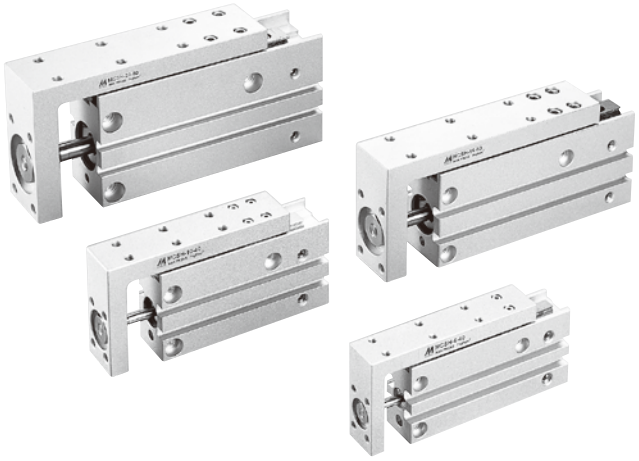
MCSH series

COMPACT SLIDE CYLINDER



Features

- Compact precision cylinder.
- Cylinder can take high lateral loads and is also non rotating.
- Cylinder can be mounted in 3 or 4 positions.
- Magnetic as standard.

Specification

Model	MCSH			
Acting type	Double acting			
Tube I.D. (mm)	6	10	16	20
Guide rail width (mm)	5	7	9	12
Port size	M5×0.8			
Medium	Air			
Min. operating pressure	0.12 MPa	0.06 MPa		0.05 MPa
Max. operating pressure	0.7 MPa			
Proof pressure	1.07 MPa			
Ambient temperature	-10~+60°C (No freezing)			
Operating speed range	50~500 mm/sec			
Allowable kinetic energy J (kgf · cm)	0.125	0.25	0.5	1.0
Lubricator	Not required			
Cushion	Rubber bumper			
Stroke length tolerance	$^{+1.0}_{0}$			
Sensor switch (*)	RCE, RCE1, RDEP			

* RCE, RCE1, RDEP specification, please refer to page 8-10, 14.

Order example

MCSH — 10 — 60

MODEL / TUBE I.D. / STROKE

Cylinder weight

Unit: g

Stroke (mm)	Tube I.D.			
	ø6	ø10	ø16	ø20
5	62	117	216	437
10	67	125	227	455
15	76	140	247	486
20	81	148	258	505
25	91	162	279	542
30	96	170	290	560
40	111	192	323	597
50	125	215	353	656
60	140	238	386	700

Table for standard stroke

Tube I.D.	Stroke (mm)
ø6, 10, 16, 20	5, 10, 15, 20, 25, 30, 40, 50, 60

Allowable moment

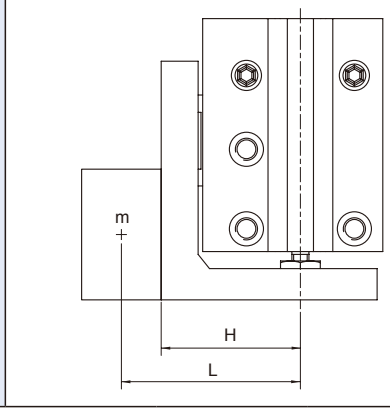
Tube I.D. (mm)	Allowable moment (N.m)		
	Roll moment load	Yaw moment load	Pitch moment load
	Mr	My	Mp
ø6	0.53	0.35	0.42
ø10	1.23	0.73	0.86
ø16	2.47	1.43	1.69
ø20	4.94	2.47	2.82

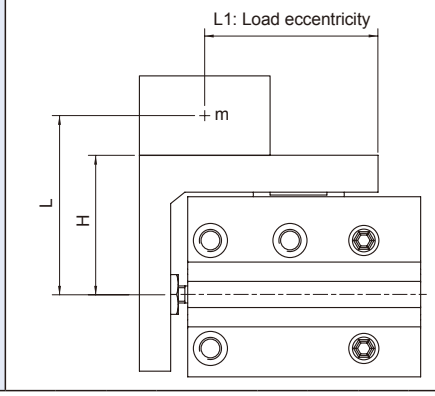
Theoretical force

Unit: N

Tube I.D. (mm)	Piston rod (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)		
				0.3	0.5	0.7
6	3	OUT	28.3	8.49	14.2	19.8
		IN	21.2	6.36	10.6	14.8
10	4	OUT	78.5	23.6	39.3	55.0
		IN	66.0	19.8	33.0	46.2
16	6	OUT	201.0	60.3	101.0	141.0
		IN	172.0	51.6	86.0	121.0
20	8	OUT	314.0	94.2	157.0	220.0
		IN	264.0	79.2	132.0	185.0

Selection conditions

Selection fig	a1	a2	a3
Max. speed (mm)	Up to 100	Up to 300	Up to 500
Vertical Mounting direction			

Selection fig	b1	b2	b3	b4	b5	b6	b7	b8	b9
Load eccentricity L1 (mm)	50	100	200	50	100	200	50	100	200
Max. speed (mm)	Up to 100			Up to 300			Up to 500		
Horizontal Mounting direction									

Tube I.D.	ø6	ø10	ø16	ø20
H dimension (mm)	24.5	30.5	34.5	41.5

Selection example

- **Vertical mounting**

  Maximum speed: 300 mm/s
  Overhang L: 20 mm
  Load mass m: 0.2 kg

1. Refer to Graph a2 based on vertical mounting and a speed of 300 mm/s.
2. In Graph a2, find the intersection of a 20 mm overhang L and load mass m of 0.2 kg, which results in a determination of ø16.

- **Horizontal Mounting**

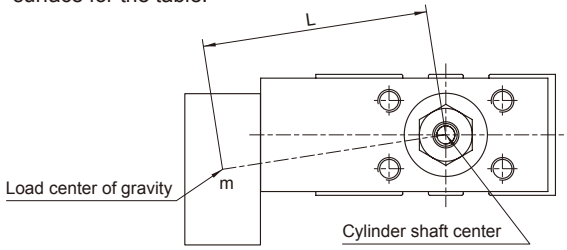
  Maximum speed: 300 mm/s
  Load eccentricity L1: 50 mm
  Overhang L: 60 mm
  Load mass m: 0.1 kg

1. Refer to Graph b4 based on horizontal mounting, a speed of 300 mm/s and load eccentricity L1 of 50 mm.
2. In Graph b4, find the intersection of a 60 mm overhang L and load mass m of 0.1 kg, which results in a determination of ø20.

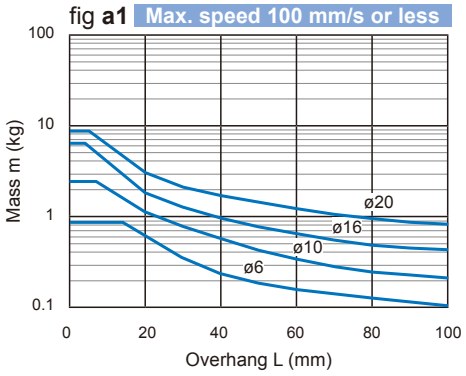
- L: Overhang (the distance from the cylinder shaft center to the load center of gravity)

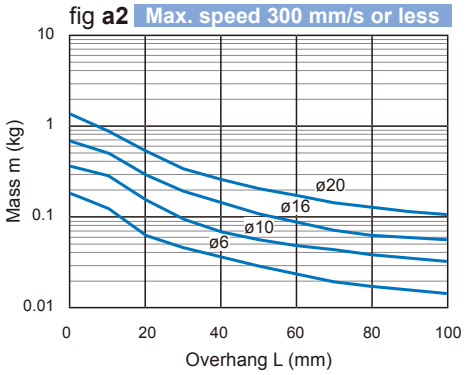
  The direction of L can also be a diagonal direction. (Refer to the drawing below)

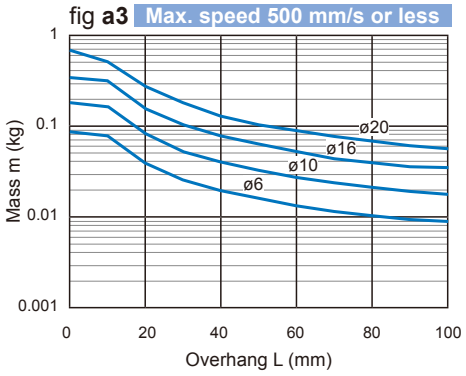
- H: Distance from the cylinder center axis to the mounting surface for the table.



Vertical mounting (fig a1 ~ a3)







Horizontal mounting (fig b1 ~ b9)

Max. speed 100 mm/s or less	Max. speed 300 mm/s or less	Max. speed 500 mm/s or less

fig **b1** (Load eccentricity 50 mm)

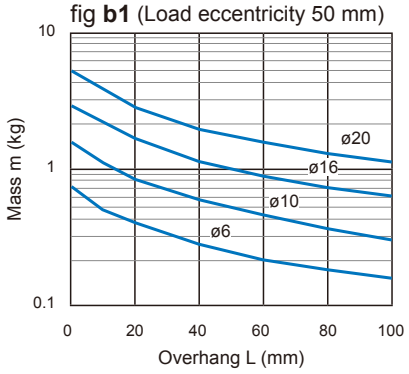


fig **b4** (Load eccentricity 50 mm)

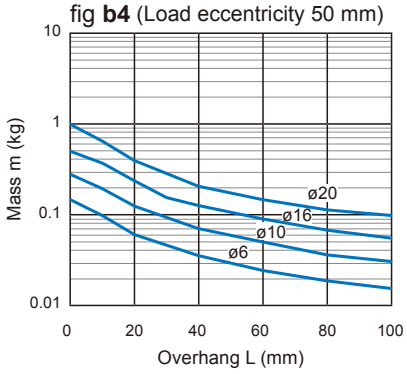


fig **b7** (Load eccentricity 50 mm)

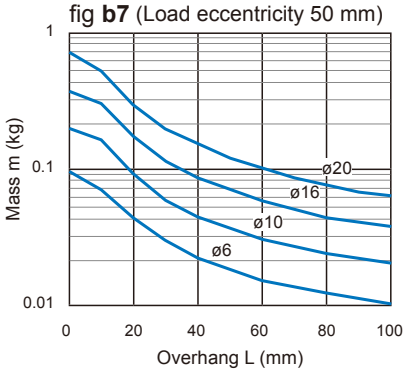


fig **b2** (Load eccentricity 100 mm)

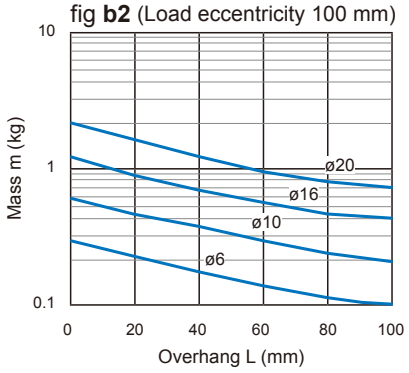


fig **b5** (Load eccentricity 100 mm)

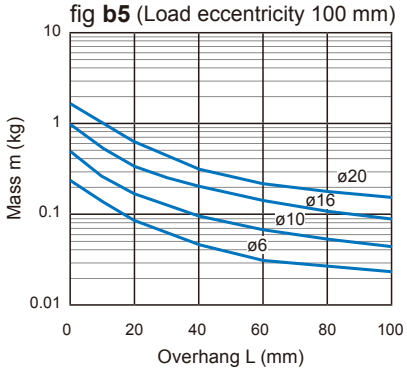


fig **b8** (Load eccentricity 100 mm)

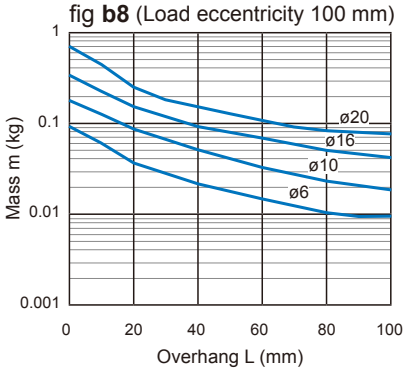


fig **b3** (Load eccentricity 200 mm)

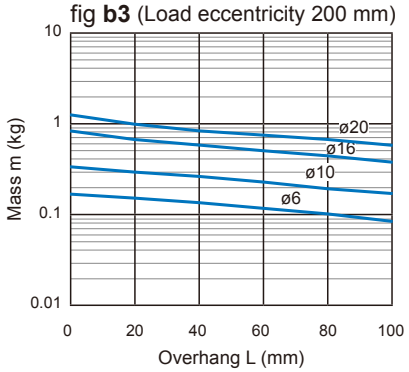


fig **b6** (Load eccentricity 200 mm)

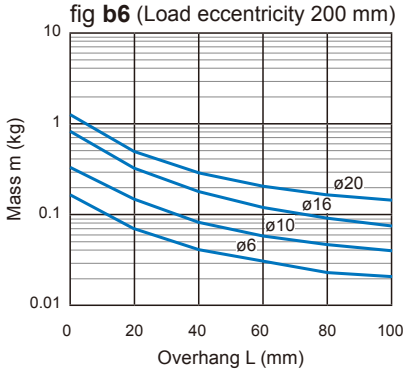


fig **b9** (Load eccentricity 200 mm)

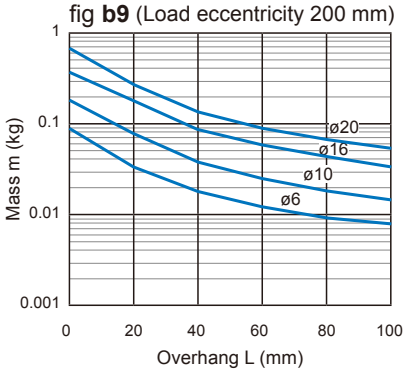
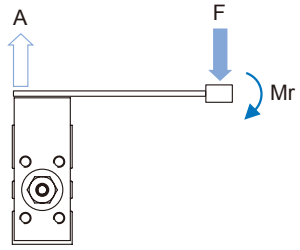
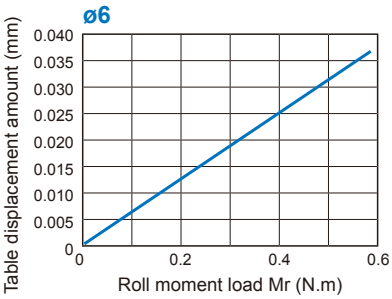


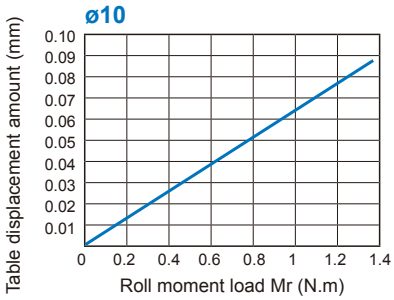
Table deflection (Reference values)

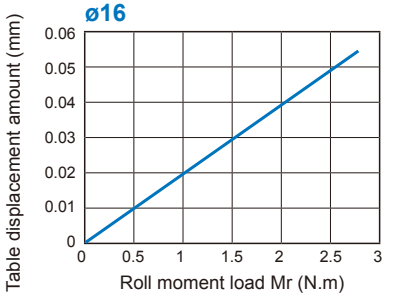
Table displacement due to roll moment load

Table displacement of section A when loads are applied to the section F with theslide table retracted.









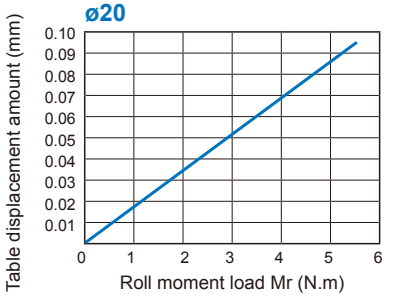
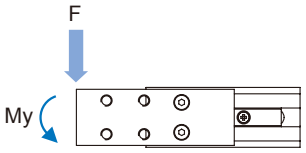
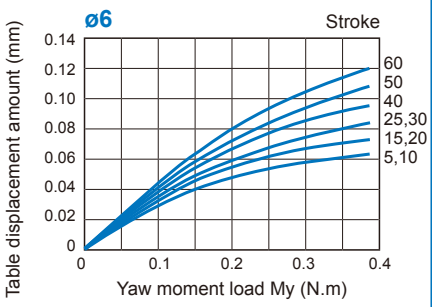
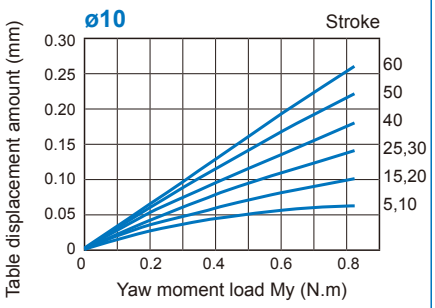


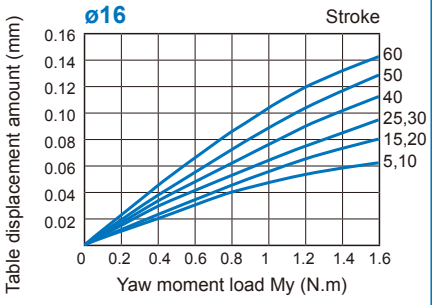
Table displacement due to yaw moment load

Table displacement when loads are applied to the section marked with the arrow at the full stroke.









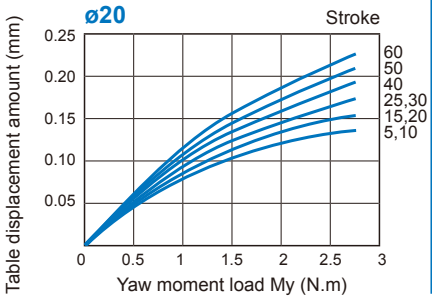
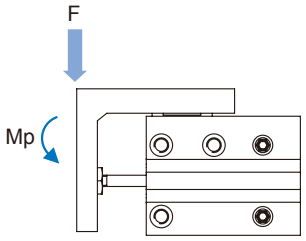
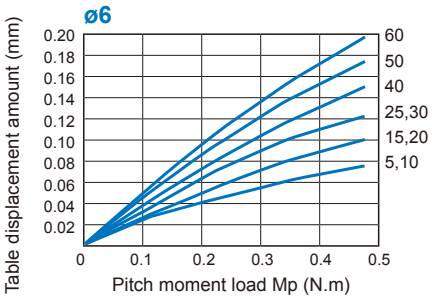
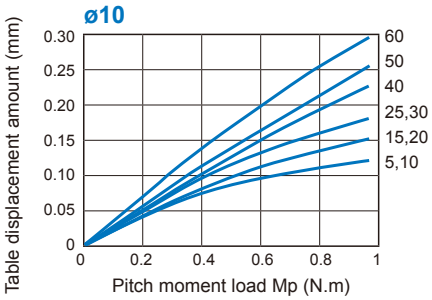


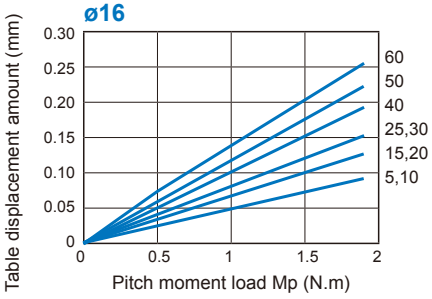
Table displacement due to pitch moment load

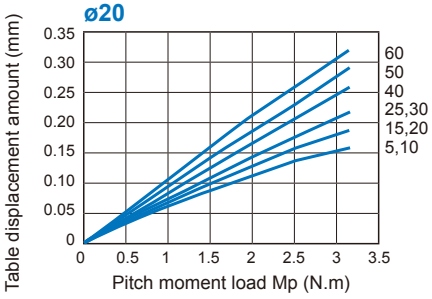
Table displacement when loads are applied to the section marked with the arrow at the full stroke.







