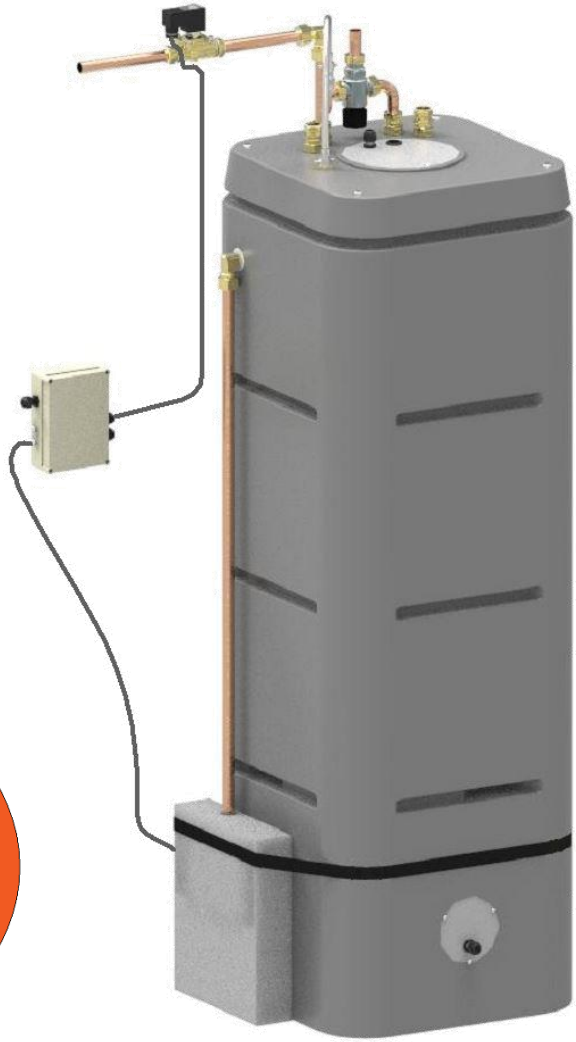
Manual

Internal Overfill Kit

Installation & Maintenance

Harlequin® HeatStream®
HOT WATER SYSTEM



WARNING

Register your product warranty

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

Compatible with the following models:

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

Electric Plus: HS150EPLUS, HS210EPLUS

This manual must be left with the end user

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1. User Instructions

1.1 Introduction

The Internal Overfill Kit is designed to be used as an alternative method for termination of the overfill pipe on the Harlequin HeatStream range of hot water storage tanks. In circumstances, where termination of the overfill pipe to waste / soil or atmosphere is impractical the internal overfill kit is an ideal solution. The internal overfill kit is designed to deal with any excess water when filling / topping up the tank, expansion of the static body of water and will provide protection against the escape of water in the event of the tank being overfilled or developing an internal fault (domestic hot water coil only).

