Trebles™

OPERATION & MAINTENANCE MANUAL

PressBox

PRESSURISATION UNIT

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ABOUT THIS MANUAL

This manual contains all the relevant information to install, commission, operate and maintain the Trebles PressBox Pressurisation Unit.

If you are not fully competent with this type of equipment we recommend that this manual is read in full before carrying out any work.

SYMBOLS USED

DANGER - Very Important safety information to prevent injury and damage to the equipment or system.

CAUTION - Important information to prevent any damage to the equipment or system.

IMPORTANT - Important information to help the equipment function correctly.

USEFUL - Information which is helpful but not critical to the operation of the unit.

FOR MORE INFORMATION

For more information please contact Trebles head office:

Trebles™

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Parkfields		Fax	01902 340941
Wolverhampton		Email	sales@gmtreble.co.uk
WV4 6AN		Website	www.trebles.co.uk

EQUIPMENT OVERVIEW

The principle of the PressBox wall mounted pressurisation unit is to provide automatically controlled water top up to sealed heating and cooling systems. It is NOT designed to fill the system.

A sealed system will always suffer minor pressure losses via slow leaks, air venting etc. This commonly causes problems for other system components such as boilers which require a minimum system pressure in order to operate effectively.

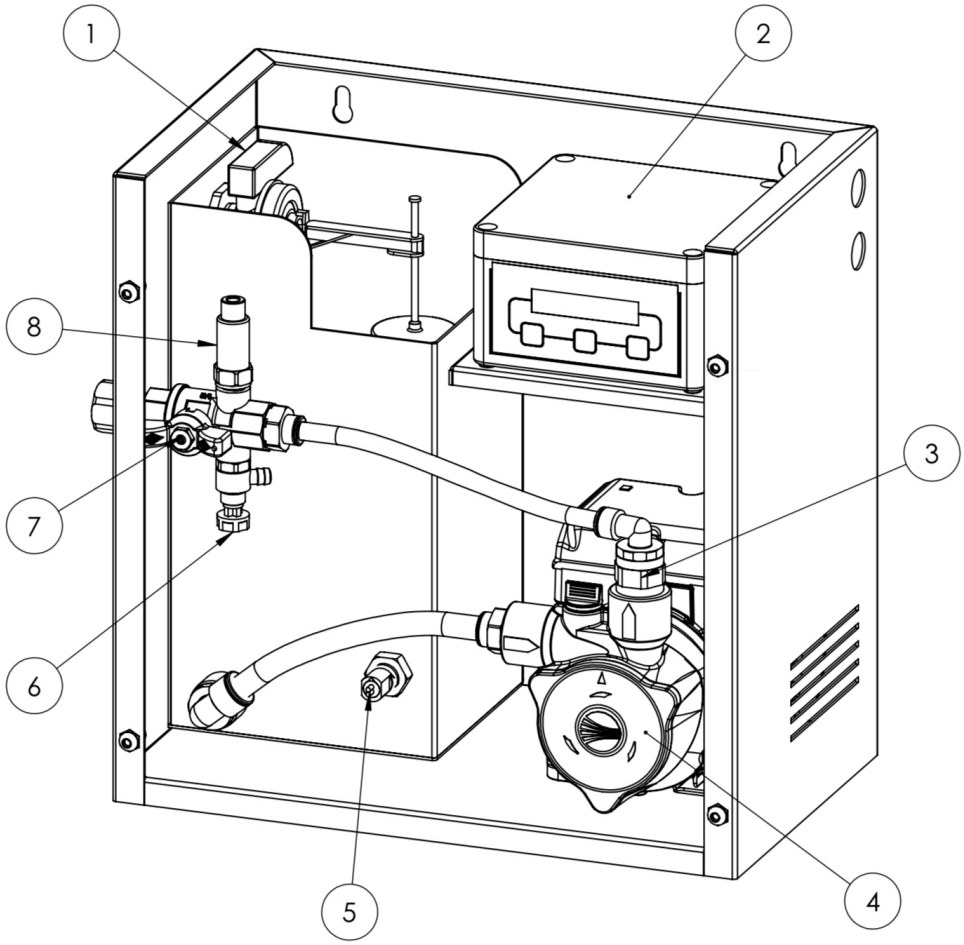
The PressBox Pressurisation unit will compensate for this loss by constantly monitoring the system pressure via a transducer. Once a pressure loss is detected (within the pre-set differential) the PressBox will pump more water into the system thus overcoming these losses until the pre-set pressure is reached.

