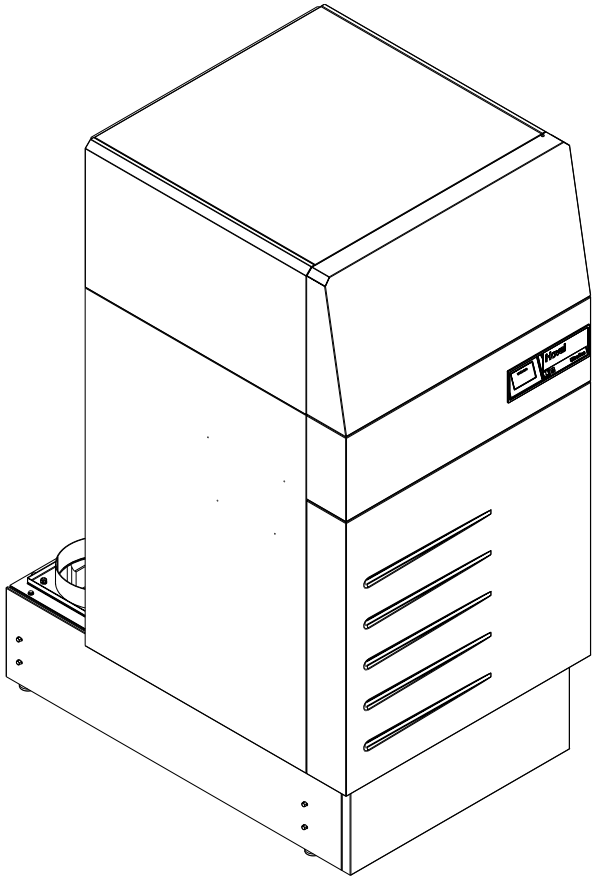
Technical information
Installation instructions

Hoval

UltraGas® 2 (125-1550)

Gas condensing boilers
for natural gas in modulating operation



These instructions are applicable to the following types:
Nominal output ranges at 50/30°C
and natural gas

51-UltraGas® 2 (125)	25 - 126 kW
51-UltraGas® 2 (150)	35 - 151 kW
51-UltraGas® 2 (190)	38 - 191 kW
51-UltraGas® 2 (230)	51 - 233 kW
51-UltraGas® 2 (300)	67 - 302 kW
51-UltraGas® 2 (350)	73 - 350 kW
51-UltraGas® 2 (400)	85 - 401 kW
51-UltraGas® 2 (450)	96 - 453 kW
51-UltraGas® 2 (530)	110 - 533 kW
51-UltraGas® 2 (620)	136 - 622 kW
51-UltraGas® 2 (700)	146 - 703 kW
51-UltraGas® 2 (800)	166 - 804 kW
51-UltraGas® 2 (1000)	205 - 999 kW
51-UltraGas® 2 (1100)	229 - 1112 kW
51-UltraGas® 2 (1300)	269 - 1320 kW
51-UltraGas® 2 (1550)	324 - 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.

Floor-standing gas condensing boilers UltraGas® 2 (125-1550) 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 95 °C[1)]. They are designed for continuously controlled reduced operation in heating systems.

[1)] See technical data

5. Initial commissioning

6. Maintenance

1. Important notices

1.1 General safety instructions

The plant 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
- Siphon filled with water
- Expansion tank connected
- Boiler connected to a flue gas line installed in compliance with the relevant regulations
- Flue gas outlet with flue gas line connected to flue 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,
- open windows and doors
- and leave the room

WARNING

The boiler must only be suspended using the four points marked as the crane suspension option in Fig. 02. The hooks on the rear 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 symbols

Warning of electrical voltage

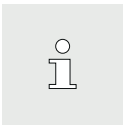
Warning of hot surface

Warning of potentially explosive substances

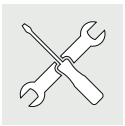
Warning of harmful or irritating substances

Warning of cutting injuries

1.2.3 Information



Information:
Provides important information.



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

Provides important information. Refers to standards and directives.

Read the operating instructions before installation and commissioning.

Read the installation instructions before installation.

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 Guarantee

The guarantee 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 Instructions

All instructions relevant to your plant 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.

Countries of destination §
For the countries of destination, the locally applicable country-specific regulations must be observed. Here are a few examples:

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 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 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 HE301-01 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 rear of the boiler must **not** be used to suspend it.

2.1.1 Space requirement of UltraGas® 2 (125-1550)

(Dimensions in mm)

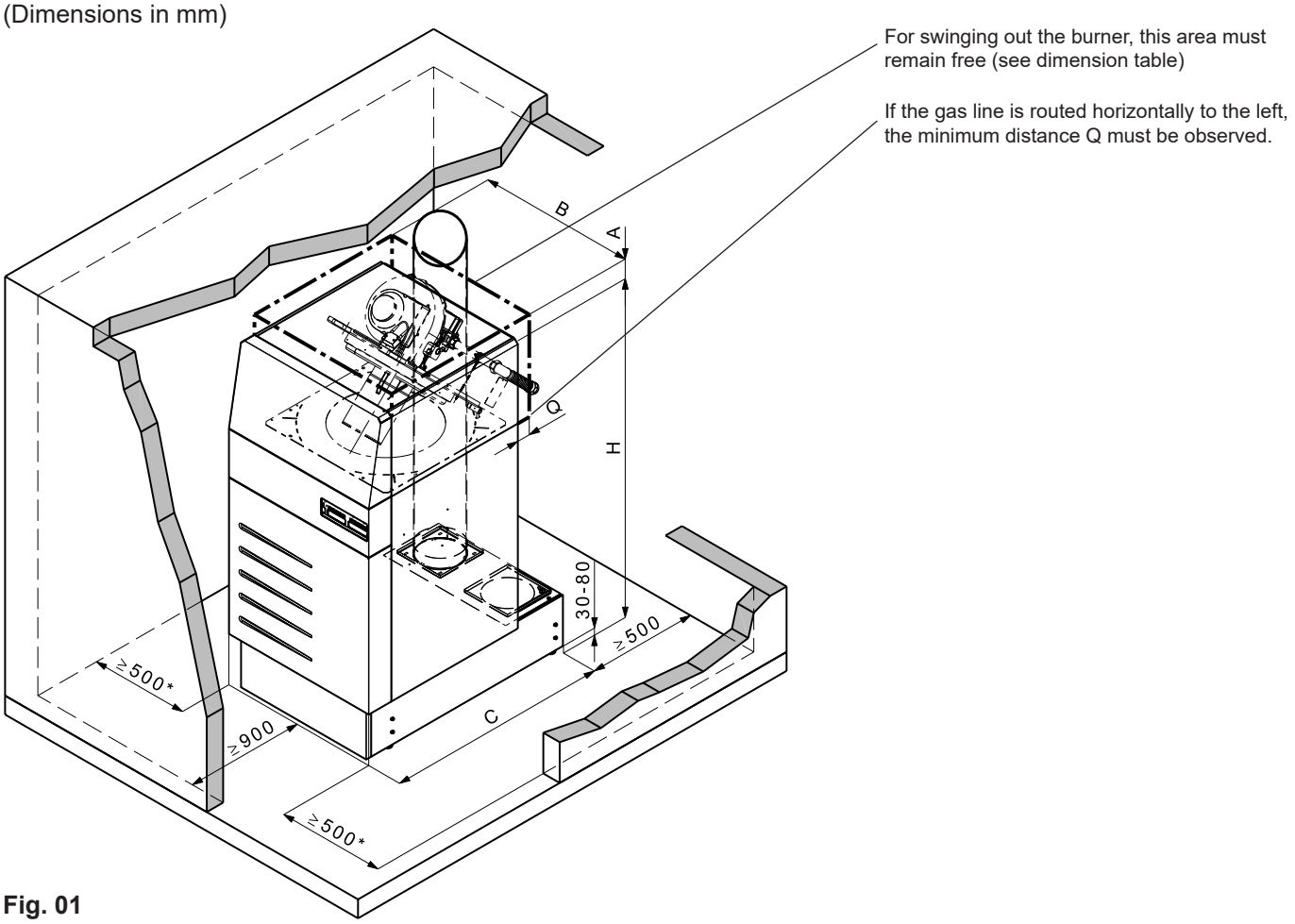


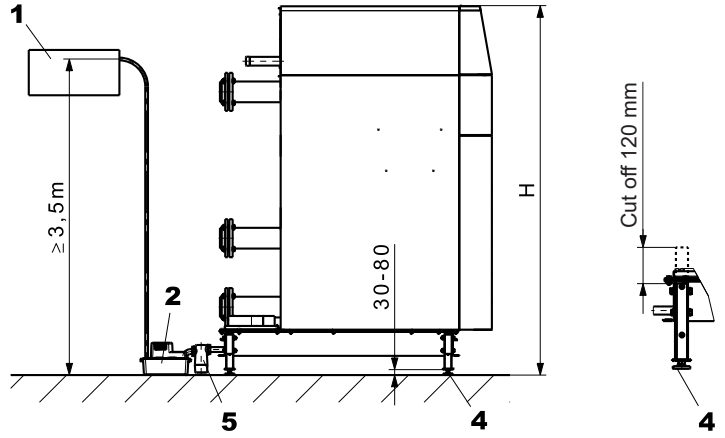
Fig. 01

Type	A [1]	A minimum [2]	B	C	H [3]	H minimum [4]	Q
UltraGas® 2 (125,150)	169	106	720	1060	2053	1933	125
UltraGas® 2 (190,230)	155	71	820	1160	2098	1978	2
UltraGas® 2 (300,350)	285	170	930	1510	2158	2038	65
UltraGas® 2 (400,450)	230	157	930	1510	2228	2108	141
UltraGas® 2 (530-700)	121	121	1110	1600	2364	2244	155
UltraGas® 2 (800-1100)	280	195	1290	1786	2385	2265	119
UltraGas® 2 (1300,1550)	291	154	1560	2104	2525	2405	163

[1] If the room height is too low: the dimension A can be reduced.
[2] **Caution!** At A minimum, the burner can no longer be swivelled out completely! Cleaning is made difficult!
[3] Height value assumes adjustable feet are set to 30 mm
[4] The feet can be shortened. **Caution!** If the feet are shortened, the base strip cannot be installed and the installer will have to fit a siphon with min. 70 mm barrier height. For details see next page.

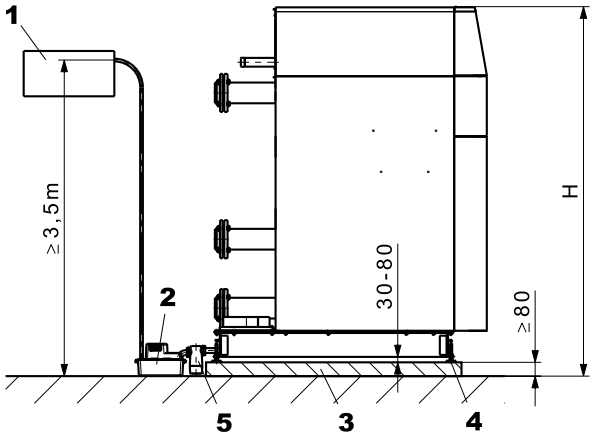
* The boiler can be placed with one side directly on the wall. However, to protect heat-sensitive walls against damage, a distance of at least 150 mm from the wall must be provided.
* The cleaning opening must be easily accessible. As a result, a minimum distance of 500 mm must be maintained on the cleaning opening side.

UltraGas® 2 with shortened boiler feet
(Dimensions in mm)



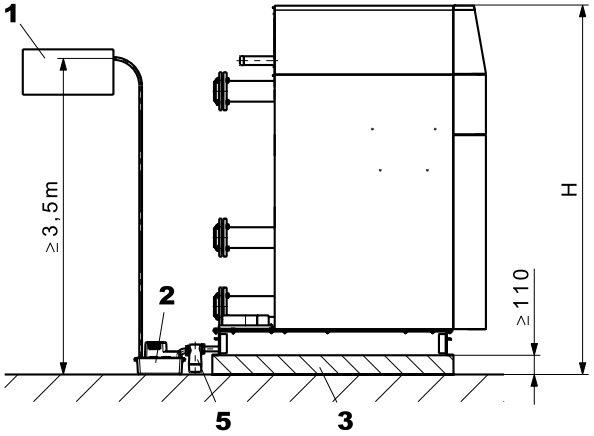
UltraGas® 2 Type	H [1)]
(125,150)	1933
(190,230)	1978
(300,350)	2038
(400,450)	2108
(530-700)	2244
(800-1100)	2265
(1300,1550)	2405

UltraGas® 2 with walled-in base and adjustable feet



UltraGas® 2 Type	H [1)]
(125,150)	1934
(190,230)	1979
(300,350)	2042
(400,450)	2112
(530-700)	2255
(800-1100)	2276
(1300,1550)	2416

UltraGas® 2 with walled-in base without adjusting feet



UltraGas® 2 Type	H
(125,150)	1934
(190,230)	1979
(300,350)	2042
(400,450)	2112
(530-700)	2255
(800-1100)	2276
(1300,1550)	2416

1 Neutralisation unit (option)
2 Condensate pump (optional)
3 Walled base
4 Adjustable feet 30-80 mm
5 Siphon [2)]

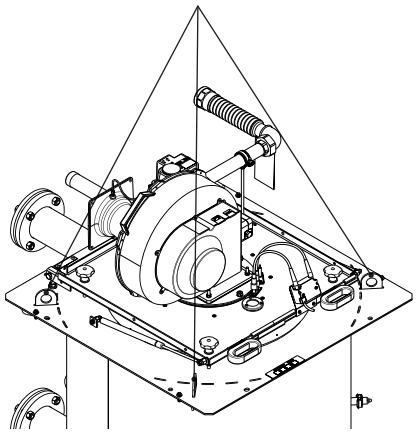
[1)] Height value assumes adjustable feet are set to 30 mm
[2)] **Caution!** The installer will have to fit a siphon with min. 70 mm barrier height.

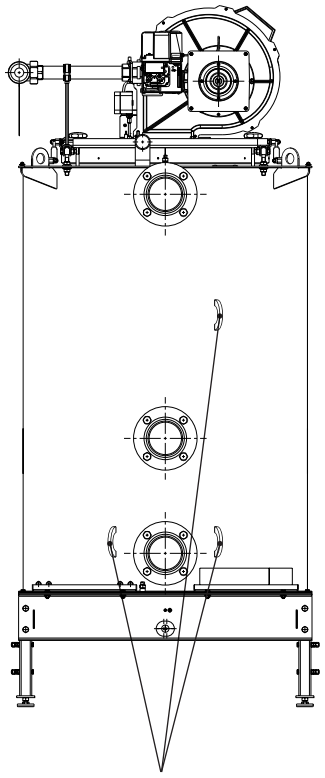
Notice
- The steps of the climbing aid provided must be horizontal. Adapt the climbing aid if necessary.
- No refunds for pedestal sheets and adjustable feet!

2.1.2 Suspension option

Crane suspension option

Notice
The chains must be at least 1.5 m long!





Notice
Do **not** suspend the crane here!

Fig. 02

2.1.3 Set-up of UltraGas® 2 (125,150)

WARNING

Tip hazard during set-up.
There is a danger of the boiler tilting over when moving it on the pallet or when removing the pallet.
• Carry out these works with great care.

1. Remove climbing aid (1).

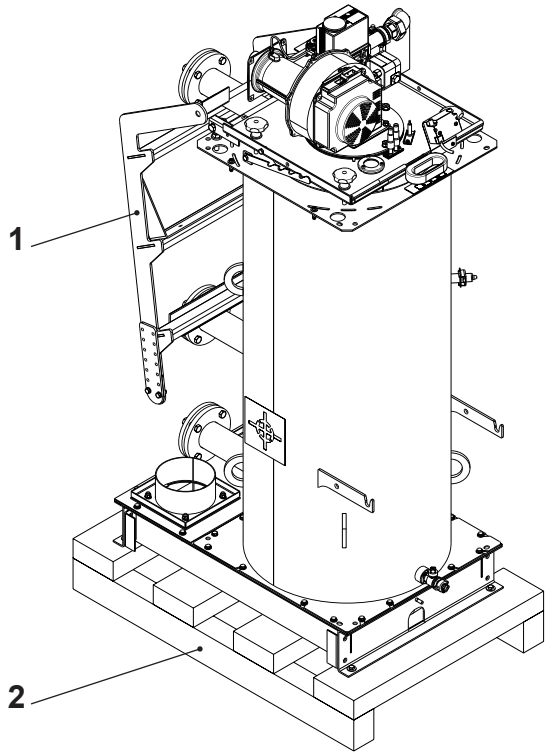


Fig. 03

2. Turn the boiler on the pallet (2) through 45°.
3. Push the boiler so that 3 boiler feet (3) can be mounted (2 feet on the front and 1 foot on the rear).

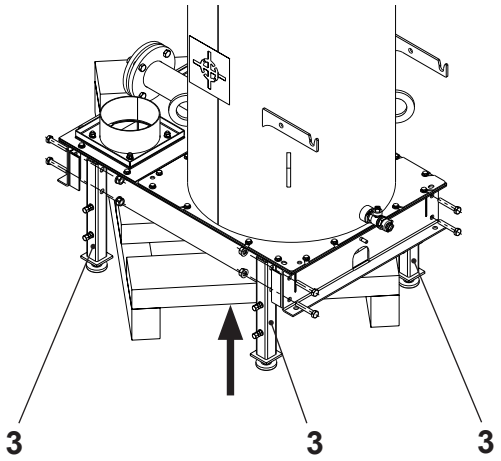


Fig. 04

4. Raise the boiler with the pallet (e.g. using a lift truck).
5. Pre-assemble 3 boiler feet (3) (tighten screws by hand).
6. Carefully lower the boiler again (danger of tipping over)
   - The boiler remains on 3 feet.
7. Remove the pallet from under the boiler.
8. Mount the 4th boiler foot (4).

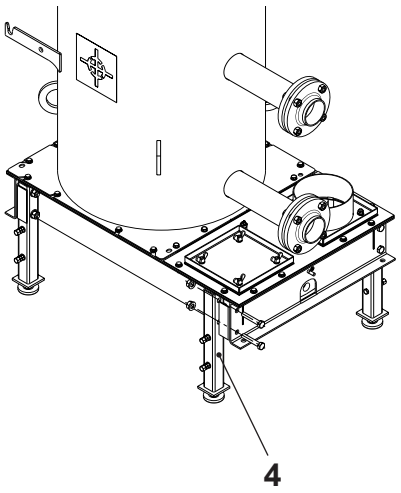


Fig. 05

9. Tighten the screws of all 4 feet.

WARNING

Tip hazard.
Unscrew the feet max. 80 mm.

2.1.4 Set-up of UltraGas® 2 (190-1550)

1. Remove climbing aid (1).

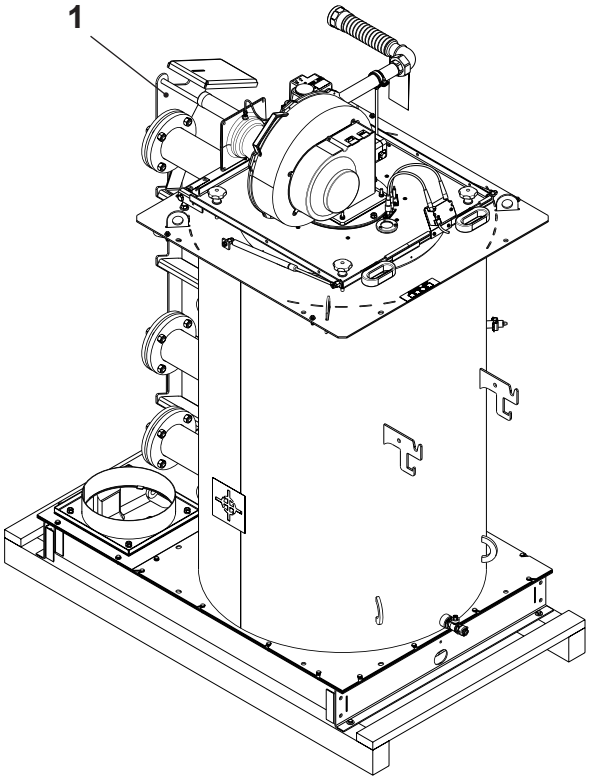


Fig. 06

2. Remove front (2) and rear (3) wooden crossbeam.

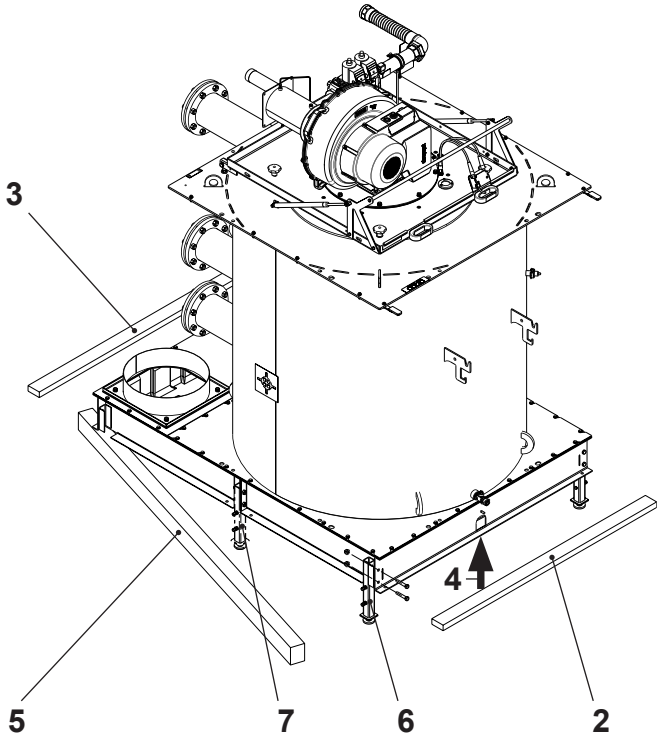


Fig. 07

3. Using a winch (4), raise the front of the boiler.
4. Remove both side beams (5) to the front and side (see Fig. 07).
5. Pre-assemble front feet (6) (tighten screws by hand).
6. Using a winch, raise the rear of the boiler.
7. Remove both side beams (5).
8. Pre-assemble rear feet and, if provided, middle (7) feet (tighten screws by hand).
9. Using a winch, place the boiler on the floor.
10. Tighten the screws of all feet.

