

Jamesbury™ Quadra-Powr™ spring diaphragm quarter-turn actuators QPX series

Exclusively developed for quarter-turn valve service, Quadra-Powr™ X spring-diaphragm actuators provide safe and reliable operation even when minimal supply pressures are available. Yet they are capable of operating at pressures as high as 7 bar (100 psi).

These units can be operated by air, gas, water, oil, or other supply media compatible with the ductile iron/carbon steel casing of the actuator and the Buna-N diaphragm reinforced with polyamide fabric.

Quadra-Powr X torque outputs range from 15 to 796 Nm (11 to 587 ft lbs), depending on actuator selection and available supply pressure.



Features

Adjustable travel stops

- Allow the actuator to be adjusted in both fully open as well as fully closed position.

High cycle-life design

- Rolling diaphragm design, along with new one-piece diaphragm retainer and UHMW Polyethylene bearing, assures extremely long cycle-life.
- Low-friction operation provides exceptionally smooth actuation.

Wide supply pressure range

- Unlike most spring-diaphragm actuators, the Quadra-Powr X can be operated up to 7 bar (100 psi).
- Actuators are available with four different spring ranges for 1.3, 2.8, 4.1 & 5.5 bar (20, 40, 60, and 80 psi) supply pressures.

Low friction bearings

- Acetal-lined stainless steel backed bearings offer a low coefficient of friction that allows virtually all of the available torque to be delivered directly to the output shaft.
- Keeps the actuator size as small as possible while delivering hundreds of thousands of smooth cycles.
- UHMW Polyethylene bearing fully guides the diaphragm retainer through stroke of actuator, ensuring smooth operation and low friction.

Completely field reversible

- Fail-open or fail-close operation can be quickly changed in the field by simply inverting the actuator. Top and bottom mounting pads are identical.
- Springs are pre-loaded in a self-contained cartridge for safer handling and easier maintenance.

Corrosion resistant

- Zinc phosphate epoxy based primer coat and UV resistant polyurethane top coat provide durability and protection in corrosive atmospheres.
- All stainless steel external fasteners.

Low maintenance

- Lubricated at the factory. No further lubrication is required.

Easily fitted with a variety of accessories

- Wide range of optional accessories and control devices, which include direct-mount sandwich manual overrides, limit switches, position indicators, solenoids, and intelligent valve controllers, are available to satisfy virtually all automatic valve requirements.

TÜV Certificate

The Quadra-Powr X is TÜV Rheinland certified according to IEC61508 to be used in safety applications up to and including safety integrity level 2 (SIL 2).

Specifications

Maximum operating pressure:	7 bar (100 psi)
Maximum design pressure:	11 bar (160 psi)
Temperature rating:	-29 °C to +66 °C / (-20° to +150 °F)
Rotation adjustment:	-5° to +5° and 85° to 95°
Supply media:	Air, water, mineral-based hydraulic fluid, sweet natural gas, nitrogen

Air volume requirements

Actuator series	Total Volume		Swept Volume		Approx. Operating speed* (sec)		Effective diaphragm area	
	liters	in.3	liters	in.3	Air stroke	Spring Stroke	cm.2	in.2
QPX1	1.03	63	0.62	38	2	2	110	17
QPX2	1.57	96	1.08	66	3	3	155	24
QPX3	3.13	191	2.18	133	5	1.5	245	38
QPX4	6.03	368	4.34	265	10	4	387	60
QPX5	11.72	715	8.70	531	3	3	619	96

* Note: Actual times may vary with the application. Larger size solenoid pilot valves are available for faster operating times. Consult the factory for details.

Actuator selection

To select an actuator for a particular valve and service, first determine the maximum operating torque of the valve from the applicable bulletin. Then refer to the appropriate mode of operation of the actuator in the torque output tables below and on the next page and select an actuator that will, at the available supply pressure, provide a torque output equal or greater than the operating torque for the valve.

Output torques in Nm at specific supply pressures									
Actuator	End of spring	End of air							
		1.3 bar*	2.0 bar	2.8 bar	3.4 bar	4.1 bar	4.8 bar	5.5 bar	6.2 bar
QPX1C	34					34	52		
QPX2A	15	31							
QPX2B	52		15	43	76				
QPX2C	77					68	98		
QPX2D	100						64	95	126
QPX3A	35	73							
QPX3B	103		26	88	150				
QPX3C	155					136	194		
QPX3D	198						126	188	250
QPX4B	207		54	176	302				
QPX4C	311					271	391		
QPX4D	399						256	381	504
QPX5B	414		107	353	603				
QPX5C	621					542	781		
QPX5D	796						510	759	1008

* Can be used for direct control with a 0.8 - 1.3 bar signal on valves with 11 and 24 Nm maximum torque requirements, respectively.

