

Torrent MultiFuelStore

Open vented thermal store providing both heating and mains pressure hot water

Design, Installation & Servicing Instructions



Models covered in this manual

Torrent MultiFuelStore OV T144-T350
Torrent MultiFuelStore SP T144-T350
Torrent MultiFuelStore SOL T210-T450

These instructions should be read in conjunction with the installation/servicing instructions issued by the manufacturer of the heat source being used.

Any installation must be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, I.E.E. Wiring Regulations and the Water Fitting Regulations (England and Wales) or Water Byelaws (Scotland). It should be read in accordance with the relevant recommendations of the following:
BS 6798; BS 5549; BS 5546;
BS 5440:1; BS 5440:2; CP 331:3
BS 6700; BS 5258 and BS 7593: 1993 and BS7671

It must be installed by a competent person as defined by the relevant regulations. Manufacturers notes must NOT be taken as over-riding statutory obligations.

This product overcomes Part G Building Regulation discharge requirements for unvented cylinders but the installation is notifiable to building control unless it is carried out under an approved competent person self-certification scheme.

Although the secondary supply (domestic) is at mains pressure, it is not necessary to fit an expansion chamber, pressure or temperature relief valve, the plumbing should allow any unusual build up of pressure to be relieved at the ball valve.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised at all times to ensure they do not play with the appliance.

This information is provided to assist generally in the selection of equipment. Responsibility for selection and specification of our equipment must however remain that of our customer and any experts or consultants concerned with the installation(s).

PLEASE NOTE: THAT WE DO NOT THEREFORE ACCEPT ANY RESPONSIBILITY FOR MATTERS OF DESIGN SELECTION OR SPECIFICATION, FOR THE EFFECTIVENESS OF AN INSTALLATION OR SYSTEM CONTAINING ONE OF OUR PRODUCTS UNLESS SPECIFICALLY REQUESTED TO DO SO IN WRITING.

All goods are sold subject to our Conditions of Sale which are set out at the rear of this specification. In the interest of continuously improving the Torrent range, Gledhill Building Products Limited reserve the right to modify the product without notice, and in these circumstances this booklet, which is accurate at the time of printing, should be disregarded. An updated set of Instructions will be produced and supplied with new appliances and will be made available for other appliances on request.



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 manufacturers instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. 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 Hot Water Industry Council who manage and promote the Scheme. Visit www.centralheating.co.uk for more information.

ISSUE 7: NOVEMBER 2012

Section	Page
DESIGN	
Description	3
Technical Information	6
System Design	8
INSTALLATION	
Installation	10
Wiring Diagrams	21
Commissioning	28
SERVICING AND MAINTENANCE	
Servicing and Maintenance	30
Fault Finding	31
Short Parts List	32
APPENDIX	
Appendix A	33
Appendix B	34
Notes	35
BENCHMARK	
Commissioning Check List	36
Service Record	37
Terms & Conditions	38

Manufacturer: Gledhill Building Products Ltd

Max. mains inlet water pressure	5.0bar
Max. working pressure - Primary heat exchanger (Indirect models)	3.0bar
Max. working pressure - Solar heat exchanger (Solar models)	6.0bar
Max. working pressure - Open vented thermal store (All models)	10.0m (1.0bar)
Max. working pressure - Open vented central heating system	30.0m (3.0bar)
Max. working pressure - Sealed heating system	3.0bar
Immersion heater rating	3kW@230Vac,50Hz

The Torrent has a built in expansion vessel, however, in a situation where the volume of domestic hot water pipework exceeds 10 litres, an additional expansion vessel must be fitted to accommodate the extra expansion volume.

Handling Before Installation

The Torrent must be handled with care and stored the correct way up in a dry place. Any manual handling/lifting operations will need to comply with the requirements of the Manual Handling Operations Regulations issued by the H.S.E. The appliance can be moved using a sack truck on the rear face although care should be taken and the route should be even. In apartment buildings containing a number of storeys we would recommend that the appliances are moved vertically in a mechanical lift. If it is proposed to use a crane, expert advice should be obtained regarding the need for slings, lifting beams etc. A specific manual handling assessment is shown in Appendix B at the rear of this manual.

Maintenance

Modifications should not be made to this product. Replacement parts, including immersion heaters, should be purchased from Gledhill Building Products Limited, or agents approved by them. The manual must always be left with the Torrent.

Note:

The cylinder is factory fitted with immersion heaters with thermal cut outs. Immersions without thermal cut outs must not be fitted.

DESIGN

Gledhill developed the principal of domestic thermal stores starting in 1982 and they have been manufacturing them since then.

Their importance to plumbing systems is described below.

a) Why use a thermal store - Alternative energy fuel sources are typically low grade, inherently unpredictable and are often available in plentiful supply but not when the heat energy is needed! A thermal store provides the means to harness the energy when it is available for later conversion into both hot water AND heating.

Being open vented, they provide a simple and inherently safe way to produce high-performance mains pressure hot water. So the householder can enjoy the comfort and luxury of a mains pressure system produced from alternative energy sources.

The alternative energy feeds into the thermal store which is also the water that circulates around the heating system. This means that the energy available from solar panels or a wood burning stove, for example, can be used to provide energy into the heating circuit to decrease the use of fossil fuel based boilers, and hence reduce household running costs.

It is very problematic and inherently unsafe to connect wood burning stoves or other uncontrolled heat sources to an unvented cylinder, and not easily possible to combine alternative energy heat sources to provide energy to the heating circuit, hence the unique advantages of a thermal store.

b) The heart of an alternative energy system - The Torrent MultiFuelStore is the ideal product to use as the heart of an alternative energy system as it will take energy input not only from a conventional boiler but also from a wide variety of alternative energy sources, including but not limited to:

- solar panels
- wood burning stoves and other uncontrolled heat sources
- ground or air source heat pumps
- electricity from renewable or low carbon sources

If the system is configured appropriately the heat from the alternative energy source will be available for both hot water AND heating. This is only possible with a thermal store such as the Torrent and is not possible with an unvented cylinder where you will only get an alternative energy contribution to the hot water.

c) In-built upgrade potential - The Torrent range comes with a full array of tapings as standard so that, for example, a wood burning stove or solar panels can be added as an upgrade to the property at a later stage and the hot water cylinder will be ready to work with it.

d) Neutral Point - The Torrent MultiFuelStore becomes the neutral point in any open vented system because the open vent and cold feed pipes are connected to it. The benefit of this is that another device to enable different systems to be joined together at a neutral point is not required, which would be required in other systems. In multiple fuel systems, the Torrent acts as a low loss header.

e) Apartments – The Torrent open vented thermal store does not need a discharge pipe from a pressure and temperature relief valve, unlike an unvented cylinder which does. This combined with the fact that discharges are not permitted into PVCu soil stacks makes the installation of un-vented stores in apartments difficult and expensive.

f) Legionella Risk – Alternative energy supplies cannot be relied upon to raise the temperature of the stored water above 55 every time they operate. This is not a problem with a thermal store because the store water is not the water that comes out of the tap. The water that comes out the tap run through a heat exchanger in the

thermal store very quickly and the volume of stagnant water in the heat exchangers is very small so there is virtually no legionella risk.

g) Less controls – The thermal store is open vented and therefore does not require additional safety devices such as temperature and pressure relief valves or an inlet control group and expansion vessels. Any expansion in the hot water supply is accommodated in the self replenishing expansion chambers connected to the heat exchangers within the store.

h) Building Regulation – The thermal store, being open vented, does not require Building control to be notified to comply with section G3 of the building regulations, unlike an unvented cylinder which does.

i) Annual inspection – The running costs of this cylinder are greatly reduced by not being required to have an annual safety inspection where as an un-vented cylinder does.

The Torrent provides high performance mains pressure hot water without the additional costs incurred with an unvented cylinder.

The Torrent MultiFuelStore is available in the following three basic variants:-

Torrent MultiFuelStore OV

The Torrent MultiFuelStore OV utilises an open vented boiler and / or direct electric immersion heaters as its primary energy source. It comes fitted with tappings for a woodburning or solid fuel boiler as standard, which can be blanked off if not required at the time of installation.

One of the benefits of the open vented boiler configuration is that the whole output of the boiler is available to the thermal store, unlike the indirect Sealed Primary (SP) version where the output from the boiler is limited by the heat exchanger. This will provide an improvement in the operational efficiency of the boiler, reducing the primary energy usage and running costs.

The Torrent MultiFuelStore OV provides high-performance mains pressure hot water. The heat energy provided from the primary heat source and / or solid fuel input is circulated from the store to the central heating circuit, allowing rapid heat-up of a radiator system.

In situations where no gas or solid fuel source is available the Torrent MultiFuelStore OV can be used exclusively from the two 3kW electric immersion elements which will provide both hot water and auxiliary heating for the property. The obvious application is apartments where no gas main is available but this could also be appropriate where electricity is available from a renewable or low carbon source.

If connected to the standard grid then the thermal store is the perfect solution to maximise useage of an off peak tariff where arrangements should be made to power the lower immersion element in order to minimise the running costs.

The Torrent MultiFuelStore OV is designed to be heated directly (i.e. without internal heat exchangers) by one or more of the following heat sources;

- Electric immersion heaters e.g. to utilise off peak electricity
- A remote gas or oil boiler
- A solid fuel boiler or stove

Torrent MultiFuelStore SP

The Torrent MultiFuelStore SP utilises a sealed system boiler as its primary energy source. It comes fitted with tappings for a woodburning or solid fuel boiler as standard, which can be blanked off if not required at the time of installation. The Torrent MultiFuelStore SP provides high-performance mains pressure hot water.

The central heating circuit is normally supplied directly from the boiler although an auxiliary heating circuit can be connected from the store in which case the solid fuel source will provide energy to the auxiliary heating circuit. Obviously, the energy output that can be provided by the auxiliary heating circuit will be limited to the energy input from the solid fuel appliance.

This sealed primary (SP) model permits the use of a smaller feed and expansion tank because the main central heating circuit does not need to be catered for. This can make positioning the F&E tank more straightforward.

An immersion element is provided and it is normally envisaged that this will be used as an emergency electric back-up for hot water and to provide emergency energy to the auxiliary heating circuit. However, if a low carbon or renewable electricity source is available then this could be connected to the immersion element to provide heat input to the thermal store, decreasing the use of the fossil fuel boiler and hence reducing running costs. The Torrent MultiFuelStore SP is designed to be heated by one or more of the following heat sources;

- Directly by an electric immersion heater as a backup heat source only
- Indirectly (i.e. via a heat exchanger) by a remote gas or oil boiler
- Directly by a solid fuel boiler or stove

Torrent MultiFuelStore SOL

The Torrent MultiFuelStore SOL utilises either a sealed system boiler and / or an open vented boiler as its primary energy source. It also has a high-efficiency solar coil to allow the homeowner to benefit from a wide variety of alternative energy inputs. The cylinder comes fitted with tappings for a woodburning or solid fuel boiler as standard, which can be blanked off if not required at the time of installation.

The Torrent MultiFuelStore SOL provides high-performance mains pressure hot water.

The central heating circuit can be supplied directly from a sealed system boiler although an auxiliary heating circuit can be connected from the store in which case both the solar and solid fuel energy will also provide an input to the auxiliary heating circuit.

Alternatively, an open vented boiler can be used to directly heat the store so that the energy will be available for both hot water and auxiliary central heating circuit.

The cylinder comes with two return connections for solid fuel and woodburning stoves to enable the homeowner to have an aga running 24 hours a day but still retaining the dedicated solar volume.

An immersion element is provided and it is normally envisaged that this will be used as an emergency electric back-up for hot water and to provide emergency energy to the auxiliary heating circuit. However, if a low carbon or renewable electricity source is available then this could be connected to the immersion element to provide heat input to the thermal store, decreasing the use of the fossil fuel boiler and hence reducing running costs.

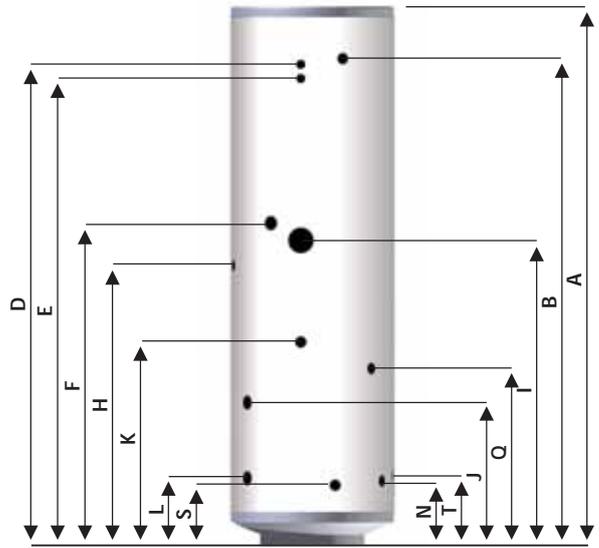
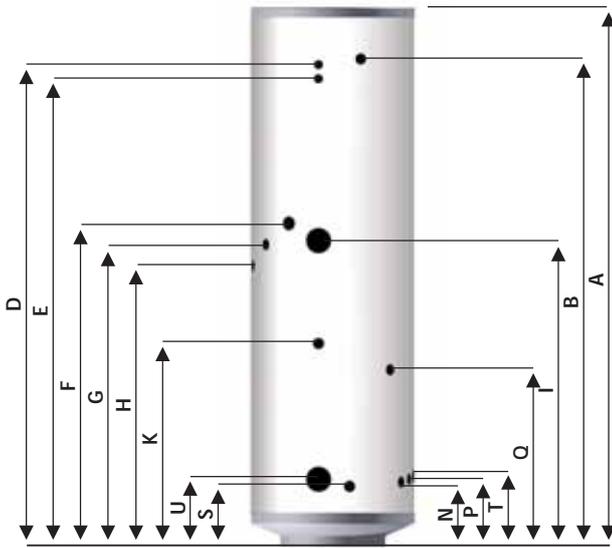
The Torrent MultiFuelStore SOL is designed to be heated by one or more of the following heat sources;

- Directly by an electric immersion heater as a backup heat source only
- Either indirectly or directly by a remote gas or oil boiler
- Directly by a solid fuel boiler or stove
- Indirectly by solar thermal system

DESIGN

Torrent MultiFuelStore OV

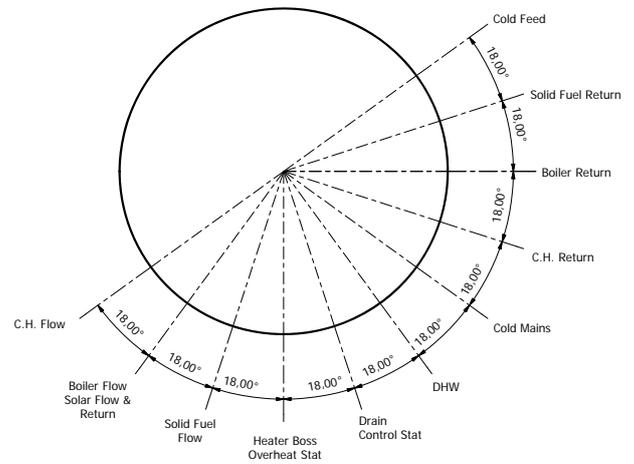
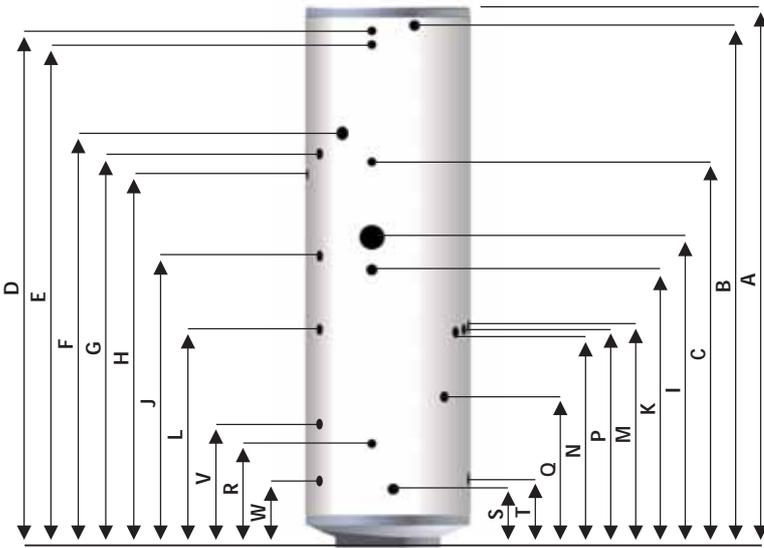
Torrent MultiFuelStore SP



