

# INSTALLATION, OPERATING AND SERVICING INSTRUCTIONS

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## DELTA Classic Combination boiler with atmospheric burner



05/11/2002

ACV reserves the right to modify the technical specifications and components of its products without prior notice.



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## 1.1 INTENDED USERS OF THESE INSTRUCTIONS

These instructions are intended for:

- the specifying engineer
- the installation engineer
- the user
- servicing technicians

## 1.2 SYMBOLS

The following symbols are used in these instructions:



**Essential instruction for operating the system correctly.**



**Essential instruction for personal safety and environmental protection.**



**Danger of electrocution.**



**Risk of burns.**

## 1.3 APPLICABLE STANDARDS

The products have received the "EC" certificate in accordance with the standards prevailing in different countries (European Directives 90/42/EEC, "efficiency", 90/396/EEC "gas appliances"). These products have also received the Belgian "HR+" mark.



## 1.4 WARNINGS

These instructions are an integral part of the equipment to which they refer and must be supplied to the user.

The product must be installed and serviced by qualified engineers, in compliance with the prevailing standards.

ACV accepts no liability for any damage resulting from incorrect installation or from the use of components or fittings not specified by ACV.



**Failure to observe instructions regarding tests and test procedures can result in personal injury or pollution risks.**

*Note:*

ACV reserves the right to modify the technical specifications and components of its products without prior notice.

## 2 INSTALLATION

### 2.1 BOILER ROOM

#### 2.1.1 ACCESS

The boiler room must be large enough to allow good access to the boiler. The following minimum distances (mm) are required around the boiler:

- front	500	- sides	100
- rear	150	- above	700

#### 2.1.2 VENTILATION

The boiler room must be fitted with top and bottom vents according to the table below.

#### 2.1.3 BASE

The base on which the boiler rests must be made of non-combustible materials.

### 2.2 CONNECTION

#### 2.2.1 CHIMNEY CONNECTION

The boiler can be connected to a standard flue that complies with the regulations in force or is connected to a chimney. It must be easy to remove to give access to the flue pipes when servicing the boiler.

- A. Top vent
- B. Bottom vent
- C. Chimney height
- D. Chimney diameter

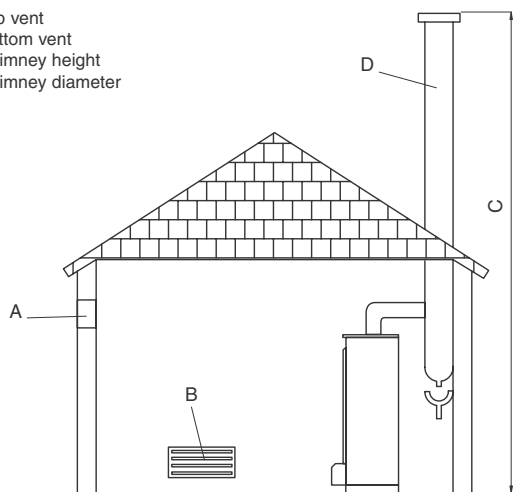


Fig. 1: Boiler room ventilation and chimney connection

		G20	G25	G30-P30
<b>Ventilation</b>				
Min. fresh air requirement	m <sup>3</sup> /h	96,6	119,3	140,4
Top vent (A)	dm <sup>2</sup>	1,5	1,5	1,5
Bottom vent (B)	dm <sup>2</sup>	1,6	2	2,3
<b>Chimney</b>				
C = 5 m Ø min. F	mm	153	157	170
C = 10 m Ø min. F	mm	153	153	153
C = 15 m Ø min. F	mm	153	153	153



#### IMPORTANT

Boilers must be installed by a qualified engineer, in accordance with the prevailing local standards and regulations.

### 2.2.2 CENTRAL HEATING CONNECTION

#### 2.2.2.1 Examples of basic circuit configurations

The drain valve and safety valve must be connected to the sewer drain.

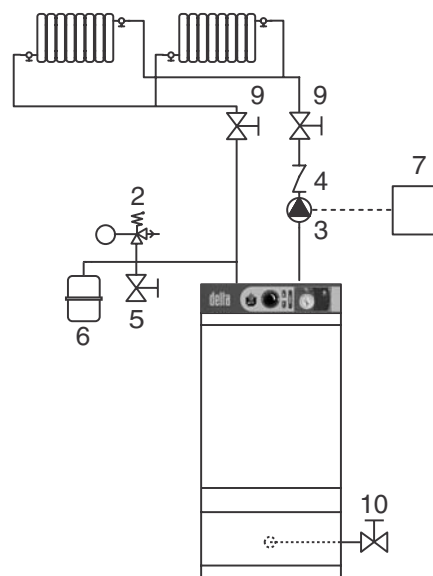


Fig. 2: Configuration with circulator controlled by a room thermostat

1. 3-way manual motorisable mixer valve
2. Safety valve pre-set to 3 bar with pressure gauge
3. Circulator
4. Non-return valve
5. System filling valve
6. Expansion tank
7. Room thermostat
8. ACV 13 controller (see controller kit page 5)
9. Central heating isolating valve
10. Drain valve

