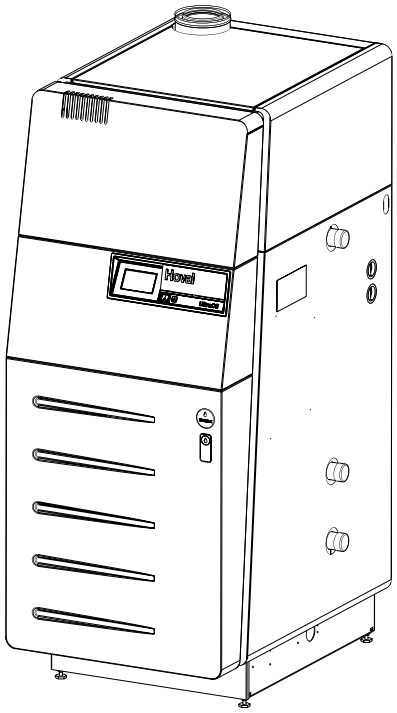
Technical information
Installation instructions

Hoval

UltraOil® (50)
Oil condensing boiler



These instructions apply to the following models:
41-UltraOil® (50)

with TopTronic® E controls

This appliance is only suitable for operation with heating oil EL (low sulphur)

Hoval products must be installed and commissioned only by appropriately qualified experts. These instructions are intended exclusively for the specialist. Electrical installations may only be carried out by a qualified electrician..

The UltraOil® heating boiler is suitable for and approved as a heating unit for hot-water systems with permitted flow temperatures up to 90 °C[1)]. It is designed primarily for closed circuits, but is equally suitable for installation in open circuits.
[1)] see chapter 3.2

1. Important notes

1.1 Other instructions

According to the execution, any additionally necessary instructions can be found in the Hoval installation handbook! In exceptional cases, the instructions are to be found with the components.

Further sources of information:
- Hoval catalogue
- standards, regulations

1.2 Safety instructions

The installation may only be put into operation if all relevant standards and safety regulations have been complied with. However, for a trial operation, the following are the minimum conditions requiring fulfilment:

1. a safety valve has been installed (closed-circuit installation)
2. controls in operation (connected to the power supply)
3. sensor for the safety temperature limiter is fitted in the submerged sleeve
4. the system is filled with water
5. an expansion container is attached
6. exhaust connections connected to the exhaust flue at the chimney
7. burner preset

The heat generator can only be de-energised by disconnection from the mains (fuse).

All electric power supply circuits must be switched off before accessing the terminals.

1.3 Regulations, official approvals

For installation and operation of the system, the following regulations are to be observed:

Germany
- DIN EN 12831 Heating systems in buildings - procedure for calculating the standard heating load.
- DIN EN 12828 Heating systems in buildings - planning of hot water systems.
- DIN EN 13384 Exhaust gas systems - heat and flow calculation methods.
- DIN 4755 Oil fired combustion systems: design, construction and technical safety requirements.
- DIN 4756 Gas fired combustion systems: design, construction and technical safety requirements, planning and execution (for operation with gas burners).
- DIN 18160 House chimneys, requirements, planning and execution.
- PED (Pressure Equipment Directive).
- TRD 721 Safety equipment to safeguard against excess pressures / safety valves / for group II steam boilers.
- VDI 2035 Prevention of damage by corrosion and the formation of scale in hot water systems.
- DIN 57 116 / VDI 0116 Electrical equipment in combustion systems (VDE regulation).

Austria
- ÖNorm B 8130 Open hot water systems, safety installations.
- ÖNorm B 8131 Closed hot water systems, safety, construction and testing regulations.
- ÖNorm B 8133 Water heating systems, technical safety requirements.
- ÖNorm B 8136 Heating systems, space requirements and other building requirements.
- ÖNorm M 7515 Calculations of dimensions of chimneys; definition of expressions, calculation procedure.
- ÖNorm H 5170 Heating installations, building and technical fire-protection regulations
- ÖVGW TR-gas (Austrian Gas and Water Confederation - Technical Guidelines

Switzerland
- VKF-Association of Cantonal Fire Insurers
- Regulations of the fire police
- SVGW Swiss Gas and Water Federation
- SNV 27 10 20 Aeration and ventilation of the boiler room
- SWKI 97-1 Water treatment for heating, steam and air conditioning plant
- SWKI 80-2 Technical safety regulations for heating installations
- KRW Corrosion caused by halides
- KRW/VSO/FKR Electrical connections on heating boilers and burners ready to plug in
- Technical tank regulations TTV 1990.

and further prescriptions and standards published by CEN, CEN ELEC, DIN, VDE, DVGW, TRD and the legislature.

In a similar manner, the regulations of the local building authorities, insurers and chimney inspectors must be taken into account. When gas is used as fuel, the regulations of the responsible gasworks must be observed and an official authorisation may also be required.

1.4 Guarantee

Trouble-free functionality is only guaranteed when both these and the operating instructions are meticulously observed and the boiler is regularly serviced by a qualified engineer (maintenance contract). Repair of faults and damage caused by contaminated operating materials (gas, water, combustion air), unsuitable chemical additives in the heating water, careless treatment, faulty installation, unauthorised modifications and damage as a result of force are not subject to our guarantee liability; this applies also to corrosion caused by halides, e.g. emanating from spray canisters, paints and varnishes, adhesives, solvents and cleaning agents.

2. Assembly

2.1 Installation, levelling

The boiler is fixed to wooden transport chocks. For transport up and down stairs, it is wise to leave these timbers in place under the boiler.

A special foundation plate for the boiler is not an essential, but it is recommended.

Space required

The flange of the boiler must be able to be swung out fully, with burner installed (see chapter 3.4).

Installation of the boiler

1. Unbolt the boiler from the wooden pallet and remove the transport securing devices.

2. Levelling the base: The base must be levelled both lengthways and crossways with a spirit level. This is carried out by adjusting the nuts on the boiler feet. After this adjustment, the upper (locking) nuts on the boiler feet must be tightened thoroughly.

2.2 Assembly of the condensate discharge and neutralisation box

For the condensate discharge, there a four versions available. The assembly is carried out, according to the version supplied, in accordance with the illustrations.

The condensate discharge must be fabricated of corrosion resistant material (see chapter 4.5).

2.2.1 Design variants

Before commissioning, the neutralisation box (if fitted) must be filled with neutralisation granulate (figure, chapter 6.4)

Before putting into service, the siphon and the neutralisation box must be filled with water.
The water can be filled through the cleaning opening into the neutralisation box and the siphon.

Possibility 1

- Stand version with siphon
- With neutralisation, condensate discharge into lower drain line.
- Drain optionally on the left or right side.

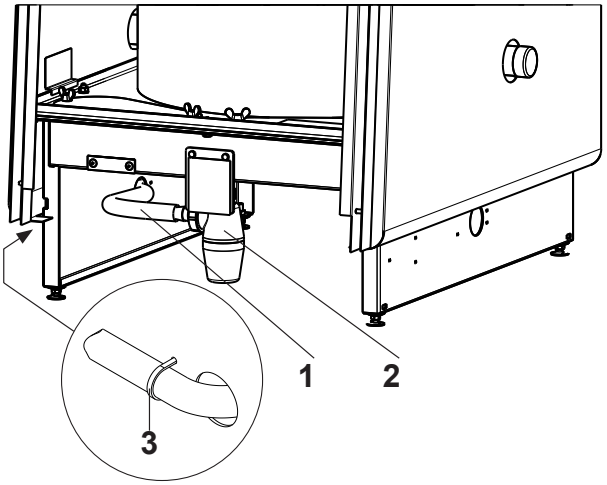


Fig. 01

Possibility 2

- Design with neutralisation box
- For condensate discharge in lower drain line, incl. condensate neutralisation.

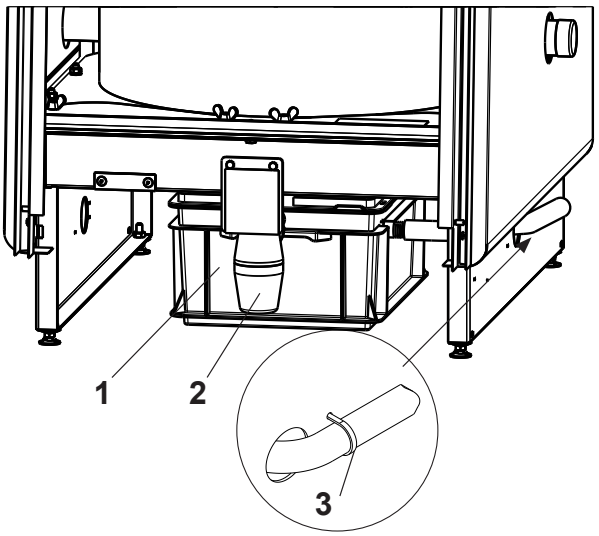


Fig. 02

Possibility 3
- Siphon and condensate delivery pump
- Without neutralisation, condensate discharge into higher drain line.

The condensate delivery pump must be installed in accordance with the enclosed instructions.

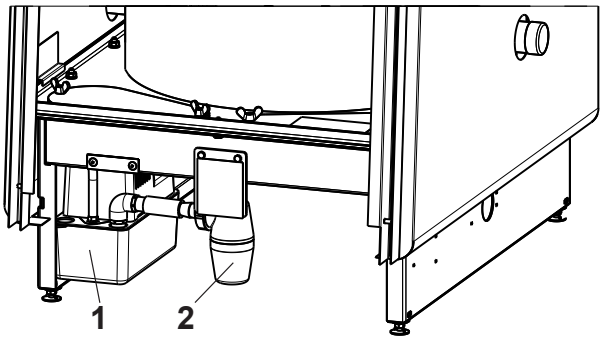


Fig. 03

Possibility 4
- Neutralisation box and condensate delivery pump
- With condensate neutralisation - condensate discharge into higher drain line.

The condensate delivery pump must be installed in accordance with the enclosed instructions.

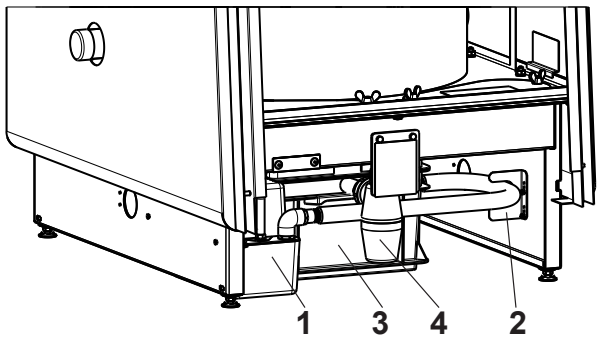


Fig. 04

2.3 Burner assembly

1. Remove front cover (1, Fig. 05), after first releasing the lateral locking bolt (1a) (turn approx. ¼ turn to the left and pull out as far as the stop). Lift the front cover (1) straight upwards and remove towards the front.
2. Lift and remove the lid (2).
3. Remove the locking screw (3) on the left and right.
4. Lift the side walls (4), by sliding them slightly towards the front.

