

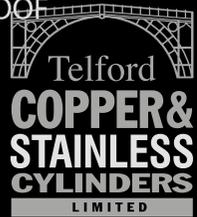
Tornado & Tempest Stainless™

Installation Guide & Customers Copy

(including Solar, Heat Pump & Horizontal)

Tel **01952 257963** Fax **01952 253452**

Furrows Business Park, Haybridge Road
Wellington, Telford, Shropshire TF1 2FE
www.telford-group.com



Tempest & Tornado Stainless

Mains pressure domestic hot water cylinder

STORAGE CAPACITY IN LITRES	WEIGHT WHEN FULL IN KGS
90	125
125	165
150	195
170	220
200	250
250	310
300	360
400	448
500	557

Water Supply Pressure	
Max 10 Bar	Min 1.5 Bar
Electric Immersion Heaters	
14"/3kW • 230V AC	
Operating Pressure	
3 BAR	
Expansion Vessel Charge Pressure	
See guide	
Expansion Relief Valve Setting	
6 BAR	
Pressure & Temperature Relief Valve Setting	
7 BAR / 90°C	
Maximum Primary Working Pressure	
2.5 BAR	
Solar	
5.5 BAR	
APPLIANCE SERIAL NO:	
Weight & Litres Capacity	
Litres	Kgs
Direct	Indirect

WARNING TO USER:

- This appliance **MUST** be serviced annually by a competent person.
- Failure to comply with the above will invalidate the manufacturer's warranty.
- Do not remove or adjust any component part of this unvented water heater: Contact the installer.
- 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 INSTALLER:

- This installation is subject to building regulation approval, notify Local Authority of intention to install.
- Use only manufacturer's recommended replacement parts.

For term and condition please refer to our website: www.telford-group.com

Installed by:

Name:

Address:

.....

Tel. No.:

Completion Date:



Technical help line: 01952 257961

Telford Copper Cylinders Limited, Unit 22, Furrows Business Park, Telford TF1 2FE

PROBLEM Solving: Assuming installation conforms to this guide.

SYMPTOM	POSSIBLE CAUSES	ACTION
No flow	Mains service valve not open	Open stop valve or replace.
	Blocked filter.	Clean filter in base of Pressure Reducing Valve.
Low Pressure	Service valve not fully open or partially blocked filter.	Ensure service valve is fully open or clean filter in PRV.
	Restricted delivery pipework	Replace damaged or old pipework.
	Low mains pressure.	Check incoming mains pressure or discuss with local water supplier
Discharge from P&T or P valve(s)	Expansion vessel.	Replenish or replace in accordance with instructions in the maintenance section.
	Inlet Pressure Reducing Valve.	Replace PRV
	Defective expansion relief valve or debris or scale on seating of valve.	Operate expansion relief valve mechanism to clear debris. If discharge does not stop replace expansion relief valve.
	Defective or incorrectly set cylinder thermostat (ie temperature set too high) allowing water to overheat.	Check setting and operation of cylinder thermostat (55-65°C). Replace if necessary.
	Crossflow from uncontrolled cold water mains supply to mixer tap or shower valves.	Check mixer taps and shower valve and fit check valves or area pressure controls if required. Alternatively supply cold water to mixer tap or shower valves from balanced supply position on inlet control set.
INDIRECT		
Water fails to heat	Boiler not working. Pump and/or control valve not operating.	Check boiler controls. Check control functions and replace faulty parts.
	Cylinder thermostat upper limit stat has operated.	Reset the button on the dual cylinder thermostat after investigating cause of overheating.
Not enough hot water	Cylinder too small.	Check storage specification is adequate. Telford Service Department can help.
Water not hot enough	Boiler not providing enough heat. Cylinder thermostat settings incorrect.	Adjust thermostat to between 55°C and 65°C. Ensure boiler thermostat is set to above 75°C.
DIRECT		
Water fails to heat	Upper limit cut-out switch has operated in immersion heater.	Turn off electricity supply, open cap of 1/H and reset cut-out (red button) or press external reset button if fitted.

	Date	Parts Replaced	Installers Reg. No.
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Installed and Commissioned			
First Annual Service			
Second Annual Service			
Third Annual Service			
Fourth Annual Service			
Fifth Annual Service			
Sixth Annual Service			
Seventh Annual Service			
Eighth Annual Service			
Ninth Annual Service			
Tenth Annual Service			

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

STEP 3 (all cylinders)

Position the unit vertically and make the incoming cold water connection to the fitting labelled "mains water inlet".

For commissioning and later maintenance purposes it is essential to fit a service valve immediately before the connection to the Inlet Control Group.

Installing the Inlet Control Group

The mains cold water supply should first pass through the pressure reducing valve, which reduces the pressure to 3.0 bar - this is factory set and cannot be adjusted - and then through the 6.0 bar *expansion valve*. The Inlet Control Group includes a single check valve and filter.

***NB** Upon commissioning. The expansion vessel pressure, should be adjusted to 0.2 bar less than the incoming water pressure. The vessel needs to be installed in a secure fashion.

Ensure that the Inlet Control Group is fitted adjacent to the cylinder with the arrows on the side pointing in the direction of the flow. It must be no further away than 500mm from the cylinder and have no devices or connections/draw offs between it and the cylinder*. Balanced supplies for showers and all taps should be taken from the appropriate connection on the Inlet Control Group(see illustration). Water regulations require that a single check valve should be fitted in the balanced draw off to prevent back flow. The inlet group supplied incorporates a single check within the body of the group.

*The expansion vessel for the Tempest Stainless™ must be fitted between the inlet control group and the unit. Tornado models do not require an expansion vessel as they use an internal air gap.

- A suitable means for draining the unit must be incorporated into the cold feed - Positioning the drain on the cold feed will allow a minimum of 80% of the cylinder to be drained off.

STEP 4 (all cylinders)

Connect the discharge pipework and tundish to the valve labelled "P&T" The tundish should be connected to the cylinder using 15mm metal pipe.

The tundish (supplied) must be fitted within 600mm of the outlet of the P&T valve and have at least 300mm of straight metal pipe below it, before any elbow or bend.

The pipework below the tundish should be fitted in accordance with the current edition of the Building Regulations (see page 7).

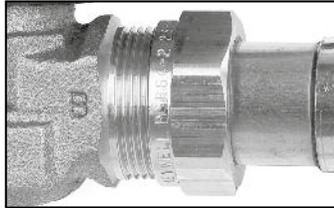
The discharge from the expansion valve on the Inlet Control Group must be connected into the discharge pipe work before the tundish (D1 Pipework).

We recommend a double check valve should be fitted to the hot water draw off to prevent any back pressure.

STEP 3 (indirect cylinders only)

Connect the boiler flow and return to the labelled connections. Before making the connections ensure that the coil is free from obstructions by blowing through it.

The Energy Cut Out valve is an essential part of the safety requirements for indirect mains pressure cylinders and should be installed on the primary flow to the cylinder with port 'B' (*embossed on side of valve body*) to the cylinder. The valve will open and close on receiving a signal from the cylinder thermostat. No further control is required for the hot water in a two zone valve system. **This valve must also be used in a flow share (Y Plan) system, in conjunction with the mid-position valve, to act as a safety cut out valve.**



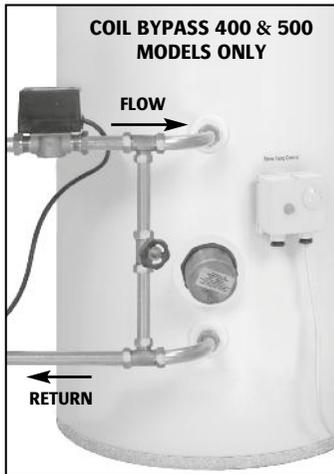
The cylinder thermostat controls the temperature of the hot water and also acts as an emergency cut out in the event that the boiler temperature controls fail. The cylinder thermostat is fitted into the pocket labelled "Store Temp Control" in the cylinder, and should be connected to operate the energy cut out valve in accordance with the wiring diagram for the scheme being installed (see pages 11 and 12).

We recommend the installation of a 22mm gate valve between the flow connection on the cylinder and the return connection on the cylinder as illustrated in image in step 6 page 5 on 400 & 500 models only. This can be opened slightly in the event of coil resonance.

STEP 6 (all cylinders)

Connect hot water draw off to connection labelled "Hot Water Draw Off".

NB: If the secondary circulation system (where used) contains more than 15 litres of water a separate expansion vessel must be provided to compensate for the larger stored volume.



STEP 7 (all cylinders)

Make electrical connections to the immersion heaters - see wiring diagram inside cap of immersion heater. **All electrical installations must be to IEE standards.**

The immersion heaters supplied with the Tornado and Tempest Stainless™ cylinder are of a special construction and include both a control thermostat and overheat protection. When fitting, ensure the 'O' ring is positioned correctly on the head of the immersion heater and lubricate before fitting. Fit it by hand until almost home then tighten gently as the 'O' rings will seal easily. **Only use genuine replacement parts which can be obtained from a Telford Copper Cylinders approved merchant.**

Ensure that the immersion heater control setting is set between 55°C and 65°C for economical operation. **The upper limit thermostat is set to 80°C and must not be tampered with.**

SERVICE RECORD

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

SERVICE PROVIDER

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

SERVICE 1 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

SERVICE 2 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

SERVICE 3 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

SERVICE 4 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

SERVICE 5 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

SERVICE 6 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

SERVICE 7 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

SERVICE 8 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

SERVICE 9 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

SERVICE 10 Date _____
 Engineer Name _____
 Company Name _____
 Telephone Number _____
 Comments _____

 Signature _____

UNVENTED SYSTEMS ONLY

Where is the pressure reducing valve situated (if fitted)?