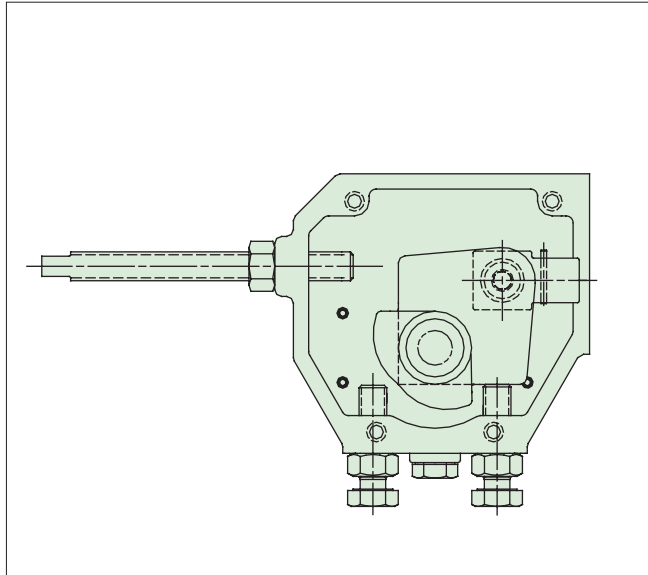
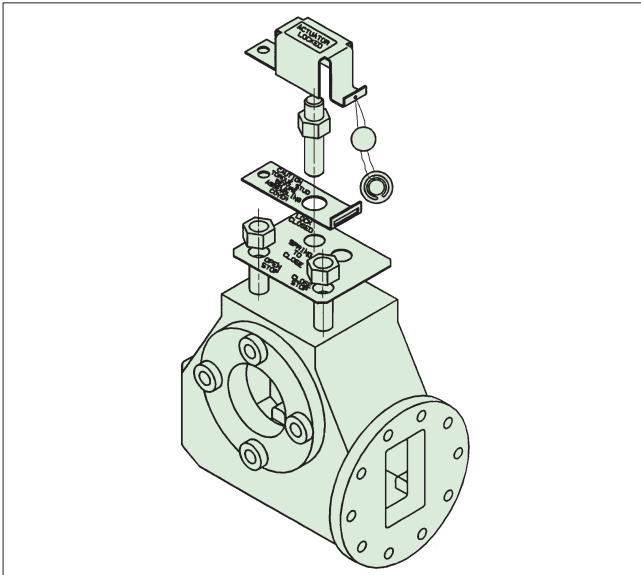
Output torques in ft lbs at specific supply pressures									
Actuator	End of spring	End of air							
		20 psi*	30 psi	40 psi	50 psi	60 psi	70 psi	80 psi	90 psi
QPX1C	25					25	38		
QPX2A	11	23							
QPX2B	38		11	32	56				
QPX2C	57					50	72		
QPX2D	74						47	70	93
QPX3A	26	54							
QPX3B	76		19	65	111				
QPX3C	114					100	143		
QPX3D	146						93	139	184
QPX4B	153		40	130	223				
QPX4C	229					200	288		
QPX4D	294						189	281	372
QPX5B	305		79	260	445				
QPX5C	458					400	576		
QPX5D	587						376	560	743

* Can be used for direct control with a 12 - 20 psi signal on valves with 8 and 18 ft lbs maximum torque requirements, respectively.

Actuator orientation

Quadra-Powr X actuators may be mounted on valves in any of four 90° quadrants. To maximize cycle life, the diaphragm casing can be mounted in the vertical position (pointing up) with the valve stem and actuator driver in the horizontal position. Standard spring orientation is “spring to close” unless otherwise specified.

Actuator accessories and controls Construction options



Mechanical lockout option

To comply with the intent of OSHA requirements for locking spring-driven actuators in the spring-driven position, every Quadra-Powr actuator can have the mechanical lockout option added to it. The design of the output shaft allows for locking the actuator in the spring-fail position without modifying the normal open/close limits. Actuators equipped with this option have a special lockout screw and a tamperproof cover attached to the housing of the actuator with a stainless steel wire. The lockout parts are readily available to permanently lock the actuator in place and padlock the locking device to prevent unwanted operation.

When limiting the rotation of the air stroke of a Quadra-Powr actuator, a 100 % adjustable stop option can be added. In the spring-to-close mode this option limits the opening stroke only; in the spring-to-open mode it limits the closing stroke only. The adjustable stop screw can be easily field mounted by simply removing a set screw and inserting the stop screw.

Wet Conditions / Tropicalization

All standard Quadra-Powr X actuators are shipped with all open mounting and accessory holes filled with fasteners. This reduces the possibility of “standing water” to enter into the driver housing. However, in extremely moist environments, water can still potentially make its way inside the unit. In fact, all spring return actuators are subject to this. Every time a Quadra-Powr cycles, air inside the actuator (on the non-pressure side of the diaphragm) is pushed outside via the breather. This is due to the decreasing volume and differential pressures that are present. When the actuator returns on the spring stroke, the exact opposite happens, air must be pulled inside the actuator taking any moisture along with it. To block off all openings in the actuator would stop the operation, as this “breathing” needs to happen for a spring-return actuator to function.