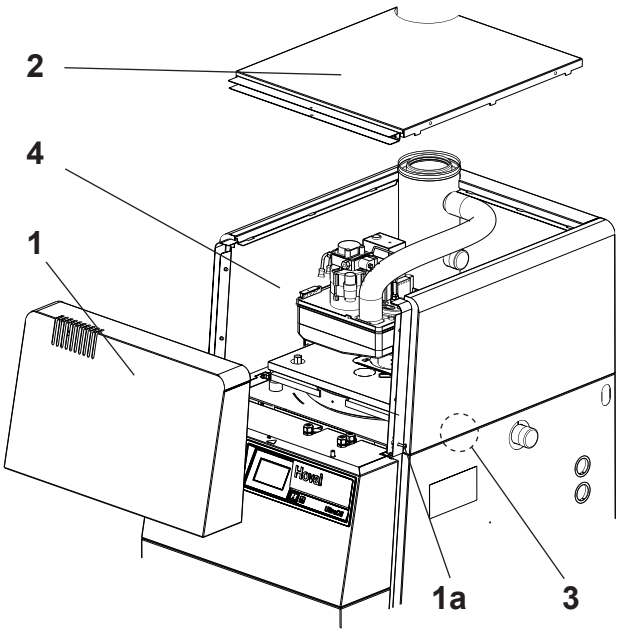


Fig. 05

5. Remove the burner from the packaging.
6. Dismount the burner flange. To do so, loosen the screw (6, Fig. 06) and rotate the burner by 15°. The required Allen key (5) is supplied with the burner.

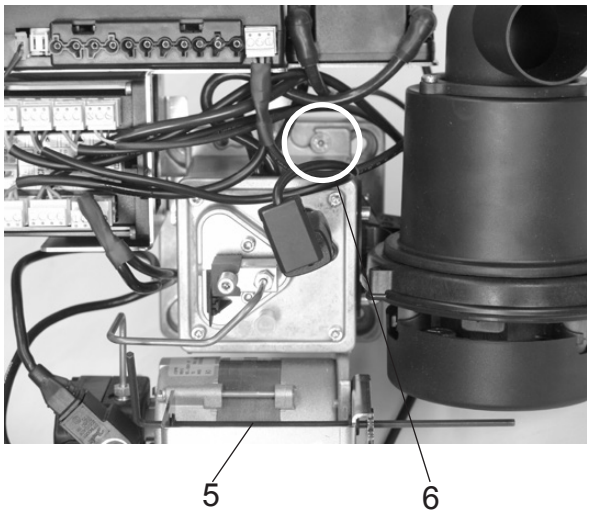
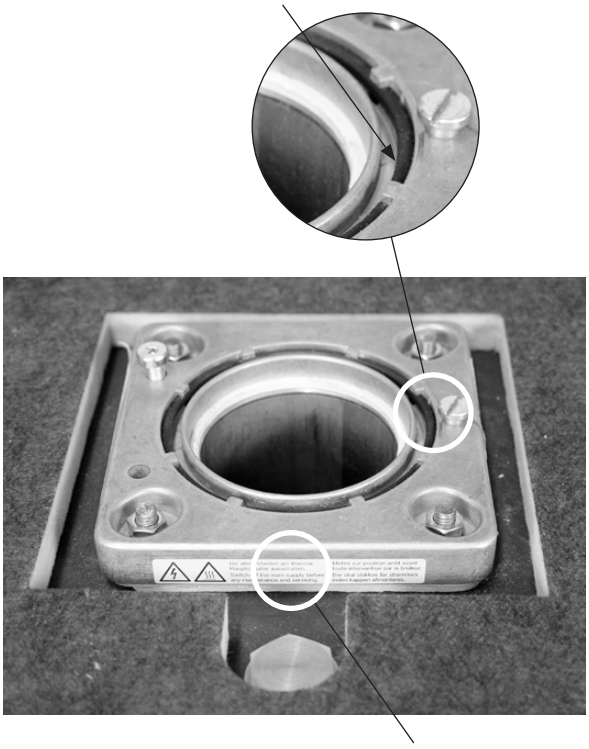


Fig. 06

7. Mount the burner flange including sealing to the boiler flange in accordance with Fig. 07. Mount the flange so that the “Warning” label is facing outwards.

   Tip to help assembly:
   To simplify installation, the sealing on the burner flange can be lubricated using a heat-resistant paste (e.g. Kluberpaste UH1 84-201).



“Warning” label

Fig. 07

8. Insert the burner rotated by 15° (final position: burner performance label facing outwards) into the burner flange. Once the stop position has been reached, rotate by 15° so that the extension piece fits beneath the head of the screw (Fig. 08).

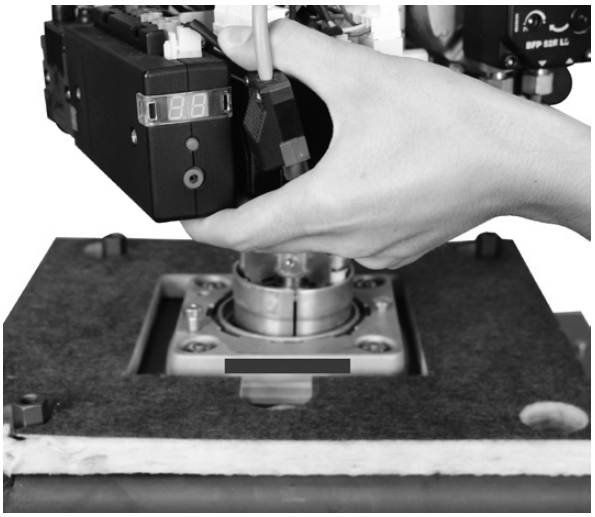
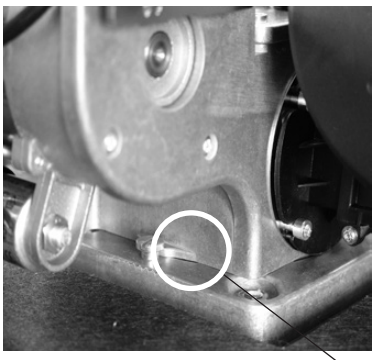


Fig. 08



Head of screw

Fig. 09

9. Tighten the screw (Fig. 06) to secure the burner.

! Insulate the space between the burner pipe and the boiler flange with the fireproof fibre supplied.

The circulating air-vents must not be covered.

Ensure that,
- the fireproof fibre is packed firmly into the space in order to prevent it falling out (Fig. 10)

Fireproof fibre

Fig. 10

10. Close the boiler flange with the burner once again.
11. The oil feeds may be taken through the side openings either on the right or the left.
12. Make plug-and-socket connections (7, Fig. 11). Pull the plug cable further out, to do this, loosen the PG unions (8). The burner must be connected to the boiler with the standard plug connection.
13. The burner cable must be shortened so that to swivel out the burner, it is essential to break the plug connection.

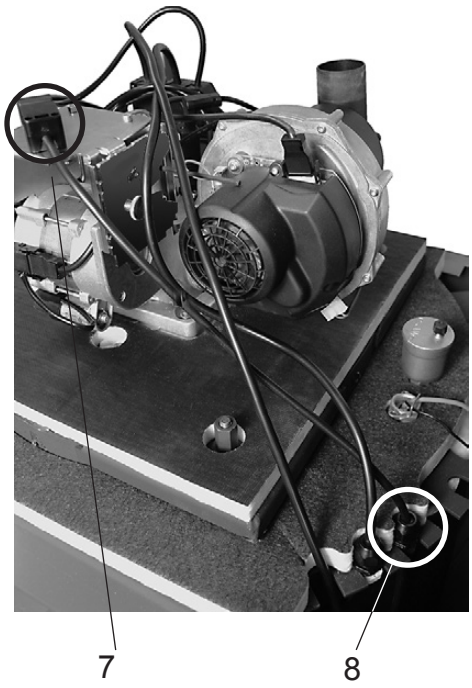


Fig. 11

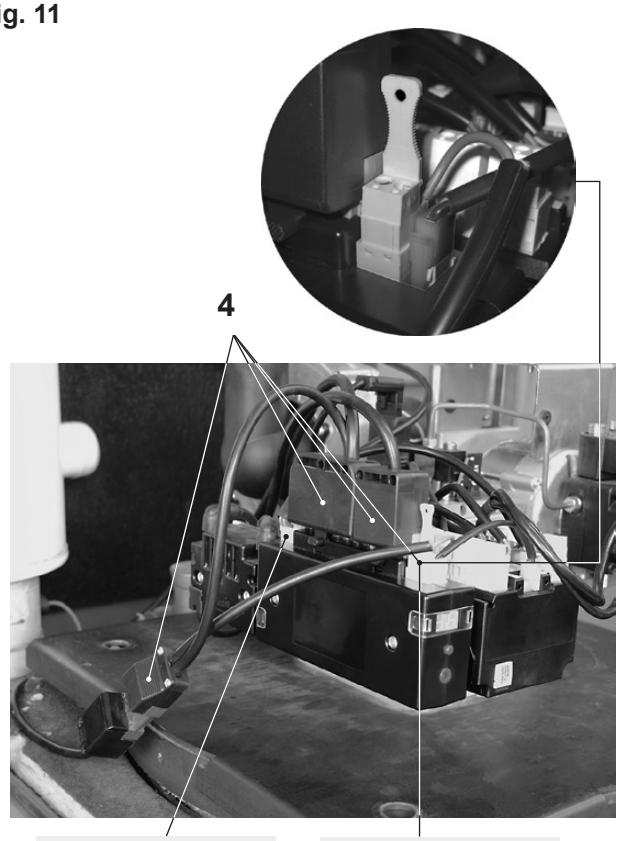


Fig. 12

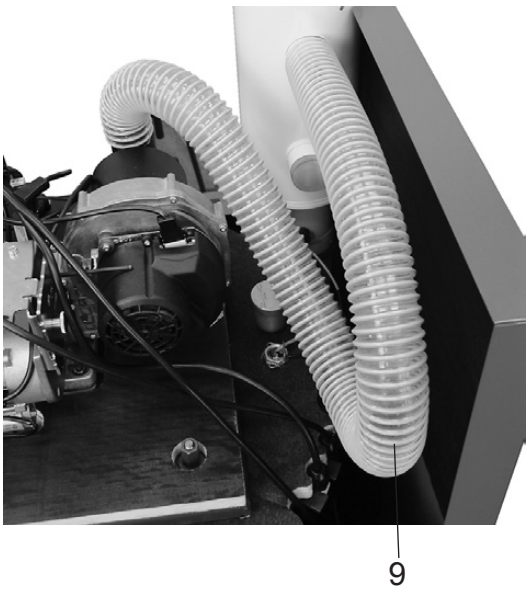


Fig. 13

14. Connect up the pipes (9, Fig. 13).
    Tip to help assembly: put the pipe in place and twist it slightly.
15. Reattach the side walls (Fig. 05), locking screws (3), lid (2) and front cover (1).

Further information is to be obtained from the instructions supplied together with the burner.

3. Technical details

3.1 Description of the boiler

The Hoval UltraOil® is a low-pollutant, energy-saving oil-fired heating boiler. The UltraOil® has a combustion chamber arranged vertically fabricated from rustless stainless steel as its primary heating surface and a secondary heating surface of a corrosion-resistant aluminium alloy. The secondary heating surface is so designed that the water vapour contained in the heating gas condenses and the heat of evaporation is utilised for the heating circuit. The UltraOil® is designed to be operated with heating oil EL.

3.1.1 The UltraOil® comply with the following directives and standards

We hereby declare that the product described, as an individual appliance, complies with the standards, guidelines and technical specifications laid down.

Directives	
92/42/EG	"Boiler efficiency directive”
73/23/EWG	“Low voltage directive”
89/336/EWG	“Electromagnetic compatibility directive”

Regulations	
Stability	prEN14394:2001
Constructional requirements	EN303-1 EN303-2 prEN 15034 prEN 15035
Low voltage	DIN VDE 0722 ed. 04.83
EMC EN	EN 50082 Teil 1 ed. 01.92

EN 12828 prescribes low water level protection in closed heating systems.
Substitute measures can be used in the case of boilers with an output of up to 300 kW.

