

## INTRODUCTION

The 1100 series valves are designed to provide pressure relief over the range of 1 to 10 BarG when using the 0 – 10 BarG inlet (this is identified as the port having the central vent visible inside), or pressure loading/sustaining duty over the range 0.5 to 3.0 BarG when using the opposite 0 – 3BarG inlet port. Normally these ports are clearly identified by external labelling but this may be damaged or removed during use. Back pressure at the discharge port in the pressure relief mode will affect the valve performance and set point - check with PROCHEM in these circumstances.

**THE MAXIMUM ALLOWABLE PRESSURE FOR STANDARD SERIES 1100 VALVES IS 16 BARG(PLASTIC UP TO DN40) & 12 BARG(PLASTIC DN50). ALL METAL VALVES ARE TO 24 BARG. DO NOT EXCEED THIS PRESSURE UNDER ANY CIRCUMSTANCES. DO NOT USE BELOW 0 DEGREES CENTIGRADE.**

The valves operate on the spring loaded diaphragm principle with the load on the diaphragm being varied by means of a screw adjuster. The adjusting screw is accessed by removing the bonnet cap on standard valves. On valves equipped with manual override, security locks, or electric contacts then these must be removed first - see the relevant section of these instructions. All adjustments should be made using a broad bladed driver to avoid damage to the adjuster screw - suitable adjuster tools are available from PROCHEM. As a safety precaution, when fully adjusted to its lower stop the adjusting screw will not block off the valve.



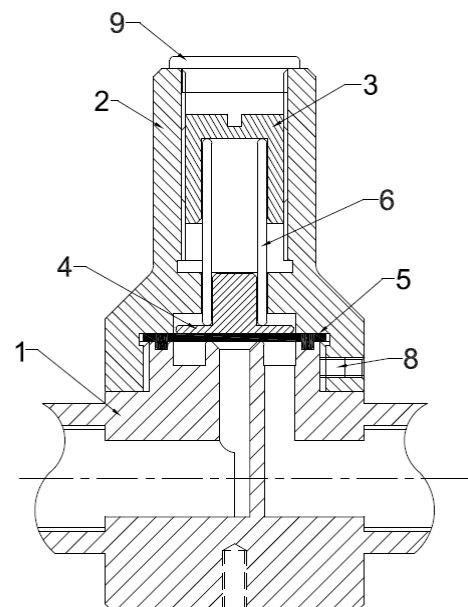
## INSTALLATION

The 1100 series valves are designed for direct mounting in the pipeline via a choice of socket weld, screwed, union, or flanged connections. The valves can be mounted in any position although totally inverted mounting is least recommended due to the possibility of air or gas pockets forming in the pipework above the valve and causing erratic operation. If the valves need to be mounted WITH THE PIPELINE AXIS VERTICAL **on lime** or **slurry duties** where settling out will occur then the LP inlet port should always be arranged at the bottom.

**The lines to the valves should be flushed clear of any construction debris prior to installation as particles of swarf or grit could damage the valve diaphragm if allowed to become trapped between it and the seat. This is especially true in the case of valves fitted with PTFE coated diaphragms. If debris is anticipated during normal operation then a strainer should be installed upstream.**

## DISASSEMBLY

Remove bonnet cap (9) and unscrew adjuster (3) to remove spring (6). Release bonnet locking grub screw (8) by a few turns. The bonnet (2) can now be unscrewed anti-clockwise and removed. The diaphragm (5) can now be removed by pushing on the pressure pad (4) from the spring side. Note: the diaphragm and integral 'O' ring seal are a single item.



## RE-ASSEMBLY

Replace pressure pad (4) in recess of bonnet (2) and carefully ease the diaphragm (5) into the threaded area pinching it so as to place the majority of it well into the locating recess of the bonnet. Using a small blunt pointed instrument carefully ease the diaphragm fully into the recess. The diaphragm should feel snug but not tight and all edges should be seated into the recess. Thread the bonnet back onto the body after ensuring that no debris remains in the body or bonnet. The bonnet can be tightened up fully (there may still be a small gap between body and bonnet). Some resistance will be felt toward the end as the integral diaphragm 'O' ring is compressed. The bonnet locking screw (8) should now be screwed home to prevent bonnet rotation (this should not be over tightened). The spring (6) can now be inserted (after lightly lubricating with thin mineral or silicone oil) into the bonnet and the adjuster screw (3) turned home to the desired pressure setting. After setting the bonnet cap (9) should be replaced.

## MAINTENANCE

It is recommended that the valves be stripped and checked for wear or damage once a year and the diaphragms replaced at least once every two years along with the springs.

## RECOMMENDED SPARES (PER VALVE)

### 2 Years operation

- 2 - DIAPHRAGMS.
- 1 - LOADING SPRING.
- 1 - ADJUSTER SCREW.
- 1 - PRESSURE PAD.

### Commissioning

- 1 - DIAPHRAGM



*\*It is also considered good practice to have at least one spare diaphragm on stock for emergency replacement.\**

## O & M INSTRUCTIONS FOR OPTIONAL FEATURES

### SECURITY LOCK

With this option a mechanical locking bar is fitted to prevent unauthorised adjustment of the valve setting pressure. The locking bar passes through a slot in the top of the bonnet and is secured with a small padlock. Adjustment of the valve setting pressure can only be achieved by unlocking the bar, sliding it out, and removing the bonnet cap. On larger valves a plastic blanking disc may be fitted and this also has to be removed.



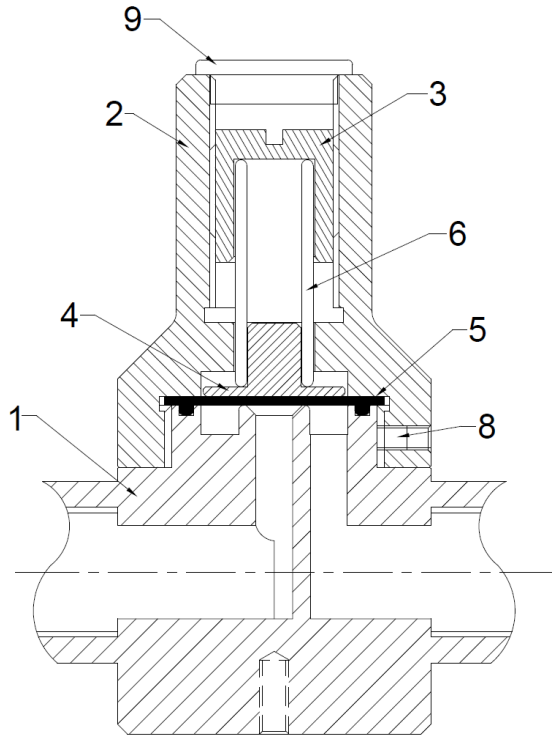
### MANUAL OVERRIDE

This option allows operators to override the valve setting pressure for line flushing or during maintenance or commissioning. The diaphragm pressure pad is lifted by means of a connecting rod passing through the bonnet cap and adjuster screw and actuated by an over-centre toggle lever. To operate, the toggle is lifted to the vertical position where it will remain until lowered thus clearly indicating that override is in operation. Note that the lever only lifts the pressure pad and not the diaphragm so the natural stiffness of the diaphragm will still produce a slight back pressure. To adjust the valve the toggle lever should be

unscrewed to withdraw the complete connecting rod assembly. (Normally the thread in the toggle lever is secured with Loctite to facilitate removal.) The bonnet cap can now be unscrewed to reveal the adjuster screw. Reverse the procedure for re-assembly.

### MANUAL OVERRIDE WITH SECURITY LOCK

In this option the connecting rod assembly passes right through the locking bar and the connecting rod must be removed before the locking bar can be withdrawn for adjustment purposes.



ACTUAL PIPELINE CONNECTIONS OMITTED FOR CLARITY

ITEM	DESCRIPTION	MATERIAL	
1	BODY ASSEMBLY	AS ORDERED	
2	BONNET	PVC	
3	ADJUSTER SCREW	PVC	*
4	PRESSURE PAD	STEEL	*
5	DIAPHRAGM	AS ORDERED	*
6	LOADING SPRING	STEEL	*
7			
8	BONNET LOCK SCREW	316 ST/STEEL	
9	CAP	POLYPROPYLENE	

\* RECOMMENDED SPARES

<b>PROCHEM SERVICES LTD</b>	
CONGLETON, CHESHIRE, CW12 2AD, ENGLAND	
DRAWING No. PS/92/243	REV 2
SUBJECT	
1100 SECTION & PARTS LIST	

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## PRESSURE SWITCH OPTION

This option enables a signal to be initiated in the event of the valve set pressure being reached or approached during operation. The switching action is operated through a separate diaphragm seal connected hydraulically to the valve inlet port. The seal isolates the pressure switch from the pumped fluid whilst allowing it to accurately monitor the line pressure via a sensor chamber fluid. See Drg. PS/94/302.

## INSTALLATION

The pressure switch option can be used with any fluid compatible with the diaphragm and valve body material. It is not recommended that this system be used with fluids that tend to settle out (such as lime slurry) as solids will tend to settle in the upper diaphragm chamber and eventually inhibit the operation of the diaphragm seal. In these cases the alternative mechanically activated alarm system which senses diaphragm movement should be used.



## DISASSEMBLY

**If the diaphragm seal is suspected of being damaged this may allow pumped fluid into the chamber and care should be exercised during disassembly.**

First undo the filling screw (3). The lower diaphragm seal chamber (1) is now released by removal of clamp screws (7). This allows the chamber to drop away and release the diaphragm (2) and any seal fluid. The pressure switch (4) is now readily unscrewed. The diaphragm and o-ring seals should be inspected for damaged and replaced as required.

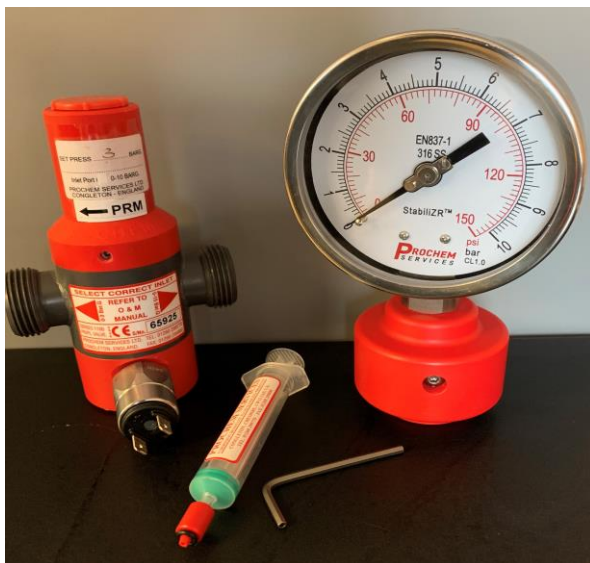
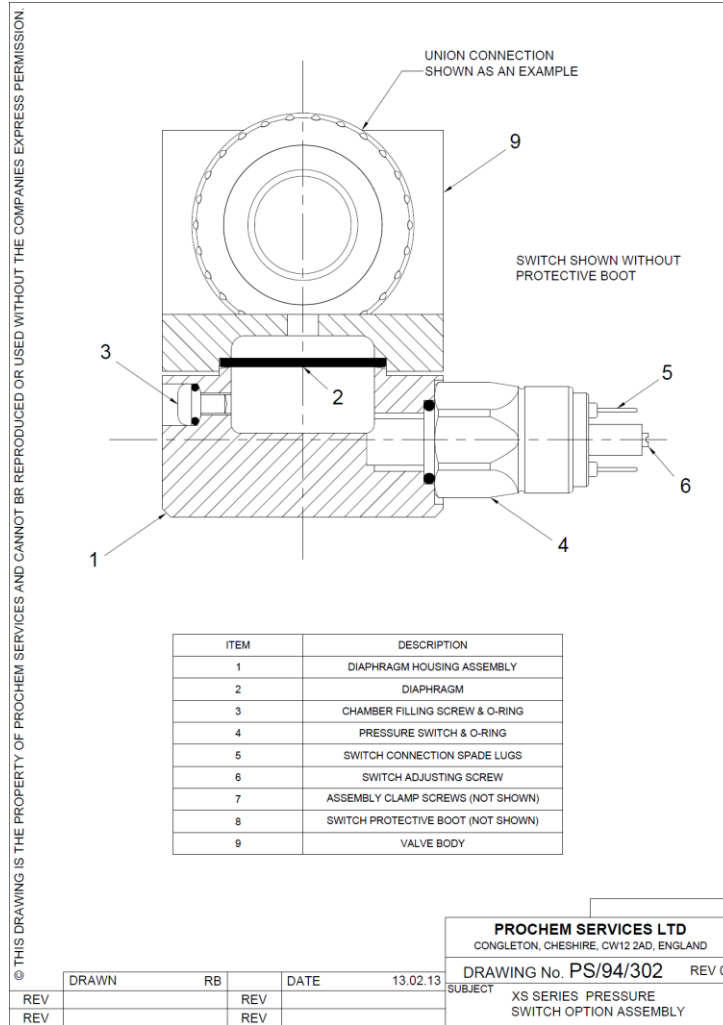
## RE-ASSEMBLY

It is essential that the complete diaphragm/ switch chamber is solidly filled with water or silicone oil for the switch to operate correctly. This is achieved as follows. Fit the diaphragm into its recess, insert the spigot into the valve body recess, and screw home the assembly clamp screws in a diametric order. **Do not over tighten the clamp screws.** With the pressure switch separate from the chamber carefully fill the switch sensing port with water or silicone oil using a fine syringe ensuring that no air bubbles are trapped in the switch body. Holding the valve so that the housing filling screw is uppermost, carefully screw into place the pressure switch with its o-ring seal. Hold vertically to prevent losing the liquid, **do not over tighten.** Fill the diaphragm chamber with water or silicone oil using the syringe making sure to eliminate any air pockets until the liquid level reaches up to the filling screw hole. Slowly screw home the filling screw with the o-ring allowing surplus seal liquid to escape past the screw. **The filling screw should not be over tightened.**

## SWITCH SETTING

Unscrew the adjuster screw (6) anti-clockwise and set the valve at the desired set pressure in the normal manner. Vent the valve at its pre-set pressure and adjust the pressure switch until it is seen to operate. The actual point of operation can be adjusted around the valve set point to suit site requirements.

**ENCLOSURE PROTECTION – IP54 (WITH BOOT FITTED)**  
**SWITCH RATING – 100 VA AT 42 VOLTS**  
**CONTACTS – NORMALLY OPEN / NORMALLY CLOSED (AS SPECIFIED)**



Syringe and Pin Hex allen key to assist bleeding gauge seals and switched 1100 series valves available from Prochem.  
Part number 'SYRINGE-BLEED-KIT'



1100 Series Valve Adjustment Tool available from Prochem.  
Part number 11780

## APPENDIX 1 – DUPLEX (DOUBLE HEADED) VALVES

This valve configuration is used to almost double the capacity of a standard 1100 Series valve. The valve is provided with two diaphragm/ seat areas and two independent loading spring assemblies. The duplex heads are arranged either side of the common main pipeline connections. In operation the duplex valves are exactly the same as the normal 'simplex' units. However certain minor variations in installation and setting up do have to be taken into account. See Drg. PS/96/493.



## INSTALLATION

The duplex valves can be mounted in most positions except that it is best not to mount with one of the bonnets on the underside of the pipework. This may cause problems with air or gas pockets developing leading to erratic operation. As with the standard 'simplex' valves, if they are mounted WITH THE PIPELINE AXIS VERTICAL on lime or slurry duties where settling out might occur then the LP inlet port should always be arranged at the bottom to prevent sediment build up.

## DISASSEMBLY & RE-ASSEMBLY

These operations are identical to the stripping and re-assembly of standard valves except that two pressure heads are involved. See Drg. PS/92/243 with standard O&M instructions.

## ADJUSTMENT

The duplex valves require special attention regarding pressure setting adjustment. As the valves have two diaphragms then one has to be 'gagged' whilst the other is adjusted. Remove the bonnet cap (8), and the blanking screw (9) in the centre of one of the adjuster screws (3). Screw in its place either a M8 or M10 (depending on valve size) threaded rod or bolt so that it contacts the pressure pad and 'gags' this side of the valve preventing the diaphragm from lifting. The other side of the valve can now be accurately set. When this is done the 'set' side of the valve is 'gagged' in the same way and the remaining side of the valve is set. When both sides of the valve are set replace the blanking screws (9) and the bonnet caps (8). The valve is now ready to use.

## OPTIONAL FEATURES

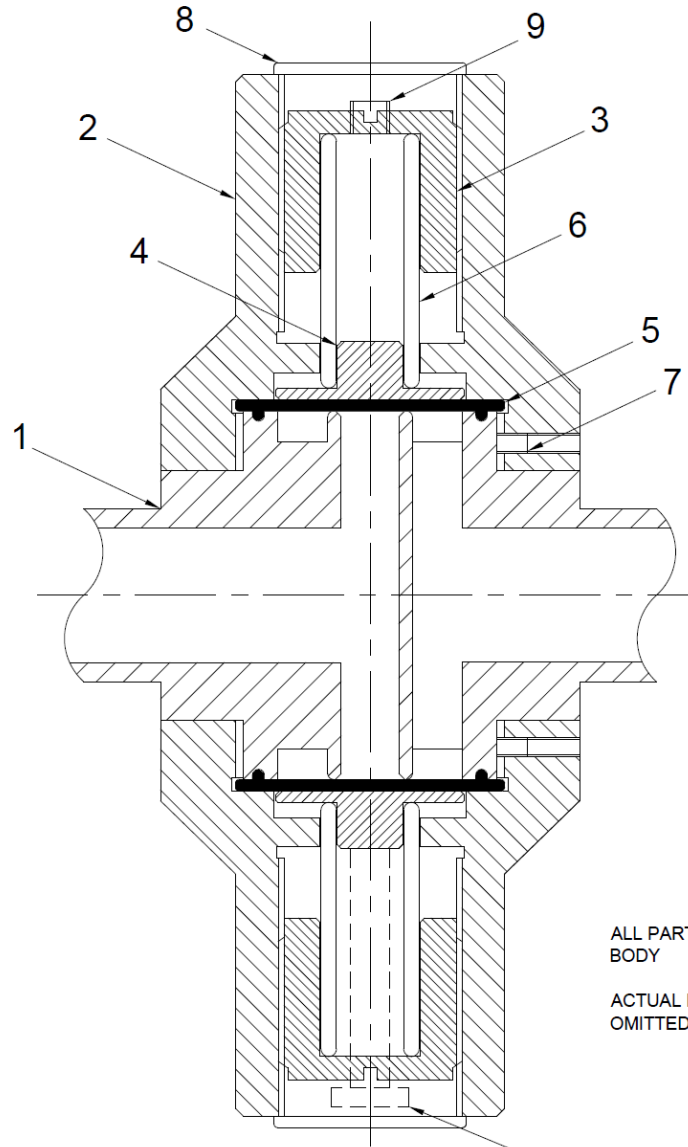
In view of the special configuration the full range of optional features is not available on the Duplex valves. The options which are available are as follows;



**SECURITY LOCK  
MANUAL OVERRIDE  
MANUAL OVERRIDE & SECURITY LOCK**



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ALL PARTS ARE DUPLICATED EXCEPT BODY

ACTUAL PIPELINE CONNECTIONS ARE OMITTED FOR CLARITY

GAGGING BOLT IN PLACE

ITEM	DESCRIPTION	MATERIAL
1	BODY ASSEMBLY	AS ORDERED
2	BONNET	PVC
3	ADJUSTER SCREW	PVC
4	PRESSURE PAD	STEEL
5	DIAPHRAGM	AS ORDERED
6	LOADING SPRING	STEEL
7	BONNET LOCK SCREW	A2 S/STL
8	CAP	POLYPROP
9	BLANKING SCREW	STEEL

\* RECOMMENDED SPARES

**PROCHEM SERVICES LTD**  
CONGLETON, CHESHIRE, CW12 2AD, ENGLAND

DRAWING No. **PS/96/493** REV 0

SUBJECT 1100 DUPLEX VALVE XS & PARTS LIST

DRAWN	RB	DATE	13.02.13
REV		REV	
REV		REV	