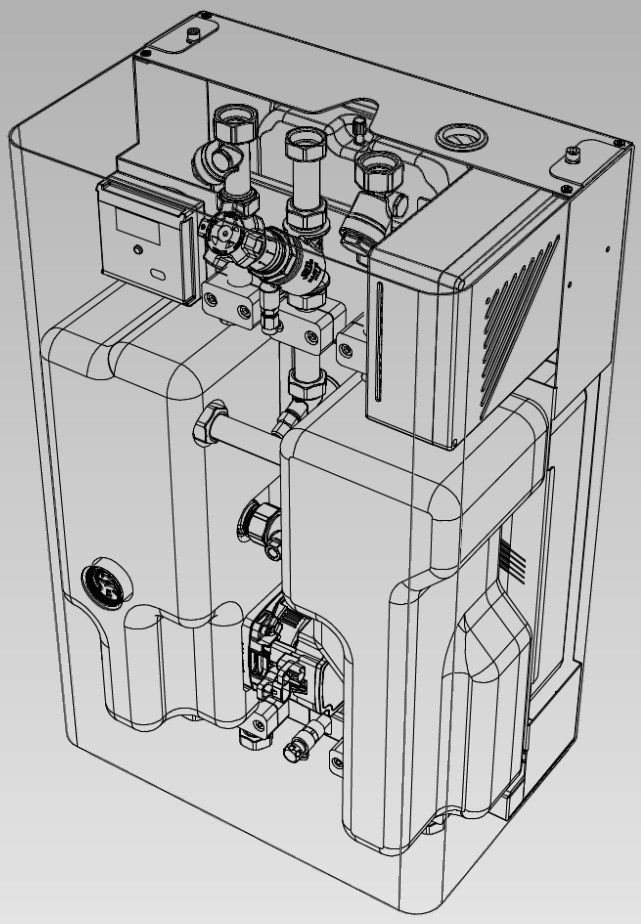
essco
ENERGY



EDGE TC / TC2 Heat Interface Unit (Intermediate)

Installation, Operation and Maintenance (IOM)

Contents

1 Key symbols and safety instructions

1.1 Key to symbols

Warnings

	Warnings in this document are identified by the warning triangle adjacent. Keywords are used at the start of a warning triangle to indicate both the type, and seriousness of the risk identified, if measures to prevent the risk are not taken.

Essco Group have defined the following Keywords and used them in this document:
• **NOTICE** Indicates a situation that could result in damage to property or equipment.
• **CAUTION** Indicates a situation that could result in minor to medium injury.
• **WARNING** Indicates a situation that could result in severe injury or death.
• **DANGER** Indicates a situation that will result in severe injury or death.

1.2 General safety instructions

Follow these guidelines

- Adhere to national and regional regulations, technical rules, and guidelines always.
- Observe the safety instructions and warnings identified and take appropriate care.
- Before starting the installation, any installation instructions (Heat interface unit, heating controls, etc.) should be carefully read through.
- Record all work carried out.

Risk of electrical shock

- Due to risk of electrical shock any electrical work or maintenance must only be carried out by qualified / registered person.
- Before carrying out any work on electrical components, isolate them from the power supply (230 V AC) (fuse, circuit breaker) and secure against unintentional reconnection.

Appliance operation
Cleaning and user maintenance should only ever be carried out by competent and authorised personnel.

Important handling instructions
Care should be taken when transporting, lifting, and carrying the appliance.

- Use a means of transport suitable for handling appliances (e.g. sack truck with strap, stair climbing or step trolley).
- When handling appliances, secure them against a fall.
- Let only trained personnel undertake the handling.
- The correct method for handling heavy objects should be strictly observed, always.

General handling guidelines
Only remove packaging at the time of the final installation to protect products from damage.

Always assess the weight of products before attempting to lift on your own. During handling and unpacking, wear safety gloves to prevent injuries to your hands through sharp-edged components.

Dispose of packaging materials appropriately.

Packaging
The following points should be observed during unpacking:

- Check the delivery immediately upon receipt for completeness and transport damage.
- Carefully unpack the unit.
- In the event of transport damage, the delivery should only be accepted conditionally.
- Do not use damaged components for assembly.
- The first fix rail can be fitted before the Heat Interface Unit, with primary / secondary circuits connected, allowing for pressure testing, and flushing of the Heat Network. Fitting the Heat Interface Unit later also reduces the risk of damage or loss on site.

Siting and installation
Correct siting, assembly and installation of the individual components are the fundamental requirements for safe and economical operation of the appliance.

- Only trained contractors are to site and install the appliance and its components.
- The appliance must only be installed in rooms and locations that meet the manufactures requirements.

Commissioning

- The appliance and the components must only be commissioned by a competent person.
- Commissioning reports should be completed during commissioning and kept as record documents after completion. Where commissioning engineers don't have templates for this, Essco Group have included copies of their report templates in this document, these can also be sent separately on request.
- Check all connections for leakages prior to starting up the heating system.
- All fixings and fittings must be checked and tightened if required after the unit has been installed.

Risk of damage due to operator error
Operator errors can result in injury and damage to property.

- Ensure that only personnel who can operate this appliance correctly have access to it.
- Inspection, maintenance, and repairs must only be carried out by competent persons.
- Use only original spare parts from the manufacturer. The manufacturer can assume no liability for damage caused by spare parts not supplied by the manufacturer. A spare parts guide can be found in the appendix of this installation operations manual.

Electrical work
Electrical work must only be carried out by a qualified electrician:

- Before starting electrical work
  - Ensure that the electricity supply is safely isolated and secure to prevent inadvertent re-connection.
  - Information on safe isolation can be found in the Health and Safety Executive Guidance HSG85.
  - Using test equipment approved to GS38 confirm that the electricity supply is disconnected.
- Refer to the manufacturer's information when installing other components with Essco equipment within the system.

Heat Exchanger
The unit contains copper-brazed stainless-steel heat exchangers. Please ensure the system complies with the requirements in BS EN 12502 Part 1 and 2 to avoid any damage caused by corrosion.

Danger of burns and scalds

- Surfaces of individual components, connections and leaking water can be very hot and cause severe burns and scalds.
- Do not touch hot surfaces.
- Caution should be taken not to touch any leaking water or drained system water unless the temperature is known and safe.

	**Notice:** An electronic Heat Interface Unit does not replace the need for thermostatic mixing valves at point of use where there is a risk of scalding. Essco Group recommend that control valves conforming to BS EN 1111 or BS EN 1287 are used at each point of use, so that in the event of cold supply water interruption, these valves shut off the flow of hot water to prevent scalding. Common Practice: Local TMV2 control at each hand-wash outlet, bath, and shower. Thermostatic taps (valves) can also be specified by the architect in lieu of TMV's to safe-guard users. Said valves should demonstrate that a maximum temperature of 48°C cannot be exceeded in operation and that the product will fail-safe (i.e., not discharge water above the maximum temperature). Such valves should also not be easily altered by building users. It should also be noted that 44°C is also recommended as the maximum discharge temperature from outlets accessed by vulnerable people.

Leakage
If leaks are observed:

- Immediately close all isolation valves.
- Ensure all leaks are repaired by a suitably qualified professional.

	**Caution:** The districts heating side of the appliance can be operated with high pressure and high temperature systems. • Please apply extreme caution and wear the appropriate safety equipment (PPE) when working on suspected leaks.

	**Notice:** The pressure differential across the primary circuit of the heat interface unit must not exceed 150kPa (1500mbar) on units without DPCV as standard. For units with internal DPCV fitted, the maximum differential pressure is 400kPa (4000mbar). • A suitable means of control should be installed to limit the differential pressure if the system design is expected to exceed the limits above (depending on the HIU model).

Instructing the customer

- When handing over, instruct the user how to operate the heating system and inform them about its operating conditions.
- Make note on retro-fit projects, where stored hot water is being replaced with heat interface units providing instantaneous hot water, that hot water can be less responsive, and a keep-warm program can be enabled where necessary.
- Explain how to operate the heating system and draw the user's attention to any safety-relevant action.
- Explain that modifications and repairs must only be carried out by an authorised contractor.
- Hand customers the appliance documentation for safekeeping.

2. Appliance Information

2.1 General Information

Main Features

- Easy to install with minimal installation space required.
- Internally insulated to minimise heat loss.
- Provides instantaneous domestic hot water and indirect central heating to properties.
- Hydraulic system separation with two heat exchangers.
- Domestic hot water demands take priority over central heating demands.
- The domestic hot water plate heat exchanger temperature is optimised to reduce the risk of lime scale formation.
- The electronic control unit provides fully modulated central heating and domestic hot water temperature control.
- Programmable keep-warm can be set to ensure heat is immediately available when domestic hot water is required. Note this feature is metered and will therefore be charged if enabled.
- Fully tamperproof and zero leakage primary control valves, 0-2 seconds fully open to fully closed position. Suitable for use as prepayment billing valves when battery backup is specified/included on Essco HIU Controller.
- Proven low return temperatures in the primary circuit through BESA testing maximises efficiency of the system.
- The appliance can be supplied with or without a heat meter fitted.
- Pre-plumbing kits available for **all top**, or **all bottom** pipework connections. The **standard** pre-plumbing kit has primary connections top and secondary connections bottom and has been used for the purposes of this manual as it is the most common.

2.2 Intended use

The appliance provides instantaneous domestic hot water and indirect central heating to properties that are serviced from district heating or central boiler plants. The appliance consists of two heat exchangers, one for the domestic hot water providing instant hot water at a safe regulated temperature and the second for central heating. The appliance is indirect, so the primary heating circuit is hydraulically separated from the property central heating by the second plate heat exchanger. Domestic hot water takes priority over the central heating demand.

This appliance must only be used as a source of heating and hot water in a sealed system.

Refer to the details on the HIU identity plate / sticker and the specifications to ensure correct use of this appliance.

2.3 Misuse

Appliance must be used as per the intended use statement. Operation outside the parameters of the intended use is considered misuse and could cause harm to people and damage to property.

Using the appliance outside of its intended use may also invalidate the manufacturer's guarantee.

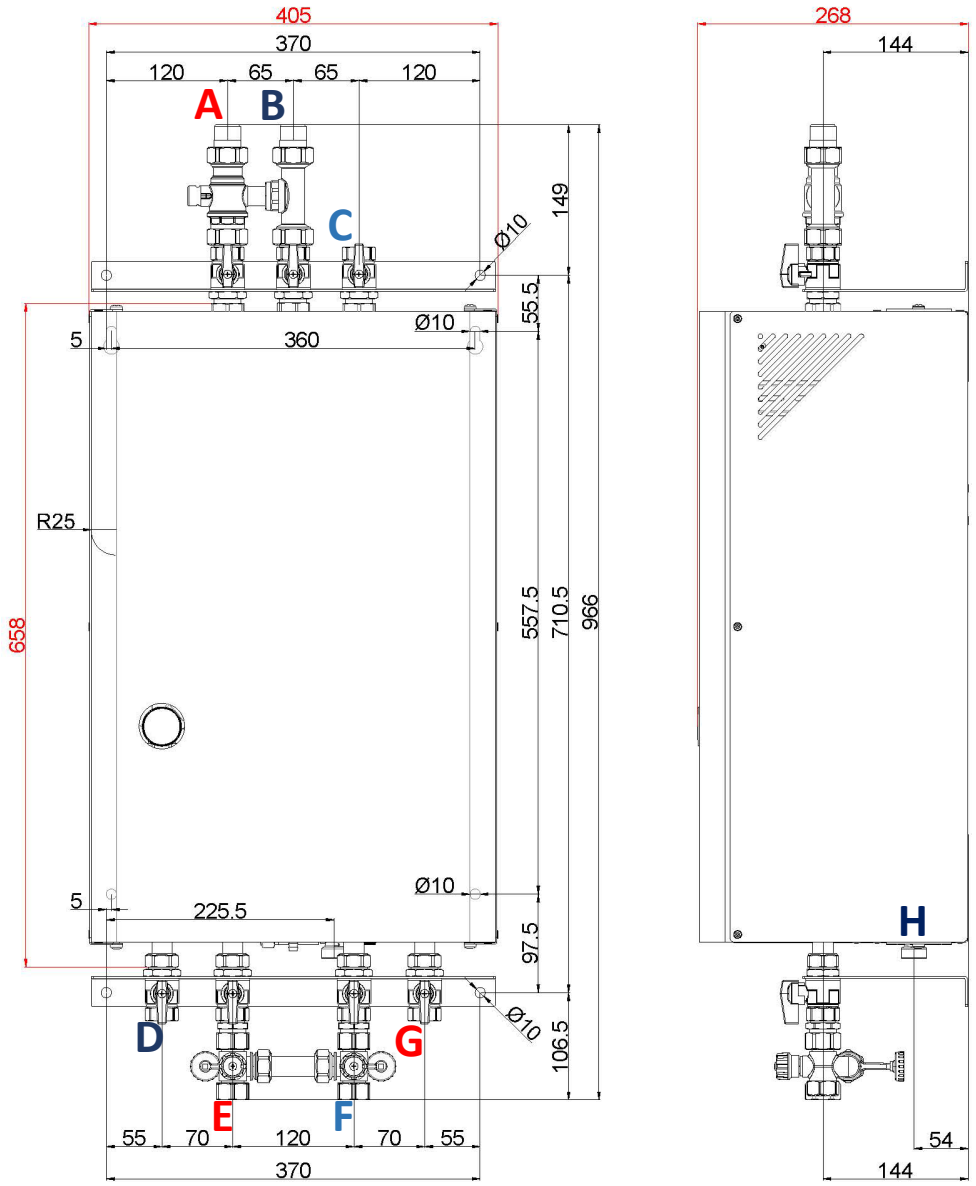
2.4 Declaration of conformity

This product, in design and operation, conforms to the European Directives and supplementary national requirements.

Compliance is demonstrated by the CE marking.

