



Johnson & Starley



Johnson & Starley

Aquastar★
PREMIER
DUPLEX STAINLESS STEEL
HOT WATER CYLINDER

Tel: 01604 762 881
www.johnsonandstarley.co.uk

installation & maintenance instructions

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PREMIER

IMPORTANT NOTE TO THE INSTALLER

Read these installation and maintenance instructions before commencing. Unvented cylinders are a controlled service as defined in the latest edition of the building regulations and should only be fitted by a competent person.

The relevant regulations are :

England and Wales - Building Regulation G3, Scotland - Technical Standard P3, N Ireland - Building Regulation P5.

After installation the benchmark log book must be completed and left along with these instructions with the householder for future reference.

INTRODUCTION

The Aquastar Premier Unvented water heater is made from Stainless Steel for excellent corrosion resistance. Aquastar Premier has a strong corrosion proofed steel case and is well insulated with environmentally friendly foam.

It is available in a range of 7 sizes from 90 - 300 litres and in Direct, Indirect and Twin Coil indirect forms.

Aquastar Premier is supplied complete with all the necessary safety and control devices needed to connect to the cold water mains. All are pre-adjusted. High quality controls have been selected to combine high flowrate performance with minimum pressure drop to make Aquastar Premier perform well in all areas, even those with low water pressure.

Aquastar Premier is WRAS approved to show compliance with Building Regulation G3

STORAGE PRIOR TO INSTALLATION

Aquastar Premier should be stored in its original packaging in an upright position in an area free from excessive damp.

Notes: The Pressure reducing valve, Non return valve and Expansion relief valve are combined together in the inlet control set.

Two Port Valve (supplied) **MUST** be fitted.

On 90 - 180 litre sizes there is no dedicated secondary return boss.

COMPONENTS SUPPLIED WITH THE UNIT

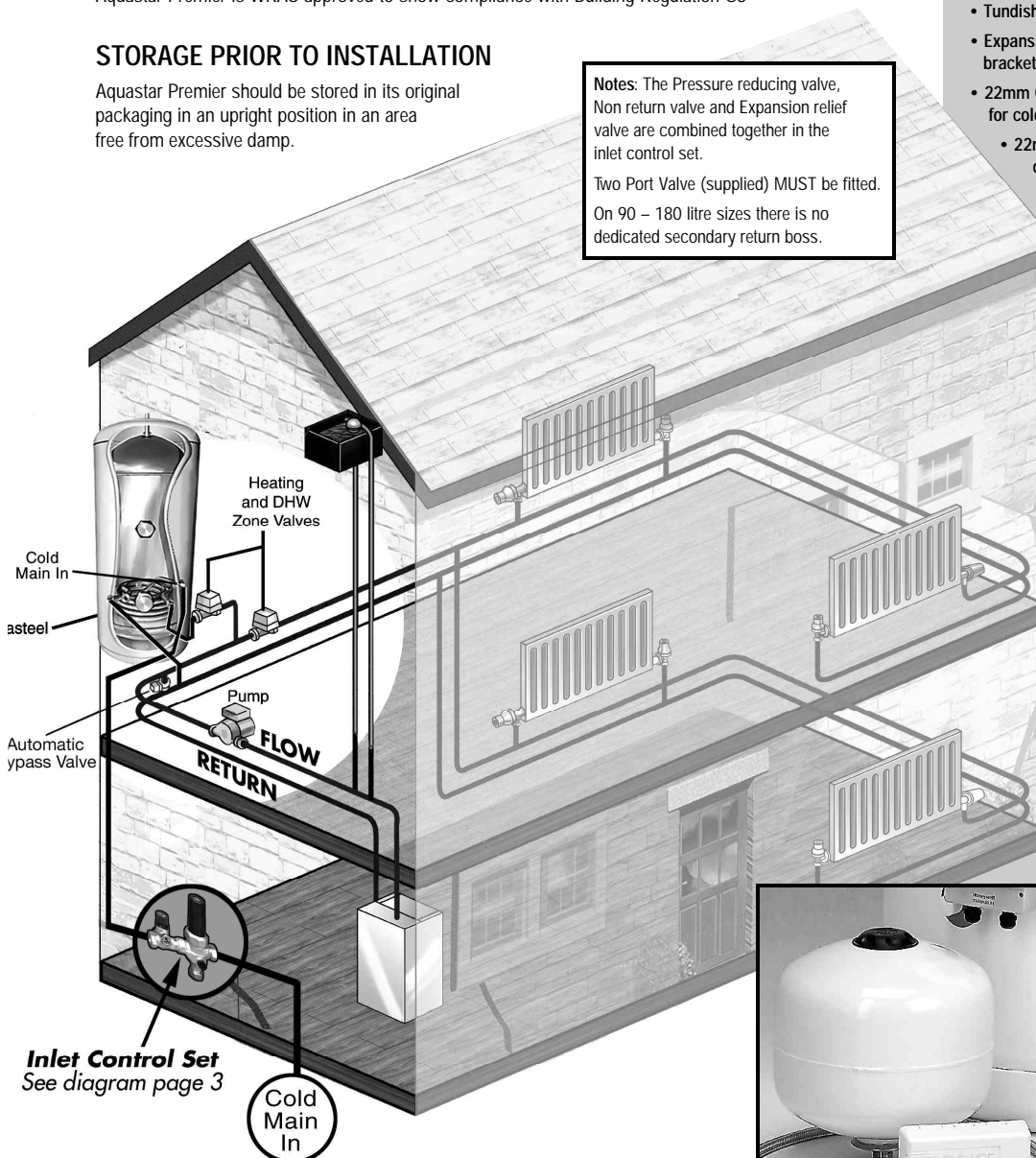
- Immersion heater(s)
- Factory fitted pressure / temperature relief valve
- Inlet control set (consisting of pressure reducing valve and expansion relief valve)
- Tundish & 15mm end feed tee
- Expansion vessel, wall mounting bracket and flexible hose
- 22mm Compression Drain tap elbow for cold feed
- 22mm Compression elbow for hot draw off
- Benchmark log book

