

# Electronic Actuated Rate of Flow and Pressure Reducing Valve



- Simplified Interfacing with SCADA Systems
- Accepts Local or Remote Set-Point
- Integral Loop Power Supply
- Accurate Pressure Control
- Reliable Hydraulic Operation
- Rugged Durable Design

The Cla-Val Model 349-01/3649-01 Electronic Actuated Rate of Flow and Pressure Reducing Control Valve combines the precise control of field proven Cla-Val hydraulic pilots and the convenience and versatility of remote set-point control. The Model 349-01/3649-01 control valve automatically reduces a higher inlet pressure to a steady lower downstream pressure regardless of changing flow rate and/or varying inlet pressure, as long as the flow rate is below a preset maximum. It also prevents excessive flow by limiting flow to a remotely set maximum rate.

## Schematic Diagram

Item	Description
1	Hytrol (Main Valve)
2	X58C Restriction Fitting
3	CRA Pressure Reducing Control
4	X52D-1 Orifice Plate Assembly
5	CDHS-30 Electronic Flow Control Pilot
6	DPT Differential Pressure Transmitter
7	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
E	X117D Position Transmitter
P	X141 Pressure Gauge
S	CV Flow Control (Opening)
V	X101 Valve Position Indicator
Y	X43 "Y" Strainer

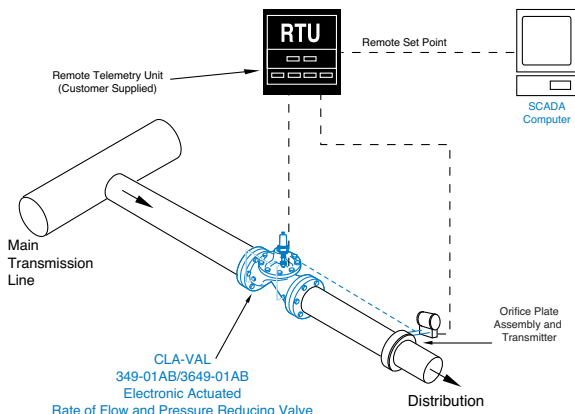
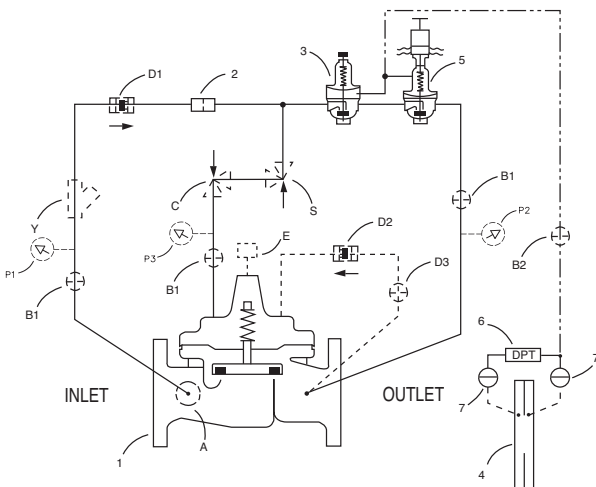
This valve is a hydraulically operated, pilot controlled diaphragm actuated control valve. The pilot system includes a direct acting pressure reducing pilot and an electronically actuated rate of flow control. The pressure reducing pilot is manually set and responsive to slight variations in downstream pressure and immediately controls the main valve to maintain the desired line pressure. The rate of flow pilot control, consisting of a hydraulic pilot and integral controller, accepts a set-point and compares it with the flow or internal potentiometer signal and makes incremental adjustments to modulate the valve to set-point.

Adjustable solid state limit switches eliminate over ranging. In the event of a power or transmitter failure, the CDHS-30 hydraulic pilot remains in valve 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

This valve is designed to be used with supervisory control systems having an isolated remote analog set-point output and a process variable flow transmitter input. The 349-01/3649-01 is typically installed in systems requiring remote set-point changes of flow rates. It is also an effective solution for lowering costs associated with "confined space" requirements by eliminating the need for entry into valve structure for set-point adjustment and system information.