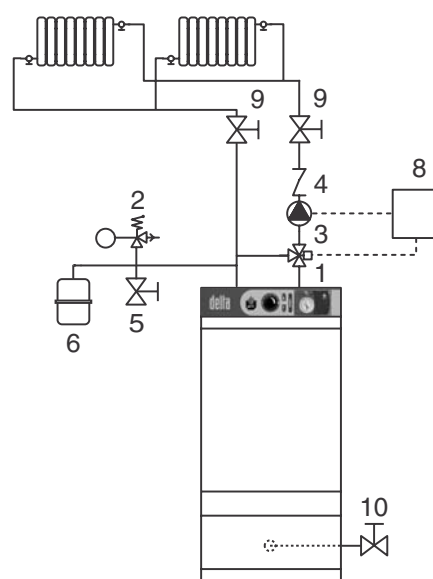


Fig. 3: Configuration with motor driven mixer valve

## 2 INSTALLATION

### 2.2.2.2 ACV circulation kit

ACV offers an optional pre-assembled circulation kit comprising:

- a circulator.
- a 3-way manual motorisable valve.
- connecting pipes including a second optional circuit.
- two isolating valves.
- adapters for mounting safety valve and filling valve to right or left of expansion tank.

### 2.2.2.3 Discharge

The drain cock and safety valve must be connected to the waste water system in accordance with current regulations.

## 2.2.3 DOMESTIC HOT WATER CONNECTION

### 2.2.3.1 Pressure reducer

If the water mains pressure is greater than 6 bar, a pressure reducer calibrated to 4.5 bar must be fitted.

### 2.2.3.2 Safety unit

The tank safety unit must be ACV approved and calibrated to 7 bar.

The valve discharge must be connected to the sewer drain.

### 2.2.3.3 Hot water expansion tank

Installing a hot water expansion tank avoids any risk of pressure surges due to water-hammer.

### 2.2.3.4 Hot water circulation

If the tank is situated a long way from the point of use, then installing a closed return circuit can provide a faster supply of hot water always available.

### 2.2.3.5 Description

1. Safety unit
2. Pressure reducer
3. Thermostatic mixing valve
4. Hot water circulator
5. Non-return valve
6. Hot water expansion tank
7. Inlet valve
8. Draw-off valve
9. Emptying valve



#### IMPORTANT

As a safety measure against burns, we strongly advise installing a thermostatic mixing valve (recommended temperature: 60° C).

#### Optional fittings available

Safety unit	Ø 3/4"
Pressure reducer	Ø 3/4"
Thermostatic mixer	Ø 3/4"
Hot water expansion tank	5 litres



Fig. 4: ACV circulation kit assembly

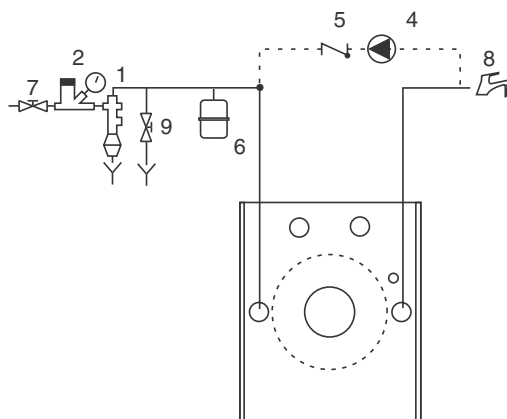


Fig. 5a: Configuration without thermostatic mixing valve

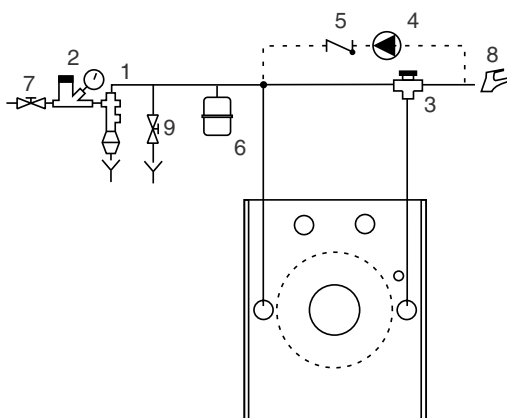


Fig. 5b: Configuration with thermostatic mixing valve

## 2 INSTALLATION

### 2.2.4 CONTROLLER KITS

#### KIT 1: ACV 13.00 / Basic

Basic kit for regulating flow temperature according to weather conditions.

It comprises: temperature regulator with analogue timer, water temperature detector (-30/130° C), outside temperature detector (-30/50° C), 230V - 3 spindle servomotor SQY 31 and intermediate socket.



