

IDEAL TURBO 2 9, 12, 18 & 24

Wall Mounted, Fan Powered, Balanced Flue, Gas Boilers.

Installation & Servicing.

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.

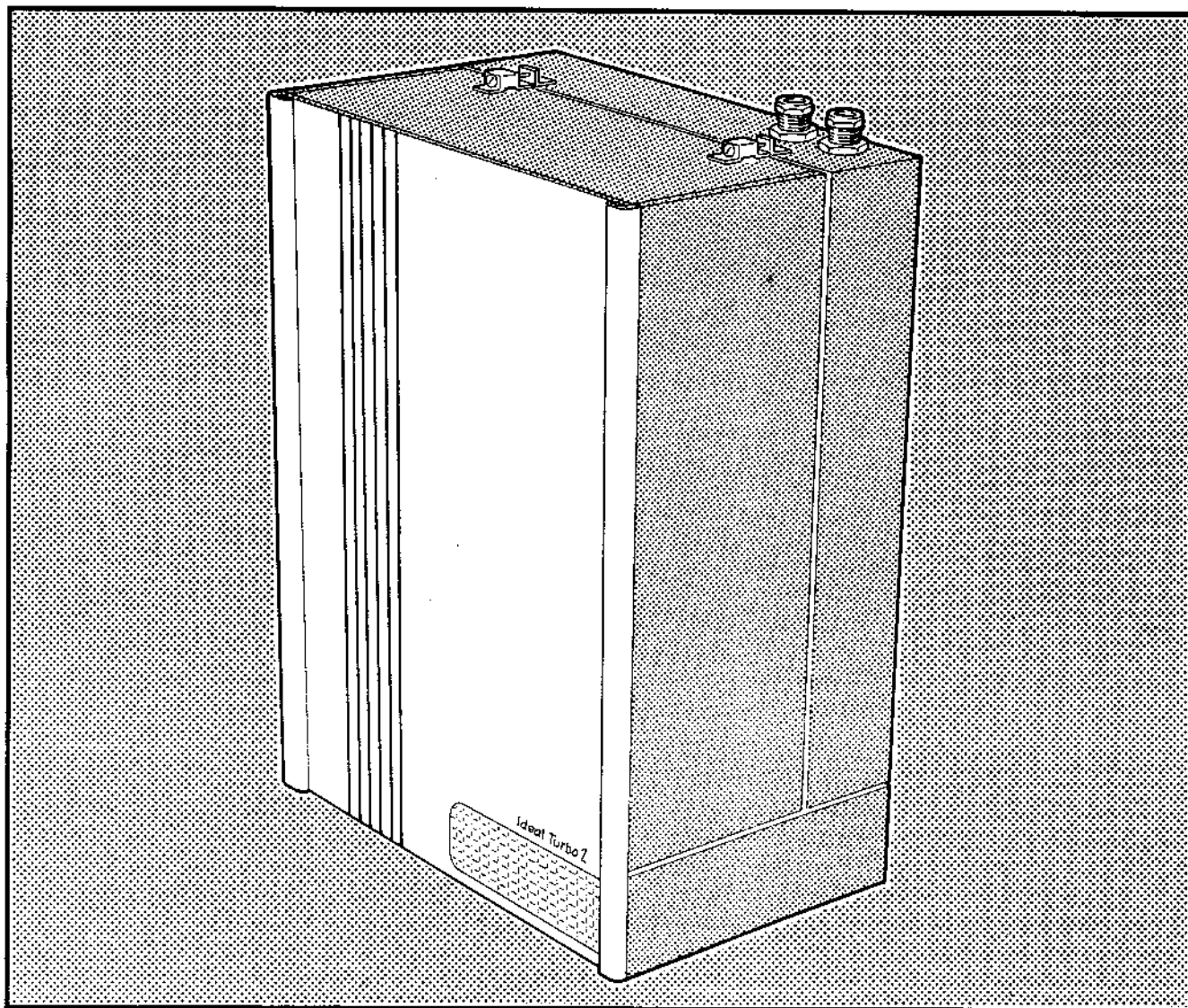
IMPORTANT: The appliances are for use with **NATURAL GAS ONLY.**

Ideal Turbo 2

9
12
18
24

G.C. Appliance No.

41 415 90
41 415 91
41 415 92
41 429 44



NOTE TO THE INSTALLER: LEAVE THESE INSTRUCTIONS ADJACENT TO THE GAS METER

Stelrad Ideal

Table 1- GENERAL DATA

Boiler Size		Turbo 2; 9	Turbo 2; 12	Turbo 2; 18	Turbo 2; 24
Main Burner		STELRAD - Premix			
Gas Control		HONEYWELL VR 4700A			
Burner Injector	BRAY Cat. 10	Size 850	Size 1150	Size 1600	Size 2300
Pilot Injector	HONEYWELL	0.3A			
Gas Supply Connection	in. BSP	½in (Lower left of control pod)			
Flow Connection		22mm Compression			28 mm. Adaptor
Return Connection		22mm Compression			28 mm. Adaptor
MAXIMUM Static Water Head	m (ft.)	30(100)			
MINIMUM Static Water Head	m (ft.)	0.450(1.5)			
Electricity Supply		240V ~ 50 Hz. Power consumption - 40W			55W
External Fuse Rating		3A			
Internal Fuse Rating		1 A (BS.4265, type F)			
Water Content	litre (gal.)	1.6(0.36)	1.6(0.36)	3.0(0.67)	3.23 (0.71)
Dry Weight	kg (lb.)	45.33(99.73)	45.33(99.73)	46.50(102.42)	47.50 (104.6)
MAXIMUM Installation Weight	kg (lb.)	31.34(68.94)	31.34(68.94)	32.5(71.63)	33.5 (73.85)

Table 2- PERFORMANCE DATA

Boiler Size		Turbo 2; 9	Turbo 2; 12	Turbo 2; 18	Turbo 2; 24
Boiler Input	kW (Btu/h)	10.00 (34 120)	14.00 (47 800)	20.81 (71 004)	27.00 (92 128)
Boiler Output to Water	80°C FLOW & 60°C RETURN kW (Btu/h)	8.589 (29 306)	12.000 (41 000)	18.000 (61 416)	23.22 (79 230)
	60°C FLOW & 40°C RETURN kW (Btu/h)	9.217 (31 448)	12.900 (44 000)	19.250 (65 681)	24.40 (83 256)
Burner Setting Pressure (Hot)	mbar (gauge)	10.2 ± 0.4	11.5 ± 0.4	13.3 ± 0.4	12.9 ± 0.4
	(in.w.g.)	4.1 ± 0.1	4.6 ± 0.1	5.3 ± 0.1	5.2 ± 0.1
Gas Consumption, after 10 minutes running	l/s	0.26	0.36	0.54	0.70
C.V. of Gas- 38.7 MJ/ m³ (10.38 Btu/ ft.³)	(ft.³/h)	(32.87)	(46.10)	(68.40)	(88.75)
Time for 100 litres revolution	Seconds	385	278	185	143
Maximum operating flow temperature	°C	82	82	82	82
Recommended water flow through boiler	l/min. at 9- 13°C	9.8 - 14.2	13.0 - 18.9	19.6 - 28.4	25.6 - 37.0

Notes.

To obtain the gas consumption,

- (a) For l/s, divide heat input (kW) by C.V. of the gas (MJ/m³)
- (b) For ft.³/h, divide heat input (Btu/h) by the C.V. of the gas (Btu/ft.³)

INTRODUCTION

The **Ideal Turbo 2** is a lightweight, wall hung, gas fired, condensing boiler. The flue system is room sealed and fan assisted. The ignition system is fully automatic.

There are four models in the range, with outputs of 8.6kW, 12kW, 18kW and 23.2kW.


A programmer is also available as an option.

The boiler casing is of white enamelled mild steel with a decorative toughened glass 'lift up' front.

The boilers are suitable for connection to open vented or sealed systems. These systems may be pumped central heating or pumped central heating combined with a pumped indirect domestic hot water circuit. Gravity circuits must NOT be used.

Adequate arrangements for completely draining the system, by provision of drain cocks MUST be provided.

Gas Safety (Installation and Use) Regulations, 1984.

It is the law that all gas appliances are installed by competent persons (e.g. CORGI- identified by ) 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 that the law is complied with. The installation of the boiler MUST also be in accordance with the current I.E.E. Wiring Regulations, the Local Building regulations, Building Standards (Scotland) Consolidation, the bye laws of the Local Water Undertaking and any relevant requirements of the Local Authority.

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

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 (small bore and microbore domestic central heating systems).
BS.5446	Installation of gas hot water supplies for domestic purpose (2nd Family Gases).
BS.5440:1	Flues (for gas appliances of rated input not exceeding 60 kW).
BS 5440:2	Ventilation (for gas appliances of rated input not exceeding 60 kW).

IMPORTANT. This appliance has been tested and certified by British Gas for safety and performance. It is, therefore, important that no external control devices are directly connected to this appliance- unless covered by these 'Installation and Servicing Instructions' or otherwise recommended by Stelrad Ideal in writing.

If in doubt please enquire.

Any direct connection of a control device not recommended by Stelrad Ideal could invalidate the British Gas acceptance and the normal appliance warranty. It could also infringe the Gas Safety (Installation & Use) Regulations and the above regulations.

Manufacturer's notes must NOT be taken, in any way, as over-riding statutory obligations.

LOCATION OF BOILER

The boiler MUST be installed on a flat and vertical non-combustible wall, capable of adequately supporting the weight of the boiler and any ancillary equipment.

THE BOILER IS NOT SUITABLE FOR EXTERNAL INSTALLATION.

IMPORTANT NOTICE. If the boiler is to be fitted in a timber framed building it should be fitted in accordance with the British Gas publication 'Guide for Gas Installations in Timber Framed Buildings' reference DAB. If in doubt, advice must be sought from the Local Gas Region of British Gas.

The boiler may be installed in any room or internal space, although particular attention is drawn to the requirements of the current I.E.E. Wiring regulations and, in Scotland, the electrical provisions of the Building Regulations applicable to Scotland with respect to the installation of the boiler in a room or internal space containing a bath or shower.

Where a room sealed appliance is installed in a room containing a bath or shower then the appliance and any electrical switch or appliance control, utilising mains electricity should be so situated that it cannot be touched by a person using the bath or shower. Where installation will be in an unusual location then special procedures may be necessary and B.S. 6798 gives details guidance on this aspect.

A compartment used to enclose the boiler MUST be designed and constructed specially for this purpose. An existing cupboard, or compartment, may be used provided it is modified for the purpose. Details of essential features of cupboard / compartment design, including airing cupboard installations are given in B.S.6798.

In siting the boiler, the following limitations MUST be observed:

1. The positions elected for installation MUST allow adequate space for servicing in front of the boiler and for air circulation around the boiler.
2. This position MUST also permit the provision of a satisfactory balanced flue termination.
3. This position MUST also permit the provision of a satisfactory connection to the condensate drain.
4. It should be noted that condensing boilers have a tendency to form a plume of water vapour at the flue terminal and therefore care should be taken when deciding on the position of the flue.

GAS SUPPLY

Ensure that the pipe work from the meter to the appliance is of adequate size. If in doubt consult the Local Gas Region. An existing meter should be checked, preferably by the Gas Region, to ensure that the meter is adequate to deal with the rate of gas supply required. Installation pipes should be fitted in accordance with B.S.6891:1988. Do NOT use pipes of a 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.

FLUEING

Detailed recommendations for flueing are given in B.S. 5440:1. The following notes are intended for general guidance.

1. The boiler is suitable for fitting to walls of thicknesses between 114mm (4 1/2 in.) and 606mm (23 7/8 in).
2. The boiler MUST be installed so that the terminal is exposed to external air.
3. It is important that the terminal allows the free passage of air across it at all times.
4. The minimum acceptable spacings from the terminal to obstructions and ventilation openings are specified in Table 3.
5. Where the lowest part of the terminal is fitted less than 2m (6.6ft) above a balcony, above ground, or above a flat roof to which people have access then the terminal MUST be protected by a purpose designed guard. Terminal guards are available from:-
 H. Docherty Ltd., Unit 3, Sawmill Road,
 Redshute Ind. Est. Hermitage,
 Newbury, Berks. (Model TG 16)
6. Where the terminal is fitted through a wall it should be protected by a plastic or painted outer casing.

GENERAL

eaves, an aluminium shield at least 750 mm (30 in.) in length should be fitted to the underside of the gutter or painted surface.

- The air inlet/ products outlet duct and the terminal of the boiler MUST NOT be closer than 25 mm (1 in.) to combustible material.

Detailed recommendations on protection of combustible material are given in BS.5440.1, 1978, subclause 20.1.

IMPORTANT. It is absolutely ESSENTIAL to ensure, in practice, that products of combustion discharging from the terminal cannot re-enter the building, or any other adjacent building, through ventilators, windows, doors, other sources of natural air infiltration or forced ventilation/ air conditioning.

If this should occur, the appliance MUST be turned OFF IMMEDIATELY and the Local Gas Region consulted.

TERMINAL

The terminal assembly of the balanced flue can be adapted to accommodate various wall thicknesses, refer to PACKAGING on page 6.

Table 3

Terminal Position	Minimum Spacing
1. Directly below an openable window, air vent or other ventilation opening.	300 mm (12 in.)
2. Below guttering, drain pipes or soil pipes.	75 mm (3 in.)
3. Below eaves.	200 mm (8 in.)
4. Below balconies or a car port roof.	200 mm (8 in.)
5. From vertical drain pipes or soil pipes.	75 mm (3 in.)
6. From internal or external corners.	300 mm (12 in.)
7. Above adjacent ground, roof or balcony level.	300 mm (12 in.)
8. From a surface facing the terminal.	600 mm (24 in.)
9. From a terminal facing a terminal.	1200 mm (48 in.)
10. From an opening in a car port (eg. door or window) into dwelling.	1200 mm (48 in.)
11. Vertically from a terminal on the same wall.	1500 mm (60 in.)
12. Horizontally from a terminal on the wall.	300 mm (12 in.)

Note. The terminal position is not in the centre of the back panel of the boiler and the flue/ air duct assembly slopes at 5°; therefore reference must be made to the template supplied with the boiler.

AIR SUPPLY

Detailed recommendations for air supply are given in BS.5440 Pt. 2.

The following notes are intended for general guidance.

- It is NOT necessary to have a purpose provided air vent in the room or internal space in which the boiler is installed.
- If the boiler is to be installed in a cupboard or compartment, permanent air vents are required (for cooling purposes) in the cupboard/ compartment, at both top and bottom areas.

FLUEING- WATER SUPPLY

room/ internal space, or be direct to outside air. The minimum effective areas of the permanent air vents, required in the cupboard/ compartment, specified below, are related to the maximum rated heat input of the boiler.

Table 4

Position of air vent	Air from room/ internal space				Air direct from outside			
	9	12	18	24	9	12	18	24
Boiler size								
HIGH LEVEL cm ² (in ²)	90 (14)	126 (20)	188 (29)	243 (38)	45 (7)	63 (10)	94 (14.5)	122 (19)
LOW LEVEL cm ² (in ²)	90 (14)	126 (20)	188 (29)	243 (38)	45 (7)	63 (10)	94 (14.5)	122 (19)

Note: Both air vents MUST communicate with the same room or internal space, or MUST both be on the same wall to outside air.

WATER SUPPLY

The hydraulic resistance of the boiler is given in the graph below. The central heating system should be in accordance with the relevant recommendations given in BS.6798 and, in addition, for small bore and microbore systems- BS 5449

The domestic hot water system, if applicable, should be in accordance with the relevant recommendations of BS.5546.

Copper tubing to BS 2871:1 is recommended for water carrying pipework.

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

The hot water cylinder, & 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 under-floor spaces.

For open vented systems, refer to Frames 16, 17 & 18 for venting arrangements. Other parts of the system which may become unavoidably air locked can be automatically vented.

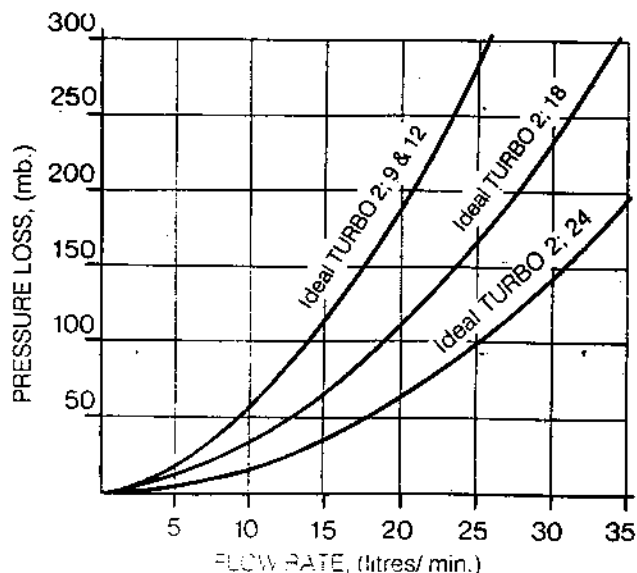
Draining taps MUST be located in accessible positions which permit the draining of the whole system, including the boiler & hot water storage vessel. Draining taps should be at least 1/2 in. nominal size & be in accordance with BS. 2879.

The circulating pump should be positioned on the flow, see Frames 16 and 17.

For sealed systems, refer to Frames 19 & 20.

For flow rates, refer to Table 2.

WATER FLOW RATE & PRESSURE LOSS



GENERAL

ELECTRICITY SUPPLY. Refer to Frames 21 and 22.

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

The boiler is supplied for 240V ~ 50Hz.
Single phase. Fuse rating is 3A.

The method of connection to the mains electricity supply **MUST** facilitate complete electrical isolation of the boiler, preferably by the use of a fused three pin plug and unswitched shuttered socket outlet, both complying with the requirements of BS 1363.

Alternatively, a fused double pole switch having a 3 mm (1/8 in.) contact separation in both poles and servicing only the boiler and system controls may be used.

The point of connection to the mains should be readily

ELECTRICAL SUPPLY-BOILER ASSEMBLY

accessible and adjacent to the boiler, except that, for bathroom installations, the point of connection to the mains **MUST** be situated outside the bathroom.

Note. Where a room sealed appliance is installed in a room containing a bath or shower, the appliance, any electrical switch or appliance control utilising mains electricity should be so situated that it cannot be touched by a person using the bath or shower.

CONDENSATE DRAIN. Refer to Frame 12.

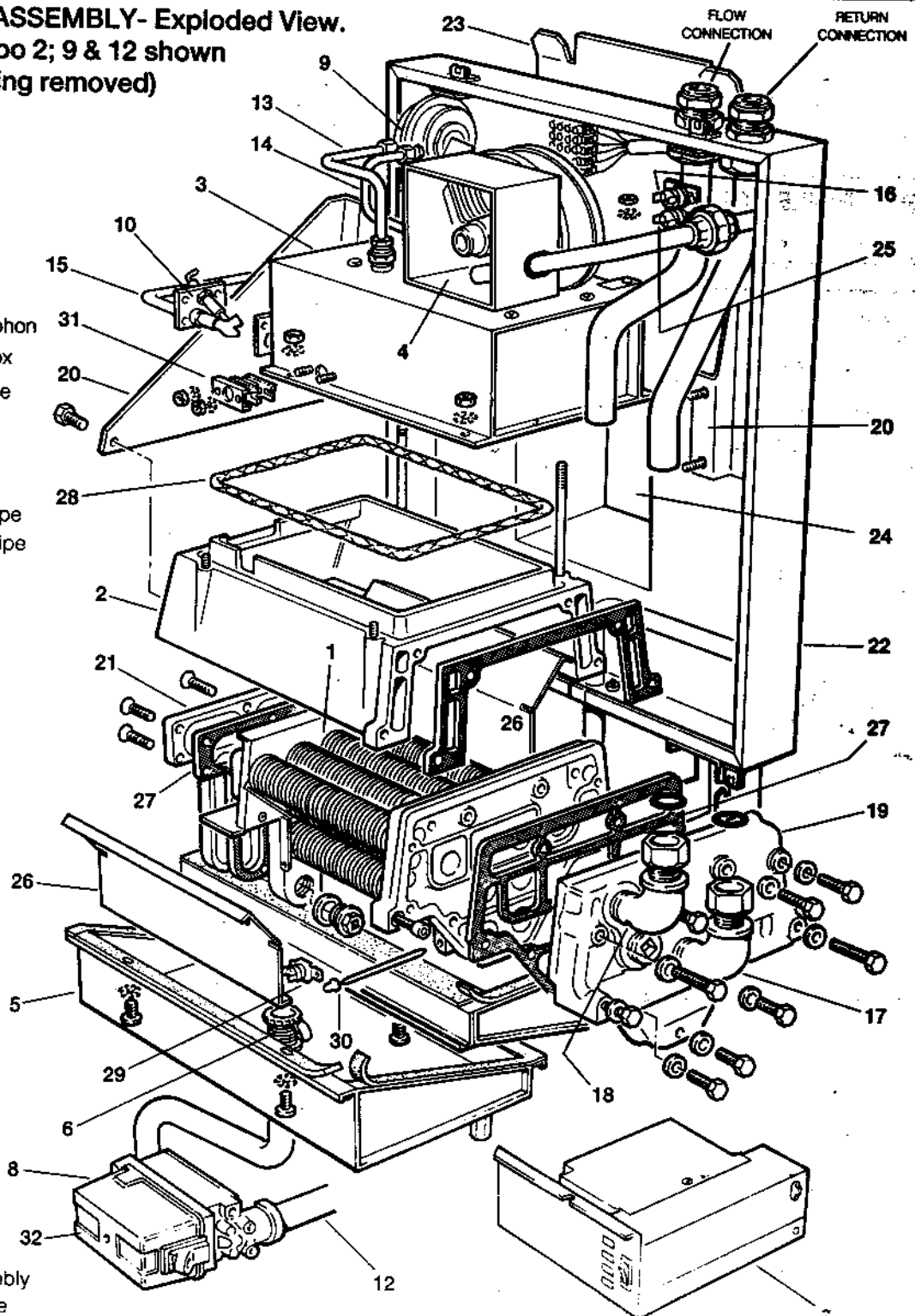
A condensate drain is provided on the boiler, this drain must be connected to a drainage point on site. All pipework & fittings in the condensate drainage system **MUST** be made of plastic. *No other materials may be used.*

The drain outlet on the boiler is standard 3/4 in. (22 mm) overflow pipe.

