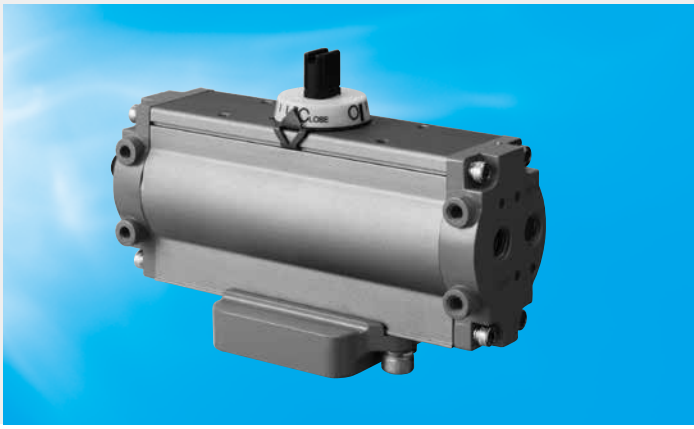
Pneumatic Cylinder

New T-DYNAMO (7E/7F/7G)

We have pursued top-level performance that carries on the excellence of the T-matic cylinder, our top-selling pneumatic actuator for butterfly valves. Employing an NAMUR mount, this unit is compact and lightweight, and offers high output and further heightened perfection as a complete system.



■Features

- **Direct valve installation with bottom ISO mounting.**
- **Completely direct mounting of valve installation section.**
- **NAMUR mount at pneumatic port connections and accessories interface.**

New T-DYNAMO Standard specifications

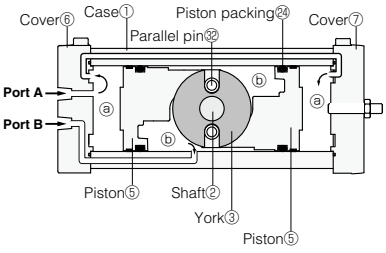
	Double-acting type					Single-acting type			
Type Torque (N·m)(When supply pressure is 0.4MPa and rotation angle is 0°)	T35	T85	T200	T380	T750	T85S	T200S	T380S	T750S
	35	85	200	380	750	30	65	116	240
Supply air pressure condition/temperature	−10 to 60 degrees C								
Air Supply Pressure	0.4 to 0.7MPa								
Body shell max (MPa)	1.05MPa								
Air connection (Rc)	Rc(PT)1/4								
Rotating angle	90°								
Ambient temperature	−10 to 60 degrees C								
Travel time(sec) with speed controller	1 to 15 sec	2 to 15 sec	3 to 15 sec	7 to 20 sec	12 to 25 sec	2 to 15 sec	6 to 15 sec	8 to 20 sec	15 to 25 sec

※The opening and closing times are the times in the case of a single unit of a cylinder with a standard speed controller (SP-K017-Z03-006) and a solenoid valve (PCS2408-03-100MC) when the air supply pressure is 0.4MPa. The opening and closing times depend on pneumatic piping system, etc.

New T-DYNAMO Principle of operation

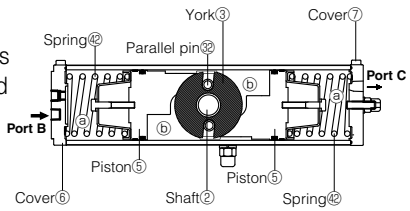
■Double-acting type cylinder

(1) The cylinder space which is enclosed by the case ① and the covers⑥ and ⑦ is divided into airtight chambers ⓐ and ⓑ by the pistons ⑤ and the piston packing ㉔.
(2) The shaft ② penetrates the chamber ⓑ of the case. The yoke ③ is fitted in the hole across the shaft in such a way that it allows it to slide in the hole. The top of the yoke is connected with the parallel pins ㉜ so it rotates in accordance with the movement of the pistons.
(3) The compressed air enters chamber ⓐ through port A and pushes the pistons. The air in chamber ⓑ is exhausted through port B as the pistons move due to a pressure difference between the two chambers. Integrated with these pistons, the parallel pins ㉜ also move and torque in the shaft is generated.



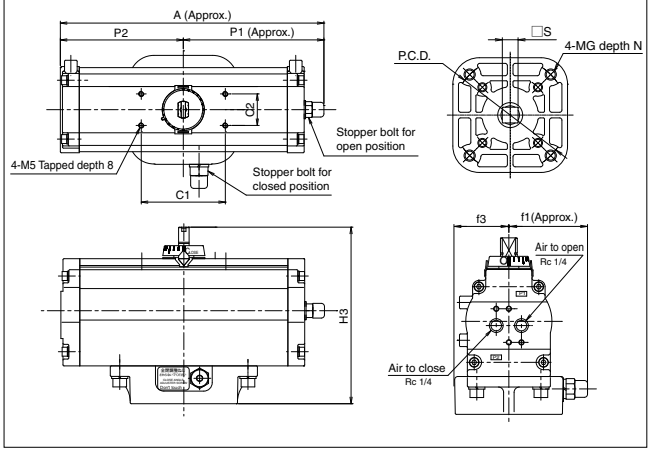
■Single-acting type cylinder

(1) The cylinder space which is enclosed by the case ① and the covers⑥ and ⑦ is divided into airtight chambers ⓐ and ⓑ by the pistons ⑤ and the piston packing ㉔.
(2) The shaft ② penetrates the chamber ⓑ of the case. The yoke ③ is fitted in the hole across the shaft in such a way that it allows it to slide in the hole. The top of the yoke is connected with the parallel pins ㉜ so it rotates in accordance with the movement of the pistons.
(3) The compressed air enters chamber ⓑ through port B and pushes the pistons. The air in chamber ⓐ is exhausted through port C as the pistons ⑤ move and the spring ㊷ is squeezed due to a pressure difference between the two chambers. Integrated with these pistons ⑤, the parallel pins ㉜ also move and torque in the shaft is generated.
(4) When air supply to Port B is stopped, the pistons are pushed back due to the force of the spring ㊷ and torque in the shaft is generated.

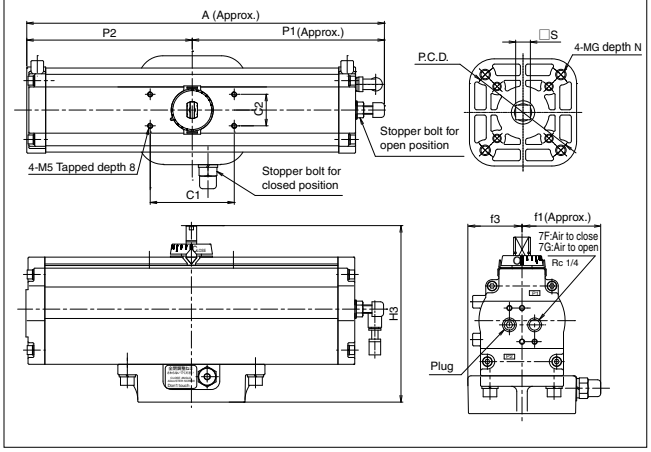


New T-DYNAMO Dimensions

Double-acting type



Single-acting type



New T-DYNAMO Dimension list

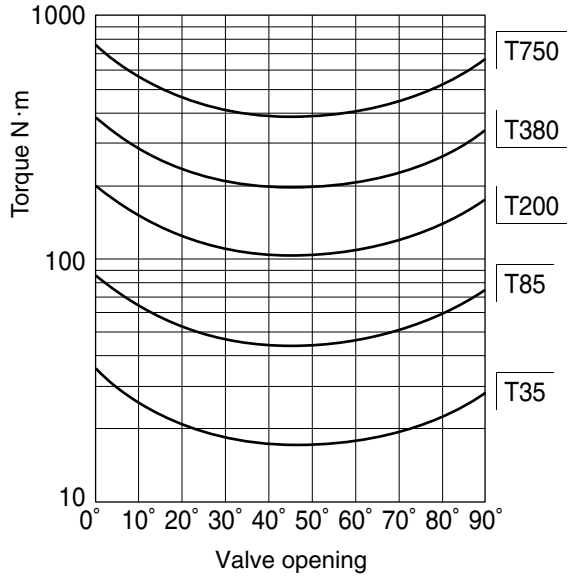
Cylinder type		Dimension (mm)											Cylinder capacity (litter/st)	Approx. Mass (kg)
		A	P1	P2	H3	C1	C2	f1	f3	S	MG	N		
T35	P.C.D.70	202.5	112	90.5	125	80	30	57	35	12	M8	13	0.2	1.7
T85	P.C.D.70	251	134	117	168	80	30	75	51	14	M8	17	0.5	4.6
	P.C.D.102										M10	20		
T200	P.C.D.70	320.5	170	150.5	203	80	30	79	51	18	M8	15	1.1	7.9
	P.C.D.102										M10	20		
T380	P.C.D.70	397.5	208.5	189	231	80	30	91	62.5	24	M8	15	2.1	14
	P.C.D.102										M10	18.5		
	P.C.D.125										M12	20		
T750	P.C.D.102	520.5	276	244.5	269	80	30	118	70	24	M10	18.5	4.6	24
	P.C.D.125										M12	23		
	P.C.D.140										M16	28		

New T-DYNAMO Dimension list

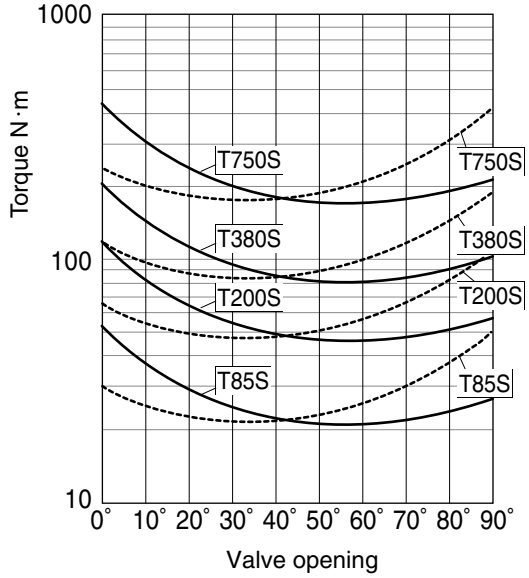
Cylinder type		Dimension (mm)											Cylinder capacity (litter/st)	Approx. Mass (kg)
		A	P1	P2	H3	C1	C2	f1	f3	S	MG	N		
T85S	P.C.D.70	338.5	181	157.5	168	80	30	75	51	14	M8	17	0.5	6.2
	P.C.D.102										M10	20		
T200S	P.C.D.70	423.5	223	200.5	203	80	30	79	51	18	M8	15	1.1	10.7
	P.C.D.102										M10	20		
T380S	P.C.D.70	524.5	273.5	251	231	80	30	91	62.5	24	M8	15	2.1	18.9
	P.C.D.102										M10	18.5		
	P.C.D.125										M12	20		
T750S	P.C.D.102	697.5	363	334.5	269	80	30	118	70	24	M10	18.5	4.6	32.4
	P.C.D.125										M12	23		
	P.C.D.140										M16	28		

New T-DYNAMO Output torque curves

Double-acting type



Single-acting type (spring returned type)



① The table shows the torque at an operating air pressure of 0.4 MPa.
② Output torque for an operating air pressure of P MPa is given by : = P x (torque value obtained from the table)/0.4. (Only double-acting type cylinder)
③ In the case of single-acting type cylinders, the spring force does not change even if the operating air pressure is changed. Thus the torque indicated by the dotted lines is constant regardless of the operating air pressure.
④ In the case of single-acting type cylinders, the output torque value at open→close is different from that at close→open. The continuous lines and dotted lines indicate the torques respectively.

