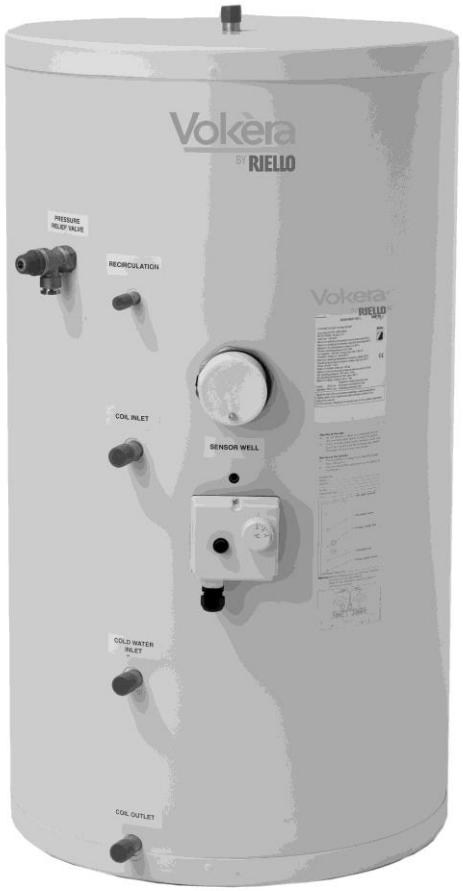
AquaFlow Unvented Hot Water Cylinders

Indirect SC - 120L- 150L – 180L - 210L – 250L – 310L
Direct – 120 6kW – 150l 6kW – 180 6kW -210 6kW-250 6kW – 310 6 kW
Solar (Twin Coil) – 210L - 250L – 300L



CE

Installation Instructions

GB, IE

INTRODUCTION

The following pages incorporate the installation instructions and must be left in a safe place adjacent to the cylinder or given to the end user once they have been correctly instructed in the effective operation of the cylinder. The Installer has a duty of care to instruct the end user how to operate the cylinder correctly.

Vokèra will not accept liability for any claims or damages from failure to observe these instructions.

These instructions include essential and important information for safe and correct installation, and are an integral part of the product. As a consequence all technical documents must always accompany the product.

Vokèra are continually developing its product range and therefore reserves the right to change specification without prior notice. All the data and instructions contained in this manual are subject to review or product update changes at any time. They will be current at time of print. If in doubt please contact the manufacturer to ensure you have the correct and current manual.

Please always refer to the instructions contained in this manual when installing the equipment.

The operations described in these instructions require specialised knowledge and therefore it is essential the installer has the appropriate qualifications and competence training prior to installing the product. You should only install this product once you have achieved such technical qualifications.

The instructions are provided in schematic form only as installations designs may vary. The diagrams used are purely indicative and as such have no pretence of completeness and are not intended to replace the design.

Please ensure that the installer has fully completed the Benchmark Checklist on the inside back pages of the installation instructions supplied with the product and that you have signed it to say that you have received a full and clear explanation of its operation. The installer is legally required to complete a commissioning checklist as a means of complying with the appropriate Building Regulations (England and Wales).

All Installations must be notified to Local Area Building Control either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer who should, on receipt, write the Notification Number on the service record / checklist. This product should be serviced regularly to ensure its safety, efficiency and performance is maintained. The installation engineer should complete the relevant Service Record on the Benchmark Checklist after each service. The service record / checklist is required in the event of any warranty work and as supporting documentation relating to home improvements in the optional documents section of the Home Information Pack This must be completed and left with the product at all times as it contains importance commissioning reference information which is essential information for future service work. Failure to do so will result in the warranty becoming void.

Vokèra cannot be held liable for any loss or damage arising from product specifications deviating from the standard version.

The information contained within this document has been compiled with all possible care, Vokèra cannot be held liable for any installation errors, loss or damage or work performed by third parties.

TABLE OF CONTENTS

1 GENERAL NOTICE

1.1 Personal Responsibility

The manufacturer is responsible for the product's conformity to the relevant construction directives, laws and regulations in force at the time the product is first commercialised. The Plumbing Engineer/Electrician/Installer and User are the each exclusively responsible in their respective fields, for knowing and observing the legal requirements and technical regulations concerning the design, installation, operation and maintenance of the appliance. Reference to laws, regulations or technical specifications contained in this manual is purely for information purposes; any new laws introduced or modifications to existing laws are not in any way binding on the manufacturer towards third parties.

1.2 Field of use

The indirect water heater for the production of hot water is only intended to be used for Domestic Hot Water heating, without exceeding the usage restrictions specified herein. To this purpose it must be hydraulically connected to a sanitary domestic hot water delivery network. It requires a power supply to operate.

Never use the unit for any purposes other than those specified herein. Any other use is to be deemed as inappropriate and is not allowed. The manufacturer cannot be held responsible for any installation errors and inappropriate equipment use.

1.3 Certifications and Markings

The CE marking applied to the appliance certifies that it conforms to the essential requirements of the following European Directives:

- 2006/95/EC concerning the safety of electrical equipment;
- 2004/108/EC concerning electromagnetic compatibility
- EN60335-2-21 Electrical Safety for Direct Cylinders
- EMC conformity

1.4 Cylinder

The cylinder is manufactured in six sizes of direct and indirect models 120L, 150L, 180L, 210L, 250L 310L plus 3 sizes of solar models 210L 250L 300L. The cylinders are manufactured from stainless steel AISI316L and it has Thermal insulation is ensured by a highly biological, CFC-free rigid polyurethane foam (PUR) coating. The full compressed foam coating allows to minimal energy losses. The external coating is made of a soft PVC material. It is supplied with all required control devices including a 2 port motorised valve

The cylinder works utilising the main domestic water supply and does not require stored cold water to operate. The hot and cold connections are 22mm. To enable the cylinder to work at its optimum level a cold water supply with a pressure and flow rate appropriate for the system is required.

1.5 Meaning of the symbols used here in

Symbol	Meaning
	Failure to comply with the provision in question may result in injuries and/or damages to **people, objects, plants or animals.**

1.6 Measuring

The measuring units used in this manual for dimensions are those of the International System (SI).

2 SAFETY

2.1 Installation site

The floor on which the unit is to be standing must be capable of supporting (locally) the weight (see Technical data table) of the full unit. Do not install the cylinder on floors made of chipboard or other flooring where the mechanical strength is compromised when damp. If the cylinder is fitted very high in the building negative pressure may form, in this instance the competent person must decide whether an anti-vacuum valve is required to protect the cylinder.

2.2 Electrical

The indirect water heater should have 240V-12.5A electrical supplies. All electrical terminal covers must be securely in place before power is switched on. The unit must be earthed. The pipework to and from the unit must be earth bonded.

2.3 Unvented

No valves must be fitted between the vessel and Pressure Reducing Valve (PRV). No valves must be fitted between the vessel and its expansion vessel.

2.4 Personal Protection

When installing and servicing the appliance, recommend the use of suitable protective clothing (i.e. gloves).

2.5 Delivery and packaging

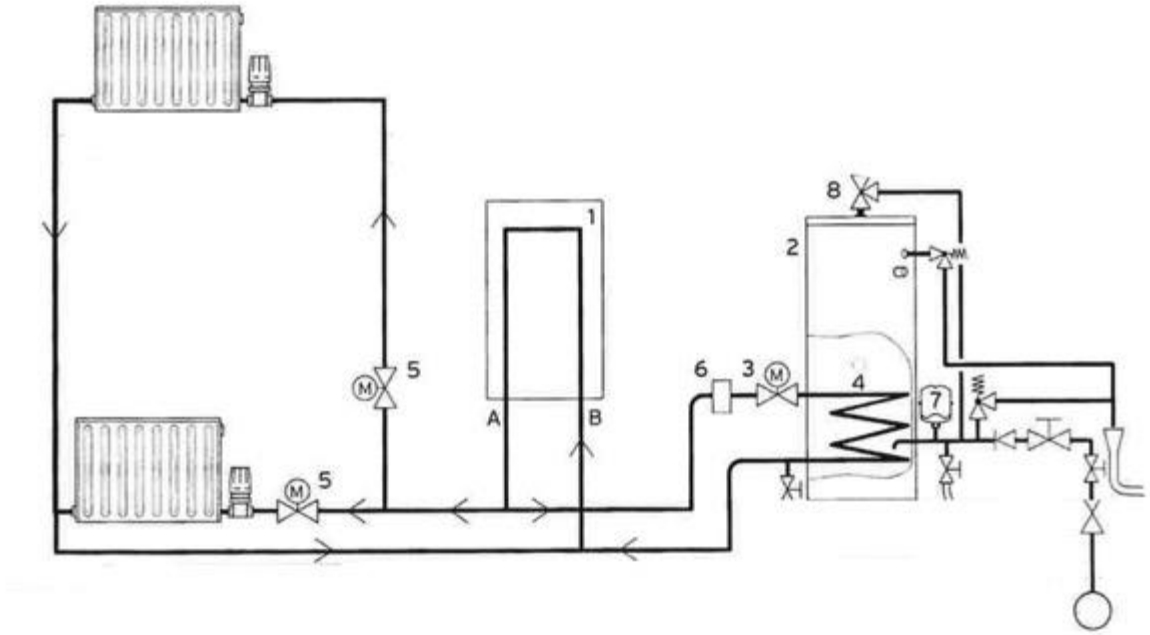
The indirect water heater is supplied in an environment-friendly and easy to handle cardboard packaging with protective inserts. Make sure that the packaging material is disposed of properly in compliance with the local environment-related regulations in force. Should the cylinder show any clear signs of any transport damage, then you should inform the supplier and return it immediately. In this instance **do not attempt to install the appliance**.