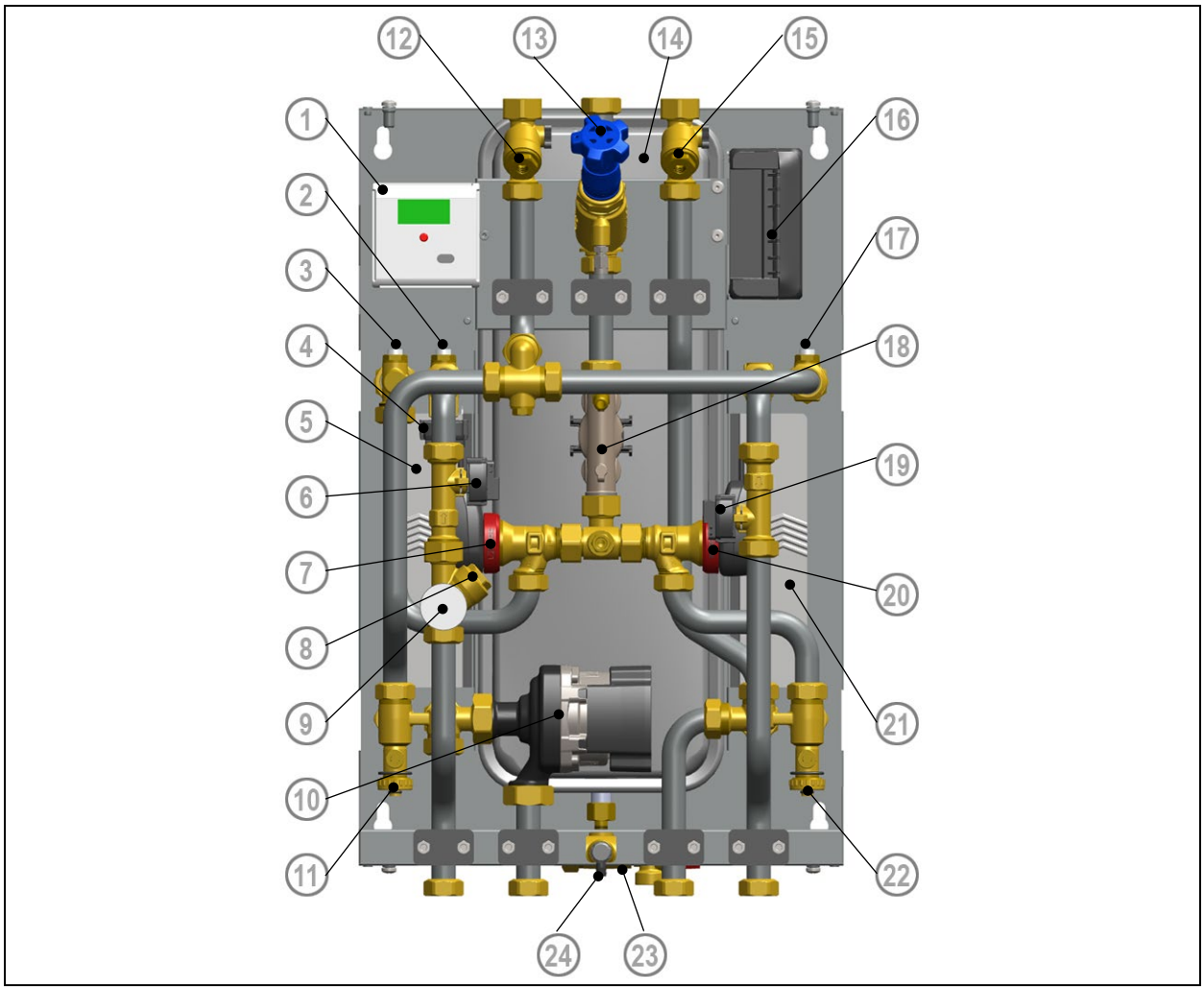
You can request the declaration of conformity for the product. To do so, send your request to the address on the back of the manual.

2.5 Appliance dimensions and hydraulic connections



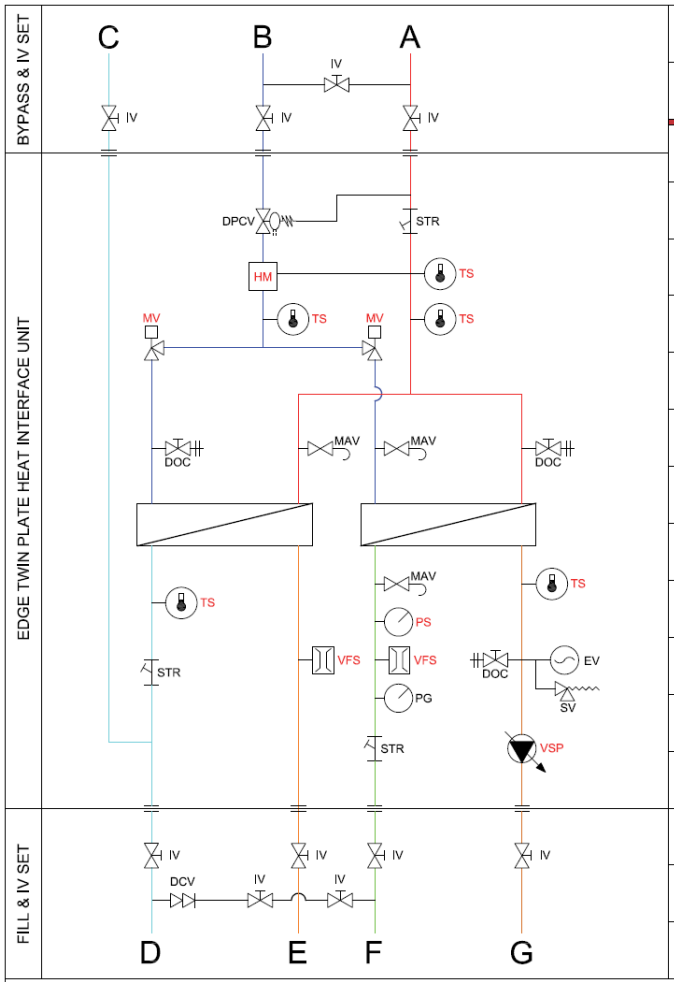
Connections		Notes
Primary	**Secondary**	
A – Primary Flow **B** – Primary Return **C** – Mains Cold Water Inlet	**D** – Central Heating Return **E** – Central Heating Flow **F** – Mains Cold Water Outlet **G** – DHW Supply **H** – Drain	Dimensions shown in red are overall HIU dimensions. All other dimensions are for setting out of fixing holes or pipework. Primary flushing bypass, filling loop & standard jigs shown in illustration above.

2.6 Internal layout



Item No.	Circuit	Component Description
1	Primary	Heat meter calculator
3		Air-vent (primary return)
11		Primary heating circuit drain valve
12		Primary flow strainer
13		Differential Pressure Control Valve (DPCV) – *model Edge-TC2 only* *(Edge-TC model has only straight pipe section fitted)*
15		Mains cold water inlet strainer
17		Air-vent (primary flow)
18		Heat meter flow body
2	Central heating (secondary)	Air-vent (central heating return)
4		Pressure sensor (central heating)
5		Plate heat exchanger (central heating)
6		Flow and temperature sensor (central heating return)
7		Central heating primary control valve
8		Central heating return strainer
9		Pressure gauge (central heating)
10		Central heating circulation pump
14		Expansion vessel
23		Pressure relief valve
24		Central heating drain valve
19	DHW (secondary)	Flow and temperature sensor (DHW)
20		DHW primary control valve
21		Plate heat exchanger (DHW)
22		Primary DHW circuit drain valve
16	N/A	HIU controller *–controller may be split into 2 boxes, for power and control*

2.7 Schematic layout



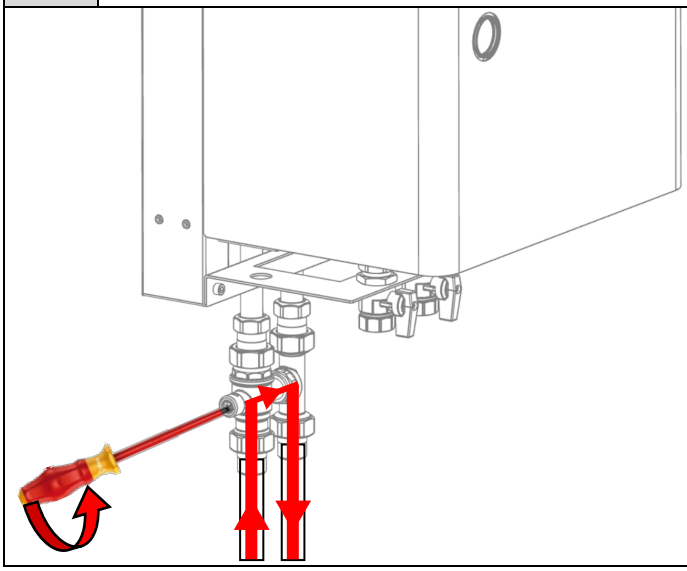
SCHEMATIC LEGEND

SYMBOL	ABVR	PRODUCT
	IV	ISOLATION VALVE
	DPCV	DIFFERENTIAL PRESSURE CONTROL VALVE
	STR	STRAINER
	HM	HEAT METER
	TS	TEMPERATURE SENSOR
	MV	2-PORT ESBE MOTORISED CONTROL VALVE
	DOC	DRAIN OFF COCK
	MAV	MANUAL AIR-VENT
	VFS	TEMPERATURE & FLOW RATE SENSOR
	PS	PRESSURE SENSOR
	PG	PRESSURE GAUGE
	EV	EXPANSION VESSEL
	SV	SAFETY VALVE
	VSP	VARIABLE SPEED PUMP
	DCV	DOUBLE CHECK VALVE

NOTE: ABBREVIATIONS (ABVR) SHOWN IN RED ARE IoT CONNECTED DEVICES

2.8 Modes of operation

1	**Bypass Mode:** ¼ turn counter-clockwise to open primary bypass Purpose: Manual mode, to flush & clean primary circuit. Note: bypassing must be done independent of HIU, as not to pass dirt through PHE or valves.



1. The HIU is fitted and 'off', or primaries are connected to a pre-plumbing jig only at this stage.
2. The primary bypass is opened to divert primary flow to primary return. Used to flush through primaries as part of commissioning.
3. This is carried out prior to final HIU connection / activation to ensure the system water is of a good standard.

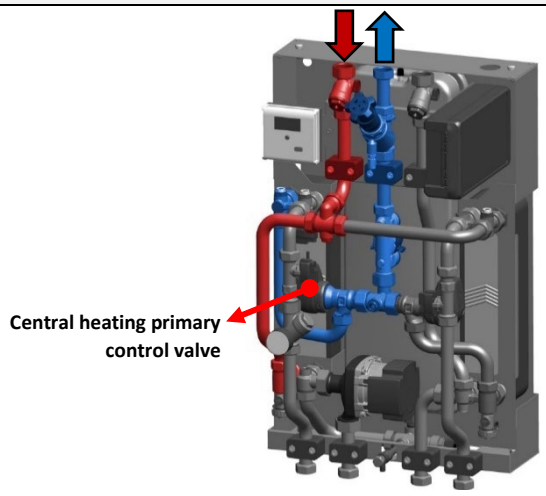
The flushing bypass is required on all terminal units. With HIU isolation valves closed, this is then opened during commissioning to ensure that only primary pipework is flushed through and not the HIU's. This helps protect balancing valves and other sensitive control components from damage caused by flushing through with poor quality water.

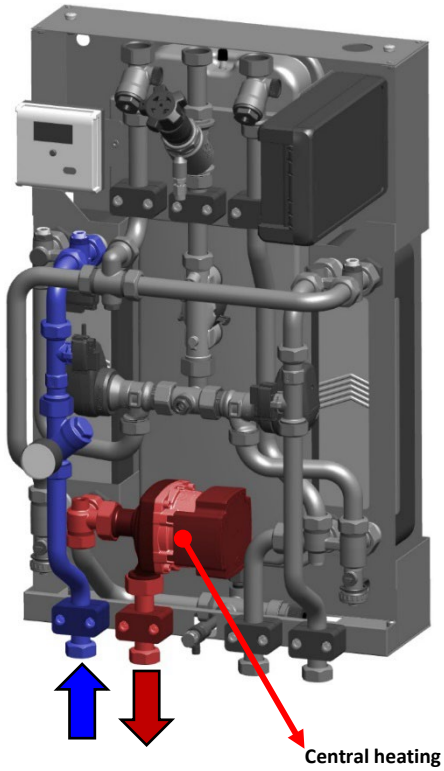
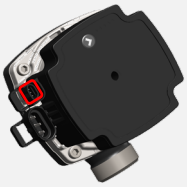
2	**Heating Mode:** In heating mode: There is a call for heat by room thermostat, room sensor or via UFH wiring centre, after detecting a fall in ambient temperature below the target set-point. The call for heat may also be received automatically if a heating schedule has been set up on the online dashboard or residents display unit where applicable.

1. When there is demand, the **central heating primary control valve** opens to pull energy from the heat network to heat the primary side of the PHE.

2. The pressure sensor reports pressure of the secondary circuit back to the controller. If the circuit has sufficient pressure, the central heating circulation pump starts running to push the closed heating loop through the secondary side of the PHE, transferring heat from the primary side to the secondary.

3. A flow and temperature sensor is fitted on the secondary central heating return side, reporting flow rate and return temperature back to the controller. This feedback is used to modulate the primary control valve position to transfer sufficient heat to the secondary side of the PHE to achieve the level of comfort required.

Primary Circuit Control:	**Central Heating Primary Control Valve Positions:**	
		**Red Circle** **= 0% OPEN** *(& zero leakage)*
		**Red Circle** + **Blue Square** **= 1-40% OPEN**
		**Blue Square** **= 40-60% OPEN**
		**Blue Square** + **Green Triangle** **= 60-99% OPEN**
		**Green Square** **= 100% OPEN**

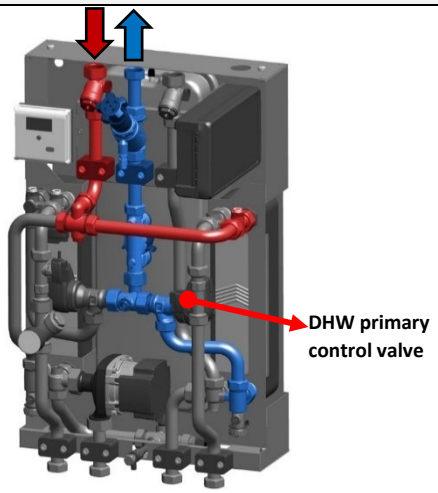
Secondary Circuit Control: Central Heating	Under Floor Heating Systems	
		Composite pipework used for underfloor heating systems utilise lesser flow temperatures due to the increased surface area of the heat emitter, when compared to traditional radiator systems. It is important not only for energy conservation, but also to protect the composite pipework, to limit the secondary temperature through UFH circuits to 35 – 55°C. The secondary flow temperature should be specified by the UFH designer, however when in doubt manufacturers data sheets should be used.
		When using the Edge Heat Interface Unit to assist in the UFH warm-up procedure, the pump data cable can be removed which will set the pump running full speed. It must be refitted afterwards. Care must be taken to ensure a flow temperature limitation thermostat is fitted and set correctly to protect the system. Should any floor coverings require further surface temperature protection, fail-safe sensors must also be fitted.

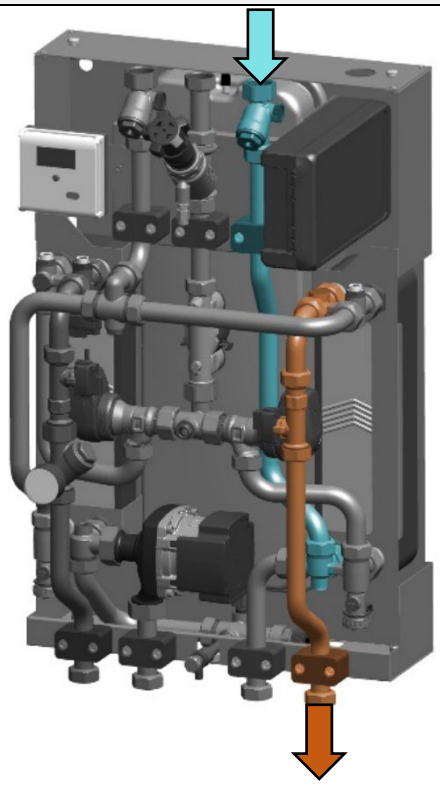
3	**DHW Mode:** In Domestic Hot Water mode: The DHW flow & temperature sensor detects flow rate during a hot water event.

1. The controller prioritises hot water, if heating is running it closes the central heating control valve, pulling 100% of primary supply through the DHW PHE. The pump speed is then optimised on the heating circuit to pull energy left in the heating PHE out and around the heat emitters, until the hot water event has ended.

2. The flow rate of outlets requiring DHW is monitored by the flow & temperature sensor and the primary DHW control valves position is modulated to achieve the load required on the secondary side of the PHE.

