



LINEAR ACTUATORS

Pre-assembled, all-in-one linear actuators save design and installation time. Choose from NSK's two product lines: Monocarrier™ and Toughcarrier™.



Linear Actuators

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Monocarrier™



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1 Monocarrier™

1.1 Features

NSK's Monocarrier™ is the culmination of technology and innovation in linear motion. This lightweight, compact, single-axis linear actuator integrates NSK ball screw, linear guide and support bearings into one unit.





1 Lightweight, Compact Design

- Available in two different product styles depending on application:
 - › Lightweight Type: MCM Series
 - › Rigid Type: MCH Series

2 All-In-One Structure

- The all-in-one structure integrates a ball screw, linear guide and support bearings into a single unit to significantly reduce design and installation time.
- Multiple datum planes, the bottom and a lateral side of the rail, facilitate highly accurate installation.
- A wide selection of fine to high helix leads is available.

3 Long Term, Maintenance-Free Operation

- Use of NSK K1™ Lubrication Unit and grease maintains smooth lubricating performance for long periods in mechanical environments where lubrication is difficult to apply, where use of oil is not permitted because of hygienic issues or where the mechanical equipment requires a high degree of washing out.
- NSK K1™ Lubrication Unit is available for food processing machines and medical equipment.
- Grease for clean environments and for general machinery is available.

4 Superb Anti-Rust Capability

- Rust-resistant, low temperature chrome plating used on bodies and sliders is a standard feature.
- Low temperature fluoride chrome plating provides increased rust protection.

5 Quick Delivery

- Selected sizes are available within 4 week delivery time.
- All standard accessories are available within 4 week delivery time as well.
- Order quantity is limited to 5 pieces.

1.2 Classification and Series

Table 1-1

	Lightweight	Beam Rigidity	Moment Rigidity
MCM Series	⊙	○	○
MCH Series	○	⊙	○

⊙ = Excellent Performance ○ = Good Performance

(MCM Series Cross-Sections)

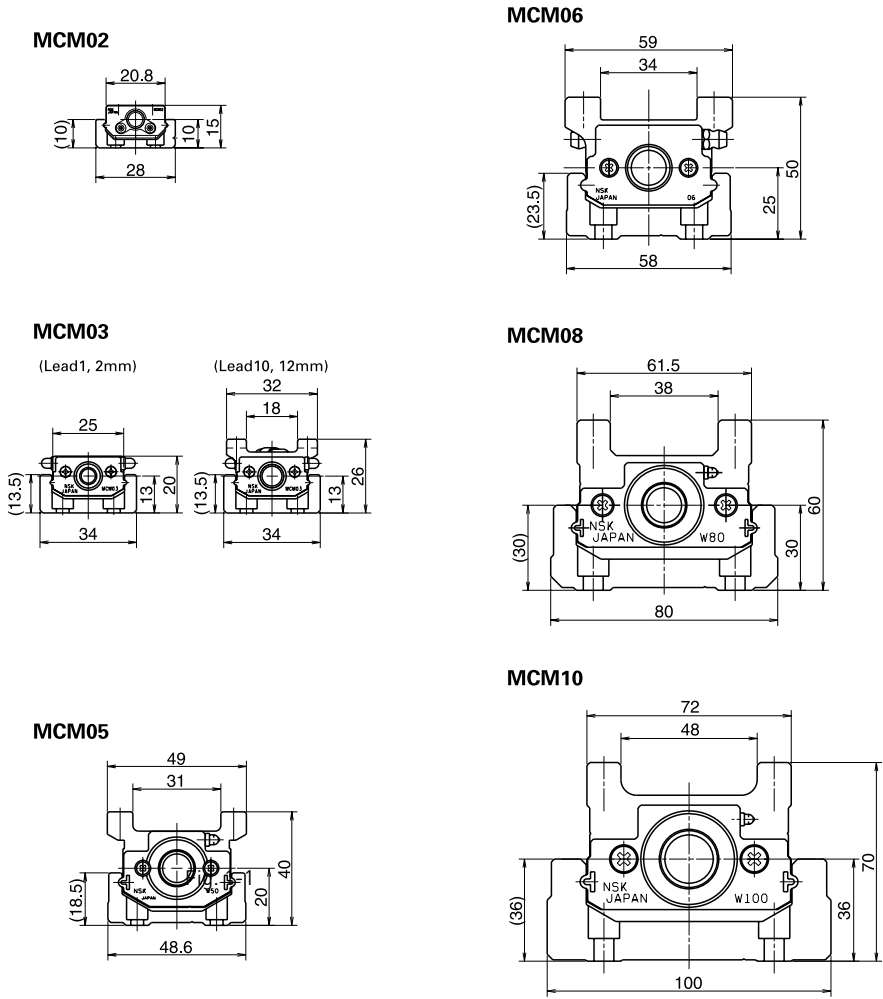


Fig. 1-1

Accuracy	Long Stroke	Size Variation
◎	○	◎
◎	◎	○

◎ = Excellent Performance ○ = Good Performance

(MCH Series Cross-Sections)

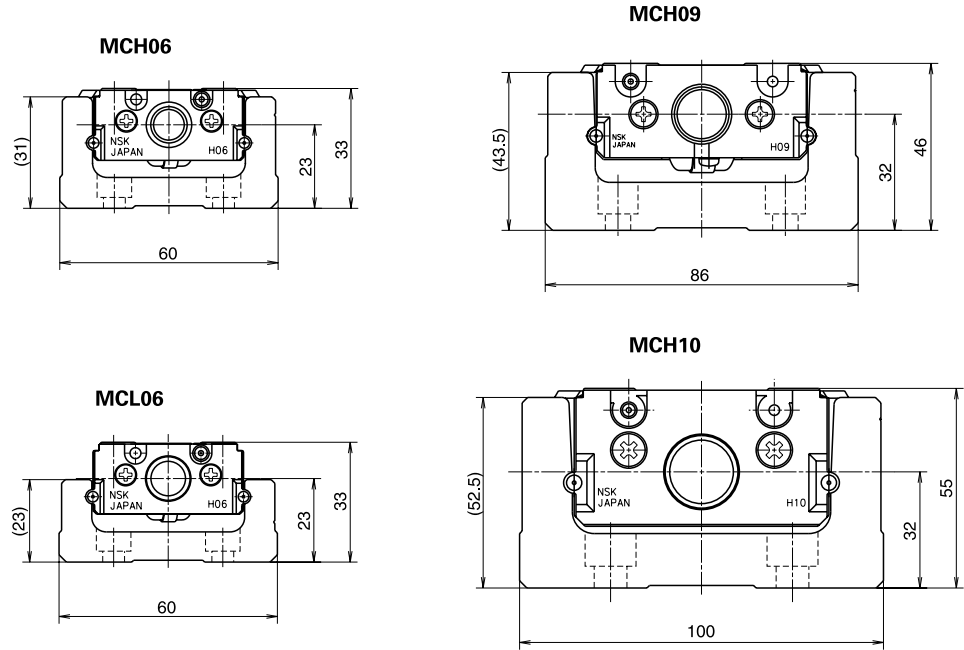


Fig. 1-2

1.3 Optional Components

MCM Series

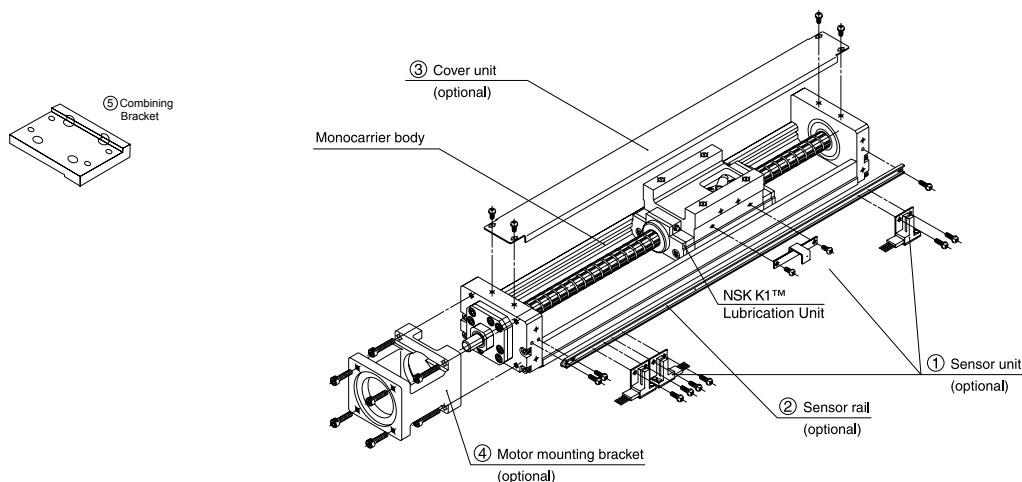


Fig.1-3 Assembly – Optional Components for MCM10 (example)

- ① Sensor unit: Sensors, sensor mounting parts and a sensor unit are available in a set
※ When a sensor unit is used, the full cover unit cannot be used.
 - ② Sensor rail: Rail for sensor mounting is available.
 - ③ Cover unit: Top cover or full cover (includes top cover and side cover) is available.
 - ④ Motor mounting brackets are available for a variety of models.
 - ⑤ Bracket for combining actuators into 2-axis mechanism. When bracket is used, the full cover unit cannot be used.
- ☆ NSK can assemble optional components upon request.

MCH Series

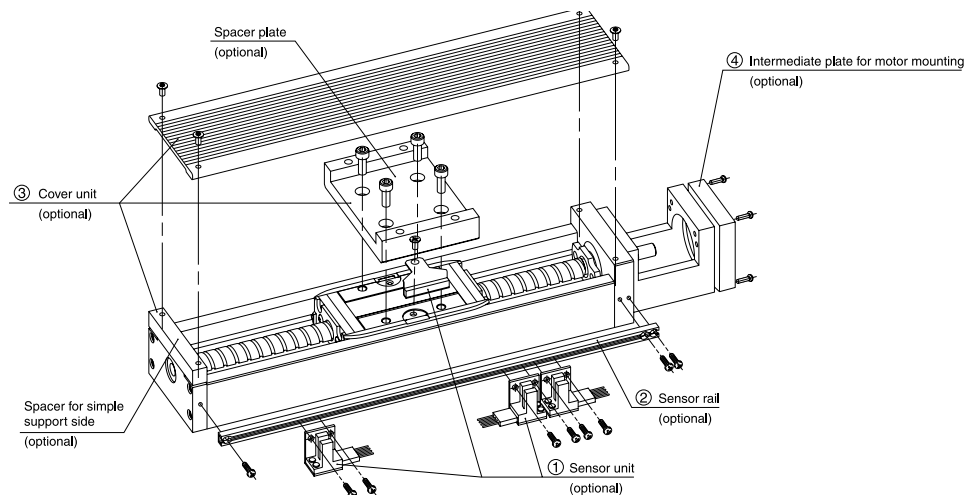


Fig. 1-4 Assembly – Optional Components for MCH10 (example)

- ① Sensor unit: Sensors, sensor mounting parts and a sensor unit are available in a set.
 - ② Sensor rail: Rail for sensor mounting is available.
 - ③ Cover unit: Top cover (includes spacer plate and spacer for simple support side) is available.
 - ④ Intermediate plate for motor mounting available for a variety of models.
- ☆ NSK can assemble optional components upon request.

1.4 Selection of Monocarrier™

1.4.1 Procedures for Selecting Monocarrier™

Select a reference type of Monocarrier™ based on stroke and rigidity (Refer to Fig. 1-6, 1-7).



Select a ball screw lead referring to "1.4.3 Maximum Rotational Speed" so that the rotational speed does not exceed the limit.



Study the loads to be applied to the linear guide and obtain the equivalent load (F_e), substituting them for equation ① or ② on Page 16. Obtain the mean effective load (F_m), substituting them for equation ③ on Page 17, then calculate the life.



Study the loads to be applied to the ball screw and support unit. Obtain the mean effective load (F_m), substituting them for equation ③ on Page 17, then calculate the life.

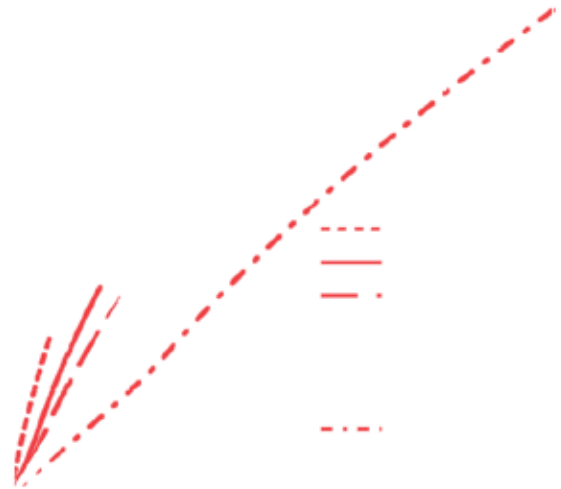


Fig. 1-6 MCM Series Rigidity in Radial Direction

1.4.2. Rigidity

Rigidity of Rail



Fig. 1-5

Table 1-2 Rigidity of Rail

Model No.	Geometrical moment of inertia x 10 ⁴ (mm ⁴)		Center of gravity (mm)	Mass (kg/100mm)
	I _x	I _y	e	w
MCM02	0.097	1.32	3.3	0.11
MCM03	0.300	3.30	4.5	0.18
MCM05	0.780	11.40	6.0	0.31
MCM06	2.140	26.10	7.0	0.57
MCM08	5.900	81.00	9.2	0.88
MCM10	15.600	219.00	12.2	1.52
MCH06	6.500	38.20	10.8	0.67
MCL06	2.580	29.60	7.8	0.56
MCH09	28.700	172.00	15.5	1.48
MCH10	54.000	307.00	18.0	1.93



Fig. 1-7 MCH Series Rigidity in Radial Direction

1.4.3 Maximum Speed

● Maximum Speed of MCM Series

Maximum speed of Monocarrier™ is determined by the critical speed of ball screw shaft and the $d \cdot n$ value. Do not exceed the maximum speeds in the table below.

Table 1-3

	Ball screw lead	Stroke (mm)	Rail length L ₂ (mm)	Maximum speed (mm/s)
MCM02 single slider	1	50	100	50
		100	150	
		150	200	
	2	50	100	100
		100	150	
		150	200	
MCM03 single slider	1	50	115	50
		100	190	
		150	240	
	2	50	115	100
		100	190	
		150	240	
	10	100	190	500
		250	340	
		100	190	
	12	250	340	600
		50	180	
		200	330	
MCM05 single slider	5	50	180	250
		600	730	
		300	430	
	10	600	730	1,000
		300	430	
		600	730	
	30	400	530	2,500
		500	630	
		600	730	
MCM05 double slider	10	60	280	500
		510	730	
		210	430	
	20	510	730	1,000
		50	190	
		500	640	
MCM06 single slider	5	50	190	250
		600	740	
		300	440	
	10	700	840	490
		800	940	
		300	440	
	20	600	740	1,000
		700	840	
		800	940	
MCM06 double slider	5	110	340	250
		410	640	
		110	340	
	10	610	840	500
		710	940	
		210	440	
	20	610	840	1,000
		710	940	
		710	940	

	Ball screw lead	Stroke (mm)	Rail length L ₂ (mm)	Maximum speed (mm/s)
MCM08 single slider	5	50	220	250
		200	370	
		100	270	
	10	700	870	500
		800	970	
		300	470	
	20	700	870	1,000
		800	970	
		400	570	
MCM08 double slider	30	500	670	2,500
		600	770	
		700	870	
	10	80	370	500
		680	970	
		180	470	
MCM10 single slider	20	680	970	1,000
		200	380	
		800	980	
	10	900	1,080	440
		1,000	1,180	
		300	480	
MCM10 double slider	20	800	980	1,000
		900	1,080	
		1,000	1,180	
	30	500	680	2,500
		600	780	
		700	880	
MCM10 double slider	10	800	980	1,510
		70	380	
		670	980	
	20	870	1,180	440
		170	480	
		670	980	
	870	1,180	880	880
		1,180	880	
		1,180	880	

Note: When operating a Monocarrier™ near critical speed or exceeding maximum speed in the table, please consult NSK.

● Maximum Speed of MCH Series

Maximum speed of Monocarrier™ is determined by the critical speed of ball screw shaft and the $d \cdot n$ value. Do not exceed the maximum speeds on the table below.

Table 1-4

	Ball screw lead	Stroke (mm)	Rail length L ₂ (mm)	Maximum speed (mm/s)
MCH06 MCL06 single slider	5	50	150	250
		↕	↕	
		500	600	
	10	50	150	500
		↕	↕	
		500	600	
	20	50	150	1,000
		↕	↕	
		500	600	
MCH06 double slider	5	100	300	250
		↕	↕	
		400	600	
	10	100	300	500
		↕	↕	
		400	600	
	20	100	300	1,000
		↕	↕	
		400	600	
MCH09 single slider	5	200	340	250
		↕	↕	
		600	740	
	10	800	940	210
		↕	↕	
		200	340	
		↕	↕	
	20	600	740	500
		↕	↕	
		800	940	
MCH09 double slider	5	200	340	410
		↕	↕	
		600	740	
	10	800	940	1,000
		↕	↕	
		200	340	
		↕	↕	
	20	600	740	830
		↕	↕	
		800	940	
MCH09 double slider	5	150	440	250
		↕	↕	
		650	940	
	10	150	440	500
		↕	↕	
		650	940	
	20	150	440	1,000
		↕	↕	
		650	940	

	Ball screw lead	Stroke (mm)	Rail length L ₂ (mm)	Maximum speed (mm/s)
MCH10 single slider	10	400	580	500
		↕	↕	
		800	980	
		↕	↕	
		900	1,080	
	20	1,000	1,180	440
		↕	↕	
		1,100	1,280	
		↕	↕	
		1,200	1,380	
MCH10 double slider	10	400	580	1,000
		↕	↕	
		800	980	
		↕	↕	
		900	1,080	
	20	1,000	1,180	870
		↕	↕	
		1,100	1,280	
		↕	↕	
		1,200	1,380	
	10	250	580	500
		↕	↕	
		750	1,080	
		↕	↕	
		850	1,180	
	20	950	1,280	480
		↕	↕	
		1,050	1,380	
		↕	↕	
		250	580	1,000
		↕	↕	
		750	1,080	
		↕	↕	
		850	1,180	
	20	950	1,280	950
		↕	↕	
		1,050	1,380	
		↕	↕	
		250	580	780
		↕	↕	
		750	1,080	
		↕	↕	
		850	1,180	
	20	950	1,280	650
		↕	↕	
		1,050	1,380	
		↕	↕	
		250	580	

Note: When operating a Monocarrier™ near critical speed or exceeding maximum speed in the table, please consult NSK.

1.4.4 Accuracy Grade

The accuracy grade of Monocarrier™ standard inventories is high grade (H), except for lead 1 and 2 mm of MCM02 and MCM03. When you require strokes longer than 1,200 mm, please consult NSK about the accuracy grade.

Table 1-5

(Unit: μm)

Grade	High grade			Precision			
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Backlash	Repeatability	Positioning accuracy	Running Parallelism (vertical)	Backlash
~200	±10	14	20 or less	± 3	20	8	3 or less
~400		16			25	10	
~600		20			30	12	
~700		23			30	15	
~1,000		23			35	15	
~1,200		30			40	20	

1.4.5 Stroke and Ball Screw Lead

1.4.5.1 MCM Series Standard Combinations of Stroke and Ball Screw Lead

Table 1-6 Single Slider

(● mark: Standard Product)

(Unit: mm)

Model No.	MCM02		MCM03				MCM05				MCM06			MCM08				MCM10		
lead stroke	1	2	1	2	10	12	5	10	20	30	5	10	20	5	10	20	30	10	20	30
50	●	●	●	●	●	●	●	●	●		●	●	●	●	●					
100	●	●	●	●	●	●	●	●	●		●	●	●	●	●			●	●	
150	●	●	●	●	●	●	●	●	●		●	●	●	●	●			●	●	
200					●	●	●	●	●		●	●	●	●	●			●	●	
250					●	●	●	●	●		●	●	●	●	●			●	●	
300							●	●	●	●	●	●	●	●	●			●	●	
400							●	●	●	●	●	●	●	●	●			●	●	
500							●	●	●	●	●	●	●	●	●			●	●	●
600							●	●	●	●	●	●	●	●	●			●	●	●
700											●	●	●	●	●			●	●	●
800											●	●	●	●	●			●	●	●
900																		●	●	
1,000																		●	●	

Table 1-7 Double Slider

(● mark: Standard Product)

(Unit: mm)

Model No.	MCM05		MCM06			MCM08		MCM10	
lead stroke	10	20	5	10	20	10	20	10	20
60	●								
70								●	
80									
110	●		●	●					
160	●								
170								●	●
180								●	●
210	●	●	●	●	●				
270								●	●
280								●	●
310	●	●	●	●	●				
370								●	●
380								●	●
410	●	●	●	●	●				
470								●	●
480								●	●
510	●	●		●	●				
570								●	●
580								●	●
610			●	●					
670								●	●
680								●	●
710			●	●					
870								●	●

Please consult NSK about double slider of MCM02 and MCM03.

1.4.5.2 MCH Series Standard Combinations of Stroke and Ball Screw Lead

Table 1-8 Single Slider

● mark: Standard Product (Unit: mm)

Model No.	MCH06			MCH09			MCH10	
lead stroke	5	10	20	5	10	20	10	20
50	●	●	●					
100	●	●	●	●	●	●	●	●
200	●	●	●	●	●	●	●	●
300	●	●	●	●	●	●	●	●
400	●	●	●	●	●	●	●	●
500	●	●	●	●	●	●	●	●
600				●	●	●	●	●
700				●	●	●	●	●
800				●	●	●	●	●
900							●	●
1,000							●	●
1,100							●	●
1,200							●	●

Table 1-9 Double Slider

● mark: Standard Product (Unit: mm)

Model No.	MCH06			MCH09			MCH10	
lead stroke	5	10	20	5	10	20	10	20
100	●	●						
150				●	●			
200	●	●						
250				●	●		●	●
300	●	●						
350				●	●		●	●
400		●	●					
450					●	●	●	●
550							●	●
650					●	●	●	●
750							●	●
950							●	●
1,050							●	●

Table 1-10 Limitations

	Model No.	Lead (mm)	Slider	Stroke (mm)
MCM Series	MCM02	1,2	Single	150
	MCM03	1,2	Single	150
		10,12	Single	350
	MCM05	5,10,20,30*	Single	900
			Double	810
	MCM06	5,10,20	Single	1,000
			Double	910
	MCM08	5,10,20,30*	Single	1,000
			Double	880
MCH Series	MCM10	10,20,30*	Single	1,800
			Double	1,670
	MCH06	5,10,20	Single	600
			Double	500
	MCH09	5,10,20	Single	1,000
			Double	850
	MCH10	10,20	Single	1,800
			Double	1,650
	MCL06	5,10,20	Single	500

*) Applicable only to single slider

1.4.6 Basic Load Rating

1.4.6.1 MCM Series Basic Load Rating

Table 1-11 Basic Load Rating

Model No.	Lead l (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Limit load (N)
			Ball screw C_a	Linear guide C	Support unit C_s	Rated running distance L_R (km)	Ball screw C_{0a}	Linear guide C_0	
MCM02	1	Ø6	340 (High grade) 405 (Precision)	4,910	615	1	555 (High grade) 615 (Precision)	2,120	490
	2		340 (High grade) 405 (Precision)	3,900		2	555 (High grade) 615 (Precision)		
MCM03	1	Ø6	735	10,900	2,670	1	1,230	4,900	1,040
	2		735	8,650		2	1,230		
MCM05	10	Ø8	1,230	6,250	4,400	10	1,690	10,900	1,450
	12		1,230	5,880		12	1,690		
MCM06	5	Ø12	3,760	15,600	6,550	5	6,310	17,000	2,730
	10		2,260	12,400		10	3,780		
MCM08	20	Ø16	2,260	9,850	7,100	20	3,780	22,800	3,040
	30		3,260	8,600		30	5,400		
MCM10	5	Ø15	7,310	25,200	7,600	5	13,500	29,400	3,380
	10		7,060	20,000		10	12,700		
MCM10	20	Ø20	4,560	15,900	7,600	20	7,750	22,700	3,380
	30		7,310	30,800		30	13,500		

Notes • Basic dynamic and static load ratings indicate the values for one slider. • Basic dynamic load rating of the linear guide is the load of perpendicular direction to the axis that allows 90% of a group of the same Monocarriers to operate, "Rated running distance" in the table, that is equivalent to 1 million revolutions of the ball screw and the support unit under the same condition without causing flaking by rolling contact fatigue. • Basic dynamic load rating of the ball screw is a load-to-axial direction that allows 90% of ball screws of a group of the same Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue. • Basic dynamic load rating of the support unit is a constant load-to-axial direction that allows 90% of support units of the same group of Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue. • Basic static load rating is a load that results in combined permanent deformations at the contact points of balls and ball grooves of respective part, which is 0.01% of the diameter.

Table 1-12 Basic Static Moment Load of Linear Guide

Model No.	Lead (mm)	Slider	Basic static moment (N · m)		
			Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
MCM02	1, 2	Single	24	8	8
MCM03	1, 2	Single	68	28	28
	10, 12		92	51	51
MCM05	5, 10, 20, 30*	Single	229	89	89
		Double	455	765	765
MCM06	5, 10, 20	Single	415	174	174
		Double	825	1,220	1,220
MCM08	5, 10, 20, 30*	Single	770	300	300
		Double	1,540	2,050	2,050
MCM10	10, 20, 30*	Single	1,170	425	425
		Double	2,340	2,940	2,940

• Basic static moment of double slider is a value when two sliders equipped with NSK K1™ Lubrication Units are butted against each other.
 • The basic static moment is the value when a rolling contact pressure of balls exceeds 4,000N/mm².
 • If operating under extreme load conditions, please consult NSK for estimation of fatigue life.

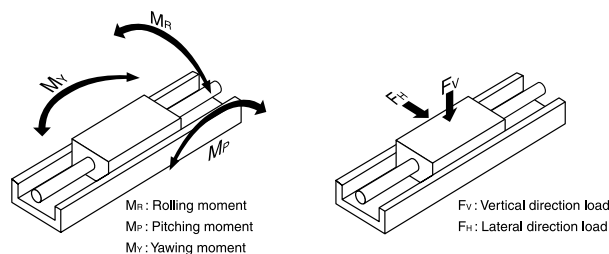


Fig. 1-8

1.4.6.2 MCH Series Basic Load Rating

Table 1-13 Basic Load Rating

Model No.	Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Limit load (N)
			Ball screw C_0	Linear guide C	Support unit C_0	Rated running distance L_R (km)	Ball screw C_{0a}	Linear guide C_0	
MCH06 (MCL06)	5	Ø12	3,000 (High grade) 3,760 (Precision)	22,800	4,400	5	5,410 (High grade) 6,310 (Precision)	16,300	1,450
	10		1,930 (High grade) 2,260 (Precision)	18,100		10	3,160 (High grade) 3,780 (Precision)		
	20		1,930 (High grade) 2,260 (Precision)	14,400		20	3,160 (High grade) 3,780 (Precision)		
MCH09	5	Ø15	6,820 (High grade) 7,100 (Precision)	40,600	7,100	5	13,200 (High grade) 13,000 (Precision)	30,500	3,040
	10		5,110 (High grade) 7,060 (Precision)	32,200		10	9,290 (High grade) 12,700 (Precision)		
	20		3,290 (High grade) 4,560 (Precision)	25,500		20	5,620 (High grade) 7,750 (Precision)		
MCH10	10	Ø20	8,230 (High grade) 10,900 (Precision)	44,600	7,600	10	17,100 (High grade) 21,700 (Precision)	42,000	3,380
	20		5,300 (High grade) 7,060 (Precision)	35,400		20	10,300 (High grade) 12,700 (Precision)		

Notes • Basic dynamic and static load ratings indicate the values for one slider. • Basic dynamic load rating of the linear guide is the load of perpendicular direction to the axis that allows 90% of a group of the same Monocarriers to operate, "Rated running distance" in the table, that is equivalent to 1 million revolutions of the ball screw and the support unit under the same condition without causing flaking by rolling contact fatigue. • Basic dynamic load rating of the ball screw is a load-to-axial direction that allows 90% of ball screws of a group of the same Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue. • Basic dynamic load rating of the support unit is a constant load-to-axial direction that allows 90% of support units of the same group of Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue. • Basic static load rating is a load that results in combined permanent deformations at the contact points of balls and ball grooves of respective part, which is 0.01% of the diameter.

Table 1-14 Basic Static Moment Load of Linear Guide

Model No.	Slider	Basic static moment (N · m)		
		Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
MCH06 (MCL06)	Single	335	133	133
	Double	770	730	730
MCH09	Single	890	385	385
	Double	1,780	2,070	2,070
MCH10	Single	1,460	610	610
	Double	2,920	3,430	3,430

• Basic static moment of double slider is a value when two sliders equipped with NSK K1™ Lubrication Units are butted against each other.
• The basic static moment is the value when a rolling contact pressure of balls exceeds 4,000N/mm².
• If operating under extreme load conditions, please consult NSK for estimation of fatigue life.

1.4.7 Estimation of Life Expectancy

1.4.7.1 Life of Linear Guide

Study the load to be applied to the linear guide of Monocarrier (Fig. 1-9). The equivalent load (F_e) is determined by substituting equation ① or ② depending on the number of sliders.

• Single Slider

$$\textcircled{1} F_e = Y_H F_H + Y_V F_V + Y_R \epsilon_R M_R + Y_P \epsilon_P M_P + Y_Y \epsilon_Y M_Y \dots$$

• Double Slider

$$\textcircled{2} F_e = \frac{Y_H F_H}{2} + \frac{Y_V F_V}{2} + Y_R \epsilon_{Rd} M_R + Y_P \epsilon_{Pd} M_P + Y_Y \epsilon_{Yd} M_Y \dots$$

F_H : Lateral direction load acting on the slider (N)

F_V : Vertical direction load acting on the slider (N)

M_R : Rolling moment acting on the slider (N · m)

M_P : Pitching moment acting on the slider (N · m)

M_Y : Yawing moment acting on the slider (N · m)

$\epsilon_R, \epsilon_{Rd}$: Dynamic equivalent coefficient to rolling moment

$\epsilon_P, \epsilon_{Pd}$: Dynamic equivalent coefficient to pitching moment

$\epsilon_Y, \epsilon_{Yd}$: Dynamic equivalent coefficient to yawing moment

Refer to Table 1-15 about Dynamic equivalent coefficient.

Y_H, Y_V, Y_R, Y_P, Y_Y : 1.0 or 0.5

In equations ① and ② for obtaining equivalent load (F_e), among $F_H, F_V, \epsilon_P M_P, \epsilon_R M_R, \epsilon_Y M_Y$, the maximum load is assumed to be 1.0 and others are to be 0.5.

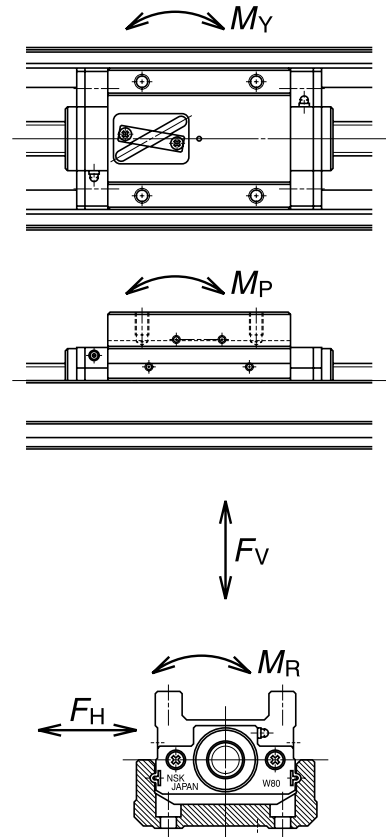


Fig. 1-9 Direction of Load

Table 1-15 Dynamic Equivalent Coefficient

Model No.	MCM02	MCM03		MCM05	MCM06	MCM08	MCM10	MCH06 MCL06	MCH09	MCH10
		lead 1, 2	lead 10, 12							
ϵ_R	95.2	79.4	79.4	52.6	45.5	32.5	27.8	48.3	34.5	28.6
ϵ_P	174.0	113.9	84.2	81.3	65.1	48.8	45.2	75.1	47.9	41.0
ϵ_Y	174.0	114.0	84.0	81.0	65.1	49.0	45.0	75.1	47.9	41.0
ϵ_{Rd}	—	—	—	26.3	22.7	16.3	13.9	24.2	17.2	14.3
ϵ_{Pd}	—	—	—	10.4 (12.2)	9.7 (11.5)	7.6 (8.6)	7.1 (8.0)	11.4 (13.2)	8.11 (9.10)	6.98 (7.82)
ϵ_{Yd}	—	—	—	10.4 (12.2)	9.7 (11.5)	7.6 (8.6)	7.1 (8.0)	11.4 (13.2)	8.11 (9.10)	6.98 (7.82)

Note: Parenthesized figures are dynamic equivalent coefficient in case of the Monocarrier™ without NSK K1™ lubrication unit.

In a case when the load acting on the slider may fluctuate (in general, M_x , M_y may fluctuate with the acceleration/deceleration of the slider), the mean effective load is determined by Eq. ③.

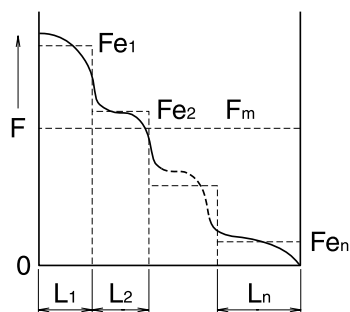


Fig. 1-10 Stepwise Fluctuating Load

Travelling distance under the equivalent load Fe_1 : L_1
 Travelling distance under the equivalent load Fe_2 : L_2

 Travelling distance under the equivalent load Fe_n : L_n

$$F_m = \sqrt[3]{\frac{1}{L} (Fe_1^3 L_1 + Fe_2^3 L_2 + \dots + Fe_n^3 L_n)} \quad \text{③}$$

F_m : Mean effective load of fluctuating loads
 L : Total travelling distance

The life of the linear guide is calculated by Eq. ④

$$L = L_a \left[\frac{C}{f_w \cdot F_m} \right]^3 \quad \text{④}$$

L : Life of the linear guide (km)
 F_m : Mean effective load acting on the linear guide (N)
 C : Basic dynamic load rating of the linear guide (N)
 L_a : Travelling distance (km)
 f_w : Load factor (Refer to Table 1-16)

When the estimated life does not meet the required life, the life of the linear guide is to be calculated again after the following measures are taken:

1. Change from the single slider type to double slider type.
2. Use a larger size Monocarrier™.

1.4.7.2 Life of Ball Screw (Support Unit)

The mean effective load is determined from the axial loads.

For calculation of the mean effective load, use Eq. ③

The life of the ball screw is calculated by Eq. ⑤.

$$L = \ell \times \left[\frac{C_a}{f_w \cdot F_m} \right]^3 \times 10^6 \quad \text{⑤}$$

ℓ : Lead of ball screw (mm)

L : Life of ball screw (mm)

C_a : Basic dynamic load rating of the ball screw (N)

F_m : Mean effective load acting on the ball screw (N)

f_w : Load factor (Refer to Table 1-16)

The life of the support unit is calculated by Eq. ⑤.

If the life of the ball screw/support unit does not meet the required life, use a larger size Monocarrier™.

Upon calculations as mentioned above, the selection of the Monocarrier™ is completed.

Table 1-16 Values of Load Factor f_w

Operating Conditions	Load Factor f_w
At smooth operation with no mechanical shock	1.0~1.2
At normal operation	1.2~1.5
At operation with mechanical shock and vibrations	1.5~3.0

1.4.8 Example of Life Estimation

This section offers an example of how to estimate the life of the Monocarrier based on the life of each component.

