

Manual

HeatStream

Installation &
Maintenance

Harlequin®
HeatStream®
HOT WATER SYSTEM



WARNING

Register your
product warranty

To activate complete the
online registration at:
www.harlequinplastics.co.uk

Applicable to the following models:

Electric: HS150E, HS210E, HS150E-SOJ, HS210E-SOJ

Electric Plus: HS150EPLUS, HS210EPLUS



This manual must be left with the end user

Pre-Installation checklist

The HeatStream family of hot water storage tanks have been developed to suit a wide range of installations, there are however some cases where existing systems may have to be upgraded. Prior to installing a HeatStream hot water storage tank, it is recommended the following checks are carried out to ensure the system meets the following requirements:

- 1) For optimum performance, it is recommended that the incoming mains water supply should be capable of delivering a minimum flow rate of 12l/min at a dynamic pressure of 1 bar or above at all times. If this cannot be achieved a cold-water booster set should be installed to achieve this. Draw off rates > 18 l/min can, in certain rare circumstances, lead to system noise when a hot water outlet is opened.
- 2) It is possible to use a gravity fed system although flow rate performance will be significantly reduced.
- 3) Incoming mains water supply pressure should not exceed 3 bar. If the supply pressure is greater than this a pressure reducer should be installed.
- 4) The tank is designed for the use and production of potable hot water, and other usage or modifications will invalidate all guarantees. The incoming mains water supply should have a total hardness of less than 200mg/litre and a chloride content of less than 300mg/litre. The heating water should have a pH value of between 6.5 and 8.5. In instances where the water chemistry exceeds the maximum permissible levels, a suitable and effective water treatment should be installed. This should be designed and installed in such a way to minimise the risk of component and or system failure.
- 5) Any circuits supplying heat to the tank and connected to an external heat source should be fully pumped (not applicable to the Electric range). Gravity circulation is not suitable.
- 6) Pipework and fittings supplying the hot water taps should be capable of withstanding minimum 4.5 bar pressure.
- 7) Pipework and fittings supplying the hot water taps should be capable of carrying water with a temperature of up to 90°C.

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1 USER INSTRUCTIONS

1.1 GENERAL ARRANGEMENT

1	Overfill pipe connection	6	Thermostat(s) & Dual element immersion heater
2	Fill loop connection	7	Hot water coil
3	Heat source coil inlet (Electric Plus Only)	8	Heat source coil (Electric Plus Only)
4	Thermostatic mixing valve	9	Insulation
5	Heat source coil outlet (Electric Plus Only)		

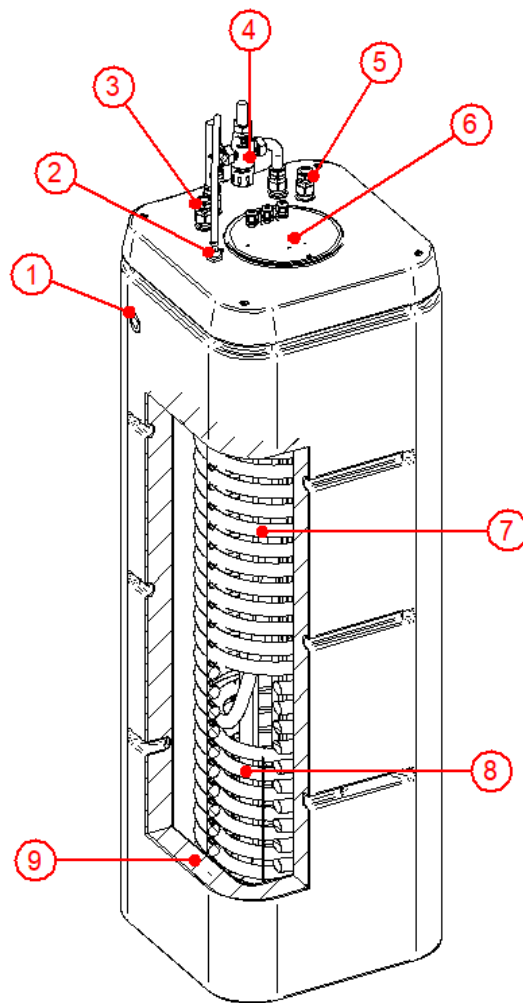


Figure 1 Key components of the HeatStream hot water storage tank

1.2 OPERATION INSTRUCTIONS

1.2.1 Thermostatic mixing Valve

A thermostatic mixing valve (Figure 2) with an adjustment range of between 30°C (MIN) and 65°C (MAX) is supplied as standard with most HeatStream hot water storage tank models. The function of the thermostatic mixing valve is to deliver water consistently at a safe temperature. For optimum performance it is recommended that the mixing valve is set to nominally 45°C (#3). This can however be adjusted dependent on user requirements.

Note: On models where a thermostatic mixing valve has not been provided, to achieve optimum performance, it is recommended that all hot water outlets should be blended at point of use.



Figure 2 Thermostatic mixing valve settings

1.2.2 Immersion heaters

The Electric and Electric Plus models are supplied with a dual element immersion heater (3kW + 3kW); a short element (27") and a long element that extends to the bottom of the tank. The short element acts only as a boost / backup to provide a small quantity of hot water quickly, whilst the long element can heat the entire tank. Each immersion heater is fitted with a thermostat which helps to regulate the store temperature. This is pre-set to nominally 70°C but can be adjusted by removing the compartment cover and adjusting the control knob accordingly.

Each thermostat has an integrated high limit safety stat which provides protection against the tank overheating. In the event of the high limit temperature being reached, power will be cut off to the immersion heater and will require manual resetting to restore operation, this can be reset by pressing down on the reset button (Figure 4).



Figure 3 Immersion heater and thermostat compartment

Note: Isolate the power supply before removing any protective covers. If you are unsure or need assistance seek help from a competent person.

1.2.3 Heat supply coil thermostat

The Electric Plus model has a factory fitted heat supply coil thermostat to control the supply of heat to the hot water storage tank from an external heat source such as a boiler. This is pre-set to nominally 65°C but can be adjusted between nominally 45°C and 75°C dependent on the heat source and desired store temperature (Figure 4).

The thermostat has an integrated high limit safety thermostat which provides protection against the tank overheating. In the event of the high limit temperature being reached the supply of heat to the tank will be cut off and will require manual resetting to restore operation, this can be reset by pressing down on the high limit reset button (Figure 4).

Note: Only reset the high limit trip when the store water has sufficiently cooled, failure to do so will irreparably damage the thermostat.

Isolate the power supply before removing any protective covers. If you are unsure or need assistance seek help from a competent person.



Figure 4 Location of thermostat controls

1.3 FREQUENT CHECKS

1.3.1 Tank water level

It is recommended that the tank water level is topped up every 6 months to ensure the correct water level is maintained. This will help to maximise performance of the unit and ensure maximum life of the components. The tank should be topped up through the filling loop as described in section 1.3.2.

1.3.2 Topping up the tank

The tank water level can be topped up using the filling loop. Connect the flexible hose as shown in Figure 5. Using a flat head screwdriver turn the ball valve (Figure 5) slowly clockwise through 90°, the tank will begin filling, when water starts to flow from the overfill pipe close the valve.



Figure 6 Filling loop disconnected



Figure 5 Filling loop connected

Ensure the filling valve is fully closed and disconnect the hose, there will be a small leakage of water so have rags handy to mop up. The caps must be screwed onto the tank and the ball valve as shown in Figure 6. Failure to replace the caps may result in steam escaping from the tank or water leaking from the ball valve.

Note: Due care and attention should be taken by the installer / end user when filling / topping up the tank. Under no circumstances should this task be left unsupervised.

