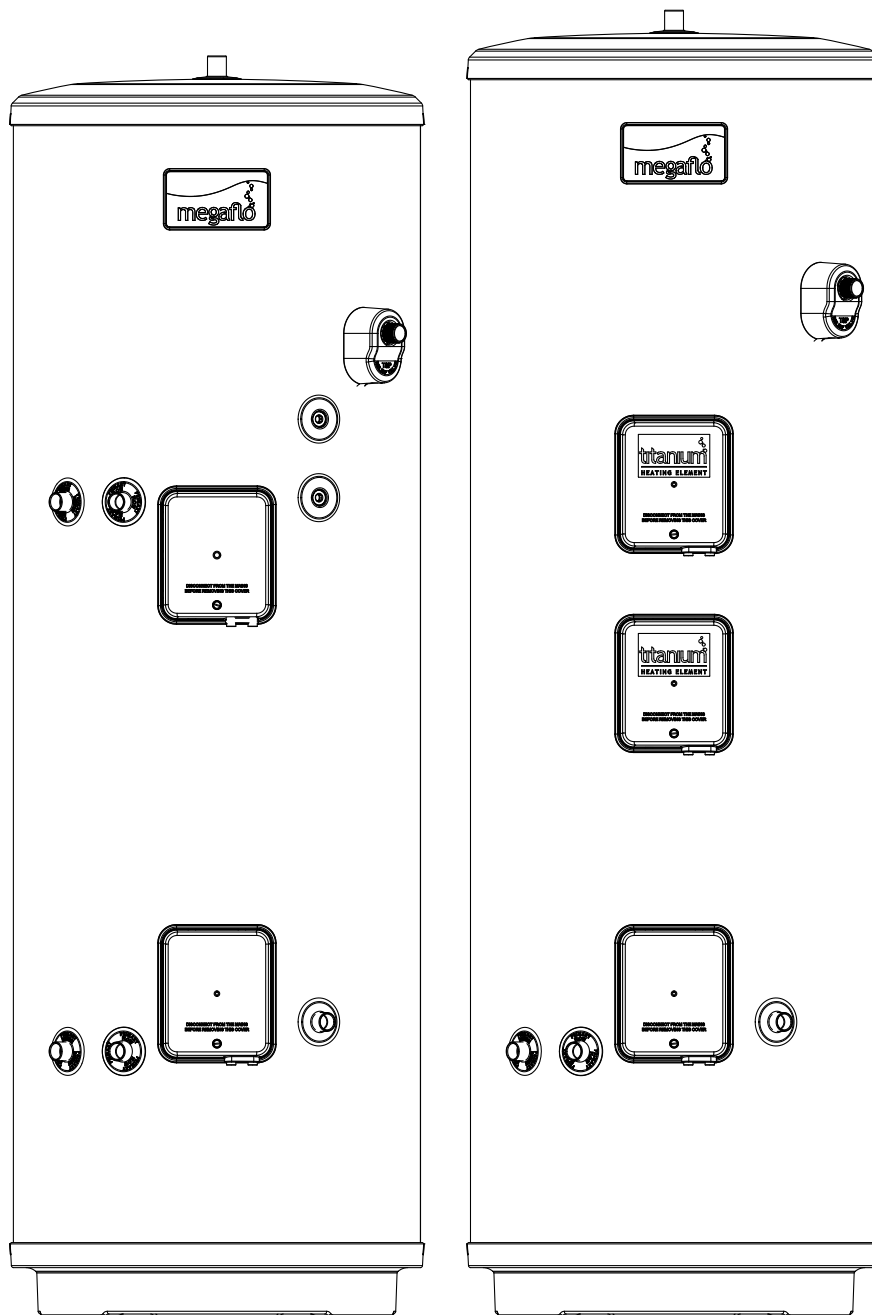




MegaFlo Eco

Unvented Direct & Indirect Solar Hot Water Cylinders



Important

Please read & understand all these instructions before commencing installation.
Please leave this manual with the customer for future reference

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Benchmark™ places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations and relevant electrical qualifications. The Benchmark™ Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference. Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark™ Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the Scheme. Visit www.centralheating.co.uk for more information. IMPORTANT NOTE TO USER: PLEASE REFER TO THE COMMISSIONING SECTION, PAGE 23 FOR IMPORTANT INFORMATION WITH RESPECT TO THE BENCHMARK SCHEME

1. Introduction

1.1 General

The following instructions are offered as a guide to the user and installer.

The installation must be carried out by a competent plumbing and electrical installer in accordance with Building Regulation G3 (England and Wales), Technical Standard P3 (Scotland) or Building Regulation P5 (Northern Ireland) and the Water Fitting Regulations (England and Wales) or Water Byelaws (Scotland).

1.2 Symbols used

In these instructions, various risk levels are employed to draw the user's attention to particular information. In doing so we wish to safeguard the user, avoid hazards and guarantee the correct operation of the appliance.



DANGER

Risk of a dangerous situation causing serious physical injury.



WARNING

Risk of dangerous situation causing slight physical injury.



CAUTION

Risk of material damage.



Signals important information.

1.3 Abbreviations

- ▶ T&P - Temperature & Pressure relief valve
- ▶ PRV - Pressure Reducing Valve
- ▶ Prv - Pressure relief valve

1.4 Liabilities

Manufacturers liability

Our products are manufactured in compliance with the requirements of the various applicable European Directives.

This appliance complies with the requirements of the CE marking directive.

In the interest of UK customers, we are continuously endeavouring to make improvements in product quality. All the specifications stated in this document are therefore subject to change without notice.

Our liability as the manufacturer may not be invoked in the following cases:

- ▶ Failure to abide by the instructions on using the appliance.
- ▶ Faulty or insufficient maintenance of the appliance.
- ▶ Failure to abide by the instructions on installing the product.

Installer's liability

The installer is responsible for the installation and the commissioning of the appliance. The installer must respect the following instructions:

- ▶ Read and follow the instructions given in the manuals provided with the appliance.
- ▶ Carry out installation in compliance with the prevailing legislation and standards.
- ▶ Perform the initial start up and carry out any checks necessary.
- ▶ Complete the commissioning checklist.
- ▶ Explain the installation to the user.
- ▶ If maintenance is necessary, warn the user of the obligation to check the appliance and maintain it in good working order.
- ▶ Give all the instruction manuals to the user.

Users liability

To guarantee optimum operation of the appliance, the user must respect the following instructions:

- ▶ Read and follow the instructions given in the manuals provided with the appliance.
- ▶ Call on qualified professionals to carry out installation and initial start up.
- ▶ Get your fitter to explain your installation to you.
- ▶ Have your required checks and services done.
- ▶ Keep the instruction manuals in good condition and close to the appliance.



This appliance can be used by children aged from 8 years and above and persons with reduced physical sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

Children must be supervised to ensure they do not play with the appliance.



- Water may drip from the discharge pipe of the pressure-relief device and this pipe must be left open to the atmosphere; (see page 12 for more details)

-the pressure-relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked; (see page 12 for more details)

- How hot water can be drained. (see page 25 for more details)

- The type or characteristics of the pressure-relief device and how to connect it; (see Figure 1 for details and Figure 19, page 29 for exploded view)

- A discharge pipe connected to the pressure-relief device is to be installed in a continuously downward direction and in frost free environment; (see page 17 for details)

Details on how to set the temperature controls for both immersion heaters and boiler controls can be found in section "Installation Instructions, page 19.

2. Safety

2.1 General safety warnings



DANGER

This cylinder is unvented and as such becomes pressurised when in operation. The combination of pressurisation and hot water could lead to serious physical injury if the safety instructions in this manual are not adhered to.



WARNING

- ▶ Only competent persons having received adequate training are permitted to work on the appliance and the installation.
- ▶ Do not tamper with any of the safety valves or controls supplied with the cylinder.
- ▶ Before any work, switch off the mains supply to the appliance.
- ▶ Do not switch on if there is a possibility that the water in the cylinder is frozen.



CAUTION

Do not operate immersion heaters until the cylinder has been filled with water.



WARNING

When handling the unit, take appropriate precautions for the weight of the unit. Weights can be found in section 3, Tables 1&2, pages 5&6.



CAUTION

Annual maintenance is recommended by a competent person.



WARNING TO USER

- ▶ If water discharges from the temperature/pressure relief valve on the cylinder shut down the boiler. Do not turn off any water supply. Contact a competent installer for unvented water heaters to check the system.
- ▶ Do not tamper with any of the safety valves fitted to the system. If a fault is suspected contact a competent installer.
- ▶ DO NOT bypass the thermal cut-out(s) in any circumstances.

3. Technical specifications

Table 1: Technical data - Indirect Cylinders

	170sd	210sdd	260sdd	300sdd	190si	210si	250si	300si
Max direct kW rating	3	6	6	6	3	3	3	3
Immersion heat up times (Btm immersion, 3kW)	86	137	179	210	114	108	131	164
Immersion heat up times (Top immersion, 3 kW)	N/A	63	111	108	N/A	N/A	N/A	N/A
Immersion heat up times (Both immersions, 6kW)	N/A	63	85	99	N/A	N/A	N/A	N/A
Aux coil surface area (m ²)	N/A				0.61	0.68	0.73	0.79
Solar coil surface area (m ²)	1.1							
Auxiliary Coil heat up times	15l/min	N/A			20.6	21.0	25.2	25.9
	30l/min	N/A			16.1	16.2	19.8	19.6
	45l/min	N/A			14.8	14.3	19.5	17.8
Auxiliary Coil rating (kW) ²	15l/min	N/A			19.7	19.7	20.7	22.2
	30l/min	N/A			26.1	25.2	26.5	29.1
	45l/min	N/A			28.1	28.6	28.8	32.6
Pressure drop through Auxiliary coil	15l/min	N/A			0.004 MPa (0.04 bar)			
	30l/min	N/A			0.014 MPa (0.14 bar)			
	45l/min	N/A			0.030 MPa (0.30 bar)			
Solar coil heat up time ⁴	25.7	29.0	37.1	40.9	29.9	28.5	34.6	41.8
Solar coil rating (kW) ⁴	21.2	22.5	22.0	22.8	20.4	22.6	22.6	23.2
Solar coil pressure drop (@15l/min)	0.001 MPa (0.01 bar)							
Heat loss (kWh/24hrs)	1.25	1.41	1.63	1.84	1.32	1.41	1.56	1.84
Hot water capacity (volume to >40°C)	166	209	260	291	191	202	248	300
Weight empty (kg)	46.2	52.5	60.7	65.3	57.3	59.9	69.1	75.4
Weight full (kg) ¹	215	263	320	368	246	266	312	369
Volume (Litres) ¹	169	210	259	303	189	206	243	294
Dedicated solar volume (Litres)	83.0	96.5	91.4	93.1	57.9	69.0	83.4	118.0
Max mains pressure	1.6MPa (16 bar)							
Max design pressure	0.8MPa (8 bar)							
Operating pressure/PRV set pressure	0.3MPa (3 bar)							
Max primary (solar) coil pressure	1.0MPa (10 bar)							
Max auxiliary coil pressure ³	1.0MPa (10 bar)							
Expansion relief valve setting	0.8MPa (8 bar)							
T&P valve setting	1.0MPa (10 bar)/90°C							
T&P Part number	95 605 810							
Immersion heater electrical rating	3.0kW@240V/2.8kW@230V ~							

Notes:

1: at 3 bar water inlet pressure

2: at 80°C - +/- 2°C

3: Although the auxiliary coil pressure rating is 1.0MPa (10bar) the 2 port zone valve and coil compression nuts supplied with the cylinder is only rated 0.86MPa (8.6 bar). If the cylinder is to be plumbed into a system delivering 1.0MPa (10 bar) a suitable 2 port zone valve and the coil compression nuts will have to be sourced.

4: at 80°C/15l/min

5: Tested to EN 12897:2006

6: Heating times using the solar primary circuit will depend on the amount of solar radiation, sunshine hours, collector panel type, size and orientation so will be variable.

Direct				
Supplier's name or trade mark	Megaflo Eco Solar			
Supplier's model identifier	170SDD	210SDD	260SDD	300SDD
Storage volume V in litres	170.0	210.0	260.0	300.0
Mixed water at 40 °C V40 in litres	213.0	208.0	271.0	309.3
The declared load profile	L	XL	XL	XL
The water heating energy efficiency class of the model	C	C	C	C
The water heating energy efficiency in %	38.6	38.6	38.3	38.2
The annual electricity consumption in kWh	2654	4338	4377	4386
Daily fuel consumption Q _{fuel} in kWh	12.200	19.960	20.190	20.240
The thermostat temperature settings of the water heater, as placed on the market by the supplier	60°C			
Specific precautions that shall be taken when the water heater is assembled, installed or maintained and disposed of at end of life	See page 5 to 31			

Indirect				
Model(s)	190Si	210Si	250Si	300Si
Energy efficiency class	C	C	C	C
Standing loss in W	65.0	72.0	80.0	88.0
Storage volume V in litres	190.0	210.0	250.0	300.0

Table 2: Technical parameters in accordance with European Commission regulations 814/2013 and 812/2013

Outer casing

White pre-coated corrosion protected steel body shell. Polypropylene top and base mouldings. ABS electrical controls housings and enclosures.

