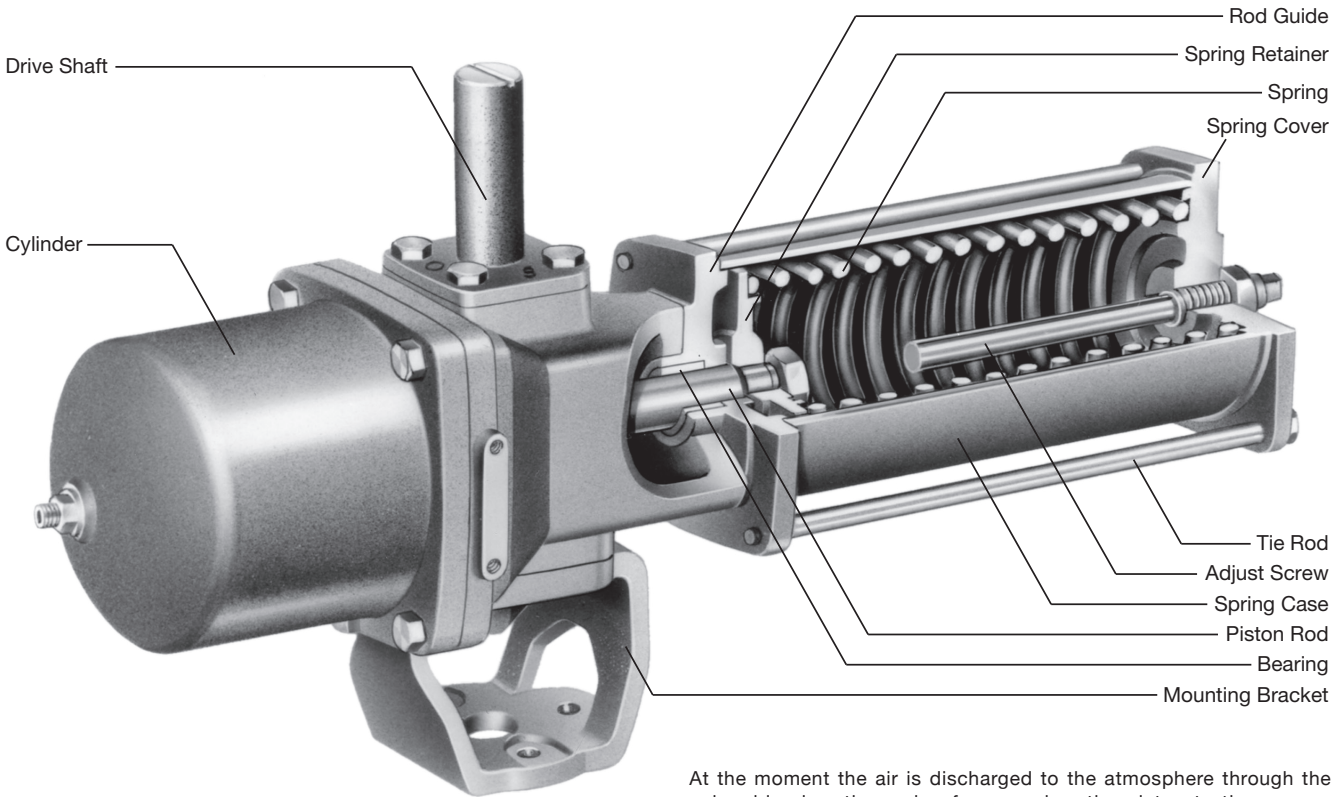


Internationally patented

## Type BS (Spring-Return) Type BSW (Spring-Return with Manual Operation Device)



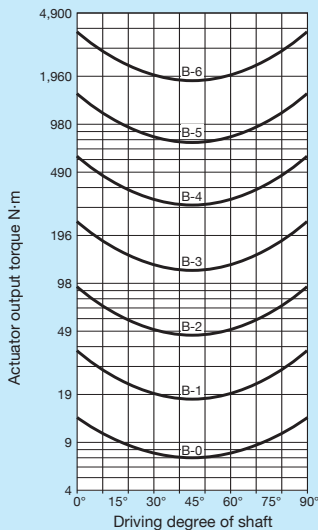
### Operational Mechanism

The air pressure supplied into the cylinder pushes the piston outward and energizes its movement to rotate the scotch-yoke counterclockwise, compressing the spring. The scotch-yoke converts linear movement of the piston rod to counterclockwise rotational movement of the drive shaft by 90°, to open or close the valve, following the preset mode.

