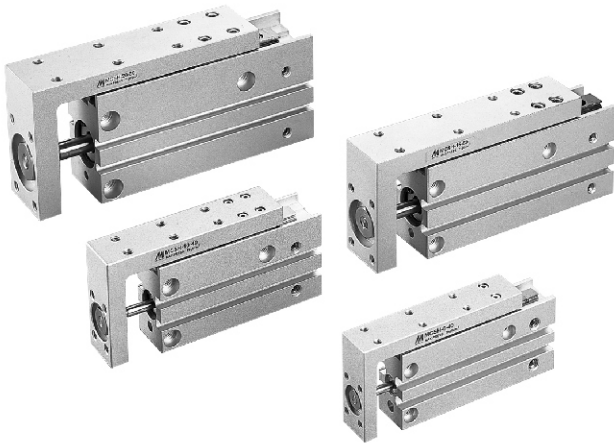


MCSH series

COMPACT SLIDE



Order example:

MCSH – 10 – 60

MODEL

TUBE I.D.

STROKE

Features:

- A table cylinder suitable for short pitch mounting.
- The use of an endless track linear guide produces a table cylinder having excellent rigidity, linearity and non-rotating accuracy.
- Mounting is possible from 3 or 4 directions.

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	1.2 kgf/cm ² (0.12 MPa)	0.61 kgf/cm ² (0.06 MPa)	0.51 kgf/cm ² (0.05 MPa)	
Max. operating pressure	7.1 kgf/cm ² (0.7 MPa)			
Proof pressure	10.7 kgf/cm ² (1.05 MPa)			
Ambient temperature	− 5~ + 60℃ (No freezing)			
Piston speed	50~500mm/s			
Allowable kinetic energy J (kgf · cm)	0.0125 (0.127)	0.025 (0.25)	0.05 (0.5)	0.1 (1.0)
Lubricator	Not required			
Cushion	Rubber bumper			
Stroke length tolerance	+1.0 0			
Sensor switch	RCE, RCE1			

Table for standard stroke:

Tube I.D.	Stroke (mm)
φ 6,10,16,20	5, 10, 15, 20, 25, 30, 40, 50, 60

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

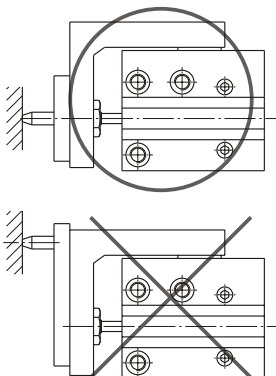
MCSH Precautions Be sure to read before handling.

COMPACT SLIDE



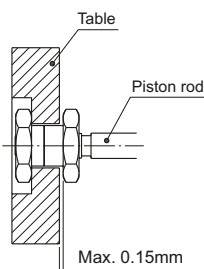
Operating precautions

- 1 Positively do not put fingers between the table and cylinder tube, as they can be caught when the piston rod retracts. If fingers are caught in a cylinder, there is a danger of injury due to the strong cylinder output, and therefore caution must be exercised.
- 2 Operate within the limits of the maximum movable weight and allowable moment.
- 3 When the output of the compact slide will be directly applied to the table, it should be applied along the rod axis. (See drawing below.)
- 4 Be sure to attach a speed controller, and adjust the speed to 500mm/s or less.



Stroke Direction Backlash

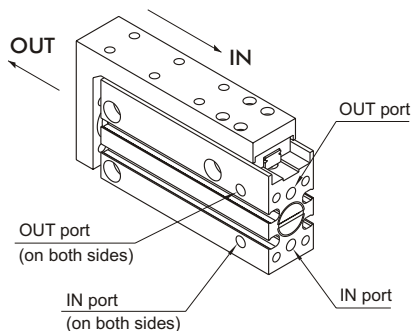
- 1 Since the connection between the piston rod and table is a floating structure, there is a maximum table backlash of 0.15mm in the stroke direction. (See drawing below.)



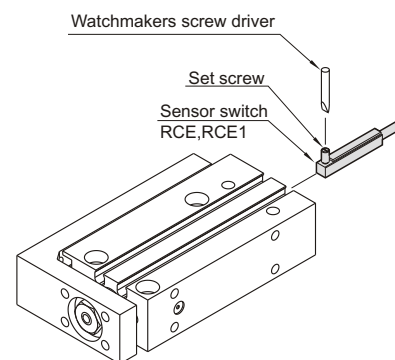
Piston rod and table connection

Operating direction with different pressure ports

- 1 The compact slide can be piped from 3 directions. Confirm the pressure ports and operating direction. (See drawing below.)



Installation of sensor switch

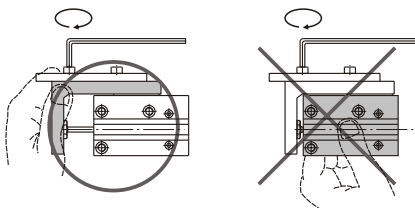


Mounting

Work piece mounting

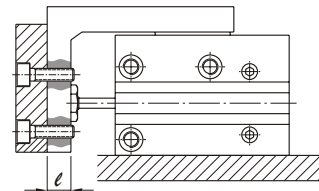
Work pieces can be mounted on 2 surfaces of the compact slide.

