

# Falcon GTE

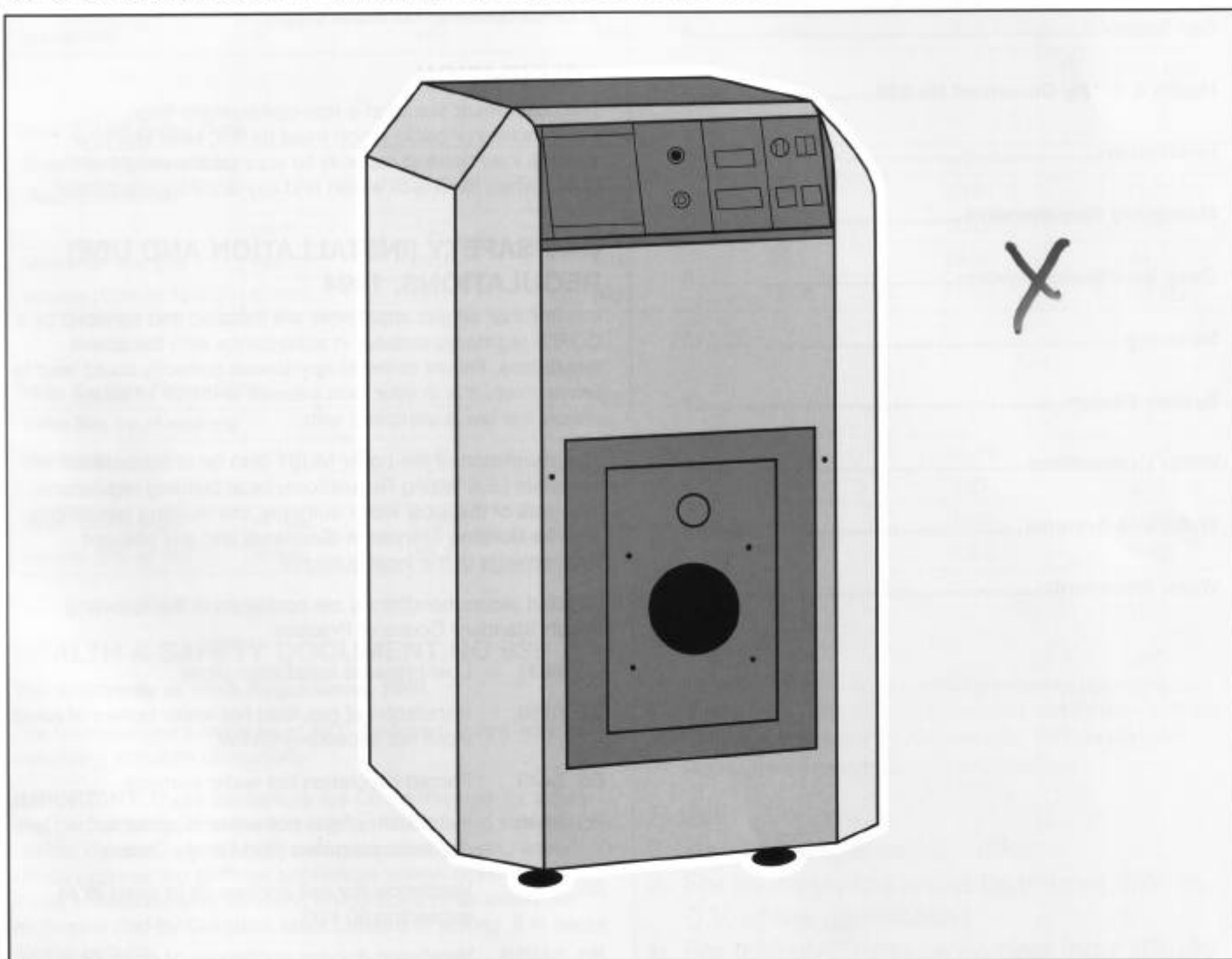
## Installation, Assembly and Servicing

### Oil or Gas Fired Boilers

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Assembly and Installation Instructions for Ideal Falcon Oil or Gas Fired heating boilers should be read in conjunction with the general technical data tables enclosed and any other technical publication supplied with the burner.

**CAUTION.** To avoid the possibility of injury during the installation, servicing or cleaning of this appliance care should be taken when handling edges of sheet steel components.



**i** Ideal BOILERS

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**INTRODUCTION**

The Falcon GTE boilers are a range of cast iron sectional pressure jet boilers offering high efficiency operation, ease of maintenance, fuel flexibility and low emissions in a compact package. Suitable for oil or gas operation the Falcon GTE range is supplied in a choice of 5 standard models, rated in outputs from 36kW (123,000 Btu/h) to 102kW (348,024 Btu/h) the range has a maximum operating pressure of 4 bar.

Designed with a large combustion chamber and 3 pass, horizontal flue way incorporating fins and cast iron turbulators, the Falcon GTE ensures maximum heat transfer efficiency (up to 93% net).

**DUTY**

The range of boilers is suitable for: combined indirect pumped domestic hot water and central heating systems; independent indirect pumped domestic hot water or central heating systems.

Fully pumped systems may be open vented or sealed.

The range of boilers is NOT suitable for:

1. Gravity DHW systems.
2. Gravity heating systems.
3. Direct domestic hot water supply.

**FOUNDATION**

The boiler must stand on a non-combustible floor (i.e. concrete or brick) which must be flat, level and of a suitable load bearing capacity to support the weight of the boiler (when filled with water) and any ancillary equipment.

**GAS SAFETY (INSTALLATION AND USE) REGULATIONS, 1994**

It is law that **all** gas appliances are installed and serviced by a CORGI registered installer in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to ensure the law is complied with.

The installation of the boiler **MUST** also be in accordance with the latest I.E.E Wiring Regulations, local building regulations, bye-laws of the local water authority, the building regulations and the Building Standards (Scotland) and any relevant requirements of the local authority.

Detailed recommendations are contained in the following British Standard Codes of Practice:

- BS. 6891      Low pressure installation pipes.
- BS. 6798      Installation of gas fired hot water boilers of rated input not exceeding 60 kW.
- BS. 5449      Forced circulation hot water systems.
- BS. 5546      Installation of gas hot water supplies for domestic purposes (2nd Family Gases)
- BS. 6644      Ventilation (for gas appliances of rated input exceeding 60 kW)
- BS. 5440:2    Ventilation (for gas appliances of rated input not exceeding 60 kW)

Table 1 - General Data

Boiler Size (no of sections)		4	5	6	7	8
Maximum Heat Input	kW	60	76.8	93.6	110	122
	Btu/h x 10 <sup>3</sup>	205	262	319	375	416
Maximum Heat Output	kW	50	64	78	92	102
	Btu/h x 10 <sup>3</sup>	170	218	266	314	348
Minimum Heat Output	kW	36	50	64	78	92
	Btu/h x 10 <sup>3</sup>	123	170	218	266	314
Combustion chamber volume	m <sup>3</sup>	0.033	0.042	0.051	0.059	0.069
	ft <sup>3</sup>	1.16	1.48	1.8	2.12	2.43
Flue way volume	m <sup>3</sup>	0.054	0.068	0.083	0.097	0.111
	ft <sup>3</sup>	1.9	2.4	2.9	3.4	3.9
Boiler water content	l	36	43	50	57	64
	gal	7.9	9.5	11	12.5	14.1
Hydraulic resistance at 15k	mbar	8.5	14.2	20.1	27.8	32.8
	m.w.g	3.4	5.6	8.0	11.1	12.1
Combustion chamber resistance (at zero draught)	mbar	0.43	0.64	0.65	0.75	0.85
	in.w.g	0.17	0.25	0.25	0.30	0.34
Boiler DRY weight less burner unit	kg	218	257	297	336	375
	lb	480	566	654	740	826

Table 2 - Oil Firing Data

Boiler Size (no of sections)		4	5	6	7	8
Maximum Oil rate	l/hr	5.77	7.38	9.0	10.61	11.77
	gal/h	1.27	1.62	1.98	2.33	2.59
Maximum flue gas volume (12% at 180°C)	l/sec	31.7	40.6	49.5	58.35	64.7
	ft <sup>3</sup> /min	67.2	86.0	104.8	123.6	137.0

Table 3 - Gas Firing Data

Boiler Size (no of sections)		4	5	6	7	8
Maximum Oil rate	m <sup>3</sup> /h	5.61	7.18	8.75	10.29	11.41
	ft <sup>3</sup> /h	1.23	1.58	1.93	2.27	2.51
Maximum flue gas volume (9% at 180°C)	m <sup>3</sup> /sec	0.028	0.035	0.043	0.051	0.055
	ft <sup>3</sup> /min	59.3	74.1	91.1	108.0	116.5

## HEALTH & SAFETY DOCUMENT NO 635

### The Electricity at Work Regulations, 1989.

The manufacturer's notes must NOT be taken, in any way, as overriding statutory obligations.

**IMPORTANT.** These appliances are CE certificated for safety and performance. It is, therefore, important that no external control devices, e.g. flue dampers, economisers etc., are directly connected to these appliances unless covered by these Installation and Servicing Instructions or as otherwise recommended by **Caradon Ideal Limited** in writing. If in doubt please enquire.

Any direct connection of a control device not approved by **Caradon Ideal Ltd.** could invalidate the certification and the normal appliance warranty. It could also infringe the Gas Safety Regulations and the above regulations.

### Notes.

To obtain the gas consumption:-

- a. For l/s divide the gross heat input (kW) by C.V. of the gas (MJ/m<sup>3</sup>)
- b. For ft<sup>3</sup>/h divide the gross heat input (Btu/h) by C.V. of the gas (Btu/ft<sup>3</sup>)

# GENERAL

## 1 BOILER WATER CONNECTIONS

Flow and return connections are positioned at the rear of the boiler and vary in size depending upon the output model.

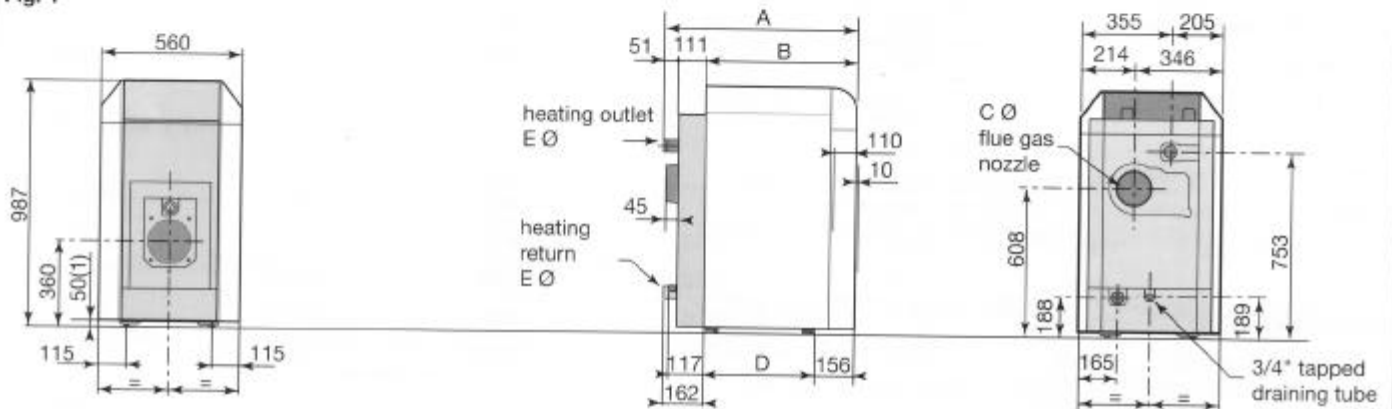
The flow and returns are provided with threaded connections.

A  $\frac{3}{4}$ " drain connection is provided at the rear bottom of the boiler heat exchanger.

Dimensional details can be found in frame 2.

## 2 BOILER DIMENSIONS

Fig. 1



(1) Adjustable feet: basic height 50mm with 35 to 65mm adjustment range.

