



# Tri-rod cylinder—TCL, TCM Series

## Compendium of TCL/TCM Series

**JIS standard**

**Two guides of special bearing steel**  
Steel ball linear bearing(TCL) or Bronze sliding bearing(TCM)

**Double-rod guide unit**  
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.

**Magnetic switch slots around the cylinder body**  
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

**Two groups of inlet and outlet air ports**

Up inlet or outlet air port

Side inlet or outlet air port

**Multi-type cylinder**

TCL: Linear bearing

TCM: Bronze bearing

**Twelve bore size are available**  
Bore size: 6, 10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100

**Be mounted cylinder from three directions**

Up mounted

Back mounted

Bottom mounted

### Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm <sup>2</sup> )	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.



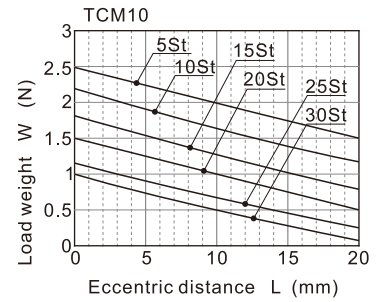
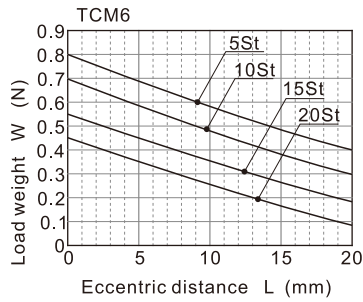
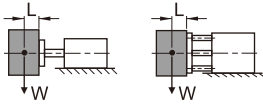


## TCL, TCM Series

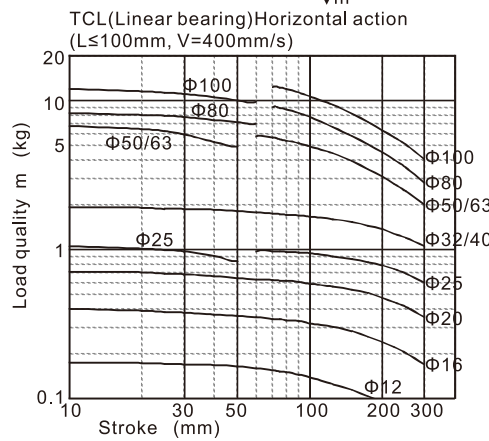
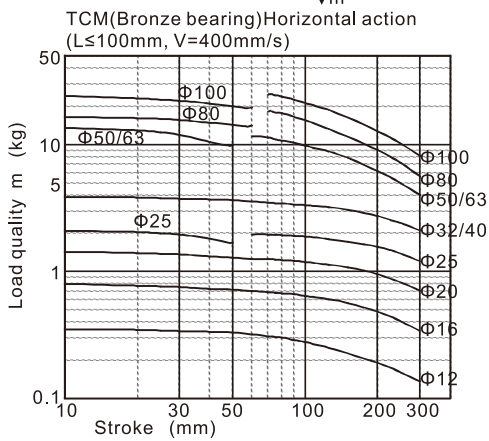
### Safe load and torque

#### 1. Max. safe load

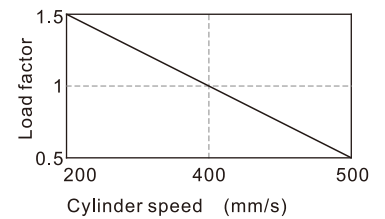
TCM6,10 Max. safe load



TC12~100 Max. safe load



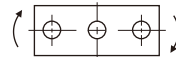
For other operating speeds of the cylinder, multiply the value of the graph when V=400mm/s by the coefficient in the following table, and the obtained value is the approximate value of the allowable load mass.



