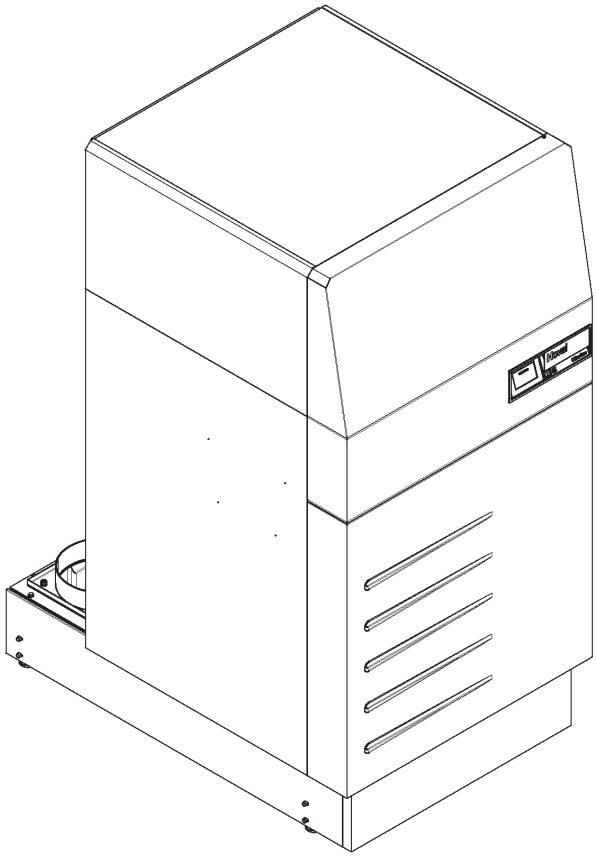
Technical information
Installation instructions

Hoval

UltraGas® 2 (125-1550)

Floor-standing gas condensing boiler



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

52-UltraGas® 2 (125)	25-126 kW
52-UltraGas® 2 (150)	35-151 kW
52-UltraGas® 2 (190)	38-191 kW
52-UltraGas® 2 (230)	51-233 kW
52-UltraGas® 2 (300)	58-299 kW
52-UltraGas® 2 (350)	70-352 kW
52-UltraGas® 2 (400)	69-399 kW
52-UltraGas® 2 (450)	77-451 kW
52-UltraGas® 2 (500)	77-491 kW
52-UltraGas® 2 (530)	110-533 kW
52-UltraGas® 2 (620)	136-622 kW
52-UltraGas® 2 (700)	146-703 kW
52-UltraGas® 2 (800)	166-804 kW
52-UltraGas® 2 (1000)	205-999 kW
52-UltraGas® 2 (1100)	229-1112 kW
52-UltraGas® 2 (1300)	269-1320 kW
52-UltraGas® 2 (1550)	324-1550 kW
52-UltraGas® 2 H (700)	146-703 kW
52-UltraGas® 2 H (1100)	229-1112 kW
52-UltraGas® 2 H (1550)	324-1550 kW

Hoval products must be installed and commissioned by specialists only. These instructions are intended exclusively for the **specialist**. Electrical installation must be performed by a licenced electrical company.

Floor-standing gas condensing boilers UltraGas® 2 (125-1550) acc. to EN 15502-1/15502-2-1 are suitable and licenced 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

1. Important notices

1.1 System manual

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

1.2 General safety instructions

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

However, at least the following conditions must be satisfied for a trial operation:
- Safety valve is installed (system sealed).
- Heating control is operating (on the electrical mains).
- The following are filled with water:
  - Heating system
  - Siphon
  - Neutralisation unit, if fitted
- The following are connected to the heat generator:
  - Sensor for safety temperature limiter connected (= boiler temperature sensor)
  - Diaphragm pressure expansion tank
  - Approved flue gas line (Flue gas line is tightly connected to the flue gas outlet of the heat generator)
- The burner is preset.

WARNING

Qualification for works

If work is carried out by non-expert persons, this can result in damage to property and personal injury.
- Only qualified personnel (persons who are adequately trained, instructed and informed about the dangers and risks associated with the product) are allowed to carry out the work in question.
- This heat generator must not be used by persons (including children) with limited physical, sensory or mental capabilities or insufficient experience and knowledge, unless they are supervised or detailed instruction is given for use of the heat generator by a person responsible for the safety of such persons.

WARNING

Fuel gas leak

Danger of explosion if there is a fuel gas leak.
- If you smell gas:
  - Do not smoke
  - No naked flames
  - Avoid the occurrence of sparks
  - Do not switch on the light or other electrical appliances
  - Open windows and doors
  - Switch off the heat generator and close the gas shut-off valve
  - Leave the room
  - Notify the specialist gas company/heating installation company
  - Follow the safety regulations on the gas meter

WARNING

Flue gas leak

Leaking flue gas represents a risk of poisoning.
- If you smell flue gas:
  - Turn off the heating system
  - Open windows and doors
  - Leave the room
  - Notify the heating installation company

WARNING

Hot surfaces

If cladding parts are dismantled and/or the boiler door is open, there is a risk of burns from touching hot surfaces.
- Allow the heat generator to cool down sufficiently before working (at least 20 minutes) or wear heat-resistant protective gloves.

NOTICE

Filling and replacement water

Damage to the heating system by filling unauthorised liquids.
- First filling of the heating system must be carried out by a heating installer.
- The filling and replacement water must be of the required water quality (see chapter 4.5.2).
- Only chemical additives for which the chemicals supplier has confirmed their safety and suitability are allowed to be used.
- If frost protection agent is being used, a separate engineering sheet is available from Hoval.

CAUTION

Sharp edges

If the cladding has not yet been fitted or if parts of the cladding have been dismantled and/or the boiler door is open, there is a risk of cuts from sharp edges.

- Handle parts of the cladding carefully and wear protective gloves.
- Avoid contact with sharp edges.
- Refit all covers and cladding parts after finishing the work.

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

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.

1.3 Explanation of the symbols

1.3.1 Warnings

DANGER

... indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

... indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

... indicates a possible hazardous situation which, if not avoided, could result in a minor or moderate injury.

NOTICE

... indicates a possible risk situation which, if not avoided, could result in property damage.

1.3.2 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

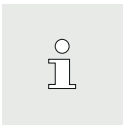
Warning of hot surface

Warning of potentially explosive substances

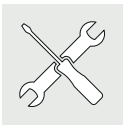
Warning of harmful or irritating substances

Warning of cutting injuries

1.3.3 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.

1.4 On delivery

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

1.5 Transport

- On receipt of the heat generator, please remove the packaging and check that the delivery is complete, consistent with your order and has not been damaged in transit.
- The heat generator must be transported and stored safely and protected from damage.
- Interim storage of Hoval condensing boilers may only take place in locations protected against the elements and against damage.
- The ambient conditions during storage must comply with the following limit values:
  - Air temperature: -10 °C - +50 °C
  - Air humidity: 50-80 % relative humidity
  - Condensation-free

1.6 Guarantee

The guarantee does not cover defects attributable to:

- Malfunctions and damage caused by installation in unsuitable rooms, e.g. hobby rooms, workshops, etc.
- Failure to follow the installation instructions
- Failure to comply with the operating instructions
- Incorrect installation
- Impermissible modifications
- Incorrect handling
- Contaminated operating media (fuel gas, heating 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, cleansing agent)
- Corrosion caused by not observing the required water quality (see chapter 4.5.2)

1.7 Regulations, standards and directives

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 EN 50156: Electrical equipment for furnaces and ancillary equipment
- 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 liquid gas

2. Technical information

2.1 Description

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 heating 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.

UltraGas® 2 is approved for burning the following fuels:
- Natural gas E
- Natural gas E with a hydrogen content (H_2) of up to 20 %
- Natural gas LL
- Propane according to DIN 51622
- Biomethane according to EN 16723

The UltraGas® 2 corresponds with the standards and guidelines listed in the EU declaration of conformity/UK declaration of conformity. The EU declaration of conformity/ UK declaration of conformity belonging to the product is found in the system book.

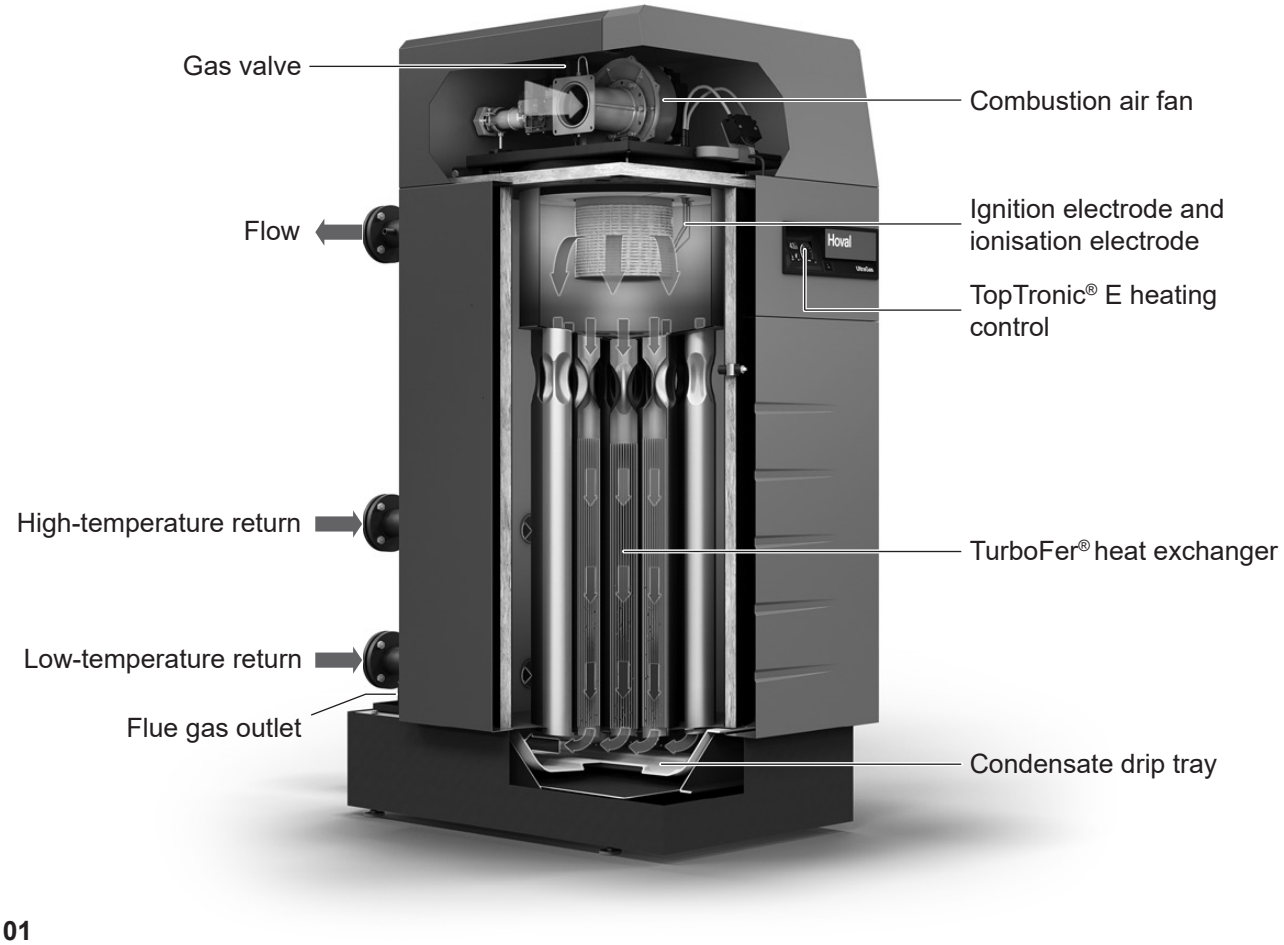


Fig. 01

2.1.1 Function descriptions

2.1.1.1 Automatic function device BIC 970 (brief description)

The automatic function device BIC 970 of the UltraGas® 2 is only used in conjunction with the heating control 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
  - Optional system flow sensor
- “Fault” and “Flame message” status outputs
- RS485 connection to TopTronic® E/UltraGas® 2
- Number of start attempts: maximum 4
- Safety time: 5 sec. (UltraGas® 2 (1300,1550): 3 sec.)
- Pre-ignition: 5 sec.
- Pre-ventilation period: 50 sec.
- After-run time for pump (230 V AC): 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 heat generator can be put back into operation when the malfunction has been rectified.

Fuses

There is a slow-blow fuse on the BIC 970: 10 A

2.2 Technical data

2.2.1 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	Hoval Oriental Beijing CN-100120
	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 (230)**		**09/2022**
(4)	Brennwertkessel Chaudière à condensation Caldaia a condensazione Condensing boiler			

(5)	Pn	**230**	kW	V (H_2O)		**265**	l
	Pn (80/60°C)	**47 - 218**	kW	PMS		**6**	bar
	Pn (50/30°C)	**51 - 233**	kW	PT	(1.5 x PMS)	**9**	bar
	Qn (H_i)	**47 - 223**	kW	Tmax		**95**	°C
	Qn (H_s)	**52 - 247**	kW	TS		**110**	°C
(6)	Anschlussart / Kind of contact / Type de raccordement / Tipo di collegamento						**B23,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, 37 mbar
CY, MT	I3P	30/50 mbar	NO, MK	I2H	20 mbar
DE	II2ELL3P	20, 50 mbar	NL	II2EK3P	20/25, 50, 50 mbar
AT	II2H3P	20, 50 mbar	LU	II2E3P	20, 50 mbar
CH, CZ, BA, BG	II2H3P	20, 37 mbar	HU	II2HS3P	20/25, 30 mbar
GB, GR, IE, IS	II2H3P	20, 37 mbar	FR	II2Er3P / IIEsi3P	20/25, 37 mbar
IT, LT, LI, PT	II2H3P	20, 37 mbar	EE, DK, SE, RS, ME	II2H3B/P	20, 30 mbar
SI, SK, TR, UA	II2H3P	20, 37 mbar	FI, HR, RO, RU	II2H3P	20, 30 mbar

(9)	Elektroanschluss / Raccordement électrique / Collegamento elettrico / Electrical Connection			
	230V~/ 50Hz/ 16A , IP20		**max. 228 W**	
(10)	NOx-Klasse / Classe NOx / Classe NOx / NOx-class		-	**EN 15502**
(11)	CE-Nr. / N° CE / Numero-CE / CE-No	**CE-0085DL0175**	SVGW-Nr. / SVGW-No. / Nº-SVGW / N. -SVGW	**20-010-4**
	UKCA-No:			
(12)	UK CA 0086/22 CE 0085/22 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 — Operating temperature max. (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 and warning notice, installation instructions and operating instructions

2.2.2 Technical data UltraGas® 2 (125-1550)

Type			(125)	(150)	(190)	(230)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	21-114	33-139	35-177	47-218
• Nominal heat output at 50/30 °C, natural gas [1]		kW	25-126	35-151	38-191	51-233
• Nominal heat output at 80/60 °C, propane [2]		kW	27-113	43-138	55-175	81-217
• Nominal heat output at 50/30 °C, propane [2]		kW	30-126	48-151	62-191	90-233
• Nominal heat input with natural gas [3]		kW	23-116	32-142	35-179	47-223
• Nominal heat input with propane [2]		kW	28-116	44-142	57-179	84-223
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (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) [4]		%	98.6/88.9	97.6/88.1	98.5/ 88.7	98.2/88.5
• Boiler efficiency at 30 % partial load operation (EN 15502) (NCV/GCV) [4]		%	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
- annual energy consumption	Q_{HE}	BY	209	265	326	412
• NOx class (EN 15502)			-	-	-	-
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	25	28	33	37
• Carbon monoxide emissions at 50/30 °C (in relation to 3 % O_2)	CO	mg/Nm³	31	21	25	13
• O_2 content in flue gas at min./max. nominal heat output		%	5.9/5.6	5.5/6.0	5.9/6.0	6.0/5.9
• Heat loss in standby mode		Watt	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
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	80	80	80
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E - (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	2.4-12.0	3.3-14.6	3.6-18.5	4.8-23.0
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	2.8-14.3	3.9-17.5	4.3-22.0	5.8-27.4
- Propane (G31) - NCV = 24.4 kWh/m³ [2]		m³/h	1.2-4.8	1.8-5.8	2.3-7.3	3.4-9.1
• Operating voltage		V/Hz	1x230/50	1x230/50	1x230/50	1x230/50
• Electrical power consumption min./max.		Watt	41/140	43/225	38/151	49/228
• Standby		Watt	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)	69	70	66	68
- Sound pressure level heating noise (standard value depending on installation conditions)		dB(A)	54	59	53	56
• Condensate quantity (natural gas) at 50/30 °C		l/h	11	12	15	20
• pH value of the condensate (approx.)		ph	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	188	226	283	344
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	37	51	55	63
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	64	65	68	69
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	43	45	46	47
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	29	28	29	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm³/h	154	180	232	280
- Maximum supply pressure for combustion air supply and flue gas line		Pa	120	120	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-50	-50	-50	-50

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] 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.

[4] Conversion acc. to EN 15502-1, Appendix J

Type			(300)	(350)	(400)	(450)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	54-274	67-315	62-362	73-415
• Nominal heat output at 50/30 °C, natural gas [1]		kW	58-299	70-352	69-399	77-451
• Nominal heat output at 80/60 °C, propane [2]		kW	83-274	115-311	97-361	111-408
• Nominal heat output at 50/30 °C, propane [2]		kW	93-299	129-352	108-399	122-451
• Nominal heat input with natural gas [3]		kW	54-282	64-331	62-374	71-427
• Nominal heat input with propane [2]		kW	87-282	121-331	100-374	115-427
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	472	452	432	412
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	770	810	830	840
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load operation (EN 15502) (NCV/GCV) [4]		%	109.2/98.4	108.9/98.1	109.0/98.2	108.9/98.1
• Room heating energy efficiency						
- without control	ηs	%	94	93	93	-
- with control	ηs	%	96	95	95	-
- with control and room sensor	ηs	%	98	97	97	-
- annual energy consumption	Q_{HE}	BY	505	590	653	-
• NOx class (EN 15502)			-	-	-	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	39	45	39	45
• Carbon monoxide emissions at 50/30 °C (in relation to 3 % O_2)	CO	mg/Nm³	18	26	23	30
• O_2 content in flue gas at min./max. nominal heat output		%	5.5/5.8	5.7/5.7	5.9/5.9	6.0/5.6
• Heat loss in standby mode		Watt	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
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	80	80	80
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E - (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	5.6-29.1	6.6-34.1	6.4-38.6	7.3-44.0
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	6.6-34.7	7.9-40.7	7.6-46.0	8.7-52.5
- Propane (G31) - NCV = 24.4 kWh/m³ [2]		m³/h	3.6-11.6	5.0-13.6	4.1-15.3	4.7-17.5
• Operating voltage		V/Hz	1x230/50	1x230/50	1x230/50	1x230/50
• Electrical power consumption min./max.		Watt	51/365	55/350	56/518	56/590
• Standby		Watt	5	5	5	5
• 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)	73	70	73	74
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	71	72	73	74
- Sound pressure level heating noise (standard value depending on installation conditions)		dB(A)	63	60	63	64
• Condensate quantity (natural gas) at 50/30 °C		l/h	22	25	28	29
• pH value of the condensate (approx.)		ph	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	445	522	591	674
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	85	101	98	112
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	64	65	66	67
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	43	44	48	47
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	29	29	29	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm³/h	364	428	483	552
- Maximum supply pressure for combustion air supply and flue gas line		Pa	130	130	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-50	-50	-50	-50

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] 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.

[4] Conversion acc. to EN 15502-1, Appendix J

Type			(500)	(530)	(620)	(700)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	71-449	100-497	125-580	132-653
• Nominal heat output at 50/30 °C, natural gas [1]		kW	77-491	110-533	136-622	146-703
• Nominal heat output at 80/60 °C, propane [2]		kW	111-441	137-489	168-569	174-643
• Nominal heat output at 50/30 °C, propane [2]		kW	121-491	145-533	178-622	187-703
• Nominal heat input with natural gas [3]		kW	71-463	101-506	124-591	134-668
• Nominal heat input with propane [2]		kW	115-463	141-506	174-591	180-668
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	408	571	536	509
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	850	978	1050	1100
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load operation (EN 15502) (NCV/GCV) [4]		%	109.0/98.2	109.1/98.3	109.0/98.2	108.9/98.1
• Room heating energy efficiency						
- without control	ηs	%	-	-	-	-
- with control	ηs	%	-	-	-	-
- with control and room sensor	ηs	%	-	-	-	-
- annual energy consumption	Q_{HE}	BY	-	-	-	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	50	33	33	40
• Carbon monoxide emissions at 50/30 °C (in relation to 3 % O_2)	CO	mg/Nm³	46	20	24	26
• O_2 content in flue gas at min./max. nominal heat output		%	5.5/5.8	5.9/5.9	5.9/6.0	6.0/5.7
• Heat loss in standby mode		Watt	750	1000	1000	1000
• 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
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	80	80	80
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E - (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	7.3-47.7	10.4-52.2	12.8-60.9	13.8-68.9
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	8.7-56.9	12.4-62.2	15.3-72.7	16.5-82.2
- Propane (G31) - NCV = 24.4 kWh/m³ [2]		m³/h	4.7-19.0	5.8-20.7	7.1-24.2	7.4-27.4
• Operating voltage		V/Hz	1x230/50	1x230/50	1x230/50	1x230/50
• Electrical power consumption min./max.		Watt	57/716	67/805	63/831	67/1060
• Standby		Watt	5	5	5	5
• 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)	78	77	75	76
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	77	70	72	71
- Sound pressure level heating noise (standard value depending on installation conditions)		dB(A)	68	67	65	66
• Condensate quantity (natural gas) at 50/30 °C		l/h	37	39	51	48
• pH value of the condensate (approx.)		ph	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	736	800	933	1055
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	112	159	196	211
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	66	67	68	69
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	44	45	47	49
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	28	28	28	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm³/h	602	654	764	863
- Maximum supply pressure for combustion air supply and flue gas line		Pa	130	130	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-50	-50	-50	-50

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] 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.

[4] Conversion acc. to EN 15502-1, Appendix J

Type			(800)	(1000)	(1100)	(1300)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	150-743	185-926	203-1038	241-1230
• Nominal heat output at 50/30 °C, natural gas [1]		kW	166-804	205-999	229-1112	269-1320
• Nominal heat output at 80/60 °C, propane [2]		kW	233-744	245-926	299-1033	362-1227
• Nominal heat output at 50/30 °C, propane [2]		kW	254-804	264-999	316-1112	385-1320
• Nominal heat input with natural gas [3]		kW	151-759	187-943	206-1057	247-1251
• Nominal heat input with propane [2]		kW	236-759	248-943	306-1057	371-1251
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	831	756	718	1211
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	1370	1540	1600	2130
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.3/88.6	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load operation (EN 15502) (NCV/GCV) [4]		%	109.1/98.3	109.0/98.2	108.6/97.8	108.7/97.9
• Room heating energy efficiency						
- without control	ηs	%	-	-	-	-
- with control	ηs	%	-	-	-	-
- with control and room sensor	ηs	%	-	-	-	-
- annual energy consumption	Q_{HE}	BY	-	-	-	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	36	36	41	37
• Carbon monoxide emissions at 50/30 °C (in relation to 3 % O_2)	CO	mg/Nm³	23	25	26	23
• O_2 content in flue gas at min./max. nominal heat output		%	6.0/5.8	6.0/5.9	6.0/5.9	6.0/5.9
• Heat loss in standby mode		Watt	1200	1200	1200	1600
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-300	17.4-300	17.4-300	17.4-300
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	300	300	300	300
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E - (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	15.6-78.2	19.3-97.2	21.2-109.0	25.5-129.0
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	18.6-93.4	23.0-116.0	25.3-130.0	30.4-153.9
- Propane (G31) - NCV = 24.4 kWh/m³ [2]		m³/h	9.7-31.1	10.2-38.6	12.5-43.3	15.2-51.3
• 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.		Watt	94/1012	203/1873	203/1933	271/4111
• Standby		Watt	7	7	7	5
• 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)	78	83	82	86
- 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 (standard value depending on installation conditions)		dB(A)	68	73	72	76
• Condensate quantity (natural gas) at 50/30 °C		l/h	57	68	72	100
• pH value of the condensate (approx.)		ph	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	1198	1488	1669	1975
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	238	295	325	390
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	66	69	70	66
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	44	47	49	45
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	28	28	29	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm³/h	981	1219	1366	1617
- Maximum supply pressure for combustion air supply and flue gas line		Pa	130	130	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-50	-50	-50	-50

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] 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.