Rp : Tapped  
R : Threaded

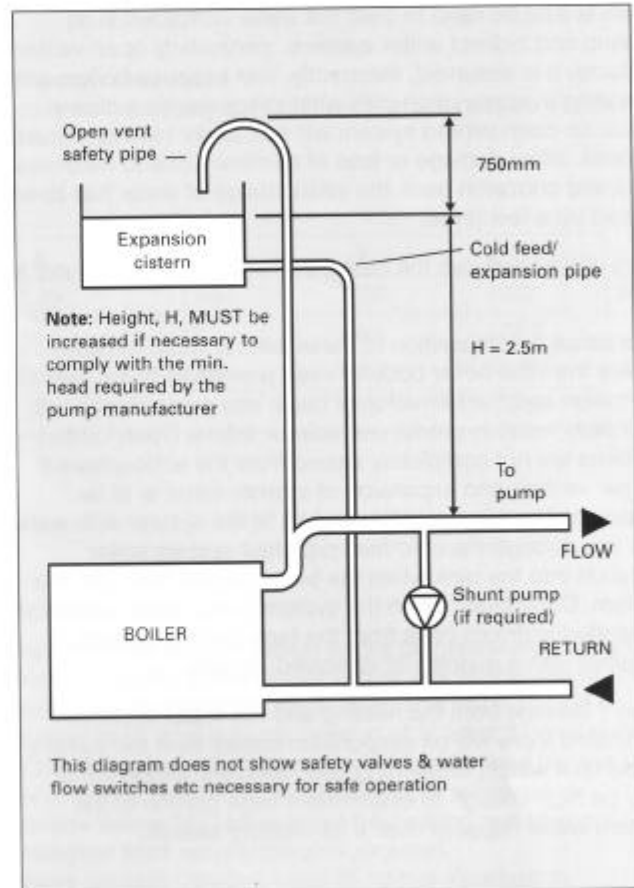
Dimensions		4	5	6	7	8
Boiler size (no of sections)						
Dimension A	mm	754	881	1008	1135	1262
Dimension B	mm	592	719	846	973	1100
Dimension C	mm	153	153	180	180	180
Dimension D	mm	423	550	673	800	927
Dimension E	in BSP	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$

### 3 OPEN VENTED SYSTEM - minimum static head requirements

The Falcon GTE boiler has a minimum static head requirement of 2.5 metres (8 feet approx) depending on the particular characteristics of the system design (see diagram). The information provided is based on the following assumptions:

1. An open vent/safety pipe connection is made immediately after the flow flange connection.
2. A cold feed/expansion pipe connection is made to the system return pipe within 0.75m of the boiler return connection.
3. The maximum flow rate through the boiler is based on a temperature difference of 11°C (20°F) at full boiler output with the circulating pump positioned in the flow of the system.
4. The boiler is at the highest point of the system. Systems designed to rise above the flow connections will, of course, automatically require a minimum static head higher than shown.
5. The position of the open vent/safety pipe above the expansion cistern water level is given as a guide only. The final position will depend upon particular characteristics of the system. Pumping over of water into the expansion cistern should be avoided.
6. Both open vent/safety pipe and cold feed/expansion pipes must be of adequate diameter to suit the output of the boiler (see table below).

Boiler Output kW (mm)	Open Vent (mm)	Cold Feed (mm)
30 to 60	25	20
60 to 150	32	25



### 4 SEALED (PRESSURISED) SYSTEMS

**Working pressure 4 bar maximum.**

Particular reference should be made to BS. 6644: Section 2; Subsection 11 and Guidance note PM5 "Automatically controlled steam and hot water boilers" published by the Health and Safety Executive.

The information and guidance given below is not intended to override any requirements of either of the above publications or the requirements of the local authority, gas or water undertakings.

In general commercial closed pressurised systems are provided with either manual or automatic water make up.

In both instances it will be necessary to fit automatic controls intended to protect the boiler, circulating system and ancillary equipment by shutting down the boiler plant if a potentially hazardous situation should arise.

Examples of such situations are low water level and operating pressure or excessive pressure within the system. Depending on circumstances, controls will need to be either manual or automatic reset. In the event of shutdown both visual and audible alarms may be necessary.

Pressure vessels used must comply with BS. 4814 and must be sized on the basis of the total system volume and initial charge pressure.

Initial minimum charge pressure should not be less than 0.5 bar (7.2psi) and must take account of the static head and specification of the pressurising equipment. The maximum water temperatures permissible at the point of minimum pressure in the system are specified in Guidance Note PM5.

When make up water is not provided automatically it will be necessary to fit controls which shut down the plant in the event of the maximum system pressure approaching to within 0.35bar (5psi) of the safety valve setting.

Other British Standards applicable to commercial sealed systems are:-

BS. 6880: Part 2

BS. 1212

BS. 6281: Part 1

BS. 6282: Part 1

BS. 6283: Part 4

## GENERAL

### 5 WATER TREATMENT

There is a basic need to treat the water contained in all heating and indirect water systems, particularly open vented systems. It is assumed, incorrectly, that because boilers are operating in conjunction with what is apparently a closed circuit an open vented system will not, under normal circumstances, allow damage or loss of efficiency due to hardness salts and corrosion once the initial charge of water has been heated up a few times.

1mm of lime reduces the heat transfer from metal to water by 10%.

In practice the deposition of these salts is liable to cause noises from the boiler body or even premature boiler failure. Corrosion and the formation of black iron oxide sludge will ultimately result in premature radiator failure. Open vented systems are not completely sealed from the atmosphere if proper venting and expansion of system water is to be achieved. The same tank is used to fill the system with water and it is through the cold feed pipe that system water expands into the tank when the boiler passes heat into the system. Conversely, when the system cools, water previously expanded is drawn back from the tank into the system, together with a quantity of dissolved oxygen.

Even if leakage from the heating and hot water system is eliminated there will be evaporation losses from the surface of the tank which, depending upon ambient temperature, may be high enough to evaporate a large portion of the system water capacity over a full heating season.

There will always be corrosion within a heating or hot water system to a greater or lesser degree, irrespective of water characteristics, unless the initial fill water from the mains is treated. Even the water in closed systems will promote corrosion unless treated. For the reason stated, **Ideal Boilers** strongly recommend that when necessary the system is thoroughly cleaned, prior to the use of stable inhibitor, which does not require continual topping up to combat the effects of hardness salts and corrosion on the heat exchangers of the boiler and associated systems.

**Caradon Ideal Ltd.**, advise contact directly with specialists on, water treatment such as:

**Fernox  
Fry Technology UK  
Tandem House  
Marlow Way  
Beddington Farm Road  
Croydon  
CR0 4XS  
Tel. 0870 601 5000**

**Betz Dearborn Ltd  
Foundry Lane  
Widnes,  
Cheshire  
WA8 8UD  
Tel. 0151 424 5351.**

### WATER CIRCULATION SYSTEM

The boiler must NOT be used for direct hot water supply.

The central heating system should be in accordance with BS. 6798 and, in addition, for smallbore and microbore systems, BS. 5449.

#### WATER TREATMENT - see Frame 5

The hot water storage cylinder MUST be of the indirect type and should preferably be manufactured of copper.

Single feed, indirect cylinders are not recommended and MUST NOT be used on sealed systems.

The appliances are NOT suitable for gravity central heating nor are they suitable for the provision of gravity domestic hot water.

The hot water cylinder and ancillary pipework, not forming part of the useful heating surface, should be lagged to prevent heat loss and any possible freezing - particularly where pipes run through roof spaces and ventilated underfloor spaces.

The boiler must be vented.

Draining taps MUST be located in accessible positions, which permit the draining of the whole system - including the boiler and hot water storage vessel. They should be at least 1/2" BSP nominal size and be in accordance with BS. 2879.

### ELECTRICAL SUPPLY

Wiring external to the appliance MUST be in accordance with the current I.E.E. (BS7671) Wiring Regulations and any local regulations which apply.

The point of connection to the mains should be readily accessible and adjacent to the boiler.

### GAS SUPPLY

The local gas supplier should be consulted, at the installation planning stage, in order to establish the availability of an adequate supply of gas. An existing service pipe must NOT be used without prior consultation with the local gas supplier.

A gas meter can only be connected by the local gas supplier or by a registered CORGI engineer.

An existing meter should be checked, preferably by the gas supplier, to ensure that the meter is adequate to deal with the rate of gas supply required. A minimum working gas pressure of 20 mbar MUST be available at the boiler inlet.

Installation pipes MUST be fitted in accordance with BS. 6891. Pipework from the meter to the boiler MUST be of an adequate size.

Do not use pipes of smaller size than the boiler inlet gas connection.

The complete installation MUST be tested for gas soundness and purged as described in the above code.

## 6 SYSTEM DESIGN

### MINIMUM WATER FLOW

#### Design flow rates

The following table gives the flow rate required for each boiler based on a design temperature difference of 11°C (20°F) at the maximum rated output. For hydraulic resistance see General Data table (page 10).

#### Minimum flow rates

It may be necessary to fit a shunt pump to ensure minimum flow rates.

Boiler size (no of sections)		4	5	6	7	8
Normal water flow rate temperature difference 11°C (20°F)	l/s	1.09	1.39	1.69	2.00	2.21
	g.p.m	14.4	18.4	22.3	26.4	29.2
Minimum water flow rate temperature difference 35°C (63°F)	l/s	0.34	0.44	0.53	0.63	0.70
	g.p.m	4.5	5.8	7.0	8.3	9.3

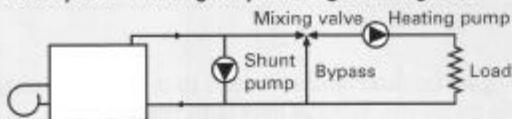
### SYSTEM DESIGN

Recommendations relating to water system design are contained in BS5449: Part 1, BS5410: Part 2, BS5376: Part 2 and BS6880.

System design must allow for adequate internal circulation within the boiler and sufficient heat release from the boiler body during and immediately after burner firing. Heating and/or hot water controls should be interlocked electrically with the burner, to prevent firing when the system does not demand heat.

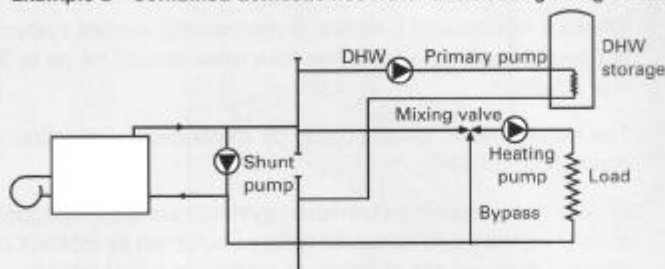
Depending on system design it may be necessary to interrupt electrical supply to the burner before any mixing valves are completely closed to the boiler flow. This will dissipate residual heat. Also a pump overrun of at least 5 minutes is required on plant shutdown to avoid interference trip out of the overheat thermostat. If system return temperature remains below 30°C for most of the heating period some protection from condensation is required. Please contact Caradon Ideal for further information.

#### Example A - Heating only utilizing a mixing valve



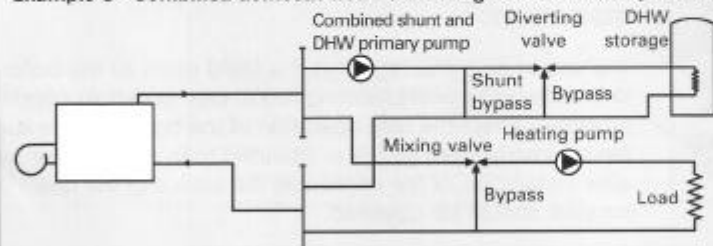
A shunt pump sized on the minimum flow rate required MUST be fitted. Both heating and shunt pumps MUST run on during the overrun period of 5 minutes. The mixing valve MUST NOT be capable of complete closure to bypass, in order that residual heat can be dissipated.

#### Example B - Combined domestic hot water and heating using a mixing valve



A shunt pump sized on the minimum flow rate required MUST be fitted. Provided adequate heat dissipation can be achieved at all times the shunt and DHW primary pumps only may run on during the overrun period of 5 mins - allowing the heating pump to be switched off. This example assumes the DHW primary pump flow rate required is less than that required for the shunt pump.

#### Example C - Combined domestic hot water using a diverter valve, and heating using a mixing valve



The example assumes flow rate required through the DHW storage cylinder is less than that required by the boiler. A combined shunt/DHW primary pump sized on the minimum flow to be required MUST be fitted. Provided adequate heat dissipation can be achieved at all times the combined pump only may run on during the overrun period - allowing the heating pump to switch off. In order to achieve adequate heat dissipation into the DHW storage cylinder, the diverter valve MUST always open during the overrun period of 5 minutes.

**Notes:** Minimum static head requirements with limit thermostat set at 100°C (212°F) : 2.5m  
The examples illustrated are intended as a general guide only  
Caradon Plumbing Solutions will be pleased to advise on specific applications  
Design and minimum flow rate tables are shown in this leaflet

# INSTALLATION

## 7 INSTALLATION REQUIREMENTS

The appliance must be installed by a CORGI registered installer.

The installation of the boiler must be in accordance with the relevant requirements of the Gas Safety Regulations, current I.E.E. (BS.7671) Regulations, Model Water Bye-laws, local water authority bye-laws and it should also comply with any relevant requirements of the local gas supplier, local authority and the relevant British Standard Codes of practice and building regulations.

### Limitations of Intended Operating Environment

These appliances are NOT suitable for installation where they will be exposed to the elements.

A boiler room shall be constructed or adapted to meet the requirements of BS 6644.

The maximum ambient temperature is 32°C at 1.5 metres from the floor with a maximum humidity of 90% RH.

### FOR SMALL PIPE INSTALLATIONS;

**BS. 6891:** Installation of low pressure pipework

### FOR LARGE PIPE INSTALLATIONS;

#### British Gas Publication:

IM11: Flues for Commercial and Industrial Gas Fired Boilers and Air Heaters.

#### Gas Installations

IGE-UP-1: Purging Procedures of Non-domestic Gas Installations. Soundness Testing Procedures for Industrial and Commercial.

IGE-UP-2: Guidance notes on the Installation of Gas Pipework, Boosters and Compressors in Customer's Premises Equal to or Greater than 25mm (Non-domestic).

BS.6644: Installation of Gas Fired Hot Water Boilers 60kW to 2MW.

CP341: Water Supply.

CP342:2: Centralised Hot Water Supply.

#### Model Water Byelaws

Manufacturers notes must not be taken, in any way, as overriding statutory obligations.

The appliance must be installed in a room separated from living rooms and provided with appropriate ventilation direct to the outside - see Table 5.

