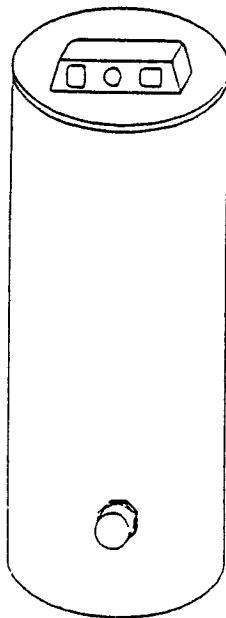
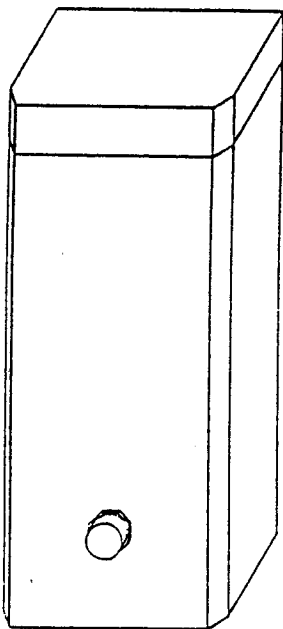


KESTON SPA

UNVENTED STORAGE CYLINDERS

Installation Instruction + Performance Specification



Models
125 litre
170 litre
200 litre
300 litre
450 litre
Direct
and Indirect
Cylinders all
with UNIQUE
CORROSION AND
BACTERIAL
GROWTH RESISTANT
RILSAN COATING
AND ULTRA HIGH
PERFORMANCE

FULLY APPROVED TO BS 7206

ISSUE: 01-1996

**KESTON BOILERS
34 WEST COMMON ROAD
HAYES
BROMLEY
KENT BR2 7BX**

**SPECIALISTS IN HIGH
EFFICIENCY COMMERCIAL &
DOMESTIC HEATING EQUIPMENT**

**TEL: 0181 462 0262
FAX: 0181 462 4459**

READ BEFORE INSTALLATION

INCORRECT INSTALLATION MAY INVALIDATE GUARANTEE

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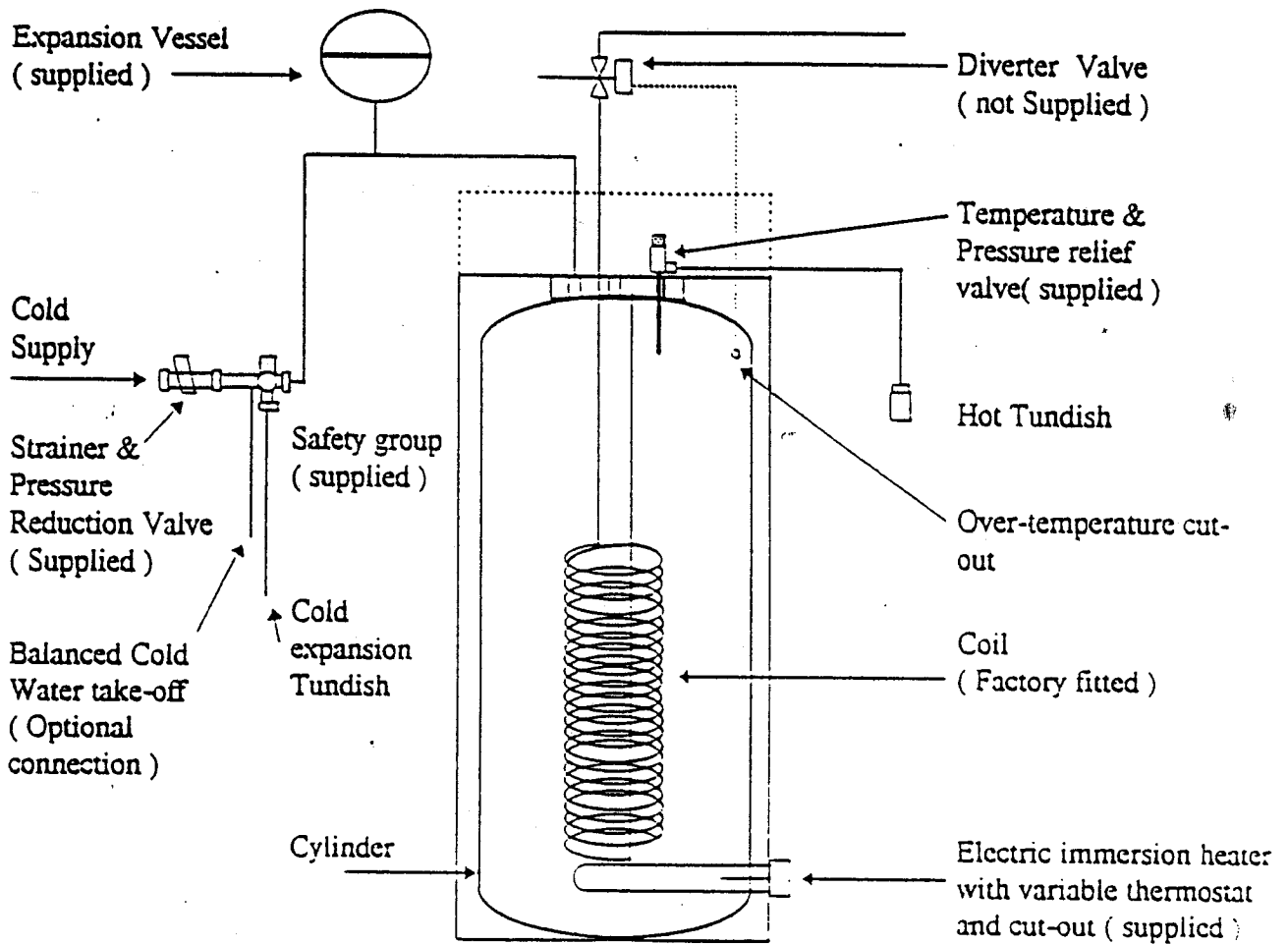
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Note to Installer:
Please leave installation manual with Householder after installation

