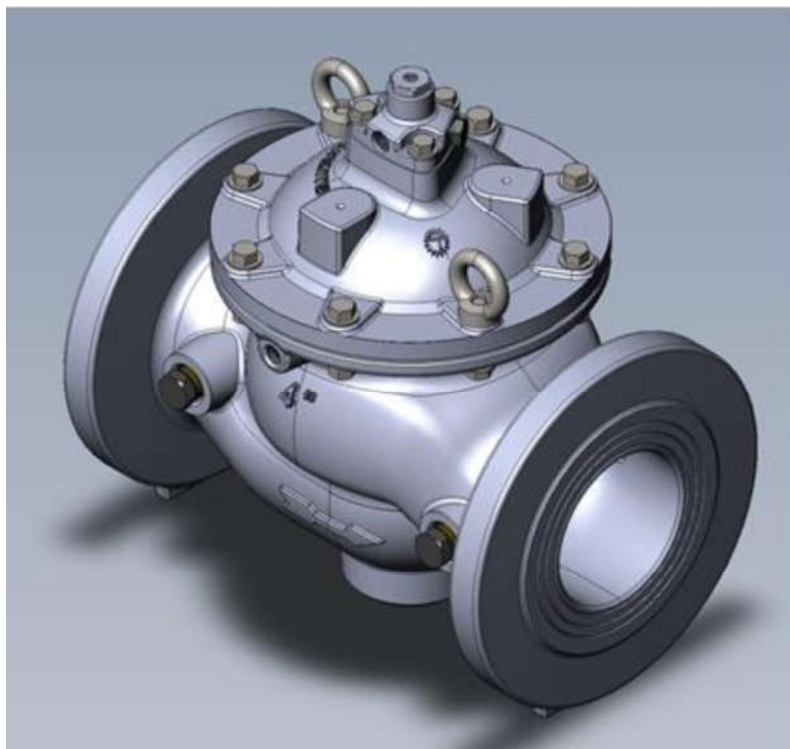




Flow Control Ltd - S300 Pressure Reducing Valves Technical Introduction information Pack

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Introduction to Flow Control Ltd

Flow Control, the company are currently working in Africa, Middle East, India, Europe and the UK. As a company we are slightly different than your usual manufacturer because we are also a design consultant, which gives us an edge over other companies in our field as we have a unique design system that has been in operation for nearly 20 years and we fully understand how our products react in certain situations.

Flow Control has a full range of products that are designed and manufactured to the highest specifications to calm and harmonise the water and waste water trunk mains & distribution system. With our advanced knowledge of transient, water hammer and column separation issues, we can implement the right product to deal with all the problems faced by the utilities today and that of the future.

With our autonomous hydraulic network modelling capabilities, we design networks to harmonise and stabilise pressures and flow that reduces leakage, burst frequencies and water quality issues like discolouration and bacteria contamination using real time monitoring equipment to prevent poor water quality issues from reaching the end user, giving full security of supply.

Flow Control's range of bespoke products and solutions that work in conjunction with the ICC (Intelligent Control Centre) and RCC (Regional Control Centre) requirements of network control, providing full autonomous control over all Transmission mains, DMZ's and DMA's, which can also be manually operated if required at any time.

As with our solutions listed below we can also reduce customer complaints, carbon emissions and extend the asset life of pipeline products and valves.

- Network Management and Hydraulic Design Modelling
- Pressure and Leakage Control
- Calm Network Solutions
- Network Security
- Surge and Water Hammer prevention
- Transient Solutions
- Full Network Autonomous Control
- PLC and SCADA Control Advances
- Power Generation solutions
- Air Valve Design and Modelling
- Water Quality Network Solutions
- Leak detection equipment



Flow Control Ltd – Main Contacts

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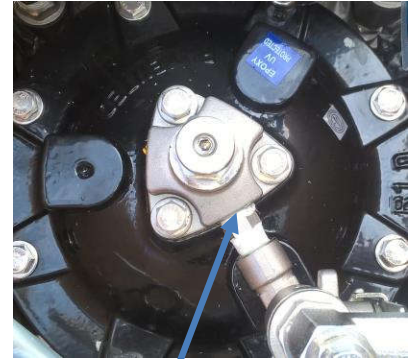
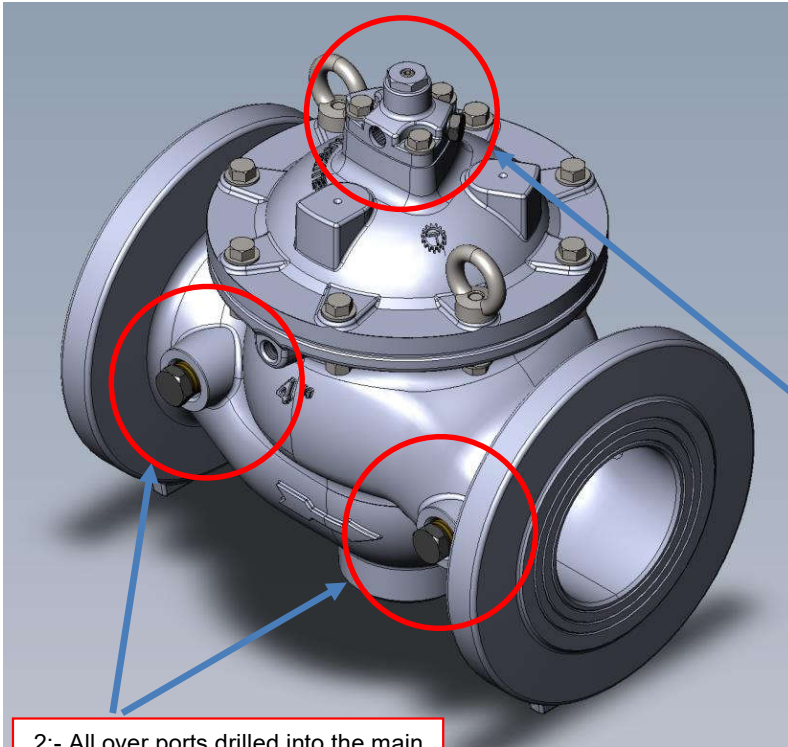
Skype video communication:- [craig.stanners1](https://www.skype.com/people/craig.stanners1)

24 Hour and 7 Days a week stocking holding

**Flow Control Company Ltd
Cooper Drive
Springwood Industrial Estate
Braintree
Essex
CM7 2RF**

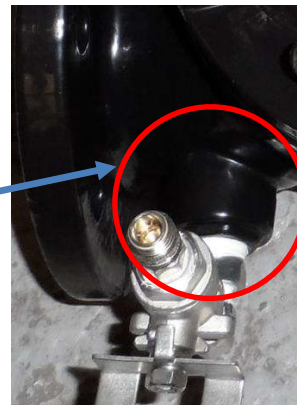
Flow Control 2016 S300 valve design key features.

All valves supplied with a 5 year warranty.



1:- New 316SST control space connection port. Removing the need for any ports to be drilled into the ductile iron bonnet. This now removes any PRV failures due to rust within the main valves control chamber.

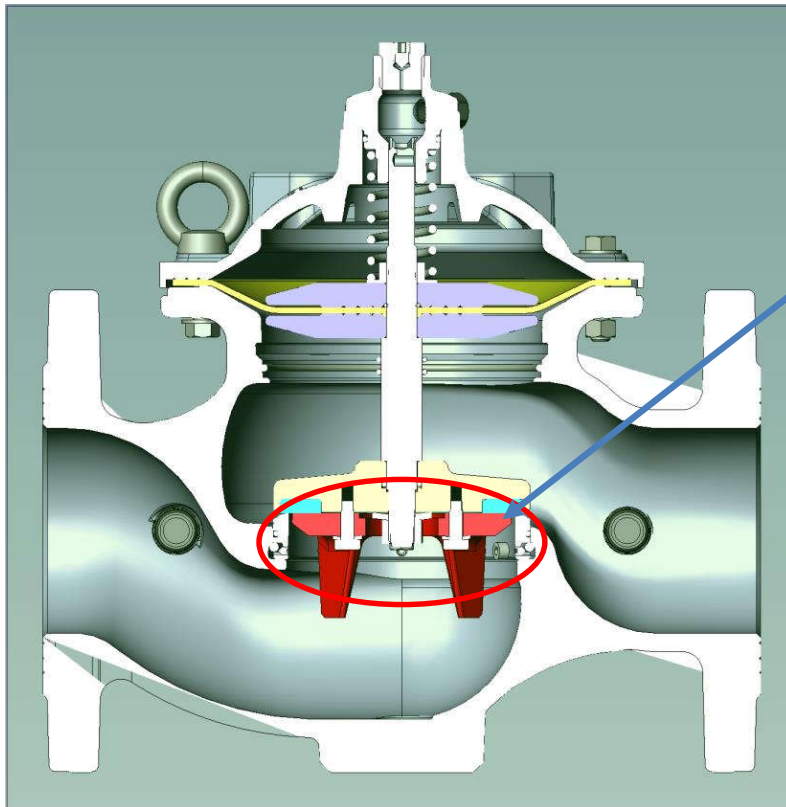
2:- All over ports drilled into the main valve body have stainless steel port inserts and are fully epoxy coated to prevent main valve body port corrosion.



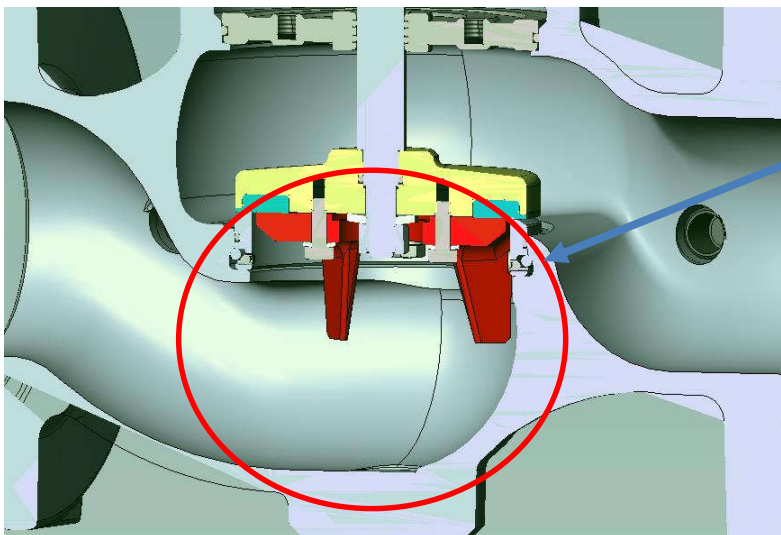
3:- All PRV pilots, piping and fittings, nuts, bolts washers etc are made from 316 Stainless Steel to prevent any corrosion.
- All pilot springs are also made from stainless steel.



Speed of control.



4:- Stainless Steel main valve seat and plug to provide added protection from any wear and tear. Due to short periods of cavitation or high flow velocities.



5:- The main valves lower guidance has no central spindle so that in the event debris builds up within the bowl of the inlet of the PRV this will **NOT** prevent the valve from closing.



6:- All valves as standard are supplied with Rectus 21 pressure tapping points for pressure loggers and controllers.

Production-Standard:

Basic Valves: S-300 valves (models 30, 31 and 32)			
Size	40-150mm (80-200mm for mod. 32)	200-500mm (250-600mm for mod. 32)	600-800mm
Body & Cover:	D.I. with SST inserts	D.I. with SST inserts	D.I. with SST inserts
	FBE Zink enriched epoxy 150 mic coated RAL-9005 (optional RAL-5010)		
Flange std.	ISO PN16 \ ISO PN25	ISO PN16 \ ISO PN25	ISO PN16 \ ISO PN25
Internals - Plug & discs	SST 304	Coated steel	Coated D.I.
Internals - Seat & shaft	SST 304	SST 304	SST 304
Internals - Bottom guide vanes	SST 304	SST 304	SST 304
Internal bolts	SST 304	SST 304	SST 304
Top guide (external)	SST 316	SST 316 (up to 300mm & Bronze LG2 300mm +)	Bronze LG2
Indicator rod	N\A, Optional: SST 316	N\A, Optional: SST 316	N\A, Optional: SST 316
Bolts & nuts	SST 316	SST 316	SST 316
Lifting rings	SST 316	SST 316	SST 316
I.D tag	Aluminum	Aluminum	Aluminum

Pilot system			
Size	40-150mm (80-200mm for mod. 32)	200-500mm (250-600mm for mod. 32)	600-800mm
Fittings and control devices	SST 316	SST 316	SST 316
Tubing	SST 316	SST 316	SST 316
PR Pilot valve model	68410 (SST 316)	CXPR (SST 316 up to 300mm) (ad. 68710 for valves 400mm and larger)	CXPR (316SST) + 68710
PS Pilot valve model	68500	CXPS (316SST) (ad. 66310 for valves 400mm and larger)	CXPS (316SST) + 66310
Pilot assembly	Mounted on SST316 Piping	Mounted on SST316 Piping	Mounted on SST316 Piping
Std. setting	4 bar	4 bar	4 bar (second pilot set to close at 4.7 bar)
Pressure gauges	One - 2" PN16 gauges, on pilot valve. Gauges facing up.	One - 2" PN16 gauges, on pilot valve. Gauges facing up.	One - 2" PN16 gauges, on pilot valve. Gauges facing up.
Pressure test points	Two 316SST ball valves, back side of valve with Ni coated brass pressure tapping points	Two 316SST ball valves, back side of valve with Ni coated brass pressure tapping points	Two 316SST ball valves, back side of valve with Ni coated brass pressure tapping points
Control filter	Self-flushing (inline) 1/4" for 40-65mm and 1/2" for 80-150mm & 316SST Y-body backup filter	Self-flushing (inline) 1/2" & 316SST Y-body backup filter	Self-flushing (inline) 1" & 316SST Y-body backup filter
Ad. Devices	316SST Needle valve on control chamber	316SST Needle valve on control chamber	316SST Needle valve on control chamber
Other pilot valves be made of Brass, unless otherwise specified			

General Weights and Dimensions

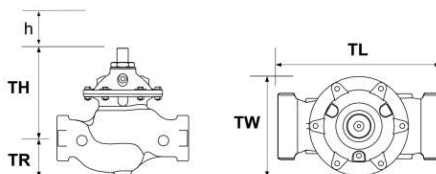
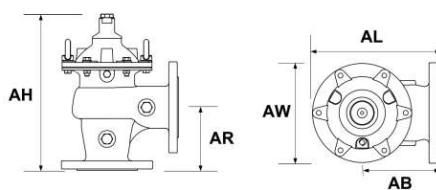
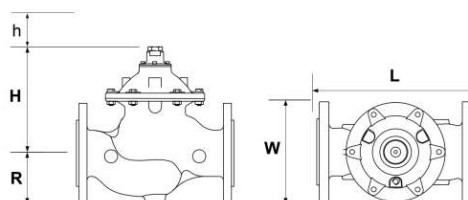
Models 30 (16 bar rated valves) / 31 (25 bar rated valves)

Globe Flanged Type

Valve Size	40 (1½")		50 (2")		65 (2½")		80 (3")		100 (4")		150 (6")	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
L	230	9 1/16	230	9 1/16	292	12 1/2	310	12 3/16	350	13 3/4	480	18 7/8
H	185	7 5/16	185	7 5/16	185	7 5/16	230	9 1/16	240	9 7/16	330	13
h***	140	5 1/2	140	5 1/2	140	5 1/2	170	6 1/16	180	7	230	9
W	153	6	170	6 1/16	170	6 1/16	200	7 7/8	235	9 1/4	330	13
R	82.5	3 1/4	82.5	3 1/4	92.5	3 5/8	100	3 15/16	110	4 5/16	142.5	5 5/8
Weight Kg/lbs*	12 / 26		12 / 26		13 / 29		22 / 49		37 / 82		80 / 176	
Vol.control chamber lit/gal**	0.1 / 0.03		0.1 / 0.03		0.1 / 0.03		0.3 / 0.08		0.7 / 0.18		1.5 / 0.4	

Valve Size	200 (8")		250 (10")		300 (12")		350 (14")		400 (16")	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
L	600	23 1/16	730	28 3/4	850	33 7/16	980	38 9/16	1100	43 5/16
H	390	15 5/8	520	20 1/2	635	25	635	25	855	33 5/8
h***	300	11 13/16	390	15 1/4	450	17 11/16	450	17 11/16	590	23 1/4
W	415	16 5/16	525	20 11/16	610	24	610	24	850	33 1/16
R	172.5	6 3/4	205	8 1/16	230	9	272	10 11/16	290	11 7/16
Weight Kg/lbs*	157 / 346		245 / 540		405 / 893		510 / 1124		822 / 1812	
Vol.control chamber lit/gal**	4.3 / 1.14		9.7 / 2.56		18.6 / 4.91		18.6 / 4.91		50 / 13.21	

Valve Size	450 (18")		500 (20")		600 (24")		700 (28")		800 (32")	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
L	1200	47 1/4	1250	49 3/16	1450	57 1/16	1650	64 15/16	1850	72 7/8
H	855	33 5/8	855	33 5/8	1574	61 15/16	1675	65 15/16	1675	65 15/16
h***	600	23 5/8	600	23 5/8	740	29 1/8	860	33 3/8	860	33 3/8
W	850	33 7/16	850	33 7/16	1100	43 3/16	1100	43 3/16	1100	43 3/16
R	310	12 3/16	357.5	14 1/16	490	19 9/16	498	19 9/16	603	23 3/8
Weight Kg/lbs*	945 / 2083		980 / 2160		1950 / 4299		2070 / 4564		2600 / 5732	
Vol.control chamber lit/gal**	50 / 13.21		50 / 13.21		84 / 22.19		84 / 22.19		84 / 22.19	



Angle Type

Valve Size	50 (2")		80 (3")		100 (4")		150 (6")		200 (8")		250 (10")	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
AL	208	8 3/16	250	9 13/16	295	11 1/16	405	16	505	19 7/8	585	23
AH	240	9 7/16	415	16 5/16	445	17 1/2	570	22 1/16	635	25	832	32 3/4
AW	170	6 11/16	200	7 7/8	235	9 1/4	330	13	415	16 5/16	495	19 1/2
AR	107	4 3/16	138	5 7/16	147	5 13/16	180	7 1/16	302	11 7/8	338	13 5/16
AB	125	4 15/16	150	5 7/8	173	6 13/16	240	9 7/16	300	11 13/16	338	13 5/16
Weight kg/lbs*	12 / 26		20 / 44		37 / 81		76 / 167		150 / 330		515 / 234	

* Approximate shipping Weight (PN 25) ** US Gallons *** h = Minimal required maintenance space

Globe Threaded Type

Valve Size	40 (1½") TH		50 (2") TH	
	mm	inch	mm	inch
TL	215	8 7/16	215	8 7/16
TH	185	7 5/16	185	7 5/16
h	140	5 1/2	140	5 1/2
TW	129	5	129	5
TR	62	2 5/8	62	2 5/8
Weight kg/lbs*	7 / 15		7 / 15	

End Connections (for PN16 or PN25)
ISO 2084, 2441, 5752 ANSI B16, AS2129, JIS B22

Model 32 (25 bar rated valves)

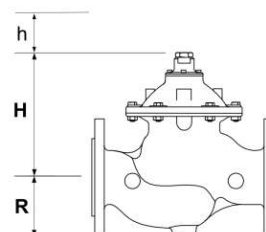
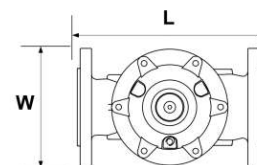
Globe Flanged Type

Valve Size	80 (3")		100 (4")		150 (6")		200 (8")		250 (10")	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
L	310	12 3/16	350	13 3/4	480	18 7/8	600	23 5/8	730	28 3/4
H	185	7 1/4	232	9 3/16	250	10	334	13 1/8	395	15 1/2
h***	107	4 1/4	156	6 1/8	170	6 3/4	220	8 11/16	275	10 13/16
W	200	7 7/8	235	9 1/4	300	11 3/4	360	14 3/16	425	16 3/4
R	100	3 15/16	120	4 11/16	150	5 7/8	182	6 3/16	215	8 7/16
Weight Kg/lbs*	15 / 33		27 / 60		51 / 112		92 / 203		171 / 377	
Vol.control chamber lit/gal**	0.1 / 0.03		0.3 / 0.08		0.7 / 0.18		1.5 / 0.4		4.3 / 1.14	

Valve Size	300 (12")		350 (14")		400 (16")		450 (18")		500 (20")		600 (24")	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
L	850	33 7/16	980	38 9/16	1100	43 3/16	1200	47 1/4	1250	49 3/16	1259	49 9/16
H	545	21 1/2	635	25	635	25	855	33 5/8	855	33 5/8	1311	51 5/8
h***	400	15 3/4	480	18 7/8	480	18 7/8	600	23 5/8	600	23 5/8	245	9 5/8
W	489	19 1/4	610	24	628	24 3/4	850	33 1/16	850	33 1/16	881	34 11/16
R	245	9 5/8	260	10 3/16	314	12 3/8	310	12 3/16	357.5	14 1/16	459	18 1/16
Weight Kg/lbs*	330 / 726		510 / 1124		544 / 1199		945 / 2083		980 / 2160		1030 / 2271	
Vol.control chamber lit/gal**	9.7 / 2.56		18.6 / 4.91		18.6 / 4.91		50 / 13.21		50 / 13.21		50 / 13.21	

* Approximate shipping Weight (PN 25) ** US Gallons *** h = Minimal required maintenance space

End Connections (for PN16 or PN25)
ISO 2084, 2441, 5752 ANSI B16, AS2129, JIS B22.



General Valve Sizing Selection Tables

Basic Model 30 & 31 - Size Selection Table

Valve Size		40 (1½")	50 (2")	65 (2½")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")	350 (14")	400 (16")	450 (18")	500 (20")	600 (24")	700 (28")	800 (32")
Max. recommended flow rate for continuous operation (m³/h)		25	40	40	90	160	350	620	970	1400	1900	2500	3100	3600	5600	7600	8135
Max. recommended flow rate for continuous operation (Gpm)		110	180	180	400	700	1600	2800	4300	6200	8400	11000	13660	15800	24700	33500	35840
Min. recommended flow rate		<1m³/h (<5 gpm)															
Globe Type																	
Flow Rate Factor:	Kv (Metric)	43	43	43	103	167	350	676	1160	1600	1600	3000	3150	3300	6000	6000	6000
	Cv (US)	50	50	50	120	194	406	786	1349	1860	1860	3488	3663	3837	6977	6977	6977
Head Loss Factor K (dimensionless)		2.2	5.4	15.4	6.7	5.6	4.8	5.5	4.5	5	9	3.8	6	5.9	4.2	7.8	13.4
Angle Type																	
Flow Rate Factor:	Kv (Metric)	60	60		140	190	460	770	1310	For head Loss of fully open valves use the following equations: $H \text{ (Bar)} = \left(\frac{Q \text{ [m³/h]}}{K_v} \right)^2 \quad \quad H \text{ (Psi)} = \left(\frac{Q \text{ [gpm]}}{C_v} \right)^2 \quad \quad H = K \frac{V^2}{2g}$							
	Cv (US)	70	70		164	222	535	895	1523								
Head Loss Factor K (dimensionless)		1.3	2.8		3.3	4.3	4.3	4.2	3.6								

Basic Model 32 - Size Selection Table

Valve Size	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")	350 (14")	400 (16")	450 (18")	500 (20")	600 (24")
Max. recommended flow rate for continuous operation (m³/h)	60	145	225	510	750	1200	1900	2030	3100	3600	3600
Max. recommended flow rate for continuous operation (Gpm)	265	640	990	2250	3990	6200	8400	8940	13660	15860	15860
Min. recommended flow rate	>1 m³/h (>5 GPM)										
Flow rate factor	Kv	43	115	165	345	663	1160	1600	1600	3000	3000
	Cv	50	134	192	401	771	1350	1860	1860	3488	3488

Flow Control's – General Sizing Program Guide

(Excel Spreadsheet - Page 1 "Data entre")



Flow Control Ltd
PRV Sizing Tool
PROJECT INFO AND KEY DATA

PROJECT DATA

Project Name	2-way PRV Demo
Location	Demo 1
Date	17/02/2016
Comments & Notes	2 way PRV sizing example

SYSTEM DATA (user entry)

Maximal Flow [lit/sec]	40
Inlet Pressure at that flow [mwc]	50
Normal (high) flow [lit/sec]	25
Inlet Pressure at that flow [mwc]	55
Minimal flow [lit/sec]	0.1
Inlet Pressure at that flow [mwc]	65
Pipe diameter [mm]	150
Required Outlet Pressure [wmc]	35

PIPE VELOCITY (M/S)

At Max Flow	2.3
At Normal Flow	1.4
At Min Flow	0.0

Enter Project Information

Enter Network flow rates (in l/sec)

From the information entered the networks pipeline velocity are provided here. (in meters/sec)

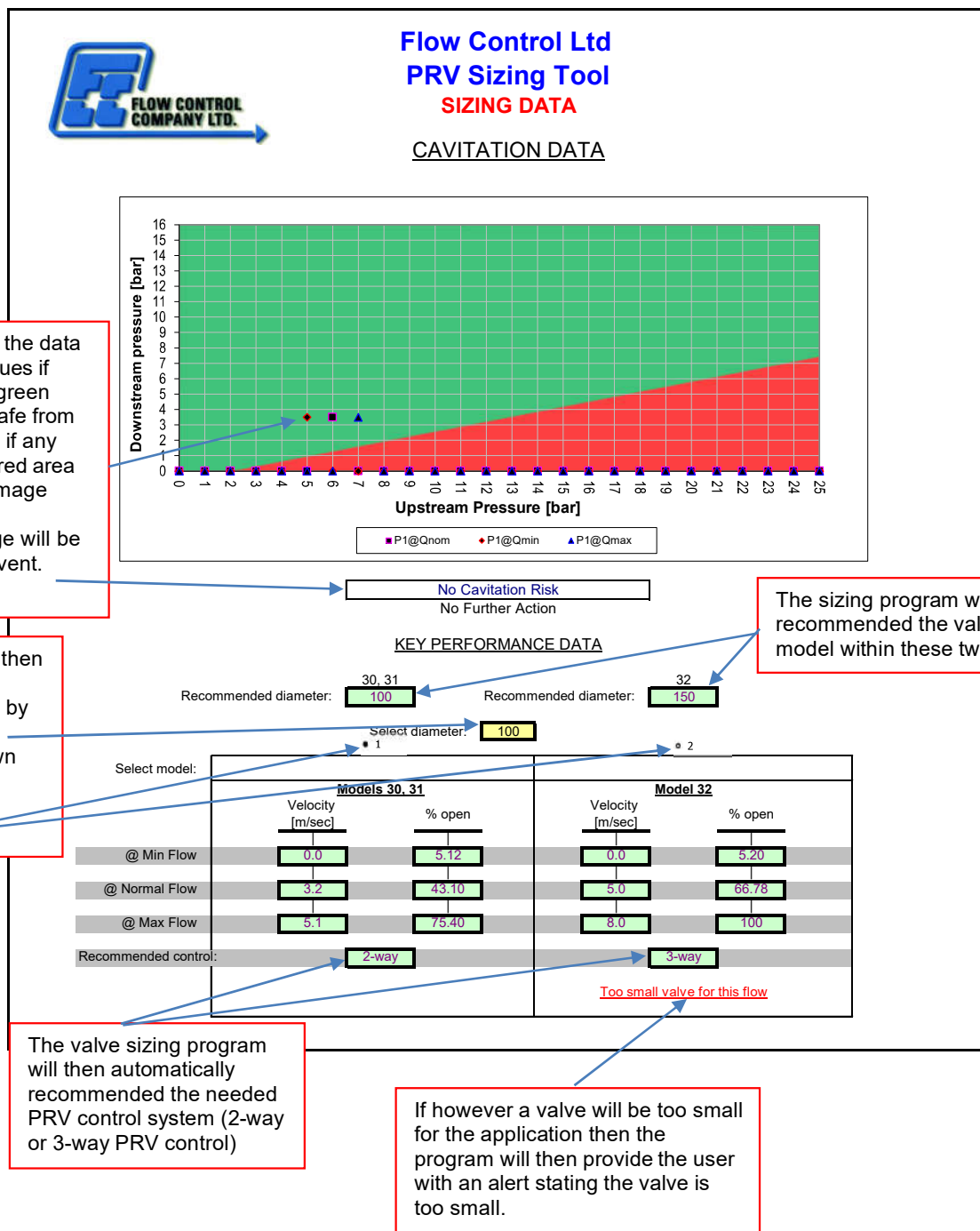
Enter network pipe diameter. (From dropdown menu)

Enter PRV required outlet pressure. (in meters)

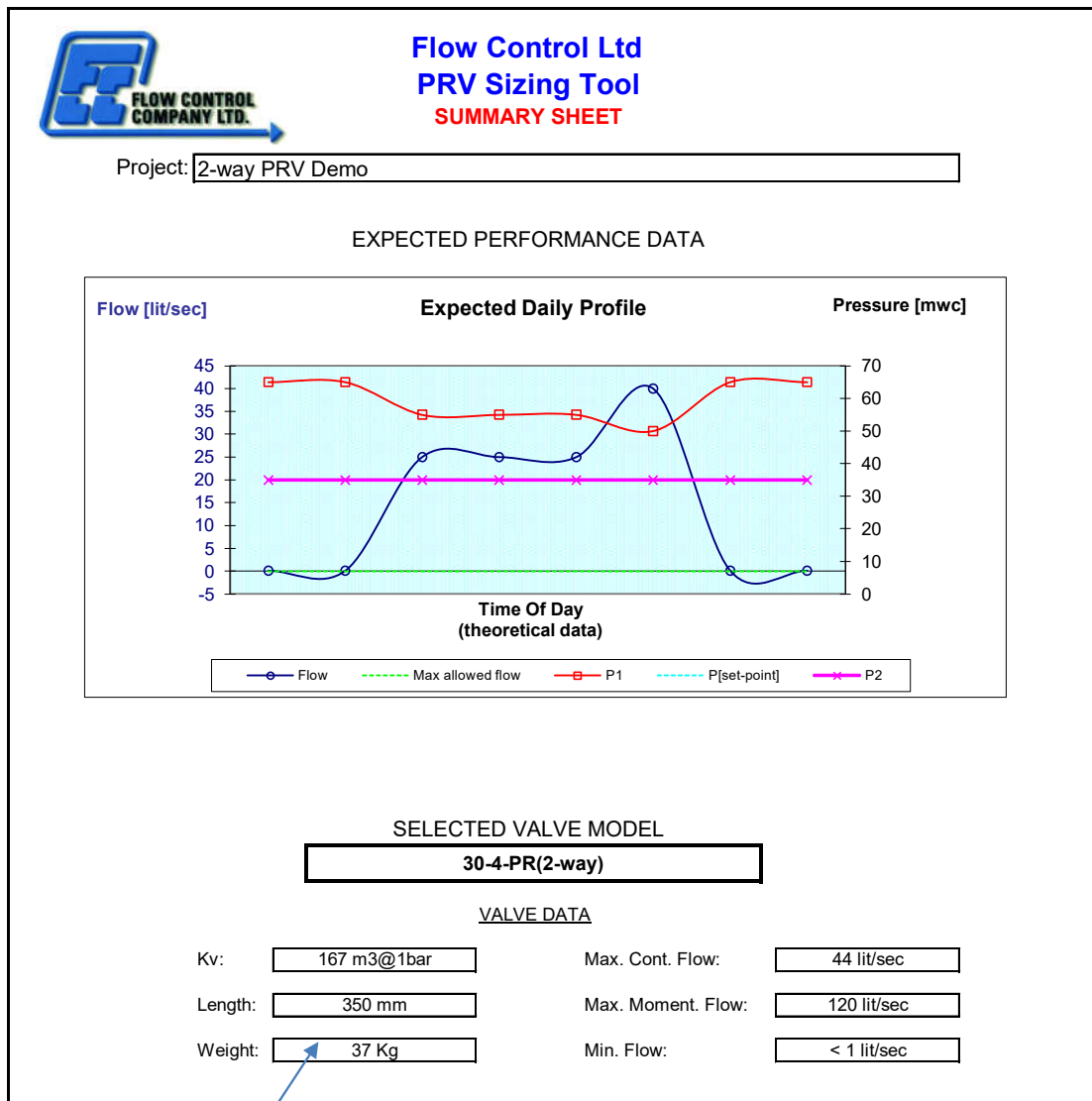
Enter PRV inlet pressures at each network flow rate. (in meters)

If any information entered is believed to be wrong an error message will be provided within this section of the program. (For example your required outlet pressure is higher than your minimum inlet pressure.)

(Excel Spreadsheet - Page 2 "Valve selection")



(Excel Spreadsheet - Page 3 "Summary Sheet")



Basic valve specifications are then provided including weights and length of valve (flange to flange).

How to Order

Once the PRV size has been selected the valve can be ordered following the below guide.

For example:- 30-ISO16-4-PR68(2W)

100mm PN16 2-way PRV with an outlet pressure adjustment range of 1 to 11Bar

1:- Firstly, valve model type:-

30 – PN16 or PN10 flanged and rated = Full Bore

31 – PN25 flanged and rated = Full Bore

32 – PN16 or PN25 flanged and rated = Reduced Bore

2:- Then, the Flange Standard needed:-

ISO10 = PN10 flanged and rated

ISO16 = PN16 flanged and rated

ISO25 = PN25 flanged and rated

3:- Then, the size needed:-

2 = DN50mm

3 = DN80mm

4 = DN100mm

6 = DN150mm

8 = DN200mm

10 = DN250mm

12 = DN300mm

4:- Then, the type of PRV control needed:-

PR68(2W) = 2-way hydraulic control pilot system (40mm to 150mm valve sizes)

PRCX(2W) = 2-way hydraulic control pilot system (200mm to 300mm valve sizes)

Note! That the standard supplied PRV downstream pressure adjustment ranges for the PRV are as follows if other ranges are required these must be clearly stated on the order

- PR68(2W) has the green spring (1 to 11 Bar)

- PRCX(2W) has a standard spring (1.5 to 20Bar)

Other 2-way pilot system springs available:

- PR68(2W), Yellow spring 0.2 to 2 Bar or Red Spring 2 – 20Bar

- PRCX(2W), Low pressure spring 0.2 to 2 Bar

If a 3-way hydraulic control pilot system is required please contact our technical team and they will provide you with the full details of the valve and pilot requirements.

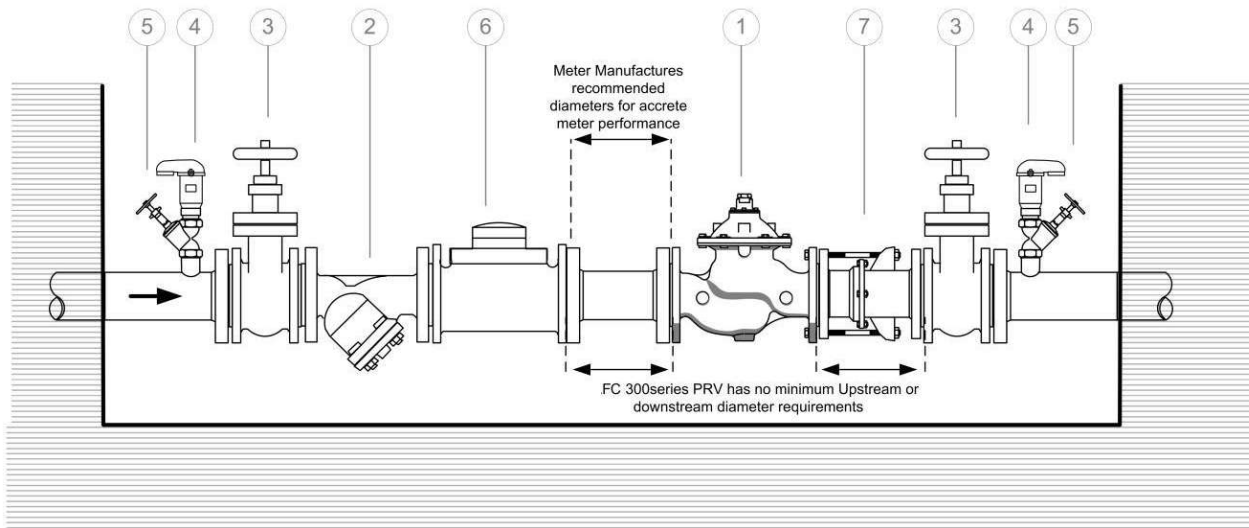
When placing the order please ensure that it includes:-

1:- Full delivery address.

2:- Site contact name.

3:- Site contact telephone number.

Good Practice installation guide



Main Parts:-

- | | |
|--|--|
| 1. FC - 300 Series (Globe Type) PRV | 4. Air Valve (option of FC combination air valve (to size 0.25 x Mains diameter) |
| 2. Main Line filter (optional) | 5. Service isolation valve (e.g. Ball, Gate Valve) |
| 3. Service isolation valve (e.g. Gate valve) | 6. Flow Meter |
| | 7. Adjustable connection |

Basic PRV Installation Layout

General commissioning manual.

Valve model:- 30[31]-4-PR(68-410)-316SST - (4" / 100mm)

FC 300series (Globe Type – Full Port) Hydraulic Pressure Reducing valve

1. Hydraulic Control Function

The Flow Control 300series Model "PRV" is an automatic, pilot controlled, pressure reducing control valve, activated by the pressure of the pipe line.

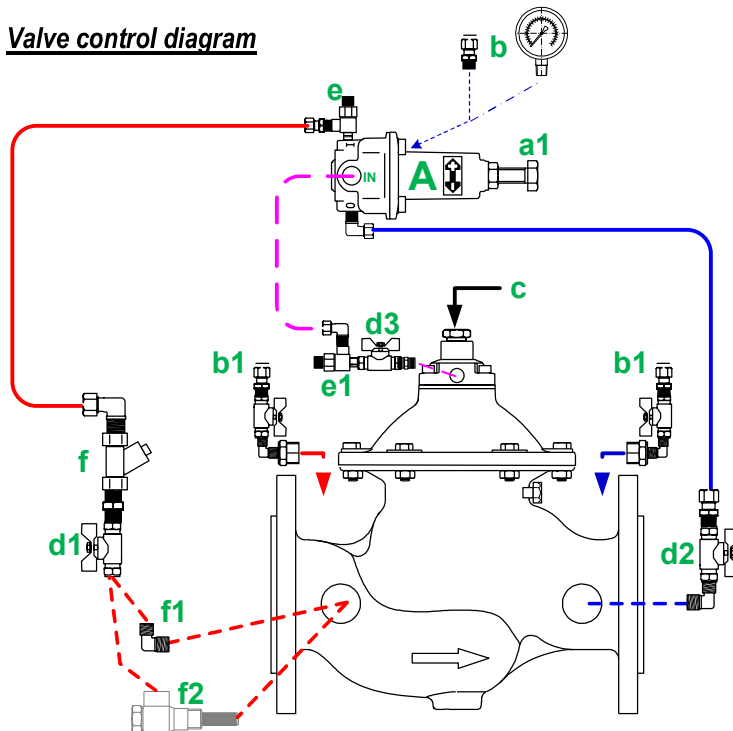
The valve will maintain a steady, predetermined pressure within the network, downstream of the valves location, regardless of fluctuations in the upstream pressure or flow rate.

- Should the downstream pressure exceed the required set-point pressure (due, for example; to a halt in pipeline flow), the valve will close drip tight.

2. Installation Instructions

- The valve can be installed in any position, but flow direction should match the engraved arrow on the body.
- Installing Main Line Isolating valves, both sides of the PR valve (is recommended).
- Flush pipeline, upstream of the valve, before the installation of the PR valve.

Valve control diagram



MAIN PARTS

- a. 68-410 316SST pressure reducing pilot valve.
- b. Pressure Tapping point (Standard Supplied) or Pressure Gauge (Optional).
- b1. Independent Inlet and Outlet Pressure Tapping Points
- c. 316SST Main valve control space air release point
- d1, d2 & d3. 316SST Pilot loop isolation ball valves.
- e & e.1 316SST Hydraulic speed of response needle valves.
- f. 316SST External Y-body back-up filter.
- f1. 1/2" Male x Male 316SST Elbow fitting (optional if requested on order placement).
- or
- f2. Internal self flushing filter (Standard Supplied)

Technical Introduction Pack

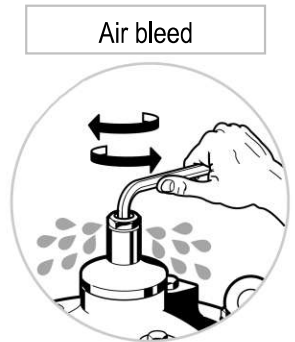
CONTROL VALVE	1. Model	30-4-ISO16-PR; 31-4-ISO25-PR -							
	2. Type	Globe, straight flow, diaphragm actuated disc type.							
	3. Description	An automatic, pilot controlled pressure reducing valve. The valve will maintain a steady, predetermined pressure in the network, downstream of its location. If the pressure falls below the set-pressure, the valve opens fully to minimize the losses.							
	4. Size	4" [100 mm]							
	5. Kv \ Cv	167 m3 @ 1 bar			195 gpm @ 1 psi				
	6. Length	350 mm			13.78"				
	7. Weight	37 Kg			82 Lb				
SERVICE CONDITIONS	8. Pressure Mod. 30	0.5 - 16 bar			7 - 230 psi				
	Pressure Mod. 31	0.5 - 25 bar			7 - 360 psi				
	9. Flow	Continuous:	0.5 - 160 m3/hr		2 - 700 gpm				
		Max. Intermittent:	235 m3/hr		1025 gpm				
		Max. Momentary:	435 m3/hr		1920 gpm				
10. Temp.	0 – 80° C			32 - 176° F					
11. Fluid type	Water			Environment:	No Data				
PARTS & MATERIALS	12. Main valve	Body&Cover:	Ductile Iron GGG50		Seat:	SST-304			
		Plug:	SST-304 (ASTM A 351 CF8)		Diaph. discs:	SST-304 (ASTM A 351 CF8)			
		Top Guide:	SST-316		Bot. Guide:	SST-304 (ASTM A 351 CF8)			
		Stem:	SST-304 (ASTM A 351 CF8)		Diaphragm	Reinforced EPDM			
		Seals:	EPDM		Spring:	SST-302	Bolts&Nuts:	SST-316	
		Coating:	FBE 150µm, RAL-9005			Indicator:			
	13. Pilot valve 1	Model:	68410-SST or DZR Brass Option		Body&Cover:	SST-316 or DZR Brass Option		Setting:	
		Internal trim:	SST or DZR Brass Option		Rubber parts:	NBR		N\A	
	Pilot valve 2	Model:	N\A		Body&Cover:	-		Setting:	
		Internal trim:	-		Rubber parts:	-			
	14. Relay valve	Model:	N\A		Body&Cover:	-			
		Internal trim:	-		Rubber parts:	-			
	15. Accessories	Control Filter		Type:	1/2" Y-Body				
		Screen:	SST-316		Body:	SST-316			
		Isolation ball-valves		Ball:	SST-316	Body:	SST-316		
		Fittings:	SST-316		Tubes:	SST-316 or Flexible Tubing Option			
		Solenoid Valve		Type:	N\A				
		Body:	-		Orifice:	-			
		Main Valve state:		De-energized:		-			
				Energized:		-			
		Voltage:	-		Enclosure:	-			
NOTES	- Other construction materials and end-connection standards are available upon request.								
	- The valve includes a unique air release mechanism for ease of commissioning								
	- Each valve is hydrostatically tested at 160% of the rated pressure								
	- Each valve is tested for proper operation at a dynamic test-rig.								
	- Unique LTP® device - enables smooth regulation at near-zero flow conditions without obstruction to the flow at high flow.								

3: – Commissioning the PRV

- a. Open isolating ball valves [d1 & d3] leaving [d2] closed.
- b. Open main line inlet valve from the network.
- c. Bleed trapped air from the control chamber by slight opening of the allen key grub screw [c] (see picture to the right).
- d. Turn the pilots pressure adjustment bolt [a1] anti-clockwise until loose.
- e. Open downstream flushing hydrant leaving main outlet network valve closed.
- f. Once only water is passing from the bleed point [c], and valves outlet pressure has drops to 0m as the IVL Flow Control 300series PRV will fully close to a drip tight position

Please note the pressure reading should be taken from the valves reverse pressure tapping point.

- g. Close flushing hydrant and open isolation ball valve [d2], and the PRV will remain closed and the pressure gauge will read 0m.
- h. Open the main outlet valve to the network and throttle bypass main line valve till the outlet drops approx. 2-5m below the required PRV set-point pressure.
- i. **Slowly** turn the pilots pressure adjustment bolt [a1] in a clockwise direction until pressure on the pressure gauge returns to the required network operating pressure.
- j. Continue to slowly close bypass valve and the PRV will take over complete control of the system.



3.1:- Commissioning PRV valve when Pre-set

- a. Open isolating ball valves [d1 & d3] leaving [d2] closed.
- b. Open main line inlet valve from the network.
- c. Bleed trapped air from the control chamber by slight opening of the allen key grub screw [c] (see picture to the right).
- d. Open downstream flushing hydrant leaving main outlet network valve closed.
- e. Once only water is passing from the bleed point [c], and valves outlet pressure has drops to 0m as the IVL Flow Control 300series PRV will fully close to a drip tight position

Please note the pressure reading should be taken from the valves reverse pressure tapping point.

- f. Open the main outlet valve to the network and throttle bypass main line valve till the outlet drops approx. 2-5m below required pre-set PRV pressure.
- g. **Slowly open [d2]**, and the PRV will open to its pre-set pressure setting.
- h. Continue to close bypass valve and the PRV will take over complete control of the system.

3.1:- Adjustment

- a. Make sure isolating ball valves [d1, d2 & d3] are all open.
- b. Make sure that the inlet and outlet main line valves are open.
- c. Check that there's no air in the IVL Flow Control 300series valve control space by bleed trapped air from the control chamber by slight opening of the allen key grub screw [c] (see picture to the top right).
- d. Once only water is passing from the bleed point [c], close bleed grub screw.
- e. Unlock locking nut and turn adjusting bolt [a1] of the pilot [A] – turning it counter-clockwise reduces the valves set pressure and turning it clockwise increase the valve set pressure. (as shown in the picture below)

Outlet Pressure
adjustment Bolt



- f. If required the valves response pace can be adjusted by needle valve [e1]. This operation can be done by loosening the locking nut on the needle valve then
- Turning screwdriver adjustment in (clockwise) slows the valves response,
 - Turning screwdriver adjustment out (anti-clockwise) accelerates the valve response time. (see picture to the right).
- g. If further adjustment of the valves closing speed is required (faster) this can be achieved by adjusting needle valve [e]. Turning it in (clockwise) slows the valves closure response time, turning it out (anti-clockwise) accelerates the valves closure response time.

Important Note:- Do not full close either needle valve as this will prevent the valve from functioning (minimum of 1 turn open from a closed position is recommended)

Speed of control
Needle valve "e1"

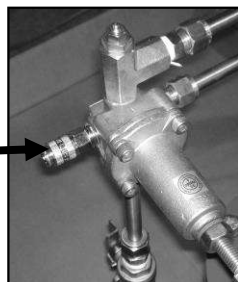


68-410 Pilot valve: Spring Selection Table

Spring No.	Spring Colour	Regulation Range	
		mwc	psi
66 (standard)	Green ■	10 – 110	15 – 160
78	Yellow ■	5 – 30	8 – 45
67	Red ■	20 – 200	30 – 290

4. Pilot Pressure Gauge / Pressure tapping point

Pressure Tapping
Point for Loggers
or Digital
Pressure Gauges



Pressure
Gauge
(Optional)



Please note that if the pressure gauge is replaced with a logging pressure tapping point the following important notes should be recognised.

- When plugging in or unplugging a logger or digital pressure gauge to the pressure tapping point, then the control space isolation ball valve [d3] should be closed while undertaken this operation. If it isn't this operation could cause pressure variation on the PRV outlet.

5. Manual activation

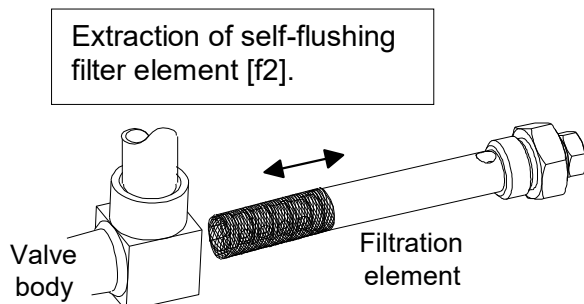
- The valve can be set in a fixed position, for maintenance of control circuit, by the closure of valves [d3] [d1 then d2] in this order. The automatic control is cancelled while these valves are closed.
- The valve can be closed manually by the closure of isolating ball valve [d2] while [d1 & d3] are kept open.

6. Minor Maintenance Checks

- Close ball valves [d3, d1 & d2] and inspect and clean the external filter [f] as water quality dictates, if it is clean then slow open the inlet supply ball valve [d1] to check the self-flushing filter [f2] if there is a good flow of water then the self-flushing filter is clean. Unless the water is very dirty, this service should first of all be done after a six months to a year to check water quality, and then a maintenance schedule drawn up accordingly.
- Inspect valve performance by checking downstream pressure gauge periodically. If the pressure setting of the valve has drifted then this is normal the first sign that maintenance is required.

6.1. Maintenance clean of self-flushing filter

If required the self-flushing filter can be cleaned without dismantling the filter assembly from the body as follows. Please note that this should never be required but is a good practice when undertake a major maintenance overhaul or inspection.



7. Troubleshooting

SYMPTOM	CAUSE	REMEDY
Valve fails to open	Closed main line isolation valves.	Open valves
	Ball valves [d2 & or d3] are closed.	Open ball valves.
	No downstream demand.	Create a demand.
	Pilot spring is de-compressed.	Adjust using bolt [a1] as described in section 3.1.
Valve fails to close	Ball valves [d1 & or d3] & or needle valves [e, e1] are closed.	Open ball valves and adjust needle valves, as described in section 3.1
	Excessive pilot spring compression.	Adjust by turning bolt [a1] as described in section 3.1.
	A rough object is trapped in the main valve seal disc.	Disassemble the valve and remove the object. Flush the upstream line when the trim and cover are disassembled.
	Ruptured main valve diaphragm. Check by opening a vent from the main valve cover by closing valves [d1, d2, d3]. If the leakage will not stop – the diaphragm is torn.	Disassemble and replace diaphragm.
Unstable regulation	The needle valves [e, e1] is not properly adjusted.	Readjust.
	Trapped air in the main valve control chamber.	Release by opening the air release allen key grub nut [c].

General Maintenance Schedule

IVL Flow Control - 300series Hydraulic Control Valve

The following is general recommendations for scheduling the maintenance work on IVL Flow Control - 300series valves.

MAIN VALVE

Part	Periodic action	Period	Replacement \ fix conditions	Estimated life span*
Diaphragm	Inspection	1 year (can be extended to up to 3-5 years in case no signs of wear appear in the first years)	When signs of wear (cracks) appear	>10 years
Main seal	Inspection	1 year (can be extended to up to 3-5 years in case no signs of wear appear in the first years)	When signs of wear appear	>10 years
Indicator's seal ****	External inspection (no need to open, just check for leakage)	6 months	When leak appear (not supposed to affect the valve operation)	>3 years
Control ports	Inspection	Inspect when undertake routine maintenance inspection	No rust should be present because of the IVLFC port protection designs unless the epoxy has been damaged. If any present clean and rebuild.	
Other parts	Inspection	1 year (can be extended to up to 5 years in case no signs of corrosion appear in the first years)		>30 years

* For potable, non aggressive water at 20 deg C, under moderate pressure conditions.

**** Valve position indicator rod arrangement is a additional option.

CONTROL LOOP

Part	Periodic action	Period	Replacement \ fix conditions	Estimated life span*
Inline filter	Inspection	1 year (can be extended to up to 3 years in case no signs of clogging appear in the first years)	Clean when dirt accumulates	>10 years
External filter	Inspection	1 year (can be extended to up to 3 years in case no signs of clogging appear in the first years)	Clean when dirt accumulates	>10 years
Pilot valve	Inspect performance	6 months (can be extended to a year)	Consult company rep. in case operation deteriorates	>30 years
Closing accelerator valve ***	Diaphragm inspection	1 year (can be extended to up to 3 years in case no signs of wear appear in the first years)	When signs of wear (cracks) appear	>20 years

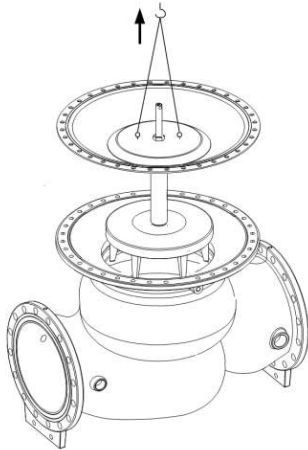
* For potable, non aggressive water at 20 deg C, under moderate pressure conditions.

*** These item is only installed on electronic override control pilot loop.

Seat replacement and assembly instructions- Valve mod. 30 / 31 / 32

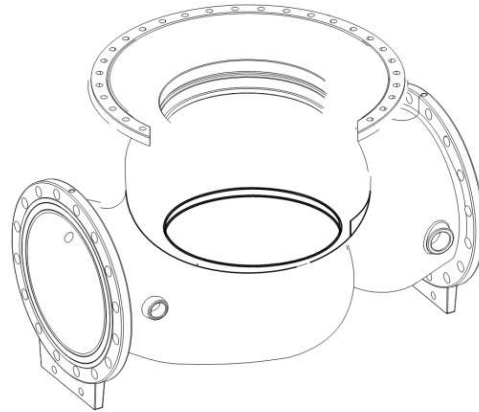
1. Pull the sealing trim from the body

Lifting equipment is only required for 200mm full bore valves and above in size.

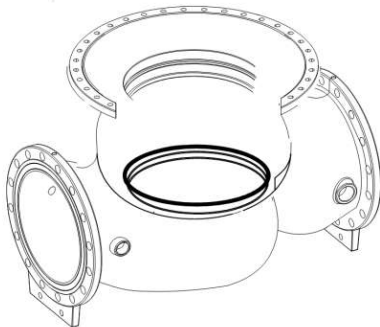


2. Remove the old seat, clean the seat area

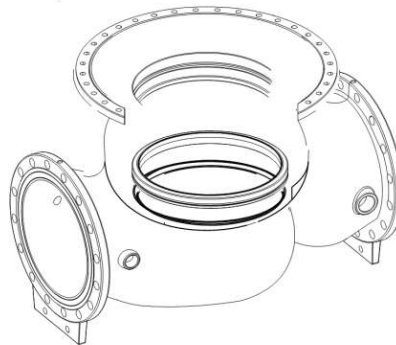
Steps 2-5:- Only if required - We have not had to replace any S300 seats for over 18 years.



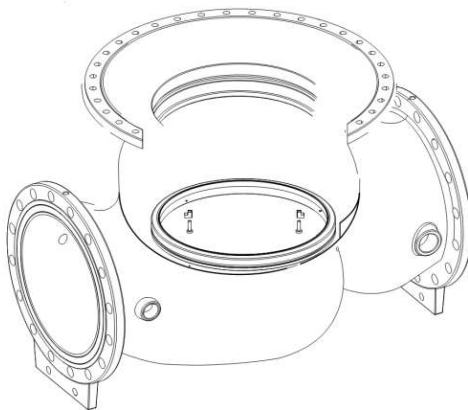
3. Assemble the seat O-ring



4. Insert the seat

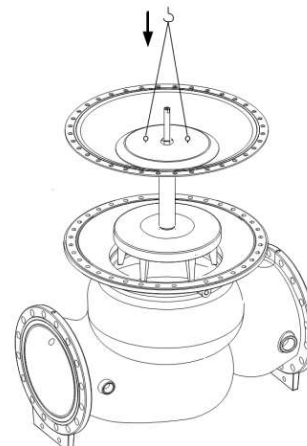


5. Lock the seat by the seat locks



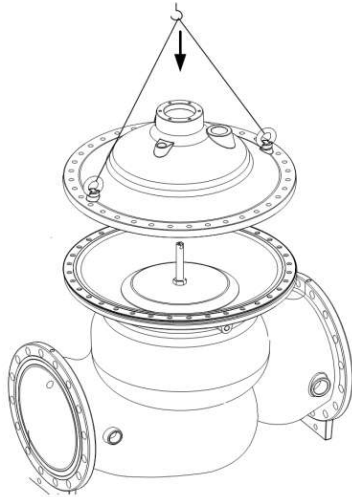
6. Insert the sealing trim in a straight, vertical direction into the valve

Lifting equipment is only required for 200mm full bore valves and above in size.

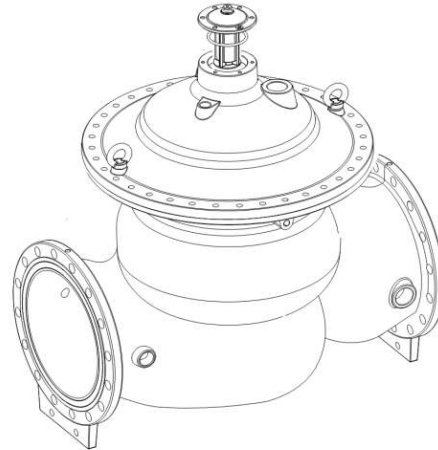


7. Assemble the bonnet- do not
Insert the bolts

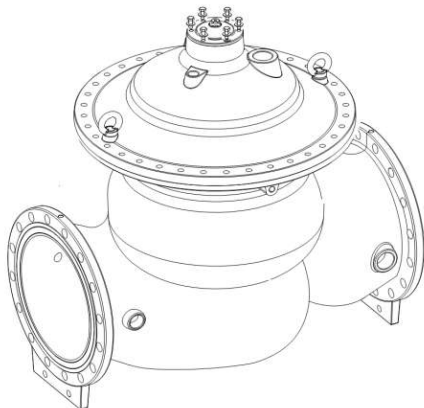
Lifting equipment is only required for 200mm
full bore valves and above in size.



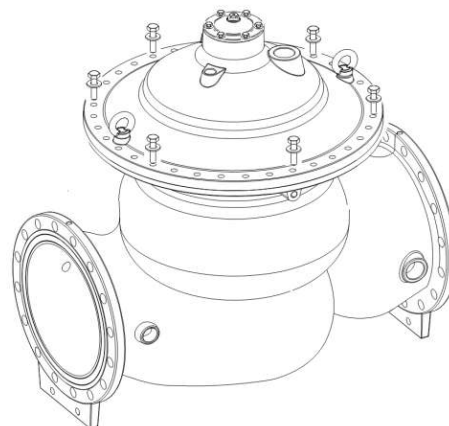
8. Assemble top guide



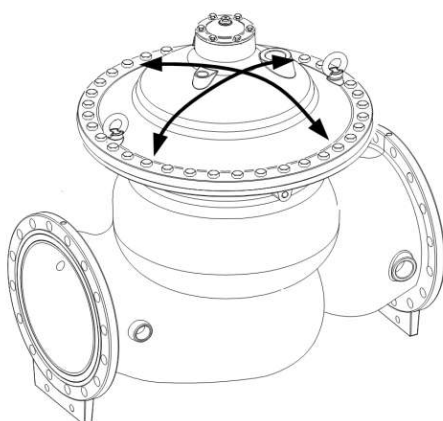
9. Tighten uniformly the bolts of the
top guide



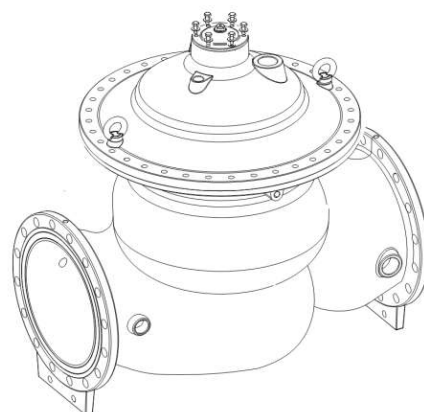
10. Insert the bolts of the bonnets



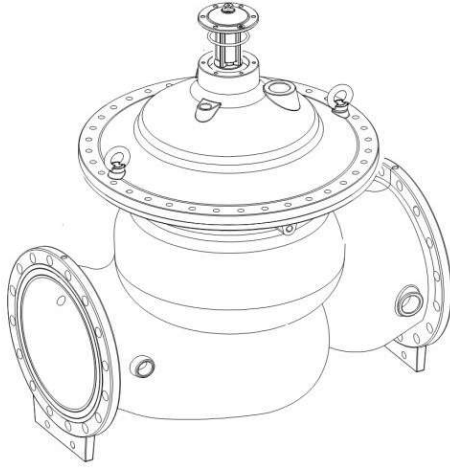
11. Tighten uniformly the bonnet bolts
Uniformly, at "cross-over" method,
2-3 times to ensure bolts are tight.



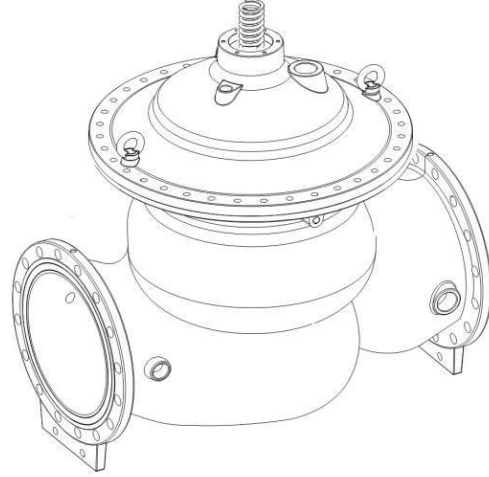
12. Once the main bonnet bolts are tight
remove top guide bolts again



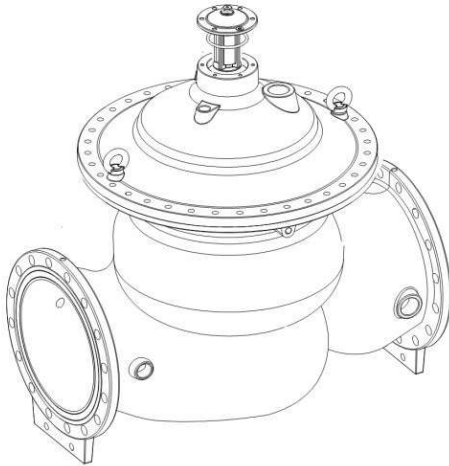
13. Remove top guide



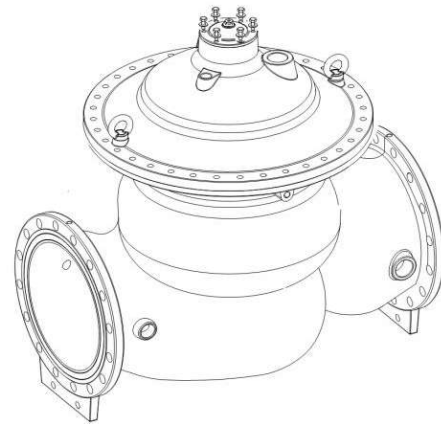
14. Insert the spring



15. Re-assemble the top guide

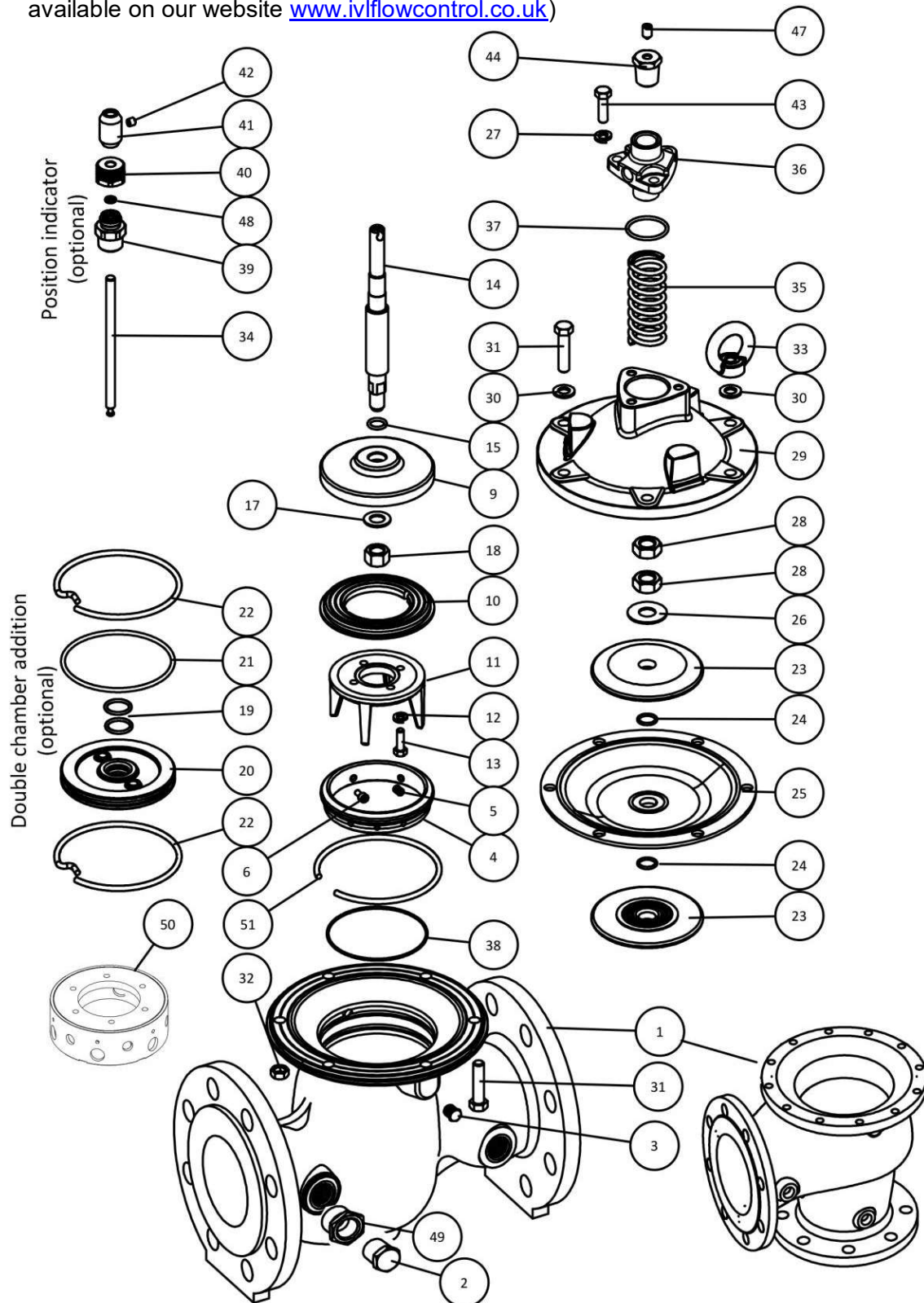


16. Tighten uniformly the bolts of the top guide



Full main valve parts breakdown

Example of 100mm Model 30 main valve parts list (all other main valve parts lists are available on our website www.ivflowcontrol.co.uk)



Series 300 Model 30 4" Main Valve Diaphragm & Complete Soft Parts Replacement Kit Cat.No.667004030W (includes parts # 10,15,19,21,24,25,37,38 & 48).

