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SAMSUNG

Generation 6 Samsung Heat Pump & Kodiak Pre-Plumb Cylinder Installation Manual

REGISTER THIS PRODUCT ONLINE WITHIN 28 DAYS OF COMMISSIONING

UNITED KINGDOM / IRELAND

https://joule.ie/register-products/

ENG-0025-06

Heat Pump Commissioning Sheet For Extended Warranty (7 Years)

MUST BE COMPLETED AND THEN REGISTERED ONLINE TO COMPLETE WARRANTY

Home owner		Company Name	
Address		Company/Installer Address	
Contact No.		Installer Name	
Email		Contact Number	
Date Unit Installed		Email	
Date Unit Commissioned		EHS Approved Installer?	
Has customer training been carried out?	Y N	Will you be maintaining the unit?	Y N

Outdoor Unit Information
(Please ensure photos of the Serial numbers & Model numbers are available for online warranty registration)

Model Number		Serial Number	
Unit Location		Header/Buffer Tank /HEX installed?	

Strainer		Glycol added		Glycol Concentration	
Fuse Rating		Mains Cable Size		Space around unit	
Drainage For Outdoor Unit		Approx System Volume (L)		Unit Correctly Mounted	
Water System Flushed				Water System Filled And Purged	
Flow sensor fitted				Flow And Return Lines Insulated	

*Glycol level around 20% check with glycol manufacture for details

Outdoor Unit Operation Data

Power Supply		Running Amps		Delta T (ΔT)	
Ambient Temp		Air In Temp (Taken manually at the back of the unit)		Air Out Temp (Taken manually at the front of the unit)	
Return Temp In		Flow Temp Out			

Please continue on next page

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Heating Controls

(Please ensure photos of the Serial numbers & Model numbers are available for online warranty registration)

Ground Floor Heat Emitter		Type of Control Used		Serial Number	
1st Floor Heat Emitter		Type of Control Used		Blending Valve Fitted	

Type of control i.e. Underfloor heating system, programmable room stat, etc.

Tank And Control Kit (MIM) Information

(Please ensure photos of the Serial numbers & Model numbers are available for online warranty registration)

Tank Manufacture		Model Number		Serial Number	
Control Kit Model No. (CN\DN)		Control Kit Serial No.		Control Kit Location Cylinder Mounted (Y/N?)	
Tank Capacity (L)		Solar Installed		Blending Valve Fitted	
Cylinder water Temp at Startup		Cylinder water Temp after 30mins		Water Flow Rate (L/min) (in heating mode)	
Fuse Rating For Mim Unit		Cable Size		Water Flow Rate (L/min) (in DHW mode)	
Immersion Heater Volts		Flow And Return Lines Insulated		Benchmark Book Completed	
Tank Sensor Fitted		Vented or Unvented			

Space Heating Field Settings

Menu Code	Function	Default	Site Settings
201*	Outdoor Temp. for Water law (Heat)	Low: 15.0°C High:2.0°C	
202*	Water Out Temp. for WL1 Heat (WL1-Floor)	Low: 35.0°C High:45.0°C	
2091	External Thermostat Application #1 (Floor)	Use (Signal only ON/OFF)	

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Domestic Hot Water & Heat Pump Settings

Menu Code	Function	Default	Site Settings
3011	Domestic Hot water Tank	Use(Hysteresis: Thermo Off)	
302*	3021 -Max Temp.	50.0°C	
	3025 - Max. DHW Operation Time	As per Table 1	
3032	Delay Time	As per Table 1	
304*	3042 - Interval	TUESDAY	
	3043 - Start Time	3HOUR	
	3044 - Target Temp.	55.0°C	
	3045 - Duration	15 Min	
3051	Timer OFF Function	Use Timer Duration:60Min	

Table 1:

#FSV	Tank Volume	Setting
3025 & 3032	≤ 180	50
	200	60
	230	70
	250	75
	300	90
	≥ 400	95

Installer's Signature

Print Name

Heat Pump Installation Checklist

Outdoor Unit Installation

Is the unit installed the correct distance from nearest boundaries?

Is the unit secured correctly to anti-vibration mounts via rubber mounts?

Is the unit mounted plumb level?

Is condensate drain kit fitted? (drain kit located inside HP access door)

If unit is mounted on wall brackets, is drip tray installed?

Heat Pump Plumbing (Outdoor Unit)

Is correct size pipe work used and insulated?

Are flexible anti-vibration hoses fitted and washers used?

Are heat pump isolation valves fitted out at the heat pump?

Is Y-Strainer fitted on the return pipework to heat pump and fitted in the correct orientation?

Is flow and return pipe work connected the right way around?

Cylinder Plumbing (Indoor Unit)

Is Flow and Return pipe work connected the right way around?

Is the heating expansion vessel correctly sized, secured and charged to correct pressure? (Not applicable for Kodiak Compact & Smart Plumb)
Is the Potable expansion vessel secured and charged to the correct pressure?

Are all pump valves and isolating valves fully open?

Has system been completely flushed of air and charged to the correct operating pressure of 2 bar?

Are all safety valves and tundish drained through a metal pipe to an appropriate drain point?

Radiator/UFH System

Has all air been removed from emitters?

Have all emitters been balanced correctly?

If UFH is installed, have correct flow rates been set?

If UFH is installed, are all valves on manifolds/pumps fully open?

Heat Pump Wiring (Outdoor Unit)

Is the correct size breaker used for heat pump?

Is an isolation switch installed for the heat pump and mounted on a fixed structure out beside heat pump?

Is the correct size power supply cable used for heat pump?

Are all cable protrusions avoiding condensate tray?

Is the correct communication cable installed and wired into correct terminals?

Cylinder Wiring (Indoor Unit)

Has the correct breaker & power supply cable been selected for the indoor unit?

Is an isolation switch installed for the indoor unit and is it mounted on a fixed structure beside the unit?

Is the correct communication cable installed and wired into correct terminals?

Heating Controls/Stats Wiring

Is each zone/floor corresponding with the correct zone valve?

Are all heating controls powered from controller on cylinder?

Are all heating controls wired and working?

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Outdoor Unit

Kodiak

Kodiak Compact

Samsung Controller

Installation Schematics

Miscellaneous

Introduction

These instructions have been prepared to ensure the Kodiak Pre-Plumb, and Kodiak Compact cylinders, designed and constructed by Joule Group Limited, is installed, operated, and maintained efficiently and safely.

This manual provides essential information regarding safe handling, installation, operation, and maintenance of the equipment and should be read in conjunction with the vendor manuals and other information that forms part of the Documentation Pack supplied with this equipment.

Failure to read and follow these instructions could result in personal injury or equipment damage.

Operation of this equipment outside the original design parameters and contrary to the instructions contained in the manual, or following any modification to the equipment without the prior agreement of Joule Group Limited, is forbidden.

No responsibility can be assumed by Joule Group Limited for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from any hazards inherent in the nature of the equipment supplied.

Every effort has been made to ensure the accuracy of information contained within this manual.

Please contact Joule Group Limited regarding any errors or omissions along with any questions regarding this manual that requires further clarification.

A copy of this manual must be always kept with the equipment throughout its service life for ready consultation.

Should the manual become lost or damaged, please contact Joule Group Limited for a replacement.

Joule Group Limited reserves the right to change the content of these manual without prior notice.

Documentation Pack Content

The Documentation Pack, which is supplied in conjunction with this Operations and Maintenance Manual, includes:

- UK Declaration of Conformity
- EU Declaration of Conformity

Safety Information

DANGER	DANGER indicates a hazardous situation that will result in death or severe injury if the hazard situation is not prevented.
WARNING	WARNING indicates a hazardous situation that can result in death or severe injury if the hazard situation is not prevented.
CAUTION	CAUTION indicates a hazardous situation that can result in minor or moderate injury if the hazard situation is not prevented.
NOTICE	NOTICE is used for practical information outside the context of possible personal injury.
SAFETY INSTRUCTIONS	Safety instructions or similar terms indicate specific safety-related instructions or processes.

WARNING	The cylinder unit must be in an upright position only.
WARNING	All external controls are 230V AC connections.
DANGER	The installers, inspector, commissioner and service eingineer must have a G3 qualification in line with the Building Regulations 2010 before conducting any work.
DANGER	No untrained person shall remove or tamper with anny part of the equipment as it may result in death or severe injury.
CAUTION	You can be injured if you do not obey the safety instructions as indicated on warning labels.
CAUTION	Observe all safety instructions and warnings attached to the equipment.
WARNING	Disconnect mains supply at isolator prior to carrying out maintenance or repair to the Kodiak Smart Pre-Plumb Cylinder. Turn off the cold-water supply alve. Open hot water tap. Open the drain valve. The unit will drain. Note water drain may be hot.
WARNING	Before carrying out any work on electrical components, isolate them from the power supply (230 V AC) (fuse, circuit breakter) and secure against unintentional reconnection.
WARNING	Do not use this equipment with guards removed or incorrectly fastened.
WARNING	Do not use this equipment with safety devices maladjusted or removed.
NOTICE	It is recommended thet the equipment is regulary serviced to ensure that this equipment operates as afficiently and as safely as possible. See Section on “Maintenance” for futher details.

CAUTION

Prior to starting any maintenance work, ensure the sourrounding is clear of all unnecessary components, debris, trip hazards and people.

CAUTION

Use authorised replacements parts, the use of unauthorised components could cause injury or machine damage.

CAUTION

All safety devices temporarily removed for set up, maintenance or repair purposes must be refitted and checkec immadiently upon completion of the maintenance and repair work prior to operation.

CAUTION

The electrical equipment must be inspected and checked at regular intervals. Defects such as loose connections or scorched or otherwise damaged cables must be rectified immadiently.

CAUTION

Be aware that the water can be hot if maintained too soon after use.

CAUTION

Leaks from pipework or seals must be repaired prior to use.

CAUTION

Take care when coming into contact with pipework as it may be hot.

SAFETY INSTRUCTIONS

This manual provides information regarding the Kodiak Smart Pre-Plumb Cylinder and must be read in conjunction with any other material supplied within the Documentation Pack.

A copy of Doccumentation Pack must be available for any persons installing, using, maintaining or repairing this equipment.

Installation and operation mst only be undertaken by authorised competent persons (G3 qualification) who fully understand the information provided within the Documentation Pack.

The procedures outlined in t his operating and maintenance instruction must always be followed.

If in doubt ask, do not take personal risk.

Conditions of Manufacture

The following condition are required of the manufacturing process for compliance with the approval

- It is the responsibility to ensure that all the equipment fitted is installed and commissioned in accordance with the O.E.M's instructions and recommendations.
- The manufacture shall provide the end-user and or installer with the necessary operating, settings, and operating parameters as appropriate for all non -electrical and electrical parts fitted to the equipment.
- The manufacturers is required to install al the marking symbols listed in section 9 of this report.
- The manufacture shall provide the end-user a copy of the Declaration of Conformity with a copy of the Original Instructions Manual.

Conditions of Safe Use

The following conditions relate to the safe installation and/or use of the equipment.

1. The installers, inspector, commissioner, and service engineer must have a G3 qualification in line with the Building Regulations 2010.
2. The installer shall ensure that any discharge from safety devices is safely conveyed to where it is visible but will not cause a danger to persons in or about the building.
3. The following electrical tests are conducted upon assembly as part of the production process and again on commissioning of the equipment when installed.
4. Verification that the electrical equipment complies with its technical documentation.
5. Verification of electrical continuity of the protective bonding circuit which shall be measured with a current between at least 0,2 A and approximately 10 A.
6. All pipework should be checked for earth continuity to avoid the formation of a galvanic cell.
7. The functions of electrical equipment shall be tested.
8. The hydraulic system shall be subjected to a combination of inspection and testing to verify that:

- the identification of systems and components conforms to the system's specifications;
- the connection of components in the system complies to the circuit diagram;
- the system, including all safety components, functions correctly;
- there is no unintended leakage on any component other than slight wetting insufficient to form a drop on any cylinder rod after multiple cycles.

Pre-Installation Notes

Store the manual in a safe place in order to be able to use it as reference after installation. For maximum safety installers should always carefully read the following warnings.

Store the provided manual in a safe location with the end user after installation, and remember to hand it over to the new end user if the Heat Pump & Cylinder unit is sold or transferred.

The Air to Water Heat Pump is compliant with the requirements of the Low Voltage Directive (2006/95/ EC), the EMC Directive (2004/108/EC) and the pressure equipment directive (97/23/EC).

The manufacturers shall not be responsible for damage originating from unauthorised changes or the improper connection of electric and hydraulic lines.

Do not use units if you see some damages on the units and recognise something untoward such as loud noise, smell or burning.

In order to prevent electric shocks, fires or injuries, always stop the unit, disable the protection switch and contact Joule's technical support if the unit produces smoke, if the power cable is hot or damaged, or if the unit is very noisy.

Always remember to inspect the unit, electric connections, refrigerant tubes and protections regularly. These operations shall be performed by qualified personnel only.

The unit contains moving parts and electrical parts which should always be kept out of the reach of children.

Do not attempt to repair, move, alter or reinstall the unit by unauthorised personnel. These operations may cause product damage, electric shock and fires.

Do not place containers with liquids or other objects on the unit.

All the materials used for the manufacture and packaging of the air to water heat pump are recyclable. The packaging material and exhaust batteries of the remote controller (optional) must be disposed of in accordance with local regulations.

The Air to Water Heat Pump containing a refrigerant must be disposed in an authorised centre or returned to retailer as special wastes.

Wear protective gloves to unpack, move, install, and service the unit to avoid your hands being injured by the edge of the parts. Do not touch the internal parts (water pipes, refrigerant pipes, heat exchangers, etc) while running the units. If you need to adjust and touch the units, allow sufficient time for the unit to cool and be sure to wear protective gloves.

In case of refrigerant leakage, try to avoid contact with the refrigerant because this could result in severe wounds.

NO Pre Paid Meters are to be installed on a Samsung Air Source Heat Pump System

Outdoor Unit Dimensions

Dimensions (Overall)

(Unit : mm)

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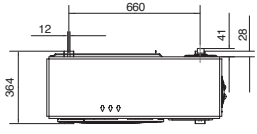

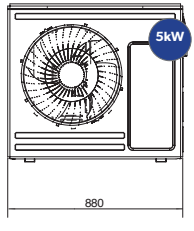

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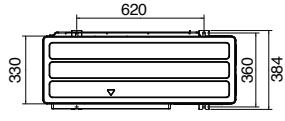

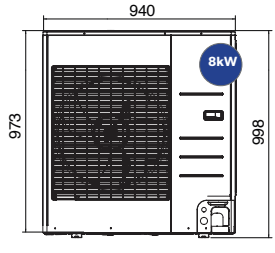

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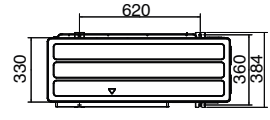

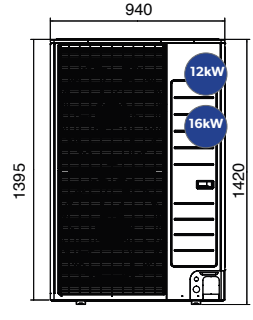

Dimensions (Water pipe)

(Unit : mm)

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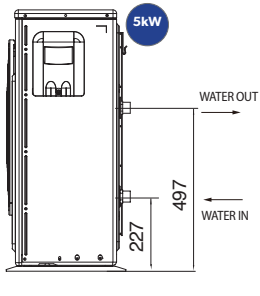

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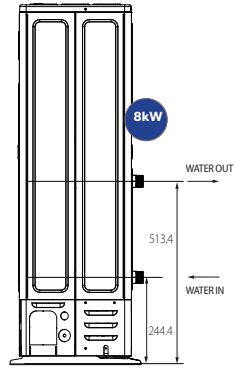

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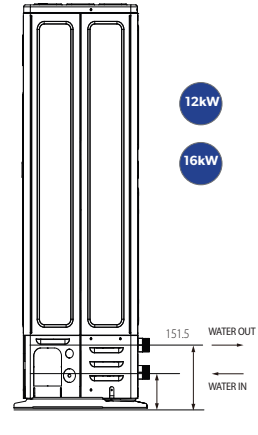


First Fix Notes

Primary Pipework From Outdoor Unit To Indoor Cylinder

- **Minimum** pipe size 28mm copper or 32mm Multilayer
- Outdoor pipework should be fully insulated and protected from water and moisture.
- If outdoor pipework is required, use duo pre-insulated pipework.
- The supplied flexible hoses must be fitted directly to the heat pump.

Electrical Supply And Cable Requirements

- Screened 0.75mm 2 core cable from outdoor unit to the indoor units MIM casing.
- Screened 0.75mm 2 core cable from the indoor units MIM casing to samsung controller.
- Power supply to outdoor unit to be terminated with IP67 isolator located next to the unit.
- Power supply to indoor unit (MIM casing) to be terminated via a 20Amp isolation switch.
- Power supply to the MIM units must connect via the ELCB fitted inside of the MIM unit.

Outdoor Unit	Breaker Size
HHSM-G600005-1	16Amp
HHSM-G600008-1	22Amp
HHSM-G600012-1	28Amp
HHSM-G600016-1	32 Amp

Indoor Unit	Breaker Size
MIM-E03(CN/DN)	20Amp

No. of Cores	Location
2 Core Screened	From indoor unit to outdoor unit. F1 & F2 Comms.
2 Core + Earth	From Zone 1 stat or Under-floor heating control centre to Indoor unit.
2 Core + Earth	From Zone 2 stat or Under-floor heating control centre to indoor unit.
2 Core Screened	From MIM unit to Samsung controller.

- When installing the outdoor unit take great care to install as per the detailed notes for installation locations. The Air-to-Water Heat Pump must have minimum clearance of 300mm at the rear of the unit and 1500mm at the front of the unit.
- The Air-to-Water Heat Pump must not be installed in a location without these clearances available.
- Condensation will form on the Air-to-Water Heat Pump. Ensure adequate provisions are put in place to prevent water forming on the ground beneath the Air-to-Water Heat Pump, resulting in a potential Health and Safety hazard.
- The Air-to-Water Heat Pump must be installed vertically and should not be tilted at an angle.
- A primary circulation pump must be installed on the flow pipework and a secondary circulation pump must be installed on the return pipework back to the Air-to-Water Heat Pump to ensure that minimum flow rates will be achieved (as per installation schematics). Installing a single circulation pump will not guarantee the correct flow rate.

First Fix Notes

- Site visits to solve a flow rate issue due to the installation of a single pump on the pipework are not covered under EUW and as such will incur a call-out charge.
- Underfloor heating pipe centres to be equal to or less than 150mm.
- Radiators are to be sized according to standardized design methods. Eg. SR.50 or MCS.
- All underfloor heating circuits to be controlled from the run signal from the third party underfloor wiring centre.
- All radiator zones to be controlled from 3rd party time clock and Thermostat; as per local building regulations.
- The hot water control is managed through the Samsung controller. Hot water takes priority over heating above 0°C.
- End user interacts with 3rd party controls only. It is the installers responsibility to ensure that attached designs are followed to achieve this or if a uniquely designed system is being installed the designer must allow for the 3rd party controls facility.
- Underfloor heating circuits are controlled by 3rd party room thermostats.
- Use of time clocks to turn off underfloor heating circuits is not recommended.
- Room thermostats in underfloor heating circuits should not be turned off but set back to a lower temperature using appropriate heating setback control for periods of unoccupied use.
- Air is the most prevalent cause of restricted flow in the system. Make sure that all pipework can easily be purged of air and that all air is removed from the system prior to starting the unit. Site visits to solve a flow rate issue due to the presence of air are not covered under EUW and as such will incur a call-out charge.

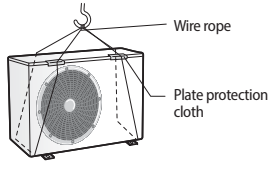
Locating The Outdoor Unit

Moving the outdoor unit

- Select the moving route in advance.
- Be sure that moving route is safe from weight of the outdoor unit.
- Do not slant the product more than 30˚when carrying it. (do not lay the product down sideways)
- The surface of the heat exchanger is sharp. Be carefule not to be injured while moving and installing.

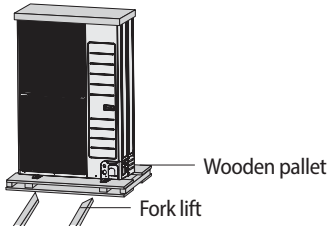
Moving the outdoor unit by wire rope

Fasten the outdoor unit by two 8m or longer wire ropes as shown at the figure. To prevent from damage or scratches, insert a piece of cloth between the outdoor unit and rope, then move the unit.



Moving the outdoor unit with a fork lift

Insert the fork into the wooden pallet at the bottom of the outdoor unit carefully. Be careful that the fork does not damage the outdoor unit.