Fig. 6a: kit 1

#### KIT 1: ACV 13.00 / Standard

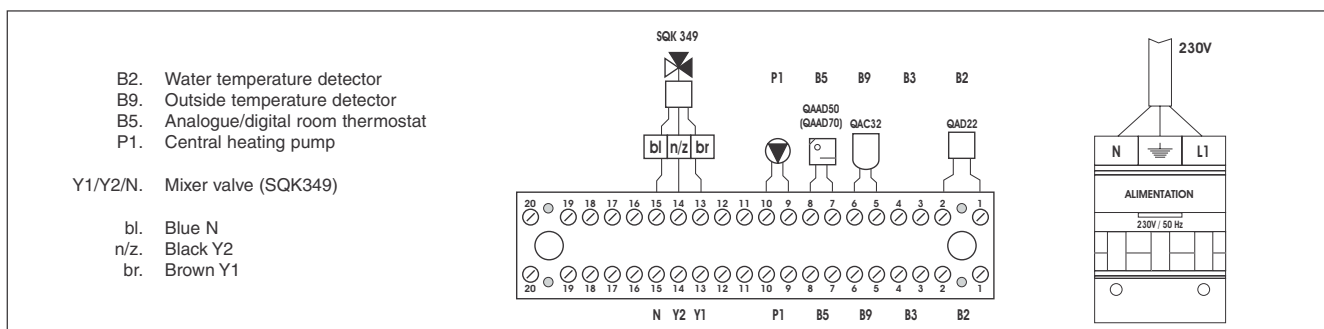
Basic kit for regulating flow temperature according to weather conditions.

It comprises: temperature regulator with analogue timer, water temperature detector (-30/130° C), outside temperature detector (-30/50+° C), 230V - 3 spindle servomotor SQY 349 and intermediate socket.



Fig. 6b: kit 2

### Wiring diagram of ACV controller kits (fig. 7)



### 2.3 ELECTRICAL CONNECTION

#### 2.3.1 POWER SUPPLY

The boiler operates with a 230 V - 50 Hz single phase supply. An on-off switch box with 6 A fuses must be fitted outside the boiler to allow power to be shut off during servicing and before any repairs are carried out on the boiler.

#### 2.3.2 COMPLIANCE

Boiler installation must comply with the prevailing local standards and legislation.

#### 2.3.3 SAFETY

The stainless steel tank must be earthed separately.

#### 2.3.4 BURNER ELECTRICAL CONNECTION

The burner is supplied with power by a 3-core cable.

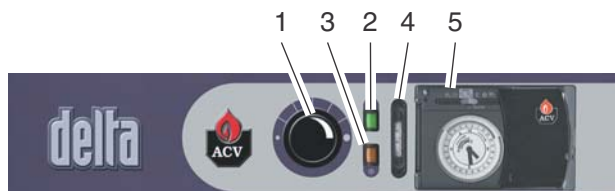


Fig. 8: Control panel



The power to the boiler must be switched off before any work is carried out.

M. Brown  
 O. Orange  
 N. Black  
 B. Blue  
 R. Red  
 T. Green-yellow

- Boiler thermostat (60/90° C)
- On/off switch
- Summer/winter selector
- Thermometer
- Controller (optional)
- TTB
- Cut-off thermostat (95° C max.)
- Safety thermostat (103° C max.)
- Plug (power and control)
- Room thermostat
- Heating pump connection
- To gas valve

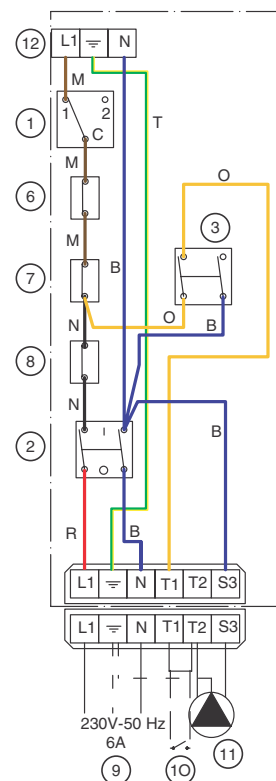


Fig. 9: Boiler wiring

## 3 START-UP

### 3.1 FILLING THE HEATING AND HOT WATER CIRCUITS

1. Fill the domestic hot water circuit and bring it up to pressure.



#### IMPORTANT

The hot water tank must be pressurised before the heating circuit is filled.

2. Fill the heating circuit taking care not to exceed the 2 bar pressure limit.
3. Vent the air from the top of the boiler.
4. After venting the air from the system, bring the pressure up to the static head plus 0.5 bar: 1.5 bar = 10 m – 2 bar = 15 m.
5. Check the power connection, the boiler room ventilation, and ensure that there are no leaks in the flue gas discharge pipes.
6. Set the thermostat (1) to between 60 and 90° C.

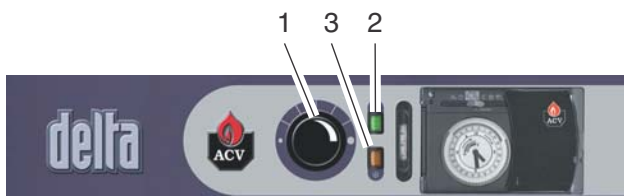


Fig. 10: Control panel

7. Set the Summer/Winter selector (3) to the desired position.
8. Switch the on/off switch (2) to the ON position.
9. Check the gas supply pressure on starting up.

### 3.2 BURNER TROUBLESHOOTING

Refer to the servicing and troubleshooting instructions for the burner.



Before servicing or repairs, switch off the power at the mains switch fitted in the boiler room by the electrician.

## 4 SERVICING

### 4.1 RECOMMENDATION

ACV advises that boilers should be serviced at least once a year. The burner must be serviced and tested by a competent engineer.