WARNING

Tip hazard.
Unscrew the feet max. 80 mm.

2.2 Installation of the thermal insulation

1. Place the insulation mat (1) around the UltraGas® 2 boiler.
   - Start at the front of the boiler.
   - Make sure that the recesses are seated correctly.
2. Fit tension springs (2) to hold the ends of the insulation mat (1) together.
3. Fasten plastic straps (3) and strap fasteners (4).
   - Do not overtighten the straps (reduced insulating value).

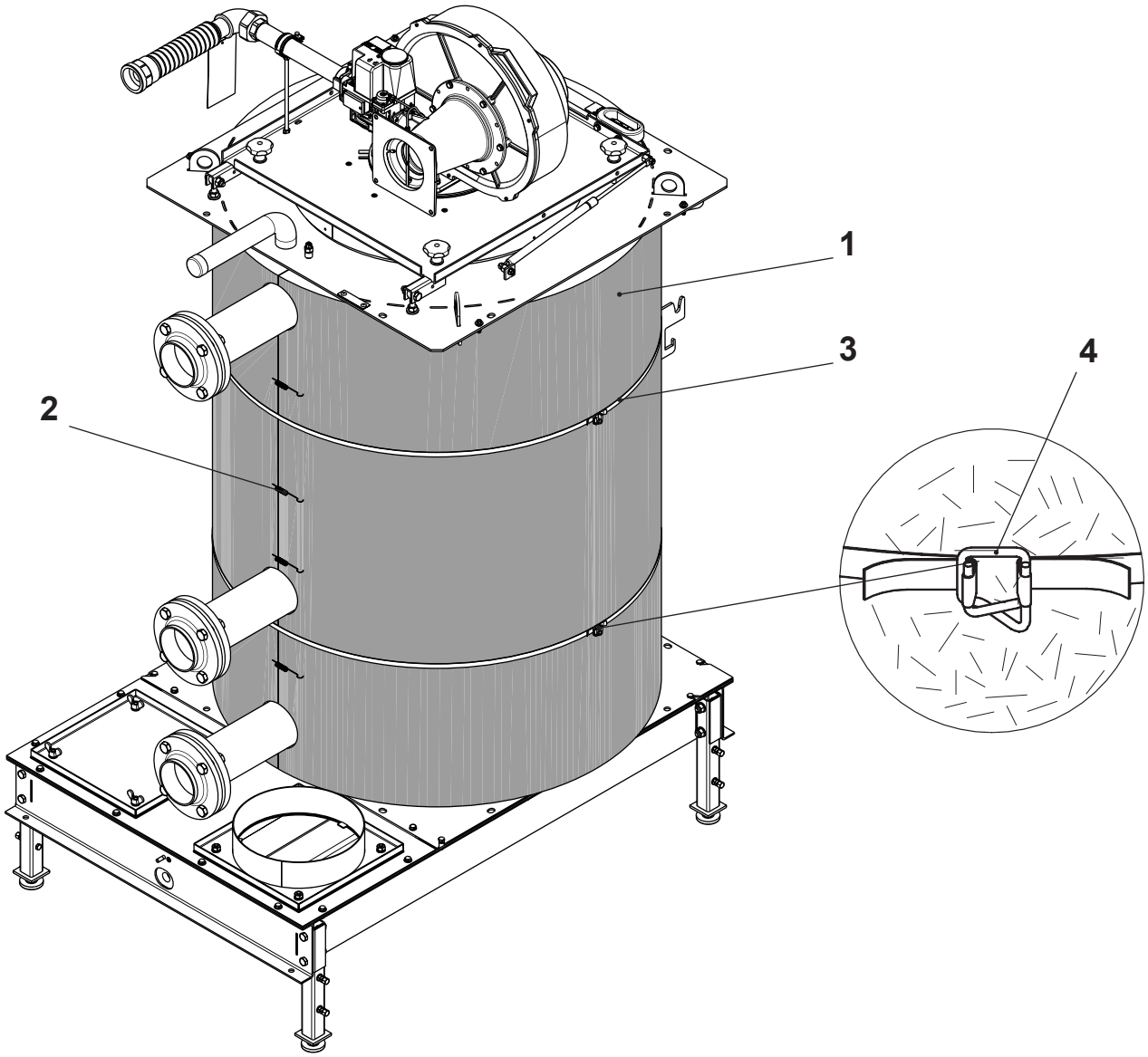


Fig. 08

2.3 Installation of the cladding

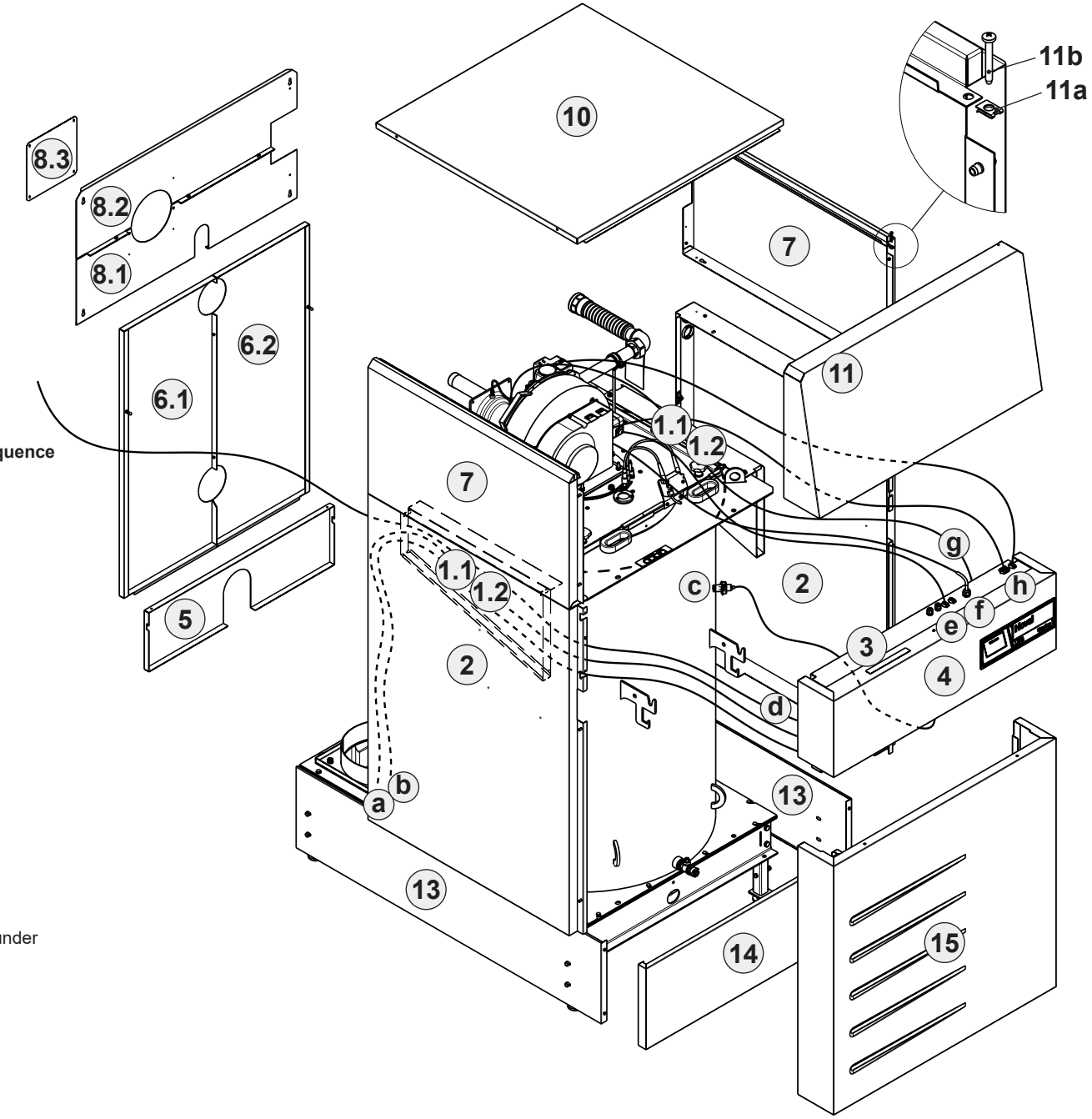


Fig. 09

Cladding sections UltraGas® 2 (125-1100) in installation sequence

1.1/1.2	Cable duct
2	Side wall bottom
3	Terminal plate
4	Electrical box
5	Rear wall bottom
6.1/6.2	Rear wall centre
7	Side wall top
8.1/8.2	Rear wall top
8.3	Blind cover for rear wall top
9	–
10	Cover plate
11	Front top
12	Siphon and condensate drain (see chapter 4.4.2)
13	Base strip on the side
14	Base strip on the front
15	Front cover

Cabling

a	Flue gas sensor (on the back of the boiler, directly under the return connection)
b	Neutralisation unit (if fitted)
c	Water pressure sensor
d	Mains cable
e	Pressure switch B18
f	Flame monitoring (ionisation)
g	Boiler temperature sensor
h	Burner wiring: 2 plug connections

Cladding sections UltraGas® 2 (1300.1550) in installation sequence

1.1/1.2	Cable duct
2.1/2.2	Side wall bottom
3	Clamping plate
4	Electrical box
5	Rear wall bottom
6.1/6.2	Rear wall centre
7	Side wall top
8.1/8.2	Rear wall top
8.3	Blind cover for rear wall top
9	Side wall spacer
10.1/10.2	Cover plate
11	Front top
12	Siphon and condensate drain (see chapter 4.4.2)
13	Base strip on the side
14	Base strip on the front
15	Front cover

Cabling

a	Flue gas sensor (on the back of the boiler, directly under the return connection)
b	Neutralisation unit (if fitted)
c	Water pressure sensor
d	Mains cable
e	Pressure switch B18
f	Flame monitoring (ionisation)
g	Boiler temperature sensor
h	Burner wiring: 2 plug connections

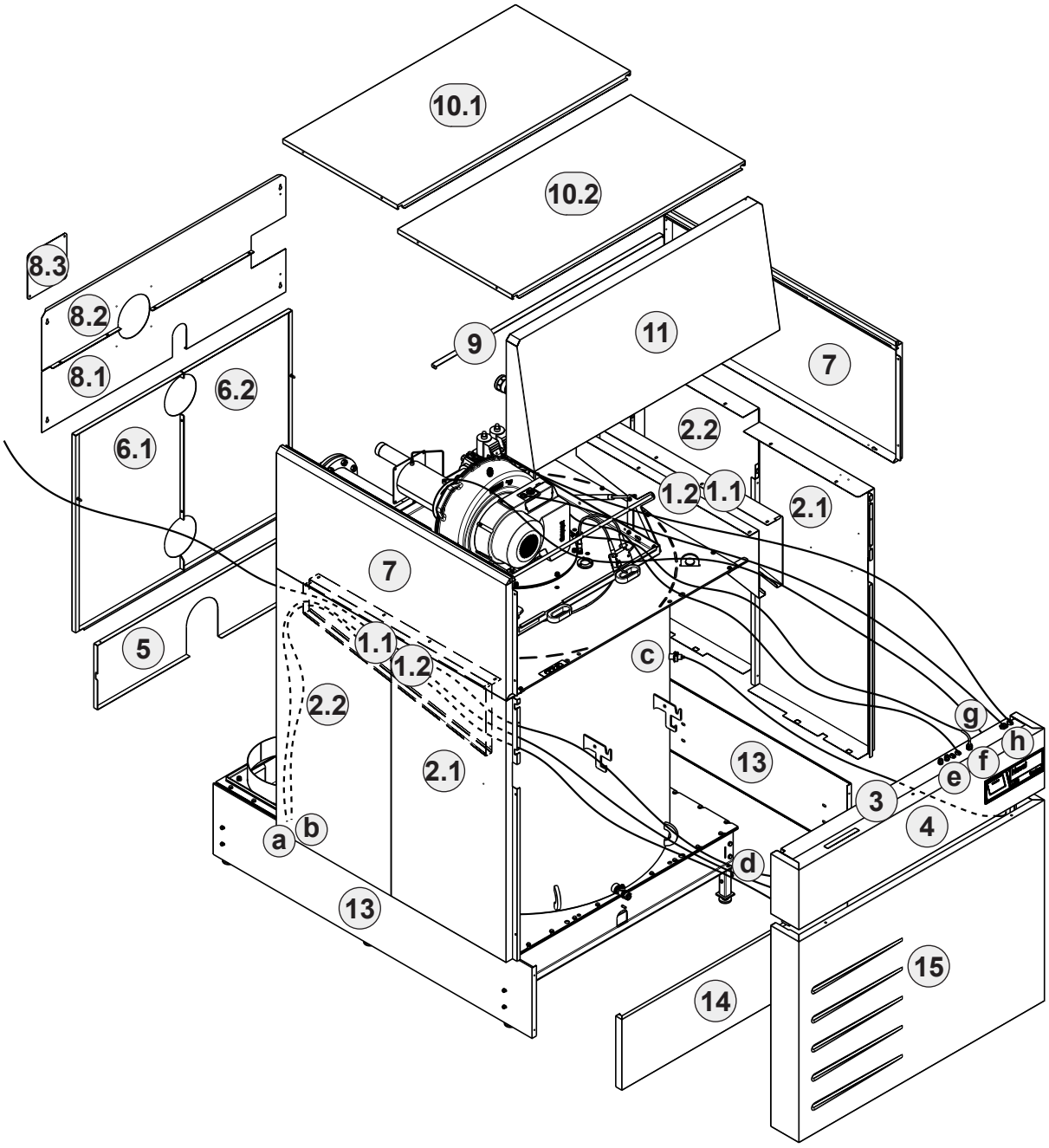


Fig. 10

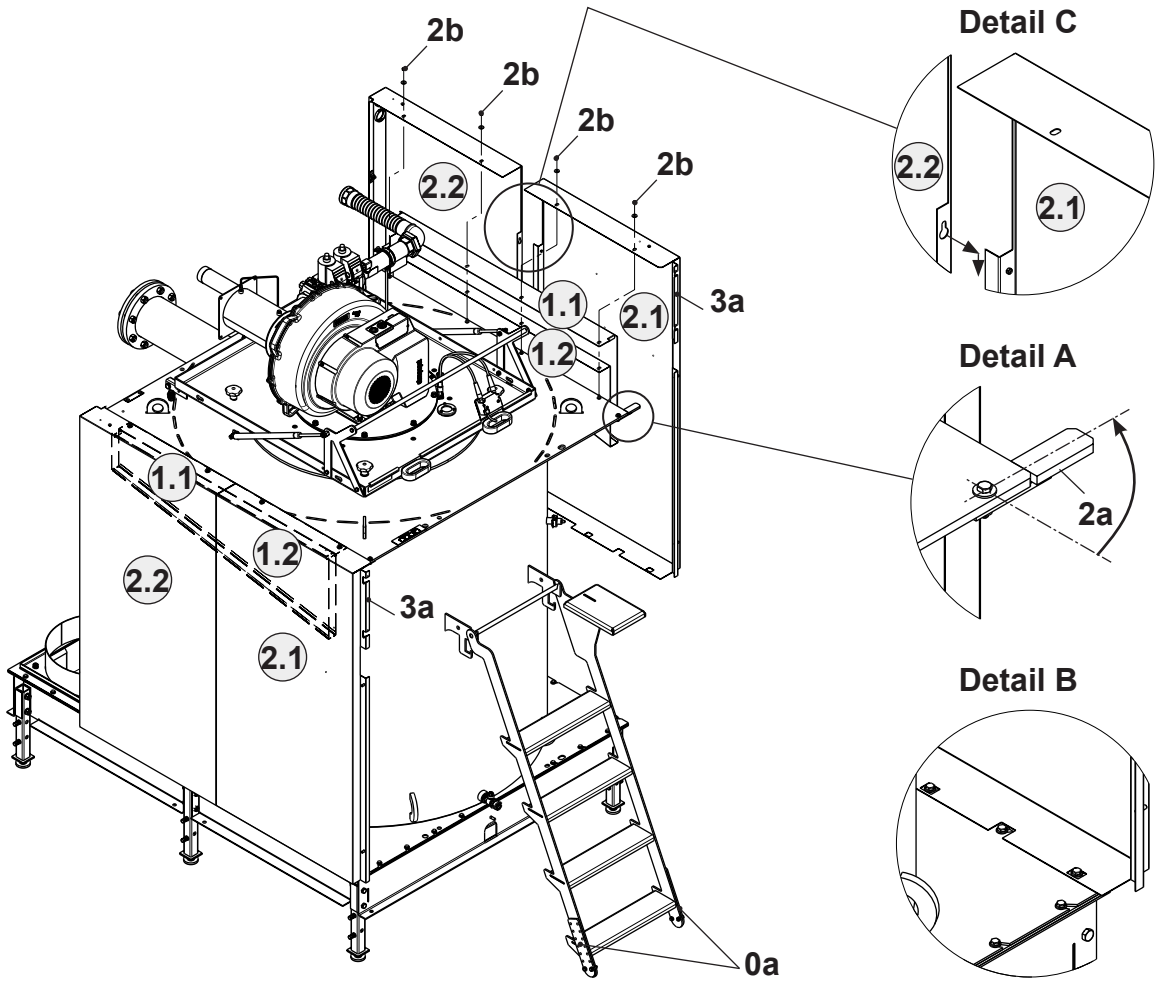


Fig. 11

1. Set up climbing aid for installation:
   Adjust the supplied climbing aid to the required length using the extension piece (0a) and set it up.
2. Mount the two cable ducts (1) on the boiler:
   - Insert the cable duct part (1.2) into the cable duct part (1.1) so that the upper holes are on top of each other.
   - Hang the cable duct (1.1/1.2) on the left or right of the boiler in the threaded pins.
3. Installing both side walls:
   - If there is a side wall support (2a, detail A), turn outwards to the side.
   - Hang the side wall section (2.1 or 2) on the boiler in such a way that the recesses at the top and bottom are positioned over the screws (“Fig. 11”, page 15, detail B).
   - Only UltraGas® 2 (1300.1550):
     Install side wall section (2.2) (detail C):
     - Position the slots in the side wall section (2.2) on the corresponding screw heads of the side wall section (2.1) and then fix the two sections together by pulling down the side wall section (2.2).
     - The recesses at the top and bottom of the side wall section (2.2) must be positioned over the screws.
   - **Loosely** fasten the lower side wall (2 or 2.1/2.2) at the fastening positions (2b) using a hexagon nut and the corresponding washer.
4. Mount terminal plate (3) of the electrical box:
   - Position the slots in the terminal plate (3) on the corresponding screw heads (3a) of the lower side walls (2) and then fix the sections together by pulling down the terminal plate (3).
   - Screw the terminal plate to the lower side walls using 4 self-tapping screws (3b).

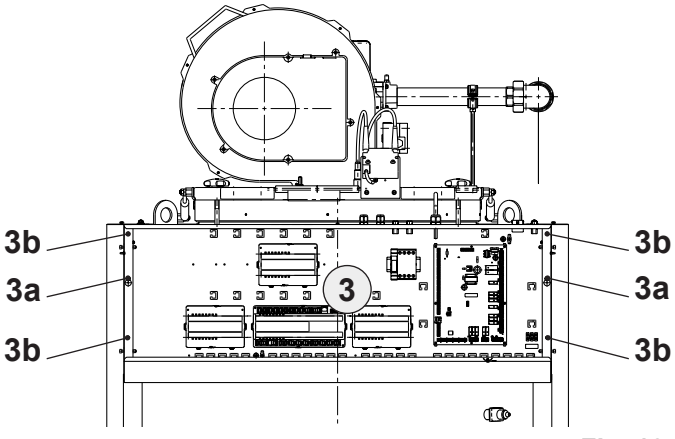


Fig. 12

5. Route all cables (a-h, Fig. 09/Fig. 10) and establish plug-in connections (wiring in accordance with Fig. 09 or Fig. 10).
   - Cables passing through one of the two cable ducts (1.1/1.2) must be inserted through the openings at the bottom of the terminal plate (3c, Fig. 13).
   - Fix cables to a strain relief strap.

CAUTION

The cables must not touch any hot parts.
- All cables must be routed through the cable ducts.

6. Installing the electrical box (4):

NOTICE

Make sure that the electrical box is not scratched by the climbing aid.

   - Hold the electrical box (4) horizontally against the boiler.
     - The recesses (4a) on the left and right of the base of the electrical box must point towards the lower two studs (4b) on the side of the terminal plate (3).

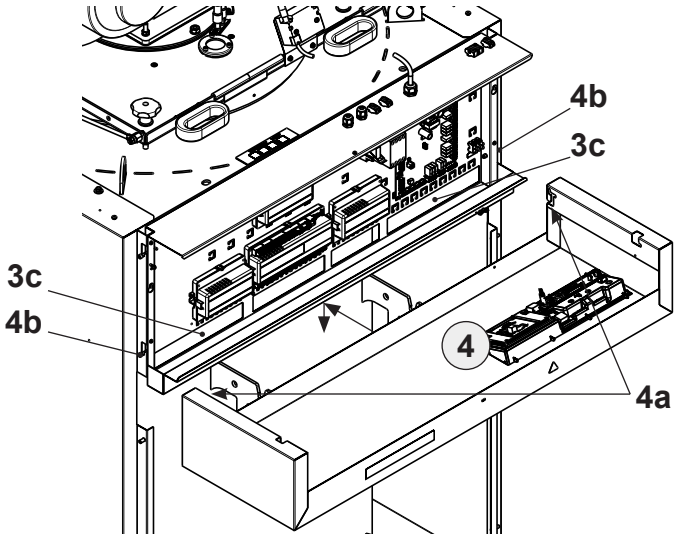


Fig. 13

   - Move the electrical box (4) forwards so that the heads of the two lower studs (4b) end up in the two recesses (4a).
   - Then pull the electrical box (4) downwards so that the studs (4b) hook into the recesses (4a).
   - Attach one safety cord (4c) each on the inside left and inside right of the electrical box.