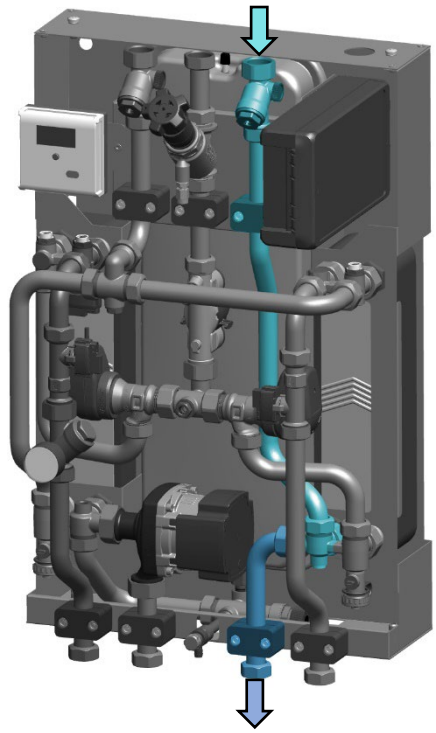
3. After hot water events have ended, the unit will either return to keep-warm mode (where enabled) or space heating.

Primary Circuit Control:	Central Heating Primary Control Valve Positions:	
		**Red Circle** **= 0% OPEN** *(& zero leakage)*
		**Red Circle** + **Blue Square** **= 1-40% OPEN**
		**Blue Square** **= 40-60% OPEN**
		**Blue Square** + **Green Triangle** **= 60-99% OPEN**
		**Green Square** **= 100% OPEN**

Secondary Circuit Control: Domestic Hot Water	Mains Cold-water Flow Rates	
		HIU's require sufficient cold mains water pressure supplied to them, in order to deliver the domestic hot water flow rate required on the secondary side. We recommend the Essco Water Meter Assembly ('WMA') as a means of setting and adjusting the cold mains pressure in to each dwelling, as this assembly also includes double check valve to prevent back-flow, while displaying the outlet pressure to aid with commissioning and fault finding.
		Where an Essco WMA / similar is not fitted, care must be taken to ensure the mains cold water reaches each unit at the required pressure and does not exceed the maximum 10 bar rating. Similarly, we recommend a reduction ratio from mains cold-water primary to HIU of 2:1, but no more than 3:1 to reduce potential for noise.

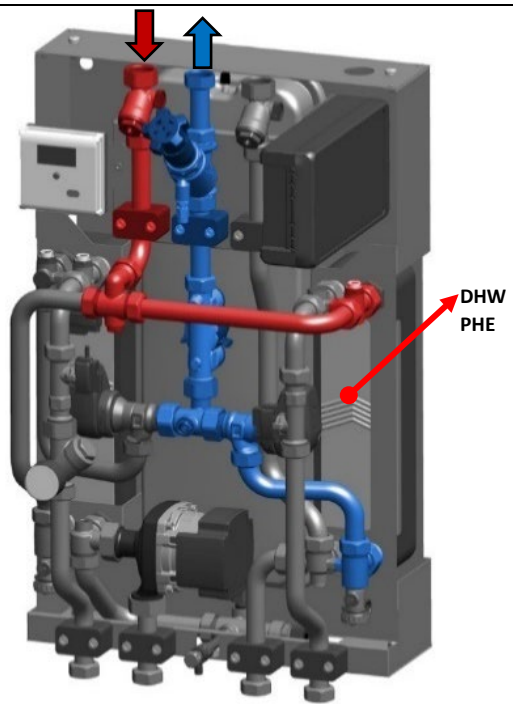
4	**MCW Mode:** In Mains Cold-water mode: A cold water tap is opened.

1. The mains cold-water feed entering the HIU passes through a strainer.
2. It is then pulled direct through the HIU and distributed out to the required outlet(s).

		HIU's require sufficient cold mains water pressure supplied to them, in order to deliver the cold water flow rate required on the secondary side. We recommend the Essco Water Meter Assembly ('WMA') as a means of setting and adjusting the cold mains pressure in to each dwelling, as this assembly also includes double check valve to prevent back-flow, while displaying the outlet pressure to aid with commissioning and fault finding.
		Where an Essco WMA / similar is not fitted, care must be taken to ensure the mains cold water reaches each unit at the required pressure and does not exceed the maximum 10 bar rating. Similarly, we recommend a reduction ratio from mains cold-water primary to HIU of 2:1, but no more than 3:1. The pipe size on the MCW outlet should also be checked adequate for the total mains cold water flow rate required. If it is too small, remove outlet pipe section on HIU and cap off, so mains cold feed can supply outlets outside of / independent from HIU.

5	**KWM Mode:** In Keep-warm mode: The heating may be on demand or off, but there is no demand for hot water.

1. The keep-warm program looks at temperature feedback from temperature sensor(s) within the HIU to maintain the set temperature at the DHW PHE. This ensures that after longer periods of inactivity, the HIU still responds quickly to a hot water event and achieves target temperature at the taps promptly. The primary DHW control valve opens only to the position required, for the time required to achieve the set temperature, it is not always open or fully open.



All energy transferred from the heat network to indirect PHE's within the Edge Heat Interface Units is metered and therefore billable. This means on any units where a keep-warm program is deployed, while it only draws a small amount of energy, this energy is chargeable to the end-user.

Within the software is the option to enable or disable this feature, and while this can be done at any time, there can be certain installations where the heat network operator has removed this permission. This may be where there are longer lateral / terminal runs or higher heat losses before the HIU, and the KWM is required to deliver the comfort and response levels required.

2.9 Technical & performance specification

Description	Unit*	A HIU only	B +Jig Pack
General			
Height	mm	658	966
Width	mm	405	
Depth	mm	268	
Maximum working pressure	kPa	16	
Maximum differential pressure rating	bar	1.5 (no DPCV), 4.0 (with DPCV)	
Minimum inlet pressure to achieve nominal DHW flow rate	bar	3	
Maximum flow temperature secondary heating	°C	90	
Maximum flow temperature DHW	°C	90	
District heating flow and return connections	mm	20	
Secondary heating flow and return connections	mm	20	
Cold feed and DHW connections	mm	20	
Pressure relief valve connection	mm	15	
Maximum working pressure district heating side	bar	10	
Pressure relief valve setting secondary heating side	bar	3	
Maximum working pressure domestic hot water side	bar	10	
Expansion vessel	litre	8	
Pipework insulation	-	9mm K-FLEX ST	
PHE insulation		9mm expanded PE	
Approvals		KIWA regulation 4 approved, CE marking	
Electrical			
Electrical power supply voltage	V	230	
Frequency	Hz	50	
Maximum power consumption	Watts	<100w	

Central heating performances

Primary flow (°C)	Heating - Radiators					
	CH (°C)	Power (kW)	Primary return (°C)	Primary flow (°C)	Min. diff pressure primary (kPa)	Secondary flow (l/s)
55	50/30	14	34.5	0.17	36.0	0.17
60	55/35	15	39.5	0.18	40.7	0.18
65	60/30	19	38.0	0.17	38.0	0.15
70	60/30	25	35.5	0.18	40.0	0.20
75	60/30 70/40	30 / 20	34 / 48	0.18	40.8 / 40.2	0.24 / 0.16
80	60/30 70/40	34 / 25	33 / 45	0.18	40.0 / 38.0	0.27 / 0.20

Primary flow (°C)	Heating - UFH					
	CH (°C)	Power (kW)	Primary return (°C)	Primary flow (°C)	Min. diff pressure primary (kPa)	Secondary flow (l/s)
55	45/35	12	35.70	0.15	30.0	0.29
60			35.30	0.12	19.0	
65			35.14	0.098	13.1	
70			35.07	0.084	9.7	
75			35.04	0.074	7.5	
80			35.02	0.065	6.0	

Domestic hot water performances

Primary flow (°C)	Domestic Hot Water				
	DHW (°C)	Power (kW)	DHW flow (l/m)	Primary return (°C)	Pressure loss primary (kPa)
60	10/55	45	14.4	25.0	40
65		55	17.6	21.0	37
70		65	21.0	15.5	38
75		75	24.0	17.0	40
80		80	25.7	16.0	37

3. Regulations

3.1 General

The installation and maintenance of the unit must be performed by a qualified person in accordance with regulations and rules of the local area where installation is to take place.

3.2 Standards and Guidelines

When installing and operating, please refer to country-specific regulations and standards, note in particular:

- The local standards and regulations on the installation conditions.
- The provision for the electrical connection to the power supply.
- The standards and regulations relating to the safety equipment of the water heating system.

3.3 Inspection and maintenance

The heating system should be inspected regularly for the following reasons:

- To achieve and maintain a high efficiency.
- To ensure operational safety.

The recommendation from BSRIA BG62/2015 is a maintenance check every 3 years should be sufficient, however water quality should be checked frequently, and strainers checked/emptied as often as required.

4. Pre-Installation requirements

4.1 General

Notice: Differential pressure above 150kPa (1500mbar) when no internal DPCV is fitted. High differential pressure could affect the performance of some components in the unit.

- Fit differential pressure control valve to protect the unit.
- The maximum allowable supply differential pressure when the internal differential pressure control valve is fitted is 400kPa (4000mbar).

4.2 System preparation
Water system and pipework

- Any plastic pipework used on the central heating system must have a polymeric oxygen barrier coating and at least 1000mm length of copper or steel pipe connected to the appliance.
- Plastic pipework used for under-floor heating must be correctly controlled and must not exceed the under-floor manufacturers' specifications.
- Under-floor heating zones can be controlled by the HIU provided the under-floor heating design does not exceed the hydraulic capacity of the HIU central heating circulation pump.

- The district circuit is completely separated from the central heating circuit using a plate heat exchanger. However, to protect the under-floor circuit in the event of a failure condition, a limiter thermostat must be fitted onto the flow pipe to the under-floor circuit and wired into the control unit. This switches off the central heating pump in the event of an over temperature condition.
- Reduced flow temperatures associated with under-floor heating circuits can also be controlled by the HIU without the need for an external mixing valve.

	**Notice:** (Underfloor heating circuits) Damage caused by excessive flow temperature. • Ensure the flow temperature does not exceed the requirements of the underfloor heating circuit manufacturer.

Secondary circuit/connections/valves

- All systems connections tap, and mixing valves must be capable of sustaining a pressure of 3 bar.
- Radiator valves should confirm to local regulations.
- A pre-settable thermostatic radiator valve (P-TRV) must be fitted to radiators in all rooms except the room with the thermostat. This must be fitted with lock-shield valves and left open.
- Drain cocks are required at all the lowest points on the system.
- Air vents are required at all high points on the system.

4.3 Domestic water supply

The maximum temperature of the DHW heat exchanger is limited by the electronic control so normally there is no need for additional water treatment to prevent scale formation.

In areas where temporary water hardness exceeds 200 ppm, consideration may need to be given to the fitting of a scale prevention device. In such circumstances, the advice of the local water authority should be sought.

Showers/bidets:

- Ensure that the shower is suitable for use with mains water pressure.
- If a shower head can be immersed in water or comes closer than 25mm from the top edge of a bath or shower tray spill over level, then an anti-siphon device must be fitted to the shower hose.
- Bidets with direct hot and cold mains water can be used (with the approval of the local water authority) and must be the over rim flushing type with shrouded outlets to prevent the fitting of handheld sprays.

Water mains pressure

Speak to an Essco technical representative to confirm minimum inlet pressure to achieve nominal DHW flow rates.

Maximum mains fed water pressure 10 bar.

- If necessary, fit a pressure reducing valve.

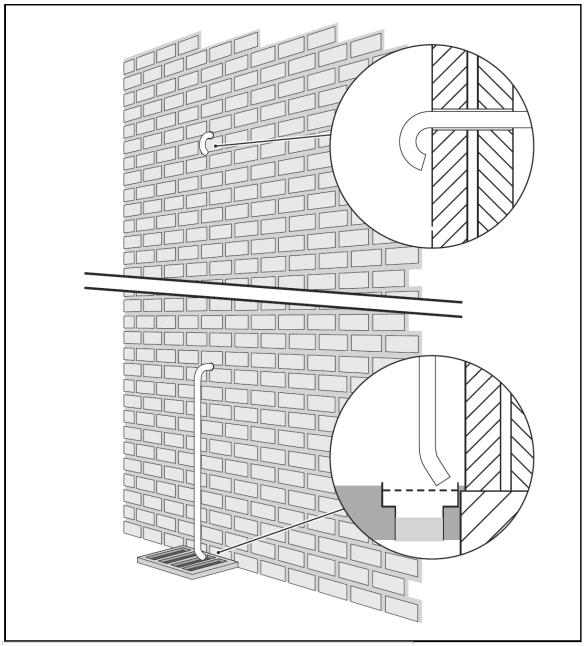
Where the mains water supply has a non-return, back flow prevention valve fitted, a mini expansion vessel should be connected to the mains water inlet pipe between the non-return valve and the appliance.

	**Notice:** Risk of damage to household appliances. Non-return, back flow prevention devices fitted to the mains water supply can cause a pressure build up which could damage the appliance and other household appliances. • Fit a mini expansion between the non-return valve, back flow prevention device.

4.4 Pressure relief pipework

	**Warning: Risk of scalding!** Injury if discharge pipe is not routed correctly. • The pressure relief valve is safety device for the appliance and if activated may discharge boiling water or steam through the relief valve drainpipe. • Care should be taken when siting the outlet pipe so that it does not cause an obstruction or discharge above a window, entrance, or other public access where it could cause a hazard.

- The pressure relief drainpipe [1] and [3] from the appliance should be at least 15mm diameter copper pipe and run downwards to a safe point of discharge, away from any electrical equipment or other hazard, preferably to an external drain or soak away.
- Pipe [1] should be finished with a partial bend, near the outlet to face the external wall (as shown) to help prevent freezing.



Internal PRV discharge

The PRV discharge pipe may terminate internally to a safe position such as a waste pipe or soil pipe, provided that the following conditions are met:

- The material used must be capable of taking the maximum temperature provided by the District Heating primary flow.
- The discharge must be directly or indirectly visible and will not discharge onto the occupants of the premises or onto any electrical wiring or components. An example of “directly” is a tundish and “indirectly” an audible indication of pressure loss.
- There is a continual fall towards the discharge point from the HIU.
- Where a tundish is used, a suitable trap is installed to protect against foul smells entering the living areas, whilst ensuring no undue resistance to the discharge. An example would be a washing machine trap with upstand.

4.5 Cleaning primary system

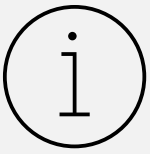
Notice: Risk of damage to system or appliance
Debris from the system can damage the appliance and reduce efficiency. Failure to comply with the guidelines for the use of water treatment with the appliance will invalidate the appliance warranty.

- Before installation, ensure that the central heating system is cleaned and thoroughly flushed in accordance to the standards and guidelines of the country of installation.

4.6 Application location and clearances

4.6.1 Location

- Follow local regulations for the location within the property that the appliance is to be installed.
- This appliance is only suitable for installing internally within a property at a suitable location onto a fixed rigid surface at least the same size as the appliance and capable of supporting the appliance weight.
- The appliance is not suitable for external installation.



No surface protection is required against heat transfer from the appliance.

Notice: Appliance damage.
Damage caused by extreme temperatures.

- Ensure the ambient temperature is above 2°C and below 30°C.

Notice: System damage.
Very cold temperature can cause the heating system to freeze if there is a power failure or fault in the system the units frost protection will be compromised.

- Do not fit the appliance in areas with no heat emitters e.g., garage.
- Drain the central heating system if it is to be shut down for an extended period.

