

Electro-hydraulic Quarter-turn Valve Actuator for Hazardous Areas

The SB-Q are compact and robust electrically operated fail safe spring-return, quarter-turn actuators for two-position and ESD applications. They feature the Rotork double-seal system with separate termination and cable gland compartments, are suitable for all types of quarter-turn valves and are supplied with a mounting flange to ISO 5211. The range is divided into two groups: SB-1Q with end torque ranging from 65 to 480 Nm (575 to 4,248 lbf-in), and SB-2Q with end torque ranging from 380 to 4,400 Nm (3,360 to 39,000 lbf-in).

SB-Q actuators are specifically designed for hazardous areas, explosionproof EExdm IIB T4, but are also available watertight and dusttight to IP67 / NEMA 6 with the option of IP68.

Consisting of a self-contained electro-hydraulic control module and scotch yoke spring-return drive, the actuators combine the simplicity of electrical operation with the precision of hydraulic control and the reliability of spring-powered fail-safe action. The spring-return mechanism provides the most reliable means of positioning a valve to the safe condition and can be provided as fail safe close, open, or last position on loss of power or signal failure. They are available with either a clockwise or anticlockwise spring stroke.

SB-Q actuators are designed specifically for on/off duty, particularly where fail safe ESD is required. They provide an electrical torque limiting facility by utilising an internal pressure switch to isolate the hydraulic pump should over-pressure be detected. Adjustable electro-mechanical volt-free end-of-stroke limit switches are provided.

A manual override gearbox is available on all sizes.

See SI actuator specifications for applications where more advanced control functions are required.



Features

- Self-contained electrically operated with internal low-pressure electro-hydraulic control module.
- Spring-return for fail safe open or close.
- Dual redundant hydraulic oscillating pumps.
- Single or dual fail safe solenoids.
- Single-phase 115 or 230 VAC power supply.
- Two-position control with torque / pump protection.
- Watertight and explosionproof.
- Double-sealed control module with separate terminal and cable gland compartments.
- Adjustable electro-mechanical volt-free limit switches.

SB-2Q Specification

Ordering Information and Model Code

ACTUATOR SELECTION	SB-2-Q111	-	0	0	2	-	1	0	-	0	0	A	A
Table 1	Actuator Size												
Table 2	Failure Mode												
Table 3	Return Speed Options												
Table 4	Supply Voltage												
Table 5	Control Option												
Table 6	Certification												
Table 7	Cable Entries												
Table 8	Hydraulic Fluid / Operating Temperature												
Table 9	Mounting												
Table 10	Accessories												

Table 1 – Actuator Size

Code		Torque Nm (lbs-in)						Stroke Speed (Seconds)			
Spring-Return Direction		Hydraulic Stroke			Spring-Return			Hydraulic	Spring-Return (See table 3 & note 2)		
Clockwise	Anti-Clockwise	Start	Mid	End	Start	Mid	End		A	B	C
SB-2-Q60	SB-2-QA60	720 (6370)	360 (3185)	500 (4425)	500 (4425)	260 (2300)	380 (3363)	14	14	10	8
SB-2-Q61	SB-2-QA61	620 (5487)	300 (2655)	350 (3095)	630 (5575)	340 (3009)	480 (4248)	14	14	10	8
SB-2-Q70	SB-2-QA70	1650 (14602)	718 (6354)	885 (7832)	1160 (10266)	570 (5044)	800 (7080)	30	30	20	12
SB-2-Q80	SB-2-QA80	3350 (29647)	1450 (12832)	1780 (15753)	2350 (20797)	1150 (10177)	1605 (14204)	55	55	45	25
SB-2-Q110	SB-2-QA110	4383 (38790)	2160 (19116)	2807 (24842)	3820 (33807)	1892 (16744)	2381 (21072)	70	70	58	20
SB-2-Q111	SB-2-QA111	6428 (56888)	3290 (29116)	4544 (40214)	5033 (44542)	2527 (22364)	3255 (28807)	110	110	90	28
SB-2-Q112	SB-2-QA112	5264 (46586)	2447 (21656)	2852 (25240)	6433 (56932)	3301 (29214)	4407 (39002)	110	110	90	28

Table 2 – Failure Mode

Code	Description
0	Fail safe on loss of power supply (in direction of spring)
1	Fail in position on loss of power supply

Table 5 – Control

Code	Description
0	Two wire, two-position control.
1	Three wire for remote controls.

Table 3 – Spring-Return Speed & ESD Options

Code	Description
0	Speed A – Single internal solenoid.
1	Speed B – Dual internal solenoid.
2	Speed C – Single internal & external solenoid (note 4).
3	Speed D – Slow acting internal solenoid, consult sales office.

