



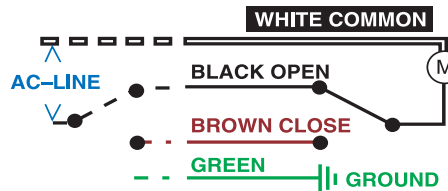
EATB Series Electric Actuator and True Union Valve



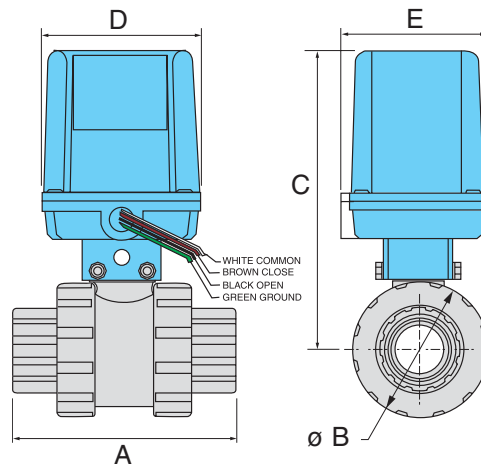
Overview

Moderately priced, full featured, plastic ball valve with unidirectional quarter-turn actuator. Fully serviceable true union ball valve provides reliable, long-term service in a wide range of corrosive applications. All plastic actuator features an integrally molded bracket and provides ample torque for 1/2" – 2" valve operation.

Wiring Diagram



Dimensions



Dimensions—Inches

Size	Part Number	A	B	C	D	E	Weight (lb/kg)
1/2"	EATB1050STE or V	4.63	2.25	8.40			6.8/3.1
3/4"	EATB1075STE or V	4.75	2.63	8.60			
1"	EATB1100STE or V	5.25	3.00	9.10	4.88	4.13	7.1/3.2
1 1/2"	EATB1150STE or V	6.75	4.00	9.50			8.1/3.7
2"	EATB1200STE or V	8.00	4.75	10.10			9.8/4.5

Valve Features

- 1/2" to 2" Corrosion-Resistant True Union Ball Valve
- Pressure Rating to 250 PSI
- EPDM Seals/FPM Seals
- PTFE Seats
- Full Port Design
- Fully Serviceable
- Double O-ring Stem Seal

Actuator Features

- All Plastic Weather-Resistant Enclosure
- 2.5-second Cycle Time
- Thermal Overload Protection
- Permanently Lubricated Gear Train
- Nema 4/4X Enclosure
- Actuator Brake for Full Open/Close
- No Adjustments Needed



Technical Information

Actuator Specifications

Model	EATB
Torque Output (in-lbs)	140
Standard Voltage	110 VAC
Duty Cycle	25%
Thermal Overload	Standard
Cycle Time (secs @ 90°)	2.5
Conduit Entry	1/2" NPT
Enclosure	NEMA 4/4X
Enclosure Material	Polypropylene
Max Current Amps @ 115 Vac	2.8

C_v Factors

Size	Factor
1/2"	8.0
3/4"	15.0
1"	29.0
1 1/4"	75.0
1 1/2"	90.0
2"	140.0

Valve Specifications

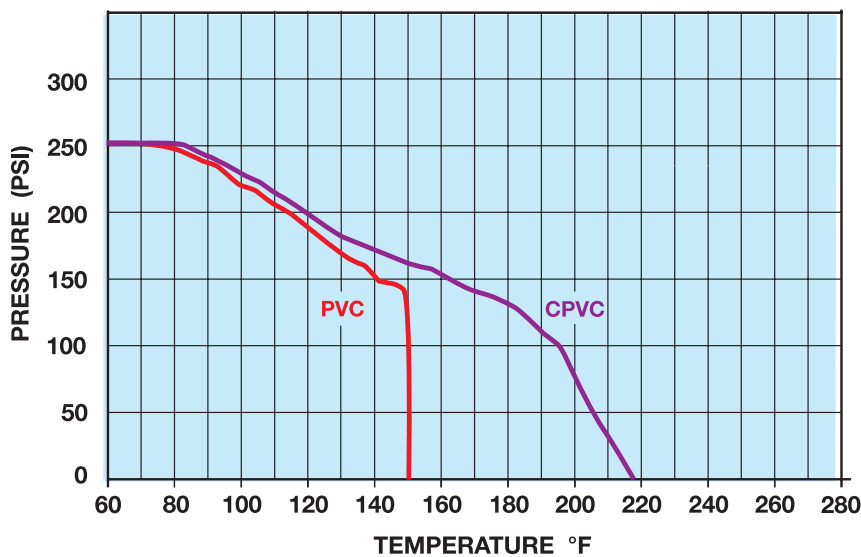
Valve Type	True Union
Material of Construction	PVC
Seals	EPDM/FPM
Seats	PTFE
End Connections	Socket or Threaded
Sizes	1/2", 3/4", 1", 1 1/2" and 2"
Pressure Rating	250 PSI @ 70°F, Non-shock
Design	Full Port

Pressure Loss Calculation Formula

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient

Operating Temperature/Pressure





EAU Series Electric Actuators



Overview

Moderately-priced uni-directional quarter-turn actuator for Hayward ball valve applications only. In addition to providing ample torque for 1/2" – 2" valve operation, this all plastic actuator offers a molded-in mounting bracket as well as several basic features.

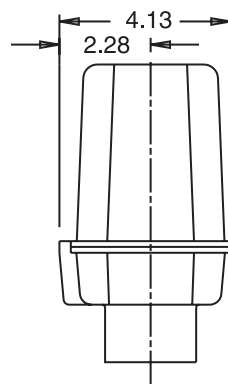
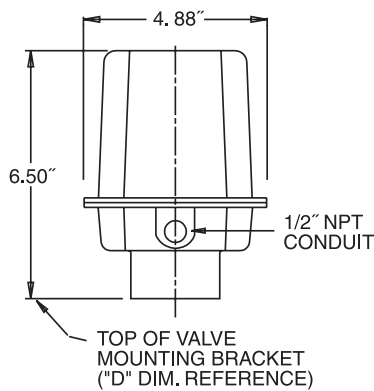
Features

- Plastic Weather Resistant Enclosure
- 90° (EAU29) or 180° (EAU28) Operation
- UL/CSA Listed Motor
- Permanently Lubricated
- Brake Standard
- On/Off Applications
- Nema 4/4X Housing
- 115 VAC Operation
- Auxiliary Limit Switch Standard

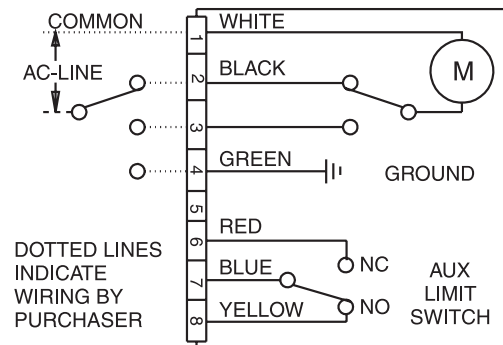
Options

- Voltage Options: 12 VDC, 24 VDC, 12 VAC, 24 VAC, 220 VAC Motors

Dimensions-Inches



Wiring Diagram



Actuator Specifications

Model	EAU
Torque Output (in-lbs)	140
Standard Voltage	115 VAC
Duty Cycle	25%
Thermal Overload	Standard
Cycle Time (secs)*	2.5/5.0
Auxiliary Switch Limit Rating	SPDT 5A Resistive @ 230 VAC
Conduit Entry	1/2" NPT
Enclosure	NEMA 4/4X
Enclosure Material	Polypropylene
Max Current Amps @ 115 VAC	2.8
Weight (lb/kg)	6.2 / 2.7

* EAU29 2.5, EAU28, 5.0

Valve Selection Chart

Size	True Union Ball Valve	Three-Way Ball Valve
1/2"- 2"	EAU29 (90°)	EAU28 (180°)

* Actuator size selections based on clean water at 70°F.