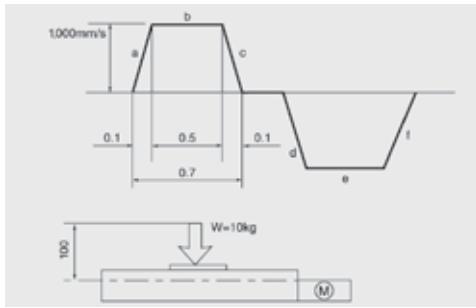


Fig. 1-11

1. Use condition

Stroke	: 600mm
Maximum Speed	: 1,000mm/s
Load Mass	: W=10kg
Acceleration	: g=9.8m/s ²
Setting Position	: Horizontal
Operating Profile	: See above figure

2. Selection of Model Number (Interim Selection)

First, select a greater ball screw lead since the maximum speed is 1,000mm/s. The interim selection is MCM06060H20K00, a single slider specification MCM06 that has a 600mm stroke, since the stroke is 600mm.

3. Calculation

3-1. Linear Guide

3-1-1. Fatigue Life

Multiply the result of the Eq. ① by the dynamic equivalent coefficient (Table 1-15 single slider) to convert the load volume. From the above operation profile,

- i) Constant speed $Fe_1 = Y_v F_v = Y_v W_0 = 1 \cdot 10 \cdot 9.8 = 98 \text{ N}$
- ii) Accelerating $Fe_2 = Y_v F_v + Y_p \epsilon_p M_p = 0.5 \cdot 10 \cdot 9.8 + 1 \cdot 65.1 \cdot 0.1 \cdot 100 = 700 \text{ N}$
- iii) Decelerating $Fe_3 = Y_v F_v + Y_p \epsilon_p M_p = 0.5 \cdot 10 \cdot 9.8 + 1 \cdot 65.1 \cdot 0.1 \cdot 100 = 700 \text{ N}$

Mean effective load F_m

$$F_m = \sqrt[3]{\frac{1}{L} (Fe_1^3 \cdot L_1 + Fe_2^3 \cdot L_2 + Fe_3^3 \cdot L_3)}$$

$$= \sqrt[3]{\frac{1}{600} (98^3 \cdot 500 + 700^3 \cdot 50 + 700^3 \cdot 50)}$$

$$= 387 \text{ N}$$

$$L = \left(\frac{C}{f_w \cdot F_m} \right)^3 \times L_a$$

$$= \left(\frac{15,900}{1.2 \cdot 387} \right)^3 \times 20$$

$$= 8.02 \times 10^5 \text{ km}$$

3-1-2. Static safety factor: Divide the basic static load rating by the maximum load.

$$F_s = \frac{C_0}{F_e} = \frac{C_0}{F_{e2}} = \frac{17,000}{700} = 24.2$$

3-2. Ball Screw

3-2-1. Fatigue Life: Obtain the axial load of each stage of operation, referring to the operation profile, and then calculate the mean load.

By the process above,

- i) Constant speed
 $Fe_1 = \mu \cdot W \cdot g = 0.01 \cdot 10 \cdot 9.8 = 0.98$
- ii) Accelerating
 $Fe_2 = Fe_1 + W = 101 \text{ N}$
- iii) Decelerating
 $Fe_3 = Fe_1 - W \alpha = 99 \text{ N}$

Axial mean effective load F_m

$$F_m = \sqrt[3]{\frac{1}{L} (Fe_1^3 \cdot L_1 + Fe_2^3 \cdot L_2 + Fe_3^3 \cdot L_3)}$$

$$= \sqrt[3]{\frac{1}{600} (0.98^3 \cdot 500 + 101^3 \cdot 50 + 99^3 \cdot 50)}$$

$$= 55 \text{ N}$$

$$L = \left(\frac{C_a}{f_w \cdot F_m} \right)^3 \times \ell \times 10^6$$

$$= \left(\frac{4,560}{1.2 \cdot 55} \right)^3 \times 20 \times 10^6 \text{ (mm)}$$

$$= 6.5 \times 10^6 \text{ km}$$

3-2-2. Static safety factor: Divide the basic static load rating by the maximum axial load.

$$F_s = \frac{C_{0a}}{F_e} = \frac{C_{0a}}{F_{e2}} = \frac{7,750}{101} = 76.7$$

3-2-3. Maximum rotational speed: According to the table of maximum rotational speed on page C7, MCM06 with 20mm lead and 600mm stroke is possible to operate under the maximum speed of 1,000mm/s.

3-3. Support Unit

3-3-1. Fatigue life: Use the axial load $F_m = 55 \text{ N}$, resulting from the calculation 3-2-1 (above).

$$L = \left(\frac{C_a}{f_w \cdot F_m} \right)^3 \times \ell \times 10^6 = \left(\frac{6,550}{1.2 \times 55} \right)^3 \times 20 \times 10^6 \text{ (mm)}$$

$$= 1.95 \times 10^7 \text{ km}$$

3-3-2. Static safety factor: Divide the limit load by the maximum axial load.

$$F_s = \frac{C_{0a}}{F_e} = \frac{C_{0a}}{F_{e2}} = \frac{2,730}{101} = 27.0$$

3-4. Result

MCM06060H20K00	Linear guide	Ball screw	Support unit
Fatigue life	8.02 × 105km	6.5 × 106km	1.95 × 107km
Static safety factor	24.2	76.7	27

In this case, the linear guide has the shortest fatigue life of the components. Therefore, the linear guide fatigue life is used as the life of the Monocarrier. The interim selection of MCM06060H20K00, that is chosen based on the use conditions, satisfies the required life.

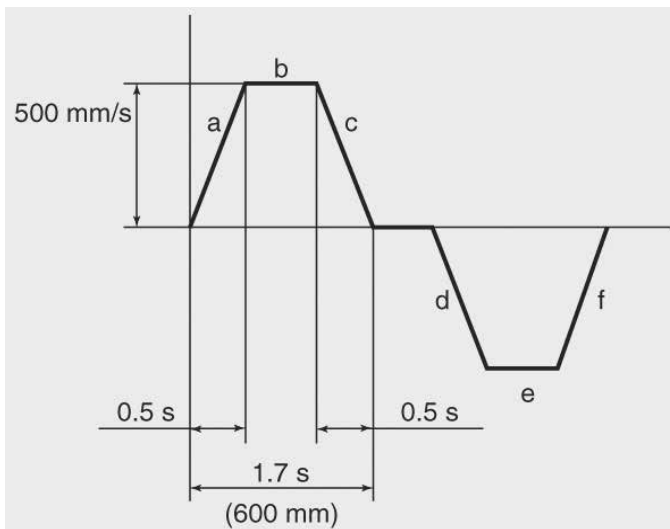


Fig. 1-12

1. Use condition

Stroke : 600 mm
Maximum speed : 500 mm/s
Load mass : $W = 20$ kg
Acceleration : 9.8 m/s^2
Setting position : Horizontal
Operating profile : See above figure

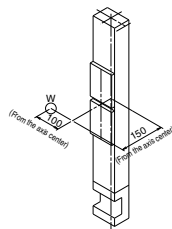


Fig. 1-13

2. Selection of Model number (Interim Selection)

Select a 10 mm lead ball screw as the maximum speed is 500 mm/s.

The interim selection is MCM08068H10D00 as a double slider specification of MCM08 has 680 mm stroke, and the setting position is vertical.

4. Calculation

4-1. Linear guide

4-1-1. Fatigue life: Multiply the result of the Eq. 2) by the dynamic equivalent coefficient (Table 1-15 double slider) to convert the load volume. From operation profile (Fig. 1-12), the acceleration is 1 m/s^2 .

$$\text{i) Constant speed} \quad Fe_1 = Y_p \times \epsilon_{pd} \times M_p + Y_v \times \epsilon_{vd} \times M_v = 1 \cdot 7.6 \cdot 20 \cdot 9.8 \cdot 0.15 + 0.5 \cdot 7.6 \cdot 20 \cdot 9.8 \cdot 0.1 = 298 \text{ N}$$

$$\text{ii) Accelerating} \quad Fe_2 = Y_p \times \epsilon_{pd} \times M_p + Y_v \times \epsilon_{vd} \times M_v = 1 \cdot 7.6 \cdot 20 \cdot (9.8 + 0.15) \cdot 0.15 + 0.5 \cdot 7.6 \cdot 20 \cdot (9.8 + 1.0) \cdot 0.1 = 329 \text{ N}$$

$$\text{iii) Decelerating} \quad Fe_3 = Y_p \times \epsilon_{pd} \times M_p + Y_v \times \epsilon_{vd} \times M_v = 1 \cdot 7.6 \cdot 20 \cdot (9.8 - 1.0) \cdot 0.15 + 0.5 \cdot 7.6 \cdot 20 \cdot (9.8 - 1.0) \cdot 0.1 = 268 \text{ N}$$

Mean effective load F_m

$$\begin{aligned} F_m &= \sqrt[3]{\frac{1}{L} (Fe_1^3 \cdot L_1 + Fe_2^3 \cdot L_2 + Fe_3^3 \cdot L_3)} \\ &= \sqrt[3]{\frac{1}{600} (298^3 \cdot 350 + 329^3 \cdot 125 + 268^3 \cdot 125)} \\ &= 300 \text{ N} \\ L &= L_a \times \left(\frac{C}{f_w \cdot F_m} \right)^3 \\ &= 10 \times \left(\frac{24400}{1.2 \cdot 300} \right)^3 \\ &= 3.11 \times 10^6 \text{ km} \end{aligned}$$

4-1-2. Static safety factor: Divide the basic static load rating by the maximum load.

$$F_s = \frac{C_0}{F_e} = \frac{C_0}{F_{e2}} = \frac{22800}{329} = 69.3$$

4-2. Ball Screw

4-2-1. Fatigue life: Obtain the axial load of each stage of operation referring to the operation profile, then calculate the mean load.

$$\text{i) Constant speed} \quad Fe_1 = W \cdot g = 20 \cdot 9.8 = 196 \text{ N}$$

$$\text{ii) Accelerating} \quad Fe_2 = Fe_1 + W \cdot \alpha = 196 + 20 \cdot 1 = 216 \text{ N}$$

$$\text{iii) Decelerating} \quad Fe_3 = Fe_1 - W \cdot \alpha = 196 - 20 \cdot 1 = 176 \text{ N}$$

Axial mean effective load F_m

$$F_m = \sqrt[3]{\frac{1}{L} (Fe_1^3 \cdot L_1 + Fe_2^3 \cdot L_2 + Fe_3^3 \cdot L_3)}$$

$$= \sqrt[3]{\frac{1}{600} (196^3 \cdot 350 + 216^3 \cdot 125 + 176^3 \cdot 125)}$$

$$= 197 \text{ N}$$

$$L = \ell \times \left(\frac{C_a}{f_w \cdot F_m} \right)^3 \times 10^6$$

$$= 10 \times \left(\frac{7060}{1.2 \cdot 197} \right)^3 \times 10^6 \text{ (mm)}$$

$$= 2.66 \times 10^5 \text{ km}$$

4-2-2. Static safety factor: Divide the basic static load rating by the maximum axial load.

$$F_s = \frac{C_{0a}}{Fe} = \frac{C_{0a}}{Fe_2} = \frac{12700}{216} = 58.7$$

4-3. Support unit

4-3-1. Fatigue life: Use the axial load $F_m = 197 \text{ N}$, that is the result of above calculation 3-2-1.

$$L = \ell \times \left(\frac{C_a}{f_w \cdot F_m} \right)^3 \times 10^6 = 10 \times \left(\frac{7100}{1.2 \times 197} \right)^3 \times 10^6 \text{ (mm)}$$

$$= 2.70 \times 10^5 \text{ km}$$

4-3-2. Static safety factor: Divide the limit load by the maximum axial load.

$$F_s = \frac{C_{0a}}{Fe} = \frac{C_{0a}}{Fe_2} = \frac{3040}{216} = 14.0$$

4-4. Result

MCM08068H10D00	Linear guide	Ball screw	Support unit
Fatigue life	$3.11 \times 10^5 \text{ km}$	$2.66 \times 10^5 \text{ km}$	$2.70 \times 10^5 \text{ km}$
Static safety factor	69.3	58.7	14.0

1.5 Maintenance

1.5.1 Maintenance Method

1. For a standard Monocarrier™, we pack grease in the slider, linear guides and ball screw.
2. The Monocarriers are equipped with NSK K1™ Lubrication Unit as a standard feature, allowing it to operate for 5 years or 10,000km (whichever comes first) without any maintenance. However, replenishing the grease may extend its life substantially.
3. NSK K1™ Lubrication Unit is ideal in environments where oily dust exists. However, the life may be shorter than the case described in section 2 (above). In this case, it may be necessary to replenish the grease more frequently.
4. Nozzle for NSK grease gun exclusive for the MCH Monocarrier™ is available as an option.

NSK reference number: NSK HGP NZ8

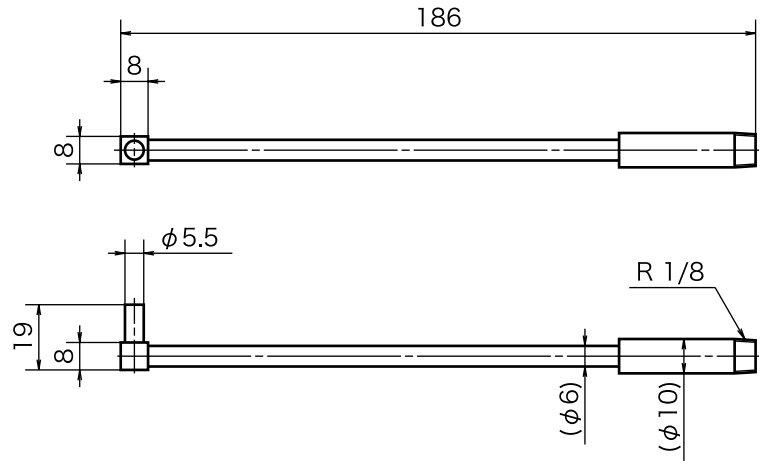


Fig. 1-14 NSK HGP NZ8

Precautions for Handling

1. Please consult with NSK when the motor is coupled to the ball screw using a pulley because there is a restriction on the allowable load to the end of the ball screw shaft.
2. To extend the high performance of NSK K1™ Lubrication Unit, please observe the following:

- | | | |
|----------------------|---|------|
| 1. Temperature range | Ambient temperature: | 50°C |
| | Max. instantaneous temperature: | 80°C |
| 2. Use of chemicals | Never leave a Monocarrier™ in close proximity to grease - removing organic solvents such as hexane or thinner. Never immerse it in an anti-rust solvent that contains kerosene. | |

Note: Other oils, such as water-based and oil-based cutting oil and grease, do not cause any problems.

1.5.2 NSK K1™ Lubrication Unit

NSK K1™ Lubrication Unit exhibits outstanding features, confirmed by abundant experimental data, along with the proven performance of linear guides and ball screws that are equipped with NSK K1™ Lubrication Unit.

(1) High-Speed Durability Test of Linear Guides Without Lubricant

Results of high-speed durability testing of linear guide without lubricant are shown in Fig. 1-15. While the linear guide cannot be operated without lubricant for even short periods without damage, the installation of the NSK K1™ Lubrication Unit permits the linear guide to run over 25,000 km without any problem.

Conditions	Test piece: LH30AN (Preload Z1) Speed: 3.3 m/s Stroke: 1,800 mm
No lubricant	All grease removed
NSK K1™ Lubricant Unit	All grease removed + NSK K1™



Fig. 1-15 Results of High-Speed Durability Test of Linear Guides Without Lubricant

(2) High-Speed Durability Test of Ball Screws Without Lubricant

Results of high-speed durability testing of ball screw without lubrication are shown in Fig.1-16. While the ball screw cannot be operated without a lubricant at 8.5 km without damage, the installation of the NSK K1™ Lubrication Unit permits the ball screw to run over 21,000 km without any problem.

Conditions	Test piece: BS2020 (ball screw) Shaft diameter: 20 mm Lead: 20 mm Load: none Speed: 1.3m/s (4,000 min-1) Stroke: 600 mm
No lubricant	All grease removed
NSK K1™ Lubrication Unit	All grease removed + NSK K1™



Fig. 1-16 Results of High-Speed Durability Test of Ball Screws Without Lubricant

- NSK K1™ Lubrication Unit for food processing is available.

For safety equipment of food processing and medical care, NSK provides the Monocarrier™ equipped with special NSK K1™ Lubrication Unit that is made of compatible material under FDA regulations.

Dimensions are the same as the standard NSK K1™ Lubrication Unit and special handling care is not required.

1.6 NSK Clean Grease LG2 Specification

● Features

This grease was developed by NSK to be exclusively used for linear guides and ball screws in clean rooms. Compared to the fluoride grease that is commonly used in clean rooms, LG2 has several advantages such as: higher in lubrication function, longer lubrication life, more stable torque (resistant to wear) and higher rust prevention.

In dust generation, LG2 is more than equal to fluoride grease in keeping dust volume low. Since the base oil is not a special oil but a mineral oil, LG2 can be handled in the same manner as general grease.

● Applications

LG2 is lubrication grease for rolling contact machine components such as linear guides and ball screws for processing equipment for semiconductors and LCD which require a highly clean environment at normal pressures at normal temperatures. It cannot be used in a vacuum environment.

● Nature

Thickener	Lithium soap base
Base oil	Mineral oil + Synthetic hydrocarbon oil
Consistency	207
Dropping point	200°C
Volume of evaporation	1.40% (99°C, 22hr)
Copper plate corrosion test	Satisfactory (Method B, 100°C, 24hr)
Oil separation	0.8% (100°C, 24hr)
Base oil kinematic viscosity	30mm ² /s (40°C)

1.7 Characteristics and Evaluation Method

1.7.1 Positioning Accuracy

Perform positioning successively from the reference position in a specific direction. Measure the difference between the actual and desired travel distances for each point from the reference position. Repeat this measurement seven times to determine the average value. Measure the average value over the entire travel distance



Fig. 1-17

at the intervals specified for each model and take the maximum difference of the average values determined at respective positions as the measured value.

1.7.2 Repeatability

Repeat positioning at any point seven times from the same direction to measure the stopping position and determine one half of the maximum difference of readings. Repeat this measurement over the entire travel distance at the intervals specified for each model. Take the maximum difference of the determined values as the measured value. Express one half of the maximum difference with a plus or minus + sign.

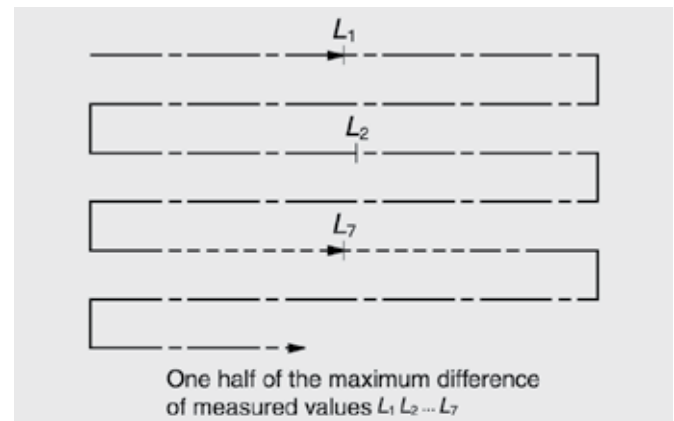


Fig. 1-18

1.7.3 Running Parallelism (Vertical Direction)

We specify the parallelism of slider to the datum bottom surface of rail. An indicator is moved in the axial slider making its stylus slightly touching on the rail bottom surface. The slider is moved in the axial direction for the checking. We define the total indicator reading as the running parallelism. During the checking, the rail is not fixed to the table base. Please be aware that, in general application, the rail is fixed to the machine base, and thus the wobbly rolling error will be added to the running parallelism.

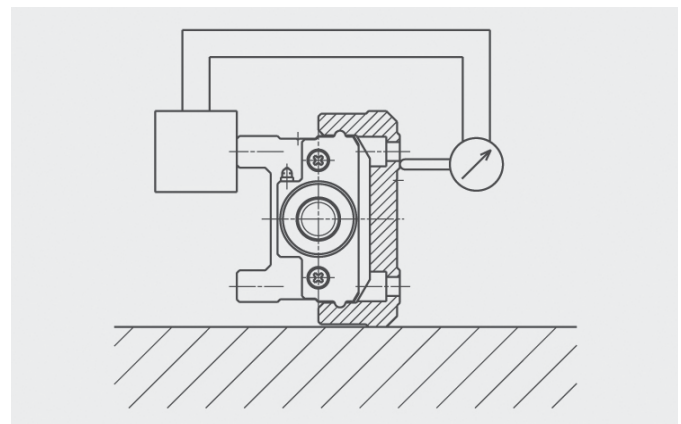


Fig. 1-19 Setting of Indicator

1.8 Special Specifications

Please consult NSK if your requirement is not in the standard products.

(1) Surface Treatment

- Fluoride low temperature chrome plating

Note: Ball screw parts (including low temperature chrome plating.)

(2) Special Machining (Processing)

i) Shaft end processing

- Key way processing
- One flat or two flats processing

ii) Dowel pin hole processing

- Slider
- Rail

Note: Due to interference with the internal construction, the position of dowel pin hole is limited. Please consult with NSK about the pin position.

(3) Motor Bracket and Intermediate Plate for Motor Mounting

- We can provide motor mounting brackets and intermediate plates that are not listed in the catalog.
- We can attach motor upon request if the motor is provided or specified in advance.

Note: Motion check of the motor is unavailable.

(4) Reversed Motor Mount

The reversed motor mount is available. Please consult NSK.

Notes: 1) We do not check motor running condition.

2) Please refer to the bottom of page C85 to C87 for the configuration of reversed motor mounting of the MCH series.

(5) Right and Left Turn Thread

Right and left turn ball screw is available.

Please consult with NSK for available leads.

(6) Ball-Screw-Less Specification (Only Linear Guide Part)

A ball-screw-less rail part with the same cross section of standard Monocarriers is available for a driven linear guide. It will lessen a height adjustment work compared with a construction with two standard Monocarriers.

Note: Height grinding adjustment of the two axes assembly is not available.

1.9 Sensor Specification
1.9.1 Proximity Switch

Use of OMRON E2S-W13, E2S-W14

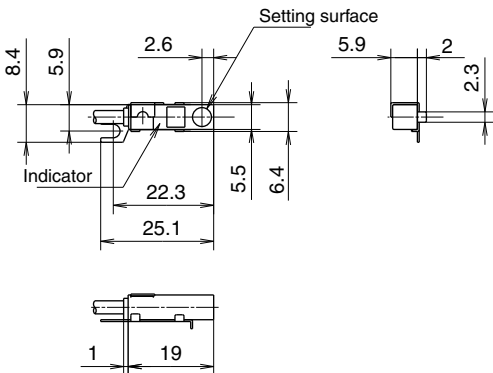
Item	E2S-W13 type	E2S-W14 type
Setting surface	Front face	
Sensing distance	1.6mm ± 15%	
Setting distance	0 to 1.2mm	
Differential travel	10% max. of sensing distance	
Detectable object type	Ferrous metal	
Standard sensing object	Iron, 12 x 12 x 1mm	
Response frequency	1 kHz min.	
Power supply voltage (operating voltage range)	12 to 24 V DC, ripple (p-p): 10% max. (10 to 30 V DC)	
Current consumption	13 mA max. at 24 V DC with no load	
Control output (Switching capacity)	NPN open collector output 50 mA max. (30 V DC max.)	
Control output (Residual voltage)	1.0 V max. with a load current of 50 mA and a cable length of 1 m	
Indicator	Operation indicator (orange)	
Operating status (with sensing object approaching)	NO (open contact)	NC (closed contact)
Wire lead length	1000 mm	

- Notes:
- 1. Do not make a wrong connection.
 - 2. Please contact NSK for PNP output type.

Movement Mode	Output Type	Type	Time Chart	Output Circuit
---------------	-------------	------	------------	----------------



E2S-W13 (Normally open contact)
E2S-W14 (Normally close contact)
The external appearances are the same.



1.9.2 Photo Sensor

Use of OMRON EE-SX674 and EE-SX674P

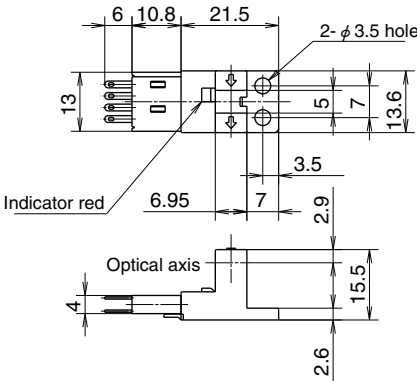
Item	EE-SX674 type (NPN) EE-SX674P type (PNP)
Slot width	5mm
Standard reference object	Opaque: 2 x 0.8mm
Differential distance	0.025mm
Light source	GaAs infrared LED with a peak wavelength of 940 nm
Indicator (without detecting object)	ON GaP red LED (peak emission wavelength: 690 nm)
Supply voltage	5 to 24VDC ±10%, ripple: (p-p) 10% max.
Current consumption	35 mA max.
Control output	NPN open collector output models: At 5 to 24 VDC: 100 mA load current
Response frequency	1kHz max. (3kHz typ.)
Ambient illumination	Fluorescent light: 1,000 lx max.
Ambient temperature	Operating: -25°C to 55°C (-13°F to 131°F) Storage: -30°C to 80°C (-22°F to 176°F)
Ambient humidity	Operating: 5 to 85%RH Storage: 5 to 95%RH
Connecting method	EE-1001/1006 Connectors; soldering terminals

Notes: 1. Do not make a wrong connection.
2. Please contact NSK for PNP output type.

Type	Movement Mode	Time Chart	Connection Terminal	Output Circuit
------	---------------	------------	---------------------	----------------



EE-SX674 (Sensor)
EE-1001 (Connector)
A connector is mounted to the sensor in the right figure.





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2 MCM Series

2.1 MCM Series Reference Number Coding

[Body]

MC	M	08	040	H	10	K	0	0
MONOCARRIER	SERIES	NOMINAL SIZE	STROKE	ACCURACY GRADE	BALL SCREW LEAD	SLIDER SPECIFICATION	GREASE SPECIFICATION	NSK MANAGEMENT NUMBER
MC: Monocarrier	M: MCM Series	Rail width, unit: 10 mm	Unit: 10 mm	H: High Precision P: Precision Grade	Unit: mm	K: Single slider D: Double slider	0: Standard AS2 B: Clean Grease LG2	

[With Optional Accessories]

MC	E	08	040	H	10	K	0	0	K	0	0	0
	OPTIONAL ACCESSORIES								NSK MANAGEMENT NUMBER	SENSOR UNIT	COVER UNIT	MOTOR BRACKET
	E: With Optional Accessories											

Note: Optional components are available separately.

Table 2-1 Sensor Unit (See pages 45-48)

Reference Number Code	Specification	Reference Number
0	N/A	—
1	Proximity switch (normally close contact 3 pieces)	MC - SRxx - 10
2	Proximity switch (normally open contact 3 pieces)	MC - SRxx - 11
3	Proximity switch (normally open contact 1 piece, normally close contact 2 pieces)	MC - SRxx - 12
4	Photo sensor 3 piece	MC - SRxx - 13

Note xx: Reference number

Table 2-2 Cover Unit (See pages 49-50)

Reference Number Code	Specification	Reference Number
0	N/A	—
1	With top cover	MC - CVxxxxx - 01 (02) ※
2	Full cover	MC - CVxxxxx - 00

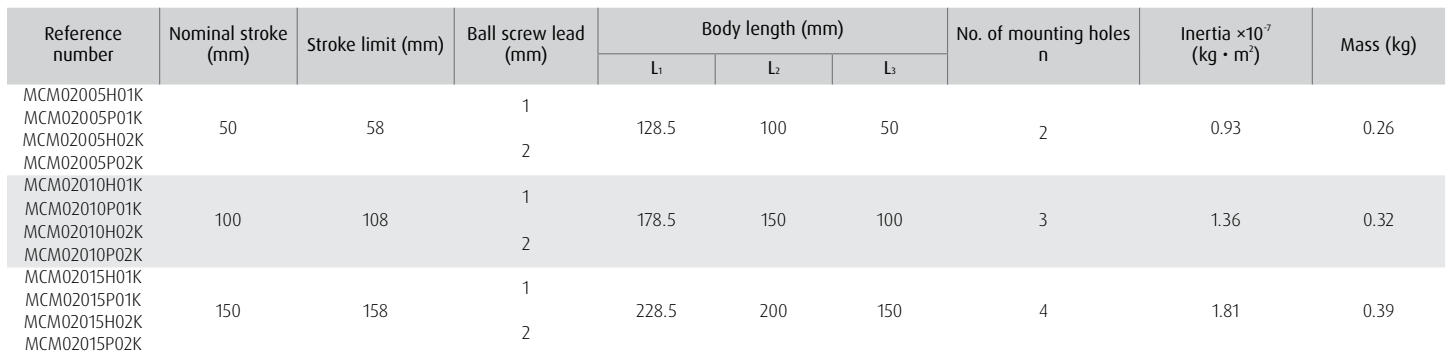
Note ※ : Monocarrier "-02" is only used for MCM03.

Note xxxxx: Reference number and stroke number

Table 2-3 The Reference Number of Motor Bracket (See pages 51-72)

Reference Number Code	Reference Number				
	MCM03	MCM05	MCM06	MCM08	MCM10
0	N/A	N/A	N/A	N/A	N/A
1	MC-BK03-146-00	MC-BK05-145-00	MC-BK06-145-00	MC-BK08-145-00	MC-BK10-170-00
2	MC-BK03-148-01	MC-BK05-146-00	MC-BK06-146-00	MC-BK08-146-00	MC-BK10-170-01
3	MC-BK03-231-00	MC-BK05-148-00	MC-BK06-148-00	MC-BK08-160-00	MC-BK10-190-00
4	—	MC-BK05-160-00	MC-BK06-160-00	MC-BK08-170-00	MC-BK10-270-00
5	—	MC-BK05-250-00	MC-BK06-170-00	MC-BK08-170-01	—
6	—	—	MC-BK06-170-01	MC-BK08-190-00	—
7	—	—	MC-BK06-250-00	MC-BK08-250-00	—
8	—	—	—	MC-BK08-270-00	—

MCM02



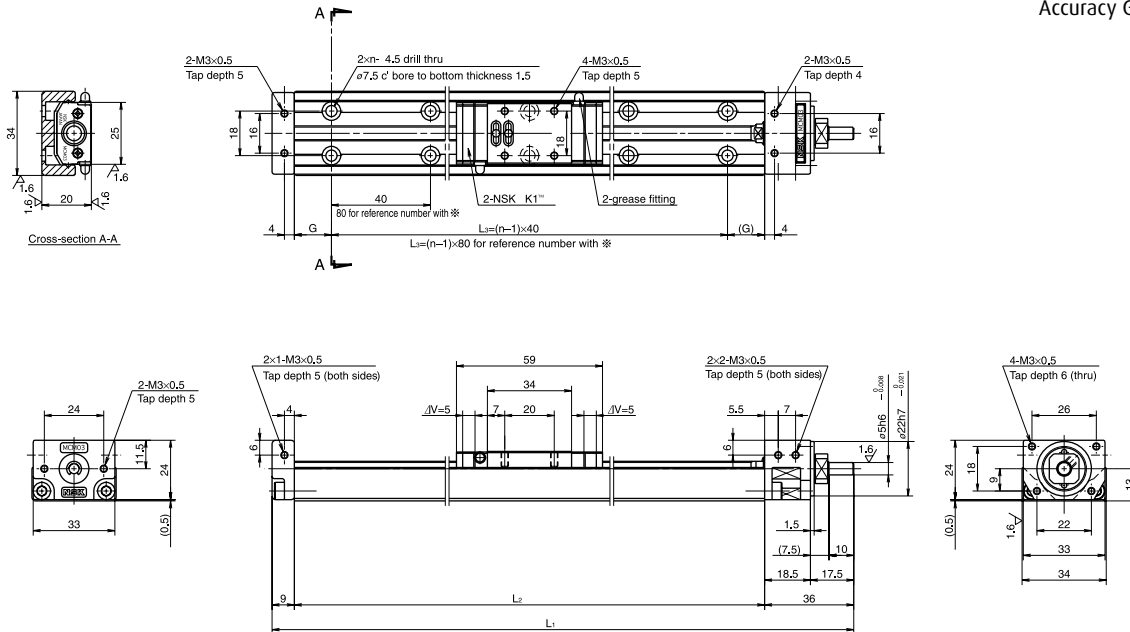
1. Frictional resistance of NSK K1™ Lubrication Unit is included in the dynamic torque in the table.
2. Grease is packed into the ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C _s	Linear guides C	Support unit C _s	Rated running distance L _s (km)	Ball screw C _{0s}	Linear guides C ₀	
1	Ø6	340 (High grade) 405 (Precision)	4,910	615	1	555 (High grade) 615 (Precision)	2,120	490
2		340 (High grade) 405 (Precision)	3,900		2	555 (High grade) 615 (Precision)		

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MCM03

Accuracy Grade: Precision (P)



Dimension of MCM03 (Single Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (K1™ is not equipped)	Ball screw lead (mm)	Body length (mm)				No. of mounting holes n	Inertia $\times 10^{-5}$ (kg $\cdot$ m 2)	Mass (kg)
				L ₁	L ₂	G	L ₃			
※MCM03005P01K00	50	56 (66)	1	160	115	18	80	2	0.015	0.6
※MCM03005P02K00			2							
MCM03010P01K00	100	131 (141)	1	235	190	15	160	5	0.021	0.7
MCM03010P02K00			2							
MCM03015P01K00	150	181 (191)	1	285	240	20	200	6	0.025	0.8
MCM03015P02K00			2							

Bolt hole pitch L₃ on the items marked with ※ is 80 mm.Monocarrier dynamic torque specification (N $\cdot$ cm)

Ball screw lead (mm)	1	0.2-1.7
	2	

1. Frictional resistance of NSK K1™ Lubrication Unit is included in the dynamic torque in the table.
2. Grease is packed into the ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.
4. Optional spacer is required when cover unit or sensor unit for MCM03 with the lead of 1 or 2mm.