4.6.2 Rooms containing a bath or shower

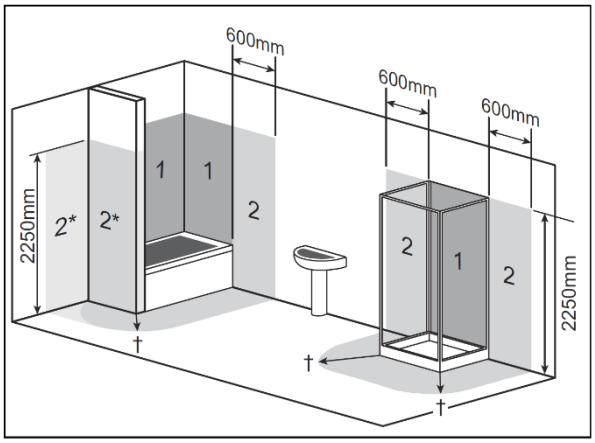
Notice: Risk of electric shock.
Any switch or appliance control using mains electricity must not be within reach of a person using the bath or shower.

- In all cases the installation must be in accordance with the latest amendments to the latest edition of the IET Wiring Regulations (BS7671).
- The IP rating of the appliance.
  - Units without internal heat meter, IPX4D.
  The IP rating of the appliance allows it to be installed in, and outside of, zone 2.
  - Unit with internal heat meter, IP40.

The IP rating of the appliance dictates that it must be installed outside of zone 2.

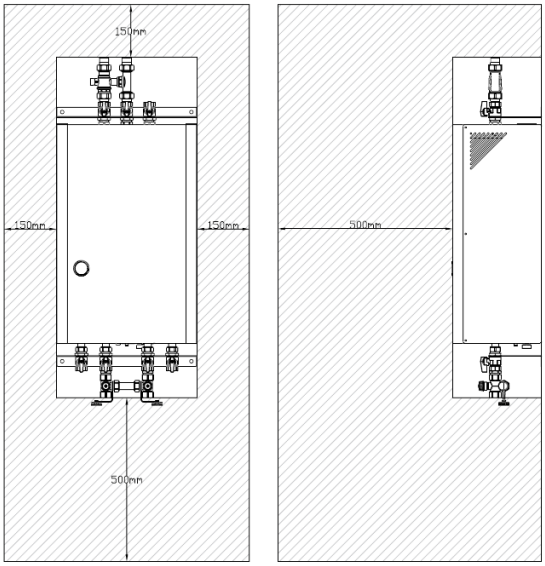
- Circuit breaking devices should be used in accordance with the regulations.

- The diagram is for guidance only.



Minimum installation and maintenance clearances		
Description		Dimensions (mm)
1	Overall clearance height	1000
2	In front of appliance	600
3	Overall clearance width	450
4	Above the appliance	150
5	Either side of appliance	150
6	Below the appliance	500

4.6.3 Installation and maintenance clearances



4.6.4 Compartment clearances

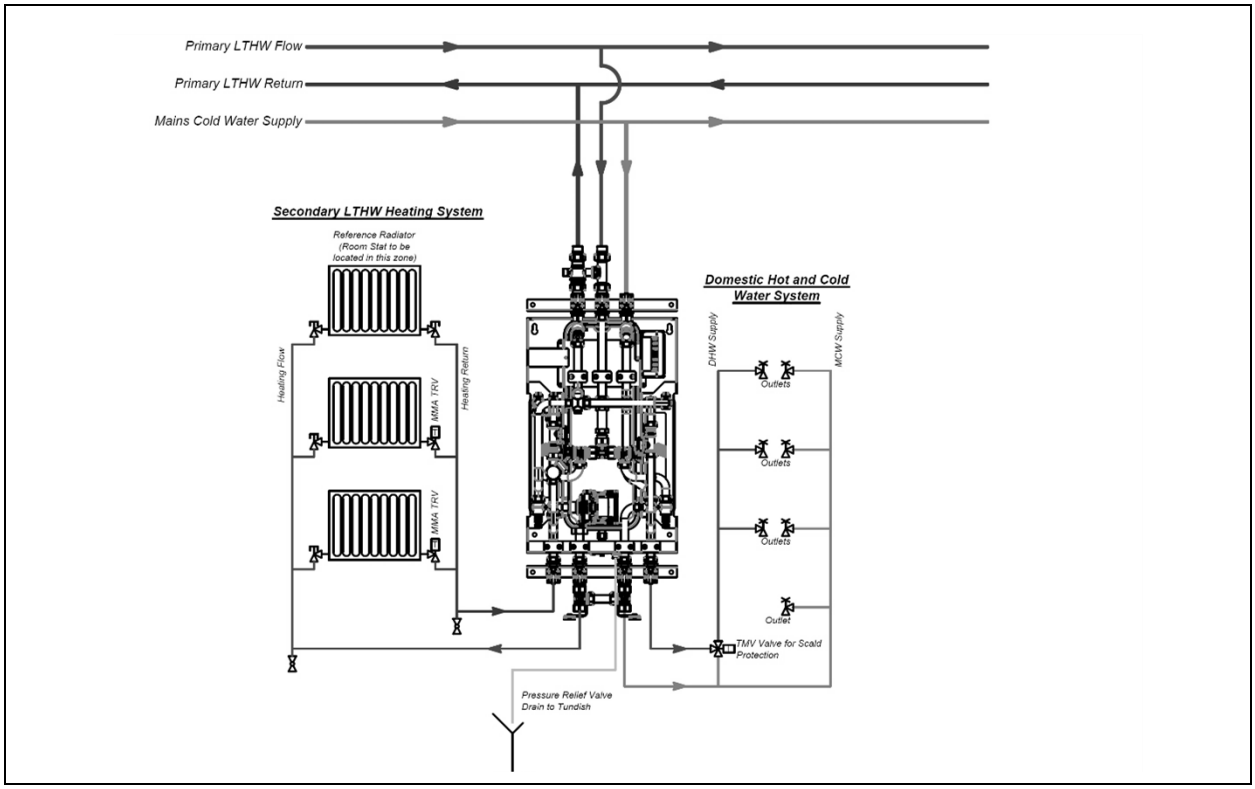
If the appliance is to be fitted in a compartment, the following is recommended.

- All service pipe work to the heat interface unit MUST be insulated when installed within a ventilated compartment.
- If the ambient temperature within the compartment exceeds 30 °C, then it is recommended to make provision for ventilation.

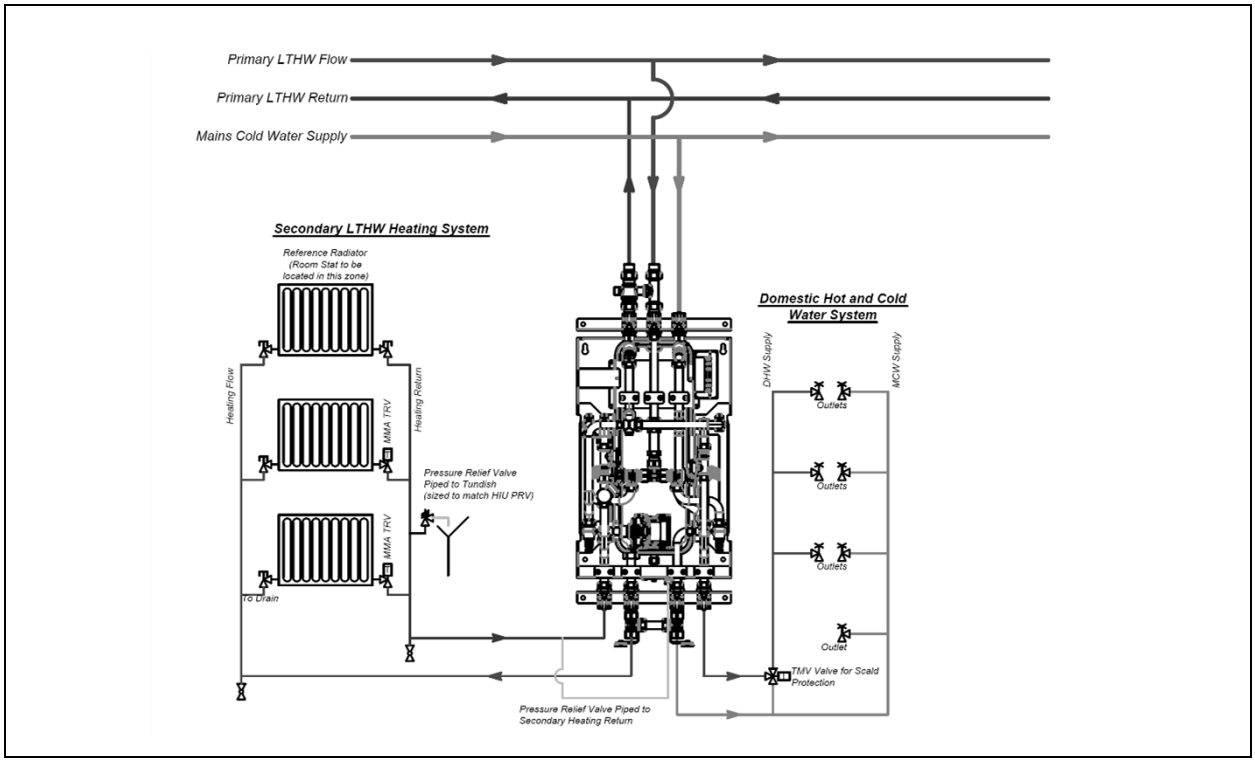
  – Ventilation openings must be provided at the front of the compartment at the lower and upper positions. Each opening must have a minimum size of 300mm by 80mm, 240cm^2 free area.

4.7 Example layouts

a) Pressure relief valve drains to tundish.



b) Pressure relief valve piped to secondary heating return.



5. Installation

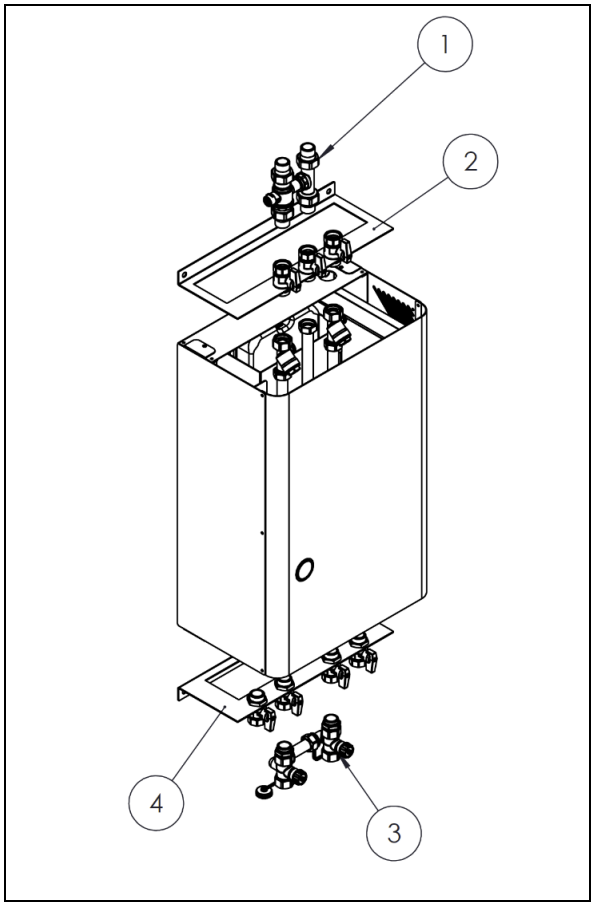
5.1 Wall mounting installation

The layout adjacent shows the relative positions of the pipe-work connections, the support bracket and mounting frame fixings.

- Determine best location and position for HIU, to ensure sufficient access for maintenance.
- Refer to Section 2.5 Appliance Dimensions for correct setting out hole dimensions of top and bottom pre-plumbing jigs.
- Using a spirit level and drill, drill fixing holes and then fit the top and bottom pre-plumbing jigs to the wall using fixings appropriate to the wall construction.
- Fit primary flushing bypass to top jig and bring primary pipework to it.
- Ensure primary bypass is closed during flushing of primary pipework.
- Following flushing and commissioning of primaries, HIU can be fitted to wall and pipes connected to jig fittings.
- Secondary pipework for space heating and hot/cold water can also be fitted and commissioned.

5.2 First Fix installation

The pipework to the appliance can be installed as shown below. (This includes the primary bypass, first fix jigs and filling loop assembly.)



Item:	Description:
1	Primary bypass assembly
2	Top entry jig
3	Fillip loop assembly
4	Bottom entry jig

5.3 HIU electrical installation

Warning: Risk of electrical shock!

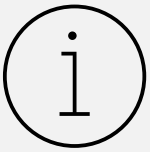
- Before carrying out any work on electrical components, isolate them from the power supply (230 VAC) (Fuse, circuit breaker) and secure against unintentional reconnection.
- Information on safe isolation can be found in the health and safety executive guidance HSG85.
- Using test equipment approved to GS38 confirm that the electrical supply is disconnected.

Electrical considerations

- All electrical work must be carried out by a competent and authorised person.
- All work must be in line with country specific and local standard and regulations.
- Supply: 230V AC - 50Hz
- This appliance must not be connected to a three
- phase supply.
- The wiring between the appliance and the electrical supply must comply with the latest IET wiring regulations that apply to wiring a fixed appliance.
- Type A RCDs must be employed where additional protection is required.
- External fuse 5 Amps to BS1362.
- The appliance must be earthed.
- The isolator must have contact separation of 3mm minimum between poles. Any system connected to the appliance must not have a separate electrical supply.
- Pre-wired mains cable supplied.
- When stripping the wire ensure copper strands so not fall into the control box.

DANGER: Risk of fire from hot appliance components. Hot appliance components can damage electrical cables.

- Ensure all electrical cables are in the correct cable guides and away from hot appliance components.

	**Cable routing** • Route cables through the cut out behind the control box and down the back of the unit • Run power cables separately from signal cables. Interference from power cables, ensure that there is at least 100mm separation from each other. • Ensure that cables are of sufficient length to allow the control box to be hung in the service position.

6. Pre-commissioning

6.1 Pre-commissioning checklist

Pre-commissioning checklist		
1	Primary network and plant room fully operational and complete (Inc. flushing & water treatment) *	
2	Mains cold-water network and Essco WMA's (where applicable) fitted as per the hydronic connections. Fully pressure test and flush mains cold-water network with water and/or air, in accordance with BS EN 806-4, selecting the correct test method based on the material and size of the installed pipes.	
3	Secondary space heating system fully operational (Inc. flushing, water treatment) *	
4	Where required, installation to be disinfected after flushing.	
5	Edge Heat Interface Unit installed as per the hydronic connections.	
6	All electrical connections are in place, connected and tested. This includes mains voltage to the HIU controller as well as any data connections required (MBUS, RS485 etc.).	
7	Space heating controllers (room thermostats / UFH wiring centres etc.) and energy / water meters are installed and commissioned.	
8	Design schedule of central heating flow rates prepared for finding commissioning settings on pre-settable TRV's or UFH balancing valves etc.	

