

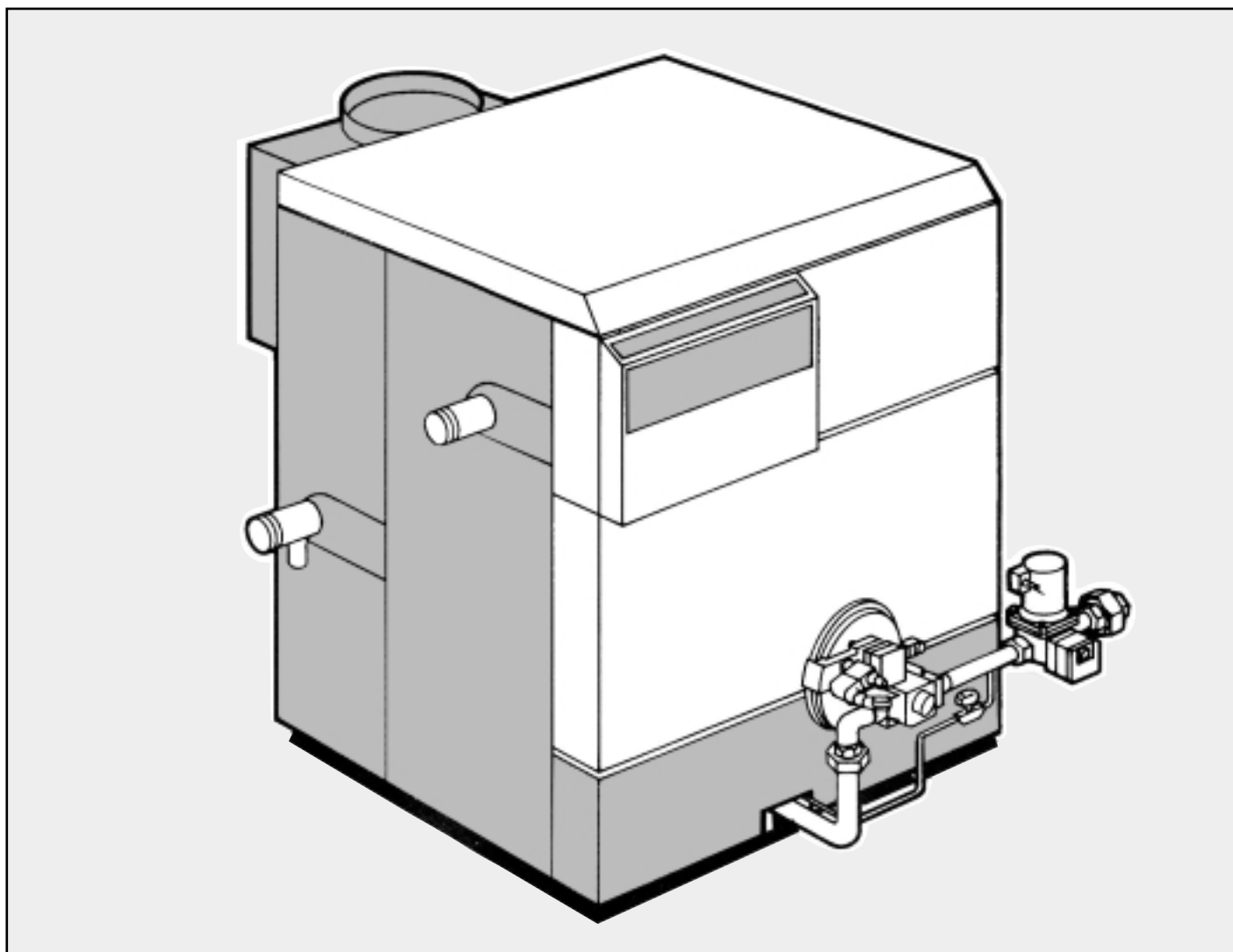
Concord ES 480/1160

Installation, Assembly and Servicing

Oil or Dual Gas Fired Boilers

Assembly and Installation Instructions for Ideal Concord ES 480/1160 heating boilers should be read in conjunction with the general technical data tables enclosed.

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

CONSTRUCTION

BOILER BODY

The sectional boiler body is of cast iron and is supplied with a sheet steel combustion chamber and integral draught diverter. The boiler is supplied in section form for site assembly.

CASING

The casing is manufactured in stove enamelled sheet steel and is easily assembled on site.

BURNERS

The burners are of stainless steel construction

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.

If the boiler is mounted on a plinth then the dimensions must exceed the plan area of the boiler by at least 75mm on each side

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			480	540	610	680	750	890	1020	1160
Boiler Output	High	kW	119 140 (1)	136 160 (1)	153 180 (1)	170 200 (1)	187 220 (1)	221 260 (1)	255 300 (1)	289 340 (1)
	Low	kW	83.5 98 (1)	95 112 (1)	107 126 (1)	119 140 (1)	131 154 (1)	155 182 (1)	179.5 210 (1)	202.5 238 (1)
Boiler Input	High	kW	133.7 156.1	153.3 179	171.3 200	190.2 222	208.9 243.9	247.5 288.9	283.6 331.1	322.2 376.1
	Low	kW	95.2 111	108.7 127.4	121.6 142.4	135.1 158	148.5 173.6	176.1 205.6	201.5 235.7	229.1 267.7
Number of sections			8	9	10	11	12	14	16	18
Approx. flue gas volume	High	kg/h	357	410	445	508	558	609	641	728
	Low	kg/h	360	413	443	512	563	591	600	682
Flue Gas Temperature	at 80°C	°C	130	130	135	130	130	140	150	150
	at 50°C	°C	115	115	120	115	115	125	135	135
CO ₂	High	%	6.4	6.4	6.6	6.4	6.4	7	7.7	7.7
	Low	%	4.4	4.4	4.6	4.4	4.4	5	5.7	5.7
Ionisation current			>20	>20	>20	>20	>20	>20	>20	>20
Flue draught required		daPa	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Minimum water temperature		°C	30	30	30	30	30	30	30	30
Maximum water temperature		°C	90	90	90	90	90	90	90	90
Maximum working pressure		bar	6	6	6	6	6	6	6	6
Electricity supply		V/Hz	230/50	230/50	230/50	230/50	230/50	230/50	230/50	230/50
Electricity output		W	450	450	450	450	450	450	450	450
Gas connection		Rc	1"	1"	1"	1 1/2"	1 1/2"	2"	2"	2"
Flow/Return connection		Rc	2"	2"	2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"
Flue outlet		mm	250	250	300	300	300	350	350	350
Water content		l	61	68	76	84	91	106	122	137
Hydraulic resistance	10k	mbar	32	48	60	84	104	208	284	388
	15k	mbar	15	21	27.5	38	47	93	127	172
	20k	mbar	8	12	15	21	26	52	71	97
Dry weight		kg	575	635	690	750	805	920	1035	1150
Gas rate	Minimum	m³/hr	14.15	16.22	18.13	20.13	22.1	26.19	30.01	34.05
	Maximum		16.52	18.94	21.16	23.49	25.81	30.57	35.04	39.8

Note:

Concord ES boilers are intended for use as Commercial boilers and are NOT certified for use in Domestic appliances. A Domestic installation is defined as an installation where the boiler takes its combustion air from a living space. It is important, therefore, that no external control device - e.g. flue dampers, economisers etc. are directly connected to this appliance unless covered by these installation and servicing instructions or otherwise recommended by Caradon Ideal Ltd. in writing. If in doubt please enquire.

GENERAL

1 WATER CIRCULATION SYSTEM

Due to the compact nature of the boiler the heat stored within the castings at the point of shutdown of the burner must be dissipated into the water circuit in order to avoid the overheat thermostat tripping.

PUMP POSITIONS

Whenever practically possible the circulating pump(s) should be positioned so that it pressurises the system being served. The vertical distance between the pump(s) and any cold feed and expansion cistern MUST comply with the pump manufacturers requirements in order to avoid cavitation. These requirements override the information given in page 6 if the static head required for the pump(s) exceeds that required for the boiler.

MINIMUM FLOW OF WATER - Refer to the table

The system design must provide for an adequate flow rate through the boiler at all times when the boiler is firing. The minimum flow rate should correspond to a temperature difference across the boiler flow and return of 20°C (36°F), assessed at catalogue rating.

Model	Temperature difference 20K	
	Lit/sec	g/min
480	1.67	22
540	1.91	25.2
610	2.15	28.4
680	2.39	31.5
750	2.63	34.7
890	3.1	40.9
1020	3.58	47.2
1160	4	52.8

1 WATER CONNECTIONS

2" For Ideal Concord ES 480/1160 with 8 to 10 sections

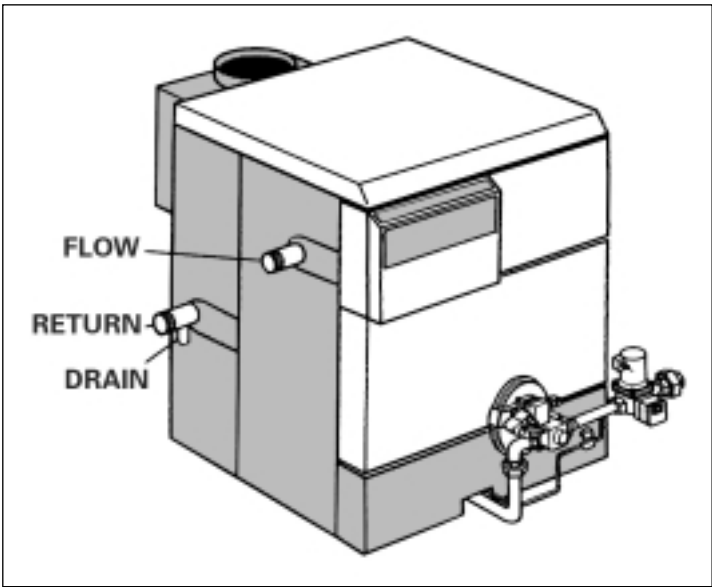
2.5" For Ideal Concord ES 480/1160 with 11 to 18 sections

Safety Valve

A safety valve must be sized and fitted in accordance with BS.6644 for every type of system. The valve should be set at 0.7 bar (10 lb/in.²) above the operating pressure in the boiler. The maximum safety valve setting is 0.7 bar (10 lb/in.²) above the maximum design operating pressure of 4.5 bar (65 lb/in.²).

