



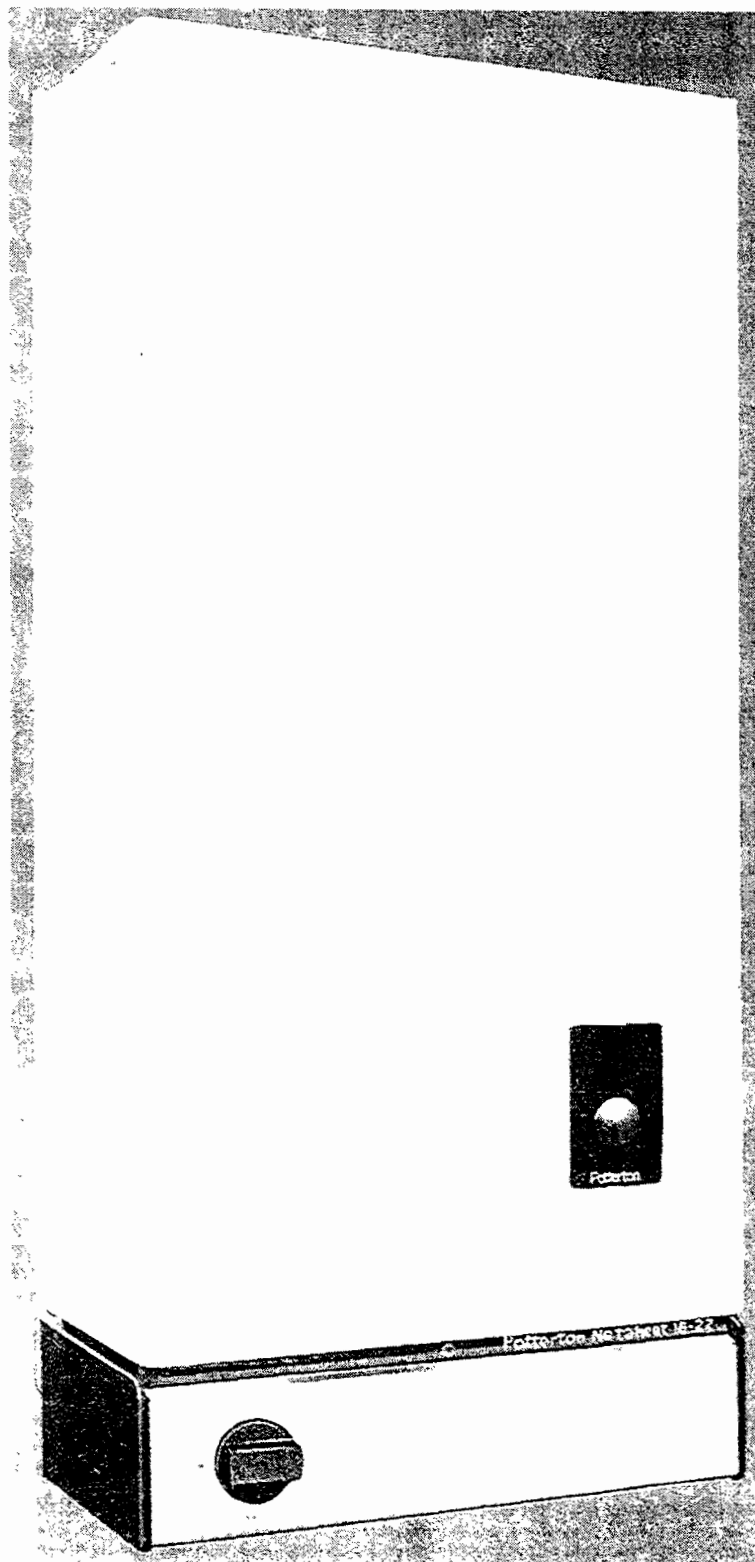
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April 1975

Potterton Netaheat Room Sealed Gas Fired Boilers

Potterton Netaheat 10 - 16 10 to 16 kW (35,000 to 55,000 Btu/h) Output

Potterton Netaheat 16 - 22 16 to 22 kW (55,000 to 75,000 Btu/h) Output



Data & Installation Instructions Potterton Netaheat Room Sealed Gas Fired Boilers

Potterton Netaheat boilers are fully automatically controlled, wall mounted, room sealed appliances, specially designed for combined gravity hot water and pumped central heating or fully pumped systems (small bore or micro-bore). The boilers have the following principal features:—

- * Cast iron "Monobloc" heat exchanger having medium capacity water content, so allowing gravity operation on the domestic hot water circuit.
- * Pipework can be run behind the boiler within its own width, enabling cupboards to be positioned close to both sides.
- * Compact, slim in width and depth; dimensioned to building modular sizes.
- * Simple one knob user control.
- * Fully automatic in operation; pilot burner only fires during main burner ignition and operation.
- * Flue fan enables a miniature flue terminal to be utilised which is unobtrusive and more easily sited on the outside wall of the building.
- * Flue discharge can be to the left, right or rear of the boiler.
- * Adjustable length flue and fresh air ducts to suit most wall thicknesses.
- * Highly efficient and designed solely for natural gas operation.
- * A wide range of heat outputs obtained from only two models.

DESCRIPTION — See Fig. 1

The Potterton Netaheat boiler has been designed for ease of installation and servicing. Because of its slim dimensions and wall mounting characteristics, it blends easily with other kitchen furniture and saves valuable floor space. It can be fitted on an outside wall, or on an internal wall as long as it is adjacent to an outside wall. The boiler can also be installed in cupboards or other confined spaces as long as these are suitably ventilated in accordance with British Standard Code of Practice 332. Part 2. All boiler components are secured to the casing back plate. A single piece cover which encloses the fan, heat exchanger and burner, seals the space inside from the room where the boiler is fitted. An easily removable drawer-shaped metal tray houses the boiler controls, but has the shaft for the thermostat knob protruding through it; this knob is the only user control. Side panels, to blank off the space between the wall and the back of the boiler, are available as optional extras.

Heat Exchanger and Burner

The heat exchanger is a single "Monobloc" casting incorporating two finned flueways and three waterways, together with two flow connections, one return connection (for the injector header) and a pocket for the thermostat phial. The capacity of the waterway is 5.7 litres (10 pts) and the resistance through the casting is such that gravity circulation at all ratings is possible on the domestic hot water circuit. The natural gas burner which is fitted immediately below the heat exchanger, has stainless steel blades mounted on a fabricated manifold which is drilled and tapped to take the main burner injectors.

Fan

The fan draws fresh air into the space formed by the boiler back plate and the removable cover. The air passes down the outside of the heat exchanger, so

helping to cool the front cover, then into the combustion chamber. Combustion products pass up through the heat exchanger and into the fluehood where, because the fan has pressurised the inside of the appliance, they are forced out through the flue duct.

Boiler Controls

The operation of the boiler is very simple with the user only having to turn the thermostat knob on or off as required. When the main inlet gas cock is turned on, gas passes up to the solenoid valve. The main electricity supply is then switched on and the thermostat turned on and to the required temperature. This turns on the fan which runs for a 10 to 15 second purge period before the pressure switch, sensing the fan running, closes. Once the pressure switch contacts have closed, the solenoid valve is energised and opens, allowing gas to pass through the governor, up to the mercury vapour flame failure valve and also to the pilot burner. At the same time, the automatic electronic spark generator operates and the pilot is ignited. When the pilot has lit, the spark generator senses a change in resistance due to the presence of the pilot flame, and the spark is cut off, although the system is still energised so that if the flame should go out, the pilot would then automatically relight.

The pilot flame heats up the phial of the flame safety valve and after about 30 seconds, the mercury vapourises, expands and opens the valve allowing gas to the main burner which ignites.

To turn the boiler off, the thermostat knob must be turned to the off position and the boiler will shut down. If there is a gas or electricity power cut at any time while the boiler is operating it will immediately shut down, but as soon as the power supply is restored, it will relight automatically. The controls system is so designed, that any failure in a component is detectable causing the boiler to shut down, before any dangerous condition could arise.

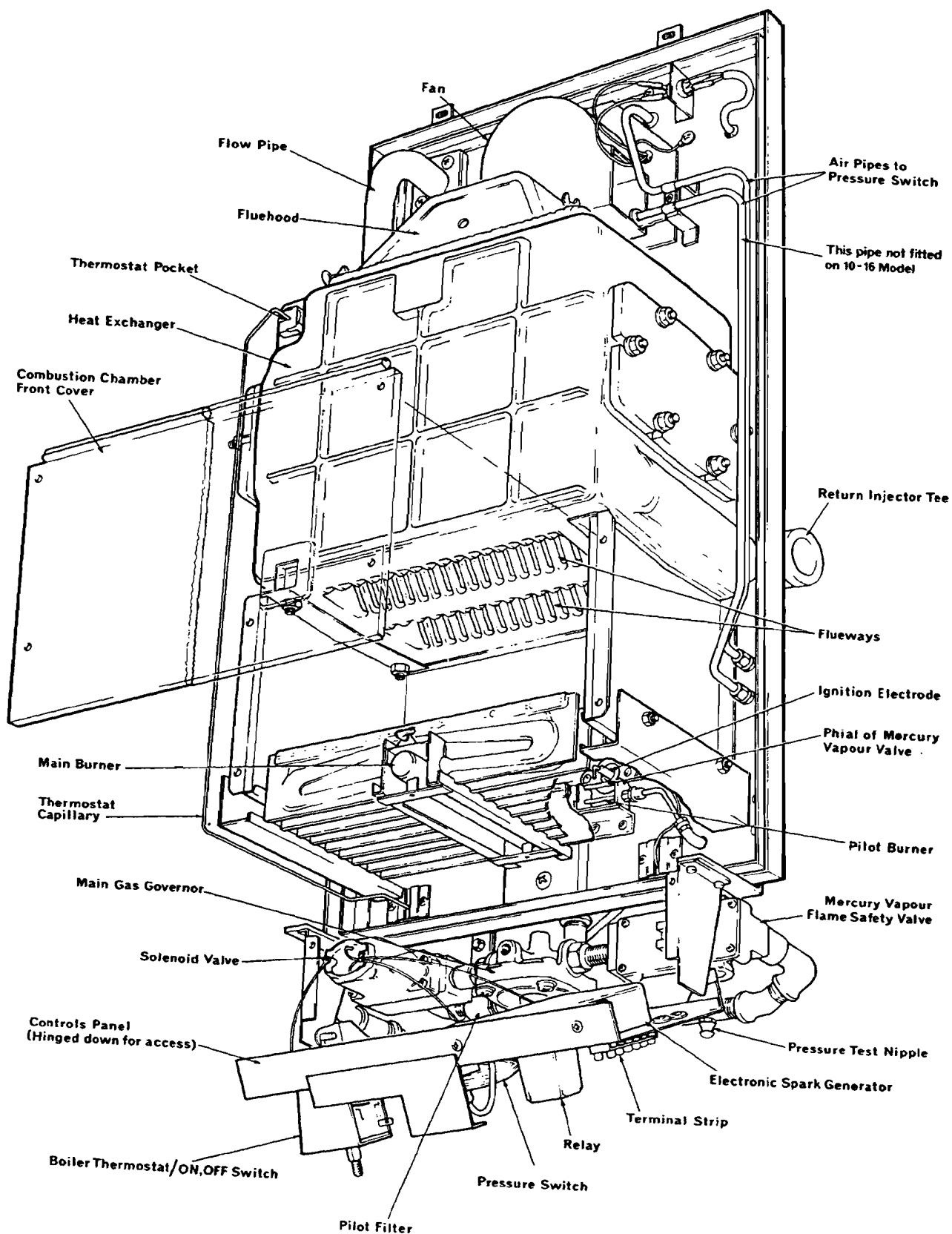


Fig. 1 GENERAL ARRANGEMENT

The thermostat knob can be set to OFF, Min. 1, 2, 3, 4 and Max. The graduations Min. to Max. correspond approximately to a temperature range of 55°C–85°C (130°F–185°F). A pump over-run thermostat, used only when the boiler is installed in a fully pumped system, is incorporated, and will operate when the water temperature within the boiler is in excess of approximately 70°C (160°F). A drop of approximately 11°C (20°F) will occur before the thermostat will switch the pump off.

A schematic wiring diagram, showing the boiler control system is given in Fig. 11.

Balanced Flue Terminals and Ducting

The fresh air inlet and flue ducts can be run from either the left, right or rear of the boiler to a miniature terminal on the outside wall of the building. The ducts on the 10-16 model are suitable for any wall thicknesses up to 380mm (15 in.) using a side outlet or 510mm (20 in.) with a rear outlet. The ducts of the 16-22 model are suitable for wall thicknesses of up to 406mm (16 in.), but for installations where a rear outlet is to be used, an extension sleeve which can be fitted between the two halves of the telescopic trunking, is available as an optional extra. With the sleeve fitted, wall thicknesses of up to 510mm (20 in.) can be catered for. The siting of the balanced flue terminal on the outside wall of the building is not critical although if it discharges at a low level, a terminal guard, supplied as an optional extra, should be fitted in accordance with Building Regulations. The terminal should be installed in accordance with British Standard Code of Practice CP.337.

THE SYSTEM

Potterton Netaheat boilers have been specially designed for combined systems e.g. small bore or micro-bore central heating with an indirect domestic hot water supply which can either have pumped or gravity circulation; the boiler can also be used for pumped central heating only. The boiler can be installed in most types of system, but the following notes are given as a general guide.

All systems should be designed so that the static head of the boiler is between a minimum of 305mm (1 ft.) and a maximum of 27.5m (90 ft.). To ensure that the minimum 305mm (1 ft.) static head is obtained, the level of the cold water in the expansion tank must not be lower than the top of the boiler casing.

If a minimum 305mm (1 ft.) head is used, extra care should be taken when designing the system, to ensure that pumping over or sucking down at the vent pipe cannot occur.

All gravity domestic systems should have a minimum effective circulating head of 1200mm (4 ft.).

A typical combined gravity system is shown in Fig. 12.

A fully pumped system giving temperature control of the central heating circuit via a room thermostat and one two-way valve is shown in Fig. 15.

Using the boiler as supplied, independent temperature control of the domestic hot water cylinder can only be applied when using fully pumped systems. If temperature control is required on a gravity hot water system, additional relays are required and full details are shown in Fig. 13.

For independent temperature control of both the central heating and domestic hot water circuits, a three-way valve with a central position can be used. This type of valve can give a flow to either circuit separately or to both circuits simultaneously. For the wiring of this type of valve refer to the valve manufacturers literature and the information given in 6. Wiring.

Independent temperature control of both circuits can also be obtained by using room and cylinder thermostats and a two-position diverter valve. This valve provides a flow to one circuit at a time and details are shown in Fig. 14.

The use of two two-way valves and associated electrical relays will also give independent temperature control of both circuits and full wiring details of this type of system are also given in Fig. 15.

A further method of providing independent temperature control in conjunction with room and cylinder thermostats, is by using two pumps. Details are given in Fig. 16. In addition to the system diagrams shown, full wiring details are also illustrated. It is recommended that when installing these systems, an indirect cylinder with a coil type of heat exchanger is used. No system should be designed in which it is possible to completely close both the domestic hot water and central heating circuits, and to obtain this, a by-pass should be fitted between the boiler flow and return pipework, capable of passing at least 1 gall. per min.

As the boilers are wall hung, a drain cock should be included at the lowest point in the central heating system. When selecting a circulating pump for the central heating system, the following data should be borne in mind:

Gravity Primary/Pumped Central Heating Systems

The resistance through the boiler heat exchanger plus the injector tee and nozzle is equal to 68.5 mbar* (27½ in. w.g.) at a flow rate of 27.25 litres/min. (6 galls/min.) see Fig. 2.

Pumped Primary Systems

The resistance through the heat exchanger and the injector tee only, is equal to 25 mbar (10 in. w.g.) at a flow rate of 27.25 litres/min. (6 galls/min.), when using the 1 in. flow connection or 43.75 mbar (17.5 in. w.g.) at the same flow rate when using the ¾ in. flow connection, see Fig. 2. If other controls, such as three-way valves are used in this type of system, the resistance through them, quoted in their manufacturers literature, must be taken into account. The circulating pump may be fitted on either the flow or return side of the boiler. If fitted on the flow, the central heating circuit will be under a positive pressure, so reducing the risk of air being drawn into the system, but if the pump is on the return there will be a negative pressure in the circuit; this applies with systems designed as illustrated in Figs. 12, 13, 14, 15 & 16.

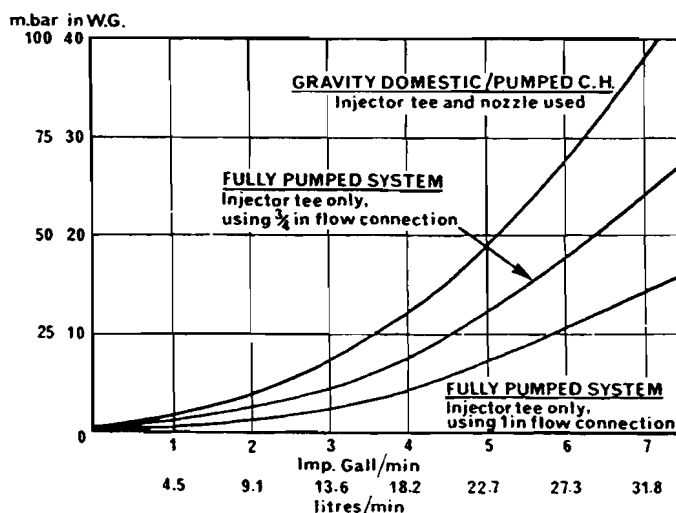


Fig. 2 PRESSURE LOSS ACROSS BOILER

SITE REQUIREMENTS

Ensure that the gas supply pipe and meter are large enough for this appliance and any others that may be run off the same meter: if not, contact the local Gas Regional Office. The boiler can be installed at any height (refer to Clearances Around the Boiler and the static head requirements) on an outside wall or on an internal wall providing that one side of the boiler is next to an outside wall. The recommendations of the relevant British Standards Codes of Practice should be followed.

Boiler Mounting Surface

The boiler must be mounted on a flat wall of non-combustible material sufficiently robust to take the

weight of the boiler. The requirements of the local authorities and the Building Regulations must be adhered to.

Clearances Around the Boiler – See Fig. 3

Any position selected for the boiler must give the following minimum clearances which are necessary for installation and maintenance.

910mm (3 ft.) at the front of the boiler

100mm (4 in.) at the top

250mm (10 in.) at the bottom

As all pipes can be run behind the boiler within the casing width, no clearance is needed at the sides.

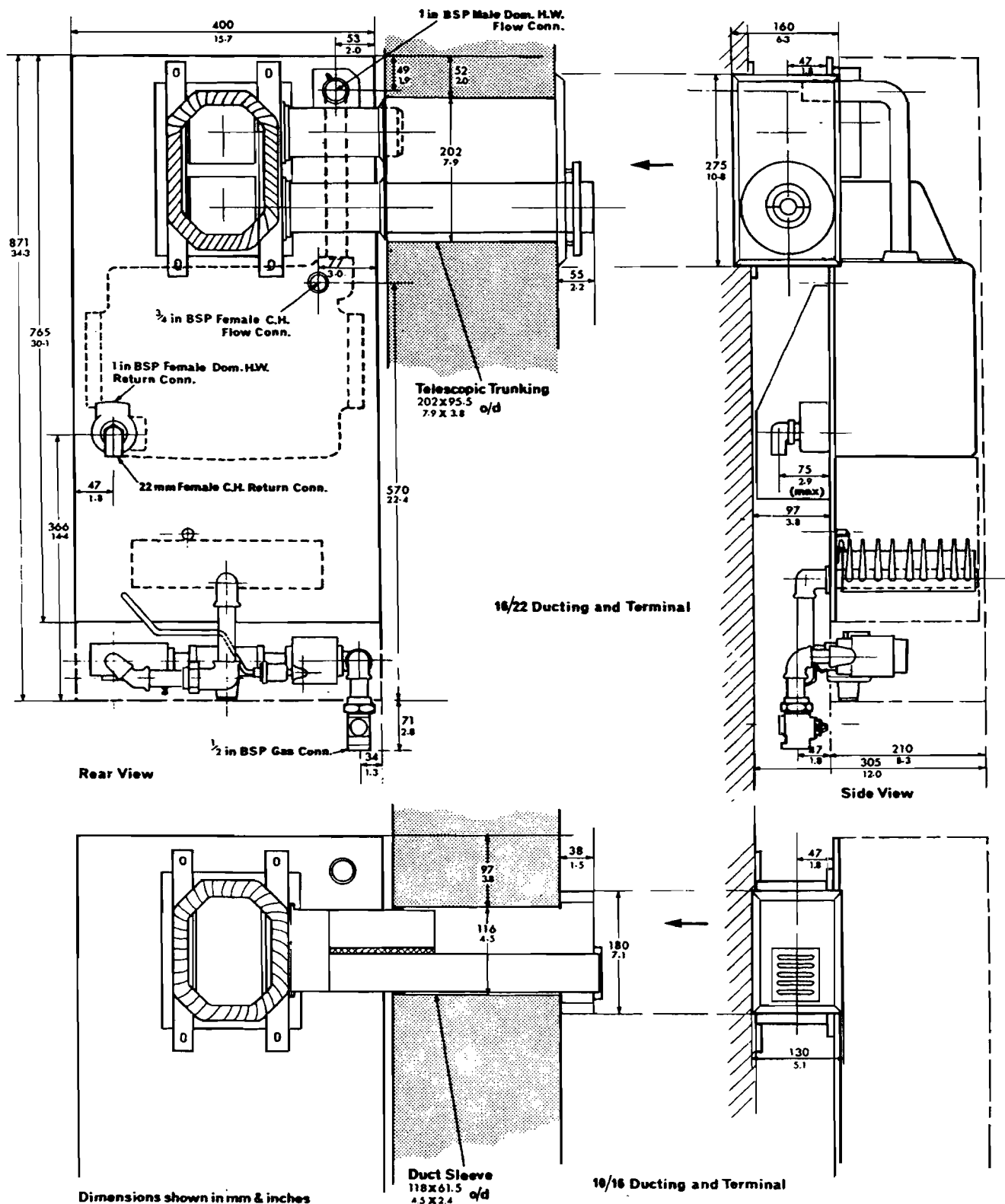


Fig.3 CONNECTIONS AND DIMENSIONS
(See also Fig. 8)

Ventilation

If the boiler is to be installed in a confined space such as a cupboard, the space will need ventilating. Openings should be provided at the top and bottom of the cupboard each of which should have a free area as follows:—

Potterton Netaheat	Free Area	
	Sq. in.	Sq. cm.
10 - 16	28	181
16 - 22	38	245

If the openings draw air from outside the building, the above free areas may be halved. Refer to British Standard Code of Practice CP.331, Part 1 1968 for further guidance.

Electricity Supply

A 240 volts a.c. 50 Hz. single phase electricity supply fused to 3 amps must be provided in accordance with the latest edition of the Institute of Electrical Engineers Regulations for the Electrical Equipment of Buildings and Local Authorities and British Gas requirements. The current rating of the wiring to the boiler must exceed 3 amps and must include an isolating switch or plug and socket; a double-pole switch is recommended.

MAINTENANCE

The efficient performance of this boiler is dependent upon regular servicing which should be carried out annually. Maintenance is best arranged by a contract placed with the Local Gas Regional Office or a qualified service engineer. In certain areas, a contractual service can be arranged direct with Potterton International and your local Potterton area office should be contacted for advice.

All parts likely to require servicing are easily accessible. By sliding the cover from the boiler controls and removing the front cover from the boiler, most components are exposed. It is then a simple matter to remove the front of the combustion chamber to gain access to the main and pilot burners and the ignition electrode. Removal of the fluehood which is secured by four wing-nuts, gives access to the flueways in the heat exchanger.

SETTING UP

Each boiler has to be adjusted once it has been installed and this is a skilled job which should only be carried out by suitably qualified engineers. Potterton International offer this service at a nominal charge.

GENERAL DATA

Potterton Netaheat 10 - 16	- Input: 12.9 to 20.2 kW (44,000 to 69,000 Btu/h) - Output: 10.25 to 16.1 kW (35,000 to 55,000 Btu/h)
Potterton Netaheat 16 - 22	- Input: 21.7 to 28.7 kW (74,000 to 98,000 Btu/h) - Output: 16.1 to 22.0 kW (55,000 to 75,000 Btu/h)
Maximum Working Head:	27.5m (90 ft.)
Weight:	Installed — 72.6 kg. (160 lbs.) Installer lifting weight — 56.7kg. (125 lbs.)
Water Content:	5.7 litres (10 pts)

CONTROLS:

Main Gas Cock:	½ in. BSP union fixed Fan Cock.
Solenoid Valve:	½ in. BSP Essex Controls.
Main Gas Governor:	½ in. BSP Jeavons or ½ in. BSP Evered.
Mercury Vapour Flame Safety Valve:	¼ in. BSP Concentric, 10 - 16 only ½ in. BSP Concentric, 16 - 22 only
Pressure Switch:	Honeywell, CN150B100.
Thermostat:	Ranco, C77 - P0102.
Relay:	Engle and Gibbs MP2 or Keyswitch KMK 2P.
Fan:	Smiths FFB 0219.
Pilot Burner:	Concentric, MF 246.
Main Burner:	Potterton.
Ignition Electrode:	Kigas, D4748.
Spark Generator:	Plessey, 407/1/72043/001.
Pilot Filter:	Harper Wyman or Concentric.
Circuit Protector:	1 amp fuse. This rating must not be exceeded.

ADDITIONAL CONTROLS

The Potterton Mini-Minder time control, which is a wall-mounted electric programmer giving a choice of programmes for both central heating and domestic hot water systems, is available as an optional extra. The Mini-Minder is fully described in its own Data Sheet which is available on request.

TECHNICAL LITERATURE

The following literature is supplied with each boiler:—
Data and Installation Instructions.
User's Guide.

INSTALLATION INSTRUCTIONS

1. General

The boiler and its associated equipment will arrive on site in two cardboard cartons. The contents of each carton is as follows, see Fig. 4.

CARTON NO. 1:

1. Installation Instructions
2. Template
3. Accessories Card
4. Balanced flue terminal and ducts.
5. Boiler Combustion chamber front cover.
6. The controls cover.
7. Mounting channel with rubber strip, and metal bearing plate and adjusting shims.
8. Telescopic trunking - 16 - 22 only.

9. Duct sleeve - 10 - 16 only.
10. Duct sealing flange and gaskets - 16-22 only.
11. The boiler front cover.
12. Safety strap.

CARTON NO. 2:

The boiler packed on its back. The boiler will be supplied without its combustion chamber front cover fitted so giving a hand hold at the underside of the heat exchanger inside the combustion chamber, when lifting the boiler into position. Two wooden feet will be found attached to the bottom of the boiler and these are to protect the controls during handling and also allow the appliance to be stood vertically prior to lifting it onto the wall.

All items in Carton No. 1 are packed so that they are easily removable in the sequence required.

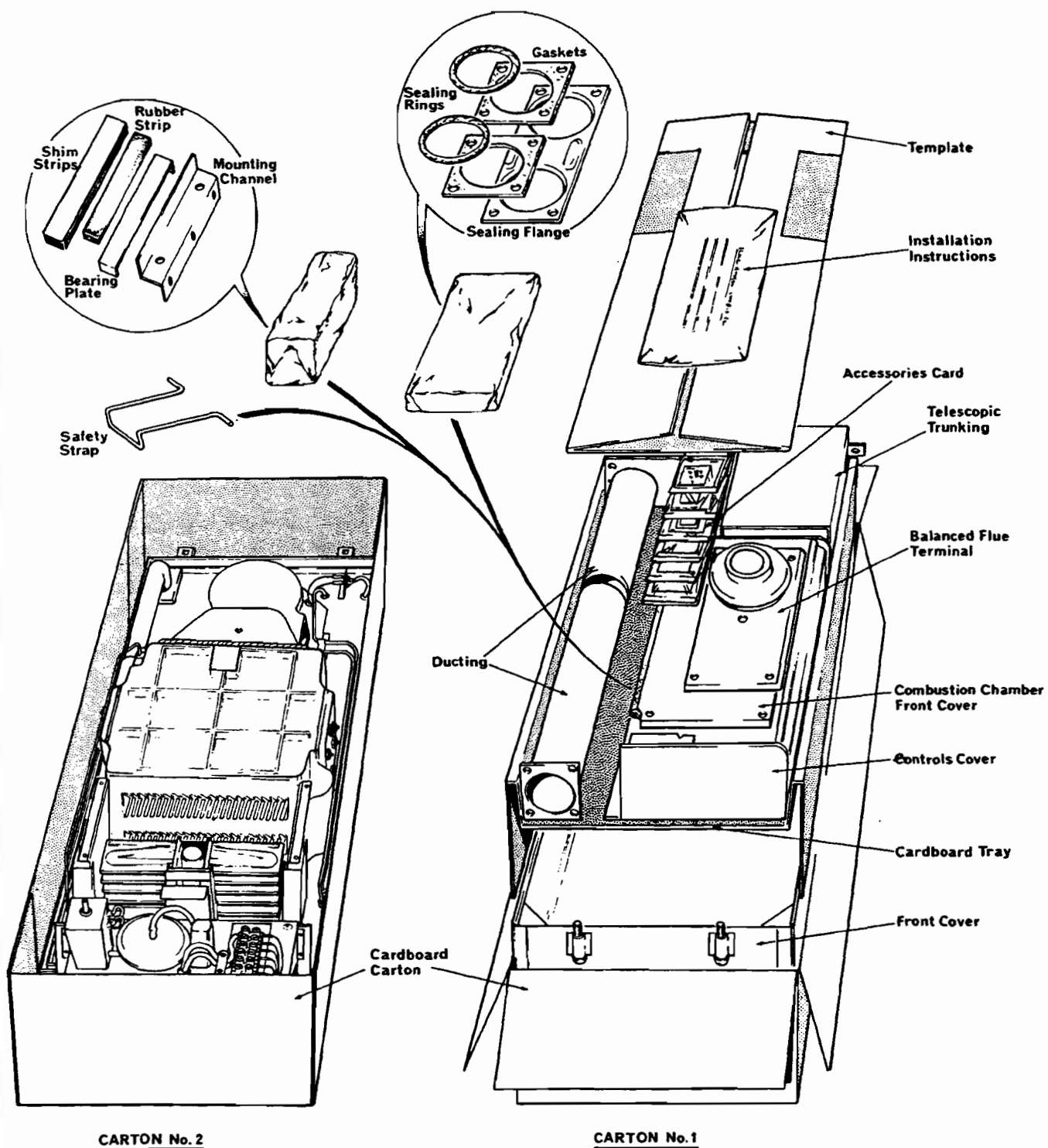


Fig.4 PACKAGING AND IDENTIFICATION OF COMPONENTS

2. Fitting the Boiler Mounting Channel

Note: The cardboard template has been designed for marking out the wall for boilers with either a rear or side flue outlet. If a side outlet is to be marked, it has been assumed that the boiler will be fitted tightly into the corner. However, allowance should be made if the corners of the wall are not square or vertical, by positioning the template and therefore the boiler, up to a maximum of 1 in. from the outside wall. This can be done by marking the centre of the boiler position on the wall, then using a spirit level or plumb line, dropping a long centre line which can then be lined up with the boiler centre line marked on the template.

A. Using the template, mark out the three screw holes on the wall where the boiler mounting channel is to be positioned, the four screw holes above the mounting channel where the plenum chamber is to be fitted, and the position of the flue and fresh air ducts on the wall.

B. Drill the three holes for the mounting channel securing screws and insert No. 12 Rawlplugs (Accessories Card Item A); fit and secure the channel using the 2 in. No. 12 counter-sunk headed woodscrews cup and flat washers; check that the channel is level. Place three of the six metal adjusting shims in the mounting channel followed by the rubber strip, then the metal bearing plate. Retain the remaining three shims.

Note: The thickness of the wall plaster in some older properties could be excessive and in these instances, it is recommended that 2½ in. long securing screws are used in operation B.

C. Drill the four holes for the plenum chamber securing screws and insert No. 12 Rawlplugs (Accessories Card Item B); do not fit the plenum chamber at this stage.

D. Cut the hole in the wall for the flue and fresh air ducts. Care should be taken when cutting the hole for a rear outlet boiler, that the screw holes for the plenum chamber are not damaged. Make good the inside and outside surface of the wall, if necessary, and also ensure that the face of the wall where the plenum chamber is to be fitted is flat.

E. Open Carton No. 2.

F. Unscrew and remove the wingnuts securing the fluehood, then lift off the fluehood, see Fig. 9. Discard the paper gasket.

G. Disconnect the three electrical leads from the fan, then unscrew and remove the bolts securing the fan. Lift off the fan, see Fig. 9.

H. Unscrew and remove the bolts securing the plenum chamber, see Fig. 9.

J. Remove the boiler from its carton and lay it front face downwards on a protective surface, such as its own carton. Take care not to damage the shaft of the thermostat.

3. Fitting the Ducting, Plenum Chamber and Balanced Flue Terminal

A. Potterton Netaheat 10 - 16 only — See Fig. 5.

- (1) Fit and cut the wall liner to size, terminating it flush with the inside and outside wall faces of the building. Ensure the ends are square.
- (2) The plenum chamber has two connections for the fresh air and flue ducts, one to one side and the other to the rear. One of these connections is blanked off with a sealing plate and gasket and depending on the direction the ducts are to be connected to the boiler, these should be re-positioned by the installer if necessary. The single side

connection can be used either for a left or right hand duct arrangement, simply by rotating the plenum chamber to the required position. With a rear outlet, the smaller opening in the plenum chamber, the air duct, must be positioned uppermost.

(3) Fit the inlet and outlet duct assembly to the plenum chamber using the six screws (Accessories Card Item C) and interposing the gasket. Ensure that the short air inlet duct is fitted uppermost.

(4) Temporarily secure the plenum chamber to the wall using the four 2 in. No. 12 counter-sunk headed screws, cup and flat washers (Accessories Card Item B), positioning the flue and fresh air ducts inside the wall liner.

(5) Mark off the lower flue duct at a point where it protrudes 41mm (1.6 in.) from the outside wall of the building. This dimension is important. Mark off both ducts at a point where they enter the wall liner.

(6) Remove the plenum chamber and liner from the wall, then cut the flue duct to size, removing all burrs.

Note: The upper air duct is already sized to suit wall thicknesses down to 205mm. (8 in.). It will only need shortening if the wall thickness is less than this in which case, cut it so that at least 25mm. (1 in.) protrudes inside the wall.

(7) On boilers using a side outlet only, position the duct assembly inside the liner, aligning the mark on the ducts with the entrance of the liner. Flatten the 13mm asbestos rope supplied, then force it into the gap between the ducts and the liner.

WARNING: IT IS VITAL THAT A GOOD SEAL IS MADE ALL AROUND BOTH DUCTS.

(8) On boilers using a rear outlet only, position the wall liner inside the wall separately as in this instance, the 13mm asbestos rope is not required. The rope on the rear of the plenum chamber provides the necessary seal.

(9) Position the ducts and liner assembly inside the wall, then secure the plenum chamber to the wall with four 2 in. No. 12 screws, cup and flat washers (Accessories Card Item B). Ensure the chamber is mounted squarely.

Note: The thickness of the wall plaster in some older properties could be excessive and in these instances, it is recommended that 2½ in. long screws are used.

(10) Measure the distance from the bottom of the box section of the plenum chamber to the top of the metal bearing plate in the boiler mounting channel, see Fig. 6. Compare this dimension with the nominal dimension of 338mm. (13.5/16 in.) and by adding additional shims or removing those already in position, adjust the measured distance to equal the nominal measurement, $\pm 1.5\text{mm}$ (1/16 in.) If a more coarse adjustment is necessary, the plenum chamber and mounting channel can be moved slightly up or down on the wall using the elongated holes in their mounting flanges. It is essential that this dimension is accurately obtained, otherwise once the boiler is lifted onto its mounting channel, the screw holes in the boiler back plate will not align with those in the plenum chamber.

(11) Make good the inside and outside wall surfaces around the liner as necessary.

- (12) Fit the balanced flue terminal over the end of the flue duct, ensuring that the duct is located inside the outlet aperture on the terminal. Secure the terminal to the wall with the two size 8, 1 in. long screws supplied (Accessories Card Item E). Note: When fitting the terminal, observe the "Top" mark on the terminal.

- (13) Remove the flue outlet grille from the terminal, then seal the gap between the outlet duct and the terminal with the sealing strip supplied.
- (14) Refit the outlet grille to the terminal so that it will direct the flue gasses sideways or downwards away from any obstruction, window, doorway, footpath or plastic pipe.