Table 6 – Certification

Code	Description
0	Watertight IP67.
1	ATEX: Hazardous area Gas group IIB (IP67).

Table 4 – Supply Voltage

Code	Description
0	1-phase 115 VAC ± 10% 50/60 Hz.
1	1-phase 230 VAC ± 10% 50/60 Hz.

Table 7 – Cable Entries

Code	Description
0	M25 x 1.5P
1	M20 x 1.5P
2	1/2" NPT
3	3/4" NPT
4	1" NPT



Table 8 – Hydraulic Fluid/Operating Temperature

Code	Description
0	Mineral fluid -20 to +60 °C.
3	Food grade fluid -10 to +60 °C.
4	Silicone fluid -30 to +60 °C (note 4 & 6).
5	Silicone fluid / low temperature seals -35 to +60 °C (note 4 & 6).

Table 9 – Mounting

Code	Description
A	Vertical stem above valve.
B	Vertical stem below valve.
C1	Valve stem & pipeline horizontal.
C2	Valve stem horizontal, pipeline vertical.
D	Vertical stem above valve with valve mounting kit.
E	Vertical stem below valve with valve mounting kit.
F1	Valve stem & pipeline horizontal with valve mounting kit.
F2	Valve stem horizontal, pipeline vertical with valve mounting kit.

Table 10 – Accessories

Code	Description
A	None.
B	Manual override hydraulic hand pump.
C	Manual override (gearbox standard IP65).
D	Watertight IP68 (7m for 72 hours).
F	Two additional volt-free SPDT limit switches (four total).
H	All cable entries plugged.
J	Viton seals.

GENERAL NOTES:

1. Select one option from each table except table 10 which has multiple options.
2. Stroke speed is typical for all actuators with no load at 20 °C ±10%
3. External solenoid options available waterproof to IP67, not IP68.
FM certified actuators available to -20 °C only.



Certification

ATEX - II 2G EEx dme* IIB T4 (T_{amb} -35 to +60 °C)
EN60079-0, EN60079-1, EN60079-7, EN13463-1.

FM - Class I, Zone1 AEx de* IIB T4 (T_a -40 to +60 °C)
(Pending) Class3600, ANSI/ISA-12.00.01,
ANSI/ISA-12.22.01, ANSI/ISA-12.16.01
ANSI/ISA-12.23.01, Class3810 & ANSI/NEMA-250.
*‘e’ increased safety available on single phase &
DC supply voltage only.

INMETRO: BR-Ex de IIB T4 (T_{amb} -40 to +60 °C)

Note: Certification temperatures are not operating temperatures.

Enclosure: Watertight to IP67 / NEMA 6, double-sealed protection with separate cable gland and termination compartment. Optional to IP68 (7 meters /72 hours). Consult factory for alternative depths / pressures consult factory. External ESD solenoid option is only available to IP67.

Materials

Control

Module: Aluminium.

Piping: 316 Stainless steel (hard piped).

Paint Finish: 2-pack epoxy silver grey (150 microns thick).

Actuator – Q60 TO 80.

Actuator

Body: Anodised aluminium.

Piston: Aluminium.

Driving

Shaft: Zinc plated steel.

Actuator

Springs: Corrosion protected spring steel.

Actuator - Q110 TO 112.

Actuator

body: Carbon steel.

Drive Shaft: Carbon steel.

Mechanical

Operating

Temperature: See table 8.

Torque/

Speed: See table 1.

Stroke: 0° ± 2.5% to 90° ± 2.5%.

Weight: See dimensional detail (page 2 & 3).

Failure Mode: Fail safe in the direction of the spring or fail in last position.

Action: Spring-return clockwise or anti-clockwise.

Hydraulic

Fluid: See table 8.

Max. Working

Pressure: 12 bar (175 psi).

Manual

Override: Optional gearbox (on SB-2Q60 to Q80) or hydraulic hand pump (on SB-2Q60 to Q112).

Mounting: Valve stem vertical or horizontal (see table 9).

Electrical

Electrical

Supply: 1-phase 115 or 230 VAC.

Supply

Tolerance: Supply voltage ± 10 %, Frequency 50/60 Hz ± 5 %.

Power

Consumption: 400 VA max.

Pump Coil

Protection: Thermal cutouts and thermal fuse.

