

# HeatMaster®

25 C

**ENGLISH**

**INSTALLATION,  
OPERATING AND  
MAINTENANCE  
INSTRUCTIONS**



*excellence in hot water*

## IMPORTANT NOTES

4

Who should read these instructions

4

Symbols

4

Recommendations

4

Certification

4

Important notes

4

## HEATING WATER RECOMMENDATIONS

5

Generality

5

Principle of prevention

5

Installation cleaning

5

## INTRODUCTION

6

Working principle

6

Technical Characteristics

7

Hot water performance

7

Frost protection

7

## USER GUIDE

8

Use of the ESYS controller

8

## TECHNICAL CHARACTERISTICS

9

General characteristics

9

Domestic hot water provision

10

Gas categories

10

## ELECTRICAL CONNECTION

11

Schematic diagram

12

## INSTALLATION INSTRUCTIONS

13

Dimensions

13

Hydraulic connection

13

Boiler Room

13

Accessibility

13

<b>INSTALLATION</b>	<b>14</b>
Flue connection	14
Gas connection	16
Domestic hot water connection	16
Central heating connection	17
Installation of a single heating circuit with regulation by ACV 22 room thermostat	18
Installation of a single heating circuit regulated by the Room Unit	20
<b>COMMISSIONING AND MAINTENANCE</b>	<b>22</b>
Commissioning of the installation	22
Checking the settings	22
Boiler maintenance	22
Temperature sensor resistance table	22
Dismantling the burner	23
Disassembling and inspecting the electrode	23
Cleaning the exchanger	23
<b>ESYS PARAMETERS FOR THE SPECIALIST</b>	<b>24</b>
Code mode	24
Communication mode	25
Parameter mode	26
Test Mode	28
Error Mode	29
Info mode	30
<b>ESYS ERRORS AND BLOCKING CODES</b>	<b>32</b>
List of error codes and solutions	32

# IMPORTANT NOTES

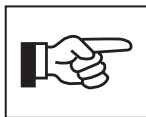
## WHO SHOULD READ THESE INSTRUCTIONS

These instructions should be read by:

- the design engineer/consultant
- the user
- the installer
- the service engineer

## SYMBOLS

The following symbols are used in this manual:



Essential instruction for the correct operation of the installation.



Essential instruction for the safety of persons and the environment.



Electrocution hazard: use a qualified technician.



Burn hazard.

## RECOMMENDATIONS



- Carefully read this manual before installing and bringing the boiler into service.
- It is prohibited to modify the interior of the appliance in any way, without the manufacturer's prior written agreement.
- The boiler must be installed by a qualified engineer, in accordance with applicable local standards and regulations in force.
- Failure to follow the instructions describing test operations and procedures could result in personal injury or a risk of environmental pollution.
- In order to ensure the appliance operates safely and correctly, it is important to have it serviced by an approved installer.
- If there is a problem please contact your installer for advice.
- In spite of the strict quality standards that ACV applies to its appliances during production, inspection and transport, faults may occur. Please immediately notify your approved installer of any faults. Remember to indicate the fault code as it appears on the screen.
- Faulty parts must only be replaced with original factory parts.

- All of our gas burners are tested and pre-adjusted in the factory for natural gas [equivalent to G20]
- Specific regulation in Belgium:  
The CO<sub>2</sub>, gas flow, air flow and air/gas supply parameters are adjusted in the factory and cannot be changed in Belgium.



- Before carrying out any work on the boiler, it is important to isolate the electrical supply to the unit.
- The user must not attempt to gain access to the components inside the boiler or the control panel.
- This appliance is not intended for use by persons with reduced physical, sensory or mental capacities, or lack of experience and knowledge (including children), unless they have been supervised or instructed concerning use of the appliance by a person responsible for their safety.

## CERTIFICATION

The appliances bear the "CE" mark, in accordance with the standards in force in the various countries [European Directives 92/42/EEC "Efficiency", 90/396/CEE "Gas Appliances"].

These appliances also bear the Belgian gas boiler quality label "HR-TOP" [condensing gas boiler].



## IMPORTANT NOTES

If you smell gas:

- Isolate the gas supply immediately.
- Ventilate the room (Open the windows).
- Do not use electrical appliances and do not operate switches.
- Notify your gas supplier and/or your installer immediately.

This manual forms part of the items delivered with the appliance and must be given to the user to keep in a safe place!

The system must be installed, commissioned, serviced and repaired by an approved installer, in accordance with current standards in force.

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.



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.



# HEATING WATER RECOMMENDATIONS

## GENERALITY

Filling water contains elements susceptible to damage boilers heat exchangers in case their concentration goes out of an adequate range.

The risk is growing with the size of the installation since the water content per installed kW increases.

## PRINCIPLE OF PREVENTION

### OXYGEN

Depending of the volume of the installation, a certain amount of oxygen is introduced in the installation. During the exploitation of the installation, some oxygen can be brought in the system in case of water re-filling and/or presence of hydraulic components without oxygen barrier (PE tubes & connectors).

The oxygen reacts with the steel creating corrosion and generating sludges. While the ACV heat exchanger is made of stainless steel and is by consequent not sensible to corrosion, the sludges generated in carbon steel part of the installation (radiators, ...) will lay down in the hot parts including the heat exchanger.

The sludges in the heat exchanger have the effect to reduce the water flow rate and to thermically insulate the active parts of the heat exchanger, what could lead to damages.

### HOW TO PREVENT AGAINST OXYGEN ?

- mechanical system : an air remover combined to a sludges remover installed following the constructors specifications limits efficiently the risk of oxygen in the installation;
- chemical system : additives allow the oxygen to stay in solution in the water. ACV recommends the additives from Fernox ([www.fernox.com](http://www.fernox.com)) and from Sentinel ([www.sentinel-solutions.net](http://www.sentinel-solutions.net)).  
note that these products must be used in strictly accordance with the water treatment manufacturer's instructions.

### HARDNESS

Depending of the volume of the installation, the hardness of water and the possible re-filling, a certain amount of lime is introduced in the installation. The lime will lay down in the hot parts, including the heat exchanger creating a reduction of the water flow rate and a thermal insulation of the active parts of the heat exchanger. That phenomena can damage the heat exchanger.

Acceptable hardness range:

mmolCa(HCO <sub>3</sub> ) <sub>2</sub> / l	°DH	°FH
0,5 - 1	2,5 - 5,6	5 - 10

### HOW TO PREVENT ?

the filling and re-filling water must be softened if necessary to match the working range. Additives can be used to keep the calc in solution in the water, ACV recommends the additives from Fernox ([www.fernox.com](http://www.fernox.com)) and from Sentinel ([www.sentinel-solutions.net](http://www.sentinel-solutions.net)).

note that these products must be used in strictly accordance with the water treatment manufacturer's instructions.

The water hardness must be check regularly and recorded in a file.

### OTHER PARAMETERS

In addition to the oxygen and the hardness, some other parameters must be controlled in the water of heating installations.

Acidity	6,6 < pH < 8,5
Conductivity	< 400 µS/cm (a 25°C)
Chloride	< 125 mg/l
Iron	< 0,5 mg/l
Cu	< 0,1 mg/l

Those parameters has to be measured and water needs chemical treatment in case of values out of range. ACV recommends the additives from Fernox ([www.fernox.com](http://www.fernox.com)) and from Sentinel ([www.sentinel-solutions.net](http://www.sentinel-solutions.net)).

Note that these products must be used in strictly accordance with the water treatment manufacturer's instructions.

## INSTALLATION CLEANING

Before filling an installation, it must be cleaned following the standard **EN14868**.

Chemical cleaners can be used, ACV recommends the additives from Fernox ([www.fernox.com](http://www.fernox.com)) and from Sentinel ([www.sentinel-solutions.net](http://www.sentinel-solutions.net)).

Note that these products must be used in strictly accordance with the water treatment manufacturer's instructions.



**In case at least one of those recommendations can not be warranted, the boiler must be hydraulically separated of installation using plate heat exchanger**

## WORKING PRINCIPLE

### TANK-IN-TANK TECHNOLOGY

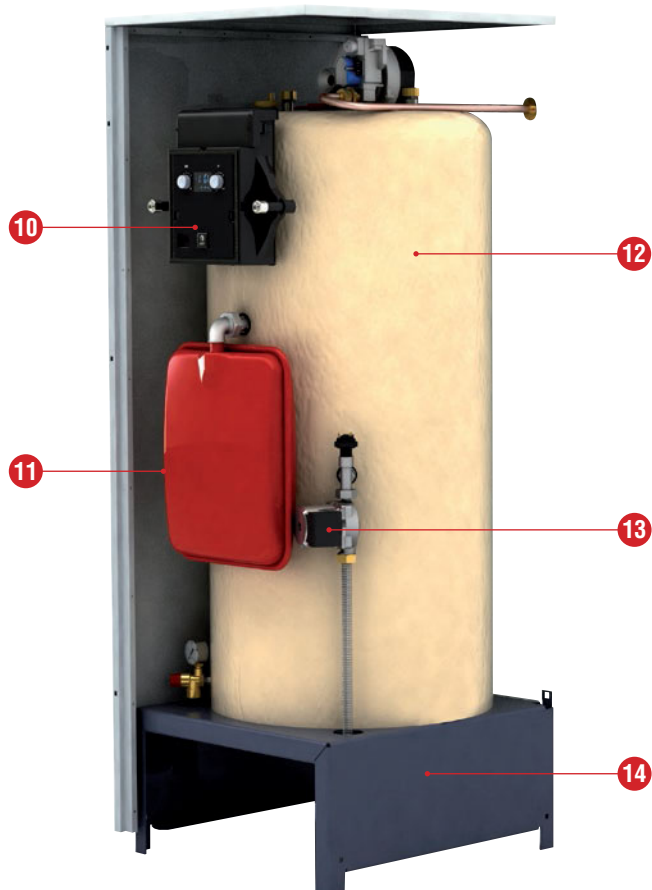
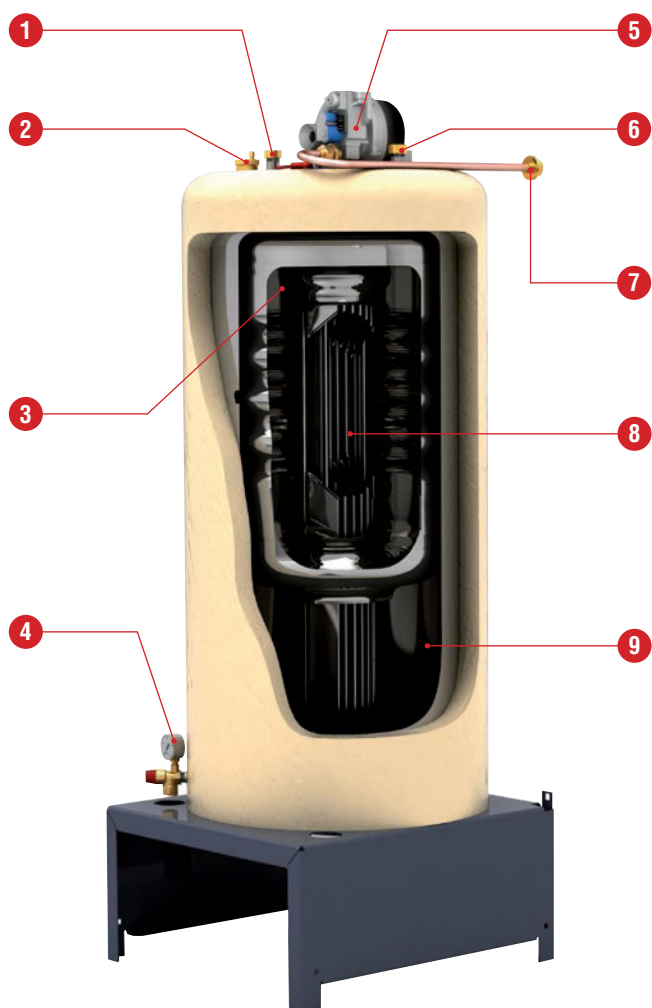
ACV Tank-in-Tank technology has been widely tried and tested and is extremely simple and reliable.

The core of the **HeatMaster® C** features a ring-shaped stainless steel tank, through which the flue tubes pass. It is surrounded by a steel shell containing the primary fluid; this outer shell extends down to the combustion chamber and also surrounds the flue tubes. The primary fluid is directly heated during the combustion process and this indirectly heats the sanitary water. Like all Tank-in-Tank cylinders, the inner cylinder is corrugated along its entire height and is suspended in the boiler by the sanitary connections.

The heat exchange surface of the tank is much greater than that of traditional generators. A large heat exchange surface means that the Tank-in-Tank cylinders have a much shorter reheat time than traditional hot water boilers, thereby minimising the volume of water stored. The higher storage temperature in the tank is also the reason for the much higher hot water flow rates.

### HeatMaster® 25 C

1. Cold water inlet
2. Auto-air vent
3. Stainless steel "Tank-in-Tank" hot water cylinder
4. Safety valve (3 bar) + pressure gauge
5. Modulating AIR/GAS premix burner
6. Domestic hot water outlet
7. Gas connection
8. Stainless steel heat exchanger
9. Heating circuit
10. Control panel
11. Expansion vessel
12. Rigid expanded polyurethane foam insulation
13. Boiler charging pump
14. Base



## DESCRIPTION OF THE TECHNICAL SPECIFICATIONS

The **HeatMaster® C** is a hot water generator linked to a condensing boiler meeting the requirements of “**HR-Top**” standards in force in Belgium. The boiler is certified in compliance with “**EC**” standards as a room sealed appliance: **C13 - C33 - C43 - C53 - C83 - C93**, but it can also be connected as an open appliance in category B23 or as an appliance operating at positive pressure from the **B23P** category.



