Pneumatic Cylinder

T-DYNAMO®

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.**
- **Built-in speed controller.**
- **Completely direct mounting of valve installation section.**
- **NAMUR mount at pneumatic port connections and accessories interface.**

T-DYNAMO Standard specifications

		Double-acting type					Single-acting type			
Output torque (N・m) (When supply pressure is 0.4 MPa and rotation angle is 0 ゜or 90 ゜)		K30	K70	K170	K370	K700	K70S	K170S	K370S	K700S
		30	70	170	370	700	25	60	115	230
Air Supply Press		0.4 to 0.7MPa								
Body shell max		1.0MPa								
Air Connection		Rc (PT) 1/4								
Rotating Angle		90 ゜(±5 ゜) Adjustment range: closed side −5 ゜to +95 ゜								
Ambient temperature/supply air temperature		−10 to 80 degrees C / −10 to 60 degrees C (Dry air, non-freezing)								
Travel time	with speed controller pressure 0.4MPa	2 to 15 sec	5 to 15 sec		7 to 20 sec	10 to 30 sec	5 to 15 sec		7 to 20 sec	10 to 30 sec

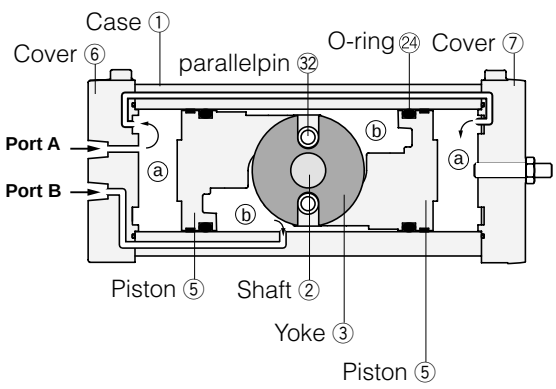
※Opening and closing times are provided as a guide. Actual times may be slower compared to the values in this table depending on the influence of air piping system, etc.

T-DYNAMO Princlple of operation

(1) The cylinder space which is enclosed by the case ① and the covers ⑥ and ⑦ is divided into the chambers ⓐ and ⓑ by the piston ⑤. Each chamber is sealed off with piston packing ㉔.

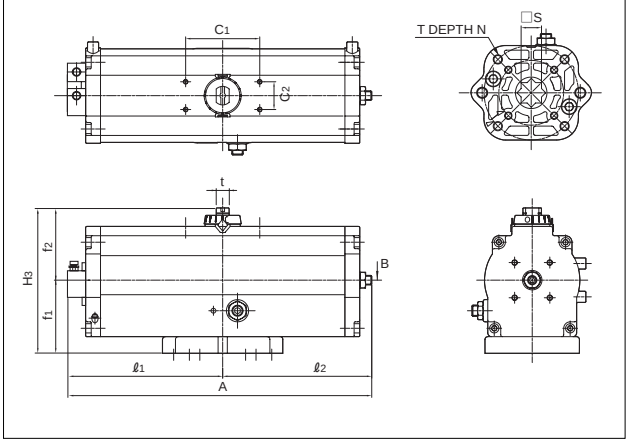
(2) The shaft ② penetrates the chamber ⓑ . The yoke ③ is fitted in the hole across the shaft in such a way that it allows it to slide in the hole. The top of the yoke is connected to the piston ⑤ with the parallel pin ㉜ such that it swings in accordance with the movement of the piston.

(3) The compressed air enters chamber ⓐ through port A and push the piston towards the left. The air in chamber ⓑ is exhausted through port B as the piston moves leftwards due to a pressure difference between the two chambers.Integrated with this piston, the parallel pin ㉜ also moves and generates torque in the shaft.

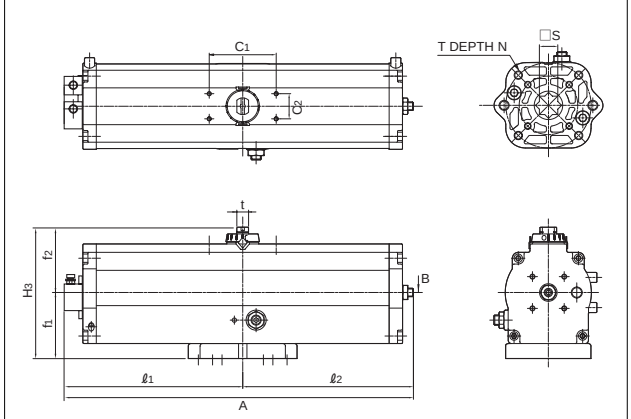


T-DYNAMO Dimensions

Double-acting type



Single-acting type



T-DYNAMO Dimension list

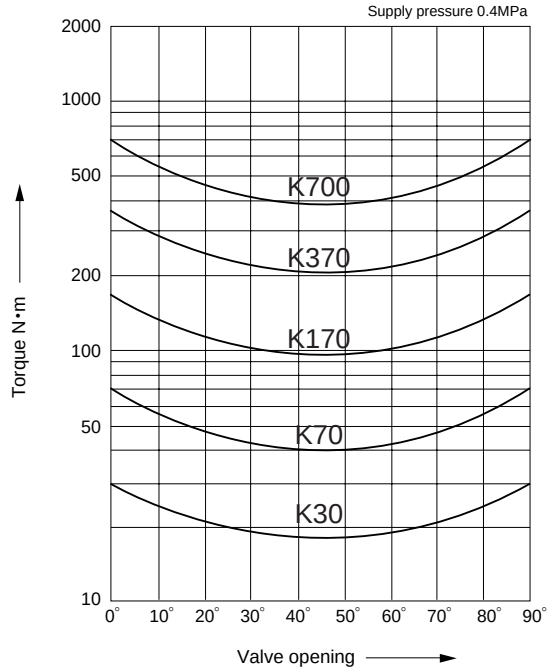
Cylinder type		Dimension (mm)											Cylinder capacity (ℓ)	Approx. Mass (kg)
		A	ℓ1	ℓ2	f1	f2	H3	C1	C2	S	N	T		
K30	P.C.D50	217	112	105	57	56	113	80	30	12	6	10	0.2	1.9
	P.C.D70										8	13		
K70	P.C.D50	266	136	130	66	67	133	80	30	17	6	10	0.5	3.9
	P.C.D70										8	16		
	P.C.D102										10	16		
K170	P.C.D70	330	170	160	79	78	157	80	30	22	8	12	1.1	6.6
	P.C.D102										10	16		
K370	P.C.D70	409	207	202	93	91	184	80	30	27	8	12	2.1	11.6
	P.C.D102										10	16		
	P.C.D125										12	18		
K700	P.C.D102	518	260	258	113	111	224	80	30	36	10	12	4.6	21.5
	P.C.D125										12	18		
	P.C.D140										16	18		

T-DYNAMO Dimension list

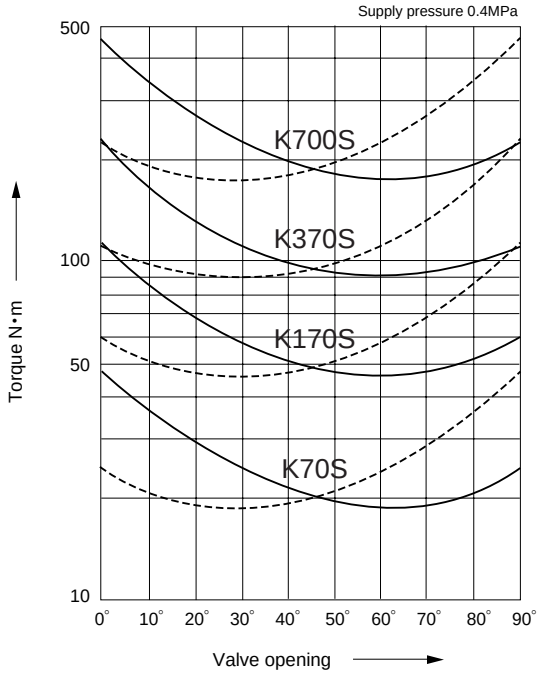
Cylinder type		Dimension (mm)											Cylinder capacity (ℓ)	Approx. Mass (kg)
		A	ℓ1	ℓ2	f1	f2	H3	C1	C2	S	N	T		
K70S	P.C.D50	347	177	170	66	67	133	80	30	17	6	10	0.5	5.1
	P.C.D70										8	16		
K170S	P.C.D50	428	219	209	79	78	157	80	30	22	6	10	1.1	8.9
	P.C.D70										8	12		
	P.C.D102										10	16		
K370S	P.C.D70	532	269	263	93	91	184	80	30	27	8	12	2.1	15.8
	P.C.D102										10	16		
	P.C.D125										12	18		
K700S	P.C.D102	698	350	348	113	111	224	80	30	36	10	12	4.6	30
	P.C.D125										12	18		
	P.C.D140										16	18		

T-DYNAMO Output torque curves

Double-acting type



Single-acting type (spring returned type)



1. The table shows the torque at an operatingair pressure of 0.4MPa .
2. Output torque for an operating air pressureof PMPa is given by : =P/0.4 X torque value obtained from the table.
3. On the single-acting type, a torque value varies with a direction of movement of the piston.
   (——— :output torque produced by air pressure,
   - - - - :output torque by spring force)
4. In the single-acting type, the spring power is equal to an operating air pressure of 0.4MPa. Even if the operating air pressure exceeds 0.4MPa, the output by the spring will be constant, as indicated by - - - lines.

