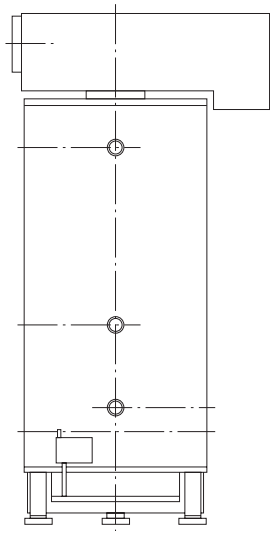

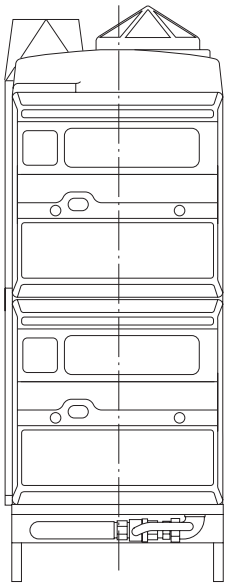

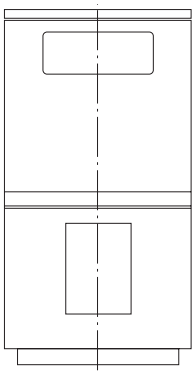

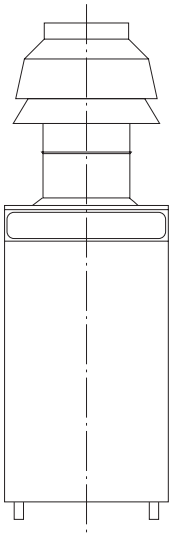

Weymouth Series Pressurisation Units

Installation, Commissioning and Servicing Instructions

Weymouth Standard & Advanced Models

IMPORTANT NOTE

THESE INSTRUCTIONS MUST BE READ AND UNDERSTOOD BEFORE INSTALLING, COMMISSIONING, OPERATING OR SERVICING EQUIPMENT

Hamworthy

HEATING & HOT WATER PRODUCTS

Customer Services

Technical Enquiries **01202 662527/662528**

To supplement the detailed technical brochures, technical advice on the application and use of products in the Hamworthy Heating range is available from our technical team in Poole and our accredited agents.

Site Assembly **01202 662555**

Hamworthy offer a service of site assembly for many of our products in instances where plant room area is restricted. Using our trained staff we offer a higher quality of build and assurance of a boiler built and tested by the manufacturer.

Commissioning **01202 662555**

Commissioning of equipment by our own engineers, accredited agents or specialist sub – contractors will ensure the equipment is operating safely and efficiently.

Maintenance Agreements **01202 662555**

Regular routine servicing of equipment by Hamworthy service engineers inspects the safety and integrity of the plant, reducing the risk of failure and improving performance and efficiency. Maintenance agreements enable our customers to plan and budget more efficiently.

Breakdown service, repair, replacement **01202 662555**

Hamworthy provide a rapid response breakdown, repair or replacement service through head office at Poole and accredited agents throughout the UK.

Spare Parts **01202 662525**

A comprehensive spare parts service is operated from our factory in Poole, providing replacement parts for both current and discontinued products. Delivery of parts and components is normally from stock within seven days. However, a next day delivery service is available for breakdowns and emergencies.

Weymouth Series Pressurisation Units

Installation, Commissioning and Servicing Instructions

Weymouth Standard & Advanced Models

NOTE: THESE INSTRUCTIONS MUST BE READ AND UNDERSTOOD BEFORE INSTALLING, COMMISSIONING, OPERATING OR SERVICING EQUIPMENT.

THE WEYMOUTH PRESSURISATION UNITS ARE INTENDED FOR USE ONLY IN COMMERCIAL/LIGHT INDUSTRIAL APPLICATIONS.

THESE PRESSURISATION UNITS COMPLY WITH THE ESSENTIAL REQUIREMENTS OF THE MAHINERY DIRECTIVE 89/392/EEC AMENDED BY 91/368/EEC, THE LOW VOLTAGE DIRECTIVE 73/23/EEC AMENDED BY 93/68/EEC AND THE ELECTROMAGNETIC COMPATIBILITY DIRECTIVE 89/336/EEC AMENDED BY 91/263/EEC AND 92/31/EEC.

PUBLICATION NO. 500001112
ISSUE 'C'
JUNE 2008

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FIGURES **PAGE**

1.0 INTRODUCTION

The pressurisation units in the Hamworthy Weymouth range are designed to maintain the minimum pressure requirement of modern low/medium temperature, hot water sealed systems. The pressurisation units also provide replacement water for losses from the systems.

Note! The pressurisation unit is not to be used for the initial filling of the system.

The Weymouth units are housed in a powder coated steel cabinet with removable cover. Housed in the cabinet is a pump, connecting pipe-work and pressure switches. In the top of the cabinet is the header tank, with a float valve. In the front of the cabinet is the systems pressure indication gauge.

The range has 2 models:-

1) The Standard with the following features:

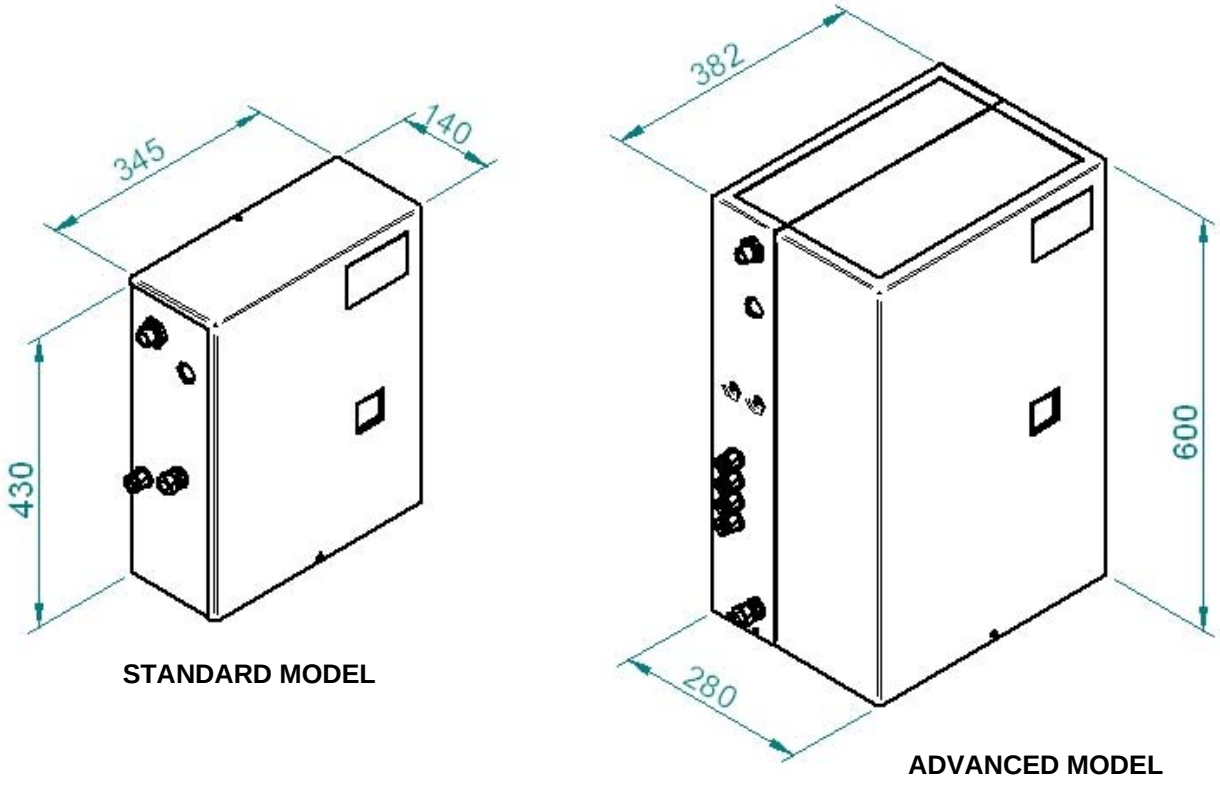
Pump control pressure switch
Non-return valve
0 – 6 bar system pressure gauge

2) The Advanced with

All the features of the standard plus:
High/Low pressure switches
Isolating Valve (between tank and pump)

2.0 TECHNICAL DATA

The basic overall dimensions of both units are shown in below Figure 1, complete dimensions are shown in Figure 9 on sheet 7.
All screw threads used in the Weymouth units conform to **ISO 7/1** or **ISO 228/1** for pipe threads where applicable & **ISO 262** for all general screw threads.
Performance and General Data is shown in Figure 2 (overleaf).