The only realistic way to eliminate all moisture from getting inside the actuator is to regulate the air that is being transferred in and out of the actuator. This can be done with an accessory typically called a re-breather or tropicalization kit. This accessory takes the clean/dry exhaust air from the solenoid valve or positioner and redirects it into the housing through the breather port. This air is dumped inside the housing during the spring stroke, thus keeping a positive pressure in the housing and keeping out atmospheric air and moisture. Any application with excessive environmental moisture should consider selecting instrumentation components which include re-breather capability.

Fusible plug

A fusible plug option is available for all Quadra-Powr X actuators to allow for automatic closing or opening of the valve in the event of a fire or excessive environmental temperature. The standard plug is designed to melt when the temperature reaches an approximate level of 165 °F (74 °C).

This releases the air from the diaphragm case and rotates the valve to its fail-closed or fail-open position. To order a fusible plug kit specify LK3116.

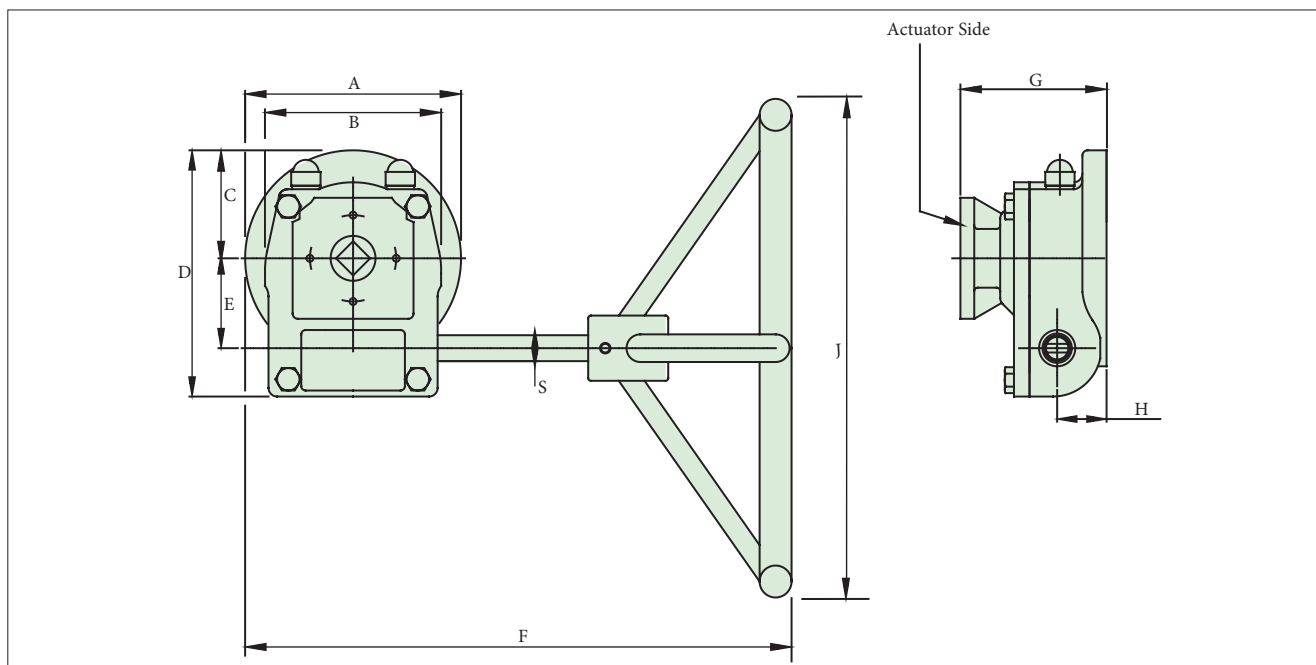
Manual Override (SRO)

A manual override is available for QPX actuators. It consists of a manual gear actuator mounted between the actuator and the valve. The device is normally disengaged from the shaft. When required, the manual override can cycle the actuator with ease (only in the pressure stroke direction), aided by the high-reduction ratio of the gear unit.

Note: The spring return override is available with the male square drive actuators only.