[4] Conversion acc. to EN 15502-1, Appendix J

Type			(1550)	H (700)	H (1100)	H (1550)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	297-1447	132-653	203-1038	297-1447
• Nominal heat output at 50/30 °C, natural gas [1]		kW	324-1550	146-703	229-1112	324-1550
• Nominal heat output at 80/60 °C, propane [2]		kW	427-1439	174-643	299-1033	427-1439
• Nominal heat output at 50/30 °C, propane [2]		kW	453-1550	187-703	316-1112	453-1550
• Nominal heat input with natural gas [3]		kW	297-1469	134-668	206-1057	297-1469
• Nominal heat input with propane [2]		kW	437-1469	180-668	306-1057	437-1469
• Operating pressure heating min./max. (PMS)		bar	1/6	1/10	1/10	1/10
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	1118	509	709	1118
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	2300	1144	1700	2440
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load operation (EN 15502) (NCV/GCV) [4]		%	108.5/97.7	108.9/98.1	108.6/97.8	108.5/97.7
• Room heating energy efficiency						
- without control	ηs	%	-	-	-	-
- with control	ηs	%	-	-	-	-
- with control and room sensor	ηs	%	-	-	-	-
- annual energy consumption	Q_{HE}	BY	-	-	-	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	35	40	41	35
• Carbon monoxide emissions at 50/30 °C (in relation to 3 % O_2)	CO	mg/Nm³	23	26	26	23
• O_2 content in flue gas at min./max. nominal heat output		%	6.0/6.0	6.0/5.7	6.0/5.9	6.0/6.0
• Heat loss in standby mode		Watt	1600	1000	1200	1600
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-300	17.4-80	17.4-300	17.4-300
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	300	80	300	300
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E - (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	30.6-151.4	13.8-68.9	21.2-109.0	30.6-151.4
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	36.5-180.7	16.5-82.2	25.3-130.0	36.5-180.7
- Propane (G31) - NCV = 24.4 kWh/m³ [2]		m³/h	17.9-60.2	7.4-27.4	12.5-43.3	17.9-60.2
• Operating voltage		V/Hz	1x230/50 3x400/50	1x230/50	1x230/50 3x400/50	1x230/50 3x400/50
• Electrical power consumption min./max.		Watt	301/4141	67/1060	203/1933	301/4141
• Standby		Watt	7	5	7	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)	85	76	82	85
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	71	-	-
- Sound pressure level heating noise (standard value depending on installation conditions)		dB(A)	75	66	72	75
• Condensate quantity (natural gas) at 50/30 °C		l/h	138	48	72	138
• pH value of the condensate (approx.)		ph	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	2230	1055	1669	2230
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	450	211	325	450
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	68	69	70	68
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	46	49	49	46
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	28	29	29	28
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm³/h	1830	863	1366	1830
- Maximum supply pressure for combustion air supply and flue gas line		Pa	130	130	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-50	-50	-50	-50

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

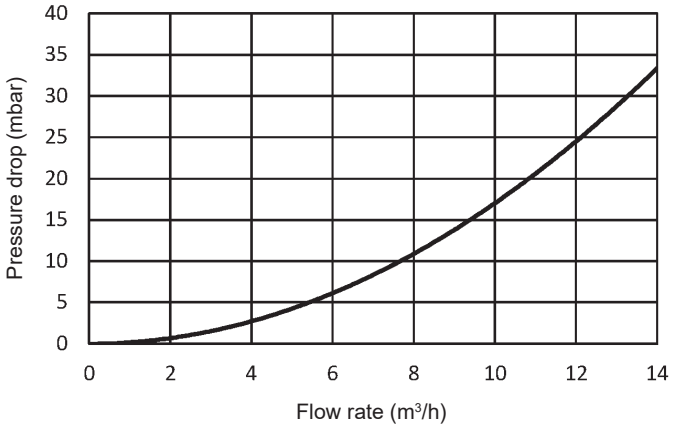
[2] Data related to NCV, conditional data

[3] 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.

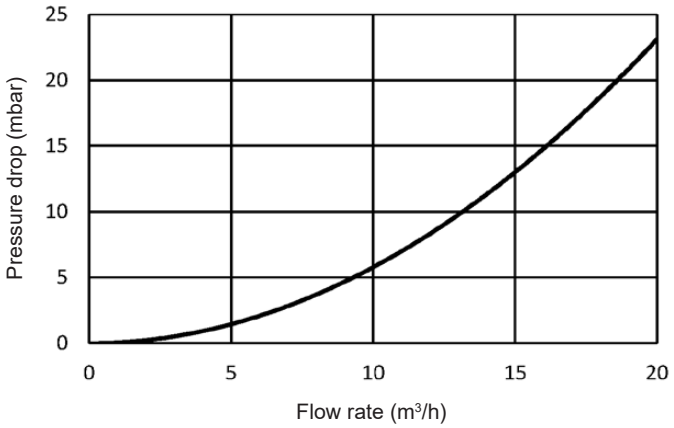
[4] Conversion acc. to EN 15502-1, Appendix J

2.2.3 Heating water side flow resistance

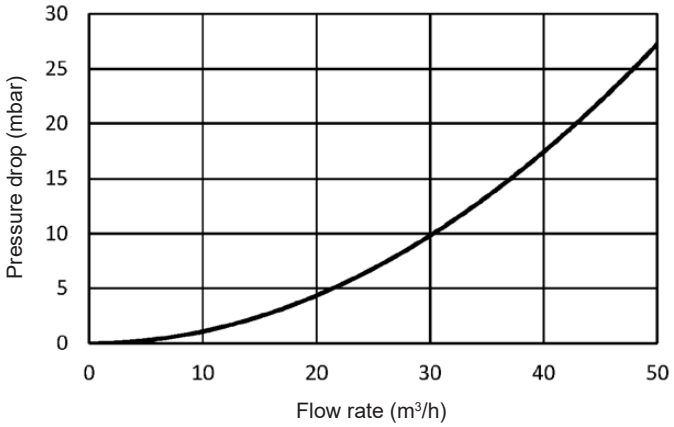
UltraGas® 2 (125,150)



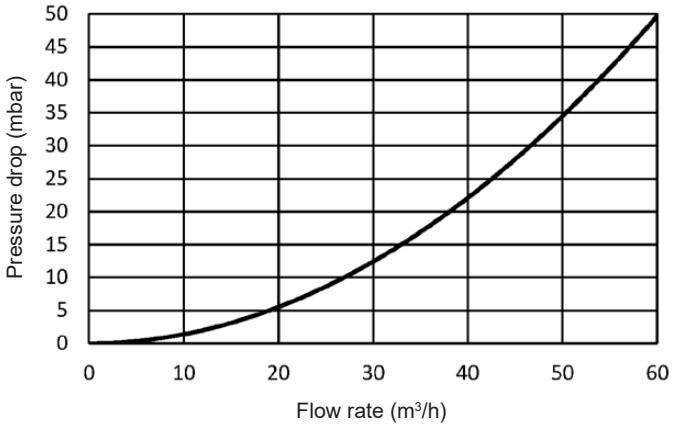
UltraGas® 2 (190,230)



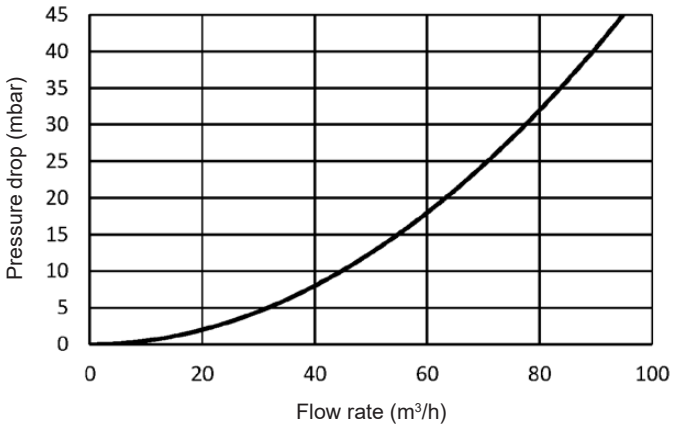
UltraGas® 2 (300-500)



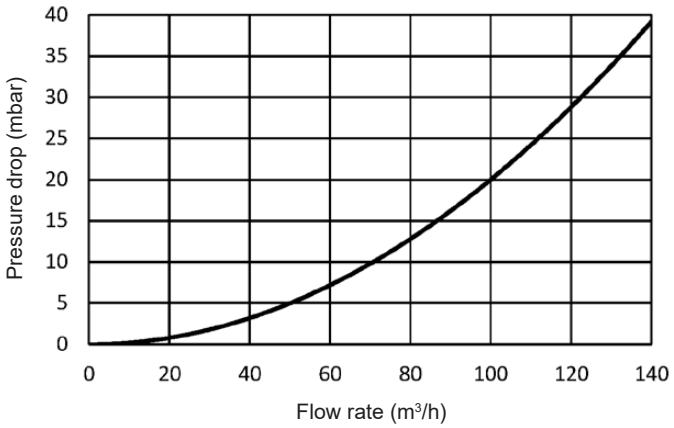
UltraGas® 2 (530-700)



UltraGas® 2 (800-1100)



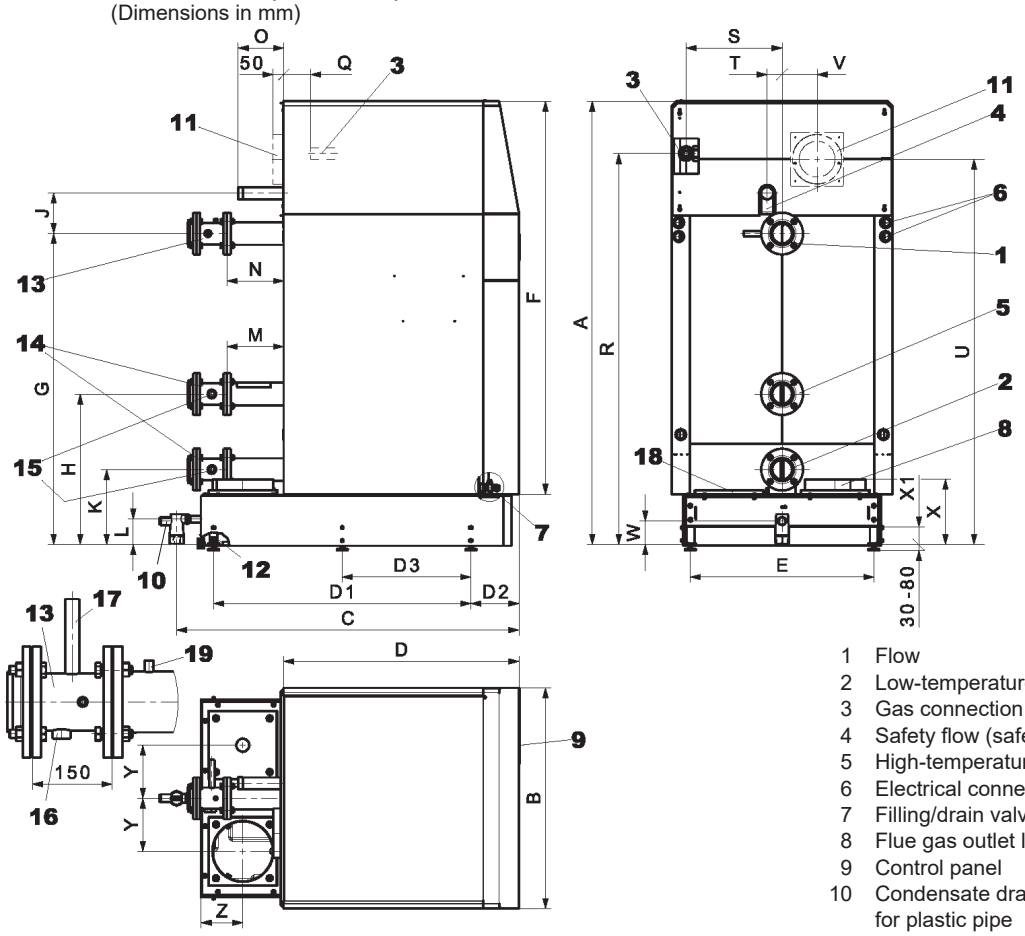
UltraGas® 2 (1300,1550)



2.3 Dimensions

2.3.1 UltraGas® 2 (125-1550) dimensions

(Dimensions in mm)



1 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 Filling/drain valve (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 Combustion air suction socket (option)
12 Boiler feet adjustable 30-80 mm
13 Safety fitting pipe flow (option)
14 Safety fitting pipe return (option)
15 Diaphragm pressure expansion tank connection Rp 1″
16 Maximum pressure limiter Rp ¾″
17 Safety temperature limiter Rp ½″
18 Cleaning opening left or right
19 Flow connector sleeve Rp ¼″ for installation of the system flow sensor

Notice
For required space, see chapter 2.3.3.

Type	A	B	C	D	D1	D2	D3	E	F	G	H	J	K	I	M	N	O	Q	R
(125,150)	1923	720	1182	799	754	242	-	533	1681	1479	714	122	334	134	207	207	65	192	1725
(190,230)	1968	820	1256	895	854	242	-	633	1726	1517	717	145	337	134	204	204	69	226	1778
(300-500)	1923	930	1632	1165	1204	242	-	743	1683	1447	745	169	365	131	285	285	189	13	1735
(530-700)	2234	1110	1722	1184	1294	242	-	923	1982	1564	757	203	377	128	286	286	225	-2	1966
(800-1100)	2255	1290	1822	1364	1480	242	-	1103	1987	1573	788	215	408	128	378	378	225	58	1959
(1300,1550)	2395	1560	2200	1640	1790	250	895	1363	2103	1600	822	238	442	138	420	420	218	22	2064
H (700)	2234	1110	1722	1184	1294	242	-	923	1982	1564	757	203	377	128	286	286	225	-2	1966
H (1100)	2255	1290	1822	1364	1480	242	-	1103	1987	1573	788	215	408	128	378	378	225	58	1959
H (1550)	2395	1560	2200	1640	1790	250	895	1363	2103	1600	822	238	442	138	390	390	218	22	2064

Type	S	T	U	V	W	X	X1	Y	Z	1,2,5 *	3	4	8	10	11
(125,150)	318	40	1725	101	124	319	99	157	139	DN 65 / PN 6 / 4-hole	Rp 1″	R 1″	Ø 155/159	DN 40	Ø 122/125
(190,230)	371	50	1778	101	124	319	99	195	139	DN 65 / PN 6 / 4-hole	Rp 1½″	R 1¼″	Ø 155/159	DN 40	Ø 197/200
(300-500)	368	40	1736	101	121	316	96	217	184	DN 100 / PN 6 / 4-hole	Rp 1½″	R 1½″	Ø 252/256	DN 40	Ø 197/200
(530-700)	483	75	1938	176	118	328	89	267	211	DN 100 / PN 6 / 4-hole	Rp 2″	R 2″	Ø 302/306	DN 40	Ø 247/250
(800-1100)	572	100	1959	176	118	374	89	357	219	DN 125 / PN 6 / 8-hole	Rp 2″	R 2″	Ø 302/306	DN 40	Ø 247/250
(1300,1550)	621	100	2064	190	128	398	89	455	244	DN 150 / PN 6 / 8-hole	Rp 2″	R 2″	Ø 402/406	DN 40	Ø 247/250
H (700)	483	75	1938	176	118	328	89	267	211	DN 100 / PN 16 / 8-hole	Rp 2″	R 2″	Ø 302/306	DN 40	Ø 247/250
H (1100)	572	100	1959	176	118	374	89	357	219	DN 125 / PN 16 / 8-hole	Rp 2″	R 2″	Ø 302/306	DN 40	Ø 247/250
H (1550)	621	100	2064	190	128	398	89	455	244	DN 150 / PN 16 / 8-hole	Rp 2″	R 2″	Ø 402/406	DN 40	Ø 247/250

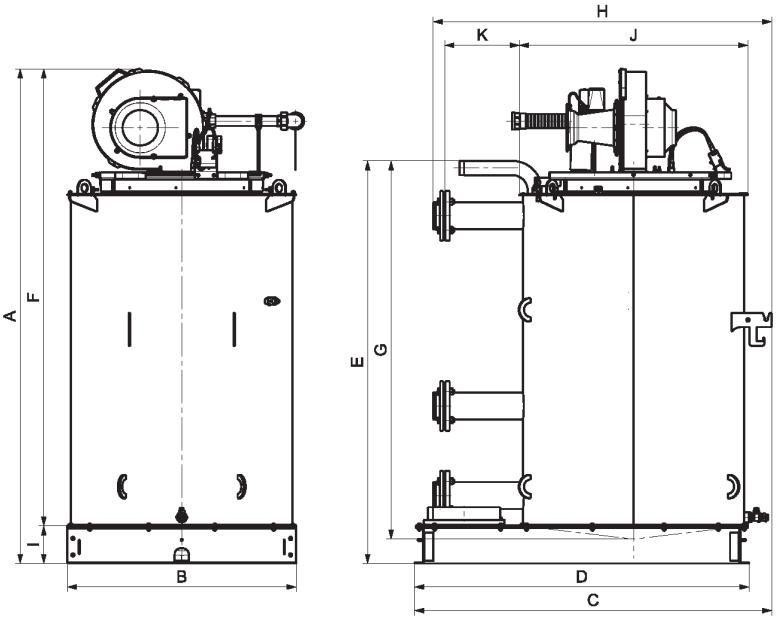
* DN = nominal diameter, PN = nominal pressure

2.3.2 Overall unit dimensions

Boiler without cladding and insulation
(Dimensions in mm)

WARNING

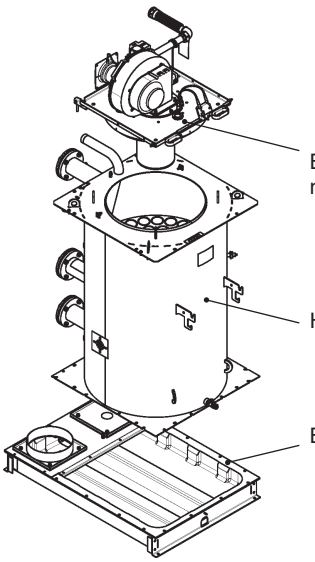
- The boiler must only be suspended using the four points marked as the crane suspension option in Fig. 02. The hooks on the rear of the boiler must not be used to suspend it.
- The four chains must be at least 1.5 m long.



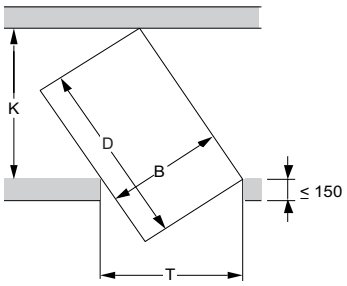
UltraGas® 2 type	A	B	C	D	E	Dimensions for multi-part installation F	G	H	I	J	K
(125,150)	1765	580	957	880	1519	1625	1421	946	140	580	242
(190,230)	1818	680	1054	980	1583	1678	1484	1037	140	680	236
(300-500)	1777	790	1400	1330	1544	1637	1451	1391	140	950	316
(530-700)	2099	970	1516	1420	1708	1940	1605	1437	159	970	316
(800-1100)	2120	1150	1712	1606	1729	1945	1625	1722	175	1150	408
(1300,1550)	2255	1410	2032	1916	1779	2056	1671	2042	199	1410	458

Weights for multi-part installation UltraGas® 2

UltraGas® 2 type	Base kg	Heat exchanger kg	Burner kg
(125)	34	207	29
(150)	34	220	29
(190)	42	272	39
(230)	42	293	39
(300)	60	440	54
(350)	60	474	54
(400)	60	509	50
(450)	60	543	50
(500)	60	565	50
(530)	79	868	78
(620)	79	929	80
(700)	79	977	80
(800)	104	1017	93
(1000)	104	1154	100
(1100)	104	1347	100
(1300)	155	1683	160
(1550)	155	1847	160



Required minimum width of door and corridor for boiler installation
The following values are the calculated minimum values (dimensions in mm)



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

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

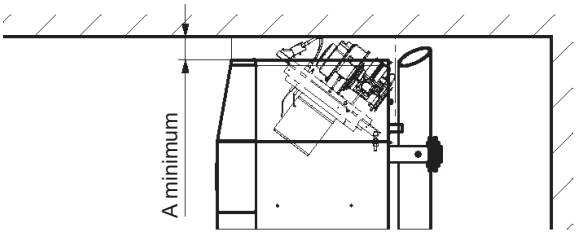
B = Boiler width
D = Maximum boiler length
T = Door width
K = Corridor width

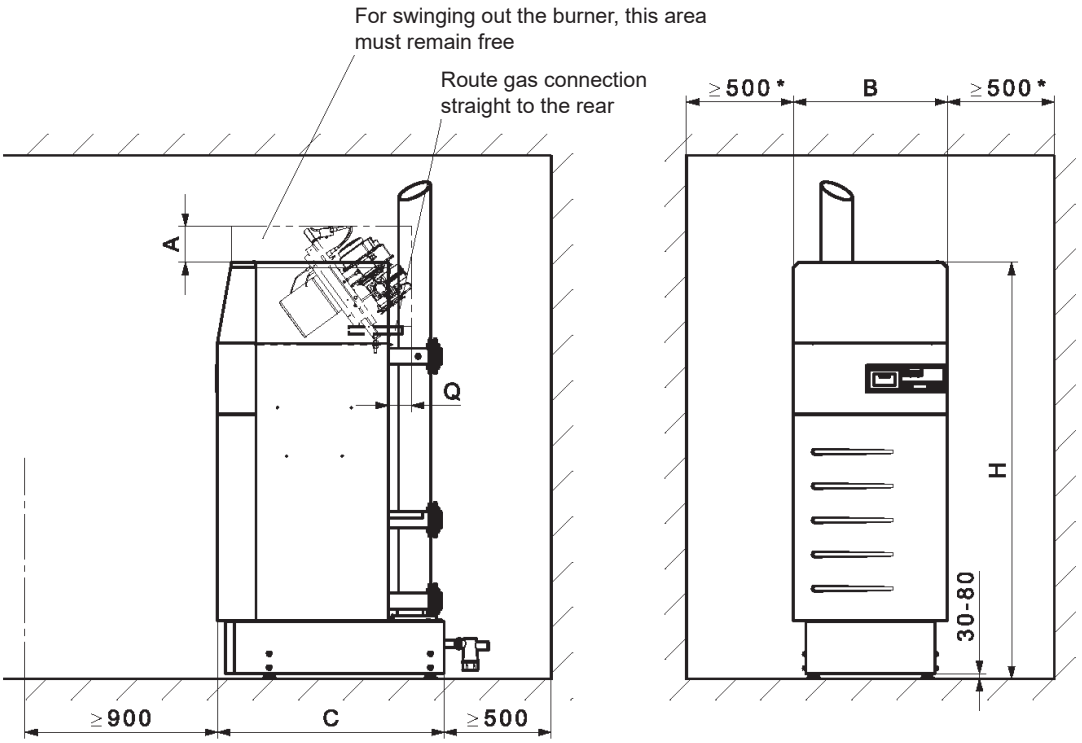
Example calculation for the required corridor width
Door width T = 800

UltraGas® 2 (500) $K = \frac{790}{800} \times 1330 =$ Corridor width ≥ 1314

2.3.3 Space requirement

(Dimensions in mm)





UltraGas® 2 type	A [1]	A minimum [2]	B	C	H [3]	H minimum [4]	Q
(125,150)	169	106	720	1060	1953	1934	125
(190,230)	155	71	820	1160	1998	1979	2
(300-500)	513	156	930	1510	1953	1937	60
(530-700)	121	121	1110	1600	2264	2255	155
(800-1100)	280	195	1290	1786	2285	2276	119
(1300,1550)	291	154	1560	2104	2425	2416	163
H (700)	121	121	1110	1600	2264	2255	155
H (1100)	280	195	1290	1786	2285	2276	119
H (1550)	291	154	1560	2104	2425	2416	163

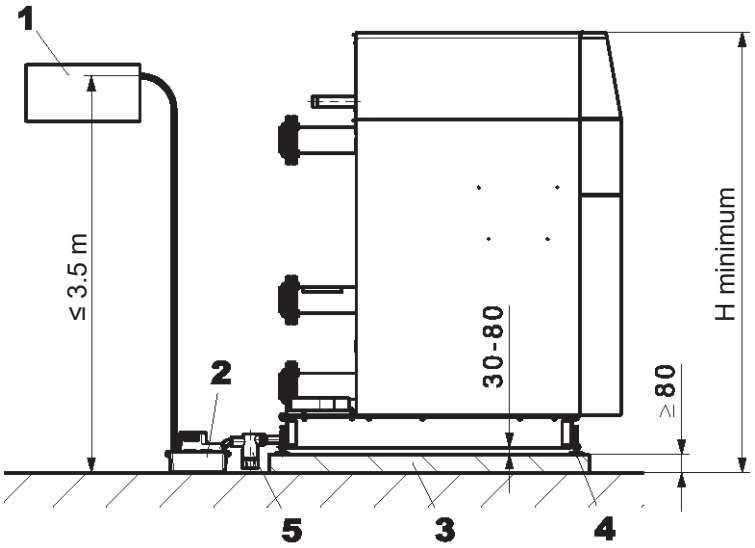
[1] If the room height is too low: the dimension can be reduced (see A minimum).
[2] **Caution!** At A minimum, the burner can no longer be swivelled out completely. Cleaning with UltraGas® 2 (125-230) and UltraGas® 2 (530-1550) still possible.
[3] Height value assumes adjustable feet are set to 30 mm.
[4] The base plates cannot be installed without feet and the installer will have to fit a siphon with min. 70 mm barrier height. For details see next page.

* The heat generator 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.

2.3.3.1 Installation variants with reduced height requirements

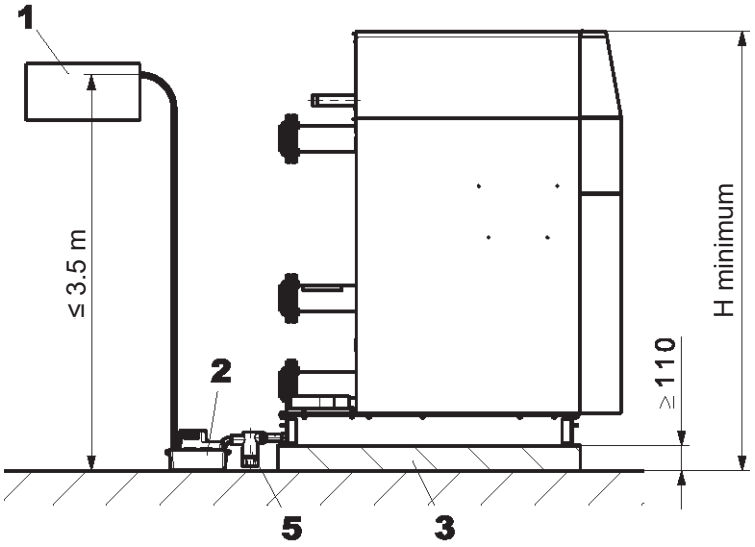
(Dimensions in mm)

UltraGas® 2 with masonry base and adjustable feet



UltraGas® 2 type	H minimum [1]
(125,150)	1934
(190,230)	1979
(300-500)	1937
(530-700)	2255
(800-1100)	2276
(1300,1550)	2416
H (700)	2255
H (1100)	2276
H (1550)	2416

UltraGas® 2 with masonry base without adjusting feet



UltraGas® 2 type	H minimum [1]
(125,150)	1934
(190,230)	1979
(300-500)	1937
(530-700)	2255
(800-1100)	2276
(1300,1550)	2416
H (700)	2255
H (1100)	2276
H (1550)	2416

1 Neutralisation unit (option)
2 Condensate pump (optional)
3 Masonry 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 base plates and adjustable feet.
- With H minimum, cleaning the siphon is more difficult.