## 8 VENTILATION

Safe, efficient and trouble-free operation of conventionally flued gas boilers is vitally dependent on the provision of an adequate supply of fresh air to the room in which the appliance is installed. Ventilation by grilles communicating directly with the outside air is required at both high and low levels. The minimum free areas of these grilles must be according to the following scale:

**Table 5 - Ventilation Requirements**

Total input rating of boilers	Position of air vents	Air vent areas (air direct from outside)
Upto 2 MW	HIGH LEVEL	270 cm <sup>2</sup> plus 2.25 cm <sup>2</sup> per kW in excess of 60 kW total rated input
	LOW LEVEL	540 cm <sup>2</sup> plus 4.5 cm <sup>2</sup> per kW in excess of 60 kW total rated input

Position ventilation grilles to avoid the risk of accidental obstruction by blockage or flooding. If further guidance on ventilation is required then consult BS.6644.

The supply of air by mechanical means to a space housing the boiler should be by mechanical inlet with natural or mechanical extraction. Mechanical extract ventilation with natural inlet must not be used.

Where a mechanical inlet and a mechanical extract system is applied, the design ventilation flow rates should be as in Table 4 of BS.6644.

The requirements for air supply by mechanical ventilation are given in BS.6644.

Note. For mechanical ventilation systems an automatic control should be provided to cause safety shutdown or lockout of the boiler(s) in the event of failure of air flow in either inlet or extract fans.

### IMPORTANT.

The use of an extractor fan in the same room as the boiler (or in an adjacent communicating room) can, in certain conditions, adversely affect the safe operation of the boiler. Where such a fan is already fitted (or if it is intended to fit an extractor fan after installation of the appliance) the advice of the gas supplier should be obtained.

Tests for spillage of products from the draught diverter when the extractor fan is running and all doors and windows are shut should be carried out after installation. If spillage is detected, the area of permanent ventilation must be increased.



## 9 BOILER ASSEMBLY

### The boiler is supplied in the following packages

- Loose sections (assembled body to special order)
- Casing and insulation
- Control panel
- Accessories pack
- Burner door

### GENERAL

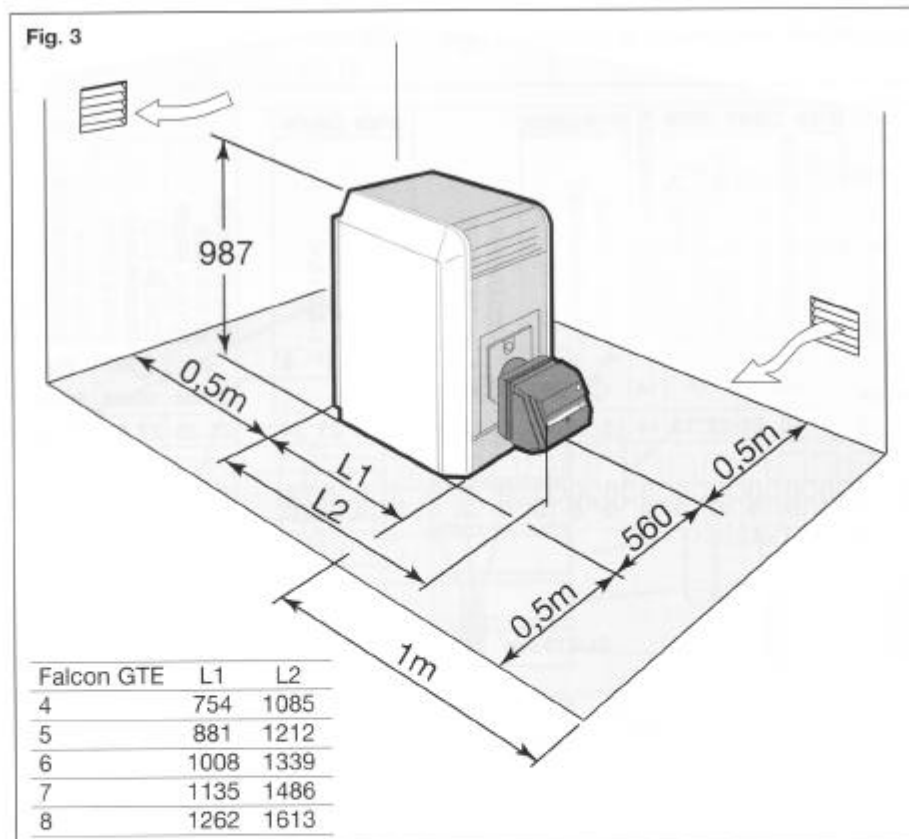
The installation of the boiler must be in accordance with the Gas Safety (Installation and Use) Regulations 1994, building regulations, I.E.E. (BS.7671) Regulations and the bye-laws of the local water undertaking. It should also be in accordance with the relevant British Standard Codes of Practice together with any relevant requirements of the local gas supplier and local authority.

### POSITIONING THE BOILER

The boiler body should be positioned as near possible to the installation site. Individual sections can be transported through standard doorways should site access be a problem.

The boiler must have sufficient space as shown in fig 3 shown below and given minimum clearance. It must also to ant local by laws and safety regulations. It is advisable to install the boiler as close as possible to the chimney connection on a non combustible floor (i.e. concrete or brick) The surface must be flat, level, and of a suitable load bearing capacity to support the weight of the boiler (when filled with water - see general data table). If the boiler is mounted on a plinth then the dimensions (See frame 2) must exceed the plan area of the boiler by at least 75mm on each side. The boiler must be positioned so that there is enough space available to allow the following

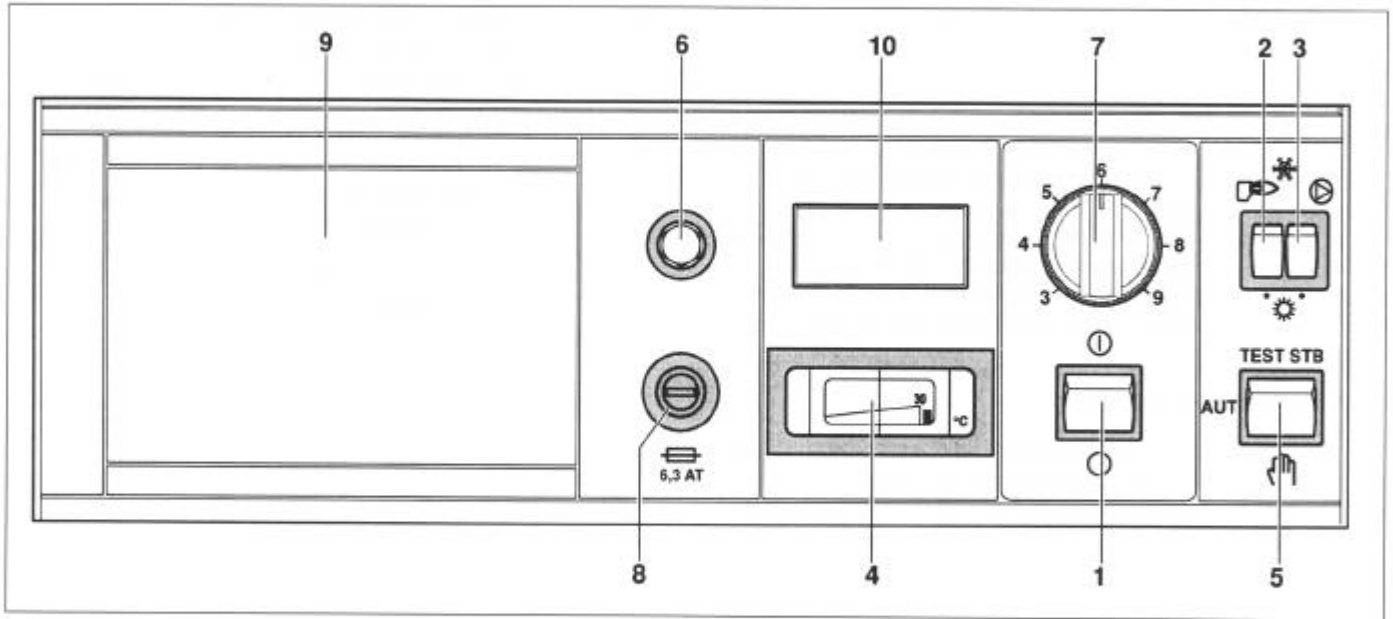
- Access around the boiler for servicing
- Space to open the boiler front door
- Space to access the burner



# INSTALLATION

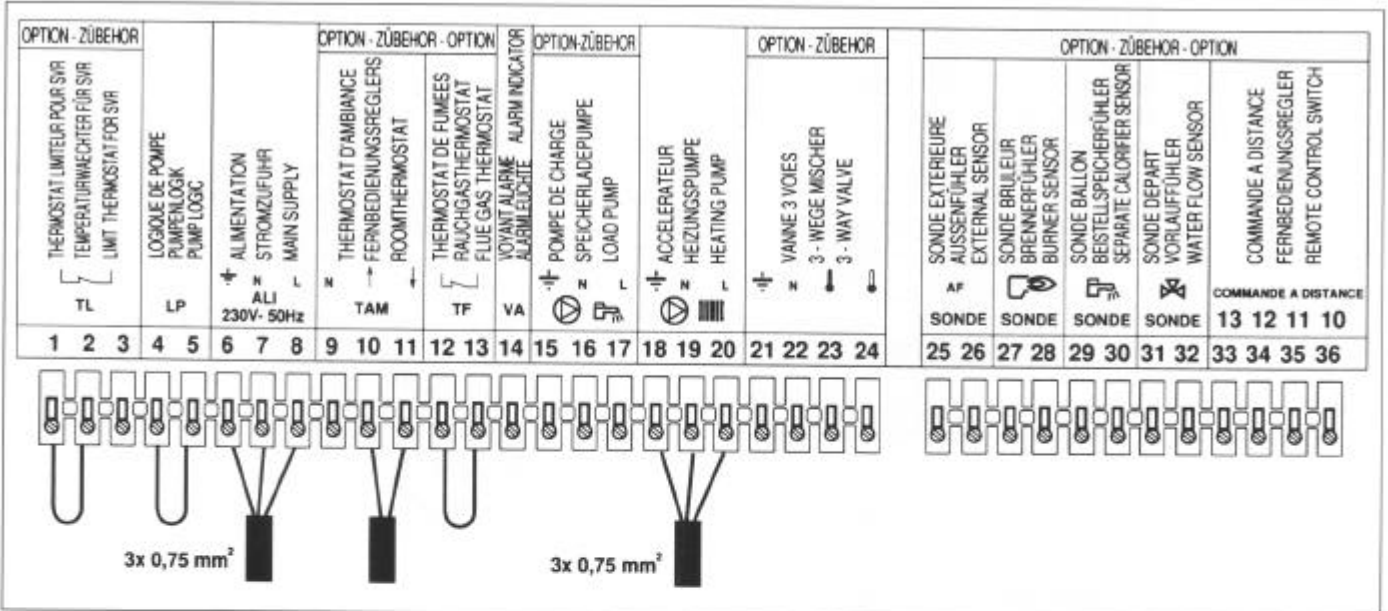
## 10 INTERNAL WIRING DIAGRAM

The control panels provided with the Falcon GTE range is complete with a European wiring harness (plug connector) designed to easily connect to the selected burner.



### Key to Diagram

- |                        |                                  |
|------------------------|----------------------------------|
| 1. On/off switch       | 6. Safety thermostat             |
| 2. Burner switch       | 7. Boiler thermostat             |
| 3. Heating pump switch | 8. 6.3 Amp fuse                  |
| 4. Boiler thermometer  | 9. Location for optional control |
| 5. Three way switch    | 10. Location for hours run metre |



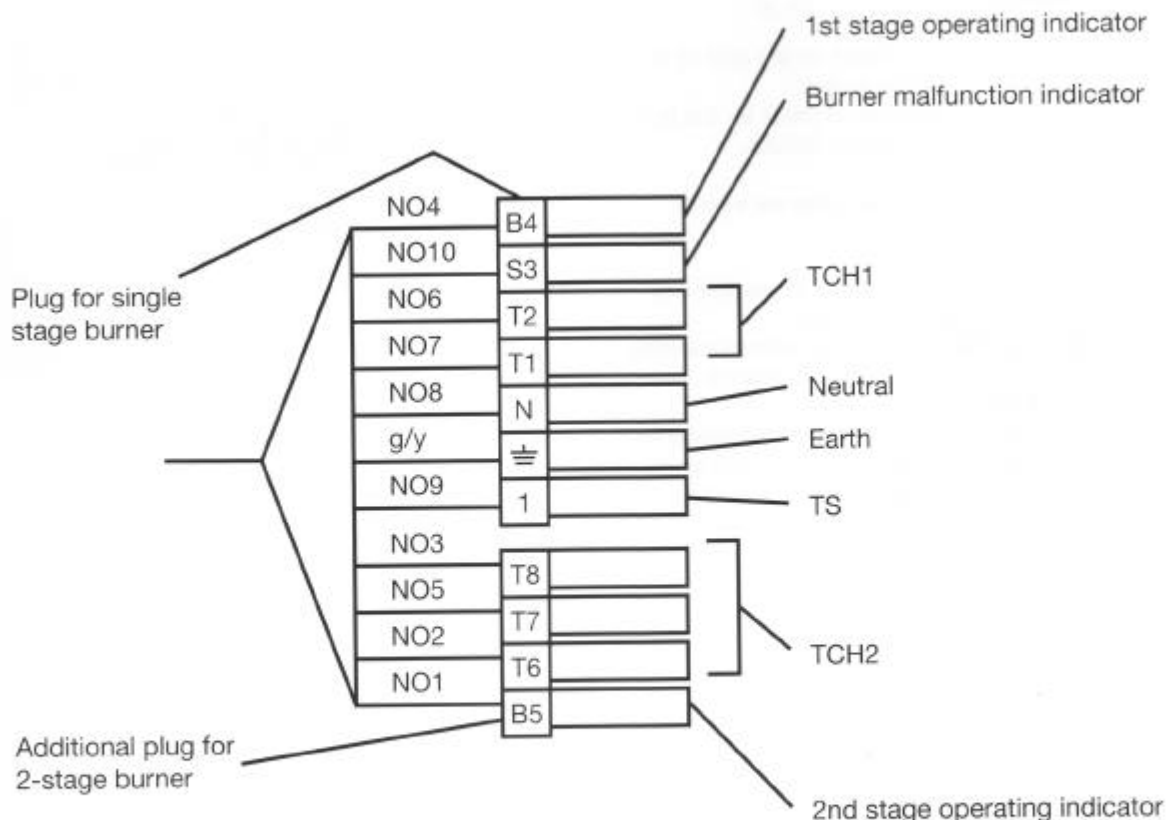
For standard operation connect mains supply and heating pump as shown in the above diagram.

