



MODEL **350-02**
3650-02

Electronic Actuated Pressure Sustaining Control Valve

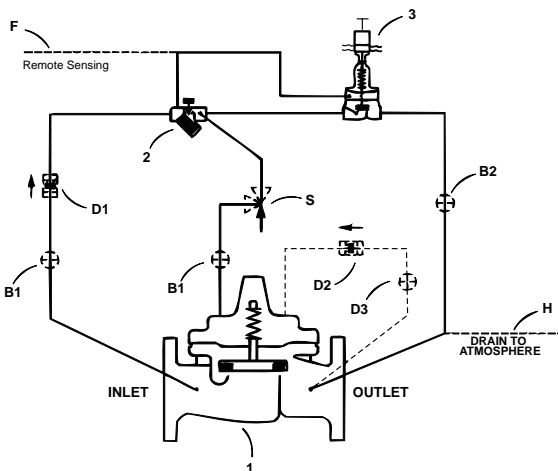


Schematic Diagram

Item	Description
1	Hytrol (Main Valve)
2	X42N-2 Strainer & Needle Valve
3	CRL-31 Electronic Pressure Sustaining Control

Optional Features

Item	Description
B	CK2 Cock (Isolation Valve)
D	Check Valves with Cock
F	Remote Pilot Sensing
H	Drain to Atmosphere
S	CV Flow Control (Opening)



- Simplified Remote Valve Setpoint Control
- 24VDC Input Power
- Easy Interfacing to SCADA Systems
- Accurate Pressure Control
- Reliable Hydraulic Operation
- Rugged Durable Design

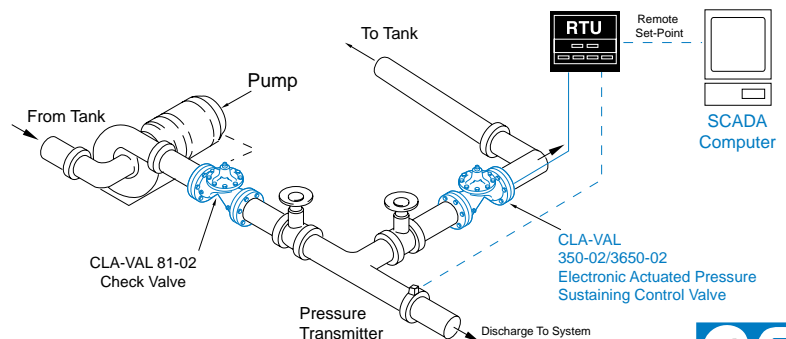
The Cla-Val Model 350-02/3650-02 Electronic Actuated Pressure Sustaining Control Valve combines precise control of field proven Cla-Val hydraulic pilots and simple, remote valve control. The Model 350-02/3650-02 is a hydraulically operated, pilot controlled, modulating valve designed to maintain constant 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-31 pilot control, consisting of a hydraulic pilot and integral controller, that accepts a remote setpoint command input and makes smooth setpoint adjustments to the pilot. The simple remote changing of valve setpoint is suitable for many applications where the process variable is monitored separately and a SCADA or similar remote control system provides valve control.

A separate Process Variable signal (customer supplied) is sent to the SCADA control system for evaluation before sending the valve a change in setpoint. The remote command input (4 - 20 mA analog) signal is automatically ranged in engineering units. Built-in Electronic Limiters adjust total turns to desired portion of pilot spring range. Since the total range of adjustment is the pilot spring range and the limiters keep the valve within an expected setpoint range of values, the SCADA control system will remain in control of the valve setpoint. Optional Range Parameter Kit is required when changing range limits.

Internal continuous electronic monitoring (pat. pend.) 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-31 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.

Typical Applications

The valve is designed to be used with supervisory control systems having remote analog setpoint 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 setpoint adjustment. Additional Pilot Controls, hydraulic and/or electronic, can be easily added to perform multiple control functions to fit exact system requirements.