3. Installation

CAUTION

Sharp edges

If the cladding has not yet been fitted or if parts of the cladding have been dismantled and/or the boiler door is open, there is a risk of cuts from sharp edges.

- Handle parts of the cladding carefully and wear protective gloves.
- Avoid contact with sharp edges.
- Refit all covers and cladding parts after finishing the work.

3.1 Installation location (requirements on the boiler room)

§

Observe country-specific regulations regarding structural requirements for the boiler room in which the heat generator is installed.

!

NOTICE

Corrosion caused by halogen compounds in the combustion air

If halogen compounds get into the combustion air of the heat generator, the heat generator can corrode on the heating gas and flue gas side.

- Make sure that the combustion air is free from halogen compounds.
- If the heat generator is operated room air dependent (construction B), the heat generator **must not** be installed in rooms in which halogen compounds occur and can get into the combustion air.

WARNING

Construction work

There is a risk of poisoning and explosion if the heat generator is connected to the gas network or put into operation while construction work is still being carried out in the boiler room.

- Do not connect the heat generator to the gas network or put it into operation until the construction work in the boiler room has been completed.

The boiler room in which the heat generator is installed must meet the following conditions regarding combustion air supply:

- An adequate combustion air supply must be guaranteed, according to local regulations.
- The necessary oxygen-rich 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.
- UltraGas® 2 can be combined with flue gas ducts that obtain combustion air:
  - from the boiler room (room air dependent operation (construction B)) or
  - via a closed system from outside (operation independent of room air (construction C))
- For room air dependent operation (construction B), the combustion air must be free from:
  - Contaminants (such as dust, building materials, etc.)
  - Aggressive substances (halogens such as chlorides, fluorides, etc.).
    - Halogen compounds can be created, for example, by cleansing and degreasing agents, solvents, glue and bleaches.
    - Rooms in which halogen compounds can occur are, for example, washrooms, drying rooms, hobby rooms, hairdressers.

3.2 Setting up heat generator

3.2.1 Requirements for installation and setting up

- For overall unit dimensions, see chapter 2.3.2
- For required space, see chapter 2.3.3
- Possibilities for reduced space requirement in height, see chapter 2.3.3.1
- Suspension option, see chapter 3.2.1.1

3.2.1.1 Suspension option

WARNING

- The boiler is only allowed to be attached at the four suspension points provided for this purpose. The hooks on the rear of the boiler must not be used to suspend it.
- The four chains must be at least 1.5 m long.

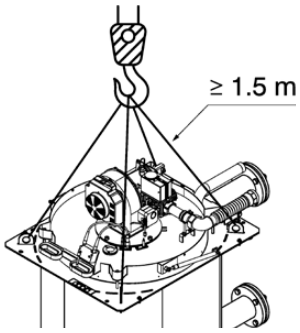
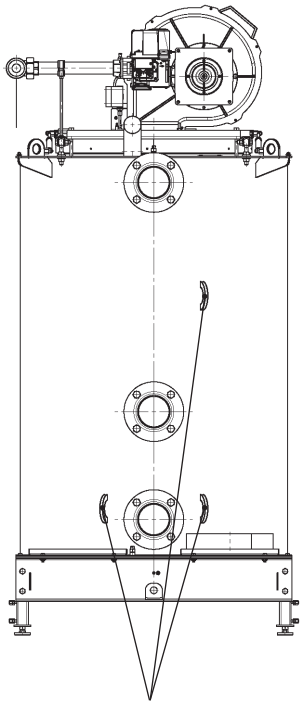


Fig. 02



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

Fig. 03

3.2.2 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).

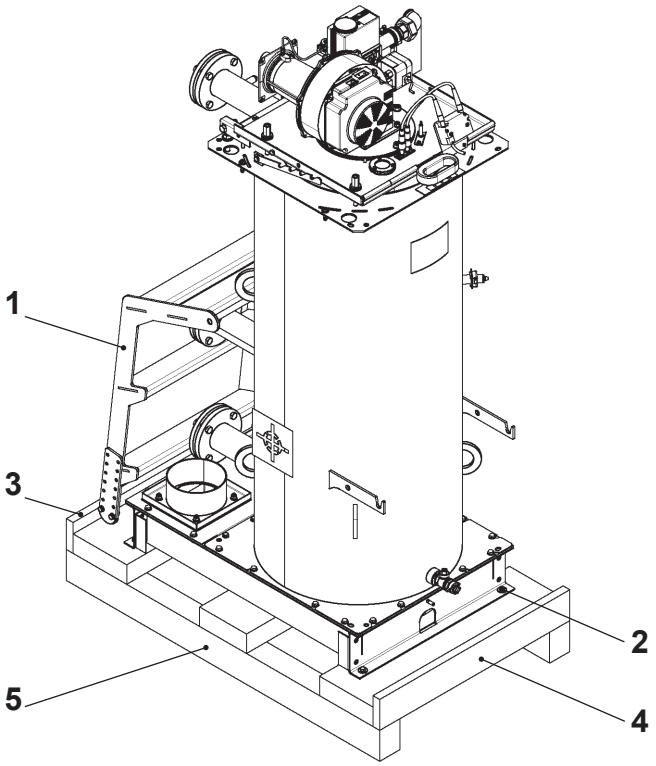


Fig. 04

2. Remove front (2) and rear (3) wooden crossbeam.
3. Remove angle screw connections (4).
4. Turn the boiler on the pallet (5) through 45°.
5. Push the boiler so that 3 boiler feet (6) can be mounted (2 feet on the front and 1 foot on the rear).

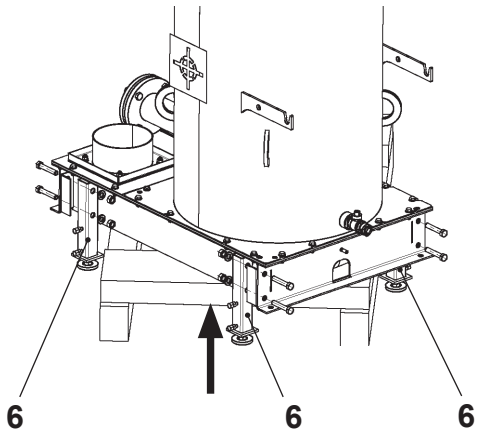


Fig. 05

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

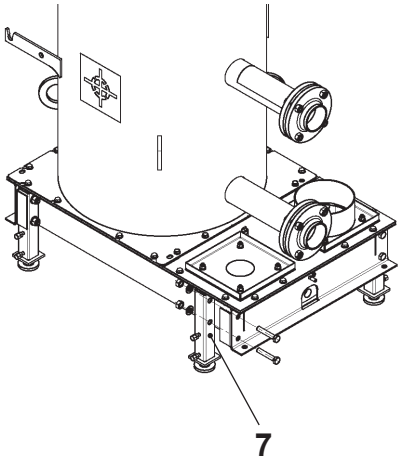


Fig. 06

11. Tighten the screws of all 4 feet.

WARNING

Tip hazard

If the boiler feet are screwed out too far, the boiler might tip over.

- Unscrew the feet max. 80 mm.

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

UltraGas® 2 (800-1550):
We recommend using at least two people for setting up and fastening the cladding to the boiler.

1. Remove climbing aid (1).
2. If the gas line compensator (2) is supplied loose, screw the gas line compensator (2) tightly onto the gas line, aligning it towards the rear.

After installation, before commissioning the complete gas line, the gas tightness must be checked (e.g. using leak detection spray).

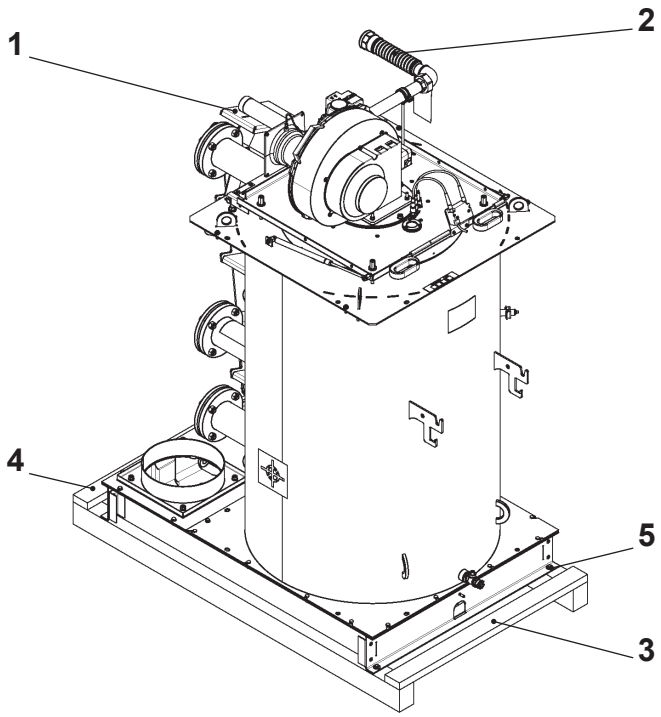


Fig. 07

3. Remove front (3) and rear (4) wooden crossbeam.
4. Remove angle screw connections (5).

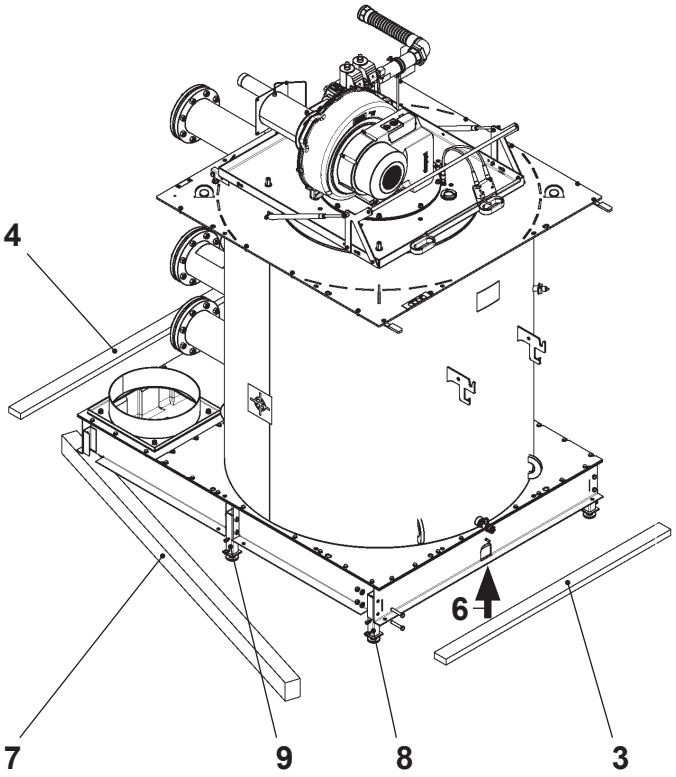


Fig. 08

5. Using a lifting device (e.g. winch (6)), raise the front of the boiler.

WARNING

Flue gas leak
If the condensate drip tray is damaged, there is a risk of poisoning due to flue gas leakage when the heat generator is operated.
- Take care not to damage the condensate drip tray when using a forklift.

6. Remove both side beams (7) to the front and side (see Fig. 08).
7. Pre-assemble front boiler feet (8) (tighten screws by hand).
8. Using a lifting device, raise the rear of the boiler.
9. Remove both side beams (7).
10. Pre-assemble rear feet and, if provided, middle (9) boiler feet (tighten screws by hand).
11. Using a lifting device, place the boiler on the floor.
12. Tighten the screws of all boiler feet.

WARNING

Tip hazard
If the boiler feet are screwed out too far, the boiler might tip over.
- Unscrew the feet max. 80 mm.

3.3 Installing 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).

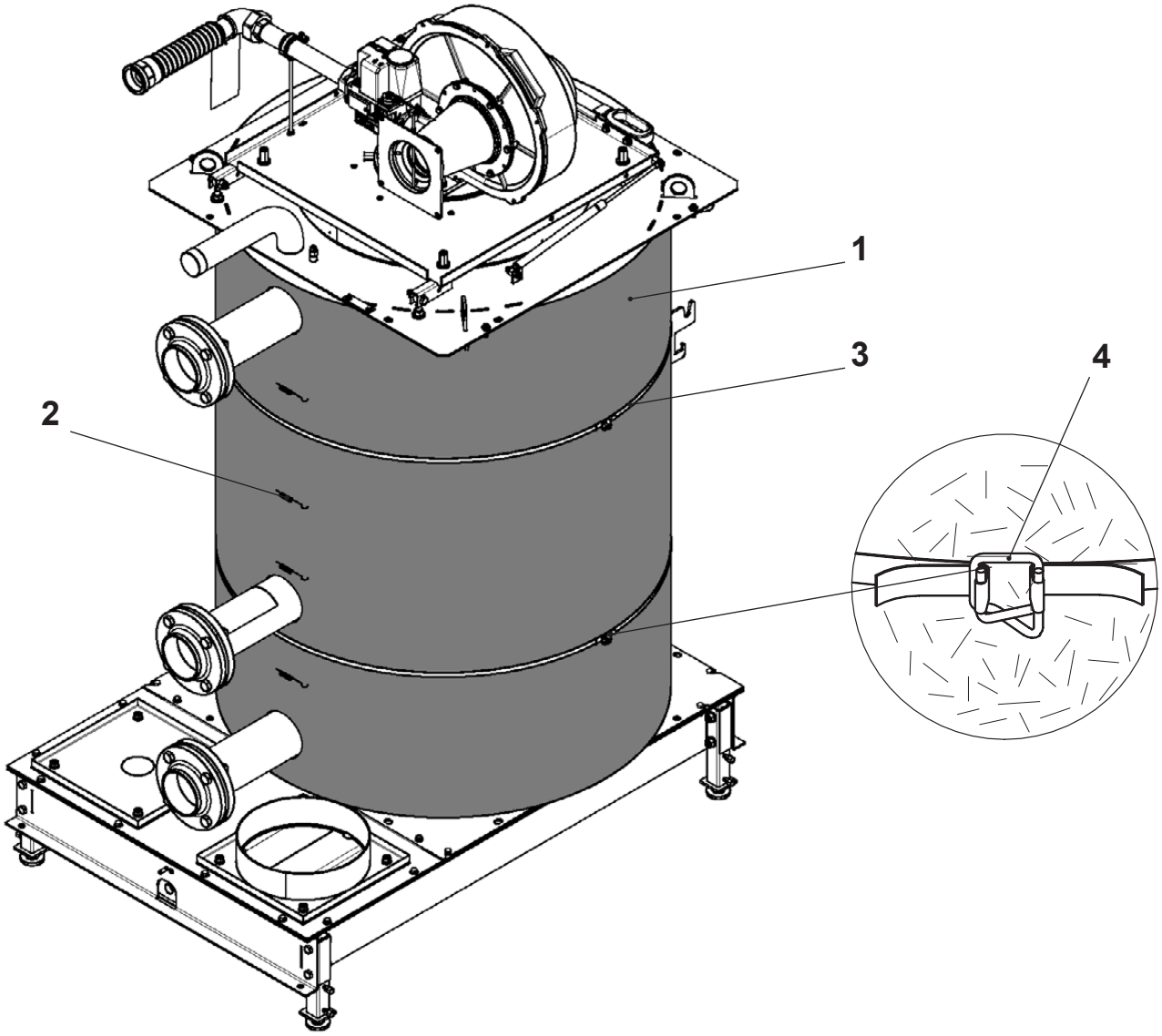


Fig. 09

3.4 Mounting cladding

UltraGas® 2 (800-1550):
We recommend using at least two people for setting up and fastening the cladding to the boiler.

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 line (see chapter 4.3.2)
13	Base plate on side
14	Base plate on 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

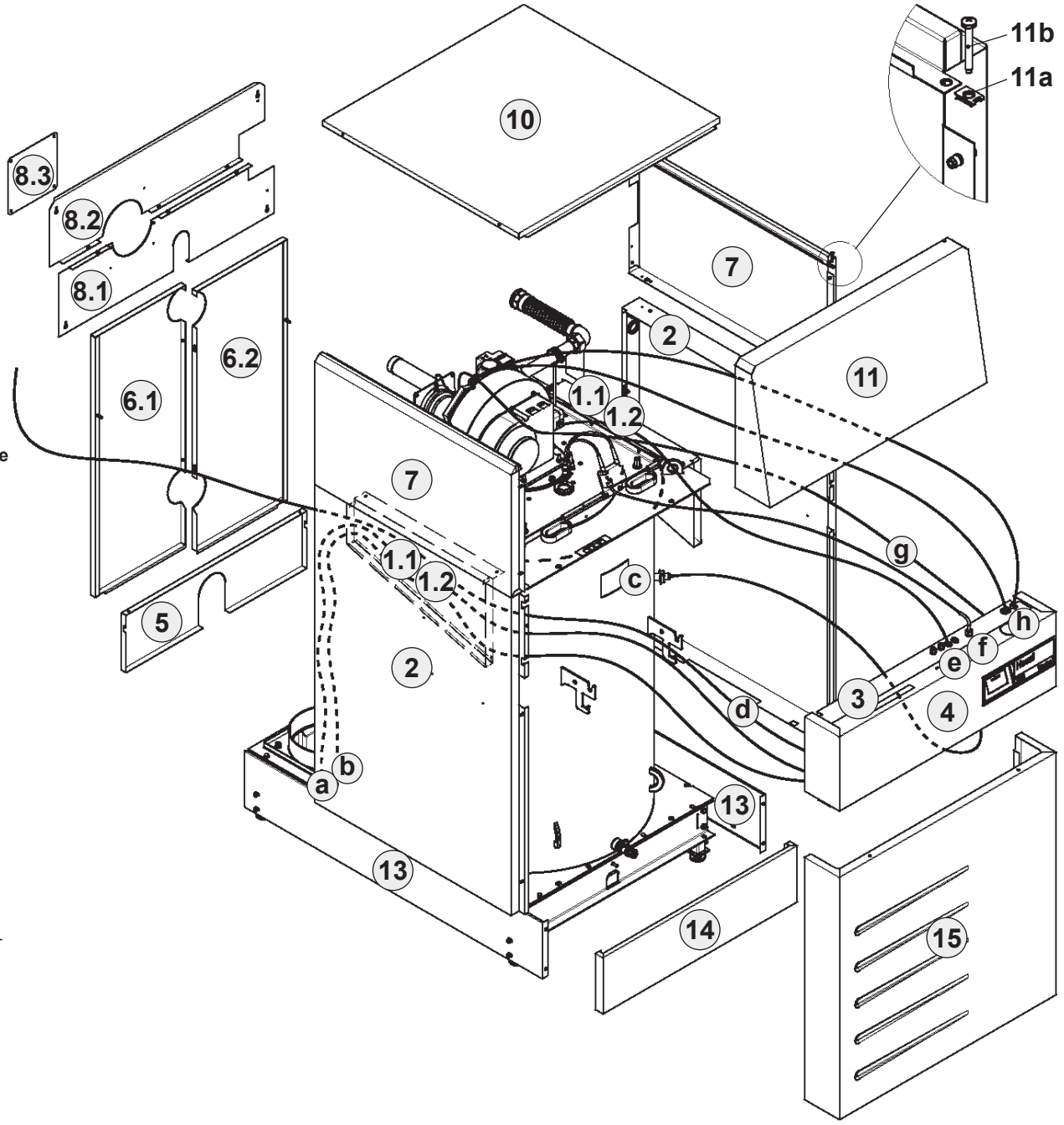


Fig. 10

Cladding sections UltraGas® 2 (1300,1550) in installation sequence

1.1/1.2	Cable duct
2.1/2.2	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	Side wall spacer
10.1/10.2	Cover plate
11	Front top
12	Siphon and condensate drain line (see chapter 4.3.2)
13	Base plate on side
14	Base plate on 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

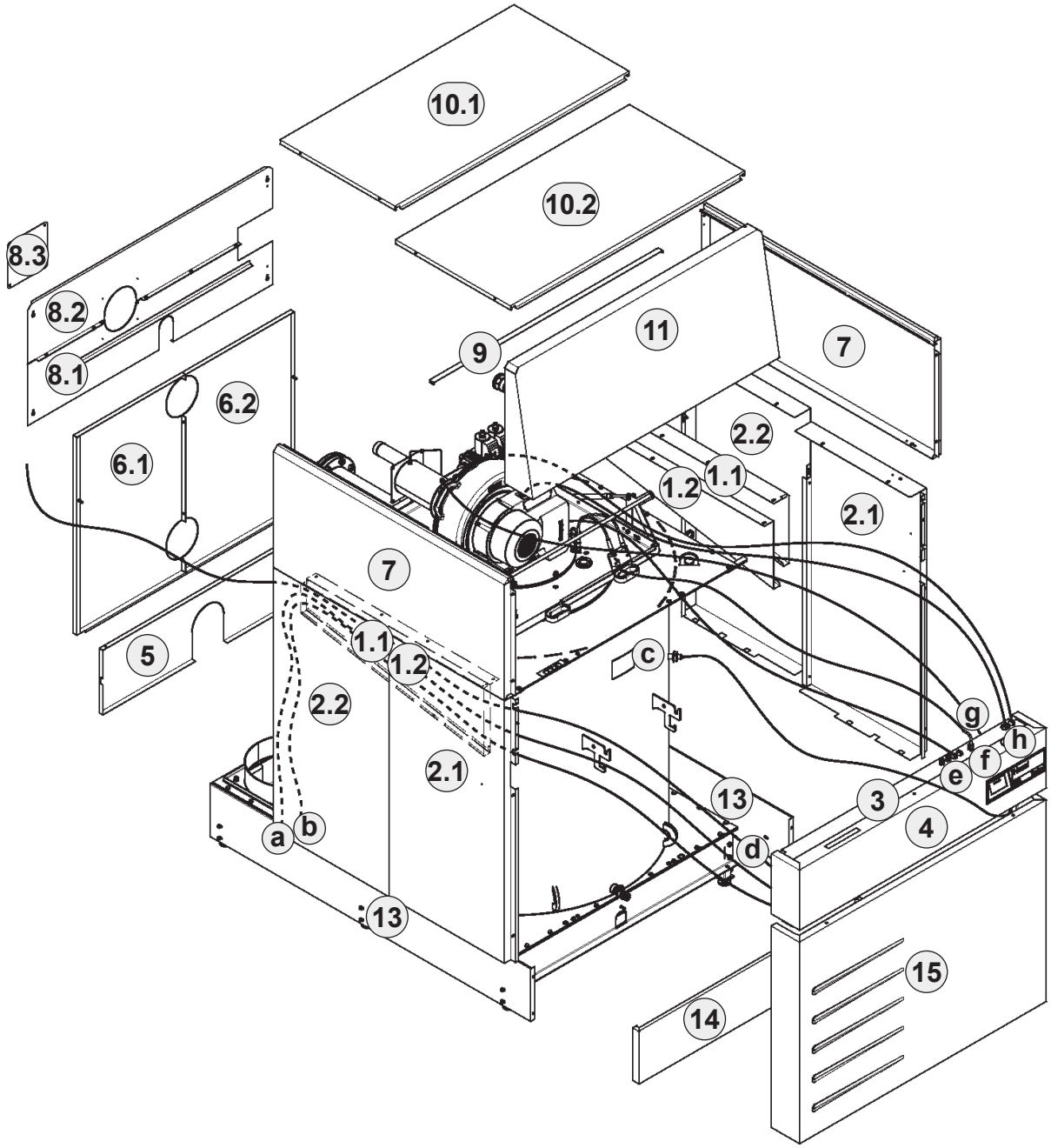


Fig. 11

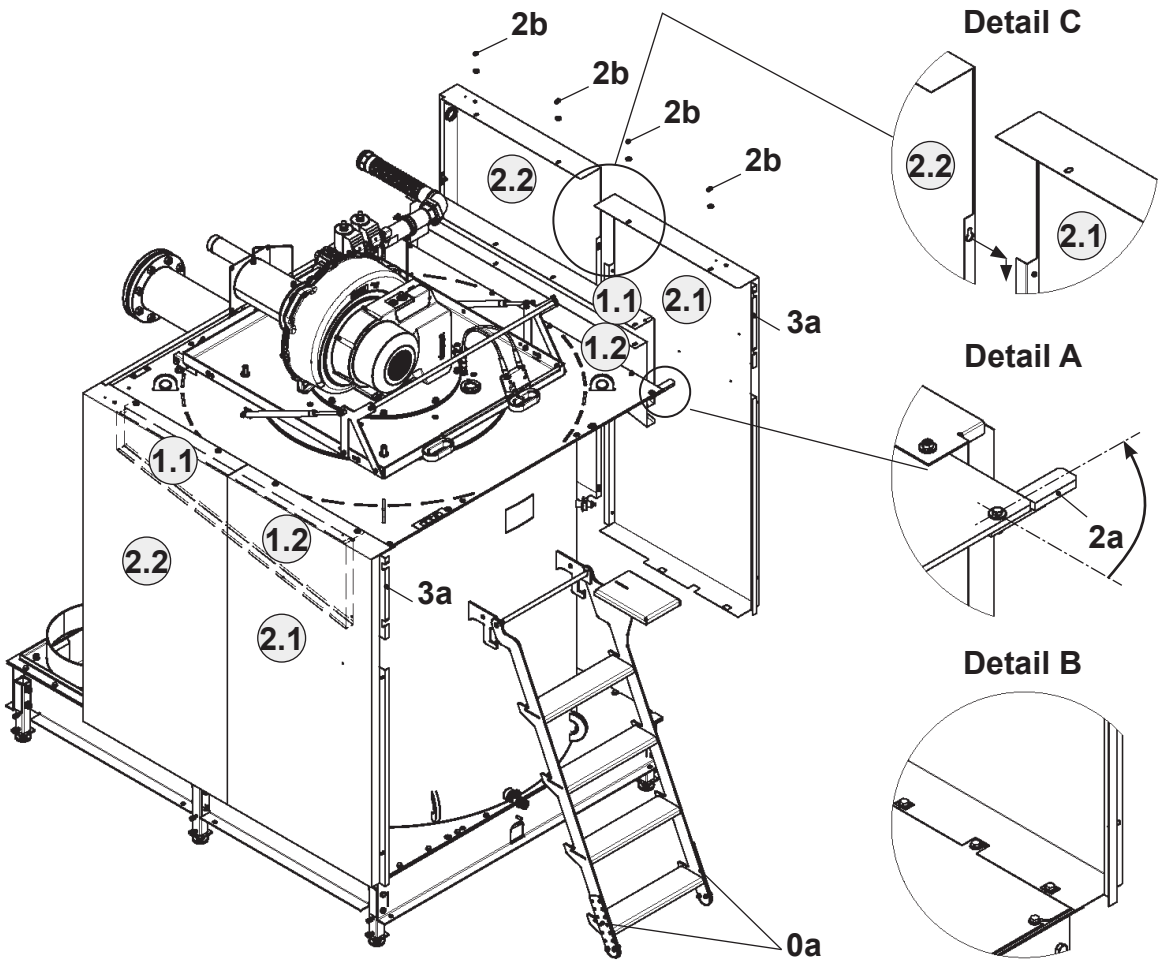


Fig. 12

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:
   - Only UltraGas® 2 (1300,1550):
     Turn side wall support (2a, detail A) 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. 12», page 28, 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).

