

# Hamworthy

*Peveiril and Purbeck top casing panels are identical except for the cut-out in the front of the Purbeck top and also the Peveiril is Post Office red, the Purbeck hammer finish grey.*

**Installers Guide  
for  
Oil Fired Boilers**

**PEVERIL Series  
P1 & P2**



# PERVIREL

PERVIREL is a series of...  
...for...  
...of...

PERVIREL is a series of...  
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PERVIREL is a series of...  
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PERVIREL Series  
54 2 74

## GENERAL DESCRIPTION

The Hamworthy **PEVERIL** Boiler is a fully automatic Oil Fired Unit designed to give reliable and efficient service. It is suitable for Domestic, Commercial and Industrial Central Heating and Indirect Hot Water Systems.

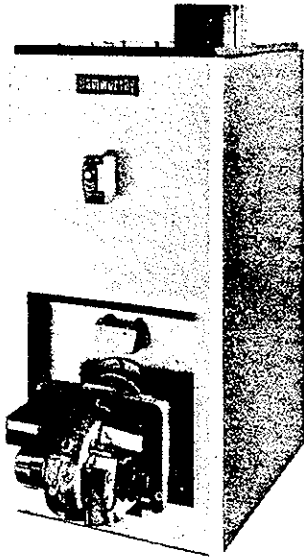


Fig. 1.  
PEVERIL Boiler  
with casing fitted

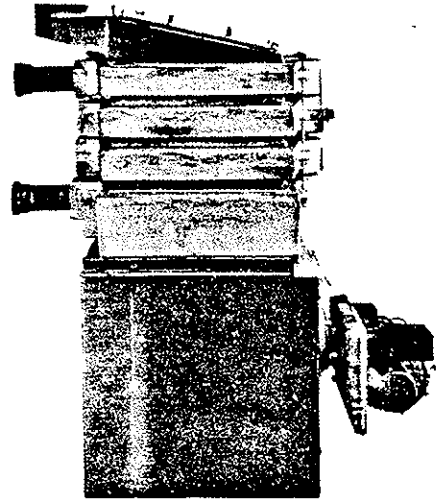


Fig. 2.  
PEVERIL Boiler  
without casing fitted

The Boiler is unique in that the cast iron sections are set above each other on the horizontal plane and by special arrangement of the connecting nipples the water flows in series through each individual section. This method ensures that no hot spots are created in the boiler and gives a small unit with high output.

Each Boiler is constructed from high grade cast iron and is factory assembled and hydraulic tested. Maximum working pressure of the unit is 690 kPa (100 lbf/in.<sup>2</sup>). Installation consists essentially of connecting electrical, oil and water services and chimney.

The flue hood, fitted to the top of the boiler, has a removable plate giving access to the flue passages for cleaning. Each unit is supplied with a matched Elco Junior S10M 35 second *Redwood No. 1* Oil Burner. (Alternative burners may be considered if approved by Hamworthy Engineering Limited).

All equipment will readily pass through narrow corridors, up or down stairways, and through 762 mm. (30 in.) doorways. The boilers need not be installed until the building is completed. Installation requires no rigging, cranes or special tools. There is no need for large boiler rooms or special load bearing structures.

If heat transfer from the boiler base could be a problem, such as on a roof installation, provision of insulation material in the foundation is advantageous.

When installing two or more Peveril Boilers in parallel it is important to arrange the water flow and return such that the last boiler on the inlet manifold is also the last boiler on the outlet manifold, as shown in Fig. 3.

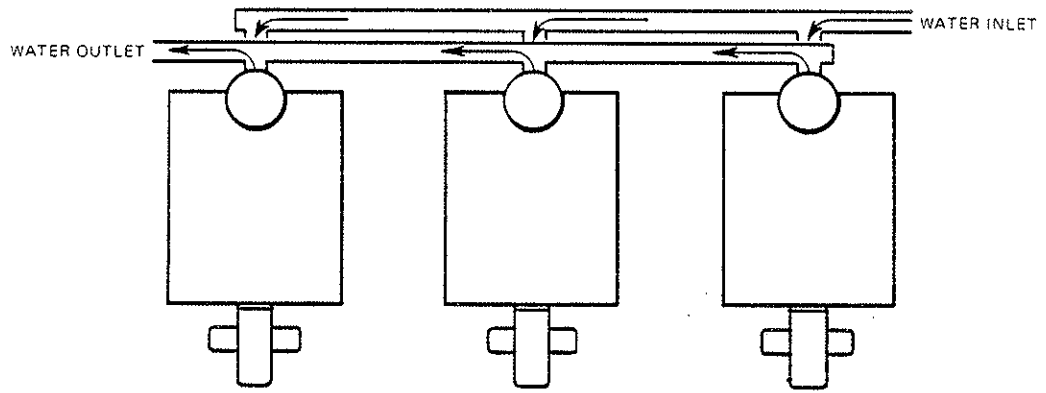


Fig. 3

PLAN

Each single Boiler unit or module should be controlled by a control thermostat, **not** supplied by Hamworthy Engineering Limited, positioned in the main flow pipework at a distance from the unit or units such that mixing of individual boiler outlets is complete.

