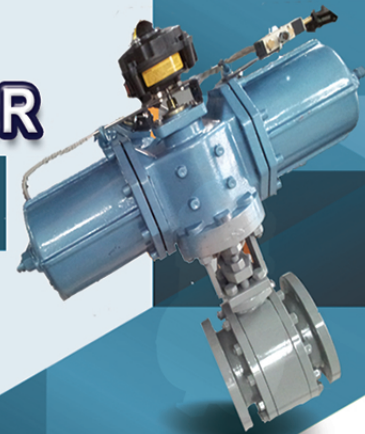


JFS

BEIJING JOINT FLOW SYSTEM CO.



PNEUMATIC ACTUATOR



CONTENT

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 AW SERIES PNEUMATIC ACTUATOR19

ZT SERIES PNEUMATIC ACTUATOR**INTRODUCTION**

The ZT series pneumatic actuator is one of the best designs in the market, available as "Double Action"(Air-air) or " Spring Return" with torque outputs for small to large flanged valves. Both actuators have twin cylinders, horizontally opposed incorporated piston guides to assure the correct contact between the pack and Pinion facilitating that the kinetic energy is transformed directly in a "turn room" that will provide a soft and constant torque.

SPECIFICATION**■ Range of pressure:**

Double Acting: Min air pressure: 2.5 bar

Max air pressure: 8 bar.

Spring return: Min air pressure: 2.5 bar

Max air pressure: 8 bar.

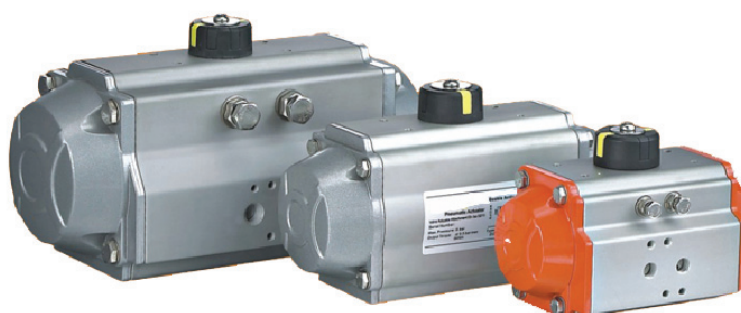
■ Range of temperature:

(1) Standard temperature: -20°C (-4°F) to + 80°C (+176°F)

(2) High temperature: -15°C (+5°F) to + 150°C (+302°F)

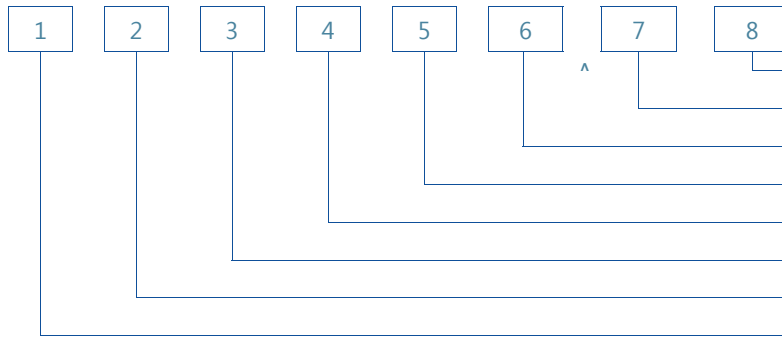
(3) Low temperature: -40°C (-40°F) to + 80°C (+176°F)

(4) Operating media: filtered dry or lubricated air



ZT SERIES PNEUMATIC ACTUATOR

ORDERING GUIDE



Model specifications
 Mode of action
 Spring amount
 End pore size
 Connection size
 Angle
 Mode of action
 Model specifications

1. Model specification

Type	Bore diameter													
ZT	050	063	075	088	100	115	125	145	160	180	200	240	265	330

2. Mode of action

Type	Double action clockwise to close (generally)	Double action counter clockwise to open	Spring return Clockwise to close (generally)	Spring return spring to open
Code	D	Do	S	So

3. Angle

Type	Rotation angle		
Two pieces body (standard)	0° - 90°	0° - 120°	0° - 180°
Three pieces body	0° - 45° - 90°	0° - 90° - 180°	/

4. Connection size

Type	Connection size												
ZT bore	050	063	075	088	100	115	125	145	160	180	200	240	265
Connection size	F04	F05	F05/F07	F05/F07	F07/F10	F07/F10	F07/F10	F10/F12	F10/F12	F12	F14	F16	F16

5. End pore size

Type	Octagonal	Dimetric	Key groove
Code	P	D	J

6. Spring quantity

Type	Spring amount							
Code	5	6	7	8	9	10	11	12

7. Operation temperature

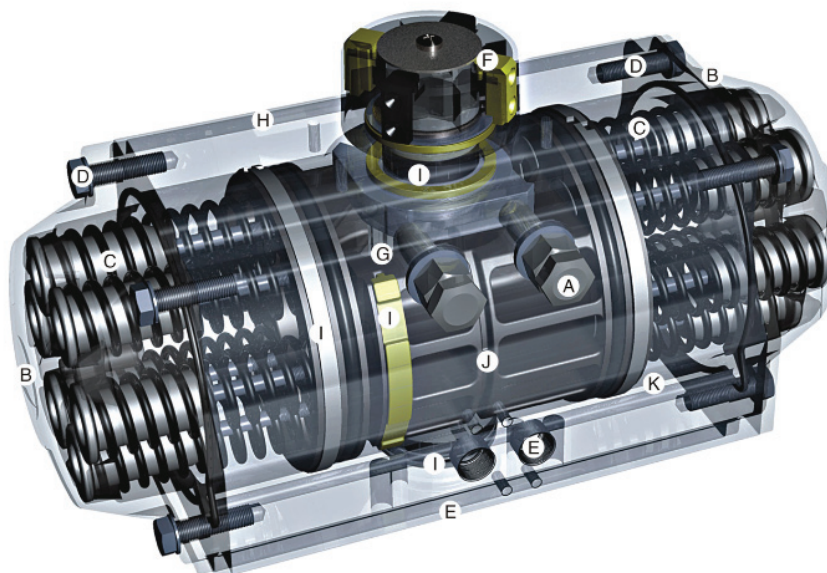
Type	DT	LT	HT
Code	Seals -15°C ~ 150°C	Seals -40°C ~ 80°C	Seals -20°C ~ 80°C

8. Anti-corrosion level

Type	Cylinder	End cover	Shaft
A	Hard coat anode	Polyester Deep	Carbon steel chemical nickel plating
B	Teflon coat + Anode oxidation	Teflon coat	Stainless steel

ZT SERIES PNEUMATIC ACTUATOR

FUNCTION AND FEATURE



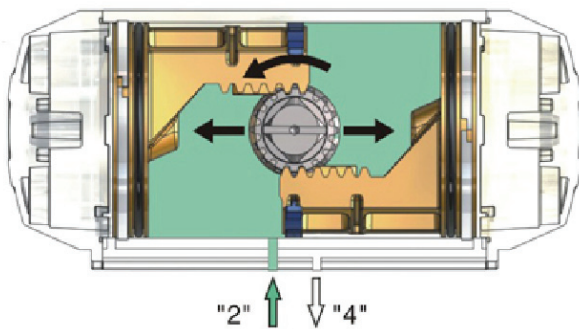
Item	Description and function
A	Two bolts out of cylinder can adjust $\pm 5^\circ$ to keep the actuator on/off position is the same with the valve's fully open position and fully closed position.
B	Hard anodized aluminum body protects against corrosive environments. And all the single action and double action actuator used the same cylinder and cover. Then we can change the action ways by adding/removing springs.
C	Combined preload springs are designed to submit at any setting occasion and it will be safer when you remove it. And the spring can use for long service life.
D	Stainless steel fastenings -protects against rust and improved aesthetics and ease of maintenance.
E	The connect dimension is designed by international standards: ISO5211-DIN3337 and DI/DE3845, and the air supply connection is designed by NAMUR standard.
F	There is a position indicator installed with NAMUR standard at the shaft end by the groove. It's convenient to set the signal switch box.
G	One piece steel pinion drive with full width piston tooth engagement.
H	New type Aluminum alloy cylinder - for anti-corrosion and superior wear performance on internal surfaces.
I	Piston - Be able to effectively reduce the friction, and maintain the sealing well.
J	Balanced double rack & pinion - eliminates side loads and keep the output torque steady
K	Channel for the air - It needn't use to connect with the open pipeline.