	7G (Open with pressure)	7F (Close with pressure)
Continuous line	Torque at close→open with air pressure	Torque at close→open with spring
Dotted line	Torque at open→close with spring	Torque at open→close with air pressure

⑤ A valve for the single-acting type cylinder should be selected referring to the torque indicated with a dotted line.

New T-DYNAMO Output torque

Double-acting type

(N·m)

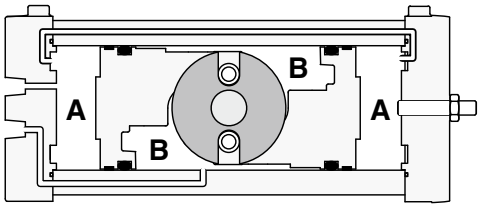
Type	Supply pressure (MPa)			
	0.4	0.5	0.6	0.7
T35	35	43	52	61
T85	85	106	127	148
T200	200	250	300	350
T380	380	475	570	665
T750	750	937	1125	1312

Single-acting type (spring returned type)

(N·m)

Type	Supply pressure (MPa)								Spring	
	0.4		0.5		0.6		0.7			
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
T85S	55	30	76	51	97	72	118	93	30	55
T200S	135	65	185	115	235	165	285	215	65	135
T380S	264	116	359	211	454	306	549	401	116	264
T750S	510	240	697	427	885	615	1072	802	240	510

New T-DYNAMO Air Consumption



(1) Required air consumption

Double-acting type

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

Single-acting type

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

V D : Double-acting type cylinder air consumption (N ℓ)
V S : Single-acting type cylinder air consumption (N ℓ)
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 $CS=\frac{VS}{t}$

C D : Double-acting type cylinder aircon-sumption (N ℓ/sec)
C S : Single-acting type cylinder air consumption (N ℓ/sec)
t : Unit time (sec)

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

•Double-acting type

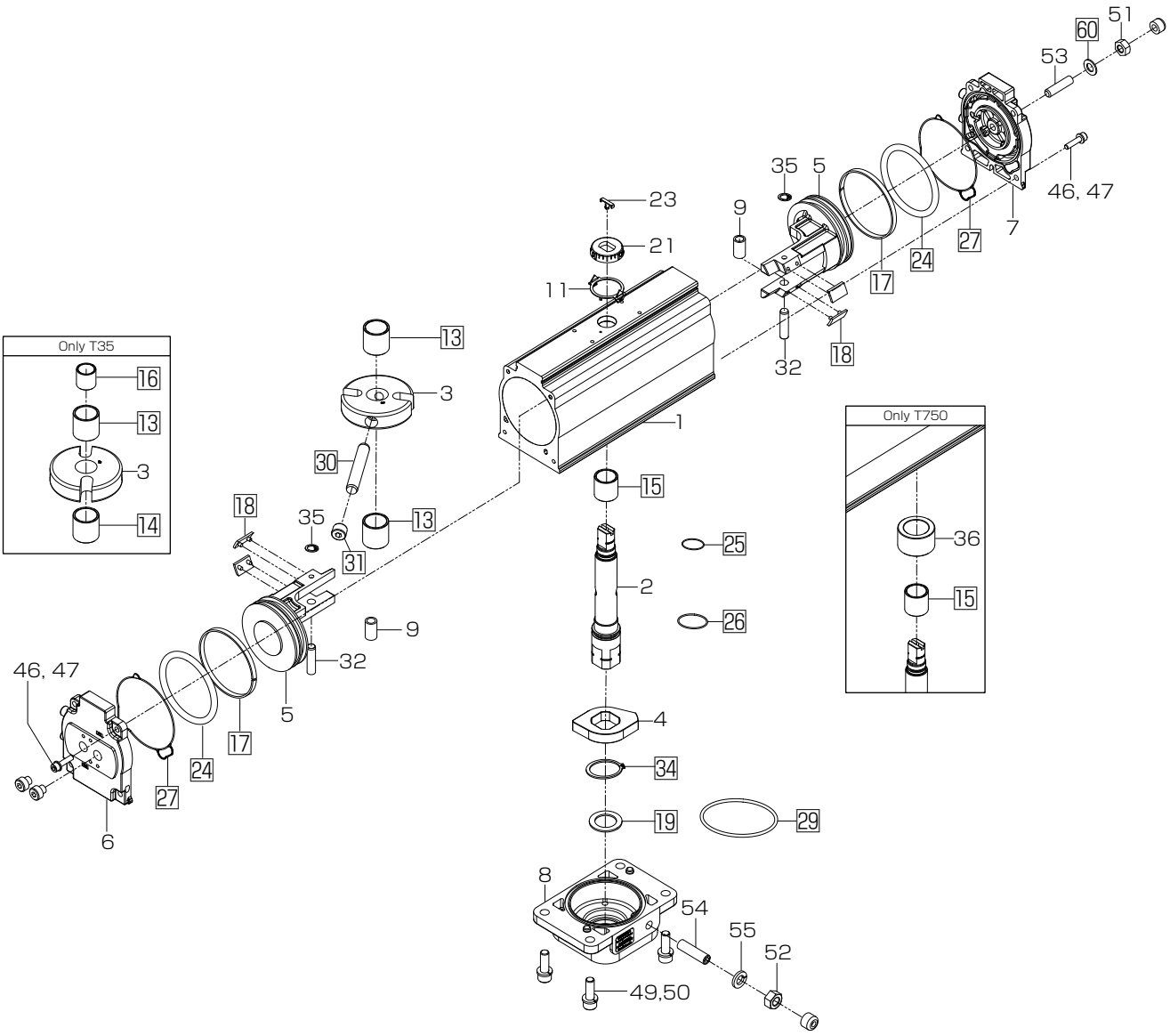
type	Cylinder capacity (ℓ)	
	A	B
T35	0.2	0.2
T85	0.4	0.5
T200	0.8	1.1
T380	1.8	2.1
T750	3.2	4.6

•Single-acting type

type	Cylinder capacity (ℓ)
	B
T85S	0.5
T200S	1.1
T380S	2.1
T750S	4.6

New T-DYNAMO Expanded view of component T35 to T750（double-acting type）

Note: The parts numbers marked with □ indicate “O-ring set”.
Please exchange all the parts included in the set.



New T-DYNAMO Parts list T35 to T750（double-acting type）

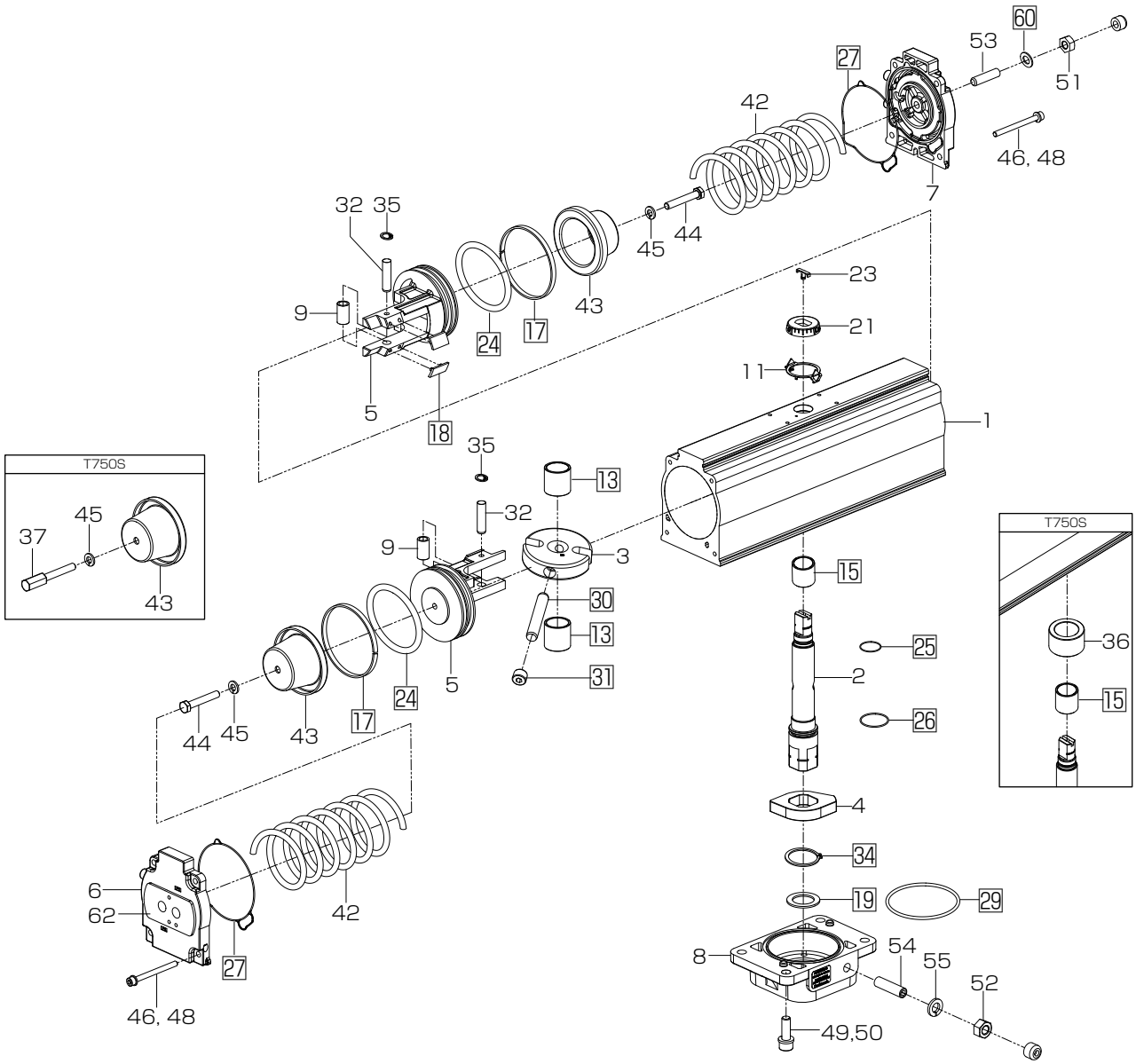
■Double-acting type

No.	Description	Q'ty	Remarks
1	Case	1	
2	Shaft	1	
3	Yoke	1	
4	Stopper	1	
5	Piston	2	
6	Cover 1	1	
7	Cover 2	1	
8	Base plate	1	
9	Bearing	2	
11	Indicator plate	1	
★ 13	Bearing 1	2	T35:1pc
★ 14	Bearing 2	1	T35
★ 15	Bearing 3	1	
★ 16	Bearing 4	1	T35
★ 17	Wear ring	2	
★ 18	Piston support	4	
★ 19	Thrust plate	1	
21	Position indicator	1	
23	Slit cover	1	
★ 24	Piston packing	2	
★ 25	O-ring (Upper Side)	1	
★ 26	O-ring (Lower Side)	1	
★ 27	Cover packing	2	
★ 29	O-ring (base plate)	1	
★ 30	Connecting pin	1	
★ 31	Plug	1	
32	Parallel pin	2	
★ 34	C-retainer (lower shaft)	1	T85～T750
35	C-retainer (piston)	2	T85～T750
36	Bearing housing	1	T750
46	Spring washer (cover 1,2)	8	
47	Hexagon bolt (cover: double-acting)	8	
49	Hexagon bolt (base plate)	4	T35:2pcs
50	Spring washer (base plate)	4	T35:2pcs
51	Hexagon stop screw	1	
52	Hexagon stop screw	1	
53	Hexagon socket set screw (open-side)	1	
54	Hexagon socket set screw (close-side)	1	
55	Spring washer (close-side stopper)	1	
★ 60	Sealing washer	1	