STANDARD MODEL

ADVANCED MODEL

Figure 1 - Basic Overall Dimensions

Figure 2 Weymouth Pressurisation Units—Technical Data

Model		**Standard**	**Advanced**
Minimum cold fill pressure	bar	1.0	
Maximum cold fill pressure	bar	3.4	
Maximum operating pressure	bar	7.0	
Maximum Flow Rate	l/min	6	
Maximum water flow rate @ maximum cold fill pressure	l/min	0.1	
Weight (empty)	kg	13	19
Weight (full)	kg	16	27
Tank capacity	litres	2.6	7.6
Factory Preset Values			
Cold fill pressure	bar	1.8	
System low pressure switch	bar	-	1.3
System high pressure switch	bar	-	3.65
To suit system conditions			
Maximum water flow temp	°C	82	
Maximum static height	m	30	
Minimum system operating pressure	bar	3.3	
Maximum system operating pressure	bar	6.3	
Safety relief valve setting (Not HHL supply)	bar	4.0	
Nominal pressure differential	bar	0.4	
Electrical Data			
Pressure switch contact rating		15A 240V AC	
Electrical Supply		230V AC 50Hz 1Ph	
Start current	amps	9	
Run current	amps	2.8	

3.0 SEALED SYSTEM FUNCTION

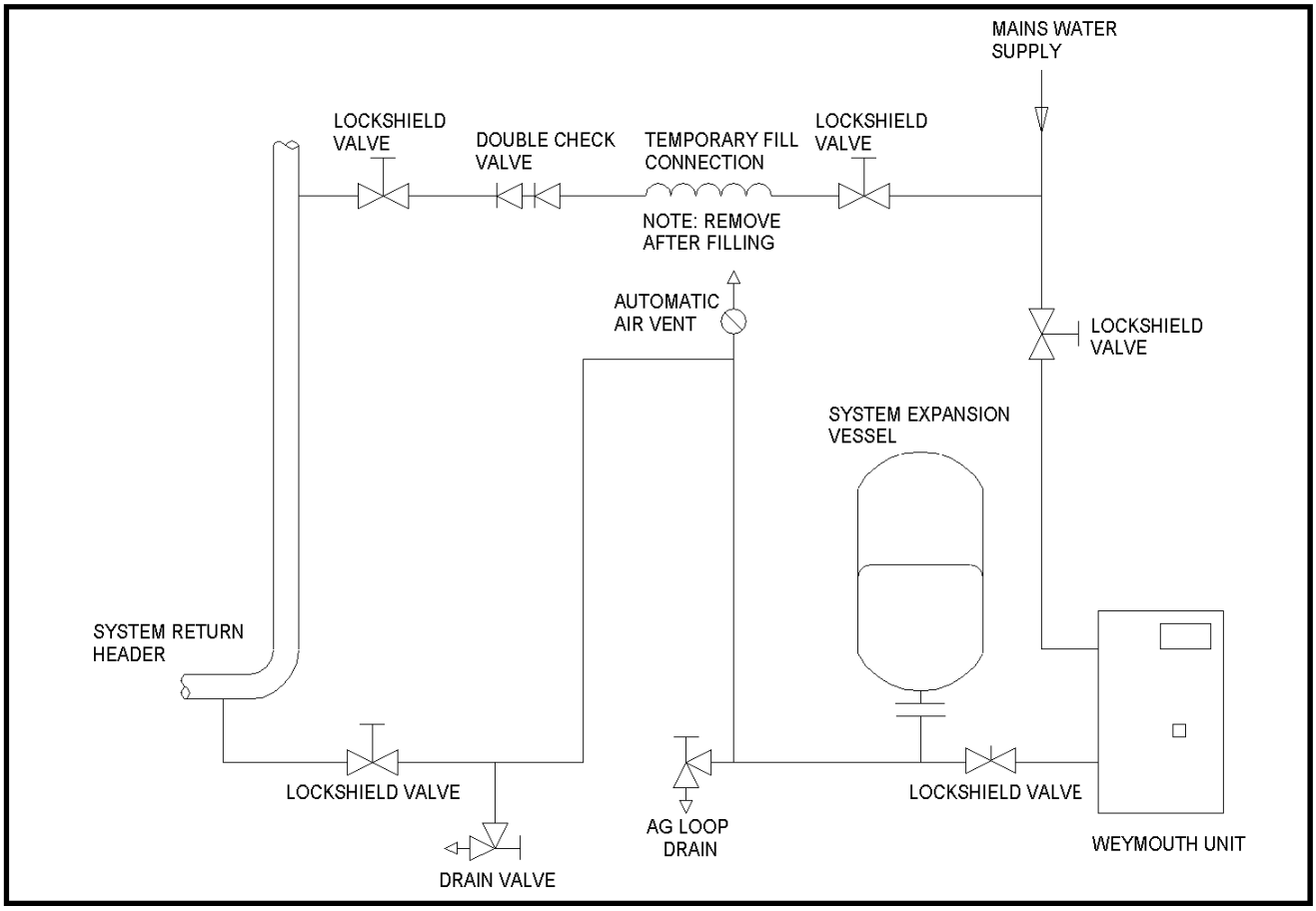
Figure 3 shows the layout of a typical sealed system.

3.1 Terminology

Expansion Vessel Charge Pressure
The gas pressure in the expansion vessel with water connection open to atmosphere

System Cold Fill Pressure
The water pressure in the system that the pressurisation unit is set to maintain

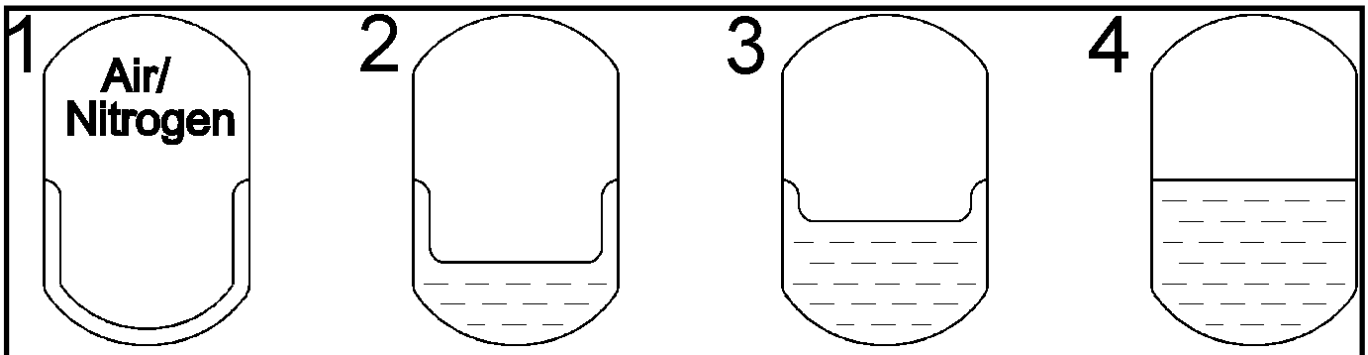
Figure 3 Typical System Schematic Layout



3.2 Application

The system expansion vessel charge pressure is set 0.1 bar below the cold fill pressure. Before operation of the boiler, with the system at cold fill pressure the expansion vessel is empty . As the system heats up the expanded volume is absorbed by the expansion vessel. A small pressure rise occurs which is accommodated by the vessel. When the system cools the pressure drops. If there has been some fluid loss the pressurisation provides replacement.