1 BOILER ASSEMBLY- Exploded View. Ideal Turbo 2; 9 & 12 shown (with casing removed)

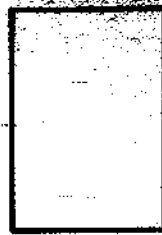
LEGEND

1. Tube pack
2. Combustion chamber
3. Burner box
4. Fan assembly
5. Sump
6. Condensate syphon
7. Boiler control box
8. Gas control valve
9. Pressure switch
10. Pilot assembly
12. Main gas line
13. Low pressure pipe
14. High pressure pipe
15. Pilot pipe
16. Over-heat thermostat
17. Return elbow assembly
18. Flow elbow assembly
19. Header casting
20. Boiler mounting bracket
21. Cover plate
22. Back panel
23. Wall mounting plate
24. Air inlet duct
25. Boiler control thermostat
26. Stainless steel deflector
27. Sealing gasket
28. Sealing rope
29. Flue gas thermostat
30. Support rods & end caps
31. Sightglass assembly
32. Gas inlet pressure test point (inside plastic cover, at bottom L.H. side of gas control)

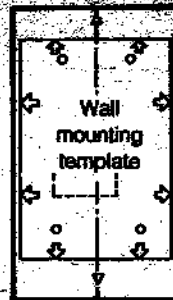


2 UNPACKING The boiler is supplied fully assembled in pack A together with one of 3 packs B, B1 or C- containing the flue terminal appropriate to the wall thickness (up to 406 mm, 16 in.). Extension duct pack D is available for wall thicknesses between 406 mm (16 in.) & 606mm (23 7/8 in.) and must be ordered with pack B. Refer to Frames 4 & 7.

PACK 'A' CONTENTS



Complete Boiler



Wall mounting template

22 x 28 mm. copper adaptors (Turbo 2; 24 only), 2 off



No. 10 x 2 in. lg. screws, 4 off



Wall plugs, 4 off



Plastic tube adaptor



Wall mounting plate



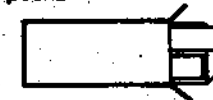
Drain Key

PACK 'B', 'B1' or 'C' CONTENTS

Flue terminal assembly



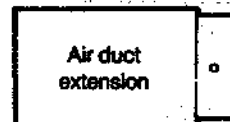
Tube of sealing compound



Wall plug, 1 off

Woodscrew, 1 off

EXTENSION PACK 'D' CONTENTS



Air duct extension

Tube of sealing compound



Flue duct extension

M4 Pozidrive screws, 2 off

Self tapping screws, 3 off

3 BOILER CLEARANCES

The space in which the boiler is to be fitted MUST have the following minimum dimensions:-

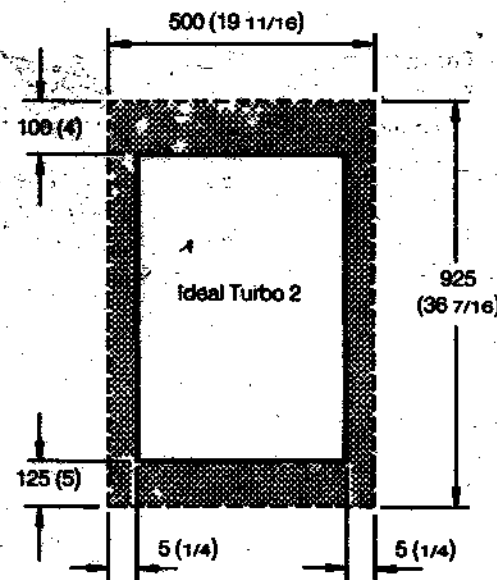
Boiler size	Width	Depth	Height
Turbo 2; 9, 12, 18 & 24	mm (in.)	mm (in.)	mm (in.)
	500 (19 11/16)	325 (13)	925 (36 1/2)

The space includes the following minimum clearances for installation & servicing:-
 At the top of the boiler- 100 mm (4 in.)
 At each side of the boiler (neglecting plastic trims)- 5 mm (1/4 in.)
 Underneath the boiler- 125 mm (5 in.)
 In addition, a minimum clearance of 450 mm (17 3/4 in.) MUST be available in front of the boiler to enable the boiler to be serviced. This clearance must be increased to 600 mm if extension pack D is fitted.

Note: inspect the wall to make sure it is of suitable load bearing capacity.

For installation the side clearances may need to be temporarily increased to allow boiler mounting, or a two-man lift can be used.

All dimensions in mm (in.)



4 WALL THICKNESS

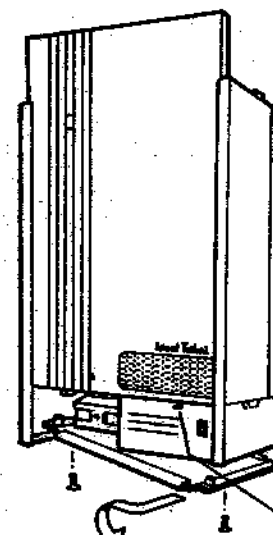
The following table shows the Flue Pack(s) required for the given wall thicknesses.

WALL THICKNESS Dimension 'X', shown in Frame 10	FLUE PACK REQUIRED
114 to 213 (4 1/2 to 8 3/8)	Pack 'C'
213 to 308 (8 3/8 to 12 1/8)	Pack 'B'
308 to 406 (12 1/8 to 16)	Pack 'B1'
406 to 606 (16 to 23 7/8)	Pack 'B' & 'D'

All dimensions in mm (in.)

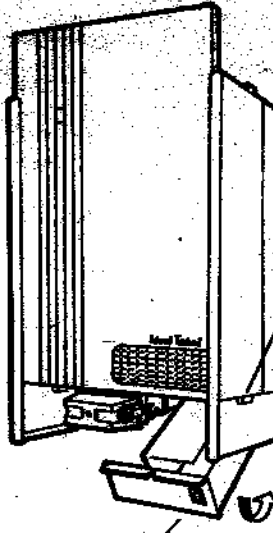
5 BOILER CASING REMOVAL

To install the boiler, then the casing must be removed.



1. Lay the boiler carefully on it's back & unscrew the two upper captive screws.
2. Slide the glass facia upwards and out. Store safely
3. Remove the two screws securing the bottom panel. Slide out the panel by moving it slightly to the left & slipping out the right hand edge.
4. Undo the screw securing the control box.

6 BOILER CASING REMOVAL, Cont.

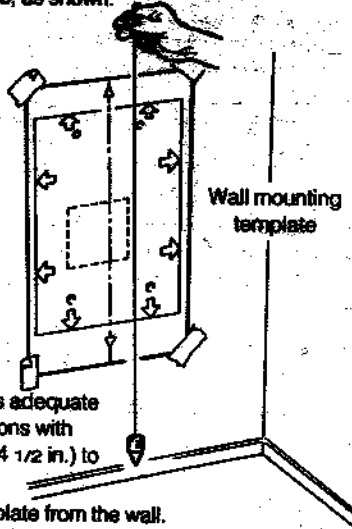


1. Lift the back of the control box slightly & swing it downwards pivoting from the back.
2. Release the two lower captive screws and lift the casing off the boiler.
3. Place the casing safely to one side taking care not to damage the enamel.

See note 1.

8 WALL MOUNTING TEMPLATE

1. Tape the template into the selected position ensuring that the upper 2 screws holes are horizontal. Check the squareness by using a plumbline, as shown.
2. Mark out the positions of the two upper wall mounting screws, the lower fixing screws & the position of the hole for the duct.



IMPORTANT. The hole for the duct is not central. It is off-set to the left.

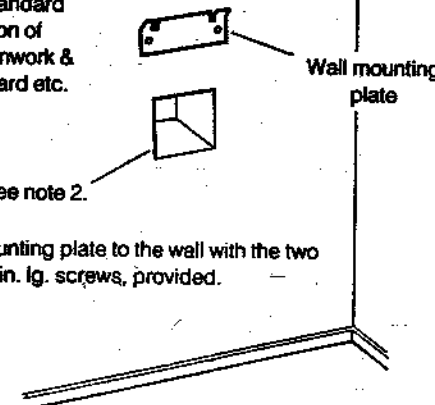
The hole indicated is adequate for all terminal positions with walls from 114 mm (4 1/2 in.) to 606 mm (23 7/8 in.).

3. Remove the template from the wall.

9 PREPARING THE WALL

1. Drill the 4 holes with an 8 mm (5/16 in.) masonry drill and insert the plastic plugs provided.
2. Cut the hole in the wall for insertion of the flue assembly.

Note. The terminal must not come into contact with combustible material, such as that used in the non-standard construction of timber framework & plaster board etc.



See note 2.

3. Fix the mounting plate to the wall with the two No. 10 x 2 in. lg. screws, provided.

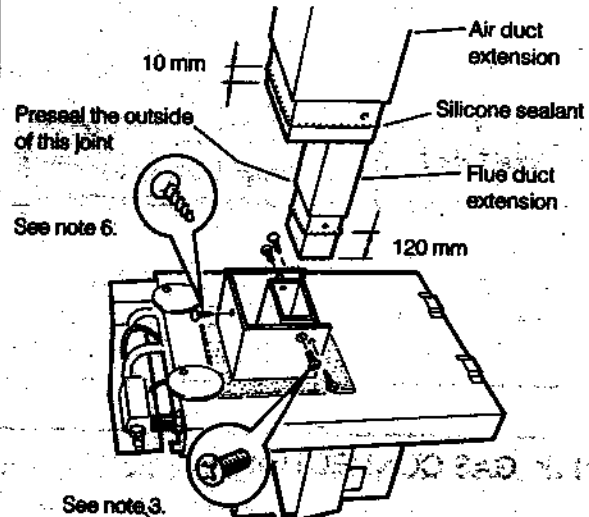
7 FITTING THE EXTENSION DUCTS

If not applicable then refer to Frame 8

If the boiler is to be fitted on a wall with a thickness exceeding 406 mm (16 in.) then extension duct Pack 'D' must be used in conjunction with the terminal Pack 'B', see Frame 4.

The extension flue duct and air duct must be fitted to the boiler flue and air ducts before the boiler is lifted onto the wall.

Lift the control box into position & turn the boiler onto it's front.



See note 6.

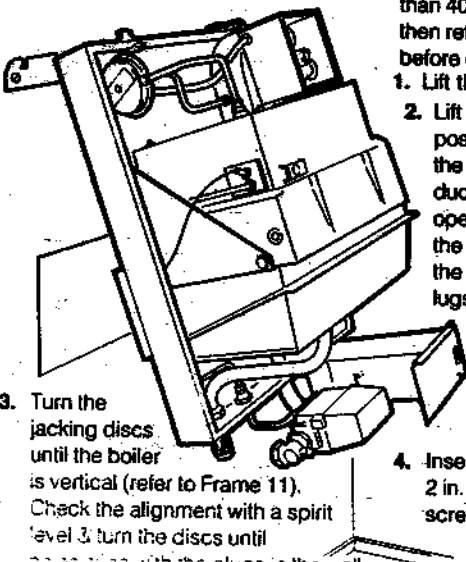
1. Pre-seal the joint of the extension duct with silicone sealant before starting the assembly procedure.
2. Apply a 5 mm thick bead of silicone sealant, supplied, around the outside of the flue- 120 mm from the stepped end.
3. Insert this stepped end into the boiler flue duct & secure with the 2 stainless steel M4 pozidrive screws, provided, through the holes in the sides of the boiler flue duct. Tighten by using a pozidriver through the holes in the boiler air duct sides.
4. Smear the exuded silicone sealant around the joint and around the screw heads to effect a watertight joint.
5. Apply a 5mm bead of silicone sealant around the outside of the air duct extension- 10 mm from the stepped end.
6. Insert this stepped end into the boiler air duct and secure with the 3 self tapping screws, provided, through the holes in the sides and bottom of the boiler air duct.
7. Smear the exuded silicone sealant around the joint & around the screw heads to effect a watertight joint. Use more sealant if necessary.
8. Continue installation as in Frame 8.

See note 3.

10 MOUNTING THE BOILER

Note. If the boiler is to be fitted on a wall with a thickness greater than 406 mm (16 in.) then refer to Frame 7, before continuing.

1. Lift the control box.
2. Lift the boiler into position, entering the projecting air duct into the wall opening. Engage the back plate on the mounting plate lugs.

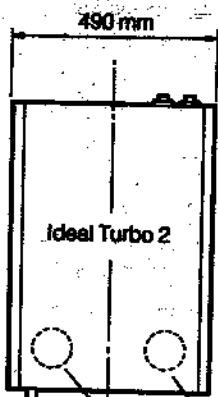


3. Turn the jacking discs until the boiler is vertical (refer to Frame 11). Check the alignment with a spirit level 3 turn the discs until
4. Insert the No. 10 x 2 in. lower fixing screws, provided.

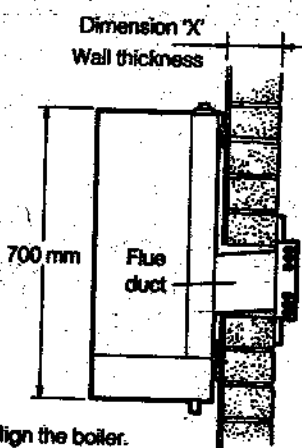
11 ALIGNING THE BOILER

1. It is most important that the boiler is installed in a vertical position.
2. The flue duct should be inclined at 5° to the horizontal. This is achieved when the boiler is vertical.

FRONT VIEW



SIDE VIEW



3. Using the jacking disks to align the boiler.

13 GAS CONNECTION

Refer to Frame 14 for details of the position of the gas connection.

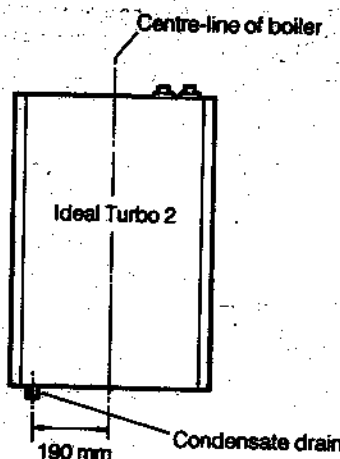
A MINIMUM gas pressure of 20 mb (8 in. w.g.) MUST be available at the boiler inlet with the boiler firing. Refer to Frames 36 or 37 'Servicing' for details of the pressure test point position.

Extend a gas supply pipe NOT LESS THAN 15 mm Ø.D. to the boiler and connect to the gas service cock situated at the bottom left hand side of the boiler. The connection MUST be made from BELOW and from the REAR of the boiler.

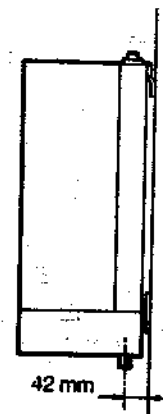
Ensure that the gas supply pipe does not foul the boiler casing when fitted.

12 CONDENSATE DRAIN

FRONT VIEW



SIDE VIEW



The condensate drain, provided on the boiler, MUST be connected to a drainage point- preferably within the building.

The routing of the drain must be made to allow a minimum fall of 1 in 20 away from the boiler, throughout its length.

The drainage pipework must be arranged such that obstruction (e.g. through freezing) of external drainage pipe does not give rise to spillage within the dwelling.

Excessive external pipe runs should be avoided in order to prevent possible freezing.

All pipework and fittings in the condensate drain system must be made of plastic. No other materials may be used.

The drain outlet on the boiler is standard 22 mm overflow pipe. This size must not be reduced in any part of its length.

In order to defer the onset of freezing of the condensate drain when the pipe is run externally then the pipe should be:

- (a) insulated with waterproof insulation,
- (b) terminated below the grille but above the water level in any external drain.

The condensate coupling fitted to the boiler is suitable for 'Barloy'/'Polypipe' tubing. An adaptor is supplied to allow the use of 'Marley'/'Terrain' tubing which is slightly larger. This adaptor should be sealed to the 'Marley'/'Terrain' tubing using a suitable plastic tube adhesive.

Where a suitable existing internal drain is available then the condensate outlet from the boiler may be connected into this drain and thus avoid freezing.

14 WATER CONNECTION

1. Complete the two water connections to the TOP of the boiler. The pump must be on the FLOW and any isolating valves positioned as close to the pump as possible. Refer to Frame 17.
2. Thoroughly flush the system with cold water WITHOUT the pump in position.
3. Ensure that all valves are open.
4. With the pump fitted, fill and vent the system and check for water soundness.

This boiler is NOT suitable for use with a direct hot water cylinder.

IMPORTANT - WATER TREATMENT

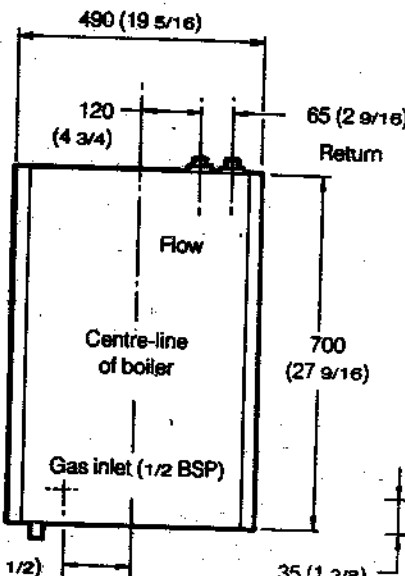
The IDEAL TURBO 2 boiler has an ALUMINIUM alloy heat exchanger and as such, appropriate water treatment MUST be used. Under no circumstances should softened water be used to fill the heating system.

Stelrad recommended only the use of FERNOX-COPAL or GRACE DEARBORN - SENTINEL X100 water treatment products and should be used in accordance with the manufacturers instructions. Further information contact:-

FERNOX MANUFACTURING CO. LTD.
BRITANNICA WORKS,
CLAVERING,
ESSEX CB11 4QZ

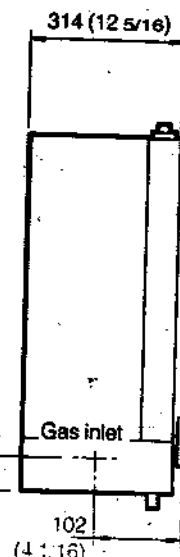
DEARBORN CHEMICALS LTD
127 BROUGHTON,
CHESTER
CH3 5BH

FRONT VIEW



All dimensions in mm (in.)

SIDE VIEW



140 (5 1/2)

35 (1 3/8)

102 (4 1/16)

15 FITTING THE FLUE ASSEMBLY

1. Remove the four screws (I), the two screws (J) and remove the end plate (G). Remove the terminal flue socket (F).
2. Remove the upper central screw (H)
3. Insert the terminal air duct (D) into the boiler air duct (A) or, if fitted, the extension air duct. Line up the terminal air duct such that the upper fixing bracket (E) touches the wall surface and the outlet angle of the grouting brackets (L) are level with the face of the wall. Also ensure that the edges of the air duct are parallel with the face of the wall. With the air duct in the correct position, mark through the top hole of bracket (E) onto the surface of the wall.
4. Withdraw the terminal air duct (D) from the boiler air duct and drill the wall with a 5.5 mm (3/16 in.) drill in the position marked. Insert the wall plug supplied.
5. Apply a 5 mm diameter bead of silicone sealant 10 to 15 mm from the ends of the mating faces of the boiler air duct (A) or, if fitted, the extension air duct and terminal air ducts (D).
6. From outside the building, pass the terminal air duct (D) through the opening and slide it into the boiler air duct (A), with the rain lip (M) at the bottom, until the upper fixing bracket (E) touches the surface of the wall. Fix the position of the terminal air duct, with the screw provided, through the top hole of bracket (E) into the inserted wall plug.

12. Seal the joints between the terminal air duct (D) and the rain lip (M) with silicone sealant to prevent the ingress of water.
13. Apply a 5 mm bead of silicone sealant 5 mm from the end of the outside surface of the protruding end of the flue duct (C).
14. Slide the terminal flue socket (F) onto the flue duct (C) until it contacts the flue fixing bracket (K), ensuring that the socket flange is parallel to the wall.
15. Smear silicone sealant around the sides and bottom of the outside of the joint to ensure a watertight seal.
16. Fasten the terminal end plate (G) to the terminal air duct (D) by screwing the two stainless steel pozidrive screws (J) and the four stainless steel pozidrive screws (I) into the terminal flue socket flange.
17. Finally, seal around the terminal wall plate using a suitable sealant to prevent the ingress of water into the wall cavity.
18. Where the lowest part of the terminal is positioned less than 2 m (6 ft. 6 in.) above a balcony, above the ground or above a flat roof to which people have access then the terminal must be protected by a purpose designed guard.

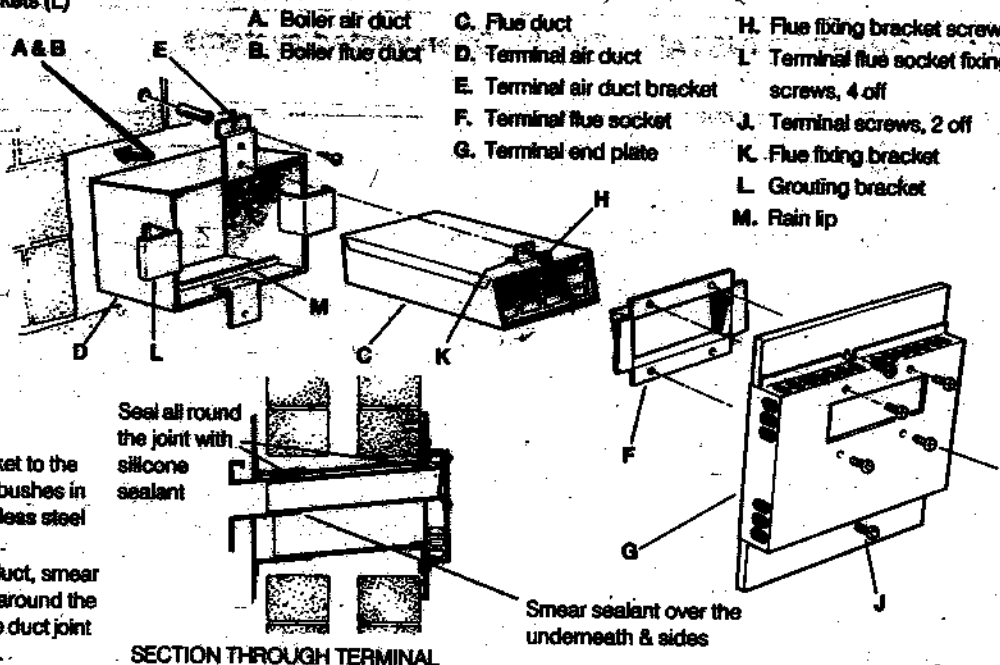
A suitable guard is available from; H. Docherty, The Old Turnery Works, Donnington, Newbury, Berkshire.