- 1 Since the table is supported by the linear guide, take care not to apply strong impact or large moment, etc. when mounting work pieces.
- 2 Hold the table when fastening work pieces to it with bolts, etc. If the body is held while tightening bolts, etc., the guide section will be subjected to large moment, and there may be a loss of precision.
- 3 For connection with a load having an external support/guide mechanism, select an appropriate connection method and perform careful alignment.
- 4 Use caution, as scratches or nicks, etc. on the sliding parts of the piston rod can cause malfunction and air leakage.



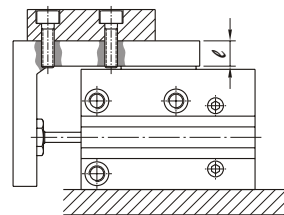
When mounting a compact slide, tighten the screws properly at a torque value within the limiting range.

1. Front mounting



Model	Bolt	Max. torque (Nm)	ℓ (mm)
MCSH-6	M3×0.5	1.1	5.5
MCSH-10	M4×0.7	2.5	7.5
MCSH-16	M4×0.7	2.5	10
MCSH-20	M5×0.8	5.1	11

2. Top mounting



Model	Bolt	Max. torque (Nm)	ℓ (mm)
MCSH-6	M3×0.5	1.1	6.5
MCSH-10	M4×0.7	2.5	8
MCSH-16	M4×0.7	2.5	9
MCSH-20	M5×0.8	5.1	9.5

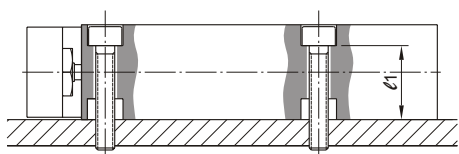
Mounting

When mounting a compact slide, tighten the screws properly at a torque value within the limiting range.

Compact slide mounting

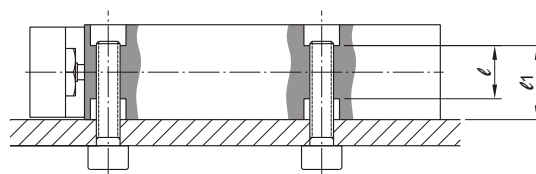
- ❶ A compact slide can be mounted from 4 directions. Make a selection suitable for the applicable machinery and work pieces, etc.

Lateral mounting (through holes)



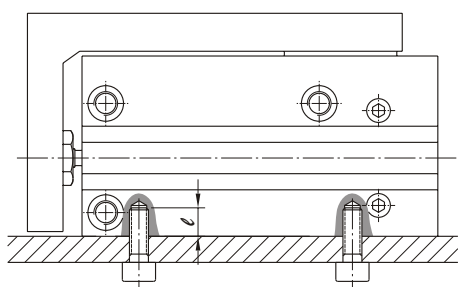
Model	Bolt	Max. torque (Nm)	l_1 (mm)
MCSH-6	M3×0.5	1.1	12.7
MCSH-10	M4×0.7	2.5	15.6
MCSH-16	M4×0.7	2.5	20.6
MCSH-20	M5×0.8	5.1	24.0

Lateral mounting (tapped holes)



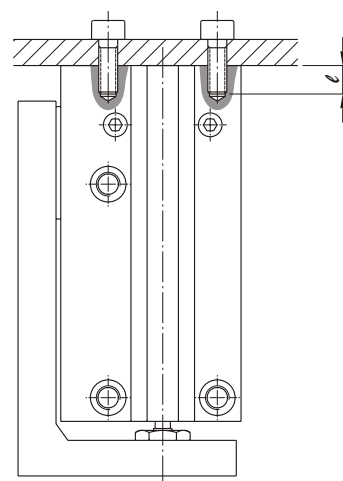
Model	Bolt	Max. torque (Nm)	l_1 (mm)	l (mm)
MCSH-6	M4×0.7	2.5	12.7	9.4
MCSH-10	M5×0.8	5.1	15.6	11.2
MCSH-16	M5×0.8	5.1	20.6	16.2
MCSH-20	M6×1	8.1	24.0	16.0

Vertical Mounting (Tapped Holes)



Model	Bolt	Max. torque (Nm)	l (mm)
MCSH-6	M3×0.5	1.1	4.8
MCSH-10	M4×0.7	2.5	6
MCSH-16	M4×0.7	2.5	6
MCSH-20	M5×0.8	5.1	8

Axial Mounting (Tapped Holes)



Model	Bolt	Max. torque (Nm)	l (mm)
MCSH-6	M3×0.5	1.1	4.8
MCSH-10	M4×0.7	2.5	6
MCSH-16	M4×0.7	2.5	6
MCSH-20	M5×0.8	5.1	8

Table accuracy

Running parallelism	Stroke (st)	
	5~30	40~60
	0.05mm or less	0.1mm or less

Allowable moment (N·m)

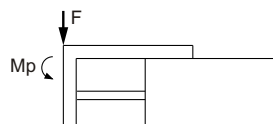
Model	Pitch moment M_p	Yaw moment M_y	Roll moment M_r
MCSH-6	0.47	0.39	0.59
MCSH-10	0.96	0.82	1.37
MCSH-16	1.88	1.59	2.75
MCSH-20	3.14	2.75	5.49

