# Hamworthy

Installers Guide for Parkstone Series P7 to P13 Boilers OIL GAS AND Dual Fuel

# PARKSTONE P7 TO P13

HOT WATER BOILERS FOR HEATING AND DOMESTIC HOT WATER

INSTALLATION AND COMMISSIONING INSTRUCTIONS

CDH 3085 November 1985



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#### INTRODUCTION

The Hamworthy Parkstone boiler has been introduced to complement the existing range of Hamworthy gas and oil fired modular boilers.

The Parkstone boiler is designed to provide an output of between 118 and 237 kW with a maximum operating pressure of 3.5 bar, and is suitable for both open and pressurised systems.

The boiler is constructed from the required number of cast iron vertical sections nippled together to provide a compact heat exchanger with a water cooled base, requiring only a level base plinth in accordance with our recommendations.

The boiler is suitable for operating with a natural draught chimney. Matched burners are available for firing 35 ST1 Fuel Oil, Natural Gas or LPG, and Dual Fuel: (Other gases subject to approval). The boilers are delivered to site either fully assembled with a separate casing carbon kit or alternatively can be supplied in complete kit form for site assembly by Hamworthy personnel.

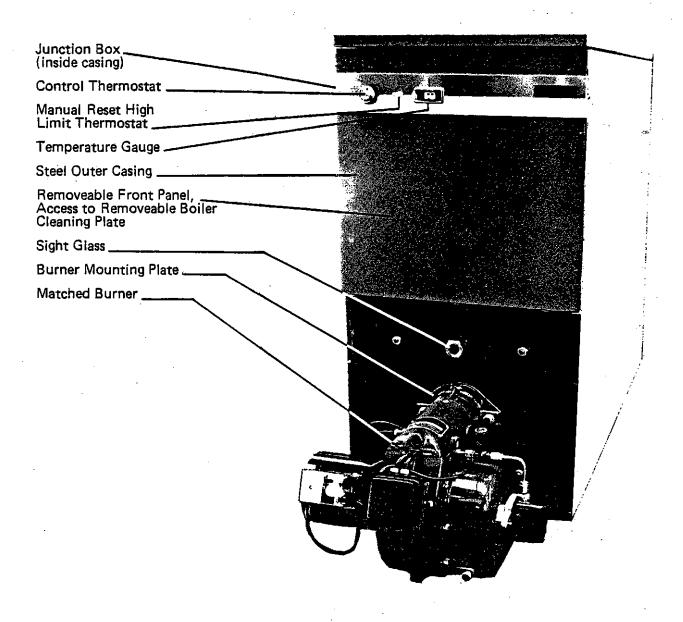


Fig 1 — BOILER ARRANGEMENT

PARKSTONE	· .	P7	P8	P9	P10	P11	P12	P13
Input  Btu/h >		150 512.25	175 597.77	200 682.41	225 768.81	250 853.90	273 932.94	300 1024.94
Output To Water Btu/h x		118.6 404	138.4 472	158.0 539	178.0 607	197.7 674	216.0 737	237.3 809
	litres IK gal	67 14.7	75 16.5	83 18.3	91 20	98 21.6	106 23.3	116 25.5
Maximum Water Pressure				3.5 50.75				<u>, , , , , , , , , , , , , , , , , , , </u>
Draught Required A Boiler Exit	t			0.125 0.05	m'bar in.wg.			
Electrical Supply	•	220/	240 v. 50	Hz singl	e phase i	fused 15.	Amps	··
Weight Dry Approx.	kg	415	482	540	607	674	741	808

			OIL FIR	ED (35 SF	ਧ)			
Oil Throughput	1/h	14.1	16.5	18.8	21.2	23.6	25.8	28.3
Approx.	UK gal/h	3.11	3.63	4.14	4.67	5.19	5.67	6.23
Oil Pump. Pressure	bar	7.93	8.27	8.55	8.75	8.96	8.96	9.24
Approx.	psi	115	120	124	127	130	130	134
Burner	Size	3_5	4.0	. 4.5	· 5.0	5.5	5.0	6.5
Nozzel	type		60° PLP		- <u>-</u>	45	В	