Figure 4 Expansion Vessel Operation



1. Diaphragm position at the cold fill / charge pressure. The vessel is empty of system fluid.

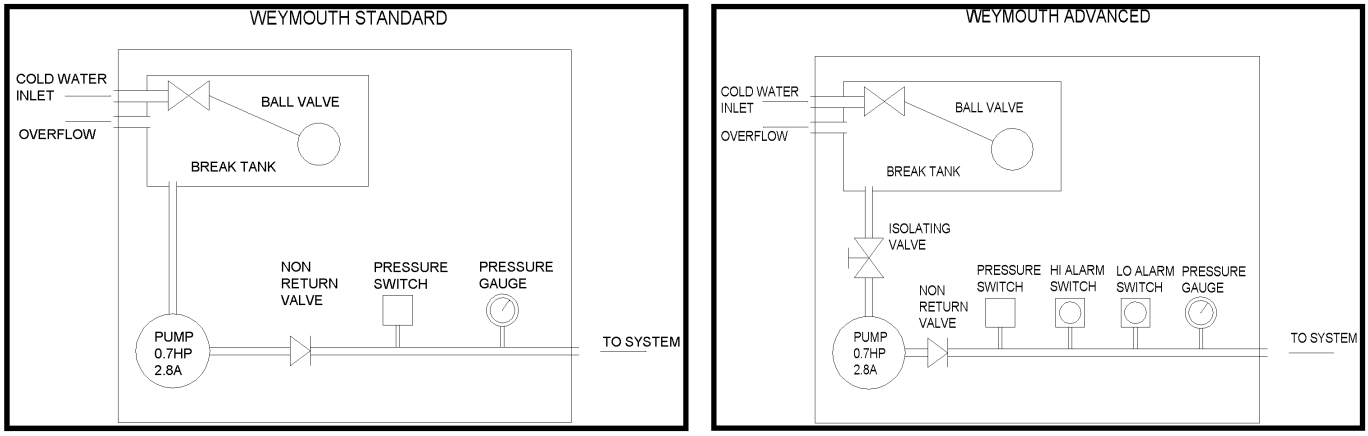
2. Diaphragm position at the hot working pressure. The system volume has expanded due to the temperature rise. The gas in the vessel is compressed. Acceptance factor = 0.35 maximum (recommended).

3. Diaphragm position at high system pressure. The boiler system is shut down by the system pressure switch on Advanced Unit.

4. Diaphragm at the safety valve lift pressure. Caused by boiler temperature limiter failure for example. Acceptance factor = 0.5 maximum (recommended).

4.0 OPERATION OF THE PRESSURISATION UNIT

Figure 5 Schematic Layout of the Standard and Advanced Units.



4.1 Unit Operation.

A drop in system pressure due to, for example, loss of water, will cause the pump to maintain the pressure. As the level of water in the tank reduces a ball valve allows new water into the tank. When the pump pressure switch is satisfied the pump stops

4.2 Safety Functions (<u>Advanced only</u>):

The advanced unit is fitted with two extra pressure switches . A pressure above the high pressure limit set on the unit will switch over the SPDT high pressure switch and a pressure below the low pressure limit set on the unit will switch over the SPDT low pressure switch.
The switches can be connected to boiler safety circuits as shown in the wiring diagram supplied with the unit and displayed inside the unit's cover.

5.0 GENERAL REQUIREMENTS

5.1 Related Documents.

Pressure Systems and Transportable Gas Containers Regulations 1989.

It is the law that pressure system appliances are installed by competent persons in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest and that of safety, to ensure that this law is complied with.

The installation of the pressurisation unit and expansion vessel MUST be in accordance with the relevant requirements of the Pressure System Regulations, Building Regulations, IEE Regulations and the bylaws of the local water undertaking.

It should also be in accordance with any requirements of the local authority and the relevant recommendations of the following documents:-

Applicable standards and documents are:

BS 7074 Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.
BS 6644 Installation of Gas Fired Hot Water Boilers 60 kW to 2 MW
BS 6880 Parts 1,2&3: Code of practice for low temperature hot water heating systems of output greater than 45 kW.
BS 6759 Part 1 (ISO 4126): Specification for safety valves for steam and hot water.
BS 3456 (CEE10 Part 1, CEE11 Part 1): Safety of Household and similar electrical appliances.
HSE Guidance note PM5: Automatically controlled steam and hot water boilers.

5.2 Mains Water Connections.

All connections to local water mains must comply with WRAS Regulations including any local requirements. **The System temporary fill connection must be as per water supply bylaws & must be removed after initial filling.**

5.3 Expansion Vessels.

System expansion vessels must be constructed to BS4814 or BS6144.
The required expansion vessel size is detailed in the contract documents. If these are not available refer to section 5.3.1, otherwise if in any doubt contact Hamworthy Heating Limited for comprehensive system sizing information. Hamworthy Heating Ltd supply a range of suitable expansion vessels details are shown below. A calculation sheet which can be used to determine a suitable volume for an expansion vessel can be found in the Appendix.

Figure 6 Hamworthy Heating Expansion Vessels

SALES REF NO.	HAMWORTHY PART NO.	TYPE	TOTAL VOL.	DIAPHRAGM PART NO.	CONNECTION	WT kgs
HOT WATER APPLICATIONS - EPDM DIAPHRAGM (0-100°C MAX)						
HAF 60V	532712002	VERTICAL	60	532712030	R1 BSPT MI	13
HAF 80V	532712003	VERTICAL	80	532712031	R1 BSPT MI	14
HAF 100V	532712004	VERTICAL	100	532712032	R1¼ BSPT MI	15
HAF 200V	532712005	VERTICAL	200	532712033	R1¼ BSPT MI	40
HAF 300V	532712006	VERTICAL	300	532712034	R1¼ BSPT MI	50
HAF 500V	532712007	VERTICAL	500	532712035	R1¼ BSPT MI	80
HAF 750V	532712008	VERTICAL	750	532712036	R1½ BSPT MI	120
HAF 1000V	532712009	VERTICAL	1000	532712037	R1½ BSPT MI	150
HAF 1200V	*	VERTICAL	1200	*	R1½ BSPT MI	530
HAF 1600V	*	VERTICAL	1600	*	R1½ BSPT MI	10
HAF 2000V	*	VERTICAL	2000	*	R1½ BSPT MI	700
* REFER TO HAM-WORTHY HEATING						
HAF 8	532712056	H/V	8		R¾ BSPT MI	
HAF 16	532712057	H/V	16		R¾ BSPT MI	
HAF 25H	532712010	HORIZONTAL	25	532712029	R1 BSPT MI	5
HAF 60H	532712011	HORIZONTAL	60	532712030	R1 BSPT MI	14
HAF 80H	532712012	HORIZONTAL	80	532712031	R1 BSPT MI	15
HAF 100H	532712013	HORIZONTAL	100	532712032	R1¼ BSPT MI	16
HAF 200H	532712014	HORIZONTAL	200	532712033	R1¼ BSPT MI	41
HAF 300H	532712015	HORIZONTAL	300	532712034	R1¼ BSPT MI	51

5.4 Safety Relief Valve.

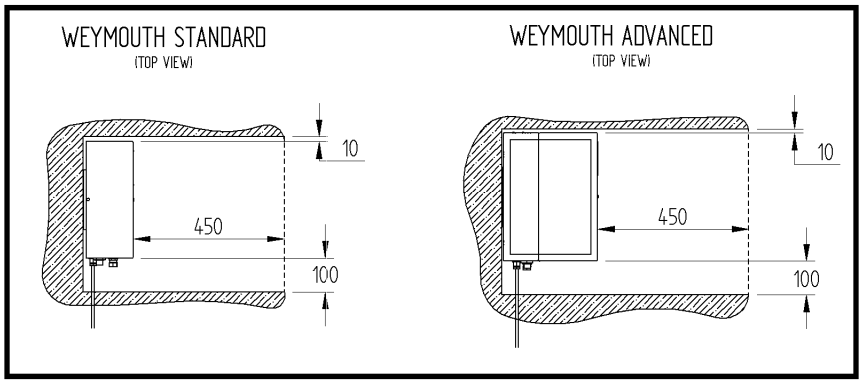
Must comply with BS6759 part 1, and be sized and installed in accordance with BS6644 & BS7074.

6.0 INSTALLATION

The units are supplied inside strong cardboard boxes with foam padding and should be left in this packaging until they arrive on site and are installed.

6.1 Location.

Figure 7 Recommended Clearance Dimensions



The units are designed for wall mounting. A mounting bracket is supplied inside the unit taped to the front of the tank. It is intended that this bracket should be fixed to the wall and the unit hung from it. Each unit also has two holes in the back of the chassis for extra security. The corresponding holes in the wall should be drilled to suit once the unit is mounted on its bracket. The bracket dimensions are shown in fig 8 below.

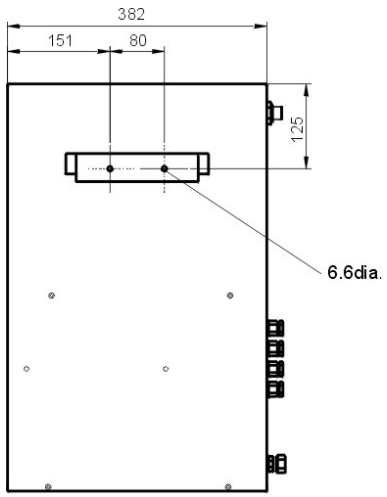


Figure 8 - Mounting Bracket Details

The pressurisation units can be installed on the floor if they are secured to a wall or support using screws through the holes in the chassis.