It incorporates a small break tank with AB Air Gap in order to eliminate any risk of mains water contamination. All models are also fitted with a low water protection switch to prevent dry running of the pump.

Once installed, the unit can be left unattended for prolonged periods of time with minimal maintenance.

The unit must always be installed alongside a system expansion vessel in order to function correctly. The vessel size/capacity should be calculated relative to the system. If in doubt please contact our office and our engineers can specify the correct size for the system.

COMPONENT LAYOUT



Component	Description
1	Inlet Float Valve
2	Digital Controller
3	Check Valve
4	Pump (PQAM 60)
5	Low Water Float Switch
6	Drain Valve
7	Internal Isolation Valve
8	Pressure Sensor

INSTALLATION

This unit is not designed to be installed outside and open to the elements. If there is no room inside the building it must be installed inside a suitable enclosure with necessary frost protection.

The PressBox is fitted with a Category 5 Break Tank and as such has a 'spill over' weir. Do not install above other equipment that would fall into the water path should the water spill over.

PIPE CONNECTIONS

Take care to ensure that all pipework is adequately supported to prevent any undue strain on the connections and prevent the ball float valve from 'bouncing'.

Non-Return Valves, PRVs or RPZ valves must not be installed between the PressBox unit and the heating/cooling system.

All pipe connections should incorporate a suitable joining compound or PTFE tape.

Connection	Size	Notes
Mains Water	1/2" BSP Male	An isolation valve should be fitted between the mains water and the unit for maintenance purposes.
Break Tank Overflow	22mm	Ensure overflow is piped to suitable drainage.
System Connection	15mm Compression	The PressBox and expansion vessel should be connected at the same point into the system in order to provide a neutral pressure reading.

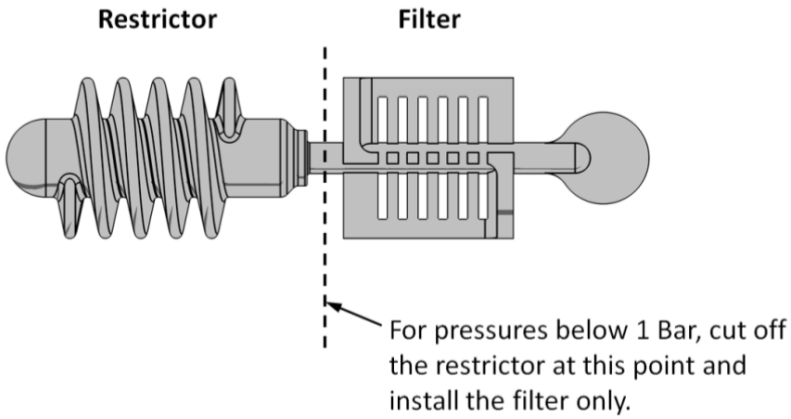
FLOW RESTRICTORS

The side-entry float valves used in the PressBox must be fitted with a filter and in most cases, a flow restrictor.

There are two types of flow restrictor that are supplied with the PressBox, a high pressure and low pressure, which are indicated by their colour.

The restrictor required should be based on the below table:

Mains Water Pressure	Flow Restrictor Required
Above 4.0 Bar	High Pressure Restrictor (White)
1.0 - 4.0 Bar	Low Pressure Restrictor (Blue)
Below 1.0 Bar	Restrictor should be removed according to the below diagram.