GAS FIRED									
Natural Gas Input	m3/h ft <sup>3</sup> /h	14.0 494.9	16.3 577.5	18.6	21.0 742.6	23.3 825.0	25.5 901.4	28.0	
Propane	m <sup>3</sup> /h	5.75	6.69	7.64	8.62	9.57	10.47	11.50	
Input	ft <sup>3</sup> /n	203.03	236.22	269.76	304.37	337.91	369.69	406.06	
Butane	m <sup>3</sup> /h	4.43	5.16	5.88	6.64	7.37	8.07	8.86	
Input	ft <sup>3</sup> /h	155.42	182.20	207.62	234.45	260.23	284.95	312.84	

#### WATER CONNECTIONS

Water Flow 21/2" BSP Male. Water Reurn 21/2" BSP Female. Vent Socket 11/2" BSP. Gauge Socket 1/2" BSP

#### DESCRIPTION

#### **Boiler Assembly**

The Hamworthy Parkstone series of boilers are manufactured from vertical cast iron sections, nippled together and held with tie rods.

Each boiler comprises a front casing with removable cleaning door and burner mounting plate fitted with a sight glass and a rear casing with  $2\frac{1}{2}$  in BSP bosses for water flow and return connections.

A water diffuser tube complete with  $1\frac{1}{4}$  in BSP socket, and  $\frac{1}{2}$  in BSP socket is supplied and fitted to the water flow connection terminating with a  $2\frac{1}{2}$  in BSP male connection. The terminal point for the water return connection is a  $2\frac{1}{2}$  in BSP female. A  $1\frac{1}{4}$  in BSP tapping point is included in the rear casing plugged for use with a safety valve (not supplied).

The number of intermediate sections varies to suit the boiler model size, i.e. the P7 comprises 5 intermediate sections, plus front and rear castings.

The sections are nippled top and bottom to each other and to the front and rear casing, two tie rods are fitted to each side of the assembled boiler to complete the assembly with a water cooled base.

The combustion chamber is gas tight. Asbestos seals and gaskets are supplied for the removable access covers for boiler and burner maintenance. The insulation blanket drapes over the boiler top and sides within the casing.

The flue gases are collected in a flue hood fitted to the top of the boiler. A spigot connection is fitted to the flue hood for connection to the chimney.

The matched burner is bolted to a mounting plate, the assembly being removable for access to the combustion chamber. Access to the flue passages within the boiler is via a removable plate fitted to the front boiler casting.

Each boiler is provided with a 3 bulb sensor pocket fitted to the front boiler casting. The sensor pockets house the sensors for temperature indicating, limit and control thermostats. The sensor indicators are mounted on a fascia panel included with the casing.

#### Casing

A steel casing is provided for site assembly giving an aesthetic styled unit where visible from the front and sides, allowing ease of access to the pipework confections at the rear of the boiler.

A junction box for the electrical connections is provided for fitting to the left hand side casing.

The basic casing kit comprises:

- 1 top casing
- 2 side casings
- 1 front casing with fascia panel
- 1 insulation blanket

Assembly is via the clips and pins provided, and it is recommended that the casing is adequately protected whilst the site installation is undertaken.

Fig. 2 — DIMENSIONS

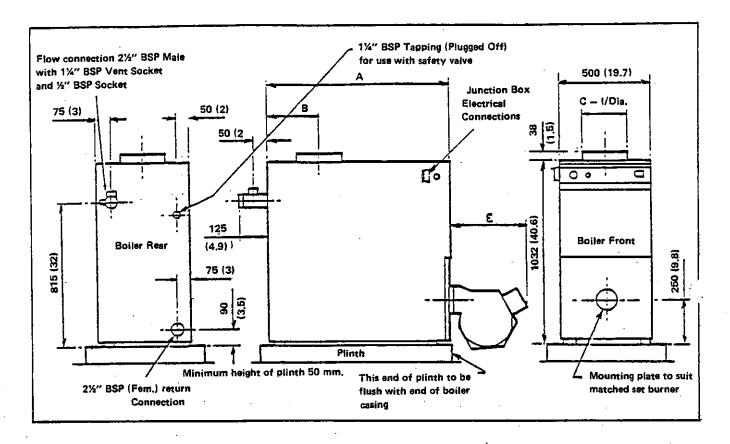


TABLE 2

			Dimens	ions			
Model	Δ			В	С		
No.	mm	in	mm	in	mm	in	
7	880	34.6	210	8.3	220	8.66	
8	1000	39.4	-290	11.4	250	9,84	
9	1120	44.1	290	11.4	250	9.84	
10	1240	48.8	290	11.4	250	9.84	
11	1360	53,5	380	15.0	300	11.81	
12	1480	58,3	380	15.0	300	11.81	
13	1600	63.0	380	15.0	300	11.81	

#### **DELIVERY/EXTENT OF SUPPLY**

 The boiler can be supplied fully assembled or in kit form, suitable for mounting onto a concrete block foundation.