T-DYNAMO Output torque

Double-acting type

(N・m)

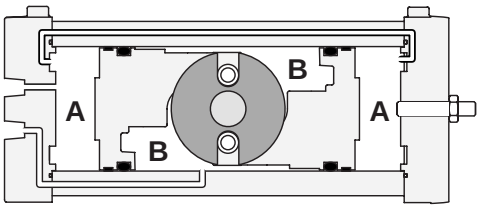
Type	Supply pressure (MPa)			
	0.4	0.5	0.6	0.7
K30	30	38	45	53
K70	70	88	105	123
K170	170	213	255	298
K370	370	463	555	648
K700	700	876	1051	1226

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°
K70S	45	25	63	43	80	60	98	78	25	45
K170S	110	60	153	103	195	145	238	188	60	110
K370S	255	115	348	208	440	300	533	393	115	255
K700S	470	230	646	406	821	581	996	756	230	470

T-DYNAMO Air consumpotion



(1) Required air consumption

Double-acting type

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

Single-acting type

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

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 aircon-sumption (Nℓ/sec)
CS : Single-acting type cylinder air consumption (Nℓ/sec)
t : Unit time (sec)

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

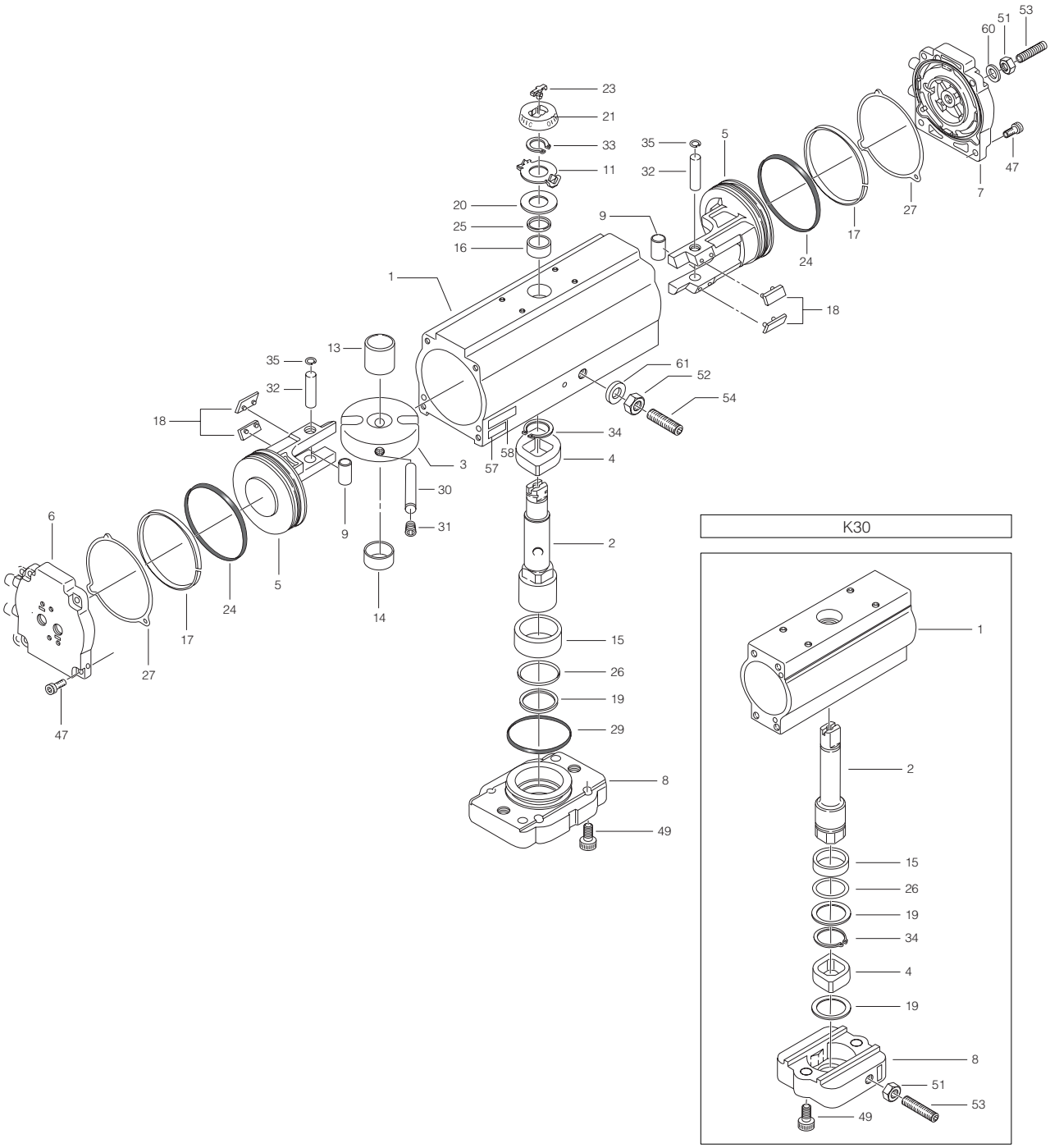
•Double-acting type

type	Cylinder capacity (ℓ)	
	A	B
K30	0.2	0.2
K70	0.4	0.5
K170	0.9	1.1
K370	1.8	2.1
K700	3.2	4.6

•Single-acting type

type	Cylinder capacity (ℓ)
	B
K70S	0.5
K170S	1.1
K370S	2.1
K700S	4.6

T-DYNAMO Expanded view of component K30 to K700 (double-acting type)



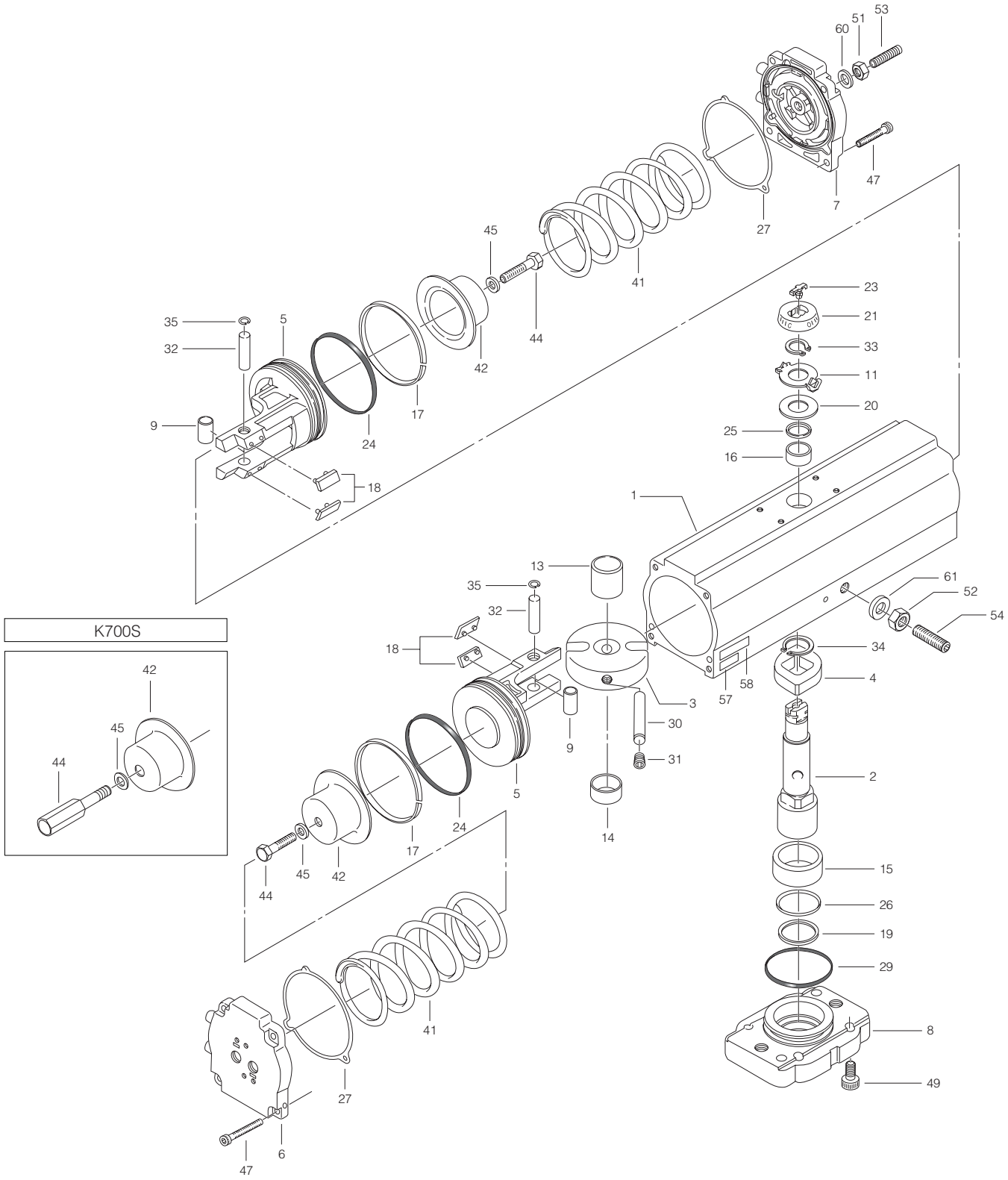
T-DYNAMO Parts list K30 to K700 (double-acting type)

