

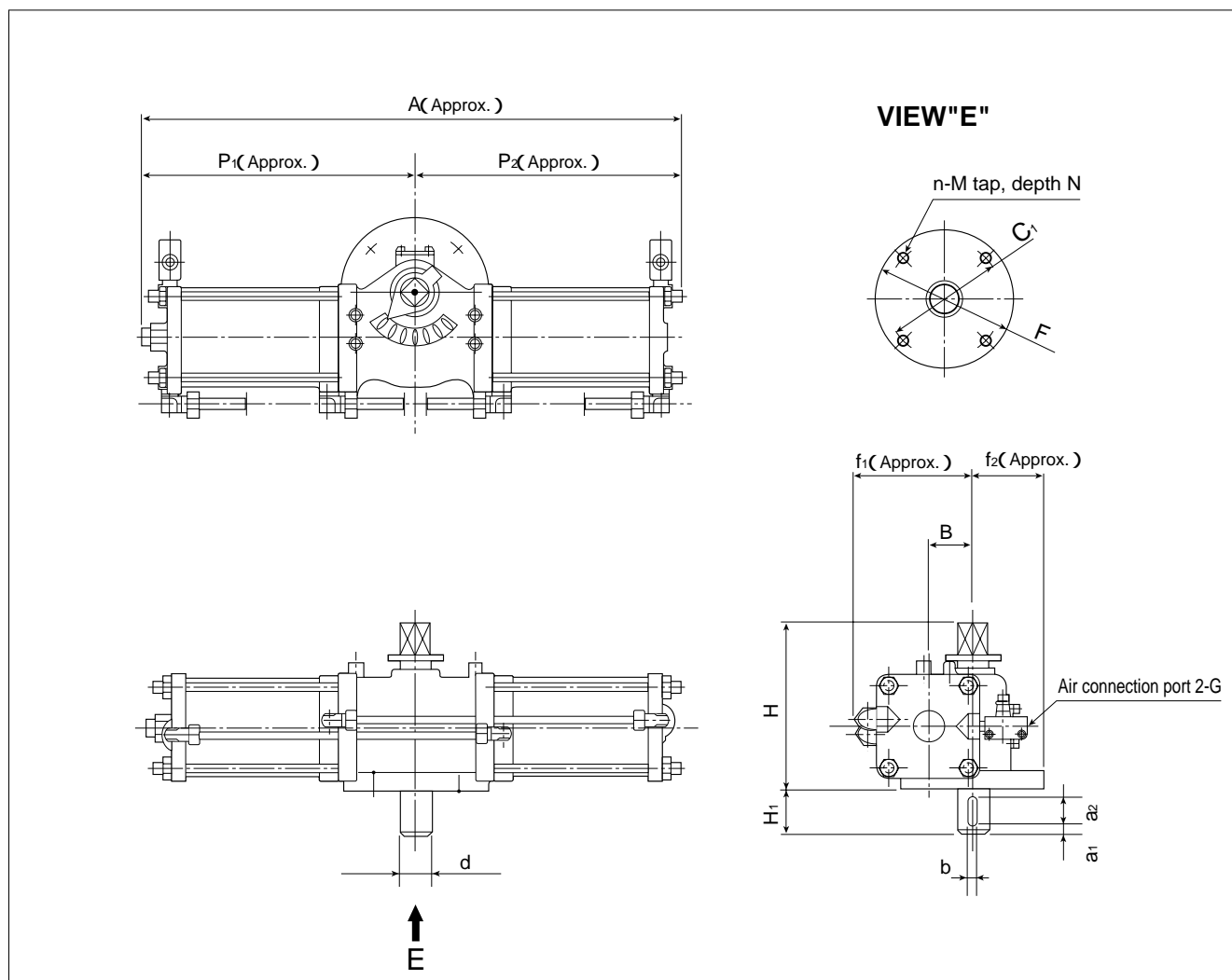
TGA

The TGA model is a double-action pneumatic actuator perfect for on/off control of the various types of butterfly valves. With an optional positioner, it can also be used for flow rate control. It mainly used for the medium to large-sized valves of size 350mm or more. The operation principle is that air pressure forces the piston inside the cylinder into a linear reciprocating motion, causing the trunnion coupled to the rod to drive the arm and rotate the output shaft.



TGA Specifications							
	TGA-125	TGA-140	TGA-160	TGA-180	TGA-200	TGA-220	TGA-250
Output torque (N·m) (When supply pressure is 0.4 MPa and rotation angle is 0 °or 90 °)	1270	1860	2750	3800	5300	7200	12000
Supply pressure (MPa)	0.4 to 0.7						
Body shell max (MPa)	1.0						
Rotating angle	- 2 to +90						
Port size	Rc3/8				Rc1/2		
Operating fluid	Dry air						
Ambient temperature / supply air temperature	0 to 80 ℃ / 0 to 60 ℃ (Non-freezing)						
Rotating speed range (sec.)	5 to 15						
Coating	Epoxy primer finish (Munsell N7)						

TGA Outer Dimensions

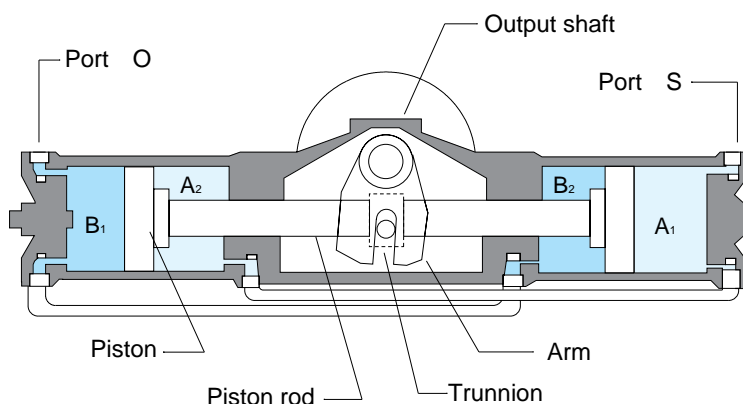


TGA Dimensions

Type	Dimension (mm)																		Approx. Mass (kg)
	A	P ₁	P ₂	f ₁	f ₂	B	H	H ₁	d	b	a ₁	a ₂	F	C1	n	M	N	G	
TGA-125	743	381	362	164	100	62	234	45	40	12	2	40	200	170	4	M16	20	Rc3/8	32
TGA-140	810	417	393	180	100	70	282	60	45	12	2	55	200	170	4	M16	20	Rc3/8	45
TGA-160	939	483	456	202	130	80	310	61	60	15	2	55	260	220	4	M20	25	Rc3/8	91
TGA-180	1053	543	510	218	130	90	323	65	65	18	2	60	260	220	4	M20	25	Rc3/8	122
TGA-200	1163	599	564	253	160	100	370	70	75	20	2	65	320	280	8	M20	25	Rc1/2	174
TGA-220	1248	642	606	270	160	110	400	85	75	20	2	80	320	280	8	M20	25	Rc1/2	198
TGA-250	1381	707	674	299	160	125	433	100	75	20	2	95	320	280	8	M20	25	Rc1/2	261

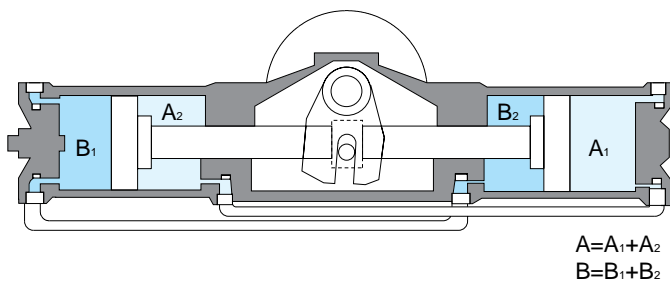
TGA Operation principle

As chambers A1 - A2 and B1 - B2 are connected through copper tubes as shown in the figure at left (single-acting cylinder is provided only with chambers A2 and B1), feeding air into port "S" will generate a thrust to push the piston toward the left. The linear motion of the piston is converted to a clockwise rotary motion of the output shaft through the trunnion. Residual air in chamber B is exhausted through port "O". Feeding air to port "O" causes the reverse of the action described above, rotating the output shaft counter-clockwise.



