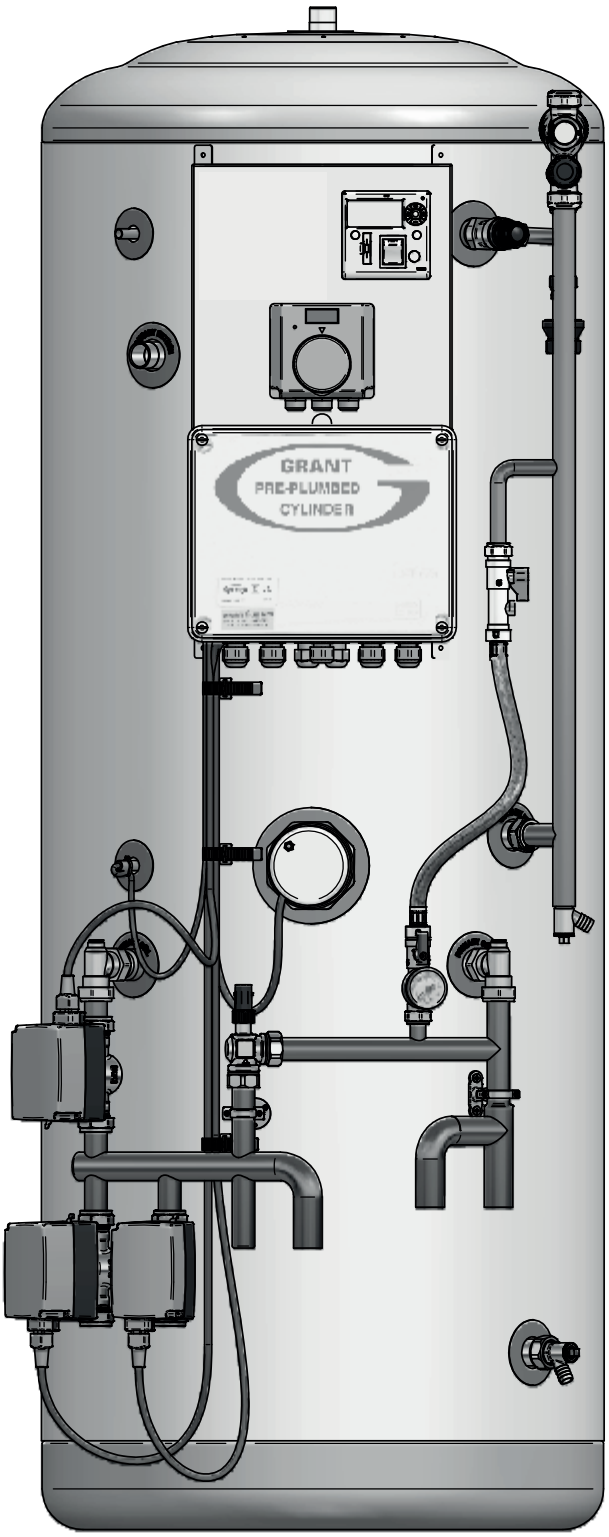
Grant QR Range

Pre-Plumbed Indirect Heat Pump Cylinder

Installation, Servicing and User Instructions



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IMPORTANT NOTE FOR INSTALLERS

These instructions are intended to guide Installers on the installation, commissioning and servicing of a Grant Quick Recovery pre-plumbed indirect heat pump cylinder. 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 QR Pre-Plumbed Heat Pump Cylinder Model	Product Code
210 litre	QRSC210PP
250 litre	QRSC250PP
300 litre	QRSC300PP

SERVICING

The cylinder should be serviced at least every twelve months and the details entered in the Service Log in Appendix C at the back of these instructions.

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1 INTRODUCTION

1.1 INSTALLATION REQUIREMENTS

Thank you for purchasing a Grant unvented hot water storage cylinder from our QR 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 25 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 heater.

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.

Should it be required, a plinth for the cylinder is available to purchase from Grant UK (product code: MB-24) to enable pipework to be run underneath the cylinder with ease. Refer to Section 2.4 for dimensions.

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

Grant QR pre-plumbed indirect heat pump cylinders are factory-fitted with the following components:

Primary circuit pipework

- 1 x 22mm 2-port zone valve for hot water
- 2 x 22mm 2-port zone valves for heating (for two separate heating zones)
- 2 x Manual air vents (one on coil flow pipe and the other on coil return pipe)
- 1 x 22mm automatic by-pass
- 1 x 15mm approved filling loop

Cold water inlet pipework

- 1 x Cold water inlet manifold
- 1 x Temperature and pressure relief valve
- 1 x 15-22mm Tundish
- 2 x Drain cocks (one on cold water inlet pipework and another at bottom of cylinder)

Electrical

- 1 x Grant EP001 Wiring Centre (pre-wired to the zone valves and dual thermostat). Refer to Grant UK DOC 0176 for more detailed information.
- 1 x 3kW electric immersion heater
- 1 x Greenbrook T205-C timer (for immersion heater)
- 1 x Dual thermostat (cylinder thermostat and high limit thermostat)

Grant QR pre-plumbed indirect heat pump cylinders have a single coil designed for connection to an air source heat pump, such as the Grant Aerona³ range. If another heat source, such as a boiler or 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) to shut off the flow from the primary source and electronically interlocked with the heat source via the cylinder control and high limit thermostat.

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.

Please refer to Figure 2-1 for positions of the components fitted to these cylinders.

1.6 OPEN VENTED HOT WATER SYSTEMS

If required, your Grant QR indirect heat pump cylinder 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 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 Section 4 of these instructions.

1.7 PRIMARY CIRCUIT PIPEWORK CONNECTIONS

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

1.8 SECONDARY CIRCUIT PIPEWORK CONNECTIONS

All secondary circuit primary pipework connections to the cylinder MUST be made in accordance with Figure 2-1 and Section 4 (Secondary Circuit Installation).

1.9 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.

The compression nuts and olives required to make the secondary return and hot water draw-off connections to the cylinder are supplied loose in the accessories pack provided with the cylinder.

1.10 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.

The cylinder immersion heater control thermostat has been factory-set to around 65°C. Please refer to Section 5.1 for further information on the immersion heater/s supplied.

The water temperature control thermostats (on the immersion heaters and dual thermostats) fitted to the cylinder should be set no higher than 65°C, however this could be decreased to be between 50°C and 55°C depending on the end user's requirements.

Setting a lower target temperature will help to minimise the build-up of lime scale and is likely to increase the longevity of the hot water cylinder.

1.11 INSULATION

All Grant QR pre-plumbed indirect heat pump cylinders are insulated with a 50mm layer of CFC/HCFC 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 3.1 and an Ozone Depletion Potential (ODP) of 0.

1.12 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

	Grant QR pre-plumbed indirect heat pump cylinders		
	210 litre	**250 litre**	**300 litre**
Nominal capacity (litres)	210	250	300
Actual capacity (litres)	197	237	289
Overall diameter (mm)	550	550	550
Overall height	1493	1744	2057
Weight - empty (kg)	59	67	73
Weight - full (kg)	256	304	362
Secondary return connection (mm)	22	22	22
Cold feed / hot draw-off connections (mm)	22	22	22
Primary coil connections (mm)	22	22	22
Primary coil length (m)	26	26	26
Primary coil surface area (m²)	2.3	2.3	2.3
Primary coil pipe diameter (mm)	28	28	28
Maximum water supply pressure (bar)	12	12	12
System operating pressure - pre-set (bar)	3	3	3
Expansion vessel charge pressure (bar)	3	3	3
Expansion relief valve pressure (bar)	6	6	6
T&P relief valve lift pressure (bar)	7	7	7
T&P relief valve lift temperature (°C)	90	90	90
Maximum primary circuit working pressure (bar)	3.5	3.5	3.5
Performance:			
Primary coil rating (kW)	32.0	32.0	34.0
Standing heat loss (kWh/24hrs)*	1.79	2.02	2.24

* Test carried out at 60°C.

2.2 PRODUCT CONTENTS

Table 2-2: Product contents (QRSCPP models)

	Grant QR pre-plumbed indirect heat pump cylinders		
	210 litre	250 litre	300 litre
Cylinder assembly	1	1	1
Expansion vessel - 19 litre	1	1	-
Expansion vessel - 24 litre	-	-	1
½" temperature and PRV - 7 bar/90°C †	1	1	1
Tundish - 15/22 mm †	1	1	1
22mm compression nut and olive	2	2	2
3/4” BSPM x 22mm compression adapter	1	1	1
Drain cock - ½" end feed †	2	2	2
Inlet manifold - 3 bar PRV and 6 bar expansion relief valve †	1	1	1
2-port motorised valve - 22 mm †	3	3	3
Dual thermostat (control: 25-65°C / high limit: 80°C) †	1	1	1
Immersion heater - 3kW 1¾" boss †	1	1	1

† Factory fitted

2.3 CYLINDER DIMENSIONS

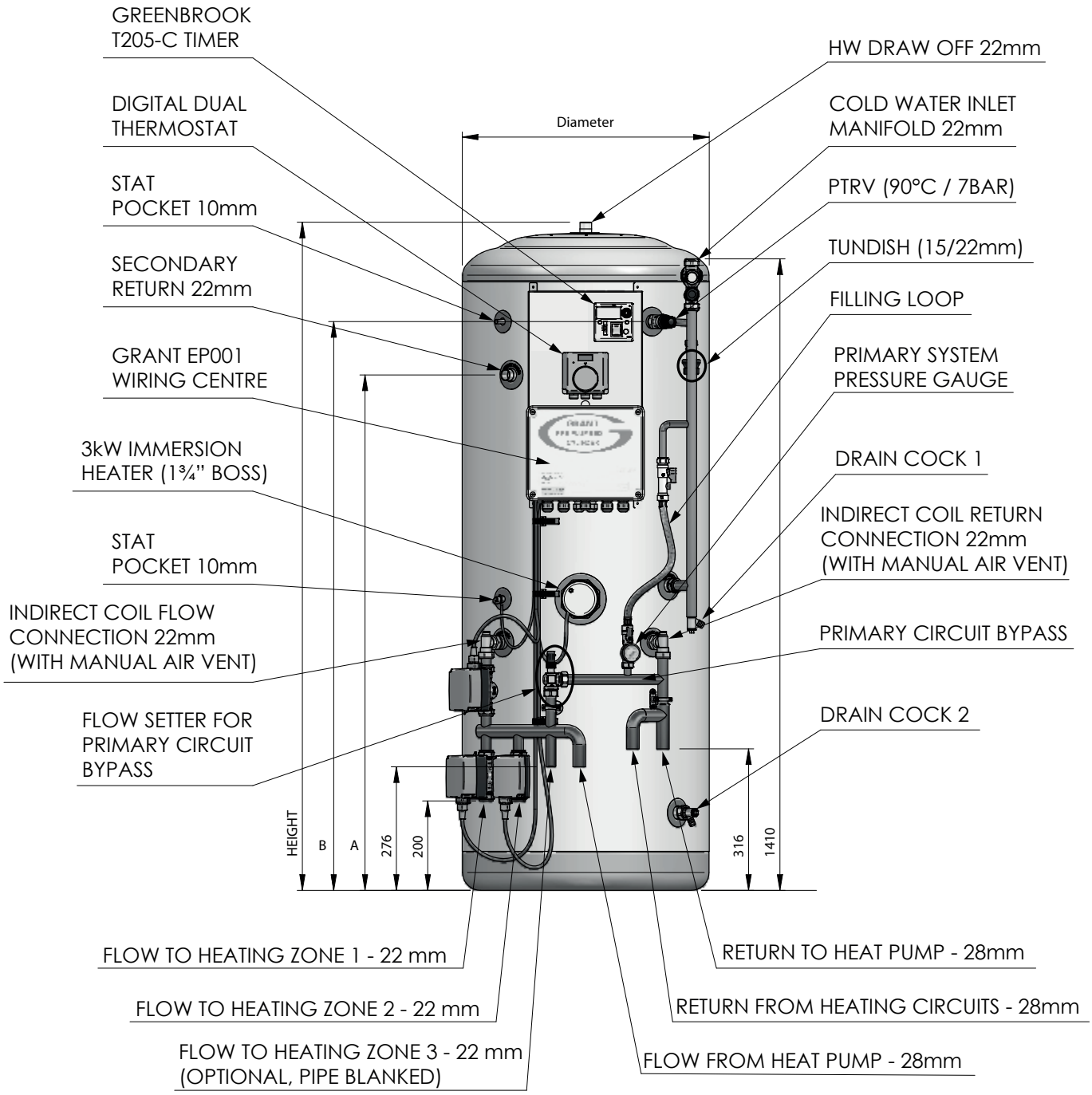


Figure 2-1: Grant Pre-Plumbed QR indirect heat pump cylinder dimensions

Table 2-3: Pre-plumbed cylinder dimensions

Dimensions (mm)	210 litre	250 litre	300 litre
A	1150	1400	1600
B	1269	1519	1832
Height	1493	1744	2057
Diameter	550	550	550