ZT SERIES PNEUMATIC ACTUATOR

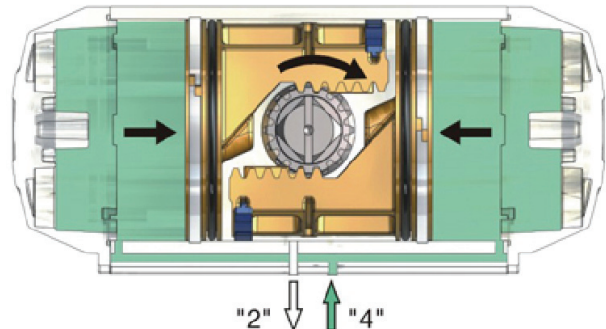
OPERATION PRINCIPLE AND ROTATION DIRECTION

Vertical view for the operation principle of standard double action actuator. (standard rotation)

Vertical view for the operation principle of standard double action actuator. (standard rotation)

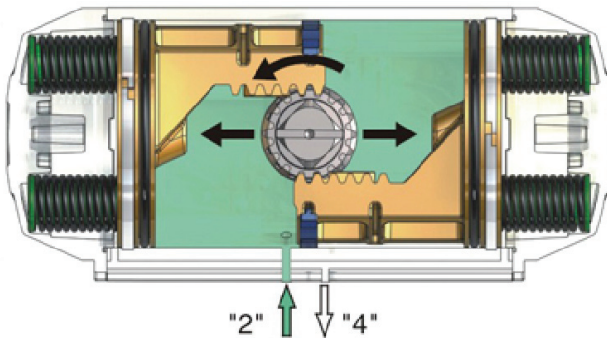


Air to Port 2 forces the pistons outwards, causing the pinion to turn counterclockwise. (open)

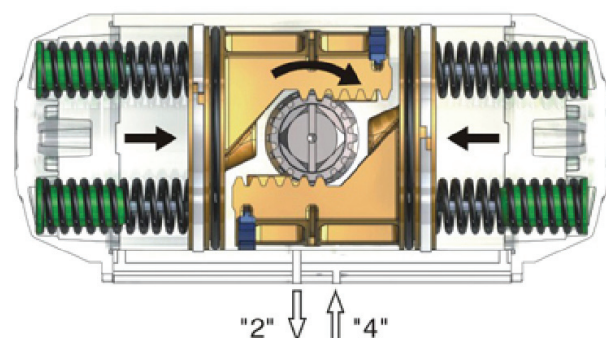


Air to Port 4 forces the pistons inwards, causing the pinion to turn clockwise. (closed)

Vertical view for the operation principle of standard single action actuator. (standard rotation)



Air to Port 2 forces the pistons outwards, causing the springs to compress. The pinion turns counterclockwise.



Loss of air pressure on Port 2 causes springs to drive the pistons inward. The pinion turns clockwise to close while air exhausts from Port 2.

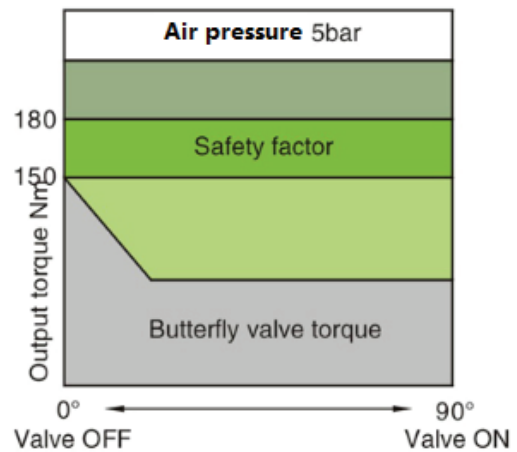
ZT SERIES PNEUMATIC ACTUATOR

Vertical view for the operation principle of standard double action actuator. (standard rotation)

Selection of double action actuator

Please confirm the safety factor before you install the pneumatic actuator. And the safety factor should be changed if the medium changed. The temperature, pressure, friction force, seat insert and so on will changed.

For example: the torque of butterfly valve is 150Nm, medium: water. Temperature is normally; and the supply air pressure is 5 bar, safety factor is 20%. The safety torque is 180Nm. Refer to the double action actuator torque list, you may find the air pressure is 5 bar, the torque is 180Nm, find the mode number is: ZT115-D.



Selection of single action actuator:

First, considering the air pressure torque and reset spring torque.

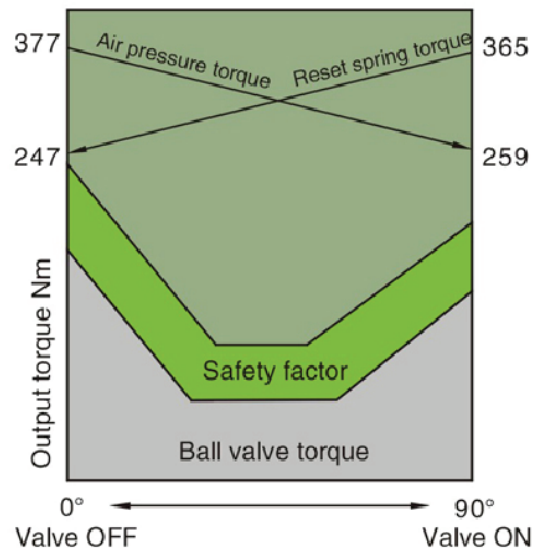
For example: The ball valve torque is 200Nm, medium: steam. Temperature is :160°C, the air pressure is 5.5bar, and the safety factor is 25%. So the safety torque is: 250Nm. Refer to the single action actuator torque list, you can find the Air pressure 5.5bar, then find the torque, and then find the spring torque at 0° and 90°. You may find the actuator mode NO. ZT 160 is suitable, and the spring quantity is 11. Confirm the following data:

The Air pressure 0°=377Nm

The Air pressure 90°=259Nm

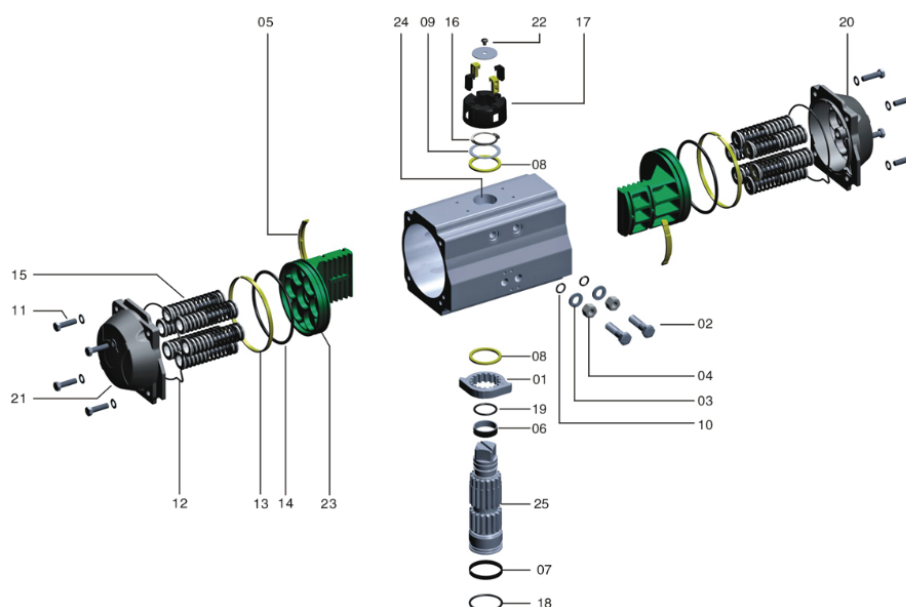
Spring travel 0°=247Nm

Spring travel 90°=365Nm



ZT SERIES PNEUMATIC ACTUATOR

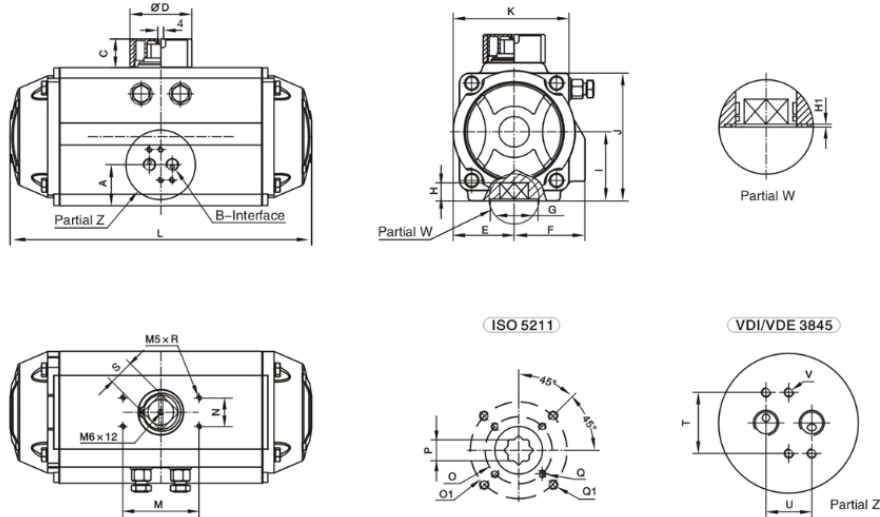
PARTS LIST AND MATERIAL



No.	Quantity	Parts Name	Standard Materials	Anti-corrosion	Backup material
1	1	Adjusting cam	Standard Materials		
2	2	Adjusting bolt	stainless steel		
3	2	Gasket	stainless steel		
4	2	Nut	stainless steel		
5	2	Direction of bashing(back of piston)	stainless steel		
6	1	Bearing wear ring(top)	composite material		
7	1	Bearing wear ring(end)	nylon 46		
8	2	Trusting gasket(drive axes)	nylon 46		
9	1	Trusting rings (drive axes)	composite material		
10	2	O-ring(adjusting bolt)	stainless steel		Fluorine or silastic
11	8	End cover bolt (end cover)	NBR		
12	2	O-rings(end covers)	stainless steel		Fluorine or silastic
13	2	abrasion proof composition ring(piston)	NBR		
14	2	O-rings(piston)	composite material		Fluorine or silastic
15	5~12	Spring	NBR	Epoxy resin coat	
16	1	Flexible ring	alloy spring steel		
17	1	Position indicator	stainless steel		
18	1	O-rings(end)	composite material		Fluorine or silastic
19	1	O-rings(top)	NBR		Fluorine or silastic
20	1	End cover	NBR	Polyester coating	
21	1	End cover	casting aluminum alloy	Polyester coating	
22	1	Screw	casting aluminum alloy		
23	2	Piston	stainless steel	Anodize oxidation	
24	1	Cylinder	casting aluminum alloy	Hard coat anodize	
25	1	driving axes	Extrusion aluminum alloy	Nickel plated	stainless steel