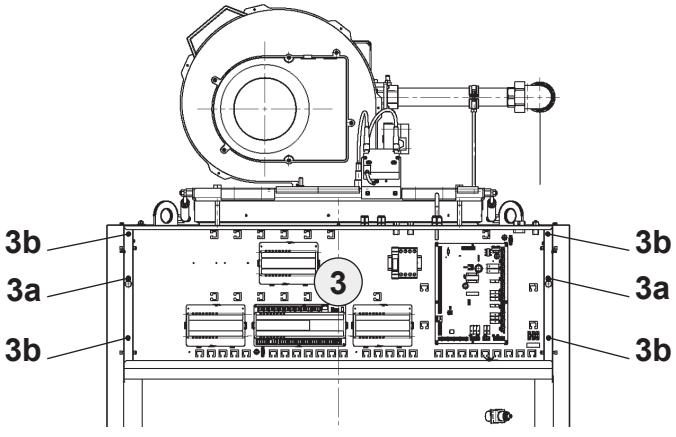


Fig. 13

5. Route all cables (a-h, Fig. 10/Fig. 11) and establish plug-in connections (wiring in accordance with Fig. 10 or Fig. 11).
   - 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. 14).
- 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).

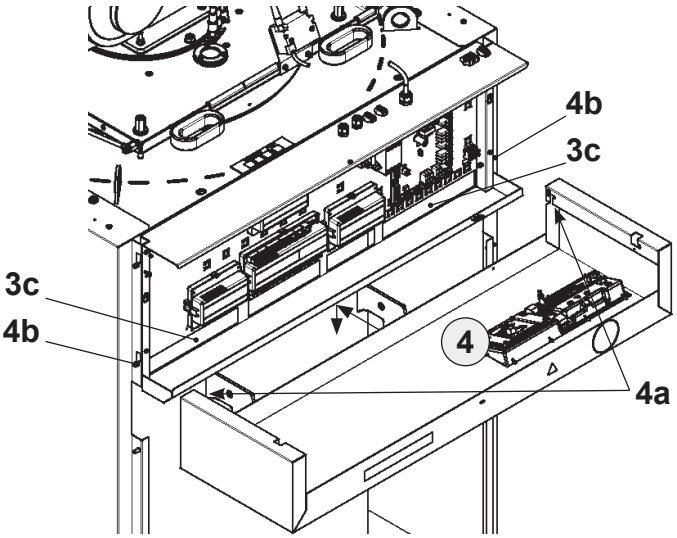


Fig. 14

- 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.

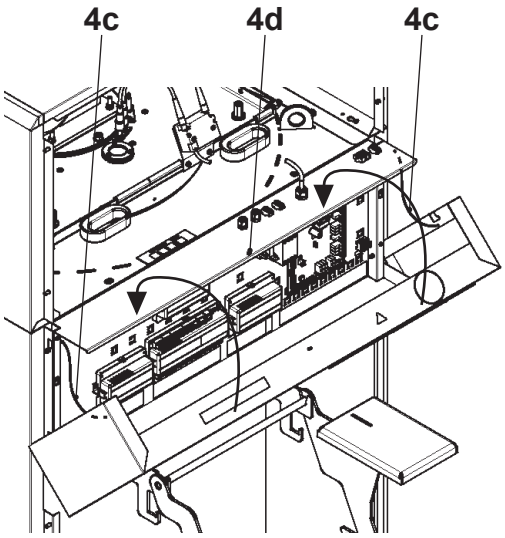


Fig. 15

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

7. Installing rear wall:

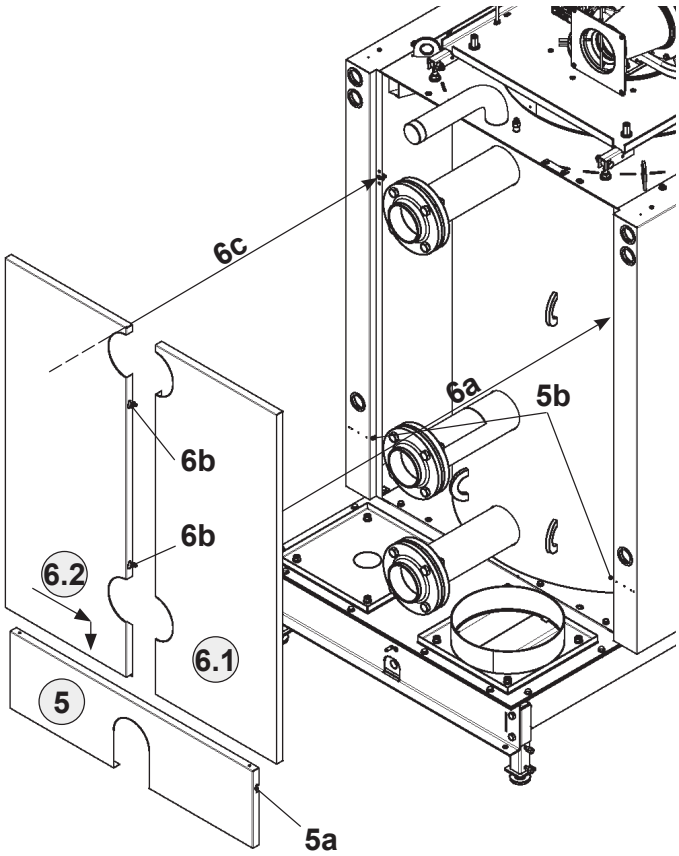


Fig. 16

- 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. 12) and fix position by tightening the screws (2a, Fig. 12).
   - Installing upper side wall (7):

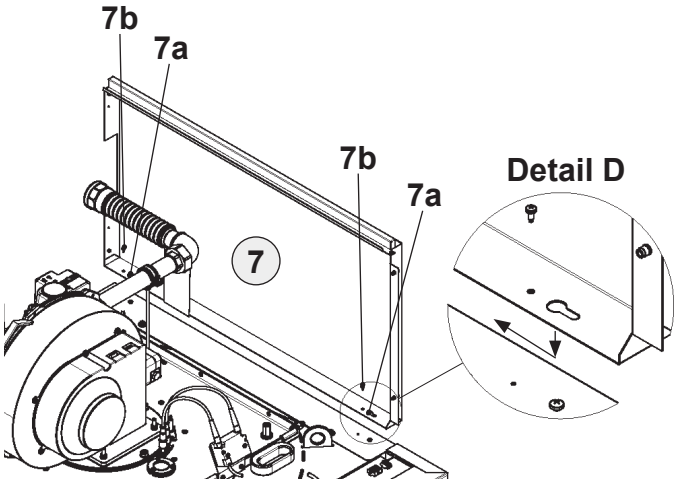


Fig. 17

   - 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-tapping 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).

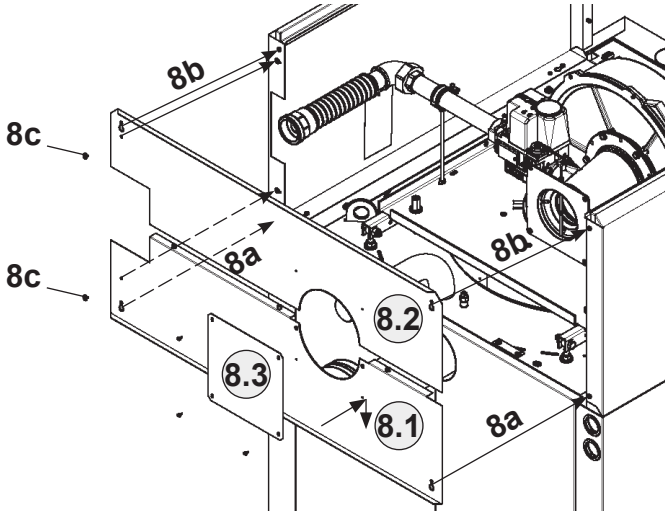


Fig. 18

   - In heat generator cascades:
     Ensure that the components for the combustion air supply are fitted to the boiler.

The composition of the components for the combustion air supply is customer-specific.

- UltraGas® 2 (125,150):
  If a motorised combustion air damper is fitted, unscrew the locking lever of the motorised combustion air damper before installation and place it in the system manual for safekeeping.

   - 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.

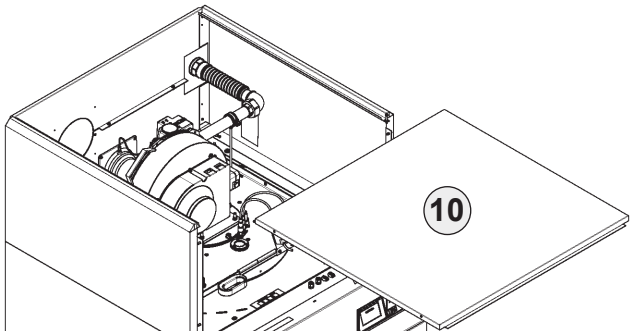


Fig. 19

- UltraGas® 2 (1300,1550):
  First put on the rear cover plate (10.1), then the front cover plate (10.2) so that:
  - the large lug on the cover plate section points to the front.

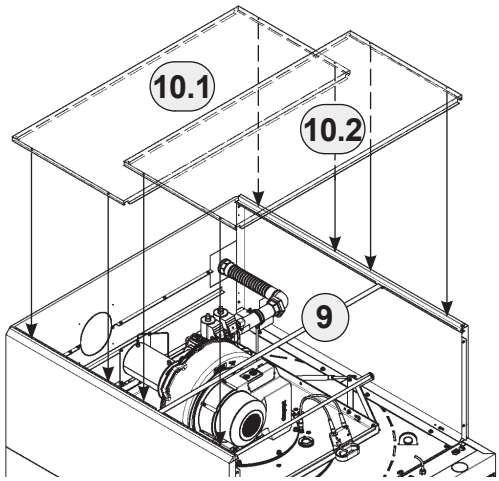


Fig. 20

12. Installing the upper front (11):

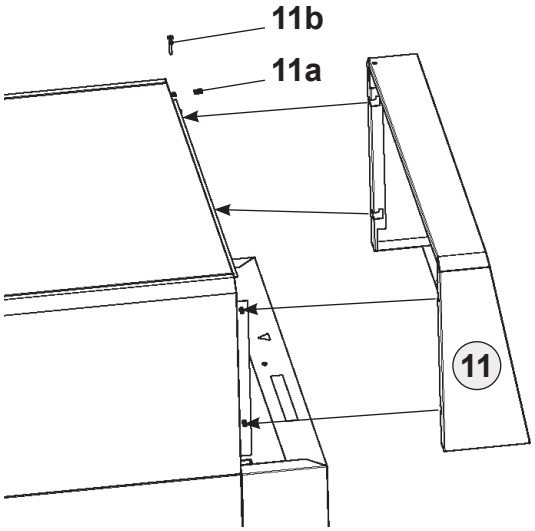


Fig. 21

- Install the C-clip (11a) in the cover plate (10 or 10.2) (see also detail in Fig. 10).
- 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. 10).

13. Installing siphon and condensate drain line (12) (see chapter «4.3.2 Installing siphon and condensate drain line», page 41):

WARNING

The supplied siphon must be installed (vertically).

14. Hang the climbing aid on the previously installed wall bracket (see Fig. 10 and Fig. 11).
15. Installing the base cladding:

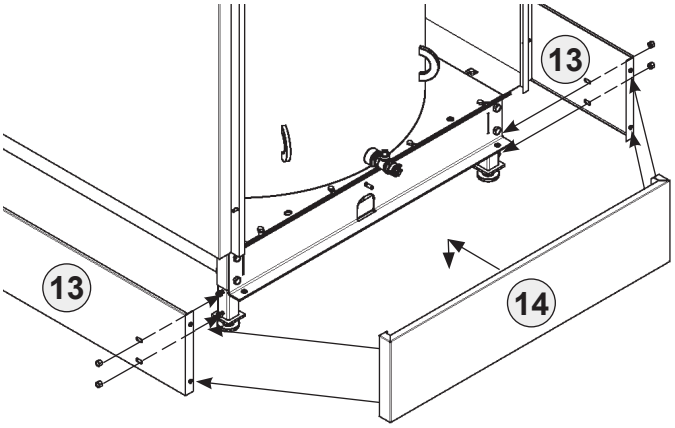


Fig. 22

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

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

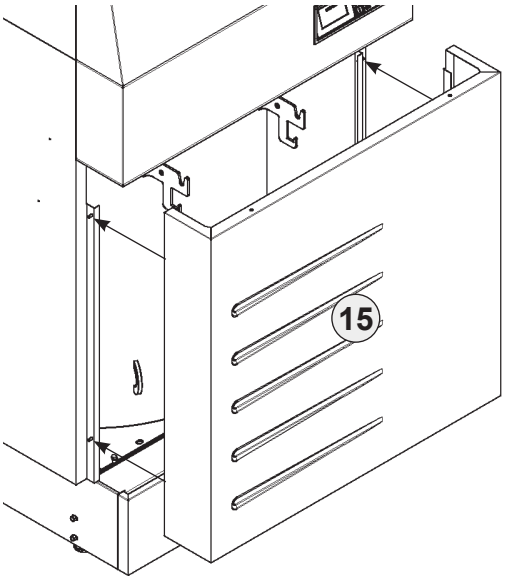


Fig. 23

3.5 Removing the cladding for maintenance and service work

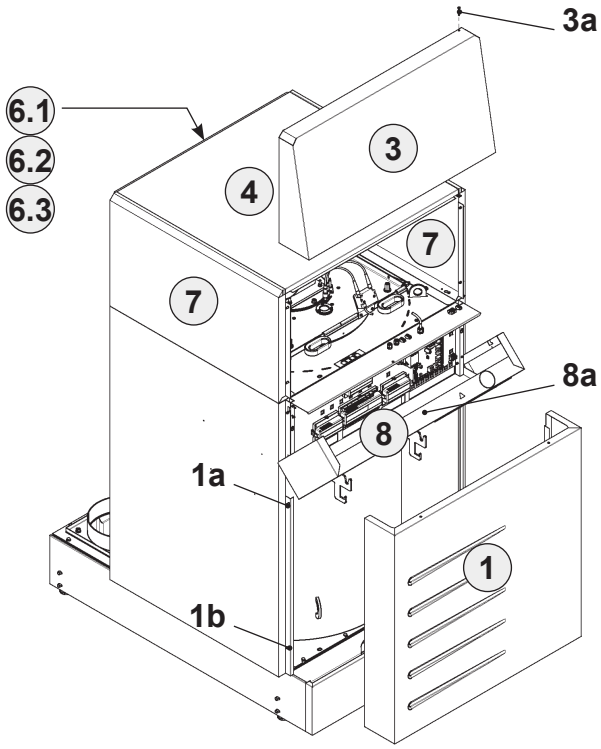


Fig. 24

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).

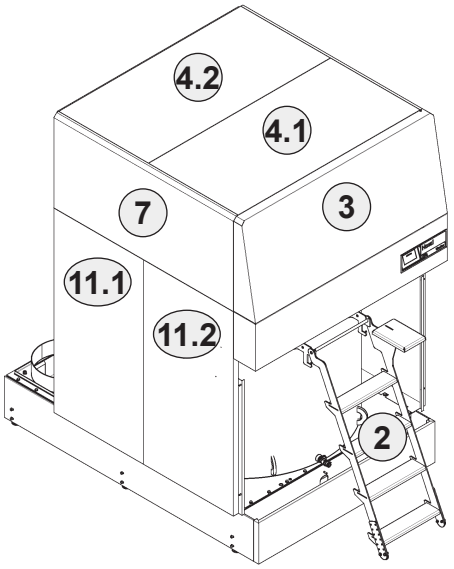


Fig. 25

3. Removing the upper front (3):
   - Remove securing screw (3a, Fig. 24).
   - Lift the upper front slightly and pull it forwards.

4. Remove cover plate (4 or 4.1/4.2):
   - UltraGas® 2 (125-1100):

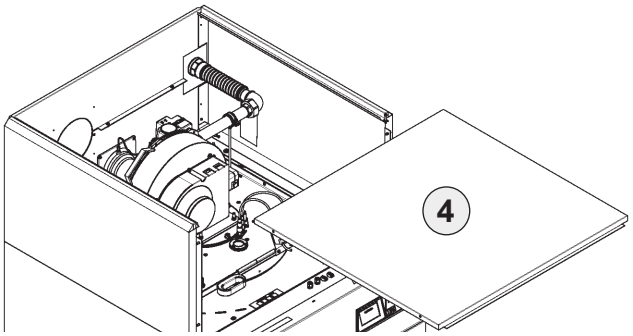


Fig. 26

   - UltraGas® 2 (1300,1550):

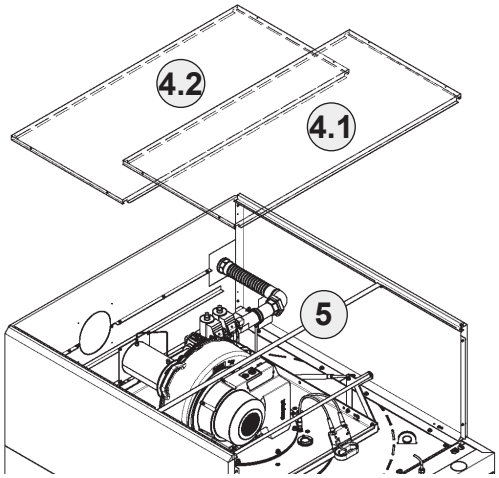


Fig. 27

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.

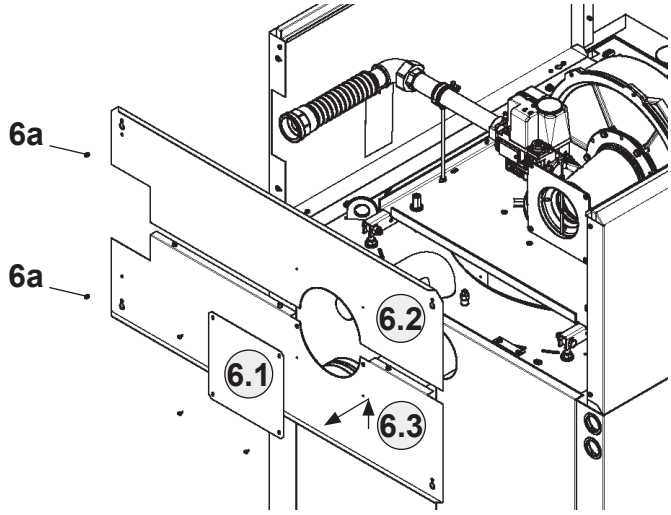


Fig. 28

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.

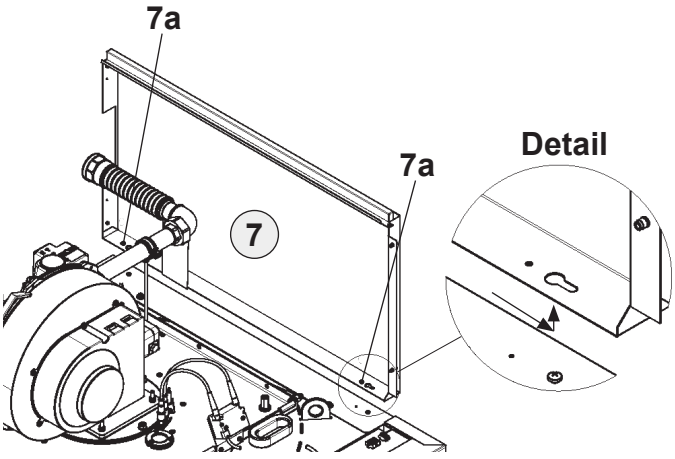


Fig. 29

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

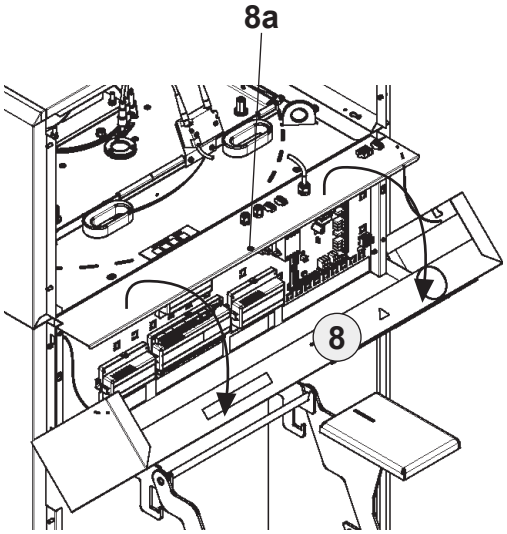


Fig. 30

4. Installation

CAUTION

Sharp edges

If the cladding has not yet been fitted or if parts of the cladding have been dismantled and/or the boiler door is open, there is a risk of cuts from sharp edges.

- Handle parts of the cladding carefully and wear protective gloves.
- Avoid contact with sharp edges.
- Refit all covers and cladding parts after finishing the work.

4.1 Combustion air supply

As a general rule:

- The locally applicable regulations for combustion air must be complied with.
- The combustion air supply must be guaranteed.
- It must not be possible to close or shut off the opening for the combustion air supply.
- The connection for direct combustion air supply must be used for direct combustion air supply to the heat generator.
- It is very important to ensure that the combustion air is free from halogen compounds. These are present, for example, in spray cans, varnishes, glues, solvents and cleansing agents.

Additionally note in heat generator cascades:
In heat generator cascades with a common flue gas line with overpressure, a motorised combustion air damper must be installed on each heat generator, otherwise there is a risk of flue gas escaping via a switched-off heat generator (via the burner and the open combustion air intake line of the heat generator).

Connections for direct combustion air supply (independent of room air)

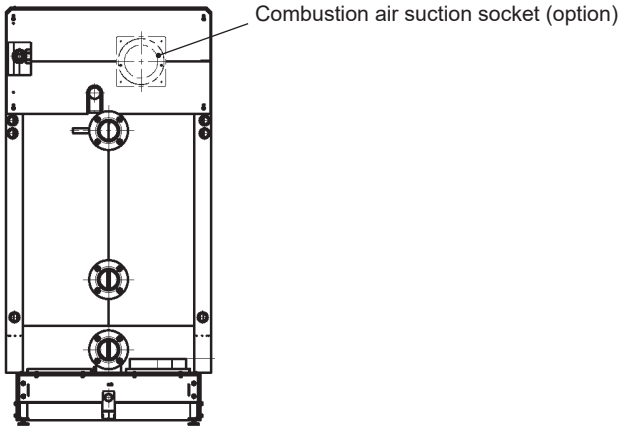


Fig. 31

4.1.1 Operation dependent and independent of room air

The combustion air can be supplied to the heat generator as follows:

- room air dependent from the boiler room
- independent of room air with separate combustion air line to the heat generator (using the “Connection for direct combustion air supply” option)

4.1.1.1 Room air dependent installation (construction B)

- Constructions that are room air dependent are marked with B23 and B33.
- In the UltraGas® 2, ventilation of the boiler room must be guaranteed for room air dependent operation.

4.1.1.2 Installation independent of room air (construction C)

In the case of installation with separate combustion air line to the heat generator (using the “Connection for direct combustion air supply” option), the following must be observed for operation independent of room air when designing the aspiration tube:

- In the UltraGas® 2, ventilation of the boiler room must be guaranteed for operation independent of room air.
- If the air intake opening at the facade is near a noise sensitive place (bedroom window, terrace etc.), we recommend using a silencer at the direct combustion air intake.
- The air intake opening must be freely accessible and have a protective grille 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 openings from indoor rooms or other ventilation equipment.

4.2 Flue gas connection, flue gas line

§

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 already installed in the heat generator.

WARNING

Flue gas leak

If the flue gas line is installed incorrectly, flue gas can escape and there is a risk of poisoning.
- Carry out the installation proficiently.
- The dimension of the flue gas line must match the flue gas connection of the heat generator.
- A full installation inspection must be completed prior to start-up.

WARNING

Condensate with corrosive effect

Due to the low flue gas temperature, condensate forms in the flue gas line and wind protection equipment. If acid condensate collects in the flue gas line, the flue gas line can be damaged so that condensate and flue gas leak out.
- The flue gas lines must be laid with a gradient to ensure that the condensate which occurs in the heat generator flows back and can be neutralised there before discharge into the sewer system.

Condensate from the flue gas line may always be discharged via the heat generator.

Note the following when designing and installing the flue gas line:
- Planning and installation instructions of the flue gas line manufacturer
- Legal construction regulations
  We recommend that you consult the regional chimney inspector **before designing and installing** the flue gas evacuation system.

Condensing gas boilers must be connected to a flue gas system. Due to the water vapour content in the flue gases at low temperatures and the resulting further condensation inside the flue gas line, gas condensing boilers **cannot** be connected to conventional chimneys.