On boilers of type UltraOil® (50), the safety disconnection function during operation without water was tested. The test was performed successfully.

Installation of low water level protection on the UltraOil® (50) is therefore not necessary.

3.2 Technical information

Type			(50)
• Nominal output 80/60 °C		kW	48
• Nominal output 40/30 °C		kW	50
• Range of output 80/60 °C		kW	28 - 48
• Range of output 40/30 °C		kW	30 - 50
• Heat input		kW	28.4 - 48.4
• Dimensions			Space requirements
• Max. boiler working temperature		°C	90
• Min. boiler working temperature		°C	no min. limit
• Min. return flow temperature		°C	no min. limit
• Min. flue gas temperature		°C	no min. limit
• Safety temperature limiter setting (water side)		°C	110
• Working / test pressure		bar	3.0 / 4.5
• Boiler efficiency with max. burner output at 80/60 °C (related to net / gross calorific value)		%	98.7 / 93.1
• Boiler efficiency with max. burner output at 40/30 °C (related to net / gross calorific value)		%	103.5 / 97.6
• Boiler efficiency at partial load 30 % at return flow 30 °C (according to EN 303) (related to net / gross calorific value)		%	104.7 / 98.8
• Nominal efficiency at 75/60 °C (according to DIN 4702 part 8) (related to net / gross calorific value)		%	102.0 / 96.2
• Nominal efficiency at 40/30 °C (according to DIN 4702 part 8) (related to net / gross calorific value)		%	104.5 / 98.6
• Stand-by deficiency qB at 70 °C		Watt	290
• Combustion gas resistance. 12.5 % CO_2. 500 m above sea. level (Tolerance +/- 20 %)		mbar	0.75
• Condensate rate	at 40/30 °C	l/h	3.52
• Flow resistance boiler [1]		z value	1.50
• Water resistance	at 10 K	mbar	27.7
	at 20 K	mbar	6.9
• Water flow volume	at 10 K	m^3/h	4.29
	at 20 K	m^3/h	2.15
• Boiler water capacity		litres	115
• Boiler gas volume		m^3	0.13
• Insulation boiler body		mm	50
• Weight (incl. casing. burner)		kg	276
• Weight of transport		kg	261
• Min. / Max. electrical power consumption [4]		Watt	6/253
• Type of protection [2]		IP	20
• Acoustic power incl. sound absorber hood			
Ambient air dependent			
- Heating noise (EN 15036 part 1)		dB(A)	71
Ambient air independent			
- Heating noise (EN 15036 part 1)		dB(A)	67
- Aspiration noise is radiated from the mouth (DIN 45835)		dB(A)	66
- Aspiration /exhaust noise - LAS - is radiated from the mouth (DIN 45835) [3]		dB(A)	-
Ambient air dependent and ambient air independent			
- Exhaust noise in the pipe (EN 15036 part 2) [3]		dB(A)	85
- Exhaust noise is radiated from the mouth (DIN 45635 part 47) [3]		dB(A)	68
• Combustion chamber dimensions Ø inside x length		mm	ø425 x 551
• Combustion chamber volume		m^3	0.0781
• Flue gas mass flow at nominal output 12.5% CO_2 heating oil		kg/h	76
• Flue gas temperature at nominal output 80/60 °C		°C	75
• Flue gas temperature at nominal output 40/30 °C		°C	40
• Supply pressure for supply air/flue gas line		Pa	50
• Maximum draught/underpressure at flue gas outlet		Pa	-20

[1] Flow resistance boiler in mbar = Volume flow $(m^3/h)^2$ x z factor
[2] Indication relates to protection against contact with dangerous components
[3] Sound absorber integrated
[4] Depending on the number of controller modules/module expansions fitted, there is an increase in the max. electrical power consumption.

3.3 Dimensions

(All dimensions in mm)

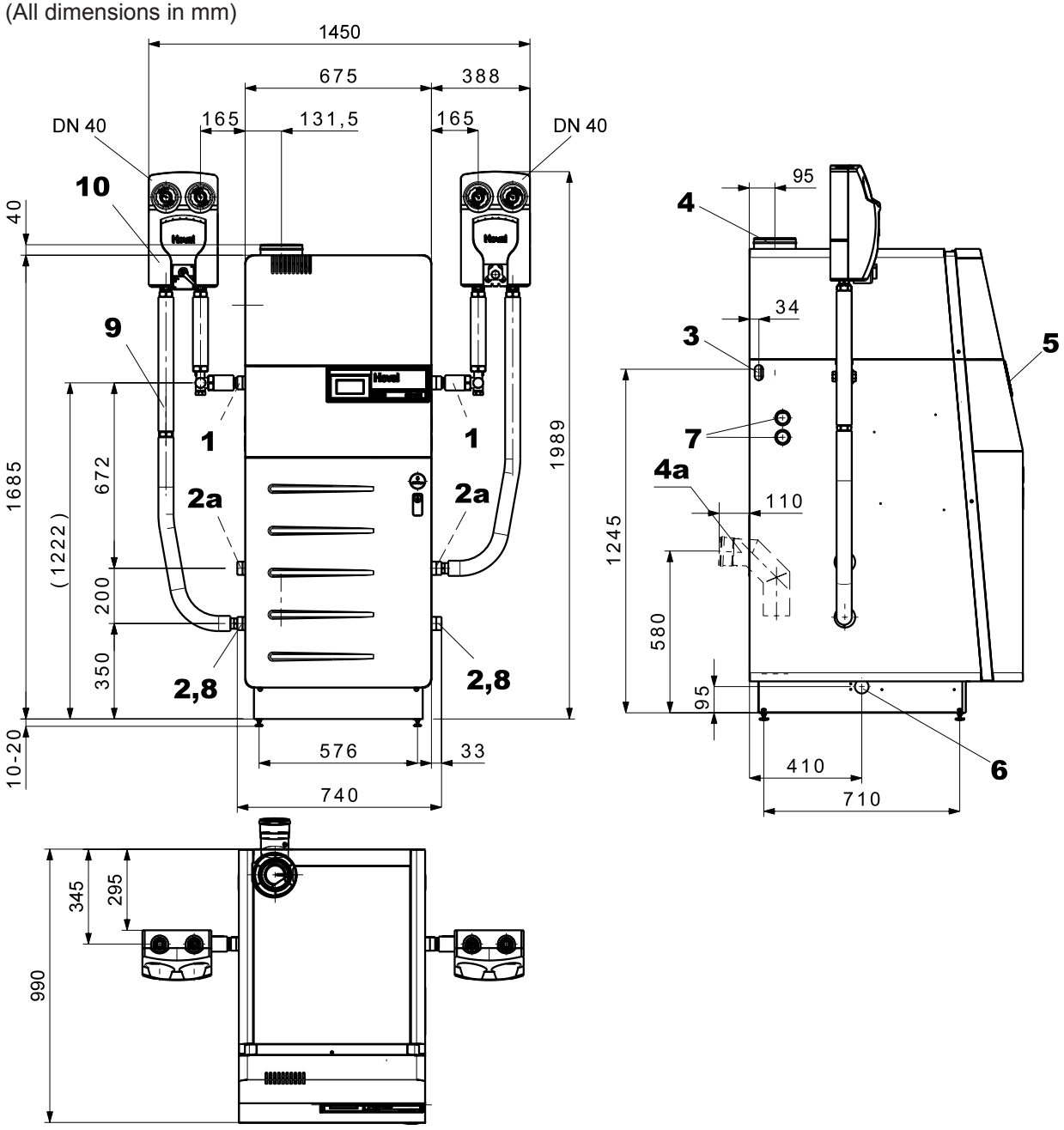


Fig. 14

1	Flow/ Safety flow	R1½"
2	Low temperature-return	R1½"
2a	High temperature-return	R1½"
3	Leadthrough for oil feed left or right	
4	LAS flue gas/ supply air connection	C100/150
5	Boiler control	
6	Condensation drainage (left or right) including siphon DN25 and 2 m PVC pipe inner Ø 19 x 4 mm	
7	Electrical connection left or right	
8	Evacuation	½"
9	Connection set (option)	
10	Heating fittings group or loading group (option)	

3.4 Space requirements

(All dimensions in mm)

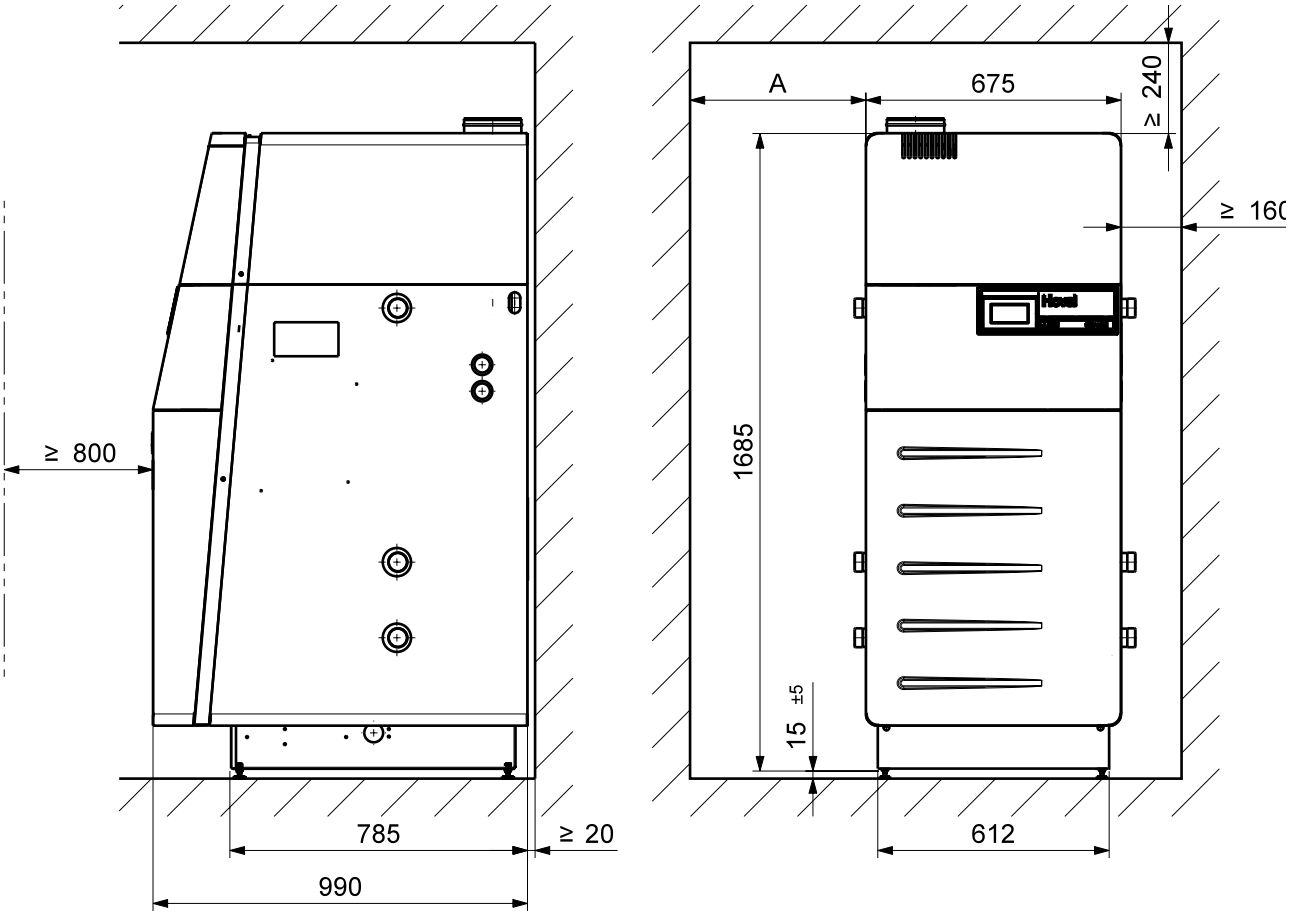


Fig. 15

Boiler door incl. burner swivels upwards and to the left or to the front.