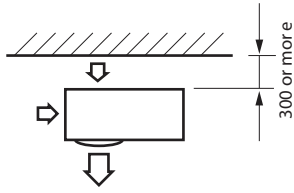


Deciding on where to install the outdoor unit

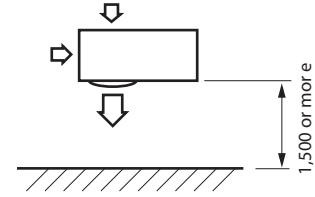
Decide the installation location regarding the following condition and obtain the user's approval.

- The outdoor unit must not be placed on its side or upside down, as the compressor lubrication oil will run into the cooling circuit and seriously damage the unit.
- Choose a location that is dry and sunny, but not exposed to direct sunlight or strong winds.
- Do not block any passageways or thoroughfares.
- Choose a location where the noise of the Air to Water Heat Pump when running and the discharged air do not disturb any neighbours.
- Choose a position that enables the pipes and cables to be easily connected to the other hydraulic system.
- Install the outdoor unit on a flat, stable surface that can support its weight and does not generate any unnecessary noise and vibration.
- Position the outdoor unit so that the air flow directly stream towards the open area.
- Place the outdoor unit where there are no plants and animals because they may cause malfunction of outdoor unit.
- Maintain sufficient clearance around the outdoor unit, especially from a radio, computer, stereo system, etc.

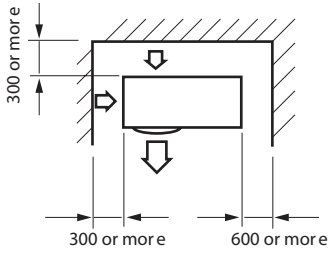
Locating The Outdoor Unit



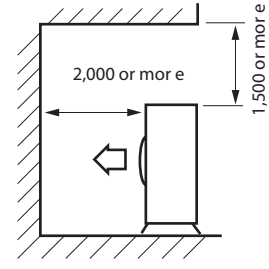
When the air outlet is opposite the wall.



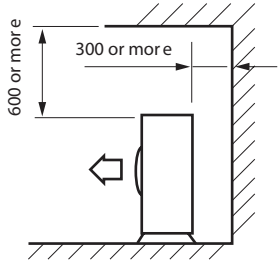
When the air outlet is towards the wall.



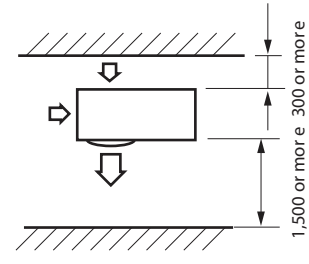
When 3 sides of the outdoor unit are blocked by the wall.



The upper part of the outdoor unit and the air outlet is towards the wall.



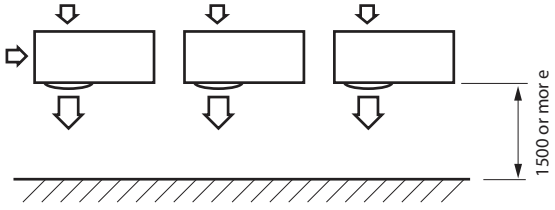
The upper part of the outdoor unit and the air outlet is opposite the wall.



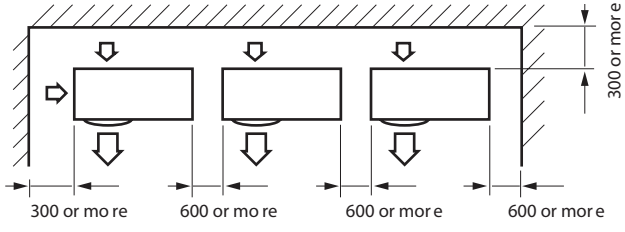
When front and rear side of the outdoor unit is towards the wall.

Locating The Outdoor Unit

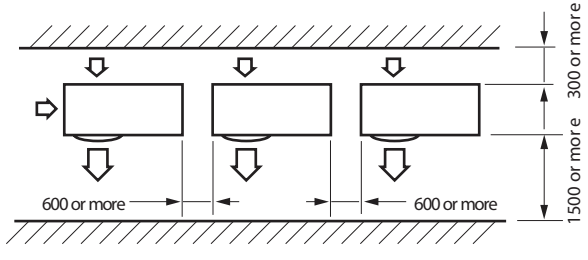
When Installing More Than 1 Outdoor Unit



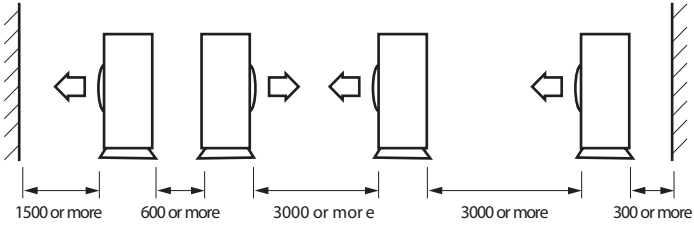
When the air outlet is toward the wall.



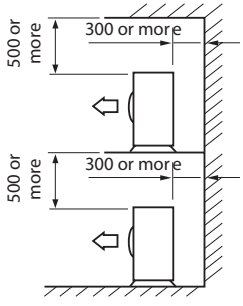
When 3 sides of the outdoor unit are blocked by the wall.



When front and rear side of the outdoor unit is towards the wall.



The upper part of the outdoor unit and the air outlet is opposite the wall.



When front and rear side of the outdoor unit is towards the wall.

The units must be installed according to distances declared, in order to permit accessibility from each side, either to guarantee correct operation of maintenance or repairing products. The unit's parts must be reachable and removable completely under safety condition.

Installing the Outdoor Unit

Installation Guidelines

Make sure to follow below guides when installing at the seashore.

1. Do not install the product in a place where it is directly exposed to sea water and sea breeze.
    - Make sure to install the product behind a structure (such as building) that can block see breeze
    - Even when it is inevitable to install the product in seashore, make sure that product is not directly exposed to sea breeze by installing a protection wall.
2. Consider that the salinity particles clinging to the external panels should be sufficiently washed out.
3. Because the residual water at the bottom of the outdoor unit significantly promotes corrosion, make sure that the slope does not disturb drainage.
    - Keep the floor level so that rain does not accumulate.
    - Be careful not to block the drain hole due to foreign substance
4. When product is installed in seashore, periodically clean it with water to remove attached salinity.
5. Make sure to install the product in a place that provides smooth water drainage. Especially, ensure that the base part has good drainage.
6. If the product is damaged during the installation or maintenance, make sure to repair it.
7. Check the condition of the product periodically.
8. All R32 models have a hydrophobic 'bluefin' coating as standard.
9. The Outdoor unit must be checked 1 year after installation for signs of corrision, regardless of the installation location.

    If installed within 500m of the seashore, an anti-corrosion coating is recommanded with *retreating effected areas every 2 years.

    If installed within 500m~2km of the seashore, an anti-corrosion coating is optional. If coated, it is recommended the unit is *retreated every 4 years. If not coated, it is recommended the unit is *retreated every 2 years.

***Note:** Retreating is an essential part of the Outdoor units annual service plan.

Depending on the condition of power supply, unstable power or voltage may cause malfunction of the parts or control system. (Places using power supply from electric generator, etc).

Do not install the Air to Water Heat Pump in following places

1. The place where there is mineral oil or arsenic acid. There is a chance that parts may get damaged due to burned resin.
2. The capacity of the heat exchanger may reduce or the Air to Water Heat pump may be out of order.
3. The place where corrosive gas such as sulfurous acid gas generates from the vent pipe or air outlet. The

copper pipe or connection pipe may corrode and refrigerant may leak.

4. The place where there is a danger of existing combustible gas, carbon fiber or flammable dust. The place where thinner or gasoline is handled.

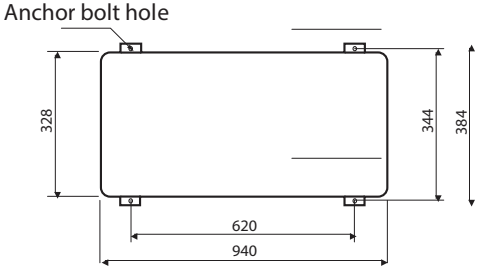
- If the outdoor unit is installed at a height, ensure that its base is firmly fixed in position.
- Make sure that the water dripping from the drain hose runs away correctly and safely.
- Installation must be carried out by qualified personnel for handling the refrigerant. Additionally, reference the regulations and laws.
- Be careful not to let foreign substances (lubricating oil, refrigerant other than R-32, water, etc.) enter the pipings.
- For disposal of the product, follow the local laws and regulations.
- For installation with handling the refrigerant(R-32), use dedicated tools and piping materials.
- Do not install where there is a risk of combustible gas leakage.

Outdoor Unit Installation

The outdoor unit must be installed on a rigid and stable base to avoid any increase in the noise level and vibration. Particularly if the outdoor unit is to be installed in a location exposed to strong winds or at a height, the unit must be fixed to an appropriate support (wall or ground).

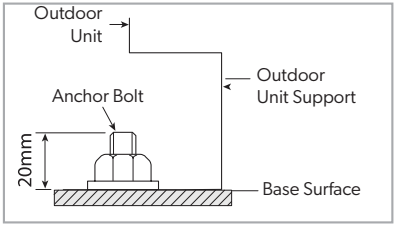
Fix The Outdoor Unit With Anchor

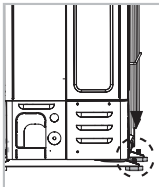
(Unit : mm)



The anchor bolt must be 20mm or higher from the base

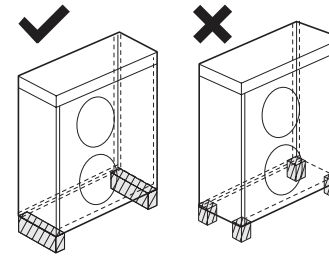
Condensate drain plug and anchor bolt rubber grommets come in a bag inside the door of the outdoor unit





Designed to cut off residual vibration from outdoor unit to rack. (not supplied with product)

Outdoor Unit Support (Ground)



Outdoor Unit Support (Wall)

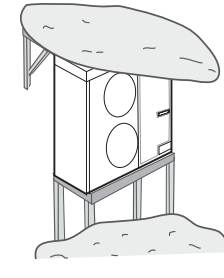
- Ensure the wall will be able to suspend the weight of rack and outdoor unit.
- Install the rack close to the column as much as possible.
- Install proper grommet in order to reduce noise and residual vibration transferred by outdoor unit towards wall.

Selecting A Location In Cold Climate

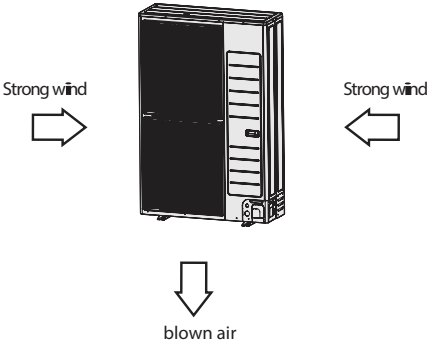
When operating the unit in a low outdoor ambient temperature, be sure to follow the instructions described below.

- To prevent exposure to wind, install the unit with its suction side facing the wall.
- Never install the unit at a site where the suction side may be exposed directly to wind.
- To prevent exposure to wind, install a baffle plate on the air discharge side of the unit.
- In heavy snowfall areas it is very important to select an installation site where the snow will not affect the unit. If lateral snowfall is possible, make sure that the heat exchanger coil is not affected by the snow (If necessary construct a lateral canopy).

1. Construct a large canopy.
2. Construct a pedestal. Install the unit high enough off the ground to prevent it being buried under snow.



Condensate Management



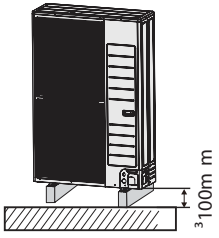
When installing the outdoor unit, consider the direction of any strong wind. Strong wind can overturn the outdoor unit. If possible, position the unit so the wind direction is towards the side of the unit.

When the Air to Water Heat Pump is running in heating mode, ice can begin accumulate on the surface of the condenser.

To prevent ice from growing, the Heat Pump will go into defrost mode to melt the ice.

The water formed from the melted ice will fall to the base of the heat pump where it can escape to ground through the drain holes in the base. This will require a drain pit or soak hole beneath the Heat Pump to prevent water or ice from forming on the ground around the Heat Pump which may be a safety hazard.

If installing the Heat Pump on a wall, the supplied drain plug and drain hose can be fitted to pipe the water away to drain.

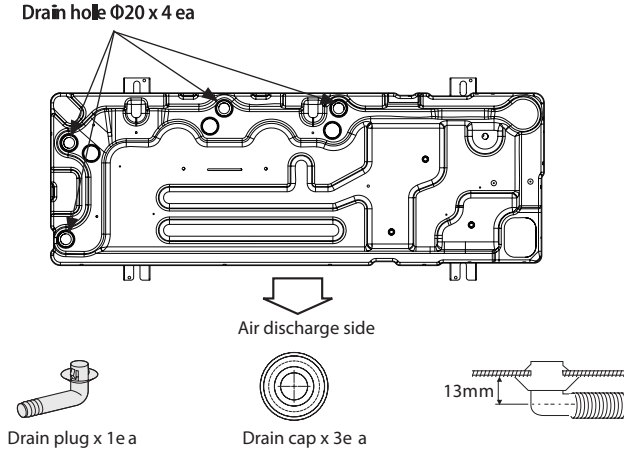


If the drain work is not sufficient, it can lead to a reduction of the system performance and possible system damage.

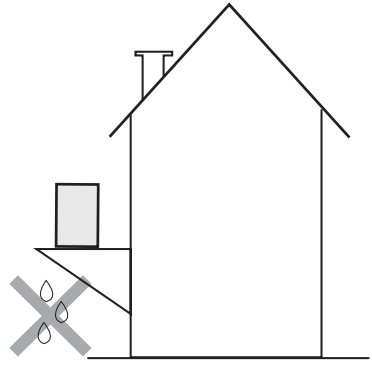
If the unit is not been installed over a gravel trap to allow for drainage then carry out the following steps:

1. Mount the unit on the anti-vibration feet keeping the unit more than 100mm above the ground.
2. Connect the drain plug as shown above and a suitable outlet pipe.
3. Run the pipe into a suitable drain located near by. If there is no drain nearby run the pipe to an area where natural drainage can take place.
4. Never mount the unit on a wall frame without installing sufficient drainage management.

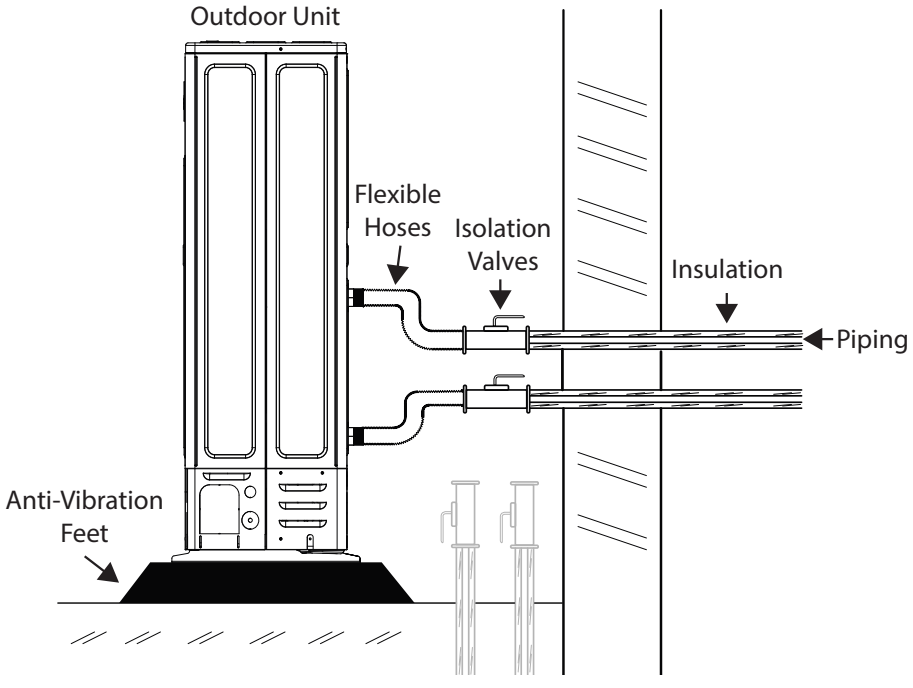
Condensate Management



1. Prepare a water drainage channel around the foundation, to drain waste water from around the unit.
2. If the water drainage of the unit is not easy, please build up the unit on a foundation of concrete blocks, etc. (the height of the foundation should be a maximum of 150mm).
3. If you install the unit on a frame, please install a water-proof plate within 150mm of the underside of the unit in order to prevent the invasion of water from the lower direction.
4. When installing the unit in a place frequently exposed to snow, pay special attention to elevate the foundation as high as possible.
5. If you install the unit on a building frame, please install a waterproof plate (field supply) within 150mm of the underside of the unit in order to avoid the drain water dripping



Outdoor Unit Pipe Work



Freeze protection

Freeze protection solutions must use Ethylene glycol with a toxicity rating of Class 1

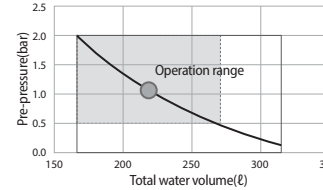
System Concentration, Vol %	Freeze protection Point °C
15.0	-7.0
20.0	-10.0
25.0	-13.0
30.0	-15.0

Piping Work

Setting capacity and pre-pressure of the expansion vessel

When it is required to change the default precharge pressure of the expansion vessel(1 bar), keep in mind the following guidelines:

- Use only dry nitrogen or air to set the expansion vessel pressure.
- Inappropriate setting of the expansion vessel precharge pressure will lead to malfunction of the system.
- Therefore, the pressure should only be adjusted by an competent installer.



Installation height difference(a)	Water volume	
	< 220 Litres	> 220 Litres
<7m	No precharge pressure adjustment required.	Actions required: • Pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume.
>7m	Actions required: • Precharge pressure must be increased, calculate the appropriate value following by "Calculating the precharge pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume.	Expansion vessel of the unit too small for the installation.

(a) Installation height difference: height difference(m) between the highest point of the water circuit and the indoor unit. If the unit is located at the highest point of the installation, the installation height is considered 0m.

- When Expansion vessel has a capacity 8 liters and 1bar pre-charged. Water volume of total system for reliable performance is minimum 30 liters.

Calculating the precharge pressure of the expansion vessel

The pre-pressure(Pg) to be set depends on the maximum installation height difference(H) and is calculated as below :

Pg=(H/10+0.3) bar

Piping work

Pipe work system volume

Primary Pipework Volume (L)																				
Flow & Return Length (m)	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
28mm Qualpex	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
28mm Polypipe	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
26mm Alupex	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	13
32mm Alupex	1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17	18	19	20	21
40mm Alupex	2	3	5	7	9	10	12	14	15	17	19	21	22	24	26	27	29	31	33	34
22mm Copper	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	12	13
28mm Copper	1	2	3	4	5	7	8	9	10	11	12	13	14	15	16	18	19	20	21	22
32mm Copper	1	3	4	6	7	8	10	11	13	14	16	17	18	20	21	23	24	25	27	28

1L Volume of water in Heat Pump Heat Exchanger

It is reccomended to achieve a minimum system water volume of 30L for the AE050RXYDEG and AE080RXYDEG units and 50L for the AE120RXYDEG and AE160RXYDEG units. Note it is the responsibility of installer to determine if additional water volume is required. System water volume is dependant on the type and length of pipework used. See above table to estimate pipework water volumes.

Pressure relief valve

The outdoor unit does not have a pressure relief valve incorporated. The installer MUST ensure the system is protected from over-pressurisation. The valve shall prevents abnomal water pressure from damaging the system by opening at a maximum pressure setting of 3.0 bar.

Filter / Strainer

Installation of the filter/ strainer is essential to protect the outdoor unit from system debris.

The filter/ strainer must be cleaned regularly to maintain the minimum system flow rate.

Piping insulation

Pipe or duct insulation should comply with BS 5422:2009. Alternatively, insulation of a thickness that provides reduction of heat loss equivilant to material having a thermal conductivity of 0.035 W/mK at 40 °C and thickness equal to the diameter of the pipe (or 40mm, whichever is smaller) may be used.

Electrical

Power Cable Specifications

1 phase

Outdoor unit	Rated		Voltage Range		MCA	MFA
	Hz	Volts	Min	Max	Min. Circuit Amps.	Max. Fuse Amps.
HHSM-G600005-1	50	220-240	198	264	16 A	20 A
HHSM-G600008-1	50	220-240	198	264	22 A	27.5 A
HHSM-G600012-1	50	220-240	198	264	28 A	35 A
HHSM-G600016-1	50	220-240	198	264	32 A	40 A

- The power cable is not supplied with Air to water heat pump.
- Supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord (Code designation IEC:60245 IEC 57 / CENELEC:H05RN-F)
- This Equipment complies with IEC 61000-3-12.
- For the power Cable, use the grade H07RN-F or H05RN-F materials.

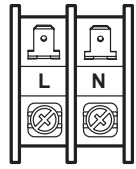
Communications Cable Specifications

- If there is a risk of disturbance to the communication cable, a screened cable must be used.