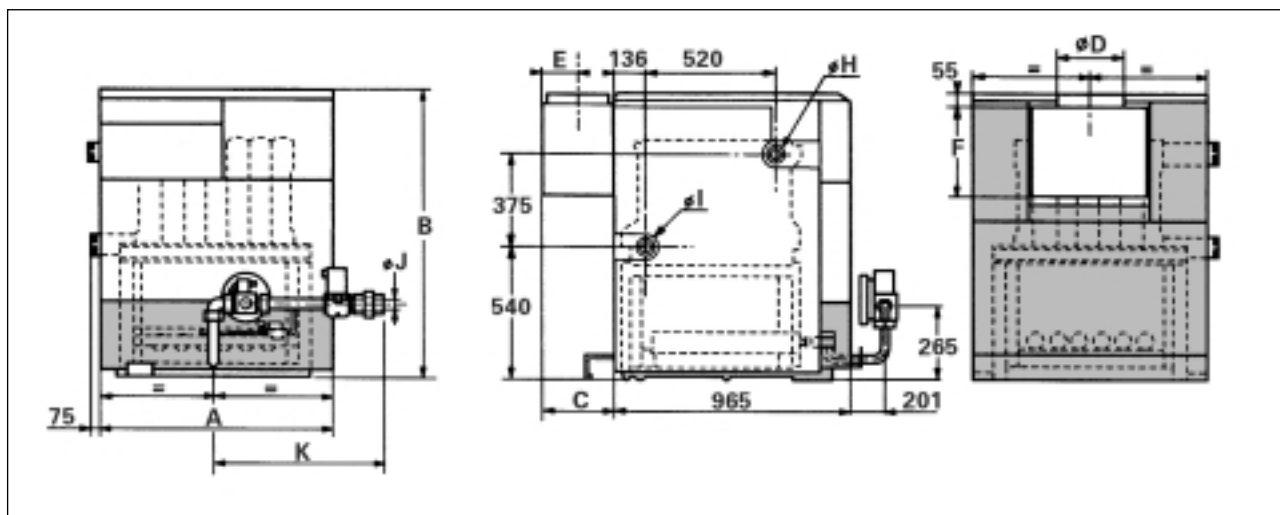
Cold Feed/Open Vent

The independent cold feed and the open vent must comply with BS.6644.

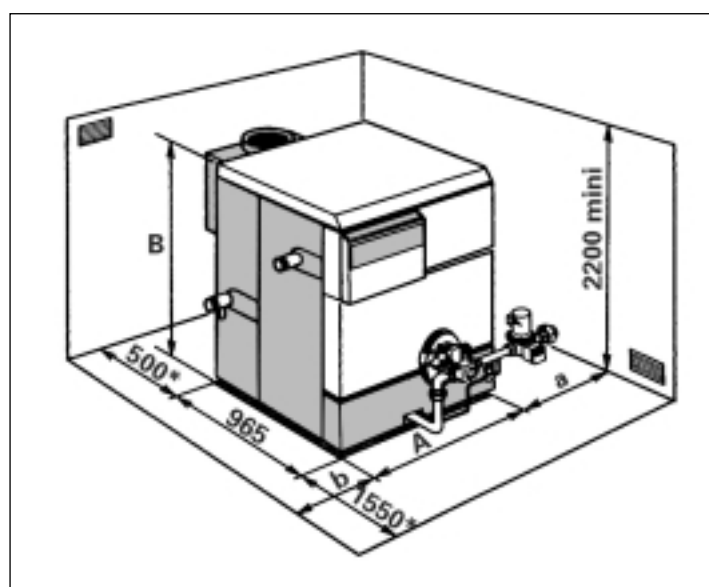


The boiler can be connected to the water circuit on either the right hand side or the left hand side.

3 CLEARANCES & DIMENSIONS



Model		A	B	C	D	E	F	H/I	J	K
480	-8	1044	1210	292	250	138	370	2"	1"	679
540	-9	1132	1210	292	250	138	370	2"	1"	679
610	-10	1220	1210	331	300	163	370	2"	1"	679
680	-11	1308	1310	331	300	163	470	2" 1/2	1" 1/2	679
750	-12	1396	1310	331	300	163	470	2" 1/2	1" 1/2	679
890	-14	1572	1310	381	350	187	470	2" 1/2	2"	711
1020	-16	1748	1310	381	350	187	470	2" 1/2	2"	711
1160	-18	1924	1310	381	350	187	470	2" 1/2	2"	711



Model	480	540	610	680	750	890	1020	1160
A mm	1044	1132	1220	1308	1396	1572	1748	1924
B mm	1210	1210	1210	1310	1310	1310	1310	1310

GENERAL

4 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, **Caradon Ideal Ltd.** 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.

OPEN VENTED SYSTEMS

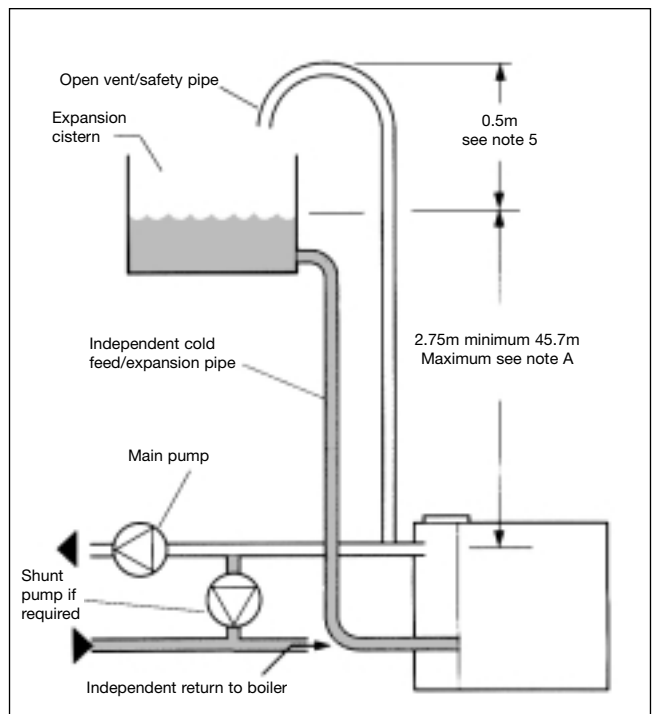
Minimum static head requirements

Particular reference should be made to BS. 6644: Section 2; Subsection 10 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 the above publications or the requirements of the Local Authority, gas or water undertakings. Other British Standards applicable are BS.5422 & BS.6700.

The information provided is based on the following assumptions:

1. An independent open vent/safety pipe connection is made to the reduction boiler flow tapping or is positioned immediately after the system flow pipe connection to the header, as shown.
2. An Independent cold feed/expansion pipe connection is made to the redundant boiler return tapping. Cold feed/expansion pipe connections made to the pumped system return will result in an increase in the static head requirement, caused by the additional resistance of the distributor tube, Surging may also increase.
3. The maximum flow rate through the boiler is based on a temperature difference of 11°C at full boiler output and the circulating pump is positioned in the flow to the system.
4. The boiler is at the highest point of circulation in the system. Systems designed to rise above the boiler flow tappings will automatically require a minimum static head higher than that 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 the particular characteristics of the system. Pumping over of water into the expansion cistern must be avoided.
- 6



Note A.

This minimum height must be increased, if necessary, to comply with the minimum head required by the pump manufacturer in order to avoid cavitation.

Note. This diagram does not show safety valves, water flow switches, etc., necessary for the safe operation of the system.

5 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:

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

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

Gas Installations

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.

6 SEALED (PRESSURISED) SYSTEMS

Working pressure 4.5 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.

On 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

INSTALLATION

7 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 ² plus 2.25 cm ² per kW in excess of 60 kW total rated input
	LOW LEVEL	540 cm ² plus 4.5 cm ² 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.

CHIMNEY SYSTEM

To ensure the safe and satisfactory operation of the boiler then the chimney system (which may be common or individual, in the case of twin or multiple boiler installation) must be capable of the complete evacuation of combustion products at all times. The effective height of the chimney terminal(s) above the boiler outlet(s) must ensure sufficient buoyancy to overcome the resistance of the bends, tees and runs of the flue pipe involved and shall terminate in a down draught free zone. The number of bends and lengths of horizontal flue pipe used should be kept to a minimum in order to reduce gas flow resistance.

Compliance with the recommendations made in BS.6644; British Gas publication IM11 'Flues for Commercial and Industrial Gas Fired Boilers and Air Heaters' and the 'Third Edition of the 1956 Clean Air Act Memorandum' should be strictly observed where applicable.

The chimney design should avoid the formation of excessive quantities of condensate and for this reason it is recommended that all chimneys are insulated and lined. In the case of brick or similar structures, a stainless steel rigid or flexible flue liner (grade 304/316) may be used in conjunction with a 50mm (Minimum) thick layer of vermiculite or perlite granules between the liner and the inner skin of the chimney body. Liners should be sealed at both top and bottom.

As the Ideal Concord ES range of boilers is supplied complete with an integral draught diverter, a diverter MUST NOT be fitted within the chimney system.

Drainage points positioned at the bottom of all vertical chimney sections should be provided. Drain pipes should be

no less than 25mm I.D., manufactured from acid condensate resistant material such as stainless steel and be positioned so that pipe runs and discharge points are not subject to the effects of frost and that flue gases cannot leak into the boiler room.

Care should be taken to ensure the specification of the chimney is suitable for the application by reference to the manufacturers literature. The Product Support Department of Caradon Ideal Ltd., can offer advice on the design of suitable chimney systems.

GAS SUPPLY

If there is any doubt regarding the capacity of the gas meter, the available gas pressure, the adequacy of existing service pipes or the size required for new service pipes then the advice of the gas supplier should be requested. Installation pipework should be fitted and tested for gas soundness in accordance with BS 6891 for small installations of IM 2, IM 5 and IM 16 for large installations.

The local gas supplier must be consulted if it is necessary to employ a gas pressure booster.

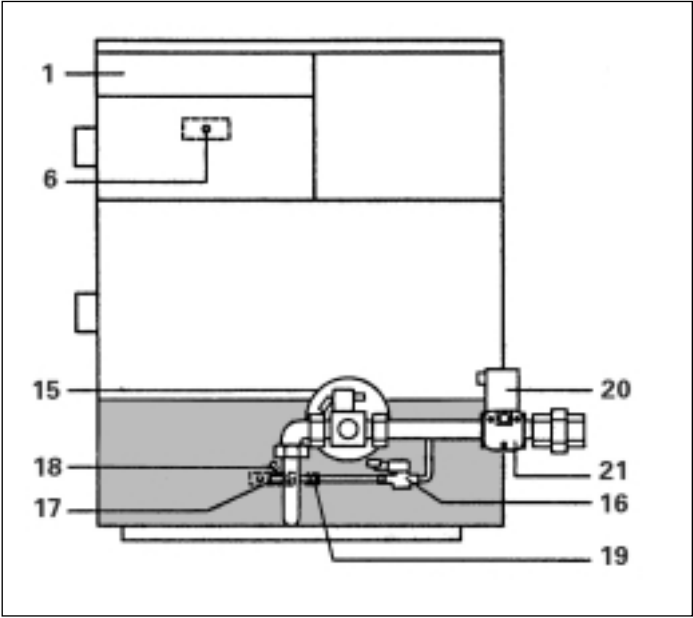
ELECTRICAL SUPPLY

A 230 V - 50 Hz mains supply is required, fused at 5 amps.

Wiring external to the appliance MUST be in accordance with the I.E.E. Wiring Regulations and any Local Regulations which apply.