Dimensions

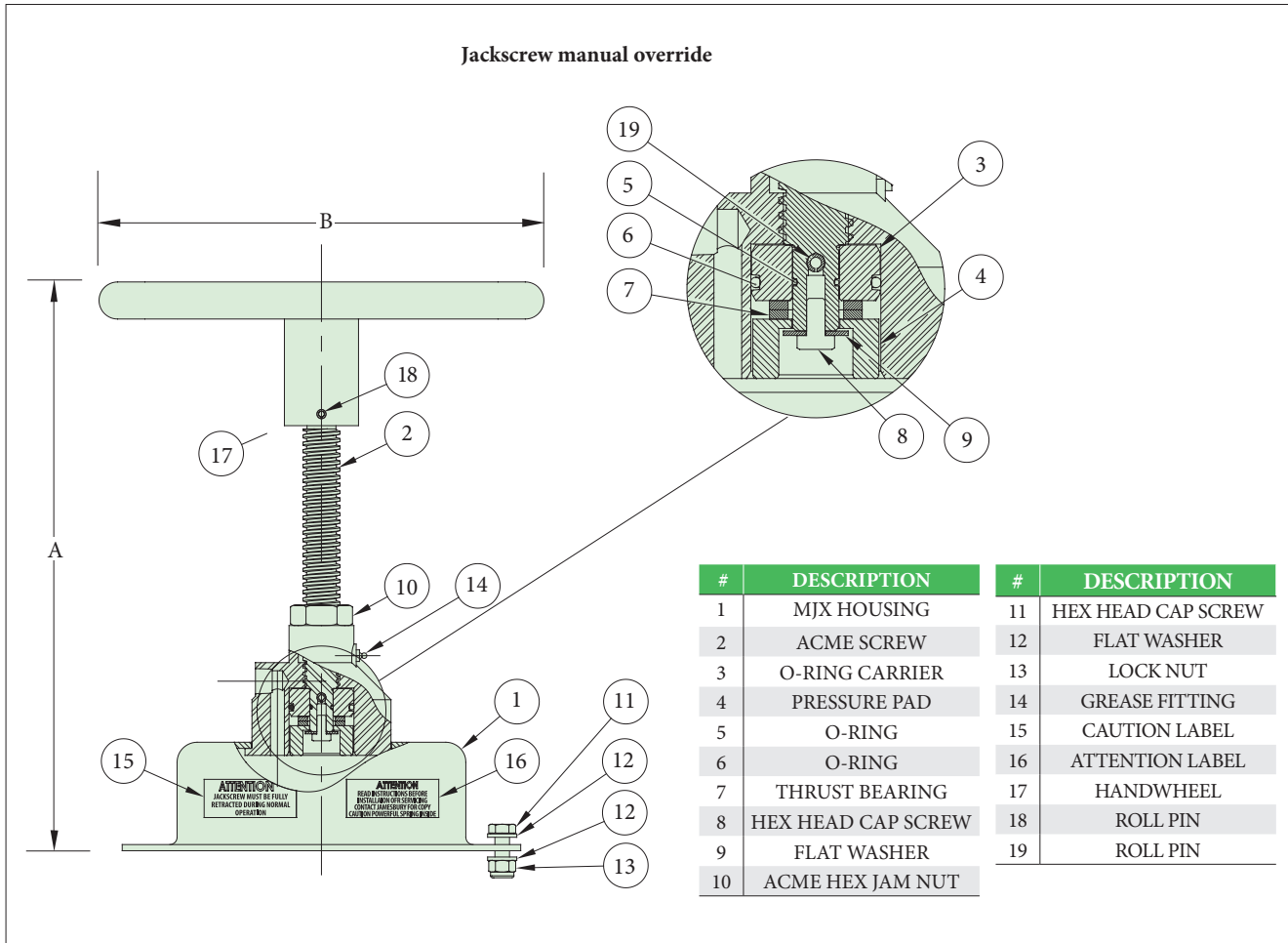


Model	Actuator series	Approximate dimensions																			
		A		B		C		D		E		F		G		H		J		S	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
SRO-1	QPX1_/M	125	4.92	102	4.02	62	2.46	142	5.61	52	2.06	232	9.14	85	3.33	29	1.13	203	8	15	0.59
SRO-2	QPX2_/M	125	4.92	102	4.02	62	2.46	142	5.61	52	2.06	232	9.14	85	3.33	29	1.13	203	8	15	0.59
SRO-3	QPX3_/M	200	7.87	175	6.89	100	3.94	226	8.90	86	3.39	305	12.00	68	2.68	42	1.65	508	20	20	0.79
SRO-4	QPX4_/M	200	7.87	175	6.89	100	3.94	226	8.90	86	3.39	305	12.00	68	2.68	42	1.65	508	20	20	0.79
SRO-5	QPX5_/M	220	8.66	N/A	N/A	110	4.33	258	10.16	104	4.11	346	13.64	79	3.11	48	1.89	610	24	20	0.79

Model	Actuator series	number of turns to fully compress the spring	Approx. weight
SRO-1	QPX1_/M	9.25	5
SRO-2	QPX2_/M	8.5	11
SRO-3	QPX3_/M	9.5	31
SRO-4	QPX4_/M	9.5	31
SRO-5	QPX5_/M	13	49

*Based on a typical valve with the strongest QPX spring option.