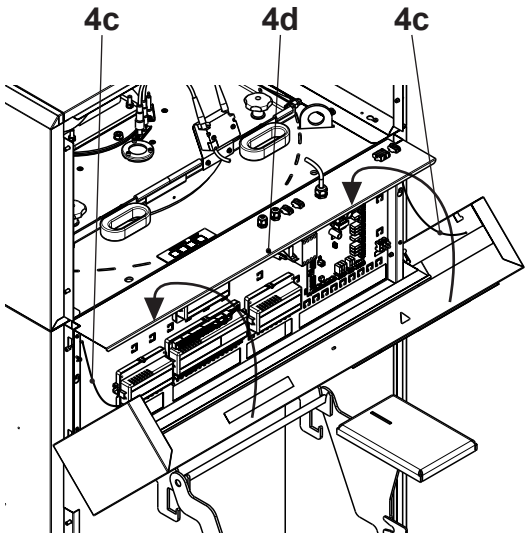


Fig. 14

   - Fold the electrical box closed upwards, lift it and hook it in, then secure with the screw (4d).

7. Installing rear wall:

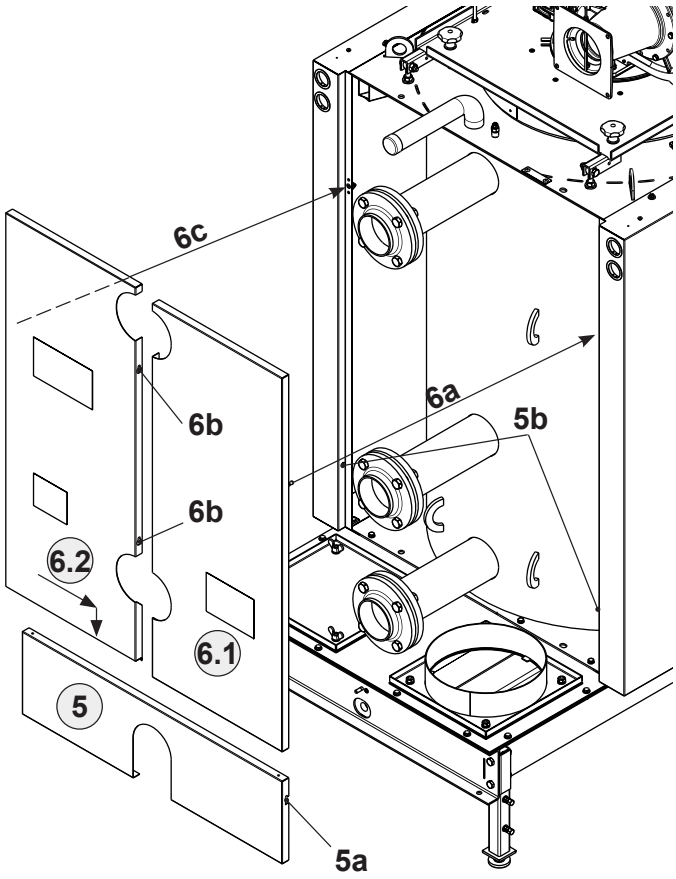


Fig. 15

   - Hook the lowest rear wall section (5) with the side recesses (5a) onto the corresponding screw heads (5b) of the side walls.
   - Installing the rear wall section (6.1):
     Press the pin of the rear wall section (6.1) into the snap lock of the corresponding side wall and let it engage (6a).

- Installing the rear wall section (6.2):
  - Position the slots (6b) in the rear wall section (6.2) on the corresponding screw heads of the rear wall section (6.1) and then fix the two sections together by pulling down the rear wall section (6.2).
  - Press the pin of the rear wall section (6.2) into the snap lock of the corresponding side wall and let it engage (6c).

8. Installing both side walls (continued):
   - Align lower side wall (2 or 2.1/2.2, Fig. 11) and fix position by tightening the screws (2a, Fig. 11).
   - Installing upper side wall (7):

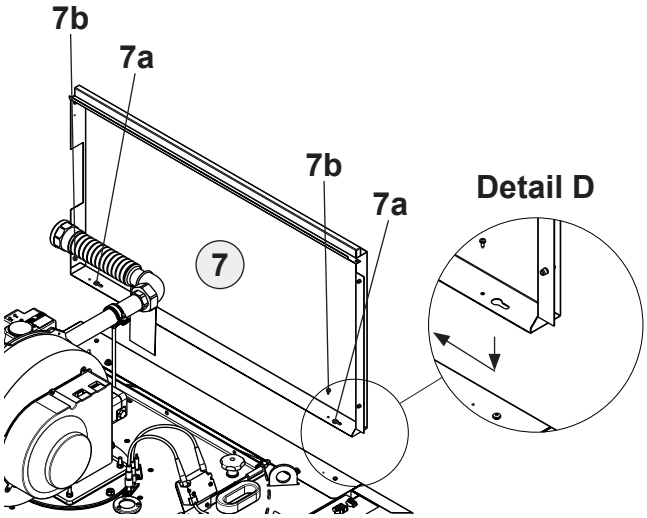


Fig. 16

   - Place the slots (7a) in the base of the upper side wall (7) on the corresponding screw heads of the lower side wall (2 or 2.1/2.2) and then fix the upper and lower side walls together by pushing the upper side wall (7) backwards.
   - Secure the upper side wall (7) using self-trapping screws (7b) ø 3.5 x 10.

9. Installing rear wall (continued):
   Installing the 3-section upper rear wall (8.1/8.2/8.3).

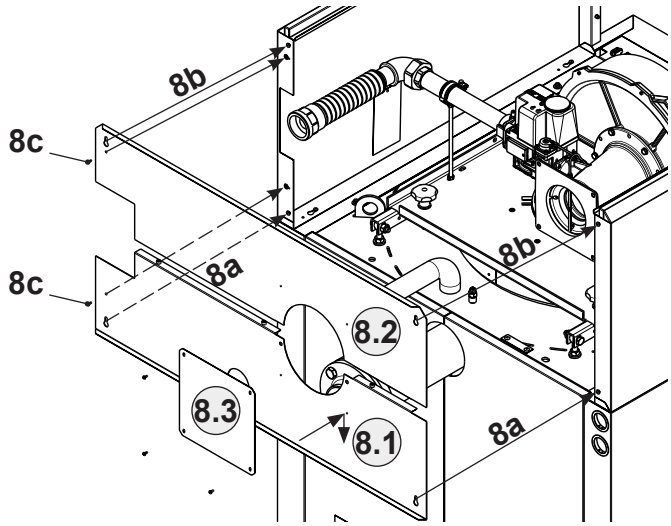


Fig. 17

   - Installing the rear wall section (8.1):
     Position the slots in the rear wall section (8.1) on the corresponding screw heads of the upper side walls (7) and then fix with the side walls by pulling down (8a).
   - Installing the rear wall section (8.2):
     Position the slots in the rear wall section (8.2) on the corresponding screw heads of the upper side walls (7) and then fix the side walls and both sections of the upper rear wall (8.1, 8.2) together by pulling down (8b).
   - Install the screws (8c) on the upper rear wall sections (8.1 and 8.2).
   - Install the blind cover (8.3) of the upper rear wall.

10. UltraGas® 2 (1300.1550):
    Hook in the spacer (9) for the side walls (7).

11. Install the cover plate (10 or 10.1/10.2):
    - UltraGas® 2 (125 - 1100):
      Push cover plate (10) into the bracket on the side walls.

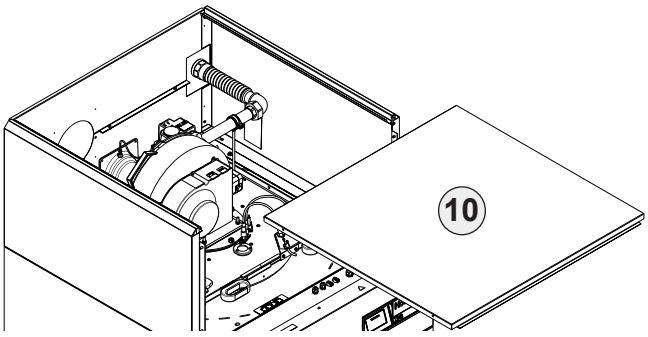


Fig. 18

    - UltraGas® 2 (1300.1550):
      First put on the rear cover plate (10.1), then the front cover plate (10.2) so that:
      - the large tab on the cover plate section points to the front.

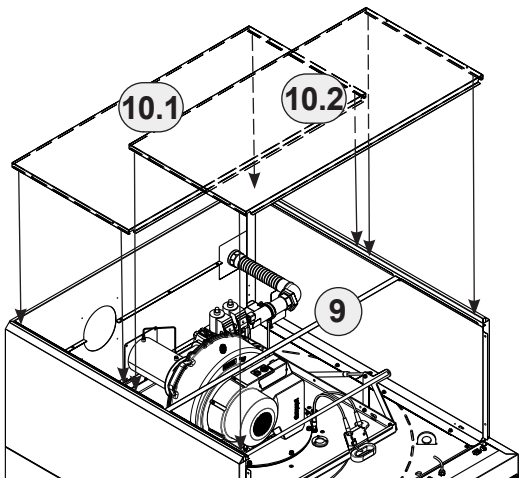


Fig. 19

12. Installing the upper front (11):

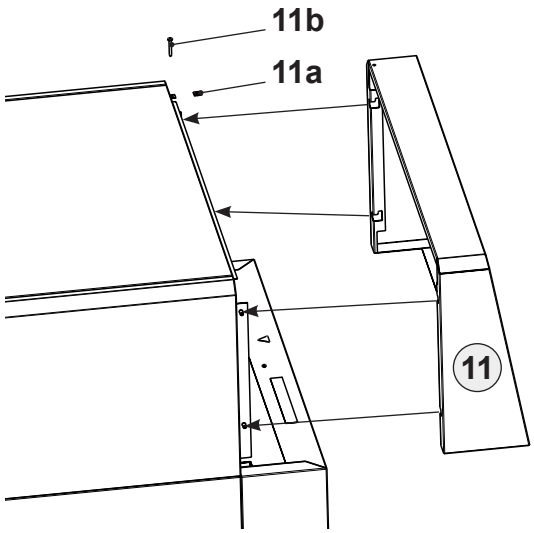


Fig. 20

- Install the C-clip (11a) in the cover plate (10 or 10.2) (see also detail in Fig. 09).
- Hang the upper front (11) onto the four pins of the upper side walls (7) so that the pins engage in the four recesses.
- Fix the upper front to the cover plate (10 or 10.2) using C-clip (11a) and carriage bolt (11b) (see also detail in Fig. 09).

13. Installing siphon and condensate drain (12) (see chapter “4.4.2 Installation of the siphon and condensate drain”, page 36):

WARNING

The supplied siphon must be installed (vertically).

14. Hang the climbing aid on the previously installed wall bracket (see Fig. 09 and Fig. 10).
15. Installing the base cladding:

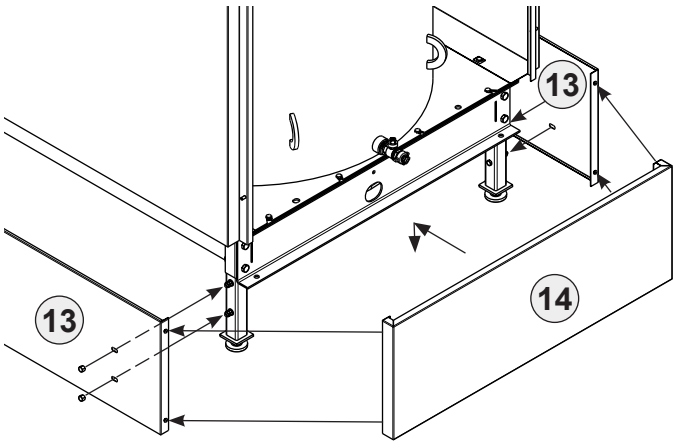


Fig. 21

- Installing both base strips (13) on the sides:
  Screw the side base strip (13) onto the boiler feet.
- Installing the front base strip (14):
  Place the slots of the front base strip (14) on the corresponding screw heads on the side base strips (13) and then fix all three base strips together by pushing the front base strip (14) downwards.

16. Installing the front cover (15):
    Hook front cover into the lower side walls.

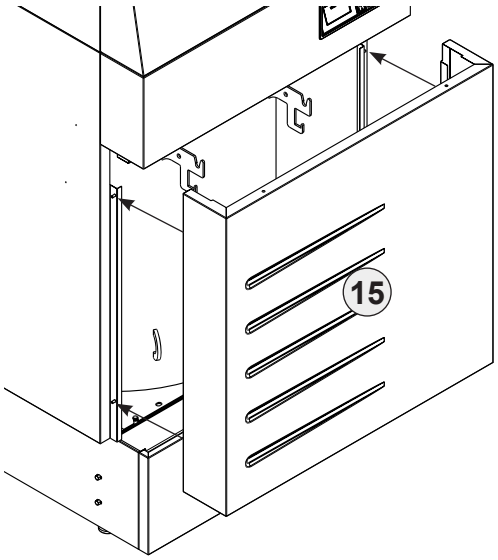


Fig. 22

2.4 Removing the cladding for maintenance and service work

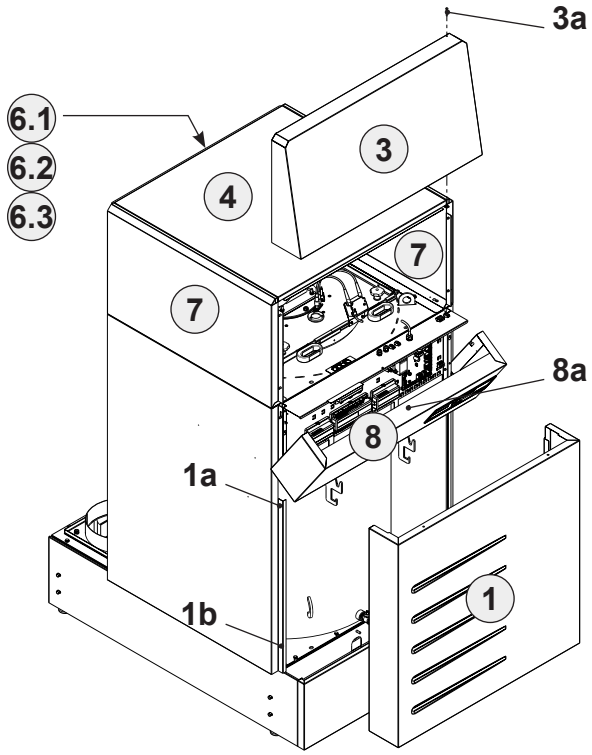


Fig. 23

1. Removing front cover (1):
   - Pull front cover away at the top (1a).
   - Unhook front cover at the bottom (1b).
2. Set up climbing aid (2).

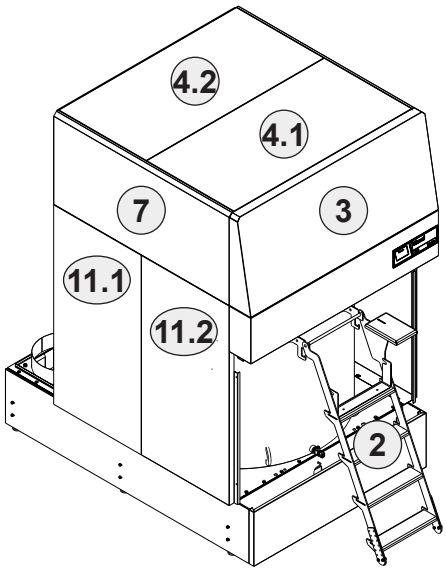


Fig. 24

3. Removing the upper front (3):
   - Remove securing screw (3a, Fig. 23).
   - Lift the upper front slightly and pull it forwards.
4. Remove the cover plates (4 or 4.1/4.2):
   - UltraGas® 2 (125 - 1100):

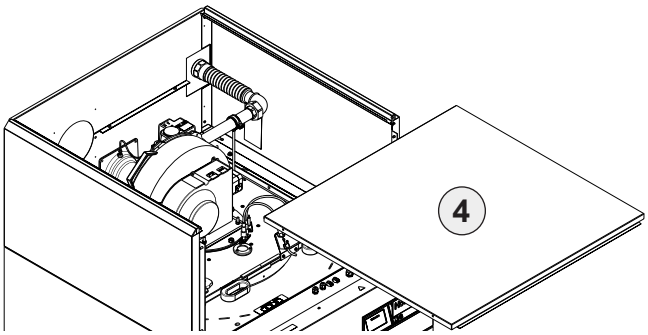


Fig. 25

   - UltraGas® 2 (1300.1550):

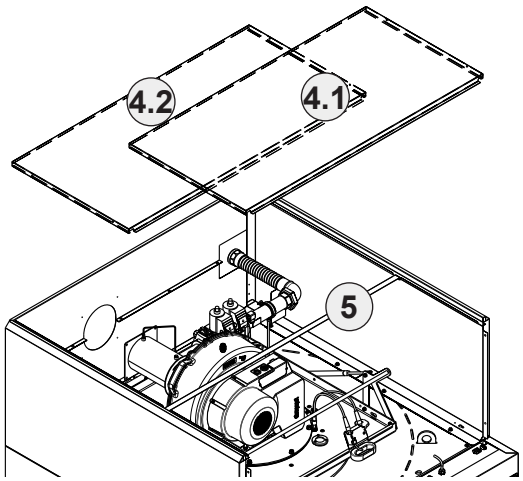


Fig. 26

5. Remove side wall spacers (5) if fitted.

6. Removing 3-section upper rear wall (6.1/6.2/6.3):
   - Remove blind cover (6.1).
   - Remove screws (6a).
   - Lift the rear wall section (6.2) slightly and pull it away.
   - Lift the rear wall section (6.3) slightly and pull it away.

If sections 6.1, 6.2 and 6.3 remain screwed together, the upper rear wall can also be dismantled as a 1 piece, with due care. However, we recommend this procedure only if there is plenty of space available.

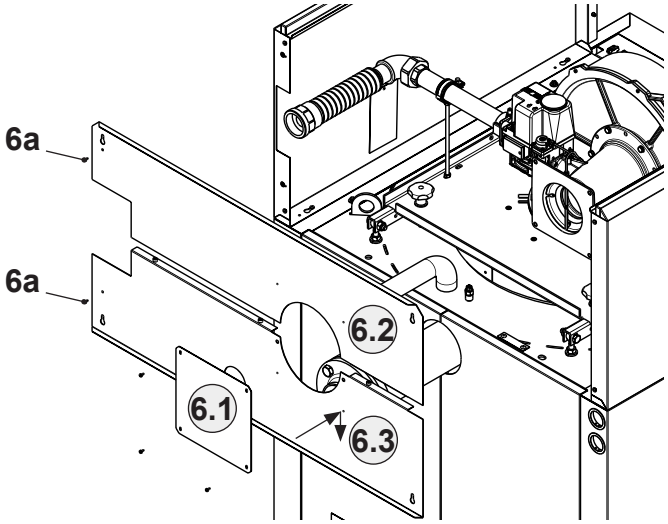


Fig. 27

7. Removing the upper side walls (7):
   - Remove the self-tapping screws (7a).
   - Pull the upper side wall (7) forwards slightly and lift it away upwards.

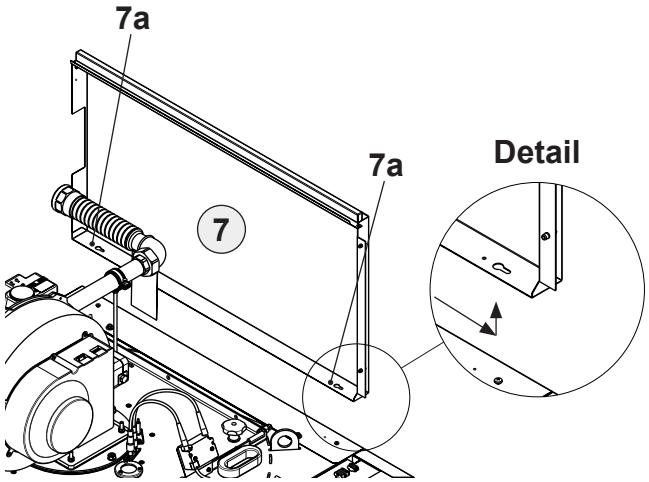


Fig. 28

8. Opening the electrical box (8):
   - Remove screw (8a).
   - Lift the electrical box (8) and fold it out.

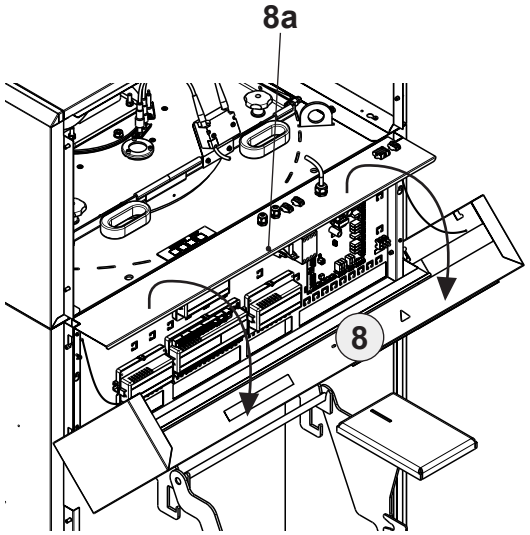


Fig. 29

3. Technical information

3.1 Description of the boiler

The UltraGas® 2 is a low-pollution and energy-saving gas condensing boiler with the Ultraclean burner system, a gas-fired premix burner with combustion air fan. The UltraGas® 2 has a vertically arranged combustion chamber of stainless steel as the primary heating surface and a secondary heating surface of TurboFer® stainless steel composite pipes (stainless steel on the water side, stainless steel/aluminium on the flue gas side).
The secondary heating surface is designed so that part of the water vapour contained in the flue 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® 2 is provided for operation with natural gas and liquefied gas. The design principle is shown in the following drawing.

