AQUINOX
STAINLESS®

STAINLESS STEEL UNVENTED HOT WATER SYSTEM

PLEASE LEAVE WITH HOUSEHOLDER

NEWARK CYLINDERS

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Contents

Specification

Due to the fact that our Cylinders are manufactured specifically to each customer's requirements, we do not include a drawing within this installation guidance booklet. If required, specific information related to this unit can be obtained by contacting us:

01636 678437

sales@newarkcylinders.co.uk

Please quote this cylinder's reference number during any correspondence:

Generic Technical Data

Pressure reducing valve preset	3 bar (Max Inlet 12 bar)
Normal working pressure (shell)	3 bar
Expansion vessel charge pressure (when system is cold and open)	3 bar
Maximum working pressure	6 bar
TPRV pressure setting	7 bar
TPRV temperature setting	90°C
Energy cut-out thermostat setting	80°C
Maximum working pressure of coil(s)	6 bar

Components Supplied

Appropriately sized:

- Pressure reducing valve
- Check valve
- TPRV
- Expansion relief valve
- Expansion vessel
- Immersion heater
- Tundish
- Drain valve

Installation

Installation should only be carried out by a “competent operative” i.e. the installer must have attended a recognised course in unvented hot water systems. All registered operatives should carry an Identification Card issued by the institute of Unvented Hot Water Systems.

The installation area should be able to cope with the weight, incoming pipes and discharge pipe when full.

All connections are positioned to enable ease of access. Please ensure suitable space is left for access for repair and/or replacement of valves etc. All the following instructions must be followed:

1. Installers should ensure incoming mains pressure is less that 12 BAR and that local authority approval for installation of unvented systems is granted. Ensure adequate flow rate is available.

2.Excessive use of flux can damage the unit and especially the valves and expansion vessel. Avoid over-use and ensure the system is fully flushed of any debris or flux after connection. If a full sterilisation of all the pipework including the cylinder is required then a complete drain down and flush of the unit is essential. A simple flush through with water is not adequate in removing all sterilising solution within the cylinder. Under no circumstances should sterilising solution be left in the cylinder any longer than required (seek dosage requirements from chemical manufacturer)

3. The unit should be piped in with at least 22mm pipe to ensure an adequate flow rate. The unit is supplied with a pressure reducing valve that has a set pressure of 3.0 BAR. We would strongly recommend fitting an isolating valve (not supplied) prior to the inlet valves for ease of maintenance at a later date. Under no circumstances should an isolating valve be fitted be fitted between the expansion valve and the cylinder.

4. Please ensure the supplied drain valve is fitted to the dedicated drain connection.

5. The TPRV (temperature and pressure relief valve) is set at 90°C and 7 BAR. No valves should be fitted between the relief valves and the cylinder.

6. The tundish, which shows visible discharge from the relief valves, is to be in a prominent, visible and safe position away from any electrical devices . See Discharge and safety devices on pages 11, 12, 13 & 14.

7. The expansion vessel pressure should be checked and set at 3.0 BAR. The vessel should be mounted securely to the wall (or other sufficient support) using the fixing kit supplied. The EV hose should connect the vessel to a suitable position on the cold inlet pipe and must not have any isolating or non-return valves between the two.

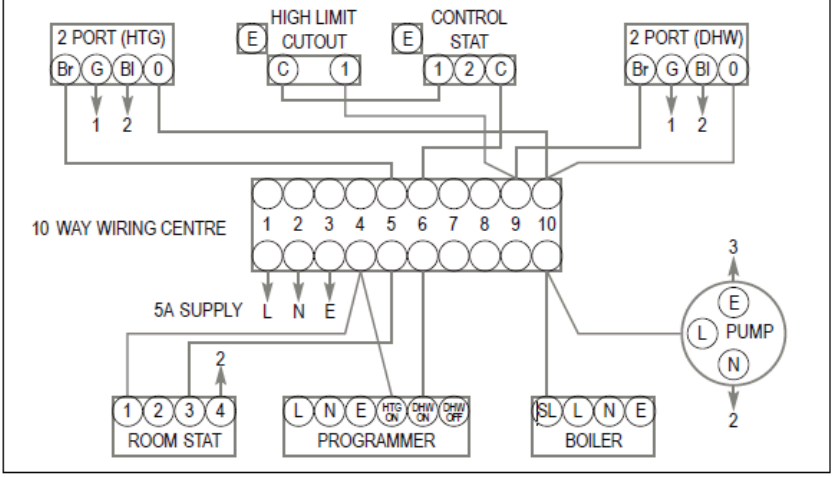
8. The electrical supply to each immersion heater must be installed by a qualified electrician. the fuse rating should be sized correctly to suit the heaters duty and isolators must be double pole to BS3456. Correct cable sizes must be used based on the power, cable length, and cable enclosures.