Design precautions

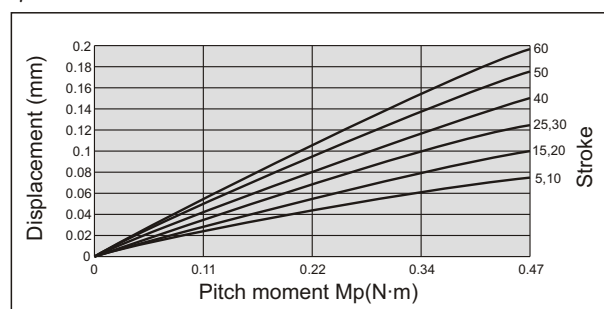
- ❶ Bore size selections cannot be made with the above graphs alone. Perform bore size selections with the model selection method provided on pages 5 and 6.
- ❷ The displacement may increase after the action of an impact load. When the table is subjected to an impact load, there may be permanent distortion of the guide unit and increased displacement.

Table displacement due to pitch moment

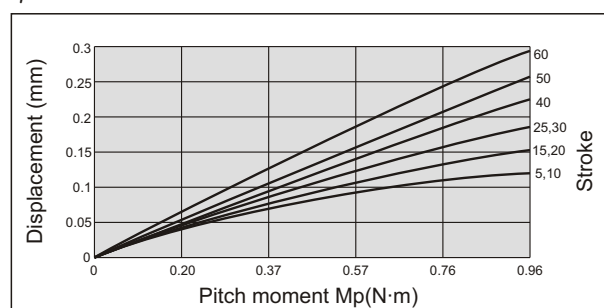
Table displacement (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



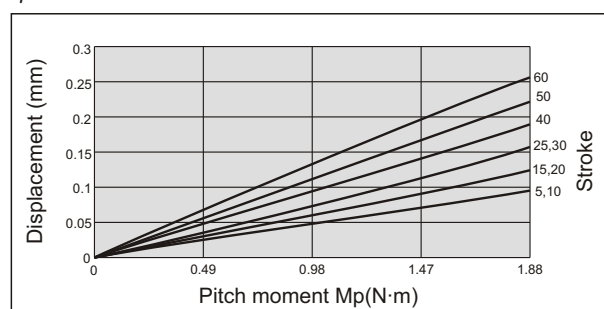
$\phi 6$



$\phi 10$



$\phi 16$



$\phi 20$

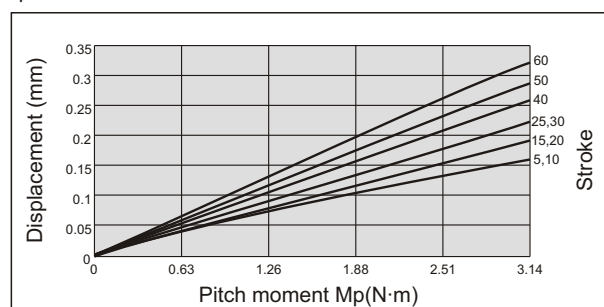
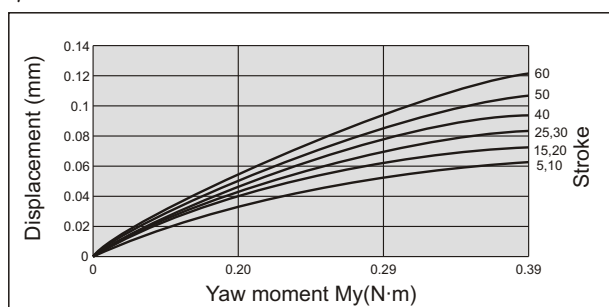


Table displacement due to yaw moment

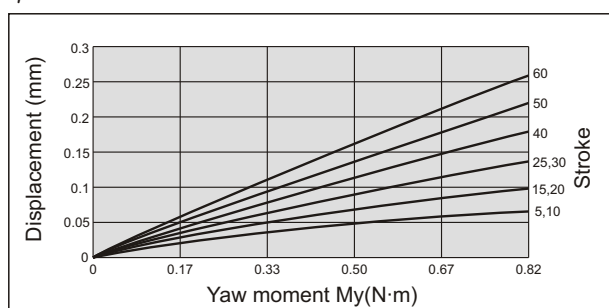
Table displacement (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