Fully assembled. Each boiler will comprise:

- 1 carton containing the steel casing complete with a temperature gauge and limit/control thermostats and wiring junction box. A pack of fixing bolts, studs etc. is included.
- 1 carton containing the burner as described on the burner supplement.

TABLE 3

Burner	Selection	Dimension 'E' millimetres			Gas Conn.	1 I		Propane inlet Pressure		Butane Inlet Pressure	
Model No.	Burner	Gas	Oil	Dual Fuel	BSP	m bar	in wg	m bar	in wg	m bar	in wg
P 7-9 P 10-13 P 7-9 P 7-11 P 12-13	Selectos D62B Selectos D16V Selectos SG16 Selectos SG16 Selectos SG18	550 550 550	450 450		<sup>3</sup> ⁄ <sub>4</sub> 1 1	17.5 17.5 17.5	7 7 7	37 37 37	14.85 14.85 14.85	28 28 28	11.25 11.25 11.25
P 7-9 P 10-11 P 12-13 P 7-9 P 10-13	Riello 15M Riello 20M Riello GBV Riello GAS 2 Riello GAS 3	418 610	290 290 473		1 1½	16 16	6.5 6.5	37 37	14.85 14.85	28 28	11.25 11.25
P 7-8 P 9-11 P 12-13	RayJGCN80/2 Ray single stage PGECNO Ray two stage PGECNO			400 427 427	1 1 1 1/2	16 16 16	6.5 6.5 6.5	37 37 37	14.85 14.85 14.85	28 28 28	11.25 11.25 11.25

Alternative burners to those listed may be selected provided approval is confirmed by Hamworthy Heating Department.

1 assembled boiler complete with flue hood, mounted on a wooden pallet suitable for fork lift handling.

NOTE: Adequate site handling equipment should be made available to suit the boiler weights shown on table 1.

Site assembled. Hamworthy personnel MUST be used for the site assembly. Each boiler will comprise:

The items noted above, with the boiler castings and assembly components mounted onto the wooden pallet.

#### **GENERAL REQUIREMENTS**

The installation of the boiler must be in accordance with the relevant requirements of the Building and IEE Regulations and the Byelaws of the Local Water Authority and Local Authority. The relevant sections of the following documents must be observed:

**British Standards Codes of Practice:** 

CP 341 300 307 Central heating by low pressure hot water.

CP 342 Centralised hot water supply: Part 1. Individual dwellings.

Part 2. Buildings other than individual dwellings.

CIBS Guide Particular reference should be made to sections B7, B11 and B13 and the installation

must be in accordance with our recommendations and good practice for our

Warranty to apply.

#### OIL FIRED

The following standards apply to oil fired boilers:

B.S. 5410

Parts 1 and 2: Oil fired installations of 44 kW and above output capacity for space heating/hot water.

#### **GAS FIRED**

The installation should be in accordance with any relevant requirements of the Local Gas Region and the relevant recommendations of the following documents:

#### British Standard Codes of Practice:

CP 331

Installation of pipes and meters for Town Gas.

Part 3. Low pressure installation pipes.

**CP 332** 

Selection and installation of Town Gas space heating.

Part 3. Boilers of more than 150,000 Btu/h (44 kW) and up to 2,000,000 Btu/h

(586 kW) output.

#### British Gas Publications

Technical notes on the design of flues for non domestic gas boilers and Combustion Air and Ventilation Air, guidance notes for boiler installations in excess of 2,000,000 Btu/h (586 kW) output.

#### **OIL SUPPLY**

Refer to notes in this leaflet and on burner supplement supplied with burner.

#### **GAS SUPPLY**

#### Service Pipes

The local gas region must be consulted at the installation planning stage in order to establish the availability of an adequate supply of gas.