## DELIVERY

Each Boiler is supplied with the following items:

- 1 — Factory assembled Boiler unit complete with refractory combustion chamber and flue hood, mounted on wood pallet and enclosed in plywood crate.  
Crate Size: 712 mm. x 610 mm. x 1474 mm. (28 in. x 24 in. x 58 in.) high.
- 1 — Carton containing:
  - Elco Junior S10M
  - 2 off flexible oil hose
  - 1 off oil filter
  - 1 off high limit stat
- 1 — Carton containing:
  - 1 off Set Insulated Flush Casings

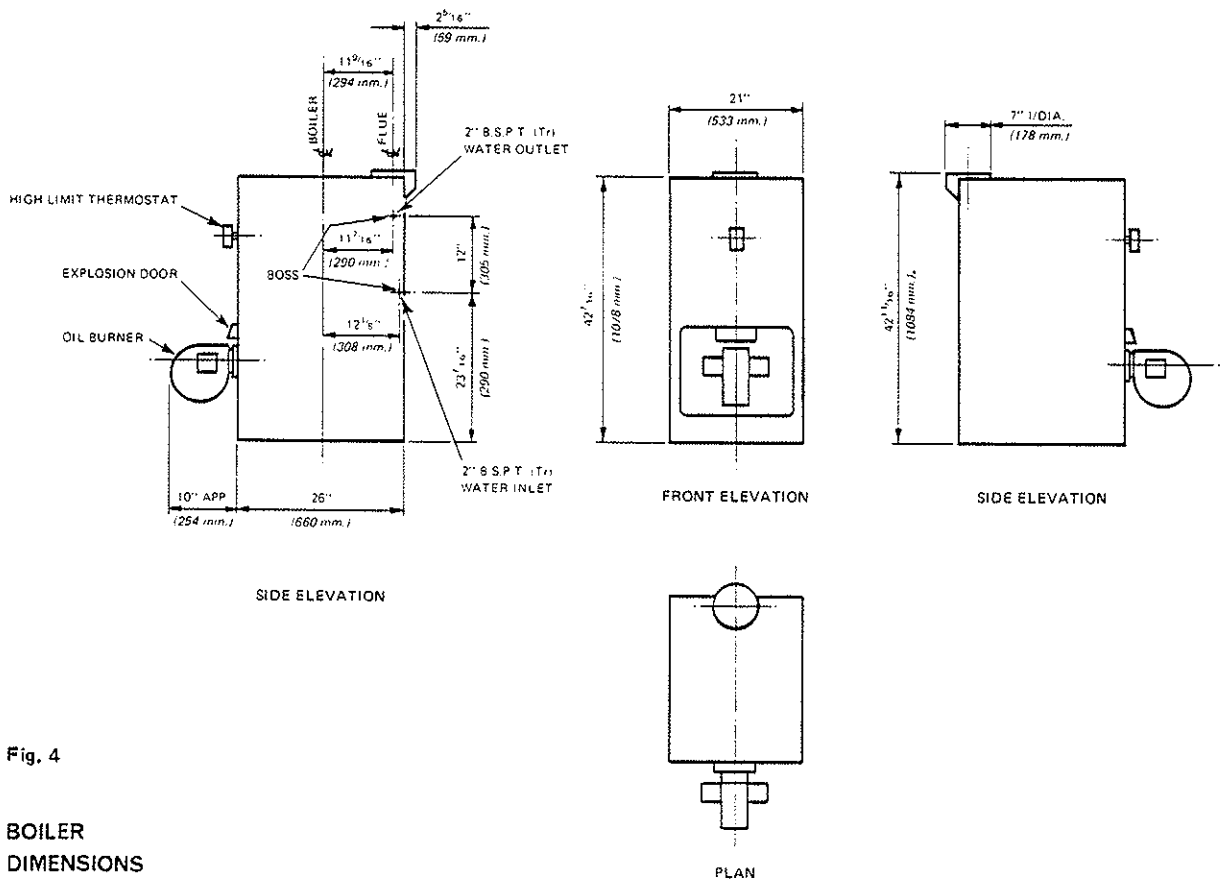


Fig. 4

## BOILER DIMENSIONS

## GENERAL DATA

### BOILER

Cast iron sectional for use on INDIRECT systems only. Factory assembled and hydraulic tested to 1380 kPa (200 lbf/in.<sup>2</sup>). Suitable for maximum working pressure of 690 kPa (100 lbf/in.<sup>2</sup>).

### TAPPINGS

Return Bottom Rear . . . . . 2 in. B.S.P.T. (Tr.)  
 Flow Top Rear . . . . . 2 in. B.S.P.T. (Tr.)  
 High Limit Thermostat fitted top front . . ¾ in. B.S.P.T. (Tr.)  
 Safety Valve Top Front  
 Vertical Connection . . . . . ¾ in. B.S.P.T. (Tr.)

**Note:** When Boilers are installed in modular form it is not necessary to fit a safety valve to each Boiler. A common valve may be fitted providing it cannot be isolated from any of the Boilers.

**Cleaning Access** — Removable plate fitted by 4 off wing nuts to flue hood giving access to convection area of Boiler.

### Pressure Drop

#### WATER

MODEL	FLOW RATE		PRESSURE DROP			
	g.p.m.	l/m	in.	mm.	lbf/in. <sup>2</sup>	kPa
P.1	11	50	4	101	.14	.96
P.2	13	59	6	153	.22	1.5

#### FLUE PASSAGE

MODEL	OVER FIRE DRAUGHT REQUIRED	PRESSURE DROP ACROSS BOILER	DRAUGHT REQUIRED AT BOILER OUTLET
P.1 & P.2	0.02 in.—0.04 in. (0.5 mm.—1 mm.) WG.	0.02 in. (0.5 mm.) WG.	0.060 in. (1.52 mm.) WG.