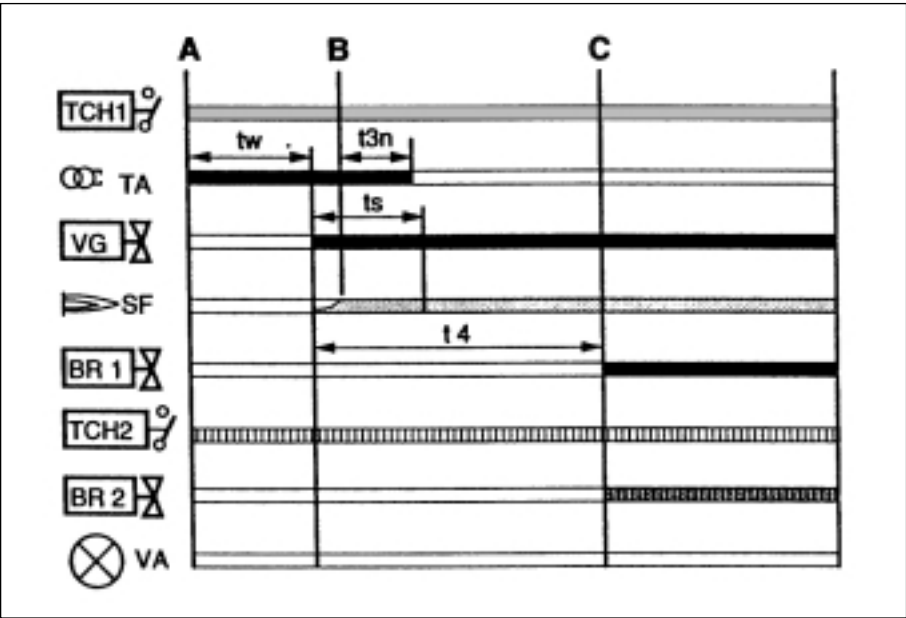
For details of connections see Frame 11".

8 CONCORD ES BOILER ASSEMBLY



- Legend**
- 1. Control Panel
 - 6. Overheat Thermostat
 - 15. Main Gas Valve
 - 16. Pilot Gas Valve
 - 17. Sight Glass
 - 18. Burner Ignitor
 - 19. Ionisation Probe
 - 20. Safety Valve
 - 21. Pressure Switch

IDEAL CONCORD ES 480/1160 OPERATING CYCLE

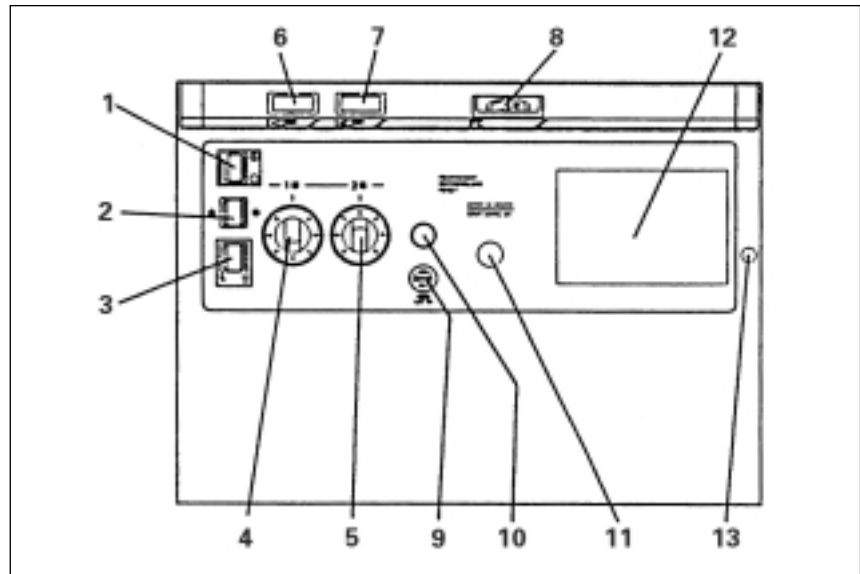


- | | |
|---|----------------------------|
| TCH1: Boiler 1st stage thermostat contact | ■ : Control signals |
| TCH1: Boiler stage thermostat contact | ▤ : Required input signals |
| BR1: 1st stage valve | |
| BR2: 2nd stage Valve | |
| SF: Ionisation sensor | |
| Ta: Ignition transformer | |
| VG: Ignition valve | |
| VA: Alarm indicator | |
| | tw: Waiting time |
| | ts: Safety time |
| | t3: Pre-ignition time |
| | t4: Opening delay of VP1 |

INSTALLATION

9 CONTROL PANEL

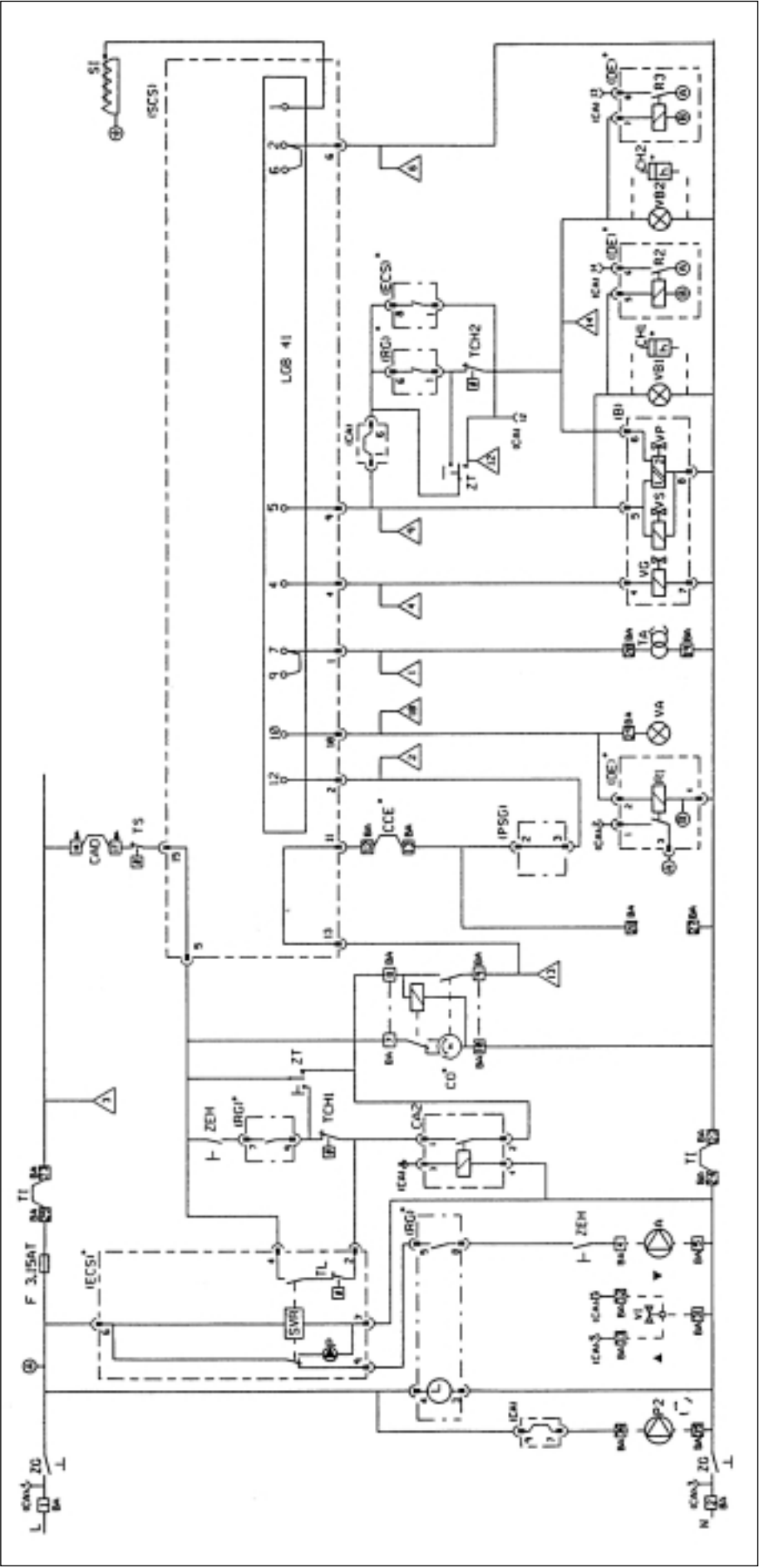
1. ZG ON/OFF switch
2. ZEH summer/winter switch
3. STB 3 position test switch:
 - "STB": testing the safety thermostat
 - Normal
 - : Forced operation (maintenance)
4. TCH1 boiler thermostat (1st stage)
5. TCH2 boiler thermostat (2nd stage)
6. First stage operating indicator light
7. Second stage operating indicator light
8. Thermometer
9. 3, 15 AT fuse
10. Safety thermostat
11. Safety box reset button
12. Location for SV-Matic or SVR Regulator (Optional)
13. Securing screw



COMPONENTS

- **ZG on/off switch:** This cuts off the mains supply to the boiler.
- **ZEH summer/winter switch:** In the "Winter"  position, heating and hot water are in operation. In the "Summer"  position, only hot water is in operation. If there is no domestic hot water tank the boiler is shut down.
- **STB test switch:** In the "  " position the burner operates under forced operation independently of the settings in the electrical circuit. The STB test position is used to test that the safety thermostat is operating satisfactorily.
- **TCH boiler thermostat:** 2 thermostats adjustable from 30 to 90°C control the switching temperature of VP1 (low heat) and VP2 (full heat or 2nd stage). **TCH1 must always be set to a higher value than TCH2.**
- **Fuse:** 3, 15 AT fuse which is accessible from the front protects the electrical circuit.
- **Safety box**
Type Landis & Gyr LGB 41.
This controls the main burner lighting sequence and flame detection functions through an ionisation probe
- **Pilot light and ionisation sensor:** The pilot light is lit electrically (lighting transformer), automatically when the on/off switch is operated and when there is a thermostatic demand. When a flame is present, checked by the ionisation sensor, the main gas valve is allowed to open.
- **Gas valve**
VP1 (1st stage) and VP2 (2nd stage) allow gas to pass to the main burner. The main burner is lit progressively.
- **Safety thermostat**
This is set to 110°C and cuts off the supply if overheating occurs. The boiler can only be restarted manually.

10 DIAGRAM OF IDEAL CONCORD ES 480/1160



A	Heating Pump	M	Motor	TS	Safety thermostat
B	Burner	N	Neutral	VA	Alarm indicator
BA	Connecting board	P2	DHW pump	VB1	On/off indicator 1st stage
BS	Separate calorifier	P	Shunt pump	VB2	On/off indicator 2nd stage
CA	Cascade calorifier	PR	Time programming	VG	Gas valve
CAD	Remote control switch	PSG	Gas pressostat	V1	Gate valve
CCE	Leak Proofing system	R1-R2-R3	Separation relay	VN	Fans
CDS	Sequence controller	RG	Regulator	VP1	Main gas valve 1st stage
CH1	Hour run meter 1st stage	SCS	Sequence control unit	VP2	Main gas valve 2nd stage
CH2	Hour run meter 2nd stage	SI	Ionisation probe	VS	Safety indicator
CO	Flue damper	TA	Ignition transformer	ZEH	Summer-winter switch
DE	Decoupling	TCH1	Boiler thermostat 1st stage	ZG	Main switch
ECS	Domestic hot water	TCH2	Boiler thermostat 2nd stage	ZT	Test switch
F3,15AT	Fuse 3,15A Delayed	TI	Isolating transformer	•	Earth
L	Phase	TL	Limiter thermostat	•	Option abbreviations

INSTALLATION

11 ELECTRICAL CONNECTIONS

WARNING. This boiler must be efficiently earthed.

The electrical supply must be made via a double-pole switch, fused at 5 Amps, having a minimum contact separation of 3mm in both poles.

This should serve only the boiler, together with its controls and pumps. The supply must be wired direct to the boiler control box and must not be interrupted by any system controls.

Wiring should be PVC insulated cable, not less than 0.75mm² (24/0.2mm). All fuses must be ASTA approved to BS. 1362.

The length of the conductors between the cord anchorage and the terminals must be such that the current carrying conductors become taut before the earthing conductor, if the cable or cord slips out of the cord anchorage.

The earth connection MUST never be omitted.

