SMEDEGAARD

PUMPING TECHNOLOGY

WALL PRESS PRESSURISATION UNITS
WHISPER™/WHISPER DUO™/MONO™

INSTALLATION AND OPERATION MANUAL

IMPORTANT INFORMATION

These instructions must be read and understood before installing, commissioning, operating or maintaining the equipment.

SMEDEGAARD PUMPS • BRIDGWATER • SOMERSET
Tel: 01278 458686 • Fax: 01278 452454
Email: info@smedegaard.co.uk • www.Smedegaard.co.uk

This installation guide gives basic instructions which are to be observed during installation, operation and maintenance of the pressurisation unit. It is therefore imperative that this manual be read by the responsible person/operator prior to the installation and should always be kept available at the site. It is not only the general safety instructions under this main heading "Safety" that are to be observed but also the specific information provided under the other main headings.

APPLICATION

The Smedegaard Whisper/Whisper Duo/Mono Wall Press Pressurisation Units are used for automatic replacement of water loss in both heating and chilled water systems. The Whisper models are designed to be used as 'top up' units, and the Mono can be used as either a 'top up' unit or as a 'fill unit'.

GENERAL

This unit, used in conjunction with a correctly sized expansion vessel, is only suitable for providing automatic water make up and control of a sealed heating or chilled water system.

EXPANSION VESSELS

System expansion vessels must be constructed to BS4814 or BS6144. These units can be provided by Smedegaard upon request.

INSTALLATION

The expansion vessel is usually connected to the inlet side of the system circulators, on the system return. With this arrangement pump pressure is additive and the entire system is above atmospheric pressure. For detailed sizing of expansion vessels see Appendix 2.

SAFETY RELIEF VALVE

A safety relief valve, in compliance with BS6759 Part 1 must be sized and installed in the system in accordance with BS6644 and BS7074.

OPERATION OF THE PRESSURISATION UNIT

PRESSURE SETTINGS

The pressurisation unit is factory set to operate the pump at 1.5 bar. The system expansion vessel charge pressure (cushion pressure) is set to approximately 0.1 bar, below the cold fill pressure.

UNIT OPERATION

As the temperature of the water in the system changes, the system expansion vessel absorbs the expanded volume of water. A small pressure rise will take place, which the expansion vessel is designed to accept.

When the system cools down, if there has been some loss of system fluid, the pump pressure transducer will sense this and will energise the pump causing it to re-charge the system, maintaining the set minimum cold fill pressure.

SYSTEM SAFETY FUNCTION

The pressurisation unit comes fitted with an electronic control module and incorporated volt free contacts for common fault. In the event that system losses are so great the pump is unable to replace the losses, the low-pressure alarm will be activated. In the case of the system pressure rising to a dangerous level, the high-pressure alarm will activate.

AIRBORNE SOUND PRESSURE LEVEL

The continuous A-weighted sound pressure level of the product covered by these instructions does not exceed 20 dB (A) for the Whisper models and 70 dB(A) for the mono.

INSTALLATION REQUIREMENTS

SET LOCATION

Unit must be sited in a dry, ventilated, frost free position.

SECURING THE PRESSURISATION UNIT

The unit is designed for wall mounting only and must be bolted to a secure vertical structure using the fixing points on the back of the casing. Service clearances required are detailed in (Appendix A), refer to page 7, figure 1.

PIPE WORK CONNECTION

Ensure that the pipe connection between the pressurisation set and the system can withstand the full working pressure of the system and does not impose any strain on the joints to the unit. For a typical system layout, refer to (Appendix A), page 8, figure 2.

BOILER/CHILLER CONNECTION

It is recommended that the high-pressure and low-pressure volt-free contact be utilised and connected to ensure that the boiler/chiller is shut down in the event of over/under pressure or low water conditions. Always refer to boiler/chiller manufacturers instructions for correct integration.

TABLE A

Vapour Pressure Allowance Table									
Flow Temp °C	Allowance Bar	Flow Temp °C	Allowance Bar	Flow Temp °C	Allowance Bar	Flow Temp °C	Allowance Bar	Flow Temp °C	Allowance Bar
90	0.2	105	0.8	115	1.6	125	2.5	135	3.7
100	0.5	110	1.2	120	2.0	130	3.1	140	4.4

SYSTEM SAFETY VALVE

A correctly sized safety valve conforming to BS7074 (where applicable) must always be fitted to the system.

ANTI-GRAVITY LOOP

An anti-gravity loop or intermediate vessel must be installed if the system flow temperature exceeds 95ºC. Refer to, (Appendix A) page 8, figure 3.

Check that the air pressure in the main expansion vessel, which should be 0.1 BAR BELOW the system CFP, is correct – see below.