* The pipework systems connected to any Essco Heat Interface Unit must have been cleaned and flushed in accordance with the relevant standards and regulations.
While Essco have summarised guidance from CIBSE CP1 2020 below in tables 6.2 and 6.3, engineers should refer to this guide, BSRIA BG29/2020 & VDI-2035 European water quality standards in full, for complete guidance on water quality requirements

6.2 Water quality & pipe corrosion (initial fill with mains water and chemical treatment used in operation)

Parameter	Units	Control limit	Monitoring frequency	Reasons for using this parameter
Visual	-	Clear with no suspended solids or gassing	Monthly	A photograph of the system water in a clear container should be taken as soon as possible following sampling. An extended period before a visual check can lead to changes in appearance, e.g., precipitation of dissolved iron when contacting with oxygen.
Odour	-	No strong sulphurous or ammoniacal smell	Monthly	Sulphide smells indicate potential growth of sulphide-reducing bacteria (SRB). Ammonia smells can indicate growth of nitrate-reducing bacteria (NRB) (some inhibitors have a mild ammonia smell).
pH (Control range defined by least noble part of system metallurgy)	-	Aluminium < 8.5 Iron-based 9.2 – 10.0 Copper and brass 7.5 – 10.0	Weekly (or continuous)	Sudden changes in pH can indicate changes in system water quality, therefore continuous monitoring is advised. pH control should be based on the metallurgy of the system. Note: Where aluminium and steel are used in the same system the pH value shall be less than 8.5 to avoid corrosion of the Aluminium.

Conductivity	µS/cm	See note 1	Weekly (or continuous)	Sudden changes in conductivity can indicate changes in system water quality, therefore continuous monitoring is advised.
Oil and grease	mg/l	Not present	Annually	Oil and grease being present indicates contamination of the system water.
Chloride measured at 80°C	mg/l	< 100	Monthly	Excess chlorides in the heat network will increase the potential for corrosion, particularly stress corrosion cracking in stainless steels and dezincification in brass fittings.
Sulphate	mg/l	-	Monthly	Monitoring of trends recommended as changes can indicate bacterial growth
Iron total	mg/l	< 15.0 (see note 2)	Monthly	Monitoring of trends recommended as changes can indicate potential corrosion issues.
Iron dissolved	mg/l	< 3.0	Monthly	Monitoring of trends recommended as changes can indicate potential corrosion issues.
Copper dissolved	mg/l	< 1.0	Monthly	Monitoring of trends recommended as changes can indicate potential corrosion issues.
Aluminium total	mg/l	<1.0	Monthly	Monitoring of trends recommended as changes can indicate potential corrosion issues. Only relevant if aluminium used in the system.
Calcium harness	mg/l	See note 3	Monthly	High levels of hardness in the system will increase precipitation of calcium carbonate scale onto heat exchanger surfaces, which will reduce efficiency. It also increases the surface temperatures of the exchangers, which may lead to the potential for stress corrosion.
Total alkalinity	mg/l	> 250, < 1250	Monthly	Low levels of alkalinity indicate a lack of protection against corrosive water. High levels of alkalinity indicate the potential for caustic embrittlement.
Ammonia	mg/l	<30	Monthly	Increasing trend of ammonia in the system water is an indication of bacteria growth.
Oxygen	mg/l	See note 4	Monthly (or continuous)	Increases in dissolved oxygen content indicates ingress of oxygen which will potentially drive corrosion, therefore continuous monitoring is advised.
Suspended solids	mg/l	< 30	Monthly	Suspended solids indicate poor system water quality and further filtration, and treatment is required.
Settled solids	mg/l	As defined in BSRIA BG 29/2020 and BS 8552: 2012 – limits as specified for pipework at extremes of the system and for terminal units.	Monthly	Not all detrimental solids are in suspension, therefore it is also essential to test for settled solids. Settled solids can reduce flow rate and can lead to greater risk of corrosion.
Inhibitor(s)		Inhibitor levels should be checked in accordance with the water treatment specialist's and manufacturers' guidance.	Monthly	Inhibitor reserves should be monitored to ensure adequate reserves are present to minimalise the potential for corrosion.
TVC (Total viable count)	cfu/ml	<10,000 at 30°C and no increasing trend	Monthly	Increasing trends of bacteria indicate poor water quality.
Pseudomonads	cfu/ml	< 1,000 at 30°C and no increasing trend	Monthly	Increasing levels of pseudomonads indicate poor water quality and potential biofilm production.
SRB (Sulphate-reducing-bacteria) at 5 days	cfu/ml	Absent	Monthly	Counts of SRB indicate poor water quality and potential for pitting corrosion under deposits and biofilms.

Note 1: Although it is important to monitor conductivity, a hard limit is not considered necessary.
Note 2: This value is from Table 5 of BG29/2020 (BSRIA, 2020), which also states that lower limits may be used.
Note 3: Total hardness will depend on the amount and type of softening applied.
Note 4: Oxygen limits are not defined in BG 29/2020 but should be as low as possible. BG 50/2013 (BSRIA, 2013) states that a value > 2 mg/l would indicate a problem with air entering the system.

6.3 Water quality & pipe corrosion (initial fill with demineralised water with a controlled pH within VDI parameters and treatment following VDI 2035 Parts 1 & 2). Note: Specialist advise should be sought when adopting the VDI 2035 approach.

Parameter	Units	Control limit	Monitoring frequency	Reasons for using this parameter
Visual	-	Clear with no suspended solids or gassing	Monthly	A photograph of the system water in a clear container should be taken as soon as possible following sampling. An extended period before a visual check can lead to changes in appearance, e.g., precipitation of dissolved iron when contacting with oxygen.
Odour	-	No strong sulphurous or ammoniacal smell	Monthly	Sulphide smells indicate potential growth of sulphide-reducing bacteria (SRB). Ammonia smells can indicate growth of nitrate-reducing bacteria (NRB) (some inhibitors have a mild ammonia smell).
pH (Control range defined by least noble part of system metallurgy)	-	Aluminium < 8.2-8.5 Iron-based 8.2 – 10.0 Copper and brass 8.2 – 10.0	Weekly (or continuous)	Sudden changes in pH can indicate changes in system water quality, therefore continuous monitoring is advised. pH control should be based on the metallurgy of the system. Note: Where aluminium and steel are used in the same system the pH value shall be less than 8.5 to avoid corrosion of the Aluminium. Magnesium sacrificial anode technology may be used, which would allow a higher pH limit to be adopted.
Conductivity	µS/cm	> 50, < 100	Weekly (or continuous)	Sudden changes in conductivity can indicate changes in system water quality, therefore continuous monitoring is advised.
Oil and grease	mg/l	Not present	Annually	Oil and grease being present indicates contamination of the system water.
Chloride measured at 80°C	mg/l	< 10	Monthly	Excess chlorides in the heat network will increase the potential for corrosion, particularly stress corrosion cracking in stainless steels and dezincification in brass fittings.
Sulphate	mg/l	-	Monthly	Monitoring of trends recommended as changes can indicate bacterial growth
Iron total	mg/l	-	Monthly	Monitoring of trends recommended as changes can indicate potential corrosion issues.
Iron dissolved	mg/l	< 0.10	Monthly	Monitoring of trends recommended as changes can indicate potential corrosion issues.
Copper dissolved	mg/l	< 0.02	Monthly	Monitoring of trends recommended as changes can indicate potential corrosion issues.
Aluminium total	mg/l	-	Monthly	Monitoring of trends recommended as changes can indicate potential corrosion issues.
Total harness	mg/l	> 10, < 200	Monthly	High levels of hardness in the system will increase precipitation onto heat exchanger surfaces, which will reduce efficiency. It also increases the surface temperatures of the exchangers, which may lead to the potential for stress corrosion.
Total alkalinity	mg/l	-	Monthly	Low levels of alkalinity indicate a lack of protection against corrosive water. High levels of alkalinity indicate the potential for caustic embrittlement.
Ammonia	mg/l	-	Monthly	Increasing trend of ammonia in the system water is an indication of bacteria growth.
Oxygen	mg/l	< 0.1	Monthly (or continuous)	Increases in dissolved oxygen content indicates ingress of oxygen which will potentially drive corrosion, therefore continuous monitoring is advised.
Suspended solids	mg/l	< 1.0	Monthly	Suspended solids indicate poor system water quality and further filtration, and treatment is required.
TVC (Total viable count)	cfu/ml	<10 for 48 hours at 37°C and 72 hours at 22°C	Monthly	Increasing trends of bacteria indicate poor water quality.
Pseudomonads	cfu/ml	-	Monthly	Increasing levels of pseudomonads indicate poor water quality and potential biofilm proliferation in the system.
SRB (Sulphate-reducing-bacteria) at 5 days	cfu/ml	Absent	Monthly	Counts of SRB indicate poor water quality and potential for pitting corrosion under deposits and biofilms.

6.4 Setting the Edge DPCV

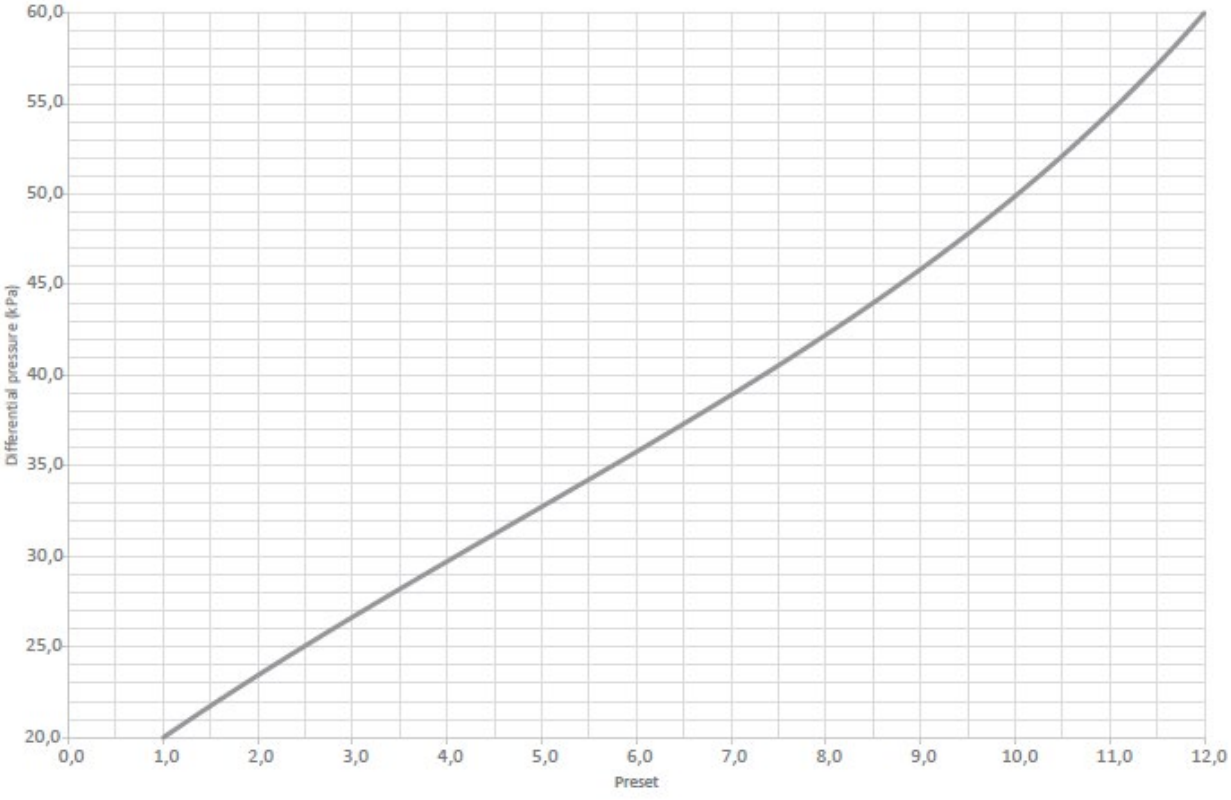
The Edge-TC2 Heat Interface Unit comes with a DPCV fitted and pre-set to 50 kPa as standard. Essco recommend the Edge-DPCV for all units, where there is either no differential pressure (dP) control on the primaries, or it is not certain that dP can not be limited to 1.5 bar at each Heat Interface Unit. The specification of DPCV we recommend and can fit is as follows:

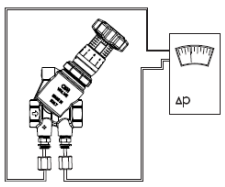
DN	Thread	dP Range	Flow Range	Kv
DN20	G. ¾”	20 – 60 kPa	150 – 2000 l/h	4.9

If Essco are asked not to supply and fit DPCV’s in the HIU’s and excessive dP causes noise and leads to damage of components in the unit, the guarantee will be invalidated. It is therefore essential that if DPCV’s are not fitted in HIU’s, that adequate care is taken to ensure the 1.5 bar limit is not exceeded during operation.

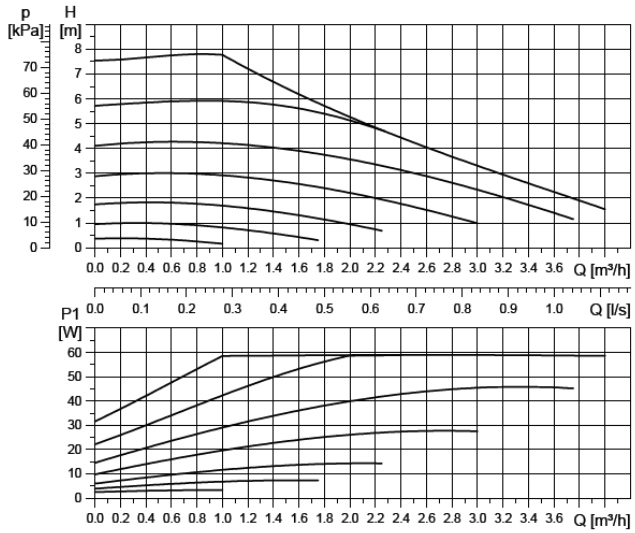
Where dP needs to be adjusted, the pre-set can be adjusted on site by commissioning engineer. Adjusting the dP is done simply using the blue control knob. The dP can be increased or decreased by turning the know clockwise or counterclockwise, respectively. The main scale with values from 0 to 12 on the handle, indicates the turns for opening the obturator, while the second circular scale from 0 to 9 sets the tenths of one turn. When regulating the differential pressure, the valve should be set to the minimum value to turn the numbers, after that, the valve is to be regulated according to the tables.

The following graph shows the differential pressure set at the different pre-sets available on the valve:



	Once the dP has been adjusted at the wheel head, the commissioning engineer should remove the caps and connect a differential pressure manometer to measure and validate the dP.	
	It should be noted that the DPCV features a ‘F - Flushing’ symbol on the knob scale. While this valve has been designed to mechanically block the dP controller to maximise flow rate during flushing, the component is still within the HIU. Flushing of the primary circuit must always be done with the primary bypass open and HIU isolation valves fully closed to ensure the HIU itself is not flushed through with water from the primaries. This ensures sensitive control valves are protected from issues associated with poor water quality.	

6.5 Checking the Pump Curve



During the selection process of the Heat Interface Unit(s), the PHE selection is made to achieve the required heating and hot water duties. The Grundfos UPM3 PWM A-Rated circulation pump is sized on flow rate associated with load and is PWM and so fully modulating. The Edge HIU Controller sets and controls the pump modulation, to optimise the space heating return temperature, while still delivering the comfort levels required.

As the physical design and installation of the secondary space heating system is not carried out by Essco Group, the pump curve has been included in our manual below.

This can be used to check there is adequate head in instances when for example, the pump is circulating water up to multiple levels. In instances like this, care must also be taken to ensure air vents are fitted at the highest points.