Model 350-02 (Uses Basic Valve Model 100-01)

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class			
		Flanged			Screwed
Grade	Material	ANSI Standards*	150 lb.	300 lb.	End** Details
ASTM A536	Ductile Iron	B16.42	250	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400
ASTM B62	Bronze	B16.24	225	400	400
ASTM A743	Stainless Steel	B16.5	285	400	400
356-T6	Aluminum	B16.1	275	—	—

Note: *ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.
** End Details machined to ANSI B2.1 specifications.



2" Globe, Screwed



4" Globe, Flanged

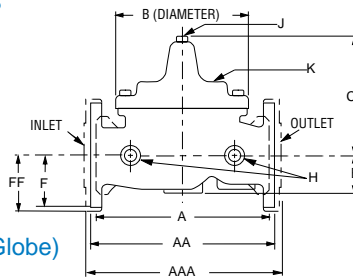


4" Angle, Flanged

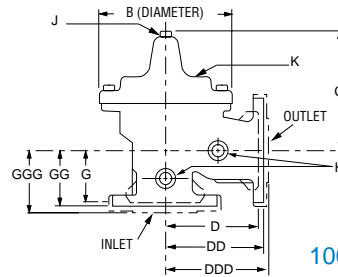
Materials

Component	Material Options						
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum		
Available Sizes	1¼" - 16", 24"	1¼" - 16", 24"	1¼" - 16"	1¼" - 16"	1¼" - 16"		
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Stainless Steel	Aluminum		
Trim: Disc Guide, Seat & Cover Bearing	Bronze is standard. Stainless Steel is optional.			Stainless Steel is standard.			
Disc	Buna-N® Rubber						
Diaphragm	Nylon Reinforced Buna-N® Rubber						
Stem, Nut & Spring	Stainless Steel						

Dimensions (In inches)



100-01 (Globe)



100-01 (Angle)

*1½" Size Only

Valve Size (Inches)	1¼	1½	2	2 ½	3	4	6	8	10	12	14	16	24
A Screwed	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	61.50	—
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	63.24	—
B Dia.	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	53.16	—
C Max.	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	43.93	—
D Screwed	3.25	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—
DD 150 ANSI	4.00*	4.75	5.50	6.00	7.50	10.00	12.75	14.88	17.00	19.50	20.81	—	—
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	—	—
E	1.12	1.50	1.69	2.56	3.19	4.31	5.31	9.25	10.75	12.62	15.50	17.75	—
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	19.25	—
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	—	—
G Screwed	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	—	—
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	—	—
H NPT Body Tapping	⅜	⅜	½	½	¾	¾	1	1	1	1	1	1	1
J NPT Cover Center Plug	¼	½	½	½	¾	¾	1	1	1 ¼	1 ½	2	1 ½	—
K NPT Cover Tapping	⅜	⅜	½	½	¾	¾	1	1	1	1	1	1	1
Valve Stem Internal Thread UNF	10-32	10-32	10-32	¼-28	¼-28	⅜-24	⅜-24	⅜-24	⅜-24	⅜-24	½-20	3/4-16	—
Stem Travel	0.4	0.6	0.7	0.8	1.1	1.7	2.3	2.8	3.4	4.0	4.5	6.50	—
Approx. Ship Wt. Lbs.	15	35	50	70	140	285	500	780	1165	1600	2265	6200	—

Model 3650-02 (Uses Basic Valve Model 100-20)

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class		
		Flanged		
Grade	Material	ANSI Standards*	150 lb.	300 lb.
ASTM A536	Ductile Iron	B16.42	250	400
ASTM A216-WCB	Cast Steel	B16.5	285	400
ASTM B62	Bronze	B16.24	225	400
ASTM A743	Stainless Steel	B16.5	285	400
356-T6	Aluminum	B16.1	275	—

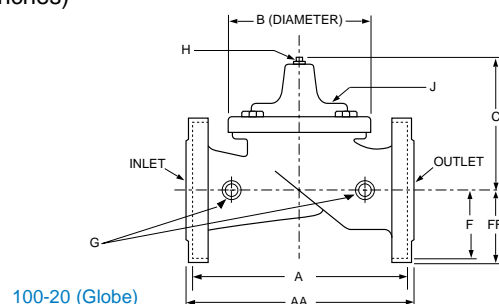
Note: *ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.