2.4 OPTIONAL PLINTH DIMENSIONS

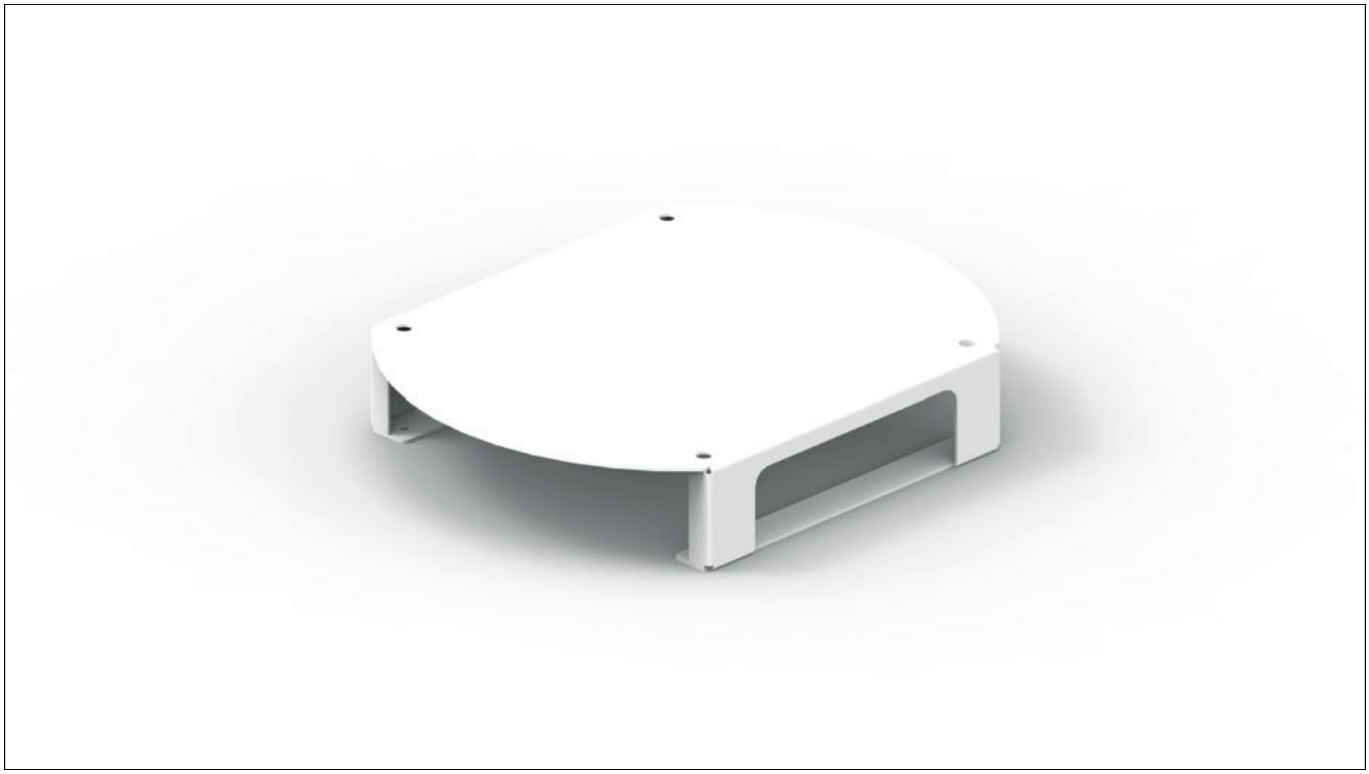


Figure 2-2: Grant QR Cylinder Plinth (product code: MB-24)

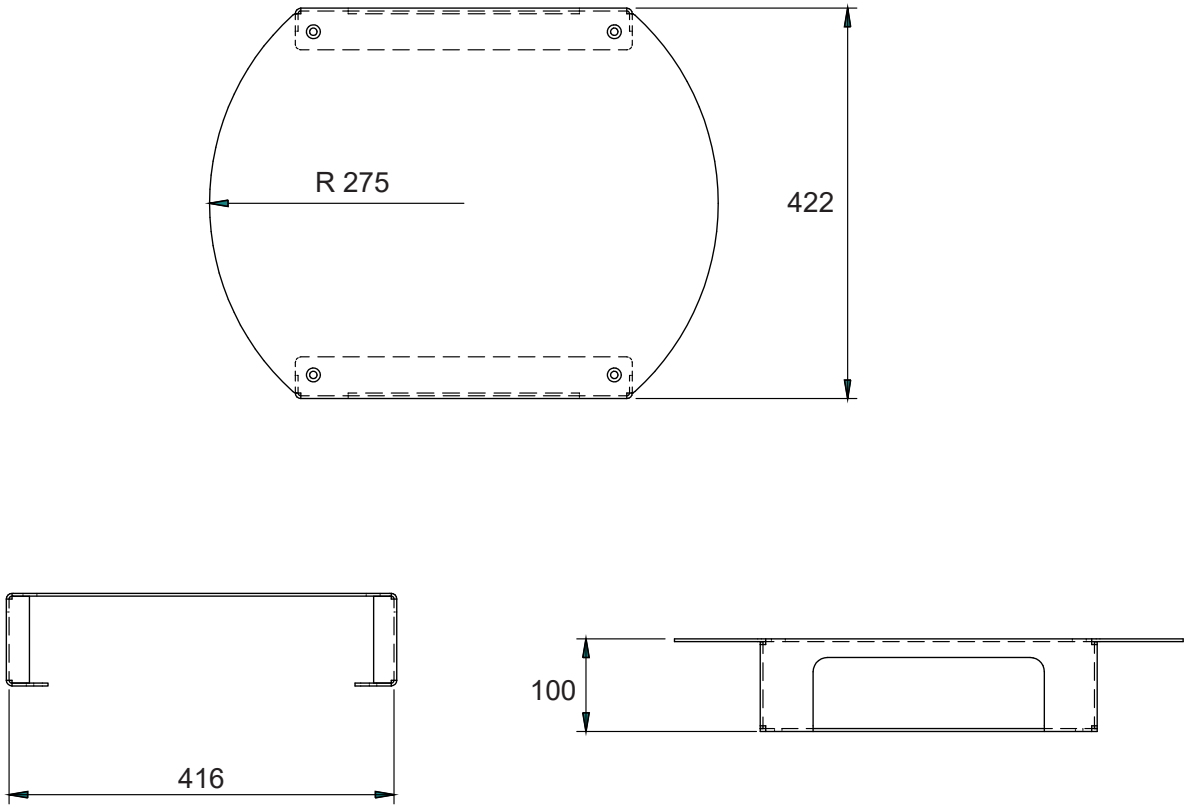


Figure 2-3: Grant QR Cylinder Plinth dimensions

3 PRIMARY CIRCUIT INSTALLATION

3.1 GRANT QR PRE-PLUMBED INDIRECT HEAT PUMP CYLINDERS

Grant QR pre-plumbed indirect heat pump cylinders 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 3.5 bar and a maximum working temperature of 90ºC.

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 PRIMARY CONNECTIONS

Grant QR pre-plumbed indirect heat pump 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 Blanked pipe tail for a third heating zone if required
- 1 x Digital dual thermostat (Cylinder thermostat and High Limit thermostat)
- 2 x Manual air vents (one on the flow into the indirect coil and another on the return from the indirect coil)
- 1 x 22mm system bypass with flow setter
- 1 x Approved filling loop to fill the primary circuit

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

1. The primary flow and return connections from the heat pump should be made to cylinder connections D and F respectively (refer to Figure 3-1 and Table 3-1).
2. The primary flow to heating zone 1 should be made to cylinder connection A (refer to Figure 3-1 and Table 3-1).
3. The primary flow to heating zone 2 should be made to cylinder connection B (refer to Figure 3-1 and Table 3-1).
4. If required, the primary flow to heating zone 3 should be made to cylinder connection C (refer to Figure 3-1 and Table 3-1).
   If a third heating zone is required, the tail of pipe C (see Figure 3-1) will need to be trimmed as it has been soldered shut during production.

! CAUTION !

If a third heating zone is to be connected to cylinder connection C (refer to Figure 3-1), the pipe tail should be cut using a pipe slicer or pipe cutter - to leave the pipe ends with a slight radius and free from any burrs or sharp edges.

This pipe tail should not be cut square using a hacksaw.

5. When filling the primary circuit, the manual air vents situated on the flow and return connections to the indirect coil can be used to vent air from the indirect coil (refer to item G in Figure 3-1).

3.3 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.

3.4 THE 2-PORT VALVE

To prevent gravity circulation when the heat pump switches off, three 2-port motorised valves have been supplied fitted to the cylinder after the primary flow pipe from the ASHP (see item D, Figure 3-1). They should be wired in accordance with Figures 5-2 and 5-3 to ensure that, when used with a Grant Aerona³ Heat Pump, the installation will comply with current legislation.

For boilers or other makes of heat pump please check with the manufacturer for connection details.

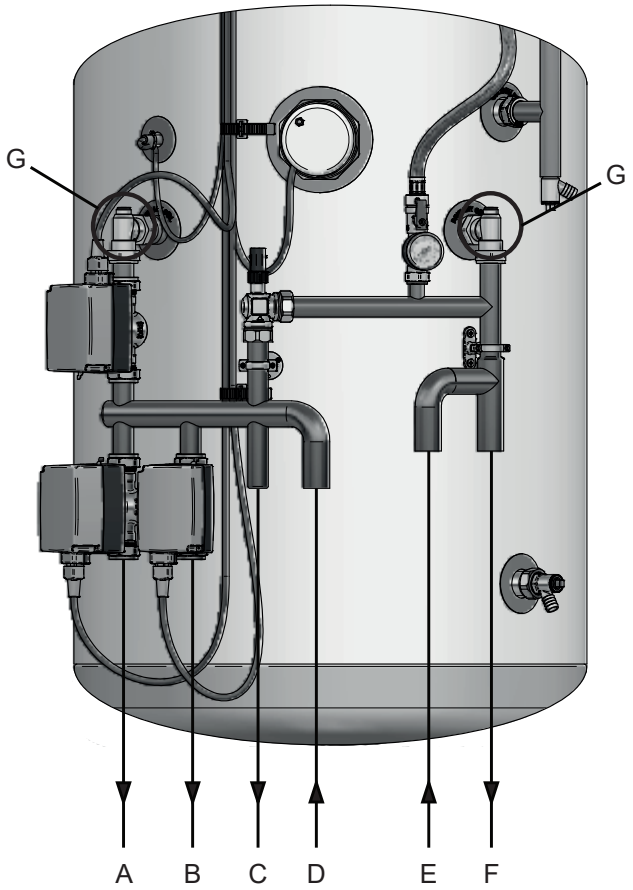


Figure 3-1: Primary circuit connections

Table 3-1: Key to Figure 3-1

Item	Description
A	22mm Flow to heating zone 1
B	22mm Flow to heating zone 2
C	22mm Flow to heating zone 3 (optional)
D	28mm Flow from ASHP
E	28mm Return from heating circuits
F	28mm Return to ASHP
G	Manual air vent

4 SECONDARY CIRCUIT INSTALLATION

4.1 GENERAL

Grant QR pre-plumbed indirect heat pump cylinders 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.

These pre-plumbed cylinders are supplied with the 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.

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 is factory fitted (refer to Figure 2-1 for location) in the cold feed to the cylinder to provide a means of draining the unit.

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. Refer to Figure 2-1 for location and Figure 4-1 for a detailed drawing of the manifold.
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 expansion vessel directly to the ¾" BSPF connection in the inlet valve manifold body, after removing the black plastic plug (see Figure 2-1 for location and Figure 4-1 for a detailed drawing of the manifold). Refer to Section 4.4 for more information on fitting the expansion vessel.
7. The expansion relief drain and the T&P relief valve are both connected to the tundish (see Figure 2-1). This pipework must be connected to a safe visible discharge point via the tundish (supplied fitted) and the pipework must have a continuous fall. Refer to Sections 4.9 to 4.13 for further information on the Tundish and Discharge pipe.
8. 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.

   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.
9. The Service Log at the back of these instructions should be completed after commissioning of the system.
10. The cylinder must be registered with Grant UK within 30 days of installation. Refer to Section 13 for further details on the Cylinder guarantee.