Basic Load Rating

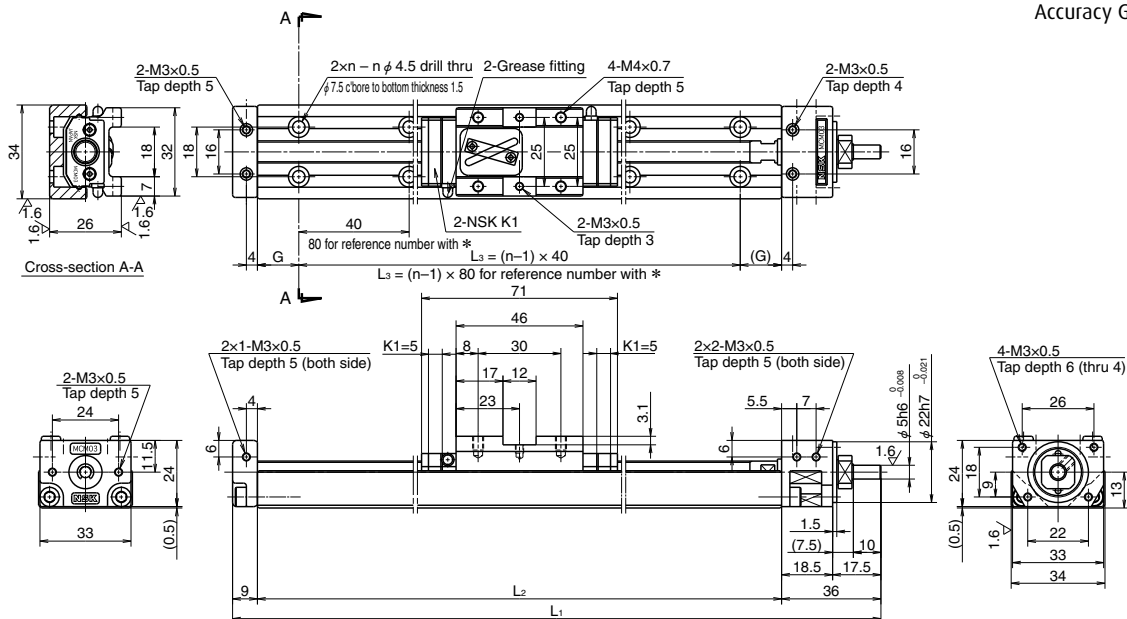
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C _a	Linear guides C	Support unit C _a	Rated running distance L _r (km)	Ball screw C _{0a}	Linear guides C ₀	
1	Ø6	735	10,900	2,670	1	1,230	4,900	1,040
2		735	8,650		2			

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N $\cdot$ m)		
	Rolling M _{R0}	Pitching M _{P0}	Yawing M _{Y0}
Single	68	28	28

MCM03

Accuracy Grade: High Grade (H)



Dimension of MCM03 (Single Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (without K1™)	Ball screw lead (mm)	Body length (mm)				No. of mounting holes n	Inertia ×10 ⁻⁵ (kg · m ²)	Mass (kg)
				L ₁	L ₂	G	L ₃			
*MCM03005H10K00	50	69	10	185	140	30	80	2	0.08	0.6
*MCM03005H12K00		(79)	12							
MCM03010H10K00	100	119	10	235	190	15	160	5	0.092	0.7
MCM03010H12K00		(129)	12							
MCM03015H10K00	150	169	10	285	240	20	200	6	0.105	0.8
MCM03015H12K00		(179)	12							
MCM03020H10K00	200	219	10	335	290	25	240	7	0.118	0.9
MCM03020H12K00		(229)	12							
MCM03025H10K00	250	269	10	385	340	30	280	8	0.131	1.0
MCM03025H12K00		(279)	12							

Note: Bolt hole pitch L₃ on items marked with * is 80 mm.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	10	0.3~3.0
	12	

1. Frictional resistance of NSK K1™ Lubrication Unit is included in the dynamic torque in the table.
2. Grease is packed into the ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

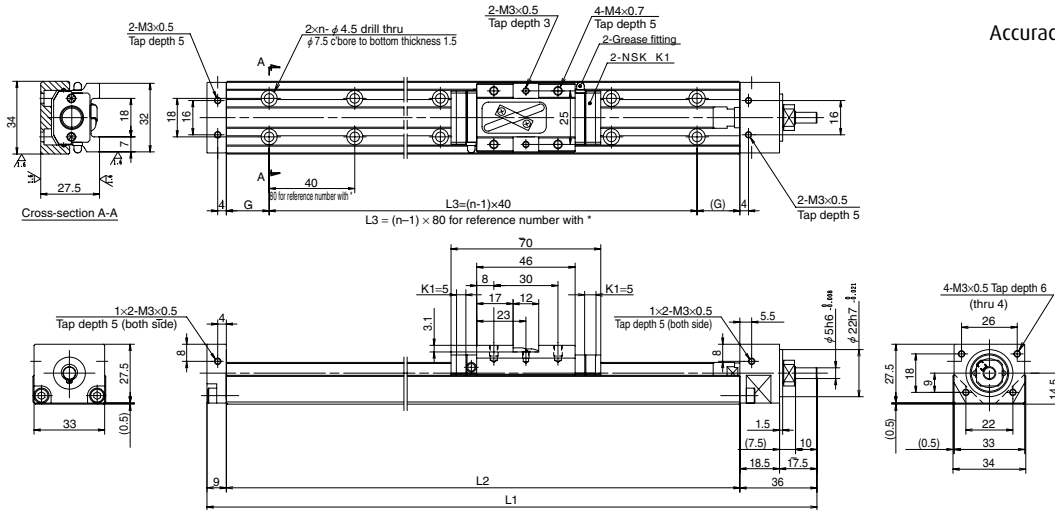
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C ₀	Linear guides C	Support unit C ₀	Rated running distance L _r (km)	Ball screw C _{0s}	Linear guides C ₀	
10	Ø8	1,230	6,250	2,670	10	1,690	6,620	1,040
12		1,230	5,880		12			

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M _{R0}	Pitching M _{P0}	Yawing M _{Y0}
Single	92	51	51

MCM03

Accuracy Grade: High Grade (H)



Dimension of MCM03 (Single Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (without K1 ^m)	Ball screw lead (mm)	Ball screw diameter (mm)	Body length (mm)				No. of mounting holes n	Inertia ×10 ⁻⁴ \ (kg · m ²)	Mass (kg)
					L ₁	L ₂	G	L ₃			
※MCM03005H15K00	50	70 (80)	15	Ø10	185	140	30	80	2	0.183	0.67
MCM03010H15K00	100	120 (130)			235	190	15	160	5	0.222	0.77
MCM03015H15K00	150	170 (180)			285	240	20	200	6	0.260	0.87
MCM03020H15K00	200	220 (230)			335	290	25	240	7	0.298	0.97
MCM03025H15K00	250	270 (280)			385	340	30	280	8	0.336	1.07

Bolt hole pitch L₃ on the items marked with ※ is 80 mm.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	15	0.3~5.6
----------------------	----	---------

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.
4. When a cover unit is added, an optional spacer plate is required.

Basic Load Rating

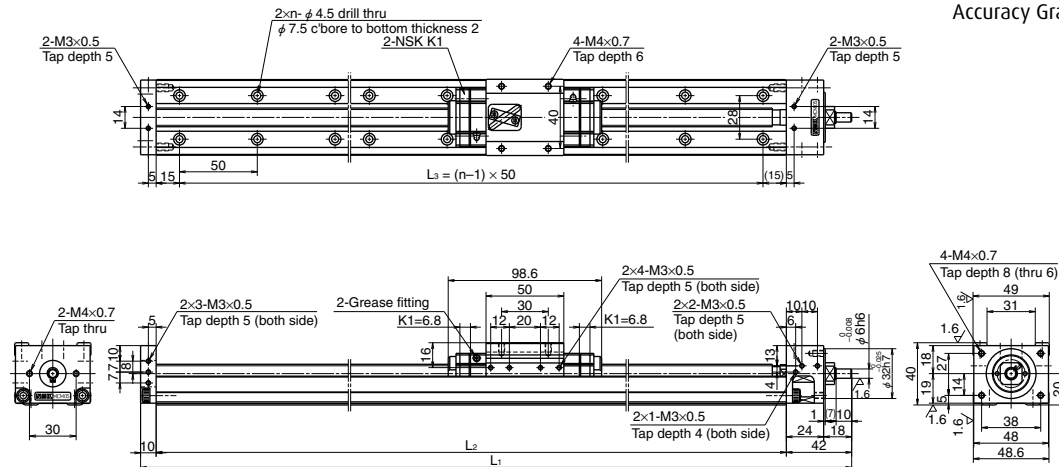
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C ₀	Linear guides C	Support unit C ₀	Rated running distance L _s (km)	Ball screw C _{0a}	Linear guides C ₀	
15	Ø10	1,760	5,440	2,670	15	2,680	6,620	1,040

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M _{R0}	Pitching M _{P0}	Yawing M _{Y0}
Single	92	51	51

MCM05

Accuracy Grade: High Grade (H)



Dimension of MCM05 (Single Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (without K1 ^{mm})	Ball screw lead (mm)	Body length (mm)			No. of mounting holes	Inertia ×10 ⁻⁴ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃	n		
MCM05005H05K00	50	80 (95)	5	232	180	150	4	0.025	1.4
MCM05005H10K00			10					0.035	
MCM05005H20K00			20					0.073	
MCM05010H05K00	100	130 (145)	5	282	230	200	5	0.031	1.6
MCM05010H10K00			10					0.04	
MCM05010H20K00			20					0.078	
MCM05015H05K00	150	180 (195)	5	332	280	250	6	0.036	1.8
MCM05015H10K00			10					0.046	
MCM05015H20K00			20					0.084	
MCM05020H05K00	200	230 (245)	5	382	330	300	7	0.042	2.0
MCM05020H10K00			10					0.051	
MCM05020H20K00			20					0.089	
MCM05025H05K00	250	280 (295)	5	432	380	350	8	0.047	2.2
MCM05025H10K00			10					0.057	
MCM05025H20K00			20					0.095	

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	5	1.0~4.8
	10	1.1~5.8
	20	1.6~7.9
	30	1.8~11.1

1. Frictional resistance of NSK K1™ is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C _s	Linear guides C	Support unit C _s	Rated running distance L _s (km)	Ball screw C _{0s}	Linear guides C ₀	
5	Ø12	3,760	15,600	4,400	5	6,310	10,900	1,450
10		2,260	12,400		10	3,780		
20		2,260	9,850		20	3,780		
30		3,260	8,600	6,550	30	5,400		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	229	89	89

Accuracy grade: High grade (H)

Monocarrier dynamic torque specification (N · cm)

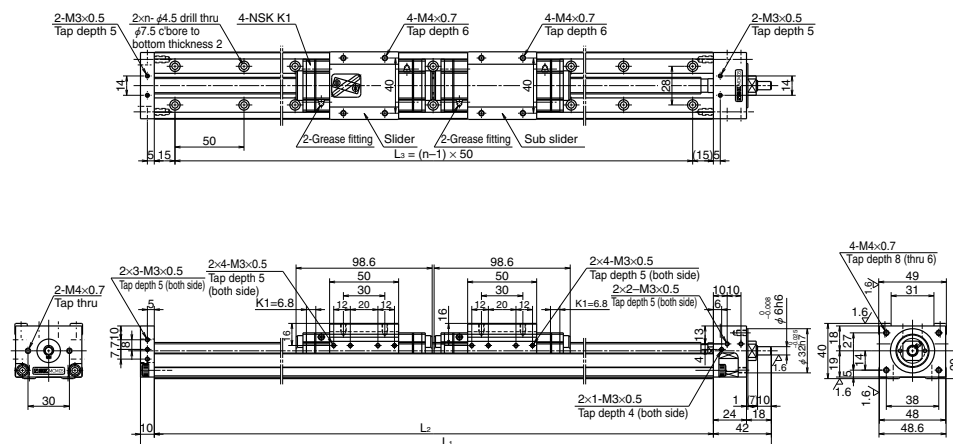
1. Frictional resistance of NSK K1™ is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Static Moment Load of Linear Guide

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MCM05 (Double Slider)

Accuracy Grade: High Grade (H)



Dimension of MCM05 (Double Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (K1™ is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes n	Inertia $\times 10^{-4}$ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃			
MCM05006H10D00	60	83 (110)	10	332	280	250	6	0.058	2.3
MCM05011H10D00	110	133 (160)	10	382	330	300	7	0.064	2.5
MCM05016H10D00	160	183 (210)	10	432	380	350	8	0.07	2.7
MCM05021H10D00	210	233 (260)	10	482	430	400	9	0.075	2.8
MCM05021H20D00			20					0.151	
MCM05031H10D00	310	333 (360)	10	582	530	500	11	0.086	3.2
MCM05031H20D00			20					0.162	
MCM05041H10D00	410	433 (460)	10	682	630	600	13	0.098	3.6
MCM05041H20D00			20					0.174	
MCM05051H10D00	510	533 (560)	10	782	730	700	15	0.109	4.2
MCM05051H20D00			20					0.185	

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	10	1.5~7.6
	20	2.3~11.8

1. Frictional resistance of NSK K1™ Lubrication Unit is included in the dynamic torque in the table.
2. Grease is packed into the ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

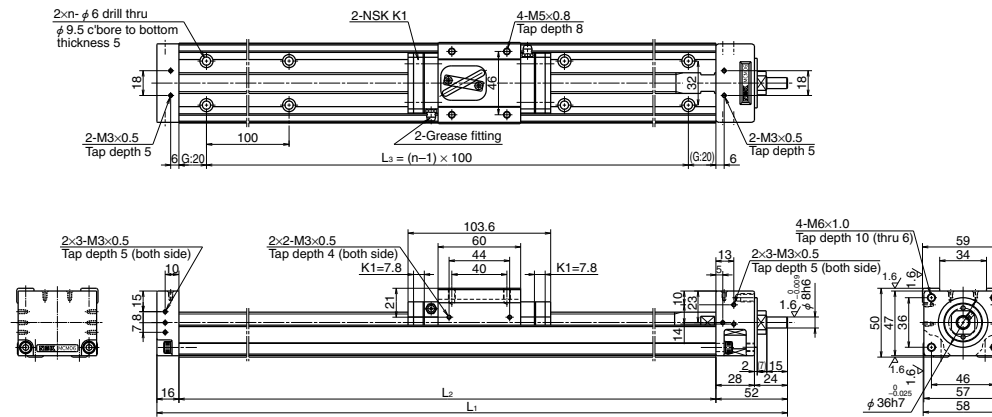
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C _a	Linear guides C	Support unit C _a	Rated running distance L _a (km)	Ball screw C _{0a}	Linear guides C ₀	
5	Ø12	3,760	15,600	4,400	5	6,310	10,900	1,450
10		2,260	12,400		10	3,780		
20		2,260	9,850		20	3,780		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M _{Ro}	Pitching M _{Ro}	Yawing M _{Ro}
Double	455	765	765

MCM06

Accuracy Grade: High grade (H)



Dimension of MCM06 (Single slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (without K1™)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes n	Inertia $\times 10^{-4}$ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃			
* MCM06005H05K00	50	85 (102)	5	258	190	100	2	0.083	2.7
* MCM06005H10K00			10					0.077	
* MCM06005H20K00			20					0.122	
MCM06010H05K00	100	135 (152)	5	308	240	200	3	0.103	3.0
MCM06010H10K00			10					0.092	
MCM06010H20K00			20					0.137	
* MCM06015H05K00	150	185 (202)	5	358	290	200	3	0.122	3.5
* MCM06015H10K00			10					0.106	
* MCM06015H20K00			20					0.152	
MCM06020H05K00	200	235 (252)	5	408	340	300	4	0.142	3.8
MCM06020H10K00			10					0.121	
MCM06020H20K00			20					0.167	
* MCM06025H05K00	250	285 (302)	5	458	390	300	4	0.161	4.2
* MCM06025H10K00			10					0.136	
* MCM06025H20K00			20					0.181	
MCM06030H05K00	300	335 (352)	5	508	440	400	5	0.18	4.5
MCM06030H10K00			10					0.15	
MCM06030H20K00			20					0.196	

Note: Dimension G is 45 for items marked with *.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	5	1.9~7.4
	10	2.2~8.6
	20	2.8~11.0

1. Frictional resistance of NSK K1™ Lubrication Unit is included in the dynamic torque in the table.
2. Grease is packed into the ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

Lead l (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C _a	Linear guides C	Support unit C _a	Rated running distance L _r (km)	Ball screw C _{0a}	Linear guides C ₀	
5	Ø16	7,310	25,200	6,550	5	13,500	17,000	2,730
10	Ø15	7,060	20,000		10	12,700		
20		4,560	15,900		20	7,750		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M _{R0}	Pitching M _{P0}	Yawing M _{Y0}
Single	415	174	174

Accuracy Grade: High Grade (H)



Monocarrier dynamic torque specification (N · cm)		
Ball screw lead (mm)	5	1.9~7.4
	10	2.2~8.6
	20	2.8~11.0

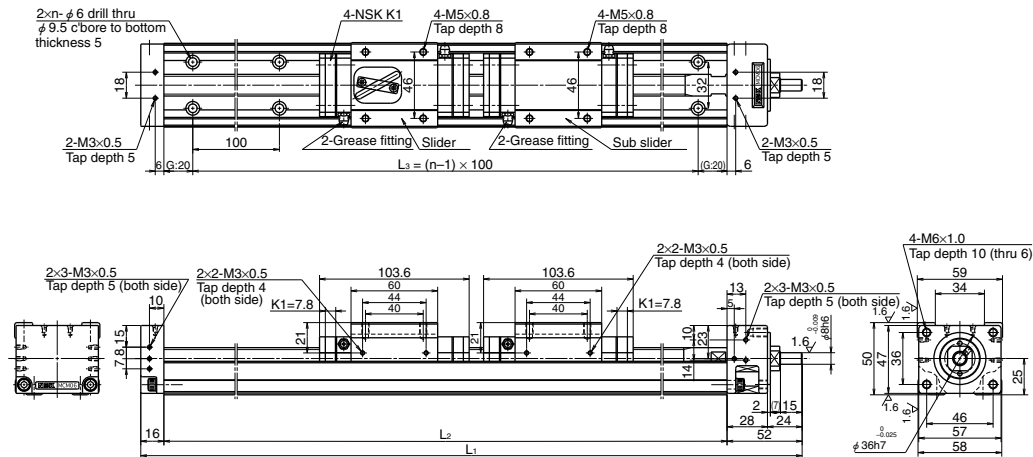
1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C _s	Linear guides C	Support unit C _s	Rated running distance L _s (km)	Ball screw C _{0s}	Linear guides C ₀	
5	Ø16	7,310	25,200	6,550	5	13,500	17,000	2,730
10	Ø15	7,060	20,000		10	12,700		
20		4,560	15,900		20	7,750		

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	415	174	174

MCM06 (Double Slider)

Accuracy Grade: High Grade (H)



Dimension of MCM06 (Double Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (K1™ is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes n	Inertia × 10 ⁻⁴ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃			
MCM06011H05D00	110	133 (164)	5	408	340	300	4	0.145	4.4
MCM06011H10D00			10					0.136	
MCM06021H05D00			5					0.184	
MCM06021H10D00	210	233 (264)	10	508	440	400	5	0.166	5.1
MCM06021H20D00			20					0.257	
MCM06031H05D00			5					0.223	
MCM06031H10D00	310	333 (364)	10	608	540	500	6	0.195	5.8
MCM06031H20D00			20					0.286	
MCM06041H05D00			5					0.262	
MCM06041H10D00	410	433 (464)	10	708	640	600	7	0.224	6.6
MCM06041H20D00			20					0.316	
MCM06051H10D00			10					0.254	
MCM06051H20D00	510	533 (564)	20	808	740	700	8	0.345	7.3
MCM06061H10D00			10					0.283	
MCM06061H20D00			20					0.375	
MCM06071H10D00	710	733 (764)	10	1,008	940	900	10	0.313	8.7
MCM06071H20D00			20					0.404	

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	5	2.3~8.5
	10	2.7~10.9
	20	4.0~15.9

1. Frictional resistance of NSK K1™ Lubrication Unit is included in the dynamic torque in the table.
2. Grease is packed into the ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

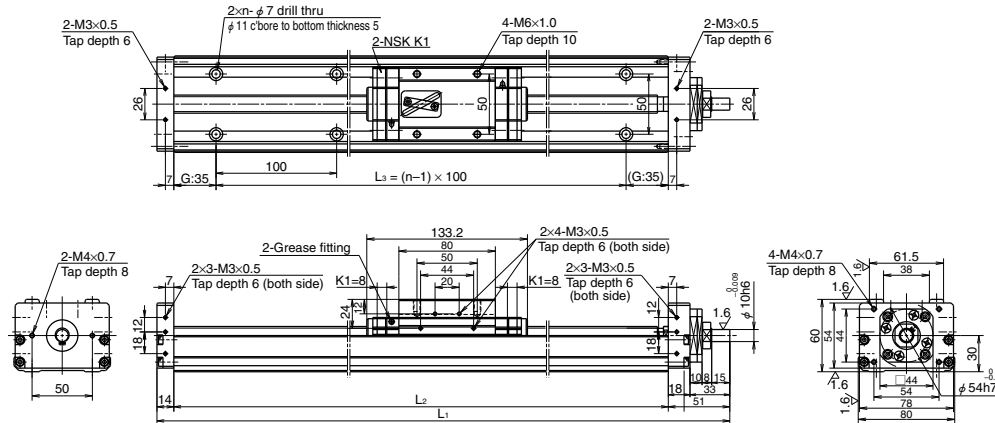
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C _a	Linear guides C	Support unit C _a	Rated running distance L _a (km)	Ball screw C _{0a}	Linear guides C ₀	
5	Ø16	7,310	25,200	6,550	5	13,500	17,000	2,730
10	Ø15	7,060	20,000		10	12,700		
20		4,560	15,900		20	7,750		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M _{Ro}	Pitching M _{Po}	Yawing M _{Yo}
Double	825	1,220	1,220

MCM08

Accuracy Grade: High Grade (H)



Dimension of MCM08 (Single Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (without K1 TM)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes	Inertia × 10 ⁻⁴ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃			
※ MCM08005H05K00	50	85 (101)	5	285	220	100	2	0.101	4.1
※ MCM08005H10K00			10					0.100	
MCM08010H05K00			5					0.120	
MCM08010H10K00			10					0.114	
MCM08010H20K00	100	135 (151)	20	335	270	200	3	0.190	4.6
※ MCM08015H05K00			5					0.139	
※ MCM08015H10K00			10					0.129	
※ MCM08015H20K00			20					0.205	
MCM08020H05K00	200	235 (251)	5	435	370	300	4	0.159	5.5
MCM08020H10K00			10					0.144	
MCM08020H20K00			20					0.220	
※ MCM08025H05K00			5					0.178	
※ MCM08025H10K00	250	285 (301)	10	485	420	300	4	0.159	6.0
※ MCM08025H20K00			20					0.235	
MCM08030H05K00			5					0.198	
MCM08030H10K00			10	535	470	400	5	0.173	6.5
MCM08030H20K00	300	335 (351)	20					0.249	

Note: Dimension G is 60 for items marked with ※.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	5	1.0~5.9
	10	2.0~7.8
	20	2.5~10.8
	30	2.8~12.0

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C _a	Linear guides C	Support unit C _a	Rated running distance L _a (km)	Ball screw C _{0a}	Linear guides C ₀	
5	Ø16	7,310	30,800	7,100	5	13,500	22,800	3,040
10	Ø15	7,060	24,400		10	12,700		
20		4,560	19,400		20	7,750		
30		5,070	169,300		30	8,730		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M _{Ro}	Pitching M _{Po}	Yawing M _{Yo}
Single	770	300	300

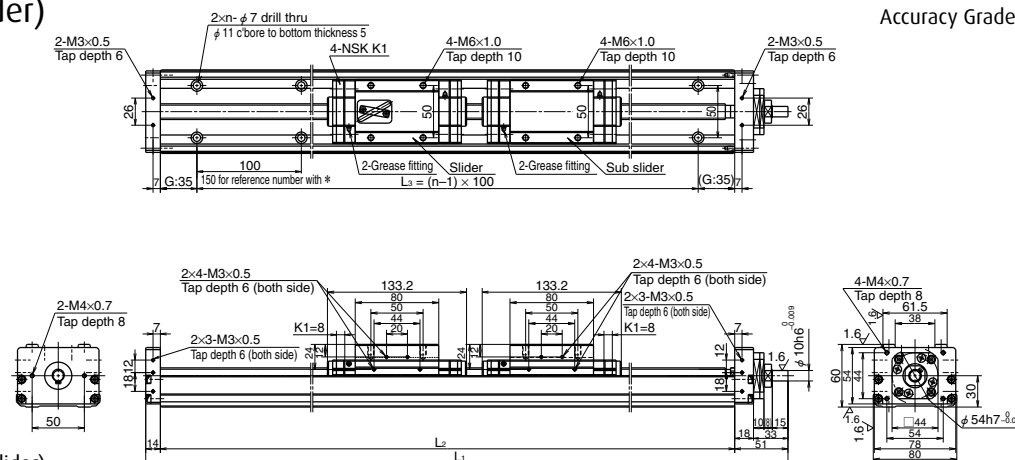
Accuracy grade: High grade (H)



Courtesy of Steven Engineering, Inc. - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com

MCM08 (Double Slider)

Accuracy Grade: High Grade (H)



Dimension of MCM08 (Double Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (K1™ is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes	Inertia ×10 ⁻⁴ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃	n		
● MCM08008H10D00	80	104 (136)	10	435	370	300	3	0.169	6.5
MCM08018H10D00	180	204 (236)	10	535	470	400	5	0.199	7.5
MCM08018H20D00			20					0.351	
MCM08028H10D00	280	304 (336)	10	635	570	500	6	0.228	8.4
MCM08028H20D00			20					0.380	
MCM08038H10D00	380	404 (436)	10	735	670	600	7	0.257	9.4
MCM08038H20D00			20					0.409	
MCM08048H10D00	480	504 (536)	10	835	770	700	8	0.287	10.3
MCM08048H20D00			20					0.439	
MCM08058H10D00	580	604 (636)	10	935	870	800	9	0.316	11.5
MCM08058H20D00			20					0.468	
MCM08068H10D00	680	704 (736)	10	1,035	970	900	10	0.346	12.2
MCM08068H20D00			20					0.498	

Bolthole pitch L_3 on item marked with • is 150mm.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead (mm)	10	2.5~10.8
	20	4.0~17.2

1. Frictional resistance of NSK K1™ Lubrication Unit is included in the dynamic torque in the table.
2. Grease is packed into the ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

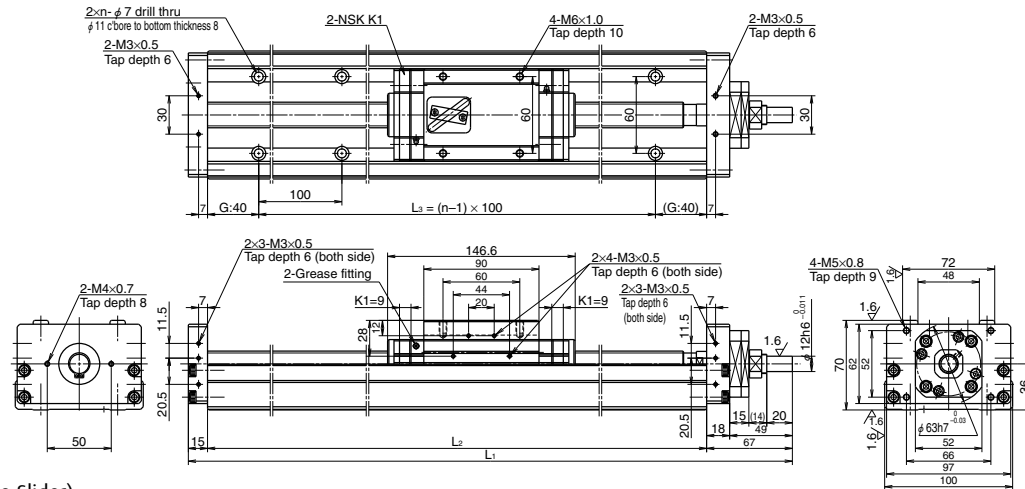
ℓ Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
(mm)	d (mm)	Ball screw C _s	Linear guides C	Support unit C _s	Rated running distance L _s (km)	Ball screw C _{0s}	Linear guides C ₀	
5	Ø16	7,310	30,800	7,100	5	13,500	22,800	3,040
10	Ø15	7,060	24,400		10	12,700		
20		4,560	19,400		20	7,750		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Double	1,540	2,050	2,050

MCM10

Accuracy Grade: High Grade (H)



Dimension of MCM10 (Single Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (without K1™)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes	Inertia ×10 ⁻⁴ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃			
MCM10010H10K00	100	130 (151)	10	362	280	200	2*	0.332	7.8
MCM10010H20K00			20					0.446	
* MCM10015H10K00	150	180 (201)	10	412	330	300	4	0.378	8.7
* MCM10015H20K00			20					0.492	
MCM10020H10K00	200	230 (251)	10	462	380	300	4	0.425	9.5
MCM10020H20K00			20					0.539	
* MCM10025H10K00	250	280 (301)	10	512	430	400	5	0.472	10.4
* MCM10025H20K00			20					0.586	
MCM10030H10K00	300	330 (351)	10	562	480	400	5	0.519	11.2
MCM10030H20K00			20					0.633	
MCM10040H10K00	400	430 (451)	10	662	580	500	6	0.612	13.0
MCM10040H20K00			20					0.726	
MCM10050H10K00	500	530 (551)	10	762	680	600	7	0.706	14.6
MCM10050H20K00			20					0.820	
MCM10050H30K00			30					1.010	

Note: 1) Dimension G is 15 for items marked with *.
 2) *: Use mounting holes on each end of the rail.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	10	2.7~10.8
	20	3.1~12.7
	30	5.1~18.0

1. Frictional resistance of NSK K1™ Lubrication Unit is included in the dynamic torque in the table.
2. Grease is packed into the ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

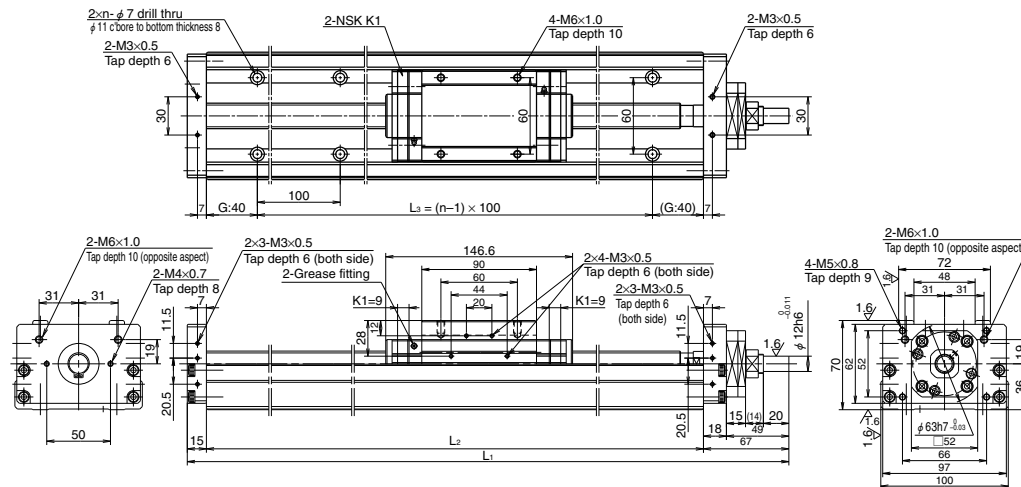
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C ₀	Linear guides C	Support unit C ₀	Rated running distance L _s (km)	Ball screw C _{0s}	Linear guides C ₀	
10	Ø20	10,900	33,500	7,600	10	21,700	29,400	3,380
20		7,060	26,600		20	12,700		
30		11,700	23,200		30	22,700		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M _{Ro}	Pitching M _{Po}	Yawing M _{Yo}
Single	1,170	425	425

MCM10

Accuracy Grade: High Grade (H)



Dimension of MCM10 (Single Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (without K1 ^{III})	Ball screw lead (mm)	Body length (mm)			No. of mounting holes n	Inertia $\times 10^{-4}$ (kg $\cdot$ m ²)	Mass (kg)
				L ₁	L ₂	L ₃			
MCM10060H10K00	600	630 (651)	10	862	780	700	8	0.800	16.3
MCM10060H20K00			20					0.914	
MCM10060H30K00			30					1.104	
MCM10070H10K00	700	730 (751)	10	962	880	800	9	0.893	18.0
MCM10070H20K00			20					1.007	
MCM10070H30K00			30					1.197	
MCM10080H10K00	800	830 (851)	10	1,062	980	900	10	0.987	19.7
MCM10080H20K00			20					1.101	
MCM10080H30K00			30					1.291	
MCM10090H10K00	900	930 (951)	10	1,162	1,080	1,000	11	1.081	21.4
MCM10090H20K00			20					1.195	
MCM10100H10K00	1,000	1030 (1,051)	10	1,262	1,180	1,000	11	1.174	23.1
MCM10100H20K00			20					1.288	

Note: Dimension G is 90 for items marked with *.

Monocarrier dynamic torque specification (N $\cdot$ cm)

Ball screw lead (mm)	10	2.7~10.8
	20	3.1~12.7
	30	5.1~18.0

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

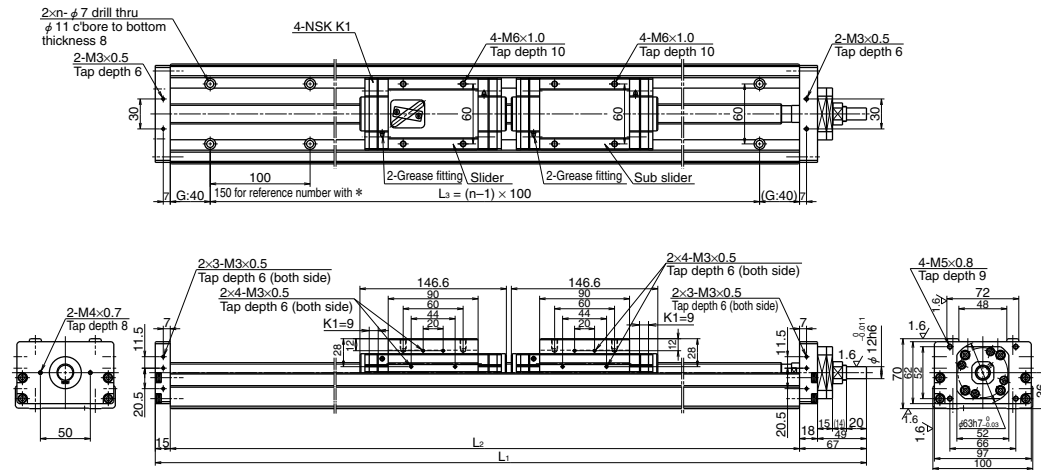
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C ₀	Linear guides C	Support unit C ₀	Rated running distance L _s (km)	Ball screw C _{0s}	Linear guides C ₀	
10	$\phi 20$	10,900	33,500	7,600	10	21,700	29,400	3,380
20		7,060	26,600		20	12,700		
30		11,700	23,200		30	22,700		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N $\cdot$ m)		
	Rolling M _{Ro}	Pitching M _{Po}	Yawing M _{Yo}
Single	1,170	425	425

MCM10 (Double Slider)

Accuracy Grade: High Grade (H)



Dimension of MCM10 (Double Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (K1™ is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes	Inertia ×10 ⁻⁴ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃	n		
● MCM10007H10D00	70	86 (122)	10	462	380	300	3	0.463	11.0
MCM10017H10D00	170	186 (222)	10	562	480	400	5	0.557	12.7
MCM10017H20D00			20					0.785	
MCM10027H10D00	270	286 (322)	10	662	580	500	6	0.650	13.4
MCM10027H20D00			20					0.878	
MCM10037H10D00	370	386 (422)	10	762	680	600	7	0.744	15.1
MCM10037H20D00			20					0.972	
MCM10047H10D00	470	486 (522)	10	862	780	700	8	0.838	17.8
MCM10047H20D00			20					1.066	
MCM10057H10D00	570	586 (622)	10	962	880	800	9	0.931	19.5
MCM10057H20D00			20					1.159	
MCM10067H10D00	670	686 (722)	10	1,062	980	900	10	1.025	21.2
MCM10067H20D00			20					1.253	
※ MCM10087H10D00	870	886 (922)	10	1,262	1,180	1,000	11	1.212	23.6
※ MCM10087H20D00			20					1.440	

Dimension G is 90 for those marked with ✱.

Dimension (1) is 150mm for those marked with ●.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead (mm)	10	4.2~15.6
	20	5.0~19.6

1. Frictional resistance of NSK K1™ Lubrication Unit is included in the dynamic torque in the table.
2. Grease is packed into the ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C _a	Linear guides C	Support unit C _a	Rated running distance L _a (km)	Ball screw C _{0a}	Linear guides C ₀	
10	Ø20	10,900	33,500	7,600	10	21,700	29,400	3,380
20		7,060	26,600		20	12,700		

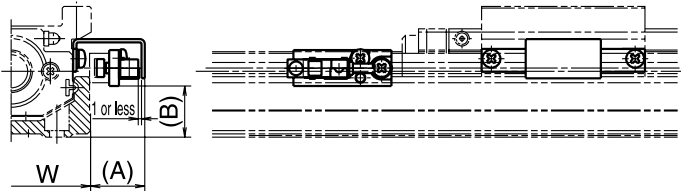
Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M_{Ro}	Pitching M_{Po}	Yawing M_{Yo}
Double	2,340	2,940	2,940

2.3 MCM Series Optional Accessories

2.3.1 Sensor Unit

● Proximity Switch



(Example of assembly)

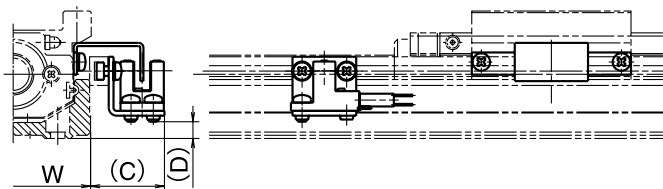
Type	Reference Number			Dimension (A) (mm)	Dimension (B) (mm)	Body width W (mm)
MCM02	MC-SR02-00	MC-SR02-01	MC-SR02-02	17	2	28
MCM03	MC-SR03-10	MC-SR03-11	MC-SR03-12	17	3	34
MCM05	MC-SR05-10	MC-SR05-11	MC-SR05-12	17	15	48.6
MCM06	MC-SR06-10	MC-SR06-11	MC-SR06-12	17	19	58
MCM08	MC-SR08-10	MC-SR08-11	MC-SR08-12	16	27	80
MCM10	MC-SR10-10	MC-SR10-11	MC-SR10-12	16	35	100
Quantity	Proximity switch (normally open)	—	3	1	E2S-W13 (OMRON Corp.)	
	Proximity switch (normally close)	3	—	2	E2S-W14 (OMRON Corp.)	

