

TYPE SL, ST, AND ST-MS PNEUMATIC / HYDRAULIC PISTON ACTUATORS

The Jamesbury brand double-acting type SL and ST, and spring-return type ST-MS piston actuators are specifically designed for efficient operation of quarter-turn rotary valves. Type ST and ST-MS models are ideal for both on-off and control applications, while the economical SL model is a quick-acting low-maintenance actuator designed for opening and closing small ball valves.

Double-acting SL and ST actuators are available with torque output ratings from 10 to 2400 FT•LBS (14 to 3254 N•m) at 100 psi (6.9 bar) supply pressure. Model ST1800 is rated for supply pressures from 40 to 125 psi (2.8 to 8.6 bar). All other models are rated to 150 psi (10 bar).

Spring-return type ST-MS actuators can provide spring-to-open or spring-to-close operation for ball valves or spring-to-close operation for butterfly valves. They are available in two classes. One is for systems with minimum supply pressures of 60 psi (4 bar), and the other for systems with 90 psi (6 bar) minimum. Torque outputs range from 13 to 440 FT•LBS (18 to 597 N•m).

Refer to Bulletin A107-1 for actuators with torque output capabilities greater than those listed herein.

FEATURES

Corrosion Resistant

- Aluminum body and endcap

High-Temperature Construction

- The standard unit is rated to 120°F (49°C) for Type SL, and 180°F (82°C) for type ST and ST-MS. High temperature ST and ST-MS models are suitable for environments to 250°F (121°C).

Low Maintenance

- Actuators are lubricated at the factory. No further lubrication required.
- Springs are enclosed in a self-contained cartridge for added reliability and easy maintenance.



Visible Position Indicator

- Red pointer continuously indicates valve position throughout the cycle.

Externally Adjustable Travel Stops

- Adjustable travel stops are standard for both the open and closed position. They allow adjustment of the angular stroke from 85° to 110°.
- Stop screws are protected from accidental changes in setting by acorn nuts.

Variety of Accessories

- Wide range of optional accessories and control devices that include limit switches, position indicators, two-stage flow controllers, programmable cycling controllers and positioners is available to satisfy virtually all automatic valve requirements.
- Valves, actuators, and accessories available as a complete assembly for single source responsibility.

SPECIFICATIONS

Supply Media: Air, water, mineral-based hydraulic fluid.

Operating temperature range:

SL = -20°F to +120°F (-29°C to +49°C)
 ST and ST-MS = -20°F to +180°F (-29°C to +82°C)
 High-Temp ST and ST-MS = -20°F to +250°F (-29°C to +121°C)

Stroke adjustment:

85° to 110°

Maximum supply pressure:

SL = 150 psi (10 bar)
 ST1800 = 125 psi (8.6 bar)
 All other ST and ST-MS = 150 psi (10 bar)

ACTUATOR	AIR VOLUME						BORE DIAM.		Typical Operating Speed**
	Body Side		End Cap Side*		Swept Volume		inches	mm	
	Cubic inches	liters	cubic inches	liters	cubic inches	liters			
SL10	3.0	0.05	1.6	0.03	2.9	0.05	1.63	41	1
ST20	11.3	0.19	2.2	0.04	6.9	0.11	2.50	64	1
ST50	16.8	0.28	6.5	0.11	13.6	0.22	3.50	89	2
ST13MS, ST20MS	16.8	0.28	-	-	13.6	0.22	3.50	89	1
ST200	70.5	1.16	18.7	0.31	69.5	1.14	5	127	5
ST60MS, ST90MS	70.5	1.16	-	-	69.5	1.14	5	127	5
ST400	80.5	1.32	31.1	0.51	137	2.25	7	178	7
ST115MS, ST175MS	80.5	1.32	-	-	137	2.25	7	178	8
ST600	25	4.15	36.0	0.59	10	2.79	6	152	8
ST160MS, ST240MS	25	4.15	-	-	170	2.79	6	152	8
ST1200	31	5.11	67.5	1.11	302	4.95	8	203	10
ST290MS, ST440MS	312	5.11	-	-	302	4.95	8	203	10
ST1800	327	5.36	218	3.57	484	7.93	10	254	12
ST2400	625	10.24	135	2.21	604	9.90	8†	203	15

* Not applicable to Type ST-MS spring-return actuators

** At 100 psi (6.9 bar) air supply for double-acting actuators, at minimum specified air supplies for spring-return actuators, allowing for 5% maximum surge, using solenoid pilot valves recommended in Bulletin A160-1 and on typical valves. Times will vary according to type of valve and service conditions. Contact your distributor or Jamesbury's home office for more specific information.

† Actuator has two 8" (203 mm) diameter cylinders.