This guard must be positioned centrally over the terminal.

7. Grout in the grouting brackets (L)
8. Apply, not greater than 15 mm from the end, two 5 mm diameter beads of silicone to the outside surface of the sliding end of the flue duct (C).
9. Carefully pass the flue duct (C) down the terminal air duct (D) and slide it into the boiler flue duct (B) until the flue fixing bracket (K) contacts the angle bracket at the top of the terminal air duct (E).
10. Attach the flue fixing bracket to the lower of the two threaded bushes in bracket (E) using the stainless steel screw previously removed.
11. From the inside of the air duct, smear silicone sealant, by hand, around the bottom and sides of the flue duct joint to ensure a watertight seal.

LEGEND

- | | | |
|------------------------------|-------------------------|--|
| A. Boiler air duct | C. Flue duct | H. Flue fixing bracket screw |
| B. Boiler flue duct | D. Terminal air duct | L. Terminal flue socket fixing screws, 4 off |
| E. Terminal air duct bracket | F. Terminal flue socket | J. Terminal screws, 2 off |
| G. Terminal end plate | K. Flue fixing bracket | L. Grouting bracket |
| | M. Rain lip | |



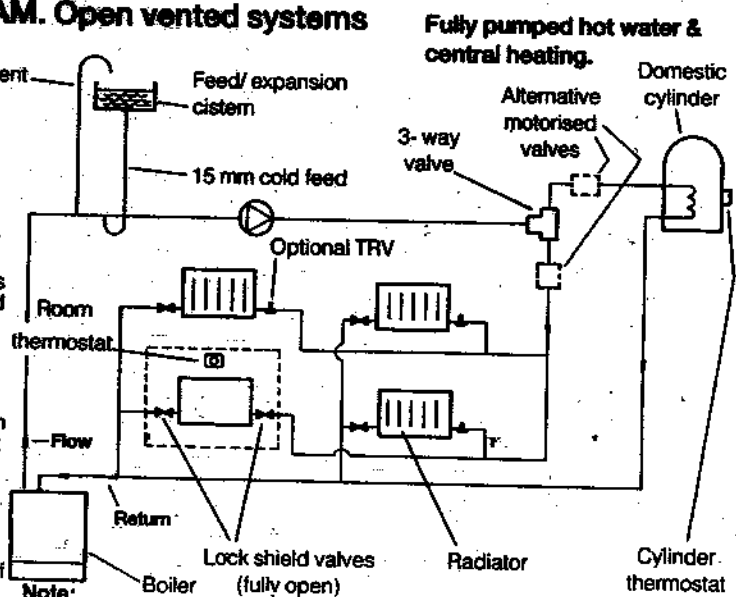
16 SCHEMATIC PIPEWORK DIAGRAM. Open vented systems

SYSTEM REQUIREMENTS

The flow and return pipes for Turbo 2; 24 should be increased to 26mm.
 The flow through the boiler **MUST NOT FALL BELOW** the values given in Table 2.
 In order to guarantee the above, a flow loop **MUST** be available when the heating zone valve is open and all manual radiator valves are closed.
 This may be achieved by fitting lock shield valves, adjusted fully open, to one radiator (Turbo 2; 9 & 12), or two radiators connected in parallel (Turbo 2; 18 & 24). It is recommended that the radiator(s) chosen should be situated in the room containing the room thermostat.

CONTROL SYSTEM

In order to achieve the maximum potential fuel savings from the Ideal Turbo 2 condensing boiler, a control system must be employed that controls the boiler temperature.
 The simplest control recommended is a room thermostat that switches the boiler on and off to maintain the desired room temperature.
 Where required, additional control may be achieved in any other room not containing the room thermostat, by the use of thermostatic radiator valves. As an alternative, weather compensation systems that control the boiler temperature

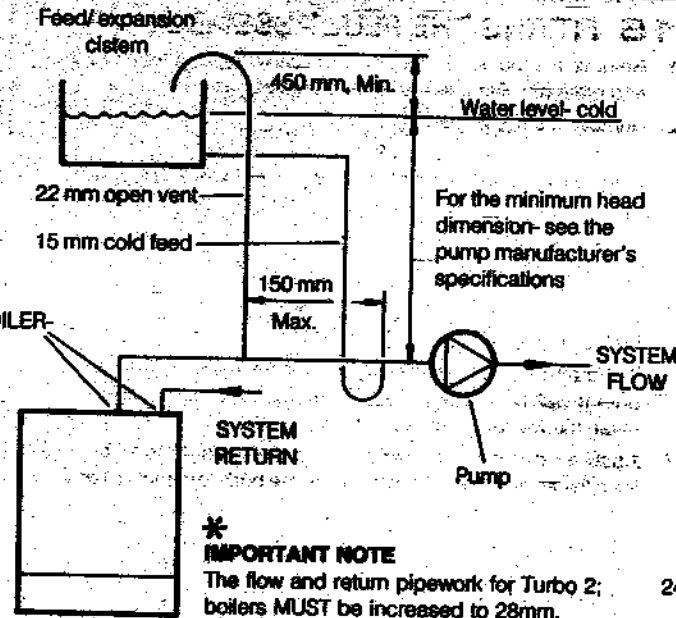


Note:
 Turbo 2; 9 & 12:- 1 radiator required
 Turbo 2; 18 & 24:- 2 radiators, parallel required

17 MINIMUM REQUIREMENTS.

Feed/ expansion cistern height for fully pumped, open vented systems

The system should be vented directly off the boiler FLOW pipe, as close to the boiler as possible. The cold lead entry should be inverted and MUST be positioned between the pump and the vent, not more than 150 mm away from the vent connection.



There should be a minimum height of 450mm of open air vent above the cistern water level. If this not possible then refer to Frame 18.

The pump MUST be fitted on the flow side of the boiler. A suitable pump is a domestic circulator capable of providing an 11°C (20°F) temperature differential, e.g. Grundfos UPS 15/60

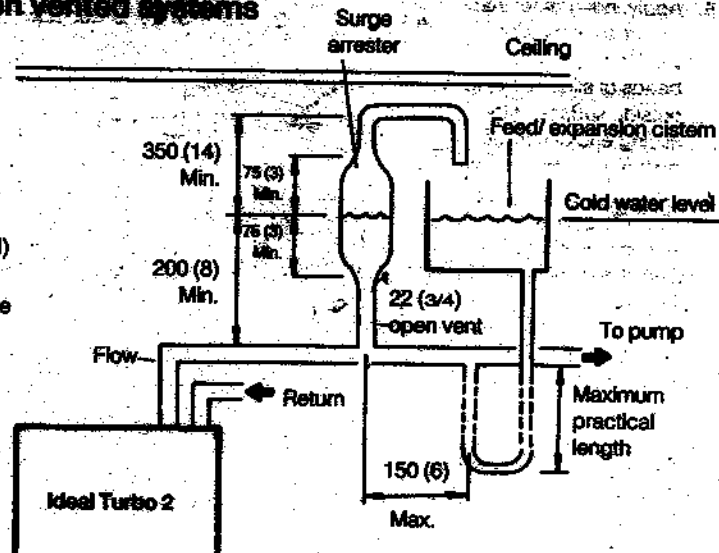
18 LOW HEAD INSTALLATIONS. Open vented systems

The Ideal TURBO 2 range of boilers can be installed in low head situations by fitting a surge arrester in the expansion pipe.

The following conditions MUST be observed:

1. The surge arrester must be at least 42 mm diameter x 150 mm long, thus ensuring a MINIMUM air gap above and MINIMUM depth of water below the static water level (cold) of 75mm.
2. The static water level (cold) must be at least 200 mm above the top of the horizontal flow pipe fitted as shown. The vent connection must NOT be made immediately off the top of the boiler, as venting is made less efficient.
3. The maximum practical length of 15 mm cold feed pipe should be used in order to reduce the effective volume of system water expanding into the feed/ expansion cistern to a minimum.

Note. The pump manufacturers minimum requirements must be complied with.



All dimensions in mm, N.B. Imperial dimensions are approximate.

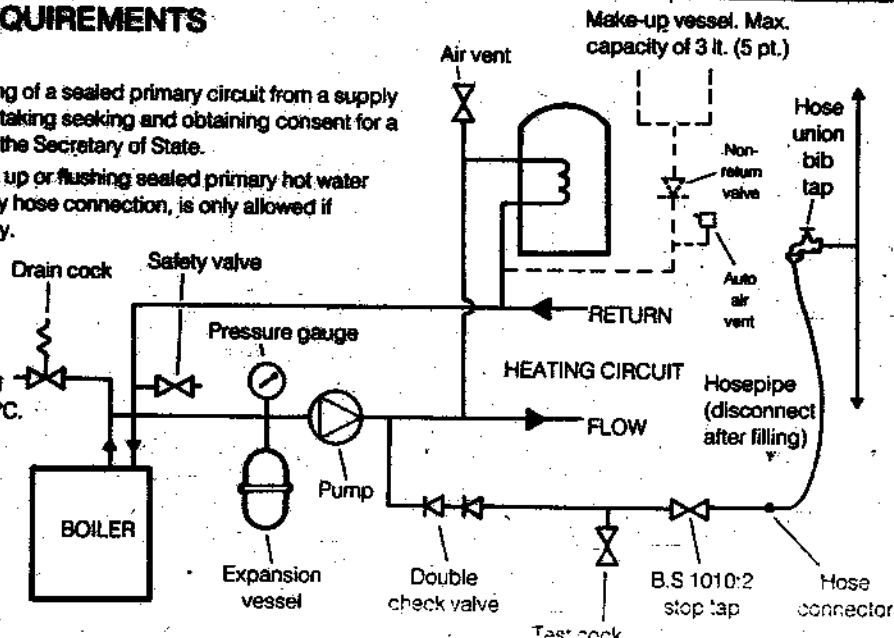
19 SEALED SYSTEM REQUIREMENTS

Notes:

- (1) Any connection for filling or replenishing of a sealed primary circuit from a supply pipe is conditional upon a water undertaking seeking and obtaining consent for a relaxation of it's Byelaws 38.8 (1) from the Secretary of State.
- (2) The method of filling, re-filling, topping up or flushing sealed primary hot water circuits from the mains, via a temporary hose connection, is only allowed if acceptable to the Local Water Authority.

1. General

- (a) The installation must comply with the requirements of BS. 6798 & BS. 5449.1.
- (b) The installation should be designed to work with flow temps. of up to 82°C.
- (c) All components of the system, including the heat exchanger of the indirect cylinder, must be suitable for a working pressure of 3 bar (45 lb./in.²) & a temperature of 110°C. Care should be taken in making all connections so that the risk of leakage is minimised.



BO SEALED SYSTEM REQUIREMENTS

2. Safety Valve

A spring loaded safety valve complying with the relevant requirements of BS 759 must be fitted in the flow pipe, as close to the boiler as possible, and with no intervening valve or restriction. The valve should have the following features:

- (a) A non adjustable pre-set lift pressure not exceeding 3 bar (45 lb./in.²).
- (b) A manual testing device.
- (c) Provision for connection of a discharge pipe. The valve or discharge pipe should be positioned such that discharge of water or steam cannot create a hazard to the occupants of the premises, or cause damage to electrical components & wiring.

3. Pressure Gauge

A pressure gauge covering at least the range 0-4 bar (0-60 lb./in.²) must be fitted to the system. The gauge should be easily seen from the fitting point and should preferably be connected at the same point as the the expansion vessel.

4. Expansion Vessel

- (a) A diaphragm type expansion vessel must be connected at a point close to the inlet of the pump, the connecting pipe being not less than 15 mm (1/2 in. nominal) size, & not incorporating valves of any sort (see Frame 19 for system layout).
- (b) The vessel capacity must be adequate to accept the expansion of system water when heated to 110° C (230° F).
- (c) The charge pressure must not be less than the static water head above the vessel. The pressure attained in the system, when heated to 110° C (230° C), should be at least 0.35 bar (5 lb./in.²) less than the lift pressure of the safety valve. For guidance on vessel sizing, refer to the table below. For further details, refer to BS 5449:1 and British Gas Corporation publication 'Material and Installation Specifications for Domestic Central Heating and Hot Water'.

5. Cylinder

The cylinder must be either of the indirect coil type or a direct cylinder, fitted with an immersion calorifier which is suitable for operating at a gauge pressure of 0.35 bar (5 lb./in.²) in excess of the safety valve setting. Single feed indirect cylinders are not suitable.

6. Make-up Water

Provision must be made for replacing water loss from the system;

- (a) From a manually filled make-up vessel with a readily visible water level. The vessel should be mounted at least 150 mm (6 in.) above the highest point of the system & connected through a non-return valve to the system- fitted at least 300 mm (12 in.) below the make-up vessel, on the return side of the domestic hot water cylinders or radiators.
- (b) Where access to a make-up vessel would be difficult by pre-pressurisation of the system (refer to note '8. Filling').

7. Mains connection

There must be no direct connection to the mains water supply or to the water storage tank supplying domestic water, even through a non-return valve, without the approval of the local Water Authority.

8. Filling

The system may be filled by one of the following methods:

- (a) Through a cistern, used for no other purpose, via a ball valve permanently connected directly to a service pipe and/ or a cold water distributing pipe. The static head available from the cistern should be adequate to provide the desired initial system design pressure. The cold feed pipe from the cistern should include a non-return valve and a stop valve with an automatic air vent connected between them- the stop valve being located between the system and automatic air vent. The stop valve may remain open during normal operation of the system if automatic water 'make-up' is required.
- (b) Through a self-contained unit comprising a cistern, pressure booster pump if required &, if necessary, an automatic pressure reducing valve & flow restrictor. The cistern should be supplied through a temporary connection from a service pipe or cold water distributing pipe. This unit may remain permanently connected to the heating system to provide limited automatic water 'make up'. Where the temporary connection is supplied from a service pipe or distributing pipe, which also supplies other 'draw off' points at a lower level, then a double check valve shall be installed up-stream of the 'draw off' point.
- (c) Through a temporary hose connection from a 'draw off' tap, supplied from a service pipe under mains pressure. Where the mains pressure is excessive then a pressure reducing valve shall be used to facilitate fitting.

The following fittings shall form a permanent part of the system and shall be fitted in the order stated.

A stop valve complying with the requirements of BS.1010 part 2 (hose from 'draw off' tap shall be connected to this fitting).

A test cock.

A double check valve of an approved type.

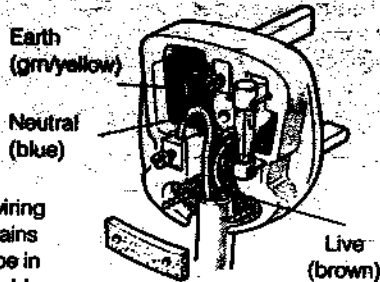
1. Thoroughly flush out the whole of the system with cold water without the pump in position.
2. With the pump fitted, fill and vent the system until the pressure gauge registers 1.5 bar (21.5 lb./in.²) and examine for leaks.
3. Check the operation of the safety valve by manually raising the water pressure until the valve lifts. This should occur within ± 0.3 bar (± 4.3 lb./in.²) of the pre-set lift pressure.
4. Release water from the system until the initial system design pressure is reached.
5. Light the boiler and heat the system to the maximum working temperature. Examine for leaks.
6. Turn off the boiler and drain the system while still hot.
7. Refill & vent system. Adjust initial pressure to required value.

Sizing procedure for expansion vessel:- The volume of the expansion vessel (litres) fitted to a sealed system shall not be less than that given by the table below multiplied by a factor of 0.8 (for flow temperatures of less than 88°C).

Safety valve setting	bar 3.0			bar 2.5			bar 2.0		
	bar 0.5	bar 1.0	bar 1.5	bar 0.5	bar 1.0	bar 1.5	bar 0.5	bar 1.0	
Total water content of system	Vessel volume								
L	L	L	L	L	L	L	L	L	
25	2.1	2.7	3.9	2.3	3.3	5.9	2.8	5.0	
50	4.2	5.4	7.8	4.7	6.7	11.8	5.6	10.0	
75	6.3	8.2	11.7	7.0	10.0	17.7	8.4	15.0	
100	8.3	10.9	15.6	9.4	13.4	23.7	11.3	20.0	
125	10.4	13.6	19.5	11.7	16.7	29.6	14.1	25.0	
150	12.5	16.3	23.4	14.1	20.1	35.5	16.9	30.0	
175	14.6	19.1	27.3	16.4	23.4	41.4	19.7	35.0	
200	16.7	21.8	31.2	18.8	26.8	47.4	22.6	40.0	
225	18.7	24.5	35.1	21.1	30.1	53.3	25.4	45.0	
250	20.8	27.2	39.0	23.5	33.5	59.2	28.2	50.0	
275	22.9	30.0	42.9	25.8	36.8	65.1	31.0	55.0	
300	25.0	32.7	46.8	28.2	40.2	71.1	33.9	60.0	
Multiplying factors for other system volumes	0.0833	0.109	0.156	0.094	0.134	0.237	0.113	0.2	

21 ELECTRICAL CONNECTIONS

WARNING: The appliance **MUST** be efficiently earthed.
A mains supply of 240 V ~ 50 Hz is required.



All external controls & wiring **MUST** be suitable for mains voltage. Wiring should be in 3-core PVC insulating cable, **NOT LESS** than 0.75 mm² (24 x 0.2 mm) to BS.6500 table 15 or 16. Wiring external to the boiler **MUST** be in accordance with current I.E.E. Wiring Regulations & Local Regulations.

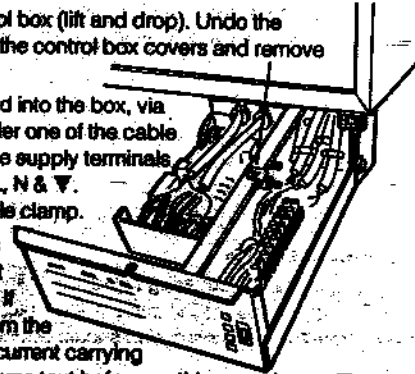
The supply connection may be made via a removable plug to an unswitched shuttered outlet &, should such a plug be used for connection to the mains, it **MUST** be of 3-pin type-wired as shown, fused at 3A & comply with the requirements of BS.1363. Alternatively, a fused double-pole switch, having a 3mm contact separation in both poles, servicing only the boiler & system controls may be used.

The point of connection to the mains should be readily accessible & adjacent to the boiler, except for bathroom installations where the point of connection to the mains **MUST** be outside of the bathroom.

22 INTERNAL WIRING & CONTROLS

Flow & pictorial wiring diagrams are shown in Frames 24 & 26. A schematic diagram is included in the Lighting Instruction Plate. If the optional programmer is to be fitted, refer to 'Programmer Installation Instructions' supplied with the programmer kit.

1. Lower the control box (lift and drop). Undo the screw securing the control box covers and remove the covers.
2. Route mains lead into the box, via hole at rear, under one of the cable clamps & into the supply terminals & stud marked L, N & ∇ . Secure with cable clamp.



- Note. The mains connection must be made so that if the lead slips from the anchorage, the current carrying conductors become taut before earthing conductor. The wiring should be 3-core PVC insulated cable not less than 0.75 mm² (24 x 0.2 mm) to BS 6500, table 15 or 16.
3. Route the pump lead into the box, via hole at rear, under a 2nd. cable clamp & into the terminals marked Lp, Np & ∇ (do not use the earth terminals being used for the mains Earth).
 4. Refit control box covers, being careful not to trap the wires.
 5. Lift and relocate the control box.

23 EXTERNAL WIRING & CONTROLS

External wiring **MUST** be in accordance with the current I.E.E. Wiring Regulations. The wiring diagrams shown in Frames 27 & 28 cover the systems most likely to be used with this appliance.

For wiring external controls to the Ideal Turbo 2 boiler, reference should be made to the system wiring diagram supplied by the relevant Manufacturer, in conjunction with the wiring diagrams shown in Frames 24, 25 & 26.

Difficulty in wiring should not arise, providing the following directions are observed:

1. Controls that switch the system ON & OFF, e.g. a time switch

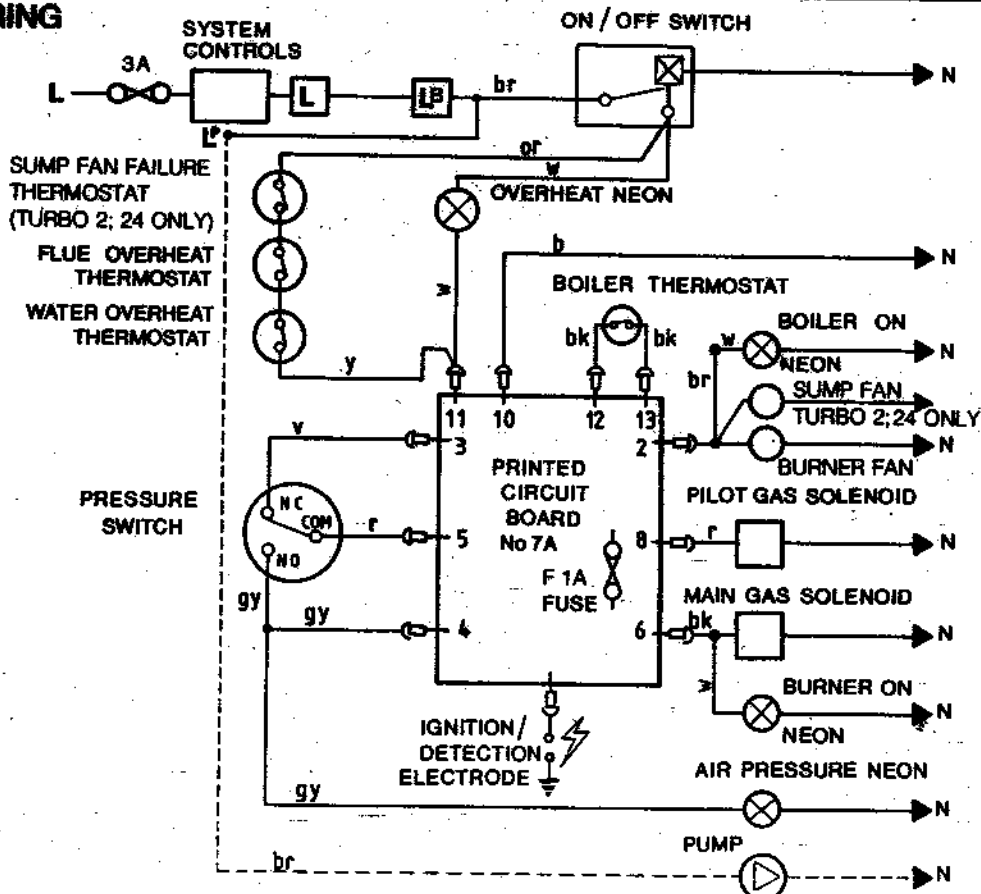
MUST be wired, in series, in the live mains lead to the boiler.