Water container

Duplex stainless steel. 100% pressure tested to 1.6MPa (16 bar)

Connections

Stainless steel grade 1.4404 (316 L)

Pipe connections accept 22mm outside diameter pipe (compression nuts and olives supplied). Thread rate is 3/4" BSP parallel to accept standard 3/4" BSP female fittings if required

Thermal insulation

CFC/HCFC free fire retardant expanded polyurethane foam with zero ozone depletion potential. It has a Global Warming Potential (GWP) of 3.1

Safety Features

Direct models: Manually resettable thermal cut-out on each immersion heater. Factory fitted T&P Relief Valve

Indirect models: Manually resettable thermal cut-out on immersion heater. Manually resettable thermal cut-out for primary heating - must be wired in conjunction with 2 port motorised valve supplied. Factory fitted T&P Relief Valve

Size	DIMENSIONS (mm)						
	A	B	C	D	E	F	G
170sd	1229	N/A	794	925	N/A	N/A	N/A
210sdd	1489	1103	829	1184	N/A	N/A	N/A
260sdd	1802	1167	888	1441	N/A	N/A	N/A
300sdd	2053	1444	983	1693	N/A	N/A	N/A
190si	1387	N/A	814	1020	925	735	825
210si	1489	N/A	949	1184	1095	1039	995
250si	1738	N/A	1068	1378	1258	1142	1156
300si	2053	N/A	1255	1693	1573	1438	1473

Table 3: Dimensions (see Figs. 1 and 2 for details)

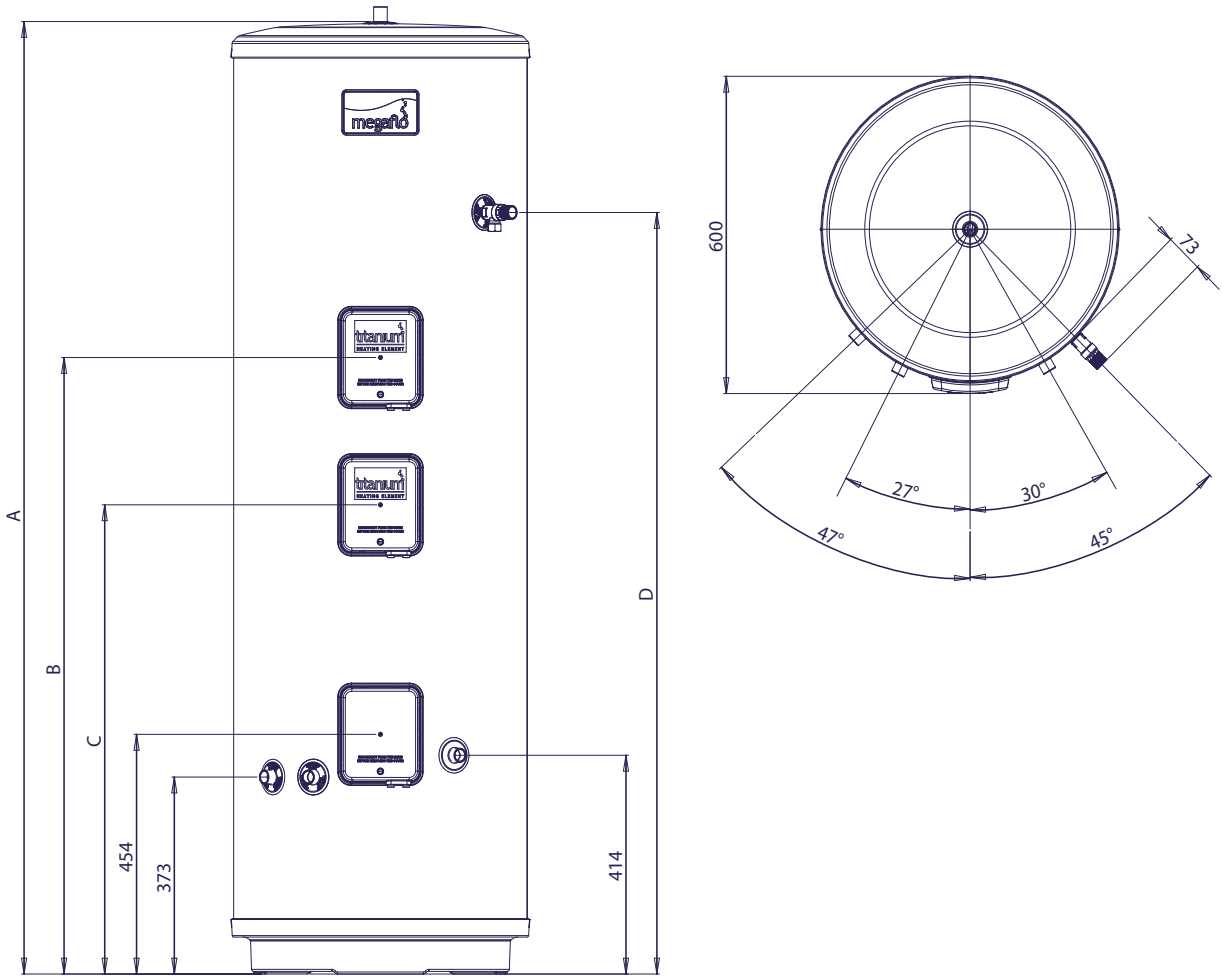


Figure 1: General dimensions - Solar direct models

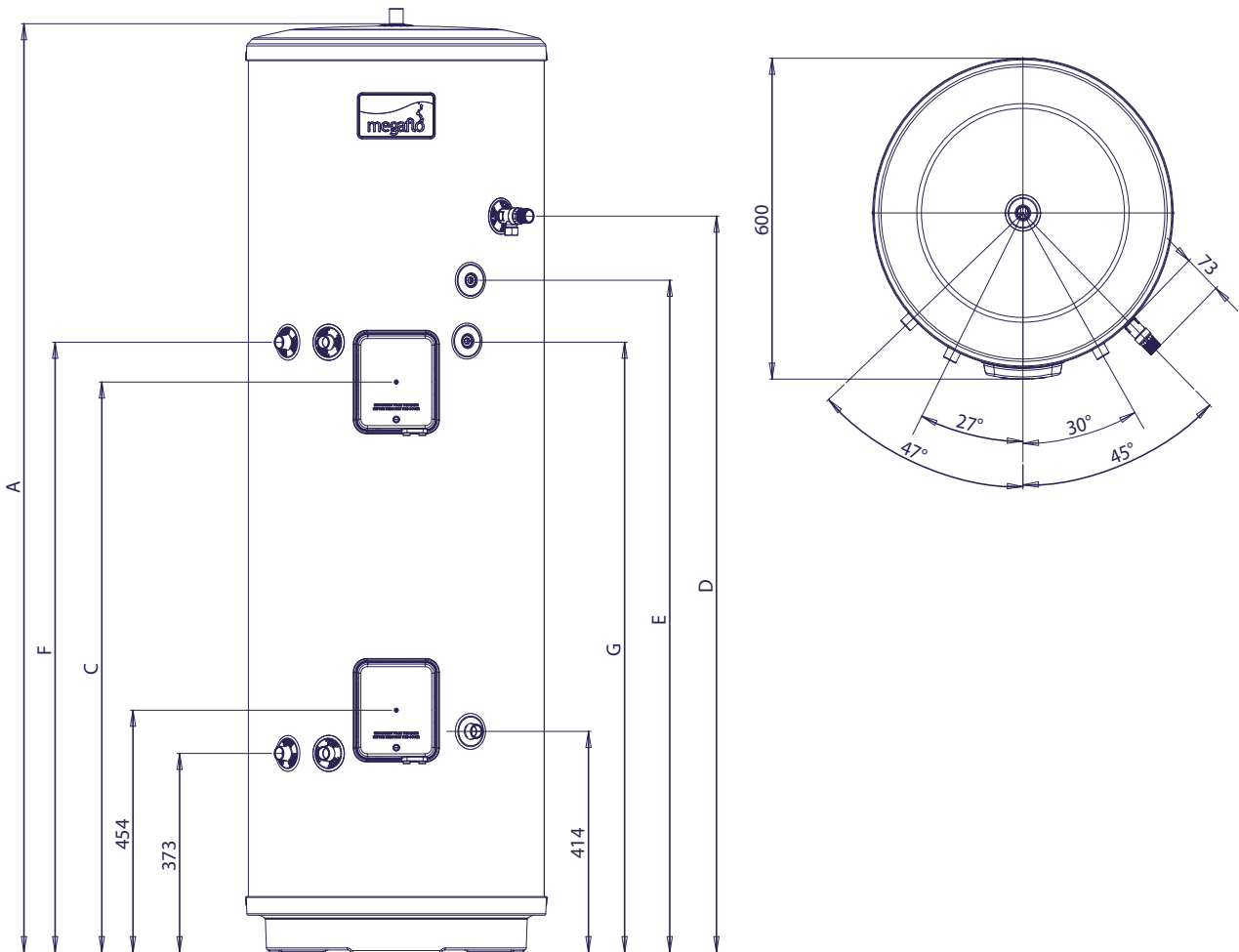


Figure 2: General dimensions - Solar indirect models

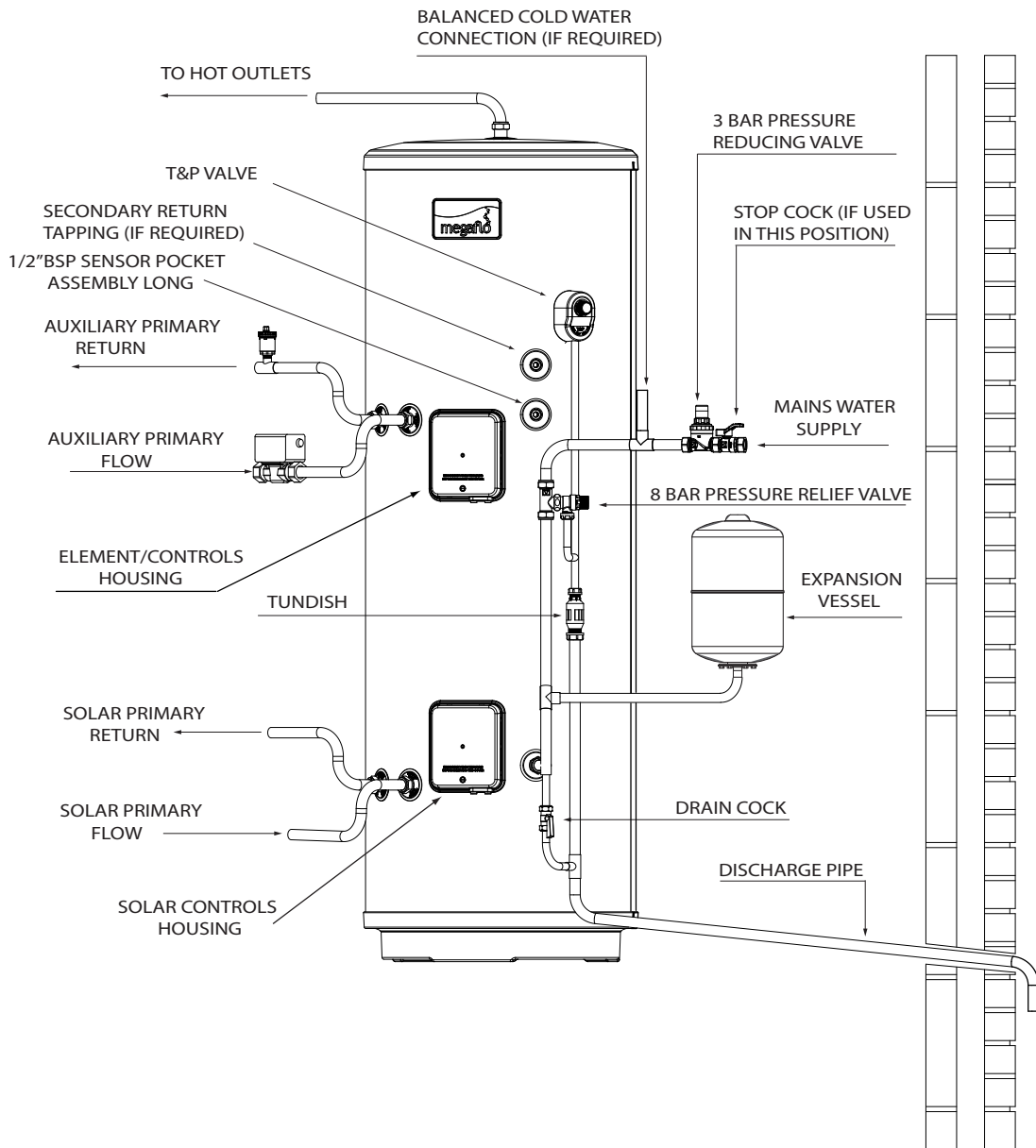


Figure 3: Schematic installation details

4. Description of the product

4.1 General description

This product is a purpose designed unvented water heater. The unit has a stainless steel inner vessel, which ensures an excellent standard of corrosion resistance. The outer casing is a combination of resilient thermoplastic mouldings and pre-painted corrosion proofed steel. All products are insulated with CFC free polyurethane foam to give good heat loss protection.

The unit is supplied complete with all the necessary safety and control devices needed to allow connection to the cold water mains. All these components are preset and should not be tampered with.

4.2 Operation principle

The unvented cylinder is used to heat and store hot water for use in domestic or light commercial applications.

Depending on the model the water can be heated directly using Immersion heater(s) or indirectly through a coil in the unit using an indirect heat source.

To provide pressure to the tap or shower an unvented unit uses the incoming mains water pressure. To do this the cylinder is sealed and not vented. However, when the volume of water is heated it expands and without any room for expansion could cause the cylinder to rupture and fail. The cylinder is supplied with an expansion vessel to accommodate this expanded water and must be fitted as per Figure 3, page 8.

4.3 Main components

See Figure 3 on page 8

4.4 Standard delivery

The delivery includes:

- ▶ Cylinder incorporating factory fitted immersion heater(s) and thermal controls and factory fitted Temperature and Pressure Relief Valve.
- ▶ Literature pack
 - ▶ Instructions (inc benchmark commissioning checklist & service record)
- ▶ Cold water control pack
 - ▶ Combination valve (inc pressure reducing valve, pressure relief valve, check valve and isolating valve)
- ▶ Tundish
- ▶ Expansion vessel

