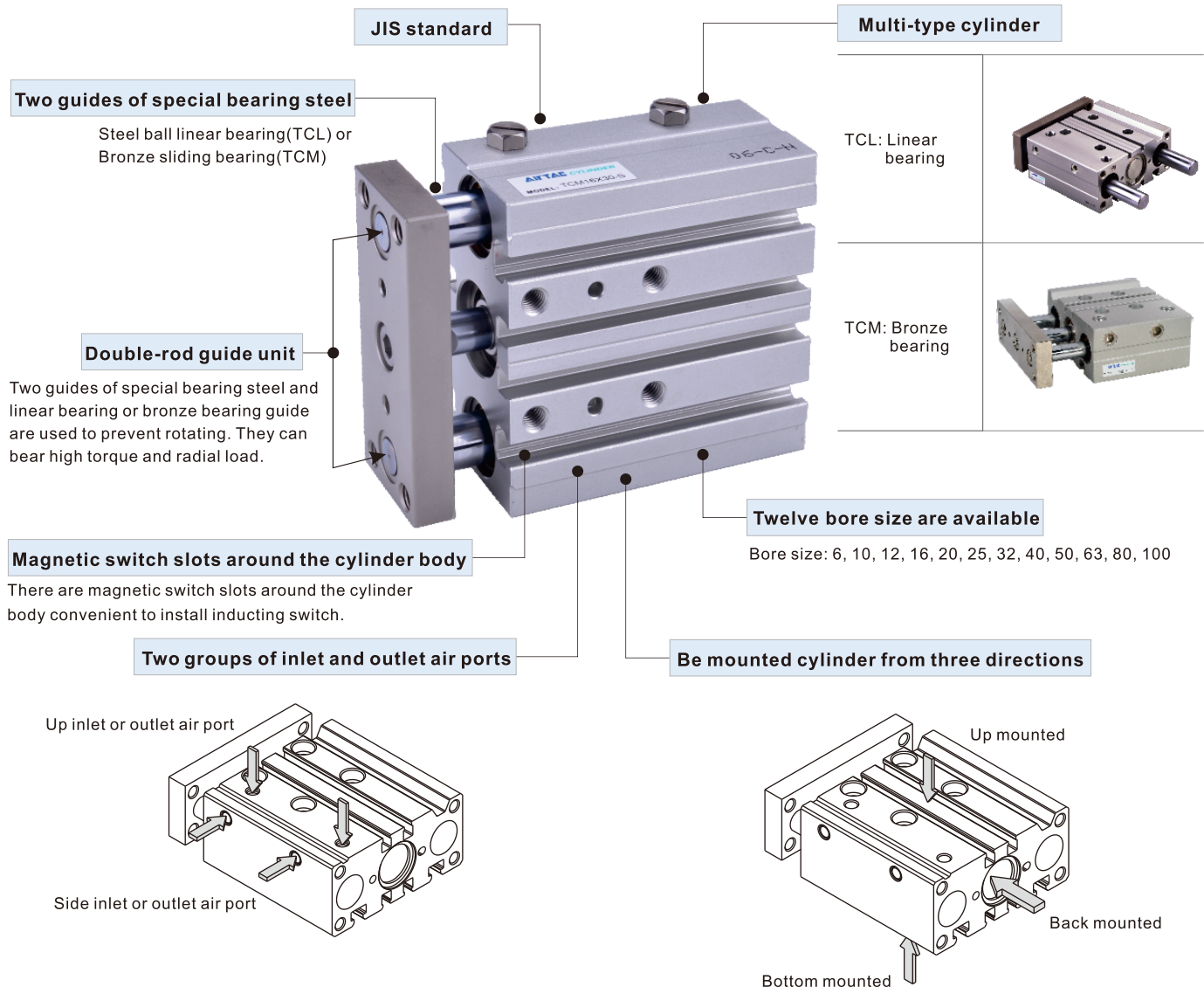




Tri-rod cylinder——TCL, TCM Series

Compendium of TCL/TCM Series



Installation and application



1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be cleared away before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40μm or below.
6. The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
7. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
8. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust cap shall be inserted into the inlet and outlet ports. As the precision of the manufacture and guide is high, never dismantle the fixed block or cylinder cover without permission.

