EN

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

HeatMaster®

25 - 35 - 45 - 70 - 85 - 120 TC

664Y6800 • A

ACV

excellence in hot water

TABLE OF CONTENTS

For specific connection diagrams and the list of associated accessories, the MCBA parameters and the error codes, refer to the System Control manual provided with this product.

NOTE

This manual contains important information with respect to the installation, the starting up and the maintenance of the boiler.

This manual must be provided to the user, who will read it carefully and keep it in a safe place.

We accept no liability should any damage result from the failure to comply with the instructions contained in this technical manual.

Essential recommendations for safety

- **It is prohibited to carry out any modifications to the appliance without the manufacturer's prior and written agreement.**
- **The product must be installed by a qualified engineer, in accordance with applicable local standards and regulations.**
- **The installation must comply with the instructions contained in this manual and with the standards and regulations applicable to installations.**
- **Failure to comply with the instructions in this manual could result in personal injury or a risk of environmental pollution.**
- **The manufacturer declines all liability for any damage caused as a result of incorrect installation or in the event of the use of appliances or accessories that are not specified by the manufacturer.**

Essential recommendations for the correct operation of the appliance

- **In order to ensure that the appliance operates correctly, it is essential to have it serviced by a certified installer or maintenance contractor every year.**
- **In case of anomaly, please call your service engineer.**
- **Faulty parts may only be replaced by genuine factory parts.**

INSTRUCTIONS FOR THE END USER

If you smell gas:

- **Immediately isolate the gas supply.**
- **Open windows and doors to ventilate the area.**
- **Do not use any electrical appliances and do not operate any switches.**
- **Immediately notify your gas supplier and/or your installer.**

Essential recommendations for safety

- Do not store any flammable or corrosive products, paint, solvents, salts, chloride products and other detergent products near the appliance.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless supervised or unless they have been given instruction concerning the use of the appliance by a person responsible for their safety.

PERIODIC CHECKS

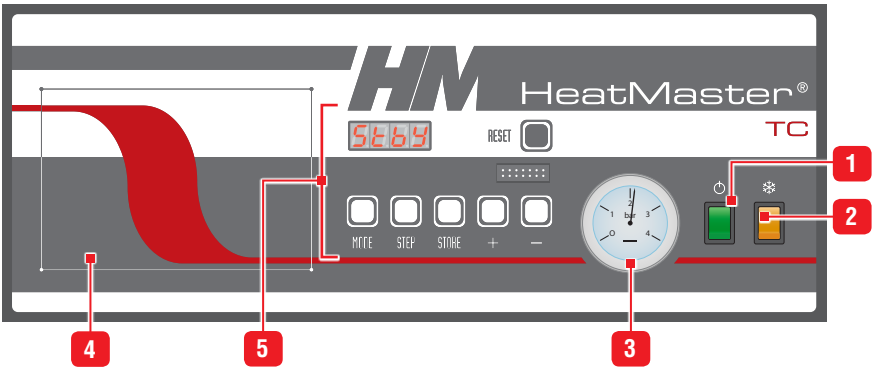
Essential recommendations for the correct operation of the appliance

- Make sure that the system water pressure is at least 1 bar when cold.
- If it is required to top up the system to maintain the minimum recommended water pressure, only add small amounts of water at a time. If a large amount of cold water is added in a hot boiler, the boiler can be damaged definitively.
- If the system needs to be refilled repeatedly with water, please contact your installer.
- Regularly check that there is no water on the floor in front of the boiler. If there is, please call your service engineer.

General remark

- Checking the boiler settings can only be carried out by an ACV-trained installer or by ACV's maintenance department.

CONTROL PANEL



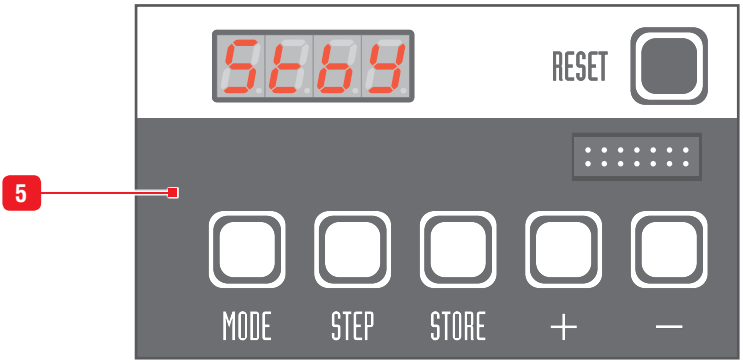
When the boiler is powered on, it starts in Stand-by mode and displays StbY for 2 seconds before displaying the boiler status.

Description

1. **ON/OFF master switch of the boiler -** The built-in indicator lights when the appliance is turned on.
2. **Summer-winter switch -** To activate or deactivate the heating pump. The built-in indicator lights in winter mode.
3. **Pressure gauge -** Indicates the primary circuit pressure (min. 1 bar when cold).
4. **Pre-cut area -** To install an optional Control Unit.
5. **User interface of the MCBA controller -** Allows to set-up the boiler operation and more specifically, to define the required temperature of the Domestic Hot Water (DHW) and the Central Heating (CH) and to activate/deactivate the DHW and heating modes:
   - Display : indicates the parameter values, the error codes and the set-up status of the parameters.
   - "**Reset**" key : to bring the parameters back to the factory-preset values.
   - "**Mode**" key : to toggle the modes and define various parameters.
   - "**Step**" key : to scroll through the various functions of a mode.
   - "**Store**" key : to save the defined settings.
   - "**+**" key : to increase the displayed value.
   - "**–**" key : to decrease the displayed value.

PARAMETER SETTING

The end user is allowed to perform some of the settings: turn on/off the domestic hot water (DHW-)/ heating function and define the required temperature of the DHW/heating circuits.
Using a special maintenance code to be entered in the MCBA interface, the qualified installers can access parameters and therefore adjust the boiler settings to specific requirements. The parameters are normally factory-preset for all normal applications.



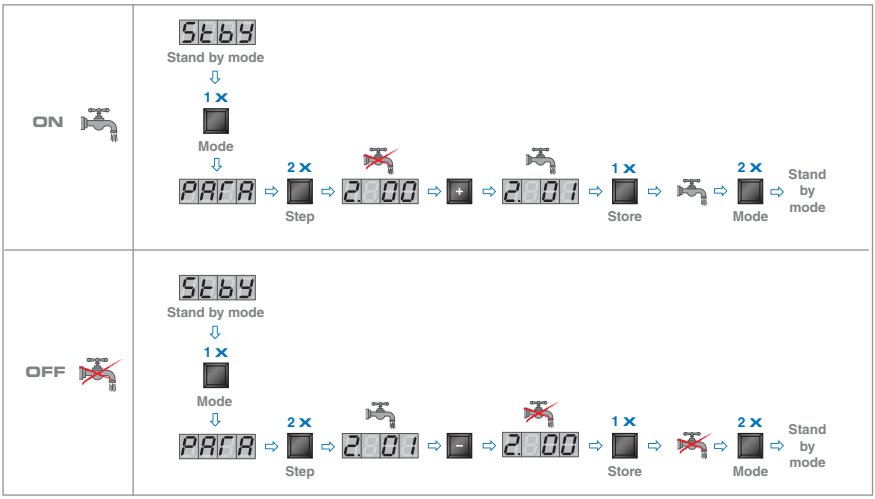
To get additional information on how to use the MCBA and the installer-specific settings, refer to the boiler System Control manual.

General remarks

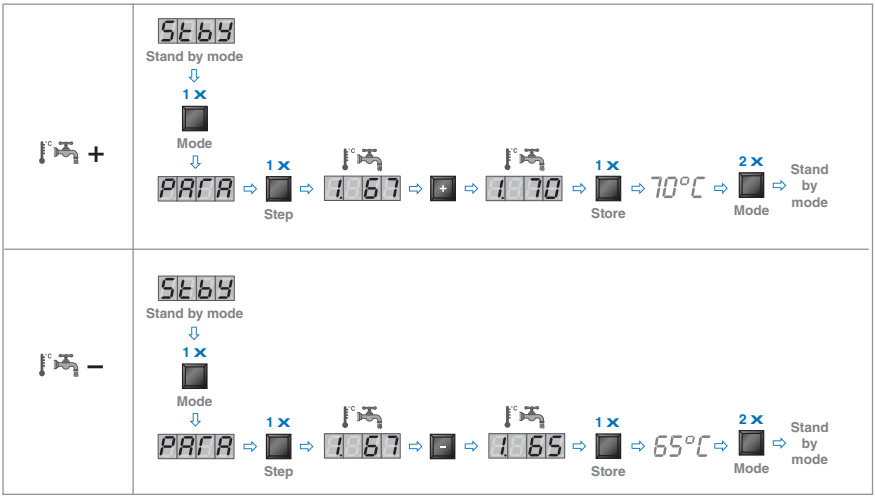
- **The end user is allowed to carry out the set-up mentioned in the following pages. Any other setup must be carried out by an approved installer.**
- **If a fault occurs, the MCBA disables the appliance and displays an error code: the display flashes and the first character is "E" followed by the fault number.**
  - **Reset the appliance by pressing the "RESET" key of the MCBA interface.**
  - **If the error code shows again, contact your installer.**

DHW mode: When it is enabled through the MCBA, this mode allows to define the DHW temperature set-point of the hot water preparation tank. The maximum authorized DHW temperature is 75°C.

→ Enable / disable the DHW mode

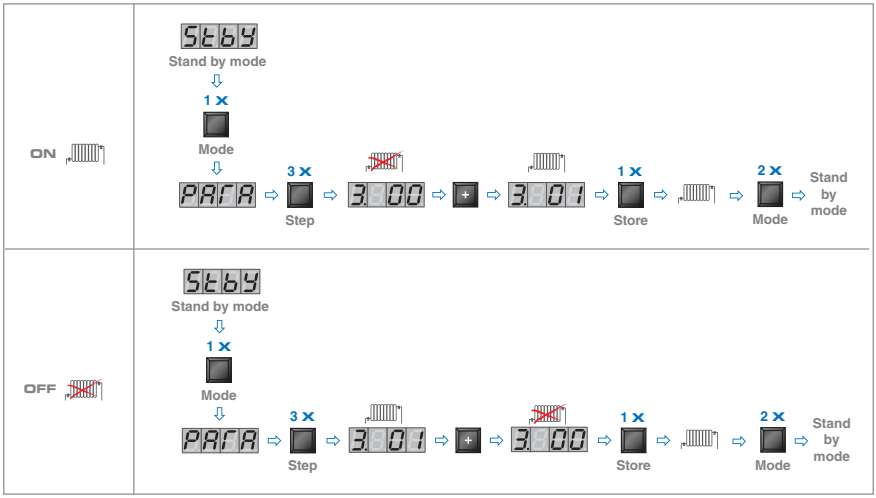


→ Setting the required DHW temperature

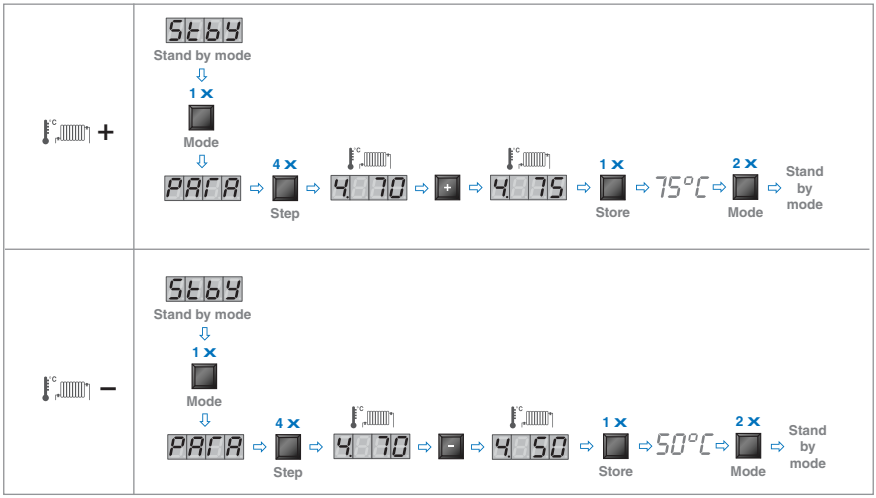


Central Heating Mode: When it is enabled through the MCBA, this mode allows to define the primary circuit temperature set-point for the heating function. The maximum authorized temperature for the circuit is 90°C.

→ Enable / disable the central heating mode



→ Setting the required heating temperature



APPLIANCE DESCRIPTION

The **HeatMaster®** TC series combines ACV's "Tank-in-Tank" concept with a double primary circuit to reach the high performance of a TOTAL CONDENSATION, double-circuit boiler.

The **HeatMaster®** models are always delivered with an ACV air/gas premix BG 2000-M burner, with low NOx emissions. During operation, the burner starts automatically as soon as the boiler temperature gets lower than the preset temperature and stops as soon as the preset temperature is reached.

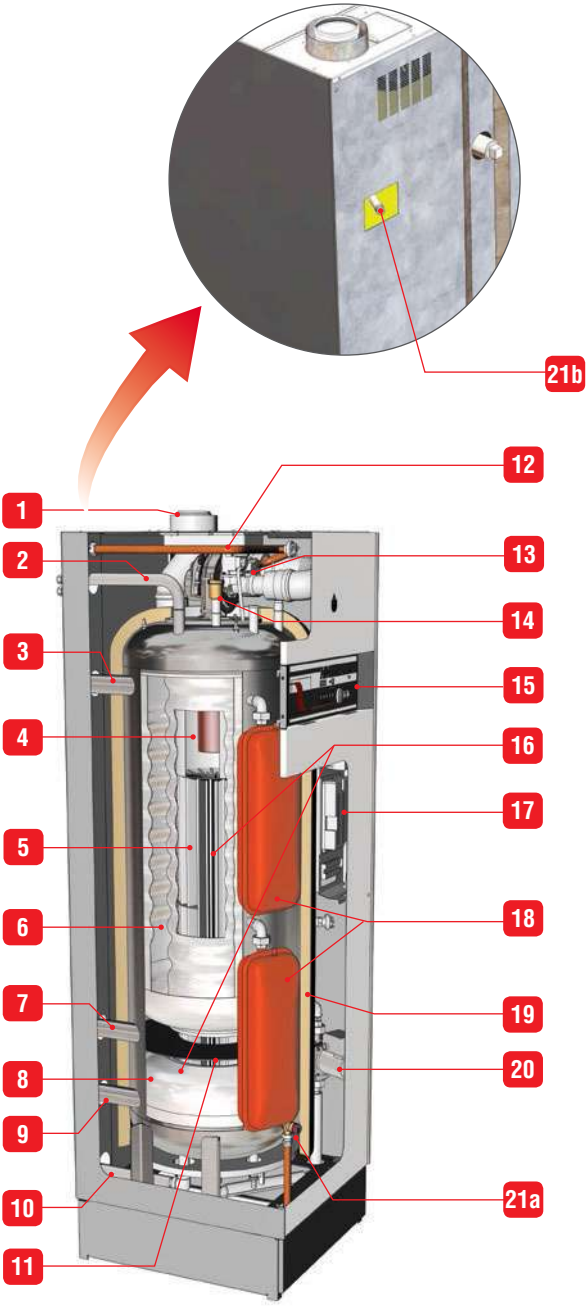
The appliance is fitted with a built-in low water pressure switch that blocks the appliance when the pressure is not sufficient: the heating circuit must be kept under water pressure (at least 1 bar). If the pressure reading on the pressure gauge is below 0.5 bar, the pressure switch stops the boiler until the pressure is higher than 0.8 bar again.

