Hoval TopGas® max (50-150)

Wall-hanging gas condensing boiler
- With condensing boiler technology
- For the combustion of:
  - natural gas E
  - natural gas E with a hydrogen content (H_2) of up to 20 % by vol.
  - propane according to DIN 51622
  - biomethane according to EN 16723
- Heat exchanger made of stainless steel
- Built-in:
  - water pressure guard for water shortage protection
  - flue gas temperature sensor with flue gas limiter function
  - automatic quick aspirator
- Integrated backflow check valve on the combustion air side
- Pre-mixing surface burner made of stainless steel
  - Modulating with gas/air group control
  - Automatic ignition
  - Ionisation guard
- Minimum water flow necessary (see technical data)
- Wall-hanging gas condensing boiler fully clad with coated white steel plates

Basic boiler control panel
- Automatic function device with monitoring unit
- Modulating burner control
- Operation and fault indication

Option
- Propane
- Free-standing calorifier

Delivery
- Wall-hanging gas condensing boiler fully clad with fastening material for wall installation

Model range

TopGas® max type		Nominal heat output 50/30 °C kW
(50)	A	9.1-49.9
(65)	A	14.9-69.9
(100)		22.3-102.0
(125)		26.3-125.3
(150)		29.8-150.4

A^{+++} → D

Energy efficiency class of the compound system with control

TopGas® max M

with integrated automatic function device LMS14 including control panel

Control panel
- Digital screen display
- Pushbuttons and rotary knob for operation
- Fault signalling lamp
- Information display

Control functions
- Control functions integrated for
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit

Operating mode selection
- Heating curve setting
- Hot water temperature setting
- Day programs/week programs
- Frost protection function
- Display of fault messages
- Error acknowledgement key
- Chimney sweep function key (safety temperature limiter test)

Options for controller
- Can be expanded with:
  - Room control unit
  - Cascade module
- Can be networked with up to 8 automatic function devices in total

Delivery
- Heating controller set separately packed, mounting on site

TopGas® max C

without control panel with integrated cascade module

For TopGas® max C (cascade) in combination with the TopGas® max M

Up to 7 TopGas® max C can be networked with the LMS14 of the TopGas® max M.

Delivery

Cascade module separately packed, installation on-site

Notice
Observe the notices on water quality, see “Engineering”!

Modbus connection

to TopTronic® E

For controlling the TopGas® max M by the TopTronic® E using a temperature signal. Various data points are transferred from the LMS14 automatic function device to the TopTronic® E (Modbus module see Accessories).

BMS connection 0-10 V

(building management system)

For control of the TopGas® max as part of a building management system

Temperature or performance control

external with 0-10 V

Integrated in the boiler

Wall-hanging gas condensing boiler

Permission boiler

TopGas® max M (50-150):
CE product ID No. CE-0085CS0419

Hoval TopGas® max M (50-150)

Stainless steel heat exchanger with modulating stainless steel burner and automatic function device LMS14 and control panel fully clad.

TopGas® max M type	Nominal heat output 50/30 °C kW	Part No.
(50)	9.1-49.9	7019 687
(65)	14.9-69.9	7019 688
(100)	22.3-102.0	7019 689
(125)	26.3-125.3	7019 690
(150)	29.8-150.4	7019 691

Energy efficiency class
see “Description”

Notice
TopGas® max M:
The cascade module must also be ordered for cascade integration.

Permission boiler

TopGas® max C (50-150):
CE product ID No. CE-0085CS0419

Hoval TopGas® max C (50-150)

Stainless steel heat exchanger with modulating stainless steel burner with automatic function device LMS14 without control panel with cascade module fully clad.

TopGas® max C type	Nominal heat output 50/30 °C kW	Part No.
(50)	9.1-49.9	7019 692
(65)	14.9-69.9	7019 693
(100)	22.3-102.0	7019 694
(125)	26.3-125.3	7019 695
(150)	29.8-150.4	7019 696

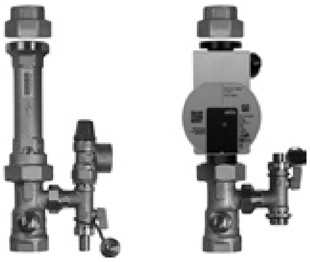
Energy efficiency class
see “Description”

Part No.

Accessories

Conversion kit liquid gas
TopGas® max (15-150)

6064 330



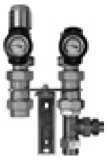
Connection set AS32-TG
consisting of:
Return:
- Shut-off valve with union nut 2″ side output with boiler fill and drain valve and connection nozzle G ¾″ (external) for connecting a diaphragm pressure expansion tank
- Speed-controlled high-efficiency pump, various versions

Flow:
- Fitting piece (180 mm) G 2″ with integrated non-return flap
- Shut-off valve with union nut 2″ and side outflow with safety valve DN 20, 3 bar up to 100 kW incl. boiler filling/draining valve

Connection set/pump type	Speed control ⎍	Part No.
AS32-TG max SPS-I 10	●	6064 405
AS32-TG max SPS-I 12	●	6064 406
AS40-TG max SPS-I 12	●	6064 407

Speed control legend

⎍ PWM1 or PM1	PWM control signal heating



Connection set AS32-2/H
for compact mounting
of all required fittings
of a direct circuit
consisting of:
2 thermometer ball valves
Wall bracket included separately
Connection T-piece DN 32
in the return flow for connecting the
sludge separator bottom and
the diaphragm pressure expansion tank
on the side on connection set
installation option
for an overflow valve
incl. non-return valve

on request

Diaphragm pressure expansion tanks, heating armature groups and wall distributors
see “Various system components”

Part No.

Accessories

Gas filter 70612/6b Rp ¾″
with instrument glands up/downstream
of the filter cartridge (dia.: 9 mm)
pore size of filter cartridge < 50 µm
Max. pressure differential 10 mbar
Max. inlet pressure 100 mbar

2007 995

Gas filter mod. 70602/6b Rp 1″
with instrument glands up/downstream
of the filter cartridge (dia.: 9 mm)
pore size of filter cartridge < 50 µm
Max. pressure differential 10 mbar
Max. inlet pressure 100 mbar

2007 996

Gas valve, passage DN 15, R ½″
with thermally releasing cut-off device

2012 075

Gas valve, passage DN 20, R ¾″
with thermally releasing cut-off device

2012 077

Gas valve, corner version DN 15, R ½″
with thermally releasing cut-off device

2012 076

Gas valve, corner version DN 20, R ¾″
with thermally releasing cut-off device

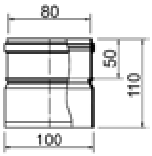
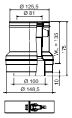
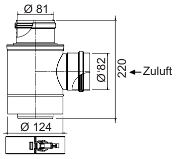
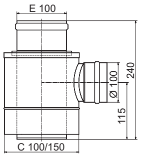
2012 078

Sludge separator DM with magnet
made of technopolymer (PO) or
brass with insulation (MS)

Type	Connection inches	Flow rate at 1.2 m/s flow speed m^3/h	k_v value m^3/h	Part No.
DM PO	Rp 1¼″	2.1	10.5	2085 523
DM MS	Rp 1½″	5.4	63.2	2085 527
DM MS	Rp 2″	8.2	70.0	2085 528

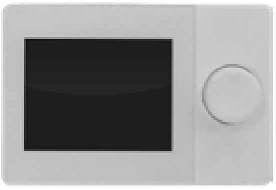
Additional sludge separators
see «Various system components»

Heating armature group, wall distributor and safety group
see “Various system components”

		Part No.
	**Insulation for sludge separator DM PO 1¼″**	2086 031
	**Reducing part E100 -> E80 PP**	2015 245
	**Concentric reducing part C100/150 -> C80/125 PP** Painted white	2025 334
	**Separating piece C80/125 -> 2 x E80 PP** for room air independent operation for separate conduction of flue gas and combustion air.	2010 174
	**Separating piece C100/150 -> 2 x E100 PP** for UltraOil® (35,50), TopGas® classic (35-80), UltraGas® (50-100) for separate conduction of flue gas and combustion air (LAS system) Recommendation: If the air inlet at the facade is near a noise sensitive place (window of bedroom, terrace etc.), we recommend to use a sound absorber at the direct combustion air inlet.	2015 244

Boiler controller with heating controller set

Part No.



Room control unit QAA74
Digital multifunctional room unit with
display and rotary pushbutton for LMS14

2085 440

Basic display:
- Status bar with operating states
- Flow and return temperature
- Outdoor temperature
- Domestic water temperature
- System information

Setting possibilities:
Heating:
- Operating mode
- Comfort setpoint temperature
- Time program

Domestic water:
- Operating mode
- Nominal setpoint
- Time program

Room station QAA55
Room temperature display
Remote control of the heating for automatic
function device LMS14

2085 450

Setting possibilities:
- Operating mode
- Room set value
- Temporary change of time program (party key)

With activated room influence:
- Variable influence of the room temperature on the heating curve
- Switch-on and off time optimisation
- Room-controlled rapid heat-up
- Automatic heating curve adaptation
- Room thermostat function

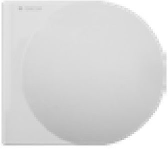
Cascade module OCI345
Module for the data connection of the
individual boilers for cascades and for
the bus connection to the room station

2085 452

Notice
TopGas® max C:
The cascade module is already included in the scope of delivery.
TopGas® max M:
The cascade module must also be ordered for cascade integration.

Modbus module OCI351
Module for controlling the TopGas® max M by
the TopTronic® E via a temperature setting.
For installation in the TopGas® max M

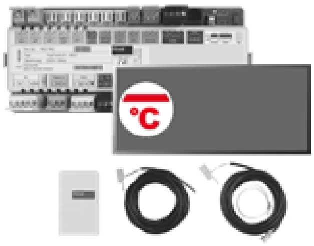
2085 886

		Part No.
	**Cascade sensor** Contact sensor NTC 10k for mounting on pipes (diameter 15 to 50 mm) for LMS14	2085 453
	**Outdoor sensor** Outdoor sensor with NTC 1k for recording the outdoor temperature for LMS14	2085 454
	**Immersion sensor TF/NTC 10k/2/5** for calorifier for LMS14 Temperature sensor NTC 10k Cable length: 2 m Immersion sleeve: 5 x 40 mm Operating temperature: 0 … 95 °C	2085 455
	**Immersion sensor TF/NTC 10k/1.5/5** Solar sensor for TopGas® max M with the automatic function device LMS14 Temperature sensor NTC 10k Cable length: 1.5 m Immersion sleeve: 5 x 40 mm Operating temperature: −30 … 200 °C	2085 456

Part No.

Heating controller set TopTronic® E ZE1

Notice
The TopTronic® E can communicate with the TopGas® max M via a Modbus connection or a 0-10 V connection.



TopTronic® E basic module heat generator TTE-WEZ
Controller module for control of heat generators and the corresponding consumers with integrated control functions for:

- Heat generator management
- Additional heat generator management
- Cascade management
- 1 heating/cooling circuit without mixer
- 1 heating/cooling circuit with mixer
- 1 hot water charging circuit
- var. additional functions

6037 053

Consisting of:

- Fitting accessories
- 1 outdoor sensor AF/2P/K
- 1 immersion sensor TF/2P/5/6T/S1
L = 5.0 with plug,
- 1 contact sensor ALF/2P/4/T/S1
L = 4.0 m with plug,
- Basic plug set for basic module

Notice
If the basic module is used without Hoval heat generator then a TopTronic® E control module must be ordered separately!

For RS-OT and TopTronic® E ZE1

Flow temperature monitor
for panel heating (1 controller per heating circuit) 15 ... 95 °C, setting (visible externally) under the casing cover

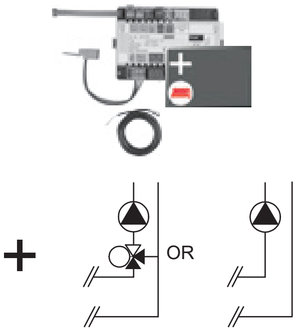
Clamp-on flow temperature monitor RAK-TW1000S
with retaining strap, without cable and plug

242 902

Part No.

TopTronic® E module expansions

for TopTronic® E basic module heat generator

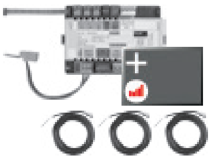


TopTronic® E module expansion heating circuit TTE-FE HK
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer

Consisting of:
- Fitting accessories
- 1 contact sensor ALF/2P/4/T, L = 4.0 m
- Basic plug set FE module

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

6034 576

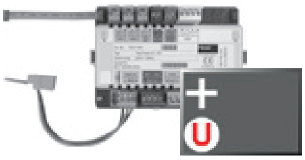


TopTronic® E module expansion heating circuit incl. energy balancing
TTE-FE HK-EBZ
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer incl. energy balancing in each case

Consisting of:
- Fitting accessories
- 3 contact sensors ALF/2P/4/T, L = 4.0 m
- Plug set FE module

Notice
The flow rate sensor set must be ordered as well.

6037 062



TopTronic® E module expansion Universal TTE-FE UNI
Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions
Consisting of:
- Fitting accessories
- Plug set FE module

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

6034 575

Further information
see “Controls” – “Hoval TopTronic® E module expansions” chapter

Flow rate sensor sets

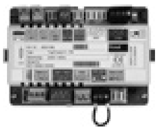
Plastic casing

Size	Connection inches	Flow rate l/min	Part No.
DN 8	G ¾″	0.9-15	6038 526
DN 10	G ¾″	1.8-32	6038 507
DN 15	G 1″	3.5-50	6038 508
DN 20	G 1¼″	5-85	6038 509
DN 25	G 1½″	9-150	6038 510

Brass casing

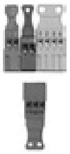
Size	Connection inches	Flow rate l/min	Part No.
DN 10	G 1″	2-40	6042 949
DN 32	G 1½″	14-240	6042 950

Accessories for TopTronic® E



TopTronic® E controller modules

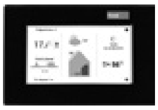
		Part No.
TTE-HK/WW	TopTronic® E heating circuit/ hot water module	6034 571
TTE-SOL	TopTronic® E solar module	6037 058
TTE-PS	TopTronic® E buffer module	6037 057
TTE-MWA	TopTronic® E measuring module	6034 574



Supplementary plug set

for basic module heat generator TTE-WEZ	6034 499
for controller modules and module expansion TTE-FE HK	6034 503

Notice
The supplementary plug set for the basic module heat generator (TTE-WEZ) is required for activation via the basic module heat generator TTE-WEZ with 0-10 V.



TopTronic® E room control modules

TTE-RBM	TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070

HovalConnect

HovalConnect LAN	6049 496
HovalConnect WLAN	6049 498
HovalConnect Modbus	6049 501
HovalConnect KNX	6049 593

TopTronic® E interface modules

GLT module 0-10 V	6034 578

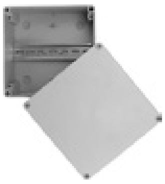
TopTronic® E sensors

AF/2P/K	Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
TF/2P/5/6T	Immersion sensor, L = 5.0 m	2055 888
ALF/2P/4/T	Contact sensor, L = 4.0 m	2056 775
TF/1.1P/2.5S/6T	Collector sensor, L = 2.5 m	2056 776

Bivalent switch

for various release or switching functions

Bivalent switch 1-piece	2056 858
Bivalent switch 2-piece	2061 826



System casing

System casing 182 mm	6038 551
System casing 254 mm	6038 552

TopTronic® E wall casing

WG-190	Wall casing small	6052 983
WG-360	Wall casing medium	6052 984
WG-360 BM	Wall casing medium with control module cut-out	6052 985
WG-510	Wall casing large	6052 986
WG-510 BM	Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Part No.

Service

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

TopGas® max (50-150)

Type			(50)	(65)	(100)	(125)	(150)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	7.8-45.9	13.0-66.4	19.4-94.1	22.5-113.9	25.8-138.3
• Nominal heat output at 50/30 °C, natural gas [1]		kW	9.1-49.9	14.9-69.9	22.3-102.0	26.3-125.3	29.8-150.4
• Nominal heat output at 80/60 °C, propane [2]		kW	7.8-45.3	13.0-66.2	19.4-94.1	22.5-113.9	25.7-138.3
• Nominal heat output at 50/30 °C, propane [2]		kW	9.1-49.9	14.9-69.9	22.3-102.0	26.3-125.3	29.8-150.4
• Nominal heat input with natural gas [3]		kW	8.2-47.1	13.5-68.1	20.1-96.7	24.2-116	26.6-140.8
• Nominal heat input with propane [2]		kW	8.5-47.1	14.7-68.1	20.4-96.7	31.2-116	27.7-140.8
• Operating pressure heating min./max. (PMS)		bar	0.8-3	0.8-4.5	0.8-6	0.8-6	0.8-6
• Operating temperature max. (T$_{max}$)		°C	90	90	90	90	90
• Boiler water content (V$_{(H2O)}$)		l	3.0	4.5	6.5	8	9.5
• Flow resistance boiler		z value	see diagram				
• Minimum circulation water quantity		l/h	2000	2800	4100	5200	5900
• Boiler weight (without water content, incl. cladding)		kg	42	53	66	74	89
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	97.6/87.9	97.6/87.9	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load (EN 15502) (NCV/GCV) [4]		%	107.9/97.2	108.2/97.5	108.1/97.4	107.8/97.1	107.9/97.2
• Room heating energy efficiency (A+++ → D)	class		A	A			
- without control	η_s	%	92	92	92	92	92
- with control	η_s	%	94	94	94	94	94
- with control and room sensor	η_s	%	96	96	96	96	96
- annual energy consumption	Q_{HE}	GJ	83	124	177	213	257
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	37.8	28.1	26.4	42.9	34.1
• O$_2$ content in flue gas at min./max. nominal heat output		%	5.6/4.8	5.6/4.8	5.6/4.6	5.3/4.2	5.3/4.2
• Heat loss in standby mode		Watt	350	356	362	368	374
• Dimensions			see table of dimensions				
• Gas flow pressure min./max.							
- Natural gas E/LL		mbar	18-50	18-50	18-50	18-50	18-50
- Propane		mbar	37-50	37-50	37-50	37-50	37-50
• Gas connection values at 15 °C/1013 mbar:							
- Natural gas E – (Wo = 15.0 kWh/m^3) NCV = 9.7 kWh/m^3		m^3/h	0.8-4.9	1.4-7.0	2.1-10.0	2.5-12.0	2.7-14.5
- Natural gas LL (G25) – (Wo = 12.4 kWh/m^3) NCV = 8.13 kWh/m^3		m^3/h	1.0-5.8	1.7-8.4	2.5-11.9	3.0-14.3	3.3-17.3
- Propane (G31) – NCV = 24.4 kWh/m^3 [2]		m^3/h	0.3-1.9	0.6-2.8	0.8-4.0	1.3-4.8	1.1-5.8
• Operating voltage		V/Hz	230/50	230/50	230/50	230/50	230/50
• Min./max. electrical power consumption (incl. pump)		Watt	16/75	22/115	33/139	35/226	27/297
• Stand-by		Watt	4	4	4	3	4
• Type of protection		IP	X4D	X4D	X4D	X4D	X4D
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40	5-40
• Sound power level							
- Heating noise (EN 15036 Part 1) (room air dependent)		dB(A)	53	53	53	51	51
• Condensate quantity (natural gas) at 50/30 °C		l/h	4.5	6.6	9.3	11.2	13.6
• pH value of the condensate			4-6	4-6	4-6	4-6	4-6
• Construction type			B23P, C13(x), C33(x), C43(x), C53(x), C63(x), C83(x), C93(x)				
• Flue gas system							
- Temperature class			T120	T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input	dry	kg/h	73	101	150	182	208
- Flue gas mass flow at min. nominal heat input	dry	kg/h	12	20	30	35	40
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	82.2	75.8	76.3	76.7	73.0
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	69.9	60.9	60.4	59.9	59.7
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	41.0	35.5	34.6	32.5	30.6
- Max. permissible temperature of the combustion air		°C	105	105	105	105	105
- Flow rate combustion air		Nm^3/h	60	83	117	141	171
- Maximum supply pressure for combustion air supply and flue gas line		Pa	50	100	100	150	200
- Maximum draught/depression at flue gas outlet		Pa	−50	−50	−50	−50	−50

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

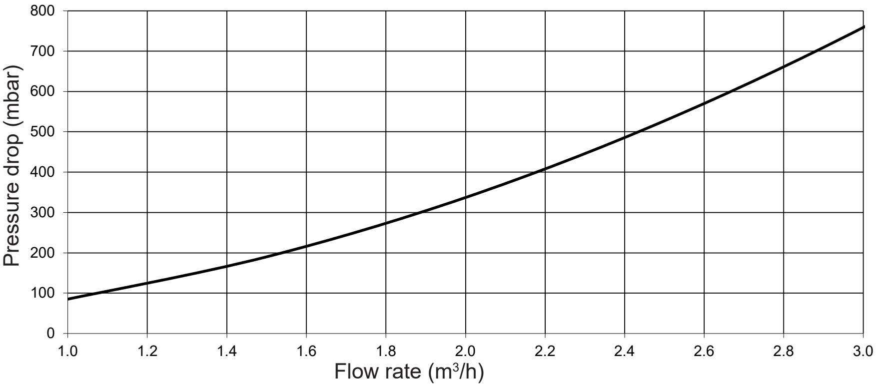
[2] Data related to NCV. The TopGas® max is also suitable for propane/butane (liquid gas) mixtures.

[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/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without resetting.

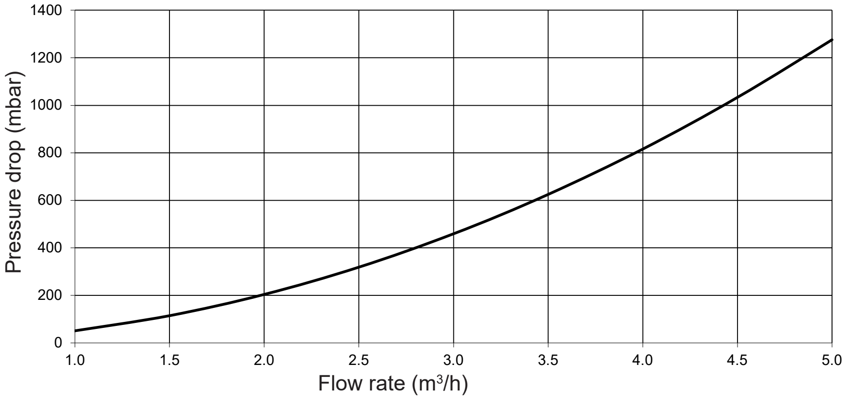
[4] Conversion acc. to EN 15502-1, Appendix J

Flow resistance on the heating water side

TopGas® max (50)

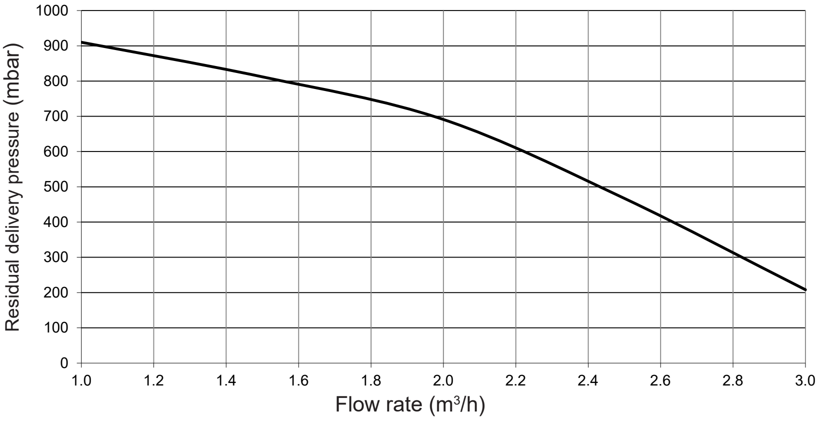


TopGas® max (65)



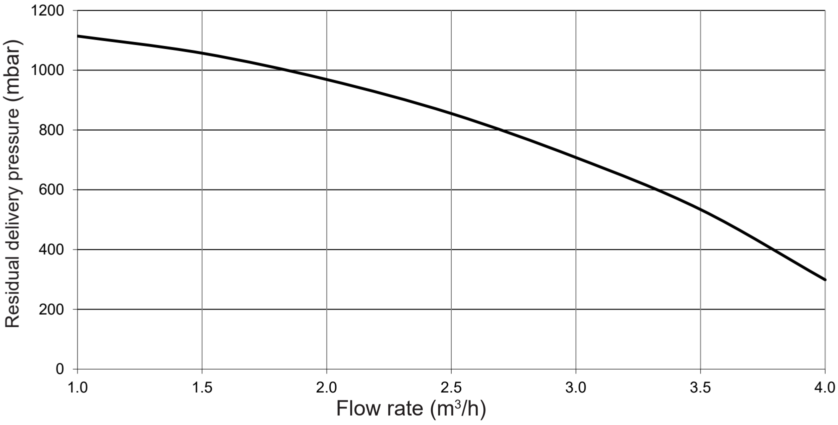
Maximum residual delivery pressure of heating pump with connection set AS32-TG max SPS-I 10

TopGas® max (50)



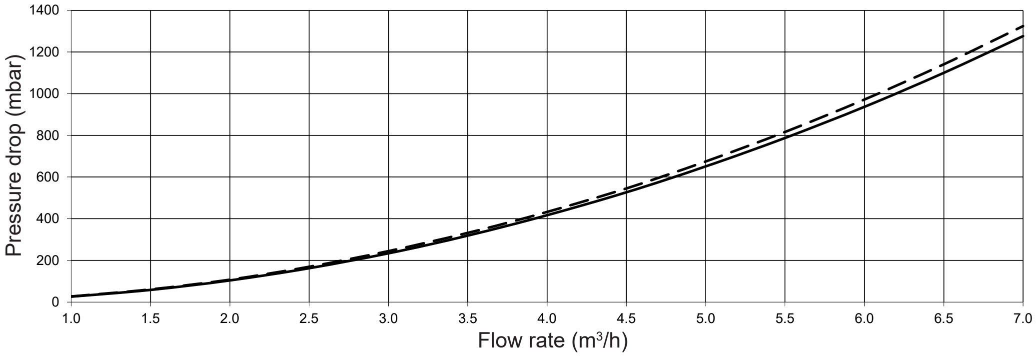
Maximum residual delivery pressure of heating pump with connection set AS32-TG max SPS-I 12

TopGas® max (65)

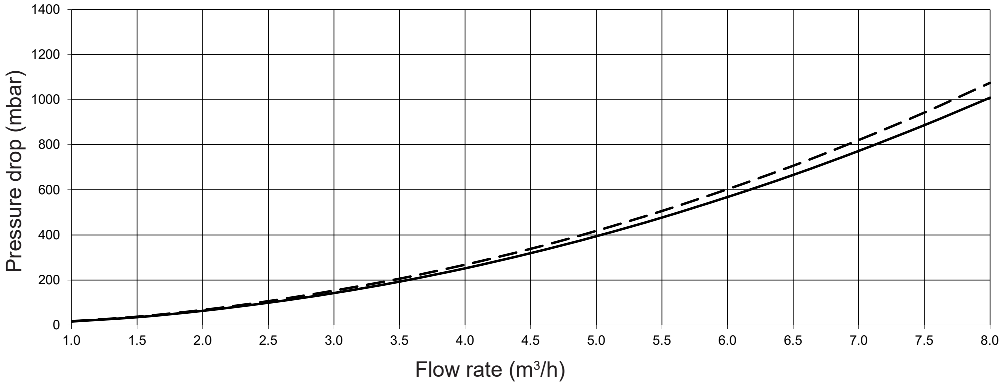


Flow resistance on the heating water side

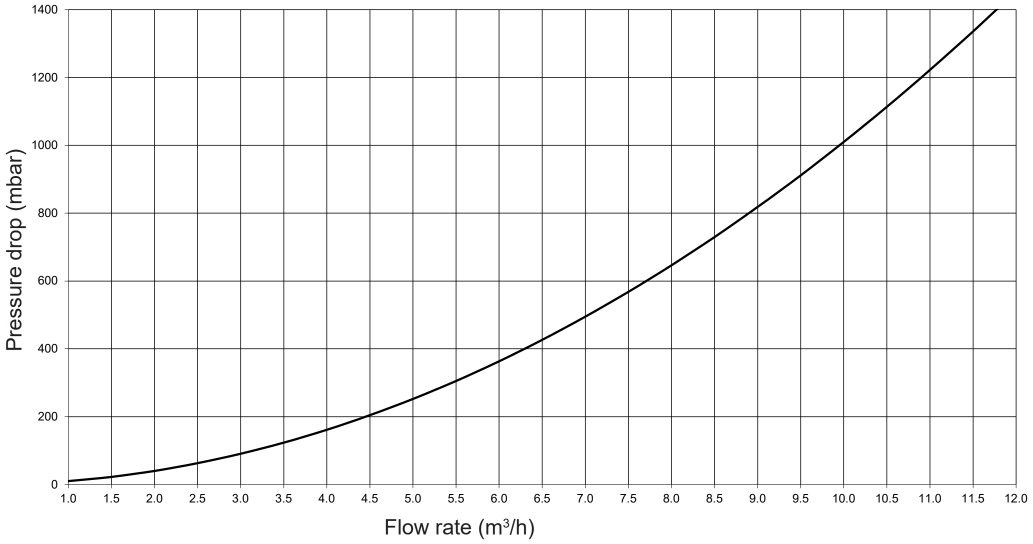
TopGas® max (100)



TopGas® max (125)

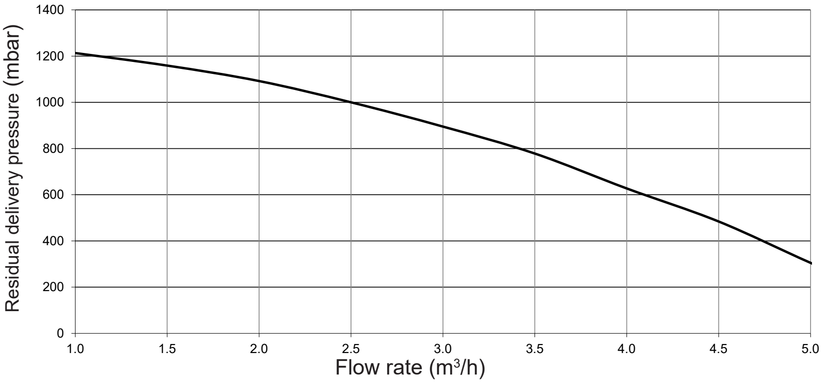


TopGas® max (150)

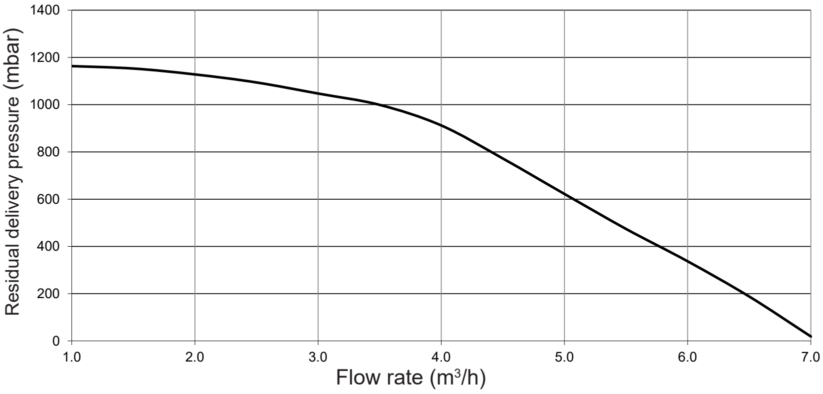


Maximum residual delivery pressure of heating pump with connection set AS40-TG max SPS-I 12

TopGas® max (100)

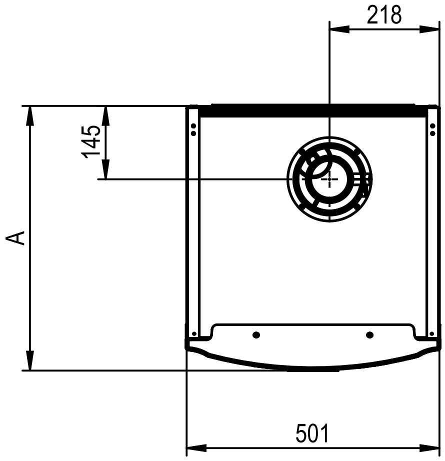


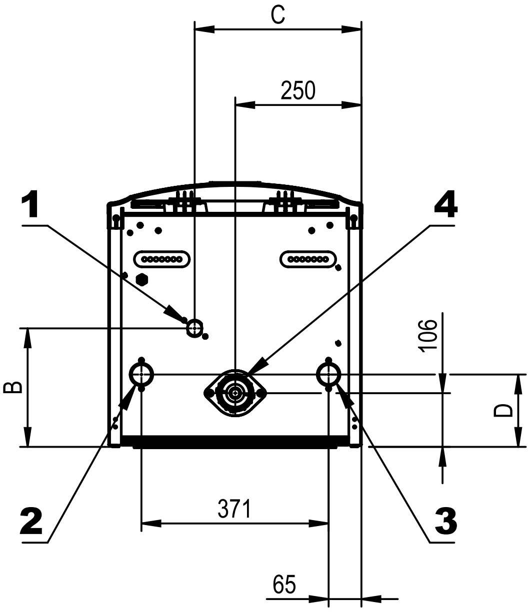
TopGas® max (125)

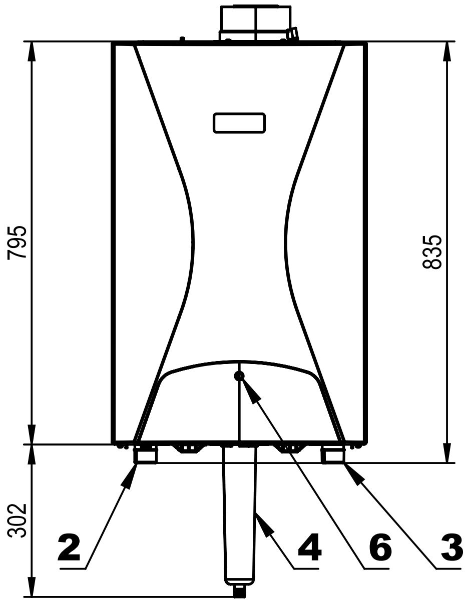


TopGas® max (50,65)

(Dimensions in mm)





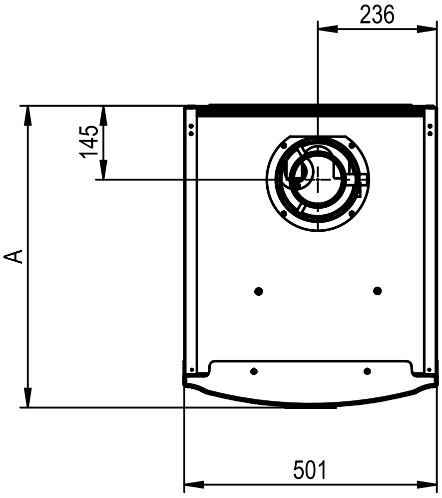


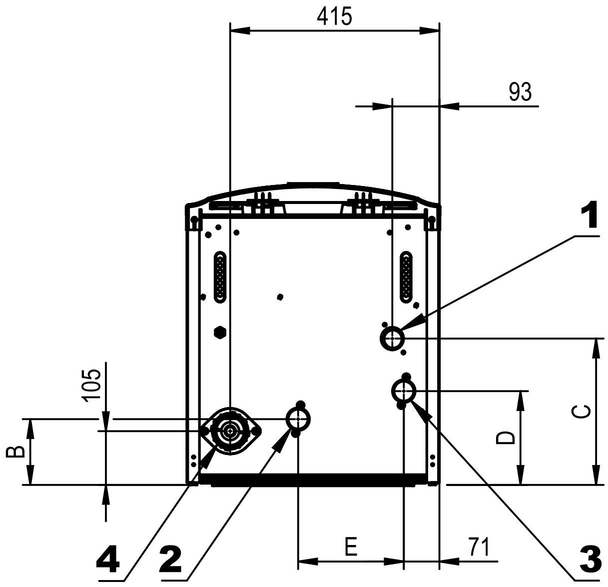
TopGas® max type	A	B	C	D
(50)	525	235	330	143
(65)	590	260	445	105

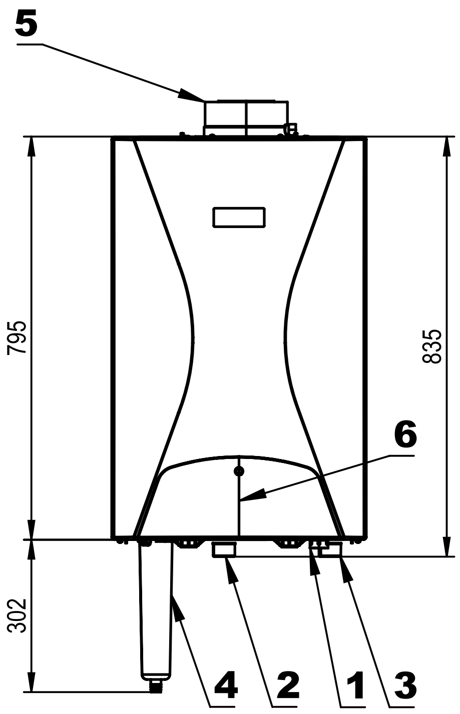
1 Gas connection ¾″
2 Flow heating 1¼″
3 Return heating 1¼″
4 Condensate drain
5 Flue gas/combustion air connection 80/125 mm
6 Cover control panel

TopGas® max (100-150)

(Dimensions in mm)





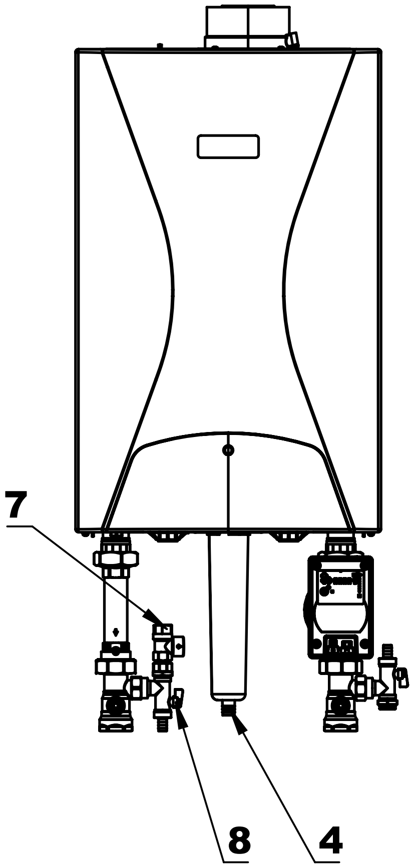


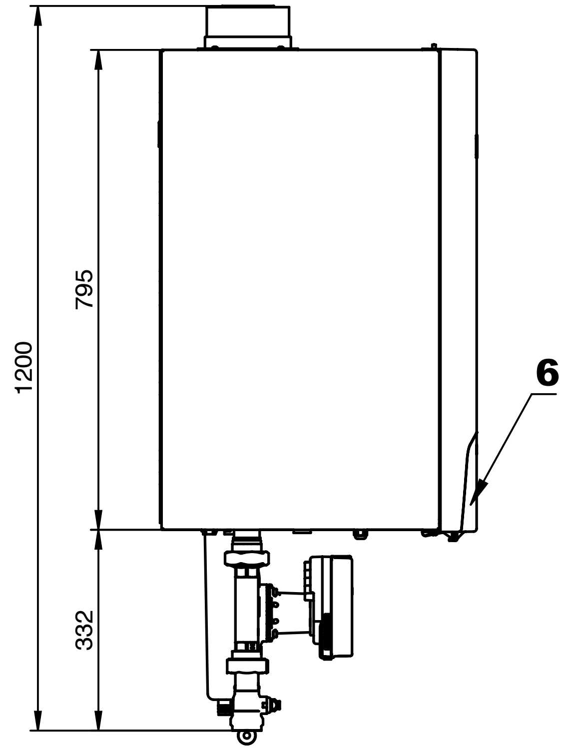
TopGas® max type	A	B	C	D	E
(100)	590	130	290	185	209
(125)	660	130	365	185	209
(150)	730	210	437	210	199

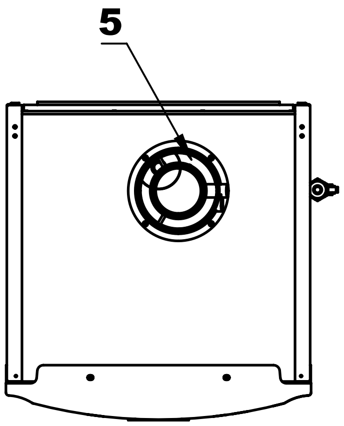
1	Gas connection	1″
2	Flow heating	1¼″
3	Return heating	1¼″
4	Condensate drain	
5	Flue gas/combustion air connection	100/150 mm
6	Cover control panel	

TopGas® max (50,65) with connection set DN 32

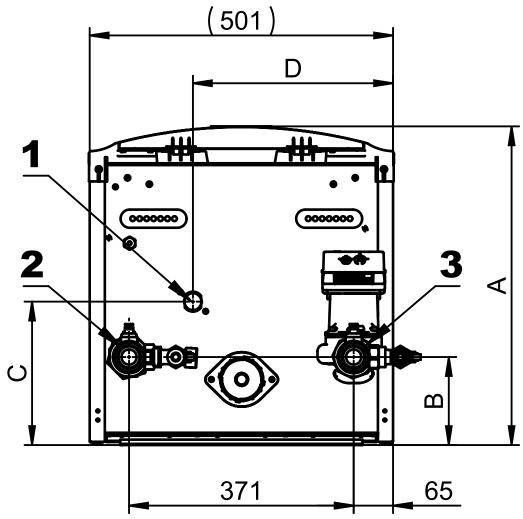
(Dimensions in mm)







View from below

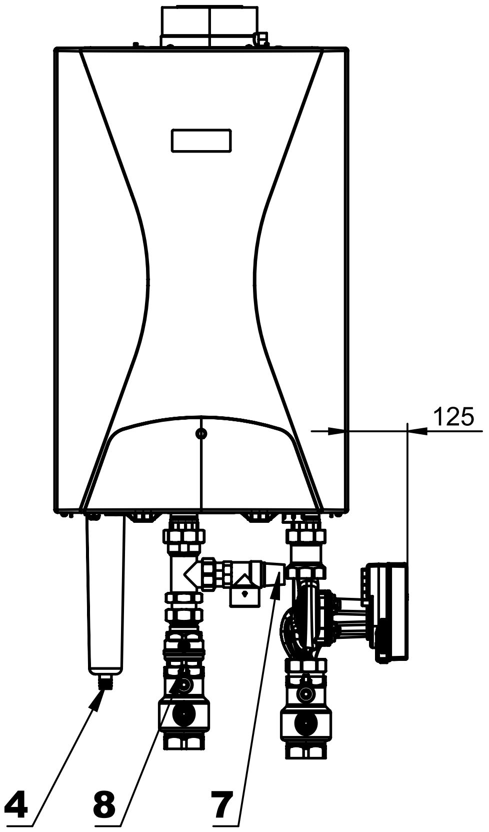


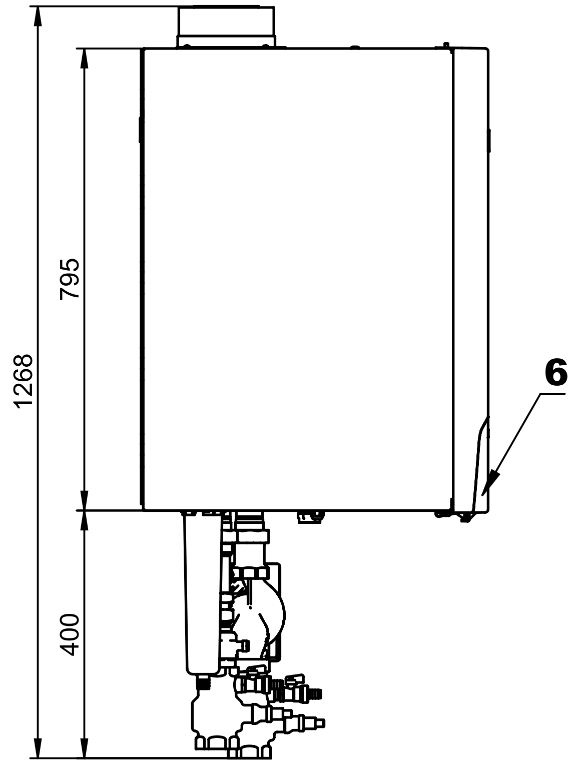
TopGas® max type	A	B	C	D
(50) with AS32-TG max SPS-I 10	525	143	235	330
(65) with AS32-TG max SPS-I 12	590	105	260	445

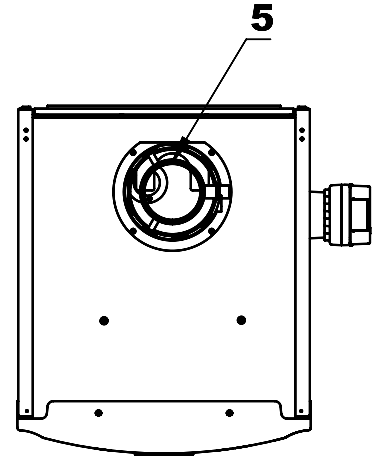
1	Gas connection	¾″
2	Flow heating	1¼″
3	Return heating	1¼″
4	Condensate drain	40
5	LAS flue gas/combustion air connection	80/125 mm
6	Cover control panel	
7	Safety valve	
8	KFE ball valve	

TopGas® max (100,125) with connection set DN 40

(Dimensions in mm)







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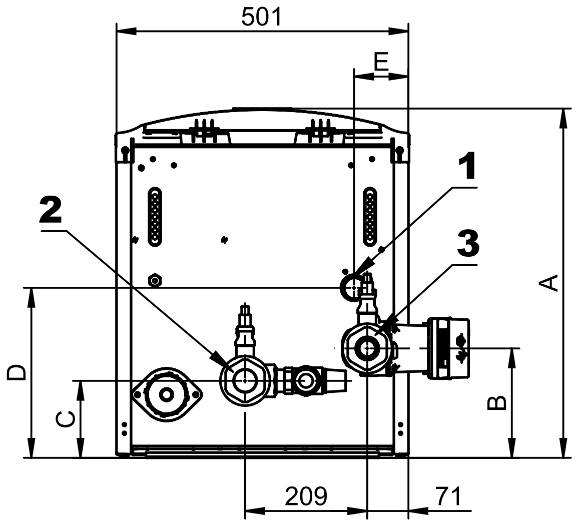

TopGas® max type	A	B	C	D	E
(100) with AS40-TG max SPS-I 12	590	185	130	290	93
(125) with AS40-TG max SPS-I 12	660	185	130	365	93

1	Gas connection	1″
2	Flow heating	1¼″ (AS 1½″)
3	Return heating	1¼″ (AS 1½″)
4	Condensate drain	40
5	LAS flue gas/combustion air connection	100/150 mm
6	Cover control panel	
7	Safety valve	
8	KFE ball valve	

Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, etc.) as well as the corresponding regional regulations.

