheresis 2º, set up temperature 50ºC - pump
  shall start up when service water temperature
  decreases to 48ºC. This function works in HSW
  priority and summer mode.

| hSᴜ hУStErES lS |

| hУStErES lS tEПP.
hSᴜ   2ᵒ꜀ |

- CH/HSW PRIORITY

| chᐟhSᴜ Pror ltУ |

- HSW PRIORITY HSW pump starts up and works
  until achieves set up temperature. When services
  water reaches set up temperature HSW pump
  turns off and CH pump turns on.

| hSᴜ Pror ltУ |

- CH PRIORITY in this mode pumps start working
  when boiler temperature reaches temperature set
  up in pump start up function. (CH pump works
permanently and HSW pump turns on after reaching desired temperature.)
In this mode HSW temperature cannot be higher than CH temperature.

| ch Pror ltУ |

- FUEL TYPE function allows to select previously
  adjusted fuel, i.e.: (different calorific value of fuel).
  Controller is possible to adjust and save four
various fuel configurations. More information on adjusting loaded fuel in
further part of the manual.

| FUEL tУPE
FUEL 1 |

- FLOOR HEATING

Controller is equipped with input supplying the
floor pump and temperature sensor which is
installed on recycle of floor installation. Floor
installation also requires installation of tee valve
on boiler output in order to limit temperature of

FLoor hEAt InG

FLoor tEMP. 22c 2 35c

installation supply. This function ensures readout and maintaining constant
temperature of floor installation. Turning off the function is performed the
same as for other pumps (you should go below minimum temperature and
then two horizontal lines shall appear on the screen, confirmation with
ENTER button). To start the function again set desired temperature and
press the ENTER button.

- MANUFACTURER SETTINGS controller is
equipped with programmed settings, you may
return to them at any time. However, you should
remember that all personal settings will be lost.

MAnUF. SEtt InGS

MAnUF. SEtt InGS YES

- END OF WORK turns the controller off. To turn
it on again press and hold ENTER button

End oF Uork

End oF Uork YES

Controller has got hidden installation menu, to get there press and hold
(▲) and (▼) buttons for 3 seconds. Changes of parameters in that menu
should be made by qualified person. Unauthorized changes of those
parameters may cause controller misoperation.

INSTALLATION MENU

- TURN OFF TIME function is to set time which is
measured when CH temperature does not
increase and maintains 5°C below set
temperature.

tUrn oFF t IME

tUrn oFF t IME 60 M In

- MAINTENANCE PAUSE function enables setting up break time between blower and loader start u in maintenance mode.

```
PR IntEnRncE PRUS
```

```
PR IntEnRncE PRUS
            15 P In
```

- MAINTENANCE OPERATION function allows setting up time of blower and loader operation in maintenance mode.

```
PR IntEnRncE LorH
```

```
PR IntEnRncE LorH
            30 SEH.
```

- BLOWER START-UP this function consists in setting 100% power of blower with time parameter (1sec. - 15 sec.) which, due to temporary loss of efficiency, has to be regulated. When you notice that the blower does not work correctly during start (it cannot start) you should increase start-up time.

```
bLoLEr StArt UP
```

```
bLoLEr StArt UP
            1.0 SEH.
```

- ROOM REGULATOR room regulator may be connected to the controller. It controls CH circulation pump. Two-core cable is led out from room regulator that should be connected to jack input. No external power sources should be connected to the device during installation of room regulator. When function is turned on, an arrow should appear on the display (upper right area). If room regulator is not connected to the device this function should not be turned on.

```
rooP rEGULRtor
```

```
rooP rEGULRto
on
```

```
ch   50° 2 55°      ←
hSu  45° 2 45°
```

- FLUE GAS TEMPERATURE (option) there is possibility of chimney sensor installation. Function allows to set up maximum threshold of flue gas temperature.

```
PRH. FLUE GRS tEPP
            250°
```

- WORM TEMPERATURE this unction protects against fuel ignition in boiler basket. When temperature of the worm increases above set up temperature, loader will start giving the fuel for 10 min. in order not to allow the fuel to ignite in boiler basket.

```
LorP tEPPErRtUrE
```

```
PRH. LorP tEPP
       60°
```

ADJUSTING THE AMOUNT OF LOADED FUEL

They are two tests, test of minimum and maximum power. Proper setting of those two parameters guarantees efficient operation of the boiler. Test should be carried out for each fuel you intend to use, fuel change requires carrying out new test. Change of minimum power of the blower will cause change of minimum power for each fuel (1,2,3,4). Improper adjustment of the fuel may result in retort loader damage.