There are two possible ways to evacuate flue gas from condensing gas boilers:
- Use of special flue gas lines approved by the building authorities,
- Use of moisture-resistant chimneys which are approved for flue gas temperatures of over 40 °C, connected to the gas condensing boiler in the boiler room by means of approved flue gas lines.

In both cases, the cross-sections and maximum lengths must be calculated on the basis of the flue gas mass flow, flue gas temperature and available maximum delivery pressure at the flue gas outlet in accordance with chapter 2.2 (EN 13384-1).

Requirements on the flue gas system

The flue gas system must meet the following requirements:
- Only flue gas systems approved and tested by the respective country of destination are allowed to be connected to the heat generator.
- Required properties of the flue gas line:
  - Gas-tight
  - Water-tight
  - Acid-resistant (due to condensate buildup)
    Suitable materials are acid resistant plastics (PPs), acid-resistant stainless steel, ceramic, glass
  - Approved for flue gas temperatures of up to 120 °C (temperature class T120)
  - Approved for overpressure
- Flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas lines of the entire flue gas system must be laid with a gradient.
  - Horizontal connecting lines must be installed with a downward slope of at least 50 mm per metre of pipe in the direction of the heat generator.

Calculation of the flue gas line dimensions

- The cross sections and the maximum lengths are calculated with reference to software or tables.
  - The values for the calculation can be found in the table under chapter «2.2.2 Technical data UltraGas® 2 (125-1550)».
- Dependence of the dimensions of the flue gas line on the dimensions of the combustion air intake line:
  - For operation independent of room air (optional accessories), the combustion air intake line should have the same internal diameter as the flue gas line.
  - If the internal diameter of the flue gas line is larger than the internal diameter of the combustion air intake line, an individual calculation must be carried out.

Flue gas connection

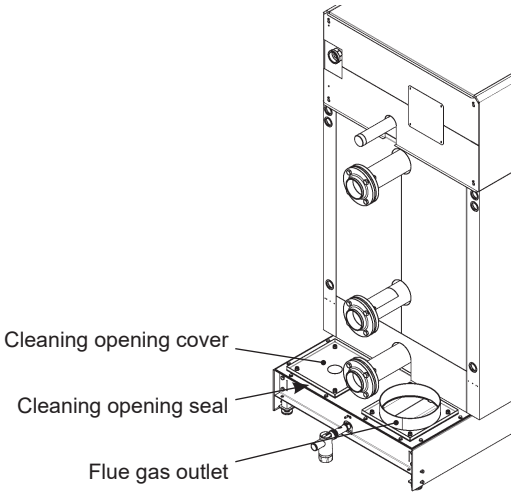


Fig. 32

The positions of the flue gas outlet and cleaning opening (cover and seal of the cleaning opening) can be swapped over.
- Torque: 5-6 Nm

4.2.1 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.
- Boiler room with openings for the combustion air supply (room air dependent operation)
- An individual calculation must be carried out for operation independent of room air (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.
- To avoid collisions with accessory equipment, the flue gas line can be led away with a bend after 0.9 m. However, the first 0.9 m must be routed straight.

WARNING

Flue gas leak

If the various components of the flue gas line do not match or do not fit the flue gas outlet of the heat generator, there is a risk of poisoning due to flue gas leakage.

- For flue gas systems from third-party suppliers (combustion air/flue gas routing 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.
- Use only one manufacturer’s components for the flue gas line (do not mix components from different manufacturers).

Table “Standard values for flue gas line dimensions”

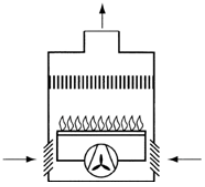
Heat generator		Smooth-walled flue gas line	Number of bends 90° (flue gas + combustion air)				
UltraGas® 2	Internal Ø flue gas outlet	Designation	Total pipe length in m (flue gas + combustion air)				
type	mm	DN	1	2	3	4	5 [1)]
(125)	155	130	24	23	22	21	
(150)	155		18	17	16	15	
(125)	155	150	47	47	46	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		50	50	50	50	
(500)	252		50	50	50	50	
(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	
H (700)	302	250	42	41	40	39	
H (1100)	302	350	47	46	45	44	
H (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.

4.2.2 Combustion air/flue gas ducting

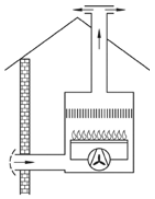
Design variants[1)]

Room air dependent operation (construction B)

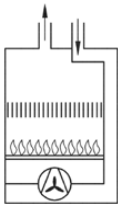


B23, B23 P
Flue gas outlet into the chimney, suction of air from the surrounding environment.
End piece of the flue gas outlet above the roof

Operation independent of room air (construction C)



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

4.3 Condensate drain line

4.3.1 Condensate drain engineering guidelines

The condensate should be led from the condensate drip tray of the heat generator 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 drain line must be observed.

- **Before planning** the condensate drain line, 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 condensate drain line from the heat generator must be made of corrosion-resistant material. The following materials are suitable for the condensate drain line:
Stoneware, glass, stainless steel and the following plastics: PVC, PE, PP, ABS and UP.

Siphon

The siphon (included in the scope of delivery of the heat generator) must be installed at the condensate drain of the heat generator and the condensate drain line must be installed at the outlet 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 line.

! **NOTICE**

Condensate with corrosive effect

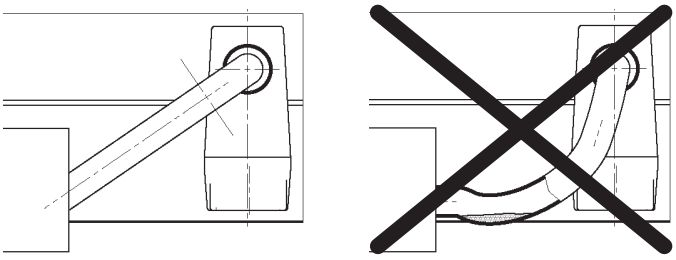
Depending on the sewer system (materials used and waste water in the sewer system), the acid condensate from the heat generator can damage the sewer system in such a way that waste water seeps out.

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

Condensate drain

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

- The minimum inner diameter of the condensate drain line must be 15 mm.
- Use a hose or fixed pipework for the condensate drain line.
- The hose connections of the condensate drain line 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 line is not possible, a condensate pump must be installed in the condensate drain line before the gradient change.
- No condensate is allowed to collect in the condensate drain line (do not form a water trap). 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

Fig. 33

NOTICE

Flue gas accumulation in the heat generator

If the condensate cannot drain away, this will lead to a condensate build-up in the condensate drip tray. The flue gas can no longer be transported away without any obstruction.

- Always route the condensate drain line with a downwards slope in such a way that the condensate is always guaranteed to flow out without any obstruction.
- If the drain is higher than the siphon, a condensate pump must be used.
- Check and clean the condensate drain line incl. siphon and neutralisation unit (if present) at least once a year.

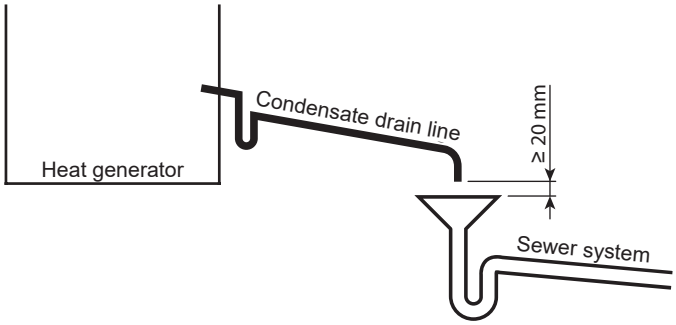
Discharge into the sewer system

WARNING

Germ contamination from the sewer system

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

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



Before commissioning of the heat generator

WARNING

Flue gas leak

If there is insufficient water in the siphon (the level is below the necessary minimum height of the water dam in the siphon), then flue gas can escape through the condensate drain line. Due to the concentration of flue gas in the air, there is a risk of poisoning from flue gas leakage.

- Before commissioning, fill the siphon and, if present, the neutralisation unit with sufficient water.
- In order to achieve the necessary minimum level of the water dam in the siphon, fill in water until the siphon overflows (the cleaning opening (Fig. 34) can be used for filling in).
  - Torque for mounting the cover of the cleaning opening: 5-6 Nm

4.3.2 Installing siphon and condensate drain line

4.3.2.1 Installing condensate drain line siphon – sewer system (standard design)

When installing the siphon and condensate drain, the engineering guidelines for condensate drains must be complied with, see chapter 4.3.1.

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

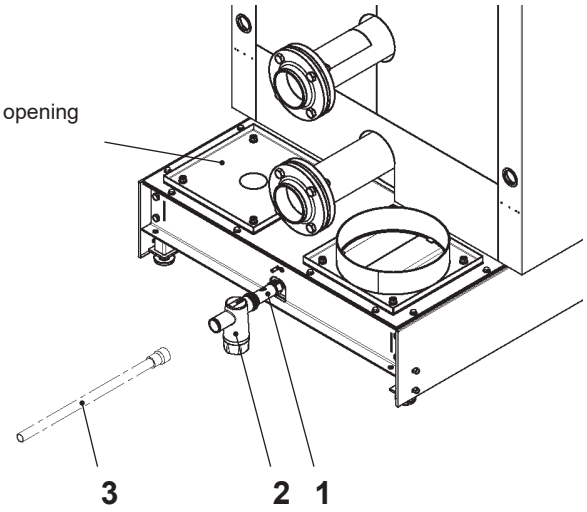


Fig. 34

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

After installation, before operation of the heat generator, the following must be carried out:

- Check condensate flow (no condensate blockage).
- Check all connections for leaks:
  - Double nipple – siphon
  - Siphon – sewer system
- Check condensate drain.

4.3.2.2 Installing condensate drain line siphon – condensate pump – sewer system at higher level

When installing the siphon and condensate drain, the engineering guidelines for condensate drains must be complied with, see chapter 4.3.1.

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.

For double condensate pumps, the instructions in the separate document “Assembly instructions for double condensate pump” must be followed.

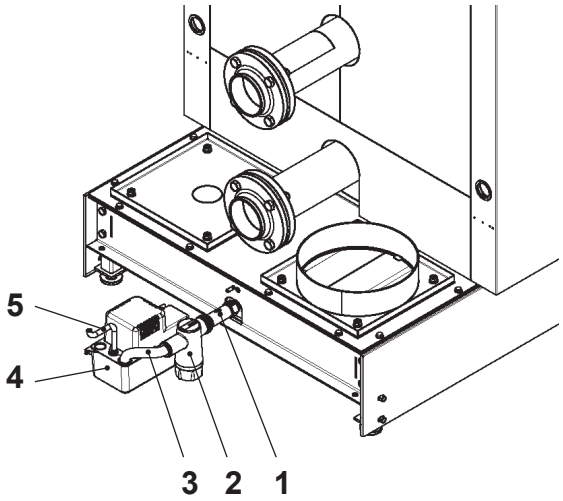


Fig. 35

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 from the condensation pump (4) to the heating control and connect according to the wiring diagram.

After installation, before operation of the heat generator, the following must be carried out:

- Check condensate flow (no condensate blockage).
- 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 – sewer system
- Check condensate drain.

4.3.2.3 Installing the condensate drain line siphon – neutralisation unit – sewer system

When installing the siphon and condensate drain, the engineering guidelines for condensate drains must be complied with, see chapter 4.3.1.

NOTICE

Blockage by granulate dust

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

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

1. Screw double nipple (1, Fig. 35) 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.
   - In order to achieve the necessary minimum level of the water dam in the siphon, fill in water until the siphon overflows.

After installation, before operation of the heat generator, the following must be carried out:

- Check condensate flow (no condensate blockage).
- 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 drain.

4.3.2.4 Installing the condensate drain line siphon – neutralisation unit – condensate pump – sewer system at higher level

When installing the siphon and condensate drain, the engineering guidelines for condensate drains must be complied with, see chapter 4.3.1.

NOTICE

Blockage by granulate dust

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

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

1. Screw double nipple (1, Fig. 35) 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.

For double condensate pumps, the instructions in the separate document “Assembly instructions for double condensate pump” must be followed.

4. Install the neutralisation unit and condensate pump in accordance with the corresponding installation and operating instructions.
5. Fill the siphon (2, Fig. 35) and the neutralisation unit with water.
   - In order to achieve the necessary minimum level of the water dam in the siphon, fill in water until the siphon overflows.

After installation, before operation of the heat generator, the following must be carried out:

- Check condensate flow (no condensate blockage).
- 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 – sewer system
- Check condensate drain.

4.4 Gas connection

WARNING

Poisoning and explosion hazard due to leaking gas

If the gas line is mounted exposed to stress or installed improperly, fuel gas can escape and there is a risk of poisoning and explosion.

- Install the gas line without stresses.
- Check for gas leaks at the gas supply line and gas connection before operating the heat generator (e.g. using leak detection spray):
  - After installation of the gas line
  - After each time the gas line is opened

WARNING

Danger of explosion due to accumulation of liquid gas

Liquid gas collects unnoticed at the lowest point in the surrounding area.

- Observe the technical rules for routing pipelines for liquid gas.

NOTICE

Contamination in the gas line

Contamination can cause the gas valve to stop working properly.

- Install an external gas filter in the supply line.

- The gas connection must be carried out by a licenced gas installer.
- Locally applicable regulations must be adhered to.
- The heat generators are only allowed to be operated with the type of gas specified on the name plate.
- Gas quality:
  - The fuel gas must be technically free of vapour, dust and liquid.
  - The gas quality must comply with the following standards or worksheets:
    - Natural gas:
      - EN 16726
      - Worksheet:
        - DVGW G 260:2021-09 (Germany)
        - ÖVGW G B210:2021-06 (Austria)
        - SVGW G18:2021-11 (Switzerland)
    - Propane:
      - DIN 51622
    - Biomethane:
      - EN 16723

- The corresponding gas flow pressure must be present at the gas valve inlet as specified in chapter «2.2.2 Technical data UltraGas® 2 (125-1550)», page 11.
- The pressure losses over the distance of the gas line must be taken into account in the design of the gas line and, if necessary, the gas pressure regulators.

Gas connection

Route gas connection straight to the rear.

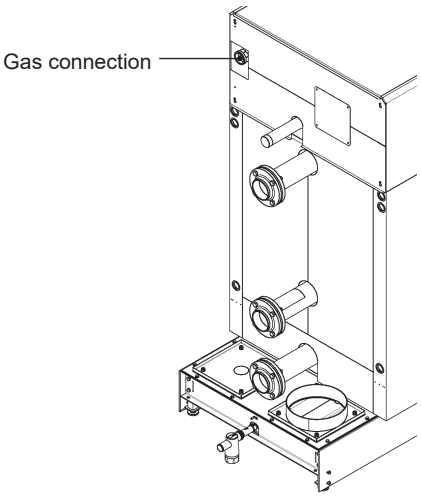


Fig. 36

Components on the gas connection of the heat generator

The following must be installed in the gas supply line of the heat generator (placement of components directly in front of the heat generator):

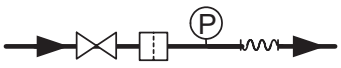
- Manual gas shut-off device (gas shut-off valve)
  The manual gas shut-off device must comply with the locally applicable regulations.
- External gas filter
  - UltraGas® 2 (125-350):
    An external gas filter can only be dispensed with if the locally applicable regulations do not require a gas filter and the gas quality can be guaranteed as specified.
  - UltraGas® 2 (400-1550):
    An external gas filter must be installed in the gas supply line.

The gas line from the external gas filter to the gas connection of the heat generator must be cleaned.

- Gas pressure regulator
  A gas pressure regulator must be installed in the following cases:
  - The gas flow pressure in the gas network exceeds the maximum permissible gas flow pressure of the heat generator (chapter 2.2.2).

- There are significant fluctuations of the gas flow pressure.
  - Pressure fluctuations in the gas network must be prevented by suitable measures (e.g. gas storage tanks or pressure regulators).
  - The local conditions must be checked in each individual case.
- The heat generator is operated with propane.

Construction of a recommended gas connection:



Legend

Manual gas shut-off device (gas shut-off valve)

Gas filter

Pressure gauge with test burner and push button cock

Gas tube/compensator

Necessary work before operating the heat generator

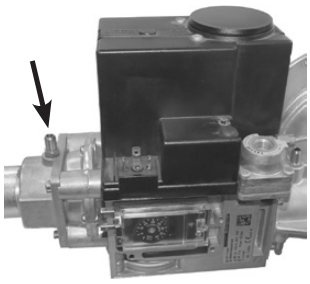
After installation, before operation of the heat generator, the following must be carried out (see chapter «5. Commissioning», page 57):

- Venting the gas line.
- Check the gas inlet pressure (gas flow pressure and net calorific value (NCV) of the fuel gas (gas connection values))
- Functional check of the compressed air monitoring device
- Set the amount of gas.
- Check for leaks at the gas connection (e.g. using leak detection spray).

4.4.1 Venting the gas line

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

1. Open the gas shut-off valve on the heat generator.
2. Vent the gas line using the inlet pressure measuring nipple.
   - Inlet measuring nipple on the gas valve:

UltraGas® (125-700)	UltraGas® (800-1550)
	

4.4.2 Checking the gas supply

1. Check all connections for leaks (e.g. using leak detection spray).
2. Check the inlet pressure.

4.5 Hydraulic connection

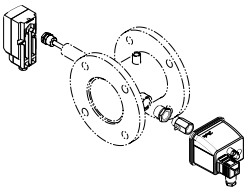
Safety engineering equipment in accordance with EN 12828

The following safety devices are integrated in the heat generators:

- Minimum pressure limiter DBmin
- Safety maximum pressure limiter DBmax
- Water pressure sensor DBmax + 50 %
- Temperature measurement device TBmax + 20 %
- Temperature controller
- Temperature monitor
- Safety temperature limiter

The following safety-relevant components must also be installed in the heating system by the customer:

- Safety valve
- Automatic air vent
- Diaphragm pressure expansion tank
  The diaphragm pressure expansion tank must be appropriately dimensioned (for the heating system, water volume and hydrostatic pressure).
- Additional safety fittings (if required by the system configuration)

Safety-related components available from Hoval as accessories	
	Safety armature set: - Pressure gauge - Safety valve - Air vent
	Safety armature set (complies with EN 12828 and SWKI HE301-01): - Maximum pressure limiter - Safety temperature limiter
	Diaphragm pressure expansion tank

DANGER

Line break

If necessary safety-relevant components are not installed in the heating system or if they are not sufficiently dimensioned, the hydraulic pipe system can burst. There is therefore a risk of scalding from hot water.

- Install all required safety-relevant components in the heating system.

Optimum efficiency

Make sure the return is connected correctly so as to achieve optimum efficiency, see Fig. 37.

Noise emissions

To prevent noise emissions, connect the flow and return lines to the heating circuit with flexible compensators.

Common return

If a common return is to be used, use the low-temperature return.

Hydraulic connections

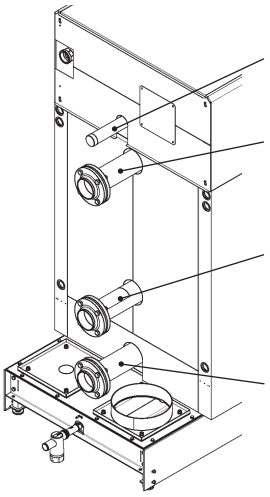


Fig. 37

4.5.1 Hydraulic integration

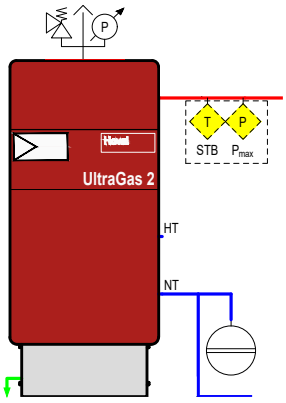
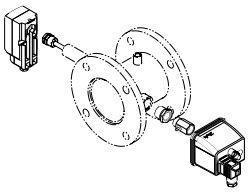


Fig. 38

Legend		
P		Safety armature set: - Pressure gauge - Safety valve - Air vent
T P STB Pmax		Safety armature set (complies with EN 12828 and SWKI HE301-01): - Maximum pressure limiter - Safety temperature limiter
		Diaphragm pressure expansion tank

Refer to the Hoval system technology to find diagrams of sample applications.

UltraGas® 2 is designed for continuously controlled operation (room temperature control/weather-controlled heat generator and heating circuit control) without lower temperature limit.

In general, the following applies during installation:
- Install sacks to prevent single-pipe gravity circulation.
- Close unused connection nozzles tightly.
- If shut-off devices to the safety equipment (diaphragm pressure expansion tank, safety valve, etc.) are installed, the shut-off devices must be secured against unintentional closing.

Safety valve and air vent
A safety valve and an automatic air vent must be fitted to the safety flow. **No** shut-off valve is allowed to be fitted upstream of the safety valve and the automatic air vent.

Maximum pressure limiter and safety temperature limiter
According to EN 12828, the following heat generators (based on individual boilers) must be equipped with expansion traps and blow-off pipe to the outside:
- Heat generators with nominal heat output > 300 kW
  - For Switzerland, directive SWKI HE301-01 applies: Heat generators with nominal heat output 70-1000 kW.

The installation of an expansion trap may be dispensed with if a maximum pressure limiter and a safety temperature limiter are additionally installed on each heat generator.

Diaphragm pressure expansion tank
An adequately dimensioned diaphragm pressure expansion tank must be provided on site.
- The diaphragm pressure expansion tank must be appropriate for the heating system, water volume and hydrostatic pressure.
- The diaphragm pressure expansion tank is connected to the low-temperature or high-temperature return.
- For return temperatures ≥ 70 °C, an intermediate tank must be installed.

Pump run-on (boiler circuit pump)
If the operating temperature of the heat generator exceeds 85 °C, the boiler circuit pump must be in operation for at least 2 minutes after each burner switch-off (pump run-on is included in the automatic function device).

Mixer circuit pump
The mixer circuit pump must be mounted in the heating manifold in the flow so that the pump operates in the overpressure range (avoid cavitation).
- To avoid noise emissions, connect circulating pumps to the pipe network with compensators.

Minimum circulation water quantity
No minimum water circulation volume is required.

Heat generator in the attic
A water pressure sensor is installed in the heat generator at the factory.

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

Calorifier
If a calorifier is connected, all heating groups must be provided with a mixer.

Underfloor heating
With underfloor heating, a flow temperature monitor must be installed.

4.5.1.1 Heat generator cascades

Basically, the TopTronic® E should take over the cascade control. This ensures efficient, environmentally friendly and product-friendly operation. However, if an external cascading strategy is planned and heat generator performance control is carried out, the following applies:

- Avoid frequent switching on and off
  (max. 7000 activations per year and per boiler)

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

4.5.2 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 heat generators are suitable for heating systems without significant oxygen intake (system type I in accordance with EN 14868.)

- The following heating systems must be equipped with separate circuits:
  - Heating systems with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping)
  - Heating 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 heat generator is replaced in an existing heating system, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the heating 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 heat generator 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	< 1 °fH
Electric conductivity	< 100 µS/cm
pH value	6.0–8.5

Requirement on the heating water:

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

Additional notices

- Hoval heat generators are suitable for heating systems without significant oxygen intake (system type I in accordance with EN 14868.)

- The following heating systems must be equipped with separate circuits:
  - Heating systems with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping)
  - Heating 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 heat generator is replaced in an existing heating system, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the heating 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 heat generator must not be filled until the heating system has been flushed.

Frost protection agent

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

4.5.3 Filling the heating system

NOTICE

Filling and replacement water

The heating system can be damaged by improper procedures during filling.

- First filling of the heating system must be carried out by a heating installer.
- Proceed professionally when refilling and topping up.
- The filling and replacement water must be of the required water quality (see chapter 4.5.2).
- If frost protection agent is being used, a separate engineering sheet is available from Hoval.

§ Country-specific regulations and manufacturer-specific specifications for replacement water must be observed (see chapter «4.5.2 Water quality in heating systems», page 50).

Both old and new systems must be professionally cleaned and flushed before filling.

1. Determine the operating pressure of the heating system according to the technical rules.
2. Determine the upstream pressure of the diaphragm pressure expansion tank according to the technical rules and set it according to the determined value.
3. Filling the heating system:
   - Open shut-off valves in the flow and return.
   - Connect the filling hose to the water treatment unit.
   - Deaerate the filling hose.
   - Connect the filling hose to the filling/drain valve of the heat generator.
   - Slowly fill the heat generator until the calculated operating pressure is displayed on the pressure gauge.

   - If the operating pressure drops below 1 bar, a warning is output and the boiler output is reduced to 50 %.
   - If the operating pressure is below 0.5 bar, heating operation is not possible and a fault is present.

   - Close the water treatment unit and the filling/drain valve.
   - Thoroughly bleed the heating system.
     - If no automatic air vent is available, vent the heat generator using a manual air vent.
   - Check the water connections for leakage.
   - Check the operating pressure again.
   - Unscrew the filling hose again after filling.
   - Ensure that the siphon and, if present, the neutralisation device are filled with water to prevent flue gas leakage.

4.6 Electrical connection

- A licenced 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

Live electrical components

Contact with live electrical components can result in injury from electric shock.

- Work on the electrical system must be carried out by licenced electricians.
- Before starting work:
  - Switch off the electric supply,
  - check that the equipment is not live and
  - secure to prevent switching back on.
- Damage to the mains cable must be repaired by a licenced electrician.

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 «UltraGas® 2 (125-1550) dimensions», page 17, 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. 14).
   - Fix cables to a strain relief strap.
   - Connection possibility for equipotential bonding, see Fig. 41.