9. All electrical wiring to thermostats, zone valves and immersion heaters must be earthed and to current IEE Wiring Regulations.

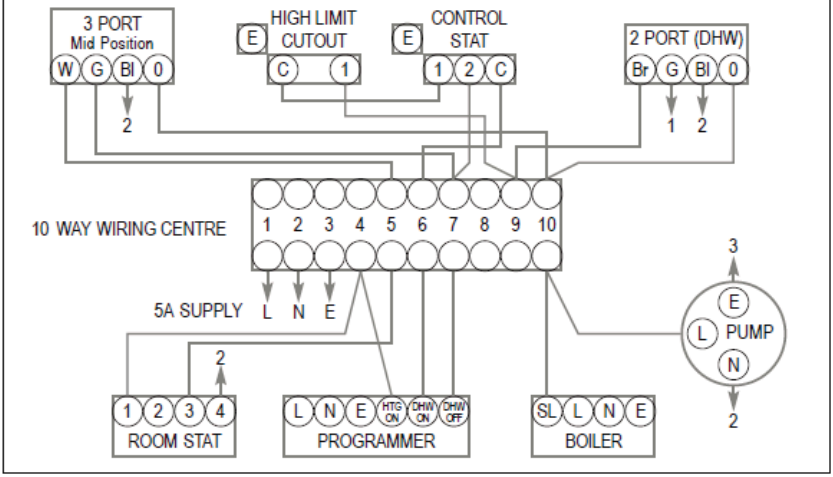
Wiring Diagrams

INDIRECT POWER*flow* WIRING DIAGRAM

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



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



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

Note: The programmer and boiler power can be taken either from the Wiring Centre or from elsewhere as appropriate.

Discharge Pipework Diagram

Diagram 1 **Typical discharge pipe arrangement**

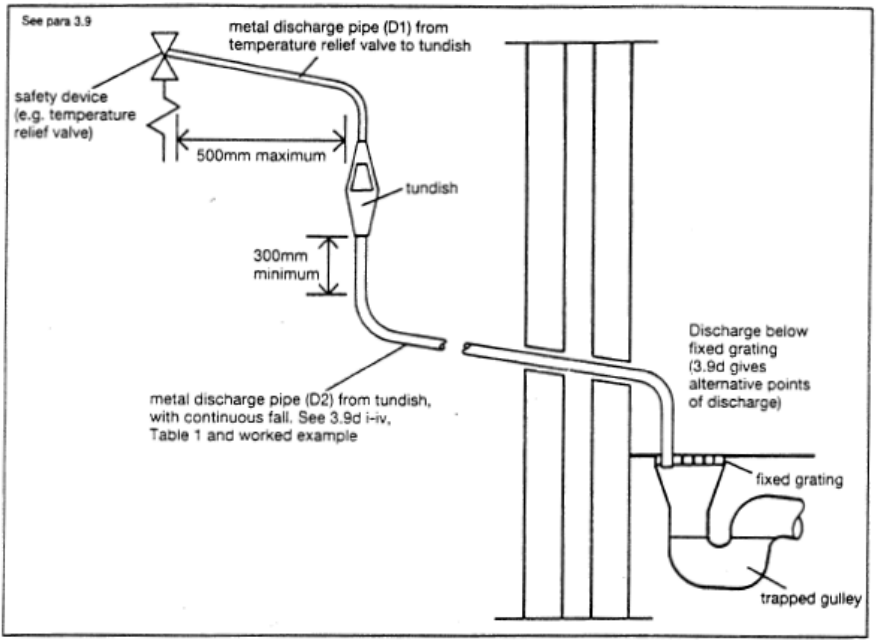


Table 1 **Sizing of copper discharge pipe 'D2' for common temperature relief valve outlet sizes**

Valve outlet size	Minimum size of discharge pipe D1*	Minimum size of discharge pipe D2* from tundish	Maximum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends)	Resistance created by each elbow or bend
G½	15mm	22mm	up to 9m	0.8m
		28mm	up to 18m	1.0m
		35mm	up to 27m	1.4m
G ¾	22mm	28mm	up to 9m	1.0m
		35mm	up to 18m	1.4m
		42mm	up to 27m	1.7m
G 1	28mm	35mm	up to 9m	1.4m
		42mm	up to 18m	1.7m
		54mm	up to 27m	2.3m

*see 3.5, 3.9, 3.9(a) and Diagram 1

Worked example:-

The example below is for a G½ 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 G½ 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 G½ temperature relief valve equates to: 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.