Note: Recommended maintenance parts are indicated by "★" before the part number.
To order a set of recommended maintenance parts, please specify "O-ring set".

New T-DYNAMO Expanded view of component T85S to T750S（single-acting type）

Note: The parts numbers marked with □ indicate “O-ring set”.
Please exchange all the parts included in the set.



New T-DYNAMO Expanded view of component T85S to T750S（single-acting type）

■Single-acting type

No.	Description	Q'ty	Remarks
1	Case	1	
2	Shaft	1	
3	Yoke	1	
4	Stopper	1	
5	Piston	2	
6	Cover 1	1	
7	Cover 2	1	
8	Base plate	1	
9	Bearing	2	
11	Indicator plate	1	
★ 13	Bearing 1 (shaft-piston)	2	
★ 15	Bearing 3 (lower shaft)	1	
★ 17	Wear ring	2	
★ 18	Piston support	4	
★ 19	Thrust plate	1	
21	Position indicator	1	
23	Slit cover	1	
★ 24	Piston packing	2	
★ 25	O-ring (upper)	1	
★ 26	O-ring (lower)	1	
★ 27	Cover packing	2	
★ 29	O-ring (base plate)	1	
★ 30	Connecting pin	1	
★ 31	Plug	1	
32	Parallel pin	2	
★ 34	C-retainer (lower shaft)	1	
35	C-retainer (piston)	2	
36	Bearing housing	1	T750S
37	Stopper bolt	1	T750S
42	Spring	2	
43	Spring guide	2	
44	Hexagon bolt (spring guide)	2	
45	Spring washer (spring guide)	2	
46	Spring washer (cover 1,2)	8	
48	Hexagon socket bolt (cover 1,2)	8	
49	Hexagon socket bolt (base plate)	4	
50	Spring washer (base plate)	4	
51	Hexagon nut (cover 2)	1	
52	Hexagon nut (base plate)	1	
53	Hexagon socket set screw (cover 2)	1	
54	Hexagon socket set screw (base plate)	1	
55	Spring washer (base plate)	1	
★ 60	Sealing washer (cover 2)	1	
62	Hexagon socket tapered plug (cover 1)	1	

Note: Recommended maintenance parts are indicated by "★" before the part number.
To order a set of recommended maintenance parts, please specify "O-ring set".

New T-DYNAMO Standard Accessory Combination Chart

■Double-action cylinder

This chart indicates the accessories than can be used together in conjunction with the double-action cylinder.
Only those items with a "○" mark in the same column can be used together.

Device name	Standard specifications		Manufacturer	Fig.	Double-acting type													Remarks
Speed controller unit		Unit	Kuroda	SP-K017-Z03-006	○	○	○	○				○	○	○	○				Meter out control
Bypass unit			Kuroda	BP-K095-Z04-002	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Five-port/2-position non explosion-proof solenoid valve	Direct mounting	Single	Kuroda	PCS2406-K090-Z03-132-***					○							○			Exhaust throttle valve applied to the solenoid valves as a speed controller
		Double	Kuroda	PCD2406-K090-Z04-120-***					○							○			
		Single	SMC	VFN2120N-****-02*					○							○			
		Double	SMC	VFN2220N-****-02*					○							○			
Five-port/2-position explosion-proof solenoid valve		Single	Kaneko	MK15G-8-AE12PU-DMI							◎							◎	
		Double	Kaneko	MK15DG-8-AE12PU-DMI							◎							◎	
Exhaust throttle valve		For solenoid valves	Kuroda	MV-2-Z03-017					○		◎					○		◎	
Explosion-proof/ Non Explosion solenoid valve	Mounted with bracket	Non-standard	Kuroda	PCS2406/2408						◎							◎		
		Non-standard	SMC	VF3130						◎							◎		
		Non-standard	CKD	4F2/4F3/4F4/4F5						◎							◎		
		Non-standard	Kaneko	MOOU, M15G, MB15G, MG15G						◎	◎						◎	◎	
Filter regulator	Direct mounting		Kuroda	P31EA22MMBNNP					○							○			Applicable to Kuroda solenoid valves only
	Mounted with bracket		Kuroda	P31EA22MMBNNP	○	○	○	○		○	○	○	○	○	○		○	○	
			SMC	AW20	○	○	○	○		○	○	○	○	○	○		○	○	
Limit switch	Non-explosion-proof BOX type	Free-angle	Tomoe	TMS-3**-**-**-**-**-*	●				●	●		●				●	●		
	Non-explosion-proof - mounted with bracket	90°	Azbil/OMRON	1LS1-J/WLCA2	●		●		●	●									
			Azbil	VCL-5001	●		●		●	●									
		80°,70°	Azbil/OMRON	1LS1-J/WLCA2	●		●		●	●									
			Azbil	VCL-5001	●		●		●	●									
		Free-angle	Azbil/OMRON	1LS1-J/WLCA2								●		●		●	●		
			Azbil	VCL-5001								●		●		●	●		
	Explosion-proof - mounted with bracket	80°,90°	Azbil	1LX-7001		●		○			○								
			Azbil	VCX-7001		●		○			○								
		70°	Azbil	1LX-7001		●		○			○								
			Azbil	VCX-7001		●		○			○								
		Open/Close detection	Azbil	VCX-7001		●		○			○								
		Free-angle	Azbil	1LX-7001									○		○			○	
			Azbil	VCX-7001									○		○			○	
Proximity switch	Direct mounting	90° only	Efector	IND2004	●	●			●	●									
			OMRON	E2MP-CB1	●	●			●	●									
	Mounted with bracket	90°,80°,70°	OMRON	(M18 shield) E2E-X7D1-N	●		●		●	●									
			OMRON	(M18 non-shield) E2E-X14MD1	●		●		●	●									
			OMRON	(M30 shield) E2E-X10D2-N	●		●		●	●									
		Free-angle	OMRON	(M18 shield) E2E-X7D1-N								●		●		●	●		
			OMRON	(M18 non-shield) E2E-X14MD1								●		●		●	●		
			OMRON	(M30 shield) E2E-X10D2-N								●		●		●	●		
Positioner	Electro-pneumatic		Tomoe(SSS)	TCE2000			○	○						○	○				
			Tomoe(SMC)	TP8100			○	○						○	○				
		Non-standard	Azbil	AVP300			○	○						○	○				
			SSS	XE/XP100-SB7			○	○						○	○				
			SSS	XE/XP100-SS3			○	○						○	○				
	Pneumatic-pneumatic		SMC	IP5100			○	○						○	○				
Manual operating	Manual lever	BOX type	Tomoe		○※1	※2			○※1	○※1	○	○※1	○	○	○	○※1	○※1	○	Manual lever applicable to: T35, T85, T200, T380
		Spanner type	Tomoe		○※1	※2	○	○	○※1	○※1	○	○※1	○	○	○	○※1	○※1	○	
	Side handle																		
	Manual gear				○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Free angle adjuster	15 to 95°											○	○	○	○	○	○	○	

Non-explosion-proof specifications	○		○		○	○		○		○			○	○				
Explosion-proof specifications		○		○			○		○		○							○
Solenoid valve					○	○	○							○	○	○		
Positioner			○	○						○	○							
Free angle adjuster									○	○	○	○	○	○	○	○		
Side handle																		

○: Usable in combination ●,◎: Only one of the ●/◎ marked items in each column can be used in combination
※1: Only spanner type available with TMS limit switch ※2: Manual lever unavailable with direct-mounted proximity switch

New T-DYNAMO Standard Accessory Combination Chart

■Single-action (spring-open type)

This chart indicates the accessories than can be used together in conjunction with the double-action cylinder.
Only those items with a "○" mark in the same column can be used together.

