

Electronic Actuated Pressure Sustaining Control Valve with Manual Hydraulic Bypass

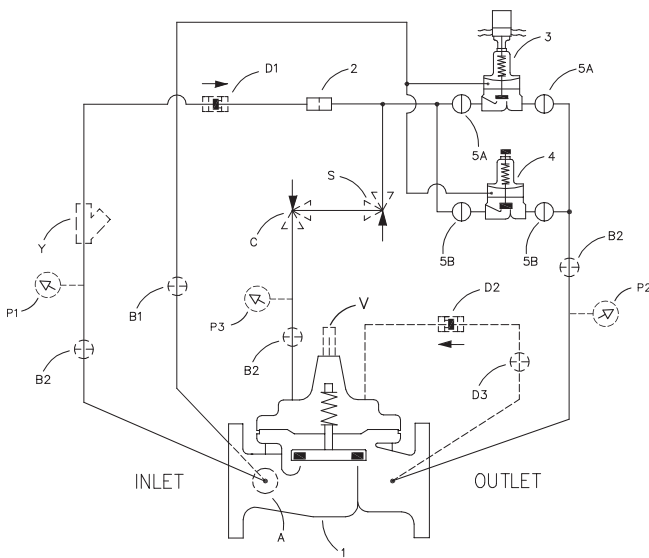
- Simplified Remote Valve Set-Point Control
- 12 to 24 VDC Input Power
- Isolated Input
- Reverse Polarity Protection
- Reliable Hydraulic Operation
- Submersible IP-68

The Cla-Val Model 350-07/3650-07 Electronic Actuated Pressure Sustaining Control Valve with Manual Hydraulic Bypass combines precise control of field proven Cla-Val hydraulic pilots and simple, remote valve control. The Model 350-07/3650-07 is a hydraulically operated, pilot controlled, modulating valve designed to maintain constant upstream pressure within close limits.

This valve can be used for pressure sustaining, back pressure or unloading functions in a by-pass system. The valve uses a CRL-33 pilot control, consisting of a hydraulic pilot and integral controller, that accepts a remote set-point command input and makes set-point adjustments to the pilot.

The recommended control method is simple remote set point change from an RTU (Remote Telemetry Unit) to the CRL-33 where the 4-20 mA command signal is ranged to specific pressure range. Very accurate control can be achieved when span does not exceed 100 psi. Since the CRL-33 is pre-ranged to the full spring range, some on-site calibration may be necessary when this control method is used. Free downloadable software is available from the Cla-Val website for this purpose. The CRL-33 can also accommodate control systems where the RTU compares pressure transmitter signal to the remote set point command signal. The RTU adjusts the CRL-33 with 4-20 mA command signal containing an adequate deadband to prevent actuator dithering after the two signals agree.

Internal continuous electronic monitoring of actuator position results in virtually instantaneous position change with no backlash or dithering when control signal is changed. In the event of a power or control input failure, the CRL-33 pilot remains in hydraulic control virtually assuring system stability under changing conditions. If check feature ("D") is added, and pressure reversal occurs, the valve closes to prevent return flow. During SCADA startup and maintenance, the manually-adjusted CRL pilot control allows automatic hydraulic valve operation when no electric power is available for CRL-33.



Schematic Diagram

Item	Description
1	Hytrol (Main Valve)
2	X58C Restriction Fitting
3	CRL-33 Electronic Pressure Sustaining Control
4	CRL5A Pressure Relief Control
5	CK2 (Isolation Valve)

