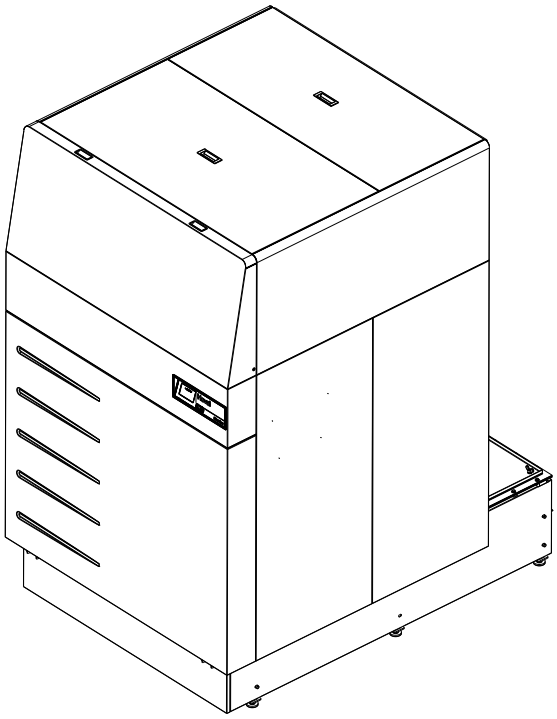
Technical information
Installation instructions

Hoval

UltraGas® (1550)

Gas condensing boilers
for natural gas in modulating operation



These instructions are applicable to the following types:
Nominal output ranges at 40/30°C
and natural gas
45-UltraGas® (1550) 328-1550 kW

Hoval products must be installed and commissioned by specialists only. These instructions are intended for **service engineers**. Electrical installation must be performed by a licensed electrical company.

Vertical gas condensing boilers UltraGas® (1550) acc. to EN 15502-1/15502-2-1 are suitable and licensed for use as heat generators for hot water heating systems with a permissible flow temperature of up to 90 °C[1)]. They are designed for continuously controlled reduced operation in heating systems.

[1)] See technical data

6. Maintenance

1. Important notices

1.1 General safety instructions

The system may only be placed in operation if all the relevant standards and safety regulations have been complied with.

At least the following conditions must be satisfied for a trial operation:

- Safety valve installed (system sealed)
- Control in operation (connected to the power supply)
- Sensor for safety temperature limiter connected (= boiler temperature sensor)
- System filled with water
- Syphon filled with water
- Expansion tank connected
- Flue gas outlet with exhaust gas line connected to exhaust gas system.
- Burner preset (see chapter 6.7).

WARNING

The heat generator can only be de-energised by disconnection from the mains (e.g. all-pole switch).

WARNING

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

WARNING

Risk of poisoning and explosion if gases leak out.
Immediately disconnect the gas supply.

WARNING

The boiler must only be suspended using the four points marked as the crane suspension option for cranes in Fig. 02. The hooks on the back of the boiler must **not** be used to suspend it.

1.2 Explanation of the symbols

1.2.1 Warnings

DANGER

... indicates a situation of immediate danger which will lead to serious or fatal injuries if not avoided.

WARNING

... indicates a situation of possible danger which can lead to serious or fatal injuries if not avoided.

CAUTION

... indicates a situation of possible danger which can lead to minor or slight injuries if not avoided.

NOTICE

... indicates a situation of possible danger which can lead to damage to property if not avoided.

1.2.2 Warning symbols

The following warning symbols are combined with signal words CAUTION, WARNING and DANGER for the warning notes.

General warning of a danger zone.

“Warning: dangerous electrical voltage” as a warning for accident prevention.
Ensures that people do not come into contact with electrical voltage. The danger sign with the black lightning symbol warns against the danger of electrical voltage.

“Warning of hot surface” sign for indicating safety.
Indicates dangers of injury and burns on hot surfaces.

Incorrect handling of potentially explosive substances can lead to serious damage, potentially fatal injuries and incalculable costs.

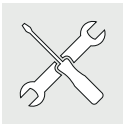
Danger:
Danger: Substances with a corrosive effect on skin, eyes and respiratory organs; can cause irritation.
Handling: Do not inhale vapours and avoid contact with skin and eyes.

Warning of cutting injuries:
Avoid cutting injuries. Clearly indicate the danger of cutting on sharp-edged parts to avoid serious and costly injuries.

1.2.3 Information

Information:
Provides important information.

Follow the instructions for use.
Requirement to follow the instructions for use.



Tool:
Indicates which tool you will need for the next work step.

Provides important information.
Refers to standards and directives.

1.3 On delivery

Carry out a visual inspection immediately on receiving the boiler. If any damage is found, take the necessary steps as defined in the delivery contract. The respective risk carrier bears the cost of repairs.

1.4 Warranty

The warranty does not cover defects attributable to:
- Failure to comply with these instructions
- Failure to comply with the operating instructions
- Incorrect installation
- Impermissible modifications
- Incorrect handling
- Contaminated operating materials (gas, water, combustion air)
- Unsuitable chemical additives to the heating water
- Damage caused by the application of force
- Corrosion by halogen compounds (e.g. paints, adhesives, solvents)
- Corrosion caused by not observing the required water quality (see chapter 5.3)

1.5 Manuals

All instructions relevant to your system can be found in the Hoval system manual - please keep all manuals! In exceptional cases, the instructions can be found with the components!

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

1.6 Regulations, standards, ordinances to be complied with for proper use

The locally applicable heating system regulations must be followed when planning, installing and operating the gas heat generator:

- The regulations of the local building authorities, insurance companies, chimney sweeps and the state/canton. etc. must also be taken into account.
- The regulations of the responsible gas supply company are to be complied with if using gas.
- Regulations governing the discharge and treatment of condensate are subject to the specifications of the local water authorities.
- Approval by the authorities may be required for installation.

The standards, guidelines and ordinances listed for the specific countries are relevant for the installation and operation of the gas heat generator. The list is intended as an aid. It is not complete. The currently applicable regulations must be observed.

Germany §

- DIN EN 12828 Heating systems in buildings - Design of hot water heating systems
- DIN EN 12831 Energy efficiency of buildings - Method for calculation of the design heat load
- DIN EN 13384 Flue gas systems – Calculation methods in heat and flow engineering
- DIN EN 14868: Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in closed water circulation systems
- DIN EN 50156; VDE 0116: Electrical equipment of combustion plants and associated facilities
- DIN VDE 0100 Erection of low-voltage installations (for electrical installation and the TAB (technical connection requirements of the relevant energy supply company))
- VDI 2035 Prevention of damage in hot water / heating systems by corrosion and the formation of scale in closed hot water heating systems.
- Rules for gas established by DVGW (in particular DVGW-TRGI Technical rules for gas installations)
- Firing ordinance of the federal states
- Technical specifications of the gas supply companies
- Worksheet DWA-A 251 Condensate from condensing boilers
  The regulations of the local water authorities could deviate from the rules in this worksheet.
- Accident prevention regulations
  - DGUV Regulation 1 Accident prevention regulations - Guidelines for prevention
  - DGUV Regulation 4 Accident prevention regulations - Electrical installations and equipment

Austria §

- ÖNORM EN 12828 Heating systems in buildings - Design of hot water heating systems
- ÖNORM EN 12831 Energy efficiency of buildings - Method for calculation of the design heat load
- ÖNORM EN 13384 Flue gas systems - Heat and flow calculation methods
- ÖNORM EN 14868: Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in closed water circulation systems
- OVE 50156: Electrical equipment of combustion plants and associated facilities
- ÖNORM H 5152 Calorific plants - Planning guidelines
- ÖNORM H 5170 Heating systems - Requirements with respect to building and safety technology, fire and environmental protection
- ÖNORM H 5195-1 Heat transfer fluid for building technology - Prevention of damage by corrosion and the formation of scale in closed hot water heating systems
- ÖVGW rules for gas
- Technical specifications of the gas supply companies
- SNT regulations

Switzerland §

- SN EN 12828+A1;SIA 384.101+A1 Heating systems in buildings - Design of hot water heating systems
- SN DIN EN 12831 Energy efficiency of buildings - Method for calculation of the design heat load
- SN EN 13384;SIA 384.42x Flue gas systems - Heat and flow calculation methods
- SN EN 14868: Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in closed water circulation systems
- SN EN 50156: Electrical equipment of combustion plants and associated facilities
- SWKI 91-1 Aeration and ventilation of the boiler room
- SWKI 93-1 Safety engineering installations for heating systems
- SWKI BT102-01 Water quality for building services systems
- SVGW rules for gas
- Swiss fire protection regulations (BSV) of the VKF (Association of Cantonal Fire Insurers)
- Regulations of the cantonal and local fire authorities
- Water Protection Regulation (GSchV)
- EKAS - Guidelines for liquefied gas

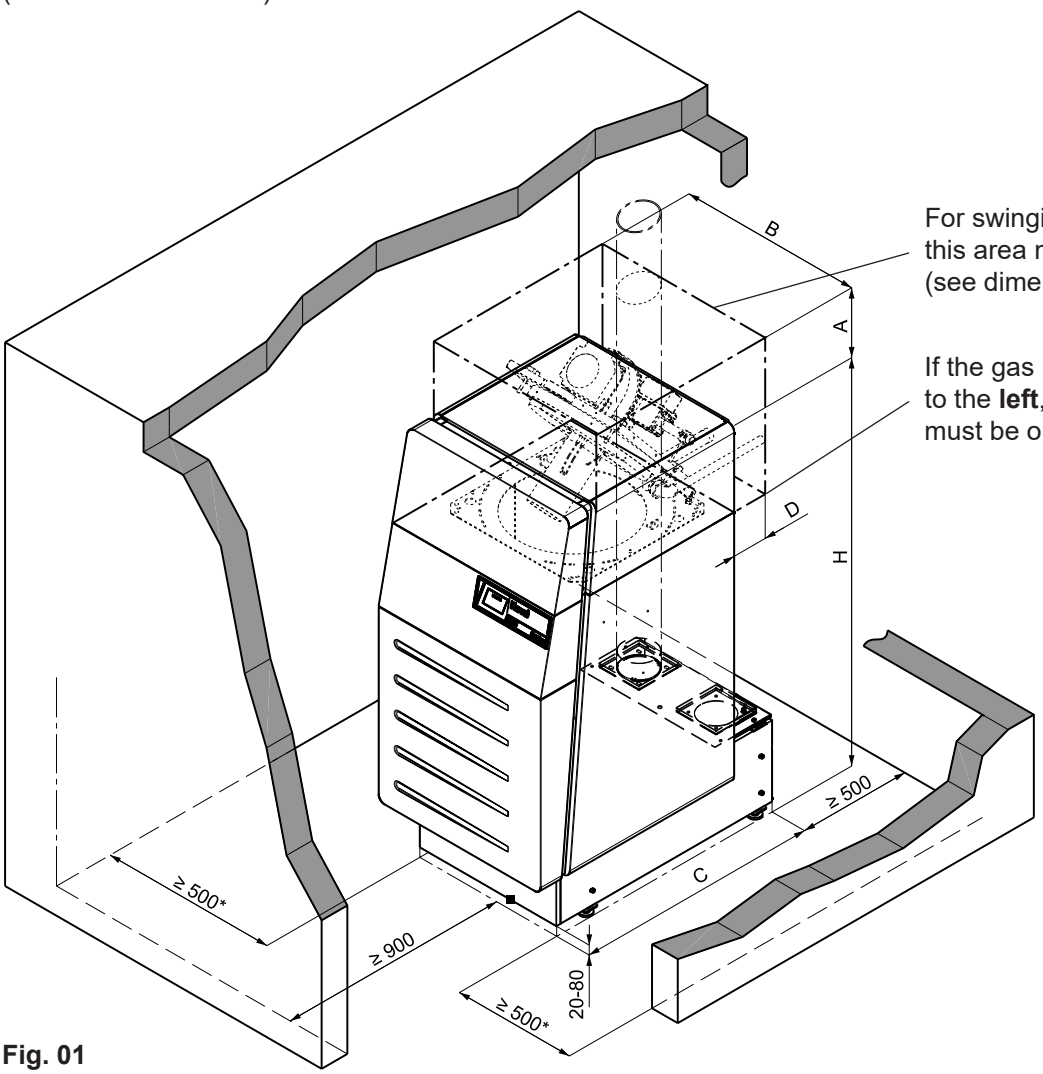
2. Installation

2.1 Set-up

WARNING

The boiler must only be suspended using the four points marked as the crane suspension option in Fig. 02. The hooks on the back of the boiler must **not** be used to suspend it.

Space requirement of UltraGas® (1550)
(All dimensions in mm)



For swinging out the burner, this area must remain free (see dimension table)

If the gas line is routed **horizontally** to the **left**, the minimum distance D must be observed.

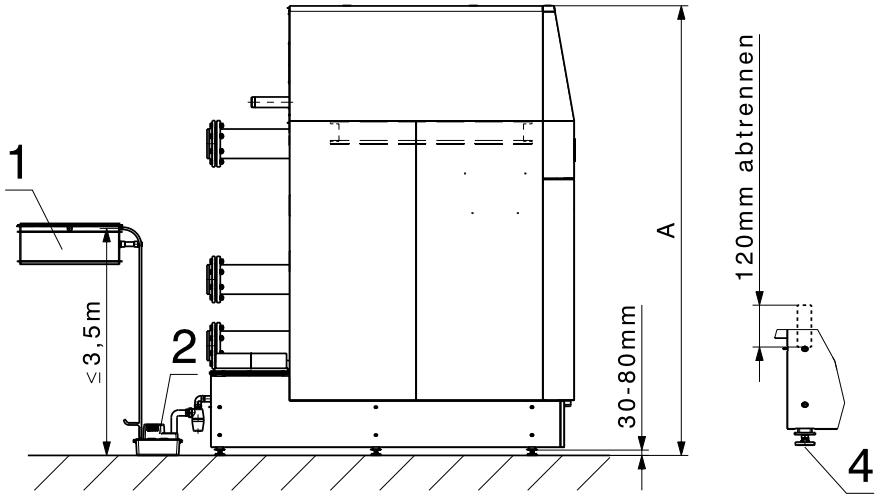
Fig. 01

UltraGas® Type	A	A minimum	B	C	D	H	H minimum
(1550)	-	450 [1]	1550 [2]	2090	200	2560	2455 [3]

[1] If the room height is too low, the dimension can be reduced. See A minimum.
[2] Caution! At A minimum, the burner can no longer be swivelled out completely! Cleaning is made difficult!
[3] Feet can be shortened, no pedestal casing possible! For details see next page.

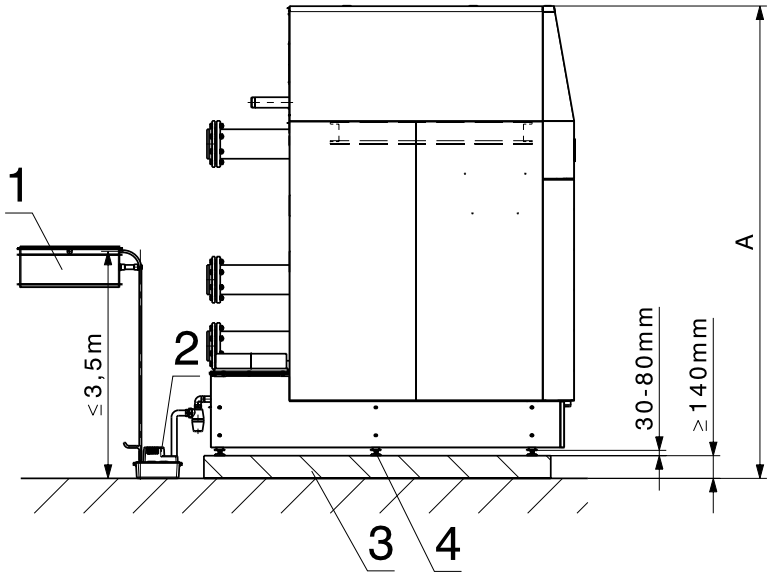
- The boiler can be placed with one side directly on the wall. For the casing to be installed, however, there must be a distance of at least 100 mm from the wall.
- The cleaning opening must be easily accessible. A minimum distance of 500 mm must be maintained on the cleaning opening side (*) for this purpose.