1.3.3 Tank overfill pipe connection

All HeatStream hot water storage tanks have an overfill pipe connection. The function of the overfill pipe is to act as a vent and prevent any pressure build up if the tank was overfilled or developed an internal fault. If water is continuously flowing through the overfill pipe this may suggest the tank has developed a fault or that the filling loop is still connected. Check that the filling loop hose is disconnected, and the connections capped. If the fault persists, contact your original installer. It is normal for a small volume of water to run off through the overfill pipe during first fill and subsequent first heat up cycle and when topping up the water inside the hot water storage tank.



Figure 7 Location of overfill pipe

Note: If a fault is discovered switch off all heat sources, isolate the power supply and contact your installer. Wait until the storage water has sufficiently cooled before carrying out any repairs.

2 TECHNICAL SPECIFICATIONS

2.1 ELECTRIC

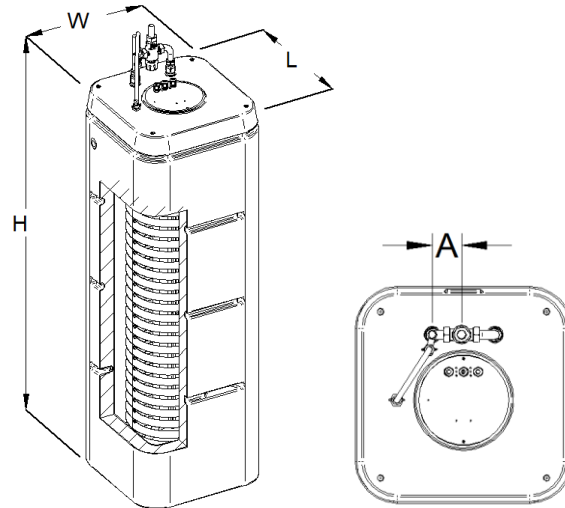


Figure 8 HeatStream Electric

PRODUCT CODE	HS150E	HS210E
Dimensions, L x W x H (mm)	520 x 520 x 1315	520 x 520 x 1650
Dimension, A (mm)	70	70
Empty weight (kg)	36	44
Total filled weight (kg)	188	246
Volume (l)	152	202
Standing heat loss (kWh/24h)	1.12	1.24
ErP rating	B	B
Heat up time (mins) by long immersion heater (15 – 60°C)	156	210
Heat up time (mins) by both immersion heaters (15 – 60°C)	78	105
Volume (l) of hot water without reheating at 15 l/min draw off rate (Cold water inlet temperature 12°C, store temperature 60°C)	113	188
Volume (l) of hot water without reheating at 15 l/min draw off rate (Cold water inlet temperature 12°C, store temperature 65°C)	128	228
Volume (l) of hot water without reheating at 15 l/min draw off rate (Cold water inlet temperature 12°C, store temperature 70°C)	180	281
Reheat time (mins) by long immersion heater (45 – 60°C)	80	107
Reheat time (mins) by short (boost) immersion heater (45 – 60°C)	20	20
Volume (l) of hot water with reheating by short (boost) immersion heater at 15 l/min draw off rate (Cold water inlet temperature 12°C, store temperature 60°C)	50	50
Domestic hot water coil maximum operating pressure (bar)	3	3
Maximum permissible storage water temperature (°C)	85	85
Pipe connections (mm)	22	22
Overfill pipe connection	G 3/4"	G 3/4"

Table 1 HeatStream Electric specifications

2.2 ELECTRIC PLUS

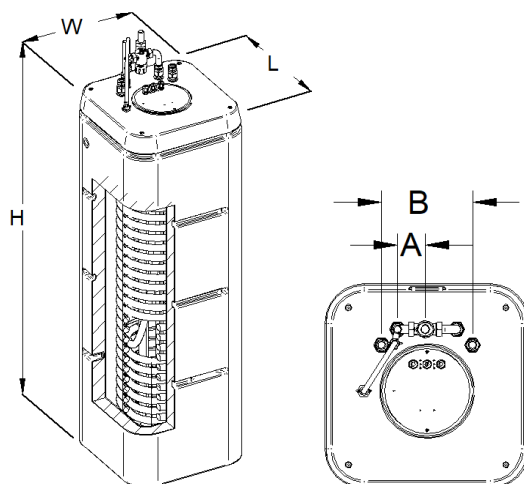


Figure 9 HeatStream Electric Plus

PRODUCT CODE	HS150EPLUS	HS210EPLUS
Dimensions, L x W x H (mm)	520 x 520 x 1315	520 x 520 x 1650
Dimension, A (mm)	70	70
Dimension, B (mm)	230	230
Empty weight (kg)	39	48
Filled weight (kg)	191	250
Volume (l)	152	202
Standing heat loss (kWh/24h)	1.12	1.24
ErP rating	B	B
Heat up time (mins) by primary coil at 15 l/min (15 – 60°C)	20	24
Heat up time (mins) by long immersion heater (15 – 60°C)	156	210
Heat up time (mins) by both immersion heaters (15 – 60°C)	78	105
Volume (l) of hot water without reheating at 15 l/min draw off rate (Cold water inlet temperature 12°C, store temperature 60°C)	113	188
Volume (l) of hot water without reheating at 15 l/min draw off rate (Cold water inlet temperature 12°C, store temperature 65°C)	128	228
Volume (l) of hot water without reheating at 15 l/min draw off rate (Cold water inlet temperature 12°C, store temperature 70°C)	180	281
Reheat time (mins) by long immersion heater (45 – 60°C)	80	107
Reheat time (mins) by short (boost) immersion heater (45 – 60°C)	20	20
Volume (l) of hot water with reheating by short (boost) immersion heater at 15 l/min draw off rate (Cold water inlet temperature 12°C, store temperature 60°C)	50	50
Domestic hot water coil maximum operating pressure (bar)	3	3
Primary coil maximum operating pressure (bar)	14	14
Primary coil pressure drop at 15 l/min (mbar)	107	134
Maximum permissible storage water temperature (°C)	85	85
Domestic water coil connections (mm)	22	22
Primary coil connections (mm)	22 Comp	22 Comp
Overfill pipe connection	G3/4"	G3/4"

Table 2 HeatStream Electric Plus specifications

3 INSTALLATION

The following instructions must be read prior to the installation of a HeatStream hot water storage tank and work should only be carried out by a trained heating technician. The installer should be aware of their responsibility and duty of care to ensure all aspects of the installation comply with all current regulations and legislation.

3.1 BUILDING REGULATIONS

Installation of HeatStream hot water storage tanks are subject to the Building Regulations listed below:

Table 3 Requisite building regulations for UK and Ireland

Northern Ireland	Technical Booklet P3
Republic of Ireland	Technical Guidance Document L
England and Wales	Approved Document G3

Compliance with the relevant Building Regulation is subject to the tank being installed and commissioned following the guidance given in this manual.

3.2 ACCESSORY KITS

Before commencing installation check that all relevant parts have been supplied. Table 4 below summarises the parts supplied in kit form with each HeatStream model:

Table 4 Accessory kit contents

	HS150E-SOJ, HS210E-SOJ	HS150E, HS210E, HS150EPLUS, HS210EPLUS
Part No. and Description	17-003-0007	17-003-0008
CP-4035 Aramid gasket 30mm	-	x3
CP-4043 1" Thermostatic mixing valve	-	x1
CP-4044 'T' - pipe	-	x1
CP-4046 '90' - pipe	-	x1
CP-4047 Straight pipe	-	x1
CP-4180 Double check valve 15mm x ½"	x1	-
CP-4185 Y pattern strainer 22mm	x1	x1
CP-FTG-KIT-02 Filling loop	x1	x1

3.3 TANK INSTALLATION

3.3.1 Handling and storage

Prior to installation, the hot water storage tank should be handled with care and stored upright in a dry location. For manual handling, pay heed to the empty tank weight, refer to section 2 'Technical Specifications'. Assessments of risks for carrying the hot water storage tank should be conducted and a plan set in place before lifting / handling the tank. Where it is not possible to eliminate hazardous manual handling, suitable controls must be introduced to reduce the risk of injury to the lowest extent reasonably practicable. Where possible, when the empty tank weight exceeds the safe lifting

guidelines team lifts / a handling aid such as a sack trolley should be used. Any manual handling / lifting operations must comply with the Manual Handling Operations Regulations issued by the HSE.