For system flow temperatures <95 ºC the CFP (bar) = (Height of system in metres/10) + 0.3 metres *
(*This is to facilitate venting at the top system)

For system flow temperatures >95 ºC the CFP (bar) = (Height of system in metres/10) + vapour allowance As detailed in the table above ***(TABLE A).***

ELECTRICAL CONNECTION

GENERAL REQUIREMENTS

The pressurisation unit should be wired by a qualified electrician, in line with existing regulations and in accordance with the wiring diagram supplied. This diagram can be found on the inside of the pressurisation unit. However if this diagram is unavailable, please contact Smedegaard before proceeding.

SUPPLY VOLTAGE

Ensure that the mains supply voltage corresponds to the voltage shown on the unit.

SUPPLY ISOLATION

The unit should be isolated from the mains electrical supply before removing the outer cover or carrying out work within the unit. An earth bonding cable is fitted to the unit – DO NOT REMOVE THIS.

WIRING TO UNIT

Remove outer case by unscrewing the retaining bolts. Please refer to (Appendix A) page 7 figure 1.

SAFETY

DANGER *Warns of the risk of electric shock, if the precautions are not observed.*

DANGER *Warns of the risk of damage to persons, property or the unit, if the precautions are not observed.*

WIRING TO UNIT

Inside the unit you will see a black control box, on the box is a small plate, with two cable glands, that is retained with two small screws. Remove the screws and put them in a safe place (see figure A below). With the cover removed there are two types of terminal block location pins visible; a three way and a two way. The connector blocks themselves are supplied loose in a bag attached to the break tank.

The 3 way terminal is your power supply. i.e. 230V AC. The two way terminal block is the volt free common fault alarm connection point. Cut the cables as shown in figure B and pass through the cable glands and secure into the three way and two way terminal blocks respectively (see figure C below). Once wired the terminal blocks can then be pushed into place and cable glands tightened. Reset cover and refix with the two screws.

***Figure A**: Section of black control box*

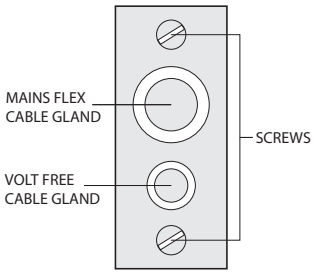


***Figure B**: 3 Core Flex*

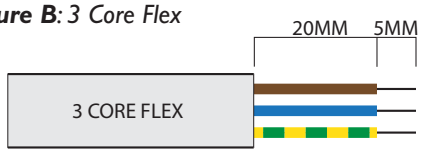
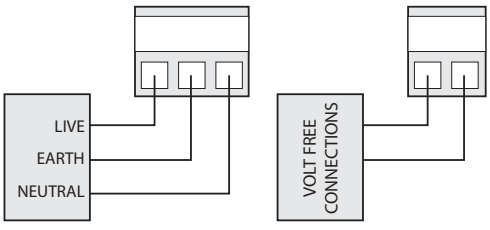


***Figure C**:The three way and two way terminal*



COMMISSIONING

GENERAL INFORMATION
To ensure accurate set-up of the pressurisation unit, it is advisable to carry out the commissioning procedure in the order shown.

SYSTEM FLUSHING
Ensure that the system has been flushed and that all foreign matter has been removed.
NOTE: Should foreign material come into contact with the expansion vessel diaphragm, premature failure of the expansion vessel assembly could result.

FILLING THE SYSTEM
The normally-open lockshield valve, fitted between system and expansion vessel, must be closed during system filling.

These units are designed as 'top up' devices. Therefore the system should be filled using the appropriate equipment. During filling, air should be allowed to vent freely at the top of the system. After filling, automatic air vents can be left to operate normally.

MECHANICAL INSTALLATION
Check that the pressurisation unit and expansion vessel have been installed correctly. Check also that the system isolating valve is opened up and that all lock-shield valves on the system are correctly set.

ELECTRICAL INSTALLATION
Ensure that the electrical connection is correct as in accordance with the wiring diagram and that the supply voltage is correct.

Check that the electrical supply to the set is wired through a local isolator. This isolator should always be switched off and the boiler/chiller control circuit isolated before removing the fused switch (if fitted), or the motor terminal box electrical connection covers.

REMINDER: Isolate the unit and any external power sources such as boiler/chiller control circuits before carrying out any work on the unit.

EXPANSION VESSEL SET-UP
To set or check the system expansion vessel charge pressure, the lock-shield valve between the system and the vessel must be closed. The drain cock, which if good practice has been followed, will be fitted to the base of the expansion vessel, must be opened to allow any water contained within the vessel to escape.