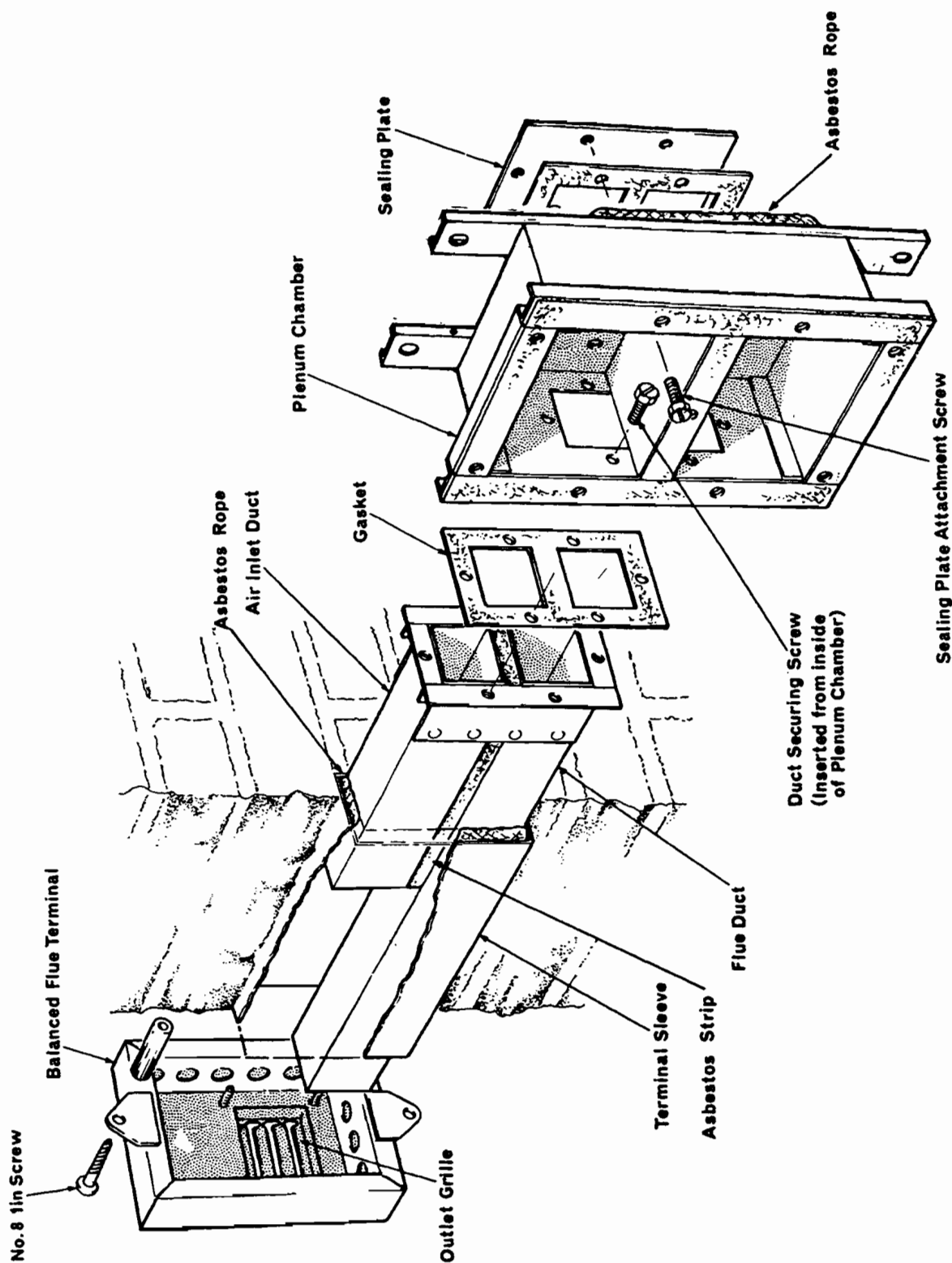


Fig. 5 ARRANGEMENT OF NETAHEAT 10/16 DUCTS

B. Potterton Netaheat 16 - 22 only — See Fig. 7.

- (1) The plenum chamber has two connections for the fresh air and flue ducts, one to one side and the other to the rear. One of these connections is blanked off with two sealing plates and gaskets and depending on the direction the ducts are to be connected to the boiler, these should be re-positioned by the installer if necessary. The single side connection can be used either for a left or right-hand duct arrangement, simply by rotating the plenum chamber to the required position. With a rear outlet, the smaller opening in the plenum chamber (air duct) must be positioned uppermost.
- (2) Fit the inlet and outlet duct assembly to the plenum chamber using the eight screws (Accessories Card Item C) and interposing the two gaskets. Ensure that the short air duct is positioned uppermost.
- (3) Temporarily secure the plenum chamber to the wall using the four 2 in. No. 12 screws, cup and flat washers (Accessories Card Item B), positioning the flue and fresh air ducts through the wall.
- (4) Mark off the lower flue duct at a point where it protrudes 32mm (1.3 in.) from the outside wall of the building.
- (5) The upper air duct is already sized to suit wall thicknesses between 230mm and 380mm (9 to 15in.) and will only need shortening, if the wall is less than 230mm (9 in.) thick. In this instance, cut off the nozzle end of the upper duct so that not less than 25mm (1 in.) and not more than 50mm (2 in.) protrudes inside the wall.
- (6) Remove the plenum chamber, then cut the duct(s) to size, removing all burrs.
- (7) Fit the telescopic trunking inside the wall and secure it to the inside face of the wall with two 1½ in. No. 10 screws, washers and Rawlplugs (Accessories Card Item D).
 Note: If the wall is less than 230mm (9 in.) thick both halves of the telescopic trunking will have to be cut to size at the plain ends where the two halves slide together; e.g. for a 180mm (7 in.) wall, cut 50mm (2 in.) from each half.
- (8) On boilers with a side flue outlet, slide the duct sealing flange and sealing rings onto the ducts. On boilers with a rear flue outlet, the flange and sealing rings are not required and should be discarded.
- (9) Position the ducts inside the wall, then secure the plenum chamber to the wall with four 2 in. No. 12 screws, cup and flat washers (Accessories Card Item B). Ensure the chamber is mounted squarely.
 Note: The thickness of the wall plaster in some older properties could be excessive and in these instances, it is recommended that 2½in. long securing screws are used.
- (10) Secure the duct sealing flange and sealing rings, if applicable, to the telescopic trunking using the four screws (Accessories Card Item D).
- (11) Measure the distance from the bottom of the box section of the plenum chamber to the top of the metal bearing plate in the boiler mounting channel, see Fig. 6. Compare this dimension with the nominal dimension of 338mm (13.5/16-in.) and by adding additional shims or removing those already in position, adjust the measured distance to equal the nominal measurement, $\pm 1.5\text{mm}$ (1/16 in.) If a more coarse adjustment is necessary, the plenum chamber and mounting channel can be moved slightly up or down on the wall using the

elongated holes in their mounting flanges. It is essential that this dimension is accurately obtained otherwise once the boiler is lifted onto its mounting channel, the screw holes in the boiler backplate will not align with those in the plenum chamber.

- (12) Make good the inside and outside surface of the wall around the telescopic trunking. Ensure that the flue outlet duct protrudes from the trunking in the CENTRE of the square aperture. This is essential to enable the next operation to be completed.
- (13) Fit the terminal outer wall plate in position, locating the end of the exhaust duct inside the circular connection of the wall plate grille. Loosely attach the plate to the trunking with the single M5 screw (Accessories Card Item E).
- (14) Square up the wall plate, then working through the four screw holes in the plate, mark the screw hole positions on the wall behind the plate.
- (15) Remove the wall plate, then drill and plug the four holes with No. 8 Rawlplugs (Accessories Card Item E).
- (16) Refit the wall plate, then secure it to the trunking with the single screw and to the wall with four No. 8, 1 in. long screws (Accessories Card Item E). It is essential for the correction operation of the unit, that no gap exists between the wall plate and the trunking.

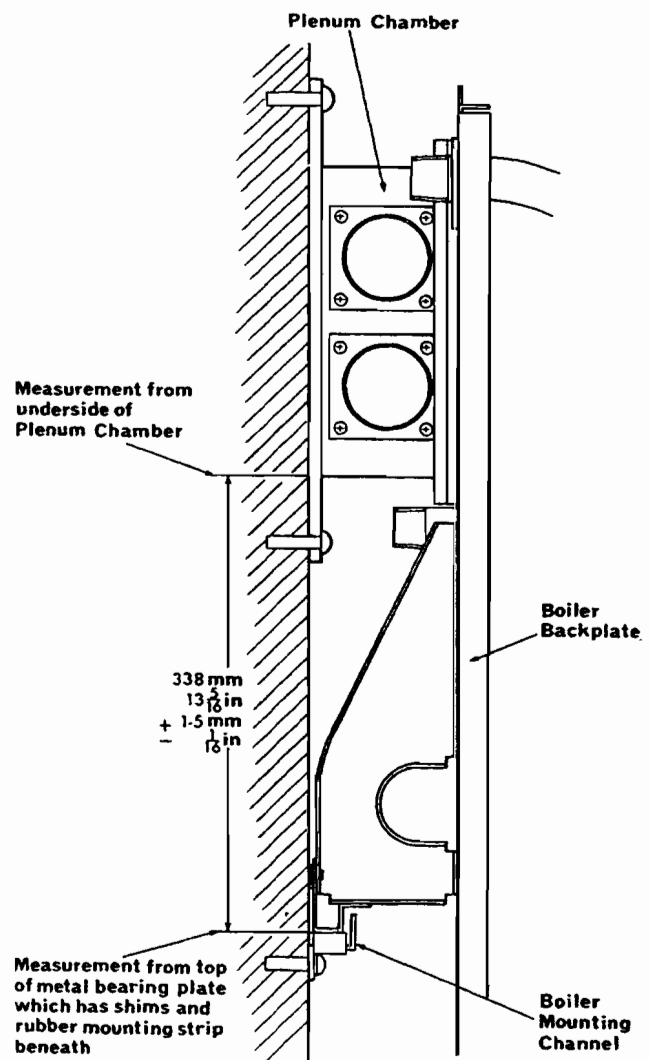


Fig. 6 RELATIVE POSITION OF PLENUM CHAMBER AND MOUNTING CHANNEL

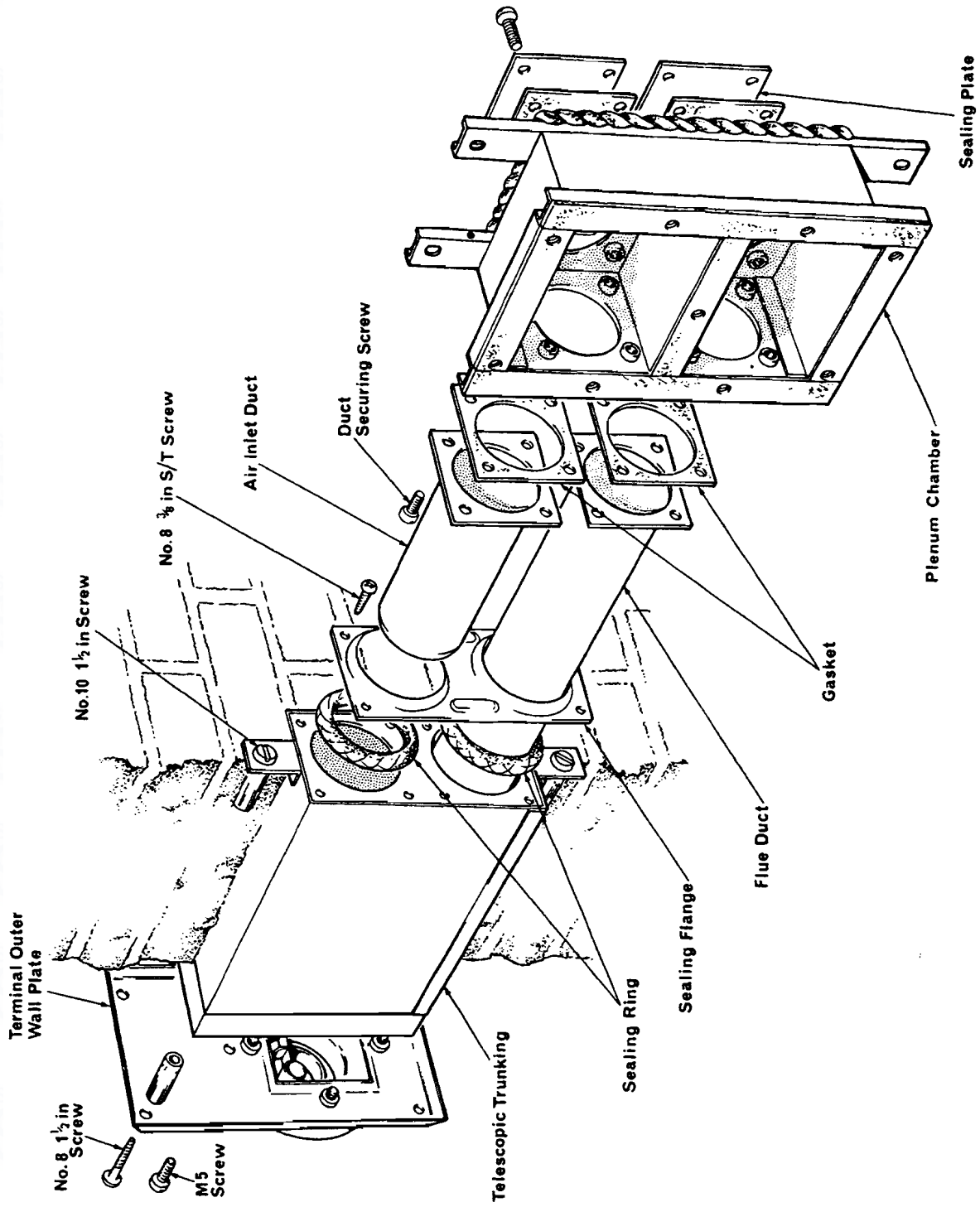


Fig. 7 ARRANGEMENT OF NETAHEAT 16/22 DUCTS

4. Preparing the Boiler

The boiler is designed so that all pipes can be hidden within its own width except where they leave the boiler at top and/or bottom. Because the water connections are behind the boiler backplate, short lengths of pipe will have to be connected to some of the tapings to be used before the boiler is lifted into position, and terminated in a position suitable for connecting to the system pipework; it is recommended that copper capillary connections are used. Although it is possible to install the boiler and its pipework with only access from the front, it is very much easier with access from at least one side. This access is not necessary for maintenance which can be carried out from the front only. The injector tee and special nozzle elbow will first have to be positioned and both joints made sound. Pipe runs must be kept clear of the areas where the plenum chamber is to be fitted and where the air inlet and flue ducts will be located if a side outlet is being used. Connections which can be used and suggested methods of running pipework behind the boiler are shown in Fig. 8. Any pipe tails running downwards from behind the boiler should not protrude below the bottom of the wooden feet. Refer to Figs. 12 to 15 for diagrams of typical systems to which the boiler can be connected.

A. Combined Gravity System

- (1) Using Fig. 8 as a guide, decide on the best pipe run at the rear of the boiler to suit the particular system.
- (2) Connect a suitable length of 28mm pipe to the domestic hot water flow connection.
- (3) Connect a suitable length of 22mm pipe to the heating flow connection. There is space behind the boiler to split the flow if necessary. The central heating circulating pump can be fitted above or below the boiler on either the flow or return as required.
- (4) Fit the injector tee and the special nozzle elbow to the boiler combined domestic hot water/central heating return connection. The 1 in. BSP side outlet in the tee for the gravity domestic return can be located in any convenient position through 360° simply by rotating the tee in its connection; this will enable it to be connected to the domestic return pipework, irrespective of the direction from which the pipework is routed. The same applies to the special nozzle elbow which must be screwed into the back of the tee; the connection in the elbow is 22mm and should be used for the heating return. When the elbow has been screwed into the tee, it should not protrude more than 95mm (3¾ in.) from the boiler backplate or it could foul the wall behind the boiler.
- (5) Connect suitable lengths of pipework to the tee and the elbow as necessary. There is space behind the boiler to combine the two heating circuits if required.

B. Fully Pumped System and Central Heating Only

- (1) Using Fig. 8 as a guide, decide on the best pipe run at the rear of the boiler to suit the particular system.
- (2) When connecting the flow pipework, it is only necessary to use one flow connection, preferably the upper 1 in. BSP with the lower ¾ in. connection being blanked off. However, in

certain circumstances where a left-hand flue terminal is being used and only a pipe run to low level is required, the lower ¾ in. BSP connection can be utilised, provided the 1 in. connection is vented. Connect a suitable length of pipe to which ever connection is to be used.

- (3) If the cold feed is to be connected into the boiler, it can be made into the 1 in. BSP tapping on the injector tee. The special ¾ in. BSP nozzle elbow can then be used for connecting the return, providing its nozzle is sawn off and any burrs removed. This is necessary to reduce the boiler resistance and to ensure correct water distribution within the heat exchanger.

If the cold feed is to be connected elsewhere in the system, the injector tee can be discarded and the return port in the heat exchanger bushed down to ¾ in. BSP and the return connected directly to the bush. Any method of connecting the return can be used, including the use of the special nozzle elbow as described previously.

Note: On systems requiring a high flow rate, the 22mm (¾ in.) pipework from the flow and return connections should be enlarged as close to the boiler as practicable.

- (4) The circulating pump can be fitted on either the return or flow in any position to suit the particular installation.

C. Boiler Main Gas Cock

- (1) The main gas cock is supplied loose but tied to the boiler and must be fitted directly to the union nut and liner already fitted to the inlet elbow. The tap must then be located in the most suitable position for operation.

NOTE: In some installations where there is a minimum clearance beneath the boiler, it may be advisable to turn the inlet elbow to the horizontal to enable the connection to be made to the cock.

- (2) Connect a suitable length of 15mm pipe to the main gas cock, terminating it above, below or to the side of the boiler in a length which can be easily connected to the main supply, once the boiler is in position on the wall.

5. Fitting the Boiler on the Wall — See Fig. 9

A metal safety strap is provided with this boiler which is used to hold the boiler backplate against the plenum chamber once the boiler has been lifted into position but before any plenum chamber securing bolts have been fitted.

This will enable the installer to leave the boiler unattended once it has been positioned, so enabling him to pick up a screwdriver etc.

The strap must first be positioned by hooking its free ends behind the upper plenum chamber securing bracket, immediately above the two upper securing screws. It can then be hinged upwards against the wall until the boiler has been fitted when it can be hinged downwards, so holding the backplate against the plenum chamber.

- A. Stand the boiler on the floor in a vertical position, then using the two wooden feet, the cast iron flow pipe and the underside of the heat exchanger, lift the boiler into position on the wall, locating its mounting bracket on the bearing plate in the mounting channel. Support the boiler in this position using the safety strap if necessary, then secure the boiler backplate to the plenum chamber with seven bolts, see bolts numbered 1 to 7 on Fig. 9. Three bolt holes in the boiler backplate are marked with a ring and these are for use when fitting the fan and must not be used in this operation.

- Warning:** (1) Take care not to damage the igniter housing on the back of the boiler, adjacent to the boiler main mounting bracket.
- (2) When fitting the bolts in A, the weight of the boiler could distort the boiler support bracket so making it difficult to line up the bolt holes in the boiler back plate with those in the plenum chamber. If this should occur, the weight of the boiler should be supported until the bolts are correctly engaged.

- B. Fit the fan in position and secure it to the boiler backplate with the three bolts, numbered 8 to 10 on Fig. 9. Connect the two mains electrical leads to their connections on the boiler backplate and the earth lead to the earth screw also on the backplate.

Warning: It is very important that when tightening the bolts in operations A and B that good seals are made. All bolts must be tight.

- C. Refit the fluehood to the heat exchanger, ensuring that a good seal is made at the plenum and that all the plenum fixing bolts have been fitted and are tight. Secure the hood in position with the four wingnuts and washers; ensure the wingnuts are tight, and that the hood makes a good seal with the heat exchanger.
- D. Fit the combustion chamber front cover, securing it with the four screws (Accessories Card Item F).
- E. Unscrew the wingnuts and remove and discard the two wooden feet taking care not to damage the capillary of the mercury vapour flame safety valve.
- F. Connect the main gas supply to the length of pipe fitted to the $\frac{1}{2}$ in. BSP gas cock.
- G. Connect the short lengths of pipe previously fitted to the boiler, to the system pipework, then fill and vent the water system and test for leaks. Rectify if necessary.

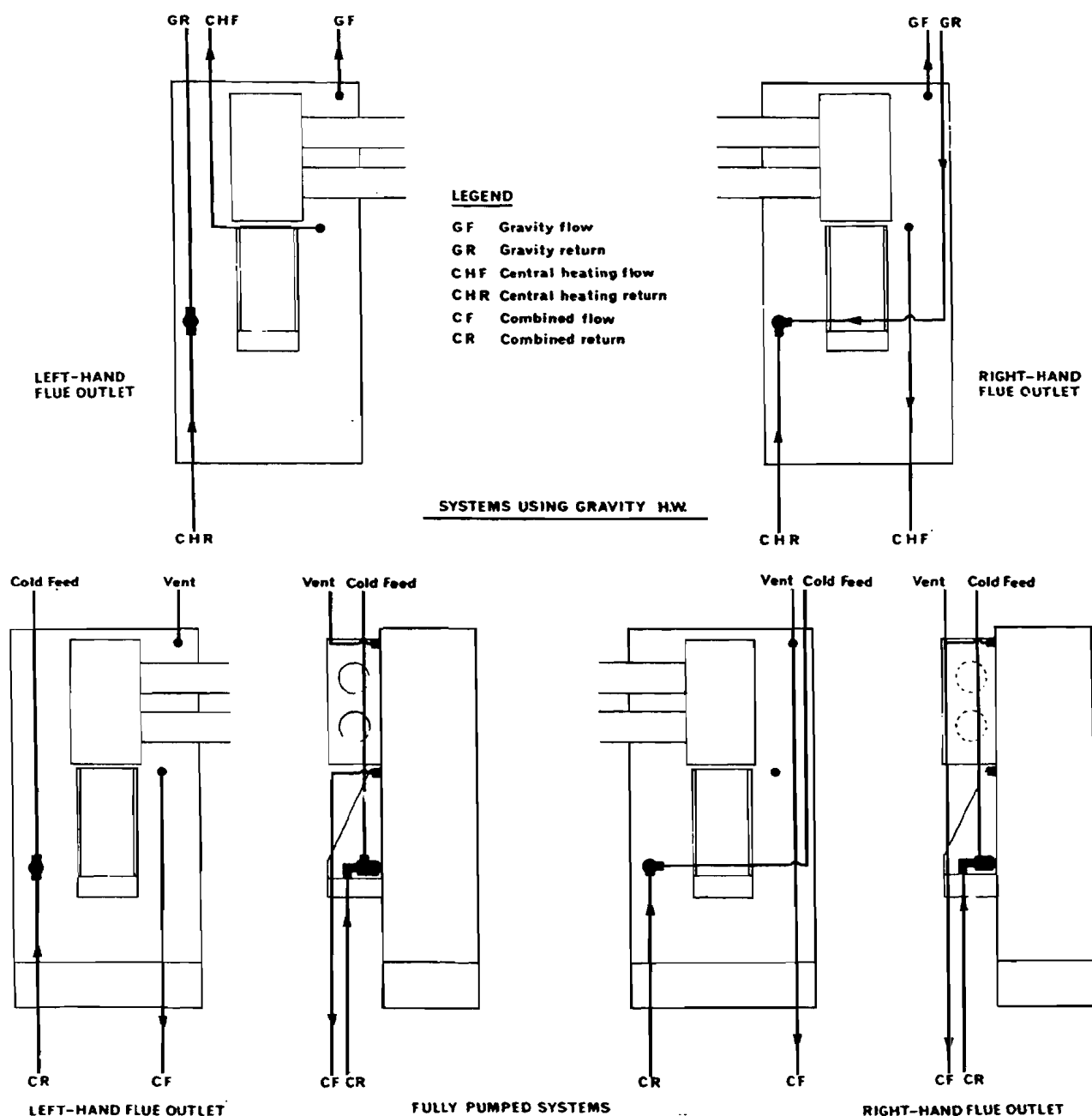


Fig. 8 SUGGESTED PIPEWORK VIEWED FROM BEHIND BOILER

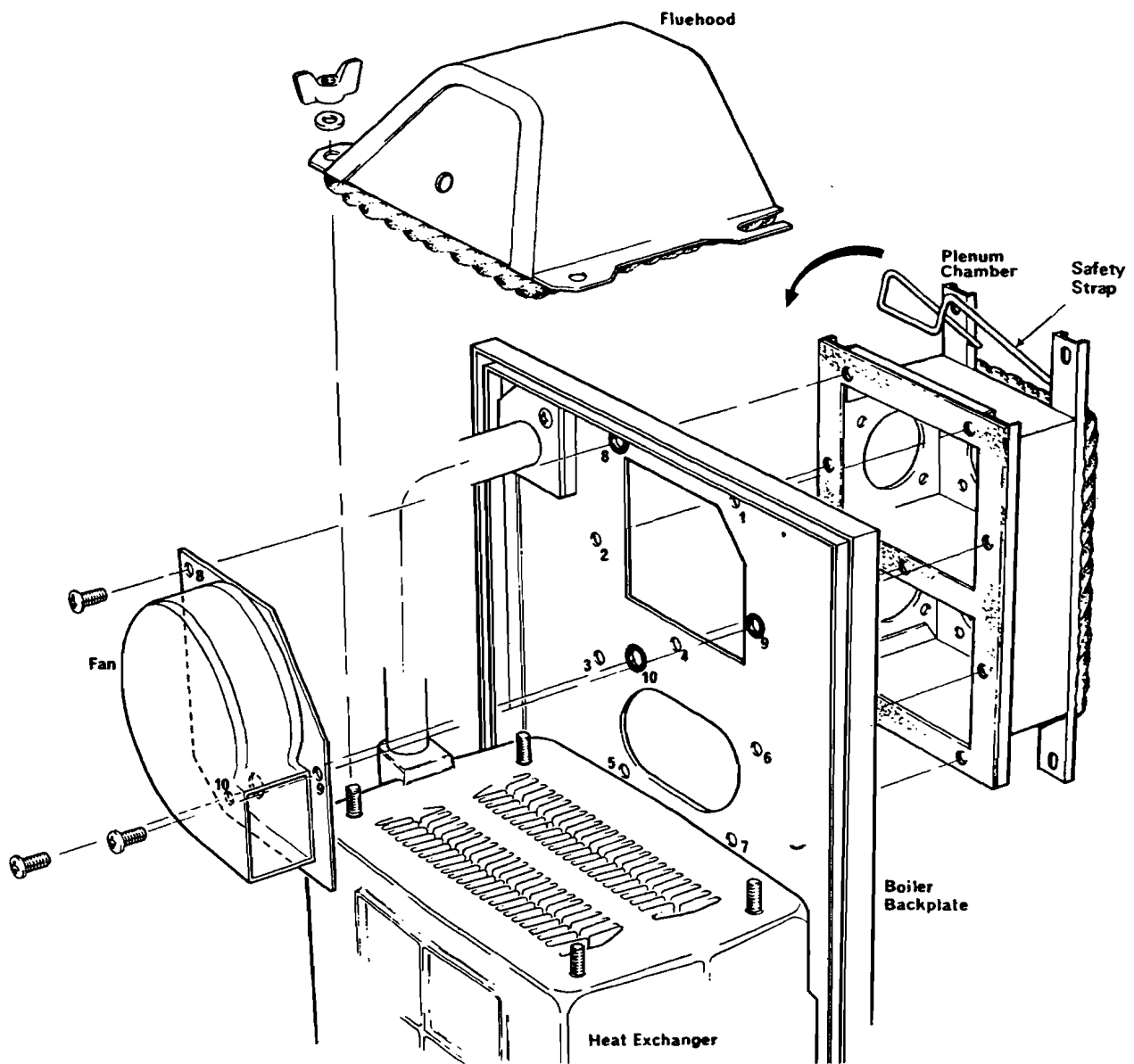


Fig. 9 PLENUM CHAMBER, FLUEHOOD AND FAN ATTACHING PARTS

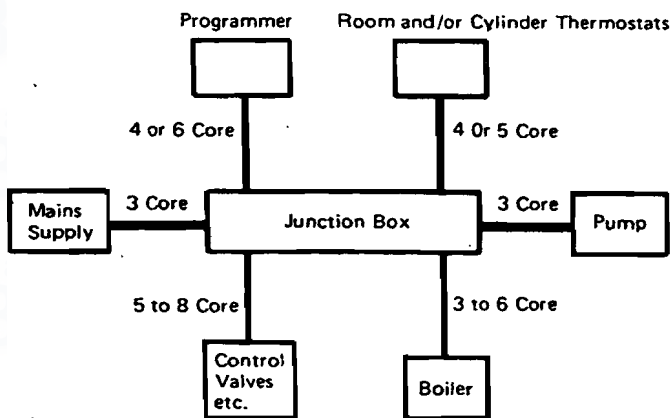


Fig. 10 PRINCIPLE OF WIRING

6. WIRING — See Fig. 11

Care must be taken to ensure that all wiring to the boiler is kept clear of sharp edges and hot surfaces.

The boiler terminal strip is not designed to accept wiring from all the on-site system controls and therefore, the installer will usually need to incorporate a suitable junction box. The principle of wiring up the boiler and its controls is shown in Fig. 10. However, the layout of a particular system will itself govern the most economical location for the junction box and its terminals.

As the boiler thermostat already incorporates a pump over-run facility, the wiring to the pump must always be as illustrated in Fig. 12, 13, 14, 15 and 16.

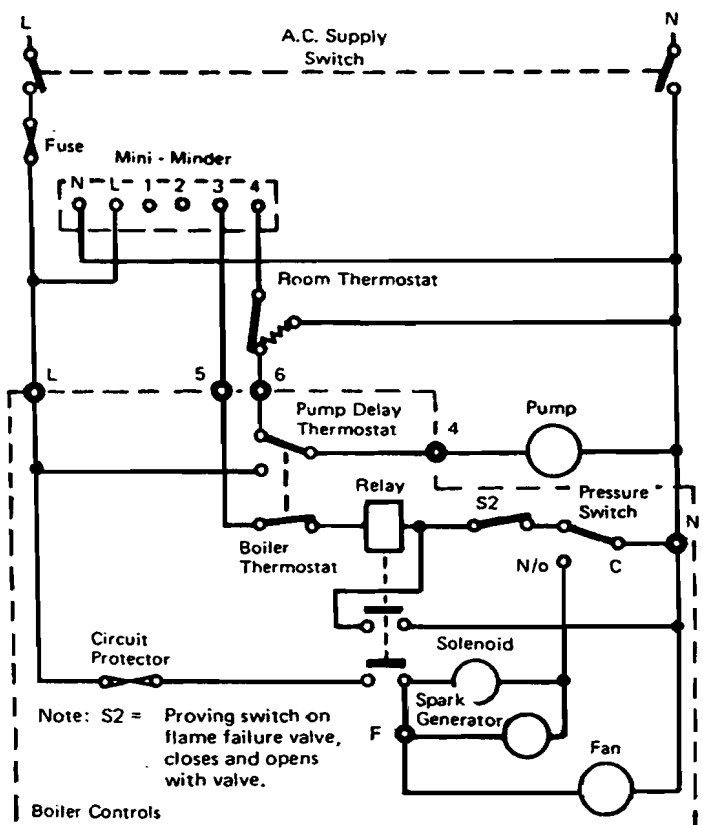


Fig. 11 SCHEMATIC WIRING DIAGRAM

Fig. 15 illustrates a system with a zone valve which requires an electrical supply to motor it both to the open and closed positions. Zone valves which require an electrical supply to open them but not to close them, should be wired in a similar manner but ignoring the closed connection from the room thermostat. For this type of valve, a room thermostat with a single pole contact should only be used. Certain zone valves may require an additional connection to the auxiliary switch (shown dotted). This would apply to those valves which internally are not suitable for giving an open signal from the normal opening voltage supply.

Wire up the boiler and system controls as illustrated in Fig. 12, 13, 14, 15 or 16 depending on the type of system installed. The wiring arrangements shown outline only the basic control requirements, and will therefore require on-site interpretation of the various boiler installation arrangements.

If a Potterton Mini-Minder time control is not being fitted, but a three terminal time clock is to be installed to control the systems illustrated in Fig. 12, 13, 14, 15 or 16 the time clock should be wired as follows:—

Live to Time Clock Live.
Neutral to Time Clock Neutral.
Earth to Time Clock Earth.
Wires normally connected to Mini-Minder Terminals 3 & 4 to Time Clock Switch.

A low limit thermostat can be installed to override the "OFF" setting of the time control if the temperature where the thermostat is situated, falls below the thermostat setting. Where a Mini-Minder or Programmer is installed, a double pole or double outlet thermostat may be necessary; for the electrical connections and type required, see the relevant system wiring diagram. Where only a time clock is fitted, the thermostat need only be a single pole type with its contact wired in parallel with the clock switch.

If a three way (proportioning diverter) valve with a mid-position is being fitted in the system, the following instructions must be adhered to in addition to the valve manufacturers wiring information:

1. Live, neutral and earth connections must be made to boiler terminals L, N and E.
2. The switched supply from the system control circuit (e.g. from the relay), must be connected to boiler terminal 5.
3. Loop boiler terminals 5 and 6 together.
4. The live supply to the pump must be taken from boiler terminal 4.

When all wiring is complete, hinge down the controls panel to gain access to the boiler front cover lower securing points, then fit the front cover to the boiler, securing it with the four captive bolts.

Ensure that an air tight seal is obtained around the perimeter of the casing. Hinge up and secure the controls panel then slide the controls cover onto the boiler and secure it with the captive screw. Fit the thermostat knob (Accessories Card Item G).

