

# Monocarrier™

Significantly saves designing load of machinery through an integration of linear motion components in one unit.

Demonstrates high performance in a wide range of applications, including assembling machines, inspection apparatuses and transporting equipment.



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Please consult your local NSK representative prior to exporting our product by the unit.

Please give your inquiry NSK representative for the specifications and dimensions of the product shown in this catalog to avoid mistakes caused by the reasons below.

\* Specifications and dimensions are subject to change without notice.

\* Though every care has been taken to ensure accuracy of the data contained in this catalogue, some errors or omissions may be involved.

# Monocarrier

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# 1 Monocarrier

## 1.1 Features

Unsurpassed Monocarrier, fruit of technology that has long been accumulated by NSK, is now available from standard stock. Light weight, compact single axis linear actuator, integrating the exceptionally reliable NSK's ball screw, linear guide, and support bearing.

### 4 Long term maintenance free

- Simultaneous use of NSK K1 lubrication unit and grease maintains smooth lubricating performance for long periods in mechanical environments where lubrication is difficult to apply.
- The simultaneous use of a small amount of grease and an NSK K1 lubrication unit provides sufficient lubrication effect in the environment where use of oil is not permitted because of hygienic issues or where the mechanical equipment requires 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.

### 2 All-in-one structure

- The all-in-one structure, integrating a ball screw, a linear guide and support bearings into a unit, significantly reduces workload for design and installation.
- Multiple datum planes, the bottom and a lateral side of the rail, facilitate highly accurate installation.
- Immediate operation right after running-in is possible because grease has been previously packed at the plant.
- Ball screw lead is available in fine to high helix leads from a wide array of the product lineup.

### 3 Superb antirust capability

- Low temperature chrome plating is a standard feature for the bodies and sliders to control rusting in normal operating and storing environments. Fluoride low temperature chrome plating is optionally available for much higher rust prevention.

### 1 Light weight, compact design

- Available in two different shapes of cross-section, depending on application.
  - Light weight type : MCM Series
  - Rigid type : MCH Series
- The design fully utilizing given space facilitates compact structure.



Built in support bearings

Linear guide (Ball groove)

Slider

A ball nut and a slider are integrated into one component.

Ball screw

A wide variety of leads, from fine leads to high helix leads, is available.

Built in support bearings

# MONOCARRIER®

## 1. 2. Classification and Series

Table 1-1

	Light Weight	Beam Rigidity	Moment Rigidity
MCM Series	○	○	○
MCH Series	○	◎	○

Accuracy	Long Stroke	Size Variation
◎	○	◎
◎	◎	○

### [MCM Series Cross-sections]

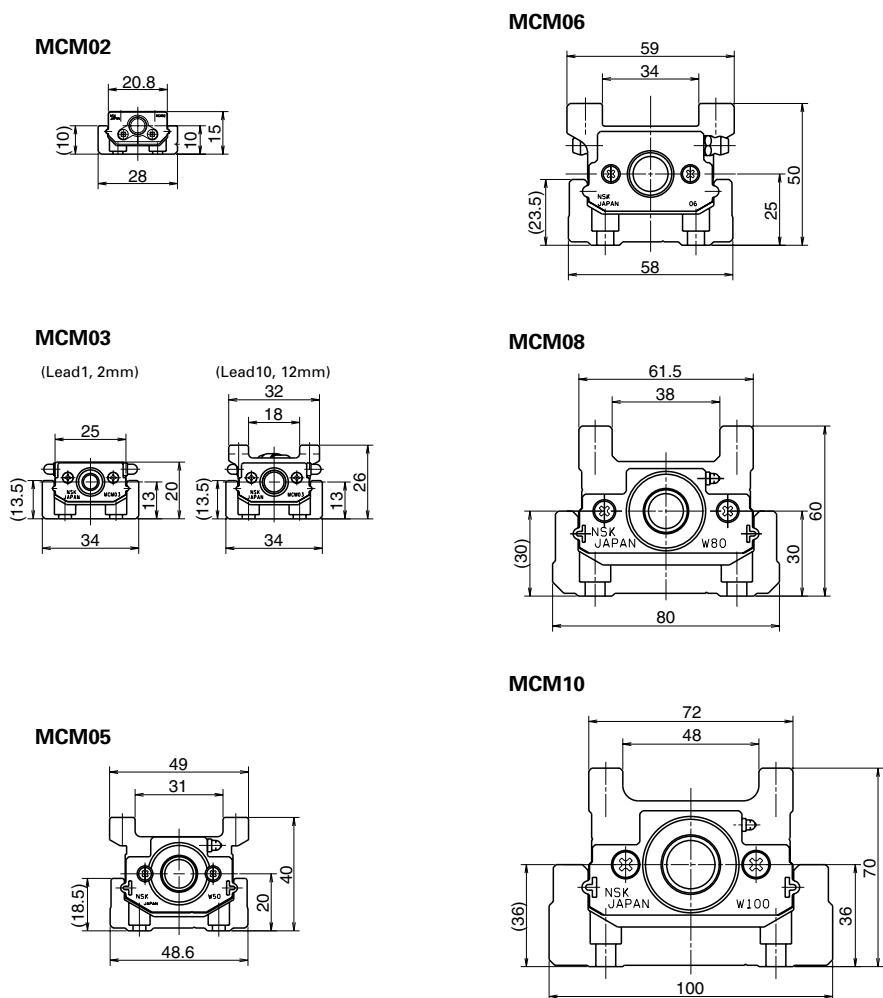


Fig. 1-1

### [MCH Series Cross-sections]

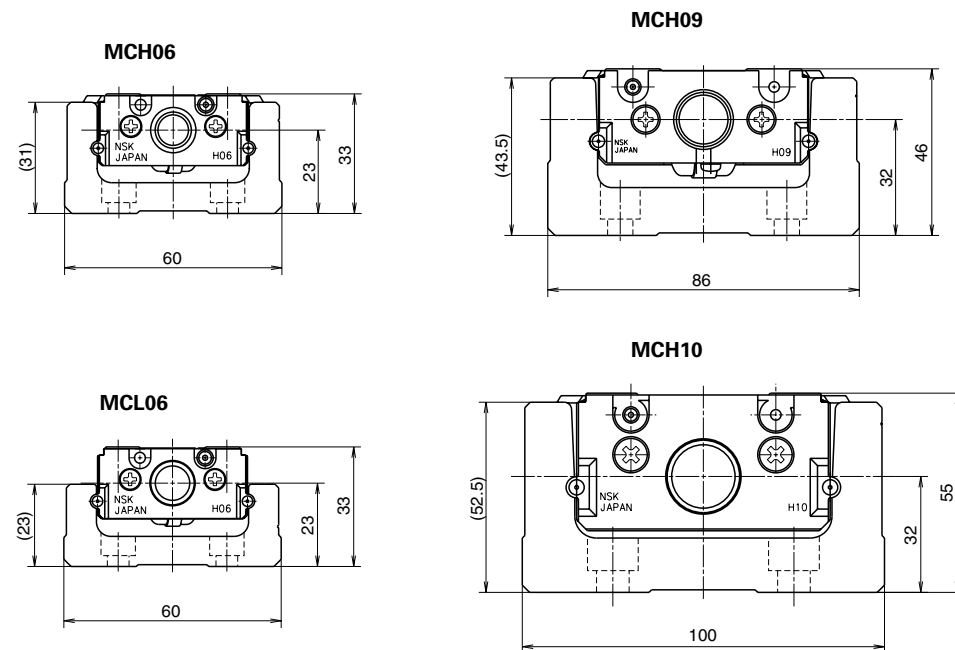


Fig. 1-2

### 1.3 Optional components

#### MCM Series

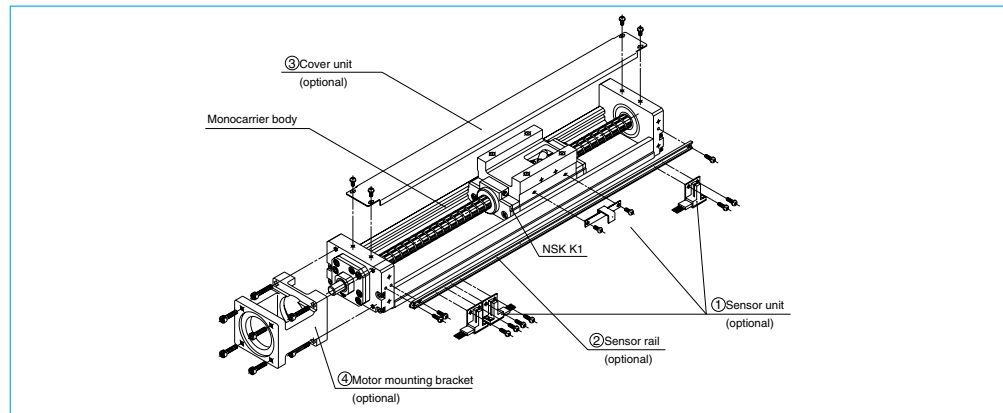


Fig.1-3 Assembly Optional components for MCM10 (example)

- ① Sensor unit : Sensors, sensor mounting parts and a sensor dog are available in a set.  
※ When you used a sensor unit, the full cover unit cannot be used.
  - ② Sensor rail : Rail for sensor mounting is available.
  - ③ Cover unit : Top cover or full cover (included top cover and side cover) is available.
  - ④ Motor bracket for motor mounting : Prepared for each motor maker.
- ☆ We assemble optional components upon request.