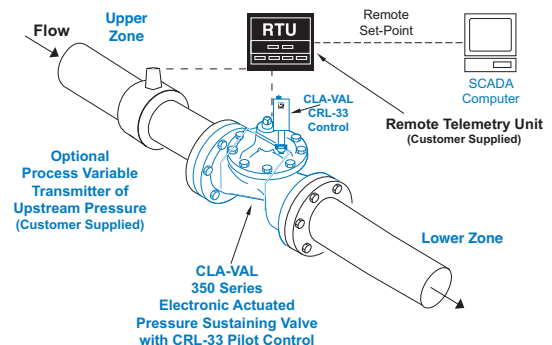
Optional Features

Item	Description
A	X46A Flow Clean Strainer
B	CK2 (Isolation Valve)
C	CV Flow Control (Closing)
D	Check Valves with Isolation Valve
P	X141 Pressure Gauge
S	CV Flow Control (Opening)
V	X101 Valve Position Indicator
Y	X43 "Y" Strainer

Typical Applications

The valve is designed to be used with supervisory control systems (SCADA), having remote analog set-point output and process variable upstream pressure input. It is also an effective solution for lowering costs associated with "confined space" requirements by eliminating need for entry into valve structure for set-point adjustment.

Additional pilot controls, hydraulic and/or electronic, can be easily added to perform multiple control functions to fit exact system requirements.



Model 350-07 (Uses Basic Valve Model 100-01)

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class				
		Flanged		Grooved	Threaded	
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End‡ Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
ASTM B62	Bronze	B16.24	225	400	400	400

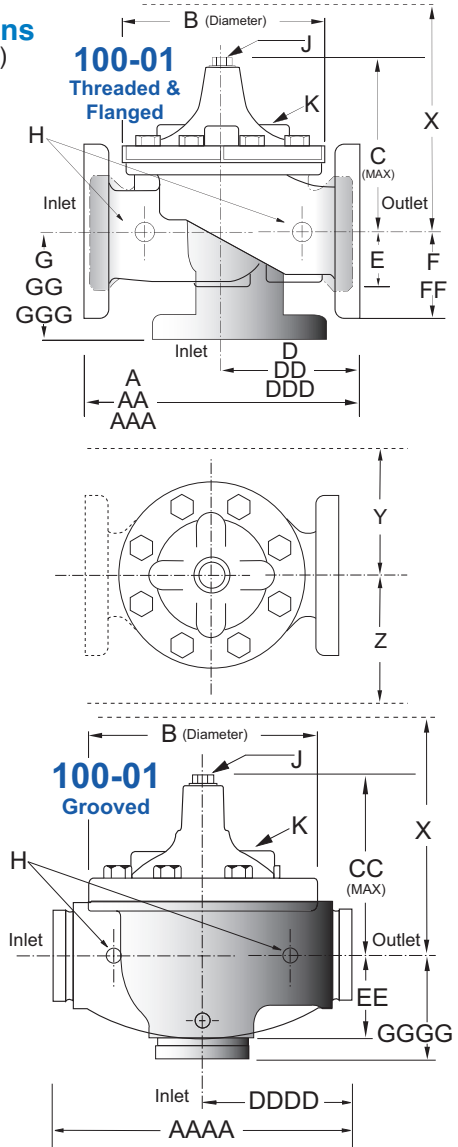
Note: * ANSI standards are for flange dimensions only.
 Flanged valves are available faced but not drilled.
 ‡ End Details machined to ANSI B2.1 specifications.
Valves for higher pressure are available; consult factory for details

Materials

Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	1" - 36"	1" - 16"	1" - 16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is Optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

For material options not listed, consult factory.
 Cla-Val manufactures valves in more than 50 different alloys.

Dimensions (In inches)



Model 350-07 Dimensions (In Inches)