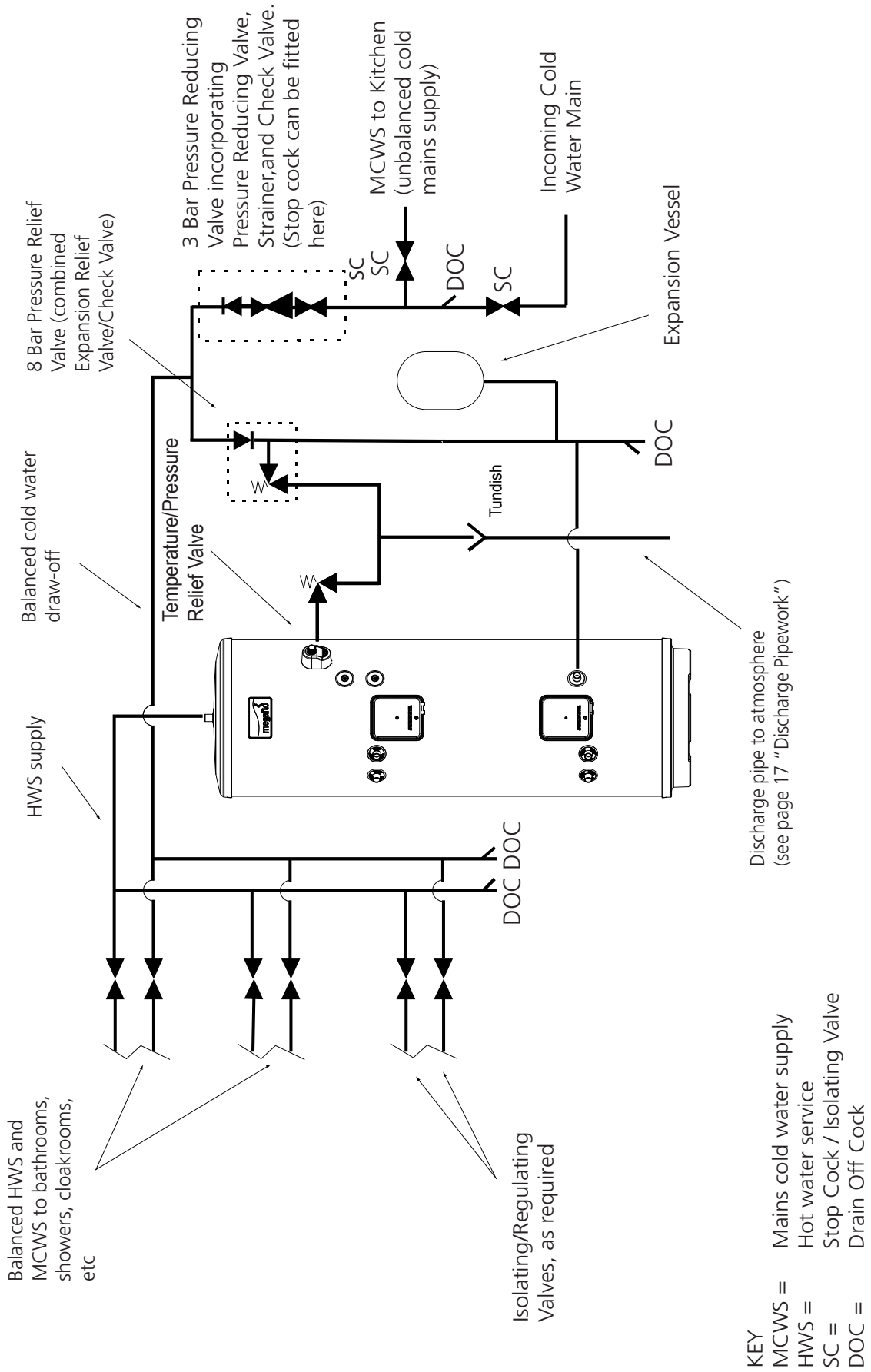
- ▶ 2 port zone valve (indirect only)
- ▶ Wiring centre (indirect only)
- ▶ T&P relief valve insulation set
- ▶ Drain valve

4.5 Storage and Handling

If the unit is to be stored before installation it must be placed upright on a secure, level surface and be in a dry, frost free environment. The support surface must be capable of supporting the packaged weight of the unit, the packaged weights are displayed on the carton label.

Please take care when handling a packaged cylinder. The units are heavy and must only be moved manually using safe working practices. The package weights of each unit are displayed on the carton label. Once removed the units can be lifted by screwing the lifting handle provided onto the outlet boss, but again take note of the unit weights when deciding on a safe lifting method. DO NOT use the factory fitted T&P relief valve to lift or manoeuvre the unit.

Figure 4: Typical system installation schematic (not to scale)



5. Before installation

5.1 Installation regulations



WARNING

Installation of the appliance must be carried out by a qualified engineer in accordance with prevailing and national regulations as listed below.

- ▶ Building Regulations G3
- ▶ The Building Standards (Scotland)
- ▶ The Building Regulations (Northern Ireland)
- ▶ I.E.E Electrical Regs
- ▶ UK Water Regulations

- ▶ Ascending spray type bidets or any other class 1 back syphonage risk requiring that a type A air gap be employed.
- ▶ Steam heating plants unless additional and appropriate safety devices are installed.
- ▶ Situations where maintenance is likely to be neglected or safety devices tampered with.
- ▶ Water supplies that have either inadequate pressure or where the supply may be intermittent.
- ▶ Situations where it is not possible to safely pipe away any discharge from the safety valves.
- ▶ In areas where the water consistently contains a high proportion of solids, e.g. suspended matter that could block the strainer, unless adequate filtration can be ensured.
- ▶ In areas where the water supply contains chloride levels that exceed 250mg/l.

5.2 Installation requirements

Water supply

In an unvented system the pressure and flowrate is directly related to the incoming water supply. For this reason it is recommended that the maximum water demand is assessed and the water supply checked to ensure this demand can be satisfactorily met.

- ▶ We suggest the minimum supply requirements should be 0.15MPa (1.5 bar) pressure and 20 litres per minute flow rate. However, at these values outlet flow rates may be poor if several outlets are used simultaneously.
- ▶ A 22mm cold water supply is recommended, however, if a smaller supply exists, which provides sufficient flow, this may be used (although more flow noise may be experienced).
- ▶ The higher the available pressure and flow rate the better the system performance.
- ▶ See tables 1 on page 5 for cylinder operating pressures. This is controlled by the cold water combination valve assembly.

Outlet/terminal fittings (taps, etc.)

- ▶ The cylinder can be used with most types of terminal fittings.
- ▶ Outlets situated higher than the cylinder will give outlet pressures lower than that at the heater, a 10m height difference will result in a 1 bar pressure reduction at the outlet.
- ▶ All fittings, pipe work and connections must have a rated pressure of at least 8 bar (dependant on cylinder being fitted) at 80°C.

Limitations

The cylinder should not be used in association with any of the following:

- ▶ Solid fuel boilers or any other boiler in which the energy input is not under effective thermostatic control, unless additional and appropriate safety measures are installed.

5.3 Choice of location

The cylinder must be vertically floor mounted. Although location is not critical, the following points should be considered:

- ▶ The cylinder should be sited to ensure minimum dead leg distances, particularly to the point of most frequent use.
- ▶ Avoid siting where extreme cold temperatures will be experienced. All exposed pipe work should be insulated.
- ▶ The discharge pipe work from the safety valves must have minimum fall of 1:200 from the unit and terminate in a safe and visible position.
- ▶ Access to associated controls and immersion heaters must be available for the servicing and maintenance of the system. Where these controls are installed against a wall a minimum distance of 250mm must be left (see Fig. 5 below).
- ▶ Note of the overall height of the unit in relation to the ceiling height and ensure that access and space is available for piping/connections to the outlet.
- ▶ Ensure that the floor area for the cylinder is level and capable of permanently supporting the weight when full of water (see Table 1, page 5 for weights).
- ▶ The tundish should be installed away from electrical components.

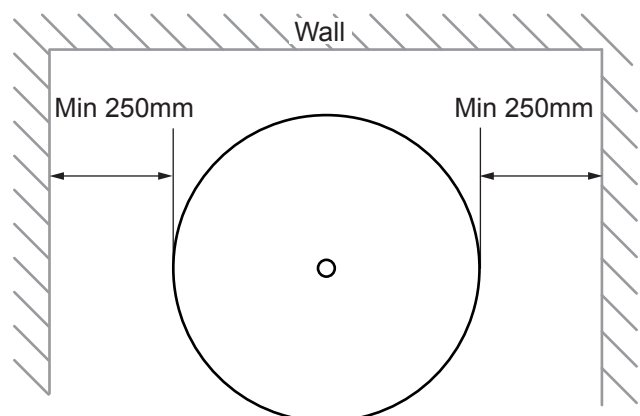


Figure 5: Siting the unit

6. Installation

6.1 General

After reading the previous sections in this booklet and choosing a good location for the unit please install, paying attention to the following hydraulic, electrical and commissioning sections.

Boiler selection (Indirect units only)

- ▶ The boiler should have a control thermostat and non self-resetting thermal cut-out and be compatible with unvented storage water heaters.
- ▶ Where use of a boiler without a thermal cut-out is unavoidable a "low head" open vented primary circuit should be used. The feed and expansion cistern head above the cylinder should not exceed 2.5m.
- ▶ Can be a sealed system or open vented type - maximum primary pressure 10 bar.
- ▶ The boiler cannot be vented through the cylinder.

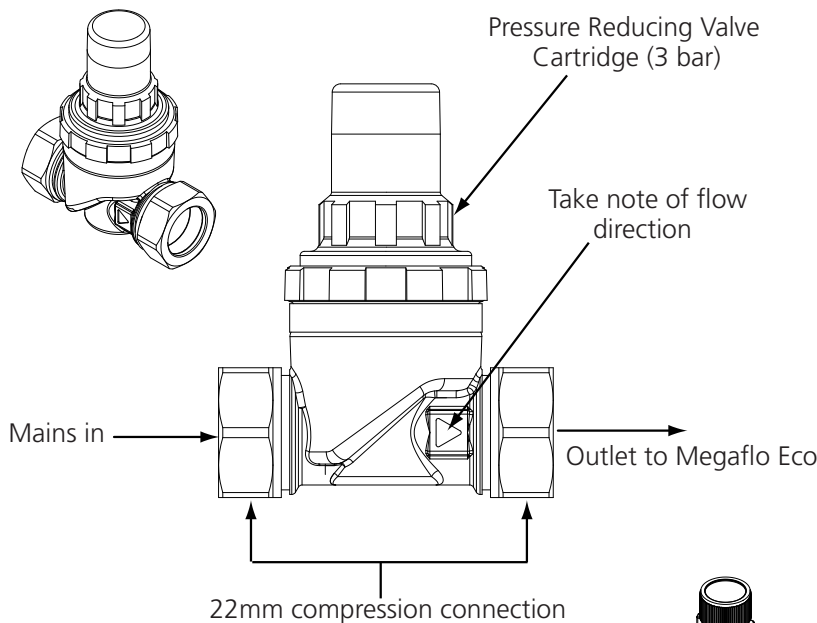


Figure 6: Pressure Reducing Valve

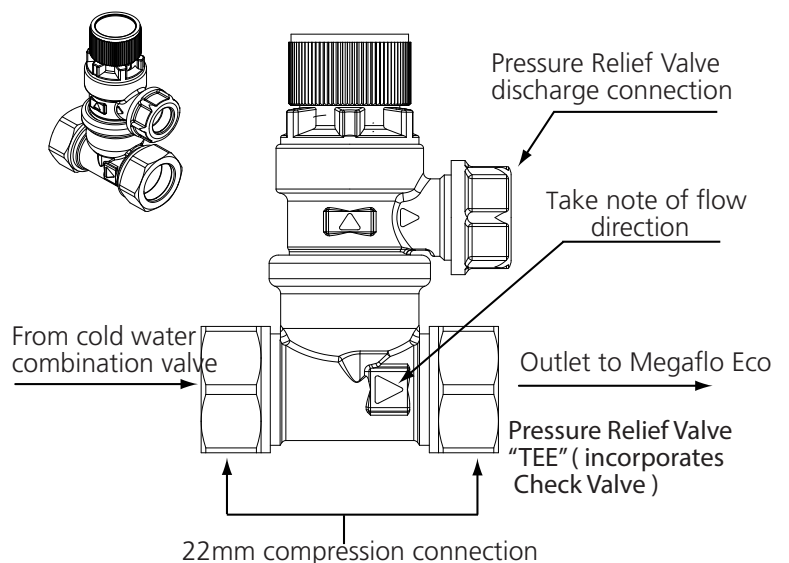


Figure 7: Expansion (Pressure Relief) Valve

6.2 Water connections



WARNING

- ▶ Under no circumstances should the factory fitted temperature/pressure relief valve be removed other than by a competent person. To do so will invalidate any guarantee or claim.
- ▶ The cold water combination valve assembly must be fitted on the mains water supply to the cylinder.
- ▶ No control or safety valves should be tampered with or used for any other purpose.
- ▶ The discharge pipe should not be blocked or used for any other purpose.
- ▶ The tundish should not be located adjacent to any electrical components.

Refer to the installation schematic (Fig 3, page 8) for details on the pipework layout. Specific details for the discharge pipework layout is also provided in Figure 11 on page 17.

- ▶ All connections accept 22mm outside diameter pipe (compression nuts and olives supplied). The thread rate is 3/4" BSP Male parallel to accept standard 3/4" BSP Female fittings if required.
- ▶ The Cold Water Inlet Control kit supplied incorporates a full flow isolating valve which will enable the Megaflo Eco to be isolated from the mains supply for maintenance or servicing.
- ▶ The location of the unit should allow access to the T&P Relief Valve to allow re-charging of the internal air gap when necessary.
- ▶ The draining tap supplied should be installed in the cold water supply to the cylinder between the expansion valve and the heater at as low a level as possible.
- ▶ It is recommended that the outlet point of the drain pipe work be at least 1 metre below the level of the heater (this can be achieved by attaching a hose to the drain tap outlet spigot).
- ▶ The cold water control pack can be connected anywhere on the cold water cylinder supply prior to the expansion vessel.
- ▶ The control pack incorporates the strainer, check valve, core unit and expansion relief valve.
- ▶ The pressure setting is set to 3.0 bar.
- ▶ The valve can be fitted in any orientation to suit the installation as long as the valve is installed with the direction of flow arrows pointing in the correct direction.
- ▶ The expansion relief valve should be installed with the discharge pipe work in either the horizontal position or facing downwards.
- ▶ No other valves should be placed between the cold water combination valve and the cylinder.
- ▶ The blank plastic plugs in the body of the pressure relief valve are pressure gauge connections to enable pressure monitoring to be carried out, should the system develop a fault. It is recommended that these be accessible (the pressure reducing valve has two – only one need be accessible).

Cold water control pack



CAUTION

- ▶ Flush supply pipe work 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 any warranty.

Primary circuit control

- ▶ The 2 port motorised valve supplied with the cylinder **MUST** be fitted on the primary flow to the cylinder heat exchanger and wired such that in the event of the cylinder overheating it will close the primary circuit.
- ▶ Primary circulation to the cylinder heat exchanger must be pumped; gravity circulation **WILL NOT WORK**.
- ▶ It is recommended that an air bleed or automatic air vent is incorporated in the primary return pipe work close to the unit.
- ▶ Boiler flow temperature should be set to 82° (maximum flow temperature to primary heat exchanger 88°C).