- MIN. BLOWER POWER function is to set up minimum fan power. Fan should be set up to work at minimum power. However, you should remember that fans lose their factory parameters as a result of use and soil. In that situation you should increase minimal airflow power.

```
Min. bLoUEr PoU.
FUEL 1
```

```
Min. bLoUEr PoU.
                12
```

CAUTION!!!
change of this parameter requires new adjustment of amount of loaded fuel, test of minimum power for each fuel type (1,2,3,4).

- FUEL 1 - Adjustment of amount of loaded fuel.

```
FoEL 1
MAH. bLoUEr PoU.
```

- MAX. BLOWER POWER - this function is to limit maximum airflow power. Maximum power should be limited when used fuel (pellet, oat) is too light and is blown around in combustion chamber due to huge fan power.

```
MAH. bLoUEr PoU.
                99
```

- FUEL LOAD this function is for quick correction of amount of loaded fuel for minimum an maximum power.

```
FUEL LoAd
4               43
```

- MINIMUM POWER TEST function consists in adjusting the amount of loaded fuel in relation to minimum amount of loaded air forced to the furnace by the blower. During test your task is to set up fuel dose in a way that fuel feeding shoul be directly proportional to combustion. Recommended time of minimum power test is 4 to 5 hrs. Confirmation of parameter causes saving set up parameter in FUEL TYPE menu.

```
Min. PoUEr tESt
2 it             3
```

- MAXIMUM POWER TEST function consists in adjusting the amount of loaded fuel in relation to maximum amount of loaded air forced to the

```
┌─────────────────────────┐
│ ПАН PoЬЕr ЬЕSЬ          │
│ 2 ſŁ                 43 │
└─────────────────────────┘
```

furnace by the blower. During test your task is to set up maximum fuel dose in a way that fuel feeding should be directly proportional to combustion. At the moment of carrying out the test boiler operates with maximum power. During test the controller monitors CH temperature. In case of exceeding 80°C controller terminates the test and enters into operation mode. Confirmation of parameter causes saving set up parameter in FUEL TYPE menu.

CAUTION!!!
Electronics company does not bear any responsibilities for improper.
setting up function of adjusting the amount of fuel.

4. Technical data

1. CH temperature adjustment range 35°C - 80°C.
2. HSW temperature adjustment range 35°C - 65°C.
3. HSW floor adjustment range 20°C - 55°C.
4. Automatic blower adjustment.
5. Operation in ambient temperature 0°C - 40°C.
6. Automatic saving of settings during supply voltage decay.
7. Relative air humidity 95%.
8. I insulation class.
9. 7 A fuse.
10. Controller has got function preventing from premature freezing of installation, in case oftemperature decrease below 6°C circulation pump starts up automatically.
11. Controller is equipped with secondary protection (emergency thermostat) which protects the boiler against overheating.

5. Use

1. Connect feeder of CH and HSW pump.
   a) yellow-green conductor to earth terminal,
   b) blue conductor to "N" terminal,
   c) brown conductor to "L" terminal.
2. After connecting the blower, pumps and after installing all sensors turn the controller on. After performing above actions the controller ensures:
   a) maintaining constant temperature of CH boiler set up by user.
   b) automatic start of pumps and blower.
   c) automatic shutdown of the blower and pumps after fuel use up.
   d) continuous readout of temperatures.

6. Error messages

Error 0 - Device failure.
Error 1 - EEPROM memory failure.
Error 2 - CH temperature sensor failure.
Error 3 - HSW temperature sensor failure.
Error 5 - Floor pump sensor failure.
Error 6 - Too high CH temperature.
Error 8 - Too high HSW temperature.
Error 9 - No fuel.

7. Fuse replacement

To replace the fuse disconnect the feeder from the socket.

8. Installation recommendations

1. Controller installation should be entrusted to authorized person.
2. Controller should be placed in location disabling it becoming heated above 40°C.
3. Perform installation in accordance with par. 5 (Use)
4. Device should be installed and operated in accordance with rules of operating electrical devices. Controller must not be exposed to water or to conditions causing steam condensation i.e. rapid changes of ambient temperature.
5. In cases of controller misoperation first check:
   a) the fuse
   b) connections stability and technical condition of cooperating devices, that means the blower, pumps.
   c) Set the controller to manufacturer settings.
6 Boiler should have check valves installed in cycles of CH and HSW pumps.
7. Floor installation requires installation of tee valve on boiler output in order.

CAUTION!!!
Perform connecting blower and circulation pumps motors only after disconnection of the controller from 230V supply network.

9. Electric parameters

1. Supply voltage	~ 230 V / 50 Hz
2. Power consumption (no ratings)	2 W
3. Output ratings:	
blower	100 W
loader	250 W
pumps	
CH	100 W
HSW	100 W
floor	100 W

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