**Connection type C63 is prohibited in Belgium.**

### JACKET

The boiler is enclosed in a steel casing, which has been degreased, had a phosphate treatment process and then stove enameled at 220 °C. The inside of this casing is lined with a layer of thermal and acoustic insulation, which minimizes losses.

### HEAT EXCHANGER

The core of the **HeatMaster® C** features a new stainless steel heat exchanger which is a result of exhaustive research and intensive laboratory tests. This reflects almost 90 years of experience in the use of stainless steel for heating and hot water generation systems. The specific geometry of the exchanger has been calculated in order to obtain a very large Reynolds number through all of its routes. The **HeatMaster® C** thus achieves an exceptional output remaining stable throughout the boiler's lifespan, given that it does not produce any oxidation on the exchanger, which is manufactured entirely of quality stainless steel.

### BURNER

ACV uses its BG 2000-M burner for the **HeatMaster® C**: this is a modulating air/gas premix burner providing safe and quiet operation while limiting emissions (NOx and CO) to an incredibly low level. Although the ACV BG 2000-M burner is very modern, it uses proven technology and is manufactured using standard spare parts that are easily available on the market.

### TEMPERATURE CONTROL

The **HeatMaster® C** is fitted with an “**ESYS**” regulator controlled by a microprocessor, which handles the safety functions (ignition, flame monitoring, temperature limitation, etc.) and the temperature control of the boiler. The **ESYS** also features a weather dependent regulator. Simply connect the outdoor temperature sensor, available as an option.

However, this regulator can also operate with a standard (on/off) room thermostat. The temperature of the system is then dependent on the outside conditions with compensation for the indoor temperature.

Two rotating buttons placed on the control panel are accessible to the user, enabling adjustment of the temperature of the heating and domestic hot water. By entering a specific maintenance code into the unit, qualified installers may access certain parameters, in order to adapt the boiler to specific requirements. In principle, these are factory preset for all normal applications.

## HOT WATER GENERATION

In addition to its exceptional capacities for hot water production, the Tank-in-Tank system by ACV offers the following advantages:

- **A solution to prevent limescale deposits:** the corrugations allow the tank to expand and contract during the heating cycle and thereby to prevent the build-up of limescale deposits.

- **Ensures that the hot water is free from legionella and bacteria:** the tank is fully immersed in the primary circuit and the domestic water is permanently maintained at a uniform temperature of greater than 60 °C.

- **Exceptional resistance to water damage and corrosion:** thanks to its stainless steel design.

This **HeatMaster® C** also enables you to choose between two sanitary function methods.

- **Full priority mode:** (factory preset) the boiler cuts the heating circuit each time the domestic circuit requires it.

- **Parallel mode:** (only with a radiator heating circuit) the boiler functions for heating and domestic hot water at the same time.

## FROST PROTECTION

The boiler is equipped with integrated frost protection: as soon as the outlet temperature [NTC1 probe] goes below 7 °C, the circulator becomes active. As soon as the outlet temperature is lower than 3 °C, the burner starts up until the outlet temperature exceeds 10 °C and the circulator continues to run for approximately 10 minutes.

If an outdoor temperature probe is connected, the circulator is activated when the outside temperature drops below the preset threshold.



## USE OF ESYS REGULATOR

The LCD display illustrated opposite enables visualisation of all of the boiler's functions.

### DISPLAY STRUCTURE

The illustration opposite represents all symbols and information that the display can show during its function.

### HEATING SYSTEM

The heating system must be kept pressurised [see "COMMISSIONING" chapter – how to determine the operating pressure].

The hydraulic circuit pressure is permanently monitored by a pressure sensor. If the pressure is less than 0.8 bar the display will show "LOP" (Low Pressure) to indicate to you that filling of the hydraulic circuit is necessary.

For more information, please ask your installer when the system is delivered.

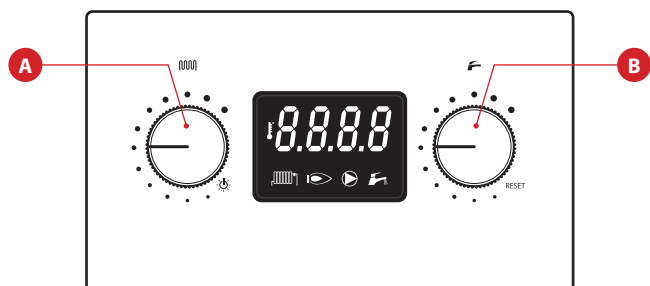


**In the case of repeated fills, contact your installer.**

### ON/OFF switch



### Setting the temperatures



#### A. Setting the heating temperature and Summer/winter function:

Range adjustable from 20 °C to 90 °C.

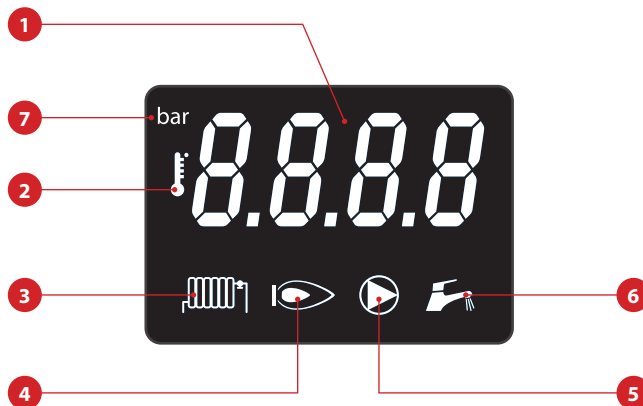
When the thermostat is positioned on ☀, the heating circuit is deactivated and the boiler is then in summer mode.

#### B. Adjustment of domestic hot water temperature and RESET function:

Range adjustable from 20 °C to 90 °C.

To operate the "RESET" function, turn the domestic hot water adjustment button to the left up to minimum, then continue to turn the button lightly and hold for 3 seconds.

### LCD Display



1. Numerical field displaying the temperatures
2. Temperature symbol
3. Symbol to select heating mode
4. Symbol indicating that the burner is operating
5. Symbol indicating that the DHW charging pump is operating
6. Symbol to select domestic hot water mode
7. Bar symbol

### FAULT:

The temperature setting of the appliance and the safety functions of the boiler's various parts are constantly monitored by the "ESYS" system. If a fault occurs, the ESYS turns the unit off and displays an error code: the screen flashes and the first character is an "E" followed by the fault code (see list of faults).

#### To reset the unit:

- Execute the "RESET" function by turning the domestic setting button to the left up to minimum, then continue to turn the button lightly and hold for 3 seconds.
- If the fault code appears again, contact your installer.



# TECHNICAL CHARACTERISTICS

## GENERAL CHARACTERISTICS

		HeatMaster® 25 C	
		Natural Gas	Propane
Central heating			
Max. heat flow in heating mode [Input]	<b>kW</b>	25	25
Max. heat flow in hot water mode [Input]	<b>kW</b>	35	30
Min. heat flow [Input]	<b>kW</b>	6	6
Max. useful power 80/60 °C	<b>kW</b>	24.2	24.2
Min. useful power 80/60 °C	<b>kW</b>	5.8	5.8
Efficiency at 100% load 80/60 °C	<b>%</b>	96.5	96.5
Efficiency at 100% load 50/30 °C	<b>%</b>	107.0	107.0
Efficiency at 30% load [EN677]	<b>%</b>	107.5	107.5

### Flue gases

CO emissions [max power]	<b>mg/kWh</b>	31	40
NOx emissions [EN483]	<b>mg/kWh</b>	22.8	45
NOx class [EN483]		5	5
Flue gas temperature - Max output power 80/60 °C	<b>°C</b>	63	63
Mass flow rate of combustion products	<b>kg/h</b>	41.4	41.0
Maximum pressure loss for the flue	<b>Pa</b>	130	130
Maximum length of concentric flue pipe Ø 80 / 125 mm	<b>m</b>	20	20

### Gas

Gas flow rate G20 - 20 mbar	<b>m³/h</b>	2.64	
Gas flow rate G25 - 25 mbar	<b>m³/h</b>	3.08	
Gas flow rate G31 - 37 mbar	<b>m³/h</b>		1.02
CO <sub>2</sub> [max power]	<b>% CO<sub>2</sub></b>	8.6	10.5
CO <sub>2</sub> [min power]	<b>% CO<sub>2</sub></b>	8.5	10.5
Gas connection (male)	<b>Ø</b>	3/4"	3/4"

### Hydraulic parameters

Maximum operating temperature	<b>°C</b>	90	90
Heating circuit capacity	<b>L</b>	126.5	126.5
Capacity of the domestic circuit	<b>L</b>	75	75
Max operating pressure of the heating circuit	<b>Bar</b>	3	3
Heat exchanger pressure drop [ΔT = 20 °C]	<b>mbar</b>	30	30
Heating connection (female)	<b>Ø</b>	1"	1"
DHW connection (male)	<b>Ø</b>	3/4"	3/4"
DHW cylinder heat exchange surface	<b>m²</b>	1.59	1.59
Nominal flow	<b>L/h</b>	1100	1100

### Electrical connection

Class	<b>IP</b>	30	30
Supply voltage	<b>V/Hz</b>	230 / 50	230 / 50
Maximum absorbed electrical power	<b>W</b>		

<b>Weight Empty (boiler packaged)</b>	<b>kg</b>	158	158
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# TECHNICAL CHARACTERISTICS

## DOMESTIC HOT WATER PROVISION

### SYSTEM OPERATING AT 80 °C

### HeatMaster® 25 C

Peak flow rate at 40 °C [ΔT = 30 °C]	L/10'	365
Peak flow rate at 40 °C [ΔT = 30 °C]	L/60'	1172
Continuous flow rate at 40 °C [ΔT = 30 °C]	L/hour	976
Peak flow rate at 60 °C [ΔT = 50 °C]	L/10'	200
Peak flow rate at 60 °C [ΔT = 50 °C]	L/60'	688
Continuous flow rate at 60 °C [ΔT = 50 °C]	L/hour	586
Reheat time for domestic hot water	Minutes	30

### MAXIMUM OPERATING CONDITIONS

Maximum operating temperature: 90 °C

Maximum operating pressure (tank full of water)

- Primary circuit: 3 bar
- Secondary circuit: 10 bar

Water quality:

- Chlorides: < 150 mg/l
- 6 ≤ pH ≤ 8

## GAS CATEGORIES: HeatMaster® 25 C models

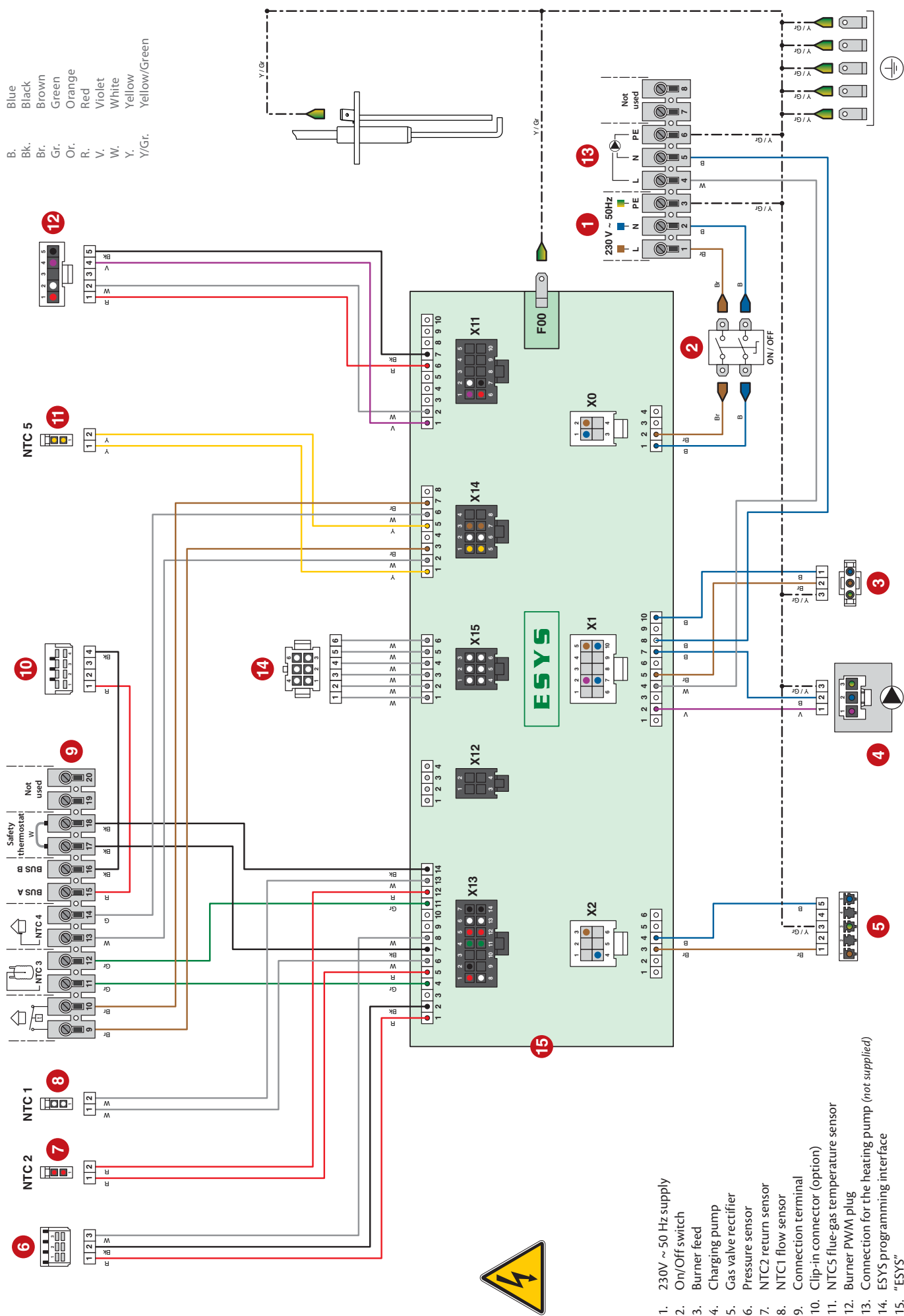
	I2H	I2L	I2E	I2ELL	I2E(S) *	I2Er	I2HS	I3P			I3B/P	
<b>G20 (mbar)</b>	20		20	20	20	20						
<b>G25 (mbar)</b>		25		25	25	25						
<b>G25.1 (mbar)</b>							25					
<b>G30 (mbar)</b>											30	50
<b>G31 (mbar)</b>								30	37	50		
AT Austria	•									•		•
BE Belgium					•				•			
CH Switzerland	•								•	•		•
CY Cyprus	•										•	
CZ Czech republic	•								•			
DE Germany			•	•						•		•
DK Denmark	•										•	
EE Estonia	•										•	
ES Spain	•								•			
FR France						•			•		•	•
GB Great Britain	•								•		•	
GR Greece	•								•			
HR Croatia	•								•		•	
HU Hungary							•				•	•
IE Ireland	•								•			
IT Italy	•								•		•	
LT Lithuania	•								•		•	
LU Luxembourg			•								•	
LV Latvia	•											
NL Netherlands		•						•	•	•	•	
NO Norway	•										•	
PL Poland			•						•		•	
PT Portugal	•								•			
RO Romania	•		•					•			•	
SE Sweden	•										•	
SI Slovenia	•								•		•	
SK Slovakia	•								•	•	•	•
TR Turquie	•										•	