Materials

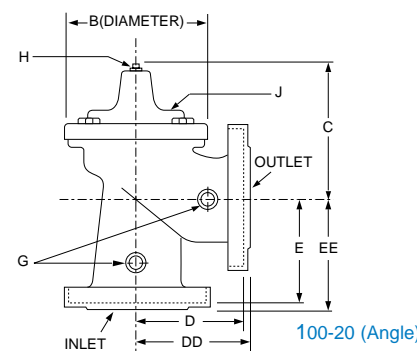
Component	Material Options						
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum		
Available Sizes	3"-30"	3"-30"	3"-16"	3"-16"	3"-16"		
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Stainless Steel	Aluminum		
Trim: Disc Guide, Seat & Cover Bearing	Bronze is standard. Stainless Steel is optional.			Stainless Steel is standard.			
Disc	Buna-N® Rubber						
Diaphragm	Nylon Reinforced Buna-N® Rubber						
Stem, Nut & Spring	Stainless Steel						

Dimensions

(In inches)



100-20 (Globe)



100-20 (Angle)

VALVE SIZE (Inches)	3	4	6	8	10	12	14	16	18	20	24	30
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
AA 300 ANSI	11.00	14.50	18.62	22.38	27.38	31.50	—	36.62	43.63	49.62	49.75	—
B DIA.	6.62	9.12	11.50	15.75	20.00	23.62	28.00	28.00	35.44	35.44	35.44	53.19
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
D 150 ANSI	—	6.94	8.88	10.69	—	—	—	—	—	—	—	—
DD 300 ANSI	—	7.25	9.38	11.19	—	—	—	—	—	—	—	—
E 150 ANSI	—	5.50	6.75	7.25	—	—	—	—	—	—	—	—
EE 300 ANSI	—	5.81	7.25	7.75	—	—	—	—	—	—	—	—
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
FF 300 ANSI	4.12	5.00	6.25	7.50	8.75	10.25	—	12.75	15.88	16.06	19.00	—
G NPT Body Tapping	3/8	1/2	3/4	3/4	1	1	1	1	1	1	1	1
H NPT Cover Center Plug	1/2	1/2	3/4	3/4	1	1	1 1/4	1 1/4	2	2	2	2
J NPT Cover Tapping	3/8	1/2	3/4	3/4	1	1	1	1	1	1	1	1
Valve Stem Internal												
Thread UNF	10-32	1/4-28	1/4-28	3/8-24	3/8-24	3/8-24	3/8-24	3/8-24	1/2-20	1/2-20	1/2-20	3/4-16
Stem Travel	0.6	0.8	1.1	1.7	2.3	2.8	3.4	3.4	4.5	4.5	4.5	6.5
Approx Ship Wt. Lbs.	45	85	195	330	625	900	1250	1380	2733	2551	2733	6500










































350-02/3650-02 Purchase Specifications (CRL-31 supplement)

The Electronic Actuated Pressure Sustaining Control Valve shall have an integral hydraulic and electronic controller contained in a NEMA 4X enclosure to provide interface between remote telemetry and valve setpoint 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 setpoint position. The actuator speed will be factory set to less than one RPM with a maximum range of nine turns. Actuator position feedback output shall be supplied standard. A separate Process Variable signal (customer supplied) must be sent to the SCADA control system for evaluation before sending the valve a change in setpoint. The remote command input 4 -20 mA analog signal must be automatically ranged in engineering units within the range set by built-in electronic limiters. Supplied electronic range limiters shall reduce total range to a portion of pilot spring range.

If the RSP signal is lost or power fails, the valve shall remain under control of the pressure reducing hydraulic control sub-assembly. No adjustments shall be necessary to the actuator except to the low and high position range adjustment. Range adjustment shall be accomplished only with valve manufacturer's components and instructions to be supplied in a separate kit.

The Electronic Actuated Pressure Sustaining Control Valve shall be Cla-Val Model 350-02/3650-02 as manufactured by Cla-Val, Newport Beach, CA.