What is the pressure reducing valve setting? bar

Has a combined temperature and pressure relief valve and expansion valve been fitted and discharge tested? Yes No

The tundish and discharge pipework have been connected and terminated to Part G of the Building Regulations Yes

Are all energy sources fitted with a cut out device? Yes No

Has the expansion vessel or internal air space been checked? Yes No

THERMAL STORES ONLY

What store temperature is achievable? °C

What is the maximum hot water temperature? °C

ALL INSTALLATIONS

The hot water system complies with the appropriate Building Regulations Yes

The system has been installed and commissioned in accordance with the manufacturer's instructions Yes

The system controls have been demonstrated to and understood by the customer Yes

The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer Yes

Commissioning Engineer's Signature _____

Customer's Signature _____

(To confirm satisfactory demonstration and receipt of manufacturer's literature)

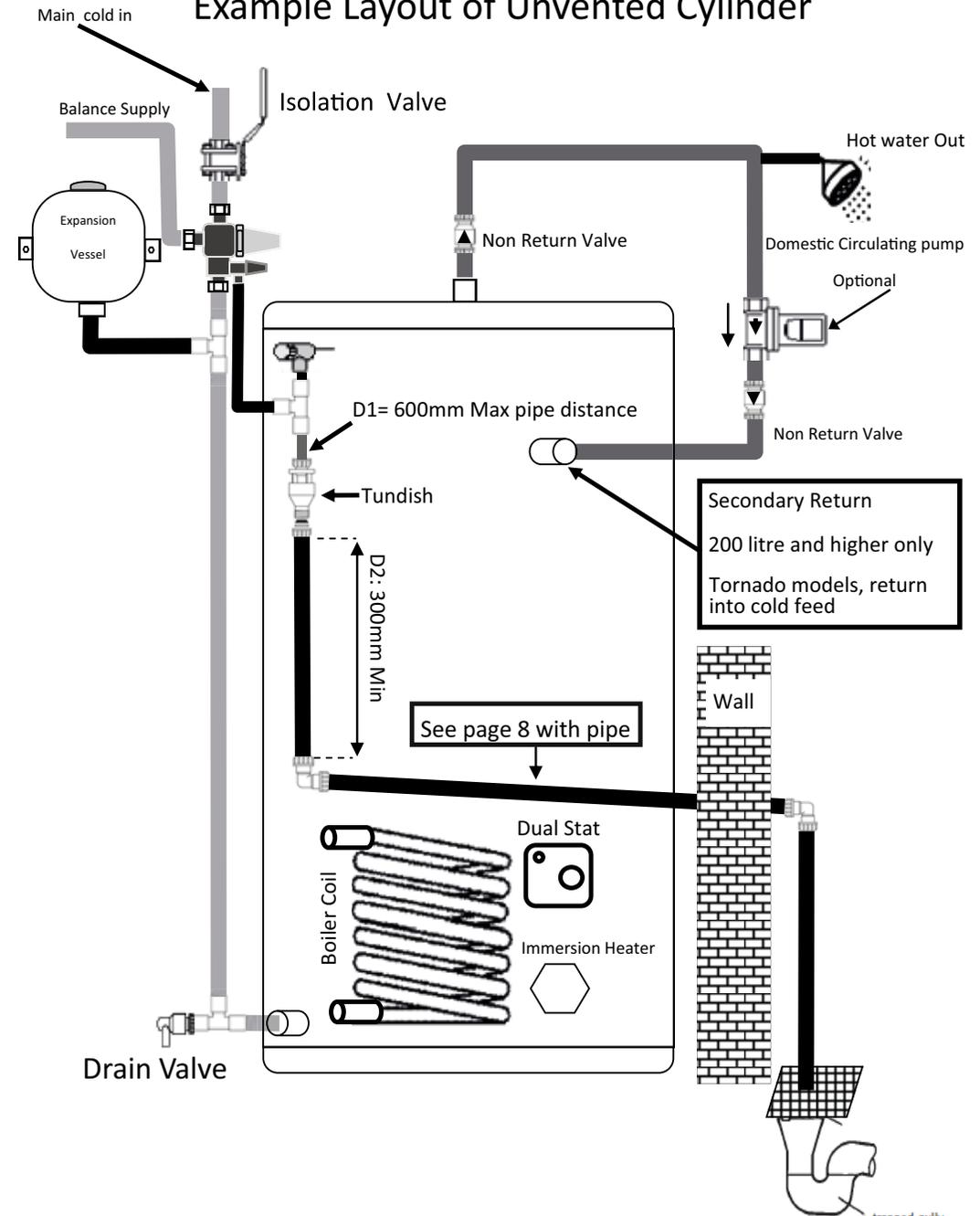
*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme.

A Building Regulations Compliance Certificate will then be issued to the customer.

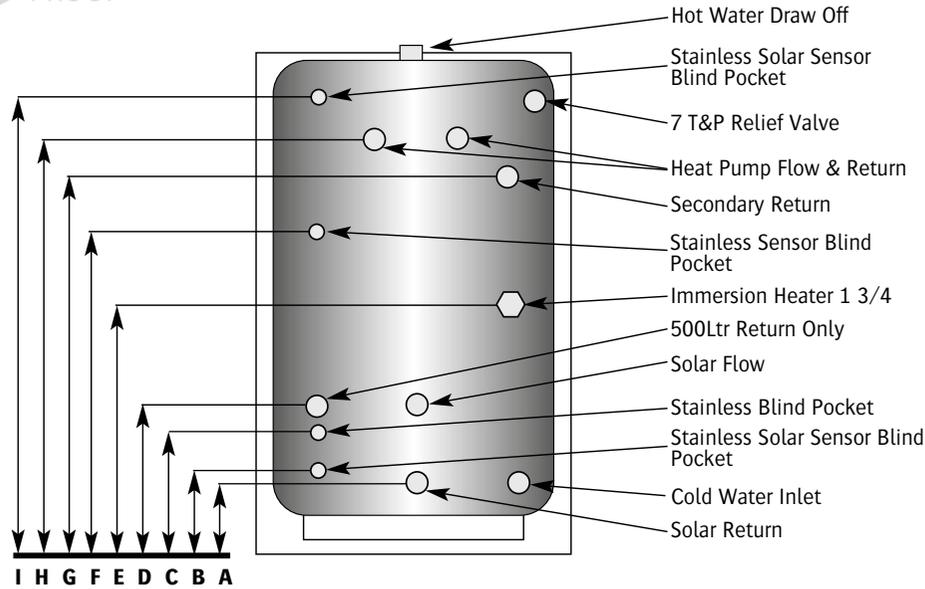
Please ensure that the installer has fully completed the Benchmark Checklist on the inside back pages of the installation instructions supplied with the product and that you have signed it to say that you have received a full and clear explanation of its operation. The installer is legally required to complete a commissioning checklist as a means of complying with the appropriate Building Regulations (England and Wales).



Example Layout of Unvented Cylinder



DIMENSIONS - TWIN COIL HEAT PUMP



All dimensions are given in mm and are subject to change without notice.

Cap (Ltr)	200	250	300	400	500
Height	1500	1800	1650	1590	1835
Diameter	554	554	580	710	710
A	173	173	201	240	240
B	223	223	301	290	290
C	373	373	401	440	390
D	473	473	581	540	490
E	543	543	651	610	590
F	973	973	1001	1155	890
G	1273	-	1261	1240	1240
H	1223	1263	1341	1340	1390
I	1323	1623	1441	1340	1590

Cap (L)	Heat Pump Coil Surface Area (m ²)	Solar Coil Surface Area (m ²)
200 Ltr	3.3	0.78
250 Ltr	3.3	1.04
300 Ltr	3.3	1.21
400 Ltr	3.3	1.57
500 Ltr	3.3	2

Foam Information
ODP Ozone Depletion potential = 0
GWP Global Warning Potential = 2.2
Foam Type = Polyurethane
British Standard 1566, D: 2002

Parts Supplied
2x Dual High Limit Stat
3Kw Immersion 240V single Phase
Expansion Vessel
Temp & Pressure Relief
3Bar Inlet Control Group
Two Port Motorised Valve

Connection Sizes	
120 - 300	H/P Coil
120 - 300	All other connections 22mm compression
400 - 500	1" Female BSP

Cap (L)	ERP Band	Immersion Heater	Standing Heat Loss
200 Ltr	C	1 x 3Kw 240v single phase	2.04kwh/24hrs
250 Ltr	C	1 x 3Kw 240v single phase	2.16kwh/24hrs
300 Ltr	C	1 x 3Kw 240v single phase	2.32kwh/24hrs
400 Ltr	C	1 x 3Kw 240v single phase	2.58kwh/24hrs
500 Ltr	C	1 x 3Kw 240v single phase	2.81kwh/24hrs

Discharge - Building Regulations:

Discharge pipes must be installed in accordance with the latest edition of the Building Regulations.

Discharge Pipes

The discharge pipe (D1) from the vessel up to and including the tundish is generally supplied by the manufacturer of the hot water storage system (see paragraph 3.5). Where otherwise, the installation should include the discharge pipe(s) (D1) from the safety device(s). In either case the tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible and within 600mm of the safety device e.g. the temperature relief valve.