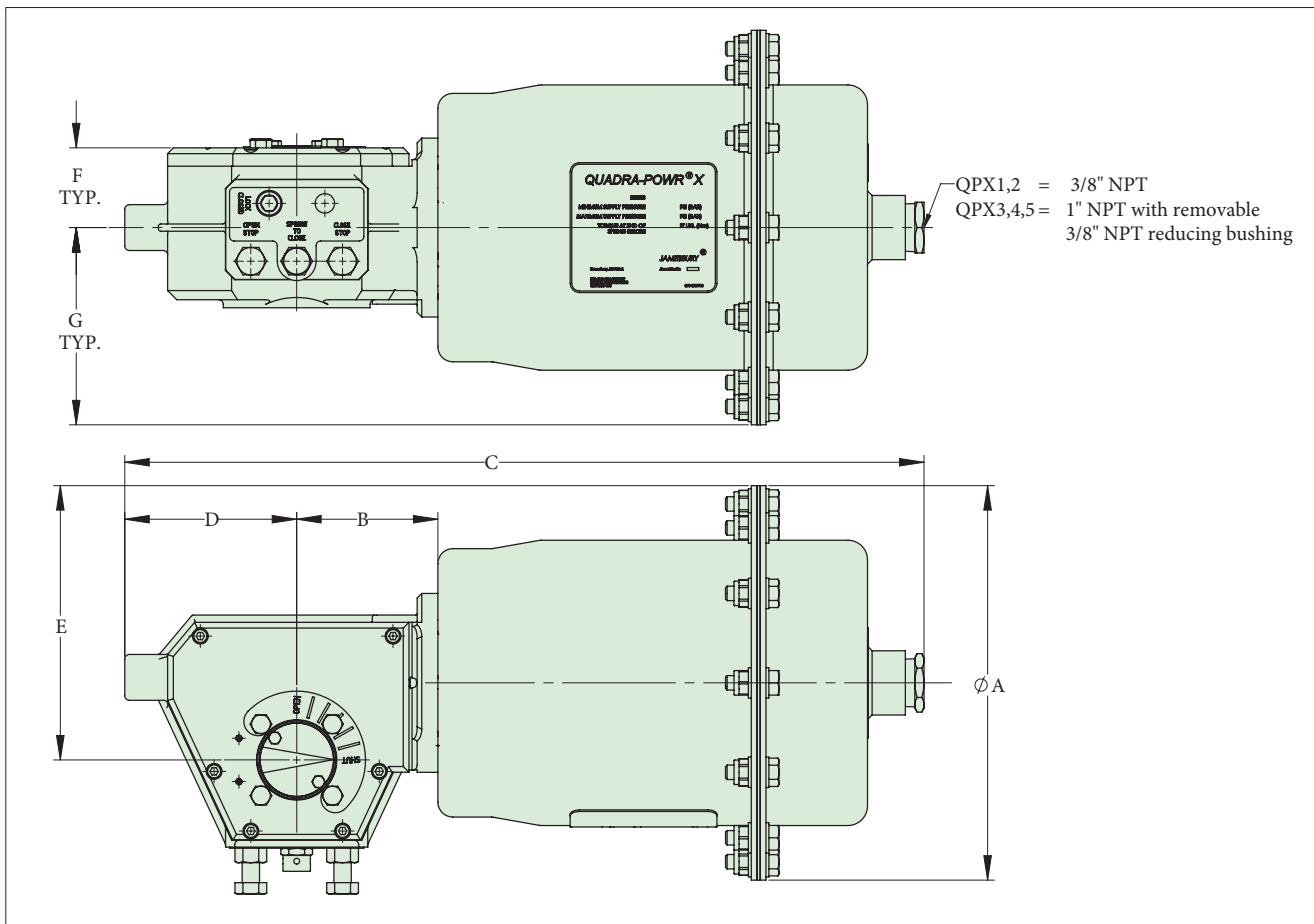
Jackscrew manual override: A jackscrew device is available on the QPX1, 2, 3, 4 and 5 actuators. When the handwheel of this device is turned, force is exerted on the diaphragm plate, compressing the actuator spring and operating the valve in the direction of the air stroke.



Model	Actuator series	Jackscrew Specification								
		Rim Pull*		number of turns to fully compress the spring	Approx. Dimensions				Approx. Weight	
		N	lb.		A		B		kg	lb.
					mm	in.	mm	in.		
MJX-1	QPX1	109	24	17	359	14.13	200	7.87	13.2	6
MJX-2	QPX2	145	33	18	409	16.12	300	11.81	17.6	8
MJX-3	QPX3	244	55	21	457	18.01	400	15.75	22.1	10
MJX-4	QPX4	222	50	25	532	20.96	500	19.69	28.7	13
MJX-5	QPX5	298	67	35	604	23.77	600	23.62	37.5	17

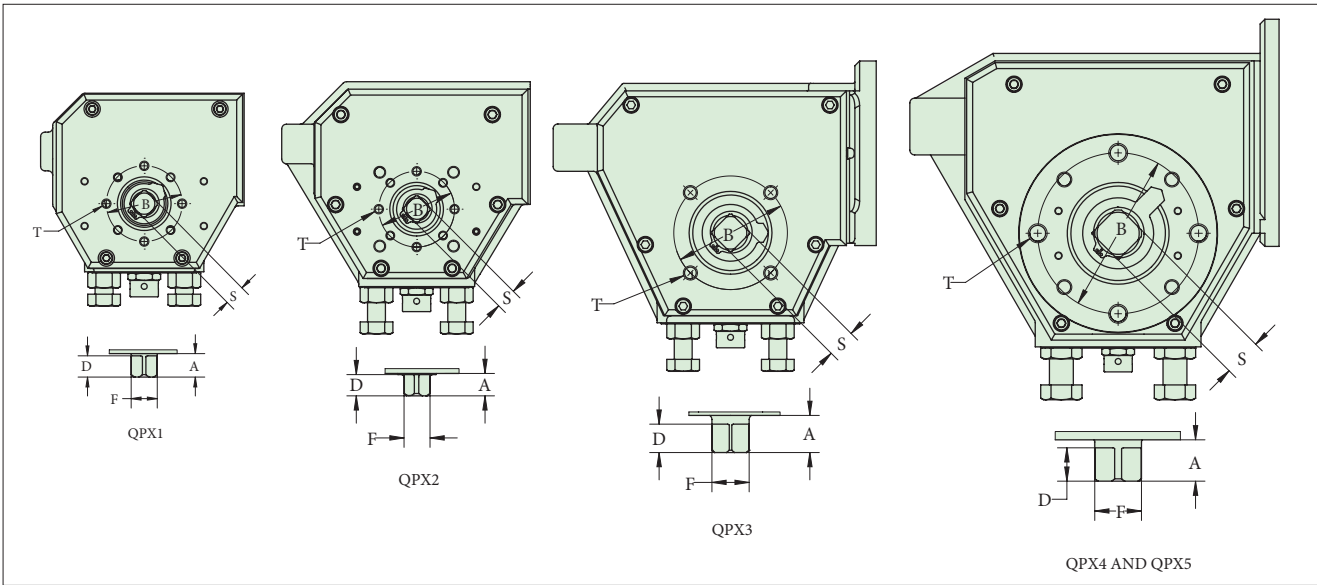
*Based on a typical valve with the strongest QPX spring option.

Dimensions



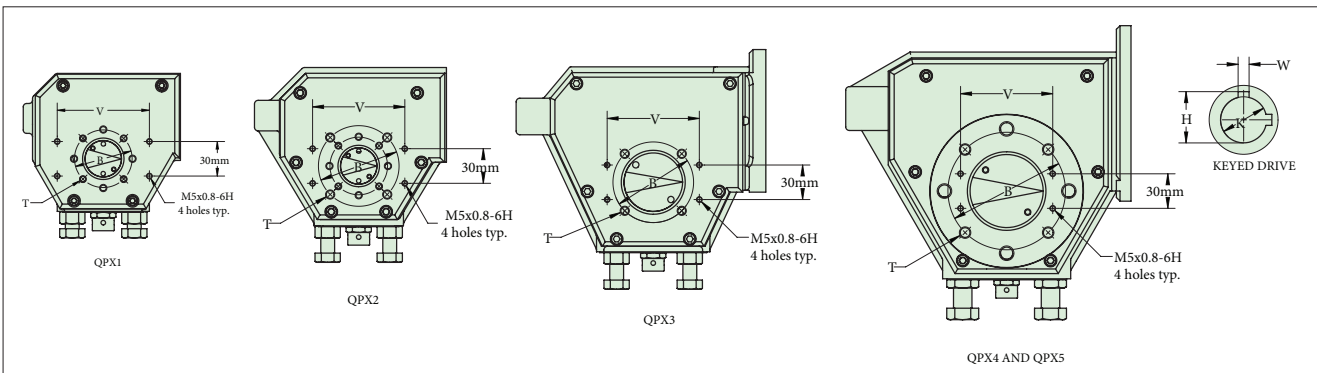
Actuator series	Approximate dimensions																Approx. weight	
	A		B		C		D		E		F M drive		F K drive		G		kg	lb.
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.		
QPX1	197	7.75	67	2.64	360	14.17	70	2.76	135	5.31	49	1.93	49	1.93	99	3.88	12	26
QPX2	228	8.98	76	3.00	430	16.93	91	3.58	156	6.14	52	2.05	52	2.05	114	4.49	18	39
QPX3	274	10.79	98	3.85	553	21.77	119	4.69	190	7.48	56	2.20	56	2.20	137	5.39	29	65
QPX4	320	12.60	108	4.25	621	24.45	140	5.51	228	8.98	62	2.44	62	2.44	160	6.30	48	105
QPX5	382	15.04	130	5.13	754	29.69	160	6.30	276	10.87	77	3.03	77	3.03	191	7.52	93	205