DIMENSIONS INCHES (MM)

SL10 Actuator

1/4" NPTF Supply Ports

1.81, 2.50, 4.19, 6.25, 1.62, 20, 18, 19, 17, 15, 14, 12, 11, 10, 13, 37, 4, 1.38, 2.47

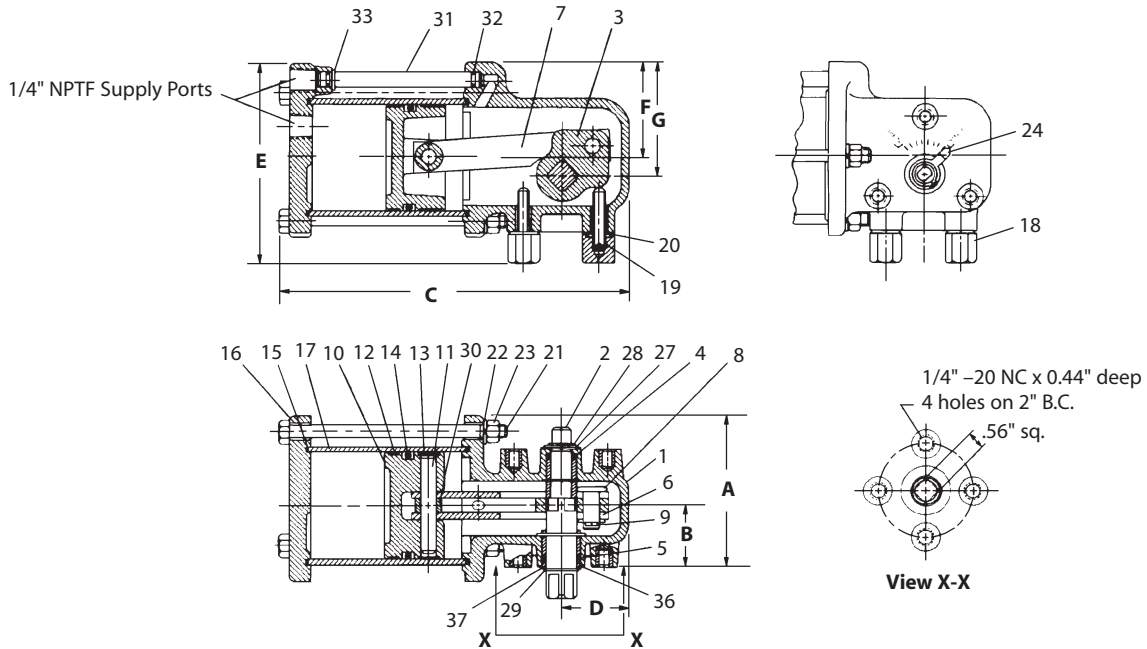
1/4"-20 NC x 0.44" deep
3 holes on 2" B.C.

.38" sq.

View X-X

BILL OF MATERIALS AND PARTS			
Part No.	Part Name	Quantity	Material
1	Cylinder Body	1	Aluminum
2	Driver	1	Stainless steel
3	Driver Arm	1	Stainless steel
4	Upper Driver Seal	1	Buna N
5	Lower Driver Seal	1	Buna N
7	Connector Plate	2	Stainless steel
8	Pivot Pin	1	Stainless steel
9	Pivot Pin Retainer	2	Stainless steel
10	Piston	1	Polypropylene
11	Piston Pin	1	Stainless steel
12	Plug	2	Polyethylene
13	E-ring	1	Stainless steel
14	Piston Seal	1	Buna N
15	End Cap Seal	1	Buna N
16	End Cap	1	Polypropylene
17	Retaining Ring	1	Carbon steel
18	Acorn Nut	2	Aluminum
19	Stop Set Screw	2	Carbon steel
20	Stop Screw Seal	2	Buna N
24	Indicator Pointer	1	Aluminum
37	Backup Washer	1	Nylon

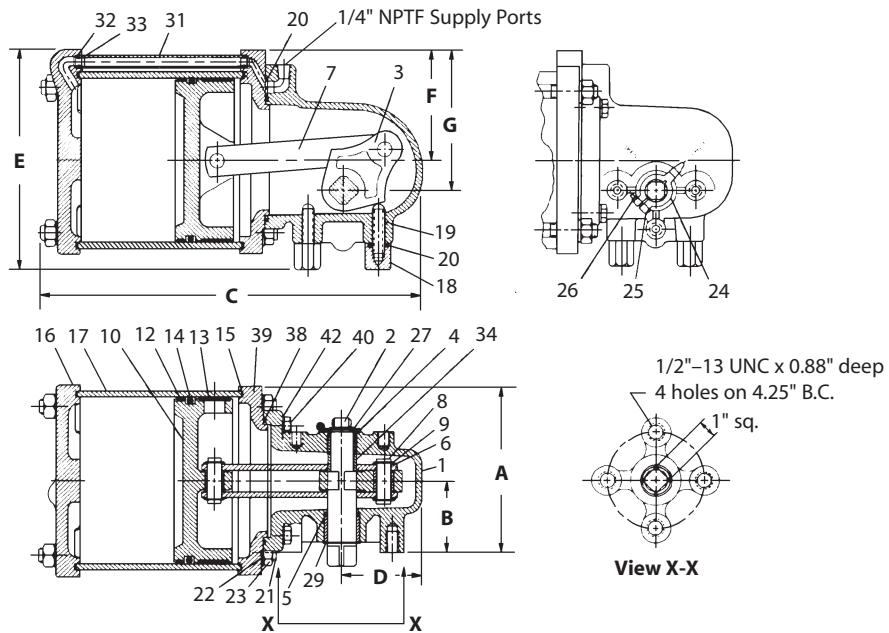
ST20 and ST50 Actuators



Actuator	A		B		C		D		E		F		G	
	Inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
ST20	3.56	90	1.44	37	8.12	206	1.59	40	4.78	121	2.19	56	2.62	67
ST50	3.94	100	1.44	37	8.51	216	1.59	40	5.53	140	2.75	70	3.38	86