UltraGas® (1550) with shortened boiler feet
(All dimensions in mm)



UltraGas® Type	A
(1550)	2457-2507

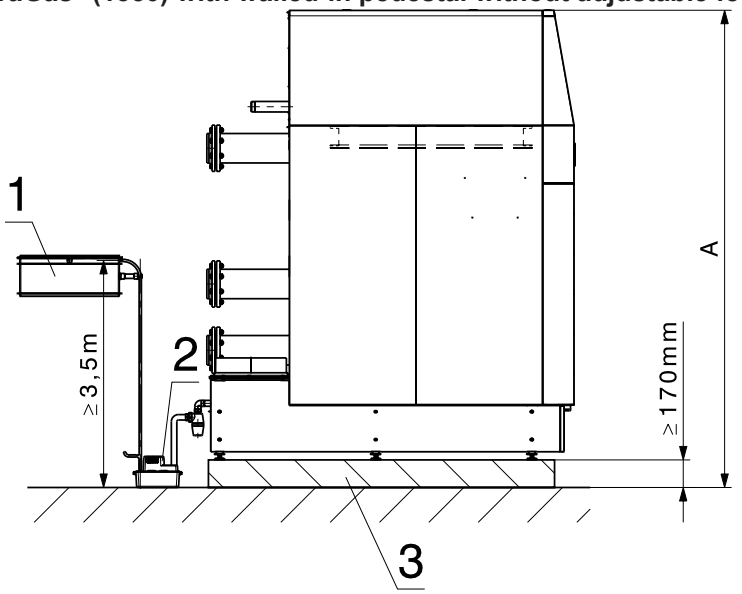
UltraGas® (1550) with walled-in pedestal and adjustable feet



UltraGas® Type	A
(1550)	2455-2505

1 Neutraliser / condensate box
2 Condensate pump
3 Walled base
4 Adjustable feet 30-80 mm

UltraGas® (1550) with walled-in pedestal without adjustable feet



UltraGas® Type	A
(1550)	2465-2515

No refunds for pedestal sheets and adjustable feet!

Procedure:

1. Remove front (5, Fig. 02) and rear (1) wooden crossbeam.
2. Using a winch (6), raise the front of the boiler.
3. Remove both side beams (2) to the front and side (see Fig. 02).
4. Push in front feet (3) and mount both front cover brackets (4).
5. Using a winch, raise the rear of the boiler.
6. Remove both side beams (2).
7. Push in the rear and centre feet and fasten.

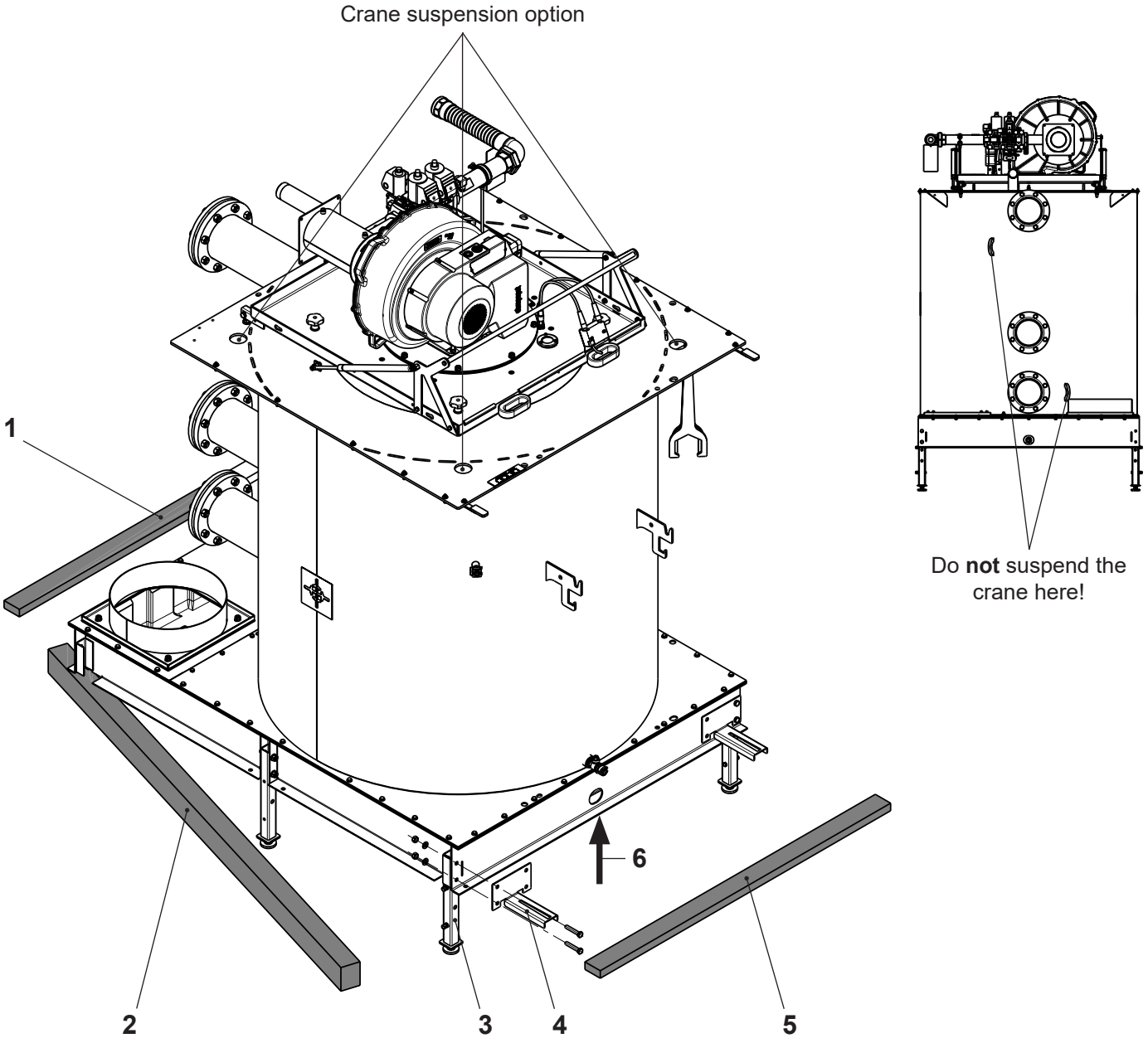


Fig. 02

Adjustable foot height is set after installation of the neutraliser / condensate box.

2.2 Installation of the thermal insulation

Place the insulation mat (1, Fig. 03) around the UltraGas® (1550) boiler and attach with plastic straps (1a, Fig. 03) and strap fasteners (1b, Fig. 03).

- Tension springs (1c, Fig. 03) are used for additional fixing
- Do not overtighten the straps (reduced insulating value).

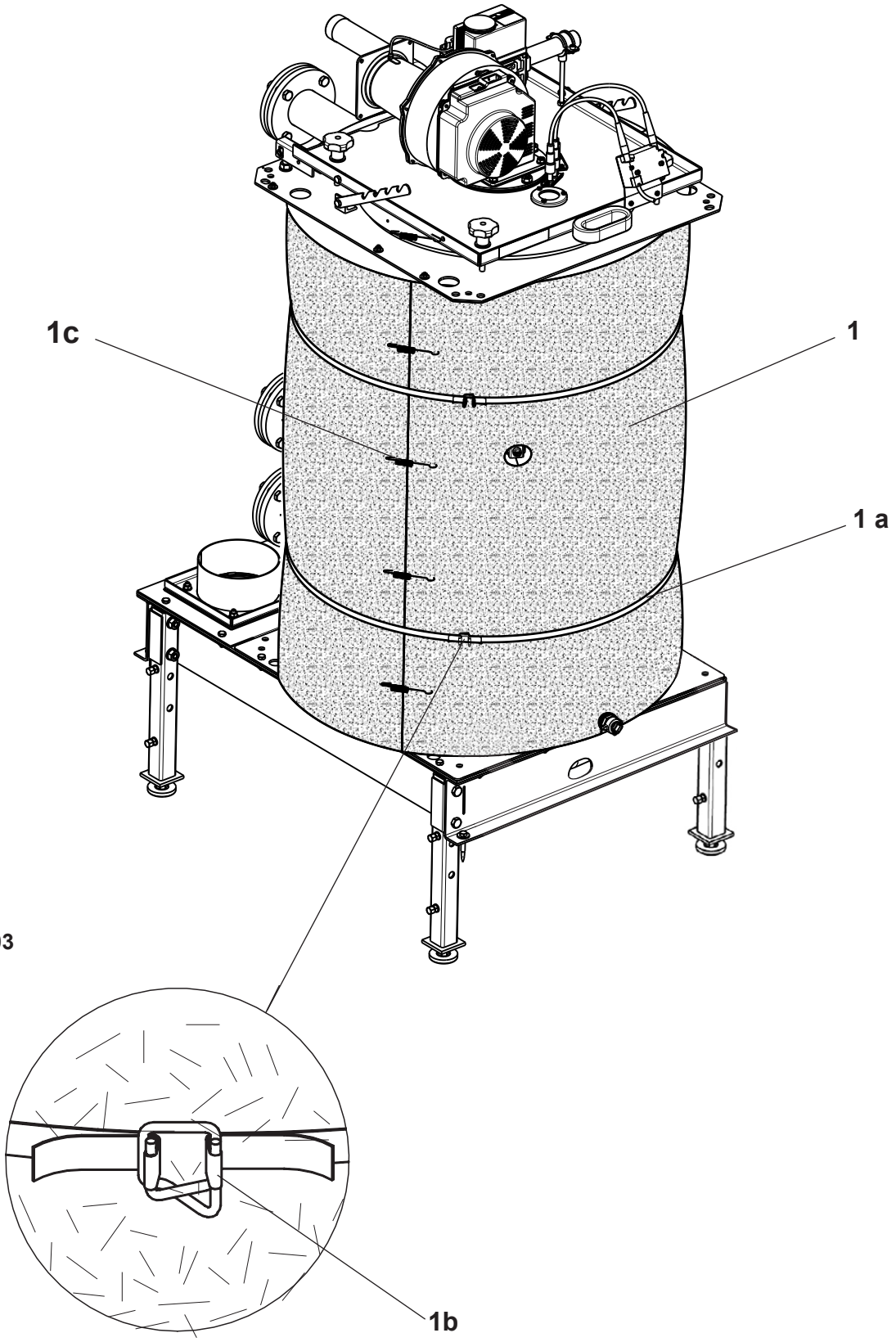
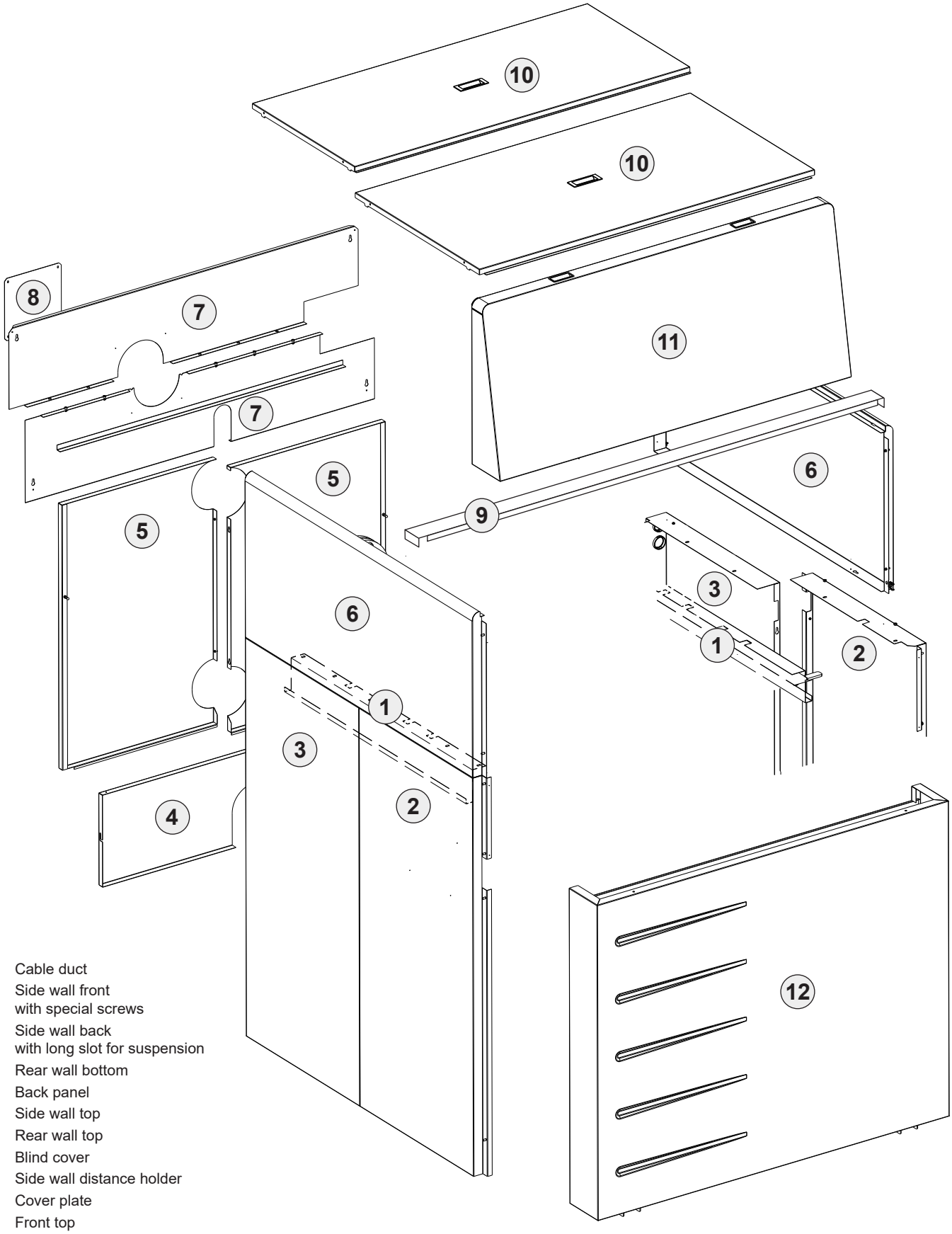


Fig. 03

2.3 Overview of casing sections

The figure below shows the order in which the casing sections are mounted. Chapter “2.4 Fitting the casing” describes in detail the individual work steps of the mounting process for attaching the casings.



1 Cable duct
2 Side wall front
with special screws
3 Side wall back
with long slot for suspension
4 Rear wall bottom
5 Back panel
6 Side wall top
7 Rear wall top
8 Blind cover
9 Side wall distance holder
10 Cover plate
11 Front top
12 Front cover

2.4 Fitting the casing

1. Hook the cable duct (1, Fig. 04) into the threaded pins on the left and right and attach with the second hexagon nuts and washers (1a) from the front already mounted on the boiler. If there is a side wall support (2, detail A), turn outwards to the side.
2. First hook in the two front side walls (3, Fig. 04) and then the two rear side walls (3a, detail B) on the boiler and secure with the 4 hexagon nuts and washers (3b, Fig. 04) already mounted on the boiler. Hook in the side walls at the screw head at the bottom of the boiler.
   - Do not yet tighten the hexagon screws (3b, Fig. 04).

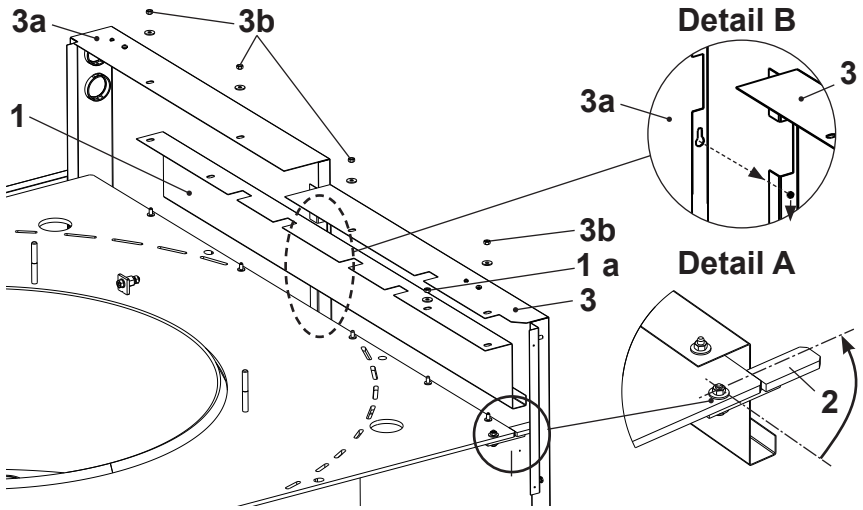


Illustration shown without burner

Fig. 04

3. Attach rear wall (4, Fig. 05) of the electrical box using 4 screws (4a). Align side walls (3, 3a) in the centre of the boiler and tighten using screws and washers (3b, Fig. 04).
4. Fit the stud (5, Fig. 05) on the right. Hook in the electrical box at the bottom on the side of the stud (6). Hold the electrical box (7) horizontal and tighten with the second stud (5) on the opposite side. Fasten the safety cord (8, 8a) on the right and left. Fold the electrical box closed upwards, lift it and hook it in, then secure with the screw (9).

