

▲ Model 110 shown

The Series 110 Differential Control Valve is designed to accurately control the pressure difference between any two points. In some systems this means the valve remains closed until pressure differential commands its opening. It is a pilot-operated, modulating type valve which controls pressure accurately and consistently at the desired setting.

## SERIES FEATURES

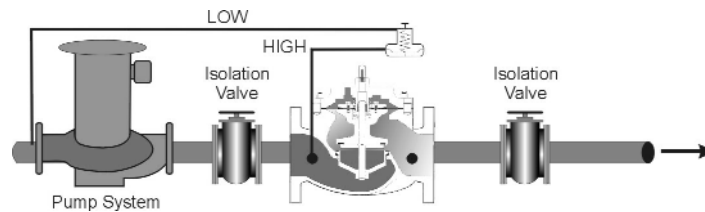
- ▶ Opens on increasing differential.
- ▶ Dual pilot sense lines can be valve or remote connected.
- ▶ Differential is adjustable over complete range of control springs. (see pilot features)

## VALVE FEATURES

- ▶ Operates automatically off line pressure.
- ▶ Heavy-duty, nylon-reinforced diaphragm.
- ▶ Rectangular-shaped, soft seat seal provides drip-tight Class VI closure.
- ▶ Diaphragm assembly guided top and bottom.
- ▶ Throttling seat retainer for flow and pressure stability.
- ▶ Easily maintained without removal from the line.
- ▶ Replaceable seat ring.
- ▶ Alignment pins assure proper reassembly after maintenance.
- ▶ Valves are factory tested.
- ▶ Valves are serial numbered and registered to facilitate replacement parts and factory support.

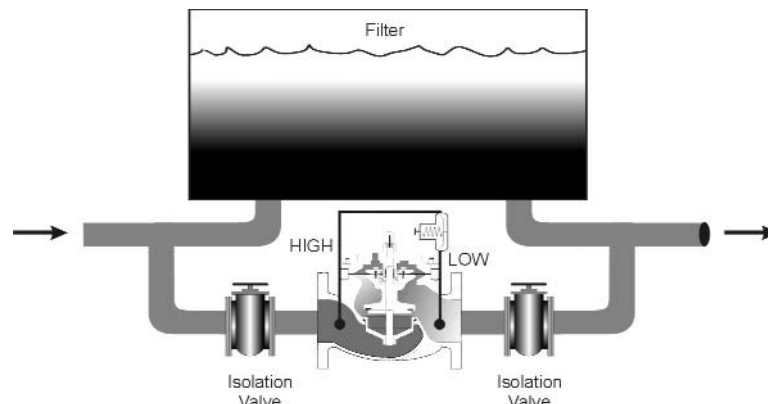
## PUMP DIFFERENTIAL CONTROL

Installed on the discharge side of a pump, the valve senses high pressure at pump discharge (valve inlet) and low pressure at the pump suction. Valve modulates to hold differential pressure constant, thus assuring pump is at optimum point on its curve.



## FILTER BYPASS CONTROL

In a filtered liquid application where loss of flow cannot be tolerated, the model 110 allows flow should the filter become clogged.

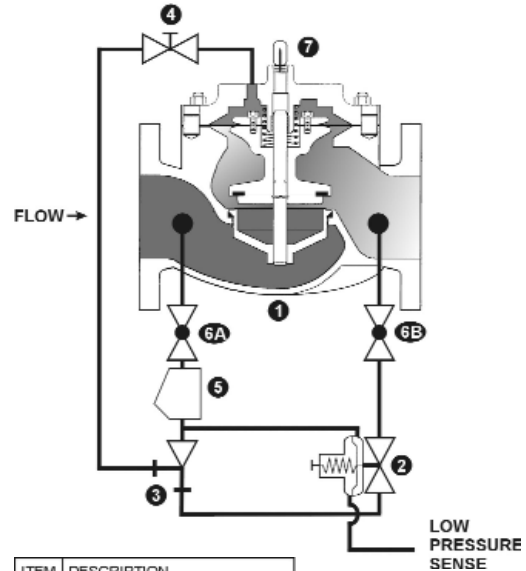


## VALVE OPERATION

### The OCV MODEL 110

- ▶ Maintains a constant differential pressure between two points in a system.
- ▶ Valve opens on increased differential.