A = minimal 150 mm *
Burner service position front - boiler cleaning from the righ

A = optimal 300 mm *
Burner service position left - boiler cleaning from the front

* without with heating armature group
500 mm with heating armature groupe

4. Installation

4.1 Boiler room requirements

Regarding the building specifications in respect of boiler rooms and their ventilation and exhaust, the current building supervisory office regulations specific to the state or country are to be observed.

The UltraOil® can be operated either dependent on air from the boiler room, or independent of boiler room air.

Not dependent upon boiler room air
As an appliance of type C53x or C63x the UltraOil® can be installed to operate independent of boiler room air, irrespective of size or ventilation of the room in which it is installed.
We recommend it is installed in a separate room in which, in accordance with pr. EN 15035, a small amount of leakage of exhaust gas can be tolerated.

Not dependent upon boiler room air:
Ensure that there is an adequate fresh air supply to the boiler room,
so that the amount of combustion air required for operation of all the burners installed there can be continuously replenished without hindrance and that for the protection of operating personnel there is no shortage of oxygen.
Binding values for the size of ventilation openings are not generally specified in the relevant regulations; it is merely required that no partial vacuum in excess of 3 N/m^2 occurs. To comply with this requirement, for up to a nominal thermal output of 50 kW, a ventilation cross-section of at least 300 cm^2 must be provided. In rectangular openings, the ratio of sides should not exceed 1.5:1; if a grid is fitted, an appropriate adjustment must be allowed so that the free cross-section area reaches the amount given above.

4.2 Flue connection and chimney

The exhaust system must be gastight, watertight, resistant to acids and be approved for the corresponding exhaust gas temperatures up to 120 °C and for operation at pressure.

Horizontal connections must be laid with a gradient down towards the boiler of at least 50 mm per meter length, to ensure that there is no hindrance to condensate flowing back into the boiler. The whole exhaust system must be designed to avoid condensate collecting.

As a general rule, only one heat generator should be connected to the chimney. For two heat generators, the corresponding regulations are to be observed.

In the UltraOil® there is an exhaust gas safety temperature limiter installed. For this reason, no additional exhaust gas temperature limiter is required for the exhaust gas system with a maximum permitted exhaust gas temperature of 120 °C.

Because of the moisture content in exhaust gases at low temperatures and the additional condensate which is thus caused in the chimney, it is not permitted to connect oil condensing boilers to traditional domestic chimneys.

The current official conditions and regulations are to be observed in respect of the exhaust gas system design.

There are two alternatives for exhaust gas system design for oil condensing boilers:

a) the use of special exhaust gas systems approved by the building authorities,
b) the use of moisture-resistant chimneys which are approved for exhaust gas temperatures of over 40 °C, connected in the boiler installation room by means of approved exhaust flues with the oil condensing boiler.

In both cases, the cross-sections and maximum lengths are to be calculated on the basis of the values for exhaust gas mass flow, exhaust gas temperature and the delivery pressure available at the exhaust connections in accordance with the table in section 3.2 (DIN 4705).

4.2.1 Exhaust gas flues approved by building regulations

The exhaust gases from the condenser oil-fired Hoval UltraOil® boiler can be led away through a gas-tight, exhaust gas flue resistant to high temperature and to condensate. Only exhaust systems approved by the respective country or state may be connected (in Austria the approvals of the respective provinces are to be observed). For transition from the exhaust gas connection to the exhaust gas flue, the manufacturers of the exhaust gas flues supply suitable boiler connection fittings.

In planning and installation of the exhaust gas flue, planning instructions and manufacturer's instructions for laying and building legislation regulations must be observed. Discussions are recommended in good time with the regional chimney inspector.

Your authorised Hoval agent will be pleased to supply you with an approved exhaust system to suit your UltraOil® boiler.

4.2.2 Example of an exhaust gas flue (Hoval exhaust gas system)

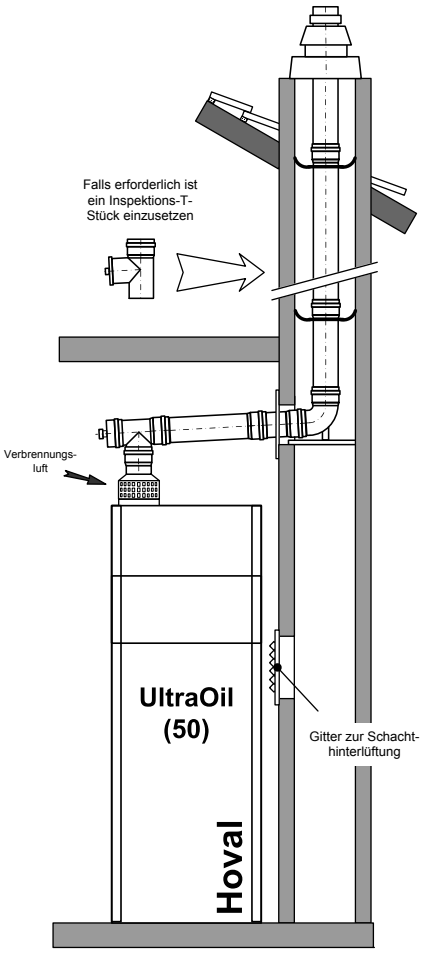


Fig. 16

4.2.3 Project planning instructions

- The exhaust gas routing must be through tested and approved exhaust gas pipework
- The exhaust gas pipework must be gastight, watertight, resistant to corrosion and acids and approved for use with exhaust gas temperatures of up to 120 °C.
- The exhaust gas system must be suitable for operation at pressure.
- The exhaust gas pipework is to be laid with gradients to ensure that the condensate which occurs in the exhaust gas system flows back into the heating boiler and can be neutralised there before discharge into the drainage.
- When using exhaust gas pipework of plastic, local state or country regulations relating to the use of the safety temperature limiter must be observed.
- The cross-sections are to be calculated for heating boilers without draughting requirement. Please take note of the SIA recommendation No. 384/4 "Chimneys for building heating systems, determination of cross-sections".
- In the exhaust gas pipework there must be a closable exhaust gas measuring connection with circular internal diameter of between 10-21 mm installed. The connection must protrude beyond the heat insulation.

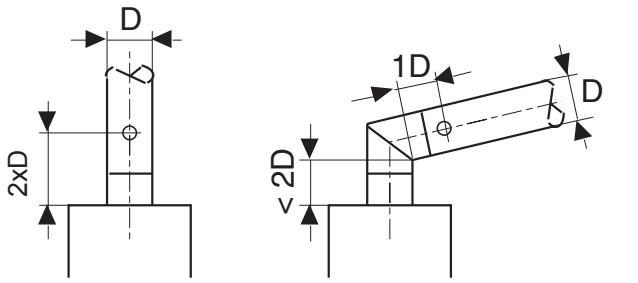


Fig. 17

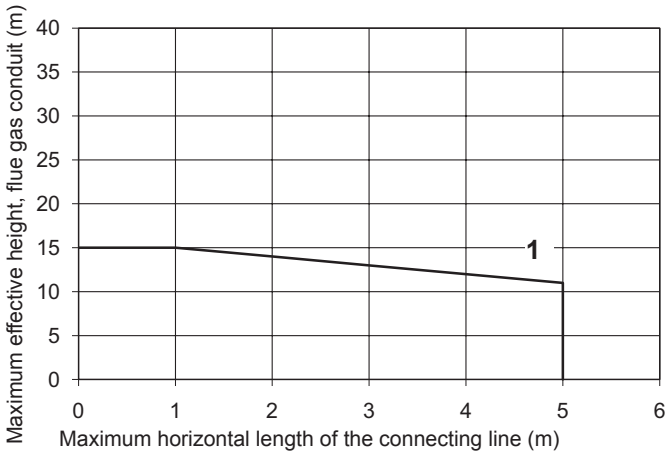
4.2.4 Dimensioning flue gas system

Non-binding guide values:
The following formpieces have been taken into account in determining the dimensioning diagrams:

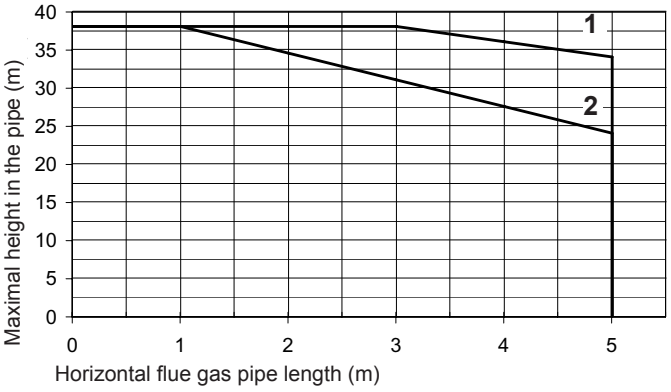
- 1 T-piece 90° for boiler connection
- 1 90° elbow to support the flue gas pipe in the shaft
- 1 component for the chimney end

Note:
The data contained in the following diagrams represent guide values calculated at maximum output. An exact calculation for the flue gas duct must be made on-site.

Hoval UltraOil® (50)



1	room air dependent	∅ 100 mm, Flue pipe horizontal ∅ 100 mm



1	room air independent	Combustion air duct separately ø 130 mm, Flue pipe vertical ø 130 mm, Flue pipe horizontal ø 130 mm
2	room air dependent	ø 130 mm, Flue pipe horizontal ø 100 mm,

4.3 Fuel

The boiler may only be operated with the fuel designated on the boiler's rating plate.

The UltraOil® heating boilers are suitable for firing with the following fuels:
- Heating oil EL low-sulphur in accordance with DIN 51 603 / ÖNorm C 1109
- Eco heating oil low-sulphur SN 181 160-2 / 2008

If an existing oil heating installation is replaced by Hoval UltraOil®, the following instructions regarding the oil tank and its refilling must be observed:
- Hoval UltraOil® must only be operated with heating oil EL low-sulphur with sulphur content < 50 ppm (< 0,005 %).
- It is recommended to clean the oil tank before refilling it.
- A residual amount of heating oil EL in the oil tank may be mixed with heating oil EL low-sulphur, provided that the residual amount does not exceed the following values of the total content.Residual amount heating oil EL (sulphur content: 2000 ppm resp. 0,2 %) max 3 % of tank volume
  Residual amount heating oil EL (sulphur content: 1000 ppm resp. 0,1 %) max 5 % of tank volume
  Residual amount eco heating oil EL (sulphur content: 500 ppm resp. 0,05 %) max 10 % of tank volume
- In order to reach the permissible mixture ratio with heating oil EL low-sulphur taking account of the residual amount of heating oil in the oil tank, a 100% tank filling is necessary.

Natural gas (conversion option to UltraGas®)

4.4 Electrical connection

A qualified technician must install the electrical supply to the equipment. The connection diagram is located in the terminal box of the heat generator; the circuit diagram is supplied separately. Refer to this for the conductor cross-section required for the mains supply.

For Austria and Germany:
An electrical circuit diagram is supplied with the boiler controls. An all-pole main switch with a minimum contact spacing of 3 mm must be fitted in the power supply line.