ZT SERIES PNEUMATIC ACTUATOR

DIMENSION



	Model	ZT050 D/S	ZT 063 D/S	ZT075 D/S	ZT088 D/S	ZT100 D/S	ZT115 D/S	ZT125 D/S	ZT145 D/S	ZT160 D/S	ZT180 D/S	ZT200 D/S	ZT240 D/S	ZT265 D/S
Size(mm)	L	140.5	158.5	210.5	247.5	268.5	315	345	408.5	437.5	487	543	621	684
	J	69	85	102	115	127	145	157	177	196	220.5	245	298.5	330
	K	59	72	84.5	97.5	111	127	136	156.5	169	190.7	213	251	298.5
	V	M5×8	M5×8	M5×8	M5×8	M5×8	M5×8	M5×8	M5×8	M5×8	M5×8	M5×8	M6×10	M6×10
	R	4	8	8	8	8	8	8	8	8	8	8	8	8
	M	80	80	80	80	80	80	80	80	80	130	130	130	130
	N	30	30	30	30	30	30	30	30	30	30	30	30	30
	G	30	35	35	55	55	70	70	85	85	100	100	130	130
	H	12	16	16	19	19	24	24	29	29	38	38	48	48
	E	29	36	42.5	49.5	56	64	69.5	80	88	99	110	131	163.5
	F	41.5	47	52	56.8	67	77	82	91.5	99	105	112	131	166
	S	11	11	19	19	19	27	27	27	27	42	42	42	42
	A	26.5	30	30.5	32.5	37.5	42.5	45	47	52	58	62	78.5	165
	C	20	20	20	20	20	30	30	30	30	50	50	50	50
	O	42	50	50	40	70	102	102	125	125	140	140	165	165
	O1	—	—	—	—	—	—	—	—	—	—	—	—	—
	T	32	32	32	32	32	32	32	32	32	32	32	45	45
	U	24	24	24	24	24	24	24	24	24	24	24	40	40
	Q	M5	M6	M6	M8	M8	M10	M10	M12	M12	M16	M16	M20	M20
	Q1	—	—	—	—	—	—	—	—	—	—	—	—	—
Remarks	T-ISO228	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"	1/2"
	ISO 5211	F04	F05	F05	F07	F07	F10	F10	F12	F12	F14	F14	F16	F16
	P	11	14	14	17	17	22	22	27	27	36	36	46	46
	H1	0.5	0.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2.5	2.5
	I	34.5	42.5	51	57.5	63.5	72.5	78.5	88.5	98	111.5	122	150.5	165
	D	40	40	40	40	40	56/65	56/65	65	65	80/115	80/155	115	115
	ISO F5211	F03	F04	F05-F07	F05-F07	F05 F07 F07 F10	F07-F10	F07-F10	F10-F12	F10-F12	F12	F12	F14	F14
	O	36	42	50	50	50 70	70	70	102	102	125	125	140	140
	O1	—	—	70	70	70 102	102	102	125	125	—	—	—	—
	Q	M5	M5	M6	M6	M6 M8	M8	M8	M10	M10	M12	M12	M16	M16
	Q1	—	—	M8	M8	M8 M10	M10	M10	M12	M12	—	—	—	—
	G	25	30	35	40	40 55	55	55	70	70	85	85	100	112
	P	9	11	17	17	17 22	22	27	27	27	27	27	36	36
	H	10	12	19	19	19 24	24	29	29	29	29	29	38	38

ZT SERIES PNEUMATIC ACTUATOR

TECHNICAL PARAMETER OF 120°~180°

Size Model	ZT050	ZT063	ZT075	ZT088	ZT100	ZT125	ZT160	ZT200
A-120°	159.5	179.5	240	281	306	395	500	618
A-180°	197	221.5	298.5	348	381.5	496	626	-
J	69	85	102	115	127	157	196	245
K	59	72	84.5	97.5	111	136	169	213
V	M5×8	M5×8	M5×8	M5×8	M5×8	M5×8	M5×8	M5×8
R	4	8	8	8	8	8	8	8
M	80	80	80	80	80	80	80	130
N	30	30	30	30	30	30	30	30
G	30	35	35	55	55	70	85	100
H	12	16	16	19	19	24	29	38
E	29	36	42.5	49.5	56	69.5	88	110
F	41.5	47	52	56.8	67	82	99	112
S	11	11	19	19	19	27	27	42
A	26.5	30	30.5	32.5	37.5	45	52	62
C	20	20	20	20	20	30	30	50
O	42	50	50	70	70	102	125	140
O1	-	-	-	-	-	-	-	-
T	32	32	32	32	32	32	32	32
U	24	24	24	24	24	24	24	24
Q	M5	M6	M6	M8	M8	M10	M12	M16
Q1	-	-	-	-	-	-	-	-
T-ISO228	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	1/4"	1/4"
ISO 5211	F04	F05	F04	F07	F07	F10	F12	F14
P	11	11	11	17	17	22	27	36
H1	0.5	0.5	0.5	1.5	1.5	1.5	1.5	2
I	34.5	42.5	51	57.5	63.5	78.5	98	122
D	40	40	40	40	40	56/65	65	80/115

Note: For ISO installation dimensions of the bottom flange and the quartet size, is the same with the travel of 90°.

ZT SERIES PNEUMATIC ACTUATOR

Model type	ZT050-D 120°X 180°X	ZT063-D 120°X 180°X	ZT075-D 120°X 180°X	ZT088-D 120°X 180°X	ZT0100-D 120°X 180°X	ZT125-D 120°X 180°X	ZT160-D 120°X 180°X	ZT200-D 120°X 180°X
Bore Φ(mm)	50 50	63 63	75 75	85 85	100 100	125 125	160 160	200 200
Travel range Rev./1°	1/6 1/6	1/6 1/6	1/6 1/6	1/5 1/5	1/5 1/5	1/4 1/4	1/4 1/4	1/4 1/4
cylinder volume of opening (L)	0.11 0.17	0.2 0.29	0.39 0.56	0.63 0.92	0.9 1.3	1.9 2.8	3.9 5.7	7.4 -
cylinder volume of closing (L)	0.18 0.27	0.32 0.47	0.61 0.88	0.97 1.4	1.4 2	2.9 4.2	6.2 8.8	11.8 -
Opening Time S(Sec.)	0.26 0.31	0.33 0.39	0.39 0.47	0.52 0.63	0.65 0.79	1.17 1.41	1.95 2.36	3.51 -
Closing Time S(Sec.)	0.33 0.39	0.39 0.47	0.52 0.63	0.65 0.79	0.91 1.10	1.56 1.88	2.34 2.83	4.55 -
Approximate weight (Kg)	1.2 1.5	2 2.5	3.4 4.4	4.6 6	6.6 8.1	12.3 15.4	24.6 29.5	44 -

Note: Opening and closing time on the above table which is depended on the follow situation

- (a) Normal temperature
- (b) Travel of 120° and 180°
- (c) The bore size of solenoid valve is 4mm, and the negotiability is Qn400L/min
- (d) Inner size of the pipe is 8mm
- (e) Clean air
- (f) Air pressure is 5.5bar
- (g) The actuator has not load

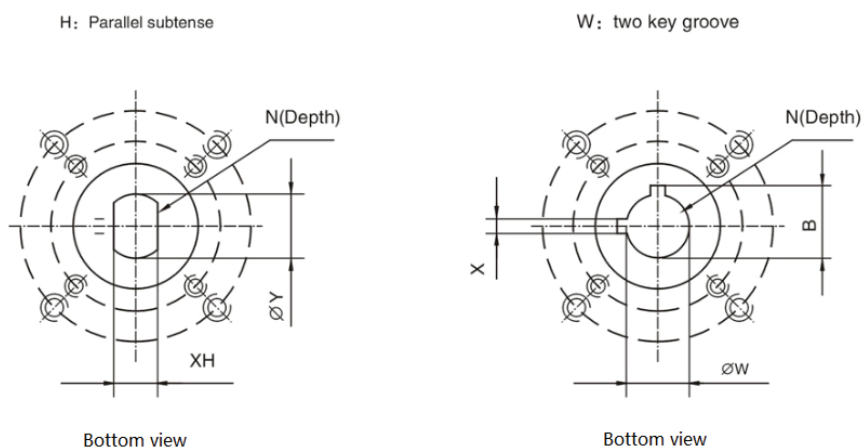
The opening and closing time will be changed if the testing situation is changed.

It must be double action when the actuator travel is 120° and 180°.

And the actuator travel can be can be varied by the customer 'special request.

ZT SERIES PNEUMATIC ACTUATOR

SIZE OF OUTPUT BORE



Size	ZT050	ZT 063	ZT075	ZT088	ZT100	ZT115	ZT125	ZT145	ZT160	ZT180	ZT200	ZT240	ZT265	ZT330
Model	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S
ΦW	12.7	12.7	12.7	15.88	19.05	22.23	22.23	28.58	28.58	31.75	31.75	33.34	38.1	41.28
B	14.2	14.2	14.2	18.4	21.6	24.8	24.8	32.1	32.1	35.3	35.3	37.4	42.4	45.3
X	3	3	5	5	5	5	5	8	8	8	8	10	10	12
N	32	32	32	32	32	45	45	45	45	45	45	51	51	65
ΦY	13	13	13	16.1	19.2	22.4	22.4	28.8	28.8	32	32	33.6	38.4	41.5
XH	10	10	10	12	14	17	17	22	22	24	24	27	27	32

Note: The above size can be varied by the customer special request.