### Oil Burner

Elco Junior S10M suitable for 35 sec. *Redwood No. 1* Fuel Oil

	P.1	P.2
Nozzle Size	1.0 gal/hr. 60° semi-solid	1.25 gal/hr. 60° semi-solid
Pump Pressure	165 lbf/in. <sup>2</sup> (1140 kPa)	165 lbf/in. <sup>2</sup> (1140 kPa)
Approximate Weight	28 lb. (12.7 kg.)	
<b>Boiler</b>		
Water Content	4.38 gal. (19.9 l.)	4.38 gal. (19.9 l.)
Heating Surface	29 ft. <sup>2</sup> (2.69 m. <sup>2</sup> )	29 ft. <sup>2</sup> (2.69 m. <sup>2</sup> )
Input Rating	166,000 Btu/h. (48 kW)	196,000 Btu/h. (57 kW)
<b>Electrical Loading</b>	Start Current 2.4 A.    Run Current 0.8 A.	
<b>Thermostat</b>	Single High Limit auto re-set.	

**Safety Controls**

The Oil Burner is fully sequenced and automatically shuts down in the event of flame failure. It fully complies with BSS.799, Part 3.

**Casing**

Sheet steel, Post Office Red stove enamelled with white fascia, fully insulated.

**TABLE 1**

MODEL REF. PEVERIL	NO. OF MODULES		APPROX. OIL USAGE		OUTPUT	
			gph	L/hr.	x 1,000 Btu/hr.	kW
P.1	1		1.06	4.85	133	39
P.2	1		1.33	6.06	157	46
MODEL REF. PEVERIL	APPROX. INSTALLED WEIGHT INCLUDING BURNER		APPROX. DELIVERED WEIGHT BOILER ONLY		RECOMMENDED CHIMNEY DIA.	
	lb.	kg.	lb.	kg.	in.	mm.
	P.1	627	285	535	241	7
P.2	627	285	535	241	7	177

## INSTALLATION RECOMMENDATIONS

1. All Boilers should be installed to B.S. Codes of Practice CP3002 Pt. 1, 1961.
2. Locate Boilers so that the length of ducting to chimney is kept to a minimum. The following minimum clearance from combustible materials must be maintained:

Side, Rear and Top . . . . .	152 mm. (6 in.)
Front . . . . .	610 mm. (24 in.) for servicing
3. Provide a good level fire resistant floor capable of bearing the weight of Boiler being installed. (See Table 1). Ensure that adequate protection from radiation is given to any waterproof membrane.
4. Adequate air for combustion must be provided by two openings in the Boiler room structure, one located at low level and one at high level. Allow between 190 & 260 cm.<sup>2</sup> (30 & 40 in.<sup>2</sup>) free area per 29.3 kW (100,000 Btu's) of Boiler input.
5. Provide 220—240 volt Single phase 50 c/s AC electrical supply preferably through a double pole fused switchbox installed in the Boiler room. All electrical wiring to be in accordance with I.E.E. regulations.
6. The flue and horizontal ducting must be self-supporting. **Under no circumstances** should the weight of these components be taken by the flue hood.

### 7. Boiler Assembly

- (a) Mark floor area to show required position for Boiler.
- (b) Remove crate and manoeuvre Boiler on its wood pallet to the required position.
- (c) Remove wood pallet and set Boiler onto floor.
- (d) Ensure that flue hood and cover are correctly fitted to the boiler.
- (e) Check burner mounting plate and refractory are correctly fitted. Ensure cast sections seated on chamber box.
- (f) Connect water services and chimney ducting.