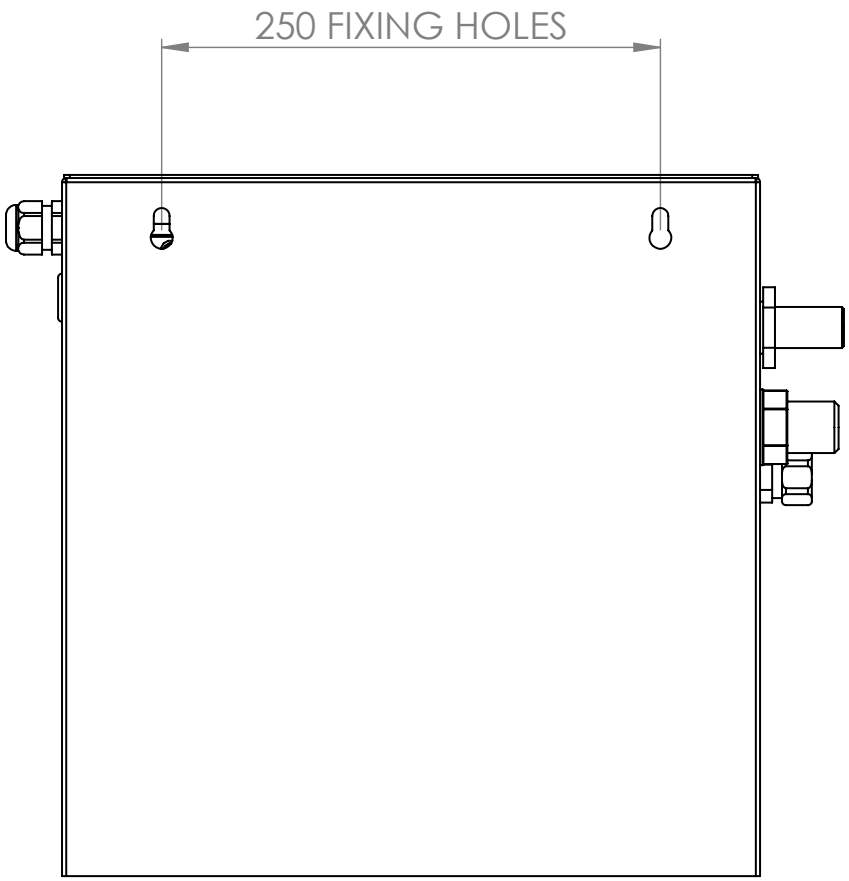


To change the flow restrictor, simply pull out using the round tab and push the correct restrictor in with the round tab towards you.

WALL FIXING

Ensure that the wall onto which the PressBox unit is being installed is suitable for bearing the load and that suitable screws are used. Failure to do so may result in the unit falling and causing damage.

Dry Weight: 15Kg **Installed Weight (approx): 19Kg**



ELECTRICAL SUPPLY

All electrical work must only be carried out by a qualified electrician, engineer or competent person.

The unit must be completely electrically isolated before removing any covers. Cables connected to any volt free contacts may be supplied from another source and remain live, these must be isolated elsewhere.

✓ **A single phase electrical supply and earth should be connected to the live, neutral and earth terminals respectively in the controller, fed from a fused isolator.**

✓ **The power supply should not be interrupted by any time clock which may be used to control the boiler or chiller.**

✓ **In addition, wiring connections should be made from the boiler/chiller control circuit to the programmable volt free STOP and REMOTE relays.**

COMMISSIONING

It is recommended that this equipment is commissioned by competent personnel only. Any damage incurred through incorrect commissioning / set-up will not be covered under warranty.

1 - SYSTEM EXPANSION VESSEL

Before the system is filled with water, check the air cushion pressure on the system expansion vessel by using a standard tyre pressure gauge on the Schrader Valve. This is normally located beneath a black plastic cap on the top or side of the vessel.

If necessary, adjust it to match the desired cold fill pressure.

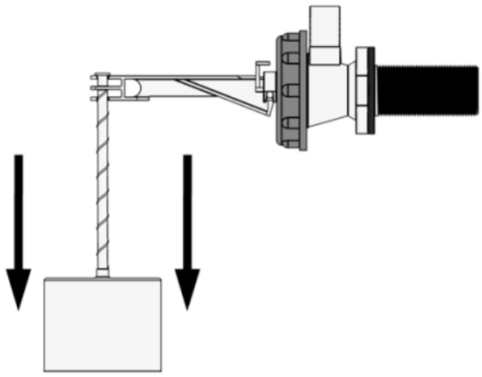
If the system is already filled then the expansion vessel should be isolated and drained so that the air cushion can be altered under neutral conditions.

Most expansion vessels are shipped with a higher air cushion pressure than most systems require. Therefore air usually needs to be released. If increasing the air cushion, an oil free air or nitrogen source should be used.