ZT SERIES PNEUMATIC ACTUATOR

THE VOLUME AND OPEN/CLOSED TIME

Model Type		ZT050	ZT063	ZT075	ZT088	ZT100	ZT115	ZT125	ZT145	ZT160	ZT180	ZT200	ZT240	ZT265	ZT330
		D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S
Bore	Φ (mm)	50	63	75	88	100	111.5	125	145	160	180	200	240	265	330
Travel range	Rev./1	1/6	1/6	1/6	1/5	1/5	1/5	1/5	1/5	1/4	1/4	1/4	1/4	1/4	1/4
Cylinder volume of opening	(L)	0.09	0.16	0.31	0.51	0.71	1.19	1.54	2.41	3.14	4.26	5.94	10	14.5	25
Cylinder volume of closing	(L)	0.15	0.26	0.49	0.78	1.11	1.8	2.34	3.78	4.92	6.89	9.46	15.2	21.38	40
Opening Time	S(Sec)	0.2 0.25	0.25 0.3	0.3 0.35	0.4 0.5	0.5 0.6	0.7 0.8	0.9 1.1	1.2 1.4	1.5 1.7	2.0 2.2	2.7 3.2	3.5 4.0	4.0 4.5	6.0 7.5
Closing Time	S(Sec)	0.25 0.3	0.3 0.35	0.4 0.5	0.5 0.6	0.7 0.9	0.9 1.1	1.2 1.4	1.5 1.8	1.8 2.1	2.4 2.8	3.5 4.0	4.1 4.6	4.5 5.0	7.0 8.5
Approximate weight	(kg)	0.96 1.06	1.58 1.7	2.7 3.15	3.8 4.4	5.4 6.51	8.4 9.84	10.2 12.6	14.5 18.1	19.8 24	25 31.6	35 54.5	53 64	83 102	134 169

Note: Opening and closing time on the above table which is depended on the follow situation

- (a) Normal temperature
- (b) Travel of 120° and 180°
- (c) The bore size of solenoid valve is 4mm, and the negotiability is Qn400L/min
- (d) Inner size of the pipe is 8mm
- (e) Clean air
- (f) Air source pressure is 5.5bar
- (g) The actuator has no load

The opening and closing time will be changed if the testing situation is changed.

ZT SERIES PNEUMATIC ACTUATOR

SELECTION TABLE FOR SINGLE ACTION ACTUATOR

Output torque of spring return actuator (Nm)														Spring Travel 0° 90°
Air pressure		2.5bar	3bar	3.5bar	4bar	4.2bar	4.5bar	5bar	5.5bar	6bar	7bar	8bar		
Actuat	Spring	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°		
ZT050	S 05	4.9 3.4	6.6 5.1	8.3 6.8	9.9 8.4	10.6 9.1	11.6 10.1	13.2 11.7					4.9 3.4	
	S 06	4.3 2.5	5.9 4.1	7.6 5.8	9.3 7.4	9.9 8.1	10.9 9.1	12.6 10.8	14.2 12.4				5.8 4	
	S 07		5.3 3.1	6.9 4.8	8.6 6.5	9.2 7.1	10.2 8.1	11.9 9.8	13.6 11.5	15.2 13.1			6.8 4.7	
	S 08			6.2 3.8	7.9 5.5	8.6 6.2	9.6 7.2	11.2 8.8	12.9 10.5	14.6 12.1	17.9 15.5		7.8 5.4	
	S 09				7.2 4.5	7.9 5.2	8.9 6.2	10.6 7.8	12.2 9.5	13.9 11.2	17.2 14.5	20.5 17.8	8.8 6.1	
	S 10						8.2 5.2	9.9 6.9	11.5 8.5	13.2 10.2	16.5 13.5	19.8 16.8	9.7 6.7	
	S 11							9.2 5.9	10.9 7.6	12.5 9.2	15.9 12.5	19.2 15.9	10.1 7.4	
	S 12								10.2 6.6	11.9 8.2	15.2 11.6	18.5 14.9	11.7 8.1	
ZT063	S 05	9.1 6.2	12 9.2	15.0 12.1	17.9 15.0	19.1 16.2	20.8 17.9	23.8 20.9					8.4 5.5	
	S 06	8 4.5	10.9 7.5	13.9 10.4	16.8 13.3	18 14.5	19.7 16.3	22.7 19.2	25.6 22.1				10.7 6.7	
	S 07		9.8 5.8	12.8 8.7	15.7 11.6	16.9 12.8	18.6 14.6	21.5 17.5	24.5 20.4	27.4 23.4			11.8 7.8	
	S 08			11.6 7	14.6 10	15.7 11.1	17.5 12.9	20.4 15.8	23.4 18.7	26.3 21.7	32.2 27.5		13.5 8.9	
	S 09				13.5 8.3	14.6 9.4	16.4 11.2	19.3 14.1	22.3 17.1	25.2 20	31.3 25.9	36.9 31.7	15.2 10	
	S 10						15.3 9.5	18.2 12.4	21.1 15.4	24.1 18.3	29.9 24.2	35.8 30	16.9 11.1	
	S 11							17.1 10.8	20 13.7	23 16.6	28.8 22.5	34.7 28.3	18.6 12.2	
	S 12								18.9 12	21.9 14.9	27.7 20.8	33.6 26.7	20.2 13.3	
ZT075	S 05	18.0 11.8	23.8 17.6	29.7 23.4	35.5 29.2	37.8 31.6	41.3 35	47.1 40.9					17.3 11.1	
	S 06	15.8 8.3	21.6 14.1	27.5 19.9	33.3 25.8	35.6 28.1	39.1 31.6	44.9 37.4	50.7 43.2				20.8 13.3	
	S 07		19.4 10.7	25.2 16.5	31.1 22.3	33.4 24.6	36.9 28.1	42.7 33.9	48.5 39.8	54.3 45.6			24.2 15.5	
	S 08			23 13	28.8 18.8	31.2 21.2	34.7 24.7	40.5 30.5	46.3 36.3	52.1 42.1	63.7 53.7		27.7 17.7	
	S 09				26.6 15.4	29 17.7	32.5 21.2	38.3 27.0	44.1 32.8	49.9 38.6	61.5 50.3	73.2 61.9	31.2 19.9	
	S 10						30.2 17.7	36.1 23.6	41.9 29.4	47.7 35.2	59.3 46.8	71 58.5	34.6 22.1	
	S 11							33.8 20.1	39.7 25.9	45.5 31.7	57.1 43.4	68.7 55	38.1 24.3	
	S 12								37.5 22.4	43.3 28.3	54.9 39.9	66.5 51.5	41.5 26.5	
ZT088	S 05	27.4 16.9	36.6 26	45.7 35.2	54.9 44.3	58.5 48	64 53.5	73.2 62.6					28.9 18.3	
	S 06	23.8 11.1	32.9 20.3	42.1 29.4	51.2 38.6	54.9 42.2	60.4 47.7	69.5 56.9	78.7 66				34.7 22	
	S 07		29.2 14.5	38.4 23.6	47.5 32.8	51.2 36.4	56.7 41.9	65.8 51.1	75 60.2	84.2 9.4			40.4 25.7	
	S 08			34.7 17.9	43.9 27	47.5 30.7	53 36.2	62.2 45.3	71.3 54.4	80.5 63.6	98.8 81.9		46.2 29.3	
	S 09				40.2 21.2	43.9 24.9	49.4 30.4	58.5 39.5	67.7 48.7	76.8 57.8	95.1 76.1	113 94.5	52 33	
	S 10						45.7 24.6	54.8 33.8	64 42.9	73.1 52.1	91.570.4	110 88.7	57.8 36.7	
	S 11							51.2 28	60.3 37.1	69.5 46.3	87.8 64.6	106 82.9	63.5 40.3	
	S 12								56.7 31.4	65.8 40.5	84.1 58.8	102 77.1	69.3 44	
ZT100	S 05	41.1 27.1	54.4 40.4	67.7 53.7	81 67	86.3 72.3	94.3 80.3	108 93.6					39.4 25.3	
	S 06	36.1 19.2	49.4 32.5	62.7 45.8	76 59.1	81.3 64.4	89.3 72.4	103 85.7	116 99				47.3 30.4	
	S 07		44.3 24.6	57.6 37.9	70.9 51.2	76.2 56.5	84.2 64.5	97.5 77.8	111 91.1	124 104			55.1 35.3	
	S 08			52.5 30	65.8 43.3	71.1 48.7	79.1 56.6	92.4 69.9	106 83.2	119 96.5	146 123		63 40.5	
	S 09				60.8 35.5	66.1 40.8	74 48.8	87.3 62.1	101 75.3	114 88.6	141 115	167 142	70.9 45.6	
	S 10						69 40.9	82.3 54.2	95.6 67.5	109 80.8	135 107	162 134	78.8 50.7	
	S 11							77.2 46.3	90.5 59.6	104 72.9	130 99	157 126	86.7 55.7	
	S 12								85.4 51.7	98.7 65	125 92	152 118	94.5 60.8	