Fig. 30

The UltraGas® 2 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.

3.2 Meaning of the data on the data plate

(1)	**Hersteller / Fabricant** **Produttore / Manufacturer**	**Hoval Aktiengesellschaft FL-9490 Vaduz**		Hoval
(2)	Vertrieb	Hoval AG CH-8706 Feldmeilen	Hoval Gesellschaft mbH A-4614 Marchtrenk	Hoval Ltd. GB-Newark NG24 1JN
	Distrib.	Hoval s.r.l. I-24050 Zanica	Hoval d.o.o. HR-10250 Lučko	Hoval EOOD BG-1797 Sofia
	Vendita	Hoval GmbH D-85609 Aschheim	Hoval SK spol. s r.o. SK-040 01 Košice	
	Sale	Hoval spol. s r.o. CZ-312 04 Plzen	Hoval s.r.l. RO-Voluntari 077190, Jud Ilfov	
		Hoval SAS F-67118 Geispolsheim	Hoval Sp. Z.o.o. PL-62-002 Suchy Las	
(3)	Modell / Modèle Modelli / Model	**UltraGas® 2 (700)**		**10/2020**
(4)	Brennwertkessel Chaudière à condensation Caldaia a condensazione Condensing boiler			

(5)	Pn	**700**	kW	V (H_2O)	**509**	l
	Pn (80/60°C)	**132 - 653**	kW	PMS	**6**	bar
	Pn (50/30°C)	**146 - 703**	kW	PT (1.5 x PMS)	**9**	bar
	Qn (H_i)	**134 - 668**	kW	Tmax	**95**	°C
	Qn (H_s)	**149 - 741**	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	II2E(R)3P / II2E(S)3P	20/25, 37 mbar	PL	II2ELw3P	20,20, 37 mbar
				ES, GB, IT	II2H3+	20, 28-30/37 mbar
	DE	II2ELL3P	20, 50 mbar	NL	II2EK3P	20/25, 50, 50 mbar
	AT, HR	II2H3P	20, 50 mbar	LU	II2E3P	20, 50 mbar
	CH, CZ, FI, GR	II2H3P	20, 37 mbar			
	PT, SI, SK, TR	II2H3P	20, 37 mbar	FR	II2Er3P / II2Esi3P	20/25, 37 mbar
	IE, LT, NO	II2H3P	20, 37 mbar	DK, EE, LV, RO, SE	II2H3P	20, 30 mbar

(9)	Elektroanschluss / Raccordement électrique / Collegamento elettrico / Electrical Connection		
	230V~/ 50Hz/ 10A , IP20	**max. 1060 W**	
(10)	NOx-Klasse / Classe NOx / Classe NOx / NOx-class	**6**	**EN 15502**
(11)	CE-Nr. / N° CE / Numero-CE / CE-No **CE-0085DL0175**	SVGW-Nr. / SVGW-No. / Nº-SVGW / N. -SVGW	**20-010-4**
(12)	CE 0085/20	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 (50/30 °C): Nominal heat output at 50/30 °C
- Qn (NCV) Nominal heat input (related to net calorific value NCV)
- Qn (GCV) 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) Read and comply with the labels (left) and warning notice, installation instructions and operating instructions (right)

3.3 UltraGas® 2 technical data

3.3.1 UltraGas® 2 (125-230)

Type			(125)	(150)	(190)	(230)
• Nominal heat output at 80/60 °C, natural gas		kW	21-114	33-139	35-177	47-218
• Nominal heat output at 50/30 °C, natural gas		kW	25-126	35-151	38-191	51-233
• Nominal heat output at 80/60 °C, propane [2]		kW	-	-	-	-
• Nominal heat output at 50/30 °C, propane [2]		kW	-	-	-	-
• Nominal heat input with natural gas [1]		kW	23-116	32-142	35-179	47-223
• Nominal heat input with propane [2]		kW	-	-	-	-
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Max. operating temperature (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	207	195	276	265
• Flow resistance boiler			See diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	378	400	490	510
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [3]		%	98.6/88.9	97.6/88.1	98.5/ 88.7	97.7/88.1
• Boiler efficiency at 30% partial load operation (EN 15502) (NCV/GCV) [3]		%	108.7/98.1	108.7/98.1	109.0/98.2	108.4/97.8
• Room heating energy efficiency						
- without control	ηs	%	93	93	93	93
- with control	ηs	%	95	95	95	95
- with control and room sensor	ηs	%	97	97	97	97
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	25	28	33	37
• Carbon monoxide emissions at 50/30 °C [4]	CO	mg/Nm³	31	21	25	13
• O_2 content in flue gas min./max. output [5]		%	5.9/5.6	5.5/6.0	5.9/6.0	6.0/5.9
• CO_2 content in flue gas at min./max. output		%	8.6/8.7	8.8/8.5	8.6/8.5	8.5/8.6
• Heat loss in standby mode		Watts	380	380	510	510
• Dimensions			See dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-80
- Liquid 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	2.3-11.6	3.2-14.2	3.5-18.0	4.7-22.4
- Natural gas LL - (Wo = 12.4 kWh/m³) NCV = 8.57 kWh/m³		m³/h	2.7-13.5	3.7-16.6	4.1-20.9	5.5-26.0
- Propane (NCV = 25.9 kWh/m³)		m³/h	-	-	-	-
• Operating voltage		V / Hz	1x230/50	1x230/50	1x230/50	1x230/50
• Electrical power consumption min./max.		Watts	41/140	43/225	38/151	49/228
• Standby		Watts	7	8	8	8
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	64	69	63	66
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	-	-	-
- Sound pressure level heating noise (depending on installation conditions) [6]			54	59	53	56
• Condensate quantity (natural gas) at 50/30 °C		l/h	11	12	15	20
• pH value of the condensate (approx.)			4.2	4.2	4.2	4.2
• Construction			B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at nominal heat input (dry)		kg/h	188	226	283	344
- Flue gas mass flow at lowest heat input (dry)		kg/h	37	51	55	63
- Flue gas temperature at nominal output and operation 80/60 °C		°C	64	65	68	69
- Flue gas temperature at nominal output and operation 50/30 °C		°C	43	45	46	47
- Flue gas temperature at lowest heat output and operation 50/30 °C		°C	29	28	29	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Flow rate combustion air		Nm³/h	154	180	232	280
- Maximum supply pressure for supply air and flue gas line		Pa	120	120	130	130
- Maximum draught/negative pressure at flue gas outlet		Pa	-50	-50	-50	-50

[1] Data related 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] Data related to NCV
[3] Conversion acc. to EN 15502-1, Appendix J
[4] Data related to 3 % of O_2
[5] Values at determination of technical data during approval
[6] Compare notice for engineering

3.3.2 UltraGas® 2 (300-450)

Type			(300)	(350)	(400)	(450)
• Nominal heat output at 80/60 °C, natural gas		kW	62-283	70-332	80-378	87-429
• Nominal heat output at 50/30 °C, natural gas		kW	67-302	73-350	85-401	96-453
• Nominal heat output at 80/60 °C, propane [2]		kW	-	-	-	-
• Nominal heat output at 50/30 °C, propane [2]		kW	-	-	-	-
• Nominal heat input with natural gas [1]		kW	62-291	70-338	78-385	89-437
• Nominal heat input with propane [2]		kW	-	-	-	-
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Max. operating temperature (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	522	496	483	457
• Flow resistance boiler			See diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	770	810	830	850
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [3]		%	98.2/88.5	98.1/88.5	98.3/88.6	98.3/88.7
• Boiler efficiency at 30% partial load operation (EN 15502) (NCV/GCV) [3]		%	109.2/98.4	108.4/97.7	108.3/97.6	108.3/97.9
• Room heating energy efficiency						
- without control	ηs	%	93	93	93	-
- with control	ηs	%	95	95	95	-
- with control and room sensor	ηs	%	97	97	97	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	31	38	41	37
• Carbon monoxide emissions at 50/30 °C [4]	CO	mg/Nm³	21	21	26	31
• O_2 content in flue gas min./max. output [5]		%	6.0/5.9	6.0/5.9	6.0/5.9	5.9/5.8
• CO_2 content in flue gas at min./max. output		%	8.5/8.6	8.6/8.6	8.5/8.6	8.6/8.6
• Heat loss in standby mode		Watts	750	750	750	750
• Dimensions			See dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-80
- Liquid 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	6.2-29.2	7.0-33.9	7.8-38.6	8.9-43.8
- Natural gas LL - (Wo = 12.4 kWh/m³) NCV = 8.57 kWh/m³		m³/h	7.2-34.0	8.2-39.4	9.1-44.9	10.4-51.0
- Propane (NCV = 25.9 kWh/m³)		m³/h	-	-	-	-
• Operating voltage		V / Hz	1x230/50	1x230/50	1x230/50	1x230/50
• Electrical power consumption min./max.		Watts	42/260	44/292	53/560	63/580
• Standby		Watts	5	8	5	8
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	-	69	-	76
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	-	-	-
- Sound pressure level heating noise (depending on installation conditions) [6]			-	59	-	66
• Condensate quantity (natural gas) at 50/30 °C		l/h	26	31	35	40
• pH value of the condensate (approx.)			4.2	4.2	4.2	4.2
• Construction			B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at nominal heat input (dry)		kg/h	460	538	608	695
- Flue gas mass flow at lowest heat input (dry)		kg/h	98	112	123	142
- Flue gas temperature at nominal output and operation 80/60 °C		°C	68	66	67	69
- Flue gas temperature at nominal output and operation 50/30 °C		°C	47	46	48	48
- Flue gas temperature at lowest heat output and operation 50/30 °C		°C	28	28	29	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Flow rate combustion air		Nm³/h	376	440	497	569
- Maximum supply pressure for supply air and flue gas line		Pa	130	130	130	130
- Maximum draught/negative pressure at flue gas outlet		Pa	-50	-50	-50	-50

[1] Data related 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] Data related to NCV
[3] Conversion acc. to EN 15502-1, Appendix J
[4] Data related to 3 % of O_2
[5] Values at determination of technical data during approval
[6] Compare notice for engineering

3.3.3 UltraGas® 2 (530-800)

Type			(530)	(620)	(700)	(800)
• Nominal heat output at 80/60 °C, natural gas		kW	100-497	125-580	132-653	150-743
• Nominal heat output at 50/30 °C, natural gas		kW	110-533	136-622	146-703	166-804
• Nominal heat output at 80/60 °C, propane [2]		kW	-	-	-	-
• Nominal heat output at 50/30 °C, propane [2]		kW	-	-	-	-
• Nominal heat input with natural gas [1]		kW	101-506	124-591	134-668	151-759
• Nominal heat input with propane [2]		kW	-	-	-	-
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Max. operating temperature (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	571	536	509	831
• Flow resistance boiler			See diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	978	1050	1100	1370
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [3]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.3/88.6
• Boiler efficiency at 30% partial load operation (EN 15502) (NCV/GCV) [3]		%	109.1/98.3	109.0/98.2	108.9/98.1	109.1/98.3
• Room heating energy efficiency						
- without control	ηs	%	-	-	-	-
- with control	ηs	%	-	-	-	-
- with control and room sensor	ηs	%	-	-	-	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	33	33	40	36
• Carbon monoxide emissions at 50/30 °C [4]	CO	mg/Nm³	20	24	26	23
• O_2 content in flue gas min./max. output [5]		%	5.9/5.9	5.9/6.0	6.0/5.7	6.0/5.8
• CO_2 content in flue gas at min./max. output		%	8.6/8.6	8.5-8.5	8.5/8.7	8.5/8.6
• Heat loss in standby mode		Watts	1000	1000	1000	1200
• Dimensions			See dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-80
- Liquid 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	10.1-50.8	12.4-59.3	13.4-67.0	15.1-76.1
- Natural gas LL - (Wo = 12.4 kWh/m³) NCV = 8.57 kWh/m³		m³/h	11.8-59.0	14.5-69.0	15.6-77.9	17.6-88.6
- Propane (NCV = 25.9 kWh/m³)		m³/h	-	-	-	-
• Operating voltage		V / Hz	1x230/50	1x230/50	1x230/50	1x230/50
• Electrical power consumption min./max.		Watts	67/805	63/831	67/1060	94/1012
• Standby		Watts	5	5	5	7
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	77	75	76	-
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	-	-	-
- Sound pressure level heating noise (depending on installation conditions) [6]			67	65	66	-
• Condensate quantity (natural gas) at 50/30 °C		l/h	39	51	48	57
• pH value of the condensate (approx.)			4.2	4.2	4.2	4.2
• Construction			B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at nominal heat input (dry)		kg/h	800	933	1055	1198
- Flue gas mass flow at lowest heat input (dry)		kg/h	159	196	211	238
- Flue gas temperature at nominal output and operation 80/60 °C		°C	67	68	69	66
- Flue gas temperature at nominal output and operation 50/30 °C		°C	45	47	49	44
- Flue gas temperature at lowest heat output and operation 50/30 °C		°C	28	28	29	28
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Flow rate combustion air		Nm³/h	654	764	863	981
- Maximum supply pressure for supply air and flue gas line		Pa	130	130	130	130
- Maximum draught/negative pressure at flue gas outlet		Pa	-50	-50	-50	-50

[1] Data related 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] Data related to NCV
[3] Conversion acc. to EN 15502-1, Appendix J
[4] Data related to 3 % of O_2
[5] Values at determination of technical data during approval
[6] Compare notice for engineering

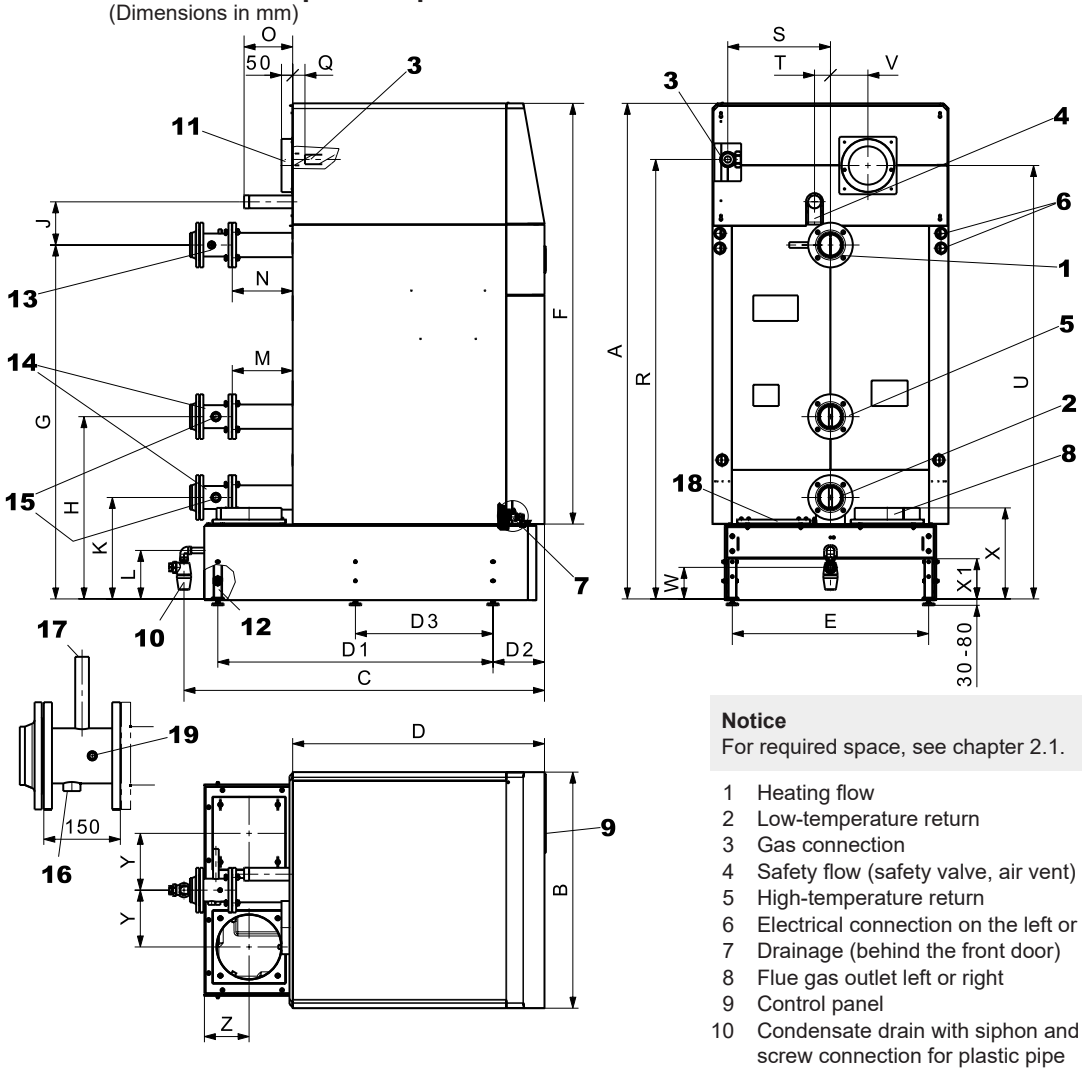
3.3.4 UltraGas® 2 (1000-1550)

Type			(1000)	(1100)	(1300)	(1550)
• Nominal heat output at 80/60 °C, natural gas		kW	185-926	203-1038	241-1230	297-1447
• Nominal heat output at 50/30 °C, natural gas		kW	205-999	229-1112	269-1320	324-1550
• Nominal heat output at 80/60 °C, propane [2]		kW	-	-	-	-
• Nominal heat output at 50/30 °C, propane [2]		kW	-	-	-	-
• Nominal heat input with natural gas [1]		kW	187-943	206-1057	247-1251	297-1469
• Nominal heat input with propane [2]		kW	-	-	-	-
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Max. operating temperature (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	756	718	1211	1118
• Flow resistance boiler			See diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	1540	1600	2130	2300
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [3]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.2/88.6
• Boiler efficiency at 30% partial load operation (EN 15502) (NCV/GCV) [3]		%	109.0/98.2	108.6/97.8	108.7/97.9	108.5/97.9
• Room heating energy efficiency						
- without control	ηs	%	-	-	-	-
- with control	ηs	%	-	-	-	-
- with control and room sensor	ηs	%	-	-	-	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	36	41	37	35
• Carbon monoxide emissions at 50/30 °C [4]	CO	mg/Nm^3	25	26	23	23
• O_2 content in flue gas min./max. output [5]		%	6.0/5.9	6.0/5.9	6.0/5.9	6.0/6.0
• CO_2 content in flue gas at min./max. output		%	8.5/8.6	8.5/8.5	8.5/8.6	8.5/8.5
• Heat loss in standby mode		Watts	1200	1200	1600	1600
• Dimensions			See dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-80
- Liquid gas		mbar	-	-	-	-
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E - (Wo = 15.0 kWh/m^3) NCV = 9.97 kWh/m^3		m^3/h	18.8-94.6	20.7-106.0	24.8-125.5	29.8-147.3
- Natural gas LL - (Wo = 12.4 kWh/m^3) NCV = 8.57 kWh/m^3		m^3/h	21.8-110.0	24.0-123.3	28.8-146.0	34.7-171.4
- Propane (NCV = 25.9 kWh/m^3)		m^3/h	-	-	-	-
• Operating voltage		V / Hz	1x230/50 3x400/50	1x230/50 3x400/50	1x230/50 3x400/50	1x230/50 3x400/50
• Electrical power consumption min./max.		Watts	203-1873	203-1933	271-4111	301-4141
• Standby		Watts	7	7	5	7
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	-	82	86	85
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	-	-	-
- Sound pressure level heating noise (depending on installation conditions) [6]			-	72	76	75
• Condensate quantity (natural gas) at 50/30 °C		l/h	68	72	100	138
• pH value of the condensate (approx.)			4.2	4.2	4.2	4.2
• Construction			B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at nominal heat input (dry)		kg/h	1488	1669	1975	2230
- Flue gas mass flow at lowest heat input (dry)		kg/h	295	325	390	450
- Flue gas temperature at nominal output and operation 80/60 °C		°C	69	70	66	68
- Flue gas temperature at nominal output and operation 50/30 °C		°C	47	49	45	46
- Flue gas temperature at lowest heat output and operation 50/30 °C		°C	28	29	29	28
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Flow rate combustion air		Nm^3/h	1219	1366	1617	1830
- Maximum supply pressure for supply air and flue gas line		Pa	130	130	130	130
- Maximum draught/negative pressure at flue gas outlet		Pa	-50	-50	-50	-50

[1] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without resetting.
[2] Data related to NCV
[3] Conversion acc. to EN 15502-1, Appendix J
[4] Data related to 3 % of O_2
[5] Values at determination of technical data during approval
[6] Compare notice for engineering

3.4 Dimensions/space required

(Dimensions in mm)



Notice
For required space, see chapter 2.1.

