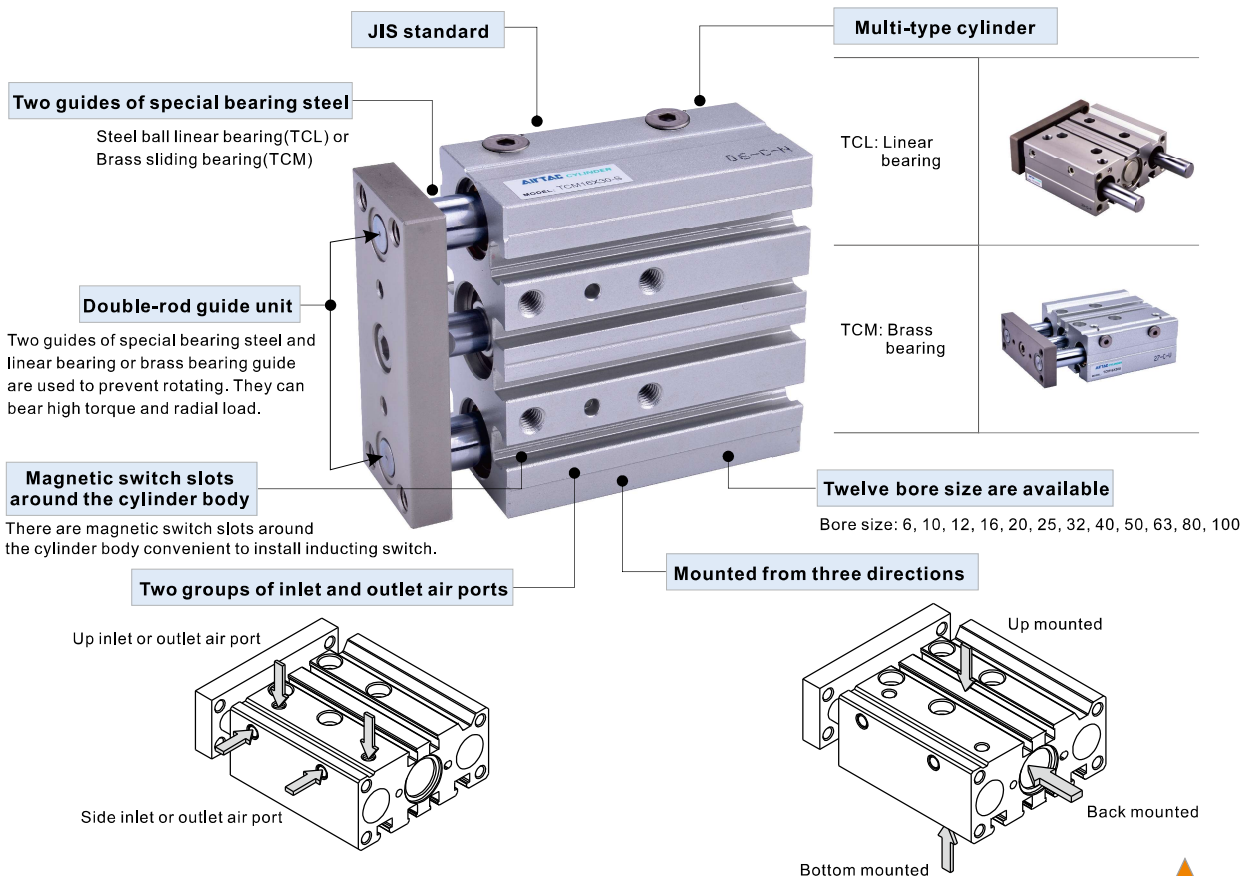




Tri-rod cylinder—TCL, TCM Series

Compendium of TCL/TCM Series



Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)						
				0.1	0.2	0.3	0.4	0.5	0.6	0.7
6	3	Double acting Push side	28.3	2.8	5.7	8.5	11.3	14.1	17.0	19.8
		Pull side	21.2	2.1	4.2	6.4	8.5	10.6	12.7	14.8
10	5	Double acting Push side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
		Pull side	58.9	5.9	11.8	17.7	23.6	29.5	35.3	41.2
12	6	Double acting Push side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2
		Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4
16	8	Double acting Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7
		Pull side	150.8	15.1	30.2	45.2	60.3	75.4	90.5	105.6
20	10	Double acting Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9
		Pull side	235.6	23.6	47.1	70.7	94.2	117.8	141.4	164.9
25	12	Double acting Push side	490.9	49.1	98.2	147.3	196.3	245.4	294.5	343.6
		Pull side	377.8	37.8	75.6	113.3	151.1	188.9	226.7	264.4
32	16	Double acting Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0
		Pull side	603.2	60.3	120.6	181.0	241.3	301.6	361.9	422.2
40	16	Double acting Push side	1256.6	125.7	251.3	377.0	502.7	628.3	754.0	879.6
		Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.3	738.9
50	20	Double acting Push side	1963.5	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4
		Pull side	1649.3	164.9	329.9	494.8	659.7	824.7	989.6	1154.5
63	20	Double acting Push side	3117.2	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1
		Pull side	2803.1	280.3	560.6	840.9	1121.2	1401.5	1681.9	1962.2
80	25	Double acting Push side	5026.5	502.7	1005.3	1508.0	2010.6	2513.3	3015.9	3518.6
		Pull side	4535.7	453.6	907.1	1360.7	1814.3	2267.8	2721.4	3175.0
100	25	Double acting Push side	7854.0	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8
		Pull side	7363.1	736.3	1472.6	2208.9	2945.2	3681.6	4417.9	5154.2

Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be cleared away before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- 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.

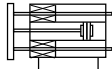


Tri-rod cylinder

TCL,TCM Series



Symbol



Product feature