ZT SERIES PNEUMATIC ACTUATOR

Output torque of spring return actuator (Nm)													Spring Travel 0° 90°
Air pressure		2.5bar	3bar	3.5bar	4bar	4.2bar	4.5bar	5bar	5.5bar	6bar	7bar	8bar	
Actuat	Spring	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	
ZT115	S 05	66.5 41.9	87.9 63.4	109 84.9	131 106	140 115	152 128	174 149					65.5 41
	S 06	58.3 28.8	79.7 50.3	101 71.8	123 93.3	131 102	144 115	166 136	187 158				78.6 49.2
	S 07		71.5 37.2	93 58.7	115 80.2	123 88.8	136 102	158 123	179 145	200 166			91.7 57.4
	S 08			84.8 45.6	106 67.1	115 75.7	128 88.6	149 110	171 132	192 153	235 196		105 65.5
	S 09				98.1 54	107 62.6	120 75.5	141 97	163 118	184 140	227 183	270 226	118 73.8
	S 10						111 62.4	133 83.9	154 105	176 127	219 170	262 213	131 82
	S 11							125 70.8	146 92.3	168 114	211 157	254 200	144 90.2
	S 12								138 79.2	159 101	202 144	245 187	157 98.4
ZT125	S 05	86 56.1	113.7 83.8	141 111	169 139	180 150	197 167	224 195					82 52.5
	S 06	75.5 39.6	103.2 67.3	131 95	159 123	170 134	186 150	214 178	242 206				99 63
	S 07		92.7 50.8	120.4 78.5	148 106	159 117	176 134	203 162	231 189	259 217			115 73.5
	S 08			110 62	137.6 89.7	149 101	165 117	193 145	221 173	248 201	304 256		132 84
	S 09				127 73.3	138 84.3	155 101	182 129	210 156	238 184	293 239	349 295	148 94.5
	S 10						144 84.5	172 112	200 140	227 168	283 223	338 278	165 105
	S 11							161 95.7	189 123	217 151	272 206	328 262	181 116
	S 12								179 107	106 135	262 190	317 245	198 126
ZT145	S 05	135 88.6	179 132	222 176	265 219	283 236	309 262	352 306					129 82
	S 06	119 62.8	162 106	206 150	249 193	266 211	293 237	336 280	379 324				155 99
	S 07		146 80.5	189 124	233 167	250 185	276 211	320 254	363 298	406 341			180 115
	S 08			173 98.2	216 142	233 159	260 185	303 229	347 272	390 316	477 403		206 132
	S 09				200 116	217 133	243 159	287 203	330 246	374 290	460 377	547 464	232 148
	S 10						227 134	270 177	314 221	357 264	444 351	531 438	258 165
	S 11							254 151	297 195	341 238	428 325	515 412	283 181
	S 12								281 169	324 213	411 299	498 386	309 198
ZT160	S 05	171 118	228 174	285 231	342 288	364 310	398 344	455 401					166 112
	S 06	149 84.3	206 141	262 198	319 255	342 277	376 311	433 368	489 425				199 135
	S 07		183 108	240 165	297 221	319 244	353 278	410 335	467 391	524 448			233 157
	S 08			218 131	274 188	297 211	331 245	388 302	444 358	501 415	615 528		266 180
	S 09				252 155	275 178	309 212	365 268	422 325	479 382	592 495	706 609	299 202
	S 10						286 178	343 235	400 292	456 349	570 462	683 575	332 224
	S 11							320 202	377 259	434 315	547 429	661 542	365 247
	S 12								355 225	411 282	525 396	638 509	399 269
ZT180	S 05	225 146	301 223	378 299	455 376	485 406	531 452	608 529					237 158
	S 06	193 98.8	270 175	346 252	423 329	454 359	500 405	576 482	653 558				284 190
	S 07		238 128	315 205	391 281	422 312	468 358	544 434	621 511	698 587			332 221
	S 08			283 157	360 234	390 264	436 310	513 387	589 464	666 540	819 693		379 253
	S 09				366 247	359 217	442 324	519 400	596 477	672 554	825 707	978 860	426 285
	S 10						373 216	450 292	526 369	603 445	756 599	909 752	474 316
	S 11							418 245	495 321	571 398	724 551	877 704	521 348
	S 12								463 274	540 351	693 504	846 657	568 379
ZT200	S 05	319 217	426 323	532 430	638 536	681 578	745 642	851 749					315 213
	S 06	277 154	383 260	489 367	596 473	638 515	702 579	808 686	915 792				378 255
	S 07		341 197	447 304	553 410	596 453	660 516	766 623	872 729	979 835			441 298

ZT SERIES PNEUMATIC ACTUATOR

Output torque of spring return actuator (Nm)													Spring Travel 0° 90°
Air pressure		2.5bar	3bar	3.5bar	4bar	4.2bar	4.5bar	5bar	5.5bar	6bar	7bar	8bar	
Actuat	Spring	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	
	S 08			404 241	511 347	553 390	617 453	723 560	830 666	936 772	1149 985		504 340
	S 09				468 284	511 327	575 390	681 497	787 603	894 709	1106 922	1319	567 383
	S 10						532 327	638 434	745 540	851 646	1064 859	1277	630 425
	S 11							596 371	702 477	809 583	1021 796	1234	693 468
	S 12								660 414	766 520	979 733	1192 946	756 510
ZT240	S 05	533 372	712 551	890 730	1069 908	1141 980	1248	1426					521 360
	S 06	461 268	640 447	818 625	997 804	1068 876	1176 983	1354	1533				625 433
	S 07		568 343	746 521	925 700	996 771	11104	1282	1461	1640			730 505
	S 08			574 417	853 596	924 667	1032 774	1210 953	1389	1568	1925		834 577
	S 09				781 491	852 563	959 670	1138 849	1317	1495	1853	2210	938 649
	S 10						887 566	1066 745	1245 923	1423	1781	2138	1042 721
	S 11							994 640	1173 819	1351 998	1709	2066	1146 793
	S 12								1101 715	1279 894	1637	1994	1251 865
ZT265	S 05	751 496	1011 755	1270	1274	1633	1789	2048					801 546
	S 06	642 336	902 595	1161 854	1114	1524	1680	1939	2198				961 655
	S 07		792 435	1052 694	954 1311	1415	1570	1830	2089	2349			1121 764
	S 08			943 534	793 1202	1306 897	1461	1721	1980	2239	2758		1281 837
	S 09				633 1093	1197 737	1352 893	1612	1871	2130	2649	3168	1442 982
	S 10						1243 732	1503 992	1762	2021	2540	3059	1602
	S 11							1393 832	1653	1912	2431	2950	1762
	S 12								1544 931	1803	2322	2840	1922
ZT330	S 05	1332	1783	2233	2684	2864	3134	3585					1238 920
	S 06	1149 767	1599	2049	2500	2680	2950	3401	3851				1486
	S 07		1415 969	1865	2316	2496	2766	3217	3667	4118			1733
	S 08			1682	2132	2312	2582	3033	3483	3934	4837		1981
	S 09				1948	2128	2398	2849	3299	3750	4648		2229
	S 10						2215	2665	3115	3566	4458		2476
	S 11							2481	2931	3382	4269		2724
	S 12								2748	3198	4079		2971

ZT SERIES PNEUMATIC ACTUATOR

SELECTION TABLE FOR DOUBLE ACTION ACTUATOR

Air source	Output torque of double action actuator (Nm)										
	2.5bar	3bar	3.5bar	4bar	4.2bar	4.5bar	5bar	5.5bar	6bar	7bar	8bar
ZT050-D	8.3	10	11.6	13.3	14	15	16.6	18.3	19.9	23.3	26.6
ZT063-D	14.7	17.6	20.5	23.5	24.6	26.4	29.3	32.2	35.2	41.4	46.9
ZT075-D	29.1	34.9	40.7	46.5	48.9	52.4	58.2	64	69.8	81.4	93.1
ZT088-D	45.8	54.9	64.1	73.2	76.9	82.4	91.5	101	110	128	146
ZT100-D	66.5	79.8	93.1	106	112	120	133	146	160	186	213
ZT115-D	107	129	150	172	181	193	215	236	258	301	344
ZT125-D	138	166	194	222	233	249	277	305	332	388	443
ZT140-D	217	261	304	348	365	391	435	478	522	609	696
ZT160-D	284	340	397	454	477	511	567	624	681	794	908
ZT180-D	383	459	536	613	643	689	766	842	919	1072	1225
ZT200-D	532	638	745	851	893	957	1064	1170	1276	1489	1702
ZT240-D	893	1072	1251	1430	1501	1608	1787	1966	2144	2502	2859
ZT265-D	1297	1556	1815	2075	2179	2334	2594	2853	3112	3631	4150
ZT330-D	2252	2703	3153	3604	3784	4054	4504	4955	5405	6306	



STROKE ADJUSTMENT

Refer to the picture, adjusting two bolt can adjust the full open/full closed position, it can adjust the actuator position from -5° to $+5^{\circ}$, and make the actuator opening position and closing position is as same as the valve open/close position.

ZT SERIES PNEUMATIC ACTUATOR

INSTALLATION OF ACCESSORY PARTS

(a) The installation of the solenoid :

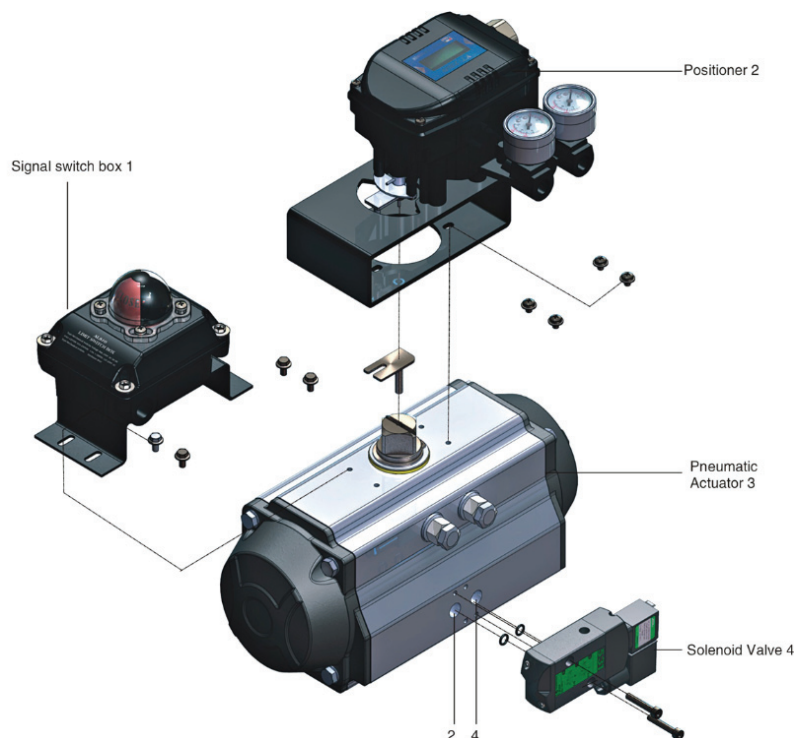
Install it in actuator directly via pin board according to NAMUR standard. It is possible to turn 2/3 way into 2/5 way. Before installing the solenoid valve in the right way, it is necessary to ensure that actuator is placed at the off-position. When assemble the solenoid (4) onto the pneumatic actuator (3), set an o-ring which is aiming at the air source port 2 and port 4 (Please refer to the picture). Then make the solenoid fastened by tighten screw bolts. If the solenoid is changed from electric force open type to electric force closed type, the only thing needed to be done is loose the screw bolt, and rotate solenoid 180° to transform port 4 from port 2.