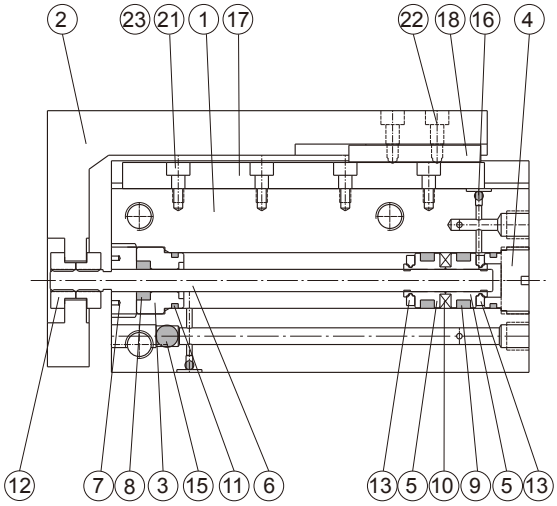




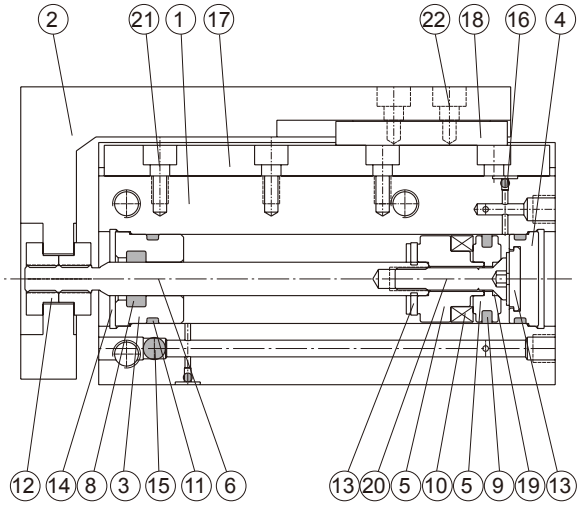
MCSH Inside structure & Parts list

COMPACT SLIDE CYLINDER

ø6, ø10



ø16, ø20



Material

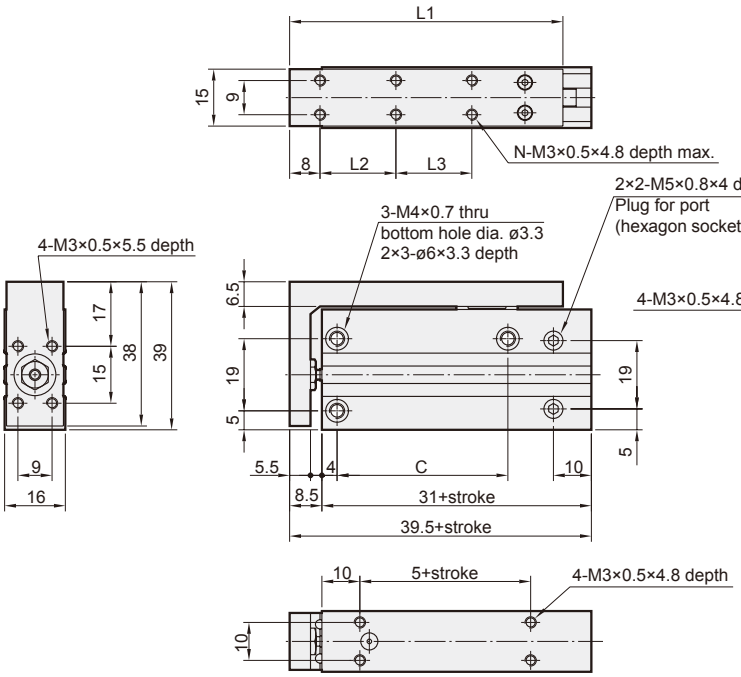
No.	Part name \ Tube I.D.	6	10	16	20	Note	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy					1	
2	Table	Aluminum alloy					1	
3	Rod cover	Brass	Aluminum alloy				1	
4	Head cover	Aluminum alloy					1	
5	Piston	Aluminum alloy					2	
6	Piston rod	Stainless steel					1	
7	Rod cover locker	*1		–			1	
8	Rod packing	NBR					1	●
9	Piston packing	NBR				Tube I.D.ø6,ø10 ×2, ø16,ø20 ×1	1 or 2	●
10	Magnet ring	Magnet material					1	
11	Cover ring	NBR					2	●
12	Rod front nut	Brass					2	
13	Cushion packing	NBR					2	●
14	C type snap ring for hole	–		Spring steel			2	
15	Steel ball A	Stainless steel					1	
16	Steel ball B	Stainless steel					2	
17	Linear guide	Stainless steel					1	
18	Guide seat	Stainless steel					1	
19	Piston gasket	–		NBR			1	●
20	Piston bolt	–		*1			1	
21	Hexagon socket head cap screw A	Stainless steel				Tube I.D.ø10~20 (*3)	2~5	
22	Hexagon socket head cap screw B	*2	Stainless steel			Tube I.D.ø6 ×2, ø10~20×4	2 or 4	
23	Round head Phillips screw	Stainless steel				Only for tube I.D.ø6 (*3)	2~5	
24	Plug gasket	NBR					4	●

*1. Stainless steel *2. Carbon steel
*3. Quantity varies depending on the stroke length.

Order example of repair kits

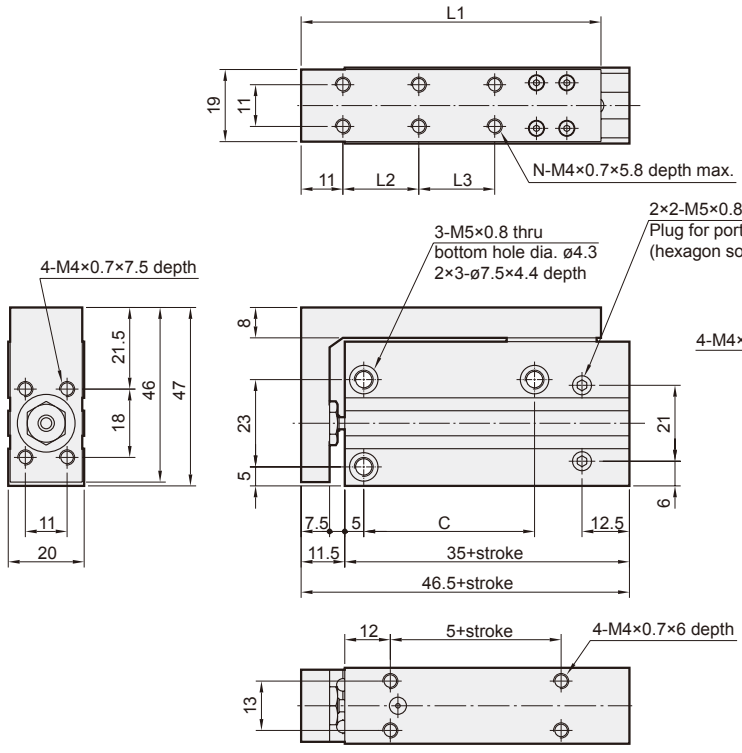
Tube I.D.	Repair kits
ø6	**PS-MCSH-6**
ø10	**PS-MCSH-10**
ø16	**PS-MCSH-16**
ø20	**PS-MCSH-20**

ø6



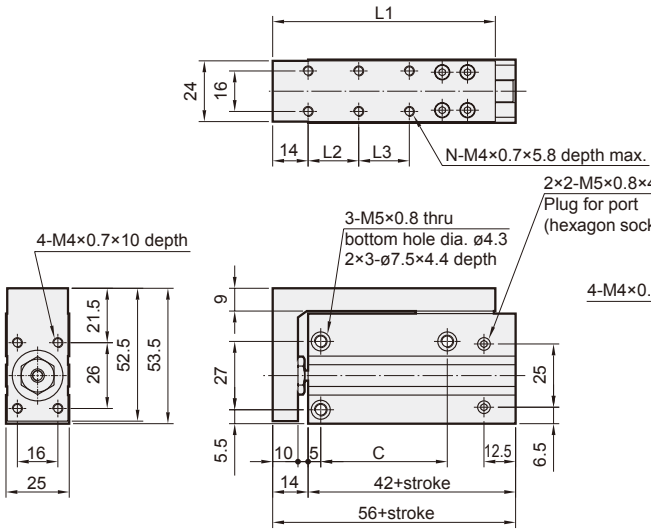
Code / Stroke	C	L1	L2	L3	N
5	14	42	10	–	4
10	14	42	10	–	4
15	24	52	20	–	4
20	24	52	20	–	4
25	30	62	30	–	4
30	30	62	30	–	4
40	45	72	20	20	6
50	55	82	25	25	6
60	60	92	30	30	6

ø10



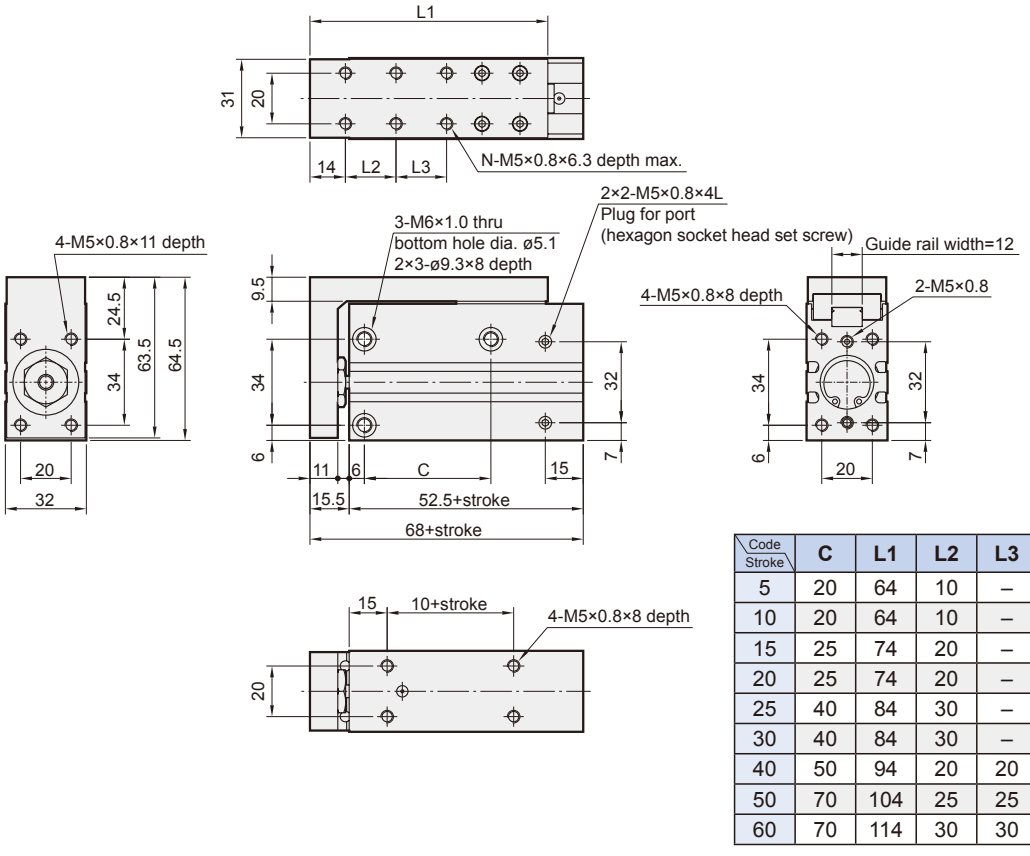
Code / Stroke	C	L1	L2	L3	N
5	14	49	10	–	4
10	14	49	10	–	4
15	24	59	20	–	4
20	24	59	20	–	4
25	30	69	30	–	4
30	30	69	30	–	4
40	45	79	20	20	6
50	55	89	25	25	6
60	60	99	30	30	6

ø16



Code / Stroke	C	L1	L2	L3	N
5	20	58	10	–	4
10	20	58	10	–	4
15	30	68	20	–	4
20	30	68	20	–	4
25	40	78	30	–	4
30	40	78	30	–	4
40	50	88	20	20	6
50	60	98	25	25	6
60	60	108	30	30	6

ø20



Code / Stroke	C	L1	L2	L3	N
5	20	64	10	–	4
10	20	64	10	–	4
15	25	74	20	–	4
20	25	74	20	–	4
25	40	84	30	–	4
30	40	84	30	–	4
40	50	94	20	20	6
50	70	104	25	25	6
60	70	114	30	30	6

MCSS series

SLIDE CYLINDER

Features

- High precision combination of cylinder and linear rail.
- Flush fitting sensor groove.
- Provide optional combination for stroke adjuster and end lock (for vertical installation to prevent falling).
- Magnetic as standard.

Specification

Model	MCSS					
Acting type	Double acting					
Tube I.D. (mm)	6	8	12	16	20	25
Port size	M3×0.5	M5×0.8			Rc1/8	
Medium	Air					
Operating pressure range	0.15~0.7 MPa					
Proof pressure	1 MPa					
Ambient temperature	-5~+60°C (No freezing)					
Lubricator	Not required					
Available speed range	50~500 mm/sec					
Cushion	Rubber bumper (Standard) Shock absorber (Option)					
End lock — Operating speed range	–	50~500 mm/sec				
End lock — Holding force (N)	–	25	60	110	160	250
Sensor switch (*)	RCE, RCE1, RDEP					

* RCE, RCE1, RDEP specification, please refer to page 8-12, 13, 18.

Table for standard stroke

Tube I.D.	Stroke (mm)
ø6	10, 20, 30, 40, 50
ø8	10, 20, 30, 40, 50, 75
ø12	10, 20, 30, 40, 50, 75, 100
ø16	10, 20, 30, 40, 50, 75, 100, 125
ø20, 25	10, 20, 30, 40, 50, 75, 100, 125, 150

Order example

MCSS — 20 L — 50 — AS — X12 — HL — □

- MODEL
- TUBE I.D.
- Blank: Standard
  L: Symmetric style
- STROKE
- (*1) STROKE ADJUSTER
  Blank: Without adjuster
  AS: Adjuster at extension end
  AT: Adjuster at retraction end
  A: Adjuster at both ends
  BS: Absorber at extension end
  BT: Absorber at retraction end
  B: Absorber at both ends
  AB: Adjuster at extension end+Absorber at retraction end
  BA: Absorber at extension end+Adjuster at retraction end
- (*2) ADJUSTABLE RANGE
  Blank: 5mm
  X11: 15mm
  X12: 25mm
  (Only for stroke adjuster)
- (*3,4) END LOCK
  Blank: Without
  HL: With end lock
  (for ø8~ø25)
- PORT THREAD
  Blank: M thread
  (for ø6~ø16)
  Blank: Rc thread
  G: G thread
  NPT: NPT thread
  (for ø20,ø25)

*1. Adjustable range is not available for shock absorber type. Shock absorber is not available for MCSS-6.
*2. **X12** (adjustable range: 25mm) is not available for MCSS-6.
*3. End lock (**HL**) not suit for symmetric style (**L**) and MCSS-6.

Theoretical force

Unit: N

Tube I.D. (mm)	Piston rod (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)					
				0.2	0.3	0.4	0.5	0.6	0.7
6	3	OUT	57	11	17	23	29	34	40
		IN	42	8	13	17	21	25	29
8	4	OUT	101	20	30	40	51	61	71
		IN	75	15	23	30	38	45	53
12	6	OUT	226	45	68	90	113	136	158
		IN	170	34	51	68	85	102	119
16	8	OUT	402	80	121	161	201	241	281
		IN	302	60	91	121	151	181	211
20	10	OUT	628	126	188	251	314	377	400
		IN	471	94	141	188	236	283	330
25	12	OUT	982	196	295	393	491	589	687
		IN	756	151	227	302	378	454	529

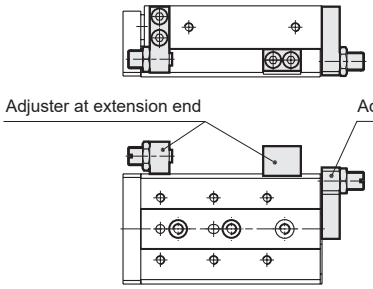
(*4) Option combination

End lock / Stroke adj.	Blank	HL
Blank	○	○
AS	○	○
AT	○	×
A	○	×
BS	○	○
BT	○	×
B	○	×
AB	○	×
BA	○	×

Options

Stroke adjuster

- Adjustable stroke range:
  0~5mm (Standard), 0~15mm (-X11), 0~25mm (-X12)
  AS: Adjuster at extension end
  AT: Adjuster at retraction end
  A: Adjuster at both ends

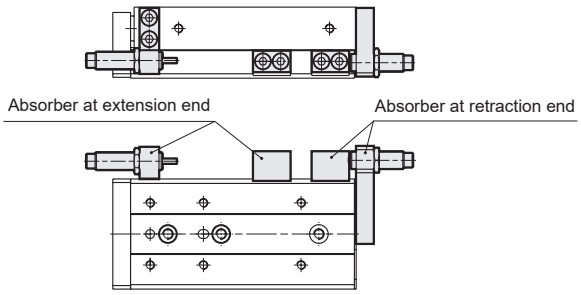


- Tightening torque of mounting bolts
  Insufficient torque will cause a decrease in the positioning accuracy and lead to malfunction.

Tube I.D. (mm)	Adjuster at extension end (AS)				Adjuster at retraction end (AT)	
	Body mounting section		Table mounting section			
	Bolt size	Tightening torque (N.m)	Bolt size	Tightening torque (N.m)	Bolt size	Tightening torque (N.m)
6	M2.5×10	0.5	M2.5×8	0.5	M2.5×8	0.5
8	M3×12	0.9	M3×10	0.9	M3×10	0.9
12	M4×15	2.1	M4×12	2.1	M4×8	2.1
16	M5×18	4.4	M5×18	4.4	M5×10	4.4
20	M6×20	7.0	M6×20	7.0	M5×12	4.4
25	M8×25	18.0	M8×25	18.0	M6×16	7.0

With shock absorber

- Enable adjustment of stroke.
- Absorb the collision at stroke end and stops smoothly.
  BS: Absorber at extension end
  BT: Absorber at retraction end
  B: Absorber at both ends

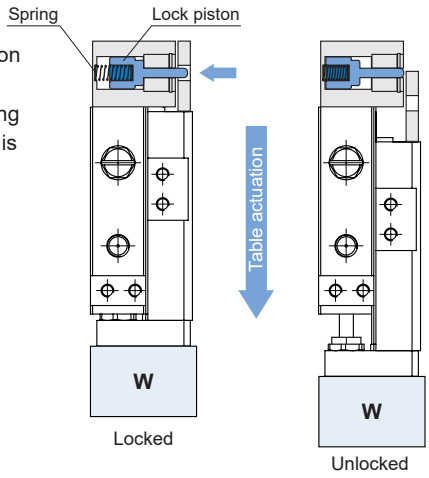


- Tightening torque of mounting bolts.
  Insufficient torque will cause a decrease in the positioning accuracy and cause malfunction.