1. JIS standard is implemented.
2. Two guides of special bearing steel and linear bearing or brass 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.
Brass 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 Φ PA 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;

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		0.2~0.7MPa(29~100psi)						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		$\leq 100 \begin{smallmatrix} +0 \\ 0 \end{smallmatrix} \quad > 100 \begin{smallmatrix} +1.5 \\ 0 \end{smallmatrix}$												
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]PT thread, G thread and NPT thread are available.

Add) Refer to P362 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	80	90	100	125	150
16	10	20	25	30	40	50	60	70	80	90	100	125	150
20	20	25	30	40	50	60	70	80	90	100	125	150	175
25	20	25	30	40	50	60	70	80	90	100	125	150	175
32	20	25	30	40	50	60	70	80	90	100	125	150	175
40	20	25	30	40	50	60	70	80	90	100	125	150	175
50	20	25	30	40	50	60	70	80	90	100	125	150	175
63	20	25	30	40	50	60	70	80	90	100	125	150	175
80	20	25	30	40	50	60	70	80	90	100	125	150	175
100	20	25	30	40	50	60	70	80	90	100	125	150	175

[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.

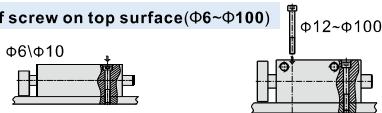
Ordering code

TC M 50 $\times$ 50 S □					
① ② ③ ④ ⑤ ⑥					
① Model	② Bearing type	③ Bore size	④ Stroke	⑤ Magnet	⑥ Thread type [Note 2]
TC: Tri-rod cylinder (Double acting type)	M: Brass bearing	6	Refer to stroke table for details	S: With magnet [Note1]	Blank: PT G: G T: NPT
		10			
		12			
		16			
		20			
		25			
		32			
		40			
		50			
		63			
		80			
		100			

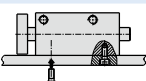
[Note1] TC Series are all with magnet. [Note2] When the thread is standard, the code is blank.

How to mount

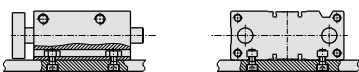
Fixation of screw on top surface(Φ 6~ Φ 100)



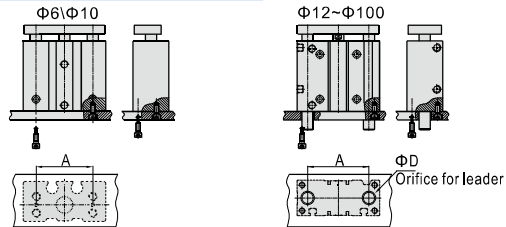
Fixation of screw at bottom surface(Φ 12~ Φ 100)



Fixation of T slot at bottom(Φ 12~ Φ 100)



Fixation of screw at back side(Φ 6~ Φ 100)

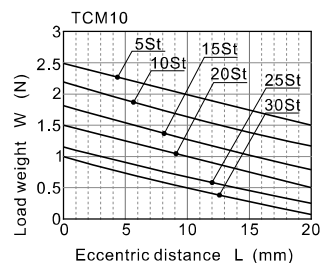
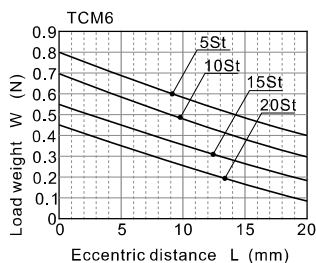
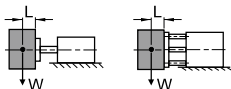