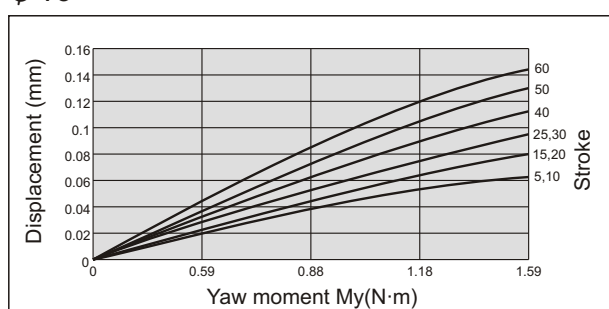
$\phi 6$



$\phi 10$



$\phi 16$



$\phi 20$

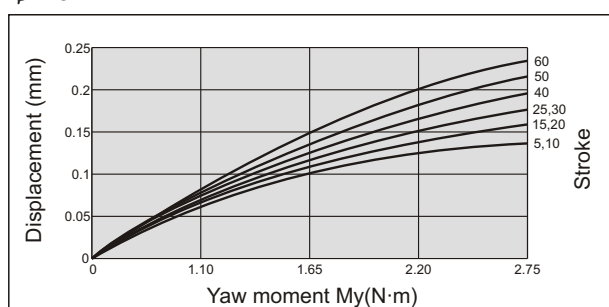
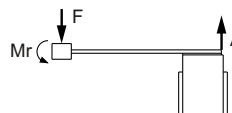
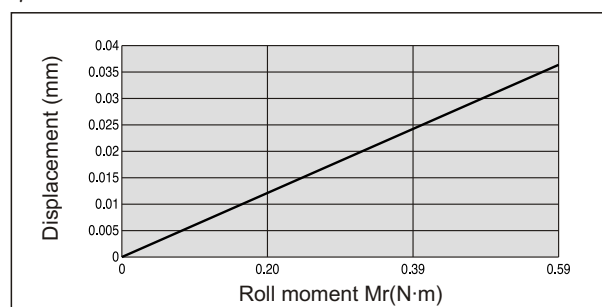


Table displacement due to roll moment

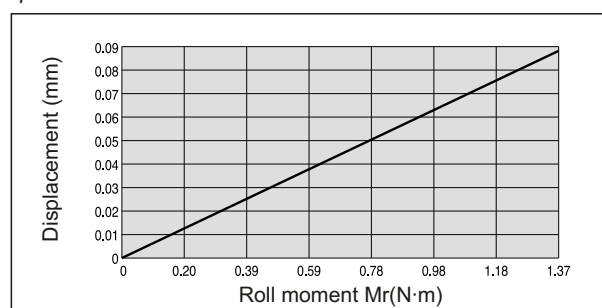
Table displacement (at A) when a load acts upon section F at the full stroke of the compact slide.



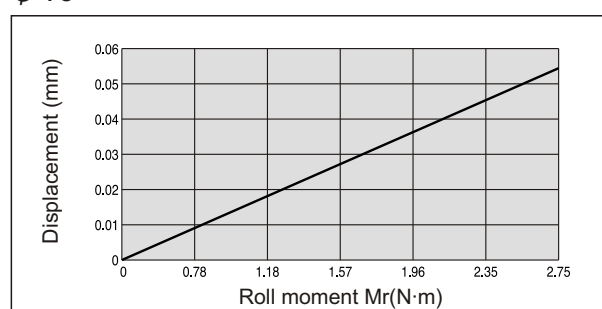
$\phi 6$



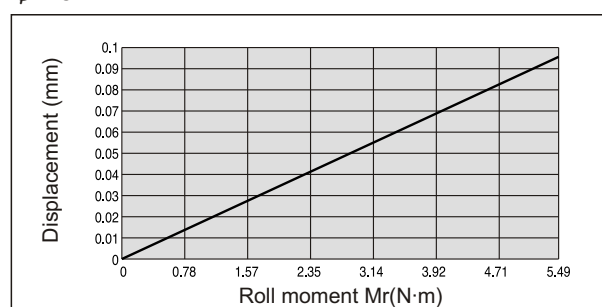
$\phi 10$



$\phi 16$



$\phi 20$



MCSH Model selection method $\phi 6 \sim \phi 20$

COMPACT SLIDE



Caution: Separate confirmation of the theoretical output is necessary. Refer to the theoretical output table on page 2.

Selection conditions:

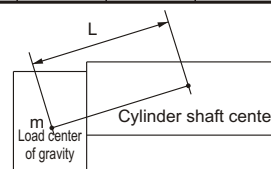
Determine the selection conditions in order, starting from the upper row in the table below, and choose one of the selection graphs to be used. the compact slide.

Mounting position	Vertical			Horizontal								
Max. speed mm/s	~100	~300	~500	~100			~300			~500		
Load eccentricity e mm	—			50	100	200	50	100	200	50	100	200
Selection graph	1	2	3	4	5	6	7	8	9	10	11	12

※ 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 .

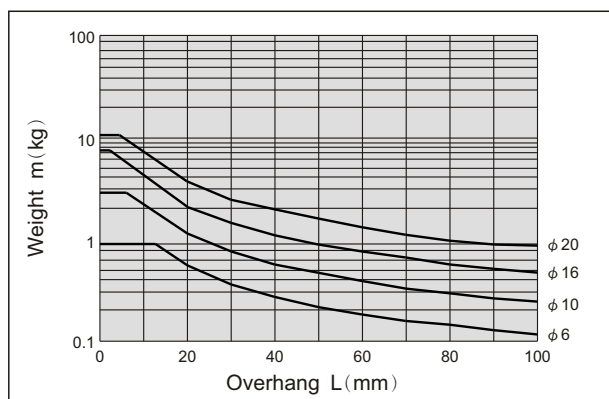
(See drawing at right)



Selection graphs 1 to 3 (Vertical mounting)