1. COMPONENT CHECK-LIST

The following items accompany your SPA UNVENTED STORAGE CYLINDER.



a) Fitted to the cylinder

- 95°C/7 BAR Temperature & Pressure (T&P) Relief Valve.
- WT11080, 3kW/240 volt electric element with 80°C cut-out switch and variable thermostat (10 to 80°C).
- Combined control and overheat thermostat with manual cut-out switch, variable thermostat (30 - 70°C) & immersion capillary sensor.

b) Supplied as Installation Pack

- Combined Strainer/pressure reduction valve, 3.5 bar.
- Combined stop tap, check valve, expansion relief valve, discharge air gap, 6 bar.
- Expansion vessel.

2. HANDLING & STORAGE

- Do not lift via valves or element bosses on unit.
- Expansion vessel must not be dented.
- Store unit away from excess heat or frost.
- **Always transport cylinders in vertical position**

3. LOCATION + CYLINDER MOUNTING

- Site the unit as close as possible to main points of usage.
- Ensure unrestricted access to plumbing connections and top of expansion vessel.
- Allow sufficient clearance for removal of elements.
- If installing floor standing models, place the unit on a load bearing surface sufficient for the full mass of the cylinder.
- If installing wall hang models ensure the wall and fixings are adequate to support the weight of the unit when full of water.
- The unit must be transported & installed vertically.

- Valves can be mounted in any orientation provided discharge downpipes can be run to drain in accordance with instruction (see Tundish).
- A drainage safe tray should be placed under the cylinder to facilitate servicing .
- When installing wall hung models, it is strongly recommended to mount a draw-off tap in the cold water pipeline under the cylinder to make drainage easier.

4. WARNINGS

- Under no circumstances must the unit be filled or operated without the factory fitted T+P relief valve.
- Do not fit any stop or check valve between the inlet safety group and the cylinder.
- Do not apply heat to any component or any welding to cylinder or pipe connections.
- All electrical wiring should be carried out by a registered electrical contractor and must conform to IEE Wiring Regulations.
- If a replacement immersion heater is required at any time, do not fit an immersion heater(s) without thermal cut-out(s).
- Ensure unit is flushed for 3 minutes via hot tap before switching on.
- Do not use excessive plumbers paste or flux, which may damage controls.
- Do not switch on power until the unit is full of water. Do not open electric elements unless power is switched off.
- Position discharge tundish away from any electrical components.
- Do not allow discharge pipes to kink or block in any way.

5. MARKINGS + SPECIFICATIONS

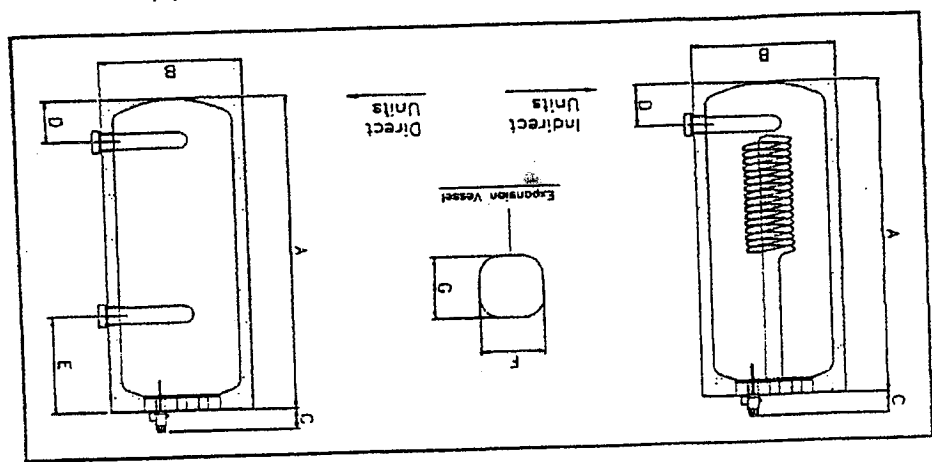
SIZE (Litres/Coil)	WEIGHT EMPTY FULL (kg)	DIMENSIONS (in mm)	IMMRSN HEATER size (kW)	COIL size (m ²)					
		A	B	C	D	E	F	G	
125	75	200	485	160	160	275	220	305	3
170	90	260	485	160	160	350	260	310	3
200/5	75	275	1465	550	160	175	260	340	3
200/7	75	275	1465	550	160	175	260	340	3
200/10	75	275	1465	550	160	175	260	340	3
300/7	130	430	1485	650	160	190	260	485	3
300/10	130	430	1485	650	160	190	260	485	3
300/20	130	430	1485	650	160	190	260	485	3
300/30	130	430	1485	650	160	190	260	485	3
450/10	150	600	1900	700	180	200	260	485	3
450/20	150	600	1900	700	180	200	260	485	3
450/30	150	600	1900	700	180	200	260	485	3