#### MCH Series

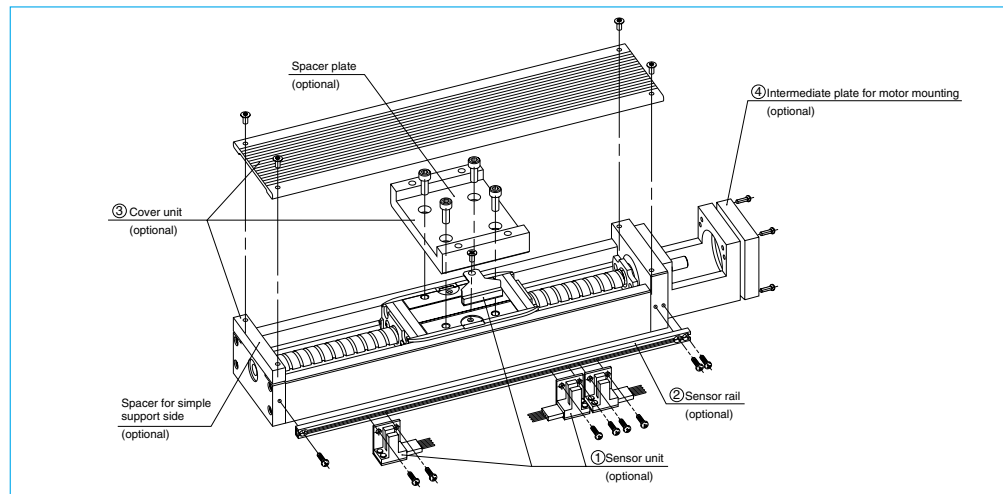


Fig. 1-4 Assembly Optional components for MCH10 (example)

- ① Sensor unit : Sensors, sensor mounting parts and a sensor dog are available in a set.
  - ② Sensor rail : Rail for sensor mounting is available.
  - ③ Cover unit : Top cover (included spacer plate and spacer for simple support side) is available.
  - ④ Intermediate plate for motor mounting : Prepared for each motor maker.
- ☆ We 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 C13. Obtain the mean effective load  $F_m$  substituting them for equation ③ on Page C14, 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 C14, then calculate the life.

#### 1.4.2. Rigidity

##### Rigidity of rail

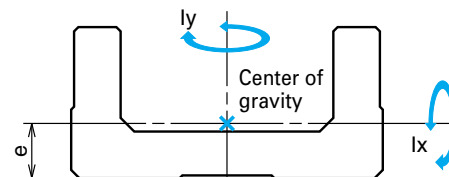


Fig. 1-5

Table 1-2 Rigidity of rail

Nominal size	Geometrical moment of inertia $\times 10^4$ (mm <sup>4</sup> )		Center of gravity (mm)	Mass (kg/100mm)
	$I_x$	$I_y$	$e$	$w$
<b>MCM02</b>	0.097	1.32	3.3	0.11
<b>MCM03</b>	0.30	3.3	4.5	0.18
<b>MCM05</b>	0.78	11.4	6.0	0.31
<b>MCM06</b>	2.14	26.1	7.0	0.57
<b>MCM08</b>	5.90	81.0	9.2	0.88
<b>MCM10</b>	15.6	219	12.2	1.52
<b>MCH06</b>	6.5	38.2	10.8	0.67
<b>MCL06</b>	2.58	29.6	7.8	0.56
<b>MCH09</b>	28.7	172	15.5	1.48
<b>MCH10</b>	54.0	307	18	1.93

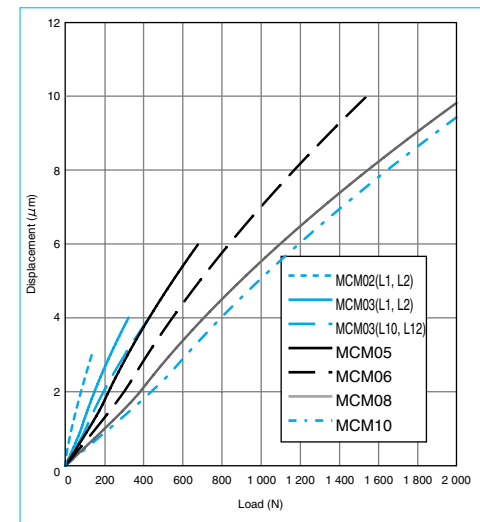


Fig. 1-6 MCM Series Rigidity in radial direction

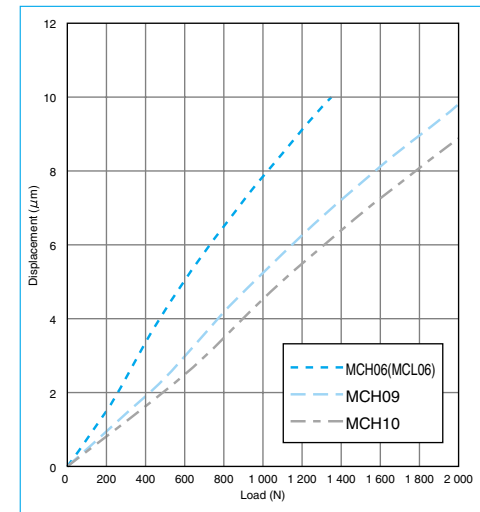


Fig. 1-7 MCH Series Rigidity in radial direction

1.4.3 Maximum Rotational Speed

● Maximum Rotational Speed of MCM Series

Maximum rotational speed of Monocarrier is determined by the critical speed of ball screw shaft and the  $d \cdot n$  value.

Do not exceed the maximum rotational speeds on the table below.

Table 1-3

	Ball screw lead	stroke (mm)	Rail length L <sub>2</sub> (mm)	Maximum rotational 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	
MCM05 Single slider	5	100	190	250
		250	340	
		100	190	
	10	100	190	500
		250	340	
		100	190	
MCM05 Double slider	10	60	280	500
		510	730	
		210	430	
	20	510	730	1000
		60	280	
		210	430	
MCM06 Single slider	5	50	190	250
		500	640	
		50	190	
	10	50	190	500
		600	740	
		700	840	
20		800	940	1000
		300	440	
		600	740	
MCM06 Double slider	5	110	340	250
		410	640	
		110	340	
	10	610	840	500
		710	940	
		210	440	
20	610	840	1000	
	710	940		
	210	440		

	Ball screw lead	stroke (mm)	Rail length L <sub>2</sub> (mm)	Maximum rotational speed (mm/s)
MCM08 Single slider	5	50	220	250
		200	370	
		100	270	
	10	700	870	500
		800	970	
		300	470	
MCM08 Double slider	20	700	870	1000
		800	970	
		800	970	
	10	80	370	500
		680	970	
		180	470	
MCM10 Single slider	10	800	980	500
		900	1080	
		1000	1180	
	20	300	480	1000
		800	980	
		900	1080	
MCM10 Double slider	10	1000	1180	720
		70	380	
		670	980	
	20	870	1180	440
		170	480	
		670	980	
20	870	1180	880	

● Maximum Rotational Speed of MCH Series

Maximum rotational speed of Monocarrier is determined by the critical speed of ball screw shaft and the  $d \cdot n$  value.

Do not exceed the maximum rotational speeds on the table below.

Table 1-4

	Ball screw lead	stroke (mm)	Rail length L <sub>2</sub> (mm)	Maximum rotational speed (mm/s)
MCH06 MCL06 Single slider	5	50	150	250
		500	600	
		50	150	
	10	500	600	500
		50	150	
		500	600	
MCH06 Double slider	20	50	150	1000
		500	600	
		100	300	
	10	400	600	500
		100	300	
		400	600	
MCH09 Single slider	5	100	300	250
		400	600	
		200	340	
	10	600	740	500
		800	940	
		200	340	
MCH09 Double slider	20	600	740	1000
		800	940	
		200	340	
	5	150	440	250
		650	940	
		150	440	
10	650	940	500	
	150	440		
	650	940		
20	150	440	1000	
	650	940		
	150	440		

	Ball screw lead	stroke (mm)	Rail length L <sub>2</sub> (mm)	Maximum rotational speed (mm/s)
MCH10 Single slider	10	400	580	500
		800	980	
		900	1080	
	20	1000	1180	360
		1100	1280	
		1200	1380	
MCH10 Double slider	10	400	580	1000
		800	980	
		900	1080	
	20	1000	1180	870
		1100	1280	
		1200	1380	
MCH10 Single slider	5	250	580	500
		750	1080	
		850	1180	
	10	950	1280	390
		1050	1380	
		250	580	
MCH10 Double slider	20	750	1080	950
		850	1180	
		950	1280	
	10	1050	1380	780
		250	580	
		1050	1380	
20	1050	1380	650	

1.4.4 Accuracy Grade

The accuracy grade of Monocarrier standard inventories is high grade (H), except for lead 1 and 2 of MCM02, and 03.

When you require strokes longer than 1200 mm, please consult NSK about the accuracy grade.