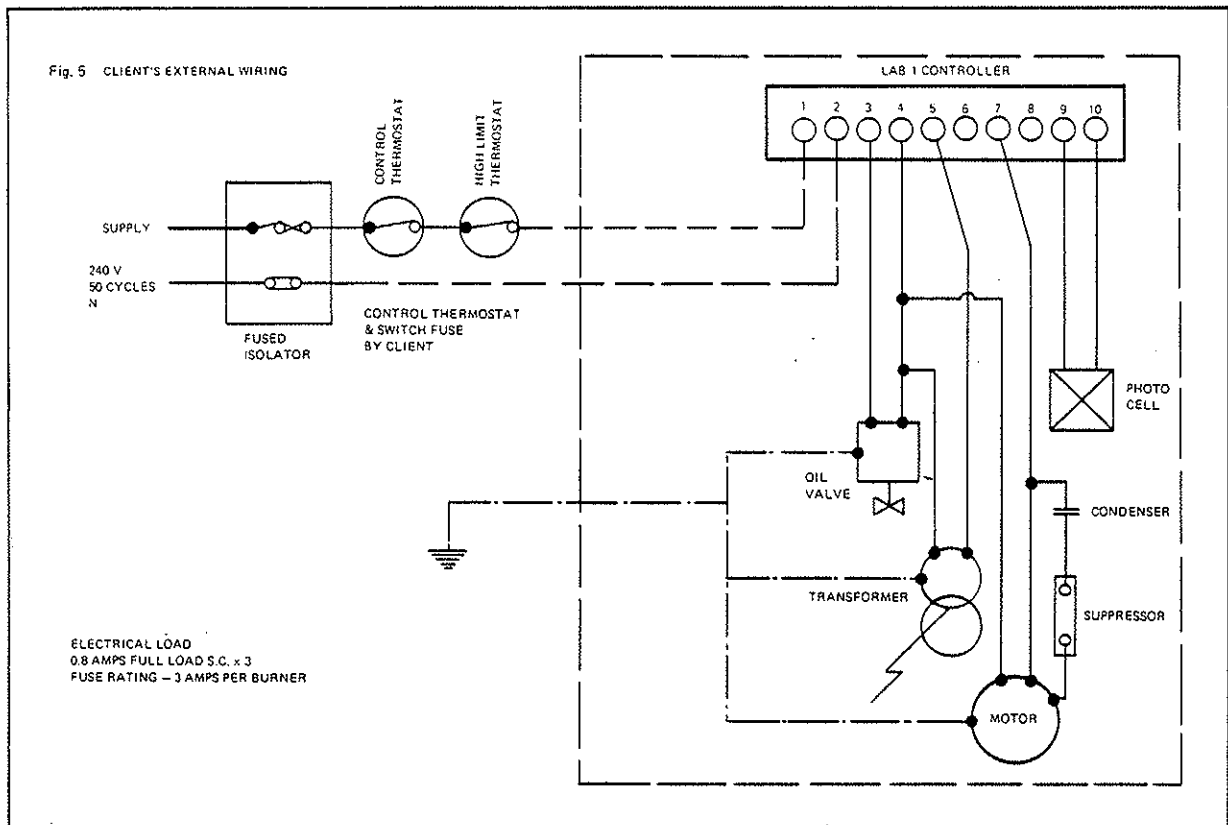
Installer to supply and fit in the system control thermostats, pressure relief valves, gauges and thermometers as required.

If the boiler is to be installed with a connecting horizontal flue, where possible allow at least 610 mm. (24 in.) of vertical flue from the boiler outlet before joining with the horizontal section. Also ensure that the vertical section of flue fits around the OUTSIDE of the spigot on top of the flue hood 190 mm. (7½ in.) o/dia. and not inside, where it could penetrate into the hood and cause a restriction.

A draught stabiliser should be supplied and fitted by the Installer into the chimney. On a multi boiler installation, only one stabiliser need be installed, provided it is of sufficient size, either at the base of the chimney or in the dead end of the horizontal section of duct.

- (g) Fit oil burner to mounting plate with bolts and gasket provided.
- (h) Connect oil pipework using filter and flexible hoses provided. In all instances an isolating valve (not Hamworthy supply) should be fitted between the main oil supply and the filter. The oil pump is supplied for a single or double pipe system.
- (i) Connect electrics in accordance with wiring diagram shown below.





- (j) Fill system with water in accordance with standard practice. Check for leaks. If the Boiler feed water has a high degree of hardness it is recommended that the water be treated to prevent precipitation of the hardness as scale or sludge in the Boiler water passageways. Details of additives can be obtained from any reliable manufacturer of water treatment chemicals or from the local Water Board.

However, it should be remembered that even if the boiler water is of average hardness, not requiring treatment, subsequent draining of a system for repair, or constant make up water due to an undetected leak, will cause fresh precipitation and gradual build up of scale. It is essential, therefore, that leaks are attended to promptly, and draining is kept to an absolute minimum.

- (k) Assemble casing around Boiler.
- (l) Fit limit thermostat provided.

## OIL SUPPLY

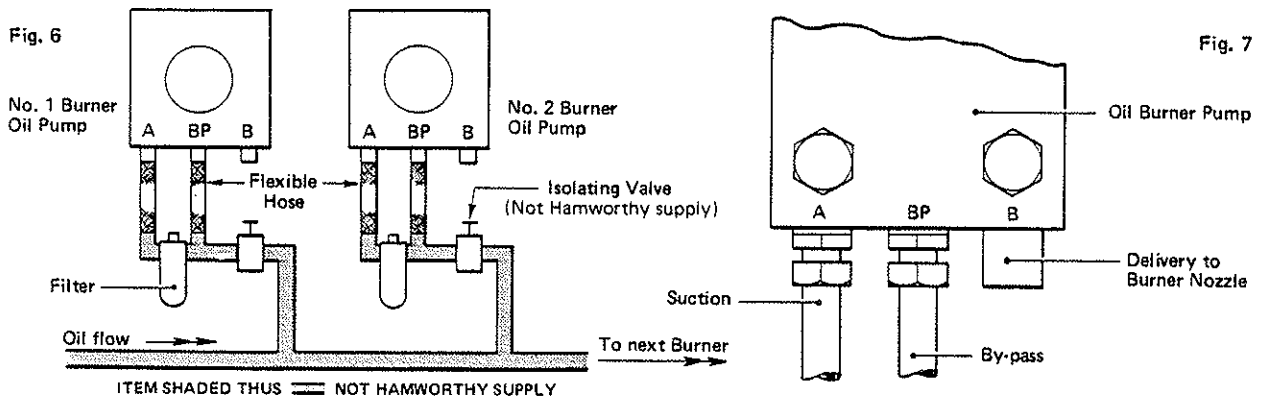
Wherever possible a single pipe gravity feed oil supply system should be installed.