Device name	Standard specifications		Manufacturer	Fig.	Air to close (spring open)																												Remarks
Speed controller unit		Unit	Kuroda	SP-K017-Z12-003-F	○	○	○	○				○	○	○	○				○	○	○	○				○	○	○	○				
Bypass unit			Kuroda	BP-K095-Z04-002																													
Five-port/2-position non explosion-proof solenoid valve	Direct mounting	Single	Kuroda	PCS2406-K090-Z03-132-***					○							○							○							○			Exhaust throttle valve applied to the solenoid valves as a speed controller
		Double	Kuroda	PCD2406-K090-Z04-120-***					○							○							○							○			
		Single	SMC	VFN2120N-****-02*					○							○							○							○			
		Double	SMC	VFN2220N-****-02*					○							○							○							○			
Five-port/2-position explosion-proof solenoid valve		Single	Kaneko	MK15G-8-AE12PU-DMI							◎							◎							◎							◎	
		Double	Kaneko	MK15DG-8-AE12PU-DMI							◎							◎							◎							◎	
Exhaust throttle valve		For solenoid valves	Kuroda	MV-2-Z03-017					○		◎					○		◎					○		◎					○		◎	
Explosion-proof/ Non Explosion solenoid valve	Mounted with bracket	Non-standard	Kuroda	PCS2406/2408						◎							◎							◎							◎		
		Non-standard	SMC	VF3130						◎							◎							◎							◎		
		Non-standard	CKD	4F2/4F3/4F4/4F5						◎							◎							◎							◎		
		Non-standard	Kaneko	MOOU,M15G,MB15G,MG15G						◎	◎						◎	◎						◎	◎						◎	◎	
Filter regulator	Direct mounting		Kuroda	P31EA22MMBNNP					○							○							○							○			Applicable to Kuroda solenoid valves only
	Mounted with bracket		Kuroda	P31EA22MMBNNP	○	○	○	○		○	○	○	○	○	○		○	○	○	○	○	○		○	○	○	○	○	○		○	○	
			SMC	AW20	○	○	○	○		○	○	○	○	○	○		○	○	○	○	○	○		○	○	○	○	○	○		○	○	
Limit switch	Non-explosion-proof BOX type	Free-angle	Tomoe	TMS-3**-**-**-**-**-*	●				●	●		●				●	●		●				●	●		●				●	●		
	Non-explosion-proof - mounted with bracket	90°	Azbil/OMRON	1LS1-J/WLCA2	●		●		●	●									●		●		●	●									
			Azbil	VCL-5001	●		●		●	●									●		●		●	●									
		80°,70°	Azbil/OMRON	1LS1-J/WLCA2	●		●		●	●									●		●		●	●									
			Azbil	VCL-5001	●		●		●	●									●		●		●	●									
		Free-angle	Azbil/OMRON	1LS1-J/WLCA2								●		●		●	●									●		●		●	●		
			Azbil	VCL-5001								●		●		●	●									●		●		●	●		
	Explosion-proof - mounted with bracket	80°,90°	Azbil	1LX-7001		●		○			●									●		○			●								
			Azbil	VCX-7001		●		○			●									●		○			●								
		70°	Azbil	1LX-7001		●		○			●									●		○			●								
			Azbil	VCX-7001		●		○			●									●		○			●								
		Open-close detection	Azbil	VCX-7001		●		○			●									●		○			●								
		Free-angle	Azbil	1LX-7001									○		○			○									○		○			○	
			Azbil	VCX-7001									○		○			○									○		○			○	
Proximity switch	Direct mounting	90°	Efector	IND2004	●	●			●	●	●								●	●			●	●	●								
			OMRON	E2MP-CB1	●	●			●	●	●								●	●			●	●	●								
	Mounted with bracket	90°,80°,70°	OMRON	(M18 shield) E2E-X7D1-N	●		●		●	●									●		●		●	●									
			OMRON	(M18 non-shield) E2E-X14MD1	●		●		●	●									●		●		●	●									
			OMRON	(M30 shield) E2E-X10D2-N	●		●		●	●									●		●		●	●									
		Free-angle	OMRON	(M18 shield) E2E-X7D1-N	●		●		●	●									●		●		●	●									
			OMRON	(M18 non-shield) E2E-X14MD1								●		●		●	●									●		●		●	●		
			OMRON	(M30 shield) E2E-X10D2-N								●		●		●	●									●		●		●	●		
Positioner	Electro-pneumatic		Tomoe(SSS)	TCE2000			○	○						○	○						○	○						○	○				
			Tomoe(SMC)	TP8100			○	○						○	○						○	○						○	○				
		Non-standard	Azbil	AVP300			○	○						○	○						○	○						○	○				
			SSS	XE/XP100-SB7			○	○						○	○						○	○						○	○				
			SSS	XE/XP100-SS3			○	○						○	○						○	○						○	○				
	Pneumatic-pneumatic		Tomoe(SSS)	TCP2000			○	○						○	○						○	○						○	○				
			SMC	IP5100			○	○						○	○						○	○						○	○				
Manual operating	Manual lever																		○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Free angle adjuster	15 to 90°		Tomoe	Attached to side cover								○	○	○	○	○	○	○															Side handle unavailable
	Side handle available		Tomoe	Attached to side cover																													
	0 to 94°		Tomoe	External unit (※1)																						○	○	○	○	○	○	○	
				Non-explosion-proof specifications	○		○		○	○		○		○		○	○		○		○		○	○		○		○		○	○		
				Explosion-proof specifications		○		○			○		○		○			○		○		○			○		○		○			○	
				Solenoid valve					○	○	○					○	○	○					○	○	○					○	○	○	
				Positioner			○	○						○	○						○	○						○	○				
				Free angle adjuster								○	○	○	○	○	○	○								○	○	○	○	○	○	○	
				Side handle															○	○	○	○	○	○	○	○	○	○	○	○	○	○	

○: Usable in combination ●,◎: Only one of the ●/◎ marked items in each column can be used in combination
※1: Free-angle adjuster unit is installed in between valve and cylinder

New T-DYNAMO Standard Accessory Combination Chart

■Single-action (spring-shut type)

This chart indicates the accessories than can be used together in conjunction with the double-action cylinder.
Only those items with a "○" mark in the same column can be used together.

Device name	Standard specifications		Manufacturer	Fig.	Air to open (spring shut)																												Remarks
Speed controller unit	Unit		Kuroda	SP-K017-Z03-006	○	○	○	○				○	○	○	○				○	○	○	○				○	○	○	○				
Bypass unit			Kuroda	BP-K095-Z04-002																													
Five-port/2-position non explosion-proof solenoid valve	Direct mounting	Single	Kuroda	PCS2406-K090-Z03-132-✻✻✻					○							○							○							○			Exhaust throttle valve applied to the solenoid valves as a speed controller
		Double	Kuroda	PCD2406-K090-Z04-120-✻✻✻					○							○							○							○			
		Single	SMC	VFN2120N-✻✻✻✻-02✻					○							○							○							○			
		Double	SMC	VFN2220N-✻✻✻✻-02✻					○							○							○							○			
Five-port/2-position explosion-proof solenoid valve		Single	Kaneko	MK15G-8-AE12PU-DMI							◎							◎							◎							◎	
		Double	Kaneko	MK15DG-8-AE12PU-DMI							◎							◎							◎							◎	
Exhaust throttle valve		For solenoid valves	Kuroda	MV-2-Z03-017					○		◎					○		◎					○		◎					○		◎	
Explosion-proof/ Non Explosion solenoid valve	Mounted with bracket	Non-standard	Kuroda	PCS2406/2408						◎							◎							◎							◎		
		Non-standard	SMC	VF3130						◎							◎							◎							◎		
		Non-standard	CKD	4F2/4F3/4F4/4F5						◎							◎							◎							◎		
		Non-standard	Kaneko	MOOU,M15G,MB15G,MG15G						◎	◎						◎	◎						◎	◎						◎	◎	
Filter regulator	Direct mounting		Kuroda	P31EA22MMBNNP					○							○							○							○			Applicable to Kuroda solenoid valves only
	Mounted with bracket		Kuroda	P31EA22MMBNNP	○	○	○	○		○	○	○	○	○	○		○	○	○	○	○	○		○	○	○	○	○	○		○	○	
			SMC	AW20	○	○	○	○		○	○	○	○	○	○		○	○	○	○	○	○		○	○	○	○	○	○		○	○	
Limit switch	Non-explosion-proof BOX type	Free-angle	Tomoe	TMS-3✻✻-✻✻-✻✻-✻✻-✻✻-✻	●				●	●		●				●	●		●				●	●		●				●	●		
	Non-explosion-proof - mounted with bracket	90°	Azbil/OMERON	1LS1-J/WLCA2	●		●		●	●									●		●		●	●									
			Azbil	VCL-5001	●		●		●	●									●		●		●	●									
		80°,70°	Azbil/OMERON	1LS1-J/WLCA2	●		●		●	●									●		●		●	●									
			Azbil	VCL-5001	●		●		●	●									●		●		●	●									
		Free-angle	Azbil/OMERON	1LS1-J/WLCA2								●		●		●	●									●		●		●	●		
			Azbil	VCL-5001								●		●		●	●									●		●		●	●		
	Explosion-proof - mounted with bracket	80°,90°	Azbil	1LX-7001		●		○			●									●		○			●								
			Azbil	VCX-7001		●		○			●									●		○			●								
		70°	Azbil	1LX-7001		●		○			●									●		○			●								
			Azbil	VCX-7001		●		○			●									●		○			●								
		Open-close detection	Azbil	VCX-7001		●		○			●									●		○			●								
		Free-angle	Azbil	1LX-7001									○		○			○									○		○			○	
			Azbil	VCX-7001									○		○			○									○		○			○	
Proximity switch	Direct mounting	90°	Efector	IND2004	●	●			●	●	●								●	●			●	●	●								
			OMERON	E2MP-CB1	●	●			●	●	●								●	●			●	●	●								
	Mounted with bracket	90°,80°,70°	OMERON	(M18 shield)E2E-X7D1-N	●		●		●	●									●		●		●	●									
			OMERON	(M18 non-shield)E2E-X14MD1	●		●		●	●									●		●		●	●									
			OMERON	(M30 shield)E2E-X10D2-N	●		●		●	●									●		●		●	●									
		Free-angle	OMERON	(M18 shield)E2E-X7D1-N	●		●		●	●									●		●		●	●									
			OMERON	(M18 non-shield)E2E-X14MD1								●		●		●	●									●		●		●	●		
			OMERON	(M30 shield)E2E-X10D2-N								●		●		●	●									●		●		●	●		
Positioner	Electro-pneumatic		Tomoe(SSS)	TCE2000			○	○						○	○						○	○						○	○				
			Tomoe(SMC)	TP8100			○	○						○	○						○	○						○	○				
		Non-standard	Azbil	AVP300			○	○						○	○						○	○						○	○				
			SSS	XE/XP100-SB7			○	○						○	○						○	○						○	○				
			SSS	XE/XP100-SS3			○	○						○	○						○	○						○	○				
	Pneumatic-pneumatic		SMC	IP5100			○	○						○	○						○	○						○	○				
Manual operating	Manual lever																		○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Free angle adjuster	15 to 90°		Tomoe	Attached to side cover								○	○	○	○	○	○	○															Side handle unavailable
	Side handle available		Tomoe	Attached to side cover																													
	0 to 94°		Tomoe	External unit(※1)																						○	○	○	○	○	○	○	
				Non-explosion-proof specifications	○		○		○	○		○		○		○	○		○		○		○	○		○		○		○	○		
				Explosion-proof specifications		○		○			○		○		○			○		○		○			○		○		○			○	
				Solenoid valve					○	○	○					○	○	○					○	○	○					○	○	○	
				Positioner			○	○						○	○						○	○						○	○				
				Stroke adjuster								○	○	○	○	○	○	○								○	○	○	○	○	○	○	
				Manual gear unit															○	○	○	○	○	○	○	○	○	○	○	○	○	○	

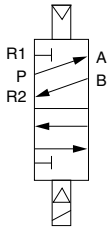
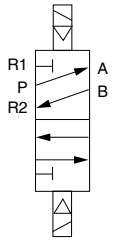
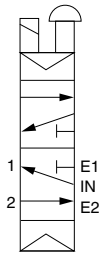
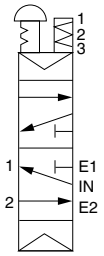
○: Usable in combination ●,◎: Only one of the ●/◎ marked items in each column can be used in combination
※1: Free-angle adjuster unit is installed in between valve and cylinder