# ELECTRICAL CONNECTION

Blue  
Black  
Brown  
Green  
Orange  
Red  
Violet  
White  
Yellow  
Yellow/Green

B.  
Bk.  
Br.  
Gr.  
Or.  
R.  
V.  
W.  
Y.  
Y/Gr.



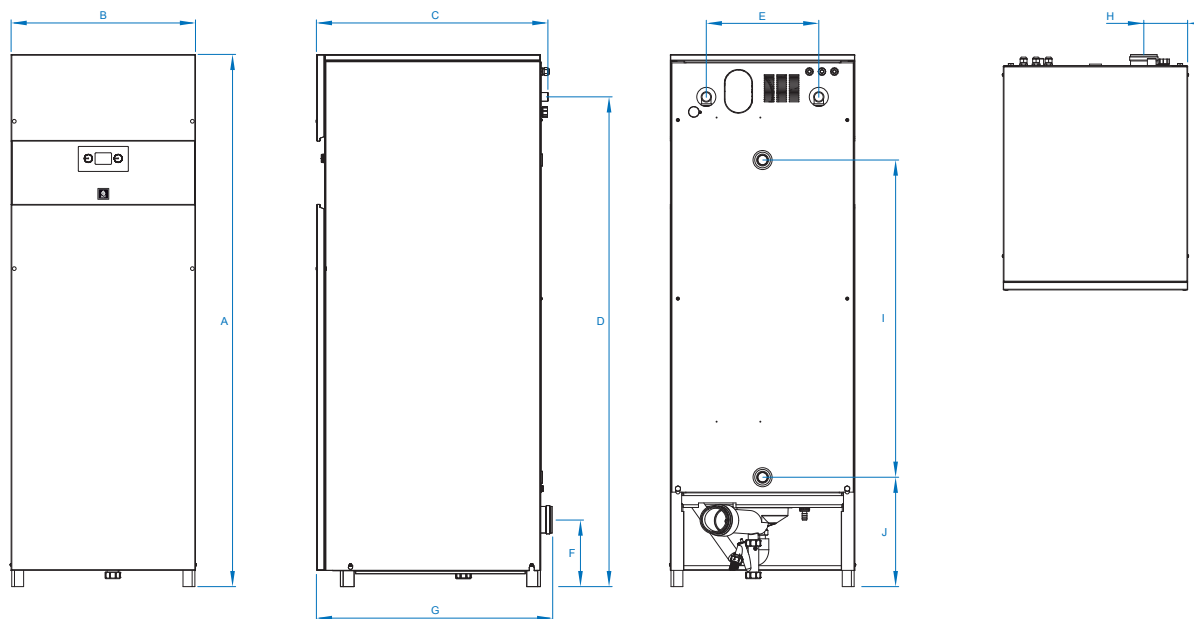
1. 230V ~ 50 Hz supply
2. On/Off switch
3. Burner feed
4. Charging pump
5. Gas valve rectifier
6. Pressure sensor
7. NTC2 return sensor
8. NTC1 flow sensor
9. Connection terminal
10. Clip-in connector (option)
11. NTC5 flue-gas temperature sensor
12. Burner PWM plug
13. Connection for the heating pump (not supplied)
14. ESYS programming interface
15. "ESYS"

## DIMENSIONS

	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm
HeatMaster® 25 C	1700	590	740	1570	360	214	753	140	1015	350

## HYDRAULIC CONNECTIONS

	HeatMaster® 25 C	
Heating connection [F]	Ø	1"
DHW connection [M]	Ø	3/4"
Gas supply [M]	Ø	3/4"

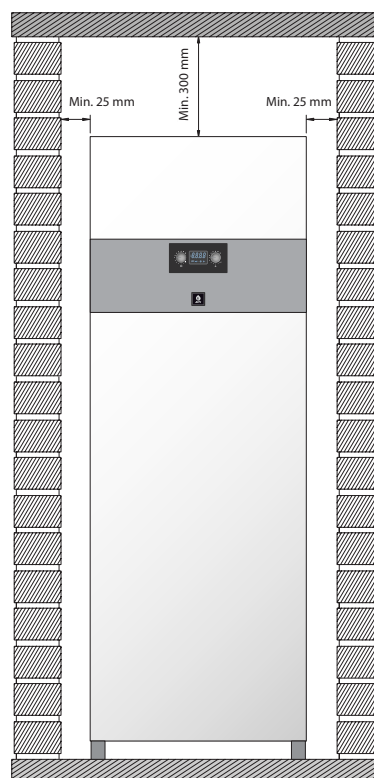


## INSTALLATION AREA

- Make sure that all air vents are unobstructed.
- Do not store any flammable materials in this room.
- Do not store any corrosive materials, paint, solvents, salts, chlorine products or any other detergent products in the vicinity of this appliance.
- If you smell gas, do not operate electrical switches, close the gas valve on the meter, ventilate the rooms and contact your installer.

## ACCESSIBILITY

The appliance must be placed in such a way that it is always easily accessible. Furthermore, the unit must have the following minimum clearance around it.



## FLUE CONNECTION

- The connections must comply with the **NBN D51-003** standard taking into account local energy suppliers' instructions, fire regulations and regulations relating to "pollution".
- Thanks to its built-in gas/air ratio regulator, the **HeatMaster® C** is, to a large extent, independent of pressure drops in the air intake and flue-gas exhaust systems. However, the maximum pressure drop of this system may not be exceeded; otherwise, the output would diminish. However, the gas/air ratio regulator always guarantees optimal combustion with very low emissions.
- In order to avoid any spillage of condensate via the terminal, the horizontal flue gas exhaust ducts must be installed with a sufficient degree of slope towards the boiler: 3° of slope = 5 mm per metre of duct.
- There must be no obstructions or inlets to other appliances within a radius of 0.5 meters around the terminal of the **HeatMaster® C**.
- **The maximum pressure drop of the chimney is 130 Pascal for the HeatMaster® 25 C.** You can calculate this value using the following table: (please see sample calculation).

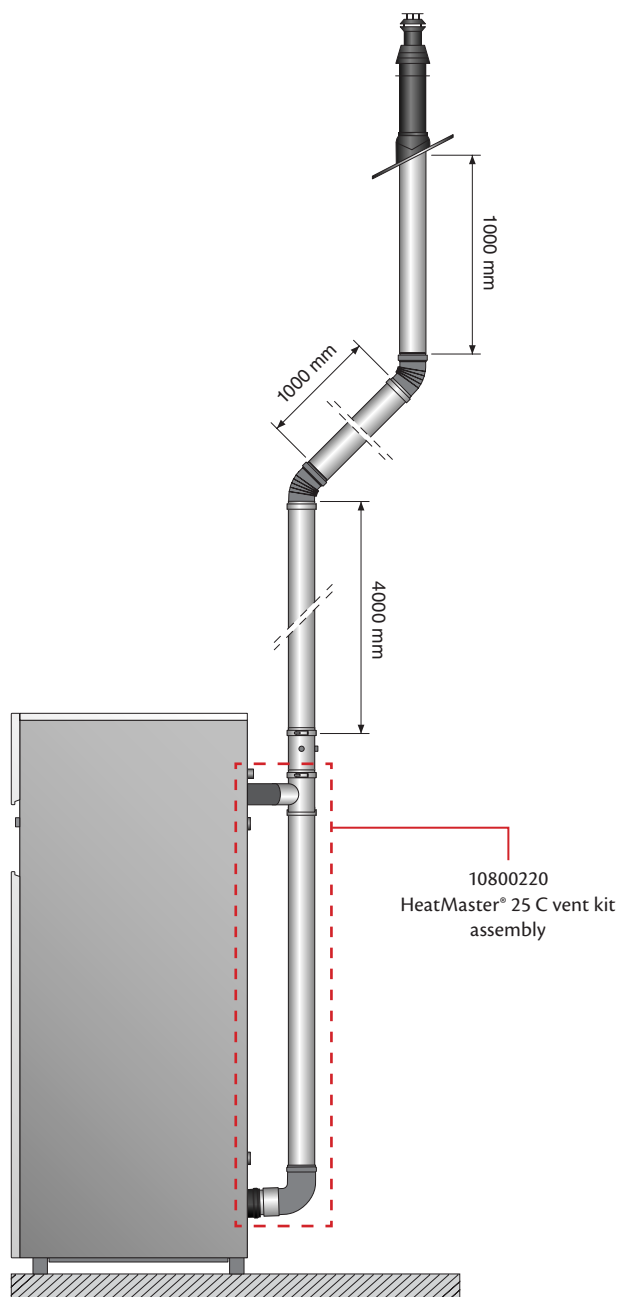
### EXAMPLE OF CALCULATION:

The diagram below consists of the following parts: pipe with a measuring point + 5 metres of vertical pipe + two 45° pipe bends + 1 metre of inclined pipe + one vertical terminal.

The resistance of this system is as follows:

$$2.5 + (5 \times 5.0) + (2 \times 4.0) + 5.0 + 20 = 60.5 \text{ PA.}$$

As this value is lower than the maximum authorised resistance, this installation is therefore compliant.