Tube I.D. (mm)	Absorber at extension end (BS)		Absorber at retraction end (BT)			
			Body mounting section		Table mounting section	
	Bolt size	Tightening torque (N.m)	Bolt size	Tightening torque (N.m)	Bolt size	Tightening torque (N.m)
8	M3×16	0.9	M3×12	0.9	M3×16	0.9
12	M4×15	2.1	M4×8	2.1	M4×15	2.1
16	M5×18	4.4	M5×10	4.4	M5×18	4.4
20	M6×25	7.0	M5×12	4.4	M6×25	7.0
25	M8×25	18.0	M6×16	7.0	M8×25	18.0

With End lock

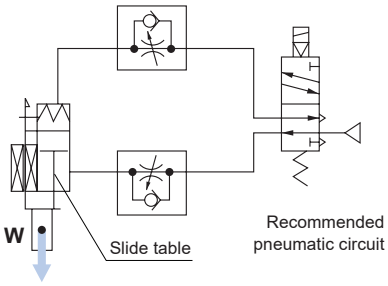
- Hold the return position of cylinder to prevent the table from dropping even if the air supply is cut off.



Caution

1. Use 4/2 or 5/2 solenoid valves.

A malfunction may occur with a control circuit that exhausts from two ports, such as exhaust center 3 position valves.

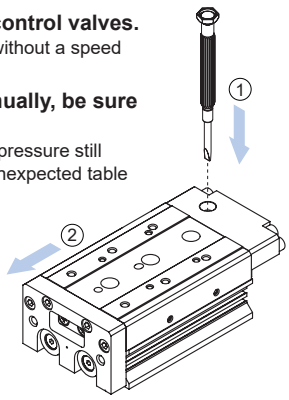


2. Be sure to use meter-out speed control valves.
If it is used in meter-in speed control or without a speed controller, it may result in malfunction.

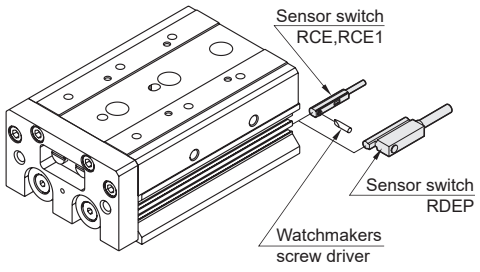
3. When releasing the end lock manually, be sure that air pressure is released.
If the End Lock is unlocked while the air pressure still remains, it may cause damage, due to unexpected table moving.

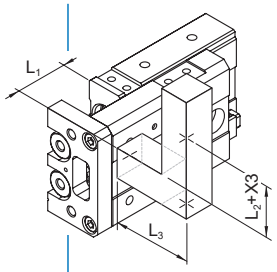
How to unlock the end lock

Before proceeding, make sure that there is no residual air pressure.
① Push down the lock piston pin.
② Slide the table forward.



Installation of sensor switch



Model selection steps	Formula / Data	Selection example
1. Operating conditions List the operating conditions considering the mounting position and workpiece configuration. Check that the load weight does not exceed the max. allowable load weight and that the average operating speed does not exceed the operating speed range.	• Model to be used. • Type of cushion. • Workpiece mounting position. • Average operating speed Va (mm/s) • Load mass W (kg): Fig 1, Table 2 • Overhang Ln(mm): Fig 2	 Cylinder: MCSS-6-10 Cushion: Rubber bumper Workpiece table mounting Mounting: Horizontal wall mounting Average operating speed: Va = 150 mm/s Load mass: W = 0.3 kg L_1 = 4mm L_2 = 4mm L_3 = 5mm
2. Kinetic energy Find the kinetic energy E (J) of the load. Find the allowable kinetic energy Ea (J). Confirm that the kinetic energy of the load does not exceed the allowable kinetic energy.	$E = \frac{1}{2} \cdot W \left(\frac{V}{1000}\right)^2$ Collision speed V = 1.4* • Va * Correction factor (Reference values) Ea = K • Emax Workpiece mounting coefficient K: Fig 3 Max. allowable kinetic energy Emax: Table 1 Kinetic energy (E) ≤ Allowable kinetic energy (Ea)	$E = \frac{1}{2} \cdot 0.3 \left(\frac{210}{1000}\right)^2 = 0.0066$ V = 1.4 • 150 = 210 Ea = 1 • 0.015 = 0.015 Can be used based on E = 0.0066 ≤ Ea = 0.015

(Continued)

Table 1: Max. allowable kinetic energy: Emax (J)

Tube I.D. (mm)	Allowable kinetic energy	
	Rubber bumper	Shock absorber
ø6	0.015	–
ø8	0.023	0.041
ø12	0.05	0.105
ø16	0.104	0.214
ø20	0.153	0.313
ø25	0.232	0.472

Fig 1: Load mass: W (kg)

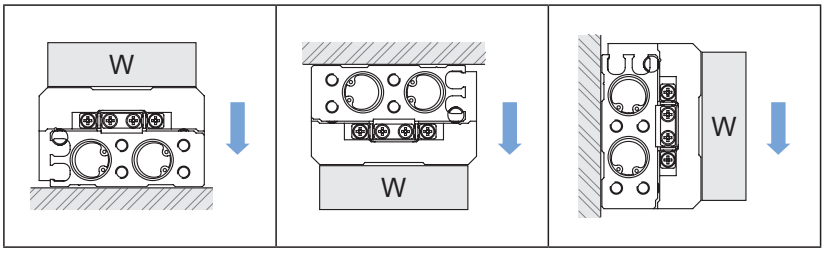


Table 2: Max. allowable load mass: Wmax (kg)

Tube I.D. (mm)	Max. allowable load mass
ø6	0.6
ø8	0.8
ø12	2
ø16	3.7
ø20	6
ø25	8.5

Fig 2: Overhang: Ln (mm), Correction value of moment center position distance: Xn (mm)

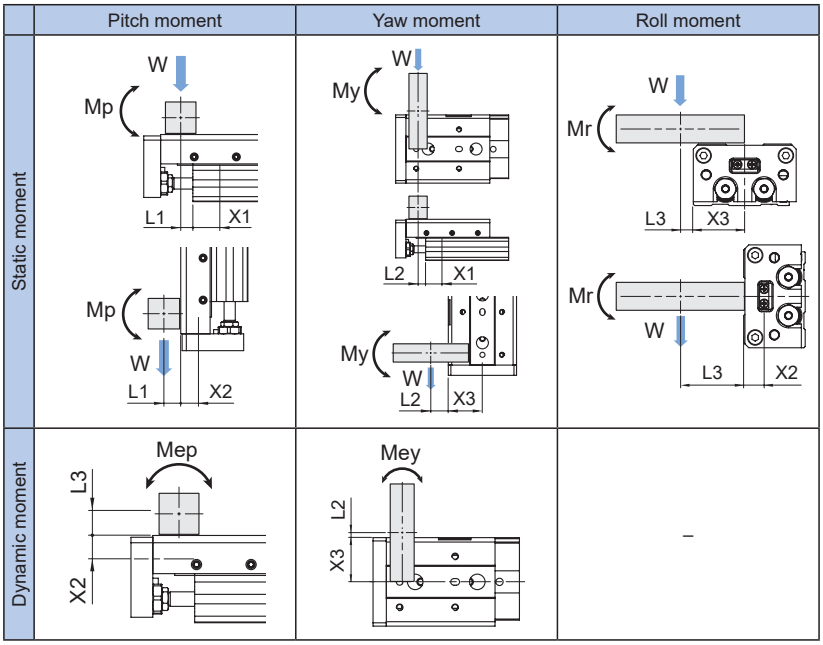
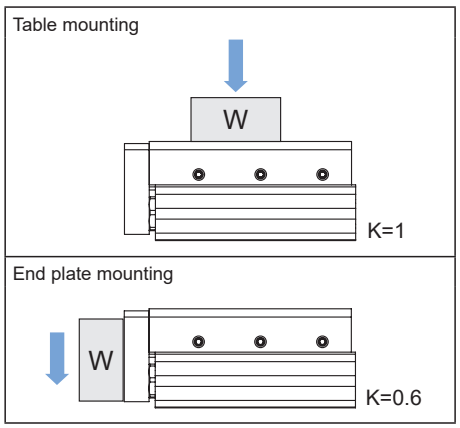


Fig 3: Workpiece mounting coefficient: K



Note.

Static moment: Moment generated by gravity.
Dynamic moment: Moment generated by impact when colliding with stopper.

Model selection steps	Formula / Data	Selection example
3. Load factor		
3-1 Load factor of load mass		
Find the allowable load mass Wa (kg). Note: There is no need to consider this load factor in the case of using perpendicularly in a vertical position. (Define $\alpha_1 = 0$.)	$Wa = K \cdot \beta \cdot Wmax$ Workpiece mounting coefficient K: Fig 3 Allowable load mass coefficient β: Fig 4 Max. allowable load mass Wmax: Table 2	$Wa = 1 \cdot 1 \cdot 0.6 = 0.6$ $K = 1$ $\beta = 1$ $Wmax = 0.6$
Find the load factor of the load mass α_1.	$\alpha_1 = W/Wa$	$\alpha_1 = 0.3/0.6 = 0.5$
3-2 Load factor of static moment		
Find the static moment M (N·m).	$M = W \cdot 9.8(Ln+Xn) / 1000$ Correction value of moment center position distance Xn: Table 3	Yawing Examine My. $My = 0.3 \cdot 9.8(4+14.5)/1000 = 0.05$ $X_1 = 14.5$
Find the allowable static moment Ma (N·m).	$Ma = K \cdot \gamma \cdot Mmax$ Workpiece mounting coefficient K: Fig 3 Allow load mounting coefficient γ: Fig 4 Max. allowable moment Mmax: Table 4	$May = 1 \cdot 1 \cdot 0.7 = 0.7$ $Mymax = 0.7$ $K = 1$ $\gamma = 1$
Find the load factor α_2 of the static moment.	$\alpha_2 = M/Ma$	$\alpha_2 = 0.05/0.7 = 0.072$
		Rolling Examine Mr. $Mr = 0.3 \cdot 9.8(5+6)/1000 = 0.033$ $X_2 = 6$ $Mar = 0.7$ (Same value as May) $\alpha'_2 = 0.033/0.7 = 0.047$
3-3 Load factor of dynamic moment		
Find the dynamic moment Me (N·m).	$Me = 1/3 \cdot We \cdot 9.8 \frac{(Ln+Xn)}{1000}$ Correction equivalent to impact $We = \delta \cdot W \cdot V$ δ: Bumper coefficient With urethane bumper (Standard) = 4/100 With shock absorber = 1/100 Correction value of moment center position distance Xn: Table 3	Pitching Examine Mep. $Mep = 1/3 \cdot 2.52 \cdot 9.8 \cdot \frac{(5+6)}{1000} = 0.09$ $We = 4/100 \cdot 0.3 \cdot 210 = 2.52$ $X_2 = 6$ $Meap = 1 \cdot 1 \cdot 0.7 = 0.7$ $K = 1$ $\gamma = 1$ $Mpmax = 0.7$ $\alpha_3 = 0.09/0.7 = 0.128$
Find the allowable dynamic moment Mea (N·m).	$Mea = K \cdot \gamma \cdot Mmax$ Workpiece mounting coefficient K: Fig 3 Allowable mounting coefficient γ: Fig 4 Max. allowable moment Mmax: Table 4	Yawing Examine Mey. $Mey = 1/3 \cdot 2.52 \cdot 9.8 \cdot \frac{(4+16)}{1000} = 0.165$ $We = 2.52$ $X_3 = 16$ $Meay = 0.7$ (Same value as Meap) $\alpha'_3 = 0.165/0.7 = 0.235$
Find the load factor α_3 of the dynamic moment.	$\alpha_3 = Me/Mea$	
3-4 Sum of load factors		
Possible to use if the sum of the load factors does not exceed 1.	$\Sigma\alpha_n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$	$\Sigma\alpha_n = \alpha_1 + \alpha_2 + \alpha'_2 + \alpha_3 + \alpha'_3 \leq 1$ $\Sigma\alpha_n = 0.5 + 0.072 + 0.047 + 0.128 + 0.235 = 0.982 \leq 1$ Add it is possible to use.

Table 3: Correction value of moment center position distance: Xn (mm)

Tube I.D. (mm)	X1, Stroke (mm)									X2	X3
	10	20	30	40	50	75	100	125	150		
ø6	14.5	14.5	19	26.5	35.5	–	–	–	–	6	16
ø8	14.5	14.5	19	28.5	35.5	49	–	–	–	8	20
ø12	23.5	23.5	23.5	27.5	33	50.5	68.5	–	–	9.5	25
ø16	22.5	22.5	22.5	26.5	32	51.5	67.5	85	–	10.5	31
ø20	25	25	25	25	32.5	49.5	68.5	88.5	88.5	15.5	38
ø25	24	24	24	24	31.5	51.5	66.5	86.5	91.5	20.5	46

Table 4: Max. allowable moment: Mmax (N·m)

Tube I.D. (mm)	Stroke (mm)								
	10	20	30	40	50	75	100	125	150
ø6	0.7	1	1.1	1.1	1.1	–	–	–	–
ø8	2	2	2.6	3.5	3.9	3.9	–	–	–
ø12	3.9	3.9	3.9	5.5	6.8	9.6	9.6	–	–
ø16	9.8	9.8	9.8	9.8	12	21	30	30	–
ø20	16.4	16.4	16.4	16.4	24.2	31.4	45.5	45.5	45.5
ø25	26.5	26.5	26.5	26.5	37.8	49.8	62.2	62.2	62.2

Fig 3: Workpiece mounting coefficient: K

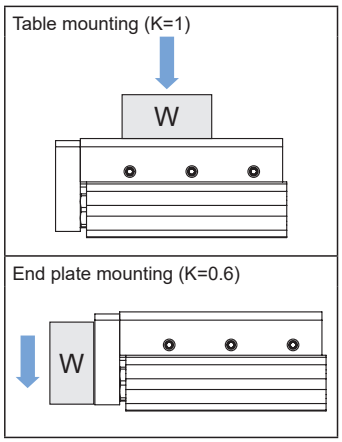
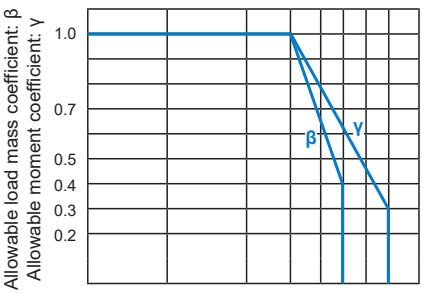


Fig.4: Allowable load mass coefficient: β
Allowable moment coefficient: γ

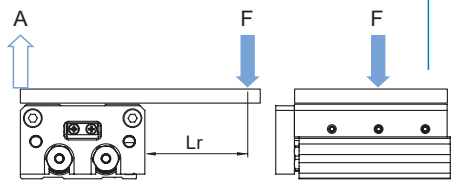


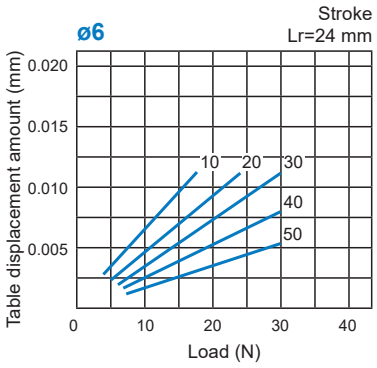
γ note: Use the average operating speed when calculating static moment. Use the collision speed when calculating dynamic moment.

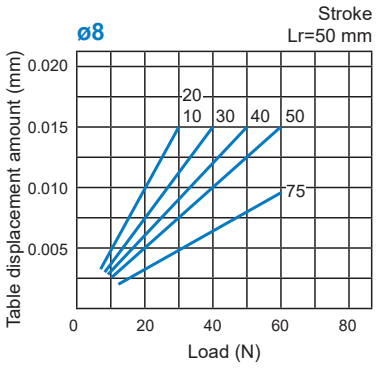
Table deflection (Reference values)

Table displacement due to roll moment load

Table displacement of section A when loads are applied to the section F with theslide table retracted.







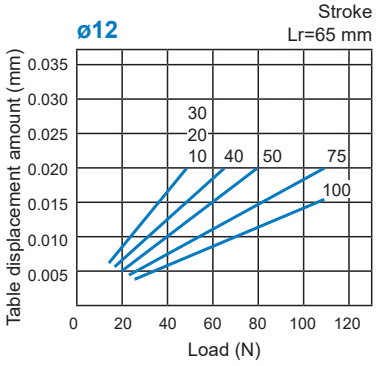
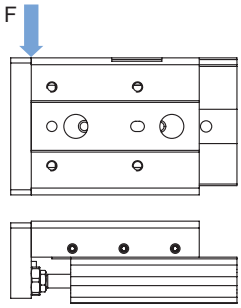
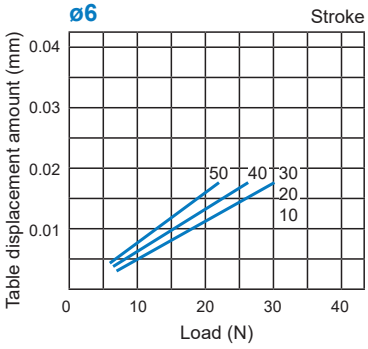
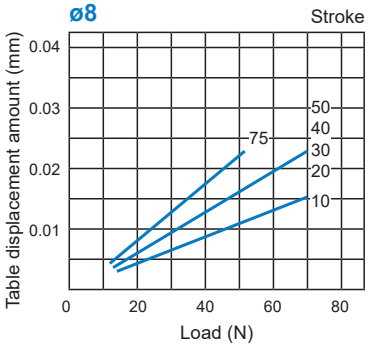


Table displacement due to yaw moment load

Table displacement when loads are applied to the section marked with the arrow at the full stroke.







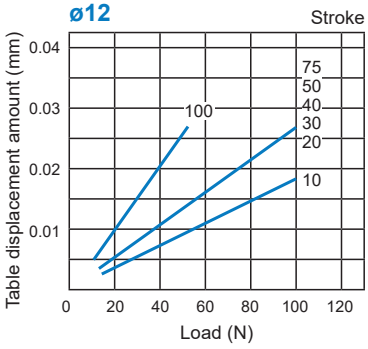
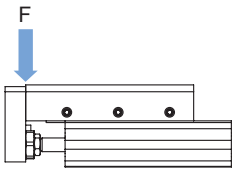
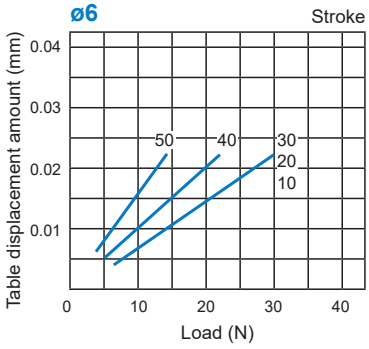
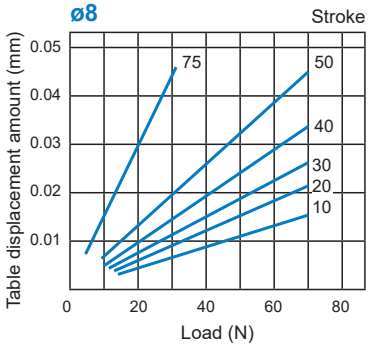


Table displacement due to pitch moment load

Table displacement when loads are applied to the section marked with the arrow at the full stroke.