The **HeatMaster®** TC series is fitted with a built-in frost protection: as soon as the boiler temperature [NTC1 sensor] drops below 7°C, the central heating pump is enabled. As soon as the NTC1 temperature is lower than 3°C, the burner ignites until the temperature exceeds 10°C. The heating pump continues to run for 10 minutes.

If an outdoor temperature sensor is connected, the pump is started whenever the outdoor temperature drops below the preset temperature. To allow the boiler to protect the system against frost, all the radiator and convector valves should be fully open.

Depending on the model, the HeatMaster® TC are equipped with a high efficiency charging pump, or with a standard charging pump.

Detail of components	
1.	80/125 mm concentric flue pipe connection, that can be transformed into two 80/80 mm pipes (HM 25 / 35 / 45 TC)
	100/150 mm concentric flue pipe connection, that can be transformed into two 100/100 mm pipes (HM 85/ 120 TC)
2.	Domestic hot water outlet
3.	Heating circuit outlet
4.	Combustion chamber
5.	Stainless steel heat exchanger
6.	Stainless steel "Tank in Tank" hot water production tank
7.	Auxiliary heating circulation loop
8.	Indirect water pre-heater
9.	Heating circuit inlet
10.	Cold water inlet
11.	Primary circuit separation disc
12.	Gas connection tube
13.	Modulating AIR/GAS premix burner
14.	Air bleed valve
15.	Control panel
16.	Heating circuit
17.	Electronic board
18.	Primary circuit expansion vessel(s) (HM 70 / 85 / 120 TC)
19.	Hard expanded polyurethane foam insulation
20.	Boiler charging pump (auxiliary circulation loop)
21a.	Safety valve (3 bar) (HM TC equipped with a standard pump)
21b	Connection + safety valve (3bar) to be installed (HM TC equipped with a high efficiency pump)


21b
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21a

BURNER DESCRIPTION

ACV AIR/GAS premix BG 2000-M burner

Main components of the burner:
- Variable speed fan
- Automatic ignition and flame detection system
- Gas valve/venturi set specially developed for low NOX air/gas premix burners.

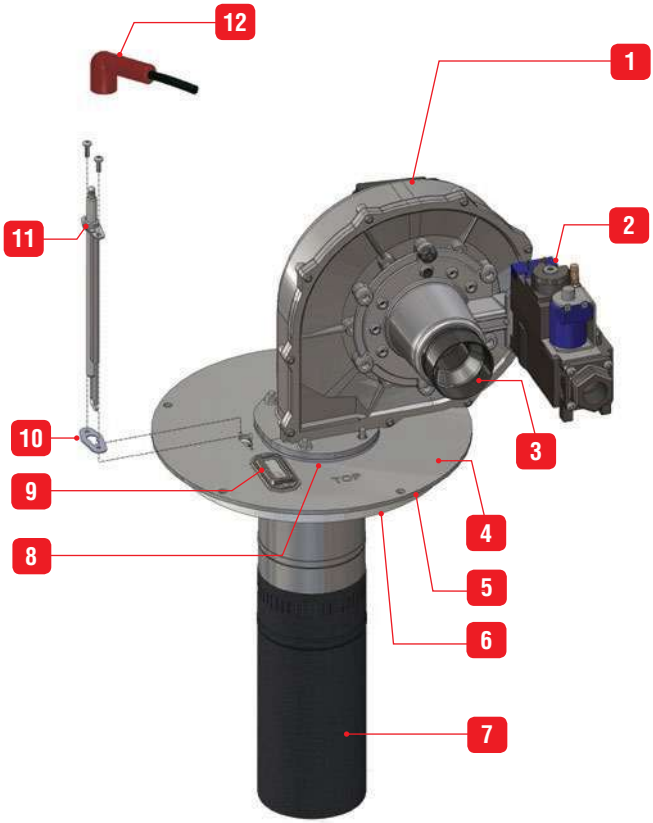
The power continually adjusts to demand, which greatly improves the general efficiency of the heating and DHW systems. The burner tube is covered with a metal fiber element (NIT) which, besides its remarkable heat exchange capacity, guarantees longer burner life.

The controller guarantees that the gas pressure at the gas valve outlet is kept equal to the absolute air pressure at the venturi inlet, corrected by the offset adjustment value. The fan draws the combustion air through the venturi, whose neck is connected to the gas valve outlet. The pressure differential created at the venturi neck by the air flow rate generates a gas intake proportional to its amount (the higher the air flow rate, the higher the pressure differential, and therefore the gas intake). The air/gas mix is then introduced into the burner via the fan.

Detail of components	
1.	Fan
2.	Gas valve
3.	Venturi
4.	Burner chamber plate flange
5.	Heat exchanger seal
6.	Insulation
7.	Burner tube
8.	Fan seal
9.	Flame sight glass
10.	Electrode seal
11.	Electrode
12.	Ignition cable (part of the electrode assembly in the HM 45 TC)

BURNER CHARACTERISTICS

			HM 25 TC	HM 35 TC	HM 45 TC	HM 70 TC	HM 85 TC	HM 120 TC
Gas type			Nat. gas Propane	Nat. gas Propane	Nat. gas Propane	Nat. gas Propane	Nat. gas Propane	Nat. gas Propane
Min fan speed	Nat. gas	rpm	1500	2000	1600	1900	1900	1300
	Propane	rpm	1500	2400	1800	1900	1900	1300
Max. fan speed	Nat. gas	rpm	6500	6300	6800	4900	6500	5300
	Propane	rpm	6100	6500	6900	4500	6000	5300



The figure shows the HM 120 TC burner. The HM 25 / 35 / 45 / 70 / 85 TC burner configuration is slightly different.

SINGLE GAS CATEGORIES (All models)

Gas type		G20	G25	G20 / G25	G25.1	G31			G30	
Pressure (mbar)		20	25	20-25	25	30	37	50	30	50
Country code	Category									
AT	I_{2H}	●								
	I_{3P}							●		
	$I_{3B/P}$									●
BE	$I_{2E(S)}$*			●						
	$I_{2E(R)}$**			●						
	I_{3P}						●			
CH	I_{2H}	●								
	I_{3P}						●	●		
	$I_{3B/P}$									●
CY	I_{2H}	●								
	$I_{3B/P}$								●	
CZ	I_{2H}	●								
	I_{3P}						●			
DE	I_{2E}	●								
	I_{2ELL}			●						
	I_{3P}							●		
	$I_{3B/P}$									●
DK	I_{2H}	●								
	$I_{3B/P}$								●	
EE	I_{2H}	●								
	$I_{3B/P}$								●	
ES	I_{2H}	●								
	I_{3P}						●			
FR	I_{2Er}			●						
	I_{3P}						●			
	$I_{3B/P}$								●	●
GB	I_{2H}	●								
	I_{3P}						●			
	$I_{3B/P}$								●	
GR	I_{2H}	●								
	I_{3P}						●			
HR	I_{2H}	●								
	I_{3P}						●			
	$I_{3B/P}$								●	
HU	I_{2HS}				●					
	$I_{3B/P}$								●	●

* HM 25 / 35 / 45 / 70 TC
** HM 85 / 120 TC

Gas type		G20	G25	G20 / G25	G25.1	G31			G30	
Pressure (mbar)		20	25	20-25	25	30	37	50	30	50
Country code	Category									
IE	I2H	●								
	I3P						●			
IT	I2H	●								
	I3P						●			
	I3B/P								●	
LT	I2H	●								
	I3P						●			
	I3B/P								●	
LU	I2E	●								
	I3B/P								●	
LV	I2H	●								
NL	I2L		●							
	I3P					●	●	●		
	I3B/P								●	
NO	I2H	●								
	I3B/P								●	
PL	I2E	●								
	I3P						●			
	I3B/P								●	
PT	I2H	●								
	I3P						●			
RO	I2H	●								
	I2E	●								
	I3P					●				
	I3B/P								●	
SE	I2H	●								
	I3B/P								●	
SI	I2H	●								
	I3P						●			
	I3B/P								●	
SK	I2H	●								
	I3P						●	●		
	I3B/P								●	●
TR	I2H	●								
	I3B/P								●	

DOUBLE GAS CATEGORIES (HM 70 / 85 / 120 TC only)

Gas type		G20	G25		G20 ⇆ G25	G31			G30		G30 ⇆ G31	
Pressure (mbar)		20	20	25	20 ⇆ 25	30	37	50	30	50	28 - 30 ⇆ 37	50 ⇆ 67
Country code	Category											
AT	II2H3P	●						●				
	II2H3B/P	●								●		
CH	II2H3P	●					●	●				
	II2H3B/P	●								●		
	II2H3+	●									●	
CY	II2H3B/P	●							●			
	II2H3+	●									●	
CZ	II2H3P	●					●					
	II2H3+	●									●	
DE	II2E3B/P	●								●		
	II2ELL3B/P	●	●					●		●		
DK	II2H3B/P	●							●			
EE	II2H3B/P	●							●			
ES	II2H3P	●					●					
FI	II2H3B/P	●							●			
FR	II2Er3P	●		●			●	●				
	II2E+3+				●						●	
GB	II2H3P	●					●					
	II2H3+	●									●	
GR	II2H3P	●					●					
	II2H3+	●									●	
HR	II2H3P	●					●					
	II2H3B/P	●							●			
HU	II2H3B/P			●					●			
IE	II2H3P	●					●					
	II2H3+	●									●	
IT	II2H3P	●					●					
	II2H3B/P	●							●			
	II2H3+	●									●	

Gas type		G20	G25		G20 ⇆ G25	G31			G30		G30 ⇆ G31	
Pressure (mbar)		20	20	25	20 ⇆ 25	30	37	50	30	50	28 - 30 ⇆ 37	50 ⇆ 67
Country code	Category											
LT	II2H3P	●					●					
	II2H3B/P	●							●			
	II2H3+	●									●	
LU	II2E3B/P	●							●			
NL	II2H3B/P			●					●			
NO	II2H3B/P	●							●			
PL	II2E3B/P	●							●			
PT	II2H3P	●					●					
	II2H3+	●									●	●
RO	II2H3P	●				●						
	II2H3B/P	●							●			
	II2E3B/P	●							●			
SE	II2H3B/P	●							●			
SI	II2H3P	●				●						
	II2H3B/P	●							●			
	II2H3+	●									●	
SK	II2H3P	●					●	●				
	II2H3B/P	●							●	●		
	II2H3+	●									●	
TR	II2H3B/P	●							●			

COMBUSTION CHARACTERISTICS

Main Characteristics			HM 25 TC		HM 35 TC		HM 45 TC	
			G20/G25	G31	G20/G25	G31	G20/G25	G31
Input (PCI)	max	kW	25.0	25.0	34.9/34.5	31.0	45.6	40.7
	min	kW	4.7	5	9.8/10.6	10.0	9.0/9.6	8.8
Output at 100%	(80/60°C)	kW	24.3	24.3	34.0/33.6	30,2	44.7	39.9
	(50/30°C)	kW	—	—	—	—	47.4	42,3
Efficiency at 100%	(80/60°C)	%	97.3	97.3	97.3	97.3	98.0	98.0
	(50/30°C)	%	—	—	—	—	103.9	103.9
Efficiency at 30% load (EN677)		%	108.9	108.9	108.9	108.9	108.9	108.9
Combustion efficiency	at 100%	%	98.2	98.2	98.2	98.2	97.9	98.2
NOx (Class 5)	Max. output	mg/kWh	74	81	59	72	42	42
	Min. output	mg/kWh	33	31	33	31	24	24
	Weighted	mg/kWh	53	53	41	41	38	38
CO	Max. output	mg/kWh	44	55,3	89.1/103.9	119.6	61.3/82.2	184
	Min. output	mg/kWh	23	9	4.6/17.1	20.9	5.9	4.8
CO_2	Max. output	$\%CO_2$	9.3	10.7	9.3	10.5	8.9/9.16	11.2
	Min. output	$\%CO_2$	8.8	10.7	8.4/9.1	9.8	8.7	9.5
Max gas flow rate G20/G25	20 mbar	m^3/h	2.64	—	3.75	—	4.8	—
	25 mbar	m^3/h	2.64	—	4.25	—	5.7	—
Max. gas flow rate G31	30/37/50 mbar	Kg/h	—	2.0	—	2.0	—	2.7
	30/37/50 mbar	m^3/h	—	1.26	—	1.26	—	1.66
Standby loss	$\Delta T = 45$ K	W	187	187	187	187	187	187
	$\Delta T = 30$ K	W	113	113	113	113	113	113