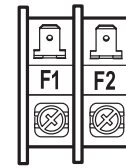
Communication cable
0.75mm², 2wires

Outdoor Unit terminal block Specifications

AC power : M5 Screw



Communication: M4 Screw

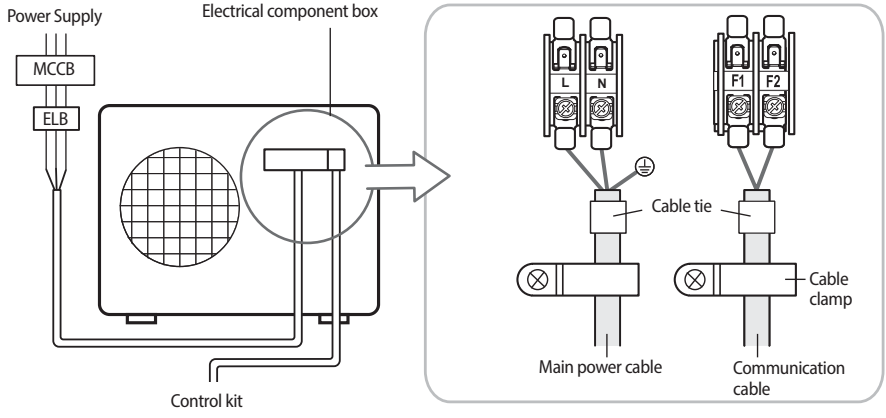


During the unit installation make first the piping connections and then electrical connections. If unit is uninstalled first disconnect electrical cables, then the piping connections.electrical connection.

Electrical

Wiring diagram of power cable

When using ELB/
MCCB for 1 phase



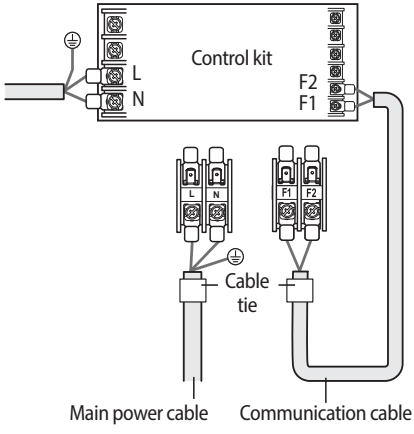
CAUTION!

- You should connect the power cable into the power cable terminal and fasten it with a clamp.
- To protect the product from water and possible shock, you should keep the power cable and the connection cord of the control kit and outdoor units within ducts. (with appropriate IP rating and material selection for your application)
- Ensure that main supply connection is made through a switch that disconnects all poles, with contact gap of a least 3 mm.
- Devices disconnected from the power supply should be completely disconnected in the condition of overvoltage category.
- Keep distances of 50mm or more between power cable and communication cable.

Electrical

Wiring diagram of communication cable

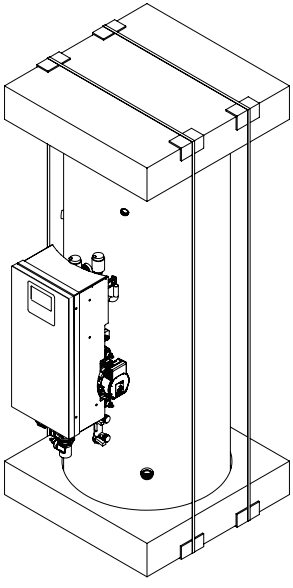
1 phase



Installing the Outdoor Unit

Moving the Indoor unit

- Select the moving route in advance.
- Be sure that moving route is safe from weight of the cylinder.

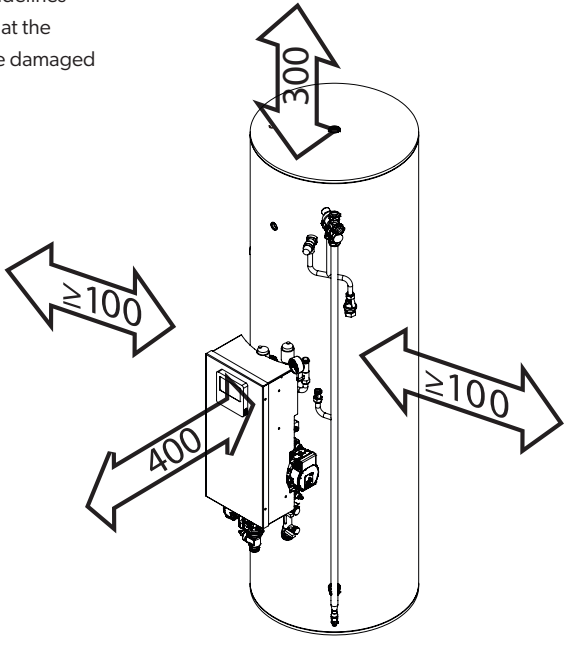


Moving the Indoor unit with a fork lift

- Insert the fork into the wooden pallet at the bottom of the cylinder carefully. Be careful that the fork does not damage the indoor unit.
- When moving the cylinder, be careful to not damage the cylinder by impact. Do not remove the packaging until cylinder has reached its final installation location.

Installation space

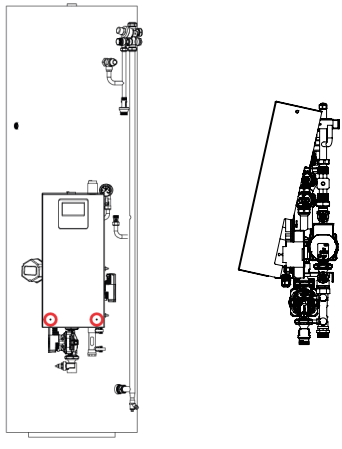
- Ensure to leave the appropriate space as indicated in the drawing.
- Adhering to the installation space guidelines will ensure adequate ventilation so that the components of indoor unit will not be damaged from overheating.



Electrical

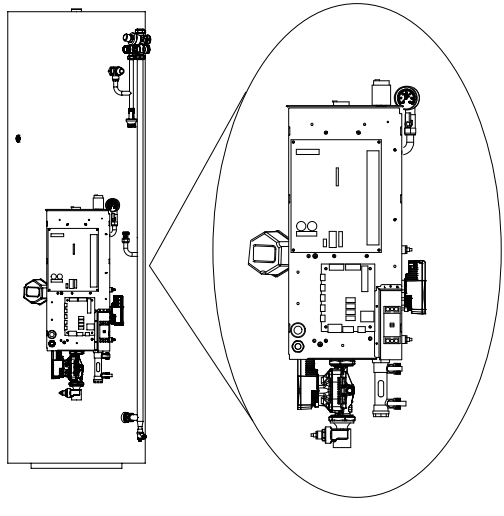
On removal of cover disengage the earth connection tab.

Removing and Attaching the Manifold Cover



Remove the cover be removing the 2 No. M4 screws of the front cover. On removal disengage the earth connection tab. Be aware Samsung controller cable and disconnect if required

Accessing Electrical Components

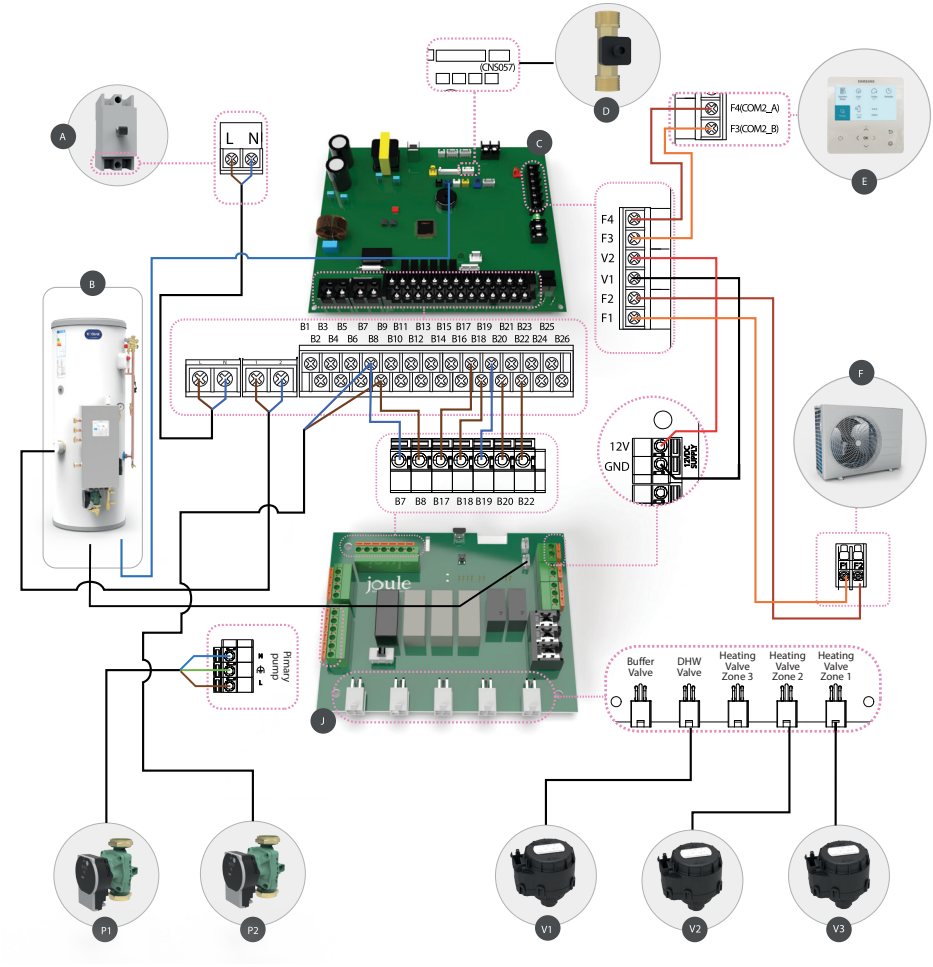


With front cover now removed full access can be gained to the electrical components of the system.

Please ensure cable entry glands are used.

Electrical

System Overview



For simplicity Earth connections have not been shown.

	Description	Item Codes
A	Samsung 30A ELCB	HZC-0000A25-70
B	SmartPlumb Tank	HUGH-G6x0x0-xC
D	Samsung Flow Sensor	HZC-0000A25-70
E	Samsung Touchscreen Controller	HZC-0000A25-70
J	Joule Kodiak PCB	TZ-W-0000000W

	Description	Item Codes
P1	Wilo Primary Circulating Pump	HZC-0000A25-60
P2	Wilo Secondary Circulating Pump	HZC-0000A25-60
V1	DHW - 2 Port Zone Valve	
V3	Heating Valve 2 - 2 Port Zone Valve	

Electrical

Power Supply

The table below outlines the power requirements for the Pre-Plumb tank

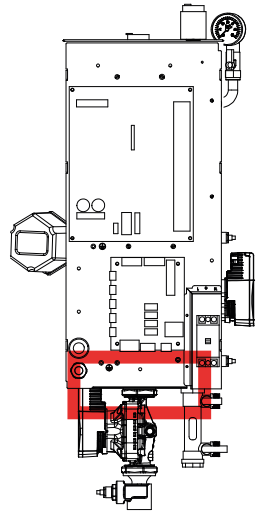
Indoor Unit	Load	Power Supply	Power Cable	MAX. Length	Type GL
			mm2 wires	m	A
MIM-E03(CN/DN)	[1]Booster Heater (3kw)	1Ø, 220-240Vac, 50Hz	4.0 / 3	<10m	20
			6.0 / 3	10m<L20m	20
	Booster Heater (~3kw) + Backup Heater (~3kw)		6.0 / 3	<10m	40
			8.0 / 3	10m<L20m	40

1) This is the standard setup in a Pre-Plumb tank.

Power Supply Cable Entry

All electrical wiring must be carried out by a competent installer and be installed in accordance with current local Wiring Regulations.

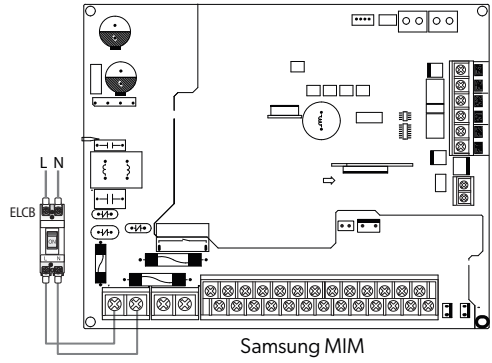
The cable entry point can be seen the diagram on the right. Remove the bottom vanity panel to access the cable fixing points and ensure all cables are secured using the fixings provided.



Power Supply Connections

Connect 'Live' and 'Neutral' power line with the terminals marked 'L, N' of the ELCB which is located inside the MIM casing.

Connect the 'Protective Earth' line with the 'Earth screw' inside the MIM casing. The rear casing of the MIM is the termination point for all Protective Earth Connections. Please use earth termination points provided.

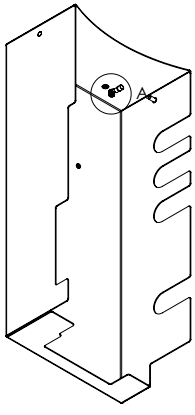


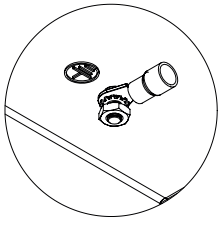
Samsung MIM

Electrical

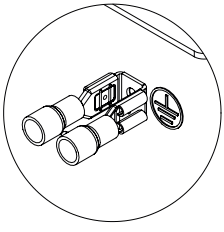
Protective Earth

All pre-installed components are earthed. The integrity of a protective earth system relies on its primary connection. It is the installers responsibility to ensure the rear of the Kodiak cover is earthed, therefore providing a protective earth connection to all system components.

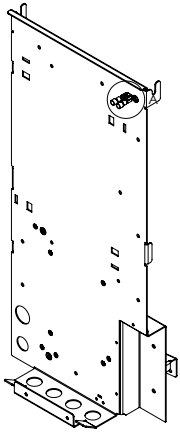




Kodiak Cover Earth



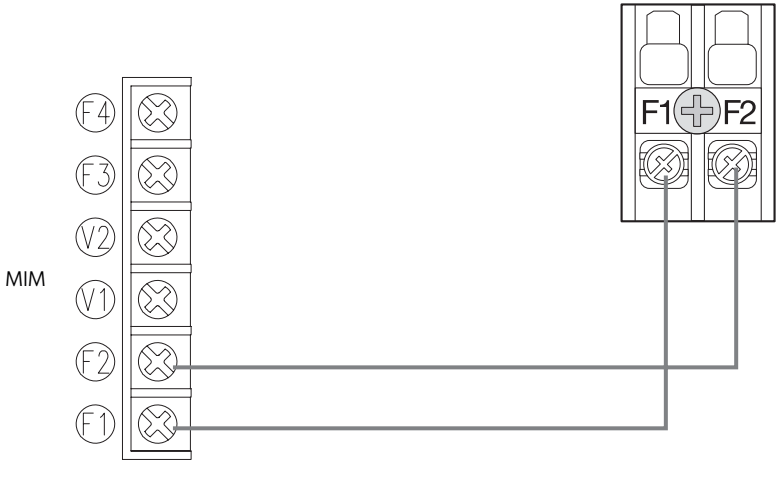
Kodiak Plate Earth



Connecting the communication cable

The communication cable carries the signal between the outdoor unit and the MIM casing.

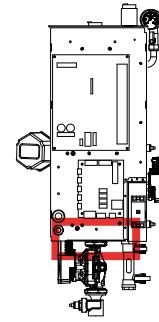
Using a two-core cable connect the terminals F1 & F2 of the outdoor unit to the terminals F1 & F2 of the MIM casing.



Connection External Controls

Connecting External Controls

Connection of external controls to the Smart Plumb unit are made directly to the 'Joule Kodiak PCB' which is located behind the top vanity panel, as detailed in the image shown on the right.



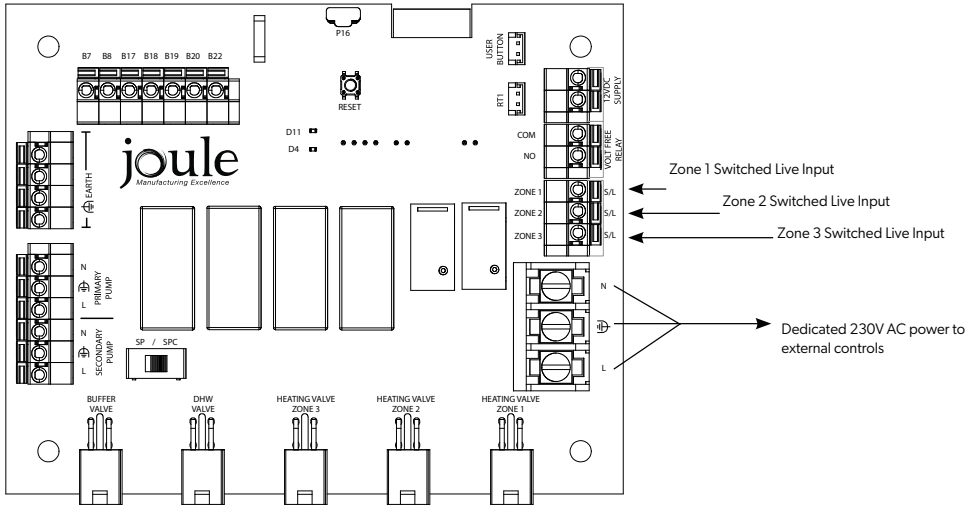
There is a dedicated 230V AC supply to power the external controls. These terminals are labelled 'External Controls Power' , specifically 'L, N & E' on the 'Joule Kodiak PCB'.

The switched live input from the external controls should be connected to the terminals labelled 'Zone 1' S/L, 'Zone 2' S/L and 'Zone 3' S/L on the 'Joule Kodiak PCB', as detailed in the image below.

N.B. Applying a 230V switched live to the terminal 'Zone 1' S/L will activate 'Heating Zone Valve 1'.

WARNING!

All external controls are 230V AC Connections

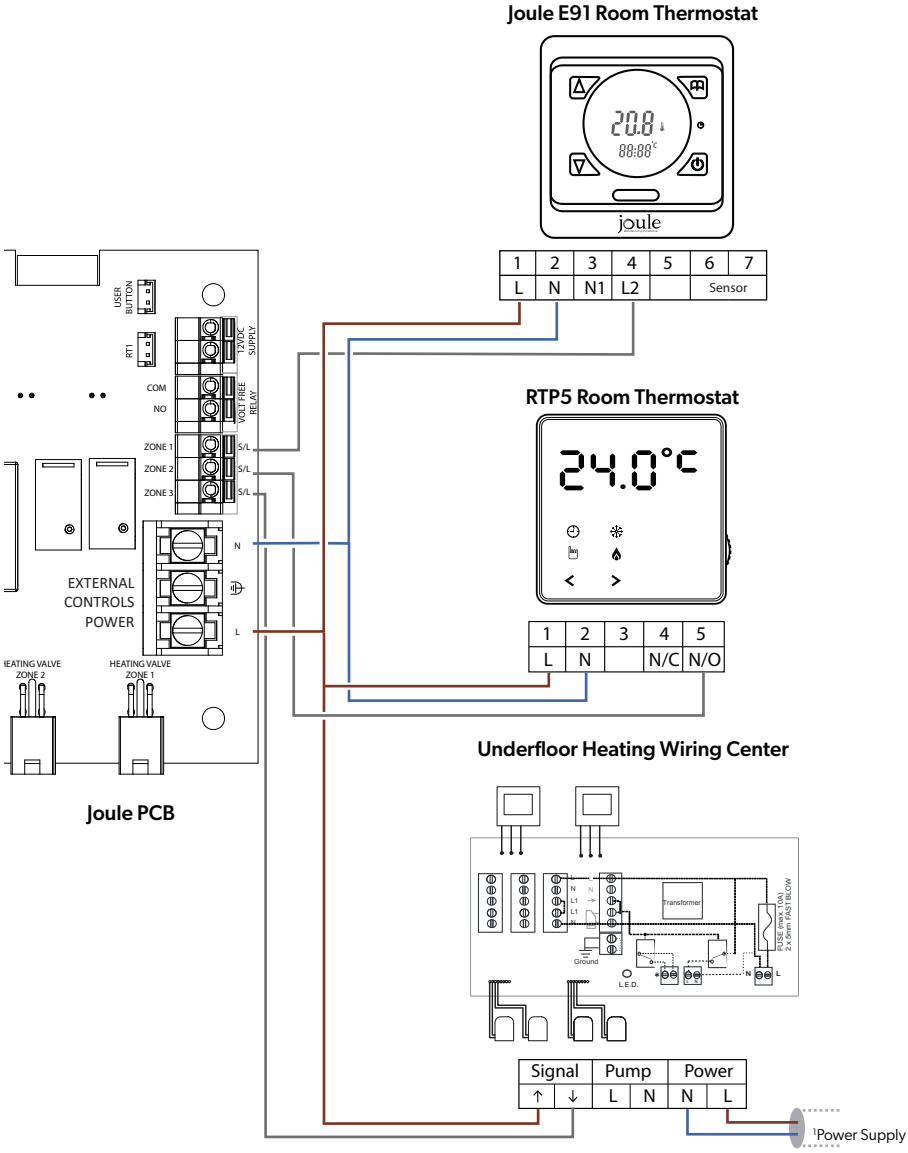


Joule Kodiak PCB

Electrical

Example External Controls

The schematic below shows examples of different types of external controls and how they connect to the 'Joule Kodiak PCB'.