2.6 Transport and manual handling

When moving the Cylinder always keep your back straight, bend your knees, don't twist, move your feet. Avoid bending forwards or sideways and keep the load as close to your body as possible. Where possible transport the unit using a suitable trolley, sack truck or get some assistance. Grip the Cylinder firmly and before lifting establish where the weight is concentrated to determine the centre of gravity, repositioning yourself if necessary. When storing and transporting it, always keep the indirect water heater vertical (straight) in its original packaging. When transporting to a second floor, it is permissible to tilt the unit to an angle of 45°, provided utmost care is taken when moving it to its final location.

Due to the forward inclination, when using forklift trucks or other means of transport proceed slowly and fasten the equipment to prevent it from tipping. When manually carrying and putting into position the cylinder, after removing the packaging you need to use the auxiliary equipment/the bracket for transportation.

System Overview



1. Heat Source
2. Cylinder
3. Two port motorised valve
4. Electric Immersion heater
5. Two port motorised valve
6. Auto air separator
7. Hot water expension vessel
8. Hot water thermostatic mixing valve

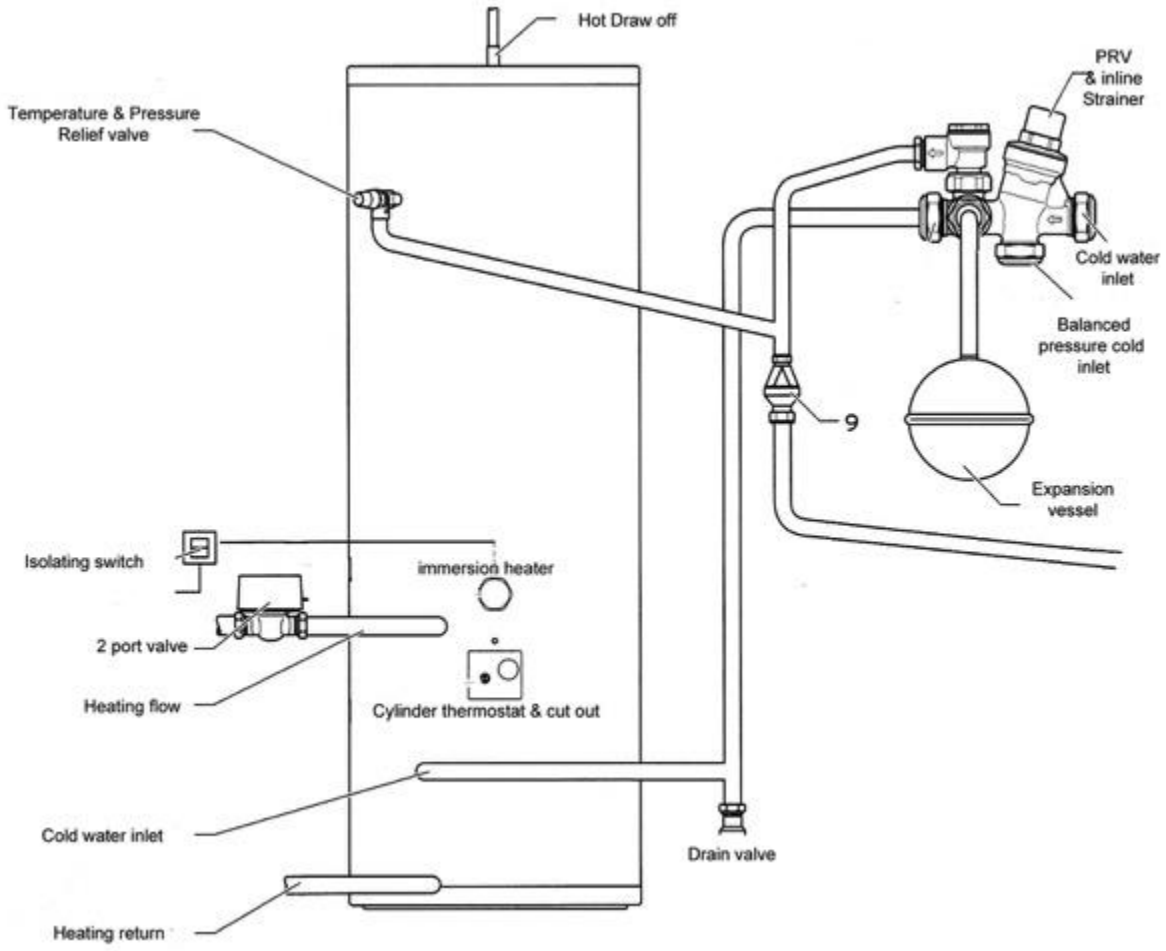
a. Heating flow
b. Heating return

3 TECHNICAL DATA

3.1 Dimensions

Model	Unit	Dia	Height
120L. Ind / Dir	mm	554.5	1001
150L. Ind / Dir		554.5	1191
180L. Ind / Dir		554.5	1371
210L. Ind /Dir/Solar		554.5	1593
250L. Ind /Dir/Solar		554.5	1843
310L / 300L. Ind /Dir/Solar		554.5	2153

3.2 Elements of the Hot water cylinder

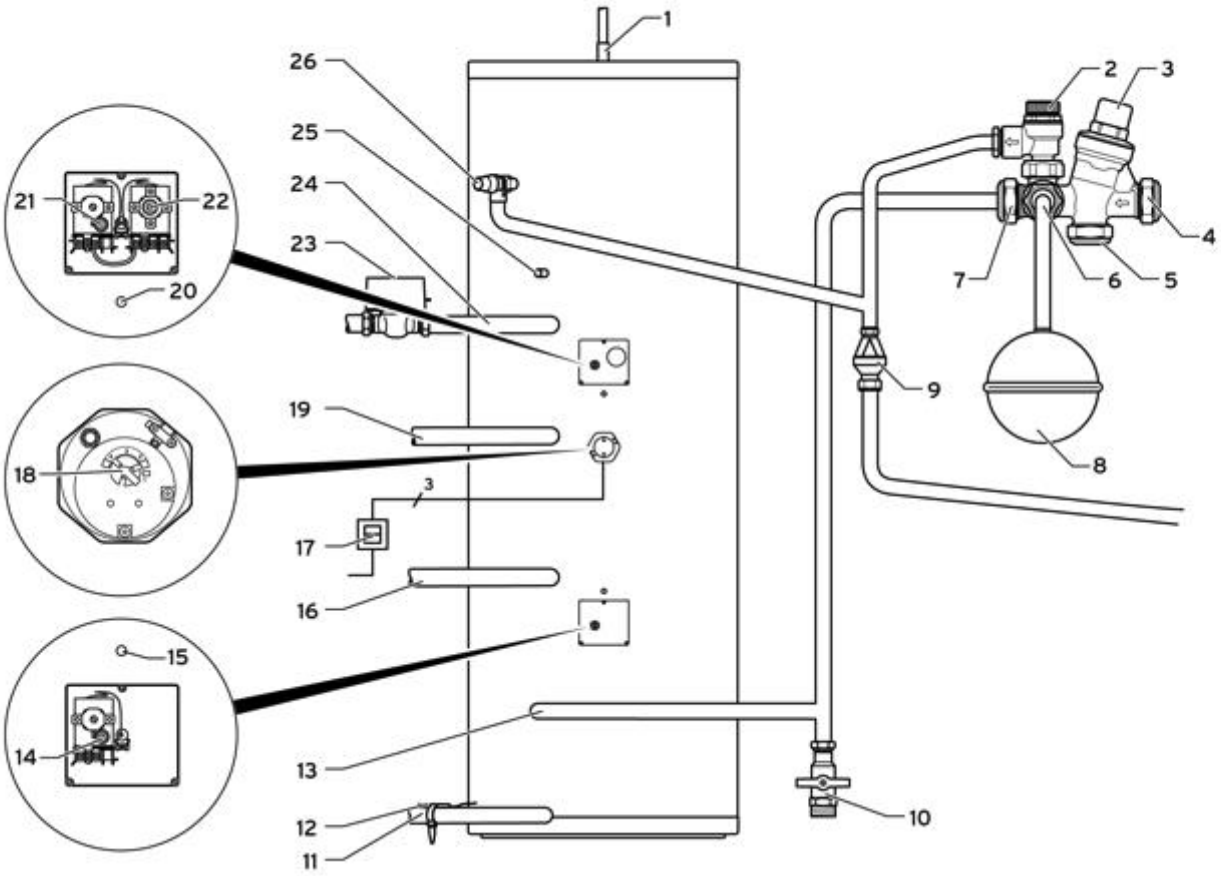


3.3 Safety Devices

The cylinder is delivered with all safety and control devices for the safe operation of the unvented hot water supply system. ** denotes solar cylinder only.