Main Characteristics			HM 70 TC		HM 85 TC		HM 120 TC	
			G20/G25	G31	G20/G25	G31	G20/G25	G31
Input (PCI)	max.	kW	69.9	69.9	85.9/85.0	83.6	115/114.6	115
	min.	kW	24.5	24.5	24.5	24.5	23.2	24.8
Output at 100%	(80/60°C)	kW	68.0	68.0	82,.9	83.6	111.6	111.6
	(50/30°C)	kW	—	—	—	—	121.7	121.7
Efficiency at 100%	(80/60°C)	%	97.3	97.3	97.5	97.5	97.1	97.1
	(50/30°C)	%	—	—	—	—	105.8	105.8
Efficiency at 30% load (EN677)		%	109.0	109.0	108.4	108.4	108.8	108.8
Combustion efficiency	at 100%	%	98.1	98.1	98.0	98.0	97.5	97.5
NOx (Class 5)	Max. output	mg/kWh	52	85	72/65	85	57/56	49
	Min. output	mg/kWh	27	27	27	27	10	42
	Weighted	mg/kWh	28	28	44	44	56	56
CO	Max. output	mg/kWh	56.3	90.0	74.4/118.7	98.8	119.2/121.4	103.0
	Min. output	mg/kWh	2.0	45.0	5.9/55.0	53.8	7.6/61.8	12.8
CO_2	Max. output	$\%CO_2$	9.1	10.9	9.3	10.9	9.3	10.2
	Min. output	$\%CO_2$	8.6	10.0	8.6	8.5/10.0	8.4	10.0
Max gas flow rate G20/G25	20 mbar	m^3/h	7.4	—	9.0	—	12.2	—
	25 mbar	m^3/h	8.6	—	10.5	—	14.2	—
Max. gas flow rate G31	30/37/50 mbar	Kg/h	—	5.43	—	5.6	—	7.5
	30/37/50 mbar	m^3/h	—	2.86	—	3.4	—	4.69
Standby loss	$\Delta T = 45$ K	W	342	342	342	342	342	342
	$\Delta T = 30$ K	W	206	206	206	206	206	206

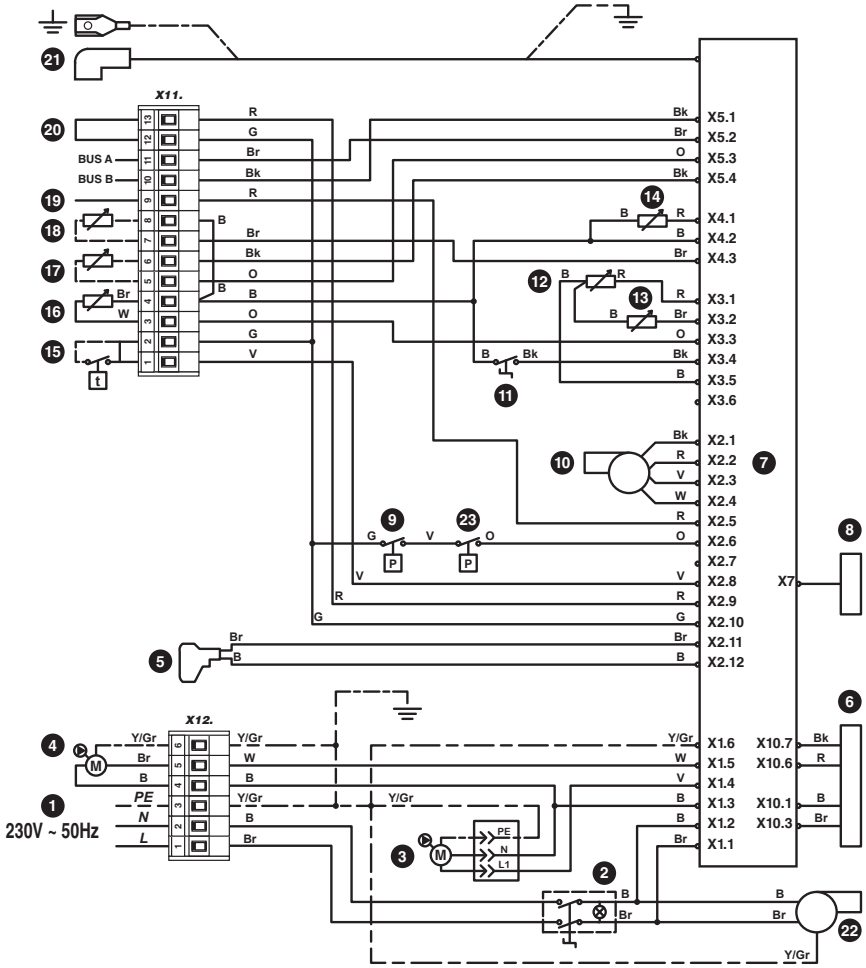
ELECTRICAL CHARACTERISTICS (HM TC EQUIPPED WITH A STANDARD CHARGING PUMP)

Main Characteristics		HM 25 / 35 TC	HM 70 / 85 TC
Rated voltage	V~	230	230
Rated frequency	Hz	50	50
Rated current (fuse)	A	6	6
Electrical consumption	W	176	220 / 230
Input intensity	A	0.8	1
IP Class		IP 30	IP 30

Description

1. 230 V power supply plug
2. ON/OFF master switch
3. Charging pump
4. Heating pump (option)
5. Gas valve rectifier
6. 230 Volt-24 Volt transformer
7. MCBA
8. Display
9. Low water pressure switch
10. Burner PWM plug
11. Summer/winter switch
12. NTC1 flow sensor
13. NTC2 return sensor
14. NTC5 flue gas temperature sensor
15. Room thermostat (option)
16. NTC3 DHW sensor
17. NTC4 outdoor temperature sensor (option)
18. NTC6 flow sensor for second heating circuit (option)
19. Positive terminal of the ionization current
20. RAM high limit thermostat (option)
21. Ignition and ionization cable
22. 230 Volt burner power supply (HeatMaster® 70 / 85 TC)
23. Gas pressure switch (HeatMaster® 70 / 85 TC)

The ionization current is measured between terminal 19 and ground.



B. Blue
Bk. Black
Br. Brown
G. Grey
O. Orange
R. Red
V. Violet
W. White
Y/Gr. Yellow/Green

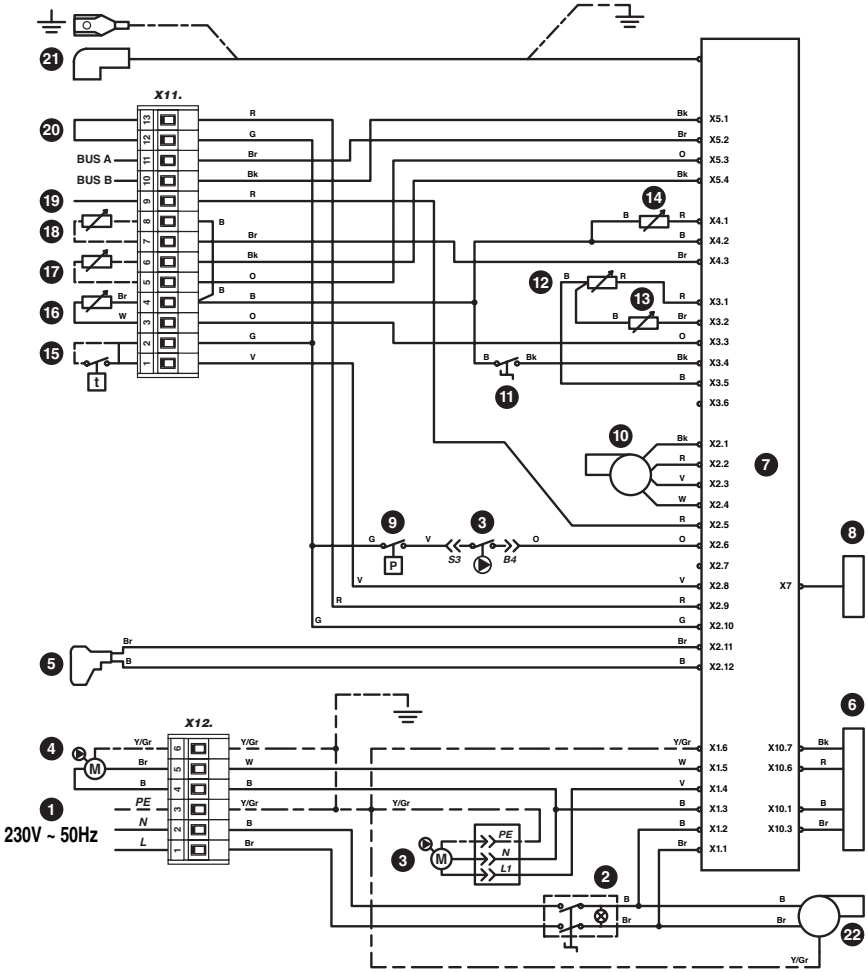
ELECTRICAL CHARACTERISTICS (HM TC < 70 KW EQUIPPED WITH A HIGH EFFICIENCY PUMP)

Main Characteristics		HM TC < 70 kW
Rated voltage	V~	230
Rated frequency	Hz	50
Rated current (fuse)	A	6
Electrical consumption	W	160
Input intensity	A	0.7
IP Class		IP 30

Description

1. 230 V power supply plug
2. ON/OFF master switch
3. Charging pump (high efficiency)
4. Heating pump (option)
5. Gas valve rectifier
6. 230 Volt-24 Volt transformer
7. MCBA
8. Display
9. Low water pressure switch
10. Burner PWM plug
11. Summer/winter switch
12. NTC1 flow sensor
13. NTC2 return sensor
14. NTC5 flue gas temperature sensor
15. Room thermostat (option)
16. NTC3 DHW sensor
17. NTC4 outdoor temperature sensor (option)
18. NTC6 flow sensor for second heating circuit (option)
19. Positive terminal of the ionization current
20. RAM high limit thermostat (option)
21. Ignition and ionization cable
22. 230 Volt burner power supply

The ionization current is measured between terminal 19 and ground.



B. Blue
Bk. Black
Br. Brown
G. Grey
O. Orange
R. Red
V. Violet
W. White
Y/Gr. Yellow/Green

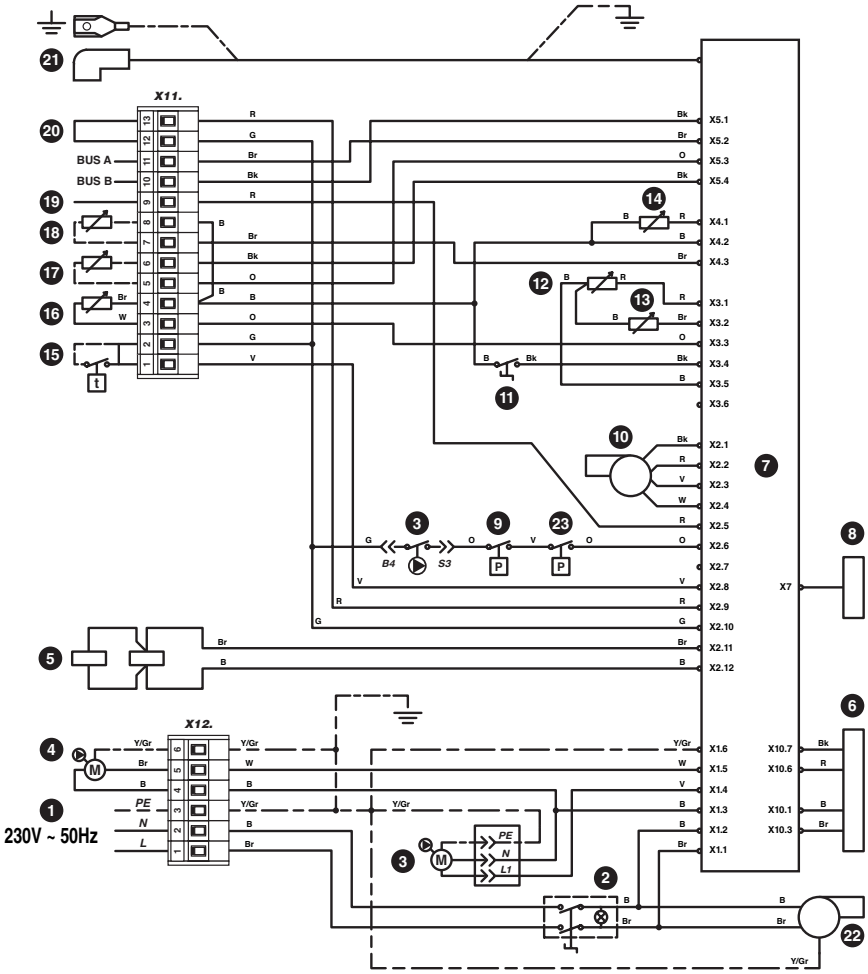
ELECTRICAL CHARACTERISTICS (HM TC ≥ 70 KW EQUIPPED WITH A HIGH EFFICIENCY PUMP).

Main Characteristics		HM TC ≥ 70 kW
Rated voltage	V~	230
Rated frequency	Hz	50
Rated current (fuse)	A	6
Electrical consumption	W	380
Input intensity	A	1.7
IP Class		IP 30

Description

1. 230 V power supply plug
2. ON/OFF master switch
3. Charging pump (high efficiency)
4. Heating pump (option)
5. Gas valve rectifier
6. 230 Volt-24 Volt transformer
7. MCBA
8. Display
9. Low water pressure switch
10. Burner PWM plug
11. Summer/winter switch
12. NTC1 flow sensor
13. NTC2 return sensor
14. NTC5 flue gas temperature sensor
15. Room thermostat (option)
16. NTC3 DHW sensor
17. NTC4 outdoor temperature sensor (option)
18. NTC6 flow sensor for second heating circuit (option)
19. Positive terminal of the ionization current
20. RAM high limit thermostat (option)
21. Ignition and ionization cable
22. 230 Volt burner power supply
23. Gas pressure switch

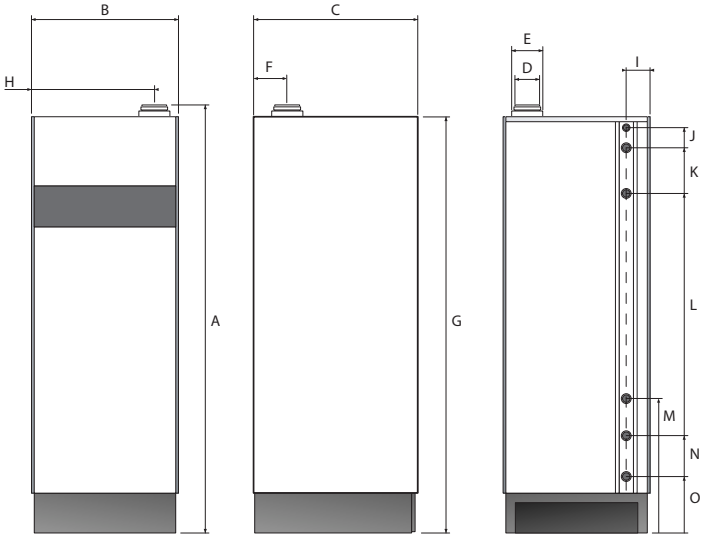
The ionization current is measured between terminal 19 and ground.