EVR Series Reversing Electric Actuators



Overview

Economical, high performance actuator for use with all true union ball valves, three-way ball valves, and butterfly valves up to 4" in size. Ideal for on/off applications where there is a need to manually override actuator operation, and use in limited space areas.

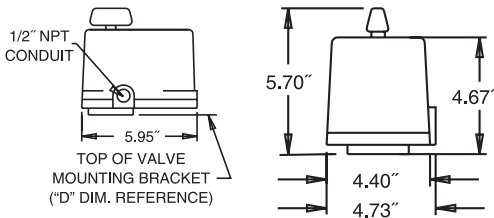
Features

- Low Profile Design
- Manual Override
- Position Indicator
- UL Listed Motor
- Nema 4/4X Enclosure
- Permanent Lubrication
- 115 VAC Operation
- Mechanical Brake

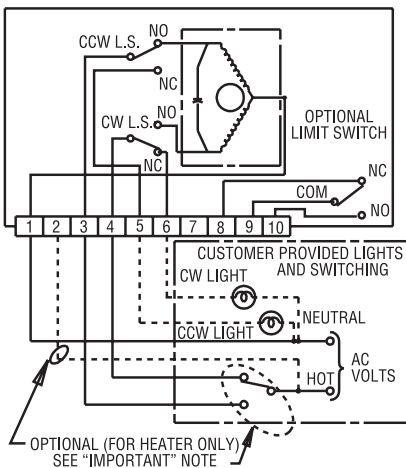
Options

- Voltage Options: 12 VDC, 24 VDC, 24 VAC and 220 VAC
- Heater and Thermostat
- Timer
- Auxiliary Limit Switches

Dimensions-Inches



Wiring Diagram



NOTE:
ACTUATOR SHOWN IN FULL CLOCKWISE EXTREME OF TRAVEL OR "CLOSED" POSITION

IMPORTANT NOTE
REVERSING ELECTRIC ACTUATORS WITH CAPACITOR START MOTORS **MUST** BE WIRED TO INDEPENDENT CONTACTS FOR OPEN/CLOSED OPERATION. **DO NOT** WIRE TWO OR MORE ACTUATORS TOGETHER - AS CAPACITOR DAMAGE WILL OCCUR.

Actuator Specifications

Model	EVR2K	EVR3K	EVR6K
Torque Output (in-lbs)	150	300	600
Standard Voltage	115 VAC		
Duty Cycle	25%		
Thermal Overload	Standard		
Cycle Time (secs @ 90°)	4.5	7.5	12.5
Auxiliary Limit Switch Rating	1/3 hp, 10 amps @ 125/230 VAC		
Conduit Entry	1/2" NPT		
Enclosure	NEMA 4/4X		
Enclosure Material	Plastic Cover/Zinc Alloy Base		
Max Current Amps @ 115 VAC	0.4	0.6	0.5
Weight (lbs/kg)	6/2.7		

Valve Selection Chart*

Size	True Union Ball Valve	Three-Way Ball Valve	Butterfly Valve
1/2" - 1"	EVR2K	EVR2K	N/A
1 1/2" - 2"	EVR2K	EVR2K	EVR3K
2 1/2"	EVR3K	EVR6K	N/A
3"	EVR3K	EVR6K	EVR3K
4"	EVR3K	EVR6K	EVR6K
6"	EVR3K	EVR6K	N/A

* Actuator size selections based on clean water at 70°F.



EJM Series Reversing Electric Actuators



Overview

Cost effective, rugged, quarter-turn actuator designed for use with all ball and butterfly valves up to 24" in size. Ideal for a wide range of applications without costly options. Positioners are available for special throttling or modulating requirements.

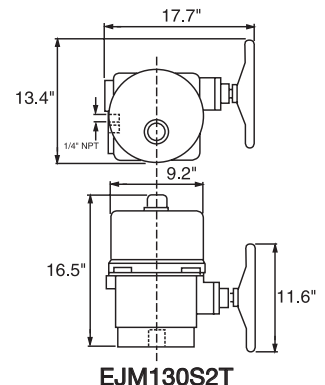
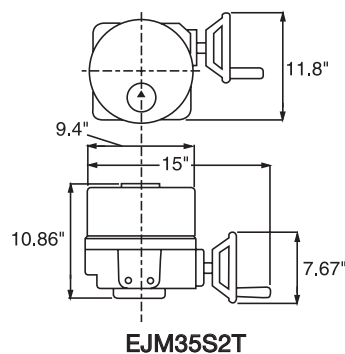
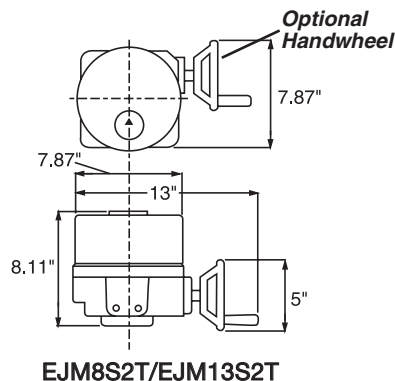
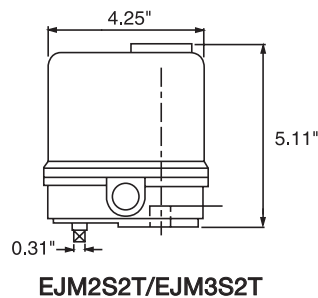
Features

- Two Auxiliary Limit Switches
- Heater with Thermostat
- NEMA 4/4X Enclosure
- Position Indicator
- Manual Override
- Self-Locking Gear Train
- Permanently Lubricated
- Thermal Overload Protection
- CE and CSA Approved
- ISO 5211 Mounting Base

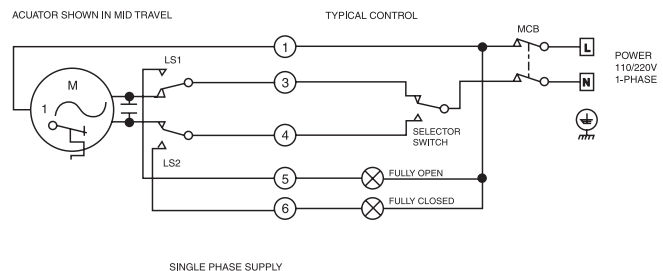
Options

- Positioners
- Voltage Options: 12 VDC, 24 VDC, 12 VAC, 24 VAC and 220 VAC Motors
- Feedback Potentiometer
- Control Stations

EJM Series Dimensions—Inches



Wiring Diagram





Technical Information

Actuator Specifications

Model	EJM2S2T	EJM3S2T	EJM8S2T	EJM13S2T	EJM35S2T	EJM130S2T
Torque Output (in-lbs)	150	300	800	1300	3500	13300
Standard Voltage	50/60 Hz, 115 VAC, 1 Phase, PSC					
Duty Cycle	25%					
Thermal Overload	Standard					
Cycle Time (secs @ 90°)	8	12	15	22	22	46
Auxiliary Limit Switch Rating	5 amps @ 125 V		1/2 hp, 15 amps @ 125/250 V			
Conduit Entry	1/2" NPT					
Enclosure	NEMA 4/4X					
Enclosure Material	Aluminum Alloy, Dry Powder Coated					
Max Current Amps @ 115 VAC	.60	1.8		3.6		10.0
Weight (lbs/kg)	5/2.3	20/9.1		40/18.2		52/23.6

Ball Valve Selection Chart*

Size	True Union Ball Valve	Three-Way Ball Valve
1/2" – 2"	EJM2S2T	EJM2S2T
2 1/2" – 6"	EJM3S2T	EJM8S2T

* Actuator size selections based on clean water at 70°F.