In this case the outlet of the oil tank should be a minimum of 152 mm. (6 in.) above the centre line of the oil pump. Connecting oil pipework to the burner should be 13 mm. (½ in.) minimum and the length of pipework as short as possible. Care should be taken to ensure that no air locks can form and the minimum amount of bends should be used.

When the bottom of the oil tank is below the centre line of the burner a two-pipe system should be used.

When using **single** pipe system the pump return port must be connected back to the pump suction port, see Fig. 6 and 7.

For two pipe system, pump return port is connected back to tank. The suction pipe is laid up to 5 mm. (0.2 in.) above the tank bottom, and should be fitted with a non return valve. The return pipe is assembled up to 15 mm. (0.6 in.) above the tank bottom.



## SINGLE PIPE GRAVITY SYSTEM ONLY

## COMMISSIONING & LIGHTING-UP INSTRUCTIONS

1. Check that Boiler and system are full of water by momentarily opening pressure relief valve and checking water flows from it.
2. Ensure isolating valves are open.
3. Turn on oil supply and bleed all air from the system. Air can be bled from oil pump by loosening plug above oil suction flexible until air is expelled. Re-tighten plug, see Fig. 8.
4. Fit oil pressure gauge with range of 2070 kPa (0–300 lbf/in.<sup>2</sup>) to pump above port B. (See Fig. 8).
5. Remove burner inner assembly and check that the electrodes are set in the correct position. (See Fig. 9). Ensure correct nozzle is fitted to burner and diffuser and air cone are positioned correctly. (See Fig. 10).
6. Set air damper to approximately one-third open.
7. Turn high limit and control thermostats to highest setting.
8. Switch on oil burner electric supply and burner should pre-purge and then ignite.
9. Adjust oil pressure on burner pump by means of adjusting screw. (See Fig. 8 and General Data).
10. Adjust air damper on burner until a steady clean flame is burning. Ensure that there is no obstruction to the air inlet damper.
11. Switch off burner and remove pressure gauge and replace plug.
12. Re-start burner and set control and limit stats to required setting.
13. Adjust draught stabiliser and air damper to give overfire draught of 0.5 – 1 mm. (0.02 – 0.04 in.) W.G. Set burner to give 0–1 smoke number (Bacharach Scale) and 10% CO<sub>2</sub> readings. It is important to ensure that the above smoke number is obtained and maintained throughout the life of the Boiler. Lock the air damper when satisfactory figures have been obtained.
14. Check all controls to ensure they operate correctly.

**Note:** The refractory combustion chamber should be allowed to dry out by running the burner on/off until the refractory attains a dull red heat (approx. 500°C.). Sight through inspection door.

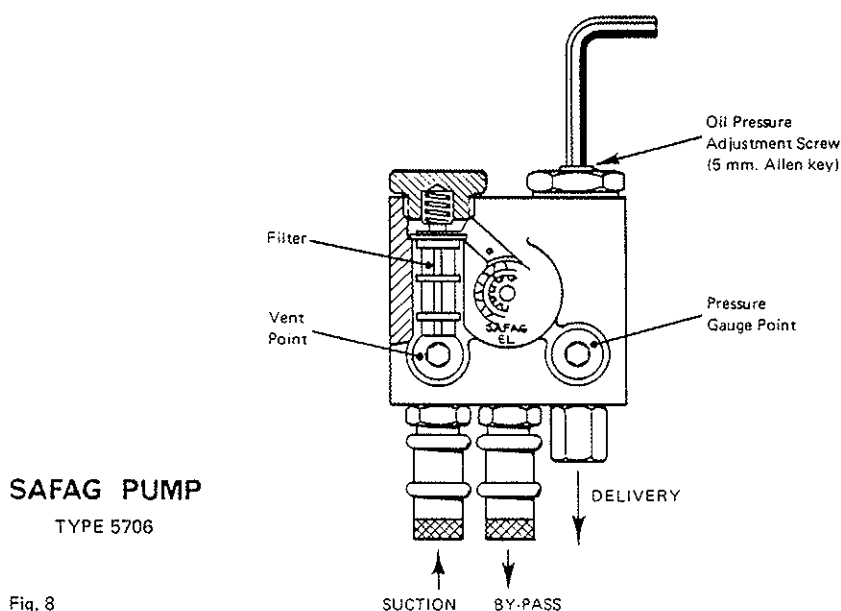


Fig. 8

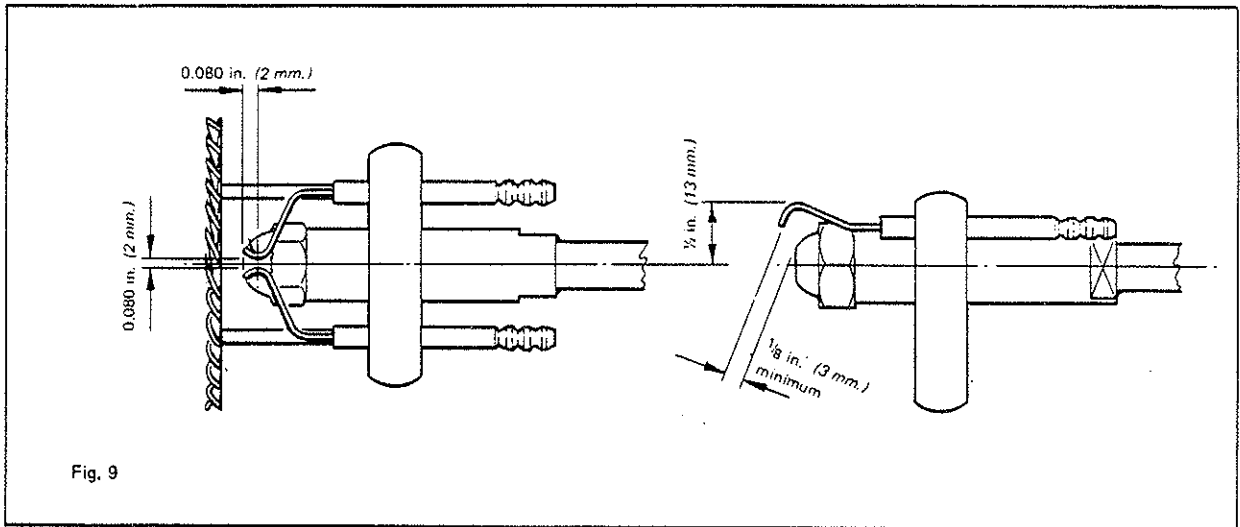


Fig. 9

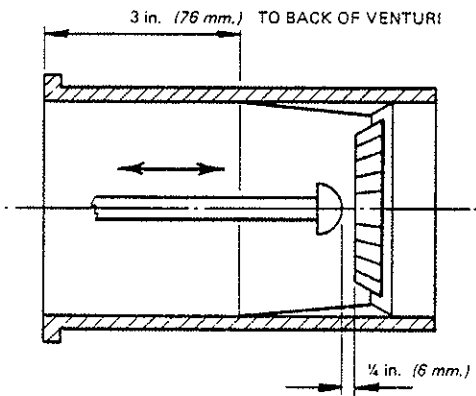


Fig. 10

To remove the burner arm assembly proceed as follows:-

1. Remove the burner cover plate.
2. Release knurled adjustment screw on oil line and disconnect the adjacent union nut.
3. Remove the H.T. leads.
4. Remove the photocell from the combustion head.
5. Remove the burner arm assembly.

To assemble the burner arm proceed in the opposite manner to the previous instructions.

## MAINTENANCE & CLEANING

1. **IMPORTANT.** Switch off and isolate electric supply and oil supply to burner before attempting cleaning or maintenance.
2. Dust build-up on the Boiler casing and burner unit is undesirable. All components should be kept clean.
3. The nozzle on the oil burner should be replaced at the beginning of each heating season.
4. The oil filter should be cleaned every 3 months, and should immediately be checked if oil tank is allowed to run low. Replace element at start of heating season.
5. The photo cell and electrodes should be cleaned at least every 2 weeks, and more if boilers are running constantly.
6. The Boiler should be inspected for accumulation of soot or other deposits at least once every 3 months. If the Boiler usage is high, this period should be reduced according to individual conditions.

Soot should be removed by either brushing or by using an approved chemical cleaner, in conjunction with brushing.

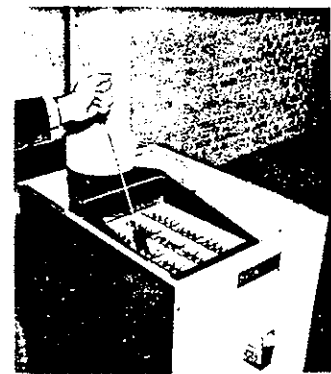
To clean the Boiler the following procedure should be adopted:



*Fig. 11  
Remove Top Casing Cover*

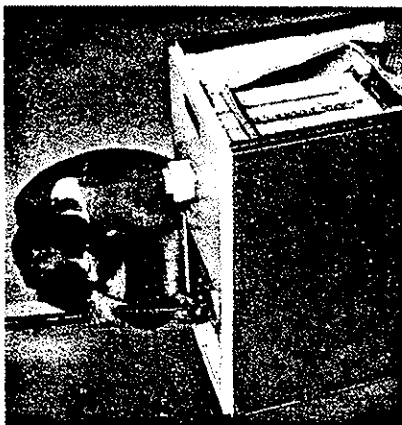


*Fig. 12  
Remove Flue Hood Cover*



*Fig. 13*

*Brush through Boiler sections  
using wire or fibre brush  
25 mm. (1 in.) diameter bristle*