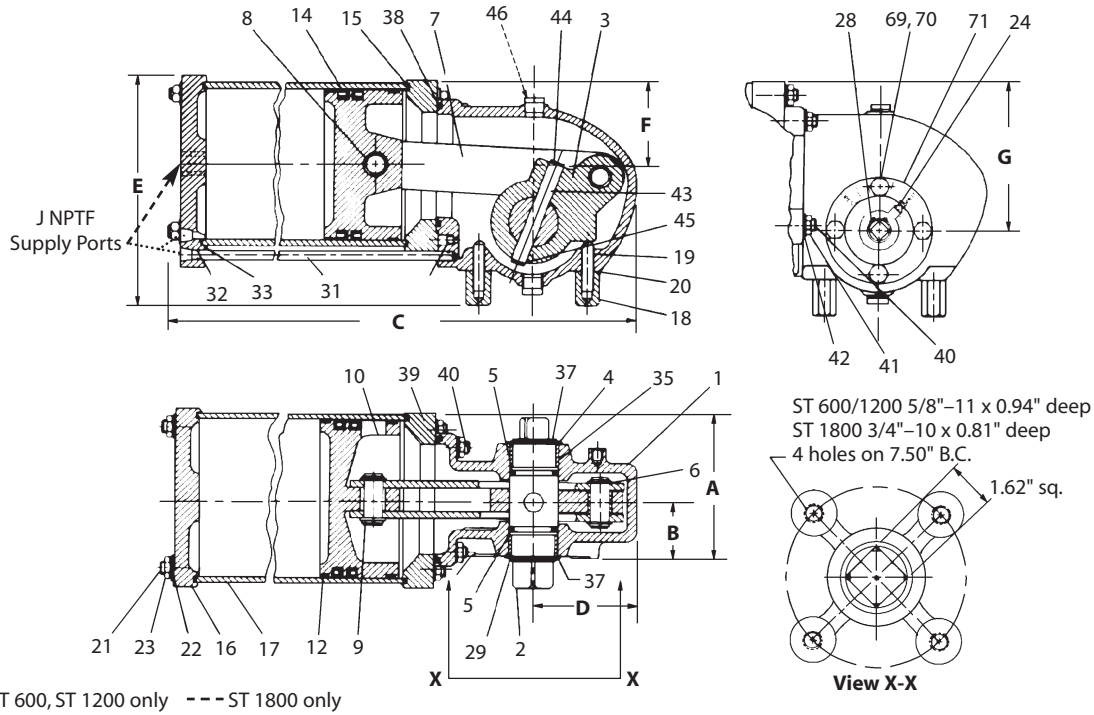
See Bulletin T121-1 for valve-to-actuator dimensions.

ST200 and ST400 Actuators



Actuator	A		B		C		D		E		F		G	
	Inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
ST200	5.94	151	3.00	76	14.44	367	3.38	86	8.81	224	3.88	99	5.06	129
ST400	7.00	178	3.00	76	16.12	409	3.38	86	9.62	244	4.69	119	5.88	149