Bore size/Item	6	10	12	16	20	25	32	40	50	63	80	100
A	20.5	23	41	46	54	64	78	86	110	124	156	188
D	TCM	X	X	10	12	13	20	20	20	20	30	-
(Min)	TCL	-	-	8	10	10	13	20	20	20	-	30

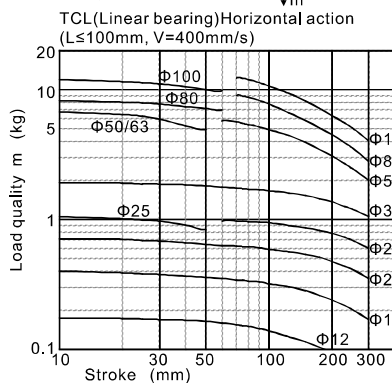
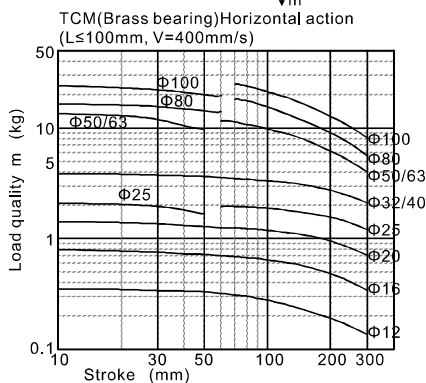
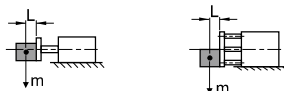
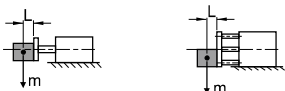
Safe load and torque

1. Max. safe load

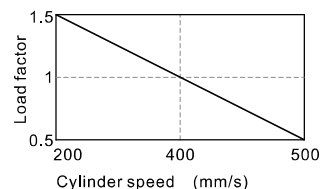
TCM6, 10 Max. safe load



TC12~100 Max. safe load



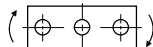
For other operating speeds of the cylinder, multiply the value of the graph when $V=400\text{mm/s}$ by the coefficient in the following table, and the obtained value is the approximate value of the allowable load mass.



2. Max. safe torque

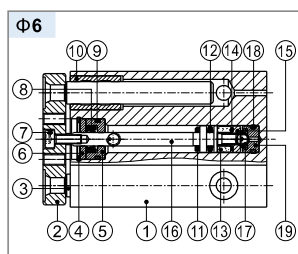
Max. safe torque

Unit: Newton-Meter(N·m)