Technical

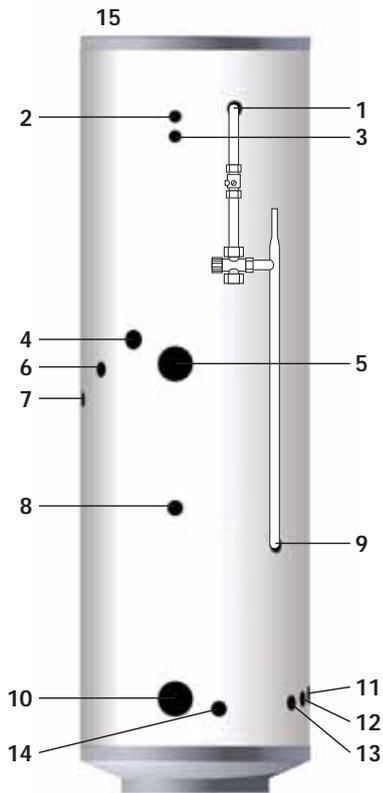
Model	Weight - Empty	Weight - Full	Capacity (Total Volume)	Overall Height (Excluding F&E Tank)	Overall Diameter	Domestic Hot Water	Solar Thermostat	Store Overheat	Store Overheat	Solid Fuel Flow	Boiler Flow	Central Heating Flow	On Peak Immersion Heater	Sealed Primary Boiler Flow	Control Stat	Sealed Primary Boiler Return
	kg	kg	litres	A=mm	mm	B=mm	C=mm	D=mm	E=mm	F=mm	G=mm	H=mm	I=mm	J=mm	K=mm	L=mm
Torrent MultiFuelStore OV																
T144-OV	52.8	219.1	166.3	1600	520	1399	n/a	1372	1322	952	877	802	877	n/a	578	n/a
T170-OV	53.7	229.8	176.1	1680	520	1482	n/a	1450	1399	990	915	840	975	n/a	604	n/a
T210-OV	60.0	300.5	240.5	1805	570	1465	n/a	1570	1520	1065	990	915	1036	n/a	663	n/a
T250-OV	66.5	332.0	266.0	1915	570	1702	n/a	1682	1632	1121	1046	971	1060	n/a	700	n/a
T350-OV	92.9	505.7	413.0	1665	720	1385	n/a	1334	1284	975	900	825	870	n/a	621	n/a
Torrent MultiFuelStore SP																
T144-SP	56.5	221.7	165.2	1600	520	1399	n/a	1372	1322	952	n/a	802	877	349	578	172
T170-SP	57.8	232.7	174.9	1680	520	1482	n/a	1450	1399	990	n/a	840	975	349	604	172
T210-SP	66.0	303.0	237.3	1805	570	1465	n/a	1570	1520	1065	n/a	915	1036	477	663	210
T250-SP	76.7	329.1	252.4	1915	570	1702	n/a	1682	1632	1121	n/a	971	1060	487	700	220
T350-SP	98.1	506.1	408.0	1665	720	1390	n/a	1334	1284	975	n/a	825	762	355	621	275
Torrent MultiFuelStore SOL																
T210-SOL	76.2	277.5	201.3	1930	520	1730	1266	1699	1649	1394	1319	1244	970	910	860	733
T250-SOL	88.2	366.1	277.9	2090	570	1880	1384	1860	1810	1488	1413	1338	1110	1042	992	775
T350-SOL	106.6	515.6	409.0	1665	720	1390	1043	1334	1284	1178	1103	1028	880	815	789	615
T450-SOL	128.7	653.7	525.0	2065	720	1775	1315	1733	1683	1445	1370	1295	975	890	884	690

Torrent MultiFuelStore SOL



Solid Fuel Return (Solar Model Only)	Central Heating Return	Boiler return	Cold Mains	Solar Thermostat	Drain	Solid Fuel return	Off Peak Immersion Heater	Solar Flow	Solar return	Cold Feed (not shown, to the rear of the cylinder)	Surface Area of Primary Heater Coil	Surface Area of Solar Heater Coil	Domestic Hot Water Volume	Domestic Hot Water Heat Exchanger Power	Domestic Hot Water Pressure Loss @ DHW FR	Standing Losses kWh/24hr	Dedicated Solar Volume	Maximum Hot Water Flow Rate
M=mm	N=mm	P=mm	Q=mm	R=mm	S=mm	T=mm	U=mm	V=mm	W=mm		m ²	m ²	litres	kW	bar	kWh	litres	litres/min
n/a	182	232	355	n/a	167	282	192	n/a	n/a	175	n/a	n/a	110	34	0.87	2.00	n/a	15
n/a	182	232	469	n/a	167	282	192	n/a	n/a	175	n/a	n/a	116	41	1.31	2.07	n/a	18
n/a	210	260	607	n/a	195	310	220	n/a	n/a	210	n/a	n/a	158	41	1.31	2.50	n/a	18
n/a	210	260	607	n/a	195	310	220	n/a	n/a	210	n/a	n/a	175	57	1.17	2.59	n/a	25
n/a	265	315	410	n/a	40	365	275x2	n/a	n/a	255	n/a	n/a	273	57	0.45	3.48	n/a	25
n/a	182	n/a	397	n/a	167	282	n/a	n/a	n/a	175	1.77	n/a	110	34	0.87	2.00	n/a	15
n/a	182	n/a	469	n/a	167	282	n/a	n/a	n/a	175	1.77	n/a	116	41	1.31	2.06	n/a	18
n/a	210	n/a	607	n/a	195	310	n/a	n/a	n/a	210	1.77	n/a	158	41	1.31	2.50	n/a	18
n/a	210	n/a	607	n/a	195	310	n/a	n/a	n/a	210	1.77	n/a	175	57	1.17	2.59	n/a	25
n/a	265	n/a	410	n/a	40	365	n/a	n/a	n/a	255	1.77	n/a	273	57	0.45	3.48	n/a	25
838	738	788	412	332	167	202	n/a	369	192	175	1.33	1.33	158	41	0.72	2.50	76	18
865	765	815	530	360	195	230	n/a	487	220	200	1.77	1.77	183	57	0.85	2.67	95	25
771	671	721	260	355	40	285	n/a	355	265	255	1.77	1.77	273	57	0.45	3.48	125	25
905	805	855	410	385	40	285	n/a	355	255	255	2.66	2.66	347	79	1.07	3.97	153	35

DESIGN



Torrent MultiFuelStore OV

Basic Appliance

1. Domestic hot water
2. Store overheat
3. Store overheat
4. Solid fuel flow
5. Immersion heater
6. Boiler flow
7. Central heating flow
8. Control stat
9. Cold mains
10. Immersion heater
11. Solid fuel return
12. Boiler return
13. Central heating return
14. Drain
15. Vent

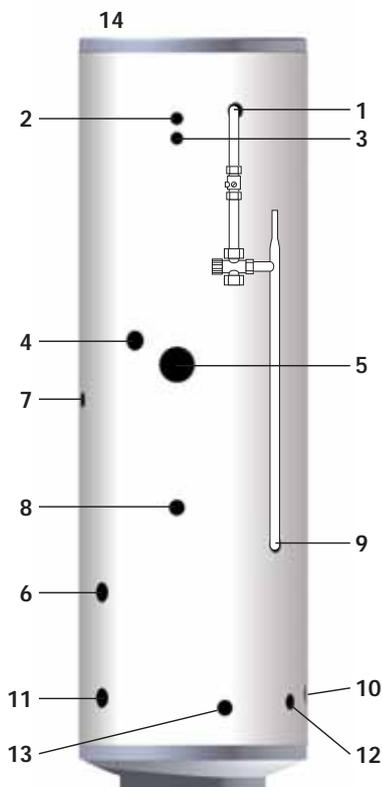
Cold feed to cylinder to rear of cylinder

Component kit supplied attached

- A. Thermostat

Optional extra components

- A. Header tank
B. Ball valve
C. Float



Torrent MultiFuelStore SP

Basic Appliance

1. Domestic hot water
2. Store overheat
3. Store overheat
4. Solid fuel flow
5. Immersion heater
6. Boiler flow
7. Central heating flow
8. Control stat
9. Cold mains
10. Solid fuel return
11. Boiler return
12. Central heating return
13. Drain
14. Vent

Cold feed to cylinder to rear of cylinder

Component kit supplied attached

- A. Thermostat

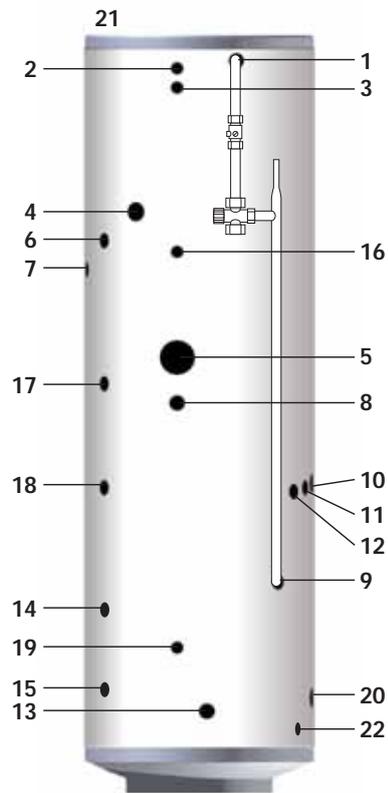
Optional extra components

- A. Header tank
B. Ball valve
C. Float

Typical arrangement of component kit shown fitted to the appliance

The feed and expansion tank must be sized to take the water expansion of the whole system (i.e. solid fuel boiler, open vented boiler and auxiliary heating).

DESIGN



Typical arrangement of component kit shown fitted to the appliance

The feed and expansion tank must be sized to take the water expansion of the whole system (i.e. solid fuel boiler, open vented boiler and auxiliary heating).

Please note there are 2 solid fuel returns on the Sol range to enable the whole store water volume to be used to store heat when the solar contribution is negligible.

For example, a solid fuel boiler that is used for space heating would be used in the winter months when the solar contribution is small. Connecting it to the lower return enables the store to hold more heat when the solar contribution is negligible.

Alternatively an Aga which runs 24 hours 365 days a year would need to be connected to the upper return when the solar contribution is greatest and the lower when the solar contribution is least. This allows the solar to make a contribution to the store even though the Aga is running 24 hours a day. A manual 3-port diverter valve may be used to switch from summer to winter mode or more sophisticated control methods used.

The controls should be fitted to maximise useful energy gain: minimise loss of useful energy and ensure that back-up heat sources are not used when adequate grade solar contribution is available. For precise guidance please refer to "table 37 section 6.0a System controls" of the "Domestic building compliance guide 2010".

Torrent MultiFuelStore SOL

Basic Appliance

1. Domestic hot water
2. Store overheat
3. Store overheat
4. Solid fuel flow
5. Immersion heater
6. Boiler flow
7. Central heating flow
8. Control stat
9. Cold mains
10. Solid fuel return
11. Boiler return
12. Central heating return
13. Drain
14. Solar flow
15. Solar return
16. Solar thermostat
17. Sealed primary boiler flow
18. Sealed primary boiler return
19. Solar thermostat
20. Solid fuel return
21. Vent
22. Cold feed to cylinder (350 and 450 models only, other sizes to rear of the cylinder)

Please note that the solar connections, 14 and 15, on the 350 and 450 litre models, are on the right hand side of the cylinder not left as shown.

Component kit supplied attached

- A. Thermostat

Optional extra components

- A. Header tank
- B. Ball valve
- C. Float

INSTALLATION

Torrent MultiFuelStore OV Model Selection Guide		
Max hot water demand	Bedrooms	Model
1 bathroom	1 - 2	T144-OV
1 bathroom + separate shower room	2 - 4	T170-OV
2 bathrooms + separate shower room	3 - 4	T210-OV
2 bathrooms + 2 separate shower rooms	3 - 5	T250-OV
3 bathrooms + 2 separate showers rooms	3 - 5	T350-OV

Torrent MultiFuelStore SP Model Selection Guide		
Max hot water demand	Bedrooms	Model
1 bathroom	1 - 2	T144-SP
1 bathroom + separate shower room	2 - 4	T170-SP
2 bathrooms + separate shower room	3 - 4	T210-SP
2 bathrooms + 2 separate shower rooms	3 - 5	T250-SP
3 bathrooms + 2 separate showers rooms	3 - 5	T350-SP

Torrent MultiFuelStore SOL Model Selection Guide			
Max hot water demand	Max solar collector area (m ²)	Bedrooms	Model
1 bathroom + separate shower room	3.04	2 - 4	T210-SOL
2 bathrooms + separate shower room	3.80	2 - 4	T250-SOL
2 bathrooms + 2 separate shower rooms	5.00	3 - 5	T350-SOL
3 bathrooms + 2 separate showers rooms	6.12	4 - 6	T450-SOL

Model Selection

The suggested model sizes shown in the tables opposite are based on a typical daily hot water usage and on the assumptions that the heating system is correctly sized and that the thermal store is heated to at least 75°C by the main heat source.

When selecting a solar model, it is important to check the dedicated solar volume (shown in table on pages 6-7) complies with the Building Regulations ADL1 Domestic Building Services Compliance Guide.

The suggested model sizes are based on typical hot water usage. For high specification dwellings an increase of one model size should be considered.

General Design Considerations

As a general rule, the cupboard footprint needs to be a minimum of 150mm wider, 80mm deeper and 80mm taller than the unit selected.

The base chosen for the Torrent should be level and capable of supporting the weight of the unit when full of water as shown in General Data.

General Restrictions

- a. An ascending spray type bidet or any other appliance with a Class 1 back-syphonage risk requiring a type A air gap should not be used.
- b. Torrent should not be used where steam is the primary heating medium.

INSTALLATION

Mains Water Supply

A typical arrangement of the hot and cold water system is shown below. All Torrent models are designed to be fed directly from the mains and they fulfil the requirements of Water Bylaw 91, and therefore do not require a check valve to be fitted to the cold water supply pipe.

The performance of the Torrent is directly related to the cold water supply pressure and volume to the dwelling. This must be capable of providing for all those services which could be required simultaneously and the maximum demand should be calculated for sizing the distribution network.

As a general guideline, although a 15mm external service may be sufficient for the smaller dwelling with one bathroom, a 22mm service is preferred (25mm MDPE) and should be the minimum for larger dwellings.

The Torrent will operate at dynamic pressure as low as 1.5 bar (at the appliance) which must be available when the local demand is at its maximum, but the preferred range is between 2 and 3.0 bar.

If the incoming static mains pressure **exceeds** 5.0 bar at any point in the 24 hour cycle, then a pressure limiting valve set at 3.0 bar should be fitted downstream of the stop tap where the cold supply enters the dwelling.

If a water meter is fitted in the service pipe, it should have nominal rating to match the anticipated maximum simultaneous hot and coldwater demand, calculated in accordance with BS 6700. This could be up to 50 l/min in some properties.

The sanitary water equipment used in the system should be suitable for a working pressure of 10 bar and the units must be fitted strictly in accordance with the requirements of the Local Water Undertaking and the relevant Water Bylaws.

Taps and Shower Fittings

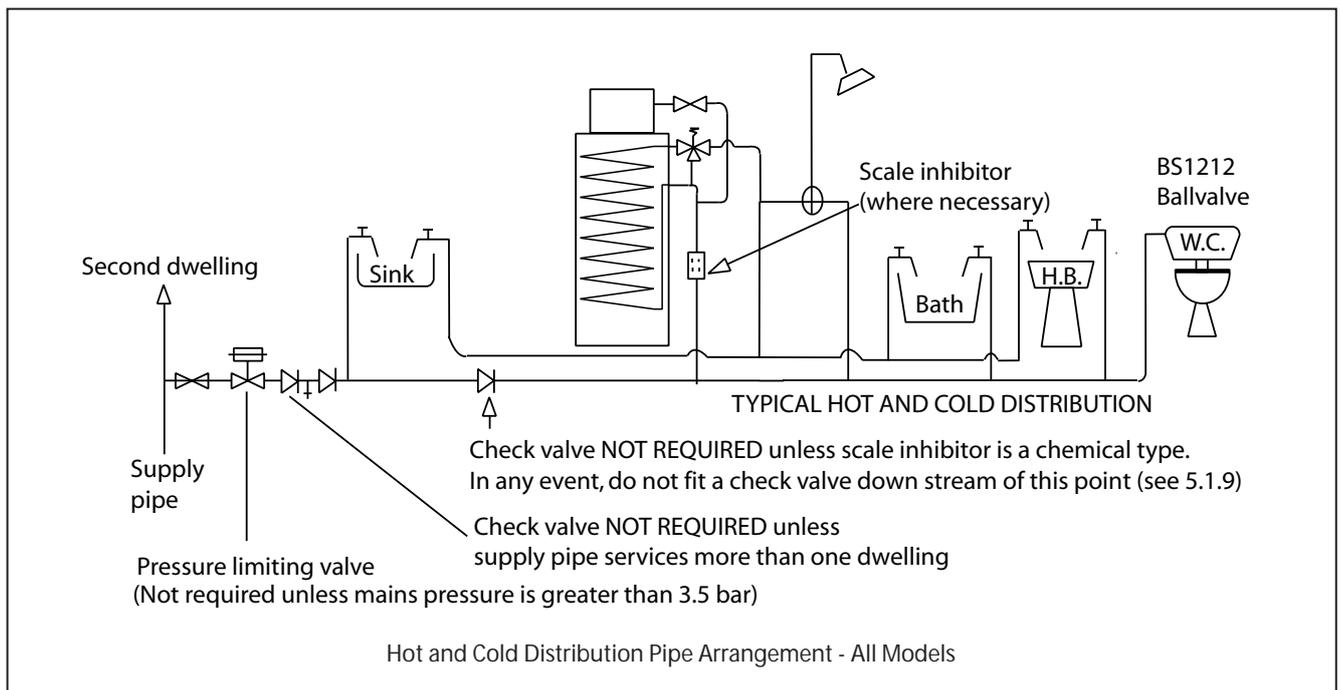
Aerated taps are recommended to prevent splashing.

All types of shower mixing valves can be used as long as both hot and cold supplies are mains fed. However all mains pressure systems are subject to dynamic changes particularly when other hot and cold taps/showers are opened and closed, which will cause changes in the water temperature at the mixed water outlet such as showers. For this reason and because thermostatic showers are now no more expensive than manual showers, we strongly recommend thermostatic showers with Torrent. The shower head provided must also be suitable for mains pressure supplies.

The hot water supply to a shower-mixing valve should be fed where practical directly from the Torrent or be the first draw-off point on the hot circuit. The cold water supply to a shower-mixing valve should where practical be fed directly from the rising mains via an independent branch.

The shower must incorporate or be fitted with the necessary check valves to prevent back-siphonage protection in accordance with Water Regulations.

The supply of hot and cold mains water directly to the bidet is permitted provided that it is of the over-rim flushing type and that type 'A' air gap is incorporated.



INSTALLATION

Pipe Layout

In all mains pressure installations it is important to remember that the incoming cold supply must be shared between all terminal fittings. It is important that a 22mm supply is brought to the appliance and a 22mm take-off is continued at least to the bath. If there are two baths, 28mm pipework should be considered. One metre of smaller diameter pipework, or flow restrictors, should be provided on the final connection to all outlets so as to balance the water available. In any event the distribution pipework should generally be in accordance with EN806:1.