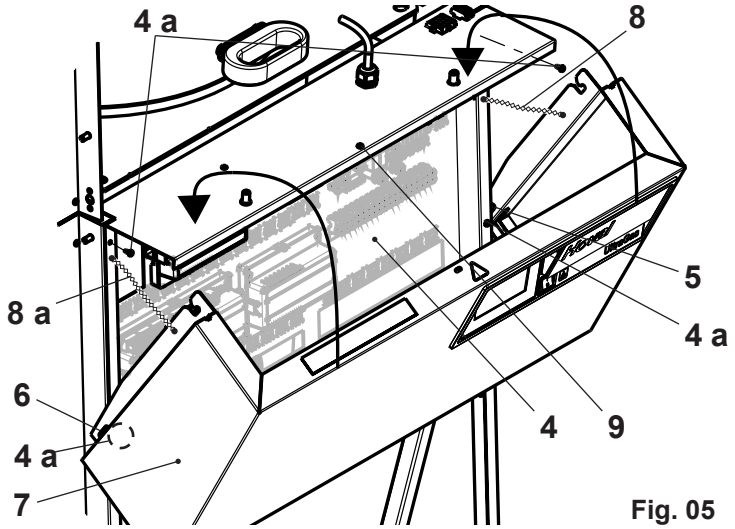


Fig. 05

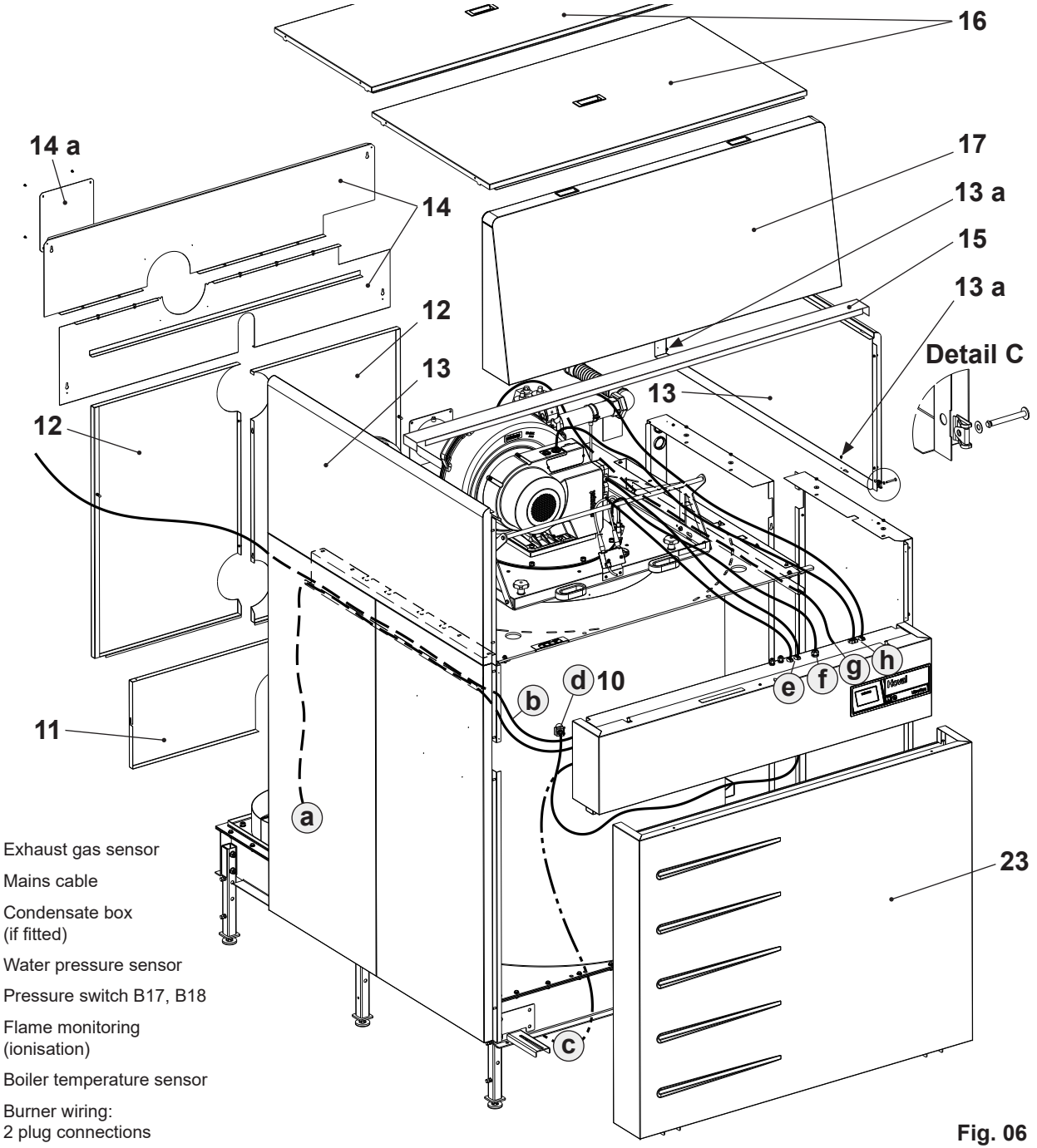
5. Route all cables (a-h, Fig. 06) and establish plug-in connections (wiring in accordance with Fig. 06).

CAUTION

The cables must not touch any hot parts.

6. Hook the lower rear wall (11, Fig. 06) onto the side walls. Hook in the rear walls (12, Fig. 06) on the opposite side and engage together on the side walls.
7. Mount the upper side walls (13, Fig. 06). Place the underside of the upper side walls (long slot) onto the special screws of the lower side walls and push in. Secure the upper side walls using 4 self-trapping screws (13a, Fig. 06) ø 3.5 x 10.
8. Hook in the upper rear walls (14, Fig. 06) and fit the blind cover (14a).
9. Hook in the distance holder (15, Fig. 06) for the side walls (13).
10. Put on cover plates (16, Fig. 06). Install the upper front (17, Fig. 06) and place the pins in slits, then push back. Mount C clips (detail C, Fig. 06), then secure with the carriage bolt. (When taking down, lift one side followed by the other.)

Before hooking in the front cover (23), first take the steps listed in chapter “2.5 Fitting the pedestal casing”.



a Exhaust gas sensor
b Mains cable
c Condensate box (if fitted)
d Water pressure sensor
e Pressure switch B17, B18
f Flame monitoring (ionisation)
g Boiler temperature sensor
h Burner wiring: 2 plug connections

Fig. 06

2.5 Fitting the pedestal casing

Attach the syphon (18, Fig. 07), which is supplied loose, including double nipple (18a).

11. Place the condensate box (option) under the boiler and establish the electrical connection. Make the condensate drain or connection line according to separate instructions.
    For UltraGas® (1550):
    Fit condensate drain pipe (18, Fig. 07) (supplied with the boiler)

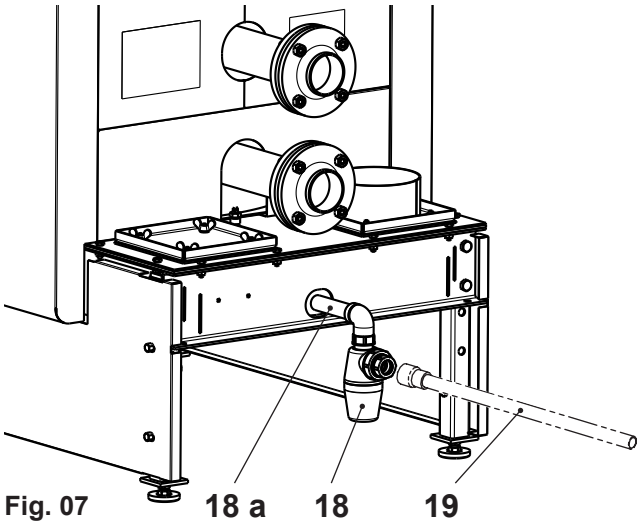


Fig. 07

12. Screw the right and left side walls (20, 21, Fig. 08) using the cap nuts already mounted on the boiler foot.
13. Hook in the front (22, Fig. 08) on the side walls (19, 20).

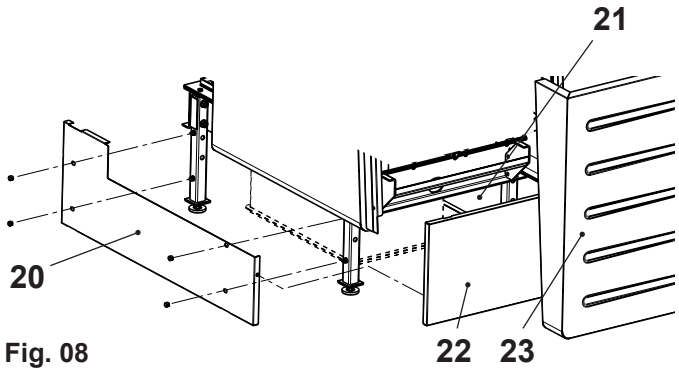


Fig. 08

14. Hook the front cover in (22, Fig. 06, Fig. 08) at the bottom and slide shut at the top.

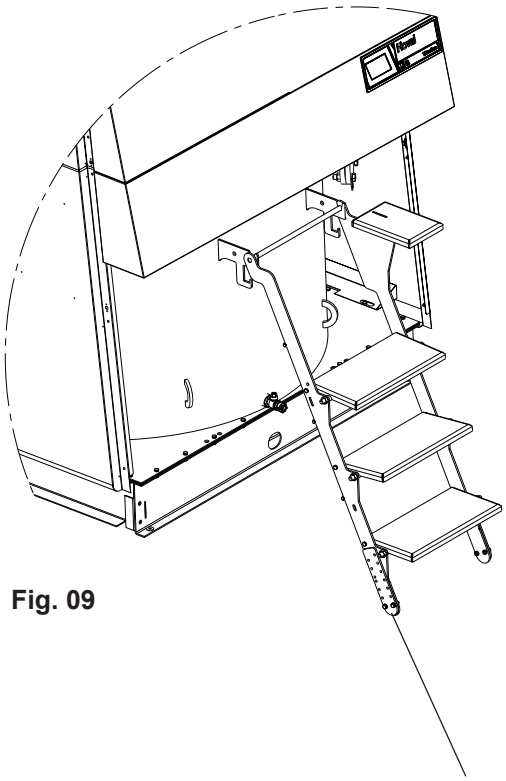


Fig. 09

If you are using the variant with shortened boiler feet or you place the boiler on a concrete pedestal, you will have to shorten the supplied conductors (saw off at the watch) or extend them.

3. Technical information

3.1 Description of the boiler

The Hoval UltraGas® (1550) is a low-pollution and energy-saving gas condensing boiler with the Ultraclean burner system, a gas-fired pre-mix burner with combustion air fan. The Hoval UltraGas® (1550) has a vertically arranged combustion chamber of stainless steel as the primary heating surface and a secondary heating surface of composite tubes (stainless steel on the water side, aluminium on the exhaust gas side).

The secondary heating surface is designed so that part of the water vapour contained in the exhaust gas condenses and the heat of evaporation is utilised for the heating circuit. The gas burner is configured as a vertical burner that can be swivelled up easily for maintenance work. The UltraGas® (1550)® is provided for operation with natural gas and liquefied gas. The design principle is shown in the following drawing.

The UltraGas® corresponds with the standards and guidelines listed in the EU declaration of conformity. The EU declaration of conformity belonging to the product is found in the system book.

Fig. 10

3.2 Meaning of the data on the data plate

(1)	**Hersteller / Fabricant Produttore / Manufacturer**	**Hoval Aktiengesellschaft FL-9490 Vaduz**		Hoval
(2)	Vertrieb Distrib. Vendita Sale	Hoval AG CH-8706 Feldmeilen Hoval s.r.l. I-24050 Zanica Hoval GmbH D-85609 Dornach Hoval spol. s r.o. CZ-312 04 Plzen Hoval SAS F-67118 Geispolsheim	Hoval Gesellschaft mbH A-4614 Marchtrenk Hoval d.o.o. HR-10250 Lučko Hoval SK spol. s r.o. SK-040 01 Košice Hoval s.r.l. RO-Voluntari 077190, Jud Ilfov Hoval Sp. Z.o.o. PL-62-002 Suchy Las	Hoval Ltd. GB-Newark NG24 1JN Hoval EOOD BG-1797 Sofia
(3)	Modell / Modèle Modelli / Model	**UltraGas® (1550)**		**02/2019**
(4)	Brennwertkessel Chaudière à condensation Caldaia a condensazione Condensing boiler			

(5)						
	Pn	**1550**	kW	V (H_2O)	**966**	l
	Pn (80/60°C)	**298 - 1472**	kW	PMS	**6**	bar
	Pn (- /30°C)	**328 - 1550**	kW	PT (1.5 x PMS)	**9.0**	bar
	Qn (H_i)	**303 - 1518**	kW	Tmax	**90**	°C
	Qn (H_s)	**336 - 1685**	kW	TS	**110**	°C

(6)	Anschlussart / Kind of contact / Type de raccordement / Tipo de collegamento	**B23P,C53,C63**
(7)	eingestellte Gasart / Réglage pour gaz / Tipo di gas previsto / Supplied for gastype / pmin	**Erdgas H/18 mbar**

(8)

BE	I2E(R) / I2E (S)	20/25 mbar	PL	II2ELw3P	20,20, 37 mbar
BE	I3P	37 mbar	ES, GB, IT	II2H3+	20, 28-30/37 mbar
CY, MT	I3P	30/50 mbar	NL	II2EK3P	20/25, 50 mbar
DE	II2ELL3P	20, 50 mbar	LU	II2E3P	20, 50 mbar
AT, HR	II2H3P	20, 50 mbar	HU	II2HS3P	20/25, 30 mbar
CH, CZ, FI, GR	II2H3P	20, 37 mbar	FR	II2Er3P / IIEsi3P	20/25, 37 mbar
PT, SI, SK, TR	II2H3P	20, 37 mbar	DK, EE, LV, RO, SE	II2H3P	20, 30 mbar
IE, IS, LT, NO	II2H3P	20, 37 mbar			

(9)	Elektroanschluss / Raccordement électrique / Collegamento elettrico / Electrical Connection			
	1x230V~/3x400V~/50Hz/10A, IP20		**max. 4070 (400V) / 41 (230V) W**	
(10)	NOx-Klasse / Classe NOx / Classe NOx / NOx-class		**6**	**EN 15502**
(11)	CE-Nr. / N° CE / Numero-CE / CE-No	**CE-0085AQ0620**	SVGW-Nr. / SVGW-No. / Nº-SVGW / N. -SVGW	**11-013-4**
(12)	CE 0085/19	SVGW SSIGE		

(1) Manufacturer
(2) Subsidiaries
(3) Boiler type (left) and production date (right)
(4) Boiler type (left) and serial no. (right)
(5) Performance features:
- Pn: Boiler nominal heat output
- Pn (80/60°C): Nominal heat output at 80/60°C
- Pn (- /30°C): Nominal heat output at 40/30 °C
- Qn (H_i) Nominal heat input (related to net calorific value NCV)
- Qn (H_s) Nominal heat input (related to gross calorific value GCV)
- V (H_2O) Boiler water content ($V_{(H2O)}$)
- PMS Max. heating operating pressure (PMS)
- PT Test pressure (PT)
- Tmax Max. operating temperature (T_{max})
- TS Safety temperature (T_S)

(6) Boiler construction type
(7) Type of gas set
(8) Gas supply pressure depending on the gas device category and the country of destination
- Column 1: Country of destination
- Column 2: Gas device category
- Column 3: Gas supply pressure

(9) Electric supply
- Nominal voltage / type of supply
- Type of protection
- Max. power consumption

(10) NOx class and authoritative standard
(11) Product ID number / registration number
(12) Designations