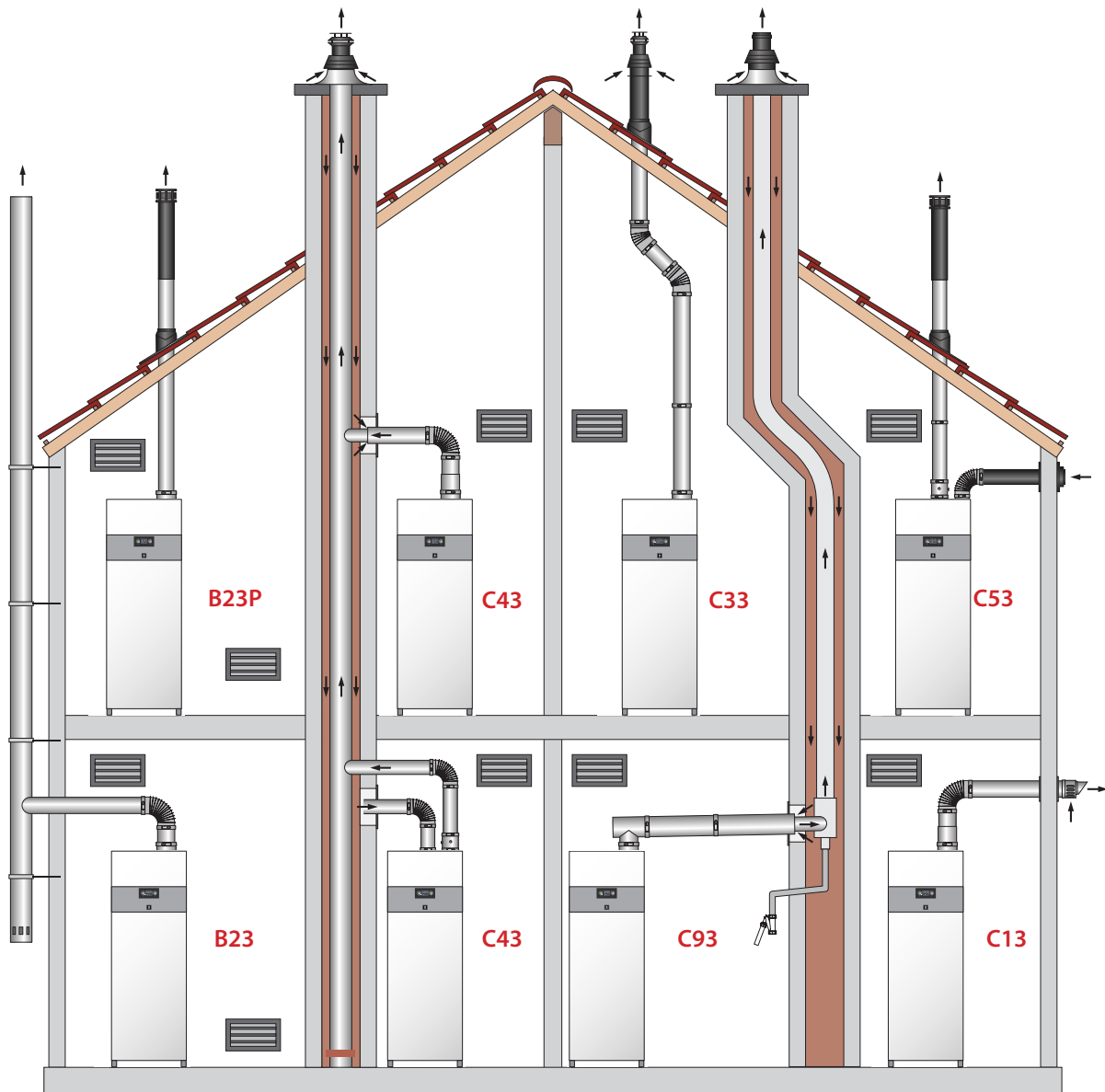


### FLUE PRESSURE DROP CHART IN PASCAL (1 Pascal = 0.01 mbar)

	Concentric pipe	Separate air inlet	Separate flue gas exhaust
	HM 25 C Ø 80/125 mm	HM 25 C Ø 80 mm	HM 25 C Ø 80 mm
Straight pipe 1 m	5.0	1.5	2.0
Pipe with measuring point	2.5	—	1.0
90° bend	6.0	1.9	3.4
45° bend	4.0	1.3	2.3
Vertical terminal	20.0	—	—
Horizontal terminal	15.0	—	—

This table is based on ACV equipment and cannot be applied generally.

## Chimney connection options



**B23** : Connection to an exhaust duct venting the combustion products outside of the installation area, with the combustion air being drawn directly from this area.

**B23P** : Connection to an exhaust system of the combustion products designed to operate with positive pressure.

**C13** : Connection by pipes with horizontal terminals that simultaneously take in combustion air for the burner and discharge combustion products outside through openings that are either concentric or close enough together to be subjected to similar wind conditions.

**C33** : Connection by pipes with vertical terminals that simultaneously take in fresh air for the burner and discharge the combustion products outside through openings that are either concentric or close enough together to be subjected to similar wind conditions.

**C93** : Connection with an individual system of which the exhaust duct for the combustion products is installed in an exhaust pipe that is part of the building. The appliance, the exhaust duct and the terminal units are certified as an inextricable assembly.

**C43** : Connection by two ducts to a collective duct system serving more than one appliance; this system of collective ducts features two ducts connected to a terminal unit that simultaneously intakes fresh combustion air 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 the supply of combustion air and for venting the combustion products; these ducts may end in zones with different pressure levels.

**C63** : Type C boiler which is intended for connection to a room sealed flue system which is approved and sold separately. **(Prohibited in Belgium).**



## GAS CONNECTION

- **HeatMaster® C** boilers are equipped with a  $\varnothing 3/4"$ M connection to connect a gas isolator.
- The gas connections must comply with all applicable standards (in Belgium: **NBN D51-003**).
- If there is a risk of dirt stemming from the gas network, place a gas filter upstream of the connection.
- Purge the gas pipe and carefully check that there are no leaks on the boiler's internal and external pipes.
- Check the system's gas pressure. Please refer to the technical data table.
- Check the gas pressure and consumption when commissioning the appliance.

## DOMESTIC HOT WATER CONNECTION



**The DHW tank (secondary) must be vented and pressurised before filling and pressurising the heating circuit (primary).**

The **HeatMaster® C** can be connected directly to the DHW circuit.

Flush the system before connecting the DHW circuit.

The system must be equipped with an approved safety unit including a 7 bar safety valve, a non-return valve and a stop valve.

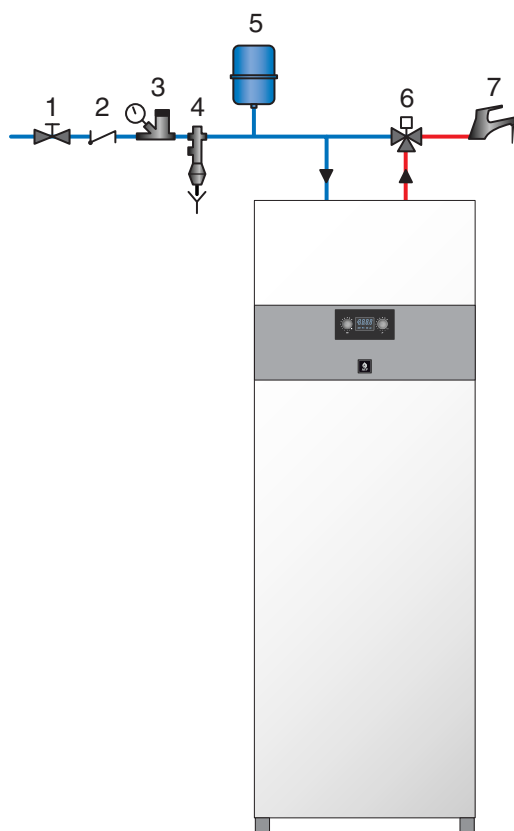
During the heating process, the domestic water expands and the pressure increases. As soon as the pressure exceeds the safety valve setting, the valve opens and discharges. The use of a DHW expansion tank (minimum 2 litres) will avoid a discharge of water and reduce water hammer.



**The hot water will reach temperatures greater than 60 °C, which can cause burns. Therefore, the installation of a temperature control valve on the hot flow immediately after the appliance is advised.**



**If stop valves are used in the installation, they can cause pressure waves when they are closed. To avoid this, use devices to reduce water hammer.**



1. Domestic cold water isolation valve
2. Non-return valve
3. Pressure reducer
4. Safety valve
5. DHW expansion vessel
6. DHW temperature control valve
7. Hot water tap

## CENTRAL HEATING CONNECTIONS

### RECOMMENDATIONS



**The DHW tank (secondary) must be vented and pressurised before filling and pressurising the heating circuit (primary).**

- The whole central heating system must be thoroughly flushed with clean water before being connected to the appliance.
- The central heating safety valve is integrated and located in the appliance. It must be connected to the drain with an air gap (allowing an inspection).
- The **HeatMaster® 25 C** consists of a 12 litre primary expansion cylinder.
- A de-stratification pump is built into the appliance. This pump must operate in DHW mode as well as in heating mode. The 3-way switch must be set to speed 3.
- Fill the system with fresh tap water. Contact your ACV representative or installer about the use of inhibitors.
- **It is possible that the connections are capped due to the presence of residual water from tests carried out on the appliance. Please ensure that all the caps are removed before filling the appliance.**
- There is a connection and valve for filling and/or draining the appliance at the bottom of the unit behind the front panel. Fill the appliance to the minimum pressure of one bar. Purge the entire installation and refill the appliance to 1.5 bar.
- Ensure that the condensate trap is fitted and connect the hose to the drain using a connection that can be inspected. If necessary fill the trap with clean water. Take the necessary precautions to prevent any risk of the condensate freezing.



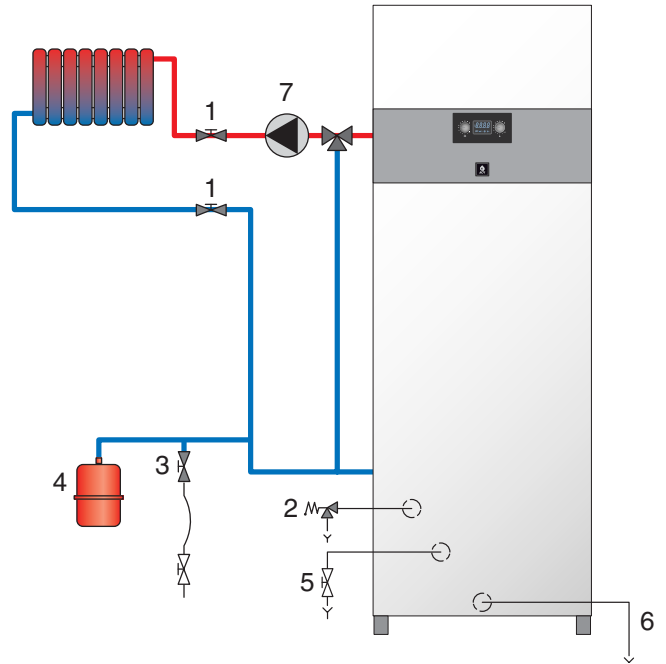
**The connection for draining condensate must comply with current regulations.**



**If there is a risk of low pressure in the hot water circuit (installation of HeatMaster® on the roof of a building), it is essential to install a vacuum breaker device onto the cold water supply.**

### HEATING CONNECTION: OVERVIEW

1. Isolating valve in the heating circuit
2. Safety valve calibrated to 3 bar, with pressure gauge
3. System filling valve
4. Expansion vessel
5. Drain down valve
6. Condensate discharge
7. Heating pump



## INSTALLATION OF A SINGLE HEATING CIRCUIT REGULATED BY AN ACV 22 ROOM THERMOSTAT

### SCHEMATIC DIAGRAM

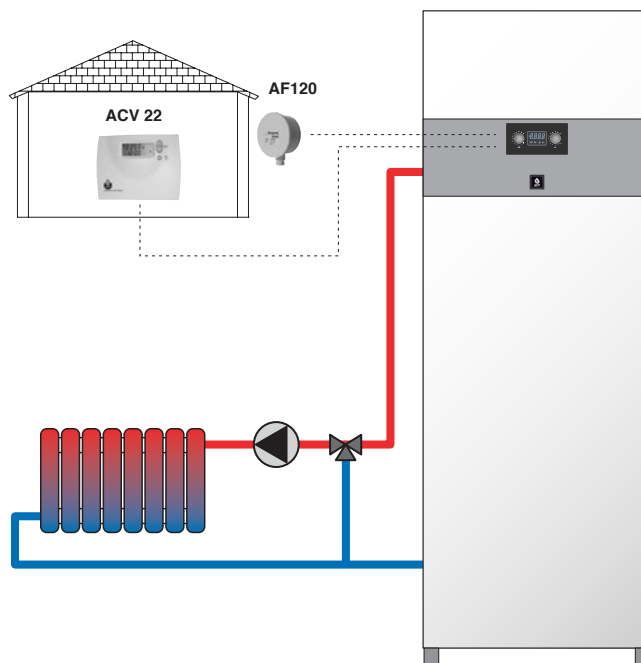
The heating system is controlled by an **On/Off** room thermostat.

In this configuration, the boiler constantly adapts its operation (minimum temperature = 60°C) to the outdoor temperature, if an outside temperature sensor is connected.

The circulator is triggered as soon as the room thermostat generates a heat demand.

Advantages for the user:

- Comfort
- Maximum output
- Simplicity of the system



- A. - Heating temperature setting guidelines without external sensor  
 - Maximum heating temperature limit with external sensor  
 - The thermostat is positioned on , the heating circuit is deactivated and the boiler is then in summer mode.




- B. - Domestic hot water temperature setting.

Before the boiler's start up, an "Auto Set" is necessary so that the boiler detects the DHW sensor.

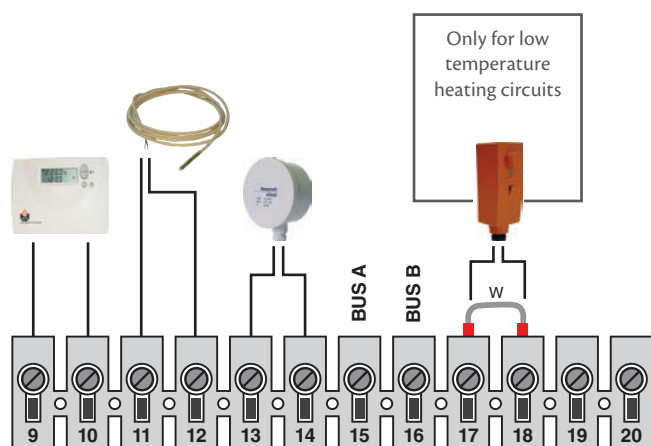
To do this, turn the right button to "RESET" then start up the boiler by pressing on the **ON/OFF** switch.

From the time that the display shows "SET" the "RESET" button can be released.

### Optional equipment

	Code	Description
	10800018	ACV 22 Room thermostat
	10510100	Outside temperature sensor, 12kΩ — AF120
	10510900	Safety thermostat RAM 5109: Mandatory to protect all floor heating circuits.

