

the **HAMWORTHY**

CHESil mk2 & BURSTOCK



CHESil mk2

Floor standing and wall hung
pressurisation units

BURSTOCK

Floor standing expansion vessel



SCAN
ME

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Increase security of sealed heating

Our Chesil mk2 pressurisation units and Burstock expansion vessels work together to provide automatic replacement of water losses, ensure minimum head requirements are maintained and deal with the effects of heating fluid expansion and contraction in sealed heating systems.

**Saves space,
improves system
cleanliness and
eases maintenance**

Chesil mk2

The compact Chesil mk2 pressurisation unit is available in floor standing and wall hung options, giving you flexibility in siting within your plant room. Designed to ensure minimum head requirements are maintained eliminating reliance on mains pressure to provide the system head. For use in sealed heating systems and chiller systems they also remove the need for cold water header tanks with associated pipe work, by providing automatic replacement of water losses.

Chesil mk2 pressurisation units offer the additional benefit of monitoring system pressure, so that appliances can be interlocked to prevent operation in the event of operating pressure conditions being too high or too low. They can also monitor water volumes

introduced to the system which can help identify leaks as well as helping decide when corrosion inhibitors may need re dosing.

Key features

- 5 models – floor standing/wall hung
- 9 litres capacity break tank
- For systems with cold fill pressure requirements up to 3 bar
- Plant interlock circuit
- Compatible with Building Management Systems (BMS)
- Volt free contacts for low and high system pressure
- Class AF air gap and overflow
- Float valve
- Single or twin pumps
- Low level switch in break tank
- Intelligent control unit
- LCD display
- Pressure transducer

Options

- Twin pump
- Additional volt-free contacts for:
General fault with LCD
interrogation





Burststock

The Burststock expansion vessels complement the Chesil range by accommodating the expanded system water and ensuring the design pressures are maintained. Dealing with the effects of heating fluid expansion and contraction that will occur as the heating fluid temperature changes across the entire operating temperature range of the sealed heating system.

Available in a range of sizes from 25 litre to 1,000 litre means you can accurately size for your heating system. By removing header tanks you have the benefits of improved water quality and reduced oxygen ingress plus all equipment – pressurisation units and expansion vessels – is located in the boiler room, making service and maintenance access simpler.

Key features

- 10 models
- 10 bar working pressures
- 70°C maximum operating temperature
- Nitrogen pre-charged interrogation



Chesil mk2

Technical information

Chesil mk2 Pressurisation Unit Type			Chesil mk2 SW	Chesil mk2 SF	Chesil mk2 TW	Chesil mk2 TF	Chesil mk2 TFHP
UIN			241437	241438	241439	241440	241441
Configuration			Wall Mounted	Floor Standing	Wall Mounted	Floor Standing	Floor Standing
Pump			Single	Single	Twin	Twin	Twin
Controls			Electronic	Electronic	Electronic	Electronic	Electronic
GENERAL DATA	Weight (empty)	kg	23.5	25	40	40	41
	Weight (full)	kg	30.5	35	49	50	51
	Maximum cold fill pressure	bar	3	3	3	3	6
	Minimum cold fill pressure	bar	1	1	1	1	3
	Maximum water flow rate	l/min	35	35	35	35	50
	Maximum water flow rate @ max cold fill pressure	l/min	12	12	12	12	28
	Noise level	dBA	<70	<70	<70	<70	<70
ELECTRICAL	Electrical supply		230V AC 50Hz 1Ph	230V AC 50Hz 1Ph	230V AC 50Hz 1Ph	230V AC 50Hz 1Ph	230V AC 50Hz 1Ph
	Pressure transducer contact rating		4-20ma	4-20ma	4-20ma	4-20ma	4-20ma
	Volt free contact rating		6a/240v	6a/240v	6a/240v	6a/240v	6a/240v
	Start current (per pump motor)	Amps	7.3	7.3	7.3	7.3	24
	Run current (per pump motor)	Amps	1.9	1.9	1.9	1.9	4.4
FACTORY SETTINGS	Cold fill pressure	bar	2.5	2.5	2.5	2.5	5
	Low pressure setting	bar	0.7	0.7	0.7	0.7	0.7
	High pressure setting	bar	4	4	4	4	6
	Expansion vessel charge pressure	bar	1.7	1.7	1.7	1.7	1.7
SYSTEM PARAMETERS FOR FACTORY SETTINGS	Maximum water flow temperature	°C	80	80	80	80	80
	Maximum static height	m	40.5	40.5	40.5	40.5	62
	Minimum system operating pressure	bar	0.7	0.7	0.7	0.7	1
	Maximum system operating pressure	bar	4	4	4	4	6
	Nominal pressure differential	bar	0.3	0.3	0.3	0.3	0.3
DIMENSIONS	Height	mm	580	805	680	680	805
	Width	mm	570	510	510	510	510
	Depth	mm	305	305	305	305	380
CONNECTIONS	Mains cold water inlet	inch	1/2	1/2	1/2	1/2	1/2
	Overflow (polythene pipe) diameter	mm	20	20	20	20	20
	System connection compression fitting, diameter	mm	15	15	15	15	15

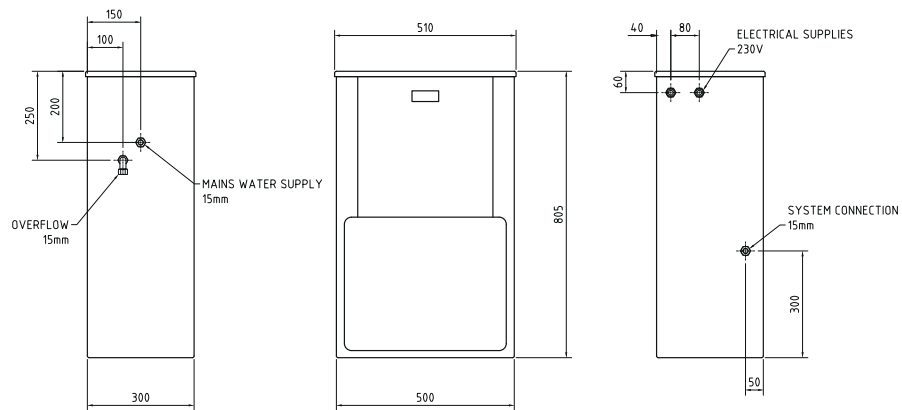
Chesil mk2

Dimensions

Dimensions – Floor standing

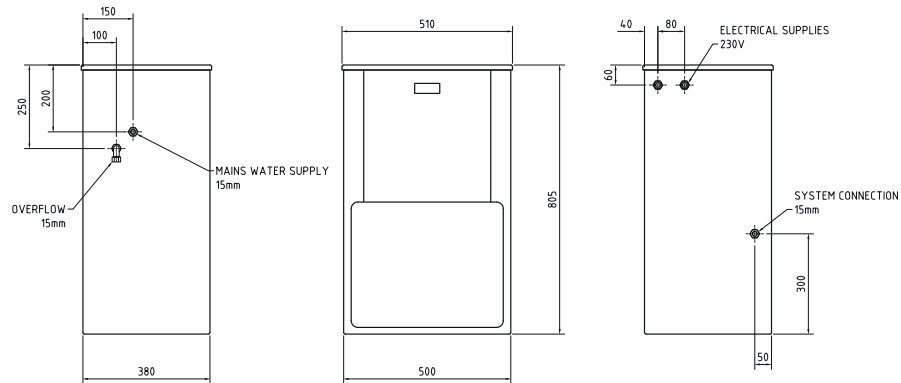
Model

- 241438 single pump



Model

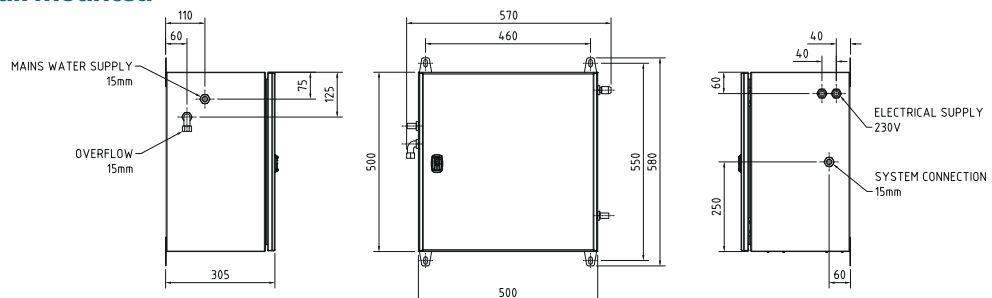
- 241440 twin pump
- 241441 twin pump, high pressure



Dimensions – Wall mounted

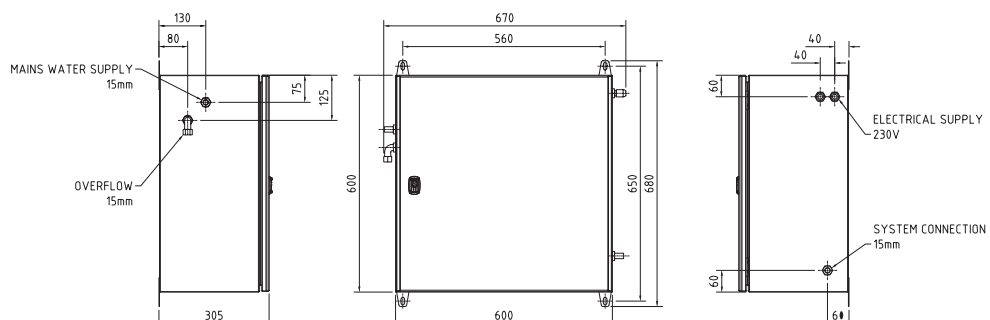
Model

- 241437 single pump



Model

- 241439 twin pump



Burstock

Technical information

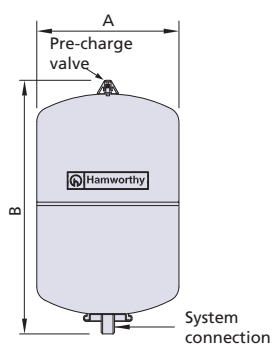
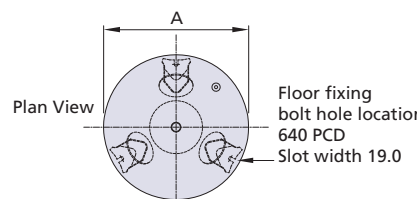
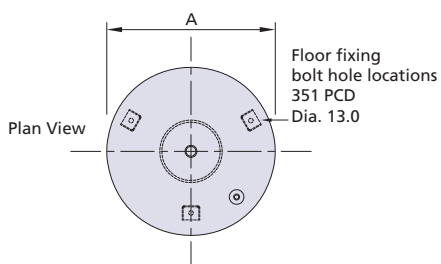
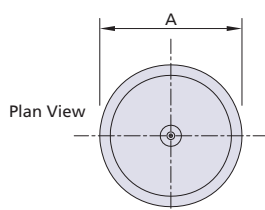
Model	Capacity litres	Connection size (inches)	Max. pressure (bar)	Shipping weight (kg)	Pre-charge pressure (bar)
PV25W	25	G ¾"	10	5	3.5
PV25W kit with wall bracket	25	G ¾"	10	5	3.5
PV60W	60	G 1"	10	14	3.5
PV60W 1.7bar	60	G 1"	10	14	1.7
PV80W	80	G 1"	10	16	3.5
PV80W 1.7bar	80	G 1"	10	16	1.7
PV100W	100	G 1"	10	19	3.5
PV100W 1.7bar	100	G 1"	10	19	1.7
PV200W**	200	G 1¼"	10	40	1.7
PV300W**	300	G 1¼"	10	54	1.7
PV400W**	400	G 1¼"	10	70	1.7
PV500W**	500	G 1¼"	10	79	1.7
PV800W**	800	G 1½"	10	195	1.7
PV1000W**	1000	G 1½"	10	228	1.7

**3.5 bar pre-charge available on request

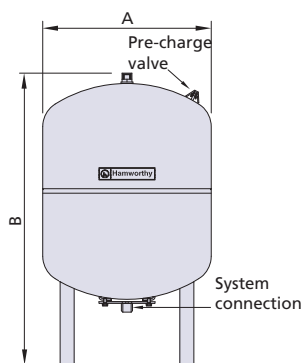
Burstock Dimensions

Dimension	Reference	PV25W	PV60W	PV80W	PV100W	PV200W	PV300W	PV400W	PV500W	PV800W	PV1000W
Diameter	A	280	409	480	480	634	634	740	740	740	740
Height	B	499	734	729	834	967	1267	1245	1475	2325	2604

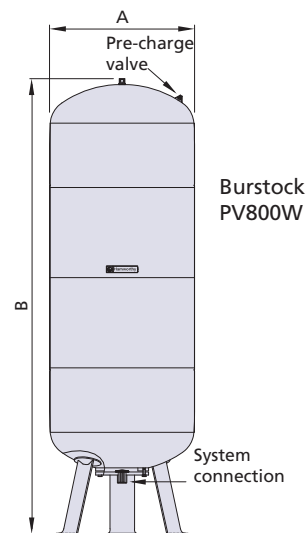
Note: All dimensions in mm unless otherwise stated.



Burstock PV25W



Burstock PV100W



Burstock
PV800W

Product specification

Chesil mk2

Steel casing

Totally enclosed in a robust powder coated steel casing, Chesil pressurisation units have a cover providing access to all internal components, whilst reducing noise during operation.

System safety

The pressurisation units incorporate comprehensive safety circuits to shut down the boiler or chiller in the event of a fault, ensuring that systems operate within health and safety requirements at all times.

Break tank

There is a make-up (break) tank providing a buffer water store, eliminating problems associated with mains water isolation. Units for heating and chiller systems feature float valves in the make-up tank, providing automatic mains cold water top up.

Burstock

Rubber diaphragm

To ensure reliable and safe operation Hamworthy Heating utilise butyl rubber diaphragms which are suitable for temperatures of 70°C at the vessel.

WRAS approved

All expansion vessels are WRAS approved and suitable for use in sealed systems for domestic hot water (DHW) systems as well as in sealed heating and chilled water systems. They may also be used in sealed, glycol-based solar circuits, provided they are given adequate protection from excessive heat or excessive cold, by including an intermediate tank and/or appropriate length of pipe between the Burstock expansion vessel and the solar circuit.

Nitrogen pre-charge

Expansion vessels are pre-charged using Nitrogen which has larger molecules than air resulting in less permeation through the diaphragm and so extending the time period between any necessary pressure top-ups.

Details of expansion vessel operation are shown on page 10, and guidance for expansion vessel sizing is given on page 11.

General requirements

Installation must be in accordance with the relevant requirements of the **Building Regulations, IET Regulations and the Water Supply (Water Fittings) Regulations**. It should also be in accordance with any relevant requirements of the Local Authority.

All connections to the local water main must comply with Water Supply (Water Fittings) Regulations 1999. Additionally, the water supply connection must also comply with all local WRAS regulations.

If conditions within the boiler house are likely to fall below freezing, then consideration should be made for providing thermostatically controlled heating of the expansion vessel connection pipe and anti-gravity loop. Water movement in this section of pipe is slow and at the most vulnerable times (overnight) may have no movement. Electrical trace heating of this pipe section is recommended, operating at approximately 5°C.

Location

The location must provide adequate space for servicing and air circulation around each unit. This includes any electrical trunking laid along the floor and to the appliance.

The pressurisation unit can be mounted directly onto a wall or supported on a floor, depending on model variant.

In either case, the mounting surface should be a **non combustible** flat and level surface capable of supporting the weight of the unit when full of water and any additional ancillary equipment.

System safety

Extra safety features built into the Hamworthy pressurisation units ensures that the plant operates within health and safety requirements at all times, and with the assurance that should an unmanned plant room develop a problem, the pressurisation unit will ensure fail safe operation along with remote indication, enabling rapid response and rectification.

Note that in general, for LTHW (Low Temperature Hot Water: up to 90°C) and MTHW (Medium Temperature Hot Water: 90–120°C) systems, maximum working pressures are defined by the heat generator (i.e. boiler).

The expansion vessel will be factory preset and so the assembly will only require a check to ensure settings have not changed during transport or installation before switching on the unit, however where system requirements dictate a higher or lower setting, then this will require adjustments to be made on commissioning.

Expansion vessel selection

A table of calculated expansion vessel sizes based on a set of fixed parameters, suitable for LTHW systems, is detailed on page 6. If your system complies with these requirements, the data as tabled may be used. For other applications outside these parameters refer to page 16 for a more detailed sizing method.

System connection

The unit must be connected to the system by an anti-gravity loop. The anti-gravity loop must be made in pipework no smaller than the expansion vessel connection and have a minimum height of 2 metres. It should include a lock shield (or lockable) valve at the system connection point for servicing, and an automatic air vent fitted at the highest point of the loop. The pipe work and fittings should be pressure tested to 1.5 times the safety valve lift pressure.

For expansion vessel sizing and selection please refer to pages 10 and 11.

Burstock expansion vessels

Hamworthy can supply a wide range of expansion vessels from its Burstock range to complete the installation. The available range is listed on page X. Expansion vessels may be combined to increase the total vessel capacity as required by the system.

In order to accurately process an enquiry, the following details will be required:

- 1. The system water content**
– litres (Sv).
The installed boiler or chiller power, (kW) rating is acceptable if water content is not known.
- 2. The static head from the base of the expansion vessel to the highest point in the system**
– Metres (Ph).
- 3. The system flow temperature**
– °C (Tf).
- 4. The maximum system working pressure**
– bar (Pw).
This is normally determined by the weakest part of the system.

With all of the above data our Technical Applications Team will be pleased to offer assistance and arrange for a quotation to be prepared.

If the required system working pressure is below 3.3 bar, or the boiler installation is on or near the roof, then the factory preset pressure settings may be adequate.

Refer also to the calculations on page XX

Expansion vessel operation for hot water applications

(Refer to the figure below)

1. Diaphragm position 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 high system pressure. The boiler system is shut down by the system pressure safety circuits.
4. Diaphragm at the safety valve lift pressure caused by boiler temperature limiter failure for example. Acceptance factor = 0.5 maximum (recommended).

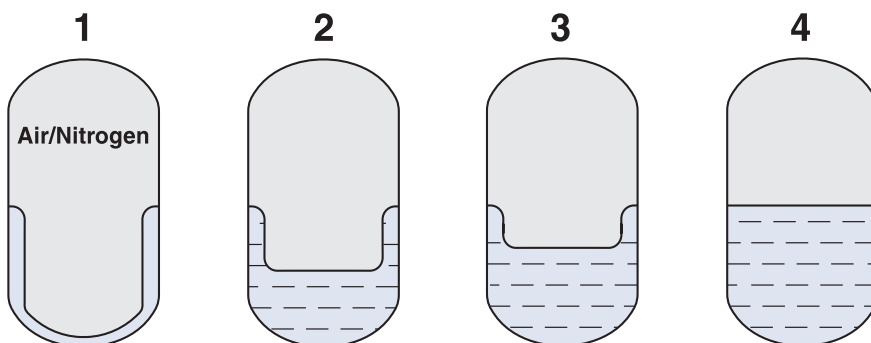
Expansion vessel operation for chilled water applications

(Refer to the figure below)

1. Diaphragm position at the charge pressure. The charge pressure is 0.35 bar less than the cold fill pressure. The vessel is empty of system fluid.
2. Diaphragm position at the cold fill pressure. As the chiller operates the system fluid contracts due to the drop in temperature. The pressurisation unit operates to maintain the system at the cold fill pressure. The gas in the vessel is compressed to equalise the system pressure.
3. Diaphragm position at the maximum ambient temperature. When the chiller is switched off, the system water expands due to the rise in system temperature to ambient. The gas in the vessel is compressed. Acceptance factor = 0.35 maximum (recommended).
4. Diaphragm at the safety valve lift pressure. Acceptance factor = 0.5 maximum (recommended).

The chiller will have been shut down by the system pressure safety circuit.

Expansion vessel operation



Expansion vessel sizing

Hot water applications

- 1) Total system water content = _____ litres. (Sv.)
Note: an assumed ratio of 10 litres/kW of installed boiler capacity can be used if not known.
- 2) Static head from base of expansion vessel to highest point of system = _____ metres. (Ph.)
- 3) System flow temperature (maximum under normal operation) = _____ °C. (Tf.)
- 4) System return temperature = _____ °C
- 5) Maximum system working pressure = _____ bar. (Pw.)
Note: normally determined by the weakest part of the system – boiler, radiators etc. If system is below pressurisation unit (i.e. roof top boiler house), the maximum static head of components fitted must be considered.
- 6) Acceptance = proportion of expansion vessel filled=0.35

Preliminary sizing sheet

Sv = litres Ph = metres Tf = °C

$$\text{Cold fill/charge pressure, Pf} = \left(\frac{\text{Ph}}{10.2} \right) + 0.2 + \text{Vp} \quad (\text{see table below})$$

$$\therefore \text{Pf} = \frac{\text{Ph}}{10.2} + 0.2 + \text{Vp} \text{ bar}$$

$$\therefore \text{Pf} = \frac{\text{Ph}}{10.2} \text{ bar (Max 3.4 bar)}$$

(Note: if Pf (calculated) is < 1.0, then use Pf = 1.0)

To size expansion vessel

Total vessel volume = $\frac{\text{Sv} \times \text{expansion factor}}{0.35}$ (see table below)

$$\therefore \text{Total vessel volume} = \frac{\text{Sv} \times \text{expansion factor}}{0.35}$$

$$= \text{_____ litres (calculated)}$$

∴ Using the next larger standard expansion vessel(s):

$$\text{_____ litres (calculated)} = \text{_____ off @ _____ litres}$$

$$+ \text{_____ off @ _____ litres}$$

Nitrogen charge pressure = Pf (fill press.) - 0.1 = bar

Chiller applications

- 1) Total system water content = _____ litres. (Sv.)
- 2) Static head from base of expansion vessel to highest point of system = _____ metres. (Ph.)
- 3) Maximum ambient temperature = _____ °C. (Tf.)
- 4) Maximum system working pressure = _____ bar.
Note: normally determined by the weakest part of the system – chiller unit, air handling unit etc. If system is below pressurisation unit (i.e. roof top air conditioning unit), the maximum static head of components fitted must be considered.
- 5) Acceptance = proportion of expansion vessel filled=0.35

Preliminary sizing sheet

Sv = litres Ph = metres Tf = °C

$$\text{Cold fill pressure} = \left(\frac{\text{Ph}}{10.2} \right) + 0.2$$

$$\therefore \text{Pf} = \frac{\text{Ph}}{10.2} + 0.2 \text{ bar}$$

$$\therefore \text{Pf} = \frac{\text{Ph}}{10.2} \text{ bar (Max 3.4 bar)}$$

(Note: if Pf (calculated) < 1.0 then Pf = 1.0)

To size expansion vessel

Vessel volume = $\frac{\text{Sv} \times \text{expansion factor}}{0.35}$ (see table below)

$$\therefore \text{Vessel volume} = \frac{\text{Sv} \times \text{expansion factor}}{0.35}$$

$$= \text{_____ litres (calculated)}$$

∴ Using the next larger standard expansion vessel(s):

$$\text{_____ litres (calculated)} = \text{_____ off @ _____ litres}$$

$$+ \text{_____ off @ _____ litres}$$

Charge pressure = Pf (fill press.) - 0.35 = bar

Hot water applications

Max. system temperature (Tf) °C	70	75	80	82	85	90	95	100	105	110	115	120
Vapour pressure Pv (bar)	0	0	0	0	0.10	0.35	0.60	0.90	1.20	1.55	1.90	2.35
Water expansion factor (ew)	0.023	0.026	0.029	0.031	0.033	0.036	0.040	0.044	0.048	0.052	0.056	0.060
Anti-freeze expansion factor (ea)	0.061	0.064	0.068	0.069	0.071	0.075	0.079	0.083	0.087	0.090	0.094	0.098

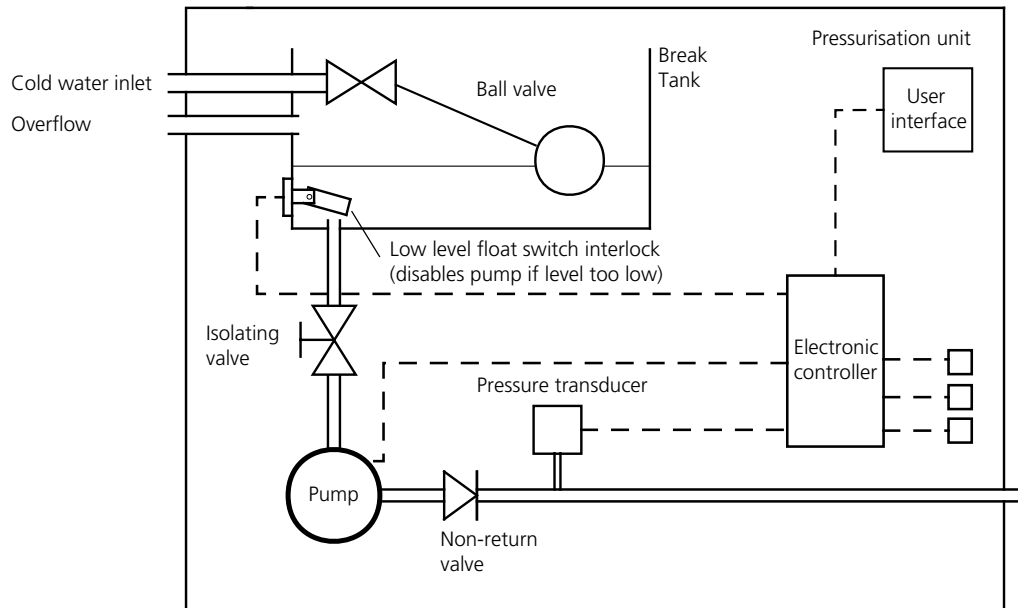
Chiller applications

Max. ambient temperature (Ta) °C	7.5	10	12.5	15	17.5	20	22.5	25	27.5	30	32.5
Water expansion factor* (ew)	0.0002	0.0003	0.0007	0.0010	0.0014	0.0018	0.0024	0.0030	0.0037	0.0044	0.0052
Anti-freeze expansion factor (ea)	0.0169	0.0188	0.0206	0.0224	0.0242	0.0261	0.0279	0.0298	0.0316	0.0330	0.0345
Anti-freeze expansion factor (ea)	0.061	0.064	0.068	0.069	0.071	0.075	0.079	0.083	0.087	0.090	0.094

*Note: these figures apply to water systems only

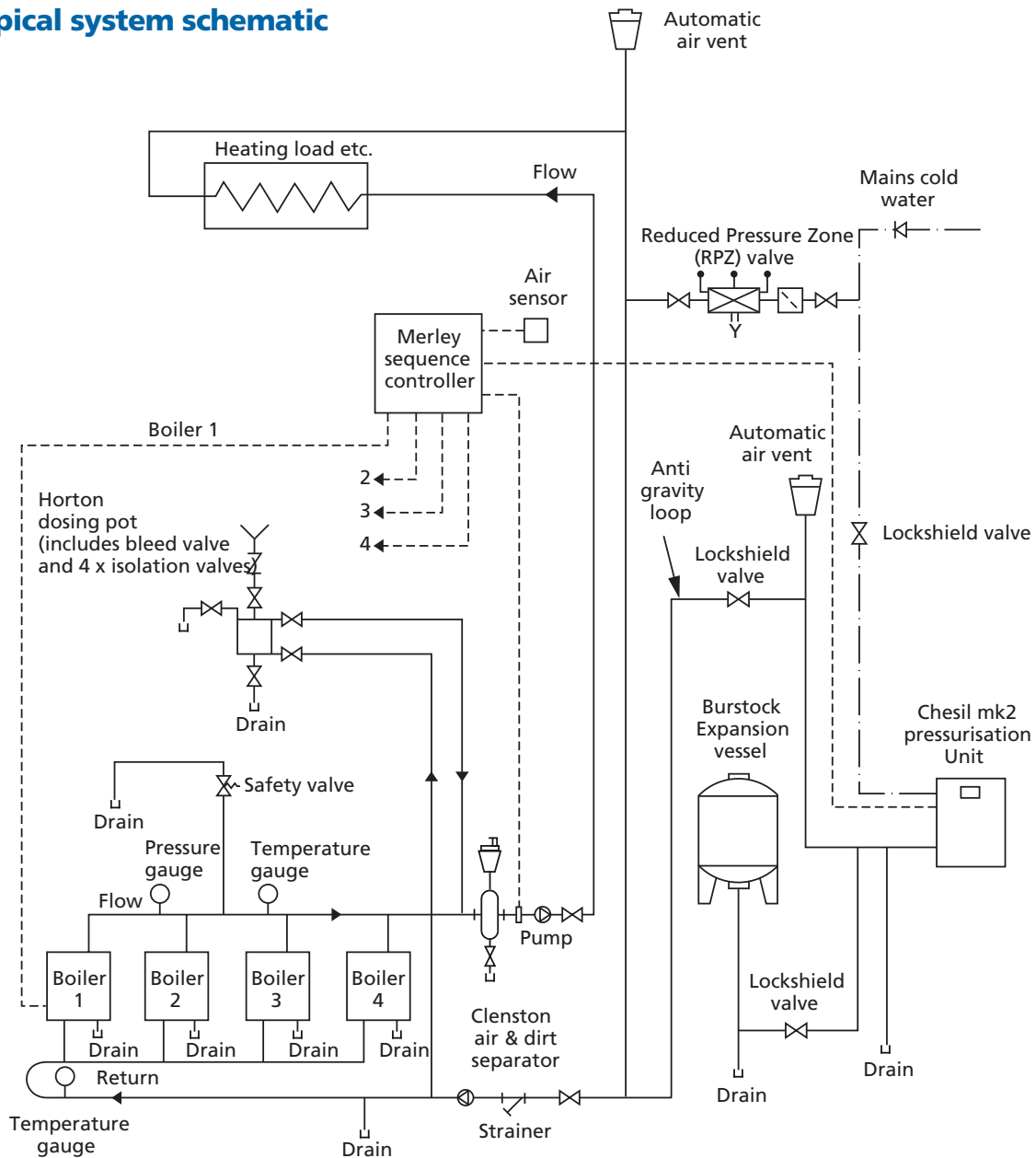
Schematics

Single pump Chesil mk2 unit with electronic controls



Schematics

Typical system schematic

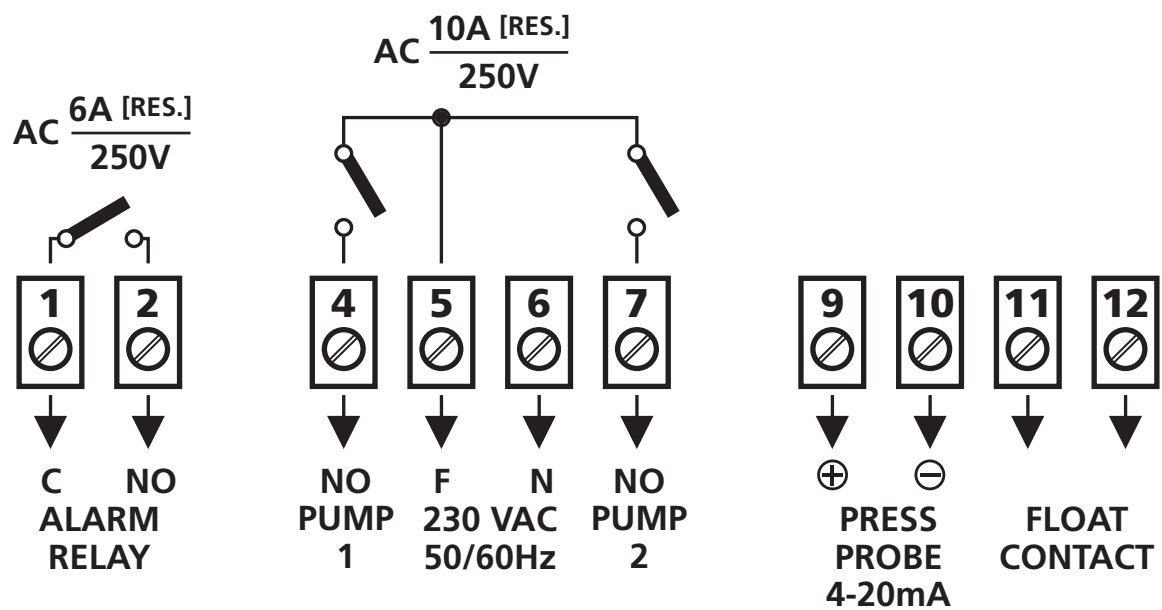


The Hamworthy Chesil pressurisation unit is now supported by additional ancillary branded products from Hamworthy.

These include:

- Hamworthy Burstock expansion vessels
- Hamworthy Horton dosing pots
- Hamworthy Clenston air and dirt separators

Wiring diagram



OPERATING CONDITIONS
T: 0...50°C RH: 30...85°C

Volt free alarms, terminals 1 & 2 on rear of digital control unit. Remove cover to access screw terminals.

Notes

**British engineering excellence from Hamworthy Heating;
the commercial heating and hot water specialists.**



**SUPPORT BRITISH
MANUFACTURING**

Hamworthy Heating Accreditations

ISO 9001 Quality Management System
ISO 14001 Environmental Management System
ISO 45001 Health & Safety Management System



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Hamworthy Heating reserves the right to make changes and improvements which may necessitate alteration to product specification without prior notice.