3.3 UltraGas® (1550) technical data

Type			(1550)
• Nominal heat output at 80/60°C, natural gas		kW	298-1472
• Nominal heat output at 40/30°C, natural gas		kW	328-1550
• Nominal heat output 80/60 °C, propane [2]		kW	-
• Nominal heat output 40/30 °C, propane [2]		kW	-
• Nominal heat input with natural gas [1]		kW	303-1518
• Nominal heat input with propane [2]		kW	-
• Operating pressure heating min./max. (PMS)		bar	1/6
• Max. operating temperature (T_{max})		°C	90
• Boiler water content ($V_{(H20)}$)		l	966
• Flow resistance boiler			See diagram
• Minimum circulation water quantity		l/h	-
• Boiler weight (without water capacity, incl. casing)		kg	2300
• Boiler efficiency at full load at 80/60 °C (NCV / GCV)		%	97.2/87.7
• Boiler efficiency at 30% partial load operation (EN 15502) (NCV / GCV)		%	107.9/97.4
• NOx class (EN 15502)			6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	31
• CO_2 content in exhaust gas at min./max. output		%	8.6/8.8
• Heat loss in standby mode		Watts	1600
• Dimensions			See dimensional drawing
• Gas flow pressure min./max.			
Natural gas E/LL		mbar	17.4-80
Liquefied gas		mbar	-
• Gas connection values at 15 °C/1013 mbar:			
Natural gas E - (Wo = 15.0 kWh/m³) NCV = 9.97 kWh/m³		m³/h	30.4-152.3
Natural gas LL- (Wo = 12,4 kWh/m³) NCV = 8.57 kWh/m³		m³/h	35.4-177.1
Propane (NCV = 25.9 kWh/m³)		m³/h	-
• Operating voltage		V / Hz	1x230/50 3x400/50
• Electrical power consumption min./max.		Watts	271/4111
• Standby		Watts	9
• Type of protection		IP	20
• Permitted ambient temperature during operation		°C	5-40
• Sound power level			
Heating noise (EN 15036 Part 1) (room air dependent)		dB (A)	86
Exhaust gas noise radiated from the mouth (DIN 45635 Part 47) (room air dependent/room air independent)		dB (A)	-
Sound pressure level (depending on installation conditions) [3]			-
• Condensate quantity (natural gas) at 40 / 30°C		l/h	138
• pH value of the condensate		approx.	4.2
• Design			B23P, C53, C63
• Exhaust gas system			
Temperature class			T120
Exhaust gas mass flow at nominal heat input (dry)		kg/h	2300
Exhaust gas mass flow at lowest heat input (dry)		kg/h	456
Exhaust gas temperature at nominal output and operation at 80/ 60 °C		°C	69
Exhaust gas temperature at nominal output and operation at 40/30 °C		°C	48
Exhaust gas temperature at lowest nominal heat load and operation 40/30 °C		°C	32
Maximum permitted temperature of the combustion air		°C	50
Volume flow of combustion air		Nm³/h	1885
Maximum supply pressure for supply air and exhaust gas line		Pa	130
Maximum draught/underpressure at exhaust gas outlet		Pa	-50
• Heat loss in standby mode		%	0.11

[1] Figures relate to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m³, operation in the Wobbe value range from 12.0 to 15.7 kWh/m³ is possible without resetting.
[2] Figures relate to NCV
[3] Compare notes for planning.

3.4 Dimensions / space required

(All dimensions in mm)

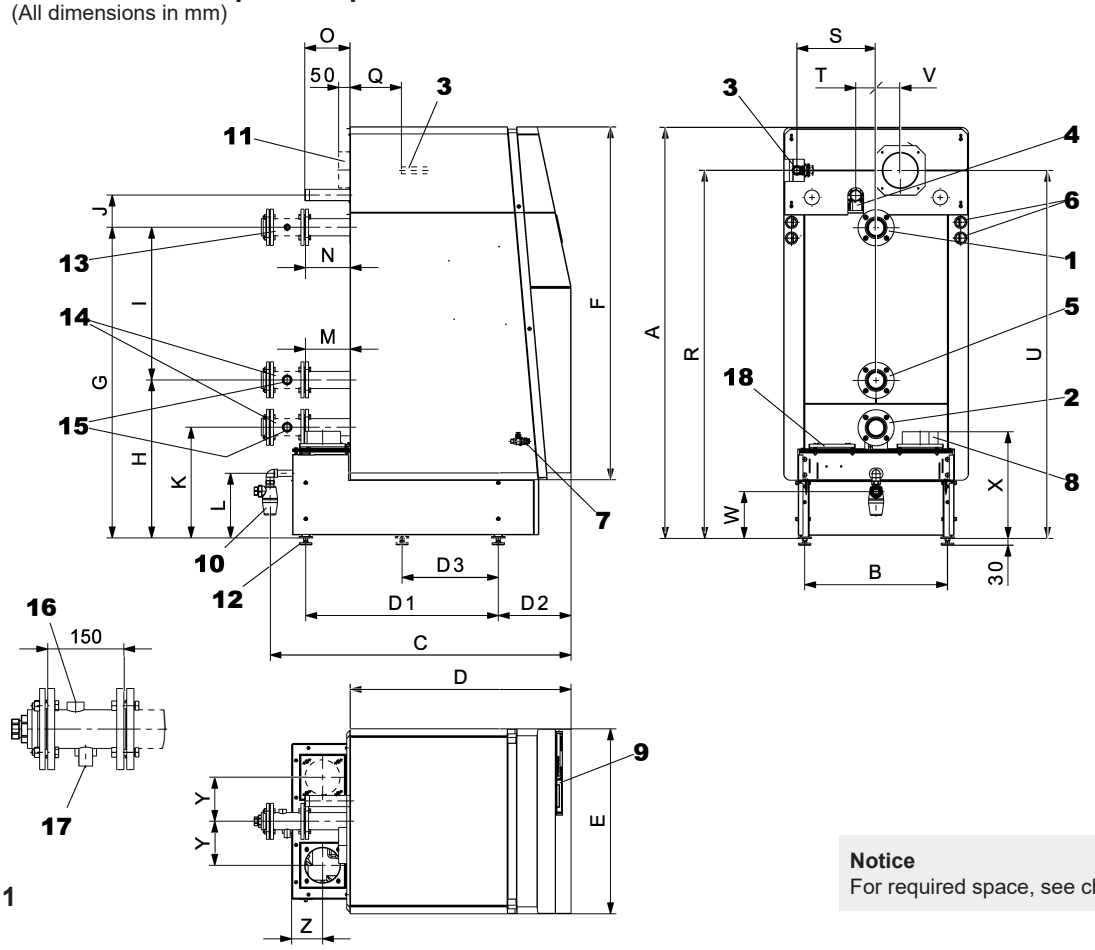


Fig. 11

Notice
For required space, see chapter 2.1.

1 Heating flow
2 Low-temperature return
3 Gas connection
4 Safety flow
5 High-temperature return
6 Electrical connection on the left or right
7 Drainage (behind the front door)
8 Exhaust outlet left or right
9 Control panel
10 Condensate drain with odour trap and screw connection for plastic pipe
11 Fresh air connection (option)
12 Boiler flows adjustable up to 80 mm
13 Safety valves connection for flow (option)
14 Safety valves connection return (option)
15 Expansion Rp 1″
16 Pressure limiter Rp ¾″
17 Safety temperature limiter Rp ½″
18 Cleaning opening left or right

Type	A	B	C	D	D1	D2	D3	E	F	G	H	I	Y	K	L	M	N	O	Q	R
(1550)	2547	1363	2152	1632	1790	242	895	1550	2260	1756	978	778	238	598	294	417	417	218	365	2210

Type	S	T	U	V	W	X	Y	Z	1,2,5	3	4	8	10	11
(1550)	625	100	2210	190	214	554	455	243	DN 150 / PN6 / 8 hole	Rp 2″	R 2″	Ø402/406	DN 40	Ø247/250

3.4.1 Overall unit dimensions

Boiler without casing and insulation

WARNING

The boiler must only be suspended using the four points marked as the crane suspension option in Fig. 02. The hooks on the back of the boiler must **not** be used to suspend it.

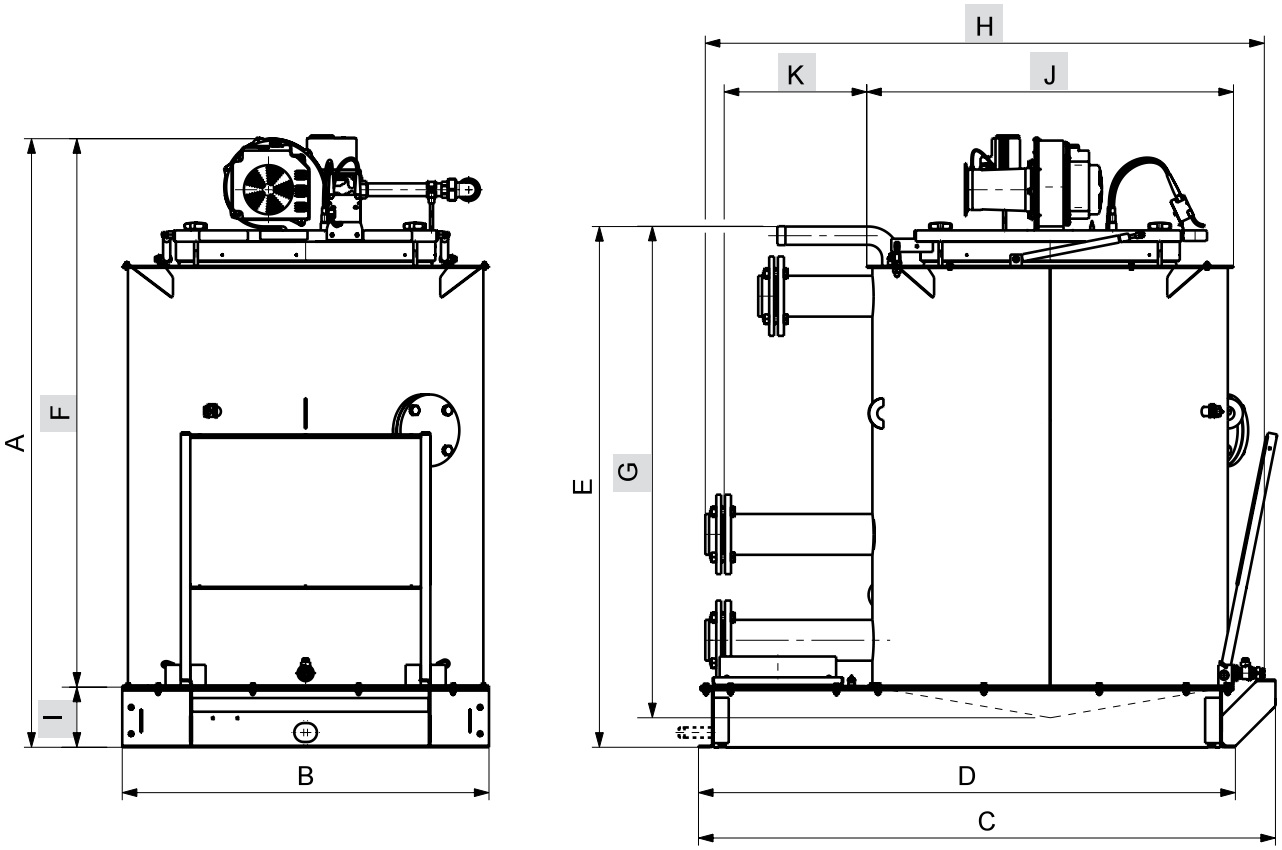
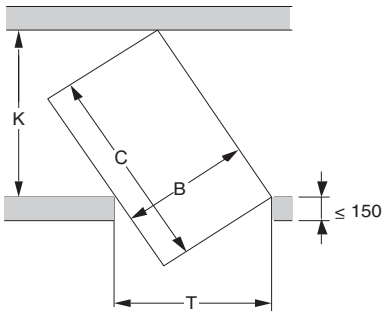


Fig. 12

UltraGas® peak load boiler Type	A	B	C	D	E	Dimensions for partial load installation F	G	H	I	Y	K
(1550)	2244	1410	2032	1916	1780	-	-	-	-	-	-

Required minimum width of door and corridor for bringing in the boiler

The following values are the calculated minimum values



$$K = \frac{B}{T} \times C$$

$$T = \frac{B}{K} \times C$$

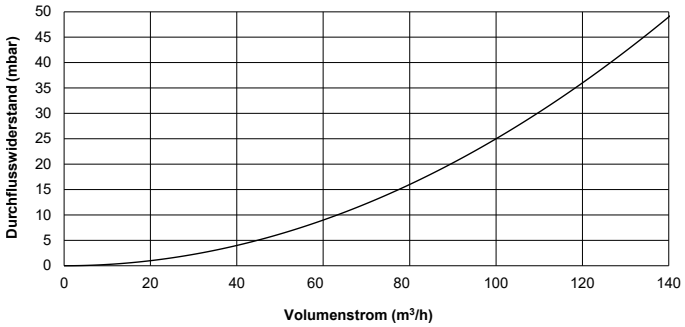
B = Boiler width
C = Maximum boiler length
T = Door width
K = Corridor width

Example calculation for the required corridor width, door width T = 1500

UltraGas® (1550) $K = \frac{1410}{1500} \times 2032 =$ Corridor width ≥ 1910

3.5 Boiler flow resistance

Hoval UltraGas® (1550)



3.6 Short description of the automatic function device

The BIC 960 automatic function device of the UltraGas® only works in conjunction with the TopTronic® E/UG heating controller. The automatic function device takes over the functions for correct operation of a modulating gas boiler.

These are some properties that are integrated in the automatic function device:

- PWM control of the fan (230 VAC)
- Modulating operation
- Common electrode for ignition and flame monitoring (ionisation)
- LPG valve or boiler room fan can be activated
- Inputs for:
  - Flow sensor 1
  - Flow sensor 2
  - Exhaust gas sensor
  - Water pressure sensor
  - Safety - limit value thermostat (not used)
  - Air pressure switch
  - Gas pressure switch
- “Fault” and “Flame message” status outputs
- Additional (external) ignition device can be connected
- RS-485 connection to TopTronic® E/UG
- RS 232 connection to the PC
- Number of start attempts: maximum 4
- Safety time: 5 sec
- Pre-ignition: 5 sec
- Pre-ventilation period: 50 sec
- Follow-on time for pump (230 VAC): 5 min after a heat demand

Fuses:

There are 3 fusible links on the BIC 960:

- 2 A slow-blow Mains
- 4 A slow-blow Pump
- 4 A slow-blow Burner fan

If one of the two 4 A slow-blow fuses, each of which protects either the pump or burner fan, blows, the device in question will not start operating.

Failure of the mains fuse of the automatic function device is indicated on the display of the TopTronic® E/UG with the “B:30 bus interruption to automatic device” error message. With double boiler or cascade systems, the next heat generator is automatically activated in this case.

4. Installation

4.1 Safety instructions

CAUTION

Cutting injuries as a result of sharp edges.
Handle parts of the casing carefully and avoid contact with sharp edges.

4.2 Requirements on the boiler room

§

Regarding the building specifications for boiler rooms, regulations specific to the state or country are to be observed.
Regarding the ventilation of boiler rooms, regulations specific to the state or country are to be observed.

CAUTION

Gas boilers must not be installed in rooms in which halogen compounds occur and can get into the combustion air (e.g. washrooms, drying rooms, hobby rooms, hairdressers).

CAUTION

Halogen compounds can be created, for example, by cleansing and degreasing agents, solvents, glue and bleaches

Always make sure there is an adequate supply of combustion air to the boiler room.
This contributes to correct function of all the firing devices that are operated there, and provides oxygen for the operating personnel to breathe.
Make sure there is an adequate supply of fresh air to the boiler room, according to local regulations.

4.2.1 Room air dependent installation

Binding values for the size of supply air 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. The locally applicable regulations must be complied with:

4.3 Exhaust gas connection, exhaust gas line

Due to the low exhaust gas temperature, condensate forms in the exhaust gas line and wind protection equipment.

§ The following directives must be complied with regarding the exhaust gas evacuation:
- DVGW (TRGI)
- ÖVGW
- SVGW/VKF

A exhaust gas temperature limiter as defined in the aforementioned guidelines is installed in the boiler.

§ The exhaust gas system must meet the following requirements:
- Gas-tight
- Water-tight
- Acid-resistant
- Approved for exhaust gas temperatures of up to 120 °C (T 120)
- Approved for overpressure

WARNING

The exhaust gas lines must be secured against unwanted loosening of the plug connections.