# INSTALLATION



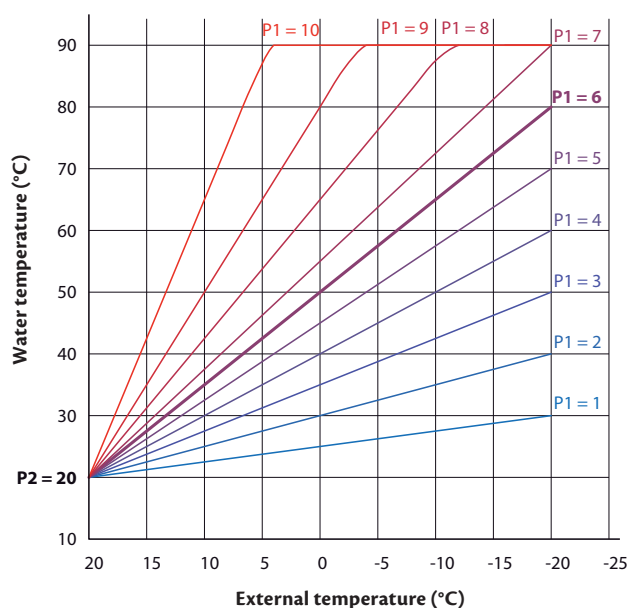
It is compulsory to install a low temperature heating circuit outlet safety thermostat.



Factory Description

P 01	6	Selection of the heating curve
P 02	20	Minimum temperature of the heating outlet
P 05	10	<b>T plus</b> = temperature increase of primary flow during domestic hot water mode
P 06	0	<b>0</b> = domestic hot water priority mode <b>1</b> = in parallel

Heating curve

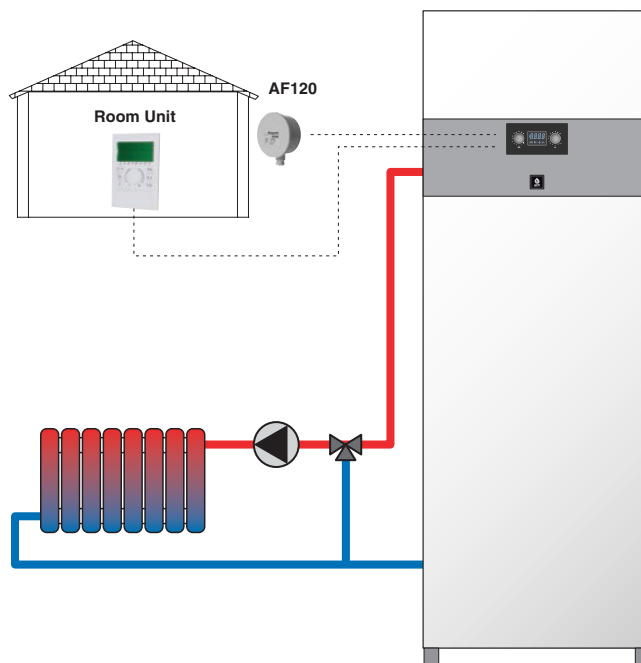


## INSTALLING A SINGLE HEATING CIRCUIT WITH ROOM UNIT REGULATION

### SCHEMATIC DIAGRAM

A Room Unit thermostat controls the heating. The latter enables a choice between different heating functions and authorises up to 3 daily programmes for heating and for domestic hot water. The Room Unit thermostat has the advantage of displaying information on system status.

In this configuration, the boiler constantly adapts its operation (minimum temperature =60C) to the outdoor temperature.



- A. - Heating temperature setting guidelines without external sensor
- Maximum heating temperature limit with external sensor
- The thermostat is positioned on , the heating circuit is deactivated and the boiler is then in summer mode.
- B. - Domestic hot water temperature setting.



When connected with a "Room Unit", the two knobs (A) and (B) have no action on the boiler, except for the "RESET" function.





Before the boiler's start up, an "Auto Set" is necessary so that the boiler detects the DHW sensor.

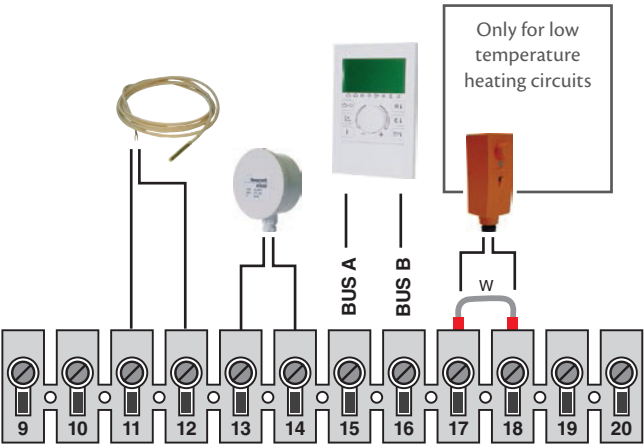
To do this, turn the right button to "RESET" then start up the boiler by pressing on the **ON/OFF** switch.

From the time that the display shows "SET" the "RESET" button can be released.

For more information, consult the Room Unit instructions

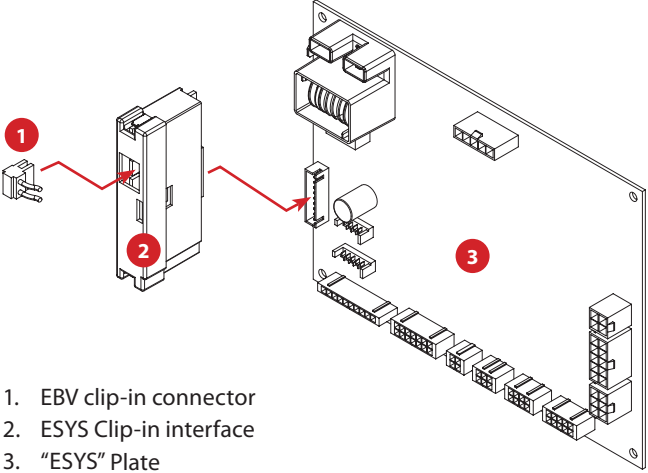
### Optional equipment

	Code	Description
	10800189	RSC Room Unit: Supplied with external probe
	10510100	Outside temperature sensor, 12kΩ — AF120
	10510900	Safety thermostat RAM 5109: Mandatory to protect all floor heating circuits.
	10800201	Interface Clip-in ESYS: Authorises communication between the boiler and the RSC Room Unit.



It is compulsory to install a low temperature heating circuit outlet safety thermostat.

Address of the interface "0"



	Factory	Description
P 05	10	T plus = temperature increase of primary flow during domestic hot water mode
P 06	0	0 = domestic hot water priority mode 1 = in parallel

## COMMISSIONING THE SYSTEM



**The DHW tank (secondary) must be vented and pressurised before filling and pressurising the heating circuit (primary). The two circuits, DHW and heating, must be filled prior to using the appliance.**



- Fill the DHW tank slowly and purge it by opening the hot water outlet. Purge all the outlets and make sure there are no leaks in the domestic hot water system.
- Fill the heating installation to at least 1.5 bar using the boiler's filling valve. Fill the system slowly. Check that the automatic air vent is operating. Check for leaks in the central heating system.
- Purge the charging pump and check that it rotates.
- Open the gas valve, purge the pipe and check for leaks in the system.
- Ensure the condensate trap is correctly fitted underneath the boiler.
- Connect the power cable to the boiler via the terminal provided and switch on the appliance. Where appropriate, put the room thermostat at its highest setting. The boiler starts up. Check the gas pressure and allow the boiler to heat up for a few minutes.
- Set the boiler to high power mode and check the CO<sub>2</sub>. (see table of technical characteristics). Next, set the boiler to minimum power mode and check the CO<sub>2</sub> (see table of technical characteristics).
- Set the central heating and hot water temperatures according to the values indicated in the instructions for use.
- Bleed the central heating system again, and, if required, fill to reach the desired pressure.
- Make sure that the heating system is properly balanced, and, if required, adjust the valves to prevent certain circuits or radiators from getting a flow rate that is far above or below the set rate.

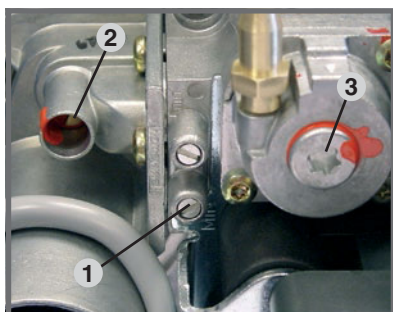


**The diameter of the condensate discharge pipe cannot be reduced. The pipe must never be obstructed.**

## CHECKING THE SETTINGS



**Specific regulation in Belgium for HeatMaster® 25. The CO<sub>2</sub>, gas flow, air flow and air/gas supply parameters are factory preset and cannot be changed.**



**REF. 3:**  
The OFFSET setting of the gas valve is set at the factory and sealed. It cannot be modified.

- Check if the parameters are set to meet the user's needs.
  - Checking the boiler's settings: only an ACV-trained installer or the ACV maintenance department can perform this task.
  - Set the appliance to maximum power mode.
  - Check the dynamic gas pressure on the gas valve. (see figure below ref.1) This must be at least 18 mbar.
- Let the appliance heat for a few minutes until it reaches at least 60 °C. Check the CO<sub>2</sub> setting of the appliance using a measuring instrument. The optimal value is indicated in the table of technical characteristics. To increase the CO<sub>2</sub> value, turn the venturi screw counter-clockwise, and turn it clockwise to decrease this value (see diagram below, ref. 2).
- Next, switch the appliance to minimum power mode. Let the appliance stabilize for a few minutes. Check the CO<sub>2</sub> value. It should be either equal to the value at full power or a maximum of 0.5 % less than it. If you observe a significant deviation, please contact ACV's maintenance department.

## BOILER MAINTENANCE



**ACV recommends that you have your boiler inspected, and cleaned, if required, at least once a year.**

Disconnect the electrical power supply before undertaking any work on it.

- Check that the condensate trap is not clogged, fill it as required and check for leaks.
- Check that the safety valves are in good working order.
- Vent the whole system and refill the appliance if required to 1.5 Bar.



**In the case of repeated fills, contact your installer.**

- Check the boiler's combustion in maximum power mode. If this value is very different from the original setting it may indicate an obstruction in the air intake ducts or flue gas exhaust pipes, or that the exchanger is clogged.

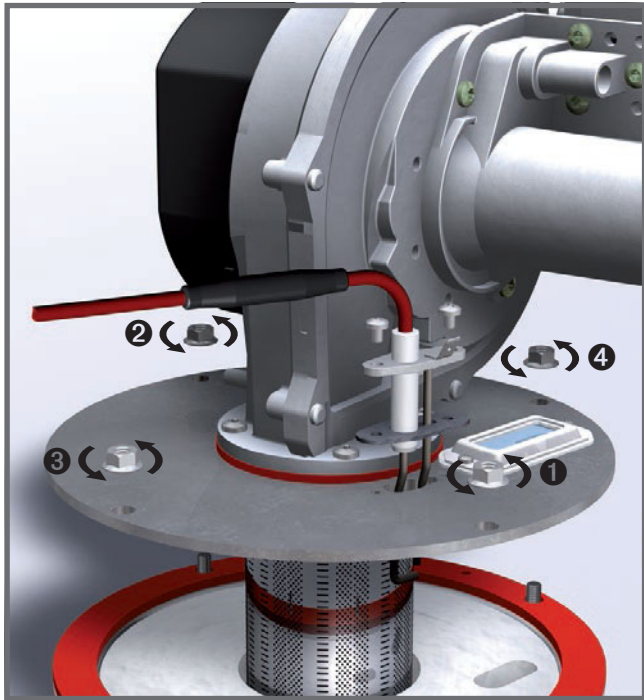
## TEMPERATURE SENSOR RESISTANCE TABLE

T° [°C]	R Ω	T° [°C]	R Ω	T° [°C]	R Ω
- 20	98200	25	12000	70	2340
- 15	75900	30	9800	75	1940
- 10	58800	35	8050	80	1710
- 5	45900	40	6650	85	1470
0	36100	45	5520	90	1260
5	28600	50	4610	95	1100
10	22800	55	3860	100	950
15	18300	60	3250		
20	14700	65	2750		



## DISMANTLING THE BURNER

- Close the gas supply valve.
- Open the top front panel of the boiler.
- Remove the fan plugs, the ignition cable, the gas valve control and the ignition electrode earth.
- For easier access, you can also remove the flap located on the top panel of the boiler.
- Unscrew the 4 nuts of the burner using a socket and ratchet.
- Unscrew the three-piece connection of the gas pipe.
- To remove the burner unit, lift the fan and gas valve out in one piece. Take care not to damage the burner's insulation, which is on the inside of the exchanger."
- Check the condition of the insulation and the seals and replace them if required, then put the burner back, following the above procedure in reverse order.

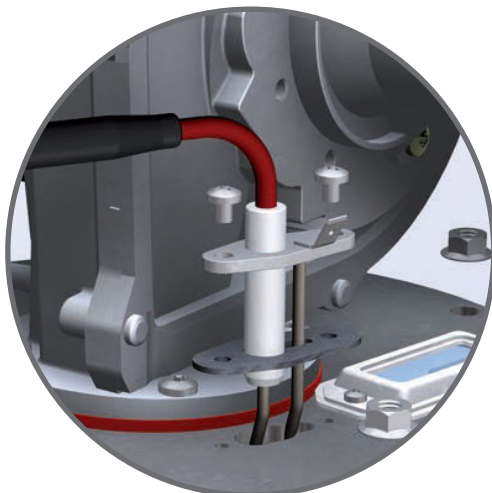


## CLEANING THE EXCHANGER

- Dismantle the burner as described above.
- Remove the burner insulation.
- Use a vacuum cleaner to clean out the chamber.
- It may also be necessary to pour water into the cylinder in order to clean out any foreign bodies located in the boiler tubes. After doing this, it is essential that the condensate trap is cleaned.
- Check the burner's insulation and seal. Replace if necessary.
- Check the electrode and replace if necessary.
- Reassemble the burner and check for any leaks.
- Power the appliance on again. Set the appliance to maximum Power mode and check for leaks of combusted gas.
- Check the gas pressure and the CO<sub>2</sub> setting as described in the previous section.