A suitable gauge should be used to check the vessel charge pressure. Generally a Schrader type valve is fitted near to the top of the expansion vessel under a protective cap. This cap must be replaced once the pressure check is complete and any adjustment is made.

If the air charge pressure is too high, the excess air can be relieved by depressing the centre of the 'Schrader' valve. In the event of the air charge pressure being too low, the vessel can be re-charged through the use of an air compressor, a nitrogen bottle or similar means. If the pressure rise is minimal, a car foot pump can be used, this method may however, be very time consuming.

Once the expansion vessel pressure is set, the vessel drain cock must be closed and the lockshield valve between the vessel and the system must be opened.

Further information relating to the operation of the expansion vessel can be found in (Appendix A) refer to page 8 figure 4.

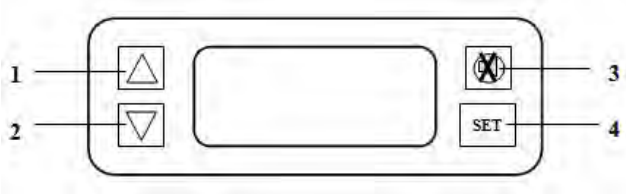
FILLING THE PRESSURISATION UNIT
The system should be filled to a minimum 1 Bar. Check that the heating/chilled system is isolated using the lockshield valves. Open the pressurisation unit supply valve and monitor the float valve on the break tank. Once the tank is full, the pump can be primed. This is done by pressing the red pump primer button. Refer to Figure E, on Page 6

DIGITAL PUMP CONTROL MODULE
The factory set pressures at which the unit will operate are as follows:

WHISPER™	Cut in: 1.4 bar Cut out: 1.5 bar
MONO™	Cut in: 1.2bar Cut out: 1.5bar

To modify these operational characteristics, the control module will need to be set as follows:

Figure D: *Control Display on front of unit*



GUIDELINES and INSTRUCTIONS

KEY 1: UP function - Increases the parameter value.

KEY 2: DOWN function - Decreases the parameter value, resets the alarm and the hours of activity of the pumps.

KEY 1 + 2: lock/unlock function - By pressing both keys at the same time for five seconds (= Pon or Pof), unlocks or locks access to the parameter menu.

KEY 3: Serves as the alarm stop function - buzzer (inside) and external alarm (if connected). Once the key has been pressed the alarm will stay off for 2 seconds and then start again until the problem has been solved. The length of the pause cannot be regulated by the user.

NB: By stopping the alarm the pump is reactivated.

SETTING THE PARAMETER VALUES

SET KEY:

- Press the Set key for 5 seconds.
- The display will show the first parameter for 5 s and then its current value.
- Use the up and down or the DOWN key.
- To confirm the new value press the Set key for 5 s.
- The value will blink for 3 s which confirms it was saved.
- The device will then automatically pass on to the next parameter and successively to its value.
- This sequence will continue for all parameters and when reaching the last parameter will start over from parameter one.
- To directly reach a required parameter (i.e. To skip one or more parameters), press the Set key repeatedly after the first parameter is displayed.
- To exit the menu, do not manipulate the controller for 10 seconds

ALARM

When an alarm goes off the related failure message will appear on the display.

The alarm will go off:

- When the current pressure value exceeds the upper limit value or fails to maintain the lower limit value: the relay and the buzzer are activated.
- When the pump operates for too long (the time in the related parameter can be set from 0...999 minutes with 10 minute steps): the relay and the buzzer are activated.
- Due to a power failure, i.e. the pump does not absorb current: the relay and the buzzer of the one-pump version are activated. By the two-pump version only the buzzer is activated as well as the second pump. If the second pump fails, the alarm relay will be activated
- When the level of the liquid within the break tank is low the buzzer is activated and pumps are stopped. Wall press whisper Duo/Mono excluded.

The alarm relay function is defined in parameter crE: relay at rest, open crE = 0, relay at rest, closed crE = 1,

ADDITIONAL FEATURES

PARAMETERS:

Setpoint > SP

Differential > dif

Low Pressure > LPr (Minimum set point 0.1 Bar) If this controller is to be used to fill the system on commissioning, positive pressure above this set point must be attained before LPr auto resets and allows the pump to run.

High pressure > HPr

Max Pump Activity > Prt

Pump No. (1/2) > nPM

Alarm Relay Contacts > crE (0=N/O 1=N/C)

Number of occurred Alarms S
(It is only possible to set this counter to “0”) > nAL

Hours of activity - Pump 1 >
(It is only possible to set this counter to “0”) > Hr1

Hours of activity - Pump 2 (if present) >
(It is only possible to set this counter to “0”) > Hr2

ALARMS:

Low Liquid level alarm >	LLL
High pressure Alarm >	HPr
Low pressure Alarm >	LPr
Max Pump activity time >	Prt
Pump 1 failure >	PF1
Pump 2 failure >	PF2
Both pumps fail >	PFA

LOW PRESSURE:

Low pressure alarm should be set at 0.5 Bar below the safety valve rating (as a maximum).