■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	1	
★ 14	Bearing 2	1	
★ 15	Bearing 3	1	
☆ 16	Bearing 4	1	
★ 17	Wear ring	2	
★ 18	Piston support	4	
★ 19	Thrust plate 1	1	K30 : 2
★ 20	Thrust plate 2	1	
21	Position indicator	1	
23	Slit cover	1	
★ 24	Piston packing	2	
★ 25	Shaft packing 1	1	
★ 26	Shaft packing 2	1	
★ 27	Cover packing	2	
★ 29	O-ring (base plate)	1	K70 to K700
★ 30	Connecting pin	1	
★ 31	Plug	1	
32	Parallel pin	2	
★ 33	C-retainer (upper shaft)	1	
34	C-retainer (lower shaft)	1	
35	C-retainer (piston)	2	K70 to K700
47	Hexagon bolt (cover: double-acting)	8	
49	Hexagon bolt (base plate)	2	
51	Hexagon nut	1	
52	Hexagon nut	1	
53	Hexagon stop screw	1	
54	Hexagon stop screw	1	
57	Serial No. plate	1	
58	Spec plate	1	
★ 60	Seal washer	1	
★ 61	Seal washer	1	K70 to K700

Note: Recommended maintenance parts are indicated by "★" before the part number. (☆ : Only K30)
To order a set of recommended maintenance parts, please specify "O-ring set".

T-DYNAMO Expanded view of component K70S to K700S (single-acting type)



T-DYNAMO Expanded view of component K70S to K700S (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	1	
★ 14	Bearing 2	1	
★ 15	Bearing 3	1	
16	Bearing 4	1	
★ 17	Wear ring	2	
★ 18	Piston support	4	
★ 19	Thrust plate 1	1	
★ 20	Thrust plate 2	1	
21	Position indicator	1	
23	Slit cover	1	
★ 24	Piston packing	2	
★ 25	Shaft packing 1	1	
★ 26	Shaft packing 2	1	
★ 27	Cover packing	2	
★ 29	O-ring (base plate)	1	
★ 30	Connecting pin	1	
★ 31	Plug	1	
32	Parallel pin	2	
★ 33	C-retainer (upper shaft)	1	
34	C-retainer (lower shaft)	1	
35	C-retainer (piston)	2	
41	Spring	2	
42	Spring guide	2	
44	Hexagon bolt (single-acting)	2	K700S : 1
45	Spring washer (single-acting)	2	
46	Stopper bolt	1	Only K700S
47	Hexagon bolt (cover: single-acting)	8	
49	Hexagon bolt (base plate)	2	
51	Hexagon nut	1	
52	Hexagon nut	1	
53	Hexagon stop screw	1	
54	Hexagon stop screw	1	
57	Serial No. plate	1	
58	Spec plate	1	
★ 60	Seal washer	1	
★ 61	Seal 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".

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
Standard accessory (included without being specified)	Speed controller unit		Unit	Kuroda	SP-K017-Z03-006	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	Plug			Tomoe		○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	Silencers			SMC	AN103-KM6	
	Full closing adjustment	−5 to + 5 °		Tomoe		○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	Full opening adjustment mechanism	70 to 95 °		Tomoe		○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	Indicator	0 to 90 °(4-step scale)		Tomoe		○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
Semi-standard	Bypass unit			Kuroda	BP-K095-Z04-002	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	Five-port/2-position non explosion-proof solenoid valve	Direct mounting	Single	Kuroda	PCS2406-K090-Z03-132-**	○ ○ ○ ○
			Double	Kuroda	PCD2406-K090-Z04-120-**	○ ○ ○ ○
	Five-port/2-position explosion-proof solenoid valve		Single	Kaneko	MK15G-8-※-DMI	○ ○
			Double	Kaneko	MK15DG-8-※-DMI	○ ○
	Exhaust diaphragm valve		For solenoid valves	Kuroda	MV-2-Z03-017	○ ○ ○ ○ ○ ○
	Filter regulator	Direct mounting		Kuroda	JB08-T2-FL00	○ ○ ○ ○
		Mounted separately using bracket		Kuroda	JB08-T2-FL00	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	Limit switch	Non-explosion-proof BOX type	90 °,70 °, fully open	Tomoe	TMS-3**-**-**-**-**-*	● ● ● ● ● ● ● ●
		Explosion-proof BOX type		Tomoe	TMS-4**-**-**-**-**-*	● ● ● ●
		Non-explosion-proof - mounted separately	90 °	Yamatake/OMERON	1LS1-J/WLCA2	● ● ● ● ● ● ●
				Yamatake	VCL-5001	● ● ● ● ● ● ●
			70 °	Yamatake/OMERON	1LS1-J/WLCA2	● ● ● ● ● ● ●
				Yamatake	VCL-5001	● ● ● ● ● ● ●
			Fully open	Yamatake/OMERON	1LS1-J/WLCA2	● ● ● ●
				Yamatake	VCL-5001	● ● ● ●
		Explosion-proof - mounted separately	90 °	Yamatake	1LX-5001	● ● ●
				Yamatake	VCX-5001	● ● ●
			70 °	Yamatake	1LX-5001	● ● ●
				Yamatake	VCX-5001	● ● ●
			Fully open	Yamatake	1LX-5001	● ● ● ●
				Yamatake	VCX-5001	● ● ● ●
	Proximity switch	Direct mounting	90 ônly	Efctor	IND2004	● ● ●
		Mounted separately	90 °	OMERON	(M18 shield) E2E-X7D1-N	● ● ● ● ● ● ●
				OMERON	(M18 non-shield) E2E-X14MD1	● ● ● ● ● ● ●
			70 °	OMERON	(M18 shield) E2E-X7D1-N	● ● ● ● ● ● ●
				OMERON	(M18 non-shield) E2E-X14MD1	● ● ● ● ● ● ●
			Fully open	OMERON	(M18 shield) E2E-X7D1-N	● ● ● ●
				OMERON	(M18 non-shield) E2E-X14MD1	● ● ● ●
	Positioner	Electro-pneumatic		Tomoe (SSS)	TCE2000	○ ○ ○ ○
				Tomoe (SMC)	TP8100	○ ○ ○ ○
		Pneumatic-pneumatic		SMC	IP5100	○ ○ ○ ○
	Manual operating	Manual lever (K30,K70,K170)	BOX type	Tomoe		○ ○
			Spanner type	Tomoe		○ ○ ○ ○ ○ ○ ● ● ● ● ● ●
		Manual gear unit				
		Manual screw handle				○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	Stroke adjuster	15 to 95 °				○ ○ ○ ○ ○ ○

	Double-acting type
Non-explosion-proof specifications	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
Explosion-proof specifications	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
Solenoid valve	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
Positioner	○ ○ ○ ○
Stroke adjuster	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

"○": Indicates the accessories than can be together in conjunction with the double-action cylinder."●": Restricted items; only one of the items in the same column marked with a "●" can be used at a time.