Fig. 12 GRAVITY HOT WATER WITH PUMPED CENTRAL HEATING

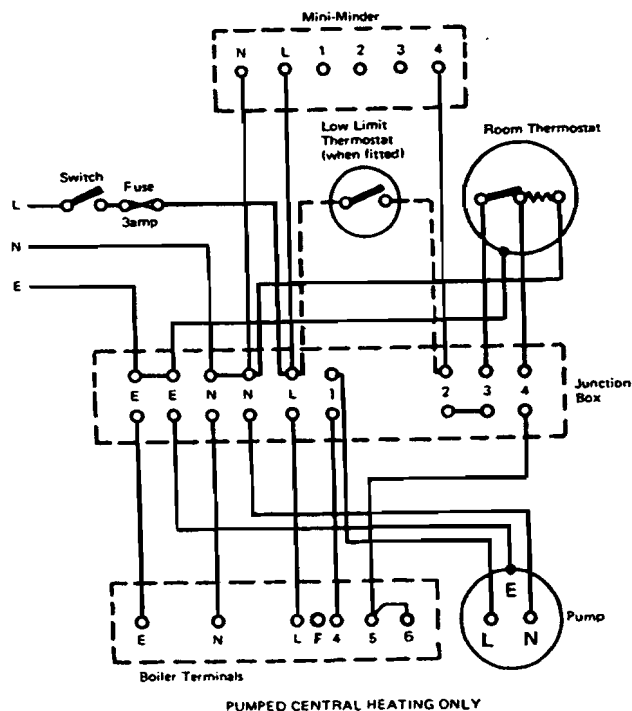
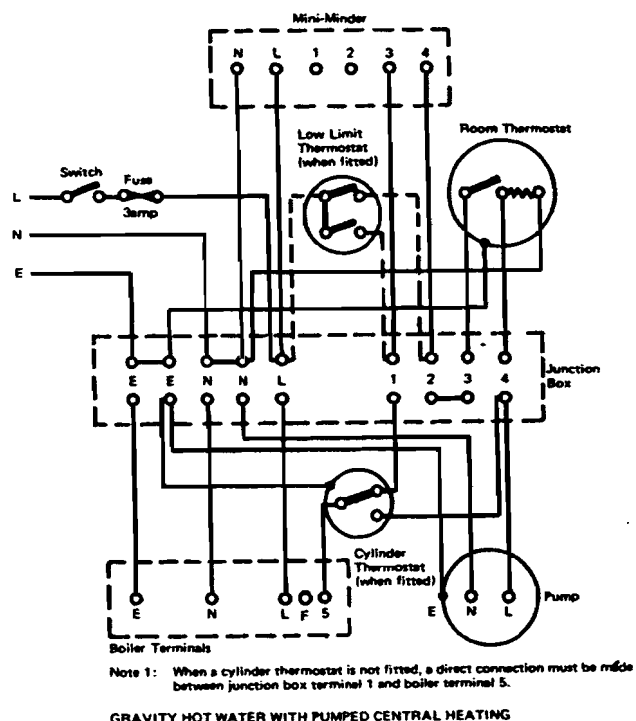
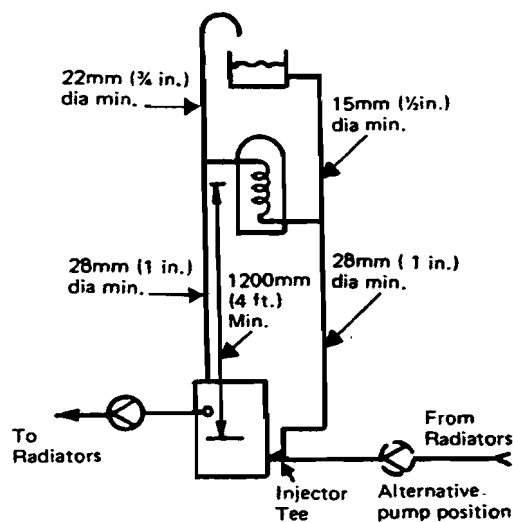


Fig. 13 GRAVITY HOT WATER WITH TEMPERATURE CONTROL AND PUMPED CENTRAL HEATING

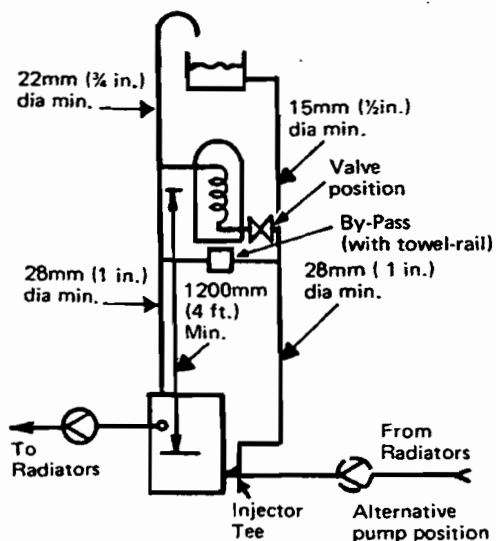
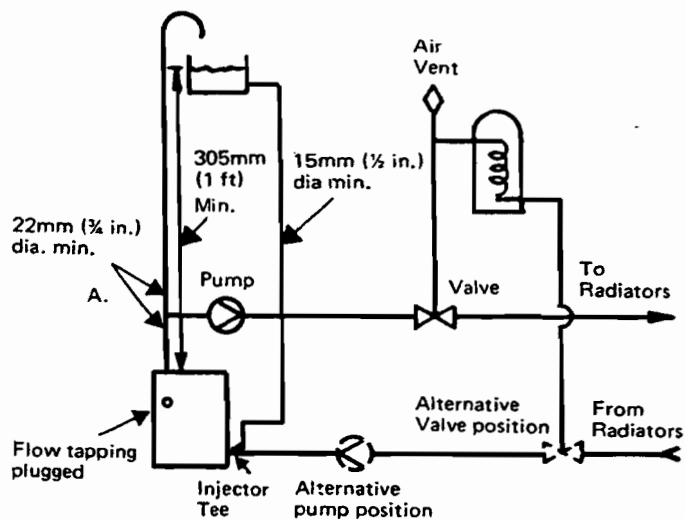
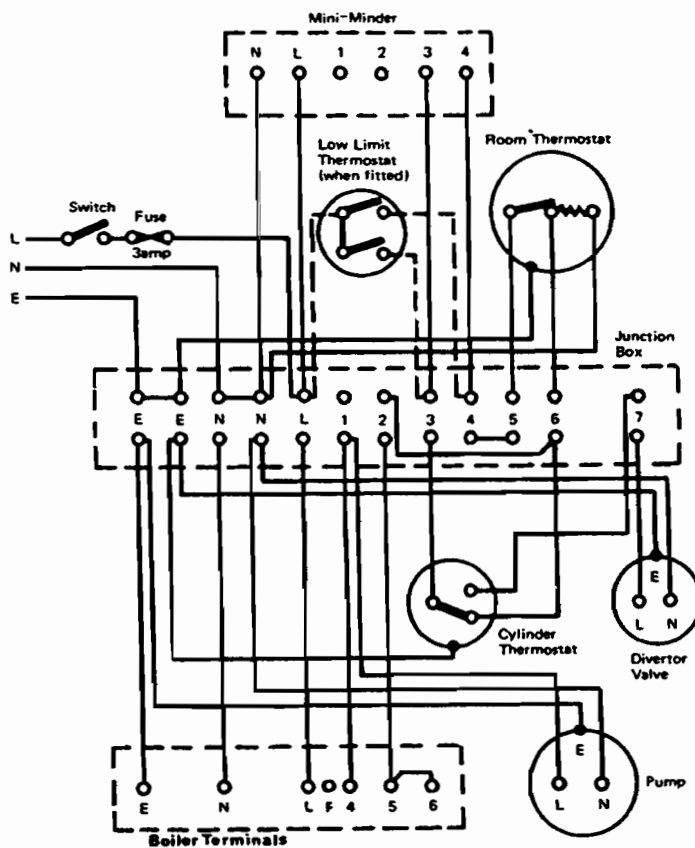
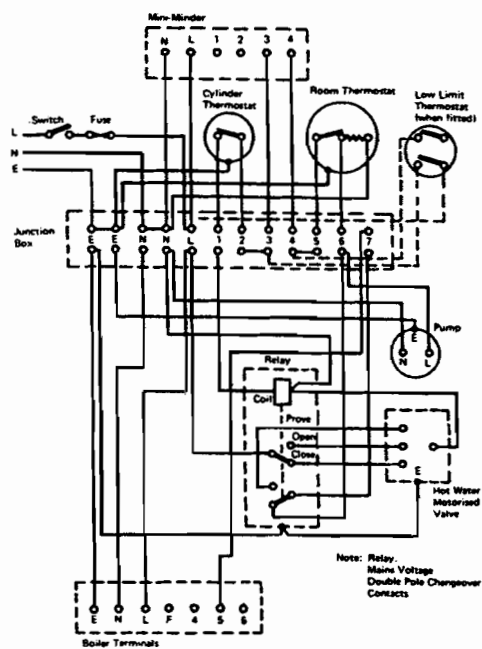


Fig. 14 FULLY PUMPED WITH TWO POSITION DIVERter VALVE

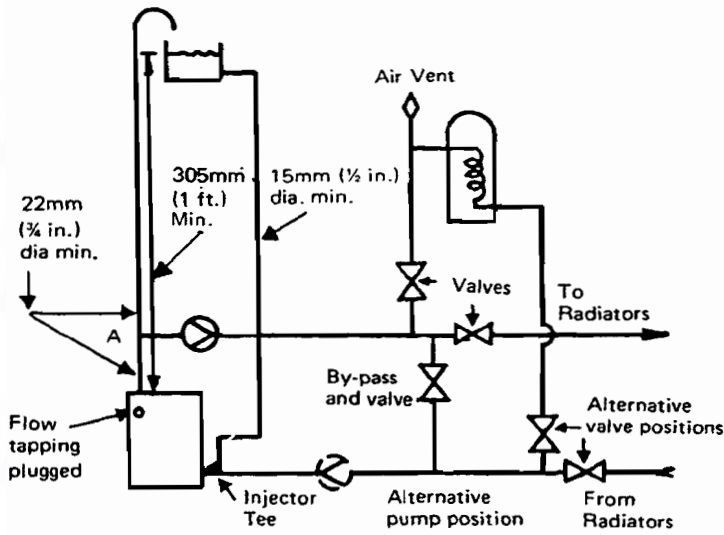


A. Junction between vent and pumped circuit to be on close to boiler as possible – Max. distance 910mm (3 ft.)



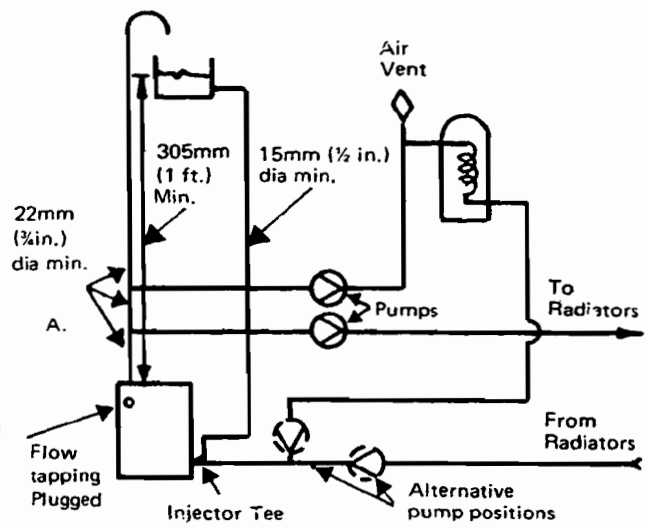
HOT WATER PRIORITY

Fig. 15 FULLY PUMPED WITH ONE OR TWO TWO-WAY VALVES



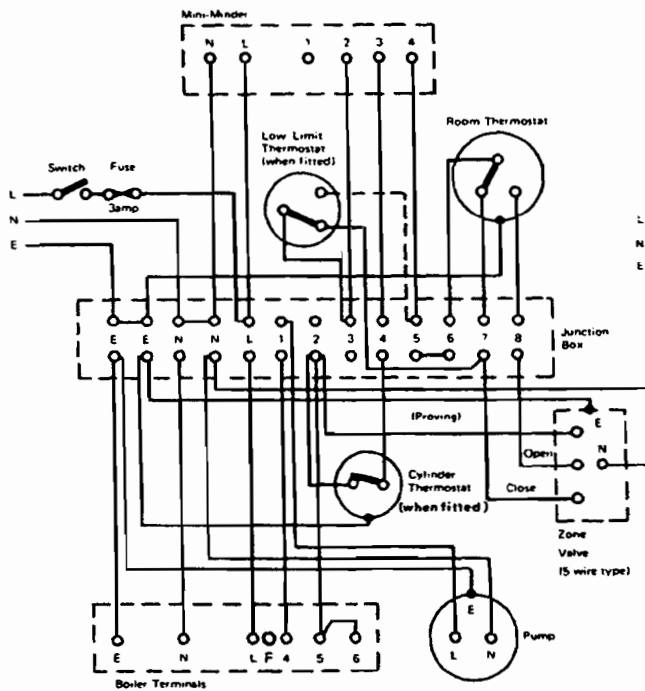
A. Junction between vent and pumped circuit to be as close to boiler as possible — Max. distance 910mm (3ft.)

Fig. 16 FULLY PUMPED USING TWO PUMPS



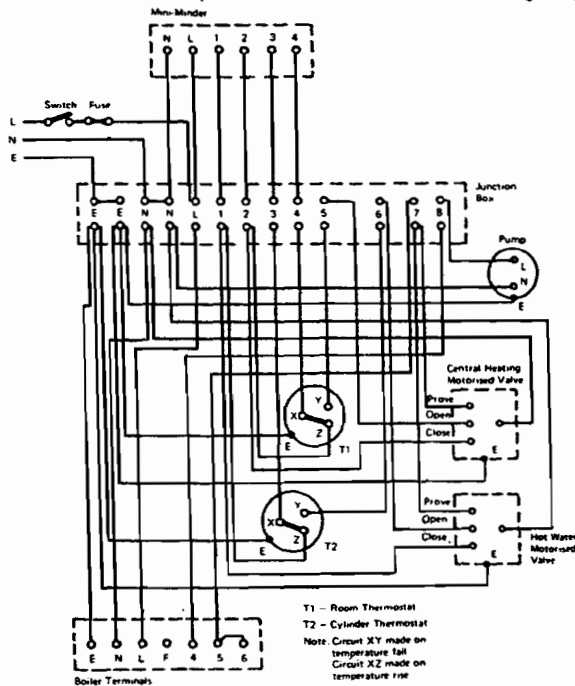
A. Junction between vent and pumped circuit to be as close to boiler as possible — Max. distance 910mm (3 ft.)

B. To stop intercirculation, a non-return valve should be fitted in each circuit.

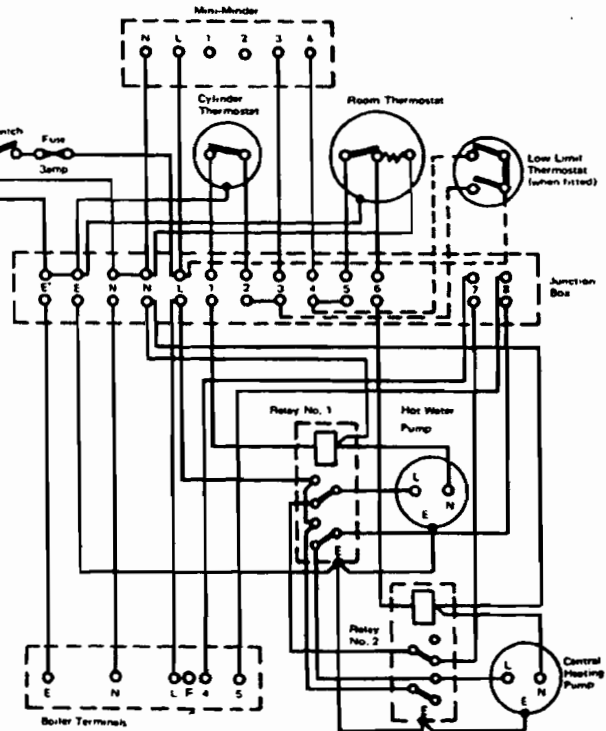


- NOTE 1. When a low limit Thermostat is not fitted, loop Junction Box Terminals 3 & 7.
2. When a Cylinder Thermostat is not fitted, loop Junction Box Terminals 2 & 4.

WITH ONE VALVE (Temperature control of Central Heating only)



WITH TWO VALVES (Independent temperature control of both circuits)



Note 1. Relays illustrated must be mains voltage, double pole, changeover contacts.

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"All descriptions and illustrations contained in this catalogue have been carefully prepared, but we reserve the right to make changes and improvements in our products which may affect the accuracy of the information contained in this catalogue"



Netaheat balanced flue gas-fired boilers

Potterton Netaheat MK.IIF 10—16
10 to 16 kW (34,000 to 55,000 Btu/h) Output

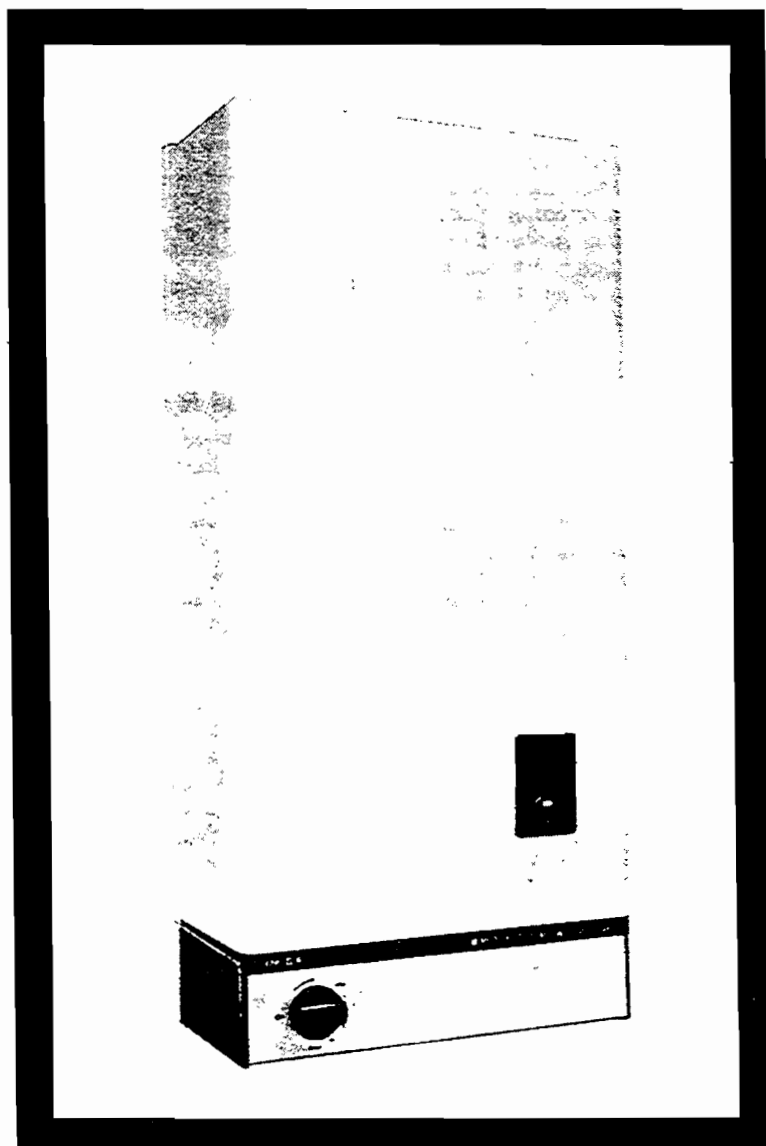
Fitted with Printed Circuit Control Panel

Potterton Netaheat MK.IIF 16—22
16 to 22 kW (55,000 to 75,000 Btu/h) Output

Fitted with Printed Circuit Control Panel

INSTALLATION INSTRUCTIONS WITH DATA INFORMATION

These installation instructions are to be followed and the specification of the appliance must not be modified.



GENERAL

Potterton Netaheat boilers are fully automatically controlled, wall mounted, balanced flue appliances, specially designed for combined gravity hot water and pumped central heating or fully pumped systems (small bore or micro-bore) giving ease of siting, installation and servicing.

DESCRIPTION — See Fig. 1

Because of its slim dimensions and wall mounting characteristics, the Potterton Netaheat blends easily with other kitchen furniture and saves valuable floor space. It can be fitted on an outside wall, or on an internal wall as long as it is adjacent to any outside wall. The boiler can also be installed in cupboards or other confined spaces as long as these are suitably ventilated in accordance with British Standard Code of Practice 332. Part 2. All boiler components are secured to the casing back plate. A single piece cover which encloses the fan, heat exchanger and burner, seals the space inside from the room where the boiler is fitted. An easily removable drawer-shaped metal tray houses the boiler controls, but has the shaft for the thermostat knob protruding through it; this knob is the only user control. Side panels, to blank off the space between the wall and the back of the boiler, are available as optional extras. Also available as an optional extra is a casing extension which can be fitted on top of the existing boiler casing to enclose a circulating pump and its pipework.

Heat Exchanger and Burner

The heat exchanger is a single "Monobloc" casting incorporating two finned flueways and three waterways, together with two flow connections, two return connections and a pocket for the thermostat phial. The capacity of the waterway is 5.7 litres (10pts) and the resistance through the casting is such that gravity circulation at all ratings is possible on the domestic hot water circuit. The natural gas burner which is fitted immediately below the heat exchanger, has steel blades mounted on a fabricated manifold.

Fan

The fan draws fresh air into the space formed by the boiler back plate and the removable cover. The air passes down the outside of the heat exchanger, so helping to cool the front cover, then into the combustion chamber. Combustion products pass up through the heat exchanger and into the fluehood where, because the fan has pressurised the inside of the appliance, they are forced out through the flue duct.

Boiler Controls

The operation of the boiler is very simple with the user only having to turn the thermostat knob on or off as required. When the main inlet gas cock is turned on, gas

passes up to a solenoid valve inside the multi-functional control. The main electricity supply is then switched on and the thermostat turned on and to the required temperature. This turns on the fan which runs for a 10 to 15 second purge period before the pressure switch, sensing the fan running, closes. Once the pressure switch contacts have closed, the solenoid valve inside the multi-functional control opens, allowing gas to flow to the pilot burner. At the same time, the automatic electronic spark generator operates and the pilot is ignited. When the pilot has lit, the spark generator senses a change in resistance due to the presence of the pilot flame, and the spark is cut off, although the system is still energised so that if the flame should go out, the pilot would then automatically relight.

The pilot flame heats up the phial of the flame safety device and after about 40 seconds, the mercury in the phial vapourises and expands so operating a switch which opens a second solenoid valve in the multi-functional control, passing gas to the main burner.

The gas pressure to the main burner is controlled by an adjustable, spring loaded governor incorporated in the multi-functional control.

To turn the boiler off, the thermostat knob must be turned to the off position and the boiler will shut down. If there is a gas or electricity power cut at any time while the boiler is operating it will immediately shut down, but as soon as the power supply is restored, it will relight automatically.

The thermostat knob can be set to OFF, Min. 1, 2, 3, 4 and Max. The graduations Min. to Max. correspond approximately to a temperature range of 55°C–82°C (130°F–180°F). The 16–22 boiler has a pump over-run thermostat, used only when the boiler is installed in a fully pumped system and this will operate when the water temperature within the boiler is in excess of approximately 70°C (160°F). A drop of approximately 11°C (20°F) will occur before the thermostat will switch the pump off.

A wiring diagram, showing the boiler control system and printed circuit board distributor panel is given in Fig. 11.

Balanced Flue Terminals and Ducting

The fresh air inlet and flue ducts can be run from either the left, right or rear of the boiler to a miniature terminal on the outside wall of the building. The ducts on the 10–16 model are suitable for any wall thicknesses up to 380mm (15in.) using a side outlet or 510mm (20in.) with a rear outlet. The ducts of the 16–22 model are suitable for wall thicknesses of up to 406mm (16in.), but for installations where a rear outlet is to be used, an extension sleeve which can be fitted between the two halves of the telescopic trunking, is available as an optional extra. With the sleeve fitted, wall thicknesses of up to 510mm (20in.) can be catered for. The siting of the balanced flue terminal on the outside wall of the building is not critical although if it discharges at a low level, a terminal guard, supplied as an optional extra, should be fitted in accordance with Building Regulations. The terminal should be installed in accordance with British Standard Code of Practice CP.337.

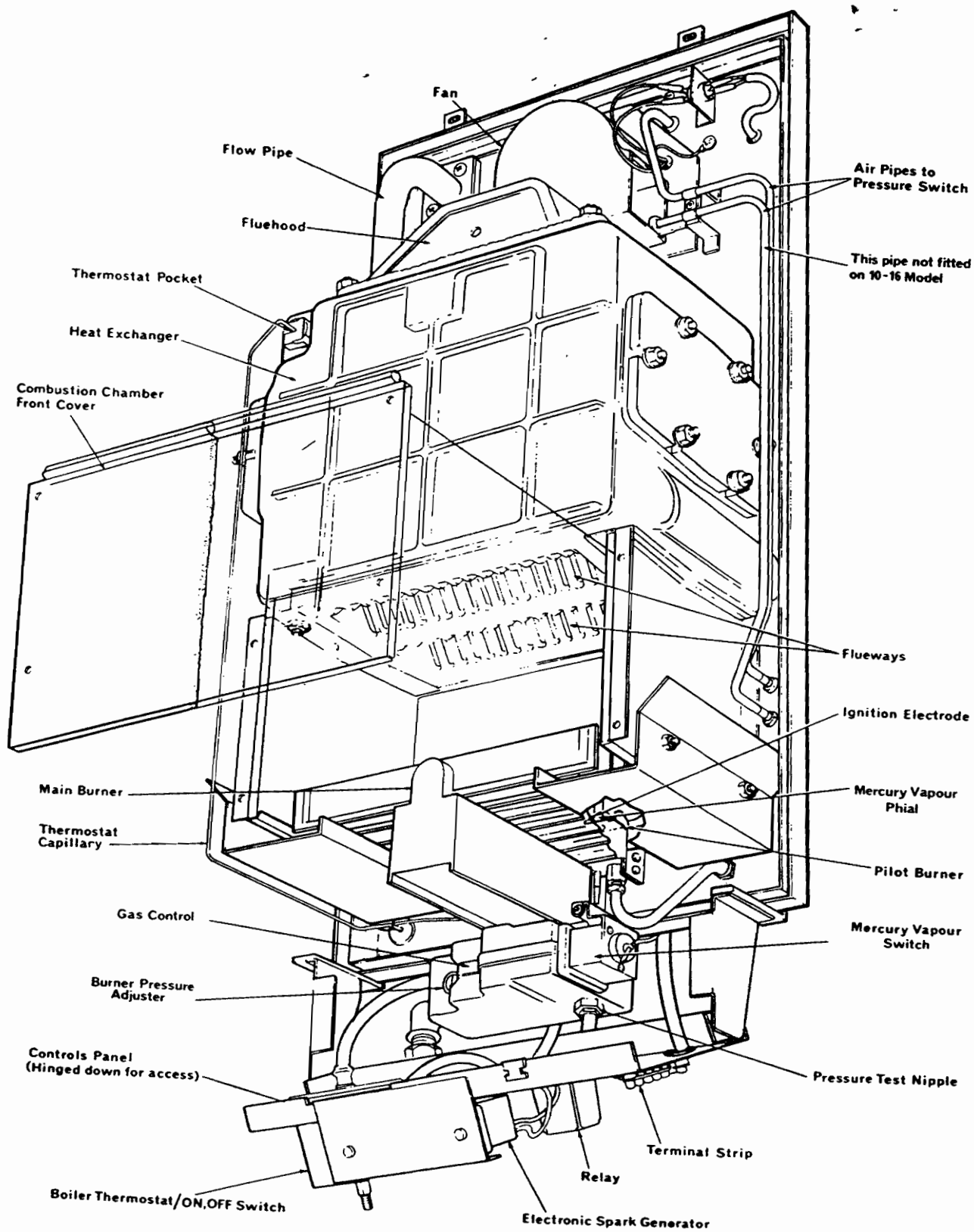


Fig. 1 GENERAL ARRANGEMENT

THE SYSTEM

Potterton Netaheat boilers have been specially designed for combined systems e.g. small bore or micro-bore central heating with an indirect domestic hot water supply which can either have pumped or gravity circulation; the boiler can also be used for pumped central heating only. The boiler can be installed in most types of system, but the following notes are given as a general guide. Also refer to BS.5376 and BS.5449 Part 1.

All systems should be designed so that the static head of the boiler is between a minimum of 305mm (1ft.) and a maximum of 27.5m (90ft.). To ensure that the minimum 305mm (1ft.) static head is obtained, the level of the cold water in the expansion tank must not be lower than the top of the boiler casing.

If a minimum 305mm (1ft.) head is used, extra care should be taken when designing the system, to ensure that pumping over or sucking down at the vent pipe cannot occur.

All gravity domestic systems should have a minimum effective circulating head of 1.2m (4ft.).

A typical combined gravity system is shown in Fig. 12.

A fully pumped system giving temperature control of the central heating circuit via a room thermostat and one two-way valve is shown in Fig. 15.

Using the boiler as supplied, independent temperature control of the domestic hot water cylinder can only be applied when using fully pumped systems. If temperature control is required on a gravity hot water system, additional equipment is required and full details are shown in Fig. 13.

For independent temperature control of both the central heating and domestic hot water circuits, a three-way valve with a central position can be used. This type of valve can give a flow to either circuit separately or to both circuits simultaneously. For the wiring of this type of valve refer to the valve manufacturers literature and the information given in 6. Wiring.

Independent temperature control of both circuits can also be obtained by using room and cylinder thermostats and a two-position diverter valve. This valve provides a flow to one circuit at a time and details are shown in Fig. 14.

The use of two zone valves will also give independent temperature control of both circuits and full wiring details of this type of system are also given in Fig. 15.

A further method of providing independent temperature control in conjunction with room and cylinder thermostats, is by using two pumps. Details are given in Fig. 16. In addition to the system diagrams shown, full wiring details are also illustrated. It is recommended that when installing these systems, an indirect cylinder with a coil type of heat exchanger is used. When fitting the 16-22 boiler, no system should be designed in which it is possible to completely close both the domestic hot water and central heating circuits, and to obtain this, a by-pass should be fitted between the boiler flow and return pipe-work, capable of passing at least 1 gall. per min. A by-pass is not required when installing the 10-16 boiler.

As the boilers are wall hung, a drain cock should be included at the lowest point in the central heating system. When selecting a circulating pump for the central heating system, the following data should be borne in mind:

Circulating Pump Selection

The resistance through the heat exchanger is equal to 25mbar (10in.w.g.) at a flow rate of 27.25litres/min. (6galls/min.), when using the 1in. flow connection or 43.75mbar (17.5in.w.g.) at the same flow rate when using the 3/4in. flow connection, see Fig. 2. If other controls, such as three-way valves are used in this type of system, the resistance through them, quoted in their manufacturers literature, must be taken into account.

The circulating pump may be fitted on either the flow or return side of the boiler. If fitted on the flow, the central heating circuit will be under a positive pressure, so reducing the risk of air being drawn into the system, but if the pump is on the return there will be a negative pressure in the circuit; this applies with systems designed as illustrated in Figs. 12, 13, 14, 15 and 16. It is recommended that the static head on the inlet side of the pump should be at least a third of the maximum pump duty.

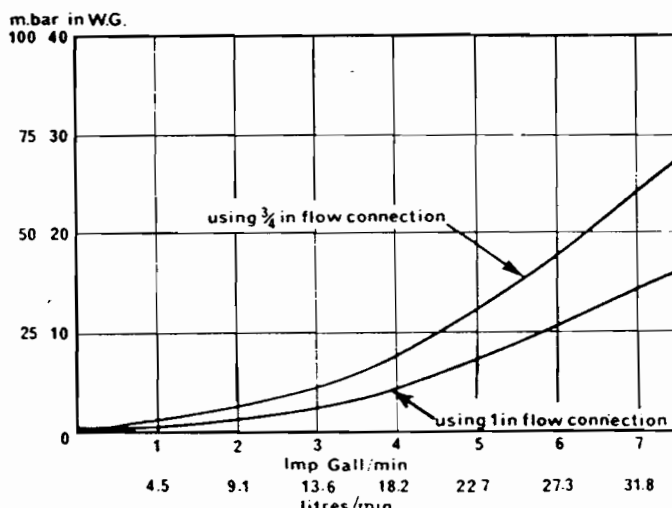


Fig. 2 PRESSURE LOSS ACROSS BOILER

SITE REQUIREMENTS

Ensure that the gas supply pipe and meter are large enough for this appliance and any others that may be run off the same meter: if not, contact the local Gas Regional Office. The boiler can be installed at any height (refer to Clearances Around the Boiler and the static head requirements) on an outside wall or on an internal wall providing that one side of the boiler is next to an outside wall. The recommendations of the relevant British Standards Codes of Practice should be followed.

Boiler Mounting Surface

The boiler must be mounted on a flat wall of non-combustible material sufficiently robust to take the weight of the boiler. The requirements of the local authorities and the Building Regulations must be adhered to.

Clearances Around the Boiler - See Fig. 3

Any position selected for the boiler must give the following minimum clearances which are necessary for installation and maintenance.

- 910mm (3ft.) at the front of the boiler
- 100mm (4in.) at the top - except where the optional extra pump casing is to be fitted, when 178mm (7in.) must be allowed.
- 250mm (10in.) at the bottom

As all pipes can be run behind the boiler within the casing width, no clearance is needed at the sides.

Ventilation

If the boiler is to be installed in a confined space such as a cupboard, the space will need ventilating. Openings should be provided at the top and bottom of the cupboard each of which should have a free area as follows:-

Potterton Netaheat	Free Area	
	Sq.in.	Sq.cm.
10-16	28	181
16-22	38	245

If the openings draw air from outside the building, the free areas may be halved. Refer to British Standard Code of Practice CP.332, Part 2 1968 for further guidance.

Electricity Supply

A 240volts a.c. 50Hz. single phase electricity supply fused to 3 amps must be provided in accordance with the latest edition of the Institute of Electrical Engineers Regulations for the Electrical Equipment of Buildings and Local Authorities and British Gas requirements. The current rating of the wiring to the boiler must exceed 3 amps and must include an isolating switch or plug and socket; a double-pole switch is recommended.

MAINTENANCE

The efficient performance of this boiler is dependent upon regular servicing which should be carried out annually.

Maintenance is best arranged by a contract placed with Potterton International Limited and further details are available from the local Potterton Regional Service Office.

All parts likely to require servicing are easily accessible. By sliding the cover from the boiler controls and removing the front cover from the boiler, most components are exposed. It is then a simple matter to remove the front of the combustion chamber to gain access to the main and pilot burners and the ignition electrode. Removal of the fluehood which is secured by four nuts, gives access to the flueways in the heat exchanger.

SETTING UP

Each boiler has to be adjusted once it has been installed and this is a skilled job which should only be carried out by suitably qualified engineers. Potterton International offer this service at a nominal charge.

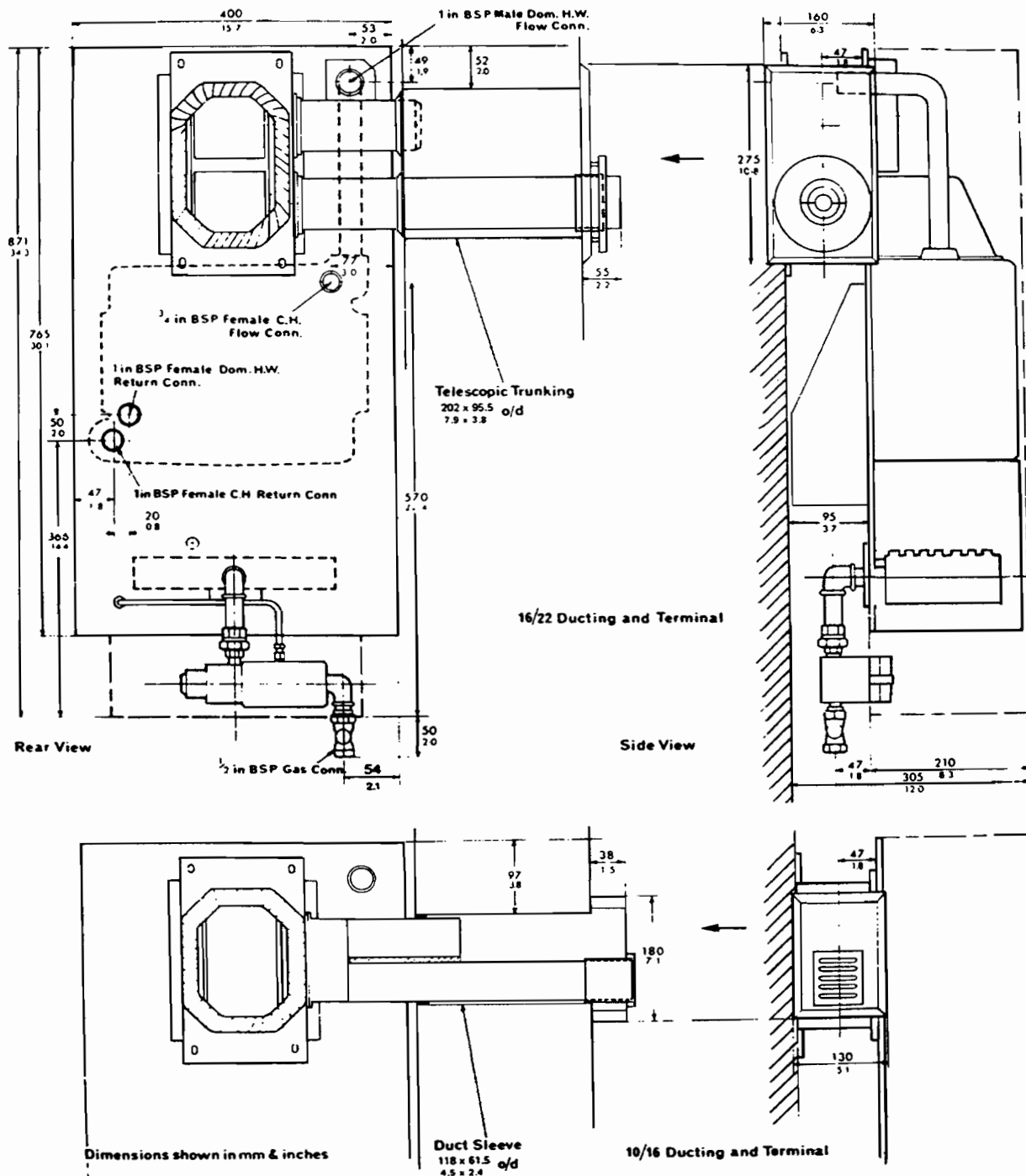


Fig.3 CONNECTIONS AND DIMENSIONS
(See also Fig. 8)

GENERAL DATA

Potterton Netaheat 10-16	Input: 13.4 to 20.9 kW (45,000 to 71,400 Btu/h) Output: 10.0 to 16.1 kW (34,000 to 55,000 Btu/h)
Potterton Netaheat 16-22	Input: 22.5 to 29.6 kW (76,800 to 101,150 Btu/h) Output: 16.1 to 22.0 kW (55,000 to 75,000 Btu/h)
Maximum Working Head:	27.5m (90ft.)
Weight:	Installed - 72.6kg. (160lbs.) Installer lifting weight - 56.7kg. (125lbs.)
Water Content:	5.7 litres (10pts.)

CONTROLS

Main Gas Cock:	½in. BSP union Loose Key Cock.
Multi-functional Control:	White Rodgers, incorporating pressure governor, two solenoid valves and a pilot filter
Mercury Vapour Switch:	White Rodgers
Pressure Switch:	Honeywell, CN150B 100

Thermostat:	Ranco C26, 10-16 boiler Ranco C77, 16-22 boiler
Relay:	I.M.O. 3 pole relay
Fan:	Smiths FFB Q219.
Pilot Burner:	White Rodgers
Main Burner:	Furigas
Ignition Electrode:	Royal Worcester
Spark Generator:	Plessey, 407/1/72637/010
Circuit Protector:	1 amp fuse. This rating must not be exceeded.
Distribution Panel:	P.C. Board including Mains Input Terminal.

ADDITIONAL CONTROLS

Potterton Electronic Programmers are available as optional extras. These electronic programmers have been developed to compliment your boiler and offer the user a variety of programmes to suit individual requirements and systems. They are attractively styled with a constant digital clock display, slider and push buttons which are easy to use and understand. The Programmer is fully described in its own Data Sheet which is available on request.

TECHNICAL LITERATURE

The following literature is supplied with each boiler:-
Data and Installation Instructions.
User's Guide.

INSTALLATION INSTRUCTIONS

1. GENERAL

Installation must be carried out in accordance with the relevant British Standard Codes of Practice and I.E.E. recommendations. Reference should also be made to British Gas publication "Material and Installation Specifications for Domestic Central Heating and Hot Water".

The boiler and its associated equipment will arrive on site in two cardboard cartons. The contents of each carton is as follows, see Fig. 4.

CARTON NO. 1:

1. Installation Instructions
2. Template
3. Accessories Card
4. Balanced flue terminal and ducts
5. Boiler Combustion chamber front cover
6. The controls cover
7. Mounting channel with rubber strip, and metal bearing plate and adjusting shims
8. Telescopic trunking - 16-22 only
9. Duct sleeve - 10-16 only
10. Duct sealing flange and gaskets - 16-22 only
11. The boiler front cover

CARTON NO. 2:

The boiler packed on its back. The boiler will be supplied without its combustion chamber front cover fitted so giving a hand hold at the underside of the heat exchanger inside the combustion chamber, when lifting the boiler into position. Two metal feet will be found attached to the bottom of the boiler and these are to protect the controls during handling and also allow the appliance to be stood vertically prior to lifting it on to the wall.