Valve Size (Inches)	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	30	36
A Threaded	7.25	7.25	7.25	9.38	11.00	12.50	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	8.50	9.38	11.00	12.00	15.00	20.00	25.38	29.75	34.00	39.00	41.38	46.00	52.00	61.50	63.00	76.00
AAA 300 ANSI	—	—	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	47.64	53.62	63.24	64.50	76.00
AAAA Grooved End	—	—	8.50	9.00	11.00	12.50	15.00	20.00	25.38	—	—	—	—	—	—	—	—	—
B Dia.	5.62	5.62	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	41.50	45.00	53.16	56.00	66.00
C Max.	5.50	5.50	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	39.06	41.90	43.93	54.60	61.50
CC Max. Grooved End	—	—	4.75	5.75	6.88	7.25	9.31	12.12	14.62	—	—	—	—	—	—	—	—	—
D Threaded	3.25	3.25	3.25	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	4.00	4.75	5.50	6.00	7.50	10.00	12.69	14.88	17.00	19.50	20.81	—	—	30.75	—	—
DDD 300 ANSI	—	—	4.25	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—	—	31.62	—	—
DDDD Grooved End	—	—	—	4.75	—	6.00	7.50	—	—	—	—	—	—	—	—	—	—	—
E	1.12	1.12	1.12	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75	12.62	15.50	12.95	15.00	17.75	21.31	24.56
EE Grooved End	—	—	2.00	2.50	2.88	3.12	4.25	6.00	7.56	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	2.50	3.00	3.50	3.75	4.50	5.50	6.75	8.00	9.50	10.50	11.75	15.00	16.50	19.25	22.50	25.60
FF 300 ANSI	—	—	3.06	3.25	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.00	16.50	19.25	24.00	25.60
G Threaded	1.88	1.88	1.88	3.25	4.00	4.50	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	4.00	3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75	14.88	15.69	—	—	22.06	—	—
GGG 300 ANSI	—	—	4.25	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	—	—	22.90	—	—
GGGG Grooved End	—	—	—	3.25	—	4.25	5.00	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	.375	.375	.375	.375	.50	.50	.75	.75	1	1	1	1	1	1	1	1	2	2
J NPT Cover Center Plug	.25	.25	.25	.50	.50	.50	.75	.75	1	1	1.25	1.5	2	1.5	1.5	1.5	2	2
K NPT Cover Tapping	.375	.375	.375	.375	.50	.50	.75	.75	1	1	1	1	1	1	1	1	2	2
Stem Travel	0.4	0.4	0.4	0.6	0.7	0.8	1.1	1.7	2.3	2.8	3.4	4.0	4.5	5.1	5.63	6.75	7.5	8.5
Approx. Ship Wt. Lbs.	15	15	15	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720
X Pilot System	11	11	11	13	14	15	17	29	31	33	36	40	40	43	47	68	79	85
Y Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	40	45
Z Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	42	47

Note: The top two flange holes on valve size 36 are threaded to 1 1/2"-6 UNC.

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class		
		Flanged		
Grade	Material	ANSI Standards*	150 Class	300 Class
ASTM A536	Ductile Iron	B16.42	250	400
ASTM A216-WCB	Cast Steel	B16.5	285	400
ASTM B62	Bronze	B16.24	225	400

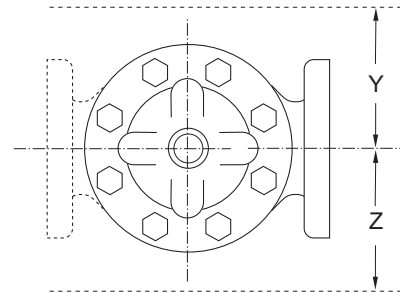
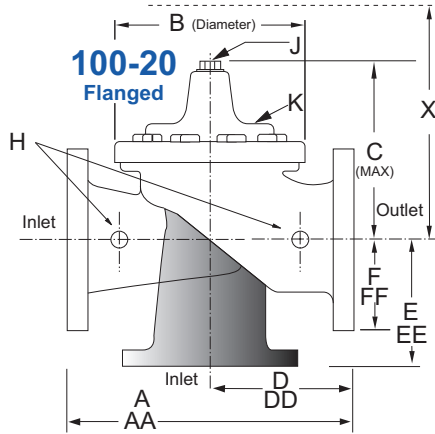
Note: * ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.
Valves for higher pressure are available; consult factory for details

Materials

Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	3" - 48"	3" - 16"	3" - 16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is Optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

For material options not listed, consult factory.
Cla-Val manufactures valves in more than 50 different alloys.