For Switzerland the following applies:
For the electrical connection, the electric circuit diagram specific to the plant must be observed.

Recommended cable cross-sections and maximum permitted cable lengths:

Line type	Cross-section	Length
Power supply of the heat generator (230 V)	min 1.5 mm^2 with 13 A fuse	unlimited m
Cables carrying mains supply voltages from actuators	min 1.0 mm^2	unlimited m
Cables carrying low voltage (sensors)	min 0.5 mm^2	max. 50 m
Data bus lines (shielded)	2x2x0.6 mm^2	max. 100 m

The electrical connection must be connected in accordance with the applicable standards of nationally or internationally recognised professional associations.

1. Remove front cover (1, Fig. 18), after first releasing the lateral locking bolt (1a) (turn approx. ¼ turn to the left and pull out as far as the stop). Lift the front cover (1) straight upwards and remove towards the front.
2. Lift and remove the lid (2).
3. Remove lower front cover (3), after first releasing the lateral locking bolt (3a) (turn approx. ¼ turn to the left and pull out as far as the stop). Slightly raise the lower front cover (3) and remove towards the front.
4. Remove the locking screw (4) on the right.
5. Lift the switch control box (5) and fold it out.

The electrical connection is to be made in accordance with the diagram supplied. (6) Cable feed-in

The electrical connection is to be made in accordance with the diagram supplied. (6) Cable feed-in

Do not reach into the marked area (Bild 18) when folding out the switch control box.
Danger of cuts and pinching in the area of the trim strip (7).
Wear gloves. Grip the switch control box by the left and right sides, not by the underside!

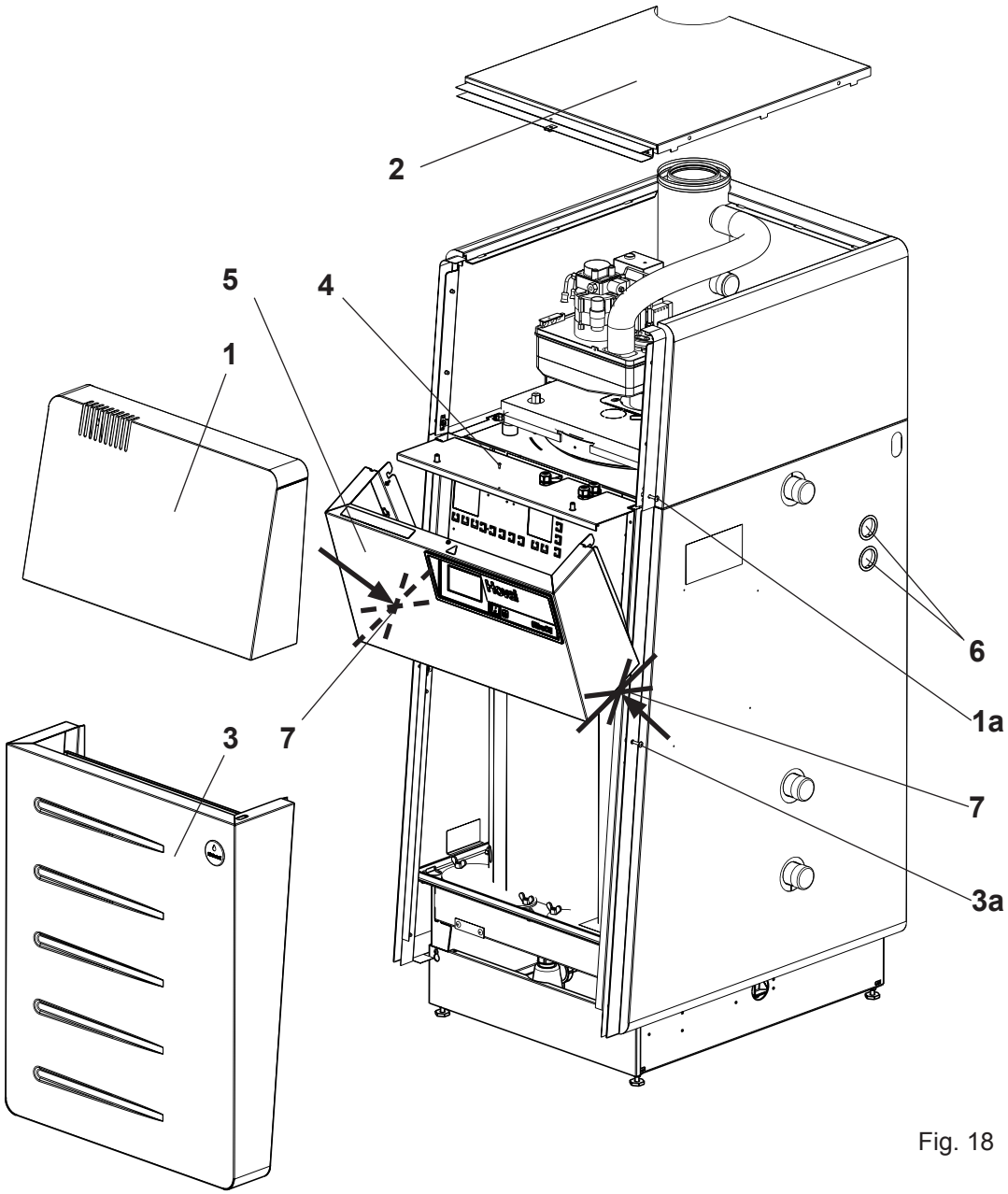
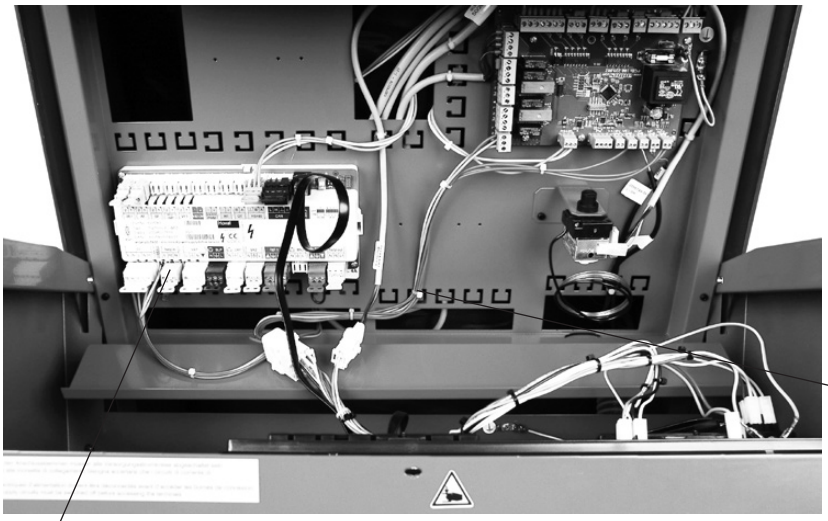


Fig. 18



Cable grip
Protect all cables against strain with the enclosed cable grips when the controller is folded open.

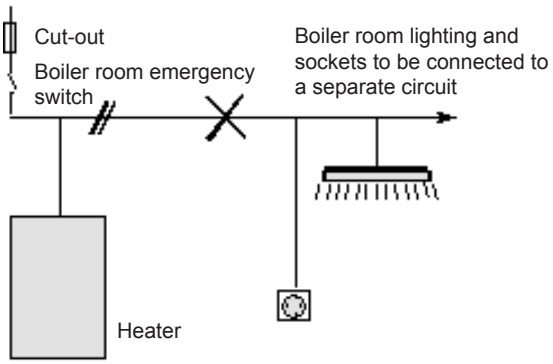
Mains supply 230V

Fig. 19

Controller modules are only connected with 3 lines (no +) of the bus system.Control modules are connected with 4 lines because these have to be supplied.

4.4.1 Safety measures relating to EMC assembly

1. For regulator units with their own power supply, separate laying of power leads and sensor or bus-leads is absolutely essential. If using cable channelling, only that fitted with separator strips may be used.
2. The power connection to the heating equipment (boiler-switchboard-regulator unit) must be designed as an independent electrical circuit. Neither fluorescent lamps nor any other machinery which might cause interference may be connected, nor may it be possible to make such a connection.

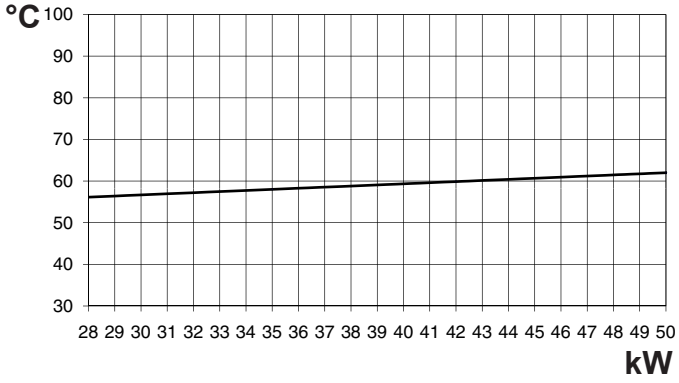


3. The external sensor must not be installed in the vicinity of transmitter or receiver fittings, for example on a garage wall near receivers for remote garage door openers, ham-radio aerials or radio alarm systems, or in the immediate vicinity of transmitters etc.

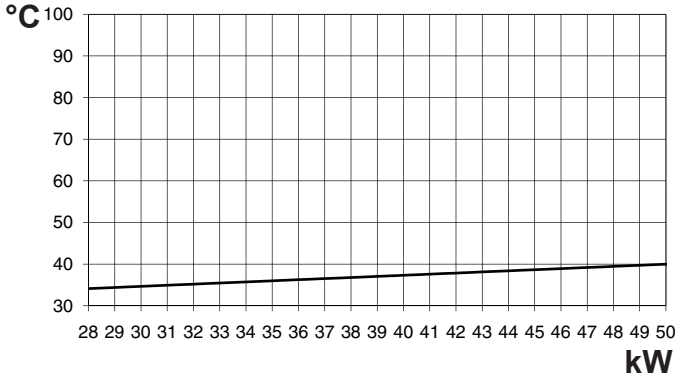
4.5 Flue gas - output diagram

The diagram show the exhaust gas temperature behaviour with Hoval burners.

Flow 80 °C Return flow 60 °C



Flow 40 °C Return flow 30 °C



kW = heating output
°C exhaust gas temperature using heating oil EL, CO_2 = 12.5%

4.6 Hydraulic integration

Examples
Direct heating circuit

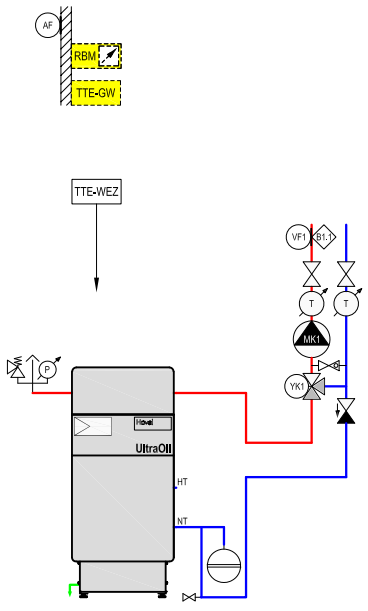


Fig. 20

Mixer circuit and water heater

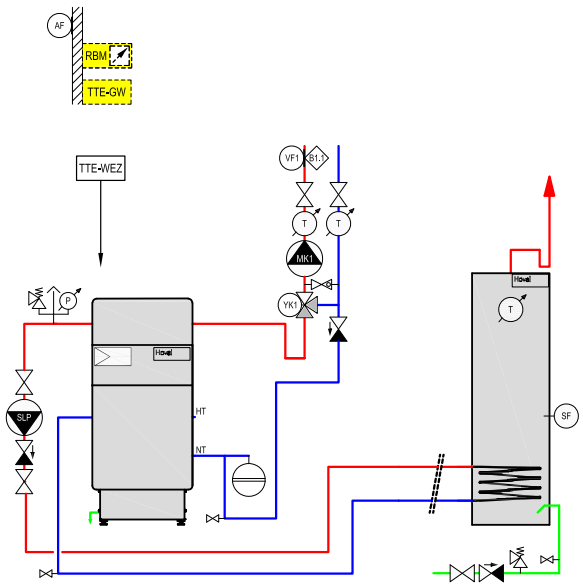


Fig. 21

4.7 Condensate discharge

The condensate discharge must be manufactured of corrosion-resistant material.
The following materials are suitable for the condensate discharge:

- PVC
- PE
- PP
- RED

The minimum inner diameter of the condensate drain must be 15 mm. The condensate drain must be sufficiently inclined.