An existing pipe must not be used without prior consultation with the local gas region.

#### Meters

A new gas meter will be connected to the service pipe by the local gas region, or a local gas region contractor.

An existing meter should be checked, preferably by the gas region, to ensure that it is adequate to deal with the rate of gas supply required.

#### Gas Supply Pipes

Supply pipes must be fitted in accordance with CP 331:3. Pipework from the meter to the boiler must be of adequate size. Do not use pipes of a smaller size than the boiler gas connection. The complete installation must be tested for soundness as described in the above Code.

#### **Boosted Supplies**

Where it is necessary to employ a gas pressure booster, the controls must include a low pressure cut-off switch at the booster inlet. The local gas region must be consulted before a gas pressure booster is fitted.

#### WATER SUPPLY

#### Adequate Water Flow

The boilers are designed as quick response low water content units, to run with a minimum of operating problems. However, care must be taken in the initial design and layout with regard to water flow through the boilers and the influence of the system controls.

Table 1 gives normal and minimum recommended water flows. The control system and valves where fitted should be regulated to avoid lower flows occurring. The flow corresponding to 22°C temperature rise across the boiler is the MINIMUM recommended flow at any time.

#### **Time Clock Control**

In order to avoid local overheating and progressive calcium deposition with zero flow conditions, when boilers are operated from time clocks, provision must be made for a pump over run after the last boiler has ceased firing.

NOTE: It is essential that when firing on oil that the water return temperature should not be less than 60°C (140°F). A return temperature below this figure may cause acid corrosion on the boiler heating surfaces.

**TABLE 4** 

#### MINIMUM WATER FLOW REQUIREMENTS

BOILER MODEL		P7	P8	P9	P10	P11	P12	P13
Design Water Flow Rate for 11°C		152	178	203	228	256	280	311
Temperature Rise	UK gal/min	33.4	39.2	44.7	50.2	56.3	61.6	68.4
Minimum Water Flow Rate	l∕min UK gal∕min	76 16.7	89 19.6	102 22.3	114 25.1	128 28.2	140 30.8	156 34.2

#### **Feed Water Quality**

If the boiler feed has a high degree of hardness, it is recommended that the water be treated to prevent precipitation of scale or sludge in the boiler water passageways. Details of additives can be obtained from any reliable manufacturer of water treatment equipment or the Local Water Authority.

It should be noted however that even if the water is of average hardness not requiring treatment, subsequent draining of a system for repair or constant make up water due to an undetected system leak will cause additional deposits and a gradual build up of scale.

It is essential therefore that leaks are attended to promptly, and draining kept to an absolute minimum. It is recommended that the system be flushed out at least twice when hot before any water treatment is added. If any doubt exists regarding the cleanliness of an old system, consideration should be given to the fitting of a coarse filter in the return pipework to the boilers.

#### AIR FOR COMBUSTION AND VENTILATION

#### Oil Fired

Adequate air for combustion must be provided by two openings in the boiler room, one located at low level and one at high level in accordance with the relevant codes of practice. For general guidance low level ventilation should not be less than 660 mm<sup>2</sup> per kW of firing rate and at high level not less than 330 mm<sup>2</sup> per kW of firing rate.

#### Gas Fired

Adequate air for combustion and ventilation must be provided by means of openings at high and low level within the boilerhouse. The air supply requirements are specified in CP 332:3 and the British Gas publication referred to above. The free areas required are as follows:

TABLE 5 — GAS FIRED AIR REQUIREMENTS

Total Input Rating of Boiler(s)	Position of Openings	Free Area of Openings (Air directed from outside)
Installations up to 730 kW (2,500,000 Btu/h)	High Level Low Level	4.5 cm² per kW (1 in² per 5000 Btu/h) 9.0 cm² per kW (2 in² per 5000 Btu/h)
Installations between 730 kW (2,500,000 Btu/h) and 1320 kW (4,500,000 Btu/h)	High Level Low Level	3.3 cm <sup>2</sup> per kW (1 in <sup>2</sup> per 7000 Btu/h) 6.6 cm <sup>2</sup> per kW (2 in <sup>2</sup> per 7000 Btu/h)
Installations in excess of 1320 kW (4,500,000 Btu/h)	High Level Low Level	2.5 cm <sup>2</sup> per kW (1 in <sup>2</sup> per 9000 Btu/h) 5.0 cm <sup>2</sup> per kW (2 in <sup>2</sup> per 9000 Btu/h)

#### **BOILER FLUE**

The chimney design must be in accordance with Local Authority Regulations and the recommendations of the Clean Air Act.