*See page 24 for specification of proximity switch.

A sensor unit consists of sensors and sensor mounting parts.

A spacer plate is required when you use a cover unit or sensor unit for an MCM03 with a lead of 1 or 2 mm. (Refer to page 30.)

● Photo Sensor



(Example of assembly)

Type	NPN Sensor* Reference Number	PNP Sensor** Reference Number	Dimension (C) (mm)	Dimension (D) (mm)	Body width W (mm)	Remarks
MCM03	MC-SR03-13	MC-SR03-40	24	0.5	34.0	* OMRON EE-SX674
MCM05	MC-SR05-13	MC-SR05-62	24	5.0	48.6	** OMRON EE-SX674P
MCM06	MC-SR06-13	MC-SR06-46	24	9.0	58.0	EE-1001 Connector
MCM08	MC-SR08-13	MC-SR08-56	23	17.0	80.0	3 Sensors & 3 Connectors
MCM10	MC-SR10-13	MC-SR10-45	22	24.0	100.0	per Ref No.

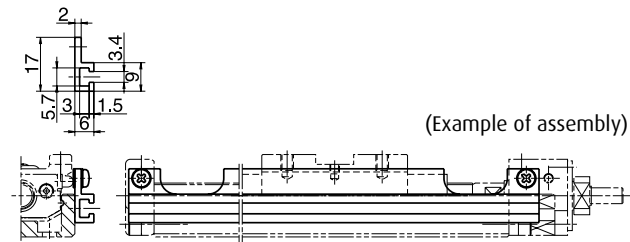
*See page 25 for specification of photo sensor.

A sensor unit consists of sensors and sensor mounting parts.

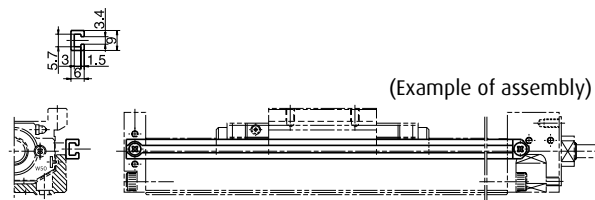
A spacer plate is required when you use a cover unit or sensor unit for an MCM03 with a lead of 1 or 2 mm. (Refer to page 30.)

Sensor Rail

Sensor Rail for MCM03: MC-SRL3- * * * *



Sensor Rail for MCM05: MC-SRL5- * * * *

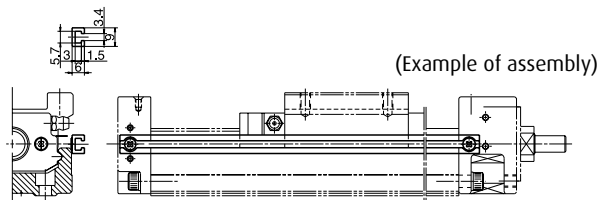


Sensor Rail for MCM02: MC-SRL2- * * * *

Sensor Rail for MCM06: MC-SRL6- * * * *

Sensor Rail for MCM08: MC-SRL8- * * * *

Sensor Rail for MCM10: MC-SRL1- * * * *



* * * * is the same as rail dimension L_2

Please install washer between sensor rail and support blocks for MCM03, MCM05, MCM06 and MCM08.

MCM Series and Sensor Rail Combination Table

Table 2-4

Model No.	Body length L ₂ (mm)	Reference No.	Sensor rail reference No.	Model No.	Body length L ₂ (mm)	Reference No.	Sensor rail reference No.				
MCM02	100	MCM02005H01K	MC-SRL2-010*	MCM05	730	MCM05060H05K00	MC-SRL5-0730				
		MCM02005P01K				MCM05060H10K00					
		MCM02005H02K				MCM05060H20K00					
		MCM02005P02K				MCM05060H30K00					
	150	MCM02010H01K	MC-SRL2-0150			MCM05051H10D00					
		MCM02010P01K				MCM05051H20D00					
		MCM02010H02K		MCM06005H05K00	MC-SRL6-0190						
		MCM02010P02K		MCM06005H10K00							
	200	MCM02015H01K	MC-SRL2-0200	MCM06005H20K00		MC-SRL6-0240					
		MCM02015P01K		MCM06010H05K00							
		MCM02015H02K		MCM06010H10K00							
		MCM02015P02K		MCM06010H20K00							
MCM03	115	MCM03005P01K00	MC-SRL3-0115	MCM06	290	MCM06015H05K00	MC-SRL6-0290				
		MCM03005P02K00				MCM06015H10K00					
	140	MCM03005H10K00	MC-SRL3-0140			MCM06015H20K00		MC-SRL6-0340			
		MCM03005H12K00				MCM06020H05K00					
		190				MCM03010P01K00			MC-SRL3-0190	MCM06020H10K00	MC-SRL6-0390
						MCM03010P02K00				MCM06020H20D00	
	MCM03010H10K00		MCM06011H05D00								
	MCM03010H12K00		MCM06011H10D00								
	240	MCM03015P01K00	MC-SRL3-0240	MCM06025H05K00	MC-SRL6-0440						
		MCM03015H10K00		MCM06025H10K00							
		MCM03015H12K00		MCM06025H20K00							
		MCM03020H10K00		MC-SRL3-0290		MCM06030H05K00	MC-SRL6-0540				
MCM03020H12K00	MCM06030H10K00										
290	MCM03025H10K00	MC-SRL3-0340	MCM06030H20K00		MC-SRL6-0640						
	MCM03025H12K00		MCM06021H05D00								
MCM05	180	MCM05005H05K00	MC-SRL5-0180	MCM06	540	MCM06021H10D00	MC-SRL6-0740				
		MCM05005H10K00				MCM06021H20D00					
		MCM05005H20K00				MCM06040H05K00					
	230	MCM05010H05K00	MC-SRL5-0230			MCM06040H10K00		MC-SRL6-0840			
		MCM05010H10K00				MCM06040H20K00					
		MCM05010H20K00				MCM06031H05D00					
	280	MCM05015H05K00	MC-SRL5-0280			MCM06031H10D00		MC-SRL6-0940			
		MCM05015H10K00				MCM06031H20D00					
		MCM05015H20K00				MCM06050H05K00					
	330	MCM05006H10D00	MC-SRL5-0330			MCM06050H10K00		MC-SRL6-0740			
		MCM05020H05K00				MCM06050H20K00					
		MCM05020H10K00				MCM06041H05D00					
	380	MCM05020H20K00	MC-SRL5-0380			MCM06041H10D00		MC-SRL6-0840			
		MCM05011H10D00				MCM06041H20D00					
		MCM05025H05K00				MCM06060H05K00					
	430	MCM05025H10K00	MC-SRL5-0430			MCM06060H10K00		MC-SRL6-0940			
		MCM05025H20K00				MCM06060H20K00					
		MCM05016H10D00				MCM06051H10D00					
530	MCM05030H05K00	MC-SRL5-0530	MCM06051H20D00	MC-SRL6-0840							
	MCM05030H10K00		MCM06070H05K00								
	MCM05030H20K00		MCM06070H10K00								
630	MCM05030H30K00	MC-SRL5-0630	MCM06070H20K00	MC-SRL6-0940							
	MCM05021H10D00		MCM06061H10D00								
	MCM05021H20D00		MCM06061H20D00								
MCM06	540	MCM05040H05K00	MC-SRL5-0530	MCM07	940	MCM06080H05K00	MC-SRL6-0940				
		MCM05040H10K00				MCM06080H10K00					
		MCM05040H20K00				MCM06080H20K00					
		MCM05040H30K00				MCM06071H10D00					
		MCM05031H10D00				MCM06071H20D00					
		MCM05031H20D00									

*) When using NSK standard sensors, prepare two sensor rails. Two sensor rails will also be required for other Monocarriers depending on signal points of sensors. Contact NSK for details.

MCM Series

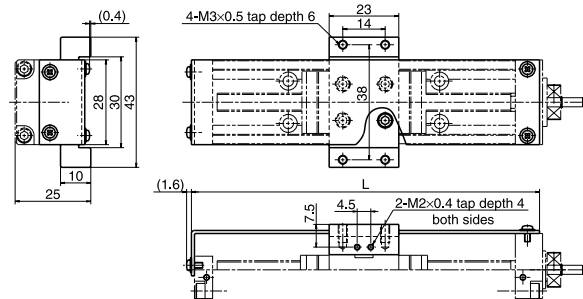
Lightweight Type

Model No.	Body length L ₂ (mm)	Reference No.	Sensor rail reference No.
MCM08	220	MCM08005H05K00	MC-SRL8-0220
		MCM08005H10K00	
	270	MCM08010H05K00	MC-SRL8-0270
		MCM08010H10K00	
		MCM08010H20K00	
	320	MCM08015H05K00	MC-SRL8-0320
		MCM08015H10K00	
		MCM08015H20K00	
	370	MCM08020H05K00	MC-SRL8-0370
		MCM08020H10K00	
		MCM08020H20K00	
		MCM08008H10D00	
	420	MCM08025H05K00	MC-SRL8-0420
		MCM08025H10K00	
		MCM08025H20K00	
	470	MCM08030H05K00	MC-SRL8-0470
		MCM08030H10K00	
		MCM08030H20K00	
		MCM08018H10D00	
		MCM08018H20D00	
	570	MCM08040H05K00	MC-SRL8-0570
		MCM08040H10K00	
		MCM08040H20K00	
		MCM08040H30K00	
		MCM08028H10D00	
		MCM08028H20D00	
	670	MCM08050H05K00	MC-SRL8-0670
		MCM08050H10K00	
		MCM08050H20K00	
		MCM08050H30K00	
		MCM08038H10D00	
	770	MCM08038H20D00	MC-SRL8-0770
		MCM08060H05K00	
		MCM08060H10K00	
		MCM08060H20K00	
		MCM08060H30K00	
		MCM08048H10D00	
	870	MCM08048H20D00	MC-SRL8-0870
		MCM08070H05K00	
		MCM08070H10K00	
		MCM08070H20K00	
		MCM08070H30K00	
	970	MCM08058H10D00	MC-SRL8-0970
		MCM08058H20D00	
		MCM08080H05K00	
		MCM08080H10K00	
		MCM08080H20K00	
		MCM08080H30K00	
		MCM08068H10D00	
		MCM08068H20D00	

Model No.	Body length L ₂ (mm)	Reference No.	Sensor rail reference No.
MCM10	280	MCM10010H10K00	MC-SRL1-0280
		MCM10010H20K00	
	330	MCM10015H10K00	MC-SRL1-0330
		MCM10015H20K00	
	380	MCM10020H10K00	MC-SRL1-0380
		MCM10020H20K00	
		MCM10007H10D00	
	430	MCM10025H10K00	MC-SRL1-0430
		MCM10025H20K00	
	480	MCM10030H10K00	MC-SRL1-0480
		MCM10030H20K00	
		MCM10017H10D00	
		MCM10017H20D00	
	580	MCM10040H10K00	MC-SRL1-0580
		MCM10040H20K00	
		MCM10027H10D00	
		MCM10027H20D00	
	680	MCM10050H10K00	MC-SRL1-0680
		MCM10050H20K00	
		MCM10050H30K00	
		MCM10037H10D00	
	780	MCM10037H20D00	MC-SRL1-0780
		MCM10060H10K00	
		MCM10060H20K00	
		MCM10060H30K00	
	880	MCM10047H10D00	MC-SRL1-0880
		MCM10047H20D00	
		MCM10070H10K00	
		MCM10070H20K00	
	980	MCM10070H30K00	MC-SRL1-0980
		MCM10057H10D00	
		MCM10057H20D00	
		MCM10080H10K00	
	1,080	MCM10080H20K00	MC-SRL1-1080
		MCM10080H30K00	
		MCM10067H10D00	
	1,180	MCM10067H20D00	MC-SRL1-1180
		MCM10090H10K00	
		MCM10090H20K00	
		MCM10100H10K00	
		MCM10100H20K00	
		MCM10087H10D00	
		MCM10087H20D00	

2.3.2 Cover Unit

Cover Unit for MCM02



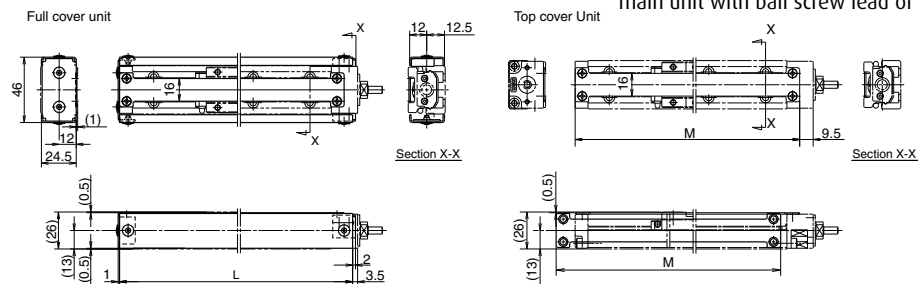
(Unit: mm)

Stroke	Reference Number	Length (L)
50	MC-CV02005-00	115
100	MC-CV02010-00	165
150	MC-CV02015-00	215

Height of screw head is not included.

Cover Unit for MCM03

Note: Optional spacer (MC-SP03-00) is required for a main unit with ball screw lead of 1 and 2 mm.

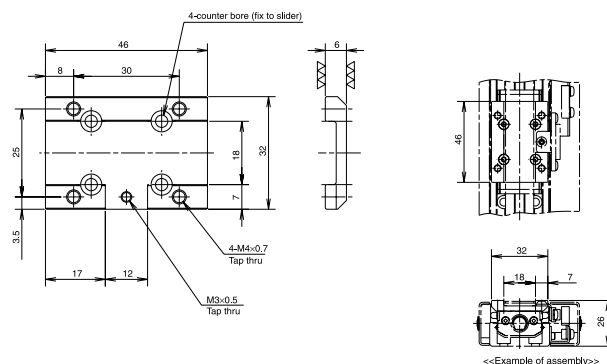


(Unit: mm)

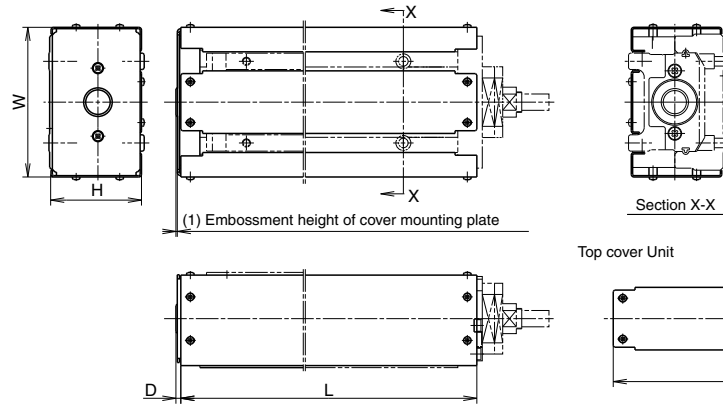
Stroke	Reference No.		Cover length	
	Top cover unit	Full cover unit	Length (L)	Length (M)
50 (lead 1, 2)	MC-CV03005-02	*MC-CV03005-01	139	133
50 (lead 10, 12)	MC-CV03005-02A	*MC-CV03005-01A	164	158
100	MC-CV03010-02	*MC-CV03010-01	214	208
150	MC-CV03015-02	*MC-CV03015-01	264	258
200	MC-CV03020-02	*MC-CV03020-01	314	308
250	MC-CV03025-02	*MC-CV03025-01	364	358

*) The full-cover unit cannot be used when the sensor unit is used.
Height of screw head is not included.

Spacer for MCM03 (Optional) MC-SP03-00 (for Ball Screw Lead 1 and 2 mm)



Cover Unit for MCM05, 06, 08 and 10



Unit: mm

Model No.	Stroke		Cover Unit Reference No.		Cover length			
	Single slider	Double slider	Top cover Unit	Full cover Unit ¹⁾	Length (L)	Height (H)	Width (W)	End part (D)
MCM05	50	—	MC-CV05005-01	MC-CV05005-00	200	38.5	65	2.6
	100	—	MC-CV05010-01	MC-CV05010-00	250			
	150	60	MC-CV05015-01	MC-CV05015-00	300			
	200	110	MC-CV05020-01	MC-CV05020-00	350			
	250	160	MC-CV05025-01	MC-CV05025-00	400			
	300	210	MC-CV05030-01	MC-CV05030-00	450			
	400	310	MC-CV05040-01	MC-CV05040-00	550			
	500	410	MC-CV05050-01	MC-CV05050-00	650			
MCM06	600	510	MC-CV05060-37	MC-CV05060-35	750	48.5	75	— ^{*2}
	50	—	MC-CV06005-01	MC-CV06005-00	225			
	100	—	MC-CV06010-01	MC-CV06010-00	275			
	150	—	MC-CV06015-01	MC-CV06015-00	325			
	200	110	MC-CV06020-01	MC-CV06020-00	375			
	250	—	MC-CV06025-01	MC-CV06025-00	425			
	300	210	MC-CV06030-01	MC-CV06030-00	475			
	400	310	MC-CV06040-01	MC-CV06040-00	575			
MCM08	500	410	MC-CV06050-01	MC-CV06050-00	675	56.5	90	2.6
	600	510	MC-CV06060-01	MC-CV06060-00	775			
	700	610	MC-CV06070-01	MC-CV06070-00	875			
	800	710	MC-CV06080-36	MC-CV06080-35	975			
	50	—	MC-CV08005-01	MC-CV08005-00	248			
	100	—	MC-CV08010-01	MC-CV08010-00	298			
	150	—	MC-CV08015-01	MC-CV08015-00	348			
	200	80	MC-CV08020-01	MC-CV08020-00	398			
MCM10	250	—	MC-CV08025-01	MC-CV08025-00	448	66.5	110	3.6
	300	180	MC-CV08030-01	MC-CV08030-00	498			
	400	280	MC-CV08040-01	MC-CV08040-00	598			
	500	380	MC-CV08050-01	MC-CV08050-00	698			
	600	480	MC-CV08060-01	MC-CV08060-00	798			
	700	580	MC-CV08070-01	MC-CV08070-00	898			
	800	680	MC-CV08080-01	MC-CV08080-00	998			
	100	—	MC-CV10010-01	MC-CV10010-00	308			
MCM10	150	—	MC-CV10015-01	MC-CV10015-00	358	66.5	110	3.6
	200	70	MC-CV10020-01	MC-CV10020-00	408			
	250	—	MC-CV10025-01	MC-CV10025-00	458			
	300	170	MC-CV10030-01	MC-CV10030-00	508			
	400	270	MC-CV10040-01	MC-CV10040-00	608			
	500	370	MC-CV10050-01	MC-CV10050-00	708			
	600	470	MC-CV10060-01	MC-CV10060-00	808			
	700	570	MC-CV10070-01	MC-CV10070-00	908			
MCM10	800	670	MC-CV10080-01	MC-CV10080-00	1,008	66.5	110	3.6
	900	—	MC-CV10090-01	MC-CV10090-00	1,108			
	1,000	870	MC-CV10100-36	MC-CV10100-35	1,208			

Note: The dimensions of cover shown above do not include the head height of fixing machine screws. Add the head of machine screws of approximately 2.5 mm to the outer measurement of a cover unit. Set a margin for mechanical interference with surrounding components.

¹⁾ When using sensor unit, full-cover unit cannot be used.

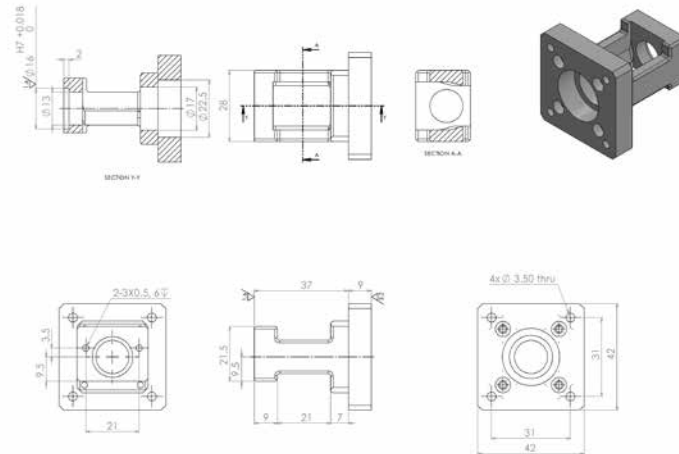
²⁾ A cover mounting plate is not used to MCM06.

2.3.3 Motor Bracket

2.3.3.1 Motor Bracket by NEMA Size

MCM02 (NEMA 17)

■ Reference Number
MC-BK02-231-31



Included:

4 pcs

M3x0.5x12

Socket Head Cap Screws

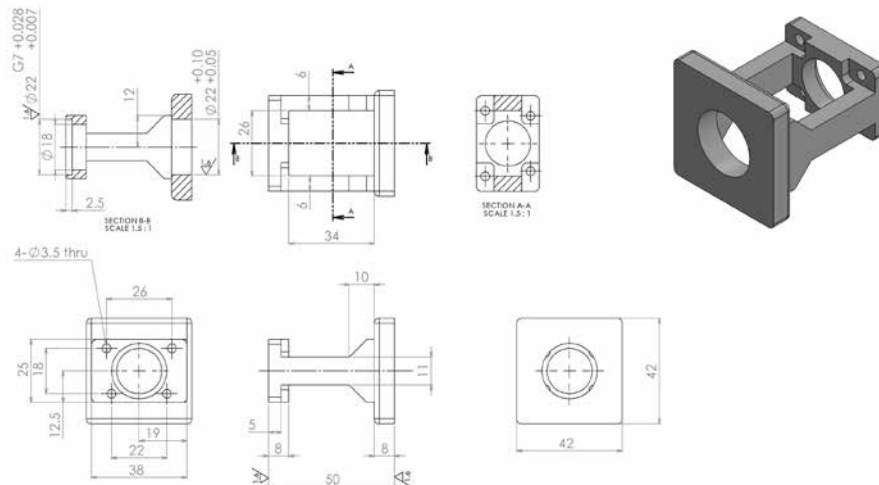
2 pcs

M3x0.5x10

Socket Head Cap Screws

MCM03 (Blank)

■ Reference Number
MC-BK03-000-31



Included:

4 pcs

M3x0.5x10

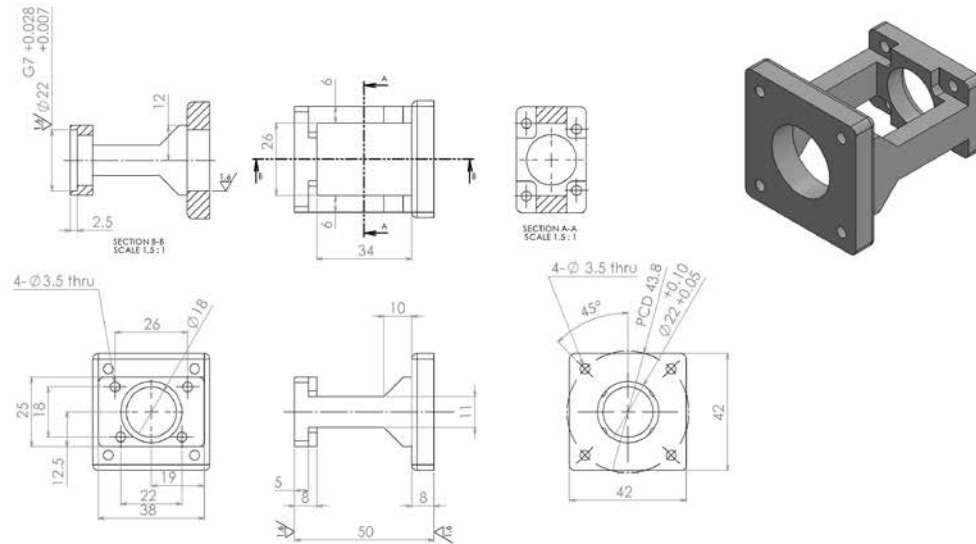
Socket Head Cap Screws

MCM Series

Lightweight Type

MCM03 (NEMA 17)

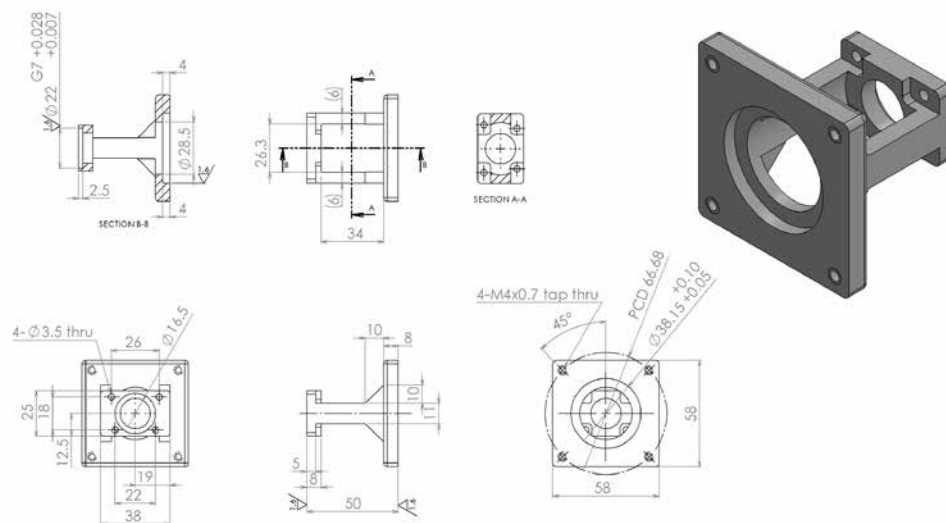
■ Reference Number
MC-BK03-231-31



Included:
4 pcs M3x0.5x10 Socket Head Cap Screws

MCM03 (NEMA 23)

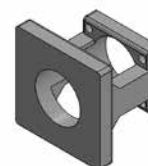
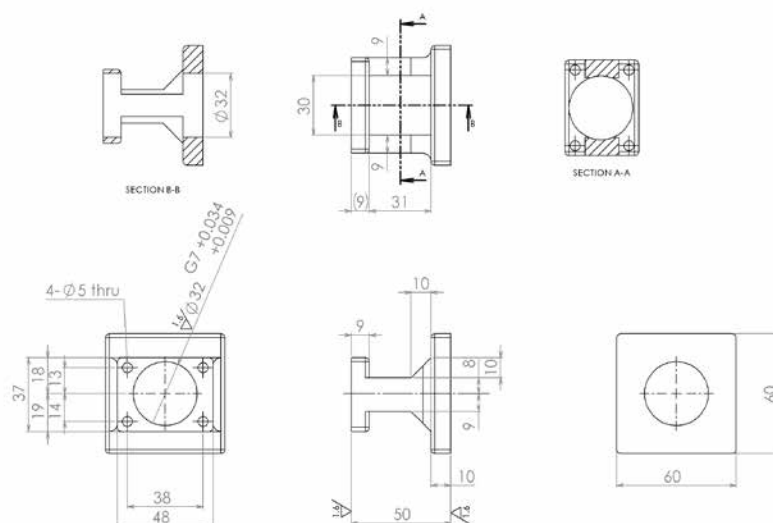
■ Reference Number
MC-BK03-167-32



Included:
4 pcs M3x0.5x10 Socket Head Cap Screws
4 pcs M4x0.7x12 Socket Head Cap Screws

MCM05 (Blank)

■ Reference Number
MC-BK05-000-31



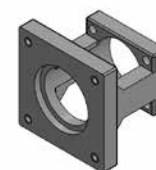
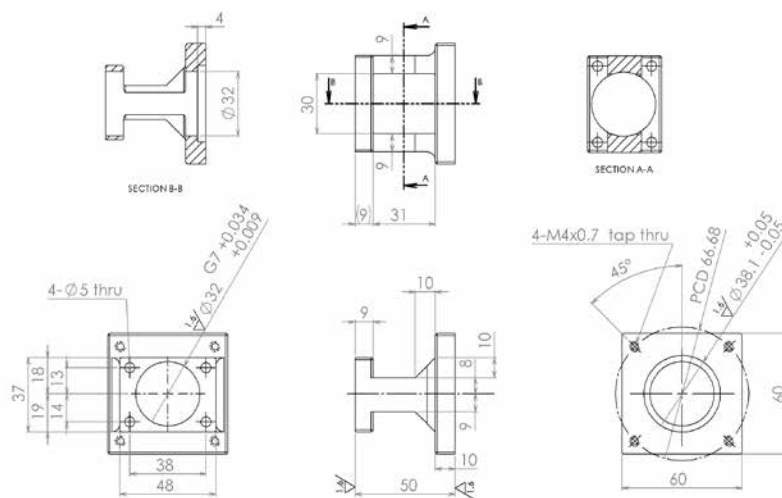
Included:
4 pcs

M4x0.7x15

Socket Head Cap Screws

MCM05 (NEMA 23)

■ Reference Number
MC-BK05-167-31



Included:

4 pcs

M4x0.7x14

Socket Head Cap Screws

4 pcs

M4x0.7x15

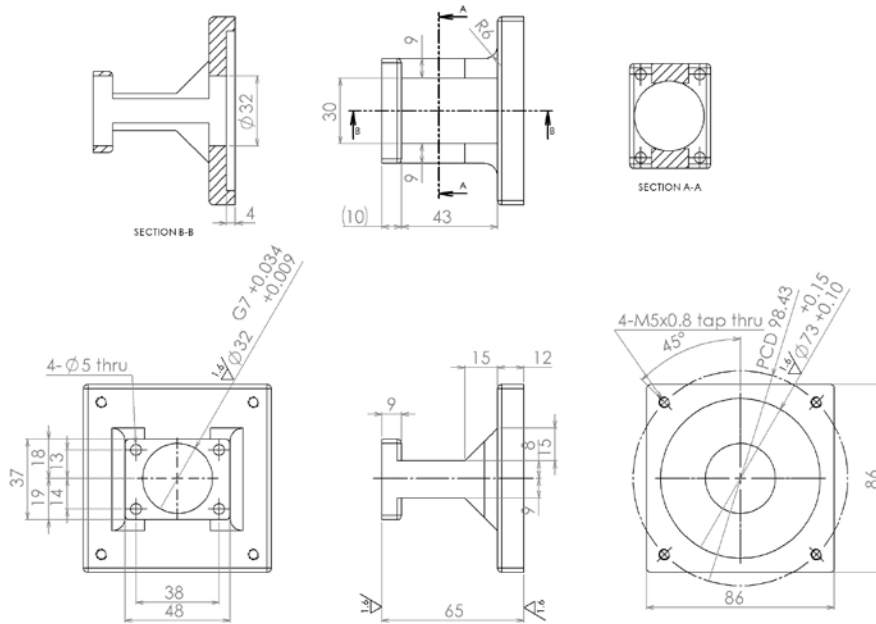
Socket Head Cap Screws

MCM Series

Lightweight Type

MCM05 (NEMA 34)

■ Reference Number
MC-BK05-198-31



Included:

4 pcs

M4x0.7x15

Socket Head Cap Screws

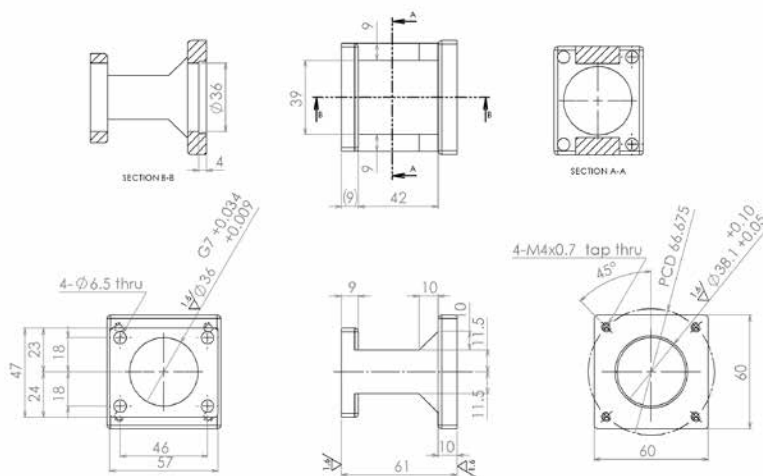
4 pcs

M5x0.8x16

Socket Head Cap Screws

MCM06 (NEMA 23)

■ Reference Number
MC-BK06-167-31



Included:

4 pcs

M6x1.0x16

Socket Head Cap Screws

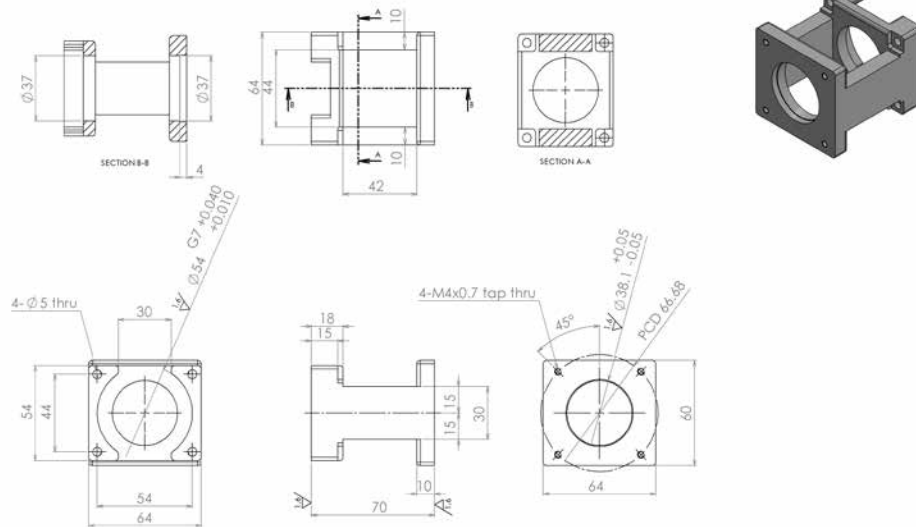
4 pcs

M4x0.7x14

Socket Head Cap Screws

MCM08 (NEMA 23)

■ Reference Number
 MC-BK08-167-31



Included:

4 pcs

M4x0.7x20

Socket Head Cap Screws

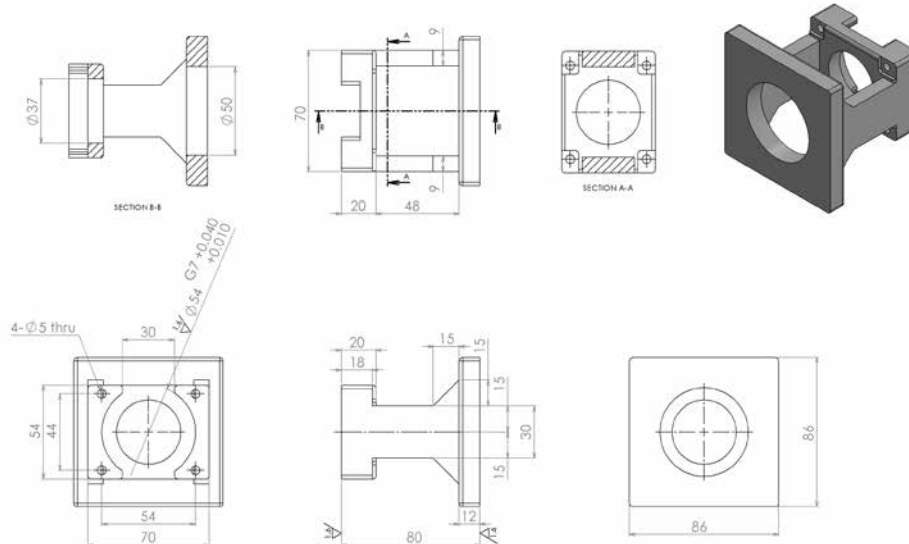
4 pcs

M4x0.7x14

Socket Head Cap Screws

MCM08 (Blank)