TGA Air consumption

Type	Cylinder capacity (ℓ)	
	A (O S)	B (S O)
TGA-125	3.629	3.629
TGA-140	5.113	5.113
TGA-160	7.713	7.713
TGA-180	10.847	10.847
TGA-200	14.730	14.730
TGA-220	20.229	20.229
TGA-250	29.278	29.278



(1) Required air consumption

Double-acting type

$$VD = (A+B) \left(\frac{P-0.1013}{0.1013} \right) N$$

Single-acting type

$$VS = (A \text{ or } B) \left(\frac{P+0.1013}{0.1013} \right) N$$

VD : Double-acting type cylinder air consumption (Nℓ)

VS : Single-acting type cylinder air consumption (Nℓ)

A, B : Cylinder capacity (ℓ)

P : Working pressure (Mpa)

N : Operating frequencies in a given time (1 round trip=1)

(2) Air consumption within a unit time

Double-acting type $CD = \frac{VD}{t}$

Single-acting type $CS = \frac{VS}{t}$

CD : Double-acting type cylinder air consumption (Nℓ/sec)

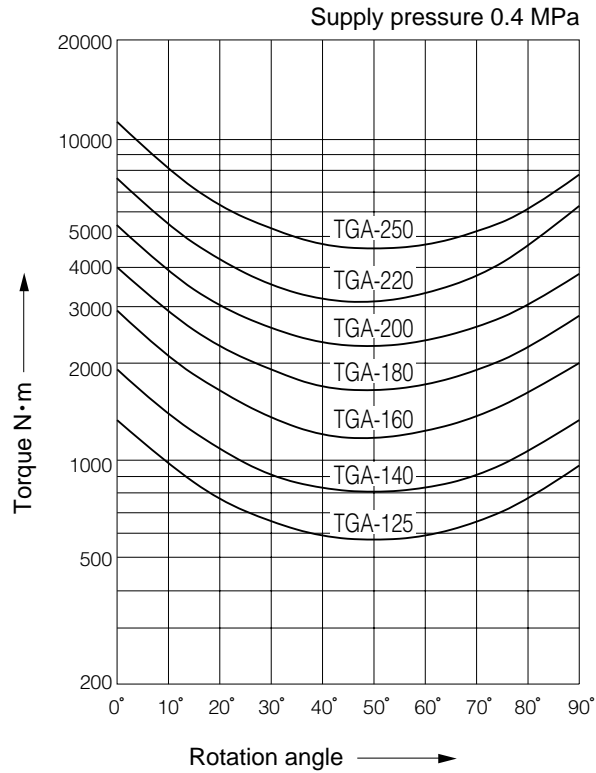
CS : Single-acting type cylinder air consumption (Nℓ/sec)

t : Unit time (sec)

Remark: The compressor should have a larger capacity than the air consumption calculated above in (1) and (2).

TGA Output torque curve

Double-acting type (TGA)



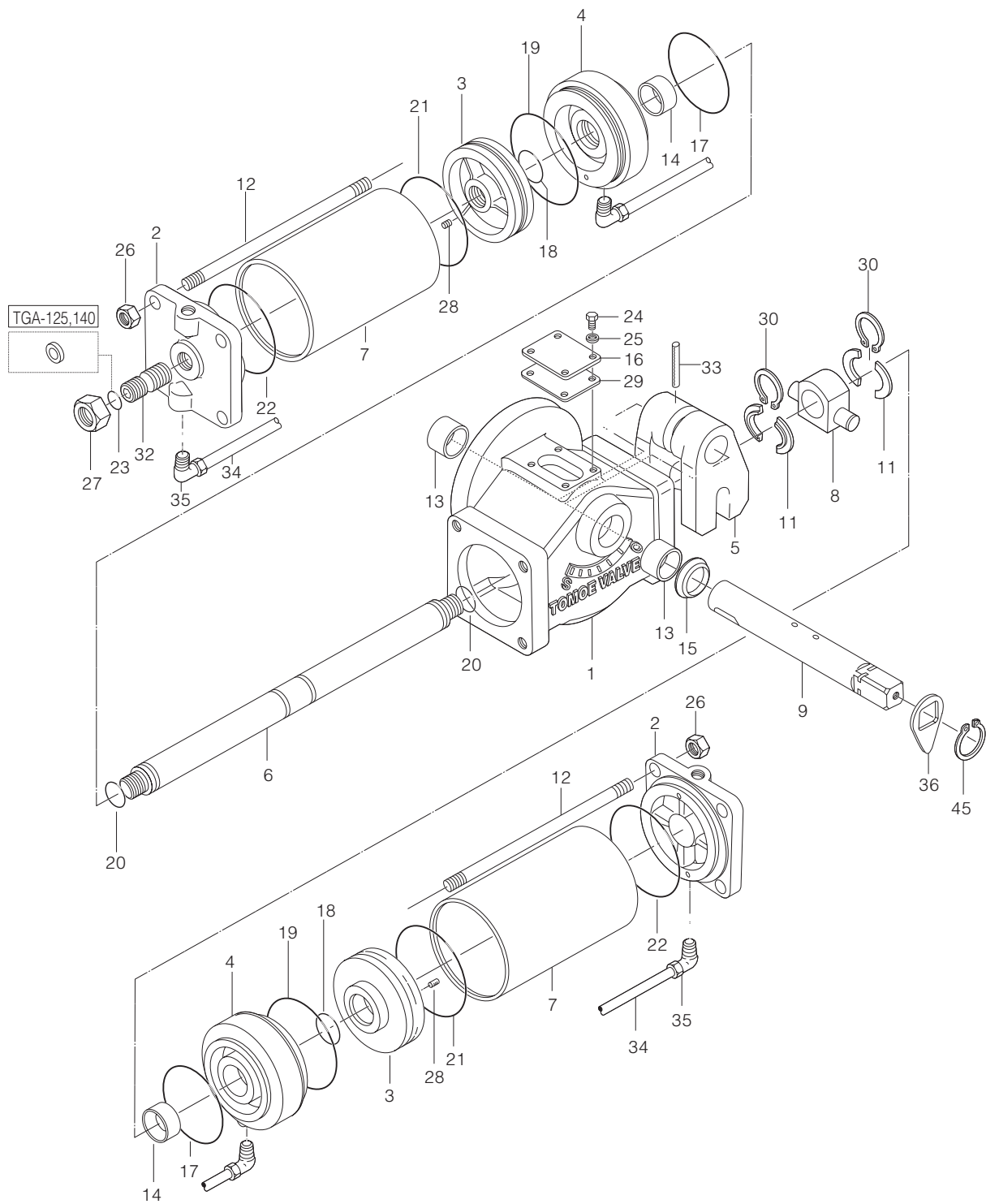
1. The table shows the torque at an operating air pressure of 0.4MPa .
2. Output torque for an operating air pressure of PMPa is given by: $P=P/4 \times$ torque value obtained from the table.

TGA Output torque

Type	Supply pressure (MPa)			
	0.4	0.5	0.6	0.7
TGA-125	1270	1588	1905	2223
TGA-140	1860	2325	2790	3255
TGA-160	2750	3438	4125	4813
TGA-180	3800	4750	5700	6650
TGA-200	5300	6625	7950	9275
TGA-220	7200	9000	10800	12600
TGA-250	12000	15000	18000	21000