ELECTRICAL CONNECTIONS (INTERNAL)

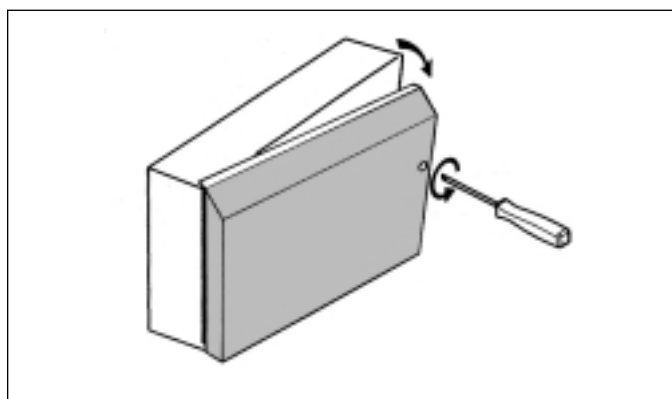
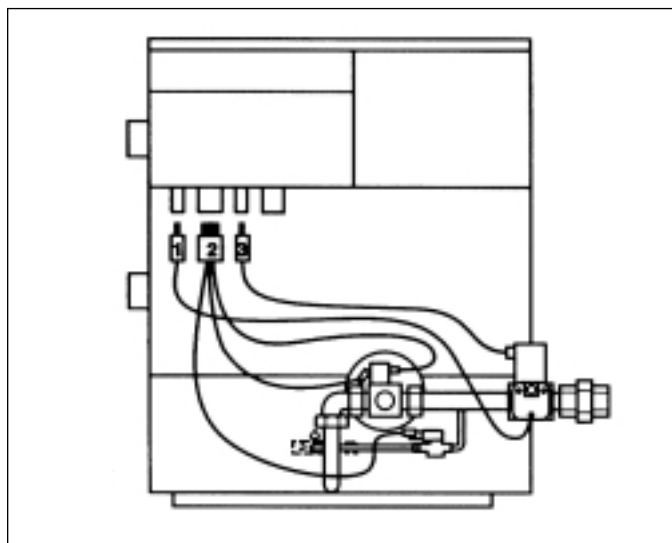
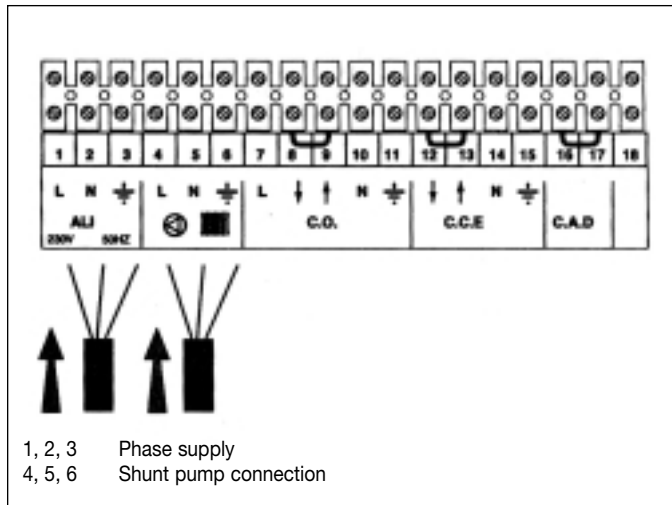
Legend

1. Gas Pressure Switch
2. Cable and plug for first and second stage gas valves
3. Cable and plug for safety valve

CONTROL PANEL

To open the control panel locate the opening on the right hand side and insert a cross headed screw driver. Turn the screwdriver 3 quarters anticlockwise to disengage the catch.

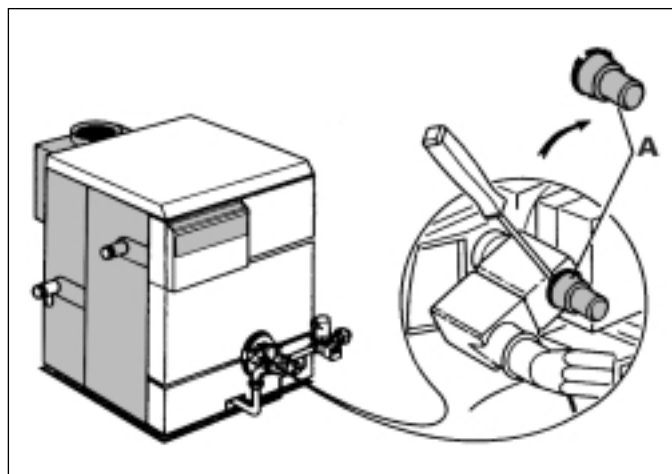
The control panel door will now open and is hinged on the left hand side.



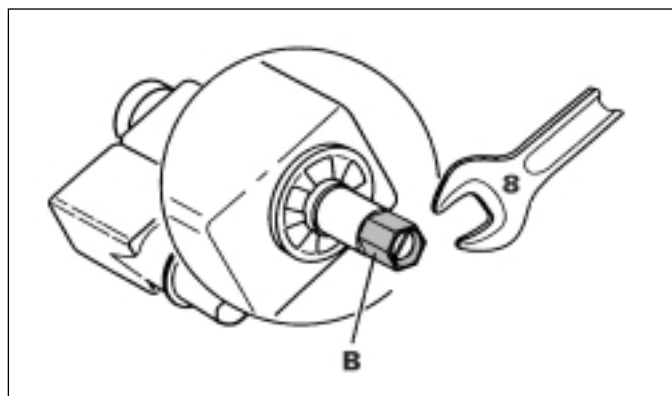
12 ADJUSTING THE BURNER PRESSURES

1. Adjusting the system controls to ensure that the boiler will operate at high rate for a reasonable period.
2. Adjust the thermostats to the maximum setting.
3. It is essential that the maximum setting (high rate) is set first.
4. Remove the dust cover from the adjustment screw (A).
5. Adjust the second stage gas pressure (high rate) in accordance with the table shown below by adjusting the nut (B) with the aid of an 8mm spanner.
6. To adjust the first stage gas pressure (low rate) remove the second stage (high rate) connector (D).
7. Using a screw driver adjust the central screw (C) until the gas pressure is in accordance with the table below.
8. When the gas pressure adjustment is complete refit the dust cap (A) to the valve.
9. Reconnect the electrical plug to the gas valve.

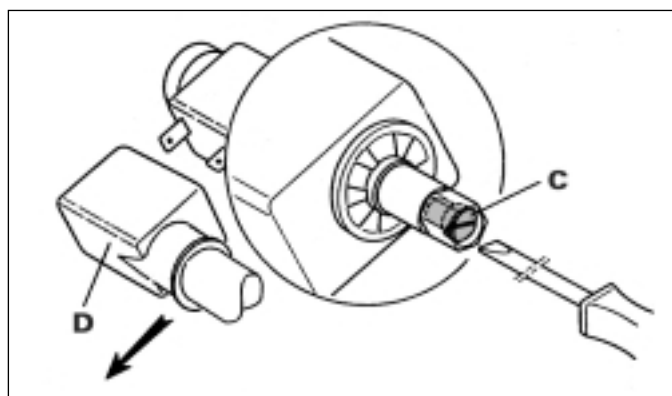
Pressure settings	Minimum	Maximum
Second Stage (mbar)	11.5	15.7
First stage (mbar)	5.75	7.85



Adjustment of second stage burner (high rate)



Adjustment of first stage burner (low rate)



- A. Dust cover
- B. Adjustment for second stage
- C. Adjustment for first stage
- D. Second stage connector

INSTALLATION

WARNING: Always turn off the gas supply at the gas inlet cock and switch OFF and DISCONNECT the electricity supply BEFORE WORKING on the appliance.

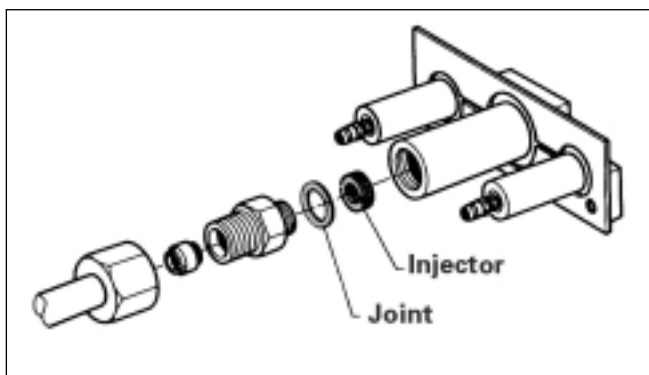
1. Remove the pilot pipe by undoing the unit holding the pipe in place.
2. Remove the back taking care to retain the joint/gasket.
3. Remove the injector using a screwdriver
4. Clean and or replace the injectors.
5. Reassemble in reverse order.

Injector size	0.75mm
---------------	--------

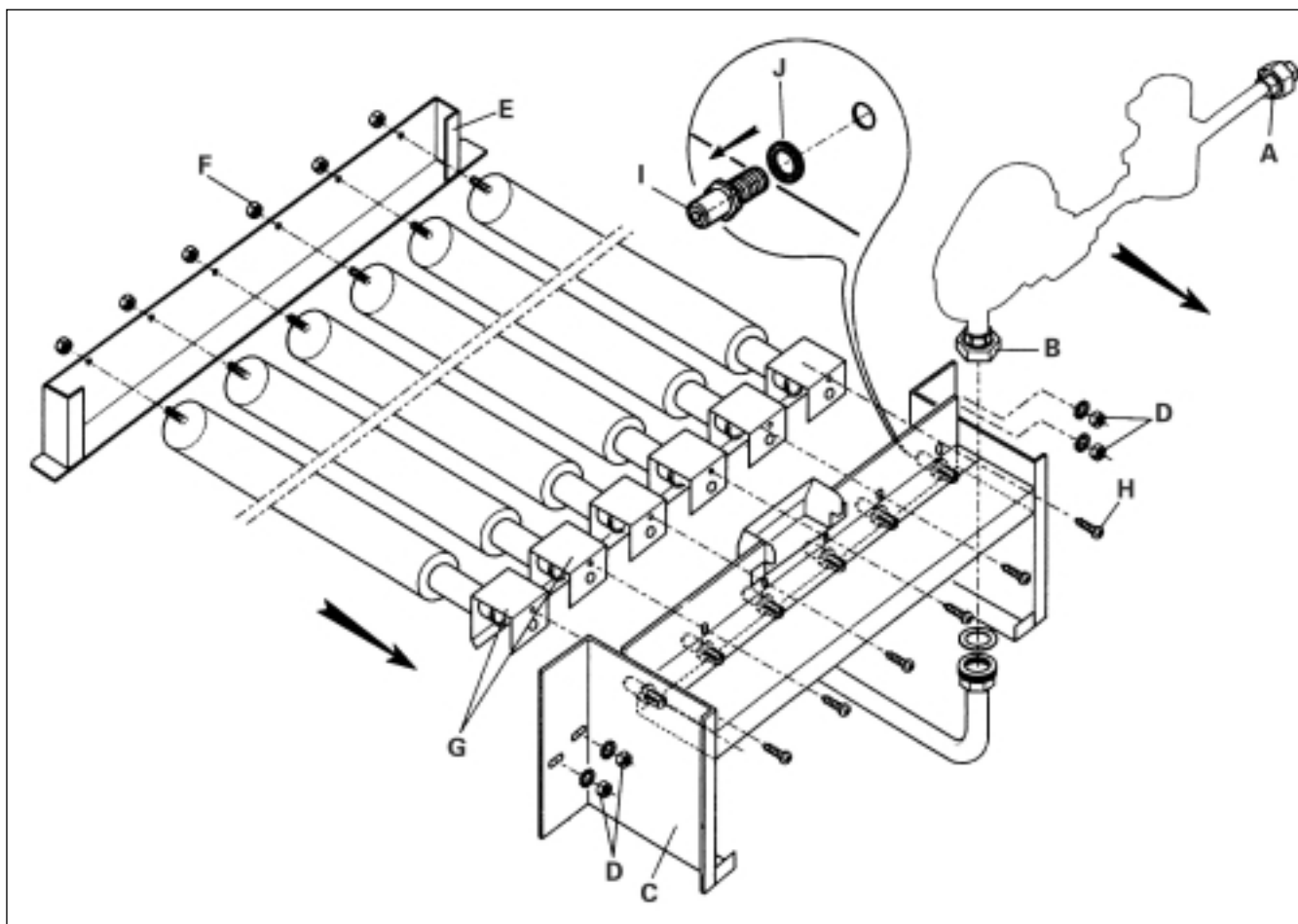
1. Disconnect the gas line assembly at points A and B.
2. Disconnect all of the electrical connectors together with the ignition electrode and ionisation probes.
3. Disconnect the four nuts D and withdraw the burner tray.
4. Remove the rear support bracket (E) by undoing the nuts (F) holding the burners in place.
5. Disconnect the front burner tray support by removing the screws (F).
6. Remove and replace the injectors (I), replace the gasket (J).
7. Assemble in reverse order.