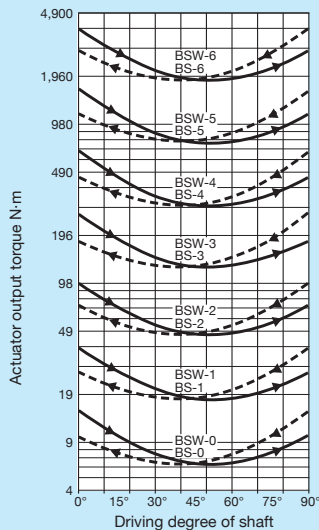
At the moment the air is discharged to the atmosphere through the solenoid valve, the spring force pushes the piston to the reverse direction, and the scotch-yoke activates clockwise rotation of the shaft to reversely operate the valve. Air failure will cause the valve to return to the original open or closed position automatically, following the preset mode, unlike the valve driven by Type B actuator.

The BSW actuator is driven with the same mechanism as Type BS, but provided with a handwheel for manual operation. Please bear it in mind that the handwheel must be **factory mounted**.

### Type B Actuator Output Torque



### Type BS/BSW Actuator Output Torque

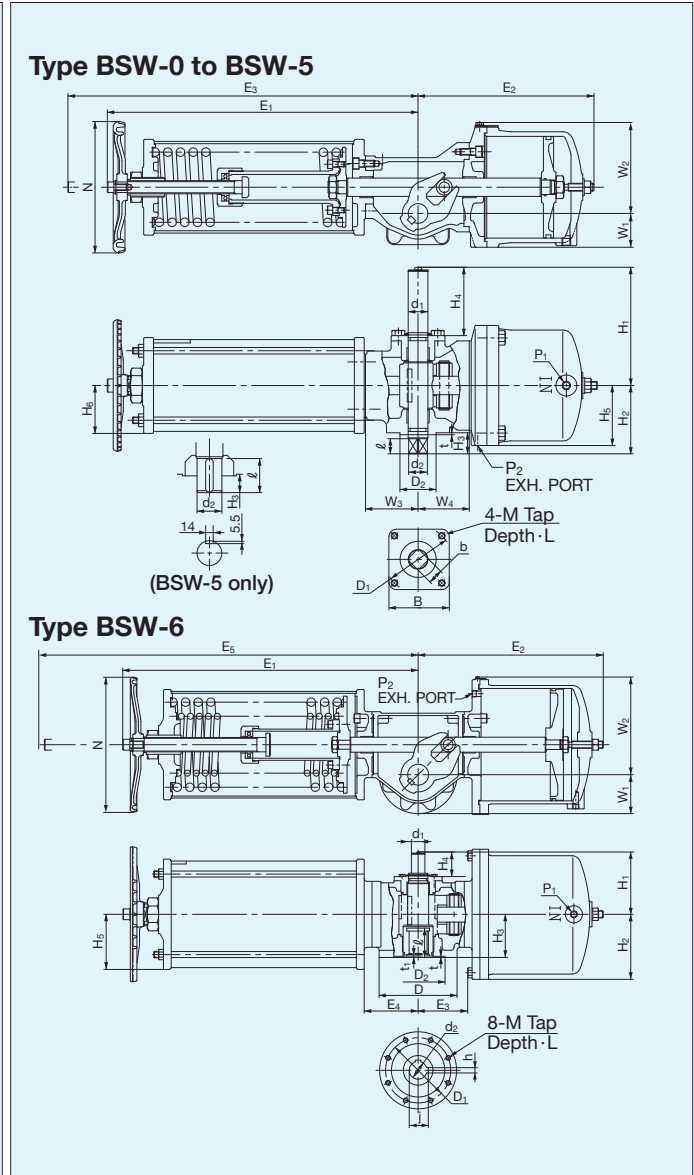
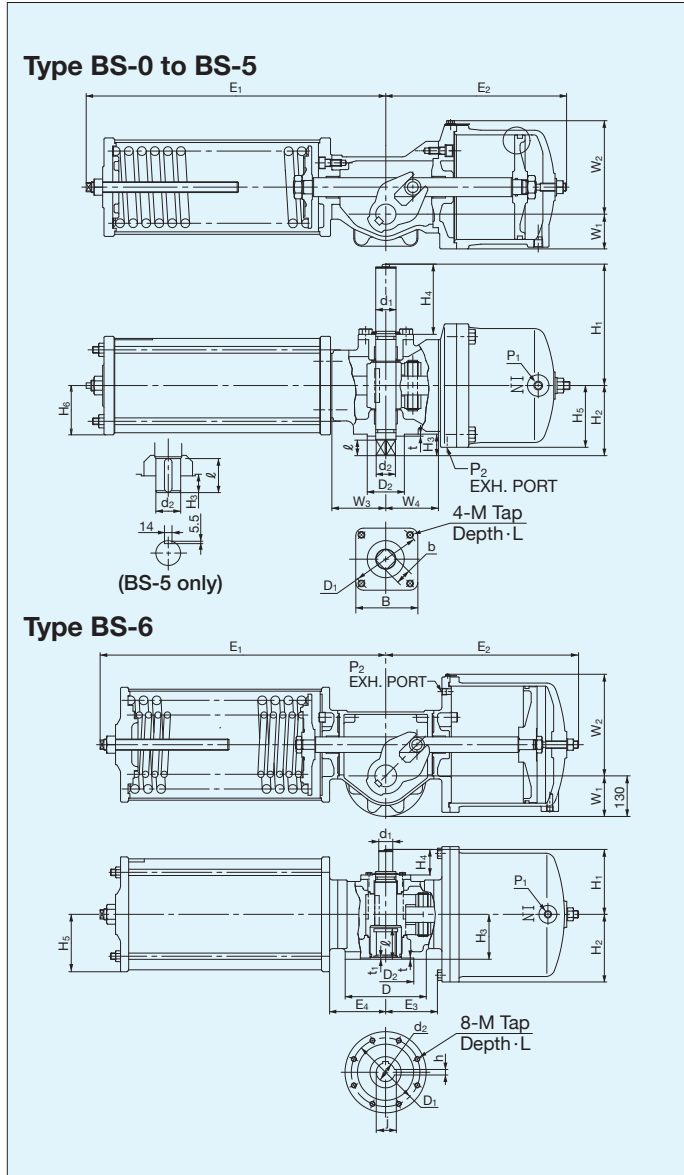