Table 1-5 (Unit : μm)

Grade Stroke (mm)	High grade			Precision			Backlash
	Repeatability	Running Parallelism (vertical)	Backlash	Repeatability	Positioning accuracy	Running Parallelism (vertical)	
~200	±10	14	20 or less	±3	20	8	3 or less
~400		16			25	10	
~600		20			30	12	
~700		23			30	15	
~1000		23			35	15	
~1200		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 inventory ○mark: Short-term delivery) (Unit : mm)

Nominal size lead stroke	MCM02		MCM03		MCM05			MCM06			MCM08			MCM10			
	1	2	1	2	10	12	5	10	20	5	10	20	5	10	20	10	20
50	●	●	●	●	○	○	●	●	○	●	○	○	○	○	○	○	○
100	●	●	●	●	●	●	●	○	●	●	○	○	●	○	○	○	○
150	●	●	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○
200					○	○	○	○	○	○	○	○	○	○	○	○	○
250					○	○	○	○	○	○	○	○	○	○	○	○	○
300							○	○	○	○	○	○	○	○	○	○	○
400							○	○	○	○	○	○	○	○	○	○	○
500							○	○	○	○	○	○	○	○	○	○	○
600							○	○	○	○	○	○	○	○	○	○	○
700									○	○	○	○	○	○	○	○	○
800									○	○	○	○	○	○	○	○	○
900																○	○
1000																○	○

Table 1-7 Double slider

(○mark: Short-term delivery) (Unit : mm)

Nominal size lead stroke	MCM05			MCM06			MCM08			MCM10	
	10	20	5	10	20	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 MCM 02 and 03.

1.4.5.2 MCH Series Standard Combinations of Stroke and Ball Screw

Table 1-8 Single slider

(●mark : Standard inventory ○mark: Short-term delivery) (Unit : mm)

Nominal size lead stroke	MCH06			MCH09			MCH10	
	5	10	20	5	10	20	10	20
50	●	●	○					
100	●	●	○	○	○	○	○	○
200	●	●	●	●	●	○	○	○
300	○	●	●	●	●	○	○	○
400	○	●	●	○	○	○	●	●
500	○	●	●	○	●	●	●	●
600				○	●	●	●	●
700				○	○	○	●	●
800				○	●	●	●	●
900							○	●
1000							○	●
1100							○	○
1200							○	○

Table 1-9 Double slider

(○mark: Short-term delivery) (Unit : mm)

Nominal size lead stroke	MCH06			MCH09			MCH10	
	5	10	20	5	10	20	10	20
100	○	○						
150				○	○			
200	○	○						
250				○	○		○	○
300	○	○						
350				○	○		○	○
400		○	○					
450					○	○	○	○
550							○	○
650					○	○	○	○
750								○
850								○
950								○
1050								○

Table 1-10 Limitations

	Nominal size	lead (mm)	slider	stroke
				(mm)
MCM series	MCM02	1,2	Single	150
		1,2	Single	150
	MCM03	10,12	Single	350
			Single	900
	MCM05	5,10,20	Double	810
			Single	1000
	MCM06	5,10,20	Double	910
			Single	1000
	MCM08	5,10,20	Double	880
			Single	1800
MCM10	10,20	Double	1670	
		Single	1800	
MCH series	MCH06	5,10,20	Double	500
			Single	600
	MCH09	5,10,20	Double	850
			Single	1000
	MCH10	10,20	Double	1650
			Single	1800
MCL06	5,10,20	Single	500	



1. 4. 6 Basic Load Rating

1. 4. 6. 1 MCM Series Basic Load Rating

Table 1-11 Basic Load Rating

Nominal size	Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Limit load (N)
			Ball screw $C_a$	Linearguide $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linearguide $C_0$	
MCM02	1	$\phi 6$	340 (High grade) 405 (Precision)	4910	615	1	555 (High grade) 615 (Precision)	2120	490
	2		340 (High grade) 405 (Precision)	3900		2	555 (High grade) 615 (Precision)		
MCM03	1	$\phi 6$	735	10900	2670	1	1230	4900	1040
	2		735	8650		2			
	10	1230	6250	10		1690			
	12	1230	5880	12					
MCM05	5	$\phi 12$	3760	15600	4400	5	6310	10900	1450
	10		2260	12400		10	3780		
	20		2260	9850		20	3780		
MCM06	5	$\phi 16$	7310	25200	6550	5	13500	17000	2730
	10		7060	20000		10	12700		
	20	4560	15900	20		7750			
MCM08	5	$\phi 16$	7310	30800	7100	5	13500	22800	3040
	10		7060	24400		10	12700		
	20	4560	19400	20		7750			
MCM10	10	$\phi 20$	10900	33500	7600	10	21700	29400	3380
	20		7060	26600		20	12700		

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 parts is 0.01% of the diameter.

Table 1-12 Basic static moment load of linearguide

Nominal size	Lead (mm)	Slider	Basic static moment (N · m)		
			Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
MCM02	1,2	Single	24	8	8
MCM03	1,2		68	28	28
	10,12		92	51	51
MCM05	5,10,20	Single	229	89	89
		Double	455	765	765
MCM06	5,10,20	Single	415	174	174
		Double	825	1220	1220
MCM08	5,10,20	Single	770	300	300
		Double	1540	2050	2050
MCM10	10,20	Single	1170	425	425
		Double	2340	2940	2940

● Basic static moment of double slider is a value when two sliders equipped with NSK K1 are butted against each other.  
 ● The basic static moment is the value when a rolling contact pressure of balls exceeds 4000 N/mm<sup>2</sup>.  
 ● If you require to apply extremely heavy load, please consult NSK for estimation of fatigue life.

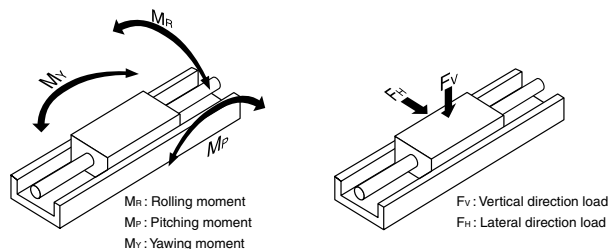


Fig. 1-8

1. 4. 6. 2 MCH Series Basic Load Rating

Table 1-13 Basic Load Rating

Nominal size	Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Limit load (N)
			Ball screw $C_a$	Linearguide $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linearguide $C_0$	
MCH06 (MCL06)	5	$\phi 12$	3000 (High grade) 3760 (Precision)	22800	4400	5	5410 (High grade) 6310 (Precision)	16300	1450
	10		1930 (High grade) 2260 (Precision)	18100		10	3160 (High grade) 3780 (Precision)		
	20		1930 (High grade) 2260 (Precision)	14400		20	3160 (High grade) 3780 (Precision)		
MCH09	5	$\phi 15$	6820 (High grade) 7100 (Precision)	40600	7100	5	13200 (High grade) 13000 (Precision)	30500	3040
	10		5110 (High grade) 7060 (Precision)	32200		10	9290 (High grade) 12700 (Precision)		
	20		3290 (High grade) 4560 (Precision)	25500		20	5620 (High grade) 7750 (Precision)		
MCH10	10	$\phi 20$	8230 (High grade) 10900 (Precision)	44600	7600	10	17100 (High grade) 21700 (Precision)	42000	3380
	20		5300 (High grade) 7060 (Precision)	35400		20	10300 (High grade) 12700 (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 parts is 0.01% of the diameter.

Table 1-14 Basic static moment load of linearguide

Nominal size	Slider	Basic static moment (N · m)		
		Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
MCH06 (MCL06)	Single	335	133	133
	Double	770	730	730
MCH09	Single	890	385	385
	Double	1780	2070	2070
MCH10	Single	1460	610	610
	Double	2920	3430	3430

● Basic static moment of double slider is a value when two sliders equipped with NSK K1 are butted against each other.  
 ● The basic static moment is the value when a rolling contact pressure of balls exceeds 4000 N/mm<sup>2</sup>.  
 ● If you require to apply extremely heavy load, please consult NSK for estimation of fatigue life.

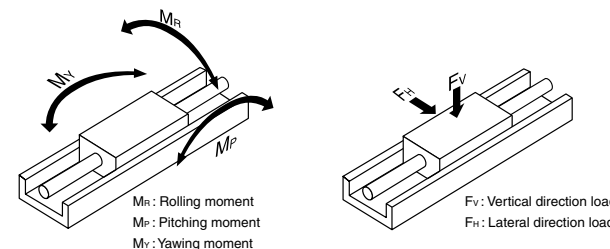


Fig. 1-9

**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. 1-10). The equivalent load ( $F_e$ ) is determined by substituting the load for equation ① (Eq.② : in case of the tightly coupled double slider type).

● In case of the single slider

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

● In case of the double slider

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

- $F_H$  : 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)

- $\epsilon_{Rr}, \epsilon_{Rd}$  : Dynamic equivalent coefficient to rolling moment
- $\epsilon_{Pr}, \epsilon_{Pd}$  : Dynamic equivalent coefficient to pitching moment
- $\epsilon_{Yr}, \epsilon_{Yd}$  : Dynamic equivalent coefficient to yawing moment

Refer to Table 1-15 about Dynamic equivalent coefficient.