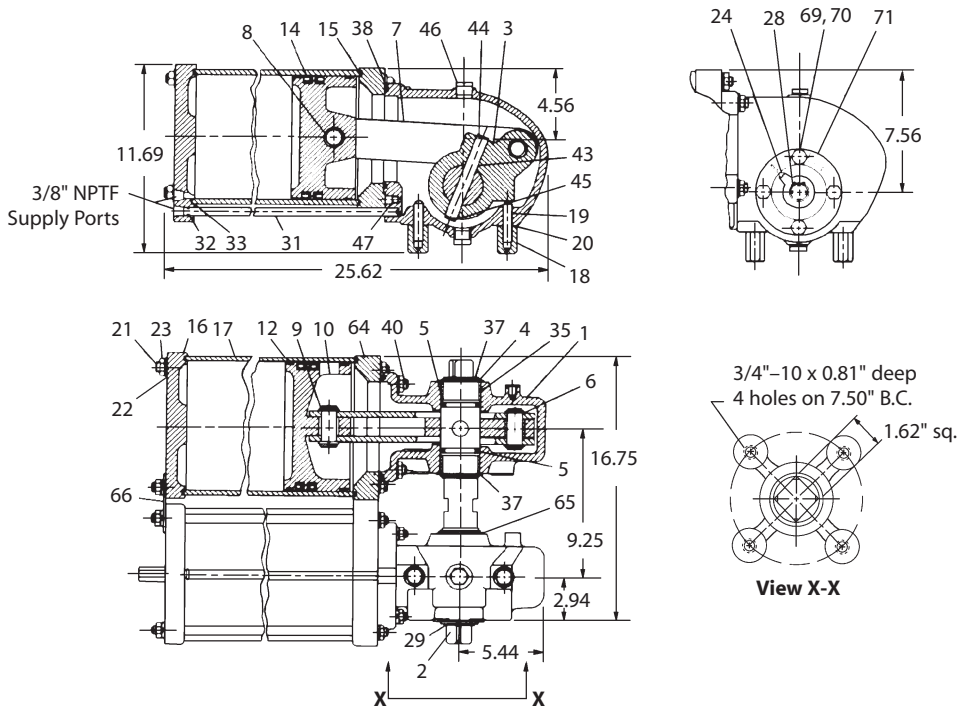
ST600, ST1200, and ST1800 Actuators



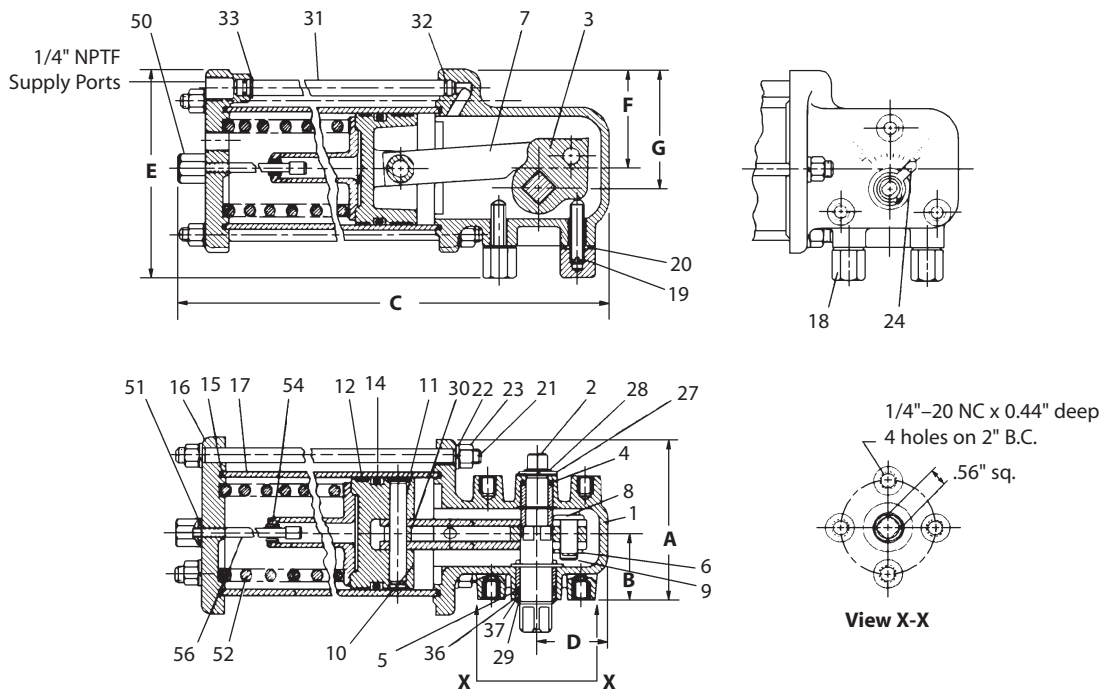
Approximate Dimensions

Actuator	A		B		C		D		E		F		G		J
	Inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	NPT
ST600	7.19	183	2.94	75	25.25	651	5.56	141	11.00	279	3.88	99	7.00	178	3/8
ST1200	7.56	192	2.94	75	25.25	651	5.56	141	11.69	297	4.56	116	7.56	192	3/8
ST1800	8.50	216	2.94	75	27.75	705	5.56	141	12.6	321	5.50	140	8.50	216	3/4

ST2400 Actuators

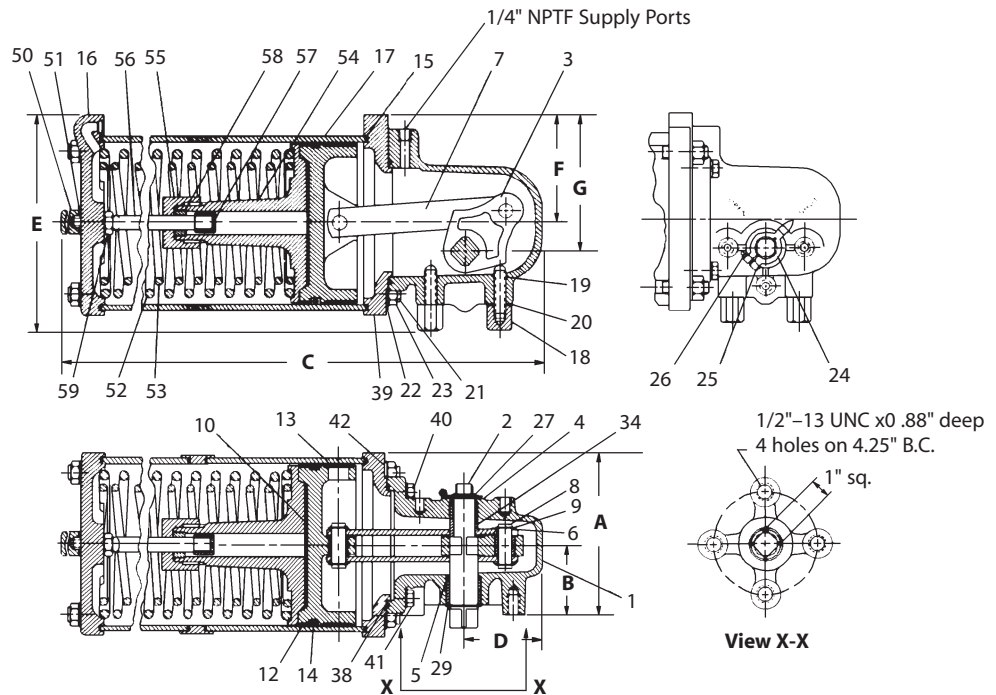


ST13MS and ST20MS Actuators



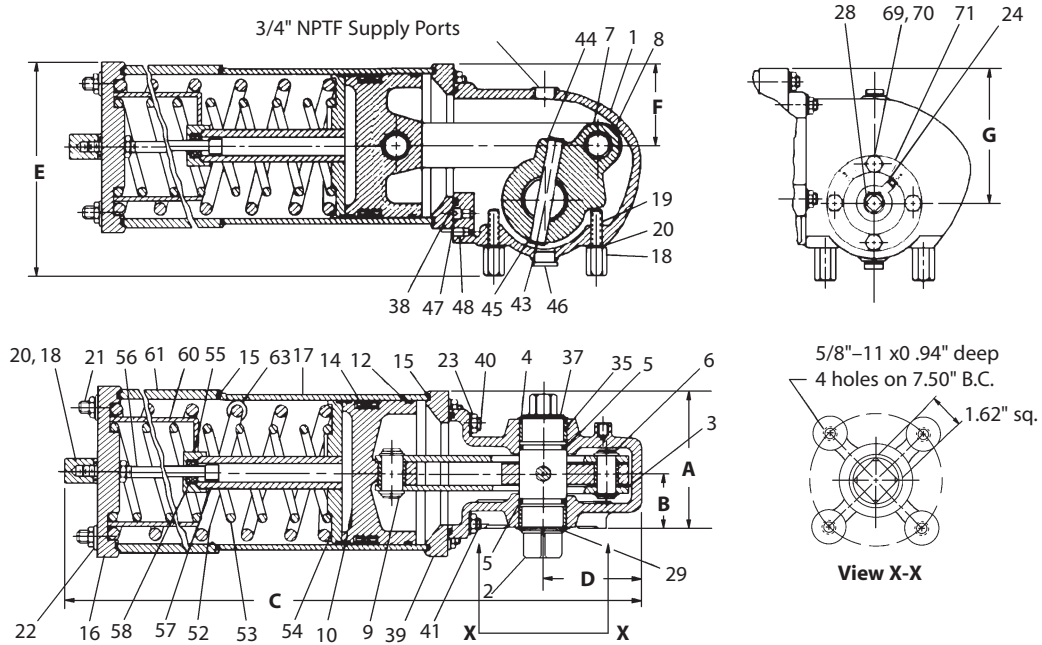
Actuator	Approximate Dimensions													
	A		B		C		D		E		F		G	
	Inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
ST13MS	3.94	100	1.44	37	13.44	341	1.59	40	5.53	140	2.75	70	3.38	86
ST20MS	3.94	100	1.44	37	13.44	341	1.59	40	5.53	140	2.75	70	3.38	86

ST60MS, ST90MS, ST115MS, and ST175MS Actuators



Actuator	Approximate Dimensions													
	A		B		C		D		E		F		G	
	Inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
ST60MS ST90MS	5.94	151	3.00	76	21.62	549	3.38	86	8.81	224	3.88	99	5.06	129
ST115MS ST175MS	7.00	178	3.00	76	24.69	627	3.38	86	9.62	244	4.69	119	5.88	149

ST160MS, ST240MS, ST290MS, and ST440MS Actuators



Approximate Dimensions

Actuator	A		B		C		D		E		F		G	
	Inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
ST160MS ST240MS	7.19	183	2.94	75	36.12	917	5.56	141	11.00	279	3.88	99	6.50	165
ST290MS ST440MS	7.56	192	2.94	75	38.88	988	5.56	141	11.60	297	4.56	116	7.56	192

BILL OF MATERIALS AND PARTS LIST FOR ALL ST ACTUATORS IN THIS BULLETIN							
Part No.	Name	ST20/50		ST200/400		ST600/1200/2400 (See Note 1)	
		Qty	Material	Qty	Material	Qty	Material
1	Cylinder Body	1	Aluminum w/bronze bearings	1	Aluminum w/bronze bearings	1	Aluminum
2	Driver	1	Stainless steel	1	Stainless steel	1	Stainless steel
3	Driver Arm	1	Carbon steel - ST20, Stainless steel - ST50	1	Carbon steel w/bronze bearings	1	Ductile iron w/Acetyl Resin bearings
4	Upper Driver	1	Buna N	1	Buna N	1	Buna N
5	Driver Seal	1	Buna N	1	Buna N	2	Buna N
6	Pivot Pin Washer	1	Stainless steel	4	Nylon	4	Stainless Steel
7	Connector Plate	2	Carbon steel	2	Carbon steel	2	Carbon steel
8	Pivot Pin	1	Stainless steel	2	Stainless steel	2	Stainless steel
9	Pivot Pin Retainer	1	Stainless steel	4	Stainless steel	4	Stainless steel
10	Piston	1	Aluminum	1	Aluminum w/bronze bearings	1	Aluminum w/Acetyl Resin bearings
11	Piston Pin	1	Stainless steel		See item #8		See item #8
12	Piston Bearing	1	Nylon	1	Nylon	2	PTFE
13	Piston Bearing	1	Nylon	1	Nylon		N/A
14	Piston Seal	1	Buna N	1	Buna N	2	Buna N
15	Gasket	2	Vellumoid	2	Vellumoid	2	Vellumoid
16	End Cap	1R1	Aluminum	1	Aluminum	1	Aluminum
17	Cylinder	2	Aluminum	1R2	Aluminum	1	Aluminum
18	Acorn Nut	2	Aluminum	2	Aluminum	2	Aluminum
19	Stop Set Screw	2	Carbon steel	2	Carbon steel	2	Carbon steel
20	Stop Screw Seal	3	Buna N	4	Buna N	2	Buna N
21	Tie Rod	3	Carbon steel	8	Carbon Steel	4	Carbon steel
22	Lock Washer	3	Carbon steel	8	Carbon steel	8	Carbon steel
23	Hex Nut	1	Carbon steel	1	Carbon steel	8	Carbon steel
24	Indicator Pointer		Carbon steel	1	Carbon steel	1	Carbon steel
25	Cap Screw		N/A	1	Stainless steel	1	N/A
26	Hex Nut	1	N/A	1	Stainless steel		N/A
27	Pointer Bearing	1	Nylon	1	Nylon		N/A
28	Retaining Ring	1	Stainless steel		N/A	1	Carbon steel
29	Retaining Ring	1	Stainless steel	1	Stainless steel	2	Carbon steel
30	Conn. Plate Spacer	1	Nylon		N/A		N/A
31	Transfer Tube	2	Aluminum	1	Aluminum	1	Aluminum
32	Tube Seal	1	Buna N	2	Buna N	2	Buna N
33	Tube Seal Retainer		Stainless steel	1	Carbon steel	1	Carbon steel
34	Bearing Spacer		N/A	1	Delrin		N/A
35	Driver Bearing	1	Part of item #1		Part of item #1	2	Delrin
36	Driver Seal Retainer	1	PTFE		N/A		N/A
37	Back up Washer		Stainless steel		N/A	2	Stainless steel
38	O-Ring Body Seal		N/A	1	Buna N	1	Buna N
39	Adapter Flange		N/A	1	Aluminum	1	Aluminum
40	Adapter Stud		N/A	4	Carbon steel	4	Carbon steel
41	Hex Nut		N/A		N/A	4	Carbon steel
42	Lock Washer		N/A	4	Carbon steel	4	Carbon steel
43	Driver Pin		N/A		N/A	1	Stainless steel
44	Driver Pin Plug		N/A		N/A	1	Carbon steel
46	3/4" Pipe Plug		N/A		N/A	1	Carbon steel
47	3/8" Pipe Plug		N/A		N/A	1	Carbon steel
48	1/8" Pipe Plug		N/A		N/A	1	Carbon steel
69	Lock Washer		N/A		N/A	4	Carbon steel
70	Hex Head Cap Screw		N/A		N/A	4	Carbon steel
71	Indicator Plate		N/A		N/A	1	Stainless steel
NOTE 1: The type ST2400 actuator combines two Type ST1200 actuators. For this actuator, double all parts and quantities through part # 48, except for parts # 2, 24, 25, and 29. The following apply to ST2400 actuators only:							
64	Lower Cylinder Body					1	Aluminum
65	Driver Retainer					2	Carbon Steel
66	Brace					1	Carbon Steel

NOTE 2: aa – ST20: 1 required
 – ST50: 2 required
 ab – ST20 ONLY
 b – ST200: 2 required
 – ST400: 3 required
 c – ST400 ONLY
 – ST600/ST1800: 2 required
 – ST 1200: 4 required
 e – ST1600/ST1800: 8 required
 – ST1200: 12 required

f – ST11200/ST1800/2400 ONLY
 g – ST600/ST1800: ONLY
 h – ST1800: 4 required
 j – ST1800: Filament-wound Fiberglass epoxy
 l – ST1800: 1 required
 m – ST1800 ONLY
 o – ST1800: Buna N
 p – ST200 only

BILLS OF MATERIALS AND PARTS LIST FOR ALL ST MS ACTUATORS IN THIS BULLETIN							
Part No.	Name	ST13/20 MS		ST60/90MS	ST115/175MS	ST160/240/290/440MS	
		Qty	Material	Qty	Material	Qty	Material
1	Cylinder Body Assembly	1	Aluminum w/bronze bearings	1	Aluminum w/bronze bearings	1	Aluminum
2	Driver	1	Stainless steel	1	Stainless steel	1	Stainless steel
3	Driver Arm	1	Carbon steel	1	Carbon steel w/bronze bearings	1	Ductile iron w/Acetyl Resin bearings
4	Upper Driver Seal	1	Buna N	1	Buna N	1	Buna N
5	Driver Seal	1	Buna N	1	Buna N	2	Buna N
6	Pivot Pin Washer	1	Stainless steel	4	Nylon	4	Stainless Steel
7	Connector Plate	2	Carbon steel	2	Carbon steel	2	Carbon steel
8	Pivot Pin	1	Stainless steel	2	Stainless steel	2	Stainless steel
9	Pivot Pin Retainer	1	Stainless steel	4	Stainless steel	4	Stainless steel
10	Piston	1	Aluminum	1	Aluminum w/bronze bearings	1	Aluminum w/Acetal Resin bearings
11	Piston Pin	1	Stainless steel		See item #8		See item #8
12	Piston Bearing	2	Nylon	1	Nylon	3	PTFE
13	Piston Bearing		N/A	1	Nylon		N/A
14	Piston Seal	1	Buna N	1	Buna N	2	Buna N
15	Gasket	2	Nitrile butadiene	2	Nitrile butadiene	3	Nitrile butadiene
16	End Cap	1	Aluminum	1	Aluminum	1	Aluminum
17	Cylinder	1	Aluminum	1	Aluminum	1	Aluminum
18	Acorn Nut	2	Aluminum	2	Aluminum	3	Aluminum
19	Stop Set Screw	2	Carbon steel	2	Carbon steel	2	Carbon steel
20	Stop Screw Seal	2	Buna N	2	Buna N	3	Buna N
21	Tie Rod	3	Carbon steel	4	Carbon Steel	4	Carbon steel
22	Lock Washer	3	Carbon steel	8	Carbon steel	8	Carbon steel
23	Hex Nut	3	Carbon steel	8	Carbon steel	9	Carbon steel
24	Indicator Pointer	1	Carbon Steel	1	Carbon steel	1	Carbon steel
25	Cap Screw		N/A	1	Stainless steel		N/A
26	Hex Nut		N/A	1	Stainless steel		N/A
27	Pointer Bearing	1	Nylon	1	Nylon		N/A
28	Retaining Ring	1	Stainless steel		N/A	1	Carbon steel
29	Retaining Ring	1	Stainless steel	1	Stainless steel	2	Carbon steel
30	Conn. Plate Spacer	1	Aluminum		N/A		N/A
31	Transfer Tube	1	Aluminum		N/A		N/A
32	Tube Seal	2	Buna N		N/A		N/A
33	Tube Seal Retainer	1	Stainless steel		N/A		N/A
34	Bearing Spacer		N/A	1	Delrin		N/A
35	Driver Bearing		Part of item #1		Part of item #1	2	Delrin
36	Driver Seal Retainer	1	PTFE		N/A		N/A
37	Back up Washer	1	Stainless steel		N/A	2	Stainless steel
38	O-Ring Body Seal		N/A	1	Buna N	1	Buna N
39	Adapter Flange		N/A	1	Aluminum	1	Aluminum
40	Adapter Stud		N/A	4	Carbon steel	4	Carbon steel
42	Lock Washer		N/A	4	Carbon steel		N/A
43	Driver Pin		N/A		N/A	1	Stainless steel
44	Driver Pin Plug		N/A		N/A	1	Carbon steel
46	3/4" Pipe Plug		N/A		N/A	1	Carbon steel
47	3/8" Pipe Plug		N/A		N/A	1	Carbon steel
48	1/8" Pipe Plug		N/A		N/A	1	Carbon steel
49	Caution Plate	1	Aluminum	1	Aluminum	1	Aluminum
50	Acorn Nut	1	Aluminum	1	Aluminum		Same as item #8
51	Acorn Seal	1	Buna N	1	Buna N		Same as item #20
52	Compr. Spring Outer	1	Carbon steel	1	Carbon steel	1	Carbon steel
53	Compr. Spring Inner		N/A	1	Carbon steel	1	Carbon steel
54	Spring Stop	1	Aluminum/brz. bearing	1	Aluminum	1	Carbon steel
55	Spring Ret. Cap		N/A	1	Aluminum	1	Carbon steel
56	Spring Ret. Rod	1	Stainless steel	1	Carbon steel	1	Carbon steel
57	Ret. Rod Cap		N/A	1	Carbon steel	1	Carbon steel
58	Ret. Rod Bearing		N/A	1	Nylon	1	Nylon
59	Ret. Rod Nut		N/A		Item #23 on ST115/117MS		See item #23
60	Label	1	Aluminum		N/A		N/A
61	Cylinder Spacer		N/A		N/A	1	Aluminum
63	Spring Bearing		N/A		N/A	11	Nylon
69	Lock Washer		N/A		N/A	4	Carbon steel
70	Hex Head Cap Screw		N/A		N/A	4	Carbon steel
71	Indicator Plate		N/A		N/A	1	Stainless steel
72	Spring Guide Tube		N/A		N/A	1	Carbon steel

NOTE 1: Item #16 and items #40 through #58 should be replaced as an entire sub-assembly for safety reasons.

NOTE 2: a – Item #16 is part of spring sub-assembly d – ST115/175MS ONLY h – ST160/240MS: 8 required j – ST290/440MS ONLY
 b – ST90/175/240/440MS g – ST160/240: 3 required – ST290/440MS: 12 required k – ST160/240MS ONLY
 c – ST60/90MS: 8 required – ST290/440: 2 required i – ST160/240MS: 9 required l – ST290/440 ONLY
 – ST115/175MS: 9 required – ST290/440MS: 13 required m – ST115/175 MS Vellumoid

ACTUATOR SELECTION

Bulletins that describe each style of Jamesbury ball valves and butterfly valves contain information on required operating torques for that particular valve design according to valve size, seat material, maximum pressure differential, and service.