(b) The installation of signal switch box:

The signal switch box is used to send the valve position and the actuator position signal to the control system. Approach of installation (refer to the picture), after coupled pneumatic actuator (3) with the signal switch box (1) and yoke. Fix them by using 4 screws.

(c) Electric force valve localizer installation:

This is only designed for adjusting type, and can be applied under double action or spring return (single action), the input and output signals are 4-20mA. Approach of installation (refer to the picture), pneumatic actuator (3) assemble with the electric force localizer (2) and yoke. Driving axes which have the NAMUR groove connect with the feedback shaft, and fixed by (4) bolts. By doing these, it can achieve the purpose of adjusting control.



ZT SERIES PNEUMATIC ACTUATOR**TROUBLE SHOOTING**

Before disassembling actuator for any reason, consult rebuilding instructions contained in following section:

I. For solenoid controlled actuators:

A. If actuator does not function, check to ascertain:

1. That valve is free to rotate. This can be done as described above in Manual Operation.
 2. That actuator is the correct size.
 3. That speed control screws are loose (if screws are tightened all the way, actuator will not operate).
 4. That correct voltage is supplied to solenoid.
 5. That sufficient air supply is available at inlet to control block. Inlet pressure to control block should be at least 40 psig for double-acting, 80 psig for spring-return (unless a reduced spring complement is installed (fewer springs)).
- When checking supply pressure, place gage in line at control block inlet and monitor gage for unexpected pressure drops.

B. If proper voltage and air pressure have been verified and valve is free, proceed as follows:

1. Turn on signal voltage. Check solenoid for clicking sound.
2. If no sound is detected, remove air pressure and turn off signal voltage.
 - a. Carefully unscrew solenoid and solenoid stem from block.
 - b. Reapply signal voltage and observe solenoid plunger. If it does not retract, replace solenoid.

C. If the actuator functions but exhibits leakage, or power loss accompanied by leakage, proceed as follows:

1. Check voltage. Voltage must be within 10% of the specified voltage (low voltage will cause leakage out of the back of the solenoid and burn out the coil).
2. Check air supply. Be certain that no sharp air pressure drops occur as unit is cycled. Loss of air pressure can cause incomplete shifting of the spool valves used in all double-acting units, which results in bypass leakage and substantial actuator torque losses.
3. If air supply and voltage are adequate, proceed as follows:
 - a. If leak is at solenoid exhaust port, replace the solenoid.
 - b. If leak occurs at exhaust ports in the block itself, the trouble will be in either the spool valves in the block, or at one of the piston seals of the actuator. A leaking piston seal will usually leak on either cycle. On spring-return actuators, piston seal leakage will show at the breather port of the end cap, or for 0539, the solenoid block interface plate. The recommended procedure in the cases above is to replace the spool valve O-rings. If the leakage persists, rebuild the actuator using a factory-supplied repair kit.

II. For actuators without the solenoid control block, or if block and solenoid are operating correctly, remove the actuator from the valve, disassemble (per Rebuilding Instructions) and check the following:

A. Make sure that all internal porting is free and clear of any obstructions. End caps, guide rods and pistons are air transporting components.

ZT SERIES PNEUMATIC ACTUATOR

NOTE: The most common problem encountered on actuators is the improper replacement of the piston guide rod assembly with the hole in it, relative to the nameplate on the body.

B. Make certain that the actuator has lubrication, and that there is no solidified grease between the pinion and the piston racks.

1. If actuator has no lubrication, apply generous amount of grease. If actuator is prepared for high or low temperature operation, consult Factory for proper lubricants.

2. If solidified grease between the pinion and the piston racks is present, clean, dry, re-grease and reassemble.

C. Verify that actuator pinion shaft and/or pistons are not bound. If bound, reassemble per Rebuilding Instructions.

D. If unit exhibits excessive amounts of backlash, check teeth on piston racks for wear. If worn, replace piston assemblies.

E. In spring-return actuators, check for misplaced or broken springs. If springs are broken, check body bore for scoring.

1. If springs are broken, replace springs. SPRINGS SHOULD ALWAYS BE REPLACED IN COMPLETE SETS.

2. If body bore is scored, replace it. Also, replace piston O-rings (contained in repair kit).

F. If actuator is free, valve is free and control block (if used) is shifting air properly, reassemble the actuator and retest. If unit still fails to operate, consult Factory for assistance.

INSTALLATION INSTRUCTION

Please read the below instructions carefully before you install the pneumatic actuator, and be careful about these technical parameters: connecting size, output torque, travel range adjusting, air consumption, operation time, rotating direction, weight and so on.

Please clean the air pipe inlet (such as scrap iron and welding slag), before connect with the pneumatic actuator.

Pneumatic actuator can be installed in any angle without affecting its function.

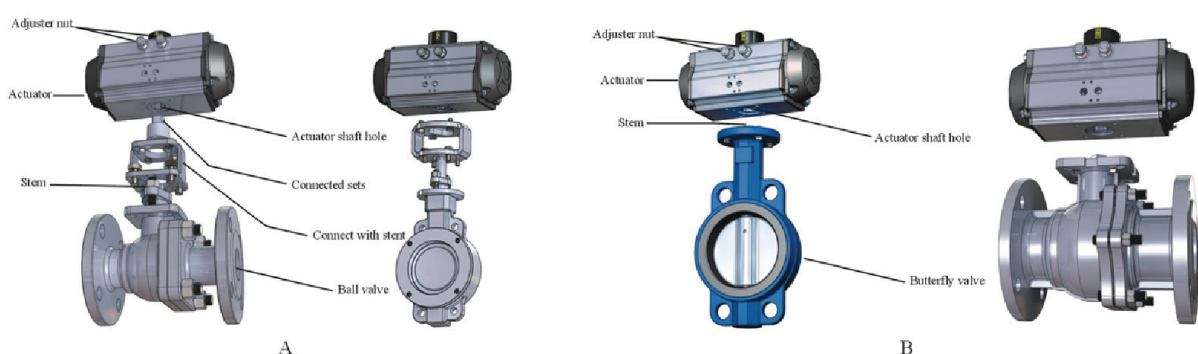
Before installing pneumatic actuator on the valve, it is necessary to ensure that actuator open/closed position and the valve open/closed position are matching with each other.

There are two types of assembly (refer to the pictures)

A. Assemble by using yoke and connector, and also can connect the extended stem through the shaft hole.

B. Fix directly, and connect with the flange which according ISO5211 international standard. Then the shaft inserted into the shaft hole.

All parts are needed to be assembled precisely. If not, it will lead to the valve leakage.



AW SERIES PNEUMATIC ACTUATOR**INTRODUCTION**

The AW Series heavy duty scotch yoke pneumatic actuators are consisted of symmetrical and canted type and offer complete modular systems. By applying to double acting and spring return configuration, our compact AW Series can be suited for torque outputs of any valve such as ball, butterfly, plug valves and other quarter turn mechanism. And AW Series are also designed to use with Hydraulic override, Limit Switches, Solenoid Valve and Positioner by built-in air tubing at the factory. The products were designed in conformity with JIS standard, and the connection dimension is conformity with standard ISO5211.

SPECIFICATION**■ Range of pressure:**

Double Acting: Min air pressure: 0.3Mpa

Max air pressure: 0.7Mpa.

Spring return: Min air pressure: 0.4Mpa

Max air pressure: 0.7Mpa.

■ Range of temperature:

(1) Standard temperature: -20°C to + 80°C

(2) High temperature: 0°C to + 180°C

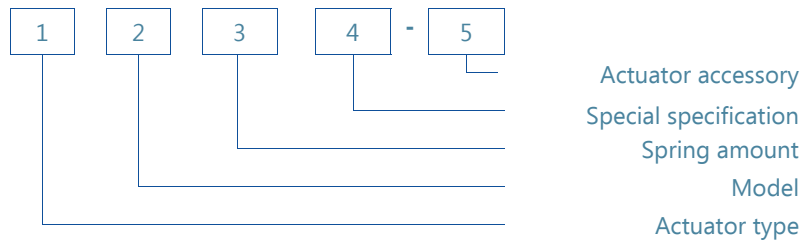
(3) Low temperature: -45°C to + 60°C

(4) Operating media: filtered dry or lubricated air



AW SERIES PNEUMATIC ACTUATOR

ORDERING GUIDE



1. Actuator type

Pneumatic actuator type
AW

2. Model specification

Type	Model specifications						
AW	13	17	20	28	35	40	60

3. Mode of action

Type	Mode of action		
/	Double action		0.3-0.7Mpa
S	Single action normal type		0.4-0.7Mpa
L	Single action low pressure type	Working pressure	AW13L: 0.25-0.4Mpa AW17L: 0.23-0.36Mpa AW20L: 0.28-0.46Mpa AW28L: 0.24-0.39Mpa