A: it is not required to neutralise condensate from a condenser oil-fired boiler of up to 120 kW drained together with domestic waste water from a private household.

CH: For the UltraOil®, the fuel used must be heating oil EL low-sulphur. As a rule, neutralisation of the condensate is not necessary. Regarding the discharge of condensate, local regulations must be taken into account.

D: For the UltraOil®, the fuel used must be heating oil EL low-sulphur. Neutralisation is therefore unnecessary. Regarding the discharge of condensate, the local regulations and the ATV (Sewage Engineering Association) data-sheet must be taken into account.

4.8 Setting the temperature controller

Basic setting of the controls will be undertaken by the heating installation engineer. Choice and setting of the various heating programmes in accordance with the operating instructions.

4.9 Safety valves

The heating equipment and hot water system must be protected with one safety valve each against unauthorised high pressures. Their blowing off performance must correspond with the boiler's maximum nominal heating output. The valve is to be installed in the feed line in the immediate vicinity of the boiler.

4.10 Loading pump (boiler with water heater)

Rotation speed and performance must correspond with the requirements of the water heater. Setting carried out by the heating installation engineer.

4.11 Heating pump

Rotation speed and performance must correspond with the requirements of the plant. They are to be set by the heating installation engineer.

5. Commissioning

5.1 Water quality

Heating Water

The European Standard EN 14868 and the directive VDI 2035 must be observed.

In particular, attention must be paid to the following stipulations:

- Hoval boilers and calorifiers are designed for heating plants without significant oxygen intake (plant type I according to EN 14868).

- Plants with
  - continuous oxygen intake (e.g. underfloor heating systems without diffusion proof plastic piping) or
  - intermittent oxygen intake (e.g. where frequent refilling is necessary)

  must be equipped with **separate circuits.**

- Treated filling and replacement water must be tested at least 1x yearly. According to the inhibitor manufacturer's instructions, more frequent testing may be necessary.

- A refilling is not necessary if the quality of the heating water in existing installations (e.g. exchange of boiler) conforms to VDI 2035.
  The Directive VDI 2035 applies equally to the replacement water.

- New and if applicable existing installations need to be adequately cleaned and flushed befor being filled. The boiler may only be filled after the heating system has been flushed!

- Parts of the boiler / calorifier which have contact with water are made of ferrous materials and stainless steel.

- On account of the danger of stress cracking corrosion in the stainless steel section of the boiler the chloride, nitrate and sulphate content of the heating water must not exceed 50 mg/l.

- The pH value of the heating water should lie between 8.3 and 9.5 after 6-12 weeks of heating operation.

Filling and replacement water

- For a plant using Hoval boilers untreated drinking water is generally best suited as heating medium, i.e. as filling and replacement water. However, as not all drinking water is suitable for use as as filling and replacement water the water quality must fulfil the standard set in VDI 2035. Should the mains water available not be suited for use then it must be desalinated and/ or be treated with inhibitors. The stipulations of EN 14868 must be observed.

- In order to maintain a high level of boiler efficiency and to avoid overheating of the heating surfaces the values given in the table should not be exceeded (dependent on boiler performance ratings - for multi-boiler plants rating of smallest boiler applies - and on the water content of the plant).

- The total amount of filling and replacement water which is used throughout the total service life of the boiler must not exceed three times the water capacity of the plant.

Maximum filling capacity based on VDI 2035

	Total hardness of the filling water up to ...							
[mol/m³] [1]	<0,1	0,5	1	1,5	2	2,5	3	>3,0
f°H	<1	5	10	15	20	25	30	>30
d°H	<0,56	2,8	5,6	8,4	11,2	14,0	16,8	>16,8
e°H	<0,71	3,6	7,1	10,7	14,2	17,8	21,3	>21,3
~mg/l	<10	50,0	100,0	150,0	200,0	250,0	300,0	>300
Conductance [2]	<20	100,0	200,0	300,0	400,0	500,0	600,0	>600
Boiler size of the individual boiler	**maximum filling quantity without desalination**							
to 50 kW	NO REQUIREMENT							20 l/kW

[1] Sum of alkaline earths
[2] If the conductance in µS/cm exceeds the tabular value an analysis of the water is necessary.

5.2 Filling the heating circuit

Filling of the heating system must be carried out by equipment specialists. The filling water and supplementary water must comply with the quality requirements in the relevant state or country (see chapter 5.1).

5.3 Filling the water heater (if fitted)

The heating boiler may also be put into service even when the water heater is not filled.

5.4 Commissioning

The heat generator must be de-energised for maintenance. Set the blocking switch to “0” and disconnect the heat generator from the mains (main switch, fuse).

All electric power supply circuits must be switched off before accessing the terminals.

Important:
On first putting into service, the proper function of all safety and regulator equipment is to be checked. Operation and maintenance of the plant must be explained in detail to the operator.

Before commissioning, the neutralisation box (where fitted) is to be filled with water.

5.5 Oil burner

Setting the burner must also be carried out by the installing engineer and must correspond to the heat requirement of the plant.
For this purpose, please use the technical information / installation instructions supplied with the burner.

Burners are fitted with oil preheating and when restarted are ready for operation again after about 2 minutes’ delay.

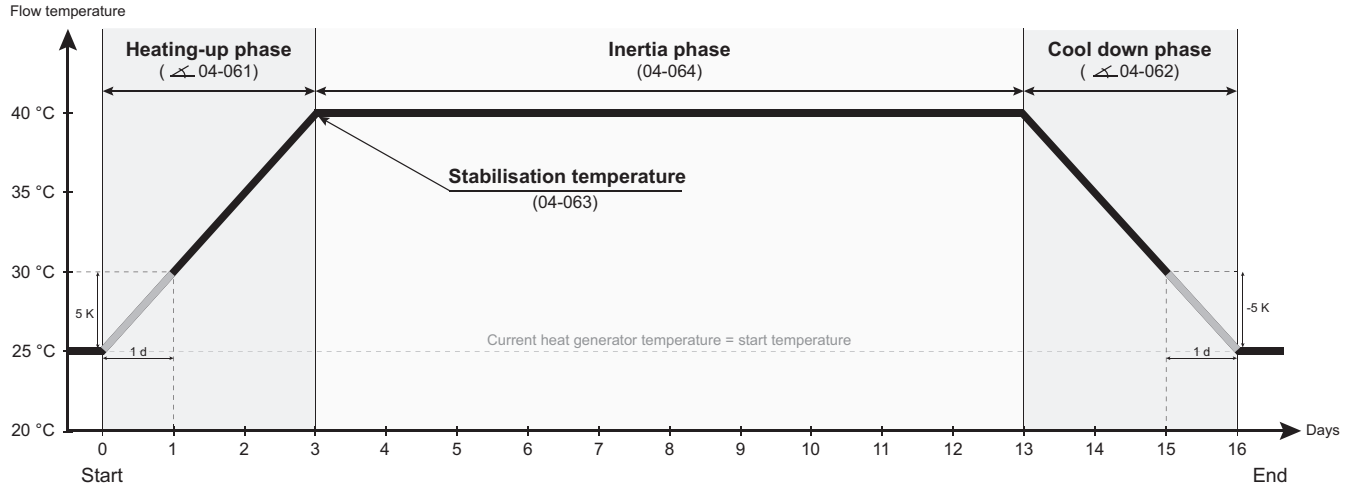
5.6 Handover to the operator / storage

Have the operator confirm in writing that the methods of operating and service procedures have been explained and that he has received a copy of the relevant operating instructions (according to sample page 32). The machinery manufacturer is responsible for providing operating instructions for the whole plant: the technical information / installation instructions must be kept with the plant all the time.

5.7 Record - Activation of screed function

Description of function

The control module of the TopTronic® E contains a functional sequence used for drying out screed floors. To start the screed drying, it is necessary for the individual functions to be set accordingly.

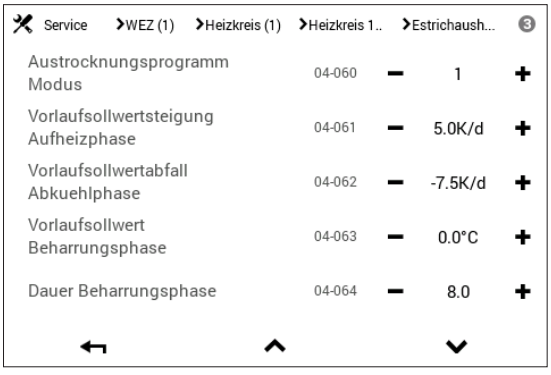


Function	Parameters	Value	Description
Heating-up phase	04-061	5 K/d	Kelvin per day (rising)
Stabilisation temperature	04-063	40.0 °C	Set maximum temperature
Inertia phase	04-064	10	Number of days in stabilisation temperature
Cooling off phase	04-062	-5 K/d	Kelvin per day (falling)
Activate screed function	04-060	1 (ON)	Start and stop screed drying

CAUTION: The graphic/table shows the factory settings. The time profile and the maximum flow temperature must be discussed with the screed layer, otherwise there could be damage to the screen – and in particular, cracks.

REACTION screed function
- Start/stop: Switch parameter 04-060 ON (1) or OFF (0)
- Power failure in heating-up phase: program restart
- Failure in the steady-state phase: Retain maximum temperature and add the failure time to the steady-state phase
- Power failure in the cooling off phase: Measurement of actual flow value and continue cooling until start value reached
- Program end: Previous basic program active again

Settings in the TopTronic® E control module

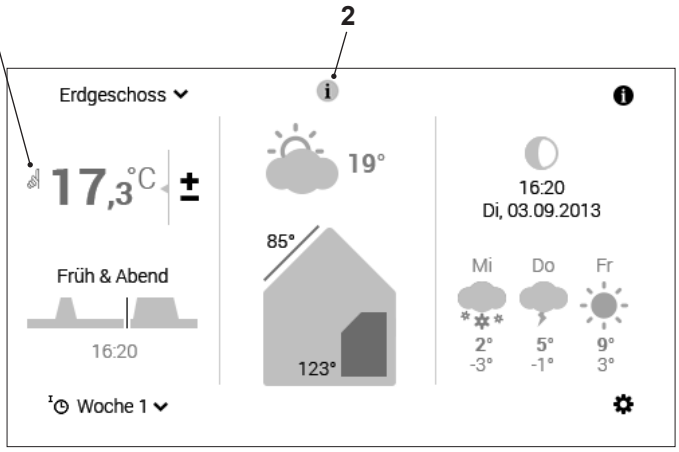


Can only be set in the corresponding user level.

Settings under **Start screen > Main menu > Service > H-GEN > Heating circuit > Heating circuit 1, 2, 3* > Screen > 04-060 to 04-064**.