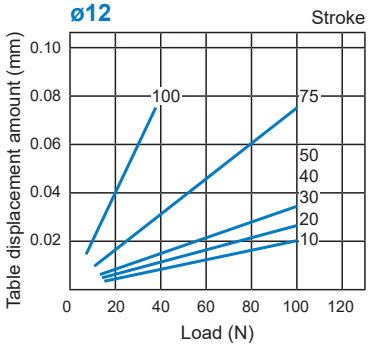
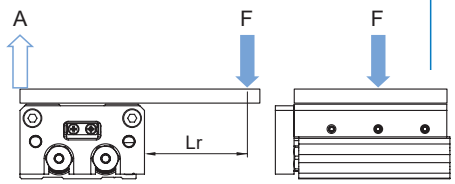
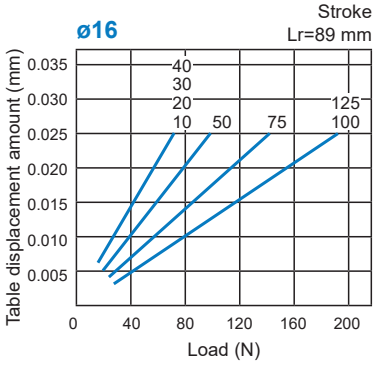


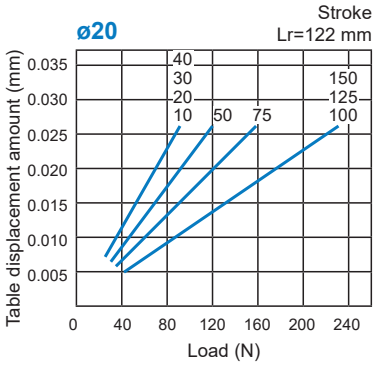
Table deflection (Reference values)

Table displacement due to roll moment load

Table displacement of section A when loads are applied to the section F with theslide table retracted.







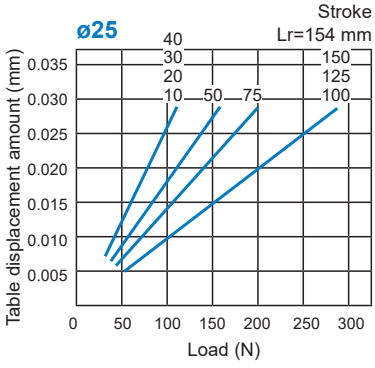
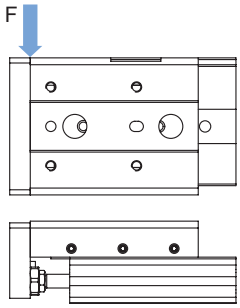
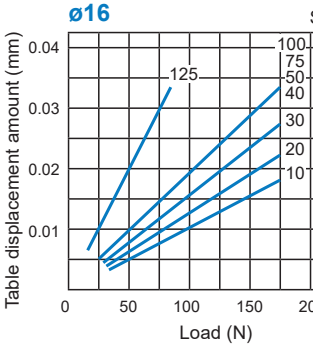
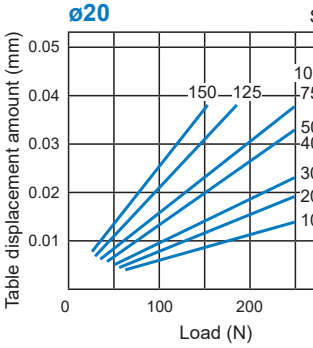


Table displacement due to yaw moment load

Table displacement when loads are applied to the section marked with the arrow at the full stroke.







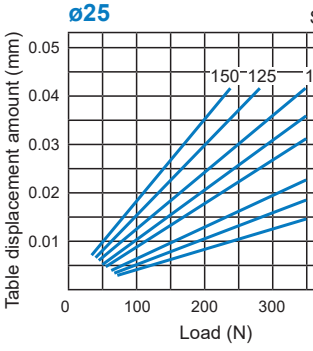
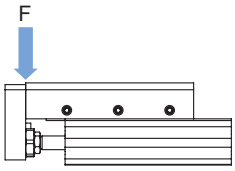
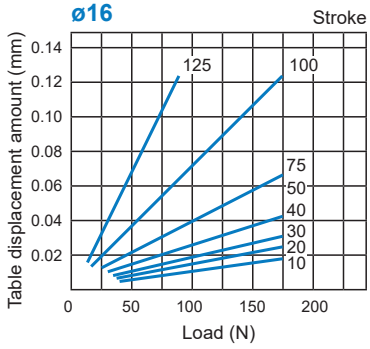
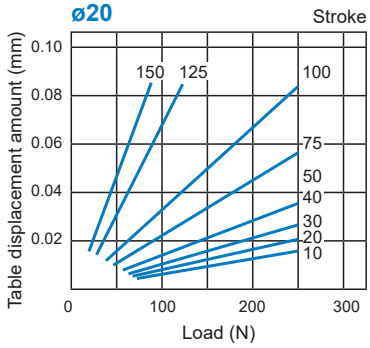


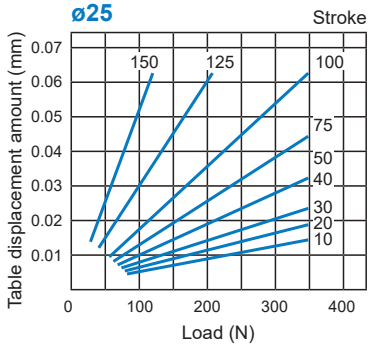
Table displacement due to pitch moment load

Table displacement when loads are applied to the section marked with the arrow at the full stroke.





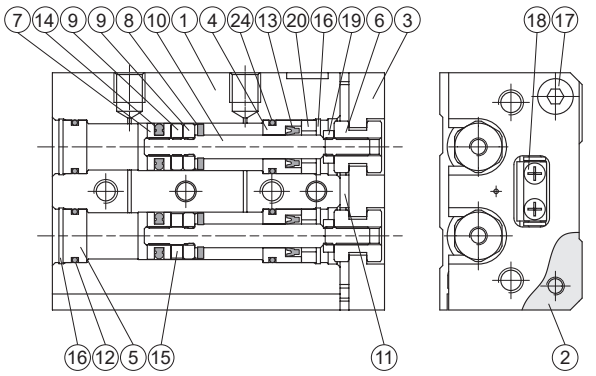




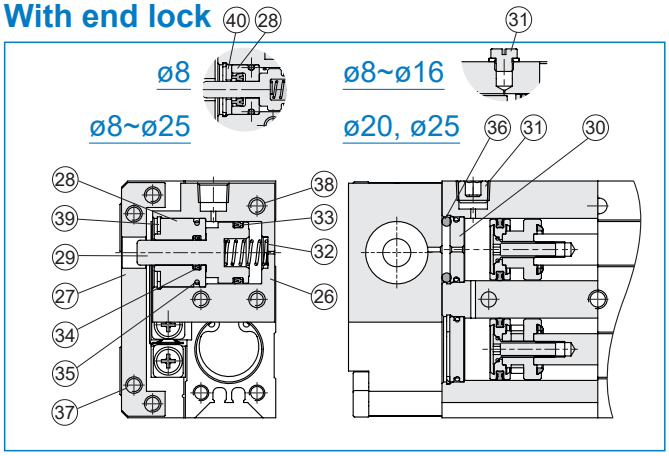
MCSS Inside structure & Parts list

SLIDE CYLINDER

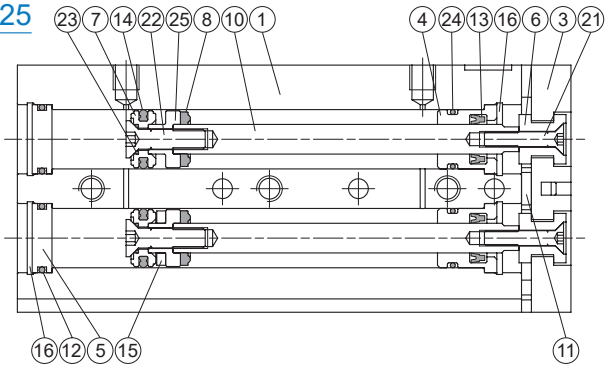
ø6, ø8

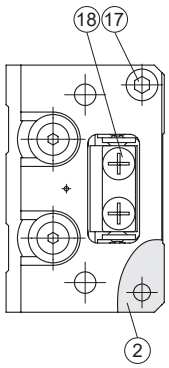


With end lock



ø12~ø25





Order example of repair kits

Tube I.D.	Repair kits (Seal kit)	
	Body	Body + End lock
ø6	**PS-MCSS-6**	–
ø8	**PS-MCSS-8**	**PS-MCSS-8-HL**
ø12	**PS-MCSS-12**	**PS-MCSS-12-HL**
ø16	**PS-MCSS-16**	**PS-MCSS-16-HL**
ø20	**PS-MCSS-20**	**PS-MCSS-20-HL**
ø25	**PS-MCSS-25**	**PS-MCSS-25-HL**

Material

*1. Aluminum alloy *2. Stainless steel *3. Spring steel

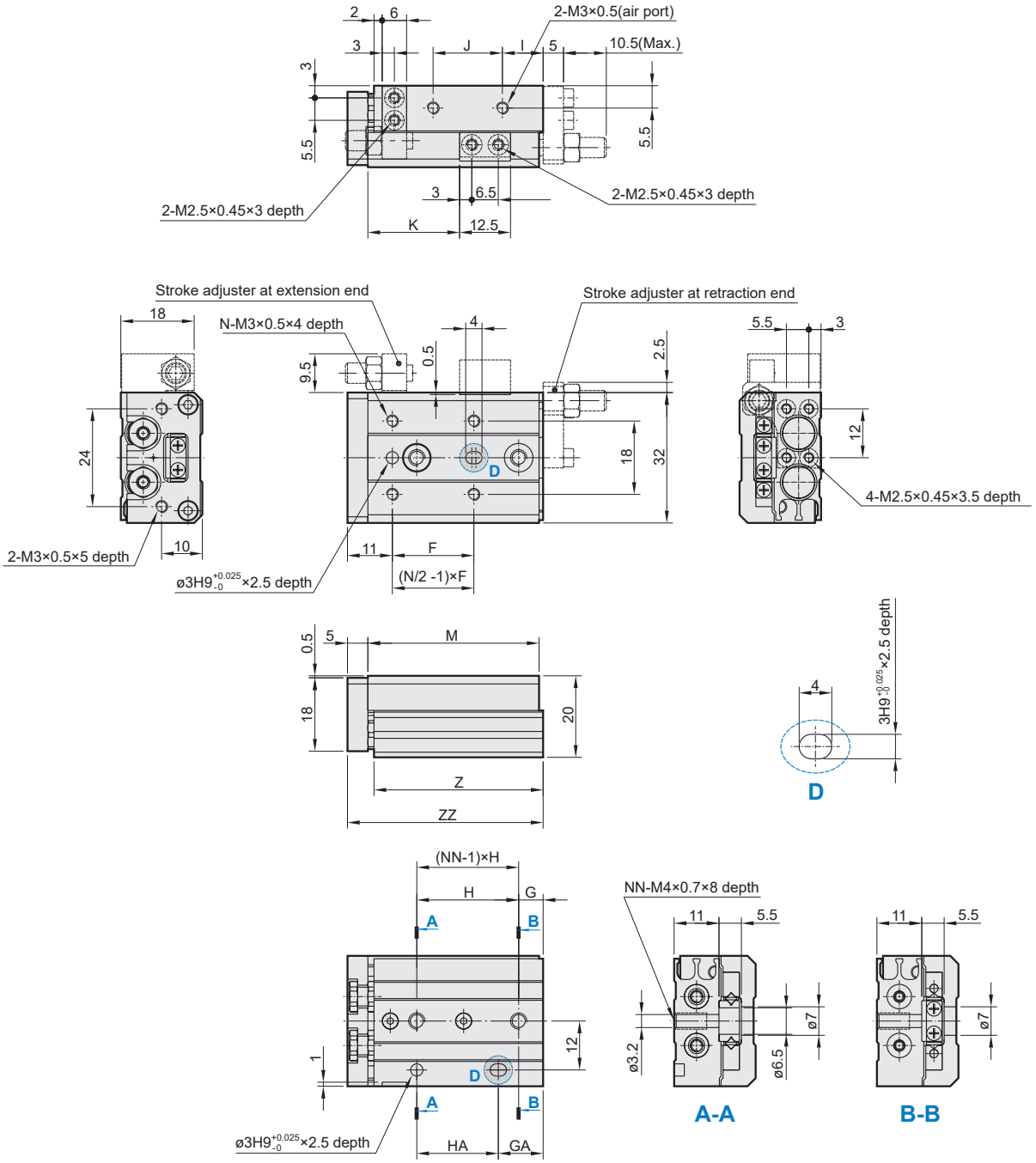
No.	Part name \ Tube I.D.	6	8	12~25	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy			1	
2	Table	Aluminum alloy			1	
3	Plate	Aluminum alloy			1	
4	Rod cover	Aluminum alloy			2	
5	Head cover	Aluminum alloy			2	
6	Floating connector	Stainless steel			2	
7	Piston	Stainless steel		*1	2	
8	Cushion pad	NBR			2	●
9	Spacer ring	*1	*2	—	3	
10	Piston rod	Stainless steel			2	
11	End cushion	PU			1	●
12	Cover ring	NBR			2	●
13	Rod packing	NBR			2	●
14	Piston packing	NBR			2	●
15	Magnet ring	Magnet material			1	
16	Snap ring	*3	Stainless steel		4	
17	Bolt	Stainless steel			2*4	
18	Slide way	Bearing steel			1	
19	Nut	Stainless steel		—	2	
20	Rod cover washer	Stainless steel		—	2	
21	Floating connector bolt	—		*2	2	
22	Piston screw	—		*2	2	

No.	Part name \ Tube I.D.	6	8	12~25	Q'y	Repair kits (inclusion)
23	Piston gasket	—		NBR	2	●
24	Cover ring	NBR			2	●
25	Piston for magnet ring	—		*1	2	

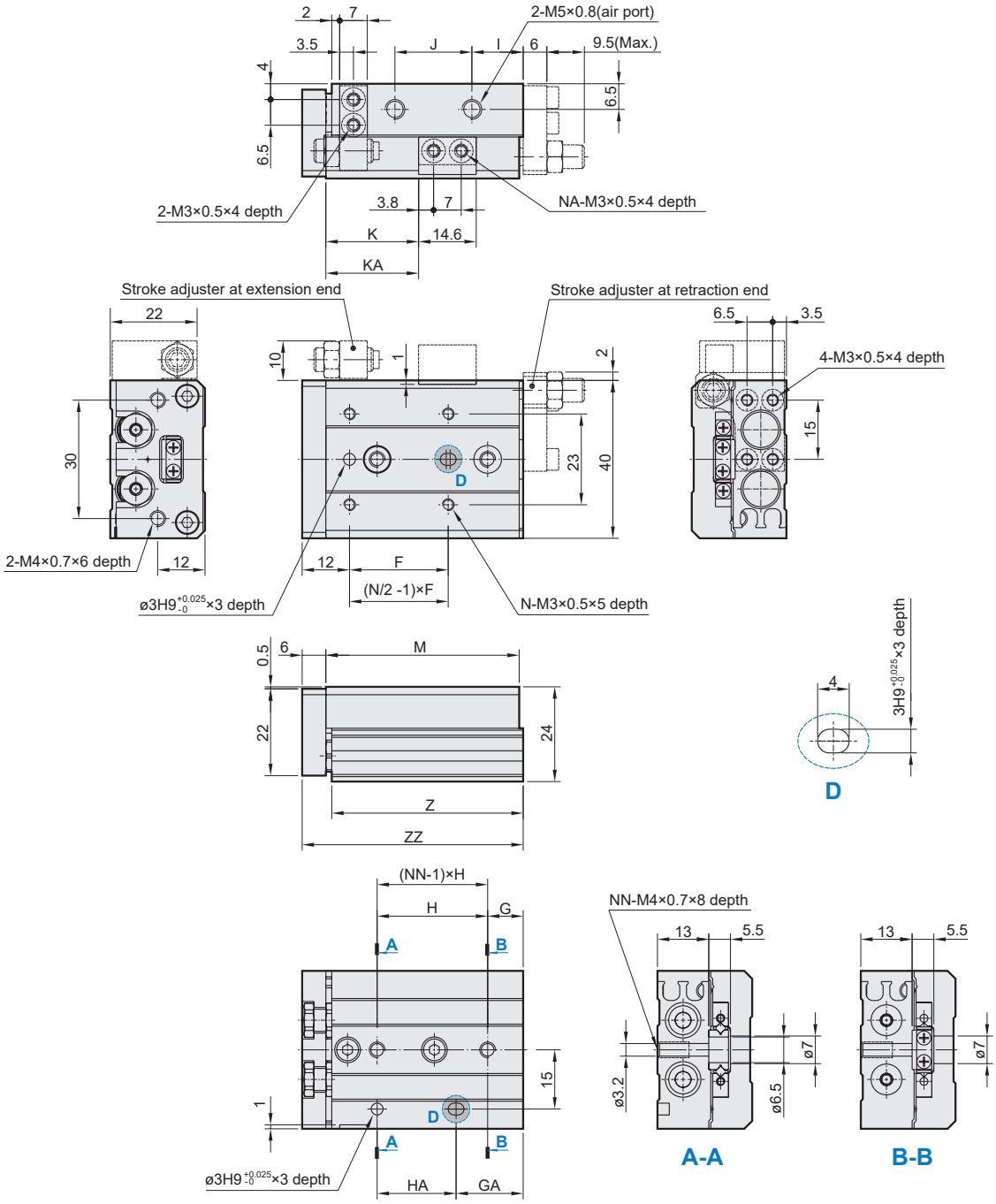
With end lock

No.	Part name	Material	Q'y	Repair kits (inclusion)
26	Body for lock	Aluminum alloy	1	
27	Table support	Carbon steel	1	
28	Rod cover	Aluminum alloy	1	
29	Piston rod	Stainless steel	1	
30	Bushing	Aluminum alloy	1	
31	Plug	Brass	1	
32	Return spring	Stainless steel	1	
33	Pison packing	NBR	1	●
34	Rod packing	NBR	1	●
35	Cover ring	NBR	1	●
36	O-ring	NBR	1	●
37	Bolt	Stainless steel	2*4	
38	Bolt	Stainless steel	3	
39	Snap ring	Stainless steel	1	
40	Rod cover washer	Stainless steel	1	

*4. Item 17 and 37: Tube I.D. ø20, 25 (Q'y: 4pcs).