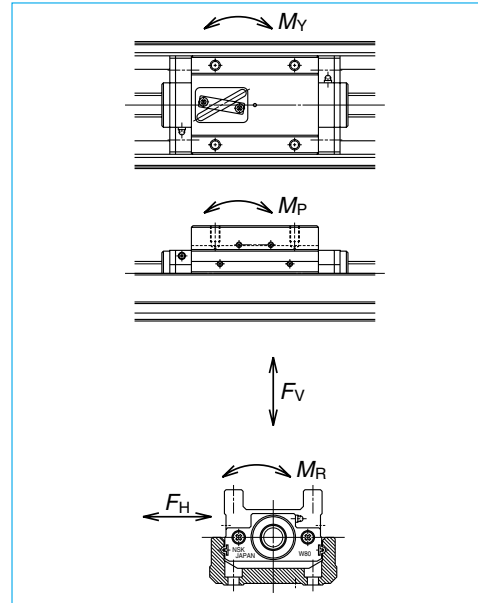
- $Y_H, Y_V, Y_R, Y_P, Y_Y$  : 1.0 or 0.5

At 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.

Figures in parentheses( ) are Dynamic equivalent coefficient in case of the Monocarrier without NSK K1.

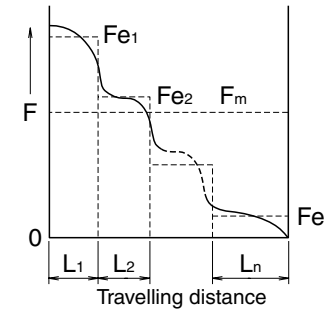
**Table 1-15 Dynamic equivalent coefficient**

Nominal size	MCM02	MCM03		MCM05	MCM06	MCM08	MCM10	MCH06 MCL06	MCH09	MCH10
		lead 1, 2	lead 10, 12							
$\epsilon_R$	95.2	79.4	79.4	52.6	45.5	32.5	27.8	48.3	34.5	28.6
$\epsilon_P$	174	113.9	84.2	81.3	65.1	48.8	45.2	75.1	47.9	41.0
$\epsilon_Y$	174	113.9	84.2	81.3	65.1	48.8	45.2	75.1	47.9	41.0
$\epsilon_{Rd}$	-	-	-	26.3	22.7	16.3	13.9	24.2	17.2	14.3
$\epsilon_{Pd}$	-	-	-	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)
$\epsilon_{Yd}$	-	-	-	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)



**Fig. 1-10 Direction of load**

In case when the load acting on the slider may fluctuate (In general,  $M_P, M_Y$  may fluctuate with the acceleration/deceleration of slider), the mean effective load is determined by Eq. ③.



**Fig. 1-11 Stepwise Fluctuating Load**

- Travelling distance under the equivalent load  $F_{e1}$  :  $L_1$
- Travelling distance under the equivalent load  $F_{e2}$  :  $L_2$
- Travelling distance under the equivalent load  $F_{en}$  :  $L_n$

$$F_m = \sqrt[3]{\frac{1}{L} (F_{e1}^3 L_1 + F_{e2}^3 L_2 + \dots + F_{en}^3 L_n)} \dots \text{③}$$

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

The life of linear guide is calculated by Eq. ④

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

- $L$  : Life of 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 clear the required life, the life of 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 ball screw is calculated by Eq. ⑤.

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

- $l$  : 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 support unit is calculated by Eq. ⑤. If the life of ball screw / support unit does not clear the required life, use a larger size Monocarrier. Upon calculations as mentioned above, selection of Monocarrier 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 how to estimate the life of Monocarrier based on the life of each component.

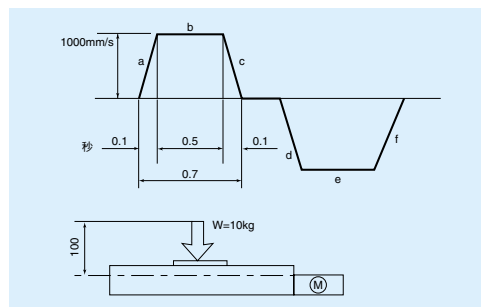


Fig. 1-12

- Use condition
  - Stroke : 600mm
  - Maximum Speed : 1000mm/s
  - Load Mass : W=10kg
  - Acceleration :  $g=9.8m/s^2$
  - Setting Position : Horizontal
  - Operating Profile : See above figure

#### 2. Selection of Nominal size

##### 2-1. Interim Selection

Firstly, select a greater ball screw lead as the maximum speed is 1000 mm/s. The interim selection is MCM06060H20K00, a single slider specification MCM06 that has 600 mm stroke, as the stroke is 600 mm.

#### 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 above operation profile,

- Constant speed  $F_{e1} = Y_v F_v = Y_p W_g = 1 \cdot 10 \cdot 9.8 = 98N$
- Accelerating  $F_{e2} = Y_v F_v + Y_p \varepsilon_p M_p = 0.5 \cdot 10 \cdot 9.8 + 1 \cdot 65.1 \cdot 0.1 \cdot 100 = 700N$
- Decelerating  $F_{e3} = Y_v F_v + Y_p \varepsilon_p M_p = 0.5 \cdot 10 \cdot 9.8 + 1 \cdot 65.1 \cdot 0.1 \cdot 100 = 700N$

##### Mean effective load $F_m$

$$F_m = \sqrt[3]{\frac{1}{L} (F_{e1}^3 \cdot L_1 + F_{e2}^3 \cdot L_2 + F_{e3}^3 \cdot L_3)}$$

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

$$= 387N$$

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

$$= \left( \frac{15900}{1.2 \cdot 387} \right)^3 \times 20$$

$$= 8.02 \times 10^5 km$$

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

$$F_s = \frac{C_0}{F_e} = \frac{C_0}{F_{e2}} = \frac{17000}{700} = 24.2$$

##### 3-2. Ball screw

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

By the process above,

- Constant speed  $F_{e1} = \mu \cdot W \cdot g = 0.01 \cdot 10 \cdot 9.8 = 0.98$
- Accelerating  $F_{e2} = F_{e1} + W\alpha = 101N$
- Decelerating  $F_{e3} = F_{e1} - W\alpha = 99N$

##### Axial mean effective load $F_m$

$$F_m = \sqrt[3]{\frac{1}{L} (F_{e1}^3 \cdot L_1 + F_{e2}^3 \cdot L_2 + F_{e3}^3 \cdot L_3)}$$

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

$$= 55N$$

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

$$= \left( \frac{4560}{1.2 \cdot 55} \right)^3 \times 20 \times 10^6 (mm)$$

$$= 6.5 \times 10^6 km$$

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

$$F_s = \frac{C_{0a}}{F_e} = \frac{C_{0a}}{F_{e2}} = \frac{7750}{101} = 76.7$$

3-2-3. Maximum rotational speed ; According to the table of maximum rotational speed on page C7, MCM06 with 20 mm lead and 600 mm stroke, is possible to operate under the maximum speed of 1000 mm/s.

##### 3-3. Support unit

3-3-1. Fatigue life ; Use the axial load  $F_m = 55 N$ , that is the result of above calculation 3-2-1.

$$L = \left( \frac{C_a}{f_w \cdot F_m} \right)^3 \times \ell \times 10^6 = \left( \frac{6550}{1.2 \cdot 55} \right)^3 \times 20 \times 10^6 (mm)$$

$$= 1.95 \times 10^7 km$$

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

$$F_s = \frac{C_{0a}}{F_e} = \frac{C_{0a}}{F_{e2}} = \frac{2730}{101} = 27.0$$

#### 3.4. Result

MCM06060H20K00	Linear guide	Ball screw	Support unit
Fatigue life	8.02 × 10 <sup>5</sup> km	6.5 × 10 <sup>6</sup> km	1.95 × 10 <sup>7</sup> km
Static safety factor	24.2	76.7	27.0

## 1.5 Maintenance

### 1.5.1 Maintenance Method

- For standard Monocarrier, we pack grease in slider, linear guides and ball screw.
- The Monocarriers equip with NSK K1 lubrication unit as a standard feature, and therefore, you can operate it for 5 years or 10 000 km, whichever comes first, without the maintenance. However replenishment of preceded grease may extend its life substantially.
- NSK K1 lubrication unit demonstrates its effects in environment where oily dust exists. However, the life may be shorter than the case described in the Clause 2 above. In such a case, it requires the measures such as increasing the frequency of replenishment.

The shortest fatigue life of linear guide among the components must be taken as the life of the Monocarrier. The interim selection of MCM06060H20K00, that is chosen based on the use conditions, satisfies the required life.

4. Nozzle for NSK grease gun exclusive for MCH Monocarriers is available as an option.

NSK reference number : NSK HGP NZ8

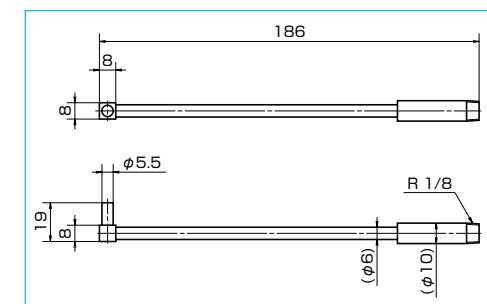


Fig. 1-13 NSK HGP NZ8

### Precautions for handling

- Please consult with NSK when the motor is coupled to the ball screw using a pulley because there is a restriction on allowable torque to the end of ball screw shaft.
- To extend high performance of NSK K1 lubrication unit, please observe the following.