* If there are several heating circuits, a separate screed function must be assigned to each heating circuit.

Function display



No.	Icon	Function
1		**Screed drying active** Various settings can be made as well. Prioritisation of the screed function means the settings are only active at the end of the function.
2		**Information remaining run time** Request of the active function phase, the ACT temperature as well as the remaining run time.

Logging

Please cut out the log and attach it to the controller during active screed function.

The time profile and the maximum flow temperature must be discussed with the screed layer, otherwise there could be damage to the screen – and in particular, cracks.

Screed function activated by:	Profile and flow temperature discussed with:

Screed function activated on:	Screed function ends on:

.....
Date and signature

6. Maintenance

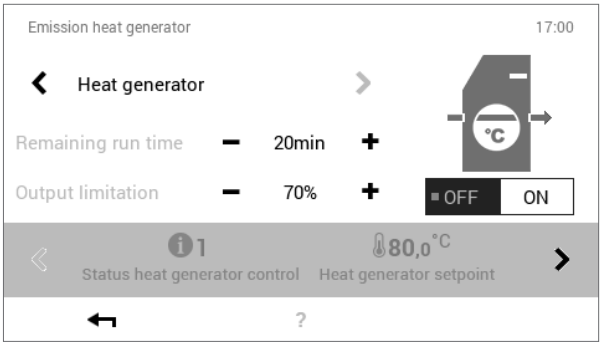
6.1 Information for combustion controller/chimney sweep regarding emission monitor key

This chapter is exclusively intended to describe the function of emissions and manual operation settings for the firing monitoring technician / chimney sweep. All operating elements are described in the operating instructions.

Danger of scalding with hot water, since the hot water temperature can exceed the target setpoint temperature.

In order to protect underfloor heating systems against impermissible superheating during emissions measurement / manual operation, it is necessary to implement appropriate safety measures (e.g. pump switch-off with maximum thermostat). The output and duration of the emission measurement can be set in the "Emission" main menu, and reactivated if required.

Emission metering



Setting at:
Home screen > Main menu (page 1) > Emission.

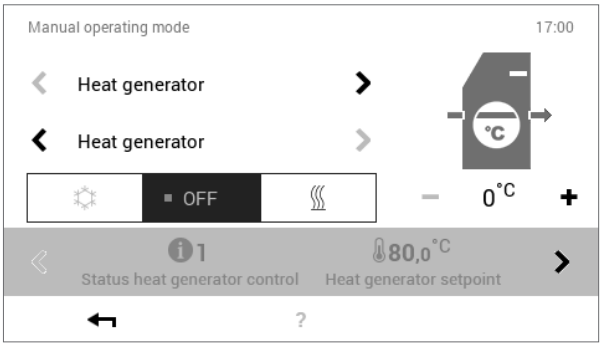
For detailed information see operating instructions, "Emission" chapter

Power limitation with 2-stage burner:

0 to 50% = 1st stage 51 to 100% = 2nd stage

REACTION to emission metering
- Go back after expiry of the time unit/time specification of return to the main menu
- Setpoint temperature = Maximum temperature limit
- Forced energy is used in an attempt to keep the corresponding heat generator temperature to 60 °C
- Regulate heating circuits and the calorifiers to their maximum temperature (in the direct heating circuit only if the hot water basic program is set to parallel operation)

Manual mode



Settings under:
Home screen > Main menu (page 2) > Manual operation.

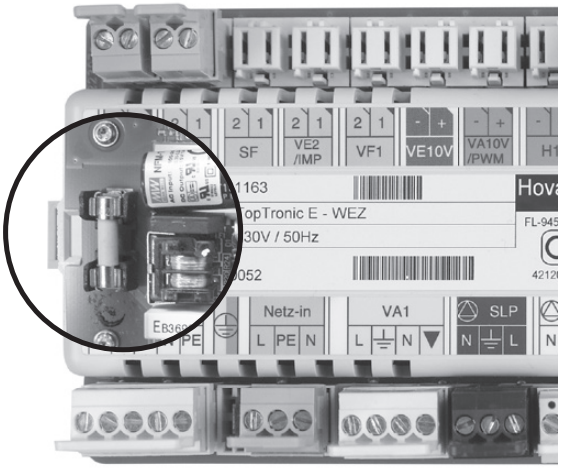
For detailed information see operating instructions, "Manual operation" chapter

REACTION for manual operation
- Setting the required setpoint temperature using the selected heating or hot water circuit
- All heating pumps ON
- Note the maximum permissible temperature of surface heating!

6.2 Renewing fuse

Electrical installations may only be carried out by a qualified electrician.

1. Set the blocking switch to "0" and disconnect the heat generator from the mains (main switch, fuse).
2. Remove the front casing according to the procedure in chapter 4.4
3. Remove the cover from TopTronic® E - WEZ (press to the side and remove).
4. 57. Renew fuse (T 10A 250V).



5. Mount protecting cover, close casing.
6. Restore the electrical power supply.

6.3 Cleaning the boiler

Cleaning of the UltraOil® may only be carried out by an authorised installer or by the Hoval customer services.
Reliable and safe operation of an oil-fired boiler and achievement of an optimum level of efficiency and clean burning can only be guaranteed if the appliance is maintained and cleaned on a regular basis.

An inspection and cleaning is necessary on an annual basis. For this, it is recommended you conclude a maintenance contract with the Hoval customer services, or with an authorised specialist dealer.
Where oil-fired boilers have been in operation throughout a building stage, exposed to enhanced amounts of dust, an inspection and examination of the contamination is to be carried out once the building work is finished, and if necessary cleaning must be arranged.

6.3.1 Prepvarations for boiler and burner cleaning

The heat generator must be de-energised for maintenance. Set the blocking switch to "0" and disconnect the heat generator from the mains (main switch, fuse).

All electric power supply circuits must be switched off before accessing the terminals.

- Await standby mode / fan follow-on time
- Remove the front cover (1, Fig. 22), lid (2) and side walls (3) (see chapter 2.3, step 1-4).
- Remove lower front cover (4) (see chapter 4.4, step 3).
- Remove base plate (5), by lifting it straight upwards and off.
- Undo the burner plug connections (burner cable, cable remote control unlocking)
- Remove the corrugated pipe from the burner air intake adapter.
- Undo the locknuts (6).
- Draw the burner with the boiler door (7) upwards, turn it sideways and let it down again.
- Clean the burner.
- Remove the lid to the cleaning aperture (8).

The siphon must be cleaned once a year. For cleaning the siphon the siphon bottom part (10 Fig. 22) must be removed.

- Clean the neutralisation box (9) (if fitted) as described in chapter 6.4.
- The cleaning scraper included in the scope of delivery is suitable for cleaning the aluFer® pipes. For a detailed description of how to clean the combustion chamber and the aluFer® pipes see chapter 6.3.3.

6.3.2 Re-assembly of the boiler

- Where installed, reattach the neutralisation box (9) and the siphon bottom part (10) and fill with water.
- Replace the lid to the cleaning aperture (8)
- Firmly pressing in the fireproof cord between the burner pipe and the door form-brick
- Grease the sealing cord before closing the boiler doors
- Close the burner with boiler door (7)
- Tighten the lock-nuts (6)
- Reconnect the burner plug connections (burner cable, cable remote control unlocking)
- Fit base plate (5), lower front cover (4), side walls (3), lid (2) and front cover (1).
- Set the main boiler control switch to "1"

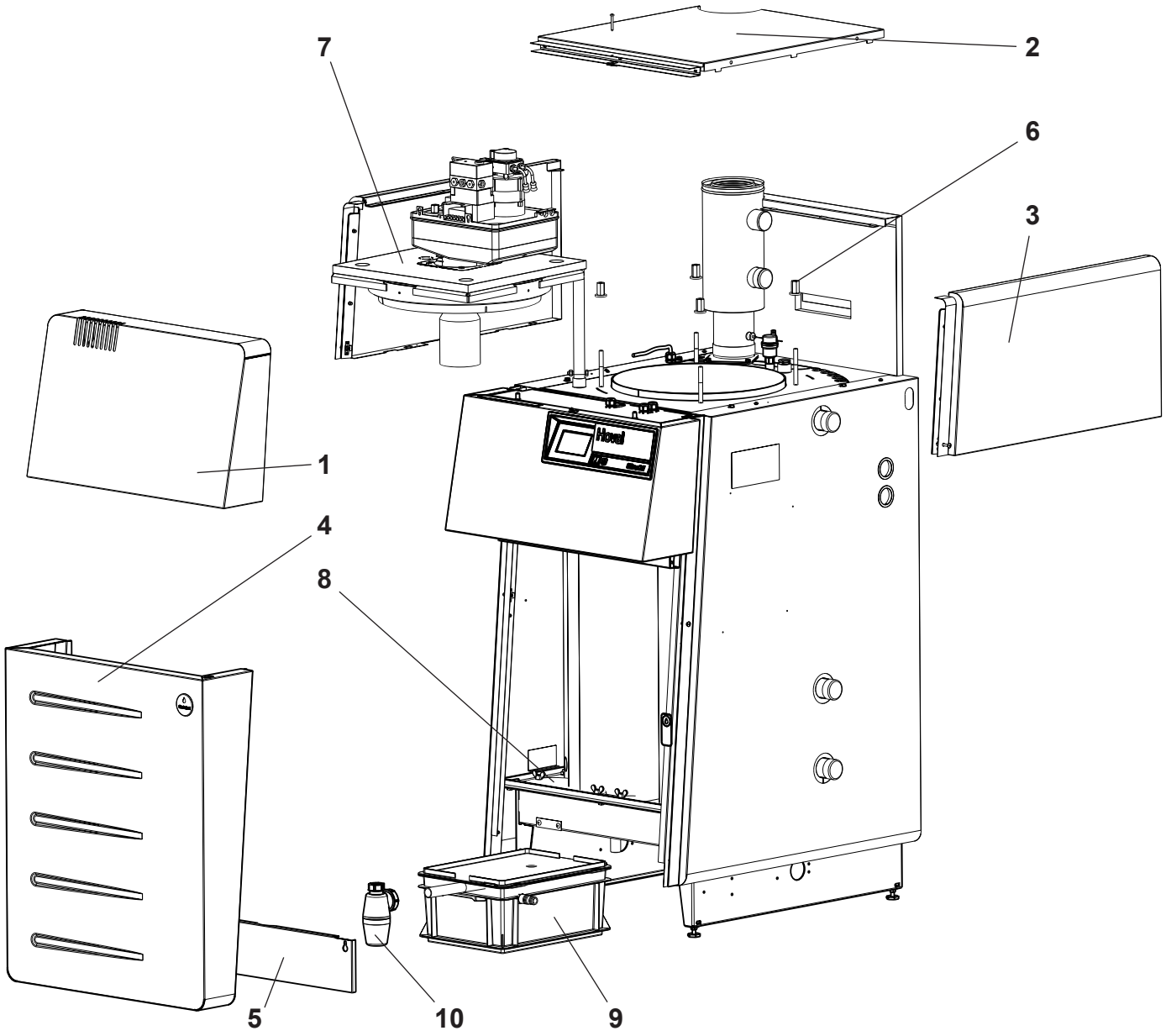


Fig. 22

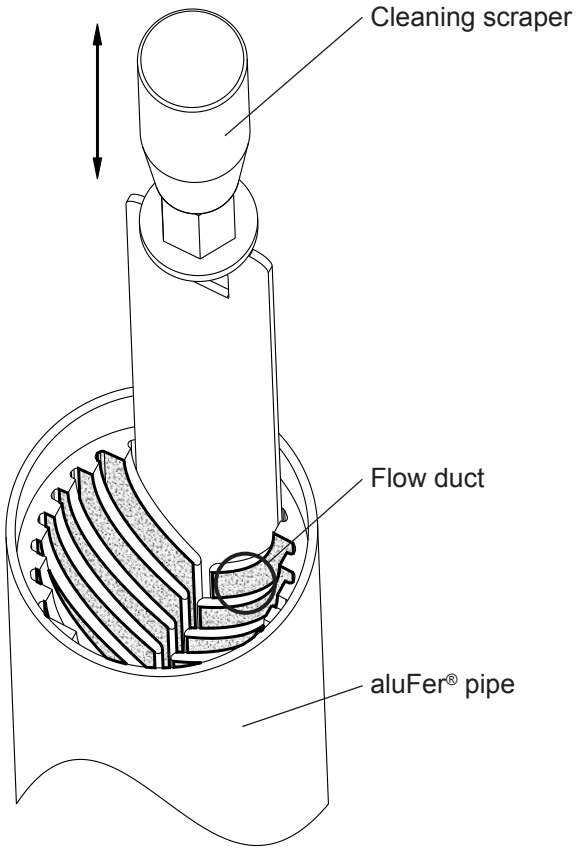
6.3.3 Cleaning the combustion chamber and the aluFer® pipes

in the case of light dirt build-up
Carry out wet cleaning of the combustion chamber and the aluFer® pipes.