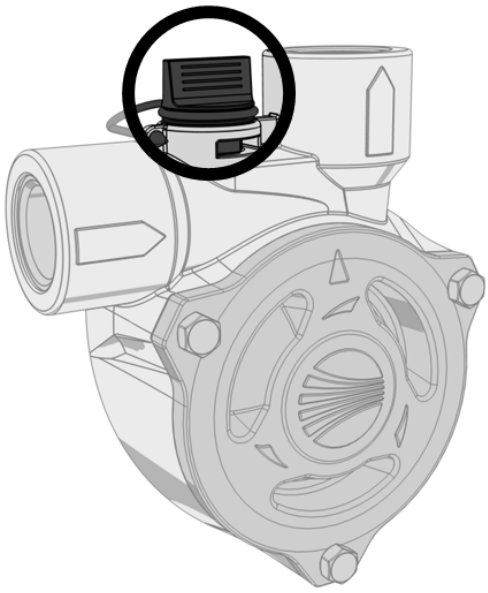
2 - FLOAT VALVE SETTING

All units are tested and set from factory so will usually be of a suitable setting.

However the float valve can be adjusted by turning the stem to raise and lower the point at which the valve will shut off thus effecting the normal water level inside the tank.



3 - VENTING PUMPS



- ✓ Ensure the internal isolation valve is closed.
- ✓ Open the plastic bleed screw located on the pump body.
- ✓ Turn on the cold water supply to the break tank.
- ✓ Once some water seeps from the bleed screw, tighten and wipe away any excess water.
- ✓ After allowing the tank to fill, check the float valve has closed properly and the water has stopped running.
- ✓ The pump should now be primed.

It is important to check pumps are fully vented and rotating correctly before leaving the equipment.

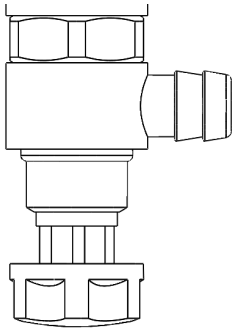
4 - INITAL START UP

- ✓ Open the internal isolation valve, thus allowing the transducer to read the system pressure.
- ✓ Turn on power supply to the unit.
- ✓ After a few seconds the pump will begin to run. The system pressure will be displayed on the controller.
- ✓ Once the set pressure has been reached the pump will stop running.
- ✓ The unit is now in normal operation.

All PressBox units are factory set and tested for a nominal cold fill pressure of 1.2 BAR. Other pre-sets available on request.

5 - ADJUSTING COLD FILL PRESSURE

The cold fill pressure can be altered within the parameters of the controller and the capabilities of the pump. If the cold fill pressure needs to be altered from its factory settings, please follow the below steps:



- ✓ Isolate the the PressBox from the system and expansion vessel using the internal isolation valve.
- ✓ Attached some flexible tube onto the drain valve (shown to the right) and loop back into the break tank.
- ✓ Press and hold the SET key for 1 second and enter the USER PIN (1111) further details in the controller section of this manual.
- ✓ Navigate to the relevant set point menu and adjust accordingly.
- ✓ Open the drain valve in order for the water to circulate and check everything is operating correctly. When satisfied Close the drain valve and remove the tube.
- ✓ Isolate, drain and adjust the air cushion in the system expansion vessel to match the new cold fill pressure entered into the controller, then re-open the vessel to the system.
- ✓ Open the internal isolation valve, exposing the PressBox to the system.
- ✓ The unit should now operate as normal under the new cold fill pressure.
- ✓ Isolate the the PressBox from the system and expansion vessel using the internal isolation valve

OPERATION

NORMAL RUNNING

The PressBox unit should always be left powered up and supplied with water, it can then operate at any time to ensure that system pressure never drops below the minimum cold fill pressure setting.

Expansion and contraction of the water within the heating/cooling system is accommodated by the expansion vessel. As the system water temperature rises and expands it is displaced into the vessel, resulting in a general system pressure rise. The extent of this rise will vary with expansion vessel size and operating temperature. However any working pressure between 1.5x and 2x the cold fill pressure can be considered normal.

The system pressure is shown on the digital display. It should be noted however that the pressure indicated on the system circulating pump delivery gauge will be somewhat higher than this.0

During normal heating/cooling system operation, the pressurisation unit activity should be minimal. Unless there is a significant water leakage, the PressBox will rarely be seen running and only briefly when the system cools down.