- Temperature range
  - Ambient temperature : 50°C
  - Max. instantaneous temperature : 80°C
- Use of chemicals
  - Never leave a Monocarrier in close proximity of grease removing organic solvents such as hexane or thinner. Never immerse it in an antirust 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™ Lubricant Unit

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

#### (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. 1-14. While the linear guide cannot be operated without lubricant for even short periods without damage, the installation of the NSK K1 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: 1800 mm
No lubricant	All grease removed
NSK K1	All grease removed + NSK K1

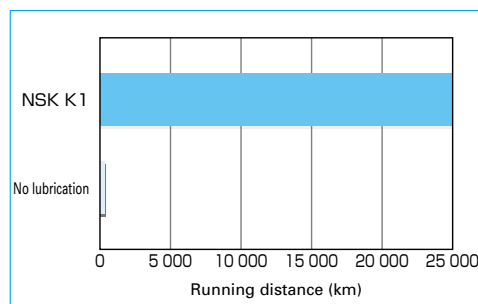


Fig. 1-14 Results of high-speed durability test of linear guides without lubricant

#### (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.1-15. While the ball screw cannot be operated without a lubricant at 8.5 km without damage, the installation of the NSK K1 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 <sup>-1</sup> )
	Stroke: 600 mm
No lubricant	All grease removed
NSK K1	All grease removed + NSK K1

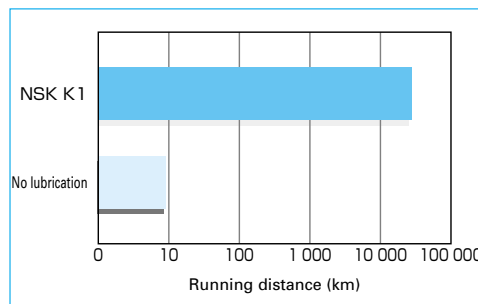


Fig. 1-15 Results of high-speed durability test of ball screws without lubricant

#### ● 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 with 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 which are commonly used in clean rooms, LG2 has several advantages such as: Higher in lubrication function, Longer lubrication life, More stable torque (resistant to wear), 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 highly clean environment at normal pressure 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 <sup>2</sup> /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 such average value almost over the entire travel distance at the intervals specified for each model and take the maximum difference of the average values determined at respective positions as the measured value.

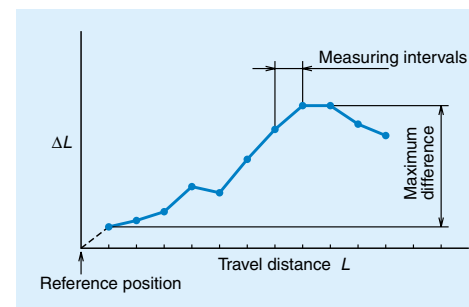


Fig. 1-16

#### 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 almost 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.

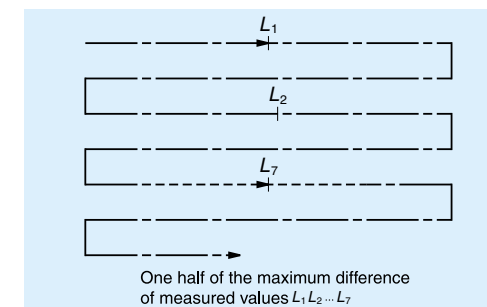


Fig. 1-17

## 1.8 Sensor specification

### 1.8.1 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	NC

Movement mode	Output type	Type	Time chart	Output circuit
NO	NPN	E2S-W13 type	Target object: Yes (ON), No (OFF) Output transistor (load): ON, OFF Output transistor (orange): ON, OFF	<p>*(Maximum load current : 50mA)</p>
		E2S-W14 type	Target object: Yes (ON), No (OFF) Output transistor (load): OFF, ON Output transistor (orange): ON, OFF	

### 1.8.2 Photo sensor

#### Use of OMRON EE-SX674

Item	EE-SX674 type
Slot width	5mm
Standard reference object	Opaque: 2 x 0.8 mm
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	35mA 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

Type	Movement mode	Time chart	Connection terminal	Output circuit
EE-SX674 type	Light-ON	Incident: ON, Interrupted: OFF Indicator (red): ON, OFF Output transistor: ON, OFF Load 1 (relay): Operates, Releases Load 2: H, L	When terminals L and ⊕ are short circuited	<p>DC 5 to 24V Less than 100mA</p>
	Dark-ON	Incident: ON, Interrupted: OFF Indicator (red): ON, OFF Output transistor: ON, OFF Load 1 (relay): Operates, Releases Load 2: H, L	When terminals L and ⊕ are open circuited	



2. 1	MCM Series Reference Number Coding	C23
2. 2	MCM Series dimension table of standard products	
	MCM02	C24
	MCM03	C25
	MCM05	C27
	MCM06	C29
	MCM08	C31
	MCM10	C33
2. 3	MCM Series Option Part	
2. 3. 1	Sensor Unit	C35
2. 3. 2	Cover Unit	C39
2. 3. 3	Motor Bracket	C41

# MCM Series



# 2 MCM Series

## 2.1 MCM Series Reference Number Coding

[Body]  
 Reference number : **MC M 08 040 H 10 K 0 0**  
 Monocarrier  
 M type: MCM Series  
 Nominal size (rail width, Unit: 10mm)  
 Stroke (Unit: 10mm)  
 Accuracy grade (H: High grade, P: Precision grade)  
 NSK management number  
 Grease specification: O (standard AS2)  
 Clean grease specification: B (LG2)  
 Slider specification K: Single slider  
 (See page C9) D: Double slider  
 Ball screw lead (mm)

[With Option part]  
 Reference number : **MC E 08 040 H 10 K 0 0 K 0 0 0**  
 E: With MCM option part  
 NSK management number  
 Sensor unit  
 Cover unit  
 Motor bracket  
 Note : Optional components are available separately.

Table 2-1 Sensor unit (See page C35~38)

Reference number code	Specification	Reference number
0	N/A	—
1	Proximity switch (b-contact 3pieces)	MC - SRxx - 10
2	Proximity switch (a-contact 3pieces)	MC - SRxx - 11
3	Proximity switch (a-contact 1pieces, b-contact 2pieces)	MC - SRxx - 12
4	Photo sensor 3pieces	MC - SRxx - 13

Note xx: Reference number

Table 2-2 Cover unit (See page C39~40)

Reference number code	Specification	Reference number
0	N/A	—
1	With top cover	MC - CVxxxx - 01 (02) ※
2	Full cover	MC - CVxxxx - 00

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

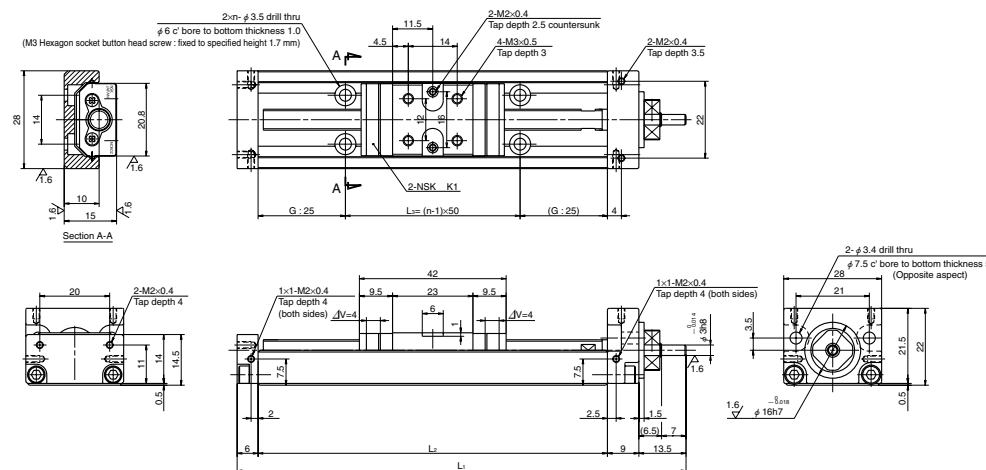
Note xxxxx: Reference number and stroke number

Table 2-3 The reference number of motor bracket

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	—

## 2.2 MCM Series dimension table of standard products

### MCM02



ΔV is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit (mm)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole <i>n</i>	Inertia $\times 10^7$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
MCM02005H01K	50	58	1	128.5	100	50	2	0.93	0.26
MCM02005P01K									
MCM02005H02K			2						
MCM02005P02K									
MCM02010H01K	100	108	1	178.5	150	100	3	1.36	0.32
MCM02010P01K									
MCM02010H02K			2						
MCM02010P02K									
MCM02015H01K	150	158	1	228.5	200	150	4	1.81	0.39
MCM02015P01K									
MCM02015H02K			2						
MCM02015P02K									

Items not marked are available from standard stock.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	High grade		Precision	
	1	2	0.1~1.3	0.2~1.6

- Frictional resistance of NSK K1 is included in the dynamic torque in the table.
- Grease is packed into ball screw, linear guide parts and support unit.
- Consult NSK for life estimates under large moment loads.
- Stroke limit = stroke + (4|margin|)·2