1) Underfloor Heating Wiring Center to be powered locally via fused spur

2) For simplicity Earth connections have not been shown.

Temperature & Pressure Relief Valve

Connect the tundish and route the discharge pipe which must be routed in accordance with Building Regulations - Part G3 of schedule 1.

When operating normally water will not be discharged from the temperature and pressure relief valve. Water discharge from the temperature and pressure valve will only occur under fault conditions. The tundish is pre-fitted as shown below.

The discharge pipe (D2) coming from the tundish should terminate in a safe place where there is no risk to persons near the discharge, be of metal and:

- Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long, i.e. discharge pipes between 9m and 18m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27m at least 3 sizes larger, and so on.

- Bends must be taken into account in calculating the flow resistance. Refer to Table 1 and the worked example. An alternative approach for sizing discharge pipes would be to follow BS6700 Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

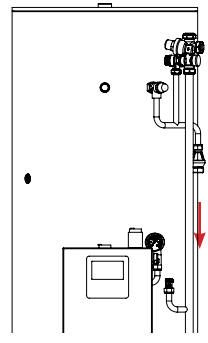
- Be installed with a continuous fall. The discharge must be visible at the final point of discharge.

TABLE 1

	G1/2			G3/4			G1		
Min. size of discharge pipe D1	15mm			22mm			28mm		
Min. size of discharge pipework D2 from tundish	22mm	28mm	35mm	28mm	35mm	42mm	35mm	42mm	54mm
Max. length of straight pipe (no bends or elbows)	Up to 9mm	Up to 18mm	Up to 27mm	Up to 9mm	Up to 18mm	Up to 27mm	Up to 9mm	Up to 18mm	Up to 27mm
Deducts the below from the maximum length for each bend or elbow in the discharge pipe	0.8m	1m	1.4m	1.0m	1.4m	1.7m	1.4m	1.7m	2.3m

Sizing of copper discharge pipe (D2) for a temp, relief valve with a G1/2 outlet size (as supplied)

Example of Discharge Arrangements



Heating System Pipework

Connecting To The Cylinder

If plastic pipes are used, they must be approved temperature resistant to 95°C at a pressure of 10 bar. A thermostatic mixer should be installed in the system to prevent the risk of scalding.

Heat Pump Primary Connections

Connect the primary connections as shown below. In the Kodiak Pre-Plumb the primary circulating pump is pre-fitted along with the hot water motorised valve.

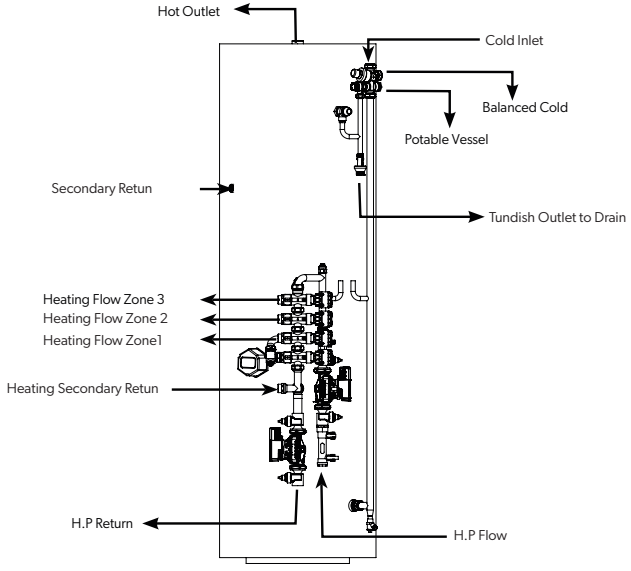
Bypass

The pre-plumb module is fitted with an automatic integral bypass to ensure a flow of water should all valves be in the closed position.

Heating System Pipe Conections

Connect the heating zone connections as shown below. In the Kodiak Pre-Plumb the heating zone motorised valves are pre-installed. The circulating pump for the heating system is also pre-installed.

All heating zone returns should be joined at the cylinder and return via heating return as shown below.



Inlet Control Group

Inlet Control Group

The cold inlet must be piped into the top of the inlet control group. It is recommended to install a full bore isolation valve on the cold inlet for maintenance and servicing of the valve.

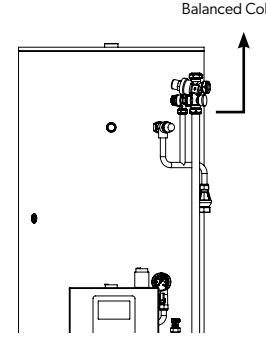
The water supply should be checked to ensure it can meet these requirements. If necessary, consult the local water authority regarding the likely pressure and flow rate availability. Consideration should be given to upgrading existing 1⁄2" (15mm) cold mains pipework to a larger size if the recommended minimum pressure / flow rate is not being achieved. Joule™ recommend that primary pipework used has a minimum diameter of 22mm to ensure low pressure loss.

Excess pressure can lead to the cylinder bursting. The inlet control set supplied has an expansion relief valve with a 15mm connection to allow it to be connected to a tundish, this is pre-plumbed. Make sure that there is enough space for future maintenance. The Inlet Control Group Pressure Reducing Valve is pre-set to 3-bar. In cases where the DYNAMIC (working) pressure is less than this, the pressure reducing valve should be set to match the DYNAMIC (working) pressure. This is required to prevent noise at the expansion vessel when water is drawn off, caused by higher STATIC pressures coming through the Inlet Control Group.

A high static (noflow) mains pressure ic no guarantee of good flow availability. In a domestic installation 1.5bar and 25ltr/min should be regarded as the minimum. The maximum mains pressure that the inlet control set can cope with is 10bar.

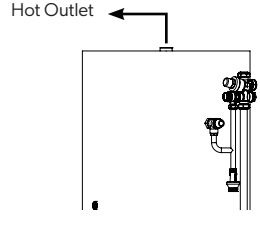
Potable Expansion Vessel

The expansion vessel receives the increased water volume when expansion takes place as the system heats up and it maintains a positive pressure in the system. The expansion vessel contains a flexible diaphragm, which is initially charged on one side with nitrogen, but can be topped up with air when required. Select a suitable position for the expansion vessel. Mount it to the wall using the bracket provided (0-24L only, 35L and above are floor standing) and hard fix into pipework and insulate. Ensure that the top of the vessel is accessible for servicing. The pipe connecting the expansion vessel to the system should have a diameter of not less than 15mm and must not contain any restrictions.



Hot Water Outlet

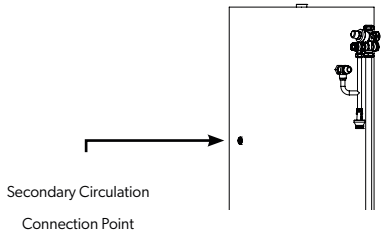
Run the first part of the hot water distribution pipework in 22mm. This can be reduced to 15mm and 10mm as appropriate for the type of tap etc. Your aim should be to reduce the volume of the hot draw-off pipework to a practical minimum so that the time taken for the hot water is as quick as possible. Do not use monobloc mixer tap or showers if the balanced cold connection is not provided. Outlets of this type can back pressurise the unit and result in discharge.



Potable Pipework

Secondary Circulation

On larger installations long pipe runs to draw-off points can cause significant volumes of water to bedrawn off before an acceptable temperature can be reached. Secondary pumped circulation using a stainless steel or a bronze pump and combined with effective time and temperature controls can overcome this problem. Where secondary return circulation is required the pipework should be run in 15mm pipe and the pipework must be insulated to prevent excessive heat loss, leading to high running costs. A check valve must also be installed to prevent back flow. The secondary circulation tank connection can be seen diagram below.



Commissioning

Potable System

First the precharge pressure in the expansion vessel must be checked to verify its is 0.3 bar below the inlet group setting ex. 3 bar inlet = 2.7 vessel. The valve is of the Schrader car tyre type.

Check all the connections for water tightness including any factory-made connections such as the immersion heater and the temperature and pressure relief valve.

Prior to filling, open the hot tap furthest away from the cylinder to expel air. Open the cold main isolation valve and allow the unit to fill. Once the cylinder has been fully commissioned it should be heated to its normal operating temperature.

Filling and Flushing The System

Filling the heating System

The zone valves incorporated do not have a manual lever so they cannot be opened manually. The valves will remain in the last known state when power to the unit is disconnected. For this reason it is important to know if power has been applied to the unit as this will determine if the valves have remained open or have closed.

The Kodiak Pre-plumb cylinders are delivered with ALL heating and hot water zone valves OPEN.

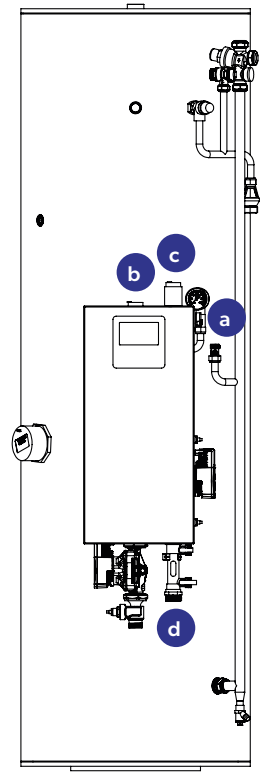
N.B. If it is unclear that power has been applied to the unit proceed to section 2.

1. Before the Heat Pump has been Powered On

If filling the system BEFORE the Heat Pump has been powered On, the heating and hot water zone valves are NOT required to be opened.

Follow the steps below to fill and vent the system in the correct order:

1. Ensure all system valves are open fully.
2. Fill the system using the incorporated **filling loop (a)** to the recommended pressure (min 1.0 bar – max 1.5 bar).
3. Vent the **manual air vent (b)** on the units coil connection (highlighted below).
4. The incorporated **automatic air vent (c)** is designed to release any trapped air in the units manifold.
5. Manually vent the all heat emitters to ensure all system air has been removed.
6. Ensure the system is watertight.
7. Connect the **fill & flush pump (d)** and circulate water around the entire system for approximately 1 hour.
8. On completion of the venting and flushing processes, disconnect the fill & flush pump and ensure the pressure remains within the recommended setting. If not, increase the pressure again using the filling loop.
9. Isolate both sides of the filling loop and disconnect the flexible section of the loop

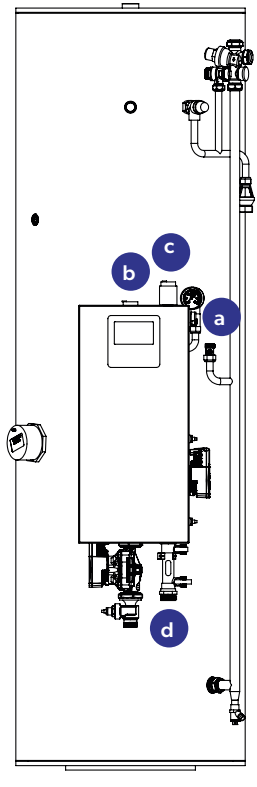


Heating System

2. After the Heat Pump has been Powered On

The Pre-plumb cylinders (Kodiak) are delivered with ALL heating and hot water zone valves OPEN so if the system is being filling AFTER the Heat Pump has been powered On, the heating and hot water zone valves WILL need to be opened.

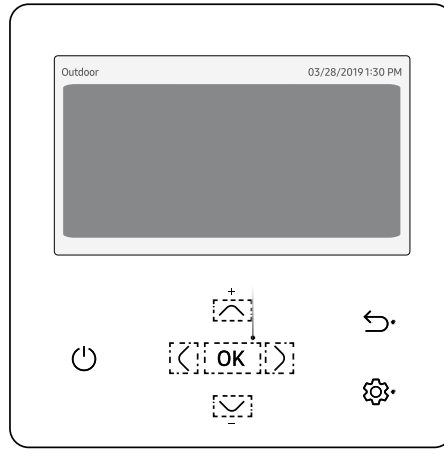
1. Ensure all system valves are open fully.
2. Fill the system using the incorporated **filling loop (a)** to the recommended pressure (min 1.0 bar – max 1.5 bar).
3. Vent the **manual air vent (b)** on the units coil connection (highlighted below).
4. The incorporated **automatic air vent (c)** is designed to release any trapped air in the units manifold.
5. Manually vent the all heat emitters to ensure all system air has been removed.
6. Ensure the system is watertight.



Once the Heat Pump is powered On follow the remaining steps to flush each zone independently:

7. Connect the **fill & flush pump (d)** as outlined below.
8. Turn On the DHW setting to open the DHW zone valve. Ensure heating zones are switched off.

    8A. Use the right and left arrows to high light the DHW function.



8B. Once highlighted push the power button and DHW should display.

8C. Once complete push ⮌ to return to front Screen

8D. DHW is now active.

8E. Flush the DHW coil for approximately 15 minutes.

9. Turn Off the DHW setting and create a Heat Demand (by turning On all room thermostats).

10. Now the heating zones can be flushed to ensure all air has left the circuit(s), for approximately 45 minutes.

11. On completion of the venting process, disconnect the **fill & flush pump (d)** and ensure the pressure remains within the recommended setting. If not, increase the pressure again using the filling loop.

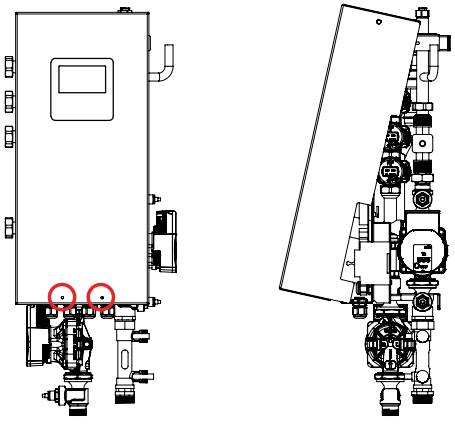
12. Isolate both sides of the filling loop and disconnect the flexible section of the loop.

Accessing The Pre-Plumbed Components

Zone Valve Motor Head

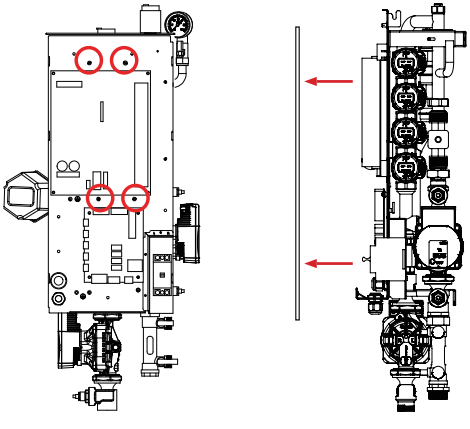
DANGER: Danger to life through electric shock!Before carrying out any work on electrical components, isolate them from the power supply (230 V AC) (fuse, circuit breaker) and secure against unintentional reconnection.

Removing the Cover



Remove the cover by removing the 2 No. M4 screws around the perimeter of the front cover. On removal disengage the earth connection tab and controller quick release connection.

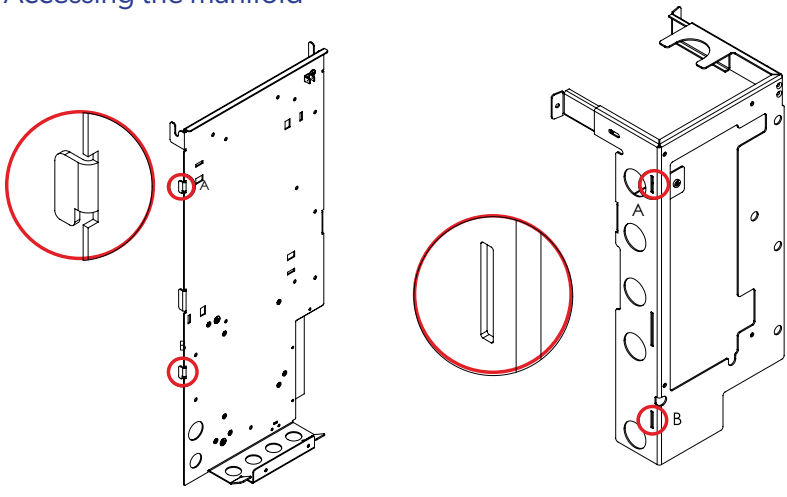
Removing the PCB Mounting Plate



Remove the PCB Mounting Plate from the Fixing Jig by removing the 4 No. M4 screws (2 No. above Samsung PCB and 2 No. between the Samsung and Joule PCB).

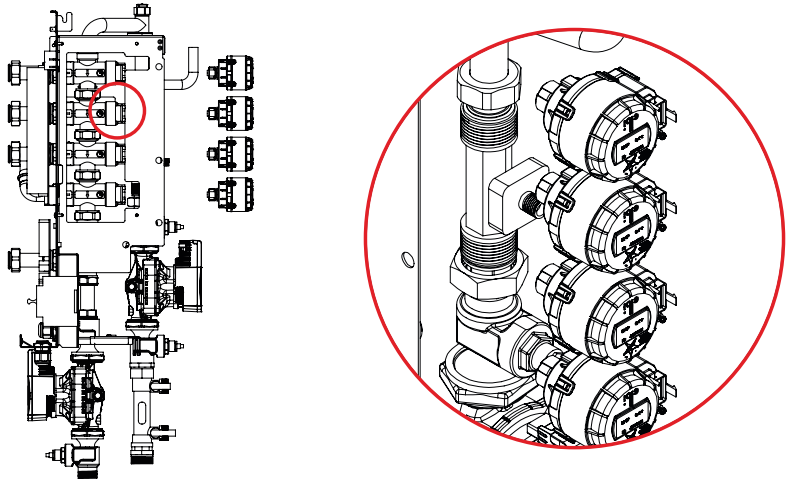
Note: Beware of cables connected

Accessing the manifold



With the PCB Mounting Plate hooks on the left hand side of the plate hang the plate in the Fixing Jig holes as shown in the image. The brass manifold is now accessible.

Removing the Motor Head



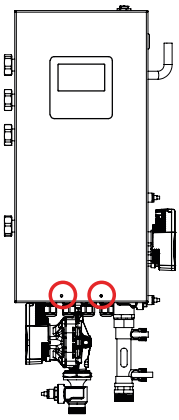
With access to the brass manifold all motor heads can be removed with disengaging the circlip as shown in the image. Once the circlip is out the motor head can be removed from the brass body.

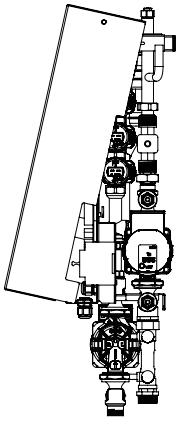
Flow Sensor

DANGER: Danger to life through electric shock!

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.

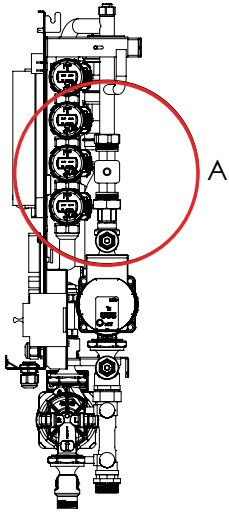
Removing the Cover

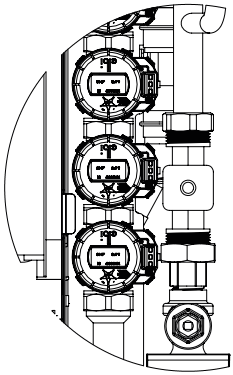




Remove the cover by removing the 2 No. M4 screws around the perimeter of the front cover. On removal disengage the earth connection tab and controller quick release connection.