Horizontal connecting pipes must be installed with an inclination of at least 50 mm per metre of their length installed in the direction of the boiler to allow free return of condensation water towards the boiler. The whole exhaust gas system must be installed so that condensate can never collect at any point.

- The cross sections and the maximum lengths are calculated with reference to diagrams or tables. The tables are available from the exhaust gas line manufacturer. The values for the calculation can be found in the table under chapter 3.3.
- The exhaust gas conduit cross sections and lengths are calculated according to the specified technical data of the boilers.
- Combustion air:
  - For airtight operation (optional accessories), the air duct should have the same dimensions as the exhaust gas line.
  - If the exhaust gas line diameter is larger than the combustion air line, an individual calculation must be done.

Standard values for the exhaust gas line dimensions can be found in the following table:

Table with bases for calculation
- Calculation based on max. 1000 m above sea level.

The first 2 m of the exhaust gas line must be configured with the same dimension as the exhaust gas connector, after which the size of the exhaust gas system can be selected according to the table below.

Standard values for the exhaust gas line dimensions

Boiler		Smooth-walled exhaust gas line	Number of 90° bends (exhaust gas + supply air)				
Type	Exhaust gas dim. mm	Designation	Total pipe length in m (exhaust gas + supply air)				
UltraGas® peak load boiler	Inner	DN	1	2	3	4	5 *
(1550)	402	400	50	50	50	50	

Notice: The data contained in the “exhaust gas line dimensions” table are standard values.
An exact calculation for the exhaust gas line must be made on site.
* If there are 5 bends or more, the delivery pressure for the supply air/exhaust gas line must be reduced by 30%.

With total pipe lengths exceeding 50 m, a separate calculation is necessary.

4.4 Condensate drain

The boiler condensate drain must be made of corrosion-resistant material. The following materials are suitable for condensate discharge:

- PVC
- PE
- PP
- ABS

Local regulations pertaining to the condensate discharge must be observed.

4.4.1 Design variants

Option 1
(Syphon supplied with the boiler)

The syphon must be fitted and filled with water before commissioning.
The water can be filled into the syphon via the cleaning hole.

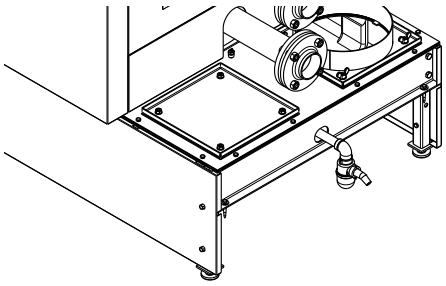


Fig. 13

Option 2
With neutralisation (neutraliser box type KB 23)

The syphon must be fitted and filled with water before commissioning.
The water can be filled into the syphon via the cleaning hole.

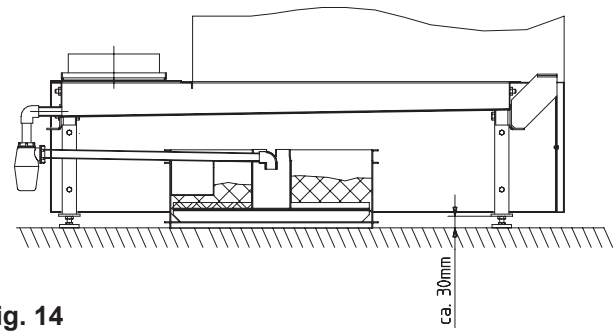


Fig. 14

Option 3 + 4
(with outflow at a higher level)

- KB 24 Neutraliser box with pump including neutralisation
- KB 22 Condensate box with pump

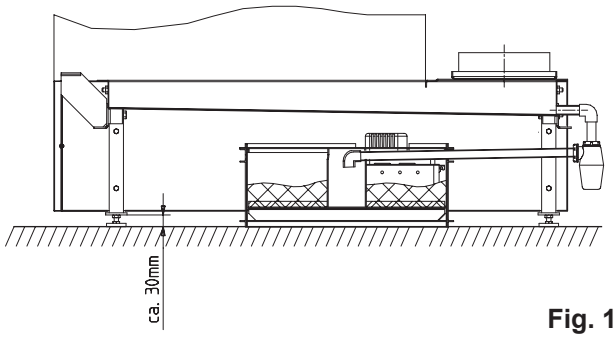


Fig. 15

Option 5
UltraGas® on base without adjusting feet

1 Neutraliser box KB 23
2 Condensate pump: part no. 6015159
3 Walled base

The syphon must be fitted and filled with water before commissioning.
The water can be filled into the syphon via the cleaning hole.

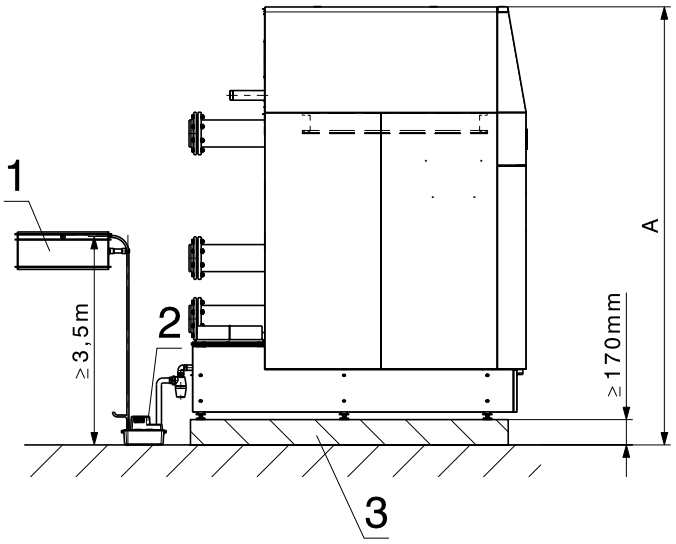


Fig. 16

4.5 Gas connection

DANGER

Danger of explosion due to leaking gas connection.

- Install a gas counter and gas pressure regulator in the gas supply line.
- Following installation of the boiler, check the gas connection for leaks.

For gas connection, see chapter 3.4, Fig. 11.

- Route gas connection straight to the rear!

4.6 Hydraulic connection

According to EN 12828:2003, the following safety-technical equipment is integrated into the boiler:

- Minimum pressure limiter DBmin
- Safety maximum pressure limiter DBmax
- Water pressure measuring device DBmax + 50%
- Temperature regulator
- Temperature measurement device TBmax + 20%
- Safety temperature limiter

Additional safety equipment may be required depending on the system configuration.

- Make sure the return is connected correctly so as to achieve optimum efficiency.
- To prevent noise emissions, connect the flow and return pipes to the heating circuit with flexible compensators.
- If a common return is to be used, user the low-temperature return.

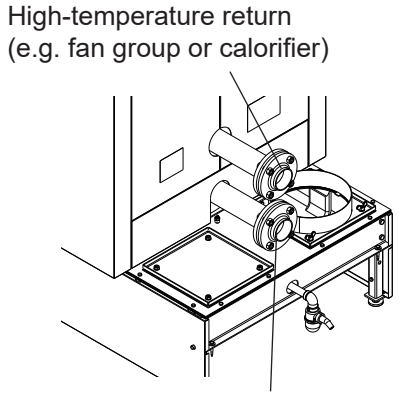


Fig. 17

4.6.1 To be provided on site

A pressure expansion tank appropriate for the heating system, water volume and hydrostatic pressure.

4.6.2 Hydraulic integration

A mixer must be installed when combining a calorifier with underfloor heating. A minimum circulation water quantity is not required.

4.6.2.1 Example application

Gas boiler with
- calorifier
- 1 direct circuit and 1- mixer circuit(s) (HT/LT separation)

Hydraulic schematic BDEE050

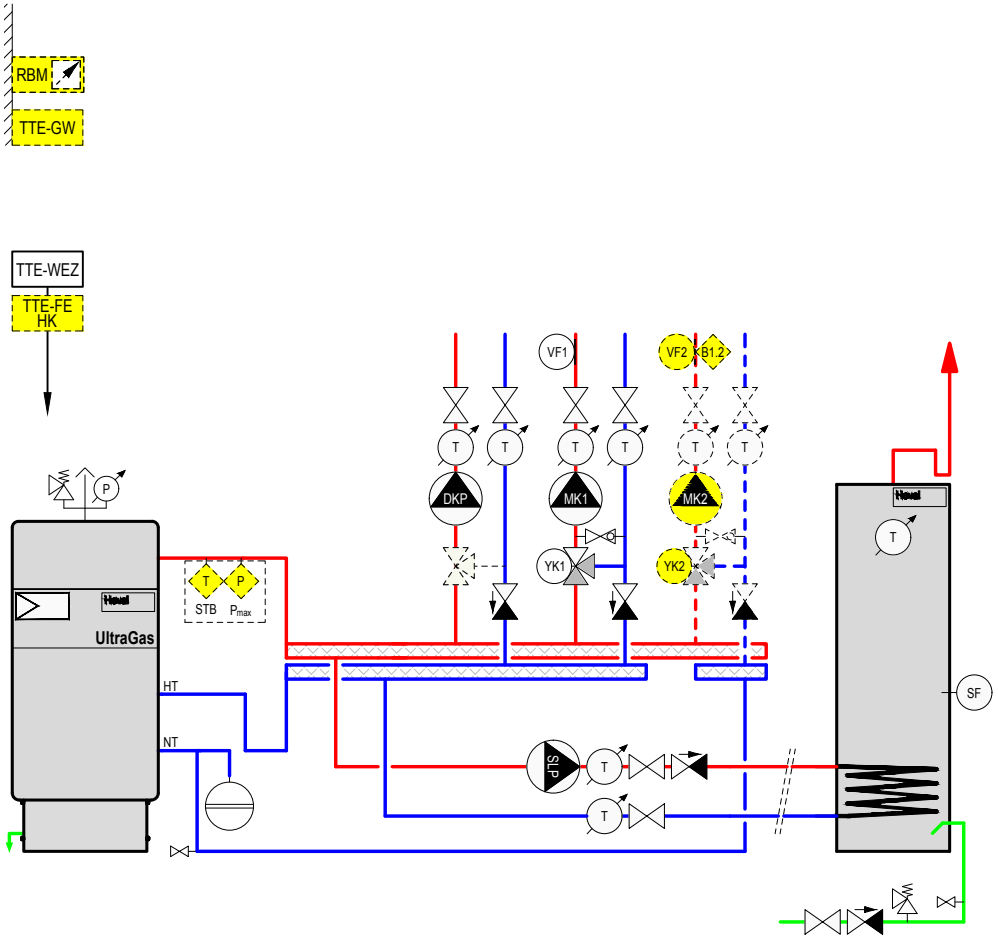


Fig. 18

TTE-H-Gen	TopTronic® E basic module heat generator (installed)
VF1	Flow temperature sensor 1
MK1	Pump, mixer circuit 1
YK1	Actuator, mixer 1
AF	Outdoor sensor
SF	Calorifier sensor
HCP	Pump for heating circuit without mixer
SLP	Calorifier charging pump
Optional	
RBM	TopTronic® E room control module
TTE-GW	TopTronic® E Gateway
TTE-FE HK	TopTronic® E module expansion heating circuit
VF2	Flow temperature sensor 2
B1.2	Flow temperature monitor (if required)
MC2	Pump, mixer circuit 2
YK2	Actuator, mixer 2

NOTICE

Please close unused connections tightly.

Important information:

- The example schematics merely show the basic principle and do not contain all information required for installation. Installation must be carried out according to the conditions on site, dimensioning and local regulations.
- With underfloor heating, a flow temperature monitor must be installed.
- Shut-off devices to the safety equipment (pressure expansion tank, safety valve, etc.) must be secured against unintentional closing!
- Install sacks to prevent single-pipe gravity circulation!
- An automatic air vent (AAV) must be installed before the shut-off valve. This is not supplied by Hoval.

4.6.2.2 Cascades

As a basic principle, the Hoval TopTronic® E should perform cascade control. This ensures an environmentally and product-friendly method of operation. However, if an external cascading strategy is planned and boiler performance control is carried out, frequent cycles should be avoided (at least 12 minute burner runtime).

Please observe the notes in the engineering documents of the responsible Hoval sales company with respect to the appropriate hydraulic switching!

4.7 Noise damping

The following measures are possible for sound insulation:

- If living areas are above or below the boiler room, make the boiler room walls, ceiling and floor as solid as possible.
- Connect pipes flexibly using expansion joints.
- Connect circulating pumps to the piping network using expansion joints.

4.8 Electrical connection

- A licensed electrical company must install the electrical supply to the equipment.
- The connection diagram is located in the electrical box of the heat generator; the circuit diagram is supplied separately.
- The country-specific regulations must be adhered to.

WARNING

The heat generator can only be de-energised by disconnection from the mains (e.g. all-pole switch).

WARNING

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

Use cable ducts with separators.

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

Procedure to remove the front casing

1. Remove front cover (1, image 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. Slightly raise the lower front cover (2), slight lift the front cover (2) and remove towards the front.
3. Remove securing screw (3).
4. Lift the electrical box (4) and fold it out.
   - The safety cord (4a) secures the electrical box.
5. Cable introduction according to dimensional drawing (chapter 3.4 dimensions, no. 6).

The electrical connection is to be made in accordance with the diagram supplied.

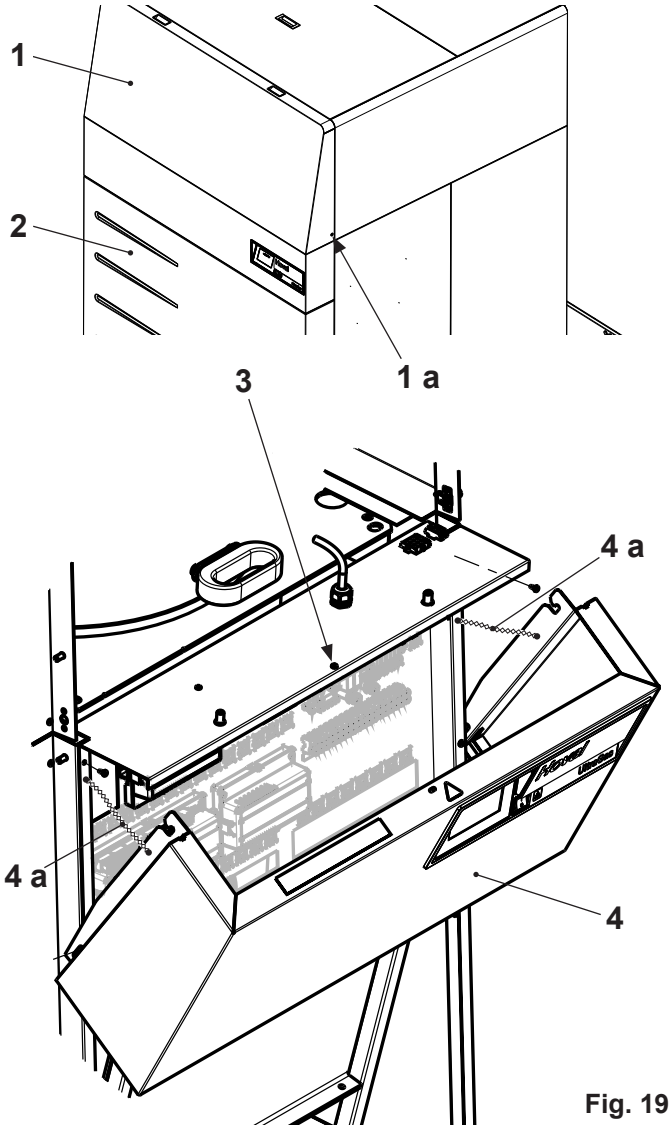


Fig. 19

4.8.1 Safety precaution for installation in line with EMC requirements

- Cables carrying mains voltage must be routed separately from sensor or data bus cables. A minimum distance of 2 cm between the cables must be observed. Cable crossovers are permitted.