- Factory fitted temperature & pressure relief valve (90°C / 7 bar)
- Expansion relief valve (6 bar)
- Thermal cut out for immersion heater
- Primary heating thermal cut out 80°C
- Pressure reducing valve (3.5bar) with inline strainer
- ** Solar pump thermal cut-out, set at 80°C, and connected to the solar pump in order to isolate this heat source if there is a fault in the solar controller.
- ** Solar cylinder thermal cut-out, set at 80°C, to be connected to the 2 port motorised valve in order to isolate the primary heat source if the water supply thermostat fails.

3.4 Elements of the Twin Coil (solar) Cylinder



Key

1 Hot water connection
2 Expansion relief valve
3 Pressure limiting valve
4 Cold water connection
5 Pressure-controlled cold water connection
6 Connection for hot water expansion vessel
7 Cylinder connection
8 Hot water expansion vessel
9 Tundish
10 Cylinder drain valve (not supplied)
11 Return line (solar circuit)
12 Solar collector temperature sensor
13 Cold water pipe
14 Solar circuit safety thermostat (TCO), set to 80 °C, to be connected with the solar pump in order to isolate this heat source if there is a malfunction in the solar control.
15 Solar circuit immersion sleeve
16 Supply line (solar circuit)
17 2- pole circuit breaker for electric immersion heater
18 Electric immersion heater with thermostat and safety thermostat
19 Return line (gas-fired boiler)
20 Reheating circuit immersion sleeve
21 Reheating circuit safety thermostat, set to 80 °C, to be connected to the 2-way motorised valve in order to isolate the primary heat source if a malfunction occurs.
22 Cylinder thermostat
23 2 -way motorised valve
24 Supply line (gas-fired boiler)
25 Circulation line connection
26 Temperature and pressure relief valve

No motorised valve is supplied for the solar pipework and it is mandatory that the solar system be supplied with a solar hydraulic station.

The cylinder solar indirect coil can only be connected to a solar circuit that is controlled via a hydraulic station which incorporates a pump and non-return valves.

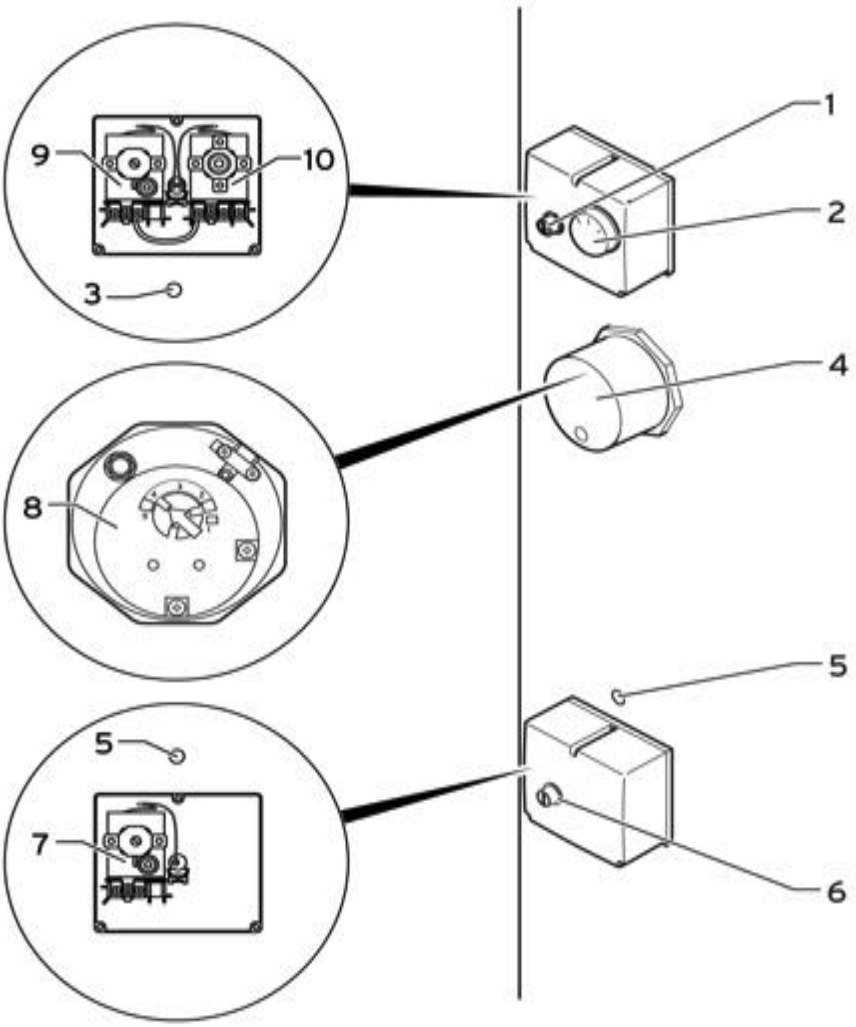
If a motorised valve is used this must be fitted on the primary return due to possible high temperatures of the solar circuit.

3.5 Solar Heating system

The solar heating system is a closed hydraulic system in which the heat transfer fluid transfers the heat to the water in the cylinder via a heat exchanger.

The water in the cylinder is heated by two separate circuits. In the lower coil the water is heated by the solar circuit and as the water in the lower section of the cylinder is generally at a lower temperature in enables sufficient heat transfer even when the solar radiation level is low. The upper coil is heated by an external heat source (boiler or immersion heater) and heats the upper section of the cylinder from which hot water is drawn for domestic purposes.

3.6 Cylinder control components

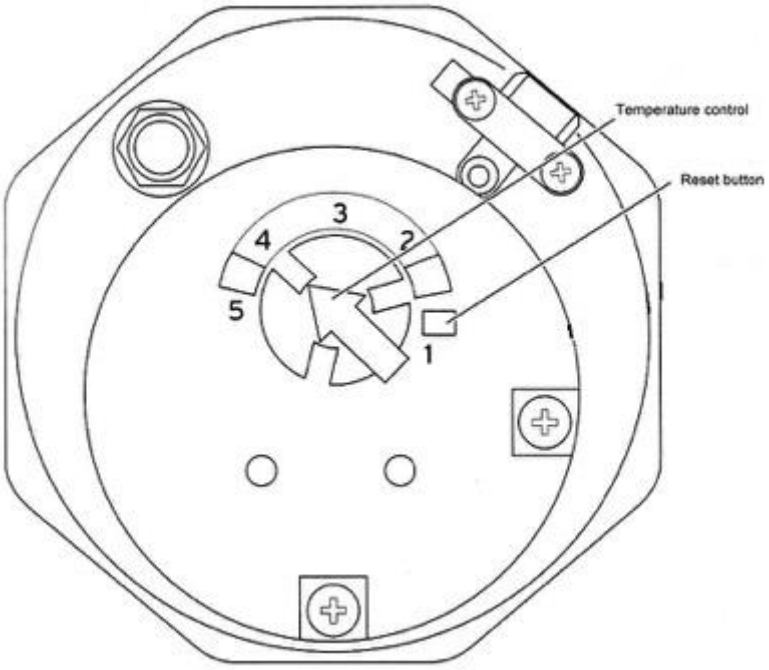


Key

1 Cover cap for reset button for reheating circuit TCO
2 Reheating circuit temperature controller
3 Reheating circuit immersion sleeve
4 Electric immersion heater cover
5 Solar circuit immersion sleeve
6 Cover cap for reset button for solar circuit TCO
7 Solar circuit safety thermostat (TCO)
8 Electric immersion heater
9 Reheating circuit safety thermostat
10 Cylinder thermostat

Information **inspection access to the cylinder is available by removal of the immersion heater boss.**