1 Heating flow
2 Low-temperature return
3 Gas connection
4 Safety flow (safety valve, air vent)
5 High-temperature return
6 Electrical connection on the left or right
7 Drainage (behind the front door)
8 Flue gas outlet left or right
9 Control panel
10 Condensate drain with siphon and screw connection for plastic pipe
11 Fresh air connection (option)
12 Boiler feet adjustable up to 80 mm
13 Safety valves connection flow (option)
14 Safety valves connection return (option)
15 Expansion Rp 1″
16 Maximum pressure limiter Rp ¾″
17 Safety temperature limiter Rp ½″
18 Cleaning opening left or right
19 System flow sensor Rp ¼″

Fig. 31

Type	A	B	C	D	D1	D2	D3	E	F	G	H	J	K	L	M	N	O	Q	R
(125,150)	2023	720	1154	799	754	242	-	533	1681	1579	814	122	434	234	207	207	65	192	1825
(190,230)	2068	820	1254	895	854	242	-	633	1726	1617	817	144	437	234	204	204	69	226	1878
(300,350)	2128	930	1604	1165	1204	242	-	743	1788	1652	845	169	465	231	285	285	189	58	1939
(400,450)	2198	930	1604	1165	1204	242	-	743	1858	1652	845	169	465	231	285	285	189	24	2015
(530-700)	2334	1110	1695	1184	1294	242	-	923	1982	1664	857	203	477	228	286	286	225	-2	2066
(800-1100)	2355	1290	1857	1364	1480	242	-	1103	1987	1673	888	215	508	228	378	378	225	58	2059
(1300,1550)	2495	1560	2175	1640	1790	250	895	1363	2103	1700	922	238	542	238	420	420	218	22	2164

Type	S	T	U	V	W	X	X1	Y	Z	1,2,5*	3	4	8	10	11
(125,150)	318	40	1825	101	154	419	199	157	139	DN 65 / PN 6 / 4 hole	Rp 1″	R 1″	Ø 155/159	DN 25	Ø 122/125
(190,230)	371	50	1878	101	154	419	199	195	139	DN 65 / PN 6 / 4 hole	Rp 1½″	R 1¼″	Ø 155/159	DN 25	Ø 197/200
(300,350)	367	40	1940	101	151	416	196	217	184	DN 100 / PN 6 / 4 hole	Rp 2″	R 1½″	Ø 252/256	DN 25	Ø 197/200
(400,450)	397	40	1986	124	151	416	196	217	184	DN 100 / PN 6 / 4 hole	Rp 2″	R 1½″	Ø 252/256	DN 25	Ø 247/250
(530-700)	483	75	2038	176	148	428	189	267	211	DN 100 / PN 6 / 4 hole	Rp 2″	R 2″	Ø 302/306	DN 25	Ø 247/250
(800-1100)	572	100	2059	176	148	474	189	357	219	DN 125 / PN 6 / 8 hole	Rp 2″	R 2″	Ø 302/306	DN 40	Ø 247/250
(1300,1550)	621	100	2164	190	158	498	189	455	244	DN 150 / PN 6 / 8 hole	Rp 2″	R 2″	Ø 402/406	DN 40	Ø 247/250

* DN = nominal diameter, PN = nominal pressure

3.4.1 Overall unit dimensions

Boiler without cladding and insulation
(Dimensions in mm)

WARNING

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

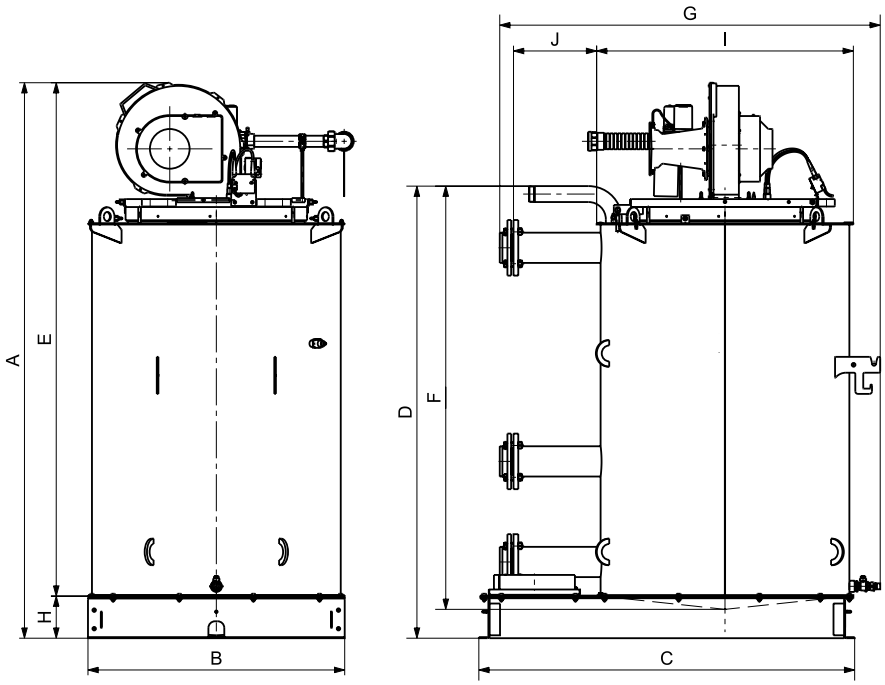
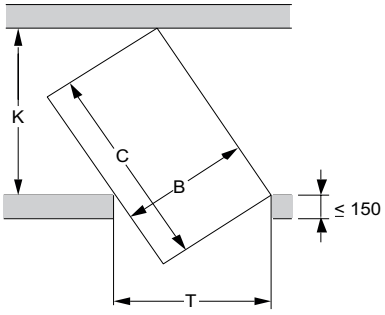


Fig. 32

UltraGas® 2 Type	A	B	C	D	Dimensions for installation as individual parts E	F	G	H	I	J
(125,150)	1765	580	880	1519	1625	1421	946	140	580	242
(190,230)	1818	680	980	1583	1678	1484	1037	140	680	236
(300,350)	1882	790	1330	1649	1742	1556	1391	140	950	316
(400,450)	1956	790	1330	1649	1816	1556	1391	140	950	316
(530-700)	2099	970	1420	1708	1940	1605	1423	159	970	316
(800-1100)	2120	1150	1606	1729	1945	1625	1722	175	1150	408
(1300,1550)	2255	1410	1916	1779	2056	1671	2042	199	1410	458

Required minimum width of door and corridor for boiler installation

The following values are the calculated minimum values



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

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

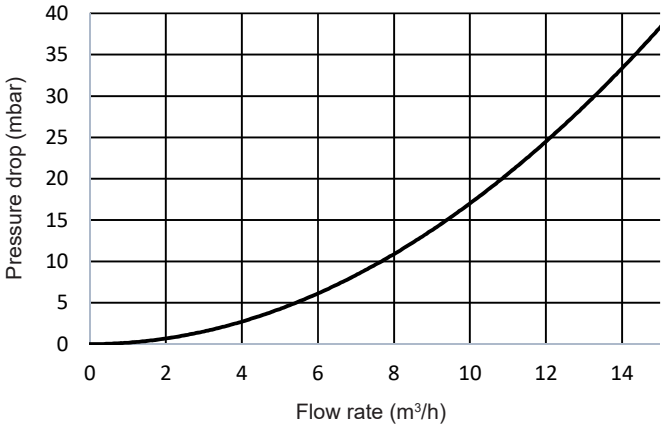
B = Boiler width
C = Maximum boiler length
T = Door width
K = Corridor width

Example calculation for the required corridor width, door width T = 1000

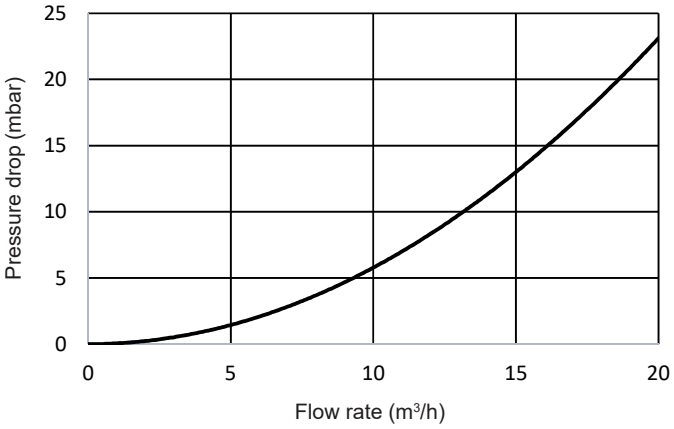
UltraGas® 2 (700) $K = \frac{970}{1000} \times 1420 =$ Corridor width ≥ 1377

3.5 Heating water side flow resistance

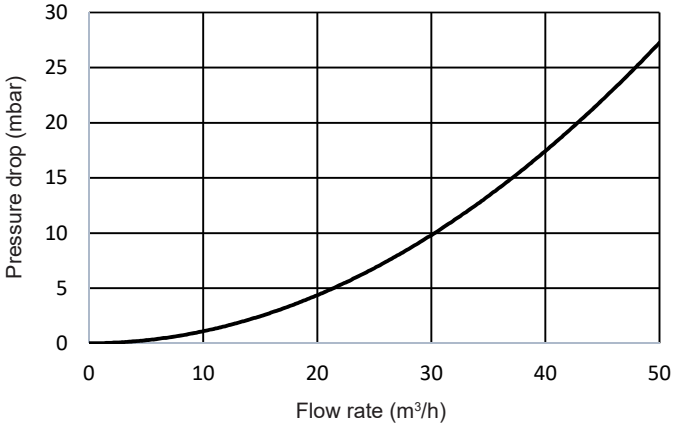
UltraGas® 2 (125,150)



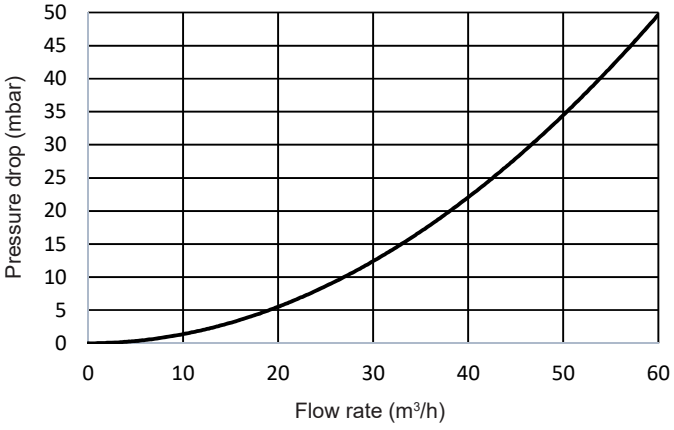
UltraGas® 2 (190.230)



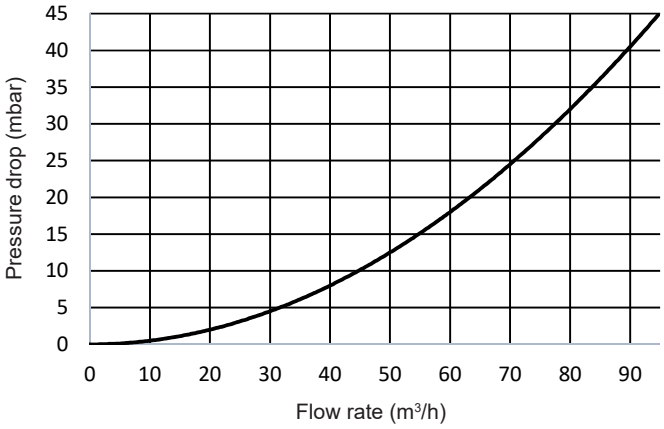
UltraGas® 2 (300-450)



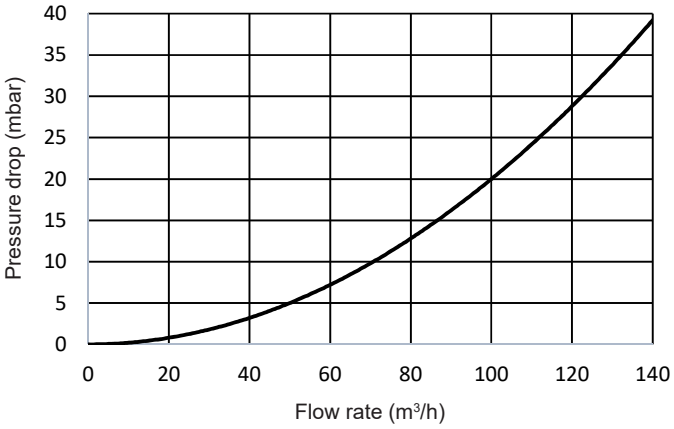
UltraGas® 2 (530-700)



UltraGas® 2 (800-1100)



UltraGas® 2 (1300.1550)



3.6 Short description of the functions of the automatic function device BIC 970

The automatic function device BIC 970 of the UltraGas® 2 is only used in conjunction with the heating controller TopTronic® E/UltraGas® 2, which means many familiar functions are already provided by the latter. Consequently, only the features which are integrated in the automatic function device are mentioned here:

- PWM control of the fan
- Modulating operation
- Ionisation electrode for flame monitoring (ionisation)
- Optional ignition monitoring via UV sensor
- Main gas valve (possibly LPG valve) or boiler room fan can be controlled
- Inputs for:
  - Flow sensor 1
  - Flow sensor 2
  - Flue gas sensor
  - Water pressure sensor
  - Safety limit value thermostat (possibly external flue gas temperature monitor)
  - Air pressure switch
  - Optional air pressure sensor can be connected for monitoring
  - Gas pressure switch
- “Fault” and “Flame message” status outputs
- RS-485 connection to TopTronic® E/UltraGas® 2
- Number of start attempts: maximum 4
- Safety time: 5 sec
- Pre-ignition: 5 sec
- Pre-ventilation period: 50 sec
- After-run time for pump (230 VAC): 5 min after a heat demand

Occurrence of a malfunction

A possible malfunction is displayed on the control module by means of error code and plain text. In addition, the lamp on the control module and, if necessary, on the fault signalling lamp of the control panel adapter also lights up. There is also a reset button on the control panel adapter with which the boiler can be put back into operation when the malfunction has been rectified.

Fuses

There is a fusible link on the BIC 970: 10AT

4. Installation

4.1 Safety instructions

CAUTION

Cutting injuries as a result of sharp edges.
Handle sections of the cladding 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.

CAUTION

Danger of corrosion on the heating gas or flue gas side

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

The following conditions must be met in the boiler room where the UltraGas® 2 is installed:

- The necessary combustion air must be able to flow in without obstruction. This contributes to correct function of all the firing devices that are operated there, and provides oxygen for the operating personnel to breathe.
- An adequate supply of fresh air must be guaranteed, 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 negative pressure in excess of 3 N/m^2 occurs in the boiler room. The locally applicable regulations must be complied with.

4.2.2 Room air independent installation

Variant using “Connection for direct combustion air supply” or “Motorised air intake damper” (optional):

- When configuring the intake tube, comply with the following:
  - If the air intake opening at the facade is near a noise sensitive place (window of bedroom, terrace etc.), we recommend using a silencer at the direct fresh air intake.
  - The air intake opening must be freely accessible and have a protective grating or possibly wind protection equipment.
  - Always keep the air intake opening clear (leaves, snow, ...).
  - Do not store any chemicals or poisonous substances in the vicinity of the air intake opening.
  - Do not install the air intake opening adjacent to extractor hood openings or other air extraction equipment.

4.3 Flue gas connection, flue gas line

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

§

The following directives must be complied with regarding the flue gas evacuation:

- DVGW (TRGI)
- ÖVGW
- SVGW/VKF
- or corresponding locally applicable instructions and regulations

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

§

The flue gas system must meet the following requirements:

- Gas-tight
- Water-tight
- Acid resistant (plastic (PPs), acid-resistant stainless steel, ceramic, glass)
- Approved for flue gas temperatures of up to 120 °C (T 120)
- Approved for overpressure

WARNING

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

Horizontal connecting lines 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 flue 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 flue gas line manufacturer. The values for the calculation can be found in the table under chapter 3.3.
- The flue 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 flue gas line.
  - If the flue gas line diameter is larger than the combustion air line, an individual calculation must be done.

The following only applies to countries in which the wall duct is allowed:
For C53 construction boilers, the air intake opening for the combustion air must not be on the opposing wall of the exhaust opening of the flue gas line.

4.3.1 Standard values for flue gas line dimensions

Standard values for the flue gas line dimensions can be found in the following table.

Table with bases for calculation

- Calculation based on max. 1000 m above sea level.
- Installation room with supply air opening (room air dependent operation)
- An individual calculation must be carried out for room air-independent operation (accessories as option) or a combustion air supply via a duct.
- Connecting line was calculated with max. 5 m.

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

WARNING

Flue gas outlet for oversized flue gas lines.

- For flue gas systems from third-party suppliers (air/flue gas line of version C63), a tolerance of +1/-0.5% of the flue gas line nominal diameter DN specified in the table must be upheld for the connection points.

Table "Standard values for flue gas line dimensions"

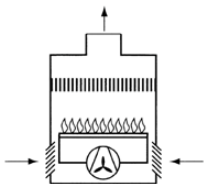
Boiler		Smooth-walled flue gas line	Number of 90° bends (flue gas + supply air)				
Type	Flue gas dim. mm	Designation	Total pipe length in m (flue gas + supply air)				
UltraGas® 2	inside	DN	1	2	3	4	5 [1)]
(125)	155	130	24	23	22	21	
(150)	155		18	17	16	15	
(125)	155	150	47	47	46	45	
(150)	155		45	45	45	44	
(190)	155		43	42	40	38	
(230)	155		20	20	19	18	
(230)	155	175	44	43	43	42	
(230)	155	200	45	44	43	43	
(300)	252		45	44	43	43	
(350)	252		44	43	43	42	
(400)	252	250	44	43	42	41	
(450)	252		43	42	41	40	
(530)	302		44	43	42	41	
(620)	302		43	42	41	40	
(700)	302		42	41	40	39	
(800)	302	300	45	44	43	43	
(1000)	302		44	43	43	42	
(1100)	302	350	47	46	45	44	
(1300)	402		46	45	44	43	
(1550)	402		45	44	43	43	

- The values in the table "Standard values for flue gas line dimensions" are standard values for reference. An exact calculation for the flue gas line must be made on site.
- For chimney systems above 25 m effective height, negative pressure in the chimney is to be expected in some operating conditions. Therefore, we recommend an individual design of the chimney system and checking the individual pressure conditions.

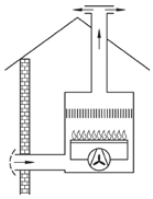
4.3.2 Air/flue gas routing

Design variants[1)]

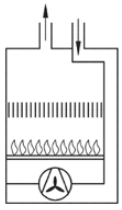
Combustion air taken from the surrounding environment



B23 P
Flue gas outlet into the chimney, suction of air from the surrounding environment.
End piece of the flue gas outlet above the roof



C53
Air intake and flue gas outlet outside in areas with
different pressure. Vertical end piece of the flue gas outlet.



C63
For connection to any certified air/flue gas systems

[1)] Source of illustrations: DVGW worksheet G 600, Technical regulations for gas installations (DVGW-TRGI), September 2018, pages 125, 135f

4.4 Condensate drain

4.4.1 Condensate drain engineering guidelines

The condensate should be led from the condensate drip tray of the gas condensing boiler to a siphon and from there via a hose or fixed pipework for condensate drainage to the sewer system or independent waste water treatment facility. The following points must be observed during installation:

Requirements and directives

Local regulations pertaining to the condensate discharge must be observed.

- **Before planning** condensate drainage, check with the responsible authority about the local regulations to be observed.
- Regulations in Germany:
  - Worksheet DWA-A 251 Condensate from condensing boilers from the DWA code of practice
  - Worksheet DVGW VP 114 Neutralisation units for gas burners - Requirements and testing from the DVGW Gas code of practice.
- Requirements and directives in Austria:
  - ÖNORM H 5152 Calorific plants - Planning guidelines
  - and above all the directives for customer natural gas systems (G K series) of the ÖVGW Gas code of practice.
- Switzerland/Liechtenstein:
  - See Suissetec information sheet regarding condensate

Material

The boiler condensate drain must be made of corrosion-resistant material. The following materials are suitable for condensate discharge:
Stoneware, glass, stainless steel and the following plastics: PVC, PE, PP, ABS and UP.

Siphon

The siphon (supplied with the heat generator) must be installed at the condensate drain of the heat generator and the condensate drain must be installed at the condensate outflow of the siphon.

Neutralisation

Without neutralisation, condensate discharge is only permitted if the waste water pipes and the sewer system are made from plastic or ceramic material (the local authority may approve a derogation).
If required by the local authority, the condensate must be neutralised before being discharged into the sewer system. In this case, a neutralisation unit must be installed in the condensate drain.

! **NOTICE**

Condensate with corrosive effect

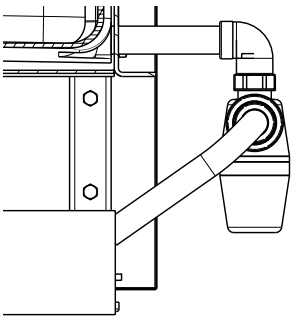
Depending on the sewer system (materials used and waste water in the sewer system), the acid condensate from the heat generator can damage the sewer system in such a way that waste water seeps out.

- Before the condensate drain is installed, check with the responsible public authority whether the condensate must be neutralised before being discharged into the sewer system.

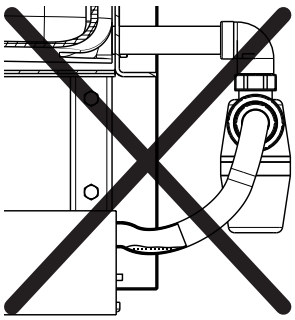
Condensate outflow

Route the condensate drain so that the condensate can flow out:

- The minimum inner diameter of the condensate drain must be 15 mm.
- Use a hose or fixed pipework for condensate drainage.
- The hose connections of the condensate drain must be laid with a constant downward gradient from the siphon to the neutralisation unit (if present) and to the sewer system. If a constant downward gradient in the condensate drain is not possible, a condensate pump must be installed in the condensate drain before the gradient change.
- No water trap is allowed in the condensate drain. For this reason, the individual hose connections must be as short as possible to prevent them from sagging. If necessary (e.g. if the neutralisation unit is positioned next to the heat generator), pull an empty tube over the hose connection as reinforcement.



Hose connection with constant downward gradient



Water trap in hose connection

NOTICE

Flue gas accumulation in the heat generator
If the condensate cannot drain off, it will accumulate in the boiler / flue gas collector. The flue gas can no longer be transported away without any obstruction.

