

HYDROTHERM

SERVICE COURSE

MASTER SET.



Hamworthy

33

HAMWORTHY HYDROTHERM BOILERS.

General Information.

- Introduced U.K. - January 1967
- Gas Council Formal Approval - December 1967
- U.K. Production commenced - June 1968 - (Gas control manifolds)
- October 1968 - Full Boiler production - GAS.
- December 1968 - Full Boiler production - OIL.

Modifications.

GAS. From January 1967 to October 1968 all Gas fired Boilers were fitted with 24 volt controls and a transformer of 51VA was supplied by Hamworthy to serve up to 3 modules ('B' Battery).

These valves are Honeywell type V81 and replacements are available from Spares stock.

OIL. The imported oil fired modules are all fired by Elco Burners, but these imported American Boilers have different sized combustion chambers and boxes and the current U.K. chamber is not interchangeable with them. The imported Boiler may be readily identified by the American flash on the casing and from the Contract number.

CASINGS.

The Hamworthy design of gas boiler casing totally encloses the gas valve train and was introduced in May 1968.

The oil fired boiler casing was introduced late in 1968, and is of one size throughout the module range as distinct from the American version which was in three different sizes.

STATISTICS. BOILER SALES. U.K. (To 23.3.70.)

GAS FIRED BOILERS.

R180	R.210	R.250	R300	Total
26	22	73	114	235

Boilers supplied up to September 1968 with Honeywell 24 volt control valve and transformer. The valve V81D may be obtained from combustion spares, and is listed on the current Hydrotherm spares list.

R180	R210	R250	R300	Total
92	103	345	738	1278

Boilers supplied with 240 volt control valves from October 1968.

OIL FIRED BOILERS.

OR175	OR210	OR280	OR330	OR385	Total
3	5	4	15	14	41

Imported Boilers with American combustion chambers up to November 1968.

OR175	OR210	OR280	OR330	OR385	Total
26	33	52	101	177	389

Boilers supplied with U.K. combustion chambers from December 1968.

Summary.

Gas boilers total sold with 24V. controls	-	235	
" " " " " 24OV. "	-	1278	
" " " export		828	
			2341
Oil Boilers total sold imported		41	
" " " " produced U.K.		389	
" " " " export		298	728
			<u>3069</u>

Total number of Contracts - 843

HAMWORTHY HYDROTHERM.

Boilers.

Module Sizes

<u>GAS</u>	<u>OIL</u>
R180	OR175
R210	OR210
R250	OR280
R300	OR330
	OR385

All Batteries are built up from multiples of these modules.

Identification

R180.	3	Burner Bars.	Wetbase plus 3 sections.	Back flow connection.
R210.	4	" "	" " 3 sections.	" " "
R250.	4	" "	" " 4 sections.	Front flow connection.
R300.	4	" "	" " 5 sections.	Back flow connection.

/cont'd.....

Identification (cont'd.)

OR175. Wetbase plus 3 sections. Back flow connection.
OR210. " " 3 sections. " " "
OR280. " " 4 sections. Front flow connection.
OR330. " " 4 sections. " " "
OR385. " " 5 sections. Back flow connection.

Notes.

- (1) Boilers with front flow connections cannot be used with the Indirect Heat Exchanger.
- (2) Battery identification. 'A' Battery. 2 modules. 'B' Battery 3 modules.
- (3) R180. OR175. OR210. 7" dome assembly and flue uptake.

Heat Exchangers.

The Hydrotherm heat exchanger is always close coupled to the Boiler unit as shown in the literature.

The main sales outlet has been on Laundrettes where the heat exchanger is used with an indirect storage cylinder. Cleaning of the coils may be done by using an acid solution.

Headers.

The pipework headers are of 3" N.B. with 2" connections to the boilers, which are tapped 2" B.S.P.T. on flow and return.

The couplings are intended to take up any differential expansion between separate modules connected to a common header. A new type of coupling will be introduced shortly, which will be interchangeable with existing couplings in the field.

Oil fired Boiler background.

Burner.