Valve Selection

Valve Selection		These Symbols  and  Indicate Available Sizes																	
		Inches	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	30	
		mm	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	
		End Detail	Screwed	Screwed & Flanged					Flanged										
Model 350-02	Basic Valve 100-01	Globe																	
		Angle																	
	Suggested Flow (GPM)	Max. Continuous	93	125	210	300	460	800	1800	3100	4900	7000	8400	11000			25000		
		Max. Intermittent	120	160	260	370	580	990	2250	3900	6150	8720	10540	13700			31300		
		Min. Continuous	10	10	15	20	30	50	115	200	300	400	500	650			1750		
	Suggested Flow (Liters/sec)	Max. Continuous	6	8	13	19	29	50	113	195	309	441	529	693			1575		
		Max. Intermittent	7.6	10.1	16.4	23	37	62	142	246	387	549	664	863			1972		
		Min. Continuous	.6	.6	.9	1.3	1.9	3.2	7.2	13	19	25	32	41			110		
Model 3650-02	Basic Valve 100-20	Globe																	
		Angle																	
	Suggested Flow (GPM)	Max.Continuous						260	580	1025	2300	4100	6400	9230	9230	16500	16500	16500	28000
		Min. Continuous						15	30	50	115	200	300	500	500	900	900	900	1850
	Suggested Flow (Liters/sec)	Max.Continuous						16	37	65	145	258	403	581	581	1040	1040	1040	1764
		Min. Continuous						.9	1.9	3.2	7.2	13	19	32	32	57	57	57	117

* 3650-02 is the reduced internal port size version of the 350-02.

For 100-01 basic valves suggested flow calculations were based on flow through Schedule 40 Pipe. Maximum continuous flow is approx. 20 ft/sec (6.1 meters/sec) & maximum intermittent is approx. 25 ft/sec (7.6 meters/sec) and minimum continuous flow is approx. 1 ft/sec (.3 meters/sec). For 100-20 basic valves suggested flow calculations were based on flow through the valve seat. Approx. 26 ft/sec (7.9 meters/sec) was used for maximum continuous flow & 1 ft/sec (.3 meters/sec) is used for minimum continuous flow. Maximum continuous flow through the valve seat for the 30" 100-20 is approx. 20 ft/sec (6.1 meters/sec).

**Flanged End Detail Only

Pilot System Specifications

Adjustment Ranges

0 to 75 psi
20 to 200 psi

Temperature Range

Water: to 180°F

Materials

Standard Pilot System Materials

Pilot Control: Bronze ASTM B62

Trim: Stainless Steel Type 303

Rubber: Buna-N® Synthetic Rubber

Optional Pilot System Materials

Pilot Systems are available with optional Aluminum, Stainless Steel or Monel materials at extra cost.

Note: Available with remote sensing control. Consult Factory

When Ordering, Please Specify

- Catalog No. 350-02 or 3650-02
- Valve Size
- Pattern - Globe or Angle
- Pressure Class
- Screwed or Flanged
- Trim Material
- Adjustment Range
- Desired Options
- When Vertically Installed

Electronic Actuator - CRL-31 Pilot Control

Supply Power Input: 24 VDC (+/- 10%) at 2 Amps
No Load draw: 25 mA

Remote Command Input: 4-20 mA analog signal, 12 to 36 VDC compliant, 220 ohm burden. Non-Isolated (return wire is referenced to power supply common wire)

Position Feedback Signal: 5 K high precision potentiometer (three-wire signal) output. Supplied standard

Speed of Rotation: Approximately 270 degrees per minute (non-adjustable)

Total Number of Turns: 9 (factory pre-set maximum)

Position Limiters: Built-in Electronic type, factory set to maximum range, field settable to desired range with Range Parameter Kit.

Loss of Signal or Loss of Power: Actuator will remain in last commanded position.

Terminal Block: Accepts up to #16 AWG solid or strand wire

Actuator Mechanical Specifications:

Enclosure and Wiring Junction Box: NEMA 4X, Anodized Aluminum
Bracket: Anodized Aluminum
Coupling: Assembly: Brass, Nickel Plated
Gear Train: Stainless Steel, permanently lubricated

Options: Range Parameter Kit. Includes Windows-based software and special 6' connecting cable. Kit is required when changing range parameters or when servicing pilot control to restore range parameters.



E-350-02/3650-02

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