All items in Carton No. 1 are packed so that they are easily removable in the sequence required.

2. FITTING THE BOILER MOUNTING CHANNEL

NOTE: The cardboard template has been designed for marking out the wall for boilers with either a rear or side flue outlet. If a side outlet is to be marked, it has been assumed that the boiler will be fitted tightly into the corner. However, allowance should be made if the corners of the wall are not square or

vertical, by positioning the template and therefore the boiler, up to a maximum of 1in. from the outside wall. This can be done by marking the centre of the boiler position on the wall, then using a spirit level or plumb line, dropping a long centre line which can then be lined up with the boiler centre line marked on the template.

- A. Using the template, mark out the three screw holes on the wall where the boiler mounting channel is to be positioned, the four screw holes above the mounting channel where the plenum chamber is to be fitted, and the position of the flue and fresh air ducts on the wall.
- B. Drill the three holes for the mounting channel securing screws and insert wallplugs (Accessories Card Item A); fit and secure the channel using the 2in No.12 counter-sunk headed woodscrews, cup and flat washers; check that the channel is level. Place three of the six metal adjusting shims in the mounting channel followed by the rubber strip, then the metal bearing plate. Retain the remaining three shims.

NOTE: The thickness of the wall plaster in some properties could be excessive and in these instances, it is recommended that 2½in. long securing screws are used in operation B.

- C. Drill the four holes for the plenum chamber securing screws and insert wallplugs (Accessories Card Item B); do not fit the plenum chamber at this stage.
- D. Cut the hole in the wall for the flue and fresh air ducts. Care should be taken when cutting the hole for a rear outlet boiler, that the screw holes for the plenum chamber are not damaged. Make good the inside and outside surface of the wall, if necessary, and also ensure that the face of the wall where the plenum chamber is to be fitted is flat.
- E. Open Carton No. 2.
- F. Unscrew and remove the nuts securing the fluehood, then lift off the fluehood, see Fig. 9. Discard the paper gasket.

- G. Disconnect the three electrical leads from the fan, then unscrew and remove the bolts securing the fan. Lift off the fan, see Fig. 9.
- H. Unscrew and remove the bolts securing the plenum chamber, see Fig. 9.
- J. Remove the boiler from its carton and lay it front face downwards on a protective surface, such as its own carton. Take care not to damage the shaft of the thermostat.

NOTE: A serrated washer is fitted beneath the centre bolt, number 4, which must be refitted when the boiler is secured to the wall.

FITTING THE DUCTING, PLENUM CHAMBER AND BALANCED FLUE TERMINAL

A. Potterton Netaheat 10-16 only — See Fig. 5

- (1) Fit and cut the wall liner to size, terminating it flush with the inside and outside wall faces of the building. Ensure the ends are square.
- (2) The plenum chamber has two connections for the fresh air and flue ducts, one to one side and

the other to the rear. One of these connections is blanked off with a sealing plate and gasket and depending on the direction the ducts are to be connected to the boiler, these should be re-positioned by the installer if necessary. The single side connection can be used either for a left or right hand duct arrangement, simply by rotating the plenum chamber to the required position. With a rear outlet, the smaller opening in the plenum chamber, the air duct, must be positioned uppermost.

- (3) Fit the inlet and outlet duct assembly to the plenum chamber using the six screws (Accessories Card Item C) and interposing the gasket. Ensure that the short air inlet duct is fitted uppermost.
- (4) Temporarily secure the plenum chamber to the wall using the four 2in. No.12 counter-sunk headed screws, cup and flat washers (Accessories Card Item B), positioning the flue and fresh air ducts inside the wall liner.

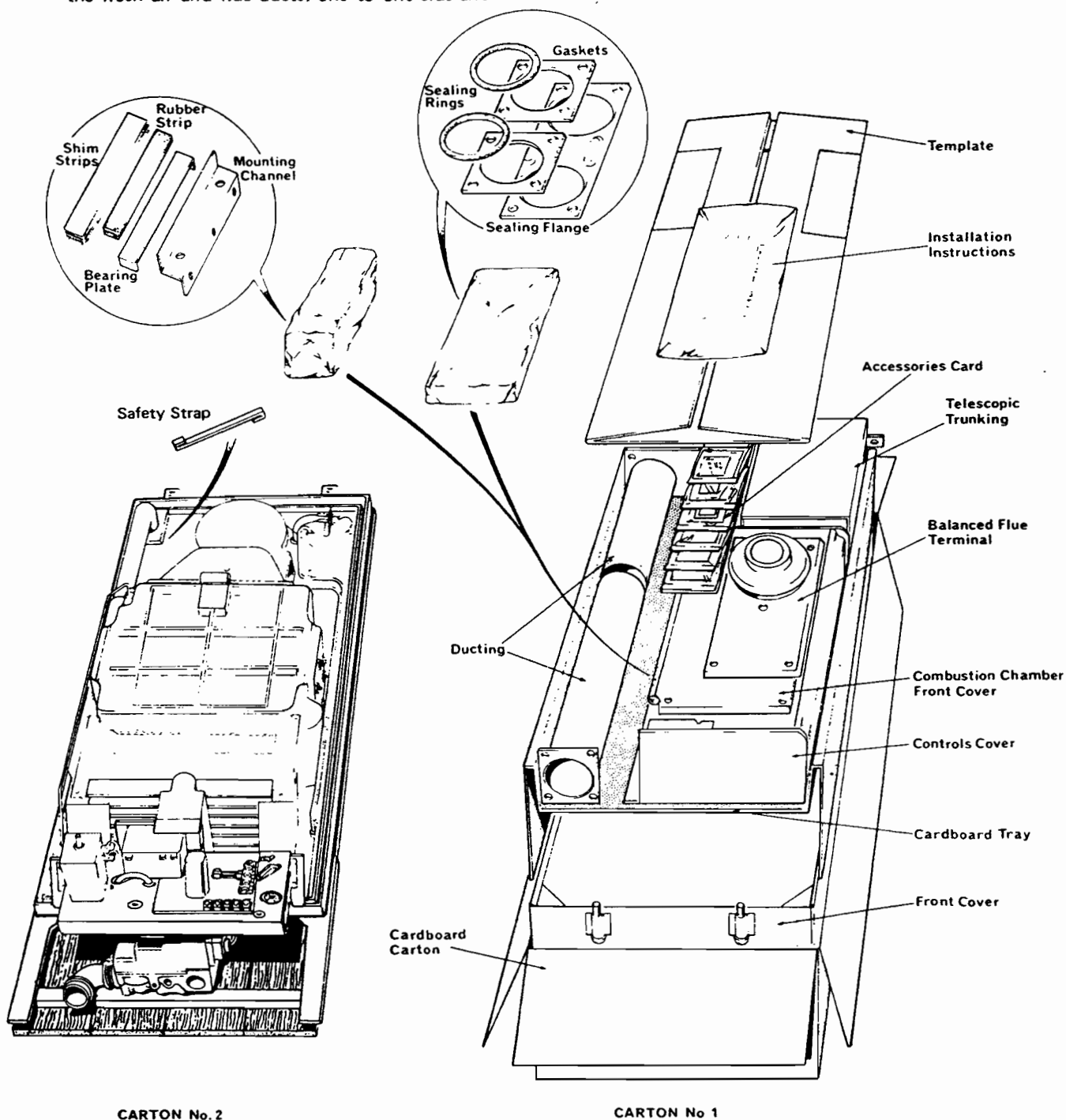


Fig. 4 PACKAGING AND IDENTIFICATION OF COMPONENTS

(5) Mark off the lower flue duct at a point where it protrudes 41mm (1.6in.) from the outside wall of the building. This dimension is important. Mark off both ducts at a point where they enter the wall liner.

(6) Remove the plenum chamber and liner from the wall, then cut the flue duct to size, removing all burrs.

NOTE: The upper air duct is already sized to suit wall thicknesses down to 205mm (8in.). It will only need shortening if the wall thickness is less than this in which case, cut it so that at least 25mm. (1in.) protrudes inside the wall.

(7) On boilers using a side outlet only, position the duct assembly inside the liner, aligning the mark on the ducts with the entrance of the liner. Flatten the 13mm glass fibre rope seal supplied, then force it into the gap between the ducts and the liner.

WARNING : IT IS VITAL THAT A GOOD SEAL IS MADE ALL AROUND BOTH DUCTS.

(8) On boilers using a rear outlet only, position the wall liner inside the wall separately as in this instance, the 13mm glass fibre rope seal is not required. The rope on the rear of the plenum chamber provides the necessary seal.

(9) Position the ducts and liner assembly inside the wall, then secure the plenum chamber to the wall with four 2in. No.12 screws, cup and flat washers

(Accessories Card Item B). Ensure the chamber is mounted squarely.

NOTE: The thickness of the wall plaster in some older properties could be excessive and in these instances, it is recommended that 2½in. long screws are used.

(10) Measure the distance from the bottom of the plenum chamber wall plate to the top of the metal bearing plate in the boiler mounting channel, see Fig. 6. Compare this dimension with the nominal dimension of 257mm and by adding additional shims or removing those already in position, adjust the measured distance to equal the nominal measurement, $\pm 1.5\text{mm}$ (1/16in.). If a more coarse adjustment is necessary, the plenum chamber and mounting channel can be moved slightly up or down on the wall using the elongated holes in their mounting flanges. It is essential that this dimension is accurately obtained, otherwise once the boiler is lifted onto its mounting channel, the screw holes in the boiler back plate will not align with those in the plenum chamber.

(11) Make good the inside and outside wall surfaces around the liner as necessary.

(12) Fit the balanced flue terminal over the end of the flue duct, ensuring that the duct is located inside the outlet aperture on the terminal. Secure the terminal to the wall with the two size 8, 1in. long screws supplied (Accessories Card Item E).

NOTE: When fitting the terminal, observe the "Top" mark on the terminal.

No.8 1in Screw

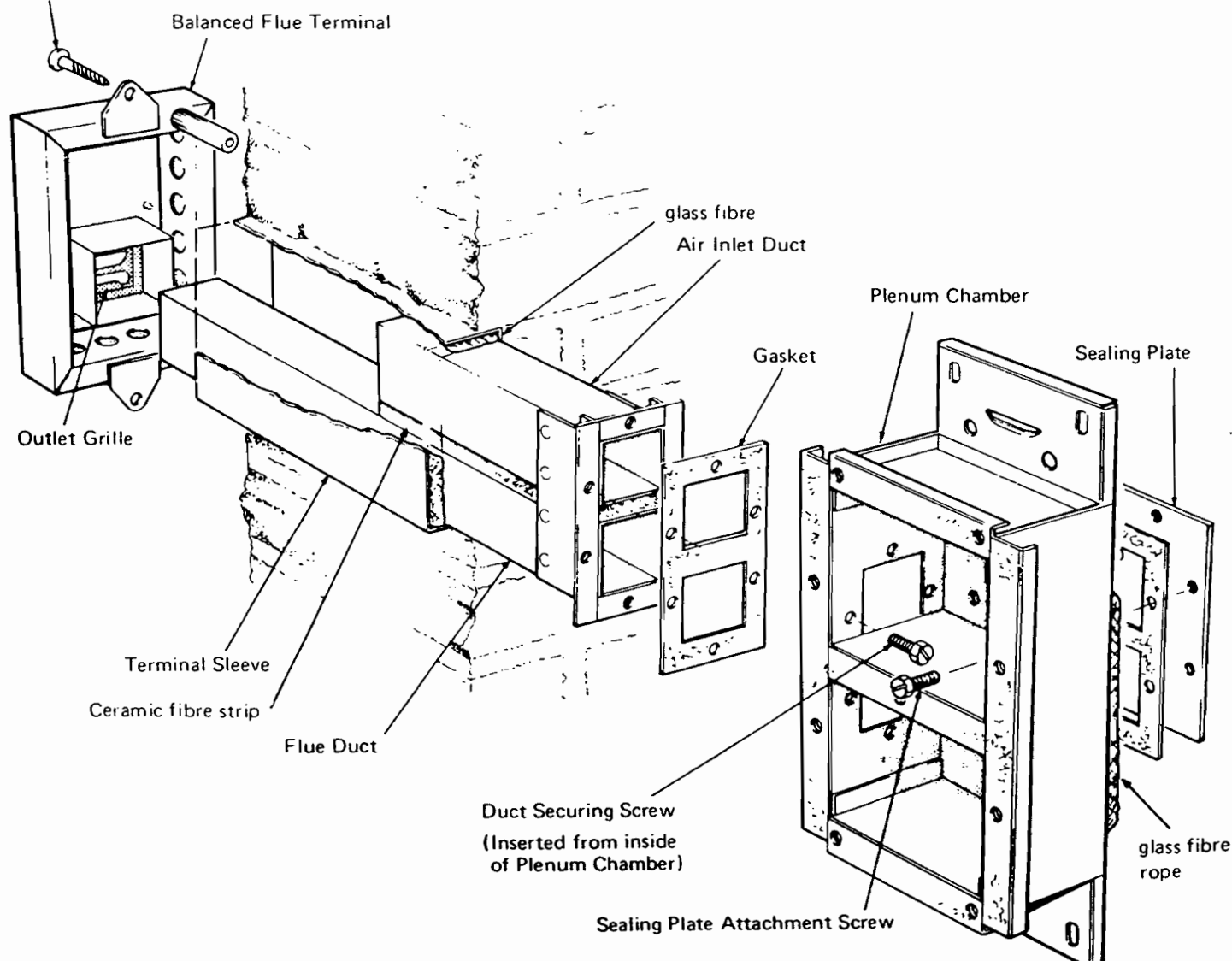


Fig. 5 ARRANGEMENT OF NETAHEAT 10/16 DUCTS

- (13) Remove the flue outlet grille from the terminal, then seal the gap between the outlet duct and the terminal with the sealing strip supplied.
- (14) Refit the outlet grille to the terminal so that it will direct the flue gases sideways or downwards away from any obstruction, window, doorway, footpath or plastic pipe.

B. Potterton Netaheat 16-22 only - See Fig. 7

- (1) The plenum chamber has two connections for the fresh air and flue ducts, one to one side and the other to the rear. One of these connections is blanked off with two sealing plates and gaskets and depending on the direction the ducts are to be connected to the boiler, these should be re-positioned by the installer if necessary. The single side connection can be used either for a left or right-hand duct arrangement, simply by rotating the plenum chamber to the required position. With a rear outlet, the smaller opening in the plenum chamber (air duct) must be positioned uppermost.
- (2) Fit the inlet and outlet duct assembly to the plenum chamber using the eight screws (Accessories Card Item C) and interposing the two gaskets. Ensure that the short air duct is positioned uppermost.
- (3) Temporarily secure the plenum chamber to the wall using the four 2in. No.12 screws, cup and flat washers (Accessories Card Item B), positioning the flue and fresh air ducts through the wall.
- (4) Mark off the lower flue duct at a point where it protrudes 32mm (1.3in.) from the outside wall of the building.
- (5) The upper air duct is already sized to suit wall thicknesses between 230mm and 380mm (9 to 15in.) and will only need shortening, if the wall is less than 230mm (9in.) thick. In this instance, cut off the nozzle end of the upper duct so that not less than 25mm (1in.) and not more than 50mm (2in.) protrudes inside the wall.
- (6) Remove the plenum chamber, then cut the duct(s) to size, removing all burrs and taking care not to distort the circularity of the duct(s).
- (7) Fit the telescopic trunking inside the wall and secure it to the inside face of the wall with two 1½in. No.8 screws, washers and wallplugs (Accessories Card Item D).

NOTE: If the wall is less than 230mm (9in.) thick both halves of the telescopic trunking will have to be cut to the size at the plain ends where the two halves slide together; e.g. for a 180mm (7in.) wall, cut 50mm (2in.) from each half.

- (8) On boilers with a side flue outlet, slide the duct sealing flange and sealing rings onto the ducts. On boilers with a rear flue outlet, the flange and sealing rings are not required and should be discarded.
 - (9) Position the ducts inside the wall, then secure the plenum chamber to the wall with four 2in. No.12 screws, cup and flat washers (Accessories Card Item B). Ensure the chamber is mounted squarely.
- NOTE:** The thickness of the wall plaster in some older properties could be excessive and in these instances, it is recommended that 2½in. long securing screws are used.
- (10) Secure the duct sealing flange and sealing rings, if applicable, to the telescopic trunking using the four screws (Accessories Card Item D).
 - (11) Measure the distance from the bottom of the plenum chamber wall plate to the top of the metal bearing plate in the boiler mounting

channel, see Fig. 6. Compare this dimension with the nominal dimension of 257mm (10 1/8in) and by adding additional shims or removing those already in position, adjust the measured distance to equal the nominal measurement, + 1.5mm (1/16.). If a more coarse adjustment is necessary, the plenum chamber and mounting channel can be moved slightly up or down on the wall using the elongated holes in their mounting flanges. It is essential that this dimension is accurately obtained otherwise once the boiler is lifted onto its mounting channel, the screw holes in the boiler back-plate will not align with those in the plenum chamber.

- (12) Make good the inside and outside surface of the wall around the telescopic trunking. Ensure that the flue outlet duct protrudes from the trunking in the CENTRE of the square aperture. This is essential to enable the next operation to be completed.
- (13) Fit the terminal outer wall plate in position, locating the end of the exhaust duct inside the circular connection of the wall plate grille. Loosely attach the plate to the trunking with the single M5 screw (Accessories Card Item E).
- (14) Square up the wall plate, then working through the four screw holes in the plate, mark the screw hole positions on the wall behind the plate.
- (15) Remove the wall plate, then drill and plug the four holes with wallplugs (Accessories Card Item E).

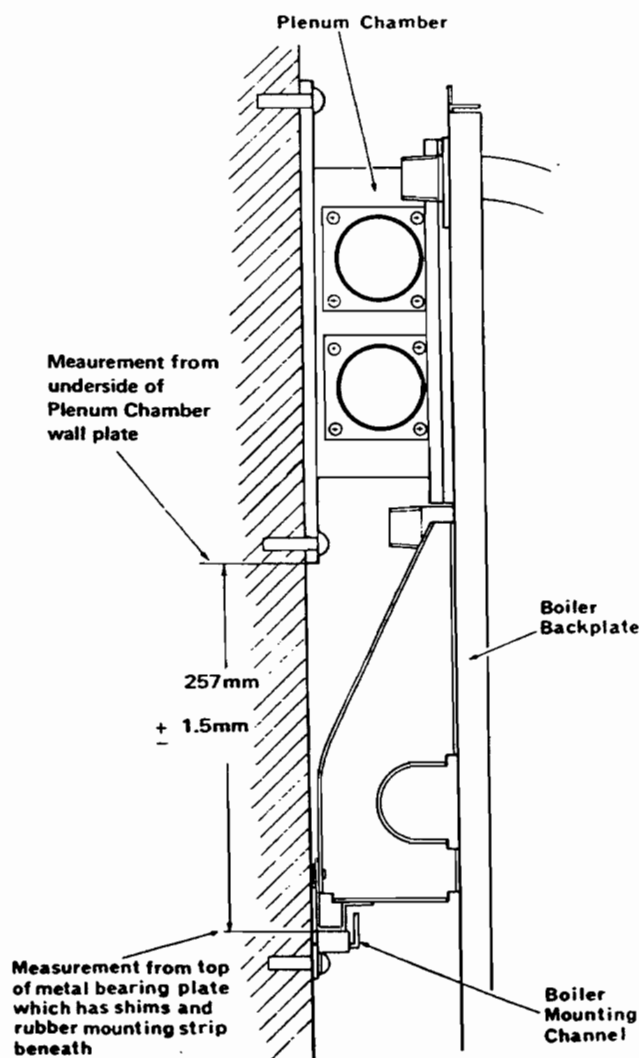


Fig. 6 RELATIVE POSITION OF PLENUM CHAMBER AND MOUNTING CHANNEL

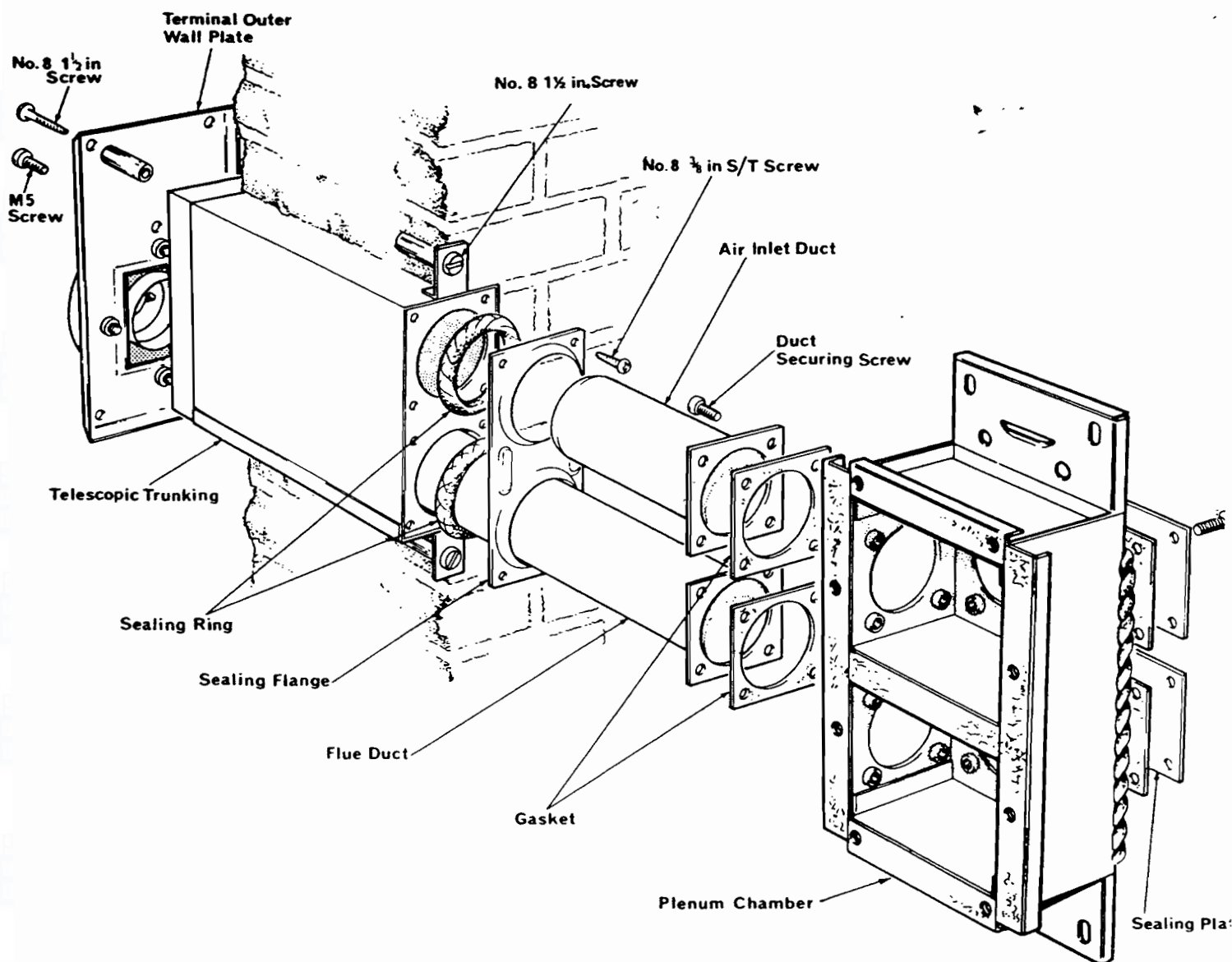


Fig. 7 ARRANGEMENT OF NETAHEAT 16/22 DUCTS

- (16) Refit the wall plate, then secure it to the trunking with the single screw and to the wall with four No.8, 1 in. long screws (Accessories Card Item E). It is essential for the correction operation of the unit, that no gap exists between the wall plate and the trunking.

4. PREPARING THE BOILER

The boiler is designed so that all pipes can be hidden within its own width except where they leave the boiler at top and/or bottom. Because the water connections are behind the boiler backplate, short lengths of pipe will have to be connected to some of the tappings to be used before the boiler is lifted into position, and terminated in a position suitable for connecting to the system pipework; it is recommended that copper capillary connections are used. Although it is possible to install the boiler and its pipework with only access from the front, it is very much easier with access from at least one side. This access is not necessary for maintenance which can be carried out from the front only. Pipe runs must be kept clear of the areas where the plenum chamber is to be fitted and where the air inlet and flue ducts will be located if a side outlet is being used. Connections which can be used and suggested methods of running pipework behind the boiler are shown in Fig. 8. Any pipe tails running downwards from behind the boiler should not protrude below the bottom of the metal feet. Refer to Figs. 12 to 16 for diagrams of typical systems to which the boiler can be connected.

A. Combined Gravity System

- (1) Using Fig. 8 as a guide, decide on the best pipe run at the rear of the boiler to suit the particular system.
- (2) Connect a suitable length of 28mm pipe to the domestic hot water flow connection.
- (3) Connect a suitable length of 22mm pipe to the heating flow connection. There is space behind the boiler to split the flow if necessary. The central heating circulating pump can be fitted above or below the boiler on either the flow or return as required.
- (4) Connect a suitable length of 28mm pipe to the upper 1 in. domestic hot water return connection.
- (5) Connect a suitable length of 22mm pipe to the lower 1 in. central heating return connection. There is space behind the boiler to combine the two heating circuits if required.

NOTE: Ensure that the fittings to the two return connections do not protrude more than 97mm from the boiler backplate or they may foul the wall.

B. Fully Pumped System and Central Heating Only

- (1) Using Fig. 8 as a guide, decide on the best pipe run at the rear of the boiler to suit the particular system.

- (2) When connecting the flow pipework, it is only necessary to use one flow connection, preferably the upper 1 in. BSP with the lower $\frac{3}{4}$ in. connection being blanked off. However, in certain circumstances where a left-hand flue terminal is being used and only a pipe run to low level is required, the lower $\frac{3}{4}$ in. BSP connection can be utilised, provided the 1 in. connection is vented. Connect a suitable length of pipe to which ever connection is to be used.
 - (3) Connect a suitable length of 22mm pipe to the lower 1 in. return connection. The upper 1 in. return can either be blanked off or used to connect the cold feed.
- NOTE: On systems requiring a high flow rate, the 22mm ($\frac{3}{4}$ in.) pipework from the flow and return connections should be enlarged as close to the boiler as practicable.
- (4) The circulating pump can be fitted on either the return or flow in any position to suit the particular installation.

C. Boiler Main Gas Cock

- (1) The main gas cock is supplied loose but tied to the boiler and must be fitted directly to the union nut and liner already fitted to the inlet elbow. The tap must then be located in the most suitable position for operation.

NOTE: In some installations where there is a minimum clearance beneath the boiler, it may be advisable to turn the inlet elbow to the horizontal to enable the connection to be made to the cock.

- (2) Connect a suitable length of 15mm pipe to the main gas cock, terminating it above, below or to the side of the boiler in a length which can be easily connected to the main supply, once the boiler is in position on the wall.

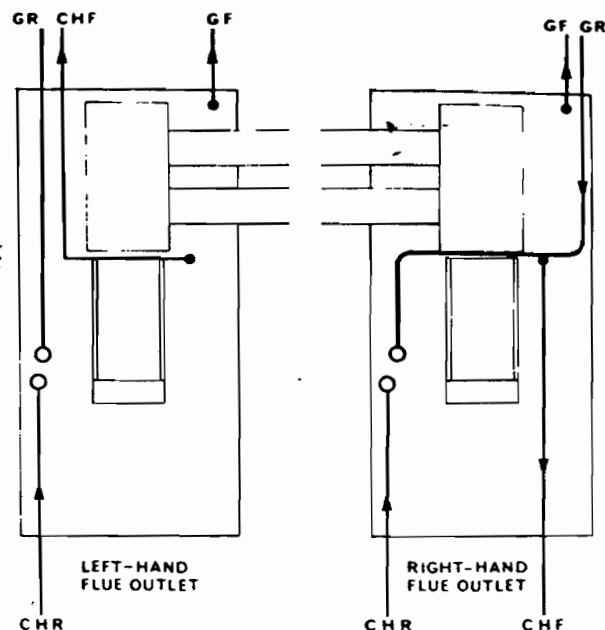
5. FITTING THE BOILER ON THE WALL – See Fig. 9

A metal safety strap is provided with this boiler which is used to hold the boiler backplate against the plenum chamber once the boiler has been lifted into position but before any plenum chamber securing bolts have been fitted.

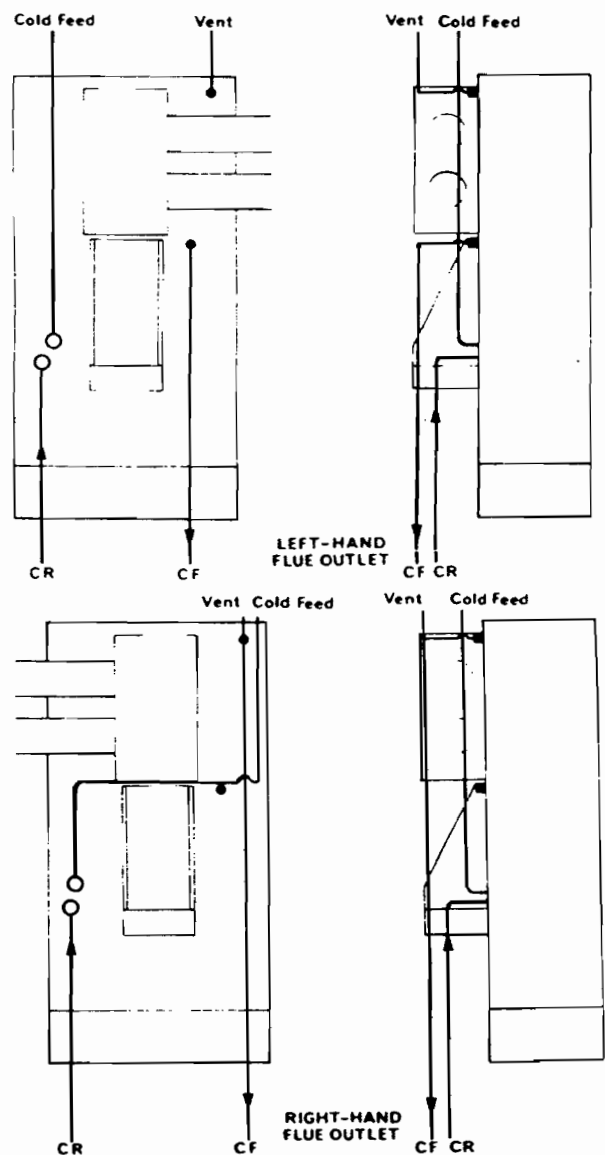
This will enable the installer to leave the boiler unattended once it has been positioned, so enabling him to pick up a screwdriver etc.

The strap must first be positioned by hooking its free ends behind the upper plenum chamber securing bracket, immediately above the two upper securing screws. It can then be hinged upwards against the wall until the boiler has been fitted when it can be hinged downwards, so holding the backplate against the plenum chamber.

- A. Stand the boiler on the floor in a vertical position, then using the two metal feet, the cast iron flow pipe and the underside of the heat exchanger, lift the boiler into position on the wall, locating its mounting bracket on the bearing plate in the mounting channel. Support the boiler in this position, using the safety strap if necessary, then secure the boiler backplate to the plenum chamber with seven bolts, see bolts numbered 1 to 7 on Fig. 9. Ensure that the serrated washer is fitted beneath the centre bolt, number 4. Three bolt holes in the boiler backplate are marked with a ring and these are for use when fitting the fan and must not be used in this operation.



SYSTEMS USING GRAVITY H.W.



FULLY PUMPED SYSTEMS

LEGEND

CHF	Central heating return	GF	Gravity flow
CF	Combined flow	GR	Gravity return
CR	Combined return	CHF	Central heating flow

Fig. 8 SUGGESTED PIPEWORK VIEWED FROM BEHIND BOILER

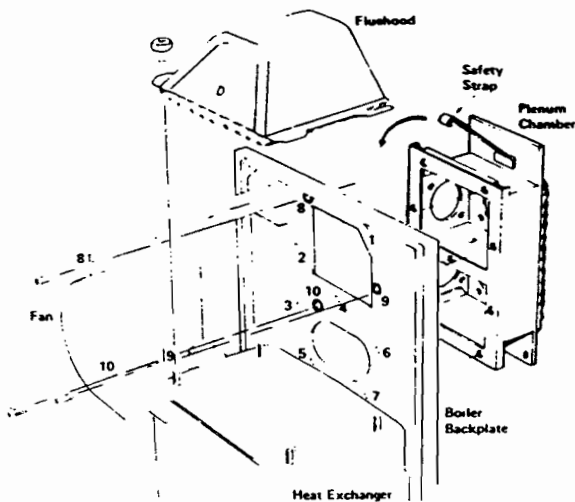


Fig. 9 PLENUM CHAMBER, FLUEHOOD AND FAN ATTACHING PARTS

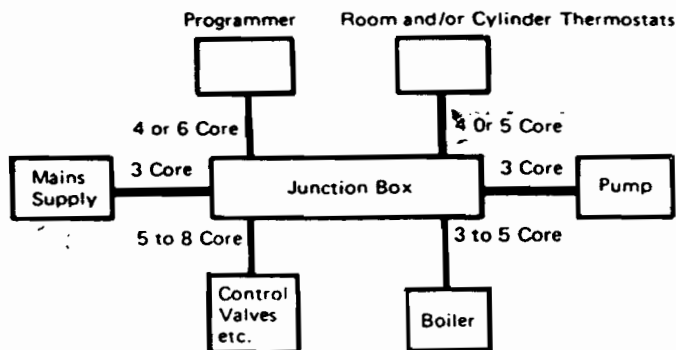
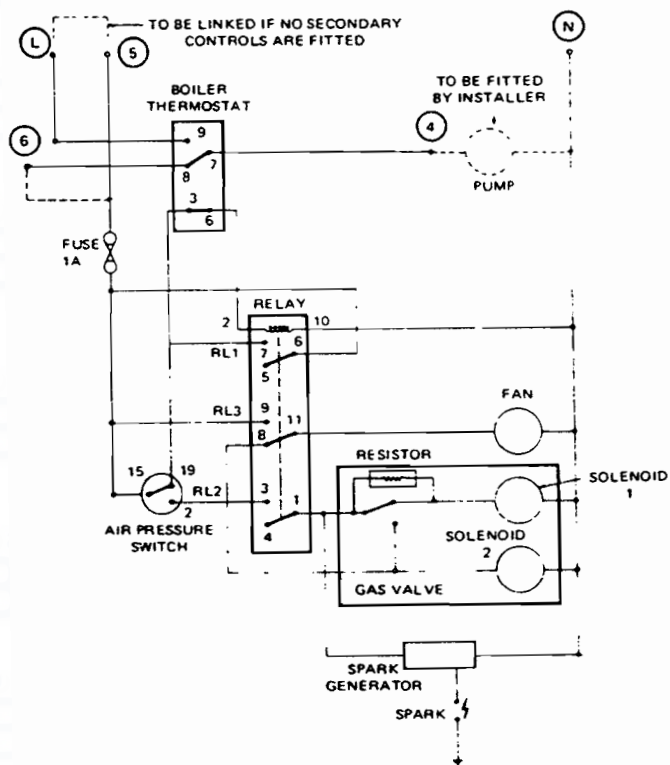
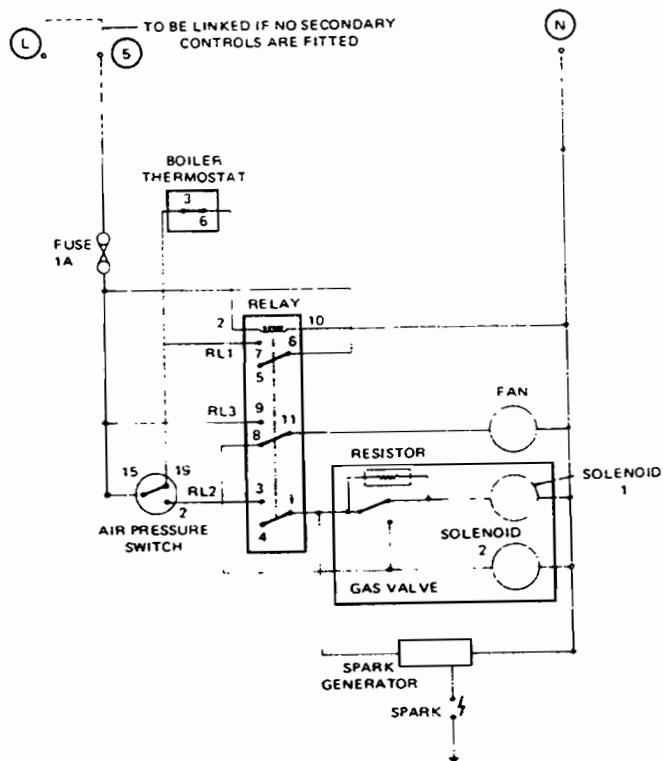


Fig. 10 PRINCIPLE OF WIRING



16/22 only



10/16 only

FUNCTIONAL FLOW DIAGRAMS

WARNING: When fitting the bolts in A, the weight of the boiler could distort the boiler support bracket so making it difficult to line up the bolt holes in the boiler back plate with those in the plenum chamber. If this should occur, the weight of boiler should be supported until the bolts are correctly engaged.