MAINTENANCE

SYSTEM EXPANSION VESSEL

Checking of the air cushion pressure of the heating/cooling system expansion vessel should be carried out annually. To carry out these checks follow these steps:

- ✓ Isolate the the PressBox from the system and expansion vessel using the internal isolation valve.
- ✓ Close the heating system isolation valve.
- ✓ Isolate and drain the system expansion vessel.
- ✓ Check the air cushion pressure and compare with the cold fill pressure setting of the PressBox.

ADJUSTING THE AIR CUSHION

If the air cushion pressure is found to have fallen below the cold fill pressure, inflate to the correct level using a suitable oil free air or nitrogen supply. Once the air cushion has been restored, re-open the vessel and system isolation valves followed by the internal PressBox Isolation valve. Depending on the circuit, the PressBox unit may run to restore the correct minimum operating pressure.

ABSENT AIR CUSHION PRESSURE

Normally after draining the expansion vessel the air cushion pressure should only be slightly below the correct level, unless this check has been neglected for some time.

If the air cushion is found to be very low a further check should be made on all vessel connections for possible air leaks. This is best carried out using soap/water solution or leak detector after inflation. Any leaks that are identified will require repair or the vessel replaced.

If the air cushion is totally absent, if air discharges from the drain valve whilst reflating or the Schrader Valve discharges water then a internal diaphragm failure has occurred. A new diaphragm or complete new vessel will be required.

Rubber is not an air tight material. Although it may not seem it, rubber will very slowly pass air particles through its surface. Hence the reason for performing an annual check on air cushion pressures and performing a top up as necessary.

VISUAL CHECK

The pump requires no lubrication but a visual check should be made for any signs or leakage or any unusual sounds when running. This also applies to the internal isolation valve and all fitting connections within the unit.

PUMP DETAILS - PQAM60

POS.	COMPONENT	CONSTRUCTION CHARACTERISTICS
1	**PUMP BODY**	**RYTON**, complete with threaded metallic port inserts in compliance with ISO 228/1
2	**BODY PLATE**	**Brass**
3	**MOTOR BRACKET**	Aluminium with brass insert (patented), reduces the risk of impeller seizure
4	**IMPELLER**	Brass, with peripheral radial vanes
5	**MOTOR SHAFT**	Stainless steel EN 10088-3 - 1.4104

6 MECHANICAL SEAL

Seal	*Shaft*		*Materials*	
Model	*Diameter*	*Stationary ring*	*Rotational ring*	*Elastomer*
MG1-12	**Ø 12** mm	Silicon carbide	Graphite	NBR

7 BEARINGS

Pump	*Model*
PQA 60	**6201 ZZ / 6201 ZZ**

8 CAPACITOR

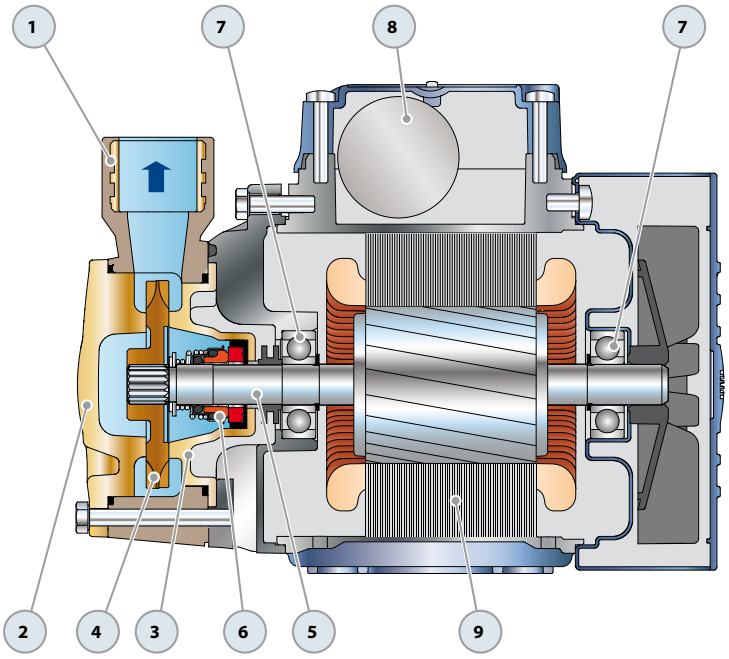
Pump	*Capacitance*	
Single-phase	*(230 V or 240 V)*	*(110 V)*
PQAm 60	**10** µF 450 VL	**25** µF 250 VL

9 ELECTRIC MOTOR

PQAm: single-phase 230 V - 50 Hz with thermal overload protector built-in to the winding.
PQA: three-phase 230/400 V - 50 Hz.