- 1) Model 65 Basic Control Valve, a hydraulically-operated, diaphragm-actuated globe or angle valve that closes with an elastomer-on-metal seal.
- 2) Model 1356 Differential Pilot, a two-way, normally closed pilot valve that senses differential pressure across its diaphragm and balances it against an adjustable spring load. An increase in differential above the set point makes the pilot open.
- 3) Model 126 Ejector, a simple "tee" fitting with a fixed orifice in its upstream port. It provides the proper pressure to the diaphragm chamber of the main valve, depending on the position of the differential pilot.
- 4) Model 141-2 Needle Valve that controls the opening/closing speed of the main valve.
- 5) Model 159 Y-Strainer (standard on water service valves), the strainer protects the pilot system from solid contaminants in the line fluid.
- 6) Model 141-4 Ball Valves (standard on water service valves, optional on fuel service valves), useful for isolating the pilot system for maintenance or troubleshooting.
- 7) Model 155 Visual Indicator (optional)



ITEM	DESCRIPTION
1	BASIC VALVE ASSEMBLY
2	DIFFERENTIAL CONTROL PILOT
3	EJECTOR
4	NEEDLE VALVE
5	Y-STRAINER
6	ISOLATION BALL VALVE
7	VISUAL INDICATOR

## PILOT 1356

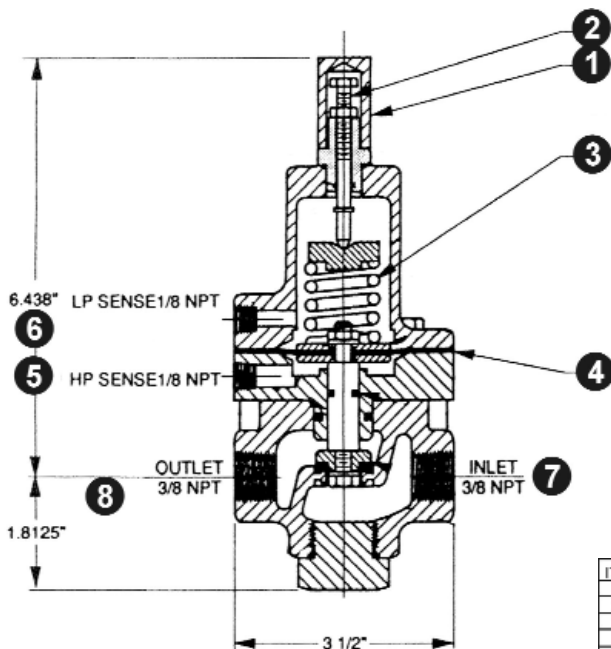
- ▶ Accurate sensing of high and low pressure.
- ▶ Normally closed, pressure differential to open.
- ▶ Simple, single adjustment of differential set point.
- ▶ All parts replaceable while mounted on the valve.
- ▶ Rubber-to-metal seat provides positive closure until required to open.
- ▶ Large area diaphragm for quick, precise control.
- ▶ Bronze or stainless steel construction.
- ▶ Multiple spring ranges.

### Pilot Materials

Bronze B-61  
Stainless Steel ASTM A743/CF8M

### Spring Ranges

5-30, 20-80, 65-180 psi



ITEM	QTY	DESCRIPTION
1	1	CAP
2	1	ADJUSTING SCREW
3	1	SPRING
4	1	DIAPHRAGM
5	1	HIGH PRESSURE SENSE
6	1	LOW PRESSURE SENSE
7	1	INLET
8	1	OUTLET

The Model 1356 Differential Pressure Pilot controls the amount of pressure in the upper chamber of the main valve (hence, the degree of opening or closing of the main valve). The pilot senses high pressure under its diaphragm and low pressure above its diaphragm. As the differential increases above the setting of the spring (adjustable), the pilot opens, decreasing the pressure in the main valve diaphragm chamber, allowing the main valve to open a proportionate amount.

Sense line locations. High pressure sensing is typically at the main valve inlet. Low pressure can be sensed at the valve outlet or at a field installed remote location.

## SIZING CONSIDERATIONS

### SIZING DIFFERENTIAL CONTROL VALVES

Because the Model 110 typically controls the differential pressure, that particular parameter of the sizing equation is already defined. All that remains is to ensure the valve is large enough to handle the required flow within proper velocity limits.

$$C_v = \frac{Q_{\max}}{\sqrt{DP/sg}}$$

where: Cv = valve coefficient  
 Q = Maximum flow rate, gpm  
 sg = Liquid specific gravity (water = 1.0)  
 dp = Differential pressure, psig

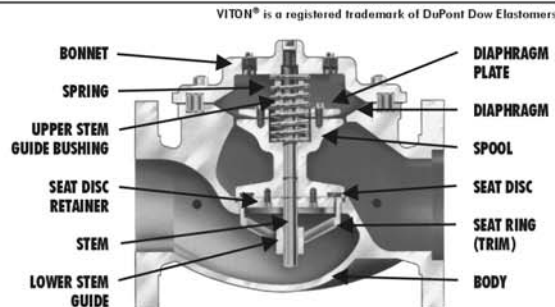
From the chart below, pick the smallest valve that has a Cv at least equal to the value calculated and where the velocity does not exceed 25 ft/sec.

SIZE	CV (GLOBE)	CV (ANGLE)	FLOW @ 25 FT/SEC (GPM)
1 ¼	23	30	115
1 ½	27	35	150
2	47	65	260
2 ½	68	87	370
3	120	160	570
4	200	270	1000
6	450	550	2250
8	760	1000	3900
10	1250	1600	6150
12	1940	2400	8700
14	2200	--	10,500
16	2850	4000	13,800
24	6900	--	31,300



## SPECIFICATIONS

VALVE BODY & BONNET	DUCTILE IRON		CAST STEEL		CAST BRONZE		STAINLESS STEEL	
<b>Material Specifications</b>	ASTM A536 (epoxy coated)		ASTM A216/WCB (epoxy coated)		ASTM B61		ASTM A743/CF8M	
<b>END CONNECTIONS</b>								
Flange Standard (also available in metric)	ANSI B16.42		ANSI B16.5		ANSI B16.24		ANSI B16.5	
Flange Class	150#	300#	150#	300#	150#	300#	150#	300#
Flange Face	Flat	Raised	Raised	Raised	Flat	Flat	Raised	Raised
Maximum Working Pressure	250 psi	640 psi	285 psi	740 psi	225 psi	500 psi	285 psi	740 psi
Screwed Working Pressure:	ANSI B1.20.1 (B2.1) 640 psi		Grooved End Working Pressure:			300 psi		
<b>INTERNALS</b>								
Stem	STAINLESS STEEL AISI 303				OPTIONAL MONEL			
Spring	STAINLESS STEEL AISI 302							
Spool	DUCTILE IRON ASTM A536 (epoxy coated)				B-61		STN. STL. ASTM A 743/CF8M	
Seat Disc Retainer	DUCTILE IRON ASTM A536 (epoxy coated) 4" & SMALLER VALVES - STAINLESS STEEL				B-61		STAINLESS STEEL	
Diaphragm Plate	DUCTILE IRON ASTM A536 (epoxy coated)				B-61		STAINLESS STEEL	
Seat Ring (Trim)	BRONZE B61 OPTIONAL STAINLESS STEEL ASTM A743/CF8M						STN. STL. ASTM A 743/CF8M	
Upper Stem Bushing	STANDARD BRONZE ASTM B438		VALVE W/ STAINLESS STEEL SEAT RING-TEFLON			TEFLON		
Lower Stem Bushing	SEAT MATERIAL VALVES W/ STAINLESS STEEL SEAT RING-TEFLON						TEFLON	
<b>ELASTOMER PARTS (Rubber)</b>								
Diaphragm/Seat Disc/O-Rings	STANDARD - BUNA-N NYLON REINFORCED				OPTIONAL - VITON®		OPTIONAL - EPDM	
Operating Temperature	-40°F to 180°F				32°F to 400°F		0°F to 300°F	
<b>COATINGS</b> WIDE RANGE OF COATING PER YOUR FLUID APPLICATION. COATINGS HANDLE MUNICIPAL POTABLE WATER, SEAWATER, PETROLEUM AND REFINED PRODUCTS.								
<b>ELECTRICAL SOLENOIDS</b>								
Bodies	STANDARD BRASS				STAINLESS STEEL (OPTIONAL)			
Elastomers	STANDARD - BUNA-N NYLON REINFORCED				OPTIONAL - VITON®			
Enclosures	WATER TIGHT, NEMA 1, 3, 4, & 4X - EXPLOSION PROOF - OPTIONAL (NEMA 7 & 9)							
Power	AC, 60HZ - 24, 120, 240, 480 VOLTS			AC, 50HZ - In 110 VOLT MULTIPLES		DC, 6, 12, 24, 240 VOLTS		
Operation	ENERGIZE TO OPEN (NORMALLY CLOSED)				DE-ENERGIZE TO OPEN (NORMALLY OPEN)			
<b>CONTROL PILOTS</b>								
Bodies	BRONZE B61		STAINLESS STEEL ASTM A743/CF8M					
Internal	AISI 303							
<b>CONTROL CIRCUITS</b>								
Tubing	COPPER OR STAINLESS STEEL							
Fittings	BRASS OR STAINLESS STEEL							