### 4.2 SERVICING THE GAS BOILER

- 1 - Switch off the power at the mains switch outside the boiler and close the gas tap.
- 2 - Set the on/off switch on the control panel to the OFF position.
- 3 - Release and remove the chimney flue (1) to free the top of the boiler.
- 4 - Remove the jacket top (2) and lift off the flue reducer (3).
- 5 - Remove the baffles (4) from the flue pipes (5) for cleaning. Replace them if in poor condition.
- 6 - Unscrew the burner chamber plate (6).
- 7 - Brush the flue pipes (5).
- 8 - Clean the burner chamber (7) and the burner (8).
- 9 - Check that the insulation on the burner chamber plate (6) is in good condition.

1. Chimney flue
2. Jacket top
3. Chimney flue reducer
4. Baffles
5. Flue pipes
6. Burner chamber plate
7. Burner chamber
8. Burner

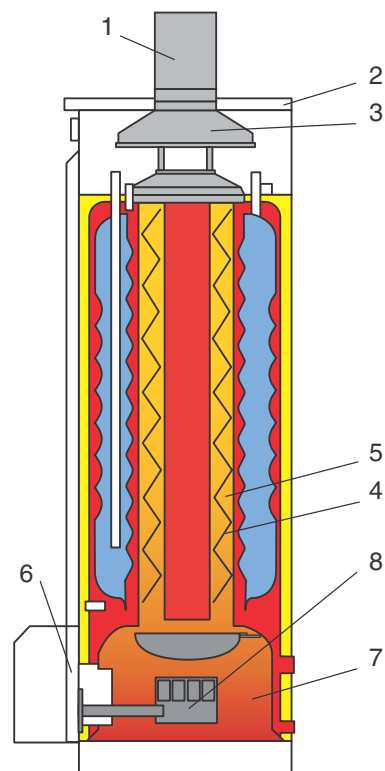


Fig. 11: Main components.

### 4.3 SERVICING THE SAFETY DEVICES

- Check that all thermostats and safety devices are working properly: boiler thermostat, cut-off thermostat and manually reset safety thermostat.
- Test the safety valves on the central heating and hot water circuits

## 4 SERVICING

### 4.4 SERVICING THE BURNER

- Check and clean the burner and ignition electrode.
- Check that the safety components are working properly.

### 4.5 EMPTYING THE BOILER

#### 4.5.1 EMPTYING THE PRIMARY CIRCUIT (central heating):

1. Switch off the power to the boiler at the mains switch installed by the electrician.
2. Close the isolating valves (1) of the boiler system.
3. Connect a hose to the drain valve (2).  
Ensure that it is attached properly.
4. Open the drain valve and let the hot water drain out.




5. When the boiler is empty, return the isolating and safety valves to their initial positions.

#### 4.5.2 EMPTYING THE HOT WATER TANK:

1. Switch off the mains power to the boiler at the external switch installed by the electrician.
2. Relieve the pressure in the primary circuit.
3. Close valves (A) and (B).
4. Open valves (C) and (D) (first C then D).
5. Let the water drain away.



6. After emptying, return the valves to their initial positions.

 For the tank to be emptied, valve (C) must be situated at ground level.

### 4.6 SPARE PARTS

Refer to the specific document available from ACV or your distributor.