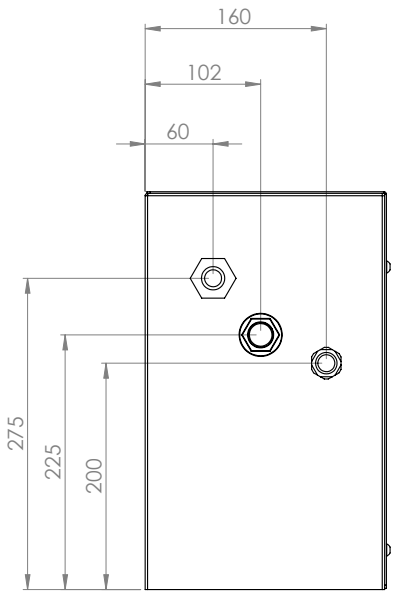
➠ **Pumps fitted with the three-phase motor option offer IE2 (IEC 60034-30) class high performance**

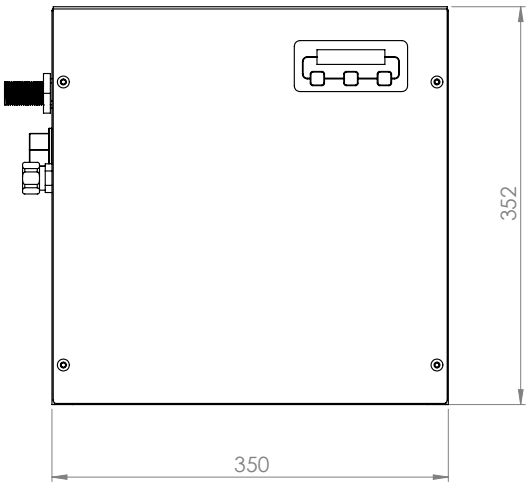
– Insulation: F class.
– Protection: IP X4.