11 WIRING HARNESS

• The Burner control circuit is fitted with 2 standard European connector-plugs and can be directly to the burners, fitted with connector-sockets. In the case of a burner not fitted with sockets, remove the plugs on the burner cable from the boiler and connect the leads to the terminal bar on the burner, proceeding as follows:

- No (9) [1] Control circuit phase interrupted in panel by safety Thermostat TS, Limit Thermostat TS and panel ON/OFF switch ZG. Connect to control circuit live terminal burner.  
NOTE: The connection terminal for this control phase must be separate from those of the power supply phase(s) which are wired direct to the burner via the installer supplied burner mains relay.
- No (8) [N] Neutral from control panel interrupted by panel ON/OFF switch. Connect to Neutral terminal of burner control box.
- No (7) T1 Live feed from burner control circuit downstream of burner ON/OFF switch. Connect to live side of first stage control thermostat (High temperature setting).
- No (6) T2 Return from 1st stage control thermostat (High temperature setting). Live on this lead, hence on T2 allows burner to fire on low fire in a 2 stage burner.
- No (10)S3 Burner lock indicator. Feeds signal from lockout terminal on burner control box to lock out indicator on boiler control panel.
- No (4) B4 Feed to 1st stage operating indicator from burner low fire control. Indicates low fire in operation. Essentially feed back from live on No (6) T2.
- No (2) T6 Live feed from burner control circuit downstream of burner ON/OFF switch. Connects to live side of 2nd stage control thermostat (Low setting thermostat).
- No (3) T8 Return from 2nd stage control thermostat (low temperature setting). Live on this lead, hence on T8 allows burner to fire on high fire in a 2 stage burner.
- No (5) T7 Back contact from 2nd stage control thermostat (low temperature setting). Live on this lead, hence T7 indicates high fire out of operation (used for modulating burners only).
- No (1) B5 Feed to 2nd stage operating indicator from burner high fire control to boiler panel. Indicates high fire in operation. Essentially feed back from live on No (3) T8.

g/y Earth.



# INSTALLATION

## 12 MAINTENANCE

It is not advisable to drain an installation, except in case of an absolute necessity. Check regularly the water level of the installation and top it up if necessary, avoiding a sudden inlet of cold water into the hot boiler.

This operation can only be undertaken a few times a year; otherwise, look for the leakage and remedy it with out delay.

**The continued performance of the boiler depends on its degree of cleanliness.**

Cleaning of the boiler must be carried out as often as required and at least, as for the flue system once a year or more, according to the regulations.

**The following operations are always carried out with the boiler and the electrical supply isolated.**

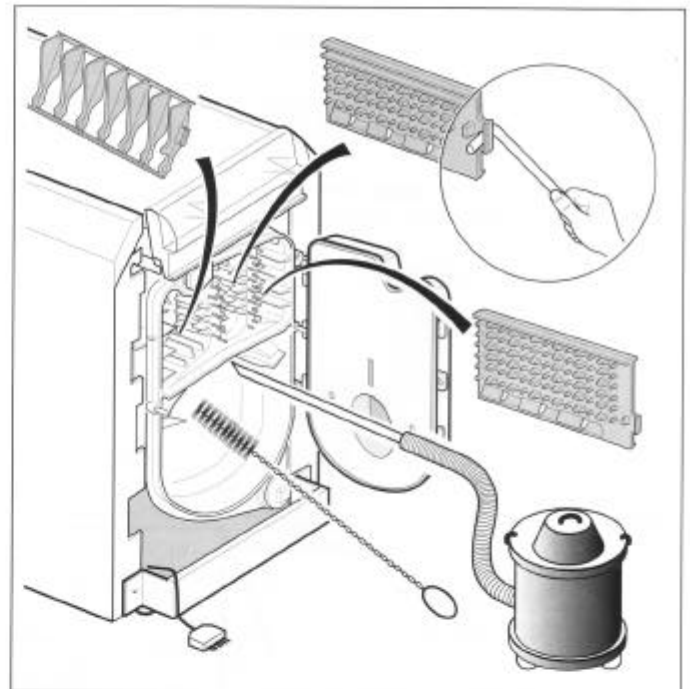
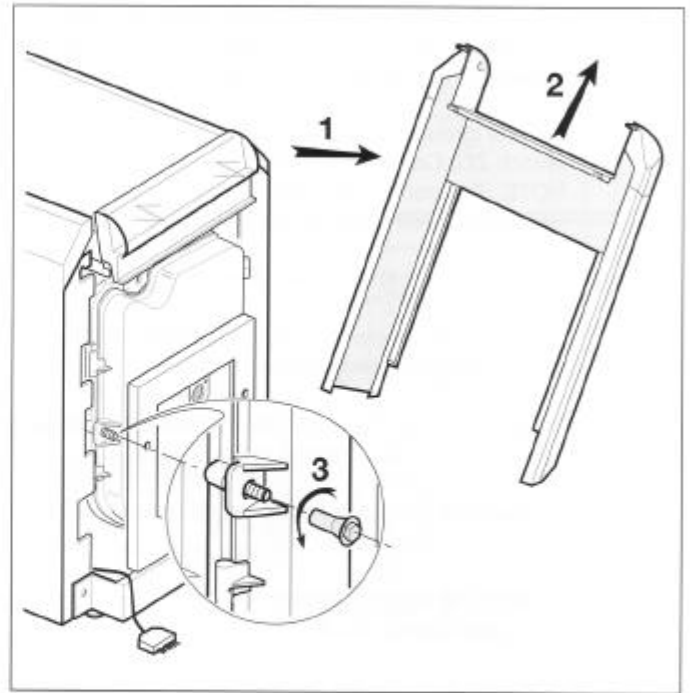
1. Close off the fuel supply to the burner.
2. Ensure that the boiler has been cooled to ambient temperature.
3. Isolate the mains supply to the boiler and burner.
4. Open the combustion chamber door after disconnecting the supply pipe to the burner.
5. Remove the flue way turbulators.
6. Thoroughly clean the flue tubes and turbulators.
7. Remove the rear cleanout covers and dispose of the debris/soot that may have accumulated.
8. Replace the rear cleanout covers after first inspecting and if necessary replacing the seal.
9. Replace the flue turbulators into the flue tubes.
10. Check the condition of the Combustion chamber door insulation.
11. Check the condition of the combustion chamber door seal.
12. Close the combustion chamber door.
13. Re-assemble the burner connections.

### IDENTIFICATION PLATE

The identification plate should be affixed on the side of the boiler following the installation of the jacket. The plate provides the main specification detail for the boiler. See frame 33 of the assembly section for details.

In the event of a long shutdown of the boiler we would recommend the following:

1. The boiler must be fully maintained.
2. Ensure that the boiler doors are closed to prevent any unnecessary air flow within the chamber.
3. If the boiler is to be put out of action for several months, we would also advise that the flue connection be removed from the boiler and closed off.
4. If the boiler is to be isolated during the winter period then we would advise that the system be treated with an antifreeze to prevent the heating water from freezing. Otherwise drain the system completely.



**13 ASSEMBLY**





**Tools required:**

- Philips head screwdriver
- wide flat screwdriver
- 13 and 17mm spanners
- hammer
- silicone glue
- JDTE assembly tool
- simplified assembly tool

**Packaging:**

the tables below show the numbers of the packages which make up the boiler.  
The packages are listed in the order in which they are opened for assembly.

**FALCON**

<b>Boiler</b>	<b>GTE 4</b>	<b>GTE 5</b>	<b>GTE 6</b>	<b>GTE 7</b>	<b>GTE 8</b>	
Boiler body delivered loose						
- front section	1	1	1	1	1	
- intermediate section	2	3	4	5	6	
- rear section	1	1	1	1	1	
- set of assembly rods	-	-	1	1	1	
- accessory package	IL 4	IL 5	IL 6	IL 7	IL 8	
Mounted boiler body - optional with accessories	IL 24	IL 25	IL 26	IL 27	IL 28	
Control panel						
- Standard	IC7	IC7	IC7	IC7	IC7	
Casing	IL 14	IL 15	IL 16 1	IL 17	IL 18	

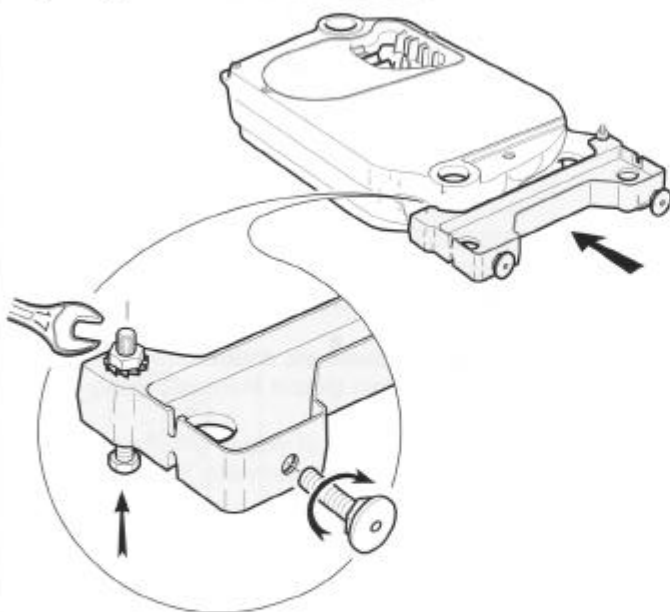
The assembly of any optional devices purchased with the boiler is described in the instructions supplied with the relevant device or in the control panel instructions. The list of available optional devices is provided in the applicable price list.

- (1) Refer to the assembly instructions supplied with the burner.

# ASSEMBLY

1

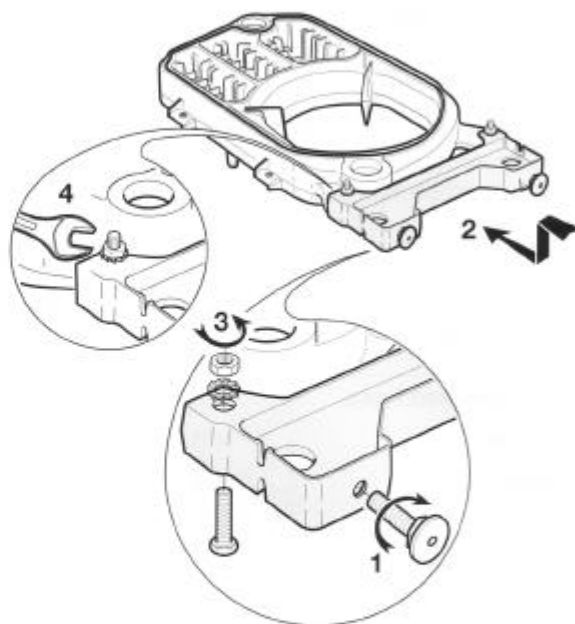
## Preparing the front and rear sections



### Installing the height converter and the adjustable feet on the rear section

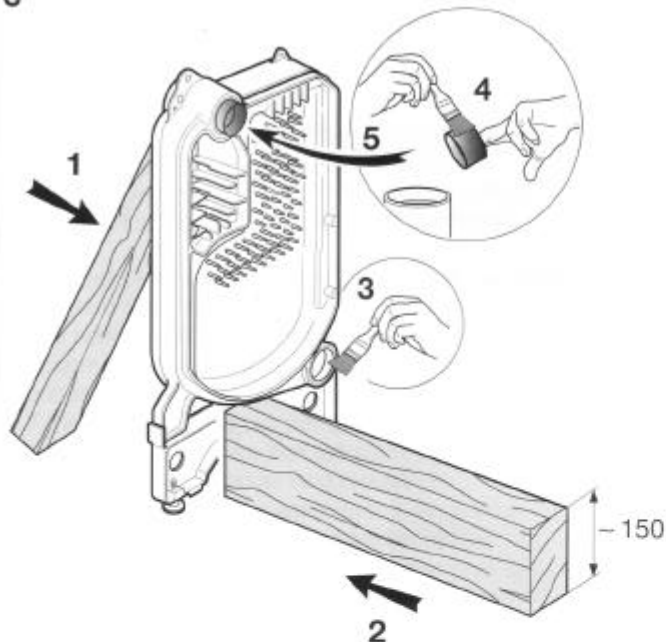
- Fix the adjustable feet (supplied in the bag containing the casing fasteners) onto the height converter.
- Place the rear section on the floor and fix the height converter (2 HM 10 x 25 screws, 17mm spanner).