■ Reference Number
 MC-BK08-000-31



Included:

4 pcs

M4x0.7x22

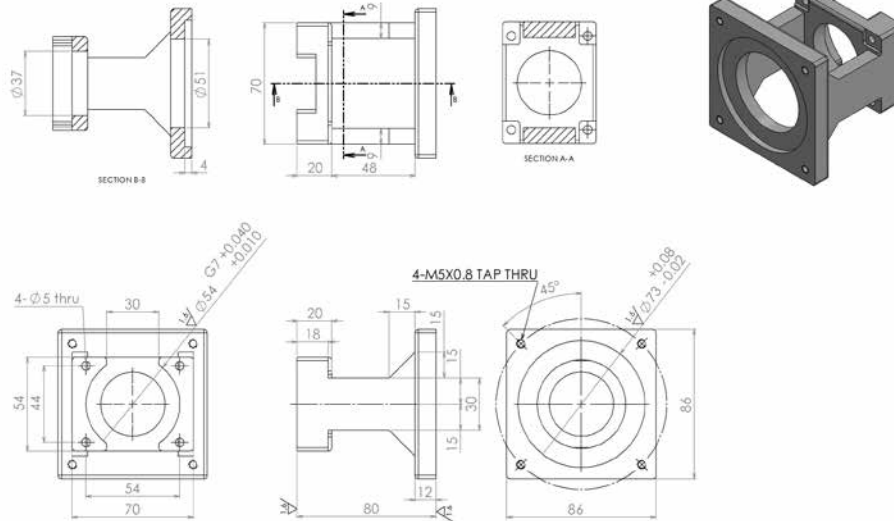
Socket Head Cap Screws

MCM Series

Lightweight Type

MCM08 (NEMA 34)

■ Reference Number
MC-BK08-198-31



Included:

4 pcs

M4x0.7x22

Socket Head Cap Screws

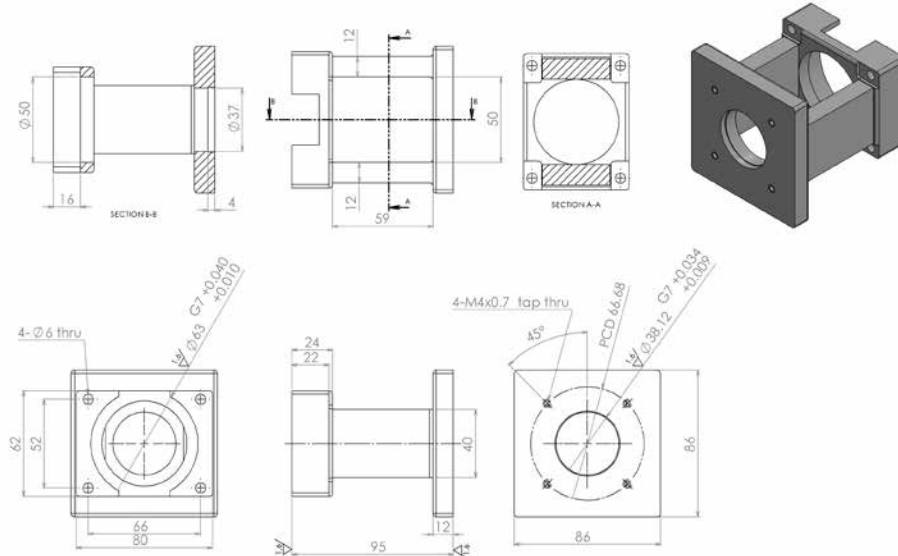
4 pcs

M5x0.8x16

Socket Head Cap Screws

MCM10 (NEMA 23)

■ Reference Number
MC-BK10-167-31



Included:

4 pcs

M5x0.8x30

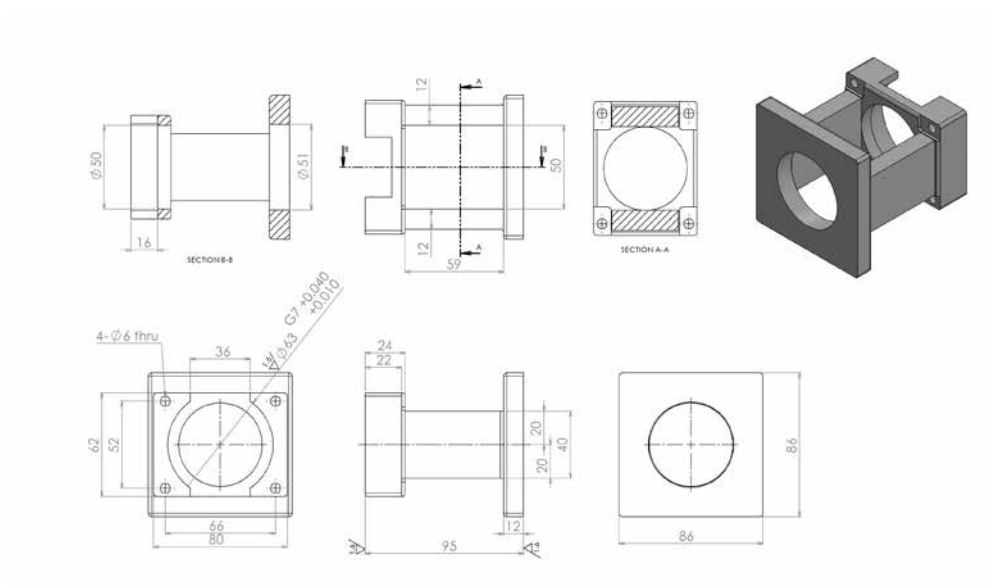
Socket Head Cap Screws

4 pcs

M4x0.7x22

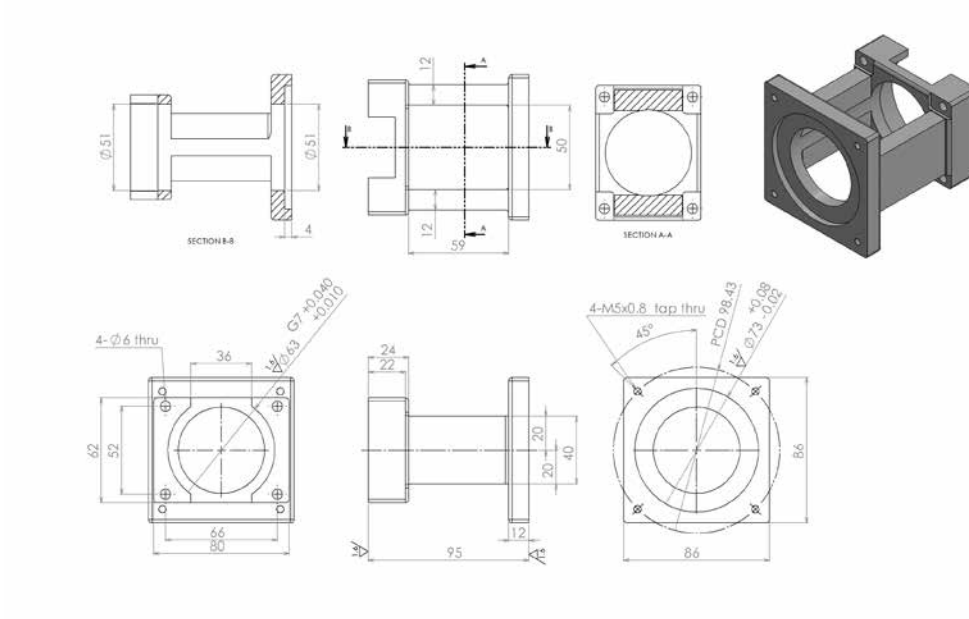
Socket Head Cap Screws

MCM10 (Blank)
 ■ Reference Number
 MC-BK10-000-31



Included:
 4 pcs M5x0.8x30 Socket Head Cap Screws

MCM10 (NEMA 34)
 ■ Reference Number
 MC-BK10-198-32

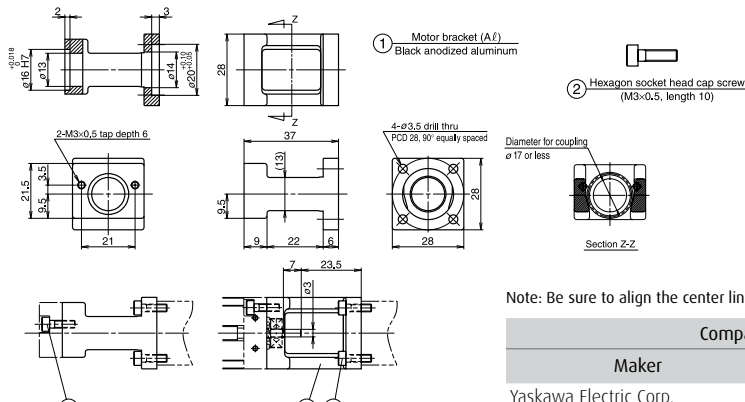


Included:
 4 pcs M5x0.8x30 Socket Head Cap Screws
 4 pcs M5x0.8x16 Socket Head Cap Screws

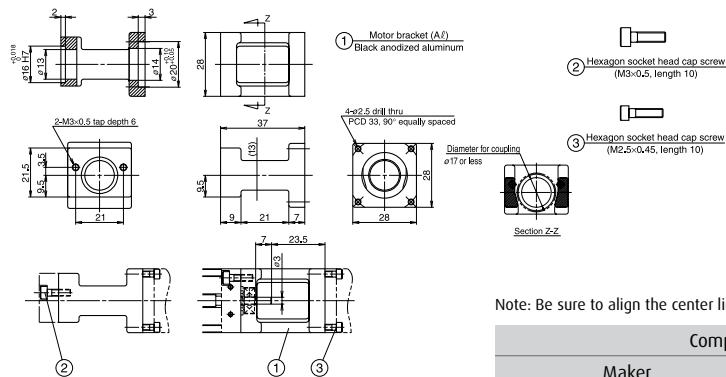
2.3.3.2 Motor Bracket by Standard Size

MCM02

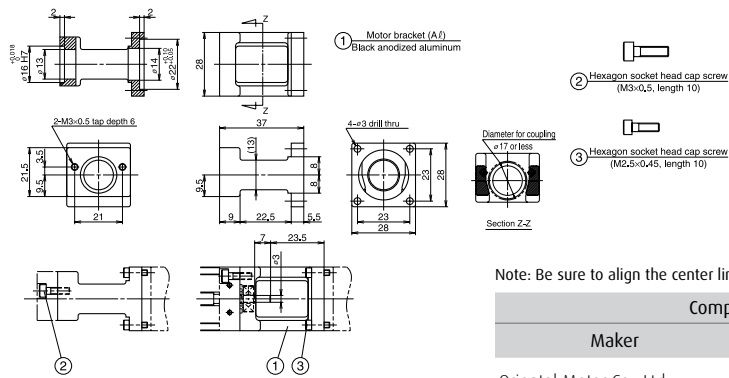
Reference Number
MC-BK02-128-00



Reference Number
MC-BK02-133-00

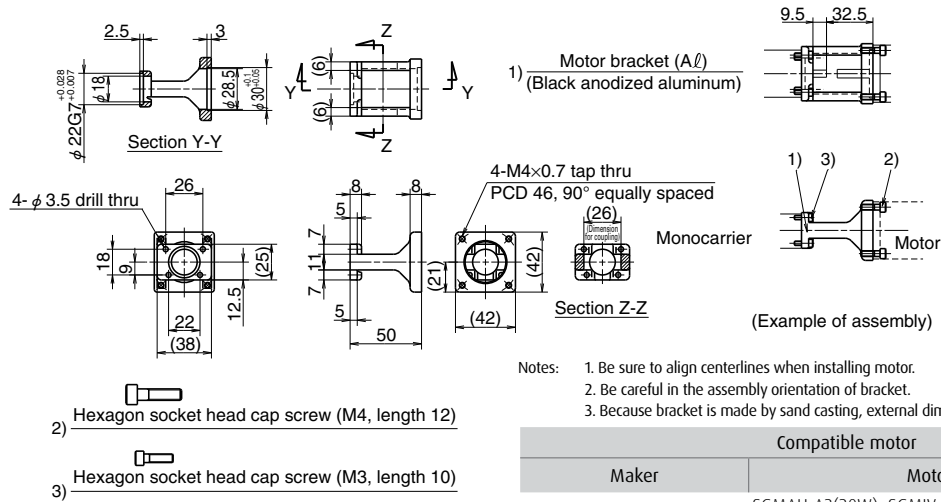


Reference Number
MC-BK02-223-00



MCM03

■ Reference Number
MC-BK03-146-00

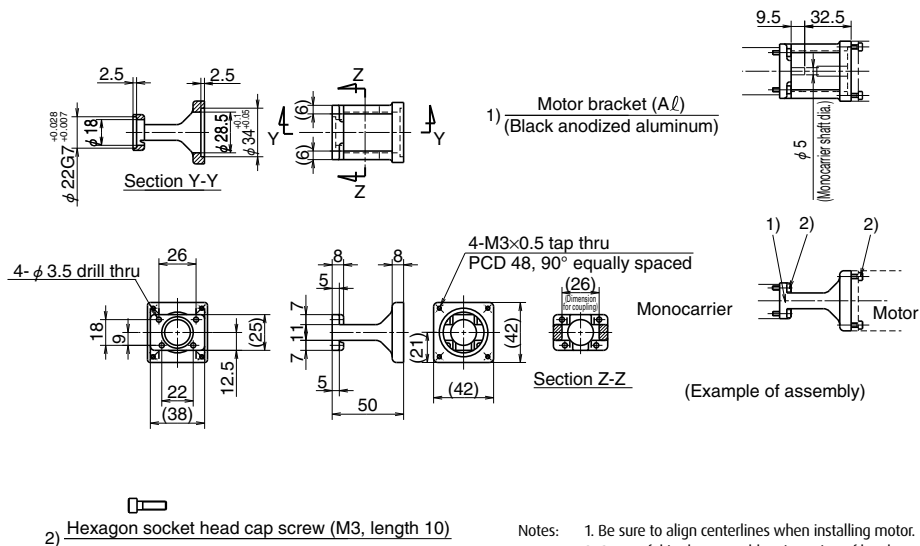


- Notes:
1. Be sure to align centerlines when installing motor.
 2. Be careful in the assembly orientation of bracket.
 3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMJV-A5A(50W), SGMAV-A5A(50W), SGMJV-01A(100W), SGMAV-01A(100W), SGMAV-C2A(150W)
	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W), HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
Sanyo Denki Co., Ltd.	P30B04003(30W), P30B04005(50W), P30B04010(100W)

MCM03

■ Reference Number
MC-BK03-148-01

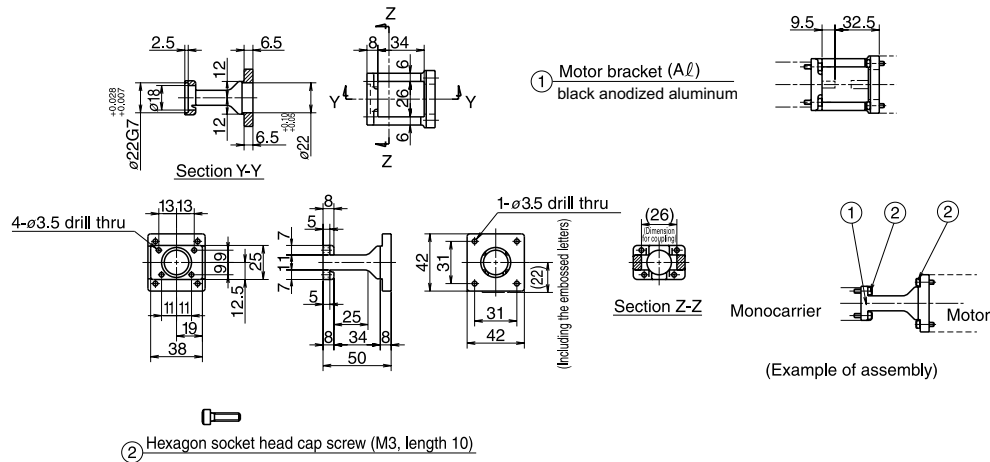


- Notes:
1. Be sure to align centerlines when installing motor.
 2. Be careful in the assembly orientation of bracket.
 3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	P50B04006(60W), P50B04010(100W)

MCM03

■ Reference Number
MC-BK03-231-00

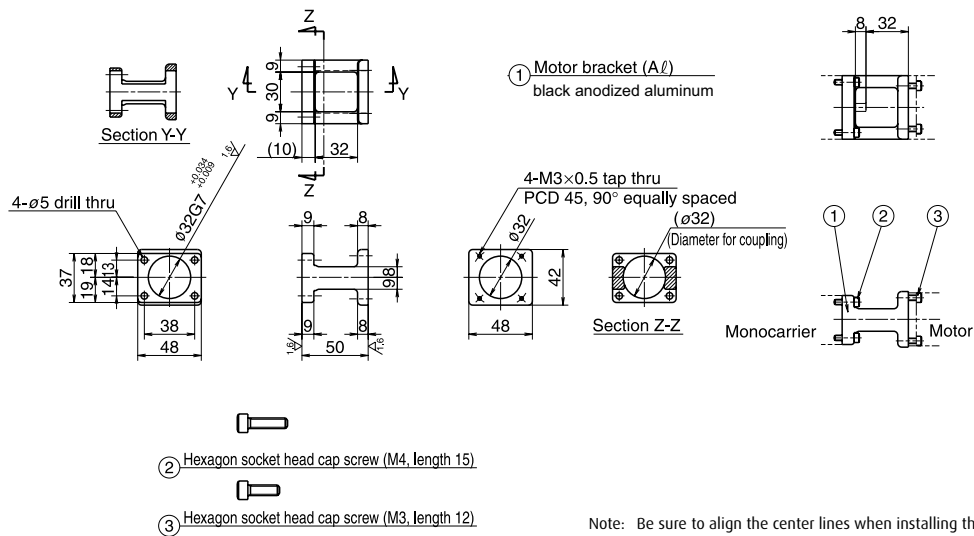


Note: Be sure to align the center lines when installing the motor.
Check the orientation of the bracket.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM423xxx, 103F55xx
Oriental Motor Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x, UMK24x, CSK24x, PK24x

MCM05

■ Reference Number
MC-BK05-145-00

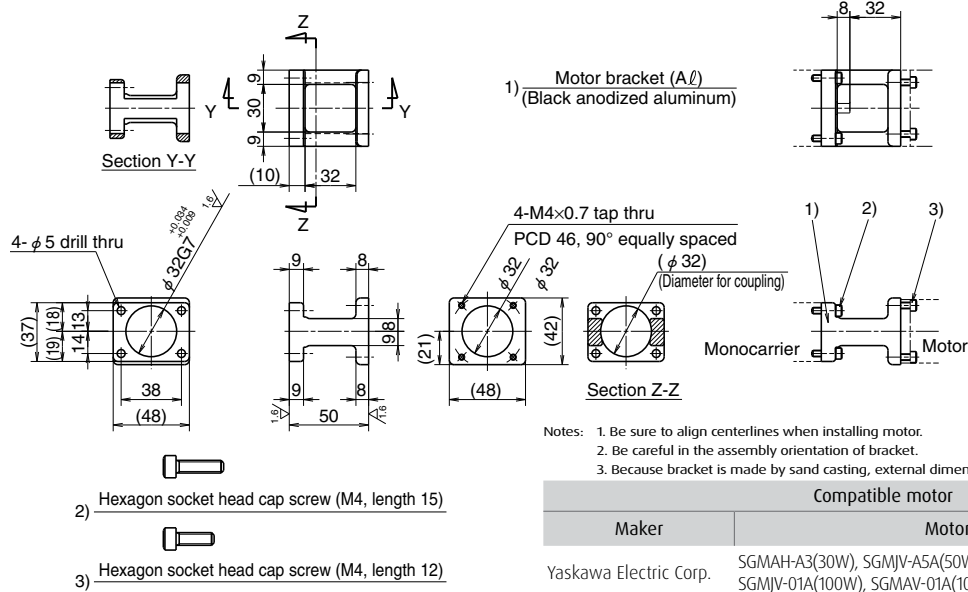


Note: Be sure to align the center lines when installing the motor.
Check the orientation of the bracket.

Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)

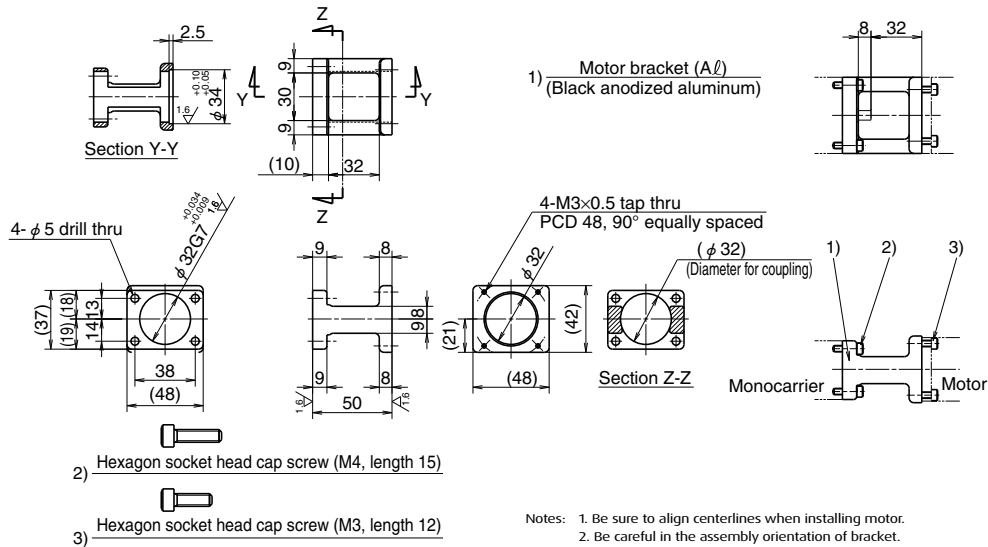
MCM05

■ Reference Number
MC-BK05-146-00



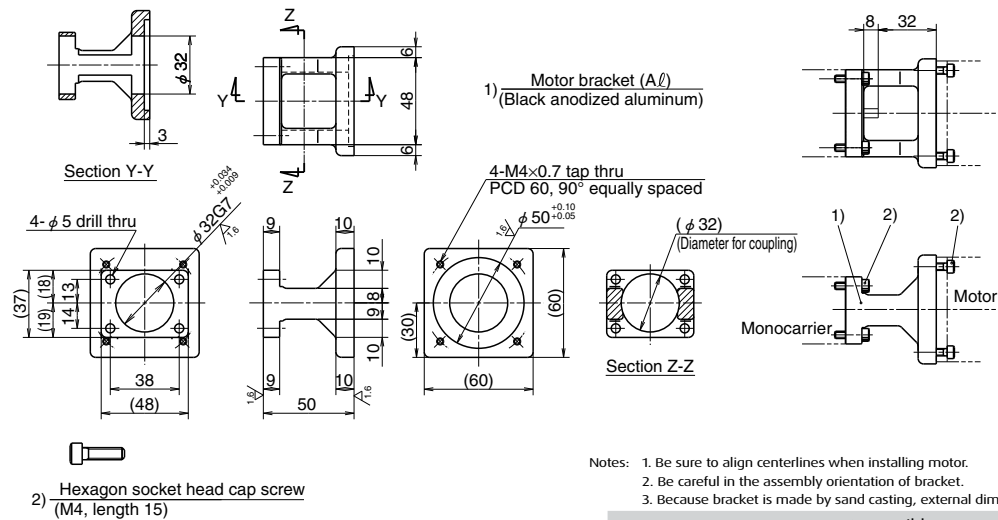
MCM05

■ Reference Number
MC-BK05-148-00



MCM05

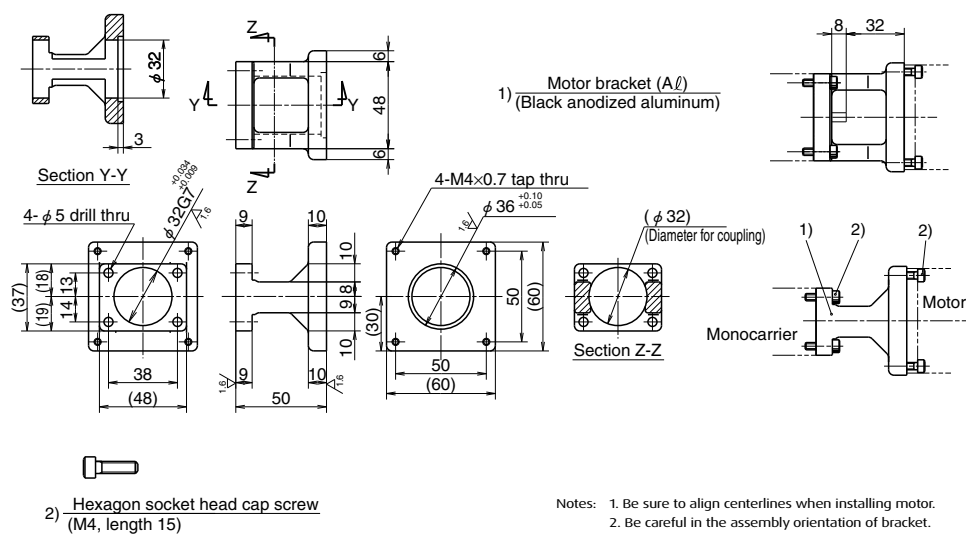
Reference Number
MC-BK05-160-00



Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	P50B05005(50W), P50B05010(100W), P50B05020(200W)

MCM05

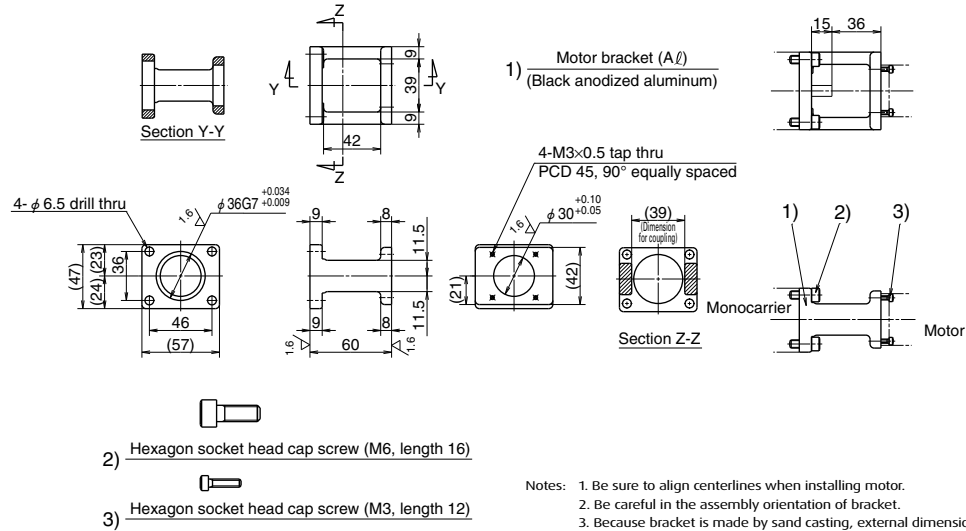
Reference Number
MC-BK05-250-00



Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x, CSK56x, CFK56x

MCM06

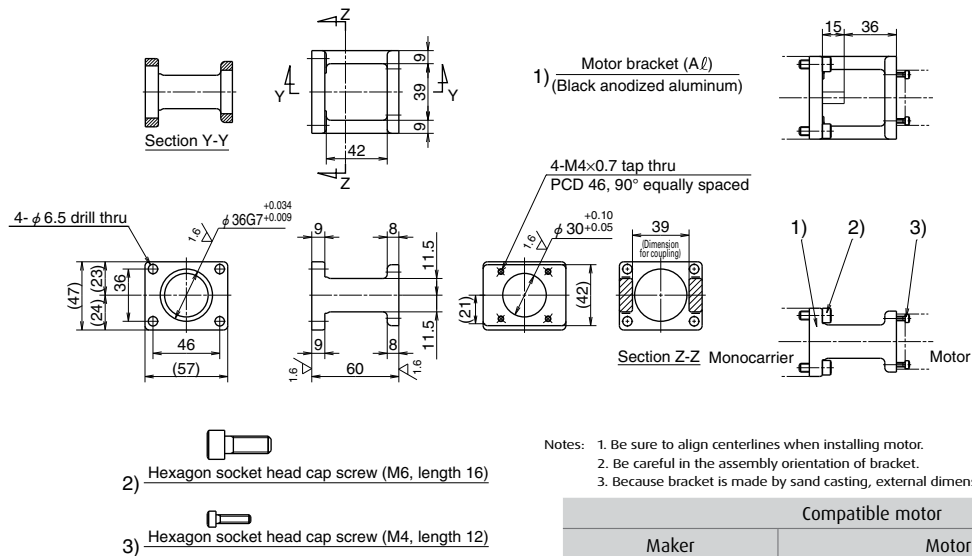
■ Reference Number
MC-BK06-145-00



Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)

MCM06

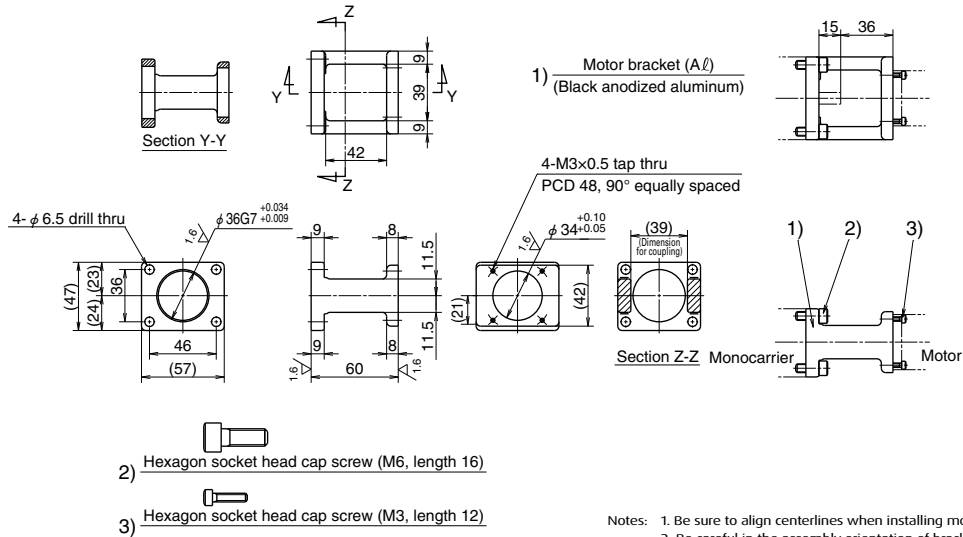
■ Reference Number
MC-BK06-146-00



Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMJV-A5A(50W), SGMV-A5A(50W), SGMJV-01A(100W), SGMV-01A(100W), SGMV-C2A(150W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W), HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
Sanyo Denki Co., Ltd.	P30B04003(30W), P30B04005(50W), P30B04010(100W)

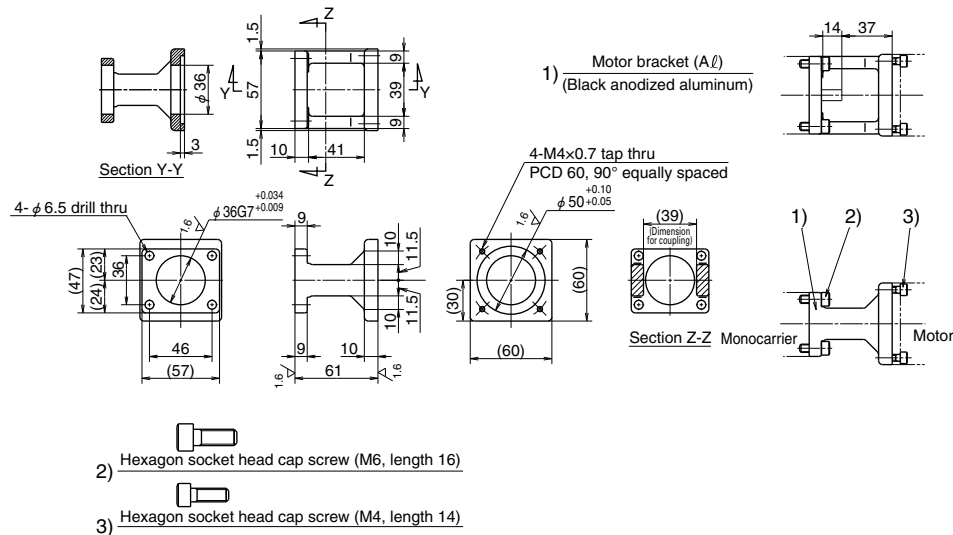
MCM06

■ Reference Number
MC-BK06-148-00



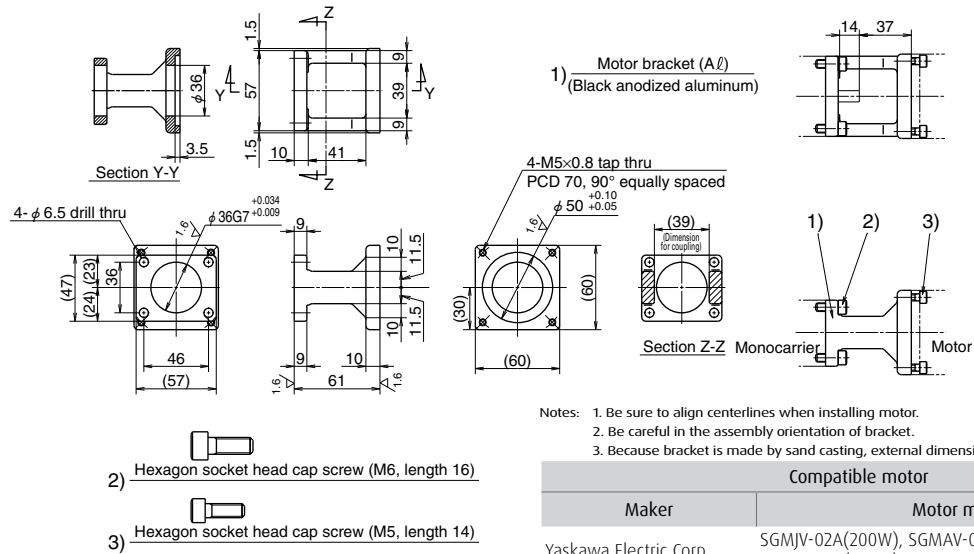
MCM06

■ Reference Number
MC-BK06-160-00



MCM06

Reference Number
MC-BK06-170-00

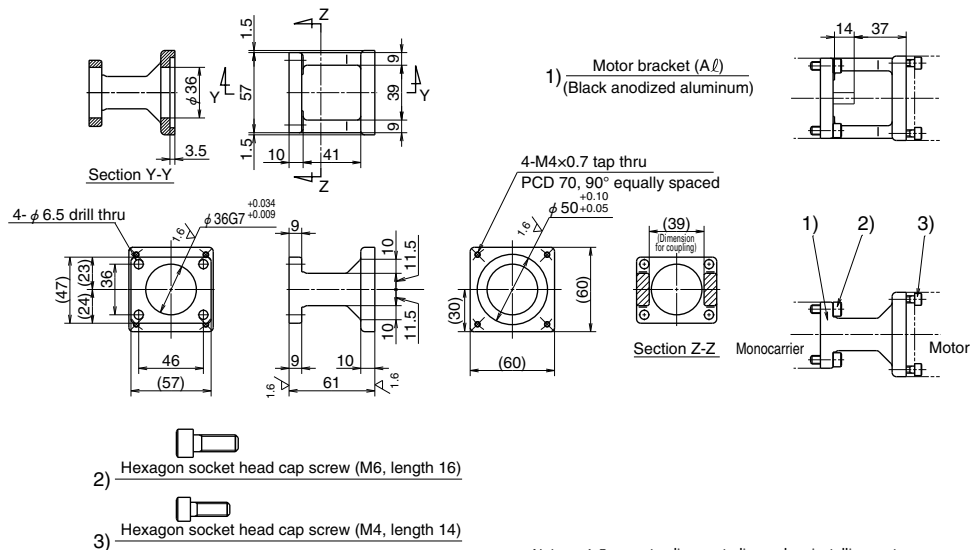


Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMJV-02A(200W), SGMJV-02A(200W), SGMJV-04A(400W), SGMJV-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W), HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
Sanyo Denki Co., Ltd.	P30B06020(200W), P30B06040(400W)