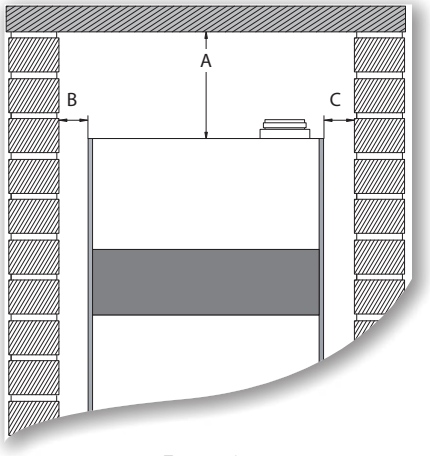


B. Blue
Bk. Black
Br. Brown
G. Grey
O. Orange
R. Red
V. Violet
W. White
Y/Gr. Yellow/Green

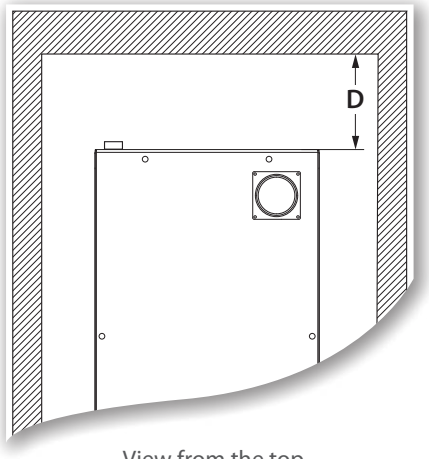
DIMENSIONS

Boiler Dimensions		HM 25 / 35 / 45 TC	HM 70 / 85 TC	HM 120 TC
A = Height	mm	1730	2165	2220
B = Width	mm	600	690	690
C = Depth	mm	670	725	725
D	mm	80	100	100
E	mm	125	150	150
F	mm	140	160	160
G	mm	1705	2115	2170
H	mm	500	580	580
I	mm	110	125	125
J = height at gas valve	mm	1660	2070	2125
K = height at DHW outlet	mm	1560	1975	2030
K = height at primary circuit outlet	mm	1365	1695	1750
M = height at auxiliary circulation loop connection	mm	—	685	740
N = height at primary circuit inlet	mm	405	485	540
O = height at DHW circuit inlet	mm	220	260	315
Heating Connection [F]	Ø	1"	1"1/2	1"1/2
DHW Connection [M]	Ø	1"	1"	1"
Gas connection [M]	Ø	3/4"	3/4"	3/4"
min. Ø of flue pipe	mm	80	100	100
Volume of the combustion chamber	L	4,0	19,3	19,3
Combustion chamber — Height	mm	210	435	435
Combustion chamber — dia.	mm	161	236	236
Drained weight	Kg	174	284	319



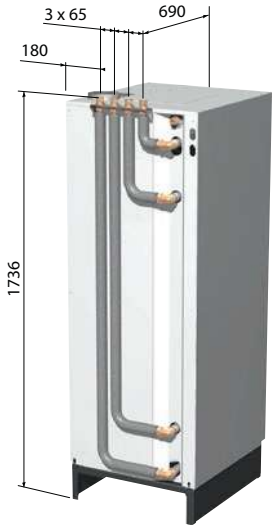


Front view



View from the top

Boiler Clearance		HeatMaster® 25 / 35 / 45 / 70 / 85 / 120 TC
A (mm)	Recommended	400
	Minimum	300
B (mm)	Recommended	800
	Minimum	600
C (mm)	Recommended	400
	Minimum	250
D (mm)	Recommended	600
	Minimum	400



"Easy Fit" kit - only for HeatMaster® 25 / 35 / 45 TC

Clearance with Easy Fit kit		HeatMaster® 25 / 35 / 45 TC
A (mm)	Recommended	400
	Minimum	300
B (mm)	Recommended	400
	Minimum	300
C (mm)	Recommended	400
	Minimum	250
D (mm)	Recommended	600
	Minimum	400

CHIMNEY CONNECTION CHARACTERISTICS

Main Characteristics			HM 25 TC	HM 35 TC	HM 45 TC	HM 70 TC	HM 85 TC	HM 120 TC
Air/flue pipe Ø	concentric	mm	80/125	80/125	80/125	100/150	100/150	100/150
	dual flow	mm	80/80	80/80	80/80	100/100	100/100	100/100
Max. temp of flue gases		°C	120	120	120	120	120	120
Flue gas temp. at water temp. of	50/30°C	°C	—	—	40,9	—	—	42,6
	80/60°C	°C	60	58	64	59	62	65
Max. allowed flue pipe pressure drop		Pa	130	130	130	150	150	240
Max recommended length of concentric flue pipe (corresponding length in meters of straight pipes) *			65	33	22	25	16**	14**
Max recommended length of dual flow (corresponding length in meters of straight pipes) *			130	66	44	50	32**	28**
Available connection types			B23 - B23P - C13 - C33 - C43 - C53*** - C63 - C83, C93					

* See pages 30 and 31 to calculate the equivalent length in meters of straight pipes
** For superior length, please contact ACV.
*** A C53 connection of the HeatMaster 120 TC requires an optional accessory.

It is mandatory to ventilate the boiler room. The high or low air vent opening dimensions depend on the boiler power and the boiler room size. The table below provides indicative values that need to be adapted according to local regulations in force.

Boiler room ventilation		HM 25 TC	HM 35 TC	HM 45 TC	HM 70 TC	HM 85 TC	HM 120 TC
Fresh air supply (B23 / B23P)	**m^3/h**	35.1	49.1	59.2	98.3	119.3	161.5
High ventilation	**dm^2**	0.8	1.1	1.5	2.1	2.6	3.6
Low ventilation	**dm^2**	0.8	1.1	1.5	2.1	2.6	3.6

Flue pipe connection types

C13 : Connection using pipes fitted with a horizontal terminal that simultaneously takes in combustion air for the burner and discharges combustion products outside through openings that are either concentric or close enough together to be subjected to similar wind conditions

C33 : Connection using pipes fitted with a vertical terminal that simultaneously takes in fresh air for the burner and discharges combustion products outside through openings that are either concentric or close enough together to be subjected to similar wind conditions

C43 : Connection using two pipes to a collective duct system serving more than one appliance; this system of collective ducts features two pipes connected to a terminal unit that simultaneously takes in fresh air for the burner and discharges the combustion products outside through openings that are either concentric or close enough together to be subjected to similar wind conditions.

C53 : Connection to separate ducts for supplying combustion air and discharging combustion products; these ducts may end in zones with different pressure levels.

C63 : Type C boiler meant to be connected to a system for supplying combustion air and discharging combustion products, that is approved and sold separately **(Prohibited in Belgium)**.

C83 : Connection using a single or double duct system. The system is made of a normal exhaust flue duct that discharges the combustion products. The appliance is also connected through a second duct fitted with a terminal, that supplies the burner with fresh outdoor air. [Only if the boiler is fitted with an ACV premix BG 2000-S burner].

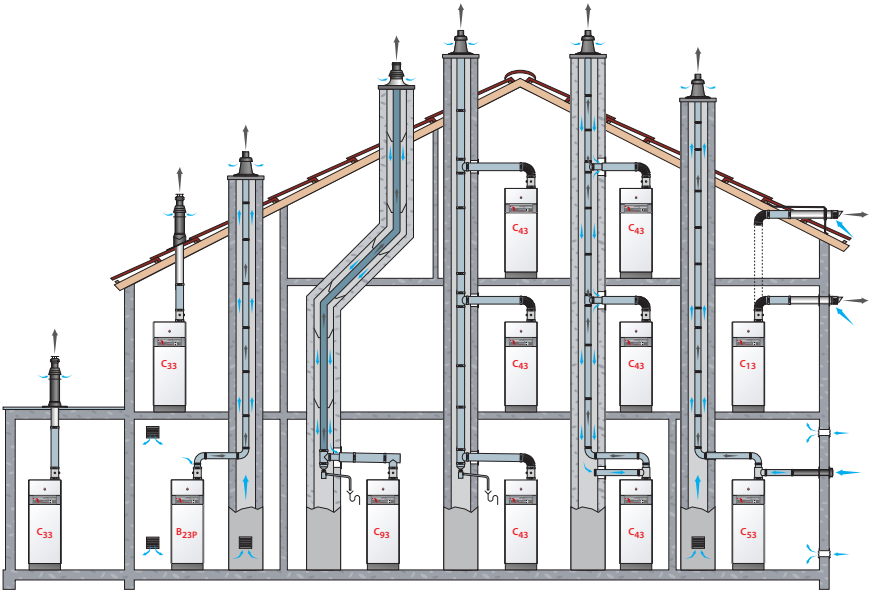
C93 : Connection using an individual system whose combustion product exhaust duct is installed in an exhaust duct that is integral with the building. The appliance, the exhaust duct and the terminal units are certified as an inseparable assembly.

B23 : Connection to an exhaust duct that discharges the combustion products outside the room where it is installed, with the combustion air being drawn directly from the boiler room.

B23P : Connection to a combustion product exhaust system designed to operate with positive pressure.

General remark

- **Make sure to install a measurement unit on the flue pipe, in accordance with the local regulation in force.**



CALCULATION OF THE FLUE PRESSURE DROP, OR OF THE CORRESPONDING LENGTH IN METERS OF STRAIGHT PIPES

When connecting the flue pipes, make sure not to exceed the maximum flue pressure drop value, or the corresponding maximum flue pipe length in meters of straight flue pipes recommended for the product, otherwise the system pressure might decrease.

The flue pipe dimensions can be calculated using either method shown on the next page. These two methods are equivalent. Please refer to the tables below indicating the pressure drop values, as well as the corresponding length in meters of straight flue pipes, applied to each of the connection components. Then compare the calculation result to the recommended maximum flue pressure drop indicated in the table on page 28.

Tables of pressure drop values applied to the various elements for the calculation:

The following tables are based on ACV equipment and cannot be applied as a rule.

	Distinct fresh air supply (L1)											
	Ø 80 mm						Ø 100 mm					
	HM 25 TC		HM 35 TC		HM 45 TC		HM 70 TC		HM 85 TC		HM 120 TC	
	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes
1m straight pipe	1	1.0	2	1.0	3	1.0	4	1.0	6	1.0	11	1.0
90° elbow	1	1.0	2	1.0	4	1.3	8	2.0	12	2.0	21	1.9
45° elbow	1	1.0	1	0.5	2	0.7	3	0.8	5	0.8	10	0.9

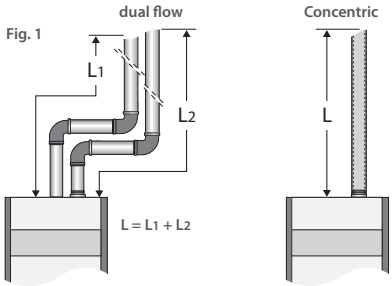
	Distinct flue gas exhaust (L2)											
	Ø 80 mm						Ø 100 mm					
	HM 25 TC		HM 35 TC		HM 45 TC		HM 70 TC		HM 85 TC		HM 120 TC	
	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes
1m straight pipe	1	1.0	2	1.0	3	1.0	2	1.0	3	1.0	5	1.0
90° elbow	1	1.0	3	1.5	5	1.7	7	3.5	10	3.3	17	3.4
45° elbow	1	1.0	2	1.0	3	1.0	5	2.5	7	2.3	12	2.4
C53 adapter	-	-	-	-	-	-	-	-	-	-	43	2.5

L = Sum of the fresh air supply pipe length (L1) and of the flue gas pipe length (L2).

	Concentric flue pipe											
	Ø 80 / 125 mm						Ø 100 / 150 mm					
	HM 25 TC		HM 35 TC		HM 45 TC		HM 70 TC		HM 85 TC		HM 120 TC	
	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes	Pa	corr. length in m of straight pipes
1m straight pipe	2	1.0	4	1.0	6	1.0	6	1.0	9	1.0	17	1.0
Pipe with measurement unit	2	1.0	3	0.8	4	0.7	3	0.5	4	0.4	7	0.4
90° elbow	3	1.5	6	1.5	10	1.7	14	2.3	21	2.3	38	2.2
45° elbow	2	1.0	3	0.8	5	0.8	8	1.3	12	1.3	22	1.3
Vertical terminal	18	9.0	35	8.8	58	9.7	22	3.7	32	3.6	59	3.5
Horizontal terminal	18	9.0	34	8.5	56	9.3	17	2.8	24	2.7	44	2.6

The installer can check that the connection complies (dual flow or concentric, fig. 1) with the recommended values (see tab. page 30 and 31) using one of the methods hereafter.

Fig. 1



Example of verification of the length of concentric flue pipes for a HeatMaster 35 TC :
The methods are detailed through an example. Figure 2 : The assembly is comprised of: 1 pipe with a measurement unit + 2 x 90° elbows + 6 meters of straight pipes + 2 x 45° elbows + 1 vertical terminal.

- **Method 1:**

a) Calculate the pressure drop (Pa) of the whole flue pipe assembly:

3 + (2 x 6) + (6 x 4) + (2 x 3) + 35 = **80**

b) Compare the resulting value with the recommended value (130 Pa).
The pressure drop for this flue pipe length is within the recommended range.

- **Method 2:**

a) Calculate the corresponding length in meters of pipes (L) for the flue pipe assembly:

0,8 + (2 x 1,5) + (6 x 1,0) + (2 x 0,8) + 8,8 = **20,2**

b) Compare the resulting value with the recommended value (**33 m** of corresponding length in meters of straight concentric flue pipes). The flue pipe length is within the recommended range.