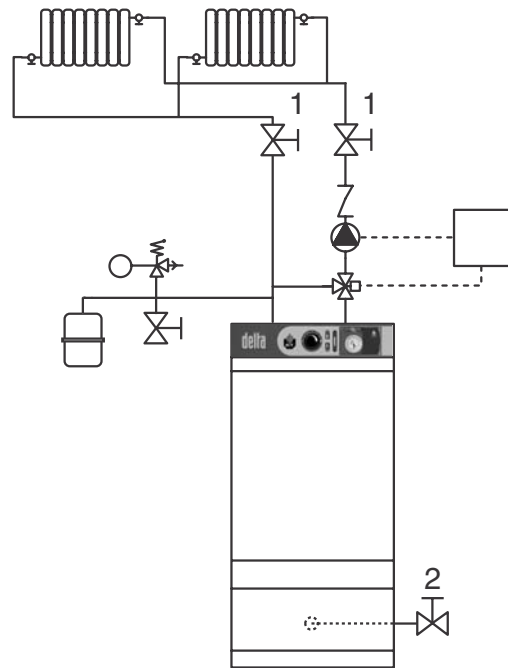


Fig. 12a: Emptying the primary circuit

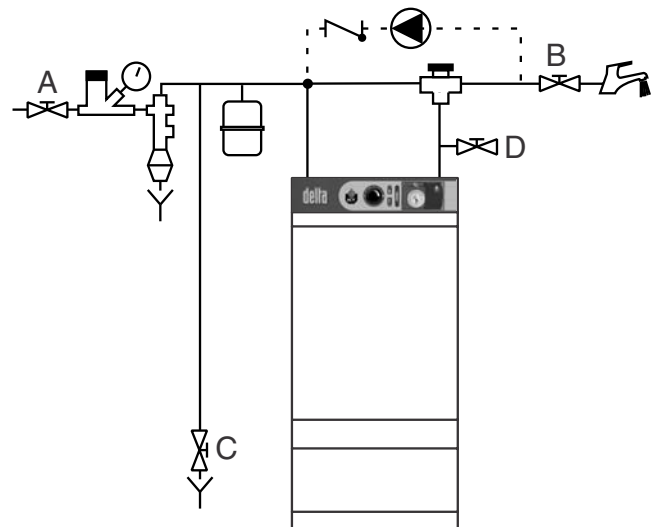


Fig. 12b: Emptying the hot water circuit

## 5 DESCRIPTION

### 5.1 OVERVIEW

- Combination boiler (*central heating and domestic hot water*).
- Designed for venting through a chimney.
- TANK-IN-TANK indirect storage type domestic hot water production.
- Fittings necessary for connecting the circulation kit for feeding the heating circuit (*available as an option*).
- Control panel with on/off switch, adjustable thermostat, thermometer, "Summer/Winter" selector and knockout for fitting ACV integrated control system (*optional*).
- Flue gas anti-backdraught safety device.
- Delivered complete with atmospheric type burner.
- DELTA Classic models G20, G25 and G30, for natural gas, with rated outputs of 23.2, 28.7 and 34 kW.
- DELTA Classic model P30, for propane, with a rated output of 34.4 kW.

### 5.2 DESCRIPTION OF OPERATION

#### 5.2.1 THE TANK-IN-TANK CONCEPT

The DELTA Performance series differs from traditional hot water producers because of its ring-shaped tank immersed in the primary fluid contained in the outer body. When there is a demand for hot water from the central heating system or the domestic hot water system, the thermostat starts the burner. The combustion gases quickly heat up the primary fluid, creating a natural circulation around the tank.

#### 5.2.2 DOMESTIC HOT WATER HEATED INDIRECTLY

This circulation facilitates heat exchange between the primary fluid and the domestic water, which takes place all over the tank surface. The corrugations on the inner and outer shells of the ring-shaped tank further boost the area of heat exchange and speed up the heating process of the domestic water.

#### 5.2.3 EASY SETTING AND SAFETY ASSURED

With a single command, the water temperature of both the primary circuit and the hot water circuit is set by the adjustable thermostat situated on the tank in the primary circuit. A cut-off thermostat, placed on top of the boiler, automatically cuts out the burner when the water temperature in the primary circuit reaches 95° C. A manually reset safety thermostat shuts off the burner if the temperature reaches 103° C.



Fig. 13: Stainless steel domestic hot water tank

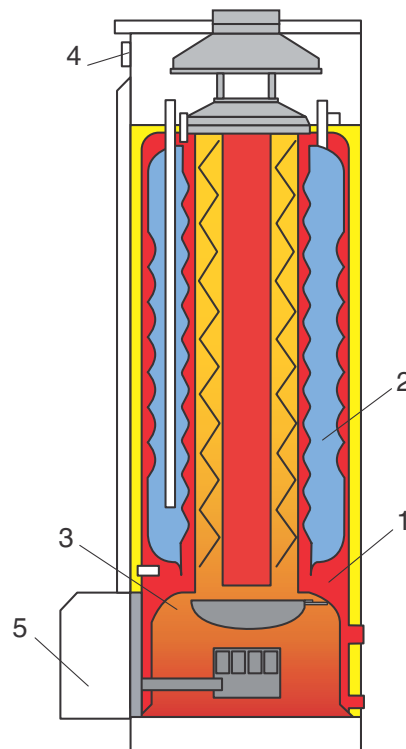


Fig. 14: Overview of boiler

1. Primary fluid
2. Domestic hot water
3. Combustion chamber
4. Control thermostat
5. Burner



## 5 DESCRIPTION

### 5.3 DESIGN FEATURES

#### 5.3.1 OUTER BODY

The outer body containing the primary fluid is made of STW 22 steel.

#### 5.3.2 TANK-IN-TANK TYPE EXCHANGER ACCUMULATOR

The ring-shaped inner tank with its large heating surface for producing domestic hot water is built of Chrome/Nickel 18/10 stainless steel. It is corrugated over its full height by an exclusive production process and entirely argon arc welded by the TIG (Tungsten Inert Gas) method.

#### 5.3.3 COMBUSTION GAS CIRCUIT

The combustion gas circuit is protected by cold galvanisation. The combustion gas circuit comprises:

##### 5.3.3.1 Flue pipes

Depending on output, DELTA Classic models contain 4 or 8 steel flue pipes with an internal diameter of 64 mm. Each pipe is fitted with a baffle of special steel designed to improve heat exchange and reduce flue gas temperature.

##### 5.3.3.2 Combustion chamber

The combustion chamber on DELTA Classic models is water cooled.

#### 5.3.4 INSULATION

The boiler body is fully insulated by rigid polyurethane foam with a high thermal insulation coefficient, sprayed on without the use of CFCs.

#### 5.3.5 JACKET

The boiler is covered by a steel jacket which has been scoured and phosphated before being stove enamelled at 220° C.

#### 5.3.6 BURNER

DELTA Classic boilers are fitted with an atmospheric burner with electric ignition.