In addition indirects have:

- Two 22mm compression elbows for the coil connections
- A 22mm compression 2 port valve and a wiring centre.
- A Dual Thermostat

Twin Coil Parts:

- Inlet Control set
- Temp & Pressure relief valve
- 15mm / 22mm Tundish
- Expansion vessel
- Wall mounting bracket
- 5 x 22mm DZR compression elbows
- Compression DZR drain elbow
- 1 x 15mm end feed tee
- Expansion vessel hose
- Immersion Heater
- 2 x Two port valves
- Wiring centre
- 2 x Dual Thermostats
- Installation & Maintenance Instructions
- Benchmark Logbook



Inlet Control Set
See diagram page 3

Cold Main In

Typical Installation 2 Port Valves



WATER SUPPLY

Aquastar Premier operates at 3 bar (controlled by the inlet control set) and is capable of delivering over 77 litres per minute. The high quality inlet control set has been designed to make the most of what is available however the performance of any Unvented system is only as good as the supply.

The maximum possible water demand should be assessed taking into consideration that both hot and cold services are supplied simultaneously from the mains.

The water supply should be checked to ensure it can meet these requirements. If necessary consult the local water company regarding the likely pressure and flow rate availability.

If measuring the water pressure note that a high static (no flow) mains pressure is no guarantee of good flow availability. In a domestic installation 1.5 bar and 25 l/m should be regarded as the minimum. The maximum mains pressure the inlet control set can cope with is 16 bar.

In most cases the supply pipe should be a minimum of 19mm bore (e.g 22mm copper pipe / 25mm HPDE). Consideration should be given to upgrading to a larger size if the recommended minimum pressure/flowrate is not being achieved.

Contact our Sales Department regarding our Mainsbooster units, which will boost performance to a new level.

SITING THE UNIT

Aquastar Premier can supply outlets above it or at some distance from it. Site the unit to minimise "dead leg" distances especially to the point of most frequent use.

Outlets above the Aquastar Premier will reduce the outlet pressure available by 0.1 bar for every 1m of height difference

The unit should be protected from frost. Particular care is needed if siting in a garage or outbuilding. All exposed pipework should be insulated

Aquastar Premier must be installed VERTICALLY on a flat base capable of supporting the weight of the cylinder when full.

(see technical specification section for weights). The minimum recommended cupboard size is 650mm square

Access for maintenance of the valves should be considered.

The immersion heaters are 375mm long and care should be taken that they can be withdrawn for servicing if required.

The discharge pipework from the safety valves should fall continuously and terminate safely.

STEP BY STEP GUIDE TO INSTALLATION

Aquastar Premier can supply outlets above it or at some distance from it. Site the unit to minimise "dead leg" distances especially to the point of most frequent use.

Identify the cold water supply pipe and fit an isolating valve (not supplied) A quarter turn full bore ball valve is recommended

Fit the drain elbow to the cylinder cold feed and use a piece of 22mm copper tube to connect between the drain elbow and the outlet of the inlet control group.

Ensure the arrow points in the direction of the water flow.

If you need a balanced cold water supply (i.e at the same pressure as the hot will be) you should insert pipe into 22mm connection on inlet manifold, see photo insert. No valve may be fitted between the inlet control set and the cold inlet.

Do not use monobloc mixers if the cold supply of the mixer is not feed from the balanced cold connection, if the cold supply is not balanced to mixer, back-pressure will arise resulting in discharge.