3.3.2 Installation location

The hot water storage tank should be supported on a solid level base, free from any debris and should cover the entire base of the tank. The base must be capable of supporting the tank filled weight, refer to section 2 'Technical Specifications'. The installation site should be indoors in a frost-free room and protected from continuous direct sunlight. The hot water storage tank must be located a minimum of 1m away from heat sources with a heat output $>90^{\circ}\text{C}$ (electric / gas heater, open fire and flue / chimneys). To protect the integrity of the hot water storage tank system it should be situated in an area with suitable and effective rodent control measures in place. When selecting a suitable location, consideration should be given with regards the relative position of the heat sources and main hot water outlets to keep pipe runs as short as possible, thus maximising efficiency. Routing of the overflow pipe should also be considered to allow it to be safely conveyed and discharged. For future servicing and maintenance requirements the hot water storage tank should be positioned in such a way that allows for components to be inspected, removed and replaced if necessary, as per Figure 10.

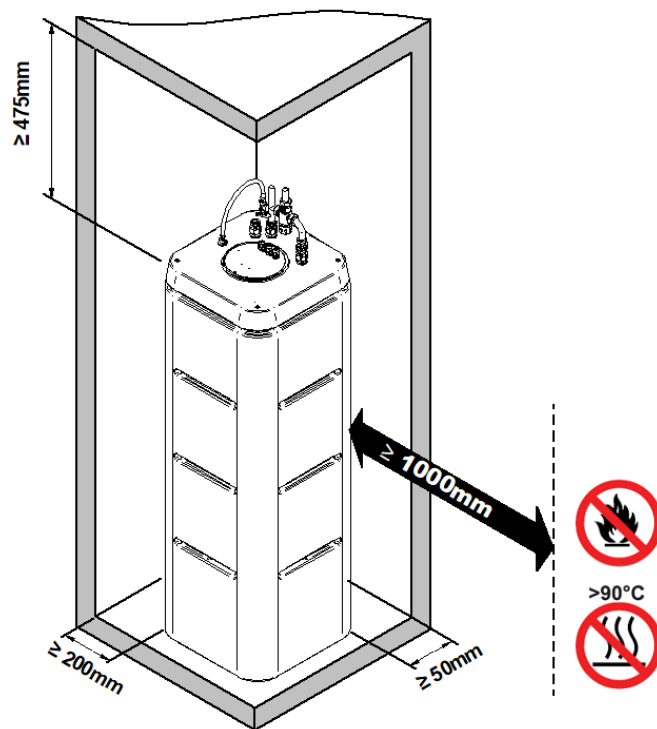


Figure 10 Recommended clearance requirements

3.3.3 Connection to copper pipe

450mm (18 inches) is the minimum distance to make a solder connection from any of the inlet and outlet connections on top of the HeatStream tank. This is to reduce the possibility of any residual flux / solder coming into contact with the stainless-steel corrugated tube inside the tank. Fluxes used for soldering or brazing are, by their nature and purpose, aggressive towards metals. If excessive flux enters the bore of the tube and remains there, local attack can result. Corrosion likelihood is best minimised by using water soluble flux with restricted aggressivity and flushing the system to remove any flux residues as soon as possible after completion of the soldering or brazing operation. It is recommended the y pattern strainer is fitted as close as possible to the cold-water inlet to the tank

before the first solder connection. It is also recommended that a central heating filter is fitted on the heat supply circuit to help reduce the risk of damage to internal parts of the hot water storage tank.

3.3.4 Mains water supply pipework

For optimum performance, it is recommended that the incoming mains water supply should be capable of delivering a minimum flow rate of 12l/min at a dynamic pressure of 1 bar or above at all times. This should be sufficient for the operation of most sanitary appliances. It is recommended minimum 22mm mains supply pipework is used however, it may be necessary to use larger diameter pipe for long pipe runs. If the mains supply pressure is likely to exceed 3 bar at any time a pressure reducing valve should be installed. A full-bore isolation valve should be fitted to the incoming mains water supply to allow the tank and cold-water outlet taps to be isolated when required. The incoming mains water pipework should be split to serve both the hot water storage tank and cold-water outlet taps after the full-bore isolation valve. To protect the public water network from backflow contamination a double check valve must be installed. Care should be taken to ensure the direction arrow on the side of the double check valve follows the direction of flow. A y pattern strainer should be fitted on the mains water supply to the hot water storage tank as close as practicable to the location of the mixing valve. This will trap any debris from the pipework upstream which may affect the performance of the hot water storage tank system. This should be fitted on a straight run of pipe away from any bends and in an accessible location to allow the filter to be removed for inspection and cleaning if necessary. Sometimes, depending on certain conditions pipework can make strange noises when opening / shutting off taps. In these circumstances, consideration should be given to whether it is necessary to fit a water hammer shock arrestor on the mains supply pipework to absorb system noise. Refer to Figure 11 for typical pipework configuration.

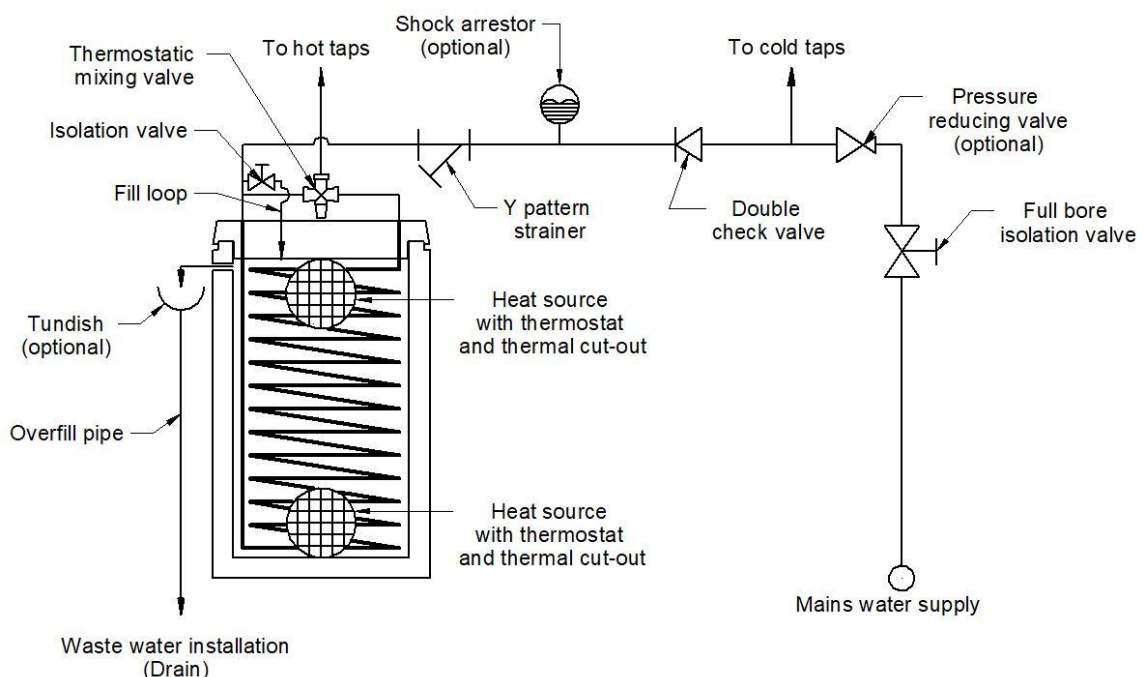


Figure 11 Mains water supply pipework configuration

Note: Draw off rates > 12 l/min can, in certain rare circumstances, lead to system noise when a hot water outlet has first been opened. This is normal and should disappear after a few seconds. Draw off rates > 18 l/min can, in some cases, lead to a constant droning noise coming from the tank when a hot water outlet has been opened – where this happens, it is recommended the flow rate is reduced until the noise disappears.