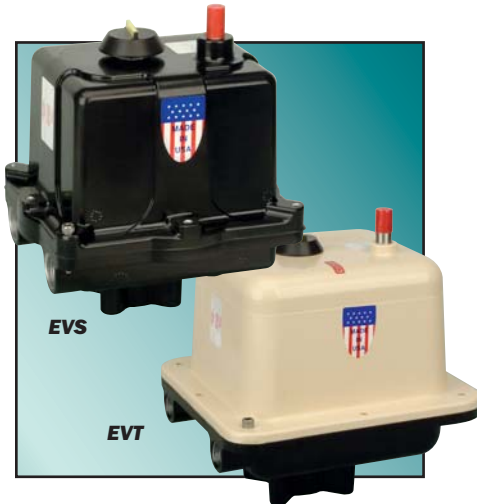
Butterfly Valve Selection Chart*

Size	Butterfly Valve
1 1/2", 2", 3"	EJM3S2T
4", 6"	EJM8S2T
8"	EJM13S2T
10", 12"	EJM35S2T
14" – 24"	EJM130S2T

* Actuator size selections based on clean water at 70°F.



EVS/EVT Series Electric Actuators



Overview

Versatile, quarter-turn actuator is designed for on/off and modulating use with all ball and butterfly valves up to 12" in size. The actuator's specially designed circuit board accepts plug-in connectors, and a wide range of options allows configuration to meet virtually any application requirement.

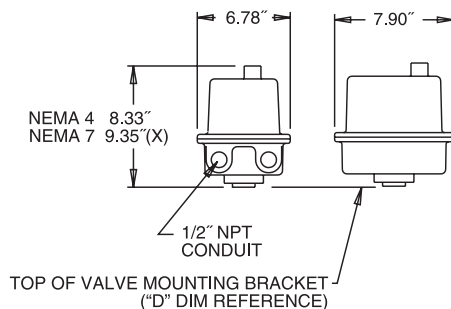
Features

- Extended Duty Motor
- Multi Option Availability
- Gold Plated Connectors
- Modular Internal Construction
- Manual Override
- Position Indicator
- UL Listed Motor
- Nema 4/4X Enclosure
- Permanent Lubrication
- 115 VAC Operation

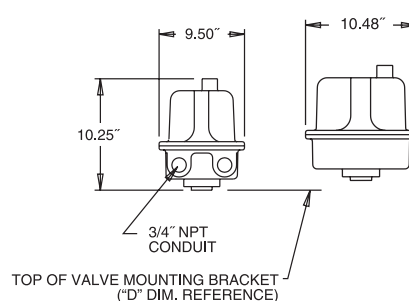
Options

- Limit Switches
- Positioners
- Voltage Options: 12 VDC, 24 VDC, 12 VAC, 24 VAC, and 220 VAC Motors
- Fail Safe Operation
- Feedback Potentiometer
- Heater & Thermostat
- Mechanical Brake
- CSA Certification
- Nema 4/4X/7/9 Enclosure

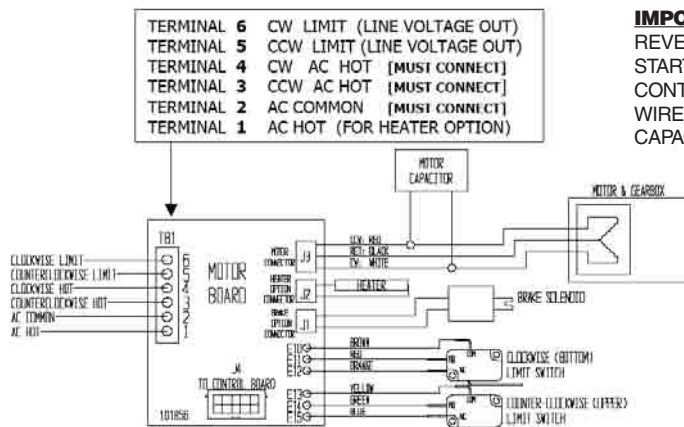
EVS Series Dimensions-Inches



EVT Series Dimensions-Inches



Wiring Diagram



IMPORTANT NOTE

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ELECTRIC ACTUATION



Technical Information

Actuator Specifications

Model	EVS2	EVS3	EVS6	EVT10K	EVT20K	EVT30K
Torque Output (in-lbs)	150	300	600	1000	2000	3000
Standard Voltage	120 VAC					
Duty Cycle	75%					
Thermal Overload	Standard					
Cycle Time (secs @ 90°)	5.0	10.0	15.0	30.0	30.0	45.0
Auxiliary Limit Switch Rating	1/3 hp, 10 amps @ 125/230 VAC					
Enclosure	NEMA 4/4X					
Conduit Entry	1/2" NPT					
Enclosure Material	Epoxy-Coated Aluminum					
Max Current Amps @ 115 VAC	.6	.6	.6	.8	.8	.8
Weight - lbs/kg	16.3/7.4	16.3/7.4	16.45/7.5	20.60/9.4	31/14.1	31/14.1

Ball Valve Selection Chart*

Size	True Union Ball Valve	Three-Way Ball Valve
1/2" – 2"	EVS2	EVS2
2 1/2" – 3"	EVS3	EVS3
4" – 6"	EVS3	EVS6

*Actuator size selections based on clean water at 70°F.

Butterfly Valve Selection Chart*

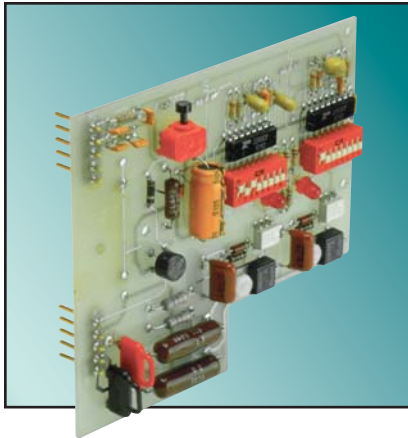
Size	Butterfly Valve
1 1/2" – 3"	EVS3K
4"	EVS6K
6" – 8"	EVT10K
10"	EVT20K
12"	EVT30K

*Actuator size selections based on clean water at 70°F.



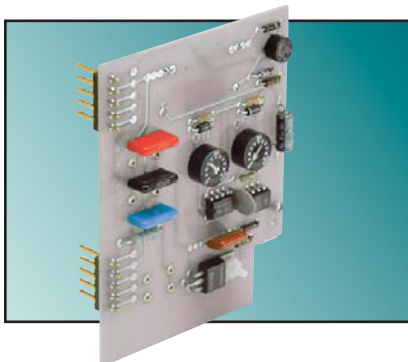
Electric Actuator Accessories

Extended Descriptions



Timer Board—Suffix A

Timer board installs within actuator enclosure. Board shown is for EVR, EVS, and EVT actuators.



Cycle Time Rate Regulator—Suffix B

Cycle time rate regulator installs within actuator enclosure. Board shown is for EVS and EVT actuators.

Timer Board

115 VAC Input—Suffix A

(For EVR, EVS & EVT actuators)

The timer board is a solid state device that allows the user to program actuators to automatically control valves in repetitive on/off functions. The switches for programming the “on” time provide 255 options for setting the length of time the valve remains open. This can range from 6 seconds to 25 minutes. The other set of switches, for programming the “off” time, provide 255 more options to set the length of time the valve remains closed. This range is from 5.5 minutes to almost 24 hours.

Cycle Time Regulator

115 VAC Input—Suffix B

(For EVS & EVT actuators)

The cycle time regulator board allows speed adjustment for both the “opening” and “closing” cycles of the actuator. The adjustments are only available for slowing the cycle down to “pulse” the motor either open or closed. This feature is used primarily to avoid water hammer or large, abrupt flow variations. Cycle time adjustments range from 3-300 times the standard cycle time (depends on torque of actuator model).

