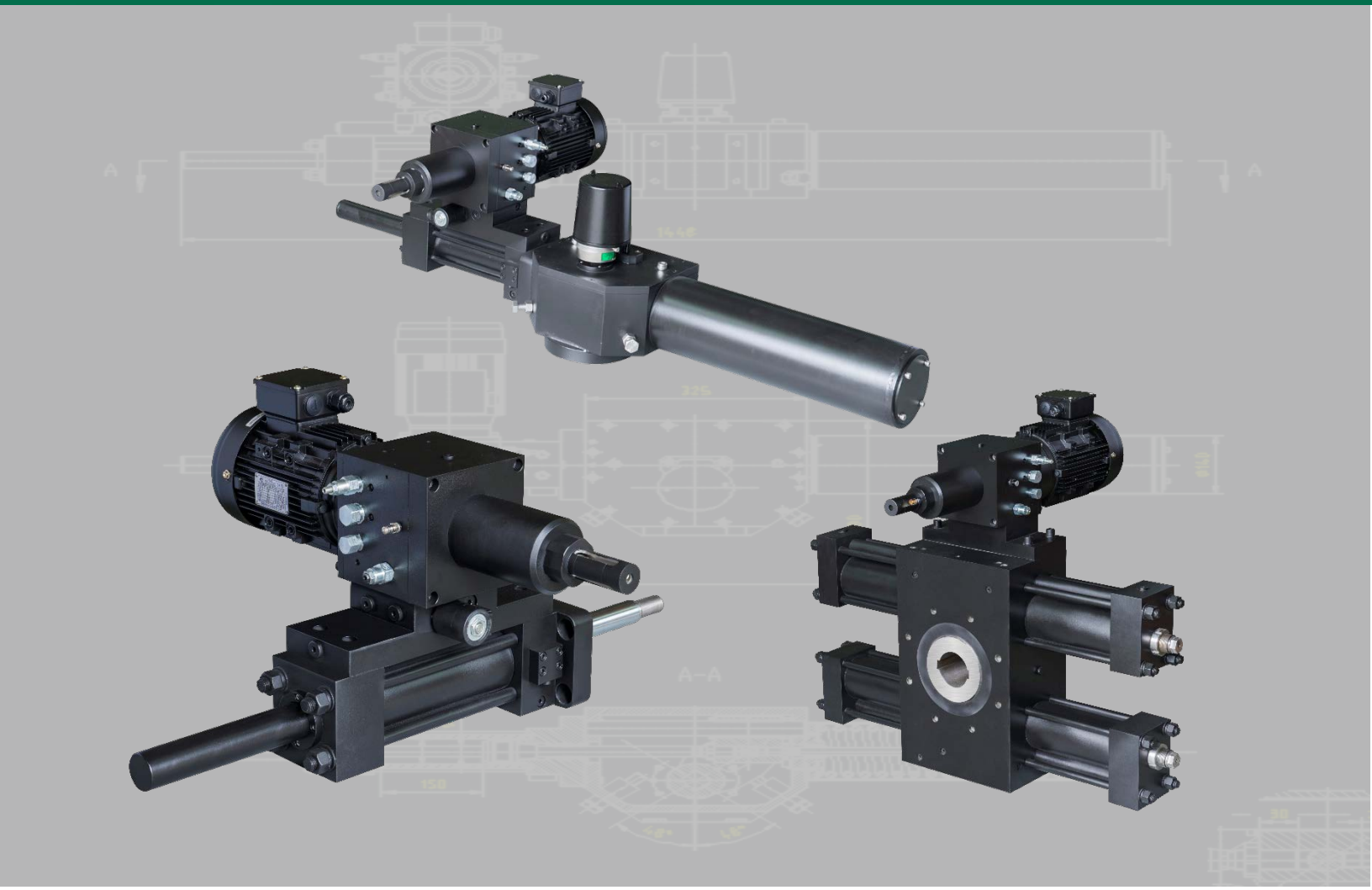
MS SERIES
Electro-Hydraulic Actuators
Actuators for Today's Industries



Compact, Efficient and Reliable. The MS Series Electro-Hydraulic Actuators are used in manufacturing and processing environments where control is essential.

Process Development & Control LLC
www.pdcvalve.com

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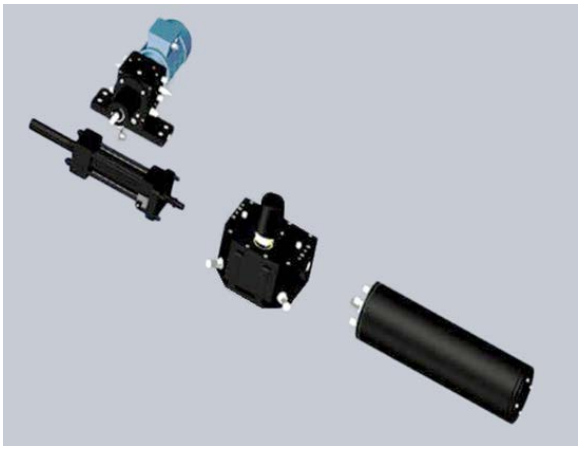
MS Series