1.2 General Arrangement

1	Overfill bottle with liquid level sensor
2	Overfill pipe
3	Dual level controller
4	N/closed solenoid valve
5	Strap

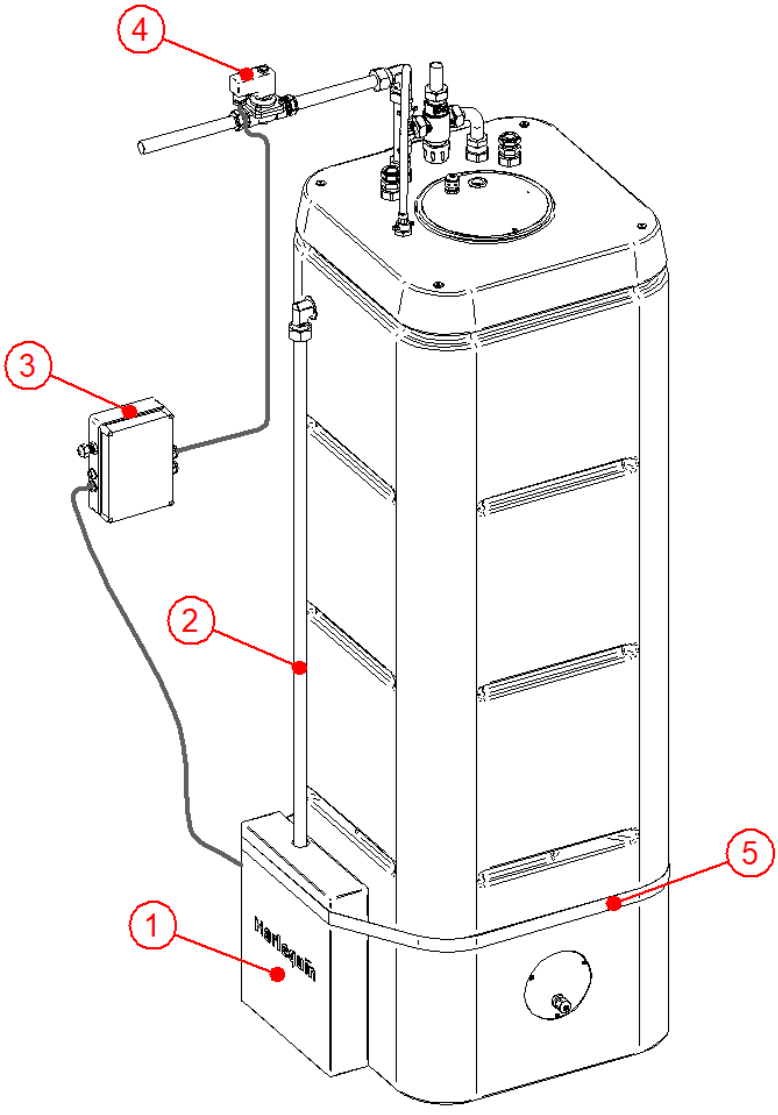

Figure 1 Key components of the internal overfill kit

1.3 Operation Instructions

1.3.1 Turning hot water on / off

To turn the hot water on, turn on the power supply to the dual level controller. If there is no water present in the overfill bottle / the water level is below the liquid level sensor, the solenoid valve will be in the open position and allow water to pass through. If the water level is above the liquid level sensor in the overfill bottle, the solenoid valve will be in the closed position and water will not be able to pass through (Refer to section 1.3.2 for guidelines on how to empty the overfill bottle). To turn the hot water off isolate the power supply to the dual level controller.

Note: For fail safe operation, if power to the dual level controller is interrupted, the orifice through the solenoid valve closes and flow through the valve stops.

1.3.2 Emptying the overfill bottle

To empty the overfill bottle, disconnect the plug of the liquid level sensor from the socket on the side of the dual level controller. Remove the strap holding the overfill bottle in place and manoeuvre the overfill bottle away from the overfill pipe taking care not to spill any of the overfill bottle contents. If the overfill pipework is in the way it may be necessary to remove the overfill pipe from the compression elbow at the overfill connection on the hot water storage tank. Once any water inside the overfill bottle has been discarded, reposition the overfill bottle beside the hot water storage tank re-inserting the overfill pipe into the opening on the top. Secure the overfill bottle in place using the strap and reconnect the plug of the liquid level sensor into the side of the dual level controller.

Note: Isolate the power supply to the dual level controller before emptying the overfill bottle. If you are unsure or need assistance seek help from a competent person.

1.4 Frequent Checks

1.4.1 Solenoid valve operation

It is recommended that the solenoid valve is de-energised once every six months to ensure proper opening and closing. A regular programme of checks will help to identify any problems in this respect and prolong the life of the solenoid valve. To check the valve is functioning correctly, turn the hot water off by isolating the power supply to the dual level controller. Check the valve is not letting by, by opening a hot water tap. To turn the hot water back on, turn on the power supply to the dual level controller. This will allow water to pass through the solenoid valve to the hot water storage tank and subsequently the hot water taps.

