Description:

The CV-ET Series Linear Control Valves is a balanced plug, cage-guided linear control valve specifically engineered for natural gas regulation applications. The "push-down-to-close" control valve is available from 2.0 in to 16 in bore with Equal Percent or Linear trim characteristics from 150 ANSI to 1500 ANSI pressure ratings. Noise attenuating trim designs are available to ensure optimal performance in natural gas regulation applications. The CV-ET control valve series may be automated using VRG's LD Linear Diaphragm or LHPA Linear High-Pressure Actuators. All VRG Control Instrumentation is compatible to ensure that you achieve optimal performance and reliability for your natural gas control applications.

Figure 1.0 – VRG Controls CV-ET Control Valve with LD Actuator and VPC Valve Pilot Controller for Pressure Control Application

Product Range:

Size Range: 2.0 in to 16 in Bore

ANSI Range: 150, 300, 600, 900 ANSI

End Connections: RFFE, WE, RTJ

Trim Type: Balanced Plug, Cage Guided, Linear Control Valve

Flow Characteristics: Linear, Equal Percentage

Performance Trim: Level 1, 2, 3 Noise Attenuating

** CUSTOM TRIM CONFIGURATIONS AVAILABLE **

Figure 2.0 – VRG Controls CV-ET Control Valve with LD Actuator

Compatible Actuators:

- LD Linear Diaphragm (Spring)
- LHPA-DA Double Acting Piston
- LHPA-SR Spring & Piston

Table 1.0 – Specifications Series CVET Linear Control Valves

Configuration	CV-ET	CV-EWT
Size Range	2.0 to 8.0 in	10 in, 12 in & 16 in
Design Standards	ANSI B16.34 ASME B16.5 NACE MRO175 -OPTIONAL	ANSI B16.34 ASME B16.5 NACE MRO175 -OPTIONAL
ANSI Range	150, 300, 600, 900 ANSI	300, 600 ANSI
End Connections	RFFE, WE, RTJ	RFFE, WE, RTJ
Trim Type	Balanced Plug Cage Guided Linear Control Valve	Balanced Plug Cage Guided Expanded Body Linear Control Valve
Flow Characteristics	Linear, Equal Percentage	Linear, Equal Percentage
Performance Trim	Level 1, 2, 3 Noise Attenuating	Level 1, 2, 3 Noise Attenuating
Max Control ΔP		
Max Shutoff ΔP		
Shutoff Class	Class IV Class V Class VI	Class IV Class V Class VI
Compatible Actuators	LD Linear Diaphragm (Spring) LHPA-DA Double Acting Piston LHPA-SR Spring & Piston	LHPA-DA Double Acting Piston LHPA-SR Spring & Piston
Coating	VRG Standard Epoxy (WHITE) Custom Coat Per Customer Specs	VRG Standard Epoxy (WHITE) Custom Coat Per Customer Specs
Sizing & Selection	VRGSize Proprietary Software	VRGSize Proprietary Software
Testing Specifications	Extended API	Extended API
Shell Pressure Test	1.0 HR @ 1.5X ANSI	1.0 HR @ 1.5X ANSI
Seat Pressure Test	30 MIN @ 1.1X ANSI	30 MIN @ 1.1X ANSI
Face-Face Specifications	ANSI B16.10	ANSI B16.10
Temperature Rating		

Notes:

1. 2 in to 8 in are “ET” Type Body Configuration
2. 10 in, 12 in, & 16 in Sizes are “EWT” Type Body Configuration

Table 2.0 – Materials of Construction Series CVET Linear Control Valves

Configuration	CV-ET	CV-EWT
Valve Body	SA352 LCC CS	SA352 LCC CS
Valve Bonnet	SA352 LCC CS	SA352 LCC CS
Valve Plug	316 SS	316 SS
Cage	316 SS	316 SS
Cage Adapter	316 SS	316 SS
Seat Ring Adapter	316 SS	316 SS
Stem	316 SS	316 SS
Groove Pin	316 SS	316 SS
Seat Ring Retainer	316 SS	316 SS
Seat Ring (Metal Seat Only)	316 SS	316 SS
Bonnet Gasket	Non-Asbestos	Non-Asbestos
Cage Gasket	Non-Asbestos	Non-Asbestos
Spiral Wound Gasket	316 SS Non-Asbestos	316 SS Non-Asbestos
Seat Gasket	Non-Asbestos	Non-Asbestos
Studs	Steel	Steel
Hex Nuts	Steel	Steel
Flow Direction Arrow	316 SS	316 SS
Drive Screw	316 SS	316 SS
Disc Retainer (Composition Seat)	316 SS	316 SS
Disc Seat (Composition Seat)	316 SS	316 SS
TFE Disc	TFE	TFE
Seal Ring	Carbon Filled TFE	Carbon Filled TFE
Backup Ring	Viton / EPDM	Viton / EPDM

Notes:

1. 2 in to 8 in are “ET” Type Body Configuration
2. 10 in, 12 in, & 16 in Sizes are “EWT” Type Body Configuration

Table x.0 – Available Linear Actuators for CV Series Linear Control Valves

LD Series
Linear Diaphragm Actuators

Description: LD Linear Diaphragm Actuators are a low pressure, spring return linear actuator suited to mate with VRG Globe Control Valves. LD Actuators feature a high thrust to weight ratio with guaranteed failure mode upon loss of supply pressure. Actuators may be selected Fail Open or Fail Closed logic.

Features:

- High Thrust at Low Supply Gas Pressure
- Ideally Suited for Stable Control (Throttling) Applications
- Ideally Suited for Use with VRG Single Acting VPC's
- Accepts VRG VGP Valve Gas Positioner Standard
- Typ. Bench Set 3-15 psig & 6-30 psig, Other Ranges Available
- Guaranteed Failure Mode (STO / STC)
- Modular Installation Matched to VRG Globe Control Valves

Max Thrust: 8,800 Lbs
Supply Range: 20 - 75 psig*

Models & Options:
657 Series (STO)
667 Series (STC)

LHPA-DA Series
Linear High-Pressure Actuators
(Double Acting)

Description: LHPA-DA Linear High-Pressure Actuators – DA Series are a high pressure, double acting linear actuator suited to mate with VRG Globe Control Valves. LHPA-DA Actuators feature maximum thrust to weight ratio in a compact design. LHPA-DA Actuators can accept up to 400 psig supply gas, allowing for BPS Bleed to Pressure System, eliminating all atmospheric emissions.