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, be of metal and:

- a. 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. discharge pipes between 9m and 18m 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. Refer to Diagram 1, Table 1 and the worked example. An alternative approach for sizing discharge pipes would be to follow BS 6700: 1987 *Specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages*, Appendix E, section E2 and table 21.
- b. have a vertical section of pipe at least 300mm long, below the tundish before any elbows or bends in the pipework.
- c. be installed with a continuous fall.
- d. have discharges visible at both the tundish and the final point of discharge but where this is not possible or is practically difficult there should be clear visibility at one or other of these locations. Examples of acceptable discharge arrangements are:
 - i. ideally below a fixed grating and above the water seal in a trapped gully.
 - ii. 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 where children may play or otherwise come into contact with discharges a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.
 - iii. 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 3 m from any plastics guttering system that would collect such discharges (tundish visible).
 - iv. 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 discharging can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe (D2) 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 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.

DIAGRAM 1 - Typical discharge pipe arrangement

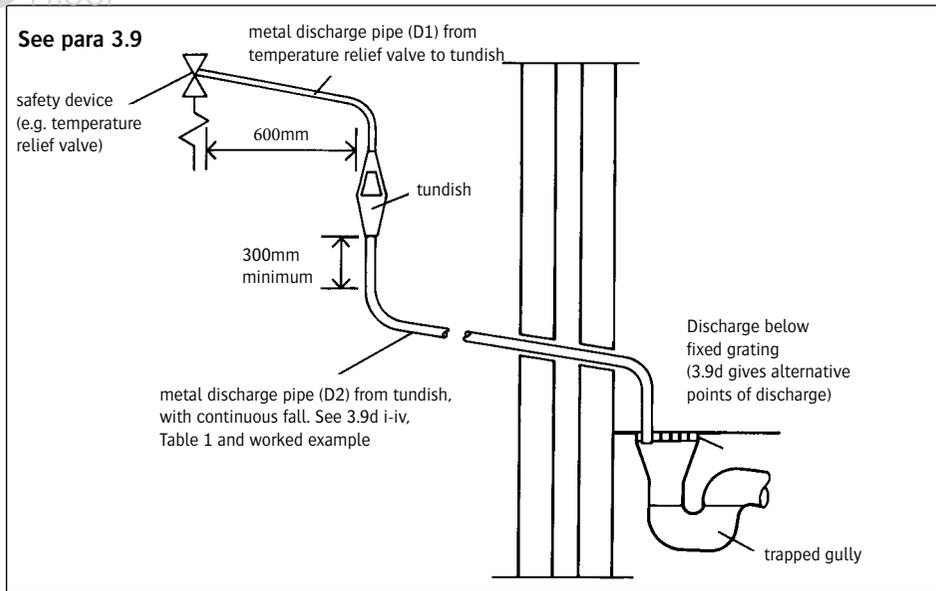


Table 1 - Sizing of copper discharge pipe 'D2' for common temperature relief valve outlet sizes

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
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
G1	28mm	35mm	up to 9m	1.4m
		42mm	up to 18m	1.7m
		54mm	up to 27m	2.3m

*see 3.5, 3.9, 3.9(a) and Diagram 1

Worked Example:-

The example below is for 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 1:

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 maximum permitted length equates to: 5.8m.

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

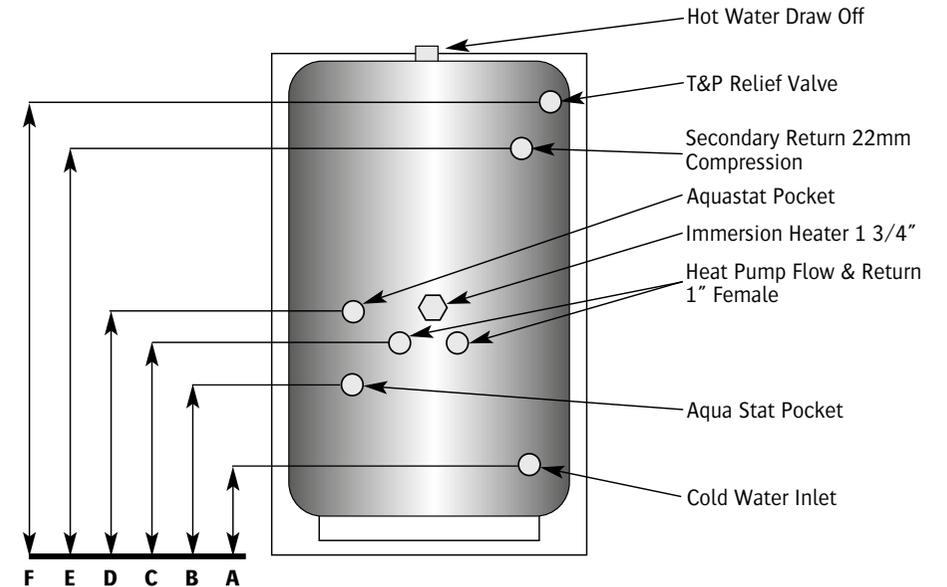
Maximum resistance allowed for a straight length of 28mm pipe (D2) from G¹/₂ temperature relief valve equates to: 18m.

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.

DIMENSIONS - TEMPEST HEAT PUMP INDIRECT



All dimensions are given in mm and are subject to change without notice.

Cap (Ltr)	170	200	250	300	400	500	Cap (L)	Heat Pump Coil Surface Area (m ²)
Height	1200	1500	1800	1650	1590	1835	170 Ltr	2
Diameter	510	554	554	580	710	710	200 Ltr	3.3
A	173	173	173	201	240	240	250 Ltr	3.3
B	373	223	423	301	555	540	300 Ltr	3.3
C	523	670	723	801	740	740	400 Ltr	3.3
D	623	770	873	901	840	890	500 Ltr	3.3
E	923	1123	1473	1261	1240	1390		
F	1023	1323	1624	1441	1340	1570		

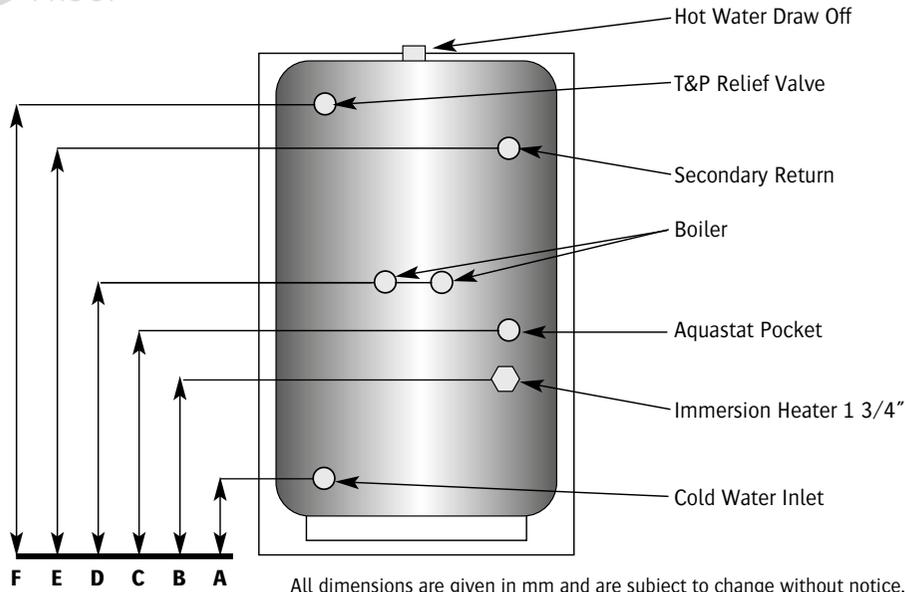
Foam Information
ODP Ozone Depletion potential = 0
GWP Global Warming Potential = 2.2
Foam Type = Polyurethane
British Standard 1566, D: 2002

Parts Supplied
Dual High Limit Stat
3Kw Immersion Heater 240V single Phase
Expansion Vessel
7Bar Temperature & Pressure Relief
3Bar Inlet Control Group
Two Port Motorised Valve

Connection Sizes	
120 - 300	H/P Coil
120 - 300	All other connections 22mm compression
400 - 500	1" Female BSP

Cap (L)	ERP Band	Immersion Heater	Standing Heat Loss
200 Ltr	C	1 x 3Kw 240v single phase	2.04kwh/24hrs
250 Ltr	C	1 x 3Kw 240v single phase	2.16kwh/24hrs
300 Ltr	C	1 x 3Kw 240v single phase	2.32kwh/24hrs
400 Ltr	C	1 x 3Kw 240v single phase	2.58kwh/24hrs
500 Ltr	C	1 x 3Kw 240v single phase	2.81kwh/24hrs

DIMENSIONS - TEMPEST INDIRECT HI GAIN



Cap (Ltr)	90	125	150	170	200	250	300	400	500
Height	750	935	1060	1200	1120	1330	1650	1590	1835
Diameter	510	510	510	510	580	580	580	710	710
A	170	170	170	170	195	195	195	240	240
B	200	200	200	200	225	225	225	270	270
C	400	400	400	450	475	555	555	640	640
D	495	495	495	600	625	845	845	870	890
E	-	-	-	-	815	975	1255	1240	1390
F	550	750	880	1030	930	1140	1435	1340	1590

Cap (L)	Time to re-heat from Cold	Time to re-heat from 75% draw-off with Boiler
90 Ltr	13 Min	9 Min
125 Ltr	19 Min	13 Min
150 Ltr	19 Min	13 Min
170 Ltr	19 Min	13 Min
200 Ltr	17 Min	12 Min
250 Ltr	18 Min	13 Min
300 Ltr	20 Min	15 Min
400 Ltr	23 Min	18 Min
500 Ltr	25 Min	20 Min

