Operation manual

Heating boilers

FORNAX PO

adapted for combustion of waste oil

All operation, installation and repair activities should be performed after reading this operation manual.
Low-temperature boiler with triple exhaust flow

FORNAX - PO

Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>PO – 50</th>
<th>PO-80</th>
<th>PO-100</th>
<th>PO-150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating power</td>
<td>50 kW</td>
<td>85 kW</td>
<td>105 kW</td>
<td>150 kW</td>
</tr>
<tr>
<td>Power range kW</td>
<td>30 – 60 kW</td>
<td>65 – 90 kW</td>
<td>95 – 115 kW</td>
<td>115 – 150 kW</td>
</tr>
<tr>
<td>Water volume</td>
<td>180 l</td>
<td>320 l</td>
<td>340 l</td>
<td>390 l</td>
</tr>
<tr>
<td>Exhaust diameter</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Dimensions L x B x H</td>
<td>1220x660x1240</td>
<td>1240x780x1420</td>
<td>1380x780x1420</td>
<td>1440x780x1420</td>
</tr>
<tr>
<td>Supply/return connection</td>
<td>DN 50</td>
<td>DN 65</td>
<td>DN 65</td>
<td>DN 65</td>
</tr>
<tr>
<td>Weight</td>
<td>350 kg</td>
<td>480 kg</td>
<td>568 kg</td>
<td>688 kg</td>
</tr>
<tr>
<td>Efficiency</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>Power supply</td>
<td>220 V / 50 Hz</td>
<td>220 V / 50 Hz</td>
<td>220 V / 50 Hz</td>
<td>220 V / 50 Hz</td>
</tr>
<tr>
<td>Current consumption</td>
<td>2.8 A</td>
<td>2.8 A</td>
<td>3.3 A</td>
<td>3.3 A</td>
</tr>
<tr>
<td>Oil consumption</td>
<td>4.6 kg/h</td>
<td>7.0 kg/h</td>
<td>10.2 kg/h</td>
<td>14.0 kg/h</td>
</tr>
<tr>
<td>Burner type</td>
<td>CBW-50</td>
<td>CBW-50</td>
<td>CBW-50</td>
<td>CBW-150</td>
</tr>
</tbody>
</table>

Technical changes possible
Boiler operation

Boiler operation consists in automatic initiation of combustion process and water heating to the temperature set by user. When water reaches the required temperature, the boiler switches off. The next initiation will take place automatically, when the water temperature drops in the range of the thermostat inertia limits.

The minimum boiler operation temperature during used-oil combustion is 50ºC.

A properly selected boiler in the heating season should operate for 6 – 10 hours a day, using fuel amount, appropriate for the given boiler power.

The boiler operation time and fuel consumption depend on the quality of thermal insulation of the heated building and the external temperature.

Before turning the boiler on

1) Check the condition of the boiler, fittings and screw connections
2) Inspect the water boiler system
3) Check if the combustion chamber, exhaust pipe and chimney are clean and free from foreign objects
4) Perform the tightness control of oil system connections
5) Check the functioning of ventilation and exhaust ducts
6) Check the functioning of:
   - the boiler thermostat
   - the STB thermal protection
   - pump releasing thermostat*
   - burner mounting assembly
7) Check the safety valve, vent for closed system
8) Check the functioning of the burner, clean it if required.

Boiler start-up

Simple automations system – basic equipment.

1) Open the main valve, cutting of the oil supply – fuel system must be flooded with oil
2) Connect the boiler to the power supply system
3) Set the switch on the control to the “off” position – only the heater turns on – and wait approx. 10 minutes for the oil to heat up in the burner, then set the switch to the “on” position – see the burner manual
4) Set the desired boiler temperature using the thermostat.

Boiler switch-off

1) Turn the power supply button to “off”
2) Set the thermostats hand-wheels to “0” positions
3) Close the main fuel valve
**Boiler automation**

The automation system consists of the following elements:

see diagram

- boiler thermometer, power supply switch, thermostat, STB – thermal protection of maximum boiler temperature – 95 or 110ºC,
- burner failure lamp

Automation system panel may be additionally equipped with a hot tap water priority system, room thermostats (sensors) or a microprocessor control (weather system).

**Automation system operation**

After connecting the boiler to the power supply and pushing the burner and pump buttons, the burner starts. The required boiler temperature is set using the thermostat, *(minimum setting for used oil is 50ºC).*

The pump starts its operation after reaching the temperature of approx. 40ºC*.

* additional equipment

**Maximum boiler temperature protection STB**

The STB turns off the boiler (completely) if the maximum temperature is exceeded. 95ºC – open central heating system, 100ºC – closed system.

In order to restart the boiler wait until it cools down, unscrew the protection cap on the protection and press the green button.

If the STB activates several times, turn the boiler off and call service.

**Burner failure lamp**

It signals the failure of burner operation.

In such case, press the button lamp on the burner housing (red button lamp), located in the lower right corner of the burner housing.

When the failure lamp lights up, wait approx. 2 minutes before restarting the burner.

If the burner switches off after a few restarts, turn it off and call service.

The cause of burner failure may be due to a lack of fuel supply.
Check the following:
- fuel level in tanks
- possible leaks in the fuel system
- if the fuel temperature is too low, approx. 5°C – paraffin precipitates
- dirty fuel filter – wash the cartridge
- dirty (clogged) nozzle
- water in the fuel system
- dirty photocell
- dirty ignition electrodes

If the boiler does not work at all:
- no lamps are lighting – check the power supply
- check STB
- check thermostat operation (slight click during hand-wheel rotation)

Service

In order to assure proper boiler operation during the whole heating season, it is necessary to order the service inspection of the boiler and burner every 5000 hours of burner operation.

