WORCESTER

Bosch Group

WALL MOUNTED DANESMOOR

WM 12/19

ROOM SEALED BF WALL MOUNTED
OIL-FIRED PRESSURE JET APPLIANCE

INSTALLATION AND SERVICING INSTRUCTIONS

BOILER OUTPUT

Hot Water and Central Heating

MINIMUM 12 kW (41,000 Btu/h)
MAXIMUM 19 kW (65,000 Btu/h)

THESE INSTRUCTIONS APPLY TO UK MODELS ONLY

THESE INSTRUCTIONS ARE TO BE LEFT WITH THE APPLIANCE

Contents

1. Installation Regulations

1.1 This appliance must be commissioned by a competent engineer after installation.

1.2 General installation information and advice may be obtained from the Oil Firing Technical Association for the Petroleum Industry (OFTEC). Training courses are also offered by OFTEC, leading to inclusion on their list of registered engineers.

1.3 A competent person should install the appliance. The person installing the appliance should be aware of the Health and Safety at Work Act and take appropriate action to ensure that the regulations are adhered to. In order to give optimum efficiency and trouble free operation the appliance should be commissioned by a qualified engineer. OFTEC recommends the use of registered engineers for the commissioning of oil-fired burners.

1.4 The manufacturers notes must not be taken, in any way, as overriding statutory obligations.

1.5 The compliance with a British Standard does not, of itself, confer immunity from legal obligations. In particular the installation of this appliance must be in accordance with the relevant requirements of the following British Standards and regulations in respect of the safe installation of equipment.

BS 5410: part 1: Code of practice for Oil Fired Boilers.

BS 799: part 5: Specification for Oil Storage Tanks.

BS 7593: Code of Practice for treatment of water in domestic hot water central heating systems.

BS 5449: part 1: Code of practice for forced circulation hot water Central Heating for Domestic Premises.

BS 7074: part 1: Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.

BS 7671: IEE Wiring Regulations, current edition.

The Building Regulations Part J England and Wales; Part F Section III Scotland; Part L Northern Ireland.

Local Water Company by-laws.

The Control of Pollution (Oil) Regulations.

1.6 To ensure that the installation will perform to the highest standards, the system and components should conform to those mentioned in the instructions.

2. General Information

2.1 The Worcester Danesmoor Wall Mounted appliance covered in these instructions is a room sealed appliance which has been designed to serve domestic central heating and hot water requirements ranging from 12 kW to 19 kW.

2.2 The appliance is suitable for connection to fully pumped conventional indirect hot water systems utilising an indirect double feed cylinder. This appliance is not suitable for use on gravity systems.

2.3 When the appliance is being installed on a sealed system it is recommended that copper pipe is used; on open vent systems copper or plastic pipe can be used.

2.4 The appliance must be installed on a load bearing external wall with wall thickness ranging from 102 mm (4 inches) to 460 mm (18 inches). When installing the appliance on a 102mm (4inch) wall the 4inch Standoff Kit must be used. The stand off kit reduces the distance the appliance protrudes through the load bearing wall. This is available from Worcester, Bosch Group as an optional extra, Part Number 7 716 192 256.

2.5 The service engineer should always have access to the inside of the property when servicing the appliance, to check for system faults and reset/replace electrical safety devices. A service switch is provided so the service engineer can override programmer settings to service the appliance when access to the system controls is not available. See Section 10.

2.6 The electrical supply to the appliance should be fed via a separate circuit breaker including earth leakage protection.

WARNING: This appliance is serviced and repaired externally. External equipment operated at 230volts should not be serviced or repaired under adverse weather conditions.

2.7 It is recommended the appliance should only be installed where outside the property the maximum height from the bottom of the appliance is 1.5 metres above a suitable hard standing from which servicing and maintenance can be safely carried out.

2.8 The boiler is factory set to 17 kW output and can be altered, if necessary, by adjusting the burner as specified in table 2. This appliance is only suitable for use with 28 second Kerosene heating oil.

NOTE: It is a mandatory requirement of the building regulations that only 28 second kerosene is used on low level discharge flues.

2.9 In the event of a lockout condition, the burner is reset by the householder from within the property using the remote lockout reset button.

2.10 An electrical service lead can be fitted to the external control box enabling the service engineer to use a light or vacuum cleaner. The electrical service lead is available from Worcester, Bosch Group as an optional extra, Part Number 7 716 192 301.

NOTE: Any electrical equipment used with this lead should be protected by a separate RCD safety unit.

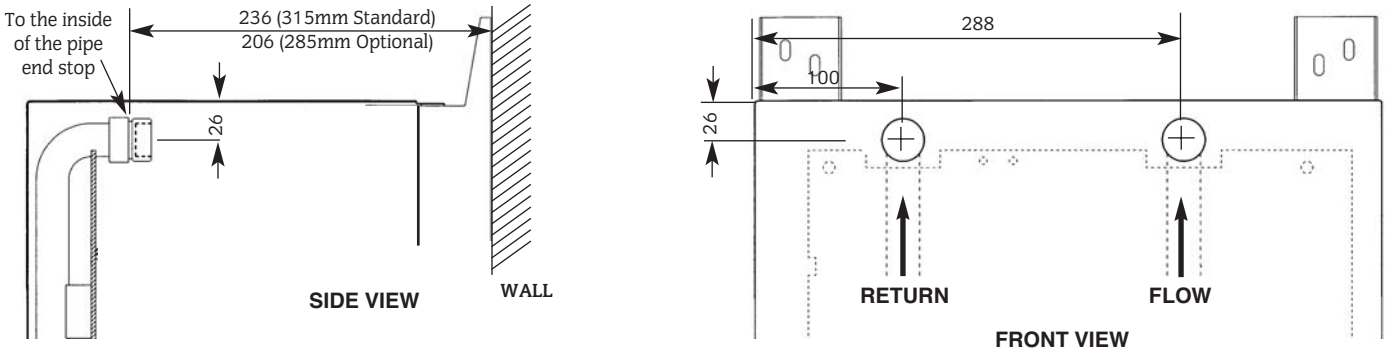
2.11 A colour co-ordinated twin channel programmer can be fitted to the appliance facia panel. This is available from Worcester, Bosch Group as an optional extra, Part Number 7 716 192 007.

3. Technical Data

Table 1

SPECIFICATIONS		
MODEL		**12/19**
POWER SUPPLY		230V 50Hz
HEATING FLOW		22mm
HEATING RETURN		22mm
HEIGHT		600mm
WIDTH		420mm
DEPTH		315mm standard (285mm optional)
FUEL LINE		1/4 inch BSP
FLUE REQUIREMENT	RS	Telescopic (Supplied with appliance)
MAXIMUM STATIC HEAD		30m (98 ft.)
PRIMARY WATER CAPACITY		6.5 litres (1.4 gal)
WEIGHT (DRY)		76Kg (167lbs)
WEIGHT (WET)		82.5Kg (182lbs)
BURNER		Electro Oil Inter B9C
WATER SIDE RESISTANCE	10°C Difference	40 mbar
WATER SIDE RESISTANCE	20°C Difference	10 mbar
EXIT FLUE GAS MASS FLOW		33kg/h
CONTROL THERMOSTAT RANGE		55°C minimum cut in to 82°C maximum cut out
CONTROL THERMOSTAT DIFFERENTIAL		5°C
HIGH LIMIT THERMOSTAT BREAK POINT		100 +0/-6°C
MANUAL RESET THERMOSTAT BREAK POINT		110 +0/-6°C
DUCT MANUAL RESET THERMOSTAT BREAK POINT		100 +0/-6°C
FROST THERMOSTAT RANGE		5°C cut in to 10°C cut out

Fig. 1. Pipework dimensions inside the property (all dimensions are millimeters)



12/19 Table 2. Electro Oil Inter B9C Burner (See Fig. 28)

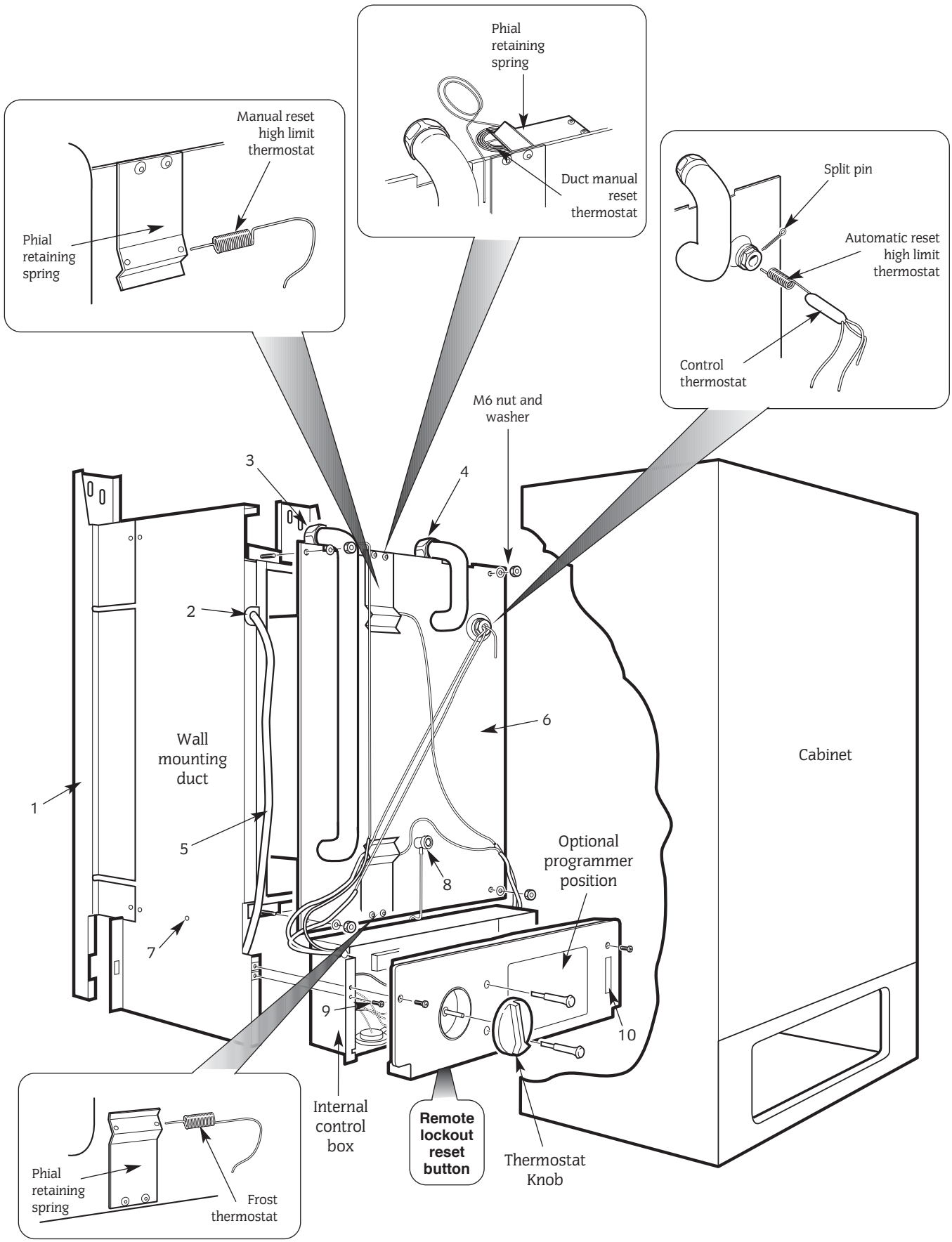
NOMINAL BOILER RATING AT NORMAL OPERATING TEMPERATURE											
Fuel**	**Nozzle ‡**	**Pump Pressure (p.s.i.) †**	**Fuel Flow Rate**		**Flue Gas Temp. (°C)***	**%CO_2**	**Approx. Air Setting**	**Appliance**			
								Input		Output	
			Kg/h	**l/h**				kW	Btu/hr	**kW**	**Btu/hr**
28 Sec. Kerosene	0.4 60°ES	115	1.11	1.41	180	9.5	7.25	13.3	46,000	**12**	**41,000**
28 Sec. Kerosene	0.5 60°ES	105	1.38	1.75	200	10.5	8.5	16.6	56,000	**15**	**51,000**
28 Sec. Kerosene	0.5 60°ES	140	1.57	1.99	210	11	8.75	18.9	65,000	**17**	**58,000**
28 Sec. Kerosene	0.6 60°ES	125	1.76	2.23	230	11.5	9	21.1	72,000	**19**	**65,000**

* **NOTE:** The flue gas temperature is measured in the flue. The probe should be inserted to a depth of 150mm in the center of the flue. The temperature measured is not an absolute flue gas temperature and is for general guidance purposes only! **NOTE: Class C2 28sec kerosene.

† **NOTE:** The pump pressure given is for general guidance only as variations in nozzle output can be up to ± 15%. It is, therefore, essential that the air is adjusted to give the correct CO_2 value.

‡ **NOTE:** The nozzle type used on 28 Sec. Kerosene outputs are nozzles calibrated specifically for use with 28 Sec. Kerosene which gives less variation in nozzle output than the standard 35 Sec. Gas Oil nozzles. However, if a 28 Sec. Kerosene nozzle is not available at servicing or commissioning it is appropriate to install a 35 Sec. Gas Oil nozzle providing the output, spray angle and pattern of the nozzle is the same as the 28 Sec. Kerosene nozzle (e.g. 0.560°ES may be replaced with a 0.560°S).

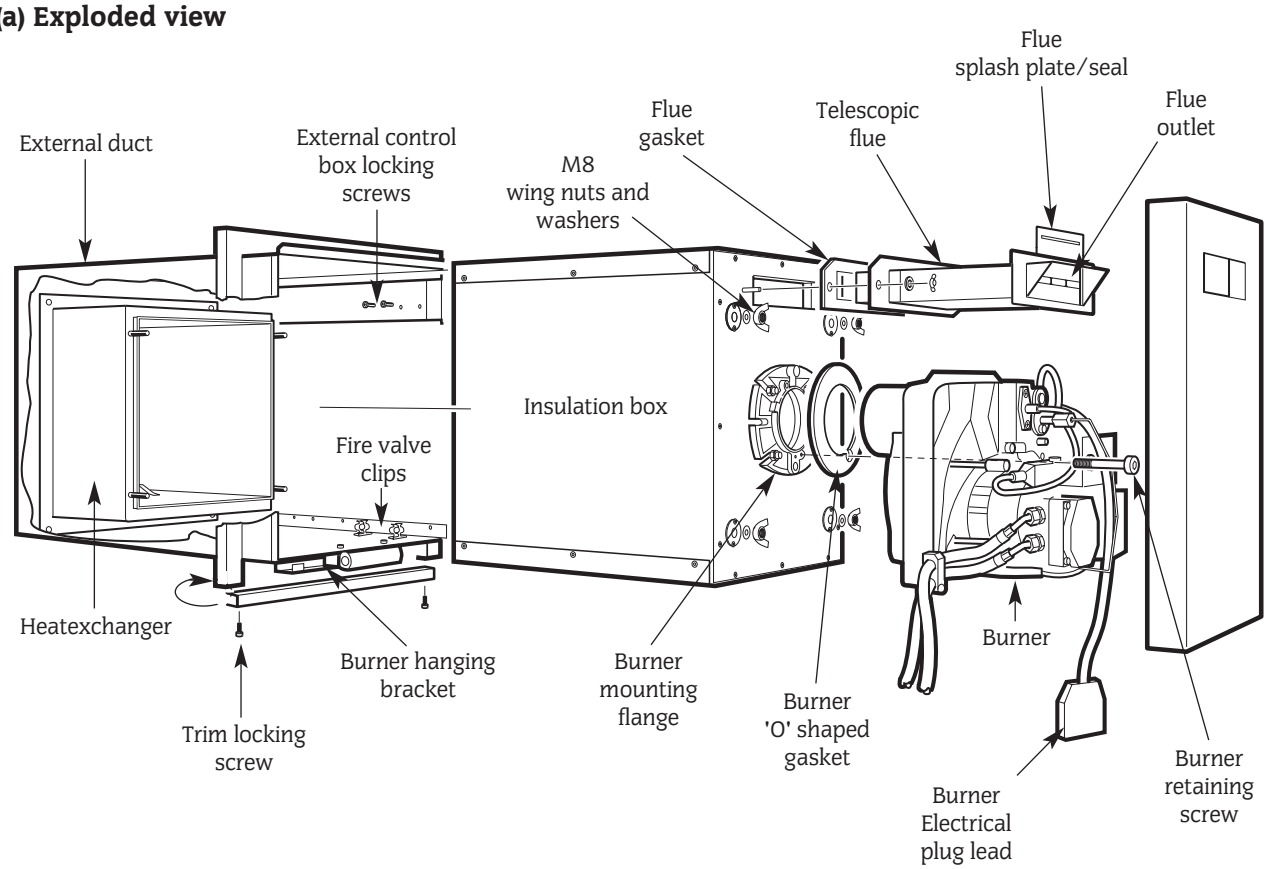
Fig. 2. Internal view of the appliance.



1. Wall mounting bracket
2. 'D' Shaped grommet
3. Central Heating return
4. Central heating flow
5. Main harness
6. Heatexchanger
7. Earth stud
8. Boiler Drain point
9. Control box locking screw
10. Serial number label

Fig. 3. External view of the appliance.