TGA Expanded view of component

TGA-125 to 160



TGA Parts list

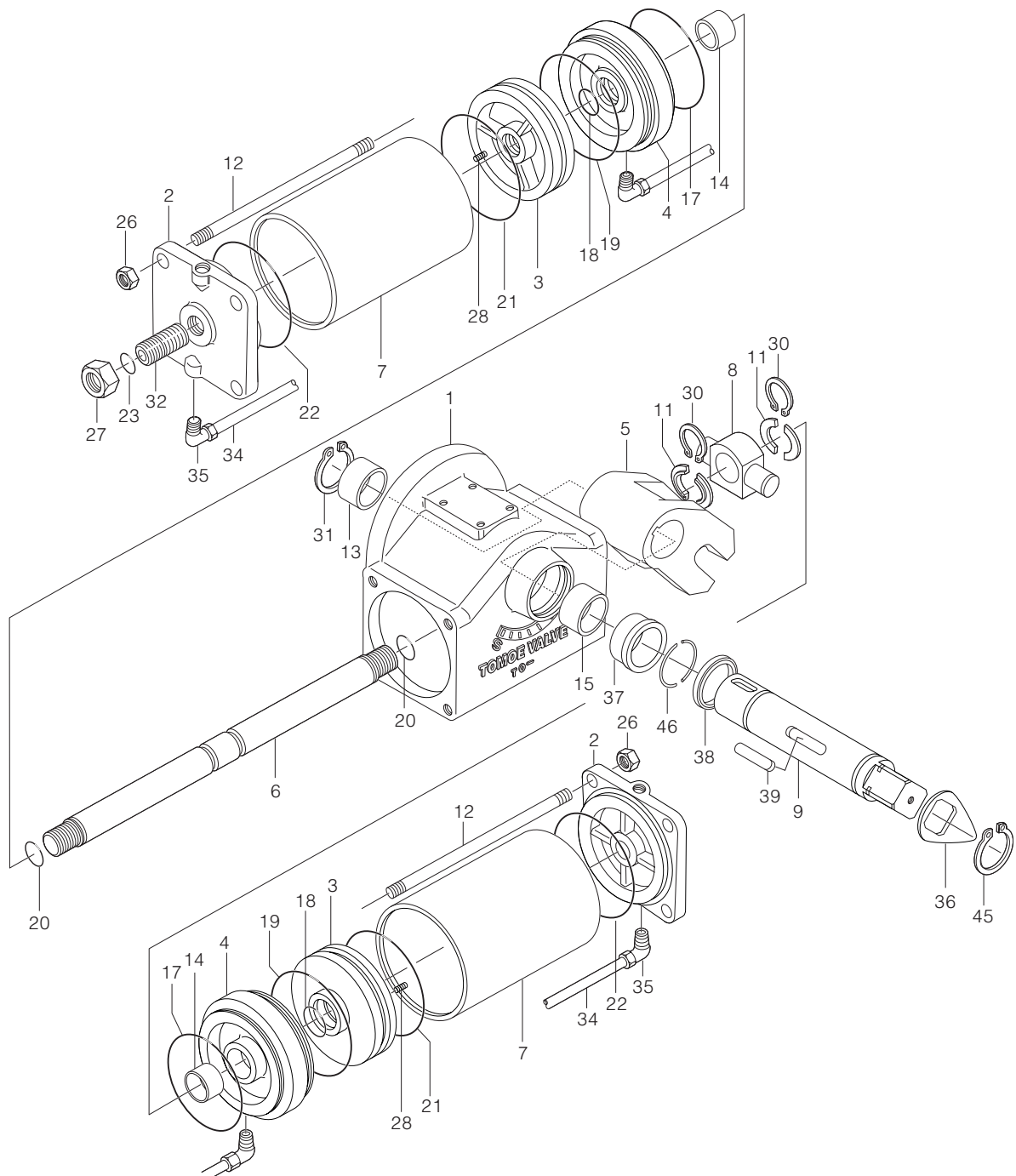
TGA-125 to 160 parts list (double-acting type)

No.	Description	Q'ty	Remarks
1	Body	1	
2	End cover	2	
3	Piston	2	
4	Rod cover	2	
5	Arm	1	
6	Piston rod	1	
7	Case	2	
8	Trunnion	1	
9	Shaft	1	
11	Rings	Set of 2	
12	Tie rod	8	
13	Bush	2	
14	Bush	2	
15	V-ring	1	
16	Cover	1	
17	O-ring	2	
18	O-ring	2	
19	O-ring	2	
20	O-ring	2	
21	O-ring	2	
22	O-ring	2	
23	Seal washer	1	TGA-125, 140
	O-ring		TGA-160
24	Hexagon bolt	4	
25	Spring washer	4	
26	Hexagon nut	8	
27	Lock nut	1	
28	Screws	2	
29	Gasket	1	
30	C-retainer	2	
32	Stopper bolt	1	
33	Spring pin	2	TGA-125
		4	TGA-140, 160
34	Copper pipe	2	
35	Pipe coupler	4	
36	Indicator	1	
45	C-retainer	1	

Remark: Parts with a "star" before the part number are recommended replacement parts. To order as a set, please specify O-ring set.

TGA Expanded view of component

TGA-180 to 250



TGA Parts list

TGA-180 to 250 parts list (double-acting type)

No.	Description	Q'ty	Remarks
1	Body	1	
2	End cover	2	
3	Piston	2	
4	Rod cover	2	
5	Arm	1	
6	Piston rod	1	
7	Case	2	
8	Trunnion	1	
9	Shaft	1	
11	Rings	Set of 2	
12	Tie rod	8	
13	Bush	1	
14	Bush	2	
15	Bush	1	
17	O-ring	2	
18	O-ring	2	
19	O-ring	2	
20	O-ring	2	
21	O-ring	2	
22	O-ring	2	
23	O-ring	1	
26	Hexagon bolt	8	
27	Lock nut	1	
28	Screws	2	
30	C-retainer	2	
31	C-retainer	1	
32	Stopper bolt	1	
34	Copper pipe	2	
35	Pipe coupler	4	
36	Indicator	1	
37	Bush	1	
38	Oil seal	1	
39	Key	1	
45	C-retainer	1	
46	Stop ring	Set of 1	

Remark: Parts with a "star" before the part number are recommended replacement parts. To order as a set, please specify O-ring set.

TGA Accessories

Accessory	Type	Manu- facturer	Part No.	Double-acting type						
				TGA-125	TGA-140	TGA-160	TGA-180	TGA-200	TGA-220	TGA-250
Five-port/2-position, non explosion-proof, solenoid valve	Single solenoid	Kuroda	PCS2408-MC					-	-	-
		Kuroda	PCS2415-MC	-	-	-	-			
	Double solenoid	Kuroda	PCD2408-MC					-	-	-
		Kuroda	PCD2415-MC	-	-	-	-			
Five-port/2-position, explosion-proof, solenoid valve	Single solenoid	Kaneko	MB15G-TMS							
	Double solenoid	Kaneko	MB15DG-TMS							
Filter regulator		SMC	AW30-03B-X490					-	-	-
		SMC	AW40-04B-2	-	-	-	-			
Limit switch	Non explosion-proof	Tomoe	TMS-BOX							
		Yamatake	1LS1-J							
		OMRON	WLCA2							
	Explosion-proof	Yamatake	1LX5001							
		Yamatake	VCX-5003							
Proximity switch	M18 shielded	OMRON	E2E-X7D1-N							
	M18 non-shielded	OMRON	E2E-X14MD1							
	M30 shielded	OMRON	E2E-X10D1-N							
Positioner	Electro-pneumatic	SSS	TCE2000							
		SMC	TP8100							
		Yamatake	AVP300							
	Pneumatic-pneumatic	SMC	IP5100							
Manual operating	Manual gear unit	Tomoe	MGC							
Stroke adjuster		Tomoe	-							
Speed controller		SMC	AS3000-03					-	-	-
		SMC	AS4000-04	-	-	-	-			
Solencer		SMC	AN200-02							
		SMC	AN300-03							
		SMC	AN400-04	-	-	-	-			
Lock-up valve		SMC	IL211-02							
Quick exhaust valve		SMC	AQ3000-03					-	-	-
		SMC	AQ5000-04	-	-	-	-			
Booster relay		SMC	IL100-03							

Remarks:

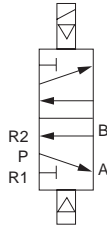
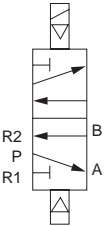
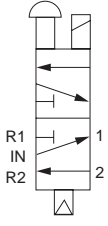
1. Symbols in table mean the following: : Standard accessory, : Installable, - : Un-installable
2. This table shows typical accessory combinations. Accessories not shown in this table can also be installed. For details, please consult us.

TGA Solenoid valves

Purpose

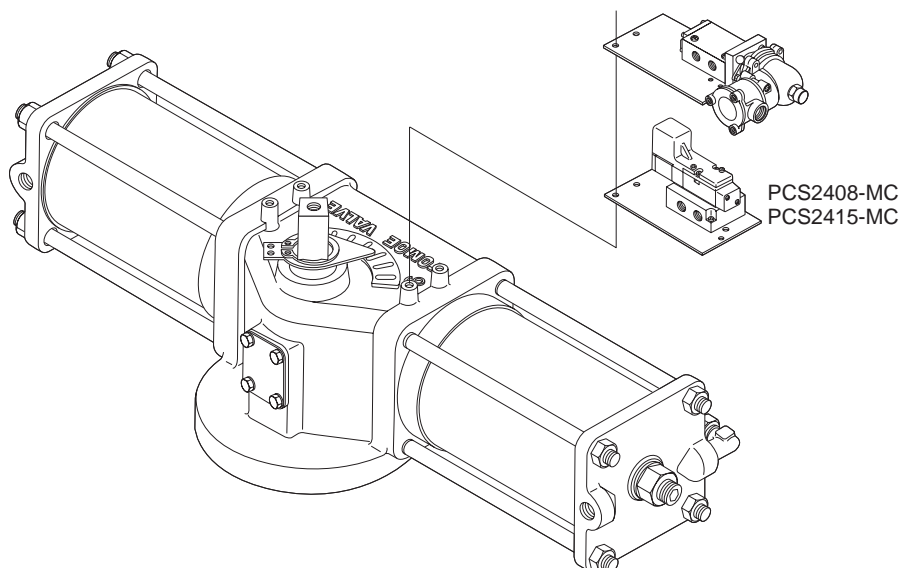
The purpose of a solenoid valve is to use electrical signals to remotely change the air flow to operate the valves.