T-DYNAMO Standard Accessory Combination Chart

■Single-action (spring opening 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.	Closed when pressurized (spring opening)
Standard accessory (included without being specified)	Speed controller unit		Unit	Kuroda	SP-K017-Z03-006	○ ○
	Plug			Tomoe		○ ○
	Silencers			SMC	AN103-KM6	○ ○
	Full closing adjustment	−5 to + 5 °		Tomoe		○ ○
	Full opening adjustment mechanism	70 to 95 °		Tomoe		※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1
	Indicator	0 to 90 °(4-step scale)		Tomoe		○ ○
Semi-standard	Bypass unit			Kuroda	BP-K095-Z04-002	○
	Five-port/2-position non explosion-proof solenoid valve	Direct mounting	Single	Kuroda	PCS2406-K090-Z03-132-**	○ ○
			Double	Kuroda	PCD2406-K090-Z04-120-**	○ ○
	Five-port/2-position explosion-proof solenoid valve		Single	Kaneko	MK15G-8-※-DMI	○ ○
			Double	Kaneko	MK15DG-8-※-DMI	○ ○
	Exhaust diaphragm valve		For solenoid valves	Kuroda	MV-2-Z03-017	○ ○ ○ ○ ○ ○
	Filter regulator	Direct mounting		Kuroda	JB08-T2-FL00	○ ○
		Mounted separately using bracket		Kuroda	JB08-T2-FL00	○ ○
	Limit switch	Non-explosion-proof BOX type	90 °,70 °, fully open	Tomoe	TMS-3**-**-**-**-**-*	● ● ● ● ● ●
		Explosion-proof BOX type		Tomoe	TMS-4**-**-**-**-**-*	● ● ● ● ● ●
		Non-explosion-proof - mounted separately	90 °	Yamatake/OMERON	1LS1-J/WLCA2	● ● ● ● ● ●
				Yamatake	VCL-5001	● ● ● ● ● ●
			70 °	Yamatake/OMERON	1LS1-J/WLCA2	● ● ● ● ● ●
				Yamatake	VCL-5001	● ● ● ● ● ●
			Fully open	Yamatake/OMERON	1LS1-J/WLCA2	● ● ● ● ● ●
				Yamatake	VCL-5001	● ● ● ● ● ●
		Explosion-proof - mounted separately	90 °	Yamatake	1LX-5001	● ● ● ● ● ●
				Yamatake	VCX-5001	● ● ● ● ● ●
			70 °	Yamatake	1LX-5001	● ● ● ● ● ●
				Yamatake	VCX-5001	● ● ● ● ● ●
			Fully open	Yamatake	1LX-5001	● ● ● ● ● ●
				Yamatake	VCX-5001	● ● ● ● ● ●
	Proximity switch	Direct mounting	90 8nly	Efctor	IND2004	● ● ● ● ● ●
		Mounted separately	90 °	OMERON	(M18 shield) E2E-X7D1-N	● ● ● ● ● ●
				OMERON	(M18 non-shield) E2E-X14MD1	● ● ● ● ● ●
			70 °	OMERON	(M18 shield) E2E-X7D1-N	● ● ● ● ● ●
				OMERON	(M18 non-shield) E2E-X14MD1	● ● ● ● ● ●
			Fully open	OMERON	(M18 shield) E2E-X7D1-N	● ● ● ● ● ●
				OMERON	(M18 non-shield) E2E-X14MD1	● ● ● ● ● ●
	Positioner	Electro-pneumatic		Tomoe (SSS)	TCE2000	○ ○ ○ ○ ○ ○
				Tomoe (SMC)	TP8100	○ ○ ○ ○ ○ ○
		Pneumatic-pneumatic		SMC	IP5100	○ ○ ○ ○ ○ ○
	Manual operating	Manual lever (K30,K70,K170)	BOX type	Tomoe		
			Spanner type	Tomoe		
		Manual gear unit				○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
		Manual screw handle				
	Stroke adjuster	15 to 95 °				※2 ※2 ※2 ※2 ※2 ※2 ※2 ※2 ※2 ※2 ※2 ※2
						○

Non-explosion-proof specifications	○		○		○				○		○		○		○		○		○		○		○	
Explosion-proof specifications		○		○				○		○		○		○		○		○		○		○		○
Solenoid valve					○	○					○	○					○	○					○	○
Positioner			○	○		○	○		○	○					○	○					○	○		
Stroke adjuster								○	○	○	○	○							○	○	○	○	○	○
Manual gear unit													○	○	○	○	○	○	○	○	○	○	○	○

"○": Indicates in individual columns the group of accessories that can be used together in conjunction with the single-action cylinder. "●": Restricted items; only one of the items marked with a "●" in the same can be used at one time.

*1: Uses a special case (main cylinder body) with a single-action full-opening adjustment mechanism.

*2: With an externally-mounted stroke adjuster between the valve and cylinder.

T-DYNAMO Standard Accessory Combination Chart

■Single-action (spring shutting 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.	Open when pressurized (spring shut)
Standard accessory (included without being specified)	Speed controller unit		Unit	Kuroda	SP-K017-Z03-006	○ ○
	Plug			Tomoe		○ ○
	Silencers			SMC	AN103-KM6	○ ○
	Full closing adjustment	−5 to + 5 °		Tomoe		○ ○
	Full opening adjustment mechanism	70 to 95 °		Tomoe		○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1 ※1
	Indicator	0 to 90 °(4-step scale)		Tomoe		○ ○
Semi-standard	Bypass unit			Kuroda	BP-K095-Z04-002	
	Five-port/2-position non explosion-proof solenoid valve	Direct mounting	Single	Kuroda	PCS2406-K090-Z03-132-**	○ ○
			Double	Kuroda	PCD2406-K090-Z04-120-**	○ ○
	Five-port/2-position explosion-proof solenoid valve		Single	Kaneko	MK15G-8-※-DMI	○ ○
			Double	Kaneko	MK15DG-8-※-DMI	○ ○
	Exhaust diaphragm valve		For solenoid valves	Kuroda	MV-2-Z03-017	○ ○ ○ ○ ○ ○
	Filter regulator	Direct mounting		Kuroda	JB08-T2-FL00	○ ○
		Mounted separately using bracket		Kuroda	JB08-T2-FL00	○ ○
	Limit switch	Non-explosion-proof BOX type	90 °,70 °, fully open	Tomoe	TMS-3**-**-**-**-**-*	● ● ● ● ● ● ● ●
		Explosion-proof BOX type		Tomoe	TMS-4**-**-**-**-**-*	● ●
		Non-explosion-proof - mounted separately	90 °	Yamatake/OMERON	1LS1-J/WLCA2	● ●
				Yamatake	VCL-5001	● ●
			70 °	Yamatake/OMERON	1LS1-J/WLCA2	● ●
				Yamatake	VCL-5001	● ●
			Fully open	Yamatake/OMERON	1LS1-J/WLCA2	● ●
				Yamatake	VCL-5001	● ●
		Explosion-proof - mounted separately	90 °	Yamatake	1LX-5001	● ●
				Yamatake	VCX-5001	● ●
			70 °	Yamatake	1LX-5001	● ●
				Yamatake	VCX-5001	● ●
			Fully open	Yamatake	1LX-5001	● ●
				Yamatake	VCX-5001	● ●
	Proximity switch	Direct mounting	90 8nly	Efctor	IND2004	● ●
		Mounted separately	90 °	OMERON	(M18 shield) E2E-X7D1-N	● ●
				OMERON	(M18 non-shield) E2E-X14MD1	● ●
			70 °	OMERON	(M18 shield) E2E-X7D1-N	● ●
				OMERON	(M18 non-shield) E2E-X14MD1	● ●
			Fully open	OMERON	(M18 shield) E2E-X7D1-N	● ●
				OMERON	(M18 non-shield) E2E-X14MD1	● ●
	Positioner	Electro-pneumatic		Tomoe (SSS)	TCE2000	○ ○ ○ ○ ○ ○ ○ ○
				Tomoe (SMC)	TP8100	○ ○ ○ ○ ○ ○ ○ ○
		Pneumatic-pneumatic		SMC	IP5100	○ ○ ○ ○ ○ ○ ○ ○
	Manual operating	Manual lever (K30,K70,K170)	BOX type	Tomoe		
			Spanner type	Tomoe		
		Manual gear unit				○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
		Manual screw handle				
	Stroke adjuster	15 to 95 °				○ ○ ○ ○ ○ ○ ※2 ※2 ※2 ※2 ※2 ※2

Non-explosion-proof specifications	○ ○
Explosion-proof specifications	○ ○
Solenoid valve	○ ○
Positioner	○ ○
Stroke adjuster	○ ○
Manual gear unit	○ ○

"○": Indicates in individual columns the group of accessories that can be used together in conjunction with the single-action cylinder. "●": Restricted items; only one of the items marked with a "●" in the same can be used at one time.

*1: Uses a special case (main cylinder body) with a single-action full-opening adjustment mechanism.

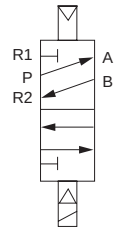
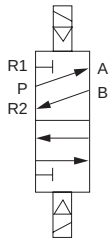
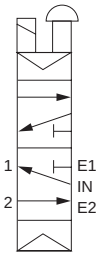
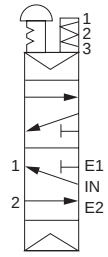
*2: With an externally-mounted stroke adjuster between the valve and cylinder.

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	K30 to K700/K70S to K700S	K30 to K700/K70S to K700S	K30 to K700/K70S to K700S	K30 to K700/K70S to K700S
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

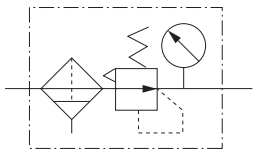
Remark: The above are standard TOMOE-compatible solenoid valves. It is also possible to install solenoid valves other that those listed above such as a double solenoid or 3-port solenoid valve. For details, please consult us.