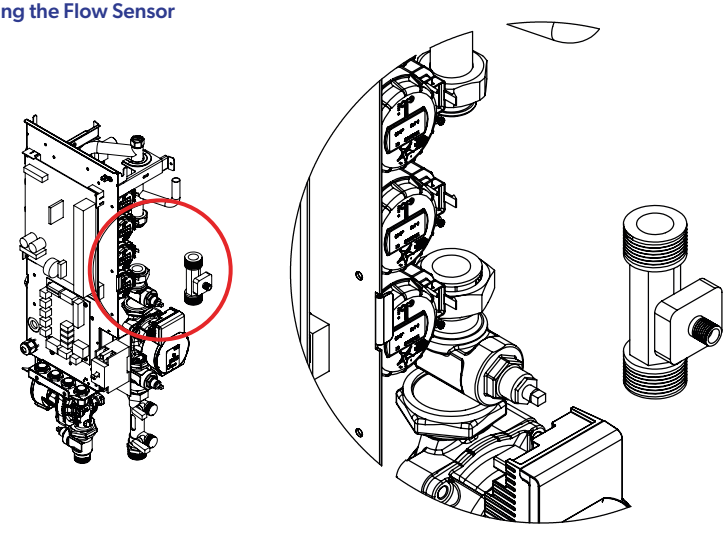
Accessing the Flow Sensor





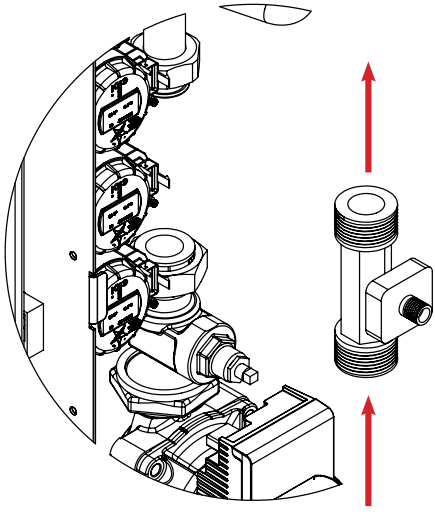
The Flow Sensor is access from the right hand side and is connected by BSP Nuts. Before replacing ensure the heating system is isolated or drained and the flow sensor cable is disconnected from the fitting. Loosen the BSP Nut either side of the Flow Sensor and ensure each nut is clear of all threads.

Removing the Flow Sensor



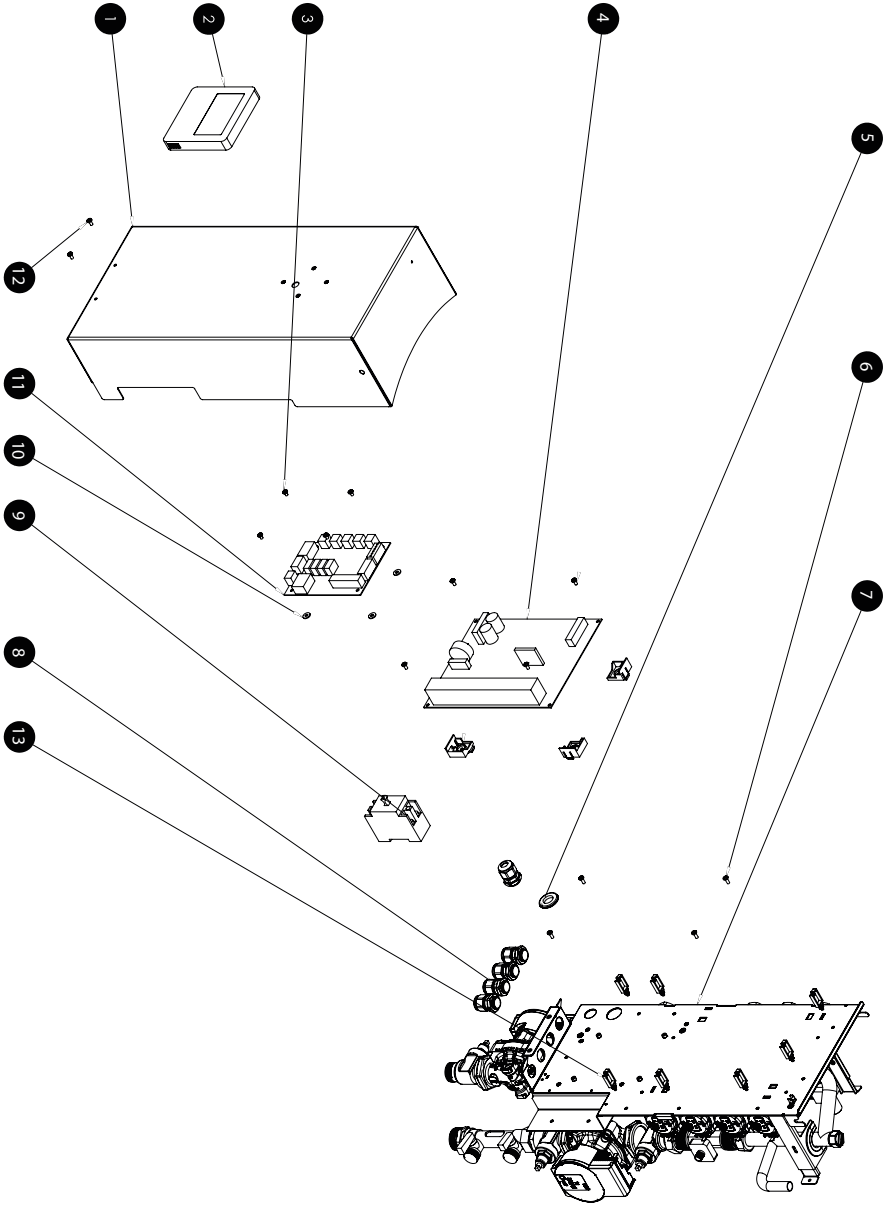
Once the nuts are free from the Flow Sensor threads the flow sensor can be taken out as shown in image.

Replacing the Flow Sensor

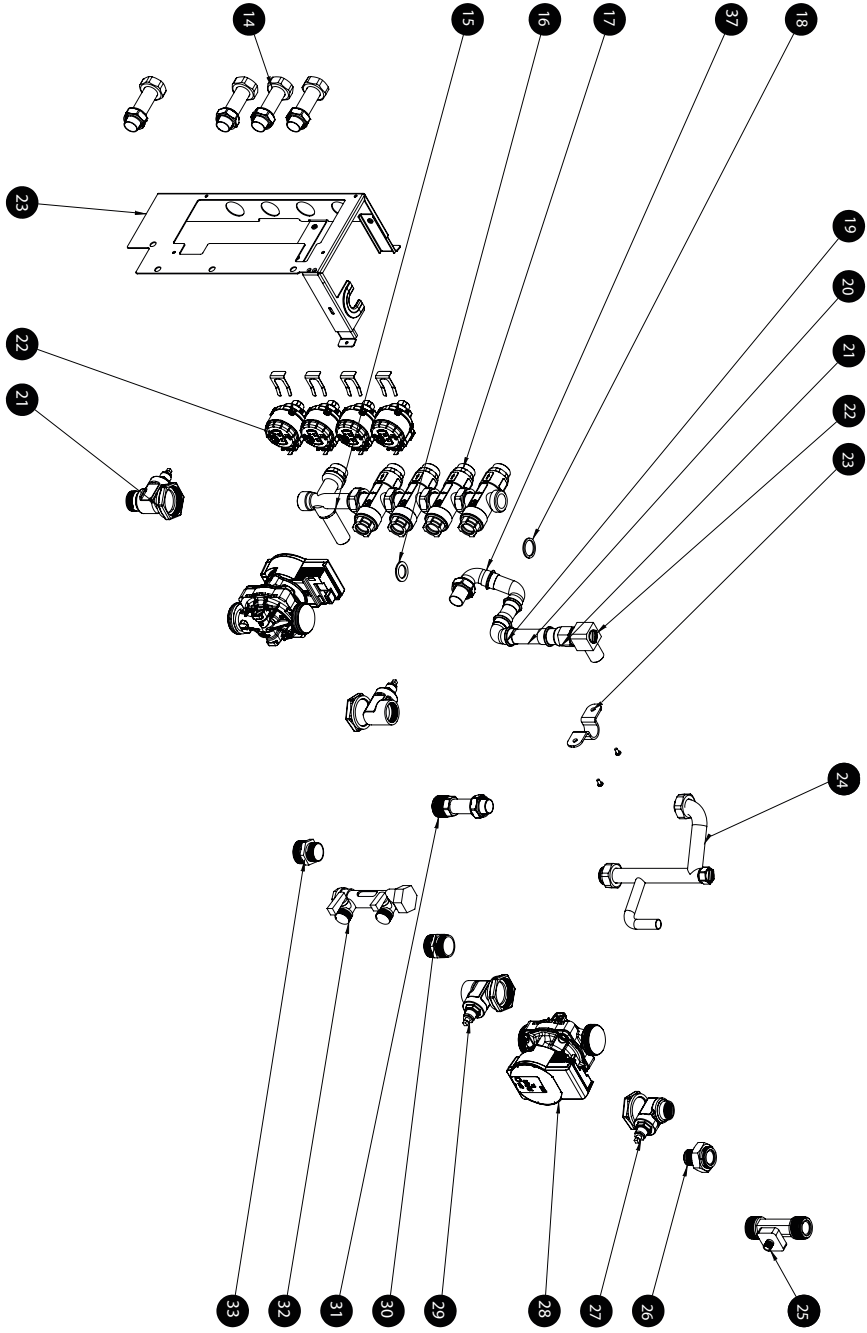


On replacing the flow sensor make sure the direction of flow is correct.

Parts List



Parts List



Parts List

Item Legend

Item No.	Part No.	Description	Qty
1	HZHP-KDK-00COV	Project Kodiak: Cover	1
2	HZSMC-G600000J	MONO CONTROL CENTRE GEN6 (UNCASED) - Controller	1
3	HMU-MS-M04X12N	M4 x 12mm Machine Screw NYLON	1
4	HZSMC-G600000J	Mono Control Centre Gen6 (RAW)	1
5	HZ-RS25-41-219	Rubber Grommet Cable Entry	1
6	HMU-MS-M04X012	M4 x 12mm Machine Screw	4
7	HZHP-KDK-00PLT	Project Kodiak: Plate	1
8	HMPYG-00000000	20MM PG GLAND	1
9	HZSMC-G600000J	MONO CONTROL CENTRE GEN6 (UNCASED) - Electrical Breaker	1
10	HMU-NW-M04X0.8	M4 Plain Nylon Tap Washer, 0.8mm Thickness	4
11	TZ-W-0000000W	Joule Kodiak PCB - Rev C	1
12	HMU-PS-M4-0012	M4x12 pan posi screw RAL 9006	2
13	HMU-PUSH-SCLIP	Cable Clip Natural Push In Nylon Saddle Clip	7

No.	Part No.	Description	Qty
14	TMPF-OUT-KOD-1	Heating zone Outlet	4
15	TZ-V-BMANIFOLD	15.1208 BY-PASS MANIFOLD	1
16	TZ-WASHR-30132	D0771 washer G1 (Ø30xØ13x2)	1
17	TZ-V-BMAN-LCKR	Brass Manifold Lock Ring	4
18	TZ-WASHR-30202	D0667 washer G1 (Ø30xØ20x2)	1
19	HMPF-00-415-22	22mm Press Elbow	1
20	HMPF-00-412-22	3/4" f X 22mm Press Straight Coupler	1
21	TZ-MANUALV-0.5	Pre Plumb 1/2'' BSP Manual Vent	1
22	HMPF-HPPP-ELB1	22mm Compression - Smooth Tube Brass Elbow	1
23	HMU-SP-CLIP22M	22mm Copper Pipe Saddle Clip	1
24	HMPF-HPPP-2ZPF/HMPF-HPPP-3ZPF	Project Kodiak: 3 Zone Primary FlowProject Kodiak: 2 Zone Primary Flow	1
25	HZSMC-G600000J	MONO CONTROL CENTRE GEN6 (UNCASED) - Flow Sensor	1
26	HMPF-RA-000134	1" BSP Female x 3/4" Male Reducing Adaptor	1
27	TBC	3/4" FEMALE PUMP VALVE	1
28	HZC-0000A25-60	circulating pump 25/60 (A rated)	2
29	HMPYV-0000028F	28MM FEMALE PUMP VALVE (ENG)	1
30	HM-FN-00028-28	1" to 1" BSP straight nipple	1
31	HMPF-ST-000221	22mm Smooth Tube x 1" BSP Male	1
32	HZK-0P-0000000	Combined Fill Flush + Flow Met	1
33	HMPF-00-411-29	411 28mm x 1" straight coupler	1
34	HMPYV-00000028	28MM PUMP VALVE (ENG)	1
35	TZM-I-PP0022MM	15.1221 Motorised Valve	4
36	HZHP-KDK-00FIX	Project Kodiak: Fixing Jig	1
37	HMPF-HPPP-ELB3	3/4'' BSP 90 Degree Brass Elbow	2

Maintenance and Servicing

General

Servicing should only be carried out by competent installers and any spare parts must be purchased from Joule

Never bypass any safety devices or operate the unit without being fully operational.

Draining

Switch the electrical power off (important to avoid damage to element). Isolate the power supply to the unit. Turn off the cold water supply valve. Open hot water tap. Open the drain valve. The unit will drain.

Water drained off may be very hot!

Annual Maintenanceg

The Cylinder/ Indoor unit require annual servicing in order to ensure safe working and optimum performance. It is essential that the following checks are performed by a competent installer on an annual basis. This is commonly done at the same time as the annual heat pump service.

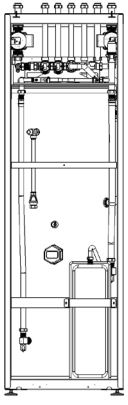
- Twist the cap for the expansion relief valve on the inlet control set and allow water to flow for 5 seconds. Release and make sure it resets correctly.
- Repeat with the pressure/temperature relief valve. In both cases check that the discharge pipework is carrying the water away adequately. If not, check for blockages etc. and clear.
- Check that any immersion heaters fitted are working correctly and that they are controlling the water at a temperature between 55°C and 65°C.
- Check the pressure in the expansion vessel is charged correctly. Turn off the water supply to the unit and open a hot tap first. The air valve on expansion vessel is a Schrader (car tyre) type.
- Air or CO2 may be used to charge the expansion vessel. Unscrew the head on the inlet control set and clean the mesh filter within.

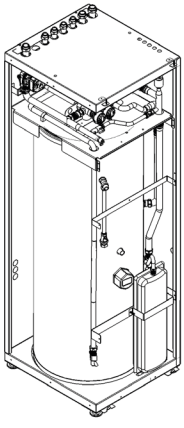
The Service Log Book supplied with this unit should be updated at each service.

Your guarantee may be void if you cannot produce proof of annual servicing.

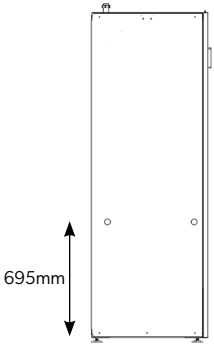
Kodiak Compact Dimensions

Product Schematics

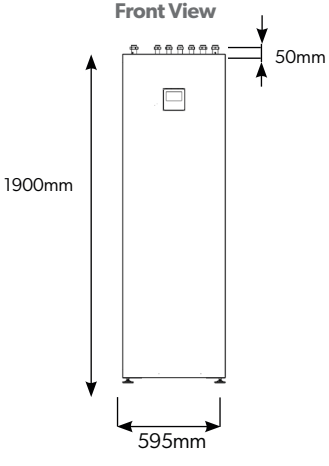




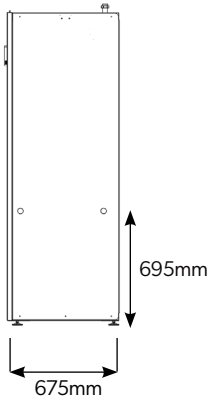
Left Side View



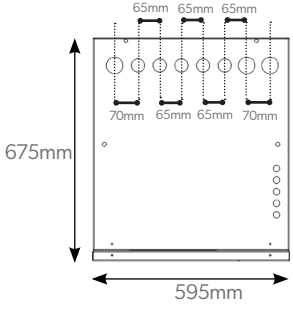
Front View



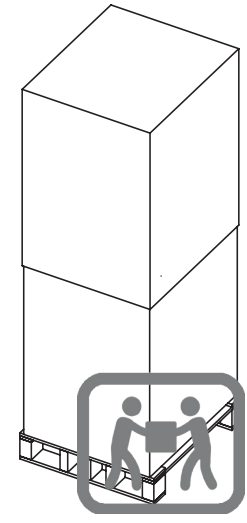
Right Side View



Top View



Transporting the unit



Transport and Handling

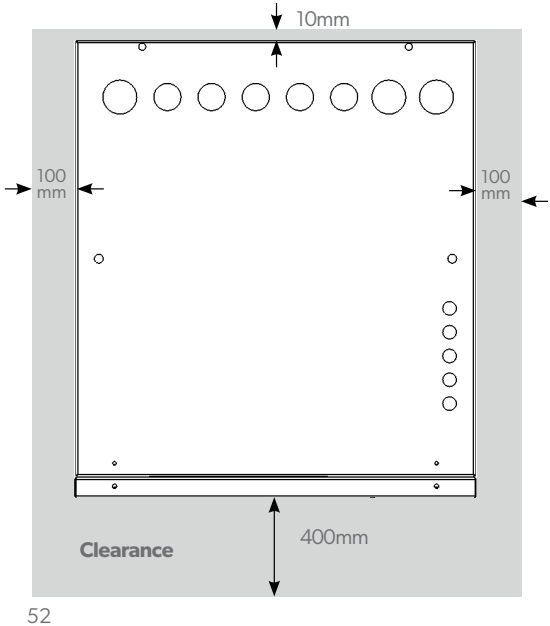
The Kodiak Compact unit is delivered fully packaged and fixed to a wooden pallet base. Care should be taken when transporting the unit ensuring that the casing is not damaged by impact.

At least two people should lift the unit to prevent injuries. The unit must be stored in a dry area and must never be dropped during handling. Packaging should only be removed at the installation location. This will help protect the casing and components. The unit must be installed on a level floor with the required load bearing capability.

The cylinder unit must be transported in an upright position only.

Suitable Location

Care should be taken that the recommended minimum distance around the unit for service and maintenance works to be carried out. Enough access to allow maintenance of the valves should be considered. In addition, the immersion heater is 400mm in length and this distance should be considered to allow withdrawal for servicing if required.

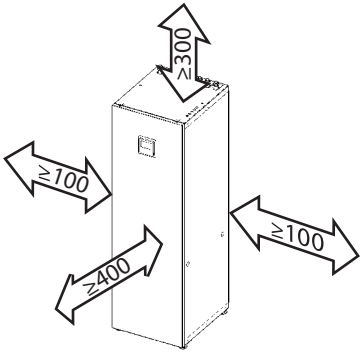


When usng the adjustable feet, ensure that the floor is strong enough. Install the unit where it is not exposed to water/excessive moisture. Particular attention is needed if sitting in a garage or outbuilding as the unit should be protected from frost. All exposed pipework must be insulated. The unit must be installed upright on a base capable of supporting its weight when full (please see the technical specification section for weights).

Installing the unit

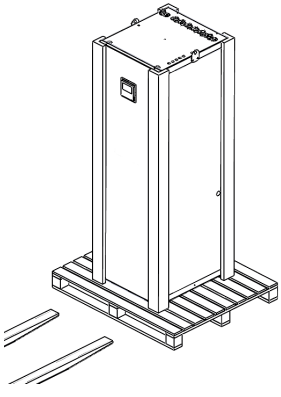
Installation space

- Ensure to leave the appropriate space as indicated in the drawing.
- Installation site should be secured with adequate ventilation so that the components of indoor unit will not be damaged from overheating.



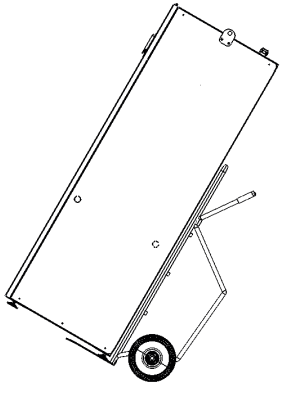
Moving the unit with a fork lift.

- Insert the fork into the wooden pallet at the bottom of the unit carefully. Be careful that the fork does not damage the unit.
- When moving the unit, take care not to cause damage through impact with the environment. Do not remove packaging until the unit has reached its final installation destination.



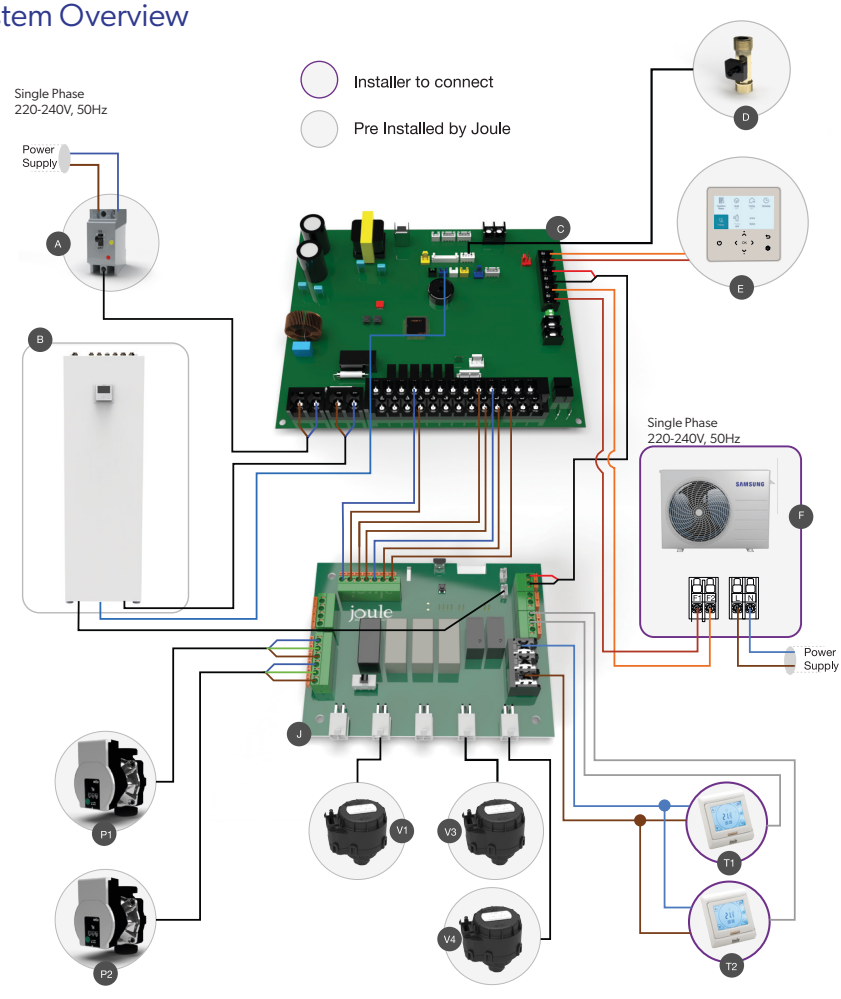
Moving the Unit Indoors

- Select the moving route in advance.
- Be sure that moving route is safe from weight of the unit.
- Transport the Unit carefully with a Hand truck.