Foam Information
ODP Ozone Depletion potential = 0
GWP Global Warning Potential = 2.2
Foam Type = Polyurethane
British Standard 1566, D: 2002
Parts Supplied
Dual High Limit Stat
3Kw Immersion Heater 240V single Phase
Expansion Vessel
Temperature & Pressure Relief
3Bar Inlet Control Group
2 Port Motorised Valve

Cap (L)	ERP Band	Immersion Heater	Standing Heat Loss
90 Ltr	C	1 x 3Kw 240v single phase	1.37kwh/24hrs
125 Ltr	C	1 x 3Kw 240v single phase	1.48kwh/24hrs
150 Ltr	C	1 x 3Kw 240v single phase	1.72kwh/24hrs
170 Ltr	C	1 x 3Kw 240v single phase	1.94kwh/24hrs
200 Ltr	C	1 x 3Kw 240v single phase	2.04kwh/24hrs
250 Ltr	C	1 x 3Kw 240v single phase	2.16kwh/24hrs
300 Ltr	C	1 x 3Kw 240v single phase	2.32kwh/24hrs
400 Ltr	C	1 x 3Kw 240v single phase	2.58kwh/24hrs
500 Ltr	C	1 x 3Kw 240v single phase	2.81kwh/24hrs

NOTES ON WATER QUALITY AND SCALING:

Water hardness can vary considerably around the country. If furring of kettles normally occurs in the area, then the unit should be fed with conditioned water only. This can be provided by a water softener with a high capacity flow rate, or a suitable water conditioner (not supplied). It is recommended that the temperature controls are set below 65°C to prevent lime scale build up.

The performance of all water storage appliances and their associated components may deteriorate if you do not protect adequately against hard water scaling. If more than 150ppm salts are present in local water samples, an effective conditioner should always be used.

MAINTENANCE:

The following checks should be conducted annually:

Check the operation of the T & P valve and Expansion valve by rotating the heads of the valves in turn until water is discharged. The discharge should stop immediately when the valve head is released. Should this not be the case the valve should be replaced. Check that the discharged water flows freely to waste and that there is no blockage.

Remove and clean the filter in the Pressure Reducing Valve.

Check that the expansion vessel charge pressure is set at 0.2 bar below the incoming pressure. If water is being discharged from the expansion valve it may be indicative of pressure loss within the expansion vessel itself. To check the pressure, isolate the unit from the cold supply and release any pressure by opening a hot tap until water stops flowing. Then use a tyre pressure gauge to verify the charge pressure. If the unit is more than 5 years old when this problem is experienced it may be advisable to replace the pressure vessel. If however, the pressure in the expansion vessel is 0.2 bar below incoming pressure the discharge may be being caused by back pressure or cross-over between the cold and hot water supplies - see below.

To replace the pressure vessel, unscrew from threaded connection. The new pressure vessel should be adjusted to 0.2 bar below incoming pressure and then fitted to the cylinder, ensuring that the threads are sealed appropriately.

Back pressure

Back pressure from a faulty or uncontrolled mixer valve or appliance will cause the cylinder to over pressurise and may result in water being discharged from the expansion valves. To protect the cylinder we recommend the fitting of a check valve on the hot water draw off to prevent back flow into the cylinder. All hot water and cold water draw offs should be balanced at the inlet control valve.

Tornado 3.0 Servicing:

If your Tornado 3.0 is discharging, it may be that the air gap has depleted. To recharge the air gap follow these steps:

Turn off all heat sources supplying the cylinder and the cold water feed. Open a hot tap until it stops running to check, then close. Leave the lowest hot tap in the property open and then hold open the T&P valve until the water stops passing and you hear bubbling of air inside the tank.

Open the cold feed and turn the heat sources back on, if discharges persist phone the Telford helpline.

Use only genuine Telford replacement parts on all repairs.

Failure to do this will nil and avoid the warranty.

**Prestige
Lifetime Guarantee:**

The Stainless steel cylinder carries a lifetime guarantee against faulty manufacture or materials, provided that:

- The product is used solely for the storage of water from a mains public supply.
- The product has not been modified or tampered with.
- The product has been installed and maintained in accordance with the installation instructions.
- You must register your guarantee online within 28 days at www.telford-group.com

The immersion heater, water control valves, cylinder thermostat, expansion vessel and energy cut out valves are guaranteed for two years from the date of manufacture on a new build. For new install/replacement one year.

This guarantee is only available in the United Kingdom of Great Britain and Northern Ireland.

Claims made against our Lifetime Guarantee must be supported with evidence of purchase and the product serial number, along with a copy of the completed Benchmark Checklist and service record. Your Statutory rights are not affected by this guarantee.

All cylinders are WRAS Approved.

Exclusions to the guarantee

Any labour charges associated with replacement of the unit or any of its components.

Any consequential losses caused by malfunction or failure of the unit.

The effects of scale build up.

Failure to carry out the annual safety check on this product will invalidate the guarantee.

Failure to service the expansion vessel may cause a **serious escape of water.**

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.

Servicing:

After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located on the inside back pages of this document.

EASYFIT KIT FOR TELFORD TORNADO CYLINDERS

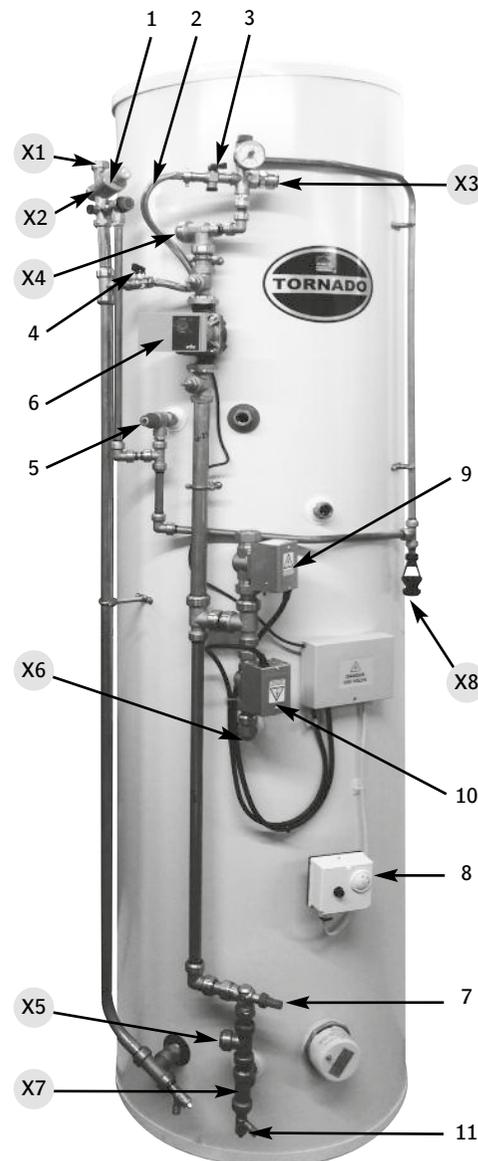


DIAGRAM KEY

- 1 - Inlet Group
- 2 - Filling loop
- 3 - Isolating valve to heating
- 4 - Isolating valve
- 5 - T&P Relief
- 6 - Pump
(Remove if central heating boiler has integral pump)
- 7 - By-pass
- 8 - Cylinder aquastat
- 9 - Heating 2 port valve
- 10 - Hot water 2 port valve
- 11 - Drain off point
- X1 - Mains water feed
- X2 - Balanced supply
- X3 - Heating expansion vessel connection
- X4 - Flow from boiler
- X5 - Return to boiler
- X6 - Flow to coil
- X7 - Return from coil
- X8 - Discharge to outside (D2)

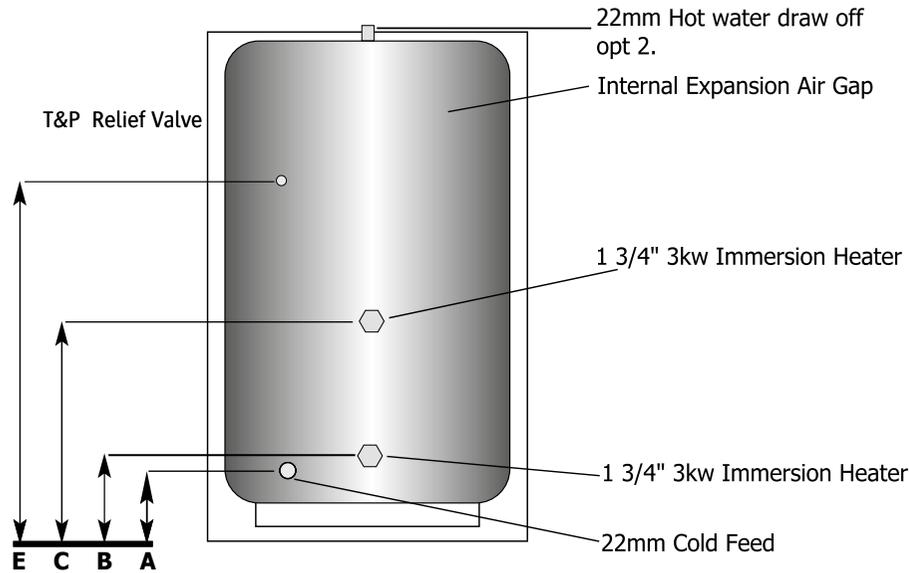
DO NOT use the pipework as a carrying aid when positioning this cylinder.

Separate power supplies must be made available for the pump, two port valves and the aquastat.

Installation must be carried out as described in this installation guide with reference to this section where appropriate. This will ensure compliance with Building Regulations, IEE Regulations and Telford Copper and Stainless Cylinders warranty provisions.