Dimensions (In inches)



Model 3650-07 Dimensions (In Inches)

Valve Size (Inches)	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48
A 150 ANSI	10.25	13.88	17.75	21.38	26.00	30.00	34.25	35.00	42.12	48.00	48.00	63.25	65.00	76.00	94.50
AA 300 ANSI	11.00	14.50	18.62	22.38	27.38	31.50	35.75	36.62	43.63	49.62	49.75	63.75	67.00	76.00	94.50
B Dia.	6.62	9.12	11.50	15.75	20.00	23.62	27.47	28.00	35.44	35.44	35.44	53.19	56.00	66.00	66.00
C Max.	7.00	8.62	11.62	15.00	17.88	21.00	20.88	25.75	25.00	31.00	31.00	43.94	54.60	61.50	61.50
D 150 ANSI	—	6.94	8.88	10.69	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
DD 300 ANSI	—	7.25	9.38	11.19	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
E 150 ANSI	—	5.50	6.75	7.25	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
EE 300 ANSI	—	5.81	7.25	7.75	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
F 150 ANSI	3.75	4.50	5.50	6.75	8.00	9.50	11.00	11.75	15.88	14.56	17.00	19.88	25.50	28.00	31.50
FF 300 ANSI	4.12	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.88	16.06	19.00	22.00	27.50	28.00	31.50
H NPT Body Tapping	.375	.50	.75	.75	1	1	1	1	1	1	1	1	2	2	2
J NPT Cover Center Plug	.50	.50	.75	.75	1	1	1.25	1.25	2	2	2	2	2	2	2
K NPT Cover Tapping	.375	.50	.75	.75	1	1	1	1	1	1	1	1	2	2	2
Stem Travel	0.6	0.8	1.1	1.7	2.3	2.8	3.4	3.4	3.4	4.5	4.5	6.5	7.5	8.5	8.5
Approx. Ship Wt. Lbs.	45	85	195	330	625	900	1250	1380	1500	2551	2733	6500	8545	12450	13100
X Pilot System	13	15	27	30	33	36	36	41	40	46	55	68	79	85	86
Y Pilot System	10	11	18	20	22	24	26	26	30	30	30	39	40	45	47
Z Pilot System	10	11	18	20	22	24	26	26	30	30	30	39	42	47	49

*Consult Factory

Note: The top two flange holes on valve sizes 36 thru 48 are threaded to 1 1/2"-6 UNC.

350-07/3650-07 Purchase Specifications (CRL-33 supplement)

The Electronic Actuated Pressure Reducing Pilot Control shall have an integral hydraulic pilot and electronic controller contained in a IP-68 rated submersible enclosure to provide interface between remote telemetry and valve set-point control. It will compare a remote analog command signal with an internal position sensor signal and adjust the hydraulic pilot control spring mechanism to a new set-point position. Remote analog signal input shall be isolated and reverse polarity protected and resettable. 4-20 mA actuator position feedback output shall be supplied standard. A second command control input shall be from dry-contact switch closure for clockwise or counter clockwise actuator rotation.

If power fails, the control pilot valve shall continue main valve to control to last set-point command. If the Remote Set-Point signal is lost the actuator is programmable to go to either the 4mA, Last, or 20mA command set-point. No mechanical adjustments shall be necessary to the actuator. The low and high position range adjustment shall be accomplished only with valve manufacturer's components and instructions to be supplied in a separate kit.

The Electronic Actuated Pressure Reducing Pilot Control shall be Cla-Val Model CRD-33 or CRA-33 as manufactured by Cla-Val, Newport Beach, CA.