T-DYNAMO Filter regulators (Pressure reducer with filter)

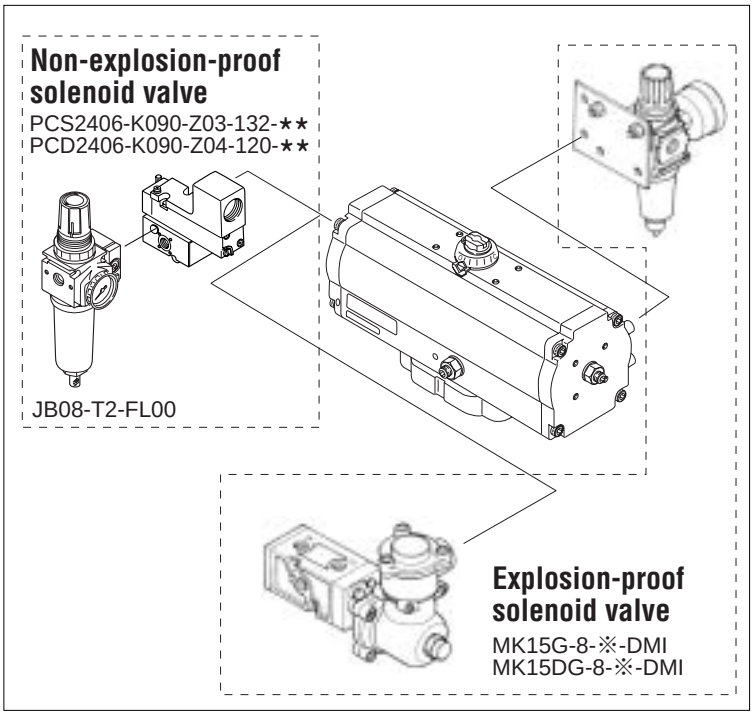
■Purpose

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	JB08-T2-FL00
Manufacturer	Kuroda
JIS symbol	
Applicable cylinder type	K30 to K700/K70S to K700S
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.

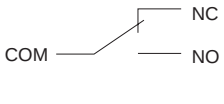
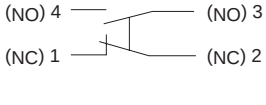
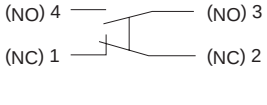
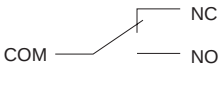


T-DYNAMO Limit switches

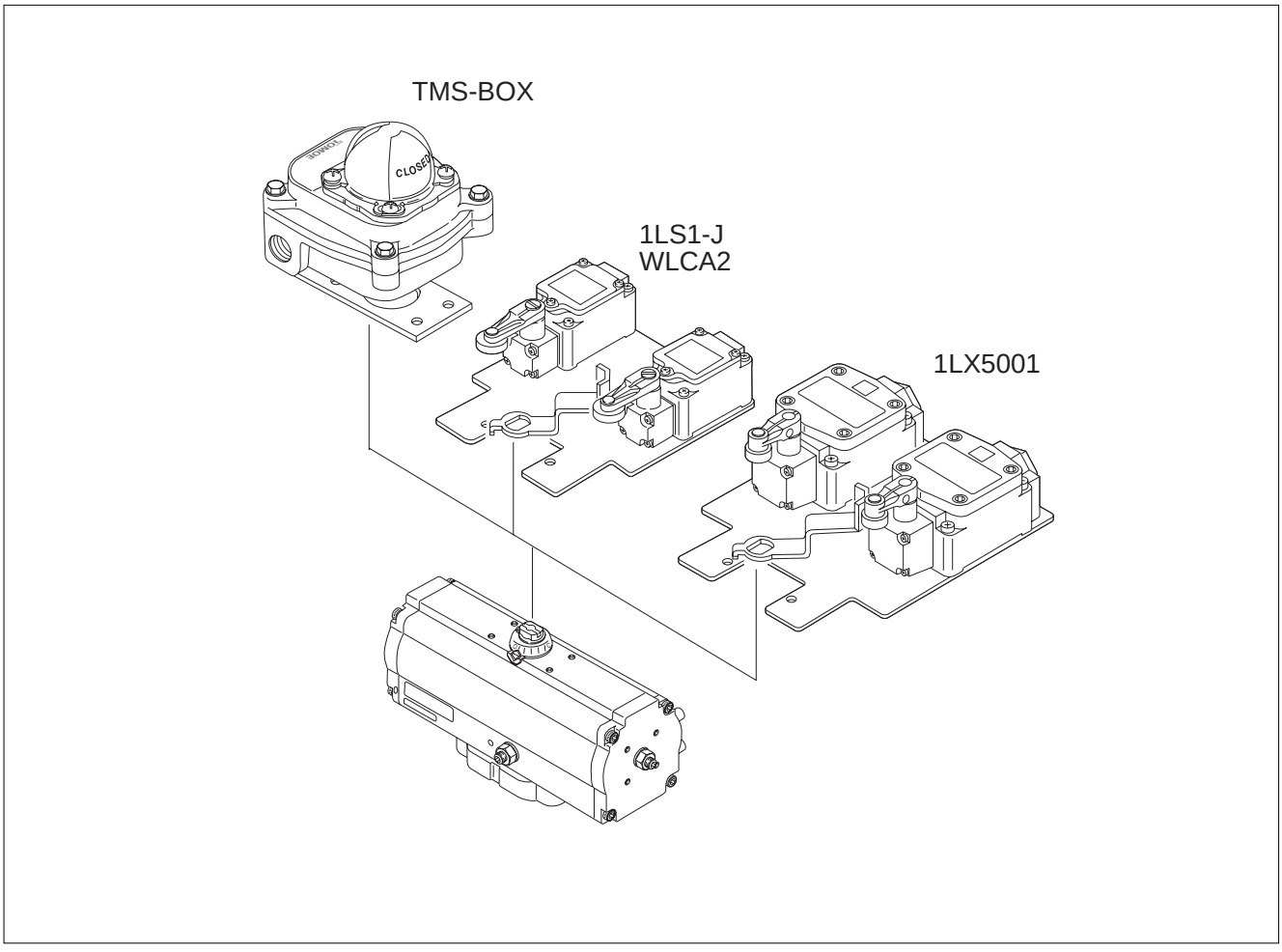
■Purpose

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	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 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 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 that those listed above. For details, please consult us.



T-DYNAMO Proximity switches

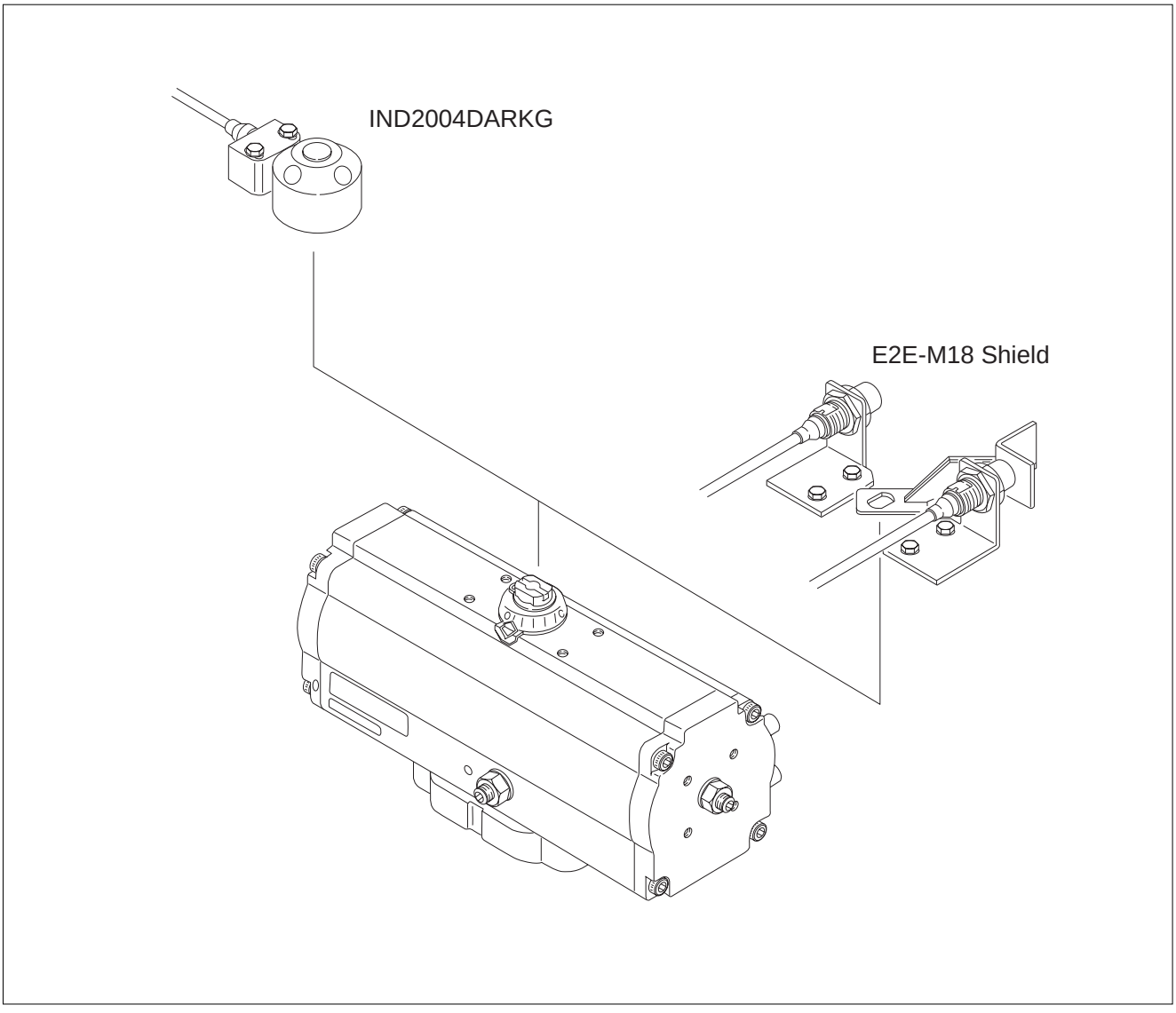
■Purpose

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.