Standard specifications

Item	Five-port/2-position, non explosion-proof, solenoid valve (single solenoid)	Five-port/2-position, non explosion-proof, solenoid valve (single solenoid)	Five-port/2-position, explosion-proof, solenoid valve (single solenoid)
Type	PCS2408-MC	PCS2415-MC	MB15G-10AE12PU-TMS
Manufacturer	Kuroda	Kuroda	Kaneko
JIS symbol			
Applicable cylinder type	TGA-125 to 180	TGA-200 to 250	TGA-125 to 250
Air connection port size	Rc3/8 (IN, OUT) Rc1/4 (EXH)	Rc1/2 (IN, OUT) Rc3/8 (EXH)	Rc3/8 (IN, OUT) Rc1/4 (EXH)
Effective sectional area	30mm ²	70mm ²	11mm ²
Rated voltage	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V, AC200V 50/60Hz AC110V, AC220V 60Hz DC24V
Explosion-proof construction	-	-	d2G4
Wiring method	Conduit terminal	Conduit terminal	Conduit terminal
Conduit entry	G1/2	G1/2	G1/2
Manual operating	Non lock bush type	Non lock bush type	Manual bottom lock type
Operating temperature	- 5 to 50 degrees C	- 5 to 50 degrees C	- 20 to 60 degrees C
Weight	0.46kg	0.85kg	1.24kg

Remark: The above are standard TOMOE-compatible solenoid valves. It is also possible to install solenoid valves other than those listed above such as a double solenoid or 3-port solenoid valve. For details, please consult us.

MB15G-10•AE12PU-TMS

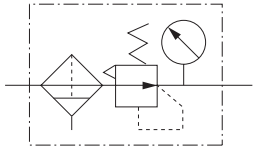
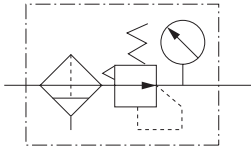


TGA Filter regulator (Pressure reducer with filter)

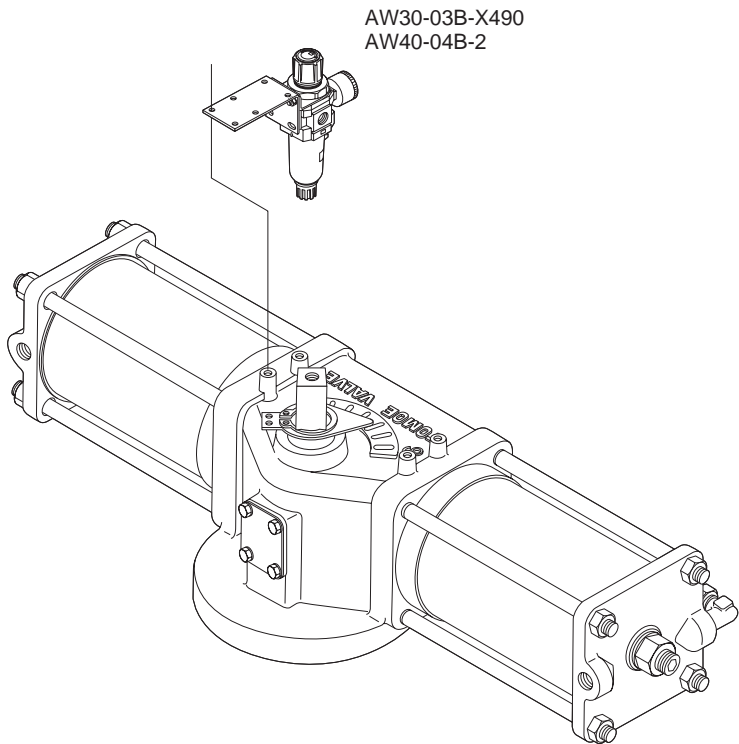
Purpose

Filter regulators are used to eliminate oil, water, and dust from the operating air in order to protect pneumatic accessories (solenoid valve and cylinder, etc.) and to keep operating pressure at an adequate and constant level (about 4 to 5 K).

Standard specifications

Type	AW30-03B-X490	AW40-04B-2
Manufacturer	SMC	SMC
JIS symbol		
Applicable cylinder type	TGA-125 to 180	TGA-200 to 250
Set pressure range	0.05 to .85MPa	0.05 to 0.85MPa
Pressure gauge connection port	Rc1/8	Rc1/4
Operating temperature	- 5 to 60 degrees C	- 5 to 60 degrees C
Air connection port size	Rc3/8	Rc1/2
Filtration	5μm	5μm
Option	Auto drain for low and high temperatures	Auto drain for low and high temperatures
Weight	0.79kg	1.52kg

Remark: The above are standard TOMOE-compatible filter regulators. It is also possible to install filter regulators other than those listed above. For details, please consult us.

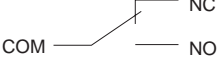
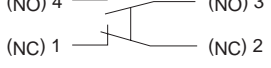
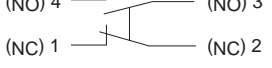
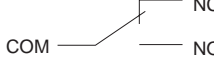


TGA Limit switches

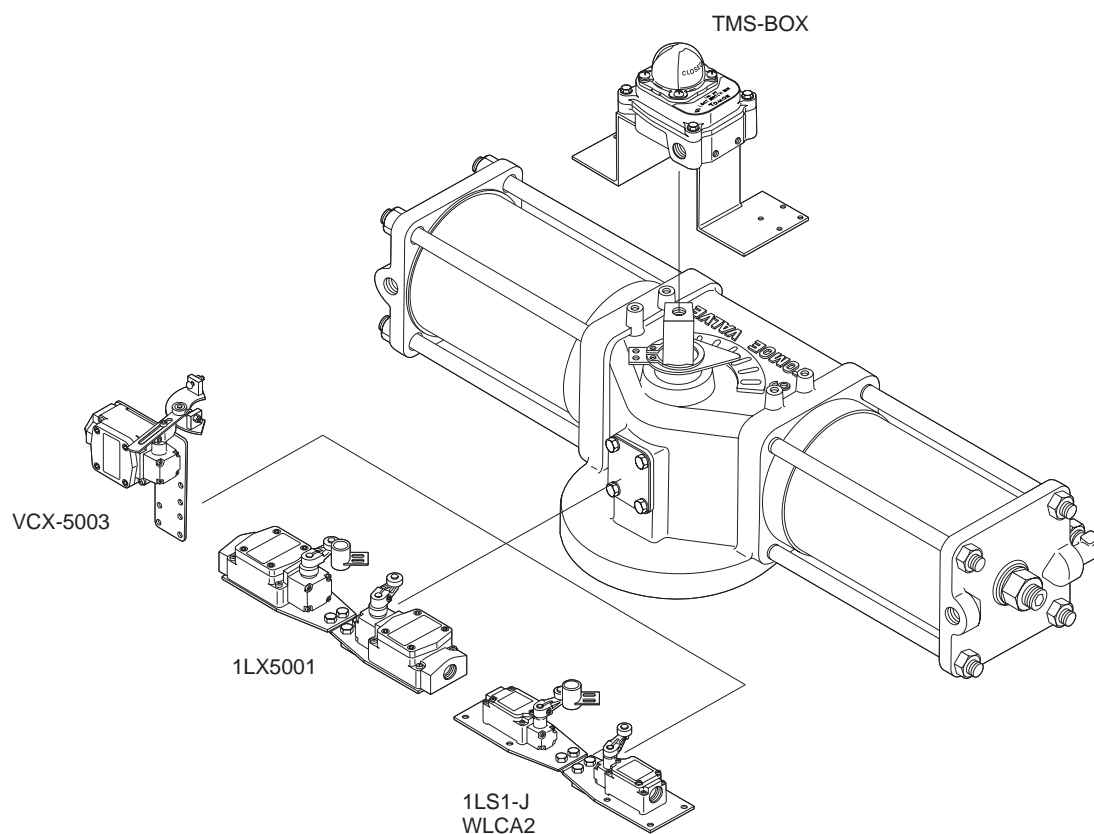
Purpose

Limit switches are used to convert the valve position (full close, full open, half open) into electric signals for lamp indication at a remote location.