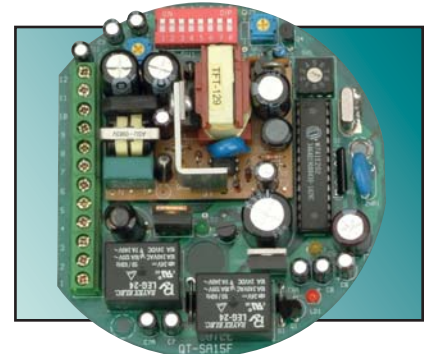
Positioners

Suffix C2E

(For EJM, EVS & EVT actuators)

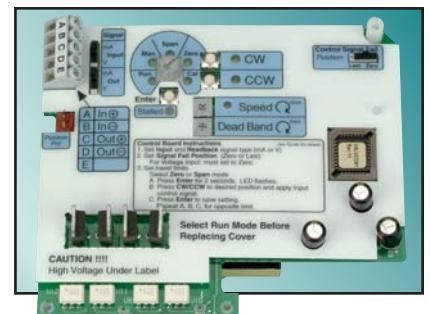
EJM positioners are used for flow-throttling applications in response to an external control signal received from a control panel (or PLC). The signal is usually in the form of current (4-20 mA range), or DC voltage (0-10 VDC range). The positioners have a simple selector switch on the circuit board so that the user can choose either the 4-20 mA or 0-10 VDC control signal, depending on which signal is being transmitted by the control panel (or PLC). The positioners are preset at the factory so at 4 mA

(or 0 VDC), the valve will be in the full closed position, and at 20 mA (or 10 VDC), the valve will be in the full open position. If the positioner receives an external signal within the range of 4-20 mA (or 0-10 VDC), the actuator will simply rotate the valve to achieve a specific position within the 0°-90° of rotation, thus achieving a specific downstream flow rate.



EJM Positioner Board—Suffix C2E

EVS & EVT—actuator positioners contain a few more features on the circuit board than just positioning. **Position Retransmit** (4-20 mA or 0-10 VDC) if chosen to send the current position signal to another electrical device in the process flow loop, **Speed Control** for slower rotation and less sudden flow rate changes, **Adjustable Dead Band** to tune-out surrounding “machine noise” that may interfere with the control signal, and selectable **Position Response** in case of lost control signal (either the actuator can stay in its current position or travel to the home/close position.)



EVS/EVT Positioner Board—Suffix C2E



Electric Actuator Accessories

Extended Descriptions

180° Center-Off

Suffix D

(For EVR, EVS & EVT actuators)

180 degree center off is used with three-way valves. A 2-hole ball (TW) is installed in the valve to provide an OFF position. The actuator moves the ball 180 degrees in 90 degree increments.

This feature is also useful when used with true union blocked end valves for two stage shut-off or dribble control.

Consult factory if this feature is used on actuators with auxiliary limit switches, Suffix S, S2, and S3.

Extended Duty Cycle Motors

75 to 100%—Suffix E

(Standard with all EVS and EVT actuators. Standard with EJM actuators with positioner option)

Actuators for on/off service typically have motors that are rated for a duty cycle of 25%. Actuators used for modulating valves must have motors that are rated at 75 to 100%.

Modulating valves are often required to cycle frequently which increases the heat generation of the motor and increases the temperature within the housing. Extended duty motors are used to allow more frequent periods of operation without overheating.

Mechanical Brake

115 VAC Standard—Suffix K

(For EVS & EVT actuators. Standard on EVR actuators.)

Used when the actuator must be stopped instantaneously and securely. It eliminates actuator "drifting" or "hunting" due to internal valve pressure of turbulence. Mechanical brake is required on butterfly valves to prevent the fluid force on the valve's disc from causing the disc to rotate.

FLOW AT	"TW" BALL	
	AVAILABLE "HCTW" PREFIX	
0°	Port A	Port B
90°	Port A	Port B
CENTER-OFF		
180°	Port A	Port B

Re-Transmitter

115 VAC Input/ 4-20 mA Output—Suffix G

(For EVS & EVT actuators)

The re-transmit module provides a 4-20 mA output signal directly proportional to the actuator/valve angular output drive movement or position. The module has an accuracy of ±0.5% within its rated voltage/temperature bands. This module includes its own power supply.

Note: Use a dual potentiometer when using the re-transmit module if a remote resistance signal is required for EWC or EWB actuators.



Electric Actuator Accessories

Extended Descriptions



Electric Fail-safe (Battery)-Suffix L2

For EVS and EVT actuators.

Electric Fail-Safe (Battery)

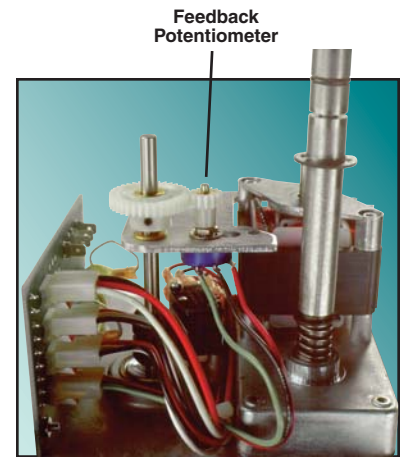
Suffix L2

(For EVS & EVT actuators)

The electric fail-safe board allows the shut down of the process system in the event of an AC power loss. Engineered to supply dependable valve actuation to fail-open or fail-closed. Upon loss of power it can provide up to 15 complete cycles under its own power. The electric actuators are driven by a powerful DC motor that runs on either AC or DC input voltage. The electric fail-safe feature incorporates a rechargeable battery pack on a plug-in modular PC board under the actuator cover. Upon power loss or a signal from an external sensor, the battery pack is automatically activated as the motor power supply. During normal operation, the unit monitors the battery pack to keep it fully charged. After a failure, and once power is restored, the recharging cycle is reactivated. LED indicator shows charge condition. It is recommended that a heater and thermostat be specified if the operational temperature falls below 40°F.

Battery Replacement

- Should be replaced every 18 to 24 months.



Feedback Potentiometer-Suffix P, P2, and P3

For EJM, EVS, and EVT actuators.

Feedback Potentiometer

Suffix P, P2, and P3

(For EJM, EVS & EVT actuators)

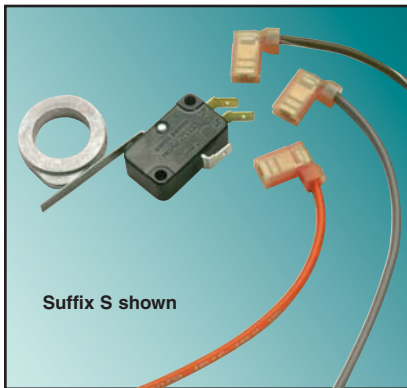
A potentiometer provides continuous, remote status indication of the position of the valve at a control panel or other monitoring equipment. The standard usage is 0 to 1000 ohms, but other resistive values can be supplied.

- Use 90°, 0 to 1000 ohms for two-way valves—Suffix P
- Use no-stop, 0 to 1000 ohms for three-way valves—Suffix P2
- Use dual, 0 to 1000 ohms for applications requiring two distinct feedback signals—Suffix P3



Electric Actuator Accessories

Extended Descriptions



Suffix S shown

Auxiliary Limit Switches— Suffix S to S3

Auxiliary Limit Switches

Suffix S, S2, and S3

(For EVR, EVS & EVT actuators)

A maximum of three additional limit switches can be installed (see Electric Actuator Specifications and Accessories—page 75). Switches are SPDT, rated at 10A @ 250 VAC, and are pre-wired to the internal terminal strip.

Auxiliary limit switches may be set to open/close at any point during the 90° rotation. These are dry contacts, and may be used to trigger alarms, illuminate indicator lights, and other similar devices.

Heater & Thermostat

Suffix T

(For EVR, EVS & EVT actuators, standard on EJM actuators)

A heater and thermostat are designed to electrically warm the inside of the actuator enclosure to approximately 40°F. Its purpose is to inhibit condensation, facilitate better lubrication, and prolong fail-safe battery life in environments as cold as -40°F.

Special Enclosure NEMA 4/4X/7/9

Suffix X2

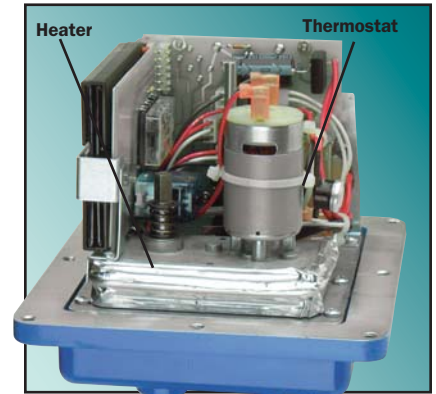
(For EVS & EVT actuators)

In addition to being water and corrosion resistant, these enclosures meet NEMA specifications for Class 1, Division 1 groups A, B, and C Explosion-proof as well as Class 1, Division 1 groups D, E, and F dust-proof.