(a) Exploded view



(b) Assembled view

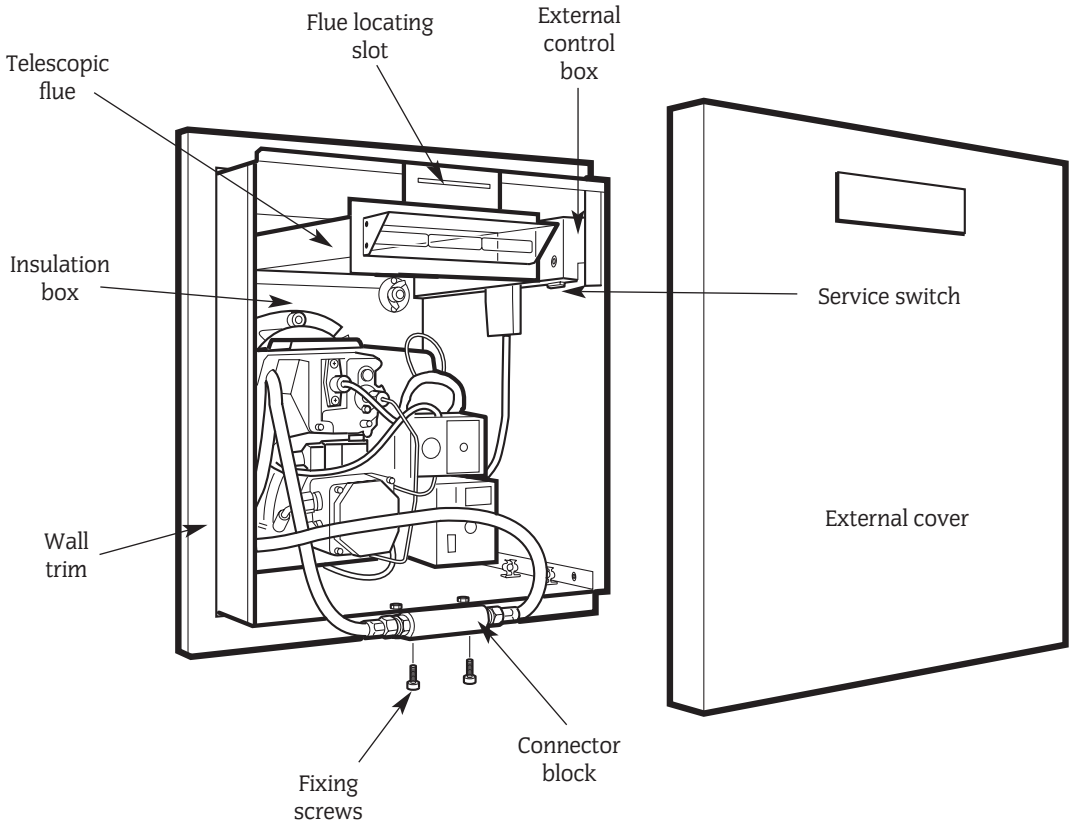
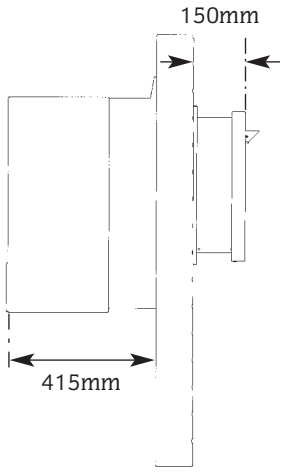
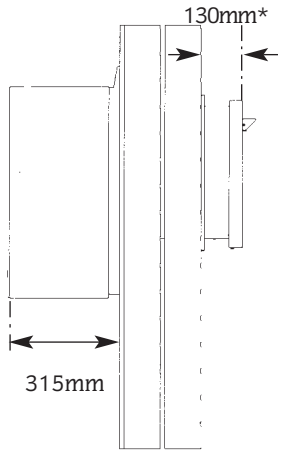


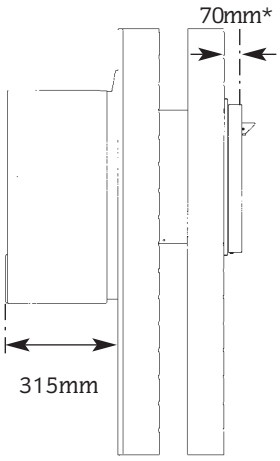
Fig. 4. Appliance position relative to standard wall thickness with cabinet in the standard Position.



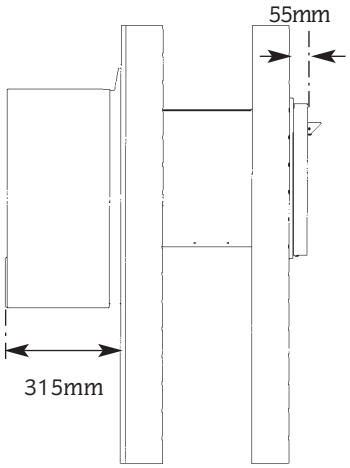
102mm (4 inch) wall with stand off kit



229mm (9 inch) wall



296mm (12 inch) wall



460mm (18 inch) wall

***NOTE:** For cabinets set at the optional 285mm position (excluding 102 and 460mm wall thickness), add 30mm to the distance the appliance protrudes the outside wall.

4. Siting the Appliance

4.1 The appliance may be installed in any room although particular attention is drawn to the requirements of the current I.E.E. Wiring regulations BS 7671 and, in Scotland, the electrical provisions of the building regulations applicable to Scotland; with respect to the installation of appliances in rooms containing baths or showers.

Where a room sealed appliance is installed in a room containing a bath or shower, any electrical switch or appliance control using mains electricity must not be able to be touched by a person whilst using the bath or shower.

4.2 The appliance is a through the wall appliance not suitable for external installation.

4.3 It is recommended the appliance should only be installed where outside the property the maximum height from the bottom of the appliance is 1.5 metres above a suitable hard standing from which servicing and maintenance can be safely carried out.

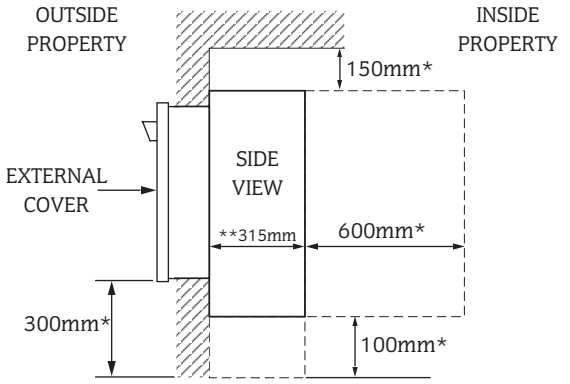
4.4 The appliance must be positioned on an external wall such that the flue terminal can safely discharge the flue gases as described in Section 7.

4.5 The appliance must be installed on a suitable load bearing external wall that is capable of supporting the weight of the appliance.

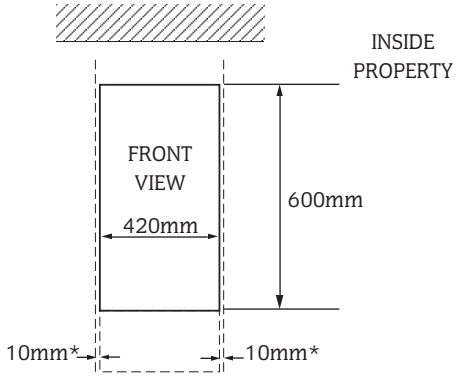
4.6 Specified clearances must be available for installation and servicing see fig. 5 and below:

(a) Above - 150mm
(b) In front - 600mm
(c) Below - 100mm
(d) Right and left hand side - 10mm

Fig. 5. Appliance casing dimensions and required clearance



* Space required for installation and servicing
** Optional 285mm if fitted within a 300mm unit



* Space required for installation and servicing

5. Removal of the Cabinet and External Cover

See Figs. 2, 3 and 7.

For installation and servicing of the appliance the cabinet should be removed as follows:

5.1 Remove the cabinet by pulling the bottom of the cabinet forwards to release the ball studs. Lift the cabinet upwards and forwards to release from the locating slots and slide the cabinet forwards.

5.2 The internal control box can be removed by undoing the two screws on the front of the facia. There is an earth loom that connects the internal control box to the wall mounting duct, release the wire from the earth rivet and push back through the hole in the back of the internal control box.

Remove the split pin from the thermostat phial pocket located in the front, right hand side of the boiler. Carefully withdraw the control and automatic high limit thermostats from the pocket noting their positions.

Carefully lift the phial retaining spring so that the manual reset overheat, manual reset duct and frost thermostats can be pulled out from the springs noting their positions.

Remove the two screws holding the internal control box to wall mounting duct and slide out the internal control box; place the control box in a safe place next to the appliance being careful not to damage the burner cable and taking care not to kink the thermostat capillary tubes.

5.3 Remove the external cover by undoing the two fixings underneath the cover and padlock if fitted. Pull the bottom of the cover so it clears the bottom of the external duct/flue and lift up to release the two locating tabs from the top of the duct.

6. Air Supply

6.1 The appliance does not require a separate vent for combustion air.

6.2 Installation in cupboards or compartments require permanent vents for cooling purposes, one at high level and one at low level, either direct to outside air or to a room. Both vents must pass to the same room or be on the same wall to the outside air. The minimum air vent free area is given in Table 3.

6.3 There must be sufficient clearance around the appliance to allow proper circulation of ventilation air. The clearances required for Installation and Servicing will normally be adequate for ventilation. See Section 4.6.

Table 3. Minimum air vent free area for room sealed appliances installed in a compartment.

Appliance model	Ventilation to room or internal space		Ventilation to outside	
	High Level	Low Level	High Level	Low Level
12/19	209cm^2	209cm^2	105cm^2	105cm^2

7. Flue System

7.1 The appliance is supplied with a telescopic flue system that caters for 102mm (4 inch) to 460mm (18 inch) Wall thickness. For details of the installation procedure refer to Section 11.6. of these installation and servicing instructions.

7.2 Siting the flue outlet terminal

1. The flue outlet terminal must be located in a suitable position, as shown in fig.8, such that the products of combustion can be freely dispersed without the possibility of the gases entering the dwelling or that of a neighbouring dwelling. The flue outlet can be seen in figs. 6 and 7.

2. Discharge of flue gases into car ports or narrow passageways is not recommended.

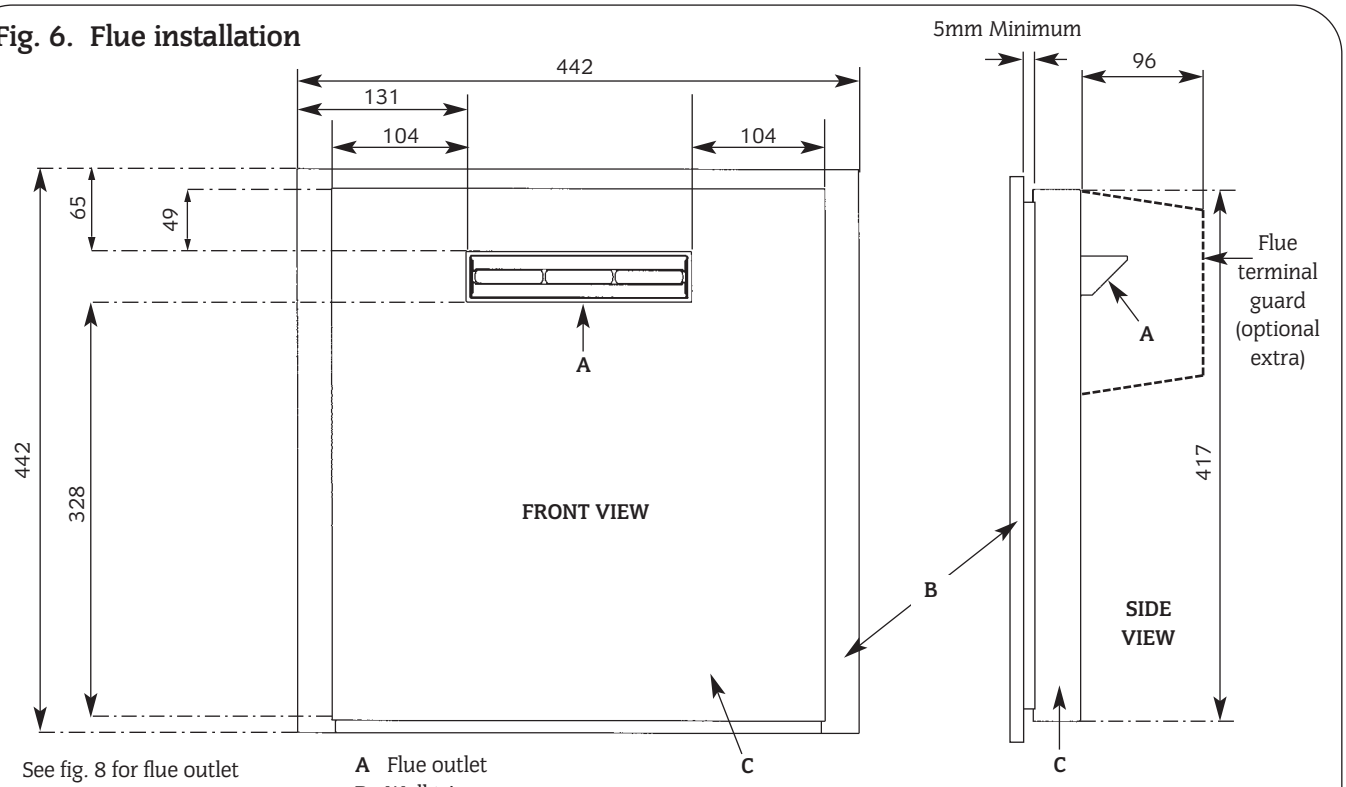
3. The terminal must not cause an obstruction nor the discharge cause a nuisance as a result of either flue gases or terminal noise.

4. If the terminal is fitted within 600mm of a plastic/painted gutter or painted eaves then an aluminium or stainless steel shield at least 750mm long should be fitted to protect the surface.

5. If a terminal is fitted less than 2 metres above a surface to which people have access a terminal guard should be fitted. A flue terminal guard kit is available from Worcester, Bosch Group, Part Number 7 716 190 017.

6. When fitting the flue terminal guard refer to the instructions supplied with the flue terminal guard kit.

Fig. 6. Flue installation

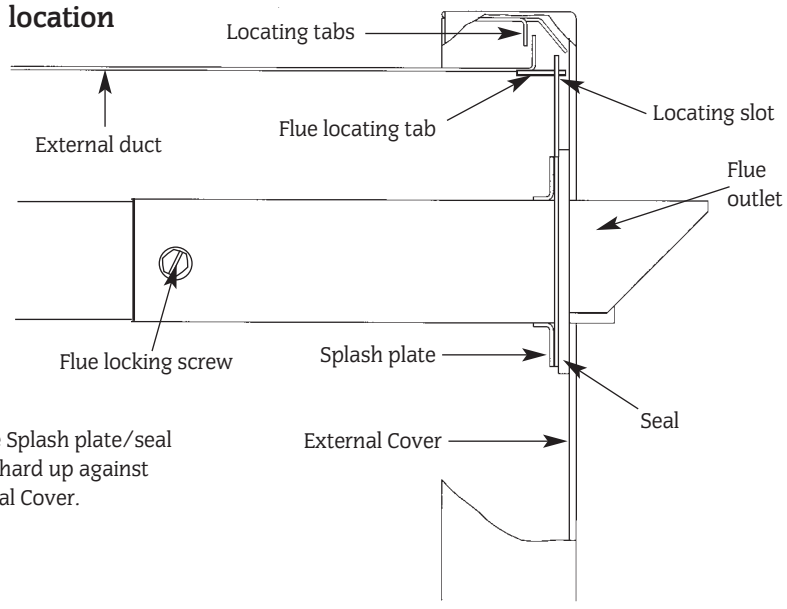


See fig. 8 for flue outlet terminating positions.

A Flue outlet
B Wall trim
C External cover

NOTE: Ensure a minimum gap of 5mm between the external cover and wall trim to allow sufficient air for combustion.

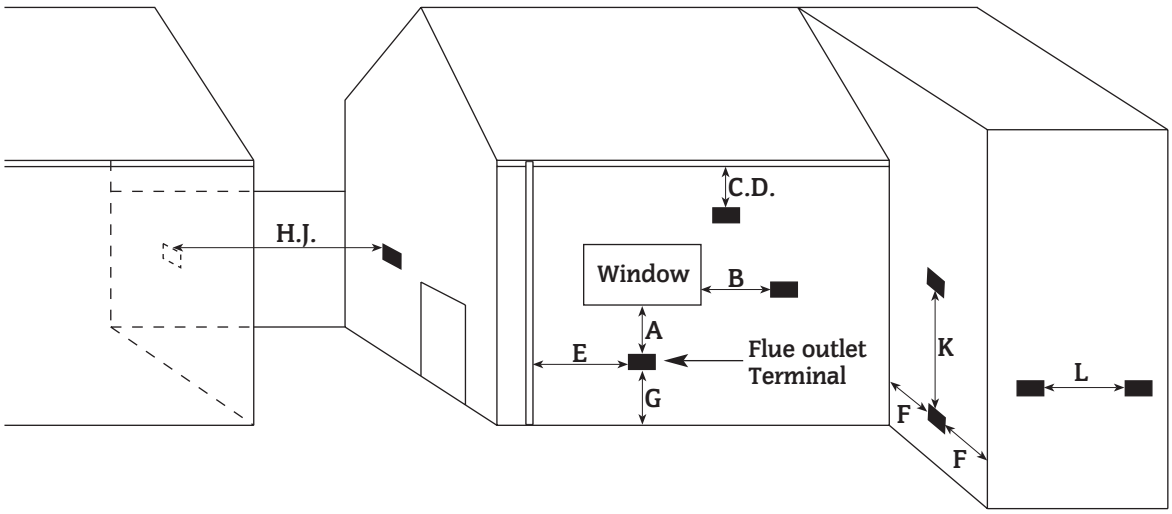
Fig. 7. Flue location



NOTE: The Splash plate/seal should be hard up against the External Cover.

Fig.8. Flue outlet terminating positions for oil-fired appliances

NOTE: The dimensions given are for general guidance only. Other surrounding buildings or objects may affect the clearance of combustion products. An alternative flue terminal position should be sought when there is any possibility of a nuisance being caused by inadequate dispersal of flue products.
Terminals should be positioned so as to avoid products of combustion entering into buildings.



	Flue outlet Terminal Position	Minimum Distance (mm)
A	Directly below an opening, air brick, window, etc.....	600
B	Horizontally to an opening, air brick, window, etc.....	600
C	Below a gutter, sanitary pipe, eaves or balcony with protection.....	75
D	Below a gutter, sanitary pipe, eaves or balcony without protection.....	600
E	From vertical sanitary pipework.....	300
F	From an internal or external corner.....	300
G	Above ground or balcony level.....	630
H	From a surface or boundry facing the terminal.....	600
J	From a terminal facing the terminal.....	1200
K	Vertically from a terminal on the same wall.....	1500
L	Horizontally from a terminal on the same wall.....	750

NOTE: Flue outlet is shown in fig. 6 and7.

8. Oil Supply

(See Figs. 9, 10 and 11).

8.1 The oil storage tank must be installed in accordance with BS799 Part 5. The tank should be arranged with a slope of 1 in 24 away from the outlet valve with a sludge cock at its lower end .