PRIMARY COIL CONNECTIONS

Connect the primary connections (Indirect only) using the compression elbows provided

The primary circuit must be positively pumped. Gravity circulation is not suitable. Either primary connection may be used as the primary flow. Reheat times are identical either way.

The primary circuit can be open vented or sealed with up to a maximum pressure of 7 bar. If you seal the primary circuit an additional expansion vessel and safety valve is required.

The boiler may be Gas, Electric, Oil etc. but must be under effective thermostatic control. Uncontrolled heat sources such as some AGA's, back boilers, solid fuel stoves, etc are NOT SUITABLE. Please contact our technical department for guidance.

Connect the two port zone valve (indirect only) into the primary flow pipework. The direction of flow arrow should be towards the primary flow connection.

On twin coil cylinders we have provided an extra thermostat boss should you wish to use it. Again a two port zone valve should be fitted (supplied)

SECONDARY CIRCULATION

Aquastar Premier can be used with secondary circulation. A 15mm pipe should be used. An appropriate WRAS approved bronze circulator should be used in conjunction with a non return valve to prevent backflow. On large secondary circulation systems it may be necessary to incorporate an extra expansion vessel into the circuit to accommodate the increased system water volume. Secondary circulation should be avoided for direct electrically heated units being used on off peak electricity tariffs.

IMMERSION HEATERS

Immersion Heaters. Only immersion heaters with a thermal cutout may be used. To help ensure this the immersion heaters have a special 1 3/4" thread. They are rated at 3 kW at 240 V and are of a low noise Incoloy construction. They have both a thermostat and a high limit cutout. Please order the correct replacement via ourselves, **any other fitted may affect your guarantee.**

When fitting ensure the 'O' ring is positioned correctly on the head of the immersion heater and lubricate before fitting. Fit it by hand until almost home then tighten gently as the 'O' rings will seal easily.

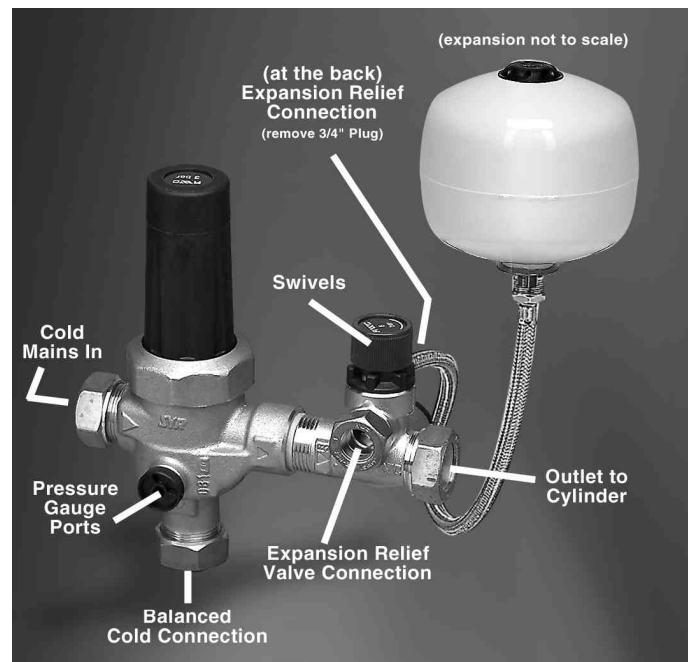
The electrical supply to each immersion heaters must be fused at 13A via a double pole isolating switch to BS 3456. The cable must be 2.5mm² heat resistant (85°C HOFr) sheathed flex complying to BS 6141:1981 Table 8.

Do not operate the immersion heater/s until the unit is full of water.