Features:

- High Thrust and High-Pressure Actuators
- Very Compact Design
- Capable of eliminating all atmospheric emissions with BPS feature
- Fast stroking speeds and high stability design ideal for power plant fuel gas applications
- Submersible Design provides sealed and enclosed yoke ideal for operator safety and vault installations
- Submersible Design Option protects valve stem and piston rod from rust and corrosion

Max Thrust: XX,000 lbs.
Supply Range: 50 - 400 psig*

Models & Options:
LHPA-DA Series – Double Acting
Optional SUB Submersible Design
Custom Mounting Adaptation

LHPA-SR Series
Linear High-Pressure Actuators
(Spring Return)

Description: LHPA-SR Linear High-Pressure Actuators – SR Series are a high pressure, spring return linear actuator suited to mate with VRG Globe Control Valves. LHPA-SR Actuators feature maximum thrust to weight ratio in a compact design. LHPA-SR Actuators can accept up to 400 psig supply gas, allowing for BPS Bleed to Pressure System, eliminating all atmospheric emissions.

Features:

- High Thrust and High-Pressure Actuators
- Very Compact Design
- Capable of eliminating all atmospheric emissions with BPS feature
- Fast stroking speeds and high stability design ideal for power plant fuel gas applications
- Submersible Design provides sealed and enclosed yoke ideal for operator safety and vault installations
- Submersible Design Option protects valve stem and piston rod from rust and corrosion

Max Thrust: XX,000 lbs.
Supply Range: 50 - 400 psig*

Models & Options:
LHPA-SR Series – Spring Return (STC)
LHPA-SR Series – Spring Return (STO)
Optional SUB Submersible Design
Custom Mounting Adaptation

Table x.0 – Available Control Instrumentation for CV Series Linear Control Valves

VPC Valve Pilot Controllers

Description: VPC Valve Pilot Controllers provide a modular plug & play pressure control system for use in conjunction with pneumatically actuated control valves for natural gas pipelines. The VPC features a simple 5-in-1 configuration system that provides compatibility with double acting piston and spring return valve actuators in a single platform. The VPC may be configured to provide compatibility with almost any pneumatic control valve on the market.

Features:

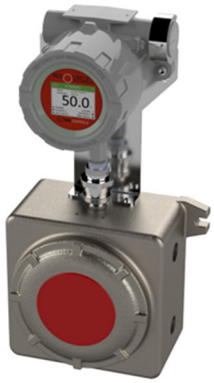
- ZERO Steady State Emissions Capable
- Complete Elimination of atmospheric emissions possible when “discharge to pressure system”
- Modular format provides flexibility and reduced tubing connections
- Military grade alloy provides superior corrosion resistance
- Only Two (2) Repair Kits cover entire product range
- Compatible with Other Manufacturer’s Pneumatic Control Valves

Setpoint Range: 3.0 to 1500 psig
Control Accuracy: ±0.5% Guaranteed
Max Supply Pressure: 400 psig

Models & Options:

VPC-DA-SN (Double Acting)
VPC-DA-BV (Double Acting)
VPC-SA-BV (Single Acting)
VPC-SA-BV-ID (Single Acting)
VPC-SA-BV-GAP (GAP Controller)

- NVD No Vent Device
- ESC Electronic Setpoint Control
- VB Volume Boosters
- Submersible Design Option
- CP Calibration Pump
- SGS Supply Gas Systems



RCVC Red Circle Valve Controllers

Description: The RCVC provides accurate positioning of natural gas control valves via electronic signal. The RCVC is compatible with all VRG Controls control valve actuators. The Red Circle Control Valve features zero steady state consumption with an ability to discharge emissions to a suitable nearby pressure system. The high-pressure capability of the RCVC system allows for efficient use of more compact pneumatic actuators. The RCVC is equipped with the advanced features ideally suited for installation on natural gas pipelines.

Features:

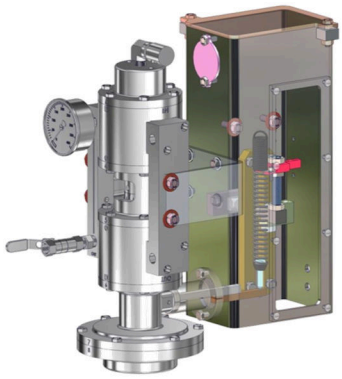
- ZERO Steady State Emissions
- Complete Elimination of atmospheric emissions possible when “discharge to pressure system”
- Class 1, Div 1, Ex Proof Design
- High Resolution TFT Color Display
- Local Programming without breach of Ex Proof Rating
- Full configurability via laptop computer with Autocalibration features
- Compatible with Other Manufacturer’s Pneumatic Control Valves
- Split Range Signal Capable

Command Input: 4-20 mA / ±24 VDC
Control Accuracy: ± 1.0%
Max Supply Pressure: 250 psig

Models & Options:

RCVC3000 (Local Installation)
RCVC3000REM (Remote Installation)

- BALLUFF Linear Non-Contact Transmitter
- Rotary Feedback Transmitter
- PCO Pressure Control Override



VGP Valve Gas Positioners

Description: VGP Valve Gas Positioners provide a modular plug & play valve positioning system for use in conjunction with pneumatically actuated control valves for natural gas pipelines. The VGP provides accurate positioning of control valves via pneumatic signal. The VGP features a simple 3-in-1 configuration system that provides compatibility with double acting piston and spring return valve actuators in a single platform. The VGP may be configured to provide compatibility with several other manufacturer’s pneumatic control valves.