3.7 Immersion Heater



Hot water temperature Settings –

1. 20°c
2. 35°c
3. 45°c
4. 60°c
5. 68°c

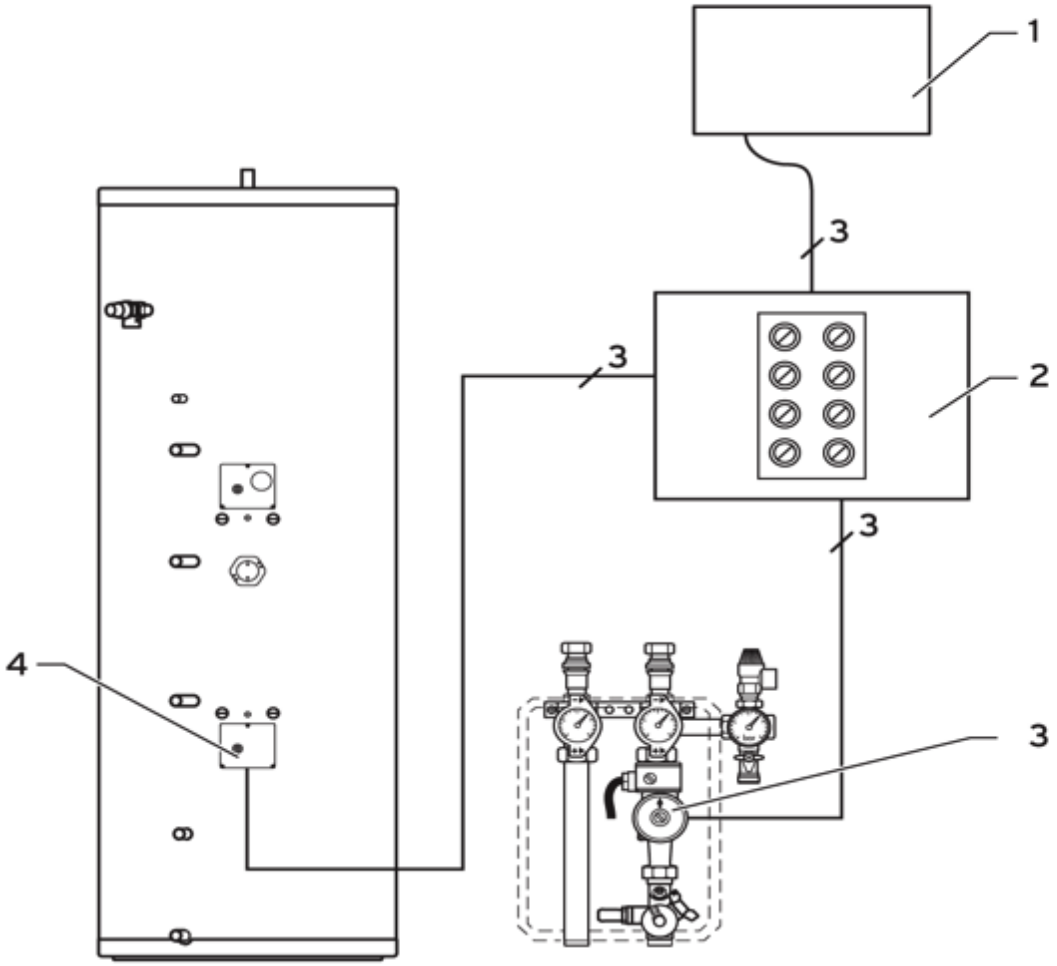
The cylinder is equipped with an additional electric immersion heater with an output of 3kW. The immersion heater will be found under the top front cladding and is designed for use in unvented cylinders. It has a temperature controller and a thermal cut out. To set the temperature required simply turn the arrowhead so that it points at one of the numbers between 1 and 5. The list above shows the approximate temperature for each setting.

When required the immersion heater boss can be used as an access to view internal of the cylinder

You can also control the temperature using a separate hot water control device with a suitable dual channel 230v timer.

Information **inspection access to the cylinder is available by removal of the immersion heater boss**.

Solar pump safety thermostat



Key

1 Solar controller or solar module
2 Terminal strip
3 Solar pump
4 Solar circuit safety thermostat

In order to meet the requirements for unvented hot water cylinder systems (G3), you must connect the power supply for the solar pump (3) via a manually resettable safety thermostat (TCO) in the solar cylinder.

3.8 Technical data table

Indirect single coil		**120L**	**150L**	**180L**	**210L**	**250L**	**310L**
Footprint (minimum)	m	0,55 x 0,64					
Hot water capacity	l	104.9	136.7	166.4	203.9	247.5	274.7
Weight Empty	Kg	26.8	28.9	32.4	36.8	40.7	45.9
Minimum ceiling height required	m	1174	1424	1774	2034	2344	2500
Maximum design pressure	bar	10					
Cylinder							
Tested in accordance with		EN 12897:2006					
Normal operating pressure	bar	3					
Cold connection (CW)		22 mm					
Hot connection (DHW)		22 mm					
Pressure reducing valve pressure	bar	3					
Cylinder T&P	°c/bar	90/7					
Expansion Valve setting	bar	6					
Expansion Vessel pressure	bar	3					
Max design pressure - Coil	bar	16					
Max primary operating pressure	bar	3					
Max working temperature - tank	°c	85					
Max operating pressure - vessel	bar	6					
Max design pressure - Tank	bar	7					
Indirect Cylinder							
Connections		22mm					
Coil Surface area	m^3	0.62	0.62	.75	.75	.75	.75
Coil Rating	kW	18.4	18.8	22	22.6	22.3	20.9
Coil length		8.97	8.97	10.85	10.85	10.85	10.85
Weight when full	Kg	146	178	209	248	291	345
Reheat times 15°c– 60°c	min	18	23	24	28	35	41
Primary heater pressure drop	mb	109	109	124	124	124	124
Primary flow rate	l/h	1400	1400	1400	1400	1400	1400
Heat Loss	W	51	60	67	77	89	103
Heat Loss EN 12897:2006	kWh/24h	1.22	1.43	1.62	1.86	2.13	2.53
Energy Rating		B	C	C	C	C	D
Max operating temperature fluid	°c	85					
Electrical Supply							
Electrical Supply	V	240					
Amp	A	12.5					
Electric protection		IP24					
Electric Heater Rating	kW	3					
Electric Heater Type		Single Phase					
EPS Insulation (NeoPor grade)							
Thickness	mm	50	50	50	50	50	50
Direct Cylinder							
6 kW Reheat time 15°c– 60°c	min	69	93	112	130	155	186
Actual water volume	l	121.3	151.2	179.3	213.9	253	301.8
Weight when full	Kg	148	180	212	251	294	348
Heat Loss	W	53	62	70	80	91	105
Heat Loss EN 12897:2006 -	kWh/24h	1.27	1.48	1.68	1.92	2.19	2.53
Energy Rating		C	C	C	C	C	D

Twin Coil Solar Cylinder					
			210L	**250L**	**300L**
Hot water capacity	Upper Coil	L	106	142	144.7
	Lower Coil	L	202.1	246.1	271.3
Coil Surface	Upper Coil	L	0.5	0.5	0.5
	Lower Coil	L	0.62	0.62	0.62
Coil Length	Upper Coil	m	7.25	7.25	7.25
	Lower Coil	m	9	9	9
Coil Rating	Upper Coil	kW	15.7	15.6	15.5
	Lower Coil	kW	18.6	18.4	17.1
Reheat Time	Upper Coil	min	21	27	29
	Lower Coil	min	34	40	49
Primary heater pressure drop	Upper Coil	mb	90	91	92
	Lower Coil	mb	118	117	117
Primary Flow rate	Upper Coil	l/h	1400	1400	1400
	Lower Coil	l/h	1400	1400	1400
Heat Loss		W	79	91	105
Weight Empty		Kg	40	43	50
Weight Full		Kg	246	288	343
Actual water volume		L	205.6	244.5	292.8
Dedicated solar Vol		L	99.6	102.5	148.1
Heat Loss		W	79	91	105
Energy Rating			C	C	D

3.9 Pack contents

Qty 1 Vokèra unvented water heater incorporating immersion heater & thermal controls
Qty 1 Factory fitted dual stat
Qty 1 Guarantee card
Qty 1 Installation and service manual
Qty 1 Accessories Kit

3.10 Kit contents

Code	Description	Quantity
29450020 / 29450021	Vokèra Kit A 120/150 S/C	
12l pot vessel 3.obar c/w brkt vertical		1
1/2" mt.draincock type a		1
3/4"bsp hose c/w sealing washer-1000mm		1
tee piece 22mm comp. x 3/4" m x 3/4" f		1
15*22mm tundish slimline straight black		1
compact inlet control 3/6 bar		1
rwc 2 port 22mm zone valve		1
29450022 / 29450023	Vokèra Kit B 180 /210 S/C & D/C	
18l pot vessel 3.obar c/w brkt vertical		1
1/2" mt.draincock type a		1
3/4"bsp hose c/w sealing washer-1000mm		1
tee piece 22mm comp. x 3/4" m x 3/4" f		1
15*22mm tundish slimline straight black		1
compact inlet control 3/6 bar		1
rwc 2 port 22mm zone valve		1
29450024 / 29450025	Vokèra Kit C Inox 250/310 S/C & D/C	
24l pot vessel 3.obar c/w brkt vertical		1
1/2" mt.draincock type a		1
3/4"bsp hose c/w sealing washer-1000mm		1
tee piece 22mm comp. x 3/4" m x 3/4" f		1
15*22mm tundish slimline straight black		1
compact inlet control 3/6 bar		1
rwc 2 port 22mm zone valve		1

Vokèra Kit D Inox 180 / 210L Direct

18l pot vessel 3.obar c/w brkt vertical	1
1/2" mt.draincock type a	1
3/4"bsp hose c/w sealing washer-1000mm	1
15*22mm tundish slimline straight black	1
compact inlet control 3/6 bar	1

Vokèra Kit E Inox 250/310L Direct

24l pot vessel 3.obar c/w brkt vertical	1
1/2" mt.draincock type a	1
3/4"bsp hose c/w sealing washer-1000mm	1
15*22mm tundish slimline straight black	1
compact inlet control 3/6 bar	1

Vokèra Kit F Inox 210L S/C HP

18l pot vessel 3.obar c/w brkt vertical	1
1/2" mt.draincock type a	1
3/4"bsp hose c/w sealing washer-1000mm	1
15*22mm tundish slimline straight black	1
compact inlet control 3/6 bar	1
rwc 2 port 22mm zone valve	1

Vokèra Kit G Inox 250/300L S0D/C HP

24l pot vessel 3.obar c/w brkt vertical	1
1/2" mt.draincock type a	1
3/4"bsp hose c/w sealing washer-1000mm	1
15*22mm tundish slimline straight black	1
compact inlet control 3/6 bar	1
rwc 2 port 22mm zone valve	1

Vokèra Kit H Inox 210L HP

12l pot vessel 3.obar c/w brkt vertical	1
1/2" mt.draincock type a	1
3/4"bsp hose c/w sealing washer-1000mm	1
15*22mm tundish slimline straight black	1
compact inlet control 3/6 bar	1