3.3.5 Hot and cold-water connections

The mixing valve pipe set fittings should be fitted to the hot and cold domestic hot water heat exchanger coil connections. These are positioned on the top of the hot water storage tank and are identified with a tap symbol, Figure 12. Once in place the thermostatic mixing valve can be connected. It is recommended that the thermostatic mixing valve be set to position 3 (nominally 45°C), see Figure 13, to achieve the best hot water output performance. This can however be adjusted dependent on user requirements - this can be set during commissioning of the hot water storage tank. Care should be taken to ensure the hot and cold-water supplies are connected to the valve in accordance with the indications on the body of the valve. The straight pipe set fitting should be fitted to the mixed water outlet on the mixing valve. See Figure 13 for hot and cold-water connection set up. The mixing valve can either be positioned in the vertical or horizontal position depending on the individual installation requirements, however it must be accessible to allow for maintenance, commissioning and testing of the valve. Fibre gaskets should be fitted at the point of each connection. Connections to the cold and mixed hot water pipe set fittings should be made using compression fittings.



Figure 12 Mixing valve pipe set



Figure 13 Mixing valve set to position #3

Note: It is not recommended to use any form of sealant / putty in combination with the flat gasket seals. These should be fitted dry.

When making the compression connections hold the compression fitting body tightly with a spanner and tighten the compression nut on top with a spanner. Do not overtighten as this can cause the fitting to leak.

On models where a thermostatic mixing valve has not been provided, in order to achieve optimum performance, it is recommended that all hot water outlets should be blended at point of use.

3.3.6 Distribution pipework

Distribution pipework should be designed and laid out in a way to minimise transfer time between the hot water storage tank system and hot water outlets. In larger installations with long pipe runs it may be necessary to install a pumped secondary hot water circuit (3.3.9 Secondary return) to circulate hot water around the property. This ensures hot water is always available on demand. It is recommended 22mm distribution pipework be used throughout the property; however, it is possible that short lengths of 15mm pipework can be used to service baths, showers or taps where required. Any pipework and fittings used should be capable of withstanding minimum pressure of 4.5 bar at a temperature of up to 90°C. It is recommended that the hot water pipework should be insulated over its entire length, if this is not possible due to an existing installation pipework leaving the tank must

be insulated to a minimum of 2m. The hot water storage tank itself does not require any additional insulation.

3.3.7 Fill Loop Connection

With the mixing valve and pipe set in place, the fill loop including isolation valve should be fitted, Figure 14. Ensure the direction arrow on the side of the isolation valve follows the direction of flow. The fill loop and isolation valve should be accessible and unobstructed by any pipework to allow the isolation valve to be easily operated and the fill loop removed when not in use. Two ½" plugs are supplied to blank off connections labelled A and B when the fill loop is disconnected.

Note: For models with the suffix "-SOJ", remove isolation valve from the filling loop and replace with the double check valve supplied. The fill loop hose connects directly onto the threaded fill point connection on top of the tank (position B).



Figure 14 Hot and cold-water connections

3.3.8 Heat supply circuits

The HeatStream Electric Plus model can be connected to an external heat source such as a boiler. Coil inlets and outlets are identifiable by labels positioned at each of the connections. The maximum operating pressure for the heat supply coil is given in the Technical Specifications section of this manual. Supply of heat to the hot water storage tank is regulated via a factory fitted coil specific thermostat which switches off the supply of heat when the required store temperature has been achieved. The thermostat has a non-self-resetting energy cut out which when wired in series with a motorised valve and or pump (not supplied) will shut off flow to the heat source. This helps to ensure the store water never exceeds 95°C if the system malfunctions. If the hot water storage tank is to be connected to an old or existing system with steel pipework or is heated by a cast iron boiler, slurry and sludge may enter the hot water storage tank which can cause blockages and corrosion. To prevent possible damage, it is recommended the system undergoes a suitable and effective cleaning and flushing procedure before filling the heat exchanger coil and a dirt filter or sludge separator is fitted.

Consideration should also be given to whether it is necessary to add corrosion inhibitor to the heat supply pipework.

Note: When making the compression connections hold the compression fitting body tightly with a spanner and tighten the compression nut on top with a spanner. Do not overtighten as this can cause the fitting to leak.

3.3.9 Secondary return

Ideally the HeatStream hot water storage tank should be installed as close as possible to all hot water outlets however, where this is not possible, and the pipe runs to tap outlets are excessive a secondary return may need to be fitted. Figure 15 details a typical schematic of how to fit a secondary return to the HeatStream hot water storage tank. In addition to a pump suitable for sanitary hot water it is recommended that a pipe thermostat or time clock is fitted to prevent the pump running constantly. To prevent excessive heat loss the secondary return pipework should be insulated over its entire length. It is essential that the check valves shown in the diagram are fitted to prevent the cold mains feed backflowing up the secondary return pipework.

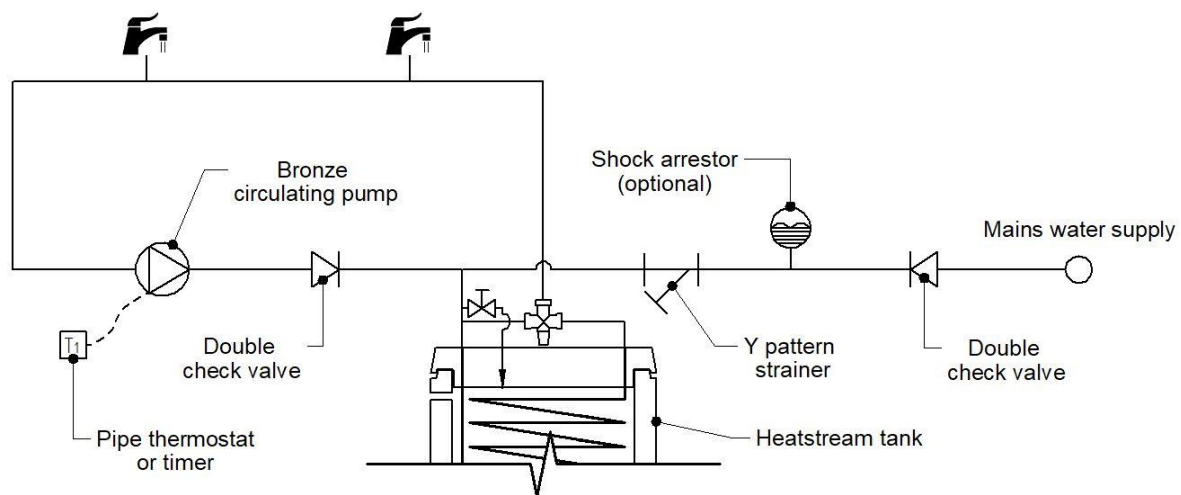


Figure 15 Secondary return schematic

3.3.10 Overfill pipework

The overfill pipework should be configured in such a way to allow any overfill flow from the hot water storage tank to be conveyed to a safe visible position. The overfill pipework should fall away from the tank via gravity, taking the shortest possible route to the termination point. The overfill pipe should be terminated to either waste, soil or atmosphere. When terminating to waste / soil pipe the overfill pipework should include a visible air-break so any overfill flow from the tank becomes apparent. Where it is not possible to terminate the overfill pipe upstream of an existing waste / soil pipe trap it is recommended that a waterless drain waste valve is fitted to prevent the escape of foul air into the living space from the drain. A dry trap tundish can also be used as a means of creating a visible air-break and trap. Any overfill pipework should have a minimum of 19mm ID (typically 22mm OD) and can be either plastic or copper pipe. If it is impractical to terminate the overfill pipe to waste / soil the overfill pipe can be terminated at a point open to the atmosphere. When terminating to a point open to atmosphere the overfill pipe should terminate in a safe place where there are no risks to persons in the vicinity of any overfill flow from the hot water storage tank.