Injector size	3.9mm
---------------	-------

REPLACEMENT OF PILOT INJECTORS



REPLACEMENT OF BURNERS INJECTORS



SPILLAGE CHECK

Check there is no spillage of combustion products from the boiler draught diverter by carrying out a spillage test, as detailed in BS. 5440:1.

ADJUSTMENT OF WATER FLOW RATE THROUGH THE BOILER

When commissioning the heating/domestic hot water system the shunt pump must be adjusted to give the minimum flow rate given in Table 2, when that part of the system intended to be used for dissipation of residual heat only is in operation.

TESTING

Check that the main burner responds correctly to manual ON/OFF operations of any controls fitted in the gas control circuit. Check, in the following manner, the operation of the flame failure safety device.

1. Extinguish the main burner and pilot burner by turning off the main gas inlet cock.
2. Wait for 1-2 minutes, during which time the gas control will close.
3. Fit the lower casing front panel.

HANDING OVER**ROUTINE OPERATION**

Full instructions covering routine lighting and operation of the boiler are given on the Lighting and Operation Instruction Label located on the inside of the inside of the casing door. Draw the attention of the boiler owner or his representative to the Lighting and Operating Instruction Label on the inside of the casing door. Give a practical demonstration of the lighting and shutting down of the boiler. Describe the function of the boiler and system controls and show how they are adjusted and used. Describe the function of the downdraught thermostat if fitted. Hand over these installation instructions to the customer and request him to keep them in a safe place for ready reference.

IMPORTANT

Point out to the owner that the boiler must have regular maintenance and cleaning, at least annually, in order to ensure reliable and efficient operation. Regular attention will also prolong the life of the boiler and should preferably be performed at the end of the heating season.

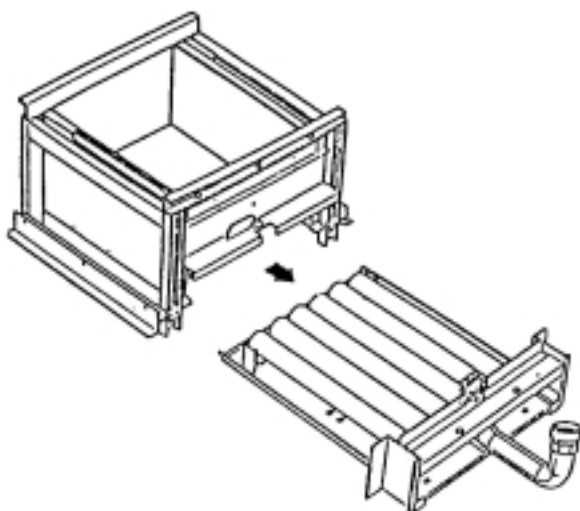
Recommended that a contact for this work should be made with a Corgi registered installer.

ASSEMBLY

Tools necessary

- | | | |
|--------------|--------------|----------------------------|
| - 8 spanner | - 13 spanner | - crosshead screwdriver |
| - 10 spanner | - 19 spanner | - type JD TE assembly tool |

1



8345-EN-24

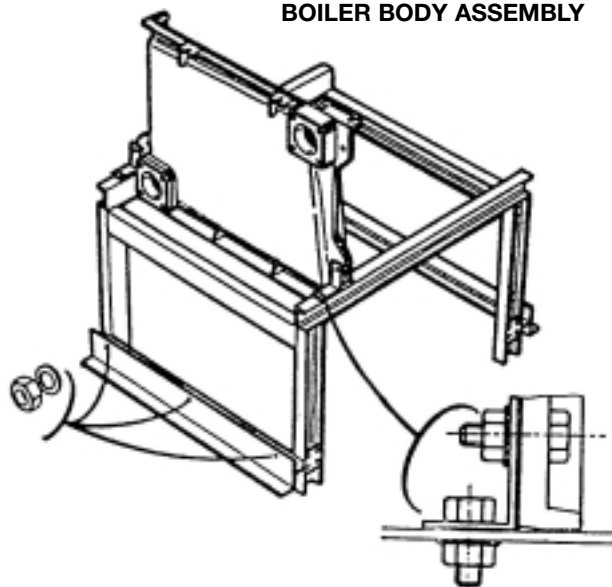
Before mounting the sections on the frame:

- remove the tray beneath the burner drawer
- remove the burner drawer by undoing the 2 bolts on either side of it (10 spanner)
- remove the combustion chamber secured by M8 bolts at the front and rear of the combustion chamber (13 spanner)

The sections can then be assembled without damaging the seal at the top of the combustion chamber.

2

BOILER BODY ASSEMBLY

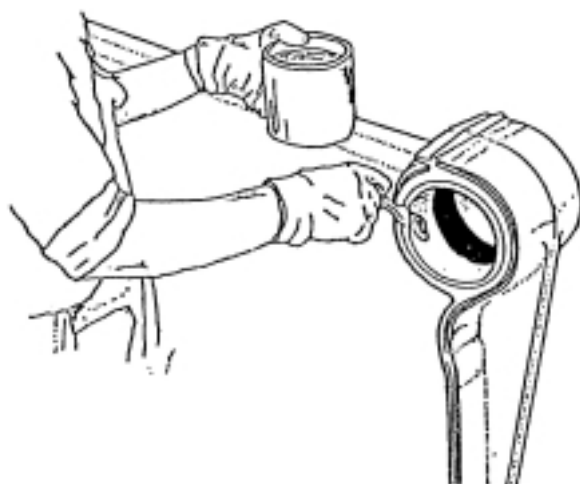


8345-EN-25

Fit the 2 lower supports of the casing, securing each with 3 H5 bolts + DE 5 serrated washers. Mount the 2 positioning brackets A and B on the frame (on the right or left) using a 10 spanner and 2 H 6x15 bolts + 2 DE 6 serrated washers + 2 H6 nuts.

Fit the end section and secure it to the brackets by 2 H 8x30 bolts + 2 H8 nuts + 2 M8N washers.

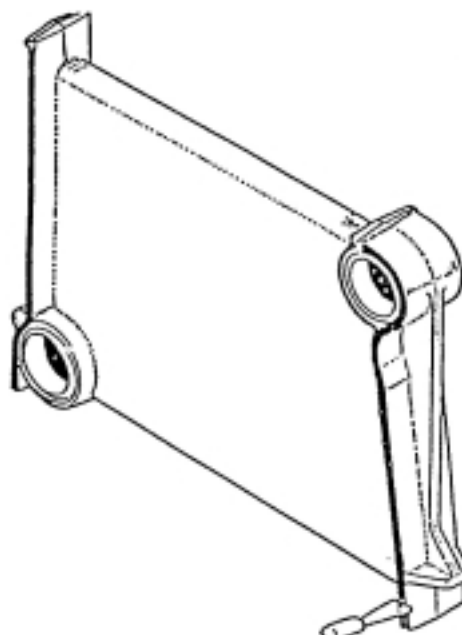
3



8345-EN-26

Clean the bores with solvent and coat with boiled linseed oil.

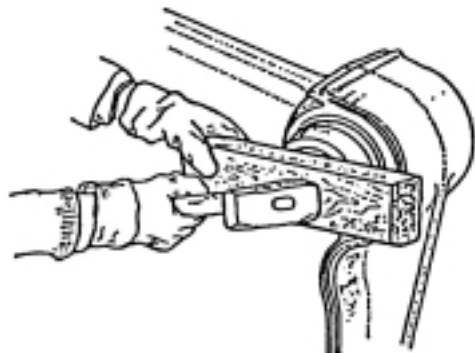
4



8345-EN-26

Carefully putty the sealing grooves with a spatula to provide a good seal for the boiler body.

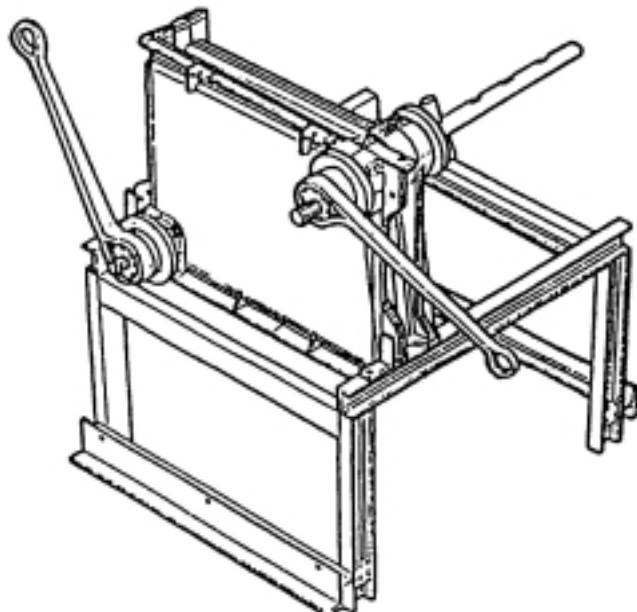
5



8345-EN-28

Clean the nipples with solvent. Coat with boiled linseed oil. Drive the 2 nipples in gently, using a piece of wood.

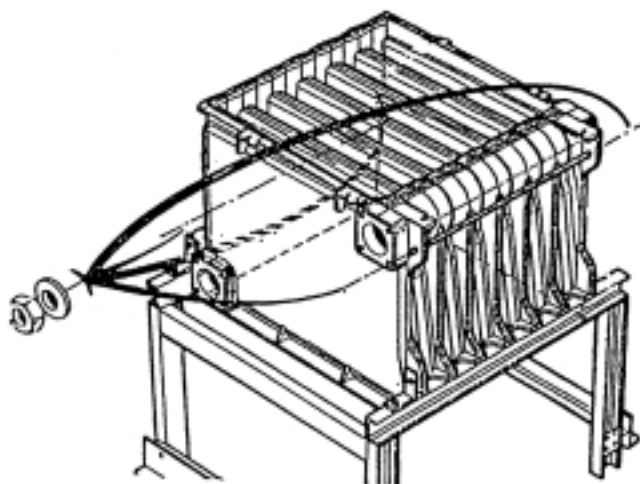
6



8345-EN-29

Fit the first intermediate section. Place the assembly tool in position. Tighten progressively so as to cause the upper and lower connections to mate evenly and simultaneously.