— Output torque when air pressure is supplied.  
--- Output torque caused by spring force when air pressure is exhausted.

Operating pressure:  
0.4 MPa

## Type BS (Spring-Return)

## Type BSW (Spring-Return with Manual Operation Device)



## Type BS Actuator Dimensions

mm

Type	E <sub>1</sub>	E <sub>2</sub>	E <sub>3</sub>	E <sub>4</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	H <sub>5</sub>	H <sub>6</sub>	D	D <sub>1</sub>	D <sub>2</sub>	d <sub>1</sub>	d <sub>2</sub>	b	B	ℓ	t	t <sub>1</sub>	M	L	h	j	P <sub>1</sub>	P <sub>2</sub>
BS-0	163	127	—	—	40	62	—	38	75	53	18	40	41	—	50	35	12	15	12	50	12	2	—	M6	9	—	—	BSPT <sup>1</sup> / <sub>8</sub>	BSPT <sup>1</sup> / <sub>8</sub>	
BS-1	239	166	—	—	30	83	47	38	140	60	18	94	52	46	50	35	16	15	12	50	12	2	—	M6	9	—	—	BSPT <sup>1</sup> / <sub>4</sub>	BSPT <sup>1</sup> / <sub>8</sub>	
BS-2	335	215	—	—	38	106	62	56	153	77	23	99	68	54	70	55	22	21	17	70	17	2	—	M8	12	—	—	BSPT <sup>1</sup> / <sub>4</sub>	BSPT <sup>1</sup> / <sub>8</sub>	
BS-3	451	286	—	—	52	140	80	78	180	104	32	104	92	73	102	70	30	28.5	23	95	23	3	—	M10	15	—	—	BSPT <sup>1</sup> / <sub>4</sub>	BSPT <sup>1</sup> / <sub>4</sub>	
BS-4	575	361	—	—	81	188	100	91	230	138	43	127	130	99	125	85	45	41	32	114	32	3	—	M12	19	—	—	BSPT <sup>1</sup> / <sub>2</sub>	BSPT <sup>1</sup> / <sub>4</sub>	
BS-5	745	461	—	—	117	256	128	114	225	167	34	91	182	139	165	130	45	46	—	162	63	3	—	M20	32	—	—	BSPT <sup>1</sup> / <sub>2</sub>	BSPT <sup>1</sup> / <sub>4</sub>	
BS-6	931	638	169	180	130	326	—	—	208	217	144	82	184	—	260	220	180	45	60	—	—	99	4	5	M16	26	18	64.4	BSPT <sup>1</sup> / <sub>2</sub>	BSPT <sup>1</sup> / <sub>2</sub>