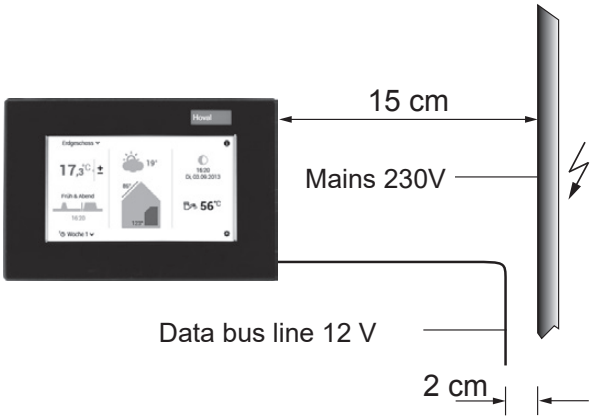


Fig. 1: Minimum distances for electrical installation

- In the case of controller modules with their own mains supply, it is imperative that cables carrying mains voltage are routed separately from sensor or data bus cables. If cable ducts are used, these must be provided with separator strips.
- When mounting controller modules or room control modules, maintain a minimum clearance of 40 cm from other electrical devices with electromagnetic emissions, such as power contactors, motors, transformers, dimmers, microwave ovens and TV sets, loudspeakers, computers, mobile phones, etc.

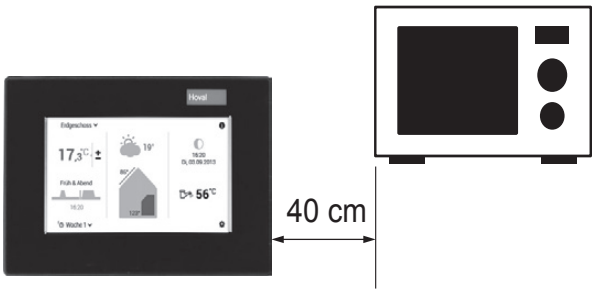
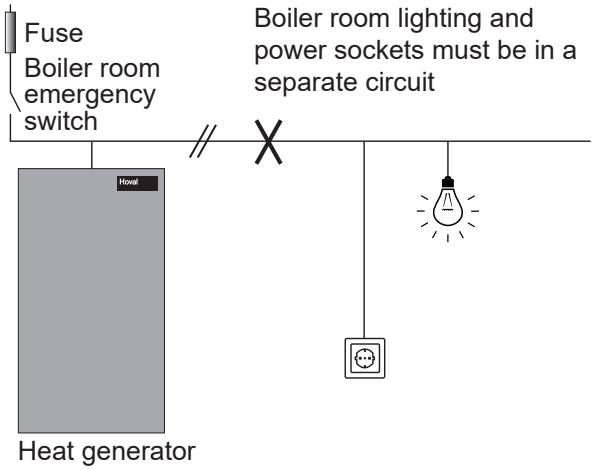


Fig. 2: Minimum distance from other electrical units

- Avoid unnecessary cable lengths, including in spare cables
- Coils of relays, contactors and other inductors in the panel, and possibly in the vicinity, must be connected. The connection can be made with RC elements, for example.
- Measures must be taken in the building and on electrical equipment to protect the units against overvoltage caused by lightning strikes.
- The mains connection for the heating system must be designed as an independent electrical circuit. Neither fluorescent lamps nor any other equipment which might cause interference may be connected, nor may it be possible to connect such equipment.



- Equipotential bonding must be established between the individual control components, control panels and the heating system.
- Shielded cables must be used for the data lines.
  Recommended versions:
  J-Y(ST)Y 2 x 2 x 0.6 mm
- Shields of data lines, analogue signal cables and power cables must be connected to earth over a large area with a highly conductive connection. The cable shields must be connected to a shield bar directly after the entry of the cable into the panel.
- Multiple earthing of a cable is not permitted (ripple pickup).

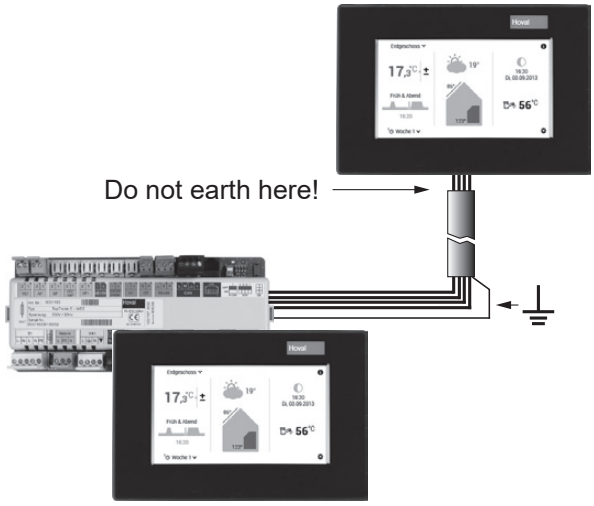


Fig. 4: One-sided earthing of the shielding

In the case of star-shaped data bus networks, double earthing is not permitted. The earthing must be carried out on one side at the star point.

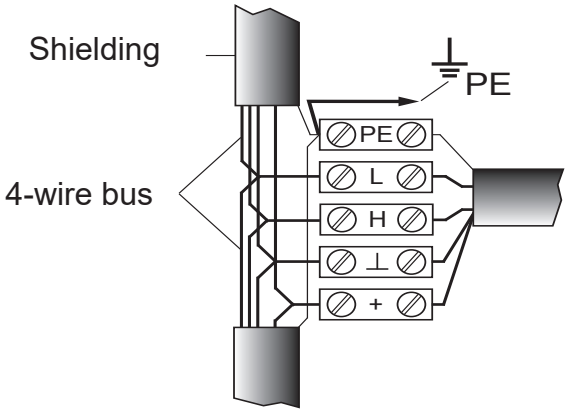


Fig. 5: Earthing for star-shaped data bus

- The outdoor sensor must not be mounted in the vicinity of transmitters and receivers (on garage walls near receivers for garage door openers, amateur radio antennae, radio alarm installations or in the immediate vicinity of large transmitters, etc.).

Maximum permitted cable lengths for cables carrying sensor and low voltage (without PWM):
- Min. 0.5 mm^2
- Max. permitted cable length: 50 m
- Max. PWM cable length according to pump specification

Longer connecting cables should be avoided because of the danger of radiated interference!

Inter-building installations
- Inter-building installations and laying the bus line underground are not permitted
- Where possible, avoid routing low-voltage and safety extra-low voltage cables (CAN bus line) in parallel in adjacent buildings (overbuildings) or through underground car parks. If this cannot be avoided, one or more of the following options should be selected to improve the decoupling:
  - Increase the spacing distance
  - Route cables in a metal cable tray or metal cable duct that is enclosed on all sides, and must be well earthed
  - Use high-quality twisted-pair cables
- Potential differences between CAN_H, CAN_L and ground must be kept low
- If there are higher potential differences, the frequency of errors will increase until the point when bus traffic is completely blocked

To ensure correct electrical installation, unit connection and equipotential bonding (energy supply company and building installation), all applicable laws, regulations and standards must be complied with; in particular, the regulations of the responsible energy supply company. Common equipotential bonding must be carried out in accordance with the regulations and standards. The cable shield is not allowed to be used for equipotential bonding.
The work is only allowed to be carried out by qualified specialist personnel. It is the responsibility of the electrician to ensure appropriate EMC installation.

4.8.2 Recommended cable cross-sections and maximum permitted cable lengths

Line type	Cross-section	Length
Electrical supply of the heat generator (230 V)	min. 2.5 mm^2 with 16 A fuse	unlimited m
Electrical supply of the heat generator (400 V)	min. 2.5 mm^2 with 16 A fuse	unlimited m
Cables with line voltage 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)	2 x 2 x 0.6 mm^2	max. 100 m

The country-specific regulations must be adhered to.

5. Initial commissioning

- After filling, always thoroughly bleed the system and check the water circuit for leaks.
- Before commissioning, the syphon or the neutraliser / condensate box must be filled with water.
- When starting up the system for the first time, the function of all safety and control devices must be verified.
- The operation and maintenance of the system must be explained to the user in detail.
- The combustion air must be filtered if there is a heavy build-up of building dust.
- It is essential to check the gas flow pressure and set the CO_2 value correctly in accordance with the technical data (see chapter 3.3).

5.1 Safety instructions

CAUTION

- Cutting injuries as a result of sharp edges.
- Handle parts of the casing carefully and avoid contact with sharp edges!
- Risk of injury for non-expert personnel.
- Initial start-up, maintenance and cleaning work are only allowed to be performed by trained specialist personnel or by Hoval customer service.

NOTICE

Damage to the system by filling unauthorised liquids.

- The filling and replacement water must be of the required water quality (see chapter 5.3).

5.2 Filling the heating system

Filling of the heating system must be carried out by trained personnel.

ÖNORM H5195, European Standard EN 14868 and VDI Guideline 2035 must be complied with (see chapter 4.3).

- Open shut-off valves in the flow and return lines.
- Connect the water hose to the filler tap.
- Slowly fill the heating system.
- Observe the water level by means of a pressure gauge.

- Only use chemical additives for which the chemicals supplier has confirmed their safety and suitability.
- If frost protection agent is being used, a separate engineering sheet is available from Hoval.

5.3 Water quality
5.3.1 Heating water

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**							
50 to 200 kW	NO REQUI-		50 l/kW	20 l/kW	20 l/kW	always desalinate		
200 to 600 kW	RE-	50 l/kW	50 l/kW	20 l/kW				
over 600 kW	MENT							

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

5.4 Venting the gas pipe

§ Comply with the necessary regulations when venting the gas pipe.

- Open the gas shut-off valve.
- Vent the gas pipe up to the gas valve.

5.5 Switching on

- Switch on the blocking switch on the control panel to release the burner.

WARNING

The heat generator is live when it has been connected to the mains.

5.6 Gas inlet pressure

The gas quantity and thus commissioning of the heating are only allowed to be performed if the values for the flow pressure have been achieved (see chapter 5.8 Setting the gas quantity).

The flow pressure and the energy content of the gas in the connection line must achieve the values specified in chapter 3.3.

NOTICE

If the gas inlet pressure is higher than 80 mbar, a gas pressure regulator must be provided by the customer to reduce the gas inlet pressure before the boiler.

5.7 Functional check of pressure monitoring device

WARNING

Lack of combustion air and exhaust gas accumulation can result in injury to persons.

- Before commissioning, check the pressure switch settings:
  - During the pre-aeration phase, measure the pressure in the burner cylinder at pressure switch B17 and compare the measured value with the nominal measured value in the table.
  - If the deviation between the measured value and the nominal value > 10%, correct setting of pressure switch B17 and B18.
- Ensure that combustion air is supplied and exhaust gas is discharged.

In order to ensure safety, the UltraGas® is equipped with a pressure monitoring device on the burner cylinder. The burner cylinder pressure monitoring device records the pressure in the burner cylinder during the boiler pre-aeration time. If the pressure is outside the set tolerance range, the UltraGas® will not complete the starting phase and will trigger a shut down. This prevents the boiler from operating in a dangerous state.

The permitted pressure tolerance range is set at the factory. Since the pressure in the burner cylinder depends on various parameters (e.g. the chimney height or the height of the boiler location), it may be necessary to adjust the tolerance range settings.

Criteria for settings of pressure switch B17 and B18

- The boiler only starts if there is no danger caused by lack of combustion air or exhaust gas accumulation. This means:
  - Pressure switch B17 (min. pressure) is set so that the gas burner is prevented from starting if too little combustion air is supplied.
  - Pressure switch B18 (max. pressure) is set so that the gas burner is also prevented from starting if exhaust gas is not discharged in sufficient volumes.
- Gas burner operation is not impaired by normal fluctuations in the blower pressure (caused by weather or the like).

5.7.1 Checking pressure in the burner cylinder (safety check)

During the pre-aeration phase, the maximum pressure in the burner cylinder is measured and compared with the nominal measured value (see table below).
If the measured maximum pressure differs more than 10% from the nominal measured value, the settings of the pressure switches B17 and B18 must be adjusted to the conditions on site.

WARNING

The settings must only be changed by a specialist trained by Hoval or by Hoval customer service.

1. Slightly loosen the screw at the top in the test port of pressure switch B17.

2. Connect pressure measurement device to the test port of pressure switch B17 and measure the maximum pressure during the pre-aeration phase.

3. Tighten screw in the test port.
4. Check whether the factory settings are suitable for the local conditions:
   Compare measured value with the nominal measured value in the following table (the difference between the measured value and the nominal measured value must be no more than 10%).

UltraGas® Type	Nominal Measured value	Factory setting	
		Pressure switch B17	Pressure switch B18
(1550)	7.4 mbar	5.5 mbar	11 mbar

5. Disassemble pressure measurement device.
6. Tighten upper screw on pressure switch B17.
7. Correct pressure switch B17 or B18 settings if necessary (if the measured value differs more than 10% from the nominal measured value):
   - Calculate setting value of the pressure switches and compare with the setting position of the dials:
     - Pressure switch B17 setting value:
       Measured value x 0.6 (safety factor)
       Example: 6.5 mbar x 0.6 = 3.9 mbar
     - Pressure switch B18 setting value:
       Measured value x 1.4 (safety factor)
       Example: 6.5 mbar x 1.4 = 9.1 mbar
   - Disassemble pressure switch covers.
   - Set the pressure switch dials so that the outward-facing arrow points to the calculated setting value.
   - Fit pressure switch covers.

WARNING

Check pressure monitoring device for correct fastening and leaks.

5.8 Setting the gas quantity, measuring the CO_2 (O_2) and NOx/CO content in the exhaust gas

WARNING

The settings on the gas/air compound regulation must only be made by a specialist trained by Hoval or by Hoval customer service.

5.8.1 UltraGas® (1550) exhaust gas measurement

Hex socket 2.5 mm

A Gas restrictor
B Offset screw

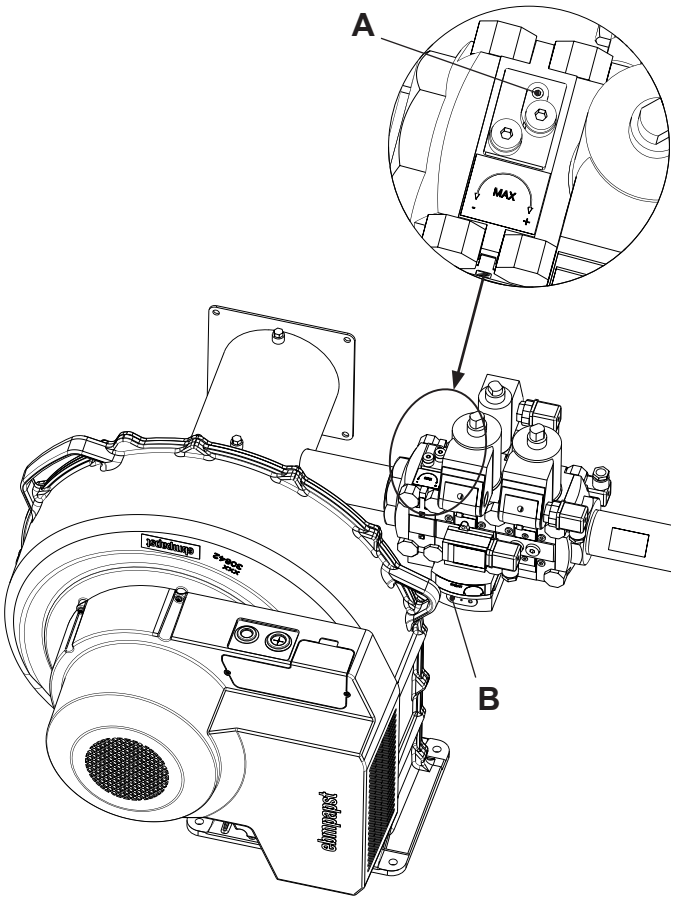


Fig. 20

Setting procedure:

If you have to make a setting on the venturi, always check both exhaust gas values.
For example: set upper value - check lower value - value is not correct - set lower value - check upper value - ...

1. Start the “Emission” menu on the control module.
   - The control automatically switches to normal operation after expiration of the remaining runtime or after pressing the “Reset” button.
2. Position emission meter in the exhaust gas line.
3. Set the boiler to maximum output (100%).
4. Set the CO_2 (O2) value by turning throttle screw A.
   - The exhaust gas value must lie in the following range:
     CO_2 = 8.5 - 8.8 (O2 = 5.9 - 5.5) % by vol. (dry)
5. Set the boiler to minimum output (1%).
6. Set CO_2 (O2) value by turning offset screw B.
   - The exhaust gas value must lie in the following range:
     CO_2 = 8.5 - 8.8 (O2 = 5.9 - 5.5) % by vol. (dry)

Factory setting: throttle screw A
Type (1550): 15.5 mm = 18.5 turns after the closed condition.
A bolt with 15.5 mm diameter can be used to help check the setting.