6.6 Operating the Edge HIU Controller

Homeowners can have simple heating control of the HIU via a single time / temperature programmable room thermostat, or via multiple independent room controls wired back to a common wiring centre. The single room thermostat, or common wiring centre sends a 'call for heat' enable signal to the HIU Controller, when one or more rooms require heat. The HIU controller then takes it from there, providing heating, keep-warm or prioritising a hot water event.

Separate operating instructions are supplied within this document for any room controls supplied by Essco Group. Where these controls have been provided by others, instructions may form part of another installation & operations manual, so please refer to the handover pack.

In addition to physical heating controls, the HIU controller also has a peer-to-peer Wi-Fi based software interface which can be accessed through any internet connected device.

The Edge User Interface is hosted inside the HIU and should only ever be accessed by authorised and competent personnel. All access is via a private webpage, which has been designed to time out after a 20-minute period for security purposes. No changes will take place until the "SAVE" button is pressed, so navigating to another level before pressing this button will result in any changes being lost. Should changes be lost, the HIU will continue to operate using the last valid settings.

When connecting to the controller, care should be taken in phone Wi-Fi settings to forget other networks, and to change any conflicting settings which may make it difficult to find the controller when searching for Wi-Fi devices.

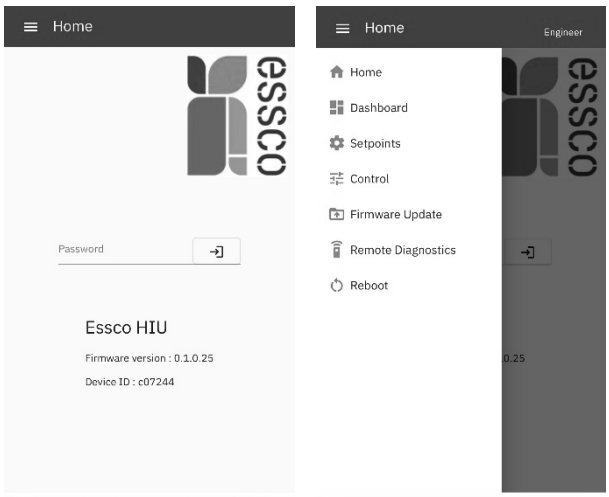
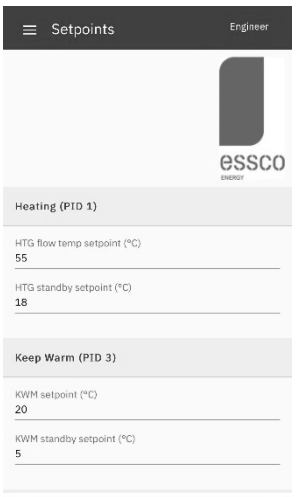
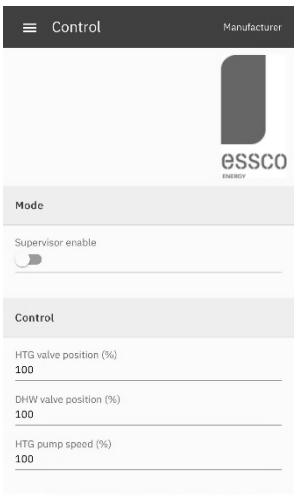
Resident / Engineer Level Access ➢ Edge User Interface

Getting Started:

A mobile phone, tablet or laptop with wireless capabilities will be required to access the HIU hotspot webpage. Access to this webpage is as follows.

1. Remove the HIU front cover.
2. Press and hold down the Wi-Fi button on right hand side of controller box for 5 seconds.
3. When released, connect your Wi-Fi device to the HIU. The Wi-Fi device will be named as per the HIU controller serial code (for example 1c602c). See HIU identity sticker for this code as required.
4. The password is set to **essco_hiu**.
5. Open a browser on your device.
6. Type in the search address bar **192.168.4.1** to connect directly to the home page.
7. Leave password blank for resident level access, where only temperature settings can be adjusted.
8. For engineers working on our units, please speak to Essco for Engineer access password where further settings are available.

From the home page you can navigate through the different levels of settings via the home page at the top of the page:

Home Screen + Menu	Setpoints	Control
		
Menu options vary based on user level.	Temperatures can be changed on this screen.	Valves and pump can be opened manually.

➢ Advanced Settings

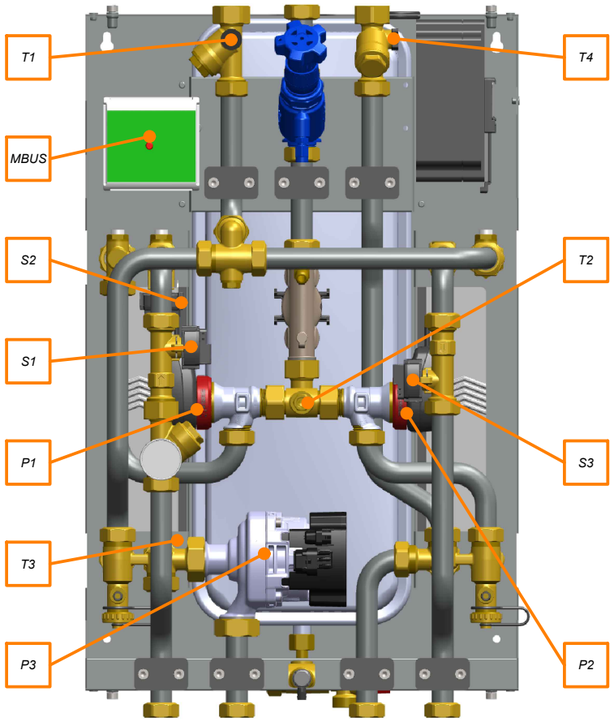
Advanced settings are also available for engineers which include the ability to update firmware in the field, reboot controls, and carry out remote diagnostics.

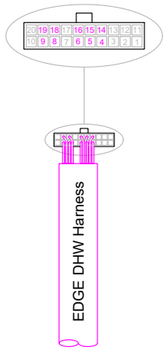
Remote diagnostics is a tool which allows an Essco engineer to connect to a controller off-site when the engineer is on site and in front of it. To set this up, the engineer must first:

1. Connect to controller using button on controller (see ‘Getting Started’)
2. Confirm engineer access level password with Essco engineer
3. Go to HIU hotspot webpage and enter engineer password to access this level
4. Home > Remote Diagnostics
5. Check resident is happy for us to connect to their Wi-Fi
6. Find homeowners Wi-Fi in list of available Wi-Fi devices, and enter residents log-in details
7. Check Essco engineer can see controller remotely to support trouble shooting
8. Disconnect from residents Wi-Fi after work is completed, or power cycle controller to restart

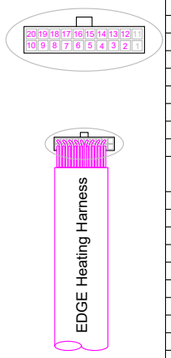
The Edge HIU Controller has a total of four software PID controllers on board: Heating > Hot Water > Keep Warm & Pump Optimisation. These software controllers use temperature and flow sensors fitted at different points on the Essco Edge Heat Interface Units. A wiring diagram, including illustration of where these sensors are fitted can be seen on the next page for both an underfloor heating, and radiator installation.

EDGE-TC HEAT INTERFACE UNIT + INTERMEDIATE HIU CONTROLLER (RADIATOR SYSTEM DRAWING).

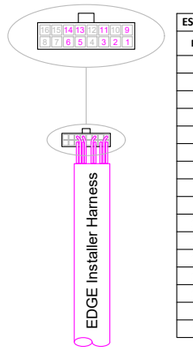




ESSCO EDGE DHW HARNESS				
PIN	DESIGNATION	CABLE	CORE COLOUR	PIN
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	TEMPERATURE SENSOR 4	T4	BROWN	1
5	VFS TEMPERATURE	S3	YELLOW	1
6	VFS GROUND	S3	GREEN	3
7	-	-	-	-
8	PWM 2 CONTROL	P2	BLACK	2
9	PWM GROUND	P2	BLUE	1
10	-	-	-	-
11	-	-	-	-
12	-	-	-	-
13	-	-	-	-
14	TEMPERATURE SENSOR 4	T4	BROWN	2
15	VFS FLOW	S3	WHITE	2
16	VFS 5V DC	S3	BROWN	4
17	-	-	-	-
18	PWM 2 FEEDBACK	P2	WHITE	4
19	PWM 24V DC	P2	BROWN	3
20	-	-	-	-



ESSCO EDGE HEATING HARNESS				
PIN	DESIGNATION	CABLE	CORE COLOUR	PIN
1	-	-	-	-
2	TEMPERATURE SENSOR 1	T1	RED	1
3	TEMPERATURE SENSOR 2	T2	GREEN	1
4	TEMPERATURE SENSOR 3	T3	BROWN	1
5	VFS TEMPERATURE	S1	YELLOW	1
6	VFS/RPS GROUND	S1/S2	GREEN	3
7	RPS TEMPERATURE	S2	YELLOW	1
8	PWM 1 CONTROL	P1	BLACK	2
9	PWM GROUND	P1	BLUE	1
	PWM GROUND	P3	BLUE	2
10	PWM 3 CONTROL	P3	BROWN	1
11	-	-	-	-
12	TEMPERATURE SENSOR 1	T1	RED	2
13	TEMPERATURE SENSOR 2	T2	GREEN	2
14	TEMPERATURE SENSOR 3	T3	BROWN	2
15	VFS FLOW	S1	WHITE	2
16	VFS/RPS 5V DC	S1/S2	BROWN	4
17	RPS PRESSURE	S2	WHITE	2
18	PWM 1 FEEDBACK	P1	WHITE	4
19	PWM 24V DC	P1	BROWN	3
20	PWM 3 FEEDBACK	P3	BLACK	3



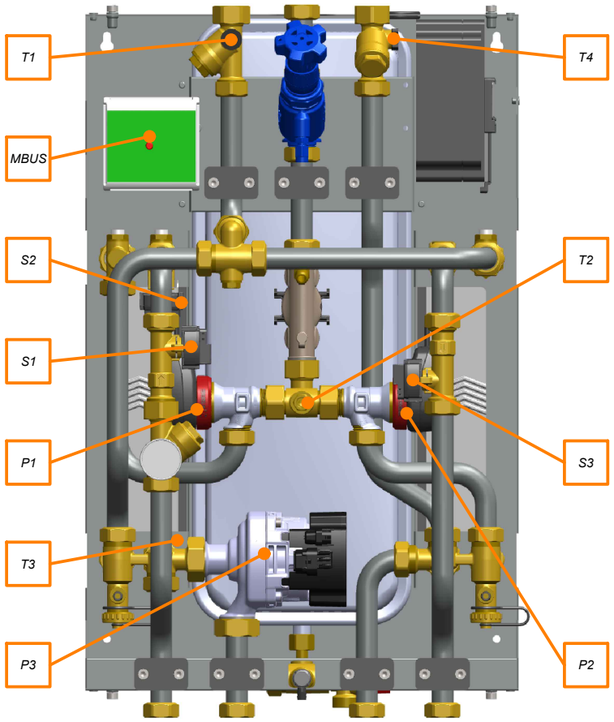
ESSCO EDGE INSTALLER HARNESS (STANDARD CONFIG)		
PIN	DESIGNATION	CORE COLOUR
1	NEUTRAL (240V SUPPLY)	BLUE
2	LIVE (240V SUPPLY)	BROWN
3	HEATING ZONE 1 - LIVE	BROWN
4	-	-
5	HIGH LIMIT SENSOR - LIVE	BROWN
6	BILLING RELAY - LIVE	BROWN
7	-	-
8	-	-
9	EARTH (240V SUPPLY)	GREEN
10	-	-
11	HEATING ZONE 1 - SWITCH RTN	BLACK
12	-	-
13	HIGH LIMIT SENSOR - SWITCH RTN	BLACK
14	BILLING RELAY - SWITCH RTN	BLACK
15	-	-
16	-	-

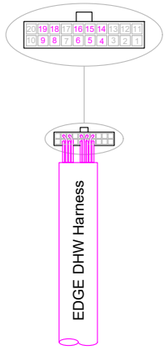
FULL SYSTEM STANDARD INSTALLATION

****DHW HARNESS VFS EARTH - 'E1'**

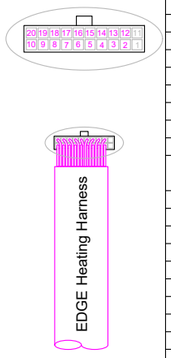
THIS IS A GREEN SINGLE-CORE FLYING LEAD WITH BOOTLACE FERRULE AND MUST BE CONNECTED TO MAINS EARTH TO PROVIDE GROUNDING FOR GRUNDFOS SENSORS. HIU CASE MUST ALSO BE EARTHED BACK TO EARTH SPADE IN CONTROLLER.

EDGE-TC HEAT INTERFACE UNIT + INTERMEDIATE HIU CONTROLLER (UFH SYSTEM DRAWING).

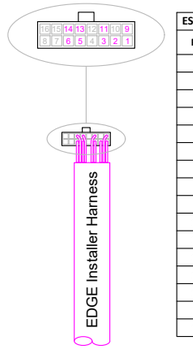




ESSCO EDGE DHW HARNESS				
PIN	DESIGNATION	CABLE	CORE COLOUR	PIN
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	TEMPERATURE SENSOR 4	T4	BROWN	1
5	VFS TEMPERATURE	S3	YELLOW	1
6	VFS GROUND	S3	GREEN	3
7	-	-	-	-
8	PWM 2 CONTROL	P2	BLACK	2
9	PWM GROUND	P2	BLUE	1
10	-	-	-	-
11	-	-	-	-
12	-	-	-	-
13	-	-	-	-
14	TEMPERATURE SENSOR 4	T4	BROWN	2
15	VFS FLOW	S3	WHITE	2
16	VFS 5V DC	S3	BROWN	4
17	-	-	-	-
18	PWM 2 FEEDBACK	P2	WHITE	4
19	PWM 24V DC	P2	BROWN	3
20	-	-	-	-



ESSCO EDGE HEATING HARNESS				
PIN	DESIGNATION	CABLE	CORE COLOUR	PIN
1	-	-	-	-
2	TEMPERATURE SENSOR 1	T1	RED	1
3	TEMPERATURE SENSOR 2	T2	GREEN	1
4	TEMPERATURE SENSOR 3	T3	BROWN	1
5	VFS TEMPERATURE	S1	YELLOW	1
6	VFS/RPS GROUND	S1/S2	GREEN	3
7	RPS TEMPERATURE	S2	YELLOW	1
8	PWM 1 CONTROL	P1	BLACK	2
9	PWM GROUND	P1	BLUE	1
	PWM GROUND	P3	BLUE	2
10	PWM 3 CONTROL	P3	BROWN	1
11	-	-	-	-
12	TEMPERATURE SENSOR 1	T1	RED	2
13	TEMPERATURE SENSOR 2	T2	GREEN	2
14	TEMPERATURE SENSOR 3	T3	BROWN	2
15	VFS FLOW	S1	WHITE	2
16	VFS/RPS 5V DC	S1/S2	BROWN	4
17	RPS PRESSURE	S2	WHITE	2
18	PWM 1 FEEDBACK	P1	WHITE	4
19	PWM 24V DC	P1	BROWN	3
20	PWM 3 FEEDBACK	P3	BLACK	3