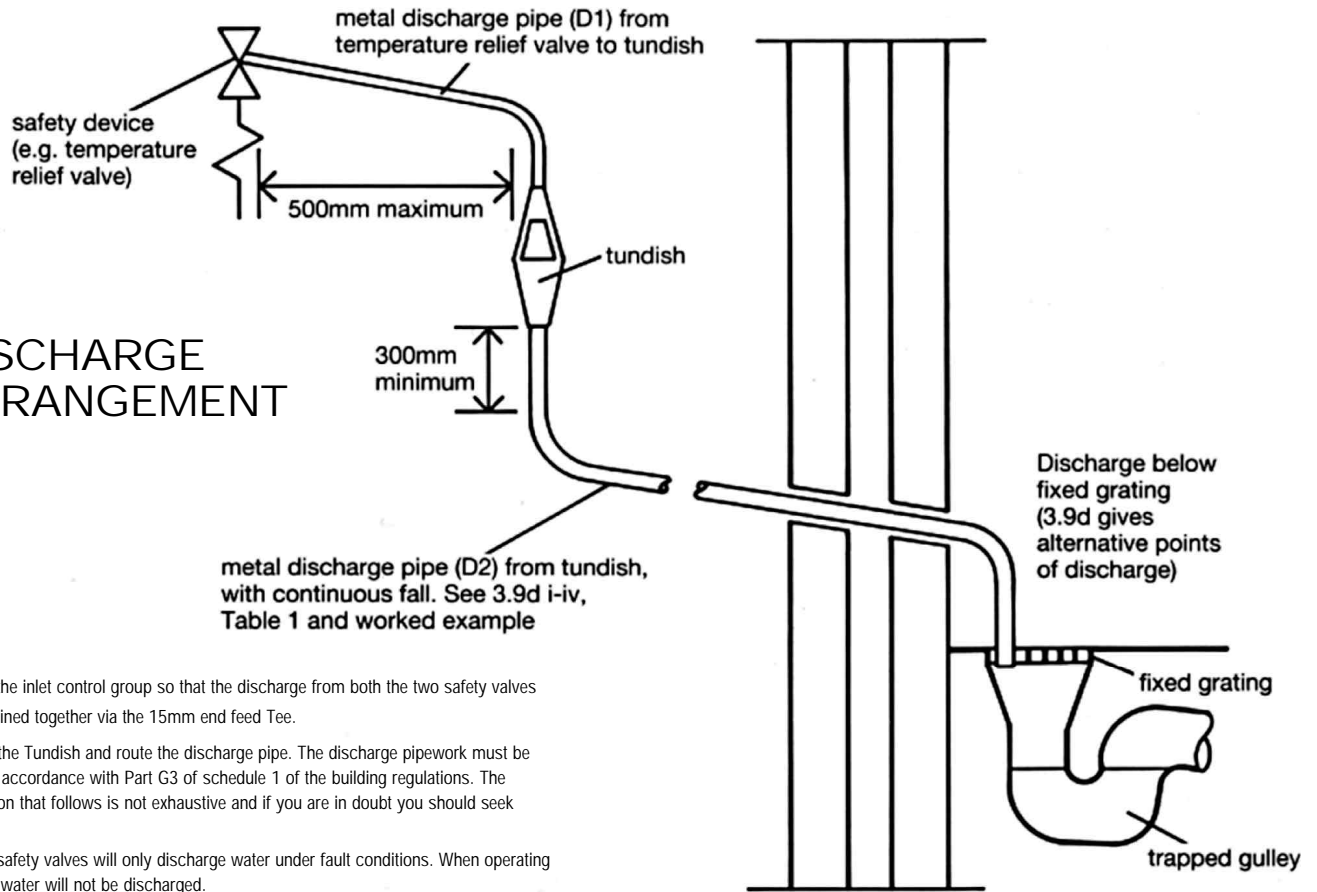
Dual Thermostat Immersion Pocket. Fit the immersion thermostat (indirect only) into the cylinder. Fit the pocket first , then the thermostat.

Complete the wiring – use the appropriate wiring diagrams on page 7

Inlet Control Set



DISCHARGE ARRANGEMENT



Position the inlet control group so that the discharge from both the two safety valves can be joined together via the 15mm end feed Tee.

Connect the Tundish and route the discharge pipe. The discharge pipework must be routed in accordance with Part G3 of schedule 1 of the building regulations. The information that follows is not exhaustive and if you are in doubt you should seek advice.

The two safety valves will only discharge water under fault conditions. When operating normally water will not be discharged.

The tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible and within 500mm of the safety device e.g. the temperature relief valve.

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

- a) 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 diagram 1, Table 1 and the worked example.

An alternative approach for sizing discharge pipes would be to follow BS6700: 1987 Specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages, Appendix E, section E2 and table 21.

- b) have a vertical section of pipe at least 300mm long, below the tundish before any elbows or bends in the pipework.
- c) be installed with a continuous fall.
- d) it is preferable for the discharge to be visible at both the tundish and the final point of discharge but where this is not possible or practically difficult there should be clear visibility at one or other of these locations. Examples of acceptable discharge arrangements are:
 1. ideally below the fixed grating and above the water seal in trapped gulley
 2. downward discharges at a low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children play or otherwise come into contact with discharges, a wire cage or similar guard is positioned to prevent contact whilst maintaining visibility
 3. discharges at a high level; e.g. in to metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering systems that would collect such discharges (tundish available).
 4. where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe to be connected. If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

Note: The discharge will consist of scalding water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

Note: It is not acceptable to discharge straight into a soil pipe.

Connect to the hot water outlet using the compression elbow provided. Hot water distribution pipework in 22mm with short lengths of 15mm to terminal fittings such as sinks and basins.

Select a suitable position for the expansion vessel. Mount it to the wall using the bracket provided. Use the hose to connect between the vessel and the inlet control group.