350-07 Valve Selection	100-01 Pattern: Globe (G), Angle (A), End Connections: Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes																		
	Inches	1	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36	
	mm	25	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
Basic Valve 100-01	Pattern	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G	G	G, A	G	G	
	End Detail	T	T	T, F, Gr*	T, F, Gr	T, F, Gr*	T, F, Gr	F, Gr	F, Gr*	F, Gr*	F	F	F	F	F	F	F	F	F
Suggested Flow (gpm)	Maximum	55	93	125	210	300	460	800	1800	3100	4900	7000	8400	11000	14000	17000	25000	42000	50000
	Maximum Intermittent	68	120	160	260	370	580	990	2250	3900	6150	8720	10540	13700	17500	21700	31300	48000	62500
	Minimum	1	1	1	1	2	2	4	10	15	35	50	70	95	120	150	275	450	650
Suggested Flow (Liters/Sec)	Maximum	3.5	6	8	13	19	29	50	113	195	309	442	530	694	883	1073	1577	2650	3150
	Maximum Intermittent	4.3	7.6	10	16	23	37	62	142	246	387	549	664	863	1104	1369	1972	3028	3940
	Minimum	.03	.03	.03	.06	.09	0.13	0.25	0.63	0.95	2.2	3.2	4.4	6.0	7.6	9.5	17.4	28.4	41.0

100-01 Series is the full internal port Hytrol.

For Lower Flows Consult Factory

*Globe Grooved Only

3650-07 Valve Selection	100-20 Pattern: Globe (G), Angle (A), End Connections: Flanged (F) Indicate Available Sizes																
	Inches	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	
	mm	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1200	
Basic Valve 100-20	Pattern	G	G, A	G, A	G, A	G	G	G	G	G	G	G	G	G	G	G	
	End Detail	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
Suggested Flow (gpm)	Maximum	260	580	1025	2300	4100	6400	9230	9230	16500	16500	16500	28000	33500	33500	33500	
	Minimum	1	2	4	10	15	35	50	50	95	95	95	275	450	450	450	
Suggested Flow (Liters/Sec)	Maximum	16	37	65	145	258	403	581	581	1040	1040	1040	1764	2115	2115	2115	
	Minimum	.06	.13	.25	.63	.95	2.2	3.2	3.2	6.0	6.0	6.0	17.4	28.4	41.0	41.0	

100-20 Series is the reduced internal port size version of the 100-01 Series.

For Lower Flows Consult Factory

We recommend providing adequate space around valve for maintenance work

CRL-33 & CRD Subassembly Specifications

Adjustment Ranges

- 0 to 75 psi
- 20 to 105 psi
- 20 to 200 psi

End Connections

1/2" NPT

Temperature Range

Water: to 180°F

Materials

- Pilot Control: Bronze ASTM B62
- Trim: Stainless Steel Type 303
- Rubber: Buna-N® Synthetic Rubber

Available with optional Stainless Steel or Monel materials. Consult factory for details

When Ordering, Please Specify

1. Catalog No. 350-07 or 3650-07
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded or Flanged
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

130VC-3 (CRL-33) Actuator Specifications

Supply Power Input:

- 12V to 24V DC
- No Load draw: 50 mA
- Max. Load draw: 250 mA

Remote Command Inputs:

- 4-20mA, analog signal (isolated and reverse-polarity protected)
- Dry contact closure (CW/CCW)

Position Feedback Signal:

4-20 mA

Alarm Output:

Dry-contact closure (High/Low)

Speed of Rotation:

Adjustable On/Off time, max 6 rpm

Diagnostic:

LED Indicator

Loss of Power:

Actuator will remain in last commanded position.

Loss of Signal Position:

Programmable - 4 mA, Last, or 20 mA

Electrical Connections:

Single, 30 feet of permanently attached cable with color-coded power supply and signal wires

Mechanical Specifications:

Environmental

- Protection Class: IP-68 (Temporary submersible)
- Ambient Temperature: 15° to 150° F (-10° to 65° C)

Materials

- Electronics Enclosure: Anodized Aluminum
- Mechanical Housing: Bronze
- Coupling Assembly: Stainless Steel
- Gear Train: Stainless Steel, permanently lubricated