Electro-Hydraulic Actuator



The MS Series Electro-Hydraulic actuator by PDC LLC is the ideal product for any general service on/off application, with fail safe options available, if desired. Consisting of a self-contained, bi-directional motor driven pump with an integral hydraulic cylinder and mechanical drive modules. MS Series actuators offer mechanical drive options of:

- MSL linear cylinder
- MSR rotary rack and pinion cylinder
- MSS rotary scotch-yoke cylinder

The MS Electro-Hydraulic's modular design allows you to choose the best combination for your service conditions. Consisting of a mechanical drive, a control box with a choice of optional Feedback and optional Fail-Safe configuration if desired.

The actuator assembly is installed on the driven device, while the control box can be attached to the actuator assembly or remotely. Connections are then made with cables. The control box offers local command of the driven device as well as from a remote location.

The MS Electro-Hydraulic actuator supplies a unique and reliable means of operating ball, butterfly, plug, gate, globe, damper valves and louvers. Only field electrical wiring is needed to operate the actuator. External oil and supply lines are not needed with the self-contained MS Electro-Hydraulic actuator.

As a full-featured, self-contained actuator the general service MS Electro-Hydraulic actuator supplies various input and output capabilities which include:

Inputs

1. Remote – two contact input; open/close with intermediate positioning
2. Local – open/close/stop push buttons stroke control

Outputs

1. Limit Switches – mechanical; end-of-travel only
2. Alarm Relay – signifies when the unit is unable to follow the control signal
3. Position Transmitter – 4 to 20 mA (Optional)

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Technical Data

Supply Voltage:
208/220/240/380/400/415/440/480V, 3Ph, 50/60Hz
Enclosure: NEMA 4, 4X or explosion proof
Motor: 1 Horsepower to 4 Horsepower
Operating Temperature: -13°F to 158°F (-25°C to 70°C)
Service: Open/Close, Fail Safe (Optional)
Output:
Rotary MSS/MSR: torque of 5K to 800K in-lbf
Linear MSL: thrust of 25K to 200K lbf

Typical Applications

- Oil and Gas Pipeline Valves
- Tank Farm Pipeline Valves
- Chemical Pipeline Valves
- Power Plant Pipeline Valves
- Metallurgical Process Pipeline Valves
- Sludge Line to Filter Press
- Influent Valve
- Backwash Valves
- Altitude Valves

Features

- Electrically Powered Self-Contained Hydraulic Actuator
- Can be mounted in any orientation
- Optional Spring Fail Safe
- Optional Accumulator Fail Safe
- Closed Circuit Hydraulic System
- Linear Series
- Rack and Pinion Series
- Scotch Yoke Series
- Optional 4 to 20 mA Valve Position Feedback
- Modular Design
- Vibration Resistance
- Discrete Operation: Motor and pump only run when motion is needed
- Optional ability to open or close the valves multiple times when the main power supply is lost

Actuators can also be provided that can open or close the valves multiple times even if the main power supply is lost.

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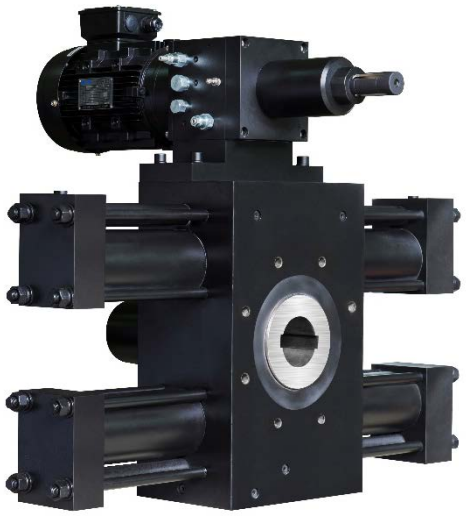
MSR Series Actuator Torque/Speed Charts



MSR Rack and Pinion Series Actuator

Nominal Torque	Output Torque (in-lbf)	Power Module Stroke Speed (sec/90° @ 50HZ)			
		D	E	F	G
5K	5,000	3	NA	NA	NA
10K	10,000	6	4	NA	NA
20K	20,000	11	7	4	NA
50K	50,000	27	17	8	6
100K	100,000	57	36	17	13
200K	200,000	NA	75	35	26
400K	400,000	NA	NA	68	51
500K	500,000	NA	NA	NA	65
600K	600,000	NA	NA	NA	78
800K	800,000	NA	NA	NA	104

MSL Series Actuator Thrust/Speed Charts

MSL Linear Cylinder Series Actuator without optional Spring Fail function

Nominal Thrust	Output Thrust (lbf)	Power Module Stroke Speed (inch/sec @ 50HZ)			
		D	E	F	G
2.5K	2,500	0.9	NA	NA	NA
5K	5,000	0.45	0.73	NA	NA
10K	10,000	0.27	0.43	0.92	NA
20K	20,000	0.11	0.18	0.39	0.53
40K	40,000	0.07	0.11	0.24	0.32
60K	60,000	NA	0.07	0.15	0.21
80K	80,000	NA	NA	0.12	0.16
100K	100,000	NA	NA	0.10	0.13
150K	150,000	NA	NA	NA	0.08
200K	200,000	NA	NA	NA	0.06