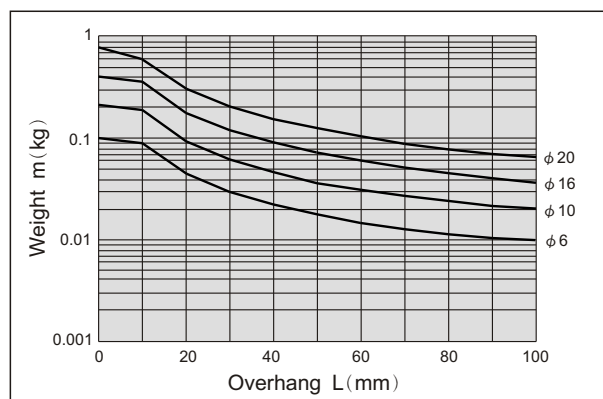
Graph 1

Max. speed 100(mm/s) or less



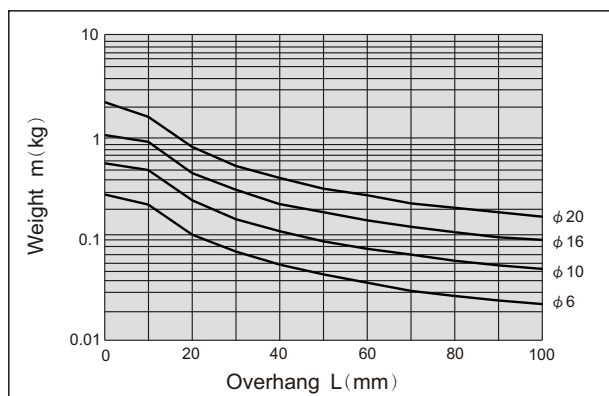
Graph 3

Max. speed 500(mm/s) or less



Graph 2

Max. speed 300(mm/s) or less



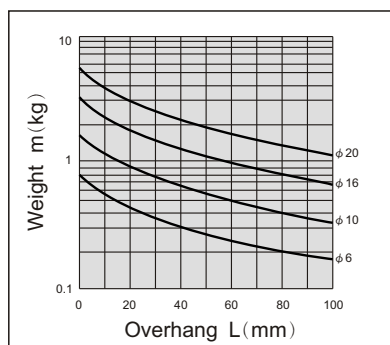
Selection graphs 4 to 12 (Horizontal mounting)