DIMENSIONS - TORNADO DIRECT



All dimensions are given in mm and are subject to change without notice

Cap (Ltr)	90	125	150	170	200	250	300
Height	n/a	1025	1260	1325	1550	1800	2050
Dia	n/a	580	580	580	580	580	580
A	n/a	178	178	178	178	178	178
B	n/a	200	200	200	200	200	200
C	n/a	495	495	495	495	495	495
E	n/a	800	950	1065	1150	1350	1500

Parts Supplied	
T&P Cover	Temperature & Pressure Relief
3Kw Immersion Heater 240V x 2	3Bar Inlet Control Group

Foam Information
ODP Ozone Depletion Potential = 0
GWP Global Warming Potential = 2.2
Foam Type = Polyurethane
British Standard 1566,D:2002

Cap (L)	24Hrs Standing Heat Loss	Immersion Heater
90 Ltr	n/a	n/a
125 Ltr	1.17kwh/24hrs	2 x 3Kw 240v single phase
150 Ltr	1.24kwh/24hrs	2 x 3Kw 240v single phase
170 Ltr	1.27kwh/24hrs	2 x 3Kw 240v single phase
200 Ltr	1.53kwh/24hrs	2 x 3Kw 240v single phase
250 Ltr	1.68kwh/24hrs	2 x 3Kw 240v single phase
300 Ltr	1.87kwh/24hrs	2 x 3Kw 240v single phase

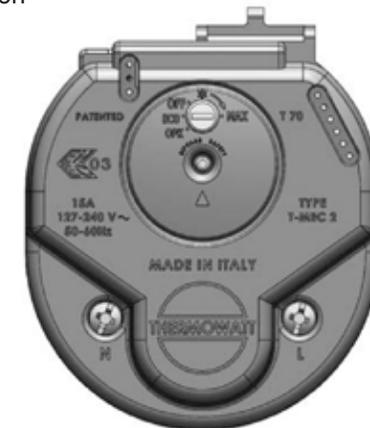
Cap (L)	Load Profile	ERP Band
90 Ltr	n/a	C
125 Ltr	L	C
150 Ltr	L	C
170 Ltr	L	C
200 Ltr	L	C
250 Ltr	L	C
300 Ltr	L	C

Immersion Heaters - Further Information.

All Unvented direct cylinders come with 1 no. standard immersion heater (top) and 1 no. smart immersion heater (bottom).

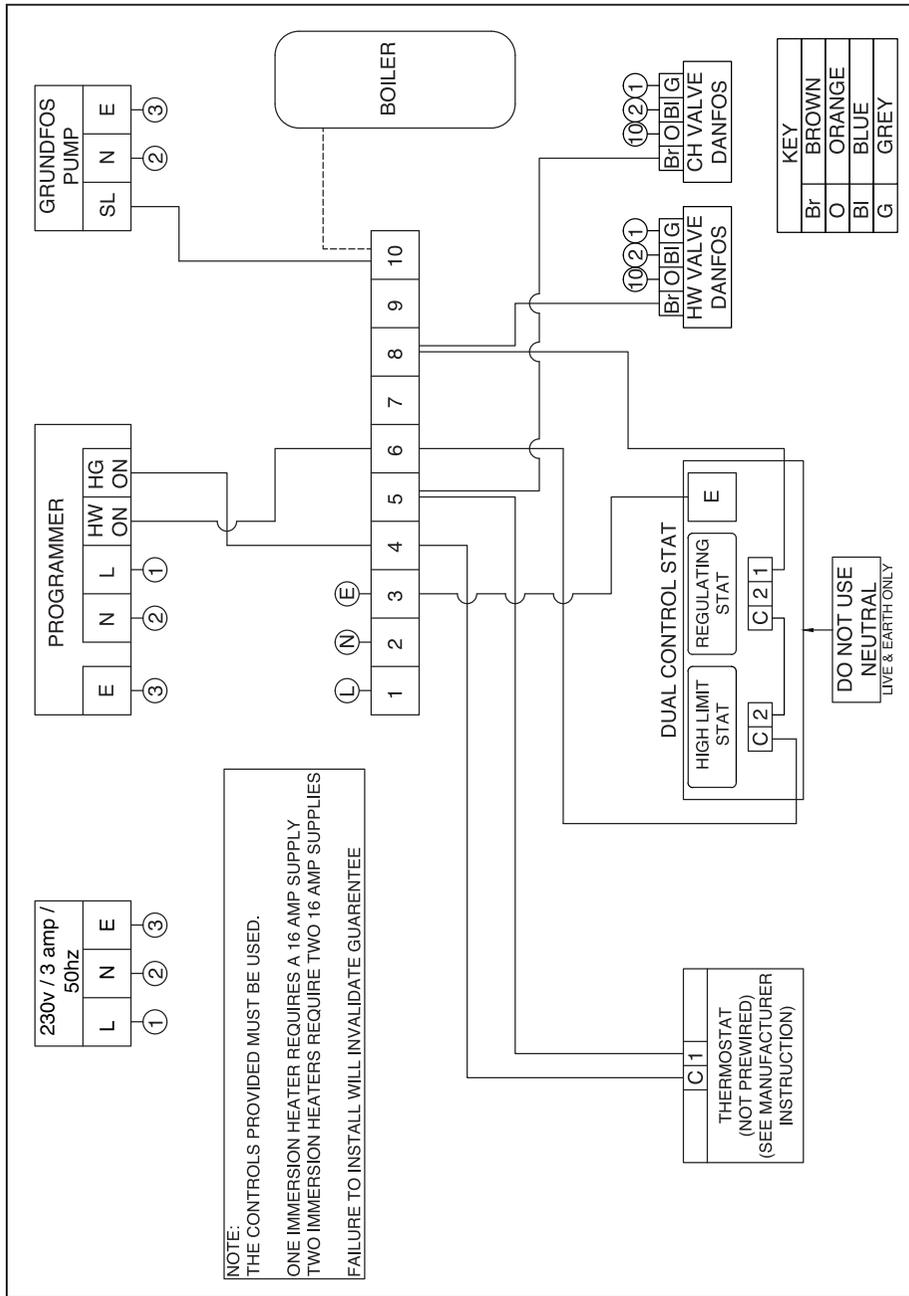
The Smart immersion comes set in ECO mode as standard with a total of four different settings:

- OPK - Basic Electronic Thermostat mode – With the control knob turned anticlockwise to the OPK position, the thermostat will control water temperature to maximum 60°C and is unaffected by any interruption to power supply. Use this position for manual switching or by timer such as economy 7 type installations. Antibacterial mode will function.
- ECO - Smart mode Factory Setting – This setting gives maximum energy efficiency and uses smart technology to learn the user's habits to control water temperature to suit demand. During the first week the thermostat will run at 65°C whilst recording hot water usage, then the following and each subsequent week it adjusts automatically to give the most efficient use of electricity. In the event of any power loss for more than 20 minutes, the thermostat will lose all recorded data, and will return to learning mode. Antibacterial mode will function.
NOTE: Changing the thermostat setting from the factory pre-set position may impact upon the efficiency rating of the cylinder in which it is fitted.
- OFF - In this mode the thermostat will not operate, only the double pole safety cut out will function. Antibacterial mode will NOT function.
- * - Antifreeze mode – This setting will maintain a minimum water temperature of 20°C to prevent the water heater from freezing. Antibacterial mode will function.
- MAX - Maximum temperature in Manual Mode – With the control knob turned clockwise to the MAX setting the thermostat will control water temperature to a maximum of 70°C. The water temperature can be adjusted to a lower setting by turning the adjustment knob anticlockwise up to 80° where the lowest setting is approximately 10°C. Antibacterial mode will function

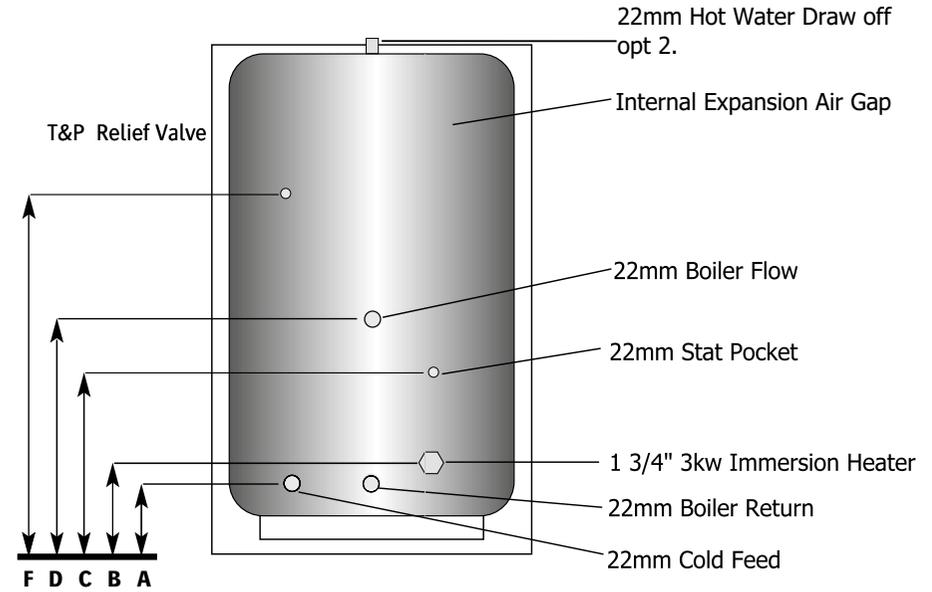


S-PLAN WIRING LAYOUT AND SYSTEMS SCHEMATIC

All Electrical Installations Must be to IEE Standards



DIMENSIONS - TORNADO INDIRECT



All dimensions are given in mm and are subject to change without notice

Cap (Ltr)	90	125	150	170	200	250	300
Height	n/a	1025	1260	1325	1550	1800	2050
Dia	n/a	580	580	580	580	580	580
A	n/a	178	178	178	178	178	178
B	n/a	248	248	248	248	248	248
C	n/a	495	495	495	495	495	495
D	n/a	505	505	605	605	825	825
F	n/a	800	950	1065	1150	1350	1500

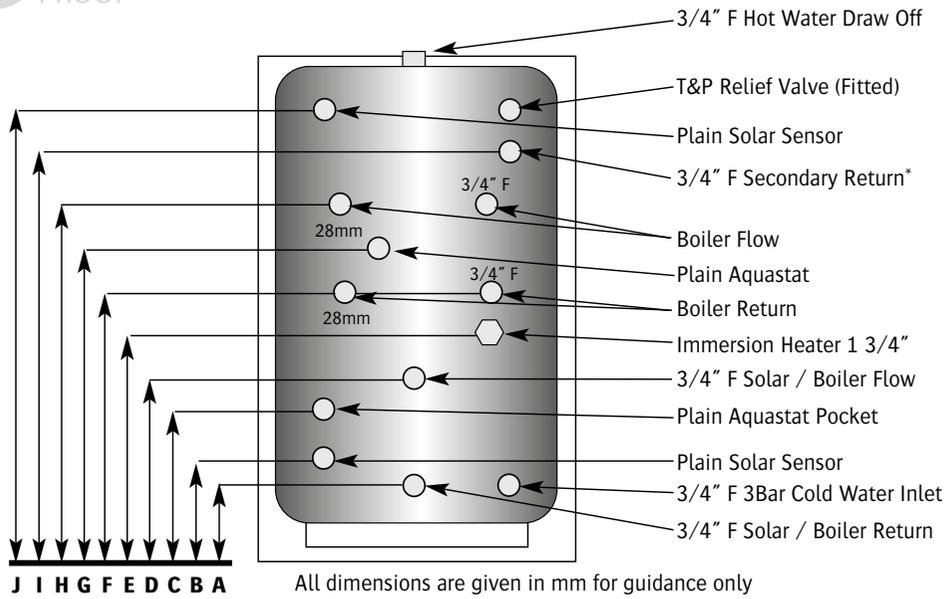
Parts Supplied	
Dual High Limit Stat	Temperature & Pressure Relief
3Kw Immersion Heater 240V single Phase	3Bar Inlet Control Group
T&P Cover	2 Port Motorised Valve

Foam Information	
ODP Ozone Depletion Potential = 0	
GWP Global Warming Potential = 2.2	
Foam Type = Polyurethane	
British Standard 1566,D:2002	

Cap (L)	24Hrs Standing Heat Loss	Immersion Heater
90 Ltr	n/a	n/a
125 Ltr	1.17kwh/24hrs	1 x 3Kw 240v single phase
150 Ltr	1.24kwh/24hrs	1 x 3Kw 240v single phase
170 Ltr	1.27kwh/24hrs	1 x 3Kw 240v single phase
200 Ltr	1.53kwh/24hrs	1 x 3Kw 240v single phase
250 Ltr	1.68kwh/24hrs	1 x 3Kw 240v single phase
300 Ltr	1.87kwh/24hrs	1 x 3Kw 240v single phase

Cap (L)	Time to re-heat from cold	ERP Band
90 Ltr	n/a	B
125 Ltr	18 Min	B
150 Ltr	22 Min	B
170 Ltr	26 Min	C
200 Ltr	25 Min	C
250 Ltr	32 Min	C
300 Ltr	38 Min	C

DIMENSIONS - TEMPEST TRIPLE COIL



* Cylinders 400 Ltrs and above are fitted with 1" BSPF Tappings

Cap (Ltr)	200	250	300	400	500
Height	1120	1330	1650	1590	1835
Dia	580	580	580	710	710
A	190	190	190	235	235
B	245	245	245	285	285
C	390	390	390	435	435
D	500	500	500	620	620
E	545	575	570	715	715
F	585	640	640	820	820
G	780	890	885	1120	1120
H	890	1025	1250	1240	1260
I	890	1025	1020	1240	1390
J	930	1140	1430	1340	1590

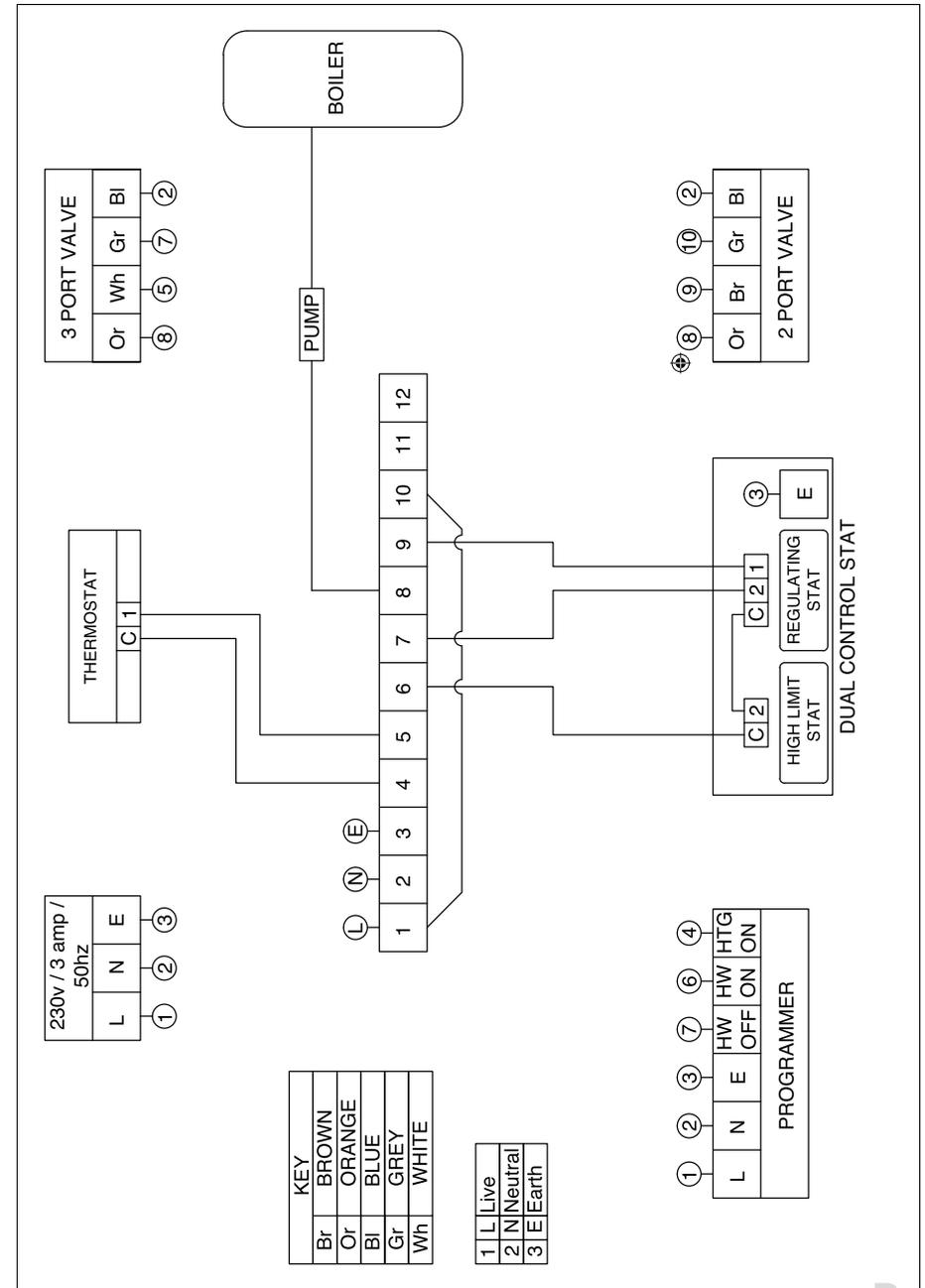
Cap (L)	ERP Band	Standing Heat Loss	Boiler & Solar Cap (L)
170 Ltr	C	1.94kwh/24hrs	50% Solar 50% Boiler
200 Ltr	C	2.04kwh/24hrs	50% Solar 50% Boiler
250 Ltr	C	2.16kwh/24hrs	50% Solar 50% Boiler
300 Ltr	C	2.32kwh/24hrs	50% Solar 50% Boiler
400 Ltr	C	2.58kwh/24hrs	50% Solar 50% Boiler
500 Ltr	C	2.81kwh/24hrs	50% Solar 50% Boiler

Parts Supplied	
2 x Dual High Limit Stat	Temperature & Pressure Relief
3Kw Immersion Heater 240V single Phase	3Bar Inlet Control Group
Expansion Vessel	2 Port Motorised Valve

Cap (L)	Time to Re-heat from 75% Draw-off with Solar	Time to Re-heat from 75% Draw-off with Boiler
170 Ltr	Dependent on UV	85Ltr = 18Min
200 Ltr	Dependent on UV	100Ltr = 20Min
250 Ltr	Dependent on UV	125Ltr = 25Min
300 Ltr	Dependent on UV	150Ltr = 26Min
400 Ltr	Dependent on UV	200Ltr = 24Min
500 Ltr	Dependent on UV	250Ltr = 25Min

Foam Information
ODP Ozone Depletion Potential = 0
GWP Global Warming Potential = 2.2
Foam Type = Polyurethane
British Standard 1566.D:2002