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



## Model 349-01 (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.

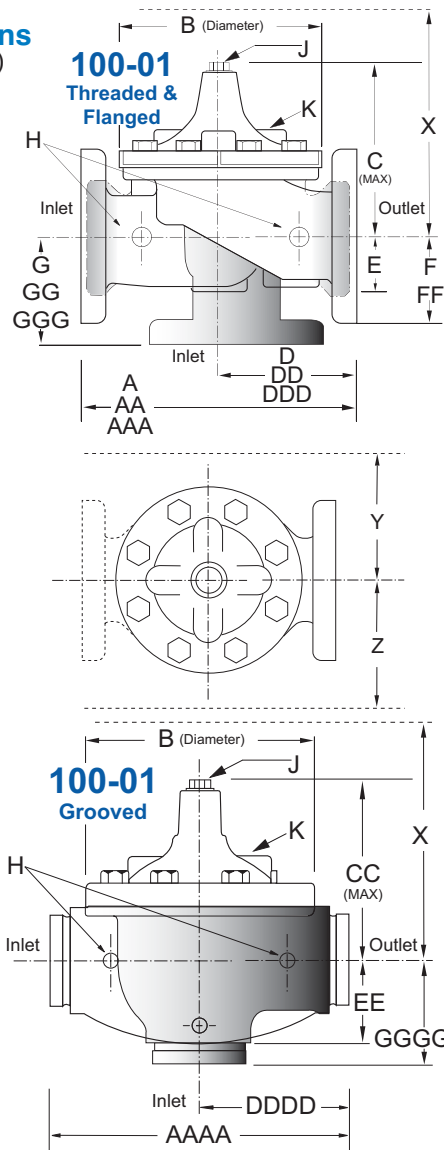
**Valves for higher pressure are available; consult factory for details**

### Materials

Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	1-1/2" - 36"	1-1/2" - 16"	1-1/2" - 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 349-01 Dimensions (In Inches)

Valve Size (Inches)	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	30	36
A Threaded	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	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	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	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	1.50	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	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	.50	.50	.75	.75	1	1	1	1	1	1	1	1	2	2
J NPT Cover Center Plug	.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	.50	.50	.75	.75	1	1	1	1	1	1	1	1	2	2
Stem Travel	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	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720
X Pilot System	11	13	14	15	17	29	31	33	36	40	40	43	47	68	79	85
Y Pilot System	9	9	10	11	12	20	22	24	26	29	30	32	34	39	40	45
Z Pilot System	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

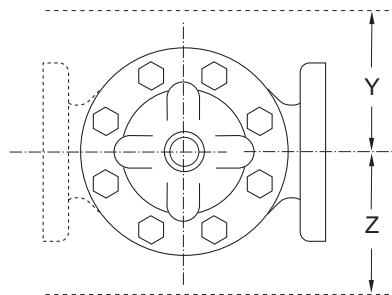
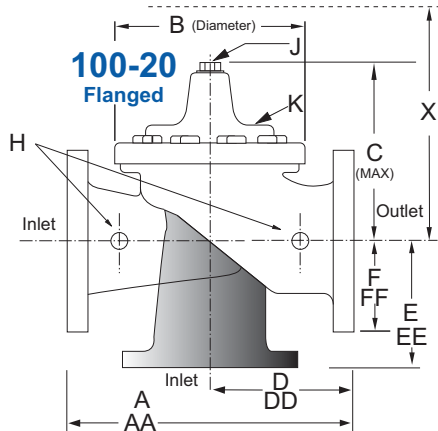
Note: \* ANSI standards are for flange dimensions only.  
Flanged valves are available faced but not drilled.  
**Valves for higher pressure are available; consult factory for details**

## 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 3649-01 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.

## 349-01/3649-01 Purchase Specifications

The 349-01/3649-01 Electronic Actuated Rate of Flow and Hydraulic Pressure Reducing Control Valve shall have an integral hydraulic and electronic controller contained in a NEMA 4 enclosure to provide the interface between remote telemetry and valve control. It will compare a selectable remote analog or local set-point with a process variable signal or internal position sensor signal and automatically adjust the hydraulic pilot control until the main control valve reaches desired set-point.