HEPvO

Alternative discharge arrangements, the HEPvO Hygienic self sealing waste valve now offers a useful alternative to conventional outlet configurations for unvented hot water storage units. The HEPvO valve has been independently assessed by BRE, however it should be noted that the acceptance of the HEPvO for temperature & pressure relief discharge applications is at the discretion of the Local Authority Building Control Department, whose advice should be sought in this regard.

For further information please contact technical support.

Table 1 - Sizing of copper discharge pipe 'D2' for a temperature relief valve with a G¹/₂ outlet size (as supplied)

Size of discharge pipework	Maximum length of straight pipe (no bends or elbows)	Deduct the figure below from the maximum length for each bend or elbow in the discharge pipe
22mm	Up to 9m	0.8m
28mm	Up to 18m	1m
35mm	Up to 27m	1.4m

WORKED EXAMPLE

The example below is for G1/2 temperature relief valve with a discharge pipe (D2) having 4 No. elbows and length of 7m from the tundish to the point of discharge.

From Table 1:
Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G1/2 temperature relief valve 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

5.8m is less than the actual length of 7m therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm pipe (D2) from a G1/2 temperature relief valve equates to: 14m

As the actual length is 7m, a 28mm (D2) copper pipe will be satisfactory.

COMMISSIONING - Filling

Check the pressure in the expansion vessel is 3 bar (45PSI). (i.e the same as the setting of the pressure reducing valve. The valve is of the car tyre (schrader) type

Check all the connections for tightness including any factory made connections such as the immersion heater and the temperature and pressure relief valve. Check the draining tap is closed.

Before filling open the hot tap furthest away from the Aquastar Premier to let air out. Open the cold main isolation valve and allow the unit to fill.

When water flows from the tap allow it to run for a short while to flush through any dirt, swarf or flux residue.

Close the tap and open each other hot tap in turn to purge all remaining air.

COMMISSIONING - Direct Units

After filling with water switch on the power to the immersion heaters and allow the unit to start to heat. The immersion heater is supplied preset at 55°C. Turning fully to + sets to approx 65°C

COMMISSIONING - Indirect Units

Consult the boiler manufacturers commissioning instructions and fill the primary circuit.

Ensure the wheel on the two port valve set to the filling position. When full move the wheel back.

Switch the programmer to Domestic Hot water (DHW) and allow the unit to start to heat.

Adjust the dial of the dual thermostat to between 55°C and 65°C as required.

STORAGE TEMPERATURE

The recommended storage temperature for both direct and indirect Aquastar Premier is 60-65°C. In hard water areas consideration should be given to reducing this to 50-55°C.

In many healthcare applications the guidance on Legionella control and safe water delivery temperatures will require storing the water at 60-65°C, distributing at 50-55°C and using thermostatic mixing valves to control the final temperature. For details consult the NHS estates guidance on safe hot water temperatures.

COMMISSIONING – Safety Valve Checks

During heat up there should have been no sign of water coming from either the expansion relief valve or the temperature / pressure relief valve.

Now hold both of these safety valves fully open allowing as much water as possible to flow through the tundish. Check that your discharge pipework is free from debris and is carrying the water away to waste efficiently.

Release the valves and check that they reseal properly.

SERVICING – General

Servicing should only be carried out by competent installers and any spare parts used must be purchased from Johnson Starley.

NEVER bypass any safety devices or operate the unit without them fully operational

SERVICING – Draining

Isolate from the electrical supply to prevent the immersion heaters burning out.

Isolate the unit from the cold mains.

Attach a hose to the draining tap ensuring it reaches to a level below the unit (This will ensure an efficient syphon is set up and the maximum amount of water is drained from the unit).

Open the hot tap closest to the unit and open the draining tap.

WARNING : WATER DRAINED OFF MAY BE VERY HOT !

ANNUAL MAINTENANCE

Aquastar Premier requires an annual service 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. Commonly this is done at the same time as the annual boiler service

1) Twist the cap of 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

WARNING : THE WATER DISCHARGED MAY BE VERY HOT!

2) 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

3) Check the pressure in the expansion vessel is charged to 3 bar. 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.

4) Unscrew the pressure reducing valve cartridge from the inlet control set and clean the mesh filter within.

5) The benchmark log book supplied with this unit should be updated at each service.

YOUR GUARANTEE MAY BE VOID WITHOUT PROOF OF ANNUAL SERVICING

SPARE PARTS

We carry the full range of spares listed below in stock. If you order before noon we will dispatch the same day for delivery the next.