Note: If a fault is discovered isolate the power supply to the dual level controller and contact your installer.

2 Installation

2.1 Packing List

Before commencing installation check that all relevant parts have been supplied. Table 1 below summarises the parts supplied as part of the kit.

Table 1 Kit contents

Part No. and Description	***HS-0VFL-KIT***
P/HS/OFBOTT Overfill bottle	x1
CP-4300 N/closed solenoid valve	x1
CP-4301 Compression straight ¾" x 22mm	x2
CP-4302 Compression elbow ¾" x 22mm	x1
CP-4303 Dual level controller	x1
CP-4304 Liquid level sensor	x1
CP-4308 Strap	x1
CP-4310 AC/DC power supply	x1
CPF041 PTFE thread sealant	x1

2.2 Overfill kit Installation

2.2.1 Installing the solenoid valve

The solenoid valve should be located as close as possible to the mains water supply inlet connection on the hot water storage tank after the y pattern strainer. The y pattern strainer will trap any debris from the pipework upstream which may affect the performance of the solenoid valve. Refer to Figure 2 for the recommended pipework configuration. Apply PTFE thread sealant on the threads of the ¾" x 22mm compression straights. Fit the compression straights to each side of the solenoid valve. Care should be taken to ensure the solenoid valve is fitted in the correct orientation i.e the direction arrow on the bottom of the valve should follow the direction of flow. The solenoid valve must be mounted in a horizontal pipe run with the coil vertical and on top. Although the solenoid valve may sometimes work in other positions, they are not designed to do so and will not work consistently and reliably if installed incorrectly. It is normal for the valve to get hot during use. To allow for cooling, sufficient space must be maintained around the valve.