Standard specifications

Type	TMS-BOX	1LS1-J WLCA2	1LX5001	VCX-5003
Manufacturer	Tomoe	Yamatake(1LS1-J) OMRON(WLCA2)	Yamatake	Yamatake
Circuit	Monopolar double-throw(1C, SPDT)X2 	Bipolar double interruption(1A1B, DPDT) 	Bipolar double interruption(1A1B, DPDT) 	Monopolar double-throw(1C, SPDT)X2 
Actuator	Hinge roller lever type	Roller lever type	Roller lever type	Adjustable roller lever type
Class of insulation	IP67(Option: Exd II BT6)	IP67	IP67, d2G4	IP67, d2G4
Rated voltage	AC250V-16A DC12V-0.6A	AC125V-10A AC250V-10A AC480V-10A DC125V-0.8A DC250V-0.4A	AC125V-5A AC250V-5A DC125V-0.8A DC250V-0.4A	AC250V-5A DC125V-0.8A DC250V-0.4A
Operating temperature	- 10 to 80 degrees C	- 10 to 80 degrees C	- 10 to 70 degrees C	- 10 to 70 degrees C
Conduit entry	2-G1/2	G1/2	G1/2	G3/4
Option	-	Heat, cold and corrosion resistant	Hydrogen anti-explosion (1LX5701)	Waterproof (VCL-5003)
Contacts	Switch detection with one (2 switches inside)	On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection	Switch detection with one (2 switches inside)
Weight	0.98kg	0.28kg	0.74kg	0.77kg

Remark: The above are standard TOMOE-compatible limit switches. It is also possible to install limit switches other than those listed above. For details, please consult us.



TGA Proximity switches

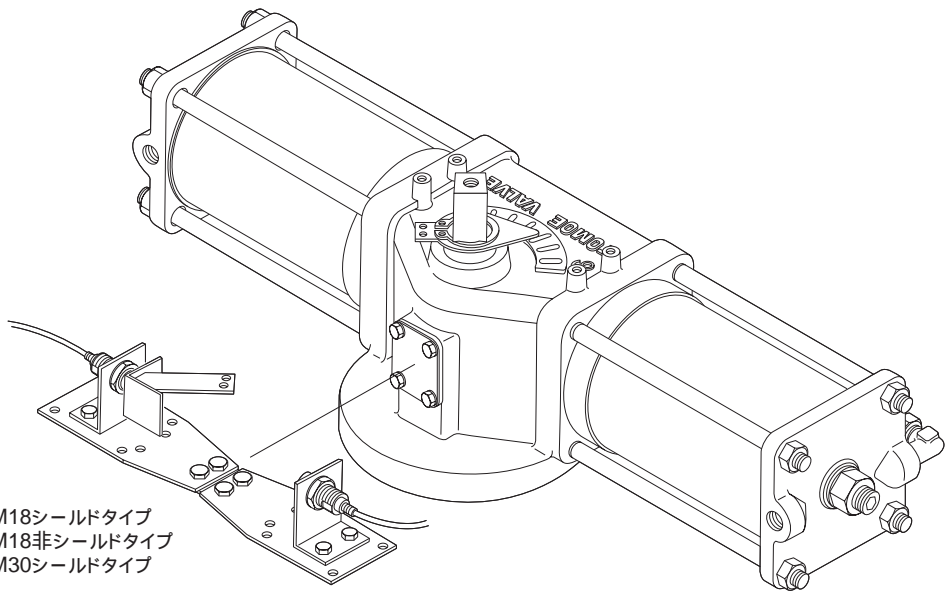
Purpose

Proximity switches are used to convert the valve position (full close, full open, half open) into electric signals for lamp indication at a remote location.

Standard specifications

Product	M18 shielded type (Can be embedded in metal.)	M18 non-shielded type (Cannot be embedded in metal.)	M30 shielded type (Can be embedded in metal.)
Type	E2E-X7D1-N	E2E-X14MD1	E2E-X10D1-N
Manufacturer	OMRON	OMRON	OMRON
With power source	DC 2-wire system	DC 2-wire system	DC 2-wire system
Motion mode	NO	NO	NO
Detecting distance	0 to 5.6mm	0 to 11.2mm	0 to 8mm
Object to be detected	Magnetic metal (stainless steel possible)	Magnetic metal (stainless steel possible)	Magnetic metal (stainless steel possible)
Power source voltage	DC12 to 24V	DC12 to 24V	DC12 to 24V
Current consumption	3 to 100mA	3 to 100mA	3 to 100mA
Class of insulation	IP67	IP67	IP67
Operating temperature	- 25 to 70 degrees C	- 25 to 70 degrees C	- 25 to 70 degrees C
Connection	Cord draw type (2m)	Cord draw type (2m)	Cord draw type (2m)
Contacts	On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection
Weight	0.13kg	0.13kg	0.18kg

Remark: The above are standard TOMOE-compatible proximity switches. It is also possible to install limit switches other than those listed above such as a DC 3-wire, AC 2-wire, AC/DC 2-wire or connector-type proximity switch. For details, please consult us.



M18シールドタイプ
M18非シールドタイプ
M30シールドタイプ

TGA Positioners

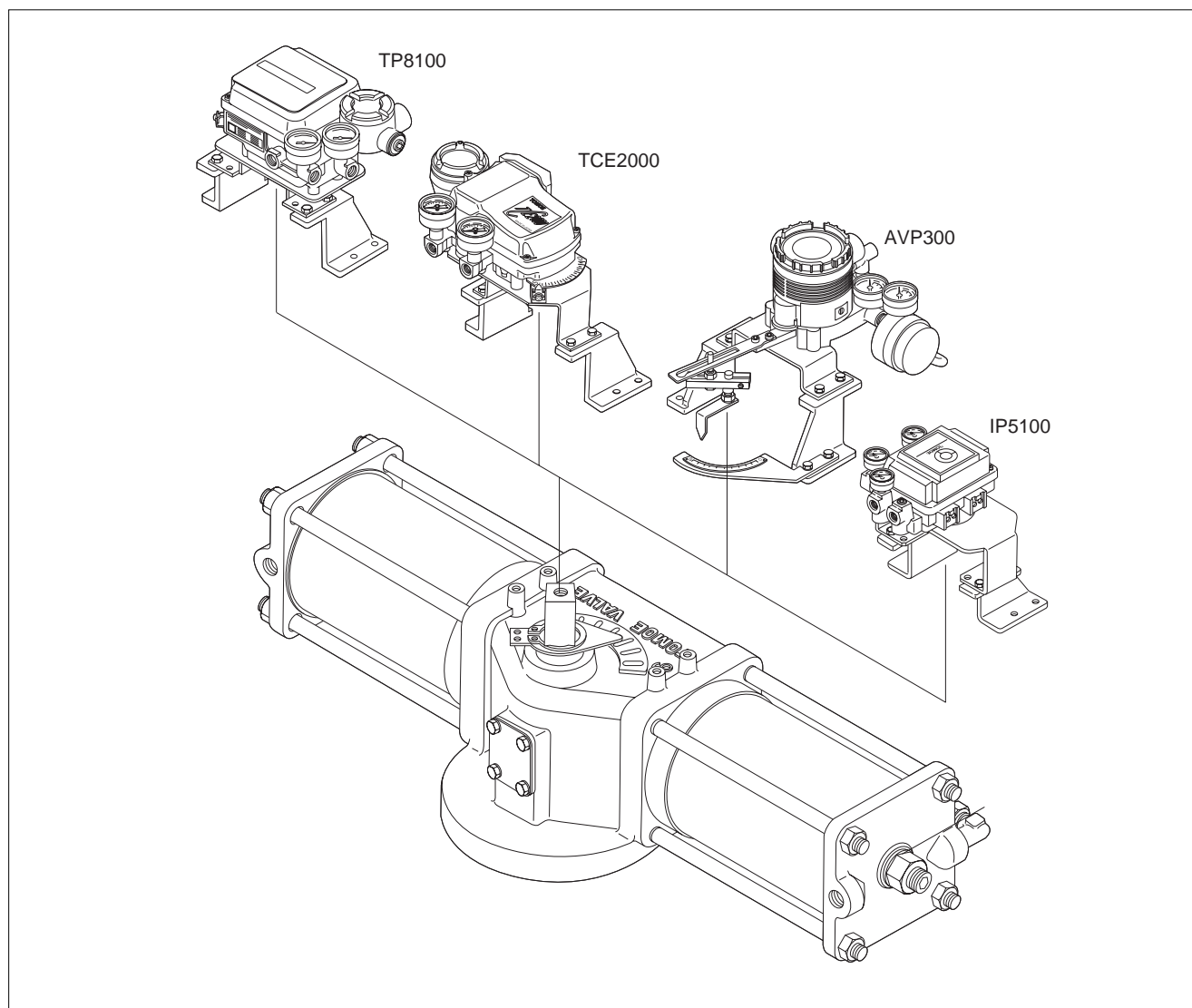
Purpose

A positioners are used for quick and accurate control of the valve opening angle with pneumatic signals or 4-20mA DC input signals from a control room or controller unit.