8.2 Do not use galvanised steel tanks or pipework for the oil supply system.

8.3 Do not use soldered joints on the oil supply pipework as this could cause a hazard in the case of a fire.

8.4 The burners on all appliances are supplied so as to be connected to a double-pipe sub-gravity feed system. Details of how to convert the burners to a single-pipe gravity feed system are shown in Fig. 10 and 11.

8.5 If a double pipe system is used then the maximum suction height allowable is 3.5 metres.

8.6 If a single pipe system is employed then the tank must be positioned such that the oil level does not exceed 4 metres above the level of the burner oil pump and in addition the oil level must be at least 0.3 metres above the level of the oil pump. Should it prove impossible to site the tank below the 4 metres maximum oil level a head breaking device must be installed between the tank and the burner.

8.7 A single pipe suction lift with a de-aerator can be used when the oil tank is positioned below the burner. An inlet and return loop should be created between the de-aerator and oil pump. De-aerators should be fitted externally to the appliance.

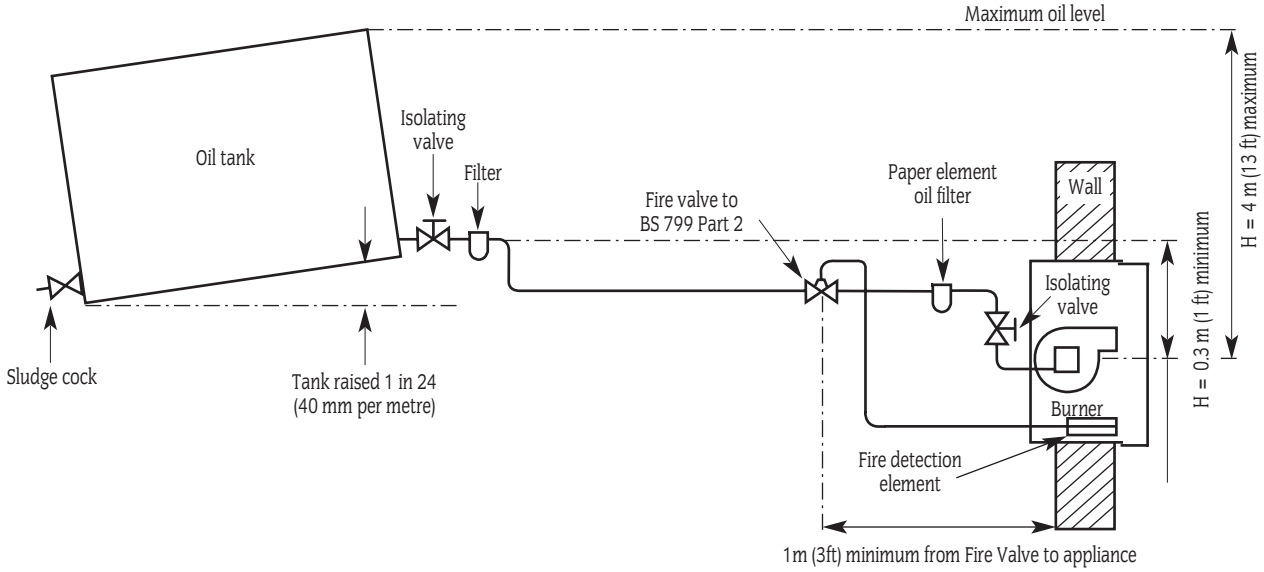
8.8 The oil supply pipe diameter can be determined using Tables 4 and 5 depending on whether a single or double pipe system is being installed. Selection of the correct pipe diameter will depend on the position of the oil storage tank relative to the burner and the length of the pipe run.

8.9 The oil supply pipe should be laid as level as possible to avoid air pockets and unnecessary friction losses.

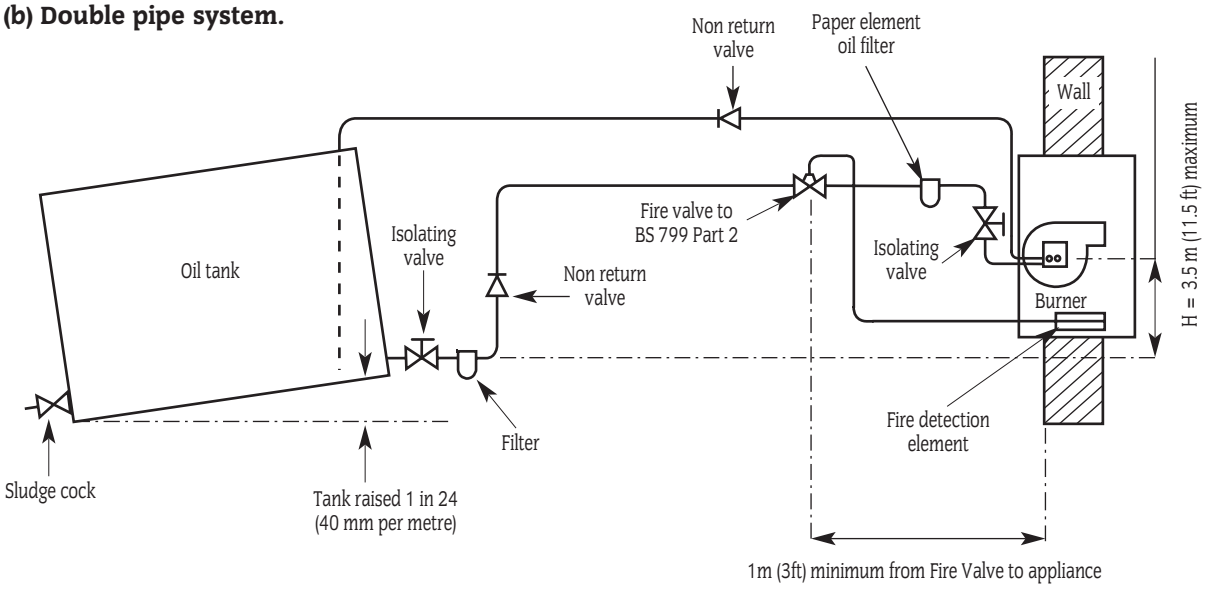
8.10 Oil boiler connections between the boiler and storage tank should be made in rigid pipework firmly attached to the wall or other secure structural element.

Fig. 9. Oil supply.

(a) Single pipe system



(b) Double pipe system.



8.11 The following components should be fitted in the fuel line between the storage tank and burner:

1. A manual isolating valve installed as close to the tank as possible.

2. A fire valve in accordance with BS799: Part 2 as shown in Fig. 9. The fire valve should be fitted externally with a fire detection element located within the appliance case. Use of a capillary type valve will allow a neat and simple installation. A suitable valve is the KBB manufactured by Teddington Controls Limited. Two inline fire valve clips have been provided next to the burner on the right hand side of the external duct, shown in Fig. 3, to allow a fire valve element to be mounted. Alternatively a fusible link or electrical system may be used. Under no circumstances should a combination isolating/fire valve be used as the sole fire protection device.

NOTE: The fire valve should be positioned at least 1 metre away from the appliance.

3. A paper element filter complying with the requirements of BS799, Parts 2, 3 and 4 should be fitted in the fuel line between the fire valve and the isolating valve but not within the appliance casing.

TABLE 4 Single pipe gravity feed system

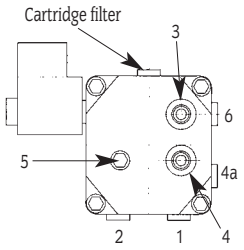
HEAD (metres)	MAXIMUM ALLOWABLE PIPE RUN (metres)	
	8 mm inside dia. pipe (10 mm O.D. copper)	10 mm inside dia. pipe (12 mm O.D. copper)
0.5	10	20
1.0	20	40
1.5	40	80
2.0	60	100

TABLE 5 Double pipe sub-gravity feed system

HEAD (metres)	MAXIMUM ALLOWABLE PIPE RUN (metres)	
	8 mm inside dia. pipe (10 mm O.D. copper)	10 mm inside dia. pipe (12 mm O.D. copper)
0	35	100
0.5	30	100
1.0	25	100
1.5	20	85
2.0	15	70
2.5	11	50
3.0	8	30
3.5	6	20

Fig. 10. Oil pump.

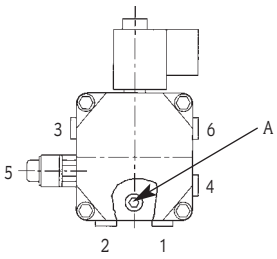
A. Danfoss BFP 41.



1 INLET
2 RETURN
3 BLEED AND PRESSURE GAUGE PORT
4 VACUUM GAUGE PORT
5 PRESSURE ADJUSTMENT
6 NOZZLE OUTLET

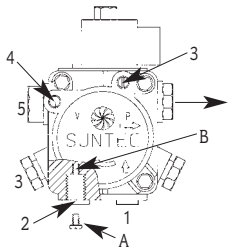
To convert to a single pipe system, remove plug 4a and remove the grub screw and insert plug 4a back into pump. Remove the return pipe, ¼ inch nipple and washer and insert the ¼ inch male plug to blank off the return port.

B. Danfoss BFP 11 Oil Pump.



To convert to a single pipe system: Remove the pump front cover, remove the changeover screw (A) nearest to ports 1 and 2. Remove the return pipe, ¼ inch nipple and washer and insert the ¼ inch male plug to blank off the return port.
Note: When removing the pump front cover ensure that a suitable receptacle is placed below the pump to catch the oil residue.

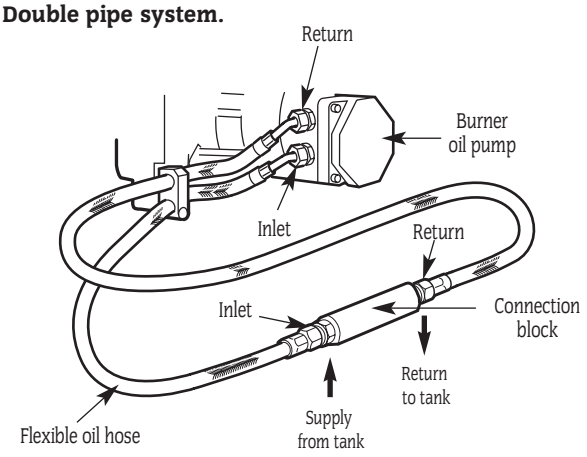
C. Suntec AS47C Oil Pump.



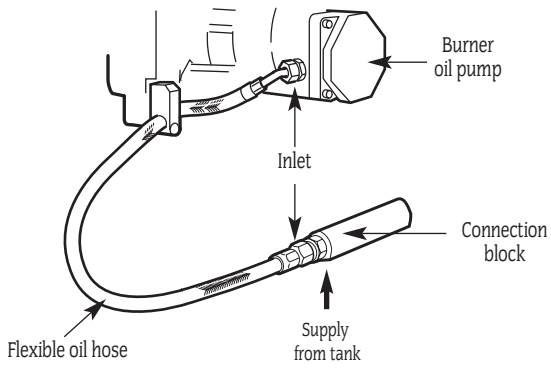
To convert to a single pipe system, remove the return pipe, ¼ inch nipple and washer from (2). Remove the grub screw (A) from the threaded hole (B). Insert the ¼ inch male plug to blank off the return port.

Fig. 11. Oil pipe installation.

A. Double pipe system.



B. Single pipe system.



9. Heating and Hot Water System

9.1 The appliance is suitable for connection to fully pumped conventional indirect hot water systems utilising an indirect double feed cylinder. This appliance is not suitable for use on gravity systems.

9.2 The flow and return sockets are located at the top of the appliance. From the inside of the property the flow pipe is on the right hand side and the return pipe is on the left hand side.

9.3 There is no requirement for a system bypass.

9.4 The pressure jet burner fitted to the appliance has full automatic control and hence there is no requirement for heat leak radiators.

9.5 The appliance is suitable for connection to open vent or sealed systems..

9.6 When the appliance is installed on a sealed system it is recommended that copper pipe is used; on open vent systems copper or plastic pipe can be used.

9.7 The primary system should be flushed and treated in accordance with the recommendations of BS 7593:1992 before the system is handed over to the user.

9.8 A drain cock should be installed at the lowest point on the heating circuit. The drain valve on the boiler (see fig. 2) is for draining the boiler only.

9.9 The pump should be set in accordance with the heating load requirements to give a flow and return differential temperature of 11°C under full load conditions.

Open Vent Primary System.

(See Fig. 12).

The following points are for guidance only. The system installation should be carried out in accordance with BS 5449: Part 1.

1. Feed and Expansion System

The feed and expansion pipes must rise continuously from the appliance and must be of the minimum diameter shown in fig.12.

The cistern must be arranged to provide a minimum static head of 1 metre above the top of the highest point in the heating circuit.

2. Filling and Venting

Air in the appliance is expelled through the vent pipe or dissipated into the system. Manual air vents should be fitted at any high points in the system.

Sealed Primary System

(See Fig.13 and 14).

The appliance is supplied with a manual reset thermostat and is suitable for use with a sealed primary system.

General

The system should be installed in compliance with the requirements of BS5449: Part 1. The boiler must be fitted with a spring loaded safety valve set to operate at 3 bar (45 psi) and the pipe connections made throughout the system must be capable of sustaining a pressure of up to 3 bar.

Manual air vents should be fitted at any high points in the system.

The following is a list of major items which must be fitted to the system:

1. Safety valve – 3 bar
2. Pressure gauge – 0 to 4 bar.
3. Expansion vessel
4. Automatic air vent.

Fig. 12. Typical fully pumped open vent system (Honeywell 'Y' plan).

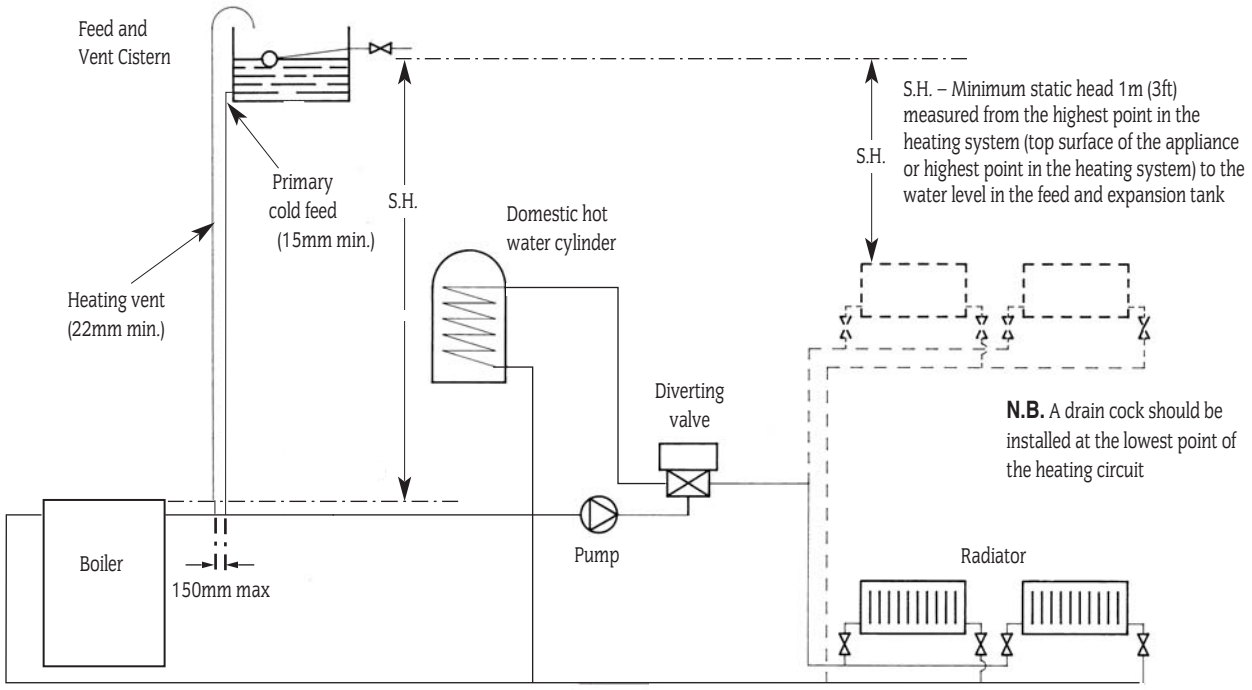


Fig. 13. Typical fully pumped sealed system (Honeywell 'Y' plan).