The boilers must be located so that the length of ducting to the chimney is kept to a minimum. An allowance of at least 610 mm (24 in) of vertical flue offtake from the boiler should be made before any connection to the horizontal flue header. This vertical section must include a slip ring (gas tight) to enable the boiler to be removed from the flue system if necessary, and should also include a flue gas sampling point, sized to take a probe in close proximity to the boiler.

The flue offtake from the boiler must fit inside the boiler spigot, where it is supported by an internal flange.

The length of flue ducting to the chimney must be as short as possible with no right angled bends. Changes of direction must be minimal and swept bends used.

The flue system must be self supporting and under no circumstances must the weight be taken by the boilers.

Provision must be taken for cleaning the flue system assembly.

The Parkstone Series of boilers are designed to operate under forced draught conditions. A minimum suction at the boiler outlet of 0.3 mbar (0.12 in wg) must be provided.

The flue system must be sized to suit anticipated flue gas volumes and temperature as tabulated.

TABLE 6

PARKSTONE SERIES OIL FIRING								
MODEL	P7	P8	P9	P10	P11	P12	P13	
Flue Nominal Dia. mm To Fit Inside Spigot in	203 8	229	229 9	229 9	279 11	279 11	279 11	
Waste Gas Volume m <sup>3</sup> /h at NTP Approx ft <sup>3</sup> /h	215 7588	250 8855	286 10109	323 11389	358 12649	391 13880	430 151.80	
Wast Gas Temperature	<u>,                                     </u>	<del></del>	270°C(5	18 <sup>o</sup> F) 109	6 CO2	1	<del></del> -	

**TABLE 7** 

MODEL	P7	P8	P9	P10	P11	P12	P13
Flue Nominal Dia. mm To Fit Inside Spigot in		229 9	229 9	229	279 11	279 11	279 11
WasteGas Volume m <sup>3</sup> /t at NTP Approx ft <sup>3</sup> /t	180.2 1 6364	210.3 7426	240.1 8478	270.5 9558	300.4 10609	328.3 11992	360.6 12735

#### INSTALLATION INSTRUCTIONS

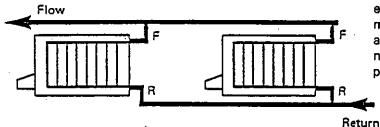
The boiler must be positioned on a level fire proof plinth of concrete or brick and attention paid to floor loading. For weights refer to table.

The boiler base is water cooled but attention should be paid to the relevant Regulations applicable to the location.

A clearance of 610 mm (24 in) must be allowed at the rear of the boiler and at the front of the burner for maintenance purposes. Fig. 4 refers.

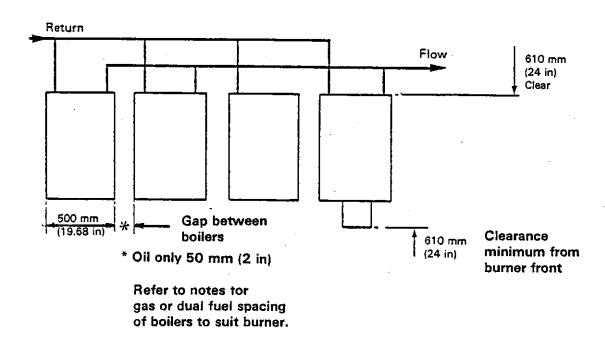
On multi boiler installations arranged in a line a minimum gap of 50 mm (2 in) is recommended on oil firing, the gap allowed for gas or dual fuel applications must be adequate to suit the gas valve train arrangement on the selected burner. Allow a nominal 235 mm gap, but refer to Hamworthy Technical Department. The reverse return method of pipework connection is recommended. Fig. 3 refers.

Fig. 3 — FŁOW WATER SYSTEM



It is important that the system layouts employ the 'reverse return' method of water connection which must be used to ensure even water flow across the modules. In this way the pressure loss across any size bank of boiler modules is never greater than that for a single module plus local pipework losses.