Fig. 21

7. Check point 4 again, then point 6.
8. Measure the NOx and CO content.
   - The measured values must lie within the limits prescribed by law. Higher values indicate faulty burner setting, dirt build-up on the gas burner or heat exchanger or a defective gas burner.

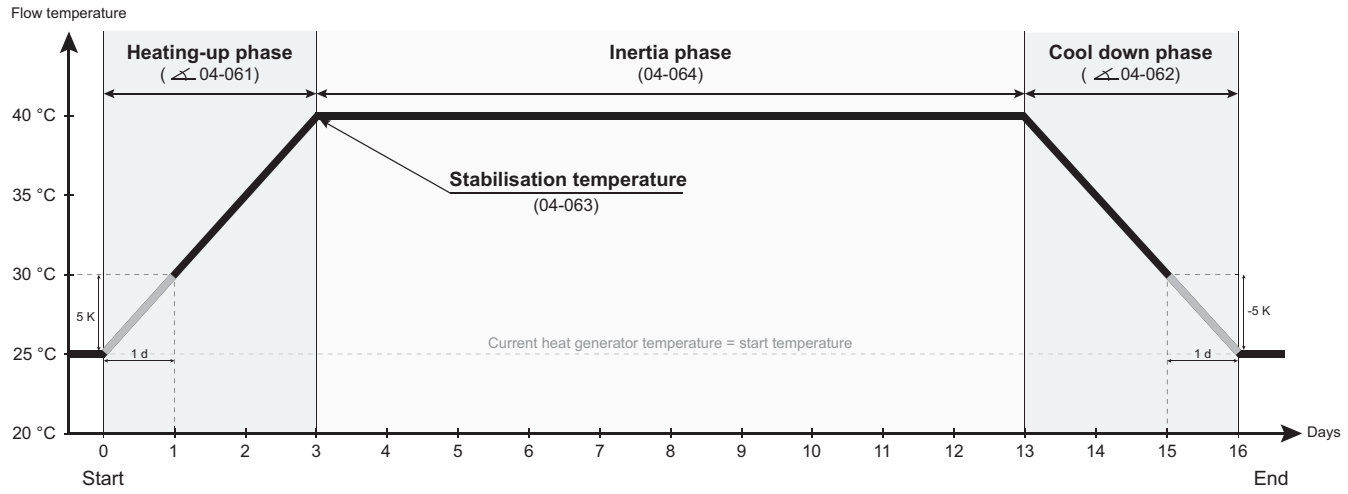
§ If the legal limit values or 150 ppm CO are exceeded, the boiler must be taken out of operation and corresponding repair measures arranged.

9. Close the “Emission” menu on the control module.

5.9 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.



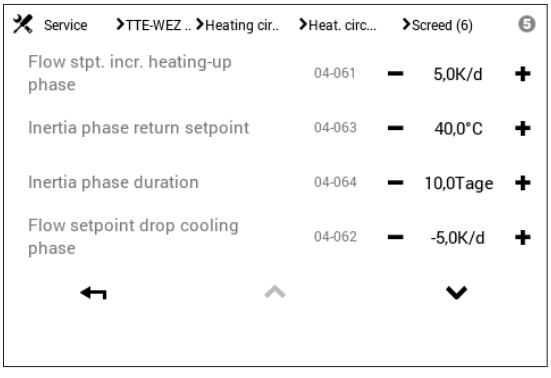
Function	Parameters	Value	Description
Heating-up phase	04-061	5 K/d	Kelvin per day (rising)
Stabilisation temperature	04-063	40.0 °C	Set maximum temperature
Inertia phase	04-064	10	Number of days in stabilisation temperature
Cooling off phase	04-062	-5 K/d	Kelvin per day (falling)
Activate screed function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

NOTICE

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

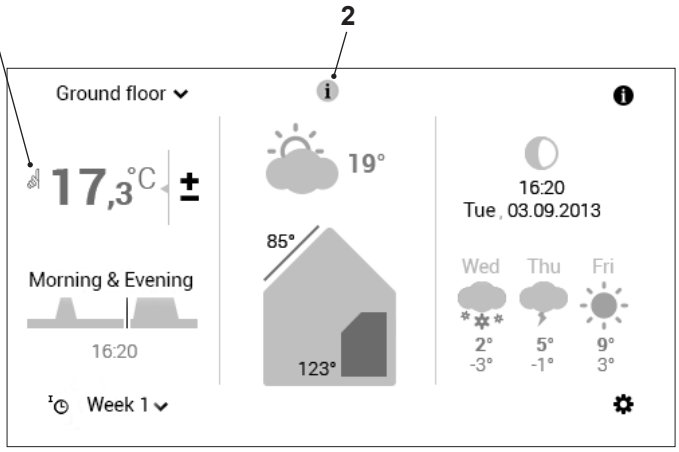


Can only be set in the corresponding user level.

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.

NOTICE

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

NOTICE

Damage to the plant as a result of failure to perform maintenance or cleaning or incorrect maintenance and cleaning.
Have the heating plant inspected and cleaned once per year.
If necessary, have the plant serviced. To avoid damage to the heating plant, remedy faults immediately!

6.1 Safety instructions

CAUTION

Cutting injuries as a result of sharp edges.
Handle parts of the casing carefully and avoid contact with sharp edges.

CAUTION

Risk of injury for non-expert personnel.
Maintenance and cleaning work are only allowed to be performed by trained specialist personnel or by Hoval customer service.

NOTICE

After repairs or replacements of boiler parts, exhaust gas measurement must always be performed as described in chapter 6.7.

WARNING

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

WARNING

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

Perform reset. See operating manual.

6.2 Deaeration

1. Open all radiator valves.
2. Heat up the plant for at least half a day with a high flow temperature.
3. Switch boiler off and wait for 5 minutes.
4. Thoroughly bleed the system.

6.3 Top up with water

§ ÖNORM H5195, European Standard EN 14868 and VDI Guideline 2035 must be complied with (see chapter 5.3).

If the water pressure drops below 1 bar, a warning is output and the boiler output is reduced to 50%. If the water pressure drops below 0.5 bar, the boiler automatically switches to lockout.

Replenish replacement water if the pressure drops below the minimum system pressure:

5. Connect the filling hose to the water tap.
6. Deaerate the filling hose.
7. Connect the filling hose to the filling and drain valve.
8. Replenish replacement water (see chapter 5.2).

6.4 Renewing fuse

WARNING

Electrical installation must be performed by a licensed 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 4.8
3. Remove the protecting cover from TopTronic® E - WEZ, press to the side and remove.
4. Renew fuse (T 10 A 250 V).

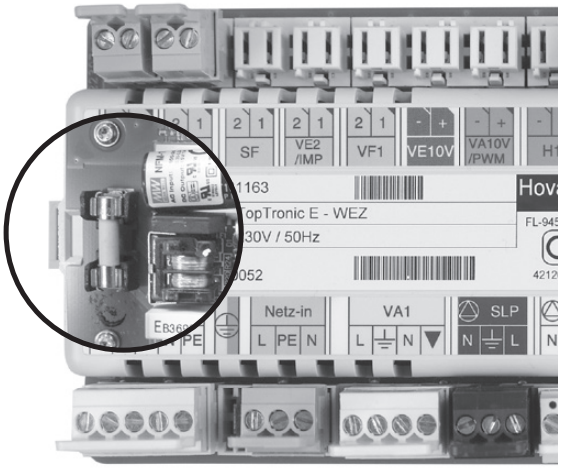


Fig. 22

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

6.5 Information for fire inspector / chimney sweep regarding emission and manual operation settings

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.

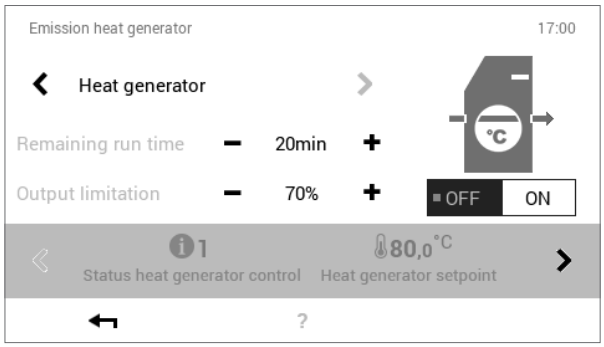
CAUTION

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

NOTICE

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.

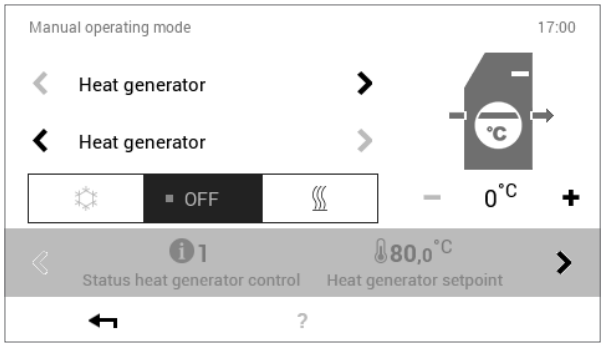
For detailed information see operating instructions, "Emission" chapter.

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, "Emission" 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!

6.6 Cleaning

The boiler is only allowed to be cleaned by a licensed specialist or Hoval customer service technician.

The Hoval gas boiler must be cleaned and serviced at least once a year.

NOTICE

! If the Hoval gas boiler was in operation during the building phase, it is essential to check the degree of contamination. Clean in the case of heavy dirt build-up.

6.6.1 Cleaning the burner cylinder (inside and out)

The burner cylinder must be cleaned if visible contamination exists (such as deposits, e.g. builder's dust)

Ring spanner, screwdriver, vacuum cleaner, compressed air, water

Preparation:
1. Remove cover plate
2. Fold out step board(s)

WARNING

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

3. Close main gas valve.
4. Remove absorber hoods.
5. Undo all burner plug-in connections.
6. Unfasten the earth wire (1, Fig. 23) on the burner cylinder.

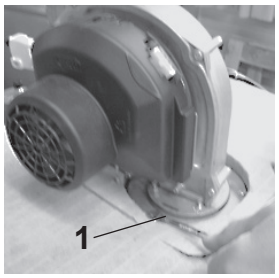


Fig. 23

7. Disconnect gas connection from the gas valves. Use the supplied special open-end spanners (Fig. 24).

Fig. 24

8. Unscrew the fan with gas mixing device (2, Fig. 25).

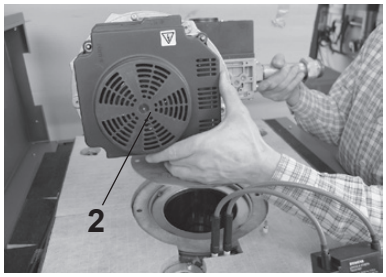


Fig. 25

Removing and cleaning:

CAUTION

Danger of burns,
let the boiler cool down or wear protective clothing.

9. Wear safety gloves when removing the burner cylinder.
10. Remove the burner cylinder upwards (3, Fig. 26).

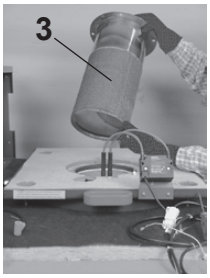


Fig. 26

11. Clean the premix burner inside and out with compressed air or thoroughly flush with water.
12. Remove released dust and dirt particles with a vacuum cleaner (4, Fig. 27).

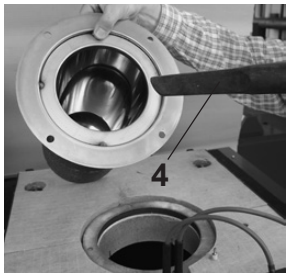


Fig. 27

Assembly:

13. Renew seal on gas connection:
    - Seal on gas connection
    - Seal for fan
    - Seal for burner cylinder
14. Assemble burner in the reverse order.
15. Check for gas leaks
16. Carry out exhaust gas measurement according to chapter 5.8

6.6.2 Cleaning the combustion chamber and burner cylinder on the outside

CAUTION

Danger of chemical burns from cleansing agents.
Wear safety gloves and protective goggles when using cleansing agents.
Comply with the instructions on the original packaging.

NOTICE

Damage to the plant by using incorrect cleansing agents.
Only use cleansing agents that are approved for gas boilers having aluminium components.

Spray the cleansing agent on undiluted.

Ring spanner, screwdriver, spray gun

Preparation:

WARNING

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

1. Close main gas valve.
2. Remove absorber hood.
3. Undo all burner plug-in connections.
4. Remove front cover.

Opening combustion chamber:

5. Unscrew palm grips
6. Swivel the burner upwards, with the boiler door (Fig. 28)

CAUTION

If a gas pressure spring is weakened, the boiler door is lowered. There is an increased danger of injury when reopening the boiler door.
Notice:
In such cases, replace both gas pressure springs.

7. Remove the cover from the cleaning opening (9, Fig. 29)
8. Remove the syphon or the neutraliser / condensate box. (For maintenance of the neutraliser / condensate box, see chapter “6.9 Maintenance for neutraliser / condensate box for type KB 22, KB 23 and KB 24 (if present)”.)

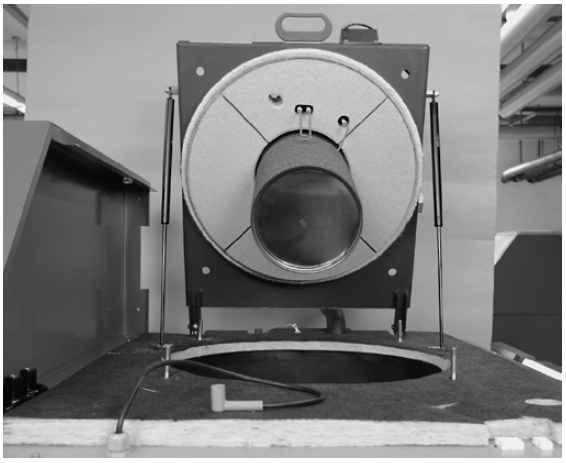


Fig. 28

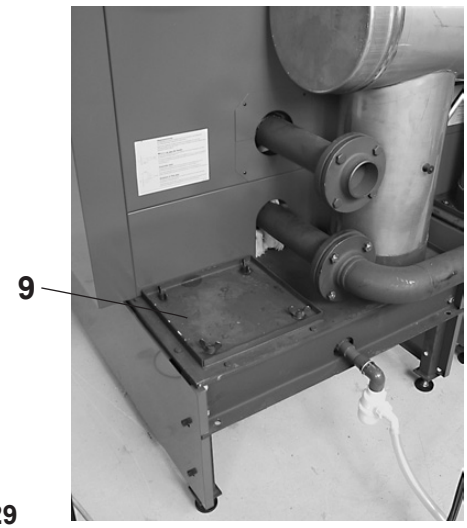


Fig. 29

Cleaning:

- Spray combustion chamber and aluFer® pipes (3, Fig. 30).
  - The best results are achieved with a spray gun and a wide spray nozzle (flat or conical jet).
    The following are to be recommended, for example:
  - Desoxin
- Allow the cleaning concentrate to soak in according to the manufacturer's instructions.
- Spray combustion chamber and aluFer® pipes with water.
- Use a spray gun with a “tight spray”.
- Repeat in case of heavy dirt build-up.
- Rinse burner chamber floor.
- Use an angled spray lance.
- Clean condensate tray.
- Clean the syphon.
  - Unscrew
  - Clean
  - Screw on
  - Fill with water
- Clean the burner cylinder fabric with compressed air.
- Check the burner cylinder fabric for damage and cracked welds.
- Connect gas and electrical connections.
- Put the boiler into operation
- Carry out exhaust gas measurement according to chapter 5.8. If necessary, adjust the setting. Make a record of the measurement.

Fig. 30

6.6.3 Cleaning/adjusting ignition and ionisation devices

The distance between the ionisation electrode and the burner cylinder must be approx. 5 ±1 mm.

Fine sandpaper, long-nose pliers, soldering lamp, compressed air

Preparation:

1. Set the blocking switch to “0” and disconnect the heat generator from the mains (main switch, fuse).
2. Open the combustion chamber as described in chapter 6.6.2 (cleaning the combustion chamber and burner cylinder on the outside).

Cleaning:

1. Sand the ignition and ionisation device with fine sandpaper if needed.
2. Clean away the sanding dust.

Setting:

Check all electrode gaps and readjust if necessary (see Fig. 31 and Fig. 32).