Features:

- ZERO Steady State Emissions Capable
- Complete Elimination of atmospheric emissions possible when “discharge to pressure system”
- Modular format provides flexibility and reduced tubing connections
- Military grade alloy provides superior corrosion resistance
- Only Two (2) Repair Kits cover entire product range
- Compatible with Other Manufacturer’s Pneumatic Control Valves
- Split Range Signal Capable

Command Input: 3-15 psig, 6-30 psig
Control Accuracy: ± 1.0%
Max Supply Pressure: 250 psig *

Models & Options:

VGP-DA-SN (Double Acting)
VGP-DA-BV (Double Acting)
VGP-SA-BV (Single Acting)

- Split Range Control Configuration
- NVD No Vent Device
- I/P Transducers
- Pneumatic Selector Relays
- VB Volume Boosters
- Submersible Design Option
- CP Calibration Pump
- SGS Supply Gas Systems

Table x.0 – Available Control Instrumentation for CV Series Linear Control Valves

Rotary Valve Status Monitor

Description: When remote status monitoring is necessary, a Rotary Valve Status Monitor is available. Multiple configurations are available to provide 4-20 mA analog valve position feedback and/or discrete limit switch end of travel indication. All components are Class 1, Div. 1 Explosion Proof and designed for use in natural gas applications. Most devices include a high visibility rotary position indication. Intended for "passive" use position feedback. Not preferred when used as "active" feedback control loop.

Features:

- Explosion Proof Design for Natural Gas Applications
- Available w 4-20 mA Analog Position Feedback
- Available w Discrete End-of-Travel Limit Switches
- Multiple Brands Available
- Typically Includes High Visibility Rotary Position Indicator
- Seamless Integration with All VRG Controls Actuators
- 24 VDC Onboard Heaters Typically Standard
- NAMUR Output Shaft

Input Range: 90° (Quarter Turn) Standard
Analog Output: 4-20 mA (Loop Powered)
Discrete Output: Limit Switches

Models & Options:

90° (Quarter Turn) – Standard
70° (Short Travel) – Optional
Various Mounting Kits for Compatibility
SP-DT Limit Switches
DP-DT Limit Switches
Mechanical Type Limit Switches
Non-Contact Proximity Switches Available
QTY 2 or 4 Limit Switch Assemblies

- NVD No Vent Device
- ESC Electronic Setpoint Control
- VB Volume Boosters
- Submersible Design Option
- CP Calibration Pump
- SGS Supply Gas Systems

Linear Position Sensor

Description: When remote status monitoring of exact quantitative valve position is required for "active" feedback control loops, the Balluff Linear Position Sensor is the ideal solution. The Balluff features a non-contact, hall-effect transmitter that will not wear and provides the most accurate and reliable performance. The Balluff Sensor is ideal for use in tandem with the VRG RCVC Red Circle Valve Controller since it provides the most robust performance with highest reliability and accuracy.

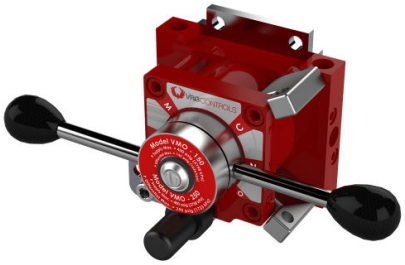
Features:

- Explosion Proof Design for Natural Gas Applications
- Available w 4-20 mA Analog Position Feedback
- Seamless Integration with All VRG Controls Actuators
- 24 VDC Onboard Heaters Typically Standard
- NAMUR Output Shaft
- Non-Contact Design will not fatigue or wear
- Suited for "Active" Feedback for use with RCVC Red Circle Valve Controller

Input Range: 2.0 in to 12 in Adjustable
Control Accuracy: ± 0.5%
Analog Output: 4-20 mA (24 VDC Req'd)

Models & Options:

Balluff BTL7 – 4 in Stroke Max
Balluff BTL7 – 6 in Stroke Max
Balluff BTL7 – 8 in Stroke Max
Balluff BTL7 – 12 in Stroke Max



VMO Valve Manual Override

The VMO Valve Manual Override is the ideal device to provide manual operation of pneumatically actuated control valves and automated isolation valves. The VMO allows the operator to locally, manually position the actuated valve. The VMO overrides primary instrumentation and is ideal for commissioning, maintenance and LOTO (Lock Out Tag Out) procedures. All units include locking devices to prevent unauthorized operation.

Features:

- Low profile mounting system for easy adaptation to virtually any pneumatically actuated valve.
- VMO design 20% less weight and half the size of comparable products.
- Compatible with almost all pneumatic actuators.
- Manifold port design ensures easy installation.
- High visibility "RED SQUARE" format ensures easy locating during emergency situations
- Epoxy topcoat provides rugged protection for most aggressive applications.

Supply Pressure: 150 psig, 250 psig
Ports: 0.250 FNPT (6)
Flow Capacity: Cv=0.40

Models & Options:

VMO-150
VMO-250

- VMO Handle Limit Switches

Table 3.0 - Maximum Flow Coefficient Cv – CV-ET & CV-EWT Series

Valve Flow Coefficient Cv - Full Open

Valve Size (in)	L0	E0	L1	E1	L2	E2	L3	E3
Characteristic	Linear	Equal Percent	Linear	Equal Percent	Linear	Equal Percent	Linear	Equal Percent
Noise Trim	N/A	N/A	1 Stage	1 Stage	2 Stage	2 Stage	3 Stage	3 Stage
2 CV-ET	73	60	52	44	37	31	30	26
3 CV-ET	148	136	112	95	81	69	65	55
4 CV-ET	236	224	198	168	140	119	109	93
6 CV-ET	433	394	375	319	272	231	23	175
8 CV-ET	846	818	695	591	501	426	381	324
10 CV-ET	1360	900	1212	720	733	703	573	549
12 CV-EWT	1400	1230	1277	1120	767	735	582	557
16 CV-EWT	1790	1590	1467	1145	895	795	805	636

Notes:

1. Above CV-ET & CV-EWT Assemblies applicable for 150, 300, and 600 ANSI Pressure Ratings
2. Linear Characteristic Trim provides maximum capacity.
3. Equal Percent Characteristic Trim provides maximum flow range ability.
4. Minimum Controllable Linear Cv = 10% of Maximum Published Cv
5. Minimum Controllable Equal Percentage Cv = 3.0% of Maximum Published Cv

Table 4.0 - Cv Profile Information CV-ET & CV-EWT Series - E0 Trim

Percent Valve Travel

Valve Size (in)	10	20	30	40	50	60	70	80	90	100
2 CV-ET	2	4	6	8	11	15	22	32	47	60
3 CV-ET	4	8	13	19	26	35	49	73	107	136
4 CV-ET	6	14	22	31	42	58	81	121	176	224
6 CV-ET	11	24	38	54	74	101	142	212	310	394
8 CV-ET	24	50	79	113	155	210	295	441	644	818
10 CV-ET	26	55	86	124	170	231	325	485	708	900
12 CV-EWT	36	75	118	170	232	316	444	663	968	1230
16 CV-EWT	46	97	153	219	301	409	574	857	1251	1590
Cv Factor	*0.029*	*0.061*	*0.096*	*0.138*	*0.189*	*0.257*	*0.361*	*0.539*	*0.787*	*1.000*
Xt	*0.321*	*0.338*	*0.356*	*0.375*	*0.395*	*0.415*	*0.437*	*0.46*	*0.485*	*0.51*
Fl	*0.62*	*0.63*	*0.65*	*0.67*	*0.69*	*0.7*	*0.72*	*0.74*	*0.76*	*0.78*

Table 5.0 - Cv Profile Information CV-ET & CV-EWT Series - E1 Trim

Percent Travel

Valve Size (in)	10	20	30	40	50	60	70	80	90	100
2 CV-ET	1	3	4	6	8	11	16	24	35	44
3 CV-ET	3	6	9	13	18	24	34	51	75	95
4 CV-ET	5	10	16	23	32	43	61	91	132	168
6 CV-ET	9	19	31	44	60	82	115	172	251	319
8 CV-ET	17	36	57	82	112	152	213	319	465	591
10 CV-ET	21	44	69	99	136	185	260	388	567	720
12 CV-EWT	32	68	108	155	212	288	404	604	881	1120
16 CV-EWT	33	70	110	158	216	294	413	617	901	1145
Cv Factor	*0.029*	*0.061*	*0.096*	*0.138*	*0.189*	*0.257*	*0.361*	*0.539*	*0.787*	*1.000*
Xt	*0.422*	*0.444*	*0.468*	*0.493*	*0.518*	*0.546*	*0.574*	*0.605*	*0.637*	*0.67*
Fl	*0.71*	*0.73*	*0.75*	*0.77*	*0.79*	*0.81*	*0.83*	*0.85*	*0.87*	*0.89*

Table 6.0 - Cv Profile Information CV-ET & CV-EWT Series - E2 Trim

Percent Travel

Valve Size (in)	10	20	30	40	50	60	70	80	90	100
2 CV-ET	1	2	3	4	6	8	11	17	24	31
3 CV-ET	2	4	7	10	13	18	25	37	54	69
4 CV-ET	3	7	11	16	22	31	43	64	94	119
6 CV-ET	7	14	22	32	44	59	83	125	182	231
8 CV-ET	12	26	41	59	81	109	154	230	335	426
10 CV-ET	20	43	67	97	133	181	254	379	553	703
12 CV-EWT	21	45	71	101	139	189	265	396	578	735
16 CV-EWT	23	48	76	110	150	204	287	429	626	795
Cv Factor	*0.029*	*0.061*	*0.096*	*0.138*	*0.189*	*0.257*	*0.361*	*0.539*	*0.787*	*1.000*
Xt	*0.479*	*0.504*	*0.531*	*0.559*	*0.588*	*0.619*	*0.652*	*0.686*	*0.722*	*0.76*
Fl	*0.76*	*0.77*	*0.79*	*0.82*	*0.84*	*0.86*	*0.88*	*0.9*	*0.93*	*0.95*

Table 7.0 - Cv Profile Information CV-ET & CV-EWT – E3 Trim

Percent Travel

Valve Size (in)	10	20	30	40	50	60	70	80	90	100
2 CV-ET	1	2	3	4	6	8	11	17	24	31
3 CV-ET	2	4	7	10	13	18	25	37	54	69
4 CV-ET	3	7	11	16	22	31	43	64	94	119
6 CV-ET	7	14	22	32	44	59	83	125	182	231
8 CV-ET	12	26	41	59	81	109	154	230	335	426
10 CV-ET	20	43	67	97	133	181	254	379	553	703
12 CV-EWT	21	45	71	101	139	189	265	396	578	735
16 CV-EWT	23	48	76	110	150	204	287	429	626	795
Cv Factor	*0.029*	*0.061*	*0.096*	*0.138*	*0.189*	*0.257*	*0.361*	*0.539*	*0.787*	*1.000*
Xt	*0.479*	*0.504*	*0.531*	*0.559*	*0.588*	*0.619*	*0.652*	*0.686*	*0.722*	*0.76*
Fl	*0.76*	*0.77*	*0.79*	*0.82*	*0.84*	*0.86*	*0.88*	*0.9*	*0.93*	*0.95*

Table 8.0 - Cv Profile Information CV-ET & CV-EWT Series - L0 Trim

	Percent Travel									
Valve Size (in)	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
2 CV-ET	7	15	22	29	36	44	51	58	66	73
3 CV-ET	15	30	44	59	74	89	104	118	133	148
4 CV-ET	24	47	71	94	118	142	165	189	212	236
6 CV-ET	43	87	130	173	217	260	303	346	390	433
8 CV-ET	85	169	254	338	423	508	592	677	761	846
10 CV-ET	136	272	408	544	680	816	952	1088	1224	1360
12 CV-EWT	140	280	420	560	700	840	980	1120	1260	1400
16 CV-EWT	179	358	537	716	895	1074	1253	1432	1611	1790
Cv Factor	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900	1.000
Xt	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900	1.000
Fl										

