

Powerstock - Storage Tank Range

Equipment For Commercial Potable Hot Water
Installations.

Installation, Commissioning and Servicing Instructions

IMPORTANT NOTE

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



Heating *at work.*

Customer After Sales Services

Telephone: **0845 450 2866** E-mail: **aftersales@hamworthy-heating.com** Fax: **01202 662522**

Technical Enquiries

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

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

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

Maintenance Agreements

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

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

Spare Parts

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.

Powerstock Storage Tank

**Models ST300, ST500, ST750
& ST1000**

**INSTALLATION, COMMISSIONING AND
SERVICING INSTRUCTIONS**

**THE POWERSTOCK STORAGE TANK IS INTENDED FOR USE AS A
COMMERCIAL APPLIANCE.**

PUBLICATION NO. 500001177
ISSUE 'E'
AUGUST 2010

CONTENTS

	PAGE
1.0	INTRODUCTION 1
2.0	TECHNICAL DATA 1
3.0	GENERAL REQUIREMENTS 1
3.1	Related Documents
4.0	LOCATION 2
5.0	WATER CIRCULATION GENERAL 2
6.0	ELECTRICAL SUPPLY 2
7.0	INSTALLATION 2
7.1	General
7.2	Water Connections
7.2.1	Coil Connection (series flow) kit
7.2.2	Vented applications
7.2.3	Unvented applications
7.2.3.1	Unvented controls
7.3	Control box installation
7.4	Installation of optional kits
8.0	COMMISSIONING AND TESTING 5
9.0	SERVICING AND SPARES 5
FIGURES	
1.2	Technical Data 1
2.1	Table Of Dimensions For Figures 2.2 & 2.3 7
2.2	General Arrangement Drawing Of ST300/ST500 8
2.3	General Arrangement Drawing Of ST750/ST1000 9
2.4	Drawing Showing Mounting Location On ST300 Of Unvented & Optional Kits 10
2.5	Drawing Showing Mounting Location On ST500 Of Unvented & Optional Kits 11
2.6	Drawing Showing Mounting Location On ST750 Of Unvented & Optional Kits 12
2.7	Drawing Showing Mounting Location On ST1000 Of Unvented & Optional Kits 13
5.1	Hot Water Applications: Vented Systems 14
5.2	Hot Water Applications: Unvented Systems 14
5.4	Hot Water Applications: Plate Heat Exchanger 15
5.5	Hot Water Applications: Solar Preheating Example 1 16
5.6	Hot Water Applications: Solar Preheating Example 2 16
6.1	Storage Tank Control Box Fascia 17
6.2	Wiring Schematic Of Control Panel 17
6.3	Wiring Schematic For Various Control Systems 18
6.4	Wiring Schematic For Immersion Heater Control 19
6.5	Table Of Contactor Current For Immersion Heaters Wired In 1 & 3 Phase 20
7.1	Levelling Feet Assembly 20
7.2	Clearances Around Product 20
7.3	Cold Water Supply Valve Train 21
7.4	Control Box Layout & Mounting 22
7.5	Earth Tag Assembly 23
9.1	Clean Out Door Flange 23
10.1	Top To Bottom Recirculation Kit 24

1.0 INTRODUCTION

1.1 The Powerstock range of Storage Tanks consist of four models of 300, 500, 750 and 1000 litres volume.

1.2 The Powerstock range of Storage Tanks are WRAS approved & based on a glass lined tank enclosed within a thermally insulated outer jacket integral with the tank. The insulation jackets of the 750l & 1000l storage tanks are however supplied separately. The storage tank is supplied with four connections. These are :- hot water supply, hot water return (both at the top of the tank) ; recirculation at the middle (where necessary this connection can be used for assembly of a thermostat pocket to which an electrical control box is affixed) & cold domestic potable water supplied at the base of the tank.

1.3 Potable water can be stored up to a pressure of 6.5 bar & to a maximum temperature of 60°C.

1.4 To prevent scalding failsafe thermostatic mixing valves must be fitted between the hot water outlet of the tank & point of use, so the water temperature discharged at point of use does not exceed 50°C.

1.5 When the tanks are used for applications other than potable water the maximum storage temperature allowable is 95°C.

1.6 All internal surfaces in contact with the domestic water are coated with a hygienic vitreous enamel coating, which ensures that water quality is not impaired, and is protected, by either a sacrificial or impressed current anode.

1.7 The tanks can be used in conjunction with the Powerstock Calorifier range, or as a thermal store as part of a Modusol solar heating package.

2.0 TECHNICAL DATA

2.1 Technical data for the storage tanks is shown in Figure No 1.2 below.

Overall layout and dimensional data is shown in Figures 2.1, 2.2 & 2.3.

Figure 1.2. Technical data.

Calorifier Model	ST300	ST500	ST750	ST1000
Storage Capacity (litres)	300	502	750	990
Max Operating Pressure (bar)	10			
Max Operating Temp (°C)	95 °C			
Weight Empty (kg)	87	111	195	248
Weight Full (kg)	387	613	945	1238
Standby Losses (kW/h)	0.1	0.13	0.15	0.2

3.0 GENERAL REQUIREMENTS

The installation of the storage tank must be in accordance with the relevant requirements of the Building Regulations, Building Standards (Scotland) Regulations, IEE Regulations, Fire regulations and Water Supply (Water Fittings) regulations.

3.1 RELATED DOCUMENTS

It is strongly recommended that the installation conforms to **BS6700:- The Design, Installation, Testing and Maintenance of Services supplying water for domestic use within buildings and their curtilages.**

Other important related documents:

Electrical Standards:- BS 7671.

The Control of Legionella bacteria in water systems Approved Code of Practice:Publication HSCL8.

3.2 When installing this equipment, due regard must be given to the maximum working pressures and temperatures as given in Figure No 1.2: Technical data. Under **NO** circumstances must these values be ignored.

4.0 LOCATION

4.1 Refer to Figure No's 2.1, 2.2 & 2.3 for overall tank dimensions & connections to and from the tanks.

4.2 The location chosen must provide adequate space for servicing and inspection as required. See Figure 7.2 For recommended clearances.

4.3 The storage tank must be installed on a level surface capable of adequately supporting its weight (when filled with water) and any ancillary equipment fitted.

4.4 The insulation jacket's surface must not be subjected to direct heat or radiation and must be protected from contact with boiler flues, etc.

5.0 WATER CIRCULATION GENERAL

5.1 Refer to Figures 5.1 to 5.6 for detailed advice on water circuit installation.

Insulation Jackets For ST750 & ST100 must be fitted prior to pipe connection.

All circulation pipework must be lagged to prevent heat loss and possible freezing, especially where pipes run through roof spaces and ventilated cavities. F & E tanks situated in areas that may be exposed to freezing conditions should also be insulated.

Drain valves must be located in accessible positions to permit draining of the contents. For potable water applications, the complete system **must** be flushed through with a suitable disinfectant to thoroughly clean all materials in contact with the water. The tank should be flushed through several times to ensure removal of the disinfectant.

6.0 ELECTRICAL SUPPLY

6.1 WARNING: THIS APPLIANCE MUST BE EARTHED.

All wiring must be installed to comply with the relevant IEE Regulations. It must also be installed and checked by a suitably competent person.

6.2 Normal supply required is 230 volts 50Hz single phase - fused at 2 amps. A temperature limiter and thermostat are fitted inside the control box for temperature control purposes. See Figure 6.1 for display fascia of the control box. Any voltage up to 230 volts AC can be used with external control systems. See Figure No's 6.2 and 6.3.

NOTE! The Powerstock control box should be wired as in a volt free configuration using an external relay. See Figure No 6.2: Typical wiring of a Storage Tank.

6.3 If a top to bottom circulator or powered anode is specified, these can be wired back to the Powerstock Storage Tank control box. See Figure No 6.3: Wiring Schematics For Various Control Systems.

6.4 The sacrificial/powerd anode must be connected to a suitable earthing point via a suitable earthing strap. It should not be assumed that a reliable earth path is available through the water connections. The Hamworthy powered anode kit is provided with an earth crimp, refer to Figure No 7.4: Earth tag assembly.

All wiring to the storage tank should be completed in heat resistant 1 mm². 3 core cable.

For powered anode applications it is necessary to provide a permanent power supply that is uninterrupted by time clocks etc in order to provide continuous protection.

7.0 INSTALLATION

7.1 GENERAL. For typical Domestic hot water installation schematic diagrams see Figure No's. 5.1 to 5.6.

Overall dimension and connection details are shown in Figures No 2.1 , 2.2 & 2.3: General layout and dimensional data.

The installation should conform to the recommendations given in **BS6700** and any other relevant codes of practice.

The storage tank must be installed on a level concrete floor or plinth which is sufficient to support its weight when filled with water. See Figure No 1.2: Technical data. For minor floor irregularities three leveling feet are supplied (contained in a bag attached to the cold feed inlet) which can be screwed directly into the support plates at the base of the vessel. See Figure No 7.1: Leveling feet assembly.

Note the vessel should be mounted on the adjustable feet or a suitable plinth to ensure that there will be sufficient elevation of the cold water feed pipe to allow for wrench clearance when connecting fittings.

7.2 WATER CONNECTIONS Refer to Figure No 2.1, 2.2 & 2.3: General layout and dimensional data.

7.2.1 VENTED APPLICATIONS Refer to Figure No 5.1: Hot water applications. The F & E tank and water supply from it must be sized to ensure that the make-up water flow is equivalent to, or exceeds, the maximum draw off rate from the storage system.

The hot water flow pipe from the storage tank must be fitted with an open vent connection. The vent should be sized as follows and rise to discharge over the feed tank.

ST 300 & 500 > Ø26mm clear bore.
ST 750 to 1000 > Ø32mm clear bore.

The vent pipe shall be protected against freezing where this might occur.

No isolating valves should be fitted between the hot water outlet and the connection point of the vent.

The maximum hot working head of the Powerstock Storage Tank is 10 bar g. (102 metres).

Dead legs to water draw off points should be as short as possible and in no case should they exceed the lengths laid down in the water regulations guide.

For example:

- (i) Pipes < 19mm I/D Maximum dead leg = 12m
- (ii) Pipes 19-24mm I/D Maximum dead leg = 7.6m
- (iii) Pipes > 25mm I/D Maximum dead leg = 3m

7.2.3 UN-VENTED APPLICATIONS Refer to Figure No 5.2. to 5.6. Any un-vented installation must follow the essential safety requirements of the **Buildings Regulations part G3 Section 2**. This document further states that the system should be designed by appropriately qualified engineers and fitted by approved installers.

The cold feed un-vented kit(s) offered by Hamworthy Heating comprise a valve train assembly incorporating expansion relief valve, non-return valve, strainer and pressure reducing valve plus a suitably sized expansion vessel compatible with potable water and sized for the unit and local pipework. A temperature/pressure relief valve is also supplied which follows the sizing recommendations from the valve supplier. This ensures adequate protection even with low incoming water mains pressures.

Refer to Figure No 7.3: Cold Water Supply Valve Train.

For comprehensive recommendations on the design, installation and testing of water supply services, attention is drawn to the appropriate sections of **BS 6700**.

The maximum hot working head of the Powerstock Storage Tank is 10 bar g. (102 metres).

Dead legs to water draw off points should be as short as possible and in no case should they exceed the lengths laid down in the water regulations guide. For example:

- (i) Pipes < 19mm I/D Maximum dead leg = 12m
- (ii) Pipes 19-24mm I/D Maximum dead leg = 7.6m
- (iii) Pipes > 25mm I/D Maximum dead leg = 3m

7.2.3.1. UNVENTED CONTROLS.

7.2.3.1.1 The pressure temperature relief valve must be fitted into the vessel at the location indicated in Figure No's 2.4 to 2.7.

Remove the ABS top cover from the vessel exposing the top connection point. Remove the 1" (ST300 & ST500) or 1 1/4" (ST750 & ST1000) BSP brass plug and screw the P & T, relief valve kit supplied into this position using a suitable WRAS approved jointing compound.

Cut a 130mm-diameter hole in the centre of the ABS top cover to clear the P & T, relief valve then refit the cover to the vessel. The installation of pipework from the P & T, relief valve outlet should conform to the recommendations given in **BS6700** and any other relevant codes of practice.

The following P & T discharge pipework kits are available . See pages 9,10,11 & 12:-

- 563605525- Discharge Piping Kit ST300
- 563605526- Discharge Piping Kit ST500
- 563605527- Discharge Piping Kit ST750
- 563605528- Discharge Piping Kit ST1000

7.2.3.1.2 COLD WATER FEED. The Hamworthy Heating cold water feed valve train (see figure 7.3 : Cold Water Supply Valve Train) is sized to provide flow rates of approximately 4800 l/h under the assumed conditions of 2 bar incoming mains water pressure and 1 bar static back pressure resulting from the highest distribution lines above the vessel and flow resistances of the system.

Potential flows will increase with higher mains pressures up to the 3.5 bar preset regulator pressure. However due to the many variables involved it is recommended that the flow rate of 4800 l/h is considered the maximum.

An expansion vessel that is pre-charged at 3.5 bar and sized to accept the water expansion volume from the storage tank and its local associated pipework is supplied with each un-vented tank.

If the water train is serving a large distribution system additional expansion vessels maybe required and the acceptance volume V2 can be calculated as follows:

$$V2 = \frac{e_t \times V1}{P_c} \left(1 - \frac{P_w}{P_c} \right)$$

Where e_t is the expansion factor which for a 65°C rise = 0.02.