#### 2. Max. safe torque

Max. safe torque

Unit: Newton-Meter(N·m)

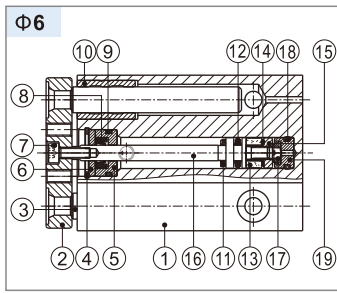


Bore size	Type	Stroke(mm)																			
		5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
6	TCM	0.008	0.007	0.006	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	TCM	0.045	0.039	0.033	0.028	0.024	0.021	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	TCM	-	0.39	-	0.32	0.29	0.27	0.24	0.21	0.49	0.46	0.43	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

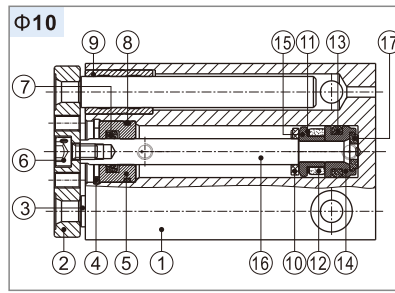
# Tri-rod cylinder

## TCL, TCM Series

### Inner structure and material of major parts

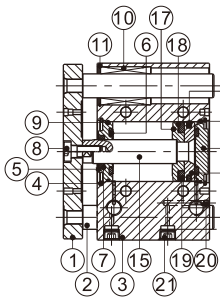


NO.	Item	Material
1	Body	Aluminum alloy
2	Fixing plate	Carbon steel
3	Leader	Stainless steel
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	O-ring stop block	Aluminum alloy
7	Screw	Alloy steel
8	Piston rod O-ring	NBR
9	O-ring	NBR
10	Bearing	Brass
11	Bumper	TPU
12	Piston seal	NBR
13	Magnet	Rare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

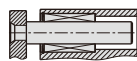


NO.	Item	Material
1	Body	Aluminum alloy
2	Fixing plate	Carbon steel
3	Leader	Stainless steel
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	Screw	Alloy steel
7	Piston rod O-ring	NBR
8	O-ring	NBR
9	Bearing	Brass
10	Bumper	TPU
11	Magnet washer	NBR
12	Magnet	Rare Earth
13	Piston seal	NBR
14	Piston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

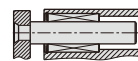
### Φ12~63



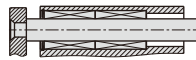
#### TCL



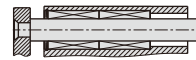
Bore size Φ12、Φ16mm  
Stroke ≤30mm



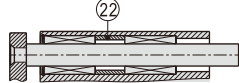
Bore size Φ20~Φ63mm  
Stroke ≤50mm



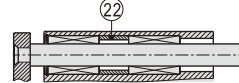
Bore size Φ12、Φ16mm  
30 < Stroke ≤100mm