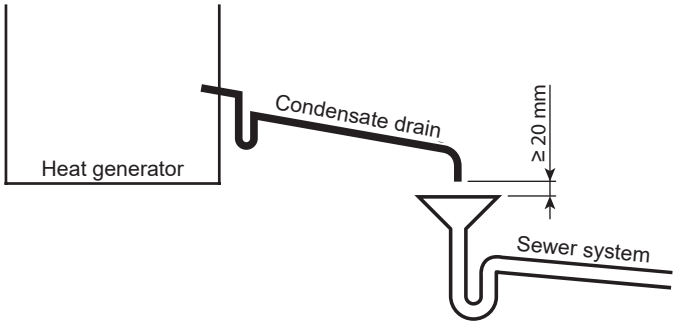
- Always route the condensate drain with a downwards slope in such a way that the condensate is always guaranteed to flow out without any obstruction.
- Check and clean the siphon, neutralisation unit (if present) and condensate drain at least 1x a year.

Discharge into the sewer system

WARNING

Germ contamination from the sewer system
If the condensate drain comes into contact with the sewer system (e.g. drain pipe), the condensate drain and the heat generator can be contaminated by germs flowing back from the sewer.

- The condensate drain **must not** come into direct contact with the drain pipe (distance min. 20 mm).



Before commissioning the gas condensing boiler

WARNING

Flue gas outlet
If there is no water in the siphon, or too little water, then flue gas can escape through the condensate drain. The concentration of flue gas in the air can represent a fatal hazard.

- Before commissioning, fill the siphon and, if present, the neutralisation unit with water.

4.4.2 Installation of the siphon and condensate drain

4.4.2.1 Installation of the condensate drain siphon – sewer system (standard design)

When installing the siphon and condensate drain, the project engineering guidelines for condensate drains must be complied with, see chapter 4.4.1.

1. Screw double nipple (1) and siphon (2) onto the condensate drip tray and tighten securely (connection must be tight!).

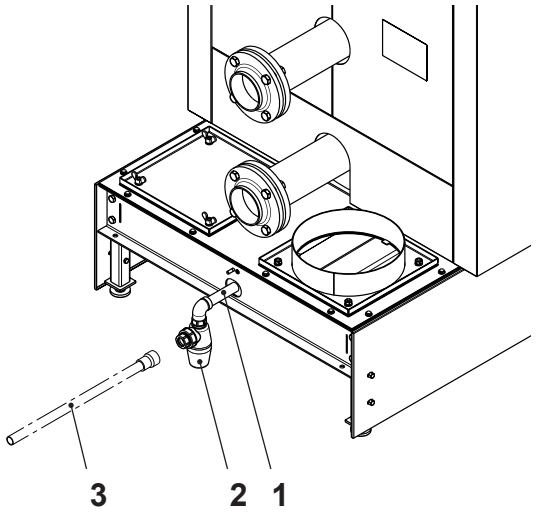


Fig. 33

2. Establish the connection (3) from the siphon to the sewer system (on site).

After installation, before commissioning of the boiler, the following must be carried out:

- Check condensate flow.
- Check all connections for leaks:
  - Double nipple – siphon
  - Siphon – sewer system
- Check condensate outflow.

4.4.2.2 Installation of the condensate drain siphon – condensate pump – sewer system at higher level

When installing the siphon and condensate drain, the project engineering guidelines for condensate drains must be complied with, see chapter 4.4.1.

1. Screw double nipple (1) and siphon (2) onto the condensate drip tray and tighten securely (connection must be tight!).
2. Place the condensate pump (4) as close as possible to the siphon (2), depending on the available space.

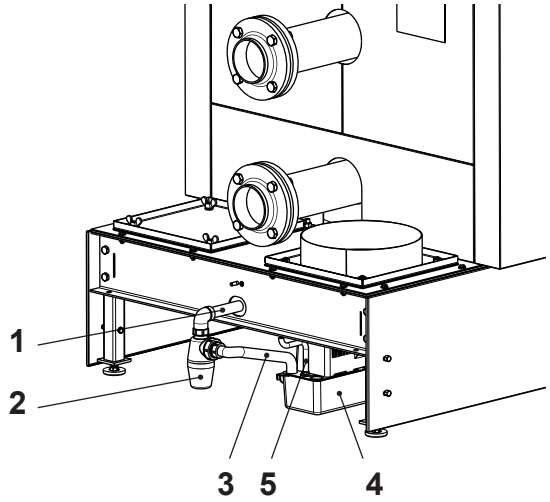


Fig. 34

3. Establishing hose connections:
   - Hose connection (3) siphon – condensate pump
     - 0.5 m hose is included with the condensate pump purchased at Hoval.
   - Hose connection (5) condensate pump – drain
     - Hose is included with the condensate pump purchased at Hoval.
4. Route the cable to the condensation pump (4) to the control and connect according to the wiring diagram.

After installation, before commissioning of the boiler, the following must be carried out:
- Check condensate flow.
- Check the function of the switching points of the condensate pump:
  - Liquid level switch for pumping out
  - Liquid level switch for locking the burner
- Check all connections for leaks:
  - Double nipple – siphon
  - Siphon – condensate pump
  - Condensate pump – drain
- Check condensate outflow.

4.4.2.3 Installation of the condensate drain siphon – neutralisation unit – sewer system

When installing the siphon and condensate drain, the project engineering guidelines for condensate drains must be complied with, see chapter 4.4.1.

NOTICE

Blockage by granulate dust

Fine granulate dust can block the neutralisation unit and the condensate drain.
- Follow the commissioning or maintenance instructions in the separate installation/ operating instructions of the neutralisation instructions.

1. Screw double nipple (1, Fig. 34) and siphon (2) onto the condensate drip tray and tighten securely (connection must be tight!).
2. Place, install and commission the neutralisation unit in accordance with the installation and operating instructions supplied with the neutralisation unit.
3. Fill the siphon and the neutralisation unit with water.

After installation, before commissioning of the boiler, the following must be carried out:
- Check condensate flow.
- Functional check of all existing electrically operated components of the neutralisation unit
- pH value measurement (before and after the neutralisation unit)
- Check all connections for leaks:
  - Double nipple – siphon
  - Siphon – neutralisation unit
  - Neutralisation unit – sewer system
- Check condensate outflow.

4.4.2.4 Installation of the condensate drain siphon – neutralisation unit – condensate pump – sewer system at higher level

When installing the siphon and condensate drain, the project engineering guidelines for condensate drains must be complied with, see chapter 4.4.1.

NOTICE

Blockage by granulate dust

Fine granulate dust can block the neutralisation unit and the condensate drain.

- Follow the commissioning or maintenance instructions in the separate installation/ operating instructions of the neutralisation instructions.

1. Screw double nipple (1, Fig. 34) and siphon (2) onto the condensate drip tray and tighten securely (connection must be tight!).
2. Place, install and commission the neutralisation unit in accordance with the installation and operating instructions supplied with the neutralisation unit.
3. Position condensate pump next to the neutralisation unit.
   - A hose is included with the condensate pump purchased at Hoval for the hydraulic connection.
4. Install the neutralisation unit and condensate pump in accordance with the corresponding installation and operating instructions.
5. Fill the siphon (2, Fig. 34) and the neutralisation unit with water.

After installation, before commissioning of the boiler, the following must be carried out:

- Check condensate flow.
- Functional check of all existing electrically operated components of the neutralisation unit/condensate pump combination
- pH value measurement (before and after the neutralisation unit)
- Check all connections for leaks:
  - Double nipple – siphon
  - Siphon – neutralisation unit
  - Neutralisation unit – condensate pump
  - Condensate pump – drain
- Check condensate outflow.

4.5 Gas connection

DANGER

Danger of explosion due to leaking gas connection.

- Install a gas meter 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. 31.

- 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 controller
- Temperature measurement device TBmax + 20%
- Safety temperature limiter

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

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

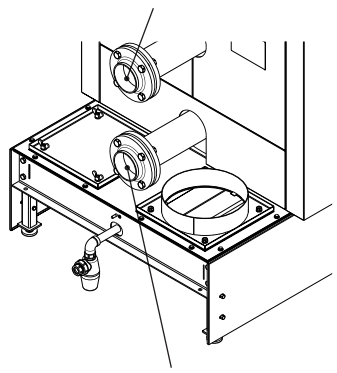


Fig. 35

4.6.1 To be observed on site

A pressure expansion tank is to be installed appropriate for the heating system, water volume and hydrostatic pressure.

4.6.2 Hydraulic integration

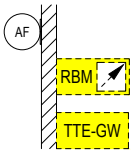
A mixer must be installed when combining a calorifier with underfloor heating.

Installation of a boiler circuit pump:
For operating temperatures of the boiler above 85 °C, after each burner switch-off, the boiler circuit pump must be in operation for at least 2 minutes (the pump after-run is included in the boiler controller with TopTronic E control).

4.6.2.1 Example

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

Hydraulic schematic BDHE050



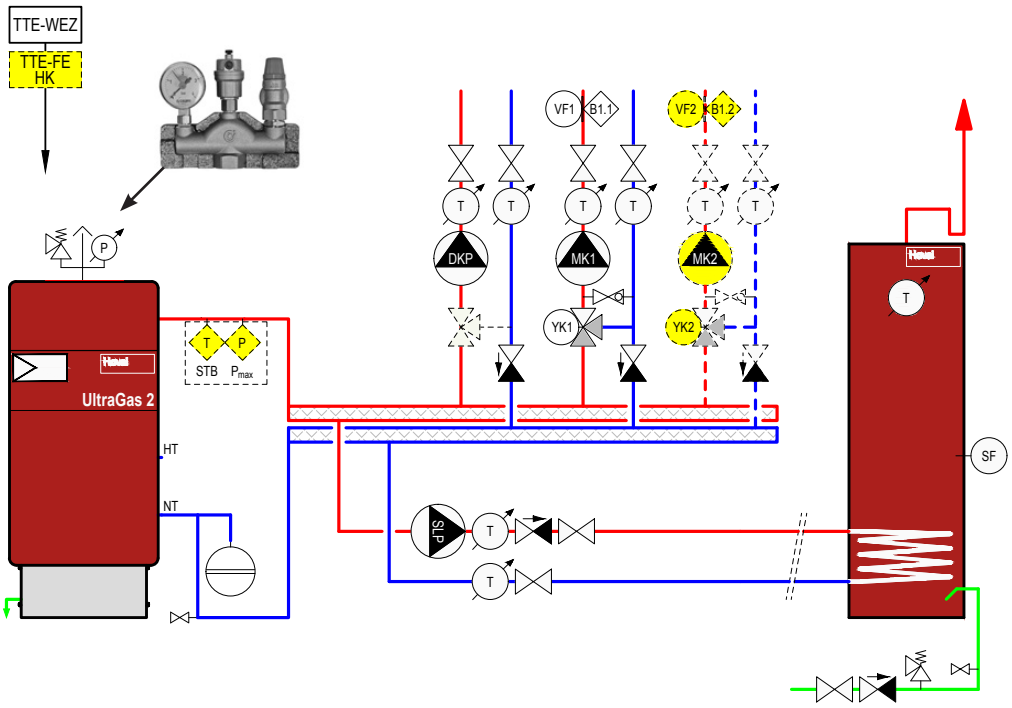


Fig. 36

TTE-WEZ	TopTronic® E basic module heat generator (installed)
VF1	Flow sensor 1
B1.1	Flow temperature monitor (if required)
MK1	Pump, mixer circuit 1
YK1	Actuator, mixer 1
AF	Outdoor sensor
SF	Calorifier sensor
DKP	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 sensor 2
B1.2	Flow temperature monitor (if required)
MK2	Pump, mixer circuit 2
YK2	Actuator, mixer 2

NOTICE

Close unused connection nozzles tightly.

Important notices:
- 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 TopTronic® 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 run time).

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

4.7 Sound insulation

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 cladding

1. Removing front cover (1):
   - Pull front cover away at the top (1a).
   - Unhook front cover at the bottom (1b).
2. Set up climbing aid (2).
3. Removing the upper front (3):
   - Remove securing screw (3a).
   - Lift the upper front slightly and pull it forwards.
4. Opening the electrical box (4):
   - Remove screw (4a).
   - Lift the electrical box (4) and fold it out.
5. Cable introduction according to dimensional drawing (chapter 3.4 dimensions, pos. 6).
   - Cables passing through one of the two cable ducts (1) must be inserted through the openings at the bottom of the terminal plate (3c, Fig. 13).
   - Fix cables to a strain relief strap.
   - Connection possibility for equipotential bonding, see Fig. 39.

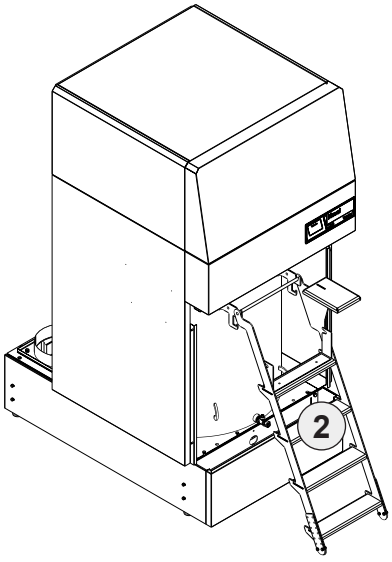


Fig. 37

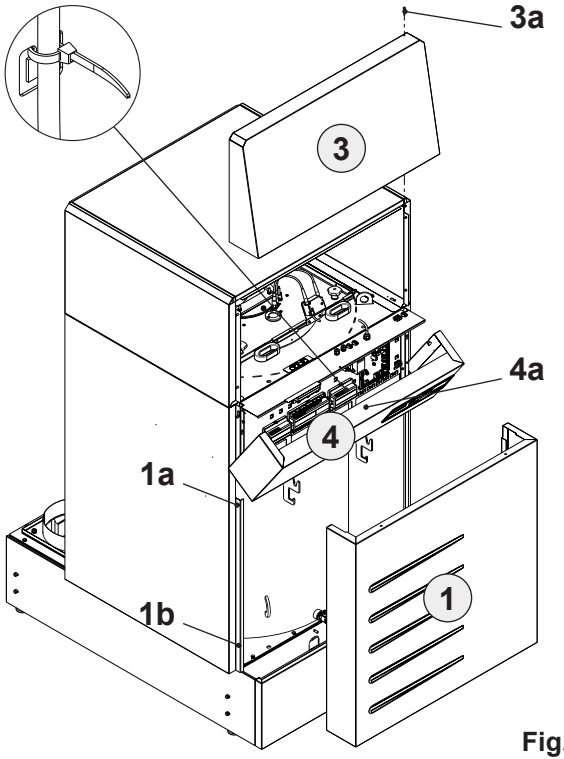


Fig. 38

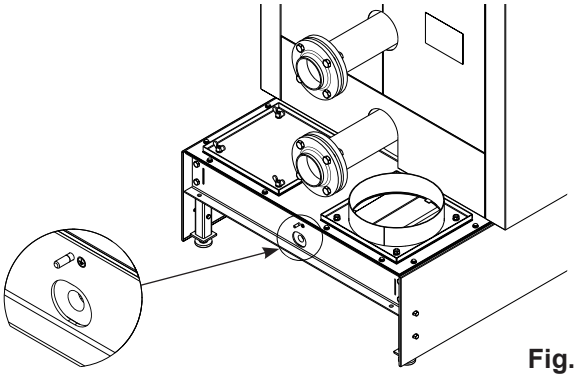
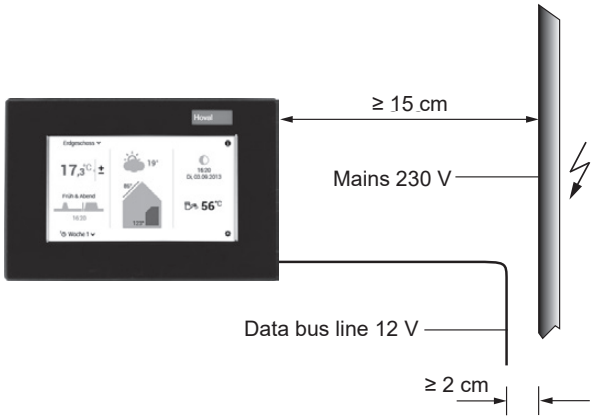


Fig. 39

4.8.1 Safety precaution for installation in line with EMC requirements

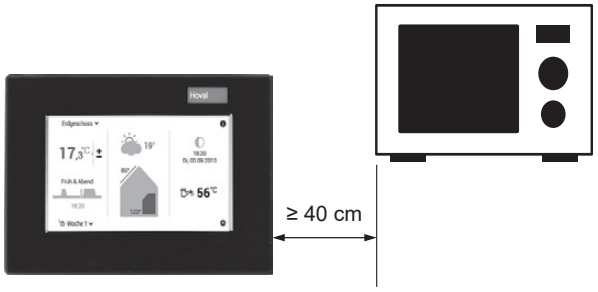
- Cables carrying mains voltage must be routed separately from sensor or data bus cables. A minimum distance of 2 cm between the cables must be observed. Cable crossovers are permitted.

Minimum distances for electrical installation



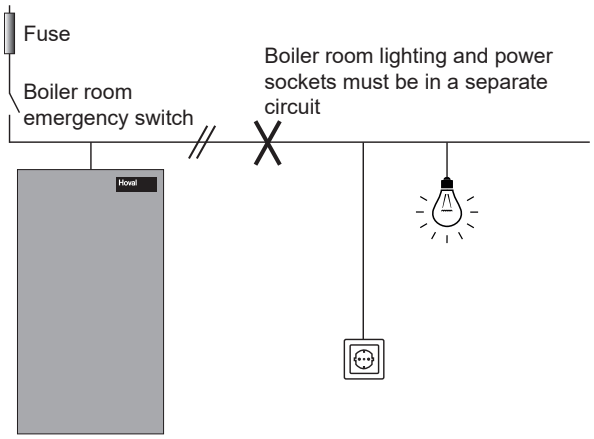
- In the case of controller modules with their own mains supply, it is imperative that cables carrying mains voltage are routed separately from sensor or data bus cables. If cable ducts are used, these must be provided with separator strips.
- When mounting controller modules or room control modules, 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.

Minimum distance from other electrical units



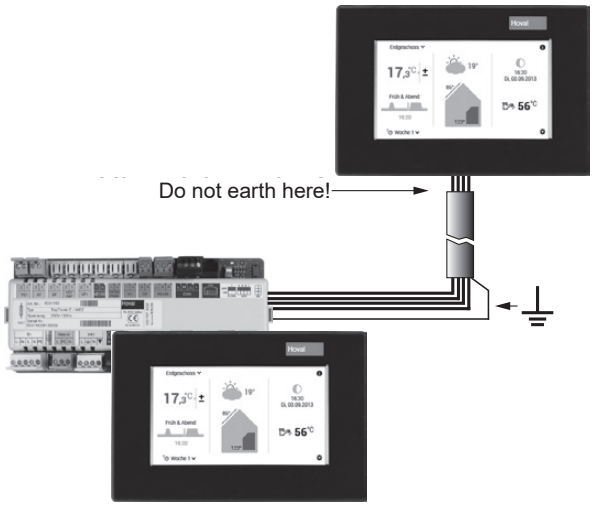
- Avoid unnecessary cable lengths, including in spare cables
- Coils of relays, contactors and other inductors in the panel, and possibly in the vicinity, must be connected. The connection can be made with RC elements, for example.

- 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).

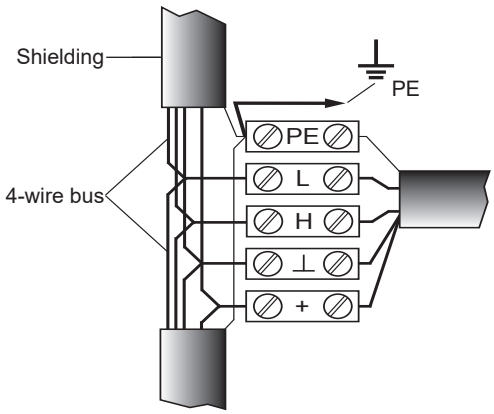
One-sided earthing of the shielding



Basic/controller module with control module

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.

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 (UltraGas® 2 (125-1550))	min. 2.5 mm² with 16 A fuse	unlimited m
• 400 V (UltraGas® 2 (1000-1550))	min. 2.5 mm² with 16 A fuse	unlimited m
Cables carrying mains voltages from actuators	min. 1.0 mm²	unlimited m
Cables carrying low voltage (sensors)	min. 0.5 mm²	max. 50 m
Data bus lines (shielded)	2 x 2 x 0.6 mm²	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 siphon or the neutralisation unit must be filled with water.
- When commissioning the system for the first time, the function of all safety and control devices must be verified.
- The operation and maintenance of the plant 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 sections of the cladding carefully and avoid contact with sharp edges!
- Risk of injury for non-expert personnel.
- Initial commissioning, 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 in heating systems

Germany and Austria

Filling and replacement water, heating water

The following applies:
- For Germany VDI 2035
- For Austria ÖNORM H5195
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water
The filling and replacement water can be both fully demineralised and also merely softened.

Heating water
- In the case of **full demineralisation of the filling and replacement water**, the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.

- In the case of **softening the filling and replacement water**, the following conditions must be complied with:
  The quality of the heating water must be checked and documented periodically. Required monitoring interval:
  - With installed heat output > 100 kW to 1000 kW: once a year
  - With installed heat output > 1000 kW: twice a year

  The following standard values for the heating water must be measured and adhered to:
  - Electrical conductivity of the heating water for operation with water containing salts: > 100 µS/cm to ≤ 1500 µS/cm
  - pH value of the heating water for systems without aluminium alloy as water-side material 8.2 to 10.0 (measurement 10 weeks after commissioning at the earliest)

- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices
- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).

- The following systems must be equipped with separate circuits:
  - Systems with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping)
  - Systems with intermittent oxygen intake (e.g. requiring frequent topping-up)

- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.

- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent
See separate engineering sheet “Use of frost protection agent”.