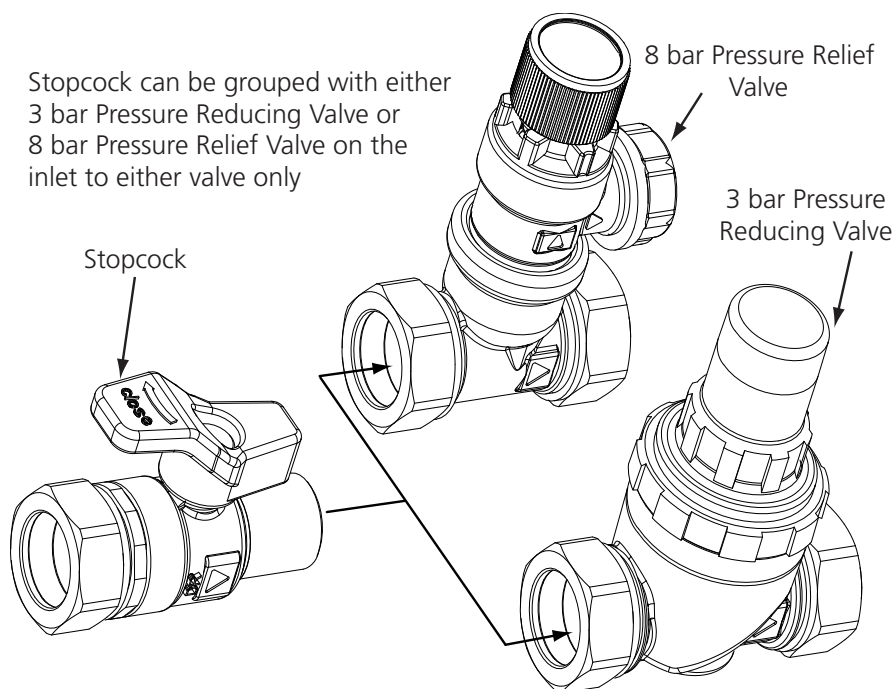


Figure 8: Cold water controls - installation combinations

Secondary circulation

If secondary circulation is required it is recommended that it be connected to the cylinder as shown (see figs. 9 and 9b).

- ▶ The secondary return pipe should be in 15mm pipe and incorporate a check valve to prevent backflow.
- ▶ A suitable WRAS approved circulation pump will be required.
- ▶ On large systems, due to the increase in system water content, it may be necessary to fit an additional expansion vessel to the secondary circuit. This should be done if the capacity of the secondary circuit exceeds 10 litres.

Pipe capacity (copper):

15mm O.D. = 0.13 l/m (10 litres = 77m)

22mm O.D. = 0.38 l/m (10 litres = 26m)

28mm O.D. = 0.55 l/m (10 litres = 18m)

Note: Plastic pipe capacities may be reduced due to thicker wall sections.

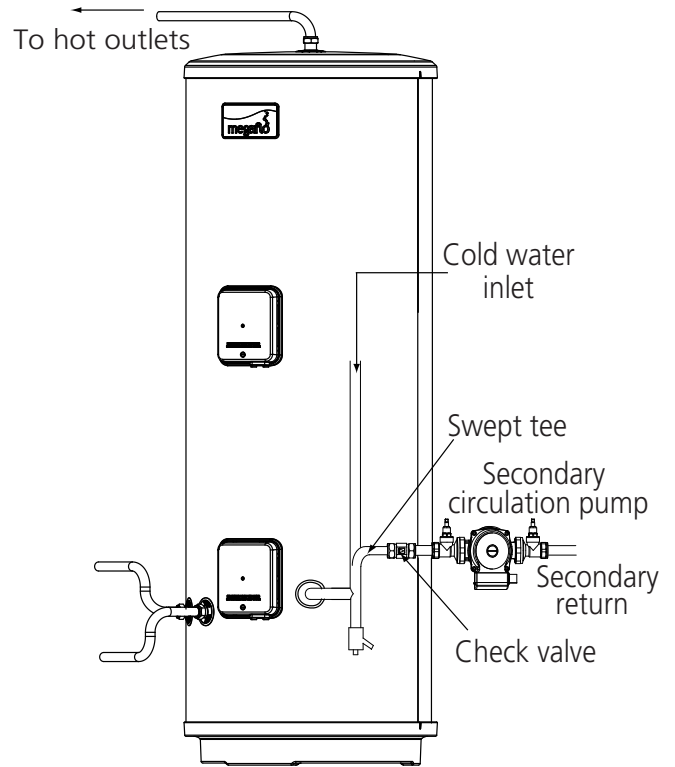


Fig. 9b Direct models

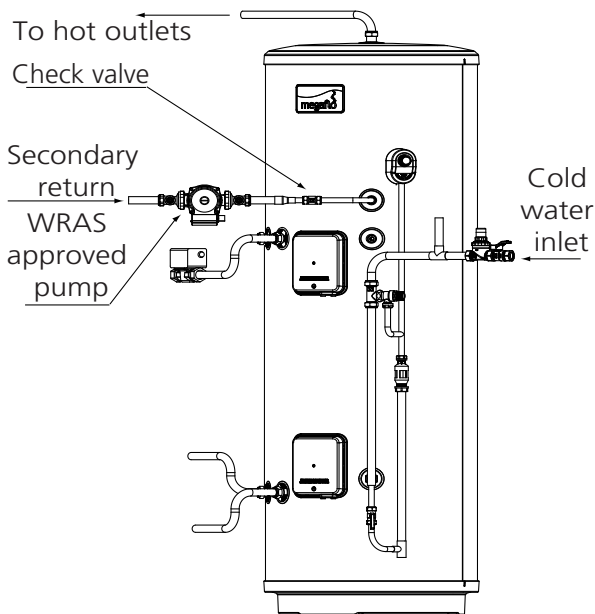


Fig. 9a Indirect models

Figure 9: Secondary circulation schematic

i In direct electric installations where a secondary circulation is required particular attention should be paid by the installer to maintain the returning water temperature (guidelines state that a minimum of 55°C return temperature is advisable). Factors such as, but not limited to, secondary circulation flow rates, minimising heat loss of all secondary circuit pipe work and timed operation during periods of high demand are critical to the correct operation and longevity of the heating element(s) and thermostats.

i Secondary circulation is not recommended for direct electric units using off-peak tariffs where the secondary circulation is not controlled in conjunction with the heat source as performance can be affected.

T&P Relief valve insulation

A set of insulating components are supplied with the cylinder and should be installed to gain maximum heat and energy saving benefits by insulating the exposed metal parts of the T&P Relief Valve. See Figure 10 below for installation instructions.

IMPORTANT INFORMATION: HOW TO INSULATE YOUR T&P RELIEF VALVE

TO SAVE HEAT AND ENERGY A SET OF INSULATING PARTS FOR THE T&P RELIEF VALVE HAVE BEEN SUPPLIED WITH THIS WATER HEATER. INSTALL THE HEATER FIRST THEN FIT THE INSULATING PARTS BY FOLLOWING THE DIAGRAMS BELOW.

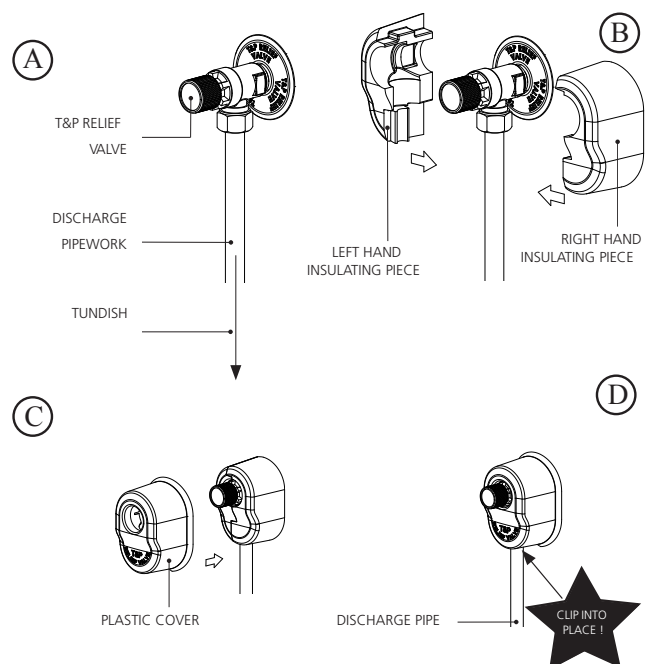


Figure 10: T&P Relief Valve insulation set installation

Discharge

It is a requirement of Building Regulation G3 that any discharge from an unvented system is conveyed to where it is visible, but will not cause danger to persons in or about the building. The tundish and discharge pipes should be fitted in accordance with the requirements and guidance notes of Building Regulation G3. The G3 Requirements and Guidance section 3.50 - 3.63 are reproduced in the following sections of this manual. For discharge pipe arrangements not covered by G3 Guidance advice should be sought from your local Building Control Officer. Any discharge pipe connected to the pressure relief devices (expansion valve and temperature/pressure relief valve) must be installed in a continuously downward direction and in a frost free environment.

Water may drip from the discharge pipe of the pressure relief device. This pipe must be left open to the atmosphere. The pressure relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked.

G3 REQUIREMENT

“...there shall be precautions...to ensure that the hot water discharged from safety devices is safely conveyed to where it is visible but will not cause danger to persons in or about the building.”

The following extract is taken from the latest G3 Regulations

Discharge pipes from safety devices

Discharge pipe D1

3.50 Each of the temperature relief valves or combined temperature and pressure relief valves specified in 3.13 or 3.17 should discharge either directly or by way of a manifold via a short length of metal pipe (D1) to a tundish.

3.51 The diameter of discharge pipe (D1) should be not less than the nominal outlet size of the temperature relief valve.

3.52 Where a manifold is used it should be sized to accept and discharge the total discharge from the discharge pipes connected to it.

3.53 Where valves other than the temperature and pressure relief valve from a single unvented hot water system discharge by way of the same manifold that is used by the safety devices, the manifold should be factory fitted as part of the hot water storage system unit or package.

Tundish

3.54 The tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible to, and lower than, the valve, with no more than 600mm of pipe between the valve outlet and the tundish (see Fig 11, page 17).

Note: To comply with the Water Supply (Water Fittings) Regulations, the tundish should incorporate a suitable air gap.

3.55 Any discharge should be visible at the tundish. In addition, where discharges from safety devices may not be apparent, e.g. in dwellings occupied by people with impaired vision or mobility, consideration should be given to the installation of a suitable safety device to warn when discharge takes place, e.g. electronically operated.

Discharge pipe D2

3.56 The discharge pipe (D2) from the tundish should:

- (a) have a vertical section of pipe at least 300mm long below the tundish before any elbows or bends in the pipe work (see fig. 11); and*
- (b) be installed with a continuous fall thereafter of at least 1 in 200.*

3.57 The discharge pipe (D2) should be made of:

- (a) metal; or*
- (b) other material that has been demonstrated to be capable of safely withstanding temperatures of the water discharged and is clearly and permanently marked to identify the product and performance standard (e.g. as specified in the relevant part of BS 7291).*

3.58 The discharge pipe (D2) should be at least one pipe size larger than the nominal 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 the equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device; between 18 and 27m at least 3 sizes larger, and so on; bends must be taken into account in calculating the flow resistance. See Fig 11, Table 6 and the worked example.

Note: An alternative approach for sizing discharge pipes would be to follow Annex D, section D.2 of BS 6700:2006 Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

3.59 Where a single common discharge pipe serves more than one system, it should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected.

3.60 The discharge pipe should not be connected to a soil discharge stack unless it can be demonstrated that the soil discharge stack is capable of safely withstanding temperatures of the water discharged, in which case, it should:

- (a) contain a mechanical seal, not incorporating a water trap, which allows water into the branch pipe without allowing foul air from the drain to be ventilated through the tundish;*
- (b) be a separate branch pipe with no sanitary appliances connected to it;*

- (c) if plastic pipes are used as branch pipes carrying discharge from a safety device they should be either polybutylene (PB) to Class S of BS 7291-2:2006 or cross linked polyethylene (PE-X) to Class S of BS 7291-3:2006; and
- (d) be continuously marked with a warning that no sanitary appliances should be connected to the pipe.

Note:

1. Plastic pipes should be joined and assembled with fittings appropriate to the circumstances in which they are used as set out in BS EN ISO 1043-1.
2. Where pipes cannot be connected to the stack it may be possible to route a dedicated pipe alongside or in close proximity to the discharge stack.

Termination of discharge pipe

3.61 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.

3.62 Examples of acceptable discharge arrangements are:

- (a) to a trapped gully with the end of the pipe below a fixed grating and above the water seal;
- (b) downward discharges at low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility; and
- (c) discharges at high level: e.g. into a metal hopper and metal downpipe with the end of the discharge pipe clearly visible or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering system that would collect such discharges.

3.63 The discharge would consist of high temperature water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

Worked example of discharge pipe sizing

Fig. 11: shows a G1/2 temperature relief valve with a discharge pipe (D2) having 4 No. elbows and length of 7m from the tundish to the point of discharge.

From Table 6:

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G1/2 temperature relief valve is 9.0m.

Subtract the resistance for 4 No. 22mm elbows at 0.8m each = 3.2m

Therefore the permitted length equates to: 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 pipe (D2) from a G1/2 temperature relief valves equates to 18m.

Subtract the resistance of 4 No. 28mm elbows at 1.0m each = 4.0m

Therefore the maximum permitted length equates to: 14m

As the actual length is 7m, a 28mm (D2) copper pipe will be satisfactory.