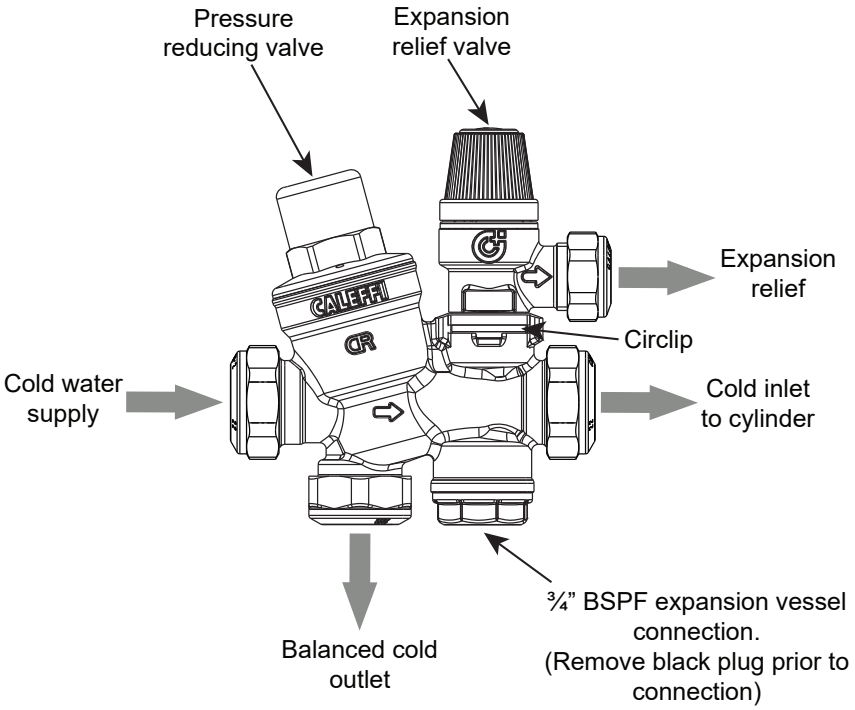


Figure 4-1: Cold water inlet manifold

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 cold water inlet to the cylinder.

The preferred method of connection is to hard pipe the expansion vessel directly to the ¾" BSPF connection in the inlet valve manifold body using 22mm diameter pipe. Refer to Figure 4-1.

To do this, with the cylinder in its final position and with all primary circuit connections to the cylinder made:

1. Remove the black plastic plug from the inlet manifold body (refer to Figure 4-1).
2. Screw the ¾" BSPM x 22mm compression adapter (supplied) into the ¾" BSPF connection in the inlet manifold body.
3. Mount the expansion vessel in a suitable position on an adjacent wall to the cylinder using the wall brackets on the vessel.

! NOTE !

The expansion vessel must be positioned with the connection point at the bottom.

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

4. Using 22mm diameter pipe and the 22mm compression nut and olive supplied with the expansion vessel, connect the expansion vessel to the inlet manifold.

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.

4.5 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 Figure 2-1.

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 Grant QR pre-plumbed indirect heat pump cylinders are fitted with a secondary return connection. If a secondary return circuit is required it should be connected to the 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.

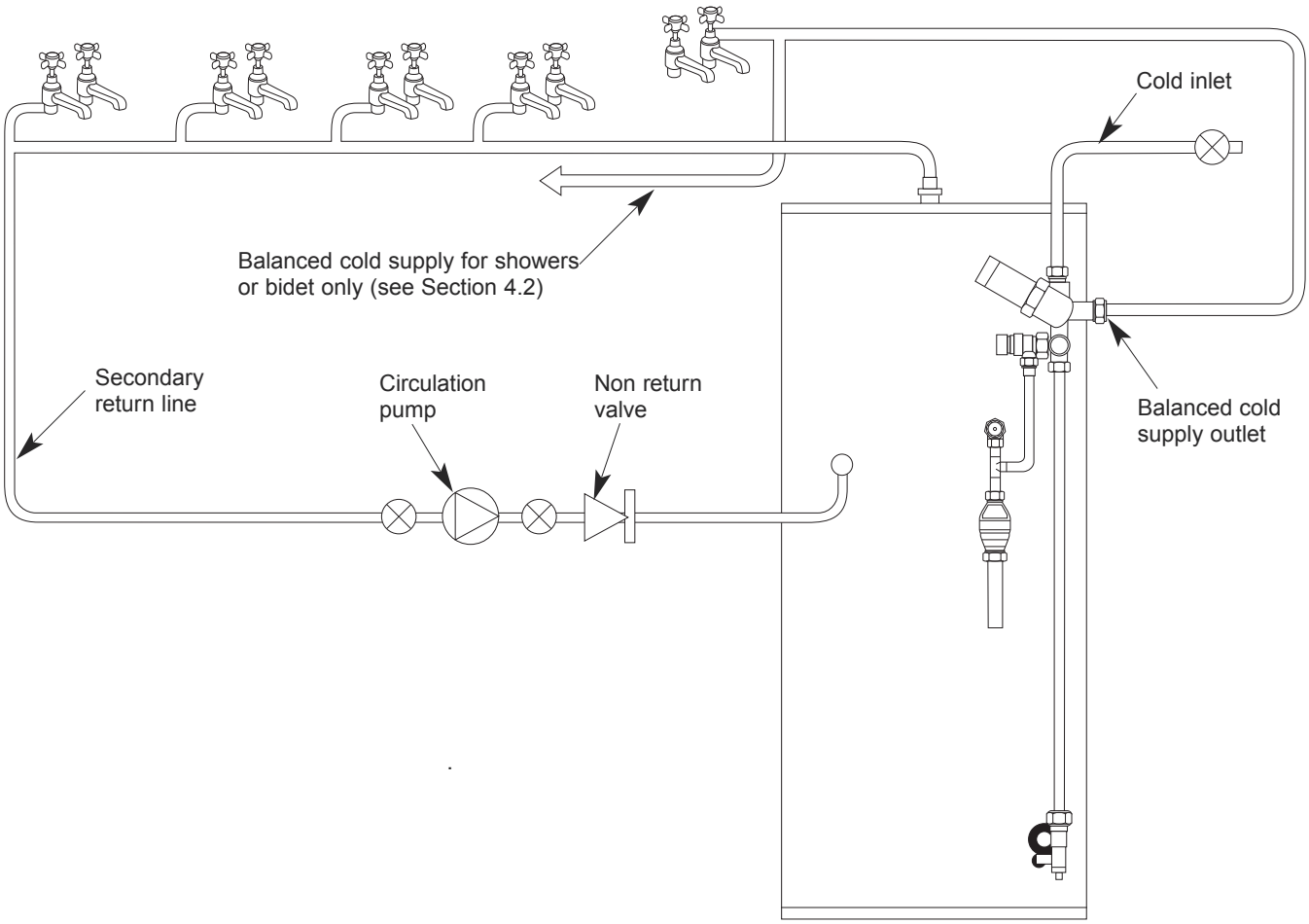


Figure 4-2: Secondary return circuit

4.9 TUNDISH

A suitable tundish is supplied fitted to the outlets from the T&P relief valve and expansion relief valve.

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 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)
½	15	22	Up to 9	0.8
		28	Up to 18	1.0
		35	Up to 27	1.4
¾	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.

4.12 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 = 5.8m.

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 = 14m.

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

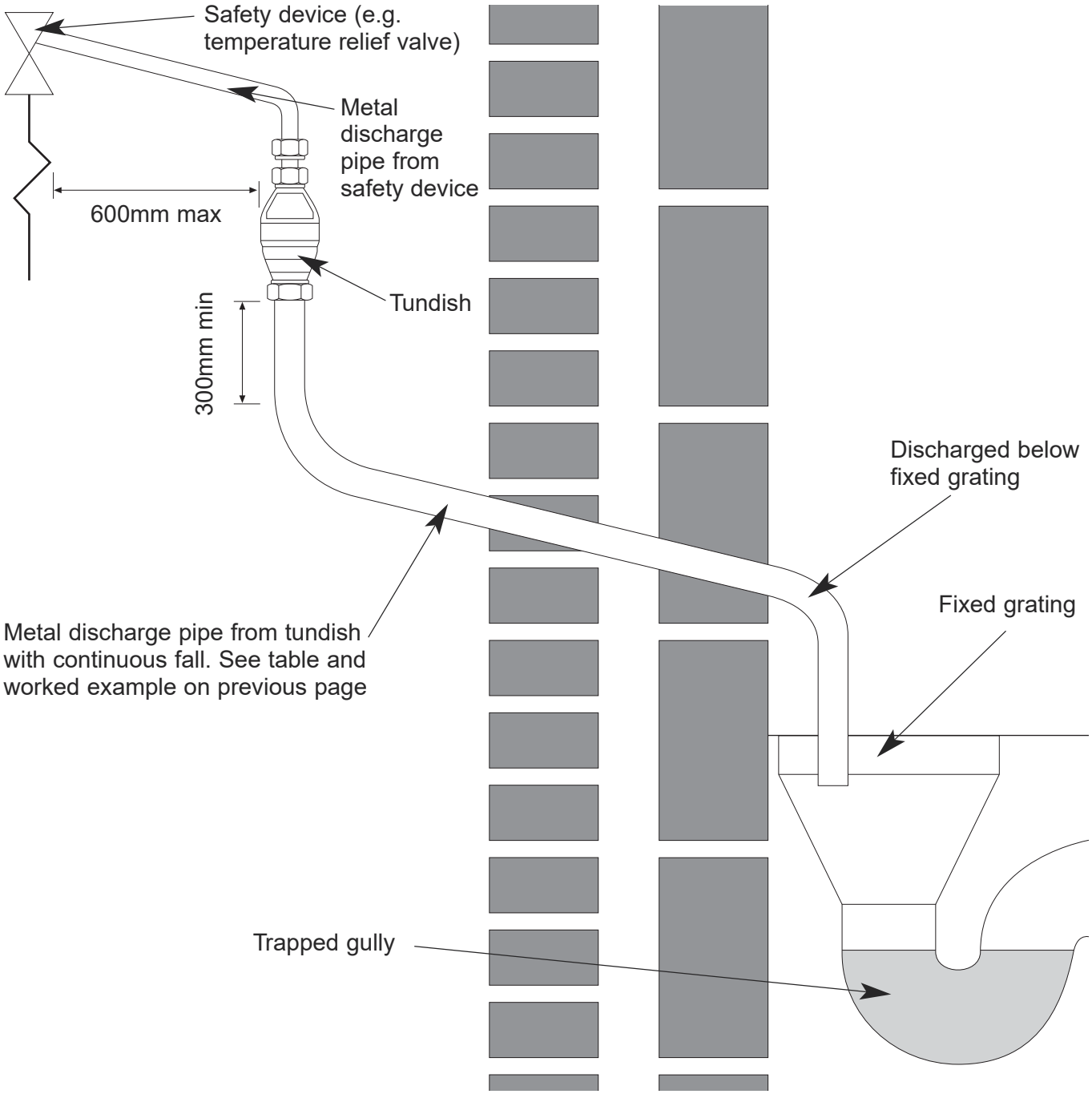


Figure 4-3: Typical discharge pipe arrangement

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 QR pre-plumbed indirect heat pump cylinders are supplied factory-fitted with one 3kW immersion heater. This immersion heater conforms to EEC Directive 76/889 for radio interference and complies with EN 60335-2-73.

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

The control thermostat is pre-set on position “• •” at a temperature of approximately 65°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 via the Greenebrook T205-C timer (factory fitted) which incorporates a double-pole isolator and is fused at 13 amps. Refer to Section 5.7 for further information on the Greenbrook T205-C timer and Figures 5-2 and 5-3 for connection details. A safety cut-out is also incorporated within the thermostat and is factory set to operate at 75°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.

Refer to Figure 2-1 for the position of the immersion heater.

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.

The 230V 50Hz power supply for the immersion heater should be wired to the Greenbrook T205-C timer (factory fitted), which incorporates a double pole isolator switch and is independently fused at 13 amps. Refer to Section 5.7 for further information on the Greenbrook T205-C timer and Figures 5-2 and 5-3 for connection details.

If this timer is to be bypassed for some reason, the immersion heater 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.

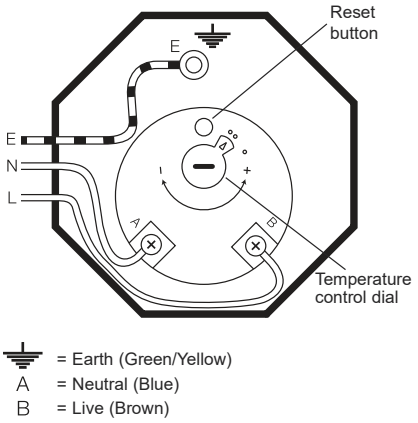


Figure 5-1: Immersion heater wiring connections

! WARNING !

This immersion heater must be earthed.

! WARNING !

The manual reset high limit thermostat must not under any circumstances by by-passed. This is pre-set to 75°C and to prevent nuisance tripping, the control thermostat should always be left in position • •.

5.3 IMMERSION HEATER SAFETY CUT-OUT

The immersion heater incorporates an in 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 words 'bipolar safety' above) 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 DIGITAL DUAL THERMOSTAT

A Digital Dual Thermostat (a combined control and high limit thermostat) is supplied factory fitted to the Grant QR pre-plumbed indirect heat pump cylinder to control the operation of the heat pump primary coil. Refer to Figure 2-1 for position.

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 at 80°C.

For details on wiring connections, refer to Figures 5-2 and 5-3.

For more detailed information on the Digital Dual Thermostat supplied with this cylinder, please refer to Appendix A at the back of these instructions.

! NOTE !

Upon first use it will be necessary to reset the digital dual thermostat.

To do this, please refer to steps 1-3 outlined in Section A.1.2 at the back of these instructions.

! NOTE !

The Digital Dual Thermostat supplied with all Grant QR pre-plumbed cylinders requires a permanent live connection. Refer to Figures 5-2 and 5-3 for wiring details.

! WARNING !

The Digital Dual Thermostat supplied with all Grant QR pre-plumbed cylinders is not suitable for use with a Y-plan type control system using a Honeywell V4073A mid-position zone valve (or similar).

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 Figure 5-2 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 QR pre-plumbed indirect heat pump cylinder is supplied factory fitted with the following electrical equipment:

- 1 x Grant EP001 Wiring Centre (pre-wired to the zone valves and dual thermostat). Refer Section 5.8 for further information.
- 2 x 2-port zone valves for space heating (for two separate heating zones)
- 1 x 2-port zone valve for hot water heating
- 1 x 3kW electric immersion heater
- 1 x Greenbrook T205-C timer (for immersion heater)
- 1 x Dual thermostat (cylinder thermostat and high limit thermostat)

These are pre-wired to the factory-fitted Grant EP001 wiring centre mounted on the cylinder. Refer to Section 5.8 and Figures 5-2 and 5-3 for details.

5.7 GREENBROOK T205-C TIMER

Grant QR pre-plumbed indirect heat pump cylinders are supplied with a Greenbrook T205-C timer factory fitted, to control the operation of the immersion heater for anti-legionella purposes.

Please refer to Grant UK DOC 0136 for detailed information on anti-legionella regimes.

Please refer to Figures 5-2 and 5-3 for connection details and Appendix B at the back of these instructions for information on how to set the Greenbrook T205-C timer.

5.8 GRANT EP001 WIRING CENTRE

The Grant EP001 wiring centre is supplied factory fitted to Grant QR pre-plumbed indirect heat pump cylinders and is wired as shown in Figure 5-2.

The Grant EP001 wiring centre has been designed as a simple and convenient means of making all system control connections for up to four space heating zones, plus one hot water zone, in one wiring centre, with optional capability to provide both volt free outputs and automatic DHW priority (for Grant Aerona³ heat pump installations).
For further information on the Grant EP001 wiring centre, please refer to Grant UK DOC 0176.

! NOTE !

All earth connections for electrical components connected to the EP001 wiring centre should be made to the brass earth bar on the inside of the EP001 wiring centre enclosure.

5.9 WIRING DIAGRAMS

The wiring diagram shown below demonstrates how the electrical components supplied with the Grant QR pre-plumbed indirect heat pump cylinder are wired from the factory.

* in order to achieve independent time control for the DHW zone, the link between terminals 33 and 34 of the EP001 wiring centre must be removed before connecting your chosen time control option. For detailed information on the operation of the Grant EP001 wiring centre, please refer to Grant UK DOC 0176.

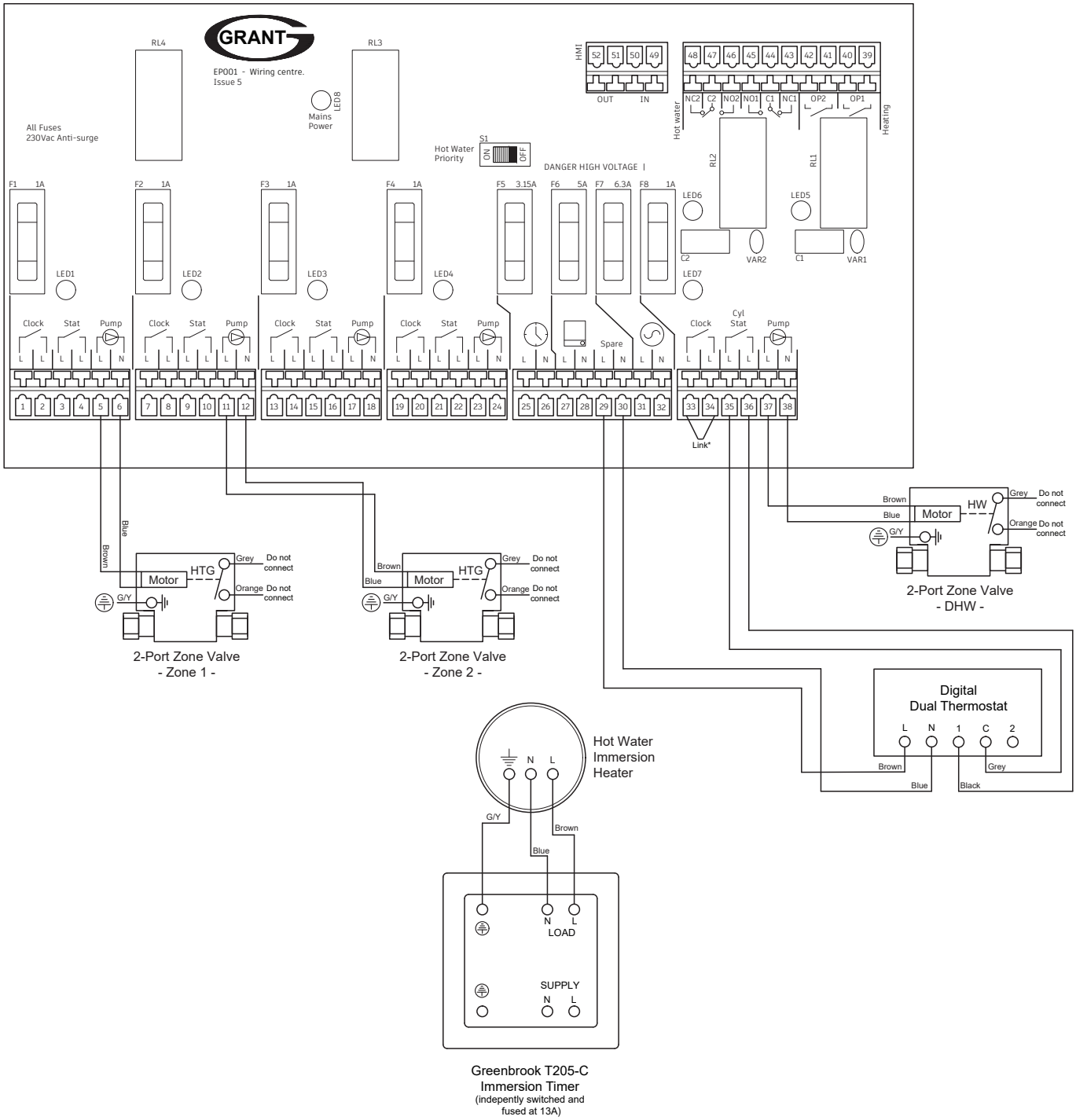


Figure 5-2: Grant QR pre-plumbed indirect heat pump cylinder wiring diagram

The control system shown in this diagram shows the "hot water priority" switch on the EP001 wiring centre in the left hand 'ON' position. This ensures that there can be no demand for space heating and hot water at the same time.

For information regarding the operation of the Greenbrook T205-C timer shown in this control system wiring diagram, please refer to Appendix B at the back of these installation instructions.

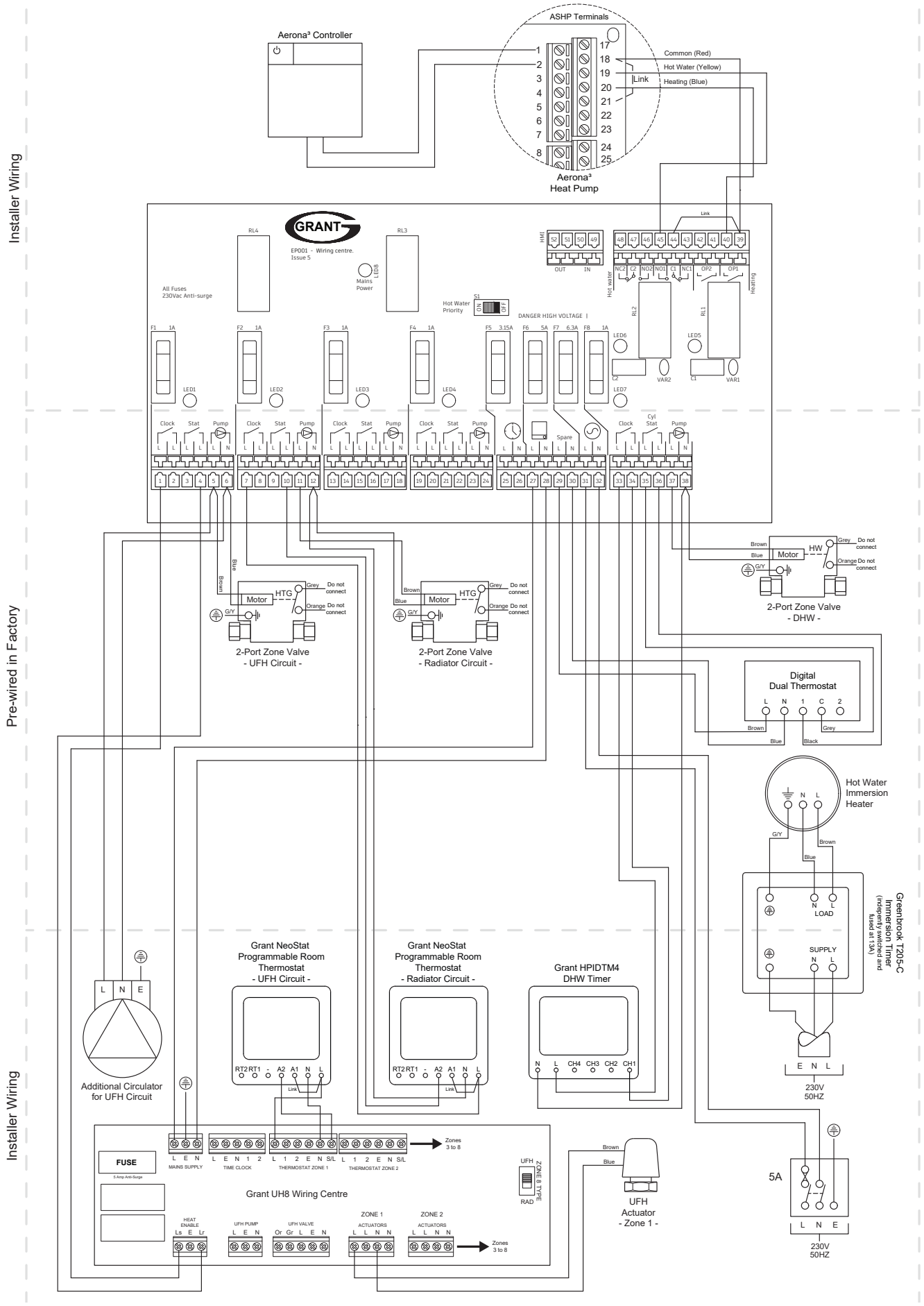


Figure 5-3: Grant QR pre-plumbed indirect heat pump cylinder connected to a Grant Aerona³ ASHP, as part of a S-Plan plus type system with UFH (Grant UH8 Wiring Centre) and a radiator circuit

6 COMMISSIONING, DRAINING DOWN AND SAFETY

! NOTE !

Commissioning details should be entered in the commissioning and service log at the back of these instructions.

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 Figure 2-1), 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 Figure 2-1.

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 CUSTOMER HANDOVER

1. Complete the commissioning and service log at the back of these instructions and leave the instructions 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

! NOTE !

Servicing details should be entered in the commissioning and service log in Appendix C at the back of these instructions.

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 Figure 2-1) 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 !

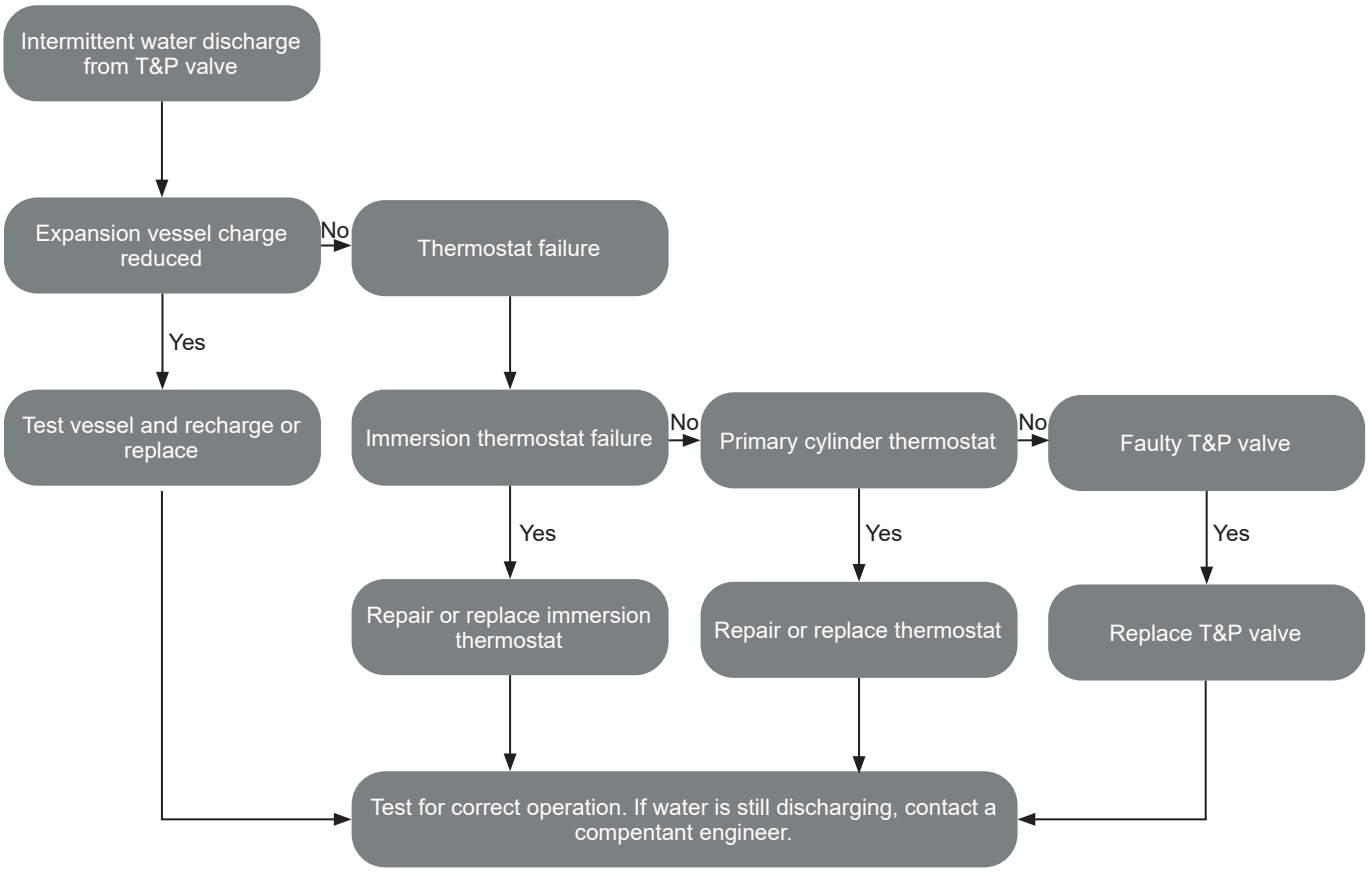
Upon re-fitting the circlip used to retain the push-fit expansion relief valve into the inlet manifold body, ensure the circlip is fully inserted into its seat.

7.4 EXPANSION VESSEL

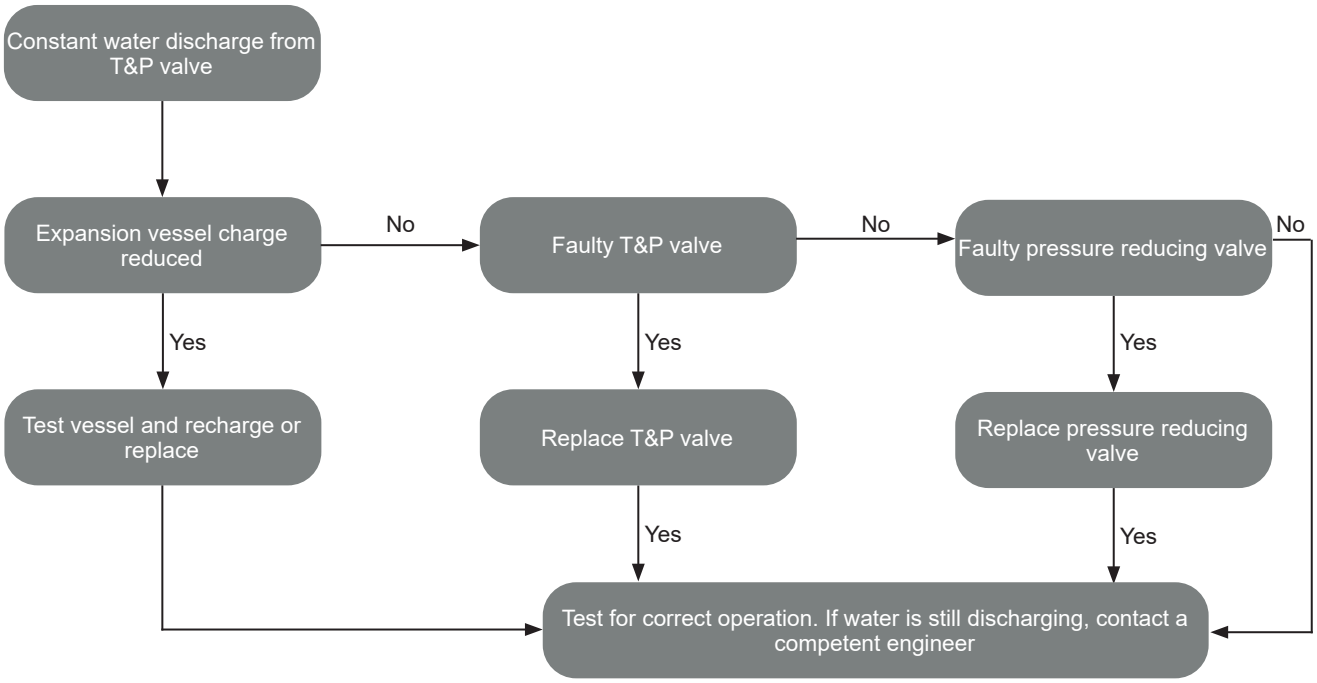
1. Isolate the cold water supply.
2. Open hot water taps.
3. Drain cylinder to below the expansion vessel connection.
4. Check expansion vessel air charge.
5. Replace expansion vessel if necessary.
6. Close drain off cock and turn on cold water supply.
7. Refill cylinder whilst checking for leaks.
8.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