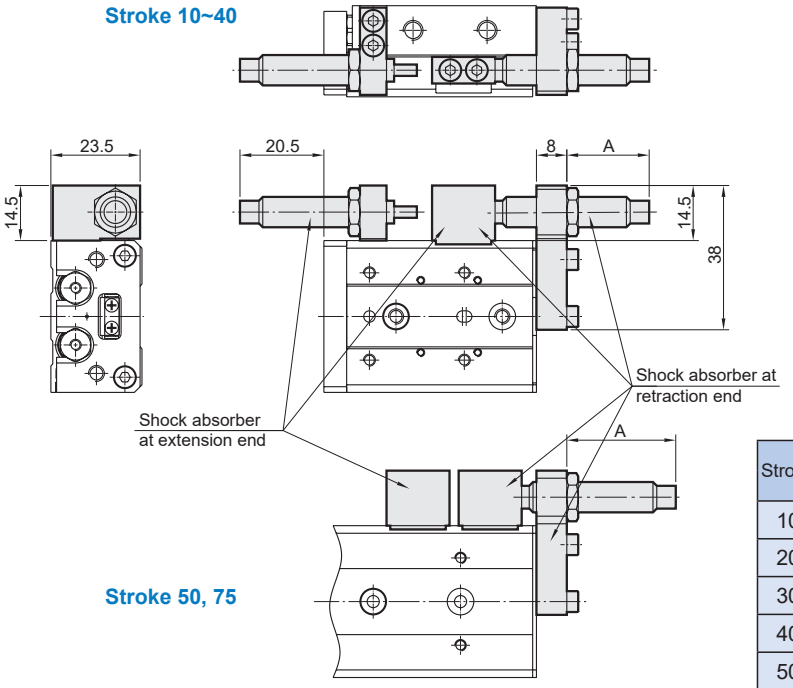


Code / Stroke	F	G	GA	H	HA	I	J	K	M	N	NN	Z	ZZ
10	20	6	11	25	20	10	17	22.5	42	4	2	41.5	48
20	30	6	21	35	20	10	27	32.5	52	4	2	51.5	58
30	20	11	31	20	20	7	40	42.5	62	6	3	61.5	68
40	28	13	43	30	30	19	50	52.5	84	6	3	83.5	90
50	38	17	41	24	48	25	60	62.5	100	6	4	99.5	106



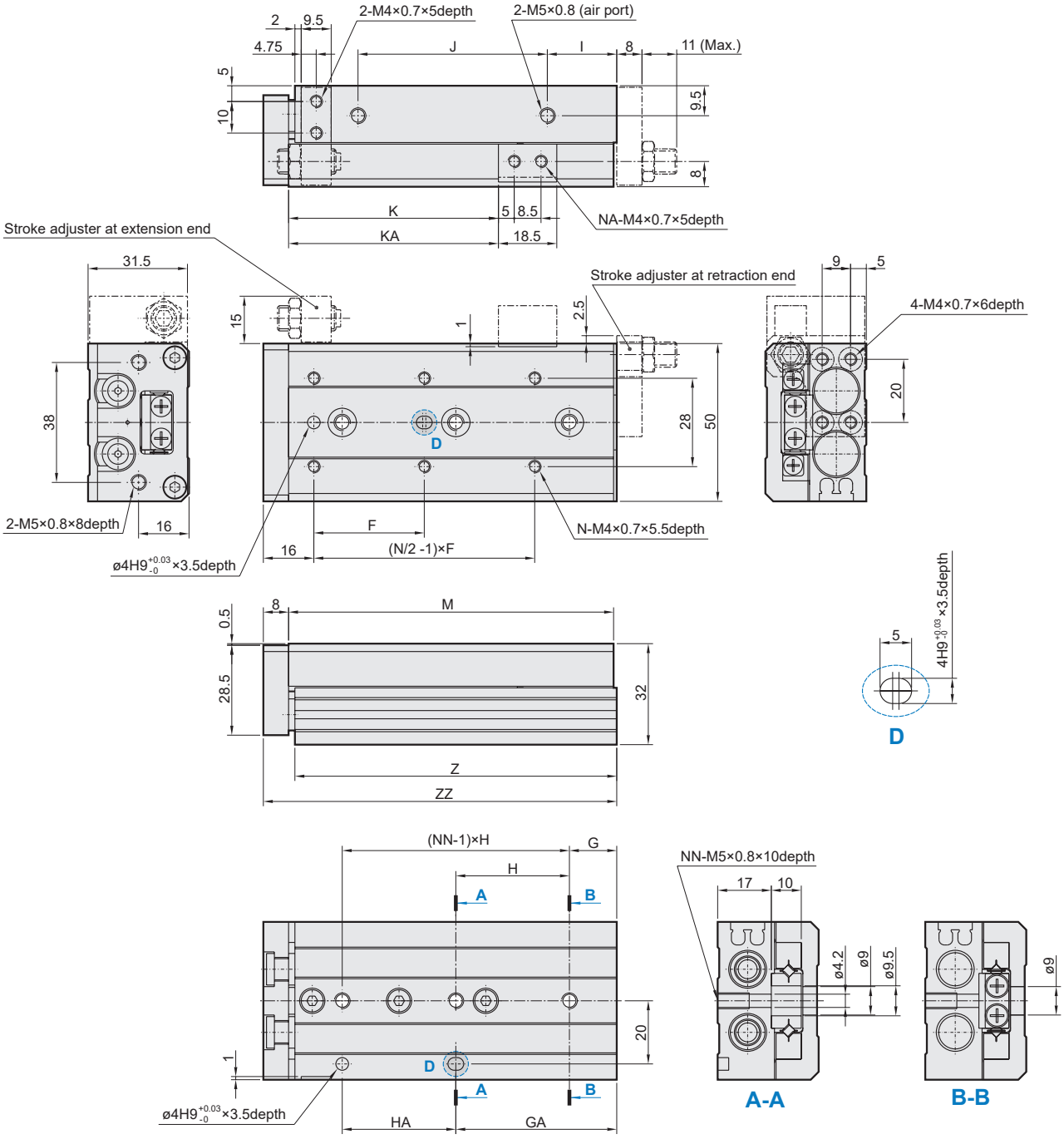
Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	25	9	17	28	20	13	19.5	23.5	-	49	4	2	2	48.5	56
20	25	12	12	30	30	8.5	29	33.5	-	54	4	2	2	53.5	61
30	40	13	33	20	20	9.5	39	43.5	-	65	4	2	3	64.5	72
40	50	15	43	28	28	10.5	56	53.5	-	83	4	2	3	82.5	90
50	38	20	43	23	46	24.5	60	63.5	82.5	101	6	4	4	100.5	108
75	50	27	83	28	56	38.5	96	88.5	132.5	151	6	4	5	150.5	158

ø8

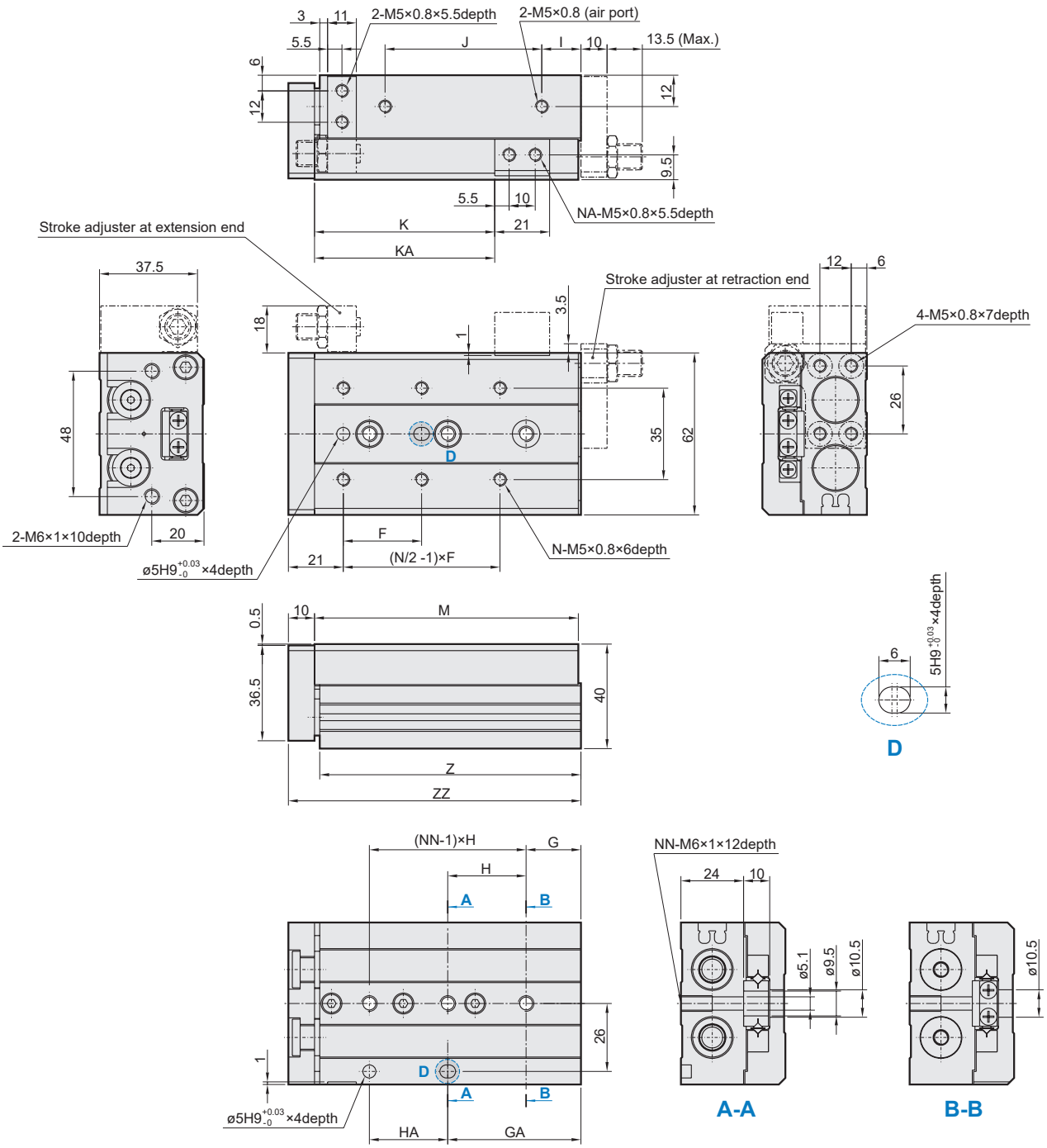


Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 21	11.5	20.1
20		16.1	25.1
30		15.1	24.1
40		7.1	16.1
50		18.1	27.1
75		18.1	27.1

* Other dimensions not indicated are the same as the basic style.

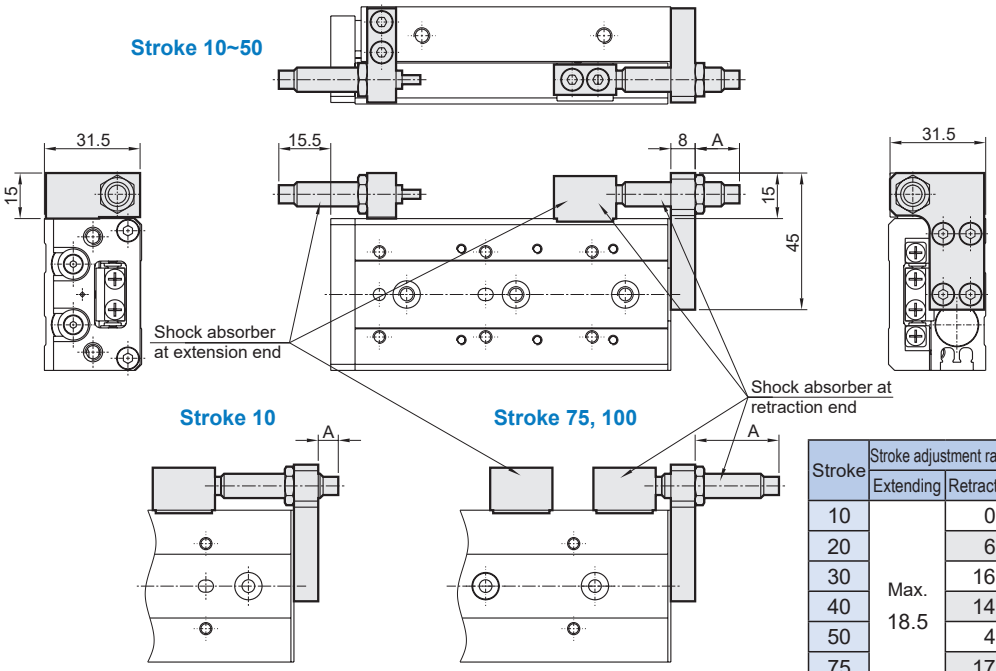


Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	15	15	40	40	10	40	26.5	-	71	4	2	2	70	80
20	35	15	15	40	40	10	40	36.5	-	71	4	2	2	70	80
30	35	15	15	40	40	10	40	46.5	-	71	4	2	2	70	80
40	50	17	42	25	25	10	52	56.5	-	83	4	2	3	82	92
50	35	15	51	36	36	22	60	66.5	-	103	6	2	3	102	112
75	55	25	61	36	72	43	85	91.5	125.5	149	6	4	4	148	158
100	65	35	111	38	76	52	130	116.5	179.5	203	6	4	5	202	212



Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	16	16	40	40	10	40	29	-	76	4	2	2	75	87
20	35	16	16	40	40	10	40	39	-	76	4	2	2	75	87
30	35	16	16	40	40	10	40	49	-	76	4	2	2	75	87
40	40	16	16	50	50	10	50	59	-	86	4	2	2	85	97
50	30	21	51	30	30	15	60	69	-	101	6	2	3	100	112
75	55	26	61	35	70	40	85	94	125	151	6	4	4	150	162
100	65	39	109	35	70	55	118	119	173	199	6	4	5	198	210
125	70	19	159	35	70	68	155	144	223	249	8	4	7	248	260

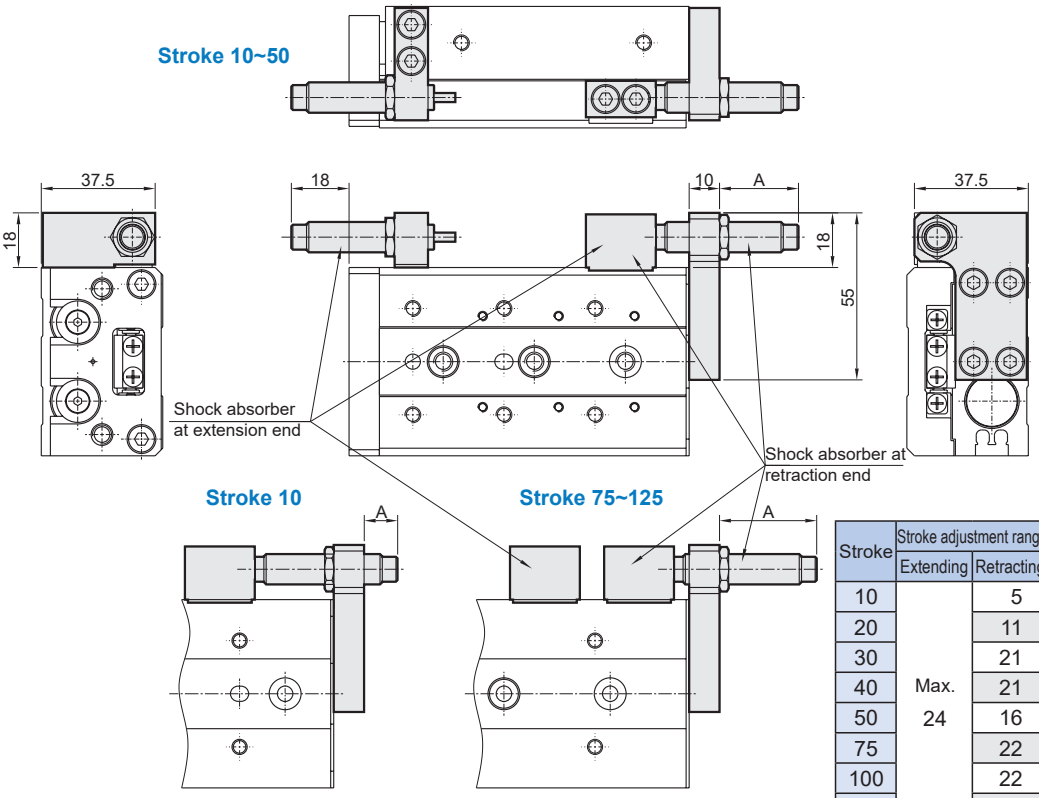
ø12



Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 18.5	0	5
20		6	15
30		16	25
40		14	23
50		4	13
75		17	26
100		17	26

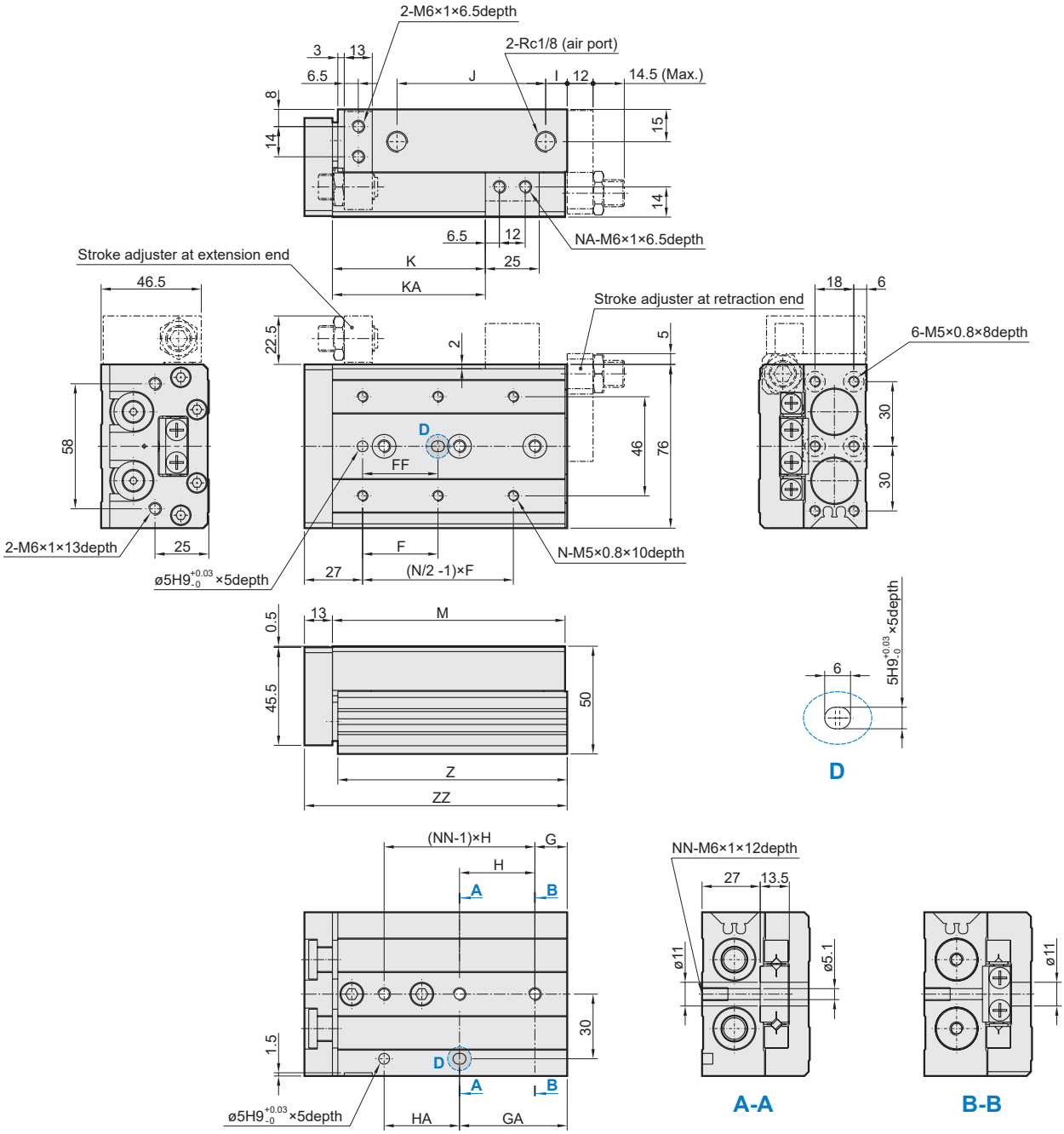
* Other dimensions not indicated are the same as the basic style.