INITIAL OPERATION OF THE PRESSURE UNIT

Once the pressure settings have been adjusted, the lockshield valve between the pressurisation unit and the system should be opened.

Figure E: *Control Box*

ROUTINE MAINTENANCE

6 MONTHLY

1. Check the expansion vessel charge pressure. A significant drop in charge pressure could be due to a faulty vessel diaphragm. Fitting a replacement diaphragm or replacing the vessel should be considered.

2. Briefly run the pump to check for rotor seizure. This could occur if the pump has not run for extended periods. This can be accomplished by depressing the red pump primer button.

12 MONTHLY

1. Check the ball float valve for soundness and replace if necessary.

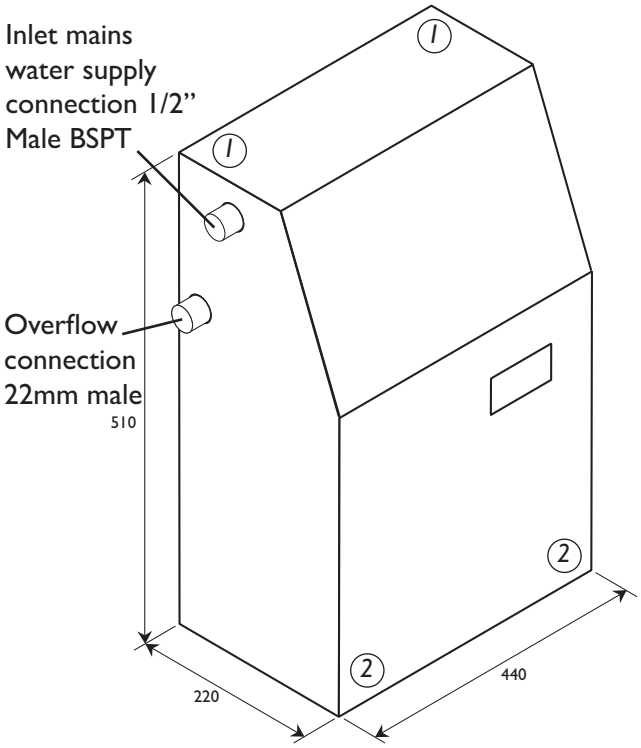
2. Check the plastic float for soundness.

3. Check the expansion vessel for external signs of corrosion. If any deterioration is observed, it is recommended that the frequency of inspection be increased or the vessel is replaced.

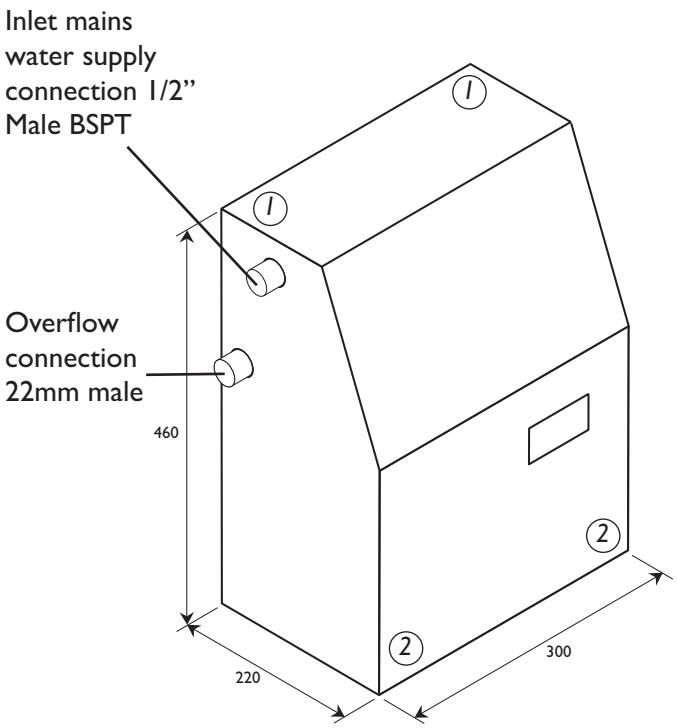
4. Check the operation of the safety circuits.