Y PLAN TORNADO & TEMPEST STAINLESS (WIRING FOR FLOWSHARE ONLY V4073H)



TELFORD SOLAR UNVENTED TWIN COIL CYLINDER STANDARD TAPPING DIAGRAM



* Cylinders 400 Ltr and above are fitted with 1" BSPF Tappings

A	Solar Sensor Pockets
B	Hot Water Draw Off - 3/4" F
C	Pressure & Temperature relief valve - fitted
D	Boiler flow & return connections - 3/4" F
E	Cylinder thermostat pocket - 22mm
F	Immersion heater
G	Solar coil flow connection - 3/4" F
H	Solar coil return connection - 3/4" F
I	Auxiliary cylinder thermostat pocket - 22mm
J	Cold fill connection - 3/4" F

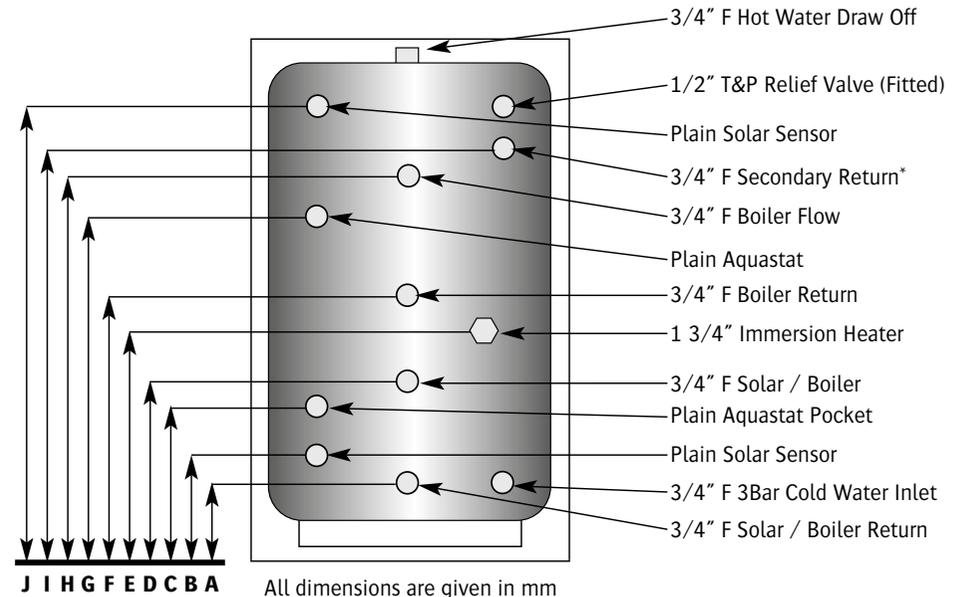
Position of tappings may differ slightly according to cylinder capacity.

The following components are supplied with the cylinder:-

T&P Relief Valve (fitted), Immersion Heater, Aquastat, Safety Cut Out Valve, High Pressure Inlet Group and Expansion Vessel (sized to suit).

Installation must be carried out as described in this installation guide with reference to this section where appropriate. This will ensure compliance with Building Regulations, IEE Regulations and Telford Copper Cylinders warranty provisions.

TEMPEST TWIN COIL / SOLAR INFORMATION DATA



All dimensions are given in mm

* Cylinders 400 Ltrs and above are fitted with 1" BSPF Tappings

Cap (Ltr)	170	200	250	300	400	500
Height	1200	1120	1330	1650	1590	1835
Dia	510	580	580	580	710	710
A	175	190	190	190	235	235
B	175	245	245	245	285	285
C	395	390	390	390	435	435
D	500	500	500	500	620	620
E	535	545	575	570	715	715
F	585	585	640	640	820	820
G	865	780	890	885	1120	1120
H	N/A	890	1025	1250	1240	1390
I	1015	890	1025	1020	1240	1260
J	1040	930	1140	1430	1340	1590

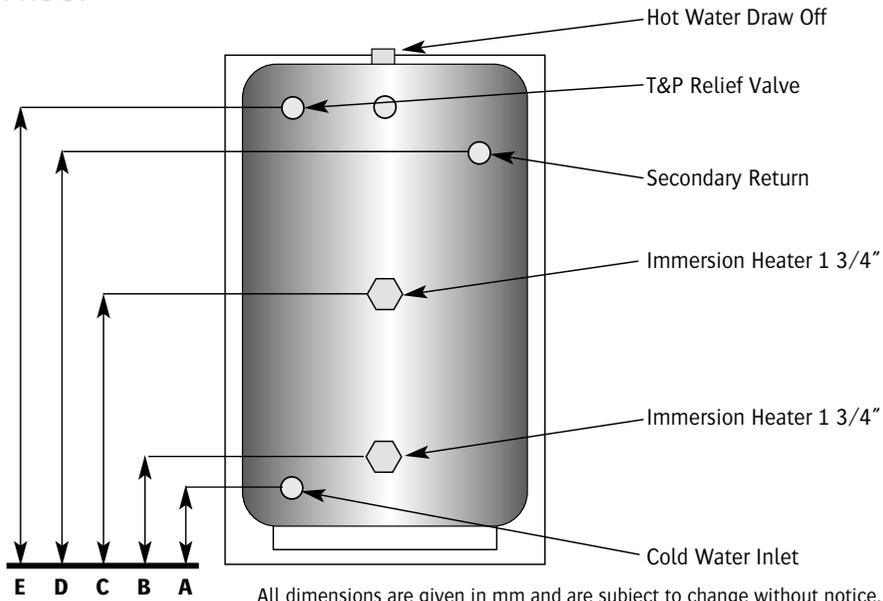
Cap (L)	ERP Band	Standing Heat Loss	Boiler & Solar Cap (L)
170Ltr	C	1.94kwh/24hrs	50% Solar 50% Boiler
200Ltr	C	2.04kwh/24hrs	50% Solar 50% Boiler
250Ltr	C	2.16kwh/24hrs	50% Solar 50% Boiler
300Ltr	C	2.32kwh/24hrs	50% Solar 50% Boiler
400Ltr	C	2.58kwh/24hrs	50% Solar 50% Boiler
500Ltr	C	2.81kwh/24hrs	50% Solar 50% Boiler

Parts Supplied	
Dual High Limit Stat	Temperature & Pressure Relief
3Kw Immersion Heater 240V single Phase	3Bar Inlet Control Group
Expansion Vessel	2 Port Motorised Valve

Cap (L)	Time to Re-heat from 75% Draw-off with Solar	Time to Re-heat from 75% Draw-Off with Boiler
170Ltr	Dependent on UV	85 Ltr = 18 Min
200Ltr	Dependent on UV	100 Ltr = 20 Min
250Ltr	Dependent on UV	125 Ltr = 25 Min
300Ltr	Dependent on UV	150 Ltr = 26 Min
400Ltr	Dependent on UV	200 Ltr = 24 Min
500Ltr	Dependent on UV	250 Ltr = 25 Min

Foam Information
ODP Ozone Depletion Potential = 0
GWP Global Warming Potential = 2.2
Foam Type = Polyurethane
British Standard 1566,D:2002

DIMENSIONS - TEMPEST DIRECT



Cap (Ltr)	90	125	150	170	200	250	300	400	500
Height	750	935	1060	1200	1120	1330	1650	1590	1835
Diameter	510	510	510	510	580	580	580	710	710
A	170	170	170	170	195	195	195	240	240
B	200	200	200	200	225	225	225	270	270
C	410	410	620	620	645	645	645	690	690
D	-	-	-	-	815	975	1255	1240	1390
E	550	750	880	1030	930	1140	1435	1340	1590

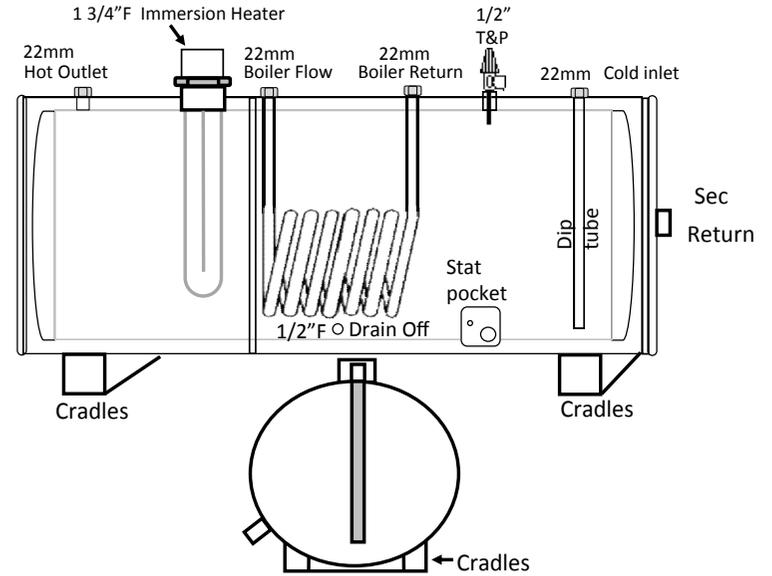
Cap (L)	Time to re-heat from Cold	Time to re-heat from 75% draw-off with Boiler
90 Ltr	52 Min	27 Min
125 Ltr	72 Min	37 Min
150 Ltr	86 Min	45 Min
170 Ltr	98 Min	51 Min
200 Ltr	108 Min	63 Min
250 Ltr	144 Min	75 Min
300 Ltr	202 Min	136 Min
400 Ltr	242 Min	198 Min
500 Ltr	289 Min	236 Min