Standard specifications

	Electro-Pneumatic, analog	Electro-Pneumatic, analog	Electro-Pneumatic, digital (smart)	Pneumatic-Pneumatic
Type	TCE2000	TP8100	AVP300	IP5100
Manufacturer	Tomoe	Tomoe	Yamatake	SMC
Input signal	4 to 20mA	4 to 20mA	4 to 20mA	0.02 to 0.1MPa
Resistance	250 (4 to 20mADC)	235 ± 15 (4 to 20mADC)	300 (4 to 20mADC)	—
Supply air	0.14 to 0.7MPa	0.14 to 0.7MPa	0.14 to 0.7MPa	0.14 to 0.7MPa
Output flow rate	180L/min. or more (SUP=0.4MPa)	200L/min. or more (SUP=0.4MPa)	250L/min. or more (SUP=0.4MPa)	200L/min. or more (SUP=0.4MPa)
Air consumption	Within 11L/min. (SUP=0.4MPa)	Within 11L/min. (SUP=0.4MPa)	Within 10L/min. (SUP=0.4MPa)	Within 11L/min. (SUP=0.4MPa)
Operating temperature	- 20 to 83 degrees C (Non explosion-proof) - 20 to 60 degrees C (Explosion-proof type d2G4)	- 20 to 8 degrees C (Non explosion-proof) - 20 to 60 degrees C (Explosion-proof type d2G4)	- 40 to 80 degrees C (Non explosion-proof) - 20 to 60 degrees C (Explosion-proof type d2G4)	- 20 to 80 degrees C
Class of insulation	IP65, Exd II BT6X	IP67, Exd II BT5	IP65 (option: Exd2CT6X)	—
Air connection port size	Rc1/4	Rc1/4	Rc1/4	Rc1/4
Conduit entry	2-G1/2	2-G1/2	2-G1/2	—
Sensitivity	Within 0.5%FS	Within 0.5%FS	Within 1%FS	Within 0.5%FS
Repeatability	Within ± 1.5%FS	Within ± 2%FS	Within ± 1%FS	Within ± 2%FS
Hysteresis	Within 1%FS	Within 1%FS	Within 1%FS	Within 1%FS
Option	—	—	Analog signal (4 to 20 mA) output Any special opening setting Supports field bus.	—
Weight	2.3kg	2.6kg	2.8kg	1.2kg

Remark: The above are standard TOMOE-compatible positioners. It is also possible to install positioners other than those listed above. For details, please consult us.



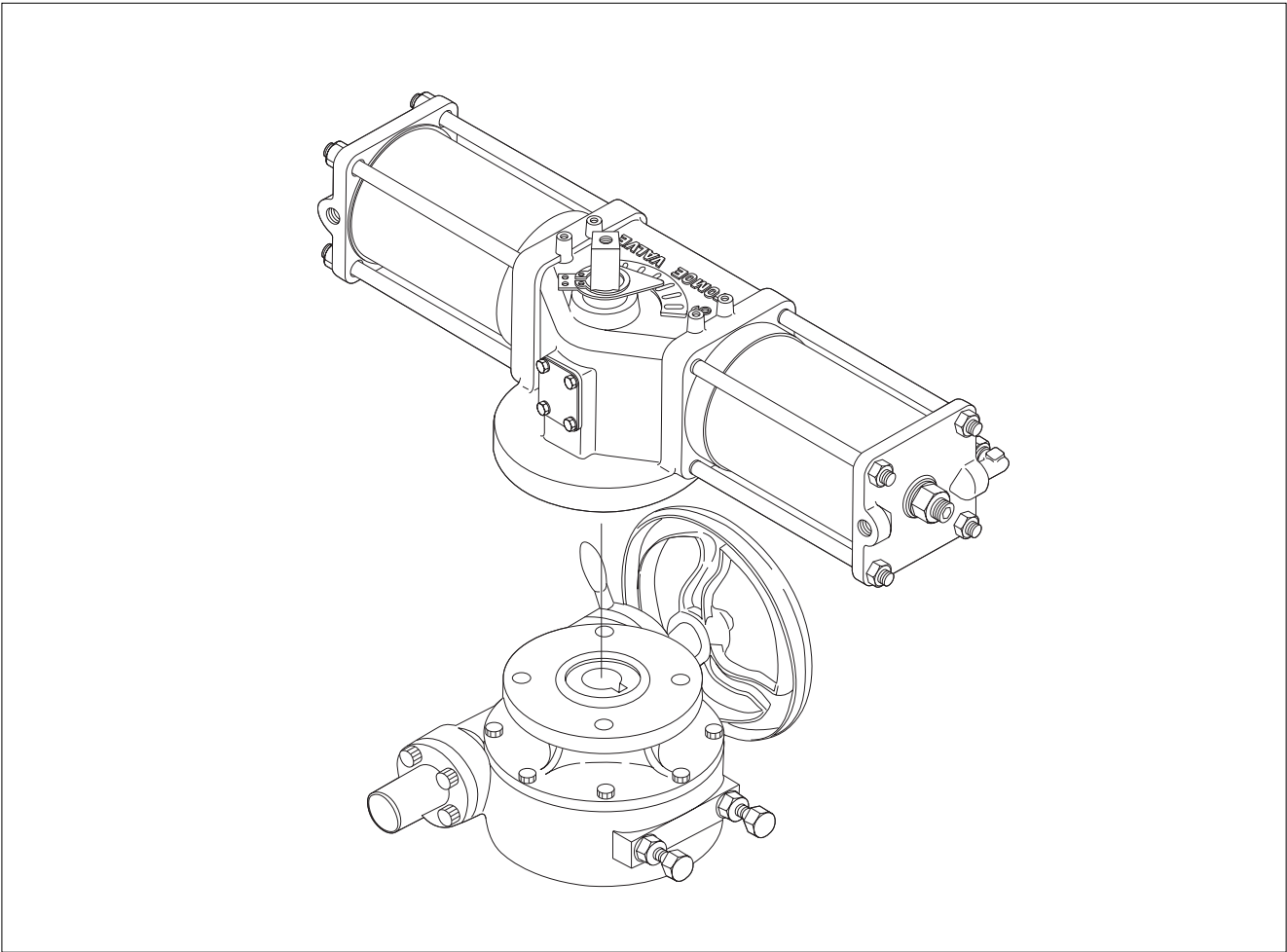
TGA Manual operation unit

Purpose

The operation unit is for manual operation of the pneumatic cylinder when air supply fails.

Standard specifications

	Function	Type	Applicable cylinder	Remarks
1	Manual gear unit	Worm gear	(D) Double acting type T-matic (E) Double acting type over TGA-100 (F) Single acting type	(1) Be sure to open the bypass valve. (2) Attach and detach the clutch exactly before and after operation.



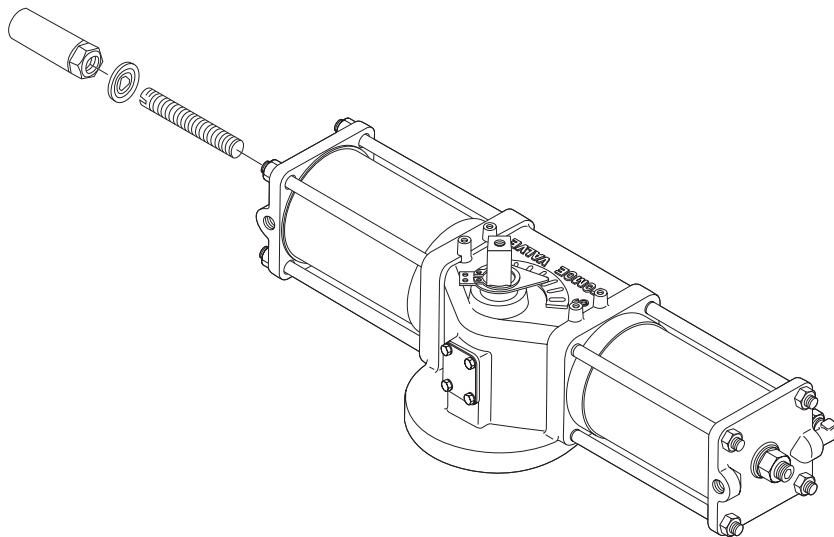
TGA Stroke adjuster

Purpose

The stroke adjuster sets the valve opening freely from the outside.