MCM06

Reference Number
MC-BK06-170-01

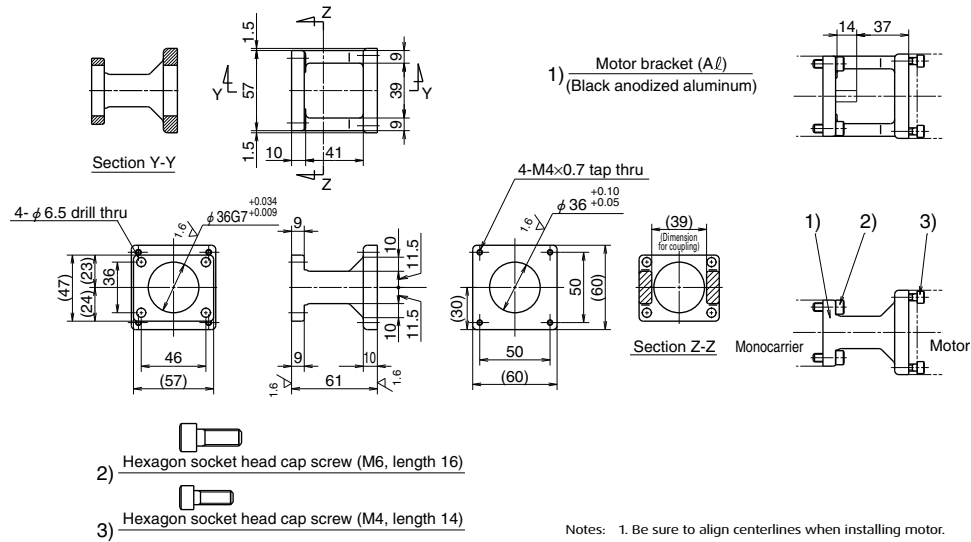


Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD02(200W), MAMA02(200W), MSMD04(400W), MAMA04(400W)

MCM06

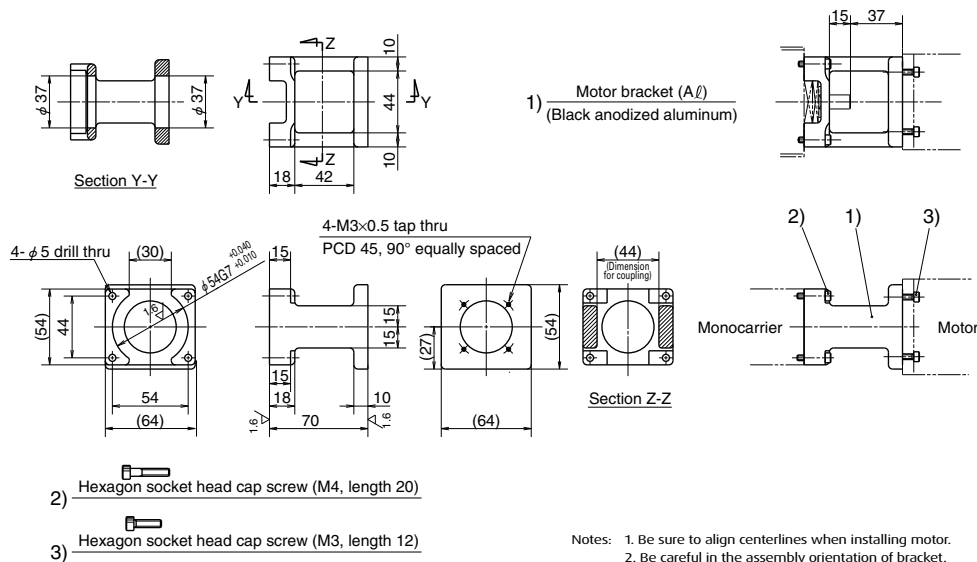
■ Reference Number
MC-BK06-250-00



Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, PK56x, CSK56x, CFK56x, UMK56x, UFK56x

MCM08

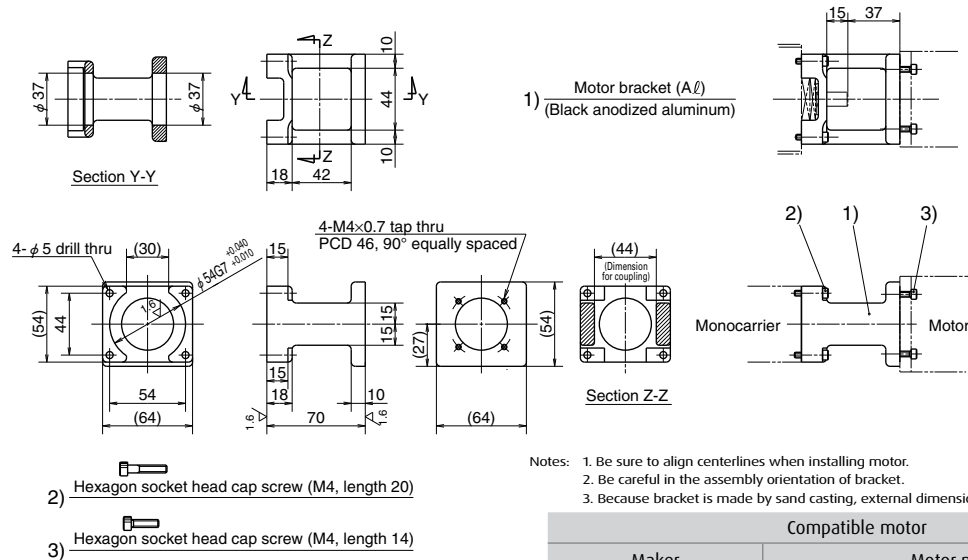
■ Reference Number
MC-BK08-145-00



Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD01(100W)

MCM08

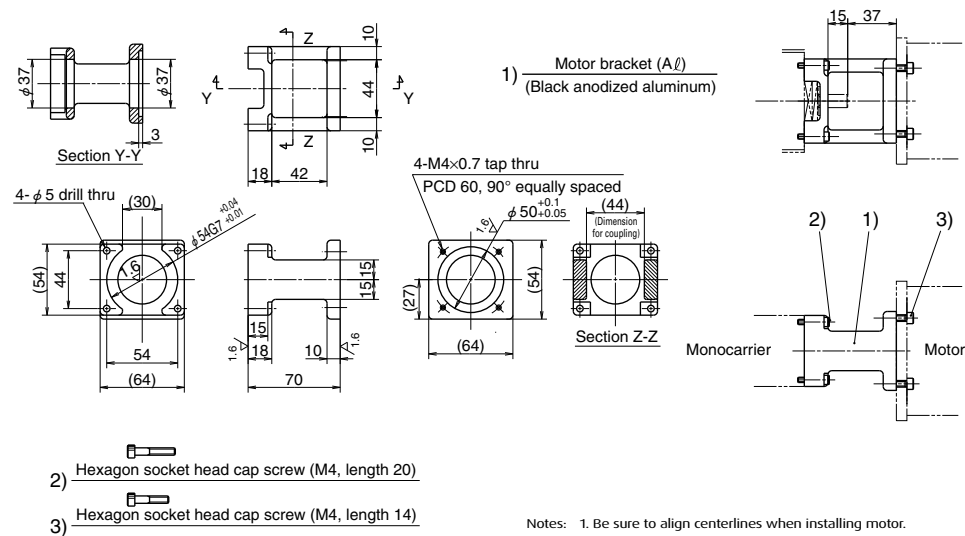
Reference Number
MC-BK08-146-00



Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMJV-01A(100W), SGM2V-01A(100W), SGM2V-C2A(150W)
Mitsubishi Electric Corp.	HF-KP13(100W), HF-MP13(100W), HC-KF13(100W), HC-MF13(100W)
Sanyo Denki Co., Ltd.	P30B04003(30W), P30B04005(50W), P30B04010(100W)

MCM08

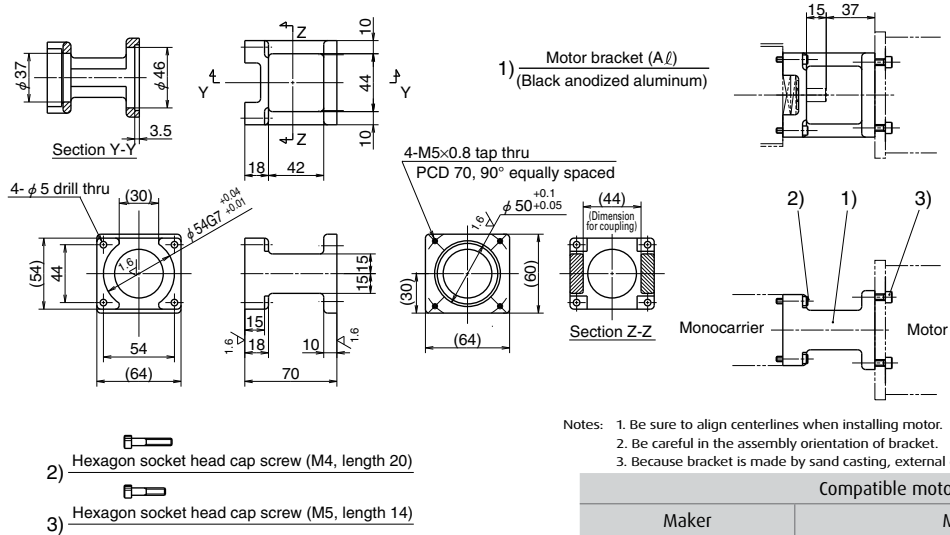
Reference Number
MC-BK08-160-00



Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	P50B05005(50W), P50B05010(100W), P50B05020(200W)

MCM08

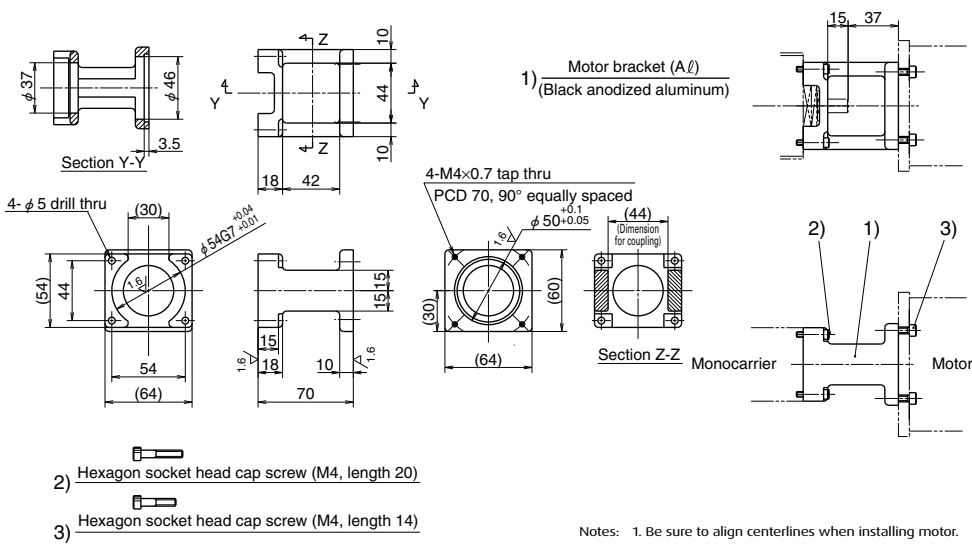
Reference Number
MC-BK08-170-00



Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMJV-02A(200W), SGMJV-02A(200W), SGMJV-04A(400W), SGMJV-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W), HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
Sanyo Denki Co., Ltd.	P30B06020(200W), P30B06040(400W)

MCM08

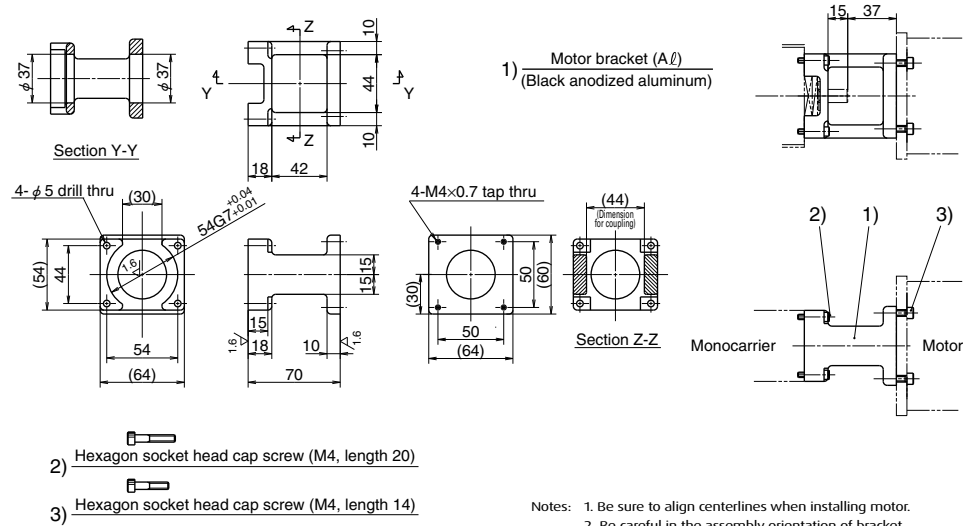
Reference Number
MC-BK08-170-01



Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD02(200W), MAMA02(200W), MSMD04(400W), MAMA04(400WW)

MCM08

■ Reference Number
MC-BK08-250-00

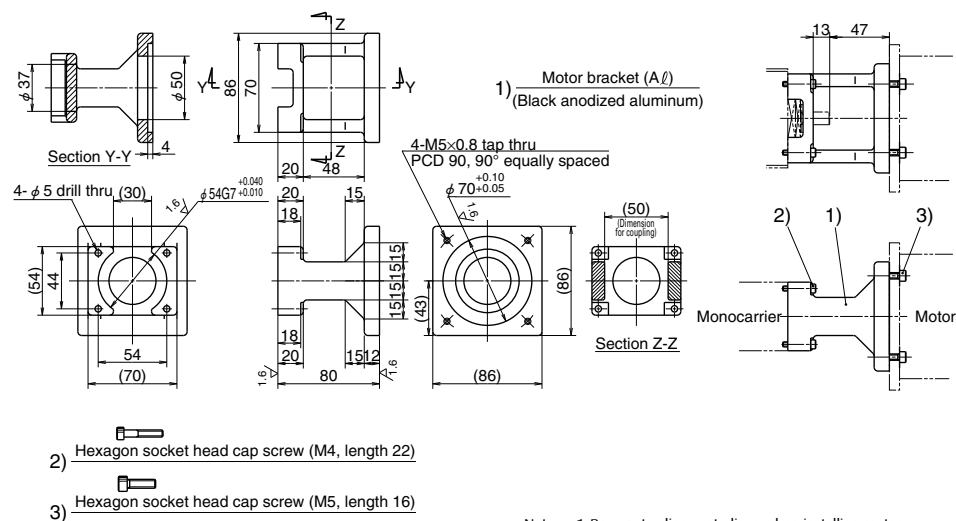


Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56xx, PK56xx, CSK56x, CFK56x, UFK56x

MCM08

■ Reference Number
MC-BK08-190-00

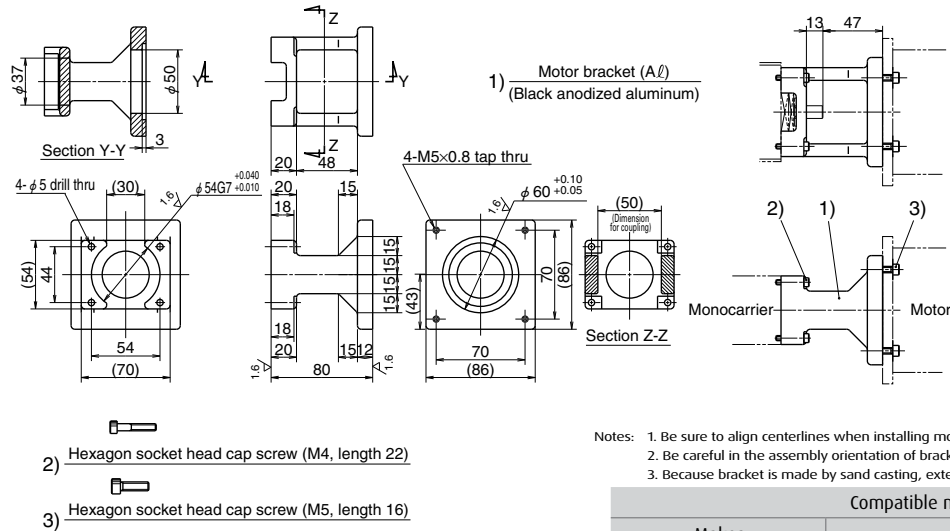


Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	P50B07020(200W), P50B07030(300W), P50B07040(400W)

MCM08

■ Reference Number
MC-BK08-270-00

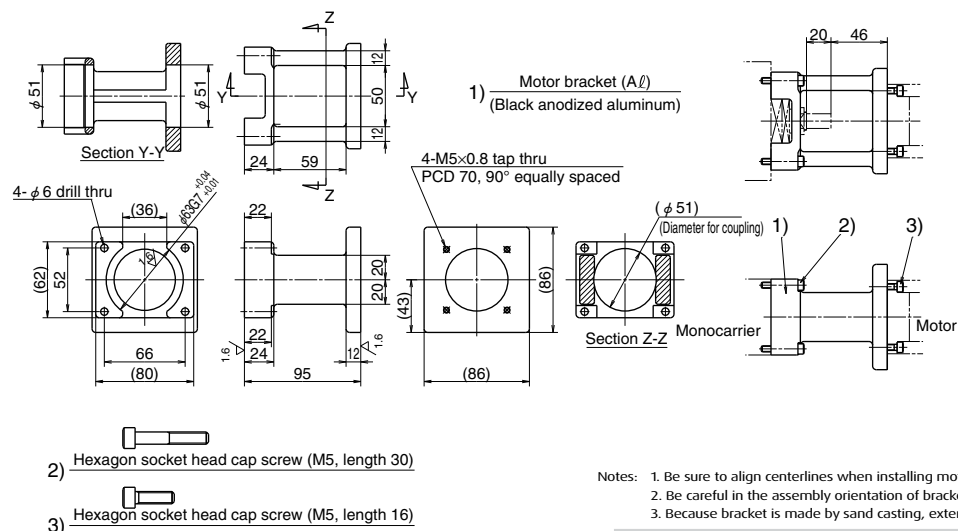


Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	AS98, UPK59x, PK59x, CSK59x, CFK59x, UFK59x
Sanyo Denki Co., Ltd.	103F85xx

MCM10

■ Reference Number
MC-BK10-170-00

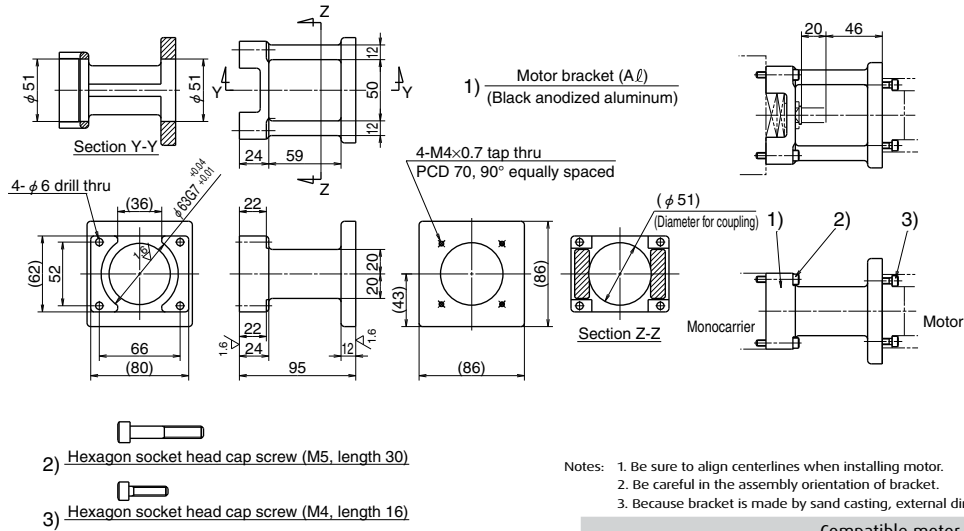


Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMJV-02A(200W), SGMJV-02A(200W), SGMJV-04A(400W), SGMJV-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W), HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
Sanyo Denki Co., Ltd.	P30B06020(200W), P30B06040(400W)

MCM10

■ Reference Number
MC-BK10-170-01

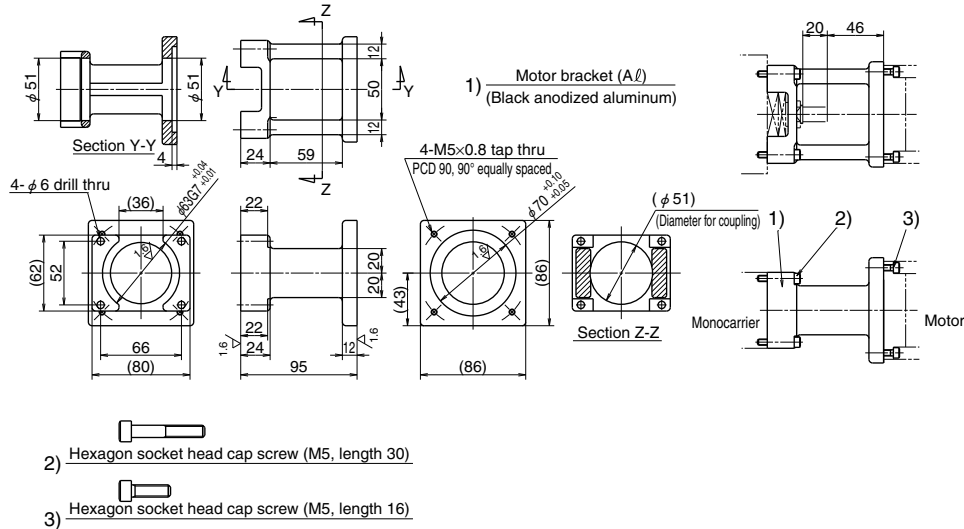


- Notes:
1. Be sure to align centerlines when installing motor.
 2. Be careful in the assembly orientation of bracket.
 3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD02(200W), MAMA02(200W), MSMD04(400W), MAMA04(400W)

MCM10

■ Reference Number
MC-BK10-190-00

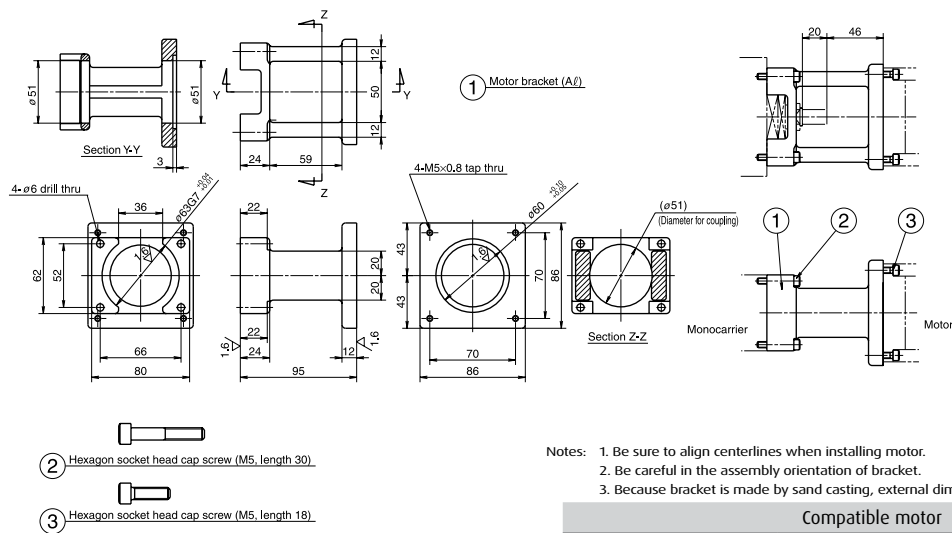


- Notes:
1. Be sure to align centerlines when installing motor.
 2. Be careful in the assembly orientation of bracket.
 3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD08(750W), MAMA08(750W)
Sanyo Denki Co., Ltd.	P50B07020(200W), P50B07030(300W), P50B07040(400W)

MCM10

Reference Number
MC-BK10-270-00



Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	103F85xx
Oriental Motor Co., Ltd.	AS98, UPK59x, PK59x, CSK59x, CFK59x, UFK59x

Motor Brackets for MCM Series by Japanese Motor Manufacturer
Table 2-5

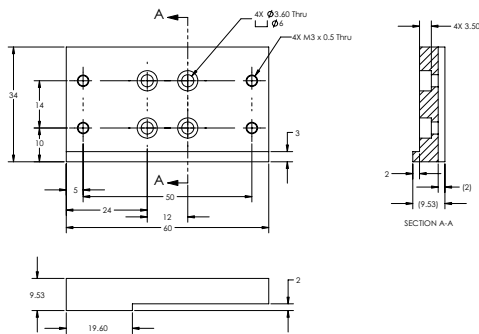
Model No.	Reference No. code	Motor bracket reference no.	Motor manufacturer	Stepping motor model no.	Wattage of AC servo motor										
					10	20	30	50	60	100	150	200	300	400	750
MCM02	1	MC-BK02-128-00	Yaskawa Electric Corp.		SGMM-A1	SGMM-A2									
	2	MC-BK02-133-00	Mitsubishi Electric Corp.		HC-AQ013	HC-AQ023									
	3	MC-BK02-223-00	Oriental Motor Co., Ltd.	PMU33/35 (5-phase) PMC33/35 (5-phase)											
MCM03	1	MC-BK03-146-00	Yaskawa Electric Corp.				SGMAH-A3	SGMJV-A5A SGMAV-A5A		SGMJV-01A SGMAV-01A	SGMAV-C2A				
			Mitsubishi Electric Corp.					HF-KP053 HF-MP053 HC-KFS053 HC-MFS053		HF-KP13 HF-MP13 HC-KFS13 HC-MFS13					
			OMRON Corp.												
	2	MC-BK03-148-01	Sanyo Denki Co., Ltd.				R88M-W03	R88M-W05		R88M-W10					
			Sanyo Denki Co., Ltd.				P30B04003	P30B04005		P30B04010					
			Sanyo Denki Co., Ltd.	PBM423xxx 103F55xx					P50B04006	P50B04010					
MCM05	1	MC-BK05-145-00	Panasonic Co., Ltd.					MSMD05A		MSMD01					
			Yaskawa Electric Corp.				SGMAH-A3	SGMJV-A5A SGMAV-A5A		SGMJV-01A SGMAV-01A	SGMAV-C2A				
			Mitsubishi Electric Corp.					HF-KP053 HF-MP053 HC-KFS053 HC-MFS053		HF-KP13 HF-MP13 HC-KFS13 HC-MFS13					
	2	MC-BK05-146-00	OMRON Corp.												
			Sanyo Denki Co., Ltd.				R88M-W03	R88M-W05		R88M-W10					
			Sanyo Denki Co., Ltd.				P30B04003	P30B04005		P30B04010					
MCM06	3	MC-BK05-148-00	Panasonic Co., Ltd.							MAMA01					
			Sanyo Denki Co., Ltd.					P50B05005		P50B05010		P50B05020			
			Sanyo Denki Co., Ltd.	PBM603xx, PB-M604xx											
	5	MC-BK05-250-00	Sanyo Denki Co., Ltd.	103F78xx											
			Sanyo Denki Co., Ltd.												
			Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, PK56x, CSK56x, CFK56x, UMK24x, CSK24x, PK24x											
MCM08	1	MC-BK06-145-00	Panasonic Co., Ltd.					MSMD05A		MSMD01					
	2	MC-BK06-146-00	Yaskawa Electric Corp.					SGMJV-A5A SGMAV-A5A		SGMJV-01A SGMAV-01A	SGMAV-C2A				
			Mitsubishi Electric Corp.					HF-KP053 HF-MP053 HC-KFS053 HC-MFS053		HF-KP13 HF-MP13 HC-KFS13 HC-MFS13					
			OMRON Corp.				R88M-W03	R88M-W05		R88M-W10					
	3	MC-BK06-148-00	Sanyo Denki Co., Ltd.				P30B04003	P30B04005		P30B04010					
			Panasonic Co., Ltd.						P50B04006	P50B04010					
			Sanyo Denki Co., Ltd.							MAMA01					
	5	MC-BK06-170-00	Yaskawa Electric Corp.									P50B05020			
			Mitsubishi Electric Corp.									SGMJV-02A SGMAV-02A		SGMJV-04A SGMAV-04A	
			OMRON Corp.									HF-KP23 HF-MP23 HC-KFS23 HC-MFS23		HF-KP43 HF-MP43 HC-KFS43 HC-MFS43	
	6	MC-BK06-170-01	Sanyo Denki Co., Ltd.									R88M-W20		R88M-W40	
			Sanyo Denki Co., Ltd.									P30B06020		P30B06040	
			Panasonic Co., Ltd.									MSMD02 MAMA02		MSMD04 MAMA04	
MCM10	1	MC-BK08-145-00	Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx											
			Sanyo Denki Co., Ltd.	103F78xx											
			Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, PK56x, CSK56x, CFK56x, UFK56x											
	2	MC-BK08-146-00	Sanyo Denki Co., Ltd.	103F85xx											
			Oriental Motor Co., Ltd.	AS98, UPK59x, PK59x, CSK59x, CFK59x, UFK59x											
	4	MC-BK08-170-00	Yaskawa Electric Corp.									SGMJV-02A SGMAV-02A		SGMJV-04A SGMAV-04A	
			Mitsubishi Electric Corp.									HF-KP23 HF-MP23 HC-KFS23 HC-MFS23		HF-KP43 HF-MP43 HC-KFS43 HC-MFS43	
			OMRON Corp.									R88M-W20		R88M-W40	
	5	MC-BK08-170-01	Sanyo Denki Co., Ltd.									P30B06020		P30B06040	
			Panasonic Co., Ltd.									MSMD02 MAMA02		MSMD04 MAMA04	
			Sanyo Denki Co., Ltd.									P50B07020	P50B07030	P50B07040	
MCM10	1	MC-BK10-170-00	Yaskawa Electric Corp.												
			Mitsubishi Electric Corp.												
			OMRON Corp.												
	2	MC-BK10-170-01	Panasonic Co., Ltd.												
MCM10	3	MC-BK10-190-00	Sanyo Denki Co., Ltd.												
			Sanyo Denki Co., Ltd.												
			Oriental Motor Co., Ltd.	103F85xx											
	4	MC-BK10-270-00	Oriental Motor Co., Ltd.	AS98, UPK59x, PK59x, CSK59x, CFK59x, UFK59x											

2.3.5 Combining Brackets

Please ask NSK for bracket not shown.

MCM02 to MCM02 Combining Bracket

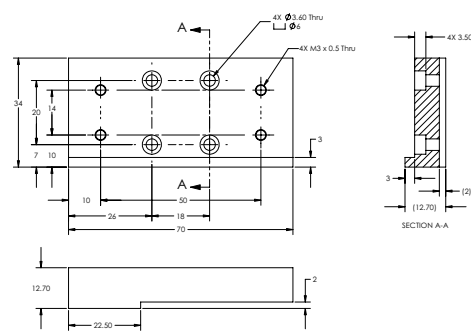
Reference Number: MC-1K0202-D-31



Description	Part Number	Qty
MCM02 to MCM02 Combining Bracket	UB890202D-301	1
M3x6 Socket Head Cap Screw	TAB3x6	4
M3x6 Button Head Cap Screw	GF4-91239A111	4

MCM03 to MCM02 Combining Bracket

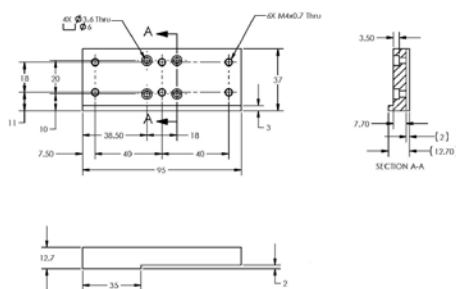
Reference Number: MC-1K0302-D-31



Description	Part Number	Qty
MCM03 to MCM02 Combining Bracket	UB890302D-301	1
M3x8 Socket Head Cap Screw	TAB3x8	4
M3x8 Button Head Cap Screw	GF4-91239A113	4

MCM03 to MCM03 Combining Bracket

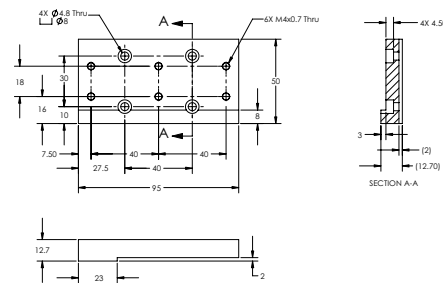
Reference Number: MC-1K0303-D-31



Description	Part Number	Qty
MCM03 to MCM03 Combining Bracket	UB890303D-30X	1
M3x8 Socket Head Cap Screw	TAB3x8	4
M4x8 Socket Head Cap Screw	TAB4x8	6

MCM05 to MCM03 Combining Bracket

Reference Number: MC-1K0503-D-31

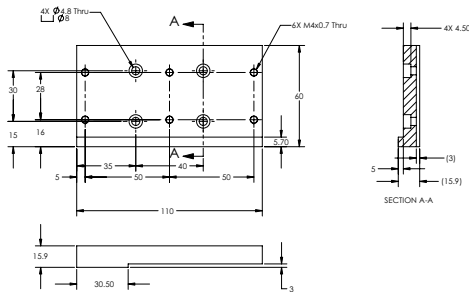


Description	Part Number	Qty
MCM05 to MCM03 Combining Bracket	UB890503D-301	1
M4x8 Socket Head Cap Screw	TAB4x8	10

MCM03 to MCM03 combining bracket can only be used with 1 or 2 mm lead.

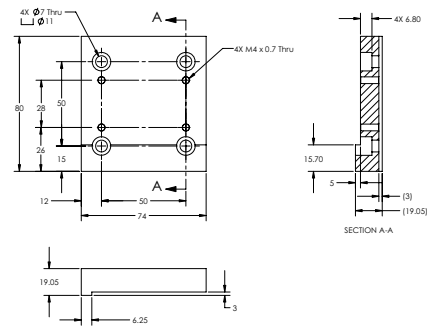
*When the combining bracket is used, only the top cover and one side cover can be used.