Max. speed 100(mm/s) or less

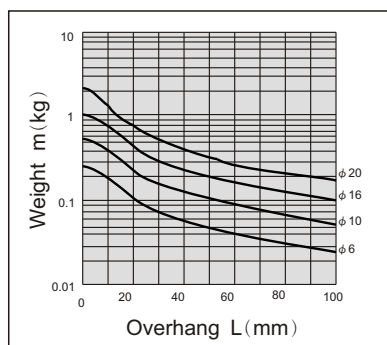
Max. speed 300(mm/s) or less

Max. speed 500(mm/s) or less

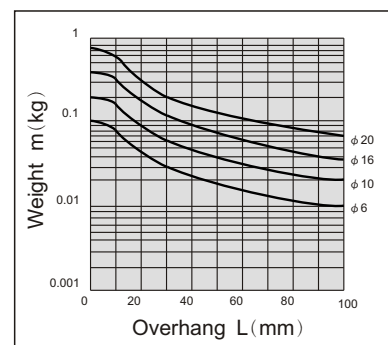
Graph 4 Load eccentricity 50mm



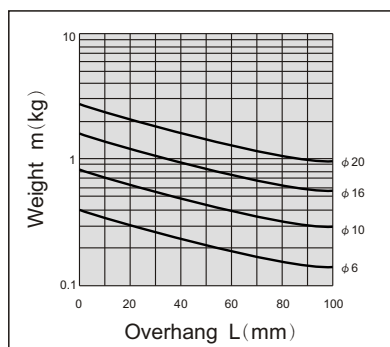
Graph 7 Load eccentricity 50mm



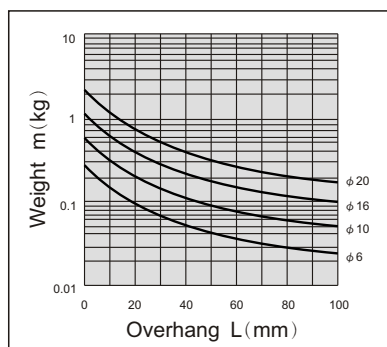
Graph 10 Load eccentricity 50mm



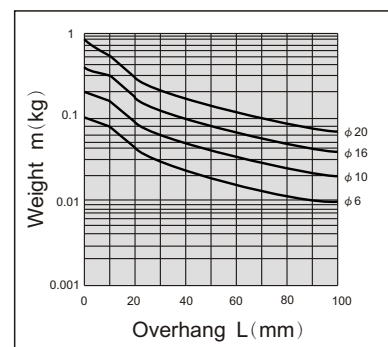
Graph 5 Load eccentricity 100mm



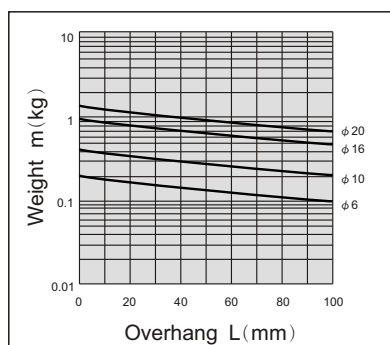
Graph 8 Load eccentricity 100mm



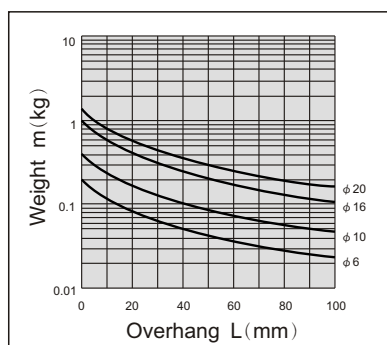
Graph 11 Load eccentricity 100mm



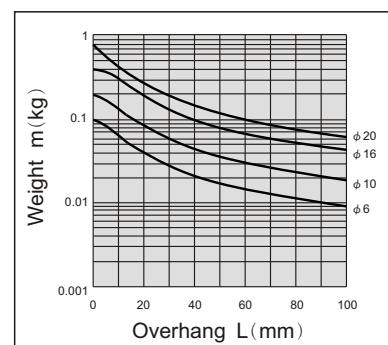
Graph 6 Load eccentricity 200mm



Graph 9 Load eccentricity 200mm



Graph 12 Load eccentricity 200mm



Selection Examples

- ①** Selection conditions:
 Mounting: Vertical
 Maximum speed: 500mm/s
 Overhang: 40mm
 Load weight: 0.1Kg

Refer to Graph 3 based on vertical mounting and a speed of 500mm/s.
 In Graph 3, find the intersection of a 40mm overhang and load weight of 0.1Kg, which results in a determination of $\phi 20$.

- ②** Selection conditions:
 Mounting: Horizontal
 Maximum speed: 500mm/s
 Load eccentricity: 50mm
 Overhang: 30mm
 Load weight: 0.1Kg

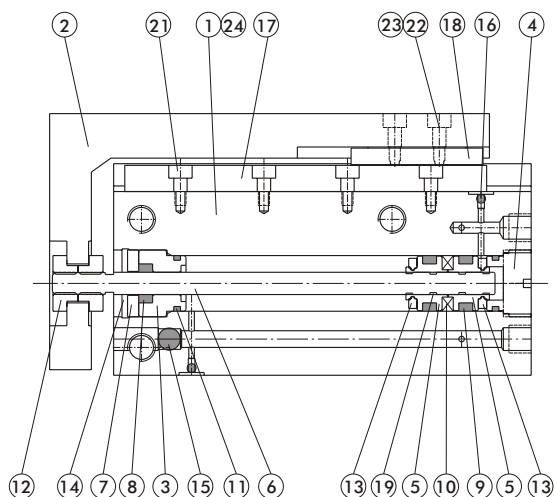
Refer to Graph 10 based on horizontal mounting, a speed of 500mm/s and load eccentricity of 50mm.
 In Graph 10, find the intersection of a 30mm overhang and load weight of 0.1Kg, which results in a determination of $\phi 16$.