DESCRIPTION

Pressure Reducing Valve (3 Bar)

Expansion Relief Valve (6 Bar)

inc. Manifold & Check Valve

Tundish

Expansion Vessel (12 Litre White)

Expansion Vessel (18 Litre White)

Expansion Vessel (25 Litre)

Expansion Vessel Hose (1 Metre)

Expansion Vessel Bracket

2 Port Valve Sunvic

Twin Aquastat

Wiring Centre

Temperature & Pressure Relief Valve

Immersion Heater

Expansion Vessel (12 Litre White + FLAT)

Expansion Vessel (18 Litre White + FLAT)

For spares and technical back-up:

Technical Helpline: **01604 707011**

Spares Helpline: **01604 707012**

Fax: **01604 767408**

FAULT FINDING

FAULT	POSSIBLE CAUSE	SOLUTION
Water escaping from the case	Compression fitting on hot drawoff not sealing	Check / remake joint with sealing paste
Cold water at taps	DIRECT UNITS Immersion heater not switched on Immersion heater thermostat thermal cut out has operated Off peak timer incorrectly set	Turn on switch and ensure 240/230v at terminals Push reset button on stat and check operation of thermostat Check with manufacturer of clock or electricity company
	INDIRECT UNITS Programmer set to central heating only Programmer not switched on Programmer clock incorrectly set Central heating boiler not working Pump not operating Indirect thermal control cut-out has operated Two port motorised valve not operating	Check setting and change to Domestic Hot Water (Hot Water Only) Switch on and ensure 240/230v at terminals Check with manufacturers instructions Check power to boiler and, if required, pilot light alight Check 240/230v at terminals and check wiring Unscrew black cover, push reset button and check cylinder thermostat operation Check wiring and valve motor
Water overflowing out of discharge pipe	Incorrect installation of discharge pipe	Tundish upside down. Pipe sizing is not in accordance with building regulation G3 Minimum 300mm drop from tundish to first bend has not been accomplished
Hot water pressure dies away at taps	Poor water pressure or flow	Check pressure and flow to property (minimum 1.5 bar-20ltr/min) Refer customer to local water authority.
Water discharges from expansion relief valve	If continual – pressure reducing valve (part of the inlet control set) may not be operating correctly	Check outlet pressure from inlet control set is 3 bar.
	If continual – expansion relief valve seat may be damaged	Remove cartridge – check seat and renew if necessary
	If intermittent – expansion vessel charge may have reduced / bladder perished	Check pressure in expansion vessel Recharge to 3 bar if necessary If bladder perished replace vessel.
Water discharges from Temp & pressure relief valve	Unit has overheated – thermal controls have failed	Switch off power to boiler and immersion heaters. Leave water supply on. Wait until discharge stops.
Milky / cloudy water	Oxygenated water	Isolate water supply and replace if faulty Water from any pressurised system will release oxygen bubbles when flowing. The bubbles will settle out.
No hot water flow	Cold main off	Check and open stop cock fully
	Strainer blocked in pressure reducing valve	Isolate water supply & clean
	Inlet control set may be fitted incorrectly	Check and refit as required

USER INSTRUCTIONS

Your Aquastar Premier system is automatic in normal use and requires only annual servicing. You should employ an competent installer to perform the annual servicing. Normally this is timed to coincide with the annual boiler service

IF WATER IS FLOWING FROM THE SAFETY VALVES THROUGH THE TUNDISH THIS INDICATES A FAULT CONDITION AND ACTION IS NEEDED

If this water is hot turn the boiler and / or the immersion heater off. Do not turn off the water until the discharge runs cool. The discharge may also stop

CALL A COMPETENT PLUMBER OUT TO SERVICE THE UNIT. Tell them you have a fault on an unvented cylinder. We stock all the spare parts they may need.

GUARANTEE

The Aquastar Premier vessel carries a fully transferable 25 year guarantee against faulty materials or manufacture provided that:

It has been correctly installed as per this document and all the relevant regulations and codes of practice in force at the time.

It has not been modified in any way, other than by Johnson Starley.

It has not been misused, tampered with or subjected to neglect

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 benchmark log book has been filled in after each annual service.

Exclusions –The Guarantee does not cover

The effects of scale build up.

Any labour charges associated with replacing the unit or its parts

Any consequential losses caused by the failure or malfunction of the unit.