Periodical boiler operation inspection

Boiler operation under conditions of proper operation of control and protection system, does not require constant supervision. Due to boiler connection with oil, central heating and power supply system, the user should periodically check:
- the tightness of connections with heating and oil system
- water level in central heating system
- natural ventilation efficiency
- air intake efficiency

Perform periodical burner inspection of: filters, the water in the heater, the nozzle, and the baffle plate. The frequency of inspection depends on oil quality.

Do not refill the water in the central heating system when the boiler is in operation or is hot.
**Operation safety**

Following the above instructions assures the safety of the boiler operation.

*In case of a fuel leak, close the valve, to cut-off the fuel flow in the tank and boiler.*

**Boiler installation**

*Install the boiler in the boiler room with adequate space around it for periodical service.*

**Boiler location diagram**

Minimum distances

![Diagram of boiler location](image)

**Connecting boiler to the central heating system**

*Install the boiler in the boiler room with sufficient space around it for periodical service. The boiler door may be opened towards the left or the right, which facilitates operation.*

*The water supply is located in front of the boiler, whereas the return is in the back. In the centre there are connections for the safety valve and the venting system. The boiler must be maintained at a minimum temperature of approx. 50°C, but does not require a minimum return temperature. It can operate in both, old and new central heating systems.*

*The cut-off valves may be mounted on supply and return connection pipes.*
Connecting to the chimney

Avoid rather sharp bends of exhaust pipe.
Choose proper exhaust pipe diameter for the given boiler power.
The chimney diameter should not be smaller than the boiler exhaust pipe diameter.
Installation of chimney pipe of high quality steel and draught control is recommended.
In case of external chimney installation, it is necessary to use a double-wall chimney.

The reduction of chimney connection diameter should be at the connection between the chimney and the boiler exhaust pipe.
The connection should be rigid, do not use goffered aluminium pipes.
**Installation of the Automatic**

Remove the upper boiler cover, position the control panel on the boiler, connect the wires to the terminal strip (all outputs are labelled), guide wires through the nodes in the boiler side wall, insert sensors capillary tubes into boiler bushings (under the insulation, approx. 150 mm from the front), install the automatics and replace the cover.

**CBW Burner installation**

The burner should be installed on the boiler front plate using the installation flange (supplied with the burner). The flange should be fixed with 4 screws (without over-tightening), with the seal positioned under it. Then insert the burner tube into the flange hole from the outside (after opening the door) and **slide it in, so it protrudes approx. 80 cm inside**. Attach the tube, screwing two upper flange parts and tighten the flange to the boiler door. Adjust the burner according to the manual.

All work associated with burner must be performed by a qualified service company.

The fuel system should be constructed according to the diagram in the burner manual. Use recommended supply diameters. Install the check valve on the supply line.
### Defects

<table>
<thead>
<tr>
<th>Defect</th>
<th>Reason</th>
<th>Removing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burner is not working</td>
<td>No voltage</td>
<td>Check multi-position</td>
</tr>
<tr>
<td></td>
<td>Check fan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check main switch</td>
<td></td>
</tr>
<tr>
<td>STB limiter switched off</td>
<td>Check multi-position</td>
<td>Call authorised service after next activation</td>
</tr>
<tr>
<td></td>
<td>Check main switch</td>
<td></td>
</tr>
<tr>
<td>Too low boiler temperature</td>
<td>Too low setpoint</td>
<td>Set higher boiler temperature</td>
</tr>
<tr>
<td></td>
<td>Too low controller</td>
<td></td>
</tr>
<tr>
<td>Boiler pump is not working</td>
<td>Stuck pump</td>
<td>Unlock pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace pump</td>
</tr>
<tr>
<td>Tap water supply pump is not working</td>
<td>No demand</td>
<td>Open tap water valve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set higher temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace pump</td>
</tr>
</tbody>
</table>

### Action test STB

**View**

- **R11 adjustment**
  - On/off switch
  - Overheating temperature limiter
  - Burner failure lamp

- **Boiler water temperature controller**
  - Set point 38-80°C
  - Boiler temperature indicator

- **R11-SB adjustment**
  - Switch: summer-winter
  - Overheating temperature limiter
  - Burner failure lamp
  - On/off switch
  - Temperature controller
  - Tap water temperature controller
  - Boiler temperature indicator

**Technical data:**
- Supply voltage: 230 V ± 10%
- Frequency: 50-60 Hz
- Pumps: 230 V/4(2)A each
- External temperature: 0-50 °C
- Storage temperature: 25-60 °C
Service level

**Power supply switch**
In O position system is disconnected from power supply

**Summer/winter switch** (only for R11-SB).

**Burner failure lamp**
**Electric connections / boiler temperature controller**

Unscrew two screws of back control system cover and remove system. Connect power supply cable with supplied plug. Insert plug into marked place on the strip and protect cable. Boiler pump and tap water tank pump are equipped with plugs by default. Insert plugs into marked place on the strip and protect cables.

When it is required to install the external temperature controller (e.g. SP1), as the default is too short, remove bridge on “STR” plug. Connect the external sensor to the “STR” plug according to the diagram and insert plug into strip marked place. Protect the cable. The default controller will be inactive, and the tap water tank control will be realized by the connected external controller.

Check the maximum temperature on the boiler controller. It is set to $80^\circ C$ by default and should not be changed.

Check the overheating limiter set point. For Poland it must not exceed $100^\circ C$. If the setting is different, e.g. $110^\circ C$, it is absolutely required to switch it to $100^\circ C$.

**Set point can not be switched!**

Disconnect control system power supply. Remove STB cover, remove fixing nut, remove fixing screws and turn the control system cover towards front. Remove STB and set $100^\circ C$ value on the scale. Replace parts in the opposite sequence. Above activities must be performed only by the qualified service.