Basic load rating

Lead <i>l</i> (mm)	Shaft dia <i>d</i> (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw <i>C<sub>a</sub></i>	linear guides <i>C</i>	Support unit <i>C<sub>a</sub></i>	Rated running distance <i>L<sub>a</sub></i> (km)	Ball screw <i>C<sub>0a</sub></i>	Linear guides <i>C<sub>0</sub></i>	
1	φ6	340 (High grade)	4910	615	1	555 (High grade)	2120	490
		405 (Precision)				615 (Precision)		
2	φ6	340 (High grade)	3900	615	2	555 (High grade)	2120	490
		405 (Precision)				615 (Precision)		

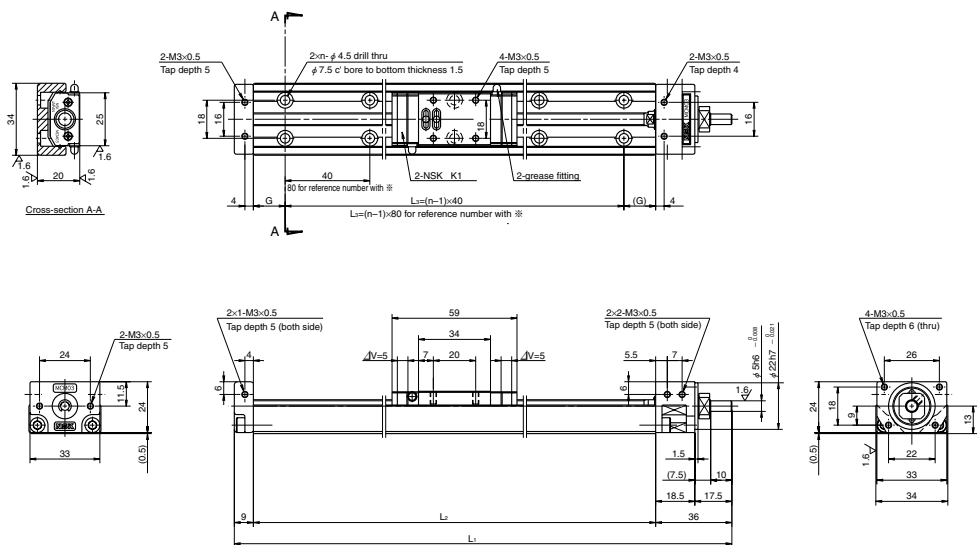
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling <i>M<sub>RO</sub></i>	Pitching <i>M<sub>PO</sub></i>	Yawing <i>M<sub>YO</sub></i>
Single	24	8	8

MCM03

Accuracy grade: Precision (P)

Ball screw lead 1 and 2



Dimension of MCM03 (Single slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				No. of mounting hole <i>n</i>	Inertia $\times 10^5$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	G	L <sub>3</sub>			
※MCM03005P01K00	50	56	1	160	115	17.5	80	2	0.015	0.6
※MCM03005P02K00		(66)	2						0.016	
MCM03010P01K00	100	131	1	235	190	15	160	5	0.021	0.7
MCM03010P02K00		(141)	2						0.022	
★MCM03015P01K00	150	181	1	285	240	20	200	6	0.025	0.8
★MCM03015P02K00		(191)	2						0.026	

Items not marked with ★ are available from standard stock.  
 Items marked with ★ are designated as "quick delivery item" upon request.  
 Bolt hole pitch L<sub>3</sub> on the items marked with ※ is 80 mm.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	1	0.2~1.7
	2	

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Optional spacer is required, when I put cover unit, sensor unit or the both together in ball screw lead of 1 and 2mm (See page C39).
5. Stroke limit = stroke + (3[margin] × 2)

Basic load rating

Lead <i>l</i> (mm)	Shaft dia <i>d</i> (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw <i>C<sub>a</sub></i>	linear guides <i>C</i>	Support unit <i>C<sub>a</sub></i>	Rated running distance <i>L<sub>a</sub></i> (km)	Ball screw <i>C<sub>0a</sub></i>	Linear guides <i>C<sub>0</sub></i>	
1	φ6	735	10900	2670	1	1230	4900	1040
2		735	8650		2			

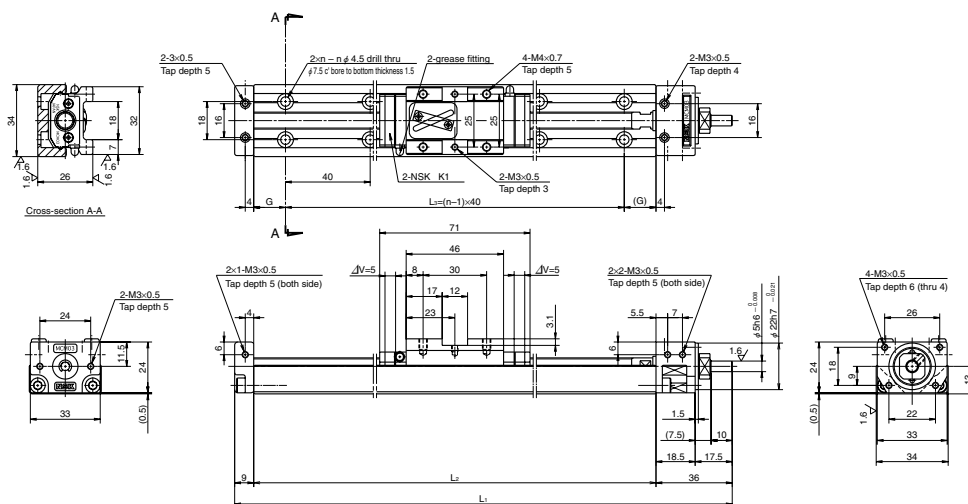
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	RollingM <sub>RO</sub>	PitchingM <sub>PO</sub>	YawingM <sub>YO</sub>
Single	68	28	28

MCM03

Accuracy grade: High grade (H)

Ball screw lead 10 and 12



Dimension of MCM03 (Single slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				No. of mounting hole <i>n</i>	Inertia $\times 10^5$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	G	L <sub>3</sub>			
MCM03010H10K00	100	119	10	235	190	15	160	5	0.092	0.7
MCM03010H12K00		(129)	12						0.109	
★MCM03015H10K00	150	169	10	285	240	20	200	6	0.105	0.8
★MCM03015H12K00		(179)	12						0.122	
MCM03020H10K00	200	219	10	335	290	25	240	7	0.118	0.9
MCM03020H12K00		(229)	12						0.135	
★MCM03025H10K00	250	269	10	385	340	30	280	8	0.131	1.0
★MCM03025H12K00		(279)	12						0.147	

Items not marked are available from standard stock.  
 Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	10	0.3~3.0
	12	

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (9.5[margin] × 2)

Basic load rating

Lead <i>l</i> (mm)	Shaft dia <i>d</i> (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw <i>C<sub>a</sub></i>	linear guides <i>C</i>	Support unit <i>C<sub>a</sub></i>	Rated running distance <i>L<sub>a</sub></i> (km)	Ball screw <i>C<sub>0a</sub></i>	Linear guides <i>C<sub>0</sub></i>	
10	φ8	1230	6250	2670	10	1690	6620	1040
12		1230	5880		12			

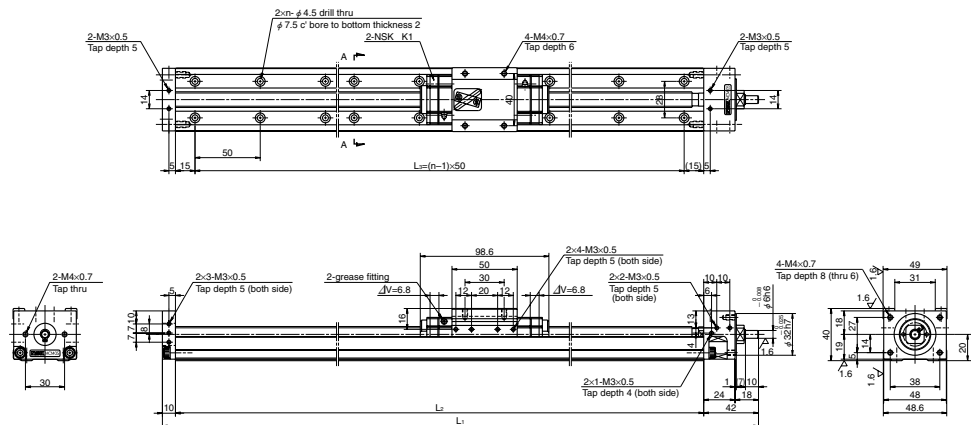
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	RollingM <sub>RO</sub>	PitchingM <sub>PO</sub>	YawingM <sub>YO</sub>
Single	92	51	51



MCM05

Accuracy grade: High grade (H)



Dimension of MCM05 (Single slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole $n$	Inertia $\times 10^{-4}$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
MCM05005H05K00	50	80	5	232	180	150	4	0.025	1.4
MCM05005H10K00		(95)							
MCM05010H05K00	100	130	5	282	230	200	5	0.031	1.6
MCM05010H10K00		(145)							
MCM05015H05K00	150	180	5	332	280	250	6	0.036	1.8
MCM05015H10K00		(195)							
MCM05020H05K00	200	230	5	382	330	300	7	0.042	2.0
MCM05020H10K00		(245)							
MCM05025H10K00	250	280 (295)	10	432	380	350	8	0.057	2.2
MCM05030H10K00		330							
MCM05030H20K00	300	(345)	20	482	430	400	9	0.101	2.3
MCM05040H10K00		430							
MCM05040H20K00	400	(445)	20	582	530	500	11	0.074	2.7
MCM05050H10K00		530							
MCM05050H20K00	500	(545)	20	682	630	600	13	0.123	3.1
MCM05060H10K00		630							
MCM05060H20K00	600	(645)	20	782	730	700	15	0.134	3.5

Items not marked are available from standard stock. Items marked with ★ are designated as "quick delivery item" upon request.