New T-DYNAMO 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

Type	Five-port/2-position non explosion-proof solenoid valve (single solenoid)	Five-port/2-position non explosion-proof solenoid valve (double solenoid)	Five-port/2-position explosion-proof solenoid valve (single solenoid)	Five-port/2-position explosion-proof solenoid valve (double solenoid)
Item	PCS2406-K090-Z03-132-✶✶	PCD2406-K090-Z04-120-✶✶	MK15G-8-※-DMI	MK15DG-8-※-DMI
Manufacturer	Kuroda	Kuroda	Kaneko	Kaneko
JIS symbol				
Applicable cylinder type	T35 to T750/T85S to T750S	T35 to T750/T85S to T750S	T35 to T750/T85S to T750S	T35 to T750/T85S to T750S
Mounting method	Direct mounting	Direct mounting	Direct mounting	Direct mounting
Air connection port size	Rc1/4 (IN, EXH)	Rc1/4 (IN, EXH)	Rc1/4 (IN, OUT, EXH)	Rc1/4 (IN, OUT, EXH)
Effective sectional area	10mm^2	10mm^2	20mm^2	20mm^2
Rated voltage	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V 50/60Hz AC110V/200V 50Hz AC220V 60Hz DC24, 100, 110, 125V	AC100V 50/60Hz AC100V, 200V 50Hz AC220V 60Hz DC24, 100, 110,125V
Class of insulation	—	—	d2G4	d2G4
Wiring method	Conduit terminal	Conduit terminal	Conduit terminal	Conduit terminal
Conduit entry	G1/2	G1/2	G1/2	G1/2
Manual operating	Non lock bush type	Non lock bush type	Manual botton lock type	Manual botton lock type
Operating temperature	—5 to 50 degrees C	—5 to 50 degrees C	—20 to 60 degrees C	—20 to 60 degrees C
Weight	0.2kg	0.27kg	1.2kg	1.7kg

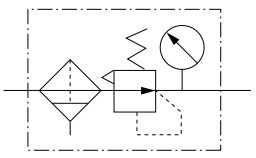
Remark: The above are standard TOMOE-compatible solenoid valves. It is also possible to install solenoid valves other that those listed above such as a double solenoid or 3-port solenoid valve. For details, please consult us.

New T-DYNAMO Filter regulators（Pressure reducer with filter）

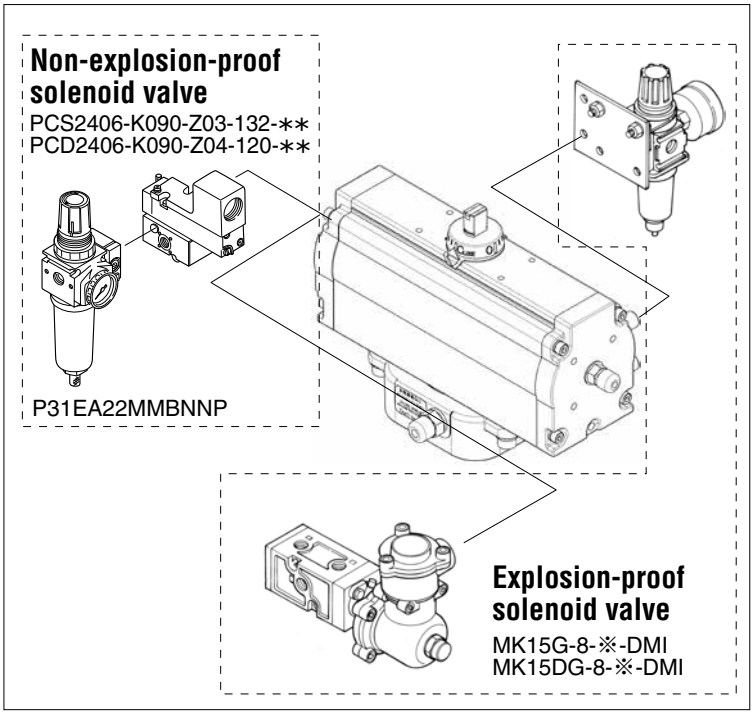
■Purpose

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	P31EA22MMBNNP
Manufacturer	Kuroda
JIS symbol	
Applicable cylinder type	T35 to T750/T85S to T750S
Set pressure range	0.03 to 0.85MPa
Pressure gauge connection port	Rc1/8
Operating temperature	—5 to 60 degrees C
Air connection port size	Rc1/4
Filtration	5μm
Attachment	Direct mounting
Option	—
Weight	0.19kg

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

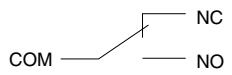
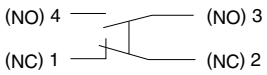
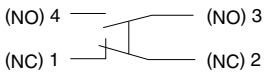
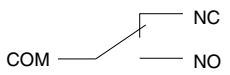


New T-DYNAMO Limit switches

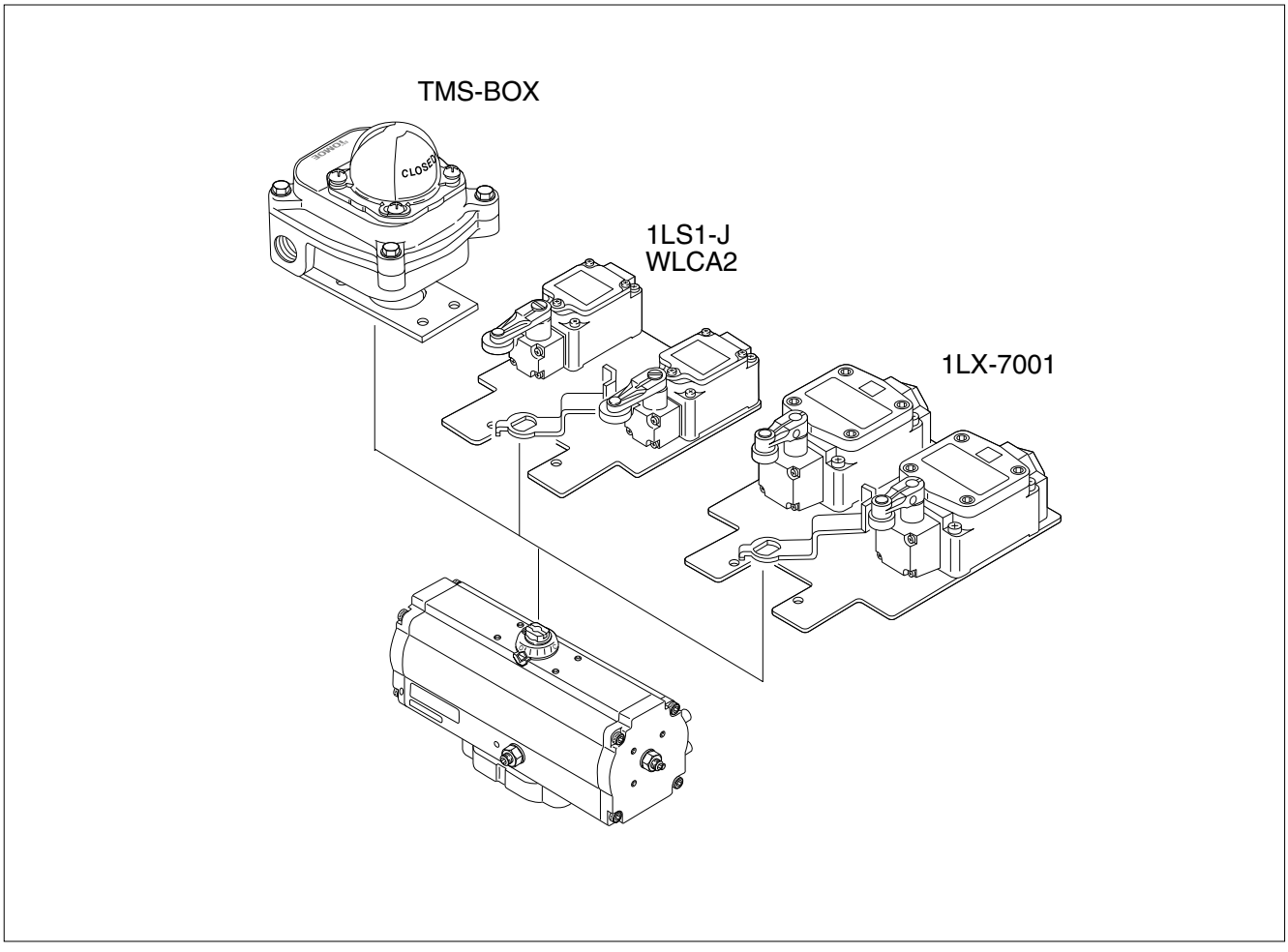
■Purpose

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	1LX-7001	VCX-7003
Manufacturer	Tomoe	Azbil (1LS1-J) OMRON (WLCA2)	Azbil	Azbil
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: ExdⅡBT6)	IP67	IP67, Exde ⅡC T6	IP67, Exde ⅡC T6
Rated voltage	AC250V-16A DC125V-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 60 degrees C	−10 to 60 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 that those listed above. For details, please consult us.