Cable

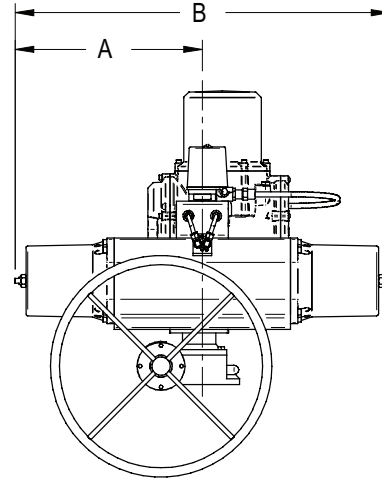
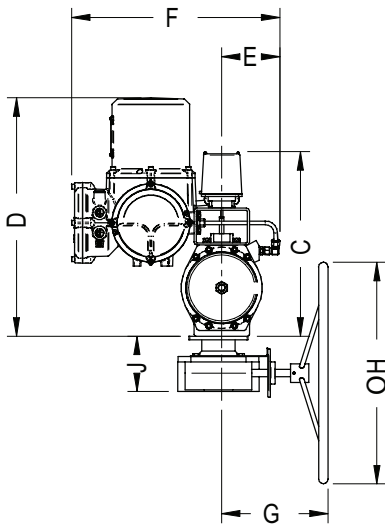
Entries: Power module has a minimum of two spare entries. (see table 7) plus two plugged M20 cable entries. See drawing No SMW-SI-010 for options. Switchbox spare entry will be plugged:
ATEX = M20, FM/ CSA = 1/2" NPT.

Limit

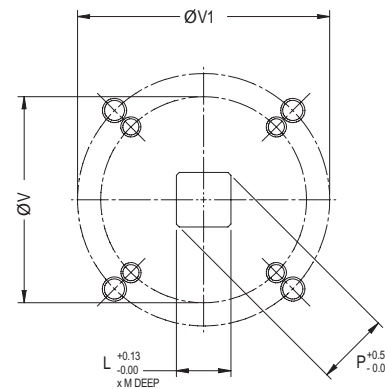
Switches: Three spare adjustable electro-mechanical SPDT volt-free switches. Rating 5 A minimum at 230 VAC (see table 10.)

SB-2Q Specification

SB-2Q Dimension & Mounting Details



DIMENSIONS (mm)	ACTUATOR CODE		
	Q60 Q61	Q70	Q80
A	285	510	510
B	570	655	102
C	408	498	498
D	557	647	647
E	126	157	157
F	525	556	556
F*	609	640	640
G	257	297	415
H	600	600	600
L	27	36	46
M	37	64	64
P	37	49	49
∅V	102	140	125
∅V1	125	N/A	165
W	M10 X 17	M16 X 25	M12 X 25
W1	M12 X 21	N/A	M20 X 32
Weight (kg)	62	98	127

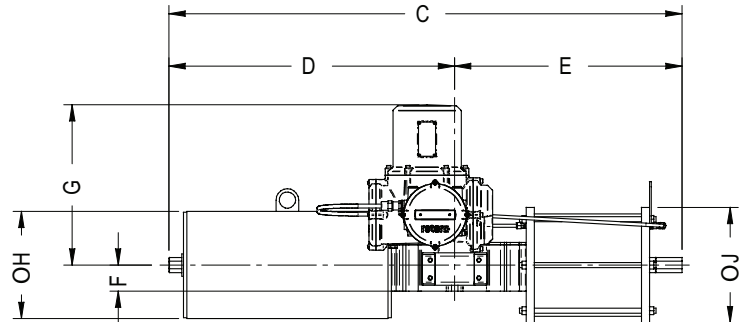
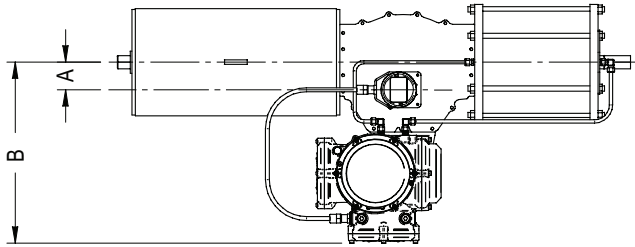


Flange & Square Drive Details to ISO 5211

NOTES:

Q70 also has the following hole pattern for mounting purposes: 170 x 110 mm, 4 x M16 x 25 deep.
Q80 also has the following hole pattern for mounting purposes: 234.7 x 97.2 mm, 4 x M16 x 2 deep.
Manual override gearboxes are optional.

SI-2-Q110 to Q112 Dimension & Mounting Details



DIMENSIONS (mm)	ACTUATOR CODE		
	Q110	Q111	Q112
A	85	85	85
B	440	440	440
B*	524	524	524
C	1580	1615	1715
D	880	895	995
E	700	720	720
F	80	80	80
G	569	569	569
H	325	325	410
J	355	415	415
M	37	64	64
V	254	254	254
W	M16 X 15	M16X15	M16X15
Weight (kg)	62	98	127