## Type BSW Actuator Dimensions

mm

Type	E <sub>1</sub>	E <sub>2</sub>	E <sub>3</sub>	E <sub>4</sub>	E <sub>5</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	H <sub>5</sub>	H <sub>6</sub>	D	D <sub>1</sub>	D <sub>2</sub>	d <sub>1</sub>	d <sub>2</sub>	b	B	ℓ	t	t <sub>1</sub>	M	L	h	j	N	P <sub>1</sub>	P <sub>2</sub>
BSW-0	185	127	218	—	—	40	62	—	38	75	53	18	40	41	—	50	35	12	15	12	50	12	2	—	M6	9	—	—	90	BSPT <sup>1</sup> / <sub>8</sub>	BSPT <sup>1</sup> / <sub>8</sub>	
BSW-1	259	166	315	—	—	30	83	47	38	140	60	18	94	52	46	50	35	16	15	12	50	12	2	—	M6	9	—	—	100	BSPT <sup>1</sup> / <sub>4</sub>	BSPT <sup>1</sup> / <sub>8</sub>	
BSW-2	362	215	438	—	—	38	106	62	56	153	77	23	99	68	54	70	55	22	21	17	70	17	2	—	M8	12	—	—	140	BSPT <sup>1</sup> / <sub>4</sub>	BSPT <sup>1</sup> / <sub>8</sub>	
BSW-3	482	286	582	—	—	52	140	80	78	180	104	32	104	92	73	102	70	30	28.5	23	95	23	3	—	M10	15	—	—	200	BSPT <sup>1</sup> / <sub>4</sub>	BSPT <sup>1</sup> / <sub>4</sub>	
BSW-4	609	361	734	—	—	81	188	100	91	230	138	43	127	130	99	125	85	45	41	32	114	32	3	—	M12	19	—	—	250	BSPT <sup>1</sup> / <sub>2</sub>	BSPT <sup>1</sup> / <sub>4</sub>	
BSW-5	795	461	956	—	—	117	256	128	114	225	167	34	91	182	139	165	130	45	46	—	162	63	3	—	M20	32	—	—	300	BSPT <sup>1</sup> / <sub>2</sub>	BSPT <sup>1</sup> / <sub>4</sub>	
BSW-6	1006	638	169	180	1250	130	326	—	—	208	217	144	82	184	—	260	220	180	45	60	—	—	99	4	5	M16	26	18	64.4	450	BSPT <sup>1</sup> / <sub>2</sub>	BSPT <sup>1</sup> / <sub>2</sub>