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 the dynamic torque in the 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. Stroke limit = stroke + (15[margin] × 2)

Basic load rating

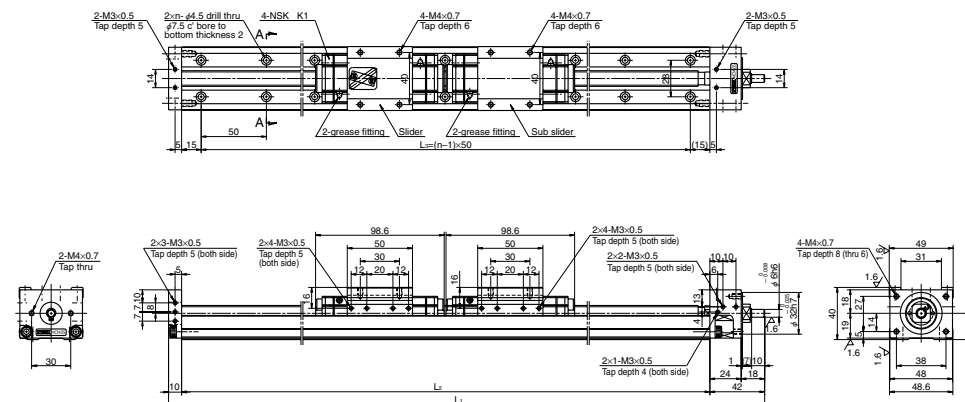
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi 12$	3760	15600	4400	5	6310	10900	1450
10		2260	12400		10			
20		2260	9850		20			

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
Single	229	89	89

MCM05 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM05 (Double slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole $n$	Inertia $\times 10^{-4}$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
★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	0.070	2.7
★MCM05021H10D00	210	233	10	482	430	400	9	0.075	2.8
★MCM05021H20D00		(260)							
★MCM05031H10D00	310	333	10	582	530	500	11	0.086	3.2
★MCM05031H20D00		(360)							
★MCM05041H10D00	410	433	10	682	630	600	13	0.098	3.6
★MCM05041H20D00		(460)							
★MCM05051H10D00	510	533	10	782	730	700	15	0.109	4.2
★MCM05051H20D00		(560)							

Items not marked are available from standard stock. Items marked with ★ are designated as "quick delivery item" upon request.

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 is included in the dynamic torque in the 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. Stroke limit = stroke + (11.4[margin] × 2)

Basic load rating

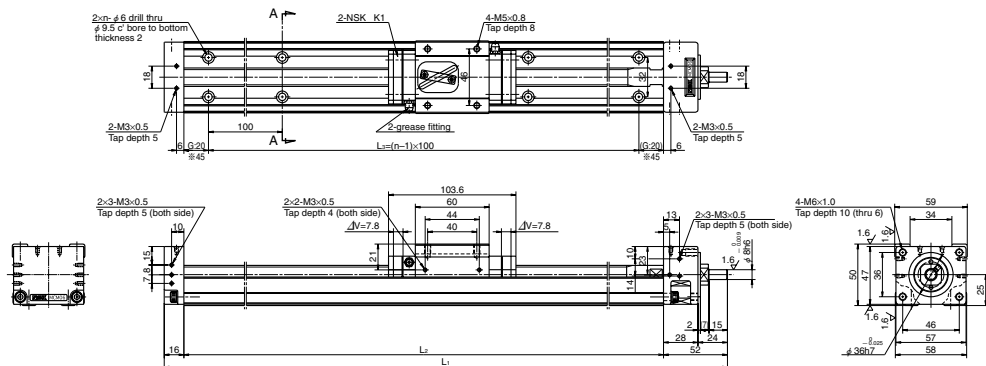
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi 12$	3760	15600	4400	5	6310	10900	1450
10		2260	12400		10			
20		2260	9850		20			

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
Double	455	765	765

MCM06

Accuracy grade: High grade (H)



Dimension of MCM06 (Single slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole $n$	Inertia $\times 10^{-4}$ (kg · m <sup>2</sup> )	Mass (kg)
				$L_1$	$L_2$	$L_3$			
※MCM06005H05K00	50	85	5	258	190	100	2	0.083	2.7
★MCM06005H10K00		(102)	10					0.077	
MCM06010H05K00	100	135	5	308	240	200	3	0.103	3.0
MCM06010H10K00		(152)	10					0.092	
MCM06020H05K00	200	235	5	408	340	300	4	0.142	3.8
MCM06020H10K00		(252)	10					0.121	
MCM06030H05K00	300	335	5	508	440	400	5	0.180	4.5
MCM06030H10K00		(352)	10					0.150	
MCM06030H20K00			20					0.196	
MCM06040H05K00	400	435	5	608	540	500	6	0.219	5.2
MCM06040H10K00		(452)	10					0.180	
MCM06040H20K00			20					0.225	
★MCM06050H05K00	500	535	5	708	640	600	7	0.258	6.0
MCM06050H10K00		(552)	10					0.209	
MCM06050H20K00			20					0.255	
★MCM06060H10K00	600	635	10	808	740	700	8	0.239	6.7
★MCM06060H20K00		(652)	20					0.284	
MCM06070H10K00	700	735	10	908	840	800	9	0.268	7.4
MCM06070H20K00		(752)	20					0.314	
★MCM06080H10K00	800	835	10	1008	940	900	10	0.298	8.1
★MCM06080H20K00		(852)	20					0.343	

Dimension G is 45 for those marked with ※.

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

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 the dynamic torque in the 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. Stroke limit = stroke + (17.5[margin] × 2)

Basic load rating

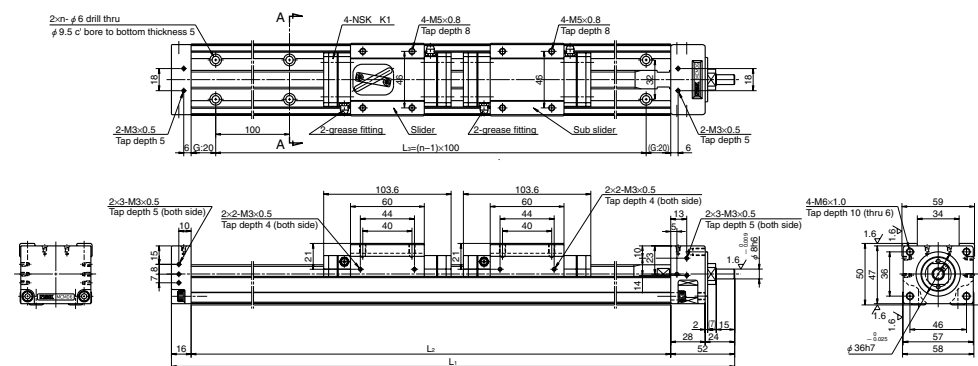
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)			Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$		
5	$\phi 16$	7310	25200	6550	5	13500	17000	2730	
10	$\phi 15$	7060	20000		10	12700			
20		4560	15900		20	7750			

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

MCM06 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM06 (Double slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole $n$	Inertia $\times 10^{-4}$ (kg · m <sup>2</sup> )	Mass (kg)
				$L_1$	$L_2$	$L_3$			
★MCM06011H05D00	110	133	5	408	340	300	4	0.145	4.4
★MCM06011H10D00		(164)	10					0.136	
★MCM06021H05D00	210	233	5	508	440	400	5	0.184	5.1
★MCM06021H10D00		(264)	10					0.166	
★MCM06021H20D00			20					0.257	
★MCM06031H05D00	310	333	5	608	540	500	6	0.223	5.8
★MCM06031H10D00		(364)	10					0.195	
★MCM06031H20D00			20					0.286	
★MCM06041H05D00	410	433	5	708	640	600	7	0.262	6.6
★MCM06041H10D00		(464)	10					0.224	
★MCM06041H20D00			20					0.316	
★MCM06051H10D00	510	533	10	808	740	700	8	0.254	7.3
★MCM06051H20D00		(564)	20					0.345	
★MCM06061H10D00	610	633	10	908	840	800	9	0.283	8.0
★MCM06061H20D00		(664)	20					0.375	
★MCM06071H10D00	710	733	10	1008	940	900	10	0.313	8.7
★MCM06071H20D00		(764)	20					0.404	

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

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 is included in the dynamic torque in the 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. Stroke limit = stroke + (11.4[margin] × 2)