Bore size Φ20~Φ63mm  
50 < Stroke ≤100mm

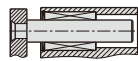


Bore size Φ12、Φ16mm  
Stroke > 100mm

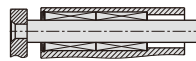


Bore size Φ20~Φ63mm  
Stroke > 100mm

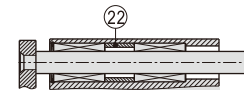
#### TCM



Bore size Φ12~Φ25mm  
Stroke ≤50mm

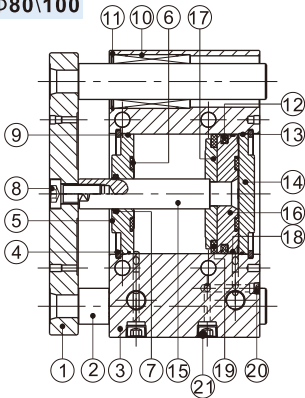


Bore size Φ12~Φ63mm  
50 < Stroke ≤100mm

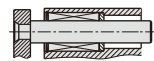


Bore size Φ12~Φ63mm  
Stroke > 100mm

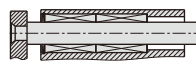
### Φ80\100



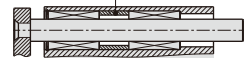
#### TCL



Stroke S=25~60mm



Stroke S=70~150mm



Stroke S=175~250mm

#### TCM



Stroke S=25~250mm

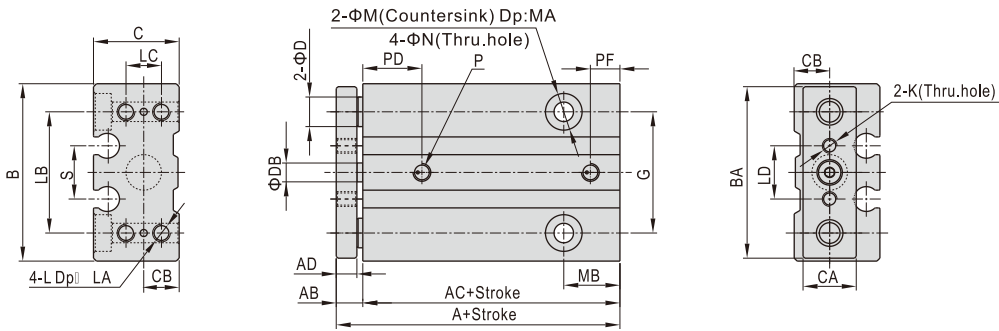
NO.	Item	Material
1	Fixing plate	Carbon steel
2	Leader	Carbon steel
3	Body	Aluminum alloy
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Piston rod O-ring	NBR
8	Screw	Alloy steel
9	O-ring	NBR
10	Bearing	Bearing steel/brass
11	C clip	Spring steel
12	Piston seal	NBR
13	O-ring	NBR
14	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