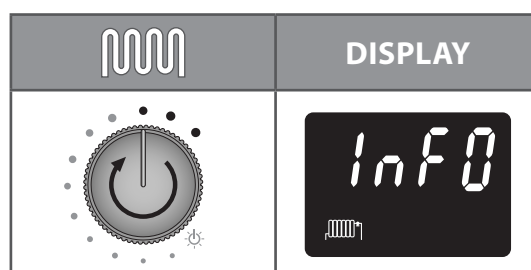
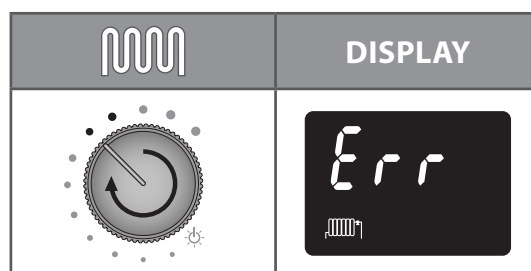
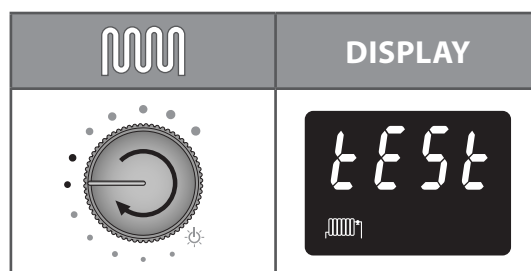
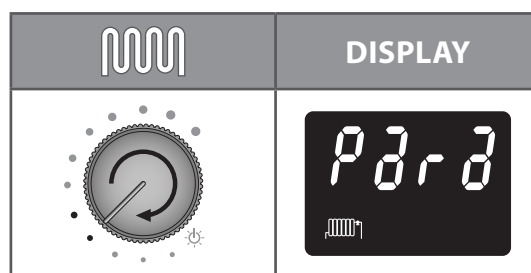
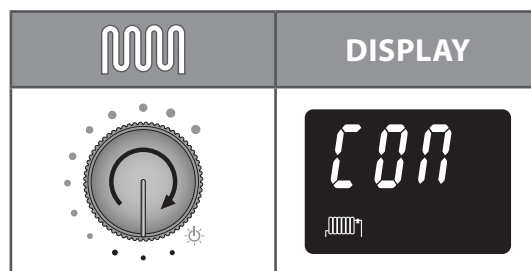
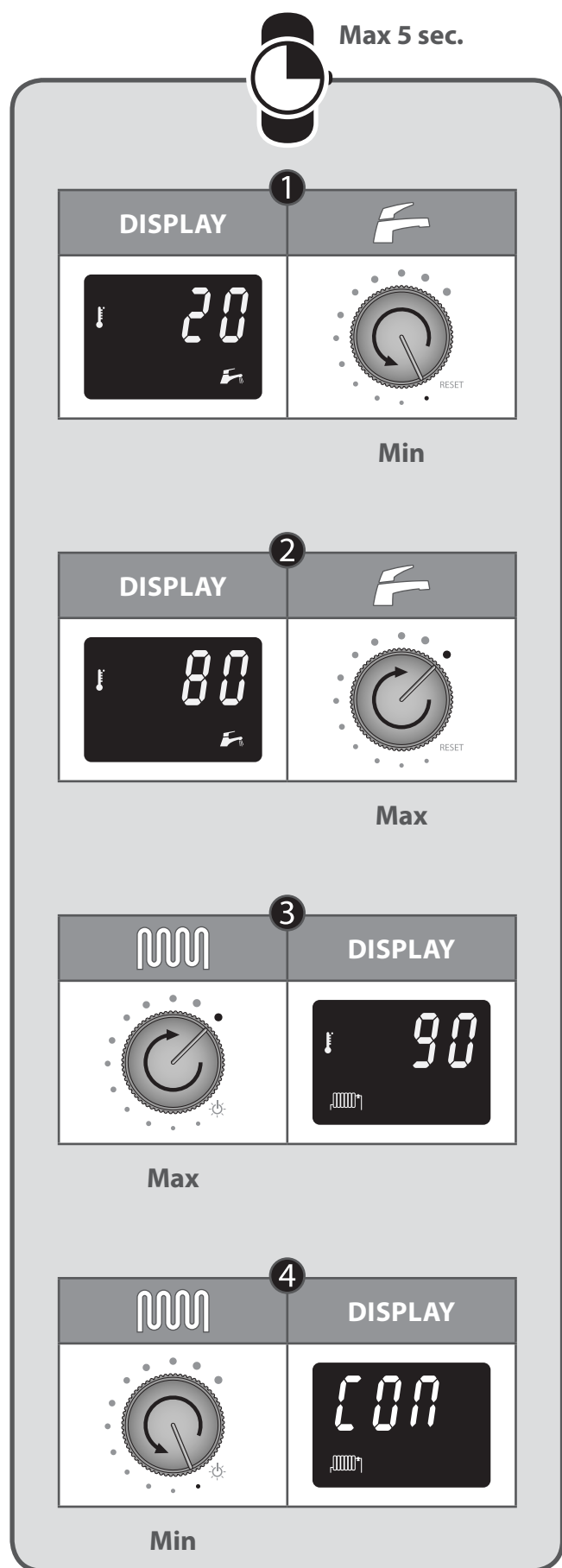
## DISASSEMBLING AND INSPECTING THE ELECTRODE

- Remove the earth lead connection.
- Unscrew the two retaining screws.
- Check the condition of the electrode and the seal, replace if necessary, before reassembling the electrode by following the above procedure in reverse order.

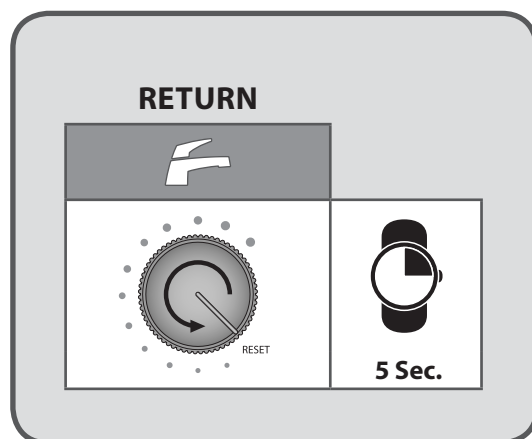
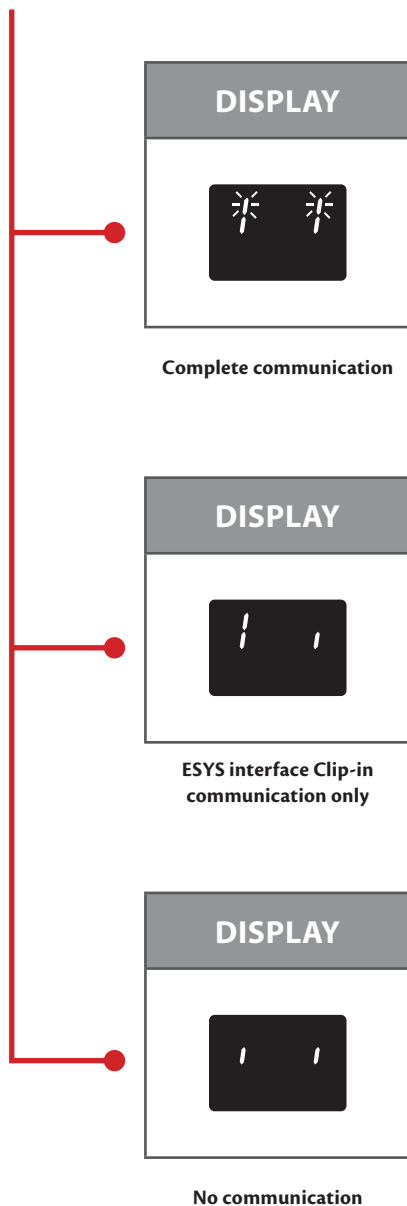
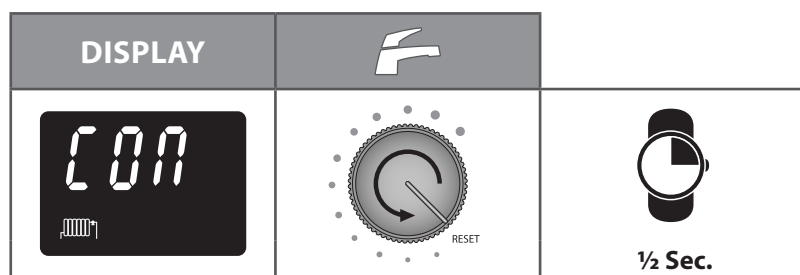
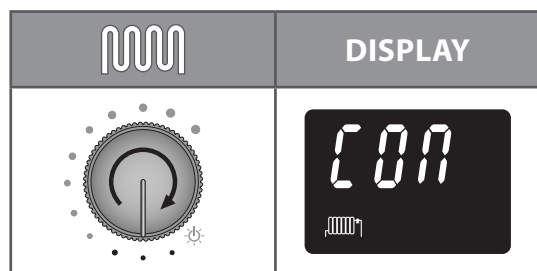


# ESYS PARAMETERS FOR THE SPECIALIST

## CODE MODE



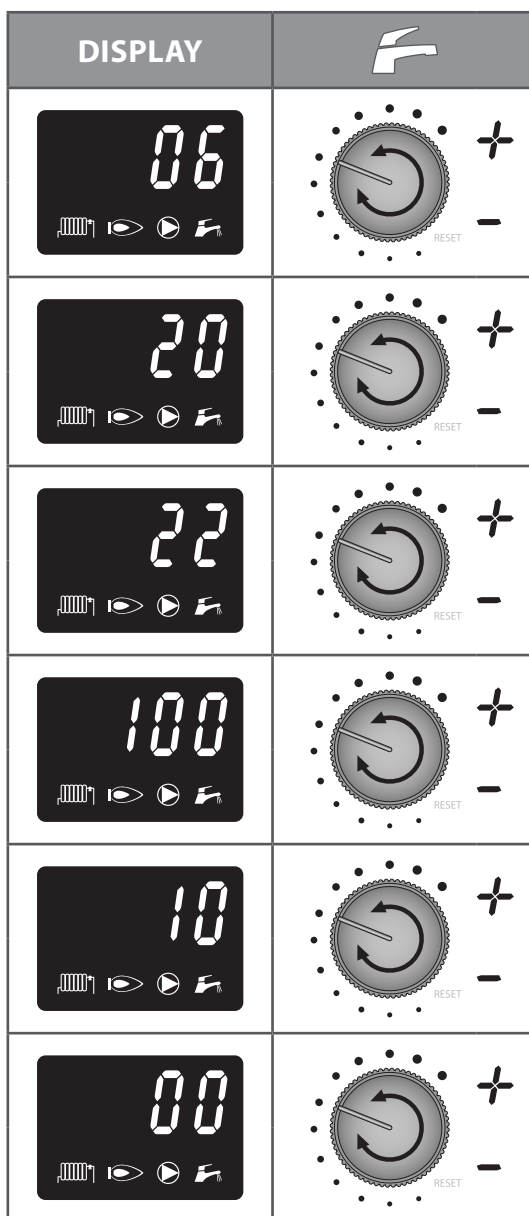
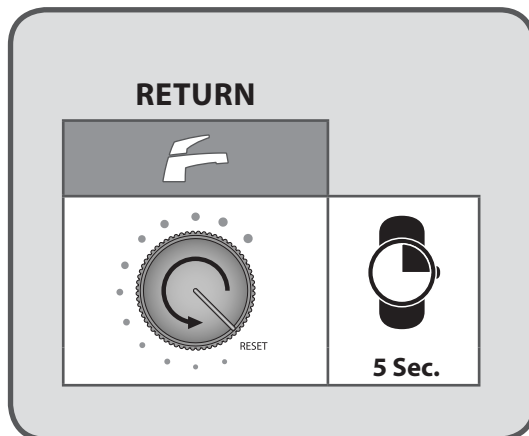
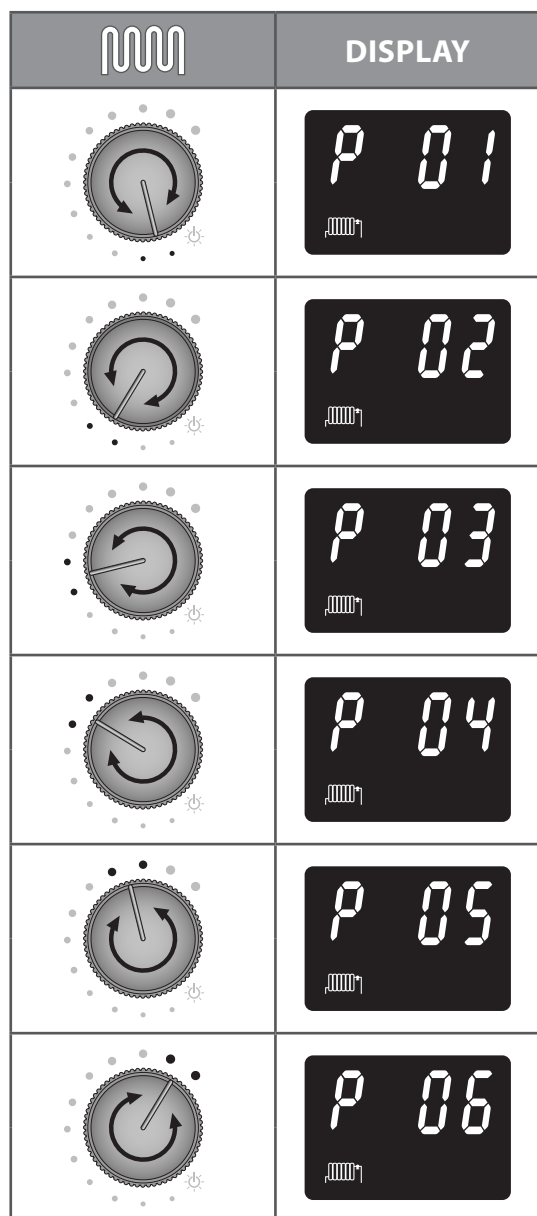
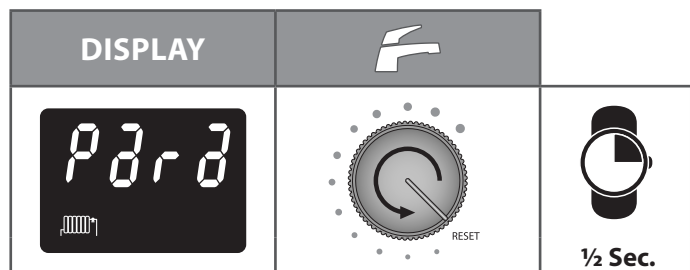
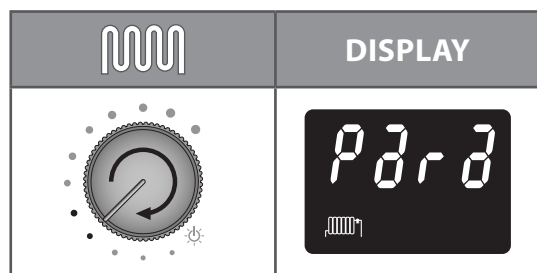
## COMMUNICATION MODE