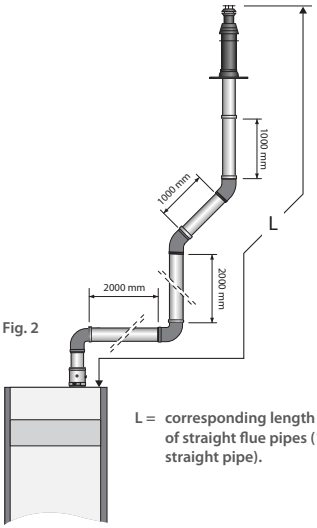


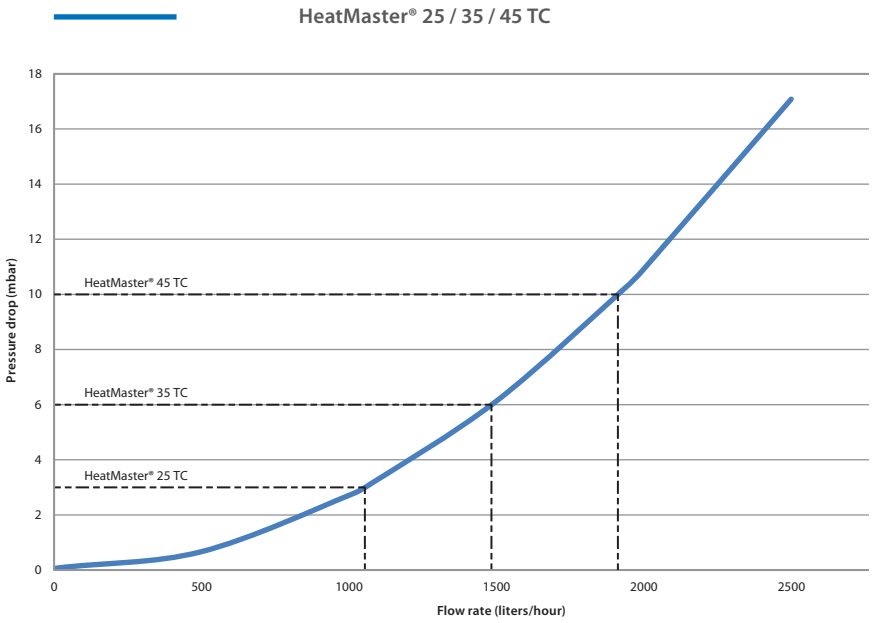
Fig. 2

L = corresponding length in meters of straight flue pipes (1 m straight pipe).

HYDRAULIC CHARACTERISTICS

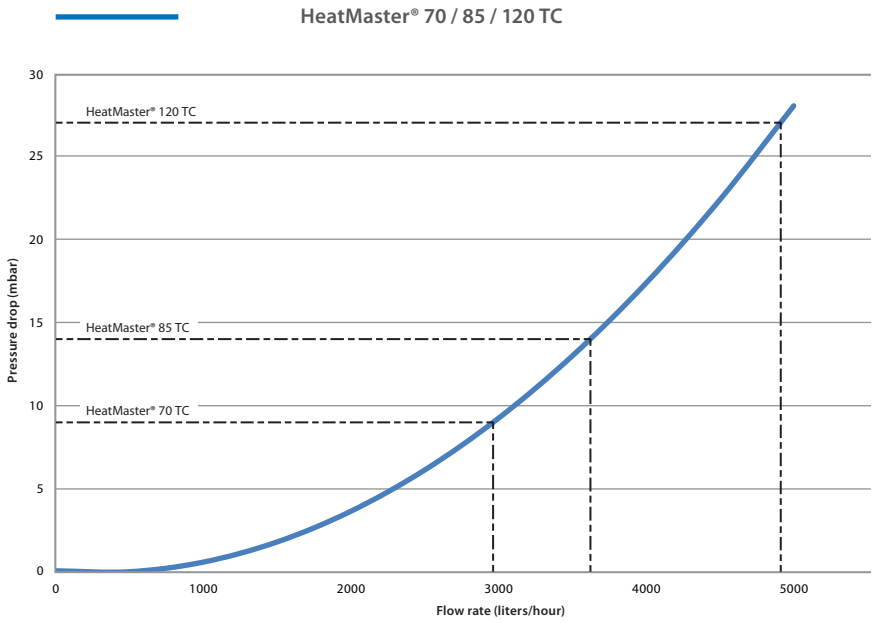
Main Characteristics		HM 25 TC	HM 35 TC	HM 45 TC
Capacity (DHW)	L	100	100	100
Capacity (primary)	L	100	100	100
Primary circuit expansion vessel volume	L	—	—	—
Water pressure drop (primary circuit) (Δt = 20 K)	mbar	3	6	10

Hydraulic pressure drop curve of the boiler



Main Characteristics		HM 70 TC	HM 85 TC	HM 120 TC
Capacity (DHW)	L	190	190	190
Capacity (primary)	L	125	125	125
Primary circuit expansion vessel volume	L	2 x 10	2 x 10	2 x 10
Water pressure drop (primary circuit) (Δt = 20 K)	mbar	9	14	27

Hydraulic pressure drop curve of the boiler



DHW PERFORMANCE

Domestic hot water performance* (cold drink water at 10°C)

Operating conditions at 90°C			HM 25 TC	HM 35 TC	HM 45 TC
Constant flow at	40 °C [ΔT = 30 K]	L/h	789	1104	1392
	45 °C [ΔT = 35 K]	L/h	676	946	1207
Peak flow at	40 °C [ΔT = 30 K]	L/10′	382	440	498
	45 °C [ΔT = 35 K]	L/10′	331	370	409
Peak flow 1st hour at	40 °C [ΔT = 30 K]	L/60′	1125	1360	1595
	45 °C [ΔT = 35 K]	L/60′	973	1159	1345
Reheat time from 10°C to 80°C		min.	35	26	23
DHW efficiency at ΔT = 30 K		%	105.4	105.4	103.1

Domestic hot water performance* (cold drink water at 10°C)

Operating conditions at 90°C			HM 70 TC	HM 85 TC	HM 120 TC
Constant flow at	40 °C [ΔT = 30 K]	L/h	2234	2713	3402
	45 °C [ΔT = 35 K]	L/h	1915	2325	2928
Peak flow at	40 °C [ΔT = 30 K]	L/10′	820	868	964
	45 °C [ΔT = 35 K]	L/10′	668	718	819
Peak flow 1st hour at	40 °C [ΔT = 30 K]	L/60′	2761	3076	3706
	45 °C [ΔT = 35 K]	L/60′	2306	2513	3153
Reheat time from 10°C to 80°C		min.	27	24	23
DHW efficiency at ΔT = 30 K		%	103.9	103.9	102.2

MAXIMUM OPERATING CONDITIONS

Maximum Service Pressure [DHW tank full of water]

- Primary circuit : ..... 3 bar
- DHW circuit : ..... 8,6 bar
- Recommended safety valve (central heating) : ..... 3 bar
- Recommended safety valve (DHW) : ..... 7 bar

Mains supply pressure

- Max 6 bar, without a pressure reducing valve being required (to avoid discharge of the safety pressure valve)

Maximum Operating Conditions

- Maximum temperature (primary) : ..... 90°C
- Maximum temperature (DHW) for the HM 25 / 35 / 45 / 70 TC** : ..... 75°C
- Maximum temperature (DHW) for the HM 85 / 120 TC : ..... 90°C

Water Quality

See "Recommendations for the Prevention of Corrosion and Scaling".

* for DHW temperatures > 45°C (ΔT > 35K), please contact ACV
** For special applications, please contact ACV.

PACKAGE CONTENTS

The HeatMaster® 25 / 35 / 45 / 70 / 85 / 120 TC boilers are delivered assembled and packaged.

At product reception and after removal of packaging, check the package contents and that the appliance is free of damages.

Contents

- Boiler
- Installation, Operation and Maintenance Instructions
- System Control manual
- Cover plate for the natural gas to propane conversion + sticker
- Ball condensate trap to be installed.
- Safety valve kit to be installed (HM TC equipped with a high efficiency pump only), comprised of:
  - A primary safety valve Ø 1/2" F
  - A T-coupling 1/2" F - 1/2" M - 1/4" F (HM 120 TC only)
  - A check-valve Ø 1/4" F - Ø 1/4" M

General remarks

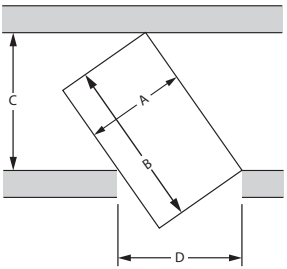
- **The manufacturer reserves the right to change the technical characteristics and features of its products without prior notice.**
- **The availability of certain models as well as their accessories may vary according to markets.**

HOW TO MOVE THE BOILER

Move the boiler using a hand truck or a pallet truck.

Use a means of transport adapted to the boiler weight. See "Dimensions", page 26

Minimum width of the door and the hall necessary to pass the boiler



A = maximum boiler width
B = maximum boiler length
C = Door width
D = Hall width
Door height = std

Hall width : $C = \frac{A}{D} \times B$

Example of calculation to determine the minimum hall width, with a door width: D = 800 mm

$C = \frac{540}{800} \times 1000$ = Hall width ≥ 675 mm

Door width: $D = \frac{A}{C} \times B$

Example of calculation to determine the minimum door width, with ahall width: D = 900 mm

$D = \frac{540}{900} \times 1000$ = Hall width ≥ 600 mm

SAFETY INSTRUCTIONS FOR THE INSTALLATION

General remarks

- The connections (electrical, flue pipe, hydraulic) must be carried out in accordance with current standards and regulations in force.
- If the water drawing off point is far from the tank, installing an auxiliary DHW loop can allow to get hot water more quickly at all times.

Essential recommendations for the correct operation of the appliance

- The boiler must be installed in a dry and protected area.
- Install the appliance to ensure easy access at all times.
- To avoid any risk of corrosion, connect the stainless steel DHW production tank directly to the earth.
- Make sure to install a pressure reducing valve set at 4.5 bar if the mains supply pressure is in excess of 6 bar.
- The DHW circuit must be fitted with an approved safety group, comprised of a 7 bar safety valve, a check valve and a shut-off valve.
- If works need to be performed (in the boiler room or close to the air vents), make sure to turn off the boiler to prevent dust from entering and accumulating in the boiler heating system.

Essential recommendations for safety

- Install the boiler on a base made of non-combustible materials.
- Make sure that all air vents are unobstructed at all times.
- A condensation outlet connected to the sewer must be fitted close to the boiler to prevent the condensation products from the flue pipe from running into the boiler.
- The horizontal flue pipes must be installed with a slight slope of 5 cm per meter, so that the acid condensation water flows to a condensate recovery container and does not damage the heating body.
- Do not store any corrosive products, paint, solvents, salts, chloride products and other detergent products near the appliance.
- The flue pipe diameter must not be smaller than that of the boiler flue gas outlet connection.

- Hot water can cause scalding!
- In the event of small amounts of hot water repeatedly being drawn off, a stratification effect can develop in the tank. The upper hot water layer may then reach very high temperatures.
- ACV recommends using a pre-set thermostatic mixing valve in order to provide hot water at a maximum of 60°C.
- Water heated to wash clothes, dishes and for other uses can cause serious burns.
- In order to avoid exposure to extremely hot water that can cause serious burns, never leave children, old people, disabled or handicapped people in the bath or shower alone.
- Never allow young children to turn on the hot water or fill their own bath.
- The temperature of the domestic hot water can be adjusted up to 90 °C in the boiler. However, the temperature of the domestic hot water at the drawing off point must comply with local regulations. (E.g. in Belgium, the maximum DHW water temperature at a drawing off point must be 75°C for boilers < 70 kW).
- The risk of developing bacteria exists, including "Legionella pneumophila", if a minimum temperature of 60°C is not maintained in both the DHW tank and the hot water distribution network.

Essential recommendations for the electrical safety

- Only an approved installer is authorized to carry out the electrical connections.
- Install a 2-way switch and a fuse or circuit breaker of the recommended rating outside the appliance, so as to be able to shut power down when servicing the appliance or before performing any operation on it.
- Isolate the external electrical supply of the appliance before performing any operation on the electrical circuit.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless supervised or unless they have been given instruction concerning the use of the appliance by a person responsible for their safety.

RECOMMENDATIONS FOR THE PREVENTION OF CORROSION AND SCALING IN HEATING SYSTEMS

How oxygen and carbonates can affect the heating system

Oxygen and dissolved gasses in the water of the primary circuit contribute to the oxidation and the corrosion of the system components that are made of ordinary steel (radiators, ...). The resulting sludge is then deposited in the boiler exchanger.

The combination of carbonates and carbon dioxide in the water results in the formation of scale on the hot surfaces of the installation, including those of the boiler exchanger.

These deposits in the heat exchanger reduce the water flow rate and thermally insulate the exchange surfaces, which is likely to damage them.

Sources of oxygen and carbonates in the heating circuit

The primary circuit is a closed circuit; the water it contains is therefore isolated from the mains water. When maintaining the system or filling up the circuit, water renewal results in the addition of oxygen and carbonates in the primary circuit. The larger the water volume in the system, the larger the addition.

Hydraulic components without an oxygen barrier (PE pipes and connections) admit oxygen into the system.

Prevention Principles

1. **Clean the existing system before installing a new boiler**
   - Before the system is filled, it must be cleaned in accordance with standard EN14336. Chemical cleaning agents can be used.
   - If the circuit is in bad condition, or the cleaning operation was not efficient, or the volume of water in the installation is substantial (e.g. cascade system), it is recommended to separate the boiler from the heating circuit using a plate-to-plate exchanger or equivalent. In that case, it is recommended to install a hydrocyclone or magnetic filter on the installation side.

2. **Limit the fill frequency**
   - Limit fill operations. In order to check the quantity of water that has been added into the system, a water meter can be installed on the filling line of the primary circuit.
   - Automatic filling systems are not recommended.
   - If your installation requires frequent water refilling, make sure your system is free of water leaks.
   - Inhibitors may be used in accordance with standard EN 14868.

3. **Limit the presence of oxygen and sludge in the water**
   - A deaerator (on the boiler flow line) combined with a dirt separator (upstream of the boiler) must be installed according to the manufacturer's instructions.
   - ACV recommends using additives that keep the oxygen in solution in the water, such as Fernox (www.fernox.com) and Sentinel (www.sentinel-solutions.net) products.
   - The additives must be used in accordance with the instructions issued by the manufacturer of the water treatment product.