Electrical

System Overview



For simplicity Earth connections have not been shown.

	Description	Item Codes
A	Samsung 30A ELCB	HZC-0000A25-70
B	Kodiak Compact	HUKC-G6210C-3C
C	Samsung MIM-E03CN/DN	HZSMC-G600000J
D	Samsung Flow Sensor	HZSMC-G600000J
E	Samsung Touchscreen Controller	HZSMC-G600000J
F	Samsung Outdoor Unit	HHSM-G6000xx-1
J	Joule Kodiak PCB	TZ-W-0000000W

	Description	Item Codes
P1	Wilo Primary Circulating Pump	HZC-0000A25-60
P2	Wilo Secondary Circulating Pump	HZC-0000A25-60
T	Joule E91 room thermostat	UZS-E91-TS0230
V1	DHW - Motorized Zone valve	TZM-I-PP0022MM
V3	Heating Valve 2 - Motorized Zone valve	TZM-I-PP0022MM
V4	Heating Valve 1 - Motorized Zone valve	TZM-I-PP0022MM

Electrical

Kodiak Compact Power Supply

The table below outlines the power requirements for the Kodiak Compact (MIM-E03(CN/DN)

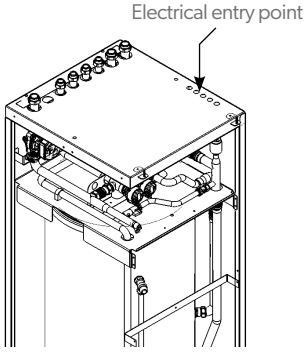
Indoor Unit	Load	Power Supply	Power Cable	MAX. Length	Type GL
			mm2 wires	m	A
MIM-E03(CN/DN)	[1]Booster Heater (3kw)	1Ø, 220-	4.0 / 3	<10m	20
			6.0 / 3	10m<L20m	20
	Booster Heater (~3kw) + Backup Heater (~3kw)	240Vac, 50Hz	6.0 / 3	<10m	40
			8.0 / 3	10m<L20m	40

1) This is the standard setup in a Kodiak Compact.

Power Supply Cable Entry

All electrical wiring must be carried out by a competent installer and be installed in accordance with current local Wiring Regulations.

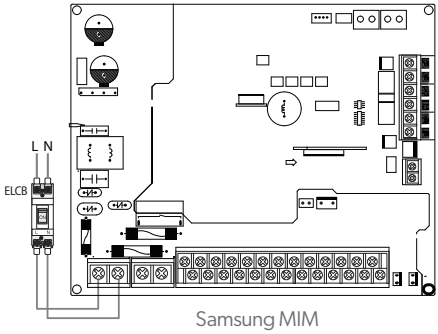
The cable entry points are located on top of the unit. The cable can enter through th rubber grommets provided or the grommet can be replaced with a suitable cable gland. Ensure all cables are secured using the fixings provided.



Power Supply Connections

Connect 'Live' and 'Neutral' power line with the terminals marked 'L, N' of the ELCB which is located inside the units electrical enclosure.

Connect the 'Protective Earth' line with the 'Earth screw' inside the units electrical enclosure. The rear casing of the units electrical enclosure is the termination point for all Protective Earth Connections. Please use earth termination points provided.



Samsung MIM

Electrical

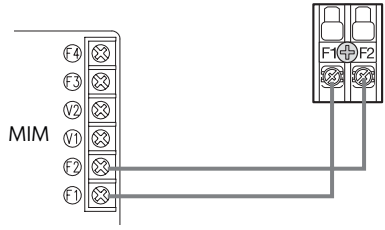
Protective Earth

All pre-installed components are earthed. The integrity of a protective earth system relies on its primary connection. It is the installers responsibility to ensure the rear of the units electrical enclosure casing is earthed, therefore providing a protective earth connection to all system components.

Connecting the communication cable

The communication cable is the signal between the outdoor unit and the MIM casing.

Using a two-core cable connect the terminals F1 & F2 of the outdoor unit to the terminals F1 & F2 of the MIM casing.



Connecting External Controls

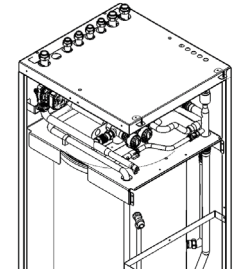
Connection of external controls to the Kodiak Compact unit are made directly to the 'Joule Kodiak PCB' which is located inside the metal electrical enclosure, as detailed in the image shown on the right.

There is a dedicated 230V AC supply to power the external controls. These terminals are labelled 'External Controls Power' , specifically

'L, N & E' on the Joule PCB.

The switched live input from the external controls should be connected to the terminals labelled 'Zone 1' S/L, 'Zone 2' S/L and 'Zone 3' S/L on the Joule PCB, as detailed in the image below.

N.B. Applying a 230V switched live to the terminal 'Zone 1' S/L will activate 'Heating Zone Valve 1'.



WARNING!

All external controls are 230V AC Connections

Example External Controls

A sample schematic showing examples of different types of external controls and how they connect to the 'Joule Kodiak PCB' is displayed on page 41 & 42.

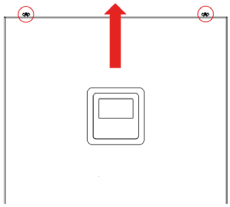
Temperature & Pressure Relief Valve

Temperature & Pressure Relief Valve Pipework

Before placing the Kodiak Compact unit into position take note of the temperature and pressure relief discharge pipe route options. There are left and right points on the Kodiak Compact unit to exit the relief pipework. To access and connect the pipe work follow guidelines listed below.

1. Remove the two wing nuts at the top of the front panel.

2. Slide front panel upwards slightly and open carefully.



3. Disconnect the quick release coupler connecting the main remote controller cable and the control board cable

Connect the tundish and route the discharge pipe which must be routed in accordance with Building Regulations - Part G3 of schedule 1.

When operating normally water will not be discharged from the temperature and pressure relief valve. Water discharge from the temperature and pressure valve will only occur under fault conditions. The tundish is pre-fitted as shown below.

The discharge pipe (D2) coming from the tundish should terminate in a safe place where there is no risk to persons near the discharge, be made of metal:

- Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long, i.e. discharge pipes between 9m and 18m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27m at least 3 sizes larger, and so on.

- Bends must be taken into account in calculating the flow resistance. Refer to Table 1 and the worked example. An alternative approach for sizing discharge pipes would be to follow BS6700 Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

- Be installed with a continuous fall. The discharge must be visible at the final point of discharge.

TABLE 1

	G1/2			G3/4			G1		
Min. size of discharge pipe D1	15mm			22mm			28mm		
Min. size of discharge pipeword D2 from tundish	22mm	28mm	35mm	28mm	35mm	42mm	35mm	42mm	54mm
Max. length of straight pipe (no bends or elbows)	Up to 9mm	Up to 18mm	Up to 27mm	Up to 9mm	Up to 18mm	Up to 27mm	Up to 9mm	Up to 18mm	Up to 27mm
Deducts the below from the maximum length for each bend or elbow in the discharge pipe	0.8m	1m	1.4m	1.0m	1.4m	1.7m	1.4m	1.7m	2.3m

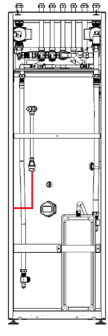
Sizing of copper discharge pipe (D2) for a temp, relief valve with a G1/2 outlet size (as supplied)

Temperature & Pressure Relief Valve

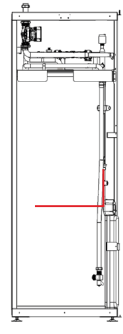
Examples of Discharge Arrangements

Left Side Pipe Exit

Front View

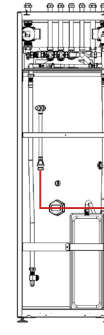


Side View

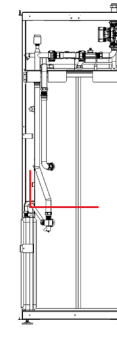


Right Side Pipe Exit

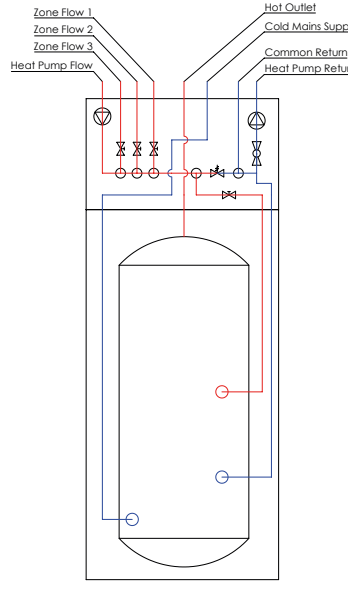
Front View



Side View



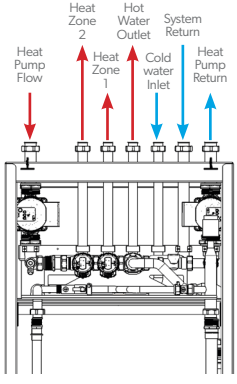
Waterway Schematic

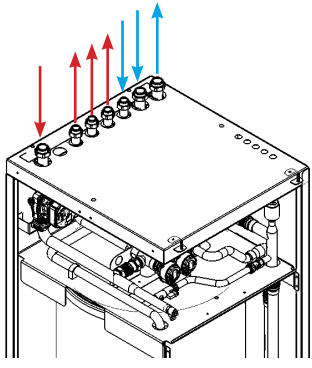


Heating System Pipework

Heat Pump Primary Connections

Connect the primary connections as shown below. The direction of flow is indicated by the arrows in the diagram below. In the Kodiak Compact the primary circulating pumps are pre-fitted along with the hot water motorised valves.

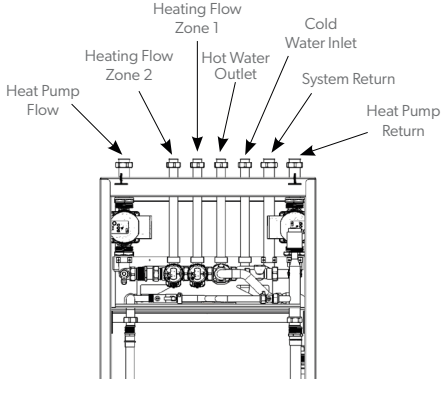


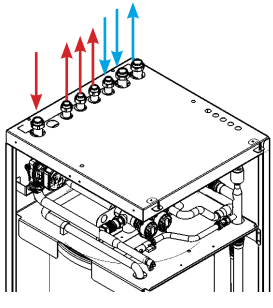


Heating System Pipe Conenctions

Connect the heating zone connections as shown below. In the Kodiak Compact the heating zone motorised valves are pre-installed along with the heating system expansion vessel. The circulating pump for the Heat pump system is also pre-fitted within the casing.

All heating zone returns should be joined and return via system retern as shown below.



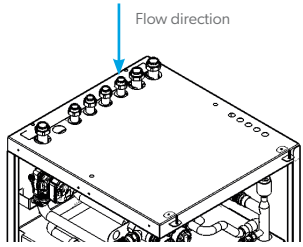


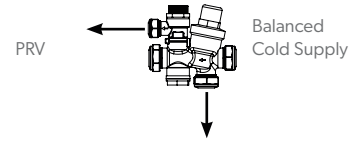
Potable Pipework

Fitting the Inlet Control Group

Excess pressure can lead to the cylinder bursting. The inlet control set supplied has an expansion relief valve with a 15mm connection to allow it to be connected to a tundish, this is pre-plumbed. Make sure that there is enough space for future maintenance and for connection of the discharge pipe for the expansion relief valve. It is essential that this connection is not covered or closed.

The cold inlet must be piped into the top of the inlet control group. It is recommended to install a full bore isolation valve on the cold inlet for maintenance and servicing of the valve.





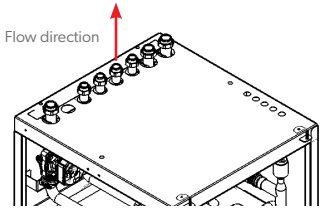
The water supply should be checked to ensure it can meet these requirements. If necessary, consult the local water authority regarding the likely pressure and flow rate availability. Consideration should be given to upgrading existing 1⁄2" (15mm) cold mains pipework to a larger size if the recommended minimum pressure / flow rate is not being achieved. Joule™ recommend that primary pipework used has a minimum diameter of 22mm to ensure low pressure loss.

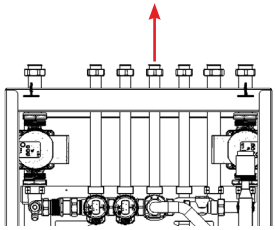
Potable Expansion Vessel

The expansion vessel receives the increased water volume when expansion takes place as the system heats up and it maintains a positive pressure in the system. The expansion vessel contains a flexible diaphragm, which is initially charged on one side with nitrogen, but can be topped up with air when required. Select a suitable position for the expansion vessel. Mount it to the wall using the bracket provided (0-24L only, 35L and above are floor standing) and hard fix into pipework and insulate. Ensure that the top of the vessel is accessible for servicing. The pipe connecting the expansion vessel to the system should have a diameter of not less than 15mm and must not contain any restrictions.

Hot Water Outlet

Run the first part of the hot water distribution pipework in 22mm. This can be reduced to 15mm and 10mm as appropriate for the type of tap etc. Your aim should be to reduce the volume of the hot draw-off pipework to a practical minimum so that the time taken for the hot water is as quick as possible. Do not use monobloc mixer tap or showers if the balanced cold connection is not provided. Outlets of this type can back pressurise the unit and result in discharge.





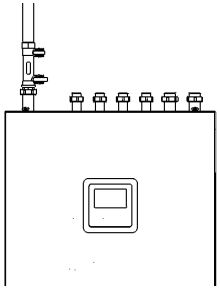
Commissioning

Potable System

Refer to page 39.

Heating System

The fill flush and flow meter is an important component of any heat pump system. It is provided in all Joule Heat Pump kits. For all heat pump systems a flow rate of over 7 l/min is required. It provides connections for the fill and flush ports of the heating system flush pump for installation and ongoing servicing. **See Page 40 & 41 for the Filling and Flushing procedure that must be completed as part of the commissioning process.**



Maintenance and Servicing

General

Servicing should only be carried out by competent installers and any spare parts must be purchased from Joule

Never bypass any safety devices or operate the unit without being fully operational.

Draining

Switch the electrical power off (important to avoid damage to element). Isolate the power supply to the unit. Turn off the cold water supply valve. Open hot water tap. Open the drain valve. The unit will drain.

Water drained off may be very hot!

Annual Maintenance

The Cylinder/ Indoor unit require annual servicing in order to ensure safe working and optimum performance. It is essential that the following checks are performed by a competent installer on an annual basis. This is commonly done at the same time as the annual heat pump service.

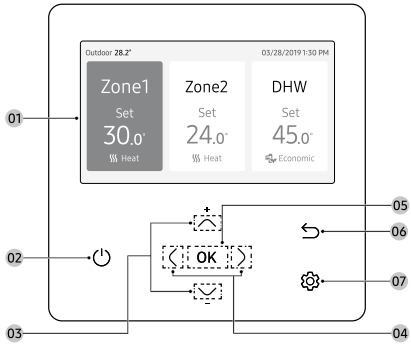
- Twist the cap for the expansion relief valve on the inlet control set and allow water to flow for 5 seconds. Release and make sure it resets correctly.
- Repeat with the pressure/temperature relief valve. In both cases check that the discharge pipework is carrying the water away adequately. If not, check for blockages etc. and clear.
- Check that any immersion heaters fitted are working correctly and that they are controlling the water at a temperature between 55°C and 65°C.
- Check the pressure in the expansion vessel is charged correctly. Turn off the water supply to the unit and open a hot tap first. The air valve on expansion vessel is a Schrader (car tyre) type.
- Air or CO_2 may be used to charge the expansion vessel. Unscrew the head on the inlet control set and clean the mesh filter within.

The Service Log Book supplied with this unit should be updated at each service.

Your guarantee may be void if you cannot produce proof of annual servicing.

Samsung Controller

Overview of the Samsung Controller Initial Start Up



Location	Function
1	**Operation status display -** Displays the operation/function settings and statuses.
2	**Operation On/Off button (LED display) -** Turns the Air to Water Heat Pump power On / Off
3	**Up/Down button -** Moves between items vertically or changes the set temperature.
4	**Left/Right button -** Moves between items horizontally or changes the item value.
5	**OK button -** Saves your new settings.
6	**Save & Return button -** Saves your new settings and returns to the previous step.
7	**Option button -** Selects the detailed setting function.

Initial Start Up

Please refer to controller symbols and button functions on pages shown on the left for further guidance on the heat pump controls.

1. Ensure that both the outdoor and indoor units are correctly wired and plumbed prior to turning on.
2. Flush the system at 110% of system flow rate in both directions.
3. Once the system has been power flushed you must now fill the system with Glycol.
4. The Glycol should be pre mixed before putting it into the system and a solar filling station is ideal for filling the system, use the connections on the fill/flush and flow meter to add the glycol.
5. Do not put Neat Glycol into the system, failure to do this may cause the glycol to block the heat exchanger or block the pipes within the heat emitter circuit.
6. Run the solar filling station for at least an hour to purge all the air from the system.
7. Turn on power to the indoor unit first. Then turn on power to the outdoor unit second.
8. The outdoor unit will start flashing. It flashes 'scanning' while connecting the indoor and outdoor units.
9. Once scanning disappears from the screen the system is ready for testing.

Setting up the controller and the time

1. Push the Gear Icon
2. Use the Arrows to highlight option and push the right arrow
3. Use the down arrow until User mode is highlighted, then push the right arrow
4. Use the down arrow until Wired Remote is highlighted and push the right arrow
5. Use the Down arrow to Current time and push the right arrow
6. Date will be highlighted, push the right arrow and date format should be displayed.
7. Push OK, now you can set the date by using the arrows.
8. Once set push OK, and you should then return to the current time menu with date highlighted.
9. Use down arrow to highlight time and right arrow to enter time menu
10. Set clock to 24 hr format by using down arrow, then left and right arrows to high light hours and minutes.
11. Use up and down arrows to set the time.
12. Once complete push OK button.
13. Use the back button to return to the home screen.

How to Add or delete Schedules

1. Push the Gear Icon to enter the menu
2. Use the right arrow to high light schedule, then push ok
3. To add a schedule push ok, when add a schedule is highlighted
4. Select daily schedule using up and down arrows, push right arrow to enter
5. Select type of schedule using up and down arrows, change from quiet to DHW
6. Push right arrow to select either Off, or what power mode you wish for the DHW mode to start in.
7. We strongly recommend that standard is selected.
8. Use right hand arrow to highlight the hour and minutes, use up and down arrows to adjust.
9. Push OK to save.
10. To edit a schedule, use up and down arrows to highlight schedule, use left and right-hand arrow to select edit, push ok and repeat above steps to edit.
11. To delete schedule, highlight delete, push ok and schedule is deleted.
12. Push to return to home screen.