8 FAULT FINDING

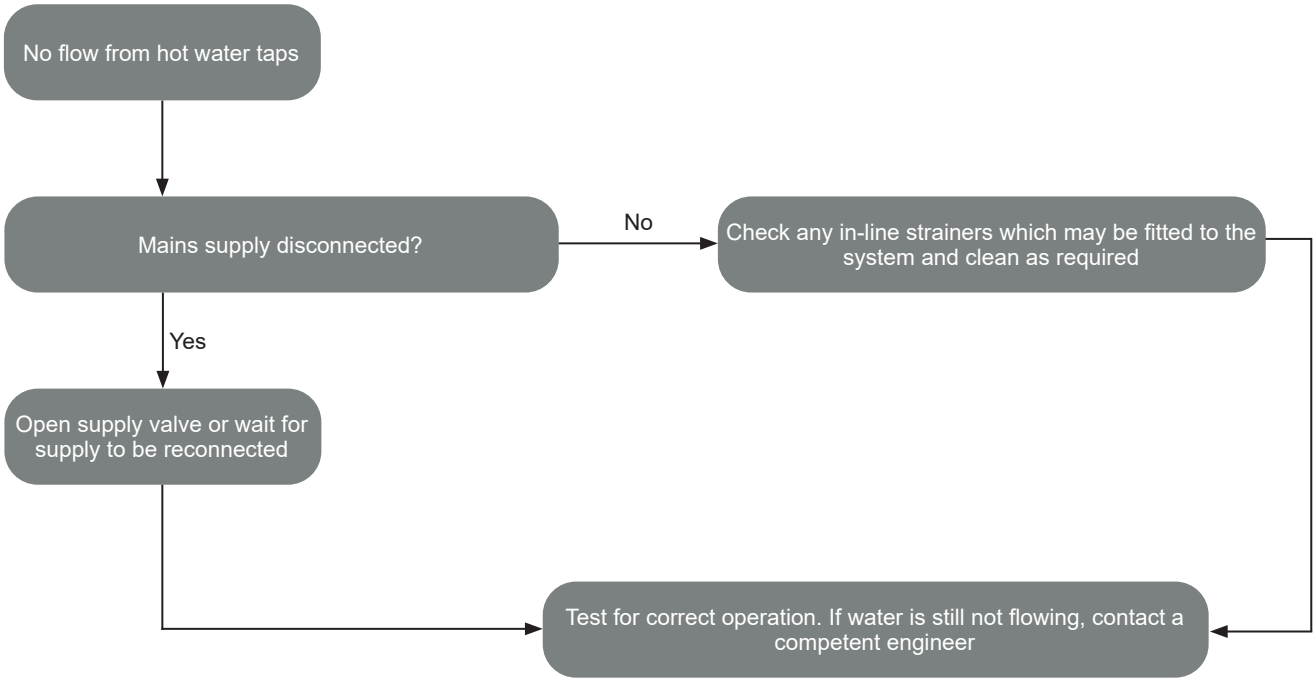
8.1 INTERMITTENT WATER DISCHARGE



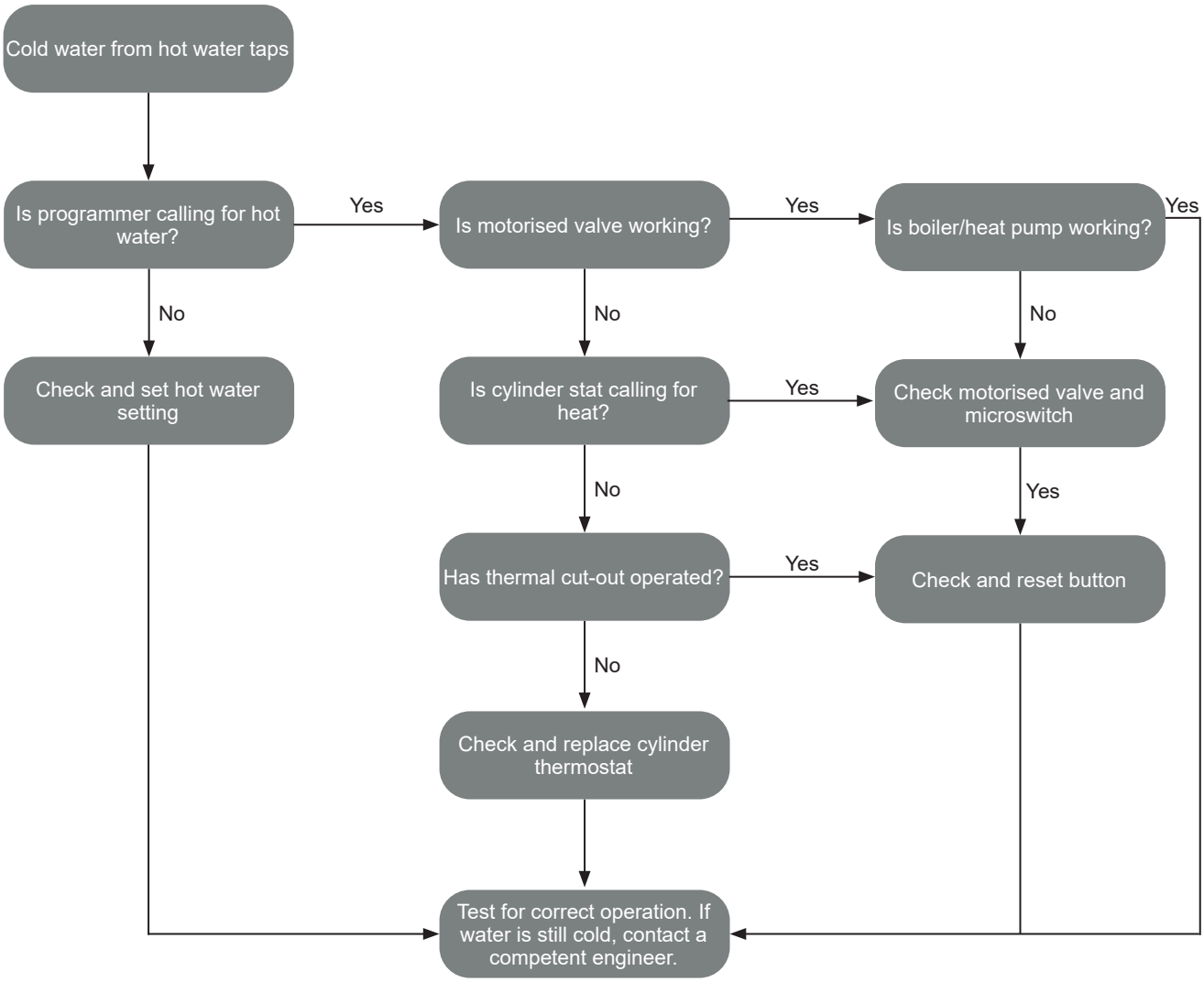
8.2 CONSTANT WATER DISCHARGE



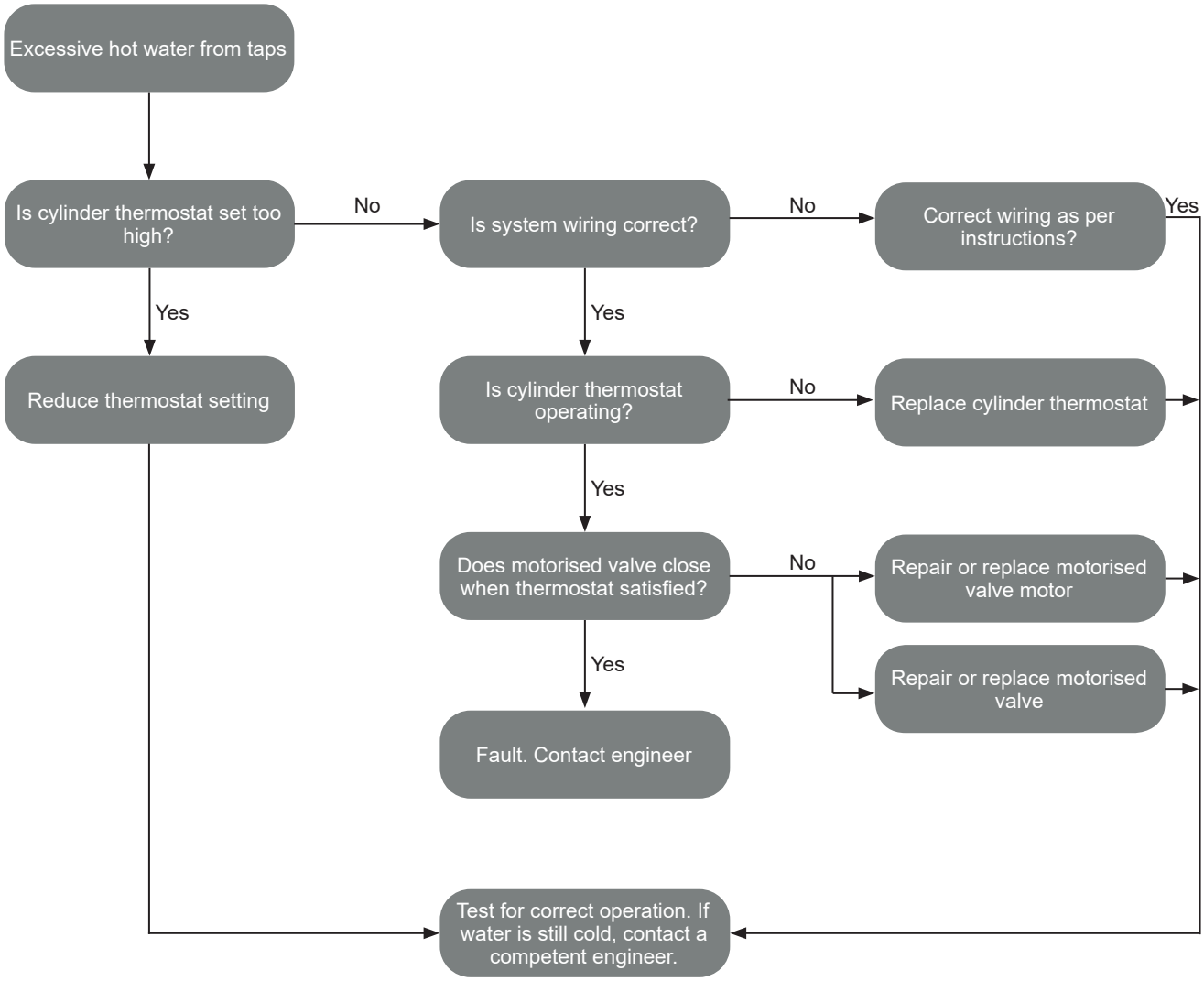
8.3 NO FLOW FROM HOT WATER TAPS



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: Grant QR indirect HP cylinders - 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 - Thermowatt Alloy 800	GCS30
Immersion heater thermostat - Thermowatt RTS	GCS31
3kW immersion heater element (Thermowatt Alloy 800) and thermostat (Thermowatt RTS)	GCS13
Drain cock	GCS14
2-port motorised valve (22mm)	GCS20
18 litre expansion vessel with 22mm compression fitting (all models EXCEPT 300L)	GCS01
24 litre expansion vessel with 22mm compression fitting (300L models only)	GCS04A

10 PRODUCT FICHE

Product fiche concerning the
THE ECODESIGN FOR ENERGY-RELATED
PRODUCTS AND ENERGY INFORMATION
(AMENDMENT) (EU EXIT) REGULATIONS 2020

Model	Description	Energy efficiency	Standing Loss (W)	Actual Volume (litres)
QRSC210PP	210 litre Single Coil Pre Plumbed	C	74	197
QRSC250PP	250 litre Single Coil Pre Plumbed	C	84	237
QRSC300PP	300 litre Single Coil Pre Plumbed	C	93	289

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	MATERIAL
Shell	Stainless steel (duplex LDX 2001)
Internal coils	Stainless steel
Compression connections	Brass
Outer casing	Galvanized steel (Estetic Tex organic coating to BS EN 10169)
Top/bottom caps	Polypropylene
T&P valve	Brass
Immersion heater	Brass/stainless steel
Dual thermostat	Plastic/copper

DISPOSAL

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

Neil Sawers
Technical Manager

12 USER INSTRUCTIONS

12.1 USER INSTRUCTIONS

Your Grant QR indirect heat pump cylinder has been designed to give many years of trouble-free service and is made from hygienic high grade stainless steel.

IMMERSION HEATERS

Your Grant QR indirect heat pump cylinder is fitted with one 3kW immersion heater. 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. Check with your installer.

The cylinder immersion heater thermostat has been factory-set to position • • (refer to Figure 5-1) to give a hot water temperature of around 65°C, but this could be lowered to 60°C if required.

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 QR indirect heat pump cylinder 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 between 50°C and 55°C for Grant Aerona³ heat pump installations

The high limit (overheat) thermostat will automatically operate if the water temperature reaches 80°C. If this operates it can be re-set. Please refer to Section A.1.3.

If the problem persists, please contact your installer.

TEMPERATURE SETTINGS

The hot water temperatures on the cylinder immersion heater thermostat and dual thermostat should not be set any higher than 65°C otherwise nuisance tripping of either the immersion heater safety cut-out, or the high limit thermostat (in the dual thermostat) will occur. This temperature could be decreased to 60°C if required.

Grant UK recommends that the dual thermostat is set between 50°C and 55°C for Grant Aerona³ heat pump installations.

Setting a lower target temperature will help to minimise the build-up of lime scale and is likely to increase the longevity of your hot water cylinder.

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 (EV) 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 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 including all electrical and mechanical components for a period of **twelve months from the date of installation**[4], provided that the cylinder 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 is registered with Grant Engineering (UK) Limited **within thirty days of installation**[4] and is serviced at twelve monthly intervals[3]. See main Terms and Conditions below.

In addition, the stainless steel (shell) used in the manufacture of the cylinder is guaranteed for a period of **twenty five years** from the date of installation[4].

Registering the product with Grant Engineering (UK) Limited

Please register your cylinder 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 for a further **twelve months** guarantee (giving **two years** from the date of installation[4]). This does not affect your statutory rights[1].

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

If your cylinder 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 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 is registered with Grant Engineering (UK) Limited within thirty days of installation[4] and is serviced after twelve months[3].

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 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 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 and[4], for cylinders over twelve months old, details of annual service is available[3].

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 has been installed for over **two years**
- If the cylinder 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 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 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 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 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 is guaranteed for **two years** from the date of installation[4], providing that after twelve months the annual service[3] has been completed and the cylinder registered with the Company within thirty days of the installation[4]. 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 is guaranteed for a period of **twenty five years** (parts only) from the date of installation[4]. This is subject to the following:
  - The cylinder 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 in accordance with the manufacturer's instructions.
- The cylinder is registered with the Company within thirty days of installation[4]. Failure to do so does not affect your statutory rights[1].
- 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 purchased and installed on the UK mainland, Isle of Wight, Channel Islands, Isle of Man and Scottish Isles only[2]. 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 is supplied under the guarantee (due to a manufacturing fault) the product guarantee continues from the installation date of the original cylinder, and **not** from the installation date of the replacement[4].
- The replacement of a cylinder under this guarantee does include any consequential costs.
- The cylinder 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 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 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 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.

APPENDIX A DIGITAL DUAL THERMOSTAT

A.1 GENERAL INFORMATION

A.1.1 THERMOSTAT SPECIFICATION

Make and model	Selco Industry - TW04E9B000D100
Adjustable temperature range	25 - 65°C ± 1°C
Temperature differential	∆t 4°C ± 1°C
Limiter thermostat operating temperature	80.0°C +0 / -3°C >> manual reset push button
Failsafe function	INCLUDED
Temperature rate of change	Any - no limitation
Restart delay to prevent short cycles	3 minutes
Frost protection	∆t 4°C ± 1°C
Power supply/power consumption	240V AC ± 10%
Output contacts rating SPDT	C-1 8A @ 250V AC
Output contacts rating SPDT	C-2 2A @ 250V AC
Differential after manual reset	20°C +3 / -0°C
Sensor NTC / range work	20K ± 3% B25-85 = 3977K ± 1% -20°C .. +115°C
Electrical rigidity	4000 V AC
Insulation resistance	50MΩ @ 500V DC
Degree of protection sensor	IP65
Max head temperature	60°C
Max bulb temperature	120°C
Degree of protection	IP40
Reference standard	EN 60730-1, EN60730-2-9 EU Directives: 2014/35/EU - CE - EMC 2014/30/EU Reach and RoHS conforms

A.1.2 FAIL SAFE FUNCTION

The "Fail Safe" function will operate if:

- The overheat protection function operates (refer to Section A.1.3).
- The contents of the cylinder drops to a temperature of -28°C.
- The temperature probe is disconnected from or incorrectly connected to the thermostat (refer to Section A.1.4).

You will be able to tell if the Fail Safe function has operated, as the warning triangle in the bottom left hand corner of the display screen will be illuminated and the indicator LED will be illuminated red (see Figure A-1).

To reset the digital thermostat and return it to normal operation after the Fail Safe function has operated:

1. Gently pull on the temperature dial to uncover the manual reset button, refer to Figure A-2.
2. Push the manual reset button and replace the temperature dial.
3. Turn the temperature dial to set the desired temperature (recommended to be 60°C).
4. Switch the thermostat off at the mains supply and back on again.

A.1.3 OVERHEAT PROTECTION FUNCTION

The thermostat is equipped with an overheat protection function, which is designed to operate if the contents of the cylinder reaches a temperature of 80°C.

If this function operates, the thermostat must be manually reset in order to resume operation. To do this:

1. Allow the temperature of the contents of the cylinder to drop below 65°C. This temperature is indicated on the thermostat display, refer to Figure A-1.
2. Investigate the cause of the overheat situation and rectify any faults.
3. Follow steps 1-4 outlined in Section A.1.2.

It is possible that this function may operate during transport or while the unit is being manoeuvred into position. If this is the case please follow the above procedure to reset the thermostat.

If this function operates, the warning triangle in the bottom left hand corner of the display screen will be illuminated and the indicator LED will be flashing red (see Figure A-1).

A.1.4 TEMPERATURE PROBE NOT RECOGNISED

If the temperature probe is either not connected or incorrectly connected, the thermostat's "Fail Safe" function will be activated, refer to Section A.1.2 for further details.

If this eventuality occurs, to rectify:

1. Ensure the mains power supply to the thermostat is switched OFF.
2. Remove the two screws securing the wiring cover to the back of the thermostat (see Figure A-1) and carefully remove the wiring cover.
3. Ensure that the temperature sensor is correctly connected to the thermostat. Refer to Figure A-3 for temperature sensor wiring details.
4. Replace the wiring cover on the back of the thermostat, ensuring the temperature probe is routed through the hole in the centre of the cover. Secure it with both screws, taking care not to over-tighten the screws.
5. Reconnect the electrical supply to the thermostat
6. Follow steps 1-4 outlined in Section A.1.2.
7. Check for correct operation.

! WARNING !

Ensure the electrical supply to the thermostat has been isolated before removing the wiring cover.

Ensure the wiring cover has been replaced before reconnecting the electrical supply to the thermostat.

A.1.5 DISPLAY SCREEN

During normal operation, the display screen will show the temperature of the contents of the cylinder.

When the temperature of the contents of the hot water cylinder is below the target temperature set by the thermostat, a small flame icon will appear in the top left hand corner of the display screen approximately 10 seconds after the status of the indicator LED changes. See Figure A-1.

If the "Fail Safe" function operates (refer to Section A.1.2), a warning triangle will appear in the bottom left hand corner of the display screen approximately 10 seconds after the status of the indicator LED changes. See Figure A-1.