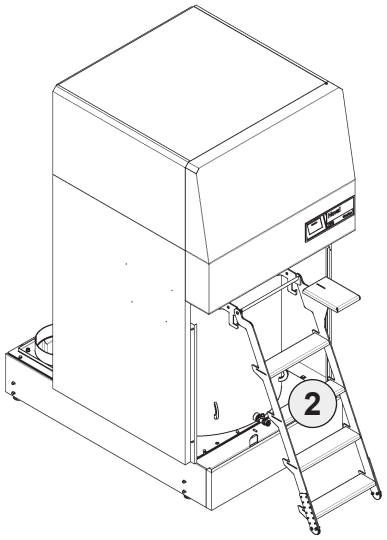


Fig. 39

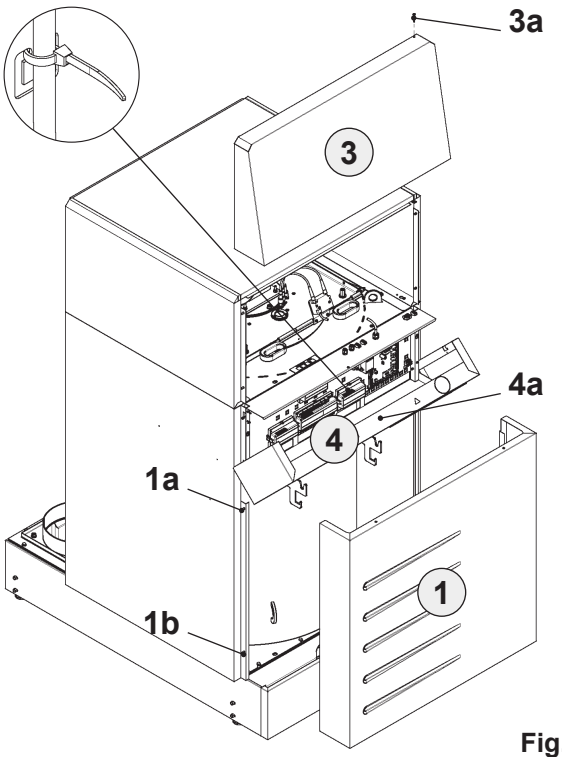


Fig. 40

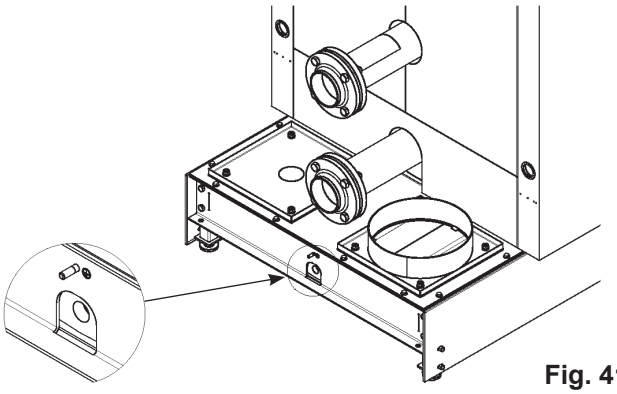
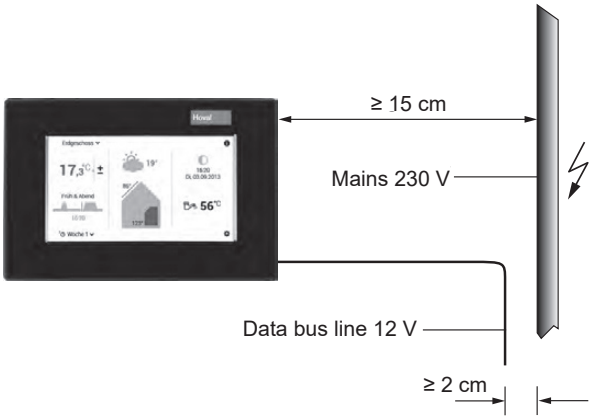


Fig. 41

4.6.1 Safety precaution for installation in line with EMC requirements

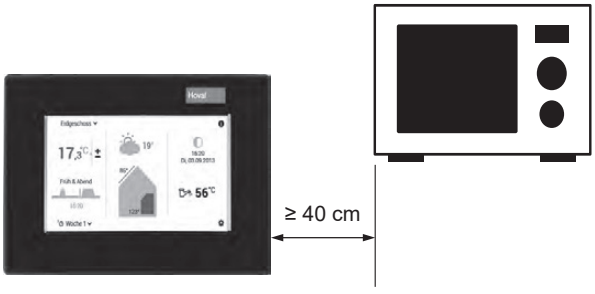
- Cables carrying mains voltage must be routed separately from sensor or data bus cables. A minimum distance of 2 cm between the cables must be observed. Cable crossovers are permitted.

Minimum distances for electrical installation



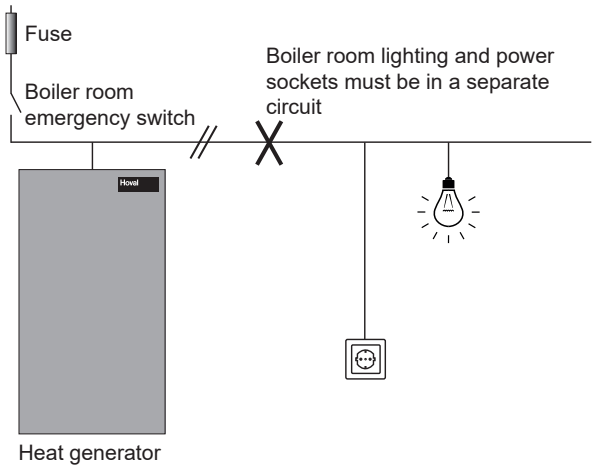
- In the case of controller modules with their own mains supply, it is imperative that cables carrying mains voltage are routed separately from sensor or data bus cables. If cable ducts are used, these must be provided with separator strips.
- When mounting controller modules or room control modules,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



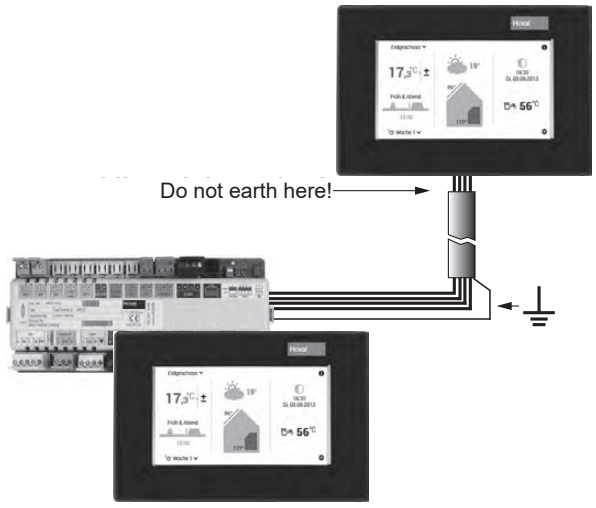
- Avoid unnecessary cable lengths, including in spare cables
- Coils of relays, contactors and other inductors in the panel, and possibly in the vicinity, must be connected. The connection can be made with RC elements, for example.

- 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 0.8 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).

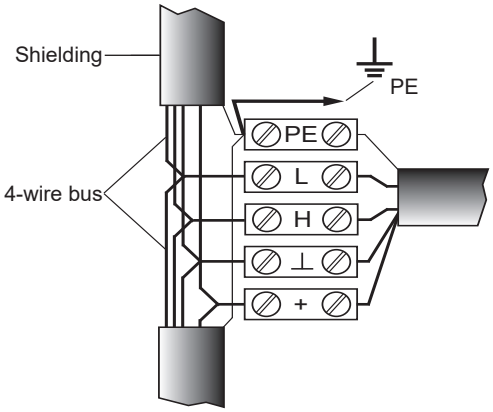
One-sided earthing of the shielding



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 mm² (J-Y(ST)Y 2 x 2 x 0.8 mm)
- 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 without prior engineering and additional measures
- 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.

4.6.2 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. Commissioning

WARNING

Flue gas leak

If the commissioning is carried out incorrectly, flue gas can escape and there is a risk of poisoning.

- Initial commissioning of a newly installed system is only allowed to be carried out by a heating specialist (only by trained specialist personnel or a Hoval customer service technician).
- A full installation inspection must be completed prior to start-up.

WARNING

Construction dust

The dust produced during the construction phase can contaminate and clog the heat exchanger and the burner cylinder. This can impair combustion and cause the heat generator to malfunction. Flue gas can escape and there is a risk of poisoning.

- If the heat generator was in operation during the construction phase, check the heat generator for dirt build-up and clean it in case of heavy dirt build-up, or replace the burner cylinder if necessary.
- We recommend using a connection protection filter during the building phase.

CAUTION

Sharp edges

If the cladding has not yet been fitted or if parts of the cladding have been dismantled and/or the boiler door is open, there is a risk of cuts from sharp edges.

- Handle parts of the cladding carefully and wear protective gloves.
- Avoid contact with sharp edges.
- Refit all covers and cladding parts after finishing the work.

WARNING

Heat generators for multi-part installation

In their as-delivered state, heat generators for multi-part installation are not leak-tight on the flue gas side. Flue gas can escape from the boiler. There is a risk of poisoning due to flue gas leakage.

- After installation, seal the sealing surfaces of the condensate drip tray with silicone and assemble UltraGas® 2, see separate document “Assembly instructions for multi-part installation”.

5.1 Prerequisites for trial operation

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

However, at least the following conditions must be satisfied for a trial operation:

- Safety valve is installed (system sealed).
- Heating control is operating (on the electrical mains).
- The following are filled with water:
  - Heating system
  - Siphon
  - Neutralisation unit, if fitted
- The following are connected to the heat generator:
  - Sensor for safety temperature limiter (= boiler temperature sensor)
  - Diaphragm pressure expansion tank
  - Approved flue gas line (flue gas line is tightly connected to the flue gas outlet of the heat generator)
- Burner preset.

5.2 Commissioning procedure

1. Performing an installation inspection:

The combustion air must be filtered if there is a heavy build-up of building dust. We recommend using the optionally available connection protection filter (combustion air filter) during the building phase.

WARNING

Flue gas leak

If the silicone seal between the condensate drip tray and the heat exchanger is missing, incomplete or if the silicone is not applied correctly, the boiler will leak. Flue gas can escape and there is a risk of poisoning.

- Make sure that the condensate drip tray is correctly sealed with silicone.

- Check that the four silicone joints between the condensate drip tray and the heat exchanger are present.

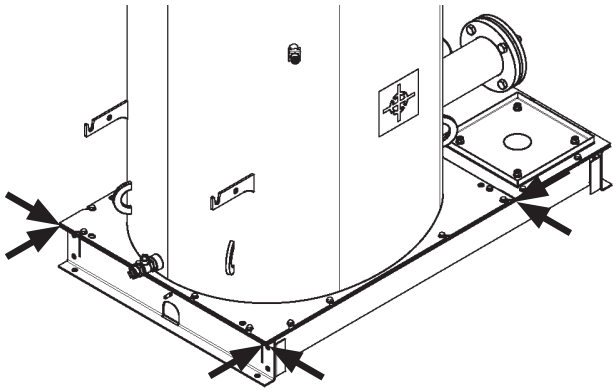


Fig. 42

- Check whether the ignition and ionisation system is set correctly, see chapter 6.5.
- Check that all assembly and installation work has been completed.
- Make sure that:
  - the combustion air supply to the heat generator is guaranteed.
  - the flue gas ducts are clear.
  - access for cleaning and maintenance is ensured.
  - the required supply voltage is available.
  - the idle pressure of the fuel gas from the gas line to the heat generator (gas inlet pressure max.) corresponds to the technical data (chapter 2.2.2).
  - the gas line is vented.
- Check whether the following are filled with water:
  - Heating system
  - Siphon
  - Neutralisation unit, if fitted

2. Switch the heat generator on, see chapter 5.3.
3. Check the parameter settings, see chapter 5.4.
4. Check the setting of the basic program of the heating control (see operating instructions for UltraGas® 2 (125-1550)).
5. Check whether the gas flow pressure is within the permissible range, see chapter 5.5.

WARNING

Damaged gas valve

If the gas flow pressure is too high, the gas valve can be damaged. There is a risk of poisoning and explosion.

- The gas flow pressure and the net calorific value (NCV) of the fuel gas (gas connection values) in the gas connection line must achieve the values specified in chapter «2.2.2 Technical data UltraGas® 2 (125-1550)», page 11.
- If the gas flow pressure is higher than the max. gas flow pressure specified in the technical data (chapter 2.2.2), a gas pressure regulator must be installed on site.
- The setting of the gas quantity and thus commissioning of the heat generator are only allowed to be performed if the values for the gas flow pressure and the net calorific value (NCV) are maintained.

6. Check the function of the pressure switch, see chapter 5.6.
7. Perform the emission measurement and adjust the gas quantity, see chapter 5.8.
8. When commissioning, the function of all safety and control devices must be verified.

- Before operation of the heat generator, various checks must be carried out, see chapter «5.9 Monitoring work before handover to the operator», page 64.
- After the initial commissioning, the operator must be instructed in detail regarding the operation and maintenance of the heating system and the heat generator, see chapter «5.10 Heat generator handed over to the operator», page 64.

5.3 Switching the heat generator on

WARNING

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

1. Open the gas shut-off valve.
2. Turn on main switch (if fitted).
3. Set the blocking switch on the control panel to “I” in order to release the burner.
4. Set the heating control to the desired basic program and desired temperature.

5.4 Checking the parameter settings

1. Check the parameterisation according to the table in chapter «8.1.1 Automatic function device UltraGas® 2», page 81 and correct it if necessary.

NOTICE

Parameter 33287 must be set to 0!

5.5 Checking the gas flow pressure

1. Check the gas flow pressure and net calorific value (NCV) of the fuel gas (gas connection values) in the gas connection line.
   - Permitted range, see chapter 2.2.2.
2. If the gas flow pressure is higher than the max. gas flow pressure specified in the technical data (chapter 2.2.2), a gas pressure regulator must be installed on site so as to reduce the gas flow pressure before the heat generator.

If the gas flow pressure is outside the set value range, no settings are allowed to be made and the boiler must not be put into operation.

5.6 Functional check of pressure monitoring device

WARNING

Flue gas leak

Flue gas can escape and there is a risk of poisoning if there is excess pressure (flue gas accumulation) on the heating gas side.

- 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 heat generator from operating in a dangerous state.

The permitted pressure tolerance range is set at the factory.

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

WARNING

The settings are only allowed to be changed by a specialist trained by Hoval or a Hoval customer service technician.

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)	8 mbar
(300)	8 mbar
(350)	7 mbar
(400)	11 mbar
(450)	10 mbar
(500)	11 mbar
(530)	11 mbar
(620)	13 mbar
(700)	15 mbar
(800)	10 mbar
(1000)	13 mbar
(1100)	14 mbar
(1300)	11 mbar

UltraGas® 2 type	Pressure switch factory setting
(1550)	12 mbar
H (700)	15 mbar
H (1100)	14 mbar
H (1550)	12 mbar

5. Mount the cover of the pressure switch.

WARNING

Check pressure monitoring device for correct fastening and leaks.

5.7 Changing the heat generator to a different type of gas

Changing over only on request. Please contact your Hoval customer service technician.

5.8 Performing the emission measurement and adjusting the gas quantity

WARNING

Gas leak

There is a risk of poisoning and explosion if gas lines and gas fittings are handled unprofessionally.

- The settings on the gas/air mixture regulation must only be made by a heating specialist or by a Hoval customer service technician.
- The values for the gas flow pressure and the gas connection values must be achieved before the gas quantity is set and the heat generator is commissioned, see chapter 2.2.2.

5.8.1 Performing the emission measurement for UltraGas® 2 (125-700)

Use hex socket 3 mm to:
- Adjust the throttle screw C.

Use a T40 Torx screwdriver to:
- Adjust the offset screw D.
- Remove the cover cap.

When adjusting the gas volume, turn throttle screw C or offset screw D just a little and then wait until the measured values are displayed constantly in the emission meter before correcting further.

Sense of rotation:
- Clockwise:
  - O_2 content is reduced.
  - CO_2 content is increased.
- Anticlockwise:
  - O_2 content is increased.
  - CO_2 content is reduced.

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

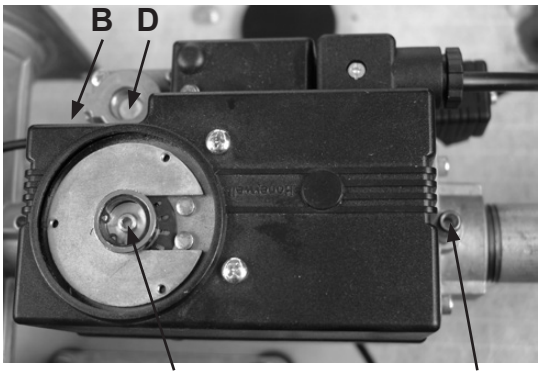


Fig. 43

Setting procedure:

1. Start the “Emission” menu on the control module.
   - The heating control automatically switches to normal operation after expiration of the remaining run time or after pressing the “Reset” button.
2. Position the measuring probe of the emission meter in the flue gas line.
3. Measure the O_2 content at full load.
   - Set the heat generator to full load ($Q_{max.}$ = 100 %).
   - Check whether the measured value (O_2) is within the following range:
     O_2 = 5.5-5.9 % by vol. (dry)
4. If the value measured at full load is out of range:
   - Remove cover cap from the gas valve so that throttle screw C is accessible.
   - Turn throttle screw C until the emission meter indicates the required setting value for O_2.
5. Measure the O_2 content at minimum load.
   - Set the heat generator to minimum load ($Q_{min.}$ = 1%).
   - Check whether the measured value (O_2) is within the following range:
     O_2 = 5.5-5.9 % by vol. (dry)
6. If the value measured at minimum load is out of range, adjust the gas quantity at minimum load:
   - Remove cover cap from the gas valve so that the offset screw D is accessible.
   - Turn offset screw D until the emission meter indicates the required setting value for O_2.
7. If the gas quantity has been changed by means of throttle screw C or offset screw D:
   - Set the blocking switch to “0” and disconnect the heat generator from the mains (e.g. main switch, fuses).
   - Install all removed parts of the cladding and put away the climbing aid (see chapter 3.4).
   - Energise the heat generator (main switch, fuses) and set blocking switch to “I”.
   - Check the O_2 content again at full load and minimum load.
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 heat generator must be taken out of operation and corresponding repair measures arranged.

9. Remove the measuring probe of the emission meter from the flue gas line and close the flue gas line.
10. Close the “Emission” menu on the control module.

5.8.2 Performing the emission measurement for UltraGas® 2 (800-1550)

Hex socket 2.5 mm

When adjusting the gas volume, turn throttle screw A or offset screw B just a little and then wait until the measured values are displayed constantly in the emission meter before correcting further.

Sense of rotation:
- Clockwise:
  - O_2 content is reduced.
  - CO_2 content is increased.
- Anticlockwise:
  - O_2 content is increased.
  - CO_2 content is reduced.

A Gas restrictor
B Offset screw

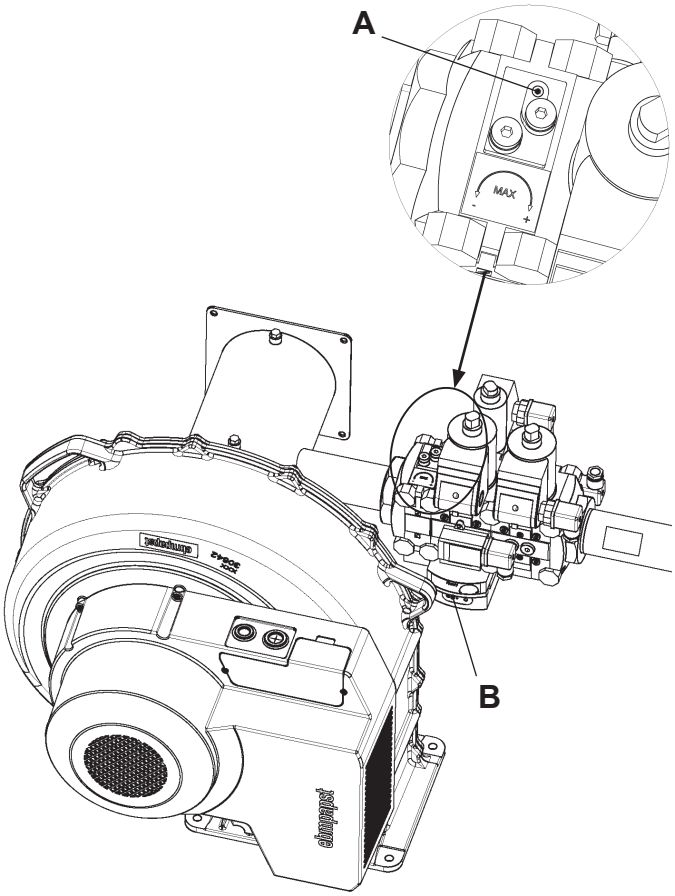


Fig. 44

Setting procedure:

1. Start the “Emission” menu on the control module.
   - The heating control automatically switches to normal operation after expiration of the remaining run time or after pressing the “Reset” button.
2. Position the measuring probe of the emission meter in the flue gas line.
3. Measure the O_2 content at full load.
   - Set the heat generator to full load ($Q_{max.}$ = 100 %).
   - Check whether the measured value (O_2) is within the following range:
     O_2 = 5.5-5.9 % by vol. (dry)
4. If the value measured at full load is out of range:
   - Turn throttle screw A until the emission meter indicates the required setting value for O_2.
5. Measure the O_2 content at minimum load.
   - Set the heat generator to minimum load ($Q_{min.}$ = 1 %).
   - Check whether the measured value (O_2) is within the following range:
     O_2 = 5.5-5.9 % by vol. (dry)
6. If the value measured at minimum load is outside the range, turn offset screw B until the emission meter indicates the required setting value for O_2.

Factory setting: throttle screw A after the closed condition.

UltraGas® 2 type	Diameter X of bolt tool	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. 45) can be used to help check the setting.

Fig. 45

7. If the gas quantity has been changed by means of throttle screw A or offset screw B:
   - Set the blocking switch to “0” and disconnect the heat generator from the mains (e.g. main switch, fuses).
   - Install all removed parts of the cladding and put away the climbing aid (see chapter 3.4).
   - Energise the heat generator (main switch, fuses) and set blocking switch to “I”.
   - Check the O_2 content again at full load and minimum load.
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 heat generator must be taken out of operation and corresponding repair measures arranged.

9. Remove the measuring probe of the emission meter from the flue gas line and close the flue gas line.
10. Close the “Emission” menu on the control module.

5.9 Monitoring work before handover to the operator

Before the heat generator is handed over to the operator, all commissioning or maintenance work must have been completed and the heating system checked.

Combustion air supply
- Check the combustion air supply.
- Ensure that the openings for the combustion air supply are open.

Flue gas leak tightness
- Check the heat generator for flue gas leaks (e.g. using leak detection spray)
  - Check the tightness of all connections of the flue gas line and thus also of the flue gas outlet and the flue gas collector.
  - Check the cover of the cleaning opening for leaks.
- Make sure that the cleaning opening and the inspection opening are closed by means of a cover.
  - Torque: 5-6 Nm

Gas tightness
- Check for gas leaks (e.g. using leak detection spray):
  - Check the gas supply line for leaks.
  - Check all connections between the gas connection and the burner for leaks.

Condensate drain line
- Check the condensate drain (make sure that there is no condensate blockage).
- Check the function of all existing electrically operated components.
- pH value measurement (before and after the neutralisation unit (if provided))
- Check all connections of the condensate drain line (including any neutralisation device that is present and the condensate pump) for leaks.
- Check condensate drain.
- Ensure that the siphon and, if present, the neutralisation device are filled with water.

Hydraulic lines
- Look and check all lines carrying water to ensure that there are no water leaks.

Protective and safety devices
- Make sure that the function of all safety and control devices has been checked.
- Make sure that all safety devices and covers that were removed are re-installed.

Covers and cladding parts
- Make sure that all covers and cladding parts have been reinstalled after finishing the work.

5.10 Heat generator handed over to the operator

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 operator:
- instructions for operation, maintenance and safety equipment of the heating system have been received.
  - Checking the operating pressure
    - The customer must be informed of the two values between which the movable pointer on the pressure gauge may move.
  - Maintenance
    - Upon handover, the customer must be notified that inspection and cleaning of the gas combustion system and heating surface and the condensate/neutralisation unit which may be required must be performed regularly – normally once per year – by the licenced installer or responsible customer service organisation.
    - The conclusion of a service contract is also important for economical operation in accordance with energy conservation laws and ensures that the burner is always correctly adjusted so that the system passes the inspections for flue gas losses and emission of pollutants prescribed by law.
- Handover of all instructions and documents.
- Inform the operator 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.

6. Maintenance

NOTICE

Damage to the unit

Damage to the heat generator can result from failure to perform cleaning and maintenance or incorrect cleaning and maintenance.

- Have the heat generator serviced and checked once a year by a Hoval customer service technician or a heating specialist.
- To avoid damage to the heat generator, remedy faults immediately.

WARNING

Hot surfaces

If cladding parts are dismantled and/or the boiler door is open, there is a risk of burns from touching hot surfaces.

- Allow the heat generator to cool down sufficiently before working or wear heat-resistant protective gloves.

WARNING

Live electrical components

Contact with live electrical components can result in injury from electric shock.

- Before starting work:
  - Switch off the electric supply,
  - check that the equipment is not live and
  - secure to prevent switching back on.
- Damage to the mains cable must be repaired by a licenced electrician.

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.

WARNING

Gas leak

There is a risk of poisoning and explosion if gas lines and gas fittings are handled unprofessionally.

- Work on gas lines and gas fittings is only allowed to be carried out by a heating specialist or a Hoval customer service technician.
- Close the gas shut-off valve and secure it to prevent it from being opened inadvertently.

CAUTION

Sharp edges

If the cladding has not yet been fitted or if parts of the cladding have been dismantled and/or the boiler door is open, there is a risk of cuts from sharp edges.

- Handle parts of the cladding carefully and wear protective gloves.
- Avoid contact with sharp edges.
- Refit all covers and cladding parts after finishing the work.

Perform reset, see operating instructions.

Safety-relevant components and wear parts

In order to maintain the safety of heat generators and components, safety-relevant components as well as wear parts must be checked and, if necessary, replaced during maintenance by a Hoval customer service technician or a heating specialist.

Defective or worn components must be replaced with genuine spare parts.