2. Controls that over-ride the system ON & OFF, e.g. a frost thermostat, **MUST** be wired into the mains lead, in parallel, with the control(s) to be over-riden. Refer to frame 29.
3. If a proprietary system is used, follow the instructions supplied by the Manufacturer.
4. *System designs featuring controls or wiring arrangements which allow the boiler to fire when there is no pumped circulation taking place must not be fitted.*

Note: If there are no external controls, the circulation pump **MUST** also be wired into the control box.

24 FLOW WIRING DIAGRAM

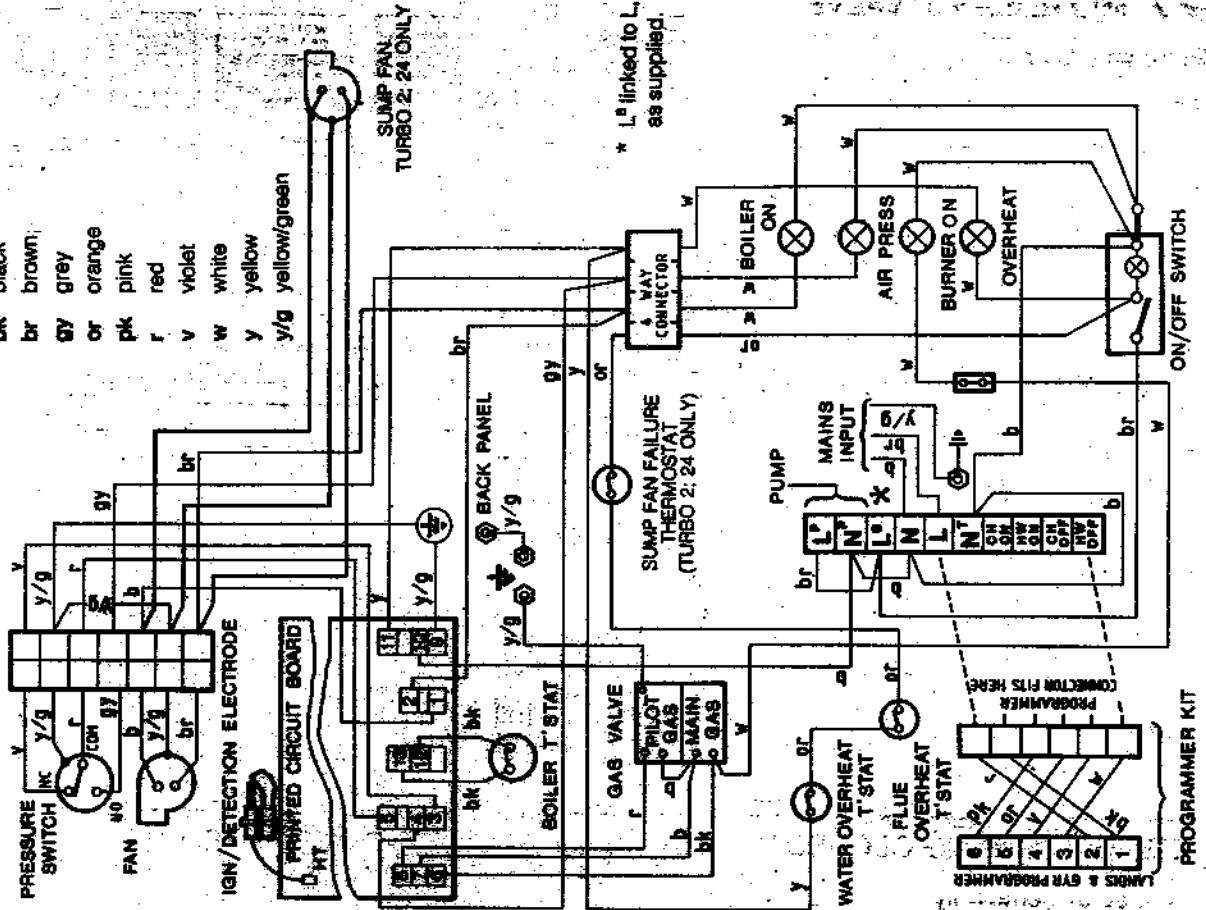
- LEGEND**
- b blue
 - bk black
 - br brown
 - gy grey
 - or orange
 - pk pink
 - r red
 - v violet
 - w white
 - y yellow
 - y/g yellow/green



26 SCHEMATIC WIRING DIAGRAM

LEGEND

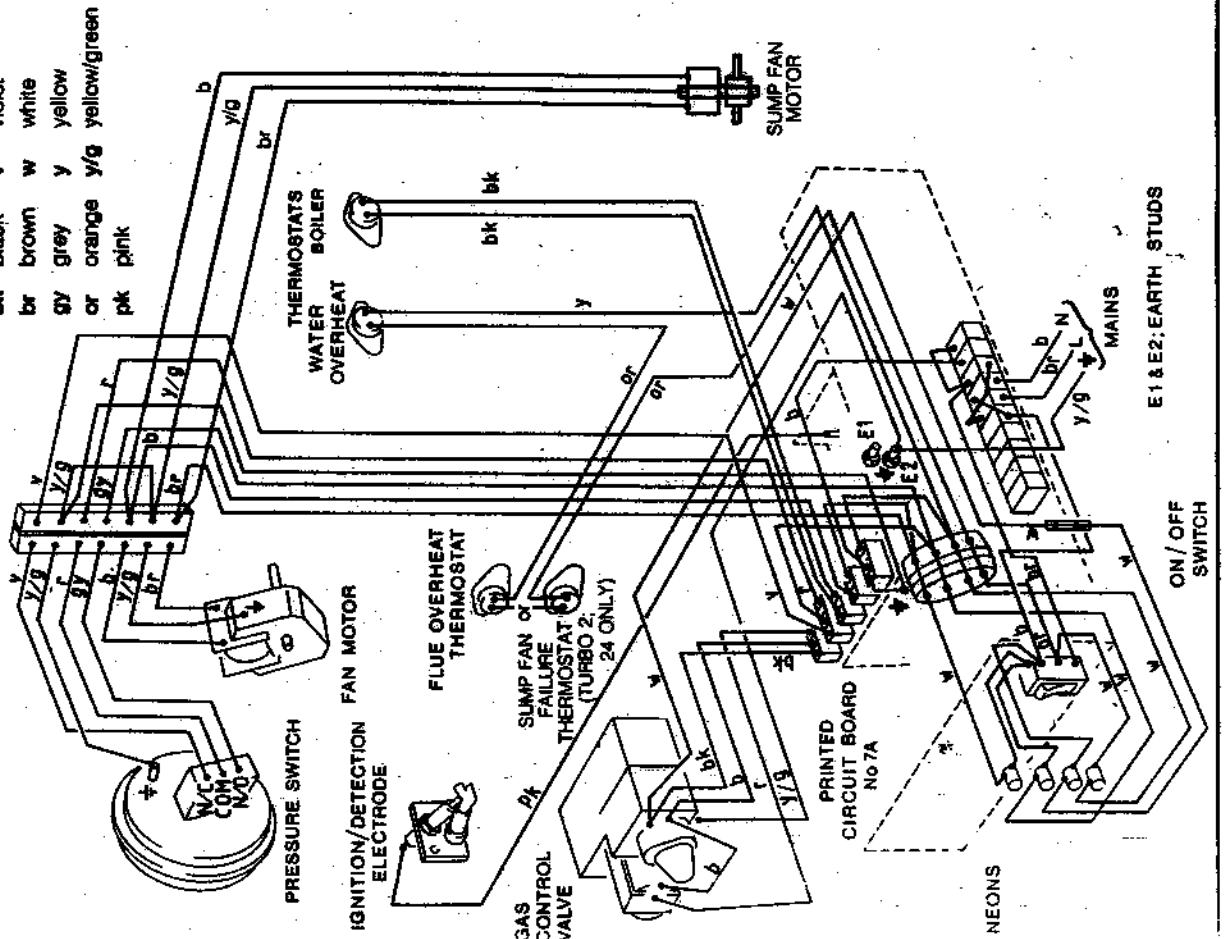
- b blue
- bk black
- br brown
- gy grey
- or orange
- pk pink
- r red
- v violet
- w white
- y yellow
- y/g yellow/green



25 PICTORIAL WIRING DIAGRAM

LEGEND

- b blue
- bk black
- br brown
- gy grey
- or orange
- pk pink
- r red
- v violet
- w white
- y yellow
- y/g yellow/green



30 COMMISSIONING & TESTING

(a) Electrical Installation

1. Checks to ensure electrical safety should be carried out by a competent person.
2. ALWAYS carry out the preliminary electrical system checks as detailed in the Instructions for the British Gas Multimeter, or similar test meter.

(b) Gas Installation

1. The whole of the gas installation, including the meter, should be inspected and tested for soundness, and purged in accordance with the recommendations of B.S. 6891: 1988.
2. Purging air from the gas installation may be expedited by loosening the union on the gas service cock, opening the cock (slot horizontal) and purging until gas is smelled.
3. Retighten the union and check for gas soundness.

WARNING: Whilst effecting the required gas soundness test and purging air from the gas installation, open all windows and doors, extinguish all naked lights and DO NOT SMOKE.

31 INITIAL LIGHTING

1. Check that all system drain cocks are CLOSED and that any valves in the flow and return pipes are OPEN and that they system is full of water.
2. Ensure the gas cock (C) is turned ON (slot horizontal).
3. Lower the control box. Loosen the screw in the burner test nipple (A), on the gas valve and connect gas pressure gauge via a flexible tube.
4. Check that all external controls are calling for heat.
5. Switch ON the electricity supply to the boiler & switch ON the ON/OFF switch (D).

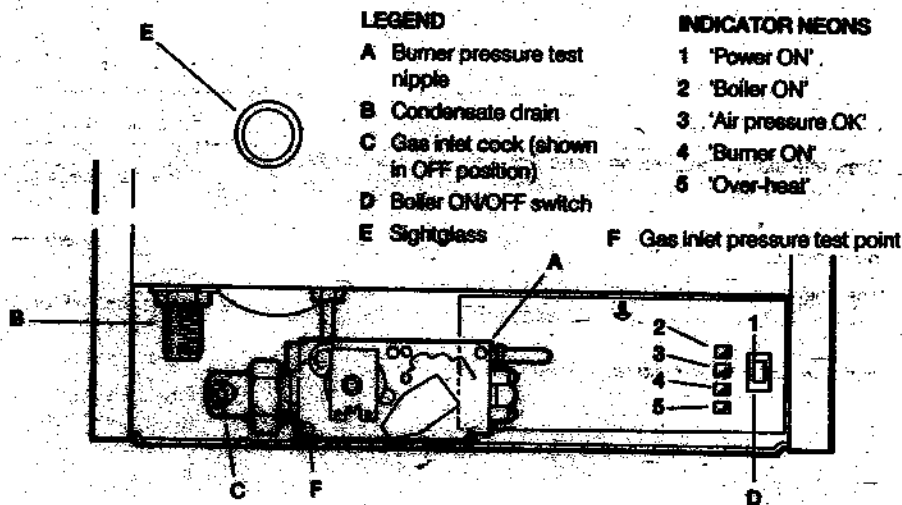
The 'Boiler On' (2) neon will light and the fan(s) will start.

After a delay of several seconds the 'Air Pressure OK' (3) neon will light.

The ignition spark will commence & when the gas line has purged, the pilot will ignite & be detected by the flame monitoring system. The main burner will then ignite & the 'Burner on' (4) neon will light.

6. When the main burner has ignited, check the burner pressure. It must be as stated in Table 2 (pg. 2) & on the Data Badge, (the Data badge is located at the lower end of the back panel).

The burner pressure is preset at the factory and should not require adjustment. The pilot adjuster is set at 'fully open'.



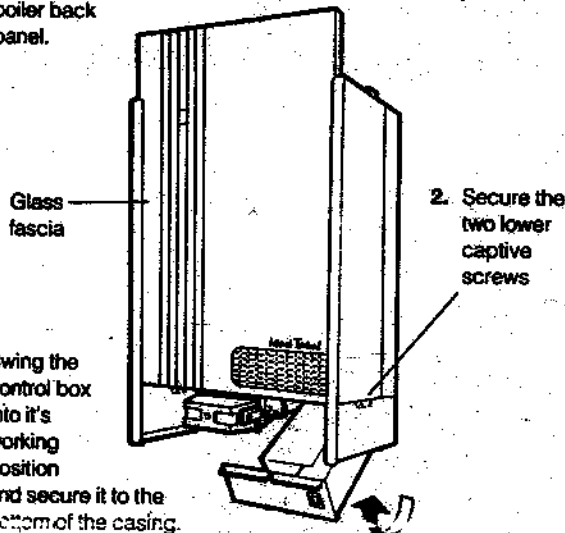
VIEW OF BOILER CONTROLS (Glass fascia removed)

7. Turn the boiler OFF.
8. Remove the pressure gauge and tube. Tighten the test nipple sealing screw (A).
9. Turn the boiler ON and check for gas soundness.
10. Locate the glass fascia into the outer casing, as far as the locating catches.
11. Refit the outer casing. Refer to Frame 32.
12. Turn ON the boiler and check for satisfactory operation.

32 FITTING THE CASING

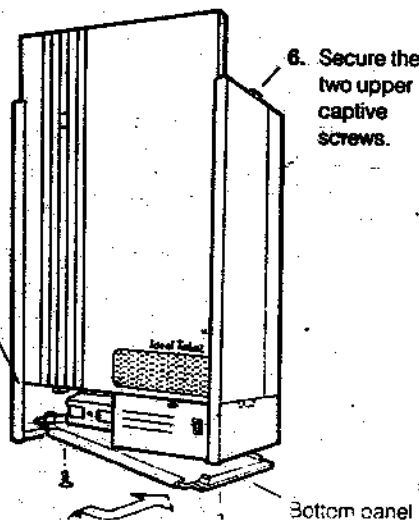
Replace the glass fascia, removed in frame 5, onto the boiler casing.

1. Lift the boiler casing up to the boiler assembly, locating the casing rear top edge onto the retaining lip at the top of the boiler back panel.



4. Replace the bottom panel & fit the two securing screws.

5. Release the glass support catch by lifting the glass slightly and pulling the release catch forwards. Lower the glass.



33 GENERAL CHECKS

Make the following checks for correct operation:

1. The correct operation of the programmer, if fitted, and all other system controls should be proved.
2. With the system HOT, examine all water connections for soundness.
Turn OFF the gas, electricity and water supplies to the appliance and drain down whilst the system is still hot, in order to complete the flushing process.
3. Finally, set the controls to the User's requirements.
The control thermostat operates at a flow temperature of 82 ° C (180 ° F)
4. Set the pump to the required setting (refer to Table 2).
5. After running the boiler for one hour, check the flue duct seals for condensate leakage
Remove the boiler casing and internally inspect the seals by looking underneath the boiler sump into the air duct (see frame 15) for evidence of condensate leakage. If leakage is evident, the seals MUST be remade. Refer to the section headed 'Fitting the Flue Assembly', Frame 15.

34 HANDING OVER

After completing the installation and commissioning of the system then the installer should hand over to the Householder by the following actions:

1. Hand the User's Instructions to the Householder and explain his or her responsibilities under the Gas safety (Installation and Use) Regulations 1984.
2. Draw attention to the Lighting Instruction Label affixed behind the window when the glass fascia is in the up position.
3. Explain and demonstrate the lighting and shutting down procedures.
4. The operation of the boiler and the use or adjustment of ALL system controls should be fully explained to the Householder in order to ensure the greatest possible fuel economy, consistent with household requirements of both heating and hot water consumption.
Advise the user of the precautions necessary to prevent damage to the system, and to the building, in the event of the system remaining inoperative during frosty conditions.
5. Explain the function of the boiler thermostat and the use of any external controls.
6. Explain the function of the boiler overheat thermostat. Emphasise that if cut out occurs, it is likely that there is a fault in the system and that the boiler should be turned OFF and the Local Service Engineer consulted.
7. Explain and demonstrate the function of time/ temperature controls, radiator valves, etc. for the economic use of the system.
8. If an optional Programmer Kit is fitted, then draw attention to the Programmer Kit User's instructions and hand them to the Householder.
9. Stress the importance of regular servicing by the local Gas Region or by a qualified Heating Engineer and that a comprehensive service should be carried out at LEAST ONCE A YEAR.

1 SCHEDULE

To ensure continued efficient operation of the appliance, it is necessary to carry out servicing and cleaning at regular intervals. The frequency of cleaning will depend on the particular installation conditions and usage but generally once per year will be quite adequate.

1. Carry out a pre-service check. Note any operational faults and **NOTE THE POSSIBLE REQUIREMENT OF ANY NEW GASKETS DURING SERVICE.**
2. Clean the burner box.
3. Clean the heat exchanger.
4. Check the main and pilot injectors for blockage.
5. Check the condition of the spark/sensing probe.
6. Check that the flue terminal is unobstructed and that the flue system is clear.
7. Check that there are no leaks from the condensate sump and that the condensate drain is unobstructed.
8. If the appliance has been installed in a compartment, check that the ventilation areas are clear.
9. Clean the inside of the glass fascia.

All of the service points are covered more fully in Frames 2 to 10 & must be carried out in sequence.

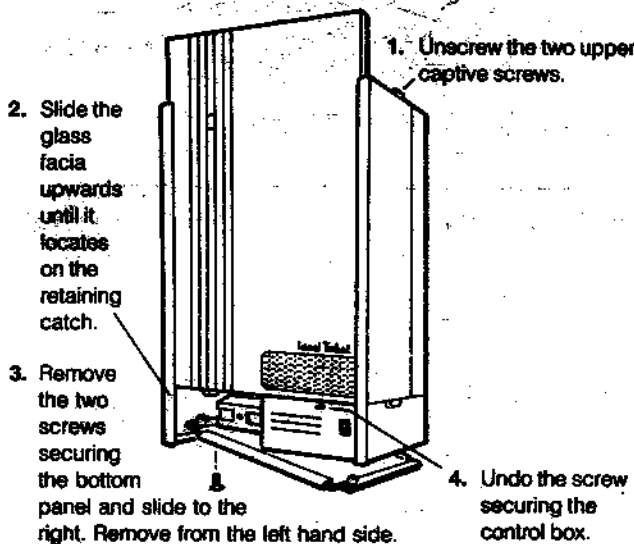
WARNING. Always turn OFF the gas supply at the gas service cock and switch off and disconnect the electricity supply to the appliance **BEFORE SERVICING.**

IMPORTANT. After completing servicing or exchange of components then always carry out functional checks and test for gas soundness where appropriate.

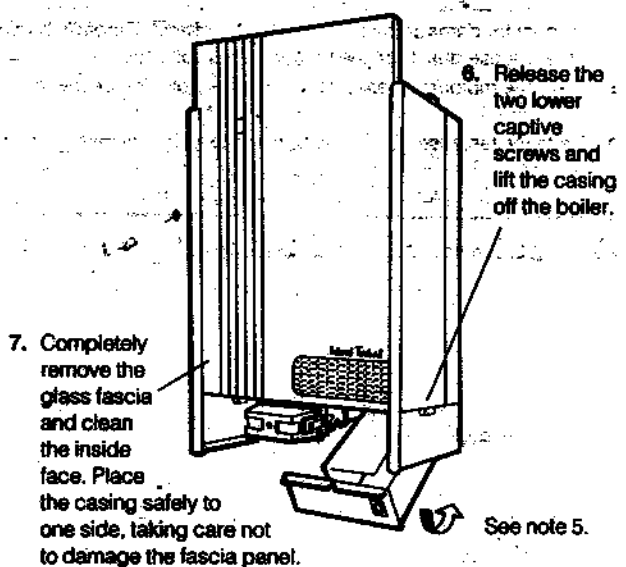
In order to carry out either servicing or replacement of components, the boiler casing must be removed. Refer to Frame 2. **THE CASING MUST BE REPLACED WHEN WORK IS COMPLETE.**

2 BOILER CASING REMOVAL

To enable Servicing the boiler casing must be removed. **ISOLATE THE BOILER FROM THE MAINS SUPPLY**

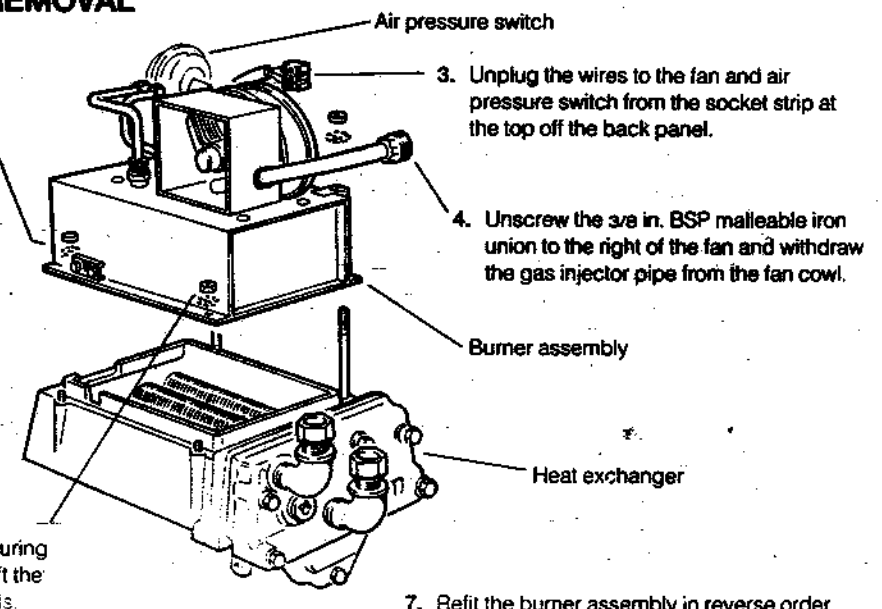


5. Lift the back of the control box slightly and swing it downwards, pivoting from the back.



3 BURNER ASSEMBLY REMOVAL

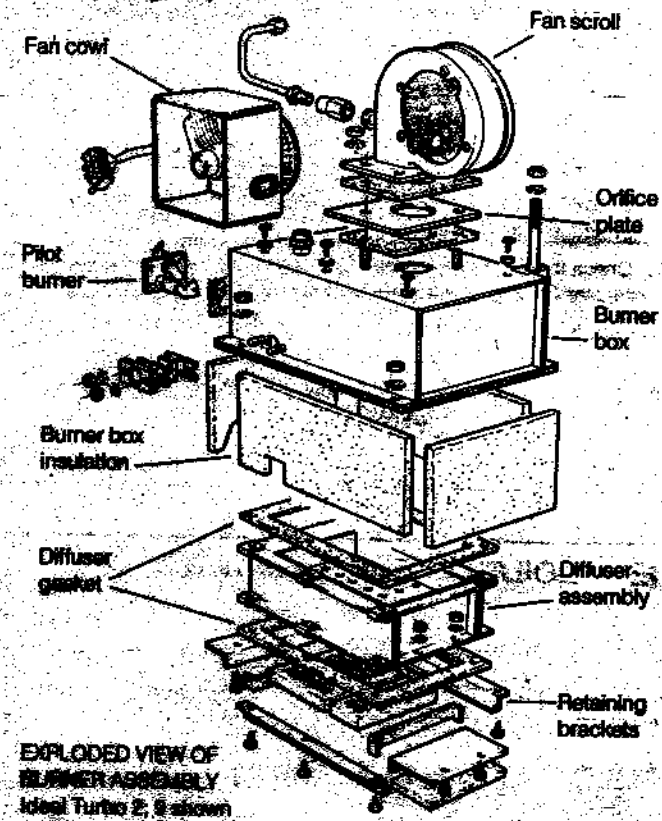
1. Disconnect the pilot union from the pilot assembly (see Frame 21 'Replacement of Parts'), to the left of the burner assembly, taking care not to damage the electrode.
2. Pull off the ignition/sensing lead from the spark electrode.
3. Unplug the wires to the fan and air pressure switch from the socket strip at the top off the back panel.
4. Unscrew the 3/8 in. BSP malleable iron union to the right of the fan and withdraw the gas injector pipe from the fan cowl.
5. Unscrew, at both ends, the unions joining the air pressure switch at the top left of appliance to the fan and burner box. Withdraw the pipes (see Frame 15 'Replacement of Parts').
6. Remove the four M6 nuts and washers securing the burner assembly to the exchanger. Lift the burner assembly from the coating studs.
7. Refit the burner assembly in reverse order.