Standard specifications

Function	Type	Applicable cylinder	Remarks
Free opening unit	Side adjust screw	(A) Double acting type T-matic	After attaching a long adjustment bolt to the cylinder cover, attach the cover of the aluminium casing.
Adjust screw	Side adjust screw	(B) Double acting type TGA-100 (C) Single acting type T-matic	Attach long adjusting screws and lock nut to the cylinder cover.

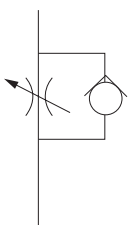
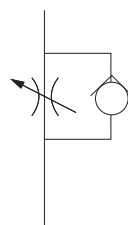


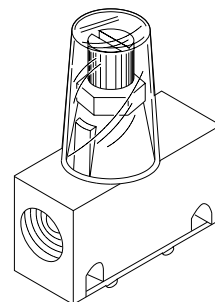
TGA Speed controllers

Purpose

For double-acting cylinders, the speed controller is used as meter out (exhaust throttle) and for single-acting cylinders, it is used as meter in (suction throttle).

Standard specifications

Type	AS3000-03	AS4000-04
Manufacturer	SMC	SMC
JIS symbol		
Applicable cylinder type	TGA-125 to 180	TGA-200 to 250
Needle revolution	8 rotations.	8 rotations.
Adjustable range	5 to 15 secs	5 to 15 secs
Operating temperature	- 5 to 60 degrees C	- 5 to 60 degrees C
Air connection port size	Rc3/8	Rc1/2
Attachement	Install to cylinder air connect port	Install to cylinder air connect port
Weight	0.13kg	0.21kg






Remark: The above are standard TOMOE-compatible speed controllers. It is also possible to install speed controllers other than those listed above. For details, please consult us.

TGA Silencers

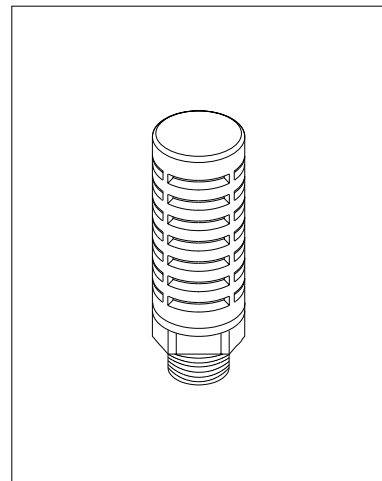
Purpose

Silencers eliminate noise at the exhaust ports on various kinds of pneumatic accessories.

Standard specifications

Type	AN200-02	AN300-03	AN400-04
Manufacturer	SMC	SMC	SMC
JIS symbol			
Effect of muffing	30dB (A)	30dB (A)	30dB (A)
Operating temperature	5 to 60 degrees C	5 to 60 degrees C	5 to 60 degrees C
Port size	Rc1/4	Rc3/8	Rc1/2
Attachment	Screw into exhaust port of solenoid valve.	Screw into exhaust port of solenoid valve.	Screw into exhaust port of solenoid valve.
Weight	0.02kg	0.03kg	0.04kg

Remark: The above are standard TOMOE-compatible silencers. It is also possible to install silencers other than those listed above.
For details, please consult us.

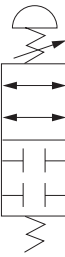


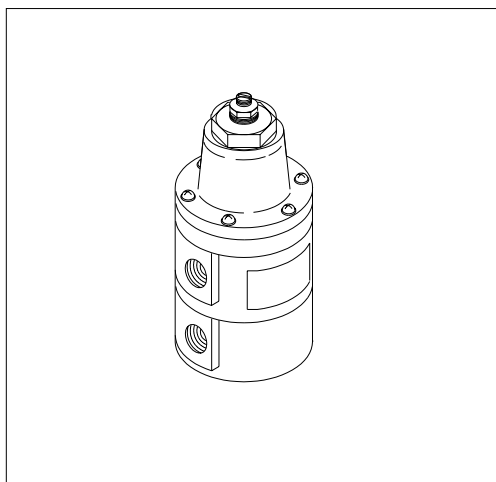
TGA Lock-up valves

Purpose

When air supply fails, the lock-up valve automatically stops the line until pressure is restored and keeps the operating unit of the cylinder at the stay-put position.

Standard specifications

Type	IL211-02
Manufacturer	SMC
JIS symbol	
Effective sectional area	17mm ²
Operating temperature	- 5 to 60 degrees C
Air connection port size	Rc1/4
Signal pressure connection port	Rc1/4
Weight	0.64kg



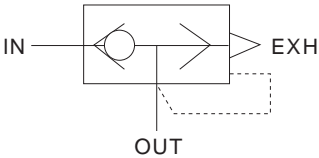
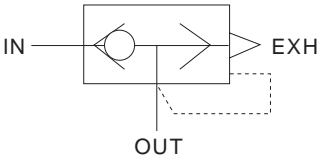
Remark: The above are standard TOMOE-compatible lock-up valves. It is also possible to install lock-up valves other than those listed above. For details, please consult us.

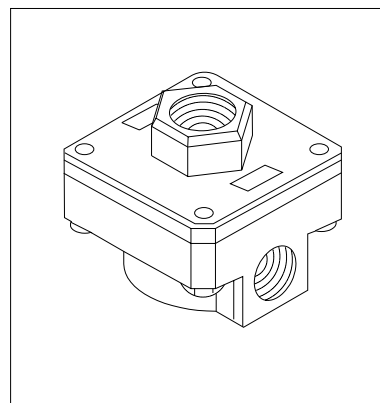
TGA Quick exhaust valve

Purpose

Quick exhaust valves act in the reverse way to a speed controller. The valve shortens the open/close operation time by improving the exhaust efficiency of the cylinder.

Standard specifications

Type	AQ3000-03	AQ5000-04
Manufacturer	SMC	SMC
JIS symbol		
Effective sectional area	70mm ² (EXH PORT)	115mm ² (EXH PORT)
Operating temperature	- 5 to 60 degrees C	- 5 to 60 degrees C
Air connection port size	Rc3/8	Rc1/2
Weight	0.21kg	0.69kg



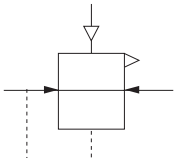
Remark: The above are standard TOMOE-compatible quick exhaust valves. It is also possible to install quick exhaust valves other than those listed above. For details, please consult us.

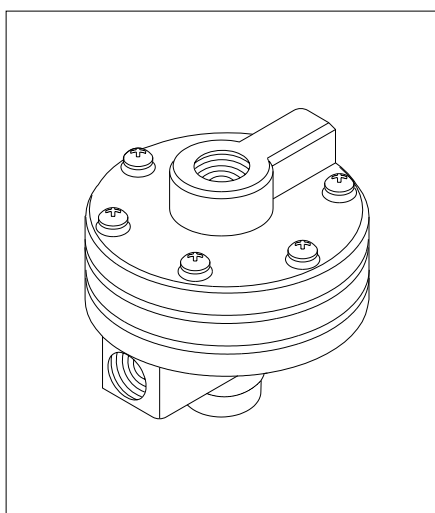
TGA Booster relay

Purpose

A booster relay is used to make switching time shorter and to improve response in cases when the piping distance from the meters and the actuator is very far, and when the capacity of the actuator is very large, or when the actuator has a large control valve with a positioner.

Standard specifications

Type	IL100-03
Manufacturer	SMC
JIS symbol	
Output flow rate	600L/min (SUP=0.5MPa)
Air consumption	Within 3L/min. (OUT=0.1MPa)
Operating temperature	- 5 to 60 degrees C
Repeatability	Within ± 1%FS
Hysteresis	Within 1%FS
Air connection port size	Rc3/8
Signal pressure connection port	Rc1/4
Weight	0.56kg



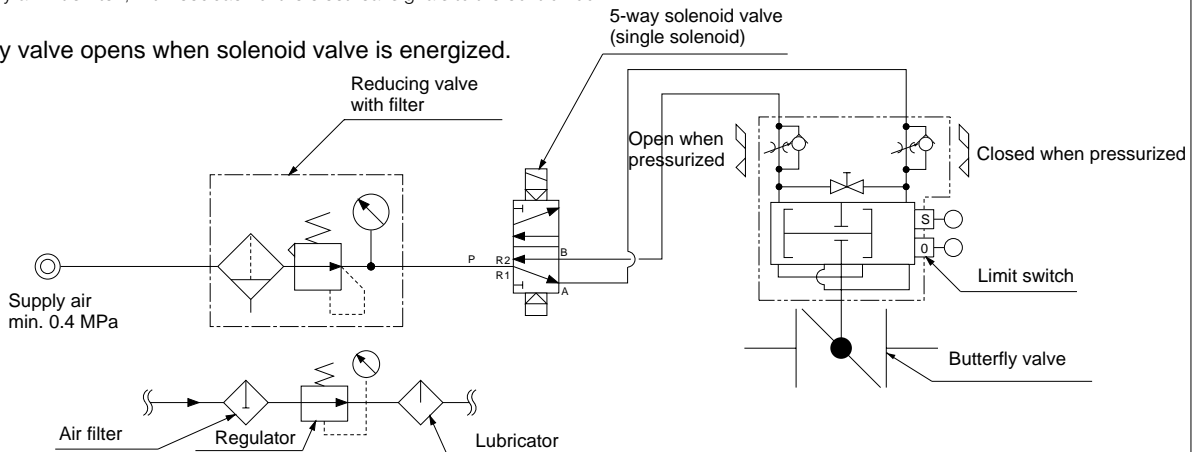
Remark: The above is a standard TOMOE-compatible booster relay.
It is also possible to install booster relays other than that listed above.
For details, please consult us.