Where it is impractical to terminate the overflow pipe to waste / soil or atmosphere, the Harlequin internal overflow kit can be used. Models with the suffix “-IOF” include the internal overflow kit as standard. The internal overflow kit can also be purchased separately (Item code: HS-OVFL-KIT).

Note: For the operation of the HeatStream hot water storage tank it is essential that the overflow pipe remains free of any blockages. A blockage in this pipe can lead to the failure of the unit.

3.4 ELECTRICAL INSTALLATION

Electrical work should only be undertaken by a competent electrician and it is their responsibility to ensure that any work carried out is done so in accordance with the latest regulations.

3.4.1 Immersion wiring

The HeatStream Electric and Electric Plus models are supplied with a dual element immersion heater (3kW + 3kW); a short element (27”) and a long element that extends to the bottom of the tank. The short element acts only as a boost / backup to provide a small quantity of hot water quickly, whilst the long element can heat the entire tank. These should be fully earthed and wired with cable having a minimum CSA of 2.5mm and a temperature resistance of at least 85°C. Each immersion heater is supplied with a combined regulation and high limit safety thermostat, under no circumstances should the thermal cut out be bypassed. The immersion heaters should be wired through a double pole isolating switch with a contact separation of at least 3mm in both poles. Care should be taken to ensure that each of the connections are securely made and that the cables are protected from accidental disconnection via the cable glands provided.

Figure 17 provides guidance on how the two immersion heaters should be wired. The immersion heaters should never be switched on unless they are fully submerged in water, dry operation of elements can cause them to fail prematurely and this mode of failure is not covered under warranty.

Note: Should it be necessary to remove the thermostat from the immersion heater element, ensure that the contacts are remade correctly between the immersion heater and thermostat. Poor connections carry the risk of overheating the contacts and thus damaging the appliance.

Before removing any protective covers the power supply should be disconnected, secured against unintentional restart and the fuse removed.

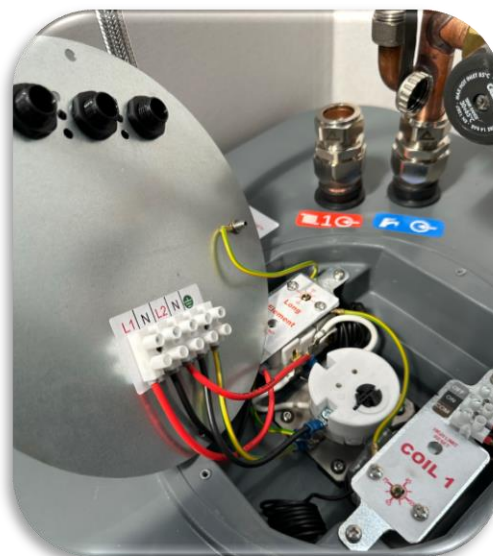


Figure 16 Control compartment layout

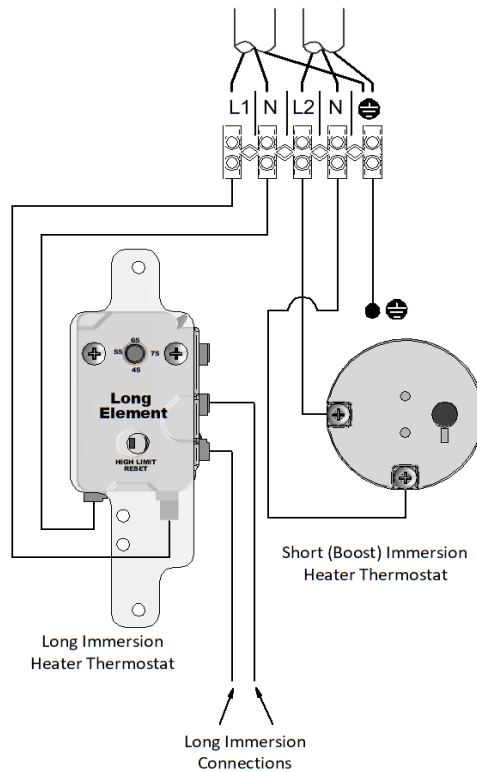


Figure 17 Dual element immersion heater wiring

3.4.2 Heat supply coil thermostat wiring (Electric Plus Only)

The HeatStream Electric Plus model has a factory fitted heat supply coil thermostat to control the supply of heat to the hot water storage tank from an external heat source such as a boiler. The thermostat has an integrated high limit safety thermostat which provides protection against the tank overheating, and therefore should be wired in such a manner as to cut off heat supply to the tank in the event of overheating. This is typically achieved using a motorised valve wired in series with the thermostat. This allows for separate and independent control of space heating and hot water. Refer to Figure 19 and Figure 20 for suggested wiring schematics. The HeatStream hot water storage tank is compatible with all heating systems and it can provide heating on or heating off signal, the live feed from the timeclock is wired into the 'COM' (Figure 18) and the switched live is available at the respective connections depending upon the thermostat set temperature.



Figure 18 Close up of tank thermostat wiring

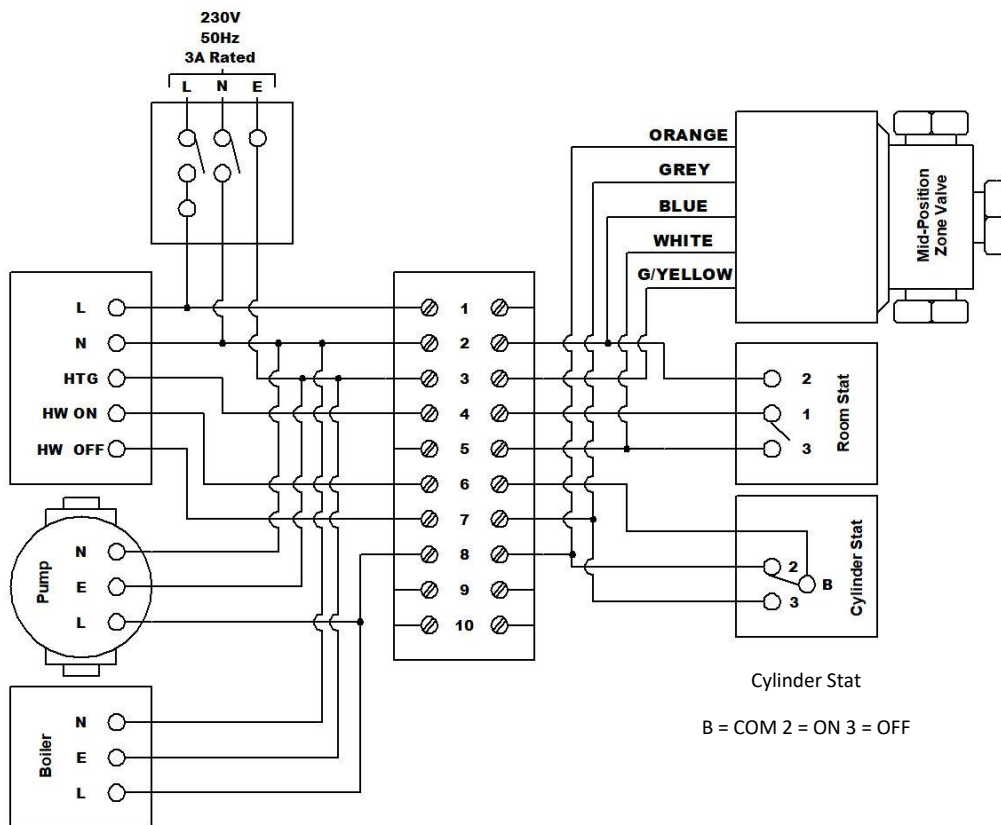


Figure 19 Y Plan (Fully Pumped System Only)