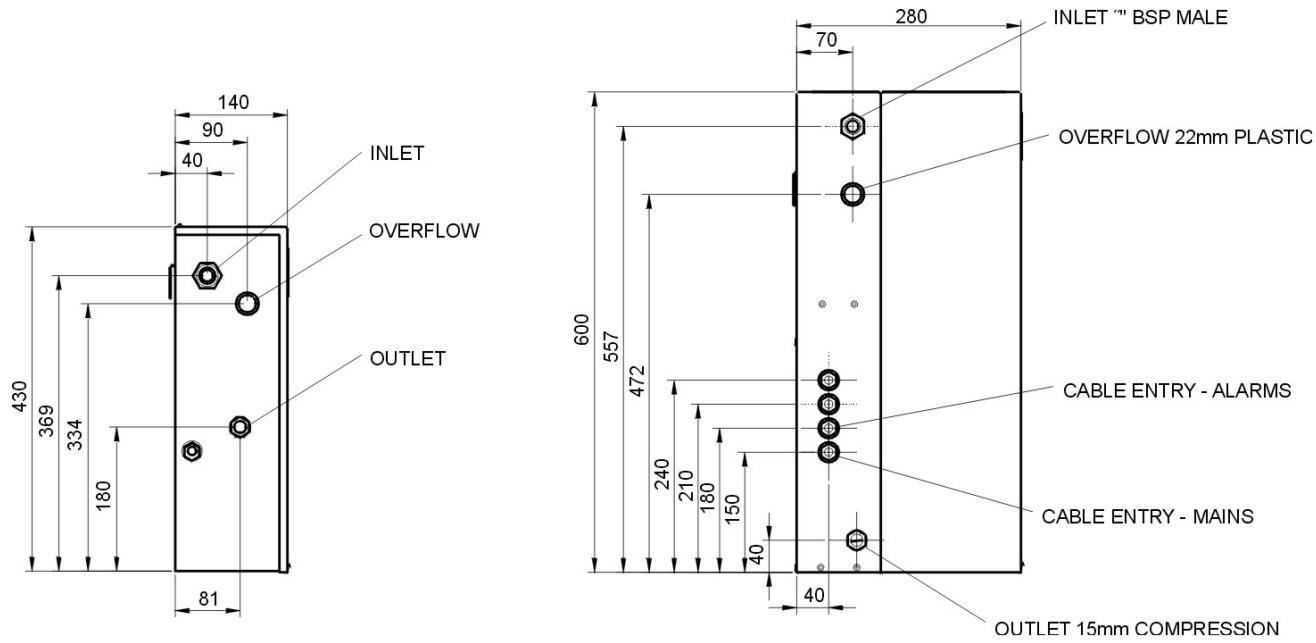
6.2 Pipework Connections (Shown in Figure 9)

1) Mains water connection (½" BSP Male).
The units have a type 'AF' air gap to prevent backflow in accordance with Water Supply (Water Fittings) Regulations 1999. The water supply connection must conform to all local WRAS regulations.

2) Overflow connection (22 mm and ¾" Female).
Overflow should be piped to where it will be safe but visible so it will be noticed and corrected.

3) System connection.
The system connection is via a 15MM compression fitting. The unit must be connected to the system by an antigravity loop (see Figure 3). The antigravity loop must be made in pipe-work no smaller than the expansion vessel connection, and have a minimum height of 2 metres. It should include a lock-shield (or lockable) valve at the system connection point for servicing and an automatic air vent fitted at the highest point of the loop. The antigravity loop must not be lagged but can be fitted with an optional kit to prevent freezing. Consult Hamworthy Heating for details. The pipe-work and fittings must be pressure tested to 1.5 times the safety valve lift pressure.

Figure 9 - Pipework Connections



6.3 Electrical connection.

Wiring diagrams for the Standard and Advanced units can be found fixed inside the cover of the unit and in the appendix. All wiring to the pressurisation unit must be in accordance with the IEE regulations, and any local regulations which apply. **Note! If in any doubt a qualified electrician should be consulted.**

6.3.1 Mains Connection

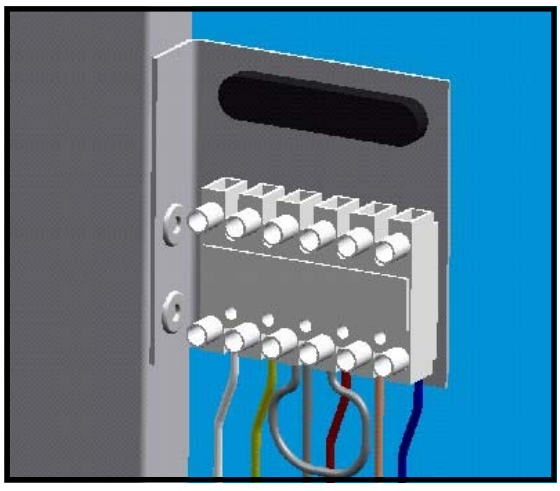
Both the Standard and Advanced are supplied fitted with a 1m flying lead for connection to the mains supply. Mains connection must be via a fused isolator rated at 13 Amps and positioned locally to the unit.

6.3.2 Safety Switches/Circuits On <u>Advanced Only</u>

The SPDT hi and lo pressure switches can be incorporated into circuits to interrupt a boiler control signal, in order to shut down the boiler in the event of a system fault condition. The boiler control system must be designed so that manual resetting is required after a system fault condition.
The circuits are rated at 230 V ~50 Hz, 15A. NOTE if the factory set pressure switch levels are to be altered terminal should not be connected at this stage.

The connection terminal and its location is shown in fig 10.

Figure 10 Advanced Alarm Terminal



7.0 COMMISSIONING

Weymouth Units are supplied factory set and tested to suit the system parameters shown in Figure 2. If the application falls within these parameters the unit requires minimal commissioning checks.

7.1 Mechanical Installation.

Check that the Weymouth Unit and expansion vessel has been installed correctly, as detailed in section 6.3: Pipe -work connections. Check also that all lock-shield or lockable valves are correctly set.

7.2 System Flushing.

Ensure that the system has been flushed and all foreign matter has been removed, including pipe scale.

Note! Should this material come into contact with the expansion vessel diaphragm it could result in premature failure of the expansion vessel assembly.

7.3 Electrical Installation.

Before working on Weymouth units ensure all electrical circuits connected to it are isolated.

7.4 System Expansion Vessel.

To set or check the expansion vessel charge pressure the lock-shield valve between the Weymouth unit and the vessel must be closed. The drain cock fitted on the base of the expansion vessel must be open to allow any water in the vessel to escape.
A suitable gauge should be used to check the charge pressure. Generally a Schrader ‘car type’ valve is fitted near the top of the expansion vessel. If the charge pressure is too high it can be reduced by depressing the centre of the Schrader valve or by using a pressure gauge with an integral air release valve. If the charge pressure is too low a small increase can be provided using a car foot pump other wise an oil free compressor or nitrogen bottle is recommended.

Note! The expansion vessel charge pressure should be set to 0.1 bar less than the cold fill pressure.

When the correct pressure is set the Schrader valve protective cap must be replaced.

Check the integrity of the pipe-work. Ensure the lock-shield valve between the Weymouth unit and the expansion vessel is open and the drain valve is closed. Ensure the air purge plug is fitted (near the top of the expansion vessel).

7.5 Initial Setting Of Both Standard And Advanced Units

1) Check water inlet supply, it MUST have a flow greater than 8l/min.

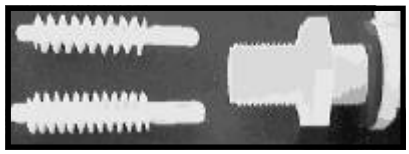
2) Flow Restrictors

Standard

Each Standard comes with a selection of inserts that can be fitted into the inlet valve to achieve the required output:

Mains inlet pressure > 4 bar H.P. restrictor (narrow coils see fig 11)
Mains inlet pressure < 4 bar L.P. restrictor (wide coils see fig 11)

Figure 11 Restrictor Inserts Standard



The restrictors are fitted by pushing them into the open end of the Inlet before attaching the unit to the water supply (see fig 11)

Advanced

Each Advanced comes with a selection of inserts that can be fitted into the inlet valve to achieve the required output:

Mains inlet pressure > 4 bar H.P. restrictor (white see fig 12)
Mains inlet pressure < 4 bar L.P. restrictor (red see fig 12)

Figure 12 Restrictor Inserts Advanced

The HP restrictor is fitted in the inlet side of the float valve assembly. This should be unscrewed in order to change the restrictor (see fig 13). The LP Restrictor is clipped to the side of the valve assembly.

Figure 13 Changing Advanced Restrictor Inserts

3) If the cold water is from a tank then the tank must be at least 2m above the inlet for the header tank to remain full when the pump is working at maximum rate. The pressurisation units should not be used to fill a heating system.

4) Check that the unit has been connected to the system using a suitable isolation valve.

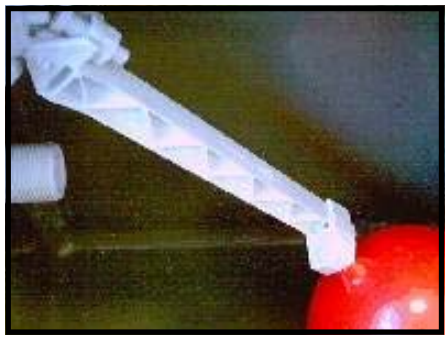
5) Check that the mains lead has been connected to a suitably fused and switched isolator.

6) The cold fill pressure switches on both the Advanced and Standard are factory set to the levels listed in figure 2 as are the Hi and Lo pressure switches. If these levels are unsuitable for the installation then adjustment instructions are given in section 7.3.

7) Set the float to its lowest level. (fig 14)

Figure 14a. Float Adjustment Standard

Figure 14b. Float Adjustment Advanced



7.6 Filling The Unit

1) Check all connections and pressures. Open inlet isolation valve and fill the tank.

2) Undo the priming screw on pump head (fig 15). Prime until water appears. Close the screw and turn on the pump (keeping system isolation valve closed). Pump should run for a few seconds until set pressure is reached.

Figure 15a. Priming Screw <u>Standard</u>

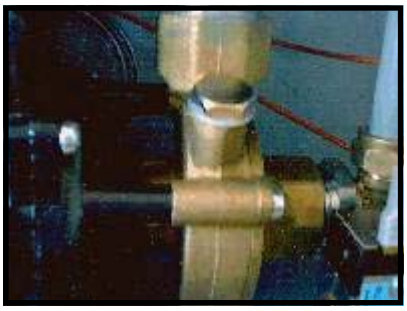


Figure 15b. Priming Screw <u>Advanced</u>

3) Check for any leaks within the unit, if OK open system isolation valve and fill system via filling loop.

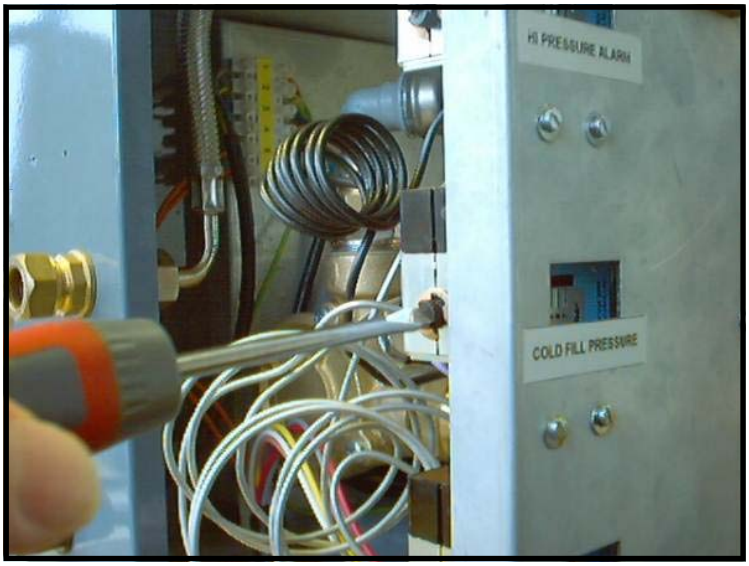
4) The unit will now monitor the system and keep it at the required pressure.

7.7 Pressure Switch Adjustment

The pressure switches are fitted with a scale to indicate the pressure at which they are set. This scale is to be used for indication only. As all the pressure switches and the pressure gauge take readings from the same place, the unit's pressure gauge can be used to give an accurate reading when setting switching levels .

The switches should be set last, after all the other commissioning tasks are complete.

Figure 16. Pressure Switch Adjustment

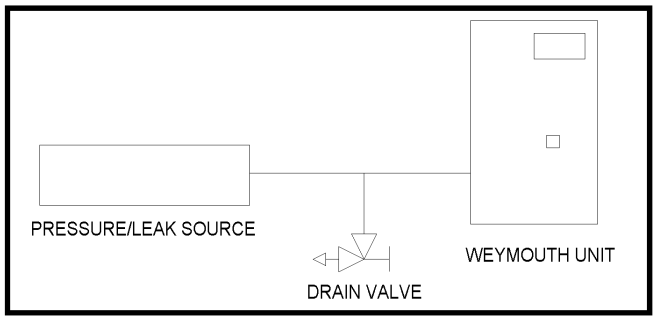


All the pressure switches have a nominal pressure differential (Hysterisis) of 0.4 bar. This means that there will be 0.4 bar between the pressure at which the switch changes state during a pressure rise and the pressure at which it will change when the pressure is falling again or vice versa. For example if the cold fill pressure switch is set to 3.4 bar then the switch will operate when the pressure rises to 3.4 bar causing the pump to stop. The switch will not change over & start the pump until the pressure has fallen back to 3.0 bar.

7.7.1 Pressure Switch Adjustment Apparatus

When adjusting pressure switches the unit must be set up with the apparatus similar to that shown in Figure 17 connected to the outlet.

Figure 17. Pressure Switch Adjustment Apparatus



7.7.2 Cold Fill Pressure Switch

Designed to stop the pump when pressure reaches a preset level. Setting procedure as follows:

1). Ensure the system pressure is lower than the pressure the switch is to be set to.

2). Switch the unit on.

3) Introduce a small leak at the outlet.

4) Because of the leak the unit begins a cycle of starting and stopping. Adjust the cold fill pressure switch until the starts at 0.4 bar below the required cold fill pressure.

7.7.3 Lo Pressure Switch (Advanced Only)

Designed to stop the boiler operating if the pressure falls below a preset level. Setting procedure as follows:

1) Set the cold fill pressure switch by following the procedure in section 7.7.2 & allow system to run to pressure.

2) Isolate the Weymouth unit from the mains electrical supply & from the boiler circuits

3) Introduce a small leak until the unit's pressure gauge reading equals the required Lo pressure setting.

4) Stop the leak.

5) The lo pressure switch is lowest on the panel which pivots around corner for easy access (see figure 23).

7) Set the lo pressure switch to its highest level (adjustment is shown in fig 16)

8) The terminals at either end of the switch form a closed circuit. Adjust the switch until the circuit is open . A meter across the two terminals will signal the change.

7.7.4 Hi Pressure Switch (Advanced Only)

Designed to stop the boiler operating if the pressure exceeds a preset level. Setting procedure follows:

1) Isolate the Weymouth unit from the mains electrical supply & boiler circuits.

2) Use the pressure source increase the pressure until the pressure gauge reads the required Hi pressure level.

3) Set the hi pressure switch to its lowest level (adjustment is shown in fig 16).

4) The terminals at either end of the switch form an open circuit. Adjust the until the circuit is closed. A meter across the terminals will signal a change.

If needed figure 25 shows the wire colours of the switches.

8.0 FAULT FINDING

General fault finding is shown in Figure 18. If the Weymouth unit still does not operate satisfactorily, consult Hamworthy Heating for assistance.

Figure 18. Fault Finding Guide.

Fault	Possible Causes	Action
Pump will not run	Unit up to pressure	None
	No power to the unit	Check at source
	Isolator fuse blown	Replace fuse in isolator. Note! Investigate cause of blown fuse before restarting the unit
	Cold Fill Pressure switch set incorrectly	Adjust pressure switches (see section 7)
	Cold fill pressure switch wired incorrectly.	Check wiring against figure 25
	Pump seized or faulty	Service or replace pump (see section 10)
Pump runs but will not build up pressure	Pump isolating valve closed (Advanced only)	Open valve (see fig 21)
	Pump not primed	Prime pump (see section 7.6)
	No water in tank	Check water level and investigate if necessary
	Pump non return valve jammed	Check valve
Pump cuts in and out rapidly (hunting)	Pressure switches set incorrectly	Adjust pressure switches (see section 7)
	Non return valve not sealing correctly	Clean valve seat or replace valve if necessary (see section 10.7)
	System Leak	Trace leak and ensure system is sound
Pump runs continuously	Cold fill pressure switch set incorrectly	Adjust pressure switches (see section 7) *
	Cold fill pressure switch faulty	Replace faulty switch (see section 10.5)
	System leak	Trace leak and ensure system is sound
Pump cuts out at wrong pressure	Cold fill pressure switch set incorrectly	Adjust pressure switches (see section 7)
	Cold fill pressure switch faulty	Replace faulty switch (see section 10.5)
Maximum system working pressure too high	Cold fill pressure switch set incorrectly	Adjust pressure switches (see section 7)
	Cold fill pressure switch faulty	Replace faulty switch (see section 10.5)
Boiler switches off un-expectedly	Hi or lo pressure switches set incorrectly	Adjust pressure switches (see section 7)
	Hi or lo pressure switches & circuits wired incorrectly	Check wiring with Wiring diagram in appendix
System pressure runs consistently at cold fill pressure	Small system leak	Trace leak and ensure system is sound.

9.0 SERVICING SCHEDULE

The following is a recommended servicing schedule for the Weymouth unit and expansion vessel. If remedial action is required, refer to section 10: SERVICING AND REPLACEMENT OF COMPONENTS. If in doubt consult Hamworthy Heating.

9.1 6 Monthly

1) Check the expansion vessel charge pressure, as described in section 7.4. A significant drop in charge pressure could be due to a faulty vessel diaphragm; replacement of diaphragm should be considered. See section 10.9.

2) Briefly run the pump to check for rotor seizure. This could occur if the pump is not run for extended periods. This can be accomplished by slightly opening the expansion vessel drain valve to initiate a leak.
Note! Ensure that the drain valve is closed after this operation.

9.2 12 Monthly

1) Check the ball float valve diaphragm seat for integrity and replace if necessary. Also check the plastic float for soundness.

2) Check the expansion vessel for signs of external corrosion. If any deterioration is observed then it is recommended that the frequency of inspection be increased.

3) Check the operation of the safety circuits if utilised on the Advanced unit.

9.3 4 Yearly

1) Remove the expansion vessel diaphragm as described in section 10.9 and inspect for wear/ageing.
Inspect the internal surface of the vessel for corrosion.

Significant corrosion can lead to failure of the vessel; replacement of the entire vessel should be considered.
If necessary replace the diaphragm as described in section 10.9.

10.0 SERVICING AND REPLACEMENT OF COMPONENTS

Note! When servicing or replacing Weymouth components electrically isolate the unit and close the system and expansion vessel isolating valves. The Advanced unit should also be isolated from the pressure alarm circuits.

When remaking screwed connections use a thread sealant .

The cover on the Standard unit is secured by one screw at the lower edge of the front panel and one screw on the top panel. The cover on the Advanced unit is secured by one screw at the lower edge of the front panel only.

10.1 Hamworthy Heating Recommended Spares

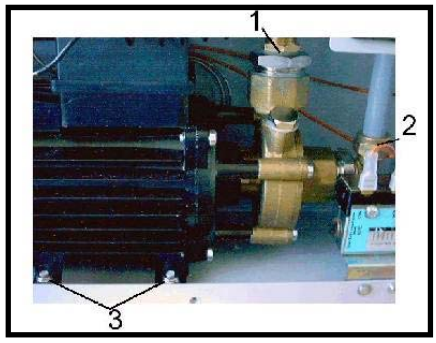
Standard Spares		**Advanced Spares**	
Part	Part N°	Part	Part N°
Pump Assembly	530905046	Pump Assembly	530905045
Float Valve Assembly	531911037	Float Valve Assembly	531911038
Pressure Gauge	557002009	Pressure Gauge	557002009
Pressure Switch Assembly	533925005	Pressure Switch Assembly	533925005
Non-return valve cartridge	531911039	Non-return valve cartridge	531911040

NOTE! For any service/replacement parts the unit serial No. (on the Data Plate inside the unit) MUST be quoted. For service or spares contacts please refer to the inside front cover of this guide.

10.2 Standard Pump Removal

Hamworthy part n° 530905046

Figure 19 Pump Fittings

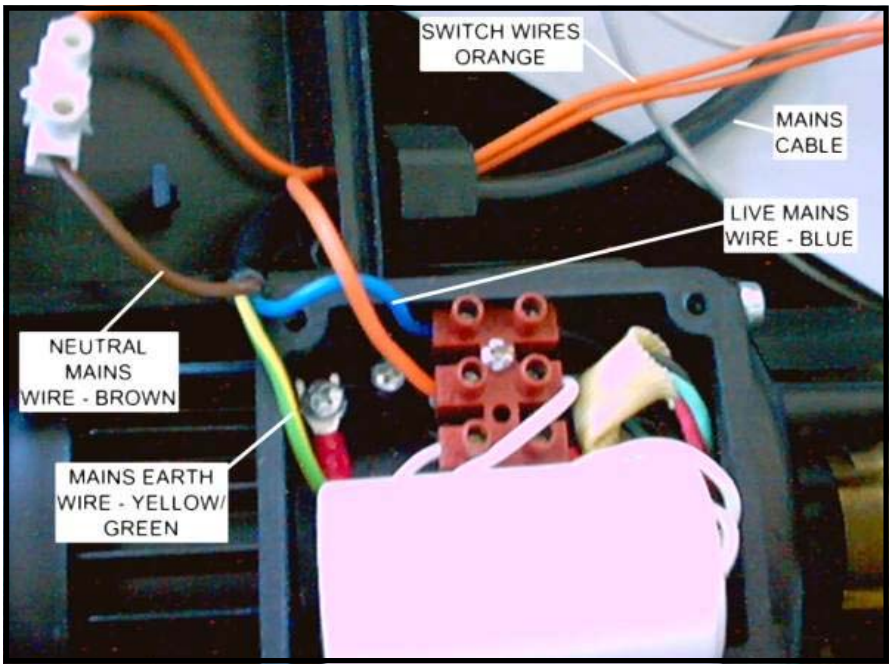


Pump Removal Sequence

1) Isolate the water supply from the unit.
2) Empty the unit's header tank.
3) Once clear of water undo the bulkhead fitting (fig 19,1),
4) Undo the down pipe fitting (fig 19,2)
5) Unscrew the 2 pump assembly mounting screws (fig 19,3).
6) Once the pump assembly has been removed from the unit the pump can easily be removed from the assembly.

The wiring terminals are inside the box on the top on the pump. The wiring layout can be found on the wiring diagram in the appendix and on Figure 20 below.

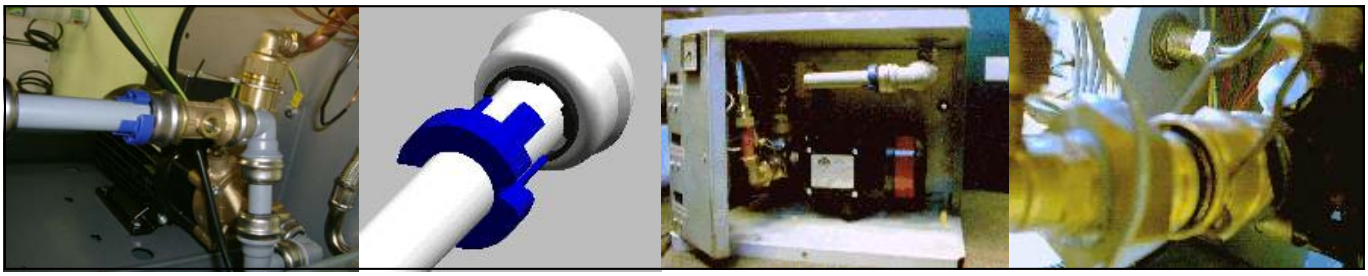
Figure 20 Standard Pump Wiring Terminals



10.3 <u>Advanced</u> Pump Removal (part n° 530805045)

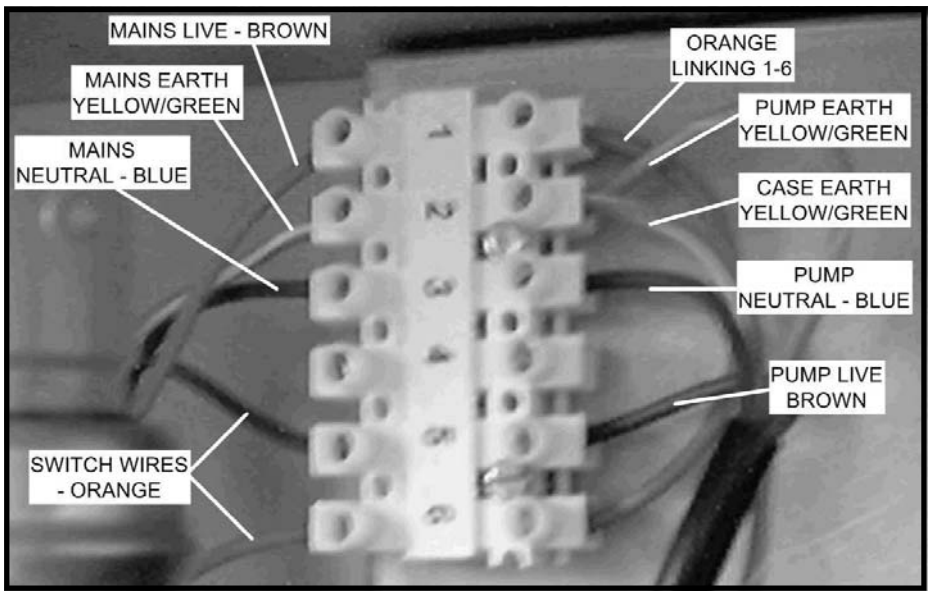
1) Isolate water by turning screw in ball valve see fig 21 bellow.
2) Disconnect the last grey elbow fitting using the blue tool provided. Take care to line up the tool correctly before pushing the tool into the fitting to release the pipe (see fig 22).
3) The pressure switch assembly can be pulled forwards (pivots on left corners see fig 23)
4) Disconnect the outlet pipe from the pump. Remove the quick release clip first (see fig 24)
5) Disconnect the wiring on the mains terminal (see fig 25)
6) The pump assembly including the mounting plate can now be removed from the unit.
7) When the pump assembly has been removed the pump can easily be removed from the assembly.

Figure 21 **Figure 22** **Figure 23** **Figure 24**



The power lead from the pump is connected to the mains terminal on the back wall of the unit. The connections are shown in Figure 25 below.

Figure 25 <u>Weymouth Advanced</u> Pump Wiring Terminal



10.3.1 Pump Fitting On <u>Both Units</u>

Pump fitting for each unit is basically the reverse of pump removal.
Care should be taken not to over tighten the 2 pump mounting screws on the Standard units as this can shear the welded thread. Once re-fitted and connected the pump needs to be bled. Instructions of this can be found in section 7.6**.**

10.4 Inlet Valve On <u>Both Units</u> (part n°s 531911037 Standard & 531911038 Advanced)

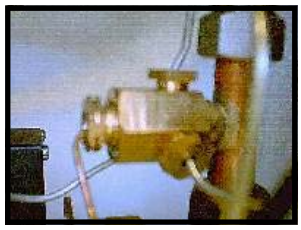
The inlet valve and float in the header tank are supplied as one assembly (see fig 14a and 14b).
The removal/replacement procedure is the same for both units.

1) Isolate the unit from the water supply.
2) Undo 1/2”BSP connection to remove supply pipe.
3) Unscrew the lock nut from the inlet tube. The valve and float are now free to be removed.
4) On the standard unit there is a black spacer which fits between the tank and the chassis. This must be refitted when a new assembly is installed.
5) Once fitted the float adjustment should be set to the lowest level (se section 7.5)

10.5 Pressure Switches On <u>Both Units</u> (part n° 533925005)

1) Undo the capillary nut holding the end into the pipe (see fig 26).
2) Take off the wires. The cold fill pressure switch on both units is connected to two orange wires which can be reconnected any way round. The Hi and Lo pressure switches (<u>Advanced only</u>) must be reconnected as shown in fig 27.
3) Pressure switch must be set to correct level. Setting instructions are given in section 7.

Figure 26 Capillary Nut



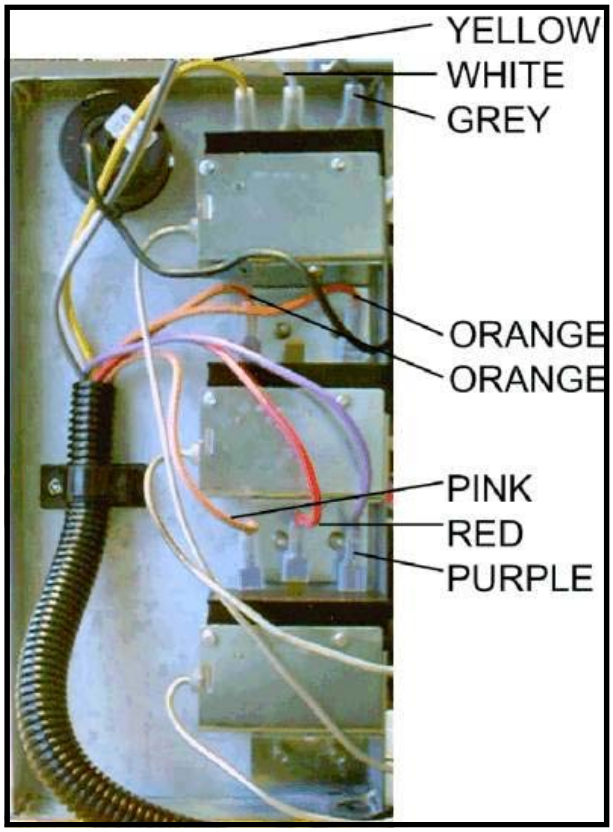


Figure 27 Switch Wiring

(<u>Advanced Only</u>)

10.6 Pressure Gauge On <u>Both Units</u>. (part n° 537002009)

1) Undo the capillary nut holding the end into the pipe (see fig 26).

2) Depress the tags on the opposite sides of the gauge body and push through the panel (see fig 28)

Figure 28 Pressure Gauge

10.7 Non-Return Valve On <u>Standard</u> Unit (part n° 531911039)

1) Follow the procedure for removal of the pump (see section 10.2). The non-return valve is inside the brass fitting shown in figure 29.
2) Unscrew the brass fitting from the silver nut it is screwed into.
3) Push the valve out from the brass fitting as shown in figure 30.

Figure 29

Figure 30

10.8 Non-Return Valve On <u>Advanced</u> Unit (part n° 531911040)

1) Follow the procedure for removal of the pump (see section 10.3). The valve is inside the brass quick release fitting shown in figure 31.
2) Unscrew the brass fitting from pump.
3) Push the valve out from the brass fitting (see fig 30).

Figure 31

10.9 System Expansion Vessel Diaphragm
(Part n° dependant on model and serial n°. Consult Hamworthy Heating for details)

1) Turn off the boiler and electrically isolate the unit.
2) Close the system isolating valve and isolate the mains water supply to the header tank.
3) Drain the pressurisation unit and expansion vessel. **Note!** Leave the drain cock open. Disconnect the expansion vessel pipe-work.
4) Unscrew the diaphragm top connection (normally a brass nut at the opposite end to the water entry).
5) Remove the bolts from the flange at the base of the vessel and remove the diaphragm.
6) To replace the diaphragm top connection (normally a brass nut at the opposite end to the water entry).
7) Screw the plug lightly into the diaphragm top connection and pull it up through the expansion vessel.
8) Lockup the diaphragm top connection and tighten the water connection flange screws. Note! Ensure that the diaphragm is not twisted.
9) Reconnect the expansion vessel pipe-work.
10) To restart the system follow the steps in section 7.

APPENDIX

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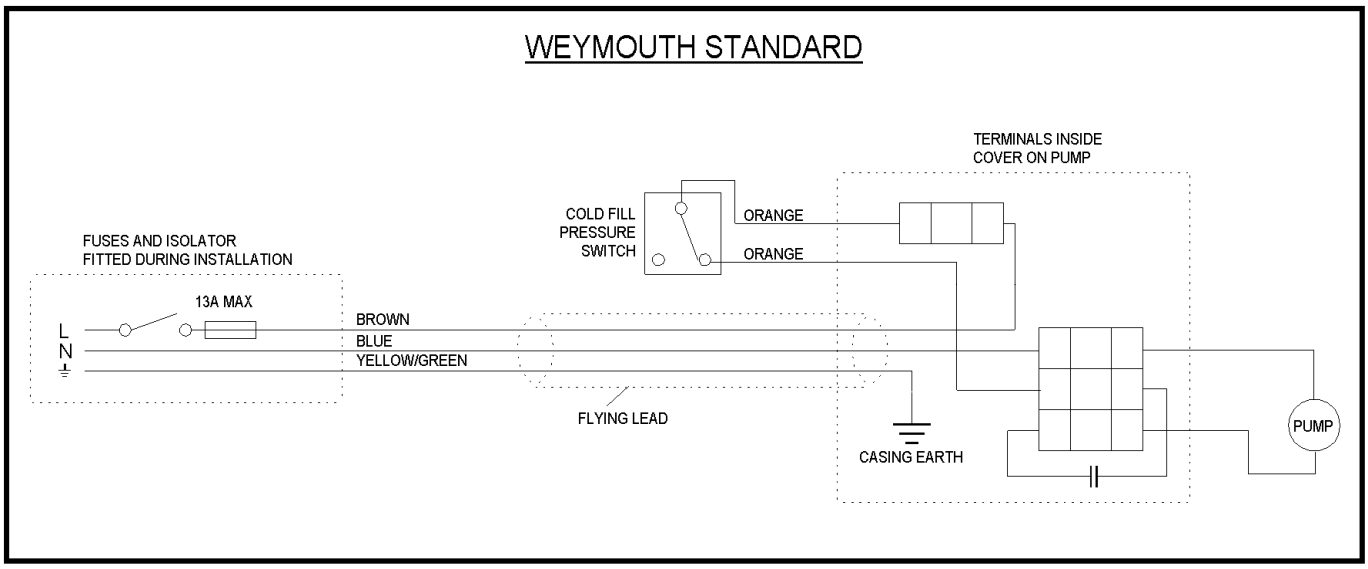
Figure A1. Wiring Diagrams



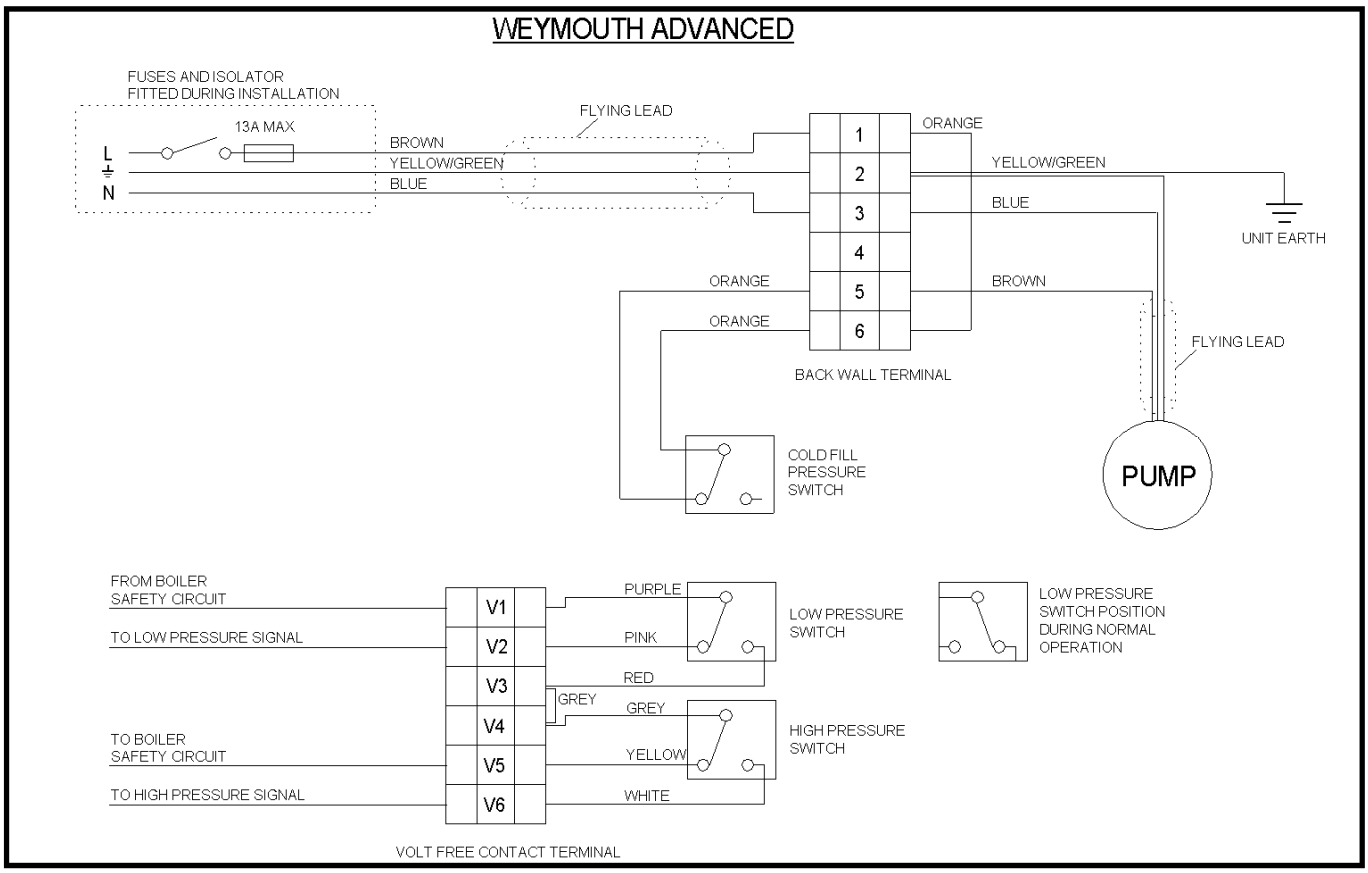


Figure A2 - Heating System Calculation Sheet

1. System Parameters

Example

System Water Content -	Vs =	☐	litres	Vs = 2000 litres
System Anti-freeze Content -	ra =	☐	%	ra = 10%
Maximum System Working Pressure -	P_w =	☐	bar	P_w = 8 bar
Maximum Static Head -	P_h =	☐	metres	P_h = 22 m

If the system volume is not known then the following rule of thumb can be applied:

System water content = Boiler power (KW) X 10

2. Expansion Vessel Volume Calculation, Vv-

$$Vv = \frac{(ra + 81.5) \times Vs}{921} = \frac{(\square + 81.5) \times \square}{921}$$ Vv = ☐ litres

Example: $Vv = \frac{(10+81.5) \times 2000}{921} = 199$

If the system is to be set up using the factory preset pressure switch levels for the Weymouth unit then no other calculations are necessary. The factory preset switch levels are:

Cold Fill Pressure Switching Level, P_f = 1.8 bar
Hi Pressure Switching Level, P_{hi} = 3.65 bar
Lo Pressure Switching Level, P_{lo} = 1.5 bar

The safety valve lift pressure should be set 0.35 bar above the Hi pressure switching level.

3. Cold Fill Pressure Switch Setting Calculation, P_f -

$$P_f = \frac{P_h}{10.2} + 0.2 = \frac{\square}{10.2} + 0.2$$ P_f = ☐ bar

Example: $P_f = \frac{22}{10.2} + 0.2 = 2.35$

4. Safety Valve Lift Pressure Calculation, P_s-

Actual fitted expansion vessel volume, V_{va} - V_{va} = ☐ litres

Example: $V_{va} = 300$

Actual fitted expansion vessel acceptance factor, a_{va} -

$$a_{va} = \frac{V_v \times 0.35}{V_{va}} = \frac{\square \times 0.35}{\square}$$ a_{va} = ☐

Example: $a_{va} = 0.23$

Actual working pressure, P_{wa} -

$$P_{wa} = \frac{P_f + a_{va}}{1 - a_{va}} = \frac{\square + \square}{1 - \square}$$ P_{wa} = ☐ bar

Example: $P_{wa} = \frac{2.35 + 0.23}{1 - 0.23} = 3.35$

Note! If $P_{wa} > P_{wa}$ then increase expansion vessel volume, V_{va} and recalculate from step start of step 3

$P_s = P_{wa} + 0.7 =$ ☐ $+ 0.7$ P_s = ☐ bar

Example: $P_s = 3.35 + 0.7 = 4.05$

5. Calculation of Expansion Vessel Acceptance Factor at Safety Valve Lift Pressure, a_s-

$$a_s = \frac{P_s - P_f}{P_s - 1} = \frac{\square - \square}{\square - 1}$$ a_s = ☐

Example: $a_s = \frac{4.05 - 2.35}{4.05 - 1} = 0.56$

Note! If $a_s > 0.5$ then increase expansion vessel volume, V_{va} and recalculate from step start of step 3

6. Lo Pressure Switch Setting Calculation, P_{sl} -

$P_{sl} = P_f - 0.3 =$ ☐ $- 0.3$ P_{sl} = ☐ bar

Example: $P_{sl} = 2.05$

7. Hi Pressure Switch Setting Calculation, P_{si} -

$P_{sh} = P_{wa} - 0.35 =$ ☐ $- 0.35$ P_{sh} = ☐ bar

Example: $P_{wa} = 3.0$

Notes

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