Valve Outlet Size	Minimum Size Of Discharge Pipe D1	Minimum Size Of Discharge Pipe D2 From Tundish	Maximum Resistance Allowed, Expressed As A Length Of Straight Pipe (I.E. No Elbows Or Bends)	Resistance Created By Each Elbow Or Bend
G1/2	15mm	22mm 28mm 35mm	up to 9m up to 18m up to 27m	0.8m 1.0m 1.4m
G3/4	22mm	28mm 35mm 42mm	up to 9m up to 18m up to 27m	1.0m 1.4m 1.7m
G1	28mm	35mm 42mm 54mm	up to 9m up to 18m up to 27m	1.4m 1.7m 2.3m

Table 6: Sizing of copper discharge pipe (D2) for common temperature relief valve outlet sizes

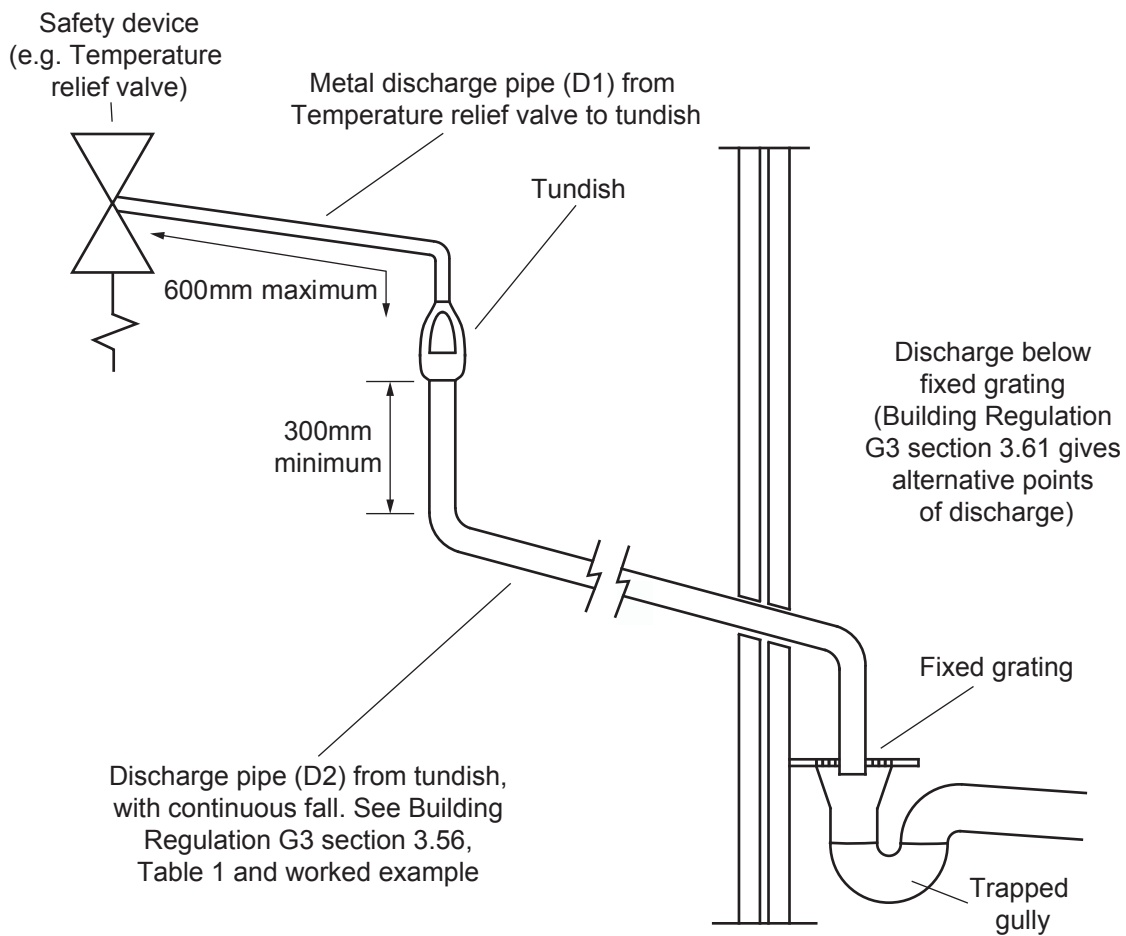


Figure 11: Typical discharge pipe arrangement (extract from Building Regulation G3 Guidance Section 3.50)

6.3 Electrical connections

In case of difficulty contact service support; contact details are available on page 40 of this booklet.



WARNING

- ▶ Disconnect from the mains electrical supply before removing any covers.
- ▶ Never attempt to replace the immersion heater(s) other than with the recommended immersion heater(s).
- ▶ DO NOT bypass the thermal cut-out(s) in any circumstances.
- ▶ All electrical wiring should be carried out by a competent electrician and be in accordance with the latest I.E.E Wiring Regulations.
- ▶ Each circuit must be protected by a suitable fuse and double pole isolating switch with a contact separation of at least 3mm in both poles.
- ▶ DO NOT operate the immersion heaters until the cylinder has been filled with water.

DIRECT models

- ▶ The immersion heaters are accessed by removing the Control Cover (see Fig 12).
- ▶ Unscrew the large screw on the cover using a flat ended screwdriver.
- ▶ Lift from the bottom of the cover at the point indicated on Fig 12 until cover comes away freely.

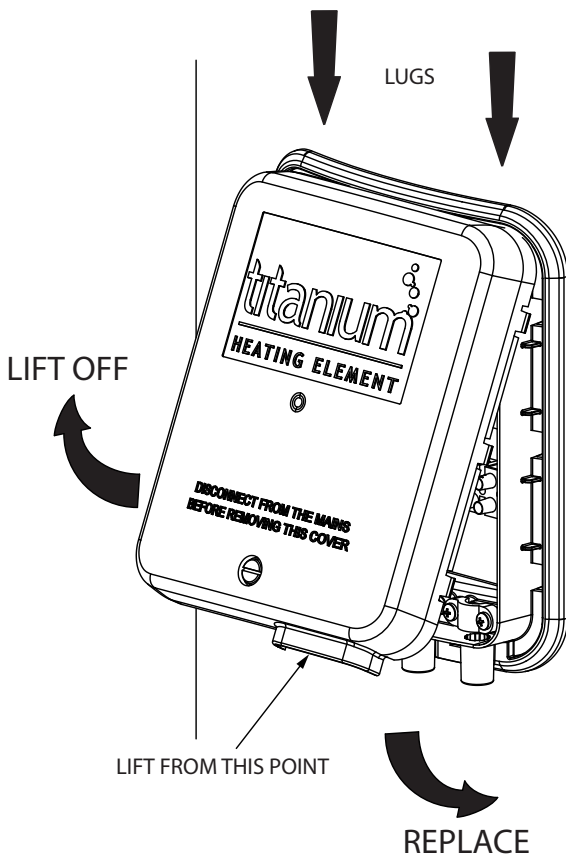


Figure 12: Immersion heater cover removal and replacement

- ▶ Each of the Megaflo Eco's are fitted with two immersion heaters. Each immersion heater is rated 3kW at 240V ~
- ▶ The immersion heater(s) should be wired in accordance with Fig 13. The immersion heater(s) MUST be earthed. The supply cable should be a minimum 1.5mm² 3 core HO5 VV-F sheathed cable and must be routed through the cable entry ports provided with the outer sheath of the cable firmly secured using the cable securing bar provided.

Direct Wiring Layout

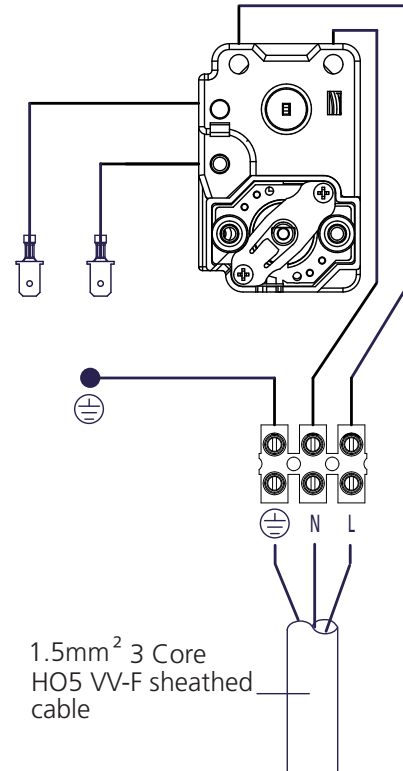


Figure 13: Wiring schematic - DIRECT models

- ▶ The immersion heater thermostat is factory set at 60°C. Should this require adjustment see Fig 14 for details of how to adjust the temperature setting. Each immersion heater has its own individual thermostatic control. The thermostat incorporates a thermal cut-out that will switch off the immersion heater in the event of a thermostat failure. The thermal cut-out reset button position is also shown on Fig 14, page 19.
- ▶ Replace the Control Cover(s) before operating. To do this tilt the cover and align the top two lugs with the holes in the housing as indicated on Fig 12. Hinge the cover downwards and firmly press the cover until it "snaps" back into place. Secure by tightening the screw on the cover using a flat ended screwdriver. DO NOT OVER TIGHTEN

SPINDLE POSITIONS

 = MINIMUM TEMP

 = MAXIMUM TEMP

 = APPROX 60 °C

ROTATE SPINDLE CLOCKWISE FOR TEMPERATURE INCREASE AND COUNTER CLOCKWISE FOR TEMPERATURE DECREASE

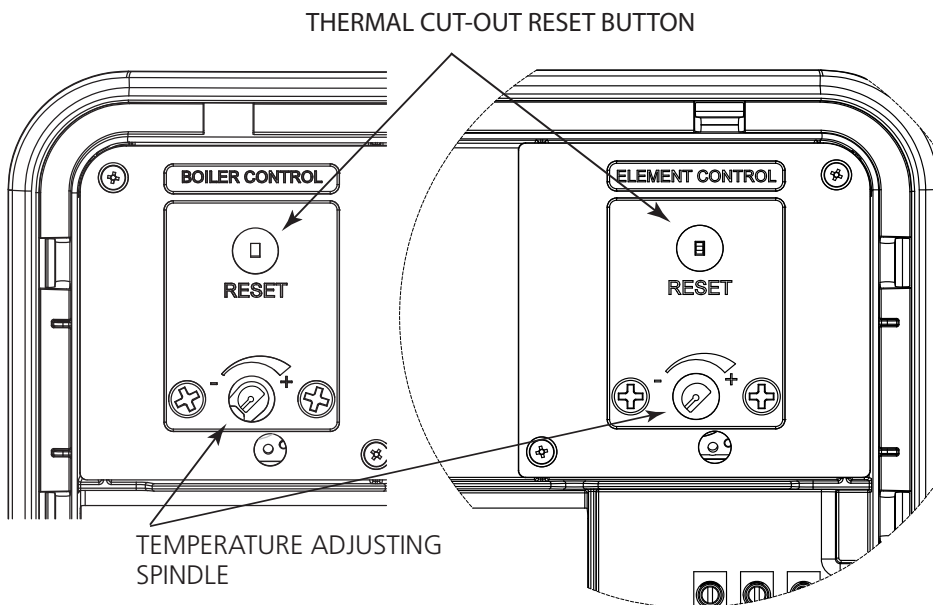


Figure 14: Thermostat adjustment

Space and heating systems controls

INDIRECT models

- ▶ The indirect controls and back-up immersion heater are accessed by removing the Control Cover (see Fig 12).
- ▶ Unscrew the large screw on the cover using a flat ended screwdriver.
- ▶ Lift from the bottom of the cover at the point indicated on Fig 12, page 18 until cover comes away freely.
- ▶ The back up immersion heater should be wired in accordance with the instructions given for DIRECT models. The immersion heater cannot be controlled by the boiler control or space heating programmer, it must be connected with its own dedicated electrical supply circuit.

- ▶ The controls provided with the cylinder will ensure the safe operation of the unit within the central heating system. Other controls will be necessary to control the space heating requirements and times that the system is required to function.
- ▶ The immersion heater and indirect thermal controls should be wired in accordance with Fig 15
- ▶ The immersion heater and indirect controls MUST be earthed. The supply cable for the immersion heater should be a minimum 1.5mm² 3 core HO5 VV-F sheathed cable and must be routed through the cable entry ports provided with the outer sheath of the cable firmly secured using the cable securing bar provided. The cable connecting the indirect control to the heating system must be an appropriate size for the maximum load of the heating controls and should be routed in the controls housing through the other cable entry port and secured using the cable securing bar provided.
- ▶ The immersion heater and indirect control thermostats are factory set at 60°C. Should this require adjustment see Fig 14 for details of how to adjust the temperature setting. The immersion heater and indirect controls each has its own individual thermostatic control. The thermostats incorporate a thermal cut-out that will switch off in the event of a thermostat failure. The thermal cut-out reset button position is also shown on Fig 14.
- ▶ Replace the Control Cover(s) before operating. To do this tilt the cover and align the top two lugs with the holes in the housing as indicated on Fig 12. Hinge the cover downwards and firmly press the cover until it "snaps" back into place. Secure by tightening the screw on the cover using a flat ended screwdriver. **DO NOT OVER TIGHTEN**
- ▶ The cylinder is compatible with most heating controls, examples of electrical circuits are shown in Figures. 16 & 17, page 20. However, other systems may be suitable, refer to the controls manufacturers instructions, supplied with the controls selected, for alternative system wiring schemes.

Control Housing Details

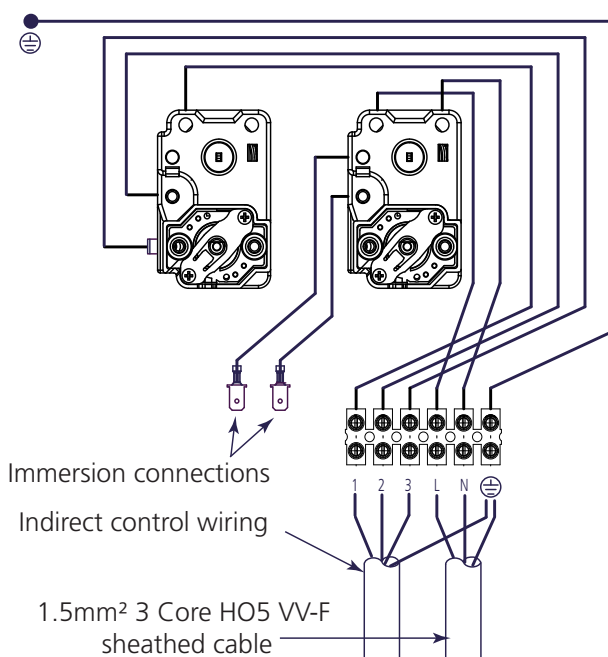
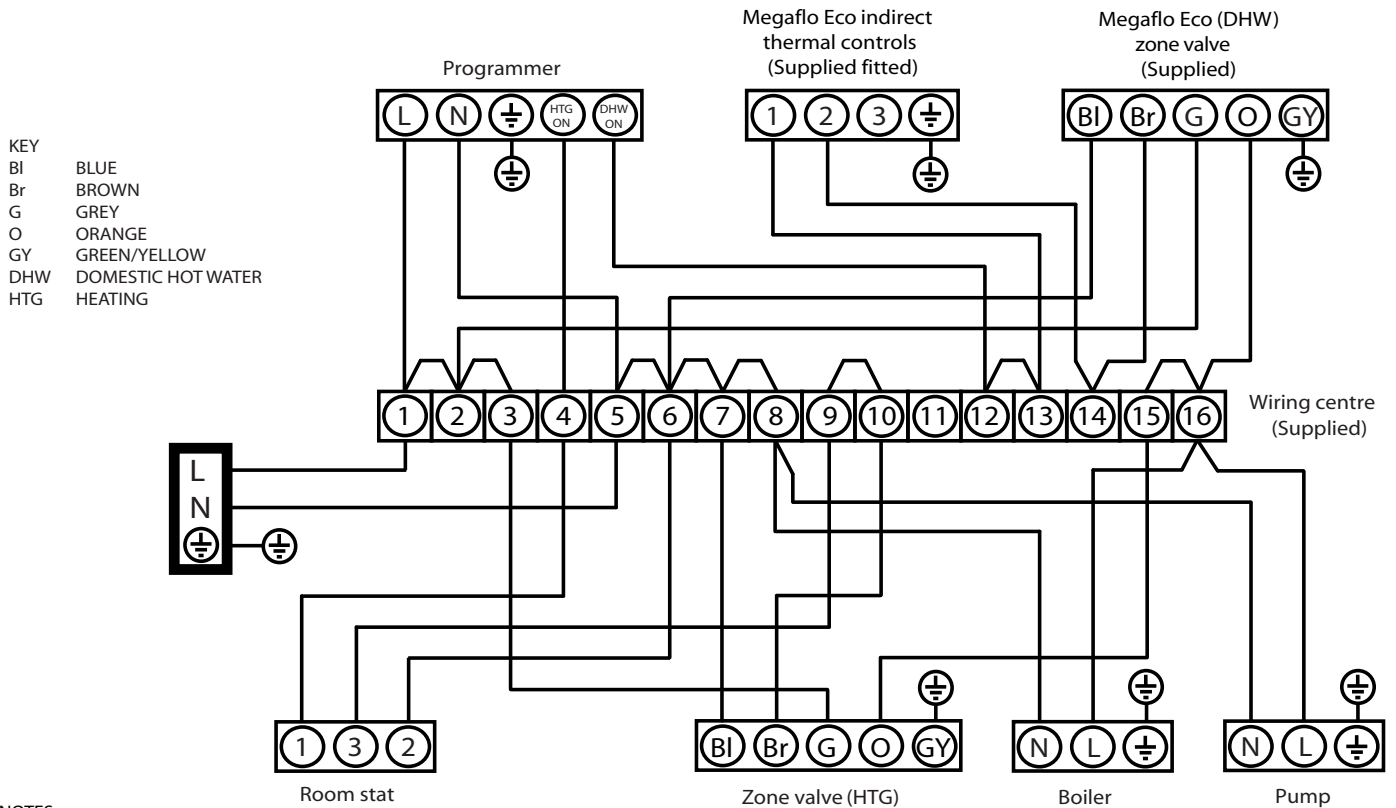
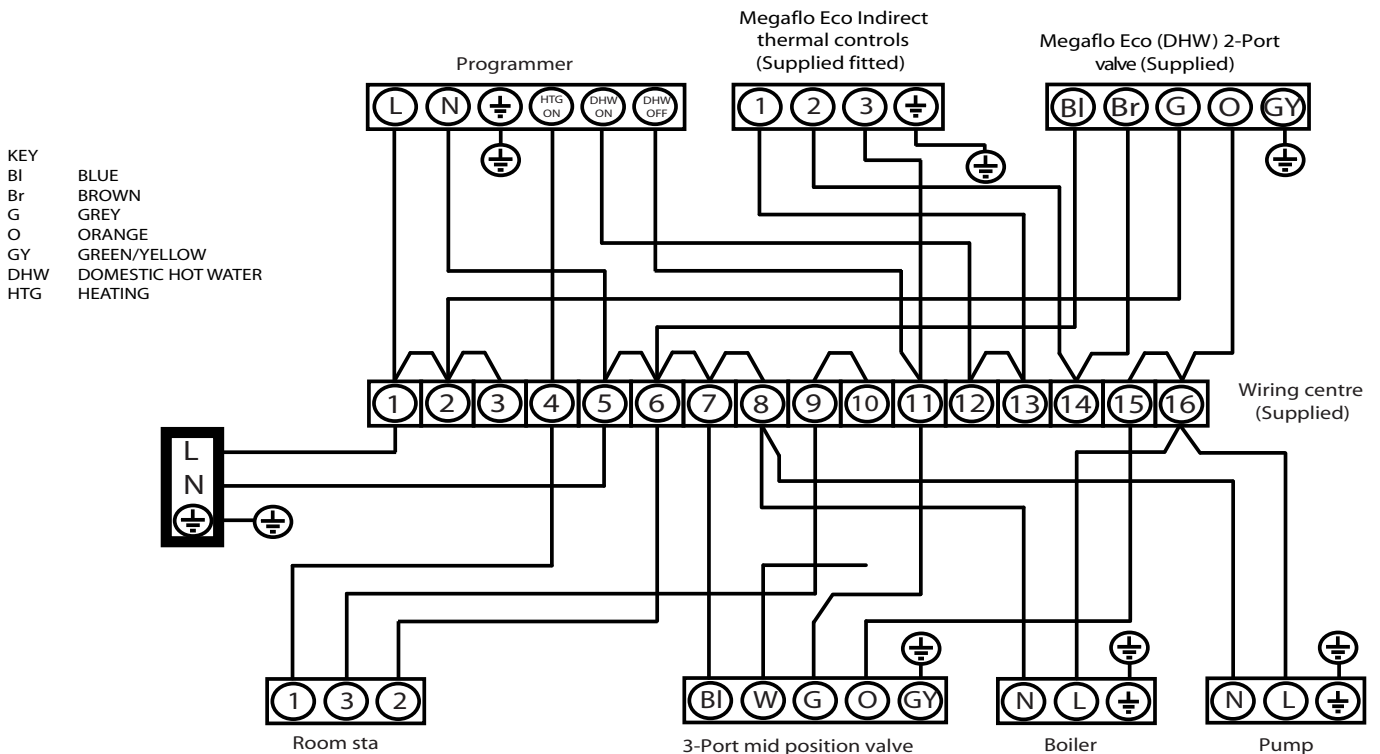


Figure 15: Wiring schematic - INDIRECT models



- NOTES:**
1. A DOUBLE POLE ISOLATING SWITCH MUST BE INSTALLED IN THE MAINS SUPPLY.
 2. ALL EARTH CONNECTIONS MUST BE LINKED BACK TO THE MAINS EARTH SUPPLY.
 3. USE COPPER LINKS SUPPLIED TO MAKE CONNECTIONS BETWEEN TERMINALS.
 4. DO NOT MOUNT WIRING CENTRE ON CYLINDER.
 5. THE ABOVE DIAGRAM IS FOR GUIDANCE ONLY, HEATRAE SADIA ACCEPT NO LIABILITY FOR ANY LOSS OR DAMAGE ARISING FROM ANY ERRORS OR OMISSIONS. THAT MAY BE INADVERTENTLY CONTAINED WITHIN THIS DIAGRAM. THE VARIOUS EQUIPMENT MANUFACTURERS SHOULD BE CONSULTED TO CONFIRM THE CORRECT OPERATION OF THEIR PRODUCTS WITHIN THE SYSTEM.

Figure 16: Wiring schematic - 2 x 2 Port valve heating system



- NOTES:**
1. A DOUBLE POLE ISOLATING SWITCH MUST BE INSTALLED IN THE MAINS SUPPLY.
 2. ALL EARTH CONNECTIONS MUST BE LINKED BACK TO THE MAINS EARTH SUPPLY.
 3. ASSUMES BASIC BOILER WITH EXTERNAL PUMP.
 4. USE COPPER LINKS SUPPLIED TO MAKE CONNECTIONS BETWEEN TERMINALS.
 5. DO NOT MOUNT WIRING CENTRE ON CYLINDER.
 6. THE ABOVE DIAGRAM IS FOR GUIDANCE ONLY, HEATRAE SADIA ACCEPT NO LIABILITY FOR ANY LOSS OR DAMAGE ARISING FROM ANY ERRORS OR OMISSIONS. THAT MAY BE INADVERTENTLY CONTAINED WITHIN THIS DIAGRAM. THE VARIOUS EQUIPMENT MANUFACTURERS SHOULD BE CONSULTED TO CONFIRM THE CORRECT OPERATION OF THEIR PRODUCTS WITHIN THE SYSTEM.

Figure 17: Wiring schematic - 2 Port valve in conjunction with 3 port mid-position valve heating system

SOLAR PRIMARY

CONNECTION TO THE SOLAR PRIMARY CIRCUIT

The lower (Solar) coil of the Megaflo Eco Solar must be connected to a fully pumped solar primary circuit. The connections are suitable for a 22mm copper pipe direct to compression fittings provided. The connections are also threaded 3/4" BSP male parallel should BSP connections be required.

The solar primary circuit must have its own dedicated circulating pump, thermal and safety controls which must be installed as per the manufacturer's instructions.

CONTROL OF SOLAR PRIMARY CIRCUIT

Temperature control of the Megaflo Eco Solar must be carried out using a suitable proprietary solar differential temperature controller. The cylinder temperature sensing probe (usually supplied with the solar differential temperature controller) should be inserted into the pocket provided on the Megaflo Eco Solar (Figure 18 below) and its cable secured using the cable clamp supplied.

The solar controller and solar primary circulation pump must be wired via the over-temperature cut-out mounted in the lower solar controls housing (Figure 18 below). This will ensure that the heat input to the solar coil is interrupted in the event of the cylinder over-heating. There must also be suitable Check (non-return) valves installed in the solar primary flow and return to prevent the possibility of any thermo-syphoning if the solar circulation is stopped.

Connection to the solar differential temperature controller should be in accordance with the manufacturer's instructions. The controller should be set to give a recommended cylinder temperature of approx. 60°C otherwise nuisance operation of the thermal cut-outs may occur.

The Megaflo Eco Solar cylinders are fitted with two additional sensor pockets for use with solar controllers and a third 1/2" BSP long sensor pocket to be used in conjunction with boiler controls where required. A second 10mm pocket is supplied within the bottom Solar Control assembly and a 8mm pocket is supplied near the T&P valve, this pocket can be removed and used as a secondary circulation connection if needed, on Indirect models only. The third sensor pocket for the boiler control is located under the 8mm short pocket near the T&P valve.

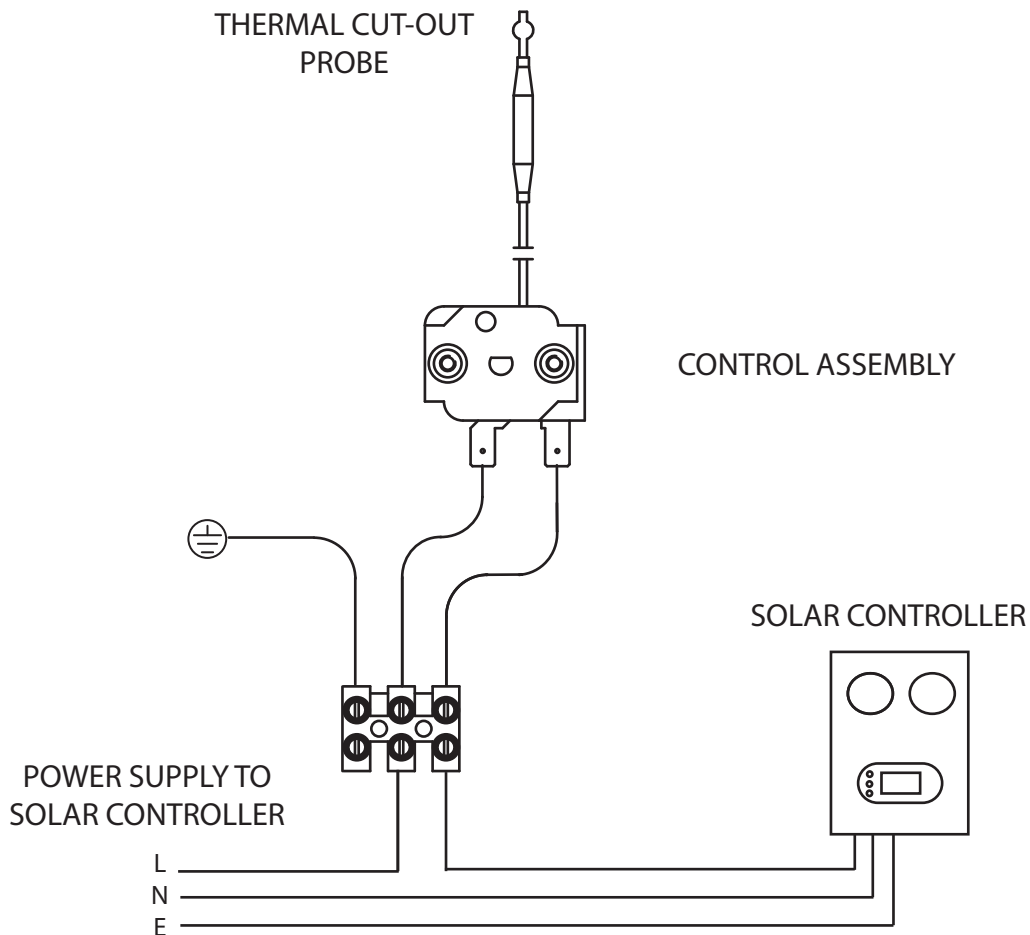


Figure 18: Wiring schematic - Solar thermal cut-out



WARNING

Should the Megaflo Eco be used in conjunction with a boiler that controls the water temperature via a sensor connected to the boiler controls it should be noted that the factory fitted indirect thermostat and thermal cut-out **MUST NOT** be disconnected or bypassed. To do so would invalidate the product approvals and warranty and it would not comply with Building Regulations. Should this method of control be adopted the Megaflo Eco Indirect thermostat should be set at maximum and the boiler cylinder control temperature set at 60°C to avoid the thermostat over-riding the boiler control.

Where the boiler control does not directly power the 2 Port Motorised Valve supplied with the Megaflo Eco, the wiring should ensure that in the event of the thermal cut-out on the Megaflo Eco Indirect controls operating power will be interrupted to the 2 Port Motorised Valve such that it closes and prevents flow of the primary heating fluid around the Megaflo Eco primary heat exchanger coil.

For further details of wiring the boiler, consult the boiler manufacturer's installation instructions.

6.4 Filling the installation

- ▶ Ensure the drain cock is CLOSED.
- ▶ Open a hot tap furthest from the cylinder.
- ▶ Open the mains stop cock.
- ▶ Open the isolating valve (fitted to either the Pressure reducing Valve or Expansion Relief Valve) by turning the blue handle so it is parallel with the direction of flow. It should be fully opened, partial opening will restrict the inlet flow rate.
- ▶ Allow the unit to fill. When water flows from the tap, allow to run for a few minutes to thoroughly flush through any residue, dirt or swarf, then close the tap.
- ▶ Open successive hot taps to purge the system of air.
- ▶ Check all connections and system pipes for water tightness.

7. Commissioning

7.1 General

After filling the installation with water in the previous section please follow the following steps to complete the installation of the unit.



WARNING

DO NOT operate the immersion heaters or primary circuit until the cylinder has been filled with water.

7.2 Checklist before commissioning

- ▶ Check all water connections for leaks and rectify as necessary.
- ▶ Turn off mains water supply.
- ▶ Remove the pressure reducing valve head work to access the strainer mesh, clean and re-fit.
- ▶ Turn the water supply back on.
- ▶ Manually open, for a few seconds, each relief valve in turn, checking that water is discharged and runs freely through the tundish and out at the discharge point.
- ▶ Ensure that the valve(s) re-seat satisfactorily.

7.3 Commissioning procedure

Solar primary circuit

- ▶ Fill the solar primary circuit following the instructions provided with the solar hydraulic controls. The cylinder temperature control sensor probe supplied with the solar differential temperature controller must be inserted into the pocket in the lower controls housing and its cable securely clamped. Heating by the solar primary circuit is controlled by the solar differential temperature controller, refer to the manufacturer's installation instructions for details of how to set up and commission the solar primary circuit. The solar controller should be programmed to give a maximum storage temperature in the Megaflco Eco Solar of 70°C although 60°C is recommended to minimise scaling.