The Elco Junior Burner only has been used on the Hydrotherm Boilers marketed in the U.K.

Up to January 1970 the Junior 8V and 12V Burners were supplied and current production includes the Junior 10 throughout the range, this Burner has a plastic cover fitted as standard.

Combustion Chamber.

The oil fired Boiler combustion chamber has been subject to change since the Boiler was introduced.

The first 41 Boilers were fitted with American combustion chambers. These are of four different sizes to suit the combustion chamber box and they are smaller than the U.K. chambers now supplied. From the Contract number it is possible to identify which contracts are affected.

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The U.K. chambers used up to January 1970 are of common size but with inside clearance holes to suit the Junior 8 and 12 Burner ($3\frac{3}{8}$ " and $4\frac{1}{8}$ " respectively).

It is essential that the correct size chamber is called up for replacement, the Burner model size and Contract number should be adequate reference.

All current chambers for the Junior 10 Burner have the $3\frac{3}{8}$ " dia. hole inside the chamber, and may be identified by the Burner type. The Boiler rating plate identifies the Contract and oil throughput.

Gas fired Boiler background.

The Boiler has mainly been used on Towns and Natural Gas using either the 24V. or 240V. Honeywell valve.

There are, however, 84 boilers working on L.P.G. or mixed gases, using the same basic components but with the orifice and burner bar jet sizes to suit. The pressure is also adjusted and the type of spring changed in the pressure regulator.

St. David's College, Lampeter, is working on propane with 50 modules fitted with White Rodgers automatic ignition, but this type of control is fitted to only one other job at a Hostel in Leicester and is unlikely to be used again due to the initial cost.

The only variation to the standard Honeywell controls is the Maclaren Self-Energising controls. These enable the boilers to operate without an external electric supply, the control circuits being powered from the heat operated by the thermocouple. These Boilers will be found on the smaller Gas pressure reducing stations and a total of 57 Boilers are in service.

The Boiler rating plate gives details of the gas, burner orifices and Contract number, and should facilitate Spares identification.

**GAS - DATA. APPLICABLE TO HYDROTHERM
GAS FIRED BOILERS.**

GAS ORIFICE SIZE & MANIFOLD TEST POINT PRESSURES.

MODEL	TOWNS ^{G4} GAS 500 BTU's/CU. FT. BURNER PRESS. ORIFICE	NATURAL GAS 1000 BTU's/CU. FT. BURNER PRESS. ORIFICE	PROPANE 2520 BTU's/CU. FT.	BUTANE / AIR 720 BTU's/CU. FT.	BUTANE 3200 BTU's/CU. FT.
R180	1.8" WG .235"	4.6" WG 1285"	11" WG .086"	3" WG .213"	11" WG .086"
R210	2.2" WG .219"	4.6" WG 1200"	11" WG .081"	3" WG .199"	11" WG .0785"
R250	1.8" WG .235"	4.6" WG 1285"	11" WG .089"	3" WG .221"	11" WG .086"
R300	1.8" WG .272"	4.6" WG 1406"	11" WG .096"	3" WG .234"	11" WG .0935"