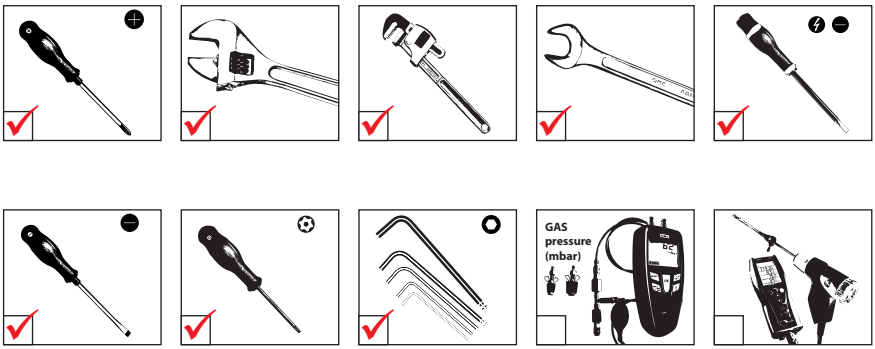
4. **Limit the carbonate concentration in the water**
   - The fill water must be softened if its hardness is higher than 20° fH (11,2° dH).
   - Check regularly the water hardness and enter the values in the service log.
   - Water hardness table :

Water hardness	°fH	°dH	mmolCa(HCO3)2 / l
Very soft	0 - 7	0 - 3.9	0 - 0.7
Soft	7 - 15	3.9 - 8.4	0.7 - 1.5
Fairly hard	15 - 25	8.4 - 14	1.5 - 2.5
Hard	25 - 42	14 - 23.5	2.5 - 4.2
Very hard	> 42	> 23.5	> 4.2

5. **Control the water parameters**
   - In addition to the oxygen and the water hardness, other parameters of the water must be checked.
   - Treat the water if the measured values are outside the range.

Acidity	6,6 < pH < 8,5
Conductivity	< 400 µS/cm (at 25°C)
Chlorides	< 125 mg/l
Iron	< 0,5 mg/l
Copper	< 0,1 mg/l

TOOLS REQUIRED FOR THE INSTALLATION

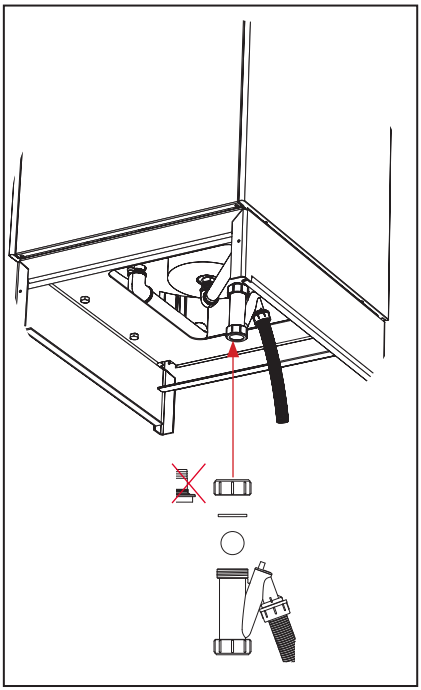


BOILER PREPARATION

If you have selected an "Easy Fit" kit (HeatMaster® 25 / 35 / 45 TC), install it at the rear of the boiler before placing the appliance in its final position.

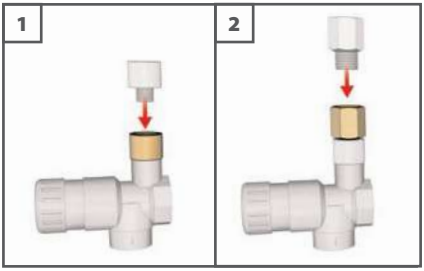
Before placing the boiler in its final position, install:

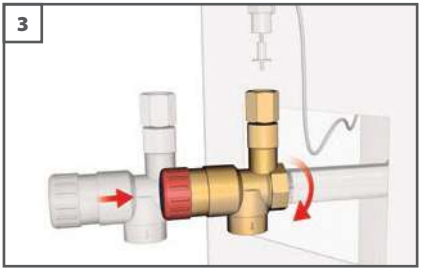
- **The ball condensate trap**



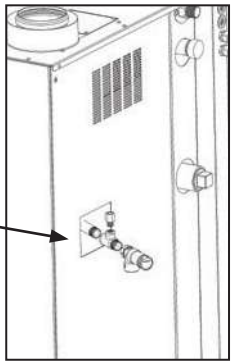
BOILER PREPARATION

- **The safety valve kit (HM TC equipped with a high efficiency pump) :**
  - T-coupling (HM 120 TC only)
  - Check valve
  - Primary circuit safety valve

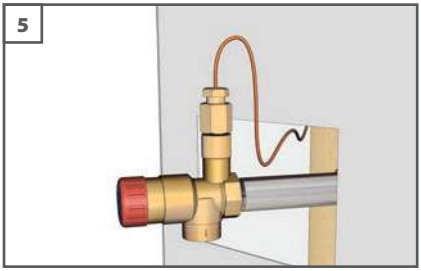




Mounting of the kit with T-coupling (HM 120TC only)



- **The pressure gauge sensor (front panel) into the pressure gauge connection of the safety valve.**



DHW CONNECTION

General remark

- The circuit illustrations are basic principle diagrams only.

Essential recommendation for safety

- The hot water output may reach temperatures in excess of 60°C, which can cause scalding! It is therefore necessary to install a thermostatic mixing valve after the appliance.

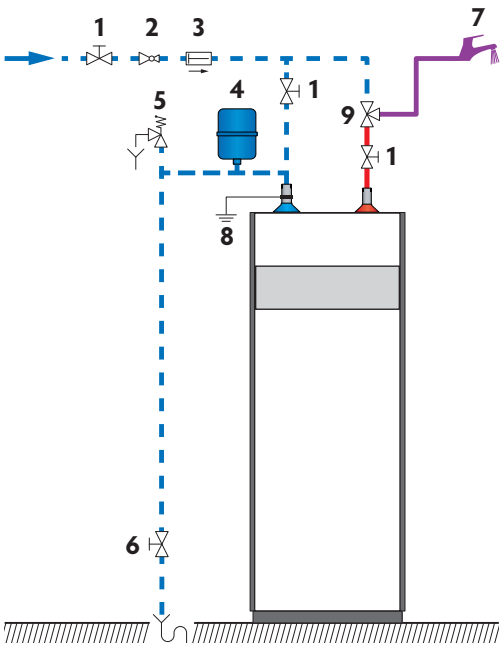
Essential recommendations for the correct operation of the appliance

- Flush the system before connecting the domestic hot water circuit. Refer to the installation instructions.
- Make sure to install a pressure reducing valve set at 4.5 bar if the mains supply pressure is in excess of 6 bar.
- The installation must be fitted with an approved safety group, comprised of a 7 bar safety valve, a check valve and a shut-off valve.
- It is recommended to install an expansion vessel in the DHW circuit to prevent the safety valve from opening constantly and reduce the water hammer effect in the system.
- If the HeatMaster® 25, 35 or 45 TC is used as a domestic hot water preparation tank, an expansion vessel of at least 16 liters must be fitted in the primary circuit (no internal expansion vessel is fitted in the HeatMaster® 25, 35 and 45 TC).

Typical installation

Description

1. Isolating valve
2. Pressure reducing valve
3. Check valve
4. DHW expansion vessel
5. Safety valve
6. Drain valve
7. Draw-off tap
8. Grounding
9. Thermostatic mixing valve

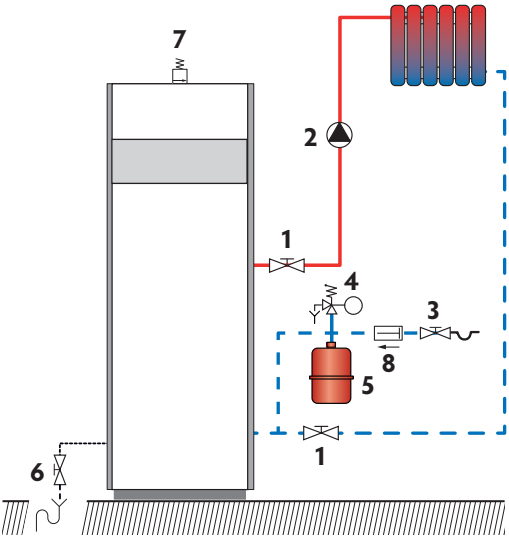


HEATING CONNECTION

For the position and dimension of connections, please refer to "Dimensions", page 26

Typical connection - high temperature

Description
1. Isolating valve
2. Heating pump
3. Filling valve
4. Safety valve
5. Expansion vessel
6. Drain valve
7. Air bleed valve
8. Check valve



Cold water

Hot water

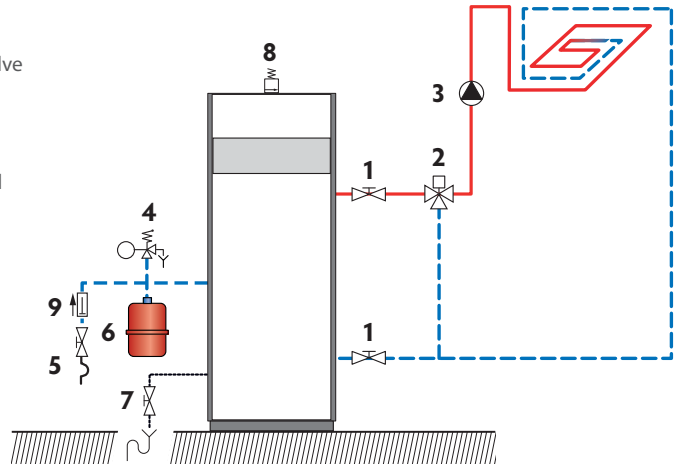
Optional accessories to control a regular high temperature heating circuit. For more information, refer to the System Control manual provided with the boiler.

Accessory	Code	Description
Room thermostat	10800018	
High temperature kit DN 25 (HM 25 / 35 / 45 TC)	10800294	Includes a heating pump, two isolating valves, a check valve and two thermometers.
High temperature kit DN 32 (HM 70 / 85 / 120 TC)	10800296	Includes a heating pump, two isolating valves, a check valve and two thermometers.

Typical connection - low temperature

Description

1. Isolating valve
2. 3-way mixing valve
3. Heating pump
4. Safety valve
5. Filling valve
6. Expansion vessel
7. Drain valve
8. Air bleed valve
9. Check valve



Cold water

Hot water

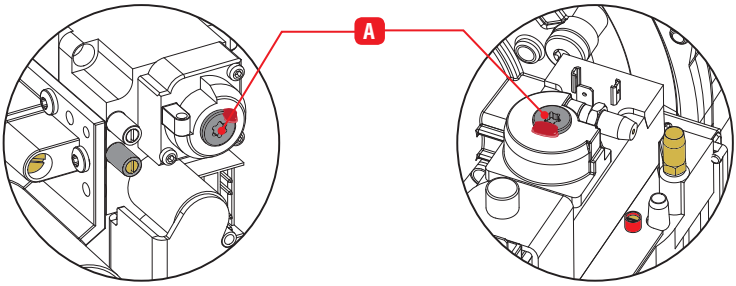
Optional accessories to control a regular low temperature heating circuit. For more information, refer to the System Control manual provided with the boiler.

Accessory	Code	Description
Room thermostat	10800018	
Contact thermostat	10510900	Mandatory to protect all floor heating circuits.
Low temperature kit DN 25 (HM 25 / 35 / 45 TC)	10800295	Includes a heating pump, two isolating valves, a check valve, two thermometers, a 3-way valve with built-in bypass and a servomotor.
Low temperature kit DN 32 (HM 70 / 85 / 120 TC)	10800297	Includes a heating pump, two isolating valves, a check valve, two thermometers and a 3-way valve with built-in bypass.
Servomotor	10800199	Motor for the 3-way valve provided with the low temperature kit.

GAS CONNECTION

Essential recommendations for safety

- The gas connection must comply with all applicable standards [e.g. in Belgium: NBN D51-003].
- The gas burners are factory preset for use with natural gas [equivalent to G20].
- The natural gas to propane conversion or the reverse is not authorized in certain countries such as Belgium. Refer to the table of gas categories in the technical characteristics of this manual.
- The CO_2, gas flow rate, air flow rate and air/gas supply parameters are factory-preset and may not be modified **in Belgium**, except for type I 2E(R)B boilers.
- Do not change the OFFSET (A) setting of the gas valve: it is factory-preset and sealed.



HeatMaster® 120 TC only

Essential recommendations for the correct operation of the appliance

- Refer to the technical characteristics of this manual or to the burner documentation to know the connection diameters.
- Bleed the gas duct and check thoroughly if all the boiler tubes, both internal and external, are tight.
- Check the system gas pressure. Refer to the table containing all relevant data in the section "Technical characteristics".
- Check the boiler electrical connection, the boiler room air vent system, the tightness of flue gas outlet pipes and of the burner chamber plate.
- Control the gas pressure and consumption at appliance start up.
- Check the boiler CO_2 adjustment (refer to the adjustment procedure and the technical data).

CONVERSION TO PROPANE (HM 85 / 120 TC)

According to the indication on the type plate, the boiler is factory preset to operate with natural gas (G20/G25). Converting the boiler to propane is done through the addition of a cover plate and adjustments.

Set-up conditions

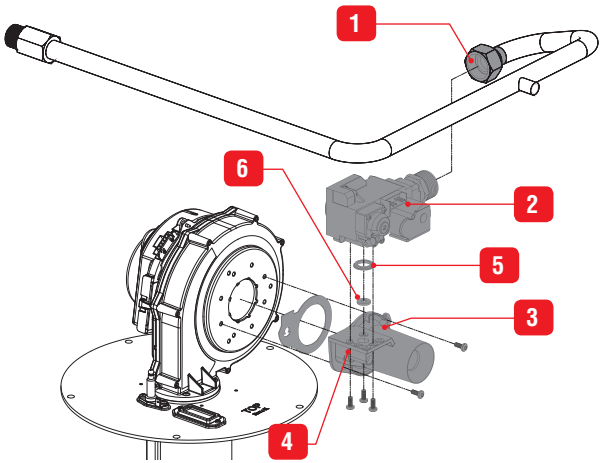
- External power supply isolated
- Gas supply closed
- Upper panel of the boiler removed

Procedure of cover plate addition

To know where the components are located on the HM 120 TC, refer to figure on page 13.