4 INSTALLATION AND COMMISSIONING

(To be installed by qualified personnel only)

Installation site

Position the domestic hot water cylinder as near as possible to the heat source to prevent heat loss

Please adhere to the following instructions

- The tundish discharge pipe must be installed with a minimum downward slope of 1:200 and must terminate in a safe and visible place
- The installation surface must be level and have the strength to bear the weight of the full cylinder
- The installation must not be at risk of frost
- The control system for the cylinder must be accessible to the service engineer
- There must be sufficient space for installing, maintaining and replacing the expansion vessel.
- There must be sufficient space for installing, maintaining and replacing the immersion heater
- Choose a site that has simple access for the necessary supplies
- To prevent heat loss ensure exposed pipework is insulated

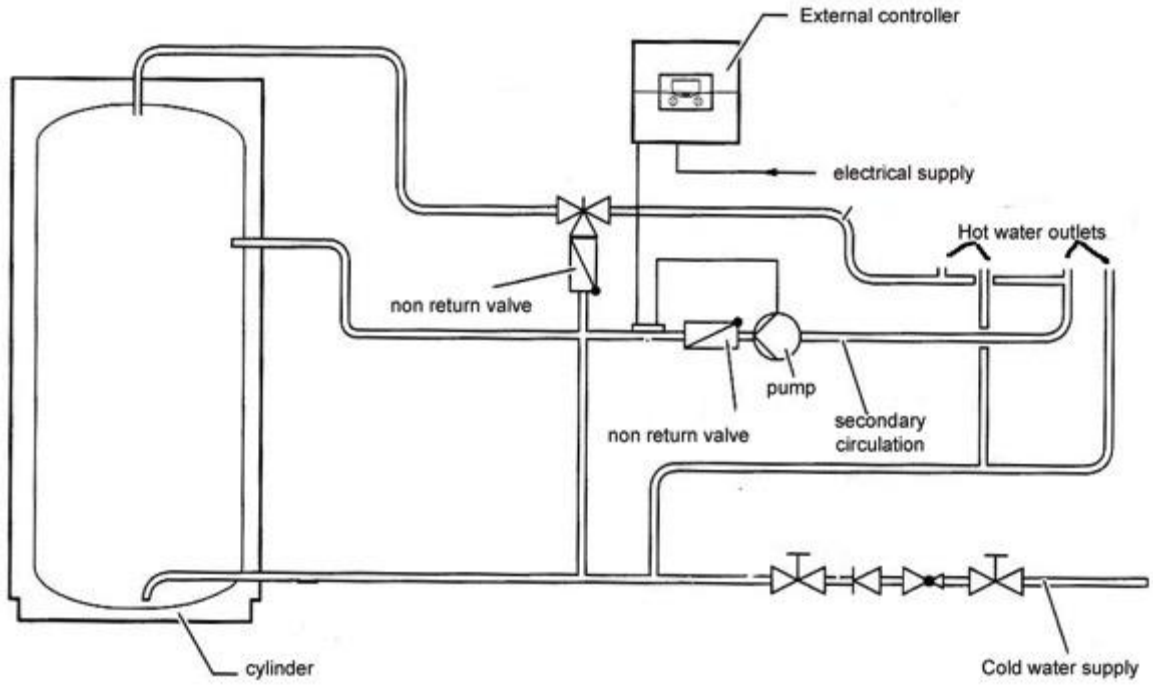
4.1 Installing pipes for the heating circuit

Ensure that the pipes in the circuit have a minimum diameter of 22mm and are as short as possible from the heat source to prevent heat loss.

The two port motorised valve prevents the cylinder from overheating and should be installed in the flow line of the heat source, (the direction of flow is marked with arrows).

Connect the hot water pipe to the 22mm hot water draw off of the cylinder, continue the pipe until the first T junction.

Diagram for illustration purposes only - does not constitute a system plan as each installation differs



A secondary circulation line increases energy consumption, please only install if required for demand and temperature reasons. If it is unavoidable keep operations to a minimum and connect a WRAS approved pump together with a non-return valve and connect to the hot water pipe. (Please note that a second expansion vessel may be required in this instance). A 15mm connection is fitted for the secondary circulation line in the cylinder which is supplied with a cap if not being used. When a secondary return circuits are used then an additional expansion vessel may be required

4.2 Cold mains inlet

The efficiency of an unvented cylinder depends on the available pressure of the cold mains inlet and flow rate. The measured static pressure must be at least 2.0 bar. A corresponding flow rate of 20 – 25 l/min must be available. **If the pressure is below 1 bar please seek advice on an alternative hot water supply system.**

4.3 Safety Assembly

Warning: Excess pressure can cause the cylinder to burst – ensure that there is no stop valve between the safety assembly and the cylinder.

This one piece inlet control incorporates several different controls devices in one, it is specifically designed for use on an unvented system to control the incoming water supply to a hot water cylinder or similar application. Compact and lightweight in design the valve incorporates several different controls: A 'drop tight' pressure reducing valve meaning the valve will hold at the pre-set pressure regardless of it being under flow or no flow conditions or regardless of fluctuating inlet pressures, a single check valve which will protect the system for backflow prevention up to fluid category 2, and a pre-set pressure relief valve which will prevent the system from over pressurisation. The expansion relief valve is designed so it can rotate, to allow the discharge connection to be easily fitted in various directions making installation simple. The valve also includes a specific connection for a balanced cold water take off which can allow the user to connect a cold water feed direct from the inlet control valve, and a dedicated connection for an expansion vessel.

During installation position the valves so that you can connect the 15mm connection of the expansion relief valve with the tundish. The flow direction is marked with arrows.

Warning : Ensure that the expansion relief valve is not covered or closed

Install the discharge pipe of the expansion relief valve with a constant fall to the outside. The discharge pipe must finish at a safe and visible height where there is no danger of it freezing and where there is no danger of injury to persons.

Actuate the expansion relief valve regularly to prevent scaling.

Connect the cylinder via the cylinder connection

Use 22mm copper pipe to connect the cylinder from the main stop valve to ensure that the cylinder is as efficient as possible. This is particularly important for installations with a balance cold water inlet

Install the safety assembly in the cold mains inlet on the cylinder

If necessary establish the connection to the cold water inlet with pressure compensation of the safety assembly

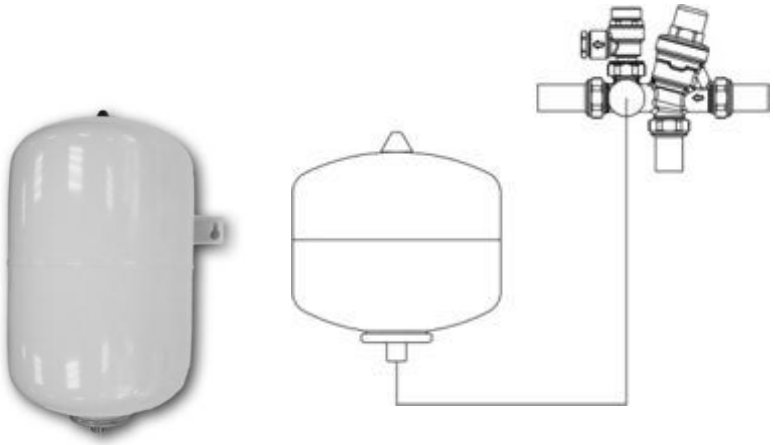
Dependent on the fittings used and the type of draw off points it may be necessary to install a backflow preventative device in the cold water inlet.

WARNING: Water temperature over 50°C running from taps may immediately cause serious burns. Children, disabled and elderly run a greater risk in this regards. Therefore it is advisable to use a thermostat mixing valve connected to the water outlet or where preferred at the point of use.

Expansion vessel

To prevent any overpressures that might damage the equipment, frequently triggering the safety unit and causing water dripping, **it is mandatory** that you install the expansion vessel included in the kit. Install it in accordance with the instructions provided by the manufacturer. The expansion cylinder is required to keep pressure constant and avoid harmful pressure shocks or accidental overpressures.

CAUTION! It is essential you install the expansion vessel vertically with connection at the bottom (see the figure below)



CAUTION: Where secondary return circuits are used* (SR) *an additional expansion vessel may be required

4.3.1 Building Regulation G3

The following text is reproduced from the Building Regulations.
It is included here for reference only.

Discharge pipes from safety devices
Discharge pipe D1
3.49 Each of the **temperature relief valves** or **combined temperature and valves** specified should discharge either directly or by way of a manifold via a short length of metal pipe (D1) to a **tundish**.

3.50 The diameter of discharge pipe (D1) should be not less than the nominal outlet size of the **temperature relief valve**.
3.51 Where a manifold is used it should be sized to accept and discharge the total discharge from the discharge pipes connected to it.

3.52 Where valves other than the **temperature and pressure relief valve** from a single unvented discharge by way of the same manifold that is used by the safety devices, the manifold should be factory fitted as part of the **hot water storage system unit** or package.

Tundish
3.53 The **tundish** should be vertical, located in the same space as the unvented **hot water storage system** and be fitted as close as possible to, and lower than, the valve, with no more than 750mm of pipe between the valve outlet and the **tundish** (see Diagram1).
Note: To comply with the Water Supply (Water Fittings) Regulations, the **tundish** should incorporate a suitable air gap.