EN  
FR  
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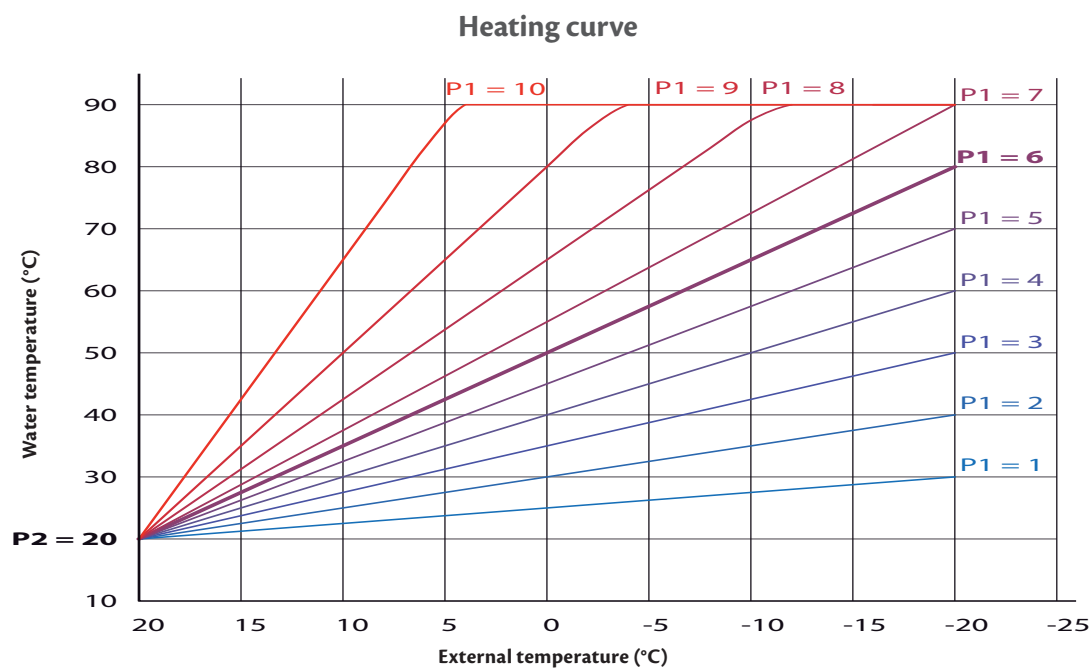
# ESYS PARAMETERS FOR THE SPECIALIST

## PARAMETER MODE





	FACTORY PARAMETER	RANGE OF PARAMETERS	DESCRIPTION
P01	6	0 - 10	Selection of the heating curve
P02	20	20 - 40	Minimum temperature of the heating outlet
P03	0	0 - 100	Minimum load
P04	65	0 - 100	Maximum load (central heating)
P05	10	5 - 30	T plus = outlet temperature increase during function in domestic hot water mode
P06	0	0 = ON 1 = Parallel	DHW priority

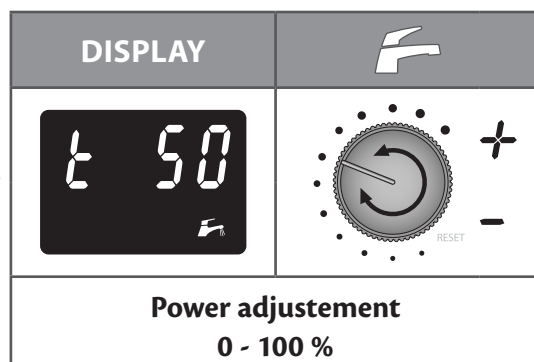
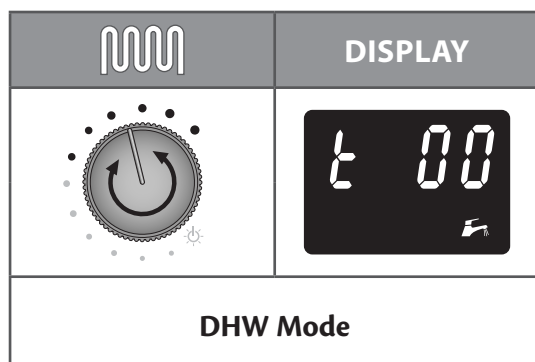
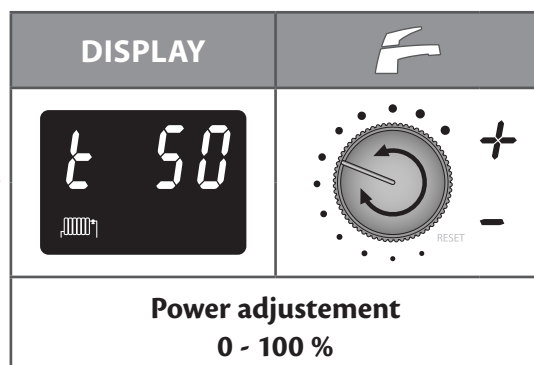
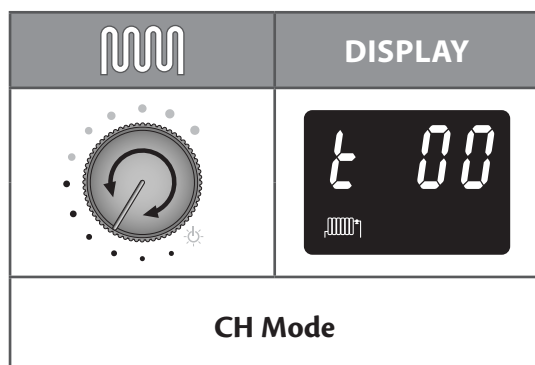
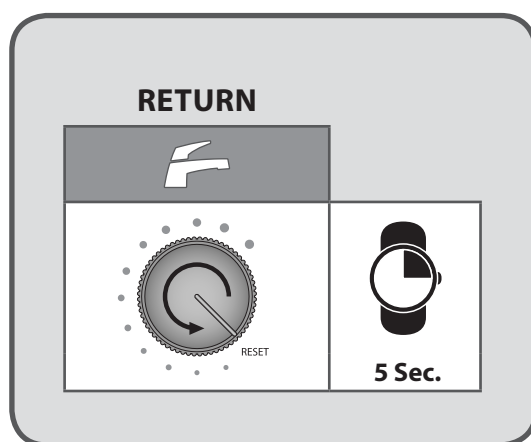
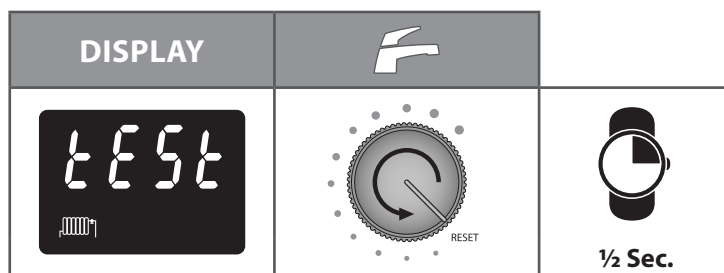
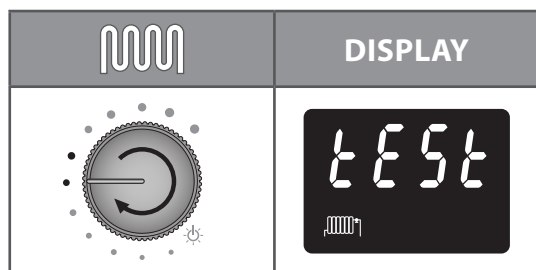


# ESYS PARAMETERS FOR THE SPECIALIST

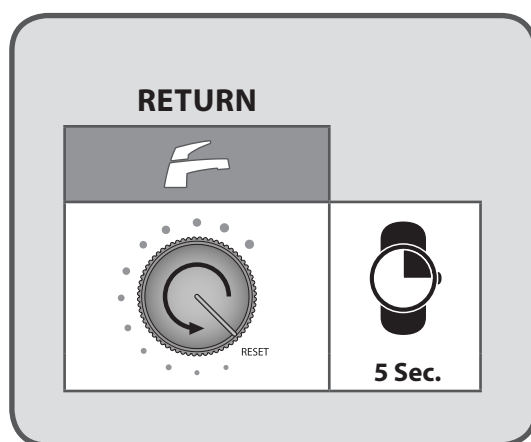
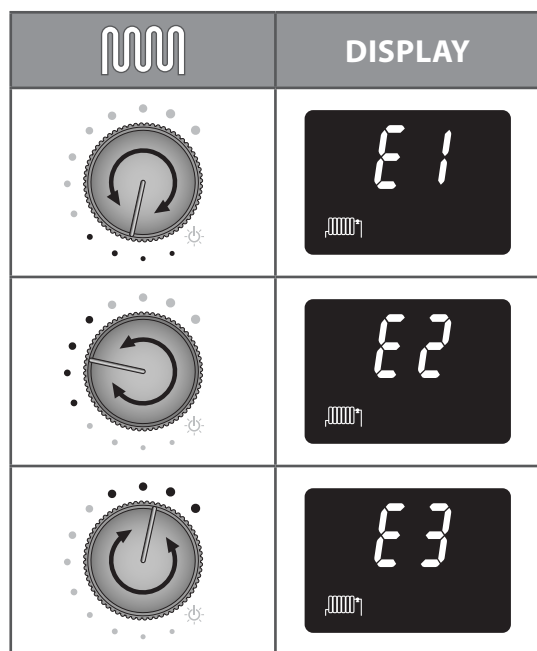
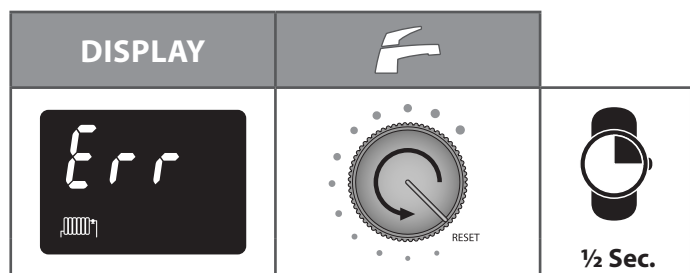
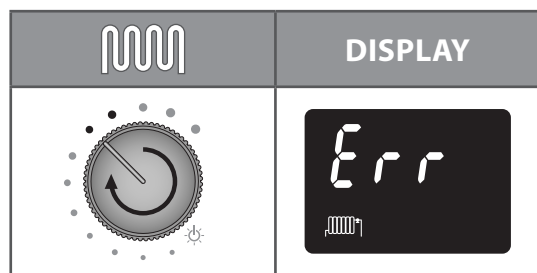
## TEST MODE

Manual selection of the input in CH or DHW mode from 0 to 100%.

This mode is used to control combustion settings.