Optional Motor Voltages—See Below for Respective Suffix

(For all actuators)

- 12D—12 VDC
- 24D—24 VDC
- 24A—24 VAC
- 220A—220 VAC



Heater and Thermostat—Suffix T
For EVR, EVS, and EVT actuators.

Surge Protector—

Suffix W

(For EVS & EVT actuators)

The surge protector, (also known as “voltage transient suppression board”) is designed for installation in 120/240 VAC actuators, and used to protect against voltage surges that could damage the actuator. This module will also protect the capacitors used within each actuator.

Second Conduit Entry

Suffix Y

(For EVS & EVT actuators)

Some applications and electrical codes require that control wires be run in a separate conduit from the power supply wires. A second 1/2” NPT conduit connection can be provided for this purpose.



Electric Actuator Specifications and Accessories

Features/ Accessories/Voltages		General Specifications				
		Actuator Model				
Standard Actuator Features		EATB	EAU	EVR	EVS/EVT	EJM
Motor Drive Rotation		Uni	Uni	Rev	Rev	Rev
NEMA Rating (Available)		4, 4X	4, 4X	4, 4X	4, 4X	4, 4X
Enclosure Material (Top/Bottom)		GFPPL/GFPPL	GFPPL/GFPPL	PVC/ZA	Al/Al	Al/Al
Manual Override (De-Clutching)				Standard	Standard	Back-Drive
Position Indicator				Standard	Standard	Standard
Position Indication w/LED		POA	POA	POA	POA	POA
Standard Voltage (VAC)		115	115	115	115	115
Prewired to Terminal Strip			Standard	Standard	Standard	Standard
Motor Thermal Protector		Standard	Standard	Standard	Standard	Standard
Automatic Reset		Standard	Standard	Standard	Standard	Standard
Auxiliary Limit Switches (SPDT)			1 STD	Optional	Optional	2 STD
Auxiliary Limit Switch (Amp Rating)		5	5	10	15	EJM 2&3 5, all others 15
Low Ambient Limit without "T" (°F)		40°F	40°F	40°F	40°F	N/A
High Ambient Limit (°F)		160°F	160°F	160°F	160°F	150°F
Motor Brake		Standard	Standard	Standard	Optional	Self-Locking Gearing
Conduit Entry Size, NPT		1/2"	1/2"	1/2"	1/2"	1/2"
Permanent Lubrication		Standard	Standard	Standard	Standard	Standard
Mounting Position		Any	Any	Any	Any	Any
Min/Max Wire Size		18/16	18/16	18/14	18/14	20/12
Optional Actuator Accessories	Suffix	EATB	EAU	EVR	EVS/EVT	EJM
Timer Board	A			Optional	Optional	
Cycle Time Rate Regulator	B				Optional	
Positioner (4-20 mA)	C2E				Optional	Optional
180 Degree Center-Off	D			Optional	Optional	
Extended Duty	E				Standard	Optional
Handwheel	H			Optional		Standard
Mechanical Brake	K		Standard	Standard	Optional	Self-Locking Gearing
Electric Fail-safe (Battery Backup)	L2				Optional	
Feedback Potentiometer						
90 Degree, 0 to 1000 Ohms	P				Optional	Optional
No-Stop, 0 to 1000 Ohms	P2				Optional	
Dual, 0 to 1000 Ohms	P3				Optional	
Auxiliary Limit Switches Available*						
Auxiliary Limit Switch w/cam 1	S			Optional	Optional	
Auxiliary Limit Switch w/cam 2	S2			Optional	Optional	Standard
Auxiliary Limit Switch w/cam 3	S3				Optional	
Heater & Thermostat	T			Optional	Optional	Standard
Enclosure, NEMA 4,7,9	X2				Optional	
316 SS Tags w/Stamped Valve Numbers	YSS2	Optional	Optional	Optional	Optional	Optional
Optional Voltages	Suffix	EATB	EAU	EVR	EVS/EVT	EJM
12 VAC	12A		Optional			Optional
24 VAC	24A		Optional	Optional	Optional	Optional
220 VAC	220A		Optional	Optional	Optional	Optional
12 VDC	12D		Optional	Optional	Optional	Optional
24 VDC	24D		Optional	Optional	Optional	Optional

*Should additional auxiliary limit switches be required greater than quantity shown, consult factory.

- Notes:**
1. K Option, Mechanical Brake, is required with Actuators for butterfly valves.
 2. E Option, Extended Duty, is included with Positioners.
 3. EVS and EVT Actuators can be CSA certified. Price on application.
 4. Positioners with 12-24 VDC input are available. Consult factory.
 5. EJM Actuators over 800 in-lb torque include handwheel.

Important Note: The valve and actuator combinations shown in this catalog have been tested and approved by Hayward Flow Control Systems when properly installed into compatible process systems. Should actuators, accessories or mounting hardware other than those supplied by Hayward be used for the operation of these valves, the installer assumes all responsibility for the performance of those valves.



NPD Series Solenoid Valves

True Union



Overview

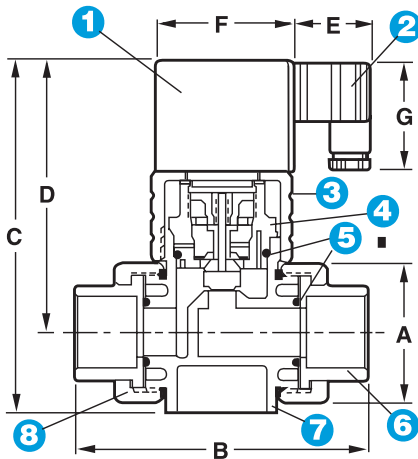
Heavy-duty solenoid valves feature true union end connections and are designed so No Pressure Differential is required for reliable operation. Problems such as sticking and “chattering” are eliminated and downstream restrictions caused by nozzles, flowmeters, and other equipment will not affect performance. The valve’s unique coil design results in lower coil operating temperatures and a 100% continuous duty rating. A molded polyester housing protects the coil assembly and electronics from harsh corrosive environments, and an easy to replace one-piece seal cartridge and plunger assembly allow the valve to quickly be put back in service.

Features

- Continuous 100% Duty Cycle
- Multi-Position Electric Connections
- Polyester Coil Housing
- 115 VAC Standard
- Corrosion Resistant
- Built-In 1/2” Conduit or S-J Type Cord Electric Connections
- FPM or EPDM Seals
- NPD Design
- 1/4 - 1” PVC, Corzan® CPVC

Options

- Voltage Options:
12 VAC/VDC, 24 VAC/VDC, 220 VAC



Parts List

True Union Solenoid Valves

- 1 Solenoid Coil
- 2 Electrical Connector
- 3 Bonnet Nut – CPVC
- 4 Seal Cartridge – CPVC, PVC
- 5 O-Rings
- 6 End Connector – PVC/CPVC
- 7 Body – PVC/CPVC
- 8 Union Nut – PVC/CPVC

Operating Parameters

For optimum valve performance, inlet pressure must not exceed 120 PSI. Flow rate should not exceed 5 feet per second.

Pressure Loss Calculation Formula

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient

Cv Factors

Size	Factor	Size	Factor
1/4"	1.3	3/4"	3.2
1/2"	2.3	1"	3.8

Dimensions–Inches

Size	A	B	C	D	E	F	G	Weight (lb/kg)
1/4"	2.25	5.30	6.30	4.60	1.60	2.60	2.00	2.79/1.3
1/2" /20*	2.25	5.30	6.30	4.60	1.60	2.60	2.00	2.81/1.3
3/4" /25*	2.63	5.50	6.60	5.10	1.60	2.60	2.00	3.01/1.4
1" /32*	2.63	5.50	6.60	5.10	1.60	2.60	2.00	3.03/1.4

* Metric End Connections Available in: BSP – Straight Thread, BSP TR – Tapered Thread and Metric Socket

Corzan® is a registered trademark of Noveon, Inc.