Fig. 4 — BOILER LAYOUT SPACING



#### Oil Supply Connections

The oil supply connections between the storage tank and the burner should be run in copper, steel or aluminium pipe. Galvanised pipes and fittings should not be used. All pipework and fittings must be oil tight and screwed joints should be made with an oil resistant compound.

The supply should terminate close to the burner with a valve and filter, and approx. the last 1/2 m should be run in flexible pipe to facilitate moving the burner in relation to the oil pump inlet, on the burner.

#### **Gravity Feed Supply**

Where the delivery connection on the tank is above the level of the pump inlet a single pipe may be used.

The burner oil pump is normally set for this supply arrangement.

#### Suction Lift Supply

Where the delivery connection on the tank is below the level of the pump inlet a two pipe system MUST BE USED.

The oil pump must be converted for use on this system by inserting the bypass plug (normally supplied loose) as shown. Refer to burner supplement for details.

If the suction pipe rises higher than the oil pump inlet at any point on the run it is recommended that a priming point should be provided so that if necessary it can be used to prime the line or check the effectiveness of the non-return valve at the tank end. Otherwise the vacuum gauge port on the pump can be used for this purpose.

#### **Burner Fuel Pumps**

The fuel pump supplied fitted to each burner will vary between types and model numbers. Refer to the supplement for burner details.

#### **ASSEMBLY**

Refer also to Fig. 7, and to List of Components, Table 8.

Control Thermostat: Locate instrument to fascia panel and casing front with 2 M8 x 11mm long screws on horizontal fixings as shown above. Control knob push fit into spindle.

**High Limit Thermostat:** Locate instrument spindle through fascia panel and casing, secure with locknut, and screw cover cap in position. The manual reset push button is accessable beneath the cover cap.

Temperature Gauge: Push fit instrument into the slot provided.

Insert the three probes into position in the three bulb socket provided on the boiler as shown.

Connect cable harness to the instruments using the connectors provided,

NOTE: The Parkstone boiler may be used in conjunction with the Hamworthy step control panel and a wiring diagram will be supplied with the panel to suit the application.

Fig. 5 — ASSEMBLY OF INSTRUMENTS TO FASCIA PANEL

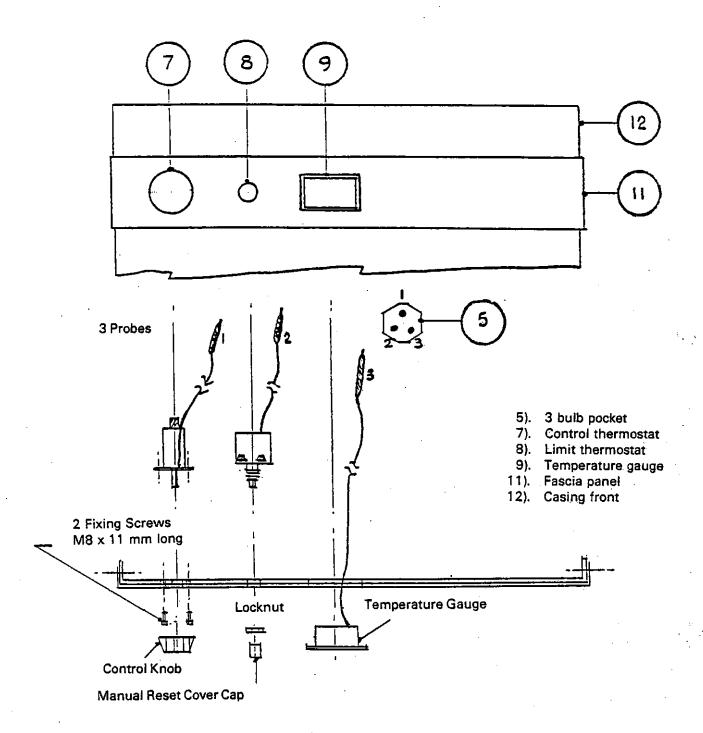
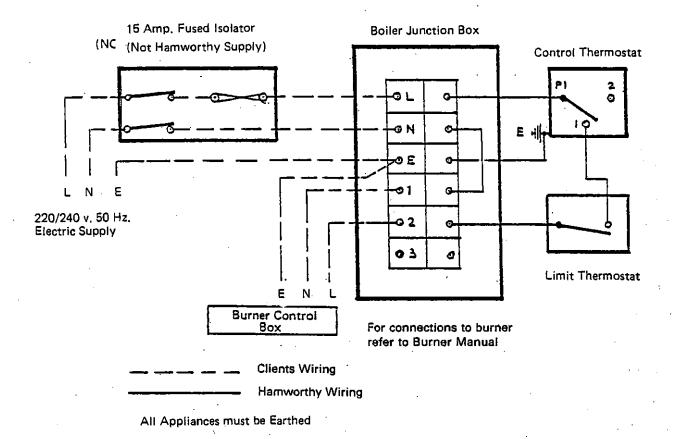


Fig. 6 - SCHEMATIC WIRING DIAGRAM



NOTE: The Parkstone boiler may be used in conjunction with the Hamworthy step control panel and a wiring diagram will be supplied with the panel to suit the application

#### **Electrical**

A 220/240 volt single phase electrical supply is required, preferably via a 15 amp double pole fused switch box located in the boiler room.

Refer to the basic wiring diagram for detail.

All electric wiring should be in accordance with IEE Regulations, and to a minimum specification of heat resistant PVC insulated cable. Care should be taken to ensure that the cables to the burner will "flex".

Consideration should be given to fitting an additional control thermostat for each module positioned in the common flow header, with a differential setting for simple sequence control, or alternatively the Hamworthy step control panel system is recommended.

All electrical conduit and cable tray should be run at high level where possible, to leave the front of the boiler clear for maintenance.

THIS APPLIANCE MUST BE EARTHED AND THE SUPPLY PROTECTED.

#### COMMISSIONING

Before attempting to commission the boiler, ensure that any personnel involved are aware of the action about to be taken, and begin by making the following checks:

- a). Flueway passages to the chimney are clear.
- b). Flueway passages within the boiler are clean and clear.
- c). Adequate ventilation exists in the boilerhouse.
- d). The installation is satisfactory.
- e.) The system is fully charged with water, ready to receive heat, all necessary valves are open, and the pump is running and circulating water.
- f). Ensure that the water circulating rate is adequate and in accordance with the flow rates required.
- g). Follow the burner lighting up instructions as described in the burner instructions supplement.
- h). The burner should be adjusted to a smoke number of 0-1, with a CO<sub>2</sub> of 10-11% when oil fired, and CO<sub>2</sub> of 8.5-9% when gas fired.

#### MAINTENANCE AND CLEANING

Ensure that the electric supply and oil supply are isolated to the boiler.

- 1. Ensure that the equipment is maintained dust free and any oil deposits removed.
- 2. The boiler should be inspected for accumulation of soot or other deposits at least once every three months, or at shorter intervals if necessary.
- 3. Check the burner nozzle and replace where necessary, or at least at the beginning of each heating season.
- 4. The boiler filter should be cleaned every 3 months and should immediately be checked out if the oil tank has been allowed to reach a low level. Replace the element at the start of each heating season.
- 5. The photocell and electrodes should be cleaned every 2 weeks, and more if the boiler is in constant operation.

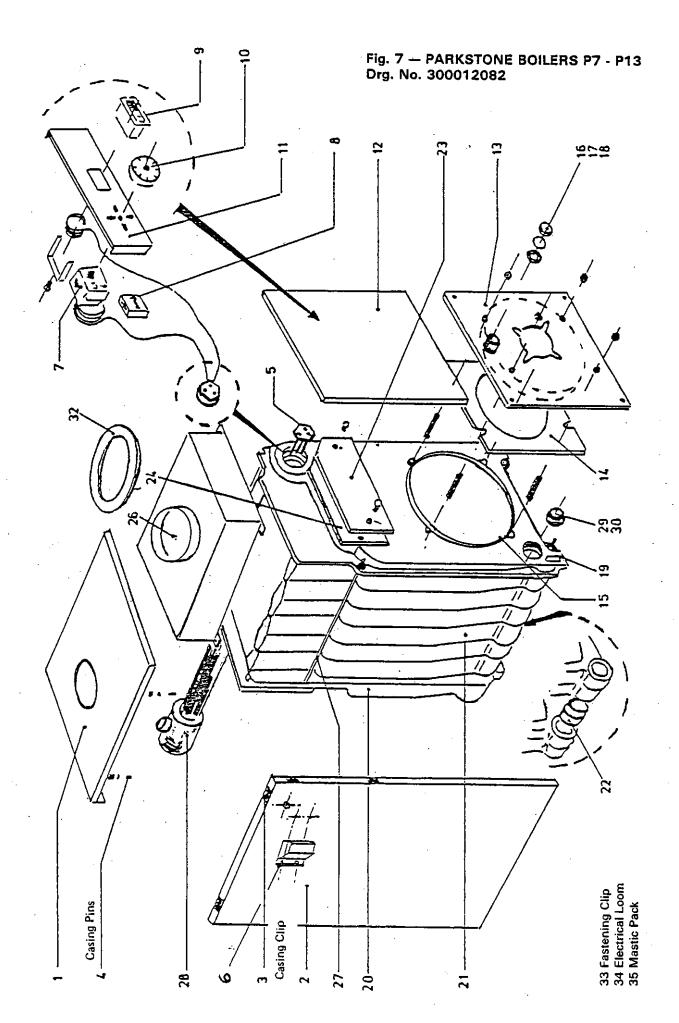
#### **Boiler Cleaning**

The boiler is supplied complete with a bolted access door. Item 23 on Fig. 7. Remove the front cover plate, item 12, and access door. This gives complete access to the flueways for vacuum or brush cleaning with approved chemical cleaner. Should it be necessary, access to the combustion chamber is also available by removing the burner mounting door, item 13, and via the flue hood, item 26, if necessary.

#### Spares

Reference should be made to Fig. 7 and the Boiler Parts List, Table 8.

Spares are available direct from Hamworthy Engineering Limited, Heating Department, Fleets Corner, Poole, Dorset BH17 7LA. Telephone (0202) 675123.



#### TABLE 8 — LIST OF PARTS — PARKSTONE BOILER

ltem	Description	Qty.
1	Casing Top	1
2	Casing Sides	2
3	Casing Clips	To suit
4	Casing Pins	To suit
5	3 Bulb Pocket	1
6	Boiler Junction Box	1
7	Control Thermostat	1
8	Limit Thermostat	1
9	Temperature Gauge	. 1
10	Temperature Control Dial	1
11	Front Panel Fascia	1
12	Casing Front	1
13	Burner Plate	1
14	Burner Plate Asbestos Seal	. 1
15	Furnace Tube Asbestos Seal	1
16	Sight Glass	1
17	Sight Glass Retaining Ring	1
18	Sight Glass Gasket	1
19	Front Casting	1
20	Rear Casting	1
21	Intermediate Castings (5 to 11)	To suit
22	Nipples (12 to 24)	To suit
23	Cleaning Door	1 ,
24	Cleaning Door Seal	1
26	Flue Hood	1
27 ·	Tie Rods	4
28	Water Diffuser Tube	1
29	2 in <sub>t</sub> Plug	. 1
30	Plug Gasket	1
31	Fire Glass Insulation (2 pieces)	1
32	Flue Hood Ring	1 .

## HENWWOETHY



#### Accredited Agents

#### HEAD OFFICE

#### HAMMANORTHEN ENGINEERING HIMITED. GOMBUSTRION DIVISIONS HEATING DEPARTMENT

PLEETS CORNER ROOMS DORSET BHAI THE 2020256751123

Cabiles Business Poole - Telex 4.17.26.

#### Offices

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Sűnreviri Havi IIB Tel 107874712

#### MIDLANDS

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COMBUSTION DIVISION.

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#### NORTH EAST

#### HAMWORTHLY ENGINEERING LIMITED COMBUSTION DIVISION

Tyne/8/Wear NE28/60R/w

Publication No. CDH 3085: 0286

#### BERKS, BUCKS /OXON, SURREY & W. KONDON

#### HOMMETER (CLORATE DESTRICONAL (CLO) REPUBLISED.

1 (ö. Ozáronol Akete) Woldkiajehran BjedkialBCT (r. 200

Nel 07/3/47/7/8/48/50

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#### DANNERENGINEERING UMHED.

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#### DEVON & CORNWALL &.

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#### NORTH WEST (Part).

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