Table 9.0 - Cv Profile Information CV-ET & CV-EWT Series - L1 Trim

	Percent Travel									
Valve Size (in)	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
2 CV-ET	5	10	16	21	26	31	36	42	47	52
3 CV-ET	11	22	34	45	56	67	78	90	101	112
4 CV-ET	20	40	59	79	99	119	139	158	178	198
6 CV-ET	38	75	113	150	188	225	263	300	338	375
8 CV-ET	70	139	209	278	348	417	487	556	626	695
10 CV-ET	121	242	364	485	606	727	848	970	1091	1212
12 CV-EWT	128	255	383	511	639	766	894	1022	1149	1277
16 CV-EWT	147	293	440	587	734	880	1027	1174	1320	1467
Cv Factor	*0.100*	*0.200*	*0.300*	*0.400*	*0.500*	*0.600*	*0.700*	*0.800*	*0.900*	*1.000*
Xt	*0.100*	*0.200*	*0.300*	*0.400*	*0.500*	*0.600*	*0.700*	*0.800*	*0.900*	*1.000*
Fl	*0.62*	*0.63*	*0.65*	*0.67*	*0.69*	*0.7*	*0.72*	*0.74*	*0.76*	*0.78*

Table 10.0 - Cv Profile Information CV-ET & CV-EWT Series – L2 Trim

	Percent Travel									
Valve Size (in)	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
2 CV-ET	4	7	11	15	19	22	26	30	33	37
3 CV-ET	8	16	24	32	41	49	57	65	73	81
4 CV-ET	14	28	42	56	70	84	98	112	126	140
6 CV-ET	27	54	82	109	136	163	190	218	245	272
8 CV-ET	50	100	150	200	251	301	351	401	451	501
10 CV-ET	73	147	220	293	367	440	513	586	660	733
12 CV-EWT	77	153	230	307	384	460	537	614	690	767
16 CV-EWT	90	179	269	358	448	537	627	716	806	895
Cv Factor	*0.100*	*0.200*	*0.300*	*0.400*	*0.500*	*0.600*	*0.700*	*0.800*	*0.900*	*1.000*
Xt	*0.479*	*0.504*	*0.531*	*0.559*	*0.588*	*0.619*	*0.652*	*0.686*	*0.722*	*0.76*
Fl	*0.71*	*0.73*	*0.75*	*0.77*	*0.79*	*0.81*	*0.83*	*0.85*	*0.87*	*0.89*

Table 11.0 - Cv Profile Information CV-ET & CV-EWT Series – L3 Trim

	Percent Travel									
Valve Size (in)	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
2 CV-ET	2.6	5.2	7.8	10.4	13.0	15.6	18.2	20.8	23.4	26
3 CV-ET	5.5	11.0	16.5	22.0	27.5	33.0	38.5	44.0	49.5	55
4 CV-ET	9.3	18.6	27.9	37.2	46.5	55.8	65.1	74.4	83.7	93
6 CV-ET	17.5	35.0	52.5	70.0	87.5	105.0	122.5	140.0	157.5	175
8 CV-ET	32.4	64.8	97.2	129.6	162.0	194.4	226.8	259.2	291.6	324
10 CV-ET	54.9	109.8	164.7	219.6	274.5	329.4	384.3	439.2	494.1	549
12 CV-EWT	55.7	111.4	167.1	222.8	278.5	334.2	389.9	445.6	501.3	557
16 CV-EWT	63.6	127.2	190.8	254.4	318.0	381.6	445.2	508.8	572.4	636
Cv Factor	*0.100*	*0.200*	*0.300*	*0.400*	*0.500*	*0.600*	*0.700*	*0.800*	*0.900*	*1.000*
Xt	*0.511*	*0.537*	*0.566*	*0.595*	*0.627*	*0.66*	*0.694*	*0.731*	*0.77*	*0.81*
Fl	*0.78*	*0.8*	*0.82*	*0.84*	*0.86*	*0.89*	*0.91*	*0.93*	*0.96*	*0.98*

Figure X.0 – Flow Profile Percent Capacity CV-ET & CV-EWT - Linear vs. Equal Percent Trims

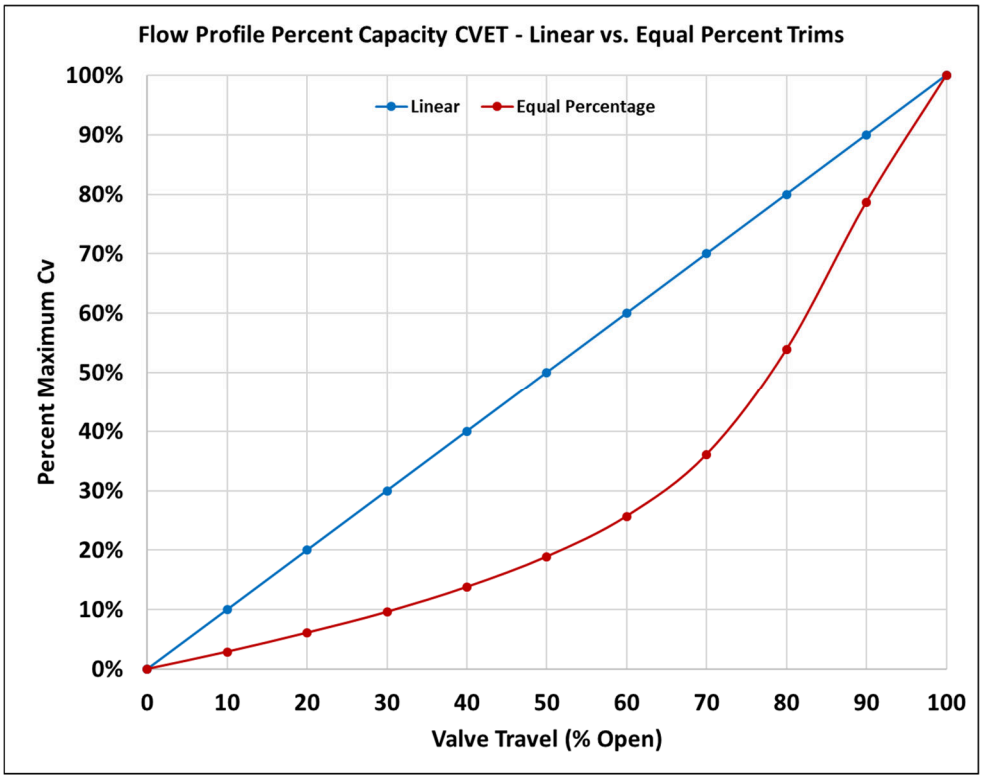


Figure X.0 - Flow Profile CV-ET & CV-EWT Linear L0 vs. Equal Percent E0 Trims - 6 in Size