FONIX STEELINDUSTRY A/S. DK-5750 RINGE

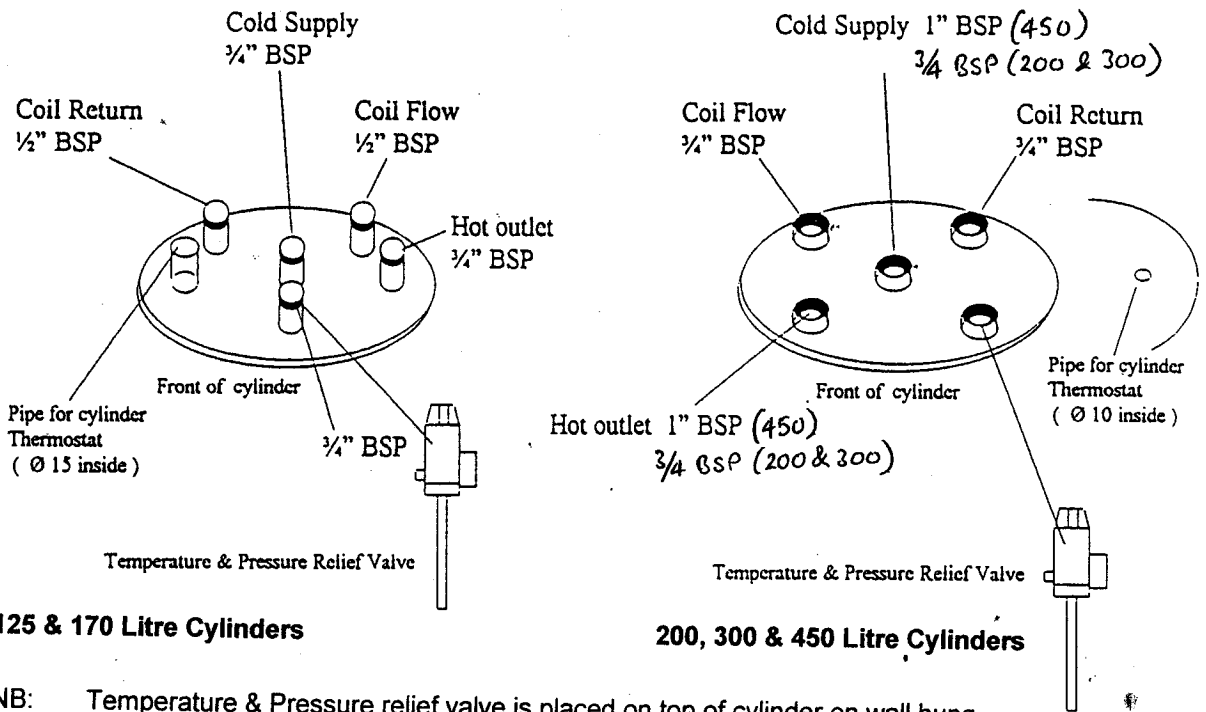
STORAGE CAPACITY	litre	
MASS FULL	kg	
MAX. SUPPLY PRESSURE	bar	16
EXPANSION VESSEL CHARGE PRESSURE	bar	3.5
EXPANSION VALVE SETTING	bar	6
MAX. PRIMARY PRESSURE	bar	16
OPERATING PRESSURE	bar	3.5
IMMERSION HEATER: 3 kW EACH / 240 V	bar	BS7351
HEATER:	kg	
MODEL IMMERSION	litre	
HEATER:	kg	
BS 3456,	bar	16
EXPANSION VESSEL CHARGE PRESSURE	bar	3.5
WT11080,	bar	6
EXPANSION VALVE SETTING	bar	6
MAX. PRIMARY PRESSURE	bar	16
OPERATING PRESSURE	bar	3.5
IMMERSION HEATER: 3 kW EACH / 240 V	bar	BS7351

WARNING TO THE USER:
 (a) Do not remove or adjust any component part of this unvented water heater. Contact the installer.
 (b) If this unvented water heater develops a fault, such as a flow of hot water from the discharge pipe, switch the heater off and contact the installer.

WARNING TO THE INSTALLER:
 (a) This installation is subject to building regulation approval, notify the Local Authority of intention to install.
 (b) Use only manufacturer's recommended replacement parts.
 (c) Installed by: _____
 Completion date: _____



+ Two identical expansion vessels we supplied & required for the 450 model.



125 & 170 Litre Cylinders

200, 300 & 450 Litre Cylinders

NB: Temperature & Pressure relief valve is placed on top of cylinder on wall hung models with all other connections below.

6. CONNECTION LAYOUT + RECOMMENDATIONS

1. For cylinder sizes up to 300 litres a suggested supply pressure of 1 bar or more is desirable.
2. For cylinders of 170 litres or below with water pressure below 1.5 bar use 22mm supply and distribution pipework.
3. Use 22mm pipe distribution up to the first branch connection.
4. For over 300 litres models use 28mm or larger pipework. If long pipe runs are required extra expansion vessel capacity may be necessary.
5. All hot pipework should be insulated.
6. Use the balanced cold take-off connection to ensure satisfactory shower performance.
7. Do not vent the primary circuit from boiler to the water heater system.
8. Better performance will be obtained by using 22mm pipe, limiting the number of elbows and fittings and using swept bends.
9. Follow connection layout on page 3. Connect valves with flow in arrow direction marked on valve bodies.

10. The high efficiency coil of the Spa 125 and Spa 170 tanks offers a higher resistance to boiler water flow than other lower efficiency traditional cylinders. Consideration should therefore be given to additional pump capacity or a 15mm coil flow/return by-pass arrangement (item A on drawing on page 9). Such a by-pass may then be adjusted to balance cylinder and water flow accordingly.
11. The high efficiency of the multi coil element used on the Spa 200, Spa 300 and Spa 450 units offers a higher resistance to boiler water flow than other lower efficiency traditional cylinders. Consideration should therefore be given to the provision of a dedicated cylinder shunt pump. For example, a Wilo 25/7 or Grundfos 25-80 pump situated on the coil return pipe will normally suffice for the 10-coil element cylinders.

HOW TO DRAIN THE SYSTEM

Switch-off electrical power to immersion heater(s) and/or shut down boiler. Close the Stop Cock Valve.

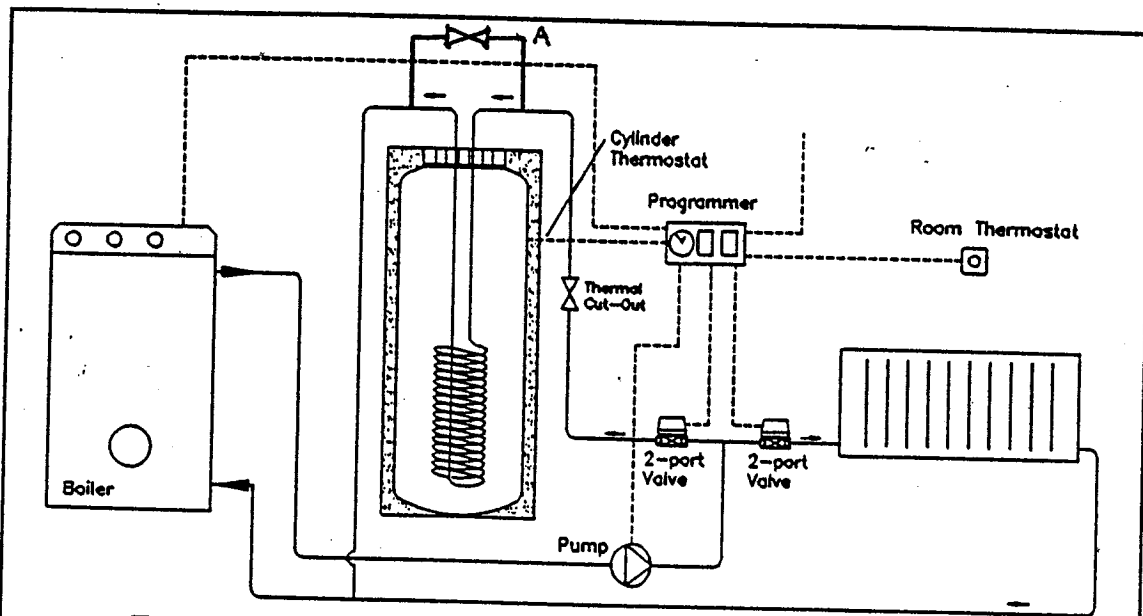
Standing units (all connections in top):

- 1) Open a hot water tap in order to reduce pressure in the cylinder.
- 2) Dismount the Temperature and Pressure Relief - Valve, or: dismount the entire endcover, if necessary, by unscrewing the M12 nuts.
- 3) Lower a hosepipe into the cylinder and fill it up with water. Quickly lead on end of the hosepipe to a drain and thereby emptying the cylinder.

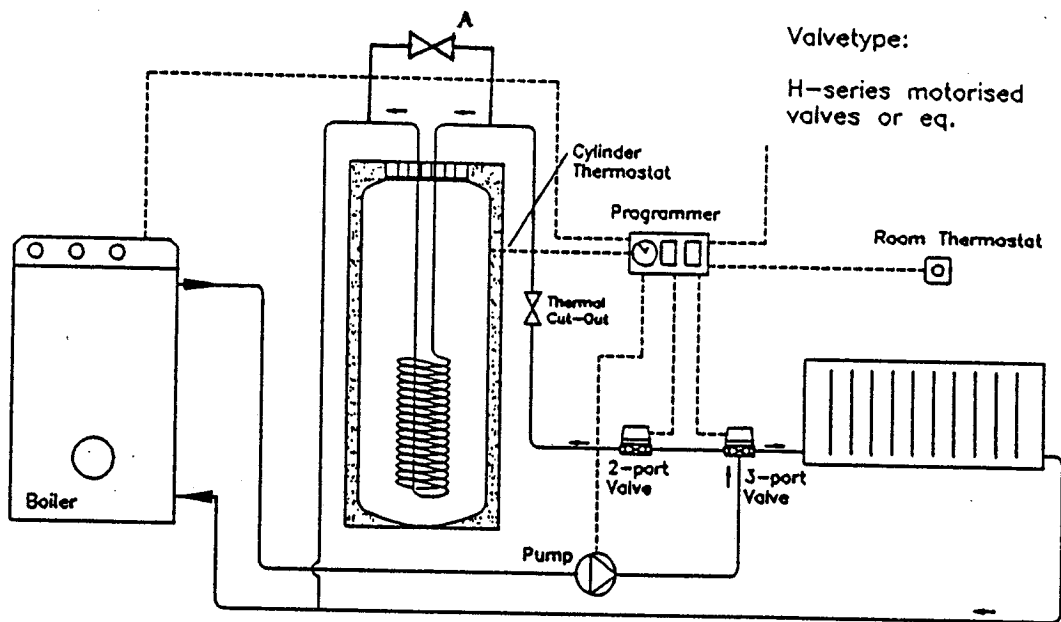
Wall hung units and units placed on a stand (all connections below):

- 1) Open a hot water tap in order to reduce pressure in the cylinder. Remember to leave a hot water tap open
- 2) If the safety group is placed below the cylinder:
 - Make sure that the cold expansion tundish is lead to a drain.
 - Open the handle on the cold expansion valve and the water will run out.
- 3) If the safety group is placed above the cylinder bottom end flange:
 - Connect a hosepipe to the drain tap placed in the cold water pipeline.
 - Open the drain tap and the water will run out.

VALVE LAY-OUT AND COMPONENTS (FLOOR STANDING MODELS)



TWO 2-Port Zone Valve System



2-Port and Mid-position Valve System

DISCHARGE PIPEWORK + TUNDISH

- TUNDISH MUST BE VISIBLE
- Discharge pipe must be to fixed grating and not located to cause possible discharge injury to persons.

Typical discharge pipe arrangement

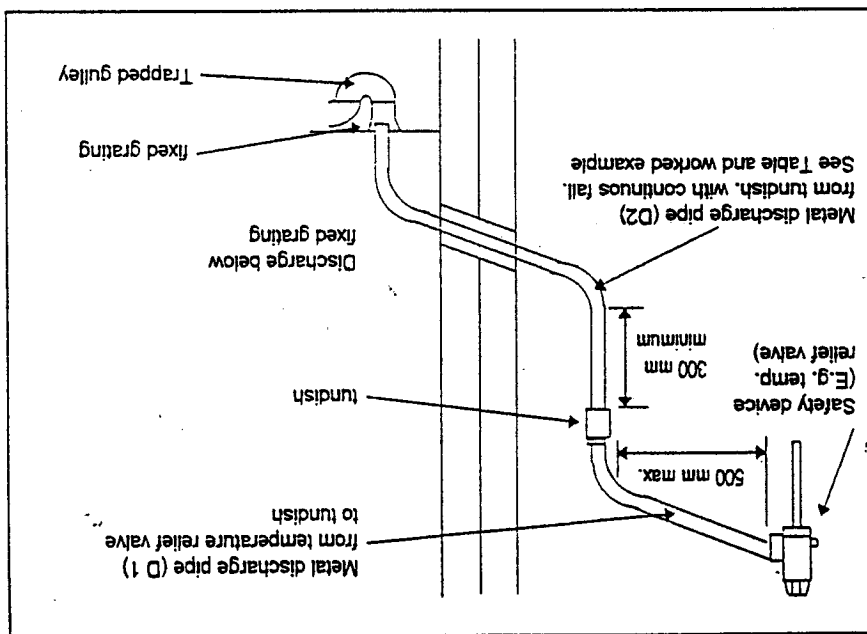


Table 1. Sizing of copper discharge pipe 'D2' for common temperature relief valve outlet sizes

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

Worked example:
 The example below is for a G 1/2 temperature relief valve with a discharge pipe (D2) having 4 No. elbows and length of 7m from the tundish to the point of discharge.

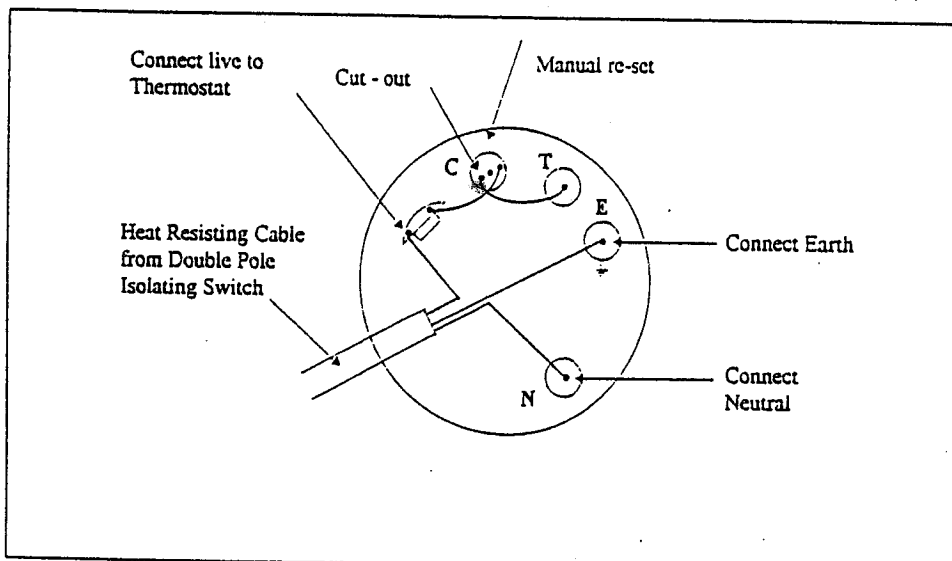
From table 1: Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G 1/2 temperature relief valve is 9.0m. Subtract the resistance for 4 No.22mm elbows at 0.8m each = 3.2m.
 Therefore the maximum permitted length elbows equates to 5.8m is less than the actual length of 7m therefore calculate the next largest size. Maximum resistance allowed for a straight length of 28mm pipe (D2) from a G 1/2 temperature relief valve equates to: 18m. Subtract the resistance for 4 No.28mm elbows at 1.0m each = 4m.
 Therefore the maximum permitted length equates to: 14m.
 As the actual length is 7m, a 28mm (D2) copper pipe will be satisfactory.

7. FLUSHING AND COMMISSIONING

- Ensure all pipe connections are tight, including immersion heater(s).
- Open a hot tap further from the unit. Open the mains stop cock to fill the unit.
- Flush for three minutes.
- Close off taps and check pipework for leaks.
- Switch on electricity to the immersion heater(s) or switch on the boiler. Refer to boiler manufacturer's instructions or commissioning.
- Bring the unit to approx. 65°C. Check that water does not discharge via the Tundish pipework during heating.
- Hand guarantee card to user.

8. ELECTRICAL SPECIFICATION + WIRING (IMMERSION HEATER)

- Element Terminals are marked N(Neutral) I(Live).
- Ensure earth connection of 3 wire supply is connected to earth terminal.
- Recommended supply for 3 kW element is 2.5mm cable to BS.6141.
- A 16 Amp timer is recommended for 3 kW elements.
- The unit is not fitted with a fuse.
- All heating elements operate a 230 volt 50 Hz mains supply.
- Do not fit immersion heater(s) without thermal cut-out(s).



FUSE RATING

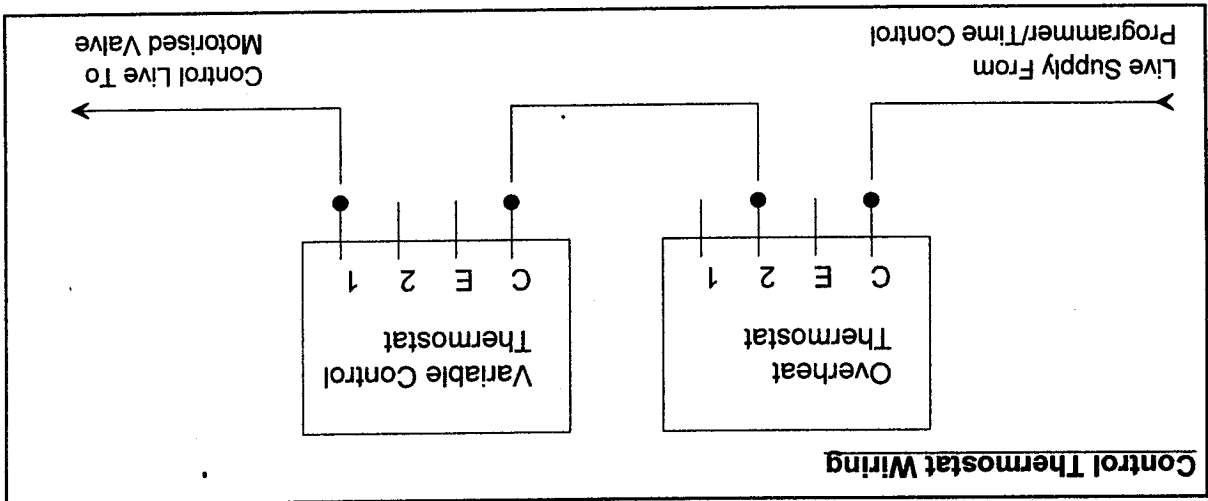
The fuse size for two immersion heaters wired separately from the main fuseboard should be 15 amps.