Plastic Pipework

All the recommendations with regard to the heating systems in this manual are generally based on BS/EN Standard copper pipework and fittings. However plastic pipework system can be used in place of copper as long as:-

- The chosen system is recommended for use in domestic heating systems by the manufacturers and it is installed fully in accordance with their recommendations.
- The design criterion of the plastic system is at least equivalent to the use of BS/EN Standard copper pipework and fittings.
- Barrier pipework for these systems is recommended.

Secondary Hot Water Circulation

If the length of the hot water draw-off pipework is excessive and the delivery time will be more than 60 seconds before hot water is available at the tap, you may wish to consider using trace heating to the hot water pipework such as the Raychem HWAT system. Also a conventional pumped secondary circulation system (shown below) can be used with any model of the Torrent.

It is important that the cold water pipework is adequately separated and protected from any heating from the hot water pipework to ensure that the water remains cold and of drinking water quality.

If secondary circulation is used, there is a possibility that excessively hot temperatures may be experienced in the hot water supply pipework due to the blending valve not

being able to mix with cold water because the water is always supplied hot. A pipe thermostat is incorporated in the circuitry which cuts the supply to the pump when the water in the return pipe reaches the set temperature of the blending valve.

Secondary circulation pipework must be insulated to prevent energy loss in both heated and unheated areas.

Ball Valve and Overflow

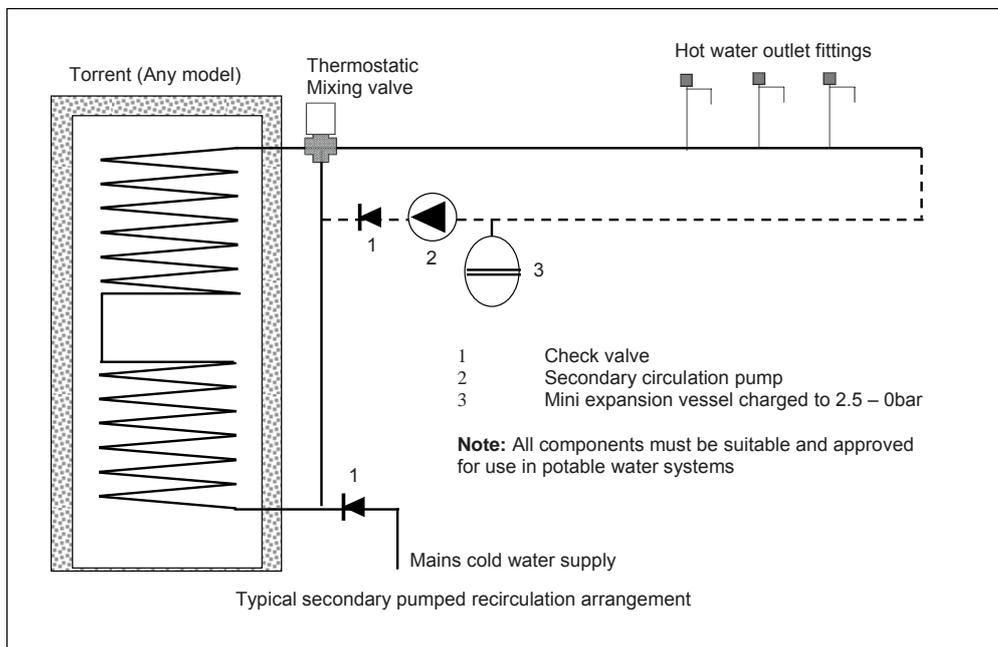
The feed and expansion tank can be filled manually if required e.g. using a hose pipe fitted with a double check valve.

In this situation an overflow pipe can still be fitted if required to ensure that if a leak occurs on the internal dhw heat exchanger it can be discharged safely to the outside of the building.

Note: If a ball valve is fitted, then a warning/overflow pipe must always be fitted.

The feed and expansion tank (provided by the installer) must be sized correctly to enable the expansion of the entire system volume. This will include the central heating, store, solid fuel and boiler circuit volumes.

See page 14 for guidance sizing the feed and expansion tank.



INSTALLATION

Water Treatment

In all Torrent models, the primary (i.e. non-potable) water is stored and the domestic hot water is heated instantaneously by means of heat exchangers. Therefore treating the primary water will not contaminate the domestic hot water supply.

Although the Torrent primary store has no special water treatment requirements, the radiators and other parts of the circuit will require the application of a scale and corrosion inhibitor. The volumes and concentration should be calculated in accordance with the manufacturers instructions and when calculating the system volume (i.e. the water content), the volume of the Torrent should be taken into account.

Use In Hard Water Areas And Scale Protection

The patented design of the domestic hot water heat exchanger is such that the turbulence through the coil slows down the formation of scale in moderate hard water conditions. However, the requirements set out in the 'Domestic Building Services Compliance Guide' and the Building Regulations approved documents L1A and L1B regarding scale protection should be complied with.

These requirements state that; "where the mains water hardness exceeds 200ppm provision should be made to treat the feed water to the water heaters and the hot water circuit of combination boilers to reduce the rate of accumulation of scale". To comply with this requirement: -

- a. The hardness of the mains water should be checked by the installer and if necessary a suitable in-line scale inhibitor device should be specified for hardness levels between 200 and 300ppm (mg/l).
- b. Where the hardness level is 300ppm (mg/l) and above, the optional phosphate type inhibitor should be specified and fitted at a suitable point in the cold water supply to the appliance.

It is important that where the supply to the Torrent is in 22mm the in-line scale inhibitor is also 22mm. In practice servicing is not normally required but in hard water areas, the requirements can be considered similar to those needed for instantaneous or 'combi' appliances.

The installation of scale inhibitor should be in accordance with the manufacturers instructions and Water Byelaws.

London Loop

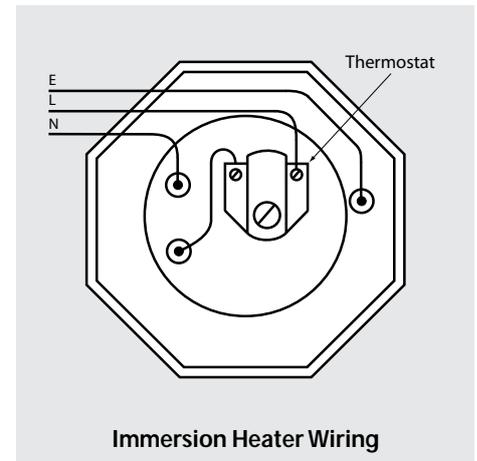
As the thermal store gets hot the water will expand and the water level in the R&E tank will rise, as will the level of water in the vent pipe. Hot water will also rise to the top of the cylinder. When the water at the base of the cylinder becomes hotter it may run out the cold feed connection pipe. If the cold feed pipe then runs vertically it works like chimney with the hot water rising to the top in the same way hot air does from a fire. If this section is not insulated then it will lose heat and waste energy.

If, however, the cold feed is formed into a Sheppard's crook or London loop it will form a thermal trap. A thermal trap works by ensuring that cold water is held below hot water. Because hot water always rises it will not be able to move down and around the loop/crook and therefore will not rise up the cold feed pipe work. This will reduce heat loss and thereby prevent energy waste.

Immersion Heaters

These are 3kW 240V AC heaters and incorporate a thermostat. The thermostat incorporating a 'single shot' overheat energy cut out which means it cannot be reset and must be replaced if it has operated. They have incalloy elements to prolong their life expectancy in aggressive water conditions.

The correct method of connecting the wiring to the immersion heater is shown opposite.



Utilising Off Peak Electricity

Where it is intended that units are fitted to offpeak circuits, then suitable controllers such as the Horstmann off peak electric time controller will be required. External wiring to the immersion heaters must be in accordance with the relevant IEE Wiring Regulations and the circuit must be protected by a suitable fuse and a double pole isolating switch.

Safety

The immersion heaters must be earthed and they must be isolated from the mains before the cover is removed on every occasion. Replacement immersion heaters should be obtained from Gledhill Building Products Limited.

INSTALLATION

Allowance for domestic hot water for sizing the boiler		
Torrent model	Allowance for domestic hot water heating (kW)	
	Full divert mode	Flow share mode
140	0	2
170	0	3
210	0	3.5
280	0	4.5
350	0	6.0
450	0	8.0

Boiler Size

The minimum total boiler power required is the sum of the power required for space heating which should be calculated in accordance with BS 5449 and the power required for producing hot water which can be read from the table opposite.

Expansion Vessel Requirements									
Safety valve setting	3.0								
Vessel charge pressure (bar)	0.5			1.0			1.5		
Initial system charge pressure (bar)	0.5	1.0	1.5	2.0	1.0	1.5	2.0	1.5	2.0
Total System Volume (litres)	Expansion Vessel Volume (litres)								
25	2.1	3.5	6.5	13.7	2.7	4.7	10.3	3.9	8.3
50	4.2	7.0	12.9	27.5	5.4	9.5	20.6	7.8	16.5
75	6.3	10.5	19.4	41.3	8.2	14.2	30.9	11.7	24.8
100	8.4	14.0	25.9	55.1	10.9	19.0	41.2	15.6	33.1
125	10.4	17.5	32.4	68.3	13.6	23.7	51.5	19.5	41.3
150	12.5	21.0	38.8	82.6	16.3	28.5	61.8	23.4	49.6

Expansion Vessel For Sealed Heating System

The table opposite can be used for sizing the heating system expansion vessel. The water content of the Torrent primary heat exchanger is listed in specification tables on pages 6 and 7 and a figure of 4.5 l/kW of installed radiator capacity can be used for a preliminary assessment of the water content of the heating system.

The expansion vessel requirements shown in the table are based on a maximum boiler flow temperature of 93°C. The expansion vessel must be suitable to accommodate the change in volume of water in the heating system when heated from 10°C to 110°C as specified in BS 5449:1990 clause 16.2.

Thermal Store	Potential Expansion of Water in Store (litres)	Minimum Number of Feed and Expansion Tanks (16 litre model inc. 10 litre expansion)
T144	OV model - 6.6 SP model - 6.6	1
T170	OV model - 7.0 SP model - 7.0	1
T210	OV model - 9.6 SP model - 9.5 SOL model - 8.0	1
T250	OV model - 10.6 SP model - 10.1 SOL model - 11.1	2
T350	OV model - 16.5 SP model - 16.3 SOL model - 16.4	2
T450	SOL model - 21	3

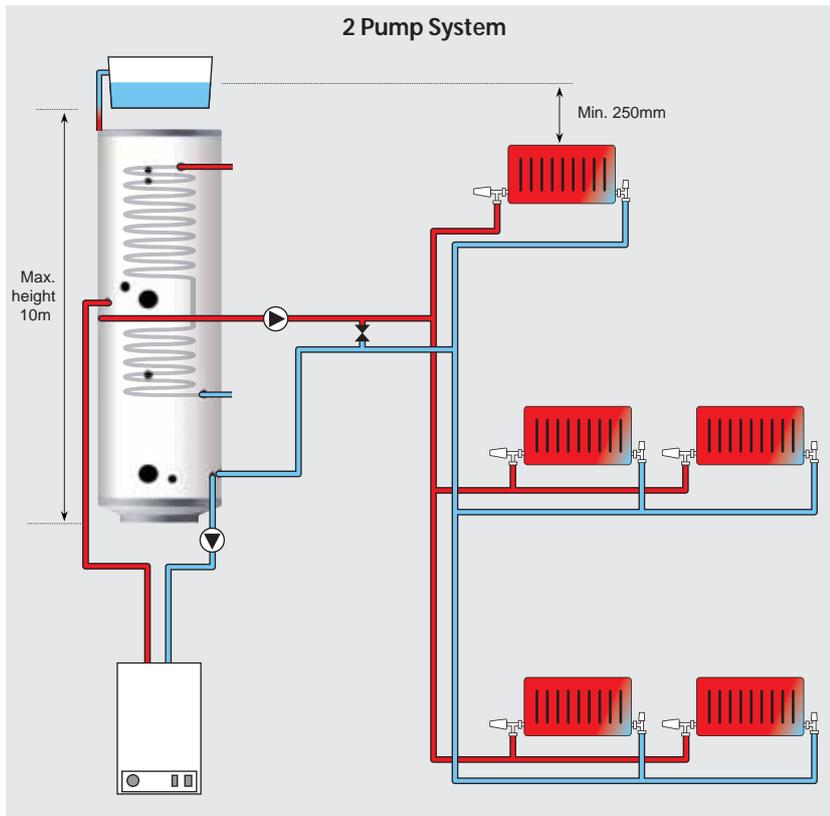
Expansion of all connected open vented systems must be added to the store expansion when choosing the size of the feed and expansion tank.
The weight of each tank when full is 27kg (not including pipework and valves).

Feed And Expansion Tank For Open Vented Heating System

The potential expansion of all the thermal stores in the range is shown in the table opposite, alongside the capacity for expansion, in our standard F & E tank, which can be supplied as an optional extra.

Expansion for all other open vented systems connected to the store must be added to this figure. So, as a preliminary assessment of the water content of the attached open vented systems, a figure of 4.5 l/kW of radiator output can be used. For example, 20 kW radiator output would have a system volume of 90 litres, and potential expansion of this would be 3.6 litres, and 10 kW would be 45 litres total volume and 1.8 litres for expansion.

INSTALLATION



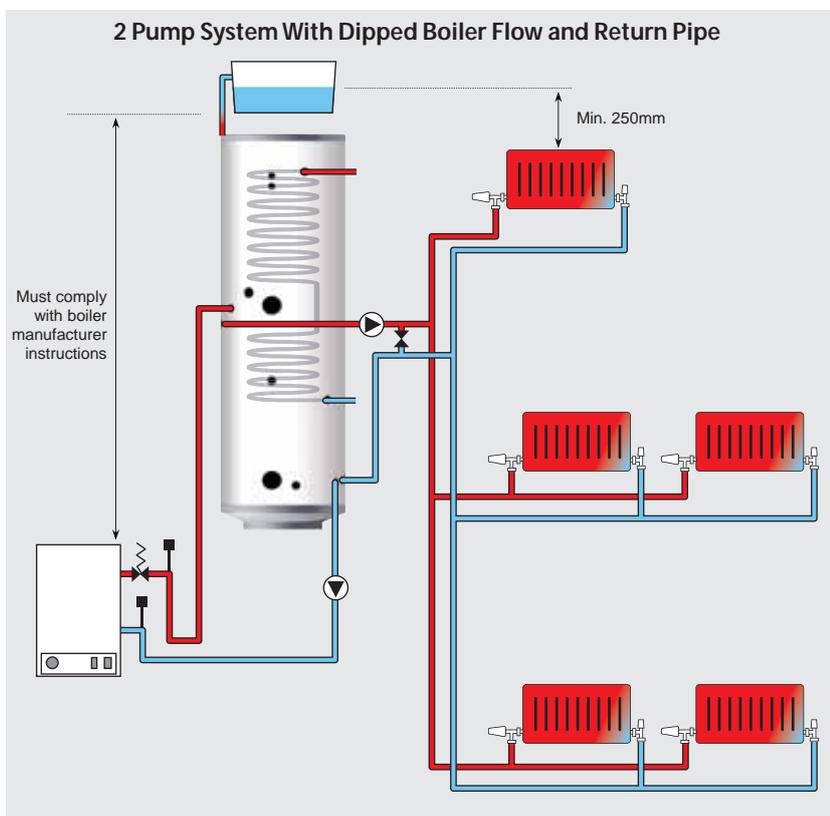
Open vented heating systems

The open vented primary system is filled via the feed and expansion (F&E) tank fitted with the Torrent OV model and therefore it is important that the F&E tank is positioned at least 250mm above the highest point in the system. Please check the F&E tank is big enough for the whole system expansion.

Also ensure that the height of the F&E tank is sufficient to meet the manufacturer's requirements for the minimum head required for the boiler and the system pump(s).

The Torrent OV models can be installed using both 'Y' Plan and 'S' Plan heating system controls. These models can also be installed without either 3-port or 2-port valves using a separate central heating pump as shown in diagrams on this page. In this case no bypass valve is required.

If the flow and return pipes between the boiler and the Torrent OV thermal store are dipped as illustrated in the schematic shown opposite, then the boiler selected must be suitable for a sealed heating system i.e. it must be fitted with an overheat thermostat. Automatic air vents should be fitted at appropriate places to vent the system and a pressure relief valve should also be fitted close to the boiler.



Any boiler can be used with the Torrent OV and the Torrent SOL provided the flow pipe from the boiler to the Torrent is continuously rising.

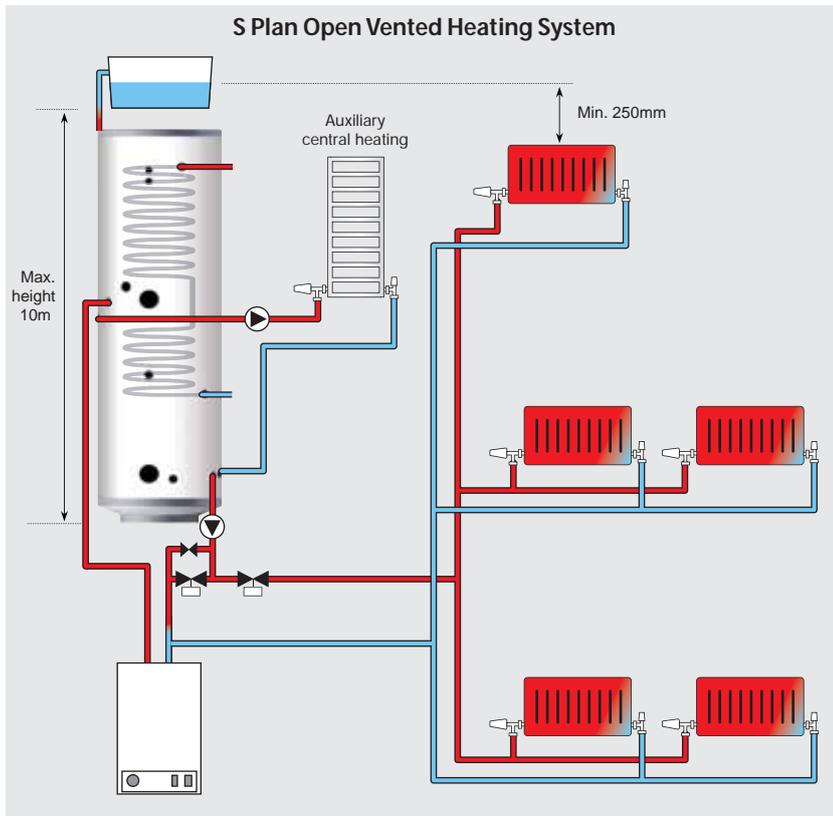
The flow pipe between the boiler and the Torrent thermal store is part of the open vent and therefore it must not be fitted with any isolating valve, non-return valve or any other component which can obstruct the flow.

The minimum size of flow and return pipe between the boiler and the Torrent should be 22mm copper or equivalent. In any case it should be sized to suit the installed boiler capacity, available pump head and the circuit resistance.

The water level must be set correctly by adjusting the ball valve in the F&E tank. The overflow/warning pipe, should be no less than the 20mm internal diameter and have a continuous fall.

The overflow/warning pipe should be fitted to discharge clear of the building and be sited so that any overflow can be easily observed. The warning pipe should be installed in either high temperature uPVC or copper and should not have any other connections to it.

INSTALLATION

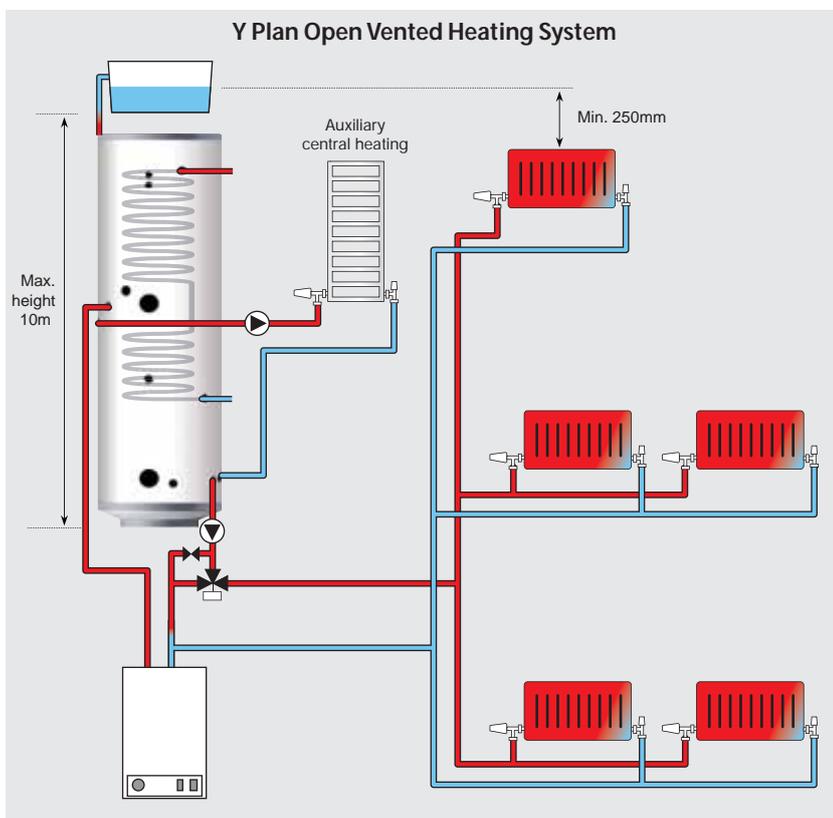


The two diagrams shown on this page show how an 'S' plan and 'Y' plan may be used in conjunction with the Torrent MultiFuelStore OV, with another space heating supply being taken direct from the store. The type of space heating used is the installer's choice and the diagrams only show possible layouts.

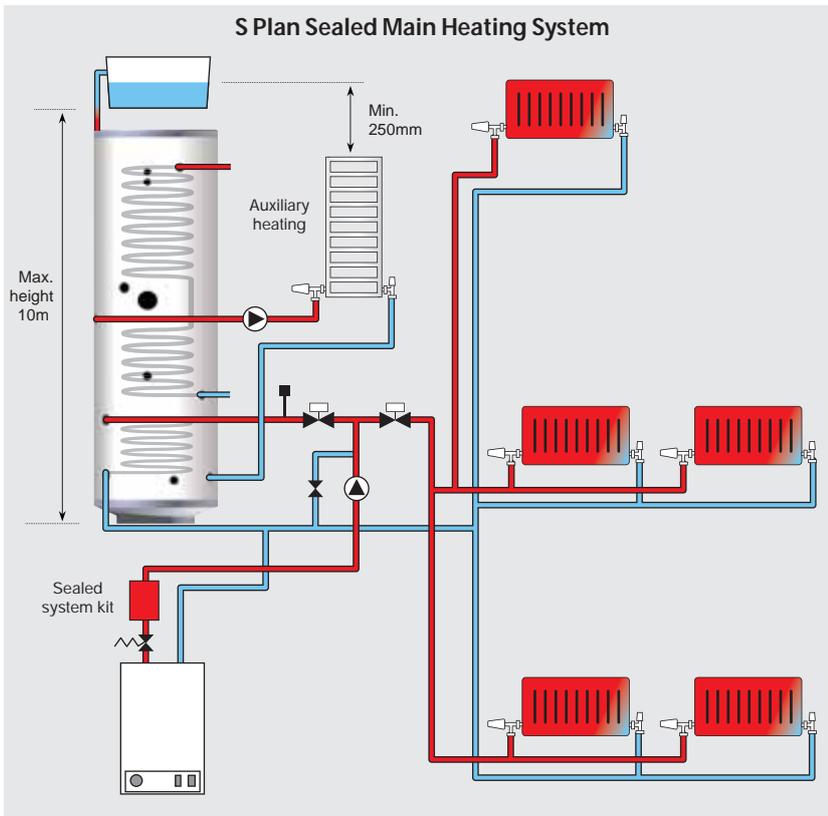
The auto bypass is positioned here to allow minimum flow rates through the boiler as TRVs close; and to allow for boilers with pump overrun.

Off delay timers may be considered for use in situations where the boiler pump overrun is controlled by sensing a temperature drop before shutting off. This type of boiler may cause the pump to run on for some minutes while the temperature slowly drops, but the store temperature may also drop causing the boiler to fire again; the boiler then short cycles. If an off delay timer is used it allows the pump to overrun for about a minute to remove any excess heat; then shuts off the pump, but it does not remove so much of the heat from the store that it causes the boiler to fire again.

A solid fuel boiler is also able to be connected to the Torrent MultiFuelStore OV, please refer to page 20 for further information.



INSTALLATION



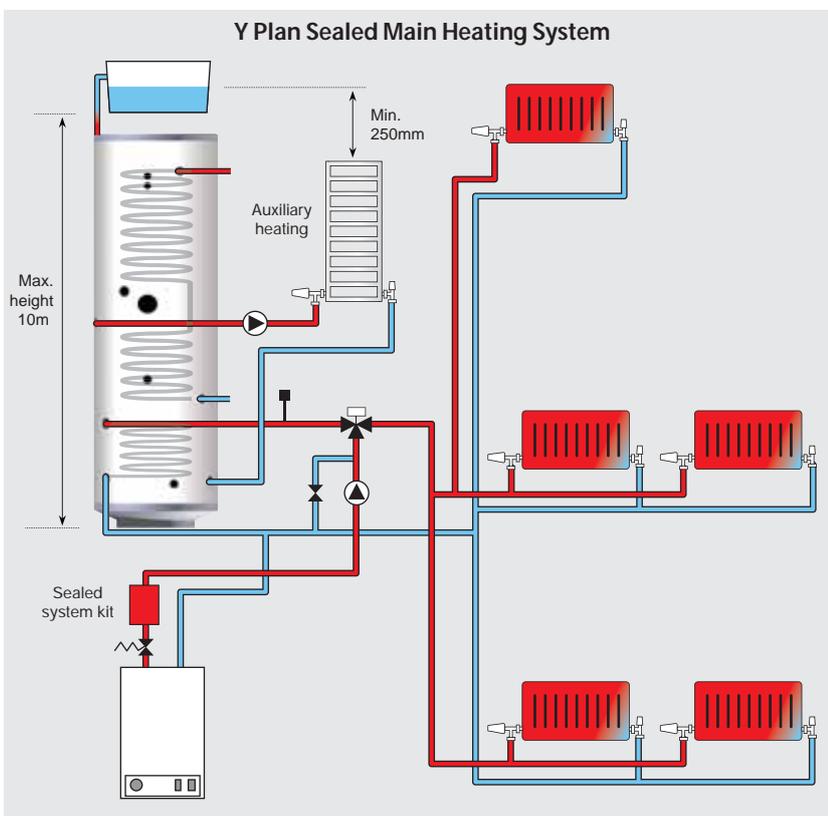
Sealed heating system

All Torrent SP models are suitable for sealed heating systems up to 3.5 bar maximum operating pressure, however the normal pressure relief valve setting is 3.0 bar. The typical layout of the open vented 'Y Plan' and 'S Plan' for the indirect Torrent models is shown in the diagrams on this page.

A boiler used in a sealed heating system must be suitable for this application i.e. it must be fitted with an overheat cut-out thermostat and can be located above the thermal store F&E tank as can the central heating system.

It is recommended that the F&E tank (for the thermal store) is fitted at a high level in the same cupboard as the Torrent. However it can be fitted remotely up to 10m above the base of the Torrent, and sized to accommodate the expansion of the cylinder and any attached central heating and solid fuel volumes.

The F&E tank overflow/warning pipe should be installed in a material suitable for a heating system feed and expansion tank in accordance with BS 5449.



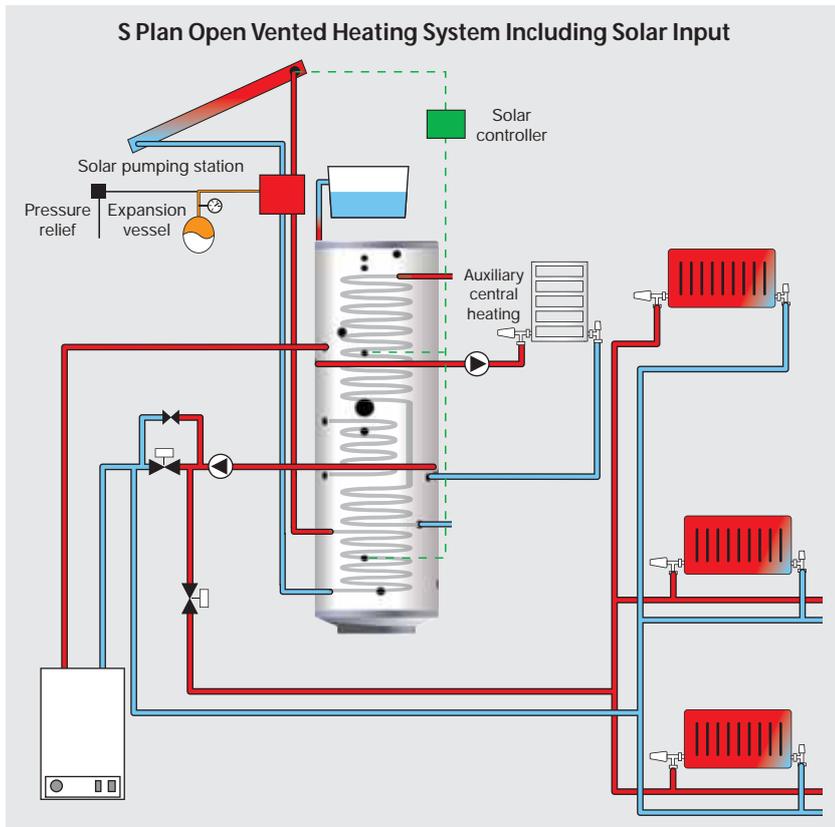
There shall be no permanent connection to the mains water supply for filling the heating system even through a non-return valve without the approval of the Local Water Authority. An approved filling loop is required for filling the heating system, which should be disconnected after commissioning the system.

The filling loop should be located adjacent to the boiler along with a suitable expansion vessel, pressure gauge, pressure relief valve and discharge arrangement.

The minimum system pressure should not be less than the static head plus 0.5 bar i.e. the height of the highest point in the system above the expansion vessel plus a margin of 0.5 bar.

A solid fuel boiler is also able to be connected to the Torrent MultiFuelStore SP, please refer to page 20 for further information.

INSTALLATION



Solar heating circuit

The Torrent SOL is an advanced thermal store and has been designed to incorporate existing boiler and central heating controls and is based on the tried and tested standard Torrent range. Therefore general design requirements for hot and cold water systems, for ball valve and overflow, for water treatment and for heating system design should be taken into account when designing the Torrent SOL based systems.

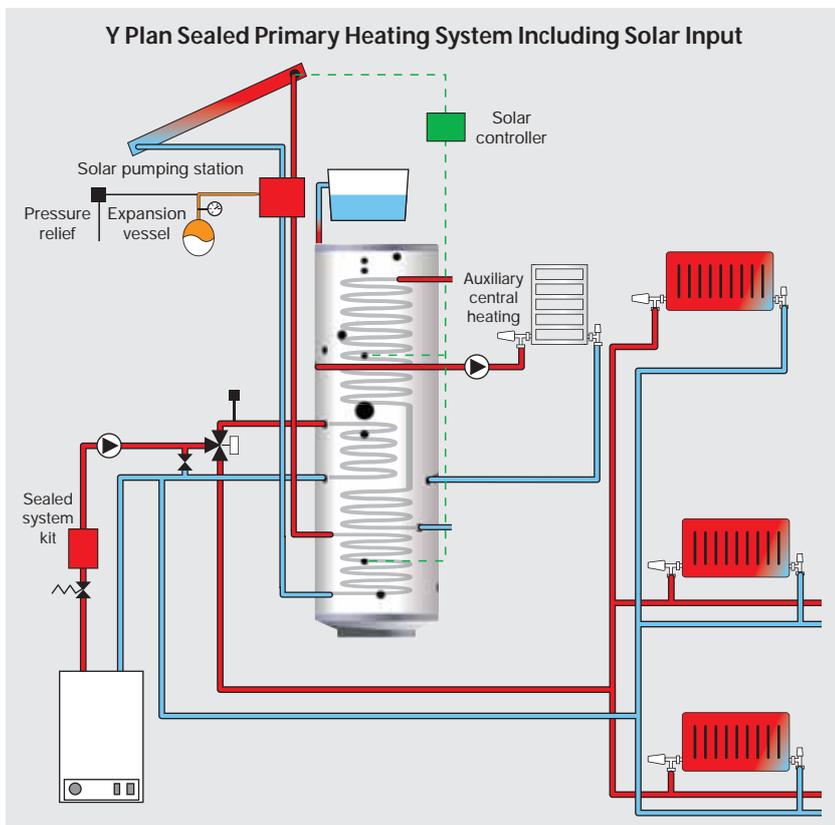
The diagram opposite shows the Torrent SOL type used in a traditional open vented heating system. The water level in the F&E tank should be at least 250mm above the highest point of the heating system e.g. a radiator.

In the open vented system shown opposite, the thermal store, radiator heating circuit and the under-floor heating circuit are all fed from the same feed and expansion tank. Therefore it should be sized to accommodate the expansion of total water content of the complete system (i.e. water content of the store + water content of radiator heating circuit + water content of under-floor heating circuit).

The diagram opposite shows the sealed primary 'SP' variant of the Torrent SOL used in a typical sealed heating system. With this system arrangement, although the boiler and the radiator central heating circuits are sealed, both the store and the under-floor heating circuit (if installed) are open vented. Therefore the feed and expansion tank should be sized to accommodate the expansion of total water content of the open vented system (i.e. water content of the store + water content of under-floor heating circuit).

The diagrams also show typical configurations of a solar thermal system with Torrent SOL, which will accumulate the energy from more than one renewable energy sources (e.g. solar, wood burning stove).

In the open vented system, this energy is available for hot water and at low level for both radiator and under-floor (if installed) space heating circuits. However in the sealed primary system configuration, this energy is only available for hot water and at low levels for the under-floor space heating circuit (if installed).