*Fig. 14  
Remove Burner & vacuum  
Combustion Chamber thro'  
Burner hole*

**RE-ASSEMBLE ALL COMPONENTS**

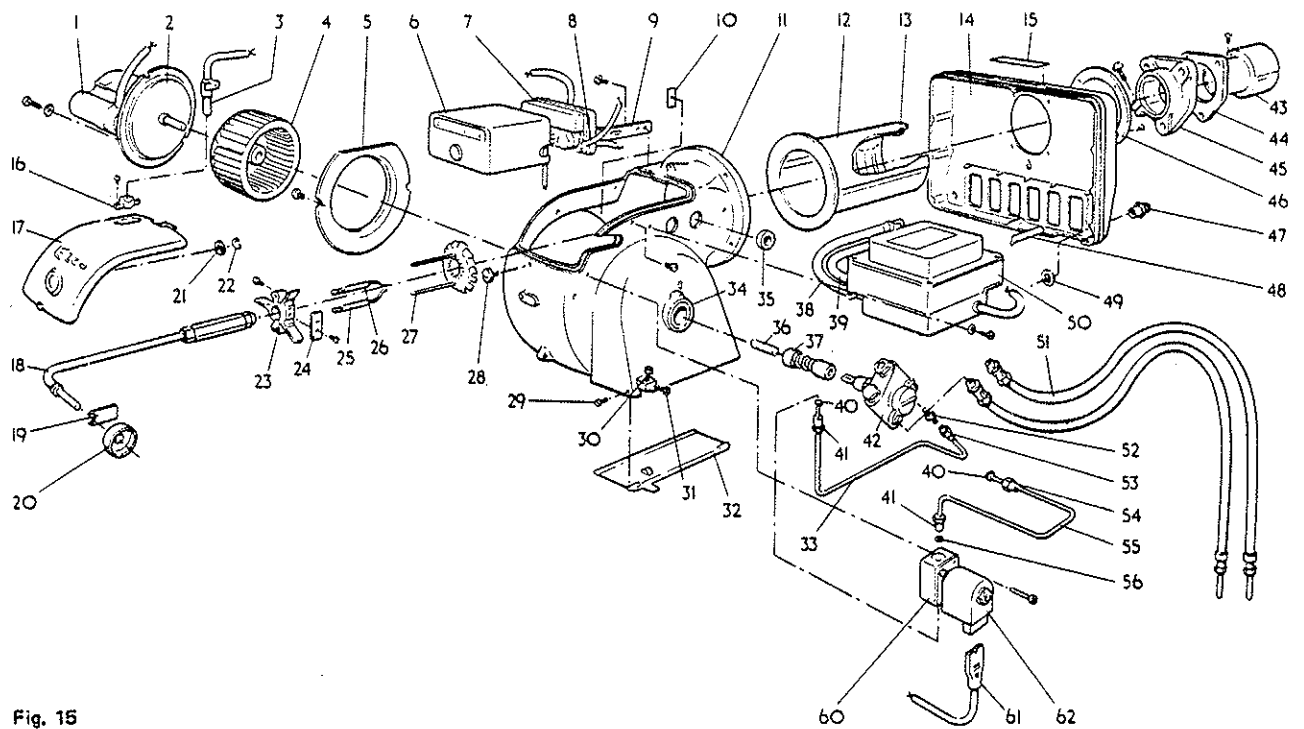


Fig. 15

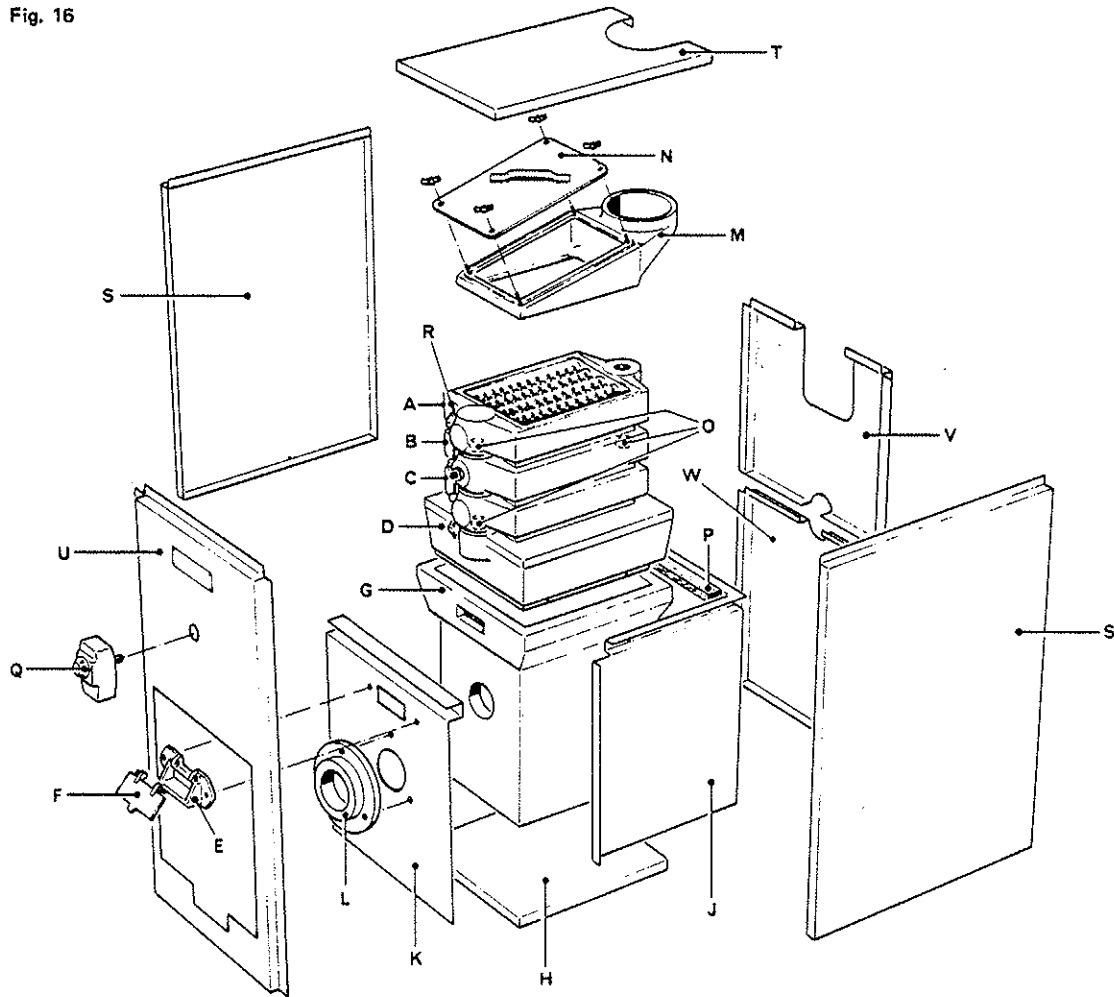
**BURNER SPECIFICATION HAMWORTHY ELCO JUNIOR 10**

Item No.	Description	Item No.	Description	Item No.	Description
1	Capacitor	21	Sight Glass	41	Lucifer Valve Nipple
2	Motor 0.125 hp 2800 rpm	22	Clamping Ring	42	Pump 5706-30
3	Photocell	23	Electrode Holder	43	Combustion Head
4	Impeller	24	Holder Lug	44	Asbestos Gasket
5	Air Entry Baffle	25	Electrode	45	Mounting Flange
6	Control Box	26	Electrode	46	Spacing Flange
7	Control Box Base	27	Air Director Plate	47	Cable Bush
8	Cable Gland	28	Filister Head Screw	48	Hose Holder
9	Support Bracket	29	Damper Locating Screw	49	Cable Bush Nut
10	Clamp	30	Damper Adjusting Screw	50	Ignition Transformer
11	Housing	31	Damper Adjusting Screw	51	Oil Hose
12	Burner Pipe	32	Damper Blade	52	Male Nipple
13	Burner Pipe Location	33	Copper Pipe	53	Union Nut
14	Burner Plate	34	Bush	54	Union Nut
15	Nameplate	35	Cap	55	Copper Pipe
16	Photocell Holder	36	Coupling Plastic	56	Washer
17	Burner Cover	37	Coupling Piece	60	Solenoid Valve
18	Nozzle Line	38	Ignition Cable	61	Solenoid Valve Terminal Plug
19	Bracket	39	Ignition Cable	62	Solenoid Valve Socket
20	Retaining Nut	40	Union Nut		

All orders for spares should be accompanied by:-  
 1. Burner Serial No.  
 2. Burner Type No. which can be found on burner nameplate.

Replacement parts are obtainable from Hamworthy Engineering Limited.

Fig. 16



**HAMWORTHY PEVERIL PARTS LIST**

Item No.	Description	Part No.	No. per Boiler
A	Section Top	330899769	1
B	Thermo Section Middle	330899488	1
C	Section Middle	330899447	1
D	Wet Base	324110066	1
E	Explosion Door Mounting Frame	324110124	1
F	Explosion Door	324120081	1
G	Combustion Refractory Box	333203027	1
H	Base Pan	330807085	1
J	Chamber Housing	333204017	1
K	Chamber Housing Front Panel	330899827	1