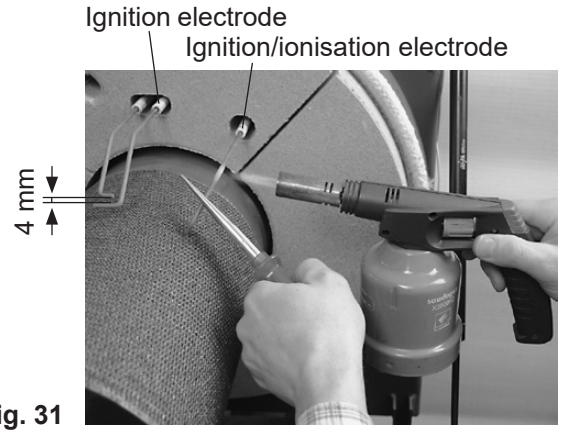


Fig. 31

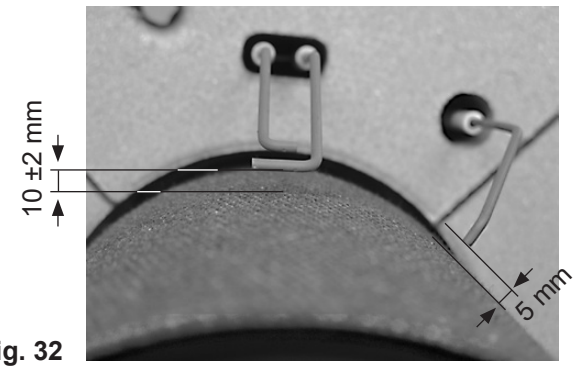


Fig. 32

1. Heat the electrode at the kink with the soldering lamp until it glows red (Fig. 31).
2. Use long-nose pliers to bend the electrode until the required gap is set.

Assembly:

1. Renew seal on gas connection.
2. Assemble burner in the reverse order.
3. Check for gas leaks

6.7 Setting the gas quantity, measuring the CO_2 (O_2) and NOx/CO content in the exhaust gas

(see chapter 5.8).

6.8 Cleaning the syphon

- Release the syphon and remove it from the boiler.
- Rinse the syphon.
- Check syphon seal (1, Fig. 33) for damage and replace if necessary.

CAUTION

If the syphon is not filled with water or becomes clogged or soiled, escaping exhaust gas can endanger lives.

- Before replacing the syphon, fill it with water.

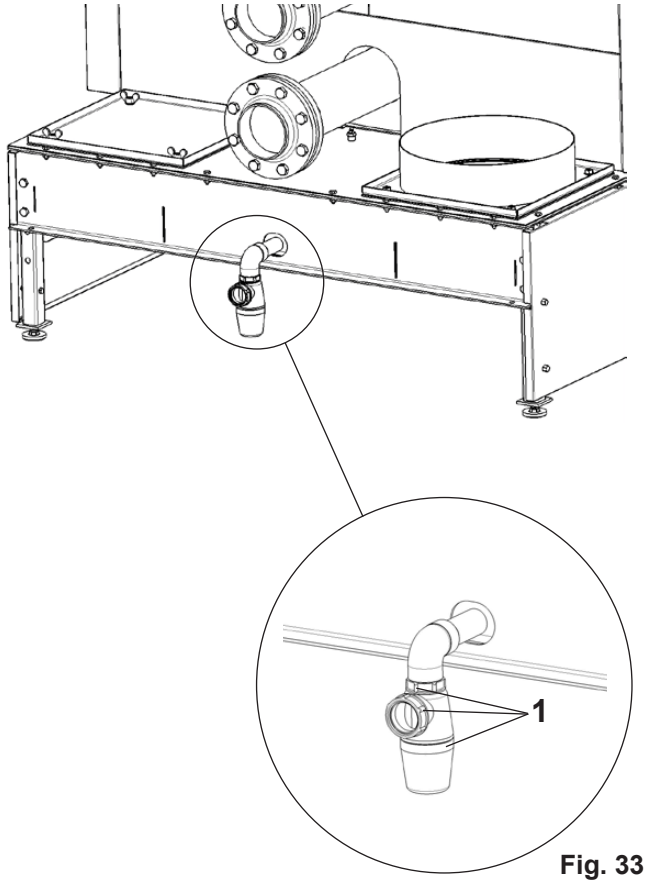


Fig. 33

6.9 Maintenance for neutraliser / condensate box for type KB 22, KB 23 and KB 24 (if present)

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 the neutraliser box can be ordered from Hoval under the following item no.:

- 1 pack (3 kg) neutralisation granules
  Part no. 2028 906
  One filling requires 4 packs of 3 kg each.

Procedure for servicing the neutraliser / condensate box

WARNING

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

1. Undo the bolts and withdraw the neutraliser / condensate box.

2. Maintance the neutraliser / condensate box:
   Condensate box KB 22:
   - Remove the condensate pump and clean the condensate pump container.

   Neutraliser box KB 23:
   - Remove the neutralisation granules and any deposits from the neutraliser box. Any remaining neutralisation granulate, since it is harmless, can be disposed of as domestic waste.
   - Refill the neutraliser box with new granules.

   Neutraliser box KB 24:
   - Remove the condensate pump and clean the condensate pump container.
   - Remove the neutralisation granules and any deposits from the neutraliser box. Any remaining neutralisation granulate, since it is harmless, can be disposed of as domestic waste.
   - Refill the neutraliser box with new granules.

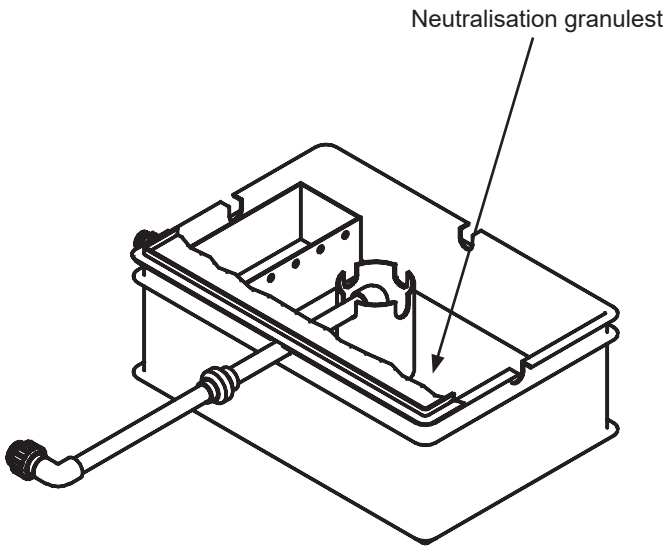
Attach the neutraliser / condensate box cover making sure that it is tight-closing.

3. Push the neutraliser / condensate box back in.

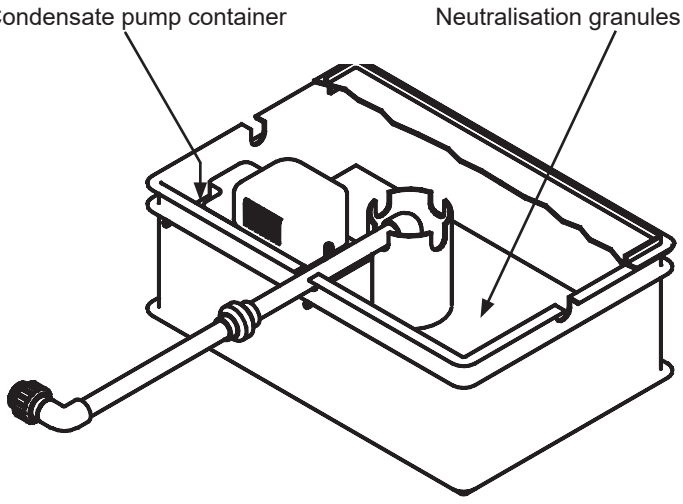
WARNING

- Before putting back into service, the siphon and the neutraliser / condensate box must be filled together with water.
- The water can be poured through the cleaning aperture into the neutraliser / condensate box and the siphon.

Neutraliser box
Type KB 23



Neutraliser box with feed pump
Type KB 24

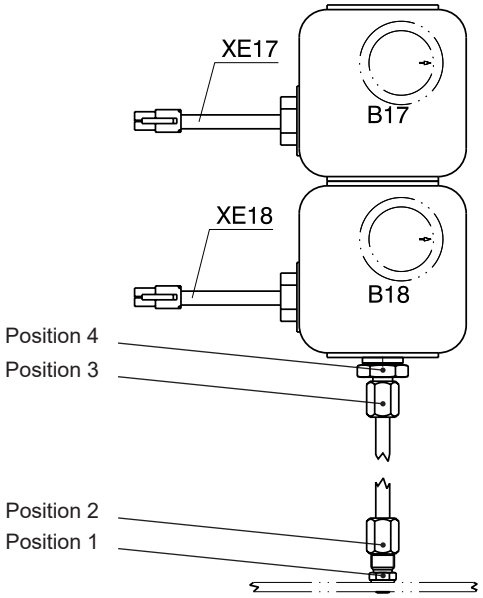


6.10 Repair pressure monitoring device

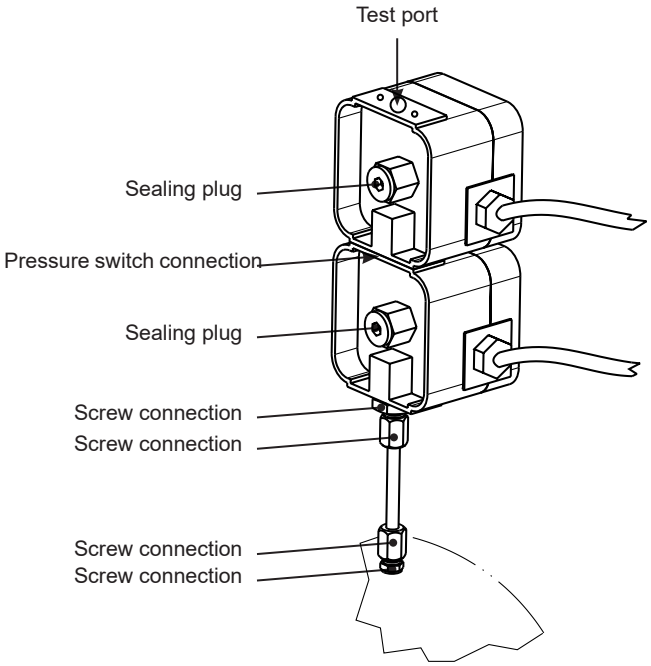
WARNING

The settings must only be changed by a specialist trained by Hoval or by Hoval customer service.

1. Check seat of the screw connections between pressure switch B18 and the burner cover:



   - Position 1 (double nipple on adapter plate): Torque: 7 Nm
   - Position 4 (double nipple on pressure switch B18): Torque: 25 Nm
   - Position 2 and 3 (Serto connecting nuts of connecting cable on the double nipples): Tightened by hand and then tightened by another 1/4 revolution with a spanner (hold position 1 or 4 in place with a spanner when doing so).
2. Perform functional check of pressure monitoring device and correct the setting of pressure switch B17 and B18. (see chapter 5.7).
3. Check pressure monitoring device for leaks at the following points:



6.11 BIC 960 automatic function device´parameter list

WARNING

Changes to the BIC may only be made by authorised Hoval customer service technicians. The following table is intended solely to provide information for the Hoval customer service technician!

6.11.1 UltraGas® (1550) automatic function device

Parameters			Description	Unit	Level	System setting values	45-UG (1550)
1	2AA	32769	Blocking temperature	°C	OEM		95
2	2AC	32770	Maximum setpoint	°C	BE		80
3	2AD	32771	Switch-off hysteresis via set value	°C	OEM		10
4	2AE	32772	Switching difference to switch-off point	°C	HF		10
5	2AF	32773	Proportional range	°C	OEM		40
6	2AG	32774	Integral part	sec	OEM		100
7	2AH	32775	Differential part	sec	OEM		25
8	2AI	32776	Set value for bus interrupt	°C	HF		75
9	2AJ	32777	Maximum temperature rise for low flow temperature	°C/sec	OEM		1
10	2AK	32778	Maximum temperature rise for high flow temperature	°C/sec	OEM		0.5
11	2AL	32779	“Low” flow temperature	°C	OEM		60
12	2AM	32780	“High” flow temperature	°C	OEM		80
13	2BC	32781	Exhaust gas temperature lock	°C	OEM		110
14	2BD	32782	Exhaust gas temperature block	°C	OEM		100
15	2CA	32783	Gas pressure switch available		OEM		1
16	2DA	32784	Hydrau. pressure sensor available		OEM		1
17	2DB	32785	Pressure warning	bar	OEM		1
18	2DC	32786	Pressure warning hysteresis	bar	OEM		0.2
19	2DD	32787	Blocking pressure min	bar	OEM		0.5
20	2DE	32788	Blocking pressure min - hysteresis	bar	OEM		0.2
21	2DF	32789	Blocking pressure max	bar	OEM		5.8
22	2DG	32790	Blocking pressure max - hysteresis	bar	OEM		0.2
23	2DH	32791	Lock-out pressure max	bar	OEM		6
24	2DI	32792	Max boiler output for pressure warning	%	OEM		50
25	2EC	32793	Ionisation warning	µA	OEM		3
26	2FA	32794	Number of Hall pulses per rotation		OEM		5
27	2FF	32795	Fan speed first phase pre-vent	rpm	OEM		5000
28	2FG	32796	Start rpm	rpm	OEM		1700
29	2FH	32797	Maximum fan speed	rpm	OEM		5000
30	2FI	32798	Minimum fan speed	rpm	OEM		1000
31	2FJ	32799	Fan ramp-up during purge	rpm/s	OEM		500
32	2FK	32800	Fan ramp-down during purge	rpm/s	OEM		200

Parameters			Description	Unit	Level	System setting values	45-UG (1550)
33	2FL	32801	Fan ramp-up during operation	rpm/s	OEM		100
34	2FM	32802	Fan ramp-down during operation	rpm/s	OEM		100
35	2FN	32803	Fan follow-on time after a lock-out	sec	OEM		180
36	2FO	32804	Fan speed after shut-down in normal operation or when locked	rpm	OEM		1600
37	2FR	32805	Fan follow-on time after operation or blocking	min	OEM		3
38	2FU	32806	Fan speed for boiler operation in frost protection mode	rpm	OEM		1600
39	2GA	32807	Waiting period after opening of main gas valve or activation of boiler room fan	min	OEM		0
40	2GB	32808	External main gas valve / boiler room fan available		OEM		1
41	2HA	32809	Heating pump follow-on time or shut-off device after heat demand	min	HF		5
42	2HD	32810	Summer operation (“summer kick”)	sec	OEM		10
43	2IA	32811	Ignition (0-> internal, 1-> internal + external, 2-> external)		OEM		2
44	2KM	32812	Stepped modulation (0-> off, 1-> rising, 2-> rising and falling)		HF		1
45	2LA	32813	Action mode fault relays		HF		2
46	2NA	32814	ADC/4 value at 0 bar		OEM		25
47	2NB	32815	ADC/4 value at 10 bar and BIC 960 V.3		OEM		225
48	2IB	32816	Extended external ignition time	sec	OEM		8
49	2CB	32817	Vacuum and overpressure switch (fan) activation / deactivation (0 -> deactivated, 1 -> activated)		OEM		1
50	2CC	32818	Reserve		OEM		0

Adjustments for liquid gas

27	2FF	32795	Fan speed first phase pre-vent	rpm	OEM		-
28	2FG	32796	Start rpm	rpm	OEM		-
29	2FH	32797	Maximum fan speed	rpm	OEM		-
30	2FI	32798	Minimum fan speed	rpm	OEM		-

36	2FO	32804	Fan speed after shut-down during normal operation or lock-out	rpm	OEM		-

* for fan type: G3G250 MW50-11 Parameter 26: 4
for fan type: G3G250 MW00-XB Parameter 26: 5

COPY FOR PLANT USER

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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:

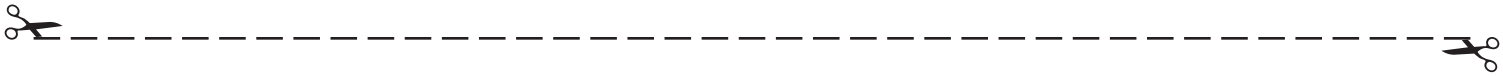
Serial number:

Year of manufacture:

Place, Date:

System installer:

System user:



COPY OF SYSTEM INSTALLER

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Confirmation

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Installation address:

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Serial number:

Year of manufacture:

Place, Date:

System installer:

System user: