



**CHALLIS
BOOSTER**



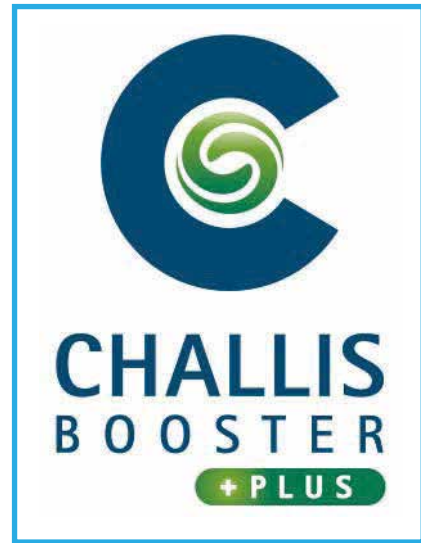
**CHALLIS
BOOSTER
+ PLUS**

Installation & Technical Guide

Domestic & Commercial

www.challisbooster.com

www.challisboosterplus.com



Installation and Technical Guide Domestic and Commercial



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IMPORTANT INFORMATION

Prior to installation, check CWC Booster or Booster +Plus consignment, ensure all components are correct and not damaged during transport.

Consignment

Pack 1 - Accumulator

System Code	CB60	CB80	CB100	CB130	CB150	CB170	CB240	CB310	CB450
Accumulator Size	60	80	100	130	150	170	240	310	450
Valve Fitted	28mm	28mm	28mm	28mm	28mm	28mm	28mm	28mm	28mm
Carton Size									
Carton Weight									

Pack 2 - Fittings

System Code	CB22	CB28	CB+22	CB+28
Pump	-	-	Qty 1	Qty 1
Bracket	-	-	Qty 1	Qty 1
Fitting Size	22mm / 1" BSP	28mm / 1¼" BSP	22mm / 1" BSP	28mm / 1¼" BSP
Carton Size				
Carton Weight				

Do not unpack until ready to use.

Store in a dry, frost free location.

Store Accumulator upright.

Take precautions to prevent damage during storage.

Contact Details

Installer 1

Installer 2

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Contact Challis Water Controls for any additional information.

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▼ Note ▼

Please disregard document reference 620-0027C supplied with vessel.

▼ Note to Installer ▼

Leave this manual with the end user/
householder.

1:1 CHALLIS WATER CONTROLS

Throughout this manual CWC is used as abbreviation for Challis Water Controls.

1:2 THIS MANUAL

This manual has been supplied to cover the installation of the CWC Booster and Booster Plus Systems.

This CWC manual is intended for:-

1. The installing Plumbing Engineer.
2. The installing Electrical Engineer.
3. The end user.

1:3 COPYRIGHT

This manual in paper form, electronic and pdf format is protected under copyright.

No part of this manual can be copied or extracted for use in any other publication. No part of this publication may be reproduced, stored in a retrieval system, transmitted in any form or by any means electronic, mechanical, recorded or otherwise without the prior written consent of the author.

1:4 SUPPLEMENTARY INFORMATION

The Supplementary Information section of this manual includes documentation provided by suppliers of components and any other information as appropriate.

1:5 PRINCIPLES OF THE BOOSTER SYSTEM

The Accumulator is basically an expansion vessel that is installed open to the incoming mains water supply. It has an internal butyl diaphragm that expands as it fills with water from the mains. It will stop filling when the pressure within the vessel is equal to the available mains pressure. If the mains pressure rises the pressure in the accumulator rises. A double check valve on the mains supply prevents any loss of pressure.

When any taps within the dwelling are opened, the water from the accumulator supplements the water drawn from the mains. The effect of this is stable pressure and flow to all taps with minimal drop off when more than one tap/outlet are opened simultaneously.

The accumulator has an air space above the diaphragm, the air pressure within this space is important to the efficiency of the Booster system and is set to optimum pressure via a pressure valve on top of the vessel.

A Booster system can have one or more accumulators to satisfy demand.

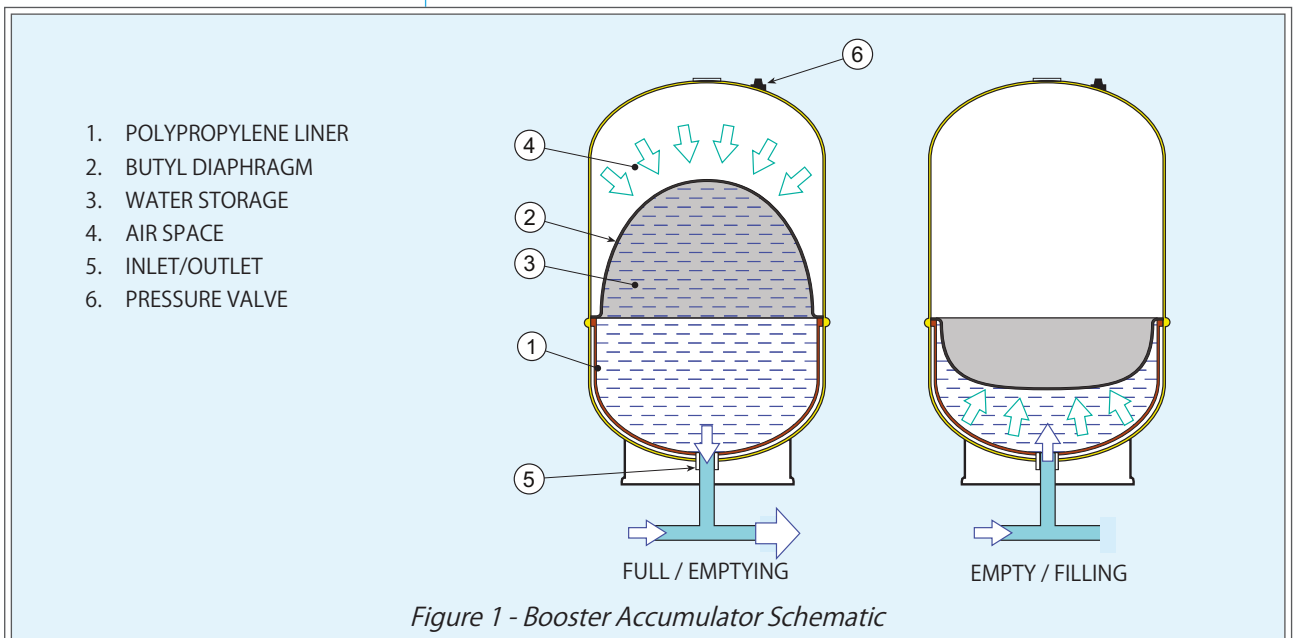


Figure 1 - Booster Accumulator Schematic

▼ Note ▼
Valves are not shown in these schematics.

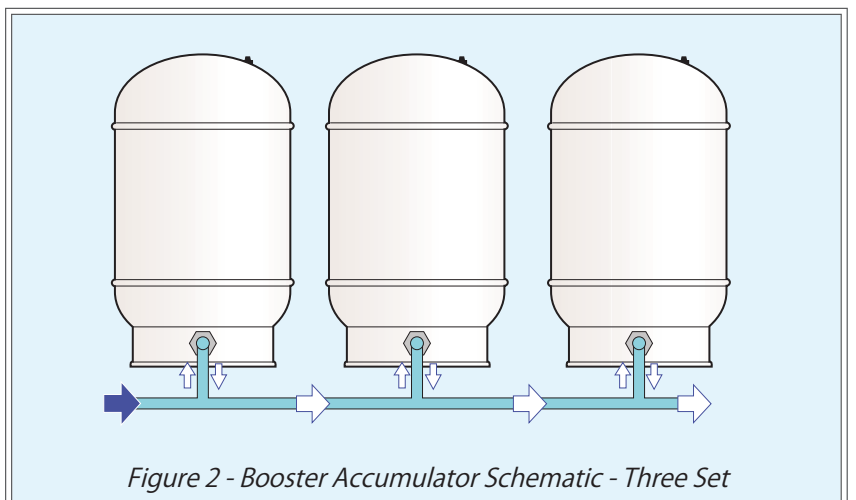


Figure 2 - Booster Accumulator Schematic - Three Set

1:6 PRINCIPLES OF THE BOOSTER PLUS SYSTEM

The Booster Plus system incorporates a pump unit mounted on top of the accumulator. The pump control reacts to the water mains pressure so that when the mains pressure is low the pump runs to draw water from the mains. This results in a higher pressure being maintained in the buildings cold water supply than that available from the mains.

A full bore pump bypass is fitted which enables the incoming water supply to directly fill the accumulator and/or feed the cold supply when ample pressure is available.

Fitting a CWC Booster Plus will enhance the performance of the water services including unvented hot water cylinders, combination boilers, electric showers and mixer showers.

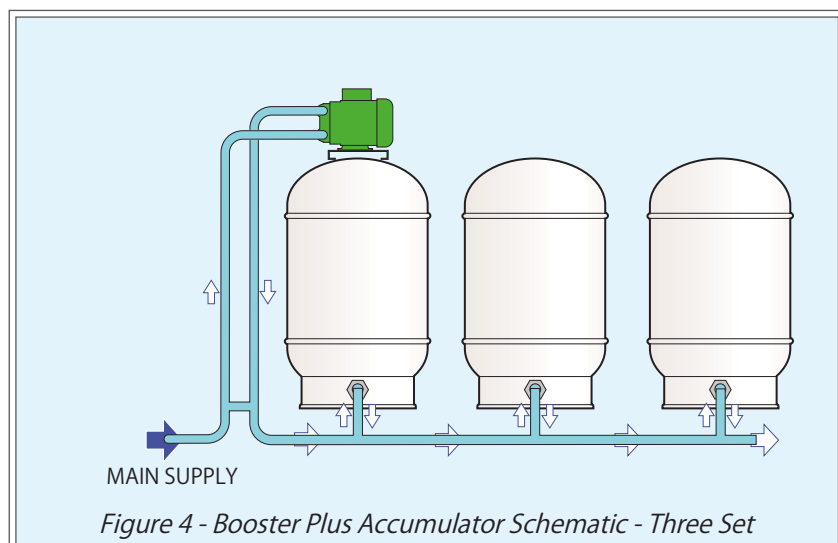
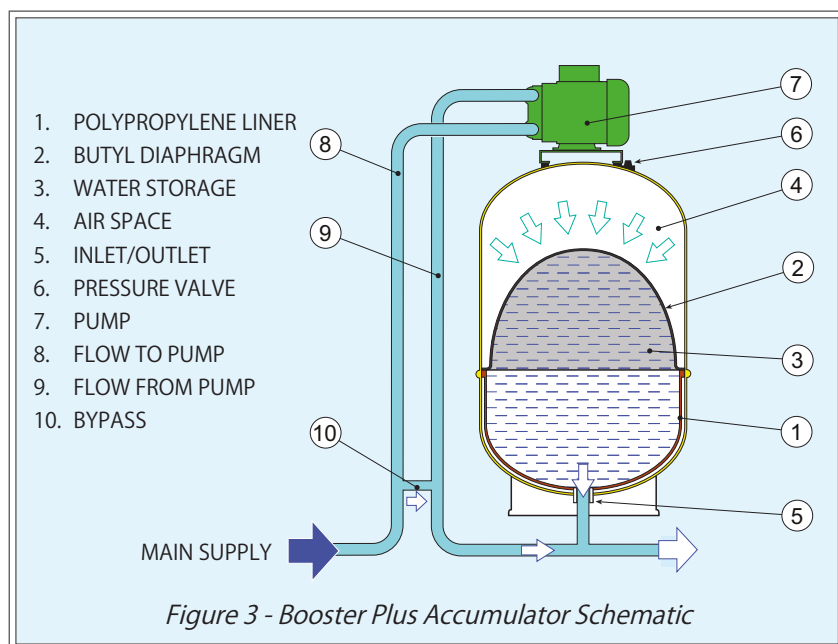
When a Booster Plus system has more than one accumulator only one pump is required, mounted on the first in the set.

▼ Note ▼

Valves are not shown in these schematics.

▼ ▼ Important ▼ ▼

Water authorities restrict the amount of water permitted to be pumped from the main at 12 litres per minute @ 1.5 to 4 Bar. The Booster Plus system falls within these limits.



▼ Note ▼

More details of system layout are shown in section 2.

1:7 TYPICAL BOOSTER SYSTEM

Figure 5 shows a basic simple system with accumulator supplementing the cold supply. The system has cold feed to a combi boiler, cold taps, hot taps and mains fed electric shower. All outlets will have stable pressure and flow regardless of how many are in use.

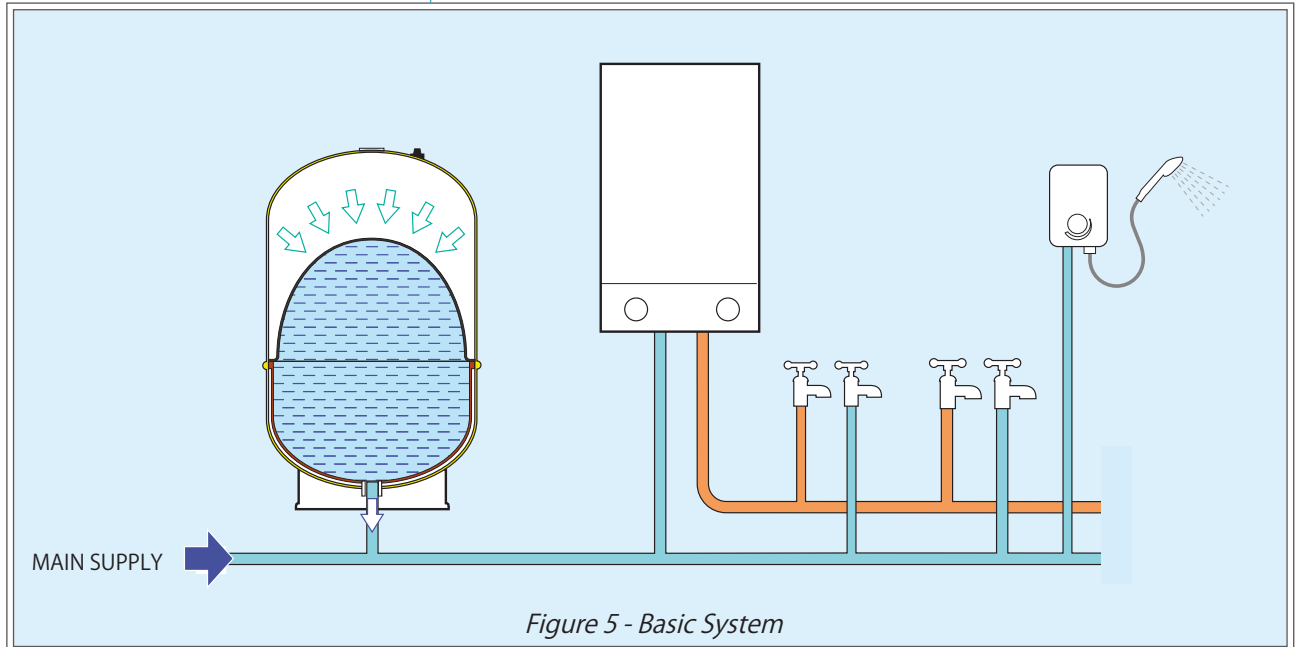


Figure 5 - Basic System

1:8 ADVANTAGES OF FITTING A BOOSTER SYSTEM

1. Flow rate to both hot and cold water to taps and services are increased.
2. Balanced pressure to both hot and cold supplies.
3. Stable pressure with minimal drop in flow rate when more than one tap is used simultaneously.
4. No in loft header tank.
5. The cold water system is sealed with minimal risk of bacteria contamination or stagnation
6. Enhanced performance of combination boilers.
7. Silent operation with no filling noise.

1:9 EXTRA ADVANTAGES OF FITTING A BOOSTER PLUS SYSTEM

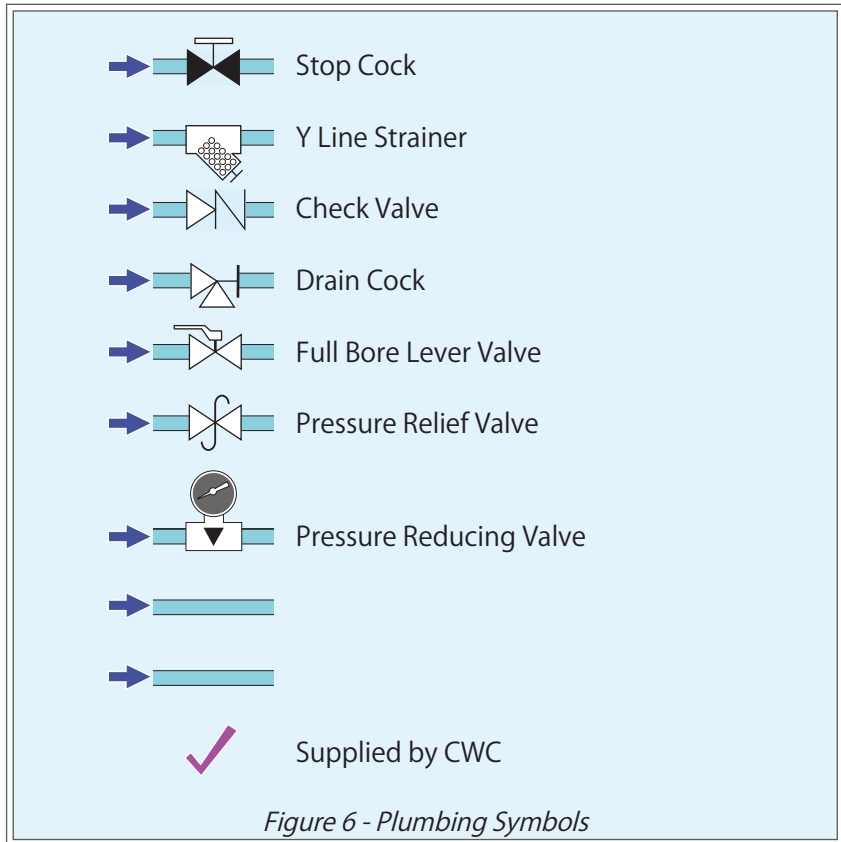
1. Pressure and flow rate from small bore mains supply is noticeably increased.
2. Pressure and flow rate from low pressure mains supply is noticeably increased.
3. Stable pressure with minimal drop in flow rate when the flow rate of the mains supply drops off at peak times.
4. When more than one accumulator is fitted considerable volumes of water can be stored that supply water at good pressure on demand.

1:10 RETROFIT SYSTEMS

Consult CWC.

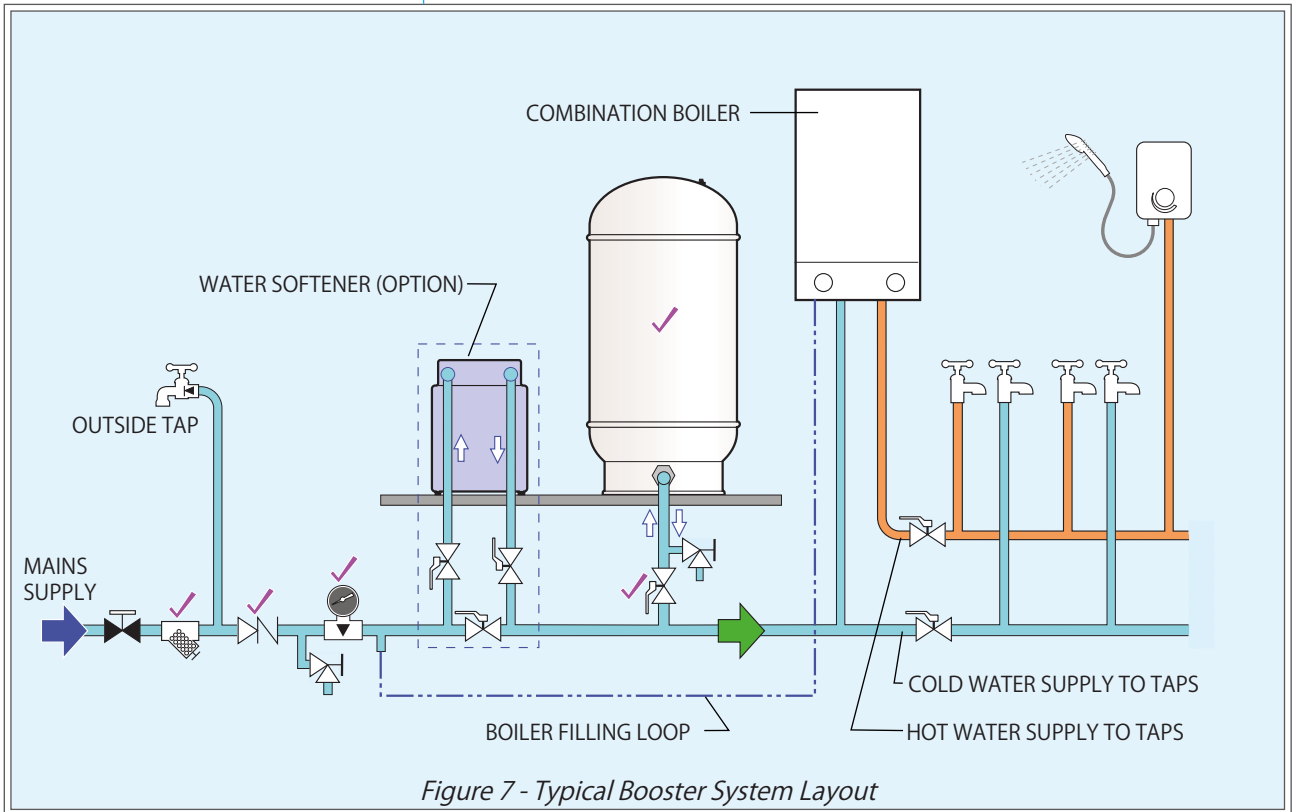
2:1 PLUMBING SYMBOLS

Figure 6 shows the plumbing symbols used in the schematic diagrams throughout this manual.

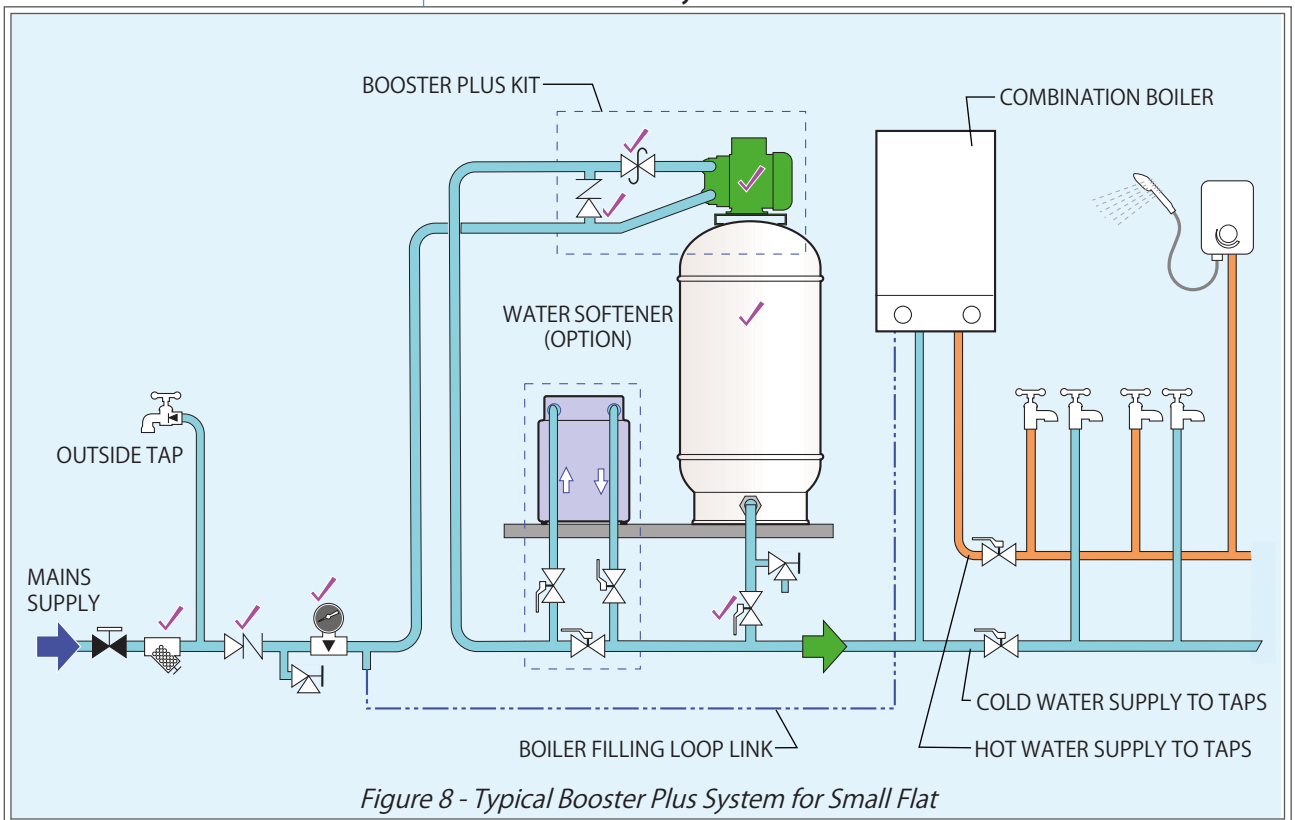


2:2 TYPICAL SYSTEMS

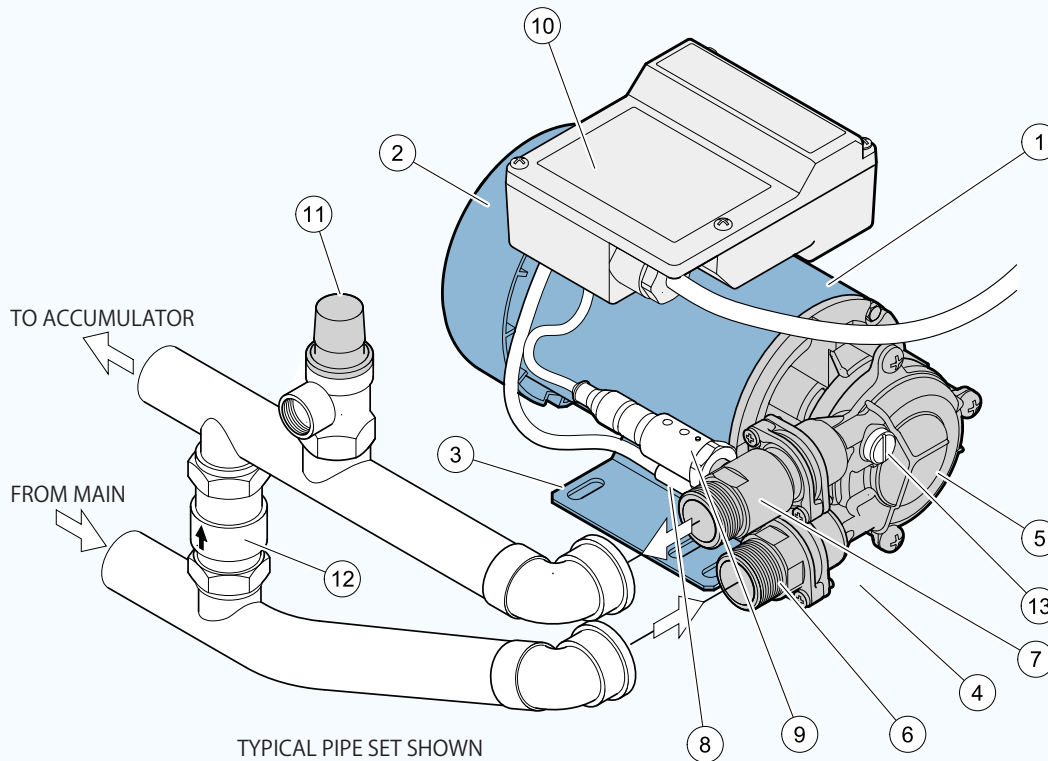
2:2.1 Booster System



2:2.2 Booster Plus System



3:1 BOOSTER PLUS PUMP DETAILS



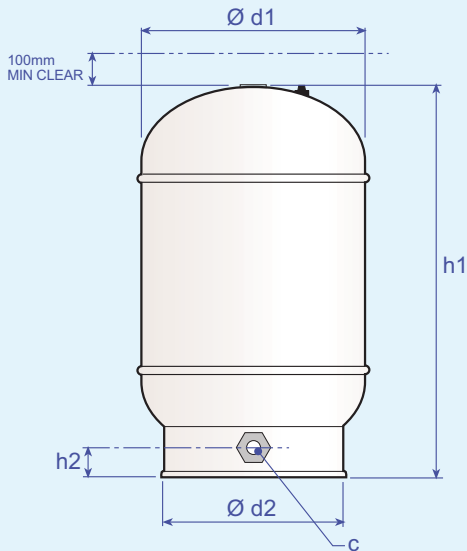
- 1. Pump Motor
- 2. Pump Cooling Fan
- 3. Motor Mounting Flange
- 4. Motor Base Plate
- 5. Pump Unit
- 6. Pump Inlet
- 7. Pump Outlet
- 8. Overheat Sensor
- 9. Pressure Sensor
- 10. Terminal Box
- 11. PRV
- 12. Check Valve
- 13. Pump Vent Plug

Booster Plus	
Motor	0.430 kW
Max Flow	12 l/min
Volts	230V 1ph 50Hz
Amps	2.0
Cable	1.5m
Cable	HO5VV-F3 G 0.75mm ²
IP Rating	IPX4

Figure 9 - Booster Plus Pump Arrangement

3:2 ACCUMULATOR DIMENSIONS & WEIGHTS

3:2.1 Accumulator Specification - Booster

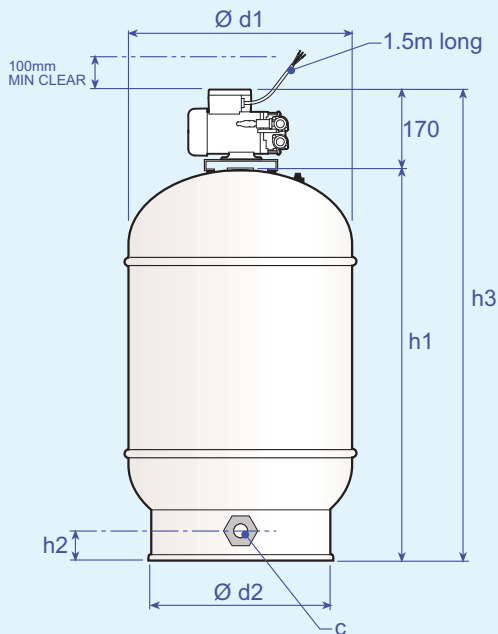


	Volume	h1	h2	Ød1	Ød2	c	Weight Empty	Maximum Weight*
Unit	litres	mm	mm	mm	mm	BSP	kg	kg
CB60	60	570	48	410	325	1"	13	75
CB80	80	750	48	410	325	1"	16	100
CB100	100	890	48	410	325	1"	19	120
CB130	130	1100	48	410	325	1"	23	155
CB150	150	924	-	530	-	1"	31	181
CB170	170	940	56	535	430	1¼"	30	200
CB240	240	1240	56	660	540	1¼"	37	280
CB310	310	1500	56	535	430	1¼"	46	380
CB450	450	1530	56	660	540	1¼"	70	525

Note *Max Weight should be used for floor loading calculations.

Figure 10 - Dimensions of Accumulator - Booster

3:2.2 Accumulator Specification - Booster Plus



	Volume	h1	h2	h3	Ød1	Ød2	c	Weight Empty	Maximum Weight*
Unit	litres	mm	mm	mm	mm	mm	BSP	kg	kg
CB+60	60	570	48	740	410	325	1"	13	75
CB+80	80	750	48	920	410	325	1"	16	100
CB+100	100	890	48	1060	410	325	1"	19	120
CB+130	130	1100	48	1270	410	325	1"	23	155
CB+150	150	924	-	1094	530	-	1"	31	181
CB+170	170	940	56	1110	535	430	1¼"	30	200
CB+240	240	1240	56	1180	660	540	1¼"	37	280
CB+310	310	1500	56	1670	535	430	1¼"	46	380
CB+450	450	1530	56	1700	660	540	1¼"	70	525

Note *Max Weight should be used for floor loading calculations.

Figure 11 - Dimensions of Accumulator - Booster Plus

3:2.3 Accumulator Features

Patented CAD2 diaphragm technology
 NSF Standard 61, CE/PD, WRAS, ACS,
 ISO-9001, Gost approved
 Stainless steel water connection
 Condensation reducing design
 Two part polyurethane, epoxy primed paint finish
 Leak free air valve cap sealed with closed cell foam
 Finish: two part polyurethane over epoxy undercoat
 Maximum working temperature 90°C
 Maximum working pressure 10 bar

3:3 SYSTEMS AVAILABLE
3:3.1 Booster Pack

Booster Pack	CB60	CB80	CB100	CB130	CB150	CB170	CB240	CB310	CB450
Accumulator	CB60	CB80	CB100	CB130	CB150	CB170	CB240	CB310	CB450

3:3.2 Booster Fittings Pack

Fittings Kit	CB22	CB28
Basic Size	22mm/1" BSP	28mm / 1¼" BSP
Y Line Strainer	Qty 1	Qty 1
Check Valve	Qty 1	Qty 1
Pressure Reducing Valve	Qty 1	Qty 1
Full Bore Isolation Valves	Qty 1	Qty 1

3:3.3 Booster Plus Fittings Pack

Fittings Kit	CB22+	CB28+
Basic Size	22mm/1" BSP	28mm / 1¼" BSP
Y Line Strainer	Qty 1	Qty 1
Check Valve	Qty 1	Qty 1
Pressure Reducing Valve	Qty 1	Qty 1
Full Bore Isolation Valves	Qty 1	Qty 1
Pump Set	Qty 1	Qty 1
Pump Base Plate	Qty 1	Qty 1

▼ ▼ Important ▼ ▼
Installation of an unvented hot water system requires building regulations approval.

4:1 REGULATIONS

Consideration should be given to any current regulations and guidance covering the installation of water services for domestic or commercial buildings.

This would include:-

- Water Regulations Advisory Scheme (WRAS)
- BS6700
- BS EN806
- Building Regulations
- Health and Safety Executive (HSE)

The appliance should be installed in accordance with the current versions the IEE Wiring Regulations (now called BS7671 "Requirements for electrical installations")

4:2 SCALE PROTECTION

CWC Accumulators do have a degree of tolerance to scale, however when the available water supply is known to be hard, suitable scale protection should be provided.

4:2.1 Water Softeners

CWC recommend the installation of ion exchange resin water softeners, these provide soft water for the household with the added advantage of preventing build-up of scale within appliances, cisterns, taps and shower heads.

When planning the installation of a water softener the following points should be considered:

1. The unit should always be connected to the mains supply before the accumulator connection.
2. Pipework in and out of the unit must be full bore and of the same size as the fittings kit.
3. A full bore bypass should be fitted with an isolating valve.
4. A drinking water take off prior to the water softener is recommended.
5. Some combination boilers require untreated water, therefore the filling loop should be connected prior to the water softener.

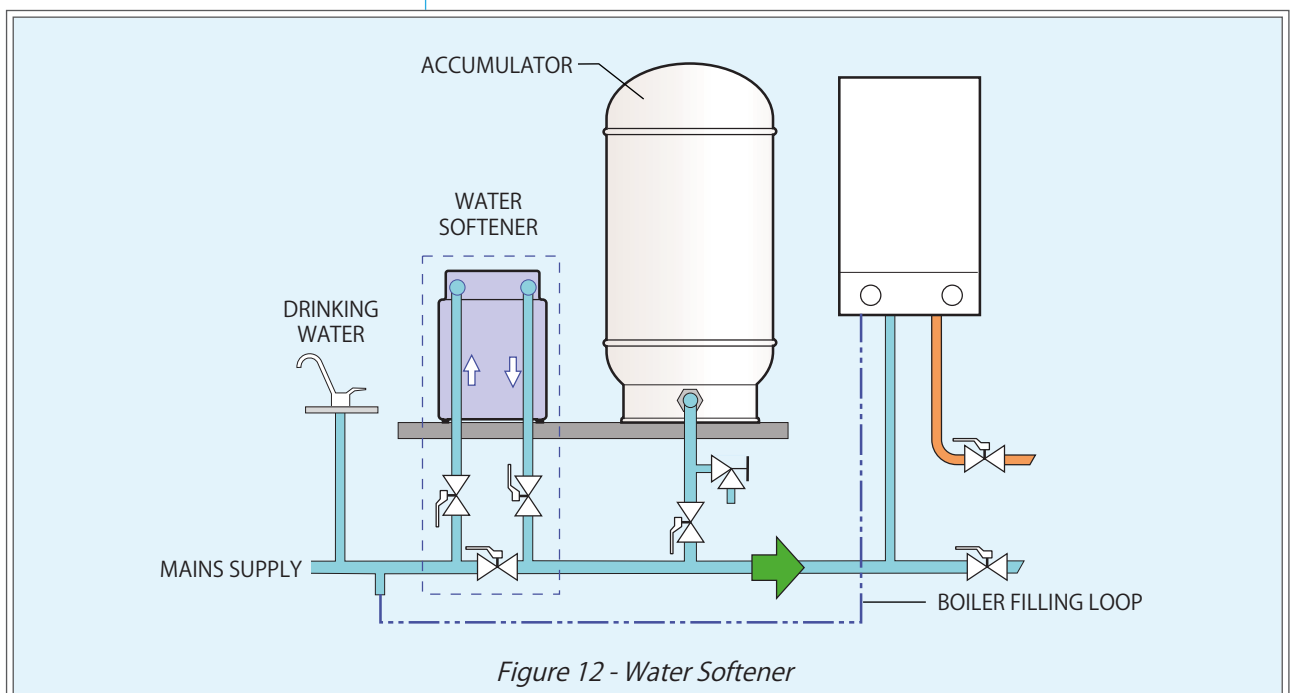


Figure 12 - Water Softener

4:3 THERMAL PROTECTION

CWC Accumulators do have a degree of tolerance to low temperatures, and when installed within a dwelling frost protection would not normally be required.

However if installed in a loft area, garage or outbuilding where temperatures fall below zero then further protection must be provided.

All pipework must have adequate insulation.

Consideration should also be given to the possibility that the water within the accumulator could be warmed by the effects of the sun or adjacent appliances.

4:4 LOCATION FOR ACCUMULATORS

The Booster and Booster Plus systems are sealed pressure systems and do not require a head of water, therefore the height the accumulator is in relation to the incoming mains makes little difference to the performance of the systems. However in high rise buildings a drop in pressure of the mains supply should be expected on the upper floors.

The accumulator can be located within the building, loft area, outbuilding, garage or basement.

When locating the accumulator the following points should be considered:-

1. Where possible the length of pipework from the incoming main to the accumulator should be kept to a reasonable minimum.
2. Where possible the accumulator should be installed vertical and level. However, it may be installed laying on its side with a suitable cradle construction.
3. The floor must be able to withstand the maximum weight of the accumulator - see 3:2.
4. A clearance of at least 100mm above the accumulator must be provided for air pressure checking and adjustment.
5. A full bore service valve (supplied) must be fitted to the pipe connecting the accumulator that enables the supply to and from the accumulator to be shut off.
6. An easily accessible drain cock must be fitted between the accumulator isolating valve and the accumulator that will enable the accumulator to be fully drained.

Booster Plus Systems Only

7. The pump requires a 240 Volt supply - see 4:6.
8. Suitable access is required for pump servicing.

▼ Note ▼

[For accumulator pressure setting see 4:8.](#)

4:5 INCOMING MAINS FITTINGS

Figure 13 shows the required arrangement of fittings to the incoming mains.

▼ ▼ Important ▼ ▼

The order that the fittings are arranged should not be changed from that shown.

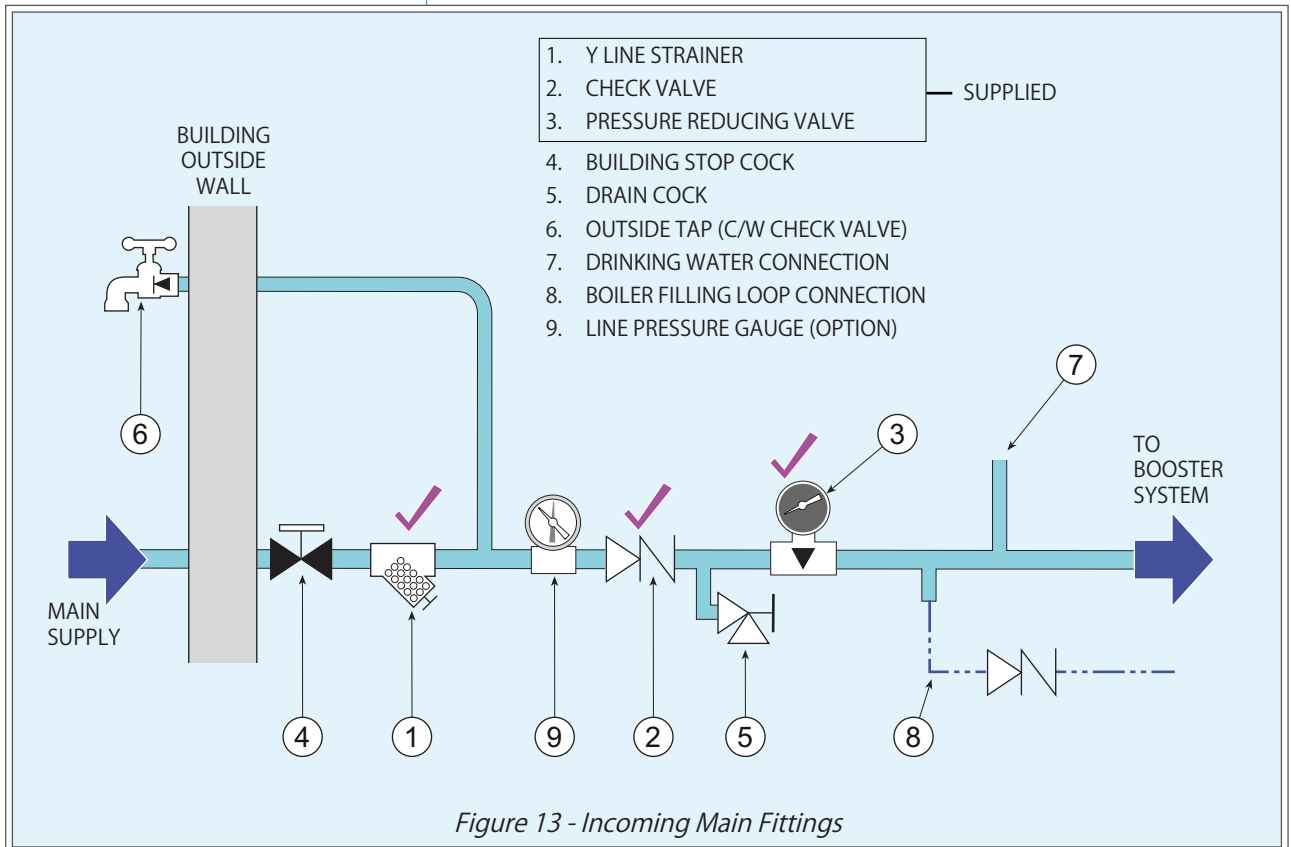


Figure 13 - Incoming Main Fittings

4:6 BOOSTER PLUS PUMP ELECTRIC SUPPLY

The pump should be wired to a double pole switch as shown in figure 14. The switch should be positioned to reduce the possibility of water contact.

The pump must be earthed.

▼ ▼ Important ▼ ▼
Earth continuity must be fitted to IEE Wiring Regulations (BS7671)

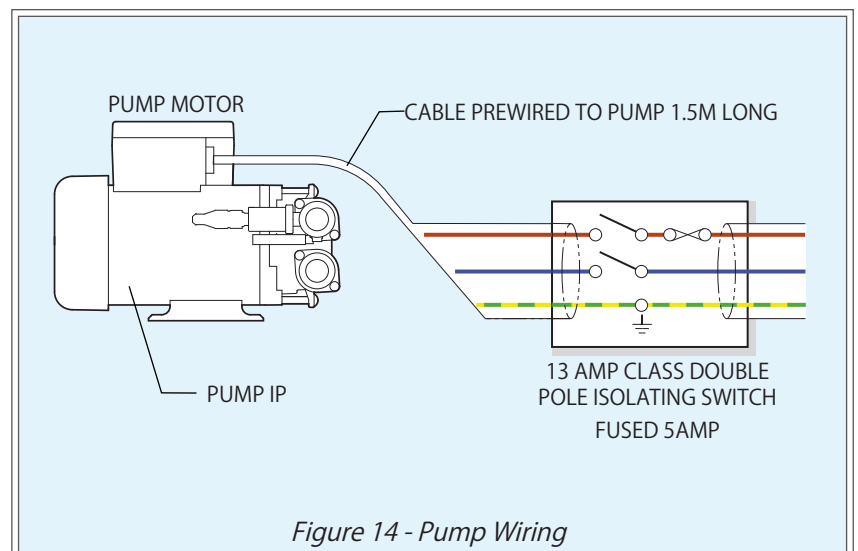


Figure 14 - Pump Wiring

▼ Note ▼

The maximum pressure that the pump will pump is 3.8 bar, the pump stops at 3.5 Bar.

▼ ▼ WARNING ▼ ▼

Isolate mains power before opening the terminal box.

▼ ▼ Important ▼ ▼

Consult CWC before changing pump pressure settings.

4:7 PUMP CUT IN PRESSURE SETTING

The pump control reacts to the water mains pressure so that when the mains pressure is low the pump runs to draw water from the mains.

The pressure at which the mains pressure falls to before the pump will start is referred to as the pump cut in pressure.

The pump cut in pressure is factory set at 1.5 bar

The pump can be changed to have a higher cut in pressure. This is done by moving the cut in pressure jumper in the terminal box, as shown in figure 15.

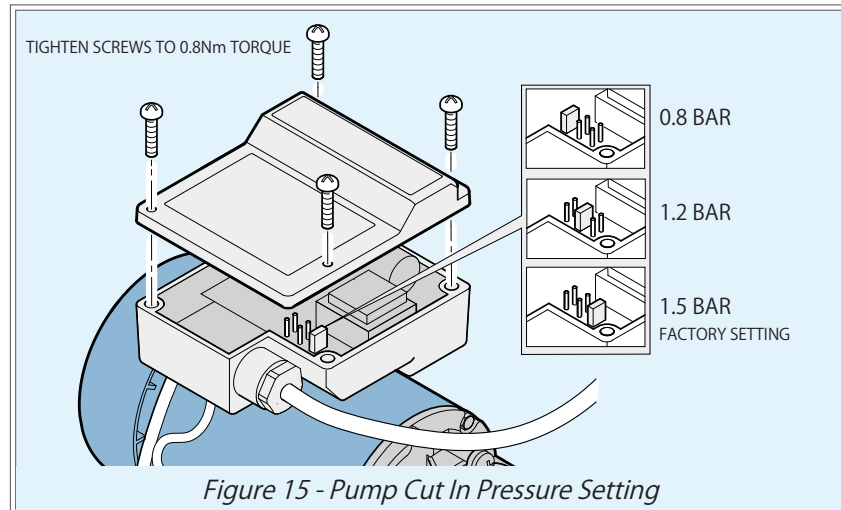


Figure 15 - Pump Cut In Pressure Setting

4:8 ACCUMULATOR PRE-CHARGE PRESSURE

The accumulator's air space pre-charge pressure is factory set at approximately 1.5 Bar.

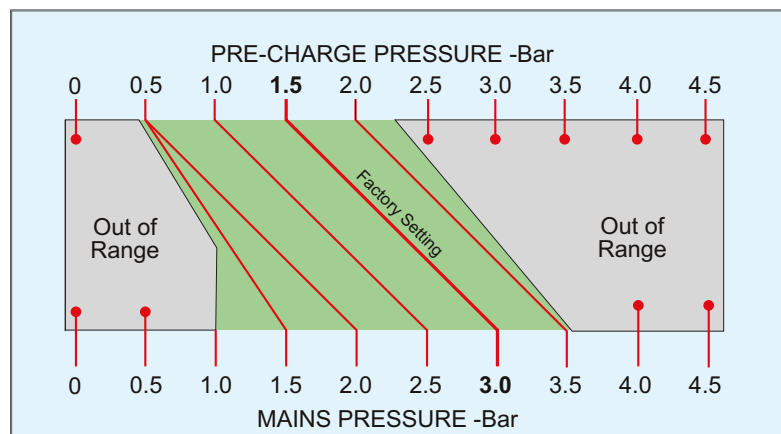
The incoming mains should have a pressure reducing valve fitted (supplied) this is normally set at 3.0 Bar.

Therefore the maximum differential pressure is 1.5 Bar (3.0 - 1.5 = 1.5), this is an ideal differential to achieve optimum filling of the accumulator.

When the incoming mains pressure is consistently below 3.0 Bar and the pre-charge pressure remains at 1.5 Bar then the differential pressure will be less than 1.5 Bar, this will result in the accumulator not filling sufficiently. Lowering the accumulators pre-charge pressure to maintain a 1.5 Bar differential will correct this.

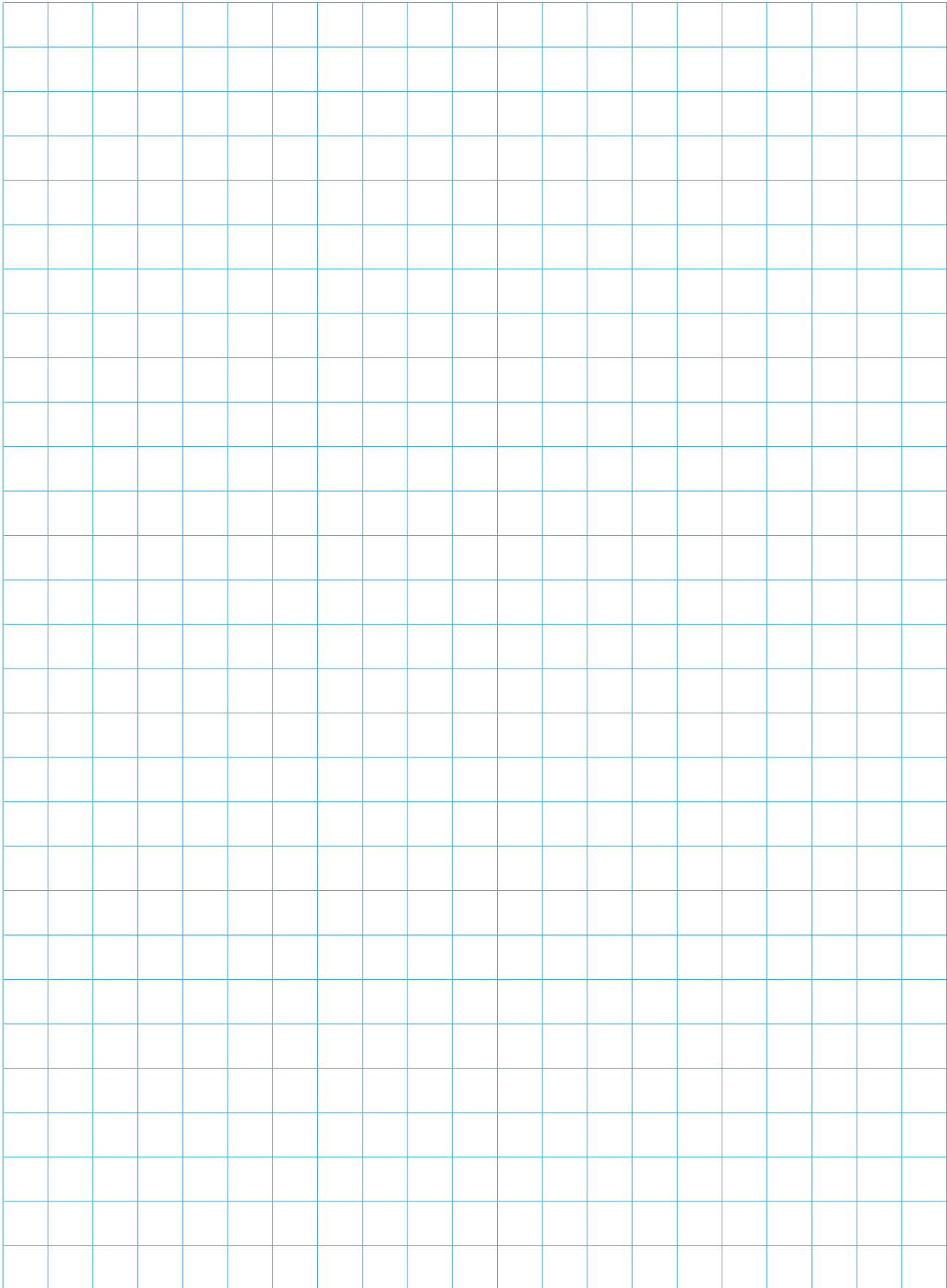
If the pressure differential is above 1.5 Bar it will result in the accumulator overfilling and if left unchecked the diaphragm could be damaged.

The CWC chart below shows the acceptable pressures (domestic) in the green area, based on a 1.5 Bar differential.



4:9 NOTES ON OPERATION

1. The vent plug on the front of the pump can be used to vent air from the pump/pipework.
2. The PCB fitted to the pump has a number of logic functions that will stop the pump if an error occurs, they are as follows:-
 - 2.1 Pump will run for 20 seconds if it has not been used for 24 hours to 'exercise' the seal and purge water from the pump.
 - 2.2 Pump will stop if the pressure sensor or temperature sensor is disconnected.
 - 2.3 Pump will stop if the temperature sensor reaches approx. 70°C, pump will restart on cooling.
 - 2.4 If the water pressure does not rise above 0.2 bar for 3 minutes uninterrupted, pump will stop for 1 minute, 3 attempts will be made to restart, the pump will stop and has to be reset by switching off the mains power supply to the pump for at least 10 seconds.





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