APPENDIX A: FIGURES AND DIAGRAMS

FIGURE 1: *TYPICAL DIMENSIONS FOR UNITS*



WallPress WHISPER DUO/MONO™



WallPress WHISPER™

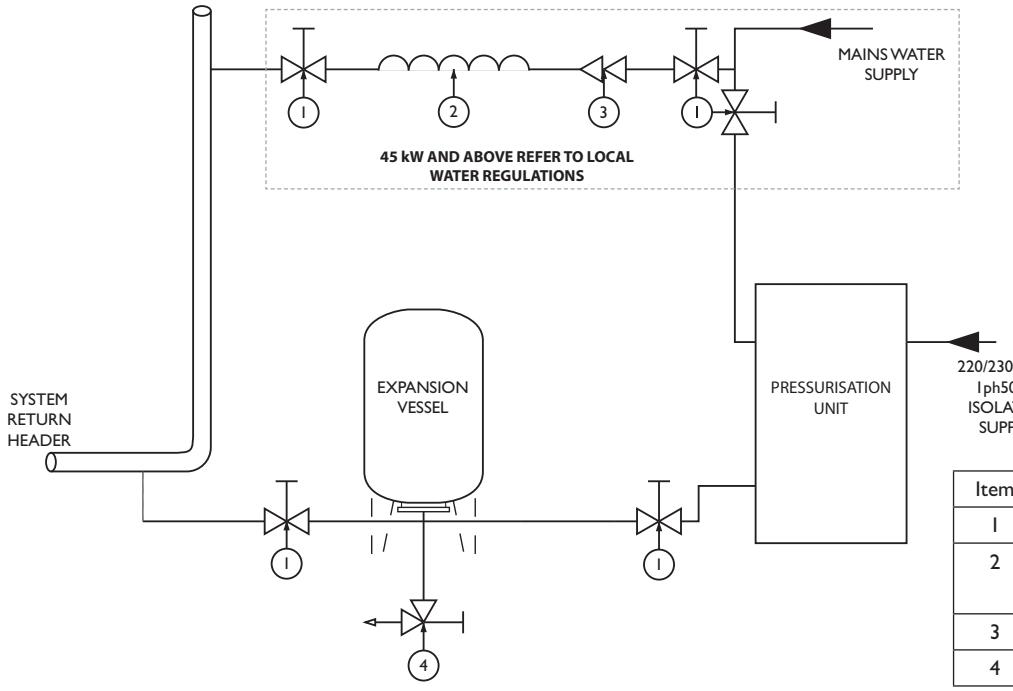
The front case Panel is secured with jar screws two and the top (1) and two at the bottom (2).

NB: The outlet system connection is on the underside of the unit. The connection is 1/2" male BSPT.

WHISPER RECOMMENDED SERVICE CLEARANCES:

Left - 150mm
Right - 100 mm
Above - 150mm
Below - 150mm

FIGURE 2: *TYPICAL SYSTEM LAYOUT*



Item	Description
1	Lockshield Valve
2	Temporary fill connection (remove after filling)
3	Double check valve
4	Drain valve

FIGURE 3: *HIGH TEMPERATURE SYSTEM LAYOUT*

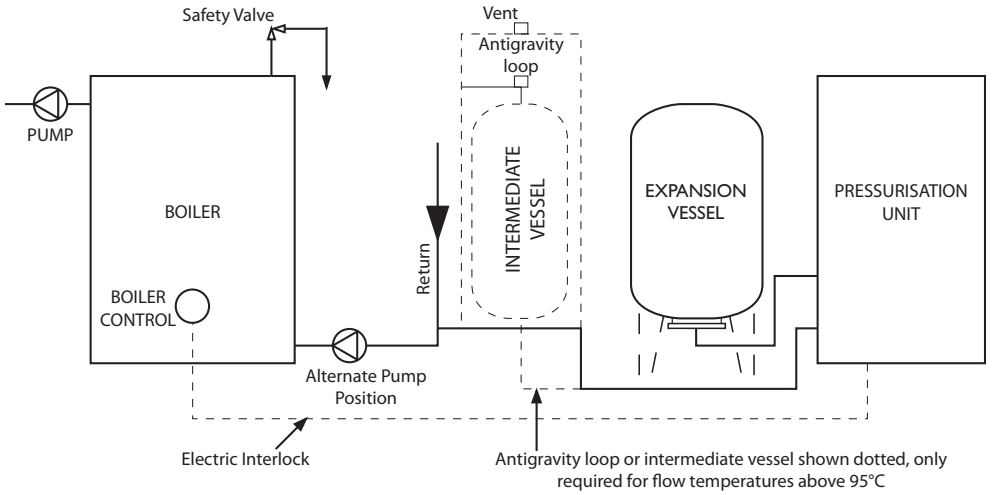
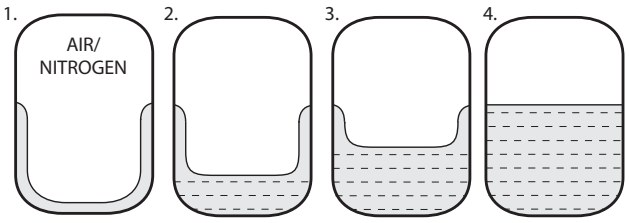


FIGURE 4: *EXPANSION VESSEL OPERATION*



1. Diaphragm at the cold fill / charge pressure. The vessel is empty of system fluid.

2. Diaphragm position at the hot working pressure. The system volume has expanded due to the temperature rise. The gas in the vessel is compressed. Acceptance factor = 0.35 maximum (recommended).