#### IMPORTANT

When starting the burner for the first time and when servicing it, refer to the technical instructions supplied with it.

#### 5.3.7 CONTROL PANEL (Fig. 15)

- 1 - Thermostat adjustable between 60 and 90° C
- 2 - On/off switch
- 3 - Summer/winter selector
- 4 - Thermometer
- 5 - Knockout for (optional) controller.

1. Inner ring-shaped domestic hot water tank
2. External body containing central heating circuit
3. Insulation
4. Jacket
5. Flue pipes
6. Baffles
7. Control thermostat 60/90° C
8. Lower heating return
9. Combustion chamber
10. Burner chamber plate
11. Boiler drain
12. Upper heating flow and return
13. Chimney connection
14. Control panel
15. Domestic hot water outlet
16. Domestic cold water inlet
17. Cut-off thermostat 95° C / Thermometer
18. Manually reset safety thermostat 103° C
19. Gas burner
20. Burner chamber disk.

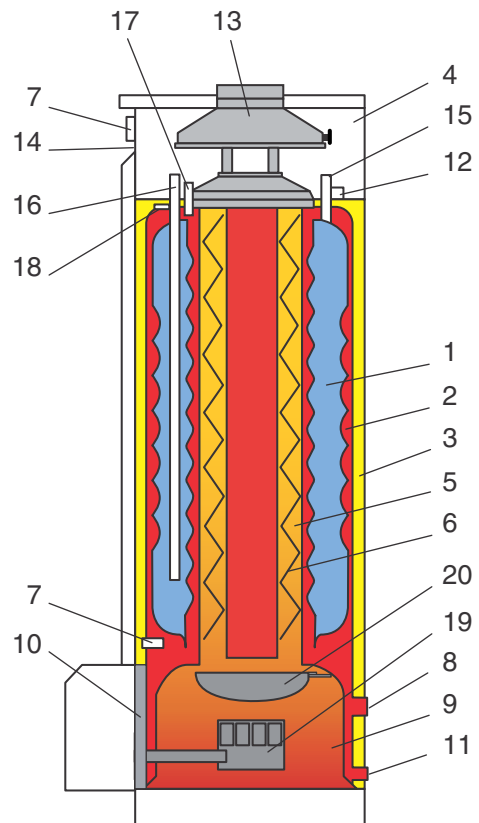


Fig. 15: Boiler structure



Fig. 16: Control panel

## 6 TECHNICAL SPECIFICATION

### 6.1 EFFECTIVE DIMENSIONS

The units are delivered fully assembled, tested and packed on a timber base with shockproof edges and protected by heat-shrunk plastic film. On reception and after unpacking, check the equipment for damage. For transport purposes, refer to the weights and dimensions given below.

### 6.2 MAXIMUM OPERATING CONDITIONS

**Maximum service pressure** (tank full of water)

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

**Test pressure** (tank full of water)

- Primary circuit: 4.5 bar
- Secondary circuit: 13 bar

**Operating temperature**

- Maximum temperature: 90° C

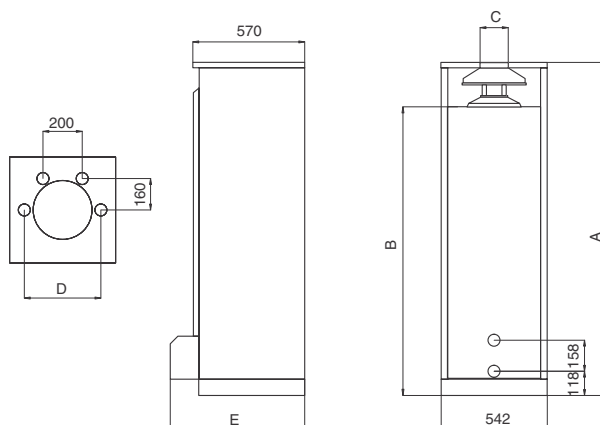


Fig. 17: Effective dimensions

Dimensions	G20	G25	G30/P30
A	1697	1697	1697
B	1460	1460	1460
C	154	154	154
D	360	390	390
Kg	712	712	712

### 6.3 DOMESTIC HOT WATER PERFORMANCE

Domestic hot water performances			G20	G25	G30	P30
<b>Operating at 80° c</b>						
Peak delivery at 40° C	(OT = 30° C)	litres/10'	266	339	339	339
Peak delivery at 40° C	(OT = 30° C)	litres/60'	820	1025	1151	1161
Continuous delivery 40° C	(OT = 30° C)	litres/h	665	823	975	986
<b>Operating at 80° c</b>						
Initial heating time		minutes	40	29	24	24
After draw-off of 140 l à 45° C		minutes	16	12	10	10
Specific delivery		litres/minutes	11	14	14,5	14,5

Results obtained without a thermostatic mixing valve and with water supply at 10° C