2



- Fix the adjustable feet onto the height converter, place the front section on the floor (with the groove facing up) and fix the height converter.

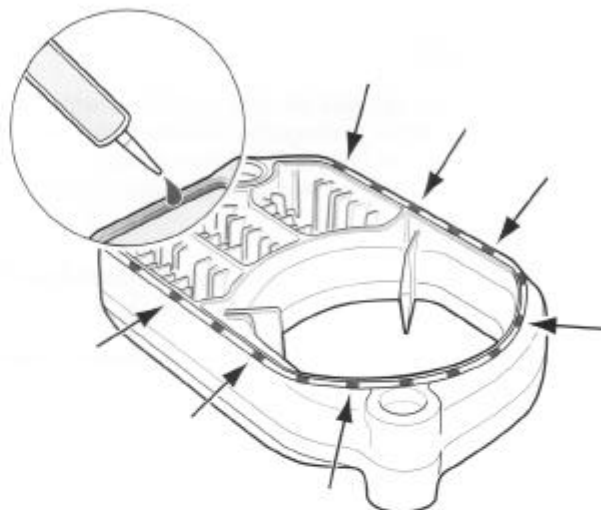
3



- 1 Support the section with a wooden block.
- 2 Place a block with a height of approx. 150mm (depending upon the number of sections, the length varies from 320 - 820mm).
- 3 Clean the bores and nipples with thinner.
- 4 Coat them with the coating material supplied.
- 5 Push in the two nipples moderately.

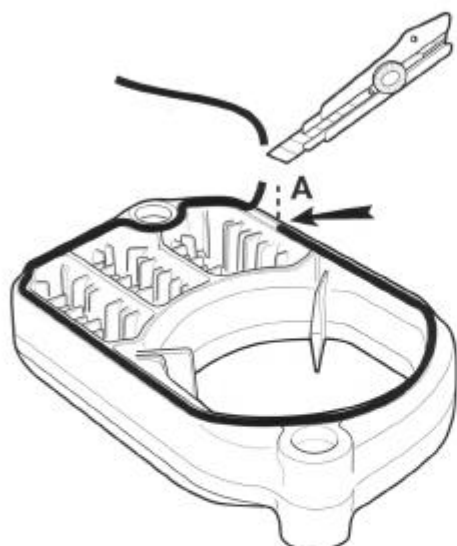
4

## Assembling the sections



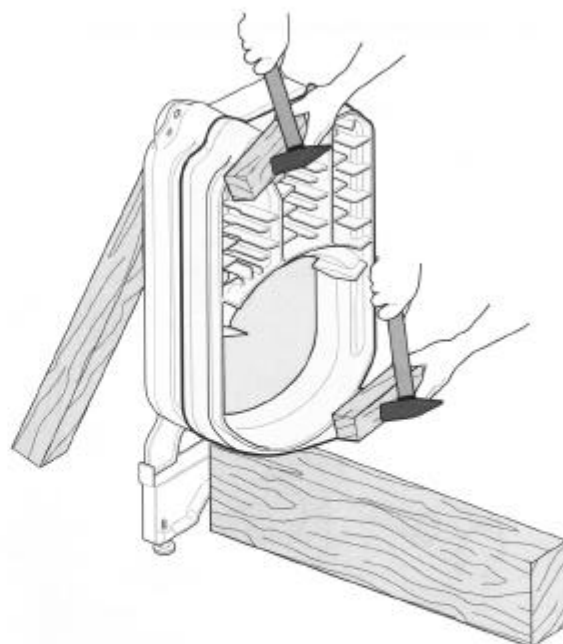
- Place the intermediate sections on the floor, groove upwards.
- Prepare the silicone cartridge.
- Put a drop of silicone at about every 200mm of the groove of the intermediate and front sections.

5



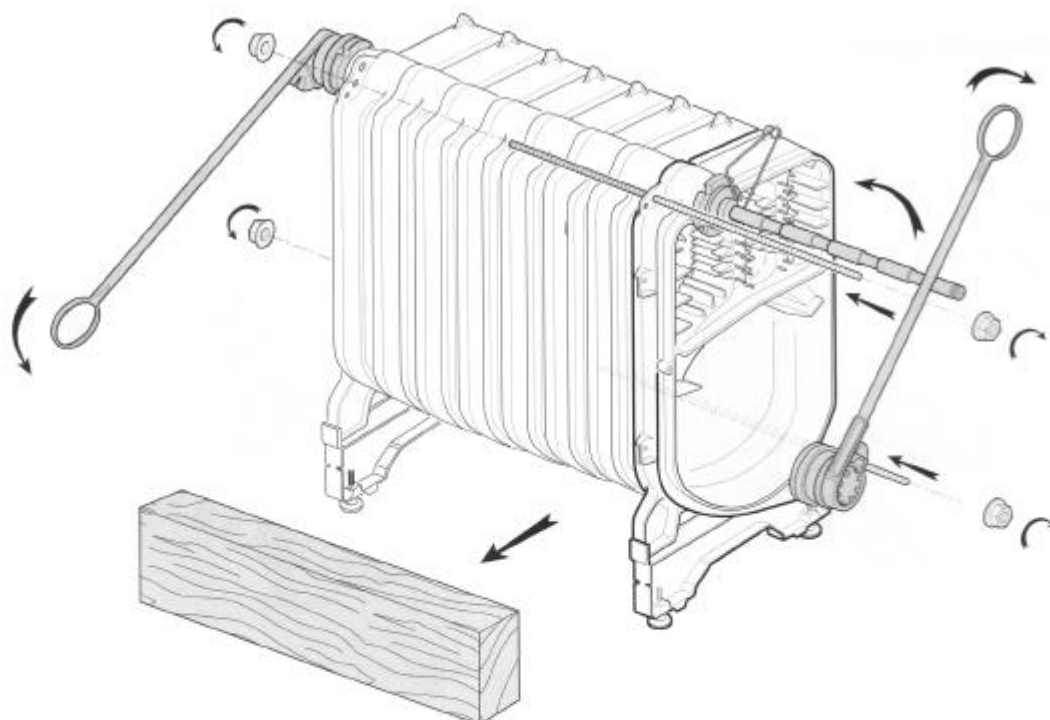
- Working from point **A** as shown above, insert the silicone braid into the groove of the intermediate and front sections. Cut it to the correct length.

6



- Place the intermediate element on the wooden block.  
 - Fit the connections of the intermediate element into the nipples on the rear.  
 - Hammer in with the help of a small wooden block.  
 - Proceed likewise for the other intermediate sections.

7



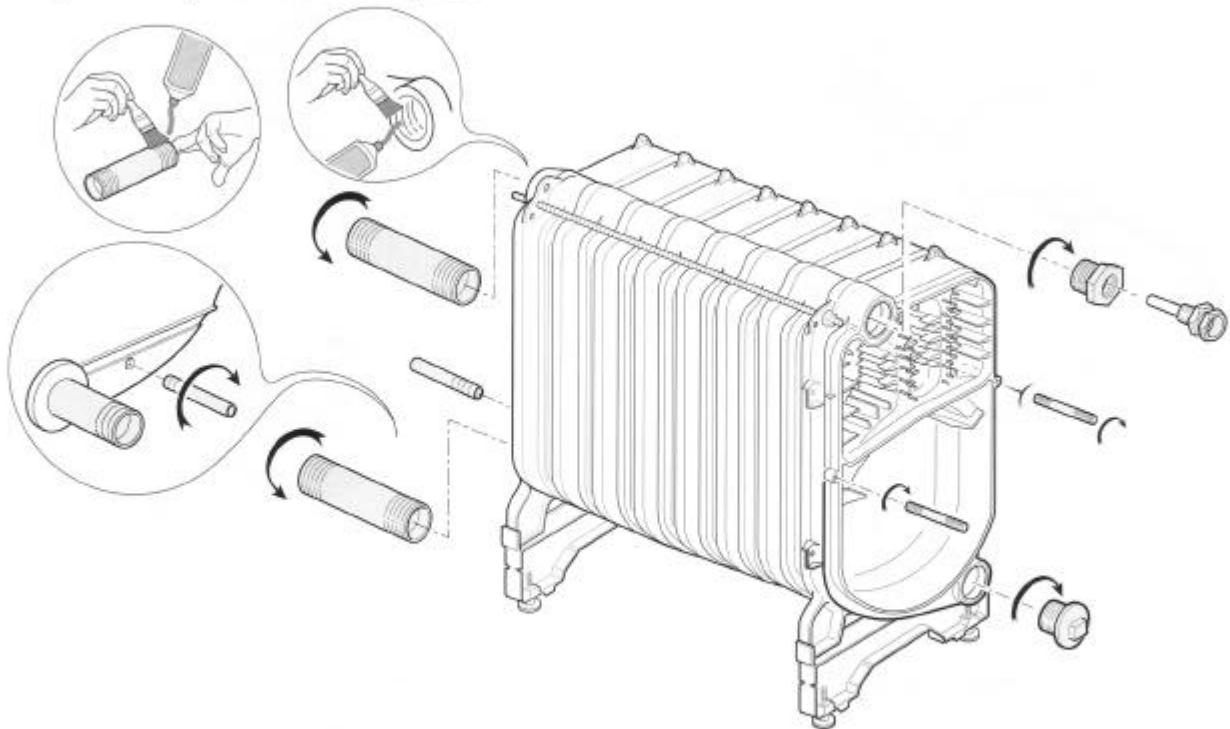
1 Complete the assembly with the front section.  
 2 Remove the wooden block.  
 3 Put the two threaded rods in place without removing the assembly tool and fasten with the four H8 flanged nuts supplied.

- Clean any extra silicone.  
 - Remove the assembly tool.

## ASSEMBLY

8

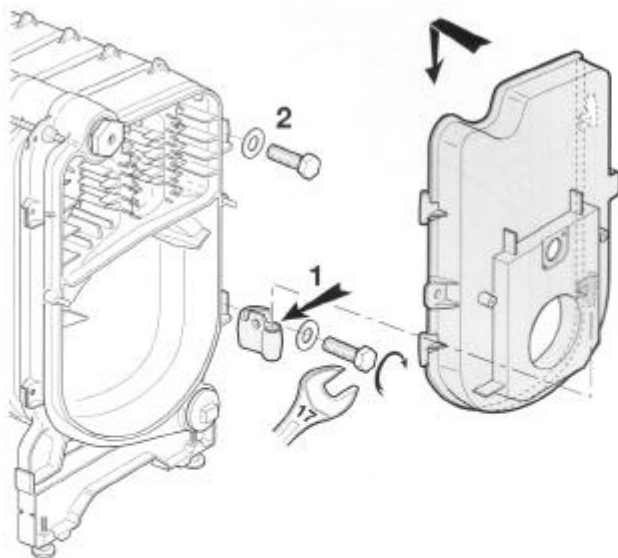
### Assembling the outlet, return and draining tubes



- Coat the threaded and tapped connections of the sections, tubes, plugs and thimble tubes with usual filler (not Supplied).
- Screw the 2 outlet and return tubes and the draining tube onto the rear section.
- Screw the threaded plug with the thimble tube in the upper connection and the other in the lower connection.
- On the front, install the two M10 pins in the holes designed for that purpose.

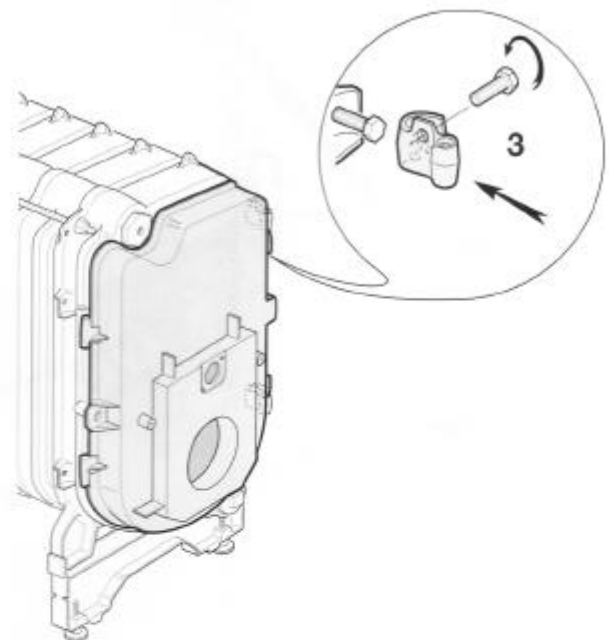
9

### Assembling the door with right-hand opening



- 1 Put the lower hinge in place, press it against the front section and fix it with an HN 10x50 screw + wide CL 10-20 tapered washer (17mm spanner).
- 2 Assemble the other HM 10x50 hinge and wide CL 10-20 tapered washer.

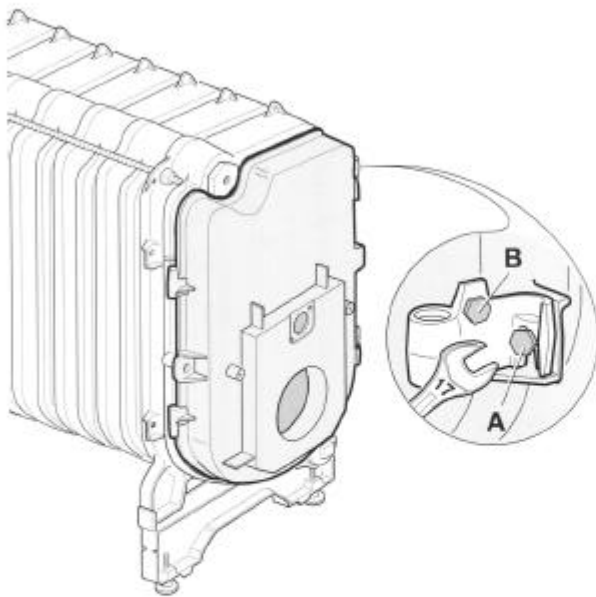
10



- 3 Mount the upper hinge (1 H 10x50 screw).
- Mount the H 10x20 adjusting screw on the upper hinge.