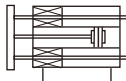


Tri-rod cylinder

TCL,TCM Series



Symbol



Product feature

1. JIS standard is implemented.
2. Two guides of special bearing steel and linear bearing or bronze bearing guide are used to prevent rotating. They can bear high torque and radial load.
 - Note: Steel ball linear bearing: It is suitable for elevation action of cylinder or the situation requiring high precision and high bearing ability, especially for the situation requiring low friction action process.
 - Bronze sliding bearing: it is suitable for the action that has radial load resistance. Compared with normal cylinder of same use, the horizontal impact resistance is doubled and it has stronger torsion rigidity.
3. Drive unit and guide unit are in the same barrel that no additional accessories are needed with minimal space required. The air intake is optional and it is convenient to install.
4. The bottom, back side and fixing plate of main body respectively has two exact orientation orifices (See ΦPA orifice and the orifice in XX point), which can provide orientation installation with high precision for the special situation.
5. Options of switch mounting with provision 4 mounting slots.
6. Special design of main body provides multi-mount;

Ordering code

TC M 50 x 50 S G					
① Model	② Bearing type	③ Bore size	④ Stroke	⑤ Magnet [Note1]	⑥ Thread type [Note 2]
TC: Tri-rod cylinder (Double acting type)	M: Bronze bearing	6	Refer to stroke table for details	S: With magnet	G: G Thread
		10			
		12			
		16			
		20			
		25			
	L: Linear bearing M: Bronze bearing	32			
		40			
		50			
		63			
		80			
		100			

[Note1] TC Series are all with magnet. [Note2] When the thread is standard, the code is blank.

Specification

Bore size(mm)	6	10	12	16	20	25	32	40	50	63	80	100	
Acting type	Double acting												
Fluid	Air(to be filtered by 40μm filter element)												
Operating pressure	0.15~0.7MPa(22~100psi)						0.15~1.0MPa(22~145psi)						
Proof pressure	1.2MPa(175psi)						1.5MPa(215psi)						
Temperature °C	-20~70												
Speed range mm/s	50~500						30~500						50~400
Stroke tolerance	≤100 ^{+1.0} ₀ >100 ^{+1.5} ₀												
Cushion type	Bumper												
Non-rotating tolerance [Note1]	TCL	-						±0.08°	±0.07°	±0.06°	±0.05°	±0.04°	
	TCM	±0.1°						±0.10°	±0.09°	±0.08°	±0.06°	±0.05°	
Port size [Note2]	M3×0.5						M5×0.8			1/8"	1/4"	3/8"	

[Note1] Retract position.

[Note2] G thread is available.

Add) Refer to P528 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10 15 20	20
10	5 10 15 20 25 30	30
12	10 20 25 30 40 50 60 70 75 80 90 100 125 150	150
16	10 20 25 30 40 50 60 70 75 80 90 100 125 150 175 200	200
20 25	20 25 30 40 50 60 70 75 80 90 100 125 150 175 200 225 250	250
32 40 50 63	25 30 40 50 60 70 75 80 90 100 125 150 175 200 225 250	250
80 100	25 30 40 50 60 70 75 80 90 100 125 150 175 200 225 250	250

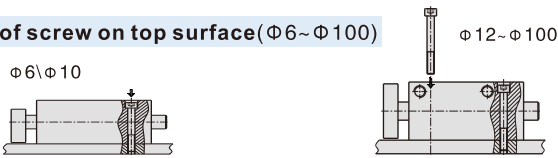
[Note] When the discrepancy between non-standard stroke and standard stroke is 1~5mm, The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 86mm stroke cylinder has the same dimensions of 90 std. stroke cylinder. But 84mm stroke cylinder should be ordered by non-standard stroke.

Tri-rod cylinder

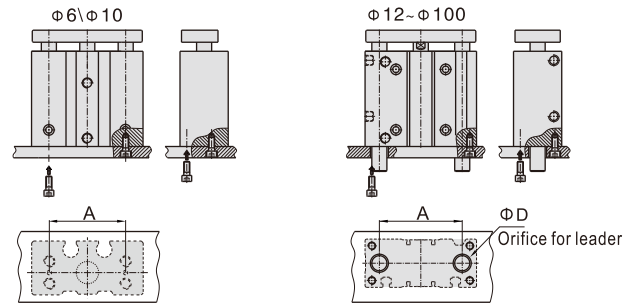
TCL,TCM Series

How to mount

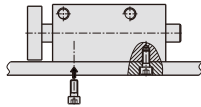
Fixation of screw on top surface($\Phi 6 \sim \Phi 100$)



Fixation of screw at back side($\Phi 6 \sim \Phi 100$)