Part	Cat.No.	Description	Material
1	55S014030A	ANSI 150 - Body	D.I.
1	55S014030D	AS 2129 D - Body	D.I.
1	55S014030N	ISO PN16 - Body	D.I.
1	55S014031S	ISO PN25 - Body	D.I.
1	55S014031B	ANSI 300 - Body	D.I.
1	55S0140310	Undrilled Body	D.I.
1	55S014032A	ANSI 150 -Angle Body	D.I.
1	55S014032D	AS 2129 D -Angle Body	D.I.
1	55S014032N	ISO PN16 -Angle Body	D.I.
1	55S014033S	ISO PN25 -Angle Body	D.I.
1	55S0130330	Undrilled Angle Body	D.I.
2	013805001	Plug	Brass
3	013825001	Plug	Brass
4	44213403000H	Seat	SST 304
5	02811430K	Cone-point stud	SST 304
6	028110516	Seat Locking Bolt Long	SST 304
7	066534000	I.D Tag	Aluminum
9	0020340303	Seal Disc	SST304
10	0713403WN	Seal	EPDM
11	444240302	Seal Guide	SST 304
12	002170603M	Cone Spring Washer	SST 304
13	027214700	Bolt	SST 304
14	022640300	Shaft (S.chamber)	SST 304
14	3322640300	Shaft (D.chamber)	SST 304
15	0709W6106	O-Ring	EPDM
17	02171203M	Cone Spring Washer	SST 304
18	021012000	Nut	SST 304
19	0709W6300	O-Ring	EPDM
20	341740300	Separating disc	Bronze
21	0709W2240	O-Ring	EPDM
22	0021540300	Lock Spring	SST 302
23	4421740302	Diaphragm Disc	SST 304
24	0709W6090	O-Ring	EPDM
25	00718403WE	Diaphragm	EPDM
26	021740302	Disk	SST 304
27	002170803M	Cone Spring Washer	SST 304
28	0021009160	Nut	SST 304
29	5S0240305	Bonnet	D.I.
30	021738000	Washer	SST 304
31	027438175	Bolt	SST 304
32	021043800	Nut	SST 304
33	532915000	Lifting Ring	SAE1020
34	022640301	Position Indicator	SST 316
35	022034000	Spring	SST 302
36	44202403S4	Cover	SST 304
37	070902125	O-Ring	NBR
38	0709W2043	O-Ring	EPDM
39	4Z100030I	Adapter Short	DZR Brass
39*	4Z100031I	Adapter Long	DZR Brass
40	4Z1000300	Air release Nut	DZR Brass
41	41510800I	L.S Actuating Nut	Brass
42	028114140	Locking Bolt	SST 304
44	4Z1020301	Air release plug	DZR Brass
45	022414140	Insert	SST 304
47	0281M0812	Cone-point Stud	SST 304
48	070906002	O-Ring	NBR
49	22412250	Insert	SST 304
50	6624640AC0	Anti-cavitation device	SST 304
51	00215403000H	seat locking ring	SST 304

Repair kits:

Body kit cat.no.66S01403xx
(Specify flange standard)

Inc. parts #1, 2, 4, 5, 6, 38, 49

Bonnet kit cat.no.66S0240305

Inc. parts #29, 45

Sealing kit cat.no.66S03403W0

Inc. parts #9, 10, 11, 12, 13, 14, 15, 16, 18

Diaphragm kit cat.no.6618403W0

Inc. parts #23, 24, 25, 26, 28

Internals kit cat.no.66S20403W0

Inc. Sealing and Diaphragm kits

Elastomers Kit cat no. 6670040300

Inc. parts: 10, 15, 19, 21, 24, 25, 37, 38, 48

Double chamber cat.no.66S03403BW

Remark: Various parts, non-standard materials, on request

Full 68-410 PRV pilot parts breakdown

Example of 68-410 PRV pilot parts list (all other pilot parts lists are available on our website www.ivflowcontrol.co.uk)

316SST Pilot valve model 68-410

No	Part No.	Designation	MTL
1	442016841S	Body	SST 316
2	022020000	Spring	SST 302
3	072668410	Vulcanized plunger	SST 316+NR
4	070909084	O-ring	NBR
5	421368410	Seat	SST 316
6	421768410	Diaphragm lock	SST 304
7	051768412	Washer	PTFE
8	471868200	Diaphragm	NR
9	421768411	Diaphragm disc	SST 304
10	022067000	Spring No. 67 (red)	SST 302
	022066000	Spring No. 66 (green)	SST 302
	022078000	Spring No. 78 (yellow)	SST 302
11	0021729000	Spring disc	SST 304
12	442026841S	Bonnet	SST 316
13	028M06316	Hex. Soc. Bolt	SST 316
14	051705651	Spring ID ring (red)	Plastic
	051705652	Spring ID ring (green)	Plastic
	051705653	Spring ID ring (yellow)	Plastic
15	00210100SM	Locking nut	SST 316
16	0027M10SS0	Adjustment bolt	SST 316
17	023825001	Plug	SST 316
18*	066524001	ID tag	AL
19*	087000019	Adj. dir. Sticker	
20**	051110000	Spacer	PA-G

* Not shown in the drawing

** Used with red spring only

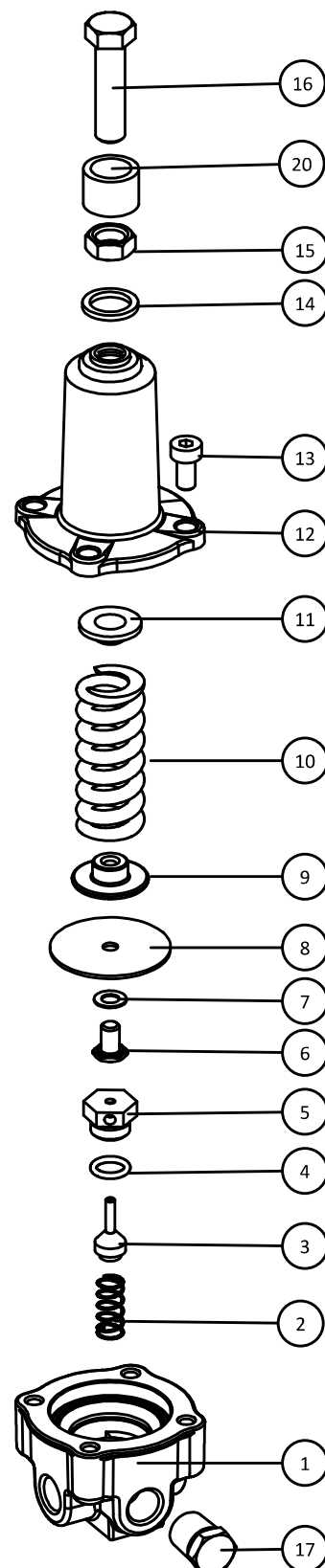
Complete pilot-valve cat. No. : 7726841000000SW

Diaphragm kit, cat. no. 6671868410000SW

Includes parts 6, 7, 8, 9

Spare parts kit, cat. no. 6606841001000SW

Includes the above diaphragm kit plus parts no. 3 & 4.

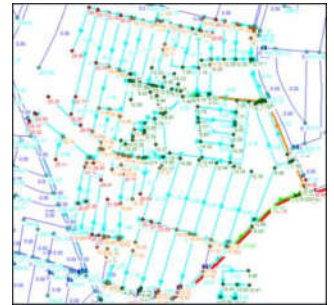
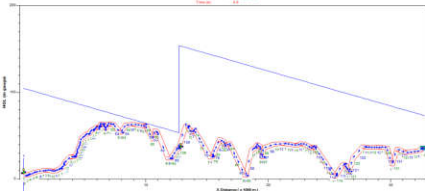


Other IVL Flow Control Key Products & Services

Air Valve Analysis and design service

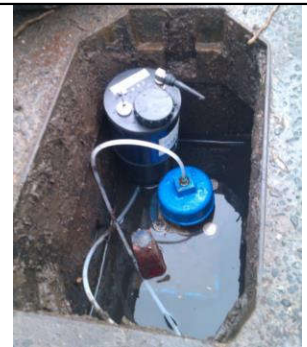
Full Range of air valves both of the sewage and potable water networks

Hydraulic Network modelling and design service



Telemetry communication and SCADA system

Water Quality Monitoring Systems



Full range of Level Float Valves - LFFV

Hydraulic Balancing Flow Control System - ConFlow

Power Generation