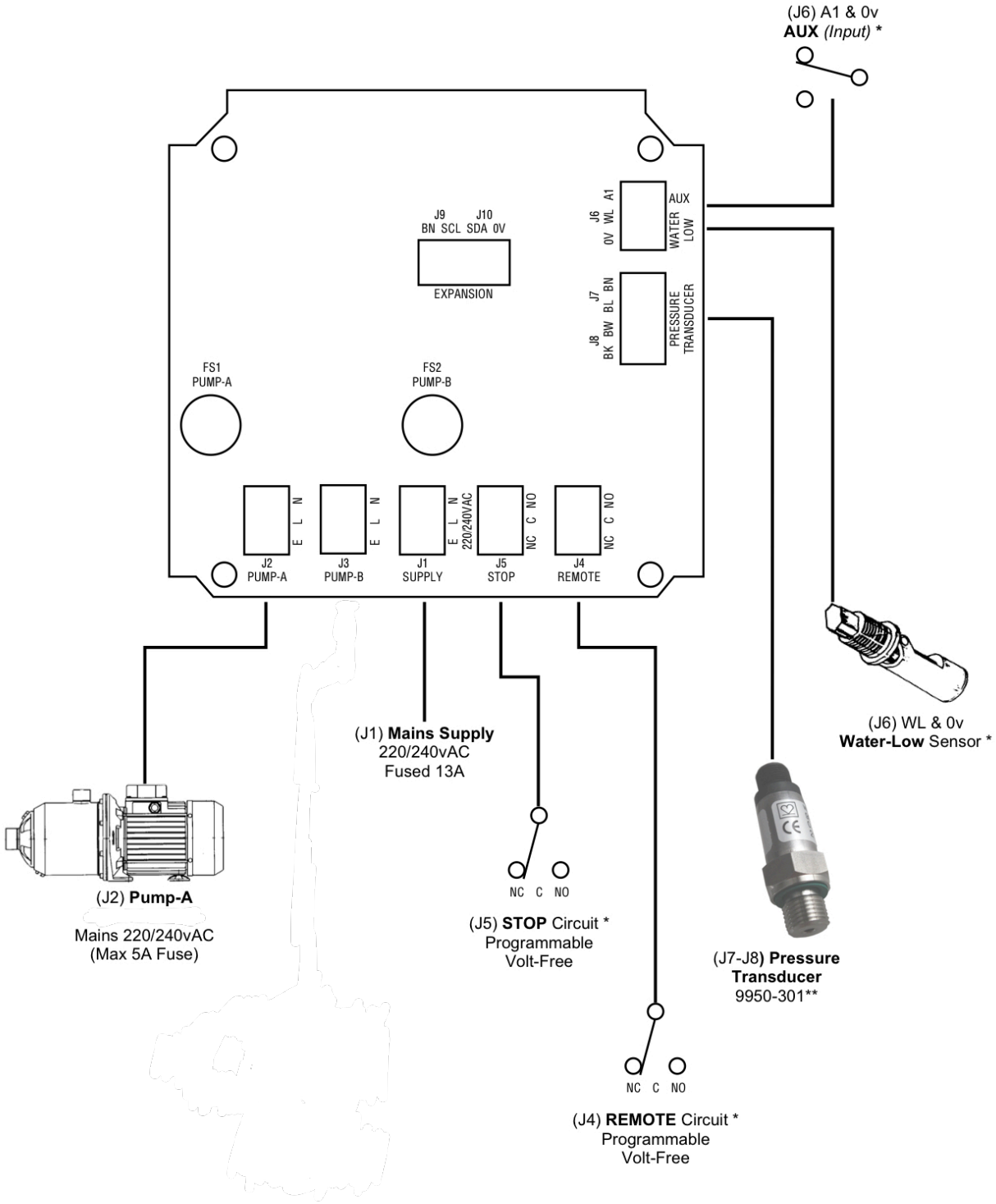
DIMENSIONS

#	ITEM	SIZE
1	MAINS WATER	1/2" MBSP
2	TANK OVERFLOW	22MM
3	SYSTEM CONNECTION	15MM



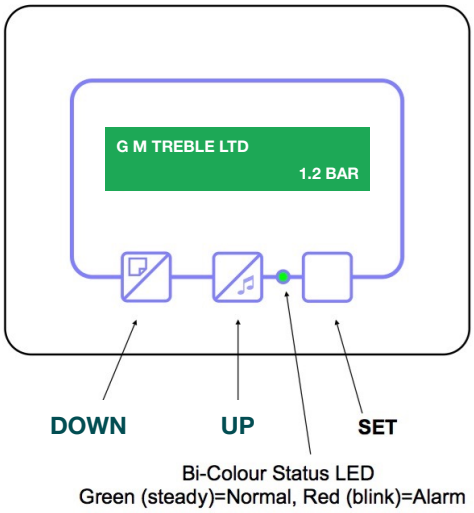


WIRING DIAGRAM



CONTROLLER

NAVIGATION / BUTTONS



During normal operation the display will show G.M.Treble Ltd along with the current system pressure.

Scrolling the menu of the AquaPro is fairly self-explanatory. Use the up and down arrow keys to navigate the menus and use the set key to select or as an ‘enter’ key.

When operating normally, if you press and hold any of the keys the controller will respond as follows:

DOWN Key

History Log - With no auxiliary alarm latched, holding the down key will show the history log. The last 32 error events are stored here along with a time and date they occurred. If multiple errors occurred simultaneously they will scroll across in sequence.

The most recent event is numbered as 1.

UP Key

Mute Alarm - Holding the up key will mute the audible alarm.

SET Key

Setup Entry - Press and release within 1 second will cause the controller to prompt for the PIN in order to access the setup menus.

Standby Mode Toggle - Press and hold for 5 seconds and the controller will switch off and display ‘standby mode’.

Upon accessing the controller you will be asked for a passcode: 1111

This allows for maintenance basic setting and cold fill pressure. For more advanced setting / programming please contact our office.