Fixation of screw at bottom surface($\Phi 12 \sim \Phi 100$)



Fixation of T slot at bottom($\Phi 12 \sim \Phi 100$)



Bore size\Item	6	10	12	16	20	25	32	40	50	63	80	100
A	20.5	23	41	46	54	64	78	86	110	124	156	188
D	TCM	X	X	10	12	13	20	20	20	20	30	-
(Min)	TCL	-	-	8	10	10	13	-	-	-	-	30

Safe load and torque

Bore size	Type	5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
Max. safe load																					
Unit: Newton(N)																					

Stroke(mm)	5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
6	TCM	0.4	0.3	0.18	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	TCM	1.5	1.2	0.8	0.5	0.25	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
12	TCM	-	3	-	3	3	3	3	3	3	3	3	3	3	2	2	-	-	-	-
16	TCM	-	2	-	2	2	2	2	2	1	1	1	1	1	1	1	-	-	-	-
20	TCM	-	7	-	7	7	7	7	7	7	7	7	7	7	6	6	5	5	-	-
25	TCM	-	4	-	4	4	4	4	4	4	4	4	4	4	3	3	3	3	2	-
32	TCM	-	-	-	14	14	14	13	12	12	12	12	12	12	11	10	10	9	8	7
40	TCM	-	-	-	7	7	7	7	6	6	6	6	6	6	5	5	5	4	4	4
50	TCM	-	-	-	20	20	20	18	16	19	19	19	19	19	18	17	16	15	14	13
63	TCM	-	-	-	10	10	10	9	8	10	10	10	10	9	9	8	8	7	7	7
80	TCM	-	-	-	37	37	37	36	35	35	34	34	34	33	33	31	29	27	26	24
100	TCM	-	-	-	19	19	19	18	17	17	17	17	17	17	16	15	15	14	13	12
125	TCM	-	-	-	19	19	19	18	17	17	17	17	17	17	16	15	15	14	13	12
150	TCM	-	-	-	140	130	120	105	165	160	155	155	150	145	130	115	100	80	70	60
175	TCM	-	-	-	70	65	60	50	80	80	75	75	75	70	65	55	50	40	35	30
200	TCM	-	-	-	70	65	60	50	80	80	75	75	75	70	65	55	50	40	35	30
225	TCM	-	-	-	220	210	200	190	180	220	210	205	195	185	165	155	135	120	105	80
250	TCM	-	-	-	110	105	100	95	90	110	105	100	100	95	85	80	70	60	55	40
275	TCM	-	-	-	280	265	250	235	220	280	270	260	250	240	230	210	180	160	140	120
300	TCM	-	-	-	140	130	125	120	110	140	135	130	125	120	115	105	90	80	70	60

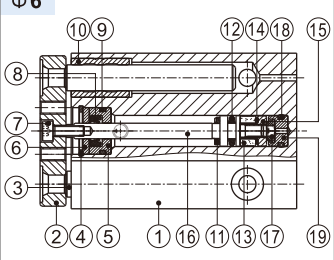
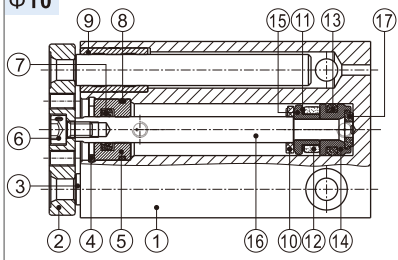
Max. safe torque																				
Unit: Newton · Meter(N · m)																				