A.1.6 INDICATOR LED STATUS

The thermostat is equipped with an LED to the lower left of the display screen (see Figure A-1).

This LED indicates the operating status of the thermostat, as follows:

- Solid Green - if the LED is emitting a solid green light, this indicates that the temperature of the water inside the cylinder has reached its target temperature and the thermostat is no longer "calling" for heat.
- Flashing Green at a rate of 1 flash per second - if the LED is flashing green at an approximate rate of 1 flash per second, this indicates that the temperature of the water inside the cylinder is below the target temperature set by the thermostat, and that the thermostat is "calling" for heat.
- Solid Red - if the LED is emitting a solid red light, this indicates that the "Fail Safe" function has operated. Refer to Section A.1.2 for further details.

A.2 THERMOSTAT INSTALLATION AND OPERATION

! WARNING !

The Digital Dual Thermostat supplied with all Grant QR pre-plumbed cylinders is not suitable for use with a Y-plan type control system using a Honeywell V4073A mid-position zone valve (or similar).

A.2.1 INSTALLATION

To install the thermostat:

1. Ensure the mains power supply to the thermostat and the other heating system controls are switched OFF.
2. Remove the two screws securing the wiring cover to the back of the thermostat (see Figure A-1) and carefully remove the wiring cover.
3. Ensure that the temperature sensor is correctly connected to the thermostat. Refer to Figure A-3 for temperature sensor wiring details.
4. Connect the thermostat to the heating system controls by following the guidance outlined in Section 5 of these instructions.
5. Replace the wiring cover on the back of the thermostat, ensuring the temperature probe is routed through the hole in the centre of the cover. Secure it with both screws, taking care not to over-tighten the screws.
6. Reconnect the electrical supply to the thermostat and other heating system controls.

! WARNING !

Ensure the electrical supply to the heating system controls has been isolated before making the connections to the Digital Thermostat.

Ensure the wiring cover has been replaced before reconnecting the electrical supply to the thermostat.

7. Insert the temperature probe into the dedicated Dual Stat pocket on the body of the cylinder (refer to item 5 in Figures 2-6 to 2-10, as appropriate).
8. Tighten the clamp screws on the rear of the thermostat onto the dual stat pocket.

! CAUTION !

Take care not to over-tighten the clamp screws.

A.2.2 OPERATION

After the thermostat has been installed, as described in Section A.2.1, set the thermostat as follows:

1. With the thermostat installed, in position and with the electrical supply to the thermostat switched on, use the temperature control dial (see Figure A-1) to adjust the domestic hot water target temperature.
   - Turn the dial clockwise to increase the target temperature and anti-clockwise to decrease the target temperature.
   - Grant UK recommend that the cylinder target temperature be set to 60°C.
2. When the target temperature has been set, leave the thermostat for approximately 10 seconds and the current temperature of the cylinder contents will be displayed on-screen.
3. Leave these instructions with the end user for future reference.

! NOTE !

Upon first use it will be necessary to reset the thermostat.

To do this, please refer to steps 1-3 outlined in Section A.1.2.

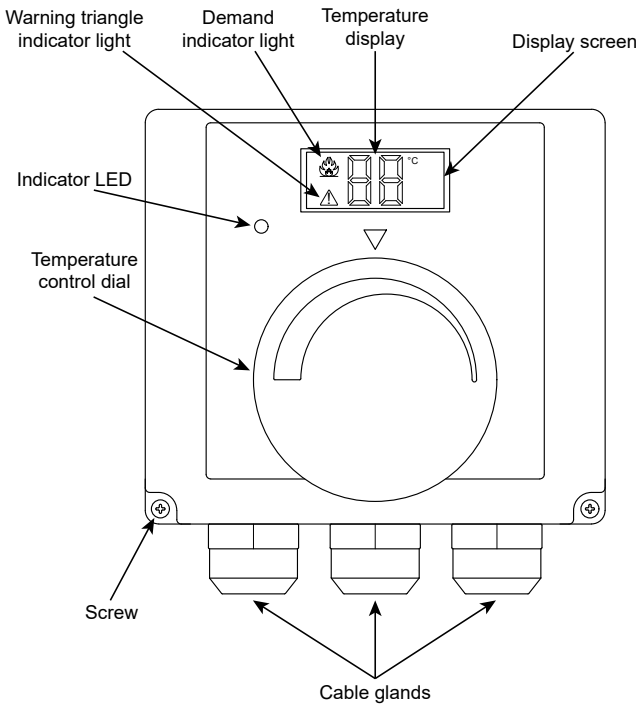


Figure A-1: Digital Dual Thermostat - Front View
Temperature control dial present

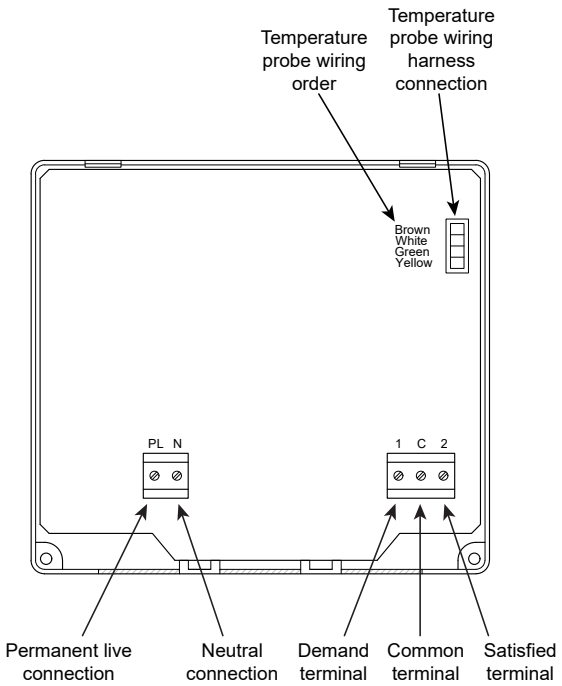


Figure A-3: Digital Dual Thermostat - Rear View
Wiring cover and cable glands removed

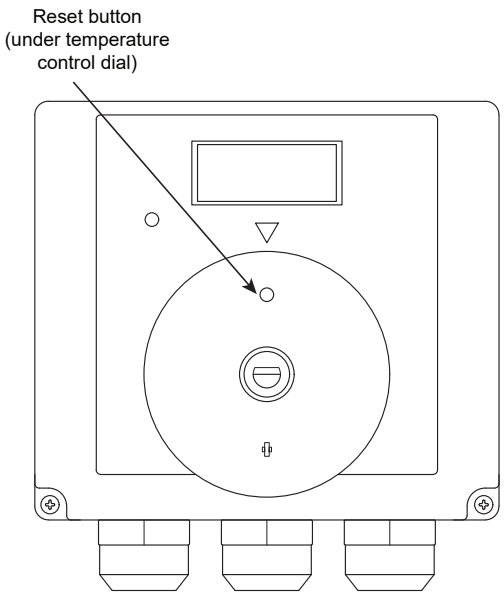


Figure A-2: Digital Dual Thermostat - Front View
Temperature control dial removed

APPENDIX B GREENBROOK T205-C FUSED TIMER SPUR SWITCH

B.1 GENERAL INFORMATION

Grant QR pre-plumbed indirect heat pump cylinders are supplied with a Greenbrook T205-C timer factory fitted, to control the operation of the immersion heater for anti-legionella purposes.

Please refer to Grant UK DOC 0136 for detailed information on anti-legionella regimes.

Please refer to Section B.3 and Section 5 of these instructions for wiring details.

B.1.1 TECHNICAL INFORMATION

Make and model	Greenbrook - T205-C
Display	LCD
Working voltage	230V - 50Hz
Rated impulse voltage	2500V
Operating temperature	-5°C to +40°C
Operation	Integrated control
Max load: Resistive Inductive	 13 Amps 6 Amps
Isolation switch	Double pole isolation
Conforms to	BS 1363-4:1995+A4:2012, BS EN 60730-1:2011, BS EN 60730-2-7:2010.
Working environment	Indoor use only
Pollution degree	2

B.2 OPERATING INSTRUCTIONS

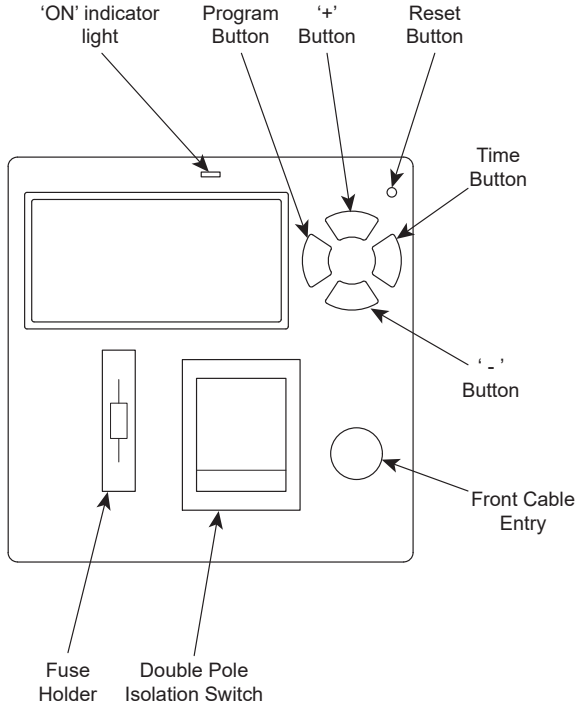


Figure B-1: Greenbrook T205-C Fused Timer Spur Switch

B.2.1 RESET THE DEVICE

1. To fully reset this unit press the recessed 'Reset' button with an insulated probe (see Figure B-1).
2. A full display will show when the battery is charged, then revert to the default screen (- - : - -). No display indicates that the battery requires charging for a minimum 3 hour period. See Figure B-2 for a representation of the screen's "full display".

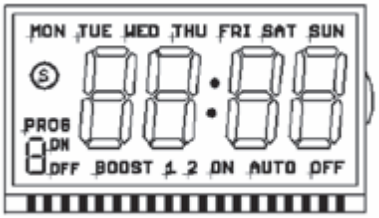


Figure B-2: Full display

B.2.2 SETTING THE DAY OF WEEK AND TIME

! NOTE !

Time setting is 24 hour mode.

1. Press the 'Time' button for 2 seconds. (See Figure B-1). The day of the week will start flashing (see Figure B-3).

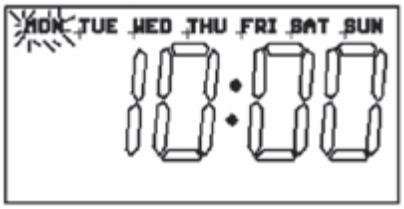


Figure B-3: Setting day of the week

2. Use the '+' or '-' button to change the display to the correct day of the week.
3. Press the 'Time' button (see Figure B-1) and the hour digits will flash (see Figure B-4).

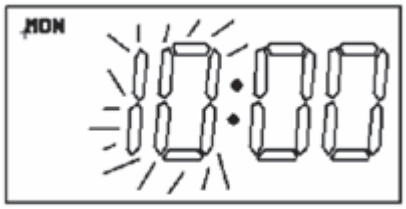


Figure B-4: Setting time of day (hours)

4. Use the '+' or '-' buttons to set the hours.
5. Press the 'Time' button (see Figure B-1) and the minutes will flash (see Figure B-5).

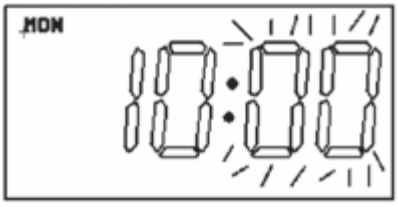


Figure B-5: Setting time of day (minutes)

6. Use the '+' or '-' buttons to set the minutes.
7. Press the 'Time' button to save the setting and return to operating mode.

! NOTE !

If '+' or '-' button is held for more than 2 seconds, the selected time digit will add or decrease quickly (about 5 steps per second), if no key is pressed within 60 seconds the display will return to operating mode.

B.2.3 PROGRAMMING THE ‘ON’/’OFF’ TIMES

! NOTE !

Time setting is 24 hour mode.

1. Refer to Figure B-1. Press the ‘Programme’ button and hold for 2 seconds. The display will represent Figure B-6 (showing 7-day type operation).

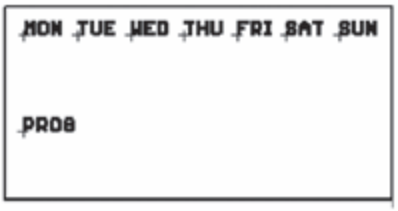


Figure B-6: Setting ‘ON’ / ‘OFF’ times

! NOTE !

Only ONE of the following options can be used at one time.

2. Use the ‘+’ or ‘-’ button to change the day grouping (PROG) at the top of the display. This will step through the following programming options:
   - 7 DAY - MON TUES WED THU FRI SAT SUN

     All of them have the same programming.

     OR
   - 5 DAY - MON TUES WED THU FRI

     Are grouped as one group, and they will have the same programming. SAT and SUN will be programmed individually.