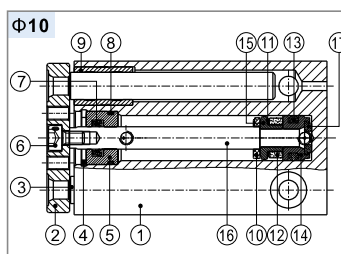


Bore size	Type	Stroke(mm)																			
		5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
6	TCM	0.008	0.007	0.006	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TCL	0.045	0.039	0.033	0.028	0.024	0.021	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	TCM	-	0.39	-	0.32	0.29	0.27	0.24	0.21	0.49	0.46	0.43	0.42	0.39	0.36	0.31	0.27	-	-	-	-
	TCL	-	0.35	-	0.29	0.26	0.24	0.22	0.19	0.44	0.39	0.37	0.35	0.32	0.29	0.24	0.20	-	-	-	-
16	TCM	-	0.69	-	0.58	0.54	0.49	0.43	0.38	0.75	0.72	0.69	0.65	0.61	0.58	0.50	0.44	0.40	0.36	-	-
	TCL	-	0.62	-	0.52	0.49	0.44	0.39	0.34	0.68	0.65	0.62	0.59	0.55	0.52	0.43	0.37	0.32	0.28	-	-
20	TCM	-	-	-	1.05	0.99	0.93	0.83	0.75	1.97	1.90	1.88	1.86	1.72	1.63	1.44	1.28	1.16	1.06	1.01	0.90
	TCL	-	-	-	0.95	0.89	0.84	0.75	0.68	1.77	1.59	1.52	1.46	1.33	1.25	1.30	1.15	1.03	0.93	0.88	0.76
25	TCM	-	-	-	1.76	1.65	1.55	1.38	1.25	3.17	3.06	2.96	2.91	2.77	2.57	2.26	2.02	1.83	1.67	1.57	1.42
	TCL	-	-	-	1.58	1.49	1.40	1.24	1.13	2.71	2.42	2.38	2.33	2.19	1.97	2.03	1.78	1.58	1.41	1.22	1.16
32	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
	TCL	-	-	-	-	5.72	5.40	5.16	4.62	5.38	5.15	5.11	5.02	4.60	4.47	3.98	3.58	3.25	2.98	2.67	2.56
40	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
	TCL	-	-	-	-	6.30	5.94	5.50	5.09	5.99	5.67	5.62	5.58	5.27	4.93	4.30	3.94	3.58	3.29	3.01	2.82
50	TCM	-	-	-	-	13.00	12.60	11.00	10.80	13.70	12.70	12.00	11.80	11.10	10.60	9.50	8.60	7.86	7.24	6.80	6.24
	TCL	-	-	-	-	9.17	8.75	8.30	7.62	10.30	9.94	9.83	9.77	8.82	8.74	8.55	7.74	7.07	6.52	6.12	5.62
63	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
	TCL	-	-	-	-	10.20	9.74	9.20	8.48	17.46	14.00	11.00	10.60	10.20	9.74	9.63	8.72	7.97	7.34	6.77	6.34
80	TCM	-	-	-	-	21.90	20.80	19.70	18.60	15.80	24.00	22.90	21.70	21.00	20.50	18.60	17.00	15.60	14.50	13.50	12.60
	TCL	-	-	-	-	15.10	14.30	13.60	12.90	12.20	21.60	20.61	19.53	18.90	18.45	16.74	15.30	14.04	13.05	12.15	11.34
100	TCM	-	-	-	-	38.80	36.80	35.00	33.50	28.50	39.40	37.50	35.60	34.50	33.80	30.90	28.40	26.20	24.40	22.50	21.40
	TCL	-	-	-	-	27.10	25.70	24.40	30.15	25.65	35.46	33.75	32.04	31.05	30.42	27.81	25.56	23.58	21.96	20.25	19.26

Inner structure and material of major parts

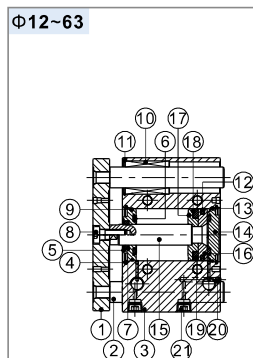


NO.	Item	Material
1	Body	Aluminum alloy
2	Fixing plate	Carbon steel
3	Guide rod	Stainless steel
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	O-ring stop block	Aluminum alloy
7	Screw	Alloy steel
8	Piston rod O-ring	NBR
9	O-ring	NBR
10	Bearing	Brass
11	Bumper	TPU
12	Piston seal	NBR
13	Magnet	Rare Earth
14	Magnet washer	NBR
15	Piston	Stainless steel
16	Piston rod	Stainless steel
17	Bumper	TPU
18	O-ring	NBR
19	Washer	Aluminum alloy



NO.	Item	Material
1	Body	Aluminum alloy
2	Fixing plate	Carbon steel
3	Guide rod	Stainless steel
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	Screw	Alloy steel
7	Piston rod O-ring	NBR
8	O-ring	NBR
9	Bearing	Brass
10	Bumper	TPU
11	Magnet washer	NBR
12	Magnet	Rare Earth
13	Piston seal	NBR
14	Piston	Brass
15	Magnet holder	Brass
16	Piston rod	Stainless steel
17	Bumper	TPU

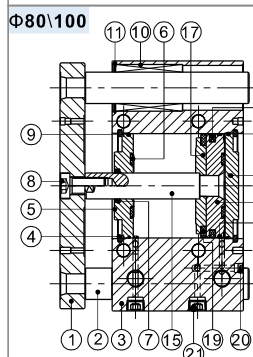
Note: inner structure & material data sheet is based on certain bore size.
Please contact AirTAC if you need inner structure & material data sheet for specific bore size.