Stroke(mm)	5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
6	TCM	0.008	0.007	0.006	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	TCM	0.045	0.039	0.033	0.028	0.024	0.021	-	-	-	-	-	-	-	-	-	-	-	-	-
12	TCM	-	0.90	-	0.79	0.71	0.65	0.77	0.72	0.65	0.53	0.50	0.47	0.41	0.36	0.31	0.27	-	-	-
16	TCM	-	0.61	-	0.45	0.40	0.35	0.58	0.50	0.44	0.39	0.37	0.35	0.32	0.29	0.24	0.20	-	-	-
20	TCM	-	1.21	-	1.04	0.94	0.88	1.23	1.11	0.99	0.72	0.69	0.65	0.61	0.58	0.50	0.44	0.40	0.36	-
25	TCM	-	0.99	-	0.74	0.66	0.59	0.99	0.86	0.77	0.69	0.65	0.61	0.57	0.52	0.43	0.37	0.32	0.28	-
32	TCM	-	-	-	1.57	1.42	1.31	2.39	2.15	1.97	1.90	1.88	1.86	1.72	1.63	1.44	1.28	1.16	1.06	1.01
40	TCM	-	-	-	1.26	1.14	1.03	2.17	1.94	1.79	1.59	1.52	1.46	1.33	1.25	1.34	1.17	1.03	0.93	0.88
50	TCM	-	-	-	2.40	2.22	2.01	3.66	3.35	3.17	3.06	2.96	2.91	2.77	2.57	2.26	2.02	1.83	1.67	1.57
63	TCM	-	-	-	2.11	1.96	1.75	3.37	3.02	2.71	2.42	2.38	2.33	2.19	1.97	2.05	1.78	1.58	1.41	1.22
80	TCM	-	-	-	6.35	6.00	5.73	5.13	5.98	5.74	5.69	5.62	5.11	4.97	4.42	3.98	3.61	3.31	2.97	2.84
100	TCM	-	-	-	5.95	5.73	5.44	4.89	5.43	5.15	5.11	5.02	4.70	4.51	6.34	5.79	5.33	4.93	4.33	4.29
125	TCM	-	-	-	7.00	6.60	6.11	5.66	6.66	6.31	6.27	6.23	5.86	5.48	4.78	4.38	3.98	3.65	3.34	3.13
150	TCM	-	-	-	6.55	6.21	5.77	5.39	6.17	5.67	5.62	5.58	5.33	4.96	6.98	6.38	5.87	5.43	5.00	4.72
175	TCM	-	-	-	13.00	12.60	11.00	10.80	13.70	12.70	12.00	11.80	11.10	10.80	9.50	8.60	7.86	7.24	6.80	6.24
200	TCM	-	-	-	9.17	8.75	8.30	7.62	10.30	9.94	9.83	9.77	8.82	8.74	11.60	10.70	9.83	9.12	8.95	7.95
225	TCM	-	-	-	14.70	13.60	12.90	12.10	19.40	16.20	13.50	12.70	12.10	11.90	10.70	9.69	8.86	8.16	7.52	7.04
250	TCM	-	-	-	10.20	9.74	9.20	8.48	17.50	14.00	11.00	10.60	10.20	9.74	13.00	11.90	11.00	10.20	9.63	8.84
275	TCM	-	-	-	21.9	20.8	19.7	18.6	15.8	24	22.9	21.7	21	20.5	18.6	17	15.6	14.5	13.5	12.6
300	TCM	-	-	-	15.1	14.3	13.6	12.9	12.2	23.8	22.7	21.6	21	20.6	18.9	17.3	16	14.8	13.5	12.9
325	TCM	-	-	-	38.8	36.8	35.0	33.5	28.5	39.4	37.5	35.6	34.5	33.8	30.9	28.4	26.2	24.4	22.5	21.4
350	TCM	-	-	-	27.1	25.7	24.4	23.0	26	39.8	37.9	36	35.2	34.6	31.8	29.3	27.2	25.3	23.5	22.1