     OR
   - INDIVIDUAL DAY -

     Each day will have its program set individually. MON followed automatically in programming by each of the other days. To copy times set for an individual day to another day (e.g. copy Sat set times to Sun), please see PROGRAM DUPLICATION below.
3. Once the desired day grouping is selected, press ‘PROG’ button to move onto programming ON/OFF times. Display will show PRoG 1 ON, and the hour digits flashing (24 hour clock). Refer to Figure B-7.

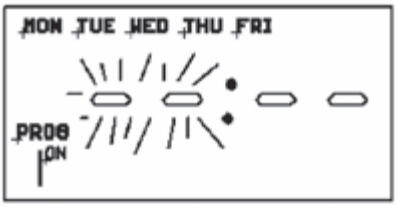


Figure B-7: Setting ‘ON’ / ‘OFF’ times (5 + 1 + 1 day operation)

4. Use the ‘+’ or ‘-’ buttons to set the hours and the ‘PROG’ button to change between hours and minutes. Followed by ‘+’ or ‘-’ again to set the minutes. Press ‘PROG’ to change the programme off times. Refer to Figure B-8.

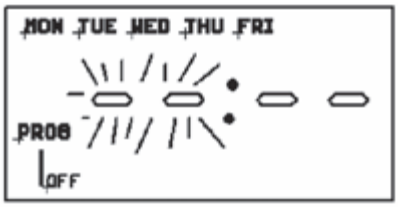


Figure B-8: Setting ‘ON’ / ‘OFF’ times (Monday to Friday)

5. Use the ‘+’ or ‘-’ buttons to set the OFF times in the same way as for PROG 1 ON time.
6. Press ‘PROG’ to scroll through program 2 ON, program 2 OFF, program 3 ON, program 3 OFF, program 4 ON, program 4 OFF, adding in times as required. If you wish to omit programmes just leave dashes in that ON/OFF location. Press ‘PROG’ to move to the next linked day (SAT follows the 5 day group automatically). Refer to Figure B-9.

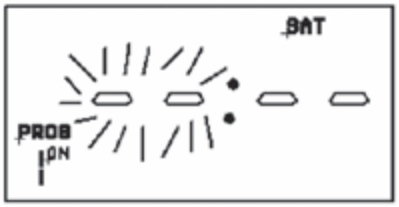


Figure B-9: Setting ‘ON’ / ‘OFF’ times (Saturday)

7. Set ON/OFF times as before. Press ‘PROG’ to move to the next linked day (SUN follows the SAT automatically). Refer to Figure B-10.

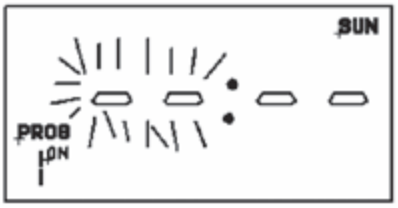


Figure B-10: Setting ‘ON’ / ‘OFF’ times (Sunday)

8. Sett ON/OFF times as before.
9. Once program 4 OFF has been set, press ‘PROG’ to exit program mode and return to operating mode.

B.2.4 PROGRAM DUPLICATION

There are two copy functions: copy one day to another, or copy one day to all other days. When programming for ‘Individual Day’ or ‘5 Day’ you can copy the programmed data from one day to another day.

1. When setting ON time of ‘PROG’ 1, press ‘TIME’ button and then use ‘+’ or ‘-’ to select the day you want to copy.
2. Press ‘TIME’ button twice to copy the data of the selected day to current day. Or press ‘TIME’ button for 2 seconds to copy the data of the selected day to the following days.

   When the ON/OFF times for WED are set, the display will show ‘THU’. Refer to Figure B-11.

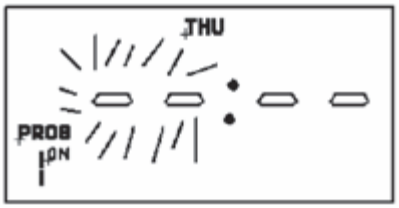


Figure B-11: Duplicating program

3. Press ‘TIME’ button then the icon ‘MON’ will be flashing. Refer to Figure B-12.

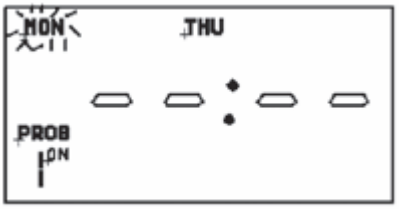


Figure B-12: Duplicating program

4. Use '+' or '-' button to select 'TUE', then press 'TIME' button twice to copy the data. The display will represent Figure B-13.

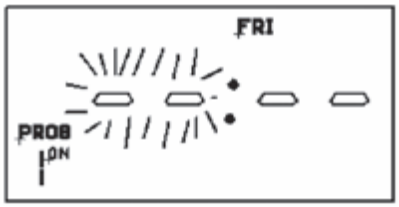


Figure B-13: Duplicating program

B.2.5 MODIFYING OR ADDING NEW PROGRAMMES

1. Press 'PROG' button and hold for approx 2 seconds, the display will represent Figure B-14.

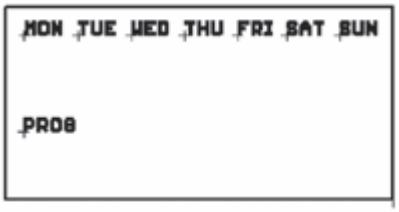


Figure B-14: Modifying or adding new programmes

2. Use '+' or '-' button to select the day grouping which requires modifying or a new day grouping for a new programme.
3. For modification press 'PROG' repeatedly to arrive at the programme time requiring modification then use '+' or '-' button to make the change. Press 'PROG' repeatedly again to arrive at the next time requiring modification and use '+' or '-' button to make the change.

B.2.6 OPERATING MODE

! NOTE !

Operating mode needs to be set to allow programmed times to function.

Advance to next program

1. Use '+' button to set the output mode.

   ON - Output to permanently ON and omit the program. Refer to Figure B-15.

   OFF - Output to permanently OFF and omit the program. Refer to Figure B-16.

   ON AUTO - Output to ON until next program OFF period. Refer to Figure B-17.

   OFF AUTO - Output to OFF until next program ON period. Refer to Figure B-18.

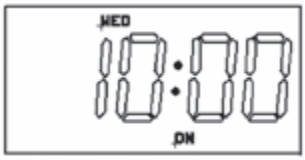


Figure B-15: ON

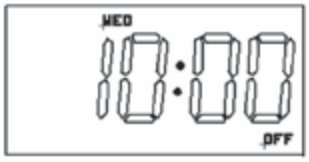


Figure B-16: OFF

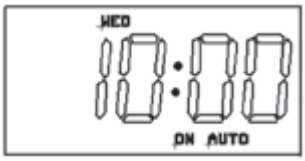


Figure B-17: AUTO ON

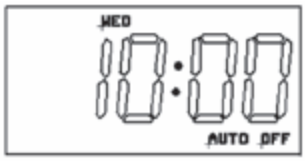


Figure B-18: AUTO OFF

B.2.7 ONE AND TWO HOUR BOOST

1. Press '-' (boost) once in normal operating mode turns on for 1 hour period. Refer to Figure B-19.

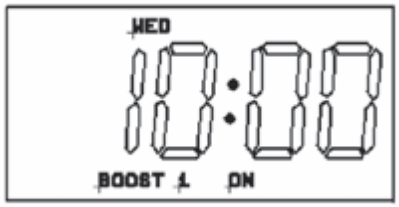


Figure B-19: One hour boost ON

2. Pressing '-' (Boost) twice in normal operating mode turns on for 2 hour period. Refer to Figure B-20.

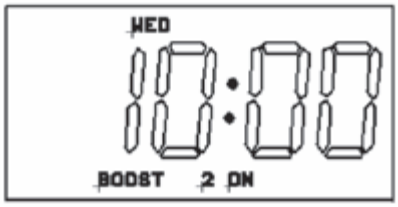


Figure B-20: Two hour boost ON

3. Pressing '-' (Boost) three times cancels the Boost ON period. Refer to Figure B-21.

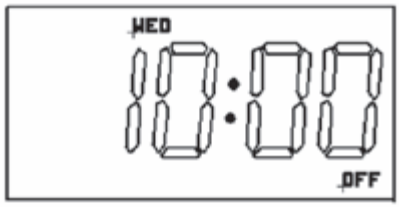


Figure B-21: Boost OFF

B.2.8 SUMMER MODE

1. In operating mode, pressing the 'PROG' and 'TIME' (combination of buttons) to set the summer mode. The clock will forward on one hour. Refer to Figure B-22.

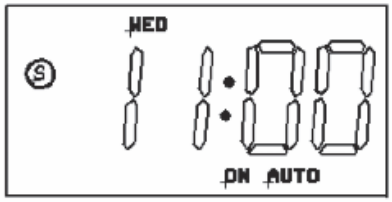


Figure B-22: Summer mode

B.3 WIRING DIAGRAM

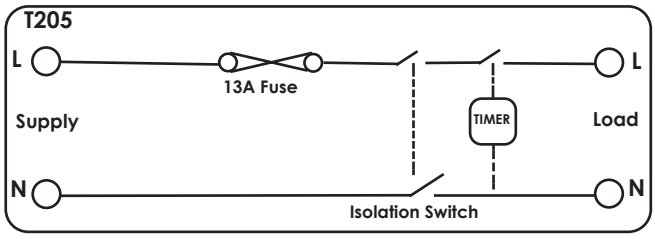


Figure B-23: Greenbrook T205-C internal wiring diagram

APPENDIX C INSTALLATION, COMMISSIONING AND SERVICE RECORD LOG BOOK

Customer Details	
Customer Name	
Customer Address	
TEL No.	

! NOTE !

1. **This Log Book is only for use in Great Britain.**
2. **Please, keep the Log Book in a safe place for future reference.**
3. **This Log Book is to be completed in full by the competent person(s) who commissioned the equipment and then handed to the customer. When this is done, the Log Book is a commissioning certificate that can be accepted as evidence of compliance with the appropriate Building Regulations.**
4. **Failure to install and commission this appliance to the manufacturer's instructions may invalidate the guarantee (refer to Section 13 - Guarantee).**

Installer & Commissioning Engineer Details			
Company Name		Date	
Company Address			
Installer Name		TEL No.	
Registration Details			
Registered operative ID card NO. (if applicable)			

Commissioning Engineer Details (if different)			
Company Name		Date	
Company Address			
Installer Name		TEL No.	
Registration Details			
Registered operative ID card NO. (if applicable)			

! NOTE !

IT IS THE RESPONSIBILITY OF THE INSTALLER TO COMPLETE THIS LOGBOOK AND PASS IT ON TO THE CUSTOMER, FAILURE TO DO SO MAY INVALIDATE THE CYLINDER GUARANTEE.

Appliance and Time Control Details

Manufacturer	**GRANT UK**	Model	
Capacity	Litres	Serial No.	
Type	**Unvented**		
Time Control	Programmer ☐ or Time Switch ☐		

COMMISSIONING PROCEDURE INFORMATION

Heat Source Primary Settings (indirect heating only)

Is the primary a sealed or open vented system? Sealed ☐ Open ☐

What is the primary heat source flow temperature? _____ °C

Incoming Water Supply Information

What is the incoming static cold water pressure at the inlet to the pressure reducing valve? _____ Bar

Has strainer (if fitted) been cleaned of installation debris? YES ☐ NO ☐

Has a water scale reducer been fitted? YES ☐ NO ☐

What type of scale reducer has been fitted?

Hot Water Cylinder Information

Are combined temperature and pressure relief valve and expansion valve fitted and discharge tested? YES ☐ NO ☐

Is primary energy source cut out fitted (normally 2-Port valve)? YES ☐ NO ☐

What is the pressure reducing valve setting (if fitted)? _____ Bar

Where is operating pressure reducing valve situated?

Has the expansion vessel or internal air space been checked? YES ☐ NO ☐

What is the hot water temperature at the nearest outlet? _____ °C

Hot Water System Information

Does the hot water system comply with the appropriate Building Regulations? YES ☐

Has the system been installed and commissioned in accordance with the manufacturer's instructions? YES ☐

Have you demonstrated the operation of the system controls to the customer? YES ☐

Have you left all the Manufacturer's literature with the customer? YES ☐

Competent Person's Signature		Customer's Signature (To confirm demonstrations of equipment and receipt of appliance instructions)	

SERVICE INTERVAL RECORD

It is recommended that your hot water system is serviced regularly and that your service engineer completed the appropriate Service Interval Record below.

! NOTE !

SERVICE PROVIDER

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions and in compliance with all relevant codes of practice.

Service 1	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

Service 2	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

Service 3	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

Service 4	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

Service 5	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

Service 6	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

Service 7	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

Service 8	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

Service 9	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

Service 10	Date:
	Engineer name:
	Company name:
	TEL No.
	Comments
	Signature

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