4 CLEANING THE BURNER AND FAN ASSEMBLY, Ideal Turbo 2; 9 & 12 only

1. Remove the burner assembly to a convenient working surface.
2. Remove the two M4 nuts & washers securing the pilot burner to L.H. side of the burner box. Withdraw the pilot burner/electrode, taking care not to lose the pilot injector. Remove the sealing gasket. Refer to Frame 10 for cleaning pilot burner/ electrode.
3. Remove the two M5 nuts & washers securing the fan assembly to the burner box. Remove fan & orifice plate to a safe place. With the burner plaques uppermost- remove the 3 pozi self tapping screws & washers securing each plaque retaining bracket to the diffuser assembly. Remove the brackets.
4. Gently lift out the plaques & inspect them for cracks or blocked ports. If cracks are found, the plaque(s) should be renewed, (Frame 23 'Replacement of Parts'). If the plaques are in good order, brush off both faces of the plaques with a soft brush & blow out any deposits. Inspect the rest of the diffuser & burner assembly. Remove lint or dust with a soft brush.
5. Inspect the burner box insulation, and renew if burnt or damaged (see Frame 30 'Replacement of Parts').
6. Refit the plaques to the diffuser assembly using the six screws and washers. Renew any damaged gaskets, ensuring that the smooth side of the tile is in view when fitted.
7. Inspect the fan assembly for excess corrosion, over-heating or distortion. If any defects are apparent then renew the fan assembly. Refer to Frame 11 'Replacement of Parts'.
8. If fan assembly appears in good condition, slacken the three screws and washers securing the motor/rotor assembly to the fan scroll. Rotate the fan cowl to release it from the keyhole slots and carefully withdraw the fan motor/rotor from the scroll. Inspect for damage by gently rotating by hand. Carefully brush off any loose dust from the blades with a soft brush.
9. Re-fit the motor/rotor assembly into fan scroll. Ensure that the shakeproof washers are retained between screw head & cowl.
10. Re-fit the fan assembly to the burner box using the two M4 nuts & washers. Renew any damaged gaskets & make sure that the correct orifice plate is fitted, (fitting uppermost & to the left).

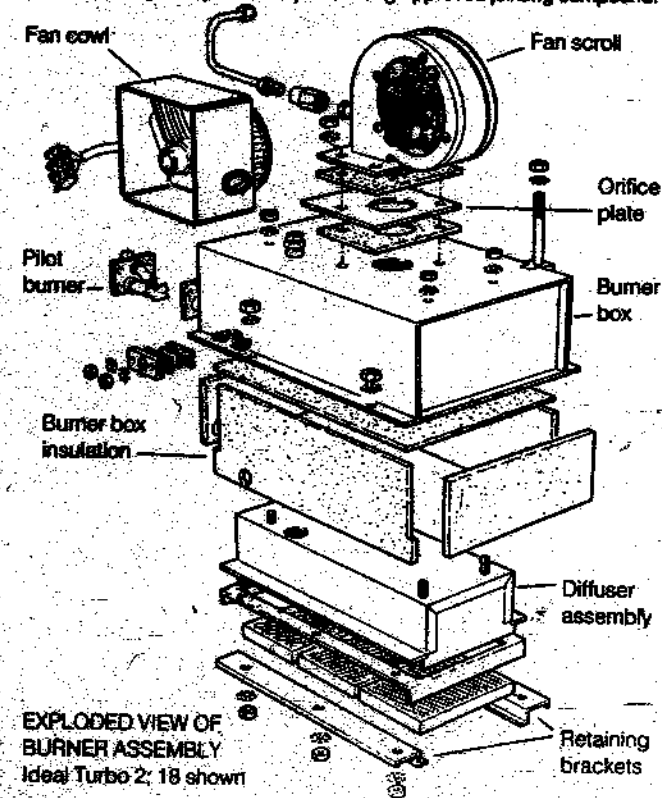
11. Refit the pilot burner using the two M4 nuts & washers. Ensure that the pilot injector is in position. Renew gasket if damaged.
12. Check the main gas injector and the burner gas pipe for blockage or damage. Replace if required, using an approved jointing compound.



5 CLEANING THE BURNER AND FAN ASSEMBLY, Ideal Turbo 2; 18 and 24

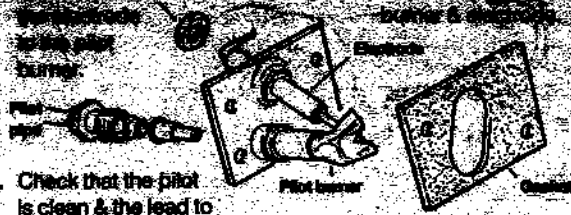
1. Remove the burner assembly to a convenient working surface.
2. Remove the two M4 nuts & washers securing the pilot burner to L.H. side of the burner box. Withdraw pilot burner/ electrode, taking care not to lose the pilot injector, & remove the sealing gasket. See Frame 6 for cleaning the pilot burner/ electrode.
3. Remove the two M5 nuts & washers securing the fan assembly to the burner box. Remove fan & orifice plate to a safe place.
4. With the burner plaques gently supported from below, carefully remove the 4 remaining M5 nuts & washers on the top of the burner box. Lift burner box away from diffuser/plaque assy.
5. With the burner plaques uppermost, remove the three M4 nuts & washers securing each plaque retaining bracket to the diffuser assembly. Remove the brackets.
6. Carefully lift out the plaques & inspect for cracks or blocked ports. If cracks are found, the plaque(s) should be renewed. If the plaques are in good order, brush both faces with a soft brush & blow out any deposits. Inspect the rest of the diffuser & burner assembly- remove any lint or dust with a soft brush. Inspect the burner box insulation & renew if burnt or damaged, refer to Frame 31. Also check the diffuser assembly gasket.
7. Refit the plaques (smooth side in view when correctly fitted) to the diffuser assembly using the six M4 nuts & washers. Renew any damaged gaskets.
8. Refit the diffuser/ plaque assembly to the box using the 4 outer M5 nuts & washers. Take care not to damage the burner box side insulation or top insulation.
9. Inspect the fan assembly for any excess corrosion, over-heating or distortion. If any defects are apparent then renew the assembly, refer to Frame 11 'Replacement of Parts'.
10. If the fan assembly is in good condition, slacken the 3 screws securing fan cowl to scroll. Rotate the fan cowl to release it from the keyhole slots, & carefully withdraw the fan rotor/motor assembly from the scroll. Inspect for damage by rotating by hand. Brush off nt loose dust from the blades with a soft brush.
11. Re-fit the motor/rotor assembly into the fan scroll. Ensure shake proof washers are retained between the screw head & cowl.

12. Refit the fan assembly to the burner box using the two M5 nuts & washers. Renew any damaged gaskets & ensure that the orifice plate is fitted with the lettering uppermost & to the left.
13. Refit the clean pilot burner/ electrode using the M4 nuts & washers. Renew the gaskets if damaged and ensure that the pilot orifice is in position.
14. Check the gas injector in the burner gas pipe for blockage or damage. Replace if required using approved jointing compound.



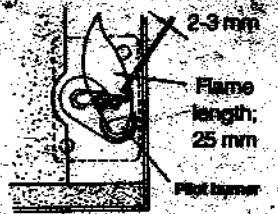
8 CLEANING PILOT BURNER/ELECTRODE

1. Remove the 14 mm nut securing the electrode to the pilot burner.
2. Inspect & clean pilot burner & electrode.



3. Check that the pilot is clean & the lead to the electrode is in good condition.
4. Check the condition of electrode. Renew if the ceramic is cracked.

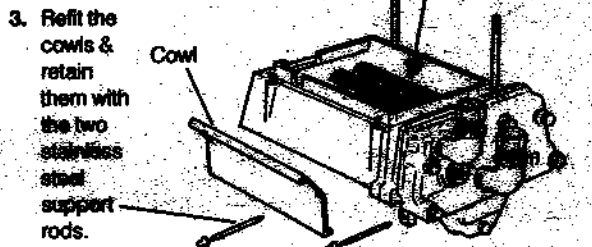
5. Renew any faulty parts, including the gasket.
6. Refit the electrode into the pilot burner using the 14 mm nut. Check that the spark gap between the pilot head & the electrode is 2 to 3 mm.



7. Refit the pilot burner to the burner box, reversing procedure given in Frame 5. Do not insert the pilot injector at this stage.

9 CLEANING THE HEAT EXCHANGER, Ideal Turbo 2; 9 & 12 only

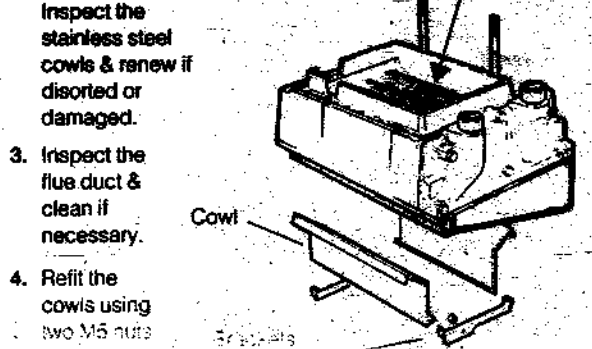
1. Remove the rear plastic end caps from both cowl support rods. With one rod removed, remove the caps by sliding them downwards.
2. Working from above & below, using a suitable brush, remove all loose deposits from the heat exchanger, particularly from between the fins. Inspect the stainless steel caps & renew if distorted or damaged.



3. Refit the cowls & retain them with the two stainless steel support rods.
4. Inspect sump gaskets for wear or damage & renew if faulty.
5. Check the flue duct and clean if necessary.
6. Refer to figure 10 for the re-assembly procedure.

9 CLEANING THE HEAT EXCHANGER, Ideal Turbo 2; 16 and 24

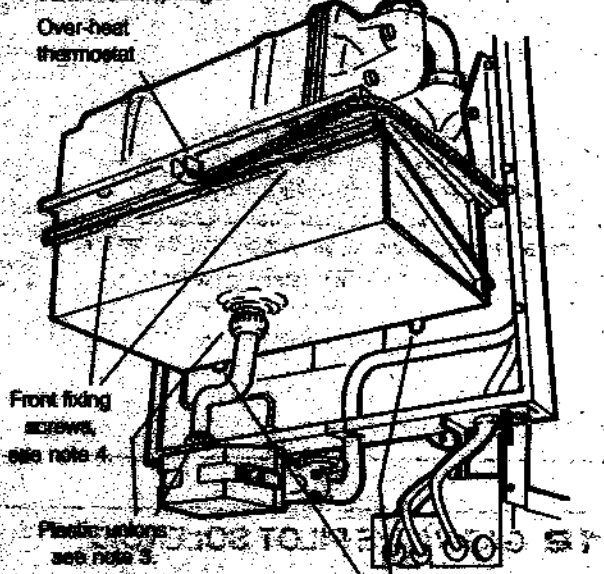
1. Undo the 2 stainless steel M5 nuts securing the cowl support brackets & remove brackets & cowls. Support the cowls as brackets are removed & allow them to drop when released.
2. Working from above & below, using a suitable brush, remove all loose deposits from the heat exchanger, particularly from between the fins. Inspect the stainless steel cowls & renew if distorted or damaged.



3. Inspect the flue duct & clean if necessary.
4. Refit the cowls using two M5 nuts

7 REMOVING THE CONDENSATE TRAP SUMP

1. Inspect the outside of the sump for any points of leakage for later correction. It is essential that the controls assembly is not subject to condensate spillage.



UNDERSIDE VIEW OF THE BOILER ASSEMBLY

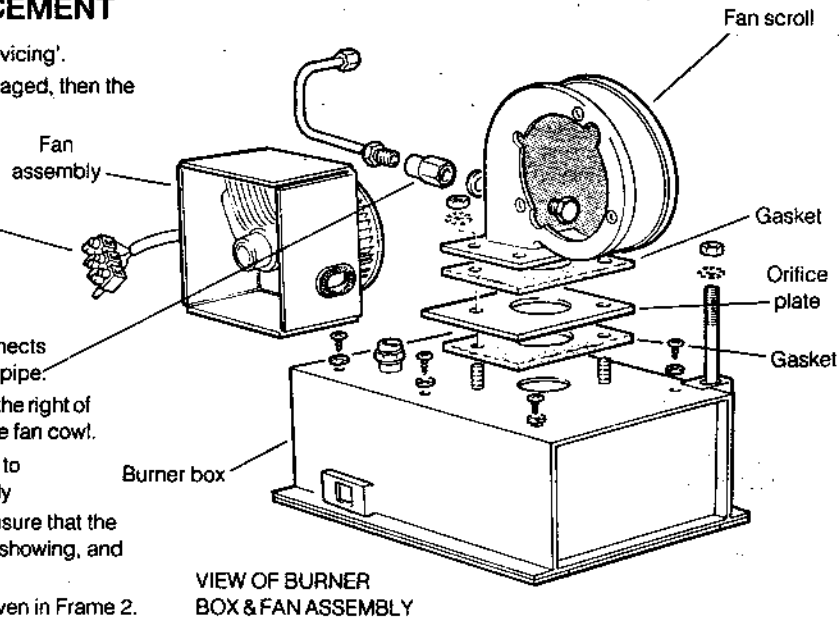
- Remove the sump as follows:
2. Remove the Sump Fan (Turbo 2; 24 only) by pulling off the three electrical connectors and removing the two M5 screws. Disconnect the sump fan failure thermostat at the push on connectors (Turbo 2; 24 only. See frame 37).
 3. Unscrew the plastic union at the bottom end of the condensate trap. Have a suitable receptacle available and remove the upper plastic union, retaining any condensate from the trap in the receptacle.
 4. Slacken the two long M5 nuts at the rear of the sump and remove the two M5 screws and washers at the front of the sump. The lower half of the sump can then be removed by lowering the front and pulling forwards.
- Note:** Only the lower half of the sump should be removed. Clean out any debris from the sump and condensate trap by flushing with clean water. Inspect the gaskets and renew them if faulty. Inspect the sump fan for excess corrosion or damage and renew if faulty.

10 RE-ASSEMBLY

1. Refit the sump and condensate trap by reversing the procedure given in Frame 7.
2. Refit the burner assembly by reversing the procedure given in Frame 3. **Note:** When replacing the pressure switch pipes reference should be made to Frame 15, 'Replacement of Parts', for the control orientation of the pressure switch. The four sensor tube connections should be positioned loosely before finally locking the pressure switch fixing screws.
3. Tighten the four sensor tube connections. Care should be taken not to omit the pilot injector when reconnecting the pilot tube into the pilot assembly.
4. Slide out the glass fascia from the case and clean. Replace the glass.
5. Refit the outer case by reversing the procedure given in Frame 2. **Note:** The control assembly is located by lifting it to a horizontal position, allowing it to automatically engage.

11 FAN ASSEMBLY REPLACEMENT

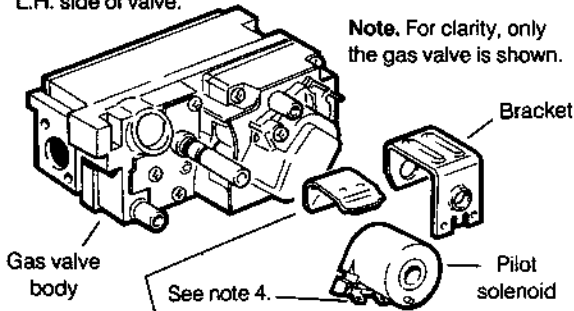
1. Remove the outer case, refer to Frame 2 'Servicing'.
2. If the fan scroll, motor or rotor is worn or damaged, then the whole fan assembly should be renewed.
3. Isolate the boiler from the mains supply.
4. Unplug the electricity supply lead to the fan from the socket strip at the top of the boiler back panel.
5. Disconnect the unions at both ends of the aluminium pressure sensing pipe which connects the fan to the pressure switch and remove the pipe.
6. Disconnect the 3/8 in. malleable iron union to the right of the fan, and withdraw the gas supply from the fan cowl.
7. Undo the M5 nuts & washers retaining the fan to the burner box. Remove the old fan assembly
8. Fit the new fan assembly in reverse order. Ensure that the correct orifice plate is fitted, with it's lettering showing, and that the gaskets are in good condition.
9. Refit the outer case- reverse of procedure given in Frame 2.



VIEW OF BURNER BOX & FAN ASSEMBLY

12 GAS VALVE PILOT SOLENOID

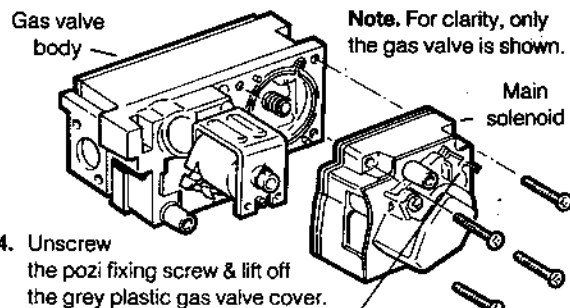
1. Isolate the boiler from the mains supply
2. Remove the outer casing, (Frame 2).
3. Unscrew the pozi fixing screw & lift off the grey plastic gas valve cover.
4. Pull off the two electrical connections to the red coil at the L.H. side of valve.



5. Prise out the spring metal clip from between the metal bracket & the red plastic body of the solenoid. Slide the solenoid & bracket off the valve.
6. Fit the new solenoid to the gas valve, reversing the removal procedure. The polarities of electrical leads are immaterial.

13 GAS VALVE MAIN SOLENOID

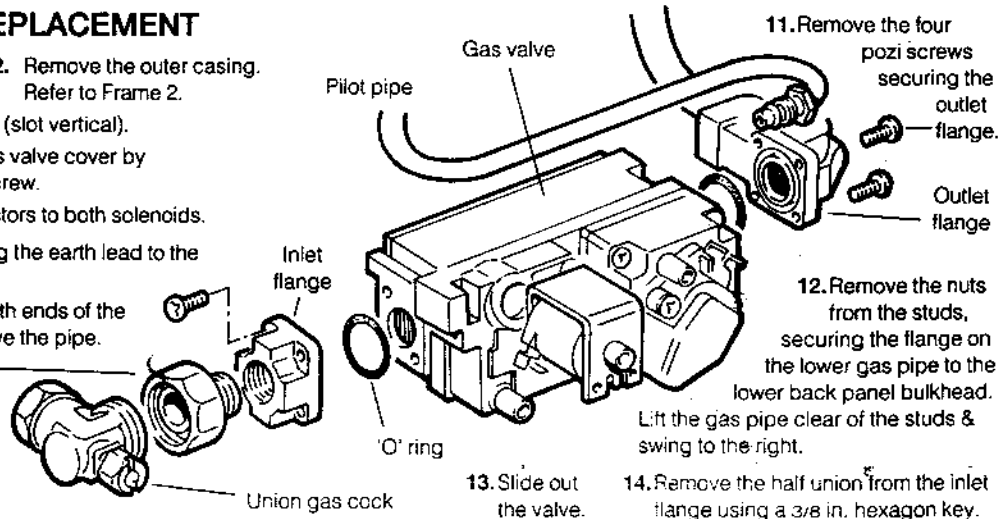
1. Isolate the boiler from the mains supply
2. Remove the outer casing, (Frame 2).
3. Turn off the boiler gas cock, (slot vertical).



4. Unscrew the pozi fixing screw & lift off the grey plastic gas valve cover.
5. Pull off the two electrical connectors to the black coil at the R.H of the valve.
6. Remove the M4 screw fixing the earth lead to the gas valve.
7. Remove the four M4 screws securing the main solenoid assembly to the valve body and remove the assembly.
8. Fit new solenoid to the valve body, reversing the removal procedure. The polarities of electrical leads are immaterial.

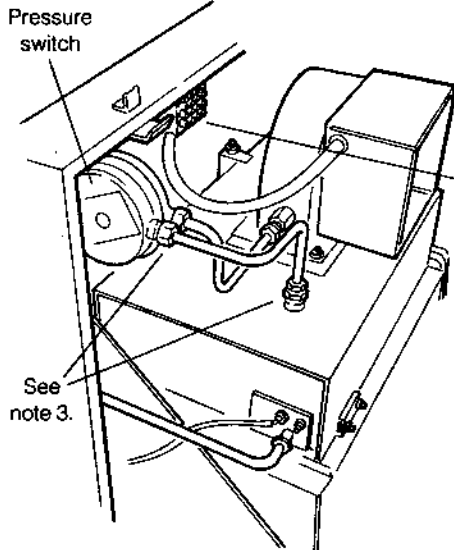
14 GAS VALVE REPLACEMENT

1. Isolate the boiler from the mains supply.
2. Remove the outer casing. Refer to Frame 2.
3. Turn off the boiler gas cock, (slot vertical).
4. Remove the grey plastic gas valve cover by removing it's single fixing screw.
5. Pull off the electrical connectors to both solenoids.
6. Remove M4 screws securing the earth lead to the gas valve.
7. Disconnect the unions at both ends of the gas valve pilot pipe & remove the pipe.
8. Disconnect the gas inlet union at the L. H. side of the gas valve.
9. Disconnect the malleable iron union to the right hand side of the burner box.
10. Slacken the M5 pozi screws securing the gas pipe to the back panel (right of the burner box).