TCL	TCM
 Bore size Φ12, Φ16mm Stroke ≤ 30mm	 Bore size Φ20~Φ63mm Stroke ≤ 50mm
 Bore size Φ12, Φ16mm 30 < Stroke ≤ 100mm	 Bore size Φ20~Φ63mm 50 < Stroke ≤ 100mm
 Bore size Φ12, Φ16mm Stroke > 100mm	 Bore size Φ20~Φ63mm Stroke > 100mm

TCM		
		
Bore size $\Phi 12 \sim \Phi 25 \text{ mm}$ Stroke $\leq 50 \text{ mm}$	Bore size $\Phi 12 \sim \Phi 63 \text{ mm}$ $50 < \text{Stroke} \leq 100 \text{ mm}$	Bore size $\Phi 12 \sim \Phi 63 \text{ mm}$ Stroke $> 100 \text{ mm}$

TCL		
		
Stroke $S = 25 \sim 60 \text{ mm}$	Stroke $S = 70 \sim 150 \text{ mm}$	Stroke $S = 175 \sim 250 \text{ mm}$



TCL	TCM
 Stroke S=25~60mm	 Stroke S=70~150mm
 Stroke S=175~250mm	 Stroke S=25~250mm

NO.	Item	Material
1	Fixing plate	Carbon steel
2	Leader	Carbon steel
3	Body	Aluminum alloy
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Piston rod O-ring	NBR
8	Screw	Alloy steel
9	O-ring	NBR
10	Bearing	Bearing steel/brass
11	C clip	Spring steel
12	Piston seal	NBR
13	O-ring	NBR
14	Back cover	Brass/aluminum alloy
15	Piston rod	Carbon steel
16	Piston	Brass/aluminum alloy
17	Magnet holder	Brass/aluminum alloy
18	Magnet washer	NBR
19	Magnet	Rare Earth/Plastic
20	Screw	Alloy steel
21	Screw	Alloy steel
22	Spacer	Aluminum alloy

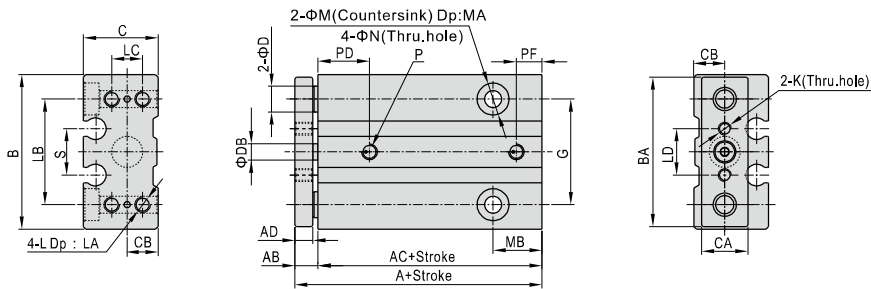
Note: inner structure & material data sheet is based on certain bore size.
Please contact AirTAC if you need inner structure & material data sheet for specific bore size.