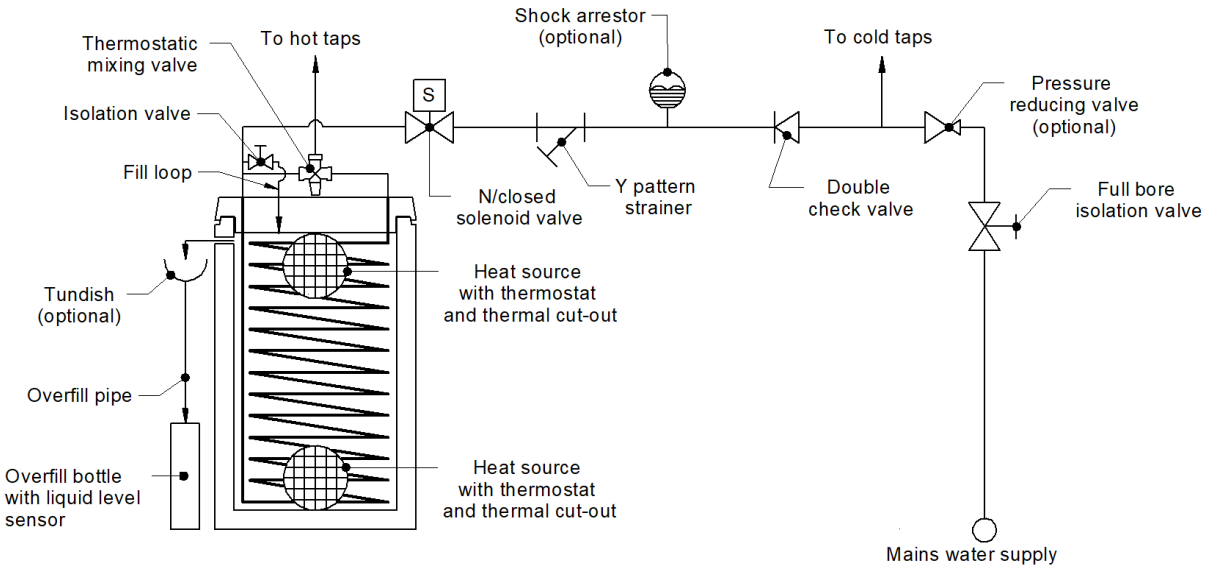

Figure 2 Internal overfill kit pipework configuration

2.2.2 Installing the liquid level sensor & overfill bottle

With the nut loose on the liquid level sensor assembly, insert it through the hole on the side of the overfill bottle. Care should be taken to ensure the liquid level sensor is fitted in the correct orientation i.e the direction arrow on the side of the liquid level sensor housing should be pointing downwards – Refer to Figure 3. Tighten the nut so the rubber bung deforms and seals the hole. Torque to 2.7Nm – do not overtighten.

The overfill bottle should be located to the left side of the hot water storage tank, supported on a solid level base, free from any debris and should cover the entire base of the bottle. The liquid level sensor side of the overfill bottle should be positioned to the rear of the hot water storage tank with a recommended clearance distance of 75mm from any structures to protect the sensor cable. Although the overfill bottle can be positioned in direct contact with the side of the hot water storage tank a minimum clearance distance of 200mm should be allowed between the hot water storage tank and any structures to allow the overfill bottle to be easily removed for emptying. Once in position, the overfill bottle should be secured in place with the strap fastened around the hot water storage tank.

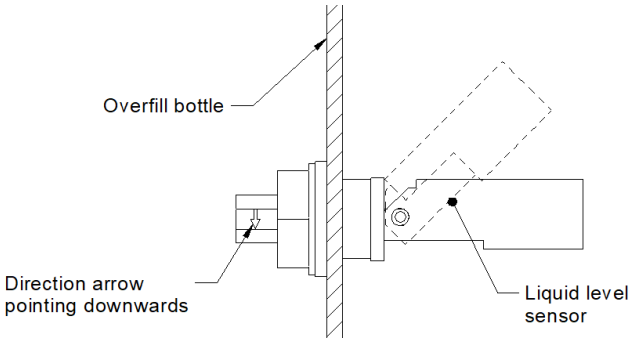

Figure 3 Correct fitment of liquid level sensor

2.2.3 Installing the overfill pipework

Apply PTFE thread sealant on the threads of the ¾" x 22mm compression elbow. Fit the compression elbow to the overfill connection on the side of the hot water storage tank. Measure the distance between the compression elbow and the top of the overfill bottle and cut a length of 22mm copper pipe to suit. To allow the overfill bottle to be easily removed for emptying the copper pipe should be fitted vertically and extend a maximum of 25mm into the opening on top of the overfill bottle. Although there is an air-break at the pipe entry point to the overfill bottle local regulations may require a tundish to be fitted on the overfill pipework.

2.2.4 Installing the dual level controller

The dual level controller should be suitably located with regards to the cable lengths of the solenoid valve (1.5m) and liquid level sensor (1m). A single switched socket outlet is required to allow the power supply to the dual level controller to be plugged in. The dual level controller should be wall mounted as high as is reasonably practical without causing strain on the cables. The dual level controller enclosure has a pair of mounting holes at each of the four corners, outside the seal and hidden by the cover. They will accept no.4 wood screws or can easily be widened for larger screws. Figure 4 shows the drilling pattern.

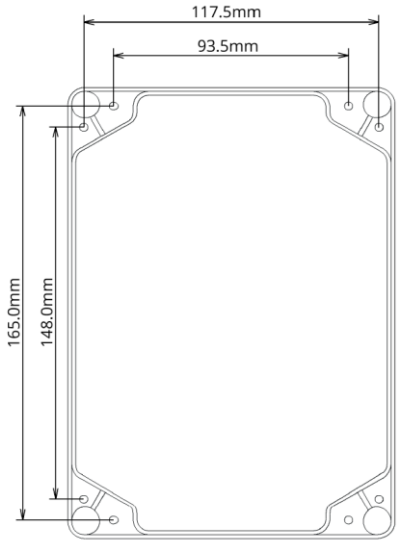

Figure 4 Dual level controller mounting holes

2.3 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.