L	Burner Mounting Flange	332411076	1
M	Flue Hood	333005166	1
N	Flue Hood Cover	333005141	1
O	Nipple	330502033	3
P	Thermblock Packing Piece	331405038	1
Q	High Limit Thermostat	747433156	1
R	Tie Rod	332012015	2
S	Side Panel	330898084	2
T	Top Panel	330898118	1
U	Front Panel	330898076	1
V	Top Rear Panel	330898100	1
W	Bottom Panel	330898092	1

When ordering spares, always quote Part Number, Name of Part and quantity required.







**HEAD OFFICE (Depot & Works)**

**HAMWORTHY ENGINEERING LIMITED,  
COMBUSTION DIVISION — HEATING DEPARTMENT,**  
FLEETS CORNER,  
POOLE, DORSET BH17 7LA  
Tel: 0202-675123  
Cables: 'Burners Poole' Telex: 41226

**Offices:**

**MIDLANDS (Depot)**

**HAMWORTHY ENGINEERING LIMITED,  
COMBUSTION DIVISION,**  
Shady Lane,  
Great Barr,  
Birmingham B44 9EX  
Tel: 021-360 7000

**NORTH WEST (Depot)**

**HAMWORTHY ENGINEERING LIMITED,  
COMBUSTION DIVISION,**  
Unit B5,  
Bankfield Trading Estate,  
Sandy Lane,  
Stockport,  
Cheshire SK5 7QL  
Tel: 061-480 0804

**NORTH EAST**

**HAMWORTHY ENGINEERING LIMITED,  
COMBUSTION DIVISION,**  
P.O. Box 11,  
Wallsend,  
Tyne & Wear NE28 6QR  
Tel: 0632-629214/5

**Accredited Agents:**

**LONDON & S.E. (Depot)**  
**MODULAR HEATING SALES LIMITED,**  
35, Nobel Square,  
Basildon,  
Essex SS13 1LP  
Tel: 0268-727917

**FOWLER COMBUSTION CO. LIMITED,**  
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Tel: 0202-525140

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St. Marychurch,  
Torquay TQ1 4PJ  
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Leaze End,  
Henlease Park Drive,  
Westbury-on-Trym,  
Bristol.  
Tel: 0272-620464

**NORTH WEST (Part)**

**GILLIES MODULAR SERVICES,**  
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Anfield,  
Liverpool 4.  
Tel: 051-263 3858

**SCOTLAND (Depot)**

**McDOWALL MODULAR SERVICES,**  
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