3. Diaphragm position at the high system pressure. The boiler is shut down by the pressurisation unit high limit pressure switch.

4. Diaphragm at the safety valve lift pressure, caused by boiler temperature limiter failure for example. acceptance factor = 0.5 maximum (recommended).

APPENDIX 2: PRESSURISATION SETS SIZING OF EXPANSION SETS

HEATING AND CHILLED WATER SYSTEMS

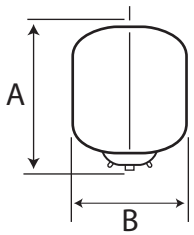
EXPANSION VESSELS

The Smedegaard extensive range of vessels vary in size between 5 and 3000 litres and are fitted with EPDM renewable rubber diaphragms which make them suitable for use in LPHW heating systems, chilled water systems, HWS systems and as a pump control vessel on a cold water booster set (potable water).

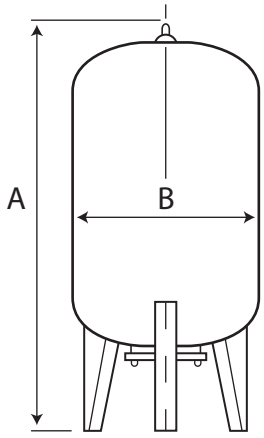
Vessels up to 24 litres are suitable for mounting directly in the pipe work. Vertical free standing vessels are available between 60 and 3000 litres. Horizontal free standing vessels are available between 24 and 300 litres. The vessels are suitable for water temperatures between -10°C and +100°C and working pressures up to 10 bar. (15 BAR AVAILABLE UPON REQUEST)

These vessels are factory charged with air at approx. 1.5 bar, unless specifically requested otherwise. This pressure will need to be corrected to suit the design condition of the system. This can be done via the Schraeder valve located near the top of the vessel.

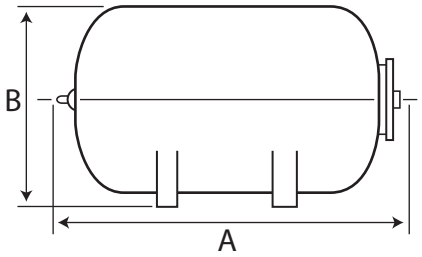
EXPANSION VESSEL DIMENSIONS



TYPE 1



TYPE 2



TYPE 3

TABLE 1

Capacity Litres	Max. Pressure bar	Connection Size BSP	A mm	B mm
Type 1 (Pipeline mounting)				
5	8	3/4"M	230	200
8	8	3/4"M	320	200
18	8	3/4"	405	270
24	8	3/4"M	495	260
Type 2 (Vertical standing)				
60	10	1"M	855	400
80	10	1"M	900	460
100	10	1"M	880	500
150	10	1"M	1030	510
200	10	1 1/4"M	1253	590
300	10	1 1/4"M	1371	650
500	10	1 1/4"M	1600	766
750	10	2"F	1970	800
1000	10	2 1/2"F	2430	800
1500	10	2 1/2"F	2130	1000
2000	10	2 1/2"F	2250	1100
2500	10	2 1/2"F	2400	1100
3000	10	2 1/2"F	2890	1100
Type 3 (Horizontal standing)				
24	8	1"M	495	260
50	10	1"M	700	405
60	10	1"M	810	405
80	10	1"M	970	495
100	10	1"M	990	495
200	10	1 1/4M	1220	625
300	10	1 1/4M	1220	680