ELECTRICAL SPECIFICATION + WIRING (THERMOSTAT CONTROL)

The cylinder control thermostat is mounted on the top of the unit in a sealed grey plastic housing with two cable entry points.

The units houses two thermostats, a control thermostat and an overheat thermostat. Operation of either thermostat must cease the supply of heat to the cylinder.

Remove the grey thermostat cover. Wire the two thermostats inside in series to the hot water control valve as shown below



9. SECONDARY CIRCULATION

A pump is required together with a check valve and swept tee.

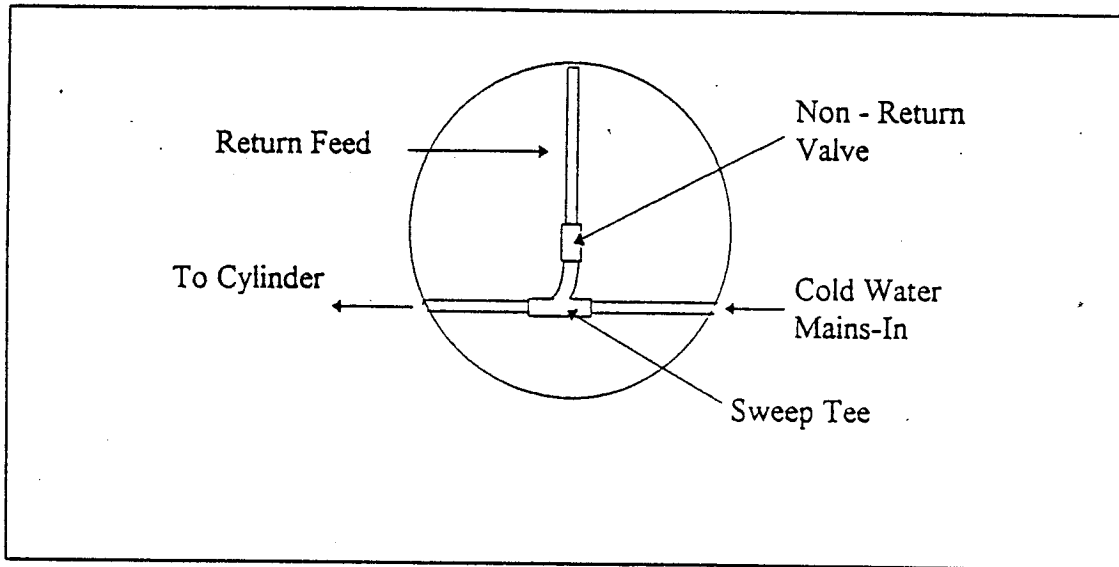
The pump should be fitted isolating valves on either side and sited to minimise air accumulation - away from the high point of the circuit. An air bleed valve may be located at the high point.

The return pipe should be fitted via a sweep tee in the cold supply fitted for the safety control group.

A Non-Return Valve (not supplied) must be fitted to prevent backflow. Calculate the flowrate and pump size by determining the total heat loss in flow and return in watts.

$$\text{Required flowrate} = \frac{\text{Total watts}}{4186 \times 1000 \times T} \quad \text{litre/second}$$

Where T = temperature difference between flow and return (normally the desirable temperature drop is 5°C and the hot water temperature should be 60°C).



10. SCALE ADVICE & MAINTENANCE

- In areas of hard water low storage temperatures (below 50°C) will result in scale deposition.
- It is advisable to set the thermostat 50 to 60°C or above and fit a water softener or scale inhibitor (capable of the required circuit flowrate), in the cold supply line.
- Special Incalloy elements are available to limit element descaling frequency.

MAINTENANCE

- The valve easing gear on the pressure + temperature relief valve must be operated at least once every 6 months.
- The charge pressure of the expansion vessel should be checked annually with a pressure gauge at the top (and with hot tap open). Recharge with clean dry air to 3.5 bar.
- Clean the pressure reducing valve filter every 2 years or if flow from water heater begins to deteriorate.

11. TROUBLE SHOOTING + FAULT GUIDE

WARNINGS

If hot water discharges at tundish do not turn off supply main. Switch off power to electric elements and shut-down heating boiler (indirect models). The cause of this could be a failure of the safety controls and you should immediately contact your installer or our service operator.