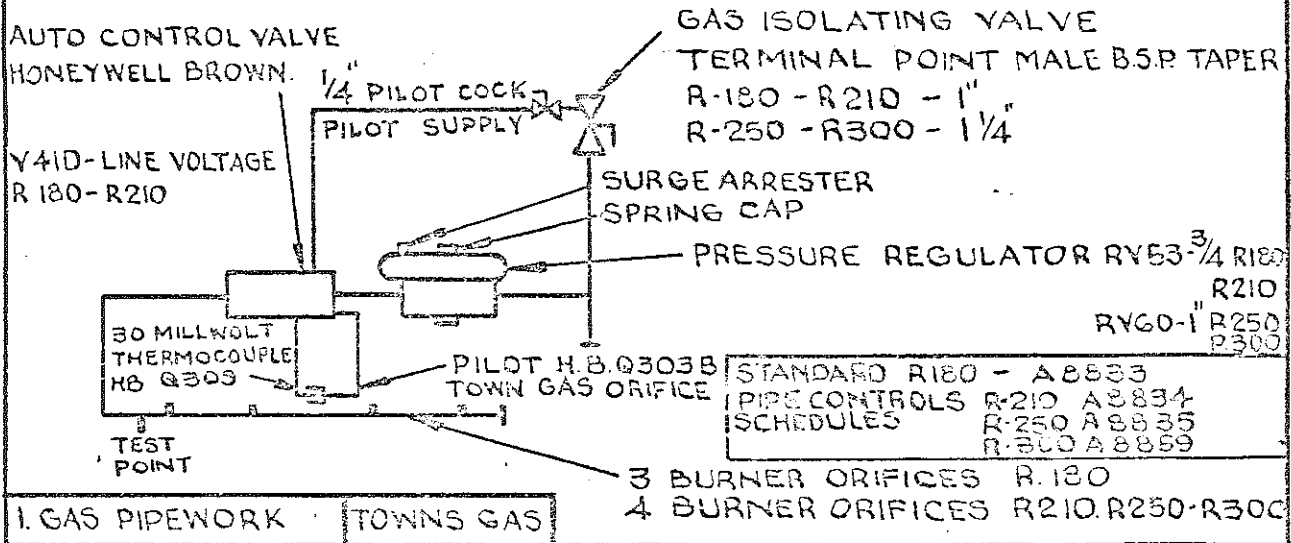
NOTE :- TOWNS GAS. G3 BURNER PRESSURE 1.5 WG
G5 BURNER PRESSURE 2.1 WG

BURNER BAR JET SIZES.

MODEL	JETS PER BAR	TOWNS GAS	NATURAL GAS
ALL SIZES	196	.081 DIA.	.150 DIA.
ALL SIZES	196	PROPANE .115" DIA.	BUTANE / AIR .0995 DIA.
		BUTANE .1025	

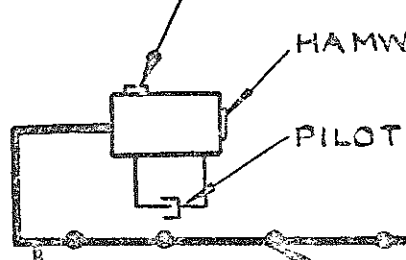
MODULE SIZES	R 180	R 210	R 250	R 300
BURNER BARS PER MODULE	3	4	4	4

HYDROTHERM - SCHEMATIC ARRANGEMENT - GAS CONTROLS.



GAS COUNCIL APPROVAL - (41-351-01 TO 04 INCL.)

V4232 240V. HONEYWELL BROWN COMBINATION GAS VALVE INCLUDES MAIN & PILOT GAS MANUAL ISOLATING VALVE. AUTOMATIC CONTROL & FLAME FAILURE & PRESSURE REGULATION (NAT. GAS.)



HAMWORTHY TERMINAL POINT 3/4" B.S.P.T

PILOT H.B. Q303B. THERMOCOUPLE HB Q309 NAT. GAS ORIFICE.

TEST POINT

3 BURNER ORIFICES R180

4 BURNER ORIFICES R210-R250-R300

THIS ARRANGEMENT WILL BE INTRODUCED LATER IN 1970.

2 GAS PIPEWORK NAT. GAS.
& LPG. UK APPLICATIONS ONLY

EXISTING TOWN GAS BOILERS
CONVERSION TO NATURAL GAS.

FROM STANDARD TOWN GAS.

USE CONVERSION SETS:-

R 180 - A 8854

R 210 - A 8855

R 250 - A 8856

R 300 - A 8857

1. CHANGE BURNER BARS.
 2. CHANGE BURNER ORIFICES
 3. CHANGE PILOT ORIFICE
 4. CHANGE PRESS. REG. SPRING
 5. FIT PRESS. REG. SURGE ARRESTER
 6. RESET PRESS. & COMMISSION.
- FOR FULL DETAILS REFER TO
CONVERSION LEAFLET.

FOR CONVERSION SET ORDERS
CONTACT COMB. SPARES DEPT. POOLE
5123

PILOT ORIFICES	DIA.
TOWNS GAS	026
NAT. GAS.	018
L.P.G.	010

MAIN FLAME
CHARACTERSTIC
1/2" SHARP BLUE-TOWNS
3/4" SHARP BLUE-NAT.

CASES FIRED WITH
THE HYDROTHERM
BOILER
NATURAL GAS U.K.
N. GAS. HOLLAND
TOWNS GAS G3-G5
BUTANE
PROPANE
BUTANE / AIR
PROPANE / AIR
METHANE / AIR
(FIRE DAMP)
REFER TO HEAD
OFFICE POOLE FOR
OTHER GAS
APPLICATIONS.

PRESSURE REGULATOR
SPRING RANGE SELECTION CHART

REGULATOR MODEL NUMBER	REGULATOR MAXIMUM INLET PRESSURE	OUTLET PRESSURE RANGE					REGULATOR CONNECTIONS S.S.P.
		TOWN GAS	TOWN GAS	NAT. GAS	L.P.G.	COLOR CODE	
		NONE STANDARD	BROWN	ORANGE	BLUE	RED	
RV 53	1 P.S.I.	2" - 5"	1" - 3.5"	3" - 8"	4" - 12"	10" - 22"	3/4"
RV 60	2 P.S.I.	2" - 5"	1" - 3.5"	3" - 8"	4" - 12"	10" - 22"	1"

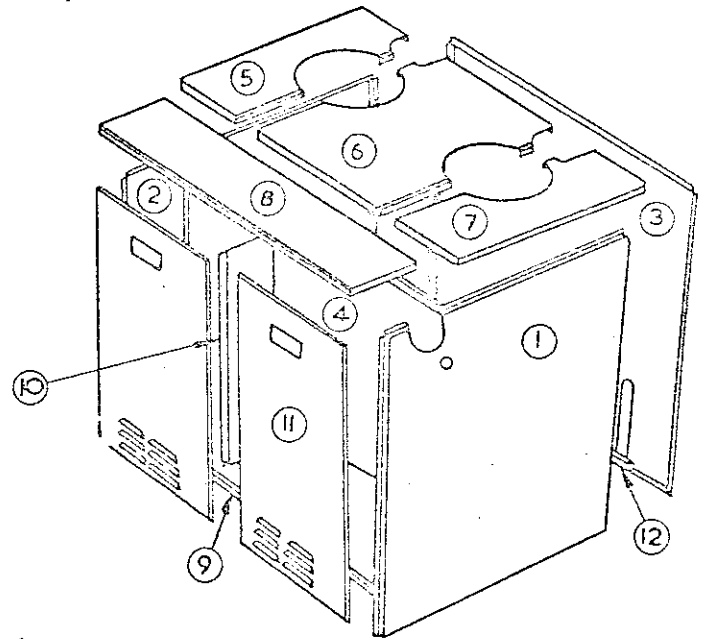
NOTE:-

TO CHANGE A SPRING UNSCREW SLOTTED CAP ON
REGULATOR, & THEN UNSCREW INNER PLUG (CLOCKWISE)
CHANGE SPRING. THE GAS MUST BE TURNED OFF ON THE
MODULE CONCERNED BEFORE REMOVING THE INNER PLUG.

NOTE

JACKET MUST BE ASSEMBLED ON BOILER BEFORE THERMOSTAT CAN BE FITTED.

1. PLACE SIDE PANELS (1) (2) AND FRONT AND REAR PANELS (3) (4) ROUND BOILER AND ATTACH WITH SCREWS PROVIDED.
2. INSERT STIFFENERS (12) AT BASE OF SLOTS IN REAR PANEL.
3. PLACE ON TOP PANELS (5) (7) (8) AND (6) (MULTI TEMPS) AND ATTACH WITH SCREWS PROVIDED.
4. FIX FRONT TIE BAR (9) TO SIDE PANELS WITH SCREWS PROVIDED.
5. INSERT DOOR GUIDE (10) (MULTI-TEMPS) AND ATTACH WITH SCREWS PROVIDED.
6. PLACE ON DOOR(S) (11)



ITEM N°	DESCRIPTION	PART N°			N° OFF
		SINGLE	A BATTERY	B BATTERY	
1	R.H. SIDE PANEL	BH.20012	BH.20012	BH.20012	1
2	L.H. SIDE PANEL	BH.20010	BH.20010	BH.20010	1
3	BACK SIDE PANEL	AH.20003	BH.20004	BH.20005	1
4	INSIDE FRONT PANEL	AH.20006	BH.20007	BH.20008	1
5	LEFT TOP PANEL	AH.20013	AH.20013	AH.20013	1
6	CENTRE TOP PANEL	—	AH.20015	— AH.20015	1 2
7	RIGHT TOP PANEL	AH.20014	AH.20014	AH.20014	1
8	FRONT TOP PANEL	AH.20016	AH.20017	AH.20018	1
9	FRONT TIE BAR	AH.20021	AH.20022	AH.20023	1
10	DOOR GUIDE	—	BH.20020	— BH.20020	1 2
11	DOOR PANEL	BH.20019	BH.20019	— BH.20019	1 2 3
12	STIFFENER	AH.20024	— AH.20024	— — AH.20024	1 2 3

HAMWORTHY ENGINEERING LTD.
COMBUSTION DIVISION. POOLE. DORSET.

ASSEMBLY INSTRUCTIONS
GAS FIRED BOILER CASING.

DRAWN

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30.9.68

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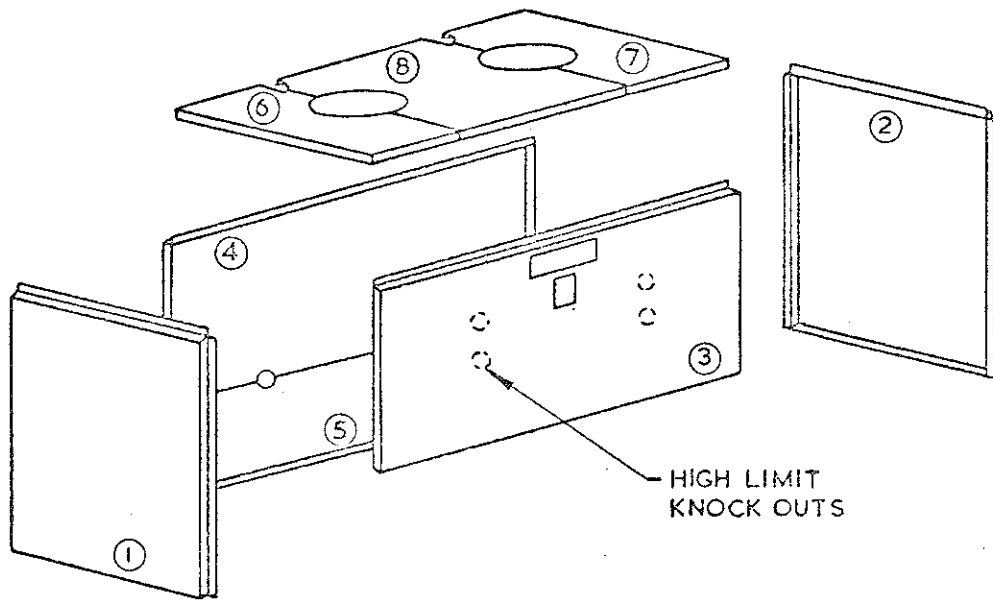
SCALE

AMENDMENTS

HYDROTHERM

ISSUE A

DRG. No. AH. 10010



ASSEMBLY INSTRUCTIONS

NOTE

JACKET MUST BE ASSEMBLED ON BOILER BEFORE HIGH LIMITS CAN BE INSTALLED.

- 1, PLACE REAR PANELS (4)(5) IN PLACE ALONG REAR OF MULTI-TEMP.
- 2, ATTACH SIDE PANELS (1)(2) WITH SCREWS PROVIDED.
- 3, ATTACH FRONT PANEL (3) WITH SCREWS PROVIDED.
- 4, PLACE LEFT AND RIGHT TOP PANELS OVER ASSEMBLY AND SECURE WITH SCREWS.
- 5, LOCK CENTRE TOP PANEL INTO LEFT AND RIGHT TOP PANELS (MULTI-TEMPS.)

ITEM No	DESCRIPTION	PART No			No OFF
		SINGLE	'A' BATTERY	'B' BATTERY	
1	LEFT SIDE PANEL	BH.20048	BH.20048	BH.20048	1
2	RIGHT SIDE PANEL	BH.20047	BH.20047	BH.20047	1
3	FRONT PANEL	BH.20046	BH.20040	CH.20045	1
4	REAR PANEL (TOP)	AH.20044	BH.20055	CH.20058	1
5	REAR PANEL (BOTTOM)	AH.20043	BH.20056	CH.20057	1
6	LEFT TOP PANEL	AH.20013	AH.20013	AH.20013	1
7	RIGHT TOP PANEL	AH.20014	AH.20014	AH.20014	1
8	CENTRE TOP PANEL	—	AH.20015	AH.20015	1 2

HAMWORTHY ENGINEERING LTD.

COMBUSTION DIVISION.

POOLE.

DORSET.

ASSEMBLY INSTRUCTIONS
OIL FIRED BOILER CASING.

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SCALE

AMENDMENTS

HYDROTHERM

ISSUE 'A'

DRG. No. AH 10011

HYDROTHERM GAS BOILERS.EXPLANATION OF TROUBLE SYMPTOMS.

POPPING SOUND WHEN BOILER GOES OFF.

1. Wrong size burner ports.
2. Air mixture too lean, adjust air shutters.

GAS ODOUR.

1. Faulty draught.
2. Ruptured diaphragm on gas pressure regulator.
3. Leak in piping.
4. Insufficient fresh air to boiler causing incomplete combustion.

WATER DRIPS FROM ABSORPTION UNIT WHEN GAS BURNER IS TURNED ON.

1. Poor draught causing moisture in burned gas to condense in flue pipe and drip back through the absorption unit.

BOILER CARBONIZES QUICKLY.

1. Improper shutter adjustment.
2. Wrong orifice or burner port.
3. Faulty draught.
4. Over gassed.

PILOT FAILURE.

1. Improper pilot flame.
2. End of thermocouple lead dirty.
3. Attaching nut of thermocouple lead to control valve loose.
4. Excessive draught deflecting pilot flame away from thermocouple.
5. Moisture build up in pilot pipework, disconnect and blow clear.

HYDROTHERM GAS BOILERS.EXPLANATION OF TROUBLE SYMPTOMS.

BOILER GOES ON AND OFF AT FREQUENT INTERVALS.

1. Break in control wiring.
2. Improperly wired.
3. No circulation. Caused by air pockets or faulty circulator.

THERMOSTAT CALLS FOR HEAT, BOILER DOES NOT FIRE.

1. Boiler is overheated.
2. Faulty high limit switch.
3. If pilot flame is extinguished, cause might be improper pilot location or loss of gas pressure.
4. Failure of control valve to operate due to faulty wiring, burned out coil or sticking of valve stem.
5. Faulty thermostat.

THERMOSTAT IS SATISFIED, BOILER BURNS CONTINUOUSLY.

1. Faulty thermostat.
2. Short in wiring leading to thermostat.
3. Leaking valve or sticking valve stem.

RUMBLING SOUND IN BOILER.

1. Boiler is overheated and high limit thermostat.

BOILER OVERHEATS AND SYSTEM REMAINS COLD.

1. Insufficient circulation due to obstruction in pipes or faulty circulation.
2. Air trapped in piping preventing proper circulation.
3. Improper wiring.

BOILER AND HEATING SYSTEM OVERHEAT.

1. Not sufficient radiation.
2. Faulty thermostat.
3. Faulty high limit thermostat.