11

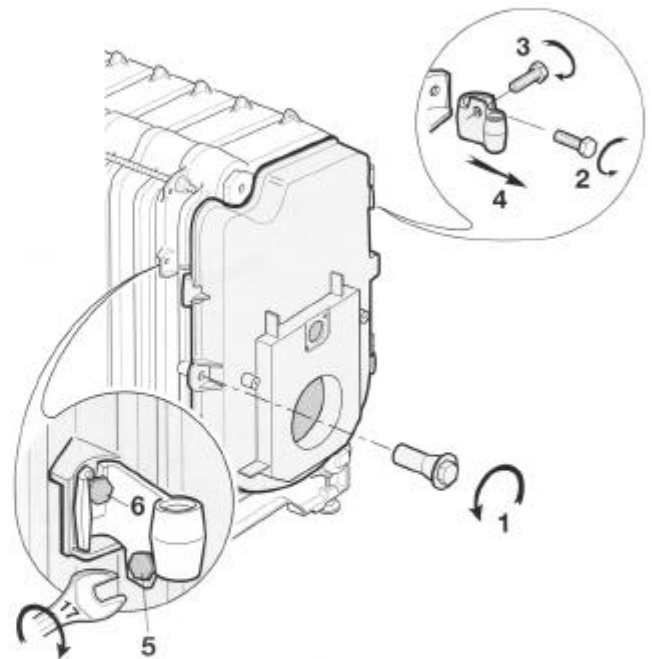


Adjust the upper hinge to adjust the door:

- unfasten screw **A**,
- adjust screw **B** so that the door is positioned correctly,
- fasten screw **A**.

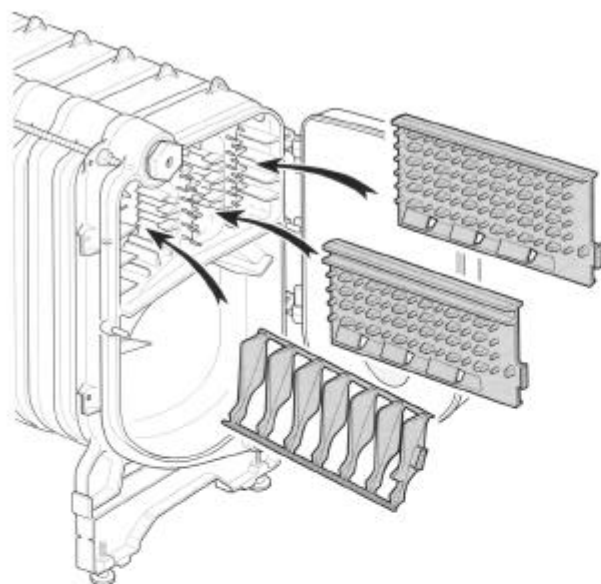
12

Assembling the door with left-hand opening



- Proceed similarly, with the hinges on the left-hand side.

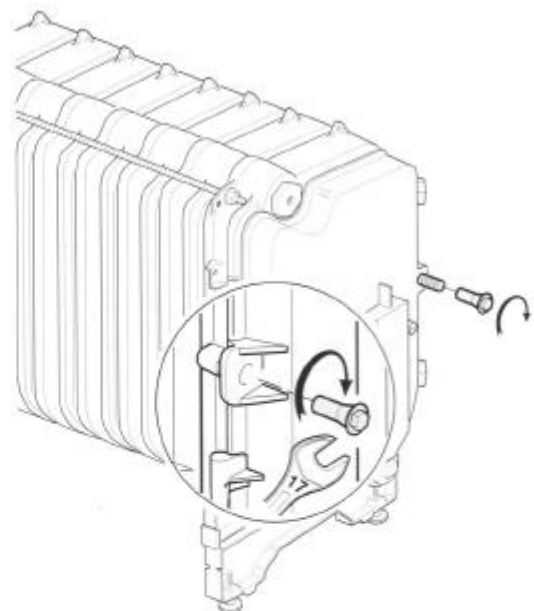
13



**Installing the convection accelerators**

- Open the door.
- Place the convection accelerators in the flues. Push them home.

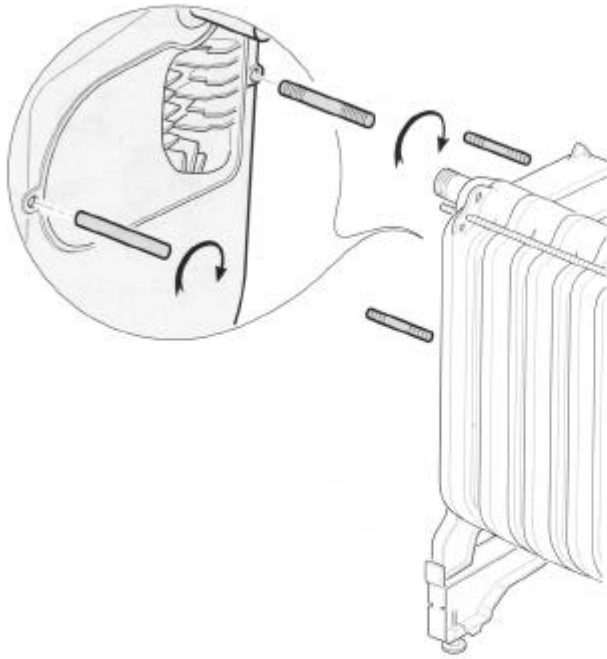
14



- Close the door with the special nuts (17mm spanner).

## ASSEMBLY

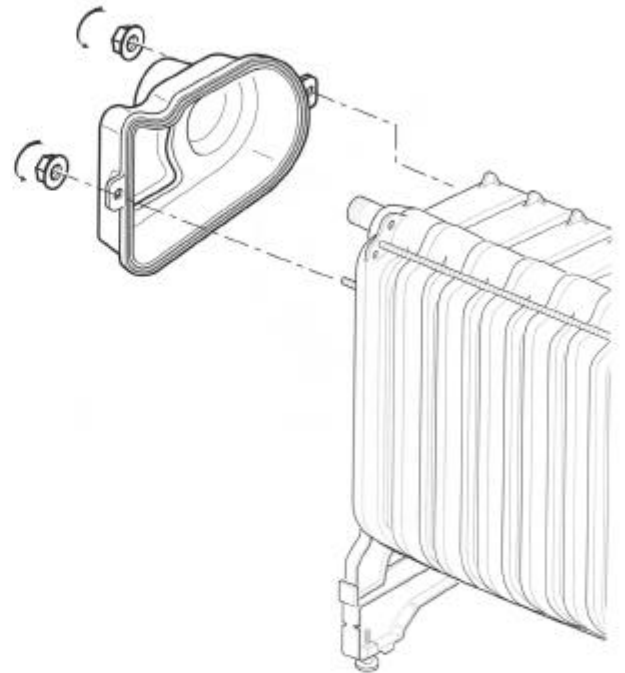
15



### Assembling the flue gas nozzle

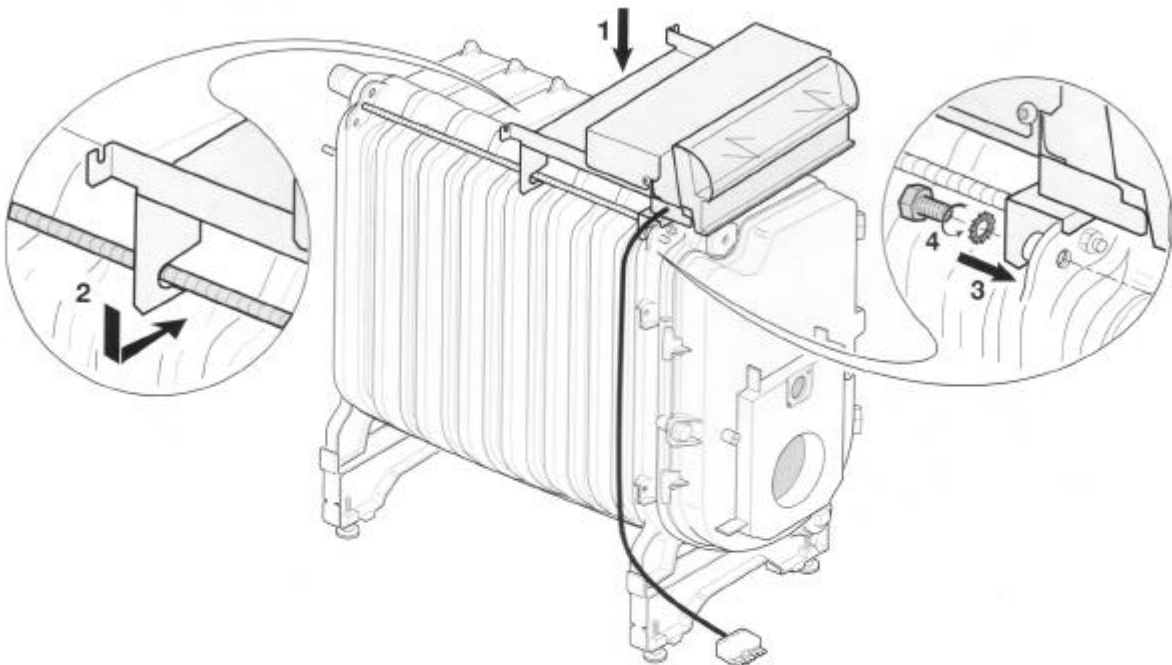
- Screw 2 M8 pins in the rear section.

16



- Assemble the flue gas nozzle onto the pins and fix with two flanged nuts.

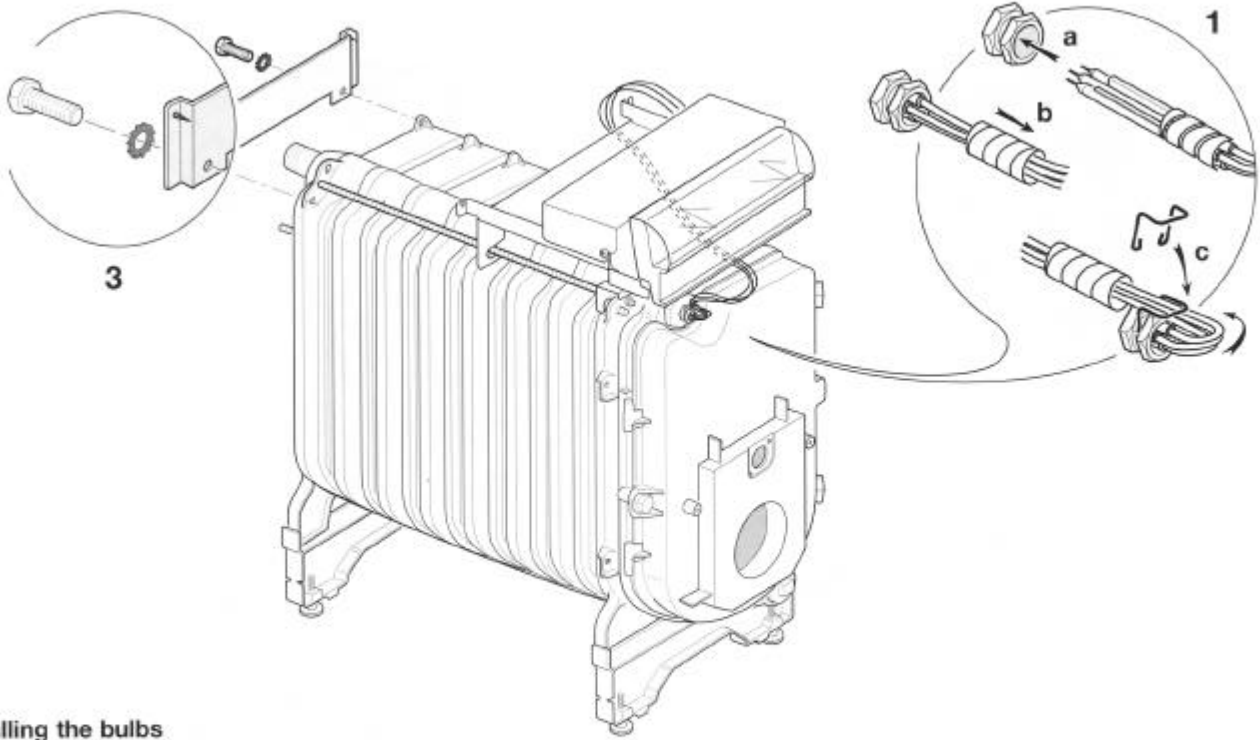
17



### Assembling the control panel

- 1 Place the control panel on the boiler body.
- 2 Position it on the body assembly rod.
- 3 Push it home behind the ears.
- 4 Fix it to the front with two M8 screws + serrated washers screwed into the cast iron.