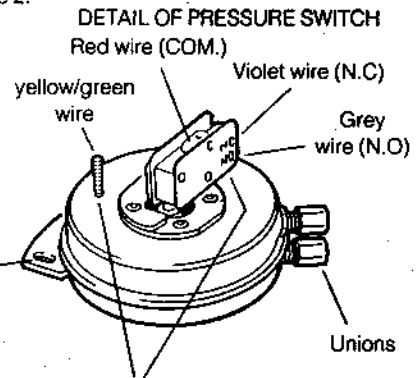
11. Remove the four pozi screws securing the outlet flange.
12. Remove the nuts from the studs, securing the flange on the lower gas pipe to the lower back panel bulkhead. Lift the gas pipe clear of the studs & swing to the right.
13. Slide out the valve.
14. Remove the half union from the inlet flange using a 3/8 in. hexagon key.
15. Remove the four M4 Pozi screws securing the gas inlet flange to the valve. Remove the flange.
16. Fit the old gas inlet flange to the new gas valve, ensuring that the O rings are in position, followed by the half union using approved jointing compound. Fit the new valve to the boiler, reversing the removal procedure.

15 PRESSURE SWITCH REPLACEMENT



TOP VIEW OF BOILER ASSEMBLY

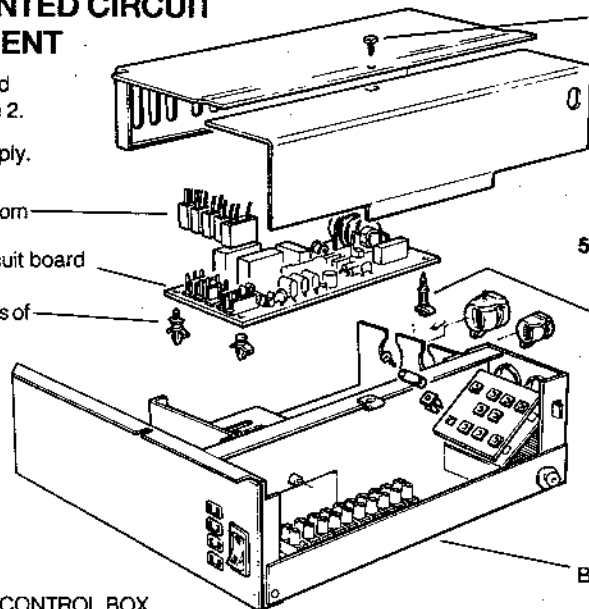
1. Isolate the boiler from the mains supply.
2. Remove the outer case- refer to Frame 2.
3. Disconnect the unions at the end of both pressure sensing pipes & remove the pipes.
4. Unplug the pressure switch wiring from the socket strip at the top of the back panel.



5. Remove the two 5 mm pozi screws securing the pressure switch to it's mounting bracket and remove the switch.
6. Disconnect the push on terminals & the earth connection from it's stud on the switch.
7. Reconnect the pressure switch- reverse of removal procedure. Fit the sensing pipes loosely before tightening the pressure switch securing screws.
8. Finally tighten the sensing pipe connections.

16 CONTROL BOX PRINTED CIRCUIT BOARD REPLACEMENT

1. Remove the casing bottom panel and lower the control box, refer to Frame 2.
2. Isolate the boiler from the mains supply.
4. Unplug the five white plastic plugs from the board.
6. Remove the PCB by nipping the barbs of the three plastic support pillars and lifting the board free.
7. Using the new PCB, re-assemble in reverse order.

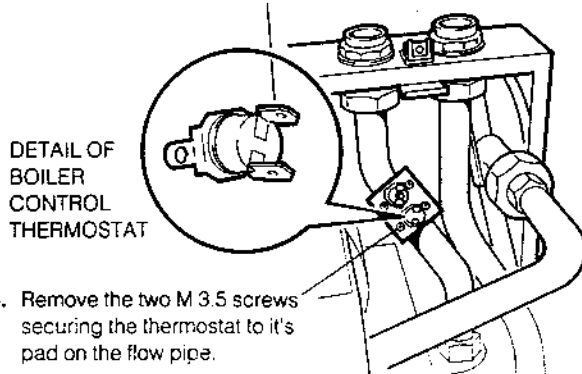


VIEW OF THE BOILER CONTROL BOX

3. Remove the control box covers by removing the single fixing screw on the top.
5. Unplug from the board the spark electrode lead.

17 BOILER CONTROL THERMOSTAT

1. Isolate the boiler from the mains supply.
2. Remove the outer case- refer to Frame 2.
3. Pull off the two electrical connectors from the thermostat.

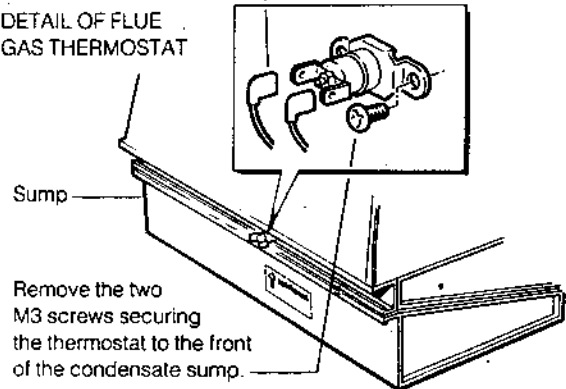


5. Use a new thermostat & replace in reverse order.

18 FLUE GAS THERMOSTAT

1. Isolate the boiler from the mains supply.
2. Remove the outer case- refer to Frame 2.
3. Pull off the two electrical connectors from the thermostat.

DETAIL OF FLUE GAS THERMOSTAT

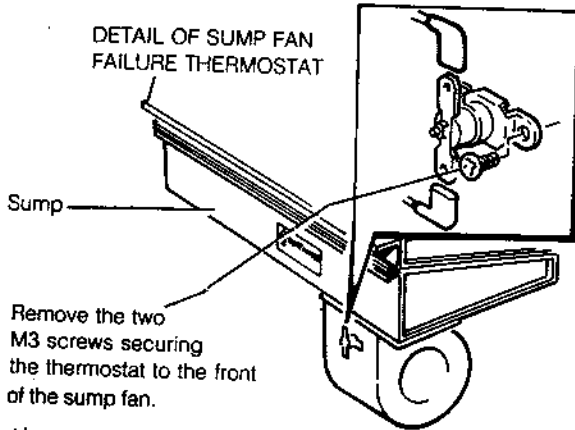


4. Remove the two M3 screws securing the thermostat to the front of the condensate sump.
5. Use a new thermostat & replace in reverse order. The polarity of the connections is immaterial.

18a SUMP FAN FAILURE THERMOSTAT **Ideal Turbo 2; 24 ONLY**

1. Isolate the boiler from the mains supply.
2. Remove the outer case - refer to Frame 2.
3. Pull off the two electrical connectors from the thermostat.

DETAIL OF SUMP FAN FAILURE THERMOSTAT

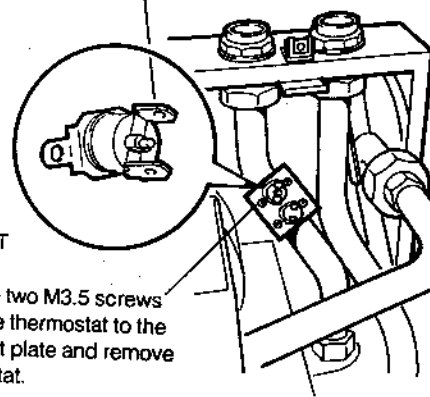


4. Remove the two M3 screws securing the thermostat to the front of the sump fan.
5. Use a new thermostat and replace in reverse order. The polarity of the connections is immaterial.

19 WATER OVERHEAT THERMOSTAT

1. Isolate the boiler from the mains supply.
2. Remove the boiler casing, refer to Frame 2.
3. Pull off the two electrical connectors from the thermostat.

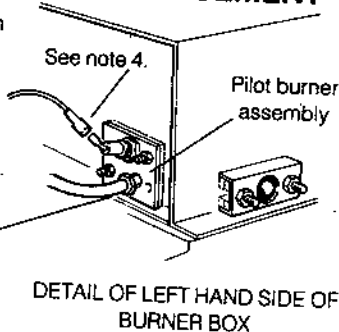
DETAIL OF WATER OVERHEAT THERMOSTAT



4. Remove the two M3.5 screws securing the thermostat to the pipe contact plate and remove the thermostat.
5. Use a new thermostat & replace in reverse order of removal. Polarity of connections is immaterial.

20 PILOT BURNER REPLACEMENT

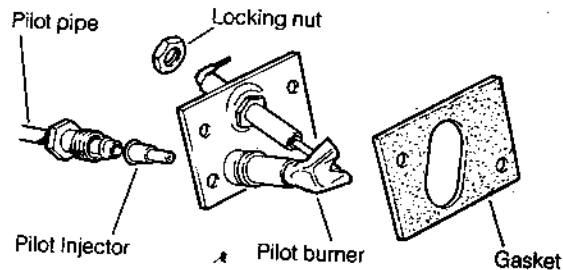
1. Isolate the boiler from the mains supply.
2. Remove the boiler casing (Frame 2).
3. Disconnect the pilot pipe union from pilot burner on the L.H. side of burner box.



DETAIL OF LEFT HAND SIDE OF BURNER BOX

4. Pull the H.T. lead from the electrode.
5. Remove the two M4 nuts & washers securing the pilot burner to the burner box. Gently flex the pilot supply tube to the left & withdraw the pilot burner assembly.
6. Remove spark electrode (Frame 22) & pilot injector (Frame 21). Check for cleanliness & lack of distortion or cracking before transferring to the new pilot burner (Frame 22).
7. If distortion is apparent, a new component **MUST BE USED**.
8. Fit the new pilot burner assembly in reverse of above. Replace the gasket if damaged (refer to Frame 21).

21 PILOT INJECTOR REPLACEMENT

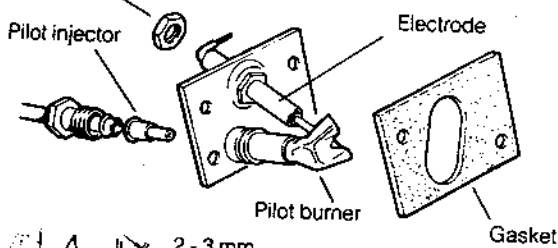


DETAIL OF REMOVED PILOT BURNER ASSEMBLY

1. Remove the pilot burner assembly as described in Frame 20.
2. Gently tap out the pilot injector from between the pilot pipe union and the pilot head and replace with a new component.

22 PILOT BURNER ELECTRODE REPLACEMENT

1. Remove the pilot burner assembly from the burner box as detailed in Frame 20.
2. Remove the 14 mm AF nut securing the electrode to the pilot burner.



2 - 3 mm.

3. Use a new electrode & replace in reverse order. Check that the electrode spark gap is 2 to 3mm between pilot head and electrode.

23 BURNER PLAQUE REPLACEMENT, **Ideal Turbo 2; 9 & 12 only**

Refer to Frame 38 (page 27) 'Exploded Views' for illustration of the procedure detailed below.

1. Remove the outer case (Frame 2).
2. Remove the burner assembly to a convenient working surface, as detailed in Frame 3.
3. Remove the two M4 nuts and washers securing the pilot burner to the LH side of the burner box. Withdraw the pilot burner taking care not to lose the pilot injector and remove the gasket.
4. Remove the two M5 nuts and washers securing the fan assembly to the burner box. Place the fan and orifice plate in a safe area.
5. With the burner plaques uppermost, remove the three pozi self tapping screws and washers securing each plaque retaining bracket to the diffuser assembly and remove the brackets.
6. Lift out and discard the old plaques and their sealing gaskets.
7. Using the correct plaque replacement kit, carefully fit the new gaskets and plaques onto the diffuser assembly. (smooth side visible when fitted). Fix them in place with the retaining brackets and the six pozi self tapping screws.
8. Refit the fan assembly to the burner box using two M5 nuts and washers. Renew any damaged gaskets and ensure that the orifice plate is fitted.
9. Refit the pilot burner using two M5 nuts and washers, ensuring that the pilot injector is in position. Renew the gasket if damaged.
10. Refit the burner assembly to the boiler as detailed in Frame 3.

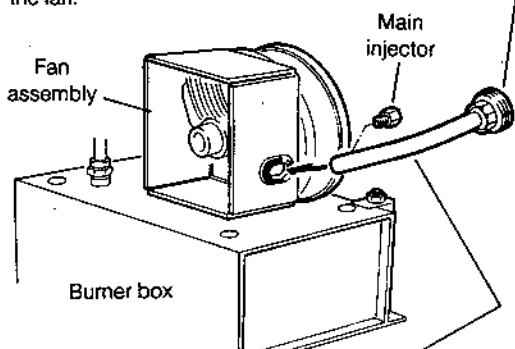
24 BURNER PLAQUE REPLACEMENT, Ideal Turbo 2; 18 and 24

Refer to Frame 39 (page 27) 'Exploded Views' for illustration of the procedure detailed below.

1. Remove the boiler casing, refer to Frame 2.
2. Remove the burner assembly to a convenient working surface, as detailed in Frame 3.
3. Remove the two M4 nuts & washers securing the pilot burner to the L. H. side of the burner box. Withdraw the pilot burner/ electrode, taking care not to lose the pilot injector & remove the gasket.
4. Remove the two M5 nuts & washers securing the fan to the burner box. Remove the orifice plate to a safe place.
5. With the burner plaques supported from below, carefully remove the four remaining M5 nuts & washers, on the top of the burner, and lift the burner box away from the diffuser/ plaque assembly.
6. With the burner plaque assembly uppermost, remove the three M4 nuts & washers securing each plaque retaining bracket to the diffuser assembly. Remove the brackets.
7. Lift out & discard the old plaques and their sealing gasket.
8. Using the Ideal Turbo 2; 18 Plaque Replacement Kit, carefully fit the new gasket & plaques onto the diffuser assembly, (smooth side visible when fitted).
9. Fix the plaques in place with the retaining brackets, using the six M4 nuts & washers. Refit the diffuser/ plaque assembly into the burner box using the four M5 nuts & washers.
10. Refit the fan assembly to the burner box using the two M5 nuts & washers. Renew any damaged gaskets & ensure that the correct orifice plate is fitted- with the lettering uppermost.
11. Refit the pilot burner using the two M4 nuts & washers. Renew the gasket if damaged & ensure that the pilot injector is in position.
12. Refit the burner assembly as detailed in Frame 3.

25 REPLACING THE MAIN INJECTOR

1. Disconnect the boiler from the mains electricity supply and remove the outer casing, refer to Frame 2.
2. Turn off the gas inlet cock.
3. Disconnect the 3/8 in. BSP malleable iron union to the right of the fan.



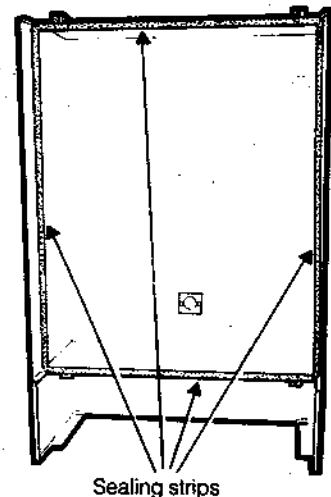
4. Withdraw the gas pipe from the fan cowl.
5. Inspect the injector for blockage or damage and renew if faulty, using an approved gas jointing compound.

26 OUTER CASING SEAL

If the casing sealing strip becomes worn or damaged then it **MUST** be renewed.

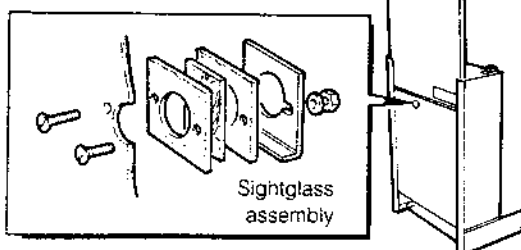
INNER VIEW OF BOILER CASING

1. Remove the boiler casing, refer to Frame 2.
2. The strips are renewed by simply pulling them out of their retaining slots around the perimeter of the casing and replacing them with new strips.
3. Replace the boiler casing, refer to Frame 32 'Installation'.



27 SIGHTGLASS (OUTER CASE)

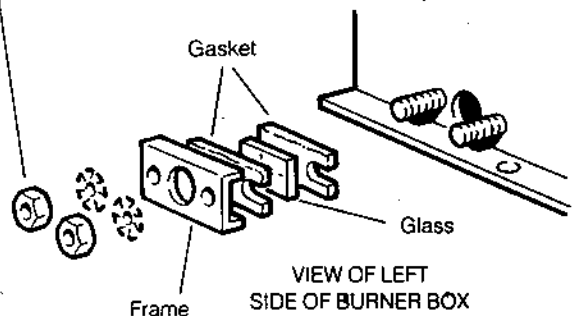
1. Remove the boiler casing, refer to Frame 2.
2. Lift the fascia panel from the casing by sliding it upwards.
3. Unfasten the two screws, nuts and washers holding the sight glass assembly to the casing front panel.
4. Fit the new assembly. Ensure gaskets are undamaged & that parts are in the correct order. The frame must have the return edge at the bottom. All components are within the case.



5. Tighten the screws to ensure an air-tight seal. Do not overtighten.
6. Refit the fascia panel.

28 SIGHTGLASS (BURNER BOX)

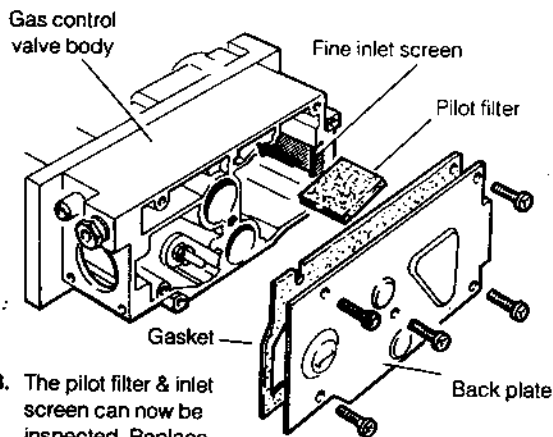
1. Remove the boiler casing, refer to Frame 2.
2. Remove the two nuts and washers securing the sight glass assembly to the burner box.



3. When fitting the new assembly make sure that the parts are in the correct order. Replace gaskets that are damaged.
4. Retighten the nuts to ensure an air tight seal. Do not overtighten.
5. Refit the boiler casing (Frame 32 'Installation')

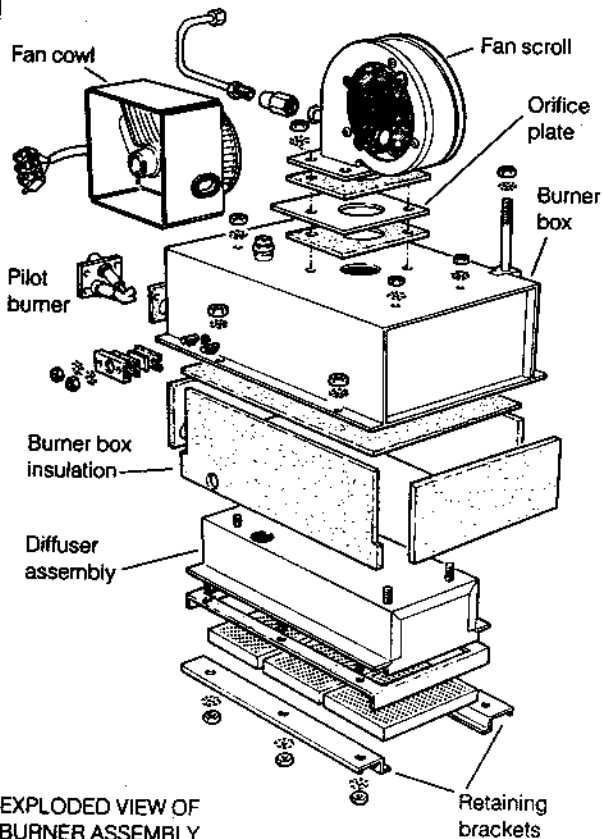
29 PILOT FILTER/ INLET SCREEN REPLACEMENT

1. Remove the gas valve as previously described in Frame 14.
2. Undo the five screws retaining the gas valve back plate & remove it.



3. The pilot filter & inlet screen can now be inspected. Replace as necessary.
4. Re-assemble in reverse order.

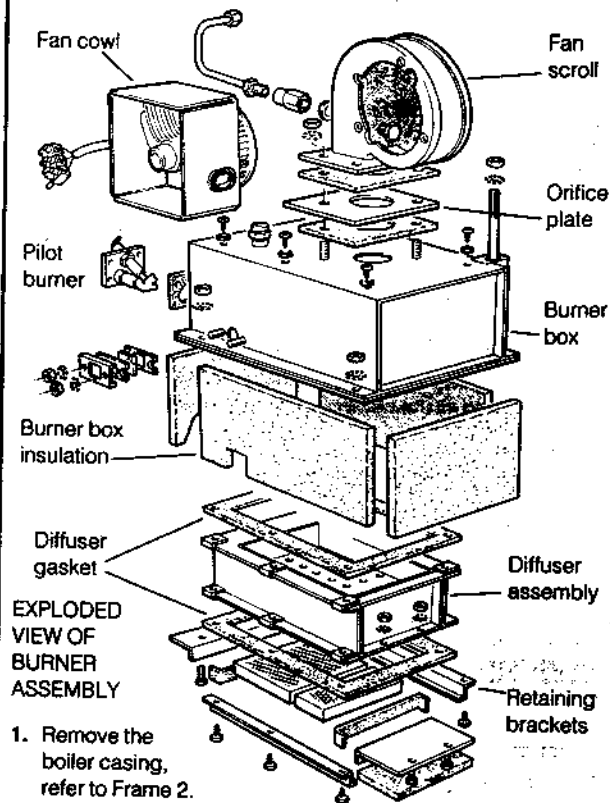
31 BURNER BOX INSULATION Ideal Turbo 2; 18 and 24



EXPLODED VIEW OF BURNER ASSEMBLY

1. Remove boiler casing, refer to Frame 2.
2. Remove the burner assembly (Frame 3) & place on a convenient working surface.
3. Remove the plaque/ diffuser assembly from the burner box, as described in Frame 24.
4. Remove the old burner box insulation & the diffuser sealing gasket.
5. Replace the diffuser sealing gasket & the new burner box insulation. Ensure that the cut-outs for the sight glass & pilot are correctly positioned.
6. Replace the plaque/ diffuser assembly, refer to Frame 24.
7. Replace the burner box, refer to Frame 3.
8. Replace the boiler casing, refer to Frame 32 'Installation'.