V1 is the volume of the entire system including the heater.

P_c is the absolute expansion vessel cushion pressure normally preset to 4.5 bar. Absolute = (3.5 bar gauge + 1 bar.)

P_w is the absolute working pressure and is the same value as that of the expansion relief valve setting 6 bar. Absolute = (5 bar gauge + 1 bar.)

V2 is the volume of the required expansion vessel.

7.3 CONTROL BOX INSTALLATION. Refer to Figure No. 6.1 for the Fascia Label & 7.4 for Control box layout & mounting.

Remove the control box from its cardboard box and remove the control box cover by first pulling off the thermostat knob and unscrewing the four screws (two top, two bottom). The control box mounting boss and fittings are located in a polythene bag inside the control box housing.

Screw the 1/2BSP thermostat pocket into the vessel at the position shown in figures 2.4 & 2.7. Locate the control box-mounting boss over the thermostat-mounting pocket so that the lip of the boss engages into the groove of the thermostat pocket. Tighten the set-screw to lock the boss onto the thermostat pocket ensuring that the two M5 threaded holes are aligned to the horizontal plane. Fit the control box back plate onto the mounting boss using the two M5 studs. Thread the control thermostat and temperature limiter bulbs to the bottom of each hole of the thermostat pocket. Coil and arrange the capillaries within the control box housing.

Fit the detachable mounting plate and complete all necessary wiring following the appropriate wiring diagram (figures 6.2 and 6.3) before fitting the control box cover.

7.4 INSTALLATION OF OPTIONAL KITS.

7.4.1 POWERED ANODE PROTECTION. Isolate all electrical supplies to the control box. Isolate and drain the secondary water from the vessel. Locate the magnesium sacrificial anode, (see Figures No 2.4 to 2.7 for anode location) unscrew and remove from the vessel. Select the new powered anode and screw it into the open tapping. The screw thread contains an integral sealing gasket but if additional sealant is used, ensure that it is WRAS approved. Refill the vessel.

Remove the control box cover by first pulling off the thermostat knob and unscrewing the four screws (two top, two bottom) refer to Figure No 7.3:Control box layout. Select the potentiostat unit and locate on the two studs on the base plate with the live and neutral terminals at the bottom. Secure with the M3 nuts and washers provided. Select the power loom and connect the blue crimped cable to N of the potentiostat and the brown to L. Connect the other ends to the terminal rail, brown to 3 and blue to N. Select the indicator lamp and pull off the plastic grommet. Push the grommet through the small hole in the front of the thermostat mounting plate and replace the lamp in the grommet from behind. Connect the miniature plug into the top of the potentiostat. Using the pre-punched hole in the control box cover as a guide cut out the hole for the neon in the self adhesive fascia label.

(Refer to Figure No 7.5: Earth tag assembly) Clean and abrade the outer surface of the cold water feed stub pipe at the base of the vessel to obtain a suitable earthing continuity point.

Select the jubilee clip and undo the screw until the clamping band can be opened out. (Note: this action may not need to be carried out if site pipework has not yet been installed to the vessel). Place the jubilee clip over the cleaned and abraded area of the cold water feed pipe and reassemble the clamping band. Select the earth mounting crimp and fit the pierced flat spade between the stub pipe and the jubilee clip clamping band. Tighten the jubilee clip to lock the earth terminal against the stub pipe.

Select the anode connection cable and feed the cable through the control box left-hand gland from the outside, leading with the two different sized crimps. Fit these crimps to the appropriate spades on the potentiostat unit and secure the cable in the gland. Connect the other end of the cable with the crimp onto the anode spade. Remove the forked spade from the cable and replace it with the supplied crimp. Connect this cable to the earthing crimp on the cold feed stub pipe. (Note: the earth connection must be made to the cold water feed pipe or other point on the vessel which will guarantee continuity between the earth and the wall of the vessel.)

Replace the control box cover and the thermostat knob.

Ensure that the vessel is full of water before switching on the electrical supply. If everything is satisfactory, the lamp will glow green. The lamp will flash red as a warning if there is a problem. This indicates that the protection is not effective and one of the following has occurred.

- a) There is no water in the vessel.
- b) There is a short circuit between the anode and the vessel.
- c) The two-core cable to the anode has been connected the wrong way round.

On rectification of the fault, interrupting the mains electrical supply to the unit for a brief period (30 seconds) will reset the indicator lamp.

Note: time clocks, etc must NOT interrupt power to this circuit. To enable the powered anode system to provide continuous protection it must have a permanent power supply.

7.4.2 FLANGE KIT FOR IMMERSION ELEMENT. (see Figure No 9.1)

A flange kit for an immersion element is available with fitting instructions.

HHL Part No. 563605221 ST300 & 500 Models

HHL Part No. 563605466 ST750 & 1000 Models

Immersion elements below are supplied optionally
4kW x 280mm long, 240V a.c. Part No. 533901393
9kW x 280mm long, 240V a.c. Part No. 533901489

See Figure 6.4 for the wiring schematic for wiring of an Immersion heater to the control panel.

See Table 6.5 for the contactor current required for the immersion heaters wired in single & 3 phase.

2. To meet the requirement of BS6700 and BS EN 806-2, it is recommended that where an immersion element is fitted on an unvented system, the electrical supply to the immersion element should also be connected to the manual reset limit thermostat of the vessel control panel in addition to the boiler, via suitable relays/contactors (not Hamworthy Heating Ltd supply). This ensures that in the event of a high temperature condition occurring, both sources of energy will be safely shut down.

7.4.3 TOP TO BOTTOM CIRCULATION.

A top to bottom circulation kit can be supplied for each storage tank (Refer to Figure No. 10.1). The kit is supplied for assembly to the tank when located in its final position.

NOTE 1: The connection Tee's must be fitted to the hot water flow and cold water return connections prior to any connection to the system pipework.

NOTE 2: All jointing compound used should be approved suitable for potable water by WRAS.

NOTE 3: Ensure that the flow arrows on the pump and check valve allow flow from the top to the bottom of the storage tank.

The pump will require connection to a 230Vac 50Hz electrical supply via a fused isolator using heat resisting 3 core cable of adequate rating (not HHL supply). Refer to pump manufacturer's instructions for details of fuse sizing etc.

WARNING: This pump must be earthed.

8.0 COMMISSIONING AND TESTING

8.1 Once all installation work has been completed the unit should be filled with water to check for leaks.

Storage tanks should be thoroughly flushed through to remove debris from vessels / pipework, etc. Refer to section 5.0 **WATER CIRCULATION GENERAL** and the relevant standard or code of practice for the correct procedure. The system should be chemically cleaned with an approved disinfectant before use.

Note! Correct operation of the control box must be checked against the wiring schematic chosen from Figure No's 6.2 and 6.3.

If controlling a diverter valve, check that when the storage tank reaches the desired set point the valve fully shuts or actuates to by-pass the storage tank. This should be checked without water flowing through the tank, thus keeping the time required for checking this operation to a minimum.

9.0 SERVICING AND SPARES

9.1 The storage tank should be regularly checked for correct operation.

The sacrificial anode must be inspected at least once every 6 months for loss of material. Spares are available on request refer to Hamworthy Heating for supply details.

IMPORTANT: Due to the variable chemical nature of distributed water supplies, it is recommended that in addition to the annual inspection cleaning, this appliance is inspected for calcium deposition anode loss within a maximum of three months following initial commissioning and the frequency of subsequent inspections adjusted accordingly.

Failure to install in accordance with the relevant **Hamworthy Heating Installers Guides** and to carry out the above recommendations may compromise appliance warranties.

WARNING: Before proceeding with any maintenance, isolate the electrical supply and turn off the gas service cock to the storage tank being serviced.

NOTE: If anodes are to be inspected proceed to the next paragraph before replacing insulation and tank top.

9.2 INSPECTION OF THE STORAGE TANK WATERSIDE SURFACES AND MAGNESIUM ANODES

9.2.1 DRAINING THE STORAGE TANK

Isolate the cold feed, hot flow and circulation connections. Connect a ¾" nominal bore hose to the drain cock connection at the bottom of the storage tank, run the hose to a convenient drainage point, open the storage tank drain cock and drain the tank.

9.2.2 REMOVAL OF INSPECTION DOOR

After checking to ensure that the storage tank has been fully drained, remove the four screws retaining the exterior (blue) casing panel of the inspection door. Remove the panel and the insulation disc to expose the inspection door flange and fixing bolts. Slacken and remove the M10 bolts and take off the inspection door.

Inspect the interior surfaces of the storage tank for any signs of calcium deposit.

Providing that exit water flow temperature has been restricted to a maximum of 60°C deposits should not normally be present. If any deposits do exist within the storage tank, these can be removed with the aid of a stiff brush and a water jet (directed through the inspection port) and flushed through the drain connection of the tank.

NOTE: On no account should a metal scraper be used to remove deposits since this may result in damage to the glass lining.

After cleaning, replace the inspection door and gasket.

9.3 INSPECTION OF MAGNESIUM ANODES

NOTE: On no account remove the magnesium anodes without checking to ensure that the storage tank is isolated on flow, feed and circulation waterside connections.

Each storage tank includes sacrificial magnesium anodes. See figures 2.2 & 2.3.

Release the nuts securing the magnesium anodes (this will require a 32mm socket spanner (ST750/1000) and 27mm (ST300/500) complete with extension bar) and withdraw the anodes vertically through the 3/4" BSP sockets and clear of the storage tank. Remove the copper anode sealing washer and inspect each anode for erosion. If the extent of erosion is sufficient to have reduced the cross-sectional area of the anode by fifty percent i.e. the diameter of the anode is less than 15 mm, it should be replaced complete with a new sealing washer.

9.4 ASSEMBLY - FOLLOWING COMPLETE SERVICING OF THE STORAGE TANK.

Close the storage tank drain cock and remove the hose connection.

Open the cold feed, hot flow and circulation isolation valves and allow the system to fill with water.

Check to ensure that there are no leaks from the inspection door sealing gasket, the magnesium anode sealing washers and the drain cock.

Replace the insulation disc over the inspection door flange and refit the exterior casing panel with the four screws.

9.5 RECOMMENDED SPARES.

<u>SPARES ITEM</u>	<u>PART No</u>
3/4 BSP Magnesium Anode ST300 & ST500	573409004
1 1/4 BSP Magnesium Anode ST750 & ST1000	539001109
Insulation Jacket ST750	533806077
Insulation Jacket ST1000	533806078
Thermometer (gauge)	557002006
Clean out door gasket (ST300 & ST500)	531201041 Refer to Fig No 9.1
Clean out door gasket (ST750, ST1000)	531201148 Refer to Fig No 9.1
Potentiostat	533901345
Indicator lamp	533901346
Control thermostat	533901178
Temperature limiter	533901343
Fuse 2A	747225834

MODEL		ST300	ST500	ST750	ST1000
DIMENSIONS (mm)	A	1836	1967	2040	2040
	B	1505	1686	1643	1671
	C			1473	1511
	D	325	276	378	386
	E	DN110	DN110	DN180	DN180
	F			R1 1/4"	R1 1/4"
	G			5	5
	H			R1/2"	R1/2"
	I	620	726	915	1010
	J			60	60
	K (Hot Water Return Connection)			R2"	R2"
	L (Hot Water Outlet Connection)	R1 1/2"	R1 1/2"	R2"	R2"
	M	16	16	60	60
	N (Circulation / Control Panel Pocket Assembly)	R3/4"	R3/4"	R1 1/4"	R1 1/4"
	O (Sensor Pocket Connection)			R1/2"	R1/2"
	P (Sensor Pocket)	R1/2"	R1/2"	R1/2"	R1/2"
	Q (Cold Water Inlet Connection)	R1"	R1"	R2"	R2"
	Q' (Secondary Cold Water Inlet Connection)	R1 1/2"	R1 1/2"		
	S	90	55	88	92
	T	272	238	290	297
	U			945	952
	V	1180	1265	1145	1154
	W	1546	1673	1640	1647
	X			1908	1911
	Y	R1"	R1"	R1 1/4"	R1 1/4"
	Z	R1 1/4"	R1 1/4"	R1"	R1"
1	272	238			
2	R3/4"	R3/4"			
3	70	110			

Figure 2.1 Table Of Dimensions For Figures 2.2 & 2.3.