1. Unscrew the gas tube pipe (**1**).
2. Remove the plug from the gas valve (**2**).
3. Disconnect the air inlet.
4. Remove the gas valve/venturi assembly (**3**) by releasing two screws. Retain the screws for reinstallation.

	Cover plate Ø	
Gas type	HM 85 TC	HM 120 TC
G20/25	—	10.7
G31	6.8	6.7



5. Remove the gas valve from the venturi (**4**) by releasing 3 screws. Retain the screws for reinstallation.
6. Install the cover plate (**6**) in the center of the O-ring (**5**).

Make sure you position the O-ring correctly.

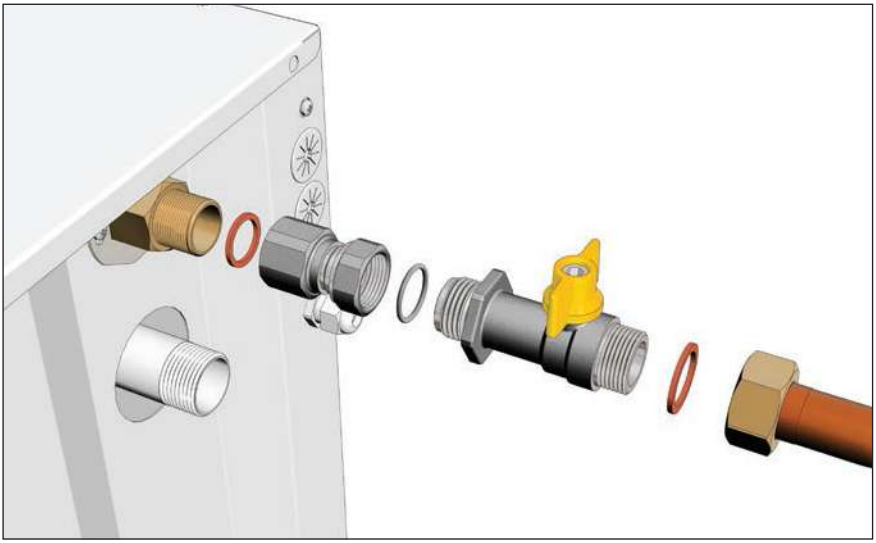
7. Reassemble the gas valve/venturi assembly, following the same procedure in reverse order, and tighten the 3 gas valve screws and the 2 venturi screws with a torque of 3.5 to 4 Nm.
8. Stick the sticker provided with the conversion kit on the boiler and check the box to indicate the type of gas to be now used with the boiler.

Follow-on tasks

- Adjust parameters 22 to 28 of MCBA (See the System Control manual)
- Carry out the CO_2 adjustment, (see "Checking and adjusting the burner")

Before carrying out the CO_2 adjustment, it is important to adjust the fan speed parameters (See the System Control manual of the boiler).

GAS CIRCUIT CONNECTION



SAFETY INSTRUCTIONS FOR STARTING UP

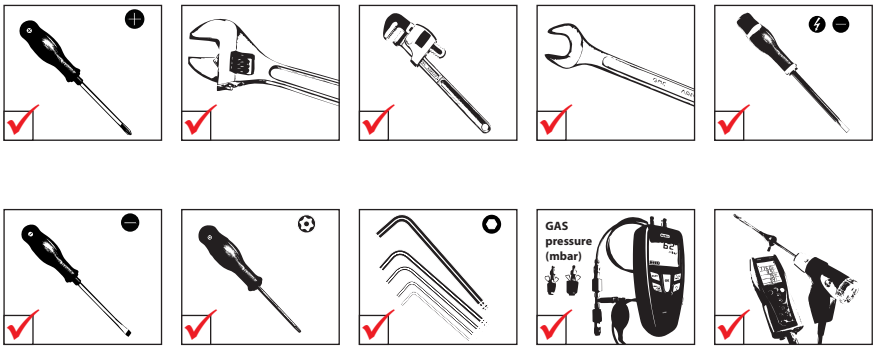
General remark

- In normal operation, the burner starts automatically as soon as the boiler temperature drops below the preset temperature.

Essential recommendations for safety

- The components inside the control panel may only be accessed by an approved installer.
- Set the water temperature in accordance with usage and local plumbing codes.

TOOLS REQUIRED FOR STARTING UP



CHECKS BEFORE STARTING UP

Essential recommendation for safety

- Check the tightness of the flue pipe connections.

Essential recommendation for the correct operation of the appliance

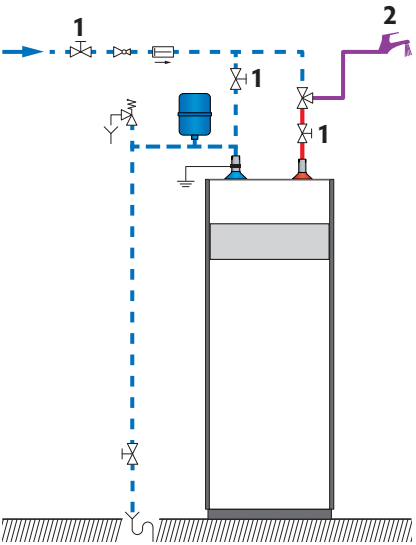
- Control the tightness of the hydraulic circuit connections.

FILLING THE SYSTEM

First put the DHW tank under pressure before pressurizing the heating (primary) circuit.

Filling the domestic hot water circuit

1. Open the isolating valves (**1**) and the draw-off tap (**2**).
2. Once the water flow rate has stabilized and the air is totally evacuated from the system, close the draw-off tap (**2**).
3. Check all the connections for leaks.

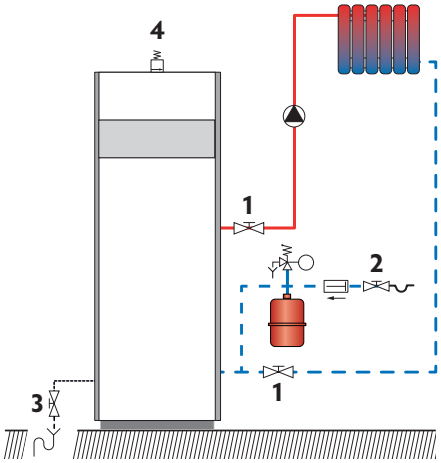


Cold water

Hot water

Filling of the heating circuit

1. Open the isolating valves (**1**).
2. Make sure that the drain valve (**3**) is tightly closed.
3. Open the filling valve (**2**).
4. Open the air bleed valve (**4**).
5. Once the system is bled from air, bring the pressure to the static pressure + 0.5 bar: 1.5 bar = 10m - 2 bar = 15m



STARTING UP THE BOILER

Set-up conditions

- All connections made
- Gas conversion carried out as required
- Power supply
- Gas supply open
- DHW and heating circuits full of water

Procedure

1. Place the ON/OFF master switch on the ON position (⏻).

2. If a room thermostat is installed, possibly increase the temperature set-point to generate a demand.

If the boiler charging pump does not work, the boiler can be damaged and its life reduced.

3. Check with your hand (pump vibrations) that the charging pump is not blocked and unblock it if required.

On the HM TC equipped with a high efficiency charging pump, a fault code "b 26" shows on the control panel display. Refer to the System Control manual provided with the boiler.

4. Checking and adjusting the burner (see “Checking and adjusting the burner”, page 52).

5. After 5 minutes of operation, bleed the heating circuit until all air is evacuated and restore a 1.5 bar pressure.

6. Bleed the central heating circuit once again and top it up with water to get the required pressure, if necessary.

7. Make sure that the central heating system is properly balanced and, if needed, adjust the valves to prevent certain circuits or radiators from getting a flow rate that is far above or below the set rate.

CHECKING AND ADJUSTING THE BURNER

When the burner operates at full power, the CO_2 rate must be within the limits mentioned in the technical characteristics, (see "Combustion characteristics", page 18).

Set-up conditions

- Operating boiler

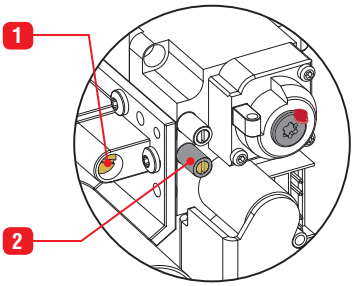
Check procedure

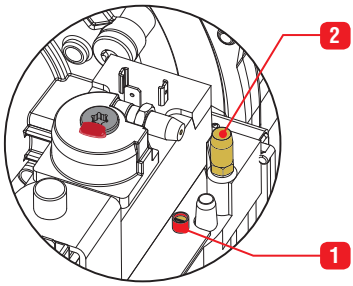
1. Check if the MCBA parameters are set to meet the user's requirements (see "Parameter setting", page 7), and change them if required.
2. Put the boiler to maximum power mode (Refer to the System Control manual provided with the boiler).
3. Using a pressure tester, check that the dynamic gas pressure at the gas valve (**2**) is at least 18 mbar.
4. Allow the appliance to heat for a few minutes until it reaches at least 60°C.
5. Measure the burner combustion by placing the flue gas analyzer probe in the measurement unit port on the flue pipe and compare the CO and CO_2 values displayed with those indicated in the combustion characteristics table.
6. If the CO_2 value differs by more than 0.3%, carry out the adjustment mentioned in the procedure below.
7. Then put the boiler to the minimum power mode (Refer to the System Control manual provided with the boiler). Allow the boiler to stabilize for a few minutes.
8. Measure the CO_2 level. It must be equal to the value at full power, or lower than that value by 0.5% maximum. If there is a significant deviation, please contact ACV's maintenance department.

CO_2 adjustment procedure

To adjust the CO_2 rate, rotate the venturi screw (**1**) :

- to the left (counterclockwise) **to increase the** CO_2 rate.
- to the right (clockwise) **to decrease the** CO_2 rate.





HeatMaster® 120 TC only

The CO_2 adjustment screw (1) of the HM 120 TC is a worm screw, whose rotation in a direction causes the CO_2 rate to cyclically increase to the maximum, then decrease to the minimum, then increase again, and so on. To adjust, monitor the value change on the analyzer to determine whether the rotation in the selected direction causes the CO_2 value to increase or decrease.

SAFETY INSTRUCTIONS FOR THE BOILER MAINTENANCE

Essential recommendation for the electrical safety

- **Isolate the external power supply of the appliance before performing any operation, unless it is required to take measurements or perform system setup.**

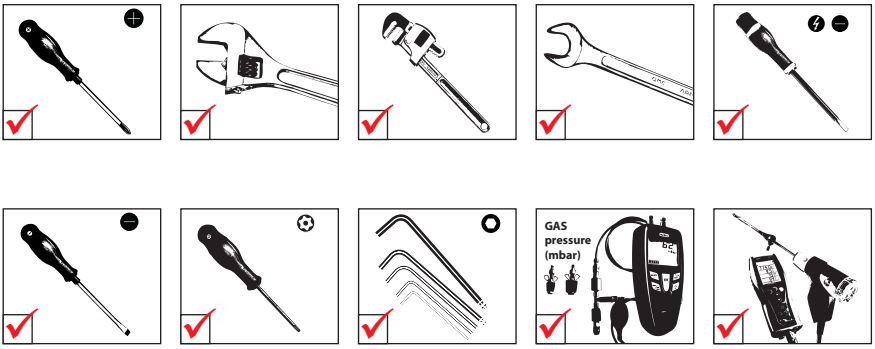
Essential recommendations for safety

- **Water flowing out of the drain valve may be extremely hot and could cause severe scalding.**
- **Check the tightness of the flue pipe connections.**

Essential recommendations for the correct operation of the appliance

- **It is recommended to have the boiler and the burner serviced at least once a year or every 1,500 hours. More frequent servicing may be required depending on boiler use. Please consult your installer for advice.**
- **The boiler and burner maintenance will be carried out by a qualified engineer, and the defective parts may only be replaced by genuine factory parts.**
- **Control the tightness of the hydraulic circuit connections.**
- **Make sure to replace the gaskets of the removed items before reinstalling them.**

TOOLS REQUIRED FOR MAINTENANCE



BOILER SHUT DOWN FOR MAINTENANCE

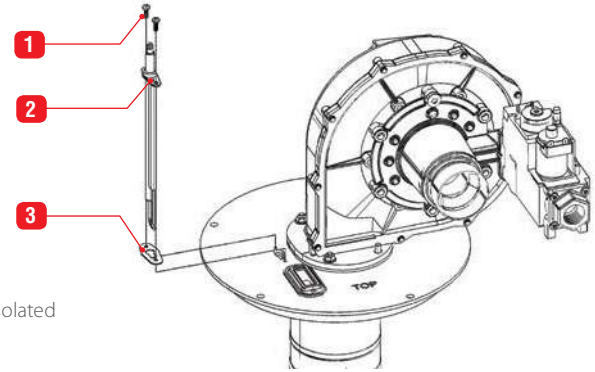
1. Switch the boiler off using the ON/OFF master switch and isolate the external power supply.
2. Close the gas supply valve of the boiler.

PERIODIC BOILER MAINTENANCE TASKS

	Tasks	Frequency		
		Periodic inspection	1 year	2 years
		End-user	Professional	
1.	Make sure that the system water pressure is at least 1 bar when cold. Top up the system if necessary, adding small quantities of water at a time. In case of repeated fills, call your installer.	X	X	
2.	Check that there is no water on the floor in front of the boiler. Call your installer if there is.	X	X	
3.	Check that no error code is displayed on the control panel. Call your installer if necessary.	X	X	
4.	Check that all gas, hydraulic and electrical connections are correctly fastened and tight.		X	
5.	Check the flue gas exhaust: correct fastening, correct installation, no leaks or clogging.		X	
6.	Check that there is no discolored or cracked area on the burner chamber plate .		X	
7.	Check the combustion parameters (CO and CO_2), see "Checking and adjusting the burner", page 52		X	
8.	Check visually the heating body: no evidence of corrosion, soot deposits or damages. Carry out all required cleaning tasks, repairs and replacements that might be required.		X	
9.	Check the electrode, see "Removal, check and reinstallation of the burner electrode", page 56			X
10.	Remove the burner and clean the exchanger, see "Removal and reinstallation of the burner", page 57 and "Cleaning the exchanger", page 58.			X
11.	Remove and clean the condensate recovery dish, see "Removing and cleaning the condensate recovery dish", page 59			X

REMOVAL, CHECK AND REINSTALLATION OF THE BURNER ELECTRODE

It is recommended to remove the electrode before removing the burner in order to prevent the insulation block from being damaged when lifting the burner.