Tri-rod cylinder

TCL, TCM Series

Inner structure and material of major parts

Φ6		Φ10																																																																																					
	<table> <tr><th>NO.</th><th>Item</th><th>NO.</th><th>Item</th></tr> <tr><td>1</td><td>Body</td><td>11</td><td>Bumper</td></tr> <tr><td>2</td><td>Fixing plate</td><td>12</td><td>Piston seal</td></tr> <tr><td>3</td><td>Leader</td><td>13</td><td>Magnet</td></tr> <tr><td>4</td><td>C clip</td><td>14</td><td>Magnet washer</td></tr> <tr><td>5</td><td>Front cover</td><td>15</td><td>Piston</td></tr> <tr><td>6</td><td>O-ring stop block</td><td>16</td><td>Piston rod</td></tr> <tr><td>7</td><td>Screw</td><td>17</td><td>Bumper</td></tr> <tr><td>8</td><td>Piston rod O-ring</td><td>18</td><td>O-ring</td></tr> <tr><td>9</td><td>O-ring</td><td>19</td><td>Washer</td></tr> <tr><td>10</td><td>Bearing</td><td></td><td>stop block</td></tr> </table>	NO.	Item	NO.	Item	1	Body	11	Bumper	2	Fixing plate	12	Piston seal	3	Leader	13	Magnet	4	C clip	14	Magnet washer	5	Front cover	15	Piston	6	O-ring stop block	16	Piston rod	7	Screw	17	Bumper	8	Piston rod O-ring	18	O-ring	9	O-ring	19	Washer	10	Bearing		stop block		<table> <tr><th>NO.</th><th>Item</th><th>NO.</th><th>Item</th></tr> <tr><td>1</td><td>Body</td><td>10</td><td>Bumper</td></tr> <tr><td>2</td><td>Fixing plate</td><td>11</td><td>Magnet washer</td></tr> <tr><td>3</td><td>Leader</td><td>12</td><td>Magnet</td></tr> <tr><td>4</td><td>C clip</td><td>13</td><td>Piston seal</td></tr> <tr><td>5</td><td>Front cover</td><td>14</td><td>Piston</td></tr> <tr><td>6</td><td>Screw</td><td>15</td><td>Magnet holder</td></tr> <tr><td>7</td><td>Piston rod O-ring</td><td>16</td><td>Piston rod</td></tr> <tr><td>8</td><td>O-ring</td><td>17</td><td>Bumper</td></tr> <tr><td>9</td><td>Bearing</td><td></td><td></td></tr> </table>	NO.	Item	NO.	Item	1	Body	10	Bumper	2	Fixing plate	11	Magnet washer	3	Leader	12	Magnet	4	C clip	13	Piston seal	5	Front cover	14	Piston	6	Screw	15	Magnet holder	7	Piston rod O-ring	16	Piston rod	8	O-ring	17	Bumper	9	Bearing		
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Φ12~63

A detailed cross-sectional diagram of a tri-rod cylinder. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22. The components include a fixing plate, leader, body, C clip, front cover, bumper, piston rod O-ring, screw, O-ring, bearing, and C clip. The diagram also shows the piston rod, piston, magnet holder, magnet washer, magnet, and spacer.

TCL

A cross-sectional diagram of a tri-rod cylinder (TCL) for bore size Φ12, Φ16mm and stroke ≤ 30mm. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22.

Bore size Φ12、Φ16mm
Stroke ≤ 30mm

A cross-sectional diagram of a tri-rod cylinder (TCL) for bore size Φ12, Φ16mm and stroke 30 < Stroke ≤ 100mm. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22.

Bore size Φ12、Φ16mm
30 < Stroke ≤ 100mm

A cross-sectional diagram of a tri-rod cylinder (TCL) for bore size Φ12, Φ16mm and stroke > 100mm. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22.

Bore size Φ12、Φ16mm
Stroke > 100mm

A cross-sectional diagram of a tri-rod cylinder (TCL) for bore size Φ20~Φ63mm and stroke ≤ 50mm. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22.

Bore size Φ20~Φ63mm
Stroke ≤ 50mm

A cross-sectional diagram of a tri-rod cylinder (TCL) for bore size Φ20~Φ63mm and stroke 50 < Stroke ≤ 100mm. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22.

Bore size Φ20~Φ63mm
50 < Stroke ≤ 100mm

A cross-sectional diagram of a tri-rod cylinder (TCL) for bore size Φ20~Φ63mm and stroke > 100mm. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22.

Bore size Φ20~Φ63mm
Stroke > 100mm

TCM

A cross-sectional diagram of a tri-rod cylinder (TCM) for bore size Φ12~Φ25mm and stroke ≤ 50mm. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22.

Bore size Φ12~Φ25mm
Stroke ≤ 50mm

A cross-sectional diagram of a tri-rod cylinder (TCM) for bore size Φ12~Φ63mm and stroke 50 < Stroke ≤ 100mm. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22.

Bore size Φ12~Φ63mm
50 < Stroke ≤ 100mm

A cross-sectional diagram of a tri-rod cylinder (TCM) for bore size Φ12~Φ63mm and stroke > 100mm. The diagram shows the internal assembly with various components labeled with circled numbers from 1 to 22.

Bore size Φ12~Φ63mm
Stroke > 100mm

NO.	Item	NO.	Item
1	Fixing plate	12	Piston seal
2	Leader	13	O-ring
3	Body	14	Back cover
4	C clip	15	Piston rod
5	Front cover	16	Piston
6	Bumper	17	Magnet holder
7	Piston rod O-ring	18	Magnet washer
8	Screw	19	Magnet
9	O-ring	20	Screw
10	Bearing	21	Screw
11	C clip	22	Spacer