Tri-rod cylinder

TCL,TCM Series

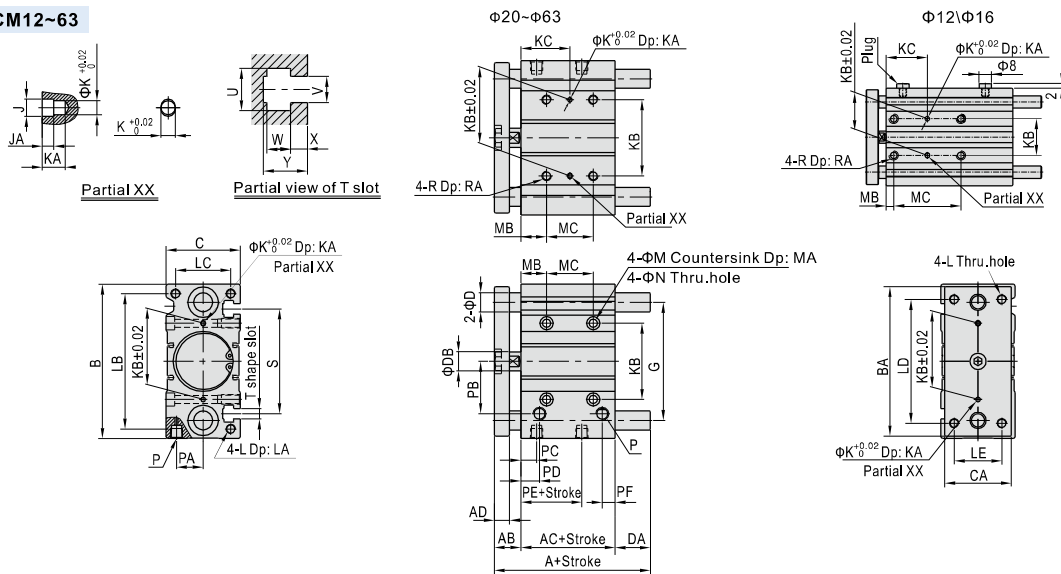
Dimensions

TCM6\TCM10

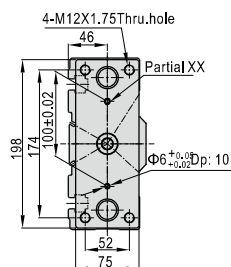
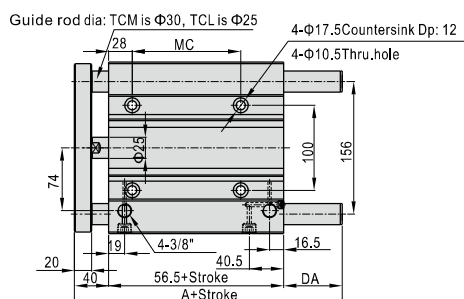
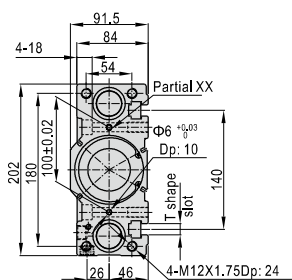
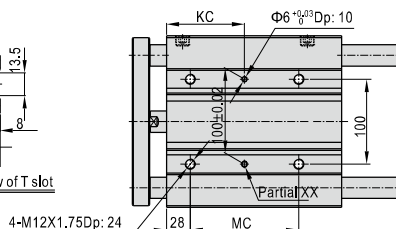


Bore size\Item	A	AB	AC	AD	B	BA	C	CA	CB	D	DB	G	K	L	LA	LB	LC	LD	M	MA	MB	N	P	PD	PF
6	29.5	6	23.5	5	30	29	14.5	9	6	5	3	20.5	M2.5X0.45	M3X0.5	5	20.5	6	9	6	3	9.5	3.5	M3X0.5	9.5	5.5
10	32	6	26	5	34	33	18	10	7.5	6	5	23	M3X0.5	M4X0.7	5	23	8	11	8	4	8.5	4.5	M3X0.5	11.5	5

TCL/TCM12~63

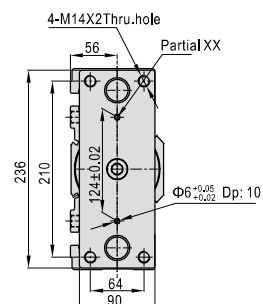
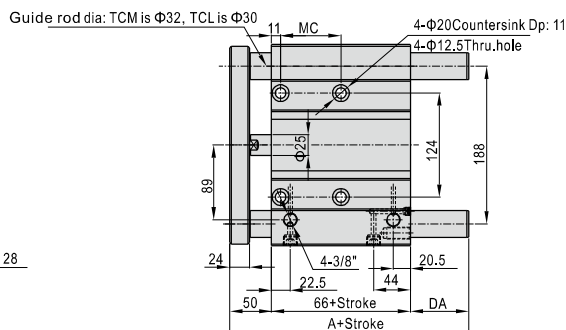
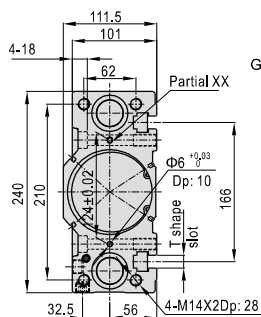
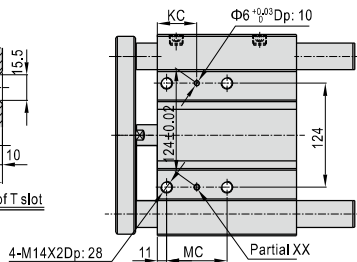
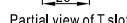


TCL,TCM Series



Item	Stroke	25	30	40	50	60	70	75	80	100	125	150	175	200	225	250
A		TCM=110.5/TCL=104.5					163.5					185.5				
DA		TCM=14/TCL=8					67					89				
KC		42					54					92				
MC		28					52					128				

TCL/TCM100



Item\Stroke	25	30	40	50	60	70	75	80	100	125	150	175	200	225	250
A	TCM=126/TCL=120					184					206				
DA	TCM=10/TCL=4					68					90				
KC	35			47					85					121	
MC	48			72					148					220	