New T-DYNAMO Proximity switches

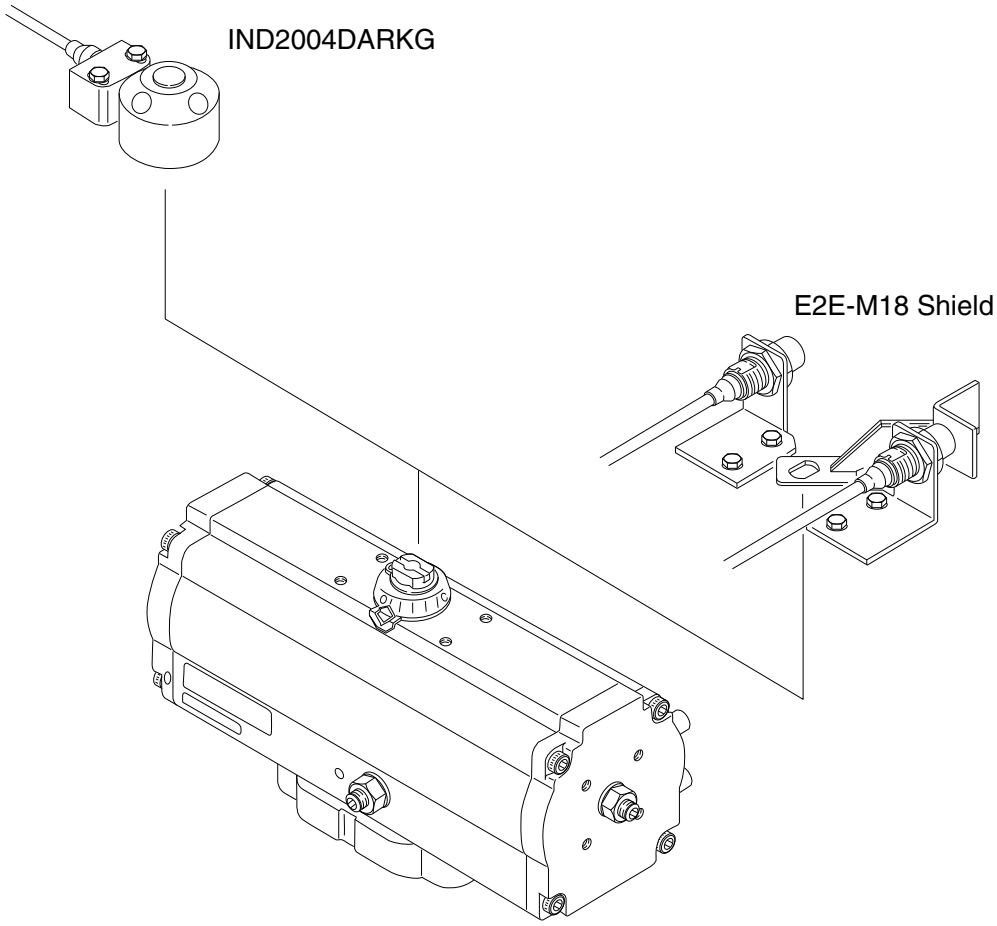
■Purpose

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.)	Direct-mounting proximity switch
Type	E2E-X7D1-N	IND2004DARKG
Manufacturer	OMRON	efector
With power source	DC 2-wire system	DC 2-wire system
Motion mode	NO	NO
Detecting distance	0 to 5.6mm	4mm±10%
Object to be detected	Magnetic metal (stainless steel possible)	Dedicated target
Power source voltage	DC12 to 24V	DC10 to 36V
Current consumption	3 to 100mA	min 4mA
Class of insulation	IP67	IP67
Operating temperature	−25 to 70 degrees C	−25 to 80 degrees C
Connection	Cord draw type (2m)	Cord draw type (2m)
Contacts	On or off detection with one Two for both on and off detection	2-point switch detection possible with a single unit
Weight	0.43 kg (including mounting plate): 1 piece	0.23 kg (including mounting plate): 1 piece

Remark: The above are standard TOMOE-compatible proximity switches. It is also possible to install limit switches other that 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.



New T-DYNAMO Positioners

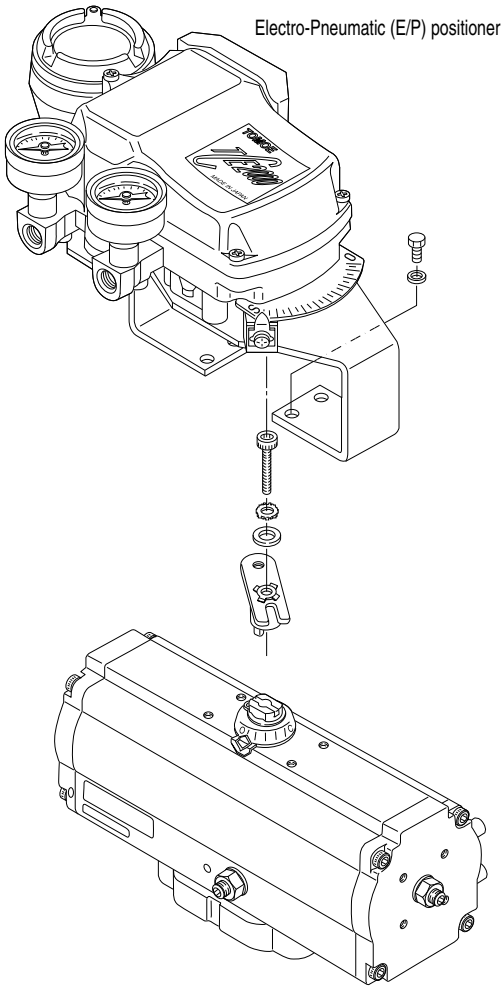
■Purpose

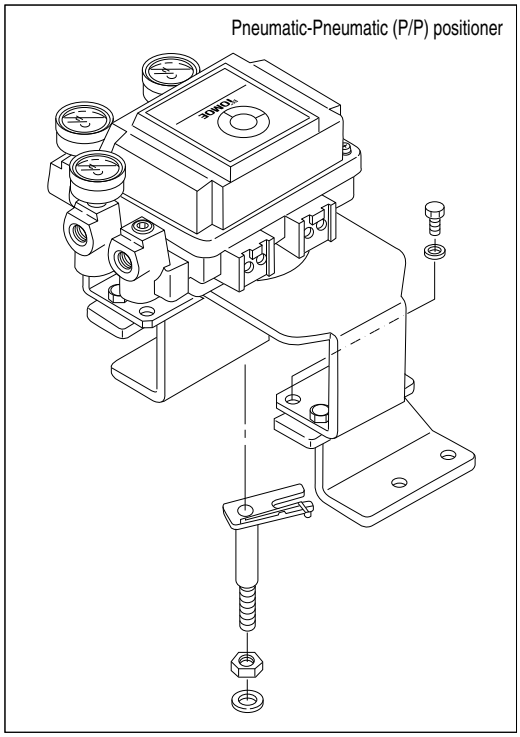
A positioners are used for quick and accurate control of the valve opening angle with pneumatic signals or 4-20mA DC input signals from a control room or controller unit.

■Standard specifications

	Electro-Pneumatic, analog	Electro-Pneumatic, analog	Pneumatic-Pneumatic
Type	TCE2000	TP8100	IP5100
Manufacturer	Tomoe	Tomoe	SMC
Input signal	4 to 20mA	4 to 20mA	0.02 to 0.1MPa
Resistance	250Ω (4 to 20mADC)	235±15Ω (4 to 20mADC)	—
Supply air	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)	200L/min. or more (SUP=0.4MPa)
Air consumption	Within 11L/min. (SUP=0.4MPa)	Within 11L/min. (SUP=0.4MPa)	Within 11L/min. (SUP=0.4MPa)
Operating temperature	−20 to 83 degrees C (Non explosion-proof) −20 to 60degrees C (Explosion-proof type d2G4)	−20 to 8 degrees C (Non explosion-proof) −20 to 60 degrees C (Explosion-proof type d2G4)	−20 to 80 degrees C
Class of insulation	IP65, ExdⅡBT6X	IP65, ExdⅡBT5	—
Air connection port size	Rc1/4	Rc1/4	Rc1/4
Conduit entry	2-G1/2	2-G1/2	—
Sensitivity	Within 0.5%FS	Within 0.5%FS	Within 0.5%FS
Linearity	Within ±1.5%FS	Within ±2%FS	Within ±2%FS
Hysterisis	Within 1%FS	Within 1%FS	Within 1%FS
Option	—	—	—
Weight	2.3kg	2.6kg	1.2kg

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





New T-DYNAMO Manual operation unit

■Purpose

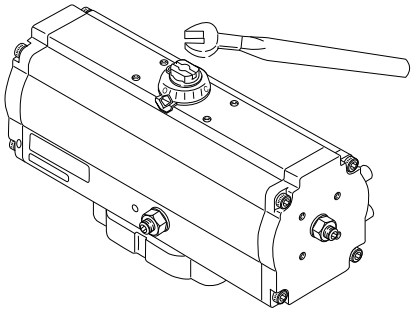
The operation unit is for manual operation of the pneumatic cylinder when air supply fails.

■Standard specifications

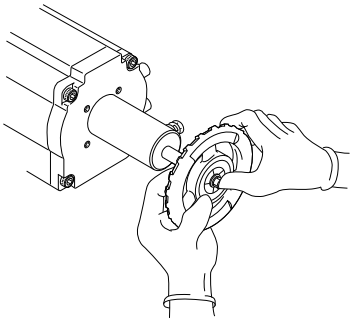
	Function	Type	Applicable cylinder	Remarks
1	Manual lever	Lever	T35, T85, T200, T380 (Double-acting)	(1) Be sure to open the bypass valve. (2) Never use for any single acting type cylinder.
2	Side handle	Screw handle	T85S, T200S, T380S, T750S (Single-acting)	(1) Restore the valve angle in the position air supply shutted off when restarting the automatic operation.
3	Manual gear unit	Worm gear	T200, T380, T750 (Double-acting)	(1) Restore the valve angle in the position air supply shutted off when restarting the automatic operation.

※Do not input signal to the solenoid valve or positioner during operation.
※To be combined use of manual operation unit and bypass valve for Double-acting.

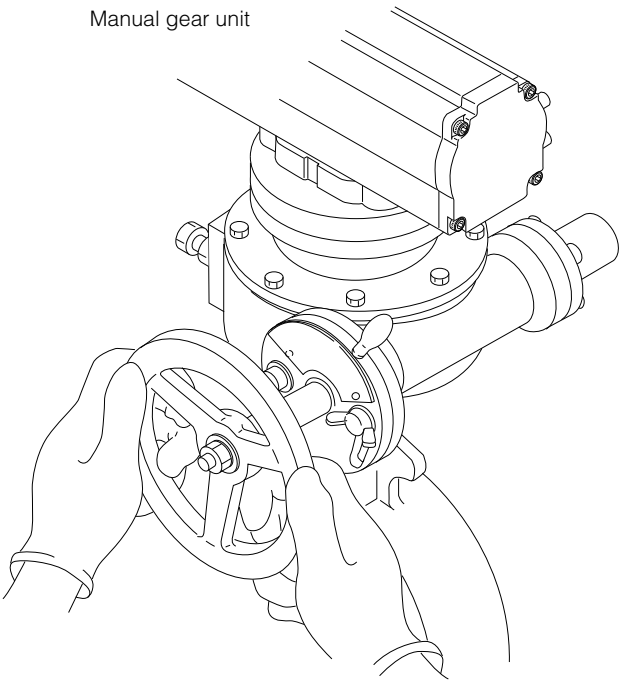
Manual lever



Side handle



Manual gear unit



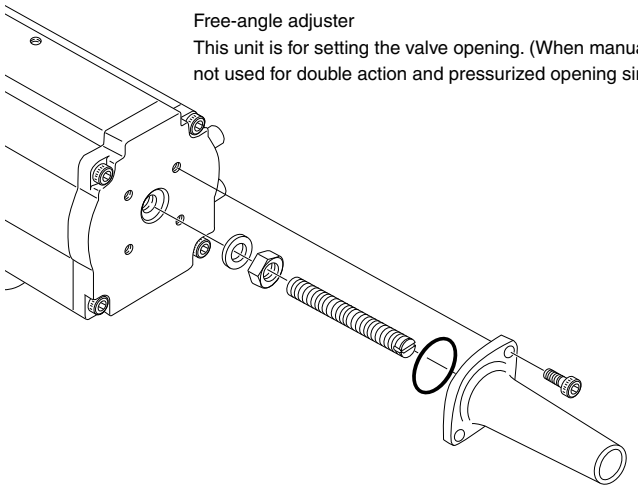
New T-DYNAMO Free-angle adjuster

■Purpose

Free-angle adjuster enables to set open/close angle depending on users' demand.