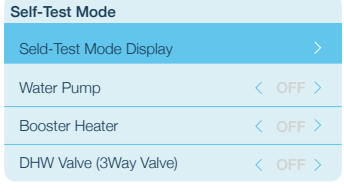
How to enter Service Mode

1. Using two hands, push and hold the up and down arrows for 10 seconds
2. Password will appear, the password is 0202
3. Use arrows to enter password
4. Push OK
5. You are now in the service Menu

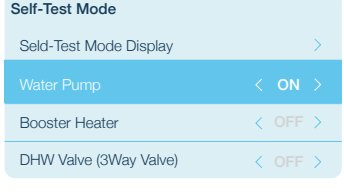
Self-Test Mode

1. To access the Self-test mode, you must enter the Service Menu.

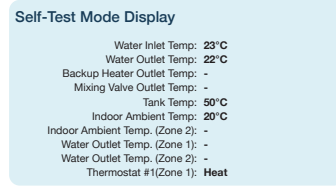
2. Once in the service menu Use the Down arrow to scroll down to self-test



3. Use the right arrow to enter the menu
4. Use and down arrows to highlight component to test
5. Once highlight use the right arrow to enable component



6. You can go up to self-test display at any point, use the right arrow to enter



Field setting values

1. Enter Service mode
2. Use down arrow to highlight field setting value
3. Push right arrow to enter
4. Use up and down arrows to select sub menu required.
5. Example for weather comp and heating flow highlight 20 – water law
6. Push right arrow to enter sub menu
7. You will see the individual settings within this menu.
8. Use up and down to set FSV
9. Example 2011 Low set is 15, High set is 2.0
10. Once set push OK and Saving FSV will be displayed.
11. You will then return to the heat sub menu.
12. You can then use the up and down arrows to highlight other heat settings and right arrow to enter.
13. To go back to FSV menu use ⮌ and you can then move to other sub menus such as DHW.
14. To exit FSV mode push ⮌ until you return to the front Screen.

Energy Monitoring Function

1. In order to enable the energy monitoring function, please set FSV 3083.
2. Enter the service mode and go to FSV 3083 within the DHW settings.

3. Set 3083 to 3 kw.
4. Now use the ⮌ to return to the front screen.
5. Use the ⚙ to enter user menu, and use the arrows to highlight “Energy”
6. Push the ok button to enter this menu
7. Energy usage should be highlighted, push right arrow to enter
8. From here you have four options.
9. Instantaneous usage
10. Weekly energy usage
11. Monthly energy usage
12. Yearly energy usage
13. Use the arrows to navigate the menus.
14. Example: weekly usage> weekly consumption> display will then show current week, use left hand arrow to look at previous week.
15. Push ⮌ to return to previous sub menu or push several times to exit to home screen.

Turning on Heating and DHW

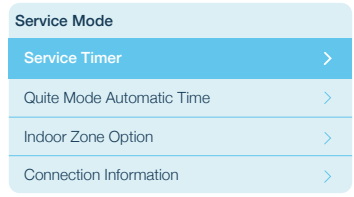
1. Use the ⮌ arrow to ensure you are on the front Screen
2. Use the right and left arrows to high light the function to turn on.
3. To turn on DHW, use the right arrow so DHW function is highlighted
4. Once highlighted push the power button and DHW should display.
5. To set temperature Push ok button whilst DHW is highlighted
6. Use up and down arrows to set water temperature
7. Push OK button to set power mode, this should be set for Standard.
8. Use up and down to select Standard and push OK.
9. Once complete push ⮌ to return to front Screen

To set heating to ON

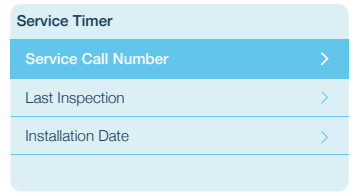
1. Use left and right arrows to highlight Zone
2. Push power button to enable heating
3. Screen display will show 0.0
4. Push the OK button to enter heating info
5. From here you can see flow temps
6. Use the ⮌ to exit this screen.
7. 0.0 must be on for the heat pump to detect run signals from the heating system.

How to setup service call number

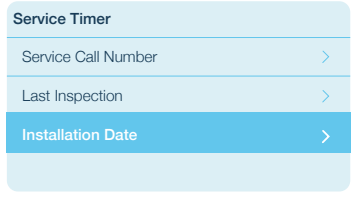
1.



2.

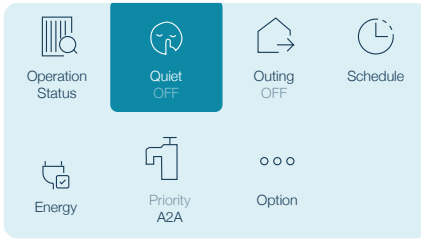


3.



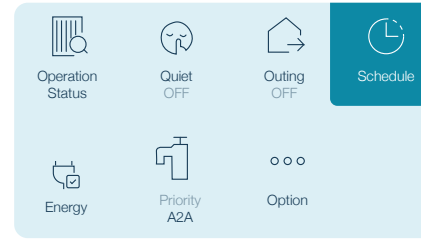
Setting Quite Mode Manually

1. Push the Gear Icon to enter the menu
2. Quite mode can then be turned on or off manually by selecting the 'Quiet' icon
3. if quiet mode is turned on manually, the output of the heat pump will be reduced. Quiet mode must be switched to off to return the heat pump output to its normal capacity.

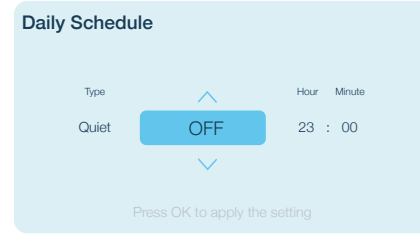


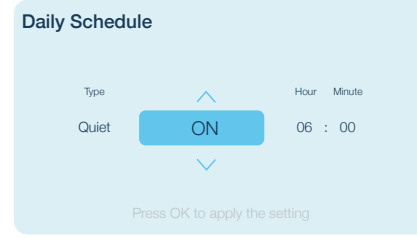
Setting Quite Mode Automatically

1. Push the Gear Icon to enter the menu
2. Enter the schedule menu



3. Select add a schedule

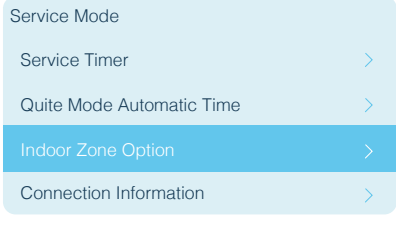




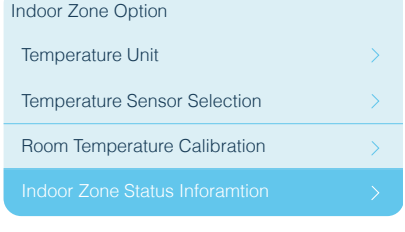
4. Choose to set the schedule daily weekly or yearly
5. Set the 'ON' and 'OFF' times for the schedule
6. Quiet mode when automatically come on during the choosen time period

How to read water flow rate

1. Enter Service mode
2. Use the arrows to move to ‘Indoor Zone Option’



3. Press the right arrow button
4. Use the down arrow to find ‘Indoor Zone Status Information’

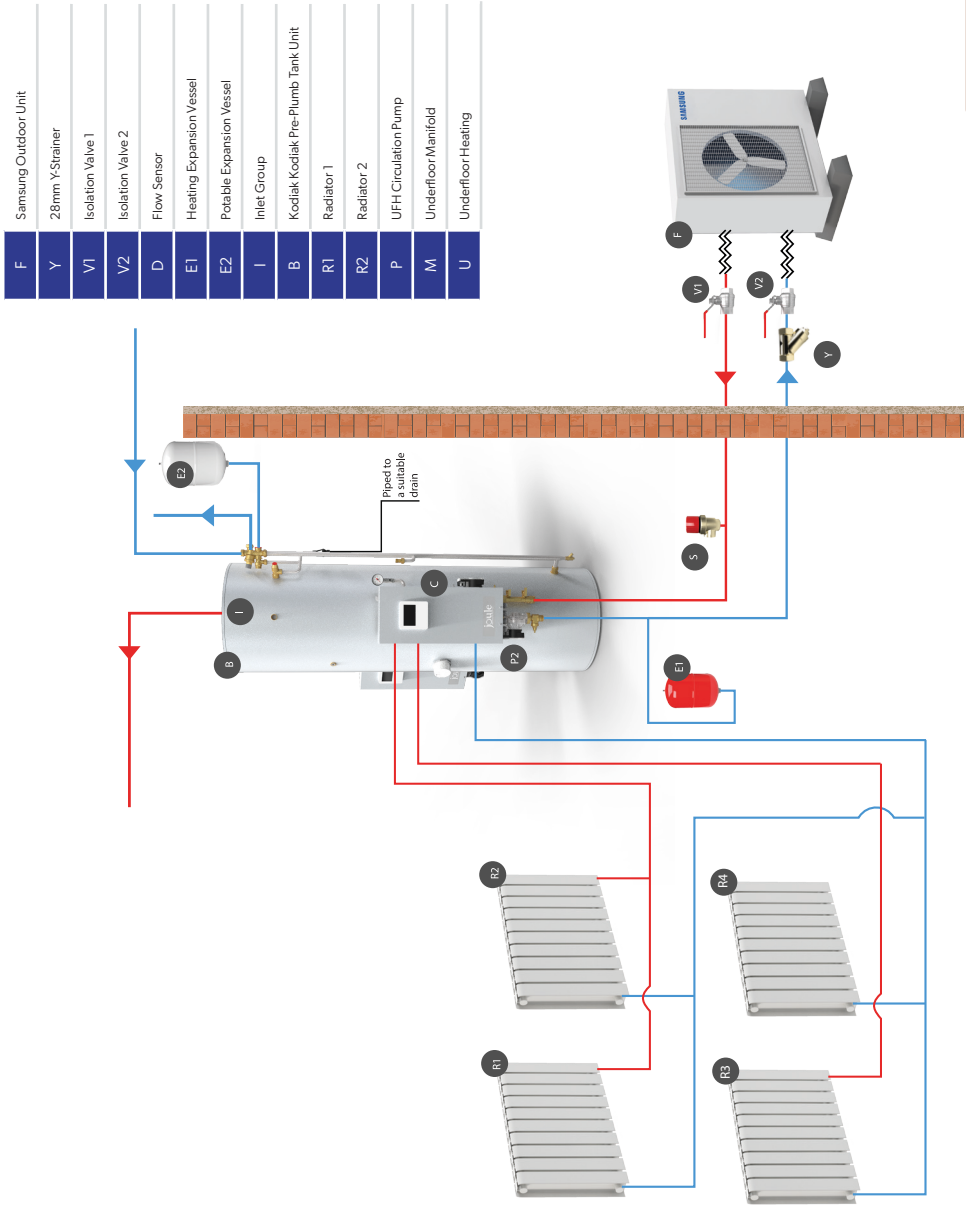


5. Press the right arrow button
6. Use the down arrow to navigate to the ‘Flow Sensor’ information

Kodiak Installation

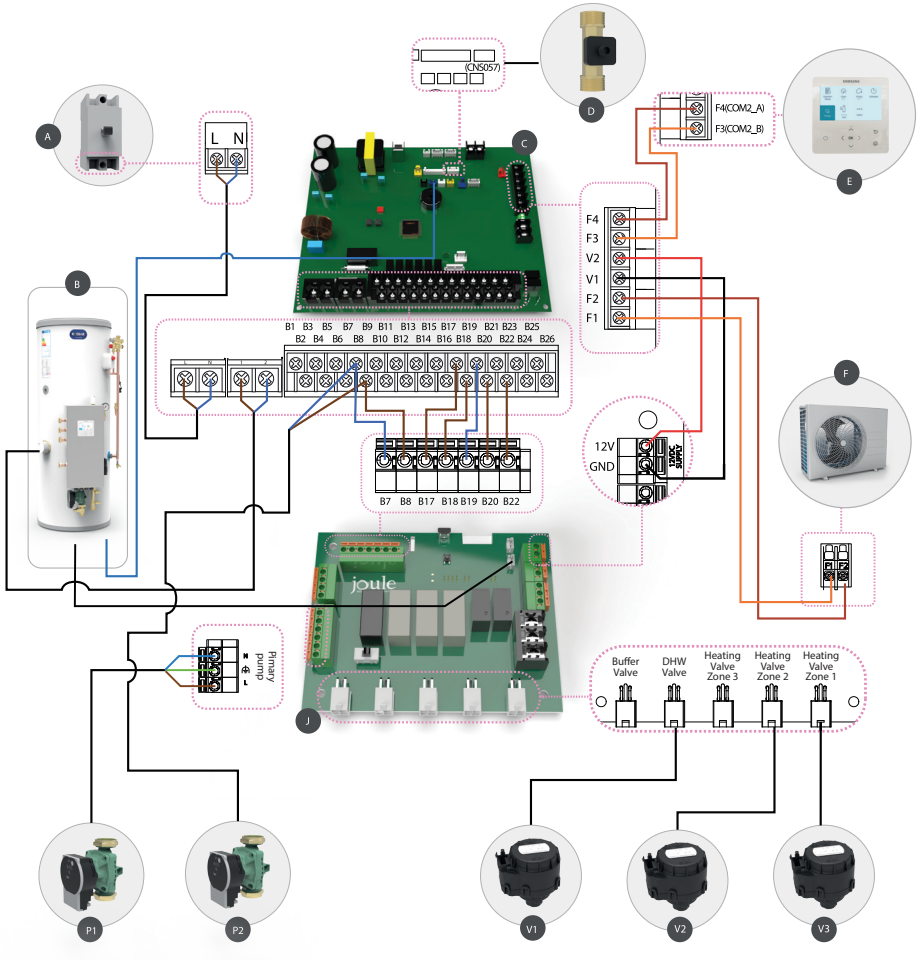
Mechanical Diagram

F	Samsung Outdoor Unit
Y	28mm Y-Strainer
V1	Isolation Valve 1
V2	Isolation Valve 2
D	Flow Sensor
E1	Heating Expansion Vessel
E2	Potable Expansion Vessel
I	Inlet Group
B	Kodiak Kodiak Pre-Plumb Tank Unit
R1	Radiator 1
R2	Radiator 2
P	UFH Circulation Pump
M	Underfloor Manifold
U	Underfloor Heating



Kodiak Installation

Electrical Diagram



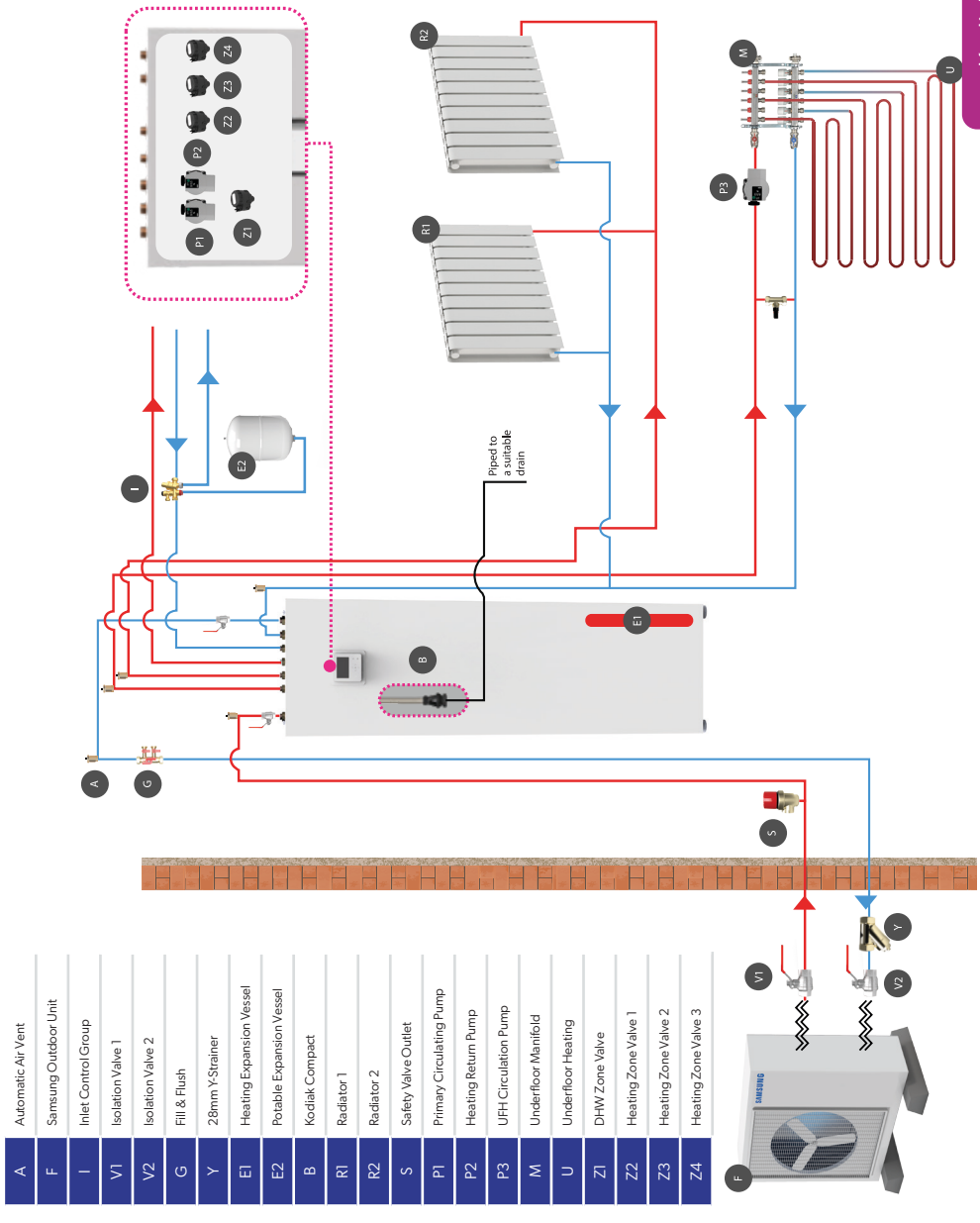
For simplicity Earth connections have not been shown.

	Description	Item Codes
A	Samsung 30A ELCB	HZC-0000A25-70
B	SmartPlumb Tank	HUGH-G6x0x0-xC
D	Samsung Flow Sensor	HZC-0000A25-70
E	Samsung Touchscreen Controller	HZC-0000A25-70
J	Joule Kodiak PCB	TZ-W-0000000W

	Description	Item Codes
P1	Wilo Primary Circulating Pump	HZC-0000A25-60
P2	Wilo Secondary Circulating Pump	HZC-0000A25-60
V1	DHW - 2 Port Zone Valve	
V3	Heating Valve 2 - 2 Port Zone Valve	

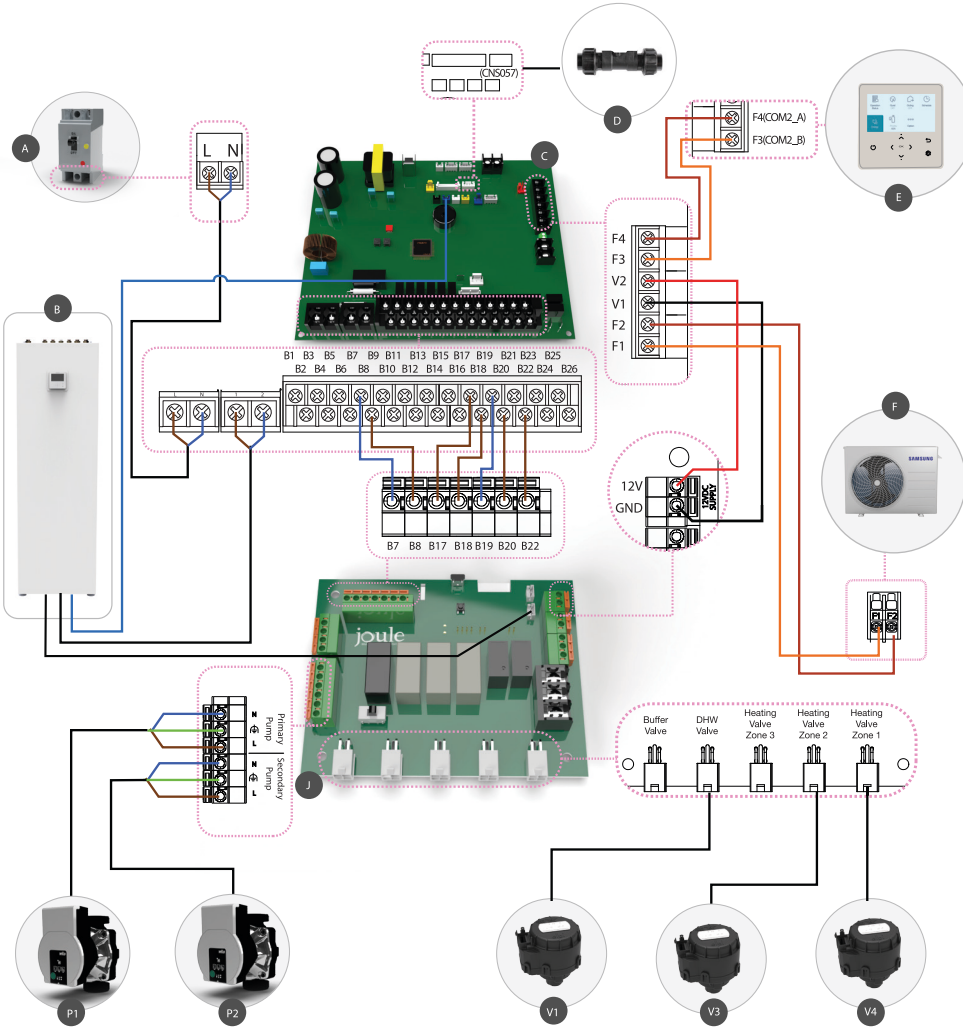
Kodiak Compact Installation

Mechanical Diagram



Kodiak Compact Installation

Electrical Diagram



Field Setting Parameters

Field Setting Parameters for the Kodiak & Kodiak Compact Cylinder

If you set a field setting and go back to check it, it will not have changed. The field setting does not get written to th PCB unless you push Ok after changing it.