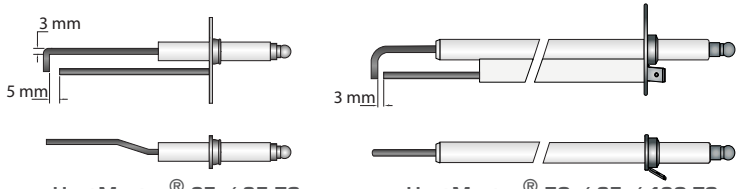


Set-up conditions

- Boiler shut down
- External power supply isolated
- Gas supply closed

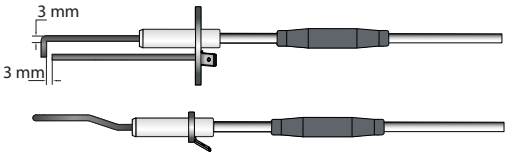
Removal procedure

1. Open the upper front panel of the boiler and remove the upper panel, located on top of the boiler by releasing two cross-head screws.
2. Unplug the electrode ignition cable.
3. Disconnect the electrode grounding cable.
4. Remove two mounting screws (1) and retain them for reinstallation.
5. Remove the electrode (2).
6. Check the correct alignment of the electrode ends and that the gap corresponds to the values indicated in the figure below.



HeatMaster® 25 / 35 TC

HeatMaster® 70 / 85 / 120 TC



HeatMaster® 45 TC

7. Check the gap between the electrode and the burner tube, see "Removal and reinstallation of the burner", page 57.

Reinstallation procedure

1. Reinstall a new gasket (3).
2. Reinstall the electrode (2) using the two screws (1), torque them at 3 to 3.5 Nm, making sure that the lock washer is correctly installed between the grounding cable and the electrode.
3. Reconnect the electrode grounding cable and the ignition cable.

REMOVAL AND REINSTALLATION OF THE BURNER

Set-up conditions

- Boiler shut down
- External power supply isolated
- Gas supply closed
- Electrode removed
- Front and upper panels open

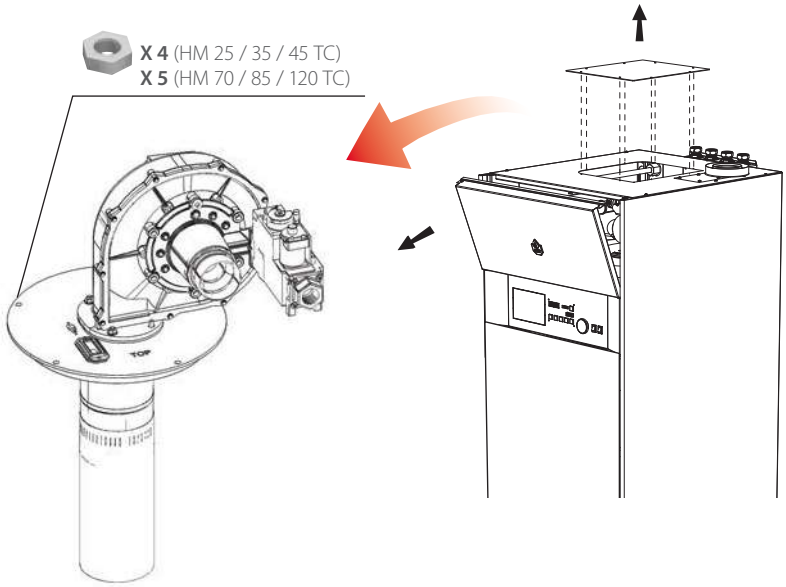
Removal procedure

1. Disconnect the plug(s) from the motor side and the plug from the gas valve side
2. Disconnect the pressure hose and the air tube.
3. Unscrew the gas pipe connection.
4. Using an open-end spanner, release the burner retaining bolts.

Make sure the electrode is removed before lifting the burner, or the insulation block may be damaged.

5. Lift the burner, fan and gas valve assembly, rotating it slightly to get it out of the exchanger.

Try not to damage the burner insulation in the exchanger, nor the burner chamber plate.



6. Check the insulation block condition and replace it if it is cracked or broken.

Check that there is no discolored or cracked area on the burner chamber plate. If it is the case, contact ACV's maintenance department.

7. Remove and replace the seals.
8. While the burner is removed, temporarily install the electrode in its housing and check that the gap between the electrode and the burner tube is approximately 5 mm.
9. Remove the electrode and retain for reinstallation.
10. If required, clean the exchanger, see "Cleaning the exchanger", page 58

Reinstallation procedure

1. Reinstall the burner, making sure that the hole to fit the electrode in the burner chamber plate and the hole in the insulation block are aligned.
2. Install the retaining nuts and fasten them in a crosswise pattern with a tightening torque of 5 to 6 Nm.
3. Reconnect the gas pipe.
4. Reconnect the air tube and the pressure hose.
5. Connect the plug(s) on the motor side and on the gas valve side.

Follow-on tasks

1. Reinstall the electrode, see "Removal, check and reinstallation of the burner electrode", page 56

CLEANING THE EXCHANGER

Set-up conditions

- Boiler shut down
- External power supply isolated
- Gas supply closed
- Burner removed i.a.w. procedure "Removal and reinstallation of the burner", page 57.
- Front and upper panels open

Procedure

1. Remove the burner insulation.
2. Vacuum clean the chamber.
3. Pour some water in the chamber to flush away any foreign deposits that may be present in the flue pipes.
4. In the case of HM TC that are not equipped with a recirculation copper tube, access the condensate ball trap by opening the boiler base, then remove and clean the condensate trap. Reinstall the condensate trap, refer to "Boiler preparation", page 41.

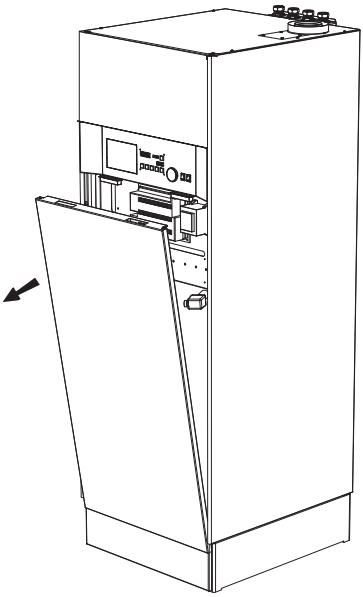
Follow-on tasks

1. Reinstall the burner according to procedure "Removal and reinstallation of the burner", page 57
2. Reinstall the electrode according to procedure "Removal, check and reinstallation of the burner electrode", page 56.
3. In the case of HM TC equipped with recirculation copper tube, remove and clean the condensate recovery tray and the condensate trap according to procedure on next page.
4. In the case of HM TC that are not equipped with a recirculation copper tube, restart the boiler in accordance with procedure "Restarting after maintenance", page 61

REMOVING AND CLEANING THE CONDENSATE RECOVERY DISH (HM TC EQUIPPED WITH A RECIRCULATION COPPER TUBE)

Set-up conditions

- Boiler shut down.
- External power supply isolated.
- Gas supply closed.
- Primary circuit of boiler drained, see "Draining the boiler", page 60.
- Hydraulic circuits (DHW and primary) isolated
- Lower front panel and base open



Procedure

Make sure that the primary circuit of the boiler has been completely drained of water before starting the procedure.

1. Remove and clean the ball condensate trap.
2. Disconnect the lower couplings.
3. Disconnect the flue gas sensor.
4. Remove the flue pipe elbow.
5. Disconnect the copper tube located between the charging pump and the condensate recovery dish.
6. Remove the condensate recovery dish and clean it.
7. Replace the condensate recovery dish gaskets
8. Reinstall the condensate recovery dish and reconnect all the previously disconnected items, in the oposite order as that mentioned in steps 2 to 5. Make sure to replace the seals and gaskets as required.

Follow-up tasks

1. Reinstall the condensate trap, see "Boiler preparation", page 41
2. Restart the boiler according to procedure, "Restarting after maintenance", page 61

DRAINING THE BOILER

Before draining the DHW tank, drain the heating (primary) circuit or bring its pressure to 0 bar.

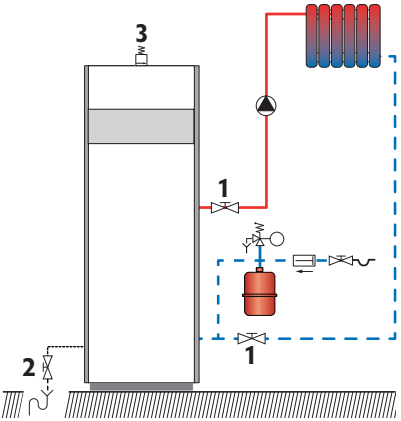
Water flowing out of the drain valve may be extremely hot and could cause severe scalding. Keep people away from the hot water discharge.

Set-up conditions

- Boiler switched off using the ON/OFF master switch
- External power supply isolated
- Fuel/gas supply closed

Heating circuit draining procedure

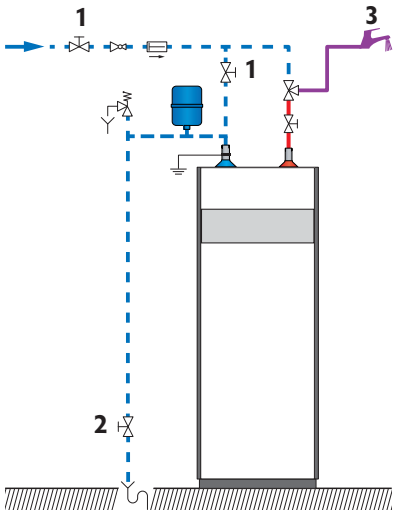
1. Close the isolating valves (**1**).
2. Connect the drain valve (**2**) to the sewer with a hose.
3. Open the drain valve (**2**) to empty the heating circuit of the boiler.
4. Open the circuit air bleed valve (**3**) to accelerate the draining process.
5. Close the drain valve (**2**) and the air bleed valve (**3**) once the heating circuit of the boiler is empty.



DHW circuit draining procedure

Before draining the DHW tank, make sure that the heating (primary) circuit pressure is null.

1. Open fully a draw-off tap (**3**) for about 60 minutes to make sure that the DHW tank has cooled down.
2. Close the isolating valves (**1**).
3. Connect the drain valve (**2**) to the sewer with a hose.
4. Open the drain valve (**2**) and drain the DHW tank water to the sewer.
5. Open the draw-off tap (**3**) to accelerate the draining process. If it is located lower than the tank connection, open a draw-off tap located higher in the system.
6. Close the drain valve (**2**) and the draw-off tap (**3**) once the DHW tank of the boiler is empty.



RESTARTING AFTER MAINTENANCE

Set-up conditions

- All removed components reinstalled
- All connections made
- Power supply
- Gas supply open
- DHW and heating circuits full of water

Procedure

1. Switch the appliance on using the ON/OFF master switch.
2. Set the appliance at maximum power and check the absence of burned gas leaks.
3. Check the correct operation of the charging pump.
4. Check the gas pressure and CO_2 adjustment in accordance with procedure "Checking and adjusting the burner", page 52.

IN CASE OF PROBLEM...

In case or problem, refer first to the "System Control Manual" provided with the boiler. A list of blockage and error codes is provided to help you solve specific issues.

If no solution can be found, please contact your ACV representative and communicate the Article Number and Serial number of the appliance that can be found on the boiler type plate.

Boiler Marking

To access the type plate, turn off the boiler and isolate the external power supply.

Location:

HM 25 / 35 / 45 TC: Upper section of the right side panel, inside the boiler. Release two upper fasteners to open the upper panel.

HM 70 / 85 / 120 TC : Lower section of the right side panel, inside the boiler. Release two front fasteners to open the lower panel.

The part number (Code) and serial number (N°) of the appliance are indicated on its rating plate and must be provided to ACV in case of warranty claim. Failure to do so will make the claim void.

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DECLARATION OF CONFORMITY - CE

Name and address of manufacturer: **ACV International** SA / NV
Kerkplein, 39
B-1601 Ruisbroek

Description of product type: **Gas condensing boilers**

Models: **HeatMaster 25 TC**
HeatMaster 35 TC
HeatMaster 45 TC

CE # : **0461BQ0820**

We declare hereby that the appliance specified above is conform to the type model described in the **CE** certificate of conformity to the following directives:

Directives	Description	Date
92/42/EEC	Efficiency Requirements Directive	20.03.2008
2009-142-CE	Gas Appliances Directive	30.10.2009
2006/95/EC	Low Voltage Directive	12.12.2006
2004/108/EC	Electromagnetic Compatibility Directive	15.12.2004

We declare under our sole responsibility that the product **HeatMaster** complies with the following standards and directives:

EN 303-3	EN 60335-2-102	EN 61000-3-2
EN 483	EN 55014-1	EN 61000-3-3
EN 677	EN 55014-2	

Ruisbroek, 24/09/2013

Date

Director R & D
Marco Croon

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DECLARATION OF CONFORMITY - CE

Name and address of manufacturer: **ACV International** SA / NV
Kerkplein, 39
B-1601 Ruisbroek

Description of product type: **Gas condensing boilers**

Models: **HeatMaster 70 TC ***
HeatMaster 85 TC **
HeatMaster 120 TC **

CE # : **0461BS0890**

We declare hereby that the appliance specified above is conform to the type model described in the **CE** certificate of conformity to the following directives:

Directives	Description	Date
92/42/EEC	Efficiency Requirements Directive	20.03.2008
2009-142-CE	Gas Appliances Directive	30.10.2009
2006/95/EC	Voltage Limits Directive	12.12.2006
2004/108/EC	Electromagnetic Compatibility Directive	15.12.2004

We declare under our sole responsibility that the product **HeatMaster** complies with the following standards and directives:

EN 677 *	EN 55014-1	EN 61000-3-3
EN 15417 **	EN 55014-2	
EN 60335-2-102	EN 61000-3-2	

Ruisbroek, 02/04/2013
Date

Director R & D
Marco Croon

MARKINGS

LABELS