18

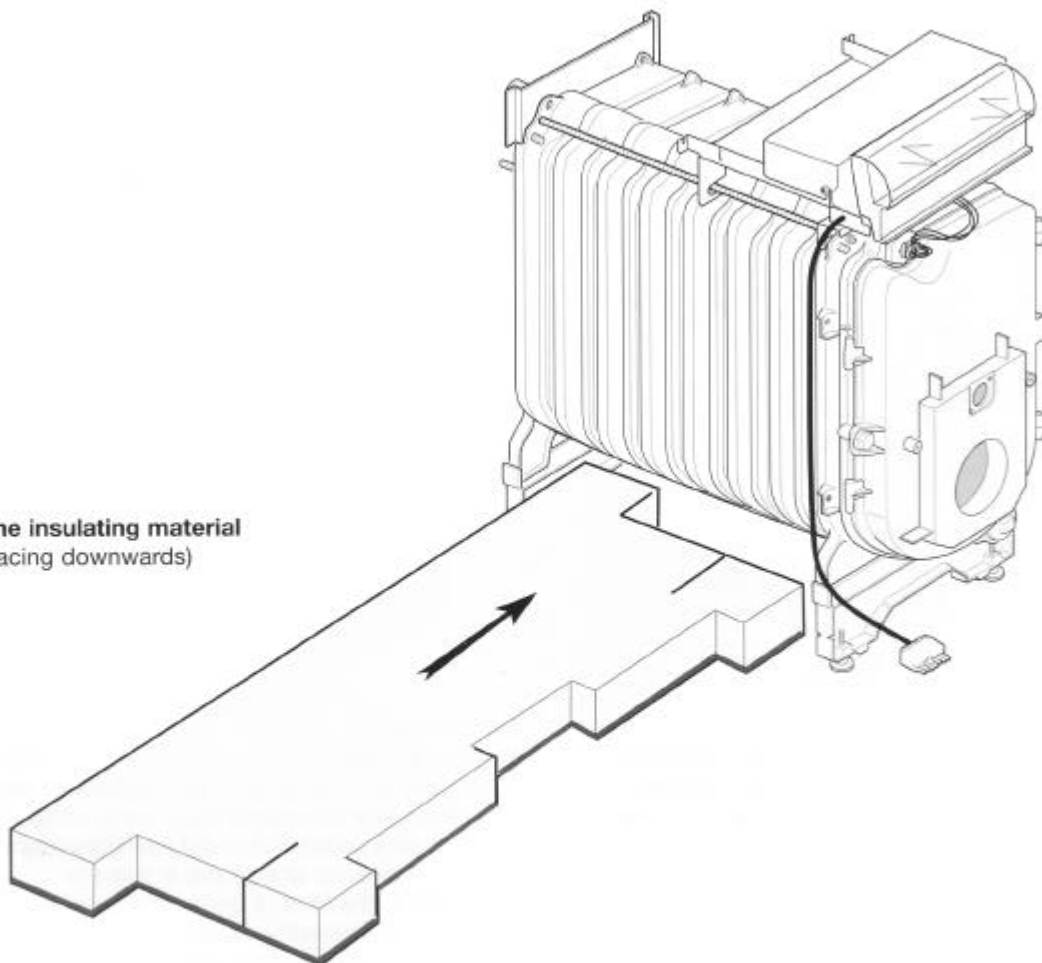


**Installing the bulbs**

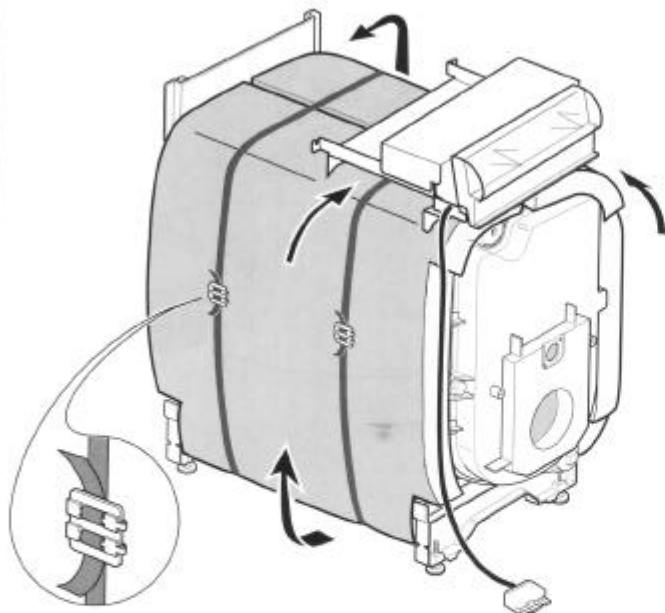
- 1 Put the bulbs in place in the thimble tubes, and pass the wires under the control panel.
- 2 Open the casing package and take out the rear crossbar.
- 3 Fix the crossbar to the rear section on the outside of the ears with two M8 screw and 2 serrated washers.

19

**Positioning the insulating material**  
(black fabric facing downwards)



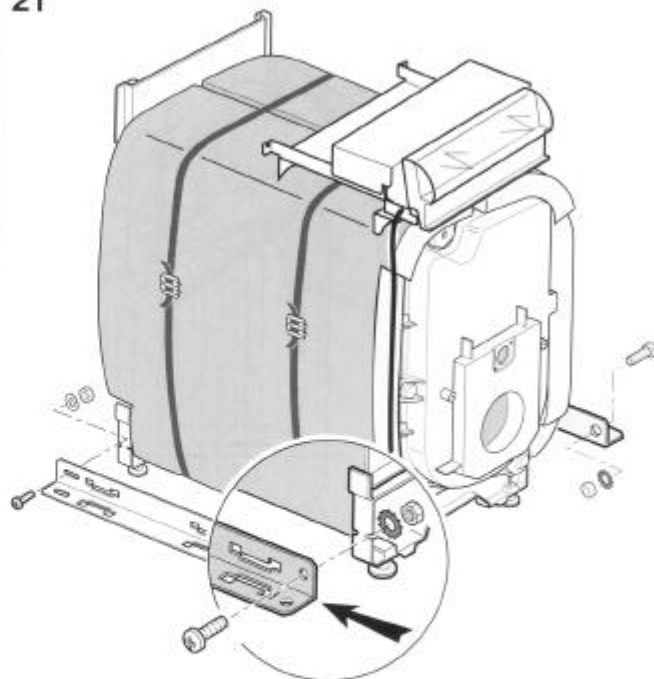
20



**Installing the insulating material**

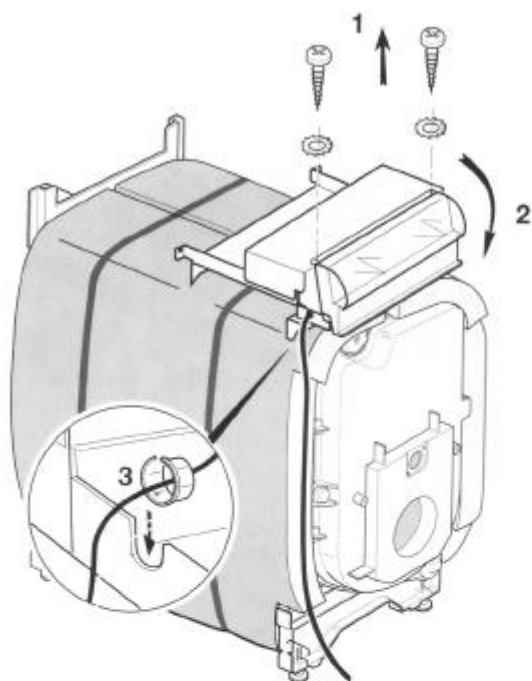
- Place the insulating material around the body and fix it with two straps.
- Put one strap on the front, underneath the control panel and the other at the middle of the remaining part.

21



- Place the two lower side pieces (with the round hole towards the front and the oblong hole towards the back of the boiler).
- Fix:
  - to the front with a screw, serrated washer and nut.
  - to the rear with a screw, LL washer and nut.
- Screw the screws home into the notch of the front height converters.

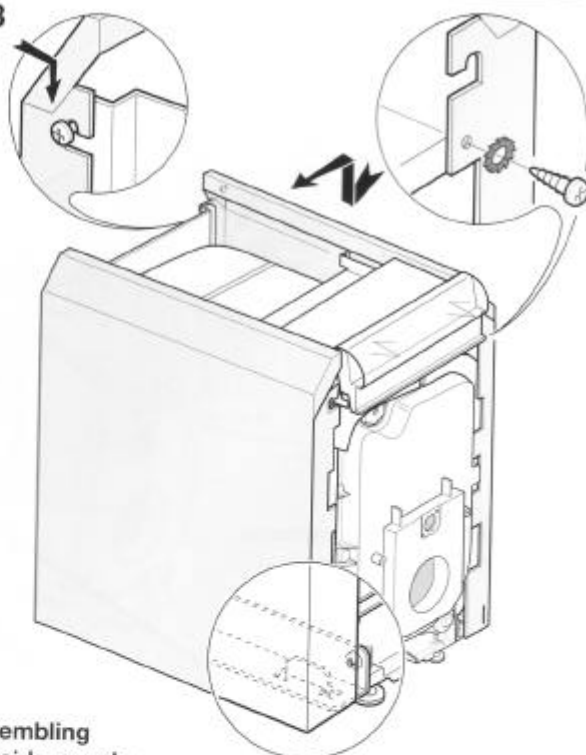
22



**Putting in place the burner cable**

- If the burner cable is not placed on the side opposite to the hinges of the furnace door (as required under European standards):
  - open the control panel (two screws and serrated washers on the rear)
  - place the burner cable on the opposite side and bring it on the outside of the crossbar.

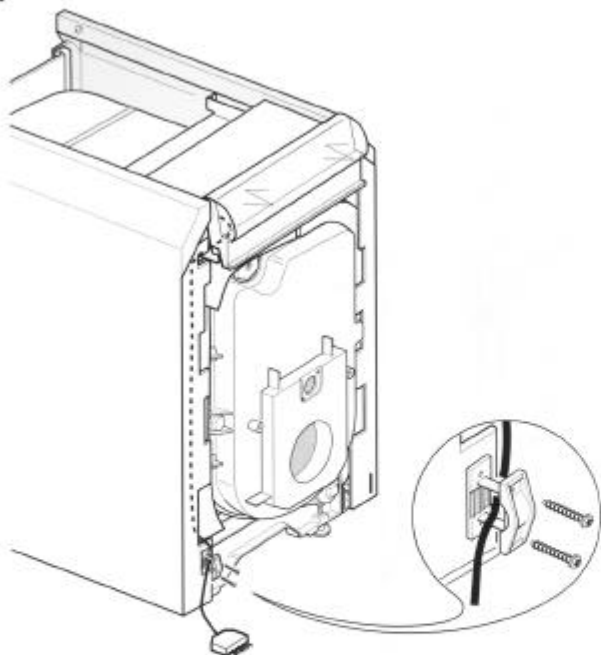
23



**Assembling the side panels**

- Insert the side panels from the bottom into the notches on the lower side pieces.
- Put the side panels in contact with the upper rear crossbar.
- Lift the panels up slightly and fit them in.
- Fix them to the front of the control panel with two tapping screws and serrated washers.
- Tighten the screws of the rear crossbar.

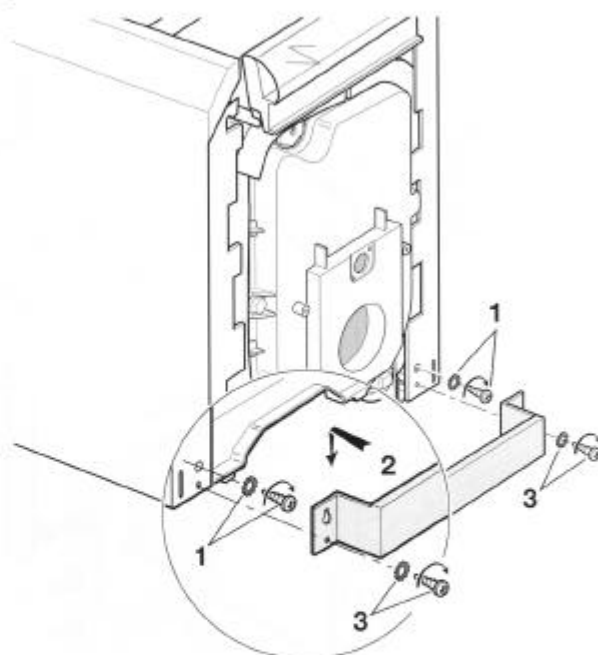
24



**Fastening the burner cable**

- Assemble the cable clamp on the side panel.
- Place the burner cable behind the side panel on the burner side, holding it in place with the cable clamp and two 3.5 ø x 25 screws.
- Adjust the length of the burner cable so that the burner has to be disconnected in order to open the furnace door. Store any surplus cable length between the rear part of the insulation and the side panel.