To select the proper actuator for a particular valve and service, first determine the maximum operating torque required for the valve from the applicable valve bulletin. Then refer to the applicable table below and select the actuator that will provide a torque output *no less* than the required operating torque for the valve at the available supply pressure.

Torque output of double-acting actuators with specific supply pressures between 40 and 150 psi (125 psi for ST1800) can be calculated as xpsi/100 of the output at 100 psi. Since torque output of a spring-return actuator in one direction is provided by a compression spring, an increase in air pressure above the rated supply pressure will not increase its rated torque output.

Type ST-MS actuators can be used on butterfly valves for spring-to-close operation only. If spring-to-open operation is required, refer to Bulletin A110-2 covering Quadra-Powr® spring-diaphragm actuators, or Bulletin A107-1 for BJA/BIJA actuators.

SL and ST Double-acting Actuators

Actuator Type	Torque Output - FT•LBS At minimum supply pressure of:							Wt. lb.
	40 psi	50 psi	60 psi	70 psi	80 psi	90 psi	100 psi	
SL10	4	5	6	7	8	9	10	3.5
ST20	8	10	12	14	16	18	20	5.8
ST50	20	25	30	35	40	45	50	7.1
ST200	80	100	120	140	160	180	200	31
ST400	160	200	240	280	320	360	400	44.5
ST600	240	300	360	420	480	540	600	74
ST1200	480	600	720	840	960	1080	1200	94
ST1800	720	900	1080	1260	1440	1620	1800	125
ST2400	960	1200	1440	1680	1920	2160	2400	174

Actuator Type	Torque Output - N•m At minimum supply pressure of:							Wt. kg
	2.76 bar	3.45 bar	4.14 bar	4.83 bar	5.52 bar	6.21 bar	6.90 bar	
SL10	5.4	6.8	8.1	9.5	11.0	12.2	14.0	1.6
ST20	10.9	13.6	16.3	19.0	22.0	24.4	27.1	2.6
ST50	27.1	33.9	40.7	47.0	54.2	61.0	68.0	3.2
ST200	108.5	135.6	162.8	190.0	217.0	244.1	271.2	14.1
ST400	217.0	271.3	323.5	380.0	434.0	488.2	543.0	20.2
ST600	325.5	406.9	488.3	570.0	651.0	732.4	814.0	33.6
ST1200	651.0	813.8	976.5	1139	1302	1465	1628	42.7
ST1800	976.5	1221	1465	1709	1953	2197	2441	56.8
ST2400	1302	1628	1953	2279	2604	2930	3255	79.1

Actuator Accessories

Solenoid pilot valves recommended for use with the Jamesbury brand piston actuators are described in Bulletin A160-1. Information on limit switches that are available with these actuators is contained in Bulletin A161-2.

ST-MS Spring-return Actuators

Actuator Type	Torque Output - FT•LBS				Wt. lb.
	60 psi		90 psi		
	Air Stroke	Spring Stroke	Air Stroke	Spring Stroke	
ST13MS	12	13			11
ST60MS	55	60			40
ST115MS	115	115			70
ST160MS	140	160			108
ST290MS	260	290			156
ST20MS			18	20	12.3
ST90MS			80	90	43
ST175MS			175	175	76
ST240MS			210	240	116
ST440MS			390	440	180

Actuator Type	Torque Output - N•m				Wt. kg
	4.1 bar		6.2 bar		
	Air Stroke	Spring Stroke	Air Stroke	Spring Stroke	
ST13MS	16	18			5
ST60MS	75	81			18.2
ST115MS	156	156			31.8
ST160MS	190	217			45.5
ST290MS	353	393			70.9
ST20MS			24	27	5.6
ST90MS			109	122	19.5
ST175MS			237	237	34.5
ST240MS			285	326	52.7
ST440MS			529	597	81.8

HOW TO ORDER

To order an actuator mounted and tested on a valve, the actuator designation should be given after the designation for the valve, i.e., 2" (DN 50) Fig. 21-2236TT-0 *with ST50 actuator*.

If an actuator is ordered for installation on a valve already in service, the order should specify the type and size of valve on which the actuator will be mounted in order that correct components will be supplied.

When actuators are furnished already mounted on valves, orientation of actuator on butterfly valves is with the axis of the cylinder parallel to the piping.

Orientation with ball valves is as follows:

- On screwed end valves, the axis of the actuator cylinder is parallel to the piping.
- On 1/2" – 4" (DN 15 –100) flanged valves, the axis of the actuator cylinder is perpendicular to the piping.
- On 6" (DN 150) and larger flanged valves, the axis of the actuator cylinder is parallel to the piping.
- Standard spring orientation for ST-MS actuators is Spring-to-Close unless otherwise specified.

In the event confirmation by Metso Automation is desired of the selection of an actuator for a given valve under specific service conditions, include full details on trim and seat materials, supply pressure, and media characteristics.

Installation Instructions, Maintenance and Operation

IMO's (Installation, Maintenance, and Operating instructions) or AMI's (Assembly, Mounting, and Installation instructions) are shipped with the products. Additional copies of these instructions are available. Call your local Metso Automation Distributor, or visit our web site.

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