7

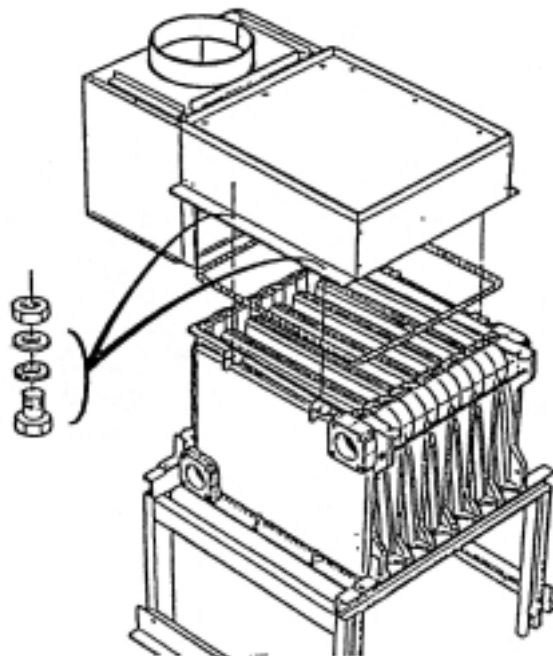


8345-EN-30 A

Fit the other intermediate sections following the instructions in figures 3, 4, 5. Fit the 2nd end section and tighten. Leave the assembly tool in place. Fit the tie rods (with M10N washers and H10 nuts). Remove the assembly tool.

8

FITTING THE DRAUGHT DIVERTER

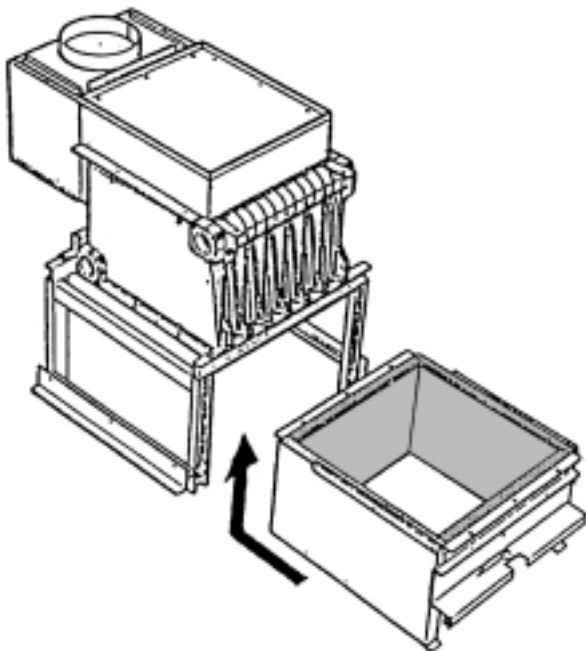


8345-EN-31 A

Fix the $\varnothing 7$ sealing bead on the body using iron putty. Start from the rear. Fit the draught diverter and secure it to the body with 4 H 8x30 bolts + 4 DE 8 serrated washers + 4 nuts + 4 M8N washers (13 spanner).

ASSEMBLY

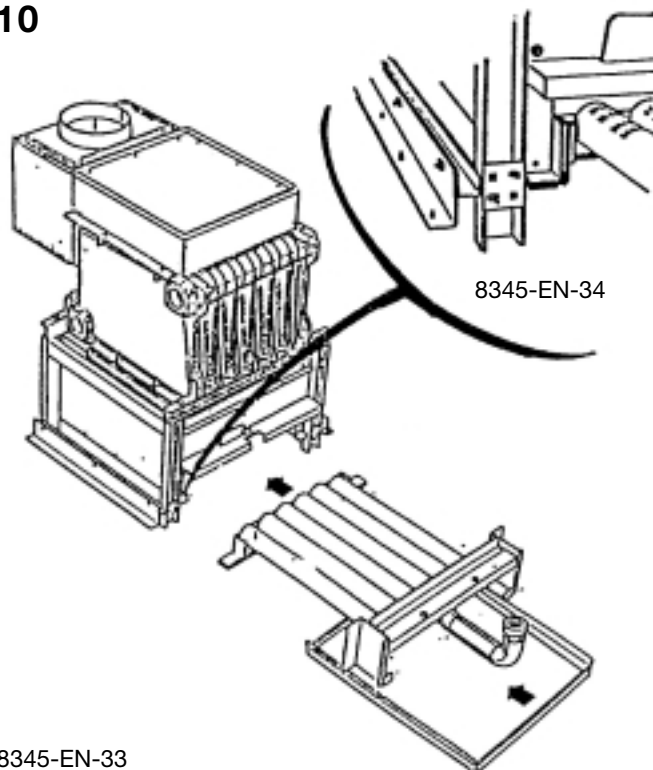
9



8345-EN-32

Replace the combustion chamber as indicated in the diagram and secure it to the frame at the front and rear by 6 H 8x30 bolts + 6 DE 8 serrated washer (13 spanner).

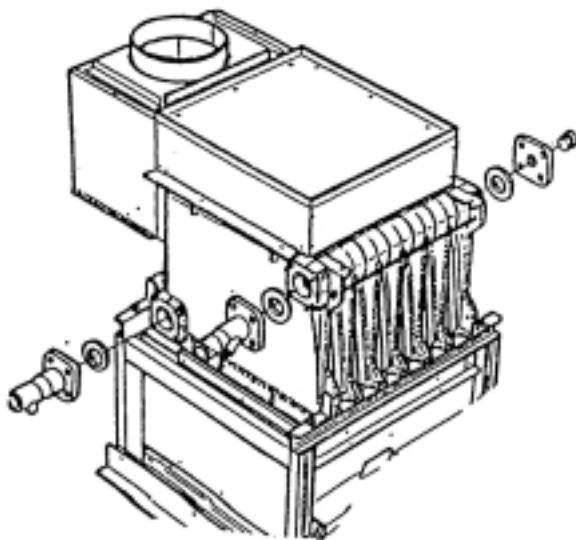
10



8345-EN-33

Replace the burner drawer in the grooves provided in the combustion chamber, secure it to the combustion chamber with H 6 nuts + DE 6 serrated washers. Slide the tray into the place provided in the lower part of the burner drawer and push it home.

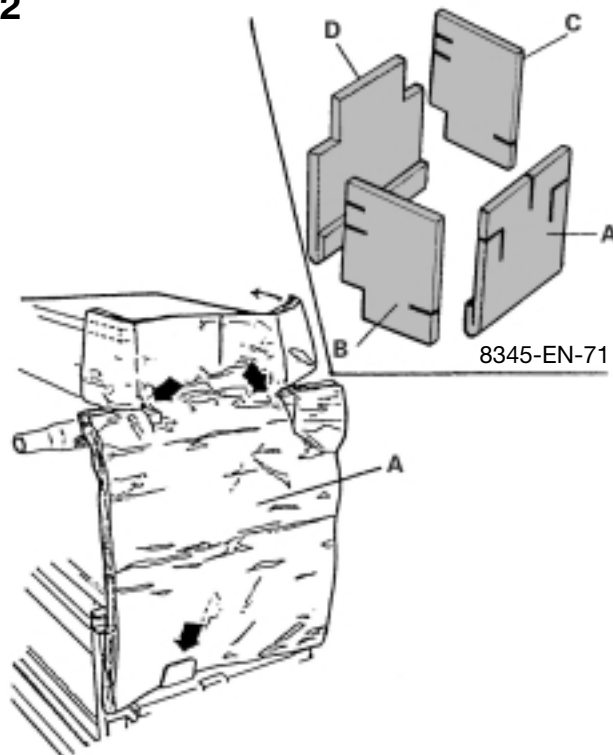
11



8345-EN-6

Attach the flow flange, the return flange, the threaded flange and the solid flange: 4 M 12 bolts + 4 H 12 nuts (19 spanner) for each flange. The opening for the finger must be on the left hand side of the boiler. If the flow and return are on the left hand side assembly is as illustrated: the opening for the finger faces forwards. If the flow and return are on the right hand side, fit the threaded flange on the left and the $\frac{1}{2}$ " plug on the right in the opening for the finger in the flow flange.

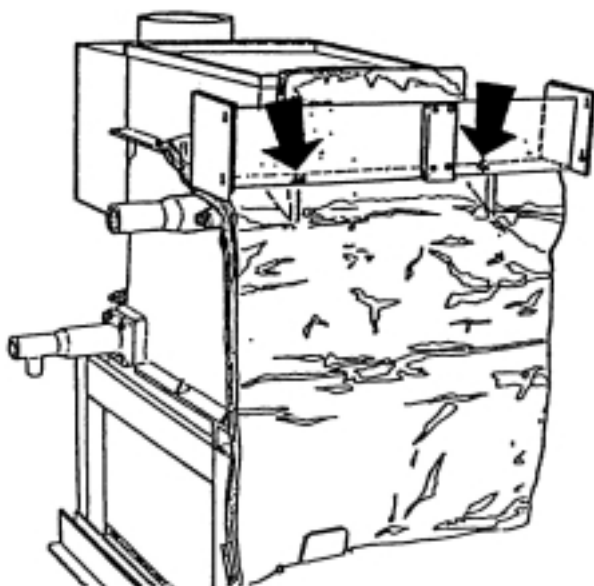
12



8345-EN-36

Fit the front insulating panel A. Slide it behind the retaining sheet metal bracket provided at the base of the combustion chamber. Pull the section attachment points through the cuts.

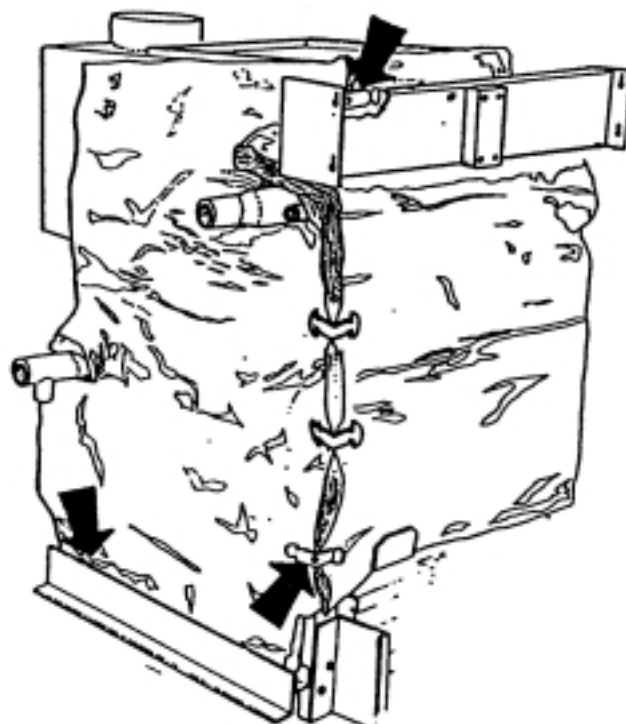
13



8340-EN-8 A

Fit the control panel supporting crosspiece to the attachment points on the sections using H8 x 30 bolts + 2 H8 nuts + 2 DE 8 serrated washers (12 spanner) + 4 flat washers.