## Cylinder Volume and Air Supply Requirements

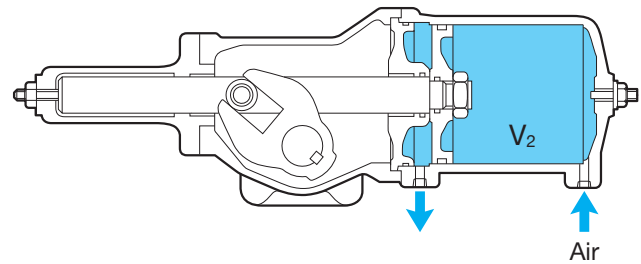
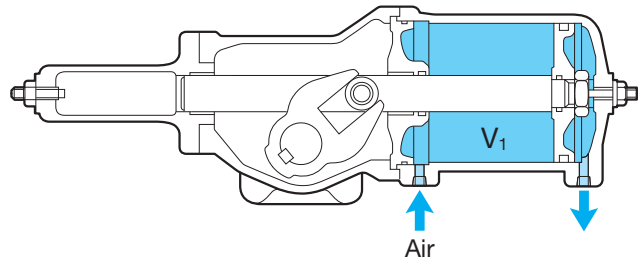
On installation of control system for actuators, air requirements of actuators should be carefully studied to ensure that a sufficient pressure is provided. Actuators should be activated by clean

air which is made free from moisture by air driers. For frequent operation, occasional lubrication is recommended for higher efficiency and longer service life.

### Cylinder volume for Type B actuators

Cylinder Type	V <sub>1</sub>	V <sub>2</sub>
B-0	0.05	0.07
B-1	0.17	0.17
B-2	0.43	0.43
B-3	1.04	1.09
B-4	2.69	2.75
B-5	6.53	6.80
B-6	15.90	14.20

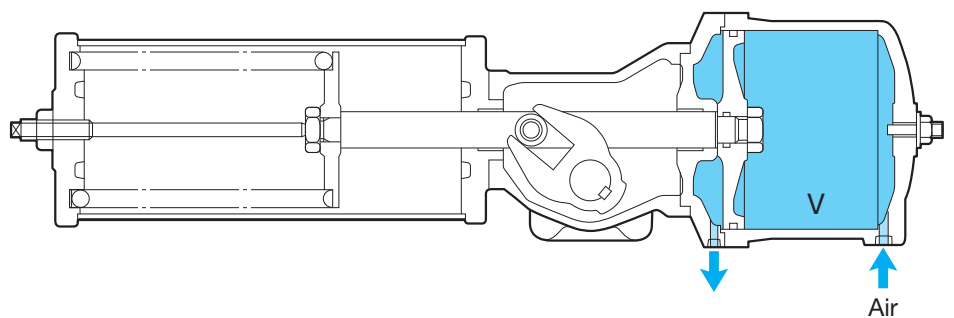
(unit: ℓ)



### Cylinder volume for Type BS/BSW actuators

Type	Cylinder	V
BS-0/BSW-0		0.17
BS-1/BSW-1		0.33
BS-2/BSW-2		0.82
BS-3/BSW-3		2.23
BS-4/BSW-4		5.39
BS-5/BSW-5		13.70
BS-6/BSW-6		30.20

(unit: ℓ)