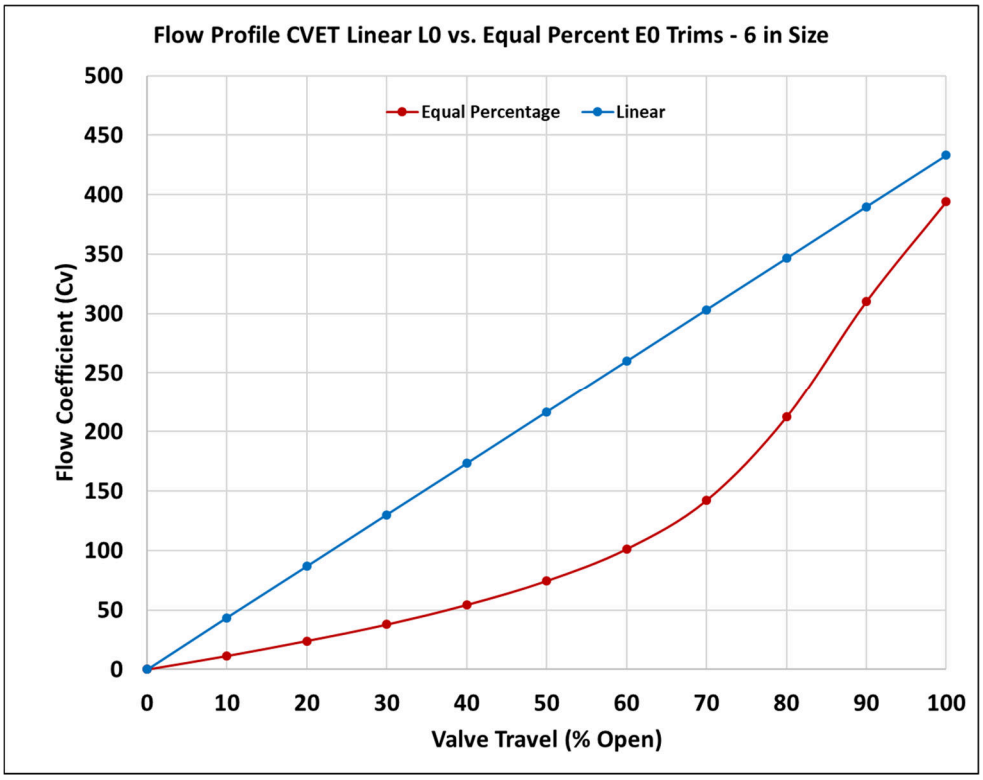


Table 12.0 – Valve Travel and Port Sizes CV-ET & CV-EWT Series Control Valves (Dimensions in Inches)

Valve Size		L0	E0	L1*	E1*	L2*	E2*	L3*	E3*
Characteristic		Linear	Equal Percent	Linear	Equal Percent	Linear	Equal Percent	Linear	Equal Percent
Noise Trim	Travel (in)	N/A	N/A	1 Stage	1 Stage	2 Stage	2 Stage	3 Stage	3 Stage
2 CV-ET	1.125	2.3125	2.3125	2.3125	2.3125	1.875	1.875	1.3125	1.3125
3 CV-ET	1.5	3.4375	3.4375	3.4375	3.4375	2.3125	2.3125	1.875	1.875
4 CV-ET	2	4.375	4.375	4.375	4.375	3.4375	3.4375	2.875	2.875
6 CV-ET	2	7	7	7	7	5.375	5.375	5.375	5.375
8 CV-ET	3	8	8	8	8	7	7	6	6
10 CV-ET	5	8	8	8	8	7	7	6	6
12 CV-EWT	5	8	8	8	8	7	7	6	6
16 CV-EWT	8.875	11	11	TBA	TBA	TBA	TBA	TBA	TBA

Notes:

1. 2 in to 8 in are “ET” Type Body Configuration
2. 10, 12 and 16 in Sizes are “EWT” Type Body Configuration

Table 13.0 – Valve Travel and Port Sizes CV-ET & CV-EWT Series Control Valves - Estimated Weights Without Actuator

Size		150 ANSI RF		150 ANSI RTJ		300 ANSI RF		300 ANSI RTJ		600 ANSI RF		600 ANSI RTJ	
in	***mm***	lbs	*kg*	lbs	*kg*	lbs	*kg*	lbs	*kg*	lbs	*kg*	lbs	*kg*
2 CV-ET	***50.8***	68	*31*	68	*31*	68	*31*	68	*31*	68	*31*	68	*31*
3 CV-ET	***76.2***	125	*57*	125	*57*	125	*57*	125	*57*	125	*57*	125	*57*
4 CV-ET	***101.6***	170	*78*	170	*78*	170	*78*	170	*78*	170	*78*	170	*78*
6 CV-ET	***152.4***	350	*160*	350	*160*	350	*160*	350	*160*	350	*160*	350	*160*
8 CV-ET	***203***	900	*408*	900	*408*	900	*408*	900	*408*	900	*408*	900	*408*
10 CV-ET	***254***	---	---	---	---	1102	*500*	1102	*500*	1590	*721*	1590	*721*
12 CV-EWT	***305***	---	---	---	---	1890	*857*	1890	*857*	1890	*857*	1890	*857*
16 CV-EWT	***406***	---	---	---	---	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA

Notes:

1. 2 in to 8 in are “ET” Type Body Configuration
2. 10 in and 12 in Sizes are “EWT” Type Body Configuration
3. Contact VRG Controls for Additional Configurations or Additional Data

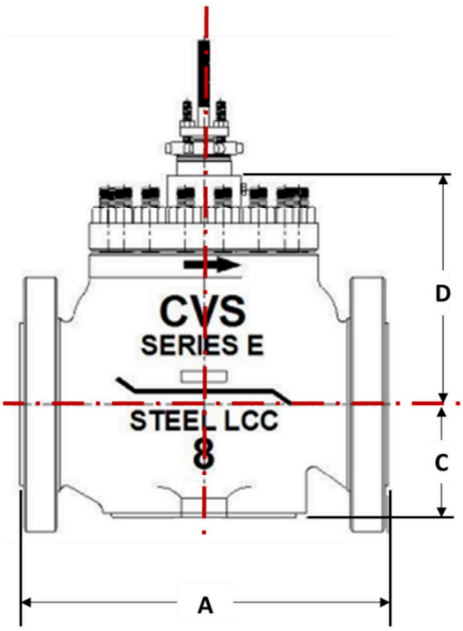


Figure 1.0 CVET Dims
2 in to 8 in Sizes

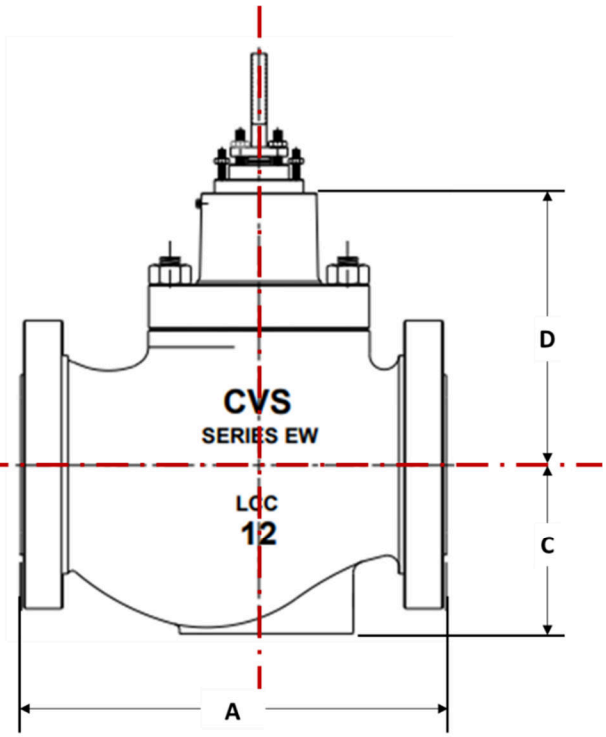


Figure 2.0 CVET (EWT) Dims
10 in and 12 in Sizes

Table 14.0 – Dimension "A" Control Valve Face-to-Face Dimensions

Size		150 ANSI RF		150 ANSI RTJ		300 ANSI RF		300 ANSI RTJ		600 ANSI RF		600 ANSI RTJ	
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
2 CV-ET	*50.8*	10	254	10.5	266.7	10.5	266.7	11.13	282.7	11.25	285.8	11.38	289.1
3 CV-ET	*76.2*	11.75	298.5	12.25	311.2	12.5	317.5	13.13	333.5	13.25	333.6	13.38	339.9
4 CV-ET	*101.6*	13.88	352.6	14.38	365.3	14.51	368.3	15.13	384.3	15.5	393.7	15.63	397
6 CV-ET	*152.4*	17.75	450.9	18.25	463.6	18.63	473.2	19.25	489	20	508	20.13	511.3
8 CV-ET	*203*	21.38	543	21.88	556	22.38	568	23.00	584	24	610	24.12	613
10 CV-ET	*254*	---	---	---	---								
12 CV-EWT	*305*	---	---	---	---	30.5	775	31.12	791	32.25	819	32.38	822
16 CV-EWT	*406*												

Table 15.0 – Dimension "C" Control Valve Centerline to Bottom of Body Dimensions

Size		150 ANSI RF		150 ANSI RTJ		300 ANSI RF		300 ANSI RTJ		600 ANSI RF		600 ANSI RTJ	
in	*mm*	in	*mm*	in	*mm*	in	*mm*	in	*mm*	in	*mm*	in	*mm*
2 CV-ET	*50.8*	2.88	*73.2*	2.88	*73.2*	2.88	*73.2*	2.88	*73.2*	2.88	*73.2*	2.88	*73.2*
3 CV-ET	*76.2*	3.56	*90.4*	3.56	*90.4*	3.56	*90.4*	3.56	*90.4*	3.56	*90.4*	3.56	*90.4*
4 CV-ET	*101.6*	4.69	*119.1*	4.69	*119.1*	4.81	*119.1*	4.81	*119.1*	4.94	*125.5*	4.94	*125.5*
6 CV-ET	*152.4*	5.19	*131.8*	5.31	*134.9*	5.31	*134.9*	5.5	*139.7*	5.5	*139.7*	5.5	*139.7*
8 CV-ET	*203*	7.50	*191*	7.50	*191*	7.50	*191*	7.50	*191*	7.50	*191*	7.50	*191*
10 CV-ET	*254*	---	---	---	---	14	*530*	14	*530*	14	*530*	14	*530*
12 CV-EWT	*305*	---	---	---	---	14	*530*	14	*530*	14	*530*	14	*530*
16 CV-EWT	*406*												

Table 16.0 – Dimension "D" Control Valve Centerline to Actuator Match Line Dimensions

		Standard Bonnet - Stem Size					
Size		3/8	*9.5*	1/2	*12.7*	3/4	*19.1*
2 CV-ET	*50.8*	in	*mm*	in	*mm*	in	*mm*
3 CV-ET	*76.2*	---	---	6.5	*165.1*	6.38	*162.1*
4 CV-ET	*101.6*	---	---	7.5	*190.5*	7.38	*187.5*
6 CV-ET	*152.4*	---	---	8.69	*221*	8.56	*217.4*
8 CV-ET	*203*	---	---	---	---	9.88	*251*
10 CV-ET	*254*	---	---	---	---	14.75	*375*
12 CV-EWT	*305*	---	---	---	---	23.63	*600*
16 CV-EWT	*406*	---	---	---	---	23.63	*600*