Φ80\100

TCL

Stroke S=25~60mm

Stroke S=70~150mm

Stroke S=175~250mm

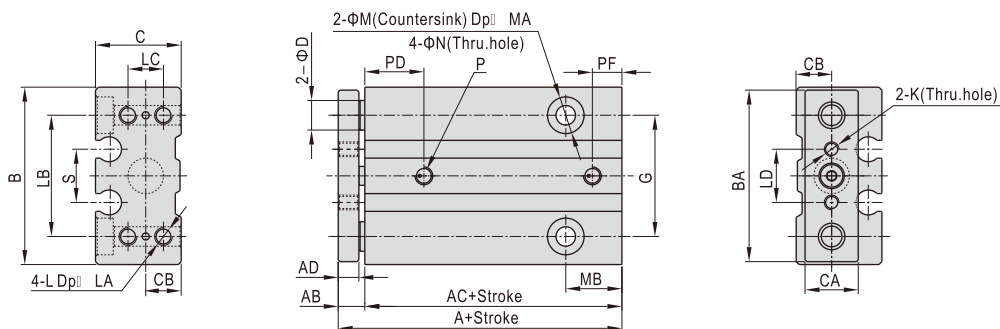
TCM

Stroke S=25~250mm

NO.	Item	NO.	Item
1	Fixing plate	12	Piston seal
2	Leader	13	O-ring
3	Body	14	Back cover
4	C clip	15	Piston rod
5	Front cover	16	Piston
6	Bumper	17	Magnet holder
7	Piston rod O-ring	18	Magnet washer
8	Screw	19	Magnet
9	O-ring	20	Screw
10	Bearing	21	Screw
11	C clip	22	Spacer

Dimensions

TCM6\TCM10

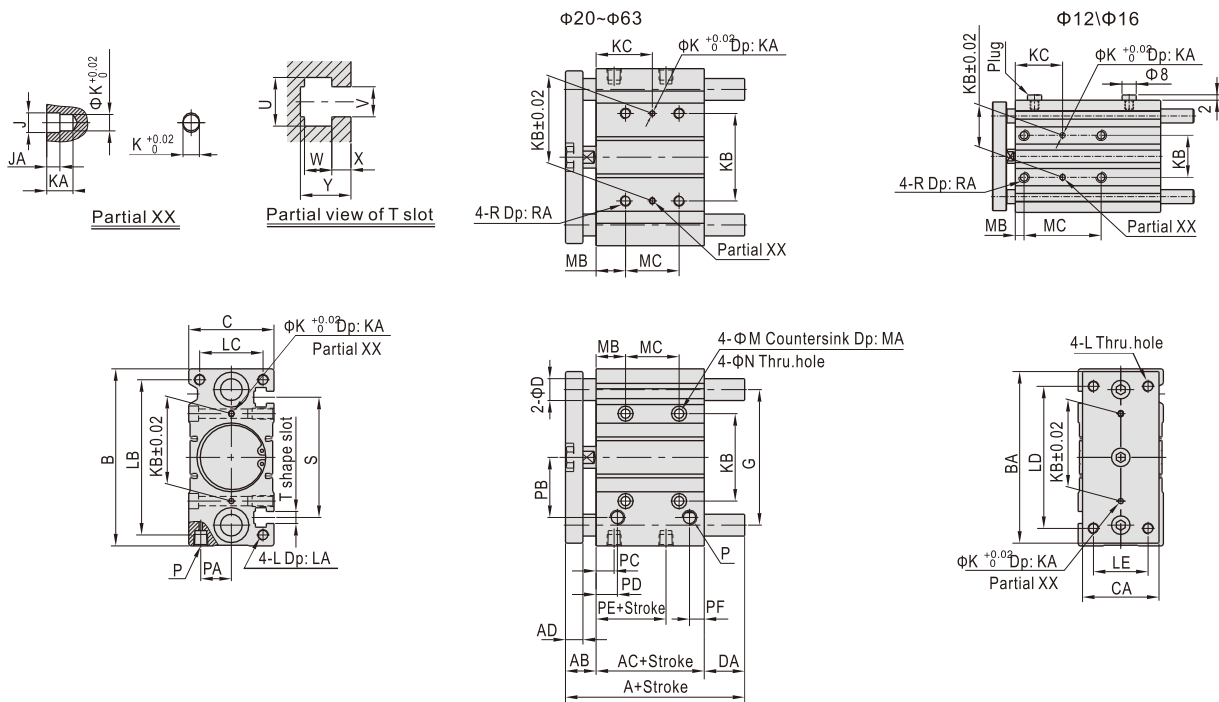


Bore size\Item	A	AB	AC	AD	B	BA	C	CA	CB	D	G	K	L	LA	LB	LC	LD	M	MA	MB	N	P	PD	PF
6	29.5	6	23.5	5	30	29	14.5	9	6	5	20.5	M2.5X0.45	M3X0.5	5	20.5	6	9	6	3	9.5	3.5	M3X0.5	9.5	5.5
10	32	6	26	5	34	33	18	10	7.5	6	23	M3X0.5	M4X0.7	5	23	8	11	8	4	8.5	4.5	M3X0.5	11.5	5