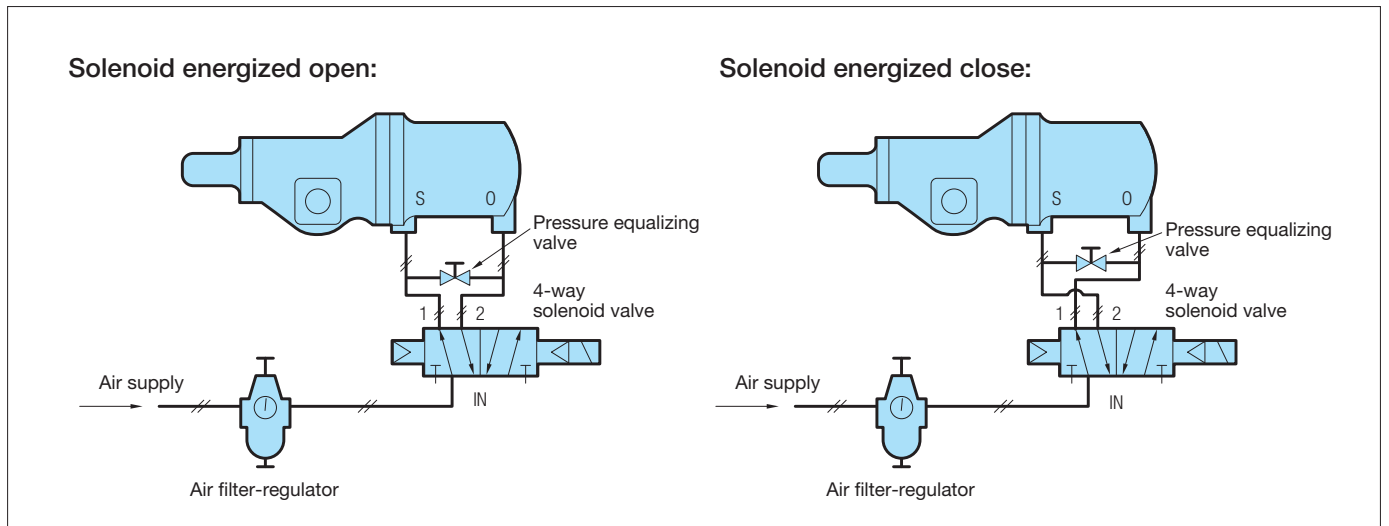
# Air Piping for Actuators

When assembling air supply pipes (either copper pipes or covered copper pipes) to actuators:

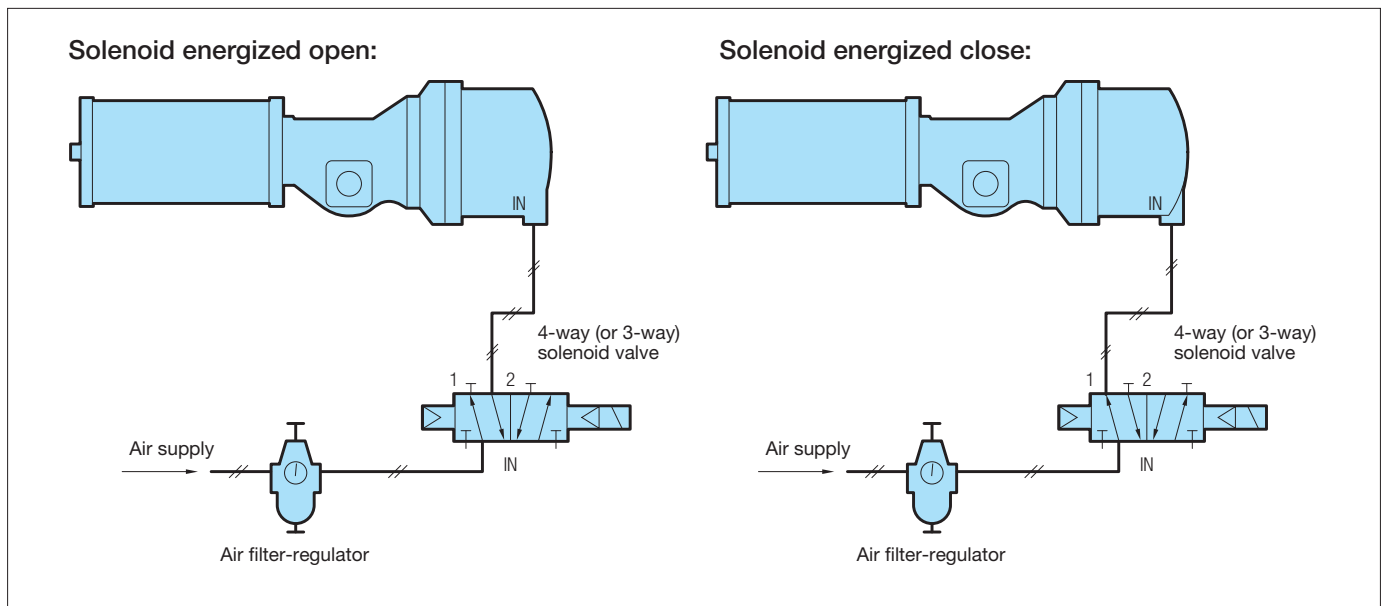
1. Select pipes of suitable diameter and wall thickness.

2. Seal all pipe joints securely to avoid leakage since accessories are mounted along the pipes between air supply source and actuator. Use PTFE tapes for sealing, making sure that loose tape ends do not extend into the pipe: they may block ports and air supply may be adversely effected.