ERROR MESSAGES

If any errors or conditions out of normal operation are detected, the following error messages will appear on lower line of the display. If there is more than one error they will scroll across so be sure to wait for a moment to check you've seen all the errors.

PRESSURE LOW / HIGH

The current pressure is outside the limits of the High and Low pressure alarms.

PUMP FAULT - (PUMP FAULT A / PUMP FAULT B)

These messages reflect the status of the respective pump fuses. If this message occurs, check one of the fuses hasn't blown.

SENSOR ERROR

The controller is detecting a problem with the signal from the transducer. Check the transducer and its connections for any signs of damage.

WATER LOW

The float switch is indicating the water level in the tank is low and therefore stops the pumps operating to prevent dry running. Check water level. If the water level is fine check float switch for damage or disorientation.

WATER REFILLING

The refill timer is running to allow the tank to amass a suitable amount of water before the pumps are switched back on. This prevents pumps cycling on and off when the water level is hovering at the bottom of the tank.

WATER LEAK

The pumps have run continuously for more than usually required to pressurise the system. A major leak may be present in the system so the pump has disabled itself to prevent flooding.

SYSTEM LOCK

Displayed when the PressBox has been locked out from use, usually only done for safety reasons.

PROGRAMMABLE RELAYS

The PressBox controller contains 2 programmable volt free contacts that can be customised within the settings to alter their output functionality.

FACTORY SETTINGS

Parameter	Default Value
USER Settings	
Cold Fill Pressure (Set Pressure)	1.2 BAR
Differential	0.2 BAR
P-Low Alarm On	0.7 BAR
P-Low Alarm Off	0.9 BAR
P-High Alarm On	2.8 BAR
P-High Alarm Off	2.5 BAR
User PIN	1111
Pump-A Control	AUTO
Pump-B Control	NO
Water-Low Mode	MAKE
Water-Low Reset Timer (secs)	60
Leak Alarm (Minutes)	5
AUX Input Port	Disabled
STOP Relay Activation	
Pressure Low	Y
Pressure High	Y
Water Low	N
Water Leak	N
Pump Fault	N
Service Due	N
System Fault	Y
Failsafe	Y
REMOTE Relay Activation	
Pressure Low	Y
Pressure High	Y
Water Low	Y
Water Leak	Y
Pump Fault	Y
Service Due	Y
System Fault	Y
Failsafe	Y

FAULT TRACING

PUMP CYCLES ON/OFF RAPIDLY	• Isolate and drain the system expansion vessel. • Check the air cushion is the same as the cold fill pressure, any substantial variance will effect the frequency of pump operation. • If this doesn't work check for debris or damage to non-return valve fitted to the PressBox pump discharge.
PUMP WILL NOT RUN	• Check the power supply to the fuse/switch and that the correct 5amp fuse is fitted and not blown. • Check that the system is not already up to pressure. • Check that the break tank water level is adequate and that the display is not showing 'Low Water'. • Check if the pump is not seized by isolating and draining the unit the removing the front plate of the pump and turning the impeller.
PUMP WILL NOT STOP	• Check that the unit is reaching the programmed set point. • Check that the pressure transducer for any visual damage. • Check that the pump has not lost its prime and vent if necessary.
HIGH PRESSURE FAULT	• The expansion vessel air cushion pressure is too low or too high. Drain the expansion vessel and check the air cushion pressure is set to the recommended level. • Heating/Cooling system temperature is too high. • System has been manually filled to an excessively high pressure.
LOW PRESSURE FAULT	• PressBox unit is not switched on. • Switch fuse has blown. • Pump has lost its prime. • There may be a leak present on the system.

WARRANTY

Congratulations and thank you for purchasing a Trebles product.

At Trebles we pride ourself on the quality of all our products, ensuring they are manufactured to the highest standard and designed to provide a long service life.

The PressBox Pressurisation Unit is guaranteed by us to be free from defects in materials or workmanship for 2 years from the date of purchase.

We will repair or replace the unit free of charge within this 2 year period, if identified to be a direct result of faulty material or workmanship. This guarantee does not cover any damage from incorrect installation, improper use or normal wear and tear.

Proof of purchase, or the product serial number, must be provided in the event of a claim in order to identify that the unit is within this warranty period.

Unit	Serial No.	Date Purchased
5230-PRESSBOX		

NOTES

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