- B. Fit the fan in position and secure it to the boiler backplate with the three bolts, numbered 8 to 10 on Fig. 9. Connect the two mains electrical leads to their connections on the boiler backplate and the earth lead to the earth screw also on the backplate.

Warning: It is very important that when tightening the bolts in operations A and B that good seals are made. All bolts must be tight.

- C. Refit the fluehood to the heat exchanger, ensuring that a good seal is made at the plenum and that

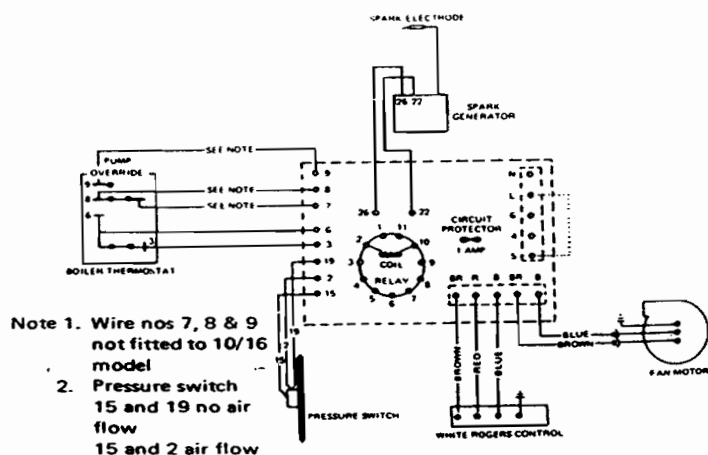


Fig. 11 BOILER WIRING DIAGRAMS

all the plenum fixing bolts have been fitted and are tight. Secure the hood in position with the four nuts and washers; ensure the nuts are tight, and that the hood makes a good seal with the heat exchanger.

- D. Fit the combustion chamber front cover, securing it with the four screws (Accessories Card Item F).
- E. Unscrew the nuts and remove and discard the two metal feet taking care not to damage the capillary of the mercury vapour flame safety switch.
- F. Connect the main gas supply to the length of pipe fitted to the $\frac{1}{2}$ in. BSP gas cock.
- G. Connect the short lengths of pipe previously fitted to the boiler, to the system pipework, then fill and vent the water system and test for leaks. Rectify if necessary.

6. WIRING – See Fig. 11

THIS APPLIANCE MUST BE EARTHED

Care must be taken to ensure that all wiring to the boiler is kept clear of sharp edges and hot surfaces.

The boiler terminal strip situated on the control panel is not designed to accept wiring from all the on-site system controls and therefore, the installer will usually need to incorporate a suitable junction box. The principle of wiring up the boiler and site controls is shown in Fig. 10. However, the layout of a particular system will itself govern the most economical location for the junction box and its terminals.

Wire up the boiler and system controls as illustrated in Fig. 12, 13, 14, 15 or 16 depending on the type of system installed. The wiring arrangements shown outline only the basic control requirements, and will therefore require on-site interpretation of the various boiler installation requirements.

If a Potterton EP 2000 Programmer is not being fitted, but a three terminal time clock is to be installed to control the systems illustrated in Fig. 12, 13, 14, 15, or 16 the time clock should be wired as follows:—

Live to Time Clock Live
Neutral to Time Clock Neutral
Earth to Time Clock Earth
Wires normally connected to
EP 2000 Terminals 3 & 4
to Time Clock Switch

A low limit thermostat can be installed to override the "OFF" setting of the time control if the temperature where the thermostat is situated, falls below the thermostat setting. Where an EP 2000 or equivalent Programmer is installed, a double pole or double outlet thermostat may be necessary; for the electrical connections and type required, see the relevant system wiring diagram. Where only a time clock is fitted, the thermostat need only be a single pole type with its contact wired in parallel with the clock switch.

MID POSITION ZONE VALUE

If a three way (proportioning diverter) valve with a mid-position is being fitted in the system, the following instructions must be adhered to in addition to the valve manufacturers wiring information:

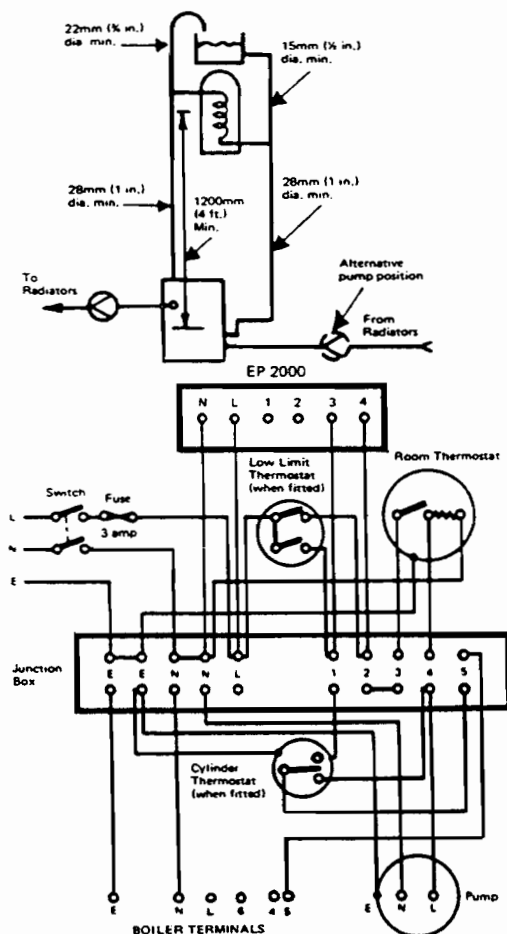
1. Neutral and earth connections must be made to boiler terminals N and E.
2. The switched supply from the system control circuit for the boiler, must be connected to boiler terminal 5.
3. On 16–22 boilers, the live supply to the pump must be taken from the boiler terminal 4, with terminal 5 and 6 looped together and in addition to note 2 a live connection made to boiler terminal L.

4. On 10–16 boilers, the live supply to the pump must be taken from the supply to boiler terminal 5.

When all wiring is complete, hinge down the controls panel to gain access to the boiler front cover lower securing points, then fit the front cover to the boiler, securing it with the four captive bolts.

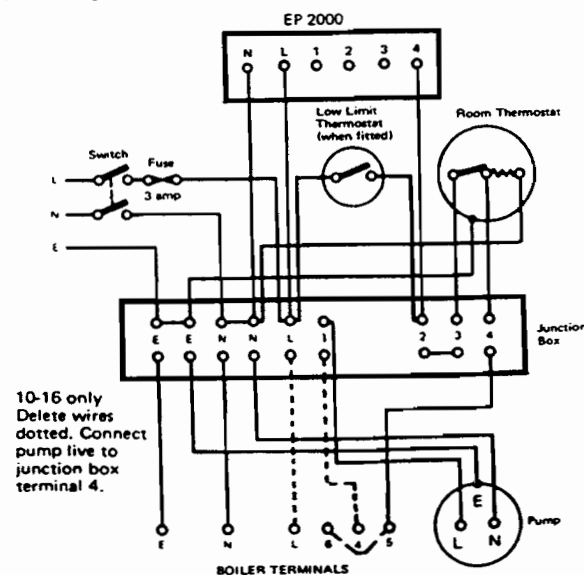
Ensure that a good seal is obtained around the perimeter of the cover. Fit the thermostat knob (Accessories Card Item G).

Fig. 12 GRAVITY HOT WATER WITH PUMPED CENTRAL HEATING



Note 1: When a cylinder thermostat is not fitted, a direct connection must be made between junction box terminal 1 and boiler terminal 5.

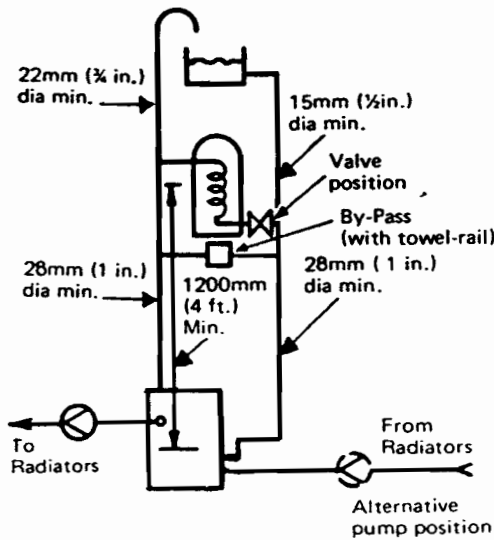
GRAVITY HOT WATER WITH PUMPED CENTRAL HEATING



10-16 only
Delete wires
dotted. Connect
pump live to
junction box
terminal 4.

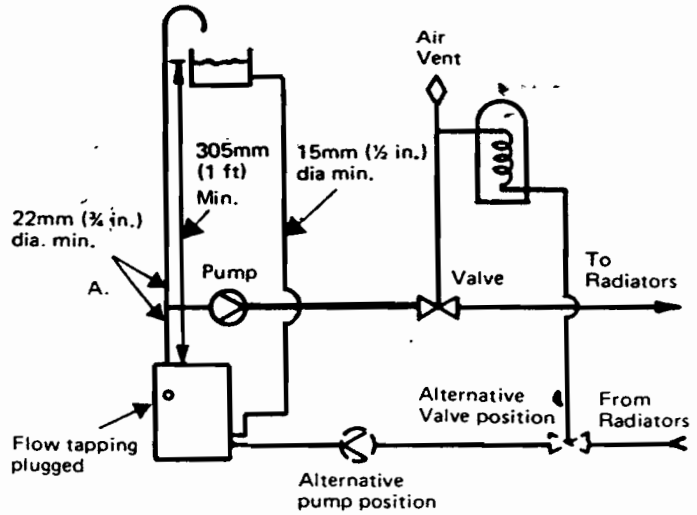
PUMPED CENTRAL HEATING ONLY

Fig. 13 GRAVITY HOT WATER WITH TEMPERATURE CONTROL AND PUMPED CENTRAL HEATING



The by-pass is not required on 10-16 boilers, when the valve used has proving contacts to control the boiler

Fig. 14 FULLY PUMPED WITH TWO POSITION DIVERTER VALVE



A. Junction between vent and pumped circuit to be as close to boiler as possible – Max. distance 910mm (3 ft.)

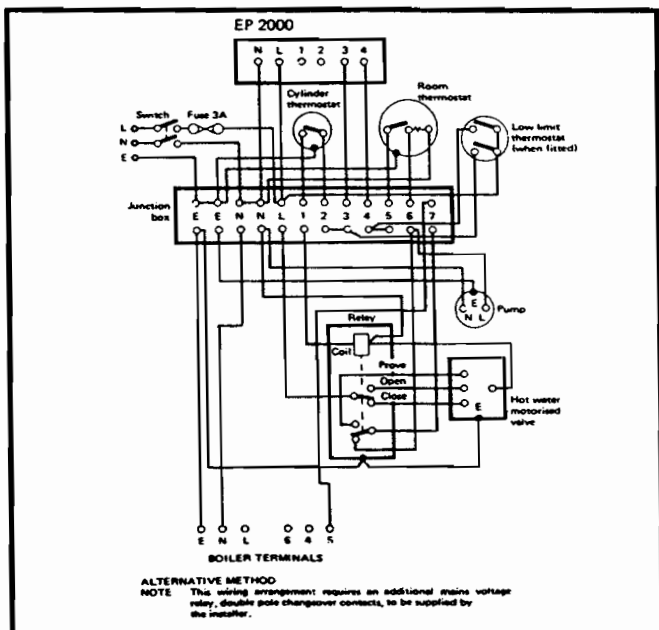
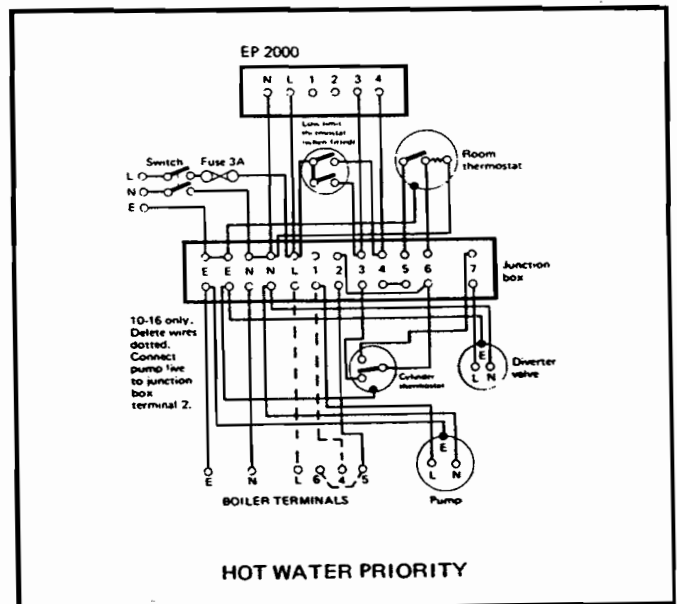
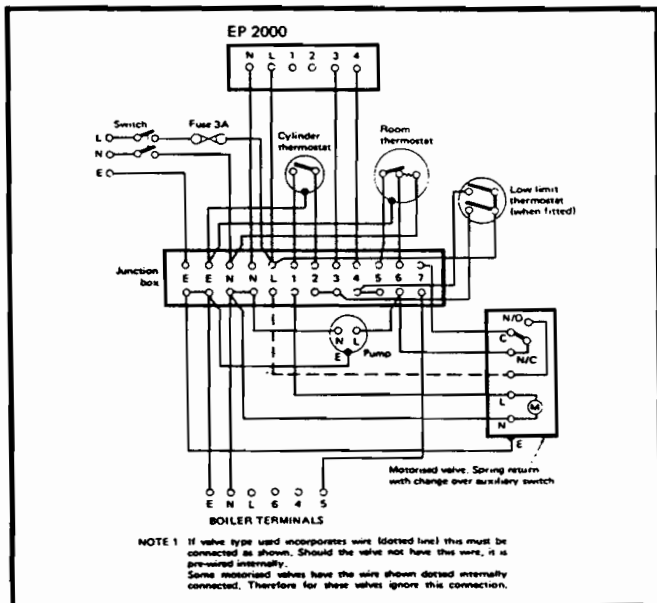
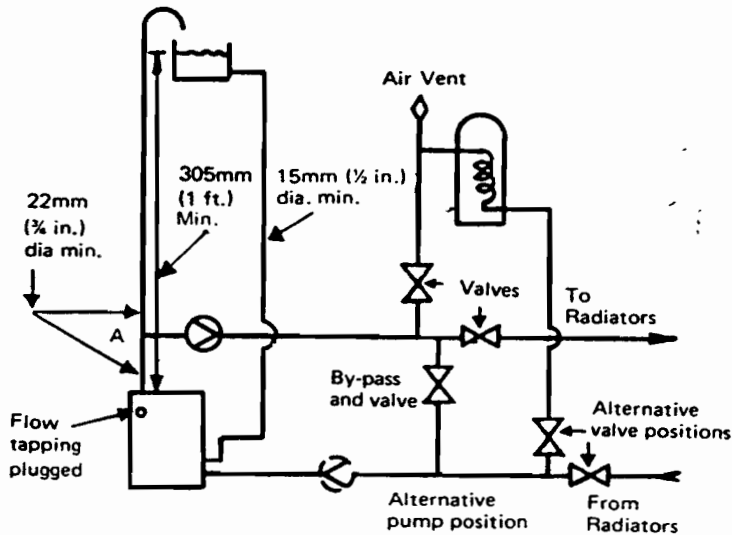
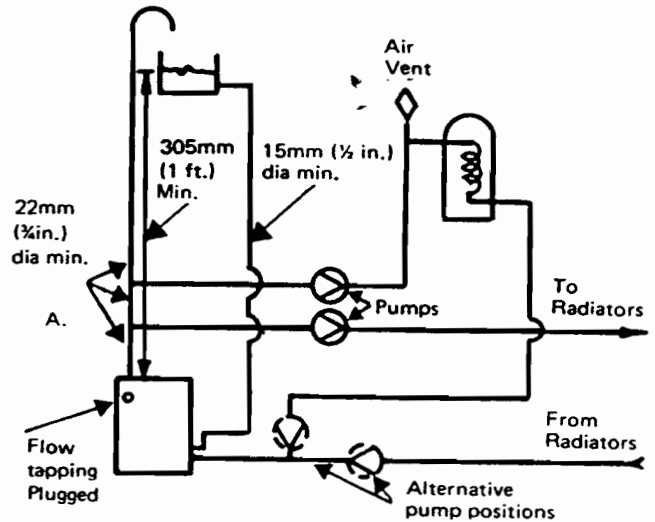


Fig. 15 FULLY PUMPED WITH ONE OR TWO ZONE VALVES SPRING RETURN



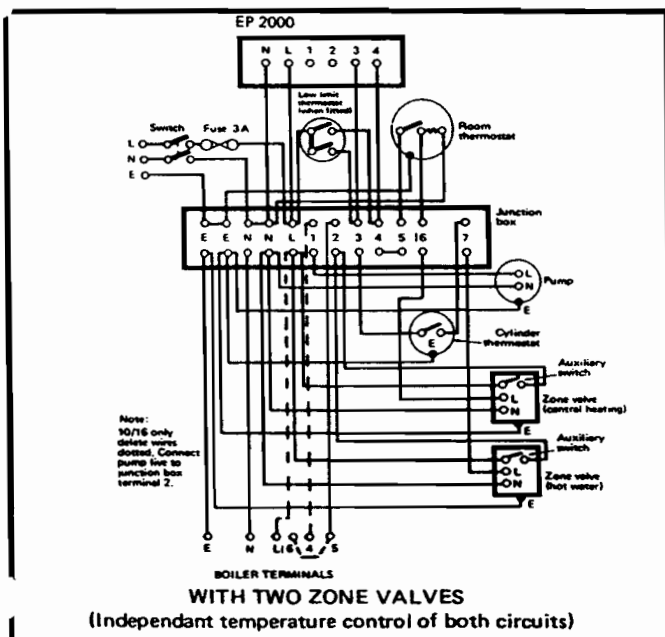
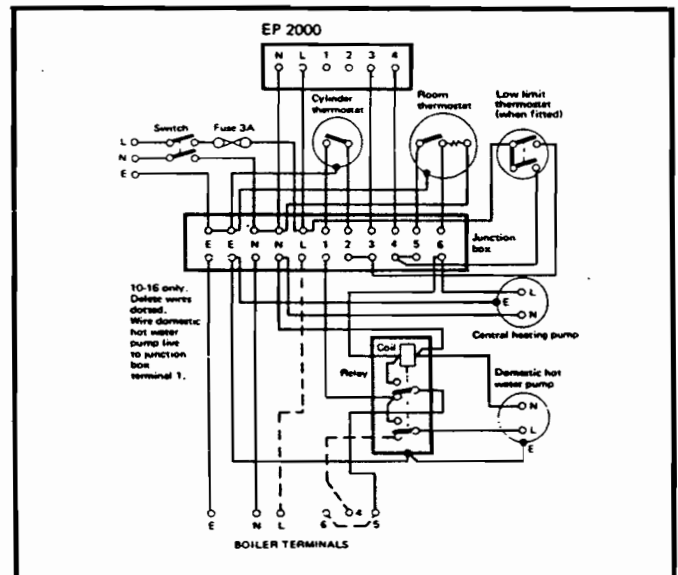
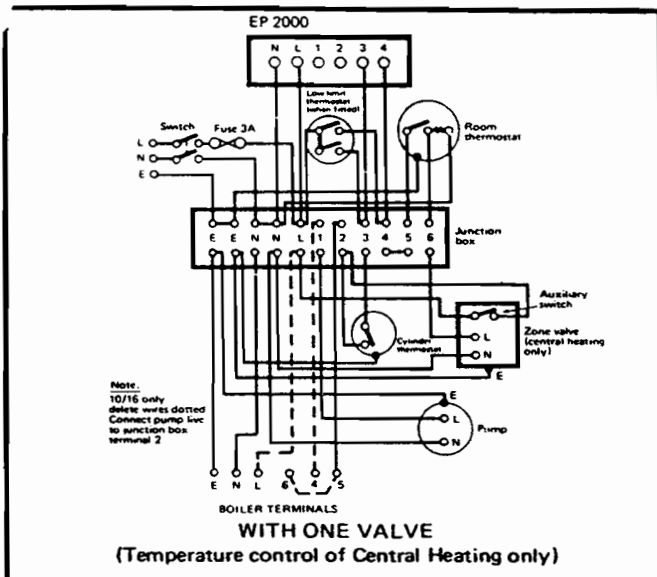
A. Junction between vent and pumped circuit to be as close to boiler as possible – Max. distance 910mm (3ft.)

Fig. 16 FULLY PUMPED USING TWO PUMPS



A. Junction between vent and pumped circuit to be as close to boiler as possible – Max. distance 910mm (3 ft.)

B. To stop intercirculation, a non-return valve should be fitted in each circuit.



NOTE: These system diagrams, figs. 12 to 16, are schematic only. Installers are advised to read "The System" on page 4 and BS. 5376 and BS. 5449 Part 1.

7. FIRST LIGHTING

WARNING: BEFORE LIGHTING THIS BOILER, ENSURE THAT THE FRONT COVER HAS BEEN CORRECTLY FITTED AND THAT THE EDGE OF THE COVER MAKES A TIGHT SEAL WITH THE SEALING STRIP IN THE GROOVE AROUND THE BOILER BACKPLATE.

- A. Check that the main electricity supply to the boiler is switched off and that the boiler thermostat is in the off position.

- B. Turn on the main gas supply.

WARNING: OPEN ALL WINDOWS AND EXTINGUISH ANY NAKED LIGHTS IN THE ROOM AND PUT OUT PIPES AND CIGARETTES.

- C. Break the union at the boiler main inlet cock, then open the cock and purge air from the supply pipe.

- D. Close the cock, remake the union then re-open the cock and test for gas soundness using a soap solution, taking care not to splash the boiler electric.

WARNING: DO NOT USE A NAKED FLAME.

- E. Ensure that the system is full of water and that the pump and radiator isolating valves are open.

- F. Ensure that the time control, if fitted, is in an on condition, and that the room and/or cylinder thermostats, where fitted, are set to high temperatures.

- G. Switch on the main electricity supply to the boiler.

- H. Turn the boiler thermostat on and to a high setting and after a period of time the main burner will light, which can be observed through the site glass in the front cover of the boiler. The time period can vary upwards of 45 seconds, depending on the amount of air in the pipework.

- J. Turn off the boiler thermostat.

NOTE: There could be a delay in lighting if the control knob is switched on and off and then on again rapidly.

8. SETTING AND CHECKING OF CONTROLS

A. Gas Rate and Main Burner Pressure Setting

- (1) Fit a pressure gauge to the pressure test nipple in the multi-functional control.
- (2) Turn on the boiler thermostat and ensure that the main burner is alight then check that the burner pressure is in accordance with Table 1.
- (3) If burner pressure adjustment is necessary, remove the screwed cap from the multi-functional control, see Fig. 1 and turn the screw beneath clockwise to increase pressure or anti-clockwise to decrease. Refit the screwed cap when the pressure is correct. Shut down the boiler, remove the pressure gauge and refit the screw in the pressure test nipple.
- (4) Isolate the main electrical supply to the boiler, then hinge up and secure the controls panel.
- (5) Remove the thermostat knob, then slide on the controls cover and secure it with the captive screw.
- (6) Refit the thermostat knob, then switch on the main electrical supply to the boiler.

- (7) With the burner set to its correct pressure, the firing rate given in Table 1 should also be obtained and this should be checked by meter reading over a period of at least 5 minutes once the boiler is hot.

B. Pilot Burner

- (1) The pilot is preset and no adjustment is required or available.

C. Boiler Thermostat

- (1) At its maximum and minimum settings, the thermostat should control the water flow temperature at approximately 55°C – 82°C (130°F – 180°F) respectively.
- (2) The thermostat has been calibrated by the makers and no attempt should be made to re-calibrate it on site. Turn the thermostat to the off position and check that the main burner shuts down.

D. Pump Over-Run Thermostat – 16–22 Boiler Only

- (1) In fully pumped systems, the over-run thermostat will keep the pump running when the boiler has shut down, as long as the water temperature within the boiler is above a predetermined limit.

OTHER BOILER CONTROLS

All boiler mounted controls are designed so that if any fault should occur they will fail safe. No further setting or checking is necessary.

REMOTE CONTROLS

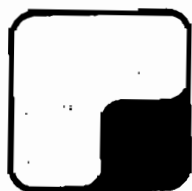
Check that any other remote control connected in the system such as programmers and thermostats, control the boiler as required.

USER'S GUIDE

A user's guide is provided with this boiler but the householder should have the operation of the boiler and system explained by the installer.

TABLE 1.

BOILER	10–16	16–22
Input	13.4 to 20.9 kW (45,600 to 71,400 Btu/h)	22.5 to 29.6 kW (76,800 to 101,150 Btu/h)
Output into water	10.0 to 16.1 kW (34,000 to 55,000 Btu/h)	16.1 to 22.0 kW (55,000 to 75,000 Btu/h)
Output into air (Approx)	0.3 to 0.4 kW (957 to 1499 Btu/h)	0.3 to 0.4 kW (998 to 1314 Btu/h)
Burner pressure	6.0 to 13.5 m.bar (2.4 to 5.4 in.w.g.)	8.5 to 14.0 m.bar (3.4 to 5.6 in.w.g.)
Injector size	3.6mm	4.2mm
No. of Injectors	1	1
Gas Rate	1.3 to 2.0 cu.m/h (45.5 to 71.5 cu.ft/h)	2.2 to 2.9 cu.m/h (77 to 101 cu.ft/h)
B.G.Code No.	41.601.34	41.601.35
Potterton Code	P.C.A.	P.C.B.



POTTERTON

INSTALLATION &
SERVICING
INSTRUCTIONS

Netaheat Electronic balanced flued gas-fired boilers

Potterton Netaheat Electronic 6/10
6 to 10 kW (20,000 to 35,000 Btu/h)

Potterton Netaheat Electronic 10/16
10 to 16 kW (34,000 to 55,000 Btu/h)

Potterton Netaheat Electronic 16/22
16 to 22 kW (55,000 to 75,000 Btu/h) Output

THIS DOCUMENT CONSISTS OF THREE PARTS:

- | | | |
|-------------|---|---------------------------|
| FIRST PART | — | DATA SECTION |
| SECOND PART | — | INSTALLATION INSTRUCTIONS |
| THIRD PART | — | SERVICING INSTRUCTIONS |

These instructions are to be followed and the specification of the appliance must not be modified
These instructions are to be left with the User or adjacent to the service meter.



**IMPORTANT: THIS APPLIANCE IS FOR USE WITH NATURAL GAS ONLY.
IT MUST BE INSTALLED BY A COMPETENT PERSON AS STATED IN THE
GAS SAFETY (INSTALLATION AND USE) REGULATIONS 1984**

**THESE BOILERS CAN BE USED ON SEALED SYSTEMS IF FITTED WITH OVERHEAT THERMOSTAT
KIT P.I.L. No. 205725 (6/10 & 10/16) OR No. 205724 (16/22)**

DATA SECTION

The following special items are available as optional kits:-

For 6/10 Models & 10/16 Models	P.I.L. No.
Pump kit casing assembly	205744
Internal fitment kit	205775
Wall Plate	205580
Terminal Guard	205792
Overheat thermostat kit	205725
Infill panel pack (single)	905813
Ducting kit*:-	
*Extension kit	Concentric ducts 205890
*Extension kit	Square ducts 205754

For 16/22 Models

Pump kit casing assembly	205744
Air Duct assembly —	200620
Flue extension rear outlet only	
Terminal Guard	200493
Overheat thermostat kit	205724
Infill panel pack (single)	905813

*IMPORTANT — Ducting kits must not be used on 16/22 models.

*NOTE — See Addendum 1 - Flues for flue length criteria.

GENERAL

Potterton Netaheat boilers are fully automatically controlled, wall mounted balanced flue appliances, specially designed for combined gravity hot water and pumped central heating or fully pumped systems (small bore or micro-bore) giving ease of siting, installation and servicing. The data badge is in the base of the control cover. The code badge is on the thermostat housing.

THE SYSTEM

Potterton Netaheat boilers have been specially designed for combined systems e.g. small bore or micro-bore central heating with an indirect domestic hot water supply which can either have pumped or gravity circulation; the boiler can also be used for pumped central heating only. The boiler can be installed in most types of system, but the following notes are given as a general guide and reference made to the following documents.

- BS 5376 Part 2 1976 : Code of practice for selection and installation of gas space heating (1st and 2nd family gases — Boilers of rated input not exceeding 60 kW).
- BS 5440 Part 1 1978 : Code of practice for flues and air supply for gas appliances of rated input not exceeding 60 kW (1st and 2nd family gases) — Flues.
- BS 5440 Part 2 1976 : Code of practice for flues and air supply for gas appliances of rated input not exceeding 60 kW (1st and 2nd family gases) — Air Supply.
- BS 5449 Part 1 1977 : Code of practice for central heating for domestic premises— Forced circulation hot water systems.
- BS 5546 1979 : Code of practice for installation of gas hot water supplies for domestic purposes (2nd family gases).
- CP 331 Part 3 1974 : Code of practice for low

pressure installation pipes.

Building Regulations : Installations in permanent dwellings, England and Scotland.

Model Water Byelaws

British Gas Publication DM2 — Guide for gas installations in timber framed housing.

First Edition September 1982

Gas Safety (Installation and Use) Regulations 1984

All pumped systems should be designed so that the static head of the boiler is between a minimum of 305mm (1 ft.) and a maximum of 27.5m (90 ft.). To ensure that the minimum 305mm (1 ft.) static head is obtained, the level of the cold water in the expansion tank must not be lower than the top of the boiler casing or the highest point in the heating system.

If a minimum 305mm (1 ft.) head is used, extra care should be taken when designing the system, to ensure that pumping over or sucking down at the vent pipe cannot occur.

All gravity domestic systems should have a minimum head above the boiler of 1.2m (4 ft.).

A typical combined gravity system is shown in Fig.24.

A fully pumped system giving temperature control of the central heating circuit via a room thermostat and a two-position valve or diverter is shown in Fig. 23(a)

If temperature control is required on the hot water system, additional equipment is necessary and details are shown in Fig. 24.

For independent temperature control of both the central heating and domestic hot water circuits, a three-position valve with a central position can be used, as shown in Fig. 23. This type of valve can give a flow to either circuit separately or to both circuits simultaneously. For the wiring of this type of valve refer to the valve manufacturers literature and the information given in Section 6. Wiring.

Independent temperature control of both circuits can also be obtained by using room and cylinder thermostats and a two-position diverter valve. This valve provides a flow to one circuit at a time and details are shown in Fig. 23.

The use of two zone valves will also give independent temperature control of both circuits and details of this type of system are also given in Fig.23(b).

A further method of providing independent temperature control in conjunction with room and cylinder thermostats, is by using two pumps. Details are given in Fig.25. For open systems it is recommended that an indirect cylinder with a coil type of heat exchanger is used. For sealed systems the storage vessel must be of the indirect coil type or a direct cylinder fitted with an immersion calorifier which is suitable for the system pressure. When fitting the boiler, no system should be designed in which it is possible to completely close both the domestic hot water and central heating circuits, and to obtain this, a by-pass of at least 15mm Ø pipe between the boiler flow and return connections should be used. The by-pass circuit must include a lockshield valve and be in circuit with the pump see Fig. 23 (a), (b) & (c).

As the boilers are wall hung, a drain cock should be included at the lowest point in the central heating system. (When selecting a circulating pump for the central heating system, the data contained in Fig.2 should be borne in mind). For systems requiring a low static head, close coupled feed and vent, and feed and vent connections some distance away from the boiler Figures 19, 20 & 21 should be referred to.

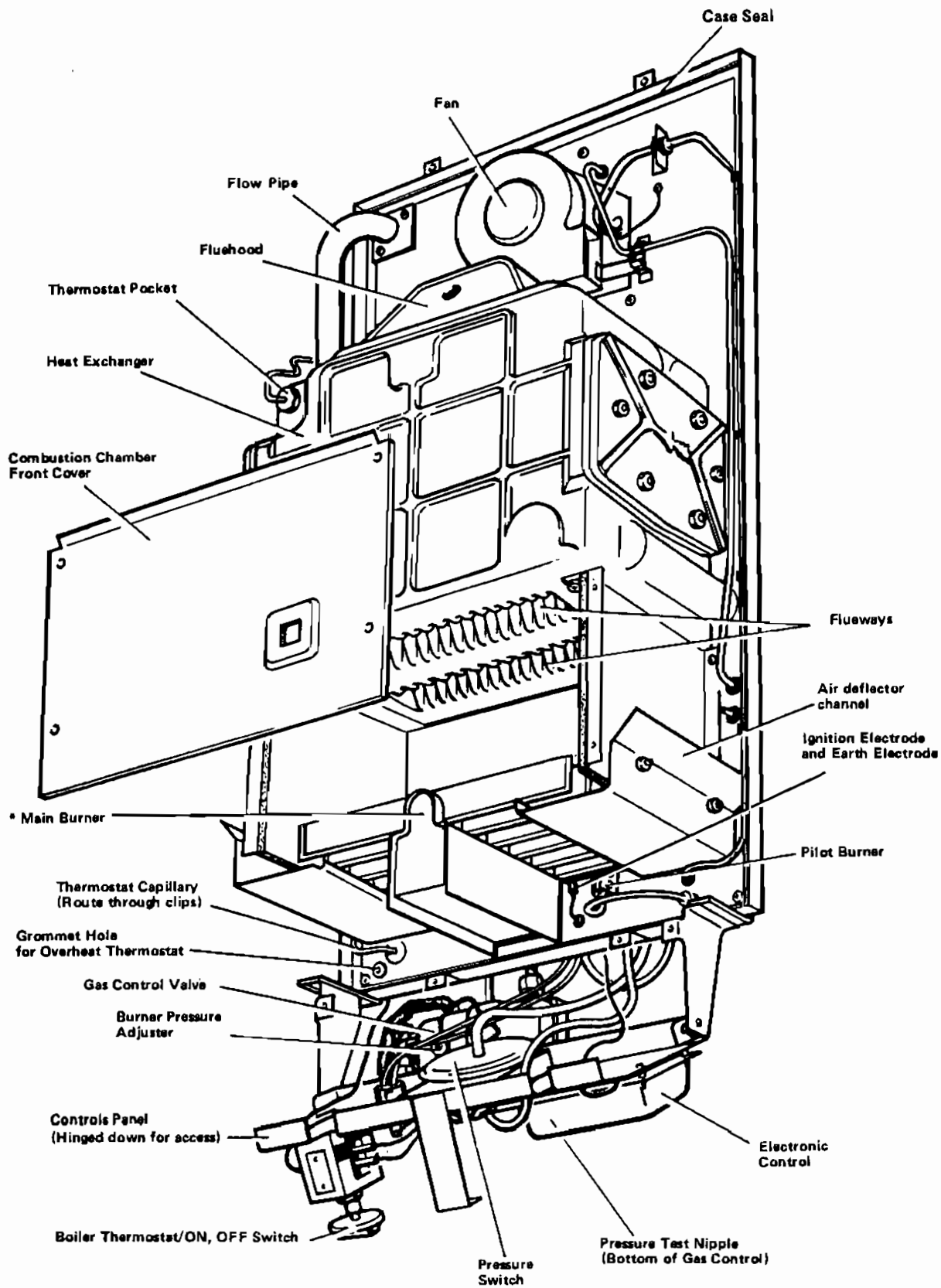


Fig. 1 GENERAL ARRANGEMENT

10/16 Unit
Illustrated

- * Bladed Burner on 10/16 & 16/22 models
Bar Burner fitted on 6/10 models

Circulating Pump Selection

The resistance through the heat exchanger is equal to 25mbar (10in.w.g.) at a flow rate of 27.25 litres/min. (6galls/min.), when using the 1 in. flow connection or 43.75mbar (17.5in.w.g.) at the same flow rate when using the 3/4 in. flow connection, see Fig. 2. If other controls, such as three-position valves are used in this type of system, the resistance through them, quoted in their manufacturers literature, must be taken into account.

The circulating pump may be fitted on either the flow or return side of the boiler. If fitted on the flow, and the cold feed is taken to the return port on the boiler, the central heating circuit will be under a positive pressure, so reducing the risk of air being drawn into the system, but if the pump is on the return there will be a negative pressure in the circuit.

The pump can be fitted in the space above the boiler if required. Use pump casing kit P.I.L. No. 205744.

It is recommended that the static head on the inlet side of the pump should be at least a third of the maximum pump duty.

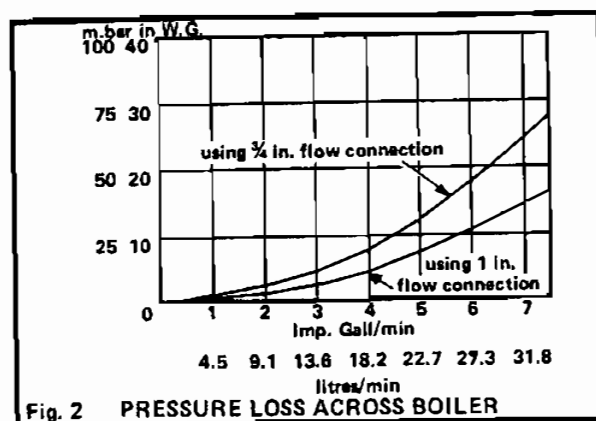


Fig. 2 PRESSURE LOSS ACROSS BOILER

The pump must be fitted with two isolating valves which are positioned as close to the pump as possible. Isolation of the valves must always leave the open vent pipe unobstructed.