Mounting dimensions, male drive version



Actuator series	Approximate dimensions - QPX Male Drive Version										
	B		T	S		A		D		F	
	Bolt Circle		Thread Size	Square		mm	in.	mm	in.	mm	in.
	mm	in.		mm	in.						
QPX1	51	2.00	1/4-20unc-2B	14	0.55	15-17	0.60-0.65	14	0.55	18	0.69
QPX2	51	2.00	1/4-20unc-2B	14	0.55	15-17	0.60-0.65	14	0.55	18	0.69
QPX3	76	3.00	3/8-16unc-2B	19	0.75	24-26	0.94-1.04	19	0.75	25	0.98
QPX4	108	4.25	1/2-13unc-2B	25	1.00	28-30	1.10-1.18	22	0.88	31	1.23
QPX5	108	4.25	1/2-13unc-2B	25	1.00	28-30	1.10-1.18	22	0.88	31	1.23

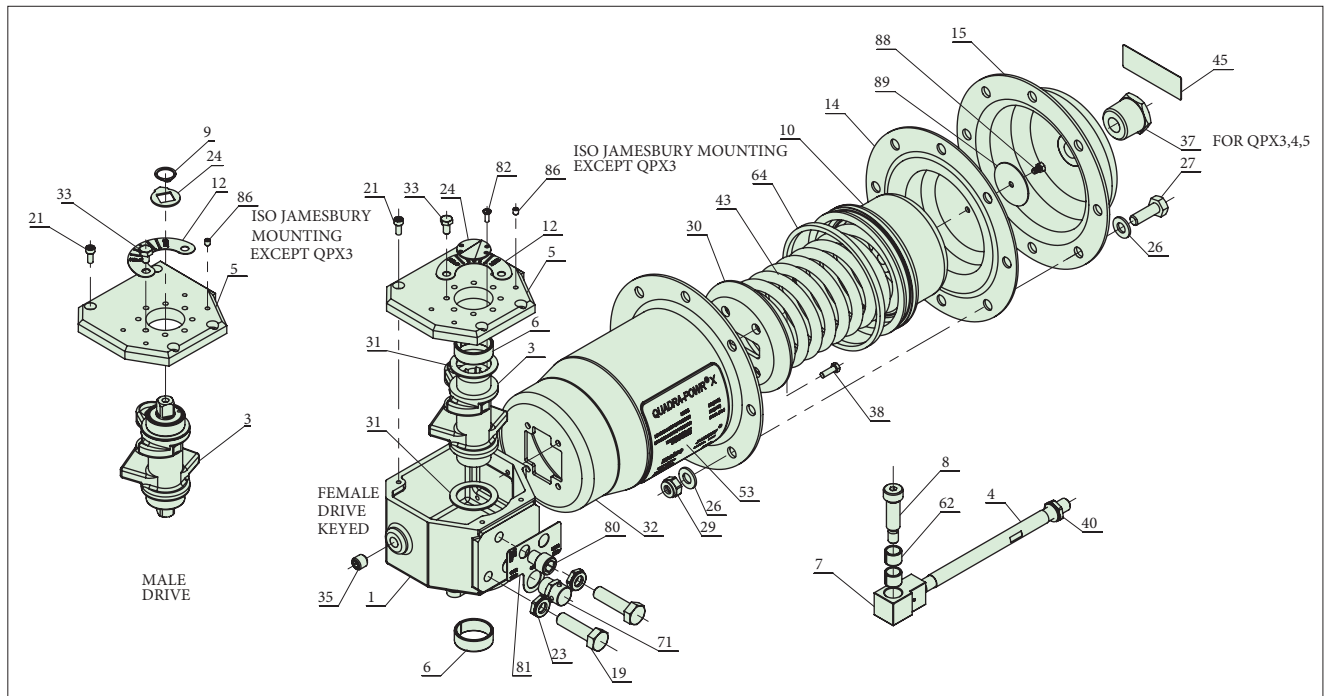
Mounting dimensions, key way version



Actuator series	Approximate dimensions - QPX Keyed Drive Version											
	ISO 5211 Mounting Flange	Accessory mounting dimensions					Key dimensions					
		B		T	V		K		H		W	
	Bolt Circle		Thread size	Accessory mount		Key diameter*		mm	in.	mm	in.	
	mm	in.		mm	in.	mm	in.					
QPX1, QPX2A	F05	50	1.97	M6	80	3.15	15	0.59	17	0.67	4.8	0.19
QPX2 (not QPX2A)	F07	70	2.76	M8	80	3.15	20	0.79	23	0.91	4.8	0.19
QPX3	F07	70	2.76	M8	80	3.15	35	1.38	40	1.57	9.6	0.38
QPX4	F10	102	4.02	M10	80	3.15	40	1.57	45	1.77	9.6	0.38
QPX5	F12	125	4.92	M12	80	3.15	40	1.57	45	1.77	9.6	0.38