The electronic actuator will supply loop power for the process variable signal. Retransmission of the process variable shall be with an isolated non-powered analog signal. The actuator speed will be infinitely adjustable between 1/3 and 5 RPM and will have an adjustable dead band. In the event of an erroneous communications signal, actuator output will be capable of being limited to a predetermined process variable value. If these signals (SP and/or PV) are lost, the valve shall remain under control of the pressure reducing and flow limiting hydraulic control. The actuator can also be programmed to drive the main valve to the open or closed position if these signals are lost.

All setup and adjustments will be capable of being made prior to placing the valve into service using actuator test points for signal measurement and subsequent calibration. Actuator diagnostics will be displayed using LEDs. Manual operation of the hydraulic pilot will be fully adjustable using a non-rotating handwheel.

The Electronic Actuated Rate of Flow and Pressure Reducing Control Valve shall be the Cla-Val Model 349-01/3649-01 as manufactured by Cla-Val, Newport Beach, CA.

<b>349-01 Valve Selection</b>	<b>100-01 Pattern:</b> Globe (G), Angle (A), <b>End Connections:</b> Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes																
	Inches	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
	mm	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	G	G, A	G	G
	End Detail	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	125	210	300	460	800	1800	3100	4900	7000	8400	11000	14000	17000	25000	42000	50000
	Maximum Intermittent	160	260	370	580	990	2250	3900	6150	8720	10540	13700	17500	21700	31300	48000	62500
	Minimum	1	1	2	2	4	10	15	35	50	70	95	120	150	275	450	650
Suggested Flow (Liters/Sec)	Maximum	8	13	19	29	50	113	195	309	442	530	694	883	1073	1577	2650	3150
	Maximum Intermittent	10	16	23	37	62	142	246	387	549	664	863	1104	1369	1972	3028	3940
	Minimum	.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
<b>100-01 Series is the full internal port Hytrol. For Lower Flows Consult Factory</b>																	
*Globe Grooved Only																	

<b>3649-01 Valve Selection</b>	<b>100-20 Pattern:</b> Globe (G), Angle (A), <b>End Connections:</b> 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	
<b>100-20 Series is the reduced internal port size version of the 100-01 Series. For Lower Flows Consult Factory</b>																	

We recommend providing adequate space around valve for maintenance work

### Pilot System Specifications

#### Adjustment Ranges

**CDHS-30:**  
Low flow equals one-fourth maximum flow

**CRA:** 2 to 30 psi  
15 to 75 psi  
30 to 300 psi

**Temperature Ranges:**  
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 additional cost.

Note: Orifice plate assembly (X52D-1) is 1/8" thick and must be installed minimum 5 pipe diameters downstream of valve with a minimum of 3 pipe diameters of straight pipe downstream of orifice plate assembly. Orifice plate assembly sensing connections should be located to the side of the pipeline. To increase measurement accuracy recommended minimum is 10 pipe diameters upstream and 5 pipe diameters downstream of the orifice plate assembly.

#### When Ordering, Please Specify

- Catalog No. 349-01 or 3649-01
- Valve Size
- Pattern - Globe or Angle
- Pressure Class
- Threaded or Flanged
- Trim Material
- Adjustment Range
- Desired Options
- When Vertically Installed

### Electronic Actuator - CDHS-30 Pilot Control

**Input Voltage:** 120/240 Vac +/- 10%, 50/60 Hz

**Operating Current:** 2 Amperes at 120 Vac

**Process Variable:** Field Selectable between 4-20mA transmitter (supplied by others) or internal potentiometer

**Loop Power Supply:** 0-24 VDC

**Retransmission:** Isolated non-powered 4-20mA

**Input Signal Monitor:** If process variable is lost actuator holds in present position, opens or closes, field selectable

**Set-Point:** Field selectable between local and remote 4-20 mA, 0-5 Volt, 0-10 Volt

**Manual Adjustment:** Non-rotating handwheel

**Limit Switches:** Electronic-Full range adjustable

**Terminations:** Terminal blocks accepting up to #16 Awg solid or stranded wire

**Operating Temperature:** 0°F to 150 °F (-18 C to 65 C)

**Environmental Rating:** Enclosure rated NEMA type 4 indoor/outdoor, corrosion resistant aluminum