6.1 Maintenance work

With every maintenance, the following seals must be:

- renewed:
  - Seal for gas connection (see Fig. 61)
  - Seals for gas filter (see Fig. 60)
- checked and, if signs of wear are visible, renewed:
  - Seal for fan (see Fig. 51)
  - Seal for adapter flange (see Fig. 51)
  - Seal for burner cylinder (see Fig. 51)
  - All siphon seals (see Fig. 57)
  - Seal for cleaning opening (see Fig. 58)

WARNING

Seals between gas connection and combustion chamber

Fuel gas and flue gas might escape if a seal between the gas connection and the combustion chamber is defective. There is a risk of poisoning and explosion.

- If a seal between the gas connection and the combustion chamber is damaged or discoloured, it will have to be renewed.

1. Bleed the heating system, see chapter 6.2.
2. Replenish replacement water, see chapter 6.3.
3. Clean and maintain the heat generator, see chapter 6.5:
   - Carry out emission measurement to determine the current condition.
   - Check the function of the neutralisation unit (if provided) (by measuring the pH value of the condensate after it has passed through the neutralisation unit. The pH value must be ≥ 6.5.)
   - Functional check of all electrically operated components of the neutralisation unit/condensate pump combination (if present).
   - Perform a general visual and odour check.
   - Check the holding force of the gas pressure springs on the boiler door and renew them if necessary.
   - Look and check the burner cylinder fabric and clean or replace the burner cylinder if necessary.
     - Renew the following seals if they have been removed:
       - Seal for fan
       - Seal for adapter flange
       - Seal for burner cylinder
   - Clean and inspect ignition and ionisation devices, and readjust or renew as necessary.
   - Clean the combustion chamber.
   - Clean condensate drip tray.
   - Clean and check the siphon:
   - Check all the siphon seals for wear, lubricate them with silicone and renew if necessary.
   - Maintain the neutralisation unit, if fitted.
   - Clean and check the condensate drain line.
   - Fill the siphon and neutralisation unit, if present, with water through the cleaning opening.
   - Check the seal of the cleaning opening for wear and replace if necessary.
   - Install the cover of the cleaning opening and check it is gas-tight.
   - Clean the gas filter of the gas valve, if present, and renew if necessary.
   - Renew seals before and after the gas filter.
   - Renew seal on gas connection.
   - Check for gas leaks at the following points (e.g. using leak detection spray).
     - at the gas connection
     - before and after the gas valve
   - Check the pressure monitoring device.
     - Check seat of the screw connections between pressure switch B18 and the burner cover.
     - Perform a functional check of pressure monitoring device.
     - Check for gas leaks at the following points (e.g. using leak detection spray).
       - at the pressure monitoring device
       - at the adapter flange
   - Service any optional motorised combustion air dampers that are fitted, see chapter 6.6.
   - Perform the emission measurement.
   - Check the gas flow pressure.
   - Check the operating pressure of the heating system.

After maintenance, before operation of the heat generator, various checks must be carried out. Checking jobs, see chapter «5.9 Monitoring work before handover to the operator», page 64.

6.2 Bleeding the heating system

4. Open all radiator valves and/or all underfloor heating circuits.
5. Heat up the heating system for at least half a day with a high flow temperature.
6. Switch the heat generator off and wait for 5 minutes.
7. Bleed the heating system (radiators and/or underfloor heating circuits) thoroughly.

6.3 Replenishing replacement water

NOTICE

Filling and replacement water

The heating system can be damaged by improper procedures during filling.

- Proceed professionally when refilling and topping up.
- The filling and replacement water must be of the required water quality (see chapter 4.5.2).
- If frost protection agent is being used, a separate engineering sheet is available from Hoval.

§ Country-specific regulations and manufacturer-specific specifications for replacement water must be observed (see chapter «4.5.2 Water quality in heating systems», page 50).

- If the operating pressure drops below 1 bar, a warning is output and the boiler output is reduced to 50 %.
- If the operating pressure is below 0.5 bar, heating operation is not possible and a fault is present.

Replenish replacement water if the operating pressure drops below 1 bar.

1. Set the blocking switch to “0” and disconnect the heat generator from the mains (e.g. main switch, fuses).
2. Connect the filling hose to the water treatment unit.
3. Deaerate the filling hose.
4. Connect the filling hose to the filling/drain valve of the heat generator.
5. Slowly fill the heat generator until the calculated operating pressure is displayed on the pressure gauge.
6. Close the water treatment unit and the filling/drain valve.
7. If no automatic air vent is available, vent the heat generator using a manual air vent.
8. Check the water connections for leakage.
9. Check the operating pressure again.
10. Unscrew the filling hose again after filling.
11. Switch the heat generator back on.

6.4 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.

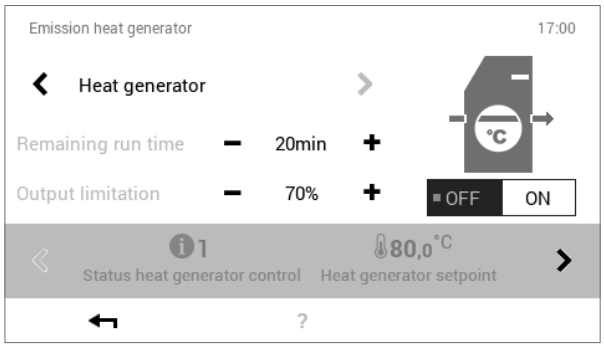
CAUTION

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.

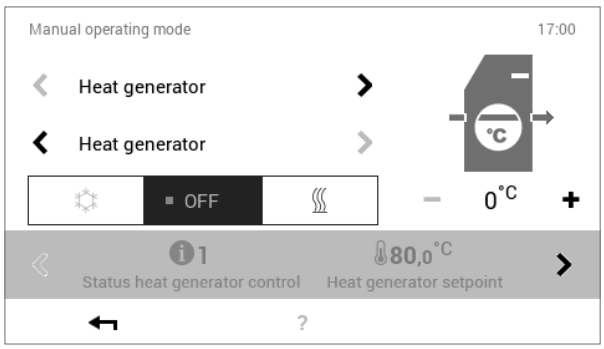
For detailed information see operating instructions, “Emission” chapter.

Power limitation with 2-stage oil 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!

6.5 Cleaning and maintaining the heat generator

The heat generator is only allowed to be cleaned and serviced by a heating specialist or a Hoval customer service technician.

The heat generator must be cleaned and serviced at least once a year.

Special tools and aids required:
- For cleaning and setting of the ignition and ionisation devices:
  - Fine abrasive paper
  - Needle-nose pliers
  - Blowtorch
- For cleaning the burner cylinder:
  - Compressed air
  - Vacuum cleaner
- For cleaning the combustion chamber:
  - Collection tank for the cleaning water
  - For rinsing with concentrated water jet e.g.:
    - Spray gun connected to water hose or
    - High-pressure cleaner
  - If a higher cleaning effect is required:
    - Spray bottle with solvent-free cleaning agent (e.g. soapy water or Hoval boiler cleaner)
  - If there are deposits on the heating surfaces:
    - Spray bottle with chloride-free cleaning agent containing phosphorus (e.g. Hoval boiler cleaner or Desoxin)
    - High-pressure cleaner

1. Energise the heat generator (main switch, fuses) and set blocking switch to “I”.
2. Before cleaning while the heat generator is in operation, carry out the following tasks:
   - Carry out emission measurement to determine the current condition (see chapter 5.8).
   - 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. The pH value must be ≥ 6.5.).
   - Functional check of all electrically operated components of the neutralisation unit/condensate pump combination (if present).
3. Set the blocking switch to “0” and disconnect the heat generator from the mains (e.g. main switch, fuses).
4. Perform a general visual and odour check on the heat generator.
   - Is there a smell of gas in the room?
   - Are there any leaks?
   - Is the fresh air intake guaranteed?
   - Is the heat generator dusty or dirty? If necessary, clean the heat generator with a damp cloth.
   - etc.

NOTICE

Cladding

Do not use aggressive or scouring cleansing agents, since they can damage the cladding of the heat generator.
- Use a damp cloth to clean the cladding of the heat generator.

5. Wait until the heat generator has cooled down.
6. Close the gas shut-off valve of the heat generator.
7. Set up the climbing aid and remove the upper section of the cladding (see chapter 3.5, steps 1 to 7).
8. Undo all burner plug-in connections.
9. Remove the combustion air connection from the Venturi tube of the burner, if present.
10. Disconnect gas connection from the gas valves, e.g. using pipe grips.

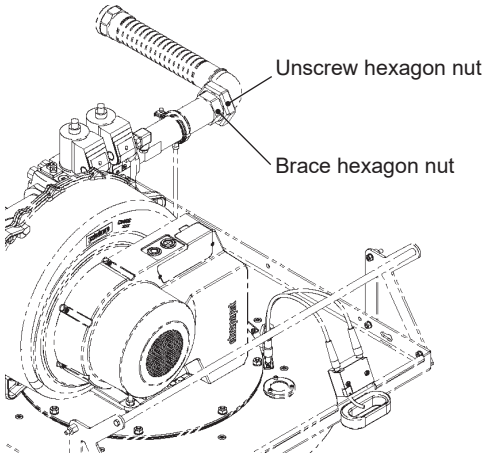


Fig. 46

11. Opening combustion chamber:
    - Unscrew hexagon nuts.
    - Swivel the burner upwards, with the boiler door (Fig. 47)

CAUTION

UltraGas® 2 (300-1550):
If a gas pressure spring is weakened, the boiler door is lowered. There is an increased danger of injury when reopening the boiler door or if the burner is not completely swivelled out (as with A minimum, see chapter 2.3.3).
- Check the holding force of the gas pressure springs at A minimum.
- If one gas pressure spring is weakened, renew both gas pressure springs.
- If required, use a block of squared timber to secure the burner against closing inadvertently.

Fig. 47

UltraGas® 2 (125,150):
Depending on where the flue gas line is installed, it may not be possible to engage the boiler door in the last grid position.

12. Look and check the burner cylinder fabric.
    - The burner cylinder must be cleaned if visible contamination exists (such as deposits, e.g. builder's dust).
    - If the burner cylinder fabric is damaged or there are cracks in the welds, the burner cylinder must be renewed (contact a Hoval customer service technician or a heating specialist).

13. If the burner cylinder fabric 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. 48

    - Unscrew the fan and gas mixing device.

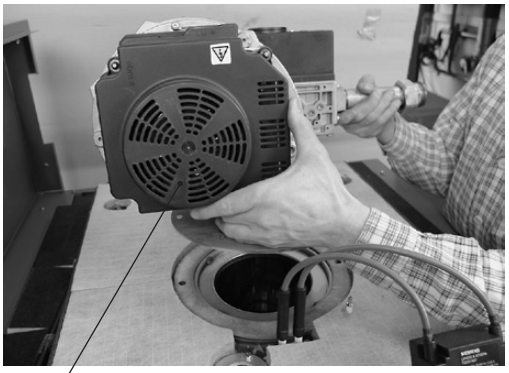


Fig. 49

    - Unscrew the adapter flange (Fig. 51).
    - Remove the burner cylinder upwards (Fig. 50).

CAUTION

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

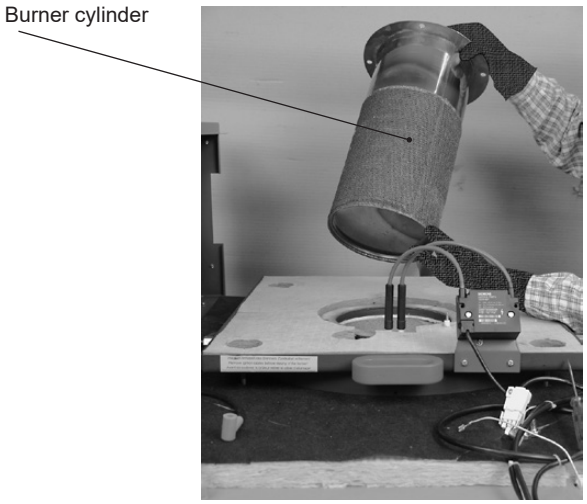


Fig. 50

- Remove the following seals:
  - Seal for fan
  - Seal for adapter flange
  - Seal for burner cylinder

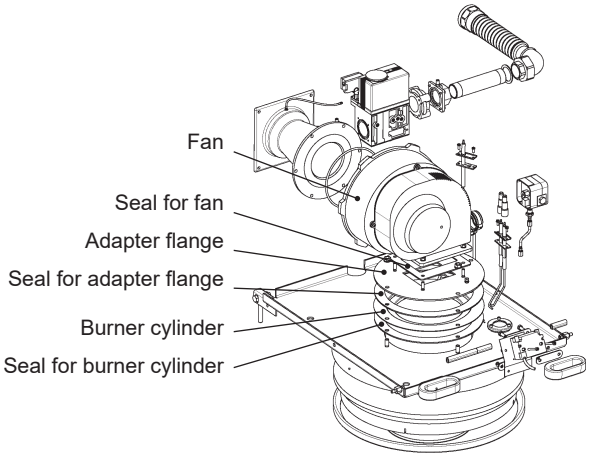


Fig. 51

- Cleaning the burner cylinder if required:
  - Clean the burner cylinder inside and out with compressed air.
  - Remove released dust and dirt particles with a vacuum cleaner.

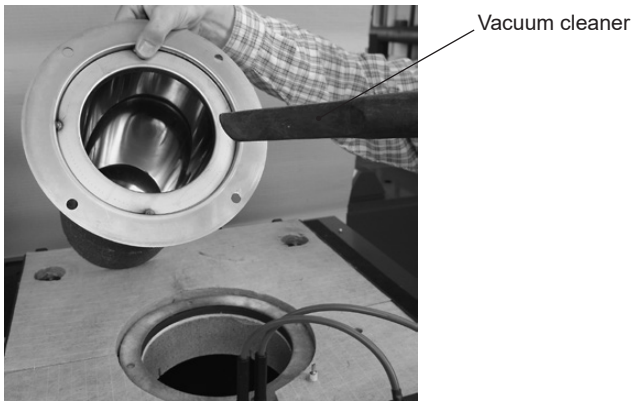


Fig. 52

- Assemble the burner in the reverse order according to Fig. 51.
  - Replace the burner cylinder if it is defective.
  - Renew the following seals:
    - Seal for fan
    - Seal for adapter flange
    - Seal for burner cylinder
- Fasten the earth wire (Fig. 48) on the burner cylinder.
- Swivel the burner upwards, with the boiler door (Fig. 47)

14. Clean and inspect ignition and ionisation devices, and readjust as necessary.
    - If necessary, sand ignition and ionisation devices with fine sandpaper, or renew them.
    - Clean away the sanding dust.
    - Check all electrode gaps (see Fig. 53 and Fig. 54).

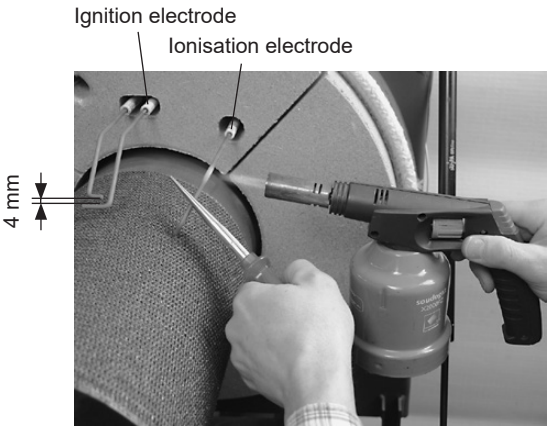


Fig. 53

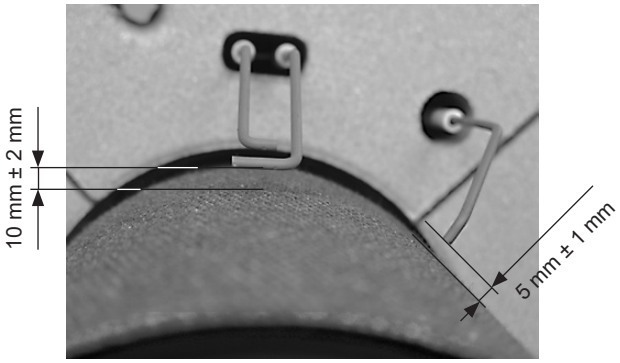


Fig. 54

- Readjusting the electrode gaps if necessary:
  - Heat the electrode at the kink with the blowtorch until it glows red (see Fig. 53).
  - Use long-nose pliers to bend the electrode until the required gap is set.

15. Clean the combustion chamber:

CAUTION

Danger of chemical burns from cleansing agents

Cleansing agents can cause chemical burns.

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

NOTICE

Damage from cleansing agents

The use of unsuitable cleansing agents might damage the heat generator and the condensate drain line. The function of the neutralisation unit (if present) might be impaired. Furthermore, not all cleansing agents are allowed to enter the sewer system.

- Only use cleansing agents if there is stubborn soiling and a chemical cleansing agent is really required.
- Only use cleansing agents that are suitable/ approved for gas boilers having aluminium components (e.g. Hoval boiler cleaner).
- Always check cleansing agents for compatibility with aluminium and stainless steel.
- Also rinse the condensate drain line after the cleaning procedure.
- Always observe the disposal instructions of the cleansing agents (do not discharge them into the sewer system).

NOTICE

Damage from cleaning tool

The heat generator might be damaged if unsuitable tools are used for cleaning.

- Use only the recommended tools for cleaning the surface.

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**.

- Separate the condensate drain line 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 or Hoval boiler cleaner), 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. Hoval boiler cleaner or Desoxin) (Fig. 55), allow to act and flush with a jet of water of a high-pressure cleaner.

It might be necessary to remove the burner cylinder for cleaning using a high-pressure cleaner. Removal of the burner cylinder, see step 10.

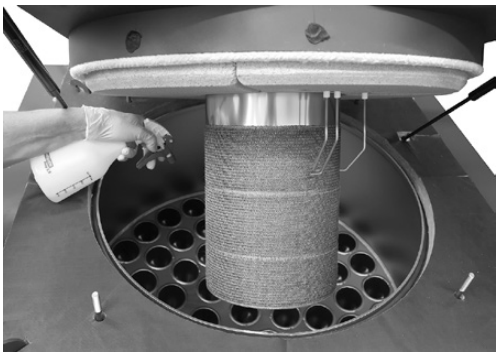


Fig. 55

  - The process can be repeated.

16. Remove the cover from the cleaning opening.

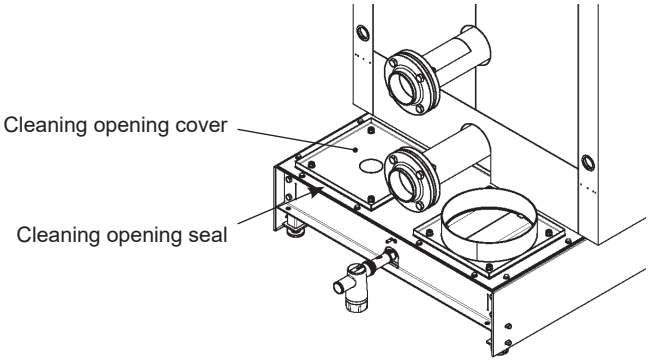


Fig. 56

17. Clean condensate drip tray.

NOTICE

Flue gas accumulation in the heat generator

If the condensate cannot drain away, this will lead to a condensate build-up in the condensate drip tray. The flue gas can no longer be transported away without any obstruction.

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

WARNING

Flue gas leak

If there is insufficient water in the siphon (the level is below the necessary minimum height of the water dam in the siphon), then flue gas can escape through the condensate drain line. Due to the concentration of flue gas in the air, there is a risk of poisoning from flue gas leakage.

- Before commissioning, fill the siphon and, if present, the neutralisation unit with sufficient water.
- In order to achieve the necessary minimum level of the water dam in the siphon, fill in water until the siphon overflows (the cleaning opening (Fig. 56) can be used for filling in).
  - Torque for mounting the cover of the cleaning opening: 5-6 Nm

18. Clean and check the siphon (Fig. 57):
    - Remove siphon.
    - Rinse the siphon with water.
    - Check all the siphon seals for wear, if necessary lubricate them with silicone and renew.
    - Install siphon.

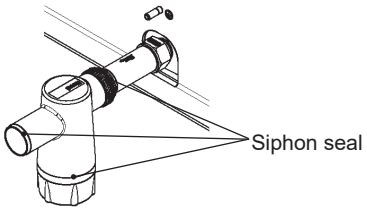


Fig. 57

19. 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" and 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.

20. Clean and check the condensate drain line:
    - Flush the condensate lines.
    - Reassemble condensate drain line and attach to the siphon.

When installing the siphon and condensate drain, the engineering guidelines for condensate drains must be complied with, see chapter 4.3.1

21. Fill the siphon (Fig. 57) and neutralisation unit, if present, with water through the cleaning opening.
    - In order to achieve the necessary minimum level of the water dam in the siphon, fill in water until the siphon overflows.
22. Check the seal of the cleaning opening 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.
  - Torque: 5-6 Nm

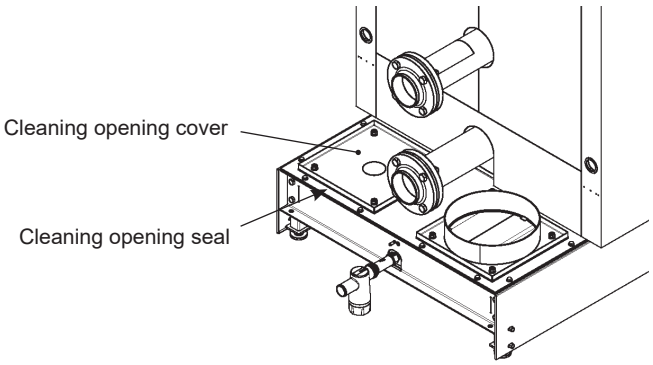


Fig. 58

23. Install the cover of the cleaning opening and check it is gas-tight.
    - Torque: 5-6 Nm
24. Closing the combustion chamber:
    - Swivel the burner with boiler door closed downwards.
    - Screw on the boiler door with hexagon nuts
      - Torque: 3-5 Nm

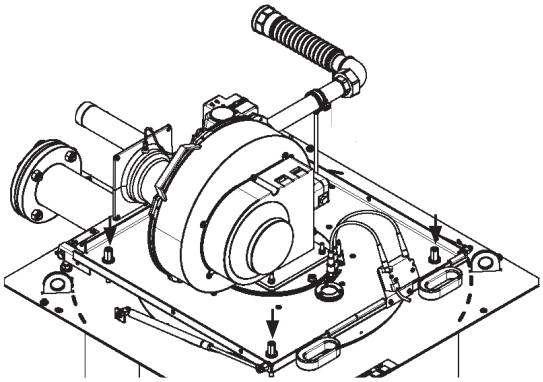


Fig. 59

25. Clean the gas filter of the gas valve, if present:

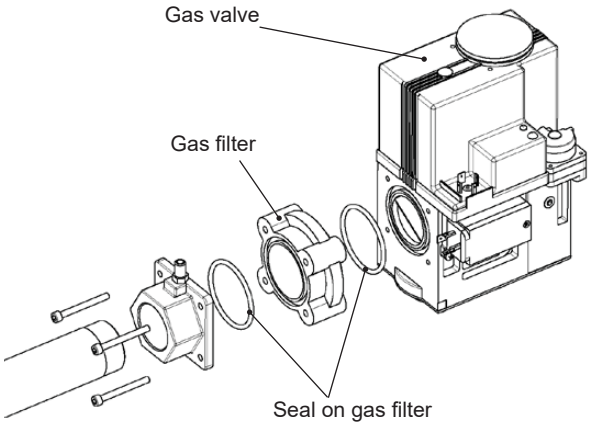


Fig. 60

- 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.

26. Replace the seal on the gas connection and connect the gas connection to gas valves, e.g. using two pipe grips.

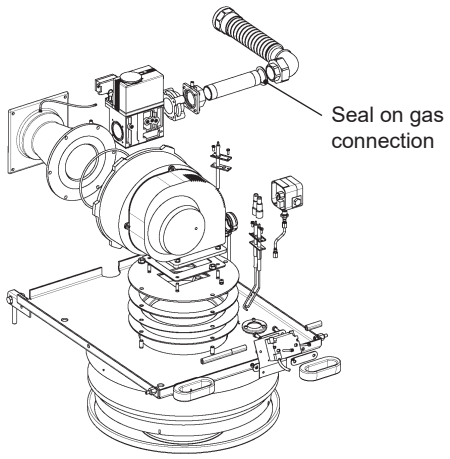


Fig. 61

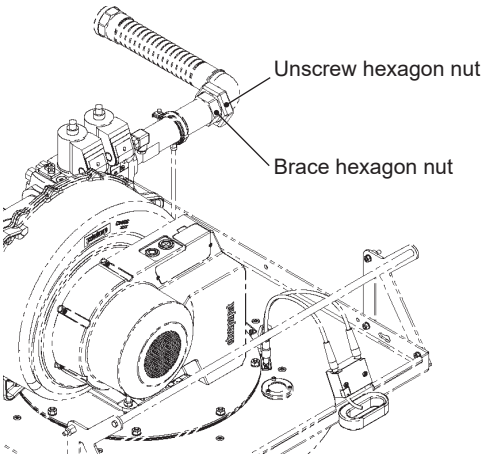


Fig. 62

27. Connect the combustion air connection to the Venturi tube of the burner, if present.
28. Connect all burner plug-in connections.
29. Energise the heat generator (main switch, fuses) and set blocking switch to “I”.
30. Open the gas shut-off valve.
31. Check for gas leaks in the area of the gas connection up to and including the gas valve (e.g. using leak detection spray).
32. Take the heat generator in operation.
33. Check seat of the screw connections between pressure switch B18 and the burner cover:

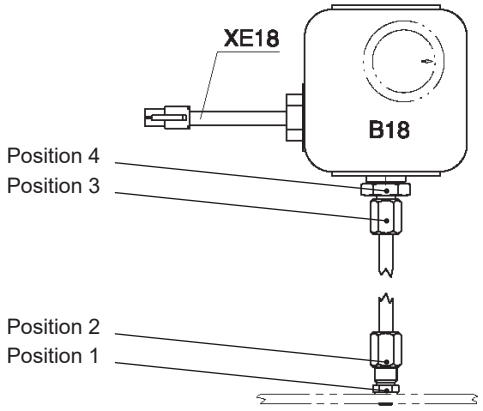


Fig. 63

- 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 (union nuts of connecting cable on the double nipples):
  Tightened by hand and then tightened by another 1/4 revolution with an open-end spanner (hold position 1 or 4 in place with a spanner when doing so).