### SALTWATER SERVICE VALVE MATERIALS

Cast Steel Special Coatings --Ni Aluminum Bronze ASTM B148 --Super Duplex Stainless Steel



#### Globe Flanged Sizes

1.25"	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
32mm	40mm	50mm	65mm	80mm	100mm	150mm	200mm	250mm	300mm	350mm	400mm	450mm	500mm	600mm

\*CONSULT FACTORY



#### Angle Flanged Sizes

1.25"	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"	16"
32mm	40mm	50mm	65mm	80mm	100mm	150mm	200mm	250mm	300mm	400mm



#### Globe/Angle Screwed Sizes

1.25"	1.5"	2"	2.5"	3"
32mm	40mm	50mm	65mm	80mm



#### Globe/Angle Grooved Sizes

1.5"	2"	2.5"	3"	4"
32mm	50mm	65mm	80mm	100mm

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 email: sales@controlvalves.com • website: www.controlvalves.com

## DIMENSIONS

U.S. DIMENSIONS - INCHES

DIM	END CONN.	1 1/4-1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	24
A	SCREWED	8 3/4	9 7/8	10 1/2	13	--	--	--	--	--	--	--	--
	GROOVED	8 3/4	9 7/8	10 1/2	13	15 1/4	--	--	--	--	--	--	--
	150# FLGD	8 1/2	9 3/8	10 1/2	12	15	17 3/4	25 3/8	29 3/4	34	39	40 3/8	62
	300# FLGD	8 3/4	9 7/8	11 1/8	12 3/4	15 5/8	18 5/8	26 3/8	31 1/8	35 1/2	40 1/2	42	63 3/4
B	SCREWED	1 7/16	1 11/16	1 7/8	2 1/4	--	--	--	--	--	--	--	--
	GROOVED	1*	1 3/16	1 7/16	1 3/4	2 1/4	--	--	--	--	--	--	--
	150# FLGD	2 5/16-2 1/2	3	3 1/2	3 3/4	4 1/2	5 1/2	6 3/4	8	9 1/2	10 5/8	11 3/4	16
	300# FLGD	2 5/8-3 1/16	3 1/4	3 3/4	4 1/8	5	6 1/4	7 1/2	8 3/4	10 1/4	11 1/2	12 3/4	18
C ANGLE	SCREWED	4 3/8	4 3/4	6	6 1/2	--	--	--	--	--	--	--	--
	GROOVED	4 3/8*	4 3/4	6	6 1/2	7 5/8	--	--	--	--	--	--	--
	150# FLGD	4 1/4	4 3/4	6	6	7 1/2	10	12 11/16	14 7/8	17	--	20 13/16	--
	300# FLGD	4 3/8	5	6 3/8	6 3/8	7 13/16	10 1/2	13 3/16	15 9/16	17 3/4	--	21 5/8	--
D ANGLE	SCREWED	3 1/8	3 7/8	4	4 1/2	--	--	--	--	--	--	--	--
	GROOVED	3 1/8*	3 7/8	4	4 1/2	5 5/8	--	--	--	--	--	--	--
	150# FLGD	3	3 7/8	4	4	5 1/2	6	8	11 3/8	11	--	15 11/16	--
	300# FLGD	3 1/8	4 1/8	4 3/8	4 3/8	5 13/16	6 1/2	8 1/2	12 1/16	11 3/4	--	16 1/2	--
E	ALL	6	6	7	6 1/2	8	10	11 7/8	15 3/8	17	18	19	27
F	ALL	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	8
G	ALL	6	6 3/4	7 11/16	8 3/4	11 3/4	14	21	24 1/2	28	31 1/4	34 1/2	52
H	ALL	10	11	11	11	12	13	14	17	18	20	20	28 1/2