Switzerland

Filling and replacement water, heating water

The following applies:

- Directive SWKI BT 102-01 “Water quality for building services systems”

Requirement on the filling and replacement water:

Designation	Reference value
Total hardness	max. 1 °fH
Electric conductivity	max. 100 µS/cm
pH value	6.0–8.5

Requirement on the heating water:

Designation	Reference value
Total hardness	max. 5 °fH
Electric conductivity	max. 200 µS/cm
pH value	8.2–10
Chlorides	max. 30 mg/l
Sulphates	max. 50 mg/l
Oxygen	max. 0.1 mg/l
Solute iron	max. 0.5 mg/l
TOC total organic carbon content	max. 30 mg/l

Manufacturer-specific specifications

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).

- The following systems must be equipped with separate circuits:
  - Systems with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping)
  - Systems with intermittent oxygen intake (e.g. requiring frequent topping-up)

- In the case of bivalent heating systems, the values of the heat generator with the strictest requirement for water quality must be complied with.

- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.

- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent

See separate engineering sheet “Use of frost protection agent”.

5.4 Parameterisation

Check the parameterisation according to the table in chapter 6.8.1 and correct it if necessary.

NOTICE

Parameter 33287 must be set to 0!

5.5 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.

5.6 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.

5.7 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 5.9 Setting the gas quantity).

The flow pressure and the energy content of the gas in the connecting 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 flow pressure before the boiler.

5.8 Functional check of pressure monitoring device

WARNING

Flue gas accumulation can result in injury to persons.

- Ensure that flue gas is discharged.

In order to ensure safety, the UltraGas® 2 is equipped with a pressure monitoring device on the burner cylinder. The pressure monitoring device records the pressure in the burner cylinder. If the pressure exceeds the set tolerance range, the UltraGas® 2 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.

5.8.1 Checking the function of the pressure switch (safety check)

WARNING

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

1. Disassemble pressure switch cover.
2. Set the pressure switch dial so that the outward-facing arrow points to the minimum value.

3. Restart the heat generator.
   - If a restart of the heat generator is not possible, the pressure switch functions.
   - If the heat generator starts, the pressure switch is defective. → Replace the pressure switch.
4. Set the outward pointing arrow on the pressure switch to the value of the factory setting for the corresponding heat generator. See table.

UltraGas® 2 type	Pressure switch factory setting
(125)	8 mbar
(150)	8 mbar
(190)	6 mbar
(230)	6 mbar
(300)	8.5 mbar
(350)	7 mbar
(400)	10 mbar

UltraGas® 2 type	Pressure switch factory setting
(450)	9 mbar
(530)	12 mbar
(620)	14.5 mbar
(700)	17 mbar
(800)	11 mbar
(1000)	14 mbar
(1100)	16 mbar
(1300)	12 mbar
(1550)	12 mbar

5. Mount the cover of the pressure switch.

WARNING

Check pressure monitoring device for correct fastening and leaks.

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

5.9.1 Flue gas measurement UltraGas® 2 (125-700)

WARNING

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

Screwdriver, hex socket 3 mm, Torx T40

The gas inlet pressure is sensed at the Honeywell multi-actuator at measuring nipple **A**.

A Gas inlet pressure measuring nipple
B Impulse line connection
C Gas restrictor
D Offset screw

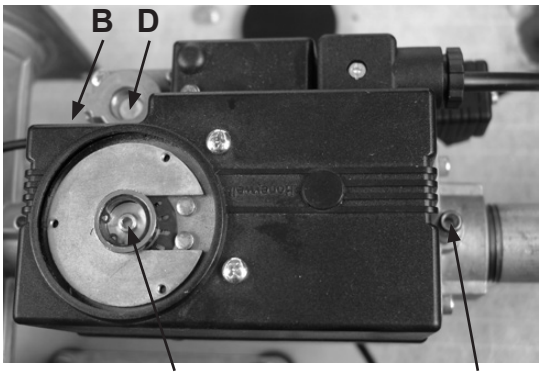


Fig. 40

Setting procedure:

If you have to make a setting on the venturi, always check both flue 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 run time or after pressing the “Reset” button.
2. Position emission meter in the flue gas line.
3. Set the boiler to maximum output (100%).
4. Set the O_2 (CO_2) value by turning throttle screw C.
   - The flue gas value must lie in the following range: O_2 = 5.5 - 5.9 (CO_2 = 8.8 - 8.5) % by vol. (dry)
5. Set the boiler to minimum output (1%).
6. Set O_2 (CO_2) value by turning offset screw D.
   - The flue gas value must lie in the following range: O_2 = 5.5 - 5.9 (CO_2 = 8.8 - 8.5) % by vol. (dry)
7. Restart the heat generator and check the two set values again.
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.

5.9.2 Flue gas measurement UltraGas® 2 (800-1550)

WARNING

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

Hex socket 2.5 mm

A Gas restrictor
B Offset screw

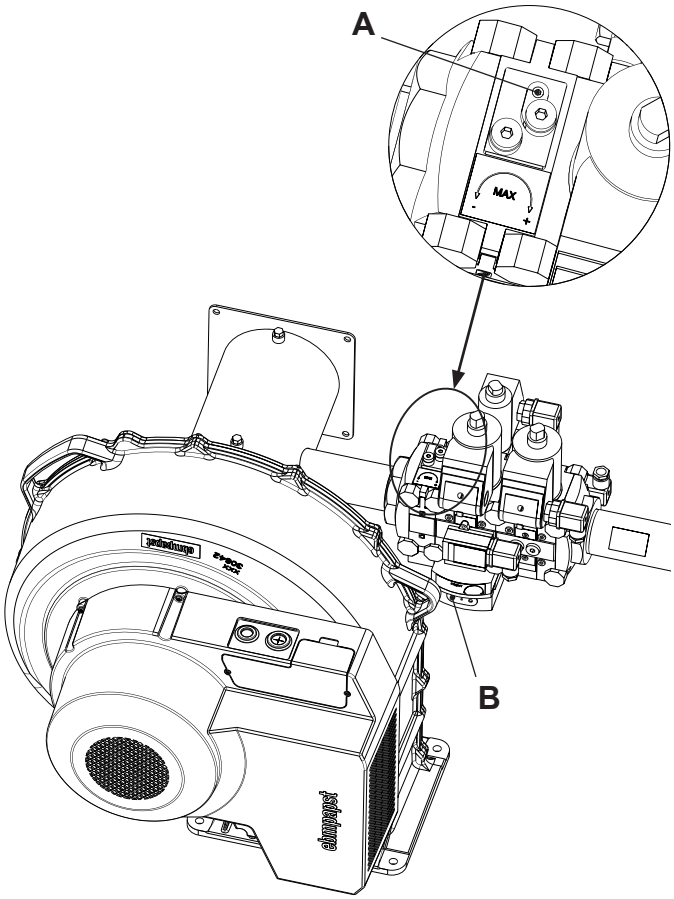


Fig. 41

Setting procedure:

If you have to make a setting on the venturi, always check both flue 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 run time or after pressing the “Reset” button.
2. Position emission meter in the flue gas line.
3. Set the boiler to maximum output (100%).
4. Set the O_2 (CO_2) value by turning throttle screw A.
   - The flue gas value must lie in the following range: O_2 = 5.5 - 5.9 (CO_2 = 8.8 - 8.5) % by vol. (dry)
5. Set the boiler to minimum output (1%).
6. Set O_2 (CO_2) value by turning offset screw B.
   - The flue gas value must lie in the following range: O_2 = 5.5 - 5.9 (CO_2 = 8.8 - 8.5) % by vol. (dry)

Factory setting: throttle screw A after the closed condition.

UltraGas® 2 Type	Diameter X Bolt as aid	Number of turns
(800,1000)	14.8 mm	17.5 turns
(1100)	19.5 mm	22.5 turns
(1300)	13 mm	16 turns
(1550)	17 mm	20 turns

A bolt with a corresponding diameter (X mm, see Fig. 42) can be used to help check the setting.

Fig. 42

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.

5.10 Handover to the owner/user

The manufacturer of the unit is responsible for providing operating instructions for the complete system.

The following points must be carried out on the handover to the owner:

- instructions for operation, maintenance and safety equipment of the plant have been received.
- Handover of all instructions and documents.
- Inform the owner that these instructions must always be kept with the plant.
- Written confirmation of the instruction.
- The handover report is on the last page of the document.

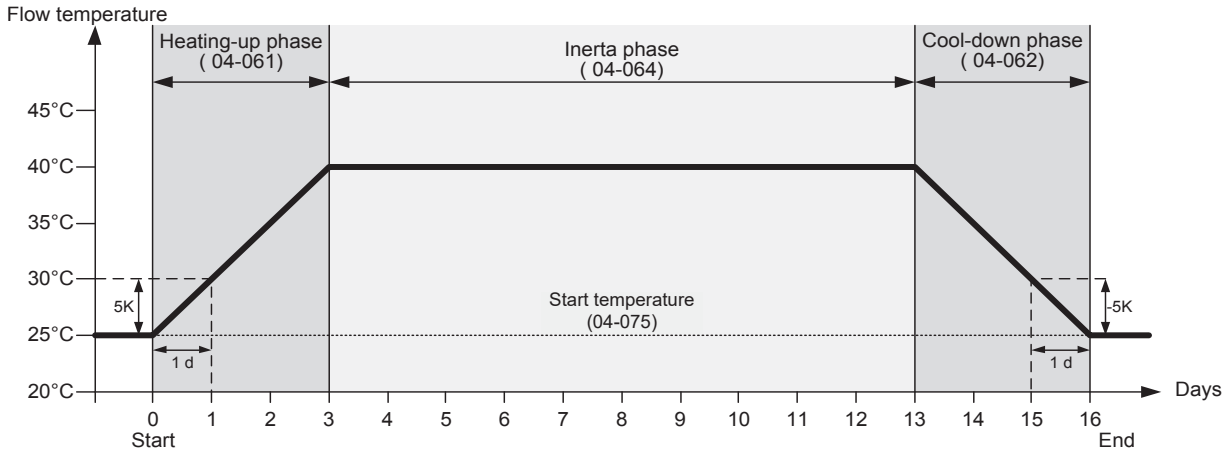
5.11 Activation of screed function

NOTICE

The activation of the screed function must only be made by a specialist trained by Hoval or by Hoval customer service.

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
Start temp. screed drying	04-075	25.0°C	Start temperature (from SW 2.09.xxx)
Heating-up phase	04-061	5 K/d	Kelvin per day (rising)
Stabilisation temperature	04-063	40.0 °C	Inertia phase flow setpoint
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
Max. temp. diff. ramp increase screed function (from SW 2.03.xxx onwards)	04-069	10 K	Kelvin (FL act/set)
Information			
Remaining run time screed function	02-019	… days	Forecast in days

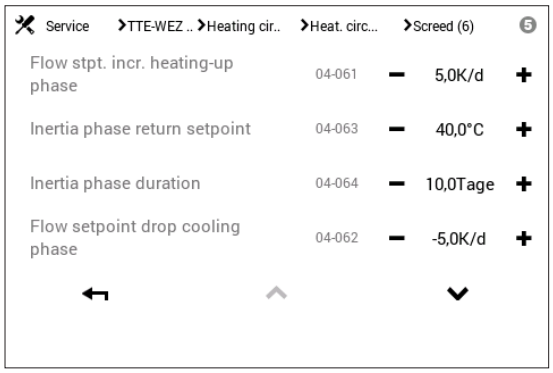
NOTICE

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

Additional info:
When the screed function starts, the heating circuit pump is switched on and the screed function starts after 1 minutes. The FL set value must be reached in each case so the controller continuously increases the flow temperature according to the set ramp. With HC parameter “04-069 Maximum temperature difference ramp increase (factory setting: 10 K)” it possible to set by how much the FL set value calculation is allowed to increase without the actual value reaching the set value.

Settings in the TopTronic® E control module

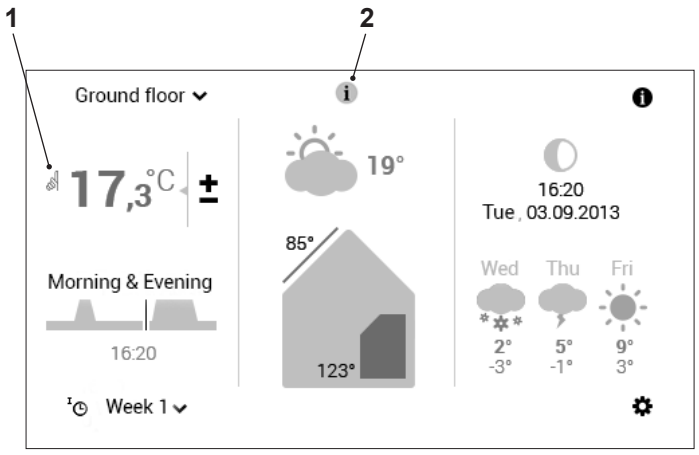


Can only be set in the corresponding user level.

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 system can result from failure to perform cleaning and maintenance or incorrect cleaning and maintenance.

- 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 sections of the cladding 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, flue 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 instructions.

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:

1. Connect the filling hose to the water tap.
2. Deaerate the filling hose.
3. Connect the filling hose to the filling and drain valve.
4. 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 (e.g. main switch, fuses).
2. Remove the front cladding 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).

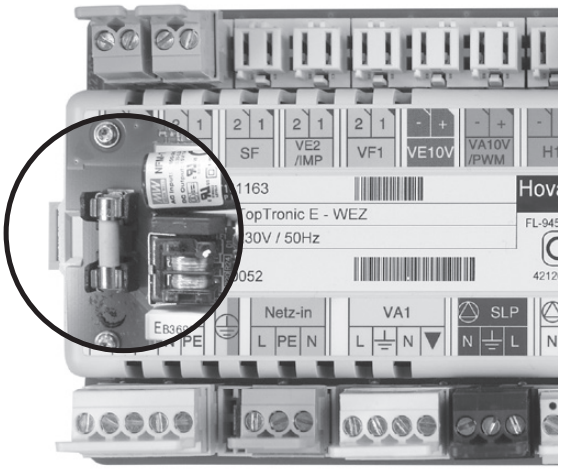


Fig. 43

5. Mount protecting cover and close cladding.
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.

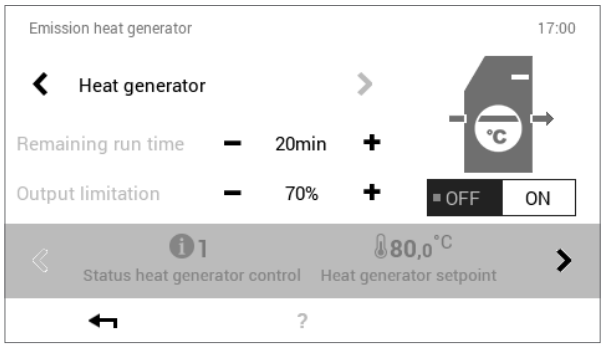
CAUTION

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.

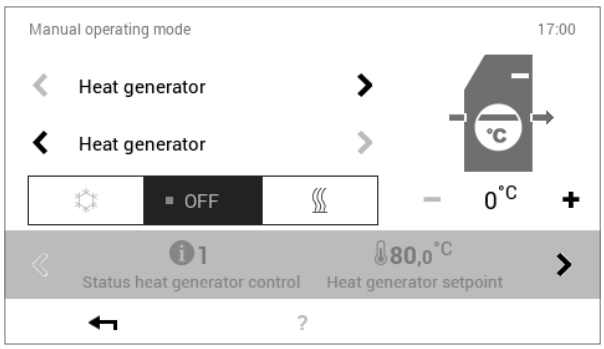
For detailed information see operating instructions, "Emission" chapter.

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 and maintaining the gas boiler

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

The Hoval gas boiler must be cleaned and serviced at least 1x 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.

Ring spanner, screwdriver, open-end spanner, vacuum cleaner, compressed air, spray bottle, water, fine sandpaper, long-nosed pliers, blowtorch

1. Before cleaning while the heat generator is in operation, carry out the following tasks:
   - If a neutralisation unit is present, check its function according to the manufacturer's operating instructions:
     - Check the neutralising effect of the neutralising agent in the neutralisation unit (measure the pH value of the condensate after it has passed through the neutralisation unit. A pH value ≥ 6.5 is OK).
   - Functional check of all electrically operated components of the neutralisation unit/condensate pump combination (if present).
2. Set the blocking switch to "0" and disconnect the heat generator from the mains (e.g. main switch, fuses).
3. Close main gas valve.
4. Set up the climbing aid and remove the upper section of the cladding (see chapter 2.4, steps 1 to 7).
5. Undo all burner plug-in connections.
6. Remove the supply air connection from the Venturi tube of the burner, if present.
7. Disconnect gas connection from the gas valves.

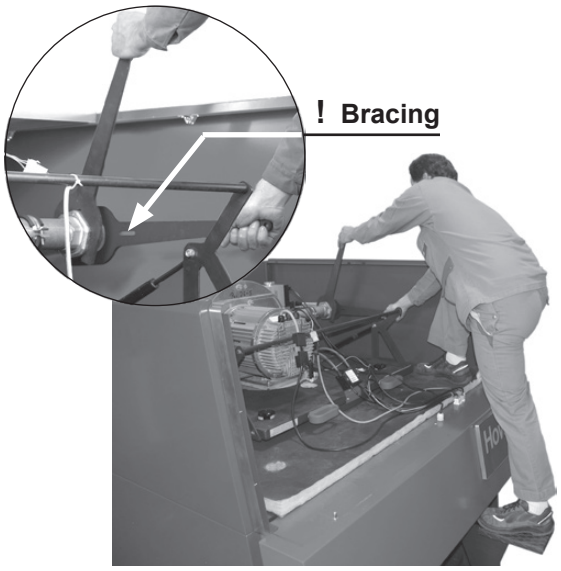


Fig. 44

8. Opening combustion chamber:
   - Unscrew palm grips.
   - Swivel the burner upwards, with the boiler door (Fig. 45)

CAUTION

UltraGas® 2 (190 - 1550):
If a gas pressure spring is weakened, the boiler door is lowered. There is an increased danger of injury when reopening the boiler door.
- In such cases, replace both gas pressure springs.

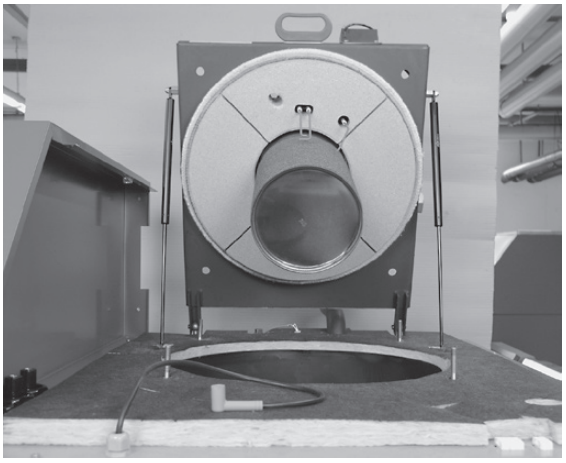


Fig. 45

9. Check burner cylinder web.
   - The burner cylinder must be cleaned if visible contamination exists (such as deposits, e.g. builder's dust).
   - If the burner cylinder web is damaged or there are cracks in the welds, the burner cylinder must be replaced.

10. If the burner cylinder web is dirty or damaged, carry out the following steps:
    - Swivel the burner with boiler door closed downwards.
    - Removing burner cylinder:
      - Unfasten the earth wire on the burner cylinder.

Fig. 46

- Unscrew the fan and gas mixing device.

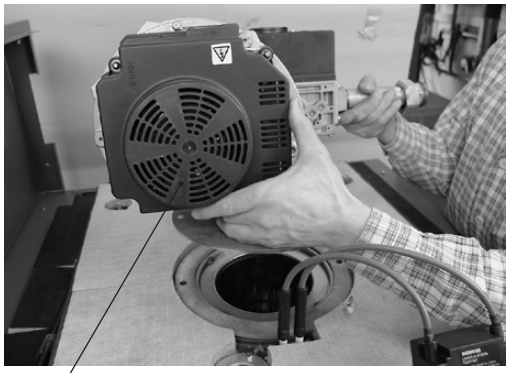


Fig. 47

- Unscrew intermediate flange (Fig. 50).
- Remove the burner cylinder upwards (Fig. 48).

CAUTION

Danger of burns
- Let the boiler cool down or wear protective clothing.
- Wear safety gloves when removing the burner cylinder.

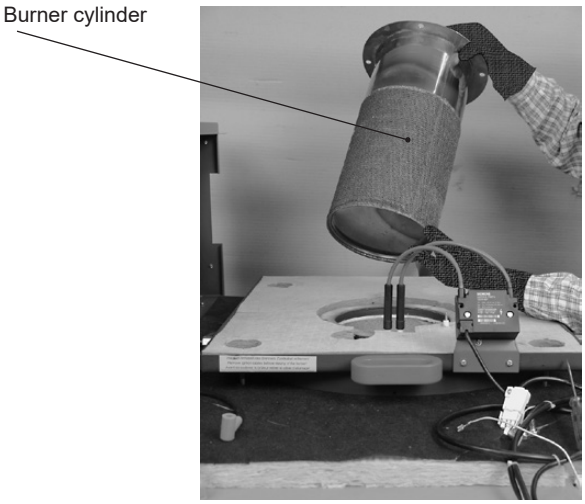


Fig. 48

- Loosen the seals of the fan, intermediate flange and burner cylinder and check for wear.
- Cleaning the burner cylinder if required:
  - Clean the burner cylinder inside and out with compressed air or thoroughly flush with water.
  - Remove released dust and dirt particles with a vacuum cleaner.