Foam Information
ODP Ozone Depletion potential = 0
GWP Global Warning Potential = 2.2
Foam Type = Polyurethane
British Standard 1566, D: 2002

Parts Supplied
2 x 3Kw Immersion Heater 240V single Phase
Expansion Vessel
Temperature & Pressure Relief
3Bar Inlet Control Group

Cap (L)	ERP Band	Immersion Heater	Standing Heat Loss
90 Ltr	C	2 x 3Kw 240v single phase	1.37kwh/24hrs
125 Ltr	C	2 x 3Kw 240v single phase	1.48kwh/24hrs
150 Ltr	C	2 x 3Kw 240v single phase	1.72kwh/24hrs
170 Ltr	C	2 x 3Kw 240v single phase	1.94kwh/24hrs
200 Ltr	C	2 x 3Kw 240v single phase	2.04kwh/24hrs
250 Ltr	C	2 x 3Kw 240v single phase	2.16kwh/24hrs
300 Ltr	C	2 x 3Kw 240v single phase	2.32kwh/24hrs
400 Ltr	C	2 x 3Kw 240v single phase	2.58kwh/24hrs
500 Ltr	C	2 x 3Kw 240v single phase	2.81kwh/24hrs

Tempest Horizontal Unvented Indirect



Water Cap	90Ltr	125Ltr	150Ltr	170Ltr	200Ltr	250Ltr	300Ltr	400Ltr	500Ltr
Length	750	935	1060	1200	1120	1330	1650	1590	1835
Diameter	510	510	510	510	580	580	580	710	710
Height	610	610	610	610	655	655	655	760	760

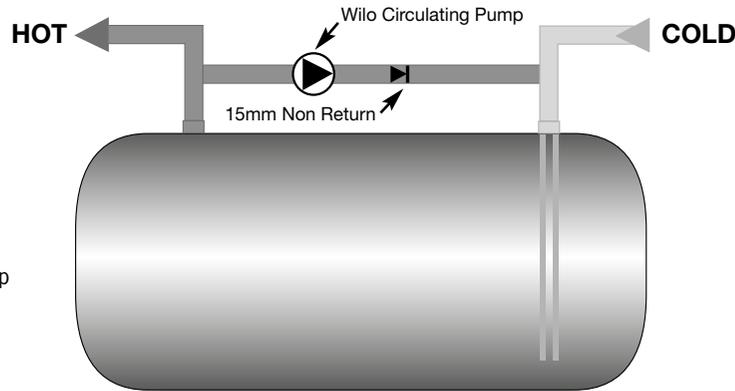
Cap	Time to re-Heat from Cold	Time to re-heat from 75% drawn off
90L	26 Min	18 Min
125L	36 Min	25 Min
150L	37 Min	26 Min
170L	36 Min	25 Min
200L	33 Min	24 Min
250L	35 Min	25 Min
300L	40 Min	29 Min
400L	45 Min	35 Min
500L	50 Min	40 Min

Cap	24Hr standing heat loss	Immersion Heater
90L	1.37kw/24hr	1x 3kW 240V
125L	1.48kw/24hr	1x 3kW 240V
150L	1.72kw/24hr	1x 3kW 240V
170L	1.94kw/24hr	1x 3kW 240V
200L	2.04kw/24hr	1x 3kW 240V
250L	2.16kw/24hr	1x 3kW 240V
300L	2.32kw/24hr	1x 3kW 240V
400L	2.58kw/24hr	1x 3kW 240V
500L	2.81kw/24hr	1x 3kW 240V

Installation must be carried out as described in this installation guide with reference to this section where appropriate. This will ensure compliance with Building Regulations, IEE Regulations and Telford Copper and Stainless Cylinders warranty provisions.

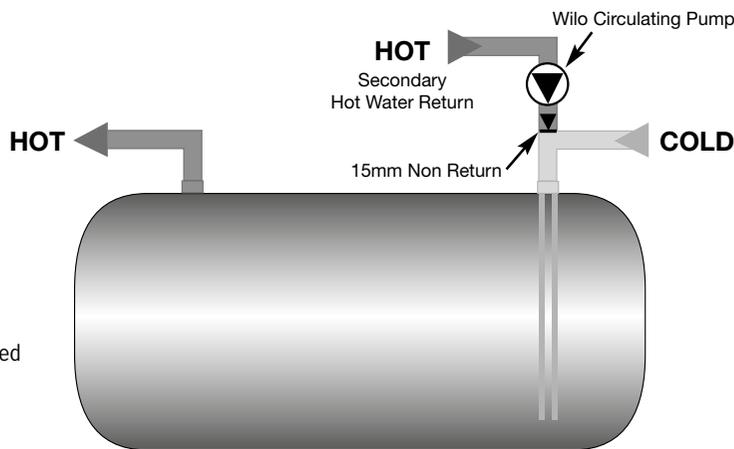
The cylinder should be mounted on the cradles (or other suitable support) so that the tappings A, B, C are along the top edge. The cylinder MUST NOT be rotated around the long axis.

WARNING IN THE ABSENCE OF A SECONDARY HOT WATER RETURN A STRATIFICATION PUMP IS RECOMMENDED TO MAINTAIN THE PERFORMANCE OF YOUR HORIZONTAL CYLINDER.



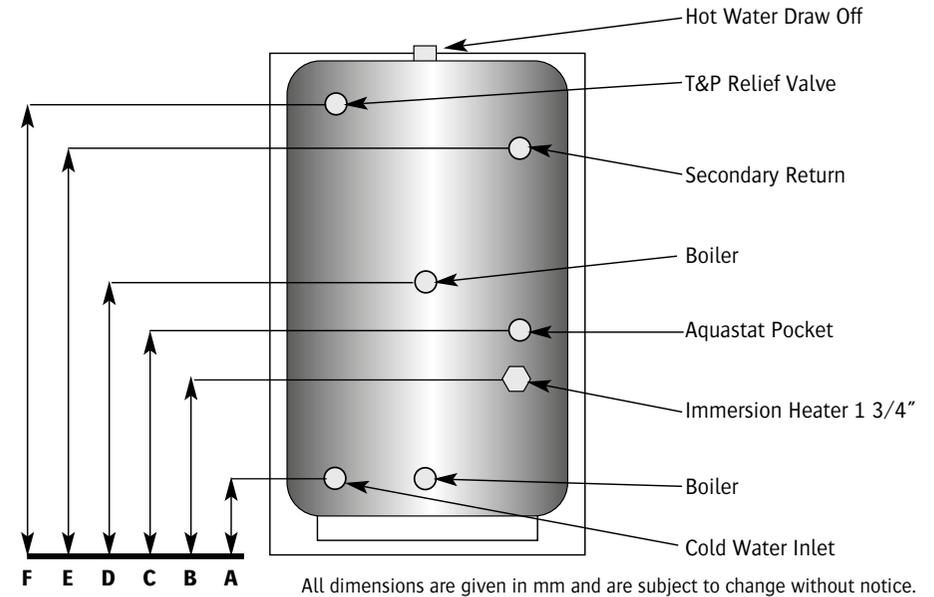
Fit a bypass across the coil as per **Page 5, Step 6 to 9**

We recommend the installation of a De-stratification pump to improve cylinder performance.



Secondary hot water return should be connected into the cold feed as illustrated

Please ensure you fill in and return your lifetime guarantee card.



All dimensions are given in mm and are subject to change without notice.

Cap (Ltr)	90	125	150	170	200	250	300	400	500
Height	750	935	1060	1200	1120	1330	1650	1590	1835
Diameter	510	510	510	510	580	580	580	710	710
A	170	170	170	170	195	195	195	240	240
B	200	200	200	200	225	225	225	270	270
C	400	400	400	450	475	555	555	640	640
D	495	495	495	600	625	845	845	1240	890
E	-	-	-	-	815	975	1255	1240	1390
F	550	750	880	1030	930	1140	1435	1340	1590

Cap (L)	Time to re-heat from Cold	Time to re-heat from 75% draw-off with Boiler	Foam Information		Cap (L)	ERP Band	Immersion Heater	Standing Heat Loss
			ODP Ozone Depletion potential = 0	GWP Global Warming Potential = 2.2				
90 Ltr	26 Min	18 Min	Foam Type = Polyurethane		90 Ltr	C	1 x 3Kw 240v single phase	1.37kwh/24hrs
125 Ltr	36 Min	25 Min	British Standard 1566, D: 2002		125 Ltr	C	1 x 3Kw 240v single phase	1.48kwh/24hrs
150 Ltr	37 Min	26 Min	Parts Supplied		150 Ltr	C	1 x 3Kw 240v single phase	1.72kwh/24hrs
170 Ltr	36 Min	25 Min			Dual High Limit Stat	170 Ltr	C	1 x 3Kw 240v single phase
200 Ltr	33 Min	24 Min	3Kw Immersion Heater 240V single Phase	200 Ltr	C	1 x 3Kw 240v single phase	2.04kwh/24hrs	
250 Ltr	35 Min	25 Min	Expansion Vessel	250 Ltr	C	1 x 3Kw 240v single phase	2.16kwh/24hrs	
300 Ltr	40 Min	29 Min	Temperature & Pressure Relief	300 Ltr	C	1 x 3Kw 240v single phase	2.32kwh/24hrs	
400 Ltr	45 Min	35 Min	3Bar Inlet Control Group	400 Ltr	C	1 x 3Kw 240v single phase	2.58kwh/24hrs	
500 Ltr	50 Min	40 Min	2 Port Motorised Valve	500 Ltr	C	1 x 3Kw 240v single phase	2.91kwh/24hrs	