- Ensure that each individual aluFer® pipe is thoroughly rinsed. After completing cleaning, check that the individual flow ducts are free of deposits and combustion residue!

in the case of heavy dirt build-up
Carry out mechanical wet cleaning of the combustion chamber and the aluFer® pipes after spraying them with concentrated cleaning agent.

- Allow the concentrate to soak in for at least 10 minutes before cleaning.
- Using the cleaning scraper, thoroughly clean the flow channels.
- A special cleaning set (contains four cleaning scrapers) to remove stubborn dirt build-up is available from Hoval, Art. No. 6022 844.
- Before removing the drain hose, all dirt particles must be adequately rinsed out of the condensate drip tray.

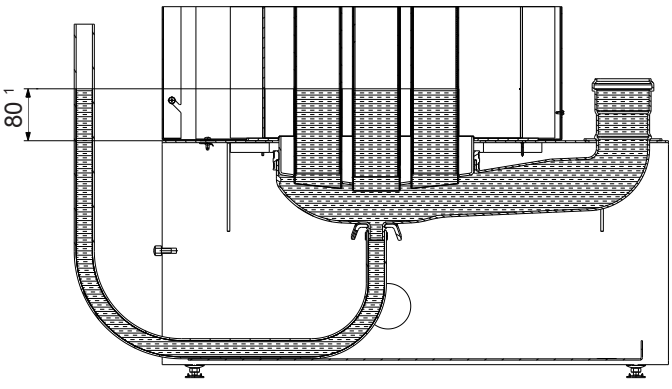


Do not use wire brushes or any sharp objects for cleaning. Ensure that the combustion chamber does not come into contact with iron, as this may cause corrosion. Care must be taken that stainless steel surfaces are not scratched or damaged in any way.

The only cleaning concentrates permitted are those approved for oil boilers having aluminium components such as Sotin 240 or Desoxin.

When working with the above cleaning agents, regulations prescribe the wearing of gloves and protective goggles. In addition, the instructions on the original packaging must be observed.

Leakage testing
After cleaning or at least every five years, the sealing between the combustion chamber and the condensate drip tray must be checked for leakage. This can be done by filling the boiler with water.



[1] Filling level water

6.4 Servicing the neutralisation installation (if fitted)

Maintenance should be undertaken at least every second year, or after the neutralisation granules are exhausted (check the ph-value if appropriate with litmus paper test).

Neutralisation granulate for refilling can be ordered from Hoval under the following item no.:

- 1 pack (3 kg) neutralisation granules
  Part no. 2028 906
  One filling requires 2 packs of 3 kg each.

Procedure for servicing the neutralisation installation

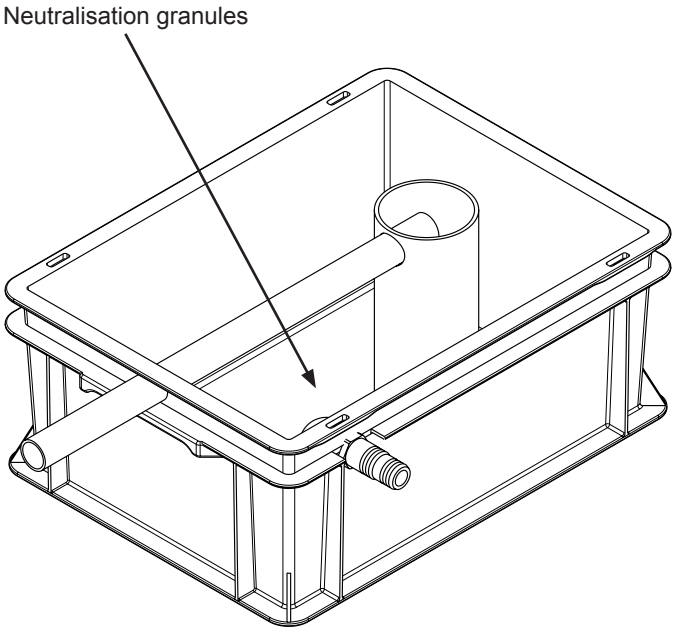
- Set the main control switch to "0".
- Remove the front cover.
- Undo the bolts and withdraw the neutralisation box.
- Remove the neutralisation granules and any deposits from the neutralisation box. Any remaining neutralisation granulate, since it is harmless, can be disposed of as domestic waste.
- Refill the neutralisation box with new granules.

Attach the neutralisation box cover making sure that it is tight-closing.

- Push the neutralisation box back in.

Before putting back into service, the siphon and the neutralisation box must be filled together with water.

The water can be poured through the cleaning aperture into the neutralisation box and the siphon.



6.5 Safety temperature limiter - Reset

If the boiler temperature rises too high (>100 °C), the system is switched off by the safety temperature limiter (STL) by means of a mechanical lockout.
The malfunction must first be unlocked on the safety temperature limiter, then on the control panel.

1. STL reset
- Open the terminal box according to chapter 4.4
- Unscrew the protective cap
- Reset the STL

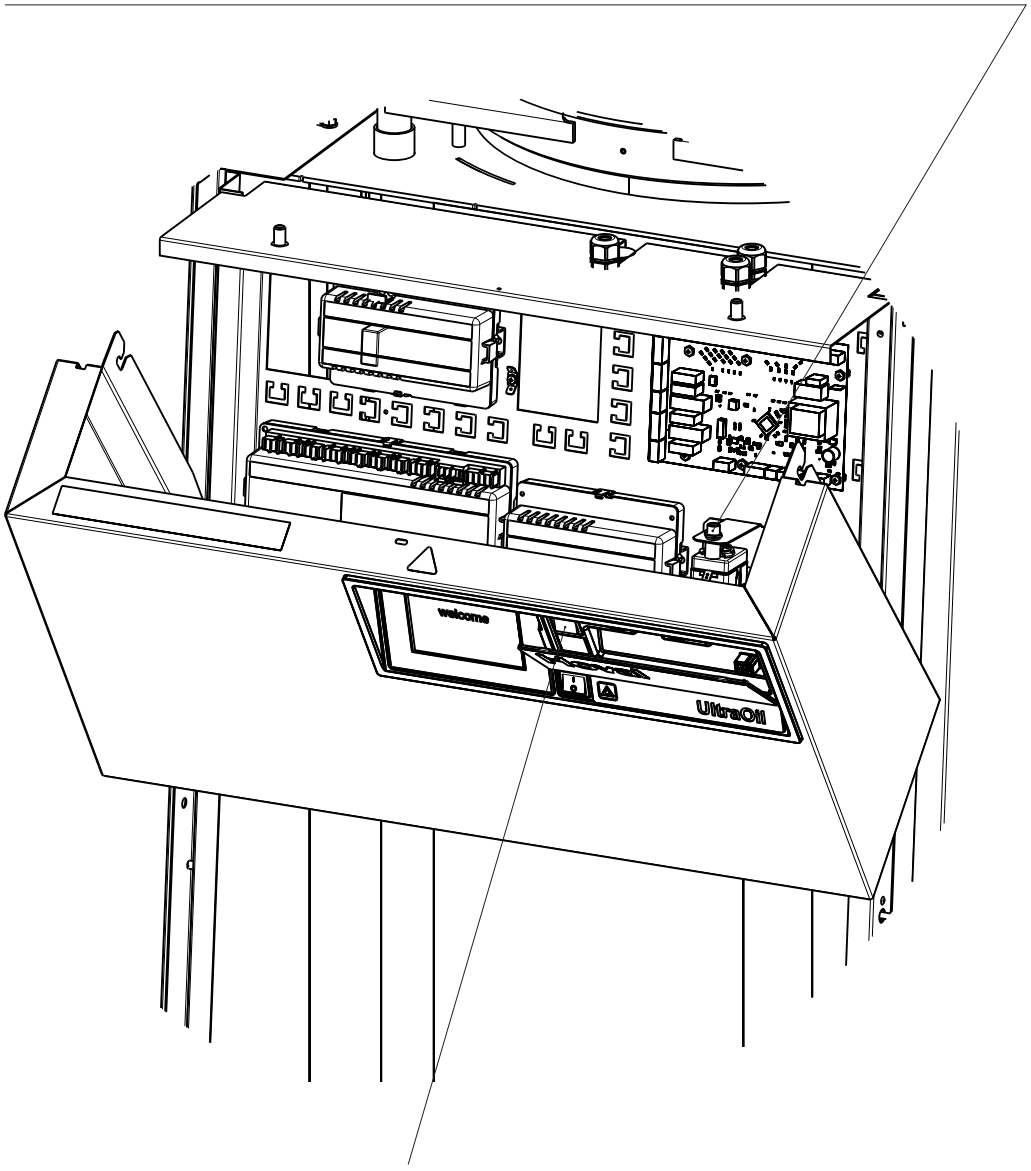


Fig. 23

2. Reset on the control panel
- Press the reset key on the control (first remove the cover): the boiler is ready for operation again once the boiler water temperature is less than 80 °C.

COPY FOR PLANT USER

Hoval

Confirmation

The user (owner) of the system herewith confirms that
- he has received adequate instruction in the operating and maintenance of the installation,
- received and taken note of the operating and maintenance instructions and, where applicable other documents concerning the heat generator and any further components.
- and is consequently sufficiently familiar with the installation.

Installation address:

Type:

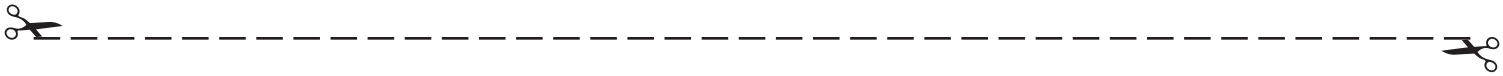
Serial number:

Year of manufacture:

Place, Date:

System installer:

System user:



COPY OF SYSTEM INSTALLER

Hoval

Confirmation

The user (owner) of the system herewith confirms that
- he has received adequate instruction in the operating and maintenance of the installation,
- received and taken note of the operating and maintenance instructions and, where applicable other documents concerning the heat generator and any further components.
- and is consequently sufficiently familiar with the installation.

Installation address:

Type:

Serial number:

Year of manufacture:

Place, Date:

System installer:

System user: