

Hoval Max-3 plus
Oil/gas boiler

Boiler

- High-efficiency 3-pass boiler according to EN 14394 for firing of heating oil EL and gas.
- Max-3 plus (420-2700) complies with the Pressure Equipment Directive 2014/68/CE
- Boiler completely welded
- For LowNOx burner with intern flue gas recirculation
- Insulation at the boiler body 80 mm mineral wool mat
- Boiler completely cased with steel plate, red powder coated
- Flue gas outlet to the rear
- Heating flow connection to the top, heating return connections to the rear, incl. counter flanges, screws and seals

Optional

- Boiler control panel with boiler control and heating control in various versions
 - Boiler control
 - with TopTronic® E control
 - with thermostat T 2.2
 - with thermostat T 0.2
- Free-standing calorifier see Calorifiers
- Boiler door swivels to the left
- Delivery in single parts and welding on site (Max-3 plus (420-1250)), time to delivery approx. 8 weeks

Delivery

- Boiler, thermal insulation and casing delivered separately packed

On site

- Mounting of insulation and casing



Model range	
Max-3 plus Type	Output kW
(420)	147-420
(530)	185-530
(620)	217-620
(750)	263-750
(1000)	350-1000
(1250)	437-1250
(1500)	525-1500
(1800)	630-1800
(2200)	770-2200
(2700)	945-2700

Permission Boiler
Directive on appliances burning
gaseous fuels 90/396/EG
Max-3 plus (420-2700):
CE product ID No. CE-0085BL0015
Pressure Equipment Directive 2014/68/CE

Boiler controller with TopTronic® E/E13.4 control

- Maximum operating temperature 90 °C

TopTronic® E controller

Control panel

- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module

- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module heat generator (TTE-WEZ)

- Control functions integrated for
 - 1 heating/cooling circuit with mixer
 - 1 heating/cooling circuit without mixer
 - 1 hot water loading circuit
 - bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Rast-5 basic plug set

The supplementary plug set must be ordered in order to use expanded controller functions.

Options for TopTronic® E controller

- Can be expanded by max. 1 module expansion:
 - module expansion heating circuit or
 - module expansion heat accounting or
 - module expansion universal
- Can be networked with a total of up to 16 controller modules:
 - heating circuit/hot water module
 - solar module
 - buffer module
 - measuring module

Number of modules that can be additionally installed in the electrical box:

- 1 module expansion and 2 controller modules
or
- 1 controller module and 2 module expansions
or
- 3 controller modules

Notice

Max. 1 module expansion can be connected to the basic module heat generator (TTE-WEZ)!

Further information about the TopTronic® E see "Controls"

Oil automatic function device OFA

- Control function integrated for
 - flue gas sensor for safety shut-off
 - 0-10 V output for connecting a modulating main pump (incl. delta T-control with low consumption)
 - Standard plug connection for 2-stage burner 1x 230 V
 - Variable input for plant-specific functions (heat generator block, return sensor, info sensor etc.)
 - Variable output for plant-specific functions (thermostat function, operating message, etc.)

Delivery

- Boiler control panel separately delivered

On site

- Mounting of the control panel at the boiler left or right side

Boiler controller with TopTronic® E/E13.5 control

- Maximum operating temperature 105 °C

- Configuration as TopTronic® E/E13.4 but:
- safety temperature limiter 120 °C

Delivery

- Boiler controller separately delivered

On site

- Mounting of the control panel at the boiler left or right side

Control panel with thermostat T 2.2

- For systems without TopTronic® controller.
- For direct 2-stage burner control, requirement starting from external calorifier or heater instruction is possible.
- Main switch "I/O"
- Safety temperature limiter 110 °C
- Selector switch burner load
- Switch summer/winter
- 3 boiler temperature regulators 30-90 °C
 - temperature regulator for base load heating
 - temperature regulator for full load heating
 - temperature regulator for calorifier
- Boiler and burner breakdown lamp
- Plug connection for burner (with cable and plug)

Optional

- 2 running time meters integrated
- 2 burner running time meters and pulse counters integrated
- Flue gas thermometer, 4.5 m capillary tube

Delivery

- Control panel separately delivered

On site

- Mounting of the control panel at the boiler left or right side

Control panel with thermostat T 0.2

- For external control
- For systems without TopTronic® controller
- For special control function
- Main switch "I/O"
- Safety temperature limiter 120 °C,
- 3 boiler temperature regulators 50-105 °C
 - temperature regulator for base load heating
 - temperature regulator for full load heating
 - temperature regulator for calorifier
- without burner plug connection

Optional

- 2 running time meters integrated
- 2 burner running time meters and pulse counters integrated
- Flue gas thermometer, 4.5 m capillary tube
- Safety temperature limiter 130 °C

Delivery

- Control panel separately delivered

On site

- Mounting of the control panel at the boiler left or right side

Oil/gas boiler



Hoval Max-3 plus (420-2700)

High-efficiency 3-pass boiler made of steel for oil/gas LowNOx firing, without control panel
For operating temperature up to 105 °C

Execution: complete delivery
Boiler, thermal insulation and casing delivered separately packed.

Max-3 plus Type	Output kW	Working pressure bar
(420)	147-420	6
(530)	185-530	6
(620)	217-620	6
(750)	263-750	6
(1000)	350-1000	6
(1250)	437-1250	6
(1500)	525-1500	6
(1800)	630-1800	6
(2200)	770-2200	6
(2700)	945-2700	6

7013 783
7013 784
7013 785

7013 786
7013 787
7013 788
7013 626

7013 627
7013 628
7013 659

The minimum boiler operating temperature and the minimum boiler return temperature must imperatively be observed (see technical data).
A constant return temperature control must be provided!

The condensate trap must imperatively be mounted on the flue gas outlet of the boiler!



Blind flange made

made of steel incl. setscrews and gasket to
Max-3 plus (420,530)
Max-3 plus (620,750)
Max-3 plus (1000-2700)

6002 192
6030 026
6002 156



Intermediate flange drilled to match burner

made of steel incl. setscrews and gasket to
Max-3 plus (420,530)
Max-3 plus (620,750)
Max-3 plus (1000-2700)

6017 595
6017 593
6017 594

Control panel
with thermostat



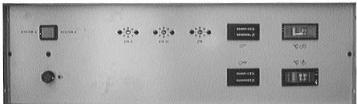
Control panel T 2.2

- Operating temperature max. 90 °C
- For systems without TopTronic® E controller.
- For direct 2-stage burner control, incl. plug connection for burner requirement starting from external calorifier or heater instruction is possible.
 - without burner running time meter and pulse counter
 - incl. 2 burner running time meters integrated
 - incl. 2 burner running time meters and pulse counters integrated
- For mounting on heat generator side right (standard) or left (configuration on request). Specify mounting variant in purchase order.

6015 017

6015 477

6015 478



Control panel T 0.2

- Operating temperature max. 105 °C
- For external switching command
- For systems without TopTronic® E controller.
- For special control function without burner plug connection
 - without burner running time meter and pulse counter
 - incl. 2 burner running time meters integrated
 - incl. 2 burner running time meters and pulse counters integrated
- For mounting on heat generator side right (standard) or left (configuration on request). Specify mounting variant in purchase order.

6015 016

6015 475

6015 476

Accessories to control panel
with thermostat

Flue gas thermometer
4 m, capillary tube

241 149

Boiler controller with TopTronic® E control



Boiler controller TopTronic® E/E13.4
for mounting on heat generator side right
(standard) or left (configuration on request).
Specify mounting variant in purchase order.
Maximum operating temperature 90 °C

Control functions integrated for

- 1 heating circuit with mixer
- 1 heating circuit without mixer
- 1 hot water loading circuit
- bivalent and cascade management
- Can be optionally expanded by max.
1 module expansion:
 - module expansion heating circuit or
 - module expansion heat accounting or
 - module expansion universal
- Can be optionally networked with a
total of up to 16 controller modules
(incl. solar module)

Consisting of:

- electrical box
- control panel
- TopTronic® E control module
- TopTronic® E basic module heat generator
- oil automatic function device OFA-200
- safety temperature limiter
- burner cable cpl. 2-stage, L = 5.0 m
- 1x outdoor sensor AF/2P/K
- immersion sensor TF/2P/5/6T/S1, L = 5.0 m
with plug
- contact sensor ALF/2P/4/T/S1, L = 4.0 m
with plug

Notice

The electrical connection for each external
burner must be clarified separately.



Boiler controller TopTronic® E/E13.5
for mounting on heat generator side right
(standard) or left (configuration on request).
Specify mounting variant in purchase order.
Maximum operating temperature 105 °C.
Configuration as boiler controller
TopTronic® E/E13.4

Notice

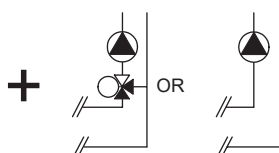
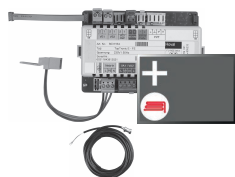
The electrical connection for each external
burner must be clarified separately.

Part No.

6040 236

6040 237

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:

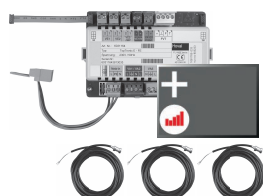
- 1 heating circuit without mixer or
- 1 heating circuit with mixer

incl. fitting accessories
1x contact sensor ALF/2P/4/T L = 4.0 m

Can be installed in:
Boiler control, wall housing, control panel

Notice

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



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:

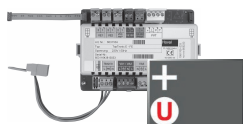
- 1 heating/cooling circuit w/o mixer or
 - 1 heating/cooling circuit with mixer
- in each case incl. energy balancing

incl. fitting accessories
3x contact sensor ALF/2P/4/T L = 4.0 m

Can be installed in:
Boiler control, wall housing, control panel

Notice

Suitable flow rate sensors (pulse sensors) must be provided on site.



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

incl. fitting accessories

Can be installed in:
Boiler control, wall housing, control panel

Further information

see "Controls" - "Hoval TopTronic® E module expansions" chapter

Notice

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

Part No.

6034 576

6037 062

6034 575

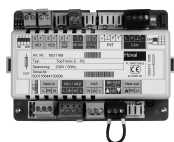
Accessories for TopTronic® E



Supplementary plug set

for basic module heat generator (TTE-WEZ)
for controller modules and module expansion
TTE-FE HK

6034 499
6034 503



TopTronic® E controller modules

TTE-HK/WW TopTronic® E heating circuit/
hot water module
TTE-SOL TopTronic® E solar module
TTE-PS TopTronic® E buffer module
TTE-MWA TopTronic® E measuring module

6034 571
6037 058
6037 057
6034 574



TopTronic® E room control modules

TTE-RBM TopTronic® E room control modules
easy white
comfort white
comfort black

6037 071
6037 069
6037 070



Enhanced language package TopTronic® E

one SD card required per control module
Consisting of the following languages:
HU, CS, SL, RO, PL, TR, ES, HR,
SR, JA, DA

6039 253



HovalConnect

HovalConnect LAN
HovalConnect WLAN

6049 496
6049 498

HovalConnect available from mid-2020

Up to that point, TopTronic® E online
is delivered.

TopTronic® E interface modules

GLT module 0-10 V
HovalConnect Modbus
HovalConnect KNX

6034 578
6049 501
6049 593



TopTronic® E wall casing

WG-190 Wall casing small
WG-360 Wall casing medium
WG-360 BM Wall casing medium with
control module cut-out
WG-510 Wall casing large
WG-510 BM Wall casing large with
control module cut-out

6035 563
6035 564
6035 565
6035 566
6038 533



TopTronic® E sensors

AF/2P/K Outdoor sensor
TF/2P/5/6T Immersion sensor, L = 5.0 m
ALF/2P/4/T Contact sensor, L = 4.0 m
TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m

2055 889
2055 888
2056 775
2056 776



System housing

System housing 182 mm
System housing 254 mm

6038 551
6038 552



Bivalent switch

2061 826

Further information
see "Controls"



Flow temperature guard
for underfloor heating system
(per heating circuit 1 guard)
15-95 °C, differential gap 6 K, capillary tube
max. 700 mm, setting (visible from the outside)
inside the housing cover.

Clamp-on thermostat RAK-TW1000.S
Thermostat with strap, without cable and plug

242 902



Immersion thermostat RAK-TW1000.S SB 150
Thermostat with pocket 1/2" - depth of immer-
sion 150 mm brass nickel-plated

6010 082



Vibration elements for boiler socket
For sound and vibration absorption.
Made of rubber. Cross section 80/50 mm.

Delivery
4 vibration elements per boiler,
mounted under the boiler socket

to Max-3 plus type	Set of pieces	Length mm
(420,530)	4	200
(620,750)	4	400
(1000,1250)	4	500
(1500,1800)	4	800
(2200,2700)	6	800

6003 739
6003 741
6003 742
6005 623
6005 624

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.

Max-3 plus (420-1250)

Type		(420)	(530)	(620)	(750)	(1000)	(1250)
• Nominal output at 80/60 °C	kW	420	530	620	750	1000	1250
• Range of output (at 80/60 °C)	kW	147-420	185-530	217-620	263-750	350-1000	437-1250
• Burner input max.	kW	441	557	651	788	1050	1313
• Boiler working temperature max. ¹	°C	90	90	90	90	90	90
• Boiler working temperature min.	°C	see table operating conditions (below)					
• Return flow temperature min.	°C	see table operating conditions (below)					
• Safety temperature limiter setting (water side) ²	°C	110	110	110	110	110	110
• Working/test pressure	bar	6/9.6	6/9.6	6/9.6	6/9.6	6/9.6	6/9.6
• Boiler efficiency at 80/60 °C in full-load operation (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	95.2/89.8	95.2/89.8	95.2/89.8	95.2/89.8	95.2/89.8	95.2/89.8
• Boiler efficiency at 30 % partial load (EN 303) (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	97.1/91.6	97.1/91.6	97.1/91.6	97.1/91.6	97.1/91.6	97.1/91.6
• Nominal efficiency at 75/60 °C (DIN 4702-8) (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	97.0/91.5	97.0/91.5	97.0/91.5	97.0/91.5	97.0/91.5	97.0/91.5
• Stand-by loss qB at 70 °C	Watt	1000	1035	1120	1180	1250	1380
• Flue gas resistance at nominal output natural gas: 10.8 % CO ₂ , 500 m over sea level (tolerance ± 20 %)	mbar	6.5	8.0	8.2	9.5	10.0	12.0
• Flue gas mass flow at nominal output natural gas: 10.8 % CO ₂	kg/h	680	859	1004	1215	1619	2025
• Flow resistance boiler ³	z-value	0.022	0.022	0.008	0.008	0.003	0.003
• Water flow resistance at 10 K	mbar	28.70	45.70	22.74	33.28	22.18	34.66
• Water flow resistance at 20 K	mbar	7.17	11.42	5.68	8.32	5.54	8.66
• Water flow volume at 10 K	m³/h	36.12	45.58	53.32	64.50	86.00	107.50
• Water flow volume at 20 K	m³/h	18.06	22.79	26.66	32.25	43.00	53.75
• Boiler water content	litres	552	520	969	938	1528	1478
• Boiler gas volume	m³	0.583	0.602	0.846	0.872	1.350	1.390
• Insulation thickness boiler body	mm	80	80	80	80	80	80
• Weight (incl. casing)	kg	1111	1171	1795	1831	2535	2643
• Weight (without casing)	kg	943	1000	1590	1620	2360	2460
• Combustion chamber dimension Ø inside x length	mm	606/1624	606/1624	684/1899	684/1899	782/2182	782/2182
• Combustion chamber volume	m³	0.466	0.466	0.669	0.669	1.047	1.047
• Dimensions	see Dimensions						
• Draught/underpressure at flue gas outlet max.	Pa	-50	-50	-50	-50	-50	-50

¹ Limited by the boiler controller E13.4 TopTronic® E and T 2.2 to 90 °C or by E13.5 TopTronic® E and T 0.2 to 105 °C.

² Max. safety temperature for boiler controller E13.4 TopTronic® E and T 2.2: 110 °C or E13.5 TopTronic® E and T 0.2: 120 °C.

³ Flow resistance boiler in mbar = Volume flow (m³/h)² x z factor

Possible operating conditions

Fuel		Heating oil EL	Natural gas H, low-sulphur heating oil EL
min. boiler temperature	°C	65	75
min. return temperature	°C	55	65
Return temperature control		yes	yes

Max-3 plus (1500-2700)

Type		(1500)	(1800)	(2200)	(2700)
• Nominal output at 80/60 °C	kW	1500	1800	2200	2700
• Range of output (at 80/60 °C)	kW	525-1500	630-1800	770-2200	945-2700
• Burner input max.	kW	1575	1890	2310	2835
• Boiler working temperature max. ¹	°C	90	90	90	90
• Boiler working temperature min.	°C	see table operating conditions (below)			
• Return flow temperature min.	°C	see table operating conditions (below)			
• Safety temperature limiter setting (water side) ²	°C	110	110	110	110
• Working/test pressure	bar	6/9.6	6/9.6	6/9.6	6/9.6
• Boiler efficiency at 80/60 °C in full-load operation (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	95.2/89.8	95.2/89.8	95.2/89.8	95.2/89.8
• Boiler efficiency at 30 % partial load (EN 303) (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	97.1/91.6	97.1/91.6	97.1/91.6	97.1/91.6
• Nominal efficiency at 75/60 °C (DIN 4702-8) (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	97.0/91.5	97.0/91.5	97.0/91.5	97.0/91.5
• Stand-by loss qB at 70 °C	Watt	1850	1950	2100	2300
• Flue gas resistance at nominal output natural gas: 10.8 % CO ₂ , 500 m over sea level (tolerance ± 20 %)	mbar	10.0	12.0	13.0	13.0
• Flue gas mass flow at nominal output natural gas: 10.8 % CO ₂	kg/h	2429	2916	3564	4374
• Flow resistance boiler ³	z-value	0.002	0.002	0.002	0.001
• Water flow resistance at 10 K	mbar	33.1	47.6	71.1	53.6
• Water flow resistance at 20 K	mbar	8.3	11.9	17.8	13.4
• Water flow volume at 10 K	m³/h	128.6	154.3	188.6	231.5
• Water flow volume at 20 K	m³/h	64.3	77.4	94.3	115.7
• Boiler water content	litres	2343	2750	3050	3550
• Boiler gas volume	m³	1.956	2.510	2.761	3.037
• Insulation thickness boiler body	mm	80	80	80	80
• Weight (incl. casing)	kg	3614	4693	5077	5649
• Weight (without casing)	kg	3266	4288	4647	5189
• Combustion chamber dimension Ø inside x length	mm	880/2415	980/2595	980/2895	980/3200
• Combustion chamber volume	m³	1.58	2.07	2.30	2.41
• Dimensions		see Dimensions			
• Draught/underpressure at flue gas outlet max.	Pa	-50	-50	-50	-50

¹ Limited by the boiler controller E13.4 TopTronic® E and T 2.2 to 90 °C or by E13.5 TopTronic® E and T 0.2 to 105 °C.

² Max. safety temperature for boiler controller E13.4 TopTronic® E and T 2.2: 110 °C or E13.5 TopTronic® E and T 0.2: 120 °C.

³ Flow resistance boiler in mbar = Volume flow (m³/h)² x z factor

Possible operating conditions

Fuel		Heating oil EL	Natural gas H, low-sulphur heating oil EL
min. boiler temperature	°C	65	75
min. return temperature	°C	55	65
Return temperature control		yes	yes

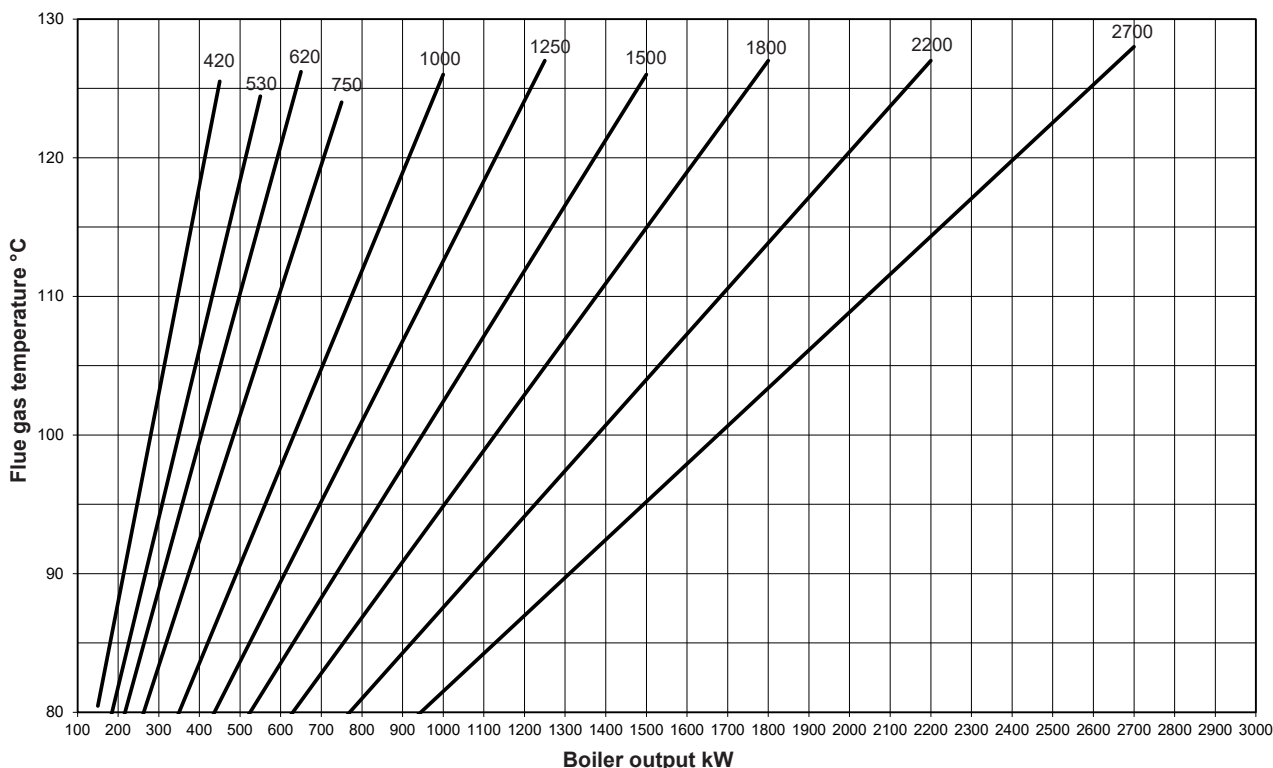
Flue gas output diagram

Flue gas temperature and power ranges

In order to achieve a good combustion quality (optimum flame burnout), the outputs must not be less than the specified minimum values.

For new systems, acid-resistant chimneys must be provided or the flue gas temperature must be set correspondingly higher (min. 160 °C).

The minimum flue gas temperature must be coordinated with the chimney conditions, otherwise the formation of sulphuric acid can lead to soot buildup in the chimney.



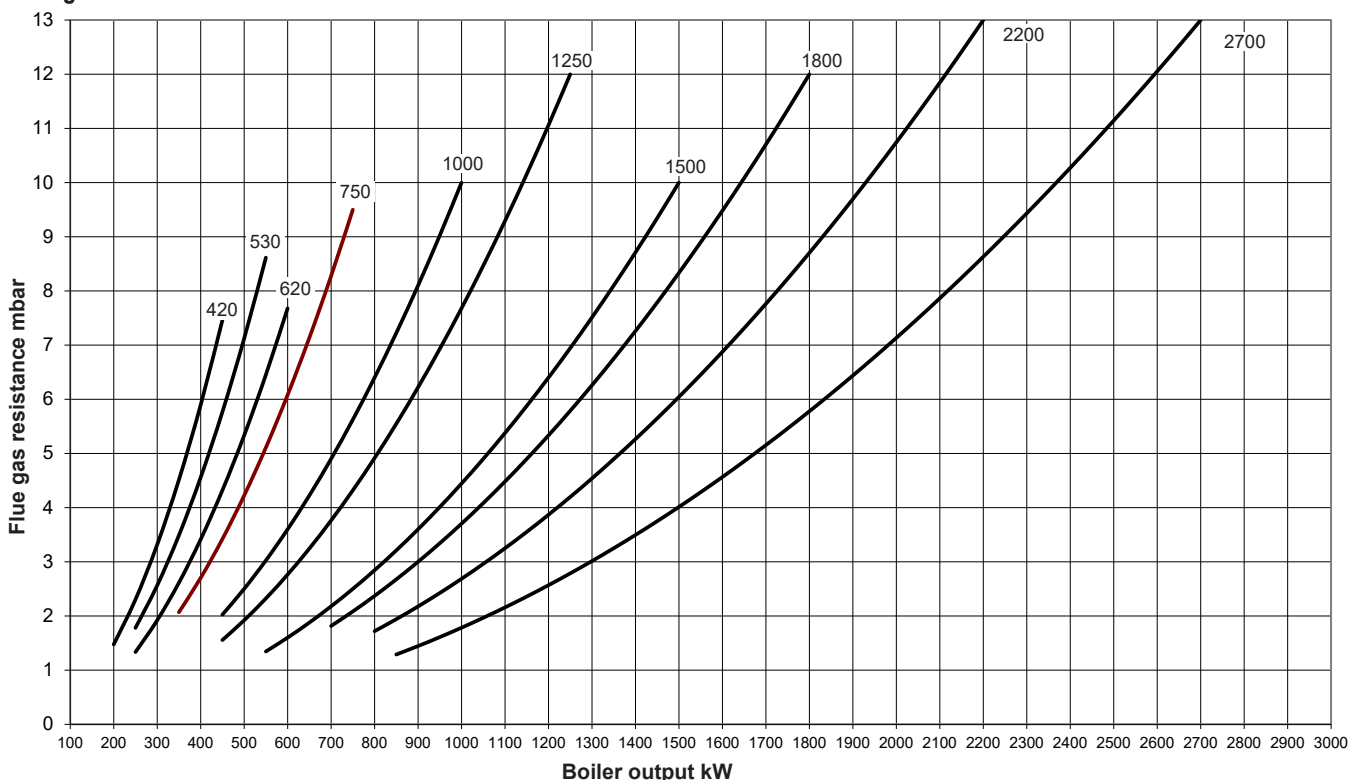
kW = Boiler output

°C = Flue gas temperature on a clean surface, boiler flow temperature 80 °C, return temperature 60 °C (in accordance with DIN 4702).

- Operation with heating oil EL, $\lambda = 1,22$ with max. burner output (CO₂ heating oil EL = 12.5 %)

- A reduction of the boiler water temperature of -10 K causes a reduction of the flue gas temperature of approx. 6-8 K.
- A modification of the CO₂ concentration of +/-1 % causes a modification of the flue gas temperature of approx. +/-8 K.

Flue gas resistor

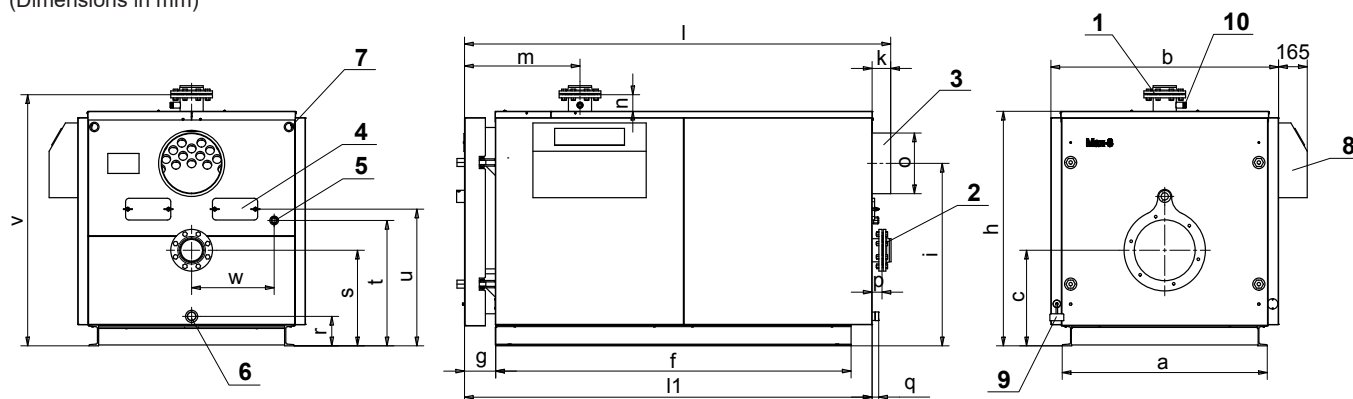


kW = Boiler output

mbar = Flue gas resistance $\lambda = 1.11$ (Natural gas: CO₂ = 10.8 %) 500 above sea level (Tolerance: +/- 20 %)

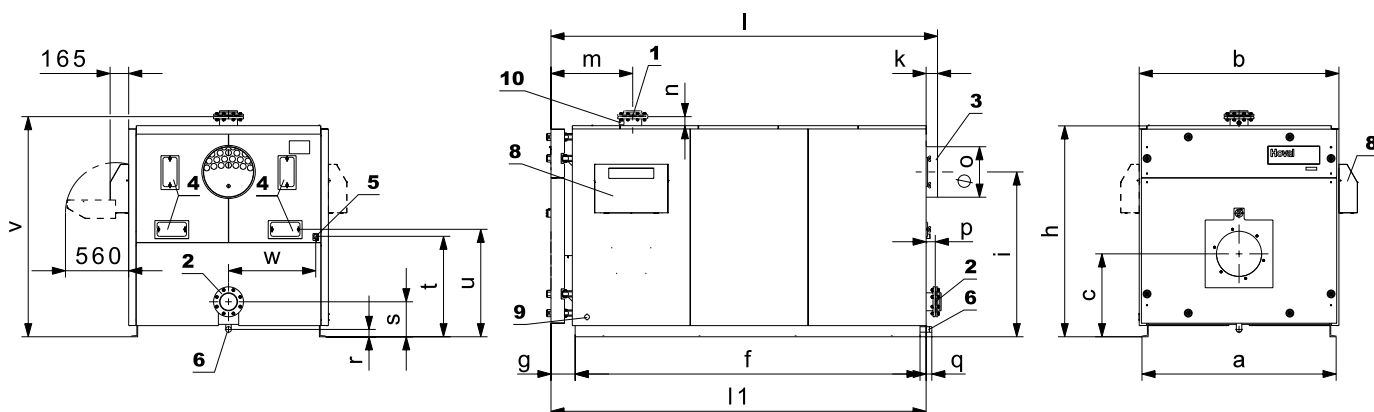
Max-3 plus (420-1250)

(Dimensions in mm)



Max-3 plus (1500-2700)

(Dimensions in mm)



1	Flow	(420,530) (620,750) (1000,1250) (1500-2200) (2700)	DN 100, PN 6 DN 125, PN 6 DN 150, PN 6 DN 150, PN 6 DN 200, PN 6	2	Return	(420,530) (620,750) (1000,1250) (1500-2200) (2700)	DN 100, PN 6 DN 125, PN 6 DN 150, PN 6 DN 150, PN 6 DN 200, PN 6	5	Flue gas collector cleaning opening R 1"
3	Flue gas outlet			6	Drain R 1½"			7	Cable routing
4	Cleaning opening			8	Control panel			9	Electrical connection
				10	Bushing Rp ¾" with immersion sleeve for boiler temperature sensor				

Max-3 plus

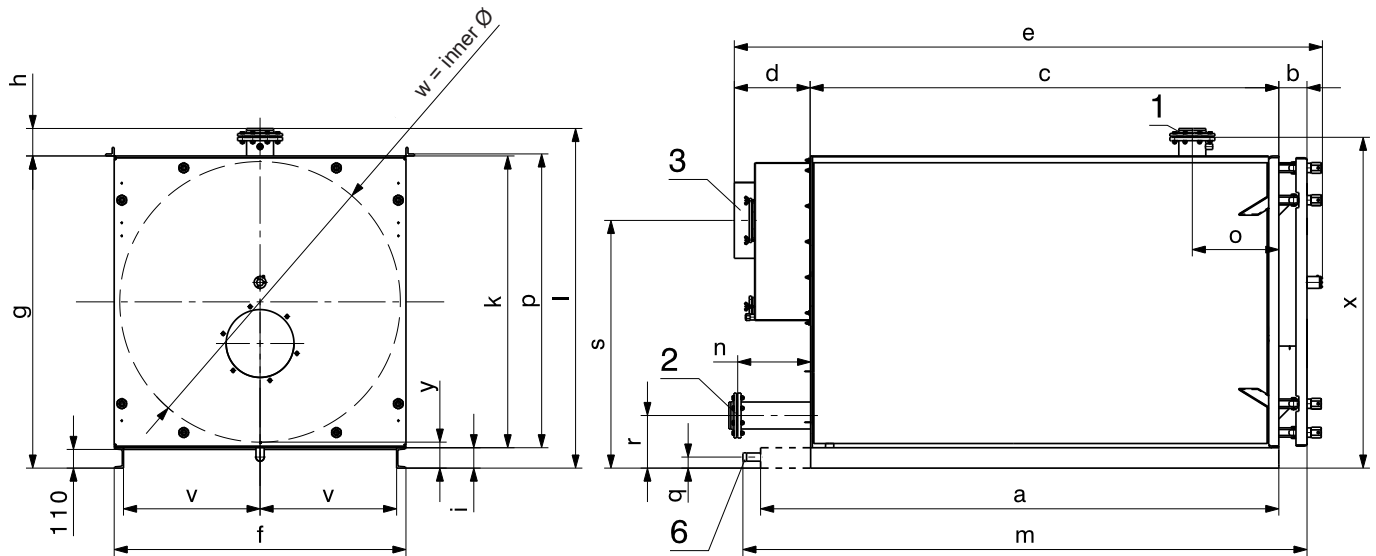
Type	a	b	c	f	g	h	i	k	l	l1	m	n	Ø o	p	q	r
(420,530)	1060	1190	515	1770	181	1230	950	104	2178	2074	641	100	299	54	34	175
(620,750)	1180	1310	550	2045	181	1350	1050	105	2452	2347	666	95	349	55	35	170
(1000,1250)	1370	1500	635	2330	181	1550	1250	107	2739	2632	681	111	349	77	37	175
(1500)	1560	1610	665	2685	212	1710	1350	103	3040	2940	722	80	447	83	34	65
(1800)	1720	1770	735	3055	214	1870	1460	103	3424	3320	724	80	447	83	52	65
(2200)	1720	1770	735	3355	214	1870	1460	101	3724	3625	724	80	447	81	50	65
(2700)	1750	1800	755	3700	212	1900	1410	82	4032	3950	722	80	647	82	51	65

Max-3 plus

Type	s	t	u	v	w	x
(420,530)	350	595	660	1330	450	-
(620,750)	550	722	786	1445	475	-
(1000,1250)	415	620	685	1660	590	-
(1500)	310	777	842	1790	695	1850
(1800)	310	890	952	1950	773	2040
(2200)	310	890	952	1950	773	2340
(2700)	370	917	982	1980	790	2670

Dimensions without insulation and casing

Boiler incl. flange, outlet without flue gas collector.
(Dimensions in mm)



- 1 Flow 3 Flue gas outlet
2 Return 6 Drain

Max-3 plus Type	a ¹	b	c	d	e	f	g	h	i	k	l	m	n	o	p
(420,530)	1920	150	1770	277	2222	1060	1180	196	120	1060	1376	2077	175	460	1072
(620,750)	2195	150	2045	228	2498	1180	1300	196	120	1180	1496	2353	172	485	1192
(1000,1250)	2480	150	2330	228	2783	1370	1500	187	120	1380	1660	2638	198	500	1392
(1500)	2685	164	2568	260	3078	1560	1680	162	120	1560	1842	2923	240	510	-
(1800)	3055	166	2760	450	3467	1720	1840	162	120	1720	2002	3325	430	510	-
(2200)	3355	166	3060	450	3767	1720	1840	162	120	1720	2002	3625	430	510	-
(2700)	3700	164	3390	430	4075	1750	1870	169	120	1750	2039	3953	430	510	-

Max-3 plus Type	q	r	s	v	w	x	y
(420,530)	175	350	950	475	990	-	-
(620,750)	170	550	1050	535	1110	-	-
(1000,1250)	175	415	1250	630	1298	-	-
(1500)	65	310	1350	725	1494	1790	153
(1800)	65	310	1460	805	1654	1950	153
(2200)	65	310	1460	805	1654	1950	153
(2700)	65	370	1410	820	1684	1980	153

* Max-3 plus (1500-2700) socket protrudes

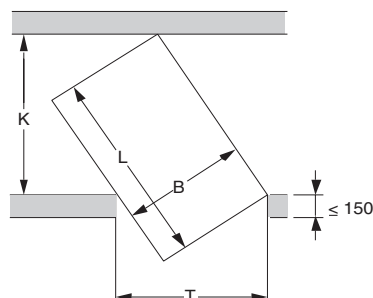
Required min. width of door and corridor to bring in the boiler

The stated measurements are minimal dimensions

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

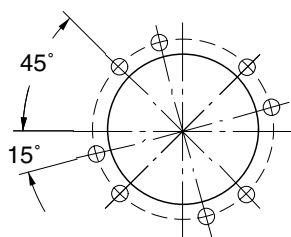
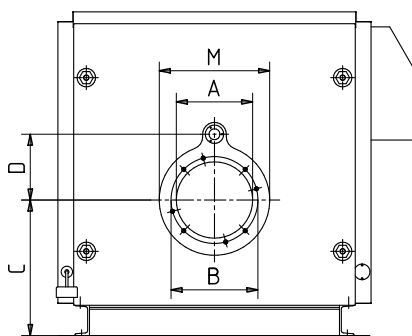
$$T = \frac{B}{K} \times L$$

- T Door width
K Corridor width
B Boiler width
L Max. boiler length



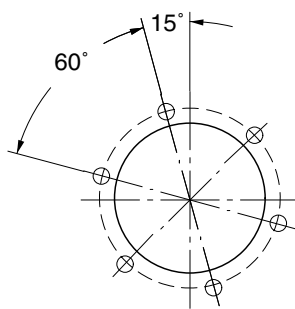
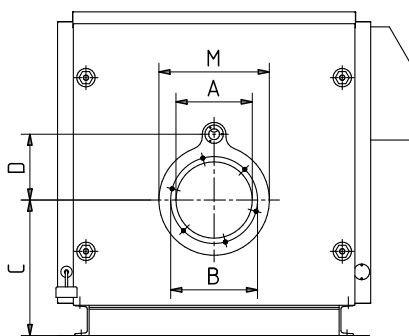
Furnace dimensions

Max-3 plus (420,530)



Screw joint flange
Max-3 plus (420,530)
4 x M12 (45°)
4 x M12 (15°)

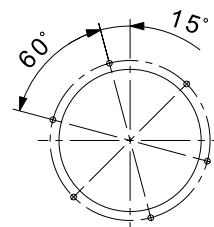
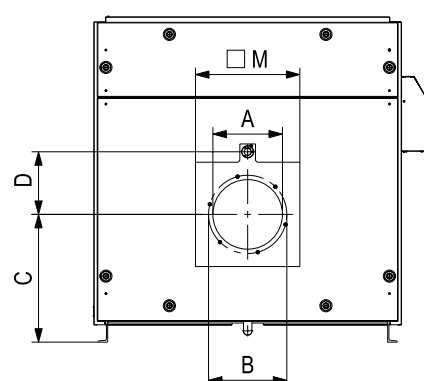
Max-3 plus (620-1250)



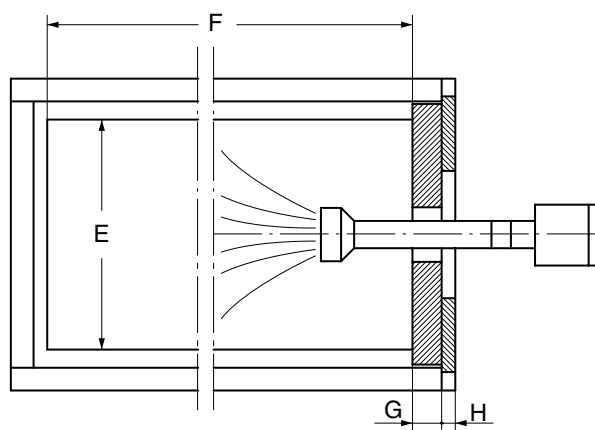
Screw joint flange
Max-3 plus (620,750)
6 x M12 (15°)

Screw joint flange
Max-3 plus (1000,1250)
6 x M16 (15°)

Max-3 (1500-2700)

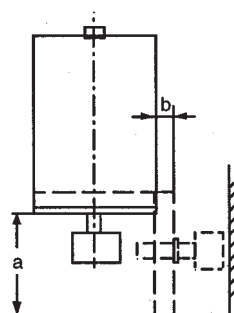


Screw joint flange
Max-3 (1500-2700)
6 x M16 (15°)



Swinging out of boiler door

Boiler door is swivelling to the right or left
(Dimensions in mm)


Dimensions
(Dimensions in mm)

Max-3 plus Type	A	B	C	D	E	F	G	H	M
(420,530)	290	330	515	250	606	1624	163	30	420
(620,750)	350	400	550	310	684	1899	163	30	500
(1000,1250)	400	450	635	330	782	2182	163	30	550
(1500)	400	450	665	360	880	2417	170	30	600
(1800)	400	450	735	360	976	2605	170	30	600
(2200)	400	450	735	360	976	2905	170	30	600
(2700)	400	450	755	360	976	3233	170	30	600

Max-3 plus Type	a	b
(420)	1060	150
(530)	1060	150
(620)	1180	150
(750)	1180	150
(1000)	1370	150
(1250)	1370	150
(1500)	1520	175
(1800)	1680	175
(2200)	1680	175
(2700)	1700	175

Standards and guidelines

The following standards and guidelines must be respected:

- technical information and installation manual of the Hoval company
- hydraulic and technical control regulations of the Hoval company
- local building law
- fire protection standards
- DIN EN 12828 Heating systems in building plans of hot water heating plants
- DIN EN 12831 Heating plants in buildings
 - procedure for computing the normed heating capacity

Water quality

Heating water:

- The European Standard EN 14868 and the Directive VDI 2035 must be observed.
- Hoval boilers and calorifiers are designed for heating plants without significant oxygen intake (plant type I according to EN 14868).
- Plants with
 - continuous oxygen intake (e.g. underfloor heating systems without diffusion proof plastic piping) or
 - intermittent oxygen intake (e.g. where frequent refilling is necessary)
 must be equipped with separate circuits.
- Treated heating water must be tested at least once yearly. According to the inhibitor manufacturer's instructions, more frequent testing may be necessary.
- A refilling is not recommended if the quality of the heating water in existing installations (e.g. exchange of boiler) conforms to VDI 2035. The Directive VDI 2035 applies equally to the replacement water.
- New and if applicable existing installations must be adequately cleaned and flushed before being recharged! The boiler may only be filled after the heating system has been flushed.
- Parts of the boiler which have contact with water are made of ferrous materials.
- On account of the danger of stress cracking corrosion the chloride, nitrate and sulfate contents of the heating water must not exceed 200 mg/l in total.
- The pH value of the heating water should lie between 8.3 and 9.5 after 6 to 12 weeks of heating operation.

Filling and replacement water:

- For a plant using Hoval boilers untreated domestic water is generally best suited as filling and replacement water. However, the quality of the untreated domestic water must at least fulfil the standard set in VDI 2035 or be desalinated and/or be treated with inhibitors. The stipulations of EN 14868 must be observed.
- In order to maintain a high level of boiler efficiency and to avoid overheating of the heating surfaces the values given in the table should not be exceeded (dependent on boiler performance ratings - for multi-boiler plants rating of smallest boiler applies - and on the water content of the plant).
- The total amount of filling and replacement water which is used throughout the total service life of the boiler must not exceed three times the water capacity of the plant.

Combustion air supply

The combustion air supply must be warranted. The air opening must not be lockable. 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.

Room air dependent operation:

- Minimum free cross-section for the air opening can be assumed as follows by way of simplification. Nominal heat output is the determining factor!
- A minimum free cross-section of once 150 cm² or twice 75 cm² and an additional 2 cm² for each kW boiler capacity in excess of 50 kW is required for the air opening into the outside air.

Burner installation

- With gas and dual-fuel burners, the burner housing weight is to be directly supported by a strut to the floor.
- Depending on the size of the burner flange, an intermediate flange may be required to attach the burner. The intermediate flange including screws and seal must be supplied by the burner company.
- The lines must be positioned so that the boiler door can still be fully opened.
- To allow the boiler door to be swung out 90° to the left or right, the connections must be flexible and routed to the burner in a sufficiently large loop
- In systems with ThermoCondensor, the burner must additionally absorb the resistance of the heat exchanger

The space between the burner pipe and the hinged flange is to be insulated. A line must be routed from the burner to the sight glass to carry cooling air, in order to cool the boiler sight glass and keep it clean.
(Delivery by the burner company)

Electric connection of the burner

- Control voltage 1 x 230 V
- Burner motor 1 x 230 V / 3 x 400 V.
- The burner must be connected to the burner connection plug of the boiler.
- For safety reasons the electrical cable of the burner must be that short that the plug must be removed when swivelling boiler door.

Sound absorbing

Sound absorption is possible through the following steps:

- Heating room walls, ceiling and floor should be very solidly built, a sound absorber should be mounted into the air inlet. Pipe holders and support should be protected by means of anti-vibration sleeves.
- Install sound absorber hood for burner.
- If living rooms are located above or under the boiler room, vibration absorbers have to be mounted to the boiler base. Pipes and flue gas tube must be connected flexibly with compensators.
- Connect circulating pumps to the piping network using expansion joints.
- For damping of flame noise it is possible to install a silencer into the flue gas tube (space should be foreseen for later installation).

Measures for sound reduction

Make sure right from the planning phase that bedrooms are not situated in the immediate vicinity of the sound source (heating room, chimney).

A reduction of the radiated burner air sound level in the heating room (reduction of the burner noises) of up to approx. 12 dB can be achieved encapsulating the burner (sound absorbing hood).

Maximum filling quantity without/with demineralisation

	Carbonate hardness of filling water up to...						
	<0.1	0.5	1	1.5	2	2.5	3
[mol/m ³] *	<0.1	0.5	1	1.5	2	2.5	3
f°H	<1	5	10	15	20	25	30
d°H	<0.56	2.8	5.6	8.4	11.2	14.0	16.8
e°H	<0.71	3.6	7.1	10.7	14.2	17.8	21.3
~mg/l	<10	50.0	100.0	150.0	200.0	250.0	300.0
Conductance ²	<20	100.0	200.0	300.0	400.0	500.0	600.0
Boiler size of the individual boiler	maximum filling quantity without desalination						
200 to 600 kW		50 l/kW	50 l/kW	20 l/kW	always desalinate		
over 600 kW							

¹ Total of alkaline earths

² If the conductance in µS/cm exceeds the tabular value an analysis of the water is necessary.

A significant part of the noise development in the combustion chamber and in the secondary heating surfaces is radiated as airborne noise via the flue gas line.

In addition, depending on dimensioning of the chimney and intersection, resonance effects caused by the vibration of the combustion noises (amplification) can occur.

These noises can be reduced on the one hand by measures on the burner side, such as modification of the flame geometry, the atomisation characteristic or the fuel throughput.

On the other hand, flue gas silencers achieve an important noise reduction.

These silencers must usually be adapted to low frequencies of 60-250 Hz.

Flue gas silencers work based on the principle of sound absorption.

The kinetic energy of the flue gases is consumed due to friction, which means a draughting requirement increase in the flue gas line is necessary. This must be taken into account when dimensioning the burner.

The connection piece from the boiler to the flue gas silencer must be gas-tight as the draught and pressure zero points lie behind the flue gas silencer.

The space required of approx. 1 m for retrofitting of a flue gas silencer should be provided during planning.

Note also that secondary air devices are installed only behind a flue gas silencer.

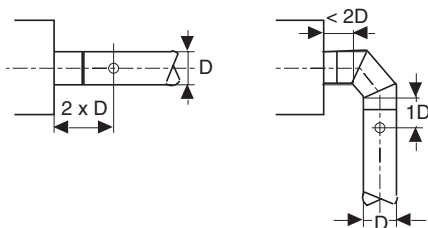
Installation instructions

Please observe the installation instructions supplied with every boiler.

Chimney/flue gas system

Flue gas line

- The flue gas connection pipe between the boiler and the vertical part of the flue gas line should be routed into the vertical part with a 30-45° incline.



- The insertion of the connection pipe into the vertical part of the flue gas line must be carried out in such a way that no condensate can flow into the boiler. A condensate trap must imperatively be mounted on the flue gas outlet of the boiler.
- A closeable flue gas measuring socket with an inner diameter of 10-21 mm must be foreseen.

Chimney

- The flue gas system must be humidity-insensitive and acid-proof and admitted for flue gas temperatures up to $> 160^{\circ}\text{C}$.
- For existing chimney installation the restoration must be carried out according to the instructions of the chimney constructor.
- Calculation of the profile of the chimney according to DIN 4705.
- It is recommendable to use a secondary air valve for chimney draft limiting.

Expansion tank/expansion

- Ideally, the pressure expansion tank should be connected to the heating system as described in our example applications, with a removable or sealable actuation device. This means that it is not necessary to drain the entire system in order to carry out work.

Safety valve

- A safety valve and an automatic air vent must be installed in the safety flow.

Mounting on site

Max-3 plus (420-1250)

If the local situation does not permit bringing in the whole boiler, the possibility of the place assembly exists.

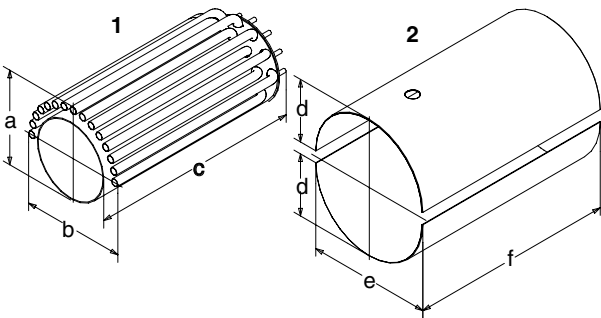
- The element welding on site incl. pressure test are to be coactive to obtain from Hoval.

Time to delivery approx. 8 weeks

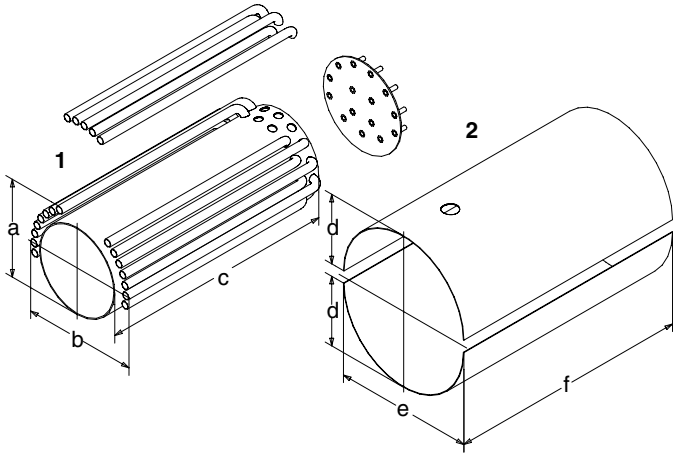


Dimensions and weights of the single parts

Max-3 plus (420,530)

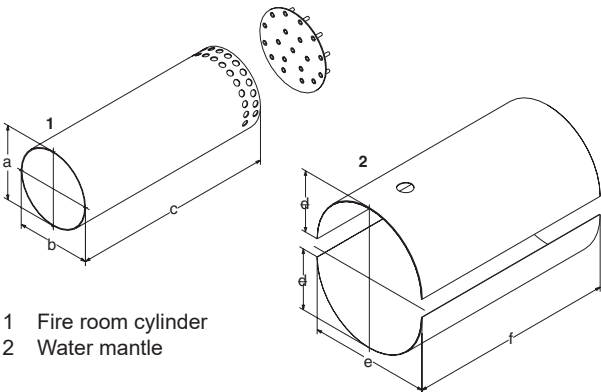


Max-3 plus (620,750)



Dimensions and weights of the single parts

Max-3 plus (1000-1250)



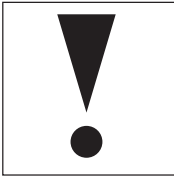
- 1 Fire room cylinder
2 Water mantle

Max-3 plus Type	Combustion chamber 1			Weight kg
	a	b	c	
(420,530)	730	835	1725	325
(620,750)	745	915	2000	410
(1000,1250)	800	800	2180	375

Max-3 plus Type	Water mantle - half shell 2			Weight kg
	d	e	f	
(420,530)	500	1000	1665	105
(620,750)	560	1120	1940	135
(1000,1250)	655	1310	2225	215

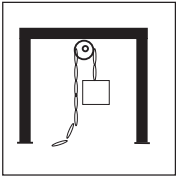
Mounting on site

Planning hints



Important preparations

- Old boiler must be dismantled and removed.
- The heating room, if necessary with boiler base, must be available with beginning of work.



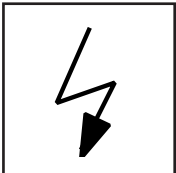
Assembly aids

If no concrete cover is present, at which a chain course with Hilti pegs can be installed, an appropriate scaffold for loads up to 2500 kg must be present.



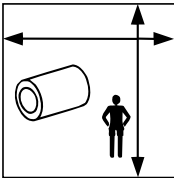
Boiler material

- The boiler material is delivered by Hoval (in single parts) and must be brought in on site.
- If bringing in the boiler parts does not take place immediately after unloading, the parts are to be stored weather-protected.



Power connection

A power connection for the welding machine with a 5-pin plug socket, 3 x 400 V must be present.



Heating room preparation

Required space

In the heating room sufficient space for the assembly of the boiler must be available (see space requirement below)



Water connection

In the heating room a water connection (3/4") with fresh water for filling and squeezing off the welded boiler has to be present.

Required space for mounting and welding in the boiler room

Min. room dimensions in mm

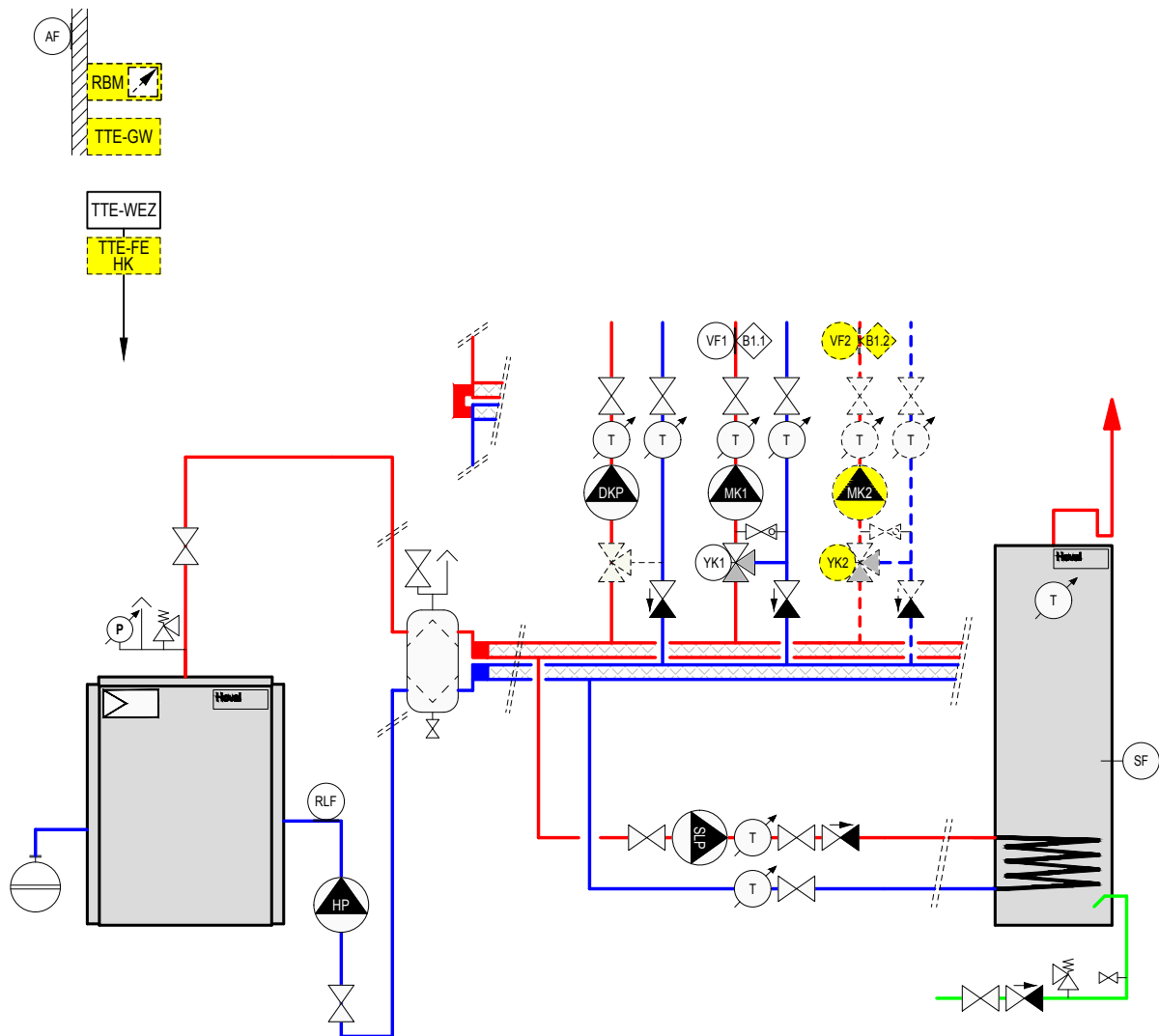
	(420)	(530)	(620)	(750)	(1000)	(1250)
Length	3700	3700	4500	4500	5000	5000
Width	2200	2200	2500	2500	3500	3500
Height	2500	2500	3000	3000	3200	3200

Max-3 (420-2700)

Oil/gas boiler with

- main pump
- return temperature control (effective on mixer circuit)
- hydraulic switch
- calorifier
- 1 direct circuit and 1-... mixer circuit(s)

Hydraulic schematic BEFE010



Notice:

- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (pressurised expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

TTE-WEZ	TopTronic® E basic module heat generator (installed)
VF1	Flow temperature sensor 1
B1.1	Flow temperature guard (if required)
MK1	Pump mixer circuit 1
YK1	Actuator mixer 1
AF	Outdoor sensor
SF	Calorifier sensor
DKP	Pump for heating circuit without mixer
RLF	Return sensor
SLP	Calorifier charging pump
HP	Main pump

Option

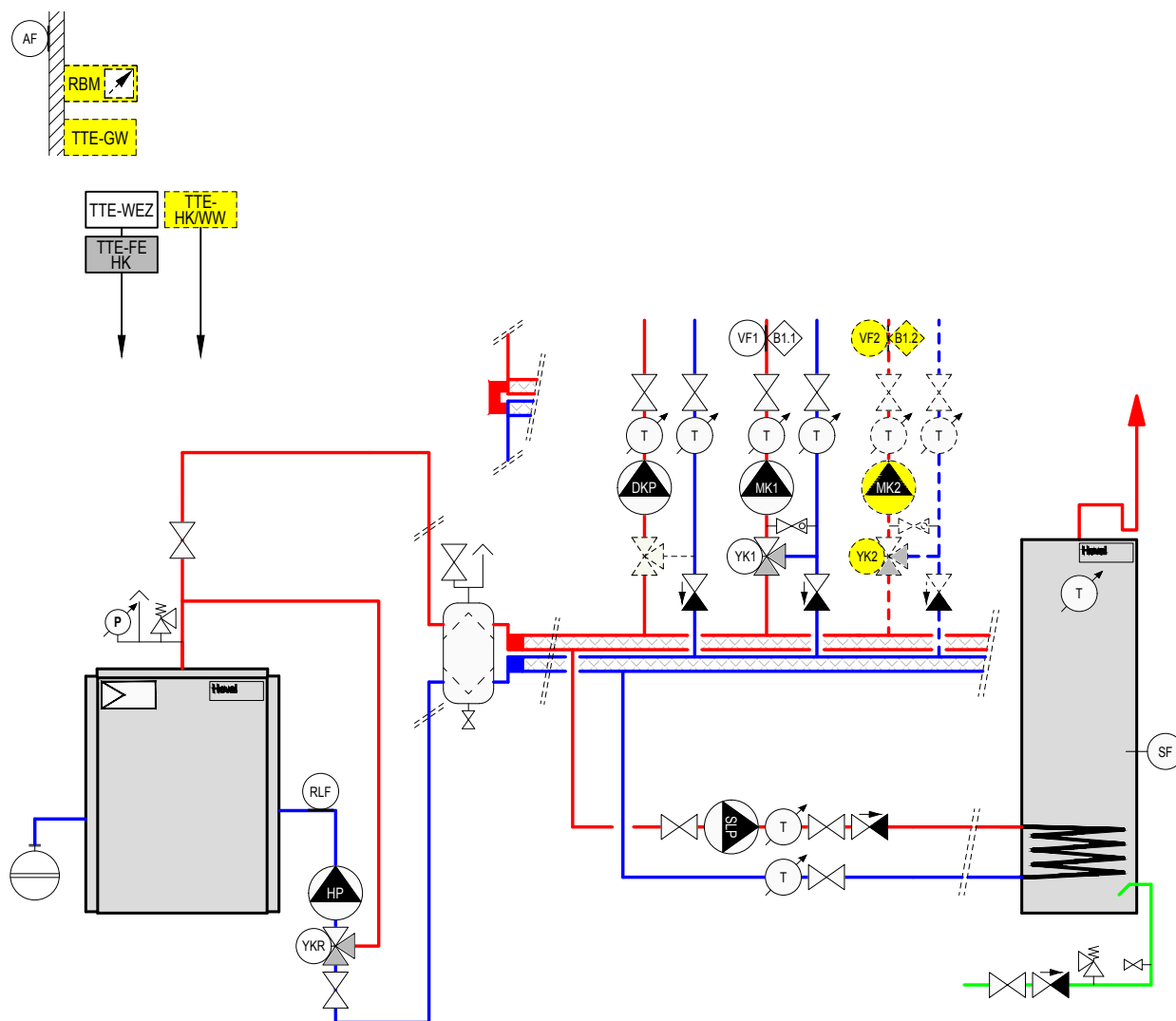
RBM	TopTronic® E room control module
TTE-GW	TopTronic® E Gateway
TTE-FE HK	TopTronic® E module expansion heating circuit
VF2	Flow temperature sensor 2
B1.2	Flow temperature guard (if required)
MK2	Pump mixer circuit 2
YK2	Actuator mixer 2

Max-3 (420-2700)

Oil/gas boiler with

- main pump
- return temperature control (continuous)
- hydraulic switch
- calorifier
- 1 direct circuit and 1-... mixer circuit(s)

Hydraulic schematic BEFE020



Notice:

- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (pressurised expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

TTE-WEZ	TopTronic® E basic module heat generator (installed)
VF1	Flow temperature sensor 1
B1.1	Flow temperature guard (if required)
MK1	Pump mixer circuit 1
YK1	Actuator mixer 1
YKR	Actuator return mixer
SF	Calorifier sensor
RLF	Return sensor
DKP	Pump for heating circuit without mixer
SLP	Calorifier charging pump
KKP	Boiler circuit pump

Option

RBM	TopTronic® E room control module
TTE-GW	TopTronic® E Gateway
TTE-HK/WW	TopTronic® E heating circuit/hot water module

TTE-FE HK	TopTronic® E module expansion heating circuit
VF2	Flow temperature sensor 2
B1.2	Flow temperature guard (if required)
MK2	Pump mixer circuit 2
YK2	Actuator mixer 2