ø16

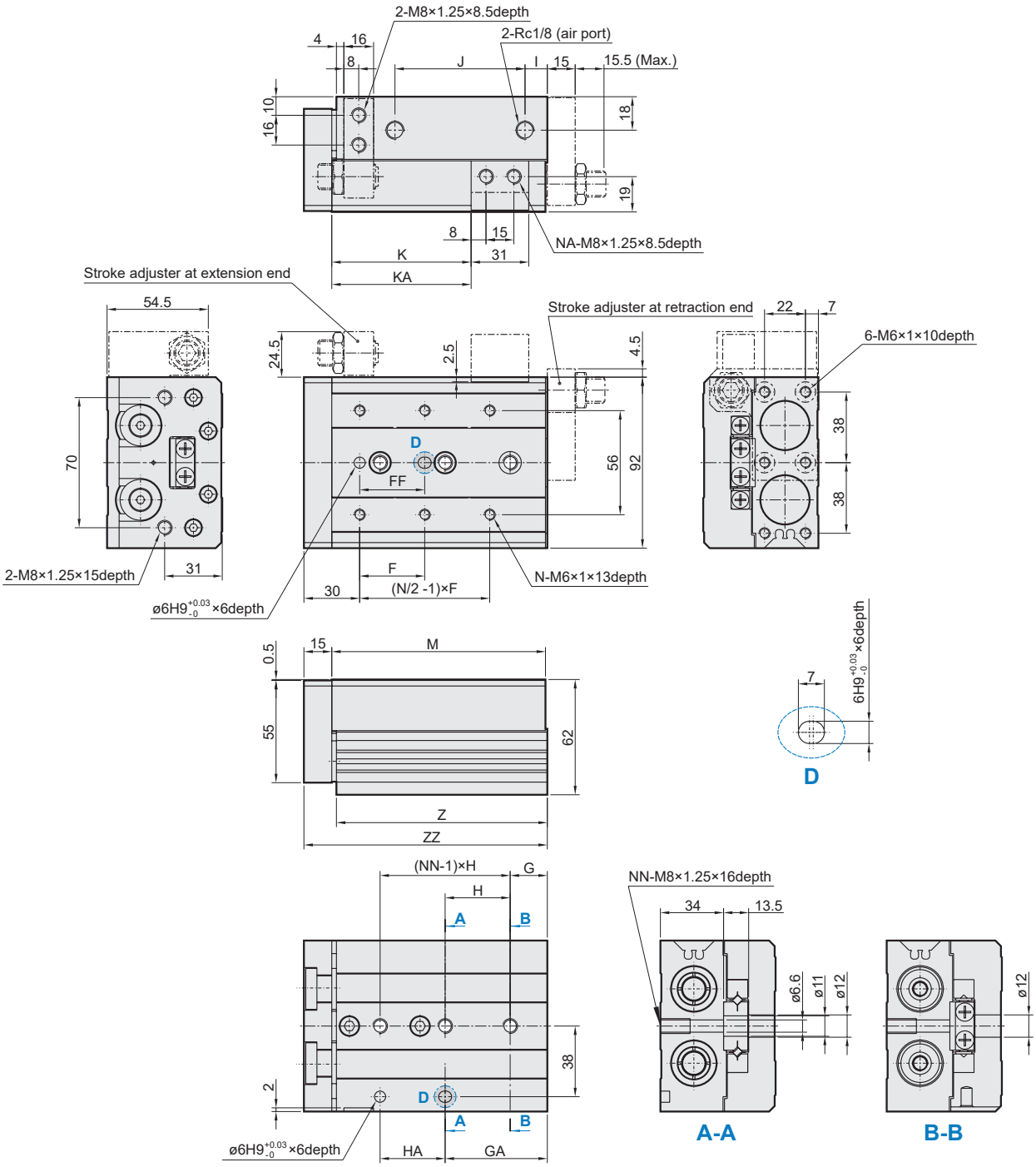


Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 24	5	10
20		11	20
30		21	30
40		21	30
50		16	25
75		22	31
100		22	31
125		22	31

* Other dimensions not indicated are the same as the basic style.

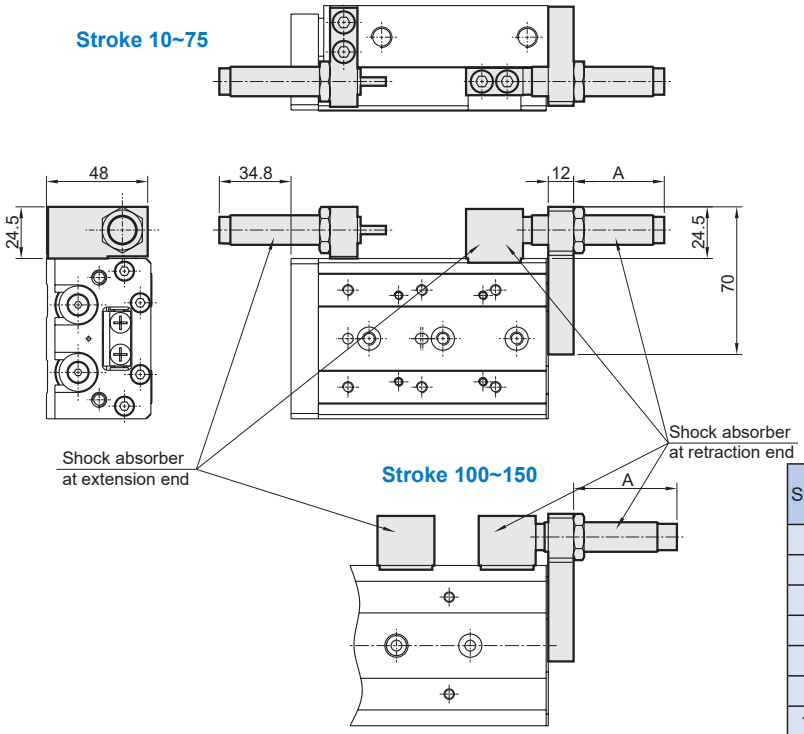


Code / Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	15	25	45	35	10	44	31	-	83	4	2	2	81.5	97
20	50	40	15	25	45	35	10	44	41	-	83	4	2	2	81.5	97
30	50	40	15	25	45	35	10	44	51	-	83	4	2	2	81.5	97
40	60	50	15	35	55	35	10	54	61	-	93	4	2	2	91.5	107
50	35	35	15	50	35	35	10	69	71	-	108	6	2	3	106.5	122
75	60	60	19	54	35	70	10	108	96	-	147	6	2	4	145.5	161
100	70	70	37	107	35	70	58	113	121	169	200	6	4	5	198.5	214
125	70	70	41	155	38	76	70	155	146	223	254	8	4	6	252.5	268
150	80	80	19	195	44	88	87	190	171	275	306	8	4	7	304.5	320



Code / Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	22	22	45	45	12	47	35	-	92	4	2	2	90.5	108
20	50	40	22	22	45	45	12	47	45	-	92	4	2	2	90.5	108
30	50	40	22	22	45	45	12	47	55	-	92	4	2	2	90.5	108
40	60	50	22	22	55	55	12	57	65	-	102	4	2	2	100.5	118
50	35	35	20	55	35	35	12	70	75	-	115	6	2	3	113.5	131
75	60	60	26	61	35	70	33	90	100	-	156	6	2	4	154.5	172
100	70	70	32	102	35	70	50	114	125	162	197	6	4	5	195.5	213
125	75	75	40	154	38	76	67	155	150	218	255	8	4	6	253.5	271
150	80	80	30	190	40	80	82	180	175	258	295	8	4	7	293.5	311

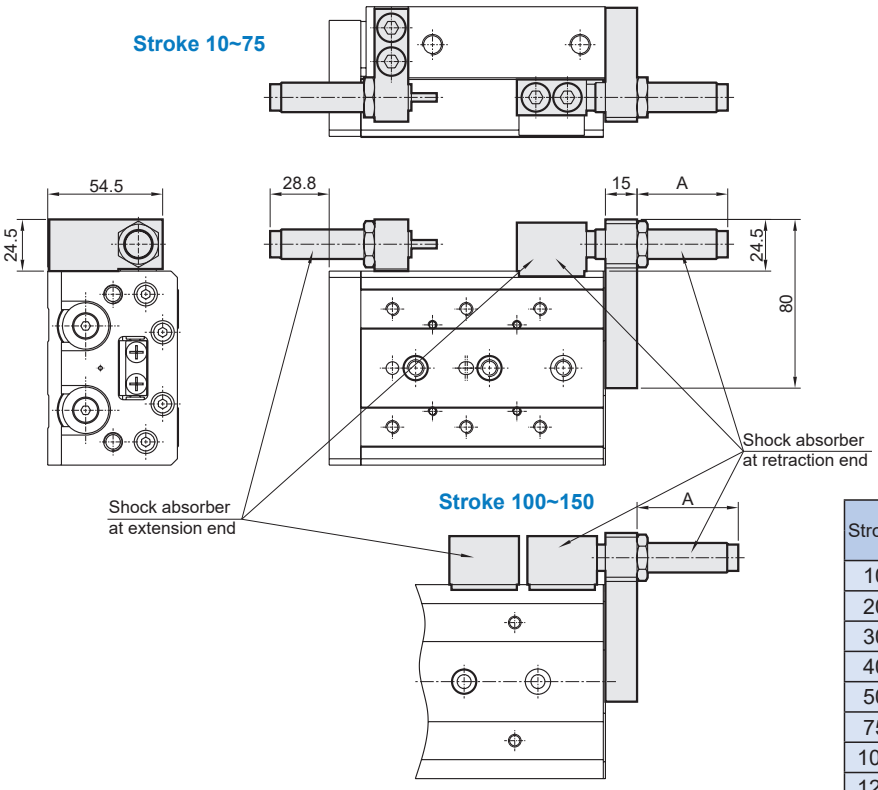
ø20



Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 40.3	15.8	28.8
20		25.8	38.8
30		35.8	48.8
40		35.8	48.8
50		30.8	43.8
75		16.8	29.8
100		36.8	49.8
125		36.8	49.8
150		36.8	49.8

* Other dimensions not indicated are the same as the basic style.

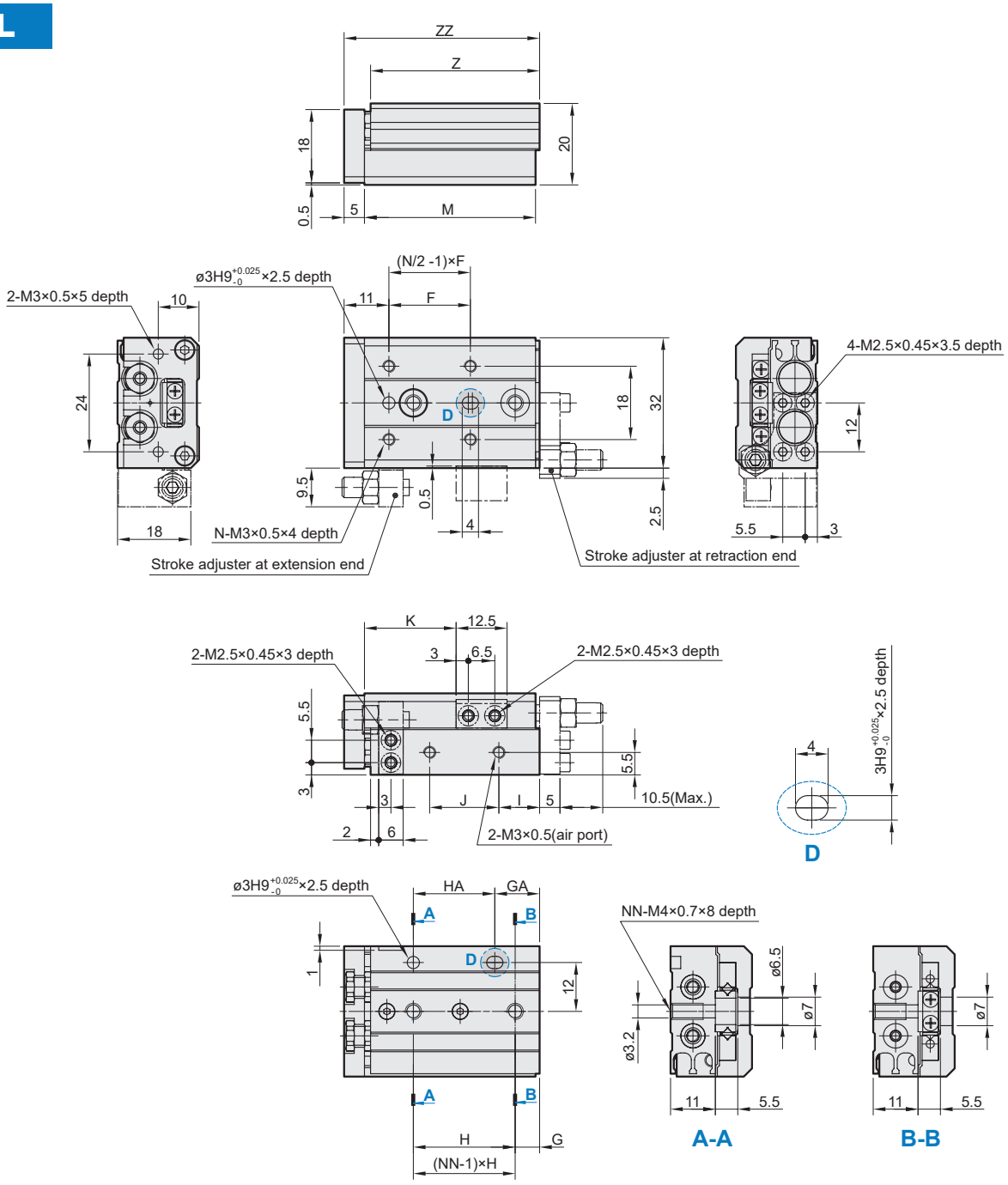
ø25



Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 36.3	12.8	26.8
20		22.8	36.8
30		32.8	46.8
40		32.8	46.8
50		29.8	43.8
75		13.8	27.8
100		34.8	48.8
125		32.8	46.8
150		32.8	46.8

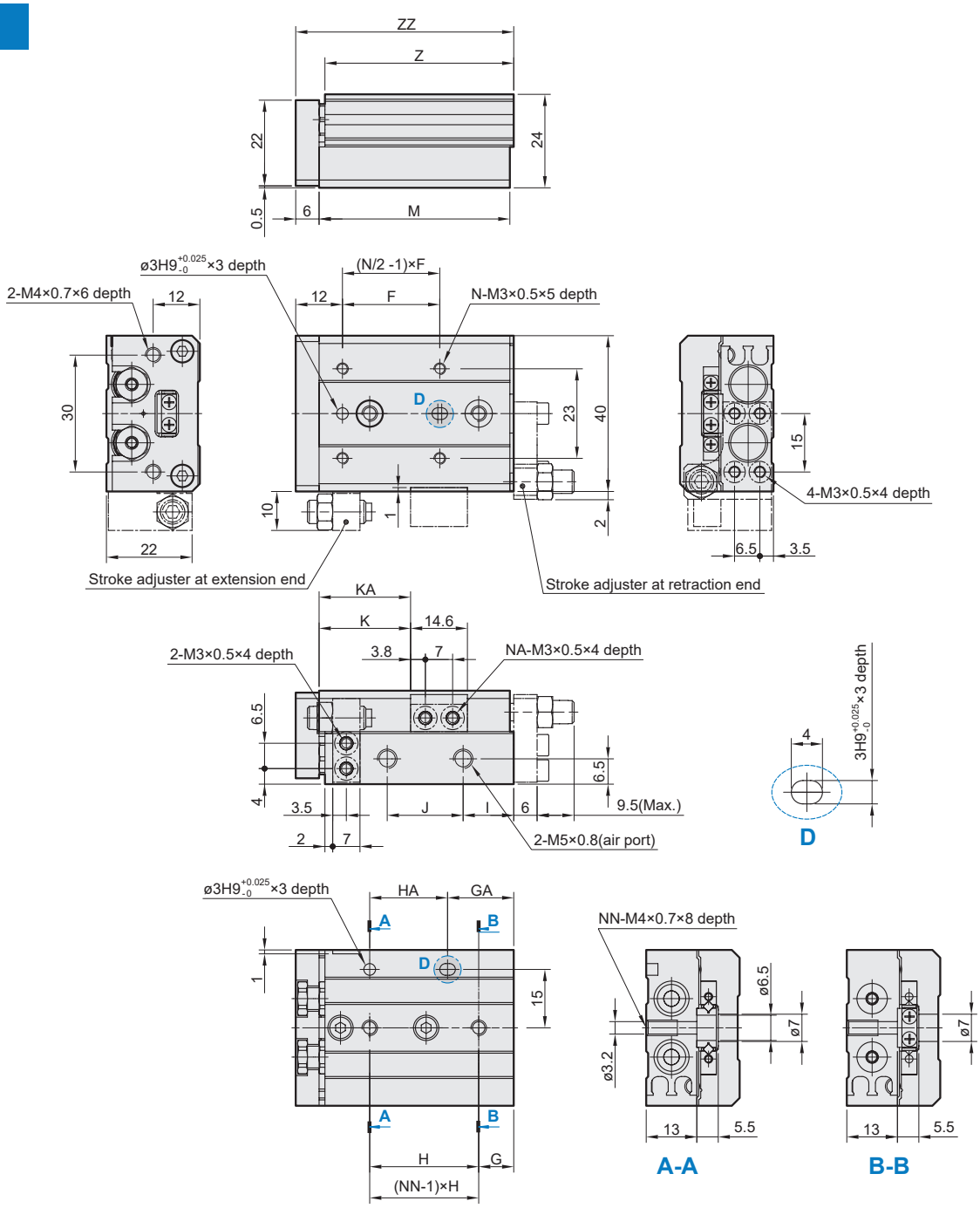
* Other dimensions not indicated are the same as the basic style.