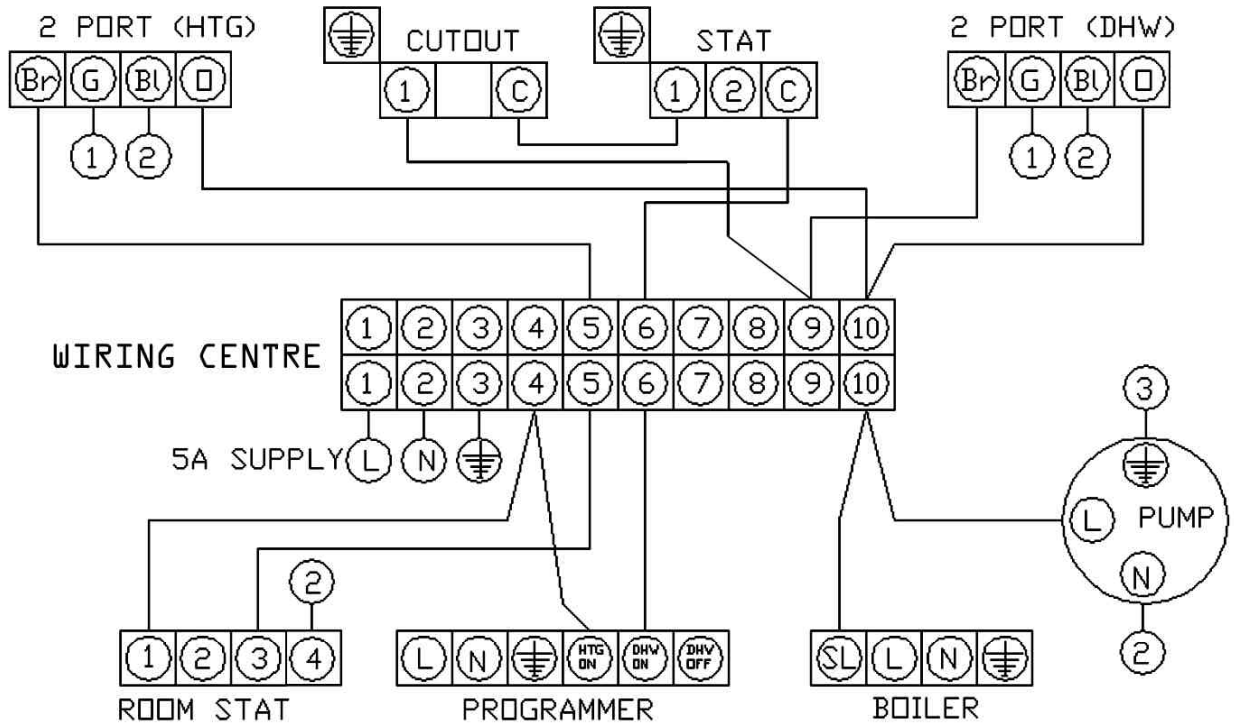
Guidance in the event of a problem

If your Aquastar Premier develops a water leak within the guarantee period, we will supply you with a replacement and send an invoice for payment. When the original unit is returned, complete with the Benchmark Log Book, and confirmed that the failure is within the terms of the warranty, your invoice will be credited in full.

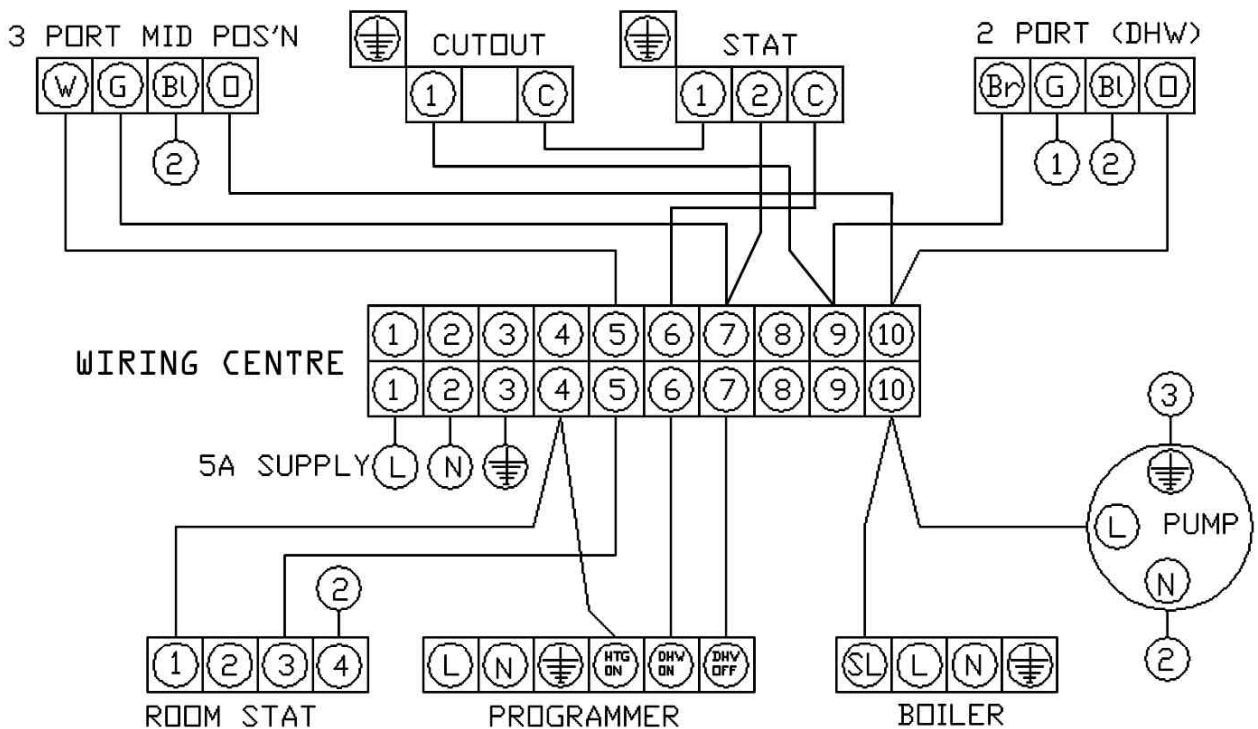
If a component part fails within the two year guarantee period, we will send you a replacement which must be purchased from Johnson & Starley. Once the returned component is proven to be faulty your invoice will be credited in full.