T-DYNAMO Positioners

■Purpose

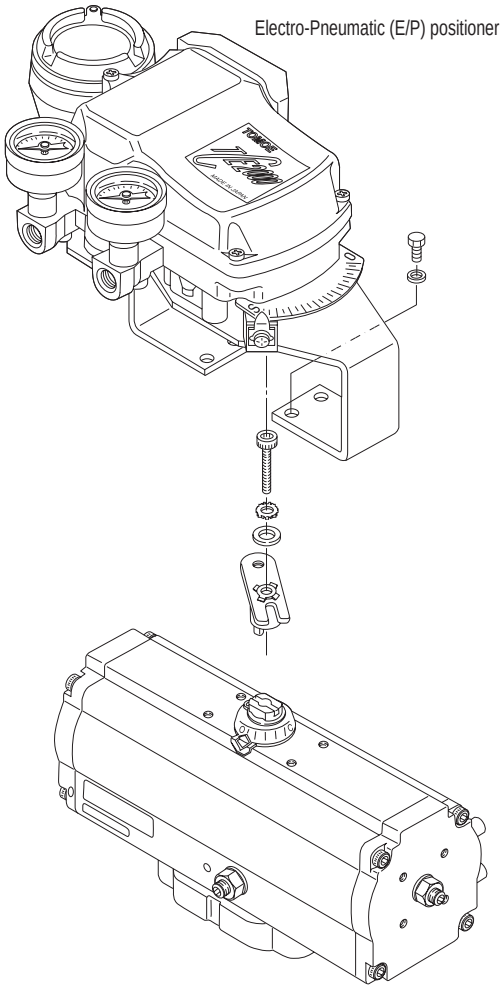
A positioners are used for quick and accurate control of the valve opening angle with pneumatic signals or 4-20mA DC input signals from a control room or controller unit.

■Standard specifications

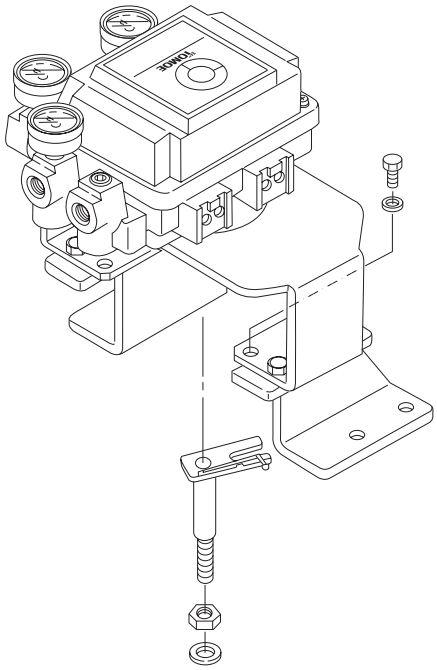
	Electro-Pneumatic, analog	Electro-Pneumatic, analog	Pneumatic-Pneumatic
Type	TCE2000	TP8100	IP5100
Manufacturer	Tomoe	Tomoe	SMC
Input signal	4 to 20mA	4 to 20mA	0.02 to 0.1MPa
Resistance	250Ω (4 to 20mADC)	235±15Ω (4 to 20mADC)	——
Supply air	0.14 to 0.7MPa	0.14 to 0.7MPa	0.14 to 0.7MPa
Output flow rate	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, Exd Ⅱ BT6X	IP67, Exd Ⅱ BT5	——
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
Repeatability	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.

Electro-Pneumatic (E/P) positioner



Pneumatic-Pneumatic (P/P) positioner



T-DYNAMO Manual operation unit

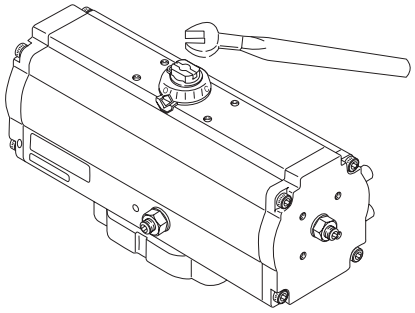
■Purpose

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

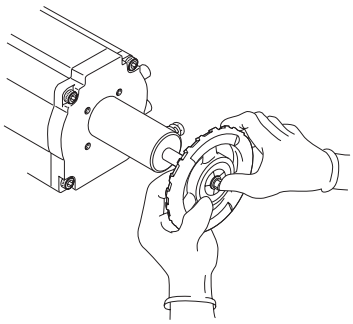
■Standard specifications

	Function	Type	Applicable cylinder	Remarks
1	Manual lever	Lever	(A) Double acting type T-DYNAMO	(1) The bypass valve must be opened. (2) Never use for any single acting type cylinder.
2	Manual screw handle	Screw handle	(B) Single acting type T-DYNAMO (C) Single acting type TG-S	(1) Attach and detach the lock screw exactly before and after operation. (2) Adjustment is possible in the full close position.
3	Manual gear unit	Worm gear	(D) Double acting type T-DYNAMO (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.

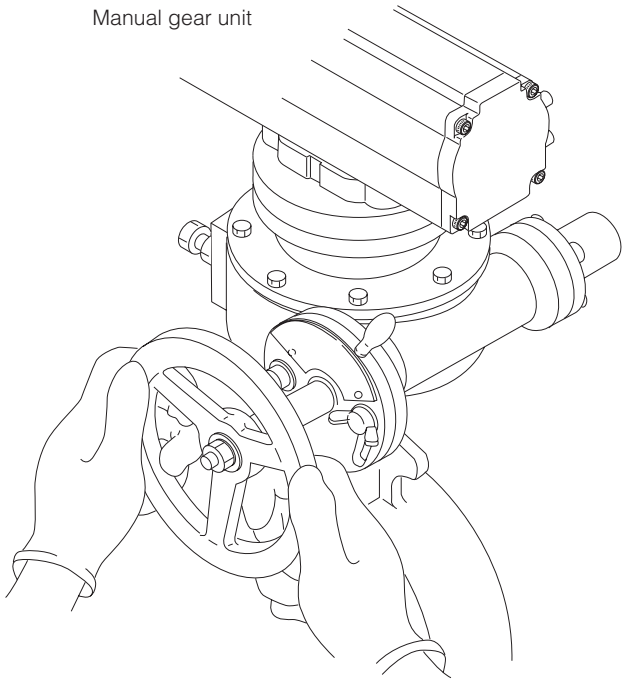
Manual lever



Manual screw handle



Manual gear unit



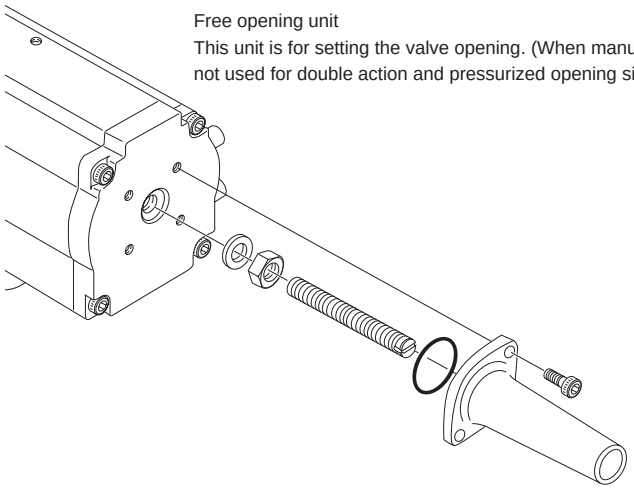
T-DYNAMO Stroke adjusters

■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-DYNAMO	After attaching a long adjustment bolt to the cylinder cover, attach the cover of the aluminium casing.
Adjust screw	Side adjust screw	(B) Single acting type T-DYNAMO	Attach long adjusting screws and lock nut to the cylinder cover.



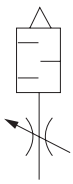
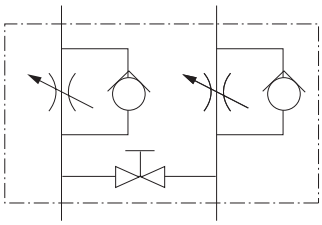
Free opening unit
This unit is for setting the valve opening. (When manual operation unit is not used for double action and pressurized opening single action.)

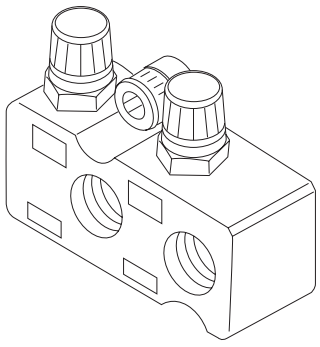
T-DYNAMO Speed controllers

■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
Option	With silencer	With bypass valve
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



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.