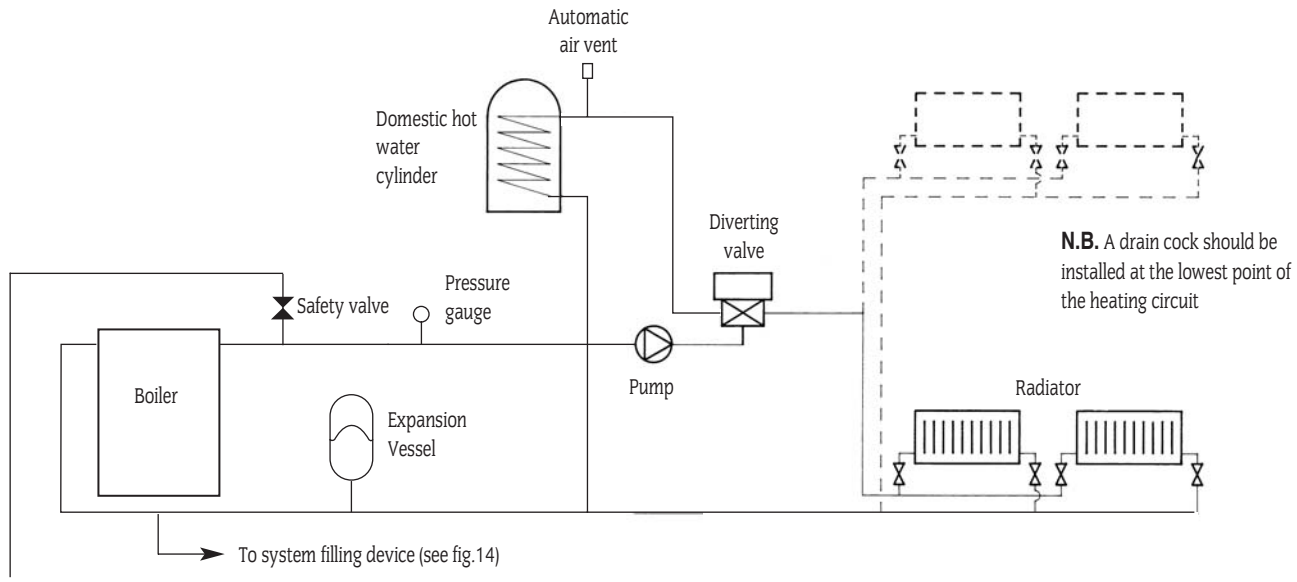
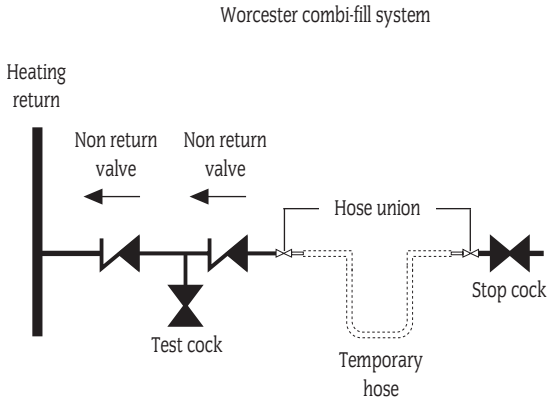
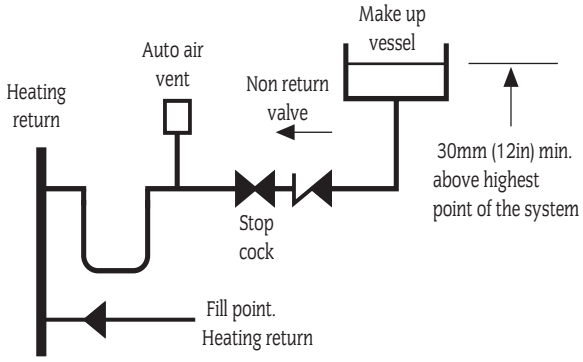


Fig. 14. System filling and make-up



METHOD 1



METHOD 2

10. Electrical

(See Figs. 15 to 22).

10.1 The electrical supply to this appliance must satisfy the latest edition IEE Wiring Regulations and any local regulations which apply.

The method of connection must allow complete isolation of the appliance and the supply to the boiler must be the only electrical supply to the system. This ensures the safety of a single fused supply.

NOTE: The appliance could provide an external electrical supply for servicing and should therefore be fed via a separate circuit breaker including earth leakage protection.

10.2 To gain access to the electrical terminal strip.

1. Isolate the mains electrical supply.

2. Remove the cabinet as described in section 5.1.

3. Release the two screws securing the facia to electrical control box and pivot the facia down. Remove the internal electrical box as described in Section 5.2.

10.3 Mains Wiring

Mains supply – 230 V AC ~ 50 Hz, 5A External Fuse to BS1362.

LIVE - Brown, NEUTRAL - Blue, EARTH - Green/Yellow

Mains Cable: 0.75mm^2 (24 x 0.20 mm) to BS 6500 Table 16.

The mains supply cable should be connected into the terminals marked L (Live), N (Neutral) and E (Earth) on the appliance terminal strip and securely held in the cable clamp located just below the L (Live), N (Neutral) and E (Earth) terminals at the rear of the electrical box . To secure the cable, remove the clamp retaining screw and pull its inner body out to allow the cable to be fed through. With the cable in position refit the screw and fully tighten to grip the cable. Feed the cable out of the appliance and route to the connection point avoiding any hot surfaces.

The appliance must be earthed.

10.4 Programmer

(See Fig. 16, 18, 21).

A plug in, colour co-ordinated, 2 channel electronic programmer is available from Worcester, Bosch Group. Full instructions covering installation and operation of the programmer are included with the kit.

The programmer will give fully independent central heating (CH) and hot water (HW) programmes when the switch on the rear of the unit is set to P.

If an **external programmer** is to be fitted to the boiler the link should be removed from the programmer plug Connection (7 to 9) and wired as shown in Fig. 16.

10.5 Safety Check

In the event of an electrical fault after the installation of the appliance, the electrical system shall be checked for short circuits, fuse failure or incorrect polarity of connections.

10.6 Basic Control (Room Thermostat)

(See Fig. 16).

As supplied the boiler will give a fully pumped heating circuit . The central heating temperature is controlled by the boiler control thermostat. Additional control may be obtained by the use of a room thermostat, having removed the link from terminal 2 to 4.

The pump should be connected to the boiler terminal block as shown in Fig.16. This will allow the pump to operate with the service switch set to the 'SERVICE' mode.

10.7 Honeywell "S" Plan (See Fig. 20, 21, 22)

NOTE: When wiring the appliance to a Honeywell 'S' Plan only use the wiring diagrams in these instructions. Use a Honeywell 10 way junction box (Part No. 42002116-001), the Honeywell wiring centre (Part No. 42005748-001) should not be used.

The "S" plan provides complete control on installations having pumped circulation to both the domestic hot water and radiator circuits.

The domestic hot water and radiator circuits are independently controlled by two motorised valves via a cylinder thermostat and a room thermostat. Both thermostats switch the water circulator and the boiler on and off.

10.8 Honeywell "Y" Plan (See Fig. 17, 18, 19)

NOTE: When wiring the appliance to a Honeywell 'Y' Plan only use the wiring diagrams in these instructions. Use a Honeywell 10 way junction box (Part No. 42002116-001), the Honeywell wiring centre (Part No. 42005748-001) should not be used.

The "Y" Plan provides complete control on installations having pumped circulation to both the domestic hot water cylinder and radiator circuits.

The domestic hot water and radiator circuits are controlled by a 3 port motorised valve via a cylinder thermostat and a room thermostat. Water flow is diverted to either circuit or to both circuits at the same time. Both thermostats switch the water circulator and the boiler on and off.

Note: The "Y" plan requires a live feed from the hot water "off" switch position. In order to achieve this, using a Worcester programmer, remove the orange wire from terminal 9 and pull back through the tie wraps. Do not attempt to cut the tie wraps. Ensure that the brown wire is firmly secured in terminal 9. Connect the orange wire to terminal 6.

10.9 Frost Protection

The appliance is supplied with a frost thermostat that is attached the heat-exchanger, this protects the appliance only.

For full frost protection of the property a single pole frost thermostat should be fitted so that both the boiler and the circulating pump/control circuits are energised under frost conditions as shown in the individual control systems. (See Fig. 16, 19 and 22).

10.11 Service Switch (see Fig. 29)

A service switch has been provided next to the burner to allow the service engineer to control the burner operation from outside the property.

The engineer should have access to the property to set the heating system controls to give a central heating demand so that the heat generated during the burner testing can be dissipated. However, in the event that the controls cannot be accessed a service position is available on the switch to enable the burner to be fired. The ability to dissipate the heat in this mode will depend on which control system has been installed and is described below for the systems specified in 10.6 to 10.8.

The switch settings are:

(a) **'RUN' mode** – Under normal operating conditions the appliance will be controlled by the programmer. The switch in this position will appear black.

(b) **'OFF' Mode** - The appliance will not operate unless there is a demand via the frost thermostat. The switch in this position will show a small amount of red.

(c) **'SERVICE' Mode** - Allows the service engineer to override the programmer to test fire the burner where there is no access to the system controls and the burner will not fire. The switch in this position will appear red.

NOTE: This mode is optional when servicing and should only be used where access to the system controls is unavailable.

The service mode will give the following minimum control:

(i) Basic Control. (See Section 10.6)

Full system control will be gained.

(ii) Honeywell "Y" plan. (See Fig 17, 18, 19)

The pump and burner will operate and heat will be dumped to the hot water tank if the time control is 'OFF' or to the heating circuit/hot water tank if the time control is 'ON' depending on the last demand made by the system.

(iii) Honeywell "S" plan. (See Fig. 20, 21, 22)

Only the burner will fire. This will allow approximately

3 minutes test time if the boiler is cold and the boiler thermostat is set to maximum.

After servicing the appliance the Service engineer must leave the appliance in the ***run*** mode. (See Fig. 29)

Fig. 15. Wiring diagram (standard).

Mains supply 230V 50Hz

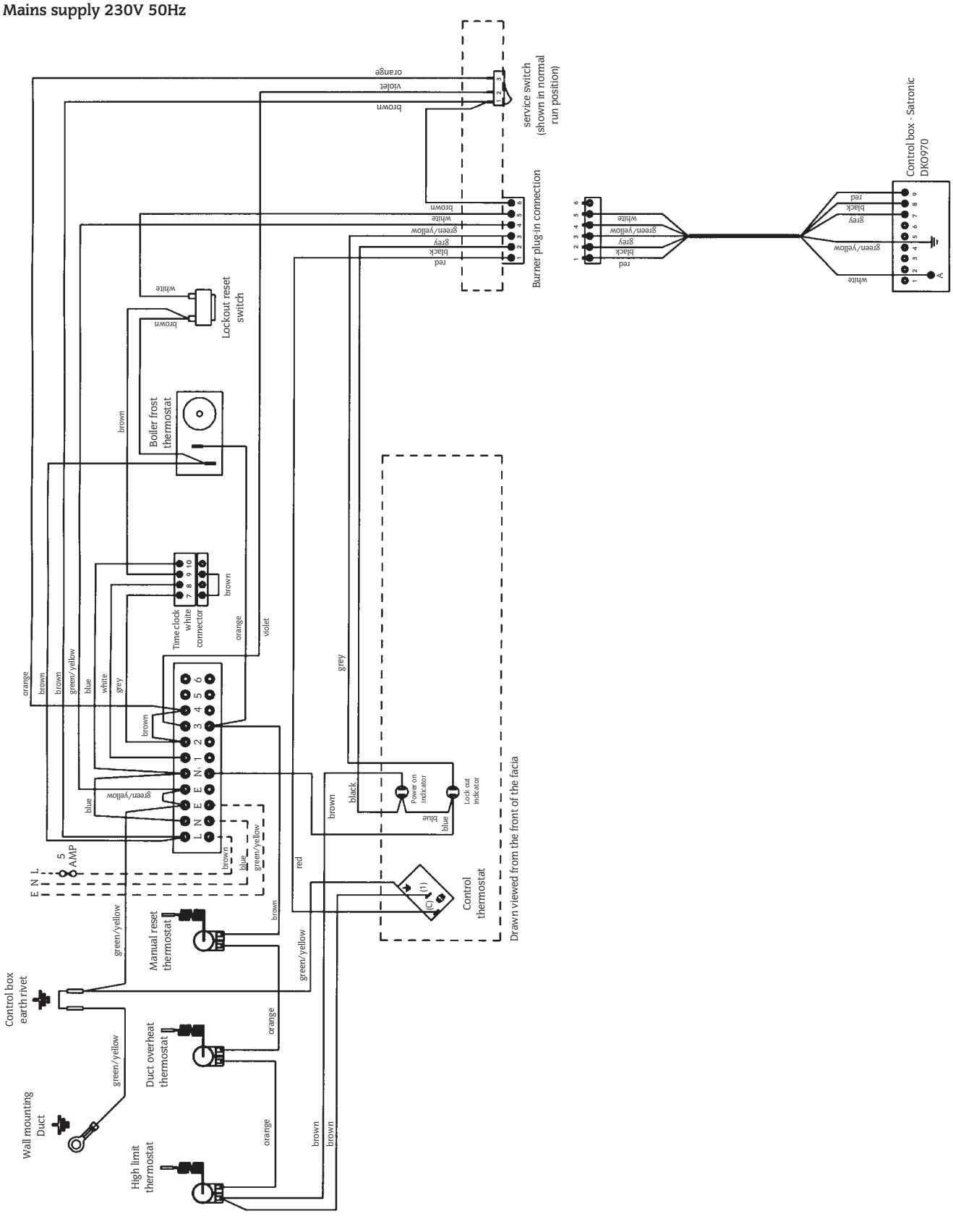


Fig. 16. Basic control (Room thermostat).

NOTE: Remove link 2 to 4.

Programmer Conections:
Grey (7) - Central Heating
White (8) - Domestic hot water
Brown (9) - Permanent live
Blue (10) - Neutral

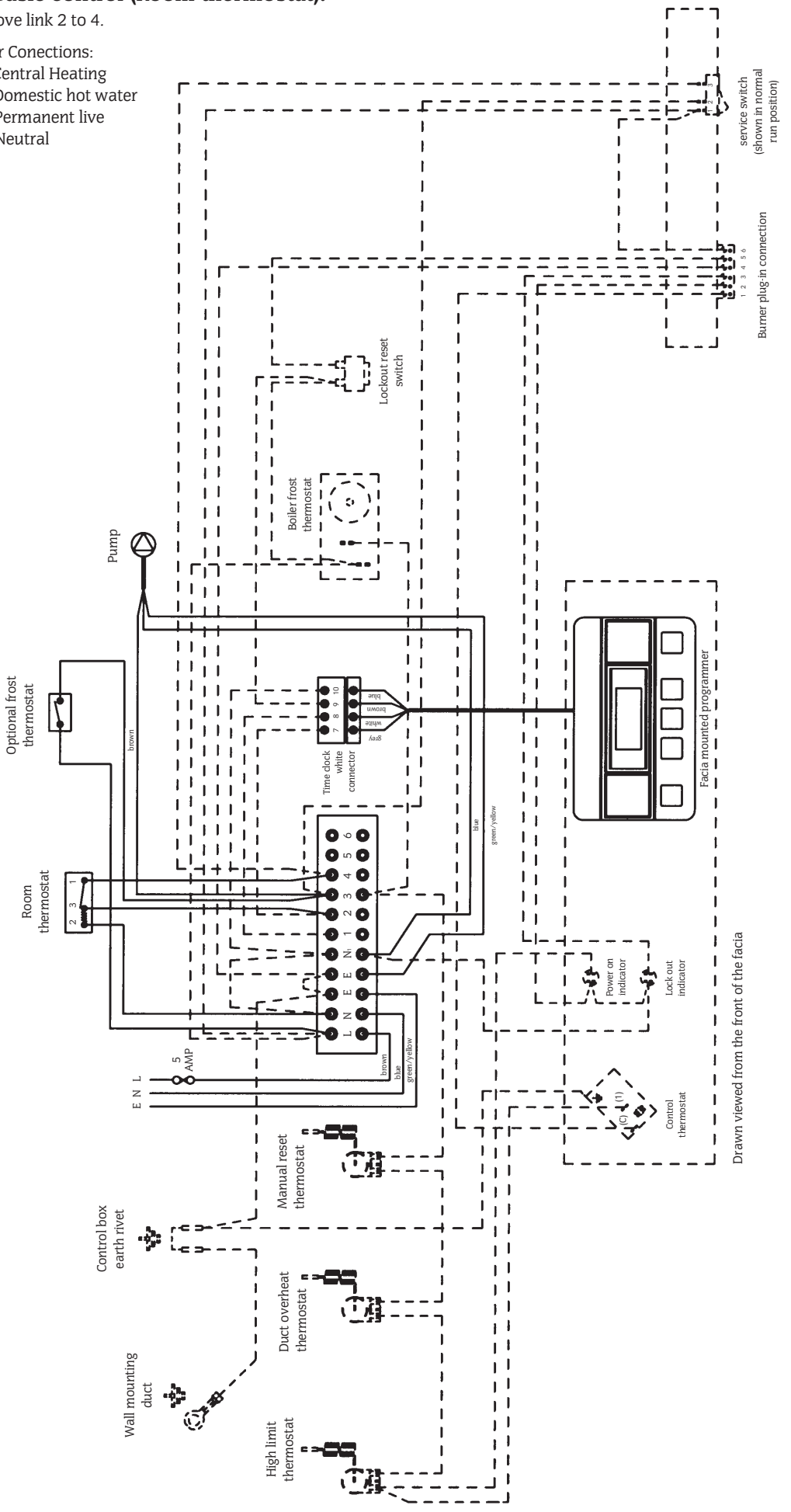


Fig. 17. Honeywell 'Y' Plan - external programmer.

NOTE: Remove link 2 to 4.

NOTE: Honeywell wiring centre (Part No. 42005748-001) should not be used.

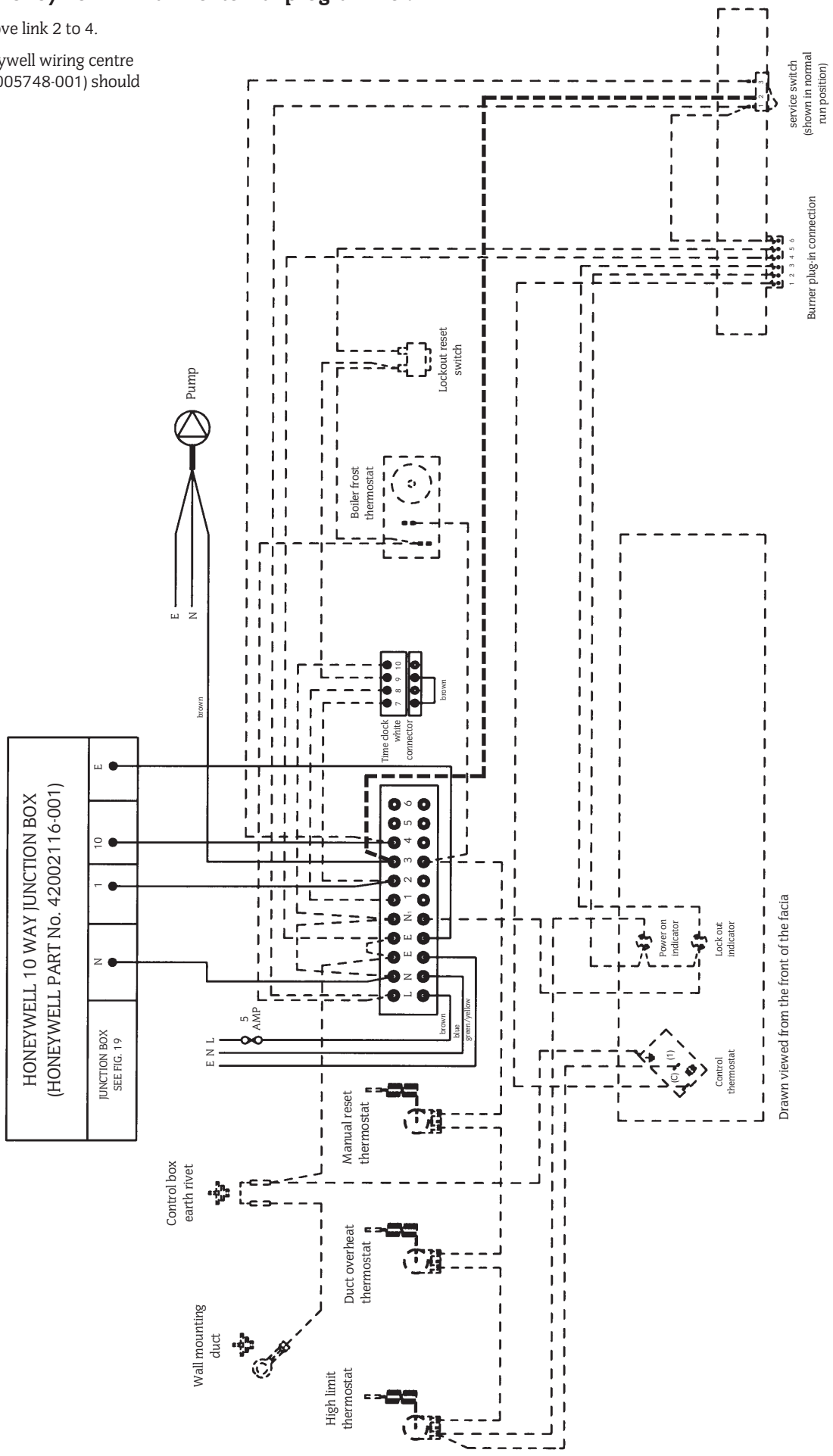


Fig. 18. Honeywell 'Y' Plan - facia mounted programmer.