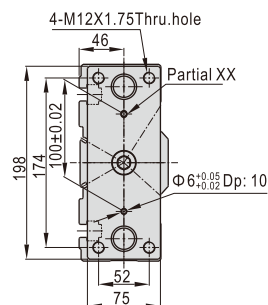
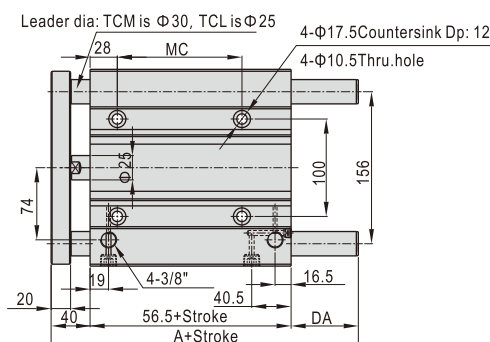
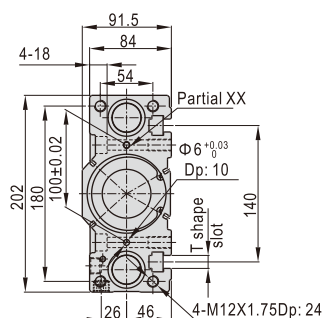
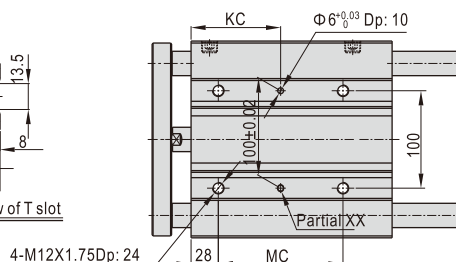
Tri-rod cylinder

TCL,TCM Series

TCL/TCM12~63

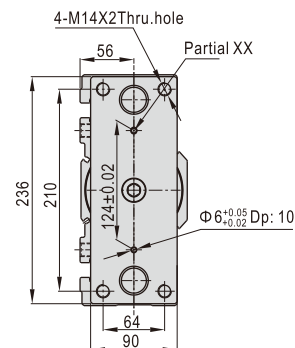
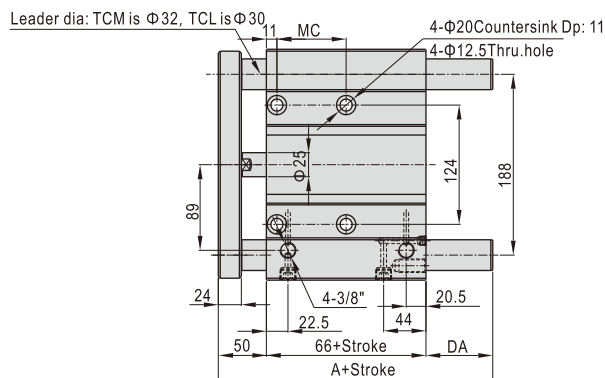
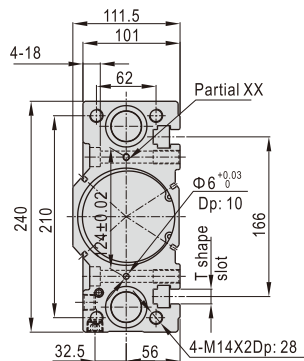
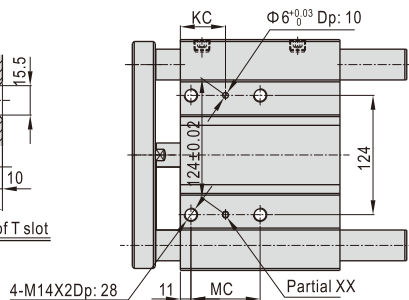