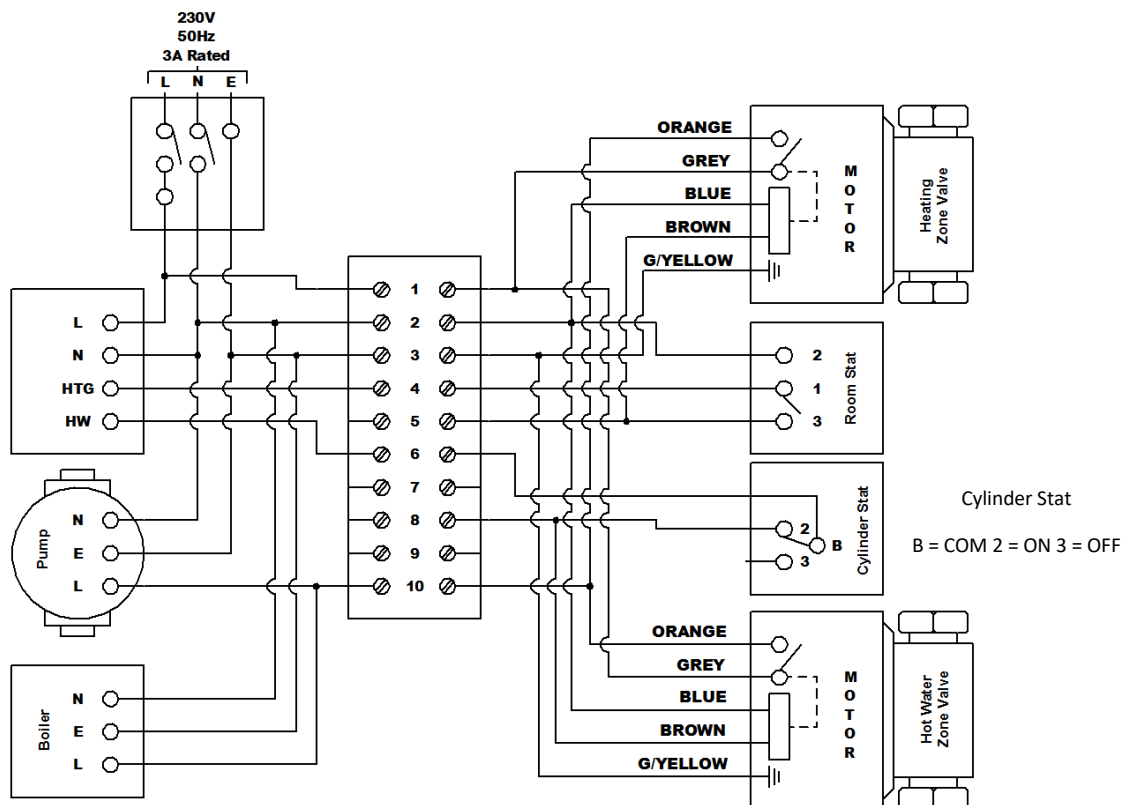


Figure 20 S Plan (Fully Pumped System Only)

4 COMMISSIONING

The following instructions must be read and understood prior to the commissioning of a HeatStream hot water storage tank. If under any circumstances there are aspects to the installation and or system which do not comply with the specification laid down, the tank **MUST NOT** be put into operation until the system and or installation meets all the requirements.

Unless otherwise instructed isolate all electrical supplies to the hot water storage tank before carrying out commissioning of the unit.

Note: Before filling ensure the overflow pipe is connected correctly, free from blockages and can discharge in a safe visible location.

4.1 PRE-COMMISSION CLEANING

A suitable and effective cleaning and flushing procedure should be undertaken on all pipework prior to commissioning of the HeatStream hot water storage tank. System contaminants such as flux residues, solder pieces, jointing compound, building debris will inevitably be found in pipework systems. If allowed to remain in the system, in sufficient quantity, these contaminants will make the system prone to blockages at strainers and valves. They may also initiate corrosion and encourage the growth of micro-organisms.

4.2 FILLING THE SYSTEM

4.2.1 Filling the DHW heat exchanger coil

With the filling loop isolation valve connected and closed, open the stopcock on the mains cold water supply to the hot water storage tank. Open the nearest hot tap followed by the rest in sequence to allow any trapped air to escape and flush out any debris. Leave the tap open until the system has been cleared.

4.2.2 Filling the HeatStream

With the filling loop hose connected as per Figure 21 open the isolation valve. Continue filling the tank until water starts to flow from the overflow pipe. When the correct store volume has been reached, shut off the isolation valve and disconnect the filling loop. Blank off connections labelled A and B as shown in Figure 21 using the two ½" caps provided.

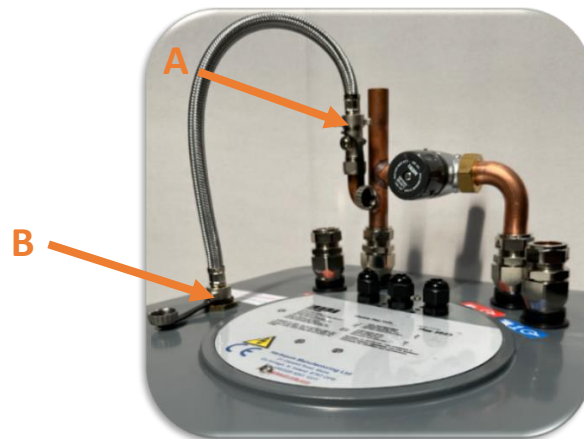


Figure 21 HeatStream filling loop location

4.2.3 Filling the heat supply coil

Following the heat source manufacturer's instructions fill the heat supply circuit (not applicable for Electric range). To minimise the likelihood of corrosion, scale, and sludge formation, consideration should be given to whether it is necessary to add corrosion inhibitor to the heat supply pipework. Any corrosion and scale inhibitor used should be suitable for the appliance, system components and water quality and be applied in accordance with the manufacturer's instructions. Before inhibitor is added to the system, the first step is to ensure the system is free from foulants i.e by carrying out a sufficient and effective cleaning and flushing procedure. The concentration of additives in the heat supply circuit should be checked after commissioning and annually thereafter throughout the life of the system to ensure energy efficiency and the benefits of ongoing protection are maintained. The addition of a central heating filter fitted anywhere on the central heating flow or return pipe will help to reduce the risk of damage to internal parts of the hot water storage tank. Depending on the system layout consideration should be given to whether it is necessary to fit an automatic air vent.

4.3 SYSTEM CONTROLS

Check the immersion heater control thermostats are set to the desired regulation temperature. These are pre-set at approx. 70°C. Before turning on the power supply to the immersion heaters ensure the correct store volume has been reached, dry running of immersion heaters can result in them failing in a short space of time, this is not covered under warranty. Connect the power supply and switch on the immersion heaters. Once the regulation temperature has been reached check that the thermostat cuts off power to the immersion heaters.