Notes:

1. 2 in to 8 in are "ET" Type Body Configuration
2. 10 in and 12 in Sizes are "EWT" Type Body Configuration
3. Contact VRG Controls for Additional Configurations or Additional Data

Table 17.0 – Linear Globe Valve LD Actuator Selection Matrix – CVET Models

Valve Size (in)	Fail Open Actuator Type LD-657			Fail Closed Actuator Type LD-667		
	150 ANSI	300 ANSI	600 ANSI	150 ANSI	300 ANSI	600 ANSI
2 CV-ET	LD 657-40	LD 657-40	LD 657-40	LD 667-40	LD 667-40	LD 667-40
3 CV-ET	LD 657-40	LD 657-40	LD 657-40	LD 667-40	LD 667-40	LD 667-40
4 CV-ET	LD 657-45	LD 657-45	LD 657-45	LD 667-45	LD 667-45	LD 667-45
6 CV-ET	LD 657-70	LD 657-70	LD 657-70	LD 667-70	LD 667-70	LD 667-70
8 CV-ET	LD 657-70	LD 657-70	LD 657-70	LD 667-70	LD 667-70	LD 667-70
10 CV-ET	LD 657-70	LD 657-70	LD 657-70	LD 667-70	LD 667-70	LD 667-70
12 CV-EWT	NA - Use LHPA	NA - Use LHPA	NA - Use LHPA	NA - Use LHPA	NA - Use LHPA	NA - Use LHPA
16 CV-EWT	NA - Use LHPA	NA - Use LHPA	NA - Use LHPA	NA - Use LHPA	NA - Use LHPA	NA - Use LHPA

Table 18.0 – Linear Globe Valve LHPA-DA Actuator Selection Matrix – CV-ET Models

Valve Size (in)	Fail Open Actuator Type LD-657			Fail Closed Actuator Type LD-667		
	150 ANSI	300 ANSI	600 ANSI	150 ANSI	300 ANSI	600 ANSI
2 CV-ET						
3 CV-ET						
4 CV-ET						
6 CV-ET						
8 CV-ET						
10 CV-ET						
12 CV-EWT						
16 CV-EWT						

Table 19.0 – Linear Globe Valve LHPA-SR Actuator Selection Matrix – CV-ET Models

Valve Size (in)	Fail Open Actuator Type LD-657			Fail Closed Actuator Type LD-667		
	150 ANSI	300 ANSI	600 ANSI	150 ANSI	300 ANSI	600 ANSI
2 CV-ET						
3 CV-ET						
4 CV-ET						
6 CV-ET						
8 CV-ET						
10 CV-ET						
12 CV-EWT						
16 CV-EWT						

Notes:

1. 2 in to 8 in are “ET” Type Body Configuration
2. 10 in, 12 in, & 16 in Sizes are “EWT” Type Body Configuration

CV	Bore Size (in)	CV Series	Trim Characteristic	Noise Trim Level	ANSI Rating	End Connections	LD Actuator Size	LD Actuator Model
	1	EZ	E Equal %	0	1.5 150 ANSI	F RFFE	LD30	657 STO
	1.5	ET	L Linear	1	3 300 ANSI	R RTJ	LD34	667 STC
	2	EWT		2	6 600 ANSI	W WELD	LD40	
	3X2	EHT		3	9 900 ANSI		LD45	
	3				15 1500 ANSI		LD46	
	4X2						LD50	
	4X3						LD60	
	4						LD70	
	6X3							
	6X4							
	6							
	8X4							
	8X6							
	8							
	10X6							
	10X8							
	12X8							
	12X10							
	12							
	16							
CV	**6**	**ET**	**E**	**2**	**6**	**F**	**LD70**	**657**

Example #1: Model CV6ETE26FLD70657
6 in CV-ET Series w Equal Percent 2-Stage Noise Trim, 600 ANSI, RFFE Connections w LD Series Size 70 Model 657 (STO) Actuator

CV	12	EWT	L	1	6	F	--	--

Example #2: Model CV12EWTL16F
12 in CV-EWT Series w Linear 1-Stage Noise Trim, 600 ANSI, RFFE Connections – No LD Actuator

Notes:

1. Reduced Port and other custom configurations available. Contact VRG Controls for additional details and assistance.
2. Base Valve Platform represents the OEM manufacturer. VRG Controls PRCV Pipeline Rotary Control Valves are optimized for pipeline control modulating service utilizing VRG PRCV control valve specifications.
3. LD Actuator Model 657 Configured as STO = Spring to OPEN upon loss Supply Gas Pressure
4. LD Actuator Model 667 Configured as STC = Spring to CLOSE upon loss Supply Gas Pressure
5. When LHPA-DA or LHPA-SR Actuators are applied, Actuator Model Number is not included in CV Series Control Valve Model Number

Table 1.0 – LHPA Linear High-Pressure Piston Actuator Model Number Derivation

LHPA	Actuator Bore (in)	X	Actuator Stroke (in)	Actuator Action	Actuator Spring(s)	Spring Action
	4		0.75	DA Double Acting	10	STO Spring to Open
	5		1.125	SR Spring Return	20	STC Spring to Close
	6		1.5		30	
	8		2		40	
	10		3		50	
	12		4		60	
	14		5			
			6			
			8			
			8.75			
			##			
LHPA	**10**	**X**	**5**	**SR**	**40**	**STO**
Example #1: LHPA10X5SR40STO						
LHPA 10 in Bore x 5 in Stroke Piston Spring Return Actuator w/ #40 Actuator Spring to Open						
LHPA	**6**	**X**	**2**	**DA**	**--**	**--**
Example #2: LHPA6X2DA						
LHPA 6 in Bore x 2 in Stroke Piston Double Acting Actuator						