Technical Information

Part Numbers

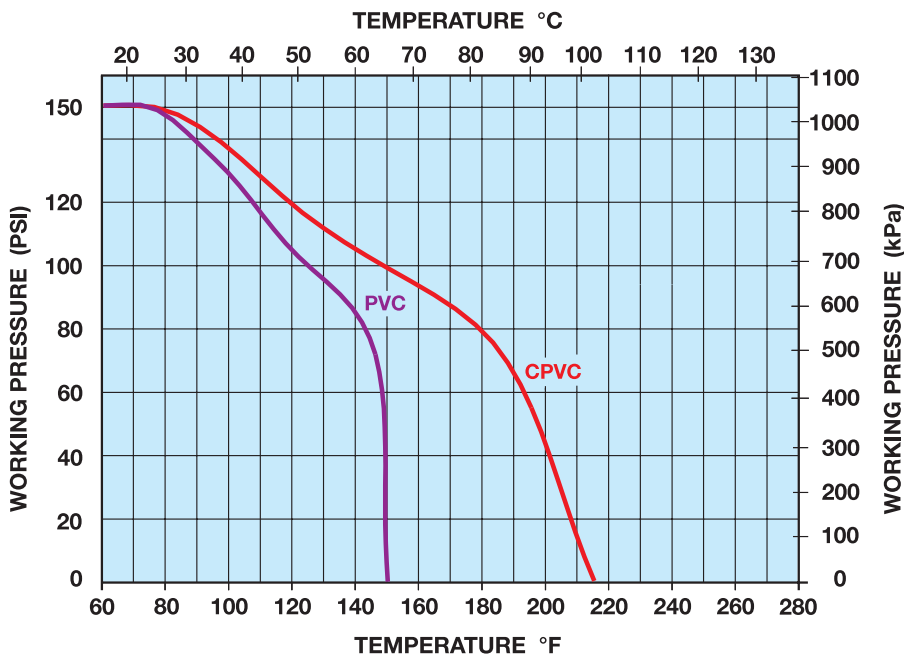
PVC/FPM Seals			CPVC/FPM Seals		
Size	End Conn.	Part Number	Size	End Conn.	Part Number
1/2"	Socket/Threaded	SV10050STV	1/4"	Socket/Threaded	SV20025STV
3/4"	Socket/Threaded	SV10075STV	1/2"	Socket/Threaded	SV20050STV
1"	Socket/Threaded	SV10100STV	3/4"	Socket/Threaded	SV20075STV
			1"	Socket/Threaded	SV20100STV
PVC/EPDM Seals			CPVC/EPDM Seals		
Size	End Conn.	Part Number	Size	End Conn.	Part Number
1/2"	Socket/Threaded	SV10050STE	1/4"	Socket/Threaded	SV20025STE
3/4"	Socket/Threaded	SV10075STE	1/2"	Socket/Threaded	SV20050STE
1"	Socket/Threaded	SV10100STE	3/4"	Socket/Threaded	SV20075STE
			1"	Socket/Threaded	SV20100STE

Solenoid Valve Selection Chart

Size	Material	End Conn.	Liner & Seals	Pressure Rating	Coil Rating
1/4", 1/2" 3/4", 1"	PVC*, CPVC	Socket, Threaded, or Flanged	FPM, EPDM	150 PSI @ 70°F Non-Shock 120 PSI Max Inlet Pressure	1.6 Amp @ 120 VAC

*1/4" not available in PVC

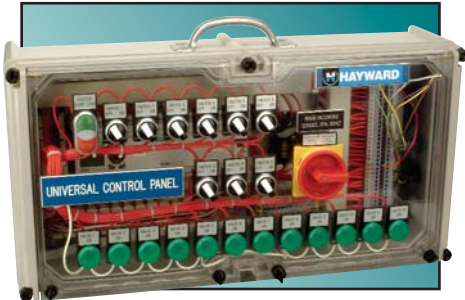
Operating Temperatures/Pressure



ELECTRIC ACTUATION



Universal Control Panel



For Control, Sequencing, and Monitoring of Automated Valves

Overview

Extremely flexible, low-cost Universal Control Panels are used to control the operation of 5 to 25 electrically or pneumatically actuated valves without the complexity and cost of programmable controllers or the maze of wires associated with hard-wire relays. Compact, electronic relays that serve as multiple timers, counters, clocks, and relays are easily programmed to perform endless combinations of actuated valve control to meet the specific requirements of virtually any application.

Features

- NEMA 4X Enclosure (UL, CSA & CE Listed)
- Transparent Hinged Cover
- Built-In Circuit Breaker
- Control Relay with Expansion Module
- Interposing Relays
- Terminal Wiring Block
- Control Switches
- Indicator and Alarm Lights

Application Flexibility

Universal Control Panels have control relay and expansion modules for numerous control functions including:

- Maximum of 20 Digital Outputs
- Maximum of 2 Analog Inputs
- Maximum of 10 Relay Outputs (Rated to 10 A Resistive [3A Ind.])

Panel Functions Include:

- 8 Timers and 8 Counters
- 4 Real Time Clocks with 4 Channels/Clock
- 8 Display Messages (To accommodate complex applications)

A standard main power disconnect switch provides added safety, a UL 489 circuit breaker allows power to be directly wired to the panel, and clearly marked terminal blocks make wiring connections easy.

An easy-to-read LCD displays circuit diagrams, continuous function updates, and other user-defined display messages. The panel can be customized to include indicating lights, alarms, interlocking relays, and selector switches. It is also AS-interface and PROFIBUS compatible.

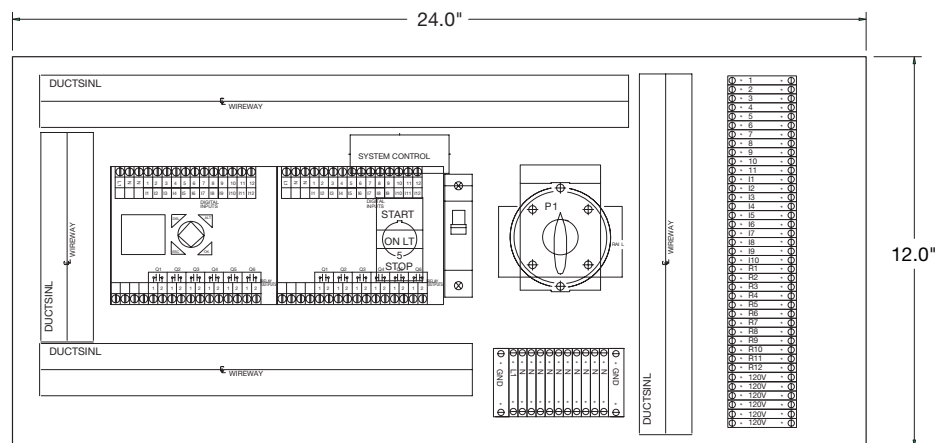
Easily Configured

Universal Control Panels are easily configured with the help of a Hayward Automated Valve Specialist. The panel can be programmed remotely, and a new control chip module can be installed on a panel already in the field. The panel is designed for use with Hayward Automated Valves but will also work with electric and pneumatic actuators from most other manufacturers.

Typical Applications

Universal Control Panels are ideally suited for small, compact systems with 5 to 25 actuated valves such as:

- Multiple Filter Banks with Backwash Systems
- Photo Processing Systems
- Small Waste and Water Treatment Plants
- HVAC Control and Sequencing
- Container Filling Systems
- PC Board Manufacturing Facilities



CONTROL BOX OVERALL HEIGHT = 9.5"



Bus Control Systems



Pneumatic Bus Control System
mounted on a butterfly valve

For Multiple Automated Valve Applications

Overview

Specially equipped Hayward actuated valves, as well as numerous other associated devices, can be linked via standardized communication networks within plants. While conventional communication architecture dictates as many as 8-12 wires run from PLC controls to each automated valve, bus architecture allows all actuated valves in the network to be controlled via a pair of daisy-chained wires – providing a level of enhanced flexibility and utility while dramatically reducing installation and maintenance costs.