The boiler can be used on a sealed system providing the overheat thermostat kit No. 205725 (6/10 & 10/16) or 205724 (16/22) is used. Fig.21 shows a typical sealed system, for further information refer to the literature supplied with the overheat thermostat kit.

INSTALLATION AND SITE REQUIREMENTS

Ensure that the gas supply pipe and meter are large enough for this appliance and any others that may be run off the same meter: if not, contact the local Gas Regional Office. The boiler can be installed at any height (refer to Clearances Around the Boiler and the static head requirements) on an outside wall or on an internal wall providing that one side of the boiler is next to an outside wall. The recommendations of the British Standards Codes of Practice BS.5440 Part 1 should be followed.

Boiler Mounting Surface

The boiler must be mounted on a flat wall of non-combustible material sufficiently robust to take the weight of the boiler. The requirements of the local authorities and the Building Regulations must be adhered to.

IMPORTANT NOTICE: TIMBER FRAMED HOUSES

If the appliance 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 Housing" reference DM2. If in doubt, advice must be sought from the local Gas Region of British Gas.

Clearances Around the Boiler

Any position selected for the boiler must give the following minimum clearances which are necessary for installation and maintenance.

610mm (2 ft.) at the front of the boiler, 5mm (.2 in.) each side, 102mm (4 in.) at the top — except where the optional extra pump casing is to be fitted, when 178mm (7 in.), must be allowed.

For high level installation e.g. above working surfaces, shelves, cabinets etc, a minimum clearance of 102mm (4 ins.) is required between the bottom of the appliance and the working surface.

For low level installations a minimum clearance of 127mm (5 ins.) is required between the bottom of the appliance and the floor. An infill panel is supplied with the boiler. If installed with one side exposed this panel covers the pipework. Extra panels are available P.I.L. No. 905813.

It is possible to achieve installation of the boiler with the clearances specified but it is advisable during installation to provide temporary access particularly to the water connections at the rear of the boiler. The appliance can then be "built in" to the minimum clearance dimensions on completion of the installation.

VENTILATION

If the boiler is to be installed in a confined space such as a cupboard, the space will need ventilating. Openings must be provided at the top and bottom of the cupboard each of which should have a free area as follows:—

Potterton Netaheat	Free Area	
	Sq.in.	Sq.cm.
6-10	18	117
10-16	29	185
16-22	40	261

If the openings draw air from outside the building, the free areas may be halved. Refer to British Standard Code of Practice BS 5440 Part 2 1976 for further guidance.

Balanced Flue Terminals and Ducting

The fresh air inlet and flue ducts can be run from either the left, right or rear of the boiler to a miniature terminal on the outside wall of the building. For information appertaining to standard flue lengths and to extension kits applications reference should be made to Addendum 1 supplied with these instructions. The siting of the balanced flue terminal on the outside wall of the building is shown in Fig.3. If a terminal is fitted less than 2m above a balcony, above the ground or above a flat roof to which people have access then a suitable terminal guard should be fitted, Terminal Guard P.I.L. No. 205792 (6/10 and 10/16) & P.I.L. No. 200493 (16/22).

Fig.3 Netaheat flue terminal positions



Flue terminal position		Min. distance
a	Below an openable window or other opening	300 mm
b	From an internal corner	25 mm
c	Under eaves	25 mm
d	Below gutters	25 mm
e	Below a balcony	25 mm
f	Adjacent to an opening window	150 mm
g	Adjacent to a soil pipe	25 mm
h	From a surface facing a flue terminal	600 mm
i	From a terminal facing a terminal	1200 mm
j	Above ground or balcony level	300 mm
k	From an external corner	25 mm
l	Between terminals - vertical	1500 mm
m	Between terminals - horizontal	300 mm

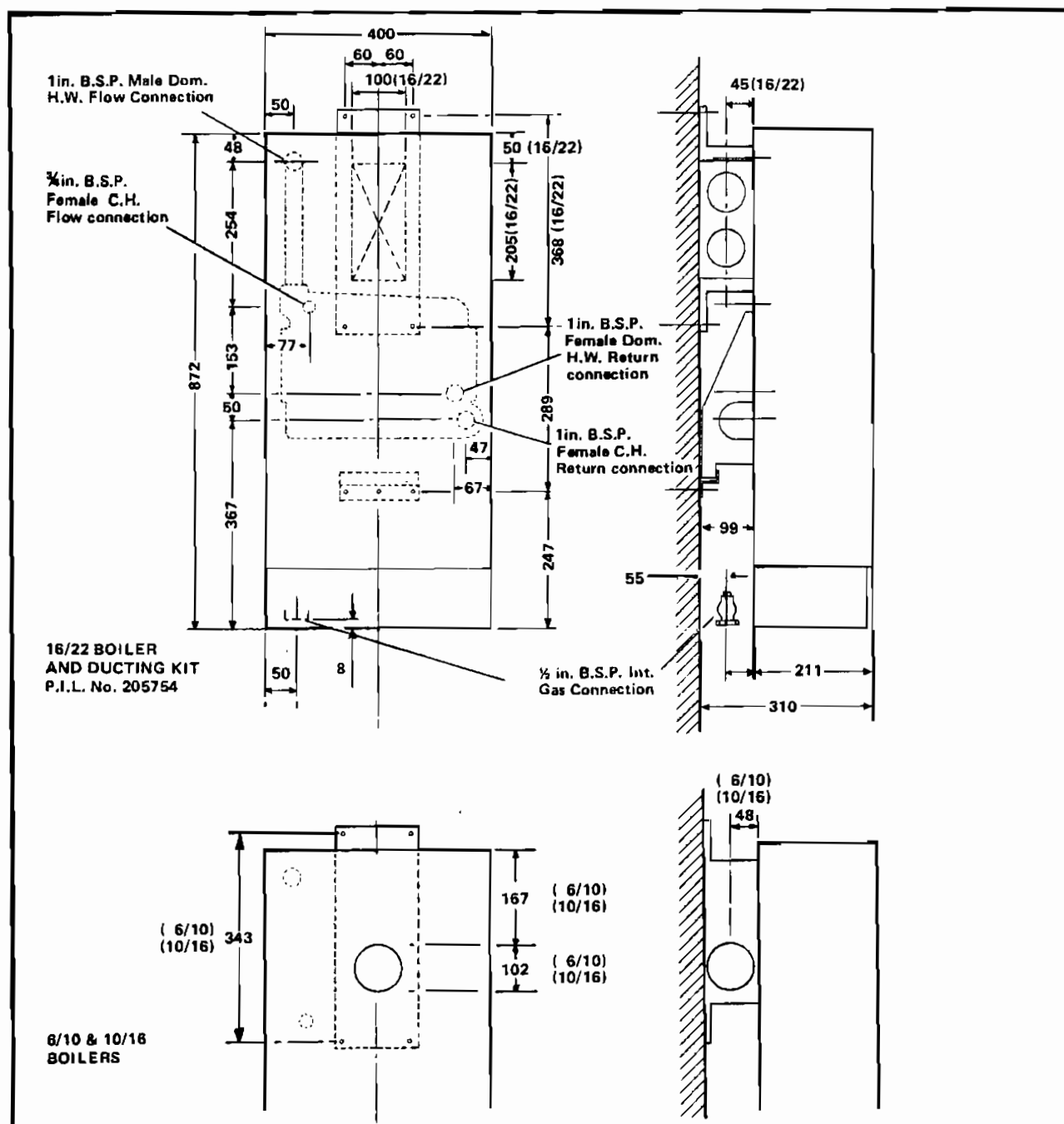
Note:—

Where a flue terminal is fitted less than 850mm (34 in.) from a plastic or painted gutter or 450mm (18 in.) from painted eaves, an aluminium shield of 750mm (30 in.) length to be fitted to underside gutter or eave.

Electricity Supply

A 240 volts $\sim$, 50 Hz., single phase electricity supply fused to 3 amperes, must be provided in accordance with the latest edition of the Institute of Electrical Engineers Regulations for the Electrical Equipment of Buildings and Local Authorities requirements. The current rating of the wiring to the boiler must exceed 3 amperes in accordance with BS.6500, 1975 and have a cross sectional area of at least 0.75 sq.mm. The supply to the boiler and its associated equipment should be controlled by an unswitched plug and socket or a double pole switch (having at least 3mm contact separation) so that complete isolation from the supply can be achieved to enable maintenance work to be carried out in safety.

FIG. 4 CONNECTIONS AND DIMENSIONS



MAINTENANCE

The efficient performance of this boiler is dependent upon regular servicing which should be carried out annually.

Maintenance is best arranged by a contract placed with Potterton International Limited and further details are available from the local Potterton Regional Service Office.

All parts likely to require servicing are easily accessible. By sliding the cover from the boiler controls and removing the front cover from the boiler, most components are exposed. It is then a simple matter to remove the front of the combustion chamber to gain access to the main and pilot burners and the ignition electrode. Removal of the fluehood which is secured by four nuts, gives access to the fireways in the heat exchanger.

ADDITIONAL CONTROLS

The Potterton EP 2000/3000 time control, which is a wall-mounted electronic programmer giving a choice of programmes for both central heating and domestic hot water systems, is available as an optional extra. The EP 2000/3000 is fully described in its own Data Sheet which is available on request.

TECHNICAL LITERATURE

The following literature is supplied with each boiler:—
Data, Installation and Service Instructions
User's Instructions

DATA

DIMENSIONS	HEIGHT	WIDTH	DEPTH	
OVERALL	872mm (34.4 in)	400mm (15.7 in)	310mm (12 in)	
SPACE FOR FIXING BOILER ONLY	1076mm (42.4 in)	410 mm (16.1 in)	915 mm (36 in)	High level installation over working surfaces
	1102mm (43.4 in)	410 mm (16.1 in)	915 mm (36 in)	Low level installation clearance at floor level
WITH PUMP KIT CASING ASSEMBLY	1279mm (50.4 in)			
WEIGHT OF THE APPLIANCE	70kg (154 lbs) installed 54kg (119 lbs) lift weight			
FLUE/AIR DUCT SIZE	6/10 & 10/16 102 mm (4 in)	16/22 202 x 95.5 mm (7.9 x 2.8 in)		
CONNECTIONS GAS COCK	R.C. ½ (½ in. B.S.P. Female) Loose key			
ELECTRICAL SUPPLY CONNECTION	Terminal Block			
TEST POINT	On Gas Valve			
SUPPLY PRESSURE	20mbar (8in) w.g.			
WATER CAPACITY OF THE BOILER	5.7 litres (1.25 gals)			

BURNER TYPE	6/10 Box Type	10/16 Seven Bladed	16/22
INJECTOR	2.8mm	3.6mm	4.2mm
HEAT OUTPUT	6 to 10.3 kW (20,470 to 35,100 Btu/h)	10 to 16.0 kW (34,100 to 54,600 Btu/h)	16.1 to 22 kW (55,000 to 75,000 Btu/h)
HEAT INPUT	7.75 to 13 kW (26,300 to 44,300 Btu/h)	13.3 to 20.5 kW (45,380 to 70,000 Btu/h)	21.9 to 29 kW (74,500 to 98,700 Btu/h)
BURNER PRESSURE (Measured Hot)	5.7 to 14 mbar (2.3 to 5.6 in.)	5.7 to 12.3 mbar (2.3 to 4.9 in.)	8.1 to 13.5 mbar (3.2 to 5.4 in.)
GAS RATE	0.72 to 1.2 cu m/hr (25.4 to 42.8 cu ft/hr)	1.2 to 1.9 cu m/hr (43.9 to 67.6 cu ft/hr)	2.0 to 2.7 cu m/hr (72 to 95.4 cu ft/hr)

IGNITION	Spark Electronic Control
SPARK GAP	4 mm +0 -1.5
PILOT GAS RATE	Governed by Main Control Governor

INSTALLATION INSTRUCTIONS

NOTE: When handling the boiler care must be taken to prevent damage to components situated on the base of the appliance.

1. GENERAL

Installation must be carried out in accordance with the relevant British Standard Codes of Practice and I.E.E. recommendations. If this boiler is installed in a bathroom the special electrical safety I.E.E. recommendations must be adhered to. Reference should also be made to British Gas publication "Material and Installation Specifications for Domestic Central Heating and Hot Water".

If the boiler is to be installed in a timber framed house the guidelines given in British Gas Publication DM2 should be followed.

The boiler and its associated equipment will arrive on site in two cardboard cartons. The contents of each carton is as follows.

CARTON No.1 :

1. Installation/Service and User's Instructions
2. Template
3. Accessories Pack
4. Balanced flue terminal and ducts
5. Boiler Combustion chamber front cover
6. The controls cover
7. Mounting channel with rubber strip, and metal bearing plate, adjusting shims and retaining strap.
8. Telescopic trunking, Duct sealing flange and gaskets — 16/22 only (Air Duct).
9. The boiler front cover
10. Flue/air ducts, ducting gaskets (6/10 & 10/16)

All items in Carton No.1 are packed so that they are easily removable in the sequence required.

CARTON No.2:

The boiler is packed on its back. The boiler will be supplied without its combustion chamber front cover fitted so giving a hand hold at the underside of the heat exchanger inside the combustion chamber, when lifting the boiler into position. The polystyrene protective cover and the two metal feet attached to the bottom of the boiler are to protect the controls during handling and installing the boiler onto the wall. These items should not be removed until the boiler is mounted on the wall. This pack also contains one infill panel, packed under the boiler pallet.

2. FITTING THE BOILER MOUNTING CHANNEL

NOTE: The cardboard template has been designed for marking out the wall for boilers with either rear or a side flue outlet. When positioning the template it must be remembered that a minimum of 5mm ($\frac{1}{4}$ in.) clearance must be provided between the boiler and any side wall. Allowance should be made if the corners of the wall are not square or vertical and the template position adjusted accordingly.

If a side outlet is to be used on a 16/22 boiler the distance between the boiler and the outside wall must not be greater than 20mm ($\frac{3}{4}$ in.). Reference should be made to Addendum 1, Flue Lengths Criteria.

NOTE: If the square ducts flue extension kit is used, the template provided with the boiler should be discarded and the template supplied with the kit used.

- A. Using the template, mark out the three screw holes on the wall where the boiler mounting channel is to be positioned, the four screw holes above the mounting channel where the plenum chamber is to be fitted, and the position of the

flue and fresh air ducts on the wall.

- B. Drill the three holes for the mounting channel securing screws and insert wallplugs (Accessories Pack Item A): fit and secure the channel using the 51mm (2in) No.12 counter sunk headed woodscrews, cup and flat washers: check that the channel is level. Place three of the six metal adjusting shims in the mounting channel followed by the rubber strip, then the metal bearing plate. Retain the remaining three shims.

NOTE: The thickness of the wall plaster in some properties could be excessive and in these instances it is recommended that 64mm ($2\frac{1}{2}$ in) long securing screws are used in operation B. When fitting on to dry lined walls ensure that a sound fixing is achieved.

- C. Drill the four holes for the plenum chamber securing screws and insert wallplugs (Accessories Pack Item B); do not fit the plenum chamber at this stage.

If the internal fitment kit Part No.205775 is used drill a 102mm dia. (4 in.) hole using a core bit.

- D. Cut the hole in the wall for the flue and fresh air ducts. Care should be taken when cutting the hole for a rear outlet boiler, that the screw holes for the plenum chamber are not damaged. Make good the inside and outside surface of the wall, if necessary, and also ensure that the face of the wall where the plenum chamber is to be fitted is flat.

- E. Open Carton No.2.

NOTE: If an overheat thermostat is to be fitted it is recommended that it is fitted at this stage, see kit literature.

- F. Unscrew and remove the nuts securing the fluehood, then lift off the fluehood, see Fig. 9. Discard the paper gasket.
- G. Disconnect the three electrical leads from the fan, then unscrew and remove the screws securing the fan. Lift off the fan, see Fig. 9.
- H. Unscrew and remove the screws securing the plenum chamber, see Fig. 9.
- J. Remove the boiler from its carton and lay it front face downwards on a protective surface, such as its own carton. Take care not to damage the spindle of the thermostat, or the capillary. Remove infill panel.

3.A FITTING THE DUCTING, PLENUM CHAMBER AND B.F. TERMINAL 6/10 AND 10/16

1. The plenum chamber is designed to accept the 6/10 & 10/16 air/flue duct assembly from either side and from the rear. If flue extension ducts Kit No.205890 1067mm (42 in.) is required discard the standard air/flue ducts and replace with ducts from kit for flue extensions between 1067mm (42 in) and 1880mm (74 in) a special kit is available Kit No. 205754. For installation of this Kit the instructions provided with it must be adhered to.

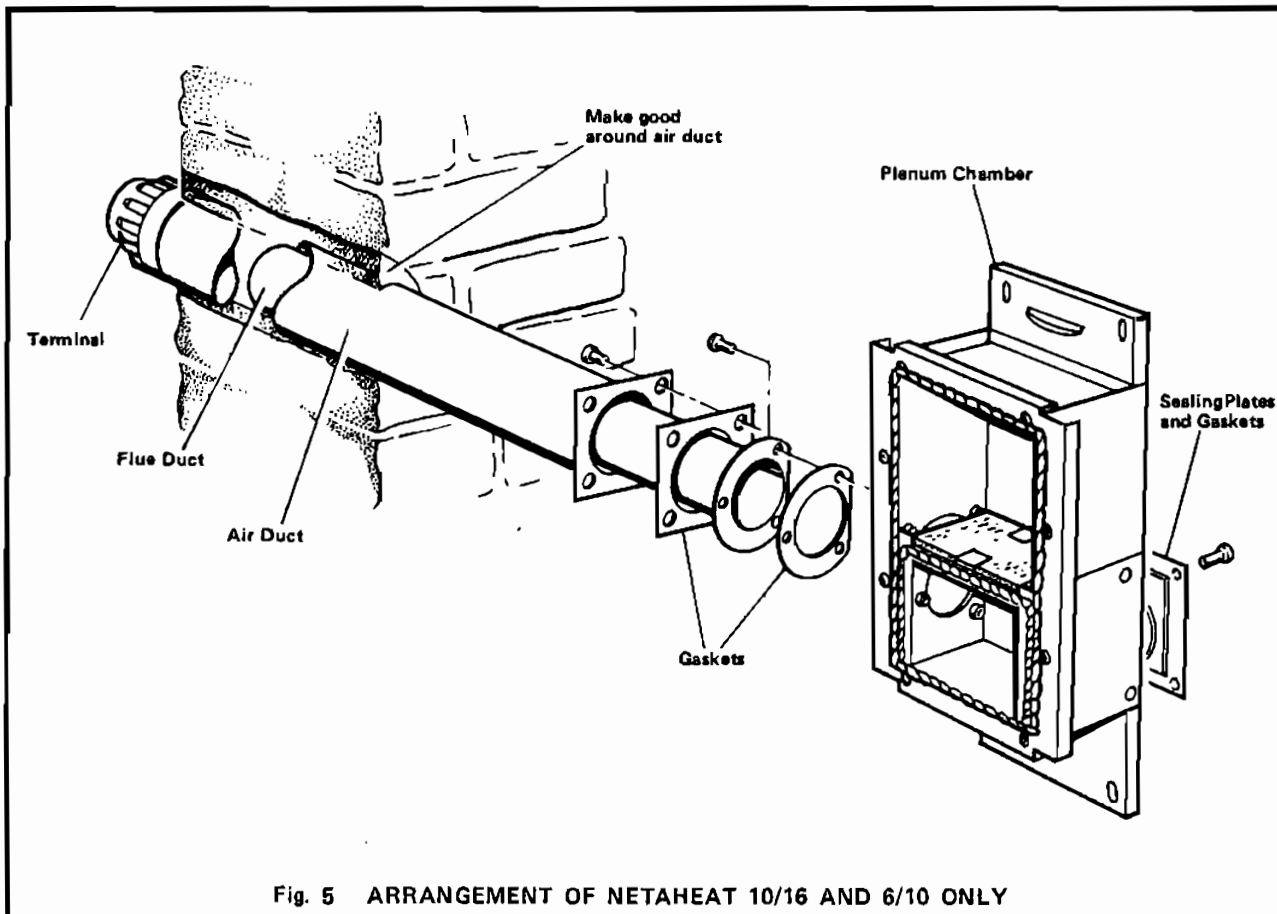
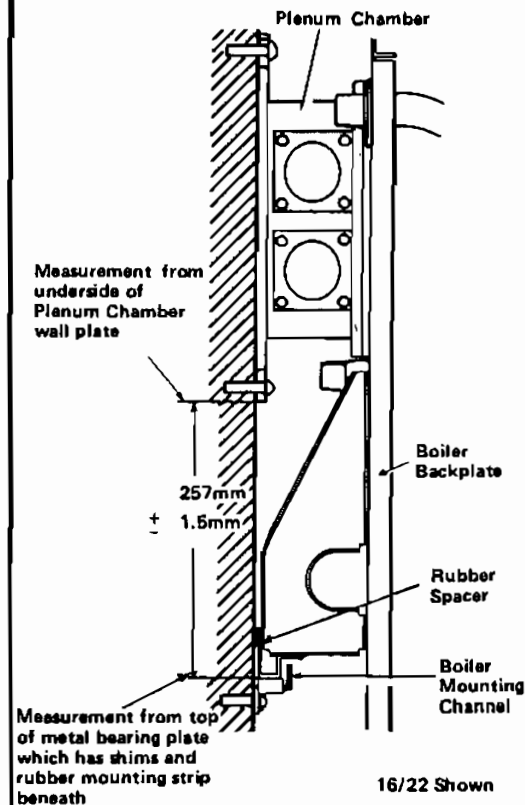
The side outlets of the plenum chamber have been sealed by blanking plates and gaskets. To use either of the side outlets it will be necessary to remove both the inner and outer blanking plates and gaskets from the side required for discharge. Both of these blanking plates and gaskets must then be fitted to the rear outlet of the plenum box before proceeding further. It is very important that the inner plate is properly refitted.

2. Air/Flue Duct Assembly

- i) Take the smaller flue duct and larger air duct from pack 1.
- ii) Measure the wall thickness accurately.
- iii) **For Rear Outlet**
 - a) Select the smaller flue duct and 'Mark OFF' (at the plain end) the cutting dimension which is equal to: The wall thickness plus 55mm (2.2 in.).
 - b) Cut the tube square to the mark and remove all burrs and sharp edges.
 - c) Select the larger air duct and 'Mark OFF' (at the plain end) the cutting dimension which is equal to: The wall thickness plus 10mm (0.4 in.).
 - d) Cut the tube square to the mark and remove all burrs and sharp edges.
- iv) **For Side Outlet**
 - a) Select the smaller flue duct and mark 'OFF' (at plain end) the cutting dimension which is equal to: The wall thickness plus the distance between the boiler casing and the wall plus 170mm (6.7 in.).
 - b) Cut the tube square to the mark and remove all burrs and sharp edges.
 - c) Select the larger air duct and mark 'OFF' (at the plain end) the cutting dimension which is equal to: The wall thickness plus the distance between the boiler casing and the wall plus 125mm (4.9 in.).
 - d) Cut the tube square to the mark and remove all burrs and sharp edges.
- v) Fit the air and flue ducts to the plenum chamber using the gaskets and screws from Pack C. Fig. 5.
- vi) Locate the ends of both ducts into the terminal rotate the terminal so that the deflector vanes deflect products away from surfaces or obstructions on the external surface of the wall. Use a 2mm

Fig. 6

RELATIVE POSITION OF PLENUM CHAMBER AND MOUNTING CHANNEL



drill and drill through the pre-drilled holes in the terminal casting and secure with screws provided in pack H.

3. For rear outlet flues, slide the glass fibre rope seal onto the terminal and push into position against the plenum chamber. For side outlet flues the glass fibre rope seal can be discarded.

4. Secure the plenum chamber/flue assembly to the wall using the four 51mm (2 in.) No.12 counter sunk headed screws, cup and flat washers (Pack B).

NOTE: The thickness of the wall plaster in some older properties could be excessive and in these instances, it is recommended that 64mm (2½ in) long screws are used. When fitting on to dry lined walls ensure that a sound fixing is achieved.

5. Measure the distance from the bottom of the plenum chamber wall plate to the top of the metal bearing plate in the boiler mounting channel, see Fig.6. Compare this dimension with the nominal dimension of 257mm (10 ins.) and by adding additional shims or removing those already in position, adjust the measured distance to equal the nominal measurement $\pm 1.5\text{mm}$ (1/16 in.). If a more coarse adjustment is necessary, the plenum chamber and mounting channel can be moved slightly up or down on the wall using the elongated holes in their mounting flanges. It is essential that this dimension is accurately obtained, otherwise once the boiler is lifted onto its mounting channel, the screw holes in the boiler back plate will not align with those in the plenum chamber.
6. Make good the outside wall surfaces around the flue outlet. A terminal wall plate Potterton Part No. 205580 is available to improve the wall appearance around the terminal.
7. For side outlet flues the internal wall should also be made good around the terminal tube

8. If the height of the terminal from the ground or balcony level is less than 2m a terminal guard must be fitted Potterton Part No. 205792, 6/10 & 10/16, Potterton Part No. 200493, 16/22.

3.B. Potterton Netaheat 16-22 only – See Fig.7

1. The plenum chamber has two connections for the fresh air and flue ducts, one to one side and the other to the rear. The rear connection is blanked off with a sealing plate, gasket and heat shield. Depending on the direction the ducts are to be connected to the boiler, these should be re-positioned by the installer if necessary. The single side connection can be used either for a left or right-hand duct arrangement, simply by rotating the plenum chamber to the required position. With a rear outlet, the smaller opening in the plenum chamber (air duct) must be positioned uppermost. The heat shield is only required for side outlet and should be discarded when the rear outlet is used.
2. Fit the inlet and outlet duct assembly to the plenum chamber using the eight screws (Accessories pack Item C) and interposing the gasket. Ensure that the short air duct is positioned uppermost.
3. Temporarily secure the plenum chamber to the wall using the four 51mm (2 in.) No.12 screws, cup and flat washers (Accessories pack Item B) positioning the flue and fresh air ducts through the wall.
4. Mark off the lower flue duct at a point where it protrudes 32mm (1.3 in.) from the outside wall of the building.
5. The upper air duct is already sized to suit wall thicknesses between 230 mm and 406 mm (9 to 16 in.) and will only need shortening, if the wall

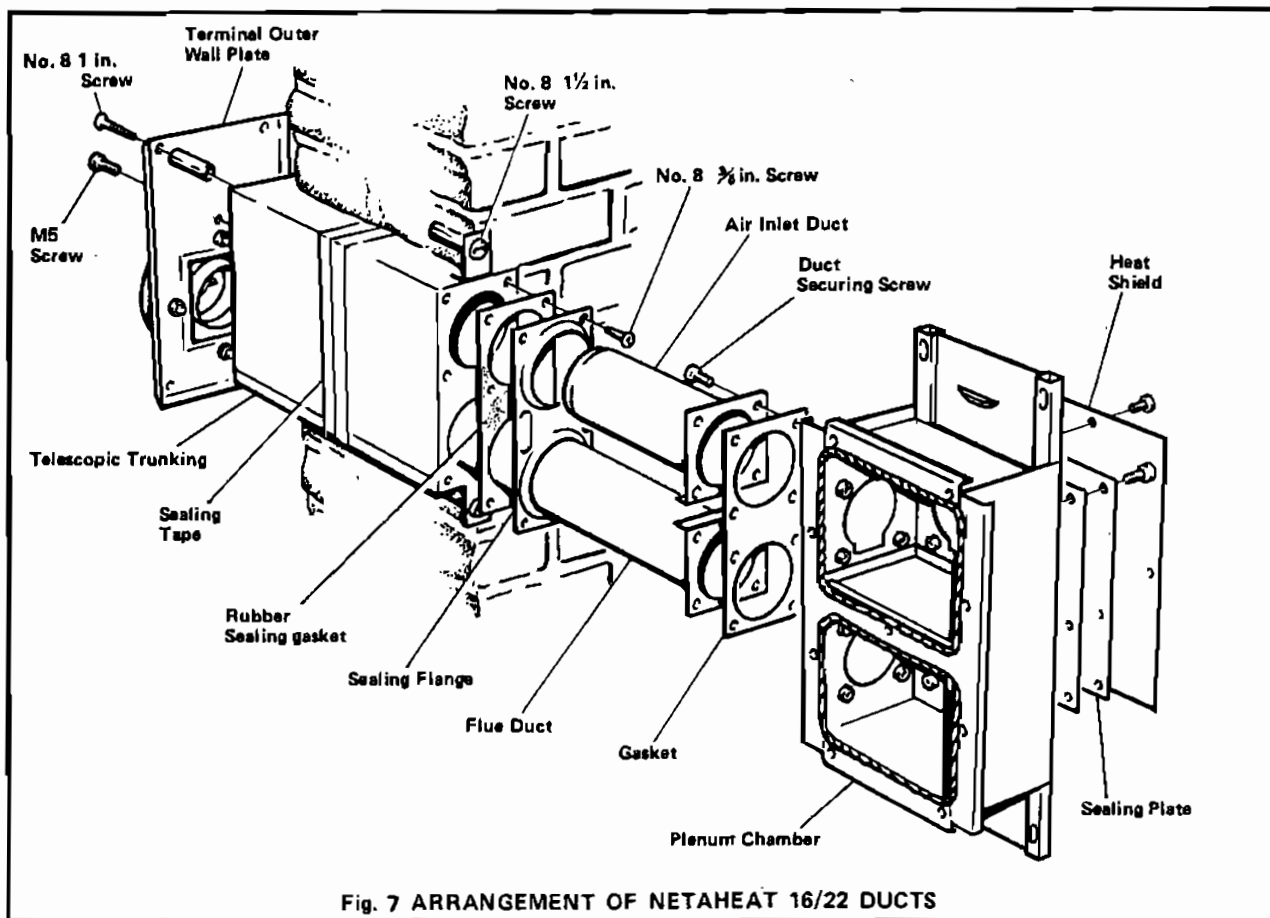


Fig. 7 ARRANGEMENT OF NETAHEAT 16/22 DUCTS

is less than 230mm (9 in.) thick. In this instance cut off the nozzle end of the upper duct so that not less than 25mm (1 in.) and not more than 50mm (2 in.) protrudes inside the wall.

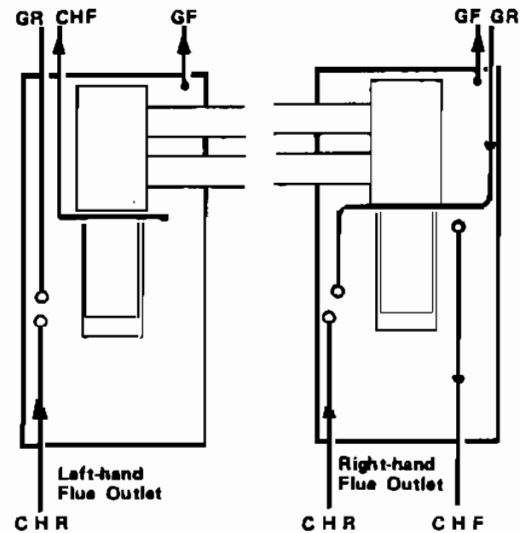
6. Remove the plenum chamber, then cut the duct(s) to size, removing all burrs and taking care not to distort the circularity of the duct(s).
7. Adjust the telescopic trunking so that the overall dimension equals the thickness of the wall. Seal the joint line of the trunking with the sealing tape provided. For rear outlet only the telescopic trunking can be extended to a wall thickness of 540 mm (21 in.) Use Potterton Part No. 200620.
8. Fit the telescopic trunking inside the wall and secure it to the inside face of the wall with two 38mm (1½ in.) No.8 screws, washers and wall-plugs (Accessories pack Item D).

NOTE: If the wall is less than 230mm (9 in.) thick both halves of the telescopic trunking will have to be cut to the size at the plain ends where the two halves slide together; e.g. for a 180mm (7 in.) wall, cut 50mm (2 in.) from each half.

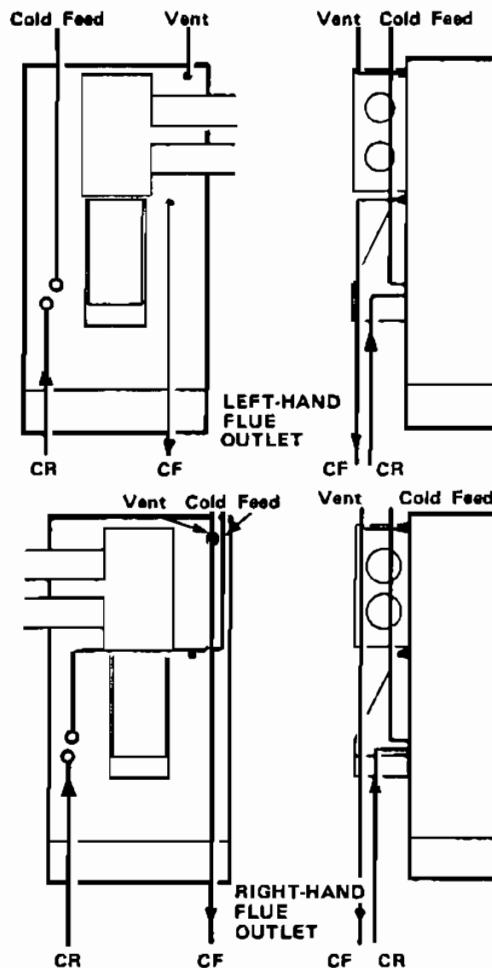
9. Secure the duct sealing flange and rubber gasket see Fig.7, to the telescopic trunking using the six screws (Accessories pack item D).
10. Position the ducts inside the wall, then secure the plenum chamber to the wall with four 51mm (2 in.) No.12 screws, cup and flat washers (Accessories pack Item B). Ensure the chamber is mounted squarely.

NOTE: The thickness of the wall plaster in some older properties could be excessive and in these instances, it is recommended that 64mm (2½ in.) long securing screws are used. When fitting on dry lined walls, ensure that a sound fixing is achieved.

11. Measure the distance from the bottom of the plenum chamber wall plate to the top of the metal bearing plate in the boiler mounting channel, see Fig.6. Compare this dimension with the nominal dimension of 257mm (10.1/8 in.) and by adding additional shims or removing those already in position, adjust the measured distance to equal the nominal measurement, + 1.5mm (1/16 in.). If a more coarse adjustment is necessary, the plenum chamber and mounting channel can be moved slightly up or down on the wall using the elongated holes in their mounting flanges. It is essential that this dimension is accurately obtained otherwise once the boiler is lifted onto its mounting channel, the screw holes in the boiler back-plate will not align with those in the plenum chamber.
12. Make good the inside and outside surface of the wall around the telescopic trunking. Ensure that the flue outlet duct protrudes from the trunking in the CENTRE of the square aperture. This is essential to enable the next operation to be completed.
13. Fit the terminal outer wall plate in position, locating the end of the exhaust duct inside the circular connection of the wall plate grille. Loosely attach the plate to the trunking with the single M5 screw (Accessories pack Item E).
14. Square up the wall plate, then working through the four screw holes in the plate, mark the screw hole positions on the wall behind the plate.



SYSTEMS USING GRAVITY H.W.



FULLY PUMPED SYSTEMS

LEGEND

CHR	Central heating return	GF	Gravity flow
CF	Combined flow	GR	Gravity return
CR	Combined return	CHF	Central heating flow

Fig. 8 SUGGESTED PIPEWORK VIEWED FROM BEHIND BOILER

15. Remove the wall plate, then drill and plug the four holes with wallplugs (Accessories pack Item E).
16. Refit the wall plate, then secure it to the trunking with the single screw and to the wall with four No.8 25mm (1in) long screws (Accessories pack Item E). It is essential for the correct operation of the unit, that no gap exists between the wall plate and the trunking.

4. PREPARING THE BOILER

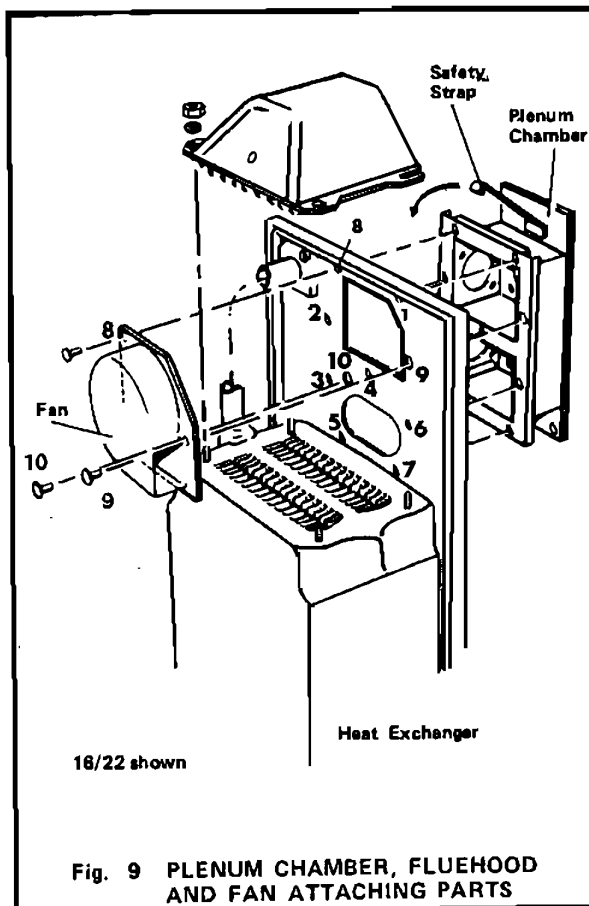
The boiler is designed so that all pipes can be hidden within its own width except where they leave the boiler at top and/or bottom. Because the water connections are behind the boiler backplate, short lengths of pipe will have to be connected to some of the tapings to be used before fixing the boiler to the plenum box, and terminated in unions in a position suitable for connecting to the system pipework; it is recommended that copper capillary connections are used. Although it is possible to install the boiler and its pipework with only access from the front, it is very much easier with access from at least one side. This access is not necessary for maintenance which can be carried out from the front only. Pipe runs must be kept clear of the areas where the plenum chamber is to be fitted and where the air inlet and flue ducts will be located if a side outlet is being used. Connections which can be used and suggested methods of running pipework behind the boiler are shown in Fig.8. Any pipe tails running downwards from behind the boiler should not protrude below the bottom of the metal feet. Refer to Figs. 18 to 25 for diagrams of typical systems to which the boiler can be connected.