Discharge Information

Discharge pipes from safety devices

D3.50 Safety devices such as temperature relief valves or combined temperature and pressure relief valves should discharge either directly or by way of a manifold via a short length of metal pipe (D1) to a tundish.

3.51 The diameter of discharge pipe (D1) should be not less than the nominal outlet size of the safety device, e.g. temperature relief valve.

3.52 Where a manifold is used it should be sized to accept and discharge the total discharge from the discharge pipes connected to it.

3.53 Where valves other than a temperature and pressure relief valve from a single unvented hot water system 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

3.54 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 safety device, with no more than 600mm of pipe between the valve outlet and the tundish. Note: To comply with the Water Supply (Water Fittings) Regulations, the tundish should incorporate a suitable air gap.

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

Discharge pipe D2

3.56 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 the pipework (see Diagram 1); and

b. Be installed with a continuous fall of at least 1 in 200

3.57 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 7291-1:2006 Thermostatic pipes and fittings for hot and cold water for domestic purposes and heating installations in buildings).

3.58 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 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.
See Diagram 1, Table 3.1 and the worked example.

Note: An alternative approach for sizing discharge pipes would be to follow Annex D, section D.2 of BS 6700:2006 + A1:2009 Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

3.59 Where a single common discharge 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.

3.60 The discharge pipe should not be connected to a oil 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;

If plastic pipes are used as branch pipes carrying discharge from a safety device, they should be either polybutylene (PB) or crosslinked polyethylene (PE-X) complying with national standards such as Class S of BS 7291-2:2006 or Class S of BS7291-3:2000 respectively; and d. be continuously marked with a warning that no sanitary appliances should be connected to the pipe.

Notes:

1. Plastic pipes should be joined and assembled with fittings appropriate to the circumstances in which they are used as set out in BS EN ISO 1043-1:2002

2. Where pipes cannot be connected to the stack it may be possible to route a dedicated pipe alongside or in close proximity to the discharge stack.

Termination of discharge pipes

3.61 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.

3.62 Examples of acceptable discharge arrangements are:

a. To a trapped gully with the end of the pipe below a fixed grating and above the water seal;

b. Downward discharge at low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility;

c. Discharges at high level: e.g. into a metal hopper and metal downpipe with the end of the discharge pipe clearly visible or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering system that would collect such discharges.

3.63 The discharge would consist of high temperature water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

Commissioning

IMPORTANT

1. Ensure the drain at the base of the cylinder is closed.

2. Open a hot tap the furthest distance from the unit.

3. Gradually open the cold mains isolator valve and fill cylinder until water appears at the hot tap. Attend to each hot water outlet in turn and ensure water flow is obtained at each outlet expelling any air within the pipework.

4. To ensure the safety valves are operating correctly, turn the tops of the valves independently to ensure water passes through the valve and into the tundish. Once this is confirmed open both valves together allowing as much water as possible to flow through the tundish. At this point make sure that your discharge pipework is free from debris and is transporting the water away to waste effectively. The valves can then be released and a check should be made to ensure they have re-seated correctly.

5. Check the immersion heater control stat is set to approximately 60°C. The Immersion Heater is supplied with a control stat with a built in high limit cut out thermostat which is pre-set and therefore, requires no adjustment.