2.3.1 Dual level controller and solenoid valve wiring

The dual level controller allows a low voltage liquid level sensor to safely control a mains voltage solenoid valve. The dual level controller requires two separate power supplies – a low voltage power supply (supplied) to the liquid level sensor side and a high voltage power supply to the solenoid valve side. A single switched socket outlet is required for the AC / DC power supply to the dual level controller. The high voltage power supply should be wired through a switched fused spur. The mains supply cable for the solenoid valve should be fed through the cable gland on the high voltage side of the dual level controller enclosure with approximately 60mm of the outer sheath stripped back. Connect the input LIVE wire to the terminal marked “COM1” and the input NEUTRAL wire to “COM2”. The EARTH terminal can provide a common connection for the two cable EARTH wires. The wires should be twisted together and secured tightly to provide a continuation of the safety earth. The screw terminals will accept a pair of 1.5mm² wires – if the wires cannot be securely joined, use a separate insulated connector strip within the enclosure. Refit the dual level controller protective cover and connect the plug of the liquid level sensor into the socket on the side of the dual level controller.

Note: Isolate all power supplies before removing any protective covers.

WARNING: Mains isolation will be compromised if wires can be pulled from their terminals. For electrical safety, wires must be securely held by the screw terminals and cable glands and must not be restrained by the screw terminals alone.