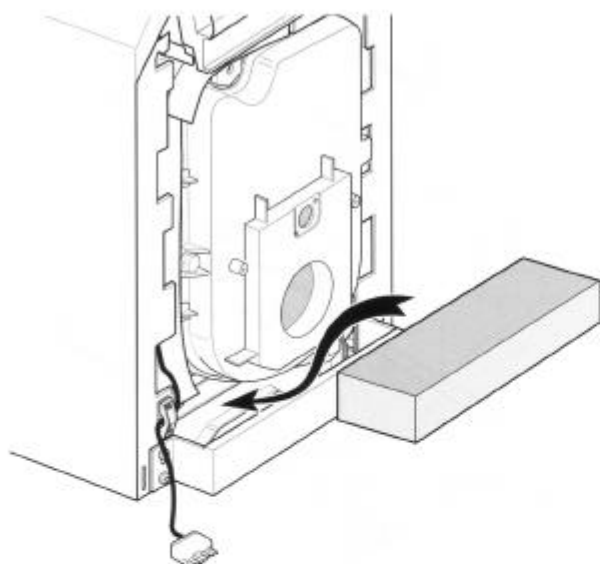
25



**Assembling the lower front panel**

- To mount the lower front panel, proceed as follows:
- 1** Assemble the two tapping screws and serrated washers on the left and right-hand side panels.
- 2** Slide lower front panel **2** onto the two tapping screws and serrated washers.
- 3** Install two tapping screws and serrated washers on the lower part and tighten the four screws.

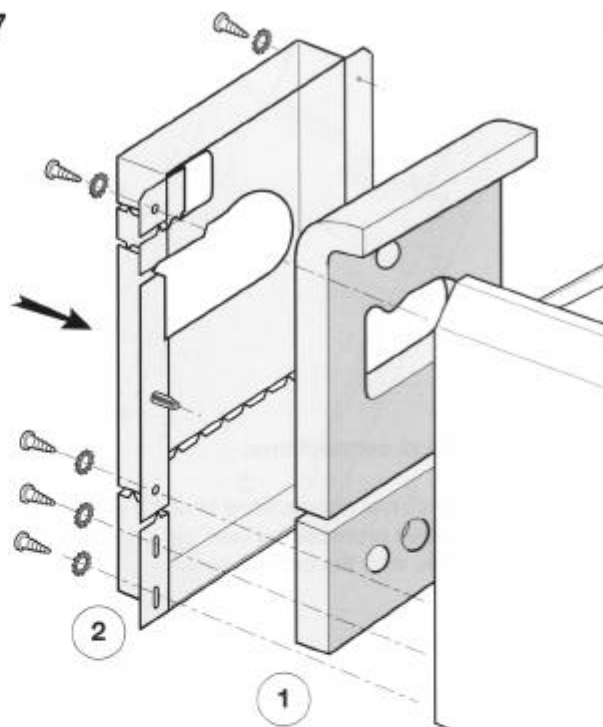
26



**Installing the lower front insulating material**

- Install the insulation of the lower front panel with the black fabric facing upwards.

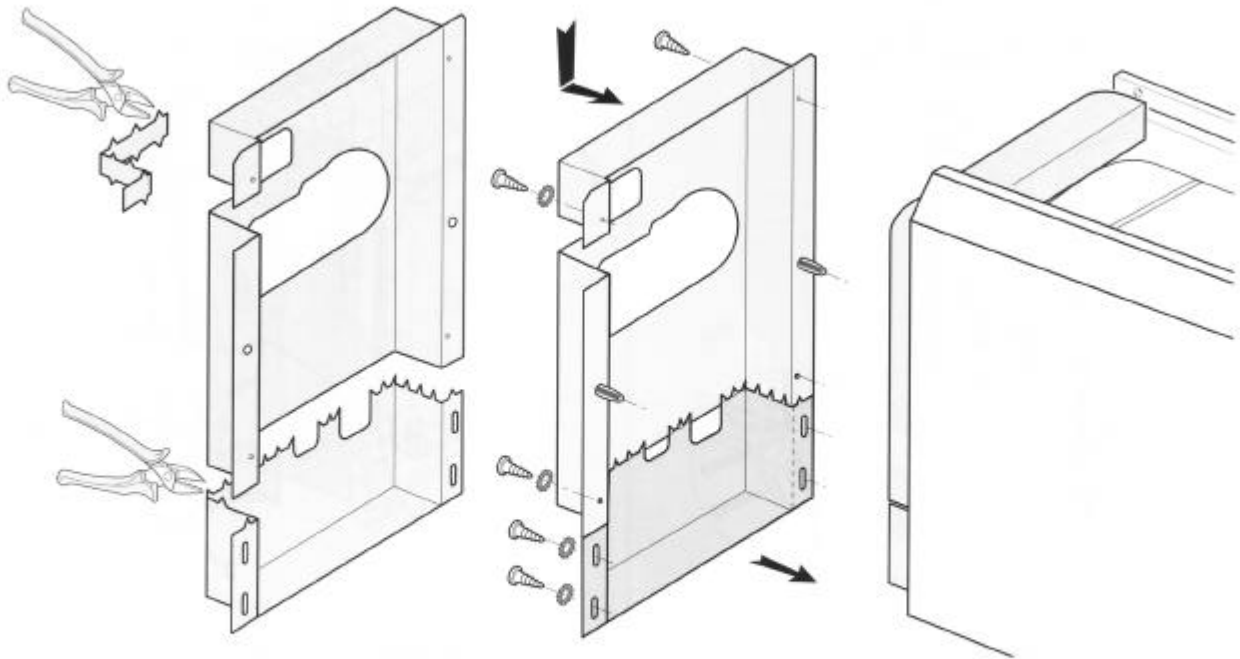
27



**Assembling the lower front panel**

- 1** Mount the lower and upper rear insulating material, with the top folded in towards the boiler at a 90° angle.
- 2** Mount the rear plate (8 tapping screws and serrated washers).

28



- If the boiler is connected to the installation, cut the panel with cutting pliers along the cut-outs.
- First assemble the lower part with four tapping screws and serrated washers.
- Then clip on the upper part.

- If required, assemble the lower part once again to conceal the cut edges.
- Fix the upper part with four tapping screws and serrated washers.

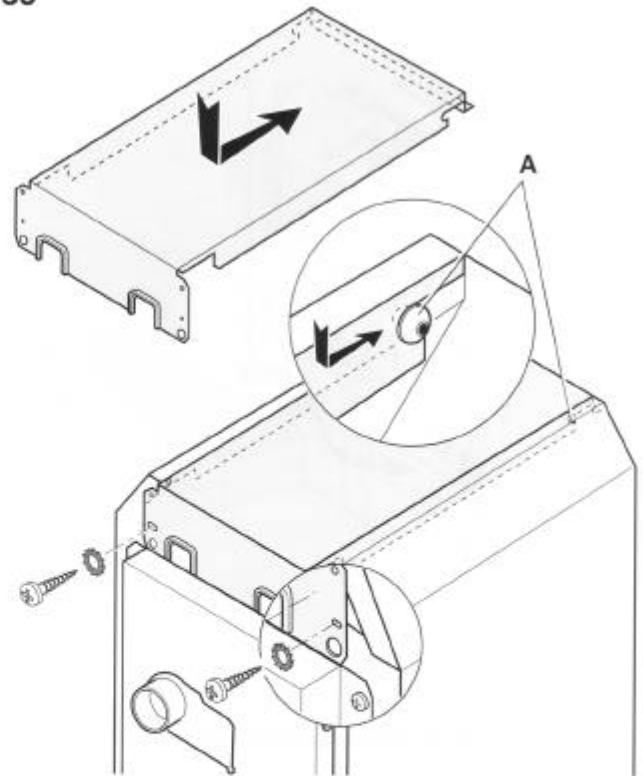
29



**Electrical connections:**

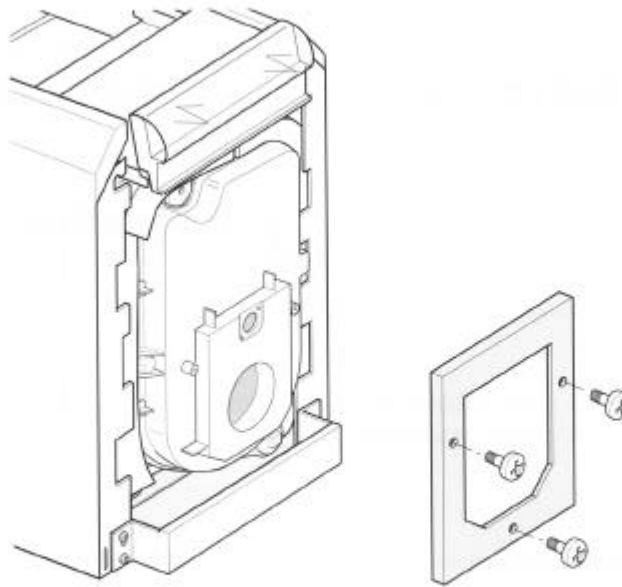
The electrical connections shall be performed by a qualified professional (see the instructions supplied with the control panel).

30



- Assemble the cover, placing it on studs A located on the front and rear of the left and right-hand side panels.
- Fix it with four tapping screws and washers.

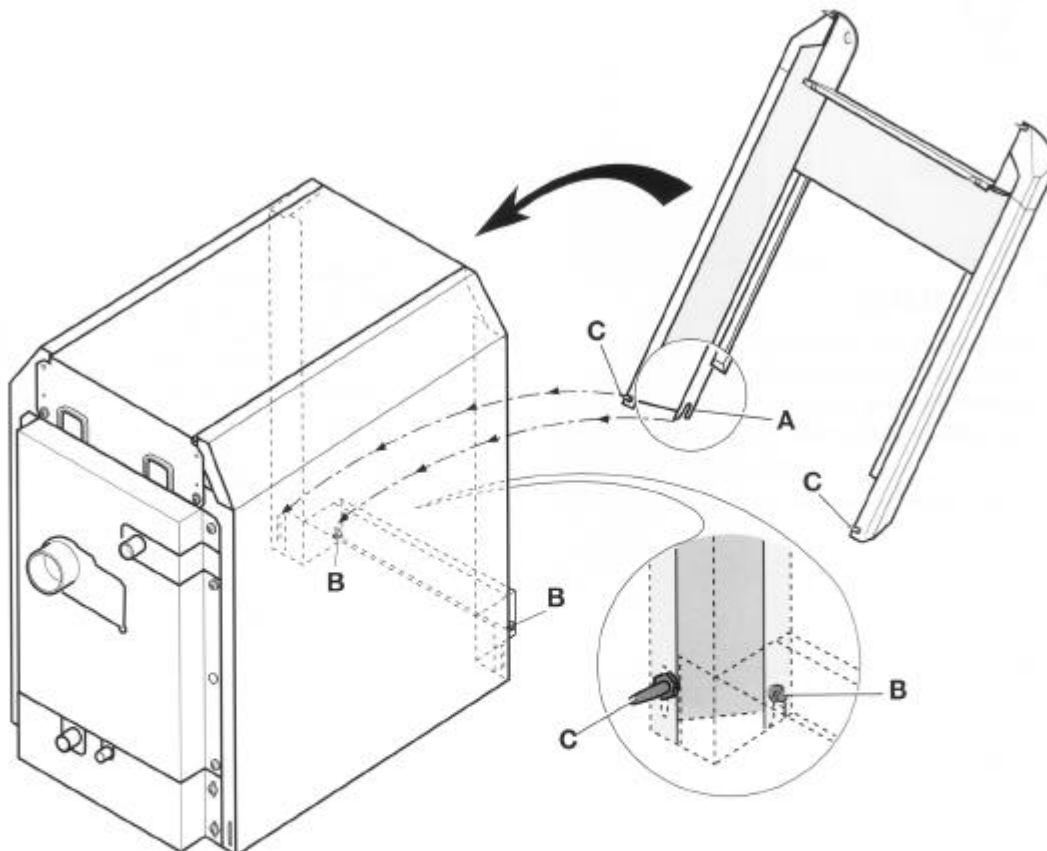
31



#### Assembling the insulated furnace door panel

- Fix it with the three black screws with large heads provided for that purpose.

32



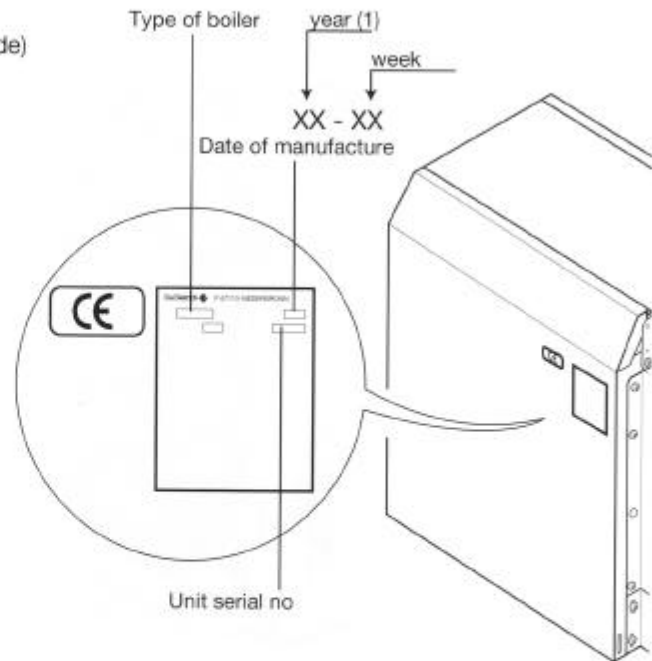
#### Assembling the front panel

- Put notches **A** on studs **B** of the lower front panel.
- Position point **C** in the centring groove of the side panel.
- Push the panel to fit it in.

## ASSEMBLY

33

Glue the identification plate and CE label (supplied in the instructions bag) on the casing (on the left or right-hand side) in an easily accessible location.



### *Technical Training*

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.....0870 840 0036

### **Caradon Plumbing Solutions**

pursues a policy of continuing improvement in the design and performance of its products. The right is therefore reserved to vary specification without notice.

March 1999

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