30 BURNER BOX INSULATION, Ideal Turbo 2; 9 & 12 only



EXPLODED VIEW OF BURNER ASSEMBLY

1. Remove the boiler casing, refer to Frame 2.
2. Remove the burner assembly (Frame 3) & place on a convenient working surface.
3. Remove the burner plaques as described in Frame 23.
4. Slide the diffuser assembly out of the burner box by removing the 6 pozi self tapping screws & fibre washers.
5. Remove the old insulation & replace with the new, correctly positioning the cut-outs for the pilot and sight glass.
6. Discard the old diffuser gaskets and replace with new.
7. Insert the diffuser into the insulated burner box, taking care not to move the diffuser gaskets. Ensure that the gaskets are between the returns of the diffuser assembly & burner box.
8. Replace the screws & fibre washers securing the diffuser assembly to the burner box.
9. Replace the burner plaques (Frame 23).
10. Replace the burner box (Frame 3).
11. Replace the boiler casing, refer to Frame 32 'Installation'.

32 HEAT EXCHANGER REPLACEMENT

Refer to Frames 36 & 37 (page 26) 'Exploded Views' for illustration of the following procedure.

1. Remove the burner assembly, as described in Frame 3.
2. Remove the sump, as described in Frame 7.
3. Drain the system of water.
4. Drain any water from the boiler by using a radiator vent key in the boiler drain cock, located in the sump.
5. Refer to Frame 11 'Installation'. From outside the building, remove the four terminal- socket fixing screws (I), the two terminal fixing screws (J), the terminal end plate (G), and the flue fixing bracket screw (H).
6. Remove the two screws securing the boiler control thermostat to the flow pipe (Frame 17).
7. Remove the two screws securing the water overheat thermostat to the flow pipe (Frame 19).
8. Unscrew the larger brass unions at the top of the FLOW & RETURN pipes inside the casing. Swing the pipes forward & lift them out of their lower sockets.

32 (Continued from p. 24) HEAT EXCHANGER REPLACEMENT

Refer to Frames 36 & 37 (page 26) 'Exploded Views' for illustration of the following procedures.

9. Remove the four M6 nuts & washers securing the heat exchanger support brackets to the back panel and carefully withdraw the heat exchanger/ sump/ flue duct assembly. Tip the heat exchanger to lower the outer end of the flue duct, allowing clearance at the top of the air duct.
Place the heat exchanger on a suitable working surface.
10. Remove the four M6 screws securing the top half of the sump assembly to the heat exchanger. Transfer the sump assembly to the new heat exchanger.
11. Renew any damaged gaskets.
12. Fit the new heat exchanger assembly to the back panel.
Carefully insert the flue duct into the air duct in reverse order of removal.
13. Re-assemble the boiler in reverse order of removal.

34 BOILER 'ON/OFF' SWITCH REPLACEMENT

Refer to Frame 40 (page 28) 'Exploded Views' for illustration of the following procedures.

1. Isolate the boiler from the mains electricity supply
2. Remove the boiler casing, refer to Frame 2.
3. Remove the control box cover by removing the single fixing screw on the top.
4. Disconnect the three 'push on' connectors from the rear of the switch.
5. Compress the retaining tabs at the top & the bottom of the switch. Prise out the switch.
6. Replace with a new switch in reverse order of removal.
7. Reconnect the 'push on' terminals.
8. Replace the control box cover.
9. Replace the boiler casing, refer to Frame 32 'Installation'.

35 REPLACING THE CONDENSATE SIPHON ASSEMBLY

Refer to Frame 36 or 37 (page 26) 'Exploded Views' for illustration of the siphon assembly.

1. Remove the boiler casing, refer to Frame 2.
2. Remove the condensate sump, refer to Frame 7.
3. Remove the brass backnut securing the siphon assembly to the base of the sump.
4. Replace the siphon with a new assembly, taking care not to omit the rubbing sealing washer & secure with the brass backnut.
5. Replace the sump in reverse order of removal.
6. Replace the boiler casing, refer to Frame 32 'Installation'.

33 INDICATOR NEON REPLACEMENT

Refer to Frame 40 (page 28) 'Exploded Views' for illustration of the following procedures.

If the 'BOILER ON' neon (No. 1), 'AIR PRESSURE OK' neon (No. 2) or 'OVERHEAT' neon (No. 4) fail, then all three must be replaced as a complete assembly- incorporating the 4-way connector & push on connectors.

Replace the assembly as follows;

1. Isolate the boiler from the mains electricity supply
2. Remove the boiler casing, refer to Frame 2.
3. Remove the control box cover by removing the single fixing screw on the top.
4. Disconnect the 4-way connector
5. Pull out the neons, (No. 1), (No. 2) & (No.4), from their holders.
6. Pull off the connector linking wires from the neons (No.1) & (No.2) from the terminal at the top of the ON/OFF switch.
7. Pull off the connector from the centre terminal of the ON/OFF switch.
8. Remove the complete assembly & replace with new assembly in reverse order of removal. Ensure the correct positioning of the neons, i.e. (No. 1) is at the top & (No.4) is at the bottom.
9. Replace the control box cover.
10. Replace the boiler casing, refer to Frame 32 'Installation'.

If the 'BURNER ON' neon (No. 3) fails, then this may be replaced singly as follows;

1. Isolate the boiler from the mains electricity supply.
2. Remove the boiler casing, refer to Frame 2.
3. Remove the control box cover by removing the single fixing screw on the top.
4. Disconnect the single in-line connector.
5. Pull off the connector, incorporating the wire from neon (No. 3), from the top terminal of the ON/OFF switch.
6. Remove the wire connecting the top terminal of the ON/OFF switch from position 'N1' on the terminal strip
7. Pull out the neon (No. 3) from it's holder
8. Replace with the new neon (No. 3) & assemble in reverse order of removal.
9. Replace the control box cover.
10. Replace the boiler casing, refer to Frame 32 'Installation'.

35a REPLACING THE SUMP FAN Ideal Turbo 2; 24 ONLY

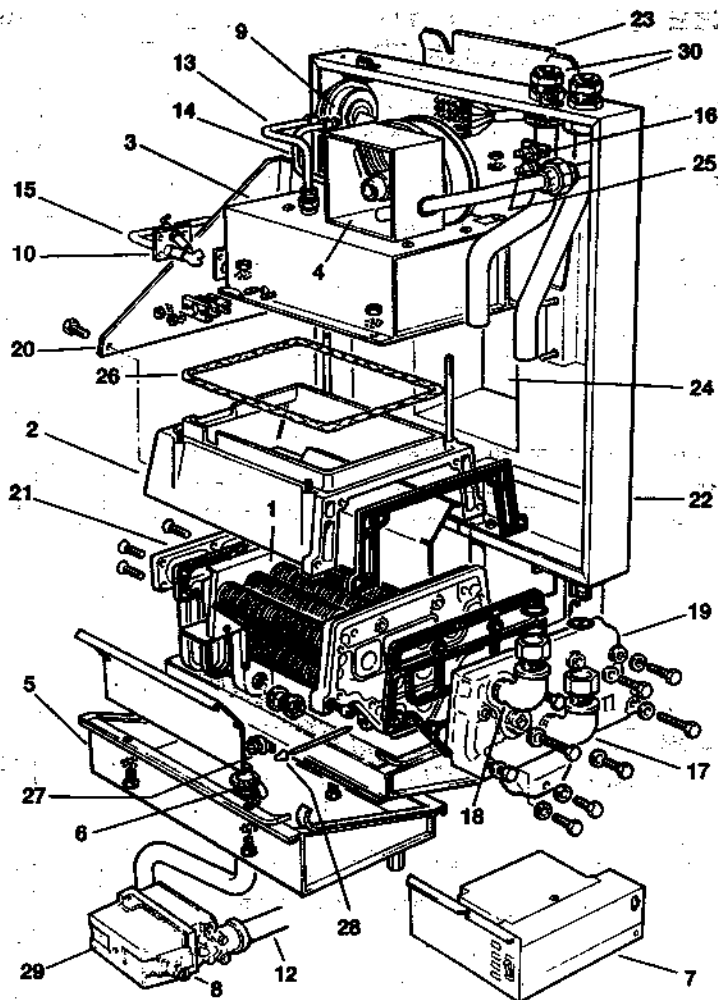
Refer to Frame 37 (page 26) 'Exploded Views'

1. Isolate the boiler from the mains electricity supply.
2. Remove the boiler casing, refer to frame 2.
3. Pull off the three electrical connectors from the sump fan motor.
4. Remove the two M3 posidrive screws holding the sump fan failure thermostat .
5. Remove the two M5 screws and washers securing the sump fan to the lower sump.
6. Fit the new sump fan in the reverse order, ensuring that the earth wire (green and yellow) is fitted to the connector on the motor body, and the other two wires to the connectors on the motor winding.

36 BOILER ASSEMBLY, Ideal Turbo 2; 9 & 12 only

LEGEND

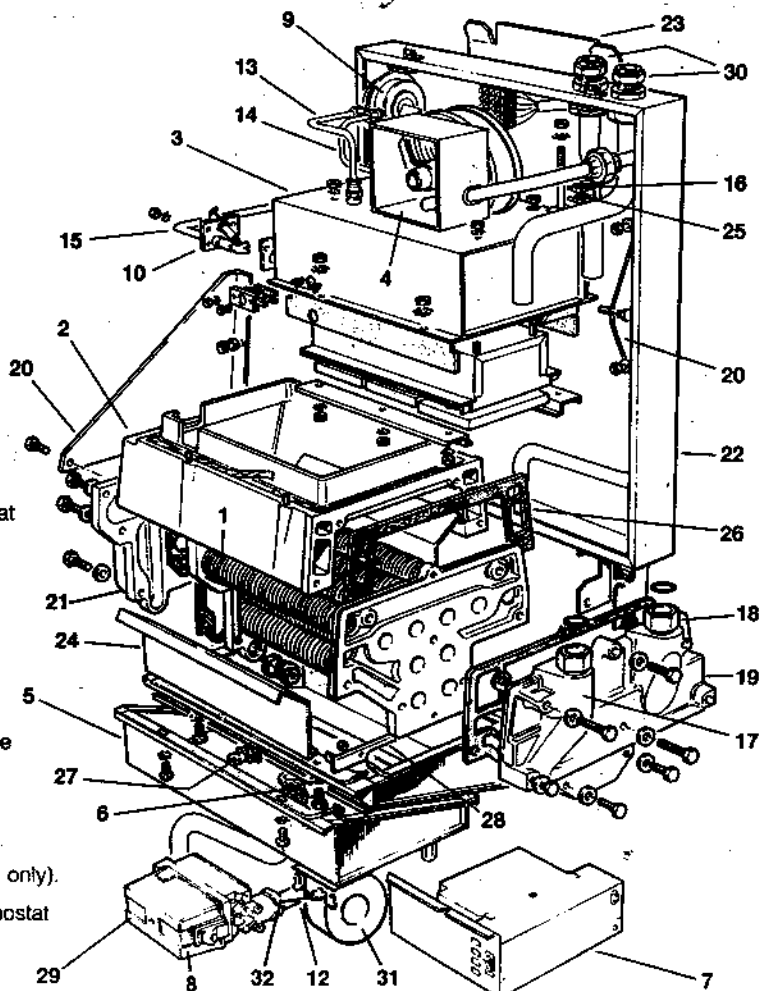
- | | |
|---------------------------|---|
| 1. Tube pack | 18. Flow elbow assembly |
| 2. Combustion chamber | 19. Header casting |
| 3. Burner box | 20. Boiler mounting bracket |
| 4. Fan assembly | 21. Cover plate |
| 5. Sump | 22. Back panel |
| 6. Condensate siphon | 23. Wall mounting plate |
| 7. Boiler control box | 24. Air inlet duct |
| 8. Gas control valve | 25. Boiler control thermostat |
| 9. Pressure switch | 26. Sealing rope |
| 10. Pilot assembly | 27. Flue gas thermostat |
| 12. Main gas line | 28. Support rods & end caps |
| 13. High pressure pipe | 29. Gas inlet pressure test point (inside plastic cover, at bottom L.H. side of gas control valve body) |
| 14. Low pressure pipe | 30. Water flow & return connections |
| 15. Pilot pipe | |
| 16. Over-heat thermostat | |
| 17. Return elbow assembly | |



37 BOILER ASSEMBLY Ideal Turbo 2; 18 and 24

LEGEND

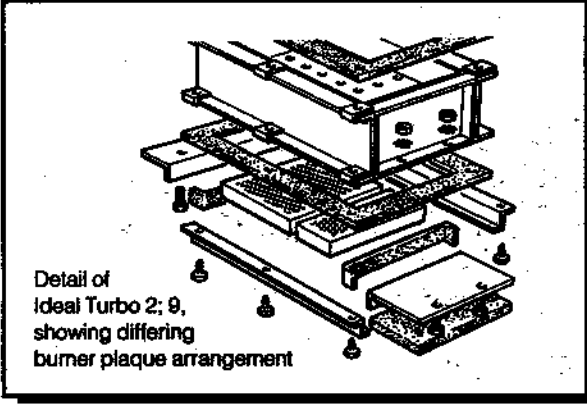
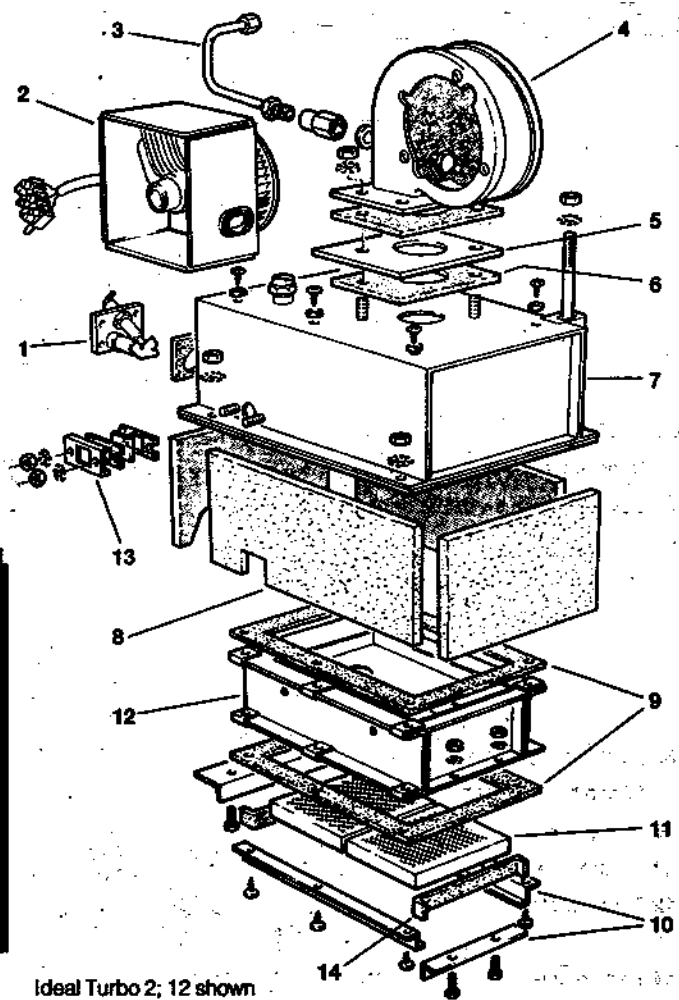
- | | |
|--------------------------|---|
| 1. Tube pack | 19. Header casting |
| 2. Combustion chamber | 20. Boiler mounting bracket |
| 3. Burner box | 21. Cover plate |
| 4. Fan assembly | 22. Back panel |
| 5. Sump | 23. Wall mounting plate |
| 6. Condensate siphon | 24. Stris. steel deflector |
| 7. Boiler control box | 25. Boiler control thermostat |
| 8. Gas control valve | 26. Sealing gasket |
| 9. Pressure switch | 27. Flue gas thermostat |
| 10. Pilot assembly | 28. Support bracket |
| 12. Main gas line | 29. Gas inlet pressure test point (inside plastic cover, at bottom L.H. side of gas control valve body) |
| 13. High pressure pipe | 30. Water flow & return connections |
| 14. Low pressure pipe | 31. Sump fan (Turbo 2; 24 only). |
| 15. Pilot pipe | 32. Sump fan failure thermostat (Turbo 2; 24 only). |
| 16. Over-heat thermostat | |
| 17. Return connection | |
| 18. Flow connection | |



**38 BURNER ASSEMBLY,
Ideal Turbo 2; 9 & 12 only**

LEGEND

- | | |
|-----------------------------|----------------------------|
| 1. Pilot assembly | 8. Burner box insulation |
| 2. Fan cowl assembly | 9. Diffuser gaskets, 2 off |
| 3. Pressure sensing pipe | 10. Retention brackets |
| 4. Fan scroll | 11. Burner plaques, 2 off |
| 5. Orifice plate | 12. Diffuser assembly |
| 6. Fan plate gaskets, 2 off | 13. Sightglass assembly |
| 7. Burner box | 14. Plaque sealing gaskets |



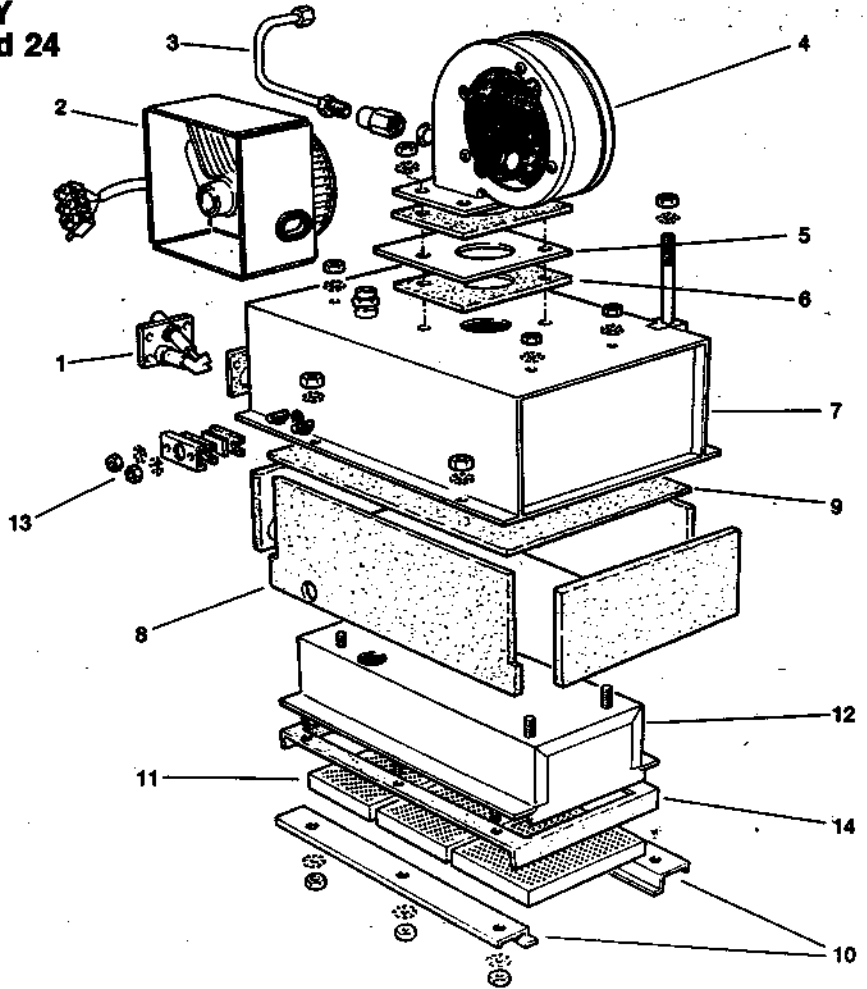
Detail of
Ideal Turbo 2; 9,
showing differing
burner plaque arrangement

Ideal Turbo 2; 12 shown

**39 BURNER ASSEMBLY
Ideal Turbo 2; 18 and 24**

LEGEND

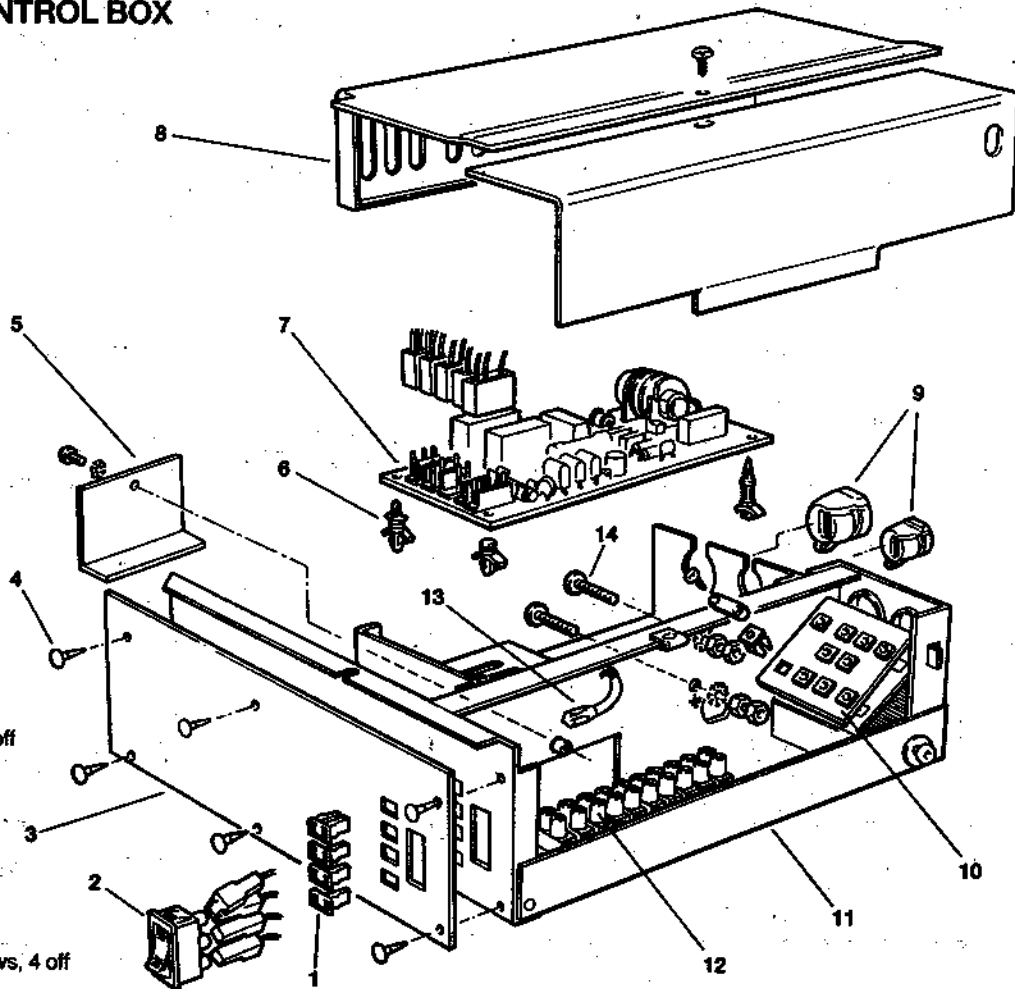
- | |
|-----------------------------|
| 1. Pilot assembly |
| 2. Fan cowl assembly |
| 3. Pressure sensing pipe |
| 4. Fan scroll |
| 5. Orifice plate |
| 6. Fan plate gaskets, 2 off |
| 7. Burner box |
| 8. Burner box insulation |
| 9. Diffuser gasket |
| 10. Retention brackets |
| 11. Burner plaques, 3 off |
| 12. Diffuser assembly |
| 13. Sightglass assembly |
| 14. Plaque sealing gasket |