SYMPTOMS POSSIBLE CAUSES ACTION

1. No or low flow

- Poor mains pressure
- Restricted pipework
- Mains stopcock not turned on
- Sticking jumper in stop cock
- Blocked filter

2. Discharging cold relief valve

- Loss of expansion vessel charge
- Defective pressure reducing valve
- Blocked or defective expansion relief valve
- Crossflow from cold supply through mixer top or other fittings

3. Water is cold

- Boiler not switched on (indirect)
- Air locked primary flow
- Thermostat settings incorrect
- Cut-out switch needs reset

- Check and recharge vessel (with hot tap open)

- Replace pressure valve

- Operate expansion valve mechanism to clear or replace

- Check mixer taps and fit check valve on hot outlet from heater.

CARRY OUT PROCEDURE BELOW

WARNINGS (ELECTRIC MODELS)

Always isolate electrical supply before opening heating elements.

Confirm that power supply is reaching the elements.
 If thermal cut-out switches have operated press in red button. If this fails to heat cylinder the element has failed and should be replaced. Fit new element and reset the thermal cut-out.
 With power to the element and the cut-out reset, check the voltage on thermal cut-out output. If this is incorrect replace cut-out switch.

12. SPARES

Item description	Model	Specification
3/4 inch Temperature + Pressure Relief Valve	PT 75/7	3/4 inch male inlet, 3/4 inch female outlet, 95°C, 7 bar
3/4 inch Pressure Reduction	MPF 75	3/4 inch male inlet, 3/4 inch Female outlet, set 3,5 bar
3/4 inch Safety Group	CWC 75/6	3/4 inch male inlet 3/4 inch female outlet set 6 bar
1 inch Temperature + Pressure Relief Valve	PT100/7	1 inch male inlet 1 inch female outlet 95°C 7 bar
1 inch Pressure Reduction Valve	MP100	1 inch female inlet 1 inch female outlet set 3.5 bar
1 inch Safety Group	CWC100/6	1 inch male inlet 1 inch female outlet set 6 bar
Expansion Vessels:		
8 litre	ACS 8	
12 litre	ACS12	All Vessels:
16 litre	ACS16	3/4 inch inlet
24 litre	ACS24	set 3.5 bar
Coils (Heat exchanger for indirect models):		
125 litre Model (Rilsaneted Coil), standing	309161	
170 litre Model (Rilsaneted Coil), standing	309162	
125 litre Model (Rilsaneted Coil), wallhung	309165	
170 litre Model (Rilsaneted Coil), wallhung	309165	
200 litre Model 5-Multicoil	312056	
200 litre Model 7-Multicoil	312058	
200 litre Model 10-Multicoil	312060	
300 litre Model 5-Multicoil	312064	
300 litre Model 7-Multicoil	312066	
300 litre Model 10-Multicoil	312068	
450 litre Model 5-Multicoil		
450 litre Model 7-Multicoil		
450 litre Model 10-Multicoil		
Electrical Heater	32-323401	
Endcover gasket 236/170/4 mm	420021	
Coil gasket (200,300 and 450 litre models) (4 pcs. per unit)	420027	
Black top		

13. KESTON SPA Specifier's Guide

KESTON SPA unvented systems are built according to the highest international quality standards and are fully approved by WRc.

Unique Benefits of the KESTON SPA Tank

* The cylinder is made of the latest high quality pressure vessel steel for high working pressure up to 10 bars built by a design leader with 75 years experience in unvented systems.

* All pipe connections (beside those for the immersion heater) are gathered in the end flange, reducing the installation time to a minimum, and giving maximum tank life.

The Benefits of the Rilsan Coating

* Rilsan is completely neutral to the surroundings and is derived from natural resins. The first environmentally friendly water heater.

* 100% poretight. Therefore no need to use anodes.

* Proven over 15 years these water heaters uses to have practically no lime-accumulation on surface. Therefore minimal cleaning is required of the inner tank.

* Maximum protection against aggressive water allows a 5 year Warranty against corrosion.

* Elastic, shockproof, and proof against high chloride water which attacks stainless steel water tanks.

* Working temperature of 85°C allows high temperature storage.

The Benefits of the KESTON SPA Super Coil Systems

* Ultra-high continuous supply performance of hot water through highly effective heat transfer coil.

* Coil "installed to measure" covering the range from 22 kW to 137 kW continuous performance, allowing very high water flow from very compact storage.

* 5, 7 or 10 Coil versions for each cylinder size in the domestic range allows exact matching with demand.

* 2 extra ultra-high performance coils (20 and 30 coils) for cylinder sizes 300 and 450 litre for the domestic/industrial market.

* The multi-coil is made of heavy duty corrosion resistant 316 stainless steel.

- * Through KESTON SPA designed Rilsan coils and stainless steel Super Coil units scale built up is reduced to an absolute minimum.

KESTON SPA - Overall Benefits

- * 1st hour delivery performance up to 2635 litre (450 litre unit)
- * 10 minutes delivery performance up to 750 litre (450 litre unit)
- * Approved testing confirms Rilsan coating has no harmful bacterial growth after 6 months, compared to all other water heater materials where bacterial growth occurs.
- * The KESTON SPA unvented hot water tank is the best for resistance against corrosion,(aggressive water with e.g. nitrite).
- * Lime-accumulation in KESTON SPA is practically unknown.