NOTE: Remove link 2 to 4.

Remove orange wire from 9 and relocate to 6.

Set the switch on the rear of the programmer to "P".

Wire from "L" to Honeywell junction box connection 1 only required if the optional frost thermostat is fitted.

NOTE: Honeywell wiring centre (Part No. 42005748-001) should not be used.

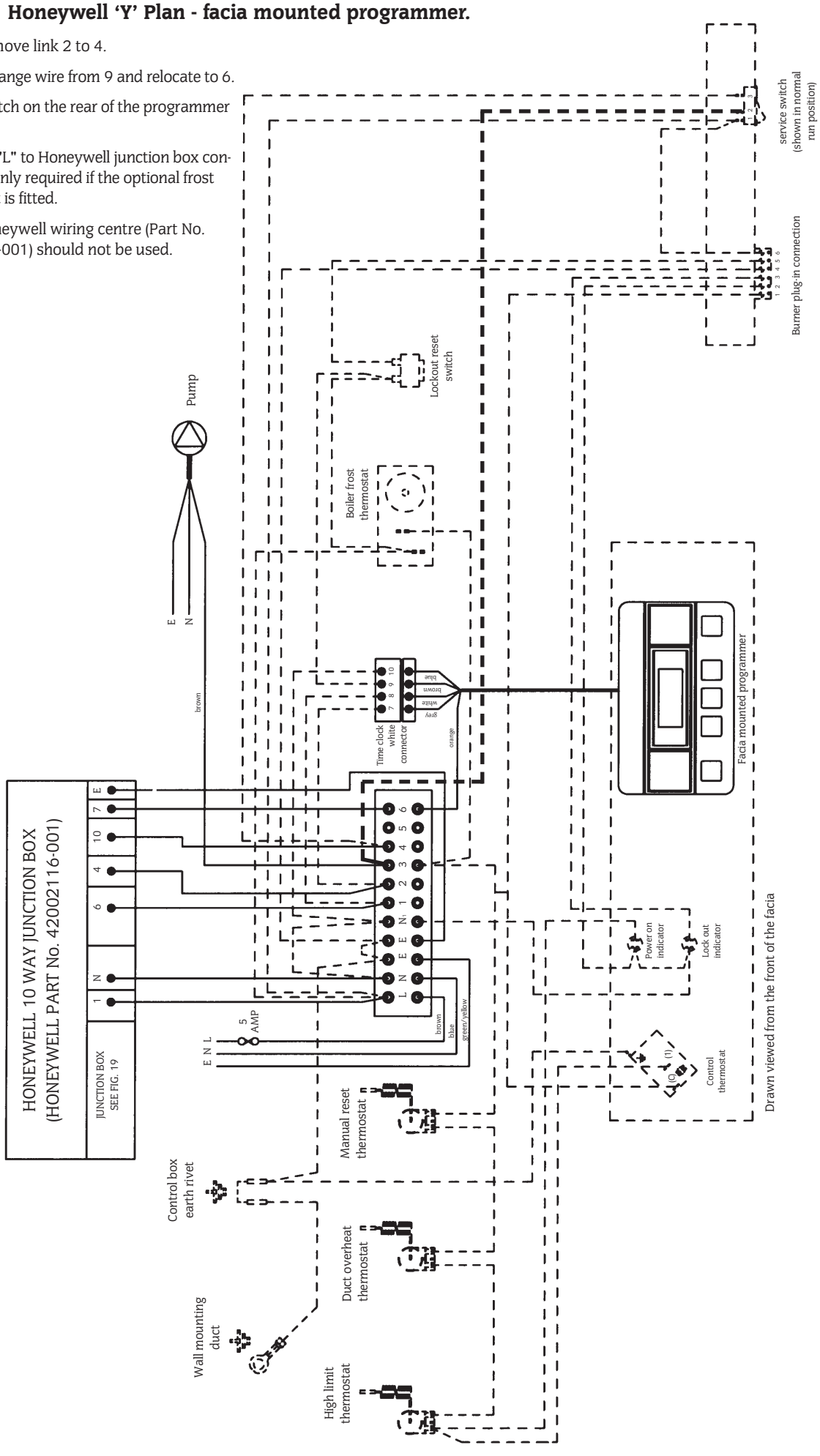
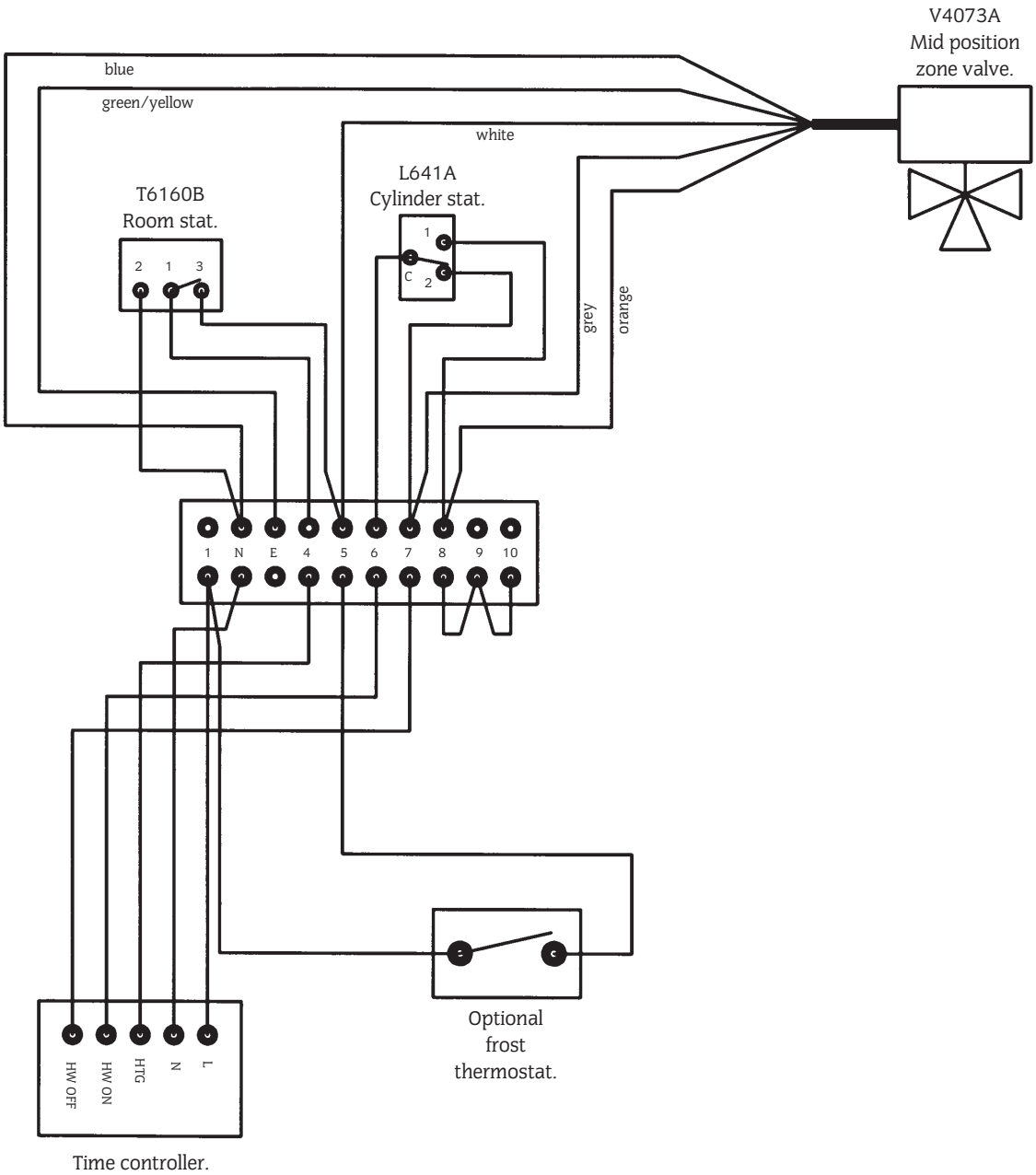


Fig. 19. Honeywell 'Y' Plan - 10 way junction box.



NOTE: When using a Worcester facia mounted programmer do not wire in this time controller. Wire as shown in Fig.18.

Fig. 20. Honeywell 'S' Plan - external programmer.

NOTE: Remove link 2 to 4.

NOTE: Honeywell wiring centre (Part No. 42005748-001) should not be used.

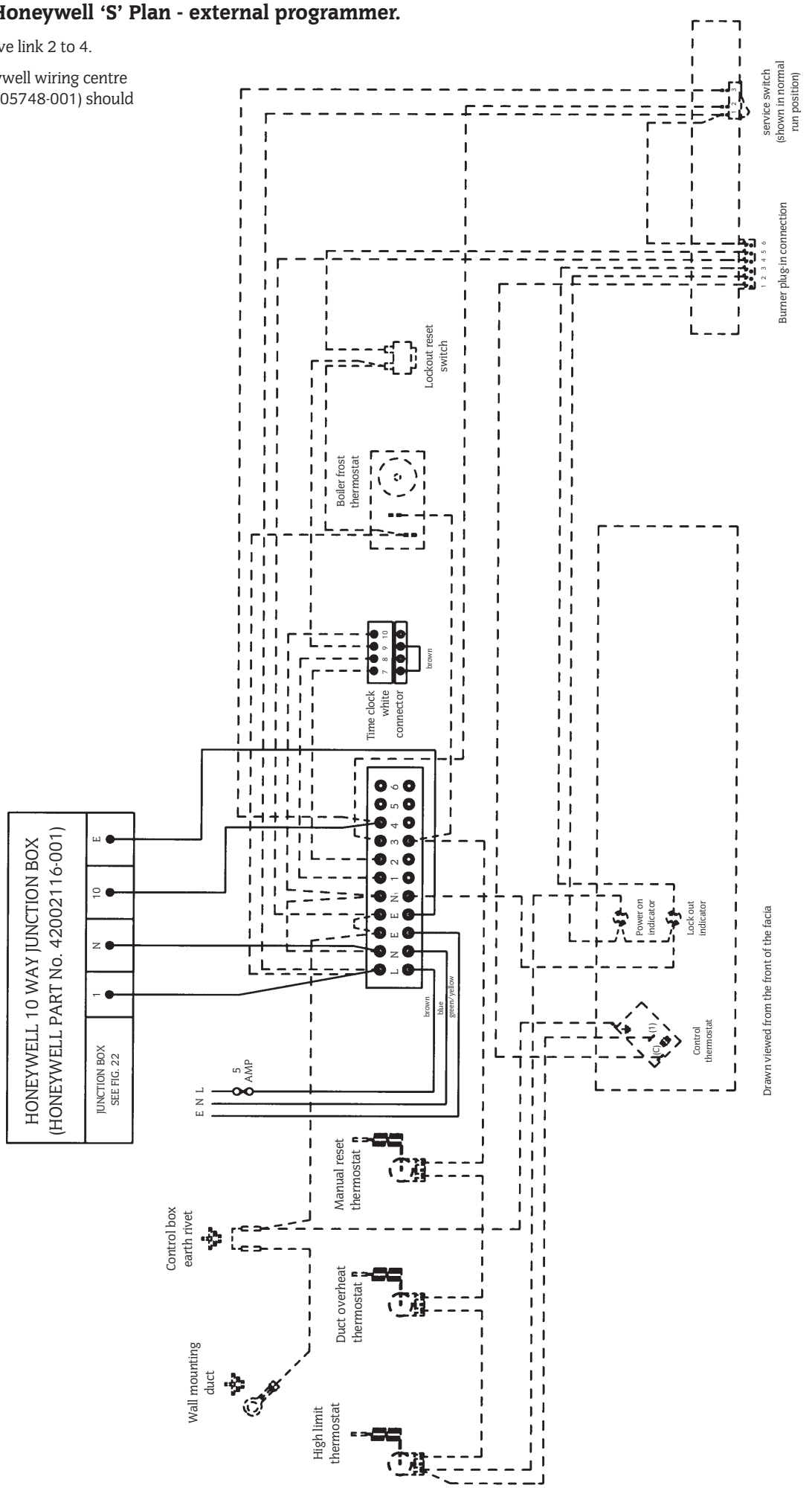


Fig. 21. Honeywell 'S' Plan - facia mounted programmer.

NOTE: Remove link 2 to 4.

Set the switch on the rear of the programmer to "P".

NOTE: Honeywell wiring centre (Part No. 42005748-001) should not be used.

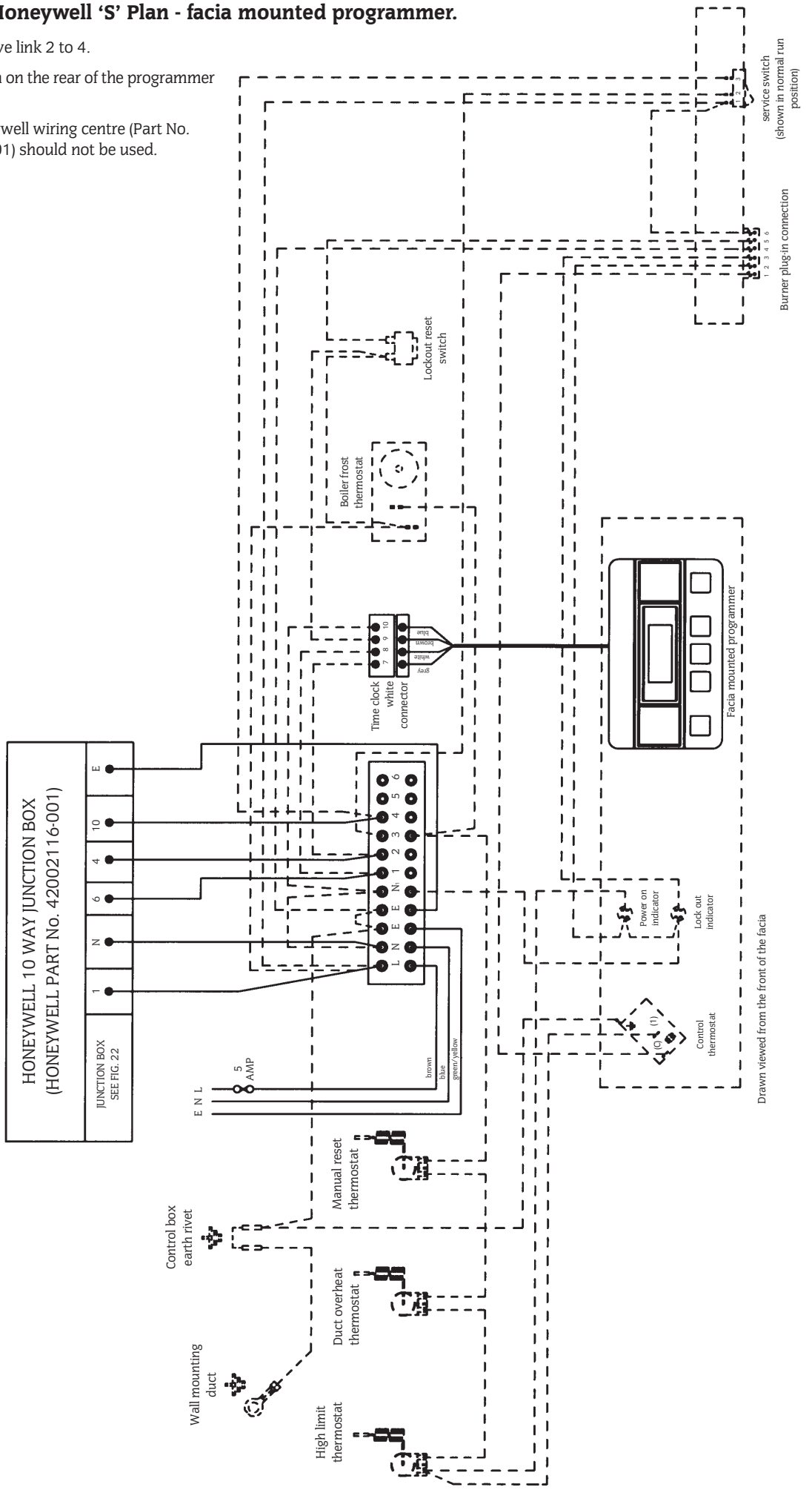
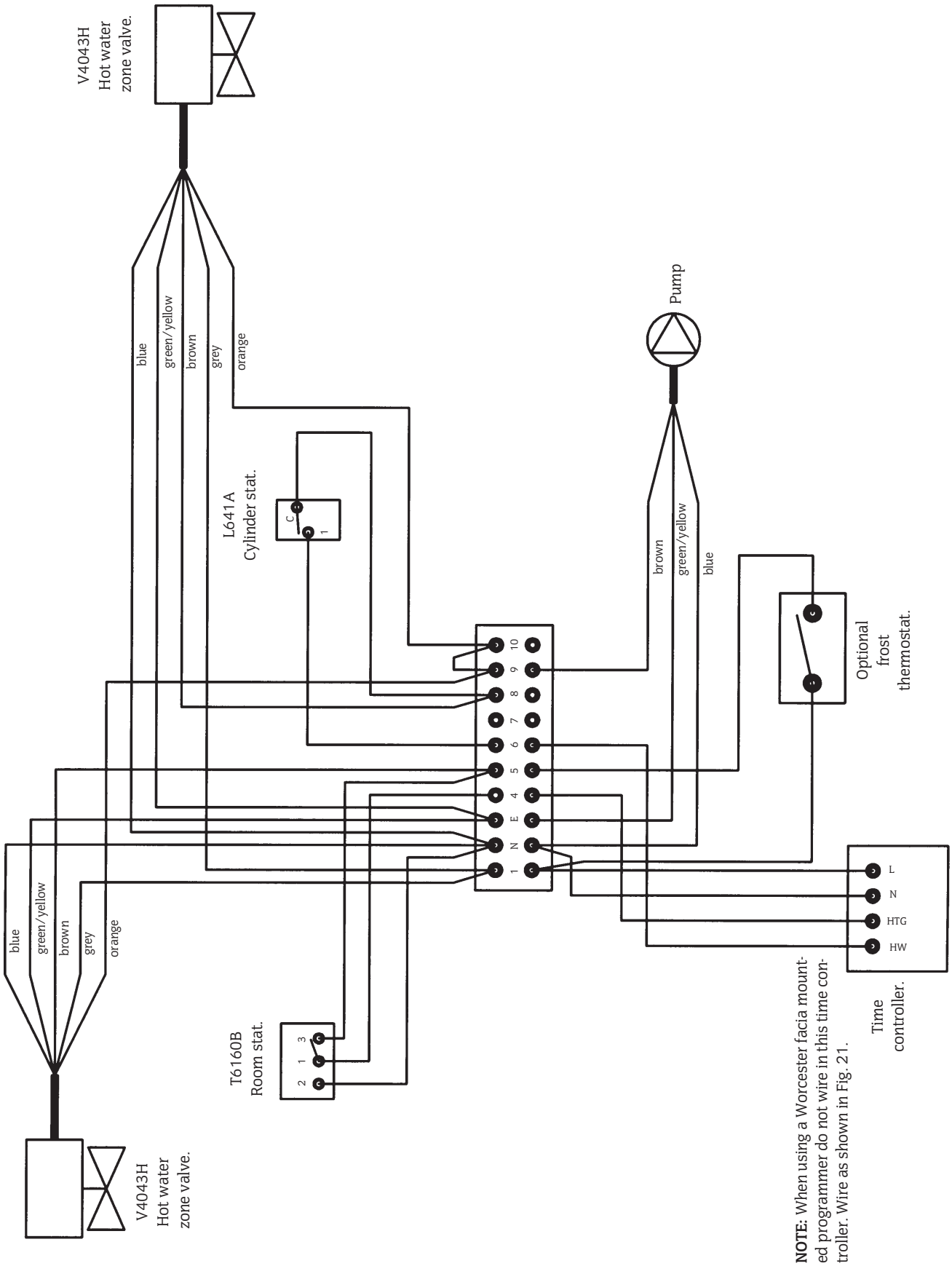