### 6.4 BOILER PERFORMANCES

		G20	G25	G30	P30
Input	kW	26,1	33,1	39,0	40,0
Output	kW	23,2	28,7	34	34,4
Combustion efficiency	%	89	89	89	89,5
Maintenance loss at 60° C as % of rated value	%	1,3	1	0,8	0,87
Mass rate of combustion products	g/sec.	20	25	30	30
Average CO <sub>2</sub>	%	9	9	9	10
Total capacity	litres	178,5	167,5	167,5	167,5
Primary circuit capacity	litres	114,5	87,5	87,5	87,5
Heating connection	Ø	1"	1"	1"	1"
Hot water connection	Ø	3/4"	3/4"	3/4"	3/4"
Hot water tank heat exchange surface	m <sup>2</sup>	1,59	2,46	2,46	2,46
Weight empty	Kg	154	186	186	186
Chimney connection		B11 BS	B11 BS	B11 BS	B11 BS

## 6 TECHNICAL SPECIFICATION

### 6.5 ATMOSPHERIC BURNER

		G20	G25	G30	P30
<b>Gas G20 - 20 mbar - I E2+ - I 2E LL</b>					
Burner pressure	mbar	13,3	12,8	12,3	-
Flow rate	m <sup>3</sup> /h	2,76	3,50	4,13	-
<b>Gas G25 - 25 mbar - I 2L</b>					
Burner pressure	mbar	13,4	13,4	13,4	-
Flow rate	m <sup>3</sup> /h	3,10	3,88	4,50	-
<b>Gas G31 - 37/50 mbar - I 3P</b>					
Burner pressure	mbar	-	-	-	28,5
Flow rate	m <sup>3</sup> /h	-	-	-	1,64
Injectorr Ø	1/100 mm	450	470	510	3x190

BE - FR	I E2+
AT - DK ES - GB IT - PT IE - SE	I 2H
BE - FR ES - GB IE - PT	I 3P
NL	I 2L
LU - DE	I 2ELL

#### 6.5.1 START-UP

- Flush the gas pipe thoroughly, activate the room thermostat and set the control thermostat for heat demand.
- Open the gas tap.
- Turn on the main switch on the control panel.

#### IMPORTANT:

- The burner is preset at the factory.
- Check the gas supply pressure and the pressure at the burner when starting up.

#### LEGEND:

1. Gas electro-valves
2. Upstream gas pressure test point
3. Pressure regulator
4. Burner gas pressure test point

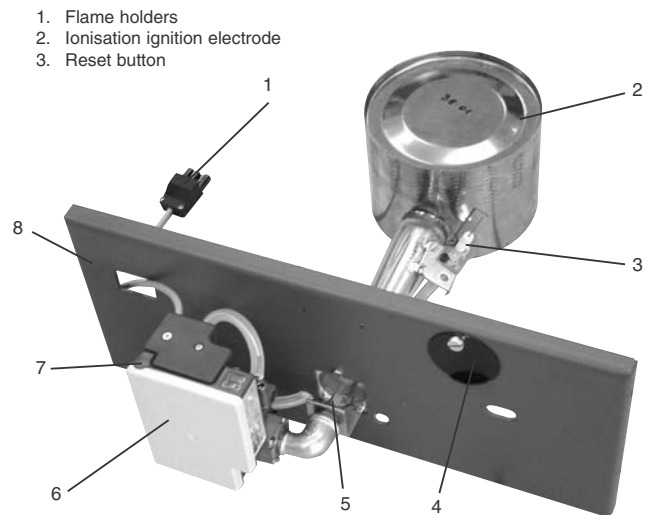


Fig. 19: Natural gas atmospheric burner

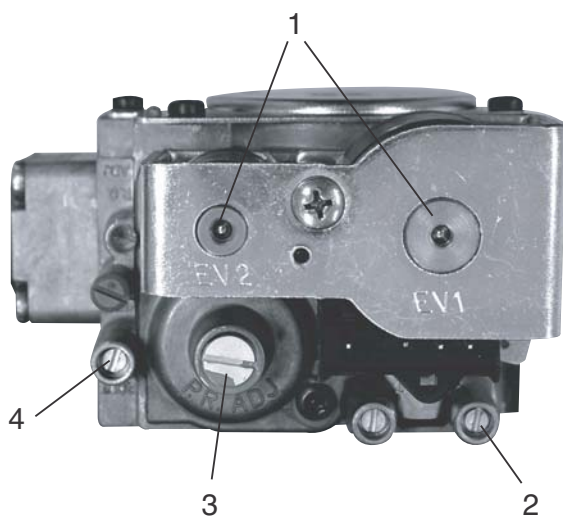


Fig. 18: Burner valve

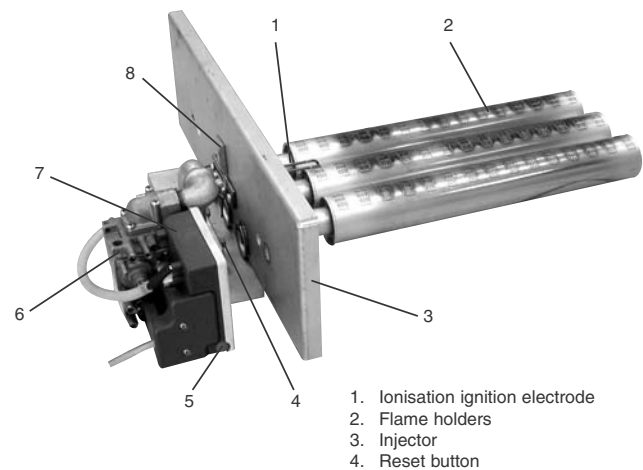


Fig. 20: Propane atmospheric burner

## 7 USER GUIDE

### 7.1 USING THE BOILER

#### 7.1.1 GETTING TO KNOW THE CONTROL PANEL (Fig. 21)



**Before doing any work on the boiler, switch off the power at the mains switch installed in the boiler room by the electrician.**