MCM05 to MCM05 Combining Bracket
Reference Number: MC-1K0505-D-32



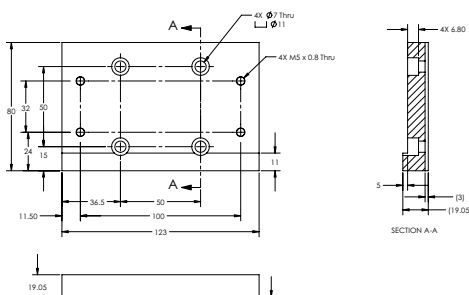
Description	Part Number	Qty
MCM05 to MCM05 Combining Bracket	UB890505D-30x	1
M4x8 Socket Head Cap Screw	TAB4x8	4
M4x12 Socket Head Cap Screw	TAB4x12	6

MCM08 to MCM05 Combining Bracket
Reference Number: MC-1K0805-D-32



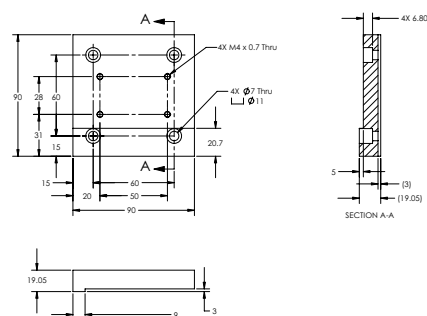
Description	Part Number	Qty
MCM08 to MCM05 Combining Bracket	UB890805D-302	1
M4x12 Socket Head Cap Screw	TAB4x12	4
M6x14 Socket Head Cap Screw	TAB6x14	4

MCM08 to MCM06 Combining Bracket
Reference Number: MC-1K0806-D-31



Description	Part Number	Qty
MCM08 to MCM06 Combining Bracket	UB890806D-301	1
M5x16 Socket Head Cap Screw	TAB5x16	4
M6x14 Socket Head Cap Screw	TAB6x14	4

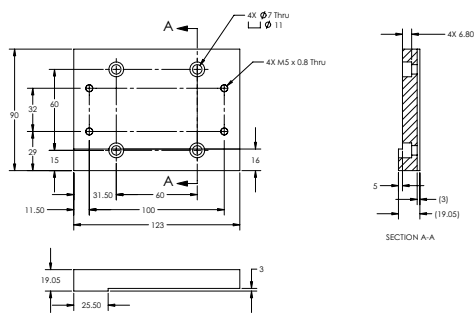
MCM10 to MCM05 Combining Bracket
Reference Number: MC-1K1005-D-31



Description	Part Number	Qty
MCM10 to MCM05 Combining Bracket	UB891005D-301	1
M4x12 Socket Head Cap Screw	TAB4x12	4
M6x14 Socket Head Cap Screw	TAB6x14	4

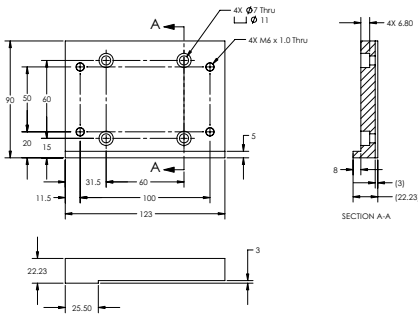
*When the combining bracket is used, only the top cover and one side cover can be used.

MCM10 to MCM06 Combining Bracket
Reference Number: MC-1K1006-D-31



Description	Part Number	Qty
MCM10 to MCM06 Combining Bracket	UB891006D-302	1
M5x16 Socket Head Cap Screw	TAB5x16	4
M6x14 Socket Head Cap Screw	TAB6x14	4

MCM10 to MCM08 Combining Bracket
Reference Number: MC-1K1008-D-35



Description	Part Number	Qty
MCM10 to MCM06 Combining Bracket	UB891006D-302	1
M5x16 Socket Head Cap Screw	TAB5x16	4
M6x14 Socket Head Cap Screw	TAB6x14	4

*When the combining bracket is used, only the top cover and one side cover can be used.

Notes

[illegible]





3.1	MCH Series Reference Number Coding.....	80
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3 MCH Series

3.1 MCH Series Reference Number Coding

[Body]

MC	H	06	040	H	10	K	(B ^{*1})	0)
MONOCARRIER	SERIES	NOMINAL SIZE	STROKE	ACCURACY GRADE	BALL SCREW LEAD	SLIDER SPECIFICATION	GREASE SPECIFICATION	SPECIAL SPECIFICATION
MC: Monocarrier	H: MCH Series L: MCH Series Low Profile Rail (only for 06 size)	Rail width, unit: 10 mm	Unit: 10 mm	H: High Precision P: Precision Grade	Unit: mm	K: Single slider D: Double slider	B: Clean Grease LG2	
*1: These two code fields shall be added when non-standard grease is used. The coding of an MCH Monocarrier™ with standard grease shall have 12 characters as shown above.								

[With Optional Accessories]

MC	S	06	040	H	10	K	0	0	K	0	0	0
	OPTIONAL ACCESSORIES								NSK MANAGEMENT NUMBER	SENSOR UNIT	COVER UNIT	INTERMEDIATE PLATE FOR MOTOR BRACKET
S: With MCH optional components R: With MCL optional components												
Note: Optional components are available separately.												

Table 3-1 Sensor Unit (See pages 88-89)

Reference Number Code	Specification	Reference Number
0	N/A	—
1	Proximity switch (normally close 3 pieces)	MC—SRHxx—10
2	Proximity switch (normally open 3 pieces)	MC—SRHxx—11
3	Proximity switch (normally open 1 piece, normally close 2 pieces)	MC—SRHxx—12
4	Photo sensor 3 pieces	MC—SRHxx—13

Notes: 1). xx: Nominal size.

2). Sensor rail is not included in sensor unit. If you require rail, please specify when ordering.

Table 3-2 Cover Unit (See pages 90-91)

Reference Number Code	Specification	Reference Number
0	N/A	—
1	For single slider For double slider	MC—HVxxxx—00 MC—HVxxxxD00

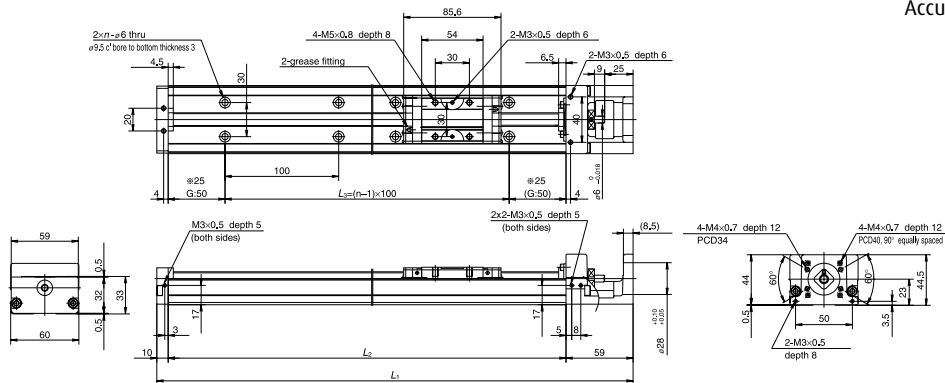
Note xxxx: Reference number and stroke number

Table 3-3 Intermediate Plate for Motor Bracket (See pages 92-97)

Reference Number Code	Type		
	MCH06 (MCL06)	MCH09	MCH10
0	N/A	N/A	N/A
1	MC-BKH06-145-00	MC-BKH09-145-00	MC-BKH10-170-00
2	MC-BKH06-146-00	MC-BKH09-146-00	MC-BKH10-170-01
3	MC-BKH06-231-00	MC-BKH09-170-00	MC-BKH10-190-00
4	MC-BKH06-250-00	MC-BKH09-170-01	MC-BKH10-190-01
5	—	MC-BKH09-231-00	MC-BKH10-250-00
6	—	MC-BKH09-250-00	MC-BKH10-270-00

MCL06

Accuracy Grade: High Grade (H)



- The rail of MCL 06 is made lighter than that of MCH 06 by lowering the rail height. The weight ratio between the MCH 06 and MCL 06 is 5 to 4.
- Double slider specification is also available for the MCL 06.
- Combinations of stroke and ball screw lead of the MCL 06 are the same as those of the MCH 06.

Dimension of MCL06 (Single Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (K1™ is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes	Inertia ×10 ⁻⁶ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃	n		
※ MCL06005H05K	50	53 (65)	5	219	150	100	2	2.38	1.0
※ MCL06005H10K			10					3.45	
MCL06010H05K	100	103 (115)	5	269	200	100	2	3.17	1.3
MCL06010H10K			10					4.12	
MCL06020H05K	200	203 (215)	5	369	300	200	3	4.51	1.9
MCL06020H10K			10					5.46	
MCL06030H10K	300	303 (315)	10	469	400	300	4	6.80	2.6
MCL06030H20K			20					10.60	
MCL06040H10K	400	403 (415)	10	569	500	400	5	8.13	3.2
MCL06040H20K			20					11.90	
MCL06050H10K	500	503 (515)	10	669	600	500	6	9.47	3.9
MCL06050H20K			20					13.30	

Dimension of G is 25 for those marked with $\ast$.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead (mm)	5	1.0~4.8
	10	1.1~5.8
	20	1.6~7.9

1. Frictional resistance of NSK K1™ is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

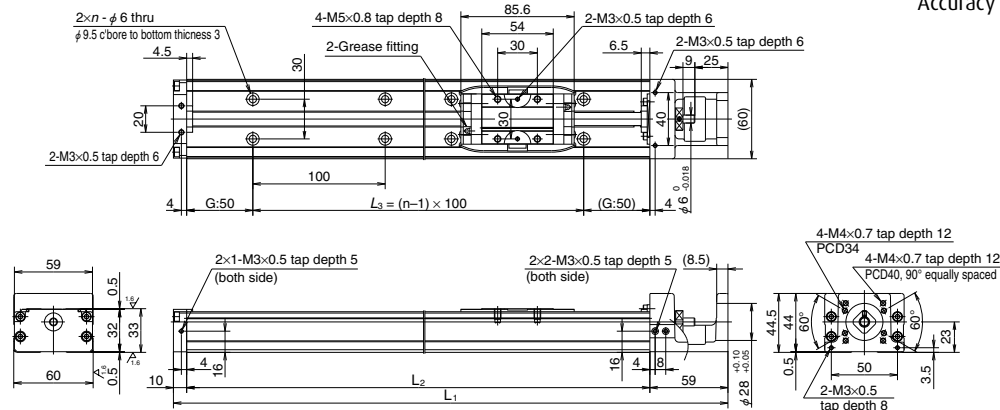
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C _s	Linear guides C	Support unit C _s	Rated running distance L _s (km)	Ball screw C _{0s}	Linear guides C ₀	
5	Ø12	3,000 (High grade) 3,760 (Precision)	22,800	4,400	5	5,410 (High grade) 6,310 (Precision)	10,900	1,450
10		1,930 (High grade) 2,260 (Precision)	18,100		10	3,160 (High grade) 3,780 (Precision)		
20		1,930 (High grade) 2,260 (Precision)	14,400		20	3,160 (High grade) 3,780 (Precision)		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	335	133	133

MCH06

Accuracy Grade: High Grade (H)



Dimension of MCH06 (Single Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (without K1™)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes n	Inertia × 10 ⁻⁶ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃			
※ MCH06005H05K	50	53 (65)	5	219	150	100	2	2.38	1.8
※ MCH06005H10K			10					3.45	
※ MCH06005H20K			20					7.25	
MCH06010H05K	100	103 (115)	5	269	200	100	2	3.17	2.2
MCH06010H10K			10					4.12	
MCH06010H20K			20					7.92	
MCH06020H05K	200	203 (215)	5	369	300	200	3	4.51	3.0
MCH06020H10K			10					5.46	
MCH06020H20K			20					9.26	
MCH06030H05K	300	303 (315)	5	469	400	300	4	5.85	3.7
MCH06030H10K			10					6.8	
MCH06030H20K			20					10.6	
MCH06040H05K	400	403 (415)	5	569	500	400	5	7.18	4.5
MCH06040H10K			10					8.13	
MCH06040H20K			20					11.9	
MCH06050H05K	500	503 (515)	5	669	600	500	6	8.52	5.2
MCH06050H10K			10					9.47	
MCH06050H20K			20					13.3	

Dimension of G is 25 instead of 50 for those marked with ※.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	5	1.0~4.8
	10	1.1~5.8
	20	1.6~7.9

1. Frictional resistance of NSK K1™ is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

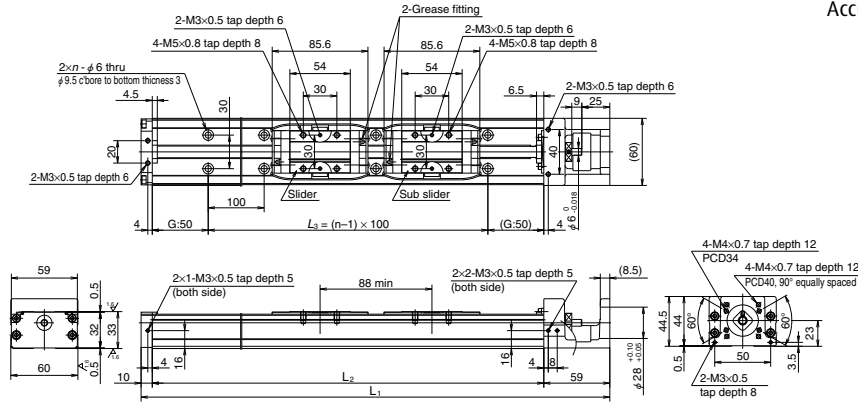
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C ₀	Linear guides C	Support unit C ₀	Rated running distance L _r (km)	Ball screw C _{0s}	Linear guides C ₀	
5	Ø12	3,000 (High grade) 3,760 (Precision)	22,800	4,400	5	5,410 (High grade) 6,310 (Precision)	10,900	1,450
10		1,930 (High grade) 2,260 (Precision)	18,100		10	3,160 (High grade) 3,780 (Precision)		
20		1,930 (High grade) 2,260 (Precision)	14,400		20	3,160 (High grade) 3,780 (Precision)		

Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M _{R0}	Pitching M _{P0}	Yawing M _{Y0}
Single	335	133	133

MCH06 (Double Slider)

Accuracy Grade: High Grade (H)



Dimension of MCH06 (Double Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (K1™ is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes n	Inertia ×10 ⁻⁶ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃			
MCH06010H05D	100	115 (139)	5	369	300	200	3	4.82	3.5
MCH06010H10D			10					6.72	
MCH06020H05D	200	215 (230)	5	469	400	300	4	8.06	4.2
MCH06020H10D			10					15.7	
MCH06030H05D	300	315 (339)	5	569	500	400	5	9.4	5.0
MCH06030H10D			10					17.0	
MCH06040H10D	400	415 (439)	10	669	600	500	6	10.7	5.7
MCH06040H20D			20					18.3	

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	5	1.2-5.2
	10	1.5-9.6
	20	2.3-11.8

1. Frictional resistance of NSK K1™ is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

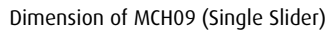
Basic Load Rating

Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C ₀	Linear guides C	Support unit C ₀	Rated running distance L _s (km)	Ball screw C _{0a}	Linear guides C ₀	
5	Ø12	3,000 (High grade) 3,760 (Precision)	22,800	4,400	5	5,410 (High grade) 6,310 (Precision)	16,300	1,450
10		1,930 (High grade) 2,260 (Precision)	18,100		10	3,160 (High grade) 3,780 (Precision)		
20		1,930 (High grade) 2,260 (Precision)	14,400		20	3,160 (High grade) 3,780 (Precision)		

Basic Static Moment Load of Linear Guide

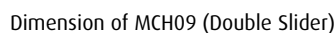
Slider	Basic static moment load (N · m)		
	Rolling M _{R0}	Pitching M _{P0}	Yawing M _{Y0}
Double	770	730	730

Accuracy Grade: High Grade (H)



Courtesy of Steven Engineering, Inc. - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com

Accuracy Grade: High Grade (H)

Monocarrier dynamic torque specification (N · cm)

1. Frictional resistance of NSK K1™ is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C _s	Linear guides C	Support unit C _s	Rated running distance L _s (km)	Ball screw C _{0s}	Linear guides C ₀	
5	Ø15	6,820 (High grade) 7,100 (Precision)	40,600	7,100	5	13,200 (High grade) 13,000 (Precision)	30,500	3,040
10		5,110 (High grade) 7,060 (Precision)	32,200		10	9,290 (High grade) 12,700 (Precision)		
20		3,290 (High grade) 4,560 (Precision)	25,500		20	5,620 (High grade) 7,750 (Precision)		

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Accuracy Grade: High Grade (H)

Monocarrier dynamic torque specification (N · cm)

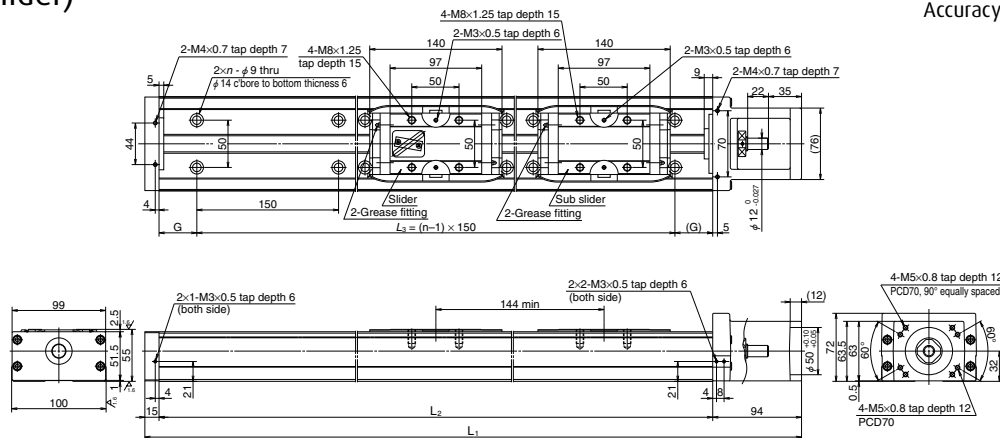
1. Frictional resistance of NSK K1™ is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Static Moment Load of Linear Guide

Courtesy of Steven Engineering, Inc. - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com

MCH10 (Double Slider)

Accuracy Grade: High Grade (H)



Dimension of MCH10 (Double Slider)

Reference number	Nominal stroke (mm)	Stroke limit (mm) (K1™ is not equipped)	Ball screw lead (mm)	Body length (mm)				No. of mounting holes n	Inertia ×10 ⁻⁶ (kg · m ²)	Mass (kg)
				L ₁	L ₂	G	L ₃			
MCH10025H10D	250	282 (314)	10	689	580	65	450	4	67.1	15
MCH10025H20D			20							
MCH10035H10D	350	382 (414)	10	789	680	40	600	5	77.3	17
MCH10035H20D			20							
MCH10045H10D	450	482 (514)	10	889	780	15	750	6	87.5	20
MCH10045H20D			20							
MCH10055H10D	550	582 (614)	10	989	880	65	750	6	97.7	22
MCH10055H20D			20							
MCH10065H10D	650	682 (714)	10	1,089	980	40	900	7	108.0	24
MCH10065H20D			20							
MCH10075H20D	750	782 (814)	20	1,189	1,080	15	1,050	8	133.0	26
MCH10085H20D	850	882 (914)	20	1,289	1,180	65	1,050	8	143.0	28
MCH10095H20D	950	982 (1,014)	20	1,389	1,280	40	1,200	9	154.0	30
MCH10105H20D	1,050	1,082 (1,114)	20	1,489	1,380	15	1,350	10	164.0	33

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	10	4.2~15.6
	20	5.0~19.6

1. Frictional resistance of NSK K1™ is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic Load Rating

Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C _a	Linear guides C	Support unit C _a	Rated running distance L _a (km)	Ball screw C _{0a}	Linear guides C ₀	
10	Ø20	8,230 (High grade) 10,900 (Precision)	44,600	7,600	10	17,100 (High grade) 21,700 (Precision)	42,000	3,380
20		5,300 (High grade) 7,060 (Precision)	35,400		20	10,300 (High grade) 12,700 (Precision)		

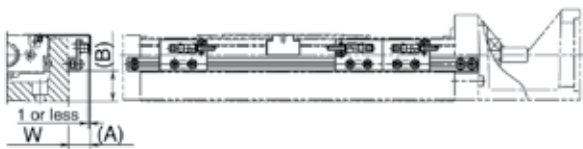
Basic Static Moment Load of Linear Guide

Slider	Basic static moment load (N · m)		
	Rolling M _{Ro}	Pitching M _{Ro}	Yawing M _{Ro}
Single	2,920	3,430	3,430

3.3 MCH Series Optional Accessories

3.3.1 Sensor Unit

● Proximity Switch



(Example of assembly)

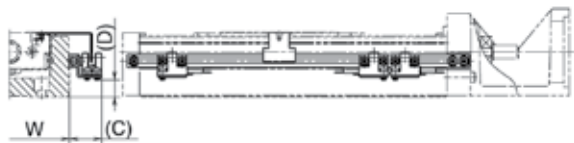
Type		Reference Number			Dimension (A) (mm)	Dimension (B) (mm)	Body width W (mm)
MCH06		MC-SRH06-10	MC-SRH06-11	MC-SRH06-12	17	10	60
MCH09		MC-SRH09-10	MC-SRH09-11	MC-SRH09-12	16	21	86
MCH10		MC-SRH10-10	MC-SRH10-11	MC-SRH10-12	16	16	100
Quantity	Proximity switch (normally open contact)	—	3	1	E2S-W13 (OMRON Corp.)		
	Proximity switch (normally close contact)	3	—	2	E2S-W14 (OMRON Corp.)		

*See page 24 for specification of proximity switch.

A sensor unit consists of sensors and sensor mounting parts.

● Photo Sensor

Sensor rail is not included in a sensor unit.



(Example of assembly)

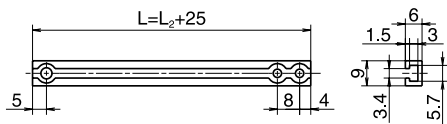
Type	NPN Sensor Reference Number	PNP Sensor Reference Number	Dimension (C) (mm)	Dimension (D) (mm)	Body width W (mm)	Remarks
MCH06	MC-SRH06-13	MC-SRH06-36	24	2	60	EE-SX674 (OMRON Corp.)
MCH09	MC-SRH09-13	MC-SRH09-40	23	12	86	EE-SX674P (OMRON Corp.)
MCH10	MC-SRH10-13	MC-SRH10-31	23	16	100	3 sets (EE-1001 connector attachment)

*See page 25 for specification of photo sensor.

A sensor unit consists of sensors and sensor mounting parts.

● Sensor Rail

- Reference Number: MC-SRL- * * * *
- * * * * is the same as rail dimension L₂.



Note: For combinations of sensors and rails, see page 91.

MCH Series and Sensor Rail Combination Table

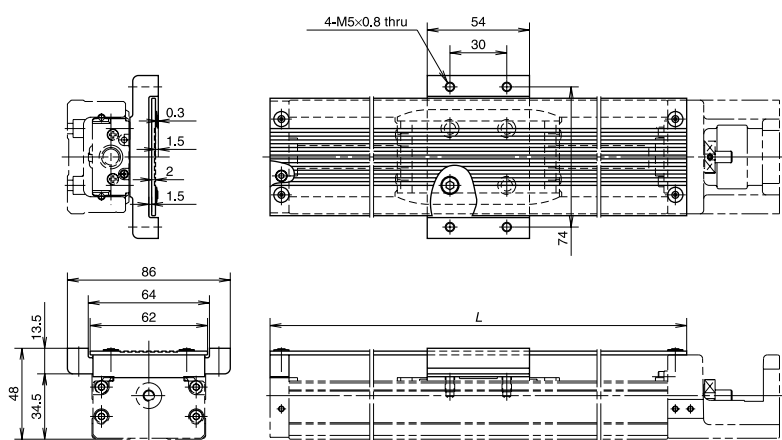
Table 3-4

Model No.	Body length L (mm)	Reference No.	Sensor rail reference No.
MCH06	150	MCH06005H05K	MC-SRL-0150
		MCH06005H10K	
		MCH06005H20K	
	200	MCH06010H05K	MC-SRL-0200
		MCH06010H10K	
		MCH06010H20K	
	300	MCH06020H05K	MC-SRL-0300
		MCH06020H10K	
		MCH06020H20K	
	400	MCH06030H05K	MC-SRL-0400
		MCH06030H10K	
		MCH06030H20K	
	500	MCH06040H05K	MC-SRL-0500
		MCH06040H10K	
		MCH06040H20K	
	600	MCH06050H05K	MC-SRL-0600
		MCH06050H10K	
		MCH06050H20K	
MCL06	150	MCL06005H05K	MC-SRL-0150
	200	MCL06010H05K	MC-SRL-0200
	300	MCL06020H05K	MC-SRL-0300
	400	MCL06030H05K	MC-SRL-0400
	500	MCL06040H05K	MC-SRL-0500
	600	MCL06050H05K	MC-SRL-0600
MCH09	240	MCH09010H05K	MC-SRL-0240
		MCH09010H10K	
		MCH09010H20K	
	340	MCH09020H05K	MC-SRL-0340
		MCH09020H10K	
		MCH09020H20K	
	440	MCH09030H05K	MC-SRL-0440
		MCH09030H10K	
		MCH09030H20K	
	540	MCH09040H05K	MC-SRL-0540
		MCH09040H10K	
		MCH09040H20K	
	640	MCH09050H05K	MC-SRL-0640
		MCH09050H10K	
		MCH09050H20K	
	740	MCH09060H05K	MC-SRL-0740
		MCH09060H10K	
		MCH09060H20K	

Model No.	Body length L (mm)	Reference No.	Sensor rail reference No.
MCH09	840	MCH09070H05K	MC-SRL-0840
		MCH09070H10K	
		MCH09070H20K	
	940	MCH09080H05K	MC-SRL-0940
		MCH09080H10K	
		MCH09080H20K	
MCH10	280	MCH10010H05K	MC-SRL-0280
		MCH10010H10K	
		MCH10010H20K	
	380	MCH10020H05K	MC-SRL-0380
		MCH10020H10K	
		MCH10020H20K	
	480	MCH10030H05K	MC-SRL-0480
		MCH10030H10K	
		MCH10030H20K	
	580	MCH10040H05K	MC-SRL-0580
		MCH10040H10K	
		MCH10040H20K	
	680	MCH10050H05K	MC-SRL-0680
		MCH10050H10K	
		MCH10050H20K	
	780	MCH10060H05K	MC-SRL-0780
		MCH10060H10K	
		MCH10060H20K	
	880	MCH10070H05K	MC-SRL-0880
		MCH10070H10K	
		MCH10070H20K	
	980	MCH10080H05K	MC-SRL-0980
		MCH10080H10K	
		MCH10080H20K	
	1,080	MCH10090H05K	MC-SRL-1080
		MCH10090H10K	
		MCH10090H20K	
	1,180	MCH10100H05K	MC-SRL-1180
		MCH10100H10K	
		MCH10100H20K	
	1,280	MCH10110H05K	MC-SRL-1280
		MCH10110H10K	
		MCH10110H20K	
	1,380	MCH10120H05K	MC-SRL-1380
		MCH10120H10K	
		MCH10120H20K	

3.3.2 Cover Unit

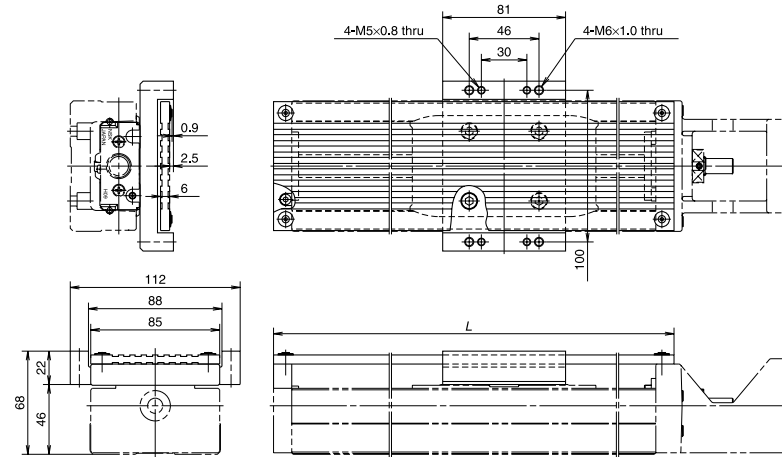
Cover Unit for MCH06
Cover Unit for MCL06



(Unit: mm)

Single Slider		Double Slider		Top cover length L
Stroke	Reference Number	Stroke	Reference Number	
50	MC-HV06005-00	—	—	170
100	MC-HV06010-00	—	—	220
200	MC-HV06020-00	100	MC-HV06010D00	320
300	MC-HV06030-00	200	MC-HV06020D00	420
400	MC-HV06040-00	300	MC-HV06030D00	520
500	MC-HV06050-00	400	MC-HV06040D00	620

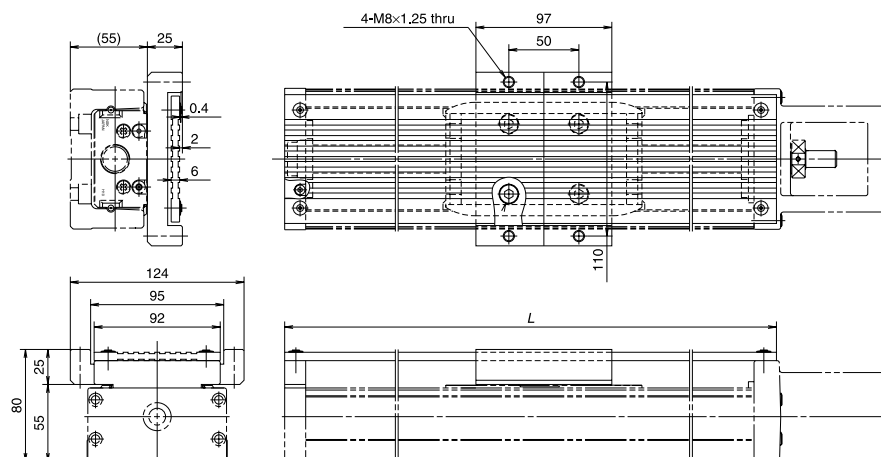
Cover Unit for MCH09



(Unit: mm)

Single Slider		Double Slider		Top cover length L
Stroke	Reference Number	Stroke	Reference Number	
100	MC-HV09010-00	—	—	264
200	MC-HV09020-00	—	—	364
300	MC-HV09030-00	150	MC-HV09015D00	464
400	MC-HV09040-00	250	MC-HV09025D00	564
500	MC-HV09050-00	350	MC-HV09035D00	664
600	MC-HV09060-00	450	MC-HV09045D00	764
700	MC-HV09070-00	—	—	864
800	MC-HV09080-00	650	MC-HV09065D00	964

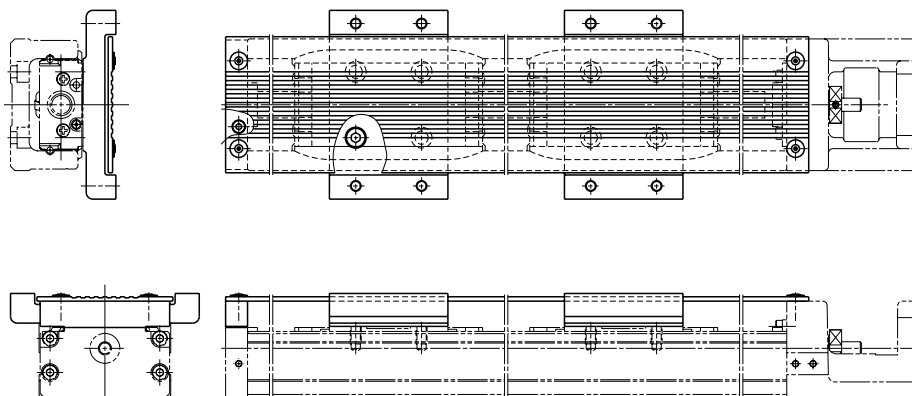
Cover Unit for MCH10



(Unit: mm)

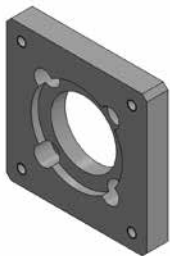
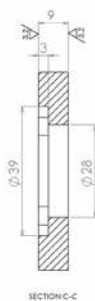
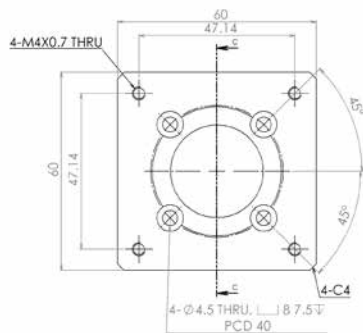
Single Slider		Double Slider		Top cover length L
Stroke	Reference Number	Stroke	Reference Number	
100	MC-HV10010-00	—	—	310
200	MC-HV10020-00	—	—	410
300	MC-HV10030-00	—	—	510
400	MC-HV10040-00	250	MC-HV10025D00	610
500	MC-HV10050-00	350	MC-HV10035D00	710
600	MC-HV10060-00	450	MC-HV10045D00	810
700	MC-HV10070-00	550	MC-HV10055D00	910
800	MC-HV10080-00	650	MC-HV10065D00	1,010
900	MC-HV10090-00	750	MC-HV10075D00	1,110
1,000	MC-HV10100-00	850	MC-HV10085D00	1,210
1,100	MC-HV10110-00	950	MC-HV10095D00	1,310
1,200	MC-HV10120-00	1,050	MC-HV10105D00	1,410

- Cover Unit for Double Sliders (Reference Drawing)
Two spacers are attached for the double slider.



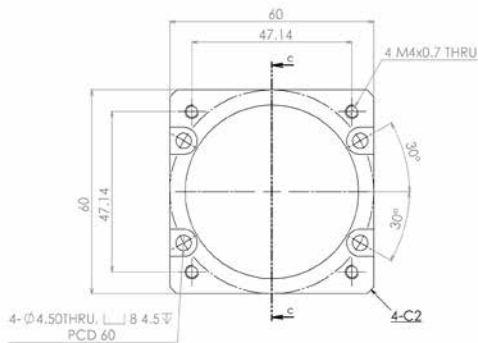
3.3.3 Motor Bracket by NEMA Size

MCH06 (NEMA 23)
■ Reference Number
MC-BKH06-247-31



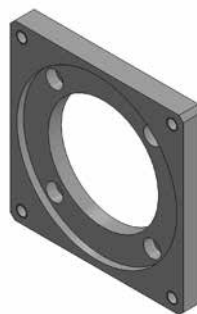
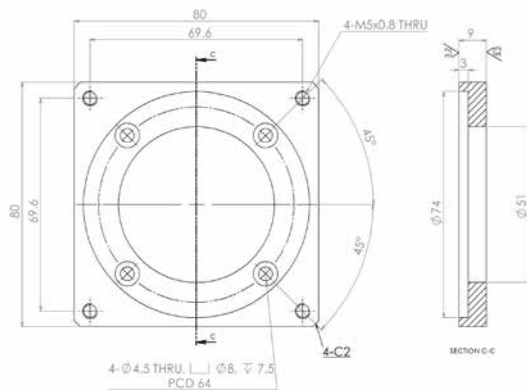
Included:
4 pcs M4x0.7x8 Socket Head Cap Screws

MCH09 (NEMA 23)
■ Reference Number
MC-BKH09-247-31



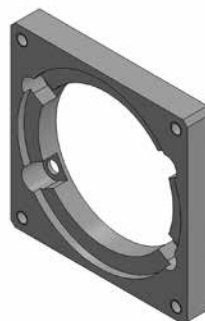
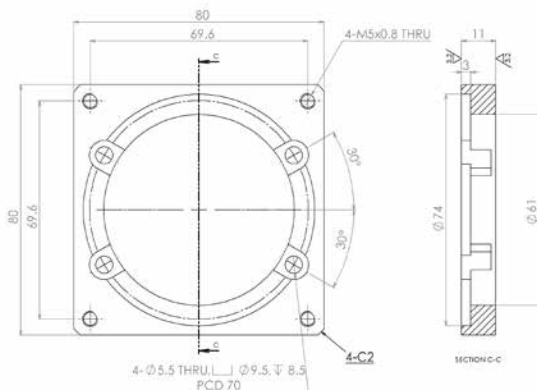
Included:
4 pcs M4x0.7x10 Socket Head Cap Screws

MCH09 (NEMA 34)
 ■ Reference Number
 MC-BKH09-269-31



Included:
 4 pcs M4x0.7x10 Socket Head Cap Screws

MCH10 (NEMA 34)
 ■ Reference Number
 MC-BKH10-269-31



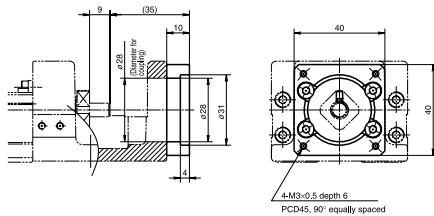
Included:
 4 pcs M5x0.8x10 Socket Head Cap Screws

3.3.4 Intermediate Plate for Motor

- If you have a motor not listed below, please contact NSK.
- If you have an indirect motor mount, please contact NSK.