## Type B Actuators (Double-Action)

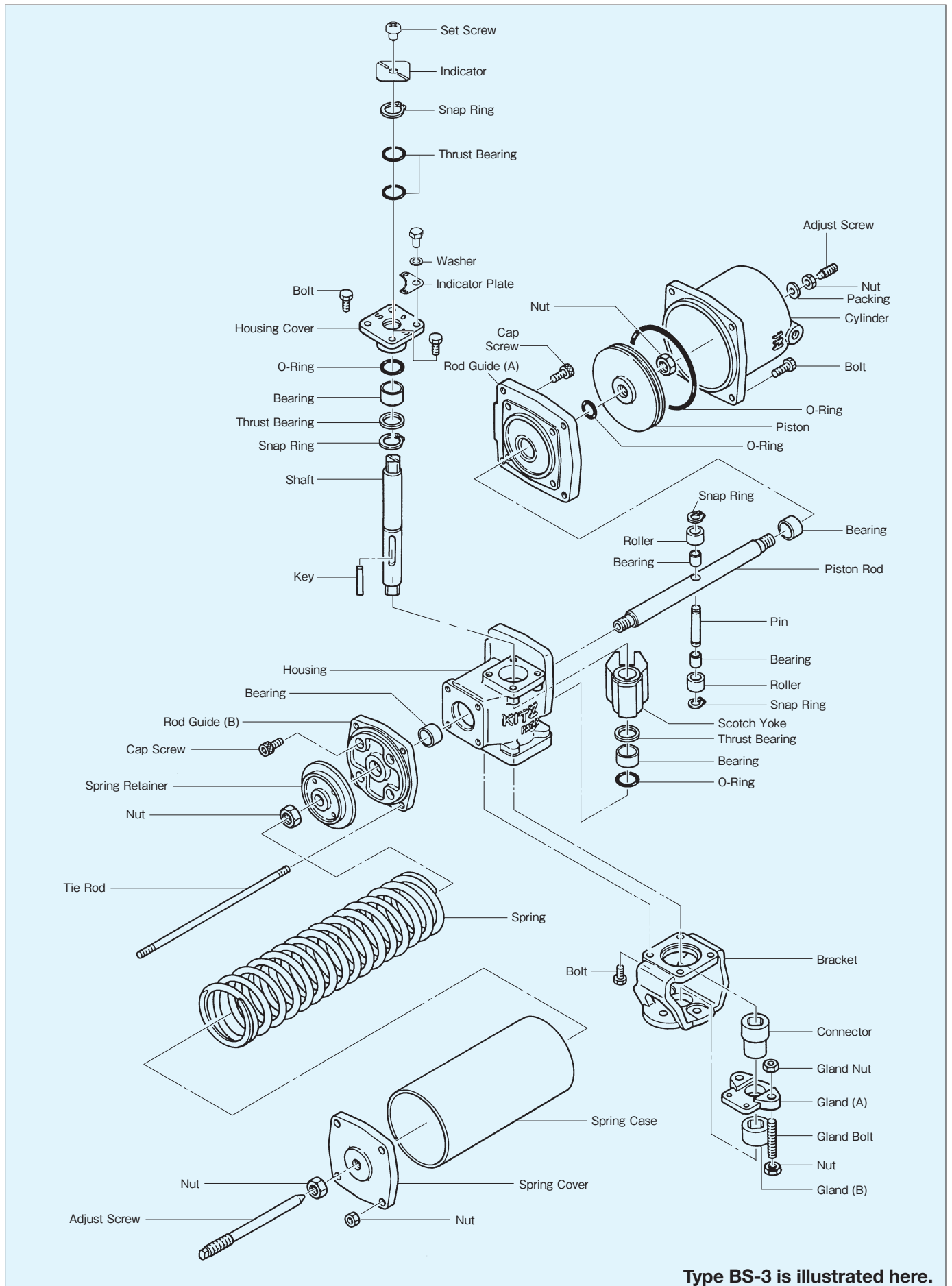


## Type BS/BSW Actuators (Spring-return)



Circuit diagrams of solenoid valves indicate that they are NOT energized.

# Construction Details of Type BS Actuators



Type BS-3 is illustrated here.