MCSH Inside structure & Parts list

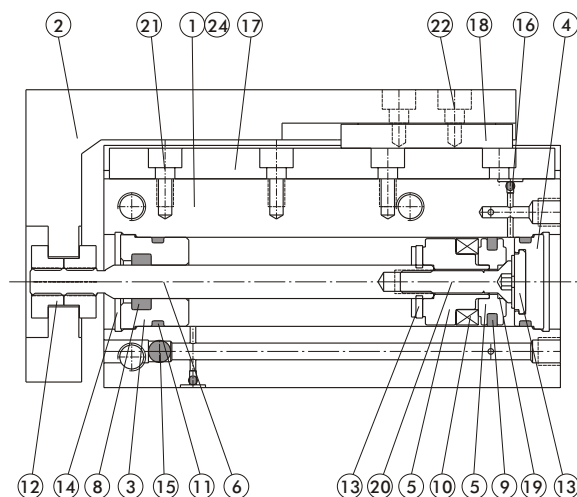
COMPACT SLIDE



φ 6, φ 10



φ 16, φ 20



Material

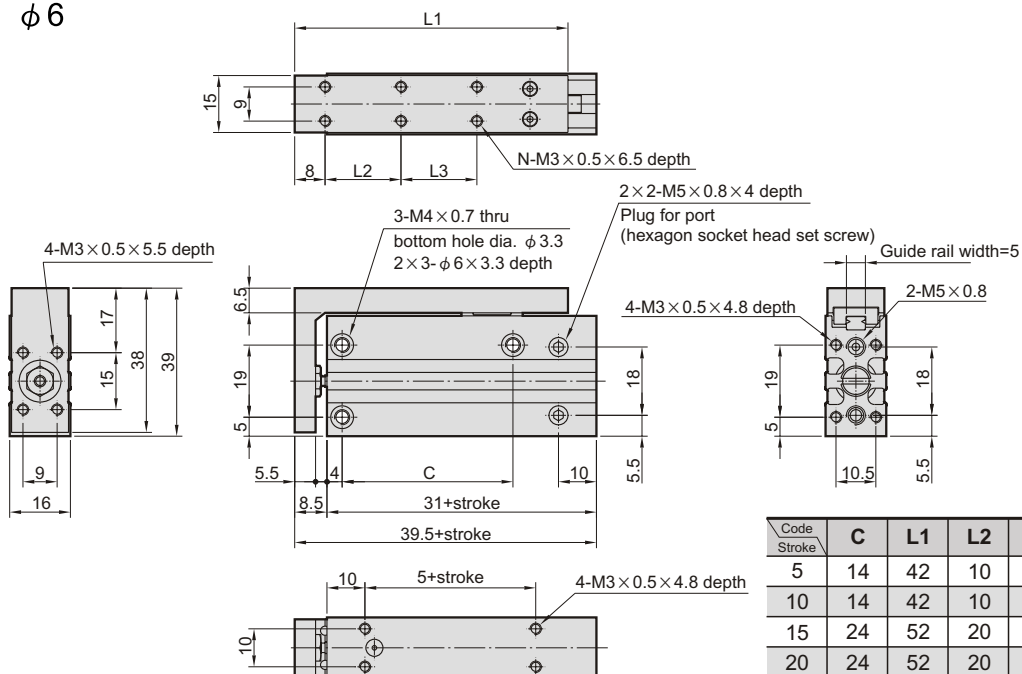
No.	Part name	Tube I.D.	6	10	16	20	Note
1	Body		Aluminum alloy				Anodized
2	Table		Aluminum alloy				Anodized
3	Rod cover		Aluminum alloy				Anodized
4	Head cover		Aluminum alloy				Anodized
5	Piston		Aluminum alloy				
6	Piston rod		Stainless steel				
7	Washer		Aluminum alloy				
8	Rod packing		NBR				
9	Piston packing		NBR				
10	Magnet ring		Magnet material				
11	Cover ring		NBR				
12	Rod front nut		Brass				
13	Cushion packing		NBR				
14	C type snap ring for hole		Spring steel				
15	Steel ball A		Stainless steel				
16	Steel ball B		Stainless steel				
17	Linear guide		Stainless steel				
18	Guide seat		Stainless steel				
19	Piston gasket		NBR				
20	Piston bolt		SCM				
21	Hexagon socket head cap screw A		Stainless steel				
22	Hexagon socket head cap screw B		Stainless steel				
23	Round head Phillips screw		Stainless steel				Only for φ 6
24	Hexagon socket head plug		Stainless steel				