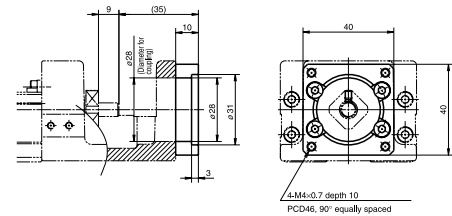
Motor Bracket for MCH06 and MCL06

Reference Number: MC-BKH06-145-00



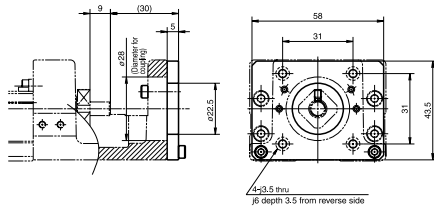
Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)

Reference Number: MC-BKH06-146-00



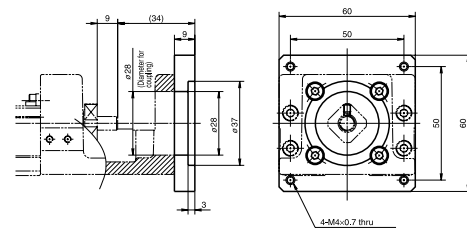
Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMJV-A5A(50W), SGMJV-A5A(50W), SGMJV-01A(100W), SGMJV-01A(100W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W), HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
Sanyo Denki Co., Ltd.	P30B04xxx P Series

Reference Number: MC-BKH06-231-00



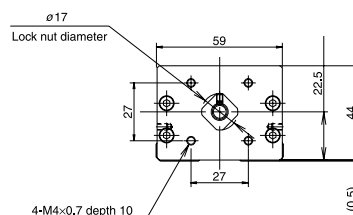
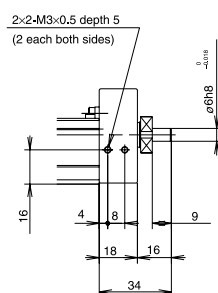
Compatible motor	
Maker	Motor models
Oriental Motor Co. Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x, UMK24x, CSK24x, PK24x
Sanyo Denki Co., Ltd.	PBM423xxx, 103F55xx

Reference Number: MC-BKH06-250-00



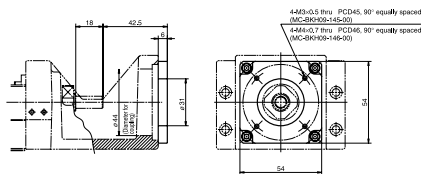
Compatible motor	
Maker	Motor models
Oriental Motor Co. Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x, CSK56x, CFK56x, MUM502(200W), MUM504(400W)
Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx, 103F78xx

Diameter of ball screw shaft end to install a pulley for indirect motor mount of MCH06



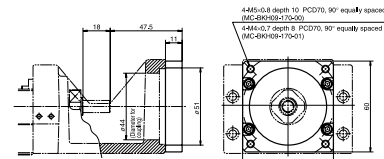
Motor Bracket for MCH09

Reference Number: MC-BKH09-145-00
MC-BKH09-146-00



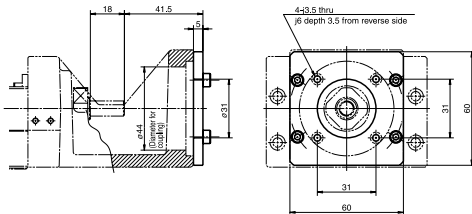
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH09-145-00	Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)
	Yaskawa Electric Corp.	SGMJV-A5A(50W), SGMV-A5A(50W), SGMJV-01A(100W), SGMV-01A(100W)
MC-BKH09-146-00	Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP05(50W), HC-KFS053(50W), HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)
	OMRON Corp.	R88M-W05(50W), R88M-W10(100W)
	Sanyo Denki Co., Ltd.	P30B04xxx P Series

Reference Number: MC-BKH09-170-00
MC-BKH09-170-01



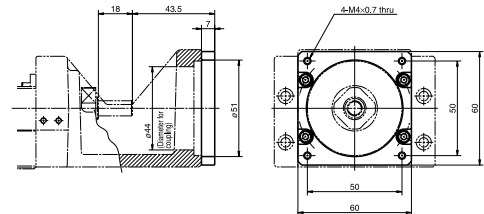
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH09-170-00	Yaskawa Electric Corp.	SGMJV-02A(200W), SGMV-02A(200W), SGMJV-04A(400W), SGMV-04A(400W)
	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W), HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
	OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
MC-BKH09-170-01	Sanyo Denki Co., Ltd.	P30B06xxx P Series
	Panasonic Co., Ltd.	MSMD02(200W), MSMA02(200W), MSMA04(400W), MSMD04(400W)

Reference Number: MC-BKH09-231-00



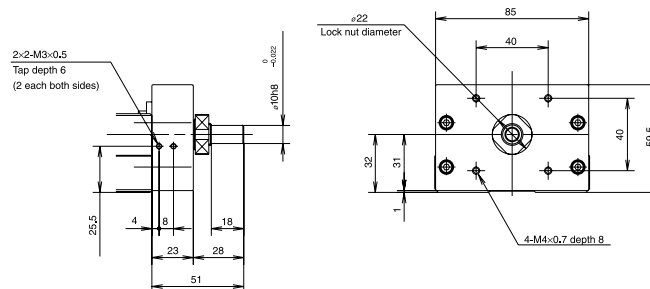
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM423xxx, 103F55xx
Oriental Motor Co. Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x, UMK24x, CSK24x, PK24x

Reference Number: MC-BKH09-250-00



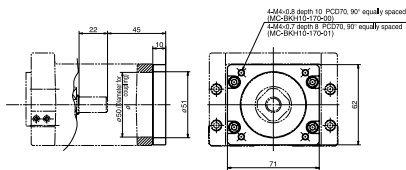
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx, 103F78xx
Oriental Motor Co. Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x, CSK56x, CFK56x

Diameter of ball screw shaft end to install a pulley for indirect motor mount of MCH09



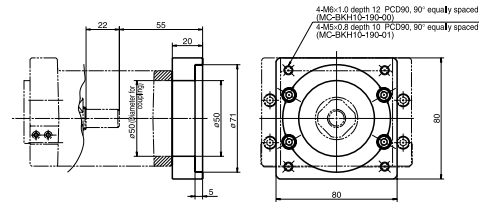
Motor Bracket for MCH10

Reference Number: MC-BKH10-170-00
MC-BKH10-170-01



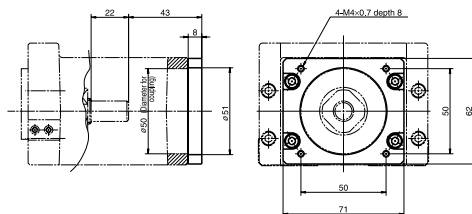
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH10-170-00	Yaskawa Electric Corp.	SGMJV-02A(200W), SGMJV-02A(200W), SGMJV-04A(400W), SGMJV-04A(400W)
	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W), HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
	OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
	Sanyo Denki Co., Ltd.	P30B06xxx P Series
MC-BKH10-170-01	Panasonic Co., Ltd.	MSMD02(200W), MSMA02(200W), MSMD04(400W), MSMA04(400W)

Reference Number: MC-BKH10-190-00
MC-BKH10-190-01



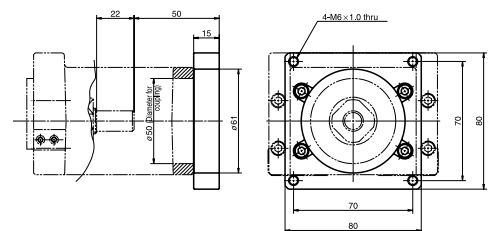
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH10-190-00	Mitsubishi Electric Corp.	HC-KFS73(750W), HC-MFS73(750W), HF-KP73(750W), HF-MP73(750W)
MC-BKH10-190-01	Sanyo Denki Co., Ltd.	P50B07xxx P Series

Reference Number: MC-BKH10-250-00



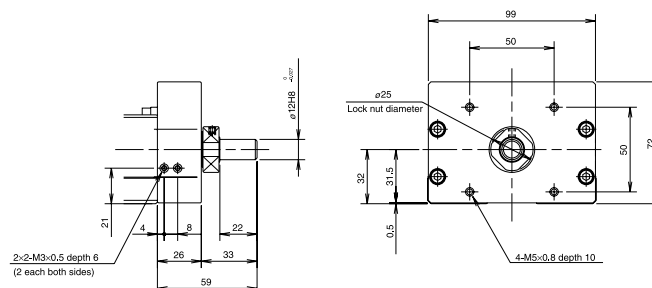
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx, 103F78xx
Oriental Motor Co. Ltd.	AS66, ASC66, UPK56x, PK56x, CSK56x, CFK56x, UMK56x, UFK56x

Reference Number: MC-BKH10-270-00



Compatible motor	
Maker	Motor models
Oriental Motor Co. Ltd.	AS98, ASC98, UPK59x, PK59x, CSK59x, CFK59x, UMK59x, UFK59x

Diameter of ball screw shaft end to install a pulley for indirect motor mount of MCH10



Intermediate Plates for MCH Series

Table 3-5

Model No.	Reference No. code	Motor bracket reference no.	Motor manufacturer	Stepping motor model no.	Wattage of AC servo motor					
					30	50	100	200	400	750
MCH06 MCL06	1	MC-BKH06-145-00	Panasonic Co., Ltd.			MSMD5A	MSMD01			
	2	MC-BKH06-146-00	Yaskawa Electric Corp.		SGMAH-A3	SGMJV-A5A SGMAV-A5A	SGMJV-01A SGMAV-01A			
			Mitsubishi Electric Corp.			HF-KP053 HF-MP053 HC-KFS053 HC-MFS053	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13			
			OMRON Corp.		R88M-W03	R88M-W05	R88M-W10			
	3	MC-BKH06-231-00	Sanyo Denki Co., Ltd.	P30B04xxx (P Series)						
			Sanyo Denki Co., Ltd.	PBM423xxx 103F55xx						
			Oriental Motor Co., Ltd.	AS46, ASC46 UPK54x, PK54x CSK54x, CFK54x UMK24x, CSK24x PK24x						
	4	MC-BKH06-250-00	Sanyo Denki Co., Ltd.	PBM603xx PBM604xx 103F78xx						
			Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
			OMRON Corp.					MUMS02	MUMS04	
MCH09	1	MC-BKH09-145-00	Panasonic Co., Ltd.			MSMD5A	MSMD01			
	2	MC-BKH09-146-00	Yaskawa Electric Corp.			SGMJV-A5A SGMAV-A5A	SGMJV-01A SGMAV-01A			
			Mitsubishi Electric Corp.			HF-KP053 HF-MP05 HC-KFS053 HC-MFS053	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13			
			OMRON Corp.		R88M-W05	R88M-W10				
	3	MC-BKH09-170-00	Sanyo Denki Co., Ltd.	P30B04xxx (P Series)						
			Yaskawa Electric Corp.					SGMJV-02A SGMAV-02A	SGMJV-04A SGMAV-04A	
			Mitsubishi Electric Corp.					HF-KP23 HF-MP23 HC-KFS23 HC-MFS23	HF-KP43 HF-MP43 HC-KFS43 HC-MFS43	
			OMRON Corp.					R88M-W20	R88M-W40	
			Sanyo Denki Co., Ltd.	P30B06xxx (P Series)						
	4	MC-BKH09-170-01	Panasonic Co., Ltd.					MSMD02 MSMA02	MSMD04 MSMA04	
	5	MC-BKH09-231-00	Sanyo Denki Co., Ltd.	PBM423xxx 103F55xx						
			Oriental Motor Co., Ltd.	AS46, ASC46 UPK54x, PK54x CSK54x, CFK54x UMK24x, CSK24x PK24x						
			Sanyo Denki Co., Ltd.	PBM603xx PBM604xx 103F78xx						
	6	MC-BKH09-250-00	Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
MCH10	1	MC-BKH10-170-00	Yaskawa Electric Corp.					SGMJV-02A SGMAV-02A	SGMJV-04A SGMAV-04A	
			Mitsubishi Electric Corp.					HF-KP23 HF-MP23 HC-KFS23 HC-MFS23	HF-KP43 HF-MP43 HC-KFS43 HC-MFS43	
			OMRON Corp.					R88M-W20	R88M-W40	
			Sanyo Denki Co., Ltd.	P30B06xxx (P Series)						
	2	MC-BKH10-170-01	Panasonic Co., Ltd.					MSMD02 MSMA02	MSMD04 MSMA04	
	3	MC-BKH10-190-00	Mitsubishi Electric Corp.							HC-KFS73 HC-MFS73 HF-KP73 HF-MP73
	4	MC-BKH10-190-01	Sanyo Denki Co., Ltd.	P50B07xxx (P Series)						
	5	MC-BKH10-250-00	Sanyo Denki Co., Ltd.	PBM603xx PBM604xx 103F78xx						
			Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UMK56x, UFK56x						
			Oriental Motor Co., Ltd.	AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x						



4.1	Features	101
4.2	Reference Number Coding	101
4.3	ToughCarrier™ TCH06	102
4.4	ToughCarrier™ TCH09	104
4.5	ToughCarrier™ TCH10	106

For complete catalog information on NSK Toughcarrier (TCH Series), please reference e3421 Toughcarrier™.



4.1 Features

- 1 Industry First: Single axis actuator that uses rollers instead of balls for the rolling element.
- 2 Higher load ratings: More than 2 times compared to standard ball type Monocarrier™.
- 3 Increased rigidity and compression rigidity (1.5 ~ 4 times compared to standard ball type Monocarrier™).
- 4 Interchangeable with Monocarrier™ MCH Series.
- 5 Standard Feature: Self-lubricating NSK K1™ units.

4.2 Reference Number Coding

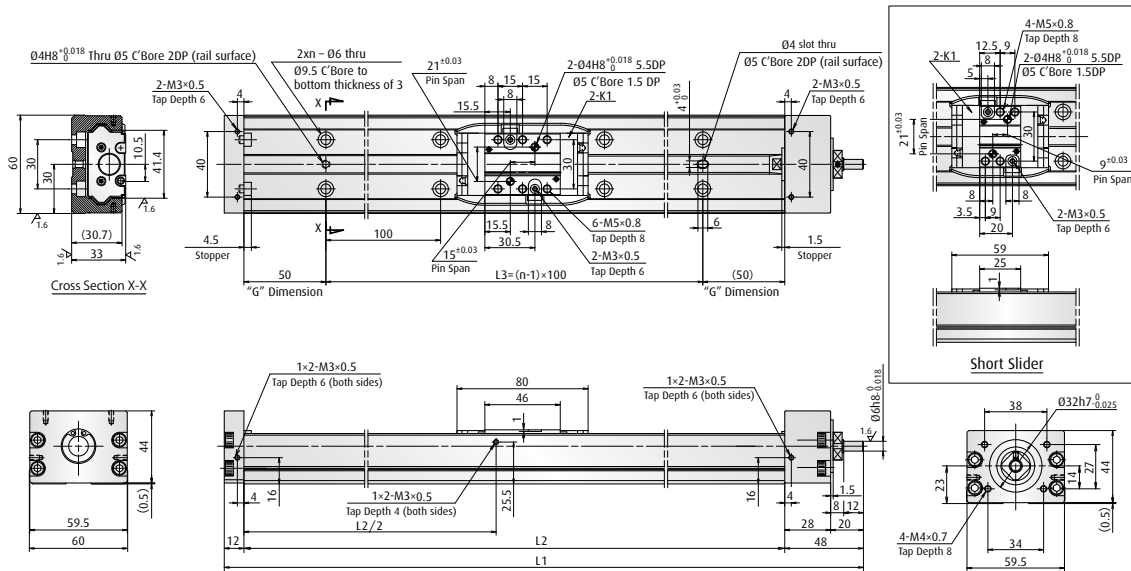
TC	H	06	030	H	05	K	0	0
TOUGHCARRIER	TYPE	NOMINAL SIZE	STROKE	ACCURACY GRADE	BALL SCREW LEAD	SLIDER SPECIFICATION	GREASE SPECIFICATION	CONTROL NUMBER
TC: Toughcarrier	H: Standard S: Optional Parts	Rail width, unit: 10 mm	Unit: 10 mm	H: High Precision P: Precision Grade	Unit: mm	K: Single slider D: Double slider A: Single short slider B: Double short slider	0: YS2	0: Without Pin Holes 1: With Pin Holes

Application: Automotive Manufacturing Equipment, General Industrial Machinery

Optional Parts: Cover units, sensor units, and motor brackets are available as standard parts. For special requests, contact NSK.

For complete catalog information on NSK Toughcarrier (TCH Series), please reference e3421 Toughcarrier™.

4.3 ToughCarrier™ TCH06



Dimensional Table

Reference number	Nominal stroke (mm)	Stroke limit (mm)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes n	Inertia ×10 ⁻⁵ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃			
*TCH06005(7)H05K(A)00			5					2.94 (2.87)	
*TCH06005(7)H10K(A)00	50 (70)	64 (85)	10	210	150	100	2	3.38 (3.06)	2.2 (2.1)
*TCH06005H20K00			20					5.1	
TCH06010(12)H05K(A)00			5					3.74 (3.67)	
TCH06010(12)H10K(A)00	100 (120)	114 (135)	10	260	200	100	2	4.18 (3.86)	2.5 (2.4)
TCH06010H20K00			20					5.9	
TCH06020(22)H05K(A)00			5					5.34 (5.27)	
TCH06020(22)H10K(A)00	200 (220)	214 (235)	10	360	300	200	3	5.78 (5.46)	3.3 (3.2)
TCH06020H20K00			20					7.5	
TCH06030(32)H05K(A)00			5					6.84 (6.77)	
TCH06030(32)H10K(A)00	300 (320)	314 (335)	10	460	400	300	4	7.28 (6.96)	3.9 (3.8)
TCH06030H20K00			20					9	
TCH06040(42)H05K(A)00			5					8.44 (8.37)	
TCH06040(42)H10K(A)00	400 (420)	414 (435)	10	560	500	400	5	8.88 (8.56)	4.6 (4.5)
TCH06040H20K00			20					10.6	
TCH06050(52)H05K(A)00			5					10.1 (9.97)	
TCH06050(52)H10K(A)00	500 (520)	514 (535)	10	660	600	500	6	10.5 (10.2)	5.3 (5.2)
TCH06050H20K00			20					12.2	

- 1) *Indicates reference number with "G" dimension = 25.
- 2) Parentheses indicate short slider reference number and dimensions.
- 3) For double slider specifications, part number and dimensions, contact NSK.
- 4) For strokes not listed, contact NSK.
- 5) Dimensions above show optional pin holes.
- 6) Specification for short slider with 20 mm lead is not established.

ToughCarrier™ TCH06

Accuracy Grades

(Unit: μm)

Grade	High grade		
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Backlash
~200	± 10	14	20 or less
~400		16	
~600		20	

Grade	Precision grade			
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Positioning Accuracy	Backlash
~200	± 3	8	20	3 or less
~400		10	25	
~600		12	30	

Specifications

Standard Slider Specifications

Reference Model	Ball Screw Lead (mm)	Shaft Dia (mm)	Basic Dynamic Load Rating (N)			Basic Static Load Rating (N)		Supporting Unit Limiting Load (N)	Basic Static Moment Load (N)		
			Ball Screw C_a	Linear Guide C	Support Unit C_a	Ball Screw C_{0a}	Linear Guide C_0		Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
TCH06-K	5	$\varnothing 12$	3,760	20,900	6,600	6,310	45,000	2,700	800	340	340
	10		2,260			3,780					
	20		2,260			3,780					

Short Slider Specifications

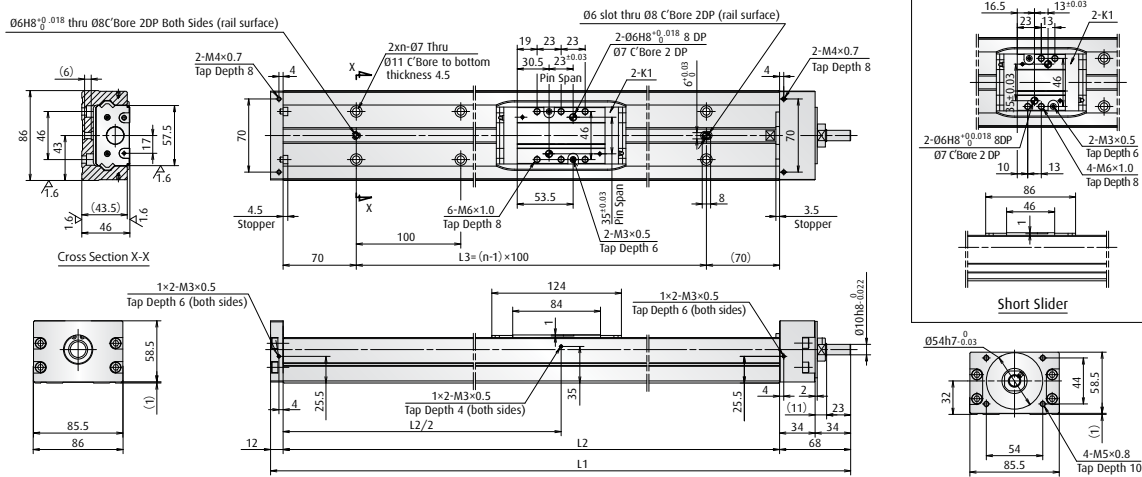
Reference Model	Ball Screw Lead (mm)	Shaft Dia (mm)	Basic Dynamic Load Rating (N)			Basic Static Load Rating (N)		Supporting Unit Limiting Load (N)	Basic Static Moment Load (N)		
			Ball Screw C_a	Linear Guide C	Support Unit C_a	Ball Screw C_{0a}	Linear Guide C_0		Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
TCH06-A	5	$\varnothing 12$	3,760	12,200	6,600	6,310	22,500	2,700	400	85	85
	10		2,260			3,780					

- › Basic dynamic and static load ratings indicate the values for one slider.
- › Basic dynamic load ratings of the linear guide is based on 50 km fatigue life with unchanging load acting perpendicular to the axis of motion on top of the slider.
- › Basic dynamic load rating of the linear guide is the load in perpendicular direction to the axis of motion that allows 90% of a group of the same ToughCarriers™ to operate equivalent to 1 million revolutions of the ball screw and support unit under the same condition without causing flaking by rolling contact.

- › Basic dynamic load rating of the ball screw is a load to axial direction that allows 90% of ball screws of a group of the same ToughCarriers™ to rotate 1 million revolutions under the same condition without causing flaking by rolling contact.
- › Basic static load rating is a load that results when combined permanent deformations at the contact points of balls and ball grooves is 0.01% of the diameter.
- › In case of moment loading when using short slider, use of 2 sliders (double short slider specification) is recommended.

For complete catalog information on NSK Toughcarrier (TCH Series), please reference e3421 Toughcarrier™.

4.4 ToughCarrier™ TCH09



Dimensional Table

Reference number	Nominal stroke (mm)	Stroke limit (mm)	Ball screw lead (mm)	Body length (mm)			No. of mounting holes n	Inertia $\times 10^{-5}$ (kg $\cdot$ m 2)	Mass (kg)
				L ₁	L ₂	L ₃			
TCH09010(14)H05K(A)00	100 (140)	108 (146)	5	320	240	100	2	9.13 (8.9)	6.5 (6.1)
TCH09010(14)H10K(A)00			10					11.0 (10.1)	
TCH09010(14)H20K(A)00			20					18.6 (14.6)	
TCH09020(24)H05K(A)00	200 (240)	208 (246)	5	420	340	200	3	14.2 (13.9)	7.9 (7.5)
TCH09020(24)H10K(A)00			10					16.0 (15.1)	
TCH09020(24)H20K(A)00			20					23.6 (19.6)	
TCH09030(34)H05K(A)00	300 (340)	308 (346)	5	520	440	300	4	18.1 (17.8)	9.4 (9.0)
TCH09030(34)H10K(A)00			10					19.9 (18.9)	
TCH09030(34)H20K(A)00			20					27.5 (23.5)	
TCH09040(44)H05K(A)00	400 (440)	408 (446)	5	620	540	400	5	21.9 (21.7)	10.8 (10.4)
TCH09040(44)H10K(A)00			10					23.8 (22.8)	
TCH09040(44)H20K(A)00			20					31.4 (27.4)	
TCH09050(54)H05K(A)00	500 (540)	508 (546)	5	720	640	500	6	25.9 (25.6)	12.3 (11.9)
TCH09050(54)H10K(A)00			10					27.7 (26.7)	
TCH09050(54)H20K(A)00			20					35.3 (31.3)	
TCH09060(64)H05K(A)00	600 (640)	608 (646)	5	820	740	600	7	29.4 (29.2)	13.6 (13.2)
TCH09060(64)H10K(A)00			10					31.3 (30.3)	
TCH09060(64)H20K(A)00			20					38.9 (34.9)	
TCH09070(74)H05K(A)00	700 (740)	708 (746)	5	920	840	700	8	33.5 (33.3)	15.0 (14.6)
TCH09070(74)H10K(A)00			10					35.4 (34.4)	
TCH09070(74)H20K(A)00			20					43.0 (39.9)	
TCH09080(84)H05K(A)00	800 (840)	808 (846)	5	1 020	940	800	9	37.4 (37.2)	16.4 (16.0)
TCH09080(84)H10K(A)00			10					(39.3) (38.3)	
TCH09080(84)H20K(A)00			20					46.9 (42.8)	

- 1) Parentheses indicate short slider.
- 2) For double slider specifications, part number and dimensions, contact NSK.
- 3) For strokes not listed, contact NSK.
- 4) Dimensions above show optional pin holes.

For complete catalog information on NSK Toughcarrier (TCH Series), please reference e3421 Toughcarrier™.

ToughCarrier™ TCH09

Accuracy Grades

(Unit: μm)

Grade	High grade		
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Backlash
~200	±10	14	20 or less
~400		16	
~600		20	
~700		23	
~800			

Grade	Precision grade			
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Positioning Accuracy	Backlash
~200	+3	8	20	3 or less
~400		10	25	
~600		12	30	
~700		15		
~800			35	

Specifications

Standard Slider Specifications

Reference Model	Ball Screw Lead (mm)	Shaft Dia (mm)	Basic Dynamic Load Rating (N)			Basic Static Load Rating (N)		Supporting Unit Limiting Load (N)	Basic Static Moment Load (N)		
			Ball Screw C_0	Linear Guide C_0	Support Unit C_0	Ball Screw C_{0a}	Linear Guide C_{0b}		Rolling M_{0a}	Pitching M_{0b}	Yawing M_{0c}
TCH09-K	5	$\varnothing 15$	7,100	44,900	8,800	13,000	96,900	5,090	2,510	1,340	1,340
	10		7,060			12,700					
	20		4,560			7,750					

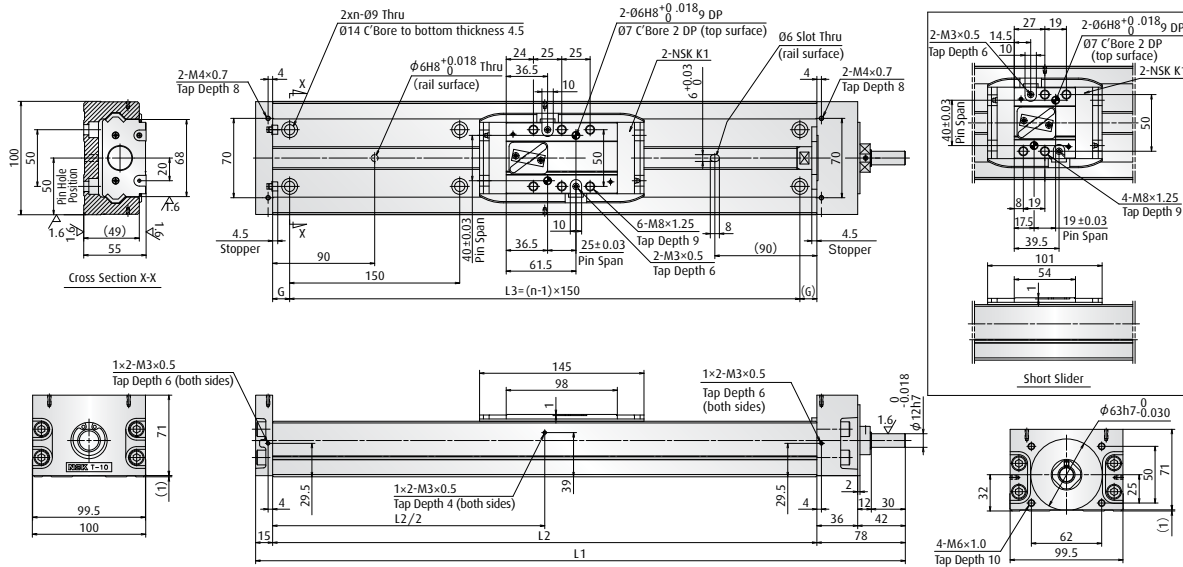
Short Slider Specifications

Reference Model	Ball Screw Lead (mm)	Shaft Dia (mm)	Basic Dynamic Load Rating (N)			Basic Static Load Rating (N)		Supporting Unit Limiting Load (N)	Basic Static Moment Load (N)		
			Ball Screw C_0	Linear Guide C_0	Support Unit C_0	Ball Screw C_{0a}	Linear Guide C_{0b}		Rolling M_{0a}	Pitching M_{0b}	Yawing M_{0c}
TCH09-A	5	$\varnothing 15$	7,100	27,900	8,800	13,000	52,500	5,090	1,350	390	390
	10		7,060			12,700					
	20		4,560			7,750					

- Basic dynamic and static load ratings indicate the values for one slider.
- Basic dynamic load ratings of the linear guide is based on 50 km fatigue life with unchanging load acting perpendicular to the axis of motion on top of the slider.
- Basic dynamic load rating of the linear guide is the load in perpendicular direction to the axis of motion that allows 90% of a group of the same ToughCarriers™ to operate equivalent to 1 million revolutions of the ball screw and support unit under the same condition without causing flaking by rolling contact.
- Basic dynamic load rating of the ball screw is a load to axial direction that allows 90% of ball screws of a group of the same ToughCarriers™ to rotate 1 million revolutions under the same condition without causing flaking by rolling contact.
- Basic static load rating is a load that results when combined permanent deformations at the contact points of balls and ball grooves is 0.01% of the diameter.
- In case of moment loading when using short slider, use of 2 sliders (double short slider specification) is recommended.

For complete catalog information on NSK Toughcarrier (TCH Series), please reference e3421 Toughcarrier™.

4.5 ToughCarrier™ TCH10



Dimensional Table

Reference number	Nominal stroke (mm)	Stroke limit (mm)	Ball screw lead (mm)	Body length (mm)				No. of mounting holes	Inertia $\times 10^{-5}$ (kg · m ²)	Mass (kg)
				L ₁	L ₂	L ₃	G			
TCH10010(16)H10K(A)00	100 (160)	126 (170)	10	373	280	150	65	2	4.27 (4.13)	9.6 (8.9)
TCH10010(16)H20K(A)00			20						5.34 (4.74)	
TCH10020(26)H10K(A)00	200 (260)	226 (270)	10	473	380	300	40	3	5.49 (5.35)	11.5 (10.9)
TCH10020(26)H20K(A)00			20						6.56 (5.96)	
TCH10030(36)H10K(A)00	300 (360)	326 (370)	10	573	480	450	15	4	6.72 (6.58)	13.5 (12.8)
TCH10030(36)H20K(A)00			20						7.79 (7.19)	
TCH10040(46)H10K(A)00	400 (460)	426 (470)	10	673	580	450	65	4	7.94 (7.80)	15.4 (14.8)
TCH10040(46)H20K(A)00			20						9.01 (8.41)	
TCH10050(56)H10K(A)00	500 (560)	526 (570)	10	773	680	600	40	5	9.17 (9.03)	17.4 (16.7)
TCH10050(56)H20K(A)00			20						10.24 (9.64)	
TCH10060(66)H10K(A)00	600 (660)	626 (670)	10	873	780	750	15	6	10.40 (10.26)	19.3 (18.6)
TCH10060(66)H20K(A)00			20						11.47 (10.87)	
TCH10070(76)H10K(A)00	700 (760)	726 (770)	10	973	880	750	65	6	11.62 (11.48)	21.2 (20.6)
TCH10070(76)H20K(A)00			20						12.69 (12.09)	
TCH10080(86)H10K(A)00	800 (860)	826 (870)	10	1,073	980	900	40	7	12.85 (12.71)	23.2 (22.6)
TCH10080(86)H20K(A)00			20						13.92 (13.32)	
TCH10090(96)H10K(A)00	900 (960)	926 (970)	10	1,173	1,080	1,050	15	8	14.07 (13.93)	25.2 (24.5)
TCH10090(96)H20K(A)00			20						15.14 (14.54)	
TCH10100(106)H10K(A)00	1,000 (1,060)	1,026 (1,170)	10	1,273	1,183	1,050	65	8	15.29 (15.15)	27.1 (26.5)
TCH10100(106)H20K(A)00			20						16.36 (15.76)	
TCH10110(116)H10K(A)00	1,100 (1,160)	1,126 (1,170)	10	1,373	1,280	1,200	40	9	16.52 (16.38)	29.1 (28.4)
TCH10110(116)H20K(A)00			20						17.59 (16.99)	
TCH10120(126)H10K(A)00	1,200 (1,260)	1,270 (1,270)	10	1,473	1,380	1,350	15	10	17.74 (17.60)	31.1 (30.4)
TCH10120(126)H20K(A)00			20						18.81 (18.21)	

- 1) Parentheses indicate short slider, reference number and dimensions.
- 2) For double slider specifications, part number and dimensions, contact NSK.
- 3) For strokes not listed, contact NSK.
- 4) Dimensions above show optional pin holes.

For complete catalog information on NSK Toughcarrier (TCH Series), please reference e3421 Toughcarrier™.

ToughCarrier™ TCH10

Accuracy Grades

(Unit: μm)

Grade	High grade		
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Backlash
~200	± 10	14	20 or less
~400		16	
~600		20	
~700		23	
~1,000		30	
~1,200		30	

Grade	Precision grade			
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Positioning Accuracy	Backlash
~200	± 3	8	20	3 or less
~400		10	25	
~600		12	30	
~700		15	35	
~1,000		20	40	
~1,200		20	40	

Specifications

Standard Slider Specifications

Reference Model	Ball Screw Lead (mm)	Shaft Dia (mm)	Basic Dynamic Load Rating (N)			Basic Static Load Rating (N)		Supporting Unit Limiting Load (N)	Basic Static Moment Load (N)		
			Ball Screw C_a	Linear Guide C	Support Unit C_a	Ball Screw C_{0a}	Linear Guide C_0		Rolling M_{0a}	Pitching M_{0a}	Yawing M_{0a}
TCH10-K	10	$\varnothing 20$	10,900	62,400	9,600	21,700	132,000	5,670	3,980	2,150	2,150
	20		7,060			12,700					

Short Slider Specifications

Reference Model	Ball Screw Lead (mm)	Shaft Dia (mm)	Basic Dynamic Load Rating (N)			Basic Static Load Rating (N)		Supporting Unit Limiting Load (N)	Basic Static Moment Load (N)		
			Ball Screw C_a	Linear Guide C	Support Unit C_a	Ball Screw C_{0a}	Linear Guide C_0		Rolling M_{0a}	Pitching M_{0a}	Yawing M_{0a}
TCH10-A	10	$\varnothing 20$	10,900	38,700	9,600	21,700	71,500	5,670	2,150	630	630
	20		7,060			12,700					

- Basic dynamic and static load ratings indicate the values for one slider.
- Basic dynamic load ratings of the linear guide is based on 50 km fatigue life with unchanging load acting perpendicular to the axis of motion on top of the slider.
- Basic dynamic load rating of the linear guide is the load in perpendicular direction to the axis of motion that allows 90% of a group of the same ToughCarriers™ to operate equivalent to 1 million revolutions of the ball screw and support unit under the same condition without causing flaking by rolling contact.

- Basic dynamic load rating of the ball screw is a load to axial direction that allows 90% of ball screws of a group of the same Toughcarriers™ to rotate 1 million revolutions under the same condition without causing flaking by rolling contact.
- Basic static load rating is a load that results when combined permanent deformations at the contact points of balls and ball grooves is 0.01% of the diameter.
- In case of moment loading when using short slider, use of 2 sliders (double short slider specification) is recommended.

For complete catalog information on NSK Toughcarrier (TCH Series), please reference e3421 Toughcarrier™.

Notes



Lined area for notes, consisting of multiple horizontal lines.

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