Since communication protocols are as varied as the 100 or so manufacturers of programmable logic controllers (PLCs), Hayward actuated valves are equipped with AS-I modules that freely communicate with all PLC brands regardless of protocol. For modulating applications that require communication modules compatible with the specific PLC used, Hayward offers modules compatible with the most popular protocols including Device Net, Profibus, Modbus, Fieldbus, and several others.

Why Bus Is Better

Conventional actuated valve systems, especially modulating systems, often require the running of discrete bundles of wire from the central control station to each actuator in the network. These wiring bundles include power, control and feedback wiring. Use of Hayward's bus control system allows all actuated valves in the network to be linked via a single pair of daisy-chained wires.

Other compatible devices such as flow meters, temperature sensors, and other instrumentation can also be included in the network. Electronic "addresses" assigned to each actuated valve enable the PLC to command any actuator in the network independently of all other actuated valves.

The advantages of bus control over conventional control are numerous:

- Wiring is greatly simplified
- Power from the air solenoid in pneumatic actuation applications can be supplied via the bus connection
- Troubleshooting and future modifications are relatively simple
- Other devices can be included in the network
- Speed, reliability, and flexibility are greatly enhanced
- Net applied cost is often a fraction of conventional control costs

Applied Cost Savings

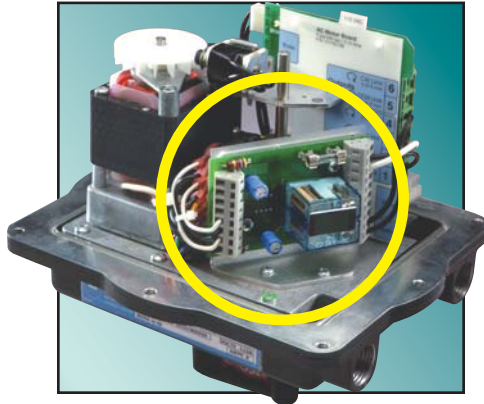
The industry standard for discreet wiring (design conduit, wire, and installation) is approximately \$8 per linear foot vs. a comparable bus system which can be installed for approximately \$2 per linear foot.

Using these cost factors, a modulating system requiring 20 actuators installed an average of 200 feet from the PLC would cost approximately \$32,000 to connect. An equivalent bus system would cost approximately \$8,000 with the resulting savings more than offsetting the cost of bus compatible actuated valves.

In bus control systems, the greatest cost savings are often realized later since troubleshooting is often accomplished through visual review of the system via a PC instead of physically tracing wires. Future modifications and system expansions are also greatly simplified.



Bus Control Systems



Electric Bus Module
(highlighted by yellow circle)

A Choice of Electric or Pneumatic Automation

Hayward bus control systems are designed to work with Hayward's EVS Series Electric and Series PH or PK Pneumatic Actuators. The bus control module for the electric actuator fits inside the actuator housing, and the one for the pneumatic actuator is contained in a small housing that mounts directly to the actuator. The module provides power and signal to the actuator.

Pneumatic Bus Module Features

- NEMA 4, 4X, and IP67 Enclosure (UL, CSA, and CE Listed)
- Transparent Screw-On Lexan® Cover
- Large Color-Coded Visual Open/Closed Indicator
- Solid State Inductive Positioning Sensors
- Integral High Flow, Low Power Consumption Solenoid Valve in Brass or Stainless Steel
- Enclosed Protected Pilot Solenoid
- AS-I or Device Net Twisted Pair Solenoid Power*
- Choice of 120 VAC or 24 VDC Operation
- Manual Override

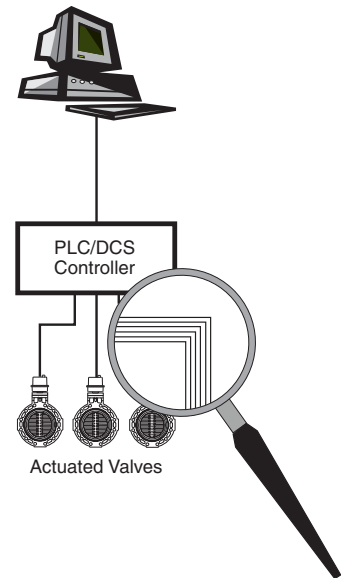
*Auxiliary power must be provided to the solenoid for Foundation Fieldbus applications.

Electric Bus Module Features

- Flexible, Housing-Enclosed Plug-In Type Protocol Module
- Several Different Protocol Modules to Handle Varying Application Requirements

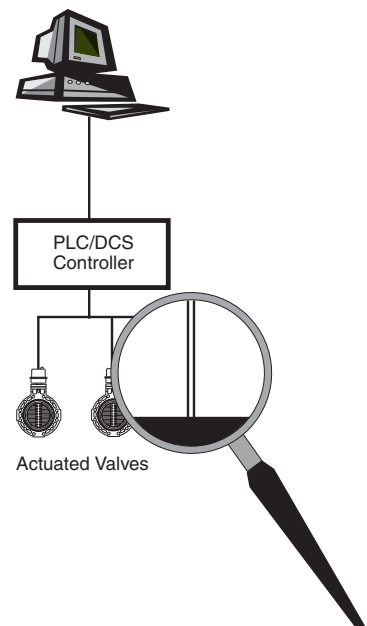
Conventional I/O Architecture

Business Systems Operator Workstations



Fieldbus I/O Architecture

Business Systems Operator Workstations



Lexan® is a registered trademark of General Electric



LS Series Control Station



For On-Demand Local or Remote Control of Electronically Actuated Valves

Overview

LS Series Control Stations are designed and engineered to provide maximum in-field flexibility for local and/or remote control of electrically actuated valves. A single LS Series Control Station can be used for local actuator control, and addition of a second station permits control from a remote location as well. One of two manual switches on each station allows control to be switched from one station to the other on demand – or both stations can be deactivated simultaneously. The other switch allows manual open, stop or close control of the valve. Two highly visible open or close indicator lights clearly show status of the valve.

Hayward LS Series Control Stations can be factory-mounted directly on the valve/electric actuator as a compact package, or ordered individually for mounting on a nearby wall or control panel. A color-coded wiring harness is available to make field installation easy.

Application Flexibility

The LS Series Control Station's modular design allows it to be easily modified to meet virtually any automated valve requirement. Determination of the number of stations required to meet switching and indication requirements for a new application is simple, and the stations can easily replace “make do” control wiring in existing applications.

Features

- NEMA 4x Rated Housing
- Rugged, Heavy Duty Construction
- Corrosion Resistant Enclosure
- Local and/or Remote Actuator Control
- Flexible Mounting on Actuator, Wall, or Control Panel
- Interposing Relays
- Eliminates Need for Switch

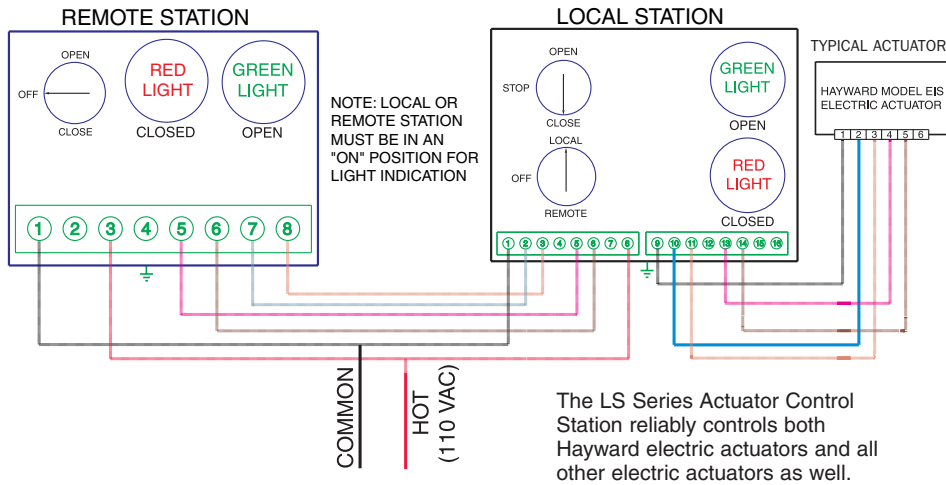
Options

- Keyed Selector Switches for Secured Access
- 4-20 mA Signal Generation for Modulating Valves
- Color Coded Wiring Harness for Easy Field Installation