EXPANSION VESSEL SELECTION FOR SYSTEMS

<95°C

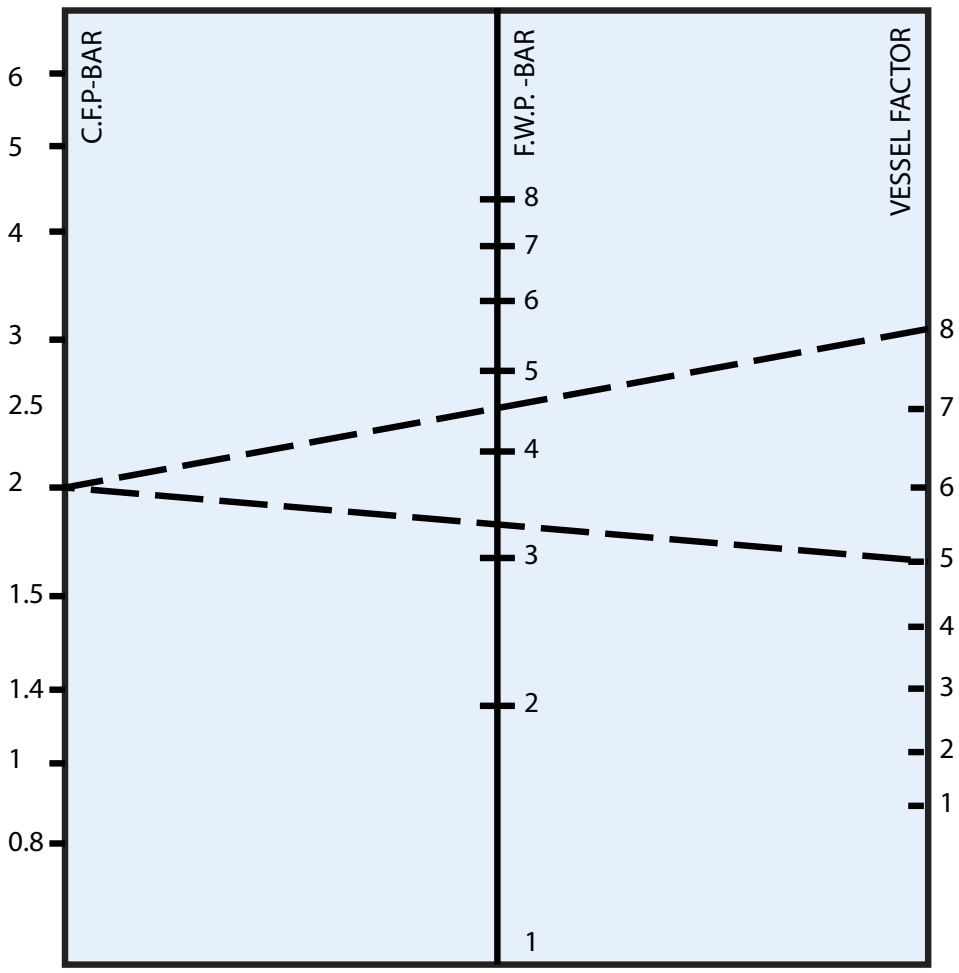
Cold fill pressure (in bar) = C.F.P. = $\frac{\text{Height of system (in metres) +3*}}{10}$

Note: Minimum C.F.P. = 0.8 bar

Example: Height of system = 17 metres therefore CFP = $\frac{17 + 3}{10}$ = 2 bar

*Margin to ensure venting at top of system.

TABLE 2



As can be seen from the above (Table 2) the lower the vessel factor the lower the final working pressure (but the larger the vessel will be).

SYSTEM FACTORS TABLE 3

	MAXIMUM SYSTEM TEMPERATURE °C												
VESSEL FACTOR	30	35	40	45	50	55	60	65	70	75	82	85	90
8	0.01	0.014	0.018	0.023	0.028	0.033	0.038	0.044	0.052	0.058	0.067	0.072	0.08
7	0.012	0.016	0.02	0.026	0.031	0.037	0.042	0.05	0.057	0.064	0.073	0.082	0.09
6	0.014	0.018	0.023	0.029	0.036	0.042	0.05	0.057	0.066	0.074	0.084	0.091	0.103
5	0.015	0.02	0.027	0.034	0.041	0.05	0.057	0.066	0.077	0.085	0.10	0.108	0.117
4	0.019	0.025	0.032	0.04	0.05	0.06	0.068	0.079	0.092	0.105	0.12	0.13	0.143
3	0.023	0.03	0.04	0.05	0.062	0.074	0.085	0.10	0.114	0.13	0.15	0.16	0.18
2	0.03	0.04	0.054	0.069	0.082	0.10	0.115	0.133	0.155	0.17	0.20	0.22	0.24
1	0.045	0.06	0.08	0.1	0.125	0.15	0.175	0.20	0.23	0.26	0.30	0.325	0.3675

Select system factor (from Table 3) using vessel factor (from Table 2) and maximum system temperature.
Example: System content = 4,400 litres and CFP = 2 bar. (If system content water unknown then use 12 litre/kW of boiler or chiller.)

Maximum system temperature = 82°C with vessel factor of 8 then the system factor from the above table 2 = **0.067**.

Minimum vessel size = 4400 x 0.067 = 295 litres.