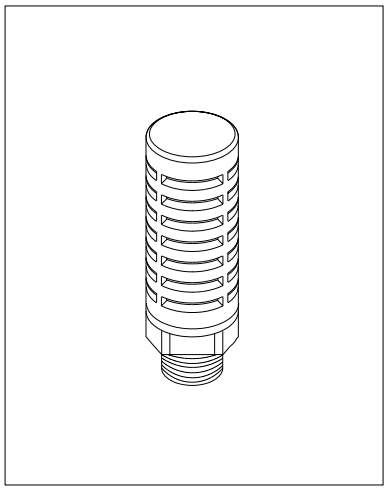
T-DYNAMO Silencers

■Purpose

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

■Standard specifications

Type	AN103-KM6	AN200-02
Manufacturer	SMC	SMC
JIS symbol		
Applicable cylinder type	K30 to K700/K70S to K700S	K30 to K700/K70S to K700S
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



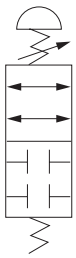
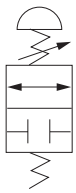
Remark: The above are standard TOMOE-compatible silencers. It is also possible to install silencers other that those listed above. For details, please consult us.

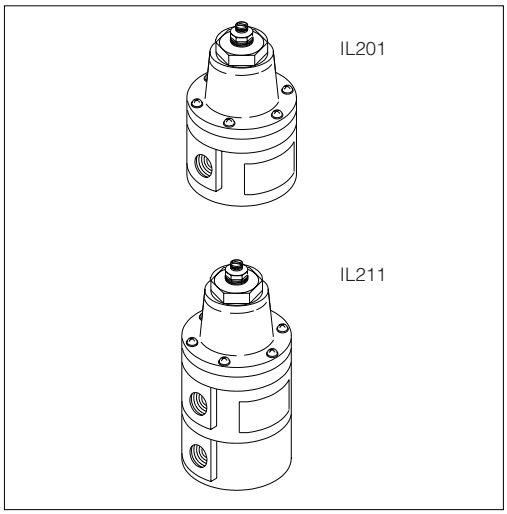
T-DYNAMO Lock-up valves

■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	K30 to K700	K70S to K700S
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



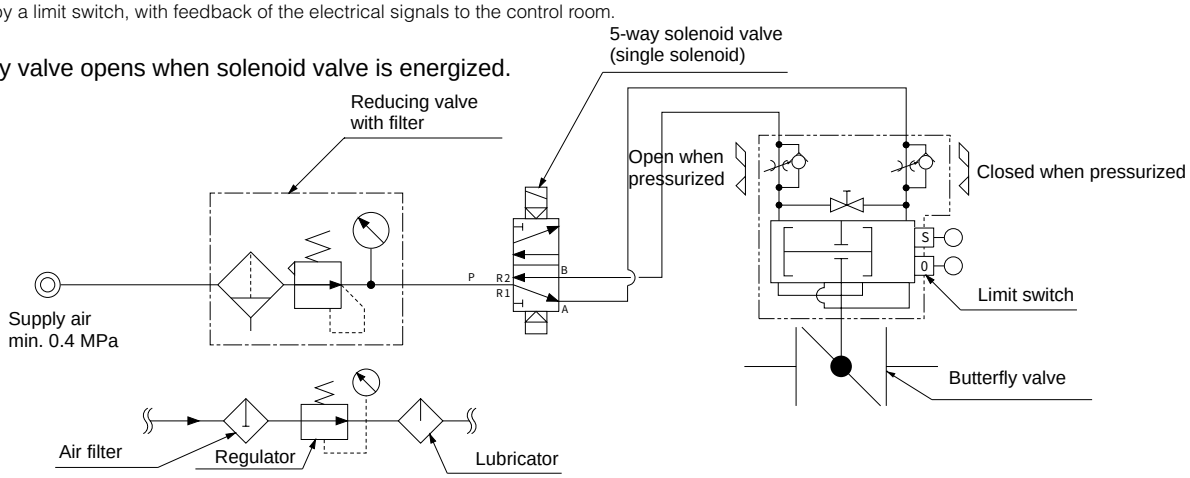
Remark: The above are standard TOMOE-compatible lock-up valves. It is also possible to install lock-up valves other that those listed above. For details, please consult us.

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.



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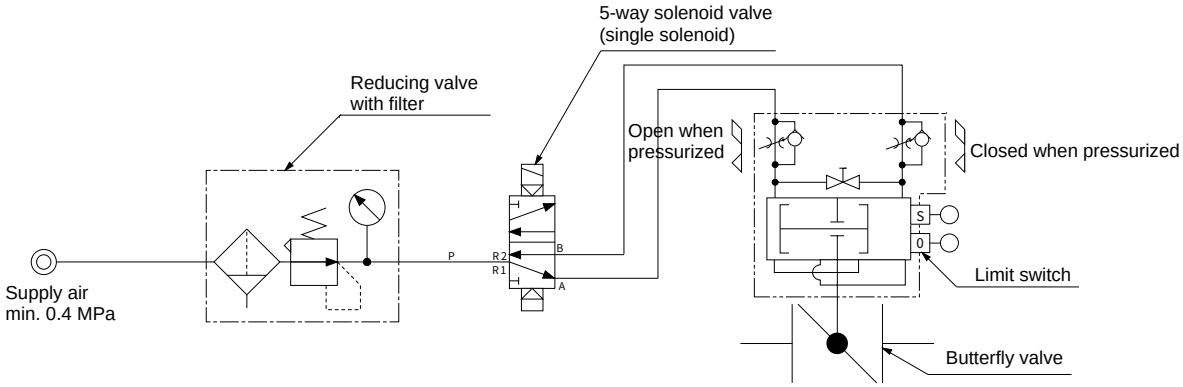
2 Butterfly valve closes when solenoid valve is energized.



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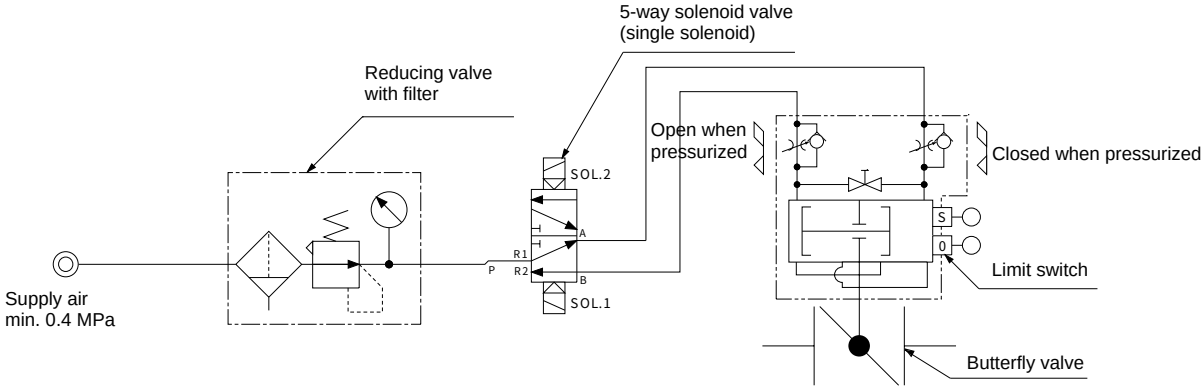
3 Butterfly valve closes when SOL.1 is energized.
Butterfly valve opens when SOL.2 is energized.

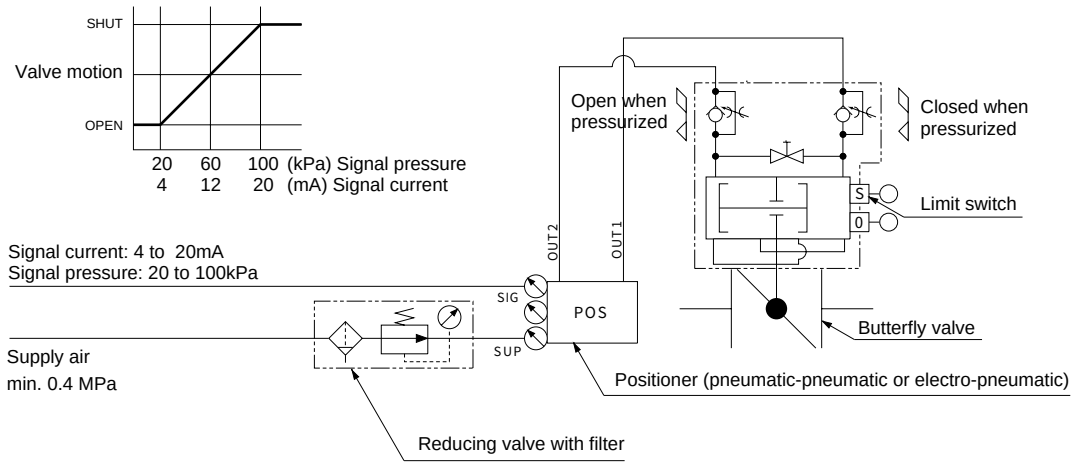


→Once SOL.1 is energized, the condition is maintained even after it is de-energized unless SOL.2 is energized.