MCSH Dimensions $\phi 6$, $\phi 10$

COMPACT SLIDE

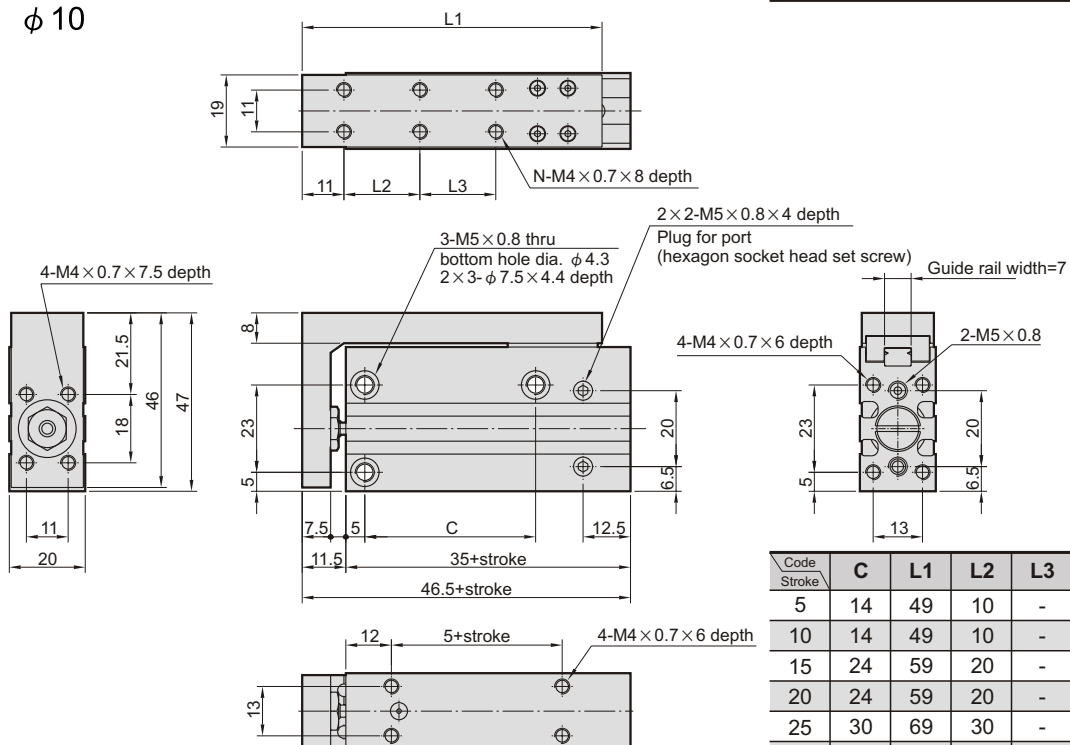


$\phi 6$



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

$\phi 10$



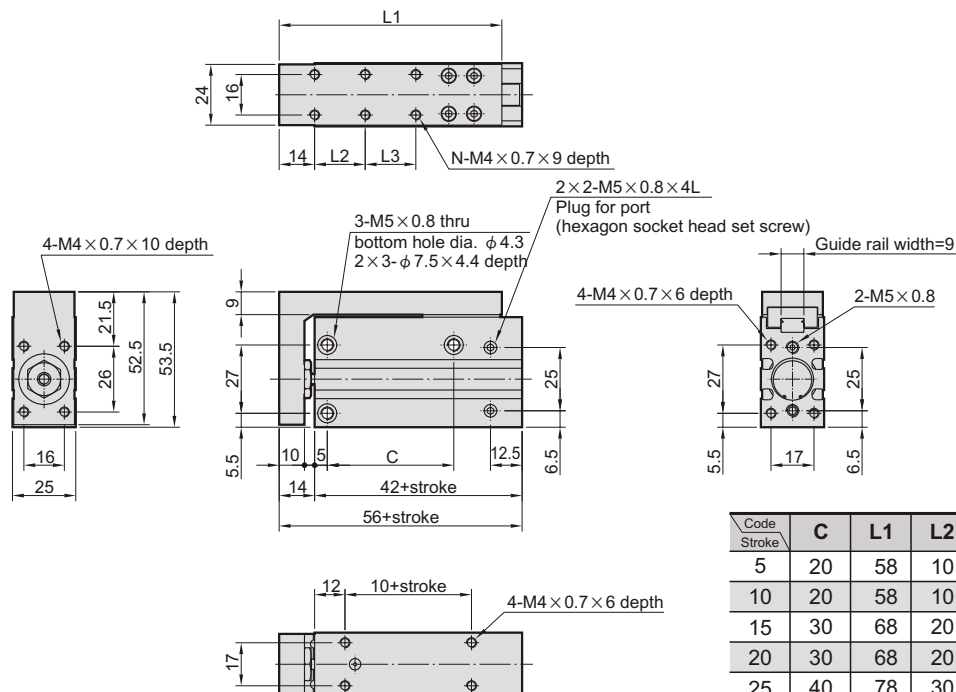
Code Stroke	C	L1	L2	L3	N
5	14	49	10	-	4
10	14	49	10	-	4
15	24	59	20	-	4
20	24	59	20	-	4
25	30	69	30	-	4
30	30	69	30	-	4
40	45	79	20	20	6
50	55	89	25	25	6
60	60	99	30	30	6

MCSH Dimensions $\phi 16$, $\phi 20$

COMPACT SLIDE

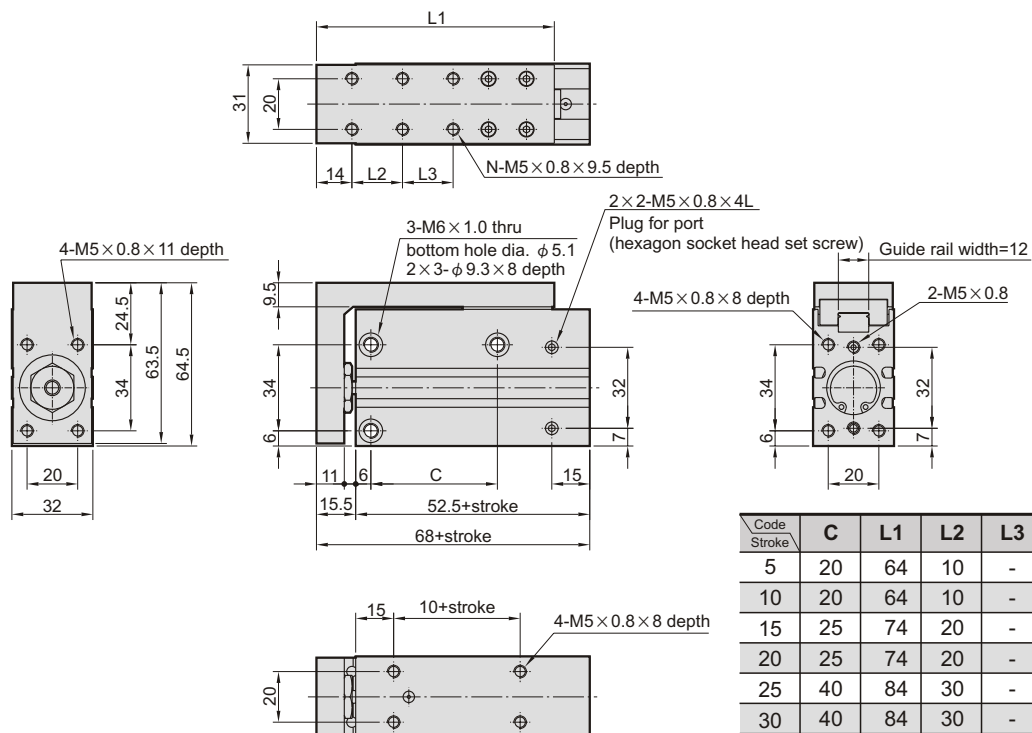


$\phi 16$



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

$\phi 20$



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