■Standard specifications

Function	Type	Applicable cylinder	Remarks
Free-angle adjuster	Side adjust screw	T35 to T750/T85S to T750S (Air to open)	Remove the cylinder cover, loosen the lock nut and insert the bolt to adjust the stroke angle. Tighten the lock nut and attach the cylinder cover in position.



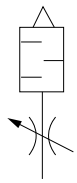
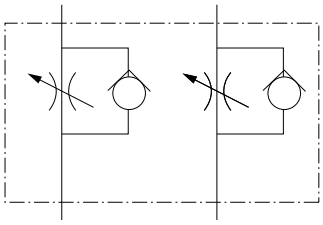
Free-angle adjuster
This unit is for setting the valve opening. (When manual operation unit is not used for double action and pressurized opening single action.)

New T-DYNAMO Speed controllers

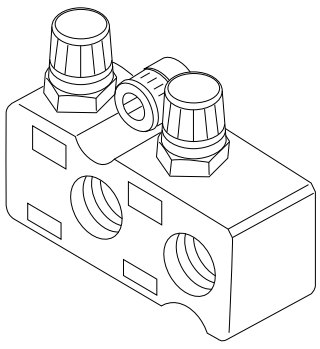
■Purpose

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	MV-2-Z03-017	SP-K017-Z03-006
Manufacturer	Kuroda	Kuroda
JIS symbol		
Applicable cylinder type	With PCS 2406-K090-Z132 solenoid valve mounted	Other than indicated at left
Function	With silencer	—
Needle revolution	10 rotations	11 rotations
Adjustable range	5 to 15 secs.	5 to 15 secs.
Air connection port size	—	Rc1/4
Attachement	Screw into solenoid valve exhaust port (Rc 3/8)	Install to cylinder
Weight	0.06kg	0.6kg

SP-K017-Z03-006



Remark: The above are standard TOMOE-compatible speed controllers. It is also possible to install speed controllers other that those listed above. For details, please consult us.
Remark: In case of Single-action (spring open, type 7F), speed controller type is SP-K017-Z12-003-F.

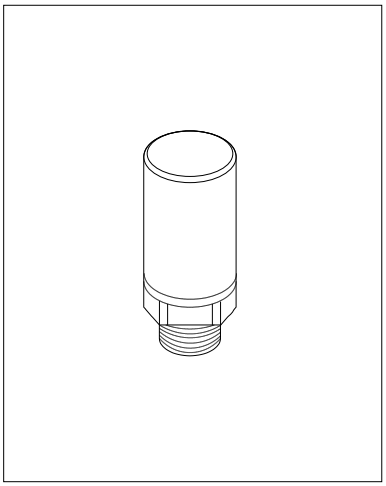
New T-DYNAMO Silencers

■Purpose

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

■Standard specifications

Type	AN103-KM6	AN20-02
Manufacturer	SMC	SMC
JIS symbol		
Applicable cylinder type	T35 to T750/T85S to T750S	T35 to T750/T85S to T750S
Effect of muffing	25dB (A)	30dB (A)
Operating temperature	5 to 60 degrees C	5 to 60 degrees C
Port size	ϕ6	Rc1/4
Attachement	Install to exhaust port together with one-touch pipe coupler.	Screw into exhaust port.
Weigh	0.02kg	0.02kg



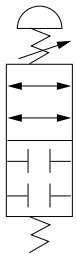
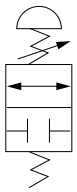
Remark: The above are standard TOMOE-compatible silencers. It is also possible to install silencers other that those listed above. For details, please consult us.

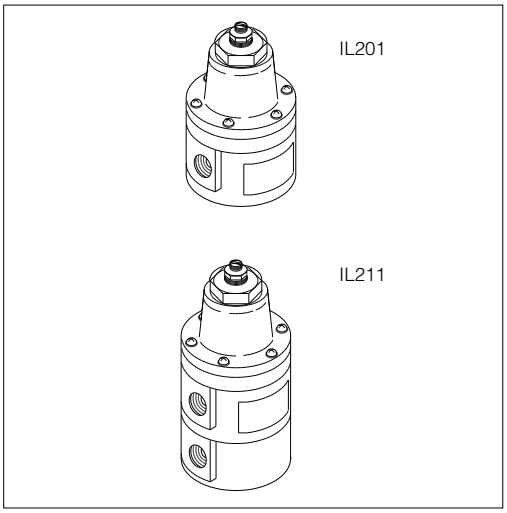
New T-DYNAMO Lock-up valves

■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	IL201-02
Manufacturer	SMC	SMC
JIS symbol		
Applicable cylinder type	T35 to T750	T85S to T750S
Effective sectional area	17mm^2	17mm^2
Operating temperature	—5 to 60 degrees C	—5 to 60 degrees C
Air connection port size	Rc1/4	Rc1/4
Signal pressure connection port	Rc1/4	Rc1/4
Weight	0.64kg	0.43kg



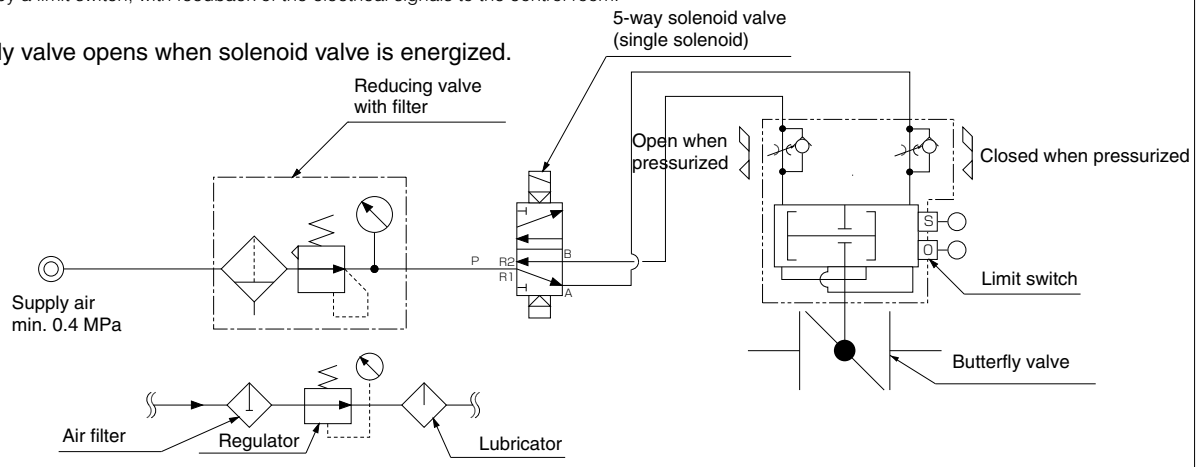
Remark: The above are standard TOMOE-compatible lock-up valves. It is also possible to install lock-up valves other that those listed above. For details, please consult us.

New T-DYNAMO Examples of standard air circuits for pneumatic actuators

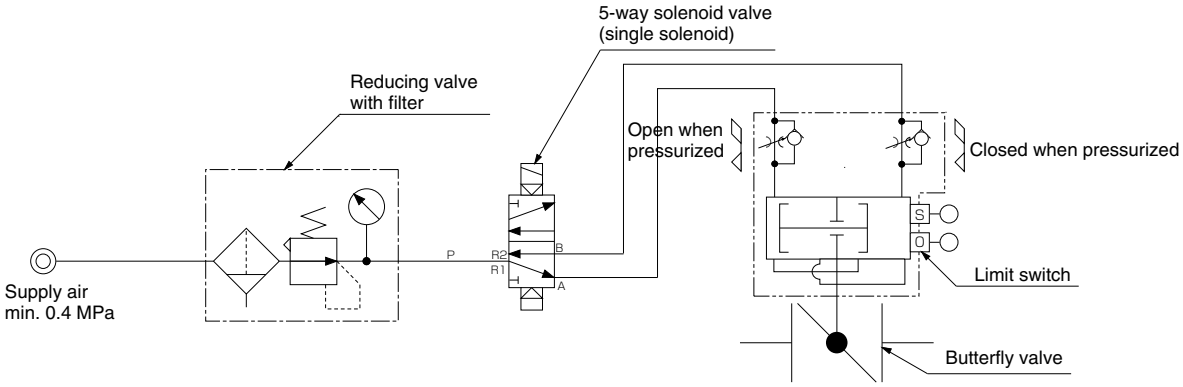
Standard and semi-standard accessories and their use
Example of standard air circuit for on/off operation (double-acting type)

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.

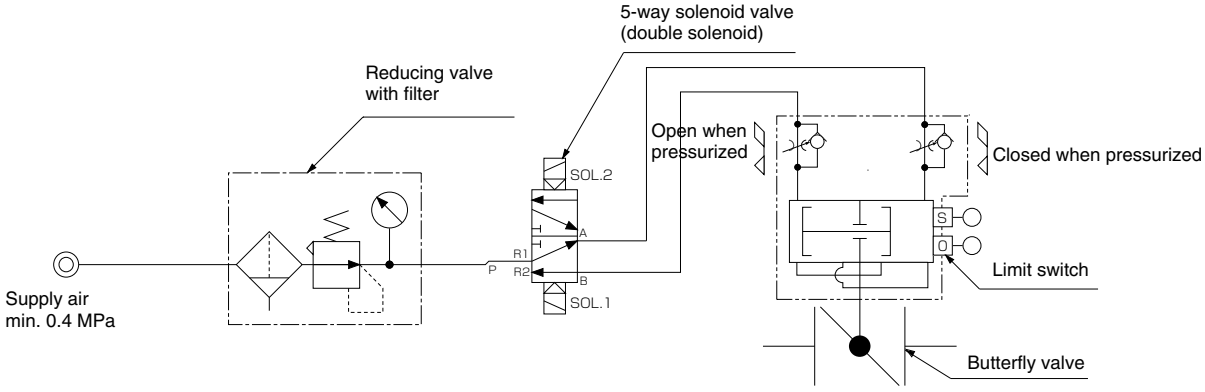
1 Butterfly valve opens when solenoid valve is energized.



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.