INSTALLATION

For maximising the use of the renewable 'green' energy, the system should be managed and controlled so that unnecessary firing of the boiler is kept to a minimum. This can be achieved by a combination of householder use of the system and controls, for example;

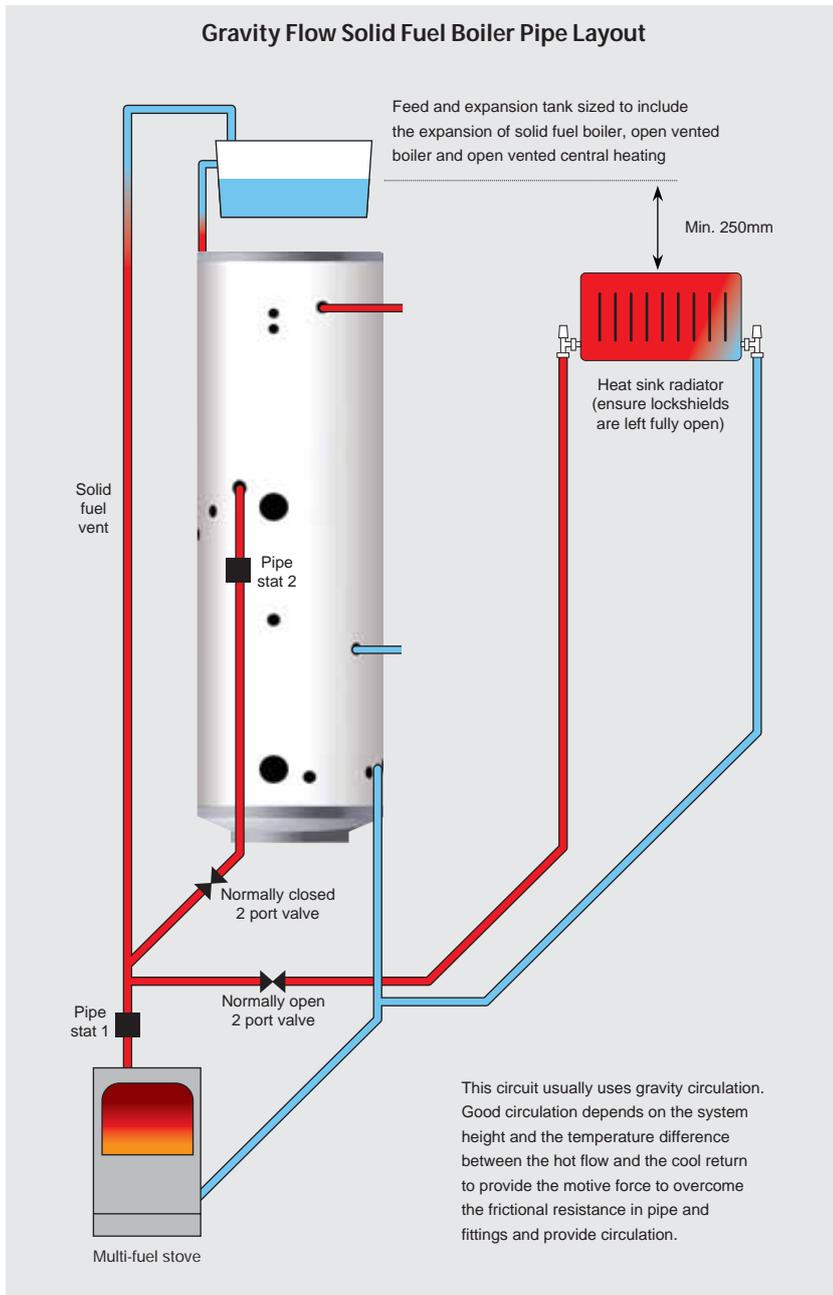
Use the store to provide shower or a bath to utilise the heat gained by the system from the previous day's solar energy input. Alternatively showering or bathing in the evening will utilise the energy that has been stored during the day from the solar system.

- As with any system, hot water and space heating should be programmed according to house holder requirements. However it is always good to remember that to gain maximum advantage from the solar panels, the store should be as cool as possible, prior to expected periods of high solar gain. To achieve this in spring, summer and autumn, the hot water channel of the boiler should be programmed to come on 30 minutes before the hot water is required in the morning and then programmed off before volumes of water are drawn off the system. This way the store is depleted of heat allowing maximum transfer from the solar system during the day.
- However further supplementary time periods for the boiler will be required in winter when not much solar energy is available.
- Uncontrolled boiler operation can also be reduced by fitting and wiring a pipe thermostat on the solar return pipe close to the Torrent SOL.

As part of setup and commissioning, it is important that this boiler hold-off pipe thermostat be adjusted to find the best setting for each individual installation. Failure to do so will give under performance of either the boiler or the solar heating system.

A solid fuel boiler can also be connected to the Torrent MultiFuelStore SOL, please refer to page 20 for further information.

INSTALLATION



- Avoid long horizontal runs and try to make the ratio horizontal:vertical to be a maximum of 20:80.

To ensure that the solid fuel boiler does not overheat the thermal store during its operation and prevent gravity circulation cooling the thermal store when it is not, the following controls can be used; HETAS and/or the solid fuel boiler manufacturers instructions should be consulted. This control system is fed from a dedicated fuse spur to enable safe isolation for changing components. All wiring should comply with BS7671 Requirements for Electrical Installations 17th edition.

Typical components (not supplied);

- 1 x Honeywell V4043B1265 - 28mm compression normally open 2 port valve
- 1 x Honeywell V4043H1106 - 28mm compression normally closed 2 port valve
- 2 x Honeywell L641B1012 - High limit pipe thermostat

When the boiler is lit, the water temperature raises. When the temperature is above pipe thermostat 1 set point, the contacts close signalling the normally closed valve to move open. Once it is fully open, it signals the normally open valve to motor there by closing it. The thermal store now receives heat from the solid fuel boiler via gravity circulation.

If pipe stat 2 set point is exceeded then the power to the normally closed valve is cut which in turn cuts the power to the normally open valve. Excess heat from the solid fuel boiler is then circulated around the heat sink radiator.

Careful selection of the pipe thermostat switching temperatures should be made during commissioning to get the best performance from the system.

There are 2 solid fuel returns on the Sol cylinder range to enable the whole store water volume to be used to store heat when the solar contribution is negligible. For example, a solid fuel boiler that is used for space heating would only be used in the winter months when the solar contribution is small. Connecting it to lower return enables the store to hold more heat when the sun cannot provide as much.

Alternatively an Aga which runs 24 hours 365 days a year would need to be connected to the upper return when the solar contribution is greatest and the lower when the solar contribution is least. A pair of simple isolation valves may be used to switch from summer to winter mode or more sophisticated control methods used.

Solid Fuel Option

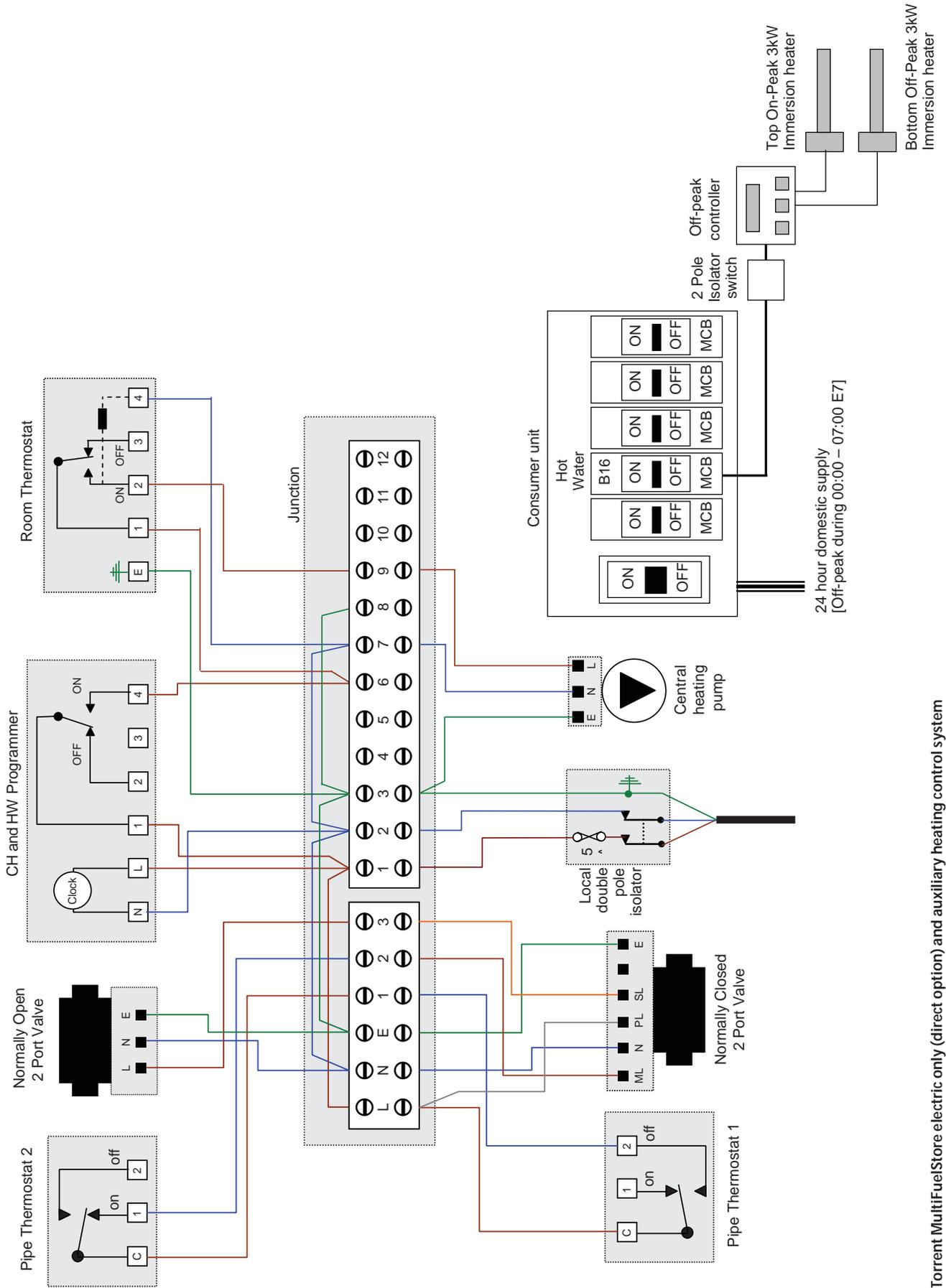
All three models of the Torrent MultiFuelStore shown in this installation manual have the tappings included as standard for a solid fuel boiler.

In the absence of recommendations from HETAS or the solid fuel boiler manufacturer, we would advise the following pipe layout to achieve the best performance from your solid fuel system and our thermal store.

This diagram represents a good example of a gravity circulation pipe layout. Points to note are;

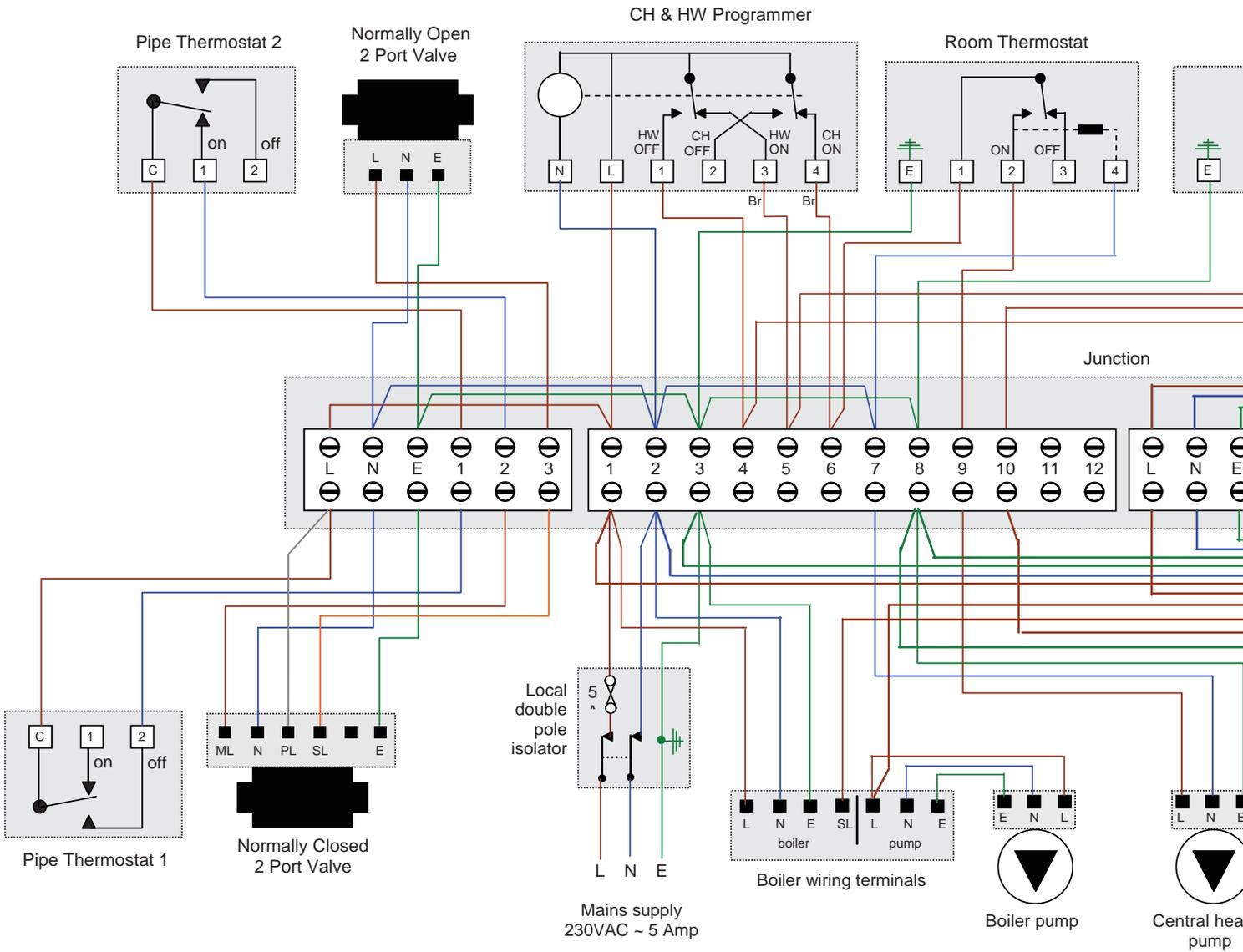
- All pipework rises towards the cylinder and the heat sink radiator and fall back towards the solid fuel burner.
- The heat source is below the cylinder which gives the layout a good system height.
- All gravity circulation pipework is recommended to be 28mm or above pipe diameter, at low flow speeds the pipe resistance is negligible in this pipe diameter.

INSTALLATION



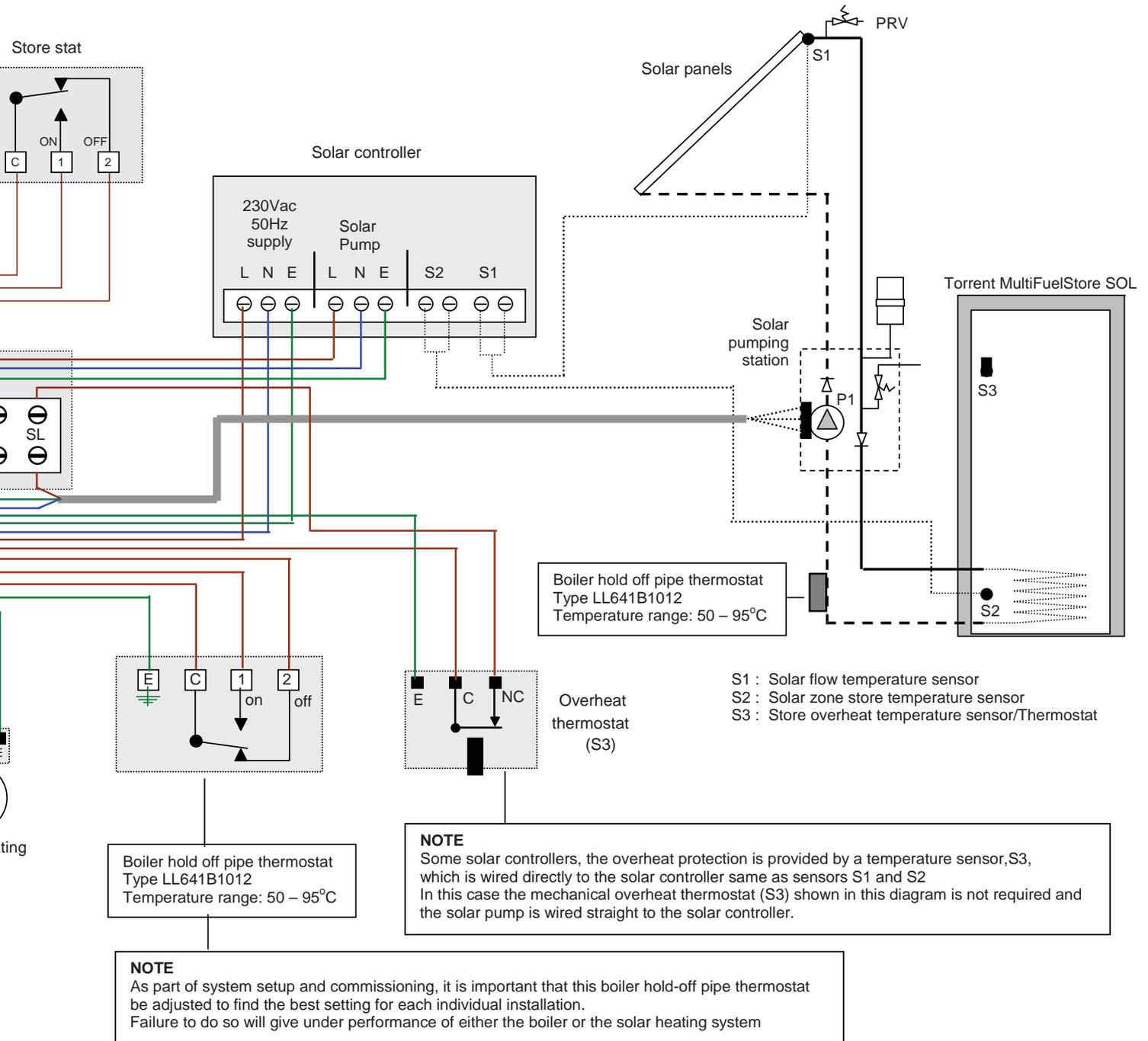
Torrent MultiFuelStore electric only (direct option) and auxiliary heating control system

INSTALLATION

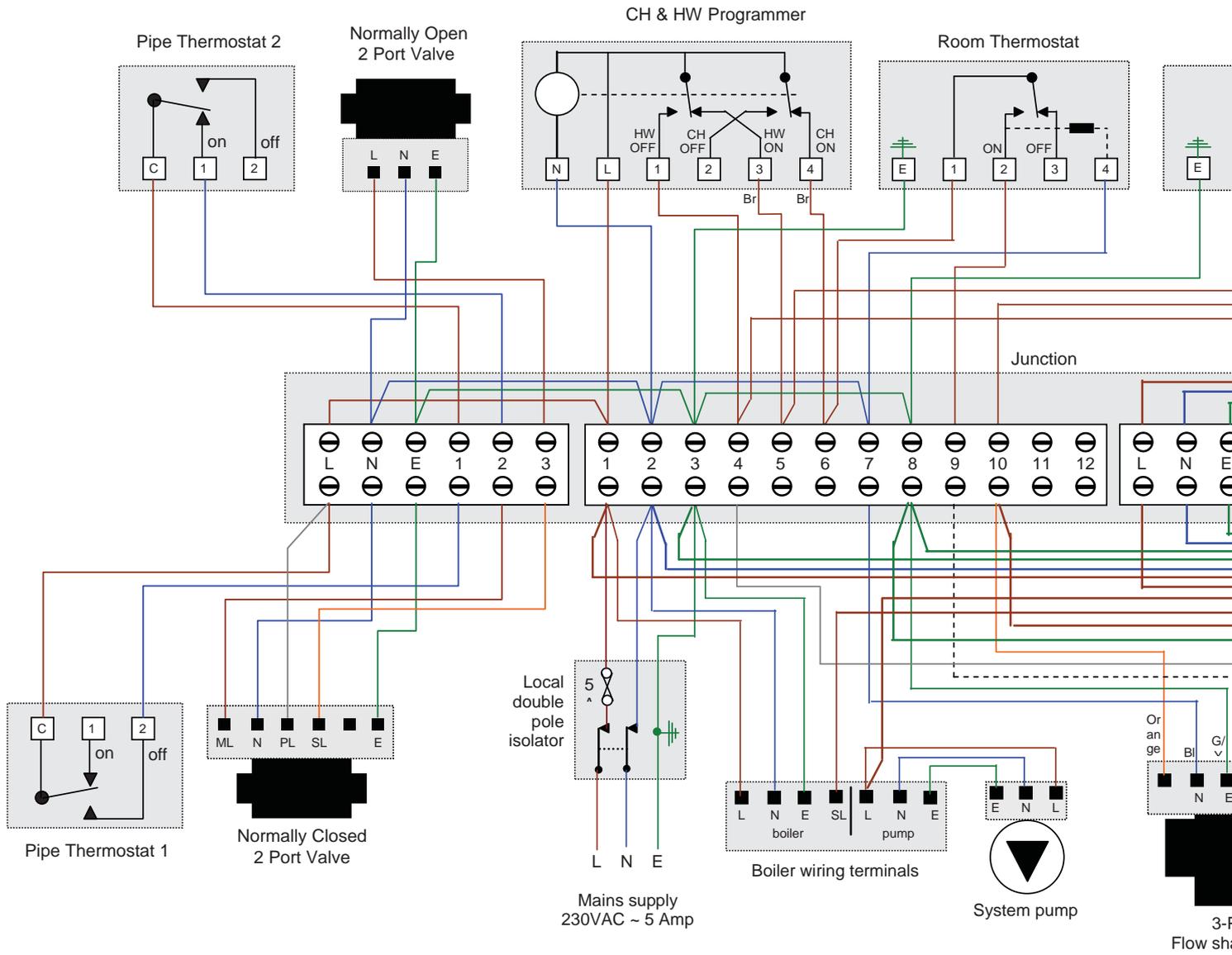


Torrent MultiFuelStore with 2 pump heating control system and typical solar heating system

INSTALLATION

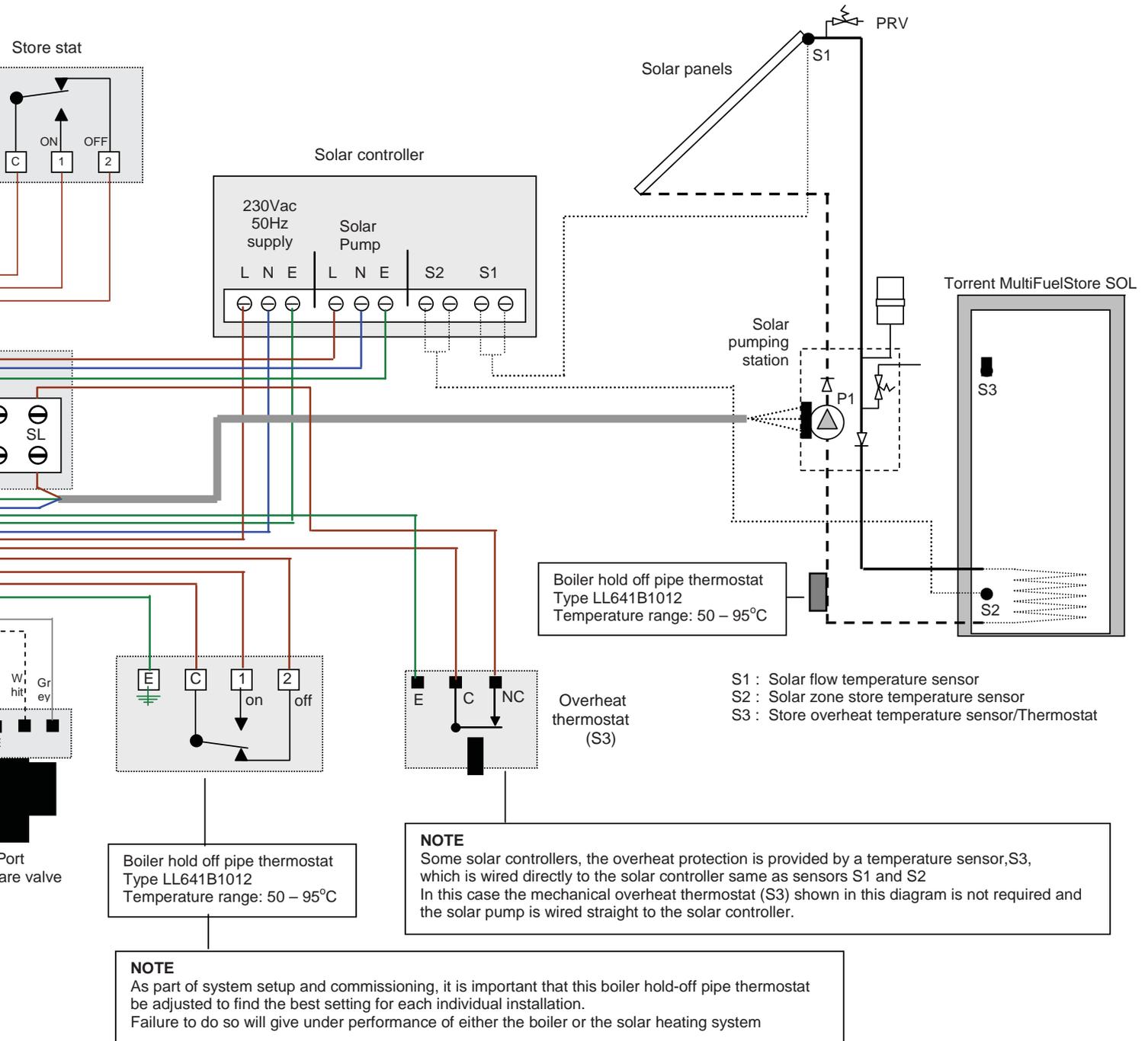


INSTALLATION

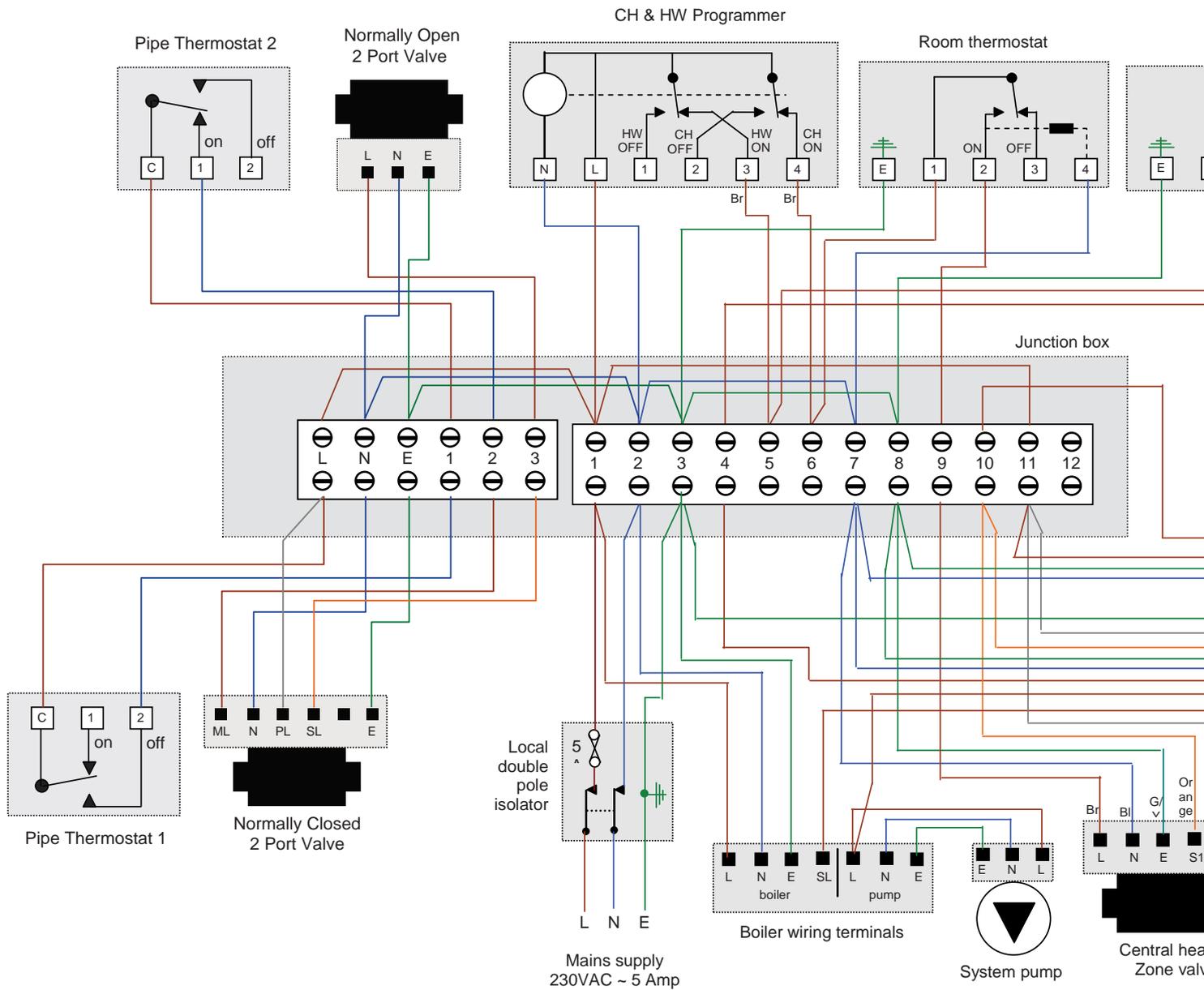


Torrent MultiFuelStore with 'Y' Plan heating control system and typical solar heating system

INSTALLATION

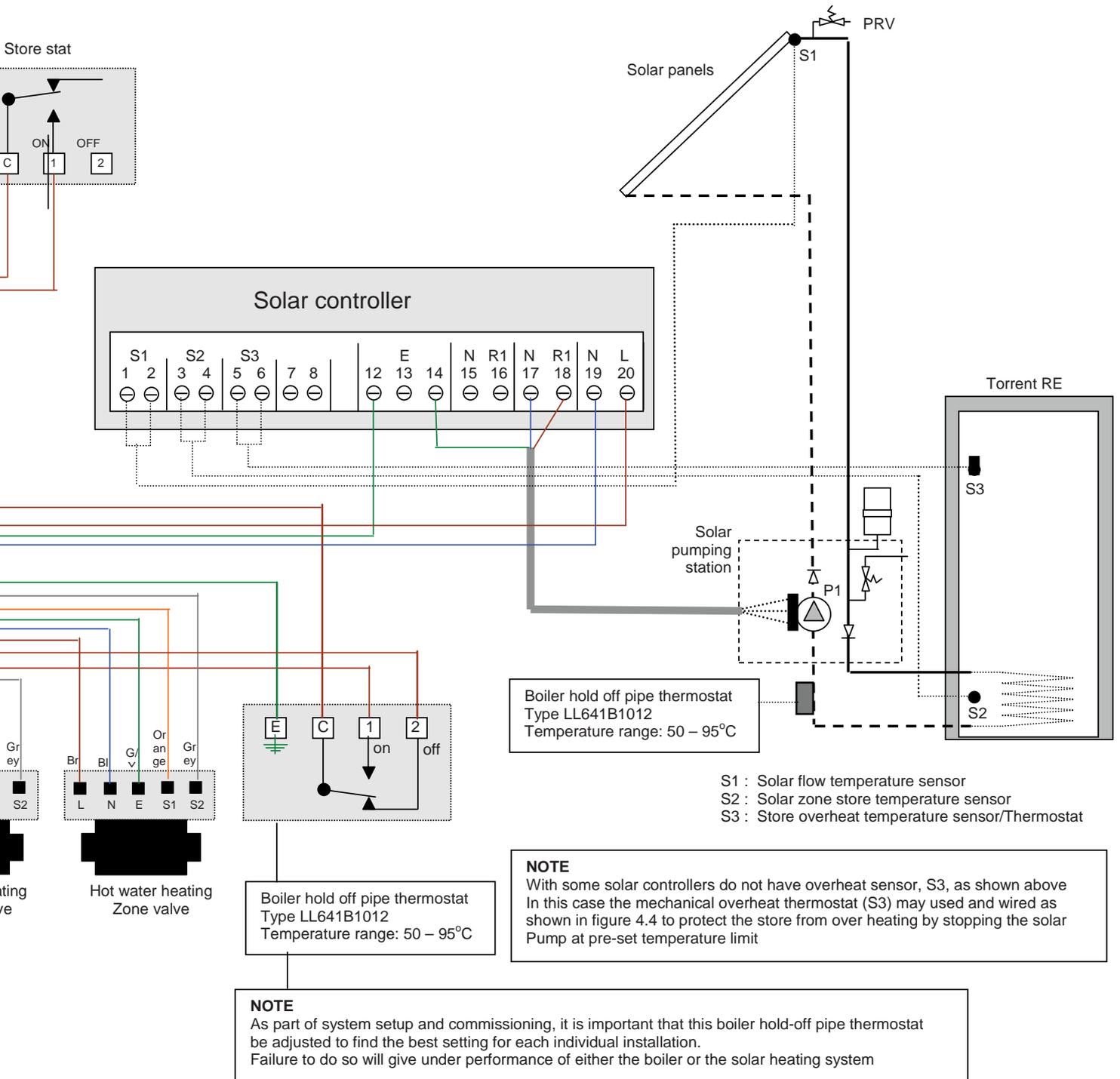


INSTALLATION



Torrent MultiFuelStore with 'S' Plan heating system with typical solar heating system

INSTALLATION



INSTALLATION

Torrent OV Models (heated by electricity only)

Ensure that the thermal store is filled with water to the water level mark inside the feed and expansion tank and the ball valve (if fitted) is adjusted correctly.

If a ball valve is fitted turn down the service valve once the system is finally filled to the point where the warning/overflow pipe will cope with the discharge arising from a ball valve failure.

Switch the immersion heater on and allow the store to heat up to full temperature (typically 75 – 77°C).

When the store has been fully charged, open the nearest hot tap and check that the mixing valve at the Torrent unit is delivering the desired temperature of 55±5°C which is a factory set value. Adjust if necessary to suit individual requirements.

Instruct the occupant on how to use the off-peak timer (if fitted) and the appliance.

Fill in and sign the 'Benchmark' section of this manual and leave it in a suitable place near the appliance.

Electrician/Installer: Please note that water at the hot tap does not indicate that the Torrent is full. Check that there is water in the feed and expansion tank before switching on the immersion heaters. Dry firing the elements will cause premature failure which is not covered by our warranty.

Non-Electric Torrent Models

Open the incoming stop valve and fill the domestic hot water system. For open vented heating system, fill the whole of the primary heating system and the thermal store with potable water through the feed and expansion tank. For sealed heating system fill the thermal store with potable water through the feed and expansion tank and the heating system to the design pressure using the filling loop.

Check the water level in the feed and expansion tank and adjust the ball valve if necessary. Check the whole of the primary heating and domestic hot and cold distribution system, including the Torrent for leaks.

It is essential that all systems function properly for optimum performance and to achieve this:-

- The primary system should be commissioned in accordance with good practice and generally in accordance with the requirements of BS 6798, BS 5449 and BS 7593. Full details of the requirements are given in PAS 33:1999 under section 10 Commissioning.
- The boiler manufacturers instructions should be followed during the commissioning phase.
- If a solar thermal system is fitted it should be commissioned as per manufacturers instructions to ensure compliance with Building regulations.
- When using either cleansing or corrosion inhibitor chemical, the manufacturers instructions must be followed.

When determining the quantities of cleanser required, the volume of the Torrent should be added to the water content of the primary system. Although the Torrent has no special water treatment requirements, the radiators and other parts of the circuit will require the application of a scale and corrosion inhibitor.

If it is proposed to 'powerflush' the heating system we would recommend that the Torrent is isolated from the heating system being cleaned. Failure to do so could seriously damage the unit. If in doubt please contact our Technical Helpline on 01253 474584.

- Fill the system and flush cold and then refill and vent the system.
- Add cleanser such as Fernox Superfloc or sentinel X300 to ensure that flux residues and the installation debris are removed from the system.
- Ensure that the store thermostat is set at 75°C and the boiler thermostat is set at its maximum. Set the boiler/system pump to give temperature difference across the boiler between 8 – 15°C.
- Switch on the system and to ensure full cleansing, circulation to all parts of the system should continue for a minimum of 1 hour.
- Flush the system hot having checked that there is no overflow or leaks when the system is up to temperature.
- Refill and vent the system and add appropriate amount of scale inhibitor, such as Fernox MB1 or Sentinel X100.

Set the boiler temperature to maximum and with the central heating off, let the system (i.e. store) heat up (Approximately 1 – 2 hours). When the store is up to temperature (75 -77°C):-

- Open the nearest hot tap and check that the mixing valve at the Torrent unit is delivering the desired temperature of 55±5°C which is a factory set value. Adjust if necessary to suit individual requirements.
- Check that the space heating system controls (e.g. programmer, room thermostat) are functioning correctly.

Switch off space heating system and ensure that the store thermostat is set to 70°C and the boiler thermostat is set to maximum.

Re-fire the boiler by running a little water and wait for the boiler to switch off. Check that there is no live supply from the store thermostat i.e. it is satisfied.

INSTALLATION

- DO -** Check the incoming mains water pressure. If it exceeds 5.0 bar at any point in the 24 hour cycle then a pressure limiting valve set at 3.0 bar should be fitted where the cold supply enters the property.
- DO -** Check that all connections are in accordance with the labelling on the thermal store.
- DO -** Fill the tank manually or adjust the ballvalve so that the water in the F & E tank is set to the correct level.
- DO -** Restrict the ballvalve fill rate when full so that the overflow pipe can cope with the fill rate in the event of a ballvalve failure.
- DO -** Make sure there is adequate clearance above the F & E tank to service the valve.
- DO -** Ensure that range-rated appliances are set **to the specified design heat input and the boiler thermostat is set to maximum for all boilers.**
- DO -** Ensure that the water level in the expansion tank is at least 250mm above the highest point on the radiator circuit and satisfies the boiler head required.
- DO -** Insulate any exposed pipework in the Torrent cupboard.
- DO -** Plumb the overflow warning pipe in 20mm minimum internal diameter tubing to discharge in a conspicuous external position, using high temperature uPVC or copper.
- DO -** Check the pump setting. This should be set as high as possible (consistent with not creating noise) so as to give a small temperature difference across the boiler, i.e. not greater than 11°C.
- DON'T -** Use a combined feed and vent on Torrent indirect installations.
- DON'T -** Use tube smaller than 28mm between boiler and Torrent when the boiler exceeds 60,000 Btu (17kW) output.
- DON'T -** Use dipped flow and return pipes between boiler and Torrent unless the boiler is fitted with an overheat switch.
- DON'T -** place any clothing or other combustible materials against or on top of this appliance.

SERVICING AND MAINTENANCE

In situations where scale inhibitors have not been fitted and the hot water service has deteriorated a Torrent can be descaled very easily.

The thermostatic mixing valve should be removed and our special adapter (MIP103) put in its place. This valve can be connected to a power flushing machine and using descaling chemicals, it can be cleaned in a relatively short time (approximately 45 minutes).

Fitting the special adapter

1. Before descaling turn the boiler off and run the hot water tap until the thermal store is below 40°C.
2. Turn off the mains water supply at stop tap supplying the Torrent.
3. Open a hot tap on the hot water system.
4. Break the three unions securing the mixing valve to the Torrent and remove the mixing valve making sure a container is in place to collect spillage.
5. Attach the adaptor to the Torrent - two unions and washers.
6. Close all hot taps on the DHW system.

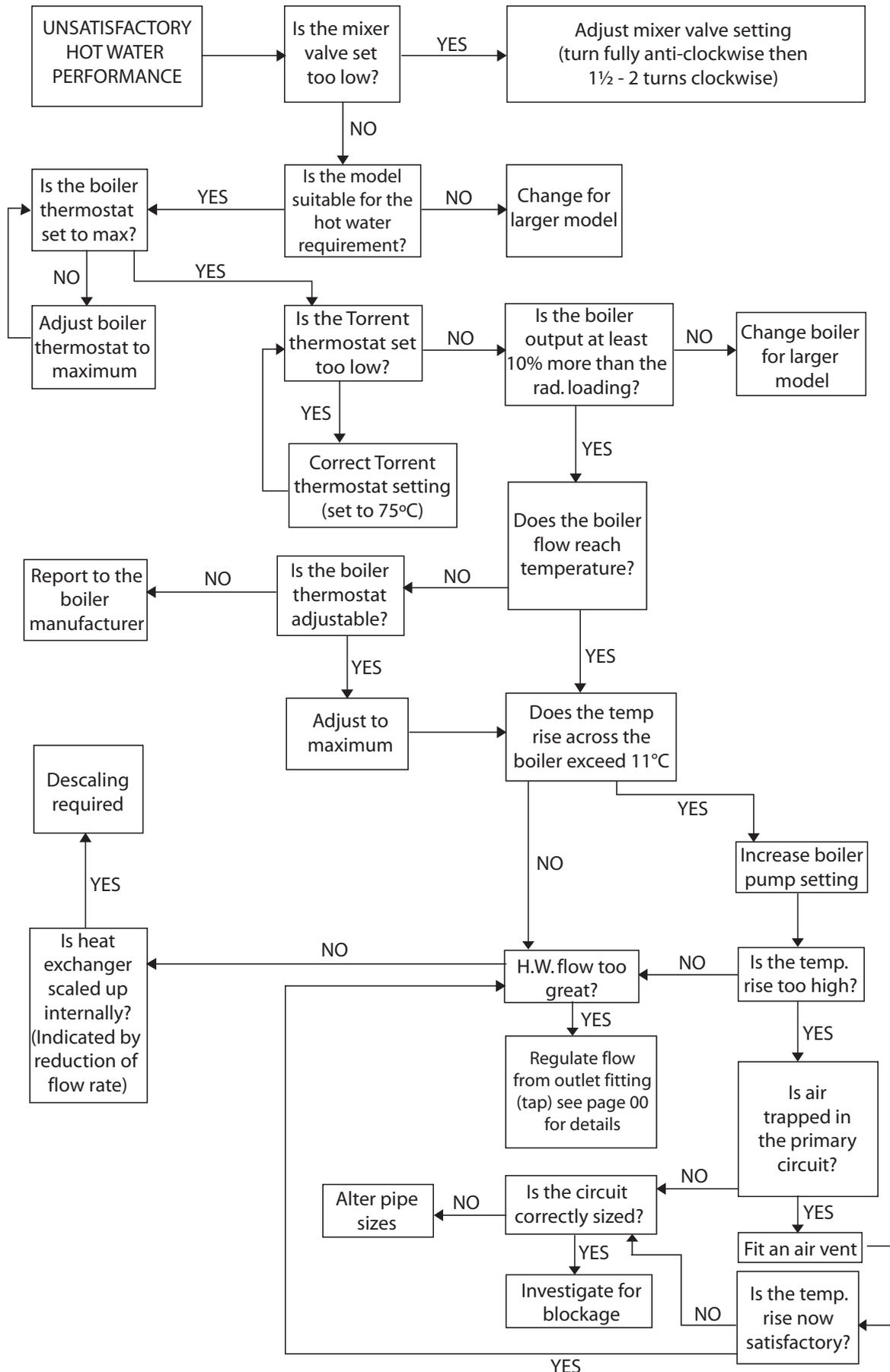
Follow the power flushing machine and descaling chemical manufacturers instructions until the heat exchanger is clear.

Note: This solution is ACIDIC and MUST be handled with CARE. It is a wise precaution to do the mixing, filling and emptying outside the premises.

To remove the special adapter

1. Remove the two hoses from the adaptor.
2. Remove adaptor.
3. Replace Oventrop mixing valve - **ensuring that it is the correct way round.**
4. Open a hot tap - preferably to a porcelain sink.
5. Turn on the mains water supply to Torrent.
6. Allow the system to flush via the open hot tap for some minutes, then flush out system at each hot tap.

SERVICING AND MAINTENANCE



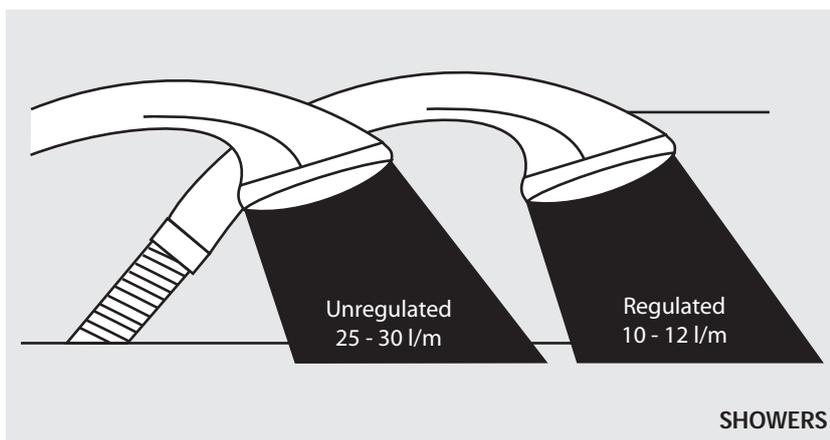
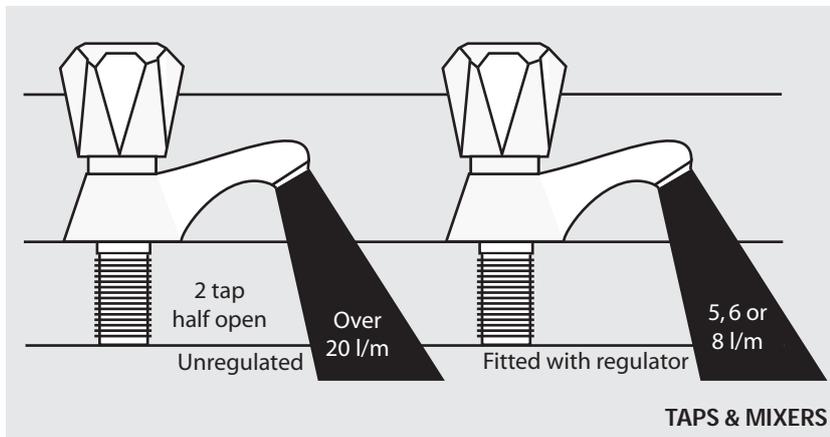
SERVICING AND MAINTENANCE

	Description	Part No.	Gas Council Part No.
1	Ballvalve 1212 Part 2	FT207	370 505
2	Ballvalve Float	FT429	370 506
3	Mixing Valve - Brawa	XC007	385 872
4	Spare ring gasket for mixing valve	XC008	370 507
5	Immersion Heater 3kW	XB482	-
6	Single Shot Overheat Immersion Stat	XB114	-
7	Plastic Feed and Expansion Tank	XB343	-
8	22mm Blank	FT311	-
9	28mm Blank	FT466	-
10	Control Thermostat	XC010	-

APPENDIX

Water Savings

Water Related Costs Can Be Reduced By Good Plumbing Practice



Vast quantities of water are needlessly run off to waste due to Taps, Mixers and Showers discharging flow rates far in excess of the rates required for them to perform their duties.

The contrasting flow rates shown on this leaflet clearly illustrate the savings that can be made whilst still providing a good performance.

British made Aquaflo Regulators provide constant flow rates by automatically compensating for supply pressure changes between 1 bar & 10 bars.

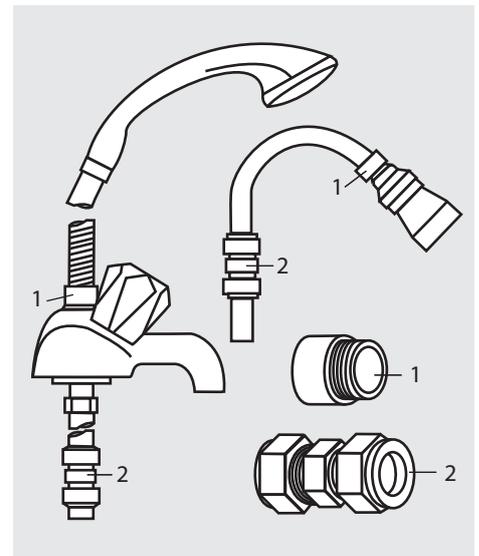
To facilitate installation into the wide range of plumbing equipment which is encountered in the U.K, Four Fixing Options are available:-

Options For Showers

1. MXF "DW" Range - For fitting behind Fixed Shower Heads or onto Flexible Hoses for Handshowers (preferably onto the inlet end when lightweight hoses are used).
2. Compression Fitting Range. "In Line" regulators as in Option 4 for Taps & Mixers.

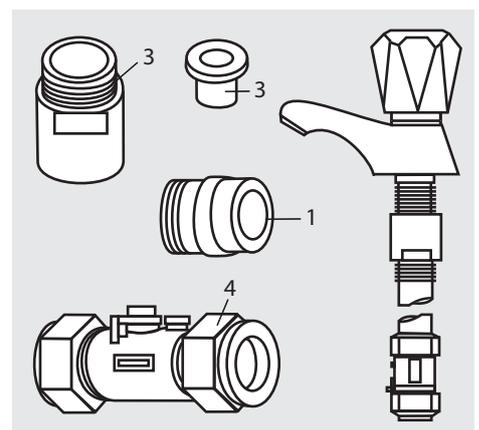
Information by courtesy of
AQUAFLOW REGULATORS LTD

Haywood House, 40 New Road, Stourbridge, West Midlands DY8 1PA
TELEPHONE (01384) 442611 FAX: (01384) 442612



4 Fixing Options For Taps & Mixers

1. MK Range - Combined Regulators & Aerators for screwing onto Taps & Mixers with internal or external threads on their noses. Anti Vandal models also available.
2. MR05-T Range - Internal Regulators. Push-fit into Tap or Mixer seats. Produced in three sizes - 12.5mm (BS1010), 12mm & 10mm, Flangeless models also available for Taps with Low Lift washers.
3. MXF Standard Range - Screw on tail models for Taps & Mixers. Fix onto the tails before fitting the tap connectors. Available in 3/8", 1/2", 3/4" and 1" BSP.
4. Compression Fitting Range - "In Line" regulators housed in 15mm & 22mm CXC Couplers & Isolating Valves. "UKWFBS" listed by the Water Research Centre. Isolation valves available for slotted screwdriver operation or with coloured plastic handles. Now available also in plastic bodied push-fit couplers & valves.



APPENDIX

MANUAL HANDLING OF APPLIANCE PRODUCTS

Description

Manual handling means any transporting or supporting of a load (including lifting, putting down, pushing, pulling, carrying or moving) by hand or bodily force.

Scope

This assessment will cover the largest unit within each product range manufactured by Gledhill.

For specific weights and dimensions please refer to technical data section.

Main Hazards

Vision may not be clear due to the size of the products. Adopting an incorrect method of lifting may cause injury, attempting to lift these products will require help from others. (Team lifts)

Control Measures

Manual lifting procedure

The lift, key factors in safe lifting are:

- a. **Balance**
 - b. **Position of back**
 - c. **Positioning of the arms and body**
 - d. **The hold**
 - e. **Taking the lead for team lifts**
-
- a. **Balance** - Since balance depends essentially upon the position of the feet, they should be apart about hip breadth with one foot advanced giving full balance sideways and forward without tension. In taking up this position, lifting is done by bending at the knees instead of the hips and the muscles that are brought into use are those of the thigh and not the back.
 - b. **Position of back** - Straight - not necessary vertical. The spine must be kept rigid, this coupled with a bent knee position, allows the centre line of gravity of the body to be over the weight so reducing strain.
 - c. **Positioning of arms and body** - The further arms are away from the side, the greater the strain on the shoulders, chest and back. Keep elbows close to the body arms should be straight.
 - d. **The hold** - Before lifting ensure you have a good hold.

- e. **Taking the lead for team lifts**- As more than one person is required for these products ensure that one person is taking the lead. **This may be you** so ensure that each person that is helping is made aware of the weight and of the items listed within this assessment. Make sure you and any others helping know the route you intend to take that it is clear of any obstructions. Never jerk the load as this will add a little extra force and can cause severe strain to the arms, back and shoulders. If there are steps involved decide on where you will stop and take a rest period. Move smoothly and in unison taking care to look and listen to others helping with the lift. Where possible use a sack truck to move the product over long flat distances, only lift the products when necessary. If in doubt stop and get more help.

Individual capability

Individual capability plays an important part in handling these products. Persons above average build and strength will find it easier and should be in good health. Persons below average build and strength may require more rest periods during the handling process.

Pregnant women should not carry out this operation.

Persons who are not in good health should seek medical advice prior to commencing any lifting or manual handling operation.

Residual risk

Following the guidelines given above will reduce any risk to injury.

All persons carrying out this operation must be fully trained and copies of the specific risk assessment made available for inspection and use in their training process.

Further guidance on Manual Handling can be obtained from the Health and Safety Executive. Manual Handling Operations Regulations 1992.

NOTES

MAINS PRESSURE HOT WATER STORAGE SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the storage system as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name _____ Telephone Number _____
 Address _____
 Cylinder Make and Model _____
 Cylinder Serial Number _____
 Commissioned by (print name) _____ Registered Operative ID Number _____
 Company Name _____ Telephone Number _____
 Company Address _____
 Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certificate*:

Building Regulations Notification Number (if applicable) _____

ALL SYSTEMS PRIMARY SETTINGS (indirect heating only)

Is the primary circuit a sealed or open vented system? Sealed Open
 What is the maximum primary flow temperature? _____ °C

ALL SYSTEMS

What is the incoming static cold water pressure at the inlet to the system? _____ bar
 Has a strainer been cleaned of installation debris (if fitted)? Yes No
 Is the installation in a hard water area (above 200ppm)? Yes No
 If yes, has a water scale reducer been fitted? Yes No
 What type of scale reducer has been fitted? _____
 What is the hot water thermostat set temperature? _____ °C
 What is the maximum hot water flow rate at set thermostat temperature (measured at high flow outlet)? _____ l/min
 Time and temperature controls have been fitted in compliance with Part L of the Building Regulations? Yes
 Type of control system (if applicable) Y Plan S Plan Other
 Is the cylinder solar (or other renewable) compatible? Yes No
 What is the hot water temperature at the nearest outlet? _____ °C
 All appropriate pipes have been insulated up to 1 metre or the point where they become concealed? Yes

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.



www.centralheating.co.uk

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 _____

Gledhill (Building Products) Ltd

AMD. NOVEMBER 2012
CONDITIONS OF SALE & GUARANTEE TERMS

1. Gledhill (Building Products) Ltd ("We" or "Gledhills") only do business upon the Conditions which appear below and no other. Unless we so agree in writing these Conditions shall apply in full to any supply of goods by us to the exclusion of any Conditions or terms sought to be imposed by any purchaser. These Conditions of Sale and Warranty Terms override those which are contained on the Invoice Forms and all Sales are now subject to these Conditions of Sale and Warranty terms only.