If applicable, check the heat supply coil thermostat is set to the desired regulation temperature. This is pre-set at 65°C but can be adjusted to allow a maximum store water temperature of 75°C. Once the regulation temperature has been reached check that the thermostat cuts off power to the heat source and that the system controls function correctly.

When the store water has reached the set temperature, open the nearest hot tap and using a thermometer check the mixing valve is delivering the desired temperature.

5 MAINTENANCE

The design of the HeatStream hot water storage tank means that it requires minimal maintenance, although it is still prudent that the unit is serviced annually to ensure its safe and efficient operation.

Servicing should be carried out by a trained heating technician and the details of any work carried out should be logged in the Service Record section of this manual.

Note: Unless otherwise instructed isolate all electrical supplies to the hot water storage tank before carrying out any maintenance work.

5.1 INSPECTION ACCESS

If for any reason, inspection access is required to check the internal components of the hot water storage tank access can be provided by means of removing the dual element immersion heater and using an appropriate inspection tool such as a borescope inserted through the opening in the lid.

Removing the lid assembly of the unit (to which the coils are attached) at any time will invalidate warranty.

5.2 MAINTENANCE CHECKS

- 1) Carry out a visual inspection of the general condition of the unit.
- 2) Check the overfill pipe connection and associated pipework for any leaks and or blockages which may affect free drainage. If necessary, replace defective parts.
- 3) Top up the hot water storage tank water level using the filling loop until water starts to flow from the overfill pipe. When the filling loop is not in use it must be disconnected from the system and the fittings capped. **(It is recommended this check is carried out every 6 months).**
- 4) When the store water has reached the set temperature, open the nearest hot water outlet tap and check the mixing valve is delivering water at a safe and consistent temperature.
- 5) Check that the immersion heater and heat supply thermostats are appropriately set.
- 6) Check all thermostats are functioning correctly (i.e. once the store water regulation temperature has been reached any connected heat source should be disabled). If necessary, replace defective parts.
- 7) Check the system pressure of the heat supply circuit (Electric Plus only) and correct pressure if necessary.
- 8) If applicable, check corrosion inhibitor levels in the heat supply circuit (Electric Plus only) and top up if required. To mitigate against potential chemical degradation, corrosion inhibitor should be re-dosed at five year intervals since last treatment.
- 9) Check the y pattern strainer / any filters are free from particulate debris / blockages.
- 10) Check all connections are tight and free from leaks. If necessary, carry out repairs / replace defective parts.

5.3 TROUBLESHOOTING

Table 5 Fault finding guide

Fault	Possible Cause	Solution
Cold water at the hot taps	Heat source malfunction (e.g. boiler / immersion heater)	Check for faults - Refer to manufacturer's instructions
	Motorised valve malfunction (where fitted)	Manually activate motorised valve. If hot water tank begins to heat, replace valve
	Pump malfunction (where fitted)	Check wiring and plumbing connections to the pump
	Programmer not set to demand hot water	Set programmer / timer to call for hot water
	Hot water tank / immersion thermostat high limit tripped / defective	Check and manually reset high limit thermostat / replace thermostat
Hot water at the cold taps	Check valve is hindered / not fitted	Replace / fit check valve
	Cold water pipework routed too close to hot pipework	Insulate / Re-route pipework
Fluctuating mixed water temperature	Low water or fluctuation water pressure and flow rate	Check water supply pressure and flow rate
No flow / reduced flow from taps	Mains water supply isolated	Check stop-cock is fully open
	Insufficient mains water supply pressure	Install cold water booster set
	Pipework / fittings restrictive	Fit suitably sized pipework and full-bore valves
	Incorrect fitment of the check valve	Ensure direction arrow on side of valve follows direction of flow
	Debris obstructing mixing valve operation	Isolate mains water supply at stop-cock, inspect mixing valve and replace if necessary
	Y pattern strainer blocked	Isolate mains water supply at stop-cock, disassemble and clean y pattern strainer
Mixing valve does not fail safe when tested	Incorrect installation of the mixing valve	Check hot and cold-water supplies are connected in accordance with indications on body of the valve
	Internal mechanism of mixing valve hindered / scaled	Isolate mains water supply at stop-cock, inspect mixing valve and replace if necessary
Continuous water discharge from overflow pipe	Filling loop attached and valve letting by	Isolate valve, remove the filling loop and fit the two ½" caps
	Leak in system coils	IMMEDIATELY isolate all power supply and heat sources. Contact installer

5.4 REPLACEMENT PARTS

HeatStream hot water storage tanks have been designed with longevity and durability in mind. Whilst the tanks have been made from high quality materials, over time some parts may need to be replaced. The list below details the parts which can be purchased for the HeatStream range of hot water storage tanks.

Table 6 Replacement parts

Part Number	Description
CP-4043	1" Mixing valve 30 - 65°C
SP-4213	Dual element immersion heater – 150L
SP-4214	Dual element immersion heater – 210L
CP-4226	Rod combistat TSR - 18"
17-004-0061	Capillary combistat BBSC – Coil 1
17-004-0135	Capillary Combistat BBSC – Long Element
CP-4185	Y pattern strainer 22mm
CP-FTG-KIT- 01	1" Mixing valve pipe set kit
CP-FTG-KIT-02	Filling loop kit
HS-OVFL-KIT	Internal overfill kit

This list does not include standard over the counter parts including plumbing / electrical hardware or any structural parts of the tank (such as the coil assemblies).

5.5 IMMERSION HEATER REPLACEMENT

Where the HeatStream tank has been installed with restricted headroom above the unit, it may be necessary to tilt the unit in order to remove and insert a replacement immersion heater without damage. It is recommended full bore isolation valves are fitted at each coil connection to the tank – this will allow the mains cold water supply and heat supply (Electric Plus only) circuits to be isolated easily to allow the unit to be disconnected and tilted. For Health and Safety it is recommended the tank contents is fully drained before attempting to manoeuvre the unit. Assessments of risks for carrying / tilting the hot water storage tank should be conducted and a plan set in place before lifting / handling the tank. Where it is not possible to eliminate hazardous manual handling, suitable controls must be introduced to reduce the risk of injury to the lowest extent reasonably practicable. Where possible, when the empty tank weight exceeds the safe lifting guidelines team lifts / a handling aid such as a sack trolley should be used. Any manual handling / lifting operations must comply with the Manual Handling Operations Regulations issued by the HSE.

Note: Isolate the power supply before removing any protective covers. If you are unsure or need assistance seek help from a competent person.

5.6 DE-COMMISSIONING

5.6.1 Disassembly, recycling and disposal

Disassembly and removal from service should be carried out by a trained heating technician.

Note: Disconnect and Isolate all electrical supplies and heat sources and allow the store water and pipework to cool before carrying out disassembly and or removal of the unit.

- 1) Close the stopcock on the mains cold water supply to the tank.
- 2) Drain the water in the hot water supply pipework by opening at least two hot water taps nearby.
- 3) Drain the water remaining in the domestic hot water coil to an open drain using a syphon fitted through the cold-water inlet connection.
- 4) Disconnect the heat supply pipework from the tank (Electric Plus only) and using a suitable collection container drain off its contents.
- 5) Drain the water remaining in the heat supply coil (Electric Plus only) using a syphon fitted through the inlet connection.
- 6) Unscrew and raise the dual element immersion heater and using a syphon inserted into the gap in the centre of the element, drain the contents of the tank.

The designation of the product means that it should not be disposed of together with unsorted domestic waste. It is the responsibility of the owner to properly dispose of the unit in accordance with national regulations. Further guidance should be sought from the appropriate local authorities. The packaging of the unit can however be recycled, and this should be done so through a local recycling centre.