Fig. 22. Honeywell 'S' Plan - 10 way junction box.



NOTE: When using a Worcester facia mounted programmer do not wire in this time controller. Wire as shown in Fig. 21.

11. Installation

The Wall Mounted appliance is installed within the wall of the property and is serviced from outside the property, but the engineer must have access to inside of the property when servicing the appliance.

The appliance must be installed on a load bearing external wall with a wall thickness ranging from 102 mm (4 inches) to 460 mm (18 inches).

It is recommended the appliance should only be installed where outside the property the maximum height from the bottom of the appliance is 1.5 metres above a suitable hard standing from which servicing and maintenance can be safely carried out.

WARNING: The appliance is serviced and repaired externally. External equipment operated at 230volts should not be serviced or repaired under adverse weather conditions.

11.1 After unpacking the appliance it is recommended it is disassembled in the following order ensuring all parts are stored in a safe place. Refer to figs. 2 and 3.

1. Remove the white cabinet, as described in Section 5, and store in a safe place to avoid damage during installation and to allow easy inspection for any leaks after the system has been filled.

2. Remove the external cover by undoing the two fixings underneath, then pull the bottom of the cover so it clears the bottom of the external duct/flue, lift up to release the two locating tabs from top of the duct and store in a safe place.

3. Remove the telescopic flue by undoing the two wing nuts and washers holding the flue to the insulation box and store in a safe place.

4. Remove the burner electrical plug lead from the external control box by depressing the two locking ears and pulling the plug downwards.

5. Remove the burner from the boiler by slackening the 5 mm retaining screw located to the left of the burner control box. This will require the use of a 4 mm hexagon driver. See fig. 3.

6. The insulation box is removed by undoing the four M8 wing nuts and washers. Holding the burner mounting flange, pull the insulation box out far enough until you can get a hand underneath, remove and store in a safe place. Care must be taken when the insulation box is removed, not to cause damage to the insulating material or the external duct.

7. Remove the baffle by lifting slightly to clear the baffle retainer and pulling forward.

8.Central Heating Control and Automatic High Limit Thermostats (See fig. 2)

Remove the split pin from the thermostat phial pocket located in the front, right hand side of the boiler. Carefully withdraw the control and automatic high limit thermostats from the pocket noting their positions.

9. Manual Reset overheat, Manual Reset Duct and Frost Thermostats (See fig. 2)

Carefully lift the phial retaining springs so the thermostats can be pulled out from the springs noting their positions.

10. Place cloth or cardboard underneath the heat exhanger inside the external duct to prevent damage to the surface of the duct when removing the heat exchanger. Remove three of the four M6 nuts/washers leaving only the bottom left nut and washer in place. Pushing on the bottom of the heat exchanger remove the remaining nut and washer. Slowly release the heat-exchanger allowing it to hang on the top two mounting studs. Remove the heat exchanger by lifting upwards to release from the two mounting studs. Place the heatexhanger on it's back taking care not to damage the threaded studs.

11. Undo the two screws on the external control box. Pull down the service switch assembly taking care not damage the wiring. Pull off the earth spade connector that is connected to the external control box at the service switch end.

12. Remove the two 'D' shaped grommets from the back of the external control box and wall mounting duct (See fig. 25).

13. Remove the internal control box by undoing the two screws holding the facia to the internal control box and pivot the facia down.

14. There is an earth loom that connects the internal control box to the wall mounting duct, release the wire from the earth rivet inside the internal control box and push back through the hole in the back of the internal control box.

15. Undo the two remaining screws holding the internal control box to the boiler. Carefully pull the internal control box out of the appliance and store in a safe place.

16. Remove the external duct from the wall mounting duct and store in a safe place.

17. Remove the Wall Mounting duct from the pallet by undoing the nuts and bolts holding it to the pallet. The two transit ties can be removed or turned so that they are in the vertical position next to the wall mounting duct to allow installation of the duct.

11.2 Mounting of the Wall Mounting Duct

There are two possible options:

(a) Align the internal cabinet with existing room units or features.

(b) Align the duct with the external brick courses.

1. Hold the **wall mounting template** up on the inside wall to the desired position. The cabinet outline is shown by the dotted line. When the position is correct tape the template to the wall.

2. At the pilot hole position on the template drill through to the outside wall. Measure the position from the centre of the pilot hole 191 mm above and below, to indicate the duct position and mark on the outside wall.

If using method (a) go to 11.2.5

If using method (b) proceed as follows:

3 If the edge of the duct position does not align itself with the mortar move the bottom edge of the duct up or down depending which is the most desired position with reference to the position of the appliance on the inside wall.

4. Measure 382 mm from the bottom edge to the top edge of the duct position. Check to see if this aligns with the mortar and make any adjustments that may be required. Go inside the property and adjust the template position by the amount it has been adjusted outside.

5. Draw a line for the top and bottom edge on the external wall and then measure 191 mm from the pilot hole to the left and right to indicate the side positions.

There should now be a square profile of 382 by 382 mm. Add 5 to 10 mm around the edge of the profile to allow enough clearance to insert the duct.

6. Inside the property with the template in position mark the mounting bracket hole positions. There are two possible positions for each screw use the outside position (A) if possible.

7. Mark out the duct position on the inside wall. There should now be a square profile of 382 by 382 mm. Add 5 to 10 mm around the edge of the profile to allow enough clearance to insert the duct.

8. Using a 10mm drill bit, drill the 4 holes required for mounting the wall mounting duct. There are two possible positions for each screw use the outside position (A) if possible.

9. Cut the hole in the wall.

10 The Wall mounting brackets are mounted to the duct in the standard 315mm position so the internal cabinet will be flush with a 300 mm deep kitchen unit; as shown in fig. 24a. If the householder requires the appliance to be installed within a 300 mm kitchen unit the M6 nuts and washers must be removed from the studs holding the wall mounting brackets to the wall mounting duct. Reassemble in the optional 285mm position as shown in fig. 24b.

11 Mount the wall mounting duct to the wall using the raw plugs and screws provided.

12 Check the that the wall mounting duct is level using a spirit level from front to back and left to right. Adjust as necessary so that the duct is level.

NOTE: It is important the wall mounting duct is level or sloping slightly downwards towards the outside of the property.

11.3 Reassembling the Appliance

1. From the outside of the property carefully insert the external duct into the wall mounting duct with the oil connection block on the bottom edge of the duct.

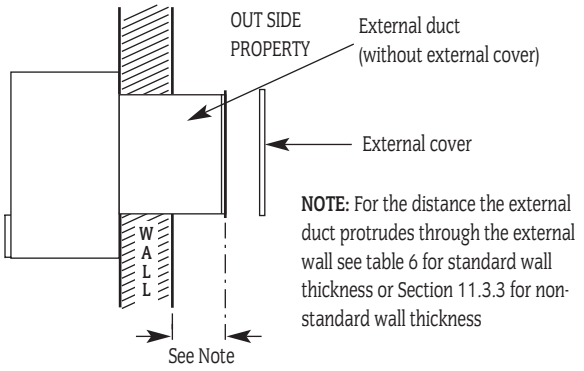
2. The wall thickness determines how far out of the outside wall the external duct protrudes. Set the external duct position by using table 6, fig. 4 and 23.

Table 6. With the external cover removed the minimum distance the external duct protrudes from the external wall for standard wall thickness.

Wall Thickness		Distance External Duct Protrudes	
(mm)	(inches)	Standard 315mm Position	Optional 285mm Position
102*	4*	140	N/A
229	9	120	150
296	12	60	90
460	18	45	45

* Using the Stand-off kit for a 4 inch wall.

Fig. 23. Distance the external duct protrudes the external wall.



3. For a non-standard wall thickness which does not correspond to table 6, fig. 4 and 23 proceed as follows:

Cabinet depth in the standard 315mm position

(a) Non-standard wall thickness within the range of 121 to 313mm the overall distance **(X),** as shown in fig. 25, from the end of the wall mounting duct inside the property to the end of the external duct outside the property should be set at 630mm.

(b) Non-standard wall thickness within the range of 314 to 460mm ensure the external duct protrudes from the property by 45mm.

Cabinet depth in the optional 285mm position

(a) Non-standard wall thickness within the range of 151 to 343mm the overall distance **(X),** as shown in fig. 25, from the end of the wall mounting duct inside the property to the end of the external duct outside the property should be set at 630mm.

(b) Non-standard wall thickness within the range of 344 to 460mm ensure the external duct protrudes from the property by 45mm.

4. Pack the external duct in the desired position to prevent movement in assembly. Check the external duct is level or slightly sloping downward towards the outside of the property using a spirit level. In the event of an oil leak this will prevent oil entering the property.

5. Place the wall trim 'U' section over the top of the external duct as shown in fig. 3. Bend the tabs at the top of the 'U' section if loose to ensure a tight fit. (See fig. 3.)

6. Insert the N°6 screws provided into the remaining section of wall trim.

7. Place the bottom section screw side down in behind the 'U' section, slide the screws into the slots and tighten the screws to secure in place.

8. Mount the external cover onto the external duct ensuring that the tabs fit over the lip of the external duct. Check that the cover fits correctly. Make any necessary adjustments to the external duct. Remove the cover and wall trim being careful not to move the external duct.

NOTE: Ensure a minimum gap of 5mm (see fig.6) between the external cover and wall trim to allow sufficient air to enter the appliance for combustion .

9. To fasten the external duct to the wall mounting duct use the locating holes in the back of the external duct to drill four 3mm holes into the wall mounting duct (see fig. 25). Using the N°6 screws provided, screw the external duct to the wall mounting duct. Check that the external duct when fastened in place is level or sloping downwards towards the outside of the property, using a spirit level. In the event of an oil leak this will prevent oil entering the property.

NOTE: It is important the external duct is level or sloping slightly downwards towards the outside of the property.

10. Using the sealant provided, completely seal the joint on all four sides between the wall mounting duct and the external duct from the inside of the property (see fig. 25).

NOTE: It is imperative that the joint between the wall mounting duct and the external duct is completely sealed to prevent oil or combustion gases entering the wall cavity in the event of a leakage.

11. Slide the internal control box back into position, ensuring the wall mounting duct earth lead is connected back into the internal control box. Connect the earth lead to the earth spade connector. The main harness is routed up the left hand side of the internal control box in the gap between the control box and the wall mounting duct (see fig. 2). Screw the internal control box to the wall mounting duct using the two screws provided.

12. Using the two screws provided fasten the facia to the internal control box.

13. Connect the earth lead to the service switch assembly and using the two screws provided fasten the service switch to the external control box on the external duct (see fig. 3).

There are two grommets on the main harness, slide the 'D' shaped grommets along the cable, fit one into the 'U' shaped slot on the rear of the external control box and the other into the 'U' shaped slot on the wall mounting duct. It is imperative that the 'D' shaped grommet is pushed fully in position on the wall mounting duct as failure to do so might cause damage to the main harness when the heat exchanger is mounted on the appliance. Ensure that the main harness does not sag by pulling gently on the cable when in position to take up the slack (see fig. 25).

14. Take up any slack on the main harness inside the wall mounting/external duct by gently pulling the main harness at position shown in fig. 25.

WARNING: It is imperative the main harness inside the wall mounting/external duct is not sagging. This will prevent the main harness being trapped behind the insulation box.

15. Put cloth or cardboard on the inside on the external and wall mounting duct to protect the surface while installing the heat exchanger.

16. Check the wall mounting duct seal as shown in fig. 25. It is important that this seal is in good condition, replace if damaged.

17. Pick up the heat exchanger and place inside the duct.

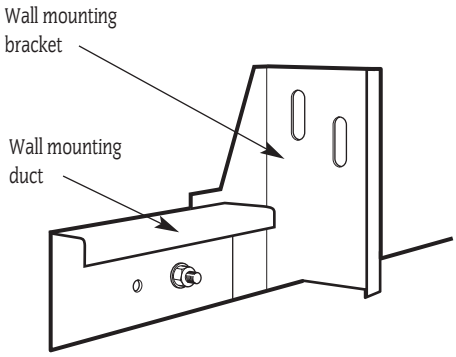
18. Lift from the bottom so that the flow and return tapings clear the top of the duct. Push onto the two studs at the top of the wall-mounting duct so they protrude through the two holes in the heat exchanger. Screw a M6 nut and washer onto each of the top two studs, do not tighten.

19. Push the bottom of the heat exchanger onto the two bottom studs and screw the remaining two M6 nuts and washers onto the bottom studs. Tighten the four nuts to secure the heat exchanger to the wall mounting duct.

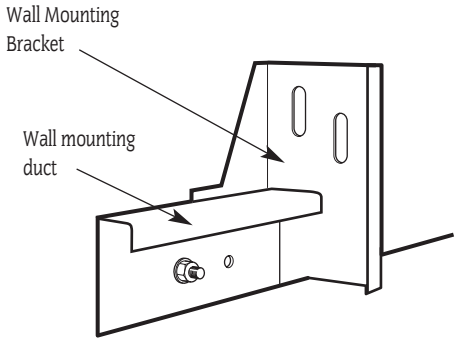
20. Replace the thermostat phials in their original positions taking care not to kink the capillaries. They must be positioned so the application or removal of the cabinet won't damage the capillaries.

21. Position the boiler drain tube which is connected to the drain valve down the back of the internal control box.

Fig. 24. Wall mounting bracket positions.

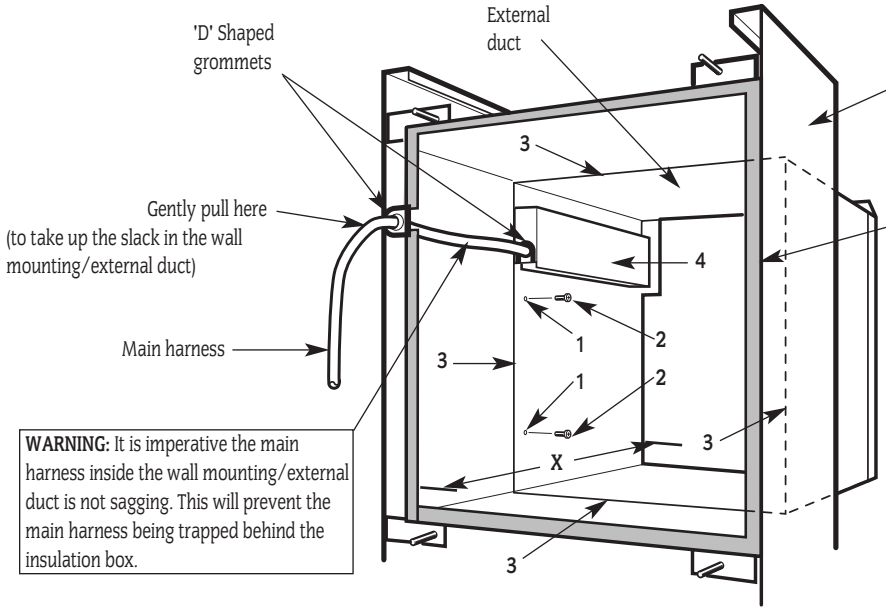


(a) Standard 315mm Position



(b) Optional 285mm Position
(for fitting appliance within a 300mm unit)

Fig. 25. Wall mounting duct / external duct assembly.



1. Two location holes each side to fasten the wall mounting duct to the external duct.
2. N°6 locking screws
3. Completely seal the joint on all four sides between the wall mounting duct and the external duct with the sealant provided.
4. External control box

Fig. 26. Baffle location.

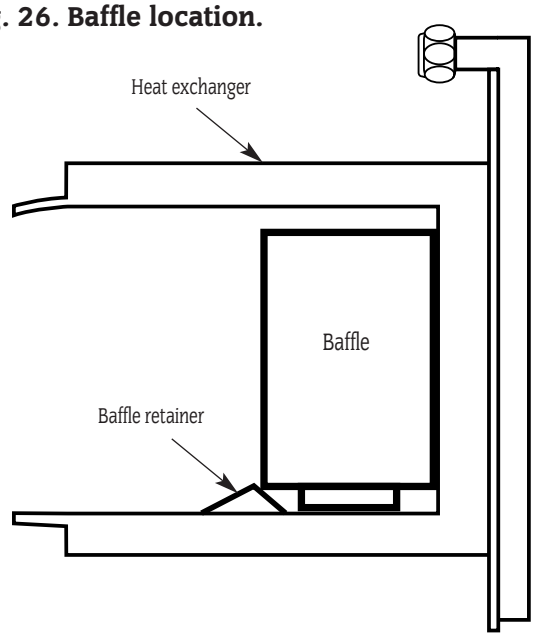
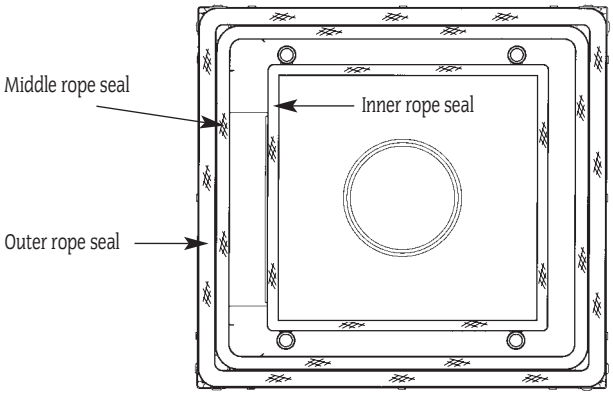


Fig. 27. Insulation box rope seals.



22. Insert the baffle into the heat exchanger ensuring the baffle is pushed hard against the back of the heat exchanger (see fig. 26).

23. Check the three rope seals in the insulation box as shown in fig. 27, adjust if necessary or replace if damaged. Push the insulation box on to the heatexhanger and tighten up using the four M8 wing nuts and washers provided.

24. Insert the burner into the burner-mounting flange.

25. Remove the wall trim and pack the gaps between the outside wall and external duct with cement. Refit the wall trim as described previously making any necessary adjustments to ensure the trim is a tight fit around the external duct before the cement sets. It is recomended that a bead of silicone sealant is applied around the duct to the cement joint before fitting the wall trim. If required apply silicone sealant to the back of the wall trim to aid fixing to the wall.

26. Pack the gaps between the inside wall and the wall mounting duct with cement.

11.4 Heating system installation.

1. Plumb the boiler into the central heating system.

2. Fill the system and vent all radiators and high points to remove air from the system.

3. Check the boiler and all pipework connections for leaks.

4. The primary system should be flushed and treated in accordance with the recommendations of BS 7593:1992.

11.5 Oil supply installation

(See figs. 9 to 11)

(a) Double pipe system

1. Disconnect the two flexible lines from each other and remove the 1/4 inch nipple. Connect the two 1/4 inch nipples and copper washers to the connection block. Ensure the conical end protrudes from the connection block. Connect the flexible oil line that is connected to inlet on the oil pump to the 1/4 inch male inlet fitting on the connection block. Connect the flexible oil line that is connected to return on the oil pump to the 1/4 inch male return fitting on the connection block. (See fig. 11)

2. The oil pipes from the oil supply tank should be routed tidily up the external wall of the property and connected into the connection block. The connection block has two female 1/4 inch BSP fittings for connection to either a 10mm or 12mm compression to 1/4 inch BSP mail fitting.

Note: On a double pipe system it generally not possible to check for leaks due to the position of the oil supply tank, therefore, use the oil pump as described in Section 12 and remove and clean the oil pump filter to remove any debris collected as a result of installation.

(b) Single pipe system

1. Disconnect the two flexible lines from each other and remove the 1/4 inch nipple. Remove the flexible oil line which is connected to the return on the oil pump and convert the burner to a single pipe system, see fig. 10 (Section 8 Oil Supply). Insert the 1/4 inch plug into the return port on the oil pump. Connect the 1/4 inch nipple and copper washer to the inlet on the connection block. Ensure the conical end protrudes from the connection block. Connect the flexible oil line which is connected to inlet of the oil pump to the 1/4 inch male inlet fitting on the connection block.

2. The oil pipe from the oil supply tank should be routed tidily up the external wall of the property and connected into the connection block. The connection block has two female 1/4 inch fittings for connection to either 10mm or 12mm compression to 1/4 inch mail fitting. Ensure the oil pipe from the oil supply tank is connected to the inlet connection only on a single pipe system.

3. Open the main oil supply valve at the tank and check for any leaks.

4. Remove the flexible oil line from the inlet of the oil pump and place in a suitable container. Open the isolating valve between the oil filter and burner.

5. Draw off at least 2.5 litres of oil until a steady flow of clear uncontaminated oil can be seen and turn off the isolating valve.

Note: never use soldered joints on oil supply pipes as this could cause a hazard in the case of a fire.

11.6 Flue Installation

1. Attach the telescopic flue to the insulation box with the two wing nuts and washers.

2. Set the approximate flue length by sliding the flue locating slot onto the tab which protrudes from the external duct.

3. Fit the external cover and insert two fixing screws and washers, do not tighten.

4. Adjust the flue so the end protrudes through the external cover ensuring the seal and splash plate are hard up against the external cover to prevent water ingress (see fig. 7).

5. Remove the external cover being careful not to knock the flue.

6. Tighten the telescopic section of the flue and re-fit the external cover onto the appliance.

7. Check to see the flue protrudes through the cover, ensuring the seal and splash plate are hard up against the external cover to prevent water ingress and make any necessary adjustments (see fig. 7).

Note. Ensure the splash plate/seal on the end of the flue is hard up against the external cover. Ensure the tab on the external duct protrudes through the locating slot.

8. Remove the external cover and remove the complete flue system by undoing the two wing nuts and washers holding the flue to the insulation box.

9. Using the sealant provided seal the two sections of flue together all the way round to prevent the recirculation of flue gases from the flue to the burner inlet.

10. Attach the telescopic flue to the insulation box with two wing nuts/washers and make any necessary adjustments before the sealant sets.

12. Commissioning the Appliance

WARNING: This appliance is serviced and repaired externally. External equipment operated at 230volts should not be serviced or repaired under adverse weather conditions.

Ensure that no foreign matter is left in the system as this could cause damage to the appliance.

12.1 Check that the electrical supply to the appliance is switched off.

12.2 When commissioning the appliance after initial installation follow the procedure from 12.3, otherwise remove the burner first as described in Section 14.3.

12.3 Prepare the heating system

1. After initial installation and checking for leaks, as previously described, drain down the system sufficiently to add a flushing agent. Flush the system in accordance with BS 7593:1992.

2. Refill the system.

12.4 Check the installation

1. Check the appliance is correctly wired as described in Section 10.

2. Check the baffle is correctly located making sure it is pushed hard up against the back of the heat exchanger as shown in fig. 26.

5. Ensure the rope seals are in good condition (see fig. 27) and the insulation box is mounted correctly onto the heat exchanger, as shown in fig. 3.

6. Check the control thermostat and auto reset high limit thermostat phials are correctly located in the boiler thermostat pocket positioned in the top right hand side of the boiler (see fig. 2).

7. Check the manual reset limit thermostat is located in the phial retaining spring on the top left hand side of the heatexhanger (see fig. 2).

8. Check the Duct thermostat is located in the phial retaining spring on the top of the wall mounting duct as shown in fig. 2.

9. Check the frost thermostat is located in the phial retaining spring on the bottom left hand side of the heatexhanger (see fig. 2).

10. Check all of the air-ways to the burner are clear of any obstruction.

12.5 Check the Burner

1. Hang the burner on the burner hanging bracket situated on the bottom left hand side of the external duct (see fig. 30).

2. Check the nozzle and electrode settings are correct for the burner (see fig. 28).

3. Check the nozzle lies central with the combustion head hole.

4. Check for any visible defects.

12.6 Replace the burner

1. Check the burner flexible oil lines are connected correctly to the connection block, as shown in figs 9 to 11and in Section 11.5 Oil supply installation.

2. With the sponge O-shaped gasket around the burner blast tube insert the burner into the burner mounting flange ensuring the cut out in the gasket lines up with the burner retaining screw. Push the burner firmly forward to compress the gasket and tighten the burner retaining screw located to the left of the burner control box using a 4mm hexagon driver.

Note: It is important that a good seal is made between the burner and the boiler to prevent re-circulation of flue gases from the combustion chamber to the burner inlet.

3. Re-connect the burner electrical plug lead into the external control box.

12.7 Fit a pressure gauge and manifold to the burner pump at the point indicated in Fig. 10.

12.8 Switch the service switch to the 'OFF' position (see fig. 29).

12.9 Turn on the electricity to the appliance.

12.10 Bleed the burner

Two Pipe System

A two pipe system will automatically vent the air back to the oil tank but it is recommended to use the single pipe system method of bleeding the burner as descibed below to quicken the removal of air from the inlet oil line. Set the programmer to **heating and hot water** and turn on the boiler thermostat. Switch the service switch to 'RUN' position as shown in fig. 29 and allow the burner to run through to lockout. Reset the burner control box and repeat the procedure until the burner fires and runs in a steady state. This may take several attempts depending on the oil pipe length and height.

Single pipe systems only

Release the fuel bleed port on the manifold and place a suitable receptacle beneath. Set the programmer to **heating and hot water** and turn on the boiler thermostat. Switch the service switch to 'RUN' position as shown in fig. 29 and allow the burner to run through to lockout. Reset the burner control box and repeat the procedure at least three times or until a steady stream of oil, without air, is exhausted from the bleed port. Re-lock the bleed port.

12.11 Adjust the air shutter and pump pressure to the settings recommended in Table 2. After a pre-ignition period of approximately 15 seconds the burner should ignite. Flame sensing is carried out by means of a photocell mounted in the burner body. Should the boiler fail to establish a normal firing pattern (or should flame failure occur during running), the absence of a flame is sensed and the control box is monitored to a safe lockout condition and the boiler is shut down. The lockout indicator light in the boiler control panel will illuminate and the reset button on the burner control box will continue flashing indicating that the burner has gone to lockout. In this instance press the lockout reset button mounted in the burner control box. Another start sequence is then initiated. Repeat the procedure until a flame is established.

Note: Persistent lockout when running indicates a fault and a Service Engineer should be consulted.

12.12 Run the boiler for approximately 3 minutes and switch off using the service switch checking that there is no after-spurting from the nozzle. This can be detected by oil saturation on the blast tube. If after-spurting occurs remove the burner from the boiler, unscrew the nozzle, and while holding the burner in a vertical position, fill the nozzle holder with oil. Refit the burner and continue to run the boiler for three minute periods until after-spurting stops.

12.13 Run the boiler for a further 15 minute period and then finally fine tune the air shutter setting to give the CO_2 level specified in Table 2 less 0.5% CO_2. During this period some smoke will be emitted due to the burning of the organic binder in the insulation box. Smoke readings will therefore be inaccurate at this point.

Note: Flue gas sampling is taken with the probe or smoke pump positioned in the flue centrally by approximately 150mm.

12.14 Check that the smoke reading is in the range 0-1. If this cannot be achieved then check that the burner head is set correctly and the nozzle is in good condition.

12.15 Check that the flue temperature does not exceed the value specified in Table 2. If this is the case then check that the baffle is correctly located. If the baffle is correctly located then reduce the pump pressure since nozzle variations of up to + or –15% may occur.

12.16 Remove the oil pressure gauge and manifold and check all oil system joints for any signs of leakage.

NOTE: Check that the oil hoses do not touch hot surfaces.

12.17 Refit the external cover in reverse order to that described in Section 5.

12.18 Allow the burner to run for a further five minutes and then recheck the CO_2 level and adjust the air setting if required.

12.19 When the heating circuit has reached full operating temperature check the whole system for any leaks.

12.20 Refit the cabinet inside the property in reverse order to that described in Section 5.

12.21 Locking the Boiler

Provision has been made to lock the external cover to the burner hanging bracket using a padlock. A suitable padlock is the P73 manufactured by Yale Security Products, or use a padlock which has 20 to 22mm between the two centres on the shackle and 15 to 20mm between the body and inside of the shackle. A slot and hole have been provided underneath the external cover to fasten the cover using a padlock.

NOTE: After commissioning the appliance the engineer should position the service switch in the **RUN** position as shown in fig. 29.

13. Instructions to the User

13.1 Hand the users instructions to the user or purchaser for retention and instruct them in the efficient and safe operation of the appliance and the heating/hot water system.

13.2 Advise the user or purchaser of the precautions necessary to prevent damage to the heating/hot water system and to the building in the event of the heating system remaining inoperative during frost conditions.

13.3 Finally advise the user or purchaser that for continued efficient and safe operation of the appliance it is important that adequate servicing is carried out by a qualified engineer at least once per year.

13.4 Worcester, Bosch Group will be pleased to discuss and offer a comprehensive maintenance contract.

Set the system controls to the users requirements.

14. Routine Cleaning and Inspection

WARNING: The appliance is serviced and repaired externally. External equipment operated at 230volts should not be serviced or repaired under adverse weather conditions.

14.1 The following should be carried out at least once per year to ensure efficient, trouble free operation.

NOTE: The service engineer should have access to the property to check for system faults and reset/replace electrical safety devices.
NOTE: The service engineer should take any necessary precautions to protect him/herself and any third party against hot surfaces on the appliance.

1. Carry out a pre-service check noting any operational faults.
2. Check and clean the burner.
3. Check and clean the air intake inlets around the external cover and duct.
4. Check that the flue system is unobstructed and clean as necessary.
5. Check and clean the insulated box.
6. Check and clean the baffle.
7. Check and clean the heat exchanger surface.
8. If the appliance has been installed in a compartment check that the ventilation areas are clear.
9. Clean all oil filters.
Some of the servicing points are covered more fully in the following instructions:-

14.2 Pre-Service Check
1. Remove the internal cabinet as described in Section 5.
2. Remove the external cover and switch the service switch to the 'OFF' position (mid position) (see fig. 29).
3. Switch the service switch to the 'RUN' position (fully black) (see fig. 29) to operate the appliance and system, noting any faults which may need to be corrected during the service.
4. To override the programmer switch the service switch to the service mode (fully red) (see fig. 29 and Section 10.11).

14.3 Cleaning the Burner
IMPORTANT – Disconnect the electrical supply at the mains before commencing any servicing. Remove the burner electrical plug lead by depressing the two locking ears and pulling the plug downwards. Turn off the oil at the service cock.
1. Remove the burner.
(a) Isolate the oil supply at both the oil tank and the isolating valve between the burner and oil filter.
(b) Remove the burner electrical plug lead by depressing the two locking ears and pulling the plug downwards.
(c) Remove the burner from the boiler by slackening the 5 mm retaining screw located to the left of the burner control box This will require the use of a 4 mm hexagon driver.
(d) Hang the burner on the burner hanging bracket situated on the bottom left hand side of the external duct (see fig. 30).

2. Clean the fan impeller using the following procedure:
Electro-oil Inter B9 Burner
(a) Remove the two screws holding the combustion head in position and withdraw the combustion head.
(b) Remove the three remaining screws holding the front cover plate in position and withdraw the cover to expose the fan impeller.
(c) Clean both sides of the fan impeller and remove any debris from the burner housing.
(d) Check the impeller rotates freely.
(e) Clean the air inlet passage and check that the adjustment mechanism operates freely.
(f) Re-assemble the components.

5. Remove the combustion head and thoroughly clean all deposits.

6. Inspection of the Mechanical Shut-off Valve (See Fig. 31)
(a) Remove the nozzle.
(b) Fasten an M5 screw, with a minimum length of 30mm, into the threaded hole (A) and pull the screw to withdraw the check valve.
(c) Check the nozzle holder is clear of any debris and clean if necessary.
(d) Check the three holes in the check valve are clear of any debris. Discard the check valve if the holes cannot be cleared or if the unit is defective and replace with a new one.
(e) Reassemble in reverse order.

7. It is strongly recommended that the oil atomising nozzle be replaced at each service. If this is not possible then remove and clean the integral filter, but under no circumstances should the nozzle be stripped into its component parts and never attempt to clean the nozzle tip.

8. Check and reset the electrodes, where necessary, as shown in fig. 28.

9. Replace the combustion head and check that the nozzle lies central to the combustion head and the head settings are as shown in fig. 28.

10. Withdraw the photocell from its housing and clean.

11. Remove and clean the oil pump internal filter using kerosene or white spirit. The internal filter is accessed by removing the oil pump cover on the Suntec AS47C and by unscrewing and withdrawing the cartridge on the Danfoss BFP 41 as indicated in fig. 10.

12. It is recommended that the standard flexible oil lines are replaced at each yearly service to prevent the possibility of a leak due to ageing.

13. Re-assemble the burner components.

14. Check the sponge O-shaped gasket located around the combustion head and replace if necessary. It is imperative that this seal is in good condition since failure will cause the combustion gases to be re-circulated into the burner inlet.

14.4 Remove the paper element from the external oil filter and replace. If the filter contains a washable element then thoroughly clean in Kerosene or white spirit and re-assemble into the filter.

14.5 Clean the Boiler.

NOTE: An electrical service lead can be fitted to the external control box enabling the service engineer to use a light or vacuum cleaner. The electrical service lead is available from Worcester, Bosch Group as an optional extra, Part Number 7 716 192 301.