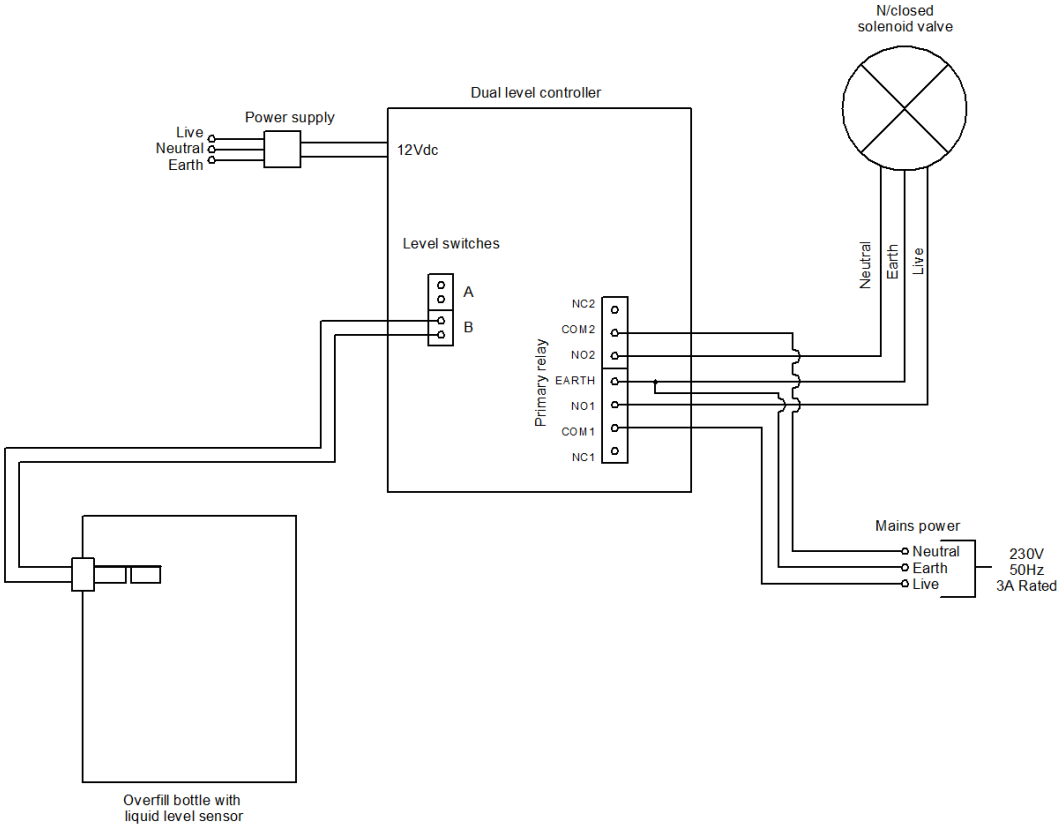

Figure 5 Internal overfill kit wiring

3 Commissioning

The following instructions must be read and understood prior to commissioning of the internal overfill kit. If under any circumstances there are aspects of the installation which do not comply with the specification laid down, the system MUST NOT be put into operation until all requirements are met.

3.1 System checks

Check the solenoid valve fails safe when the power supply is interrupted. Isolate the power supply to the dual level controller and check the flow through the solenoid valve is stopped by opening a hot water tap.

Check the liquid level sensor is functioning correctly by topping up the hot water storage tank via the filling loop and allowing water to flow into the overfill bottle. When the water level has risen above the liquid level sensor, check the flow through the solenoid valve is stopped by opening a hot water tap. To restore normal operation the overfill bottle will need to be emptied (Refer to section 1.3.2 for emptying of the overfill bottle).

Depending on the configuration of the pipework, flow through the tap will only stop when water in the pipework has been cleared by gravity flow.

When restoring operation, open the nearest hot water tap followed by the rest in sequence to allow any trapped air to escape. Leave the tap open until the system has been cleared.

4 Maintenance

The design of the internal overfill kit means that it requires minimal maintenance, although as with any mechanical product, proper, proactive maintenance and care can extend product life and ensure its reliable and predictable operation. It is therefore recommended that the unit is serviced annually.

Note: Unless otherwise instructed isolate all electrical supplies to the overfill kit before carrying out any maintenance work.

4.1 Maintenance Checks

1) Carry out a visual inspection of the general condition of the internal overfill kit.
2) Check the flow through the solenoid valve is stopped when the power is disconnected by opening a hot water tap.
3) Check the flow through the solenoid valve is stopped when the overfill bottle level has risen above the liquid level sensor by opening a hot water tap.
4) Periodic inspection of the internal parts of the solenoid valve for damage or excessive wear is recommended. Thoroughly clean all parts. If parts are worn or damaged, replace the solenoid valve.
5) Check all connections are tight and free from leaks. If necessary, carry out repairs / replace defective parts.

4.2 Replacement Parts

Whilst the internal overfill kit has been made from high quality materials, over time some parts may need to be replaced. To assure safety and reliability, always use original service parts.

Table 2 Replacement parts

Part Number	Description
CP-4300	N/Closed solenoid valve

The list does not include standard over the counter parts including plumbing / electrical hardware.

4.3 Troubleshooting

Table 3 Fault finding guide

Fault	Possible Cause	Solution
No flow / reduced flow from hot water taps	Overfill bottle level above liquid level sensor	Empty overfill bottle and restore operation
	Power supply is off	Check power supply
	Dirt particles in the solenoid valve	Isolate mains water supply at stopcock, disassemble and clean the solenoid valve
		Check y pattern strainer is orientated and located correctly
	Y pattern strainer blocked	Isolate mains water supply at stopcock, disassemble and clean y pattern strainer filter
	Damaged or deformed solenoid valve	Check power supply matches solenoid valve specification
		Isolate mains water supply at stopcock, inspect solenoid valve and replace if necessary