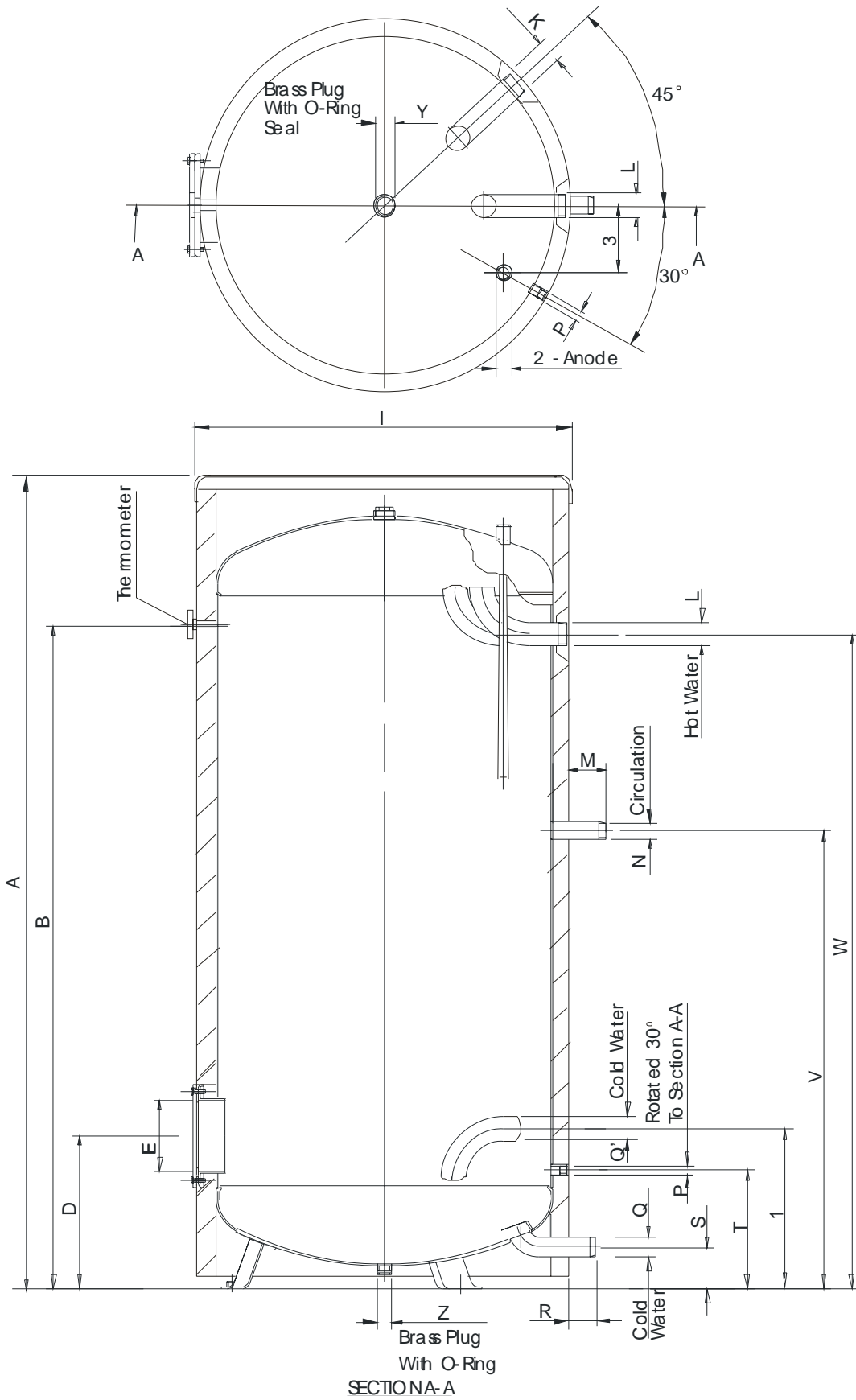


Figure 2.2 General Arrangement Drawing Of ST300/ST500

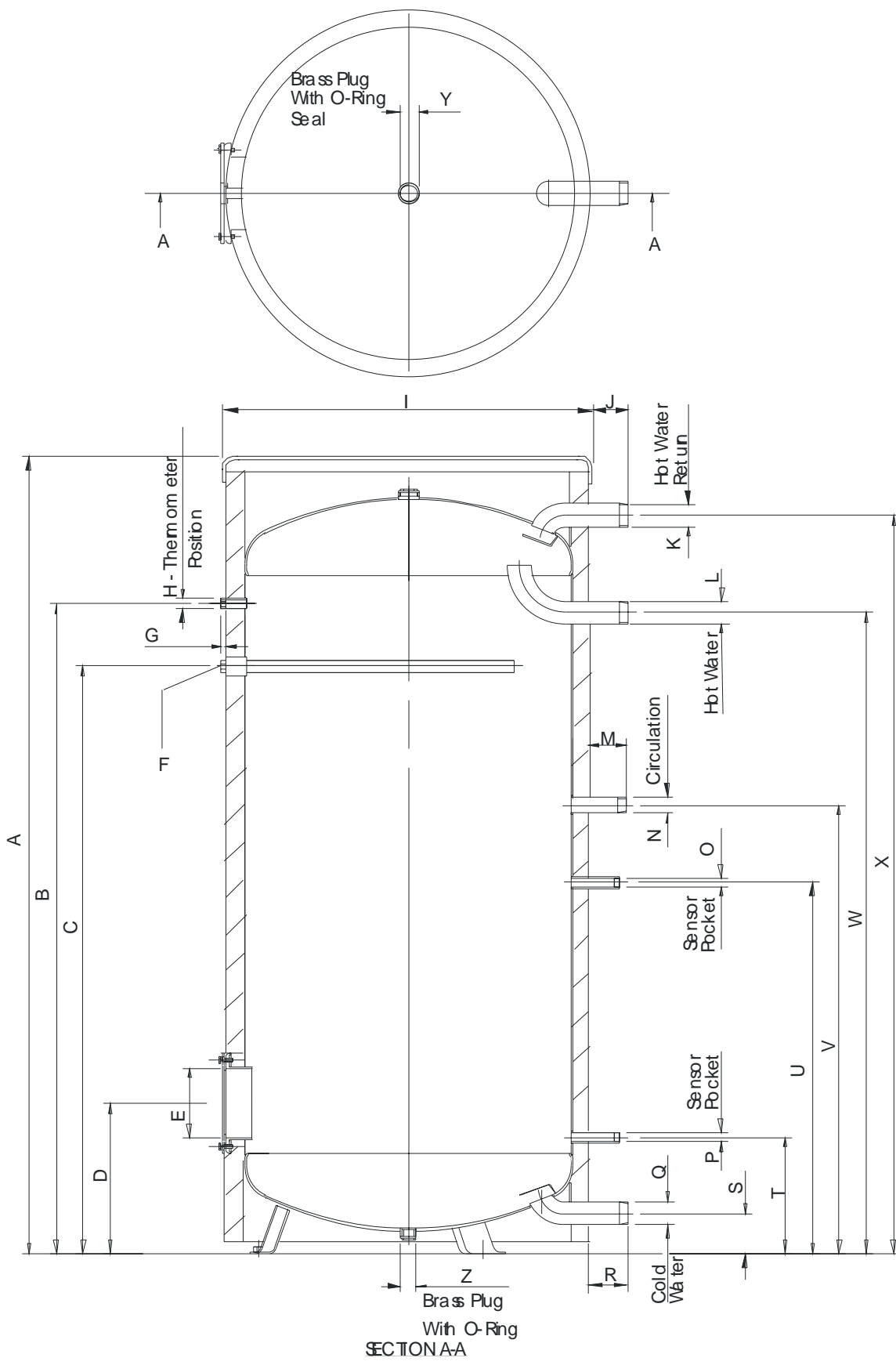


Figure 2.3 General Arrangement Drawing Of ST750/ST1000

ITEM NUMBER	DOCUMENT NUMBER	TITLE	QUANTITY
1	532710023	ST500 STORAGE TANK	1
2	741620335	3/4" BRONZE FEMALE SOCKET	1
3	741627373	3/4" TO 1/2" HEXAGON BUSH BRONZE	1
4	531050016	DUAL THERMOSTAT POCKET	1
5	563902267	CONTROL PANEL	1
6	557002006	THERMOMETER	1
7	563605508	PRESSURE TEMPERATURE RELIEF VALVE KIT	1
8	532710023	ST500 STORAGE TANK TOP	1
9	563605533	DISCHARGE PIPEWORK KIT ST500	1
10	573409004	R3/4" MAGNESIUM ANODE	1
11	563605482	RE-CIRCULATION PUMP KITS ST500	1
12	-	BULB RETENTION SPRING	1

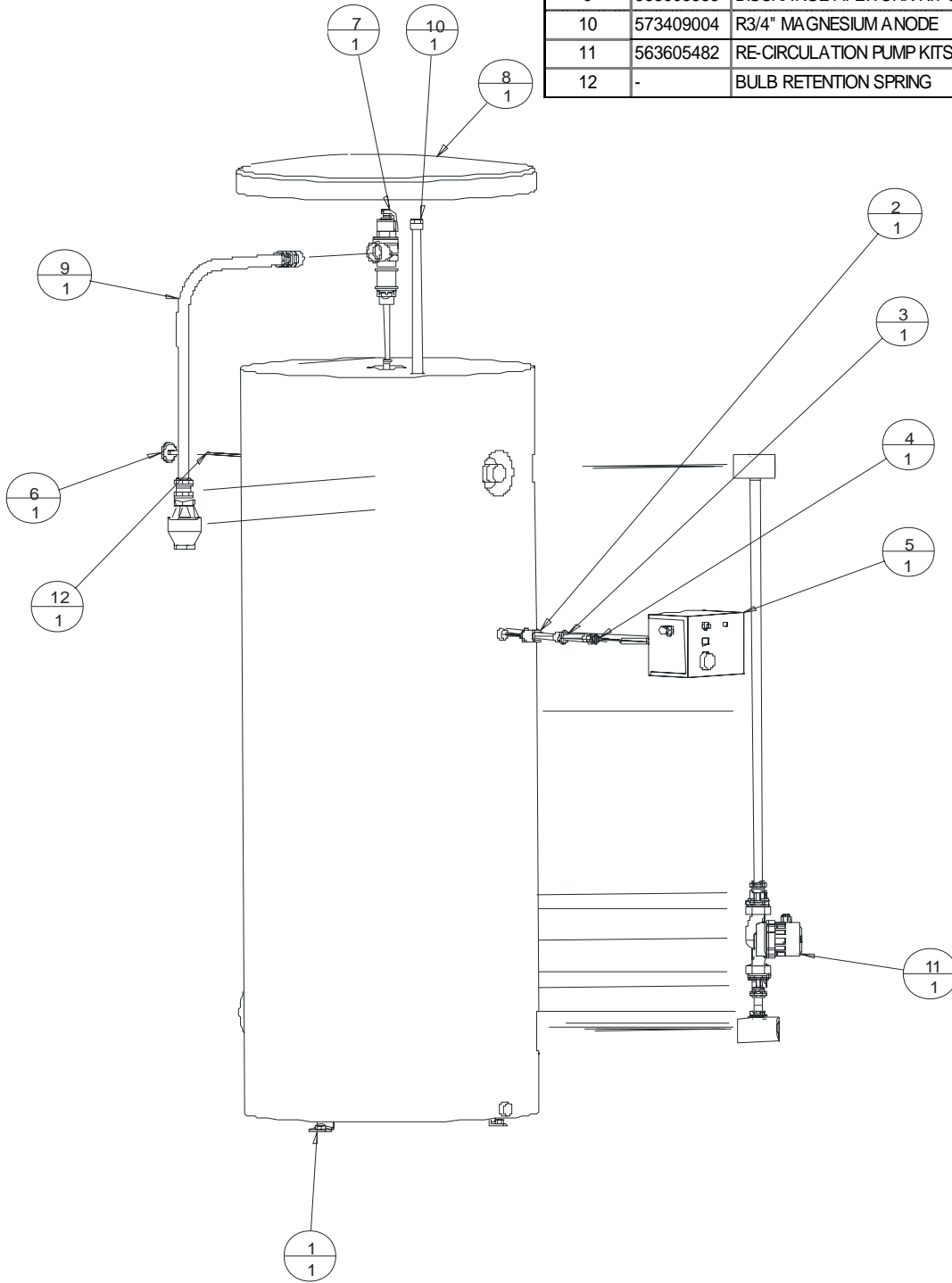


Figure 2.5 General Arrangement Showing Mounting Location Of Kits On ST500

ITEM NUMBER	DOCUMENT NUMBER	TITLE	QUANTITY
1	532710024	ST750 STORAGE TANK	1
2	533806077	ST750 STORAGE TANK JACKET	1
3	533806077	PS-ST750 TOP	1
4	533806077	PS-ST1000 FLANGE COVER	1
5	563605502	ST750 PT RV KIT	1
6	557002006	THERMOMETER	1
7	-	THERMOPOCKET	1
8	-	BULB RETENTION SPRING	1
9	539001109	RP1 1/4" MAGNESIUM ANODE	1
10	563902267	CONTROL PANEL	1
11	531050016	DUAL THERMOSTAT POCKET	1
12	741683340	RC 1 1/4" CAP BRONZE	1
13	742222133	1/2" COUNTERSUNK PLUG BRONZE	1
14	563605527	DISCHARGE KIT ST750	1
15	563605483	RE-CIRCULATION PUMP KIT ST750	1