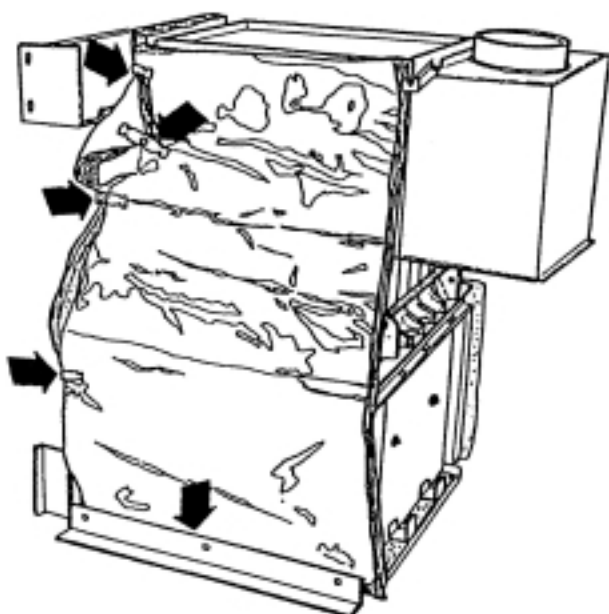
14



8345-EN-38 B

Fit the left hand side insulating panel B, slide the base of the panel into the retaining channel. Slip the top end under the front panel and secure in place with clips.

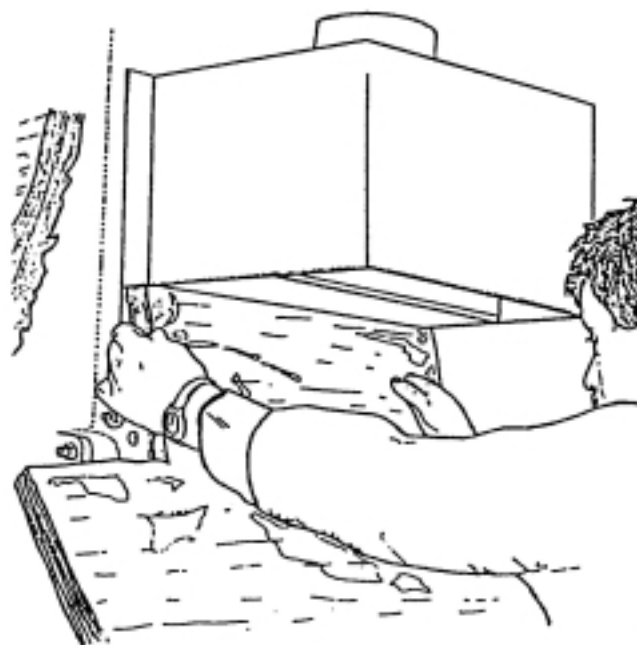
15



8345-EN-39 A

Fix the second side insulating panel C in the same way and secure with clips.

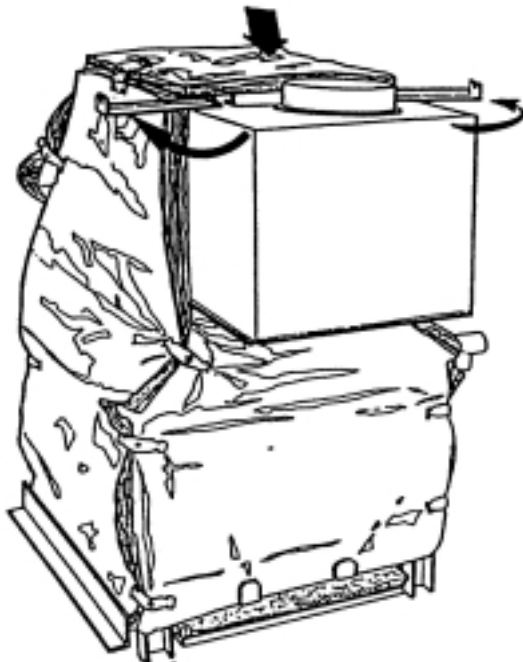
16



8345-EN-40

Slide the rear insulating panel D between the body and draught diverter, and place the bottom end in the 2 retaining brackets provided for the purpose. Slide the sides of the insulation underneath the slide insulating panels and fix with clips.

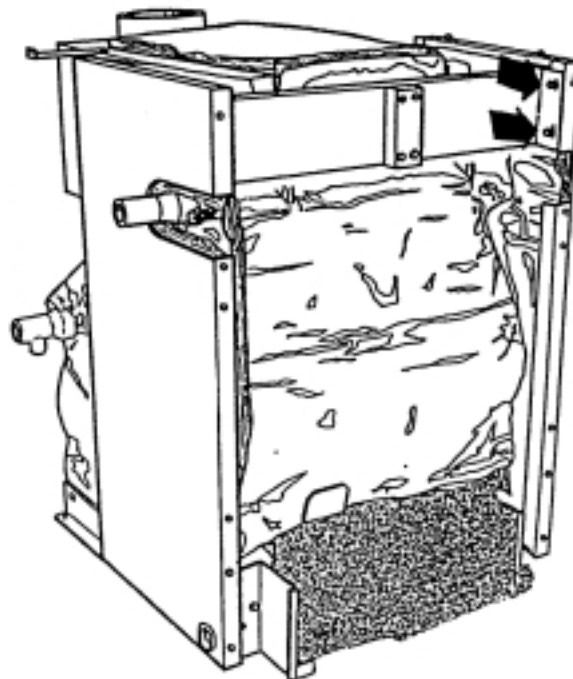
17



8345-EN-41 A

Fit the upper insulating panel onto the draught diverter. Pivot the casing supporting bars outward perpendicular to the side of the boiler.

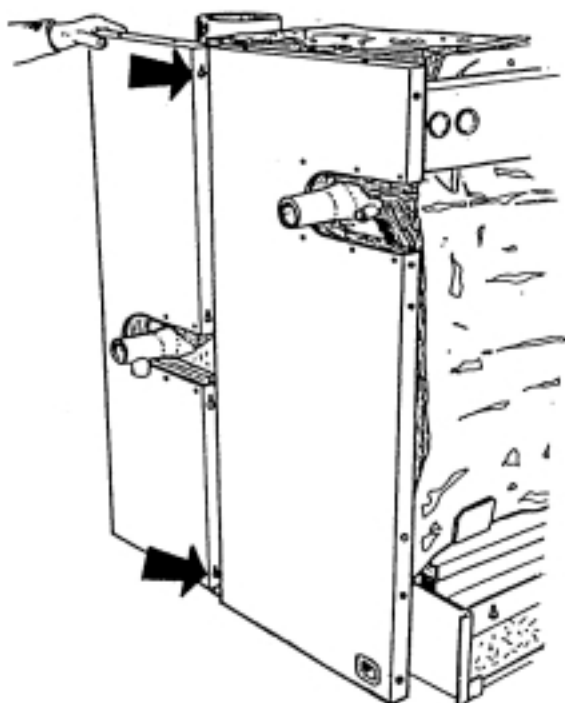
18



8345-EN-38 B

Fit the left and right front side panels. Clip them onto the rivet studs provided on the lower supports. Secure each with 2 H6 nuts + 2 M6N washers to the control panel supporting crosspiece (10 spanner).

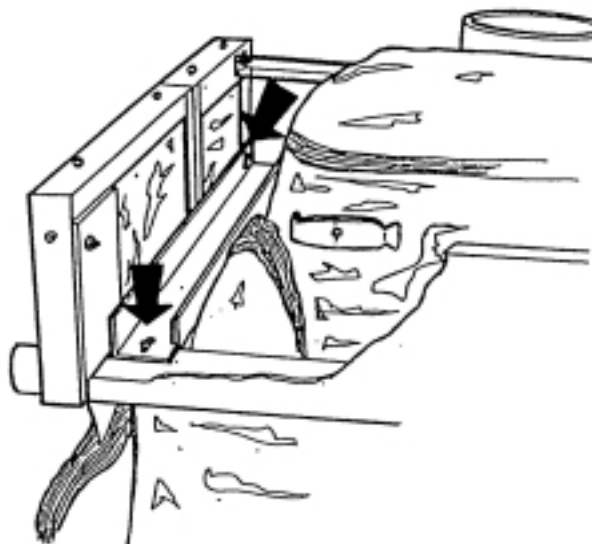
19



8345-EN-43 B

Hook each of the rear side panels onto the front side panel using the slotted holes, clip them to the rivet studs on the lower support. Secure them to the casing supporting bars using 1 H6 nuts + 1 M6N washer (10 spanner).

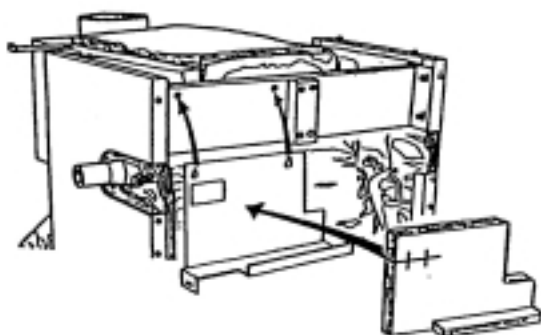
20



8345-EN-44 A

Fit the two horizontal cable channels along the left hand side panel and the right hand side panel and secure with 1 SIM EC CB 3.94 x 12.7 screw.

21



Hook the insulation support onto the casing support and fit the insulation

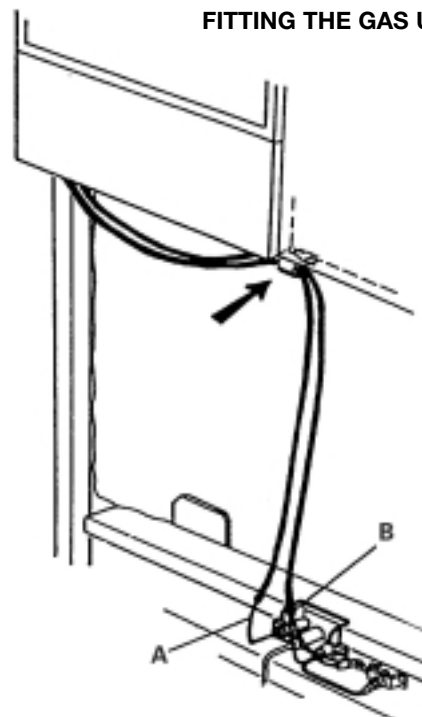


8345-EN-45

Hook the control panel and the upper front panel onto the studs using the slotted holes. Then fit the gas unit

22

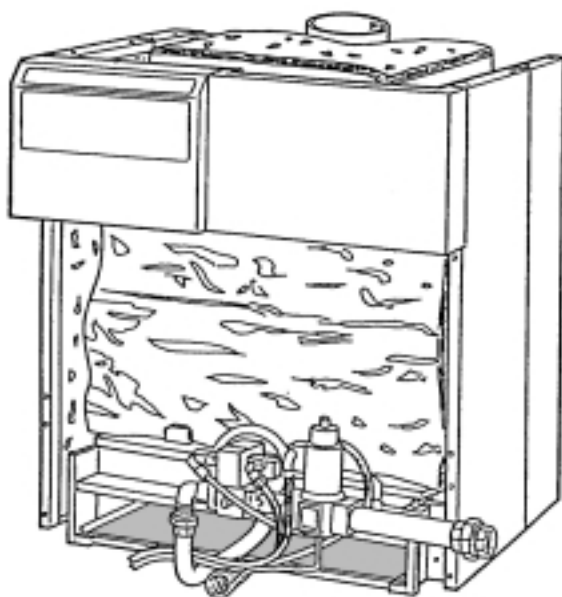
FITTING THE GAS UNIT



8345-EN-11 B

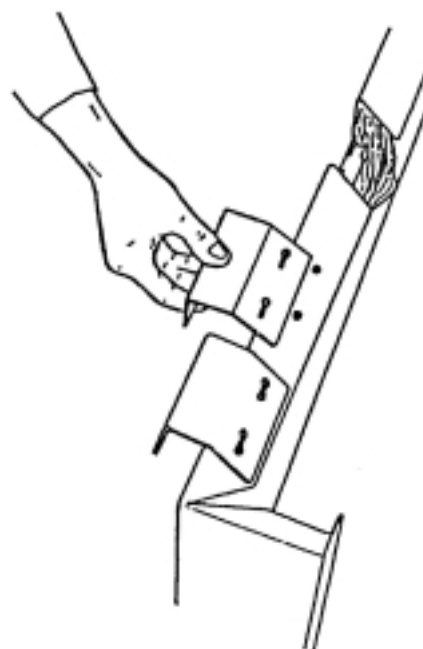
Secure the cables coming from the control panel on the upper front panel using the clips provided. Connect ignition cable A, sensor cable B and the earth wire.