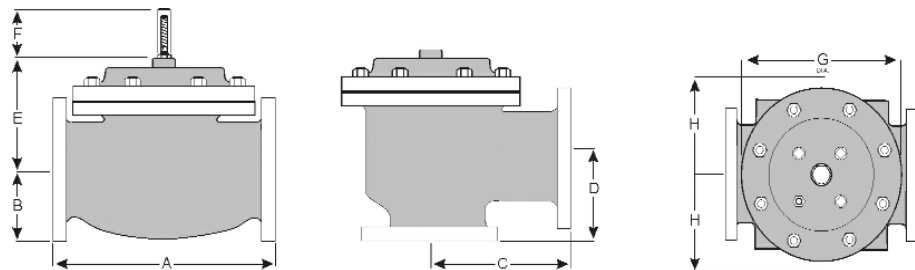
\*GROOVED END NOT AVAILABLE IN 1 1/4"

METRIC DIMENSIONS - M.M.

DIM	END CONN.	DN32-DN40	DN50	DN65	DN80	DN100	DN150	DN200	DN250	DN300	DN350	DN400	DN600
A	SCREWED	222	251	267	330	--	--	--	--	--	--	--	--
	GROOVED	222	251	267	330	387	--	--	--	--	--	--	--
	150# FLGD	216	238	267	305	381	451	645	756	864	991	1026	1575
	300# FLGD	222	251	283	324	397	473	670	791	902	1029	1067	1619
B	SCREWED	37	43	48	57	--	--	--	--	--	--	--	--
	GROOVED	25*	30	37	44	57	--	--	--	--	--	--	--
	150# FLGD	59-64	76	89	95	114	140	171	203	241	270	298	406
	300# FLGD	67-78	83	95	105	127	159	191	222	260	292	324	457
C ANGLE	SCREWED	111	121	152	165	--	--	--	--	--	--	--	--
	GROOVED	111*	121	152	165	194	--	--	--	--	--	--	--
	150# FLGD	108	121	152	152	191	254	322	378	432	--	529	--
	300# FLGD	111	127	162	162	198	267	335	395	451	--	549	--
D ANGLE	SCREWED	79	98	102	114	--	--	--	--	--	--	--	--
	GROOVED	79*	98	102	114	143	--	--	--	--	--	--	--
	150# FLGD	76	98	102	102	140	152	203	289	279	--	398	--
	300# FLGD	79	105	111	111	148	165	216	306	298	--	419	--
E	ALL	152	152	178	165	203	254	302	391	432	457	483	686
F	ALL	98	98	98	98	98	98	162	162	162	162	162	203
G	ALL	152	171	195	222	298	356	533	622	711	794	876	1321
H	ALL	254	279	279	279	305	330	356	432	457	508	508	724

\*GROOVED END NOT AVAILABLE IN DN32

For maximum efficiency, the OCV control valve should be mounted in a piping system so that the valve bonnet (cover) is in the top position. Other positions are acceptable but may not allow the valve to function to its fullest and safest potential. In particular, please consult the factory before installing 8" and larger valves, or any valves with a limit switch, in positions other than described. Space should be taken into consideration when mounting valves and their pilot systems.



A routine inspection & maintenance program should be established and conducted yearly by a qualified technician. Consult our factory @ **1-888-628-8258** for parts and service.

### How to order your valve

When Ordering please provide:  
 Series Number - Valve size - Globe or Angle -  
 Pressure Class - Screwed, Flanged, Grooved -  
 Trim Material - Adjustment Range - Pilot  
 Options - Special needs / or installation  
 requirements.

Represented by:

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 email: sales@controlvalves.com • website: www.controlvalves.com

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