Samsung Gen 6 Monobloc #FSV REVIEW -

Applicable Products: Kodiak Pre-Plumb Cylinder & Kodiak Compact.

Menu Code	Menu Des.	Sub Menu code	Sub Menu Description	Function			Pre-commissioning Setting	#FSV Range		
				Item	Step	Unit		Default	Min	Max
10**	Remote Controller	105*	DHW Tank Temp.	Max.	1	°C	55	55	50	70
				Min.			40	40	30	40
20**	Water Law	201*	Outdoor Temp. For Water Law (Heat)	High	1	°C	2	-10	-20	5
				Low			15	15	10	20
		202*	Water Out Temp. for WL1 Heat (WL1.Floor)	Low: Target Value	1	°C	35	35	17	65
				High: Target Value	1	°C	45	45	17	65
		2091	External Thermostat Application #1 (Floor)	#1 (Floor)	-	-	Use(Signal ON/OFF) or WL Interlink OFF (Water Pump 2)	Not Use	Not Use	Use(Signal ON/OFF) or WL Interlink OFF (Water Pump 3)
30**	DHW	3011	Domestic Hot Water Tank	-	-	-	Use(Hysteresis) Thermo ON/OFF State	Not Use	Not Use	Use (Hysteresis) Thermo ON/OFF State
	Heat Pump	302*	3021 Max Temp.	-	1	°C	50	55	45	55
			3025 Max. DHW Operation Time	-	5	min	As per Table 1	60	5	95
	Booster Heater	303*	3035 Delay Time	-	5	min	As per Table 1	20	20	95
	Disinfection	304*	3042 Interval	-	1	day	TUESDAY	TUES	MON	SUN
			3043 Start Time	-	1	o' clock	3HOUR	3 HOUR	0 HOUR	24 HOUR
			3044 Target Temp.	-	5	°C	60	55	40	70
			3045 Duration	-	5	min	15	15	5	60
	Forced DHW Operation	305*	Forced DHW Operation	Timer OFF Function	-	-	Use	Not Use	Not Use	Use
				Timer Duration	10	min	60 min	60 min	30 min	300 Min

Table: 1

#FSV	Tank Volume	Setting
3025 & 3032	≤ 180	50
	200	60
	230	70
	250	75
	300	90
	≥ 400	95

Fault Codes

Error Code	Contents	Measure	Product op. in error condition	Error Type
			Outdoor unit / Comp. / Ind. unit	
101	Indoor unit communication error	Check the communication cable of indoor unit. Check the DC output voltage at the communication terminal.	Operation off	Communication error
102	Indoor unit/outdoor unit communication time-out error: errors in more than 6 packets	Check the outdoor communication cable connection. Check DC output voltag and the communication terminal.	Operation off	Communication error
121	Indoor temperature sensor (open/short error)	Check indoor unit room temperaute sensor. Check indoor unit PCB connector CN41 (White)	Operation off	Indoor sensor error
122	Indoor unit Eva in sensor (Open/Short)	Check indoor unit pipe sensor. Check indoor PCB connector CN41 (White)	Operation off	Indoor sensor error
128	Indoor unit Eva in sensor disconnection	Check the disconnection of indoor unit pipe sensor.	Operation off	Indoor sensor error
153	Indoor floating switch secondary detection	Check indoor unit float sensor. Check indoor PCB connector CN5 (black)	Operation off	Self diagnostic error
202	Indoor/outdoor communication error (1 min)	Check the communication connection between indoor and outdoor units. Check the power line and communication cable connection status.	Operation off	Communication error
203	Communication error between indoor/outdoor INVIMAIN <-> MICOM (1 min)	Check MAIN MICOM Check INVERTER MICOM	Operation off	Communication error
221	Outdoor temperature sensor error	Check sensor connection status Check sensor location Check sensor resistance	Operation off	Outdoor sensor error
237	COND temperature sensor error	Check sensor connection status Check sensor location Check sensor resistance	Operation off	Outdoor sensor error
251	[Inverter] Emission temperature sensor error	Check sensor connection status Check sensor location Check sensor resistance	Operation off	Outdoor sensor error

Fault Codes

Error Code	Contents	Measure	Product op. in error condition	Error Type
			Outdoor unit / Comp. / Ind. unit	
440	Heating operation blocked	Check the operation setting state Check temperature sensor	Operation off	Self diagnostic error
458	Outdoor fan 1 error	Check input power connection status Check the connection status between the motor and outdoor unit of PCB Check indoor/outdoor fuse	Operation off	Self diagnostic error
461	[Inverter] Compressor startup error	Check the compressor connection status Check the resistance between different phases of the compressor	Operation off	Outdoor unit protection control error
462	[Inverter] Total current error / PFC over current error	Check the input power Check the coolant charging status Check the normal operation of outdoor fan	Operation off	Outdoor unit protection control error
464	[Inverter] IPM over current error	Check coolant charging Check the compressor connection status and normal operation Check the obstacles around the indoor and outdoor units Check whether the outdoor unit service valve is open Check whether the indoor/outdoor installation pipe/wiring are correct	Operation off	Outdoor unit protection control error
465	Compressor V limit error	Check the compressor connection status Check the resistance between different phases of the compressor	Operation off	Outdoor unit protection control error
466	DC LINK over/low voltage	Check input power Check AC power connection	Restart in 3 minutes	Outdoor unit protection control error
467	[Inverter] Compressor rotation error	Check the compressor connection status Check the resistance bettwen different phases of the compressor	Operation off	Outdoor unit protection control error
468	[Inverter] Current sensor error	Check EEPROM DATA Check the normal operation of PCB	Operation off	Outdoor unit protection control error
469	[Inverter] DC LINK voltage sensor error	Check the input power connection Check the status of RY21 and R200 in the INVERTER PCB	Operation off	Outdoor unit protection control error
471	[Inverter] OTP error	Check EEPROM DATA Check the normal operation of PCB	Operation off	Outdoor unit protection control error

Fault Codes

Error Code	Contents	Measure	Product op. in error condition	Error Type
			Outdoor unit / Comp. / Ind. unit	
475	Outdoor fan 2 error	Check th einput power connection status Check the connection status of the motor and the outdoor unit PCB Check the indoor/outdoor unit fuse	Operation off	Self diagnostic error
554	Gas leak error	Check the coolant charging status Check the indoor EVA sensor Check if the outdoor unit service value is open Check that the indoor/outdoor installation pipe/ wiring are correct	Operation off	Self diagnostic error
556	Capacities not matched	Check the option code of the indoor unit	Operation off	Outdoor unit protection control error
601	Communication error between the indoor unit and wired remote controller	Check the connection wire between the indoor unit and the wired remote controller	Operation off	Wired remote controller error
602	Communication error between the Master and Slave wired remote controllers	Check the option switch for defining the master and slave (only one master and one slave can exist)	Normal operation	Wired remote controller error
606	COM1/COM2 cross installation error	Check that wired remote controller is connected to the COM2 terminal of the indoor unit	Normal operation	Wired remote controller error
607	Communication error between the Master and Slave wired remote controllers.	Check the option switch for defining the master and slave (only one master and one slave can exist)	Normal operation	Wired remote controller error

Troubleshooting

Error Code	Meaning	Troubleshooting
E177	Emergency stop	Indoor unit ($POUSPM kit) orders emergency stop. Check the indoor unit ($POUSPM kit)
E201	Control kit quantity is mismatched.	Control kit quantity must be matched with outdoor unit 1 by 1. Check the $POUSPM kit quantity. It must be 1EA.
E403	Detection of outdoor freezing when compressor stops.	Outdoor unit (condenser) froze. Check condenser.
E404	Protection of outdoor overload when compressor stops.	Compressor is overloaded. Please check same as E461 and check compressor when it starts.
E416	Discharge temperature of a compressor in an outdoor unit is overheated.	Discharge temperature is overheated.
E440	Heating operation is not available since the outdoor air temperature is over 35 degrees.	Check the outdoor temperature.
E441	Cooling operation is not available since the outdoor air temperature is lower than -15 degrees.	Check the outdoor temperature.
E465	Compressor overload error	Compressor is overloaded. Please check same as E461 and check compessor when it starts.
E468	Current sensor error	Exchange INVERTER PBA.
E471	Outdoor EEPROM error	EEPROM date is wrong. Exchange EEPROM or MAIN PBA. (This error doesn't occur in EMF 150-AM)
E474	IPM (IGBT Module) or PFCM temperature sensor error	Exchange INVERTER PBA.
E484	PFC overload error	Check reactor located in control plate. If reactor is normal, exchange INVERTER PEA.
E500	IPM is over heated	Check INVERTER PBA's temperature. Power off and cool down INVERTER PBA, and then restart the outdoor unit.
E556	Capacity mismatching between indoor and outdoor	EEPROM data is wrong. Exchange EEPROM or MAIN PBA
E557	Option code miss matching among the indoors (only for DPM)	EEPROM data is wrong. (This error doesn't occur in EMF 150-AM)
E911	Emergency stop	Ensure flow sensor is fitted onto pipework and connected to Samsung PCB. Ensure flow rate is above 16 litres per minute. Ensure all air is removed from system. Check circulation pumps speed setting. Check zone valves are not sticking cloesd. Check direction of flow sensor on pipework. Check direction of pump on pipework. Check direction of Flow Meter on pipework.
E912	Emergency stop	Check circulation pumps are not operating. check flow sensor is installed on horizontal pipework. Ensure 150mm of horizontal pipework each side of flow sensor.

Maintenance and Servicing

Annual Servicing

All Samsung Air Source Heat Pumps supplied by Joule must be serviced annually to validate the product warranty under the terms of the EUW[1] agreement. Items that must be inspected annually to validate the warranty include,

- Check outdoor fan motor and lubricate if needed
- Check electrical wiring, contacts and terminals; repair as required
- Check all safety components
- Check compressor operation
- Check indoor thermostat operation
- Check defrost and heating modes (winter only)
- Check for excessive noise and vibration
- Check refrigerant charge
- Inspect air filters
- Check all safety and pressure switches
- Check motor and heaters/voltage/amperes

An annual service must be carried out by a suitable qualified engineer to validate the terms of the Joule EUW agreement.

[1]. EUW = Extended Warranty Period

Service to Validate Warranty

Kodiak & Air Source Heat Pump

Customer Name:			
Installed Address:			
City:		**Country**	
Post Code:		**Email**	

Heat Pump Model:		**Serial No:**	
Cylinder Model:		**Serial No:**	
Engineer Name:		**Company:**	
Phone No.:		**Email:**	
Accredited Joule Service Partner?			☐ **yes** ☐ **no**

Heating	Description	Comment
Hydraulics	Check pipe work insulation, repair as required	
	Check for signs of water leakage, repair as required	
	Check inhibitor concentration level	
	Clean the line strainer	
	Remove any trapped air in the system	
	Check system pressure is set to 1.5bar when cold	
	Check that heat emitters are balanced & action if required	
Electrical	Check thermostats connections	
	Check thermostat functionality	
Safety Equipment	Check heating safety	
	Check / Charge expansion vessel	

Service to Validate Warranty

Kodiak & Air Source Heat Pump

Outdoor Unit	Description	Comment
	Check for undue noise, vibration or any obvious defects	
	Inspect for damage and clean (ph. neutral cleaner)	
	Inspect for corrosion and treat as required	
	Inspect evaporator for damage and clean fins	
	Inspect fan blade and motor for damage, tighten fixing and clean as required	
	Clean and check condensate drainage	
	Check for signs of water leakage, repair as required	
	Check unit for any damage	
	Check that the unit/units are securely fixed to the wall	
	Check hydraulic flow & return temperatures	
	Check air extract, exhaust, fresh & supply temperatures are in line with what is expected	
Outdoor Electrical	Check evaporator temperature Check any electrical wiring associated with the heat pump	
	Check that any sensors are inserted correctly and have not become dislodged	

Warranty

Standard Warranty Period And Extended Warranty Period

The warranty period starts on the date of installation as shown on the commissioning report. The standard warranty period ends 24 months later. By registering the product(s) which can be done either by yourself, or by the reseller from whom you have purchased the products (the "Reseller") within 28 days after the installation date, you will receive an additional 5 year extended limited warranty service depending on the product type which will bring the total period of coverage to 7 years from the date of installation. All of the terms set in this Statement of Limited Warranty shall apply to any extended warranty. The method of service and operating conditions will be as described in the original warranty statement provided with the Samsung Product.

Warranty: Redemption Process & Details

1. This promotion cannot be used in conjunction with any other promotion(s) or special bid/tender pricing offered by Samsung Electronics.
2. This offer applies to models purchased after 00:01hrs (GMT) on 1st May 2016.
3. Upon registration the claimant will be sent an email confirmation with notification of registration and a related reference number for the claim being registered on.
4. A copy of your invoice and commissioning report MUST be submitted as proof of purchase.
5. Proof of dispatch will not be accepted as proof of receipt.
6. The 7 Year Extended Warranty is not transferable and no alternative will be offered.

Statement For Samsung

1. This offer only applies to the purchase of a new (not second-hand) Samsung air conditioning Product which is sold in the UK or ROI after 1st May 2016

Product	Model	Warranty Type
All EHS Product	various	7 years On Site

2. For customers outside the UK & ROI please refer to the country specific warranty information that came with your product.
3. All Extended Warranty Redemptions must be registered online within 28 days of installation.
4. This Promotion is only available to end user customers who are using the products for business purposes.
5. Employees or agents of Samsung or their families or households or anyone professionally connected to this promotion is not eligible.
6. By registering for the Extended Warranty you agree to be bound by these terms and conditions.

Warranty

Extent Of Warranty

During the extended warranty period Samsung continues to warrant that the Samsung Product shall be free from defects in materials and workmanship. If the relevant product does not function as warranted, against defective materials or workmanship, you should contact the Joule technical department or your local sales representative.

Samsung Maintenance Parts, Supplies and Optional accessories (i.e. consumables), supplied as part of the initial Samsung Product installation and listed in the Samsung Product User Guides, is warranted against defective materials or workmanship for the first 6 months, from date of Samsung Product purchase or recommended average life volume, whichever is achieved first, but is excluded from the Extended Warranty period.

When Warranty service involves the exchange of a product or part, subject to applicable law, the item replaced becomes the property of Samsung.

The replacement item assumes the remaining warranty period of the original product.

Before you present the product(s) for On Site (IH) warranty service you must:

- Ensure that the Product is available for Warranty repair, on Site at the registered address.

Claim(s) For Warranty Service

To obtain a Warranty service, you must:

- Contact the Joule technical department or your local sales representative.
- Provide the full product model code and serial number
- Provide proof of activated extended warranty and proof of annual maintenance contract as per the e-mail confirmation sent at the time of online warranty registration(s)
- Provide a clear fault description and carry out any diagnostics as advised
- Comply with any reasonable instructions from Samsung or an Authorised Service Centre to allow you to receive the warranty service

Transfer Of Product

If you transfer this product to another user, warranty service may be available to that user during the remainder of the standard 24 month warranty period, but not during any extended warranty period (i.e. the extended warranty is not transferable).

Exclusions

Samsung makes no representation or guarantee that the Samsung product(s) will operate uninterrupted or error free.

During the Extended Warranty Period, Samsung will only provide the Warranty in the UK and ROI.

Samsung is not responsible for paying any travel or delivery costs where the product is located outside the UK or ROI.

Services performed by Samsung in rectifying damage or defect caused as a result of any excluded conditions shall be subject to additional charges for labour, transportation and parts.

The Extended Warranty is only available if you have an ongoing maintenance contract in place with a maintenance provider approved by Samsung, under which the product(s) must be checked at least once a year by that maintenance provider.

Warranty Service is not available to you if the product you present is:

- Defaced
- Altered
- Damaged beyond repair, or
- In need of a repair not included in Warranty service. (e.g Periodic Maintenance, consumable replacement and the repair or replacement of parts due to normal wear and tear) transportation damage, or any other damage caused by external factors (i.e. not damage caused by issues inherent in the manufacturing of the product)
- Does not match Product Model and serial number details as registered for Warranty service

To the maximum extent permitted by law, warranty service does not include repair of failures caused by:

- Modification or attachments
- Accidents or misuse
- Unsuitable physical or operating environment
- Third party products, generic or refilled e.g. maintenance units or replacement parts
- Maintenance by anyone other than Joule or a Joule authorised service provider.
- Operation of a product beyond the limit of its duty cycle or Product specifications
- Products, components, parts, material, software, or interfaces not furnished by Samsung

Neither Samsung nor its third party suppliers or resellers make any other warranty, guarantee, or condition of any kind, whether express, implied, legal or statutory, with respect to the product(s), and to the extent permitted by applicable law, specifically disclaim any implied, legal or statutory warranties or conditions or merchantability, fitness for a particular, general or normal purpose, satisfactory quality, durability and warranties against latent defects.

General Terms Of Promotion

1. These terms and conditions are governed by English law and come under the English courts shall have exclusive jurisdiction to settle and resolve any dispute which may arise in connection with the validity, effect, interpretation and/or performance of these terms.

2. By registering for the extended warranty you agree to be bound by these terms and conditions.

3. The Promoter shall have the right, where necessary, to undertake all such action as is reasonable to protect

itself against fraudulent or invalid claim(s) including, without limitation, to require further verification as to the identity, and other relevant details of an entrant or claimant and/or the verification as to their qualifying purchase.

4. The Promoter shall not be liable for any interruption to this promotion whether due to force majeure or other factors beyond the Promoter's control.

5. The Promoter reserves the right, acting reasonably and in accordance with all relevant legislation and codes of practice, to vary the terms and conditions of this Promotion.

6. Promoter: Samsung Electronics (UK) Ltd, Samsung House, 1000 Hillswood Drive, Chertsey, Surrey, KT16 0PS. (Please do not send any Warranty applications to this address - they will not be registered for Warranty promotion)

Joule Cyclone

The **JOULE Cyclone** stainless steel vessel carries a fully transferable 25-year guarantee against faulty materials or manufacture provided that:

- It has been installed in the United Kingdom or the Republic of Ireland as per the instructions provided in the installation manual provided with the cylinder and in accordance with all of the relevant standards, regulations and codes of practice in force at the time.
- It has not been modified in any way, other than by JOULE
- It has not been misused, tampered with or subjected to neglect.
- The system is fed from the public mains water supply.
- It has only been used for the storage of potable water.
- It has not been subjected to frost damage.
- The unit has been serviced annually.
- The Service Log Book has been completed after each annual service.
- The warranty card is filled in and a copy is sent by email to warranty@joule.ie

Exclusions

The guarantee does not cover cylinders affected by the following;

- The effects of scale build up on the cylinder.
- Any labour charges associated with replacing the unit or its parts.
- Any consequential losses caused by the failure or malfunction of the unit.

Please note that invoices for servicing may be requested to prove that the unit has been serviced annually.

Unvented Kit & Other Components

The expansion vessel and cold water controls supplied with JOULE models carry a 1-year guarantee. All other components that are fitted to, or supplied, with the unit carry a 1-year guarantee.

Benchmark Checklist

SYSTEM COMMISSIONING CHECKLIST

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

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

Customer Name ______ Telephone Number ______

Address ______

Cylinder Make and Model ______

Cylinder Serial Number ______

Commissioned by (print name) ______ Registered Operative ID Number ______

Company Name ______ Telephone Number ______

Company Address ______

______ Commissioning Date ______

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

Building Regulations Notification Number (if applicable) ______

ALL SYSTEMS PRIMARY SETTINGS (indirect heating only)

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

ALL SYSTEMS

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

UNVENTED SYSTEMS ONLY

Where is the pressure reducing valve situated (if fitted)?			
What is the pressure reducing valve setting?			bar
Has a combined temperature and pressure relief valve and expansion valve been fitted and discharge tested?	Yes ☐	No ☐	
The tundish and discharge pipework have benn connected and terminated to Part G of the Building Regulations		Yes ☐	
Are all energy sources fitted with a cut out device?	Yes ☐	No ☐	
Has the expansion vessel or internal air space been checked?	Yes ☐	No ☐	

THERMAL STORES ONLY

What store temperature is achievable?		°C
What in the maximum primary flow temperature?		°C

ALL INSTALLATIONS

The hot water system complies with the appropriate Building Regulations	Yes ☐
The system has been installed and commissioned in accordance with the manufacturer's instructions	Yes ☐
The system controls have been demonstrated to and understood by the customer	Yes ☐
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer	Yes ☐

Commissioning Engineer's Signature

Customer's Signature

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

*All installations in England and Wales must be notfied to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

benchmark
COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

Notes

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