Direct units

- ▶ Switch on electrical supply to the immersion heater(s) and allow the cylinder to heat up to normal working temperature (60 - 65°C recommended).
- ▶ If necessary the temperature can be adjusted by inserting a flat bladed screwdriver in the adjustment spindle on front of the immersion heater (ELEMENT) control thermostat and rotating (see Fig. 14 page, 19 for details of how to adjust). The adjustment represents a temperature range of 10°C to 70°C.
- ▶ Check the operation of thermostat(s) and that no

water has issued from the expansion relief valve or temperature/pressure relief valve during the heating cycle.

Indirect units

- ▶ Fill the indirect (primary) circuit following the boiler manufacturer's commissioning instructions.
- ▶ To ensure the cylinder primary heat exchanger is filled, the 2 port motorised valve (supplied) should be manually opened by moving the lever on the motor housing to the MANUAL setting. When the primary circuit is full return the lever to the AUTOMATIC position.
- ▶ Switch on the boiler, ensure the programmer is set to Hot Water and allow the cylinder to heat up to a normal working temperature (60 - 65°C recommended).
- ▶ If necessary the temperature can be adjusted by inserting a flat bladed screwdriver in the adjustment spindle on front of the indirect (BOILER) thermostat and rotating (see Fig. 14, page 19 for details of how to adjust). The adjustment represents a temperature range of 10°C to 70°C.
- ▶ Check the operation of thermostat(s) and that no water has issued from the expansion relief valve or temperature/pressure relief valve during the heating cycle.

7.4 Benchmark

Benchmark

The cylinder is covered by the Benchmark Scheme which aims to improve the standards of installation and commissioning of domestic heating and hot water systems in the UK and to encourage regular servicing to optimise safety, efficiency and performance.

Benchmark is managed and promoted by the Heating and Hotwater Industry Council. For more information visit www.centralheating.co.uk.

Please ensure that the installer has fully completed the Benchmark Checklist (see page 32) of this manual and that you have signed it to say that you have received a full and clear explanation of its operation. The installer is legally required to complete a commissioning checklist as a means of complying with the appropriate Building Regulations (England & Wales).

All installations must be notified to Local Area Building Control either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer who should, on receipt, write the Notification Number on the Benchmark Checklist.

This product should be serviced regularly to optimise its safety, efficiency and performance. The service engineer should complete the relevant Service Record on the Benchmark Checklist after each service.

The Benchmark Checklist may be required in the event of any warranty work.

8. Operation

8.1 General



WARNING

- ▶ If water discharges from the Temperature & Pressure relief valve on the cylinder shut down the heat source and/or switch off the immersion heater(s). DO NOT turn off the water supply. Contact a competent installer for unvented water heaters to check the system.
- ▶ DO NOT tamper with any of the safety valves fitted to the system. If a fault is suspected contact a competent installer.
- ▶ Disconnect from the mains electrical supply before removing any covers.
- ▶ DO NOT bypass the thermal cut-out(s) in any circumstances.
- ▶ Water stored at temperatures in excess of 60°C can scald. Consideration to blend down water delivery temperatures at the point of use to a safe level should be given
- ▶ All electrical wiring should be carried out by a competent electrician and be in accordance with the latest I.E.E Wiring Regulations.

Temperature controls – direct units immersion heater(s)

- ▶ A combined thermostat and thermal cut-out is provided for each immersion heater fitted. The thermostat is factory set to give a water storage temperature of approx. 60°C, however it can be set to control between 10°C and 70°C. This will usually have been done during installation and commissioning. Adjustments can only be made by opening the controls covers.
- ▶ Access to the thermostat can be made by opening the controls housing cover - DISCONNECT THE ELECTRICAL SUPPLY BEFORE OPENING THE COVER(S).
- ▶ Temperature adjustment is made by rotating the adjustment knob on the top of the thermostat. The adjustment represents a temperature range of 10°C to 70°C (see page 19, fig 14 for method of adjustment).
- ▶ Maximum working temperature is 70°C. In very hard water areas limit to 60/65°C to minimise the build up of limescale on the immersion heater element surfaces.

DO NOT bypass the thermal cut-out(s) in any circumstances.

Temperature controls - indirect units

- ▶ A combined thermostat and thermal cut-out is provided for the control of the external boiler. The thermostat is factory set to give a water storage temperature of approx. 60°C, however it can be set to control between 10°C and 70°C. This will usually have been done during installation and commissioning. Adjustments can only be made by opening the controls covers.
- ▶ Access to the thermostat can be made by opening the controls housing cover - DISCONNECT THE ELECTRICAL SUPPLY BEFORE OPENING THE COVER(S).
- ▶ Temperature adjustment is made by rotating the adjustment knob on the top of the thermostat. The adjustment represents a temperature range of 10°C to 70°C (see page 19, fig 14 for method of adjustment).
- ▶ Maximum working temperature is 70°C. In very hard water areas limit to 60/65°C to minimise the build up of lime scale on the heat exchanger coil surfaces.
- ▶ The boiler thermostat and thermal cut-out must be wired in series with the 2 port motorised zone valve supplied to interrupt the flow of primary water around the heat exchanger coil when the control temperature has been reached.
- ▶ The controls fitted to the cylinder will affect the temperature of the stored water only, other controls will be provided in the system for time and temperature control of the space heating requirements. Consult the instructions provided with those controls for details of adjustments.

DO NOT bypass the thermal cut-out(s) in any circumstances.

Flow performance

When initially opening hot outlets a small surge in flow may be noticed as pressures stabilise. This is quite normal with unvented systems. In some areas cloudiness may be noticed in the hot water. This is due to aeration of the water, is quite normal and will quickly clear.

Operational faults

Operational faults and their possible causes are detailed in the Fault Finding section (page 26) of this book. It is recommended that faults should be checked by a competent installer

9. Maintenance

9.1 General

Maintenance requirements

Unvented hot water systems have a continuing maintenance requirement in order to ensure safe working and optimum performance. It is essential that the relief valve(s) are periodically inspected and manually opened to ensure no blockage has occurred in the valves or discharge pipe work.

Similarly cleaning of the strainer element and replacement of the air in the internal expansion volume will help to prevent possible operational faults.

The maintenance checks described below should be performed by a competent person on a regular basis, e.g. annually to coincide with boiler maintenance.

After any maintenance, please complete the relevant Service Interval Record section of the Benchmark Checklist on page 32 of this document.

9.2 Standard inspection & maintenance operations

Inspection

The immersion heater boss can be used as an access for inspecting the cylinder internally.

Safety valve operation



CAUTION

Water discharged may be very hot!

- ▶ Manually operate the temperature/pressure relief valve for a few seconds.
- ▶ Check water is discharged and that it flows freely through the tundish and discharge pipe work.
- ▶ Check valve reseats correctly when released.
- ▶ Repeat the above procedure for the expansion relief valve.

Strainer

- ▶ Turn off the isolating valve prior to the Pressure Reducing Valve or the main stop cock to the system.
- ▶ Open the lowest hot tap in the system to relieve the system pressure.
- ▶ Using a spanner unscrew the pressure reducing cartridge and remove the moulded housing. The strainer will be removed with the cartridge.
- ▶ Wash any particulate matter from the strainer under clean running water.
- ▶ Replace the strainer and screw the Pressure Reducing Valve cartridge into the moulded housing.
- ▶ Close hot tap, turn on isolating valve or main stop cock to the system. Check for leaks.

Descaling immersion heater(s)

- ▶ Turn off the mains water supply, isolate the electrical supply and turn off boiler
- ▶ Attach a hosepipe to the drain cock having sufficient length to take water to a suitable discharge point below the level of the unit.
- ▶ Open a hot tap close to the unit and open drain cock to drain unit.
- ▶ Open the cover(s) to the immersion heater housing(s) and disconnect wiring from immersion heater(s) thermostat(s).
- ▶ Unscrew the immersion heater and withdraw the immersion heater from the cylinder. Take care when lifting the immersion heater out of the cylinder and work within safe working practices.
- ▶ Carefully remove any scale from the surface of the element(s).



CAUTION

DO NOT use a sharp implement as damage to the element surface could be caused.

- ▶ Ensure sealing surfaces are clean and seals are undamaged, if in doubt fit a new immersion heater gasket. (spare part number 7035165)
- ▶ Replace immersion heater(s), making sure not to trap the immersion heater gasket.
- ▶ Rewire, check, close and secure immersion heater housing cover(s).

Re-commissioning

- ▶ Check all electrical and plumbing connections are secure. Close the drain cock.
- ▶ With a hot tap open, turn on the cold water supply and allow unit to refill.
- ▶ DO NOT switch on the immersion heater(s) or boiler until the unit is full.
- ▶ When water flows from the hot tap allow to flow for a short while to purge air and flush through any disturbed particles.
- ▶ Close hot tap and then open successive hot taps in system to purge any air.
- ▶ When completely full and purged check system for leaks.
- ▶ The heating source (immersion heater(s) or boiler) can then be switched on.

Expansion Vessel Charge Pressure

- ▶ Remove the dust cap from the top of the expansion vessel. Check the charge pressure using a tyre pressure gauge. The charge pressure should match the incoming mains pressure. If it is lower than the required setting it should be re-charged using a tyre pump (schrader valve type). If it is higher than required, reduce the pressure by pushing the centre pin in the schrader valve until the required pressure is met.
- ▶ **DO NOT OVER CHARGE.** Re-check the pressure and when correct replace the dust cap.

10. Troubleshooting



WARNING

Do not tamper with any of the safety valves or controls supplied with the cylinder as this will invalidate any warranty.

- ▶ Water contained in the cylinder may be very hot, especially following a thermal control failure. Caution must be taken when drawing water from the unit.

The fault finding chart (table 7, below) will enable operational faults to be identified and their possible causes rectified. Any work carried out on the unvented water heater and its associated controls MUST be carried out by a competent installer for unvented water heating systems. In case of doubt contact service support.

Spare Parts

A full range of spare parts are available for the cylinder range (Table 8, page 28). Refer to the technical data label on the unit to identify the model installed and ensure the correct part is ordered. You will need to quote the serial number, which is printed on the data label.

10.1 Fault finding

Important

- ▶ After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located on pages 33 of this document.
- ▶ Servicing should only be carried out by competent persons in the installation and maintenance of unvented water heating systems.
- ▶ Any spare parts used MUST be authorised parts.
- ▶ Disconnect the electrical supply before removing any electrical equipment covers.
- ▶ NEVER bypass any thermal controls or operate system without the necessary safety valves.

Fault	Possible cause	Remedy
No hot water	1. Mains water supply off.	1. Check and open stop cock.
	2. Strainer blocked.	2. Turn off water supply. Remove strainer and clean (see page 23 and Figure 19A, Page 29).
	3. Cold water combination valve incorrectly fitted.	3. Check and refit as required.
Water from hot taps is cold	1. Back up immersion heater not switched on.	1. Check and switch on.
	2. Back up immersion heater thermal cut-out has tripped.	2. Check. Reset by pushing button (Figure 14, page 19).
	3. Indirect programmer set to central heating only.	3. Check. Set domestic to a hot water programme.
	4. Indirect boiler not working.	4. Check boiler operation. If fault is suspected consult boiler manufacturers instructions.
	5. Indirect thermal cut-out has tripped.	5. Check. Reset by pushing button. Check operation of indirect thermostat (Figure 14, page 19).
	6. Indirect motorised valve not connected correctly.	6. Check wiring and/or plumbing connections to motorised valve (see Figures 16&17, page 20).
	7. Insufficient solar gain with no auxiliary heating switched on.	7. Check auxiliary heat source is switched on and is controlled to provide heat gain if no solar output is available.
Water discharges from expansion relief valve	1. Intermittently. Air volume has reduced within the expansion vessel.	1. See page 25 for details on how to test and recharge.
	2. Continually. 3 bar pressure reducing valve is not working correctly.	2. Check pressure from 3 bar pressure reducing valve. If greater than 3 bar replace pressure reducing cartridge.
	3. Continually. Expansion valve seat damaged.	3. Remove expansion relief cartridge from 8 bar pressure relief valve and check seating, if necessary fit new cartridge.
Water discharges from the T&P valve intermittently	1. Air volume has reduced within the expansion vessel.	1. See page 25 for details on how to test and recharge.
	2. 8 bar expansion relief valve faulty.	2. Check valve and replace if necessary
Water discharges from the T&P valve continually	1. Thermal control failure. Note water will be very hot.	1. Switch off power supply to immersion heater(s) and shut down the boiler. DO NOT turn off the water supply. When discharge stops check all thermal controls, replace if faulty.
Milky water	1 Oxygenated water.	1. Water from a pressurised system releases oxygen bubbles when flowing. The milkiness will disappear after a short while.

Table 7: Fault finding chart

11. Decommissioning

11.1 Decommissioning procedure

- ▶ Isolate electrical supplies and make safe
- ▶ Isolate the water supply
- ▶ Drain the cylinder
- ▶ Drain the primary circuit (indirect only)
- ▶ Remove cylinder
- ▶ Cap pipe work

Environmental information

Products are manufactured from many recyclable materials. At the end of their useful life they should be disposed of at a Local Authority Recycling Centre in order to realise the full environmental benefits.

Insulation is by means of an approved CFC/HCFC free polyurethane foam with an ozone depletion factor of zero.

WEEE Declaration

Disposal of Waste Equipment by Users in Private Household in the European Union.



This symbol on the product indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the company where this product was purchased.

12. Spare parts

12.1 Spare parts list

A full range of spare parts are available for the cylinder range. Refer to the Technical Data label on the unit to identify the model installed and ensure the correct part is ordered.