ESSCO EDGE INSTALLER HARNESS (STANDARD CONFIG)		
PIN	DESIGNATION	CORE COLOUR
1	NEUTRAL (240V SUPPLY)	BLUE
2	LIVE (240V SUPPLY)	BROWN
3	HEATING ZONE 1 - LIVE	BROWN
4	-	-
5	HIGH LIMIT SENSOR - LIVE	BROWN
6	BILLING RELAY - LIVE	BROWN
7	-	-
8	-	-
9	EARTH (240V SUPPLY)	GREEN
10	-	-
11	HEATING ZONE 1 - SWITCH RTN	BLACK
12	-	-
13	HIGH LIMIT SENSOR - SWITCH RTN	BLACK
14	BILLING RELAY - SWITCH RTN	BLACK
15	-	-
16	-	-

ENERGY BILLING CONTROLLER
[EXAMPLE - BY OTHERS]

Mains Out	Mains Power Supply 230v
	3 core 1.5mm flex

BILL RELAY	Billing Cut-off Relay
	2 core 1.0mm flex

Mains In	Mains Power Supply 230v
	3 core 1.5mm flex

RTS PWR	Room Thermostat Supply
	3 core 1.0mm flex

RTS ENA	Room Thermostat Enable
	2 core 1.0mm flex

S3 - DHW FLOW & TEMP SENSOR
S1 - HTG FLOW & TEMP SENSOR
S2 - HTG PRESSURE & TEMP SENSOR

ESSCO EDGE INTERMEDIATE CONTROLLER

P2 - DHW CONTROL VALVE

P1 - HTG CONTROL VALVE

T4 - MCW TEMP SENSOR
T3 - HTG FLOW TEMP SENSOR
T2 - PRIMARY RETURN TEMP SENSOR
T1 - PRIMARY FLOW TEMP SENSOR

IP RATED ENCLOSURE BY OTHERS

POWER
N
E
L
RS1 L
RS1 SL
BL L
BL SL
H/L L
H/L SL

SWITCHED FUSED SPUR

FUSE

HTG THERMOSTAT

ESBE TS122 H/L STAT

ENERGY METER

PUMP

Mains Out	Pump Mains Power Supply 230v
	3 core 1.5mm flex

P3 - HTG PUMP

H/L STAT	High Limit UFH Flow Temp Stat
	3 core 1.5mm flex

MBUS	Heat Meter MBUS Connection
	1 pair screened twisted 0.5mm²

****DHW HARNESS VFS EARTH - 'E1'**

THIS IS A GREEN SINGLE-CORE FLYING LEAD WITH BOOTLACE FERRULE AND MUST BE CONNECTED TO MAINS EARTH TO PROVIDE GROUNDING FOR GRUNDFOS SENSORS. HIU CASE MUST ALSO BE EARTHED BACK TO EARTH SPADE IN CONTROLLER.

6.7 Handover

- Complete the commissioning checklist section 6.4, page 21.
- Set up the appliance controls and show the customer how to operate all the controls for central heating.
- Show the customer where the serial number/appliance information is when they call in with a problem.
- Show the customer how to safely isolate the appliance.
- Advise the customer they can find information on the Essco website, https://esscogroup.co.uk/.
- Advise the customer that the varying external temperature will affect the output of the appliance.
- Ensure that the installation and maintenance manual and other details are provided as part of handover.
- If known, please fill in local warden/site agent/contractor engineers' detail in the fault or breakdown sections of the user instructions.
- If the appliance is unused and exposed to freezing conditions, shut off all the mains supplies and drain the system and appliance, label accordingly.

6.8 Product guarantee

This product has a non-transferable 2-year guarantee from the date of delivery. This covers faulty product or workmanship to the terms and conditions that can be found on our website.

This O&M has been designed to provide recommendations throughout, which if carried out will help to prolong product lifespan and provide better functionality and accuracy. Essco recommend the use of over pressure limitation in any systems where the maximum operating valves of the HIU might be exceeded.

If a valve fails and is returned to us for inspection and damage can be seen because of water quality or through overpressure, this will also void the warranty.

For further details and to read full terms and conditions please visit us online at https://esscogroup.co.uk/wp-content/uploads/2021/04/Essco-B2B-Terms-Conditions-APRIL-2021.pdf. Your statutory rights are not affected by the manufacturer's guarantee.

ELYSATOR

Water quality
Advanced heating systems need suitably treated water.

Technical applications demand high standards of water quality, which is why Sections 6.2 and 6.3 of this IOM provide the latest CIBSE CP1 2020 recommendations for controlling water quality and pipe corrosion.

Essco Group have partnered with Elysator to also provide customers with the very best products and advice needed to meet the latest VDI-2035 European Water Quality Standards. This ensures that gases, minerals, and pollutants are removed from water using environmentally responsible and chemical free processes, until the water is suitable for the required application. When Elysator is fitted, Essco also increase the HIU product guarantee from 2 years to 5 years.

Speak to one of our technical sales representatives to select a suitable product to avoid these common issues:

- Sludge deposits in systems and pipes due to the products of corrosion.
- Blocking of regulating valves and pumps.
- Corrosion holes and further system water damage to boilers and other heat sources.
- Excessive flow noise caused by corrosion related gas formation.
- Increased energy consumption due to irregular heat distribution.
- Increased maintenance costs.

Product			System Volume (m^3)	Maximum Output (m^3/h)	Operating Pressure (bar)	Maximum Water Temperature (°C)
ELYSATOR© trio	ELYSATOR® trio 10		0.5 m^3	3 m^3/h	6 bar	90 °C
	ELYSATOR® trio 15		1.5 m^3	5 m^3/h		
	ELYSATOR® trio 25		5 m^3	7 m^3/h		
ELYSATOR© trio.1	ELYSATOR® trio 10.1		< 0.5 m^3	< 3 m^3/h	6 bar	90 °C
	ELYSATOR® trio 15.1		< 1.5 m^3	< 5 m^3/h		
	ELYSATOR® trio 25.1		< 5 m^3	< 7 m^3/h		
ELYSATOR© industrial	ELYSATOR® trio 50		15 m^3	0.30 – 0.60 m^3/h	10 bar	100 °C
	ELYSATOR® trio 75		25 m^3	0.48 – 0.90 m^3/h		
	ELYSATOR® trio 100		35 m^3	0.60 – 1.20 m^3/h		
	ELYSATOR® trio 260		70 m^3	1.50 – 3.00 m^3/h		
	ELYSATOR® trio 500		120 m^3	3.00 – 6.00 m^3/h		

	ELYSATOR® trio 800		220 m^3	4.80 – 9.60 m^3/h		

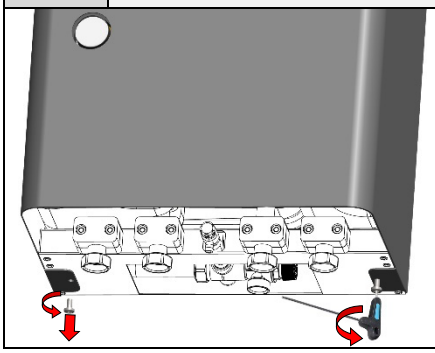
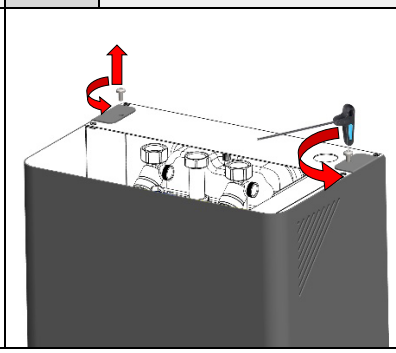
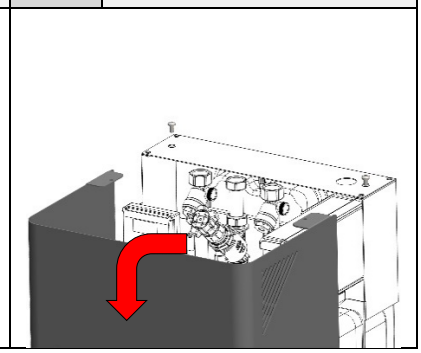
7. Inspection and maintenance

As HIUs are an inherently low maintenance space heating system, the recommendation from BSRIA BG 62/2015 is that a maintenance check every 3 years should be sufficient. Essco Group recommend that strainers however are checked at least once annually, depending on the water quality of the installation. Any build-up of debris can cause flow restriction and when left unchecked, damage to components within the HIU.

BSRIA inspection and maintenance procedure guidance recommends the following checks are carried out.

- No leaks associated with HIU or secondary distribution.
- Primary isolation valves are operable.
- Internal strainers are clear.
- Supply differential above required minimum.
- Thermal insulation is intact.
- Control valves respond to demand signals for heating and hot water.
- Supply temperatures to heating and hot water are as when the unit was commissioned.
- Check mains pressure storage water heater safety valve (where fitted).
- Heat meter registers demand (or replace and commission new heat meter if scheduled).
- Consumer is satisfied with heating and hot water performance.

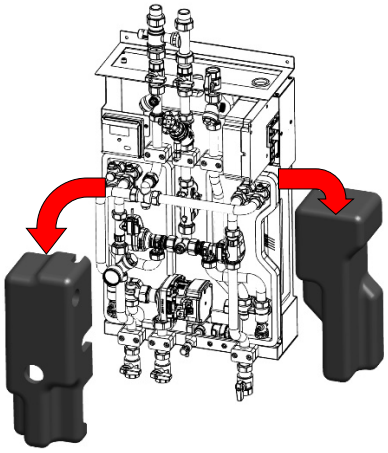
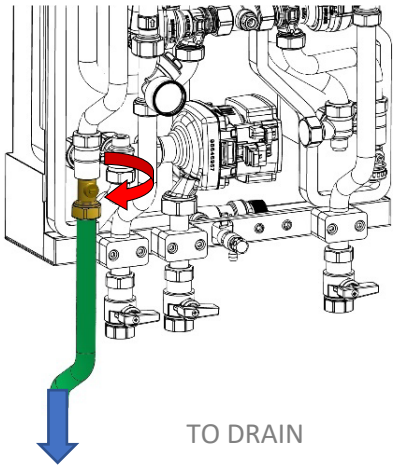
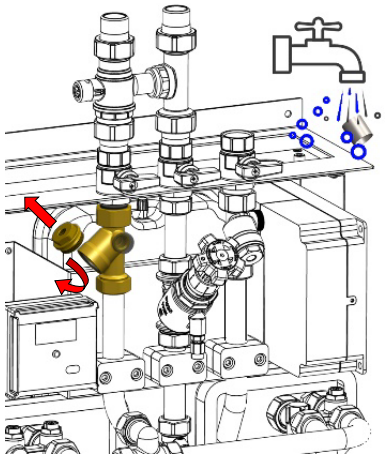
7.1.1 Removing the cover

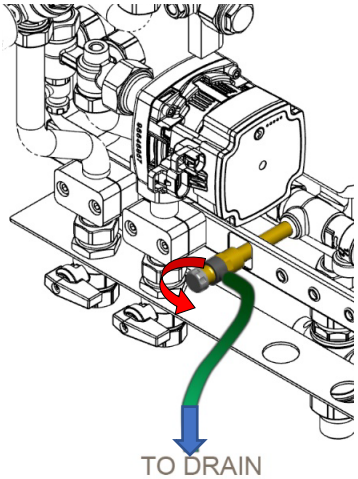
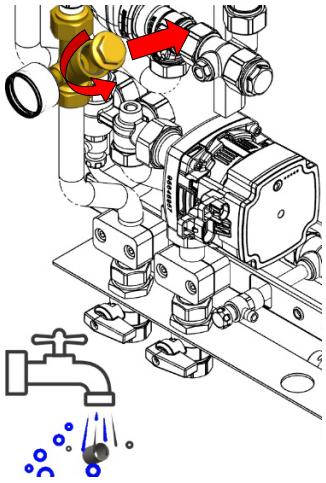
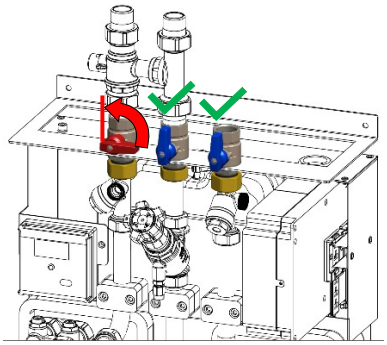
1	Use an Allen Key to remove the two bolts on the underside of the case.	2	Use an Allen Key to remove the two bolts on the top of the case.	3	Slide the case off using both hands, then place it onto a soft surface to avoid damage.
					

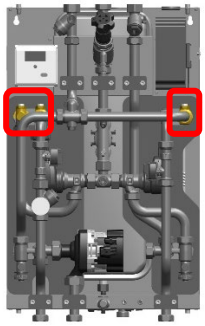
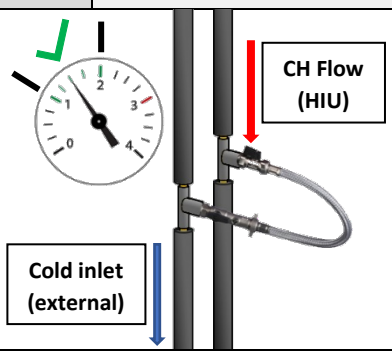
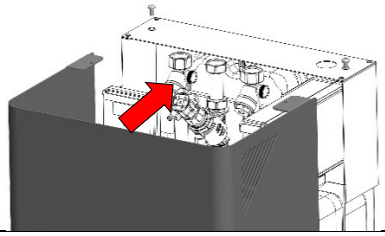
7.1.2 Draining the appliance & filter maintenance

The Edge T Heat Interface Unit features three strainers, one on the primary inlet designed to protect the PHE and primary control valve, a second on the central heating return to protect secondary side components, and a third on the mains cold water inlet. These strainers should be checked as regularly as system conditions dictate; however, we recommend they are checked at least once annually.

	Notice: Risk of water damage to appliance or property! Damage from disconnecting water pathways which may have retained some water. • Take care after draining appliance to protect equipment/property from residual water content within components.		Draining the appliance. • Open the air vents at the top of the desired circuit to aid draining of the appliance. Ensure they are closed after draining has been completed.

1	Carefully remove the insulation shells, set aside, and allow the unit to cool before moving forward.	**2**	Connect a suitable length of hose to the primary drain cock and take to drain. Twist to open drain cock and drain water. Close drain and remove hose when complete.	**3**	Twist and remove the primary strainer cap using a wrench to access the mesh. Clean strainer mesh under running water, then replace and refit cap.
					

4	Connect a suitable length of hose to the CH drain cock and take to drain. Twist to open drain cock and drain water. Close drain and remove hose when complete.	**5**	Remove the strainer cap using a wrench to access the mesh. Clean strainer mesh under running water, then replace and refit cap. **Repeat for MCW strainer as necessary.**	**6**	Slowly reopen primary isolation valves and check for leaks before opening fully. Repeat with CH and MCW / DHW isolation valves.
					

7	Switch fused spur on & open manual air vents to remove air from circuits as HIU operates. Close afterwards.	**8**	Check CH pressure on pressure gauge. Use filling loop (by others) to top up to 1.5 bar, as necessary.	**9**	Refit insulation shell and case. Record maintenance activity & date in log for future reference.
					

8. Appendix

8.1 Commissioning templates

On the next four pages are copies of Essco commissioning templates, designed to assist commissioning engineers on site when commissioning units to the latest CIBSE CP1 2020 guidelines.

These can be sent as separate files on request.

ESSCO GROUP : COMMISSIONING CHECKLIST > EdgeT with UFH.

*In line with latest **CIBSE CP1 2020** Guidance.*

KEY:	***Green**: Essco to complete prior to commissioning.*	***Orange**: Commissioning engineer to complete on site.*

HIU Model:	{please select}	**Controller Model:**	{please select}
HIU Serial №:		**Controller Serial №:**	
Building Visited:		**Meter Serial №:**	
Flat Number:		**kWh on Meter:**	
Engineer:		**Date:**	
Start Time:		**End Time:**	

Section A : Initial Checks.