1. Remove the telescopic flue by releasing the two wing nuts and washers, check and clean.
2. Check the condition of the seals on both the inlet and outlet of the flue system and replace if necessary.
3. Remove the insulation box by releasing the four M8 wing nuts and washers. Holding the burner-mounting flange, pull the insulation box out far enough until you can get a hand underneath and remove. Care must be taken when the insulation box is removed so as not to cause damage to the insulating material or the external duct.
4. Check the insulation box for any visible defects and replace if necessary.
5. Check the three rope seals as shown in fig. 27 and replace if necessary.
6. Vacuum the inside if the insulation box being careful not to damage the surface of the insulation.

NOTE: When cleaning the inside of the insulation box it is imperative that the surface of the insulation is not damaged, therefore, do not use abrasive tools or cleaning fluids on this component.

7. Remove the baffle, clean and check its condition. Replace baffle if considered to be badly corroded.

8. Thoroughly clean all of the heat exchanger surfaces using a stiff wire brush and vacuum clean all loose debris from the combustion chamber.

9. Replace the items in reverse order noting the baffle position shown in fig. 26.

14.7 Fire Valve.
Check that a fire valve is fitted to the incoming oil line with the body located at a minimum distance of 1 metre away from the appliance and the detection element is located within the external duct next to the burner. Two inline fire valve clips are provided

for this purpose on the base of the external duct to the right of the burner as shown in fig. 30.

14.8 Re-commission the Burner.

1. Connect the flexible oil supply hoses to the connection block as described in Section 11.5. The flexible oil line on the inlet to the oil pump goes to the inlet on the connection block and the flexible oil line on the return of the oil pump goes to the return on the connection block.

2. With the sponge O-shaped gasket around the burner blast tube insert the burner into the burner mounting flange ensuring that the cut out in the gasket lines up with the burner retaining screw. Push the burner firmly forward to compress the gasket and tighten the burner retaining screw located to the left of the control box using a 4mm hexagon driver.

Note: It is important that a good seal is made between the burner and the boiler to prevent re-circulation of the combustion gases from the combustion chamber to the burner inlet.

3. Reconnect the electrical lead plug into the external control box.

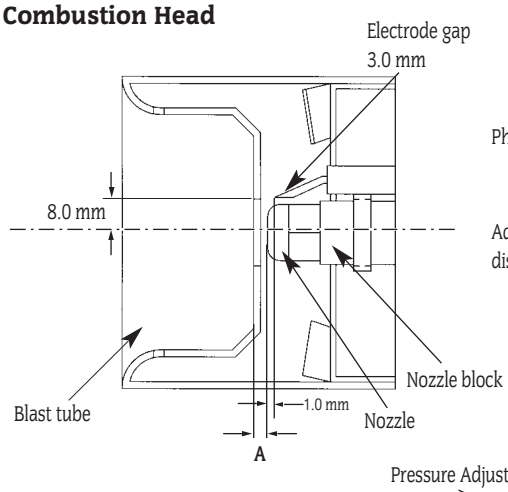
4. Turn on the oil supply at both the oil tank and between the burner and oil filter.

5. Re-commission the burner as described in Section 12.

NOTE: After commissioning/sevicing the appliance the engineer should position the service switch in the **RUN** mode as shown in fig. 29.

Fig. 28. Electro Oil Inter B9 Burner. (12/19 model)

Combustion Head



Output kW	Head Type	Dimension A
12/19	PL 6/7/21.5/10-E	4 mm

To adjust the nozzle position, undo the locking screw located at the rear of the nozzle line and rotate the adjusting disc one turn anti-clockwise to move forward by 1 mm.

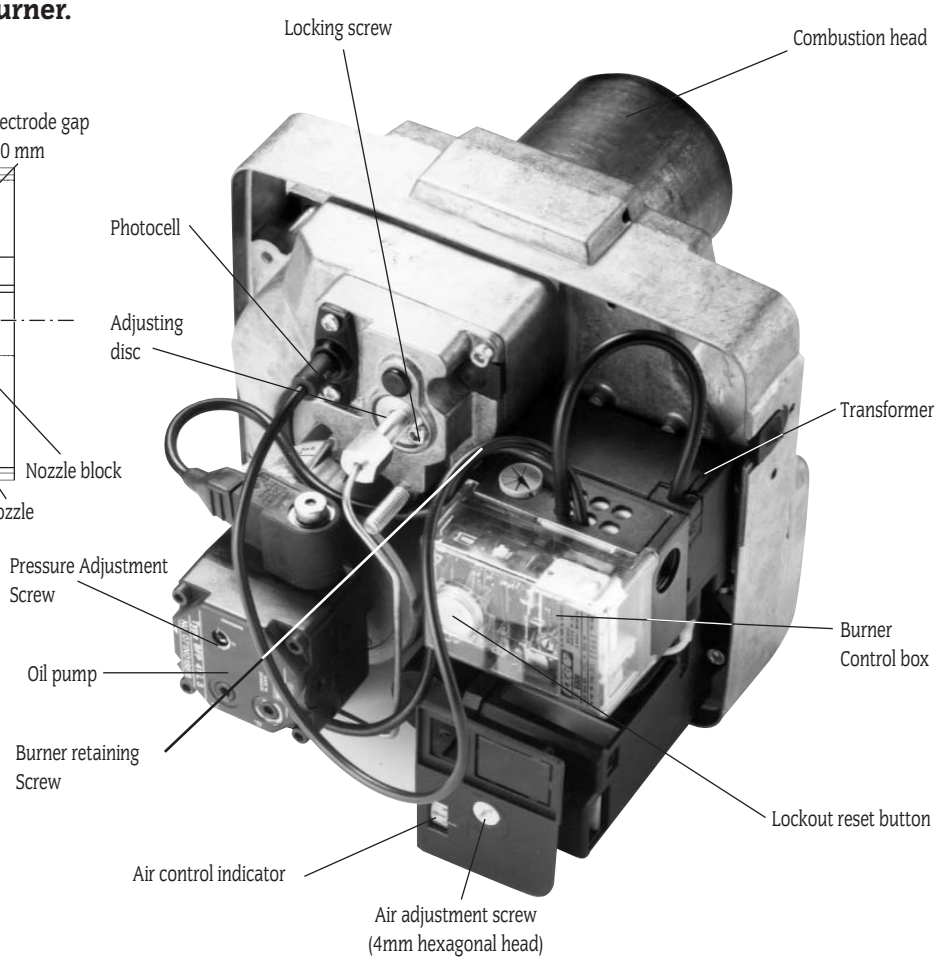
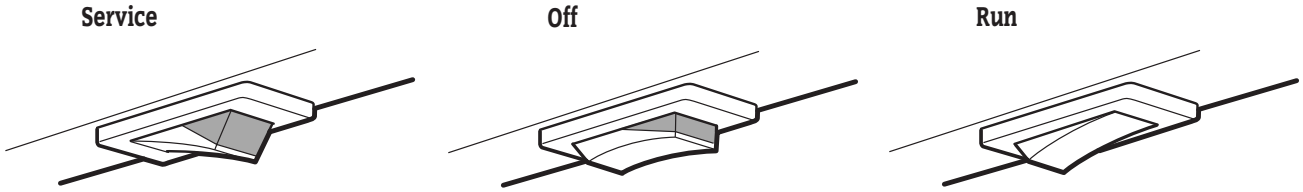


Fig. 29. Service switch positions



Note: Always set the switch to **run** after servicing.

Fig. 30. Hanging of burner during commissioning / service

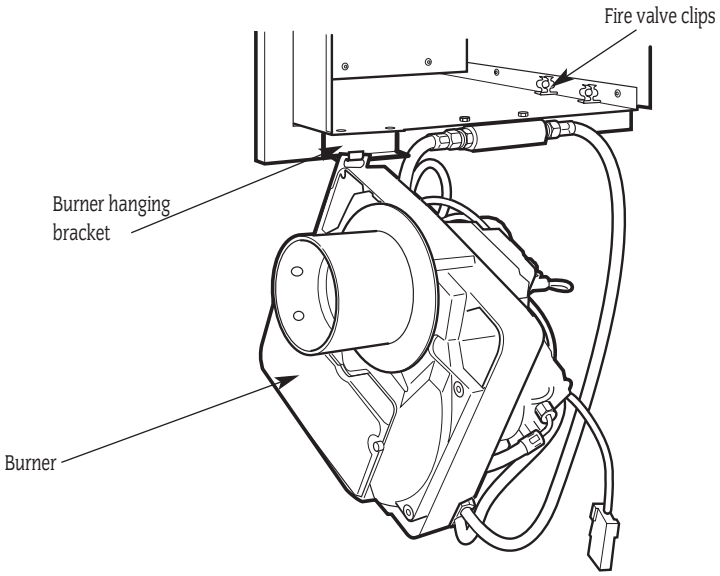
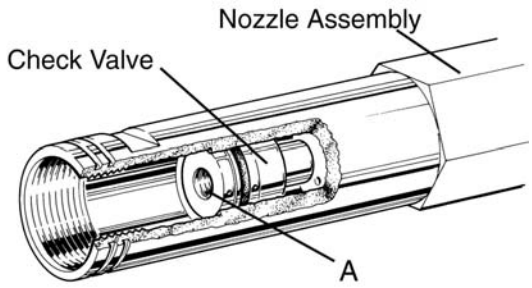


Fig. 31. Mechanical shut-off valve.

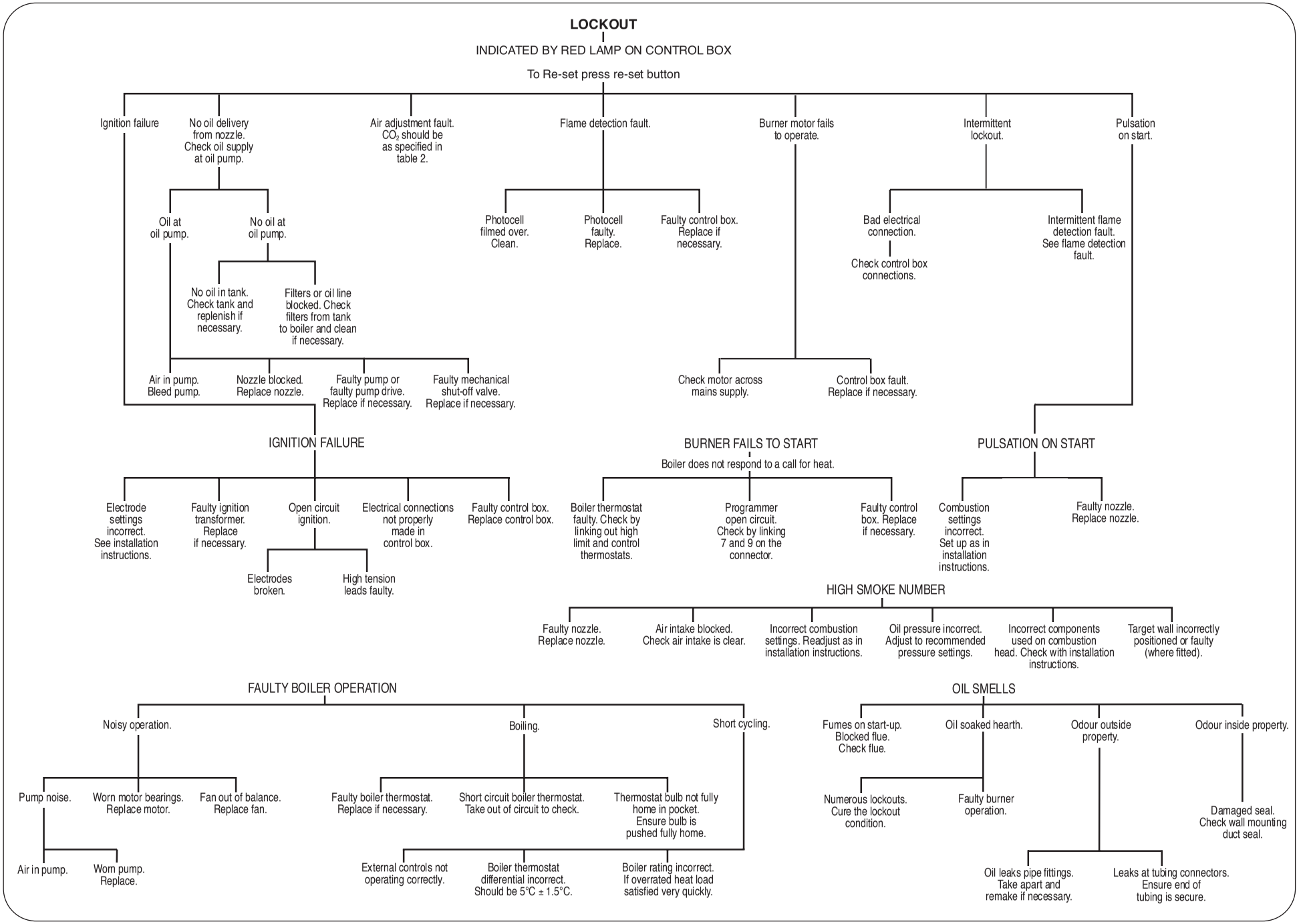


15. Short Parts List

Part		Manufacturers Reference	Qty	Worcester Part No.
Burner		Bentone B9C	1	8 716 157 040 0
Burner Control 1.	Control box	Satronic DKO 970 Mod.21	1	8 716 142 396 0
	Photocell	Satronic MZ770	1	8 716 142 735 0
	Control box base	Satronic S701TTG	1	8 716 157 042 0
Blast tube		PL 6/7/21.5/10-E	1	8 716 157 041 0
Ignition electrode			1	8 716 142 752 0
Nozzle	12(kW)	Danfoss 0.4 60°ES	1	8 716 156 679 0
Nozzle	15(kW)	Danfoss 0.5 60°ES	1	8 716 156 673 0
Nozzle	17(kW)	Danfoss 0.5 60°ES	1	8 716 156 673 0
Nozzle	19(kW)	Danfoss 0.6 60°ES	1	8 716 156 680 0
Motor		AEG or Simel 70 W	1	8 716 156 597 0
Oil pump		Danfoss BFP41L3	1	8 716 142 736 0
Transformer		Danfoss EBI 052F0030 (excludes cable)	1	8 716 156 696 0
Mechanical shut-off valve			1	8 716 156 658 0
Flexible oil line kit		Worcester	1	8 716 157 033 0
Main harness/service switch assembly		Worcester	1	8 716 146 674 0
Burner 'O' shaped gasket		Worcester	1	8 716 140 797 0
Burner mounting flange		Worcester	1	8 716 140 014 0
Flue gasket		Worcester	1	8 716 140 561 0
Flue/splash plate seal		Worcester	1	8 716 140 933 0
Insulation box		Worcester	1	8 716 121 655 0
Rope seal kit		Worcester	1	8 716 121 694 0
Heat exchanger		Worcester	1	8 716 121 649 0
Baffle		Worcester	1	8 716 121 650 0
Control Thermostat		Seibe K36-P2321	1	8 716 142 390 0
Automatic reset high limit thermostat		Seibe L07-P1037	1	8 716 142 391 0
Manual reset high limit thermostat		Seibe LM7-P5110	1	8 716 142 392 0
Duct manual reset thermostat		Seibe LM7-P5111	1	8 716 142 394 0
Frost thermostat		Seibe K36-P1363	1	8 716 142 393 0
Lockout reset switch		Arcolectric H83001AB	1	8 716 146 161 0

Accessories for Danesmoor WM 12/19

Part	Worcester Part No.
Stand-off kit (4 inch wall)	7 716 192 256
Electrical service lead	7 716 192 301
Flue terminal guard kit	7 716 190 017
Twin Channel Programmer	7 716 192 007


LOCKOUT
INDICATED BY RED LAMP ON CONTROL BOX
To Re-set press re-set button
Ignition failure
No oil delivery from nozzle. Check oil supply at oil pump.
Air adjustment fault. CO_2 should be as specified in table 2.
Flame detection fault.
Burner motor fails to operate.
Intermittent lockout.
Pulsation on start.
Oil at oil pump.
No oil at oil pump.
No oil in tank. Check tank and replenish if necessary.
Filters or oil line blocked. Check filters from tank to boiler and clean if necessary.
Air in pump. Bleed pump.
Nozzle blocked. Replace nozzle.
Faulty pump or faulty pump drive. Replace if necessary.
Faulty mechanical shut-off valve. Replace if necessary.
Photocell filmed over. Clean.
Photocell faulty. Replace.
Faulty control box. Replace if necessary.
Check motor across mains supply.
Control box fault. Replace if necessary.
Bad electrical connection.
Check control box connections.
Intermittent flame detection fault. See flame detection fault.
IGNITION FAILURE
Electrode settings incorrect. See installation instructions.
Faulty ignition transformer. Replace if necessary.
Open circuit ignition.
Electrodes broken.
High tension leads faulty.
Electrical connections not properly made in control box.
Faulty control box. Replace control box.
BURNER FAILS TO START
Boiler does not respond to a call for heat.
Boiler thermostat faulty. Check by linking out high limit and control thermostats.
Programmer open circuit. Check by linking 7 and 9 on the connector.
Faulty control box. Replace if necessary.
PULSATION ON START
Combustion settings incorrect. Set up as in installation instructions.
Faulty nozzle. Replace nozzle.
HIGH SMOKE NUMBER
Faulty nozzle. Replace nozzle.
Air intake blocked. Check air intake is clear.
Incorrect combustion settings. Readjust as in installation instructions.
Oil pressure incorrect. Adjust to recommended pressure settings.
Incorrect components used on combustion head. Check with installation instructions.
Target wall incorrectly positioned or faulty (where fitted).
FAULTY BOILER OPERATION
Noisy operation.
Boiling.
Short cycling.
Pump noise.
Worn motor bearings. Replace motor.
Fan out of balance. Replace fan.
Air in pump.
Worn pump. Replace.
Faulty boiler thermostat. Replace if necessary.
Short circuit boiler thermostat. Take out of circuit to check.
Thermostat bulb not fully home in pocket. Ensure bulb is pushed fully home.
External controls not operating correctly.
Boiler thermostat differential incorrect. Should be 5°C ± 1.5°C.
Boiler rating incorrect. If overrated heat load satisfied very quickly.
OIL SMELLS
Fumes on start-up. Blocked flue. Check flue.
Oil soaked hearth.
Odour outside property.
Odour inside property.
Numerous lockouts. Cure the lockout condition.
Faulty burner operation.
Damaged seal. Check wall mounting duct seal.
Oil leaks pipe fittings. Take apart and remake if necessary.
Leaks at tubing connectors. Ensure end of tubing is secure.

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PUBLICATION 8 716 114 741a (11/07)