3.54 Any discharge should be visible at the **tundish**. In addition, where discharges from safety devices may not be apparent, e.g. in dwelling occupied by people with impaired vision or mobility, consideration should be given to the installation of a suitable safety device to warm when discharge takes place, e.g. electronically operated.

Discharge pipe D2
3.55 The discharge pipe (D2) from the **tundish** should:

a. Have a vertical section of pipe at least 300mm long below the **tundish** before any elbows or bends in pipework (see Diagram 1); and
b. Be installed with a continuous fall thereafter of least 1 in 200.

3.56 The discharge pipe (D2) should be made of:

a. Metal; or
b. Other material that has been demonstrated to be capable of safely withstanding temperatures of the water discharged and is clearly and permanently marked to identify the product and performance standard (e.g. as specified in the relevant part of BS 7291).

3.57 The discharge pipe D2 should 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. for discharge pipes between 9m and 18m the equivalent resistance length beat least two sizes larger than the nominal outlet size of the safety device; between 18m and 27m at least 3 sizes larger, and so on; bends must be taken into account in calculating the flow resistance. See diagram 1, table 1 and worked example.
Note: an alternative approach for sizing discharge pipes would be to allow Annex D, section D.2 of BS 6700:2006 Specification for design, installation, testing and maintenance of devices supplying water for domestic use within buildings and their curtilages.

Diagram 1 – **Typical discharge pipe arrangement**

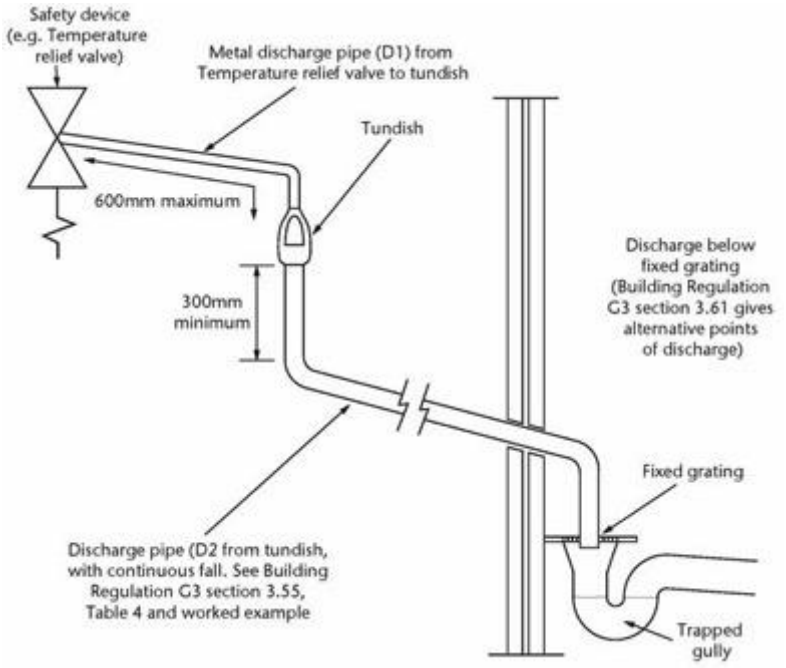


Table 1 – **Sizing of copper discharge pipe 'D2' for common temperature relief valve outlet sizes**

Valve outlet size	Minimum size of discharge to Tundish (D1)*	Minimum size of discharge pipe from Tundish (D2)*	Maximum resistance allowed expressed as a length of straight pipe, i.e. elbows or bends	Resistance created by each elbow or bend
G ½	15mm	22 mm 38 mm 35 mm	up to 9 m up to 18 m up to27 m	0.8 m 1.0 m 1.4 m
G ¾	22 mm	28 mm 35 mm 42 mm	up to 9 m up to 18 m up to27 m	1.0 m 1.4 m 1.7 m
G 1	28 mm	35 mm 42 mm 54 mm	up to 9 m up to 18 m up to27 m	1.4 m 1.7 m 2.3 m

**See 3.49 and 3.56 and Diagram 1*
***Note**: The above table is based on copper tube. Plastic pipes may be of different bore and resistance.*
Sizes and maximum lengths of plastic should be calculated using data prepared for the type of pipe being used.

Worked Example
The example below is for a G ½ 6 with discharge pipe (D2) having 4 No. 22mm elbows and length of 7m from the **tundish** to the point of discharge.
From Table1
Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G ½ t**emperature relief valves** is: 9.0m
Subtract the resistance for 4 No.22mm elbows at 0.8m each=3.2m
Therefore the maximum permitted length equates to: 5.8m which is less than the length of 7m therefore calculated the next largest size.
Maximum resistance allowed for a straight length of 28mm copper discharge pipe (D2) from a G ½ **temperature relief valve** is. 18m
Subtract the resistance for 4 No.28mm elbows at 1.0m each=4m
Therefore the maximum permitted length equates to: 14m
As the actual length is 7m, a 28mm (D2) copper pipe will be satisfactory.

3.58 Where a single common discharged pipe serves more than one system, it should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected.

3.59 The discharge pipe should not be connected to a soil discharge stack unless it can be demonstrated that the soil discharge stack is capable of safely withstanding temperatures of the water discharged, in which case, it should:

a. Contain a mechanical seal, not incorporating a water trap, which allows water into the branch pipe without allowing foul air from the drain to be ventilated through the **tundish**;
b. Be a separate branch pipe with no **sanitary appliances** connected to it;
c. If plastic pipes are used as branch pipes carrying discharge from a safety device they should be either polybutylene (PB) to Class S of BS 7291-2:2006 or cross linked polyethylene (PE-X) to Class S of BS 7291-3:2006;and
d. Be continuously marked with a warning that no **sanitary appliance** should be connected to the pipe.

4.4 Unit filling

⚠ ***WARNING: Switching on the equipment when it is not filled with water will seriously damage the electric heating element.***

⚠ ***WARNING: In the presence of water with a hardness degree >200ppm it is mandatory that you install a softener to reduce limestone scaling inside the cylinder and keep the electric heating element and the hydraulic safety unit in good working order.***

To fill the equipment you need to:

- The tap present in the hydraulic unit must be put in the open position, the opening of the tap allows the equipment's supply. The retain system incorporated in the safety hydraulic unit prevents from the heat water return.
- open the main water supply or the equipment water supply cock;
- open a hot water tap (e.g. bathroom, wash basin, etc.) to allow the water to flow out; when the water outflow from the tap is constant the equipment will be full;
- check that there are no leaks from the various hydraulic connections;

We recommend that you clean the pipes before laying them.
Only proceed with the electrical connection after performing this operation

4.5 Electrical connection

Wiring should be installed by a qualified, competent person in accordance with the prevailing building regulations, part P of the current IEE regulations and all other directives.

⚠ **WARNING: Switching on the equipment when it is not filled with water will seriously damage the electric heating element.**

⚠ **WARNING: If the supply cable is damaged, it must be replaced by the manufacturer or by its technical support service or a suitably qualified person.**

Standard commercial cables can be used, 230 V supply lines must be laid separately above lengths of 10m.

The discharge pipes of the tundish, drain valves and motorised valves must be laid at distance from all electrical components.

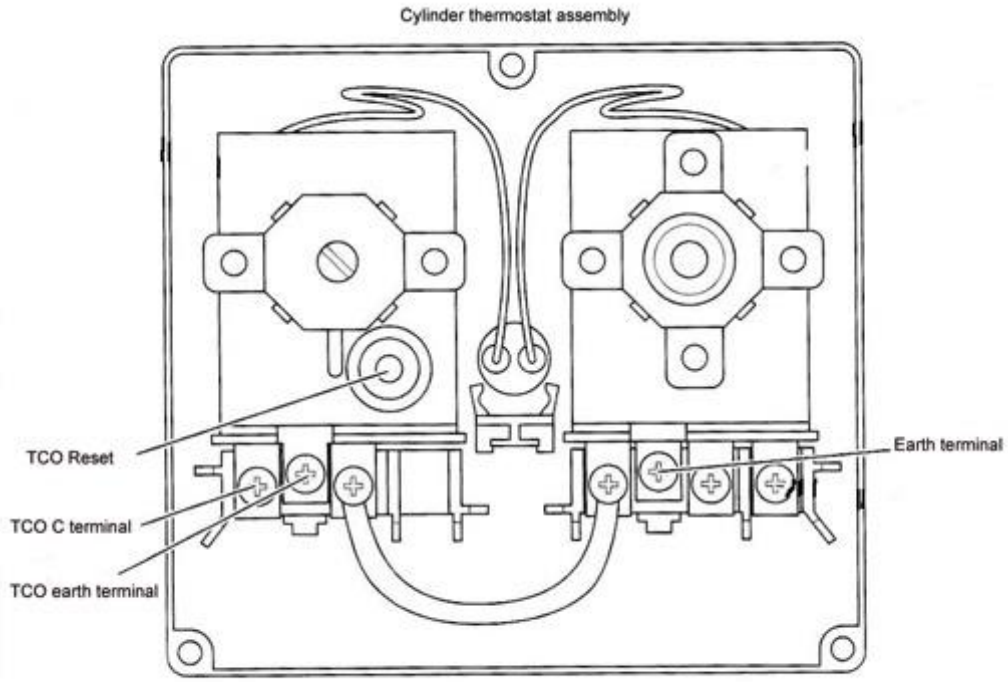
Before wiring the control components dismantle the casing to facilitate the work. Utilise the cut outs in the casing for routing cables.