(Nearest standard vessel = 300L) FWP = 4.5 bar

With vessel factor of 5 then the system factor from the above table = **0.10**.

Minimum vessel size = 4400 x 0.1 = 440 litre (nearest standard vessel = 500L) FWP = 3.3 bar.

Standard vessels sizes are 5.8, 18, 24, 50, 60, 80, 100, 150, 200, 300, 500, 750 and 1000 litres.

TABLE 4

VAPOUR PRESSURE ALLOWANCE -Add to CFP-	
Flow -°C	Allowance - bar
95	0.2
100	0.5
105	0.8
110	1.2
115	1.6
120	2.0
125	2.5
130	3.1
135	3.7
140	4.4

Notes: For chilled water systems use 30°C Ambient.

For temperature >95°C add vapour pressure allowance (see Table 4) to Cold Fill Pressure. An intermediate vessel (or antigravity loop) will also be required (for sizing see Table 5).

INTERMEDIATE VESSEL SELECTION TABLE 5

Flow -°C	Selection Factor F
95	0.0025
100	0.004
105	0.006
110	0.008
115	0.011
120	0.013
125	0.016
130	0.0195
135	0.023
140	0.0265

Intermediate vessel size (litres) = system size (litres) x F.

APPENDIX 3: FAULT FINDING GUIDE

Fault	*Cause*
Motor does not run	■ Pump is up to cut-out pressure ■ Cut in pressure too low ■ Pressure transducer is faulty ■ Interrupted power supply ■ Pump controller faulty
Pump runs continuously	■ Pressure transducer faulty ■ System leak ■ Pump controller faulty ■ Cut-out pressure set too high
Rapid cycling	■ To be expected when first commissioning ■ Differential between cut in and cut out too small ■ Pressure transducer faulty ■ Pump controller Fault
Pump does not reach pressure	■ 3 phase motor in reverse ■ Cut out pressure too high ■ system leak ■ Blockage at inlet to pump ■ Pressure transducer faulty
System FWP too high	■ Expansion vessel air pressure too high ■ Expansion vessel air pressure too low ■ Loss of air cushion – possible rupture to vessel diaphragm ■ Expansion vessel too small ■ Cut-out pressure set too high ■ Pressure transducer faulty ■ Pump controller faulty

NOTE: DO NOT TAMPER WITH THE UNIT IF UNSURE - CALL SMEDEGAARD FOR ASSISTANCE

CERTIFICATION

DECLARATION OF CONFORMITY

We, SMEDEGAARD Pumps, Unit 7, Barhams Close, Bridgwater, Somerset, TA9 3PT hereby declare that our products.

Are in conformity with the following Directives:

Councils Directive 2006/42/EC of the laws of member states relating to construction and making of machines.
Standards used: EN 809 2002

Councial Directive 2006/95/EC of the laws of the member states relating to Electrical equipment designed for use within certain voltage limits.
Standards used: EN 60 335-2-51 and EN 60 335-1

Council Directive 2004/108/EC of the laws of the member States relating to electromagnetic Compatibility.
Standards used: EN 61800-3

Date: 04-11-09

C. Barrett
General Manager

GUARANTEED FOR PRESSURISED UNIT

1. For a period of 1 year after the date of supply, in the event of any defect in the equipment or its components, replacement of the defective parts will be supplied; however, this does not include any labour costs.

2. The working temperature must not be greater than 120ºC

Please complete in capital letters

Serial No: …….....

Purchaser: ……..

Date of Installation: ……... Installer:…….....

Tel: …….....

ANY CLAIMS SHOULD BE MADE THROUGH YOUR INSTALLER

NOTES

NOTES

SMEDEGAARD

PUMPING TECHNOLOGY

PRESURISATION SETS

HEATING AND CHILLED WATER

SITE CHECK LIST - PRE COMMISSIONING

The following conditions must prevail before the Smedegaard engineer is called to the site. Failure to provide the following could result in an aborted visit and a full commissioning charge being invoiced.

1. Mains cold water supply must be connected and available at the Smedegaard Pressurisation Set break tank.

2. An appropriate electrical supply to the Pressurisation Set.

3. System must be filled to approximately the required Cold Fill Pressure.

4. Pressurisation unit and Expansion vessel, or vessels, must be isolated from the system; i.e. no water should be in the system expansion vessel, or vessels, prior to commisioning.

5. High and Low pressure alarm circuit (electrical) from the Smedegaard Pressurisation unit to the boiler controls must be connected.

SMEDEGAARD PUMPS • BRIDGWATER • SOMERSET
Tel: 01278 458686 • Fax: 01278 452454
Email: info@smedegaard.co.uk • www.Smedegaard.co.uk