4. Special specification

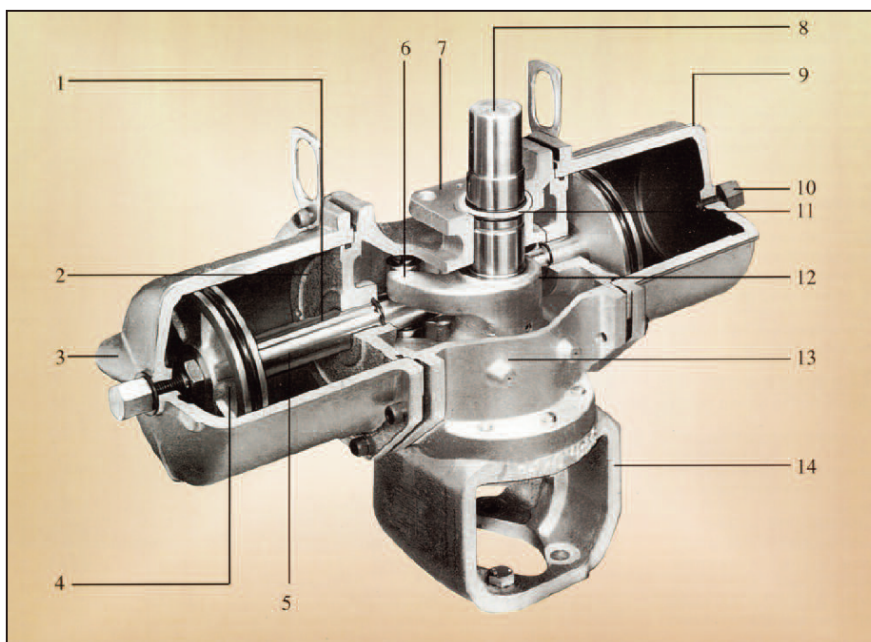
Type	Special specification
/	Normal type (Temperature: -20°C ~+80°C)
A	Direct acting
B	Stainless steel nut and bolt
C	Control
F	High frequency
K	High temperature
T	Low temperature
N	Air Conditioning NPT
Q	High speed (AW, AW-S)

5. Actuator accessories

Type	Actuator accessories
/	No actuator accessory
L	With limit switch box
H	For double acting with manual lever (AW13)
HG	For Double acting with manual gear box (AW17, AW20, AW28)
HW	For single acting with outside wheel (AW-S)

AW SERIES PNEUMATIC ACTUATOR

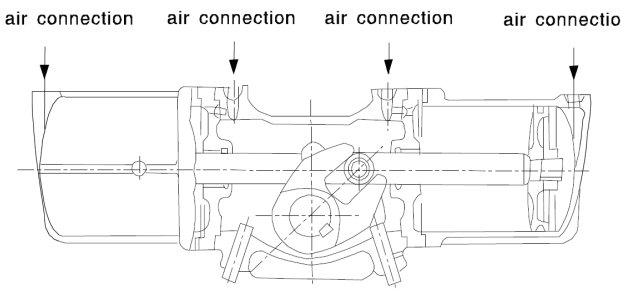
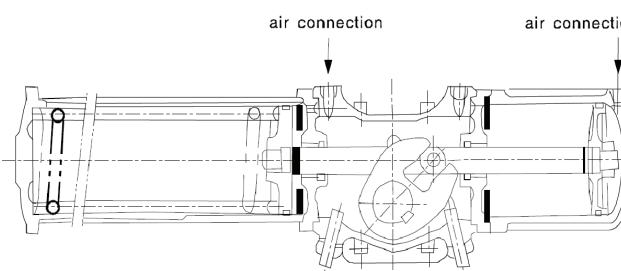
PARTS LIST



Item	Description and Function
1	P.T.F.E Bearing with low friction coefficient
2	Adaptor
3	Air connection Rc 1/4" 3/8" 1/2"
4	Piston rugged Aluminium Alloy
5	Carbon steel n/hard chrome plated piston Rod
6	Hand surfaced. Carbon Alloy steel pin and Roller
7	Mounting Plate for manual Gear
8	Stem carbon steel n/hard chrome plated
9	The Inner Piston cylinder is carbon steel, ENP lined
10	Externally adjustable stop bolt
11	O-ring (viton)
12	Rugged ductile iron scotch yoke converts linear piston
13	Compact rugged Ductile iron or steel body
14	Scotch yoke

AW SERIES PNEUMATIC ACTUATOR

PNEUMATIC ACTUATOR STRUCTURE FEATURE

Type	Structure feature
AW	 Double action pneumatic actuator has high output torque Working pressure:0.3-0.7Mpa
AW-S	 Single action pneumatic actuator is more safe and reliable. Normal type working pressure: 0.4-0.7Mpa

AIR CONSUMPTION

Momentary Flow rate: Q_p, Q_s

Double action: $Q_p = A \{ (P+0.1) / 0.1 \} 60 /$

Single action: $Q_s = B \{ (P+0.1) / 0.1 \} 60 /$

Air consumption: V_p, V_s

Double action $V_p = (A+B) \{ (P+0.1) / 0.1 \} n$

Single action $V_s = B \{ (P+0.1) / 0.1 \} n$

Remarks:

Q_p = Momentary flow rate of double action type (L/min)

Q_s = Momentary flow rate of single action type (L/min)

V_p = Air consumption of double action type (L)

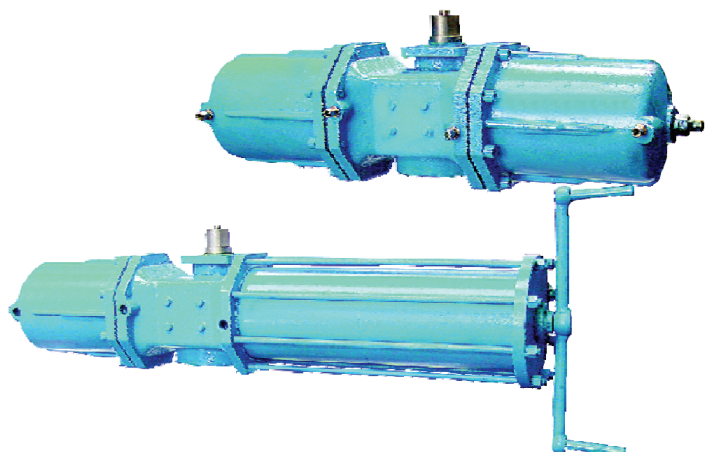
V_s = Air consumption of single action type (L)

A,B= Cylinder capacity (L)

P= Operation pressure (Mpa)

T= Operation time (Sec)

n= Operation time within a certain period



AW SERIES PNEUMATIC ACTUATOR
OUTPUT TORQUE OF DOUBLE ACTION PNEUMATIC ACTUATOR

Model	Air Pressure (Mpa)				
	0.3	0.4	0.5	0.6	0.7
AW13	515	620	770	930	1080
AW17	950	1270	1590	1910	2230
AW20	2150	2870	3580	4300	5020
AW25	3360	4480	5600	5720	7850
AW28	5150	6860	6560	10300	12020
AW35	10120	13500	16870	20250	23620
AW40	13220	17630	22040	26450	30860
AW50	22460	29950	37440	44930	52420
AW60	47300	63070	78840	94510	110380

OUTPUT TORQUE OF SINGLE ACTION PNEUMATIC ACTUATOR

Model	Spring torque		Air Pressure (Mpa)					
			0.4		0.5		0.6	
	Min	Max	Min	Max	Min	Max	Min	Max
AW13S	230	430	165	340	340	646	490	700
AW17S	330	670	600	930	920	1290	1230	1573
AW20S	1190	1960	880	1670	1600	2390	2320	3110
AW25S	1600	2510	1970	2660	3090	4000	4210	5120
AW28S	2900	5610	1250	3960	2970	5665	4680	7400
AW35S	5520	10740	2760	7970	6130	11340	9610	14720
AW40S	8770	14400	3240	8860	7650	13260	12060	17670
AW50S	13110	27490	6370	20760	14840	29220	23310	37700

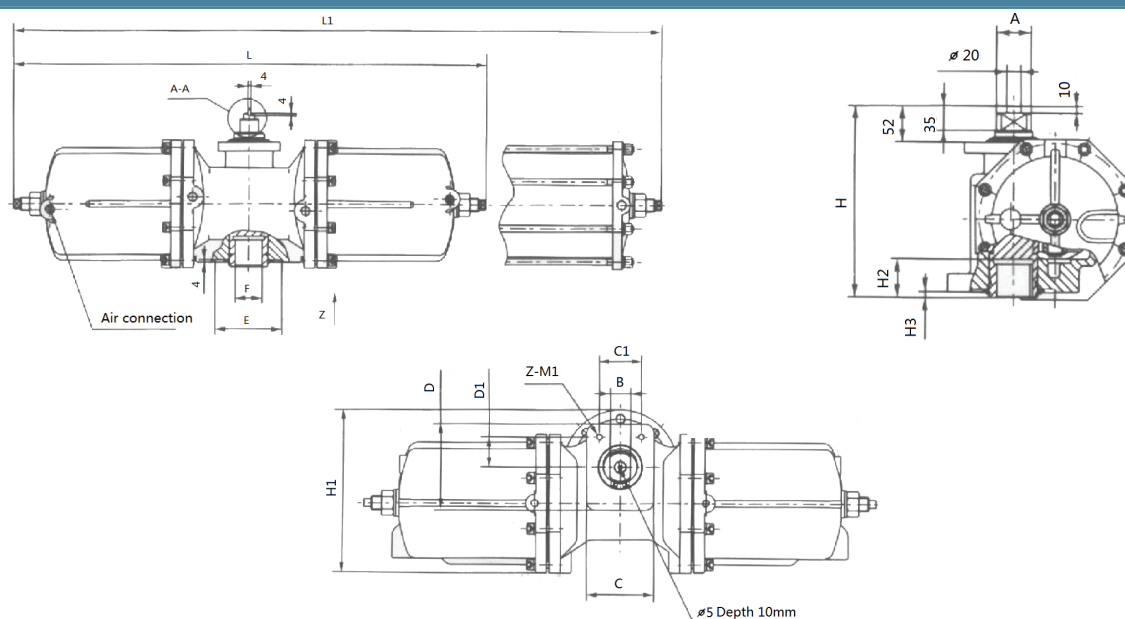
CYLINDER VOLUME AND ACTUATOR WEIGHT

Model		AW13	AW17	AW20	AW25	AW28	AW35	AW40	AW50	AW60
Cylinder volume (L)	Double action	6.5	14.8	30.8	48.5	73	146.2	193.2	350	630
	Single action	3.25	7.15	15.4	24.2	36.5	74.1	96.1	175	315
Actuator weight (kg)	Double action	48	82	170	195	325	600	800	1070	1580
	Single action	65	116	223	260	450	845	1070	1400	