	Incorrect fitment of the solenoid valve	Ensure direction arrow on the bottom of solenoid valve follows direction of flow
	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
Solenoid valve does not fail safe when tested	Dirt particles in the solenoid valve	Isolate mains water supply at stopcock, disassemble and clean the solenoid valve
		Check y pattern strainer is orientated and located correctly
	Damaged or deformed solenoid valve	Isolate mains water supply at stopcock, inspect solenoid valve and replace if necessary
	Components missing after disassembly	Isolate mains water supply at stopcock, inspect solenoid valve and if necessary, replace missing parts
	Liquid level sensor orientated incorrectly	Ensure direction arrow on the side of liquid level sensor is pointing downwards
Continuous water flow from overfill pipe	Liquid level sensor orientated incorrectly	Ensure direction arrow on the side of liquid level sensor is pointing downwards
	Leak in system coils	IMMEDIATELY isolate all power supplies and heat sources. Contact installer
System noise	Alternating current can create a buzzing sound	Fix all components securely to reduce resonance noise
	Water hammer	Fit water hammer shock arrestor

4.4 De-commissioning

At the end of the equipment life, this product should be recycled according to the European Directive on Waste Electronic Equipment. Outside the EU, dispose of this product according to local recycling or waste disposal regulations.

This equipment is expected to have a long service life and regulations may change during that time.

This product must not be disposed in household waste.

5 Warranty

5.1 Warranty Statement

The Harlequin internal overfill kit ("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 1 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.

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 maintained regularly in accordance with the manufacturer's instructions and all regulations and codes of practice in force at the time;
   1.5 completion of service records 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 handling 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 1 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 internal overfill kits 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.

5.2 Warranty Registration

To get the full benefits of the Harlequin 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/

6 Commissioning and Service Records

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

Installation		
The solenoid valve is mounted on a horizontal pipe run with the coil vertical and on top	Yes	(tick)
The direction arrow on the solenoid valve follows the direction of flow	Yes	(tick)
The y pattern strainer is orientated and located correctly	Yes	(tick)
A shock arrestor has been fitted on the mains supply pipework	Yes	(tick)
The overfill bottle has been secured in place with the strap	Yes	(tick)
All protective covers are secure and in place	Yes	(tick)
Any electrical work carried out is in accordance with the latest regulations	Yes	(tick)
Commissioning		
The solenoid valve shuts off when the power supply to the dual level controller is isolated	Yes	(tick)
The solenoid valve shuts off when the liquid level in the overfill bottle is above the liquid level sensor	Yes	(tick)
The overfill bottle can be easily removed for emptying	Yes	(tick)
Handover		
The installation 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	
		Email Address	
Overfill kit Serial Number			
Customer's Signature		Engineer's Signature	
Date		Commissioning Date	

6.1 Inspection / service records

Please complete records of any inspections and or work carried out e.g service / maintenance on the unit.

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 12

Service Date _____
Engineer Name _____
Company Name _____
Telephone Number _____
Comments _____

_____
Signature

SERVICE 13

Service Date _____
Engineer Name _____
Company Name _____
Telephone Number _____
Comments _____

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Signature

SERVICE 14

Service Date _____
Engineer Name _____
Company Name _____
Telephone Number _____
Comments _____

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Signature

SERVICE 15

Service Date _____
Engineer Name _____
Company Name _____
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Comments _____

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SERVICE 18

Service Date _____
Engineer Name _____
Company Name _____
Telephone Number _____
Comments _____

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Signature

SERVICE 19

Service Date _____
Engineer Name _____
Company Name _____
Telephone Number _____
Comments _____

_____
Signature

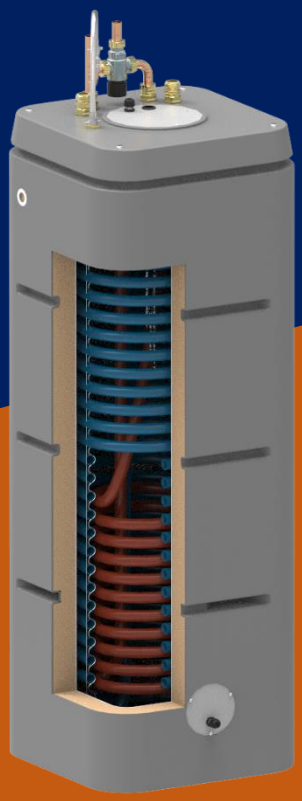
SERVICE 20

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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