# Tri-rod cylinder

## TCL, TCM Series

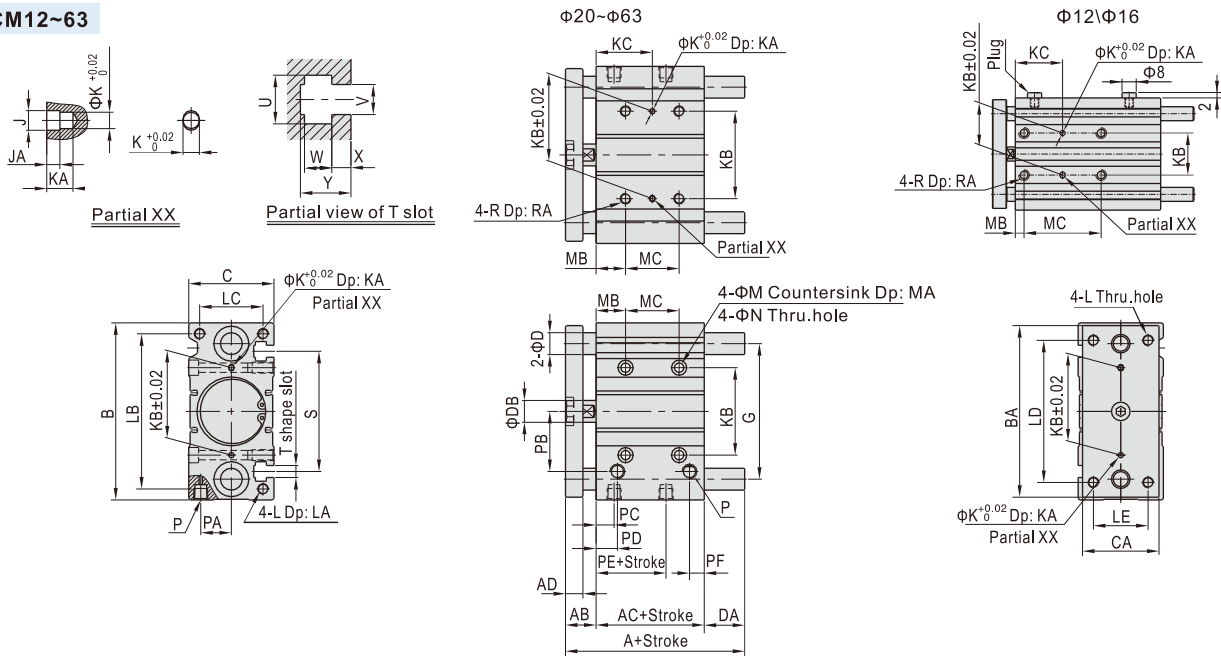
### Dimensions

#### 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



Bore size\Item	A				DA				MC				KC								
	TCL	TCM	TCL\TCM		TCL	TCM			≤30	31~100	101~200	>200	≤30	31~100	101~200	>200	≤30	31~100	101~200	>200	
Stroke	≤30	≤50	31(51)~100	101~200	>200	≤30	31~100	101~200	>200	≤50	51~100	101~200	>200	≤40	41~100	101~200	>200	≤40	41~100	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

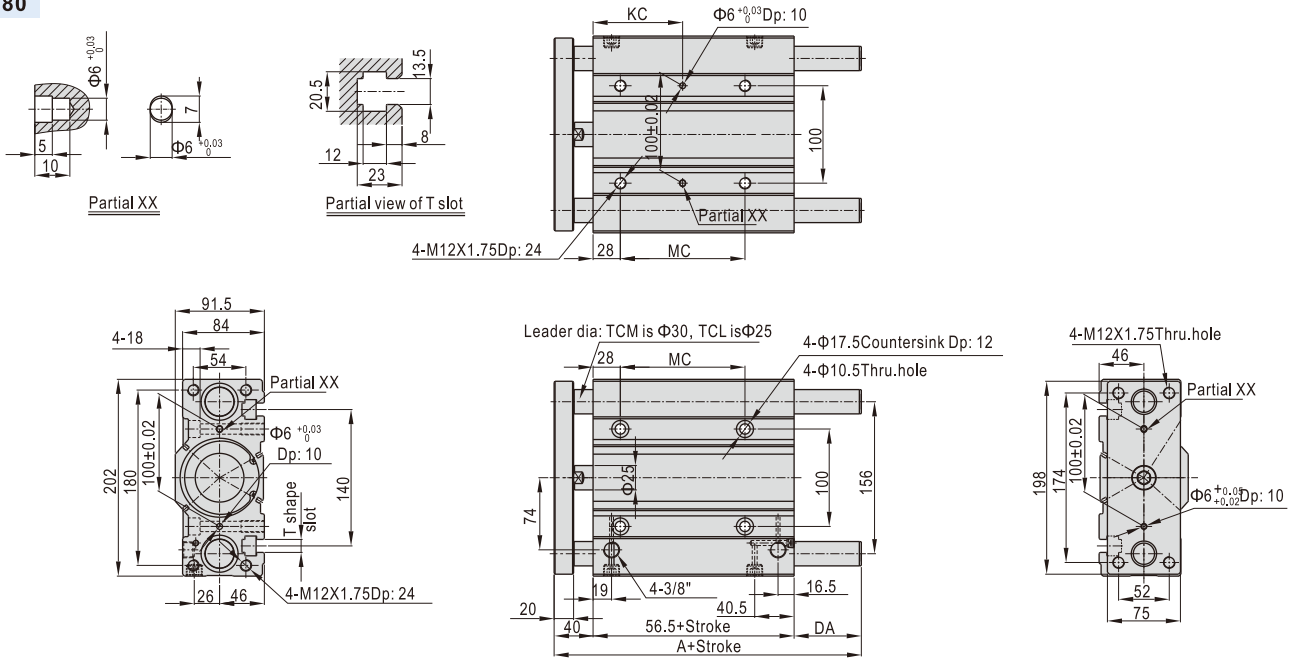
Bore size\Item	AB	AC	AD	B	BA	C	CA	D(TCL)	D(TCM)	DB	G	J	JA	K	KA	KB	L	LA	LB	LC	LD
12	13	29	8	58	56	26	22	6	8	6	41	3.5	3	3	6	23	M4×0.7	10	50	18	48
16	13	33	8	64	62	30	25	8	10	6	46	3.5	3	3	6	24	M5×0.8	12	56	22	54
20	16	37	10	83	81	36	30	10	12	10	54	3.5	3	3	6	28	M5×0.8	13	72	24	70
25	16	37.5	10	93	91	42	38	12	16	12	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	16	78	4.5	3	4	6	42	M8×1.25	20	98	34	96
40	22	44	12	120	118	54	44	16	20	16	86	4.5	3	4	6	50	M8×1.25	20	106	40	104
50	28	44	16	148	146	64	60	20	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	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