* Note: keyway diameter does not follow ISO 5211

Exploded view



Bill of materials and parts list

No.	Part description	Quantity by QPX size					Material
		1	2	3	4	5	
1	Driver housing			1			Gray or ductile iron
3	Driver arm			1			Ductile iron
4	Actuator rod			1			Carbon steel
5	Cover			1			Gray or ductile iron
6 y	Driver arm bearing			2			Stainless steel with acetyl lining
7	Clevis			1			Carbon steel
8	Shoulder screw			1			Carbon steel
9	Retaining ring (male drive actuators only)			1			Stainless steel
10	Diaphragm retainer			1			Ductile iron
12	Indicator plate			1			Stainless steel
14 x,y	Diaphragm with centering hole			1			Nitrile/Polymide fabric blend
15	Diaphragm casing			1			Carbon steel
19	Hex head cap screw			2			Stainless steel
21	Socket head cap screw	4	4 or 6	6	6	6	Stainless steel
23	Hex jam nut			2			Stainless steel
24	Indicator pointer			1			Carbon steel
26	Washer	16	24	24	32	48	Stainless steel
27	Hex head cap screw	8	12	12	16	24	Stainless steel
29	Nylon insert lock nut	8	12	12	16	24	Stainless steel
30	Spring retainer			1			Carbon steel
31 y	Thrust bearing			2			Nylon
32	Spring housing			1			Carbon steel
33	Hex head cap screw			4			Stainless steel
35	Set screw			1			Stainless steel
37	NPT adapter	-	-	1	1	1	Stainless steel
38	Hex head cap screw	4	4	6	10	10	Carbon steel
40	Hex jam nut			1			Stainless steel
43	Compression spring			1			Carbon steel
45	Attention plate			1			Mylar
53	Identification tag			1			Metalized polyester
62 y	Clevis bearing			2			Stainless steel with acetyl lining
64 x,y	Bearing, diaphragm retainer			1			UHMW PE
71	Breather			1			Stainless steel
80	Socket head cap screw			1			Stainless steel
81	Name plate			1			Stainless steel
82	Screw (keyed drive actuators only)			2			Stainless steel
86	Socket set screw			8			Stainless steel
88	Hex head cap screw			1			Stainless steel
89	Diaphragm washer			1			Stainless steel

x = included in Diaphragm Service Kit
y = included in Complete Service Kit

WARNING:

As the use of the actuator is application specific, a number of factors should be taken into account when selecting a valve for a given application. Therefore, some of the situations in which the valves are used are outside the scope of this manual. If you have any questions concerning the use, application or compatibility of the valve with the intended service, contact Valmet for more information.

How to order

Pneumatic, spring-diaphragm actuator, Series QPX

1.	2.	3.	/	4.	5.	6.
QPX	1	C		M	AS	C

1. sign	2. sign	3. sign	4. sign		5. sign	6. sign	
Actuator series	Size	Spring option	Keyed female drive	Male square drive	Options	Model version	
QPX	1	C	K15 (15 mm)	M (Male square)	- AS MJX SO F No sign, standard version 100% Adjustable stop (air direction) Manual jackscrew override Fail open 1" NPT Air Inlet (2. sign "3-5" only) (Not applicable to 5. sign "MJX")	C (Model C)	
		A					
	2	B					K20 (20 mm)
		C					
	3	D					K35 (35 mm)
		A					
		B					
		C					
	4	D	K40 (40 mm)				
		B					
	5	C					
		D					
		D					

3. sign	Spring option details
A	1.3 bar / 20 psi
B	2.8 bar / 40 psi
C	4.1 bar / 60 psi (standard)
D	5.5 bar / 80 psi

Accessories

Field mountable accessories		QPX size				
		1	2	3	4	5
100% Adjustable stop kit	Code	AS-1		AS-3	AS-4	AS-5
	P/N	MA0234139		MA0234140	MA0234141	MA0234142
Mechanical lockout kit	Code	LD-60		LD-61	LD-62	LD-63
	P/N	MA0026407		MA0026408	MA0026409	MA0026410
Manual jackscrew override kit	Code	MJX-1	MJX-2	MJX-3	MJX-4	MJX-5
	P/N	MA0026451	MA0026452	MA0026453	MA0026454	MA0026455
Manual override gearbox (QPX_/M only)	Code	SRO-1	SRO-2	SRO-3	SRO-4	SRO-5
	P/N	MA0043214	MA0043215	MA0043216	MA0043217	MA0043218
Fusible plug	Code	LK-3116				
	P/N	MA0044535				

Valmet Flow Control Oy

Vanha Porvoontie 229, 01380 Vantaa, Finland.

Tel. +358 10 417 5000.

www.valmet.com/flowcontrol

Subject to change without prior notice.

Neles, Neles Easyflow, Jamesbury, Stonel, Valvcon and Flowrox, and certain other trademarks, are either registered trademarks or trademarks of Valmet Oyj or its subsidiaries in the United States and/or in other countries.