2. PRICE

Once an order or call off has been accepted the price will be held for three months **but if delivery is extended beyond that period at the customer's request, then we reserve the right to amend the price when necessary.** The company reviews its pricing annually to adjust for changes in our cost base. We reserve the right to alter prices at any time for severe movements in raw materials (mainly copper and steel). If there is to be a change we will give customers at least four weeks notice but anything delivered after that date will be at the revised price. An order may not be cancelled or varied after acceptance without the written consent of the company. Such cancellation or variation shall be subject to such reasonable charges as may be appropriate.

3. SPECIFICATION

The goods are supplied in accordance with the Specifications (if any) submitted to the Purchaser and any additions and alterations shall be the subject of an extra charge. Any goods not so specified shall be in accordance with our printed literature or the literature of any of our component suppliers (subject to any modifications made since publication). If we adopt any changes in construction or design of the goods, or in the specification printed in our literature, the Purchaser shall accept the goods so changed in fulfilment of the order.

4. PAYMENT

The buyer shall make payment in full within thirty days from the end of the month in which the invoice is dated. If we receive payment in full on or before the due date we will allow an appropriate settlement discount except where we have quoted a special net price. If payment is not received in full on or before the due date we shall be entitled in addition to the invoice price to:

- (i) payment of a sum equal to any increase in the copper price supplement applicable to the particular goods sold between the date of receipt of order and the date of receipt of payment in full; and
- (ii) interest on any part of the invoice price unpaid after the due date at the rate of 3% per annum over the base rate for the time being of HSBC Bank plc.

5. TIME

We give estimates of delivery dates in good faith and time of delivery is not nor shall be made of the essence of any contract nor shall we be liable for any loss or damage occasioned by delay in delivery.

6. DELIVERY

We deliver free normally by our own vehicles within 25 miles of any of our manufacturing depots. Delivery to any place more than 25 miles from one of our manufacturing depots may be subject to our quoted delivery charges. We reserve the right to make delivery of goods contained in one order by more than one consignment and at different times. Where a period is agreed for delivery and such period is not extended by our Agreement, the Purchaser shall take delivery within that period. If the Purchaser fails to take delivery, we shall be entitled at the Purchaser's risk and expense to store the goods at the Purchaser's premises or elsewhere and to demand payment as if they had been despatched. Off loading at point of delivery shall be the responsibility of and be undertaken by the Purchaser.

7. SHORTAGES OR DAMAGE

Goods must be inspected before signature of delivery note and any damage, shortage or discrepancy noted on the delivery note and the goods returned on the same vehicle. The buyer must also give us immediate written notice of the damage, shortage or discrepancy so that we may prompt investigation.

8. RETURN OF GOODS

Goods may not be returned to the Company except by prior written permission of an authorised officer of the Company and such return shall be subject to payment by the Purchaser of handling and re-stocking charges, transport and all other costs incurred by the Company.

9. COMPANY LIABILITY AND GUARANTEE

9.1. Subject to the terms of these Conditions of Sale and Guarantee Terms Gledhills provide Guarantees in respect of specific products as set out in this clause.

9.2. Each Guarantee is strictly conditional upon the following:-

9.2.1. Complaints must be given to us immediately, before any action is taken, as responsibility cannot be accepted if repairs or renewals are attempted on site without our written approval.

9.2.2. The unit has been installed in accordance with our installation and service instructions and all relevant codes of practice and regulations in force at the time of installation.

9.2.3. All necessary inlet controls and safety valves have been fitted correctly.

9.2.4. The unit has only been used for the storage of potable water supplied from the public mains. The water quality shall be in accordance with European Council Directive 98/83 EC, or revised version at the date of installation, and is not fed with water from a private supply. Particular:

Chloride content:	Max. 200 mg/l
Sulphate content:	Max. 200 mg/l
Combination chloride/sulphate:	Max. 300 mg/l (in total)

9.2.5. Where appropriate the unit has been regularly maintained as detailed in the installation and service instructions

9.2.6. Defects caused by corrosion or scale deposits are not covered by any Guarantee.

9.2.7. Where we agree to rectify any defect we reserve the right to undertake the work on our own premises.

9.2.8. We will not accept any labour charges associated with replacing the unit or parts for any of the following products listed.

9.2.9. If the newly fitted water heater is not in regular use then it must be flushed through with fresh water for at least 15 minutes. Open at least one hot water tap once per week, during a period of at least 4 weeks.

9.3. Guarantees are provided in respect of specified goods supplied by Gledhills as follows:-

(a) Domestic and Commercial Open Vented Cylinders and Tanks.

The storage vessel is guaranteed for ten years and if it proves to be defective either in materials or workmanship, we will either repair or supply replacement at our option with the closest substitute in the case of any obsolete product to any address in Great Britain.

(i) free of all charge during the first year after delivery by us.

(ii) thereafter at a charge of one-tenth of the then current list price and any copper price supplement and delivery charge during the second year after delivery by us and increasing by a further one-tenth on the second and subsequent anniversary of delivery by us.

(b) Domestic Mains Fed Products [Primary Stores]

The storage vessel is guaranteed for five years and if it or any integral pipework as part of the storage vessel assembly proves to be defective either in materials or workmanship, we reserve the right to either repair or supply replacements or the closest possible substitute in the case of any obsolete product and will collect and deliver to any address in England, Wales and Scotland (excluding all Scottish Islands).

(i) free of all charge during the first year after delivery by us.

(ii) thereafter at a charge of one-fifth of the then current list price or any copper price supplement and delivery charge during the second year after delivery by us increasing by a further one-fifth on the second and subsequent anniversary of delivery by us.

(c) Stainless Steel Unvented Cylinders

Gledhill guarantee the components including controls, valves and electrical parts for two years from the date of purchase. IT SHOULD BE NOTED THAT THE FACTORY FITTED TEMPERATURE AND PRESSURE RELIEF VALVE MUST NOT BE REMOVED OR ALTERED IN ANY WAY OR THE GUARANTEE WILL NOT BE VALID. GLEDHILL WILL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL LOSS OR DAMAGE HOWEVER IT IS CAUSED.

The guarantee for the stainless steel vessel is for twenty five years against material defect or manufacturing faults if the original unit is returned to us **AND PROVIDED THAT:**

- (i) It has not been modified, other than by Gledhill.
- (ii) It has not been subjected to wrong or improper use or left uncared for.
- (iii) It has only been used for the storage of potable water, max 200mg/litre chloride.
- (iv) It has not been subjected to frost damage.
- (v) The benchmark service record is completed after each annual service.
- (vi) The unit has been serviced annually.
- (vii) Any disinfection has been carried out strictly in accordance with BS6700.

If the stainless steel vessel proves to be defective either in materials or workmanship we reserve the right to either repair or supply replacements or the closest possible substitute in the case of any obsolete product and will collect and deliver to any address in England, Scotland and Wales (excluding all islands):

(i) free of charge during the first year after delivery by us.

(ii) thereafter at a charge of one twenty fifth of the then current list price during the second year after delivery by us and increasing by a further one twenty fifth on the second and subsequent anniversary of delivery by us.

ACTION IN THE EVENT OF FAILURE

If the stainless steel cylinder develops a leak we will ask for a deposit against the supply of a new one. This will be refunded if the failure is within the terms of the warranty when it has been examined by us.

Please note:

- Installation must have been carried out by a licensed specialized company (heating contractor or plumber) following the version of installation instructions in force.
- Gledhill or its representative was given the opportunity to check complaints on site immediately after any defect occurred.
- Confirmation exists that the system was commissioned properly and that the system was checked and maintenance was performed annually by a specialised company licensed for this purpose.

(d) Components of our products other than Storage Vessels and Integral Pipework.

We will either extend to the purchaser the same terms of warranty as we are given by the manufacturer of the component or if the manufacturer does not give any warranty, replace free of charge any component which becomes defective within two years after the date of the delivery by us and is returned to us at the purchaser's expense but we shall not meet the cost of removal or shipping or return of the component or any other cost charges or damages incurred by the purchaser.

9.4.

9.4.1. In respect of goods supplied by us and in respect of any installation work carried out by or on our behalf, our entire liability and the purchaser's sole remedies (subject to the Guarantees) shall be as follows:-

- (a) We accept liability for death or personal injury to the extent that it results from our negligence or that of our employees

- (b) Subject to the other provisions of this clause 9 we accept liability for direct physical damage to tangible property to the extent that such damage is caused by our negligence or that of our employees, agents or subcontractors.
- (c) Our total liability to the purchaser over and above any liability to replace under the Guarantees (whether in contract or in tort including negligence) in respect of any one cause of loss or damage claimed to result from any breach of our obligations hereunder, shall be limited to actual money damages which shall not exceed £20,000 provided that such monetary limit shall not apply to any liability on the part of ourselves referred to in paragraph (a) above
- (d) Except as provided in paragraph (a) above but otherwise notwithstanding any provision herein contained in no event shall we be liable for the following loss or damage howsoever caused and even if foreseeable by us or in our contemplation:-
 - (i) economic loss which shall include loss of profits, business revenue, goodwill or anticipated savings
 - (ii) damages in respect of special indirect or consequential loss or damage (other than death, personal injury and damage to tangible property)
 - (iii) any claim made against the purchaser by any other party (save as expressly provided in paragraph (b) above)
- (e) Except in respect of our liability referred to in paragraph (a) above no claim may be made or action brought (whether in contract or in tort including negligence) by the purchaser in respect of any goods supplied by us more than one year after the date of the invoice for the relevant goods.
- (f) Without prejudice to any other term we shall not be liable for any water damage caused directly or indirectly as a result of any leak or other defect in the goods. We cannot control the conditions of use of the goods or the time or manner or location in which they will be installed and the purchaser agrees to be fully responsible for testing and checking all works which include the goods at all relevant times (up to, including and after commissioning) and for taking all necessary steps to identify any leaks and prevent any damage being caused thereby.
- (g) Nothing in these Conditions shall confer on the purchaser any rights or remedies to which the purchaser would not otherwise be legally entitled

10. LOSS OR INJURY

Notwithstanding any other provision contained herein the purchaser's hereby agree to fully indemnify us against any damages losses costs claims or expenses incurred by us in respect of any claim brought against us by any third party for:-

- (a) any loss injury or damage wholly or partly caused by any goods supplied by us or their use.
- (b) any loss injury or damage wholly or partly caused by the defective installation or substandard workmanship or materials used in the installation of any goods supplied by us.
- (c) any loss injury or damage in any way connected with the performance of this contract.
- (d) any loss resulting from any failure by the purchaser to comply with its obligations under these terms as to install and/or check works correctly.

PROVIDED that this paragraph will not require the purchaser to indemnify us against any liability for our own acts of negligence or those of our employees agents or sub-contractors

FURTHER in the case of goods supplied by us which are re-sold and installed by a third party by the purchaser it will be the sole responsibility of the purchaser to test the goods immediately after their installation to ensure that inter alia they are correctly installed and in proper working order free from leaks and are not likely to cause any loss injury or damage to any person or property.

11. VARIATION OF WARRANTY AND EXCLUSION

Should our warranty and exclusion be unacceptable we are prepared to negotiate for variation in their terms but only on the basis of an increase in the price to allow for any additional liability or risk which may result from the variation. Purchasers are advised to insure against any risk or liability which they may incur and which is not covered by our warranty.

12. ADVICE

Any advice or assistance given by the Company is provided without charge and is in good faith without undertaking, representation or warranty, and we will not accept any liability, whether consequential or compensatory, for advice or assistance given.

13. RISK AND RETENTION OF TITLE

- (a) goods supplied by us shall be at the Purchaser's risk immediately upon delivery to the Purchaser or into custody on the Purchaser's behalf or to the Purchaser's Order. The Purchaser shall effect adequate insurance of the goods against all risks to the full invoice value of the goods, such insurance to be effective from the time of delivery until property in the goods shall pass to the Purchaser as hereinafter provided.
- (b) property in the goods supplied hereunder will pass to the Purchaser when full payment has been made by the Purchaser to us for :-
 - (i) the goods of the subject of this contract.
 - (ii) all other goods the subject to of any other contract between the Purchaser and us which, at the time of payment of the full price of the goods sold under this contract, have been delivered to the Purchaser but not paid for in full.
- (c) until property in the goods supplied hereunder passes to the Purchaser in accordance with paragraph (2) above.
 - (i) the Purchaser shall hold the goods in a fiduciary capacity for us and shall store the same separately from any other goods in the Purchaser's possession and in a manner which enables them to be identified as our goods.
 - (ii) the Purchaser shall immediately return the goods to us should our authorised representative so request. All the necessary incidents associated with a fiduciary relationship shall apply.
- (d) the Purchaser's right to possess the goods shall cease forthwith upon the happening of any of the following events, namely :-
 - (i) if the Purchaser fails to make payment in full for the goods within the time stipulated in clause 4 hereof.
 - (ii) if the Purchaser, not being a company, commits any act of bankruptcy, makes a proposal to his or her creditors for a compromise or does anything which would entitle a petition for a Bankruptcy Order to be presented.
 - (iii) if the Purchaser, being a company, does anything or fails to do anything which would entitle an administrator or an administrative receiver or a receiver to take possession of any assets or which would entitle any person to present a petition for winding up or to apply for an administration order.
- (e) the Purchaser hereby grants to us an irrevocable licence to enter at any time any vehicle or premises owned or occupied by the Purchaser or in the possession of the Purchaser for the purposes of repossessing and recovering any such goods the property in which has remained in us under paragraph (2) above. We shall not be responsible for and the Purchaser will indemnify us against liability in respect of damage caused to

any vehicle or premises in such repossession and removal being damaged which it was not reasonably practicable to avoid.

- (f) notwithstanding paragraph (3) hereof and subject to paragraph (7) hereof, the Purchaser shall be permitted to sell the goods to third parties in the normal course of business. In this respect the Purchaser shall act in the capacity of our commission agent and the proceeds of such sale :-
 - (i) shall be held in trust for us in a manner which enables such proceeds to be identified as such, and;
 - (ii) shall not be mixed with other monies nor paid into an overdrawn bank account.

We, as principal, shall remunerate the Purchaser as commission agent a commission depending upon the surplus which the Purchaser can obtain over and above the sum, stipulated in this contract of supply which will satisfy us.

- (g) in the event that the Purchaser shall sell any of the goods pursuant to clause (6) hereof, the Purchaser shall forthwith inform us in writing of such sale and of the identity and address of the third party to whom the goods have been sold.

- (h) if, before property in the goods passes to the Purchaser under paragraph (2) above the goods are or become affixed to any land or building owned by the Purchaser it is hereby agreed and declared that such affixation shall not have the effect of passing property in the goods to the Purchaser. Furthermore if, before property in the goods shall pass to the Purchaser under paragraph (2) hereof, the goods are or become affixed to any land or building (whether or not owned by the Purchaser), the Purchaser shall:-
 - (i) ensure that the goods are capable of being removed without material injury to such land or building.
 - (ii) take all necessary steps to prevent title to the goods from passing to the landlord of such land or building.
 - (iii) forthwith inform us in writing of such affixation and of the address of the land or building concerned.

The Purchaser warrants to repair and make good any damage caused by the affixation of the goods to or their removal from any land or building and to indemnify us against all loss damage or liability we may incur or sustain as a result of affixation or removal.

- (i) in the event that, before property in the goods has passed to the Purchaser under paragraph (2) hereof, the goods or any of them are lost, stolen, damaged or destroyed :-
 - (ii) the Purchaser shall forthwith inform us in writing of the fact and circumstances of such loss, theft, damage or destruction.
 - (iii) the Purchaser shall assign to us the benefit of any insurance claim in respect of the goods so lost, stolen, damaged or destroyed.

14. NON-PAYMENT

If the Purchaser shall fail to make full payment for the goods supplied hereunder within the time stipulated in clause 4 hereof or be in default of payment for any other reason then, without prejudice to any of our other rights hereunder, we shall be entitled to stop all deliveries of goods and materials to the Purchaser, including deliveries or further deliveries of goods under this contract. In addition we shall be entitled to terminate all outstanding orders.

15. VALUE ADDED TAX

All prices quoted are exclusive of Value Added Tax which will be charged at the rate ruling at the date of despatch of invoice.

16. TRADE SALES ONLY

We are only prepared to deal with those who are not consumers within the terms of the Unfair Contract Terms Act 1977, the Sale of Goods Act 1979 and the Supply of Goods and Services Act 1982. Accordingly any person who purchases from us shall be deemed to have represented that he is not a consumer by so purchasing.

17. JURISDICTION

The agreement is subject to English law for products delivered in England and Scottish law for products delivered in Scotland and any dispute hereunder shall be settled in accordance therewith dependent upon the location.

18. PRODUCT DEVELOPMENT

Gledhill have a policy of continuous product development and may introduce product modifications from time to time.

Providing peace of mind

On expiry of your initial warranty period, Gledhill Response Limited would be pleased to provide further customer support with a range of services including:

Low cost annual repair and maintenance contracts direct from Gledhill

Annual servicing and safety checks

Expert response to 'out of warranty' breakdowns at fixed charges

Please ring 08445 679898 or visit www.gledhill.net for further details



Gledhill Building Products Limited

Sycamore Estate, Squires Gate, Blackpool FY4 3RL Tel: 01253 474550 Fax: 01253 474551 sales@gledhill.net

Gledhill Building Products produce cylinders for use with a wide range of heat sources including:

Gas and oil boilers
Ground source heat pumps

Electricity
Solar energy

Air source heat pumps
Wood burning stoves

For further information of Gledhill products can be found on the internet at www.gledhill.net



FM 2057
Gledhill cylinders are produced
under an ISO 9001:2008
Quality System accepted
by BSI



Due to a programme of continuous improvement Gledhill Building Products reserve the right to modify products without prior notice.

It is advisable to check the product technical detail by using the latest design and installation manuals available from our technical support team or on our website.