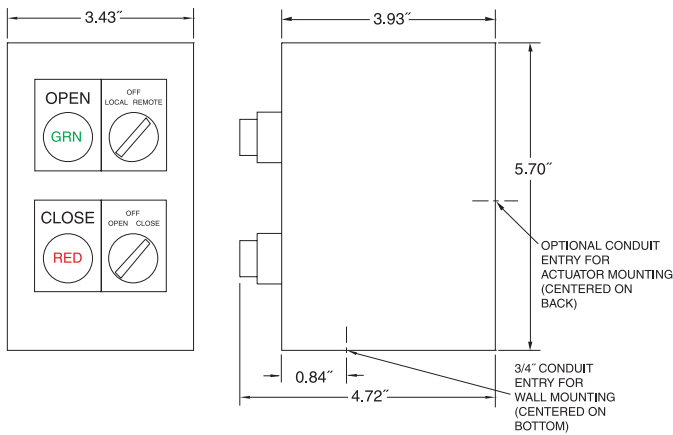


LS Series Control Station

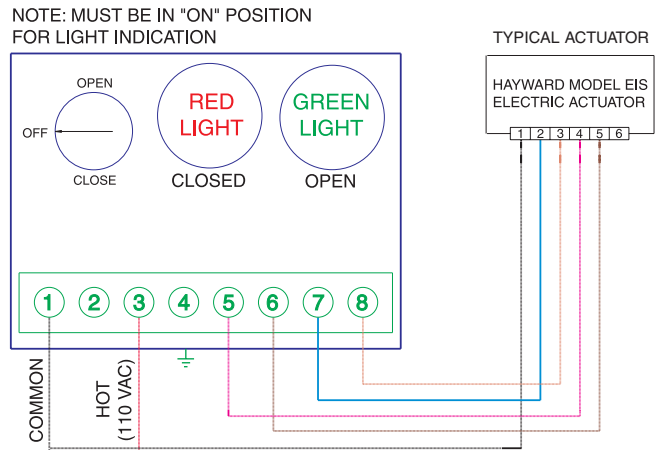
Wiring Diagram Where Two Actuator Control Stations are Used for Both Remote and Local Control



Dimensions



Wiring Diagram Where Actuator Control Station is Used for Either Remote or Local Control



A Better Way to Control Automated Valves

Why bother to custom fabricate switching controls for your electric actuator? Hayward has a better solution...the Series LS Actuator Control Station. Just connect a power source and you're ready to put your automated valve into service...without loose wires, hanging switches or confusion about whether the actuator has opened or closed the valve. And the LS Control Station can be mounted directly to the actuator, near it or in a convenient remote location. Not just for new installations, the Actuator Control Station can easily replace existing "make do" control wiring. The color-coded wiring harness makes a field retrofit simple to do.



Webster D-Series Vertical Seal-Less Immersible Pumps

All Plastic CPVC, Polypropylene, or PVDF Construction



Features

- Exclusive Two-Year Warranty
- Built for Years of Trouble Free Service
- Integral Mounting Bracket
- No Metal Ever Contacts the Process Fluid
- Pump Cannot Fail Due to Rust or Corrosion
- Dynamically Balanced Impeller
- Can be Run Dry or Against a Closed Valve
- No Seals to Leak or Replace

Options

- Inlet Screens
Protect Pump
Impellers From
Damage

Built To a High Standard

Often, pumps built to handle smaller capacity applications are not built to the standards of larger capacity pumps. This is not the case with Webster D-Series pumps. These pumps have been designed to perform reliably for years with standard features like a Heavy-Duty, TEFC, epoxy painted motor and extra features, such as increased end-bell motor protection, larger motor bearings for tighter control and less vibration, and improved capacitor protection.

Runs Dry, Runs Against a Closed Valve

A dynamically balanced, semi-open impeller with a unique “tandem” design permits the pump to run dry or to operate against a closed valve without damage to ensure years of trouble-free service. The seal-less design eliminates leaking and costly seal replacements.

All Plastic Construction

A D-Series pump can never fail because of rust or corrosion...the pump features all-plastic construction...the process media never comes in contact with metal. And with a choice of three different plastic materials of construction, including all-natural polypropylene, there's one right for your corrosive application.

Two Year Warranty

Lots of pumps claim to be reliable but only offer a one-year warranty. All Webster D-Series pumps are backed by Hayward's extended two-year warranty, your assurance of reliability.



Technical Information

D-Series Pump Specifications

Natural Polypropylene, CPVC, or PVDF Construction

Threaded Connections

Stainless Steel Shaft with non-metallic sleeve

PTFE Fume Barrier protects motor and bearings

Viton O-rings

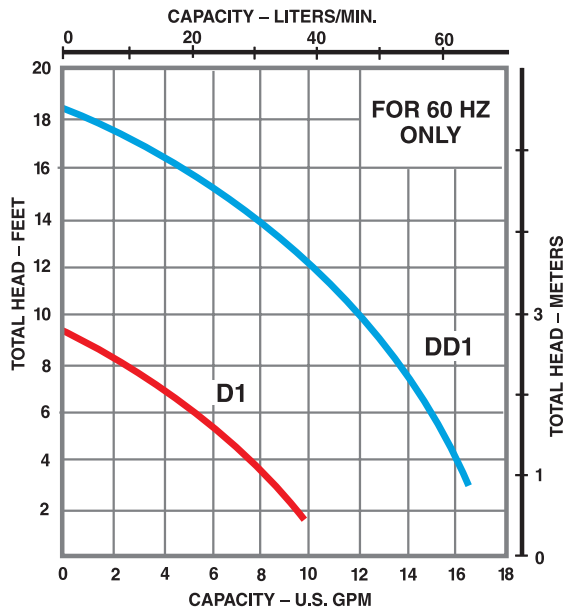
For flow rates from 2 to 17 GPM with TDH's up to 18 feet

Single Phase Motor with 1/8 HP, 115/230 VAC has heavy duty TEFC, epoxy painted construction and is rated for continuous duty service

The motor features a 1/2" diameter extended stainless steel shaft and sealed ball bearings with "slinger" lip seal

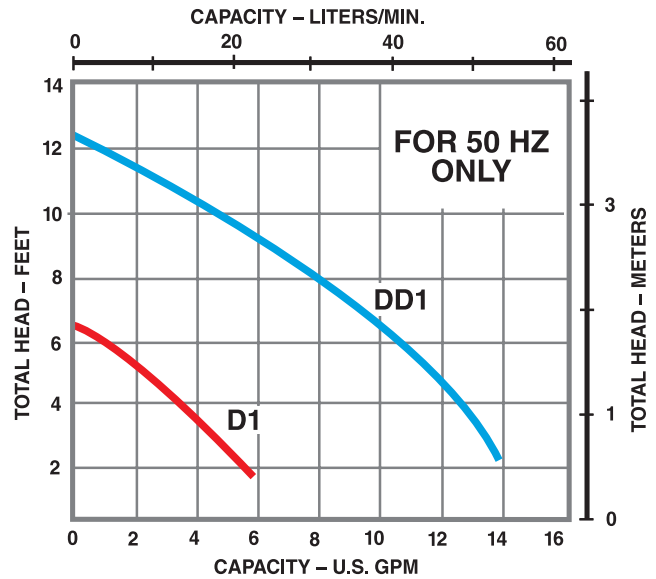
Performance Curves

60Hz



D1, DD1

50Hz



D1, DD1