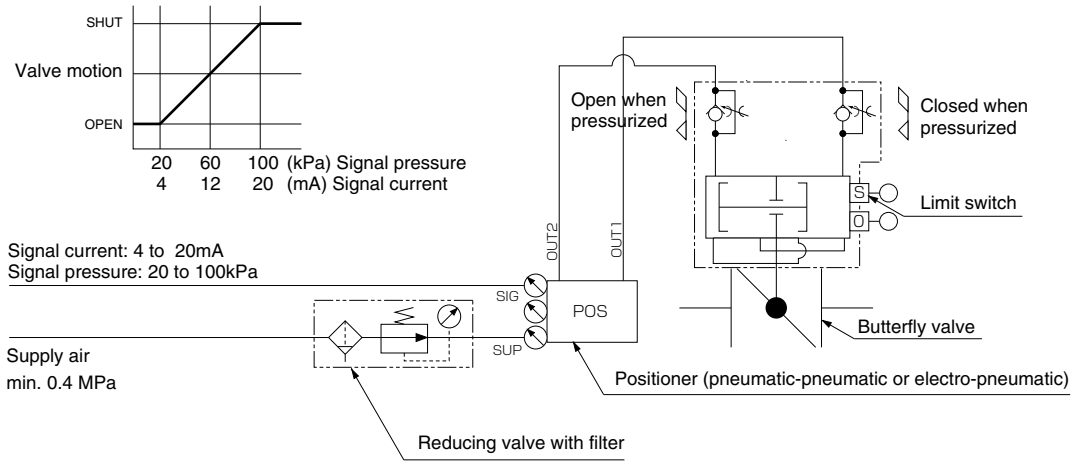


→Once SOL.1 is energized, the condition is maintained even after it is de-energized unless SOL.2 is energized.

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

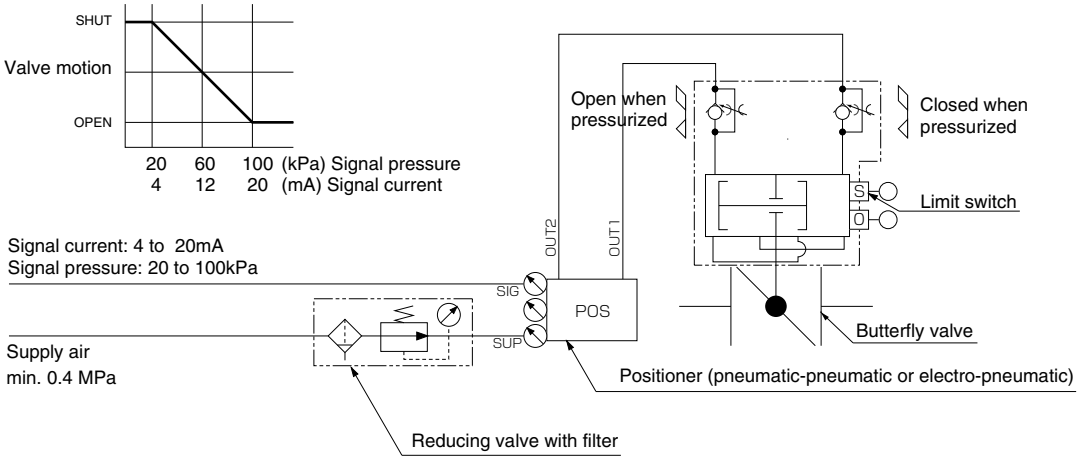
Shown below are examples of standard circuits in which a P/P or E/P positioner is attached to the butterfly valve driven by a double-acting pneumatic cylinder to give instruction signals from a remote control room to the positioner. This adjusts the valve opening exactly and quickly in proportion to 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.



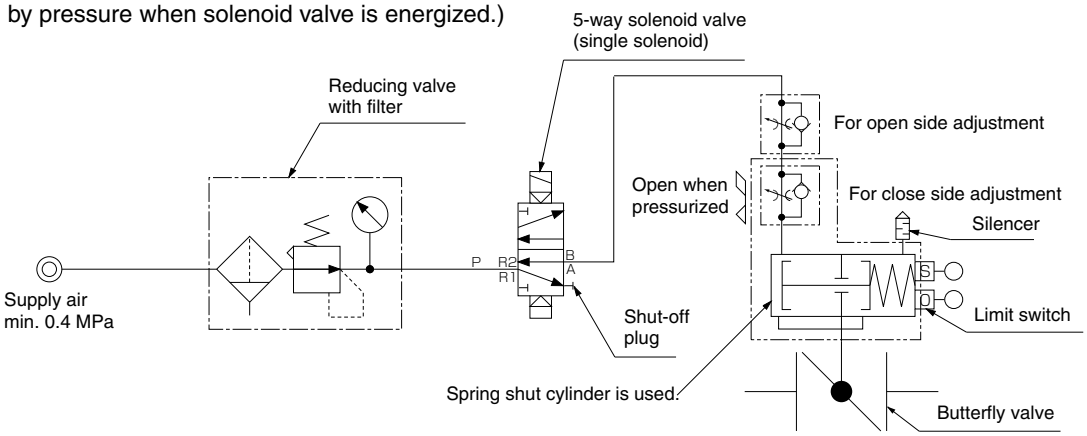
→The butterfly valve closes fully when input signal goes off under a state of assured air supply.

New T-DYNAMO Example of standard air circuits for pneumatic actuators

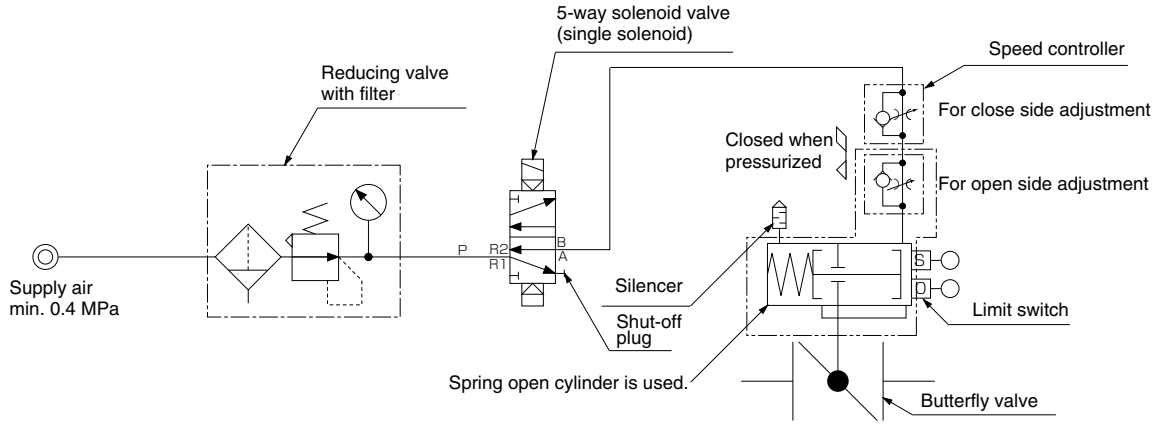
Example of standard air circuit for on/off operation (single-acting type)

Shown below are examples of standard circuits to operate the valve automatically to the safe side of open or close when the operating air supply or power supply fails in the middle of operation.

1 Butterfly valve closes when air supply falls.
(Opened by pressure when solenoid valve is energized.)
Butterfly valve closes when power supply falls.
(Opened by pressure when solenoid valve is energized.)



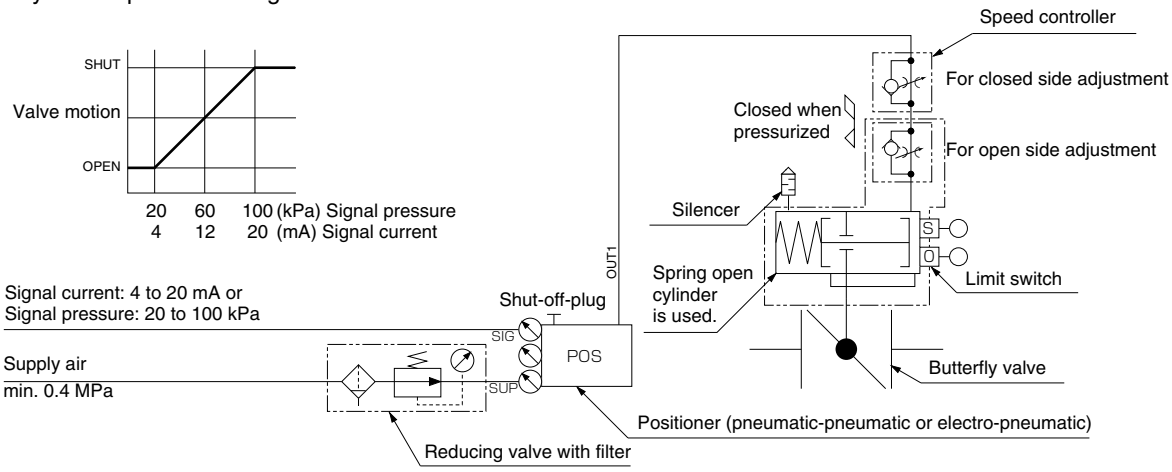
2 Butterfly valve opens when power supply falls.
(Closed by pressure when solenoid valve is energized.)
Butterfly valve opens when air supply falls.
(Closed by pressure when solenoid valve is energized.)



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

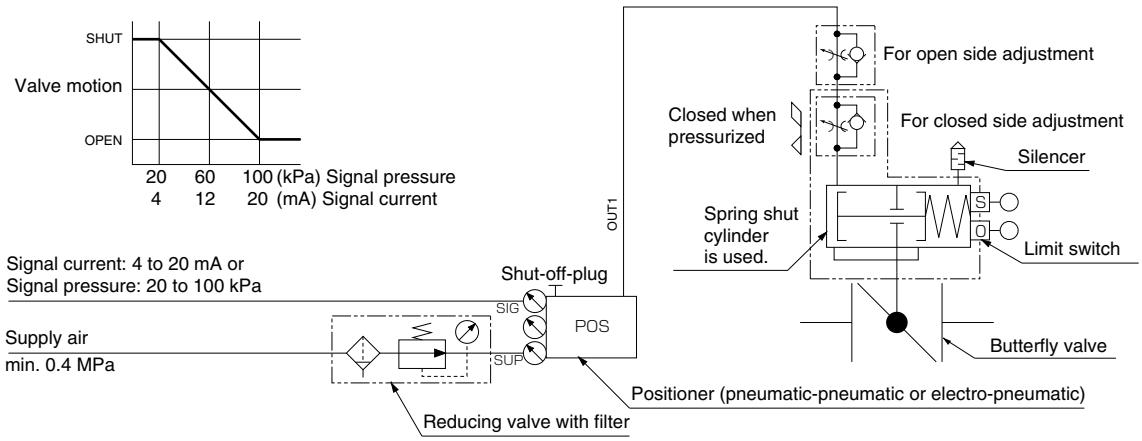
Shown below are examples of standard circuits in which the P/P or E/P positioner is attached to the butterfly valve driven by a single-acting pneumatic cylinder to adjust valve opening exactly and quickly in proportion to the signals transmitted by a local controller or from a remote control room. This will also detect the open/close position of the valve by a limit switch which sends feedback of the electric signals to the control room. When the operating air supply or power supply fails, the valve is automatically operated to the safe side of open or close.

3 Direct action
Butterfly valve closes when signal increases.
Butterfly valve opens when signal decreases.



→Butterfly valve opens when air supply fails.

4 Reverse action
Butterfly valve opens when signal increases.
Butterfly valve closes when signal decreases.



→Butterfly valve closes when air supply fails.