L



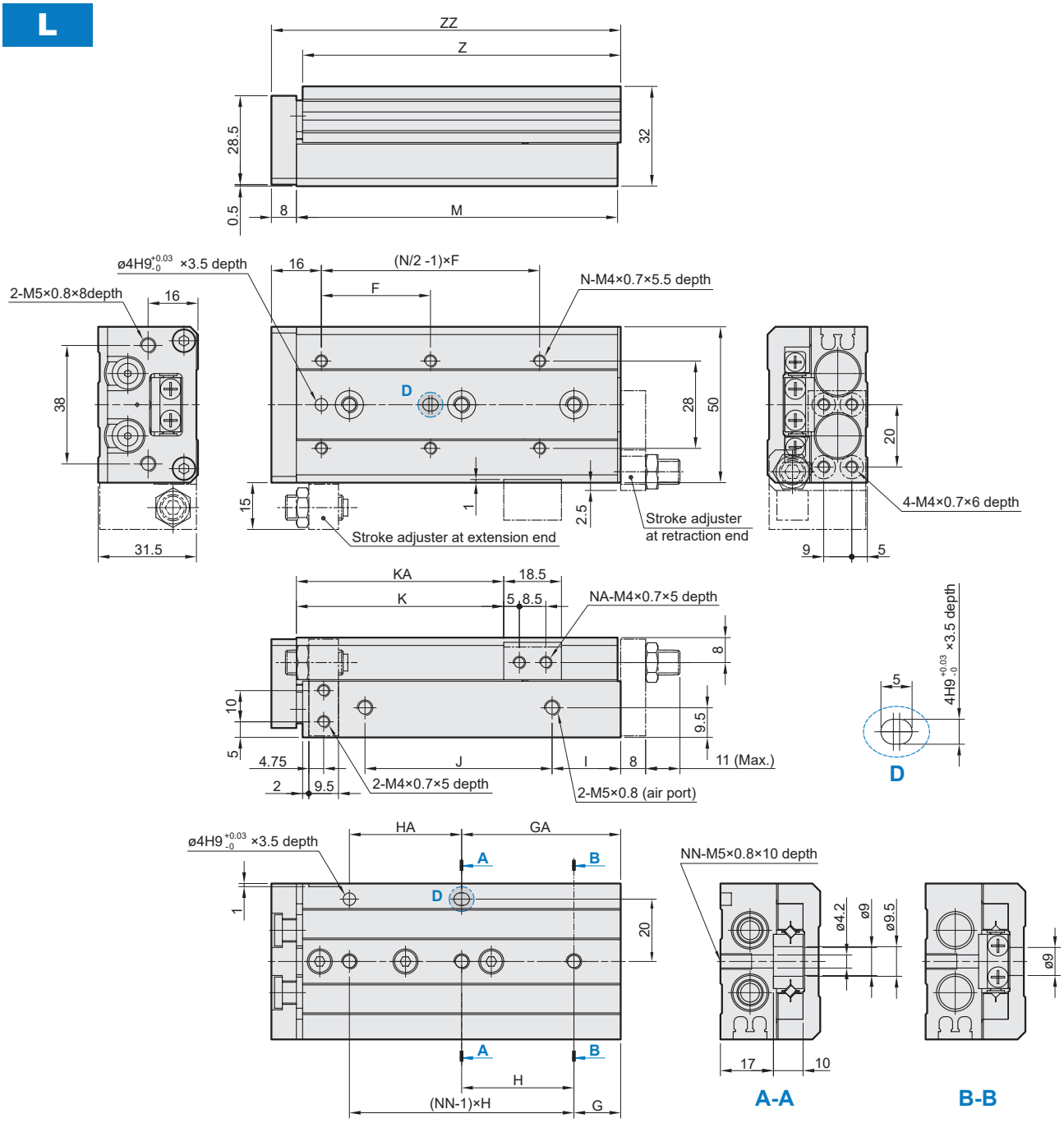
Code / Stroke	F	G	GA	H	HA	I	J	K	M	N	NN	Z	ZZ
10	20	6	11	25	20	10	17	22.5	42	4	2	41.5	48
20	30	6	21	35	20	10	27	32.5	52	4	2	51.5	58
30	20	11	31	20	20	7	40	42.5	62	6	3	61.5	68
40	28	13	43	30	30	19	50	52.5	84	6	3	83.5	90
50	38	17	41	24	48	25	60	62.5	100	6	4	99.5	106

L



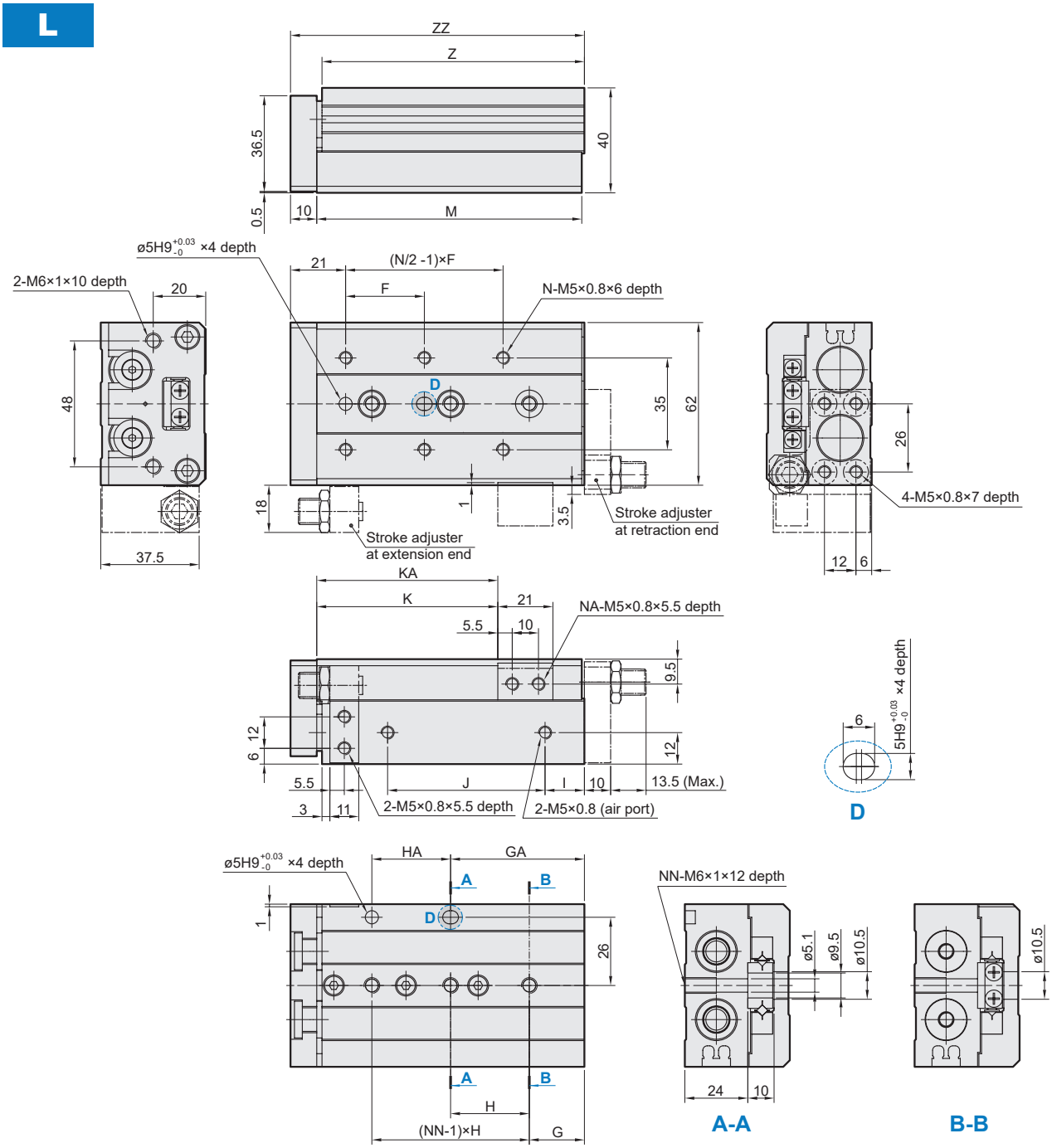
Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	25	9	17	28	20	13	19.5	23.5	–	49	4	2	2	48.5	56
20	25	12	12	30	30	8.5	29	33.5	–	54	4	2	2	53.5	61
30	40	13	33	20	20	9.5	39	43.5	–	65	4	2	3	64.5	72
40	50	15	43	28	28	10.5	56	53.5	–	83	4	2	3	82.5	90
50	38	20	43	23	46	24.5	60	63.5	82.5	101	6	4	4	100.5	108
75	50	27	83	28	56	38.5	96	88.5	132.5	151	6	4	5	150.5	158

L



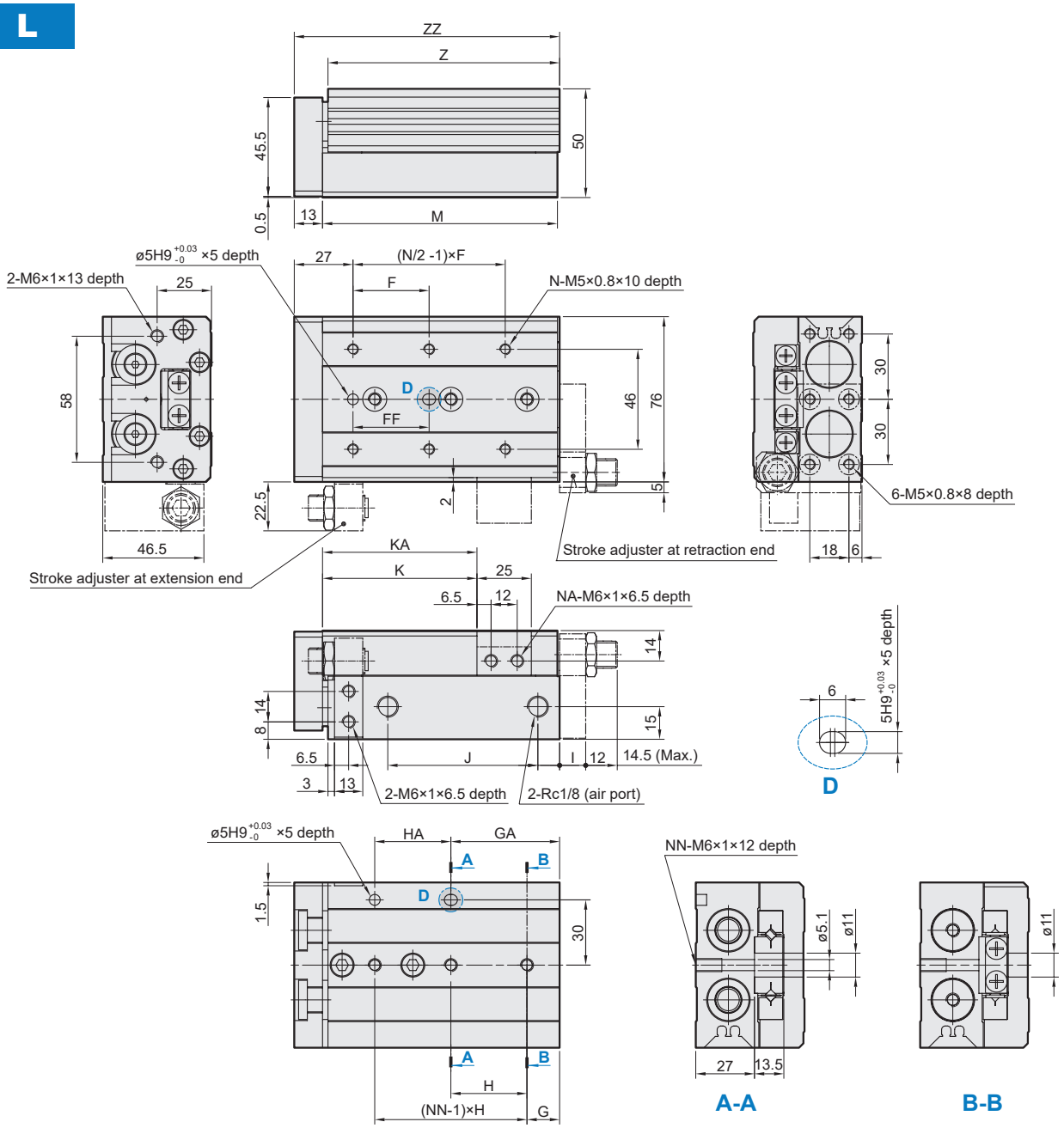
Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	15	15	40	40	10	40	26.5	–	71	4	2	2	70	80
20	35	15	15	40	40	10	40	36.5	–	71	4	2	2	70	80
30	35	15	15	40	40	10	40	46.5	–	71	4	2	2	70	80
40	50	17	42	25	25	10	52	56.5	–	83	4	2	3	82	92
50	35	15	51	36	36	22	60	66.5	–	103	6	2	3	102	112
75	55	25	61	36	72	43	85	91.5	125.5	149	6	4	4	148	158
100	65	35	111	38	76	52	130	116.5	179.5	203	6	4	5	202	212

L



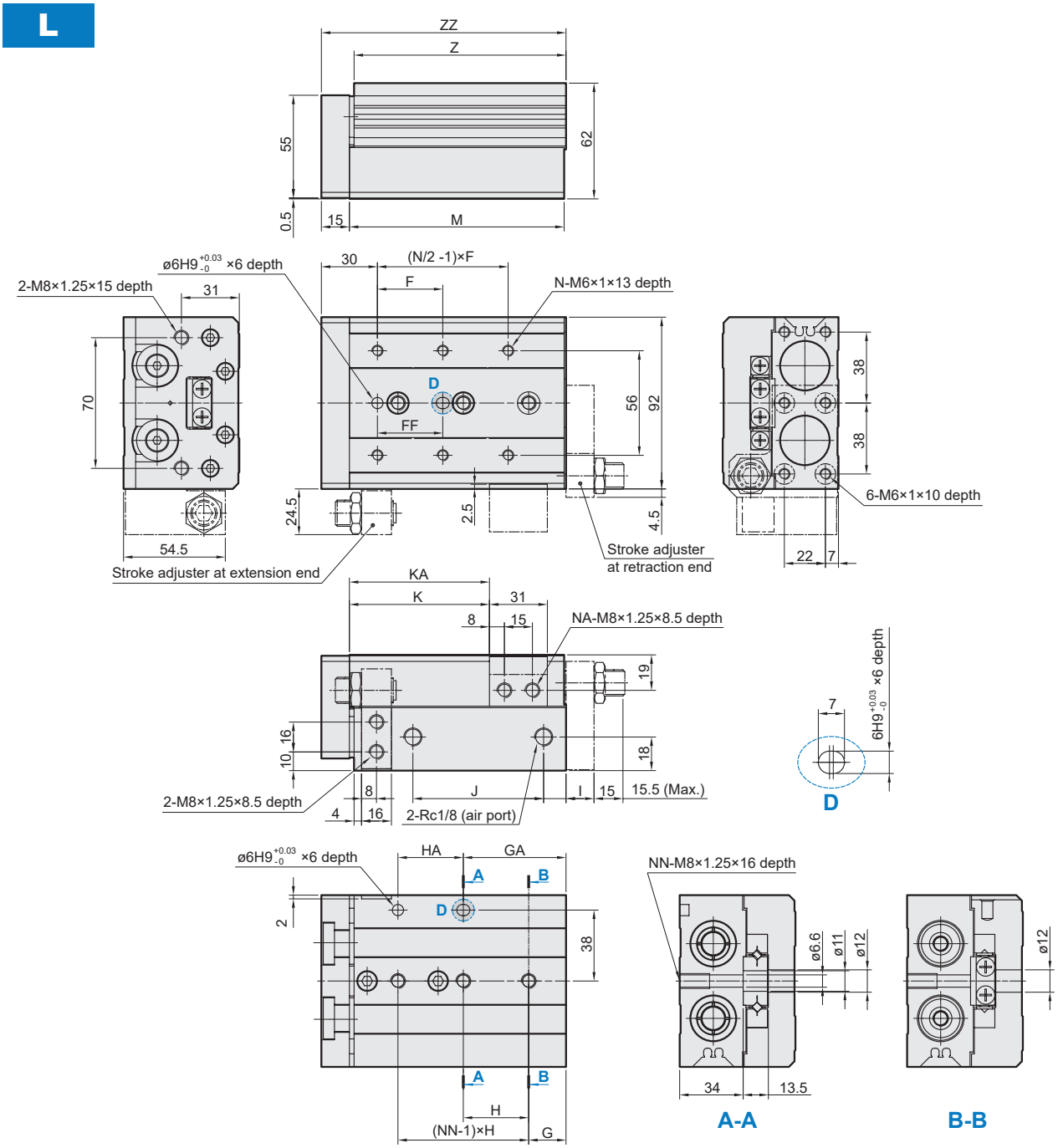
Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	16	16	40	40	10	40	29	–	76	4	2	2	75	87
20	35	16	16	40	40	10	40	39	–	76	4	2	2	75	87
30	35	16	16	40	40	10	40	49	–	76	4	2	2	75	87
40	40	16	16	50	50	10	50	59	–	86	4	2	2	85	97
50	30	21	51	30	30	15	60	69	–	101	6	2	3	100	112
75	55	26	61	35	70	40	85	94	125	151	6	4	4	150	162
100	65	39	109	35	70	55	118	119	173	199	6	4	5	198	210
125	70	19	159	35	70	68	155	144	223	249	8	4	7	248	260

L



Code / Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	15	25	45	35	10	44	31	–	83	4	2	2	81.5	97
20	50	40	15	25	45	35	10	44	41	–	83	4	2	2	81.5	97
30	50	40	15	25	45	35	10	44	51	–	83	4	2	2	81.5	97
40	60	50	15	35	55	35	10	54	61	–	93	4	2	2	91.5	107
50	35	35	15	50	35	35	10	69	71	–	108	6	2	3	106.5	122
75	60	60	19	54	35	70	10	108	96	–	147	6	2	4	145.5	161
100	70	70	37	107	35	70	58	113	121	169	200	6	4	5	198.5	214
125	70	70	41	155	38	76	70	155	146	223	254	8	4	6	252.5	268
150	80	80	19	195	44	88	87	190	171	275	306	8	4	7	304.5	320

L



Code / Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	22	22	45	45	12	47	35	–	92	4	2	2	90.5	108
20	50	40	22	22	45	45	12	47	45	–	92	4	2	2	90.5	108
30	50	40	22	22	45	45	12	47	55	–	92	4	2	2	90.5	108
40	60	50	22	22	55	55	12	57	65	–	102	4	2	2	100.5	118
50	35	35	20	55	35	35	12	70	75	–	115	6	2	3	113.5	131
75	60	60	26	61	35	70	33	90	100	–	156	6	2	4	154.5	172
100	70	70	32	102	35	70	50	114	125	162	197	6	4	5	195.5	213
125	75	75	40	154	38	76	67	155	150	218	255	8	4	6	253.5	271
150	80	80	30	190	40	80	82	180	175	258	295	8	4	7	293.5	311

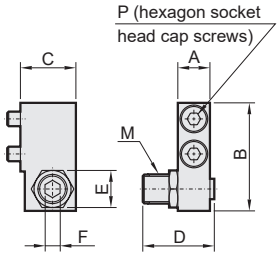
Order example of stroke adjuster

MCSS — 20 L — AS — X12

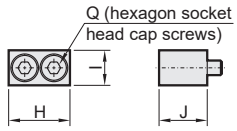
- MODEL
- TUBE I.D.
- Blank: Standard
  L: Symmetric style
- STROKE ADJUSTER
  AS: Adjuster at extension end
  AT: Adjuster at retraction end
  A: Adjuster at both ends
  A2: Adjusting bolt
- ADJUSTABLE RANGE
  Blank: 5mm
  X11: 15mm
  X12: 25mm
  * **X12** (adjustable range: 25mm) is not available for MCSS-6.