⚠ **DANGER – Without earthing life threatening voltage can reach the pipework and draw off points – it it imperative that you earth the immersion heater**

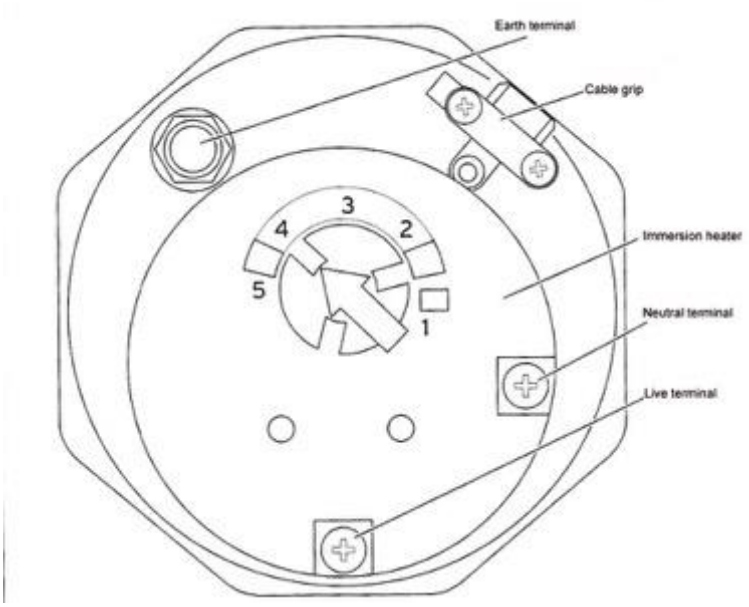
⚠ **Ensure that both hot and cold pipes are connected to the earth line by means of an earth cable directly on the cylinder.**

⚠ You must also ensure that the immersion heater is connected to the earth line via the earth terminal.

Cylinder thermostat and thermal cut-out for reheating circuit

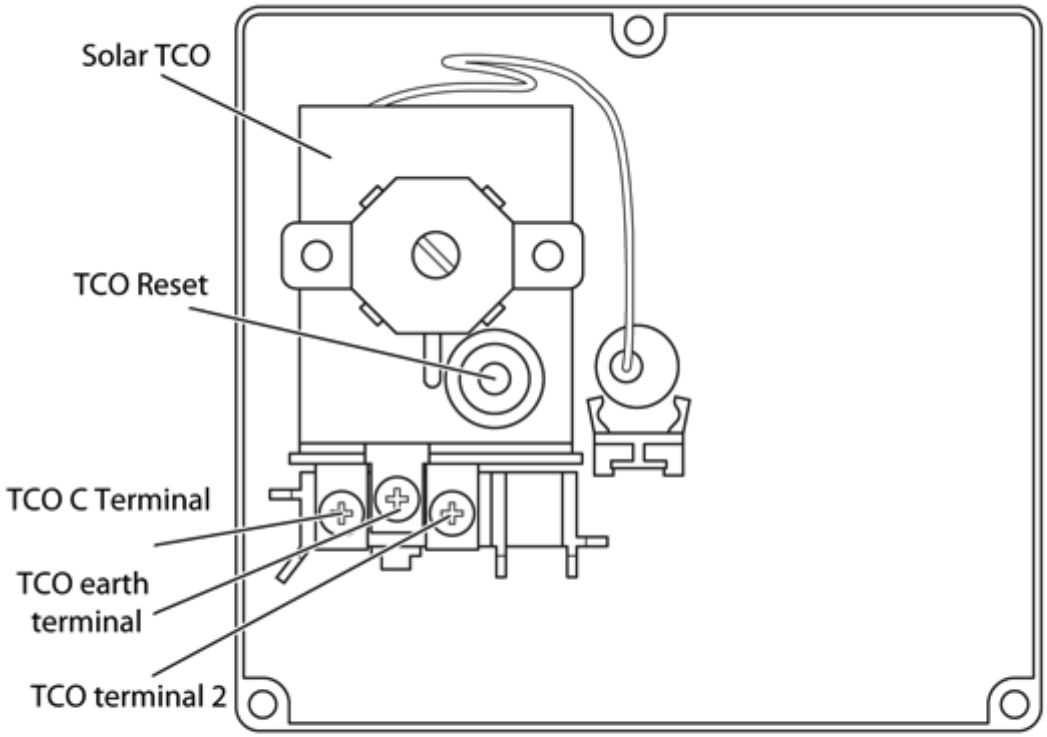


Electrical connection of the immersion heater



Only switch the immersion heater on when the cylinder is full

Solar circuit thermal cut out (TCO)



It is mandatory that the live supply to the solar pump is run in series through terminals 3 & 5 from the solar control to the pump for this to operate as the solar TCO,

4.6 Safety limiting device (manual reset

Reset, after eliminating the causes of intervention, as follows:
- disconnect the power supply;
- remove the protection cover fixing screws;
- lightly press the thermostat reset button, using an insulated object with round tip, in the position indicated, until hearing a click.

4.7 Solar controller - When the solar controller is used as the normal control thermostat on the cylinder and the cylinder incorporates a high limit thermostat for the solar circuit

4.8 T&P

Technical data
Max Pressure: 7 bar
Max Temperature: 90°C

4.9 Motorized Zone Valve

Technical data
240V, 0.04°, 6/5W, 50/60Hz
Max Diff. Press. : 55.2kPa (8psi)
Max. Stat. Press. : 863 kPa (125 psi)
Max. Fluid Temp. : 5-88 °C (40-190°F)
Max. Ambient Temp. : 52°C (125°F)
Hot water Only

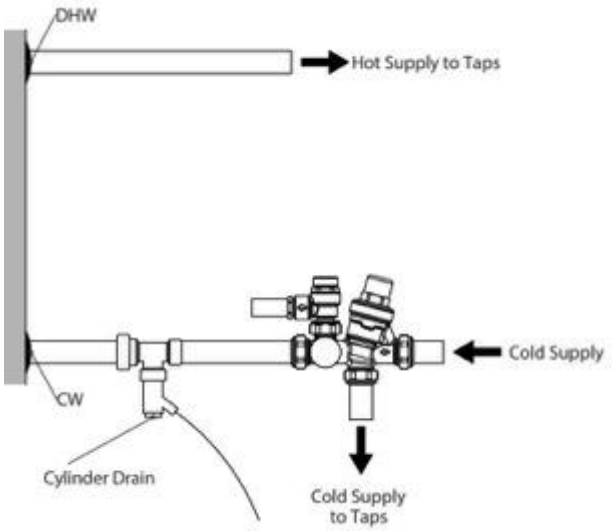
4.10 Dual Thermostat

Technical data
Temperature range: 25±5 ÷ 65±3°C
Temperature differential: Δt 8±2 K
Limit temperature: FIX 80±3°C
Fail safe: YES
Differential (Manual Reset): 20±5°C
Max. body temperature: T 80°C
Max. bulb temperature: T 125°C
Ambient temperature effect: -0.12°C/°C *
Fairlead: M20x1.5
Degree of protection: IP40
Contact rating: N-A 10(2,5)A/250V~

- Change in switching pint refer to maximum change of the value of ambient temperature

4.11 Drainage

Typical drain arrangement and system design.



4.12 Unit emptying

Should the unit be going to remain unused for a prolonged time, we recommend that you empty it. In this case proceed as follows:

- cut off the power supply and the main water supply;
- open a hot water tap to allow air to flow in;
- turn the emptying knob on the hydraulic safety unit to the open position;
- verify that the discharge connector of the hydraulic safety unit is connected to a drain as specified in par. 3.1.1.

4.13 Restart after a long term stop

When the unit is restarted after a long term stop (trail running included), it is normal that outlet water is unclean. Keep the tap on and the water will be clean soon.

5 COMMISSIONING SYSTEM

⚠ ***IMPORTANT: It is the responsibility of the installer to ensure that the system is properly commissioned and the end user instructed in the safe operation of the equipment.***

The thermostat on the immersion heater should be adjusted to trip at 60°C. This is the ideal temperature to prolong element life in hard water areas. Scale on the sheath builds up more rapidly at temperatures above this causing the element to overheat and premature failure can occur. Higher temperatures without additional controls would result in scalding. In known hard water areas the use of a scale inhibitor is also recommended.

In addition to the thermostat the thermal cut-out will switch power off to the element should the thermostat malfunction, causing an excessive rise in water temperature. The thermal cut-out can be reset manually after the fault has been corrected

5.1 Electrical Check

- Check that all wiring including earth wiring, has been installed correctly, conform to current regulation and satisfactory electrical test and inspection certificate has been completed.
- Check all electrical covers are correctly fitted;
- Check Tundish is positioned so that any spillage or spray from the Tundish would not contact any electrical components.
- Check all wiring connections have been made.
- Check the required earth continuity conductors have been fitted.

5.2 Pre-Fill Check

- Check the expansion vessel is fitted and that no valves are fitted between the expansion vessel and the combination valve.
- Check that no valves are fitted between indirect water heater and the combination valve.
- Check the PRV, tundish and discharge pipes are corrected installed to conform to the Building Regulation G3.
- Check all pipes connections are tight and no joints have been left unsoldered.
- Check all drain cocks are closed.