6. Switch on the immersion heater / water heating system and check operation of the system.

IT IS EXTREMELEY IMPORTANT TO FOLLOW ALL OF THESE INSTRUCTIONS, AS FAILURE TO DO SO COULD LEAD TO THE SYSTEM BECOMING OVER-PRESSURISED AND/OR OVER-HEATED, WHICH CAN BE DANGEROUS

The commissioning checklist on the next page is to be completed in full by the competent person who commissioned the storage syste. This is to demonstrate compliance with the appropriate building regulations. It should then be handed to the end-user to keep for their reference and the reference of any engineers attending this installation in the future. Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Commissioning Checklist

Fitter Details	
Cylinder Production No.	
Commissioned by.	
Registration Operative No.	
Approval Licence No.	
Company Name	
Company Address	
Commissioning Date	
Telephone No.	
Building Regulations Notification	

System Type		
Indirect Boiler	YES	NO
Biomass Boiler	YES	NO
Heat Pump	YES	NO
Solar Panels	YES	NO
Direct Electric	YES	NO

System Primary Settings				
Is the circuit sealed or vented?	Vented		Sealed	
Set system pressure	BAR			
Maximum flow temperature	°C			

Unvented Systems		
Has a temperature & pressure relief valve and expansion velve been fitted and discharge tested?	YES	NO
Is a cut out device fitted?	YES	NO
Pressure Reducing Valve Setting	BAR	
Pressure Reducing Valve Position		
Has the expansion vessel pressure been checked?	YES	NO
Hot Water Temperature at nearest outlet	°C	

Final Checks	Check
The system complies with the appropriate building regulations.	
The system has been installed and comissioned in accordance with the manufacturers instructiions	
The system controls have been demonstrated to and understood by the customer.	
The manufacturer's literature, including benchmark checklist, has been explained and left with the customer.	

Commissioning Engineers Signature	
Customers Signature	
Date	/ /

All installations must be notified to Local Area Building Control (LABC) either directly or through a Competent Persons Scheme. LABC will then issue a Building Regulations Compliance Certificate to the customer.

Troubleshooting

DISCHARGE FROM EITHER OF THE RELIEF VALVES INDICATES A MALFUNCTION IN THE SYSTEM AND MUST BE INVESTIGATED IMMEDIATELY.

OVERHEATED HOT WATER DISCHARGE
In the unlikely event of overheated (95°C) water being discharged, the heat source(s) should be switched off immediately and a competent operative called out.

DO NOT SHUT OFF THE COLD WATER SUPPLY OR ADD ADDITIONAL HEAT UNTIL AN ENGINEER HAS INSPECTED, DIAGNOSED THE CAUSE, RECTIFIED, AND RE-COMMISSIONED THE UNIT FOR SAFE USE.

In the event of an overheat, a competent engineer only, should oversee the running off of the hot water safely, via a nearby tap. Once cold water has entered the unit and replaced the overheated water to a suitable extent (running water is now 60°C), the immersion heater and energy cut out should be checked for correct operation.

Once the faulty component (which allowed the cylinder to become overheated) has been identified, it should be replaced and testedfor correct operation before re-commissioning the system.

DO NOT FOR ANY REASON BYPASS THE ENERGY CUT-OUT/ HIGH LIMIT STAT

WATER DISCHARGE
If water is occasionally being discharged from the expansion relief valve when the water is heated, this would indicate that one of the pressure regulating components is not doing its job correctly. In this case, the following diagnosis procedure should be followed:

1. Switch off all power and heat supplies to the cylinder and allow the cylinder to go cold.

IF THIS PROCEDURE IS FOLLOWED WHILE THE SYSTEM IS STILL HOT/ WARM, YOU MAY SET THE PRESSURES INCORRECTLY AND NOT RECTIFY THE ISSUE.

2. Use a pressure gauge to check what pressure that is being allowed through the pressure reducing valve. If the gauge shows 3 BAR or below, skip step 3.

3. If the gauge shows a pressure in excess of 3 BAR, the pressure reducing valve (if adjustable) may be set too high, or may have developed a fault. If adjustment of the valve doesn't bring the pressure down to 3 BAR (after opening and re-closing a tap), it should be replaced. If after adjustment/ replacement the issue persists, go to step 4.

4. Check the air pressure in the expansion vessel via the schrader valve on top (situated under the removable plastic cap). If this is 3 BAR, skip step 5.

5. If the expansion vessel pressure is not 3 BAR, isolate the water supply to the cylinder and open a hot tap to deplete the pressure inside the cylinder. While the tap is still open, either add or remove air as necessary, until the pressure is 3 BAR.