# Tri-rod cylinder

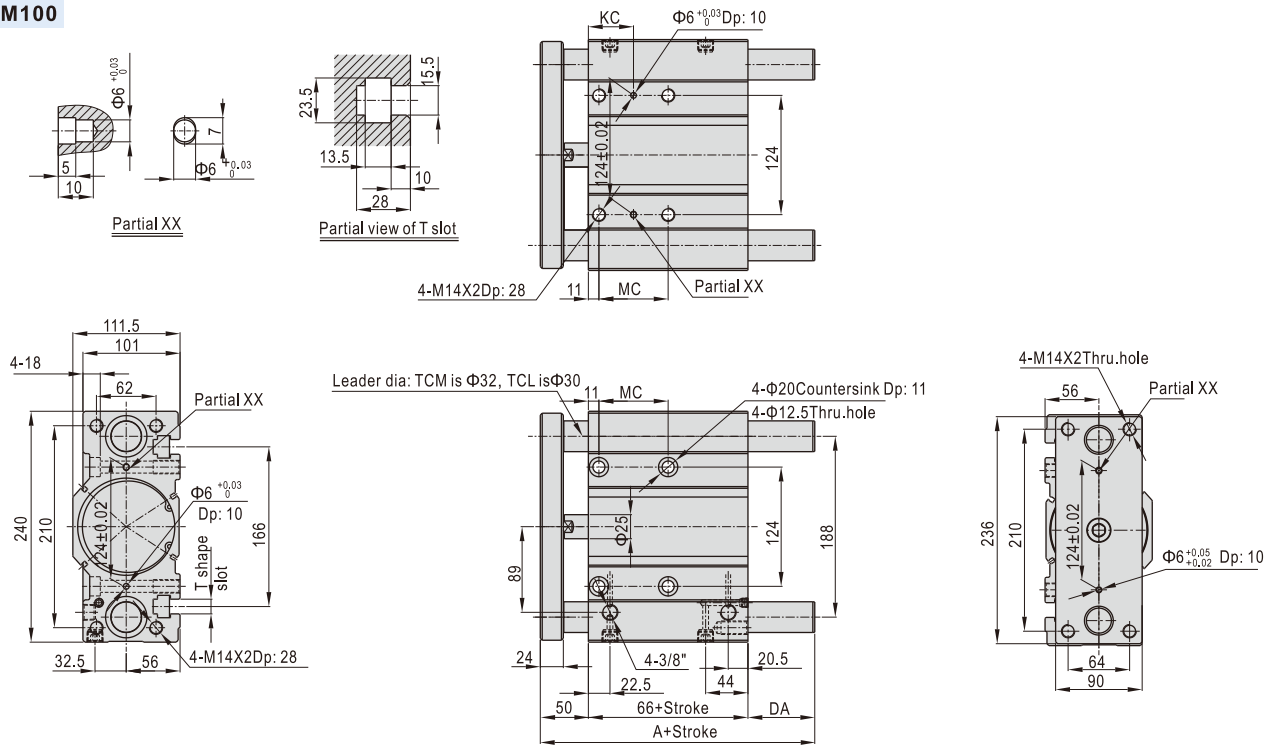
## TCL, TCM Series

### TCL/TCM80



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				
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=128/TCL=122					186					208				
DA	TCM=12/TCL=6					70					92				
KC	35					47					85				
MC	48					72					148				