5.3 Fitting System

- Close all isolating valves.
- Close all taps.
- Open the incoming water mains stopcock.
- Turn on mains water, allow system to fill up to first isolating valve. Turn on hot taps. Open isolating valves and allow the indirect water heater to fill and let water pass through the system to the open hot tap, this will expel most of air from the system and fill the indirect water heater vessel.
- Systematically open all hot and cold taps to purge air.
- Check system for leaks.
- Check no water is discharging from T&P or PRV.
- Expansion vessel – with the water supply turned off and taps open, check expansion vessel pressure and top up as necessary.
- Cylinder T&P – check its operation; with the water supply on, turn the T&P test knob and check water discharges to tundish, ensure the valve closes after testing.
- Discharge pipe (D1) – open either T&P or PRV gradually to produce all full bore discharge into tundish and D2 and check there is no back pressure, and that the water flows freely to drain.
- Pressure Reducing Valve (PRV) – check that the correct outlet pressure is being maintained by measuring the pressure at an in-line terminal fitting e.g. a tap.
- When necessary the immersion heater boss can be used as an access to view internal of the cylinder

5.4 Drain System

- Turn off incoming mains stop cock.
- Using hose and suitable containers, drain all water from the cylinder and pipework using drain cocks.
- Remove and clean in-line strainer of combination valve.
-

5.5 Cleaning The System

- Using proprietary chlorination product, chlorinate domestic hot water system as per manufacturer's instruction.
- Drain the system as 4.15, then fill and drain to flush as many times as recommended by chlorination product manufacturer.
- Refill system.

5.6 Setting And Testing Controls

- Switch on indirect water heater electric isolating switch.
- For commissioning use the factory default setting, no changes parameters should be required.
- Set indirect water heater into operation, and when hot check for leaks.
- Check operating of any open flue appliances that could be affected by air movement through the indirect water heater.
- Fill in details in the Benchmark Logbook.

5.7 Handing Over

- Complete the Benchmark Logbook.
- The installer should re-check the system and ensure it's completely satisfactory before demonstrating to the end user.
- The end user should be aware of the following:
  - The most cost effective use of the indirect hot water system using the automatic mode.
  - How to set the temperature of the tap hot water.
  - How to set the different functions.
  - The function of the combination valve's PRV and that over pressure will cause steam and scalding water to be emitted from the discharge pipes.
  - That the tundish is supplied as a visual identification for over pressure.
  - The procedure to follow in event of over pressure.

⚠ ***IMPORTANT: This manual must be left with the end user together with the Service record / Logbook.***

6 MAINTENANCE INSTRUCTIONS

(Qualified personnel only)

⚠ ***WARNING: the repair and/or maintenance operations must only be performed by qualified personnel. Only use genuine spare parts. Prior to undertaking any maintenance operations, turn off and disconnect the equipment from the mains electrical supply before commencing any work on the Cylinder. We recommend that you purchase any spare parts from only authorised dealers or directly from the Manufacturer.***

6.1 General

- Control regularly the connection between the supply plug and wiring.
- If the system is not used for a long period, empty the cylinder in order to avoid freezing.
- It is advised to clean regularly the inside part of the cylinder and the electric heating element in order to preserve the efficiency.
- Control the magnesium anode and change it if needed.
- Clean the air filters each month in order to preserve the heating performance.
- Before turning off the system for a long period you must:
  - Remove the current supply;
  - Drain all the water from the cylinder and the pipes;
  - Close all valves ;
  - Control regularly all inside components.

6.2 Water circuit / Condensate discharge

The water circuit check is limited to the integrated filter installed by the customer (if any; in this case follow the instructions provided by the valve manufacturer); also check the tightness of the valves, of the screw connections, etc.; should they be loose, have them tightened by technicians.

6.1 Replacement of the electric immersion heater

If replacement of the electric immersion heater is required follow this procedure.

Procedure:

- Turn off the unit;
- Disconnect product from the electrical supply
- Empty the cylinder until the water level seems to be lower than the place where the electric immersion heater is joined;
- Remove the immersion heater cover. Disconnect the cable from the thermostat
- Remove the thermostat
- Disconnect and replace the electric immersion heater; Replace the O-Ring if necessary.
- Replace the thermostat
- Restore the electric connections;
- Replace the immersion heater cover
- Fill the cylinder and check for leaks;
- Restore the connection to the electric supply;

6.2 Outer cover cleaning

For the cleaning of the outer shell only use a damp cloth. Do not in any circumstances use abrasive products containing organic thinners (alcohol, benzene, etc.).

6.3 Hydraulic safety unit efficiency check

The hydraulic unit efficiency is very important to prevent any overpressures inside the cylinder (that would damage it), and allows the user to safely operate the equipment. Periodically check the efficiency of the hydraulic safety unit, according to the instructions provided by the manufacturer. Follow the instructions provided by the manufacturer. During the check clean the unit and remove any limescale.

6.4 General notes

Always use tools that are appropriate for the intended purpose.
Always replace the gaskets and/or the o-rings ensuring the hydraulic sealing.
Only use genuine spare parts.
During reinstalling make sure that:

- the resistance is properly housed and the sealing gaskets are correctly installed;
- the safety and regulation devices (thermostats) are properly installed inside their housings;
- before reconnecting the equipment to the mains fill it (referring to the appropriate section) and check that there are no water leaks.

6.5 After-sales service

In case of errors or malfunctions, switch off the equipment and disconnect the power supply. Then contact the technical support service.

Fault	Cause	Remedy
The cylinder cools down at night	One pipe circulation in the case of short tube networks with low pressure loss	Install a non-return valve as close as possible to the cylinder
Primary heating not working. Boiler runs for short periods repeated until cylinder reaches temperature	air in the reheating chamber	Vent the reheating heat exchanger.
	Heat exchanger surface area too small	Compare the data provided by the boiler manufacturer with the cylinder data it may be possible to cure by setting a higher flow rate on the boiler
Only cold or lukewarm water at draw off	The cold and cold draw offs have been reversed	Turn off the cold water supply and let the water flow out via the how draw off. Only a few litres of water will flow if the setup is correctly. The hot water withdrawal pipe intake is then in air space and further draining is not possible. If it is possible to drain the entire cylinder via the hot draw off then the connections are incorrect. Change the connections.
	Hot water thermostat set too low	Increase the setting
	Heating insufficient – boiler doesn't reheat	Check boiler is working
	External control device faulty	Check controls are working and that the 2 port valve is in the DHW position
	Air in the reheating heat exchanger	Vent the reheating heat exchanger

	Cylinder sensor faulty	Check thermal cut out and replace if faulty
Water flows from the expansion relief valve when heating up	Dirt on the valve seat	Check and repair
	PRV Faulty	Check an replace if faulty
	Expansion vessel faulty	Check pressure, if insufficient re-pressurise and replace if pressure not held
	Expansion relief valve faulty	Check if pressure is normal and replace if faulty
Water flows from the temperature and pressure relief valve when heating up	Dirt in the valve seat	Check and repair
	Boiler temperature control system faulty	Check boiler control system and that the 2 port valve switches when cylinder temperature reached
	Cylinder sensor faulty	Check sensor and TCO replace if faulty
	T & P relief valve faulty	If water escapes when only heated by the immersion replace the T & P relief valve
	Immersion heater faulty	Check thermal cut out and replace if faulty

6.6 Service record / Logbook

Vokèra BY RIELLO

MAINS PRESSURE HOT WATER STORAGE SYSTEM COMMISSIONING CHECKLIST

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

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

Customer Name _____ Telephone Number _____

Address _____

Cylinder Make and Model _____

Cylinder Serial Number | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Commissioned by *(print name)* _____ Registered Operative ID Number _____

Company Name _____ Telephone Number _____

Company Address _____

_____ Commissioning Date _____

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

Building Regulations Notification Number *(if applicable)* _____

ALL SYSTEMS PRIMARY SETTINGS (indirect heating only)

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

ALL SYSTEMS

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

UNVENTED SYSTEMS ONLY

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

THERMAL STORES ONLY

What store temperature is achievable?		°C
What is the maximum hot water temperature?		°C

ALL INSTALLATIONS

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

Commissioning Engineer's Signature _____

Customer's Signature _____

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

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

Vokèra BY RIELLO

SERVICE RECORD

It is recommended that your hot water system is serviced regularly and that the appropriate Service Record is completed.

Service Provider
Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

SERVICE 1 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

SERVICE 2 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

SERVICE 3 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

SERVICE 4 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

SERVICE 5 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

SERVICE 6 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

SERVICE 7 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

SERVICE 8 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

SERVICE 9 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

SERVICE 10 Date
Engineer Name
Company Name
Telephone Number
Comments
Signature

DISPOSAL OF WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (2002/96/EC – WEEE DIRECTIVE)
This symbol indicates that the appliance must not be treated as domestic waste upon disposal.
Rather, it must be delivered to an authorized collection centre for the recycling of electrical and electronic appliances.

Proper disposal of this appliance will avoid potential health hazards and adverse consequences for the environment.

Recycling of materials helps to preserve natural resources.

For further information about the recycling of this appliance, please contact your municipal offices, your domestic waste disposal service or the retailer/installer from whom the appliance was purchased.
The penalties for failure to comply with these disposal procedures are laid down in local legislation.