A. Combined Gravity System

- (1) Using Fig.8 as a guide, decide on the best pipe run at the rear of the boiler to suit the particular system.
 - (2) Connect a suitable length of 28 mm pipe to the domestic hot water flow connection.
 - (3) Connect a suitable length of 22mm pipe to the heating flow connection. There is space behind the boiler to split the flow if necessary. The central heating circulating pump can be fitted above or below the boiler on either the flow or return as required.
 - (4) Connect a suitable length of 28mm pipe to the upper 1 in. B.S.P. domestic hot water return connection.
 - (5) Connect a suitable length of 22mm pipe to the lower 1 in. B.S.P. central heating return connection. There is space behind the boiler to combine the two heating circuits if required.
- NOTE:** Ensure that the fittings to the flow and return connections do not protrude more than 97mm (3 7/8 in.) from the boiler backplate or they may foul the wall.

B. Fully Pumped System and Central Heating Only

- (1) Using Fig.8 as a guide, decide on the best pipe run at the rear of the boiler to suit the particular system.
- (2) When connecting the flow pipework, it is only necessary to use one flow connection, preferably the upper 1 in. BSP with the lower 3/4 in. BSP connection being blanked off. However, in certain circumstances where a lefthand flue terminal

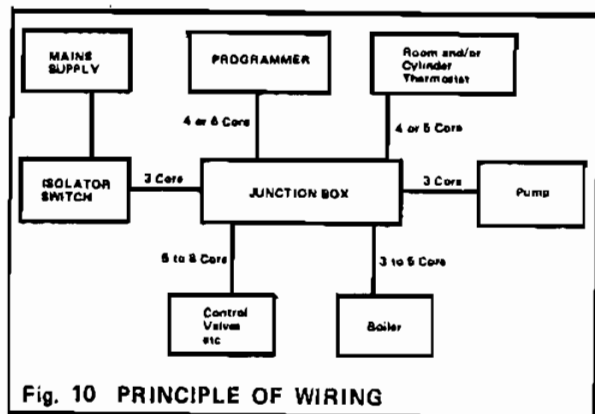


is being used and only a pipe run to low level is required, the lower 3/4 in. BSP connection can be utilised, provided the 1 in. BSP connection is vented. Connect a suitable length of pipe to which ever connection is to be used.

- (3) Connect a suitable length of 22mm pipe to the lower 1 in. B.S.P. return connection. The upper 1 in. B.S.P. return connection can either be blanked off or used to connect the cold feed.
- NOTE:** On systems requiring a high flow rate, the 22mm pipework from the flow and return connections should be enlarged as close to the boiler as practicable.
- (4) The circulating pump can be fitted on either the return or flow in any position to suit the particular installation.

Boiler Main Gas Cock

- (1) Access can be gained to the gas service cock union with the control panel in the lowered position.
- (2) When installed with minimum clearances the gas supply pipework should be installed before mounting the boiler. Prepare a 1/2 B.S.P. gas point terminating with the gas service cock (provided) to the dimensions shown in Fig. 4.



5. FITTING THE BOILER ON THE WALL — See Fig.9

A metal safety strap is provided with this boiler which is used to hold the boiler backplate against the plenum chamber once the boiler has been lifted into position but before any plenum chamber securing bolts have been fitted.

This will enable the installer to leave the boiler unsupported once it has been positioned, so enabling him to pick up a screwdriver etc.

The strap must first be positioned by hooking it in the slot in the plenum chamber (See Fig.9). It can then be hinged upwards against the wall until the boiler has been fitted when it can be hinged downwards, so holding the backplate against the plenum chamber.

NOTE: Before fitting the boiler ensure that the rubber spacer is in position, see Fig.6.

- A. Stand the boiler on the floor in a vertical position using the two metal feet and polystyrene control cover protector, then using the cast iron flow pipe and the underside of the heat exchanger, lift the boiler into position on the wall, locating its mounting bracket on the bearing plate in the mounting channel. Support the boiler in this position using the safety strap if necessary, then secure the boiler backplate to the plenum chamber with the screws numbered 1 to 7 on Fig. 9. **NOTE:** Screw No. 4 not used on 8/10 & 10/16 boilers. Three screw holes in the boiler backplate are marked with a ring and these are for use when fitting the fan and must not be used in this operation.

WARNING: When fitting the screws in A, the weight of the boiler could distort the boiler support bracket so making it difficult to line up the screw holes in the boiler backplate with those in the plenum chamber, if this should occur, the weight of the boiler should be supported until the screws are correctly engaged.

- B. Fit the fan in position and secure it to the boiler backplate with the three screws, numbered 8 to 10 on Fig. 9. Connect the two mains electrical leads to their connections on the boiler backplate and the earth lead to the earth screw also on the backplate.

WARNING: It is very important that when tightening the screws in operations A and B that good seals are made. All screws must be tight.

- C. Refit the fluehood to the heat exchanger, ensuring that a good seal is made at the plenum and that all the plenum fixing screws have been fitted and are tight. Secure the hood in position with the four nuts and washers; ensure the nuts are tight,

and that the hood makes a good seal with the heat exchanger.

- D. Fit the combustion chamber front cover, securing it with the four screws (Accessories pack Item F).
- E. Remove and discard polystyrene cover.
- F. Unscrew the nuts and remove and discard the two metal feet.
- Undo the two screws securing the controls panel in position, then hinge down the panel to give access to the gas cock.
- G. Connect the main gas cock union to the boiler.
- H. Connect the short lengths of pipe previously fitted to the boiler, to the system pipework, then fill and vent the water system and test for leaks. Rectify if necessary.

6. WIRINGS — See Figs. 10, 11, 12 and 13

THIS APPLIANCE MUST BE EARTHED

The installation must comply with I.E.E. Wiring Regulations and any local regulations. All cable and connections must be of the approved type.

The boiler and all external control circuit wiring must be supplied from the same single isolating switch or plug and socket.

Care must be taken to ensure that all wiring to the boiler is kept clear of sharp edges and hot surfaces. The boiler terminal strip situated in the control panel is not designed to accept wiring from all the on-site system controls and therefore, the installer will usually need to incorporate a suitable junction box or Potterton EP 2000/3000 Programmer.

The principle of wiring up the boiler and site controls is shown in Fig. 10. However, the layout of a particular system will itself govern the most economical location for the junction box and its terminals. Wire up the boiler and system controls as illustrated in Figs. 14, 15, 16 and 17 depending on the type of system installed. The wiring arrangements shown outline only the basic control requirements, and will therefore require on-site interpretation of the various boiler installation requirements.

If a Potterton EP 2000/3000 time control is not being fitted, but a three terminal time clock is to be installed to control the systems illustrated in Figs. 14, 15, 16 and 17 the time clock should be wired as follows:-

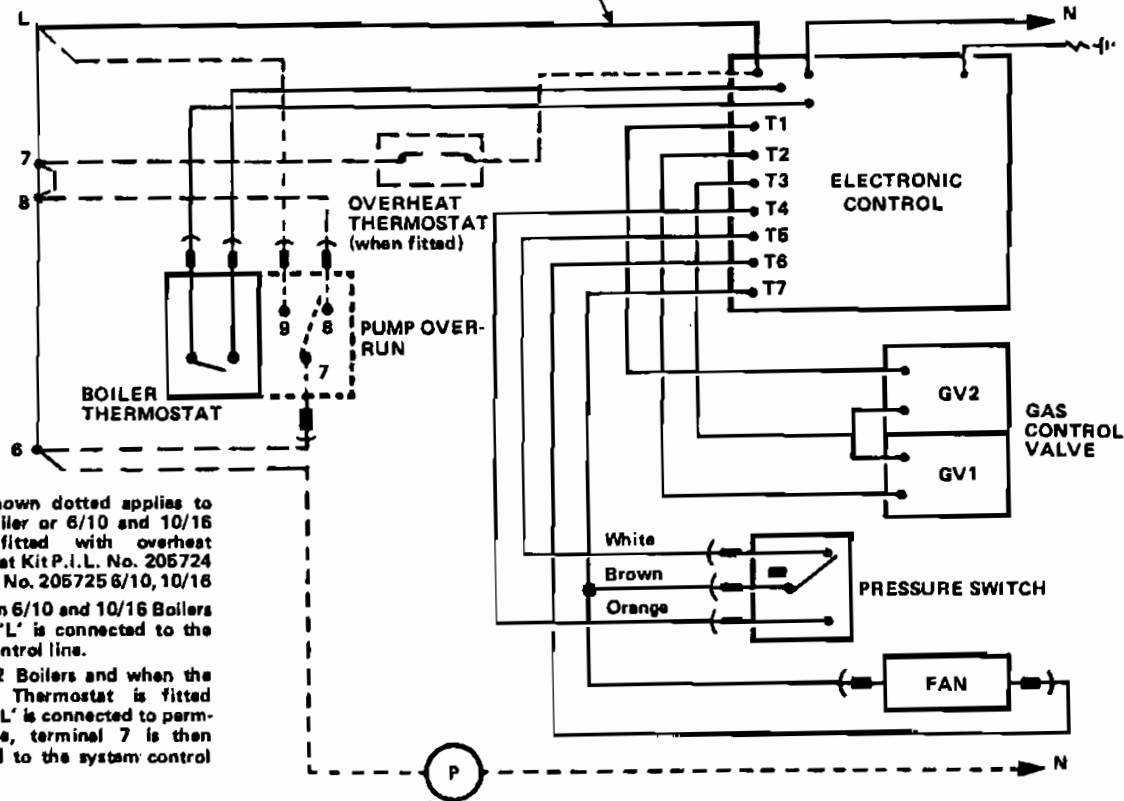
Live to Time Clock Live
Neutral to Time Clock Neutral
Earth to Time Clock Earth
Wires normally connected to EP 2000/3000 terminals to time clock switch.

A frost protection (low limit) thermostat can be installed to over-ride the "OFF" setting of the time control if the temperature where the thermostat is situated, falls below the thermostat setting. Where an EP 2000/3000 Programmer is installed, a double pole or double outlet thermostat may be necessary; for the electrical connections and type required, see the relevant system wiring diagram. Where only a time clock is fitted, the thermostat need only be a single pole type with its contact wired in parallel with the clock switch. Feed the supply cable through the cable clamp on the rear of the control panel leaving sufficient length of cable to reach connection on the terminal block. Lift the control and secure into position. Feed cable through the hole in the panel and connect to the boiler terminal strip as follows:-

6/10 and 10/16 BOILERS

Connect switched live supply from programmer or system controls to L.

THIS CONNECTION IS REMOVED WHEN THE PUMP OVERRUN/OVERHEAT THERMOSTAT IS USED.



Wiring shown dotted applies to 18/22 Boiler or 6/10 and 10/16 Boilers fitted with Overheat Thermostat Kit P.I.L. No. 205724 - 16/22 or No. 205725 6/10, 10/16

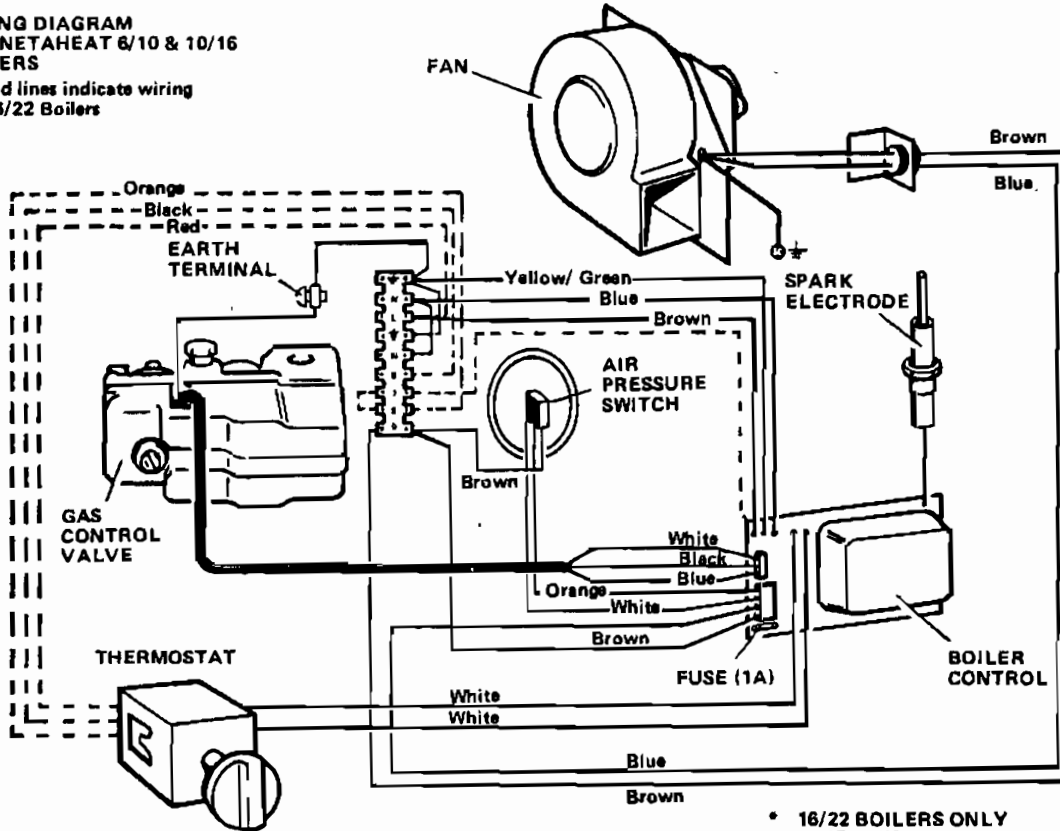
NOTE: On 6/10 and 10/16 Boilers terminal 'L' is connected to the system control line.

On 16/22 Boilers and when the Overheat Thermostat is fitted terminal 'L' is connected to permanent line, terminal 7 is then connected to the system control line.

FIG. 11 FUNCTIONAL FLOW DIAGRAM

WIRING DIAGRAM FOR NETAHEAT 6/10 & 10/16 BOILERS

Dotted lines indicate wiring for 18/22 Boilers



• 18/22 BOILERS ONLY IF SECONDARY CONTROLS ARE NOT FITTED: LINK BOILER TERMINALS 7 AND L.

Fig. 12 BOILER WIRING DIAGRAM

16/22 FULLY PUMPED SYSTEM

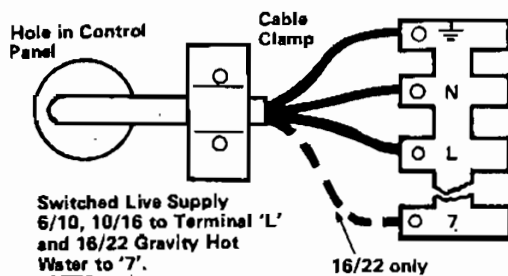
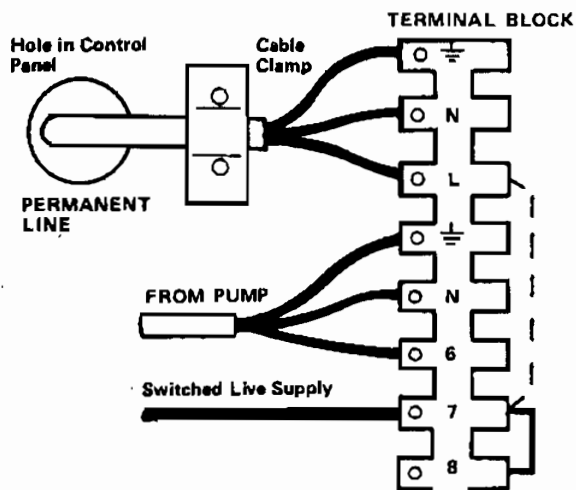


Fig. 13 EXTERNAL WIRING
(Boiler Terminals)

16/22 BOILERS (Gravity hot water, pumped central heating)

Connect switched live supply from programmer or system controls to 7.

16/22 BOILERS (Fully pumped systems)

Connect switched live supply from programmer or system controls to 7. Connect a permanent live supply to L. Connect terminals 7 and 8 and connect the live supply to the pump to terminal 6. If no switched supply is provided link terminals 7 and L.

When all wiring is complete, hinge down the controls panel to gain access to the gas valve pressure test nipple and pressure adjuster. Fit the front cover to the boiler, securing it with the four captive screws.

Ensure that a good seal is obtained around the perimeter of the cover. Fit the thermostat knob (Accessories pack Item G). Fit infill panel if required.

To Fit the Infill Panel

Locate the notched brackets on the infill panel onto the two spring clips provided on either side of the rear face of the boiler back panel.

With the infill panel resting in position press the top of the panel firmly downwards. This will allow the notched brackets to engage fully into the spring clips. If a second infill panel is required this can be obtained as an optional extra P.I.L. No.905813.

FIG. 15 GRAVITY HOT WATER WITH TEMPERATURE CONTROL AND PUMPED CENTRAL HEATING EP 2000/3000 PROGRAMMER SHOWN

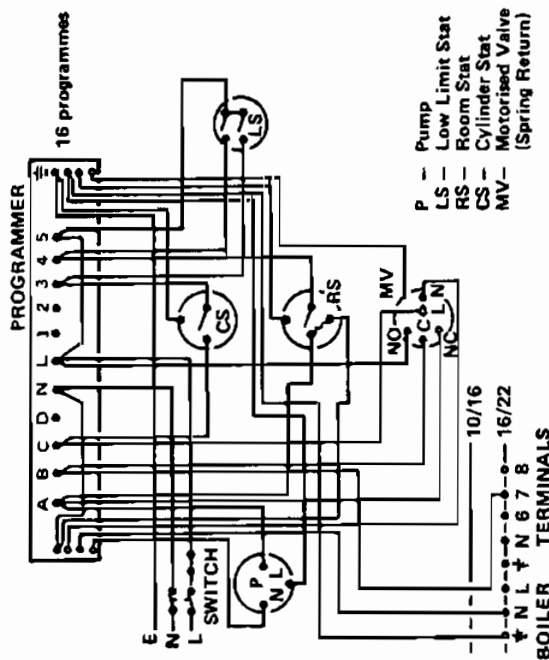
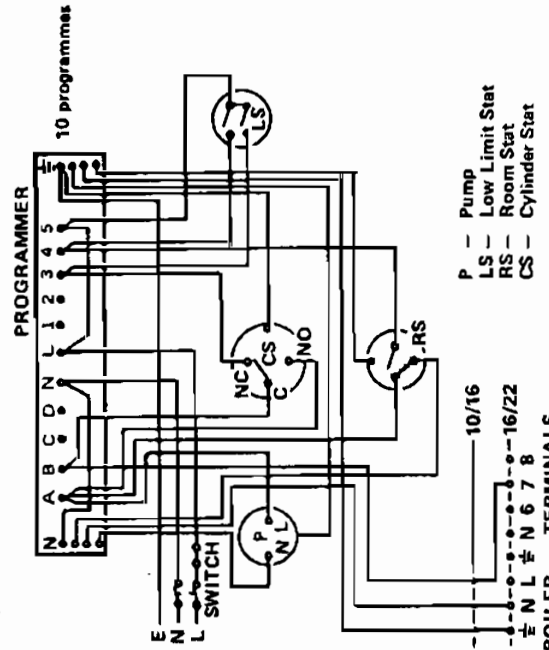


FIG. 14 GRAVITY HOT WATER WITH PUMPED CENTRAL HEATING EP 2000/3000 PROGRAMMER SHOWN



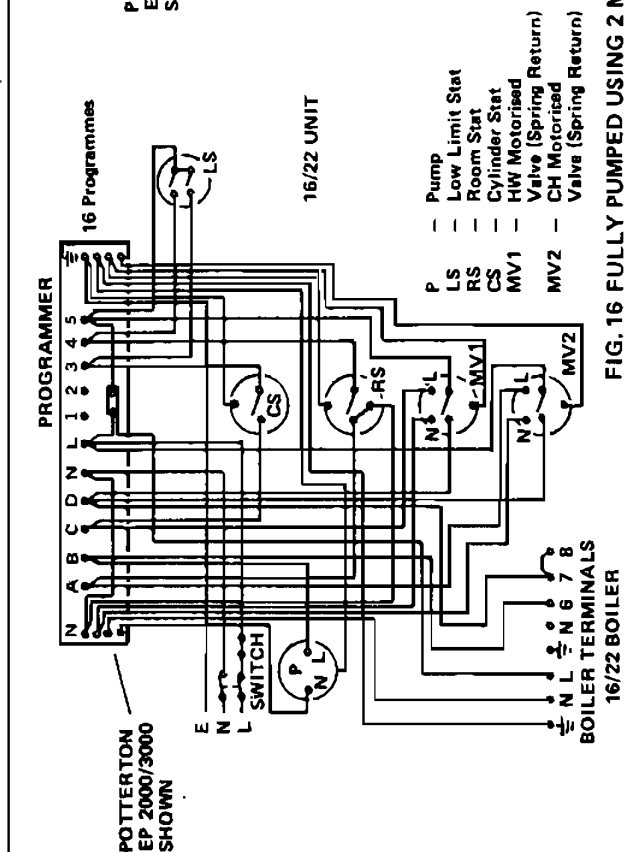
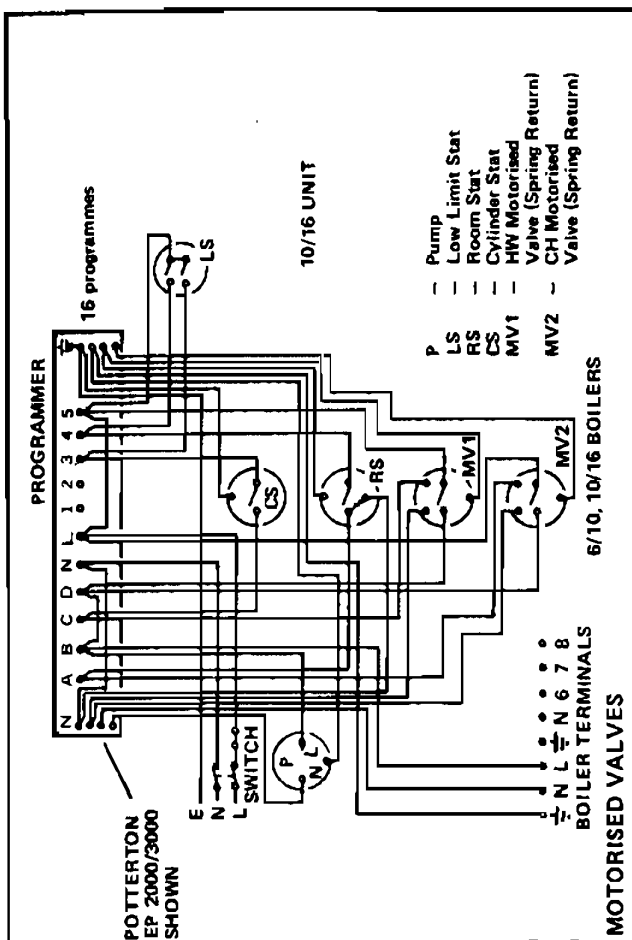
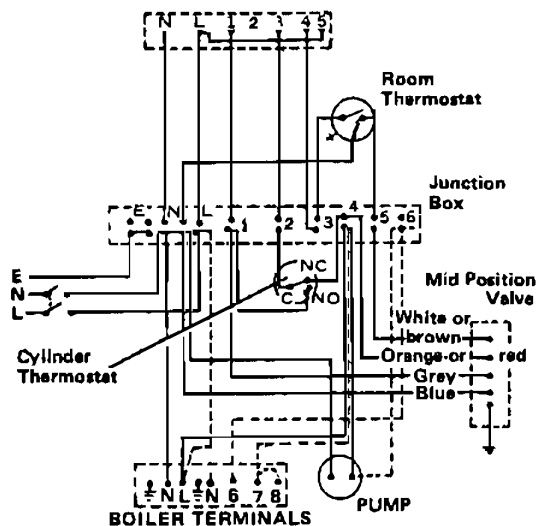


FIG. 16 FULLY PUMPED USING 2 MOTORISED VALVES

FIG. 17 NETAHEAT WIRING MID POSITION DIVERTER VALVE (SPRING RETURN)

Earth connections have been omitted. All items may require an earth connection



C = Common, NC = Normally closed
No = Normally open

The colour coding of the electrical cable fitted to the motorised valve varies from manufacturer to manufacturer. The colours indicated cover most spring return valves. This diagram is not suitable for users which use a relay junction box.

Dotted wires show wiring for 18/22 boiler

FIG. 18 FULLY PUMPED SYSTEMS

Minimum requirements for low static head situations (e.g. — flats and other single storey buildings)

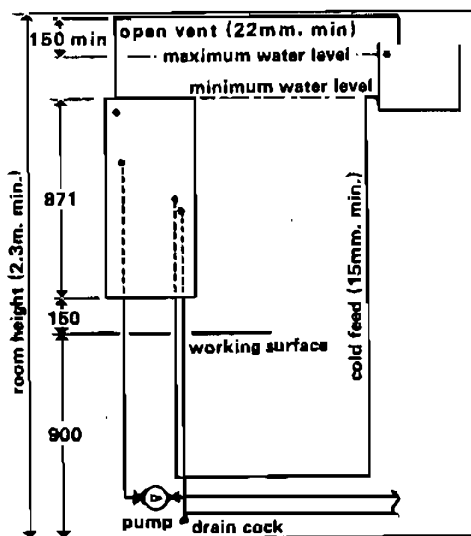


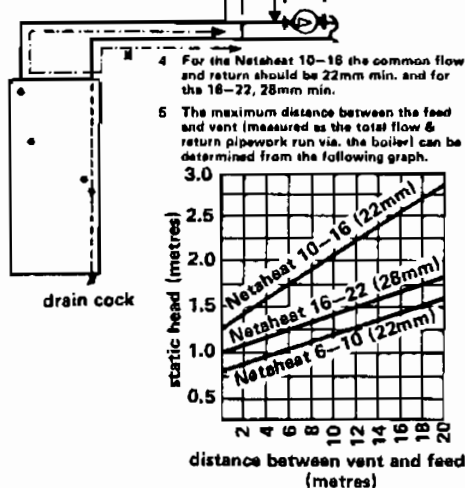
FIG. 19

FULLY PUMPED SYSTEMS

Minimum requirements when open vent and cold feed is situated some distance from the boiler.

NOTE

- 1 Wherever possible the open vent and cold feed pipes should be connected at the boiler. If this is not possible then care should be taken to ensure that the position chosen does not cause air to be drawn into the system.
- 2 The open vent and cold feed pipes should connect into the common flow and return pipes respectively, and both be of the same diameter.
- 3 The maximum distance between the feed and vent (measured via the boiler) is governed by the available static head, the boiler size, and flow and return size.



7. COMMISSIONING

The whole of the gas installation including the meter should be inspected and tested for soundness and purged in accordance with the recommendations of C.P. 331 Part 3.

FIRST LIGHTING

WARNING:

BEFORE LIGHTING THE BOILER, ENSURE THAT THE FRONT COVER HAS BEEN CORRECTLY FITTED AND THAT THE EDGE OF THE COVER MAKES A TIGHT SEAL WITH THE SEALING STRIP IN THE GROOVE AROUND THE BOILER BACKPLATE.

BEFORE PROCEEDING TO LIGHT THE BOILER THE WHOLE SYSTEM SHOULD BE FLUSHED OUT WITH COLD WATER AND WITH THE PUMP REMOVED, REPLACE PUMP WHEN COMPLETED.

FOR SEALED SYSTEMS REFER TO THE INSTRUCTIONS SUPPLIED WITH THE OVERHEAT THERMOSTAT KIT.

- A. Check that the main electricity supply to the boiler is switched off and that the boiler thermostat is in the off position.
- B. Turn on the main gas supply.
- C. Ensure that the system is full of water and that the pump and radiator isolating valves are open.
- D. Ensure that the time control, if fitted is in an on condition, and that the room and/or cylinder thermostats, where fitted, are set to high temperatures.
- E. Switch on the main electricity supply to the boiler.

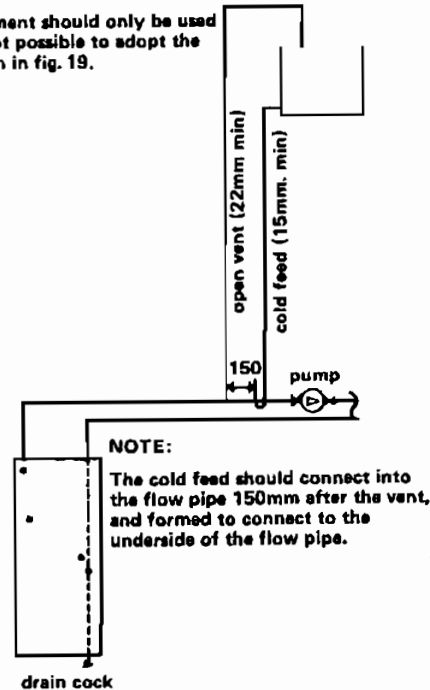
In the event of an electrical fault after installation of the appliance, preliminary electrical system checks must be carried out (i.e. earth continuity polarity and resistance to earth as described in the multimeter instruction book). Refer to fault Finding Chart. Fig. Nos 31, 32, & 33,

FIG. 20

FULLY PUMPED SYSTEMS

Close-coupled open vent and cold feed arrangements.

This arrangement should only be used where it is not possible to adopt the system shown in fig. 19.



- F. Fit the thermostat knob and turn the boiler thermostat on and to a high setting and after a period of time the main burner will light, which can be observed through the sight glass in the front cover of the boiler. The time period can vary upwards of 45 seconds, depending on the amount of air in the pipework.

Test for gas soundness around boiler components using leak detection fluid.

- G. Turn off the boiler thermostat.

NOTE: There could be a delay in lighting if the control knob is switched on and off and then on again rapidly.

8. SETTING AND CHECKING OF CONTROLS

A. Gas Rate and Main Burner Pressure Setting

- (1) Fit a pressure gauge to the pressure test nipple in the multi-functional control.
- (2) Turn on the boiler thermostat and ensure that the main burner is alight then check that the burner pressure is in accordance with values stated under data.

The burner pressure is set to the maximum output at the factory.

- (3) If burner pressure adjustment is necessary remove the screwed cap from the multi-functional control see Fig.1 and turn the screw beneath clockwise to increase pressure or anti-clockwise to decrease. Refit the screwed cap when the pressure is correct. Shut down the boiler, remove the pressure gauge and refit the screw in the pressure test nipple ensuring that a gas tight seal is made.

FIG. 21

SEALED SYSTEMS — Only applicable to boilers fitted with the optional over heat thermostat kit

NOTE

- 1 Automatic air release valves must be fitted at all high points
- 2 The boiler must be fitted with a safety valve pre-set to operate at 3 bar and fitted with a discharge pipe terminating at a safe and convenient position.
- 3 A pressure gauge, with a range of at least 0 — 4 bar, shall be fitted to the system in a visible position.
- 4 A filling point shall be provided at low level and fitted with a stop cock. The method adopted for filling the system shall be approved by the local Water Authority. Provision shall be made for replacing system water losses by the use of a make-up vessel fitted above the highest point of the system, or by the pre-pressurisation of the system.
- 5 The expansion vessel shall be sized to accommodate the change in system water volume when heated to 88°C, comply with BS4814, and be pre-charged with air or nitrogen to a pressure not less than the system's static head.

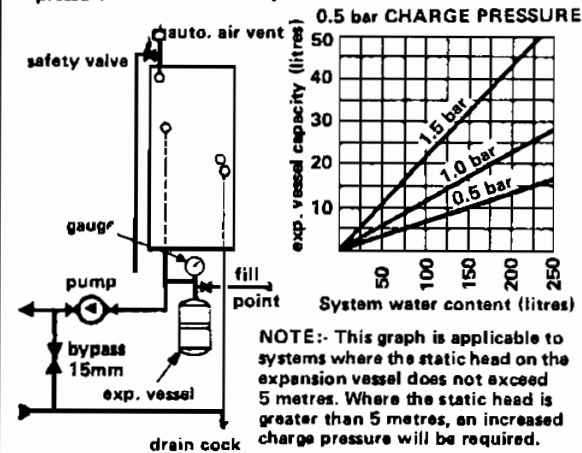


FIG. 22

FULLY PUMPED SYSTEMS — Alternative low static head situations (only applicable to boilers fitted with the optional over heat thermostat kit).

This arrangement should only be used where it is not possible to adopt the system shown in fig. 18.

NOTE

- 1 The open vent and cold feed pipes should connect into the flow pipe within 150mm of each other, on the inlet side of the pump. The cold feed should connect into the underside of the flow.
- 2 Where an automatic air vent is fitted above the boiler, the minimum water level must be above the vent.

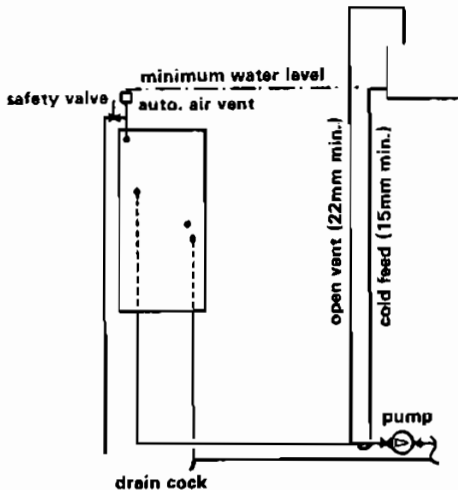


FIG. 23

TYPICAL CONTROL SYSTEMS

NOTE:

All 16/22 boiler systems and 6/10, 10/16 boiler systems where the overheat thermostat kit is fitted must include a by-pass circuit capable of maintaining a water flow of at least 1 gal/min if, the design permits the closing down of both hot water and central heating circuits.

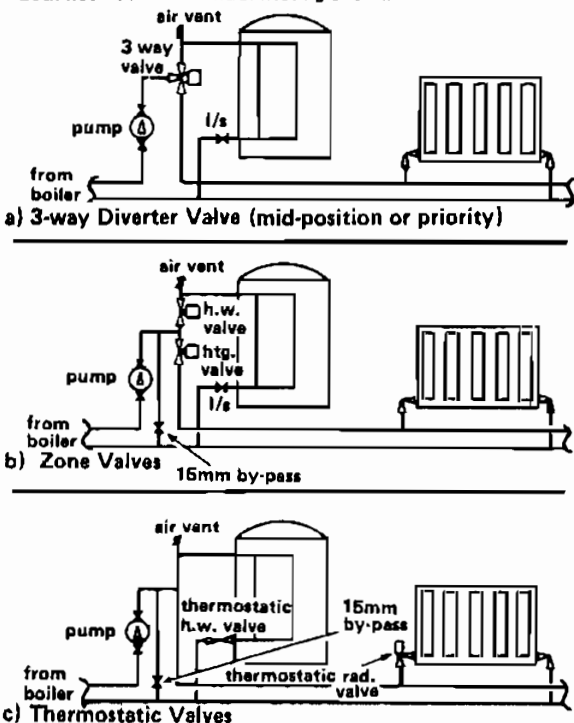


FIG. 24

GRAVITY HOT WATER SYSTEMS

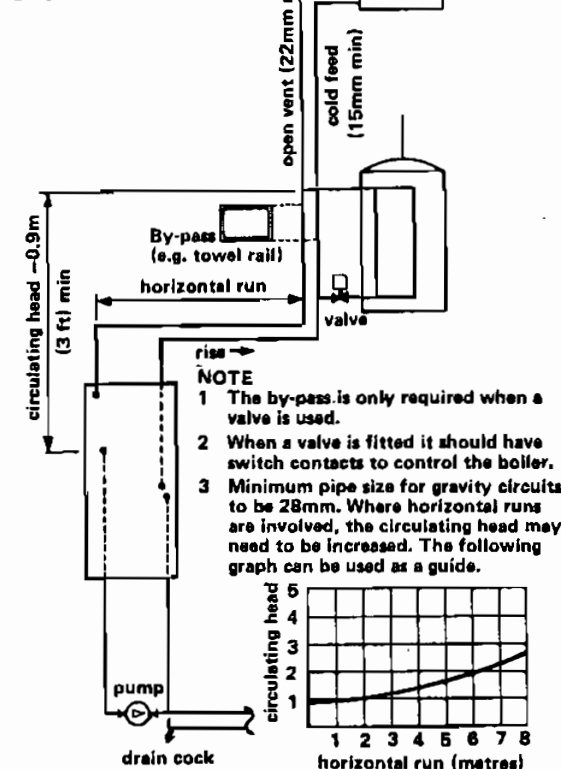
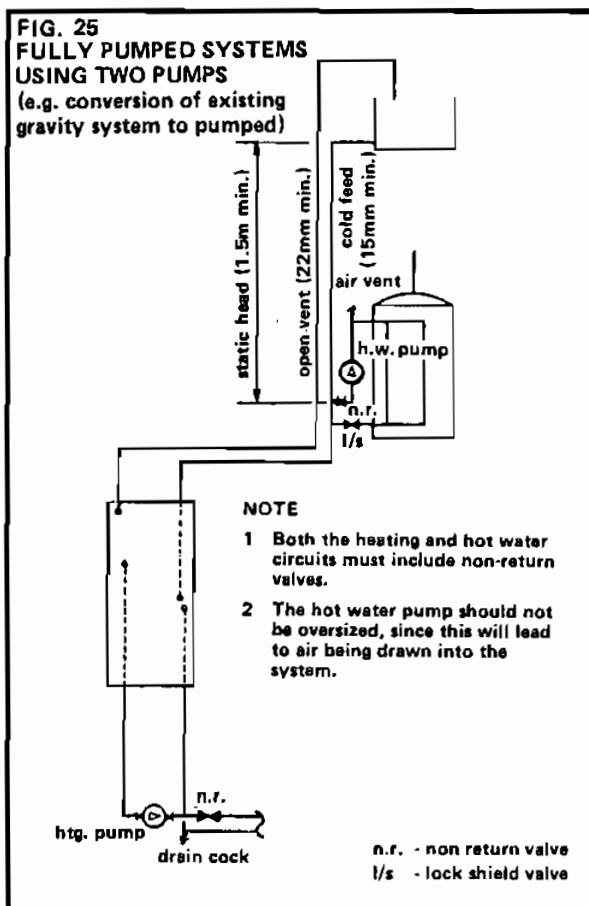


FIG. 25
FULLY PUMPED SYSTEMS
USING TWO PUMPS

(e.g. conversion of existing gravity system to pumped)



- (4) Isolate the main electrical supply to the boiler, raise control panel and secure into position (two screws).
- (5) Remove the thermostat knob, then slide on the controls cover and secure it with the (Pack G) screw, and insert plastic plug.
- (6) Refit the thermostat knob, then switch on the main electrical supply to the boiler.
- (7) With the burner set to its correct pressure, the gas rate given in "Data" should also be obtained and this should be checked by meter

reading over a period of at least 5 minutes once the boiler is hot.