Standard and semi-standard accessories and their use

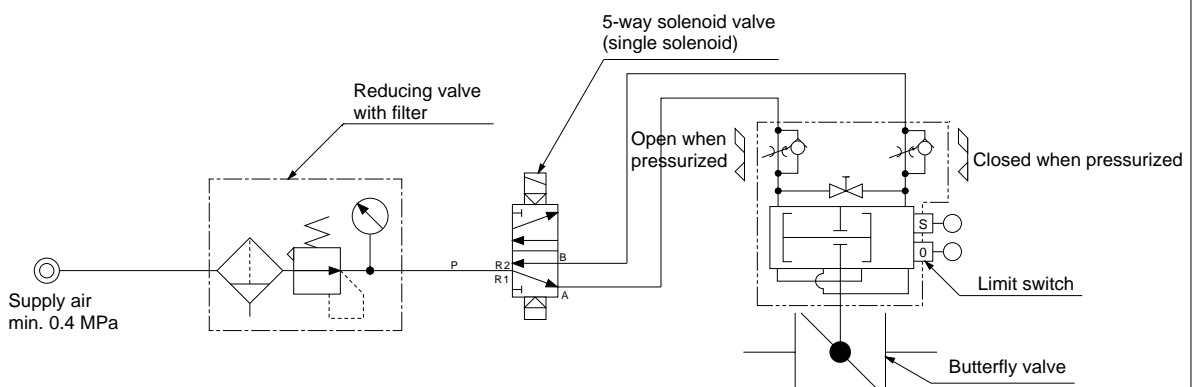
Example of standard air circuit for on/off operation (double-acting type)

Shown below are standard circuits to open and close a butterfly valve driven by a double-acting air cylinder while transmitting electrical signals from a remote control room. Switching of the flow of operation air is performed by the solenoid valve, and detection of the open/close position of the valve is performed by a limit switch, with feedback of the electrical signals to the control room.

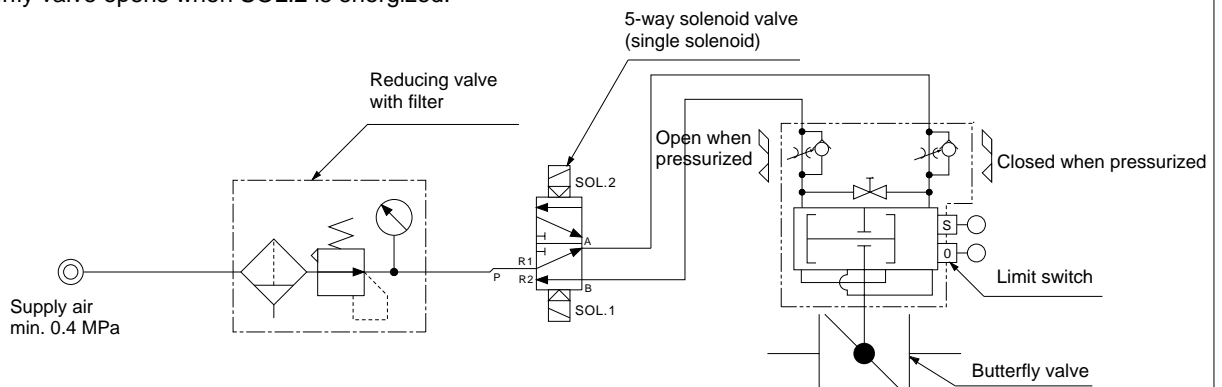
1 Butterfly valve opens when solenoid valve is energized.



2 Butterfly valve closes when solenoid valve is energized.



3 Butterfly valve closes when SOL.1 is energized. Butterfly valve opens when SOL.2 is energized.



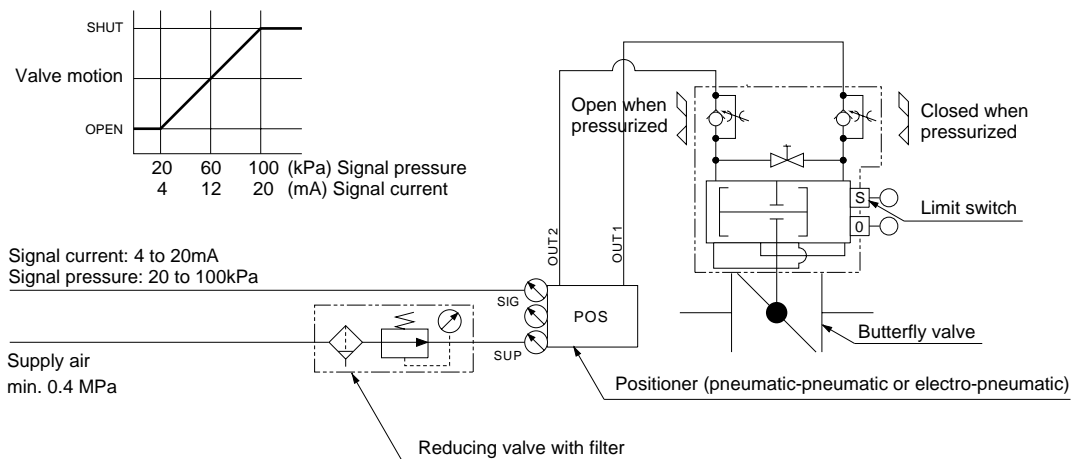
Once SOL.1 is energized, the condition is maintained even after it is de-energized unless SOL.2 is energized.

Example of standard air circuit for control operation (double-acting type)

Shown below are examples of standard circuits in which a P/P or E/P positioner is attached to the butterfly valve driven by a double-acting pneumatic cylinder to give instruction signals from a remote control room to the positioner. This adjusts the valve opening exactly and quickly in proportion to the signals, and also detects the open/close position of the valve by a limit switch which sends feedback of the electrical signals to the control room.

4 Direct action

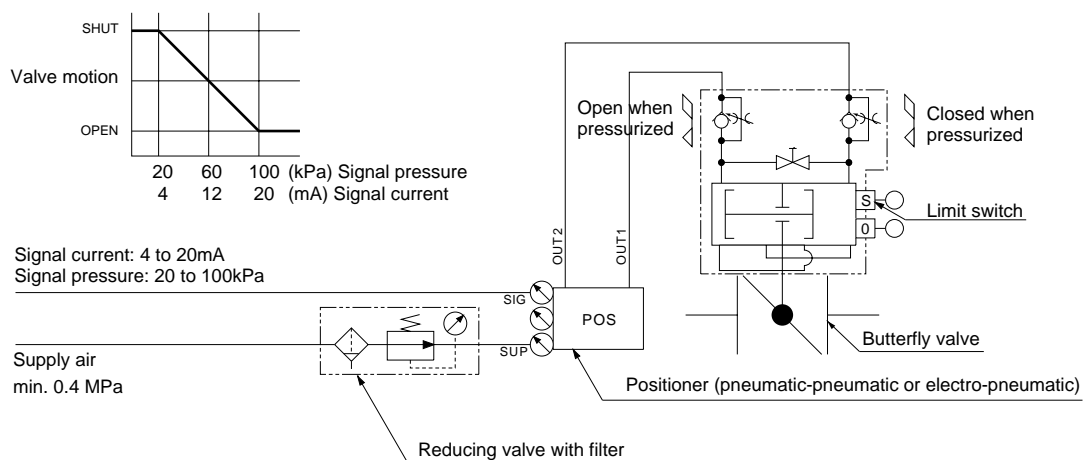
Butterfly valve closes when signal increases.
Butterfly valve opens when signal decreases.



The butterfly valve opens fully when the input signal goes off under a state of assured air supply.

5 Reverse action

Butterfly valve opens when signal increases.
Butterfly valve closes when signal decreases.



The butterfly valve closes fully when input signal goes off under a state of assured air supply.