AW SERIES PNEUMATIC ACTUATOR

OUTER DIMENSION DRAWING

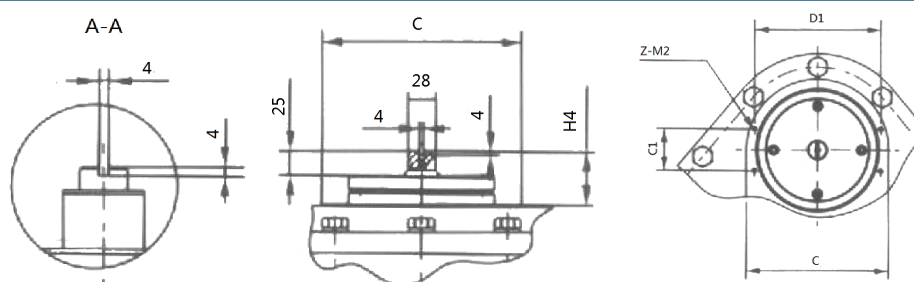
DOUBLE ACTION AND SINGLE ACTION OUTER DIMENSION DRAWINGS



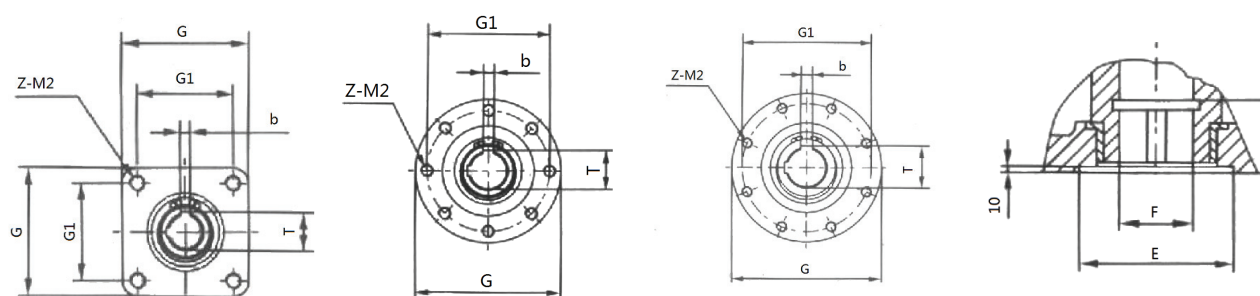
Note: L dimension is for the double action pneumatic actuator, and L1 dimension is for the single action pneumatic actuator.

CONNECTION DIMENSION DRAWINGS

THE TOP OF THE PNEUMATIC ACTUATOR CONNECTION DIMENSION DRAWINGS (DETAIL A-A)



THE BOTTOM OF THE PNEUMATIC ACTUATOR CONNECTION DIMENSION DRAWINGS (DETAIL Z)



Note: The detail A-A and detail Z source please refer the drawing of outer dimensions drawings.

AW SERIES PNEUMATIC ACTUATOR

DIMENSION

Model	AW13/ AW13S	AW17/ AW17S	AW20/ AW20S	AW25/ AW25S	AW28/ AW28S	AW35/ AW35S	AW40/ AW40S	AW50/ AW50S	AW60
L	627	850	1158	1158	1443	1880	1880	2350	2800
L1	850	1120	1495	1630	1955	2520	2520	3280	/
H	228	275	326	326	396	440	490	500	700
H1	200	270	350	375	460	545	670	680	820
H2	46	55	67	67	80	116	116	144	172
H3	7	8	12	12	11	/	/	/	/
H4	/	/	/	/	/	/	54	54	54
A	42	50	64	64	85	/	/	/	/
B	28	34	44	44	55	/	/	/	/
C	85	112	137	137	160	203	203	230	256
D	95	143	157	157	170	/	/	/	/
C1	70	70	100	100	100	160	160	195	234
D1	35	50	60	60	60	60	60	80	80
Z-M1	2-M8	2-M10	2-M10	2-M10	2-M10	4-M6	4-M6	4-M6	4-M6
E	Φ80	Φ120	Φ140	Φ140	Φ220	Φ220	Φ220	Φ280	Φ280
F	Φ34	Φ48	Φ60	Φ60	Φ70	Φ105	Φ105	Φ120	Φ140
G	Φ132	Φ190	Φ232	Φ232	Φ318	Φ350	Φ350	Φ400	Φ500
G1	Φ100	Φ160	Φ200	Φ200	Φ280	Φ300	Φ300	Φ350	Φ450
Z-M2	4-M16	8-M16	8-M16	8-M16	8-M20	8-M24	8-M24	12-M24	12-M27
b	10	14	18	18	20	28	28	32	36
T	37.3	51.8	64.4	64.4	74.9	117.8	117.8	127.4	148.5
Air connection	4-G1/4	4-G3/8	4-G3/8	4-G3/8	4-G3/8	4-G1/2	4-G1/2	4-G1/2	4-G1/2

AW SERIES PNEUMATIC ACTUATOR**FEATURE**

Double action

1. The output characteristics of scotch yoke constructive pneumatic apply with the large size valves.
2. The cylinder is separated from the scotch yoke, and this structure lead low air consumption.
3. The double cylinders and double pistons can support high output torque.
4. The double action pneumatic actuator is smaller volume than the single action

Single action (spring return)

1. When the electric power supply is suddenly stopped, the single action pneumatic actuator still can operate the valve on/off by spring torque.
2. The actuator is more safe and steady.

TROUBLESHOOTING

Before disassembling actuator for any reason, consult rebuilding instructions contained in following section:

I. For solenoid controlled actuators:

A. If actuator does not function, check to ascertain:

1. That valve is free to rotate. This can be done as described above in Manual Operation.
 2. That actuator is the correct size.
 3. That speed control screws are loose (if screws are tightened all the way, actuator will not operate).
 4. That correct voltage is supplied to solenoid.
 5. That sufficient air supply is available at inlet to control block. Inlet pressure to control block should be at least 40 psig for double-acting, 80 psig for spring-return (unless a reduced spring complement is installed (fewer springs)).
- When checking supply pressure, place gage in line at control block inlet and monitor gage for unexpected pressure drops.

B. If proper voltage and air pressure have been verified and valve is free, proceed as follows:

1. Turn on signal voltage. Check solenoid for clicking sound.
2. If no sound is detected, remove air pressure and turn off signal voltage.
 - a. Carefully unscrew solenoid and solenoid stem from block.
 - b. Reapply signal voltage and observe solenoid plunger. If it does not retract, replace solenoid.

C. If the actuator functions but exhibits leakage, or power loss accompanied by leakage, proceed as follows:

1. Check voltage. Voltage must be within 10% of the specified voltage (low voltage will cause leakage out of the back of the solenoid and burn out the coil).

AW SERIES PNEUMATIC ACTUATOR

2. Check air supply. Be certain that no sharp air pressure drops occur as unit is cycled. Loss of air pressure can cause incomplete shifting of the spool valves used in all double-acting units, which results in bypass leakage and substantial actuator torque losses.

3. If air supply and voltage are adequate, proceed as follows:

- a. If leak is at solenoid exhaust port, replace the solenoid.
- b. If leak occurs at exhaust ports in the block itself, the trouble will be in either the spool valves in the block, or at one of the piston seals of the actuator. A leaking piston seal will usually leak on either cycle. On spring-return actuators, piston seal leakage will show at the breather port of the end cap, or for 0539, the solenoid block interface plate. The recommended procedure in the cases above is to replace the spool valve O-rings. If the leakage persists, rebuild the actuator using a factory-supplied repair kit.

II. For actuators without the solenoid control block, or if block and solenoid are operating correctly, remove the actuator from the valve, disassemble (per Rebuilding Instructions) and check the following:

A. Make sure that all internal porting is free and clear of any obstructions. End caps, guide rods and pistons are air transporting components.

NOTE: The most common problem encountered on actuators is the improper replacement of the piston guide rod assembly with the hole in it, relative to the nameplate on the body.

B. Make certain that the actuator has lubrication, and that there is no solidified grease between the pinion and the piston racks.

1. If actuator has no lubrication, apply generous amount of grease. If actuator is prepared for high or low temperature operation, consult Factory for proper lubricants.

2. If solidified grease between the pinion and the piston racks is present, clean, dry, re-grease and reassemble.

C. Verify that actuator pinion shaft and/or pistons are not bound. If bound, reassemble per Rebuilding Instructions.

D. If unit exhibits excessive amounts of backlash, check teeth on piston racks for wear. If worn, replace piston assemblies.

E. In spring-return actuators, check for misplaced or broken springs. If springs are broken, check body bore for scoring.

1. If springs are broken, replace springs. SPRINGS SHOULD ALWAYS BE REPLACED IN COMPLETE SETS.

2. If body bore is scored, replace it. Also, replace piston O-rings (contained in repair kit).

F. If actuator is free, valve is free and control block (if used) is shifting air properly, reassemble the actuator and retest. If unit still fails to operate, consult Factory for assistance.