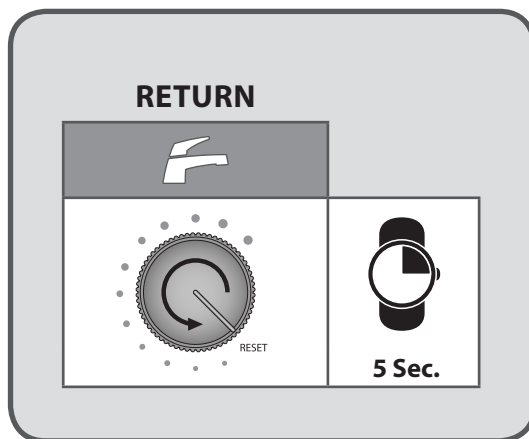
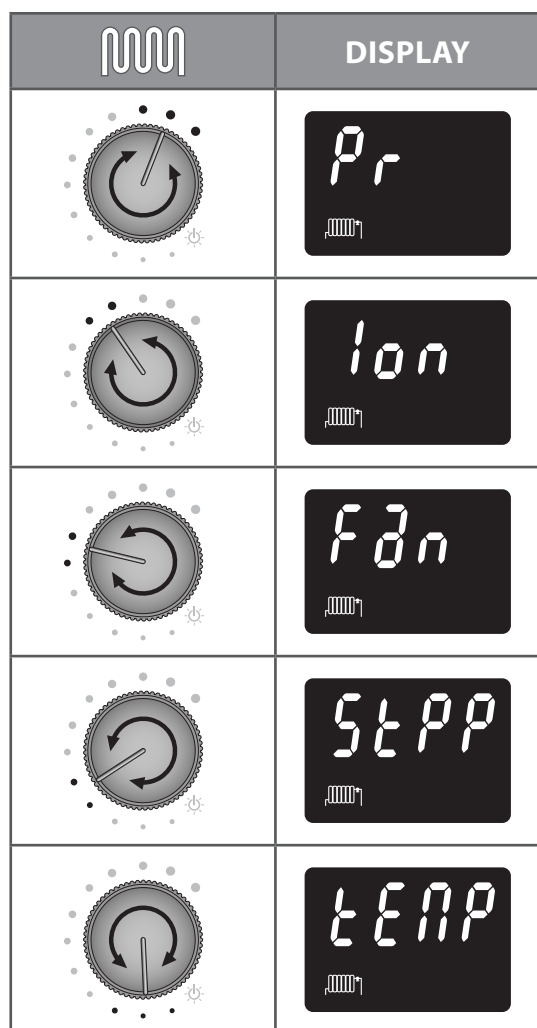
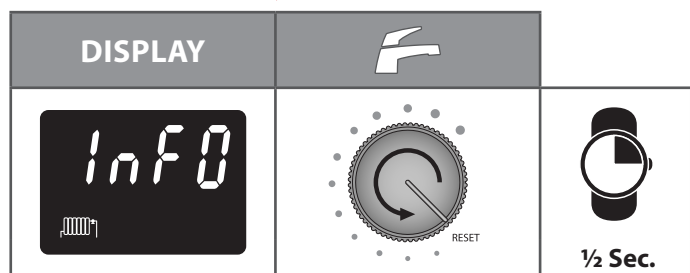
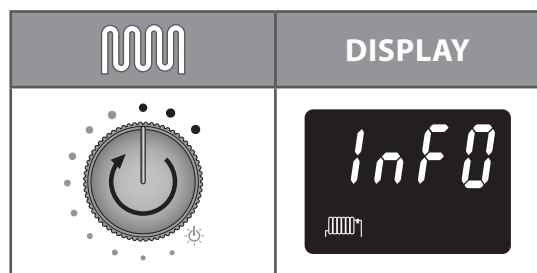
## ERROR MODE







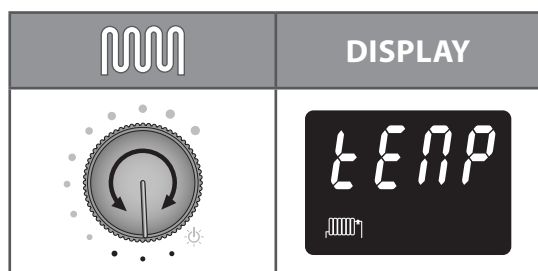
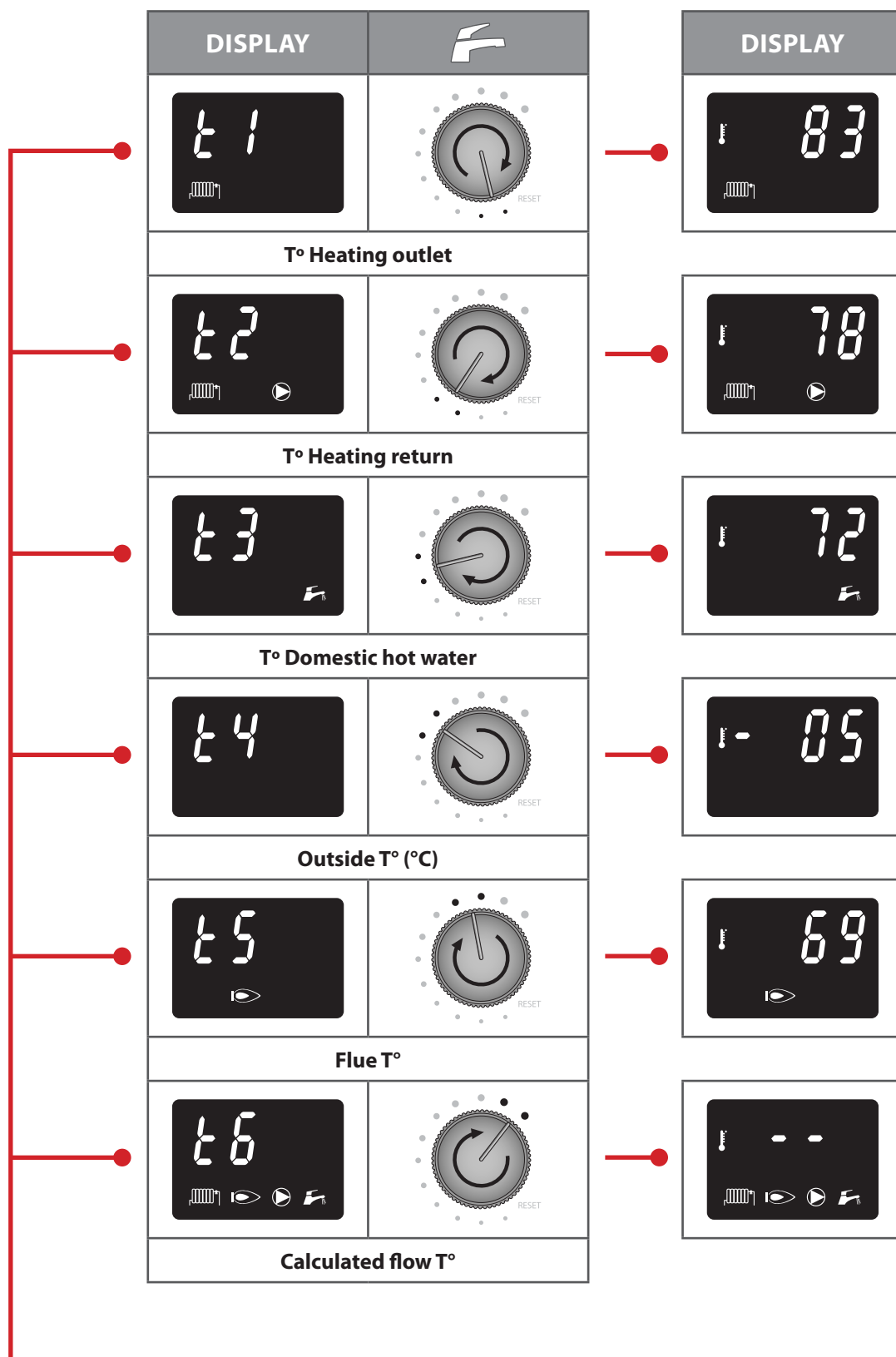


# ESYS PARAMETERS FOR THE SPECIALIST

## INFO MODE



DISPLAY	
	bar
	$(30/10) \geq 2,4 \mu A$
	rpm
	0% = CH 100% = DHW



# "ESYS" ERRORS AND BLOCKING CODES

## LIST OF ERROR CODES + SOLUTIONS [in ERROR mode]



To unlock the system:

- Press "RESET" on the screen.
- If the fault reoccurs, contact your installer.

If a fault occurs during operation, the system locks out and the screen starts to flash.

The first character is an "E" and flashes, the following two characters indicate the code for this fault, see the chart below.

Codes	Description of the fault	Solution for the fault
E 01	No flame presence after five start-up attempts	<ol style="list-style-type: none"> <li>1. Check the wiring (short circuit in the 24 V wiring)</li> <li>2. Check the electrode and its position</li> <li>3. Check the burner gas level</li> </ol>
E 02	Abnormal flame signal detected	<ol style="list-style-type: none"> <li>1. Check the ignition wiring</li> <li>2. Check the electrode and its position</li> <li>3. Replace the ESYS (water damage)</li> </ol>
E 03	Maximum thermostat open	Check the link across 9-10. Check the thermostat and wiring if fitted.
	T1 or T2 > 110°C	<ol style="list-style-type: none"> <li>1. Check the NTC wiring and replace it if necessary.</li> <li>2. If the NTC1 sensor is OK, check if there is water flow in the boiler</li> </ol>
E 05	No tachometer signal from the fan	<ol style="list-style-type: none"> <li>1. Check the PWM connection</li> <li>2. Check the fan's wiring</li> <li>3. If the problem persists after two "RESET" attempts, replace the fan, if not, replace the "ESYS" circuit board.</li> </ol>
E 07	Flue gas temperature too high (NTC5)	<ol style="list-style-type: none"> <li>1. Check the connection of the NTC5 sensor</li> <li>2. Check the wiring of the NTC5 sensor</li> <li>3. If the problem persists replace the NTC5 sensor</li> </ol>
E 08	No flame detection	<ol style="list-style-type: none"> <li>1. Check the electrode gap</li> <li>2. Check the electrode resistance [1kΩ]</li> </ol>
E 09	Gas valve relay error	If the problem persists after two "RESET" attempts, Replace the "ESYS" circuit board if necessary
E 11	Crack of sensor NTC1 or NTC2	Check the sensor NTC1 and NTC2
E 13	Remote "RESET" error	<ol style="list-style-type: none"> <li>1. Do a local "RESET" on the boiler.</li> <li>2. If the problem persists replace the "ESYS" circuit board</li> </ol>
E 21	ADC error	"RESET" the system or Replace the "ESYS" circuit board if necessary
E 25	CRC Error	"RESET" the system or replace the "ESYS" circuit board if necessary
E 30	Short circuit NTC1	<ol style="list-style-type: none"> <li>1. Check the connection of the NTC1 sensor</li> <li>2. Check the wiring of the NTC1 sensor</li> <li>3. If the problem persists replace the NTC1 sensor</li> </ol>
E 31	NTC1 open circuit	<ol style="list-style-type: none"> <li>1. Check the connection of the NTC1 sensor</li> <li>2. Check the wiring of the NTC1 sensor</li> <li>3. If the problem persists replace the NTC1 sensor</li> </ol>
E 32	Short circuit NTC3	<ol style="list-style-type: none"> <li>1. Check the connection of the NTC3 sensor</li> <li>2. Check the wiring of the NTC3 sensor</li> <li>3. If the problem persists replace the NTC3 sensor</li> </ol>
E 33	NTC3 open circuit	<ol style="list-style-type: none"> <li>1. Check the connection of the NTC3 sensor</li> <li>2. Check the wiring of the NTC3 sensor</li> <li>3. If the problem persists replace the NTC3 sensor</li> </ol>
E 34	Deviation of the mains frequency > 1.5 Hz	Check the mains frequency
E 37	Water pressure	Check the water pressure
E 41	No communication from the water pressure sensor	Check the water pressure sensor and replace if necessary

# "ESYS" ERRORS AND BLOCKING CODES

Codes	Description of the fault	Solution for the fault
E 43	Short circuit NTC2	<ol style="list-style-type: none"> <li>1. Check the connection of the NTC2 sensor</li> <li>2. Check the wiring of the NTC2 sensor</li> <li>3. If the problem persists replace the NTC2 sensor</li> </ol>
E 44	NTC2 open circuit	<ol style="list-style-type: none"> <li>1. Check the connection of the NTC2 sensor</li> <li>2. Check the wiring of the NTC2 sensor</li> <li>3. If the problem persists replace the NTC2 sensor</li> </ol>
E 45	Short circuit NTC5	<ol style="list-style-type: none"> <li>1. Check the connection of the NTC5 sensor</li> <li>2. Check the wiring of the NTC5 sensor</li> <li>3. If the problem persists replace the NTC5 sensor</li> </ol>
E 46	NTC5 open circuit	<ol style="list-style-type: none"> <li>1. Check the connection of the NTC5 sensor</li> <li>2. Check the wiring of the NTC5 sensor</li> <li>3. If the problem persists replace the NTC5 sensor</li> </ol>
E 47	Open or defective water pressure sensor	Check the water pressure sensor and replace if necessary
NTC	Maximal difference T1 - T2 exceeded	Check the water flow rate



excellence in hot water



## 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 C**

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	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 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, 19/08/2013

Date

Director R & D  
Marco Croon





EN

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RU



Handwriting practice lines consisting of 20 sets of three horizontal dotted lines.