23



Fit and secure the pre-assembled gas unit. Fit the pilot gas feed pipe. Connect the earthing wire to the earth pin located to the right of the pilot light.

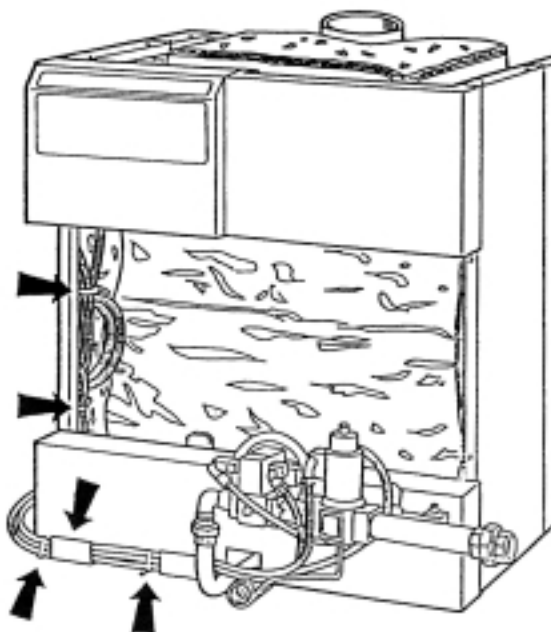
24



8345-EN-49

Fit the cable supports to the lower front panel using SIM EC CB 3.94 x 12.7 screws and fit the panel.

25

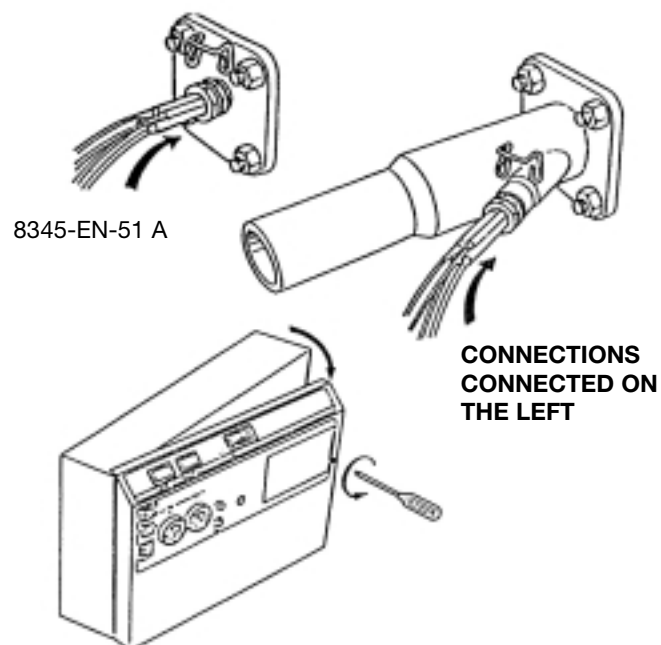


8345-EN-50

Secure the wires with the cable supports, pass them through the casing to the control panel. Secure the bundle using the cable clips.
Warning: The cables should not slip under the boiler. Carefully secure the bundle with the cable clips and secure the cables to the supports provided for the purpose on the lower panel.

26

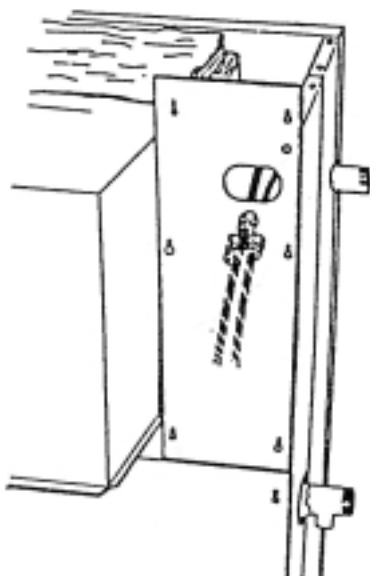
CONNECTIONS CONNECTED ON THE RIGHT



8345-EN-8

Fit the wires into the finger on the left hand side of the boiler. To open the control panel: turn the fitting on the right hand upright of the panel one quarter turn. Open by pulling forwards.

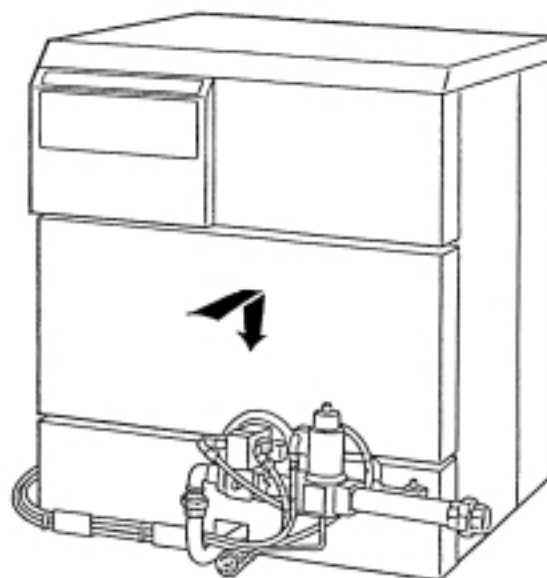
27



8345-EN-52 A

Run the supply and accelerator cables to the control panel securing them in the cable track by cable clips. These cables are to be positioned and held in place with a help of the cable clamping bush on the loose rear plate.

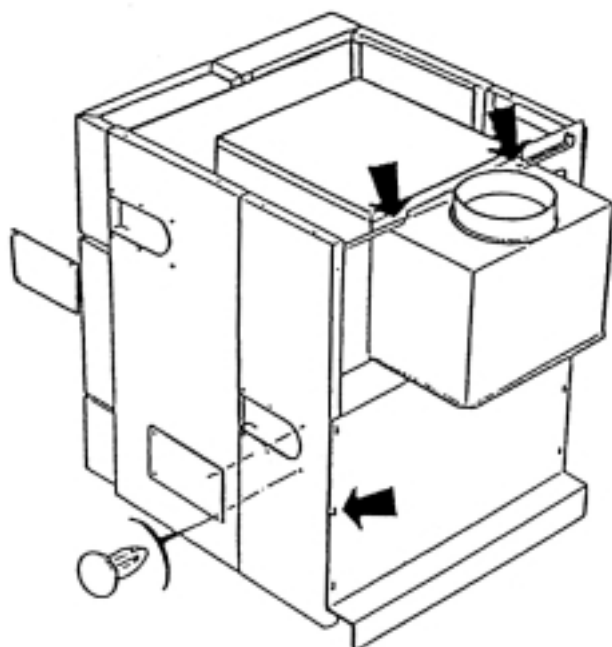
28



8345-EN-53

Connect up the electrical wiring in accordance with the wiring and cabling diagram. Fit the intermediate front panels.

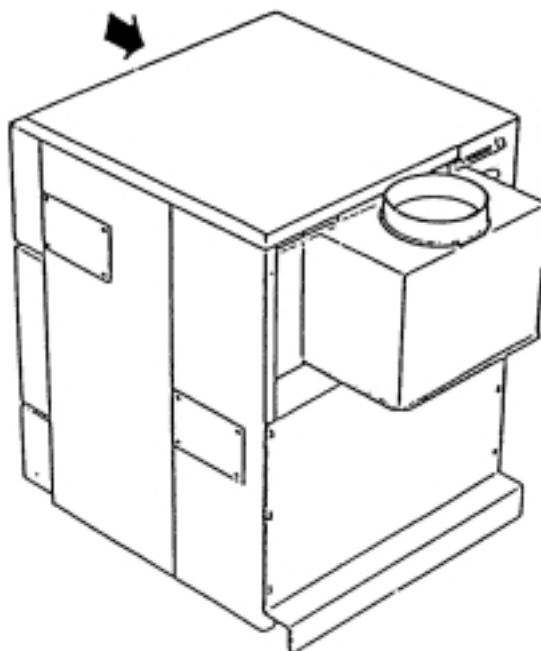
29



8345-EN-54 A

- Secure the lower rear panel using SIM screws.
- Clip on the cover plates: 2 cover plates on the connections side and 2 on the opposite side.
- Adjust the position of the casing by adjusting the 2 fixing screws for the casing supporting bars and the 2 fixing screws for the front crosspieces.

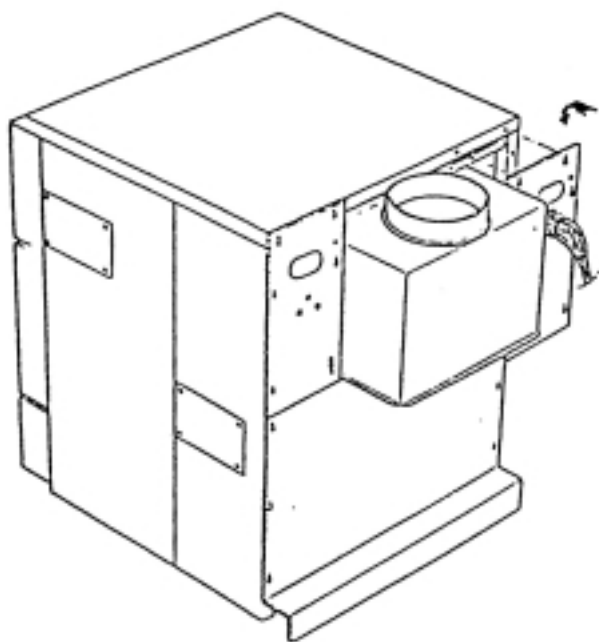
30



8345-EN-55

Fit the lid by releasing the right hand rear panel.

31



8345-EN-56 A

Fit the left hand rear plate and secure the right hand rear plate to the horizontal cable track and tighten up the 2 SIM EC CB 3.94 x 12.7 self-taping screws so that the 2 panels can only be removed using a tool.

Technical Training

The Caradon Plumbing Limited Technical Training Centre offers a series of first class training courses for domestic, commercial and industrial heating installers, engineers and system specifiers. For details of courses please ring:

.....01482 498432

Caradon Plumbing Limited

pursues a policy of continuing improvement in the design and performance of its products.

The right is therefore reserved to vary specification without notice.

September 2001

AO



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