- (8) The whole system should be further flushed while hot, and the lockshield valve on the by-pass circuit set for quiet operation (1 gal/min min flow rate) before leaving the installation.
- (9) Attach self adhesive arrow to indicate burner pressure on data badge. (Pack G)

B. Pilot Burner

- (1) The pilot is pre-set and no adjustment is required or available. The pilot flame envelope should cover the electrode tip and earth strip see Figs. 26 and 29.

C. Boiler Thermostat

- (1) At its maximum and minimum settings, the thermostat should control the water flow temperature at approximately 55°C – 82°C (130°F – 180°F).
- (2) The thermostat has been calibrated by the makers and no attempt should be made to re-calibrate it on site. Turn the thermostat to the off position and check that the main burner shuts down.

D. Pump Over-Run Thermostat – 16/22 Boiler Only

- (1) In fully pumped systems, the over-run thermostat will keep the pump running when the boiler has shut down, as long as the water temperature within the boiler is above a pre-determined limit.

OTHER BOILER CONTROLS

All boiler mounted controls are designed so that if any fault should occur they will fail safe. No further setting or checking is necessary.

REMOTE CONTROLS

Check that any other remote control connected in the system such as time clocks and thermostats control the boiler as required.

USER'S INSTRUCTIONS

A User's Instructions is provided with this boiler but the householder should have the operation of the boiler and system explained by the installer.

SERVICING INSTRUCTIONS

To ensure continued efficient operation of the boiler, it is necessary to carry out maintenance and cleaning at regular intervals.

The frequency of cleaning will depend upon the particular installation conditions and the use to which the boiler is put, but in general, once per year should be adequate.

WARNING:

Before the start of any maintenance work, switch off the main electricity supply and disconnect the plug at the socket or switch off the main isolating switch.

It is advisable to clean the boiler immediately after the end of the heating season. If there has been any delay in cleaning and the boiler has been switched off, it is desirable to operate the boiler for a short time to dry out deposits in the flueways which if they are left in the cold state, will absorb moisture and become both corrosive and difficult to remove.

The following notes apply to the boiler and its controls See Fig.1 but it should be remembered that attention must

also be paid to the heating circuit itself including radiator valves, thermostats, the time control and the expansion and feed water system. In all cases prior to maintenance, light up the boiler and check that the pilot and main burners have a clean, even flame and that the gas rate and main burner pressure is correctly set. If the pilot flame is satisfactory, no further maintenance of the pilot burner is necessary and the information given in "3. Pilot Burner" can be ignored.

1. Preparing the Boiler

- A. Pull off the thermostat knob, remove the plastic plug, then unscrew the single screw securing the controls cover to the boiler, then gently slide the cover from the boiler.
- B. Unscrew the four casing securing screws, two at the top and two at the bottom, then lift off the boiler casing.
- C. Unscrew the four screws securing the combustion chamber front cover, then remove the cover.

- D. Undo the two screws securing the controls panel in position, then hinge down the panel.
- E. Turn off the isolating gas cock undo the union in the main gas pipe to the burner at the rear of the boiler.
- F. Remove the right-hand air deflector channel by removing the two fixing nuts. See Fig.1.
- G. Release pilot assembly by undoing the tube nut on the back panel.
- H. Remove electrode lead.
- J. Remove a further two screws securing the main burner assembly to the boiler backplate, then gently ease the burner from the combustion chamber, taking care not to damage the gasket which must be replaced when refitting the burner.

2. Heat Exchanger

NOTE: Before any cleaning is carried out, it is advisable to put a sheet of thick paper beneath the heat exchanger, by lodging it on the bottom return edges of the combustion chamber. This will catch the deposits that will be removed from the flueways. If this is not done, the deposits will foul the boiler controls and also the floor space or furniture beneath the boiler.

- A. Unscrew the four nuts and lift off the fluehood.
- B. Working from above and below the heat exchanger, use a suitable brush and remove all deposits from between the fins of the casting.
- C. Refit the fluehood, taking care that a good seal is made with both the boiler backplate and the heat exchanger. Fully tighten the four nuts.

3. Pilot Burner

NOTE: The following operations are only necessary if the pilot flame is distorted or the wrong size, i.e. too small (injector blocked).

- A. Unscrew the two hexagonal head screws securing the pilot to the main burner and remove the pilot assembly and pilot tube. On 6/10 boilers the pilot shield is a loose item.
- B. Unscrew the aluminium pilot tube from the pilot assembly. Take care not to damage the electrode.
- C. Lightly brush the pilot and its shield to remove any deposits. Remove the pilot injector and clean its orifice or replace.
- D. Gently clean any deposits from the electrode.
- E. Refit the pilot injector to the pilot burner and assemble the aluminium feed pipe to the pilot assembly, and tighten union.
- F. Secure the pilot assembly to the main burner bracket with the two hexagon head screws. On the 6/10 boilers ensure that the pilot shield is in position see Fig.30.

NOTE: If at any time the pilot burner has to be removed from the pilot shield, when it has been refitted, the distance between the electrode tip and the heat shield of the pilot should be checked to ensure it is $4\text{mm} \pm 1.5\text{mm}$. The tip of the pilot burner must be closer than 3mm to the edge of the first burner blade see Fig. 26 for (10/16 and 16/22 models) and Fig. 29 for 6/10 models.

4. Main Burner

- A. Lightly brush any deposits from the top of each burner blade and ensure there is no fluff in the entry of the burner venturi. If on reassembly the burner flame picture is incorrect or the correct gas rate or burner pressure cannot be obtained, remove the burner Fig.27 (10/16 and 16/22 models) and Fig.30 (6/10 model) and thoroughly clean. Clean or replace the injector. In the event of the above procedures not rectifying the flame appearance the complete burner should be changed

- B. Refit the main burner assembly into the boiler combustion chamber and secure it to the boiler backplate with the two screws.
- C. Reconnect the union in the main gas pipe at the rear of the boiler.
- D. Connect pilot feed pipe to union on back panel, tighten tube nut at union.
- E. Refit electrode lead to electrode.
- F. Refit the right-hand air deflector channel.

5. Combustion Chamber Insulation (Side insulation not fitted to 6/10 model)

- A. Check the combustion chamber insulation for damage. If damaged replace as follows:— for side and front panel insulation bend back locating strips and replace insulation. To replace the insulation at the rear of the combustion chamber it will be necessary to remove the walls of the combustion chamber by unscrewing the four screws in the back panel and the nuts holding the panels to the heat exchanger. Bend back the locating strips and fit insulation.
- B. Refit the combustion chamber front cover, securing it with the four screws. Ensure that the screws are tight and that a good seal has been made.

6. Fan

- A. Disconnect the three electrical leads from the fan.
- B. Remove the three securing screws and lift off the fan.
- C. Carefully clean any deposits from around the fan motor and its supports.
- D. Very gently clean the fan impeller, taking care not to damage the aluminium impeller or dislodge its balance weights.
- E. Replace the fan into the boiler securing it with the three screws. Take care not to damage the pressure sensing pipe adjacent to the fan outlet (16—22 only).

NOTE: It is very important that the fan securing screws are fully tight as an air tight seal must be obtained between the fan and the backplate.

- F. Reconnect the three electrical leads.
- G. Fit the boiler casing into position and secure it with the four screws.
- H. Fit the thermostat knob to the spindle of the thermostat, but do not secure the controls at this stage, until the main burner pressure setting has been checked.

7. Case Seal

Check the main case seal. Replace if damaged. The seal is a push fit into the channel on boiler back panel.

8. Other Boiler Mounted Units

No further servicing or maintenance is required on any other boiler mounted unit. Repair is by replacement and instructions on the removal and replacement on all these items is given in 9.

9. Fault Finding

Refer to Fig. 31, 32 and 33 for Boiler Fault Finding Chart and to Figs. 11 and 12.

10. Removal/Replacement of Boiler Mounted Units

A. Ignition Electrode

- (1) Switch off the main electricity supply and disconnect the plug at the socket or switch off the main isolating switch.
- (2) Remove the main burner as described in 1. "Preparing the Boiler", operations A to J.

- (3) Remove the screw and bracket securing the electrode to the pilot shield then withdraw the electrode.
- (4) Replacement is the reverse of removal, but before refitting the main burner, check that the distance between the electrode tip and the hood of the pilot is $4.0\text{mm} \pm 1.5\text{mm}$ Fig.26, 29 and 30.

B. Electronic Control

- (1) Disconnect the main electricity supply at the isolating switch or plug and socket.
- (2) Remove 4-way plug and gas valve connections from the electronic control. Also remove electrode lead, and connections to the thermostat and input terminal block.
- (3) Unclip the control from the four supporting lugs. Push barbs inwards to release each lug.
- (4) Remove electronic control.
- (5) Replacement is the reverse of removal.
- (6) Follow the lighting procedure and test the boiler as described in "7. Commissioning".

C. Gas Control Valve

- (1) Disconnect the main electricity supply at the isolating switch or plug and socket.
- (2) Pull off the thermostat knob, remove the plastic plug, and then unscrew the single screw securing the controls cover and slide the cover from the boiler.
- (3) Unscrew the two screws securing the control panel and hinge down the panel.
- (4) Turn off the isolating gas cock.
- (5) Disconnect the three leads from the multi-functional control at the electronic control board and slide leads through grommet hole, remove earth lead.
- (6) Unscrew the union connecting the pilot supply pipe to the multi-functional control.
- (7) Unscrew the two unions, one either side of the control.
- (8) Remove the pipe fittings from the old multi-functional control.
- (9) Refit pipe fittings to new control.
- (10) Replacement is the reverse of removal.
- (11) Follow the full lighting procedure and test the boiler as described in "7. Commissioning".

D. Boiler Thermostat, Pressure Switch, See Fig.28

The following initial operations are necessary to remove and replace the above items.

- (1) Switch off the main electricity supply and disconnect the plug at the socket or switch of the isolating switch.
- (2) Pull off the boiler thermostat knob, remove the plastic plug and then unscrew the single screw securing the controls cover to the boiler and gently slide the cover from the boiler.
- (3) Undo the two screws securing the control panel in position then hinge down the panel.

Boiler Thermostat/Overheat Thermostat

- (1) Unscrew the four casing securing screws, then remove the boiler casing.

- (2) Remove the split pin and thermostat bulb from its pocket in the heat exchanger, remove and retain the split grommet in boiler back plate, then thread the thermostat bulb and its capillary through the hole in the back plate.

- a) Disconnect the electrical connections from the thermostat. Ensure the connections are suitably identified so they can be correctly connected to the replacement unit; refer to the wiring diagram Fig. 12 to ensure correct re-connection.
- b) Remove the hexagonal nut securing the thermostat to the front of the control panel and lift away the thermostat.

Overheat Thermostat

- a) Remove the electrical connections from the overheat thermostat (2 push-on connectors).
- b) Remove the two screws securing the overheat thermostat to the mounting bracket and retain.
- c) Remove the split pin, slide the bulb of the boiler thermostat and the coiled capillary of the overheat thermostat from the thermostat. Remove the split grommet in the boiler back plate and thread the overheat thermostat capillary and coil through the hole.

- (3) Replacement is the reverse of removal. Ensure the rubber grommet in the boiler backplate makes a good seal around the thermostat capillary. Ensure that the capillary is secure in the clips provided. A conductive paste is available and should be applied to the bulb of the thermostat before inserting into the thermostat pocket. Thermostat bulb to locate on wire spacer or overheat thermostat coil.

If the overheat thermostat is fitted, ensure that the capillary lies in the groove on the bulb of the boiler thermostat.

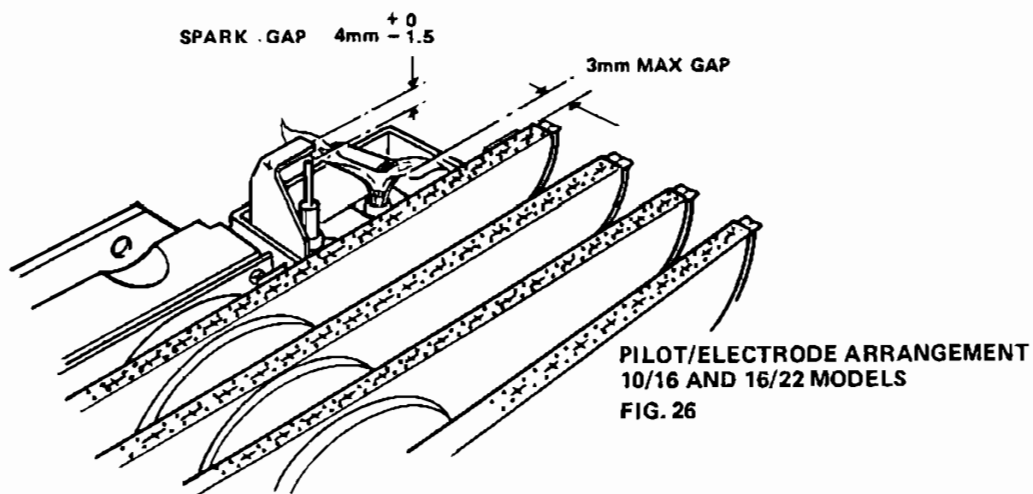
- (4) Follow the full lighting procedure and test the boiler as described in "7. Commissioning", (Installation Section).

Pressure Switch

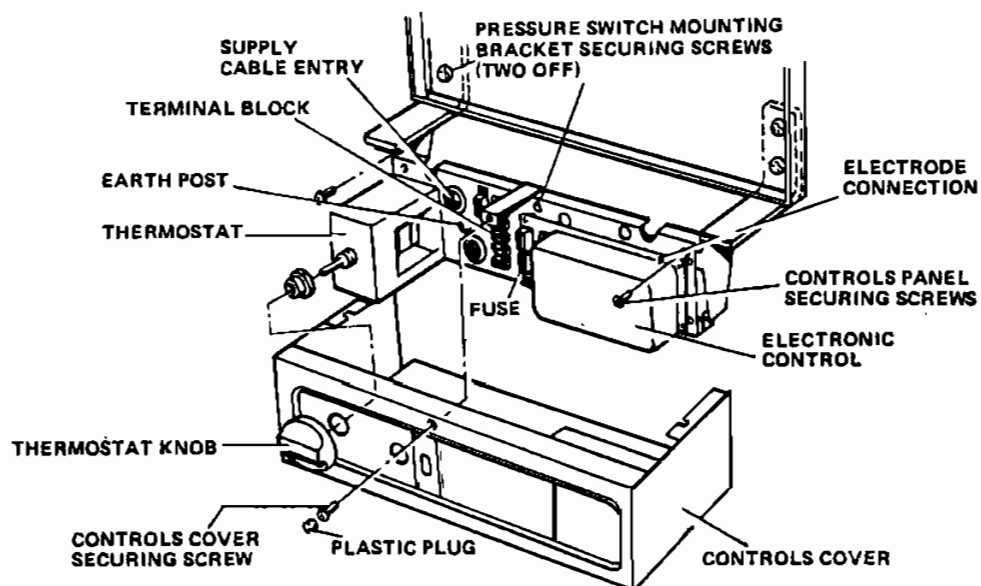
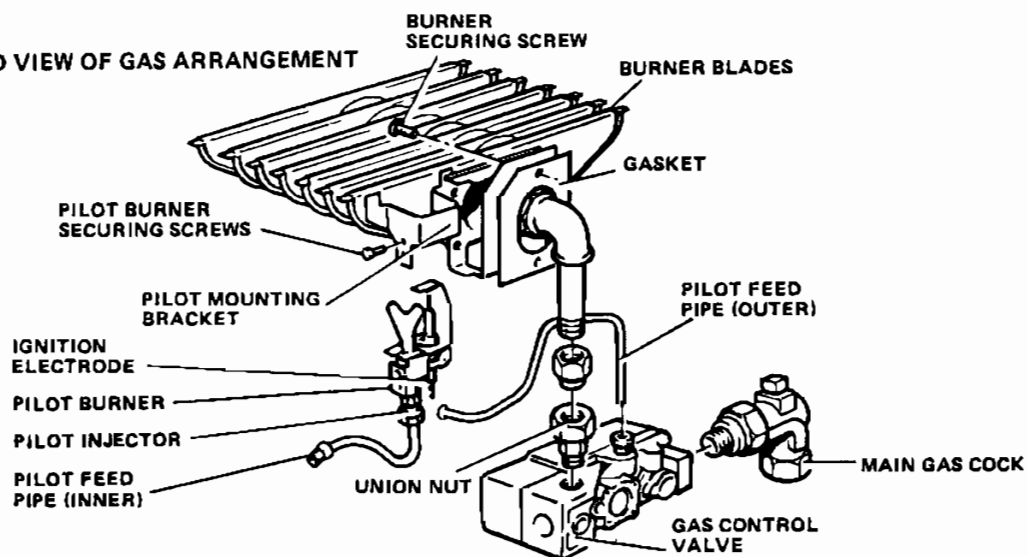
- (1) The pressure switch is located behind the control panel.
- (2) Remove the two screws securing the pressure switch mounting bracket to the control panel.
- (3) Remove the plastic tubes from the connections on each side of the pressure switch.
- (4) Disconnect the three electrical leads from the rear of the switch.
- (5) Remove the two screws securing the pressure switch to the support bracket.
- (6) Replacement is the reverse of removal. Ensure that plastic tubes are not kinked. Connect wires as colour coding on switch.
- (7) Follow the full lighting procedure and test the boiler as described in "7. Commissioning" (Installation Section).

E. Fuse — 1 amp See Fig.28

- (1) The fuse is located at the bottom lefthand corner of the electronic control. To gain access in it is only necessary to remove the control cover.
- (2) Remove the fuse from its holder.
- (3) Replacement is the reverse of removal.
- (4) Follow the full lighting procedure and test the boiler as described in "7. Commissioning", (Installation Section).



EXPLODED VIEW OF GAS ARRANGEMENT
FIG. 27



ELECTRICAL COMPONENTS FIG. 28

**FIG. 29 PILOT/ELECTRODE ARRANGEMENT
6/10 MODEL**

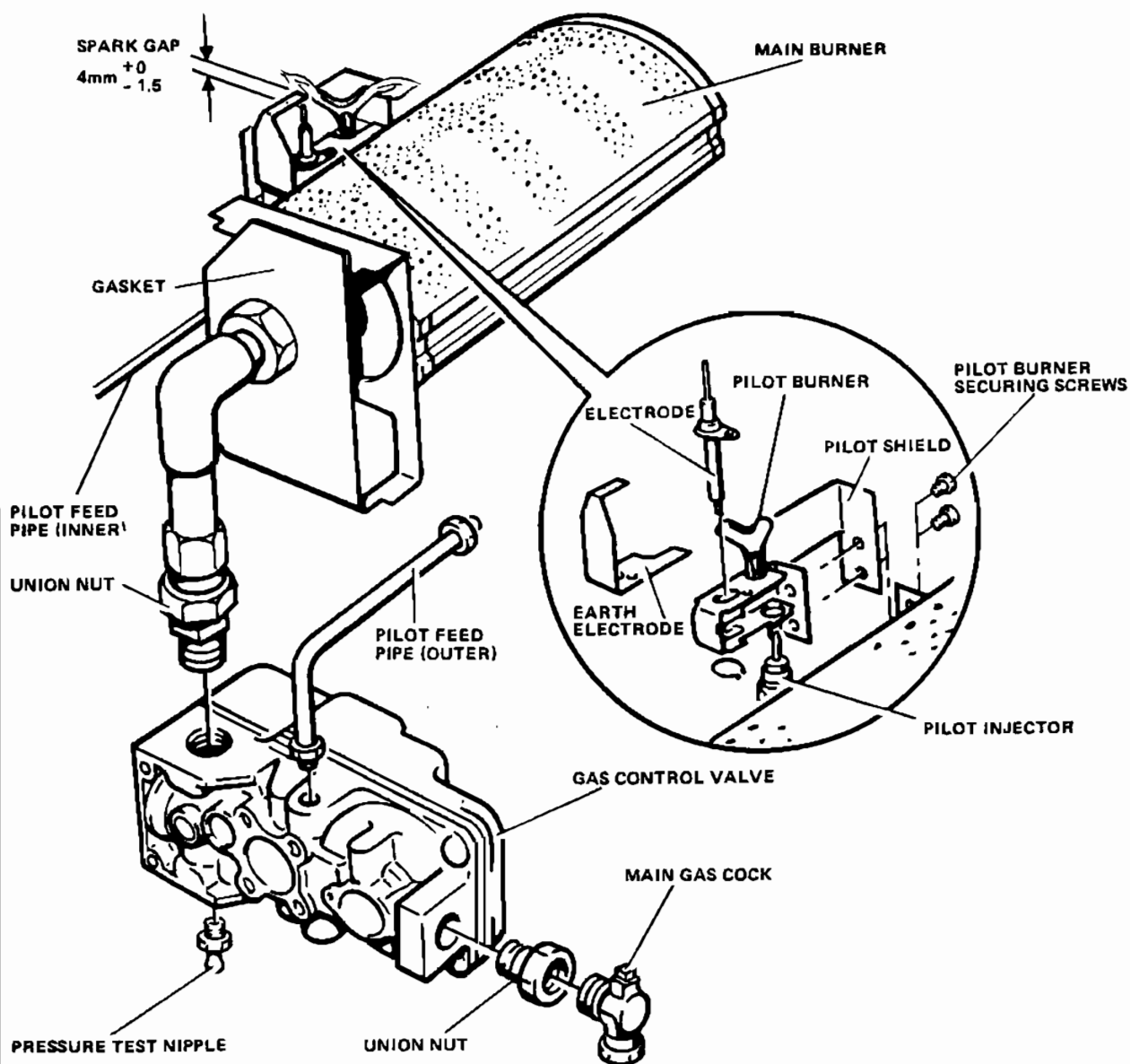
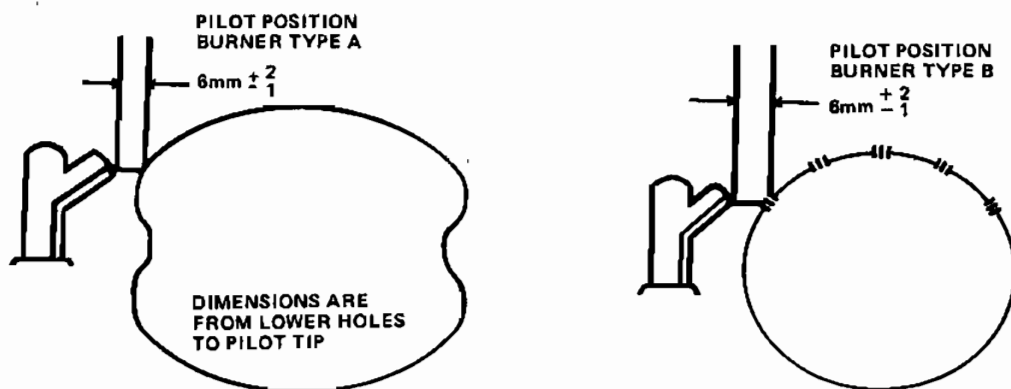
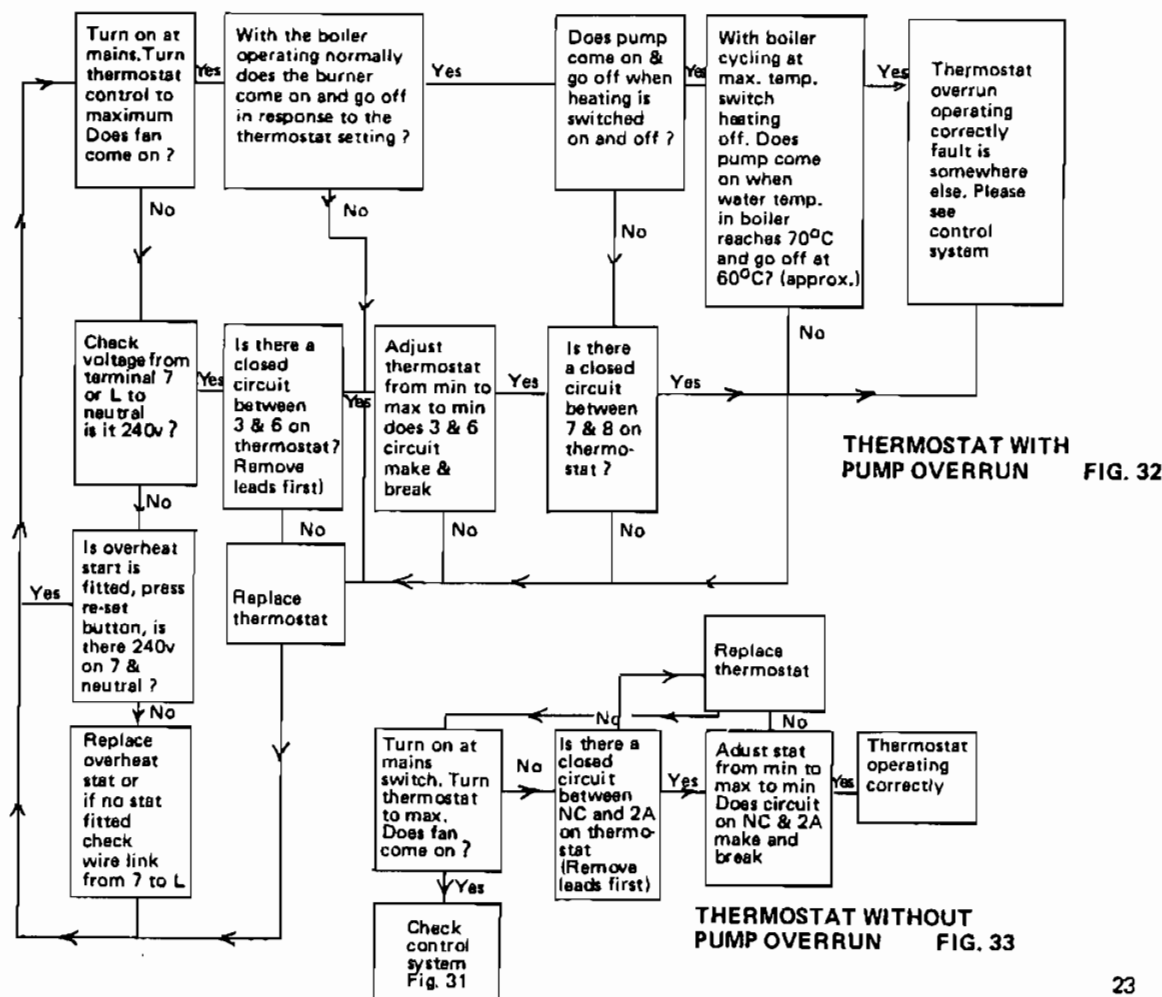
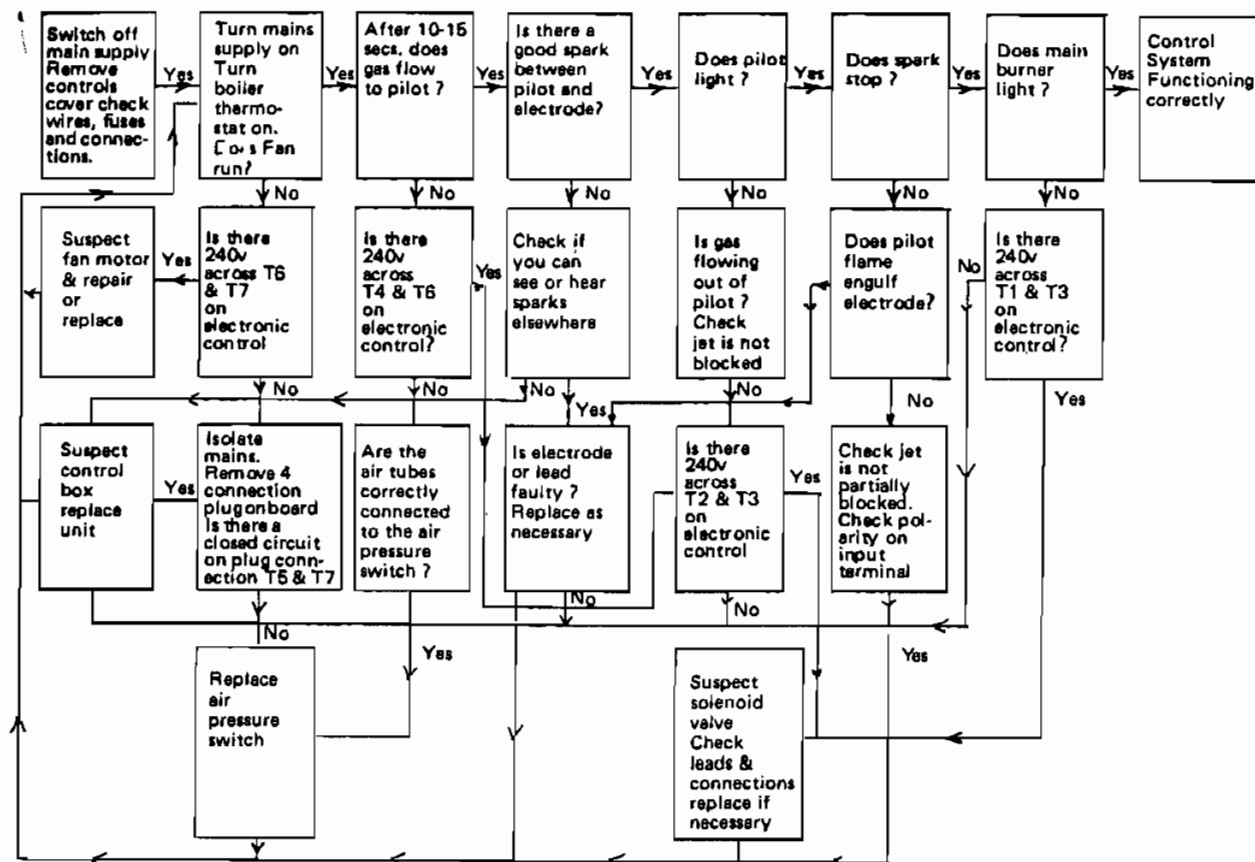
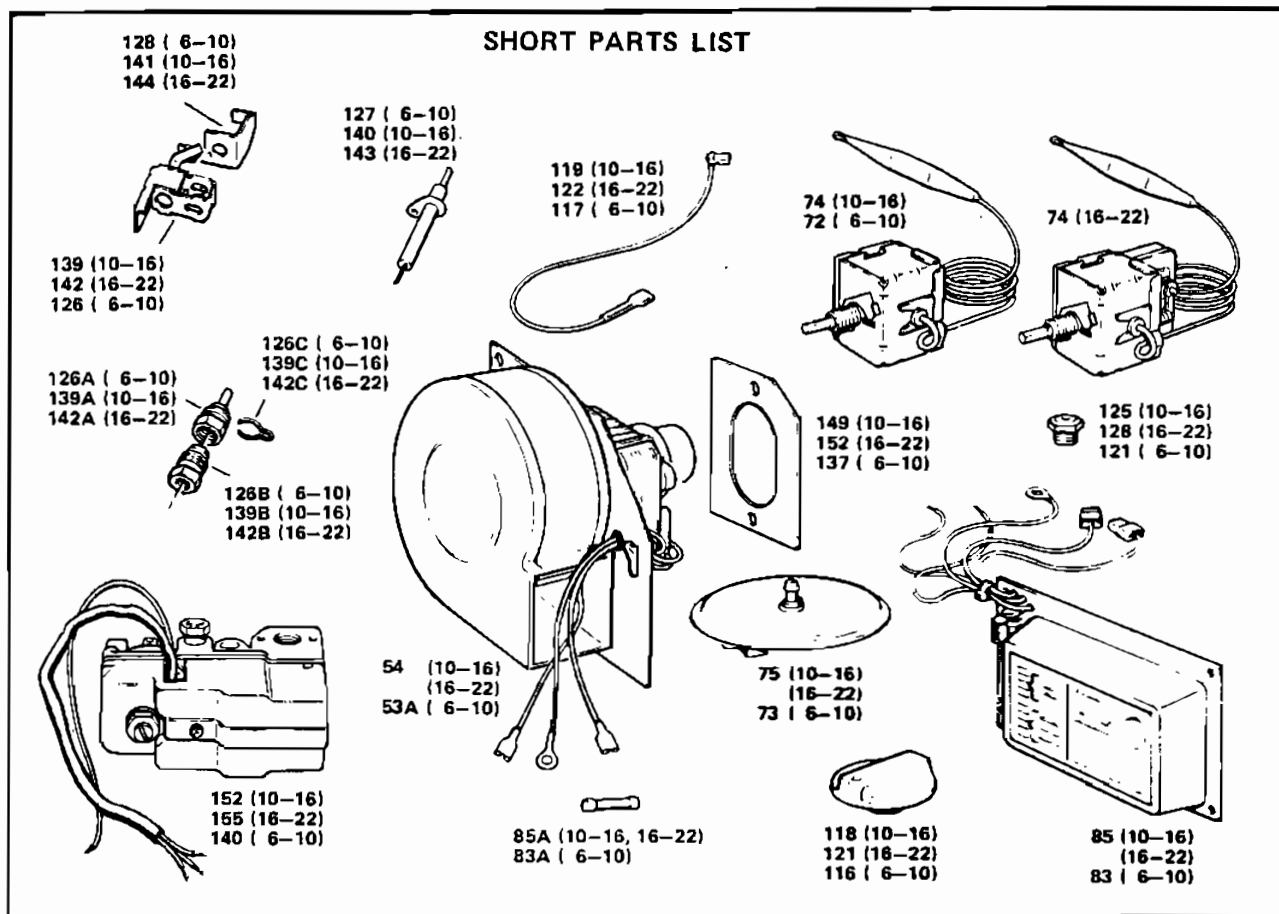


FIG. 30 EXPLODED VIEW OF GAS ARRANGEMENT

FIG. 31 FAULT FINDING CHART – CONTROL SYSTEM



SHORT PARTS LIST



Key No.			Description	Potterton Part No.	British Gas Part No.
6-10	40-16	16-22			
53A	54	54	Fan Assembly	409550	389231
73	75	75	Pressure Switch	642204	387607
72	74		Thermostat	404480	395923
		74	Thermostat	404481	395228
83	85	85	Electronic Control	407676	336708
116	118	121	Thermostat Knob	200277	357634
140	152	155	Gas Control Valve	907219	392811
121			Main Burner Injector	410955	336831
	125		Main Burner Injector	410497	358297
		128	Main Burner Injector	410903	358298
126	139	142	Pilot Burner Assembly	402890	336728
126A	139A	142A	Pilot Injector	402899	336855
126B	139B	142B	Shear Off Union	402492	357932
126C	139C	142C	Injector Securing Clip	402896	336856
128	141	144	Spark Earthing Bracket	205705	336730
127			Electrode	407679	336874
	140	143	Electrode	407675	395924
117	119	122	Electrode Lead	205743	336724
137	149	152	Main Burner Gasket	200725	357995
83A	85A	85A	Fuse	641903	336585

"All descriptions and illustrations contained in this leaflet have been carefully prepared but we reserve the right to make changes and improvements in our products which may affect the accuracy of the information contained in this leaflet"

POTTERTON

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