The guarantee period starts from the date of purchase and no registration is required. Please note that invoices for servicing may be requested to prove that the unit has been serviced annually. All the components fitted to / or supplied with the Aquastar Premier carry a 2 year guarantee.

WIRING DIAGRAM TWO 2 PORT ZONE VALVE (S-PLAN)



WIRING DIAGRAM 3 PORT MID POSITION VALVE (Y-PLAN) + 2 PORT VALVE



Key: W = White, G = Grey, Bl = Black, O = Orange, G/Y = Green / Yellow, Br = Brown,
L = Live, N = Neutral, C = Common Terminal, SL = Switched Live

Note: The boiler and programmer power can be taken either from the Wiring Centre or from elsewhere whichever is more convenient

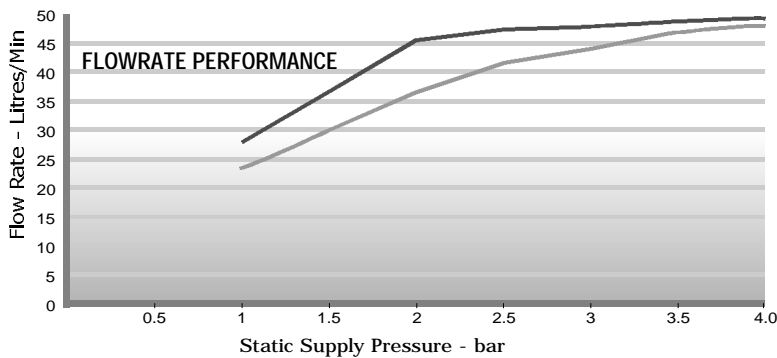
REHEAT PERFORMANCE (From 15°C-65°C, as measured by WRAS)

SPECIFICATION SUMMARY

Capacity	Height	Diameter	Weight (empty)	Weight (full)	Direct	Direct		Indirect	
						Reheat time one element	Reheat time two element	Reheat time	Coil KW rating
90 litres	718 mm	550 mm	30 kg	120 kg	90 litres	58 mins	-	13 mins	16.5 KW
120 litres	906 mm	550 mm	35 kg	155 kg	120 litres	90 mins	45 mins	17 mins	16.5 KW
150 litres	1093 mm	550 mm	40 kg	190 kg	150 litres	121 mins	61 mins	17 mins	18.9 KW
180 litres	1281 mm	550 mm	45 kg	225 kg	180 litres	157 mins	79 mins	21 mins	18.9 KW
210 litres	1469 mm	550 mm	50 kg	260 kg	210 litres	193 mins	96 mins	22 mins	18.9 KW
250 litres	1719 mm	550 mm	55 kg	305 kg	250 litres	224 mins	112 mins	28 mins	21.4 KW
300 litres	2032 mm	550 mm	60 kg	360 kg	300 litres	263 mins	132 mins	36 mins	21.4 KW

Aquastar Premier Pressure V Flow Performance

(measured at 50% Backpressure to simulate the effect of the drawoff pipework and taps)



Primary Coil

22mm dia Coil in coil design for improved performance. Entire cylinder contents are heated on indirect model

Outer Casing

Zintec corrosion proofed steel with durable oven hardened white paint finish

Thermal Insulation

Fire retardant polyurethane foam. The foam is CFC free, HCFC free and contains no Ozone depleting chemicals. Nominal thickness 50 mm

Expansion Vessel

12 litre with 90,120,150 & 180 models
18 litre with 210 & 250 models
25 litre with 300 model

Control Settings

Pressure Reducing Valve set at 3 Bar
Expansion Relief Valve set at 6.0 bar
Temp / Pressure Relief set at 7 bar 90°
High limit thermostat set at 85° C.

Anode - None Required

Immersion Heater

1³/₄" Incoloy sheathed low noise element
Rated at 3.0kW @ 240V
Thermostat adjustable from 30°C to 65°

Approvals

WRAS approved and Approved to Building Regulations G3 and L1.



WRAS
APPROVED
PRODUCT



WRc-NSF Ltd
Building Regulations Approved



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