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

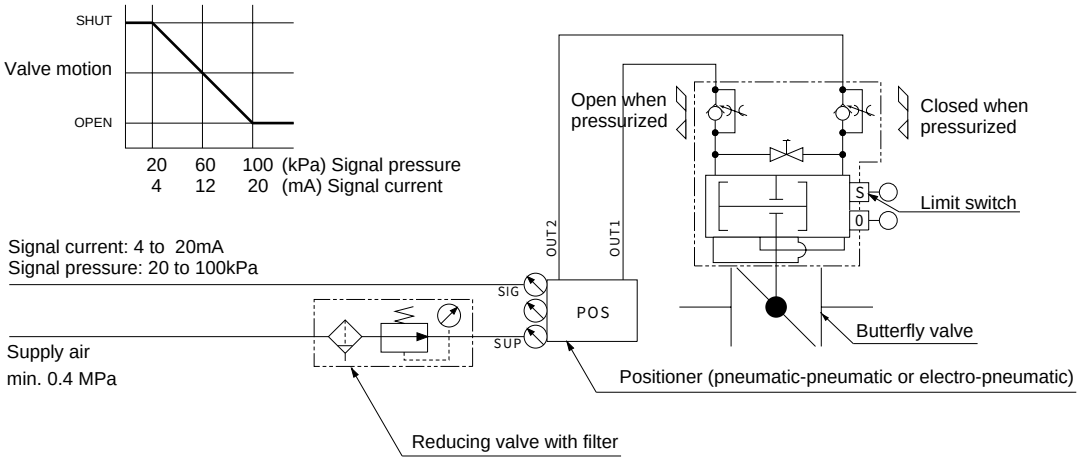
Shown below are examples of standard circuits in which a P/P or E/P positioner is attached to the butterfly valve driven by a double-acting pneumatic cylinder to give instruction signals from a remote control room to the positioner. This adjusts the valve opening exactly and quickly in proportion to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



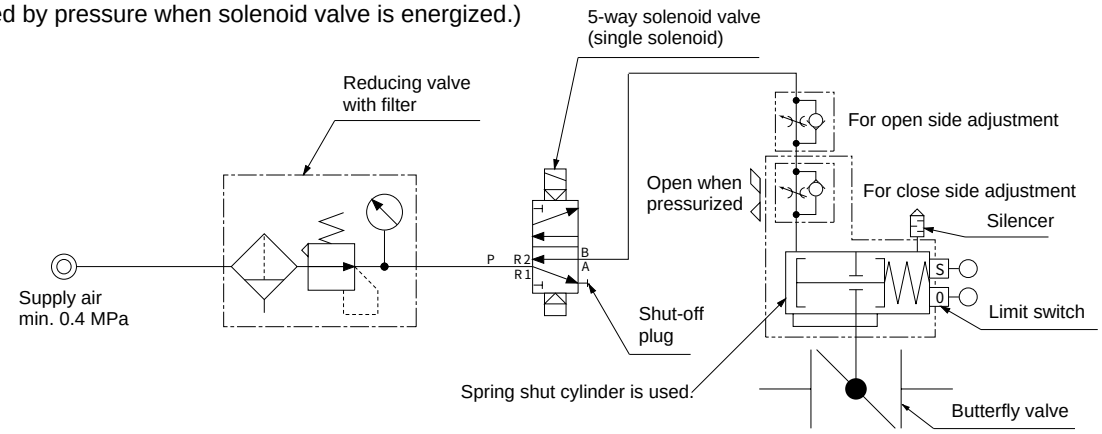
→The butterfly valve closes fully when input signal goes off under a state of assured air supply.

T-DYNAMO Example of standard air circuits for pneumatic actuators

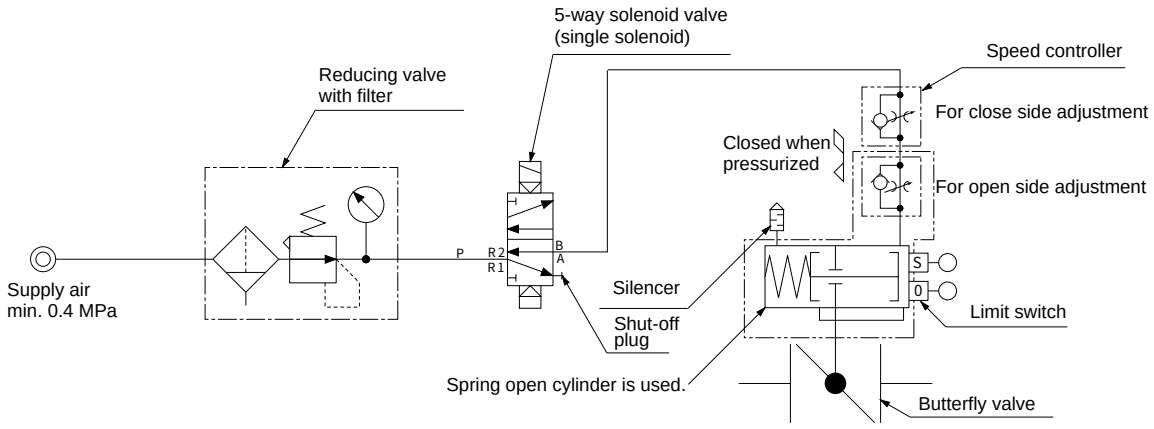
Example of standard air circuit for on/off operation (single-acting type)

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.)



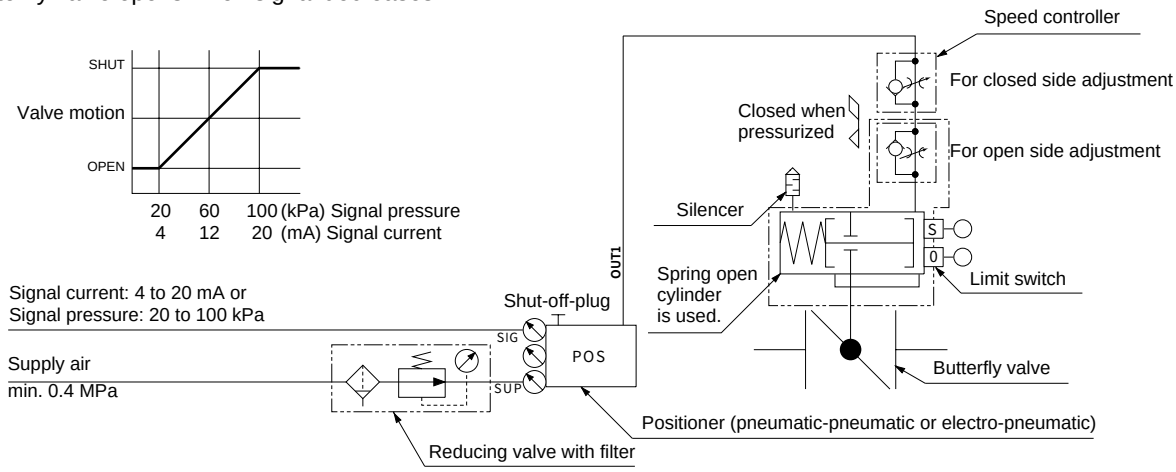
2 Butterfly valve opens when power supply falls.
(Closed by pressure when solenoid valve is energized.)
Butterfly valve opens when air supply falls.
(Closed by pressure when solenoid valve is energized.)



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

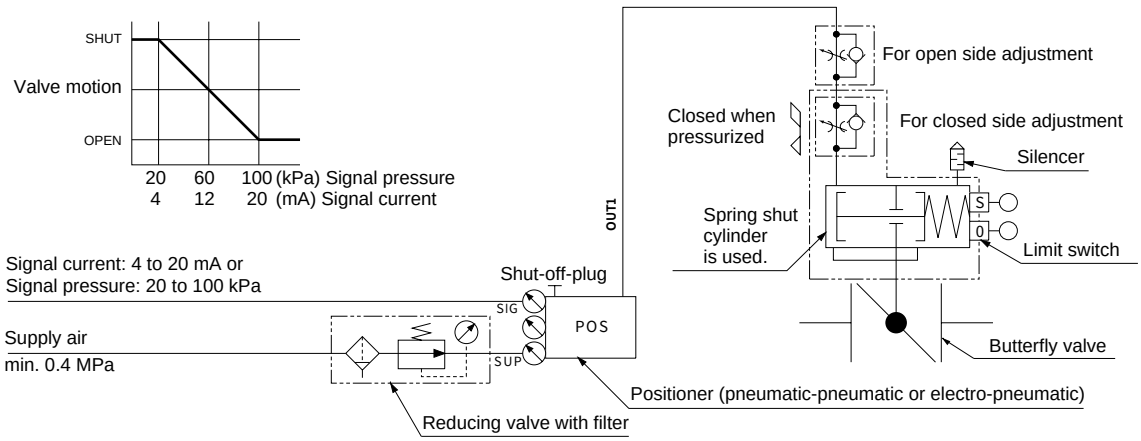
Shown below are examples of standard circuits in which the P/P or E/P positioner is attached to the butterfly valve driven by a single-acting pneumatic cylinder to adjust valve opening exactly and quickly in proportion to the signals transmitted by a local controller or from a remote control room. This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