The following standards and guidelines must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DVGW directives
- DIN EN 12828 Safety-relevant requirements
- DIN EN 12831 Heaters Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 “Protection of metallic materials against corrosion”
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- 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 must be fully demineralised.

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.
- pH value of the heating water for systems with aluminium alloy as water-side material 8.0 to 8.5 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- The following systems must be equipped with **separate circuits**:
  - Systems operated with softened water.
  - Plants with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up).
- In the case of bivalent heating systems, the values of the heat generator with the strictest requirement for water quality must be complied with.
- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent

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

Heating room

Boilers cannot be positioned in rooms in which halogen compounds can occur and into which combustion air can enter (e.g. wash-, dryer-, work room, hairdressers and so on).
Halogen compounds can be caused by cleaning and degreasing solutions, dissolvents, glue and bleaching lyes.

Combustion air supply

The supply of combustion air must be guaranteed. There must be no possibility to close the air supply opening. For direct combustion air supply (LAS system), use the separator C80/125 -> E80 PP or C100/150 -> E100 PP.

The minimum free cross-section for the combustion air can be assumed simplified as follows:

- *Room air-independent operation with separate combustion air pipe to the boiler:*
  0.8 cm^2 per 1 kW of output. The pressure drop in the combustion air pipe must be considered for the calculation of the flue gas system.

- *Room air-dependent operation:*
  Minimum free cross-section of the opening into the open: 150 cm² or twice 75 cm² and additionally 2 cm² necessary for each kW of output over 50 kW for vent in to the open.

Gas connection

Commissioning

- Initial commissioning is only allowed to be carried out by a qualified installer.
- Burner setting values according to the installation instructions.

Manual gas shut-off valve and gas filter

Immediately in front of the boiler a manual gas shut-off device (valve) must be installed according to relevant regulations. Should the local regulations or conditions demand this, an approved gas filter must be installed in the gas supply pipe between the gas tap and the boiler in order to prevent malfunction due to foreign particles being carried along with the gas.

Type of gas

- The boiler is only to be operated with the type of gas stated on the rating plate.

Gas pressure natural gas:

- Necessary gas flow pressure at the boiler inlet:
  natural gas min. 18 mbar, max. 50 mbar

Propane gas pressure:

- For propane, a gas pressure regulator must be provided on site for reducing the pilot pressure on the boiler
- Required gas flow pressure at the boiler entry: propane min. 37 mbar, max. 50 mbar

Gas pressure regulator

- The installation of a gas pressure regulator is only necessary if the gas flow pressure in the gas network exceeds the maximum permissible gas flow pressure of the TopGas® max or if there are considerable fluctuations in 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.

Sludge separator

The installation of a sludge separator with magnetic ring is mandatory in the gas boiler return.

Minimum heating water circulation quantity

- Depending on the boiler type, different minimum circulating water quantities are required through the boiler. For details, see the corresponding data sheets.
- During burner operation, the circulating pump must be constantly in operation and the minimum heating water circulation quantity must be guaranteed.
- After each burner switch-off, the circulating pump must be in operation for at least 2 minutes (is guaranteed by the boiler controller).

Heating boiler in the attic

A water pressure guard is built in in the boiler, which automatically turns the gas burner off in case of water shortage. Notice: Mount the diaphragm pressure expansion tank in the heating flow and the pump in the heating return. See also paragraph “diaphragm pressure expansion tank”!

Condensate drainage

- A permit for discharge of the flue gas condensate into the sewage system must be obtained from the relevant authority or sewer operator.
- The condensate from the flue gas line can be discharged via the boiler. A condensate trap is no longer needed in the flue gas system.
- The condensate must be conducted openly (funnel) into the sewage system.
- Suitable materials for condensate drain:
  - stoneware pipes
  - pipes made from glass
  - pipes made from stainless steel
  - pipes made from plastic: PVC, PE, PP, ABS and UP

Diaphragm pressure expansion tank

- An adequately dimensioned diaphragm pressure expansion tank must be provided.
- The minimum inlet pressure in the diaphragm pressure expansion tank must be 1.2 bar and the minimum operating pressure in the boiler must be 1.5 bar.
- The pump must be connected in the heating return and the diaphragm pressure expansion tank must be connected on the pump suction side.
- If the aforementioned minimum operating pressure in the boiler of 1.5 bar cannot be maintained (e.g. roof heating centres), the diaphragm pressure expansion tank must be installed in the heating flow.
- Starting from 70 °C an additional intermediate tank is necessary.

Flue gas system

- The flue gas must be routed through a tested and approved flue gas line.
- Flue gas lines must be gas-, condensate- and over pressure-tight.
- The flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas system must be connected with an angle, so that the resulting condensate of the flue gas system can flow back to the boiler and can be neutralised there before discharging into the canalisation.
- Gas boilers with condensation heat utilisation are to be connected to a flue gas line min. temperature class T120.
- A flue gas temperature limiter is integrated into the boiler.

Allocation of gas filters for TopGas® max (50-150)

TopGas® max type	**Gas throughput natural gas E** m³/h	**Gas filter type**	**Dimension**	**Pressure drop gas filter** (with clean filter) mbar
(50)	4.9	70612/6B	Rp ¾″	0.15
(65)	7.0	70612/6B	Rp ¾″	0.30
(100)	10.0	70602/6B	Rp 1″	0.15
(125)	12.0	70602/6B	Rp 1″	0.23
(150)	14.5	70602/6B	Rp 1″	0.30

It is essential to set the dimensions of the gas line!

Table “Standard values for flue gas line dimensions”

Boiler		**Smooth-walled flue gas line**	**Number of bends 90° (flue gas + combustion air)**			
TopGas® max	Internal Ø flue gas outlet	Designation	Total pipe length in m (flue gas + combustion air)			
type	mm	DN	1	2	3	4
(50)	80	100	30	30	30	13
(65)	80	100	30	30	30	17
(100)	100	130	30	30	30	30
(125)	100	130	30	30	30	30
(150)	100	130	30	30	30	30

Notice: A T-piece on the boiler connection fitting has already been taken into account for the flue gas line dimensioning. 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.