ITEM	DESCRIPTION	PART NUMBER
1	Cold water inlet control kit - Complete (includes Items 2, 4 & 6)	95 605 894
2	3 bar Pressure reducing valve - Complete	95 605 886
3	3 bar Pressure reducing valve - Cartridge	95 605 891
4	8 bar Expansion valve - Complete	95 605 893
5	8 bar Expansion valve - Cartridge	95 605 888
6	Stopcock	95 605 885
7	Immersion heater gasket	7035165
8	Immersion heater key spanner (NOT SHOWN)	95 607 861
9	Immersion heater blanking plug (NOT SHOWN)	95 605 881
10	Tundish (NOT SHOWN)	95 605 838
11	Insulation set for T&P relief valve (NOT SHOWN)	95 607 922
12	Temperature & Pressure relief valve (NOT SHOWN)	95 605 810
13	Set of compression nuts and olives (NOT SHOWN)	95 607 838
14	Drain valve 1/4 turn (NOT SHOWN)	95 605 051
15	Swept tee joint (for secondary return) (NOT SHOWN)	95 605 812
16	Direct element - Titanium lower	95 606 988
17	Immersion heater backnut - Brass	95 607 940
18	Direct combined thermostat / thermal cut-out	95 612 720
19	Direct (Titanium) controls cover	95 614 119
20	Direct mounting plate	95 607 929
21	3 way terminal block	95 607 932
34	Direct element - Titanium upper	95 606 989
22	Indirect element - Incoloy	95 606 984
23	Immersion heater backnut - Plastic (Black)	95 605 132
24	Indirect combined thermostat / thermal cut-out	95 612 719
25	Indirect controls cover	95 614 118
26	Indirect mounting plate	95 607 931
27	6 way terminal block	95 607 933
28	2 port motorised valve (22mm compression connections)(NOT SHOWN)	95 605 819
29	1/2 " BSP Sensor Pcket Assembly Long	7 032 579
30	3 way terminal block solar	95 607 939
31	Indirect accessory kit	95 970 554
32	Mounting plate, solar	95 607 937
33	1/2 " BSP sensor pocket	95 607 938
34	Twin solar temperature pocket	95 606 990
35	Expansion vessel (24 Litre)	95 607 612
36	Solar thermal cut-out	95 612 698

Table 8: Spare parts list

Figure 19: Cold water inlet controls spares, exploded views

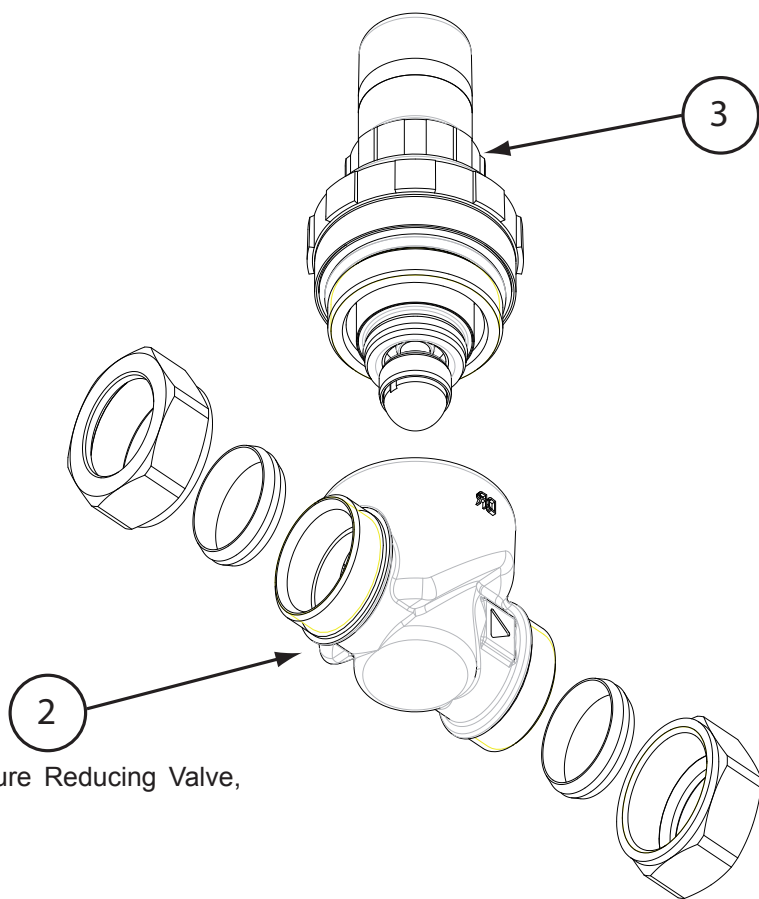


Figure 19 A: 3 bar Pressure Reducing Valve, exploded view

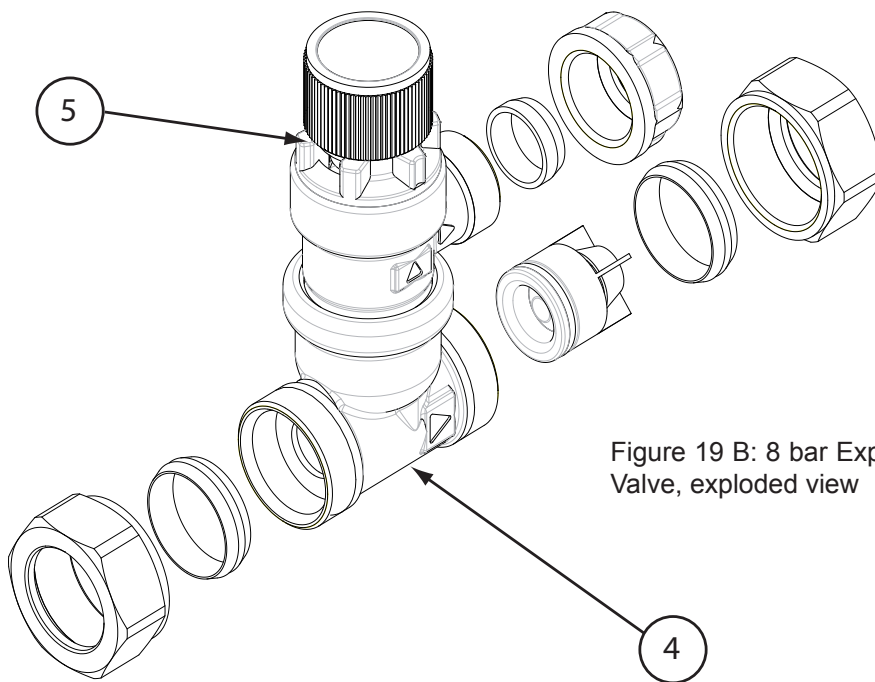


Figure 19 B: 8 bar Expansion (Pressure Relief) Valve, exploded view

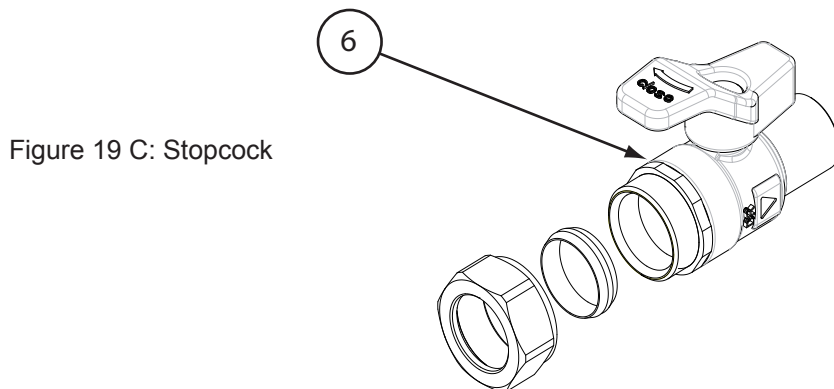


Figure 19 C: Stopcock

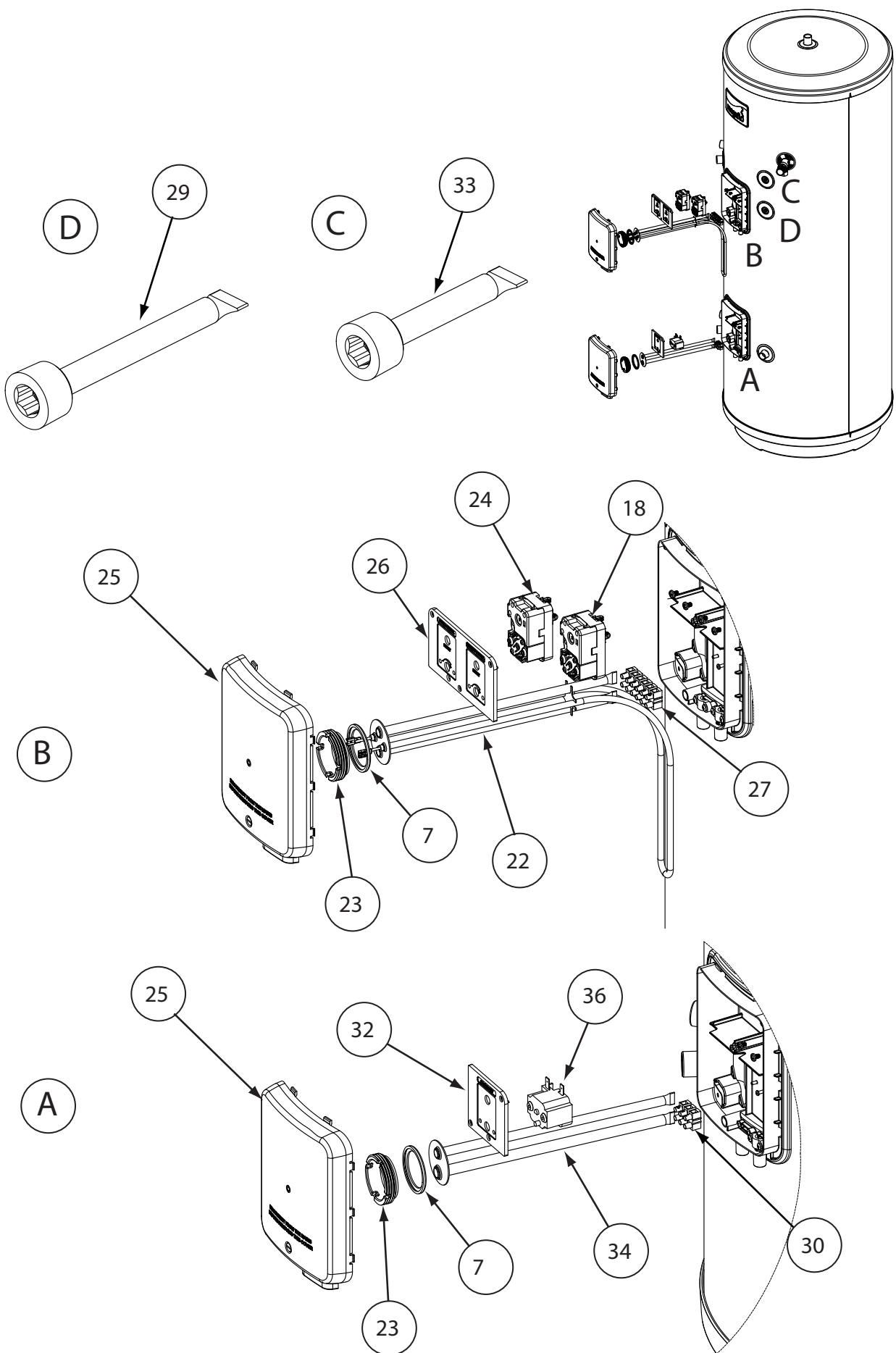


Figure 20: Direct controls and immersion heater, exploded view

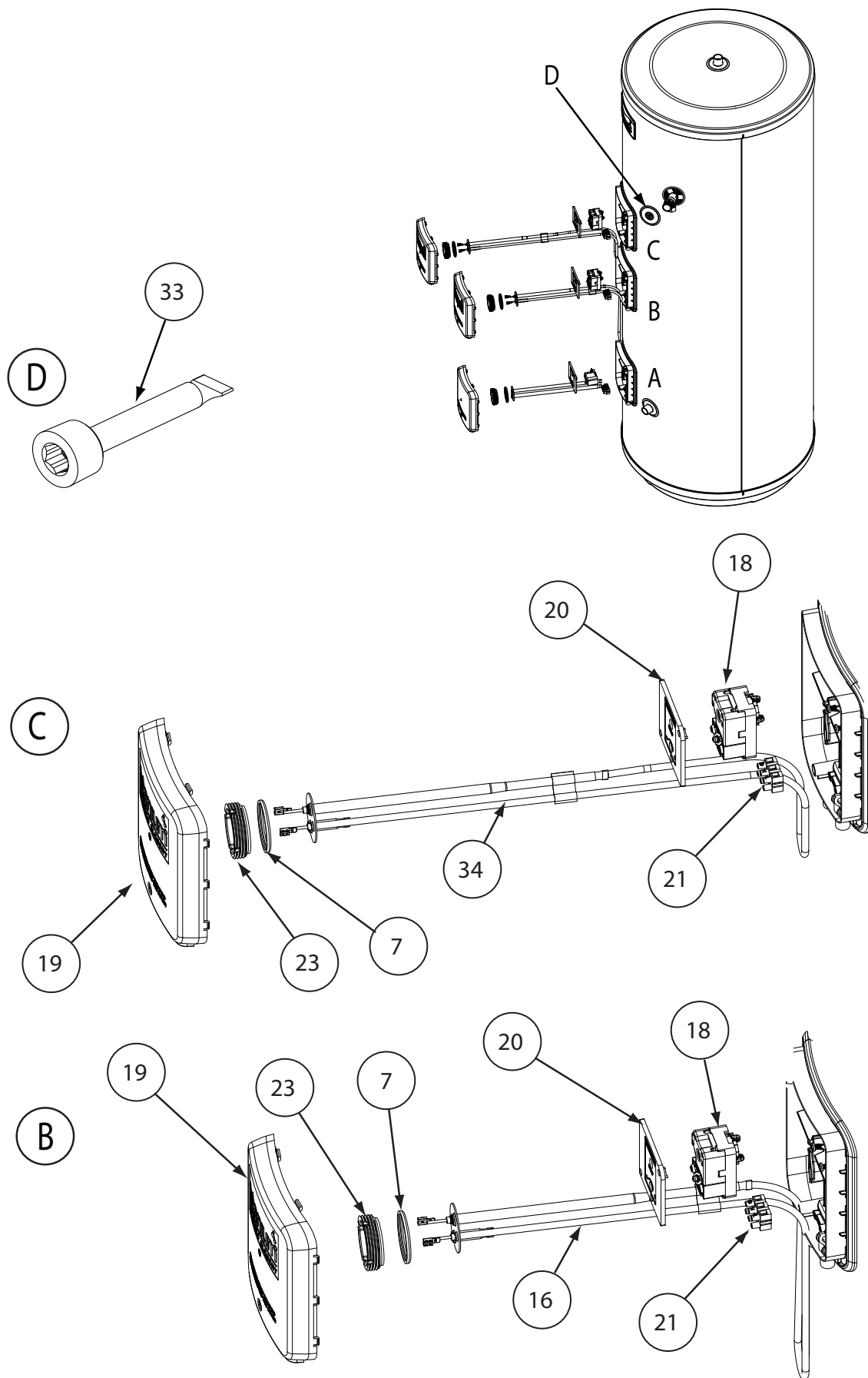


Figure 21: Indirect controls and immersion heater, exploded view