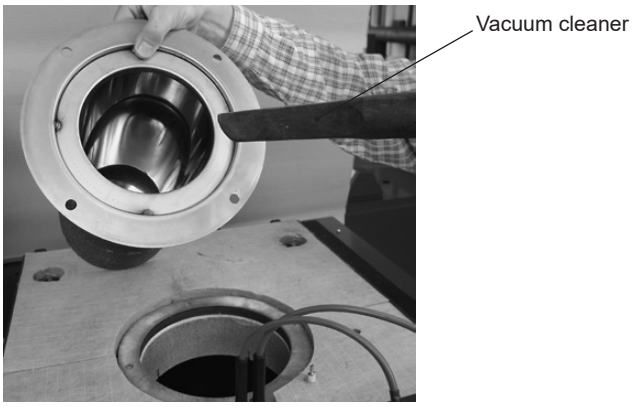


Fig. 49

- Make sure that the burner cylinder is dry.
- Assemble the burner in the reverse order according to Fig. 50.
  - Replace the burner cylinder if it is defective.
  - Replace the seal if signs of wear are visible.

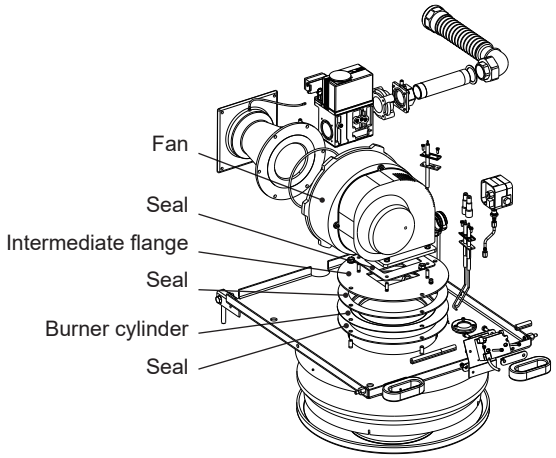


Fig. 50

- Fasten the earth wire (Fig. 46) on the burner cylinder.
- Swivel the burner upwards, with the boiler door (Fig. 45)

11. Clean and adjust ignition and ionisation devices.
    - Sand ignition and ionisation devices with fine sandpaper if required.
    - Clean away the sanding dust.
    - Check all electrode gaps (see Fig. 51 and Fig. 52).

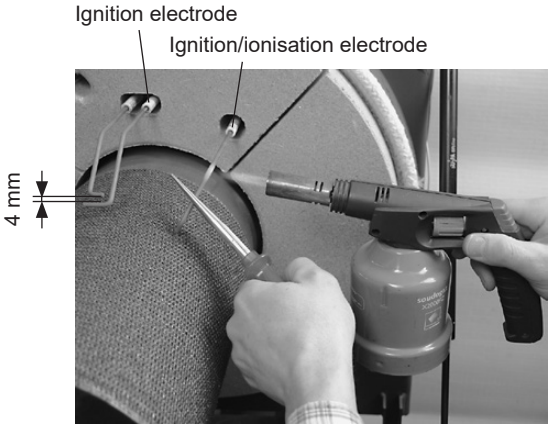


Fig. 51

Fig. 52

    - Readjusting the electrode gaps if necessary:
        - Heat the electrode at the kink with the blowtorch until it glows red (see Fig. 51).
        - Use long-nose pliers to bend the electrode until the required gap is set.

12. Clean the combustion chamber:

NOTICE

The combustion chamber and the heating surfaces (combustion chamber and TurboFer® stainless steel composite pipes) of the UltraGas® 2 must be cleaned **once a year**.

CAUTION

Danger of chemical burns from cleansing agents.

- Wear safety gloves and protective goggles when using cleansing agents.
- Observe the manufacturer's instructions regarding the use of all cleansing agents.

NOTICE

Damage to the plant by using incorrect cleansing agents.

- Only use cleansing agents that are approved for gas boilers having aluminium components.
- Always check cleansing agents for compatibility with aluminium and stainless steel.

NOTICE

Cleansing agents in the condensate drain and/or sewage system.
Cleansing agents can impair the function of the neutralisation unit. Furthermore, not all cleansing agents are allowed to enter the sewer system.

- Before cleaning, check whether the cleansing agent to be used is allowed to enter the sewer system and the neutralisation unit, if present. If not:
    - Before cleaning, take measures to prevent the cleansing agent from entering the condensate drain.
    - If necessary, after cleaning, dispose of the cleansing agent properly according to the manufacturer's instructions.

- Separate the condensate drain with siphon from the condensate drain socket and ensure that the cleaning water is directed into a collection tank or, if local regulations permit, into the sewer system.
- Thoroughly flush the heating surfaces (combustion chamber and TurboFer® stainless steel composite pipes (aluminium and stainless steel)) with a concentrated jet of water (e.g. using a spray gun attached to a water hose).
- If a higher cleaning effect is required:
  Wet the heating surfaces with solvent-free cleansing agent (e.g. soapy water), allow to act for a few minutes and rinse with water.
- If deposits on the heating surfaces occur despite of annual cleaning according to the steps above:
  - Spray the heating surfaces with chloride-free, phosphoric cleansing agent (e.g. Desoxin) (Fig. 53), allow to act and flush with a jet of water of a high-pressure cleaner.

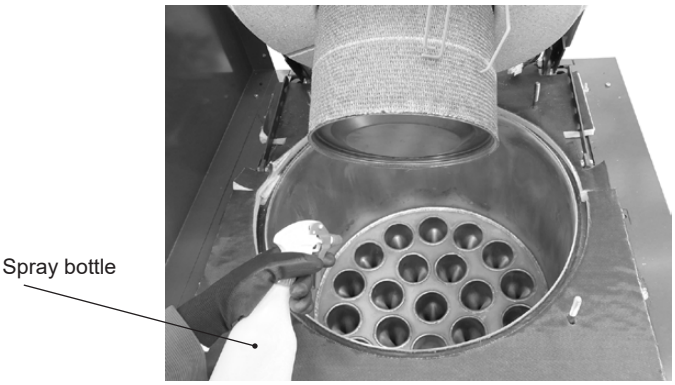


Fig. 53

  - The process can be repeated.

! **NOTICE**

Cleansing agents in the condensate drain and/or sewage system.

- Also rinse the condensate drain (tray and siphon) after the cleaning procedure.
- Always observe the disposal instructions of the cleansing agents (do not discharge them into the sewage system).

13. Remove the cover from the cleaning opening.

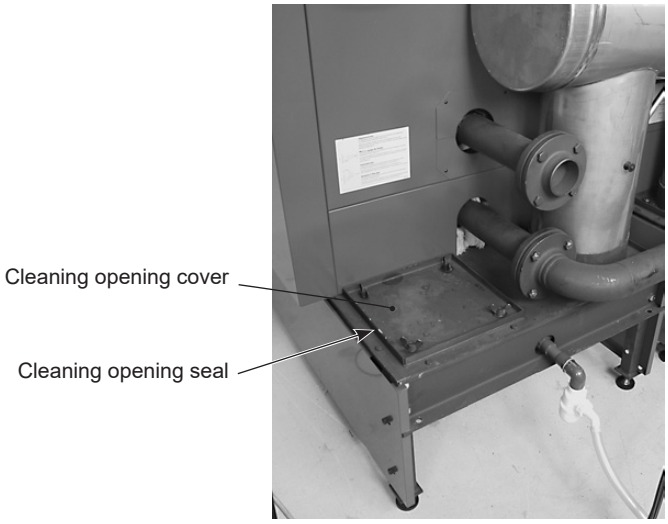


Fig. 54

14. Clean condensate drip tray.

! **NOTICE**

Flue gas accumulation in the heat generator

If the condensate cannot drain off, it will accumulate in the boiler / flue gas collector. The flue gas can no longer be transported away without any obstruction.

- Always route the condensate drain with a downwards slope in such a way that the condensate is always guaranteed to flow out without any obstruction.
- Check and clean the siphon, neutralisation unit (if present) and condensate drain at least 1x a year.

WARNING

Flue gas outlet

If there is no water in the siphon, or too little water, then flue gas can escape through the condensate drain. The concentration of flue gas in the air can represent a fatal hazard.

- Before recommissioning, fill the siphon and, if present, the neutralisation unit with water.
  The water can be filled into the neutralisation unit and the siphon via the cleaning opening (Fig. 54).

15. Maintaining siphon (Fig. 55):
    - Remove siphon.
    - Rinse the siphon.
    - Check siphon seals for damage and replace if necessary.
    - Install siphon.

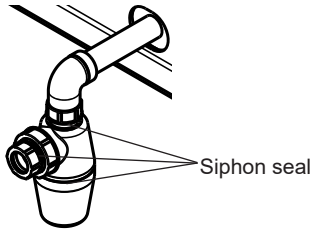


Fig. 55

16. If a neutralisation unit is present, maintain it according to the manufacturer's operating instructions:

NOTICE

Reduction in the neutralisation effect

The neutralising agent in the neutralisation unit is subject to degradation. The pH-neutralising effect diminishes over time.

- Replace the neutralisation agent in the neutralisation unit at the interval specified by the manufacturer or if the pH value of the condensate is < 6.5 after passing through the neutralisation unit.

    - While the heat generator is disconnected from the electricity supply (blocking switch set to "0" heat generator disconnected from the mains (e.g. main switch, fuses)):
        - Clean and check the neutralisation unit according to the manufacturer's instructions.
        - If the pH value of the condensate is < 6.5, renew the neutralisation agent according to the manufacturer's instruction.
17. Cleaning and checking the condensate drain:
    - Flush the condensate lines.
    - Reassemble condensate drain and attach to the siphon.

When installing the siphon and condensate drain, the project engineering guidelines for condensate drains must be complied with, see chapter 4.4.1

18. Fill the siphon (Fig. 55) and neutralisation unit, if present, with water through the cleaning opening.
19. Check the seal of the cleaning opening (Fig. 54) for wear and replace if necessary.

WARNING

If the cleaning opening has a leak, flue gas can escape and there is a risk of poisoning.

- Check the seal of the cleaning opening for wear and tightness at the cover.
- Always close the cleaning opening.

20. Install the cover of the cleaning opening (Fig. 54) and check it is gas-tight.
21. Closing the combustion chamber:
    - Swivel the burner with boiler door closed downwards.
    - Screw on the boiler door with star shaped knobs
22. Cleaning the gas filter HFVR050, if present:

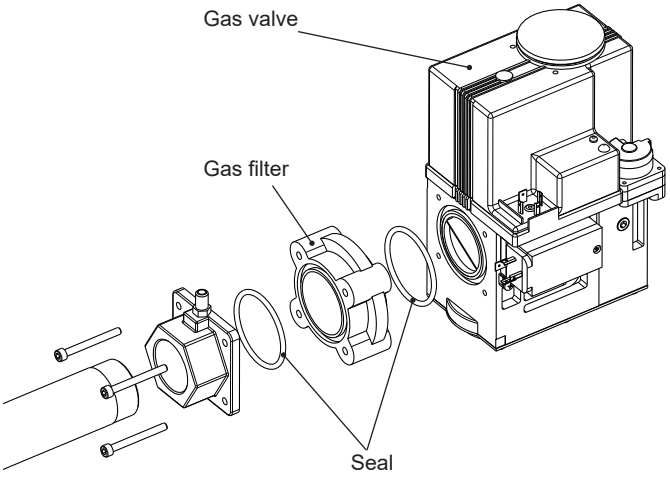


Fig. 56

    - Remove the gas filter.
    - Clean the removed gas filter with clean running water.
        - Replace the gas filter if it is not possible to clean it perfectly.
    - Dry the gas filter.
    - Reinstall the dry gas filter together with new seals.
23. Replace the seal on the gas connection and connect the gas connection to gas valves.

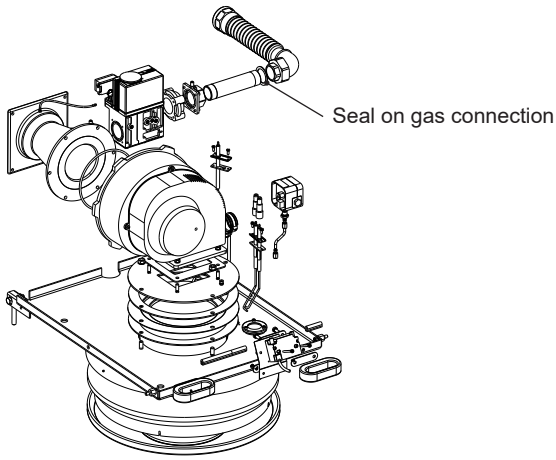


Fig. 57

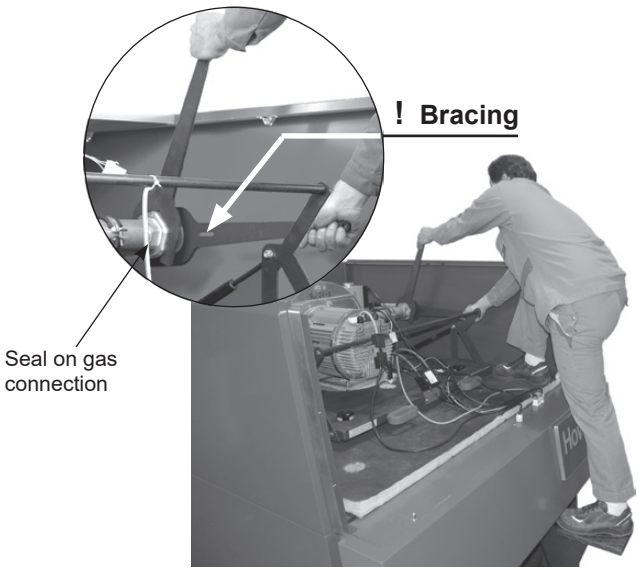


Fig. 58

24. Connect the supply air connection to the Venturi tube of the burner, if present.
25. Connect all burner plug-in connections.
26. Energise the heat generator (main switch, fuses) and set blocking switch to “I”.
27. Open main gas valve.
28. Check for gas leaks at the gas connection (e.g. using leak detection spray).
29. Put the gas boiler into operation.
30. Check seat of the screw connections between pressure switch B18 and the burner cover:

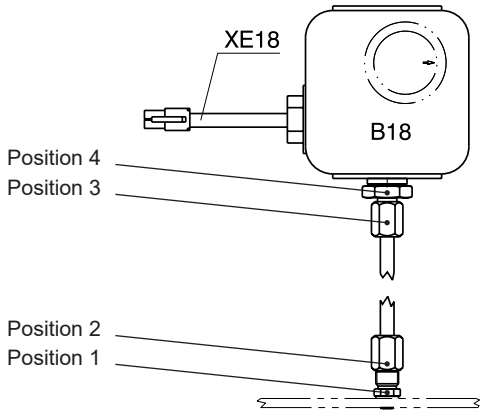


Fig. 59

- Position 1 (double nipple on adapter plate):
  Torque: 5 Nm
- Position 4 (double nipple on pressure switch B18):
  Torque: 25 Nm
- Position 2 and 3 (Serto union 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).

31. Perform a functional check of pressure monitoring device. See chapter 5.8.
    - To check the function of the pressure switch B18, set it to the minimum value and restart the heat generator.
      - If a restart of the heat generator is not possible, the pressure switch functions.
      - If the heat generator starts, the pressure switch is defective. → Replace the pressure switch.
    - Set the outward pointing arrow on the pressure switch to the value of the factory setting for the corresponding heat generator. See table page 49.
32. Check for gas leaks (e.g. using leak detection spray):
    - Check pressure monitoring device at the following points

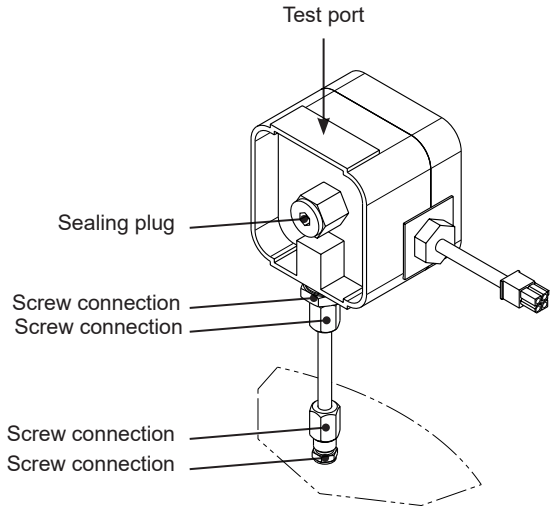


Fig. 60

    - Tightness at the intermediate flange (Fig. 50)
33. Carry out flue gas measurement according to chapter 5.9.
    - If necessary, adjust the setting.
    - Make a record of the measurement.
34. Before recommissioning, install all removed parts of the cladding and put away the climbing aid (see chapter 2.3).

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

See chapter 5.9.

6.8 BIC 970 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!

6.8.1 Automatic function device UltraGas® 2

Parameters CAN bus	Description	Tree	Unit	Plant Setting values	51-UltraGas® 2 (125)	51-UltraGas® 2 (150)	51-UltraGas® 2 (190)	51-UltraGas® 2 (230)	51-UltraGas® 2 (300)	51-UltraGas® 2 (350)	51-UltraGas® 2 (400)	51-UltraGas® 2 (450)	51-UltraGas® 2 (530)	51-UltraGas® 2 (620)	51-UltraGas® 2 (700)	51-UltraGas® 2 (800)	51-UltraGas® 2 (1000)	51-UltraGas® 2 (1100)	51-UltraGas® 2 (1300)	51-UltraGas® 2 (1550)
33287	SC1-6 debounce time	Configuration	s		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33537	Valve testing system function 0 = OFF 1 = Valve testing system available	Vlv testing sys			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33793	Function air level mntrg. 0 = Max. switch 1 = Min. and max. switches 2 = Pressure sensor	Air level mntrg.			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34561	Y6 function main gas valve 0 = OFF 1 = External main gas valve	Gas valves			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
36889	Minimum speed fan	Primary air fan	rpm		1100	1200	1000	1000	1000	1100	1000	1000	900	900	1000	900	1100	1100	1000	1000
36890	Maximum speed fan	Primary air fan	rpm		4600	5500	4400	4800	5200	5300	5400	5400	4500	4500	4800	4600	5700	5800	5000	5000
36892	Fan speed pre-ventilation	Primary air fan	rpm		4600	5500	4400	4800	5200	5300	5400	5400	4500	4500	4800	4600	5700	5800	5000	5000
36898	Start speed	Primary air fan	rpm		1600	1900	1600	1600	1700	1700	1600	1600	1600	1600	1600	1600	1800	1800	1700	1700
36902	Speed post-ventilation normal	Primary air fan	rpm		1100	1200	1000	1000	1000	1100	1000	1000	900	900	1000	900	1100	1100	1000	1000
36913	Run time post-ventilation blocking	Primary air fan	s		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
36919	Run time post-ventilation locking	Primary air fan	s		180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180
37121	Number of Hall pulses	Primary air fan			3	3	3	3	3	3	3	3	3	3	3	3	4	4	5	5
36920	Rising ramp flushing	Primary air fan	rpm		500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
36921	Falling ramp flushing	Primary air fan	rpm		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
36922	Rising ramp normal operation	Primary air fan	rpm		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
36923	Falling ramp normal operation	Primary air fan	rpm		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
37383	Blocking temperature WF	Heat gen. sensor	°C		103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103
37384	Switching diff. from blocking temp. WF	Heat gen. sensor	K		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
37387	Main pump frost protection ON	Heat gen. sensor	°C		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
37388	Main pump frost protection OFF	Heat gen. sensor	°C		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
37389	Heat gen. frost protection ON	Heat gen. sensor	°C		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
37390	Heat gen. frost protection OFF	Heat gen. sensor	°C		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Parameters CAN bus	Description	Tree	Unit	Plant Setting values	51-UltraGas® 2 (125)	51-UltraGas® 2 (150)	51-UltraGas® 2 (190)	51-UltraGas® 2 (230)	51-UltraGas® 2 (300)	51-UltraGas® 2 (350)	51-UltraGas® 2 (400)	51-UltraGas® 2 (450)	51-UltraGas® 2 (530)	51-UltraGas® 2 (620)	51-UltraGas® 2 (700)	51-UltraGas® 2 (800)	51-UltraGas® 2 (1000)	51-UltraGas® 2 (1100)	51-UltraGas® 2 (1300)	51-UltraGas® 2 (1550)
37633	Function flue gas sensor 0=OFF 1=Flue gas sensor (AGF)	Flue gas sensor			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
37639	Blocking temperature AGF	Flue gas sensor	°C		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
37641	Locking temperature AGF	Flue gas sensor	°C		110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
38660	Ionisation warning	Flame monitoring	µA		1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
38913	Water pressure sensor present 0 = OFF 1 = ON	Water pressure sensor			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
38914	Min. pressure warning	Water pressure sensor	bar		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
38915	Switching diff. min pressure warning	Water pressure sensor	bar		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
38918	Min. pressure blocking	Water pressure sensor	bar		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
38919	Switching diff. min pressure blocking	Water pressure sensor	bar		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
38920	Max. pressure blocking	Water pressure sensor	bar		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
38921	Switching diff. max pressure blocking	Water pressure sensor	bar		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
38922	Max. pressure locking	Water pressure sensor	bar		6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
39946	Max. setpoint (BR)	Burner	°C		90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
39947	Setpoint for bus interrupt	Burner	°C		75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
39950	Sw.-off hysteresis above set value (BR)	Burner	K		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
39951	Sw. diff. rel. to switch-off point (BR)	Burner	K		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
39955	Proportional range (YBR)	Burner	s		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
39957	Integral component (BR)	Burner	s		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
39958	Differential component (BR)	Burner	s		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
39961	Maximum output	Burner	%		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
39962	Output limitation on pressure warning	Burner	%		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
39980	Stepped modulation operating mode 0 = OFF 1 = Upwards 2 = Upwards and downwards	Burner			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
40450	Max. temp. rise low flow temp.	Burner	K/s		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
40451	Max. temp. rise high flow temp.	Burner	K/s		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
40452	Low flow temperature	Burner	°C		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
40453	High flow temperature	Burner	°C		80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
40226	Follow-on time	Main pump	min		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

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,
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