Bore size\Item	A					DA								MC				KC				
	TCL	TCM	TCL\TCM			TCL				TCM												
Stroke	≤30	≤50	31(51)~100	101~200	>200	≤30	31~100	101~200	>200	≤50	51~100	101~200	>200	≤30	31~100	101~200	>200	≤30	31~100	101~200	>200	
12		42		55	85	—	0	13	43	—	0	13	43	—	20	40	110	—	15	25	60	—
16		46		65	95	—	0	19	49	—	0	19	49	—	24	44	110	—	17	27	60	—
20		53		80	104	122	0	27	51	69	0	27	51	69	24	44	120	200	29	39	77	117
25		53.5		82	104.5	122	0	28.5	51	68.5	0	28.5	51	68.5	24	44	120	200	29	39	77	117
Stroke	≤50	≤50	51~100	101~200	>200	≤50	51~100	101~200	>200	≤50	51~100	101~200	>200	≤40	41~100	101~200	>200	≤40	41~100	101~200	>200	
32	65	78	102	118	140	5.5	42.5	58.5	80.5	18.5	42.5	58.5	80.5	24	48	124	200	33	45	83	121	
40	66	78	102	118	140	0	36	52	74	12	36	52	74	24	48	124	200	34	46	84	122	
50	76	89	118	134	161	4	46	62	89	17	46	62	89	24	48	124	200	36	48	86	124	
63	77	89	118	134	161	0	41	57	84	12	41	57	84	28	52	128	200	38	50	88	124	
Bore size\Item	AB	AC	AD	B	BA	C	CA	D(TCL)	D(TCM)	G	J	JA	K	KA	KB	L	LA	LB	LC	LD		
12	13	29	8	58	56	26	22	6	8	41	3.5	3	3	6	23	M4×0.7	10	50	18	48		
16	13	33	8	64	62	30	25	8	10	46	3.5	3	3	6	24	M5×0.8	12	56	22	54		
20	16	37	10	83	81	36	30	10	12	54	3.5	3	3	6	28	M5×0.8	13	72	24	70		
25	16	37.5	10	93	91	42	38	12	16	64	4.5	3	4	6	34	M6×1.0	15	82	30	78		
32	22	37.5	12	112	110	48	44	16	20	78	4.5	3	4	6	42	M8×1.25	20	98	34	96		
40	22	44	12	120	118	54	44	16	20	86	4.5	3	4	6	50	M8×1.25	20	106	40	104		
50	28	44	16	148	146	64	60	20	20	110	6	4	5	8	66	M10×1.5	22	130	46	130		
63	28	49	16	162	158	78	70	20	20	124	6	4	5	8	80	M10×1.5	22	142	58	130		
Bore size\Item	LE	M	MA	MB	N	P	PA	PB	PC	PD	PE	PF	R	RA	S	U	V	W	X	Y		
12	14	8	4.5	5	4.5	M5×0.8	8	18	11	11	13	7.5	M5×0.8	12	37	7.5	4.5	4	2	6.5		
16	16	8	4.5	5	4.5	M5×0.8	10	19	11	11	15	8	M5×0.8	10	38	7.5	4.5	4	2.5	7		
20	18	9.5	5.5	17	5.5	1/8"	10.5	25	10.5	10.5	12.5	9	M6×1.0	12	44	8.5	5.5	4.5	3	8		
25	26	9.5	5.5	17	5.5	1/8"	13.5	28.5	11.5	11.5	12.5	9	M6×1.0	12	50	8.5	5.5	4.5	3	8.5		
32	30	11	7.5	21	6.5	1/8"	16	34	12.5	12.5	7	9	M8×1.25	16	63	10.5	6.5	5.5	3.5	9.5		
40	30	11	7.5	22	6.5	1/8"	18	38	14	14	13	10	M8×1.25	16	72	10.5	6.5	5.5	4	11		
50	40	14	9	24	8.5	1/4"	21.5	47	12	14	9	11	M10×1.5	20	92	13.5	8.5	7.5	4.5	13.5		
63	50	14	9	24	8.5	1/4"	28	55	16.5	16.5	14	13.5	M10×1.5	20	110	18	11	10	7	18.5		



Item/Stroke	25	30	40	50	60	70	75	80	100	125	150	175	200	225	250
A	TCM=112.5/TCL=106.5					165.5					187.5				
DA	TCM=16/TCL=10					69					91				
KC	42					54					92		128		
MC	28					52					128		200		

Partial XX



Item\Stroke	25	30	40	50	60	70	75	80	100	125	150	175	200	225	250
A	TCM=128/TCL=122					186					208				
DA	TCM=12/TCL=6					70					92				
KC	35			47					85					121	
MC	48			72					148					220	