**On the control panel, switch off the ON/OFF switch.**  
(item 2, Fig. 21)

#### 1 - Control thermostat 60 to 90° C (item 1, Fig. 21)

Central heating systems are generally designed to operate at 80° C maximum. If they are operated at a lower temperature, a 3-way mixer valve installed on the heating flow pipe (see Fig. 3, page 3) allows the temperature to be set manually or, if you decide to install a regulator (§ 2.2.4), automatically.

We recommend you set the thermostat to the maximum values to get the best from the domestic hot water system.



The water stored in the domestic hot water tank in the boiler can be at a very high temperature.

In all cases, install the thermostatic mixer (Fig. 5b, page 4) on the domestic hot water flow pipe which must not exceed 60° C.

A blender or mixing valve is recommended at each point of use.

#### 2 - ON/OFF switch (item 2, Fig. 21)

This must be used to switch off the boiler before working on it.

#### 3 - Summer/winter selector (item 3, Fig. 21)

“Winter” position: activates both the hot water and central heating functions. “Summer” position: the room thermostat or regulator (§ 2.2.4) is switched off. The heating circulator is also switched off. Only the domestic hot water function is provided. You can lower the temperature on the thermostat (1) to save energy. If there is not enough hot water, we recommend setting the thermostat (1) to its maximum value.

When the next heating season begins, simply select “Winter” to reactivate the heating system.

#### 4 - Thermometer (item 4, Fig. 21)

Reads the temperature of the boiler primary circuit (central heating) directly.

#### 5 - Regulator (item 5, Fig. 21)

See the user instructions enclosed if you have chosen this option.



Fig. 21: Control panel

### 7.1.2 HEATING SYSTEM GAUGE PRESSURE

Your system is fitted with a heating safety valve set to 3 bar, with a pressure gauge.

Ensure that the water in the system is always pressurised. When cold, and the air in the system has been vented, the pressure gauge must show a pressure between 0.5 and 1.5 bar, depending on the height of the building (1 bar = 5m / 1.5 bar = 10 m and 2 bar = 15 m).

To add water, open the filling valve (Fig. 2 and 3 page 3). Close the valve after filling. Vent the air in the system to get an accurate water pressure reading.

### 7.1.3 SAFETY VALVE (central heating)

(item 2, Fig. 3, page 3)



The drain pipe to waste water system drain must be law current regulations.



In the event of a fault after this short trial, inform the installing engineer.

### 7.1.4 SAFETY UNIT (domestic hot water)

(item 1, Fig. 5a and 5b, page 4)

A monthly inspection is recommended.

Lift the lever on the emptying device for a few seconds to ensure that the safety valve is working properly.



The drain pipe to waste water system drain must be law current regulations.



In the event of a fault after this short trial, inform the installing engineer.

## 7 USER GUIDE

### 7.1.5 GAS BURNER - RESETTING

If the atmospheric burner is not working:

1. Remove the protective cover.
2. Press the red button to start the burner.

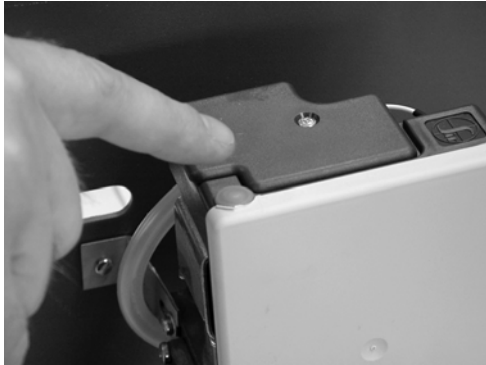


Fig. 22: Burner reset button

3. If the burner lights, replace the cover.



**If the burner is not working, isolate the electricity supply before attempting to reset the safety thermostat.**

4. Remove the front panel of the casing and reset the safety thermostat positioned on top of the boiler.



**Wait until the boiler temperature is below 60 °C. Then replace the casing front panel.**



Fig. 23: Safety thermostat reset button

5. If the burner lights, replace the cover.
6. If the fault persists, notify the installing engineer.

#### **Starting the burner.**

In normal operation, the gas burner starts automatically whenever the boiler temperature falls below the set temperature.



**To ensure your system operates properly, have it professionally serviced once a year before the central heating season begins.**

### 7.2 BOILER ROOM

- Keep vents free at all times.
- Do not store inflammable products in the boiler room.
- Take care not to store corrosive products near the boiler, such as paints, solvents, chlorine, salt, soap and other cleaning products.
- If you smell gas, do not switch on the light or light a flame. Turn off the mains gas tap at the meter and inform the appropriate services immediately.



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