	Checklist	Design Value	Confirmation	Notes
1	Flushing Bypass closed	-		*Should be closed*
2	Strainer clean			*Should be empty*
3	Primary supply temp			*Run DHW first to check*
4	Energy Meter: responsive, with no errors & positive dT	-		*If there are issues, stop and report to Essco*

Section B : Central Heating on, check heat into flow header of underfloor heating manifold while heating up, then check circuit balancing valve settings and that air has been vented fully.

	UFH Manifold Circuit / Room Name	Heat at flow and return headers of UFH manifold	Pre-setting value for balancing lock-shield valves	Confirm setting and isolation valves F.O.	Confirm air has been vented from pipes & manifold
1	{please select}	{please select}		{please select}	{please select}
2	{please select}	{please select}		{please select}	{please select}
3	{please select}	{please select}		{please select}	{please select}
4	{please select}	{please select}		{please select}	{please select}
5	{please select}	{please select}		{please select}	{please select}
6	{please select}	{please select}		{please select}	{please select}
7	{please select}	{please select}		{please select}	{please select}
8	{please select}	{please select}		{please select}	{please select}
9	{please select}	{please select}		{please select}	{please select}
10	{please select}	{please select}		{please select}	{please select}
11	{please select}	{please select}		{please select}	{please select}
12	{please select}	{please select}		{please select}	{please select}
	Central Heating pressure on pressure gauge:				

Section C : Confirm Central Heating (CH) commissioned to achieve design objectives.				
With DHW off, set all room thermostat(s) to maximum temperature. Use clamp-on thermometer fitted to HIU primary flow & return pipework to monitor temperatures until stabilised (allow 120 mins for UFH). HIU online dashboard and/or energy meter can also be used where required.				
Check	**Design Value**	**Tolerance**	**Actual Value**	**Criteria Met**
CH Flow temp				{please select}
CH Return temp*				{please select}
Primary return temp*				{please select}
Energy Meter consumption (kW)				{please select}
Calculate flow rate based on kW and measured dT under full load				{please select}
Confirm room thermostats switches UFH circuit actuators off *(~4-6min delay)*:				{please select}
If Criteria has not been met: *next its necessary to check each individual UFH circuit return temperature*				

Section D : Set up and test DHW				
Check	**Design Value**	**Tolerance**	**Actual Value**	**Criteria Met**
DHW delivery temperature at Kitchen tap. Should be minimum of 45°C within 45 seconds				{please select}
DHW temperature at HIU Plate exchanger outlet (Dashboard check)				{please select}
Cold Main temperature	-			
Primary Return temperature on energy meter (or Dashboard)				{please select}
Power output – check kitchen tap output is 10-20 kW				{please select}

Section E : Further checks *(only where information has been provided with this checklist)*	
Check	**Criteria Met**
Check operation of pre-payment system	
Check plant room can deliver total diversified design load to heat network	

Please Note:

This form has been designed to be completed by site contractor, however it can also be used by an Essco HIU Commissioning Engineer when HIU commissioning forms part of an order with Essco Group.

It should be noted however that in either instance, radiator valve setting, balancing, and venting must always be carried out by site contractor. If Essco have been appointed to commission the HIU, these activities need to be completed in advance of this visit to avoid aborted visit costs or delays.

ESSCO GROUP : COMMISSIONING CHECKLIST > EdgeT HIU with Radiators.

*In line with latest **CIBSE CP1 2020** Guidance.*

KEY:	***Green**: Essco to complete prior to commissioning.*	***Orange**: Commissioning engineer to complete on site.*

HIU Model:	{please select}	**Controller Model:**	{please select}
HIU Serial Nº:		**Controller Serial Nº:**	
Building Visited:		**Meter Serial Nº:**	
Flat Number:		**kWh on Meter:**	
Engineer:		**Date:**	
Start Time:		**End Time:**	

Section A : Initial Checks.

	Checklist	Design Value	Confirmation	Notes
1	Flushing Bypass closed	-		*Should be closed*
2	Strainer clean			*Should be empty*
3	Primary supply temp			*Run DHW first to check*
4	Energy Meter: responsive, with no errors & positive dT	-		*If there are issues, stop and report to Essco*

Section B : Central Heating on, check flow into top of radiator while heating up, then check valve setting and that air has been vented fully.

	Room Name	Flow top of radiator & return at bottom	Pre-setting value for pre-settable TRV	Confirm setting and lock shield is F.O.	Confirm air has been vented from radiator
1	{please select}	{please select}		{please select}	{please select}
2	{please select}	{please select}		{please select}	{please select}
3	{please select}	{please select}		{please select}	{please select}
4	{please select}	{please select}		{please select}	{please select}
5	{please select}	{please select}		{please select}	{please select}
6	{please select}	{please select}		{please select}	{please select}
7	{please select}	{please select}		{please select}	{please select}
8	{please select}	{please select}		{please select}	{please select}
9	{please select}	{please select}		{please select}	{please select}
10	{please select}	{please select}		{please select}	{please select}
	Central Heating pressure on pressure gauge:				

Section C : Confirm Central Heating (CH) commissioned to achieve design objectives.

With DHW off, set all room thermostat(s) and TRV's to maximum temperature. Use clamp-on thermometer fitted to HIU primary flow & return pipework to monitor temperatures until stabilised (60 mins for rads, 120 mins for UFH). HIU online dashboard and/or energy meter can also be used where required.

Check	Design Value	Tolerance	Actual Value	Criteria Met
CH Flow temp				{please select}
CH Return temp*				{please select}
Primary return temp*				{please select}
Energy Meter consumption (kW)				{please select}
Calculate flow rate based on kW and measured dT under full load				{please select}
			Confirm room thermostat switches heating off:	{please select}

****If Criteria has not been met:** next its necessary to check each individual radiator return temperature*

Section D : Set up and test DHW				
Check	**Design Value**	**Tolerance**	**Actual Value**	**Criteria Met**
DHW delivery temperature at Kitchen tap. Should be minimum of 45ºC within 45 seconds				{please select}
DHW temperature at HIU Plate exchanger outlet (Dashboard check)				{please select}
Cold Main temperature	-			
Primary Return temperature on energy meter (or Dashboard)				{please select}
Power output – check kitchen tap output is 10-20 kW				{please select}

Section E : Further checks *(only where information has been provided with this checklist)*	
Check	**Criteria Met**
Check operation of pre-payment system	
Check plant room can deliver total diversified design load to heat network	

Please Note:

This form has been designed to be completed by site contractor, however it can also be used by an Essco HIU Commissioning Engineer when HIU commissioning forms part of an order with Essco Group.

It should be noted however that in either instance, radiator valve setting, balancing, and venting must always be carried out by site contractor. If Essco have been appointed to commission the HIU, these activities need to be completed in advance of this visit to avoid aborted visit costs or delays.

8.2 Spare parts guide

These last pages in this IOM include drawings and component order codes to assist with the identification and supply of any spare parts required during the products lifespan.

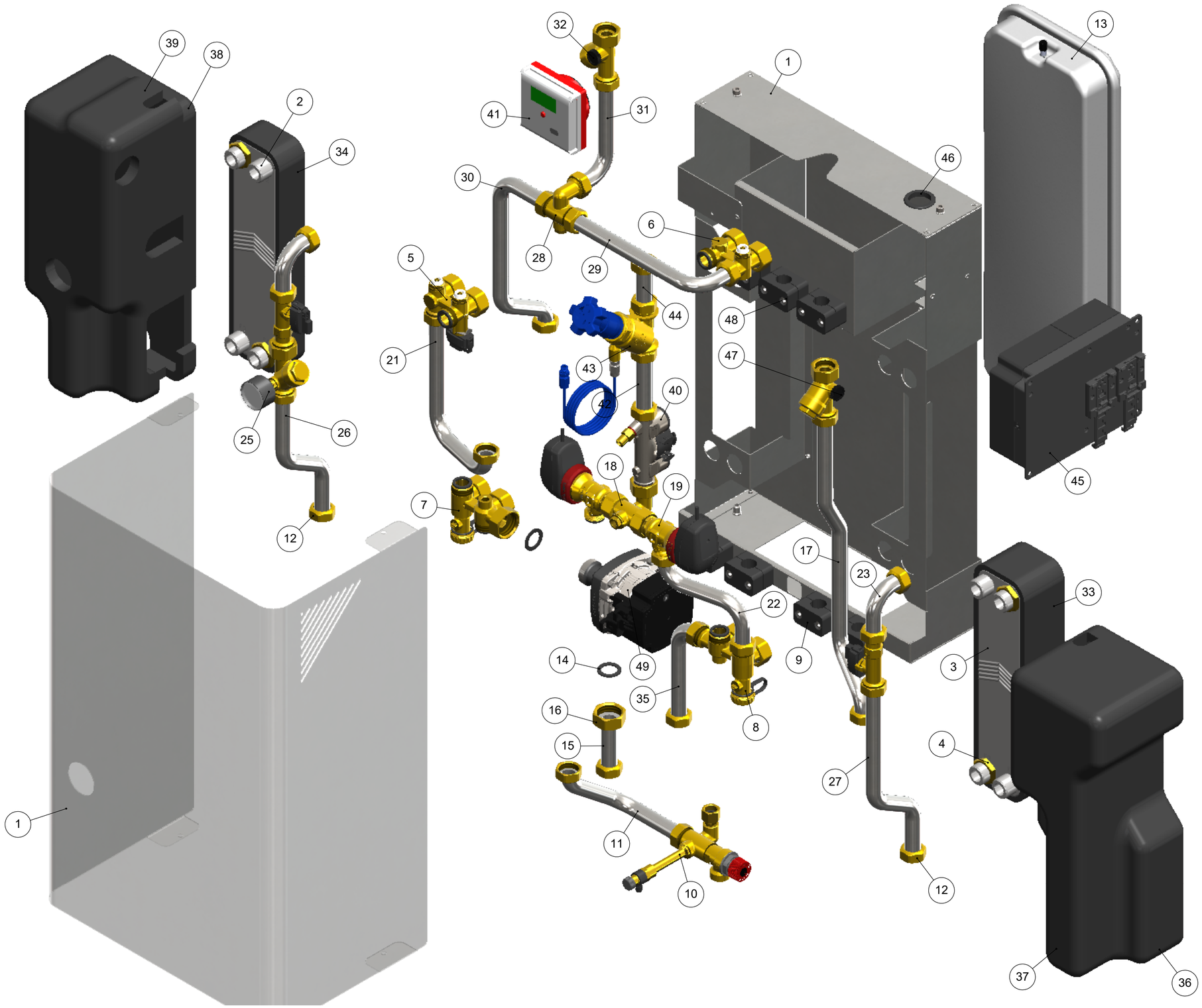
Please contact an Essco technical representative for any further information required or to place an order with us for parts required.

The main spare part codes available are as follows.

HIU2-ASS-1*	Heating section assembly
HIU2-ASS-2*	Domestic water assembly
HIU2-ASS-3*	Heating circulator assembly
HIU2-ASS-4*	Domestic water outlets assembly
HIU2-ASS-5*	VFS body assembly (no sensor)
HIU2-ASS-6*	Primary flow assembly
HIU2-ASS-7*	Primary return assembly
HIU2-ASS-8*	Heating strainer assembly
HIU2-ASS-9*	Inlet strainer assembly
HIU2-ASS-10*	Expansion vessel assembly
EDGE-BVK-1R	Isolation valve G3/4 red lever
EDGE-BVK-1B	Isolation valve G3/4 blue lever
EDGE-12P	Heat exchanger E8LAS 12 plates
EDGE-24P	Heat exchanger E8LAS 24 plates
EDGE-42P	Heat exchanger E8LAS 42 plates
EDGE-52P	Heat exchanger E8LAS 52 plates
EDGE-60P	Heat exchanger E8LAS 60 plates
EDGE-70P	Heat exchanger E8LAS 70 plates
EDGE-12P-INS	Insulation for E8LAS 12 plates
EDGE-24P-INS	Insulation for E8LAS 24 plates
EDGE-42P-INS	Insulation for E8LAS 42 plates
EDGE-52P-INS	Insulation for E8LAS 52 plates
EDGE-60P-INS	Insulation for E8LAS 60 plates
EDGE-70P-INS	Insulation for E8LAS 70 plates
EDGE-HS-INS	Heating section insulation shell (complete)
EDGE-DS-INS	Edge domestic water section insulation shell (complete)
EDGE-SLB	ESBE SLB valve PWM molex
EDGE-PUMP	Heating circulation pump
EDGE-PN6DV	Drain valve G1/4 PN6
EDGE-PN25DV	Drain valve G1/4 PN25
EDGE-PG	Pressure gauge 6 bar
EDGE-SV	Pressure relief valve G1/2 3 bar
EDGE-AV	Manual air vent G3/8
EDGE-EV8L	Expansion vessel G3/8 8 litres
EDGE-DPCV	DPCV G3/4 20-60kpa
EDGE-SC	Spare cartridge for G3/4 strainer

* Sub-assemblies, single piece of each tested, packed and labelled.

Part No.	Part Code	Quantity	Material
1	HIU2-BOX	1	
2	18430-24	1	
3	18430-42	1	
4	G001G	4	CW614N
5	HIU2-ASS-1	1	
6	HIU2-ASS-2	1	
7	HIU2-ASS-3	1	
8	HIU2-ASS-4	1	
9	CPC420SC	7	PP
10	HIU2-ASS-10	1	
11	HIU2-T20X1-13	1	AISI316
12	HIU2-NUT-1 SL	29	CW617N
13	EDGE-EV8L	1	
14	QF3655	1	EPDM
15	HIU2-T20X1-5	1	AISI316
16	08-0094	1	CW617N
17	HIU2-T20X1-12	1	AISI316
18	HIU2-ASS-7	1	
19	43200120	2	
20	GP24X17X02.5	5	EPDM
21	HIU2-T20X1-1	1	AISI316
22	HIU2-T20X1-4	1	AISI316
23	HIU2-T20X1-3	2	AISI316
24	HIU2-ASS-5	2	
25	HIU2-ASS-8	1	
26	HIU2-T20X1-7	1	AISI316
27	HIU2-T20X1-9	1	AISI316
28	HIU2-ASS-6	1	
29	HIU2-T20X1-2	1	AISI316
30	HIU2-T20X1-8	1	AISI316
31	HIU2-T20X1-11	1	AISI316
32	HIU2-ASS-9	1	
33	HIU2-INS-1	1	PE
34	HIU2-INS-2	1	PE
35	HIU2-T20X1-6	1	AISI316
36	HIU2-INS-3	1	PE
37	HIU2-INS-4	1	PE
38	HIU2-INS-5	1	PE
39	HIU2-INS-6	1	PE
40	561423194937 01	1	
41	561423194937 02	1	
42	HIU2-T20X1-15	1	AISI316
43	EDGE-DPCV	1	
44	HIU2-T20X1-14	1	AISI316
45	Controller	1	
46	MFP01340282N8	1	PVC
47	HIU2-ASS-11	1	
48	ISO 4762 M6 x 40 - 24N	14	
49	EDGE-PUMP	1	



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FIT & FORGET

essco
PREFAB

Essco Group
Unit 5, Nelson Industrial Park
Herald Road
Southampton
SO30 2JH

T. 01489 779068
F. 01489 779069

www.esscogroup.co.uk

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