MSS Series Actuator Torque/Speed Charts

MSS Scotch Yoke Cylinder Series Actuator

Nominal Torque	Output Torque (in-lbf)			Power Module Stroke Speed (sec/90°@ 50HZ)			
	Start	Mid	End	D	E	F	G
5K	5,232	3,078	5,232	5	NA	NA	NA
10K	10,465	6,156	10,465	5	NA	NA	NA
20K	21,923	12,896	21,923	12	8	NA	NA
50K	52,791	31,053	52,791	26	17	8	6
100K	107,062	62,977	107,062	45	28	13	10
200K	212,106	124,768	212,106	NA	60	28	21
400K	462,823	272,149	462,823	NA	NA	57	42
800K	850,777	500,457	850,777	NA	NA	NA	77

MSS Series Actuator Torque/Speed Charts

MSS Scotch Yoke Cylinder Series Actuator with Optional Spring Fail Safe (F.S.) Function

Nominal Torque	Hydraulic Closing Torque (in-lbf)			Hydraulic Opening Torque (in-lbf)			Spring Emergency Shutdown Torque (in-lbf)			Power Module Stroke Speed (sec/90° @ 50HZ)				
	Start (90°)	Run (45°)	End (0°)	Start (0°)	Run (45°)	End (90°)	Start (90°)	Run (45°)	End (0°)	D	E	F	G	F.S.
5K	8,349	4,171	5,833	5,078	2,198	2,395	5,781	2,513	2,762	6	NA	NA	NA	<1
10K	13,813	6,869	9,541	8,657	3,752	4,099	9,514	4,088	4,387	6	NA	NA	NA	<1
20K	31,818	15,943	22,388	19,961	8,783	9,902	21,741	9,460	10,425	13	8	NA	NA	<1
50K	68,628	34,890	49,999	41,678	18,672	21,807	46,725	20,910	24,370	27	17	8	6	<1
100K	125,536	62,520	87,032	78,441	34,062	37,370	86,415	37,243	40,210	45	28	14	10	<1
200K	277,945	132,469	172,541	186,127	76,419	73,696	194,720	77,340	68,235	NA	61	29	21	<1

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How to Order the MS Series Actuator

	Drive Options		Control Box		Power Module		Voltage		Torque /Thrust		Travel		Fail Safe		Fail Safe Direction		Approvals
MS	X	-	XX	-	X	-	XX	-	XXXX	-	XXX	-	X	-	XX	-	XX
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)

Drive Options (1)	
X=	Description
L	Linear
S	Scotch Yoke
R	Rack and Pinon

Control Box (2)	
XX=	Description
A1	Standard
A2	Standard with 4 to 20 mA Feedback

Power Module (3)	
X=	Description
D	1 Horsepower
E	1.5 Horsepower
F	3 Horsepower
G	4 Horsepower

Voltage (4)	
XX=	Description
01	208, 220, 240 VAC
02	380, 400, 415 VAC
03	440, 480 VAC

Torque/Thrust (5)	
XXXX=	Description
005K	5,000 in*lbs (MSS OR MSR) 5,000 lbf (MSL)
010K	10,000 in*lbs (MSS OR MSR) 10,000 lbf (MSL)
020K	20,000 in*lbs (MSS OR MSR) 20,000 lbf (MSL)
XXXX	up to 800,000 in*lbs (MSS OR MSR) up to 200,000 lbf (MSL)

Travel (6)	
XXX=	Rotation or Stroke
090	Degrees (for MSS)
090, 120	Degrees (for MSR)
002, 004, 006, 008, 010, 012, 016, 020	Inches (for MSL)

Fail Safe Method (7)	
X=	Description
N	None
S	Spring (MSS or MSL only)
A	Accumulator

Fail Safe Movement (8)	
XX=	Description
FP	Fail in Place
CW	Clockwise (for MSS and MSR)
CC	Counterclockwise (for MSS and MSR)
E	Extend (for MSL)
R	Retract (for MSL)

Approvals Required (9)	
XX=	Description
N	Non-Hazardous Location NEMA 4X, IP66

Spring Fail Safe units require the addition of a helical spring assembly and solenoid valve to the standard MS Actuator. When electrical power is present, the solenoid is energized and the actuator will operate normally. Upon loss of solenoid power, the solenoid valve opens connecting both chambers of the hydraulic cylinder. The spring will now move the actuator stem to the selected failure position. The spring can be specified to drive the cylinder in either direction but, is not field reversible. A spring fail event may be initiated via a trip signal, loss of electrical power, loss of control signal, or a combination of these situations.

Accumulator Fail Safe units require the addition of an accumulator and can drive the actuator several times. Please contact the factory for more information.

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