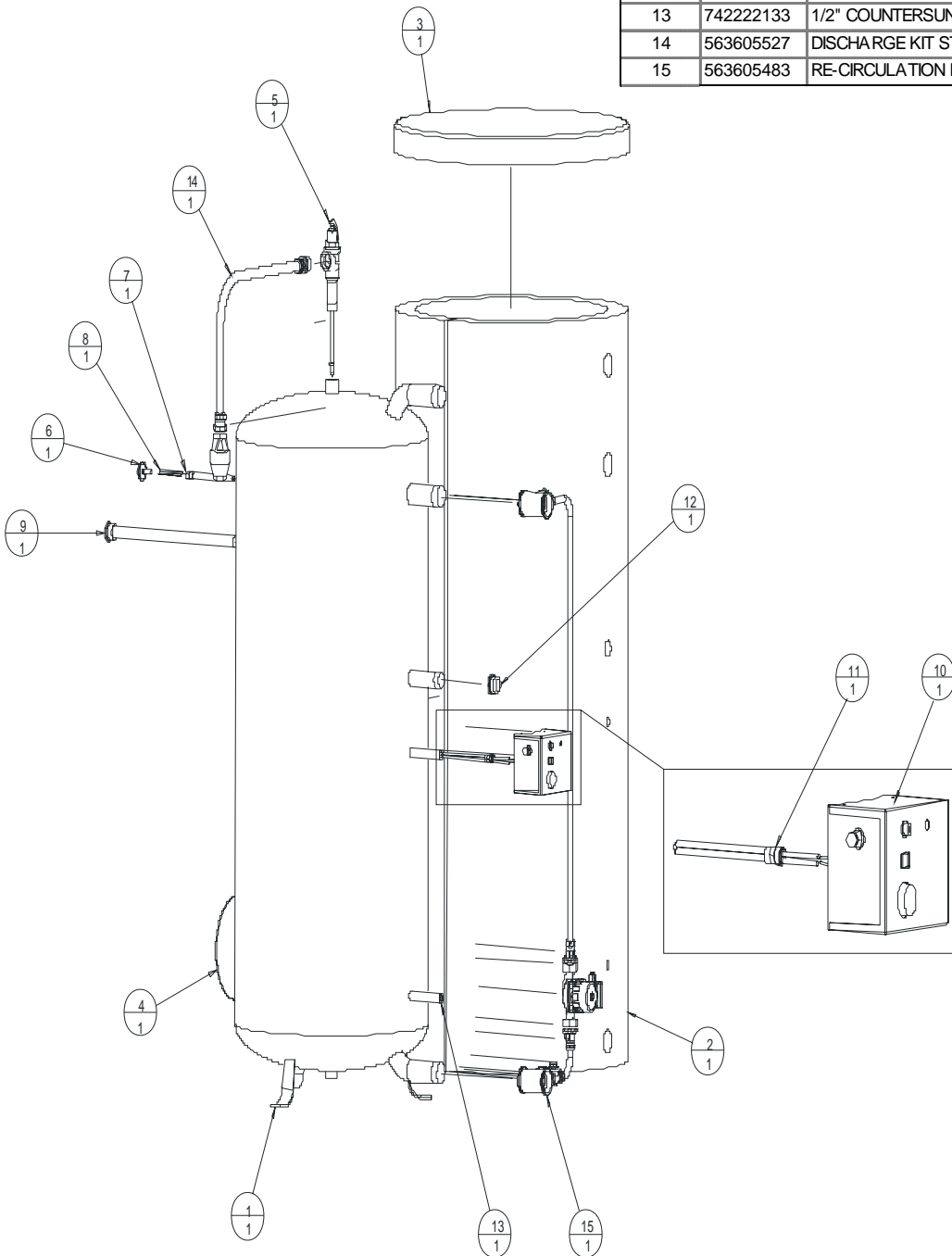


Figure 2.6 General Arrangement Showing Mounting Location Of Kits On ST750

ITEM NUMBER	DOCUMENT NUMBER	TITLE	QUANTITY
1	532710025	ST1000 STORAGE TANK	1
2	533806078	ST1000 INSULATION JACKET	1
3	533806078	ST1000 TOP	1
4	533806078	ST1000 FLANGE COVER	1
5	531050016	DUAL THERMOSTAT POCKET	1
6	563902267	CONTROL PANEL	1
7	742222133	1/2" COUNTERSUNK PLUG BRONZE	1
8	-	THERMOPOCKET	1
9	557002006	THERMOMETER	1
10	-	BULB RETENTION SPRING	1
11	563605503	PS10000 PT RV ASSEMBLY	1
12	563901426	GROUNDING SOCKET ANODE	1
13	563605528	DISCHARGE PIPEWORK KIT ST1000	1
14	741627472	HEX BUSH MALE R1 1/4" x FEMALE R3/4" REDUCING	1
15	539001109	R3/4" MAGNESIUM ANODE	1
16	563605484	RE-CIRCULATION PUMP KIT ST1000	1

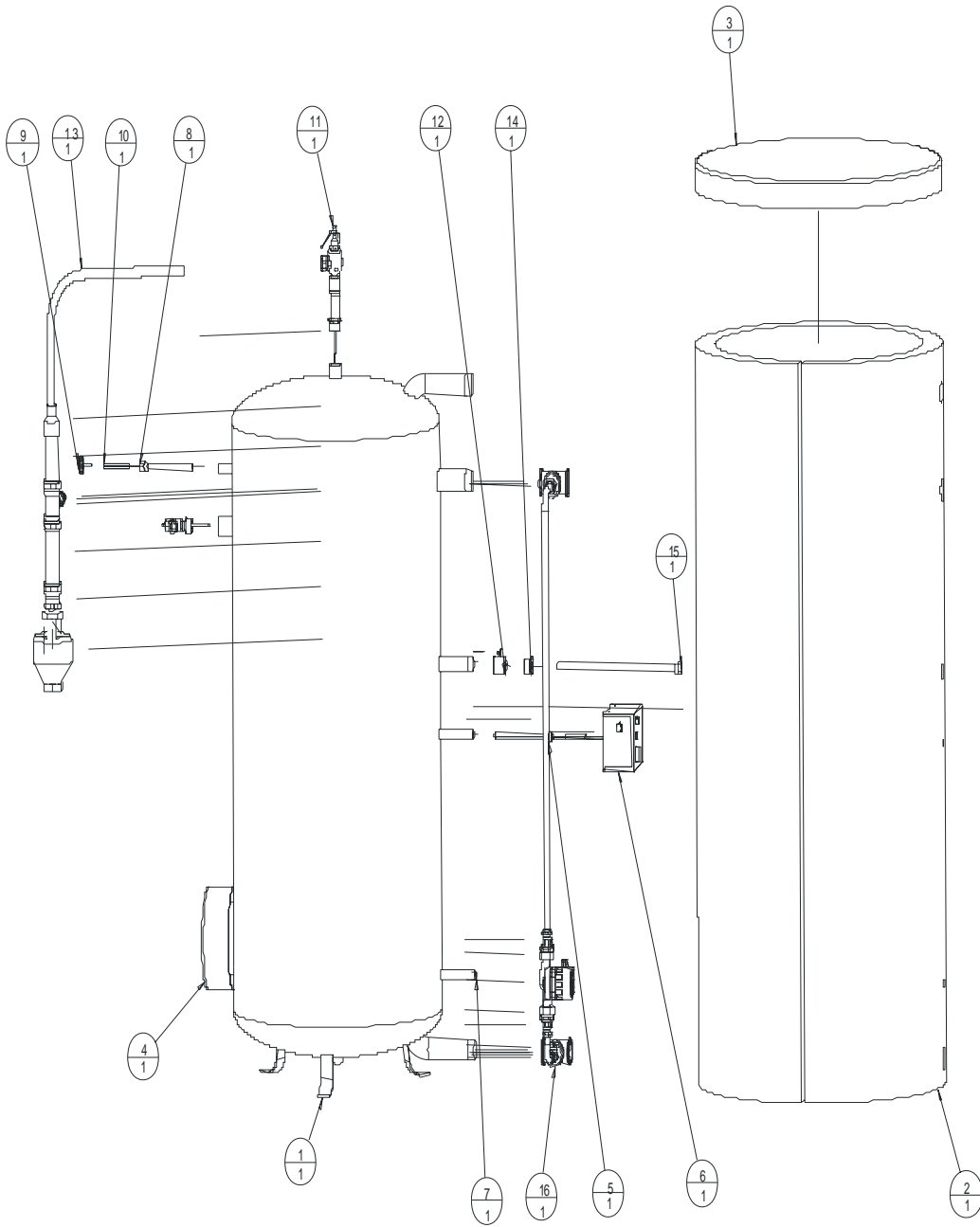


Figure 2.7 General Arrangement Showing Mounting Location Of Kits On ST1000

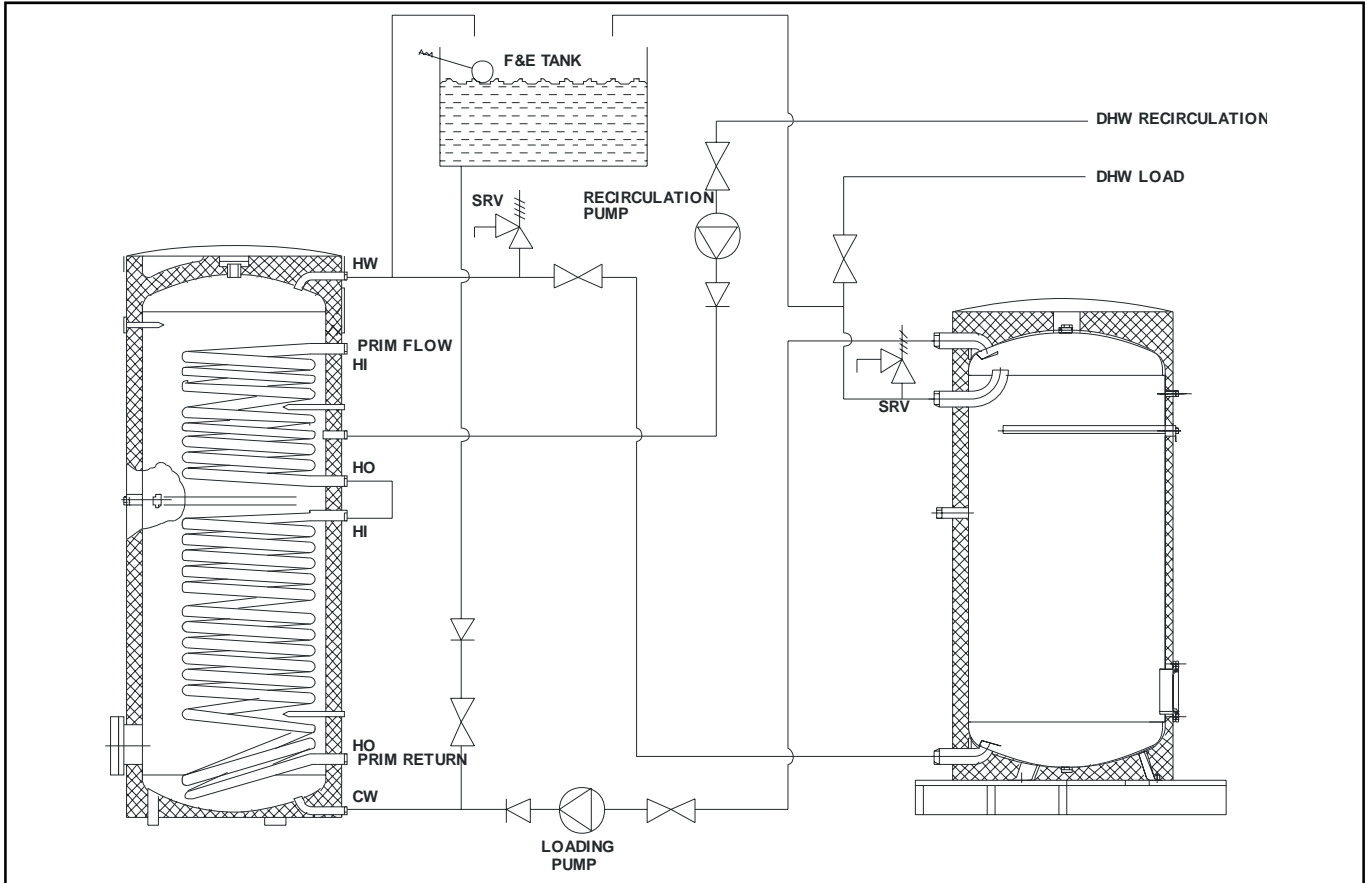


Figure 5.1 Hot Water Applications: Vented system.

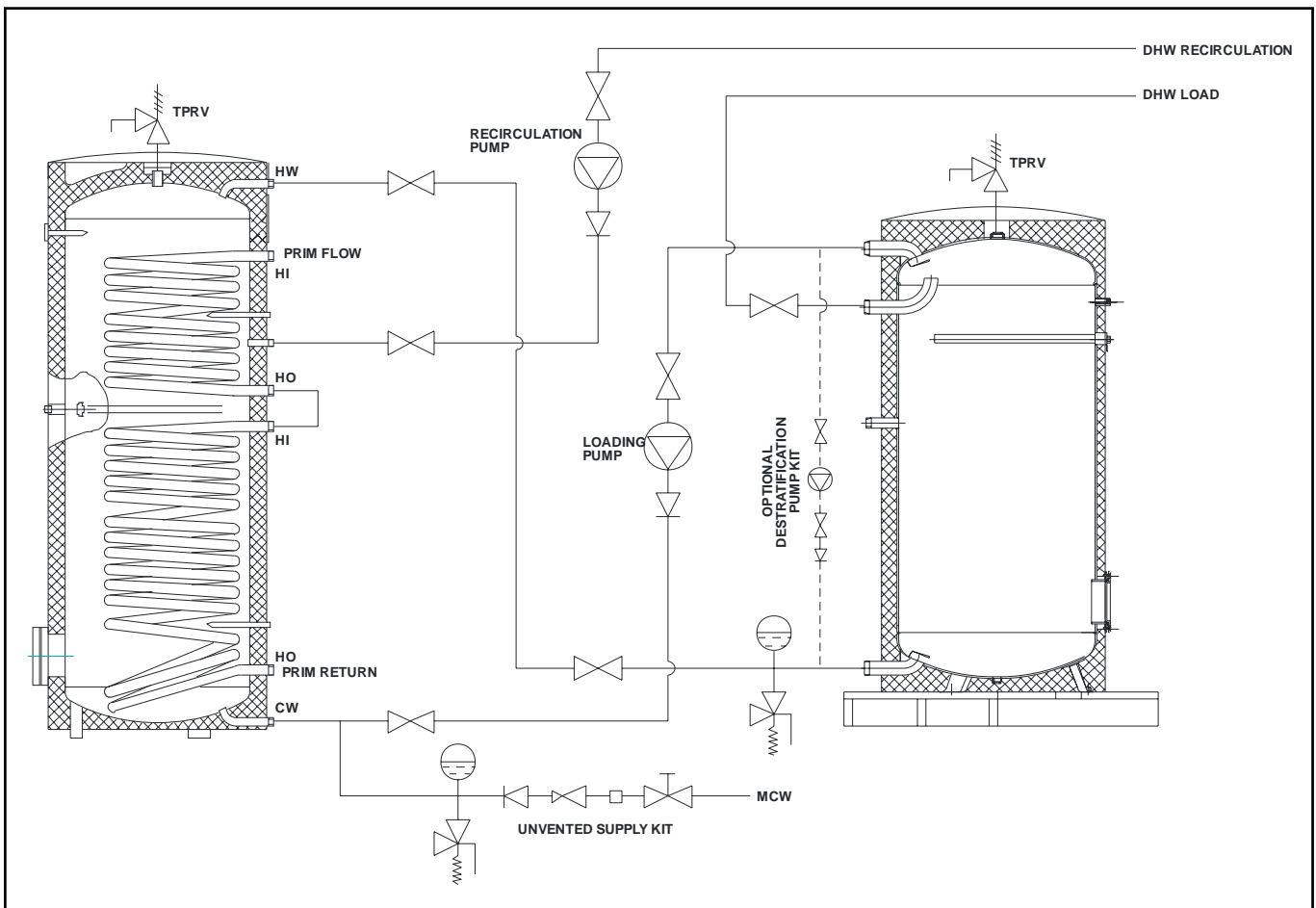


Figure 5.2 Hot Water Applications: Un-Vented system.

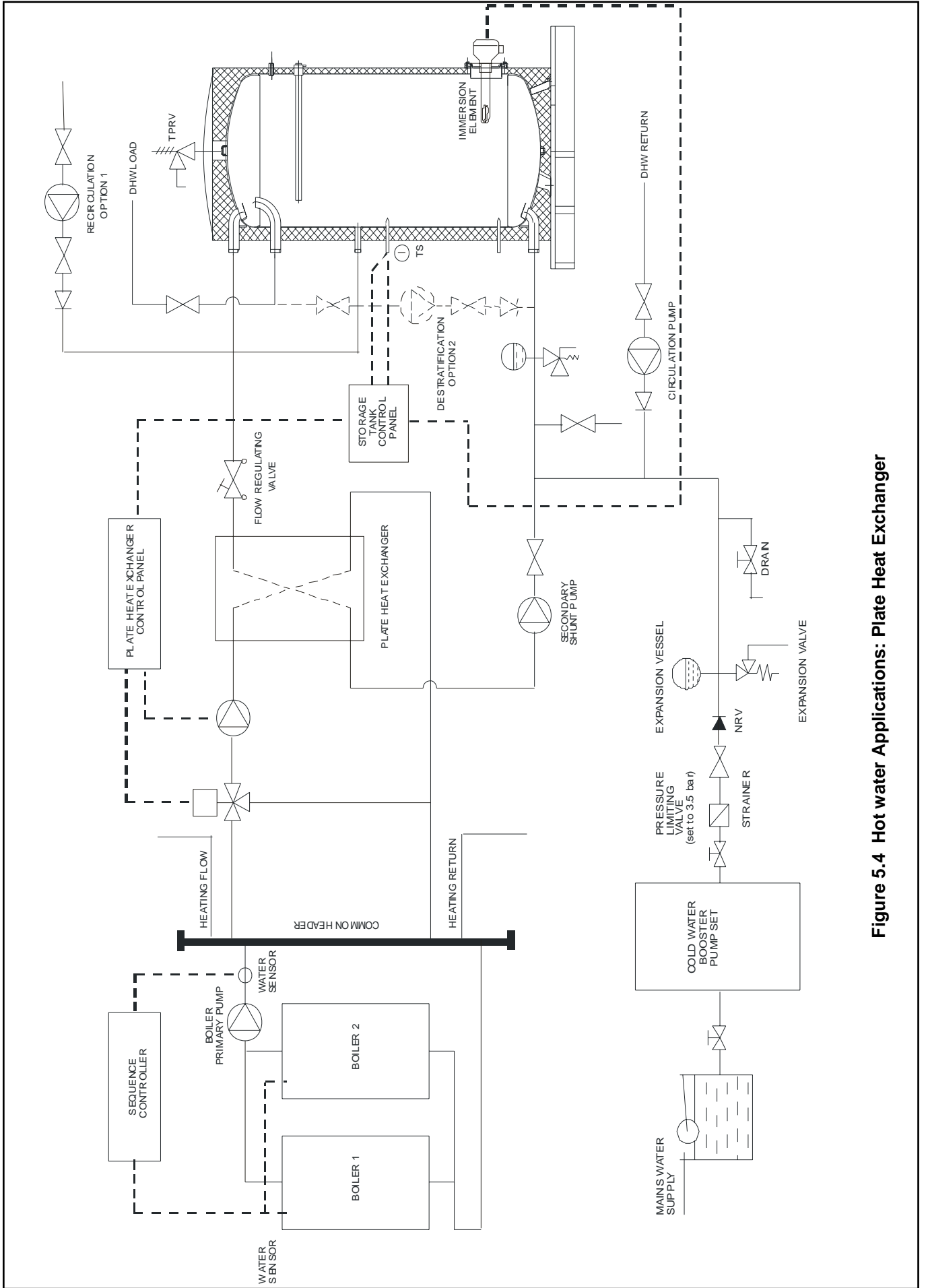


Figure 5.4 Hot water Applications: Plate Heat Exchanger

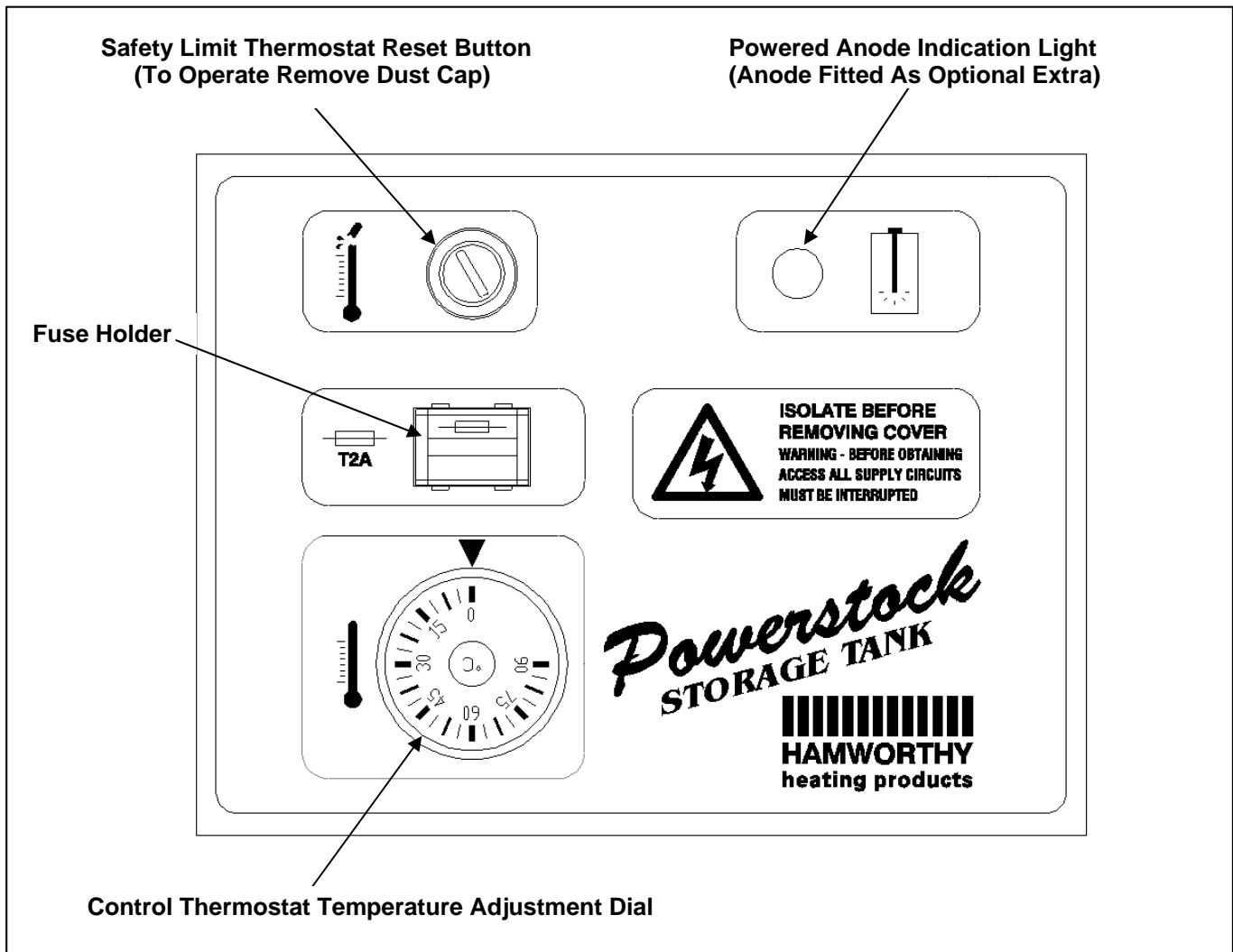


Figure 6.1 : Storage Tank Control Box Fascia.

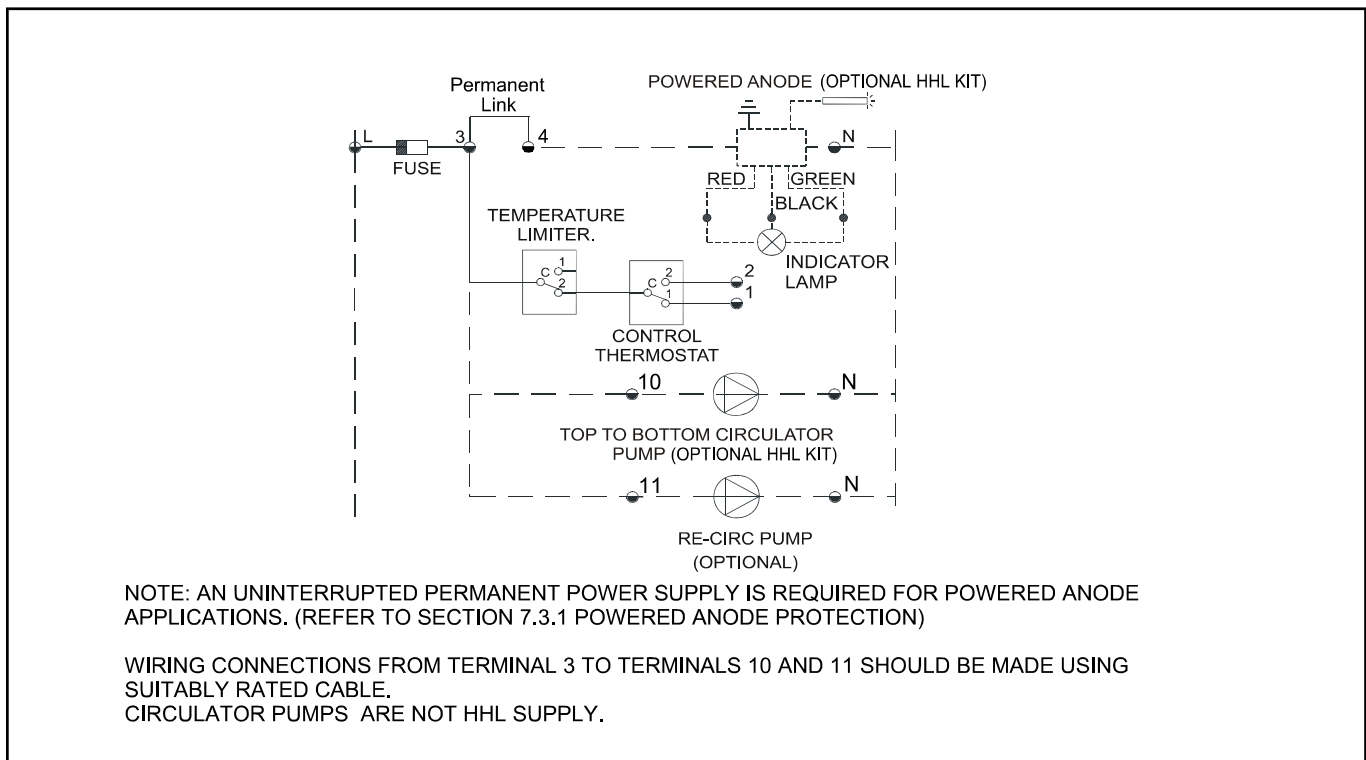
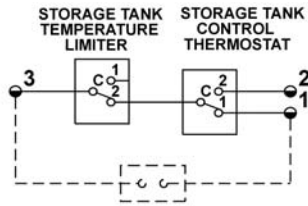


Figure 6.2 : Schematic wiring diagram of the control box.

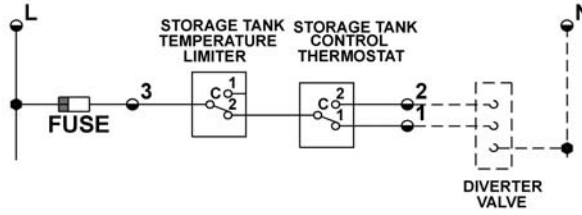
SIMPLE CONTROL SYSTEM.



REMOTE START/ STOP TERMINALS

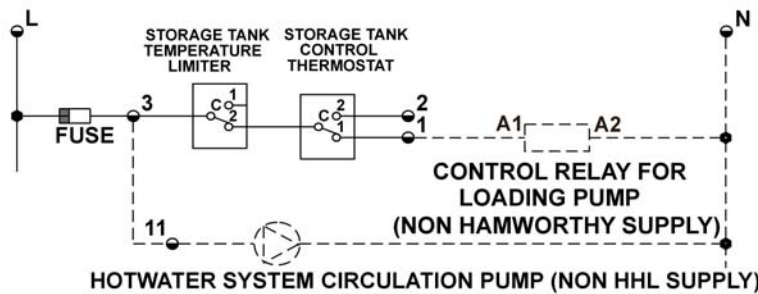
FOR SIMPLE CONTROL, NO MAINS ELECTRICAL SUPPLY IS CONNECTED TO THE "L" & "N" TERMINALS. TERMINALS 1 AND 3 ARE VOLT FREE EXCEPT WHEN SUPPLIED WITH SIGNAL VOLTAGE FROM A BOILER / BMS VIA THE REMOTE START/STOP TERMINALS.

DIVERTER VALVE CONTROL.

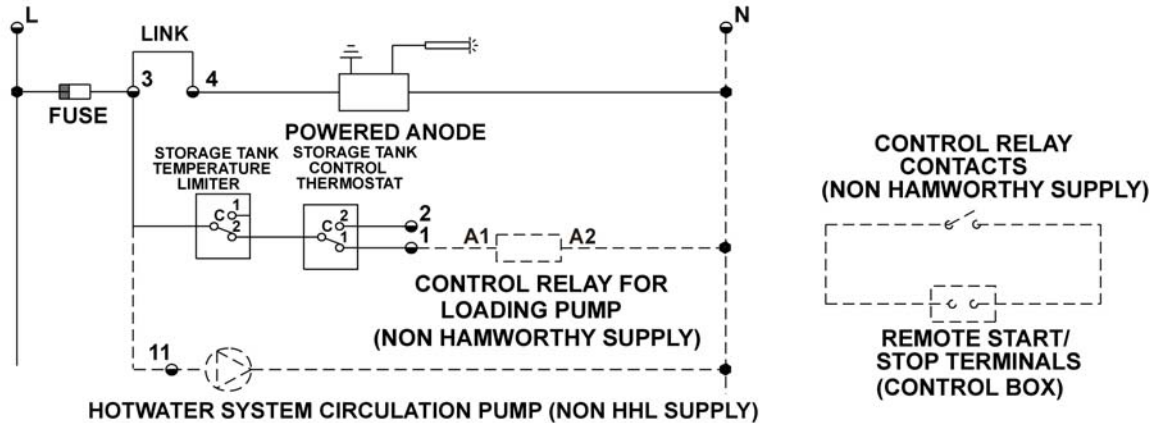


USED WHERE 1 TANK IS CHARGED WITH HOTWATER FIRST. FOR DIVERTER VALVE CONTROL THE MAINS SUPPLY IS CONNECTED TO THE "L" & "N" TERMINALS. TERMINALS 1 & 2 PROVIDE SIGNAL VOLTAGE TO ACTUATE THE VALVE.

CONTROL OF LOADING PUMP & SYSTEM CIRCULATION PUMP.



CONTROL WITH POWERED ANODE.



BOILER CONTROL WITH CIRCULATOR PUMP OR POWERED ANODE.

NOTE! THE BOILER MUST NOT BE DIRECTLY CONNECTED TO THE POWERSTOCK CONTROL BOX. THE COMMON AND NORMALLY CLOSED CONTROL CONTACTS ON THE BOILER CONTROL RELAY ARE OF THE VOLT FREE TYPE EXCEPT WHEN SUPPLIED VIA THE BOILER REMOTE START/STOP TERMINALS..

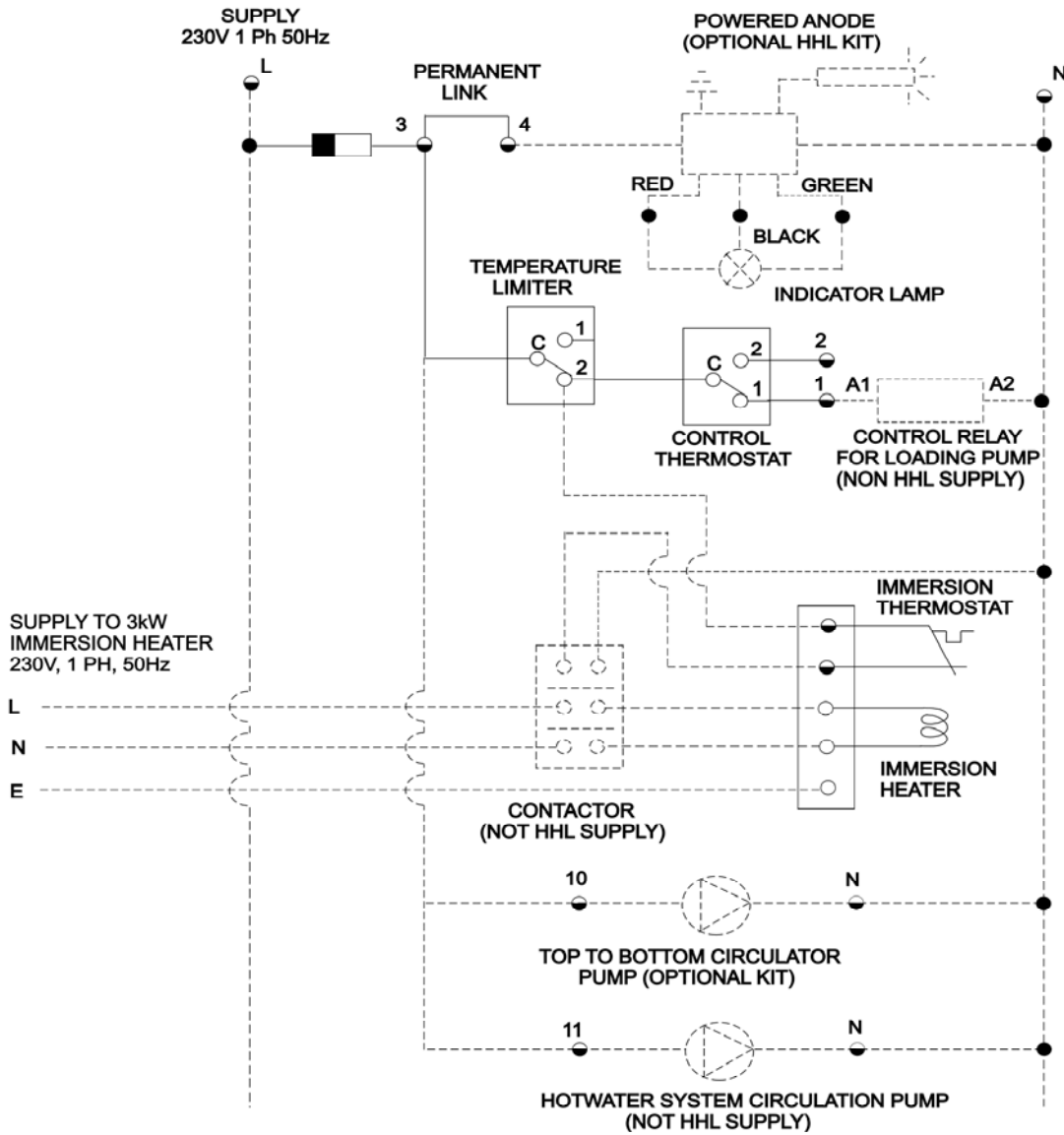
POWERSTOCK CONTROL BOX TERMINALS

----- CLIENTS WIRING

● TERMINAL No

Figure 6.3 : Wiring Schematics For Various Control Systems.

IMMERSION HEATER CONTROL SYSTEM.



NOTE ! AN INTERRUPTED PERMANENT POWER SUPPLY IS REQUIRED FOR POWERED ANODE APPLICATIONS. WIRING CONNECTIONS FROM TERMINAL 3 TO TERMINALS 10 & 11 SHOULD BE MADE USING SUITABLY RATED CABLE. IF AN OPTIONAL IMMERSION HEATER IS FITTED, A SEPARATE POWER SUPPLY & APPROPRIATE CONTROL MUST BE PROVIDED.

IMMERSION HEATER WIRING CONNECTION.

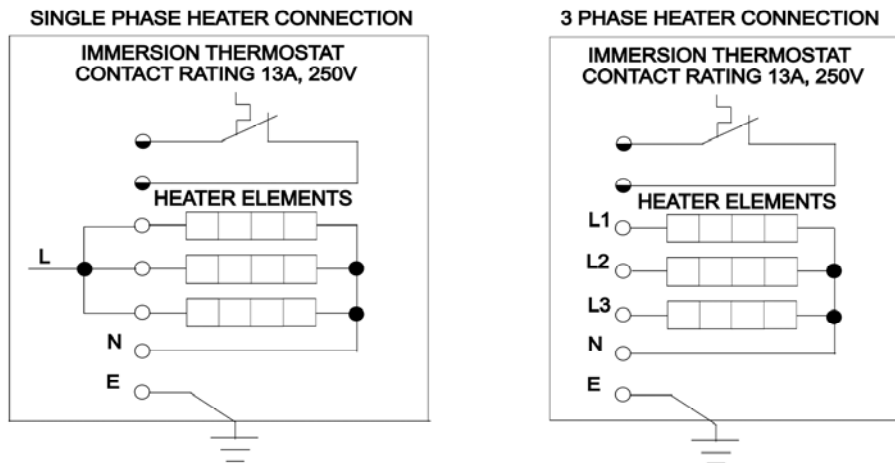


Figure 6.4 : Wiring Schematic For Immersion Heater Control.

IMMERSION HEATER RATING (kW)	HHL PART NUMBER	MINIMUM CONTACTOR CURRENT (A)	
		SINGLE PHASE	3 PHASE
4	533901393	16.7	5.6
9	533901489	37.5	12.5

Figure 6.5 - Table Of Minimum Contactor Current When Immersion Heaters Are Wired For Single & 3 Phase Supply

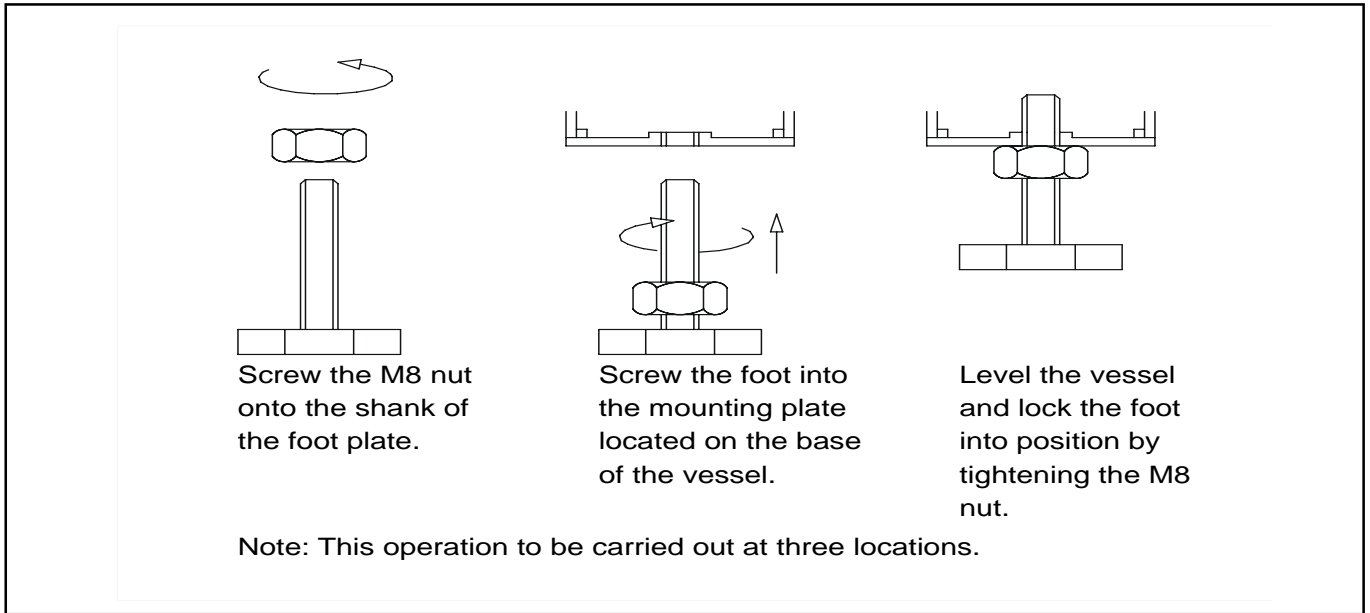


Figure 7.1 : Leveling feet assembly

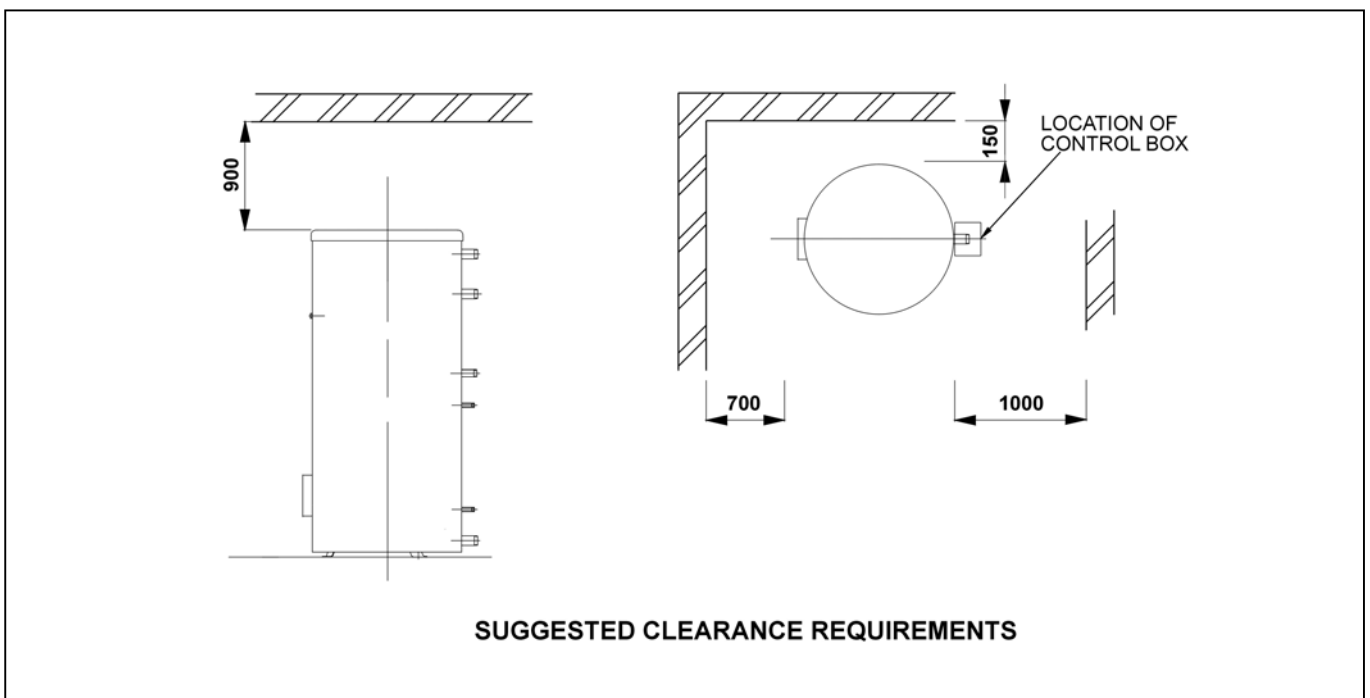
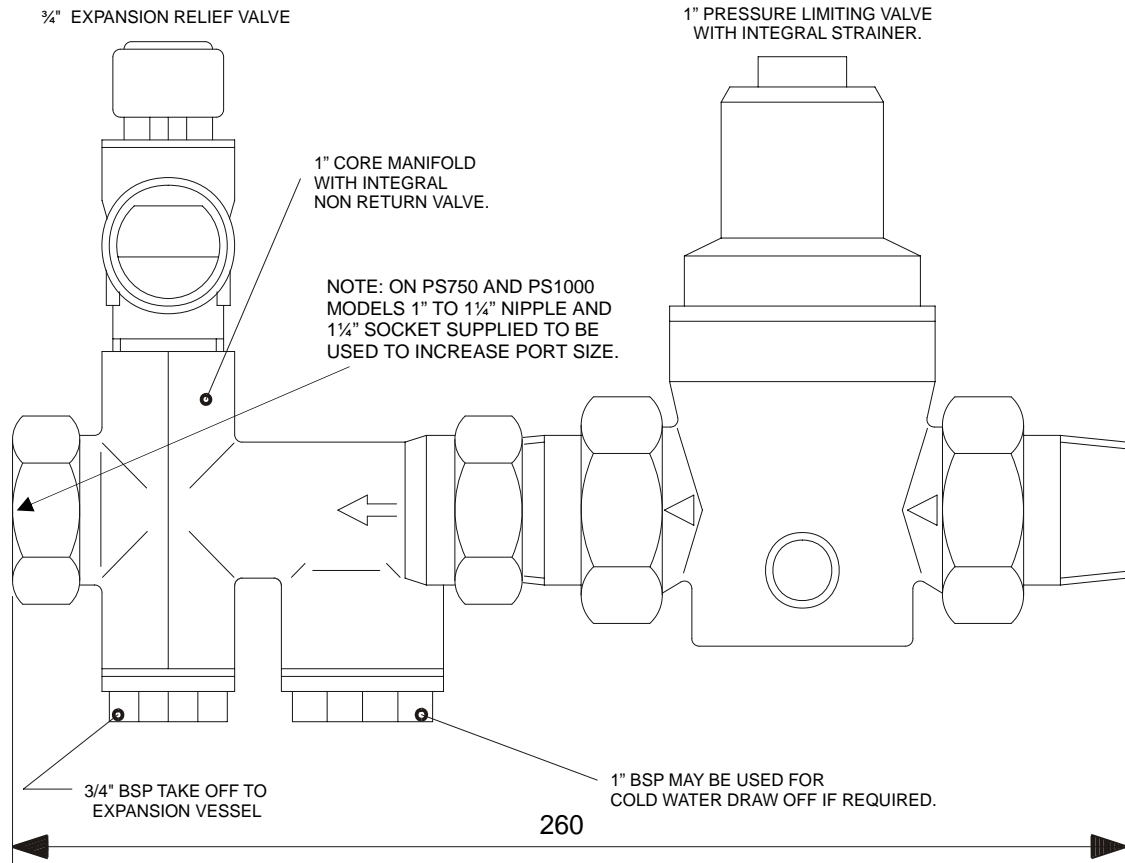


Figure 7.2 : Clearances Required Around Product



Powerstock model	ST300	ST500	ST750	ST1000
Cold water feed side				
Pressure limiting valve (set to 3.5 bar) with integral strainer.	HHL PART No 531902006			
Expansion relief valve (set to 5 bar)	HHL PART No 531905003			
Check valve	HHL PART No 531911030			
1 1/4" Female Socket (Bronze)	Not required	Not required	741620345 1 off	741620345 1 off
1 1/4" to 1" Reducing Nipple (Bronze)	Not required	Not required	741617250 1 off	741617250 1 off
Expansion vessel HHL Part No	24 litre x 2 532712082	60 litre 532712058	80 litre 532712059	100 litre 532712060
Secondary hot water side				
Pressure temperature relief valve (set to 7 bar and 90°C +5 -0)	HHL PART No 531905004			

For ST300 & ST500 models quote HHL Ref: 562403076 } For full Kit Part No.s
 For ST750 & ST1000 models quote HHL Ref: 562403214 }

Figure No 7.3 : Cold Water Supply Valve Train

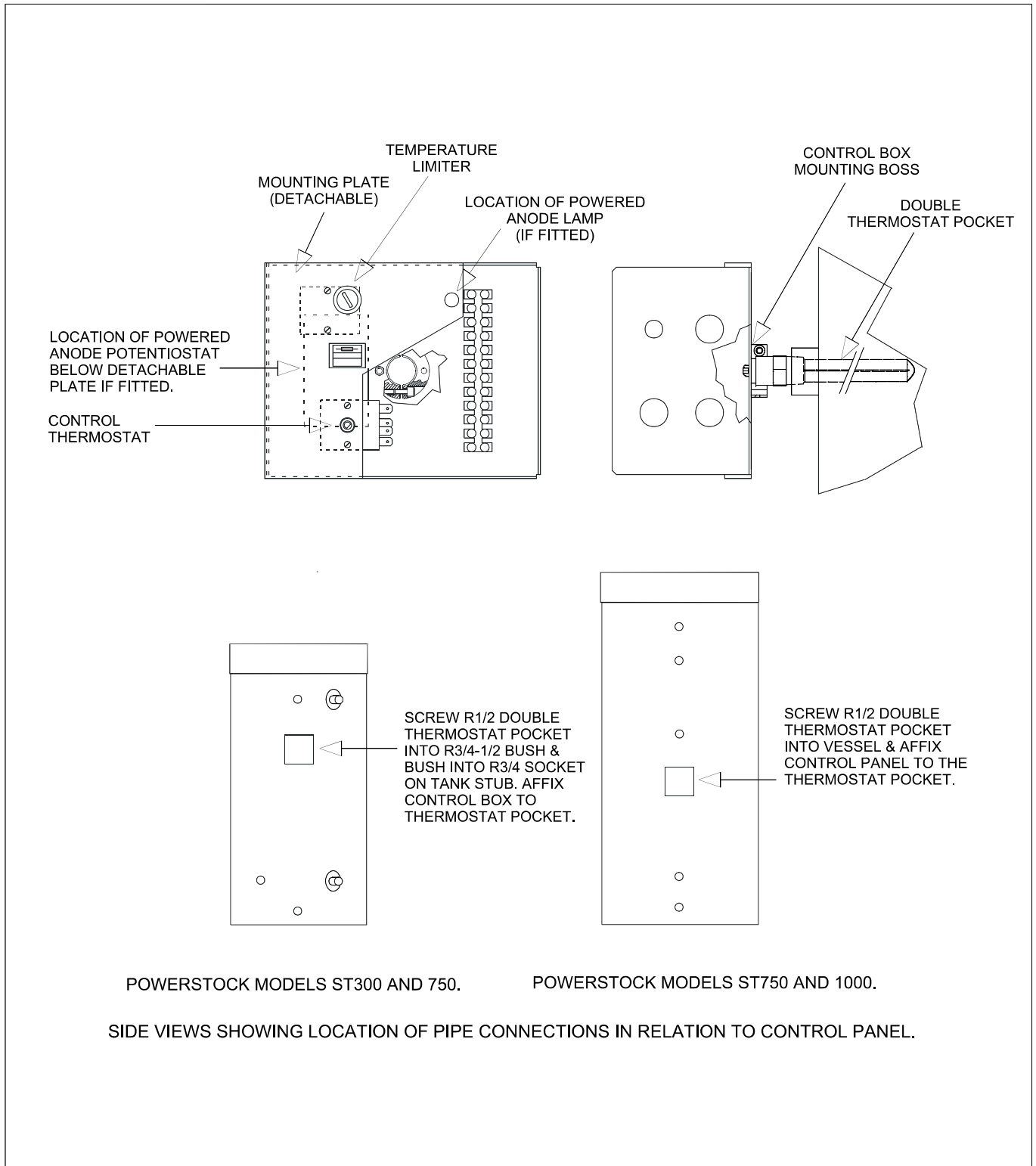


Figure 7.4 : Control box layout & Mounting.

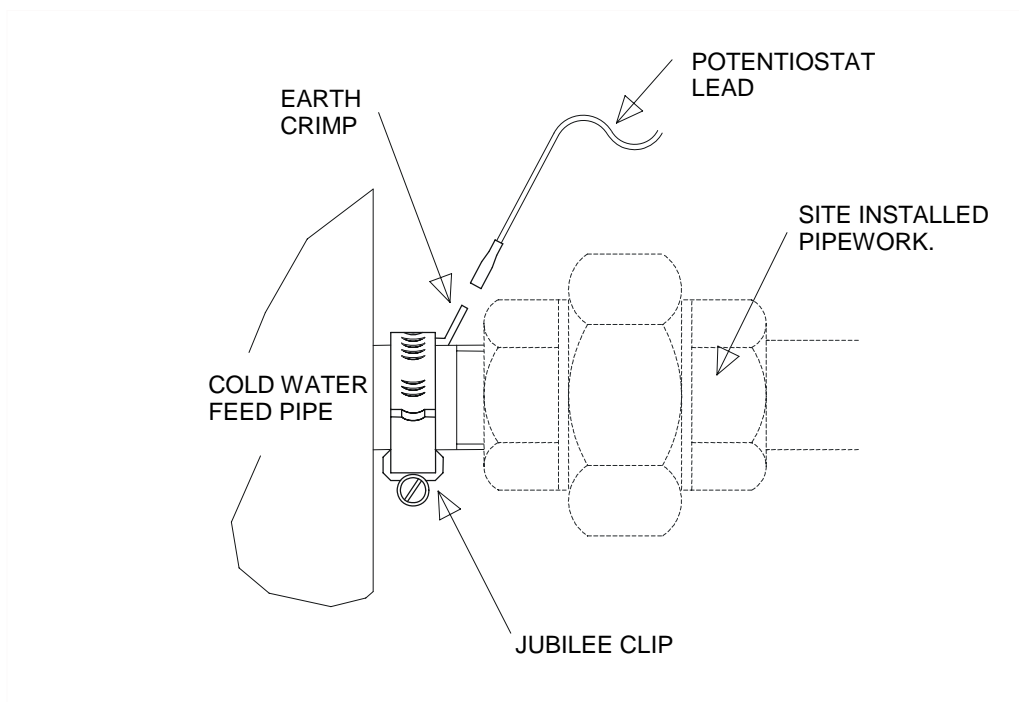


Figure 7.5 : Earth tag assembly.

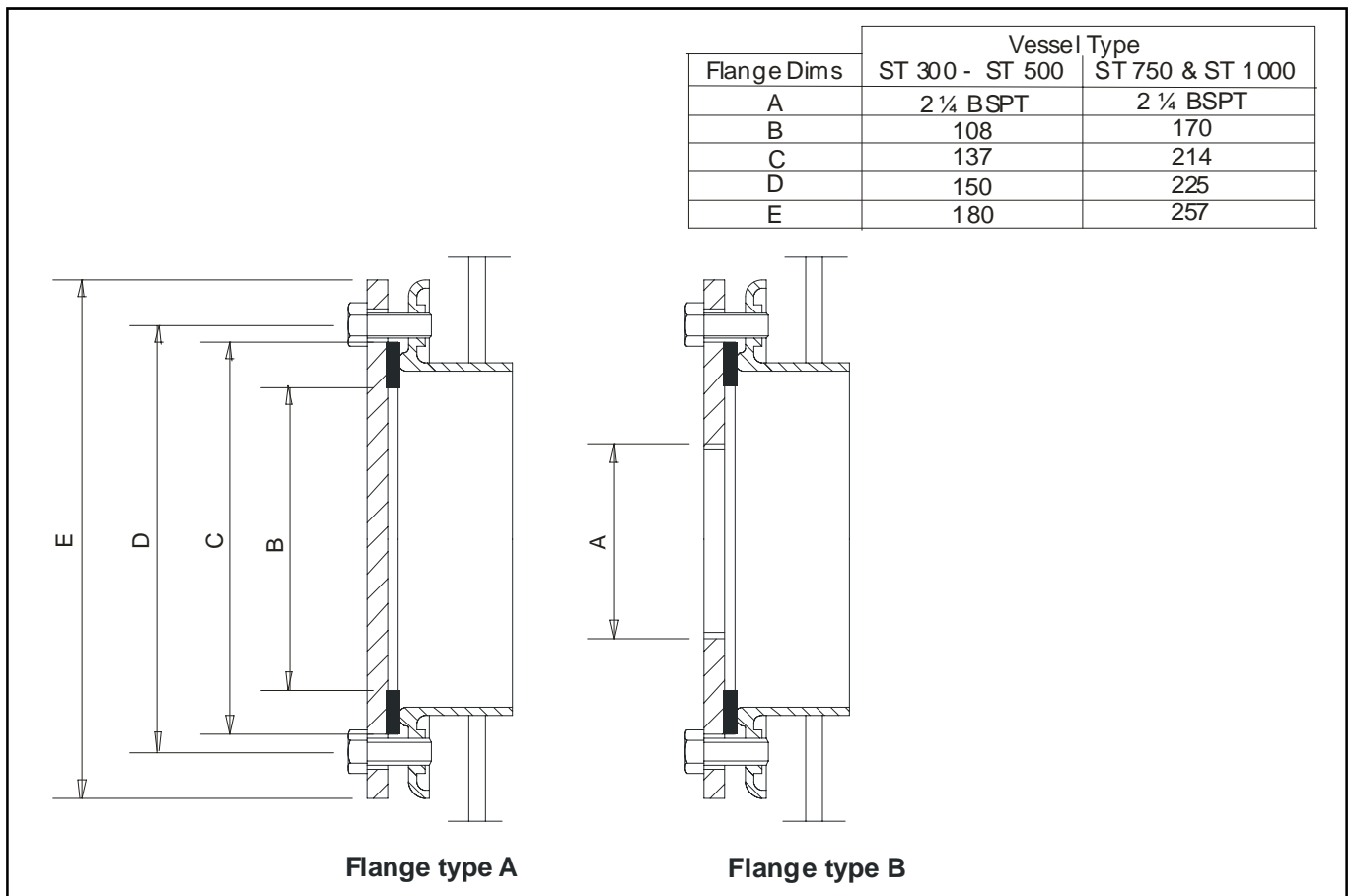
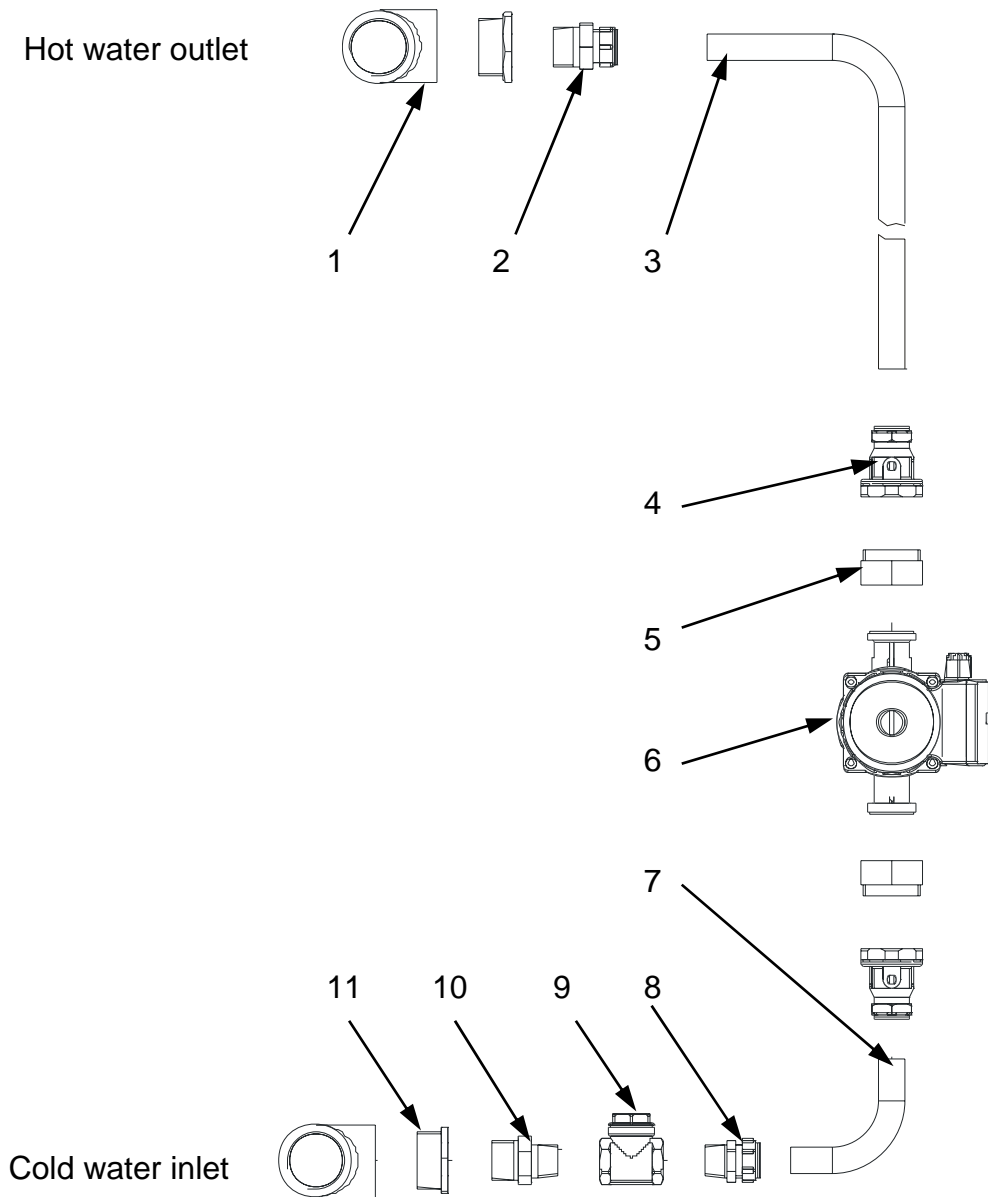


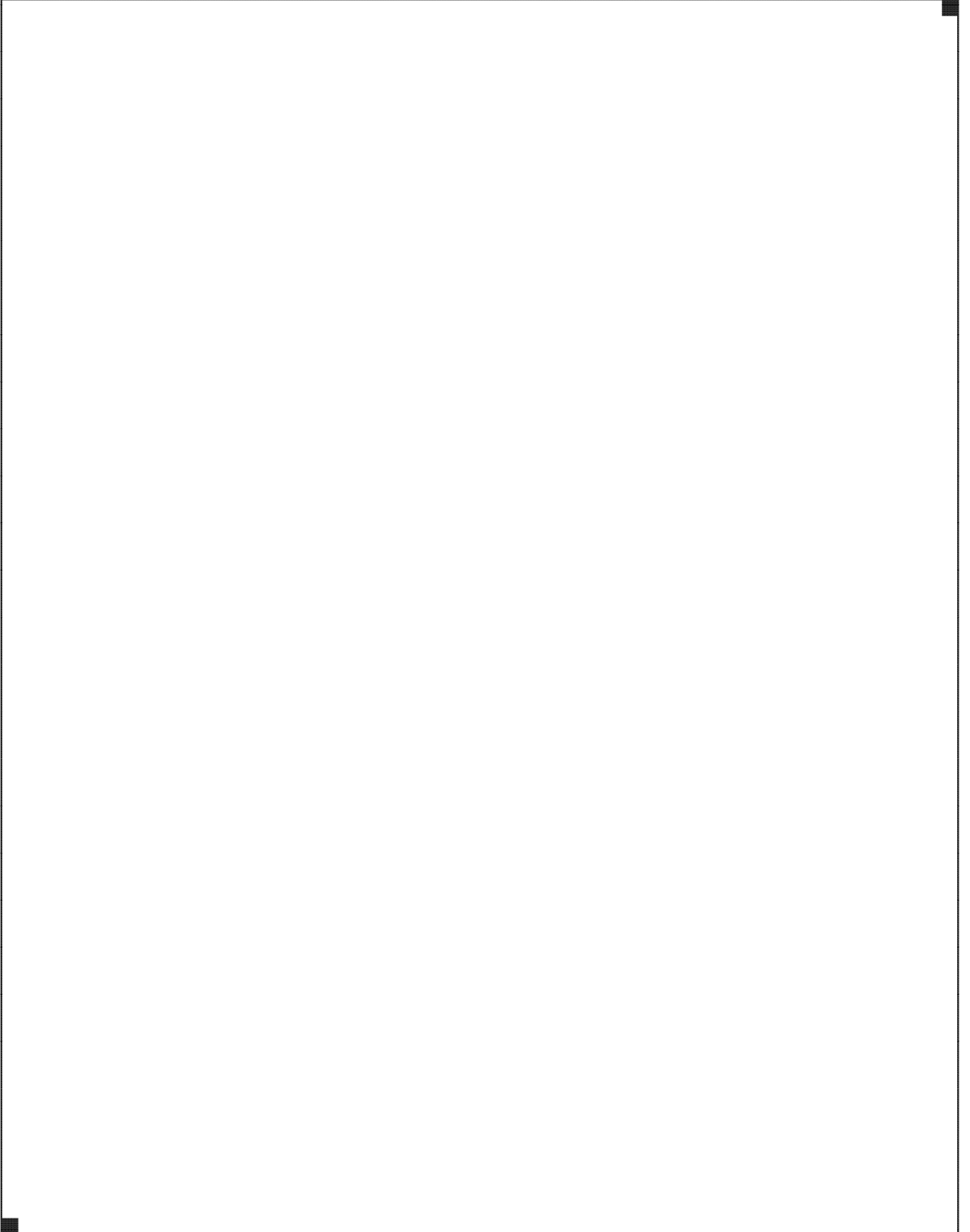
Figure 9.1 : Clean out door flange.



Item	Description	Qty	ST300	ST500	ST750	ST1000
	Re-circulation kit		563605481	563605482	563605483	563605461
1	Tee	2	741654302	741654302	741654310	741654310
2	Coupling	1	530505128	530505128	530505128	530505128
3	Pipe 22mm	1	532403235	532403236	532403237	532403237
4	Isolation valve	2	531911002	531911002	531911002	531911002
5	Pump adaptor	2	530905047	530905047	530905047	530905047
6	Pump Biral WX13	1	1154050150	1154050150	1154050150	1154050150
7	Elbow	1	532403011	532403011	532403011	532403011
8	Coupling	1	530505002	530505002	530505002	530505002
9	Check valve	1	531911003	531911003	531911003	531911003
10	Adaptor	1	741614291	741614291	741614291	741614291
11	Reducing Bush	2	741627357	741627357	741627480	741627480

Figure 10.1 : Top to bottom circulation.

Notes



Hamworthy Heating Accredited Agents

North West England

Gillies Modular Services
210-218 New Chester Road, Birkenhead, Merseyside L41 9BG
tel: **0151 666 1030** fax: **0151 647 8101**

Southern Ireland

HEVAC Limited
Naas Road, Dublin 12, Ireland
tel: **00 353 141 91919** fax: **00 353 145 84806**

Northern Ireland

HVAC Supplies Limited
Unit A6, Dargan Court, Dargan Crescent, Belfast BT3 9JP
tel: **02890 777737** fax: **02890 771233**

Scotland

McDowall Modular Services
14-46 Lomond Street, Glasgow, Scotland G22 6JD
tel: **0141 336 8795** fax: **0141 336 8954**

North East England

Allison Heating Products
12 Sunnyside Lane, Cleadon Village, Sunderland SR6 7XB
tel: **0191 536 8833** fax: **0191 536 9933**



Customer Service Centre

Hamworthy Heating Limited,
Fleets Corner, Poole,
Dorset BH17 0HH.

Telephone: **0845 450 2866**

Fax: **01202 662522**

Email: **aftersales@hamworthy-heating.com**

Website: **www.hamworthy-heating.com**