6 WARRANTY

6.1 WARRANTY STATEMENT

The Harlequin HeatStream® hot water tank ("the Unit") is supplied with the following warranties in favour of the original end user purchaser ("the Customer") from the date of purchase;

- (a) a 5-year warranty on the plastic inner tank body against defects of material.
- (b) a 2 year warranty on all parts and components as well as any defects that may have occurred from time to time during the normal manufacturing process of the Unit as carried out by those exercising all relevant skill and experience and complying with all relevant legislation, regulations and codes of practice relating to the manufacturing process.

(Note: Optional internal overfill kits are covered by a separate warranty statement and terms as included in the internal overfill kit manual).

1. The warranties provided are from the date of purchase and are conditional upon:
 - 1.1 the Unit being installed and commissioned by competent persons in accordance with the manufacturer's instructions and relevant legislation, regulations and codes of practice in force at the time;
 - 1.2 the Unit being registered with Harlequin Manufacturing Limited within 30 days of purchase and the warranty registration completed. Proof of purchase should be retained in the event of a claim.
 - 1.3 the Unit not being modified in any way, or misused or subject to neglect;
 - 1.4 the Unit being serviced annually by competent persons in accordance with the manufacturer's instructions and all regulations and codes of practice in force at the time;
 - 1.5 each service record being completed and proof of purchase and servicing being retained and made available to Harlequin Manufacturing Limited in respect of any claim;

- 1.6 the Unit being used solely for the purpose of heating potable water that complies at all times with EU and local / national regulations and not fed from a private source;
- 1.7 the water quality used being fully compliant with conditions outlined in the operation manual for the Unit and with EU and local / national regulations.

Failure to comply with any of the conditions outlined in this clause will invalidate the warranty in its entirety.

2. The warranties are for the benefit of the Customer only and are not transferable or assignable by the Customer to any third party.
3. The warranties exclude:
 - 3.1 labour costs associated with the replacement of the Unit or its components;
 - 3.2 any defects that appear after the Customer makes any modification or alteration to the Unit;
 - 3.3 defects arising from normal deterioration;
 - 3.4 defects caused by the improper use or storage of the Unit and in particular (but without limitation) Harlequin Manufacturing Limited shall not be liable in the case of improper or faulty handling or processing of the Unit by the Customer;
 - 3.5 consequential losses however caused.
4. If within the warranty period, a material defect is discovered in the Unit:
 - 4.1 the Customer must send written notification following discovery giving particulars and either at its own expense and risk shall return the Unit to Harlequin Manufacturing Limited within 2 weeks of written notice being provided by Harlequin Manufacturing Limited; or (at Harlequin Manufacturing Limited's sole option) shall permit Harlequin Manufacturing Limited to inspect same; and
 - 4.2 such defect has arisen from faulty materials employed or workmanship carried out by Harlequin Manufacturing Limited and is existing but not reasonably discoverable upon inspection at the time of receipt, then Harlequin Manufacturing Limited shall supply such part(s) free of charge along with the costs of transporting same to the Customer;
 - 4.3 the manufacturer reserves the right to repair or replace the parts as deemed necessary by the manufacturer.
 - 4.4 the replacement parts must be fitted in accordance with the terms of the warranty set out above;
 - 4.5 the replacement parts shall be covered for the unexpired term of the 2 year warranty;
 - 4.6 invoices for call out and/or repair by any third party or parts supplied by a third party will not be accepted unless previously authorised by Harlequin Manufacturing Limited in writing.
5. Harlequin Manufacturing Limited's liability for defective Units is limited in all circumstances to delivery of parts for the defective Unit and the Customer shall accept same as fulfilment of Harlequin Manufacturing Limited's obligations.
6. Harlequin Manufacturing Limited disclaims all other warranties whether express, implied or statutory. Your statutory rights are not affected.
7. The warranties apply to Harlequin HeatStream® range of hot water tanks installed in the United Kingdom, Isle of Man, Channel Islands and Republic of Ireland only. Provision of warranty cover elsewhere is subject to the prior written agreement of Harlequin Manufacturing Limited.
8. The warranties are governed by and construed in accordance with the laws of Northern Ireland and the parties submit to the exclusive jurisdiction of the courts of Northern Ireland in any dispute arising out of or in connection with the warranties.

6.2 WARRANTY REGISTRATION

To get the full benefits of the Harlequin HeatStream Warranty it must be registered. Registration can only be done by completing the online registration form on the Harlequin website at the following address:

<https://warranty.harlequinplastics.co.uk/>

7 COMMISSIONING AND SERVICE RECORDS

It is the responsibility of the installer to complete this installation and commissioning checklist.

Installation		Tick or insert value	
What is the incoming static cold water pressure on the mains supply?			bar
To what pressure is the pressure reducing valve set on the mains supply?			bar
Has a shock arrestor been fitted on the mains supply pipework?			Yes (tick)
Is the installation in a hard water area (ie >200mg / litre)?	Yes (tick)	No	(tick)
If yes, has a suitable and effective water treatment been fitted?			Yes (tick)
What type of hard water treatment has been fitted?			
Is the installation located a minimum of 1m away from heat sources with a heat output >90°C?			Yes (tick)
Is the overflow pipe arrangement piped and terminated in accordance with Building Regulations?			Yes (tick)
Has the thermostatic mixing valve been installed correctly?			Yes (tick)
All appropriate pipes are insulated up to 1metre or the point where they become concealed			Yes (tick)
Controls			
Have time and temperature controls been fitted in compliance with Building Regulations?			Yes (tick)
What type of control system has been fitted?	Y Plan (tick)	S Plan (tick)	C Plan (tick) Other (tick)
Are all heat sources wired through the correct thermostat?			Yes (tick)
Commissioning			
Thermostatic mixing valve set point (min - max / 1 - 7)			
Hot water temperature at the nearest outlet			°C
Maximum hot water flow rate (measured at high flow outlet)			l/min
What position is the long immersion heater thermostat set? (45-75)			
What position is the short (boost) immersion heater thermostat set? (1-5)			
Handover			
The hot water system complies with the appropriate Building Regulations			Yes (tick)
The system is installed and commissioned in accordance with the manufacturer's instructions			Yes (tick)
The system controls have been demonstrated to and understood by the customer			Yes (tick)
All product literature has been left with and explained to the customer			Yes (tick)
Installation Address Details		Commissioning Engineer Details	
Customer Name		Engineer Name	
Address		Company Name	
		Company Address	
Telephone Number			
Email Address		Telephone Number	
		Mobile Number	
Heatstream Model (e.g 150E/210EPLUS)		Email Address	
Heatstream Serial Number			
Customer's Signature		Engineer's Signature	
Date		Commissioning Date	

7.1 SERVICE RECORD

SERVICE 1 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____	SERVICE 2 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____
SERVICE 3 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____	SERVICE 4 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____
SERVICE 5 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____	SERVICE 6 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____
SERVICE 7 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____	SERVICE 8 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____
SERVICE 9 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____	SERVICE 10 Service Date _____ Engineer Name _____ Company Name _____ Telephone Number _____ Comments _____ Signature _____

SERVICE 11

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature**SERVICE 13**

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature**SERVICE 15**

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature**SERVICE 17**

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature**SERVICE 19**

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature**SERVICE 12**

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature**SERVICE 14**

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature**SERVICE 16**

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature**SERVICE 18**

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature**SERVICE 20**

Service Date _____

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature

About Harlequin

Harlequin have been at the forefront of manufacturing development in the rotationally moulded plastic storage products industry for over 35 years. From its base in Northern Ireland Harlequin now sell to over 25 countries worldwide with an unrivalled reputation for quality, backed up with its 9001, 14001 and 18001 Management System Certifications.



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