34. Perform a functional check of pressure monitoring device. See chapter 5.6.
    - 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 59.
35. Check for gas leaks (e.g. using leak detection spray):
    - Check pressure monitoring device at the following points

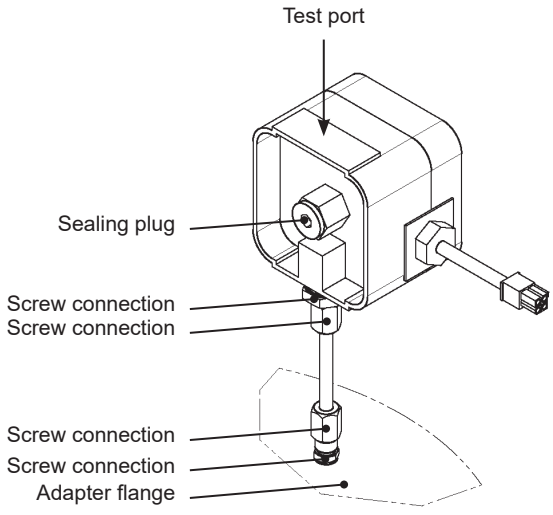


Fig. 64

- Leak-tightness at the adapter flange (Fig. 64)

36. Service any optional motorised combustion air dampers that are fitted, see chapter 6.6.
37. Check the gas flow pressure, see chapter 5.5.
38. Install all removed parts of the cladding and put away the climbing aid (see chapter 3.4).
39. Perform the emission measurement according to chapter 5.8.
    - If necessary, adjust the setting.
    - Make a record of the measurement.
40. Check the operating pressure of the heating system.

6.6 Servicing motorised combustion air damper (option)

WARNING

Flue gas outlet via open combustion air intake line

In heat generator cascades with a common flue gas line with overpressure (i.e. also in double boilers), flue gas can escape via the burner through the open combustion air intake line of a switched-off heat generator. There is a risk of poisoning.

- Ensure that a motorised combustion air damper is installed and electrically connected in all heat generators in the cascade.
- Service motorised combustion air dampers once a year.
- In the event of a malfunction, if the error codes “E:18 Fan speed lower limit” or “E:21 No flame after ignition” occur, also check the function of the motorised combustion air damper.

WARNING

Live parts in the actuator

When the actuator is open there is a risk of electric shock due to contact with live electrical parts.

- Before opening the actuator, safely disconnect it from the electrical power system.

NOTICE

Unsuitable lubricants

The use of unsuitable lubricants can lead to the complete failure of motors.

- The motor bearings of the actuators are only allowed to be relubricated with Ballistol universal oil.

In the event of a malfunction, if the error codes “E:18 Fan speed lower limit” or “E:21 No flame after ignition” occur, also check the function of the motorised combustion air damper:

- If the actuator of the motorised combustion air damper loses power, relubricate the motor bearings of the actuator.
- If the actuator of the motorised combustion air damper is stuck, replace the actuator.

1. Switch off all heat generators in the heat generator cascade:
   - Set the blocking switch to “0” and disconnect the heat generator from the mains (e.g. main switch, fuses).
   - Close the gas shut-off valve.
2. Remove motorised combustion air dampers from all heat generators in the heat generator cascade.

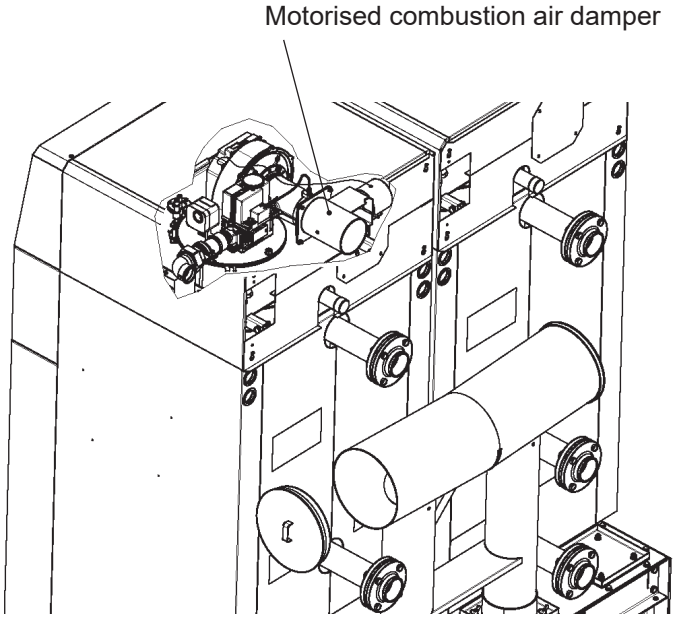


Fig. 65

3. Dismantle the motor covers.

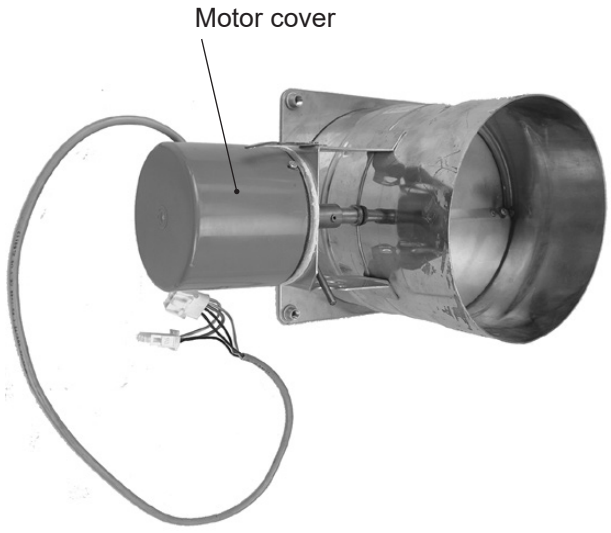


Fig. 66

4. UltraGas® 2 (125,150), UltraGas® 2 D (250,300): Screw the locking lever onto the motorised combustion air dampers (Fig. 67).
   - The locking levers for the motorised combustion air dampers can be found in the system manual.
5. Attach a thin tube to a spray can for applying the Ballistol universal oil.
6. Lubricate the motor bearings of the motorised combustion air dampers:
   - Turn the motorised combustion air damper so that the actuator is at the bottom.

- Spray the oil strongly past the rotor into the lower bearings several times as can be seen in the photo.

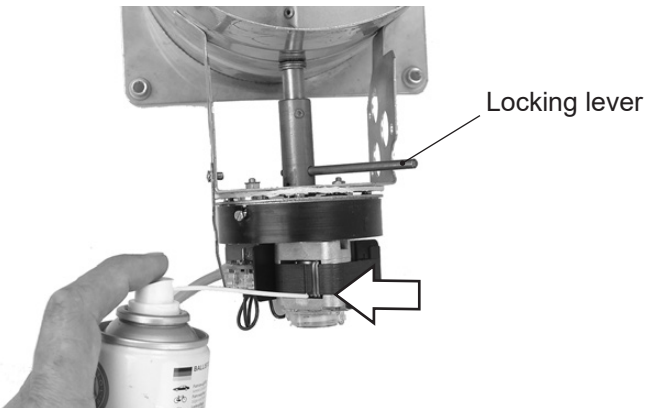


Fig. 67

- Use the locking lever to move the motorised combustion air damper.

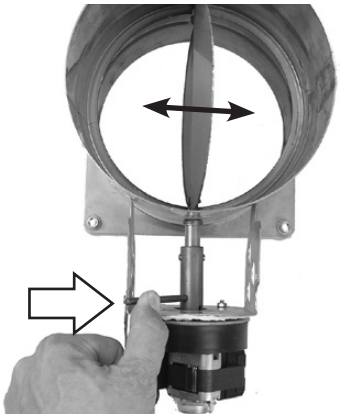


Fig. 68

- Wait a few minutes until the oil has been absorbed.
- Turn the motorised combustion air damper so that the actuator is at the top.
- Spray the oil strongly past the rotor into the lower bearings several times as can be seen in the photo.

Fig. 69

- Use the locking lever to move the motorised combustion air damper.

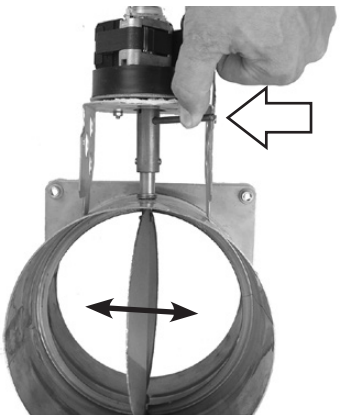


Fig. 70

- Wait a few minutes until the oil has been absorbed.

7. UltraGas® 2 (125,150), UltraGas® 2 D (250,300): Unscrew the locking lever of the motorised air intake dampers and place it in the system manual.

As there is insufficient space, the motorised combustion air dampers for UltraGas® 2 (125,150) and UltraGas® 2 D (250,300) must be installed in the heat generators without locking levers.

8. Install the motor covers.
9. Install motorised combustion air dampers in the heat generators and connect them electrically:
   - Mount the motorised combustion air damper on the Venturi tube using four screws and nuts.
   - Connect motorised combustion air damper electrically:
     - UltraGas® 2 (125-800), UltraGas® 2 D (250-1600):

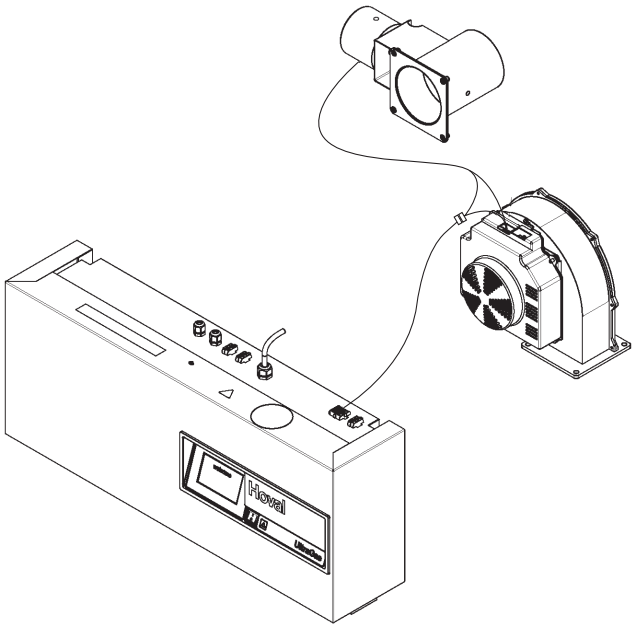


Fig. 71

- UltraGas® 2 (1000-1550), UltraGas® 2 D (2000-3100):

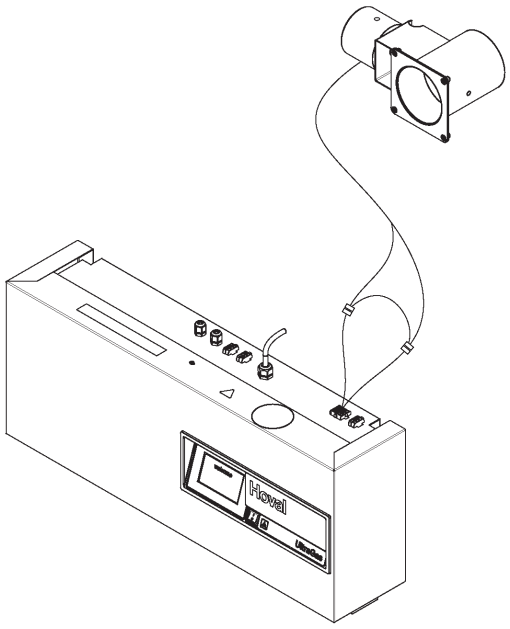


Fig. 72

10. Distribute the lubricant optimally in the bearing:
    - Energise the heat generator (main switch, fuses) and set blocking switch to “I”.
    - Run the actuator through several cycles.

If the actuator of the motorised combustion air damper is not running well:

- Repeat lubrication process or replace actuator.

6.7 Renewing fuse

WARNING

Electrical installations are only allowed to be carried out by an 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 4.6
3. Remove the protection hood from TopTronic® E - WEZ, press to the side and remove.
4. Renew fuse (T 10 A 250 V).

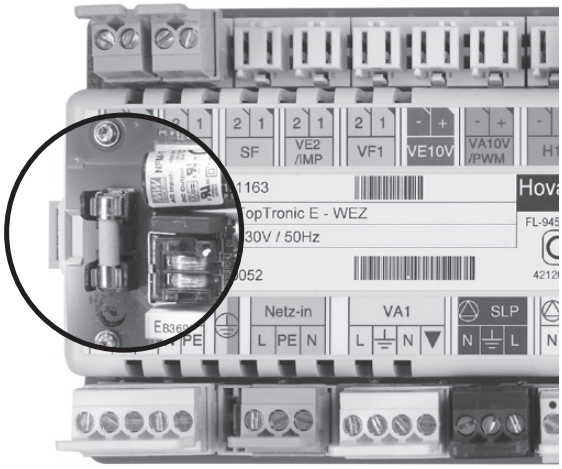


Fig. 73

5. Mount protection hood and close cladding.
6. Restore the electrical power supply.

6.8 Monitoring work before handover to the operator

Before the heat generator is handed over to the operator, all commissioning or maintenance work must have been completed and the plant checked.
For the checking jobs to be carried out, see chapter 5.9.

7. Decommissioning

NOTICE

Damage to the unit

The heat generator might be damaged if the decommissioning is carried out improperly.

- The decommissioning must be carried out by a heating specialist

7.1 Disconnecting the heat generator from the mains

NOTICE

Damage by frost

In case of frost, there is a risk that the heating system will freeze, causing damage to the heat generator and the heating system.

- If the electrical power supply is interrupted and there is a risk of freezing, drain water from the heat generator and the heating system.

1. Set the blocking switch to “0” and disconnect the heat generator from the mains (e.g. main switch, fuses).
2. Close the main gas shut-off valve.
3. Close the gas shut-off valve of the heat generator.
4. Set up the climbing aid and remove the upper section of the cladding (see chapter 3.5, steps 1 to 7).
5. Undo all burner plug-in connections.
6. Disconnect gas connection from the gas valves, e.g. using pipe grips, and seal.

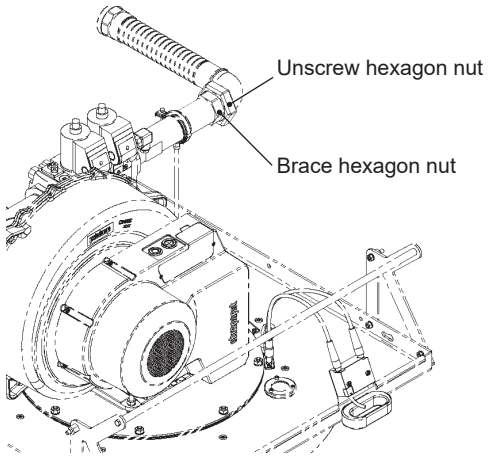


Fig. 74

7. If there is a risk of frost, drain the water:
   - Close the following water connections on the heat generator:
     - Flow
     - High-temperature return HT
     - Low-temperature return LT

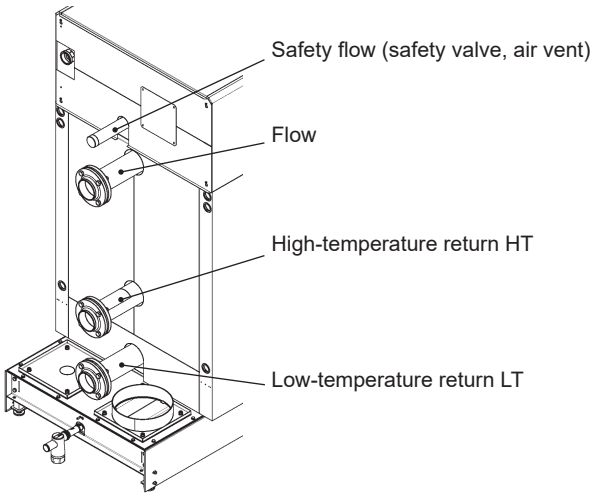


Fig. 75

   - Connect the hose to the filling/drain valve of the heat generator and place the other end of the hose in the drain.
   - Open the filling/drain valve.

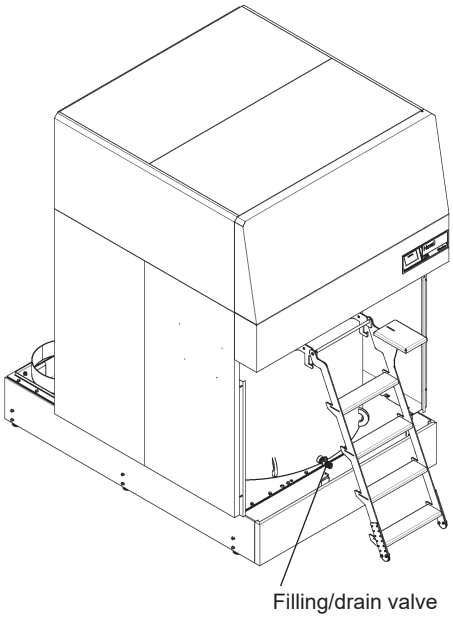


Fig. 76

   - Open the manual air vent, if present.
   - Wait until the heat generator has been drained.
   - Unscrew the siphon, drain it and reinstall it.

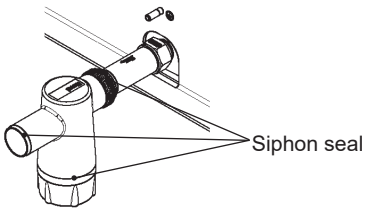


Fig. 77

   - If a neutralisation unit is present, drain it according to the manufacturer’s operating instructions.
8. Drain the remainder of the heating system properly.

8. Appendix

8.1 BIC 970 automatic function device parameter list

WARNING

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

8.1.1 Automatic function device UltraGas® 2

Parameter CAN bus	Description	Tree	Unit	Plant setting values	52-UltraGas® 2 (125)	52-UltraGas® 2 (150)	52-UltraGas® 2 (190)	52-UltraGas® 2 (230)	52-UltraGas® 2 (300)	52-UltraGas® 2 (350)	52-UltraGas® 2 (400)	52-UltraGas® 2 (450)	52-UltraGas® 2 (500)	52-UltraGas® 2 (530)	52-UltraGas® 2 (620)	52-UltraGas® 2 (700)	52-UltraGas® 2 (800)	52-UltraGas® 2 (1000)	52-UltraGas® 2 (1100)	52-UltraGas® 2 (1300)	52-UltraGas® 2 (1550)	52-UltraGas® 2 H (700)	52-UltraGas® 2 H (1100)	52-UltraGas® 2 H (1550)
33287	SC1-6 debounce time	Configuration	s		0	0	0	0	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	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	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	1	1	1	1
36889	Minimum speed fan	Primary air fan	rpm		1100	1200	1000	1000	1100	1100	1100	1100	1000	900	900	1000	900	1100	1100	1000	1000	1000	1100	1000
36890	Maximum speed fan	Primary air fan	rpm		4600	5500	4400	4800	5500	5200	6000	6500	7000	4500	4500	4800	4600	5700	5800	5000	5000	4800	5800	5000
36892	Fan speed pre-ventilation	Primary air fan	rpm		4600	5500	4400	4800	5500	5200	6000	6500	7000	4500	4500	4800	4600	5700	5800	5000	5000	4800	5800	5000
36898	Start speed	Primary air fan	rpm		1600	1900	1600	1600	2000	2000	2000	2000	1700	1600	1600	1600	1600	1800	1800	1700	1700	1600	1800	1700
36902	Speed post-ventilation normal	Primary air fan	rpm		1100	1200	1000	1000	1100	1100	1100	1100	1000	900	900	1000	900	1100	1100	1000	1000	1000	1100	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	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	180	180	180	180
37121	Number of Hall pulses	Primary air fan			3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	5	5	3	4	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	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	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	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	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	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	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	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	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	3	3	3	3

Parameter CAN bus	Description	Tree	Unit	Plant setting values	52-UltraGas® 2 (125)	52-UltraGas® 2 (150)	52-UltraGas® 2 (190)	52-UltraGas® 2 (230)	52-UltraGas® 2 (300)	52-UltraGas® 2 (350)	52-UltraGas® 2 (400)	52-UltraGas® 2 (450)	52-UltraGas® 2 (500)	52-UltraGas® 2 (530)	52-UltraGas® 2 (620)	52-UltraGas® 2 (700)	52-UltraGas® 2 (800)	52-UltraGas® 2 (1000)	52-UltraGas® 2 (1100)	52-UltraGas® 2 (1300)	52-UltraGas® 2 (1550)	52-UltraGas® 2 H (700)	52-UltraGas® 2 H (1100)	52-UltraGas® 2 H (1550)
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	10	10	10	10
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	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	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	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	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	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	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	0.2	0.2	0.2	0.2
38916	Warning max. pressure	Water pressure sensor	bar		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	9.2	9.2	9.2
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	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	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	6	10	10	10
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	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	6.2	10.2	10.2	10.2
38930	Water pressure sensor upper limit	Water pressure sensor	bar		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	12	12	12
39946	Max. setpoint (BR)	Burner	°C		90	90	90	90	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	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	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	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	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	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	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	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	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	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	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	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	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	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	5	5	5	5

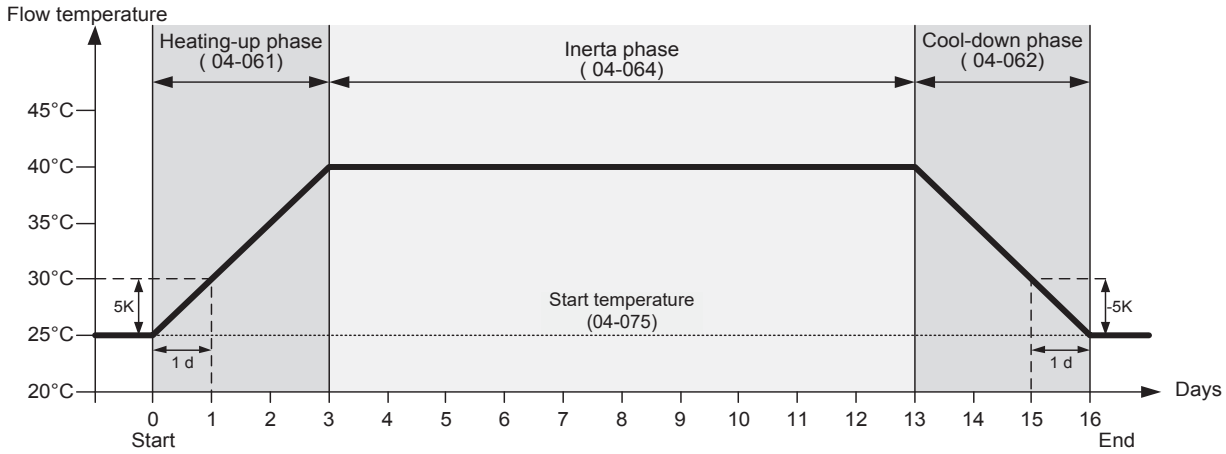
8.2 Activate screed function

NOTICE

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

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

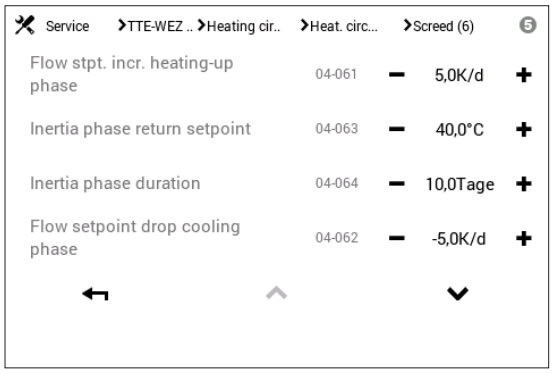
NOTICE

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

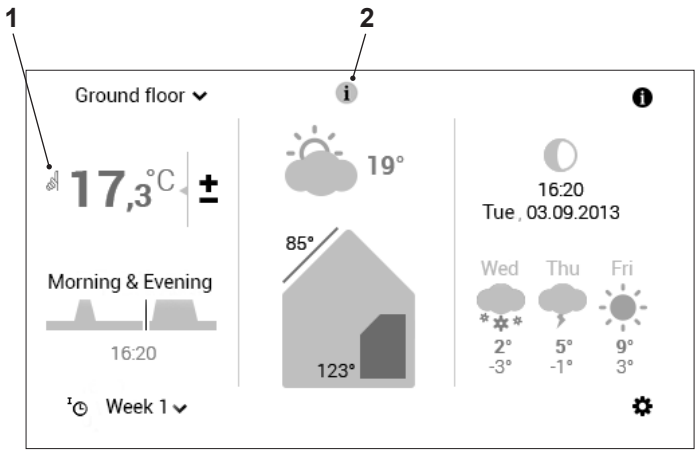


Can only be set in the corresponding user level.

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

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 installation and any further components.
- and is consequently sufficiently familiar with the installation.

Installation address:

Type:

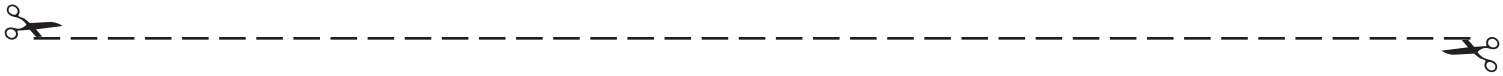
Serial number:

Year of manufacture:

Place, Date:

System installer:

System user:



COPY OF SYSTEM INSTALLER

Hoval

Confirmation

The user (owner) of the system herewith confirms that
- he has received adequate instruction in the operating and maintenance of the installation,
- received and taken note of the operating and maintenance instructions and, where applicable other documents concerning the installation 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: