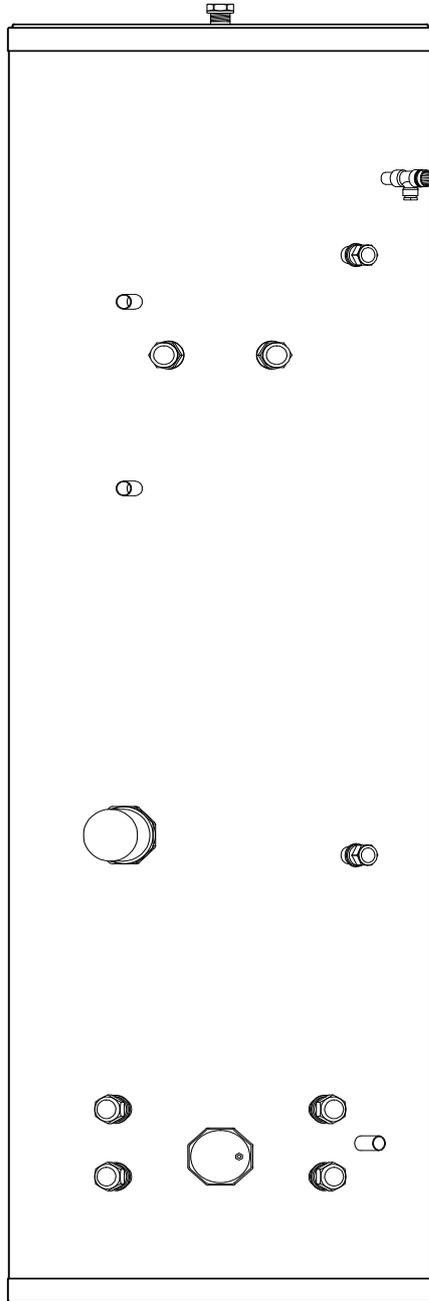


Grant MonoWave System

Indirect HP (High Performance) Cylinder with Buffer for ASHP and Boiler applications

Installation, Servicing and User Instructions



IMPORTANT NOTE FOR INSTALLERS

These instructions are intended to guide Installers on the installation, commissioning and servicing of the Grant MonoWave HP (high performance) cylinder with buffer. After installing the cylinder, leave these instructions with the user.

User instructions to guide users in the operation of the cylinder are in Section 12 of these instructions.

SPECIAL TEXT FORMATS

The following special text formats are used in these instructions for the purposes listed below:

! WARNING !

Warning of possible human injury as a consequence of not following the instructions in the warning.

! CAUTION !

Caution concerning likely damage to equipment or tools as a consequence of not following the instructions in the caution.

! NOTE !

Used for emphasis or information not directly concerned with the surrounding text but of importance to the reader.

PRODUCT CODES COVERED

Grant MonoWave indirect HP Cylinder Model	Product Code
200 litre "standard" cylinder	HPFR200C/BS
250 litre "standard" cylinder	HPFR250C/BS
300 litre "standard" cylinder	HPFR300C/BS
200 litre "pre-plumbed" cylinder	HPFR200PPC/BS
250 litre "pre-plumbed" cylinder	HPFR250PPC/BS
300 litre "pre-plumbed" cylinder	HPFR300PPC/BS

SERVICING

The cylinder should be serviced at least every twelve months and the details entered in the Benchmark Book.



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1 INTRODUCTION

1.1 INSTALLATION REQUIREMENTS

Thank you for purchasing a Grant unvented hot water storage cylinder from our Wave range.

These Installation and User instructions must be read carefully before you begin installing the cylinder.

The cylinder must be installed by a competent person in compliance with all current legislation, codes of practice and local by-laws covering the installation of an unvented hot water cylinder.

Please also make sure that the installation complies with the information contained in these Installation and User Instructions.

To prevent damage to the coil, cylinder and cylinder connections, make any soldered joints before connecting pipework to the cylinder.

1.2 WATER SUPPLY REQUIREMENTS

We recommend that your Grant unvented cylinder is installed with an uninterrupted water supply.

Where possible, the unit should be fed via a Ø22 mm supply pipe. It requires a supply pressure of at least 1.5 bar with a flow rate of at least 20 litres per minute as a minimum for it to function.

Even with this pressure and flow rate, the flow from the outlets will be disappointing if several outlets are used simultaneously. Generally speaking, the higher the supply pressure, the better the system will function.

The cylinder control equipment is factory set to limit the incoming system operating pressure to 3 bar. The maximum supply pressure into the pressure reducing valve (PRV) is 12 bar.

1.3 LOCATION

The unit is designed to be floor standing, vertically mounted, internally in a frost-free environment. When choosing a suitable location for the cylinder, consideration should be given to the routing of the discharge pipe to a convenient point and also the availability of an adequate power supply for connecting the immersion heaters.

The cylinder may stand on any flat and level surface without any special foundation requirements, provided that it is sufficiently robust to support the full weight of the cylinder (refer to Section 2.1).

The position of the cylinder should be such that easy access is provided for servicing the controls and replacing the immersion heater should the need arise.

Generally, pipe runs should be made as short as possible and lagged to prevent heat loss.

1.4 STORAGE AND HANDLING

If the cylinder is not being installed immediately, it should remain in its carton to prevent damage. We recommend that the cylinder be transported to its installation position on a sack truck or similar whilst still within the carton.

! CAUTION !

Do not use the Temperature and Pressure relief valve (T&P relief valve) as a handle when moving and positioning the cylinder.

With pre-plumbed cylinders, do not use the pipework as a carrying handle when lifting, moving and positioning the cylinder.

1.5 ABOUT YOUR CYLINDER

The Grant MonoWave HP indirect cylinder with buffer is available in both pre-plumbed and standard versions.

Both versions are factory-fitted with a temperature and pressure relief (T&P) valve and two 3kW immersion heaters (one in the cylinder and the other in the buffer). Refer to Section 5 for further details on the immersion heaters.

The pre-plumbed cylinders are factory fitted with the following:

Primary circuit pipework

- 1 x 2-port zone valve for hot water
- 2 x 2-port zone valves for heating (for two separate heating zones)
- 1 x Auto air vent (on the flow pipe)
- 1 x 22 mm gate valve by-pass

Cold water inlet pipework

- 1 x Temperature and pressure relief valve
- 1 x Tundish
- 1 x Cold water inlet manifold
- 1 x Drain cock
- 1 x 22mm tee for expansion vessel connection

Electrical

- 1 x Wiring centre (pre-wired to the zone valves and dual thermostat)
- 2 x 3kW electric immersion elements (one in the cylinder and one in the buffer)
- 1 x Dual thermostat (cylinder thermostat and high limit thermostat)

Both pre-plumbed and standard versions have a single coil designed for connection to an air source heat pump, such as the Grant Aeronas range. If another make of heat pump is to be connected, please refer to the manufacturer's installation instructions for more information.

The coil must be connected using a 2-port motorised valve (factory fitted on the pre-plumbed versions) to shut off the flow from the primary source and electronically interlocked with the heat source via the cylinder control and high limit thermostat. This valve is factory fitted on the pre-plumbed versions and supplied loose with the standard cylinder versions.

Failure to fit this 2-port valve will invalidate all guarantees and will be in breach of the Building Regulations Approved Document G3 (2010). More information on electrical wiring is given in Section 5 of these instructions.

Both pre-plumbed and standard versions also have a 50 litre buffer tank, located below the cylinder within the same casing.

On pre-plumbed versions of this cylinder range, the buffer tank MUST only be connected as a volumiser. Refer to Section 3.4.

On standard versions of this cylinder range, the buffer tank can be used in one of two ways, depending on the system requirements as follows:

1. As a buffer

Where the flow and return connections from the heat pump are connected to one side of the buffer and the flow and return connections for the system (including the cylinder) are connected to the other side.

Refer to Figure 3-1 for details of the pipework connections for this option.

The buffer option is not available on pre-plumbed models in this cylinder range.

! NOTE !

A primary circuit circulating pump (not supplied with the cylinder) will be required if this option is used.

2. As a 'volumiser'

To simply increase the volume of the primary circuit when required. Refer to the heat pump requirements given in the Aerona³ Installation and Servicing Instructions for further details.

In this case, the flow connections on either side of the buffer are capped off and the return from the heating system connected to one side of the buffer, with the return to the heat pump connected to the return connection on the other side.

Refer to Figures 3-2 and 3-3 for details of the pipework connections for this option.

1.6 OPEN VENTED HOT WATER SYSTEMS

If required, your MonoWave HP cylinder with buffer can be used as part of an open vented hot water system, i.e. fed from a cold water storage cistern and fitted with an open vent pipe, provided the maximum head does not exceed 30 metres.

When used in this way, it will not be necessary to install the expansion vessel and cold water inlet manifold supplied with the cylinder.

! NOTE !

The temperature and pressure relief (T&P) valve must be left connected to the cylinder (as supplied).

As it may still operate due to temperature, the temperature and pressure relief (T&P) valve should be connected in the correct manner - refer to guidance given in Sections 4.9 to 4.13 of these instructions.

1.7 PRIMARY CIRCUIT PIPEWORK CONNECTIONS

All primary circuit pipework connections to the cylinder MUST be made in accordance with Figures 3-1 to 3-3 as appropriate. Refer to Section 3 (Primary Circuit Installation).

1.8 CYLINDER BY-PASS

When either a Grant Aerona³ HPID13R32 (13kW) or HPID17R32 (17kW) heat pump is used with the 'standard' version of this cylinder, a simple by-pass MUST be fitted between the primary flow and return pipes at the cylinder. This by-pass consists of a 22 mm pipe fitted between the primary flow and return pipes fitted with a 22 mm gate valve.

The pre-plumbed version of the cylinder is supplied with a factory fitted coil by-pass, fitted between the primary flow and return pipes (below the heating zone valves).

This by-pass must be set during commissioning. Refer to Section 6.7 of these Installation and User Instructions.

! NOTE !

A by-pass at the cylinder, as described above, is NOT required for the Grant Aerona³ HPID6R32 (6kW) or HPID10R32 (10kW) heat pumps, but ONLY when a Grant Aerona³ HPID13R32 (13kW) or HPID17R32 (17kW) heat pump is used with this cylinder.

1.9 SECONDARY CIRCUIT PIPEWORK CONNECTIONS

All secondary circuit primary pipework connections to the cylinder MUST be made in accordance with Figures 3-1 to 3-3 as appropriate. Refer to Section 4 (Secondary Circuit Installation) for more detailed information.

1.10 TAPS AND FITTINGS

All taps and fittings incorporated in the unvented hot water system should have a rated operating pressure of 7 bar or above.

1.11 HARD WATER SCALING

If the cylinder is used in a hard water area scaling will form inside the cylinder and this will reduce both the performance and working life of the cylinder.

Where the total hardness exceeds 125 ppm a high capacity water softener, or suitable water conditioner, should be installed in the incoming cold water supply to the cylinder.

It is recommended that the water temperature control thermostats (on the immersion heaters and dual thermostats) fitted to the cylinder be set no higher than 60°C. This will help reduce the migration of suspended solids in the water and help minimise the build-up of lime scale.

1.12 INSULATION

All Grant MonoWave HP indirect cylinders with buffer are insulated with 40mm thick CFC/HFC free, fire retardant, polyurethane foam injected between the stainless steel cylinder and the outer casing. This polyurethane foam has a Global Warming Potential (GWP) of less than 3 and an Ozone Depletion Potential (ODP) of 0.

1.13 HEALTH AND SAFETY

The information supplied in Table 2-1 will help you assess the safest way to manoeuvre your cylinder into position.

Please use the table to find the empty weight of your cylinder and then consider how you can safely move it into its final position.

Please leave these Installation and User Instructions with the householder after installation.

2 TECHNICAL DATA

2.1 CYLINDER TECHNICAL DATA

Table 2-1: Cylinder technical data

	Standard cylinder			Pre-plumbed cylinder		
	200 litre	250 litre	300 litre	200 litre	250 litre	300 litre
Nominal capacity (litres)	200	250	300	200	250	300
Actual capacity (litres)	194	242	292	194	242	292
Buffer - nominal capacity (litres)	50	50	50	50	50	50
Overall diameter (mm)	580	580	580	580	580	580
Overall height	1775	1956	2144	1775	1956	2144
Weight - empty (kg)	60	67	74	60	67	74
Weight - full including buffer (kg)	302	357	414	302	357	414
Secondary return connection (mm)	22	22	22	22	22	22
Cold feed / hot draw-off connections (mm)	22	22	22	22	22	22
Primary coil connections (mm)	22	22	22	22	22	22
Primary coil length (m)	16.00	16.00	16.00	16.00	16.00	16.00
Primary coil surface area (m ²)	3.3	3.3	3.3	3.3	3.3	3.3
Primary coil pipe diameter (mm)	32	32	32	32	32	32
Maximum water supply pressure (bar)	12	12	12	12	12	12
System operating pressure - pre-set (bar)	3	3	3	3	3	3
Expansion vessel charge pressure (bar)	3	3	3	3	3	3
Expansion relief valve (bar)	6	6	6	6	6	6
T&P relief valve lift pressure (bar)	7	7	7	7	7	7
T&P relief valve lift temperature (°C)	90	90	90	90	90	90
Maximum primary circuit working pressure (bar)	3	3	3	3	3	3
Performance:						
Primary coil rating (kW)	46	46	46	46	46	46
Standing heat loss (kWh/24hrs)*	1.88	2.02	2.21	1.88	2.02	2.21

* Test carried out at 60°C.

2.2 PRODUCT CONTENTS

Table 2-2: Product contents

	Standard cylinder			Pre-plumbed cylinder		
	200 litre	250 litre	300 litre	200 litre	250 litre	300 litre
Standard cylinder - 200 litres	1	-	-	-	-	-
Standard cylinder - 250 litres	-	1	-	-	-	-
Standard cylinder - 300 litres	-	-	1	-	-	-
Pre-plumbed cylinder - 200 litres	-	-	-	1	-	-
Pre-plumbed cylinder - 250 litres	-	-	-	-	1	-
Pre-plumbed cylinder - 300 litres	-	-	-	-	-	1
Expansion vessel (22mm compression) - 19 litre	1	-	-	1	-	-
Expansion vessel (22mm compression) - 24 litre	-	1	1	-	1	1
Expansion vessel hose (3/4" BSPF x 3/4" BSPM) c/w washer	1	1	1	-	-	-
Adapter (22mm compression x 3/4" BSPM)	1	1	1	-	-	-
1/2" temperature and PRV - 7 bar/90°C †	1	1	1	1	1	1
Temperature and PRV cover	1	1	1	-	-	-
Tundish - 15/22 mm	1	1	1	1 †	1 †	1 †
Drain cock - 1/2" end feed	1	1	1	1 †	1 †	1 †
Inlet manifold - 3 bar pressure reducing valve and 6 bar expansion relief valve	1	1	1	1 †	1 †	1 †
2-port motorised valve - 22 mm (hot water)	1	1	1	1 †	1 †	1 †
2-port motorised valve - 22 mm (heating)	-	-	-	2 †	2 †	2 †
Dual thermostat (control: 25-65°C / high limit: 90°C)	2	2	2	2*	2*	2*
Immersion heater - 3kW 1 3/4" boss †	2	2	2	2	2	2

† Factory fitted

* One of the dual stats supplied with the pre-plumbed versions of these cylinder comes factory fitted and the other comes loose in the accessories kit.

2.3 DIMENSIONS

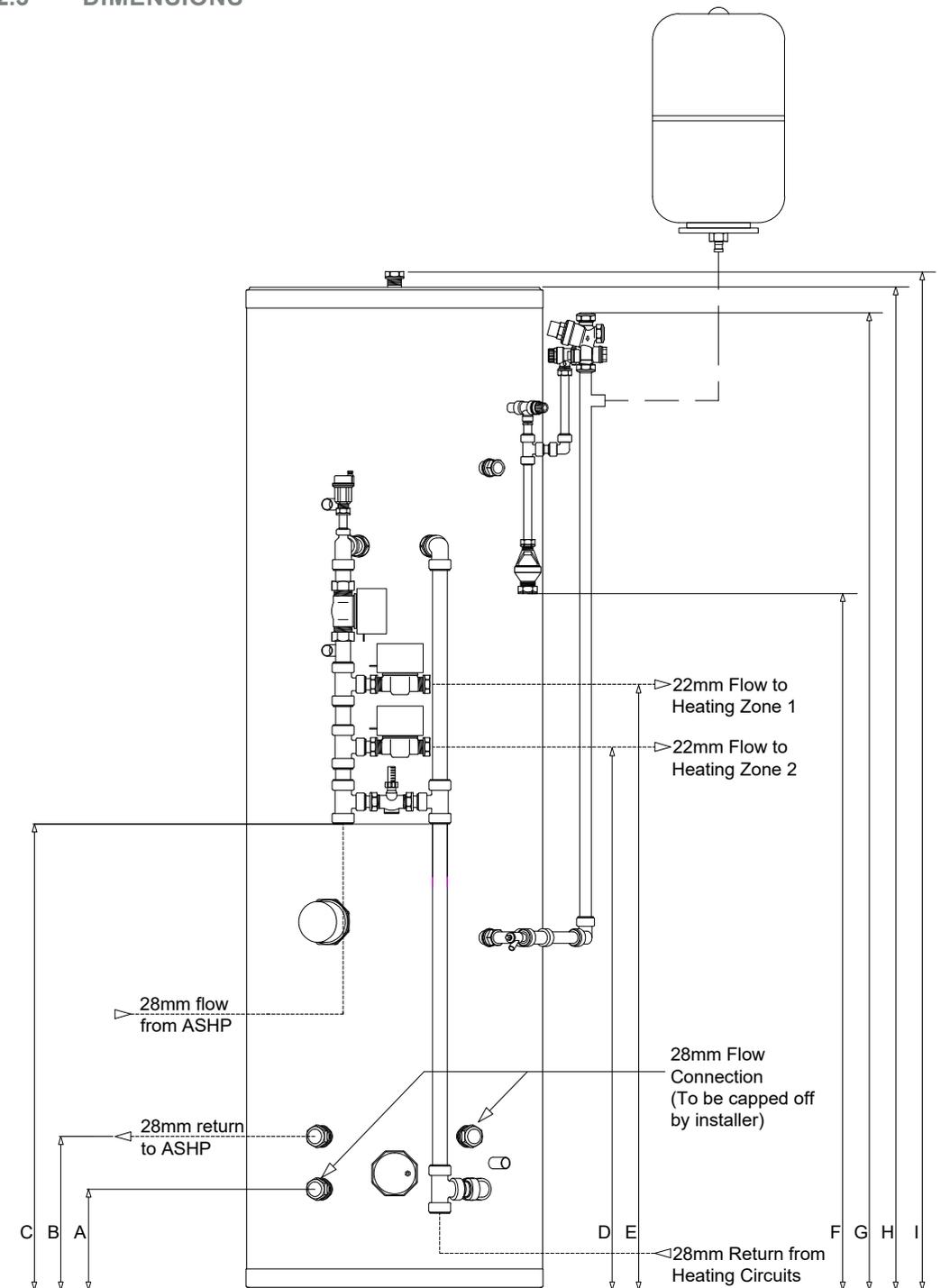


Figure 2-1: Pre-plumbed cylinder dimensions

Table 2-3: Pre-plumbed cylinder dimensions

Dimensions (mm)	200 litre	250 litre	300 litre
A	200	193	193
B	300	294	294
C	750	780	770
D	910	940	940
E	1035	1065	1060
F	1170	1340	1550
G	1700	1870	2,085
H	1740	1921	2109
I	1775	1956	2144
Diameter	580	580	580

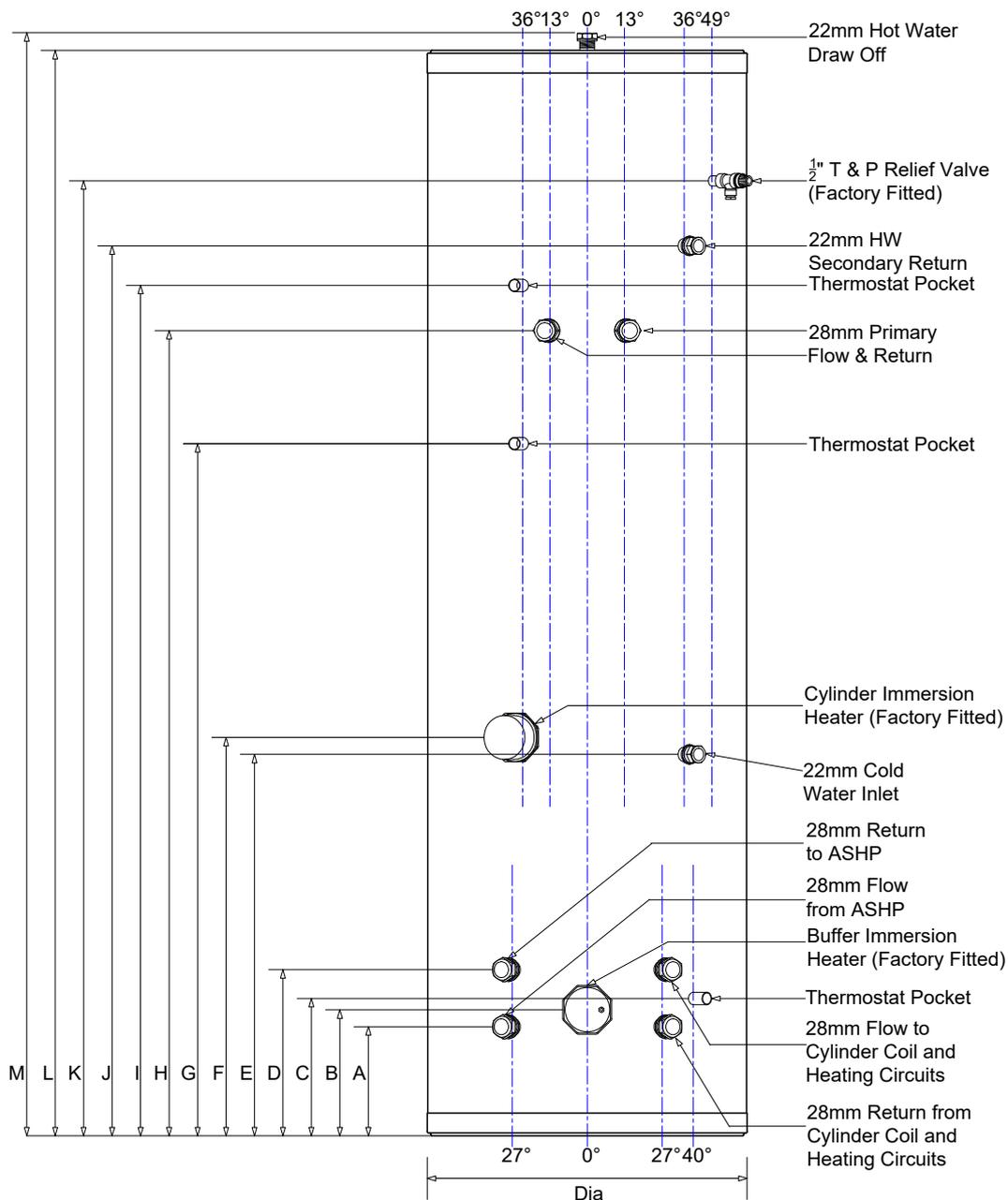


Figure 2-2: Standard cylinder dimensions

Table 2-4: Standard cylinder dimensions

Dimensions (mm)	200 litre	250 litre	300 litre
A	200	193	193
B	230	223	223
C	250	243	293
D	300	294	294
E	680	675	675
F	710	705	705
G	1200	1225	1225
H	1400*	1425	1425
I	1480	1505	1846
J	1300*	1575	1855
K	1530	1725	1915
L	1740	1921	2109
M	1775	1956	2144
Diameter	580	580	580

*Secondary return tapping is below Flow and Return tappings on 200 litre model.

3 PRIMARY CIRCUIT INSTALLATION

3.1 GRANT MONOWAVE HP CYLINDERS WITH BUFFER

Grant MonoWave HP indirect cylinders with buffer are specifically designed for connection to most fully pumped Air Source Heat Pump systems (such as the Grant Aerona³ Heat Pump range) - either open vented or sealed systems having a maximum working pressure of 3 bar and a maximum working temperature of 90°C. If you are in any doubt over the suitability of an Air Source Heat Pump (other than a Grant Aerona³ heat pump) for use with the cylinder, consult the heat pump manufacturer.

! WARNING !

Solid fuel or wood burning boilers and gravity circulation systems must not be used on the primary circuit of an unvented hot water system.

3.2 HARD WATER AREAS

If the cylinder is to be used with a boiler, in a hard water area, we recommend that the primary flow temperature be limited to 75°C. This will help reduce the migration of suspended solids in the water and help prevent the build up of lime scale.

3.3 PRIMARY CONNECTIONS: STANDARD CYLINDER

The buffer tank incorporated in the cylinder can be used in one of two ways, either as a buffer or as a volumiser.

Depending on which option is to be used, proceed with the installation as follows:

3.3.1 WHERE THE BUFFER OPTION IS TO BE USED

Make the primary circuit and heat pump connections to the cylinder/buffer tank as follows (Refer to Figure 3-1):

1. Connect the primary circuit return pipe into the buffer tank primary circuit return connection – the 28 mm compression connection located to the LOWER RIGHT of the buffer tank immersion heater.
2. Connect the primary circuit flow pipe into the buffer tank primary circuit flow connection – the 28 mm compression connection located to the UPPER RIGHT of the buffer tank immersion heater.
3. Connect the heat pump flow and return pipes to the buffer tank heat pump flow and return connections – the 28 mm compression connections located to the LEFT of the buffer tank immersion heater.

The heat pump flow MUST be connected to the LOWER connection and the heat pump return to the UPPER connection.

! NOTE !

The upper left (heat pump return) connection is fitted with an internal 'dip pipe' that allows air to be vented from the top of the buffer tank. For this to function the heat pump return must be connected to the UPPER connection.

4. Connect the hot water primary circuit flow and return pipes to the 28 mm compression cylinder coil flow and return connections.
5. The 2-port zone valve (supplied with the cylinder) MUST be fitted into the hot water primary flow to the cylinder coil flow connection and wired in accordance with Figure 5-3 to comply with current legislation. Refer to Section 5 of these Installation and User Instructions.
The valve has 22 mm compression connections.
6. An automatic or manual air vent should be installed in the primary flow pipe to the coil to allow air to be vented from the upper coil

7. When a Grant Aerona³ HPID13R32 (13kW) or HPID17R32 (17kW) heat pump is used with this cylinder, a simple by-pass MUST be fitted between the primary flow and return pipes at the cylinder. This by-pass consists of a 22 mm pipe fitted between the primary flow and return pipes fitted with a 22 mm gate valve.
8. This by-pass must be set during commissioning. Refer to Section 6.7 of these Installation and User Instructions.

! NOTE !

A by-pass at the cylinder, as described above, is NOT required for the Grant Aerona³ HPID6R32 (6kW) or HPID10R32 (10kW) heat pumps, but ONLY when a Grant Aerona³ HPID13R32 (13kW) or HPID17R32 (17kW) heat pump is used with this cylinder.

3.3.2 WHERE THE VOLUMISER OPTION IS TO BE USED

Make the primary circuit and heat pump connections to the cylinder as follows (Refer to Figure 3-2):

1. Cap off both buffer tank flow connections – the 28mm compression connections located to the UPPER RIGHT and LOWER LEFT of the buffer tank immersion heater.
2. Connect the primary circuit return pipe into the buffer tank primary circuit return connection – the 28mm compression connection located to the LOWER RIGHT of the buffer immersion heater.
3. Connect the heat pump flow to the primary circuit flow pipe.
4. Connect the heat pump return pipe to the buffer tank heat pump return connection – the 28mm compression connection located to the UPPER LEFT of the buffer tank immersion heater.

! NOTE !

The upper left (heat pump return) connection is fitted with an internal 'dip pipe' that allows air to be vented from the top of the buffer tank. For this to function the heat pump return must be connected to the UPPER connection.

5. Connect the hot water primary circuit flow and return pipes to the 28mm compression cylinder coil flow and return connections.
6. The 2-port zone valve (supplied with the cylinder) MUST be fitted into the hot water primary flow to the cylinder coil flow connection and wired in accordance with Figure 5-4 to comply with current legislation. Refer to Section 5 of these Installation and User Instructions.
The valve has 22mm compression connections.
7. An automatic or manual air vent should be installed in the primary flow pipe to the coil to allow air to be vented from the upper coil.
8. When a Grant Aerona³ HPID13R32 (13kW) or HPID17R32 (17kW) heat pump is used with this cylinder, a simple by-pass MUST be fitted between the primary flow and return pipes at the cylinder. This by-pass consists of a 22 mm pipe fitted between the primary flow and return pipes fitted with a 22 mm gate valve.
9. This by-pass must be set during commissioning. Refer to Section 6.7 of these Installation and User Instructions.

! NOTE !

A by-pass at the cylinder, as described above, is NOT required for the Grant Aerona³ HPID6R32 (6kW) or HPID10R32 (10kW) heat pumps, but ONLY when a Grant Aerona³ HPID13R32 (13kW) or HPID17R32 (17kW) heat pump is used with this cylinder.

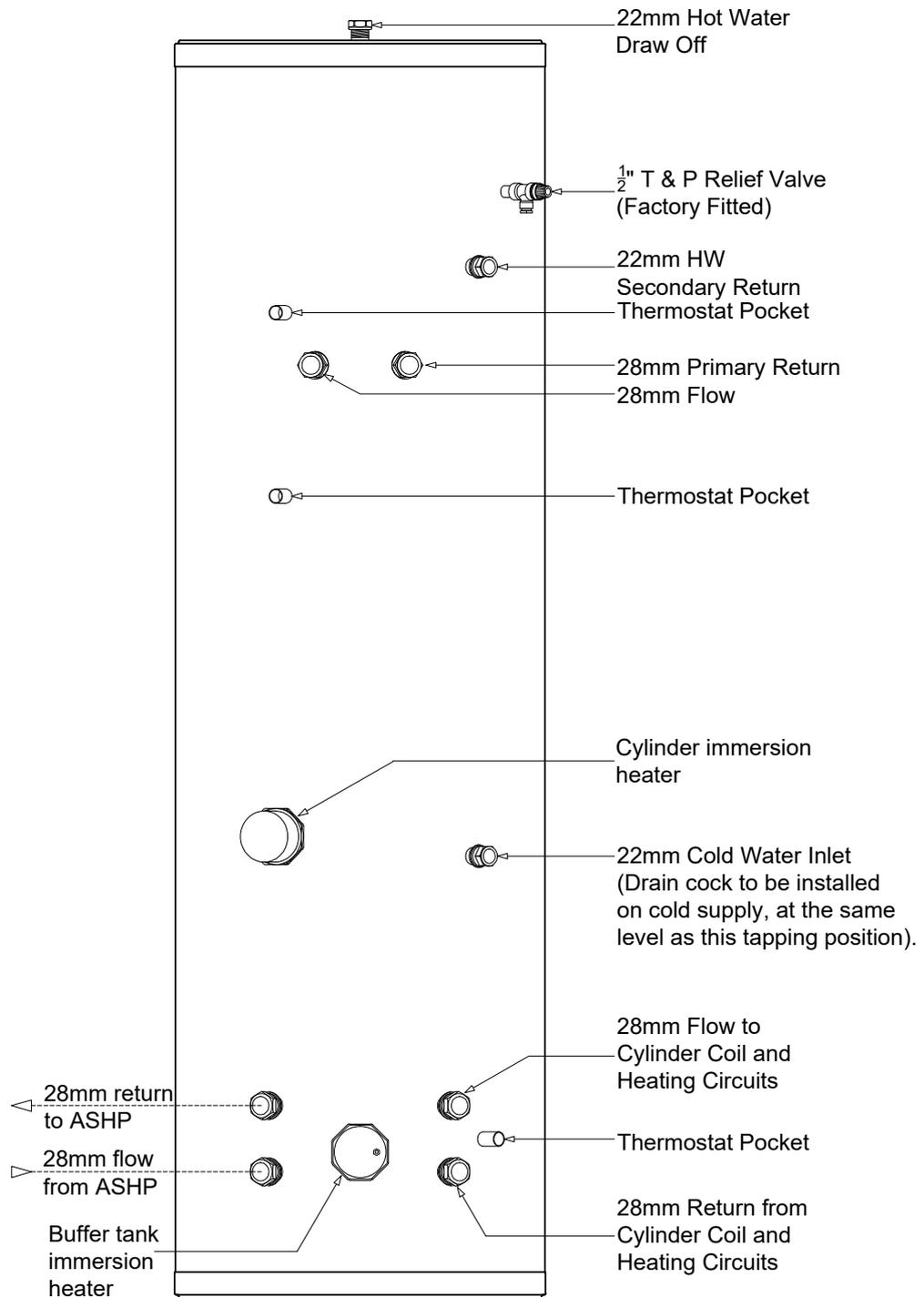


Figure 3-1: Standard cylinder primary connections (buffer option)

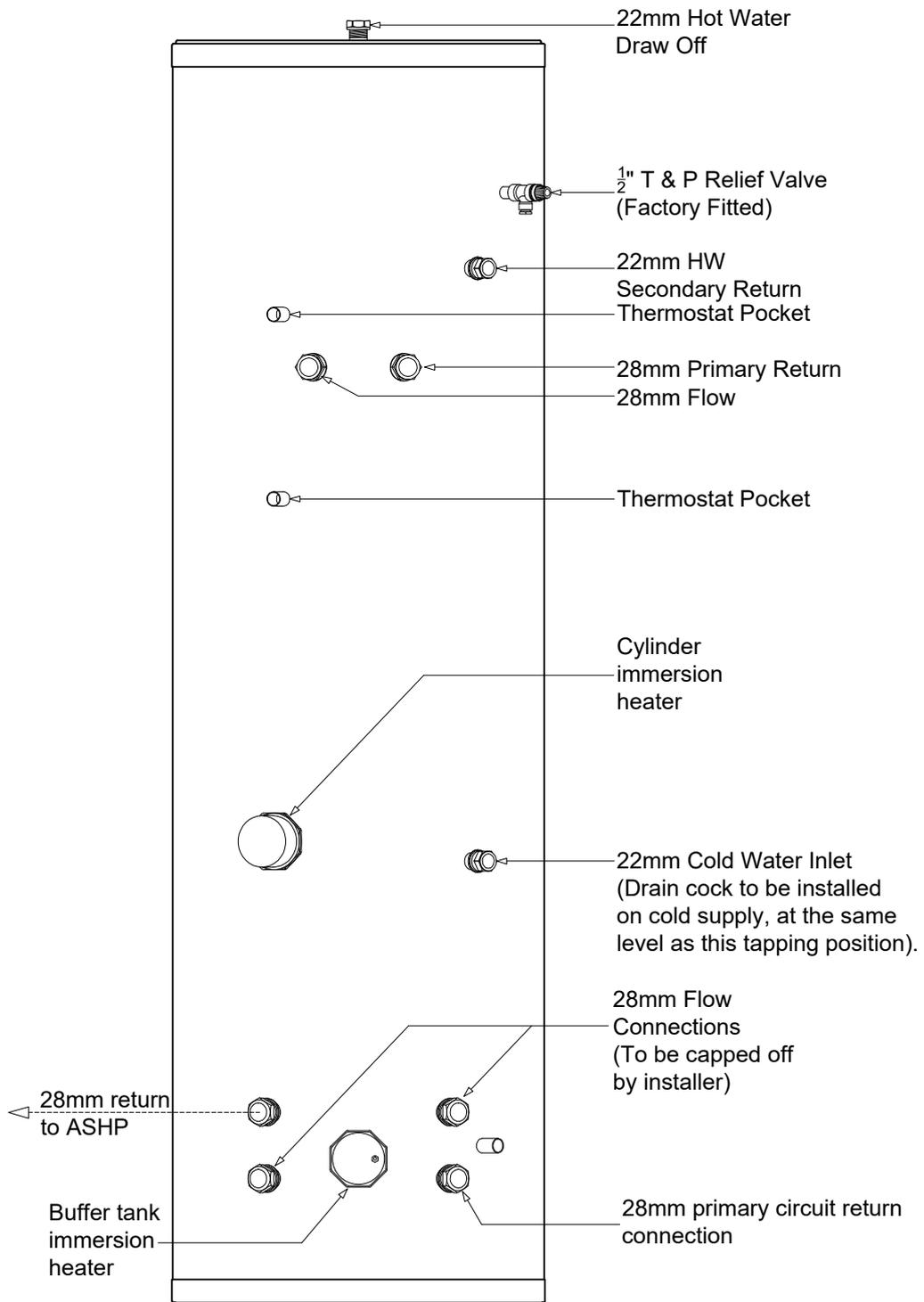


Figure 3-2: Standard cylinder primary connections (volumiser option)

3.4 PRIMARY CONNECTIONS: PRE-PLUMBED CYLINDERS

The pre-plumbed cylinders are factory fitted with primary circuit pipework that includes the following components:

- 1 x 2-port zone valve for hot water
- 2 x 2-port zones valves for heating (for two separate heating zones)
- 1 x Dual thermostat (Cylinder thermostat and High Limit thermostat)
- 1 x Auto air vent
- 1 x 22mm gate valve (cylinder coil by-pass)

! NOTE !

The buffer tank incorporated in the cylinder should only be used as a volumiser with the pre-plumbed versions of this cylinder range.

Make the primary circuit and heat pump connections to the cylinder/buffer tank as follows (Refer to Figure 3-3):

1. Cap off both the buffer tank flow connections – the 28mm compression connections located to the UPPER RIGHT and LOWER LEFT of the buffer immersion heater.
2. Connect the primary circuit return pipe from the heating circuits into the 28mm Tectite Tee connector - located to the LOWER RIGHT of the buffer immersion heater.
3. Connect the heat pump flow pipe to the into the 28mm Tectite Tee connector on primary flow pipe (on the left hand side of the Cylinder).
4. Connect the heat pump return pipe to the buffer tank return connection – the 28mm compression connection located to the UPPER LEFT of the buffer tank immersion heater.

! NOTE !

The upper left (heat pump return) connection is fitted with an internal 'dip pipe' that allows air to be vented from the top of the buffer tank. For this to function the heat pump return must be connected to the UPPER connection.

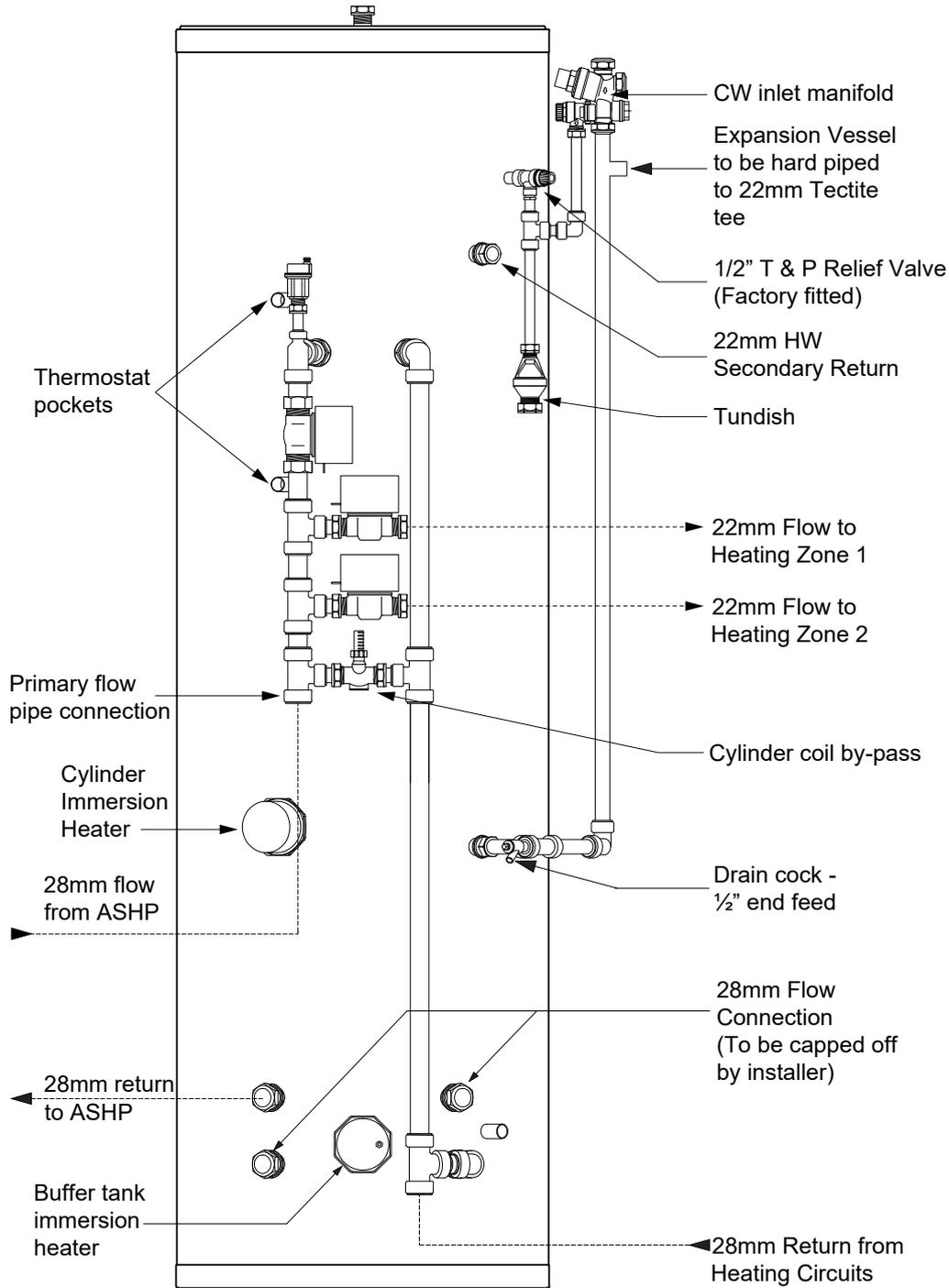


Figure 3-3: Pre-plumbed cylinder primary connections

4 SECONDARY CIRCUIT INSTALLATION

4.1 GENERAL

Grant MonoWave HP cylinders with buffer are supplied with all the necessary safety devices and components required for an unvented hot water system. For a list of these safety devices and components refer to Table 2.2 in these Installation and User instructions.

The pre-plumbed cylinders are supplied with these safety devices and components factory fitted, requiring only the following to be carried out by the installer:

- Connect the cold water supply pipe to the cold water inlet manifold. Refer to Sections 4.2 and 4.3 for details.
- Connect the expansion vessel. Refer to Sections 4.3 and 4.4 for details.
- Connect the discharge pipe to the outlet of the Tundish. Refer to Section 4.9 for details.

The standard cylinders are supplied with the safety devices and components loose in a kit, with the exception of the Temperature & Pressure (T&P) relief valve which is always factory-fitted. These MUST be fitted to the cylinder as detailed in the following Sections 4.2 to 4.13.

For commissioning and maintenance purposes, it is essential to fit a service valve (not supplied) in the cold water supply pipe, immediately before the inlet manifold.

The ½" drain cock (supplied in the kit) must be fitted in the cold feed to the cylinder to provide a means of draining the unit. Refer to Figures 3-1 and 3-2, as appropriate, for a suitable drain cock position on the standard cylinders that will enable most of the cylinder to be drained off when required. The pre-plumbed cylinders come with the drain cock installed on the cold water supply to the cylinder.

4.2 COLD WATER INLET MANIFOLD

This manifold contains a pressure reducing valve, double check valve and expansion relief valve with a stainless steel seat.

The pressure reducing valve is factory set to 3 bar. The set pressure is shown on top of the valve. The maximum inlet pressure to this valve is 12 bar.

A balanced cold water connection is provided on the inlet manifold. Refer to Figure 4-1. This should only be used to provide balanced cold supplies to shower valves and mixer taps. If the balanced cold water outlet is not required, blank off this port.

4.3 INSTALLATION

1. Cold water supply pipe to be 22mm nominal size.
2. Flush supply pipework before connection to remove all flux and debris prior to fitting the inlet controls. Failure to do this may result in irreparable damage to the controls and will invalidate the warranty.
3. Once the pipework is flushed connect the cold supply to the Inlet manifold.
The manifold can be installed in any position as long as it is installed in the correct flow direction. Refer to the arrows on the side of the body.
Make sure that the head of the expansion relief valve is offset from the cylinder for ease of access.
4. The expansion relief valve should be either horizontal or upright - if fitted inverted, debris may be deposited on the seat and cause fouling of the seat when the valve operates. Check direction of flow arrows.
5. If the installation requires one, a pressure gauge should be sourced and fitted on the cold water supply to the cylinder, between the inlet manifold and the cold water inlet tapping on the cylinder.
6. Connect the supplied expansion vessel into the cold water supply, between the expansion relief valve (in the cold water inlet manifold) and the cylinder. Refer to Section 4.4 for further information.
7. The expansion relief drain pipework must be connected to a safe visible discharge point via the tundish (supplied with the cylinder) and the pipework must have a continuous fall.
8. Connect the expansion relief valve outlet into the discharge pipe from the temperature and pressure Relief valve using a 15mm copper pipe and tee piece (not supplied). Fit the tundish below this tee piece using a short length of copper pipe. Refer to Sections 4.9 to 4.13 for further information on the Tundish and Discharge pipe.
9. The pressure reducing valve has two outlets, the second one is for a balanced cold water supply, to a shower or a bidet (over rim type only, ascending spray type requires type AA, AB or AD air gap).

Major shower manufacturers advise fitting a mini expansion vessel in the balanced cold supply to accommodate thermal expansion and prevent tightening of shower controls.

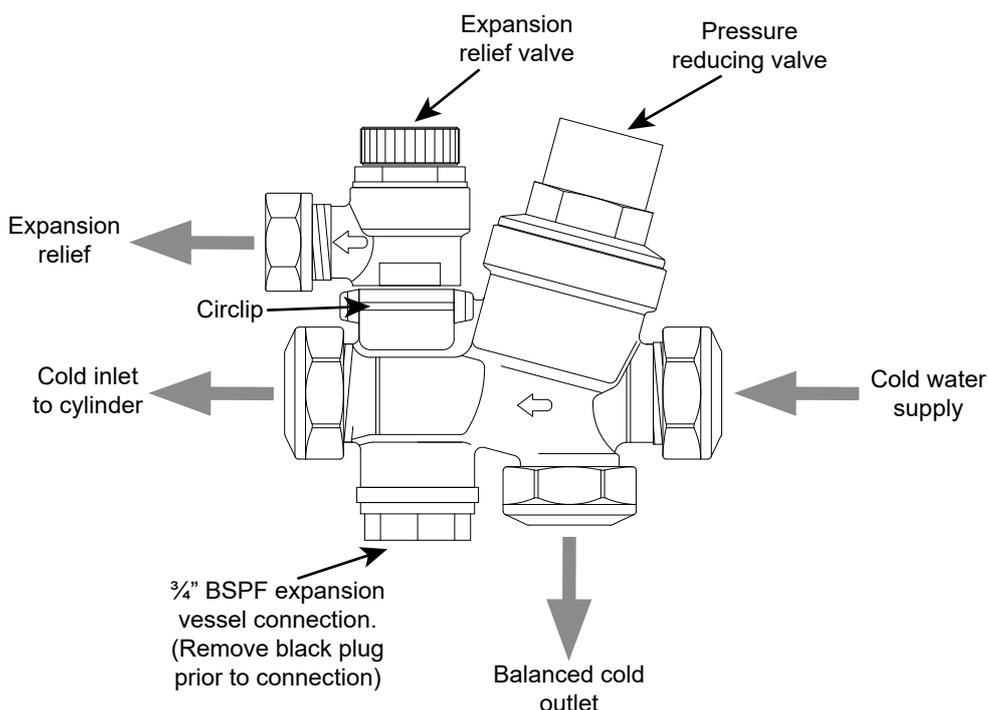


Figure 4-1: Cold water inlet manifold

If the dwelling has a shower mixing valve (manual or thermostatic) or a Bidet (over rim type) use the cold water supply from the balanced cold water connection on the inlet manifold for these outlets.

Do not use the balanced cold connection to supply bath taps as this can reduce the flow of water available to the cylinder. If the balanced cold water outlet is not required, blank off the connection.

10. The Benchmark book enclosed with the cylinder should be completed after commissioning of the system.
11. The cylinder must be registered with Grant UK within 30 days of installation. Refer to Section 13 for further details on the Cylinder guarantee.

4.4 EXPANSION VESSEL

A suitable expansion vessel with a pre-charge pressure of 3bar is supplied for fitting to all cylinders.

This expansion vessel must be connected into the cold water supply, between the expansion relief valve (in the inlet manifold) and the cylinder.

Mount the expansion vessel in a suitable position on an adjacent wall to the cylinder using the wall brackets on the vessel. The expansion vessel must be positioned with the connection point at the bottom.

No valve should be fitted between the expansion vessel and cylinder.

The air charge pressure in the expansion vessel must be regularly checked (e.g. at every service) and topped up as necessary. The correct air charge pressure is 3.0bar. Refer to Sections 7.1 and 7.4 for further details.

4.4.1 STANDARD CYLINDER EXPANSION VESSEL CONNECTION

On the standard cylinders, The vessel should be connected to the $\frac{3}{4}$ " BSPF connection provided on the supplied cold water inlet manifold via the $\frac{3}{4}$ " expansion vessel hose. Refer to Figure 4-1.

! NOTE !

The expansion vessels supplied with the MonoWave with Buffer cylinders are supplied with a 22mm compression fitting.

A 22mm compression to $\frac{3}{4}$ " BSPM adapter is supplied for connecting the expansion vessel to the supplied expansion vessel hose.

A short length of 22mm pipe will need to be sourced and fitted between the 22mm compression fittings at the expansion vessel and the expansion vessel hose adapter.

4.4.2 PRE-PLUMBED CYLINDER EXPANSION VESSEL CONNECTION

On the pre-plumbed cylinders, the vessel should be "hardpiped" to the 22 mm Tectite connection on the cold water supply pipe just below the inlet manifold body. Refer to Figure 3-3.

! NOTE !

The expansion vessels supplied with the MonoWave with Buffer cylinders are supplied with a 22mm compression fitting.

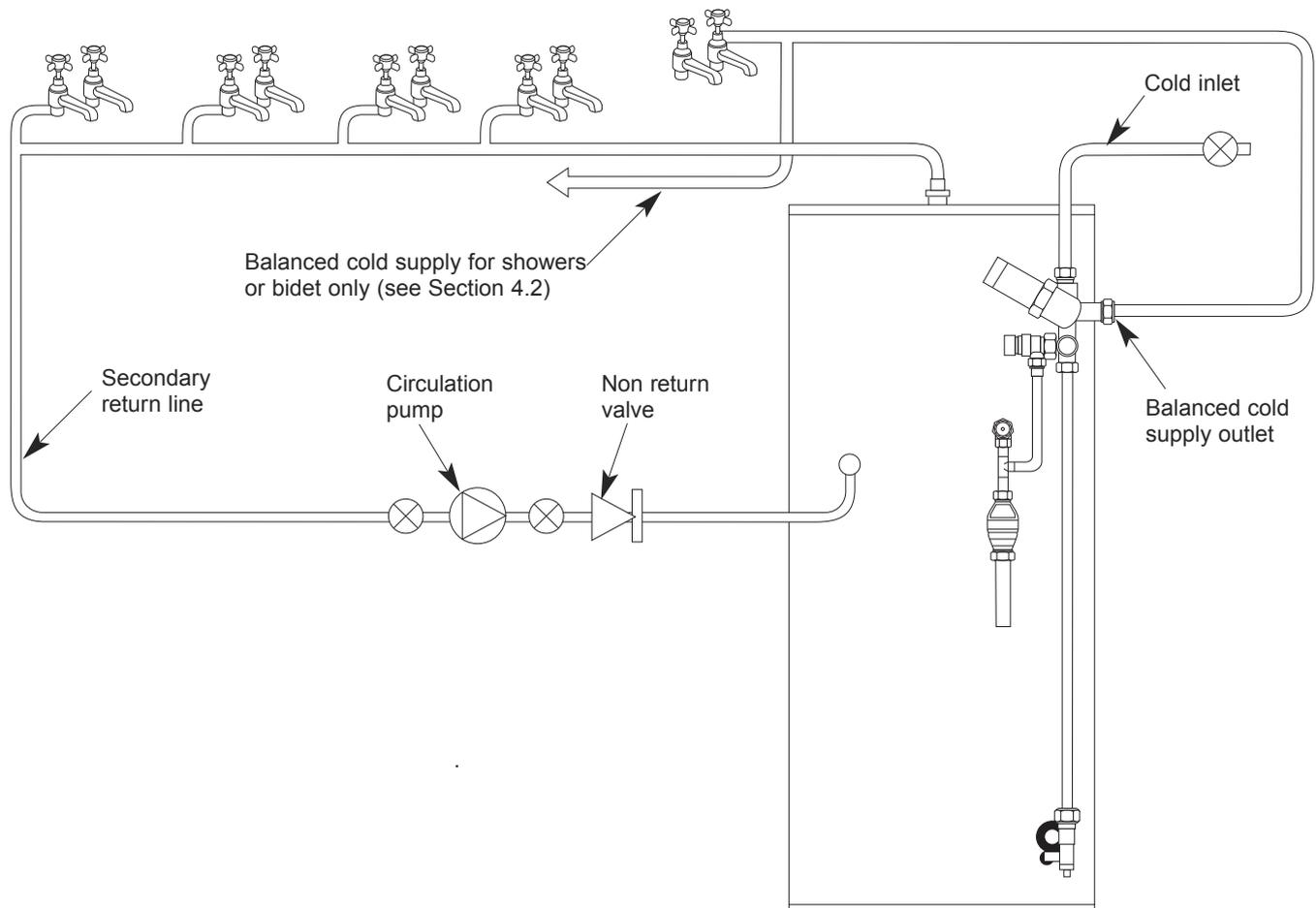


Figure 4-2: Secondary return circuit

4.5 TEMPERATURE AND PRESSURE RELIEF VALVE

The temperature and pressure relief valve (T&P Valve) is supplied factory fitted to the cylinder. The T&P valve must not be removed from the cylinder or tampered with in any way. The valve is pre-set to lift at 7bar or 90°C and any attempt to adjust it will invalidate the guarantee.

4.6 HOT WATER SUPPLY

Connect the hot water supply pipe to the top outlet of the cylinder. Refer to Figures 3-1 to 3-3, as appropriate.

4.7 PREVENTION OF SCALDING

Building Regulations Approved Document G (Part G3) requires that the hot water temperature supplied to a bath should be limited to a maximum of 48°C by using an in-line blending valve (not supplied with the cylinder) with a maximum temperature stop.

The length of the supply pipe between the blending valve and the bath hot water outlet should be kept to a minimum to prevent the colonisation of waterborne pathogens (e.g. legionella). Refer to Approved Document G for further details.

4.8 SECONDARY RETURN

All MonoWave HP cylinders are fitted with a secondary return connection. If a secondary return circuit is required it should be connected to the MonoWave HP cylinder as shown in Figure 4-2.

! NOTE !

If a secondary circulation circuit is installed then a larger expansion vessel may be required to handle the increase in volume.

4.9 TUNDISH

A suitable tundish is supplied with the cylinder for fitting in the common discharge pipe from the T&P and Expansion relief valves. On the pre-plumbed cylinders this is factory-fitted on the secondary circuit pipework. On the standard cylinders this is supplied loose and must be fitted by the installer.

The tundish should be vertical, located in the same space as the unvented hot water cylinder and be fitted as close to, and lower than, the T&P valve with no more than 600mm of pipe (D1) between the valve outlet and the tundish.

! WARNING !

The tundish must NOT be positioned above or in close proximity of any electrical current carrying devices or wiring.

A discharge pipe must be fitted to the outlet of the tundish. This must conform to the requirements as given in Sections 4.10 to 4.13 of these Installation and User Instructions.

4.10 DISCHARGE PIPE

1. The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge.

- a) It should be made of metal or other material that has been demonstrated to be capable of withstanding temperatures of the water discharged.
- b) Be at least one pipe size larger than the normal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long, i.e. for discharge pipes between 9m and 18m long the equivalent resistance length should be at least two sizes larger than the normal outlet size of the safety device, between 18m and 27m at least three sizes larger and so on.

Bends must be taken into account in calculating the flow resistance. Refer to Sections 4.11, 4.12 and 4.13.

- c) Have a vertical section of pipe at least 300 mm long, below the tundish before any elbows or bends in the pipe work.
- d) Be installed with a continuous fall of 1:200 (0.286°).
- e) Have discharges visible at both the tundish and the final point of discharge but where this is not possible or practically difficult there should be clear visibility at one or other of these locations.

2. Examples of acceptable discharge arrangements are:

- a) ideally below a fixed grating and above the water seal in a trapped gully.
- b) downward discharges at a low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children may play or otherwise come in to contact with discharges, a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.
- c) discharges at high level; e.g. into a metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastics guttering systems that would collect such discharges (tundish visible).

3. Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation can be traced reasonably easily.

The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe to be connected.

If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when a discharge takes place.

! NOTE !

The discharge will consist of scalding water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

4.11 DISCHARGE PIPE ARRANGEMENT

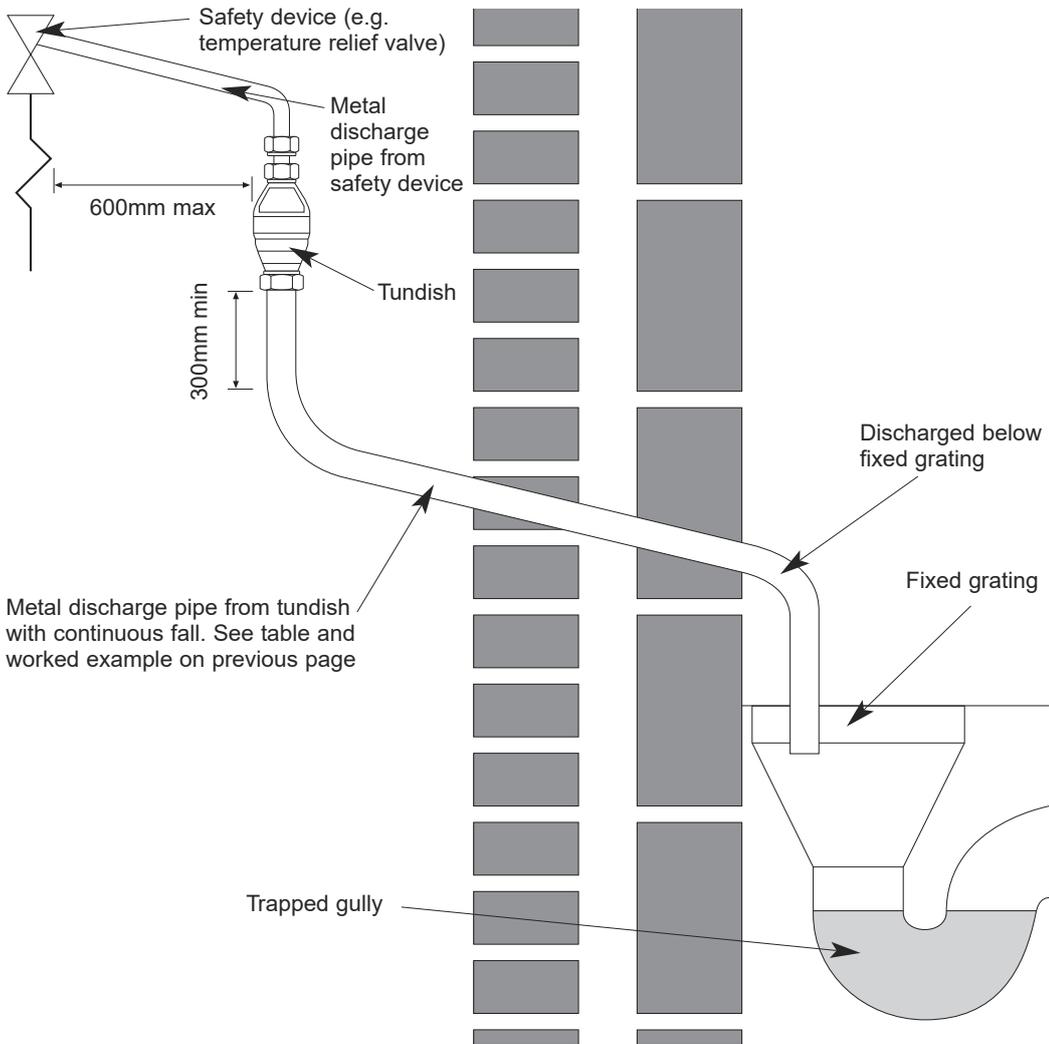


Figure 4-3: Typical discharge pipe arrangement

4.12 DISCHARGE PIPE SIZING

Refer to Table 4-1 (discharge pipe sizing).

Table 4-1: Discharge pipe sizing

Valve outlet size Diameter (inches)	Minimum size of discharge pipe D1 (mm)	Minimum size of discharge pipe D2 from tundish (mm)	Maximum resistance allowed, expressed as a length of straight pipe, i.e. no elbows or bends (m)	Resistance created by each elbow or bend (m)
1/2	15	22	Up to 9	0.8
		28	Up to 18	1.0
		35	Up to 27	1.4
3/4	22	28	Up to 9	1.0
		35	Up to 18	1.4
		42	Up to 27	1.7
1	28	35	Up to 9	1.4
		42	Up to 18	1.7
		54	Up to 27	2.3

! NOTE !

The above table is based on copper tube. Plastic pipes may be of a different bore and resistance.

Sizes and maximum lengths of plastic pipe should be calculated using data for the type of pipe being used.

4.13 WORKED EXAMPLE

The example below is for a 1/2" diameter temperature relief valve with a discharge pipe (D2) having 4 x 22mm elbows and a length of 7 m from the tundish to the point of discharge.

From Table 4-1:

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a 1/2" diameter temperature relief valve is 9.0m.

Subtract the resistance for quantity of 4 x 22mm elbows at 0.8m each = 3.2m.

Therefore, the maximum permitted length is $9.0 - 3.2 = 5.8\text{m}$.

5.8m is less than the actual length of 7m; therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm copper discharge pipe (D2) from a 1/2" diameter temperature relief valve is 18m.

Subtract the resistance for a quantity of 4 x 28mm elbows at 1.0m each = 4m.

Therefore, the maximum permitted length is $18 - 4 = 14\text{m}$.

As the actual length is 7m, a 28mm diameter copper pipe will be satisfactory in this case.

5 ELECTRICAL

All electrical wiring must be carried out by a competent person and in accordance with the current edition of BS7671 (the I.E.T. Wiring Regulations), including any amendments.

The control equipment supplied must be wired according to these Installation and User Instructions to ensure that the cylinder functions safely.

From an economic and convenience point of view, it is intended that these controls operate in conjunction with other control packages, for example, an "S-plan" type system that incorporates a programmer, etc.

5.1 IMMERSION HEATER

All Grant HP MonoWave cylinders with a buffer are supplied factory-fitted with two 3kW immersion heaters (one in the cylinder and one in the buffer). These immersion heaters conform to EEC Directive 76/889 for radio interference and comply with EN 60335-2-73.

The BEAB approval certification on this immersion heater only applies if a Cotherm TSE rod type thermostat is used.

The control thermostat is pre-set on position 4 at a temperature of approximately 60°C. Refer to Figure 5-1.

Installation and wiring instructions for the immersion heater are supplied with each unit. The wiring connections are also shown in Figure 5-1. Follow the wiring instructions connecting the live, neutral and earth as indicated.

The immersion heater must be permanently connected to the electrical supply through a double-pole isolator. A safety cut-out is also incorporated within the thermostat and is factory set to operate at 80°C ± 5°C.

The immersion heater is factory fitted to the cylinder. If the immersion heater needs to be replaced it must be fitted to the cylinder using the gasket provided on the unit. Only use a correctly shaped spanner. Stilsons or pipe grips should not be used. The use of sealing compound is not recommended.

! WARNING !

The immersion heater must NOT be used unless it is fully immersed in water.

Always ensure that the cylinder and buffer are full of water BEFORE switching on the electrical supply.

! NOTE !

The upper (cylinder) immersion heater will heat the contents of the hot water cylinder.

The lower (buffer) immersion heater will add heat to the primary circuit connected to the heat pump, if required.

The lower (buffer) immersion heater WILL NOT heat the contents of the hot water cylinder.

Refer to Figures 3-1 to 3-3 (as appropriate) for the positions of the two immersion heaters.

5.2 IMMERSION HEATER WIRING INSTRUCTIONS

Ensure that the supply voltage corresponds to the voltage rating of the immersion heater as shown on the rating label on the terminal cover.

Each 3kW 230V 50Hz-immersion heater should be wired in accordance with the instructions given in Figure 5-1.

The cable must be routed through the strain relief bush. The cable grip should be secured using only the screws provided.

It should be wired through a double pole isolator switch or suitable controller, with a minimum break capacity of 13 amp and contact separation of at least 3mm.

Use 85°C heat resistant rubber insulated HOFR sheathed flexible cable, with minimum cross sectional area of 1.5mm², to comply with BS 6141 table 8 and must be fully earthed.

! WARNING !

Always ensure that the immersion heater cap is not covered.

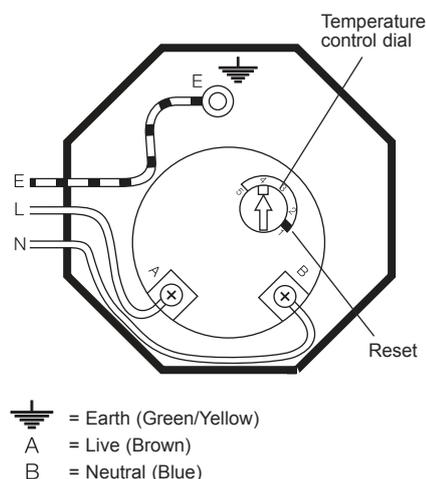


Figure 5-1: Immersion heater wiring connections

! WARNING !

This immersion heater must be earthed.

! WARNING !

The manual reset high limit thermostat must not under any circumstances be by-passed. This is pre-set to 80°C and to prevent nuisance tripping, the control thermostat should always be left in position 4.

5.3 IMMERSION HEATER SAFETY CUT-OUT

The immersion heater incorporates an independent non self-resetting over temperature cut-out device to prevent excessive water temperatures.

In normal operation the reset pin positioned to the side of the control knob and indicated by a triangle (with the word 'safety' below) will be approximately 2-3mm below the upper surface of the thermostat cap.

Should the over temperature cut-out operate, the reset pin will be pushed upwards to become level with or slightly above the cover.

Wait until the temperature has fallen sufficiently. Then Investigate and identify the cause of the cut-out operation and rectify the fault.

Then manually reset the cut-out by pressing in the reset pin to its normal operating position using hand pressure only with a suitably sized implement.

! WARNING !

Before removing the immersion heater covers to either reset the safety cut-out or check/alter the thermostat setting, ensure that the electrical supply is isolated.

Ensure the cover to the immersion heater cover is replaced correctly and the retaining nut is fitted. Finally switch the mains electricity supply back on.

5.4 DUAL THERMOSTAT

This is a combined cylinder control and high limit (overheat) thermostat. Two are supplied with every Grant MonoWave cylinder with buffer, one to control the operation of the heat pump primary coil and the other to control the temperature of the buffer (should additional temperature control be required).

The control thermostat has an adjustment range between 25°C and 65°C. It is recommended that it is set to 60°C. The high limit (overheat) thermostat will automatically operate at 90°C.

PRE-PLUMBED CYLINDERS

The Dual Thermostat intended to control the operation of the heat pump primary coil is supplied factory fitted and connected to the wiring centre on the cylinder. For details on the correct wiring connections, refer to Figures 5-2 or 5-5, as appropriate.

The other Dual Thermostat is supplied loose in the unvented hot water safety kit and should only be fitted if required.

STANDARD CYLINDERS

Both Dual Thermostats are supplied separately in the unvented hot water safety kit. One should be fitted into the stainless steel sensor pocket in the cylinder and secured in place using the retaining screws on the thermostat housing. For details on the correct wiring connections, refer to Figures 5-3, 5-4 or 5-6, as appropriate.

The other should be fitted into the stainless steel sensor pocket in the buffer section of the cylinder, if required.

Refer to Figures 3-1 to 3-3 (as appropriate) for sensor pocket position.

5.5 2-PORT VALVES

To comply with the regulations governing the installation of indirect unvented hot water cylinders, a 2-port motorised valve must be fitted in the primary flow to prevent gravity circulation when the boiler switches off.

This acts as a positive energy cut-out should the high limit (overheat) thermostat (in the dual thermostat) operate. If this happens, the 2-port zone valve will operate and shut off the primary flow to the cylinder.

When installed as part of an "S-plan" type of heating control system, this motorised valve will also control the temperature of the domestic stored water via the cylinder control thermostat, (located in the dual thermostat).

This valve should be wired in accordance with the wiring diagrams (Figures 5-2 to 5-6 as appropriate), to comply with current legislation.

For other makes of air source heat pump, other than the Grant Aerona³, consult the heat pump manufacturer for electrical connection details.

5.6 PRE-PLUMBED CYLINDER WIRING

The Grant MonoWave 'pre-plumbed' HP cylinder with Buffer is supplied with three factory-fitted 2-port zone valves, as follows:

- 2 x 2-port zone valves for space heating (for two separate heating zones)
- 1 x 2-port zone valve for hot water heating

These are pre-wired to the factory-fitted wiring centre mounted on the cylinder.

To independently control these three zones valves (two space heating zones and one hot water zone) a three-channel programmer will be required, with a room thermostat in each of the two heating zones.

If the cylinder is to be used with a Grant Aerona³ air source heat pump:

Refer to Figure 5-2.

A Grant EP002 heat pump interface box (supplied with all Grant Aerona³ air source heat pumps) MUST be used to provide the voltage free switching for the Aerona³ air source heat pump, as shown in Figure 5-2.

Refer to Section 5.8 for further details on the Grant EP002 heat pump interface box.

If the cylinder is connected to a boiler:

Refer to either Figure 5-5 or 5-6 (as appropriate). The Grant EP002 heat pump interface box is NOT required in this case.

5.7 STANDARD CYLINDER WIRING

The Grant MonoWave 'standard' HP cylinder with Buffer is supplied with a single 2-port zone valve, which is supplied separately in the unvented hot water safety kit.

This valve MUST be fitted in the primary flow pipe to the cylinder coil. It MUST be wired in accordance with the appropriate wiring diagram as detailed below.

If the cylinder is to be used with a Grant Aerona³ air source heat pump:

Refer to the wiring diagrams Figure 5-3 or 5-4, depending on whether the buffer or volumiser option is being used.

A Grant EP002 heat pump interface box (supplied with all Grant Aerona³ air source heat pumps) will be required to provide the voltage free switching for the Aerona³ air source heat pump, as shown in Figure 5-3 and 5-4.

Refer to Section 5.8 for further details on the Grant EP002 heat pump interface box.

If the cylinder is connected to a boiler:

Refer to either Figure 5-5 or 5-6 (as appropriate). The Grant EP002 heat pump interface box is NOT required in this case.

5.8 HEAT PUMP INTERFACE BOX

The Grant EP002 heat pump interface box (supplied with all Grant Aerona³ air source heat pumps) is designed to provide the voltage free switching for the Aerona³ air source heat pump, using the space heating and hot water switched live outputs from the control system wiring centre.

This box can be installed next to the heating system wiring centre. Alternatively, it can be located nearer to the Aerona³ heat pump, but NOT be installed externally.

Refer to the Aerona³ installation instructions for further details.

This interface box is NOT required when the cylinder is used with a Grant oil boiler.

Refer to Figures 5-2 to 5-4 for connection details.

5.9 PRE-PLUMBED MONOWAVE CYLINDER WITH HEAT PUMP

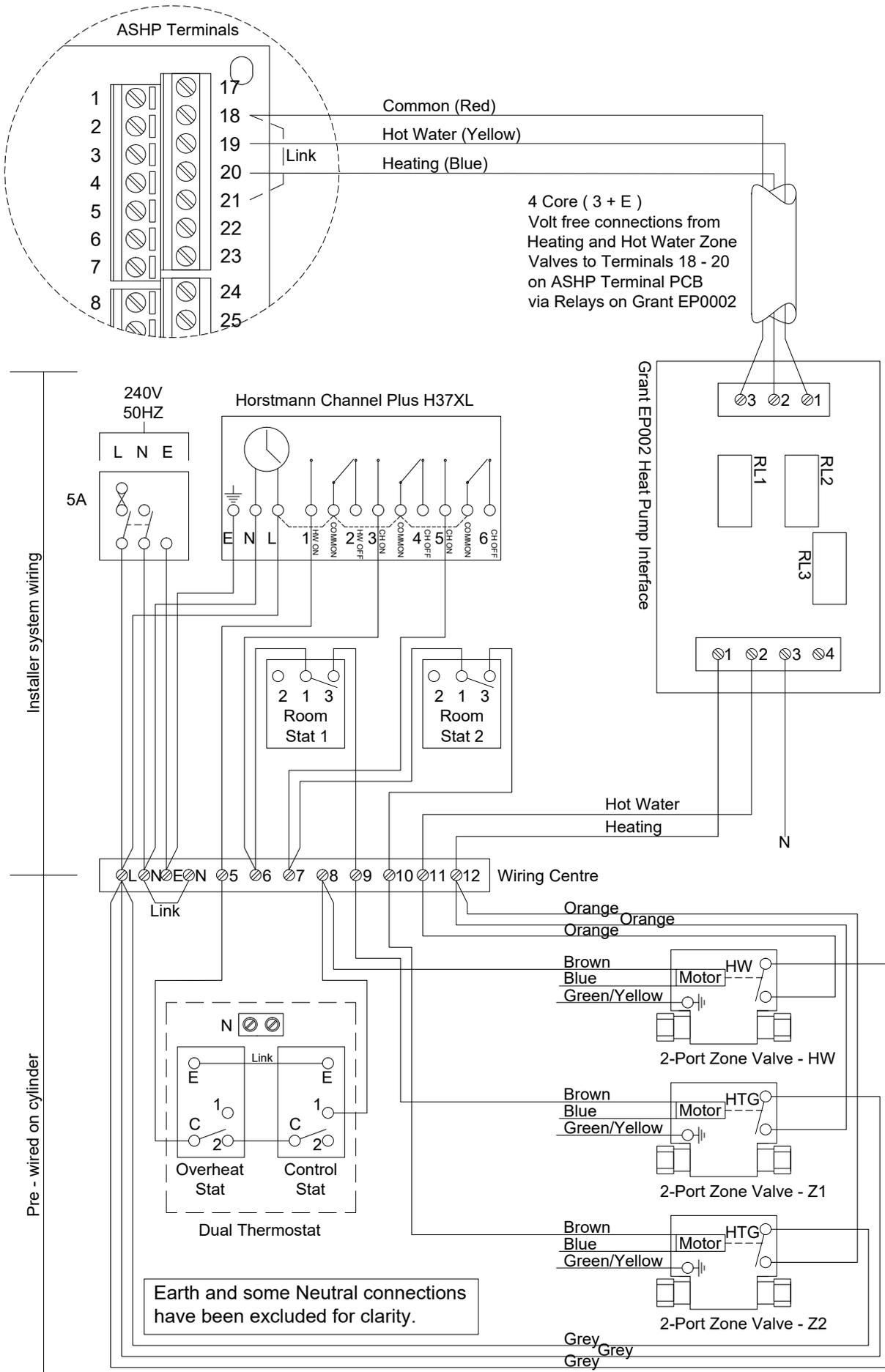


Figure 5-2: Pre-plumbed cylinder (volumiser option)

5.10 STANDARD MONOWAVE CYLINDER WITH HEAT PUMP

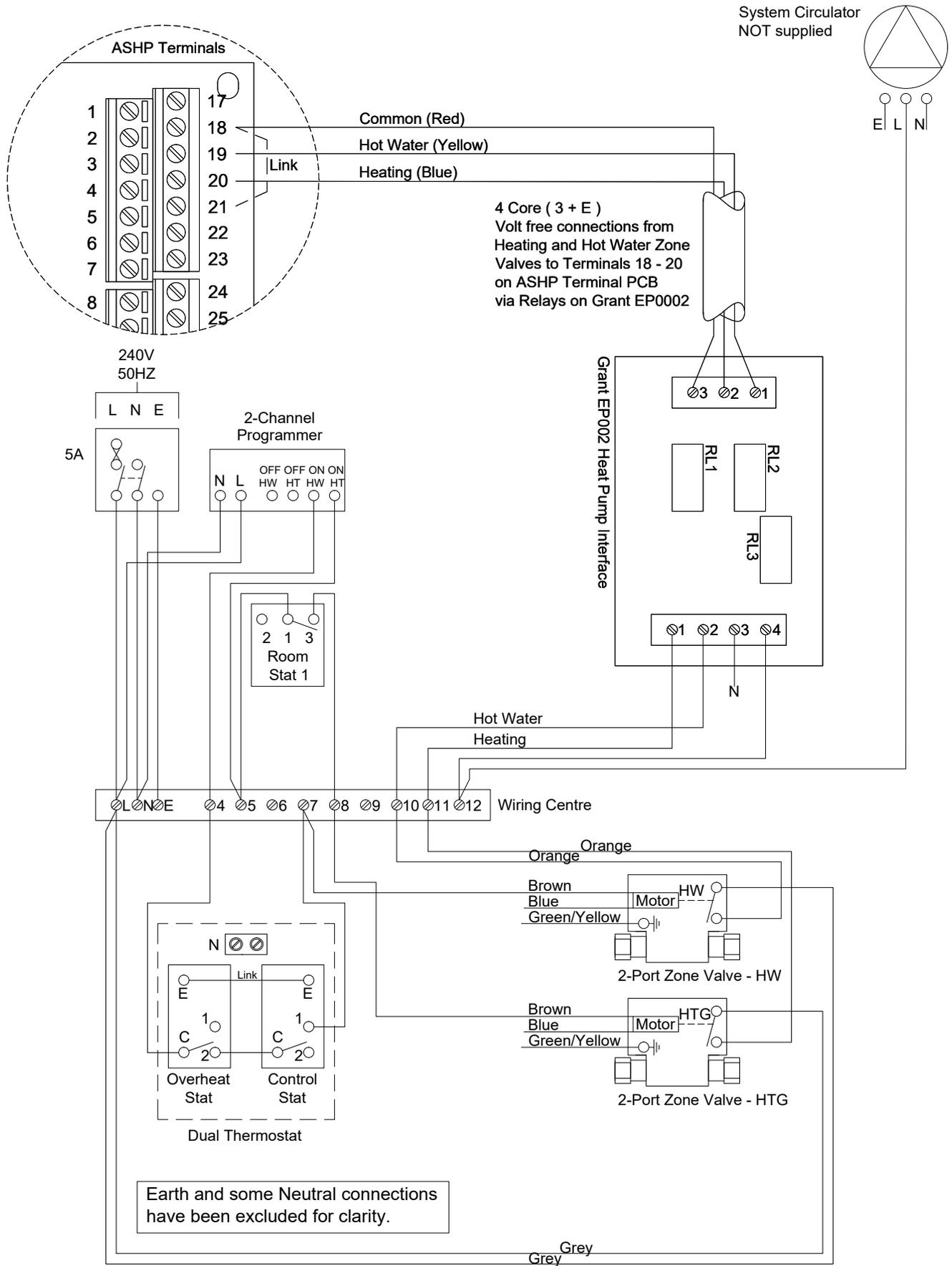


Figure 5-3: Standard cylinder (buffer option)

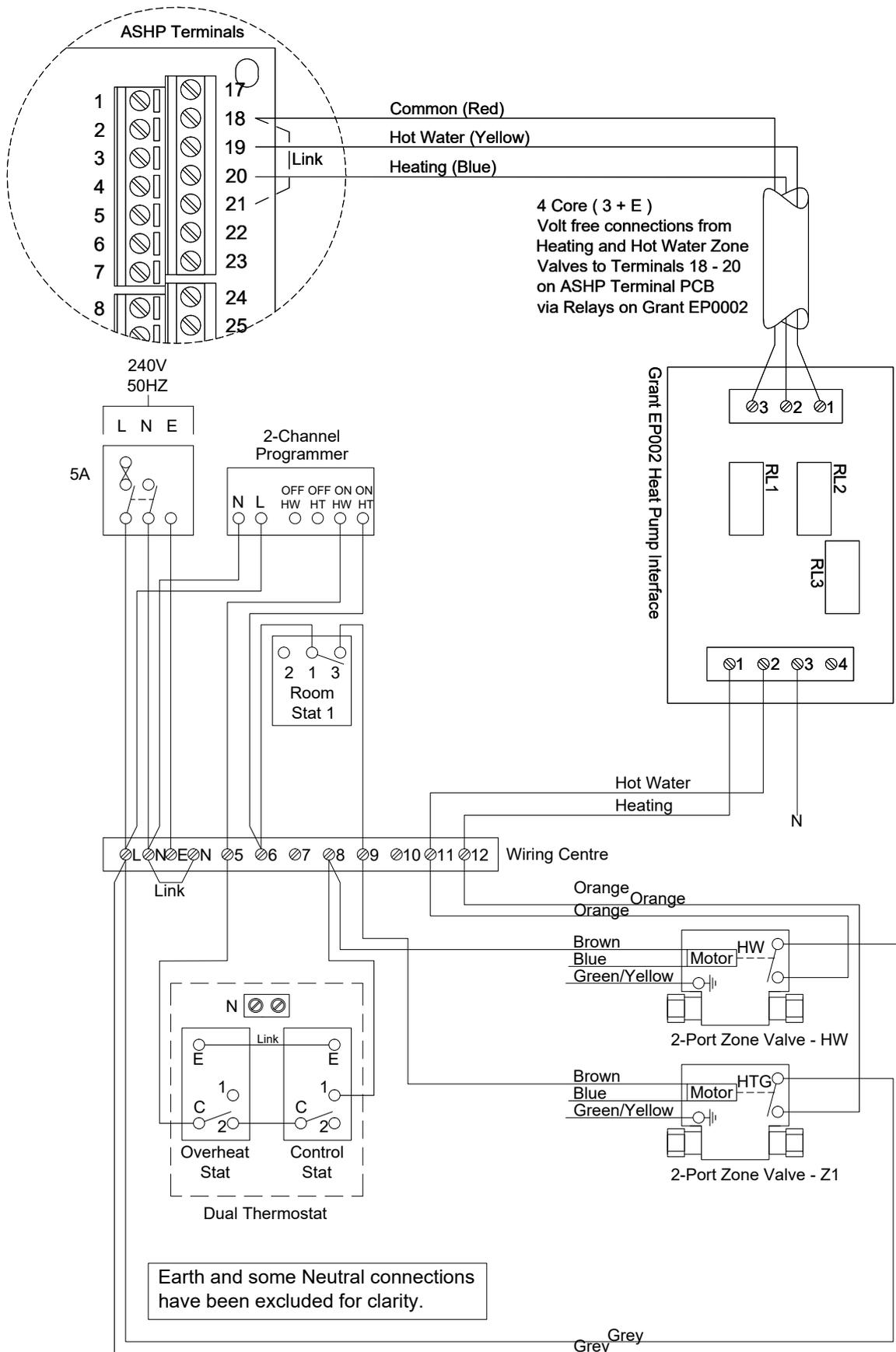


Figure 5-4: Standard cylinder (volumiser option)

5.11 PRE-PLUMBED AND STANDARD MONOWAVE CYLINDER WITH BOILER

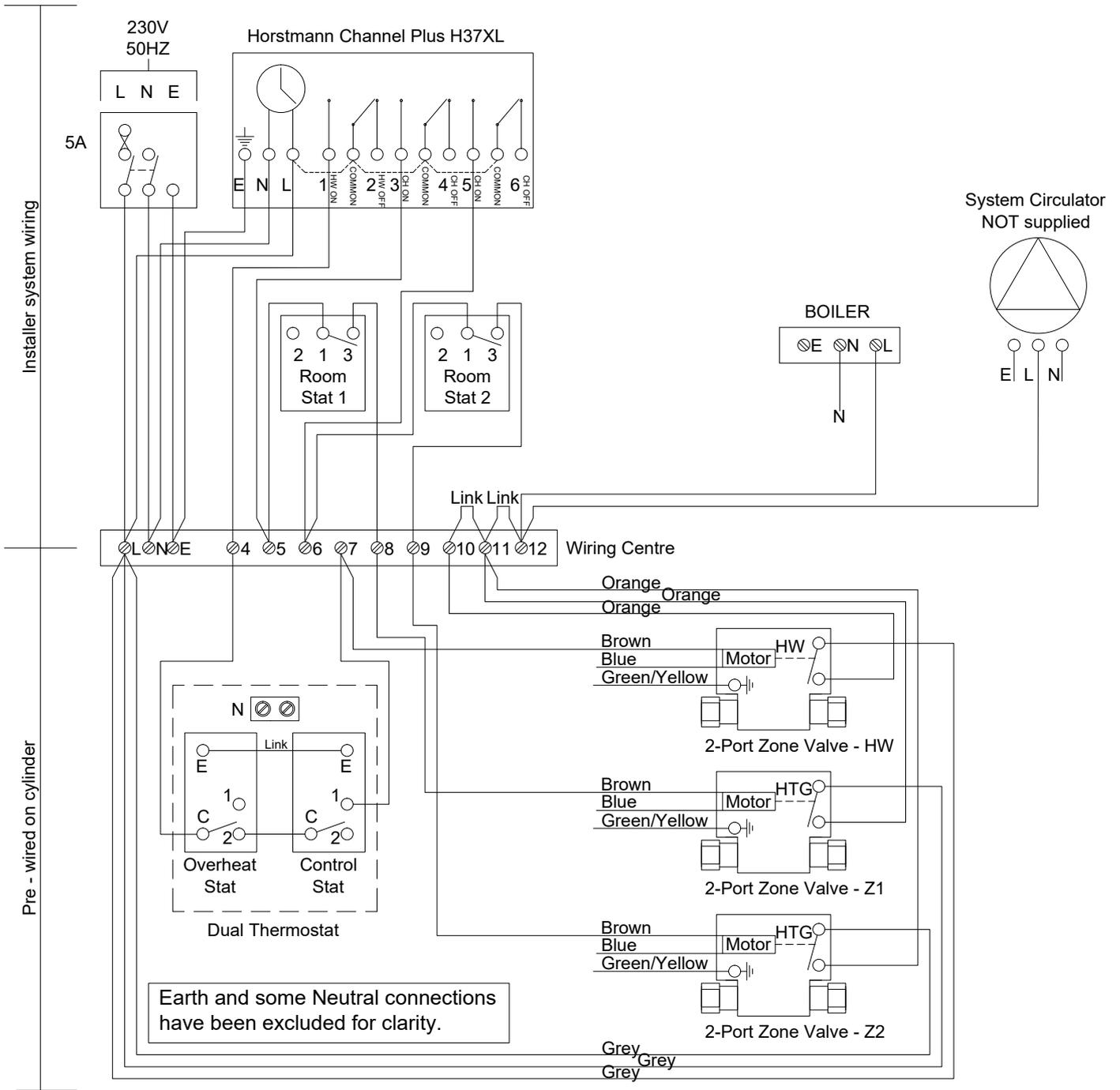


Figure 5-5: Pre-plumbed cylinder with boiler

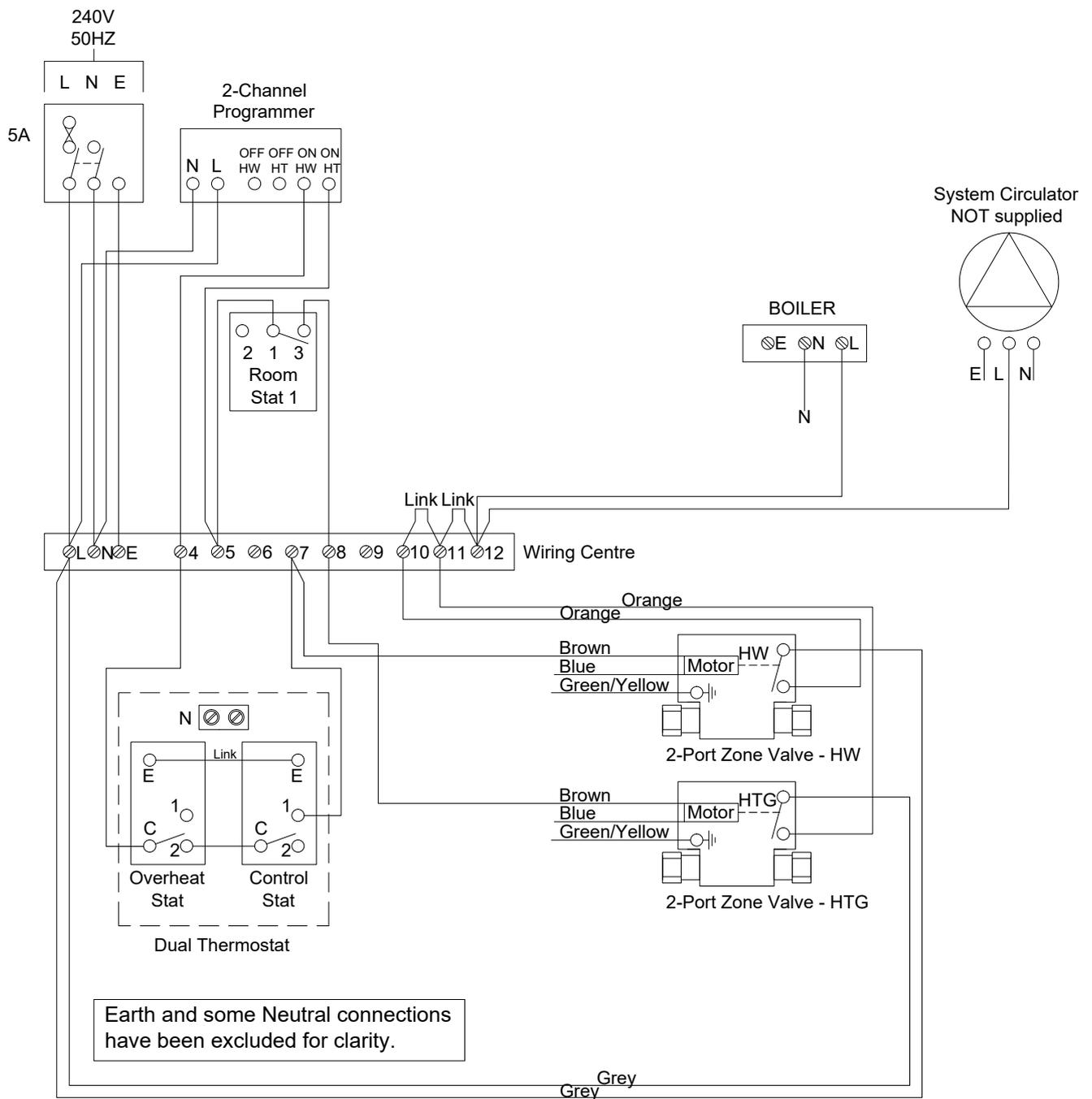


Figure 5-6: Standard cylinder with boiler

6 COMMISSIONING, DRAINING DOWN AND SAFETY

6.1 FILLING THE CYLINDER

! CAUTION !

Before filling the cylinder check that the immersion heaters have not loosened in transit. Tighten as necessary using a shaped spanner. Stillsons or pipe grips should not be used.

1. Ensure that all connections are fully tightened.
2. Ensure that the service valve in the cold water supply is closed.
3. Open all hot water taps supplied by the cylinder.
4. Slowly open the service valve in the cold water supply.
5. Continue to fill the cylinder until water flows from all taps.
6. Open the service valve fully and close all the hot taps.
7. Allow system to stabilise for five minutes.
8. Open each hot water tap in turn to expel air from the system pipe work.
9. Check for leaks.
10. Manually operate Temperature and Pressure Relief Valve (refer to Figures 3-1 to 3-3, as appropriate), to ensure free water flow through discharge pipe. (Turn knob to left).
11. Heat the water to chosen temperature and then close the service valve.
12. Drain the cylinder to flush out any flux/solder from the installation process. Refer to Section 6.2 below.
13. Re-fill the cylinder – as described above.
14. Re-heat cylinder to the required temperature and re-check for leaks.

6.2 DRAINING DOWN

1. Switch off the electrical power to the immersion heater (important to avoid damage to the element).
2. Switch off the heat pump (or boiler).
3. Turn off the cold water service valve (or stop cock).
4. Open all hot water taps.
5. Open drain cock in cold water supply to drain unit down. Refer to Figures 3-1 to 3-3, as appropriate.

6.3 IMMERSION HEATER SAFETY CUT-OUT

The immersion heater incorporates an independent non self-resetting over temperature cut-out device to prevent excessive water temperatures. Refer to Section 5.3 for further details.

The safety cut-out will operate if:

- a. The wiring is incorrect.
- b. The immersion heater thermostat or cylinder thermostat fails.
- c. Thermostat is set too high.

To reset the safety cut-out:

1. Unscrew and remove the nut holding the immersion heater cover in place.
2. Remove the immersion heater cover.

! WARNING !

Before removing the immersion heater cover, to either reset the safety cut-out or check/alter the thermostat setting, ensure that the electrical supply is isolated.

3. The safety cut-out reset pin is positioned to the side of the control knob (indicated by a triangle with the word 'safety' below). Refer to Figure 5-1.
4. If the cut-out has operated, the reset pin will be pushed upwards (to be level or slightly above the cover).
5. Wait until the temperature has fallen sufficiently.
6. Investigate and identify the cause of the cut-out operation and rectify the fault.
7. Press in the reset pin (to its normal operating position) to reset the cut-out. Use hand pressure only with a suitably sized implement.
8. Refit the immersion heater cover correctly and secure in position with retaining nut.
9. Switch the mains electricity supply back on.

If the problem persists, please contact your installer.

6.4 COLD WATER DISCHARGE FROM TUNDISH

There are two reasons why cold water will discharge from the tundish:

1. The pressure reducing valve has malfunctioned (This will cause a large volume of water to flow through the tundish).
2. The Expansion relief valve is letting by (This will cause a very low volume of water to flow through the tundish).

In both cases, identify the defective component and replace. All repairs must be carried out by a competent person.

6.5 HOT WATER DISCHARGE FROM TUNDISH

There are four reasons why hot water will discharge from the tundish:

1. Thermal cut-out has malfunctioned.
2. The control thermostat has malfunctioned.
3. The T & P valve is letting by.
4. The expansion vessel has failed or lost its charge.

In all cases, should a repair be necessary, the work must be carried out by a competent person.

Isolate the cylinder from all electrical supplies before commencing maintenance work.

6.6 EXPANSION VESSEL

1. The expansion vessel is connected into the cold water supply to the cylinder.

! NOTE !

No valve should be fitted between the expansion vessel and the supply pipe.

2. Ensure that the air charge in the vessel matches the pressure setting shown on the pressure reducing valve.
3. The expansion vessel must be installed even if an accumulator is fitted.
4. The charge of the vessel must be checked at every annual service.

6.7 SETTING THE CYLINDER BY-PASS

The pre-plumbed Grant MonoWave cylinder with buffer is supplied with a factory-fitted coil by-pass fitted between the primary flow and return pipes (below the heating zone valves).

The standard Grant MonoWave HP cylinder with buffer MUST be fitted with a simple by-pass between the primary flow and return pipes at the cylinder when used with a Grant Aeronas³ HPID13R32 (13kW) or HPID17R32 (17kW) heat pump. Refer to Section 3.3 – Primary Connections – Standard cylinder.

In either case, this by-pass must be set during commissioning, as follows:

1. If the integral buffer is to be used as a buffer:
 - a. Set the water pump in the Grant Aeronas³ heat output to Level 1 (minimum). Refer to Section 8.3.6 of the Aeronas³ Installation Instructions.
 - b. With the system operating to only heat the cylinder (i.e. with no space heating demand), progressively open the gate valve.
 - c. Reduce the flow of water through the cylinder coil enough to prevent any water flow noise from the cylinder.
 - d. It may be necessary to reduce the primary circulating pump output. Refer to pump User Instructions for guidance.
2. If the integral buffer is to be used as a volumiser:
 - a. Set the water pump in the Grant Aeronas³ heat output to Level 1 (minimum). Refer to Section 8.3.6 of the Aeronas³ Installation Instructions.
 - b. With the system operating to only heat the cylinder (i.e. with no space heating demand), progressively open the by-pass valve.
 - c. Reduce the flow of water through the cylinder coil enough to prevent any water flow noise from the cylinder.

6.8 CUSTOMER HANDOVER

1. Complete the Benchmark book supplied with the cylinder and leave it with the user.
2. Explain the operation of the system to the User, referring to Section 12 of these instructions.
3. In particular, make the user aware of what to do if water is seen to flow from either the T&P Valve or Expansion relief Valve.
4. Refer the user to the Information given in Section 12 of these instructions.

! NOTE !

Leave these Installation, Servicing and User instructions with the user for future reference.

7 MAINTENANCE

7.1 SERVICING AND MAINTENANCE

1. Servicing and maintenance must only be carried out by a competent unvented hot water installer, or by Grant Engineering (UK) Limited authorised personnel.
2. Before any work whatsoever is carried out on the installation, it MUST first be isolated from the electricity supply.

! WARNING !

Both the primary and secondary systems will contain very hot water that will scald; therefore care should be taken when opening any joints, seals or valves.

3. Only use spare parts authorised by Grant Engineering (UK) Limited. The use of unauthorised spare parts will invalidate the guarantee.
4. Drain the cylinder – When draining the cylinder, always switch off the boiler/heat pump and the immersion heater first. Turn off the water supply at the service valve or mains stopcock.
Connect a hose pipe to the drain cock (see Figures 3-1 to 3-3, as appropriate) and route it to a convenient gully. Open the drain cock and all hot taps that are served by the cylinder. The cylinder may take several minutes to empty completely.
5. In hard water areas it may be necessary from time to time to remove and de-scale the immersion heater element. Replace the gasket each time it is removed.
6. Check any in-line strainers which may be fitted in the cold supply to the cylinder and clean if necessary.
7. Remove the expansion relief valve cartridge. Check and clean valve seat. Replace cartridge. Refer to Section 7.3 for further information.
8. Check the charge pressure in the expansion vessel and top up as necessary. The charge pressure should be 3.0 bar. Refer to Section 7.4 for further information.
9. Whilst the hose pipe is connected, the drain cock open and with the immersion heater removed, the cylinder may be flushed out to remove any debris, sand or lime scale particles that may have collected in the bottom by using a further hose pipe connected to the cold water main.
10. Close the drain cock, disconnect the hose, refit the immersion heater and close all hot water taps before re-opening the stopcock. Allow the cylinder time to fill whilst checking for any leaks. Release any air from the system by opening each hot water tap individually, starting with the one furthest from the cylinder.
11. Manually lift the expansion relief and temperature and pressure relief valve one at a time, every 12 months (more frequently in hard water areas) to prevent debris from building up behind the valve seat. Whilst carrying out this operation, check that the discharge to waste is unobstructed. Check that each valve seals correctly when released. As the valves are pre-calibrated, they require no further maintenance.
12. Finally switch on the mains electricity supply to the immersion heater and the boiler/heat pump. As the system heats up, check again for any leaks and rectify as necessary.

7.2 INLET MANIFOLD ASSEMBLY

The inlet manifold assembly should not, under normal circumstance, require any maintenance. During annual servicing it may be necessary to inspect and/or clean the expansion relief valve cartridge. The frequency of cleaning will depend on the local water conditions.

7.3 EXPANSION RELIEF VALVE CARTRIDGE

1. Isolate the cold water supply.
2. Remove the un-sprung circlip retaining the expansion relief valve cartridge in the inlet manifold body. See Figure 4-1.
3. Carefully remove the expansion relief valve cartridge from the inlet manifold body. It is a push fit type fitting, so gently pull on the body of the cartridge until it is released.
4. Clean valve seat face and seating - do not scratch or damage either seat face or seating.
5. Refit in reverse order.
Ensure that the circlip is fully inserted into its seat.
Expansion valve cartridge (Grant UK product code: GCS08).

! CAUTION !

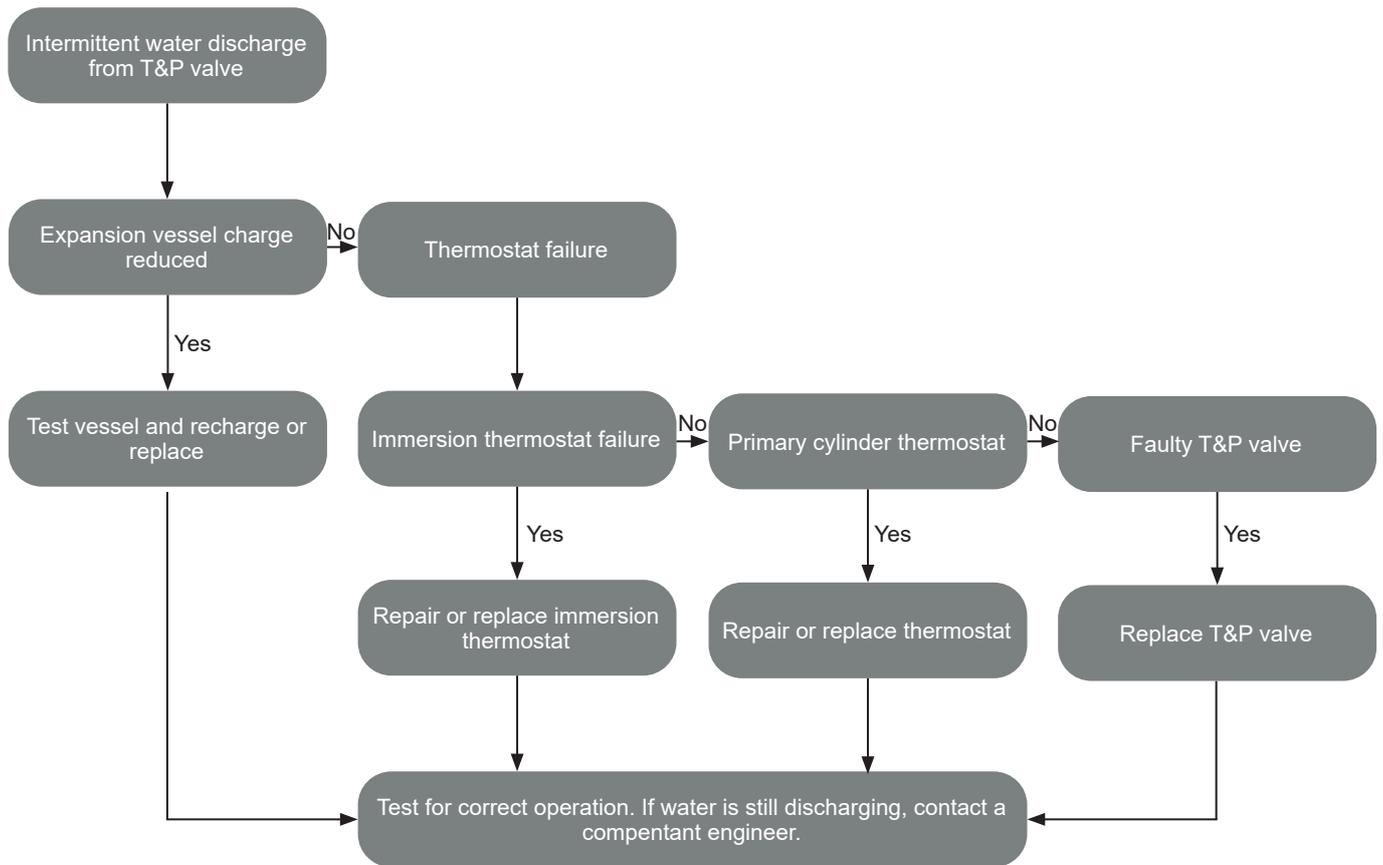
Upon re-fitting the circlip used to retain the push-fit expansion relief valve into the inlet manifold body, ensure the circlip is fully inserted into its seat.

7.4 EXPANSION VESSEL

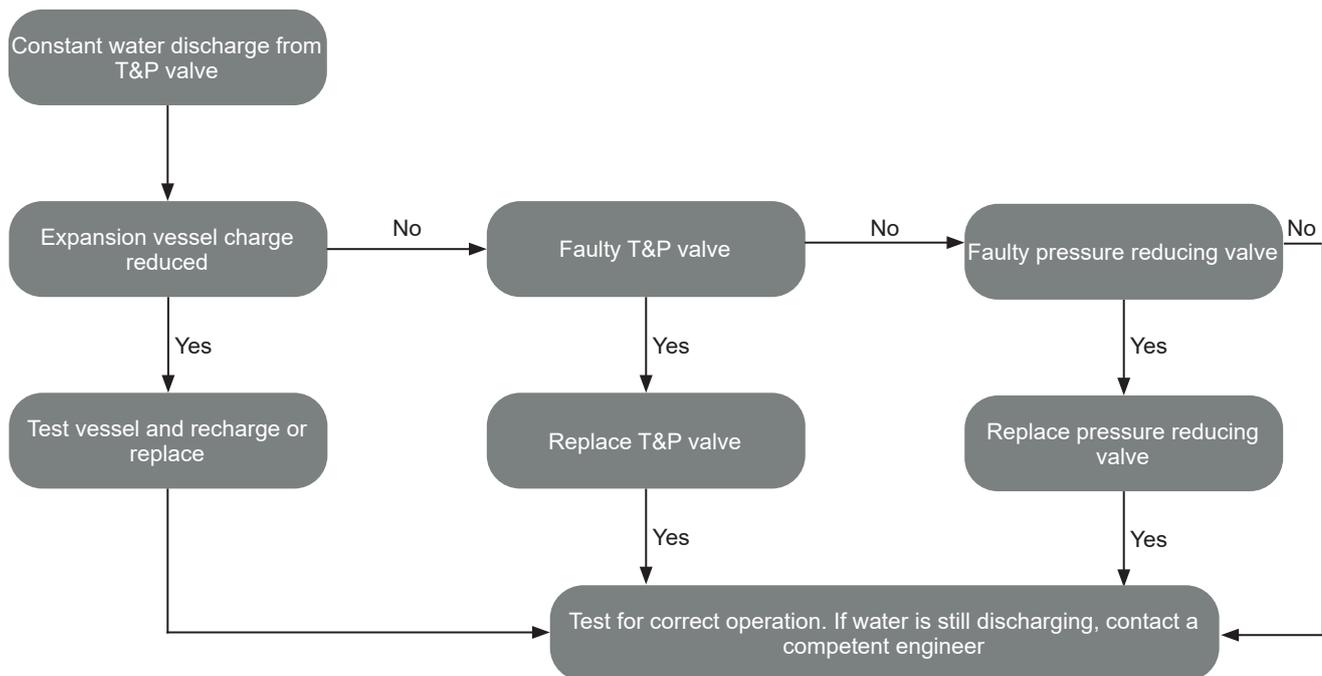
1. Isolate the cold water supply.
2. Open hot water taps.
3. Drain cylinder to below the expansion vessel connection.
4. Check expansion vessel air charge.
5. Replace expansion vessel if necessary.
6. Close drain off cock and turn on cold water supply.
7. Refill cylinder whilst checking for leaks.
8. When water is flowing freely from taps close taps.

8 FAULT FINDING

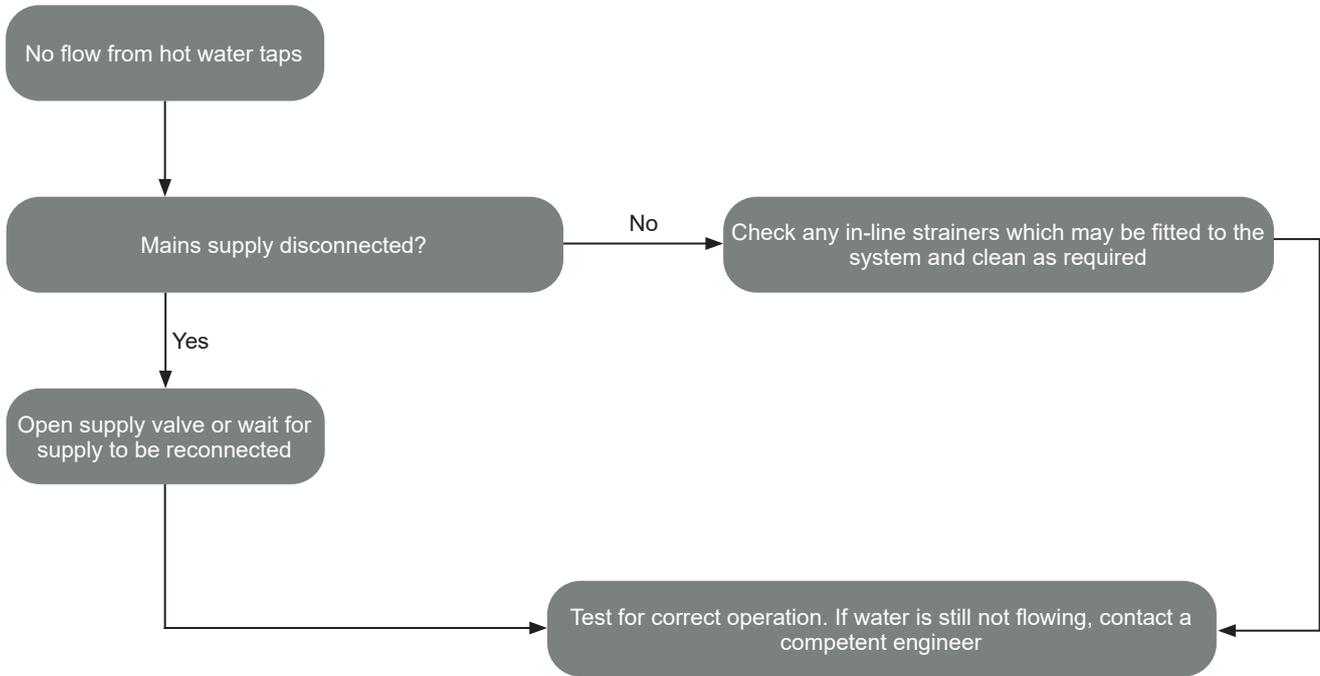
8.1 INTERMITTENT WATER DISCHARGE



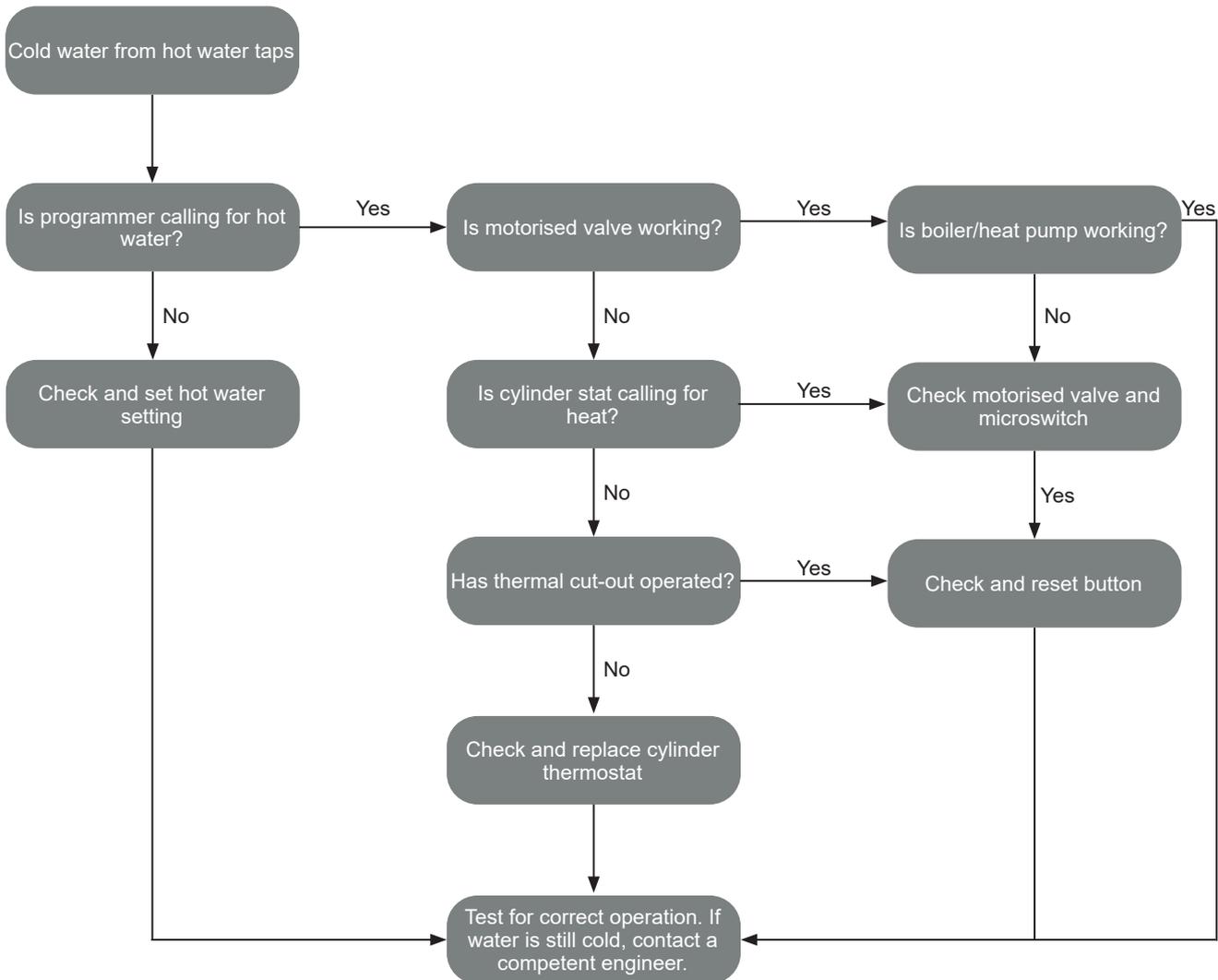
8.2 CONSTANT WATER DISCHARGE



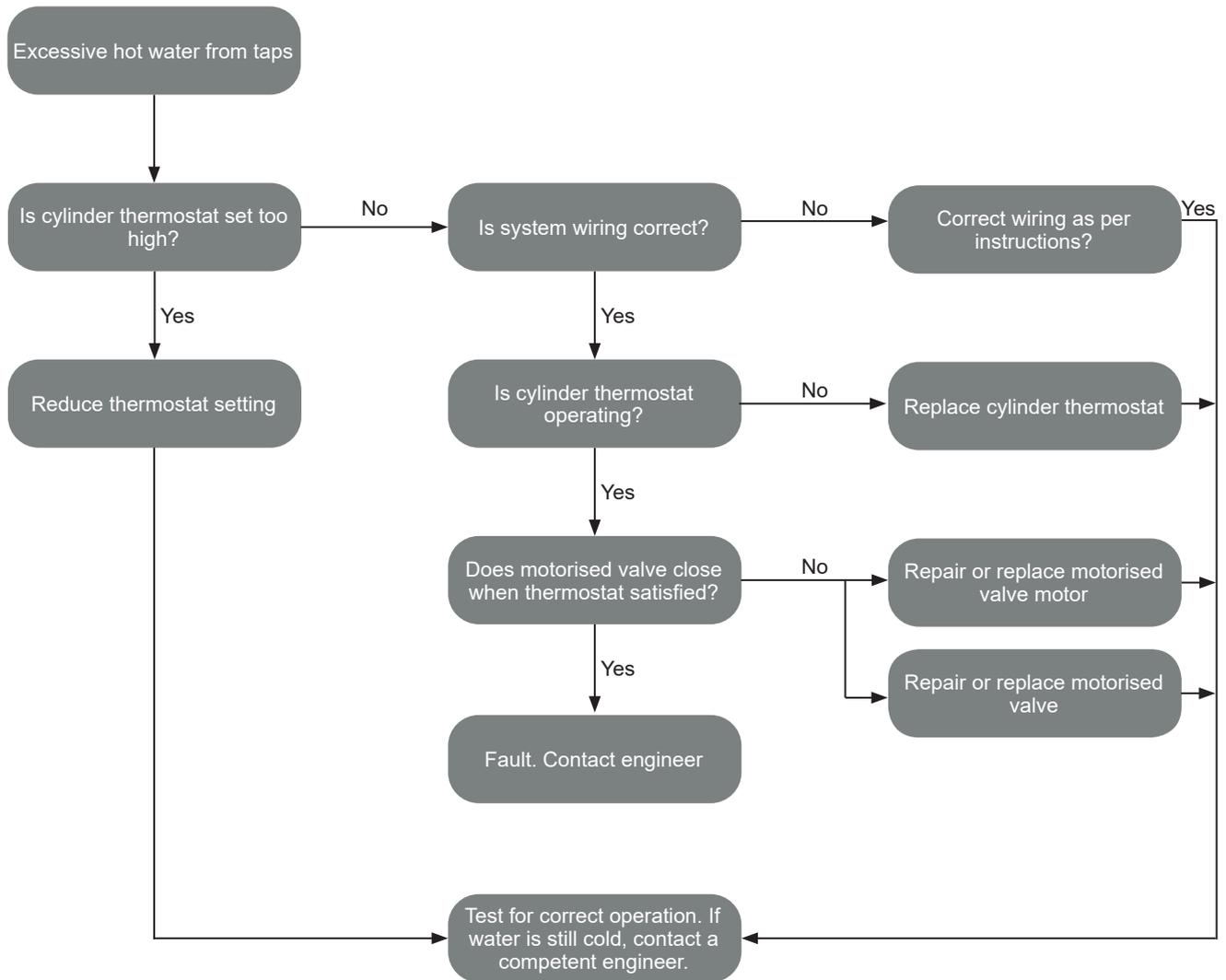
8.3 NO FLOW FROM HOT WATER TAPS



8.4 COLD WATER FLOW FROM HOT WATER TAPS



8.5 EXCESSIVE HOT WATER FROM TAPS



9 SPARE PARTS

9.1 SPARE PARTS

Table 9-1: MonoWave cylinder with integral buffer - spare parts

Product description	Product code
Inlet manifold c/w 3 bar pressure reducing valve and 6 bar expansion relief valve	GCS07
Expansion relief valve - 6 bar	GCS08
½" Temperature and pressure relief valve 90°C / 7 bar	GCS09
Tundish - 15mm / 22mm compression	GCS10
Control / Limit thermostat	GCS11
3kW immersion heater element - Cotherm type ELE14-IN-800-UNV	GCS30
Immersion heater thermostat - Cotherm type TSE	GCS31
3kW immersion heater element (Cotherm type ELE14-IN-800-UNV) and thermostat (Cotherm type TSE)	GCS13
Drain cock	GCS14
2-port motorised valve (22mm)	GCS20
19 litre expansion vessel with 22mm compression fitting (18 litre actual volume) (200L models only)	GCS36
24 litre expansion vessel with 22mm compression fitting (22 litre actual volume) (250L and 300L models)	GCS37
Expansion vessel hose - ¾" BSPF x ¾" BSPM	GCS02

10 PRODUCT FICHE

Product fiche concerning the
COMMISSION DELEGATED REGULATIONS
(EU) No 812/2013 of 18 February 2013
(EU) No 814/2013 of 2 August 2013

Model	Model identifier	Energy efficiency	Standing loss (W)	Storage volume (litres)
MONOWAVE	HPFR200PPC/BS	C	78	194
MONOWAVE	HPFR250PPC/BS	C	84	242
MONOWAVE	HPFR300PPC/BS	C	92	292
MONOWAVE	HPFR200C/BS	C	78	194
MONOWAVE	HPFR250C/BS	C	84	242
MONOWAVE	HPFR300C/BS	C	92	292

11 END OF LIFE INFORMATION

GENERAL

Grant hot water storage cylinders and thermal stores incorporate components manufactured from a variety of different materials. The majority of these materials can be recycled whilst the smaller remainder cannot.

Materials that cannot be recycled must be disposed of according to local regulations using appropriate waste collection and/or disposal services.

DISASSEMBLY

There is little risk to those involved in the disassembly of the cylinder or thermal store if the process is undertaken with care and reasonable precautions are taken.

RECYCLING

Many of the materials used in Grant hot water storage cylinders and thermal stores can be recycled, as listed below:

COMPONENT

Shell/Buffer
Internal coils
Compression connections
Outer casing
Top/bottom caps
T&P valve
Immersion heater
Dual thermostat

MATERIAL

Stainless steel (duplex 2034)
Stainless steel
Brass
Steel (acrylic coated)
ABS (acrylic capped)
Brass
Brass/stainless steel
Plastic/copper

DISPOSAL

All materials other than those listed above must be disposed of responsibly as general waste.



Neil Sawers
Technical Manager

Grant Cylinder Fiche V1.5 26/11/2020

12 USER INSTRUCTIONS

12.1 USER INSTRUCTIONS

Your Grant MonoWave HP cylinder with buffer has been designed to give many years of trouble-free service and is made from hygienic high grade stainless steel.

IMMERSION HEATERS

Your Grant MonoWave HP cylinder with buffer is fitted with two 3kW immersion heaters (one in the cylinder and one in the buffer). Refer to Section 5.1 for further details.

The immersion heater in the cylinder can be used to heat your hot water when your heat pump (or boiler) is switched off, e.g. during the summer months.

In the case of a Grant AERONA³ heat pump, this immersion heater may also be used to assist in the heating of your hot water if you have a Grant Boost Kit fitted. Check with your installer.

The cylinder immersion heater has been factory-set to position 4 (refer to Figure 5-1) to give a hot water temperature of around 60°C.

The immersion heater incorporates an independent non self-resetting over temperature cut-out device to prevent excessive water temperatures. If this safety cut-out operates it can be re-set. Refer to Section 6.3.

If the problem persists, please contact your installer.

DUAL THERMOSTAT

Your Grant MonoWave HP cylinder with buffer is also fitted with a Dual Thermostat (mounted on the cylinder). Refer to Section 5.4 for further details.

The cylinder control thermostat has an adjustment range between 25°C and 65°C. It is recommended that it is set to 60°C.

The high limit (overheat) thermostat will automatically operate if the water temperature reaches 90°C. If this operates it can be re-set. To do this, first wait for the cylinder to cool down. Then unscrew the plastic cap and press in the small re-set pin.

If the problem persists, please contact your installer.

TEMPERATURE SETTINGS

The hot water temperatures on the cylinder immersion heater and dual thermostat should not be set any higher than 60°C otherwise nuisance tripping of either the immersion heater safety cut-out, or the high limit thermostat (in the dual thermostat) will occur.

If you are in any doubt, these temperatures adjustments should be best left to your installer.

HOT WATER

When a hot tap is turned on there may be a short surge of water, this is quite normal with unvented systems and does not mean there is a fault.

When you first fill a basin the water may sometimes appear milky. This is due to very tiny air bubbles in the water, which will clear very quickly.

! WARNING !

If water is seen to flow from either the Temperature & Pressure Relief (T&P Valve) valve or the Expansion Relief Valve on the cylinder seek expert advice immediately.

If the water is flowing from the T&P Valve, immediately:

1. Shut off the electrical supply to the immersion heater(s).
2. Shut down the boiler or other heat sources to the cylinder e.g. solar, heat pump, etc.
3. DO NOT SHUT OFF THE WATER SUPPLY TO THE CYLINDER.
4. Contact your installer to check the system.

IMPORTANT

Do NOT tamper with any of the Safety controls fitted to the cylinder. If you suspect a fault always contact a competent installer who is qualified to work on unvented water cylinders.

13 GUARANTEE

You are now the proud owner of a cylinder/thermal store from Grant Engineering (UK) Limited, which has been designed to give you years of reliable, trouble free operation.

Grant Engineering (UK) Limited guarantees the manufacture of the cylinder/thermal store including all electrical and mechanical components for a period of **twelve months from the date of installation⁴**, provided that the cylinder/thermal store has been installed in full accordance with the installation and servicing instructions issued.

This will be extended to a total period of **two years** if the cylinder/thermal store is registered with Grant Engineering (UK) Limited **within thirty days of installation⁴** and is serviced at twelve monthly intervals³. See main Terms and Conditions below.

In addition, the stainless steel (shell) used in the manufacture of the cylinder/thermal store is guaranteed for a period of **twenty five years** from the date of installation⁴.

Registering the product with Grant Engineering (UK) Limited

Please register your cylinder/thermal store with Grant Engineering UK Limited **within thirty days of installation**. To do so visit www.grantuk.com and follow the links to the 'Homeowners Zone', where you can register your cylinder/thermal store for a further **twelve months** guarantee (giving **two years** from the date of installation⁴). This does not affect your statutory rights¹.

If a fault or defect occurs within the manufacturer's guarantee period

If your cylinder/thermal store should fail within the guarantee period, you must contact Grant Engineering (UK) Limited who will arrange for the repair under the terms of the guarantee, providing that the cylinder/thermal store has been correctly installed, commissioned and serviced (if the appliance has been installed for more than twelve months) by a competent person and the fault is not due to tampering, misuse or the failure of any external components not supplied by Grant Engineering (UK) Limited, e.g. pipework, etc.

This two year guarantee only applies if the cylinder/thermal store is registered with Grant Engineering (UK) Limited within thirty days of installation⁴ and is serviced after twelve months³.

In the first instance

Contact your installer or commissioning engineer to ensure that the fault does not lie with the system components or any incorrect setting of the system controls that falls outside of the manufacturer's guarantee otherwise a service charge could result. Grant Engineering (UK) Limited will not be liable for any charges arising from this process.

If a fault covered by the manufacturer's guarantee is found

Ask your installer to contact Grant Engineering (UK) Limited Service Department on +44 (0)1380 736920 who will arrange for a competent service engineer to rectify the fault.

Remember - before you contact Grant Engineering (UK) Limited:

- Ensure the cylinder/thermal store has been installed, commissioned and serviced by a competent person in accordance with the installation and servicing instructions.
- Ensure the problem is not being caused by the heating system, its controls or any system connected to it.

Free of charge repairs

During the **two year** guarantee period no charge for parts or labour will be made, provided that the cylinder/thermal store has been installed and commissioned correctly in accordance with the manufacturer's installation and servicing instructions, it was registered with Grant Engineering (UK) Limited within thirty days of installation and⁴, for cylinders/thermal stores over twelve months old, details of annual service is available³.

The following documents must be made available to Grant Engineering (UK) Limited on request:

- Proof of purchase
- Benchmark 'Installation, Commissioning and Service Record Log Book

Chargeable repairs

A charge may be made (if necessary following testing of parts) if the breakdown is due to any fault(s) caused by the plumbing or heating system, external electrics and external components. See 'Extent of manufacturer's guarantee' below.

Extent of the manufacturer's guarantee:

The manufacturer's guarantee does not cover the following:

- If the cylinder/thermal store has been installed for over **two years**
- If the cylinder/thermal store has not been installed, commissioned, or serviced by a competent person in accordance with the installation and servicing instructions.
- The serial number has been removed or made illegible.
- Fault(s) due to accidental damage, tampering, unauthorised adjustment, neglect, misuse or operating the cylinder/thermal store contrary to the manufacturer's installation and servicing instructions.
- Damage due to external causes such as bad weather conditions (flood, storms, lightning, frost, snow or ice), fire, explosion, accident or theft.
- Fault(s) due to incorrectly sized expansion vessel(s), incorrect vessel charge pressure or inadequate expansion on the system.
- Fault(s) caused by external electrics and external components not supplied by Grant Engineering (UK) Limited.
- Cylinder/thermal store servicing, de-scaling or flushing.
- Checking and replenishing system pressure.
- Pipework, electrical cables and plugs and external controls not supplied by Grant Engineering (UK) Limited.
- Heating system components, such as radiators, pipes, fittings, pumps and valves not supplied by Grant Engineering (UK) Limited.
- Instances where the cylinder/thermal store has been un-installed and re-installed in another location.
- Use of spare parts not authorised by Grant Engineering (UK) Limited.

Terms of manufacturer's guarantee:

- The Company shall mean Grant Engineering (UK) Limited.
- The cylinder/thermal store must be installed by a competent installer and in full accordance with the relevant Codes of Practice, Regulations and Legislation in force at the time of installation.
- The cylinder/thermal store is guaranteed for **two years** from the date of installation⁴, providing that after twelve months the annual service³ has been completed and the cylinder/thermal store registered with the Company within thirty days of the installation⁴. Any work undertaken must be authorised by the Company and carried out by a competent service engineer.
- The stainless steel (shell) used in the manufacture of the cylinder/thermal store is guaranteed for a period of **twenty five years** (parts only) from the date of installation⁴. This is subject to the following:
 - The cylinder/thermal store is operated correctly, in accordance with the installation and servicing instructions.
 - Proof is provided that the connecting system/s has been flushed or chemically cleaned where appropriate (refer to BS 7593) and that the required quantity of a suitable corrosion inhibitor added.
 - Proof of annual servicing (including the checking of any expansion vessels and pressure relief valves) must be provided if and when requested by the Company.
- This guarantee does not cover breakdowns caused by incorrect installation, neglect, misuse, accident or failure to operate the cylinder/thermal store in accordance with the manufacturer's instructions.
- The cylinder/thermal store is registered with the Company within thirty days of installation⁴. Failure to do so does not affect your statutory rights¹.
- The balance of the guarantee is transferable providing the installation is serviced prior to the dwelling's new owners taking up residence. Grant Engineering (UK) Limited must be informed of the new owner's details.
- The Company will endeavour to provide prompt service in the unlikely event of a problem occurring, but it cannot be held responsible for any consequences of delay however caused.
- This guarantee applies to Grant Engineering (UK) Limited cylinders/thermal stores purchased and installed on the UK mainland, Isle of Wight, Channel Islands, Isle of Man and Scottish Isles only². Provision of in-guarantee cover elsewhere in the UK is subject to agreement with the Company.
- All claims under this guarantee must be made to the Company prior to any work being undertaken. Invoices for call out/repair work by any third party will not be accepted unless previously authorised by the Company.
- Proof of purchase and date of installation, commissioning and service documents must be provided on request.
- If a replacement cylinder/thermal store is supplied under the guarantee (due to a manufacturing fault) the product guarantee continues from the installation date of the original cylinder/thermal store, and **not** from the installation date of the replacement⁴.
- The replacement of a cylinder/thermal store under this guarantee does include any consequential costs.
- The cylinder/thermal store must be connected to a mains water supply (installations utilising a private water supply are not covered by this guarantee).
- Breakdown/failure due to lime scale will not be covered by this guarantee.
- The cylinder/thermal store must not be sited in a location where it may be subjected to frost.

Hard water advice

If you live in a hard water area, protection against scaling in your cylinder/thermal store must be provided.

You should fit an appropriate scale inhibitor or water softener as any breakdown caused by water scaling is not covered by either the manufacturer's guarantee. Ask your installer for advice.

Foot notes:

1. Your statutory rights entitle you to a one year guarantee period only.
2. The UK mainland consists of England, Scotland and Wales only. Please note that for the purposes of this definition, Northern Ireland and Scilly Isles are not considered part of the UK mainland.
3. We recommend that your cylinder/thermal store is serviced every twelve months (even when the guarantee has expired) to prolong the lifespan and ensure it is operating safely and efficiently.
4. The guarantee period will commence from the date of installation, unless the installation date is more than six months from the date of purchase, in which case the guarantee period will commence six months from the date of purchase.



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