6. If the issue persists once you have confirmed that the expansion vessel's air pressure is 3 BAR, the expansion relief valve may have developed a fault causing it to discharge water at a lower pressure than it should. In this case, it should be replaced with a valve that opens at 5 BAR or 6 BAR. If you replace a 6 BAR valve with a 5 BAR valve, the expansion vessel may need to be replaced with a larger one. Failure to size the expansion vessel correctly can result in further complaints of water discharge, and will reduce the lifespan of the cylinder if not addressed.

7. If the issue persists even after the expansion relief valve has been replaced, the system may be experiencing crossflow. This is when the hot and cold water supplies are not pressure-balanced and higher pressure cold water is able to get into the cylinder via mixer taps or mixer valves. If this is the case, then you would need to re-position the point at which the cold main splits, to be downstream of the 3 BAR pressure reducing valve (known as a "balanced cold"). If this is not feasible, then an additional 3 BAR pressure reducing valve may be required to reduce the cold water supply to those mixer taps/ valves. The use of check valves may also be an option, if the cold water is getting to the cylinder by travelling the wrong way down the hot water draw off pipe, secondary return, shower connection, etc.

IMMERSION HEATERS

If the immersion heater is not heating the water, the electrical cut-out (or high limit stat) may have operated. This may be due to the control stat being set too high, being miscalibrated, or having developed another fault.

This issue could also be caused by the high limit stat being set too low, being miscalibrated, or having developed another fault.

To correct this, you should ensure that there is at least a 15° difference between the control stat and the high limit stat's set temperatures. If further guidance on this is needed, please refer to the immersion heater's literature or contact its manufacturer with the thermostat's model numbers.

If after adjusting the temperature settings of the stats and resetting the high limit stat, the issue persists, the stats should be replaced (by contacting the manufacturer with the thermostat's model numbers).

If after replacing the thermostats, the issue persists, the element itself may have developed an irreparable fault, in which case the entire immersion heater should be replaced.

In hard water areas, it is advised to set the immersion heater at no higher than 60°C to reduce limescale build up. If the immersion heater has a significant limescale build up, it is advised to replace it, as its efficiency will be considerably reduced.

Servicing

Annual maintenance and servicing should be carried out by a competent operative.

Failure to maintain this system in accordance with these instructions will invalidate the manufacturer's warranty. We would, therefore, recommend that a regular service schedule is arranged at the time of its installation.

All maintenance and servicing work should be recorded on the next page of this booklet. Failure to be able to provide a copy of this record with any warranty claim will result in the claim not being successful.

ANNUAL SERVICE CHECKS

Expansion Relief Valve - Manually open the twist cap and check that the water is discharged and runs clearly through the tundish and out at the final discharge point. Ensure that the valve re-seats and reseals itself.

Temperature & Pressure Relief Valve (TPRV) - The same procedure as for the expansion relief valve, above.

Strainer - Turn off mains at stopcock, there will be a small amount of residual water in the pipework, remove the cartridge from the pressure reducing valve, clean strainer and replace.

Expansion Vessel - Check the air pressure in the expansion vessel via the Schrader valve on top (situated under the removable plastic cap). If the expansion vessel pressure is anything but 3 BAR, isolate the water supply to the cylinder and open a hot tap to deplete the pressure inside the cylinder. While the tap is still open, either add or remove air as necessary (via the schrader valve) until the pressure is 3 BAR.

Servicing Record

Service Recorded Date	Serviced by	Comments

Manual Handling

As our cylinders can vary in both size and weight, it is important to know the correct way to handle them;

Firstly, here are some basic manual handling tips to always keep in mind:

It is recommended that any weight over 25kg should be lifted by at least 2 people. If the item is too heavy for multiple people to lift safely, it is advised to seek alternative methods such as a crane or forklift

Larger items may obstruct vision so ensure there is a clear path which is free from any slip or trip hazards.

Footing should be shoulder width apart so that there is full balance both forward and sideways.

Your back should be straight and kept rigid as to not put strain on the weaker lower back muscles and ensure you don't move in a jerking motion or any way which involves twisting your back.

Elbows should be kept close to the body and upper arms should be parallel to your body.

If possible, wear gloves when lifting, in case of sharp edges.

More specifically to this cylinder:

Carry handles are provided in what we believe are the most ergonomic positions possible. These should of course be utilised as much as possible when moving the unit.

It is important that the item is not lifted or moved using any of the fittings as this could break the welds and cause leaks.

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Please feel free to contact us for any further information you require:

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