AS Stroke adjuster at extension end (Standard and symmetric style share the same order code)

Mounted to body
Material: Aluminum alloy



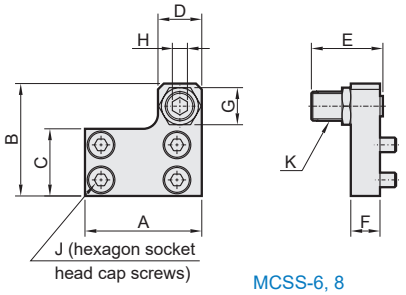
Mounted to table
Material: Aluminum alloy



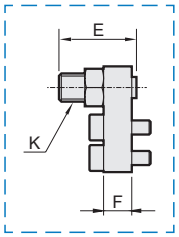
Tube I.D.	Order code	Adjustable stroke range (mm)	Mounted to body								Mounted to table			
			A	B	C	D	E	F	M	P	H	I	J	Q
6	MCSS-6-AS	5	6	17.8	10.5	16.5	7	2.5	M5×0.8	M2.5×10	12.5	6	8.5	M2.5×8
	MCSS-6-AS-X11	15				26.5								
8	MCSS-8-AS	5	7	21.5	11	16.5	8	3	M6×1	M3×10	14.6	7	10	M3×10
	MCSS-8-AS-X11	15				26.5								
	MCSS-8-AS-X12	25				36.5								
12	MCSS-12-AS	5	9.5	31	16	20	11	4	M8×1	M4×16	18.5	10	13	M4×12
	MCSS-12-AS-X11	15				30								
	MCSS-12-AS-X12	25				40								
16	MCSS-16-AS	5	11	37	19	24.5	14	5	M10×1	M5×16	21	12	16.5	M5×16
	MCSS-16-AS-X11	15				34.5								
	MCSS-16-AS-X12	25				44.5								
20	MCSS-20-AS	5	13	45.5	24	27.5	17	6	M12×1.25	M6×20	25	13	21	M6×20
	MCSS-20-AS-X11	15				37.5								
	MCSS-20-AS-X12	25				47.5								
25	MCSS-25-AS	5	16	53.5	26.5	32.5	19	6	M14×1.5	M8×25	31	17	25.5	M8×25
	MCSS-25-AS-X11	15				42.5								
	MCSS-25-AS-X12	25				52.5								

AT Stroke adjuster at retraction end (ø6, ø8: Standard and symmetric style share the same order code)

Mounted to body
Material: Aluminum alloy



MCSS-6, 8

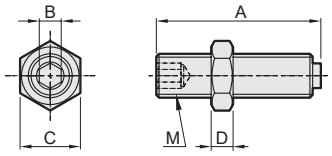


Tube I.D.	Order code	Adjustable stroke range (mm)	A	B	C	D	E	F	G	H	J	K
6	MCSS-6-AT	5	21	19	10.5	8	16.5	5	7	2.5	M2.5×8	M5×0.8
	MCSS-6-AT-X11	15					26.5					
8	MCSS-8-AT	5	25	22.5	12.5	9	16.5	6	8	3	M3×10	M6×1
	MCSS-8-AT-X11	15					26.5					
	MCSS-8-AT-X12	25					36.5					
12	MCSS-12□-AT	5	32	31	18.5	13	20	8	12	4	M4×8	M8×1
	MCSS-12□-AT-X11	15					30					
	MCSS-12□-AT-X12	25					40					
16	MCSS-16□-AT	5	40	38.5	23	15	24.5	10	14	5	M5×10	M10×1
	MCSS-16□-AT-X11	15					34.5					
	MCSS-16□-AT-X12	25					44.5					
20	MCSS-20□-AT	5	50	48	29	21	27.5	12	17	6	M5×12	M12×1.25
	MCSS-20□-AT-X11	15					37.5					
	MCSS-20□-AT-X12	25					47.5					
25	MCSS-25□-AT	5	60	58	35	23	32.5	15	19	6	M6×16	M14×1.5
	MCSS-25□-AT-X11	15					42.5					
	MCSS-25□-AT-X12	25					52.5					

* □ For standard and symmetric style options.

A2 Adjusting bolt (Standard and symmetric style share the same order code)

Material: Stainless steel



Tube I.D.	Order code	Adjustable stroke range (mm)	A	B	C	D	M
6	**MCSS-6-A2**	5	16.5	2.5	7	4	M5×0.8
	MCSS-6-A2-X11	15	26.5				
8	**MCSS-8-A2**	5	16.5	3	8	4	M6×1
	MCSS-8-A2-X11	15	26.5				
	MCSS-8-A2-X12	25	36.5				
12	**MCSS-12-A2**	5	20	4	11	4	M8×1
	MCSS-12-A2-X11	15	30				
	MCSS-12-A2-X12	25	40				
16	**MCSS-16-A2**	5	24.5	5	14	4	M10×1
	MCSS-16-A2-X11	15	34.5				
	MCSS-16-A2-X12	25	44.5				
20	**MCSS-20-A2**	5	27.5	6	17	5	M12×1.25
	MCSS-20-A2-X11	15	37.5				
	MCSS-20-A2-X12	25	47.5				
25	**MCSS-25-A2**	5	32.5	6	19	6	M14×1.5
	MCSS-25-A2-X11	15	42.5				
	MCSS-25-A2-X12	25	52.5				

Cylinder weight

Unit: g

Model	Stroke (mm)									Adjuster		Absorber		End lock
	10	20	30	40	50	75	100	125	150	AS	AT	BS	BT	
MCSS-6(L)	89	110	122	161	199	–	–	–	–	10	10	–	–	–
MCSS-8(L)	155	166	201	246	281	394	–	–	–	18	18	31	41	40
MCSS-12(L)	360	362	369	425	529	722	960	–	–	40	36	46	57	92
MCSS-16(L)	576	600	602	674	762	1095	1410	1702	–	67	66	76	101	168
MCSS-20(L)	1050	1060	1092	1145	1320	1815	2365	2880	3368	113	111	173	211	316
MCSS-25(L)	1636	1650	1673	1797	1989	2713	3260	4260	4530	198	185	239	309	562

AS/ BS: Extension end
AT/ BT: Retraction end

Order example of absorber

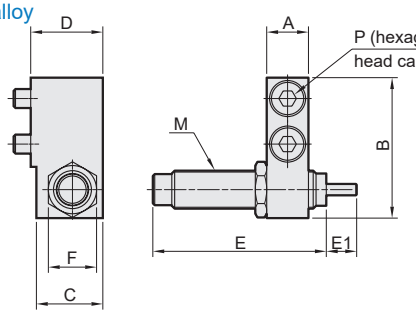
MCSS — 20 L — B — P

- MODEL: MCSS
- TUBE I.D.: 8~25
- Blank: Standard; **L**: Symmetric style
- ABSORBER: **BS**: Absorber at extension end; **BT**: Absorber at retraction end; **B**: Absorber at both ends
- APPLICABLE RANGE (Only for absorber code B); **P**: Mounted to table × 2

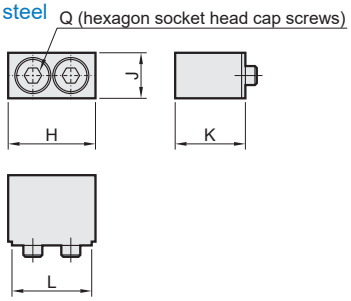
Tube I.D.	Stroke	
	Blank: Mounted to table × 1	**P**: Mounted to table × 2
8	10~40	50,75
12	10~50	75,100
16	10~50	75~125
20	10~75	100~150
25	10~75	100~150

BS Stroke adjuster at extension end (Standard and symmetric style share the same order code)

Mounted to body
Material: Aluminum alloy



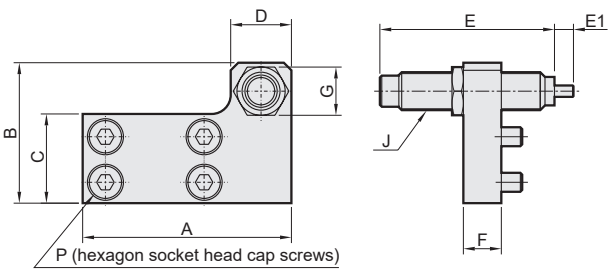
Mounted to table
Material: Carbon steel



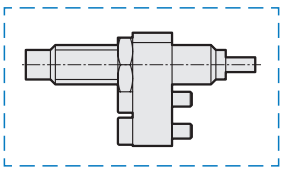
Tube I.D.	Order code	Mounted to body										Mounted to table				
		A	B	C	D	E	E1	F	M		P	H	J	K	L	Q
8	**MCSS-8-BS**	7	23	14	15.5	38.5	6	11	M8×1	MDSC-0806-3-N	M3×16	16.6	7	15.5	14.6	M3×16
12	**MCSS-12-BS**	9.5	31	14.5	16	38.5	6	11	M8×1	MDSC-0806-3-N	M4×16	20.5	10	15	18.5	M4×12
16	**MCSS-16-BS**	11	37	17.5	19	45.5	8	12.7	M10×1	MDSC-1008-3-N	M5×16	23	12	18.5	21	M5×16
20	**MCSS-20-BS**	13	47	23.5	26	67.5	12	19	M14×1.5	MDSC-1412-3-N	M6×25	27	13	25.5	25	M6×25
25	**MCSS-25-BS**	16	53.5	23.5	26.5	67.5	12	19	M14×1.5	MDSC-1412-3-N	M8×25	33	17	25.5	31	M8×25

BT Stroke adjuster at retraction end (ø8: Standard and symmetric style share the same order code)

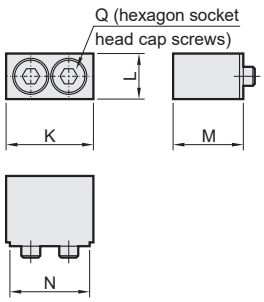
Mounted to body
Material: Aluminum alloy



MCSS-8



Mounted to table
Material: Carbon steel



Tube I.D.	Order code	Mounted to body											Mounted to table				
		A	B	C	D	E	E1	F	G	J		P	K	L	M	N	Q
8	**MCSS-8-BT**	38	23	12.5	14	38.5	6	8	12	M8×1	MDSC-0806-3-N	M3×12	16.6	7	15.5	14.6	M3×16
12	**MCSS-12□-BT**	45	31	18	14	38.5	6	8	11	M8×1	MDSC-0806-3-N	M4×8	20.5	10	15	18.5	M4×12
16	**MCSS-16□-BT**	55	37	23.5	16	45.5	8	10	12.7	M10×1	MDSC-1008-3-N	M5×10	23	12	18.5	21	M5×16
20	**MCSS-20□-BT**	70	47	29	23	67.5	12	12	19	M14×1.5	MDSC-1412-3-N	M5×12	27	13	25.5	25	M6×25
25	**MCSS-25□-BT**	80	54	35	23	67.5	12	15	19	M14×1.5	MDSC-1412-3-N	M6×16	33	17	25.5	31	M8×25

* □ For standard and symmetric style options.

Order example of stroke adjuster + absorber (ø8: Standard and symmetric style share the same order code)

MCSS — 20 L — AB — P

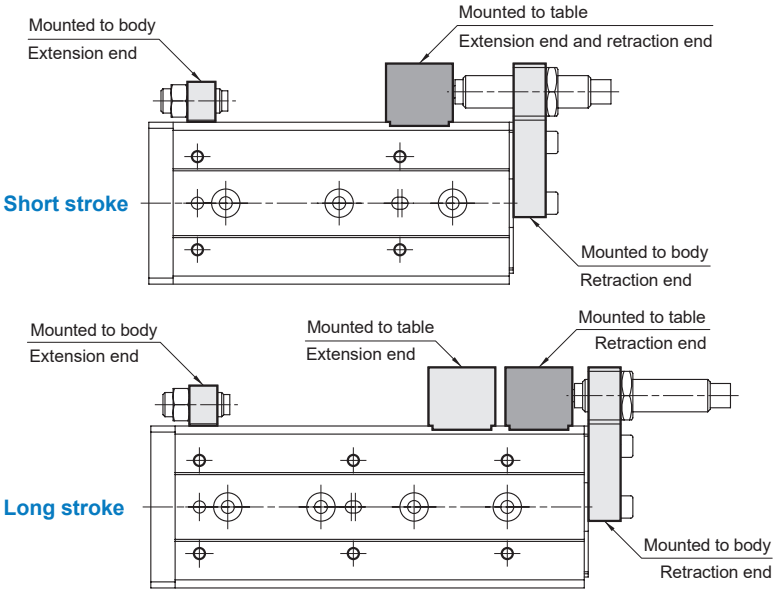
- MODEL
- TUBE I.D.: **8~25**
- Blank: Standard; **L**: Symmetric style
- ABSORBER: **AB**: Adjuster at extension end + Absorber at retraction end; **BA**: Absorber at extension end + Adjuster at retraction end

APPLICABLE RANGE
(Only for absorber code AB)

Tube I.D.	Stroke	
	Blank: Mounted to table × 1	**P**: Mounted to table × 2
8	10~40	50,75
12	10~50	75,100
16	10~50	75~125
20	10~75	100~150
25	10~75	100~150

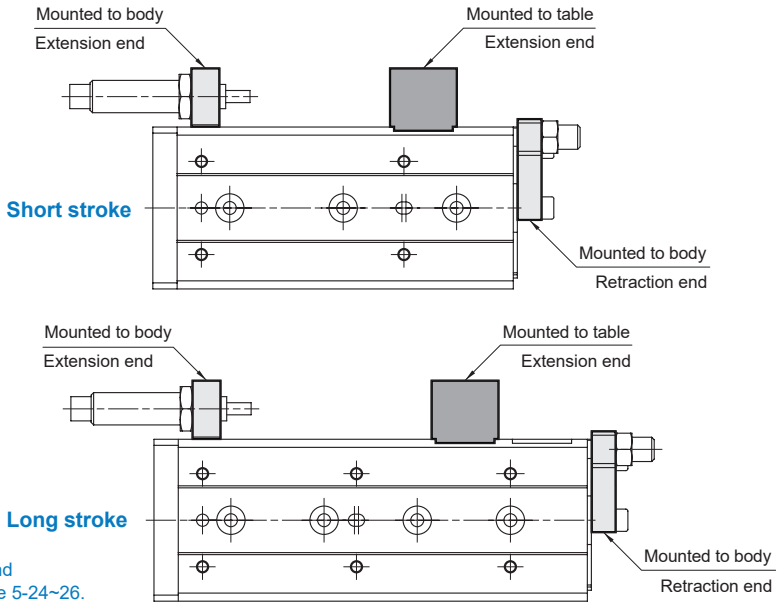
AB Adjuster at extension end + Absorber at retraction end (AS + BT)

Material
- Aluminum alloy
- Carbon steel



BA Absorber at extension end + Adjuster at retraction end (BS + AT)

Material
- Aluminum alloy
- Carbon steel



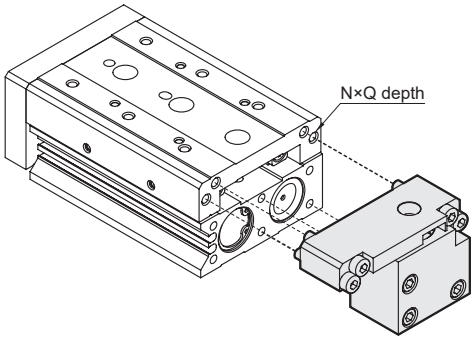
* The adjustment stroke range and dimensions, please refer to page 5-24~26.

Order example of end lock

MCSS — 20 — HL — □

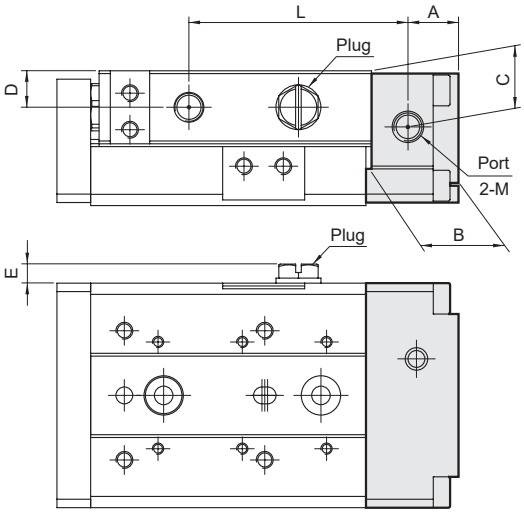
- MODEL
- TUBE I.D. **8**, **12**, **16** **20**, **25**
- END LOCK
- PORT THREAD
  Blank: M thread (for ø8~ø16)
  Blank: Rc thread
  G: G thread
  NPT: NPT thread (for ø20,ø25)

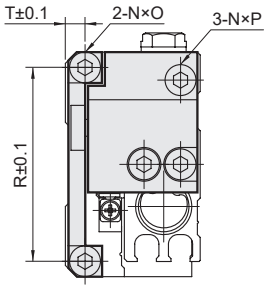
Mounting of with end lock



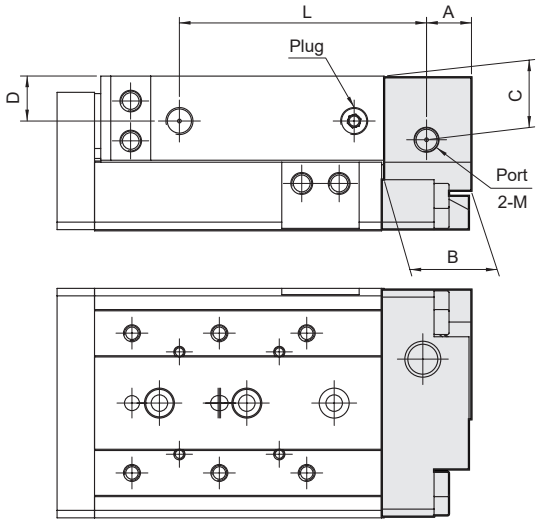
HL With end lock

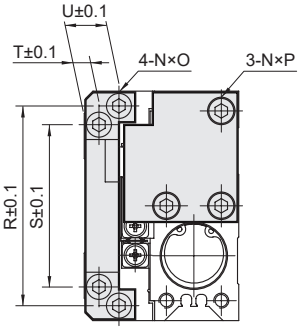
ø8~ø16





ø20, ø25





Code / Stroke / Tube I.D.	A	B	C	D	E	L									M	N	O	P	Q	R	S	T	U
						10	20	30	40	50	75	100	125	150									
8	9	15.5	10	6.5	3.4	39	44	55	73	91	141	–	–	–	M5×0.8	M3×0.5	16L	14L	5	34.5	–	3.5	–
12	10.5	20	14.5	9.5	3.4	59.5	59.5	59.5	71.5	91.5	137.5	191.5	–	–	M5×0.8	M4×0.7	20L	20L	6	42.4	–	4.5	–
16	13	25	18	12	3.4	62	62	62	72	87	137	185	235	–	M5×0.8	M5×0.8	25L	25L	8	52	–	5.5	–
20	15.5	30	20	15	–	68.5	68.5	68.5	78.5	93.5	132.5	185.5	239.5	291.5	Rc1/8	M5×0.8	30L	30L	6	67	55	4.5	10.5
25	18	35	25.5	18	–	76	76	76	86	99	140	181	239	279	Rc1/8	M6×1.0	25L	35L	5	80	65	6	14

* Other dimensions are the same as the standard type.