40 BOILER CONTROL BOX

LEGEND

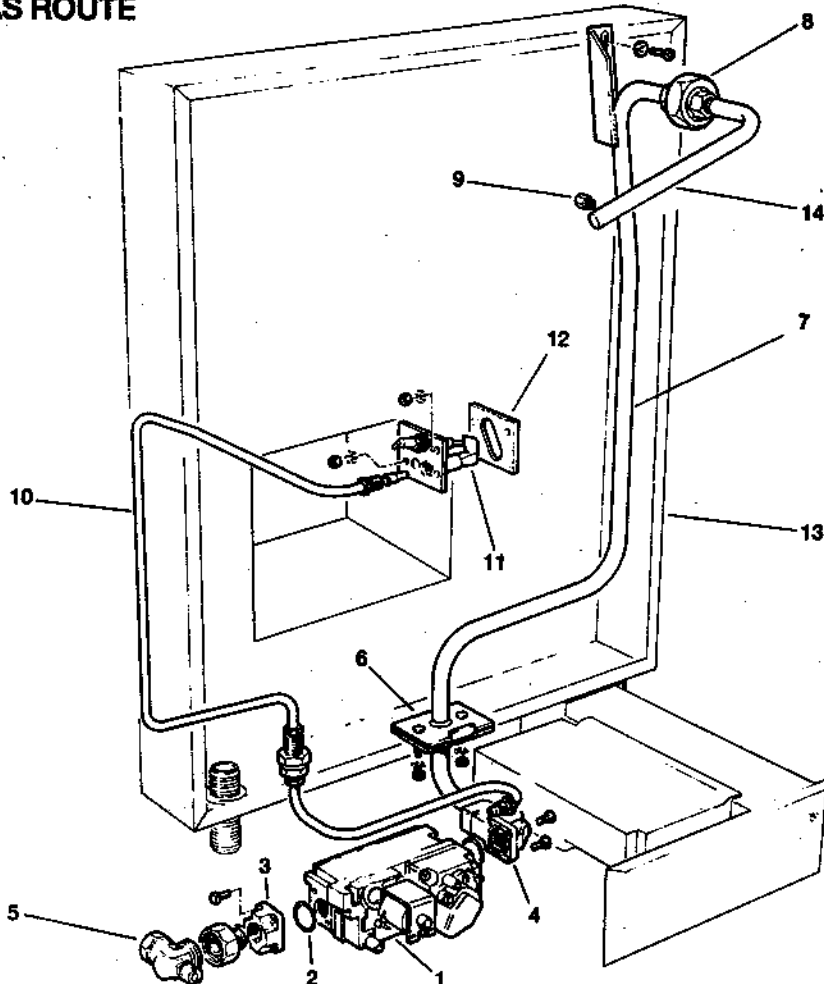
- 1. Neon lenses, 4 off
- 2. Boiler ON/OFF switch
- 3. Fascia
- 4. Fascia pins, 6 off
- 5. Cover plate
- 6. Printed circuit board support pillars, 3 off
- 7. Printed circuit board
- 8. Control box covers, 2 off
- 9. Wiring bushes, 2 off
- 10. Wiring clamps
- 11. Control box
- 12. Terminal strip
- 13. Indicator neons, 4 off
- 14. Earth connection screws, 4 off



41 MAIN & PILOT GAS ROUTE

LEGEND

- 1. Gas control valve
- 2. 'O' ring seal, 2 off
- 3. Gas inlet flange
- 4. Gas outlet flange
- 5. Union gas cock, shown in the OFF position
- 6. Gas inlet sealing plate
- 7. Gas inlet pipe
- 8. Malleable iron gas union
- 9. Main gas injector
- 10. Pilot gas supply pipe
- 11. Pilot burner
- 12. Sealing gasket
- 13. Boiler back panel
- 14. Gas injection pipe



ELECTRICAL CONTROL SEQUENCE

The lamps on the control box indicate the stage of sequential control that the appliance has reached. When the external controls & Programmer/Time clock are calling for heat, the relevant zone valve will open & it's auxiliary switch will feed power to the boiler control box, initiating the following sequence:-

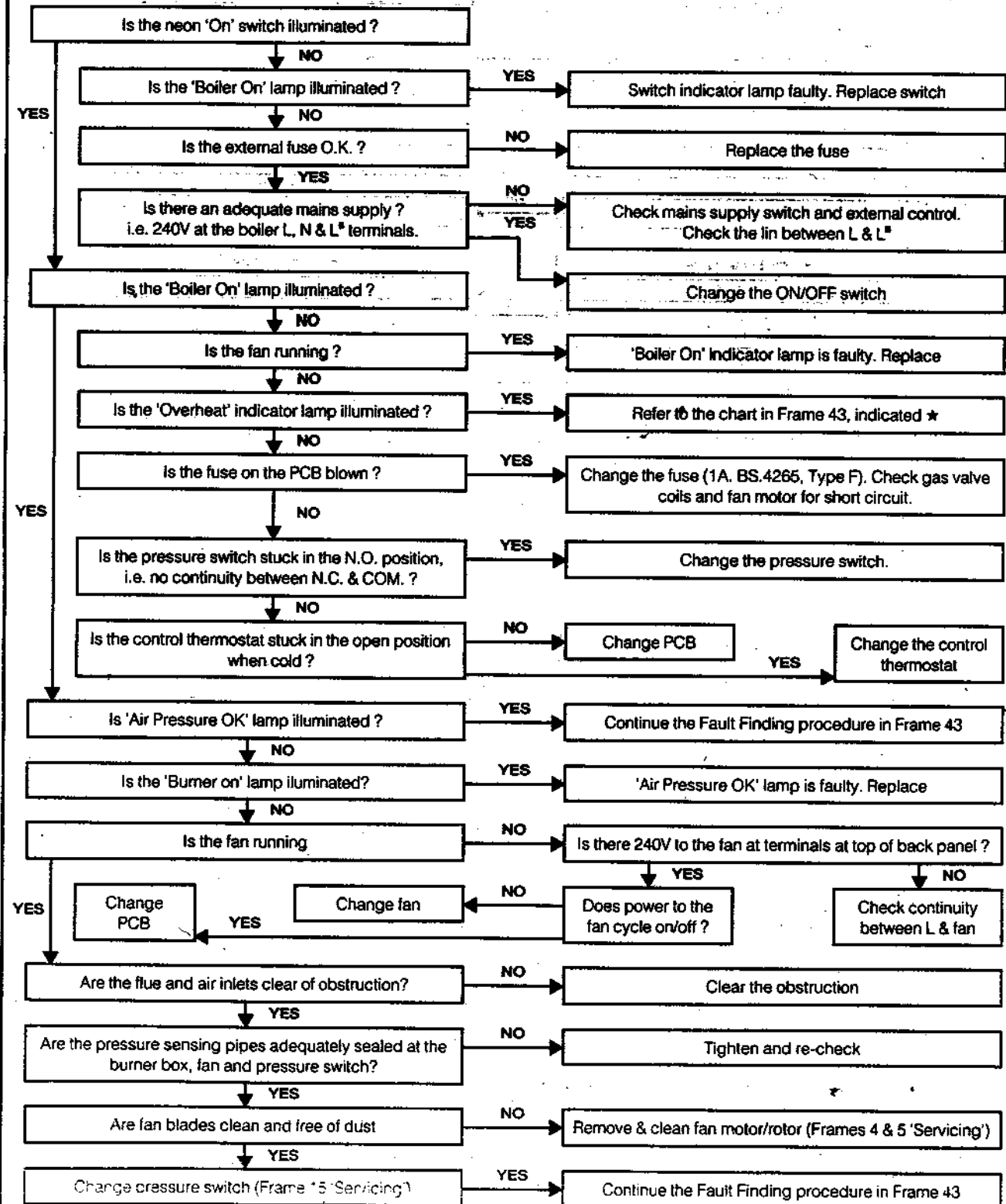
1. 'Power On' lamp illuminates in switch when in the ON position.
2. 'Boiler On' lamp is illuminated, fan starts up, pressure switch detects correct combustion air flow and makes a circuit.
3. 'Air Pressure O.K.' lamp is illuminated. Ignition spark occurs at pilot burner, pilot is ignited & a pilot flame is detected by the control box.
4. 'Burner On' lamp is illuminated. Main gas valve opens-feeding gas to the main burner which ignites. Burner continues to fire until supply to gas valve is interrupted by any external control or the boiler thermostat.

5. Should there be a fault with the control thermostat or inadequate flow of water through the boiler, the overheat thermostat will trip, illuminating the 'Overheat' lamp.
6. Should there be a problem with the heat exchanger, the flue gas overheat thermostat will trip to protect the non-metal seals, also illuminating the 'Overheat' lamp.

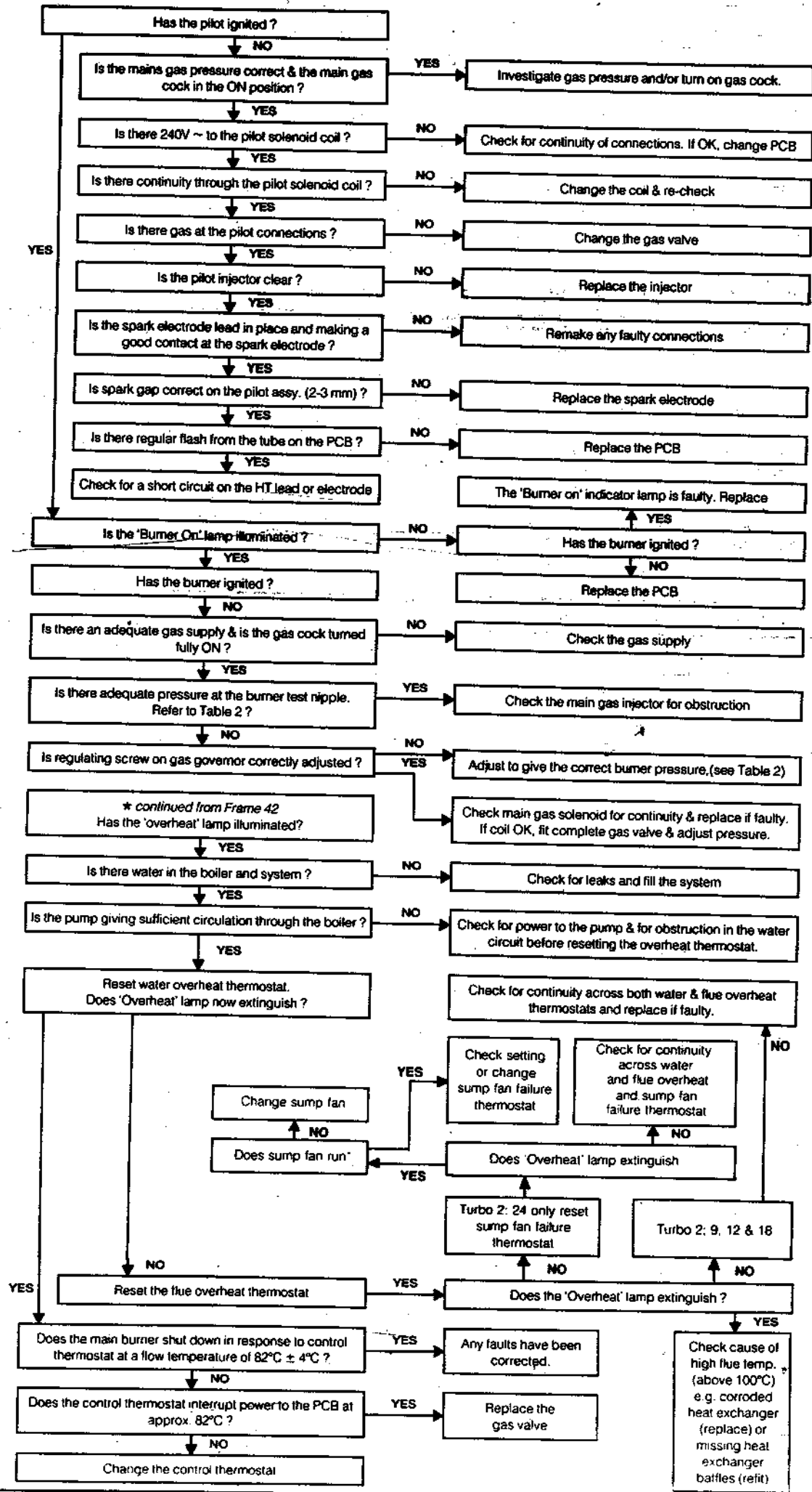
Any failure of the boiler to carry out it's normal functional sequence above should be investigated using the following fault finding chart.

Before attempting any electrical fault finding ALWAYS carry out the preliminary electrical system checks, as detailed on pages 6-9 of the Instructions for the British Gas Multimeter. On completing a service task which has required the breaking & remaking of electrical connections then the checks, 'A' earth continuity, 'C' Polarity, 'D' resistance to earth, MUST BE REPEATED.

42 SWITCH ON THE ELECTRICAL SUPPLY TO THE BOILER & ENSURE ALL EXTERNAL CONTROLS ARE CALLING FOR HEAT. TURN 'ON/OFF' SWITCH ON.



43 PROCEDURE CONTINUED FROM FRAME 42



The following list comprises parts commonly required as replacement due to damage, expendibility, or such that their failure or absence is likely to affect safety or performance.

This list is extracted from the G.C. List of Parts, which contains all available spare parts.

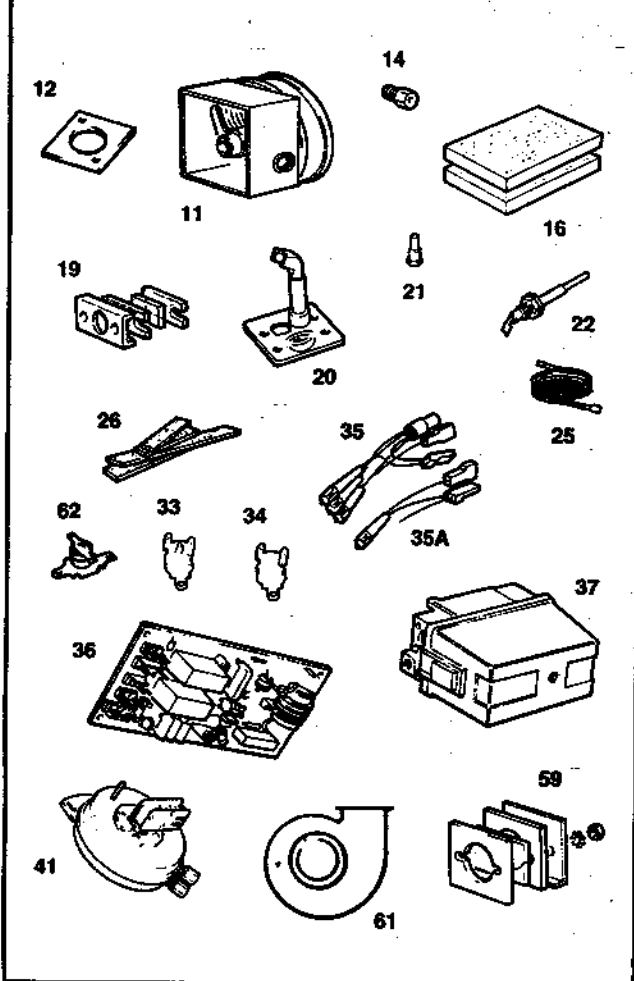
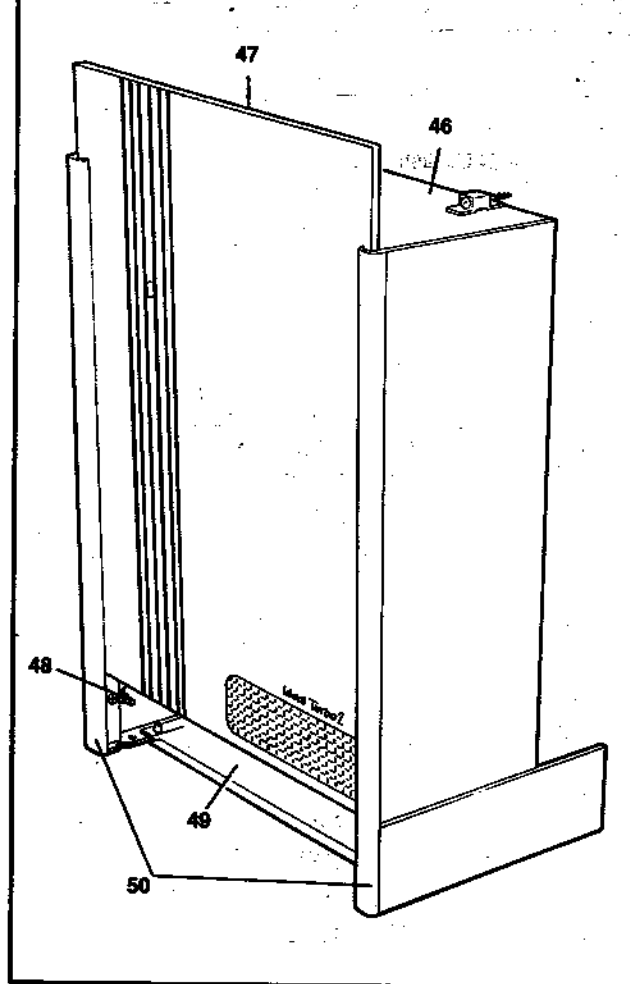
Copies of the G.C. Lists are held by Gas regions, Steirad-Ideal Distributors and by merchants.

IDEAL TURBO 2; 9, 12, 18 & 24 GAS-BOILERS

When ordering spares, please quote:-

1. Boiler Model
2. G.C. Appliance Number
3. Description
4. Maker's Part Number
5. Quantity

Key No.	GC Part No.	Description	Boiler	No. Off	Maker's Part No.
11	319 288	Fan assembly complete with sealing gaskets and nuts	All	1	199 305 015
12	319 289	Fan orifice plate	9N	1	199 305 016
	319 290	Fan orifice plate	12N	1	199 315 016
	319 291	Fan orifice plate	18N	1	199 325 016
		Fan orifice plate	24N	1	
14	398 044	Main burner injector - Bray Cat 10 size 850	9N	1	189 336 060
	398 050	Main burner injector - Bray Cat 10 size 1150	12N	1	189 346 061
	398 058	Main burner injector - Bray Cat 10 size 1600	18N	1	189 046 061
		Main burner injector - Bray Cat 10 size 2300	24N	1	
16	319 298	Burner plaques, brackets, screws and gaskets	9N	1	199 300 226
	319 219	Burner plaques, brackets, screws and gaskets	12N	1	199 310 226
	319 300	Burner plaques, brackets, screws and gaskets	18N	1	199 320 226
19	319 493	Sight glass assembly kit	All	1	160 079 333
20	383 690	Pilot burner - Honeywell Q349A 1083 with Honeywell 45000 062010 injector	9N & 12N	1	199 300 080
	383 691	Pilot burner - Honeywell Q349A 1075 with Honeywell 45000 062010 injector	18N & 24N	1	199 320 080
21	382 869	Pilot injector	All	1	589 300 083
22	383 692	Ignition electrode - Buccleuch BE/3234/S1	9N & 12N	1	589 300 089
	383 693	Ignition electrode - Buccleuch BE/3235/S1	18N & 24N	1	589 320 089
25	319 309	Flames sensing lead	All	1	589 300 091
33	382 873	Overheat thermostat - Elmwood 2455RM 98 727	All	1	589 300 030
34	382 874	Thermostat - High setting - Elmwood 2455R 98 728 with 2 taptite screws	All	1	589 300 056
35	319 321	1, 2 & 4-neon and lead sub assembly	All	1	589 300 037
35a	319 322	3-neon and lead sub assembly	All	1	589 300 038
36	319 035	Automatic ignition printed circuit board - Pactrol No. 7A	All	1	589 250 063
37	382 871	Gas control valve - Honeywell VR4700A 4006	All	1	589 300 045
41	382 875	Air pressure switch - EAC NFS 6163456	9, 12 & 18	1	589 305 051
		Air pressure switch assembly (with orifices)	24	1	
46	319 328	Boiler casing assembly - white stove enamel (less glass fascia) with sight glass assembly	All	1	199 304 030
47	319 329	Glass fascia panel	All	1	199 300 086
48	319 300	Securing catch for fascia panel	All	1	199 300 089
49	319 331	Controls casing bottom panel	All	1	199 300 087
50	319 332	Set of fascia trims	All	1	199 300 088
61	319 341	Casing sight glass assembly with gaskets	All	1	199 300 045
		Sump fan assembly	24N	1	
62		Sump fan failure thermostat	24N	1	

44 SMALL PARTS**45 BOILER CASING ASSEMBLY**

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

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