Basic load rating

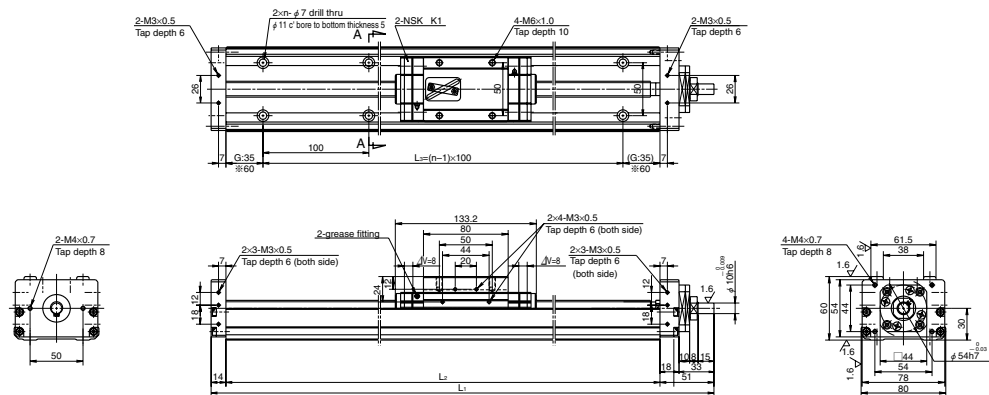
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)			Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$		
5	$\phi 16$	7310	25200	6550	5	13500	17000	2730	
10	$\phi 15$	7060	20000		10	12700			
20		4560	15900		20	7750			

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{R0}$	Pitching $M_{P0}$	Yawing $M_{Y0}$
Double	825	1220	1220

MCM08

Accuracy grade: High grade (H)



Dimension of MCM08 (Single slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia $\times 10^{-4}$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
★※MCM08005H05K00	50	85 (101)	5	285	220	100	2	0.101	4.1
★ MCM08010H05K00	100	135	5	335	270	200	3	0.120	4.6
MCM08010H10K00		(151)	10					0.114	
★※MCM08015H05K00	150	185 (201)	5	385	320	200	3	0.139	5.1
★ MCM08020H05K00	200	235	5	435	370	300	4	0.159	5.5
MCM08020H10K00		(251)	10					0.144	
MCM08030H10K00	300	335	10	535	470	400	5	0.173	6.5
MCM08030H20K00		(351)	20					0.249	
MCM08040H10K00	400	435	10	635	570	500	6	0.203	7.4
MCM08040H20K00		(451)	20					0.279	
MCM08050H10K00	500	535	10	735	670	600	7	0.232	8.4
MCM08050H20K00		(551)	20					0.308	
MCM08060H10K00	600	635	10	835	770	700	8	0.262	9.3
MCM08060H20K00		(651)	20					0.338	
★ MCM08070H10K00	700	735	10	935	870	800	9	0.291	10.5
★ MCM08070H20K00		(751)	20					0.367	
★ MCM08080H10K00	800	835	10	1035	970	900	10	0.320	11.2
★ MCM08080H20K00		(851)	20					0.396	

Dimension G is 60 for those marked with ※.

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

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

- Frictional resistance of NSK K1 is included in the dynamic torque in the table.
- Grease is packed into ball screw, linear guide parts and support unit.
- Consult NSK for life estimates under large moment loads.
- Stroke limit = stroke + (17.5[margin] × 2)

Basic load rating

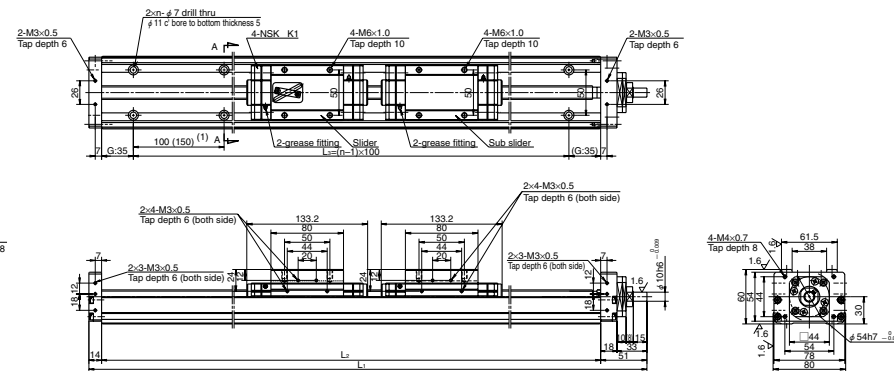
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi$ 16	7310	30800	7100	5	13500	22800	3040
10	$\phi$ 15	7060	24400		10	12700		
20		4560	19400		20	7750		

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{R0}$	Pitching $M_{P0}$	Yawing $M_{Y0}$
Single	770	300	300

MCM08 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM08 (Double slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia $\times 10^{-4}$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
★●MCM08008H10D00	80	104 (136)	10	435	370	300	3	0.169	6.5
★ MCM08018H10D00	180	204	10	535	470	400	5	0.199	7.5
MCM08018H20D00		(236)	20					0.351	
★ MCM08028H10D00	280	304	10	635	570	500	6	0.228	8.4
MCM08028H20D00		(336)	20					0.380	
★ MCM08038H10D00	380	404	10	735	670	600	7	0.257	9.4
MCM08038H20D00		(436)	20					0.409	
★ MCM08048H10D00	480	504	10	835	770	700	8	0.287	10.3
MCM08048H20D00		(536)	20					0.439	
★ MCM08058H10D00	580	604	10	935	870	800	9	0.316	11.5
MCM08058H20D00		(636)	20					0.468	
★ MCM08068H10D00	680	704	10	1035	970	900	10	0.346	12.2
MCM08068H20D00		(736)	20					0.498	

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

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	10	2.5~10.8
	20	4.0~17.2

- Frictional resistance of NSK K1 is included in the dynamic torque in the table.
- Grease is packed into ball screw, linear guide parts and support unit.
- Consult NSK for life estimates under large moment loads.
- Stroke limit = stroke + (11.8[margin] × 2)

Basic load rating

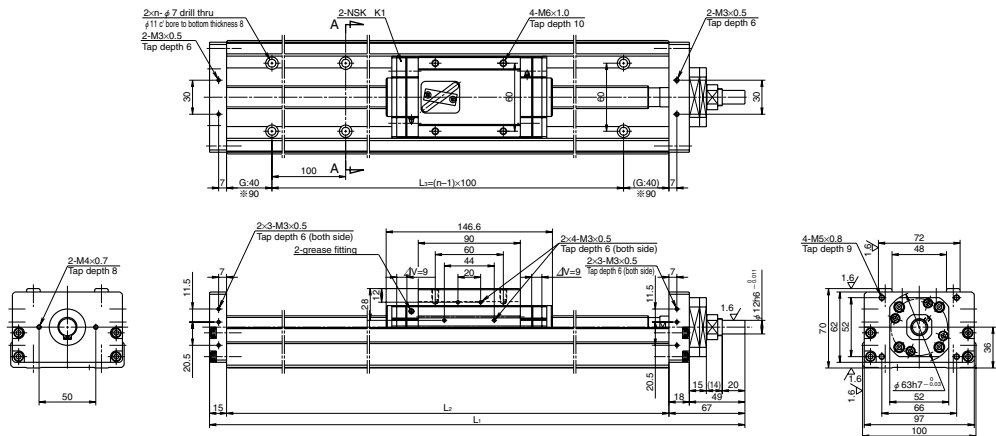
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi$ 16	7310	30800	7100	5	13500	22800	3040
10	$\phi$ 15	7060	24400		10	12700		
20		4560	19400		20	7750		

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{R0}$	Pitching $M_{P0}$	Yawing $M_{Y0}$
Double	1540	2050	2050

MCM10

Accuracy grade: High grade (H)



Dimension of MCM10 (Single slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole $n$	Inertia $\times 10^4$ (kg · m <sup>2</sup> )	Mass (kg)
				$L_1$	$L_2$	$L_3$			
MCM10020H10K00	200	230 (251)	10	462	380	300	4	0.425	9.5
MCM10030H10K00	300	330	10	562	480	400	5	0.519	11.2
MCM10030H20K00		(351)	20					0.633	
MCM10040H10K00	400	430	10	662	580	500	6	0.612	13.0
MCM10040H20K00		(451)	20					0.726	
★ MCM10050H10K00	500	530	10	762	680	600	7	0.706	14.6
★ MCM10050H20K00		(551)	20					0.820	
MCM10060H10K00	600	630	10	862	780	700	8	0.800	16.3
MCM10060H20K00		(651)	20					0.914	
★ MCM10070H10K00	700	730	10	962	880	800	9	0.893	18.0
★ MCM10070H20K00		(751)	20					1.007	
MCM10080H10K00	800	830	10	1062	980	900	10	0.987	19.7
★ MCM10080H20K00		(851)	20					1.101	
★ MCM10090H10K00	900	930	10	1162	1080	1000	11	1.081	21.4
★ MCM10090H20K00		(951)	20					1.195	
★※ MCM10100H10K00	1000	1030	10	1262	1180	1000	11	1.174	23.1
★※ MCM10100H20K00		(1051)	20					1.288	

Dimension G is 90 for those marked with ※.

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

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

- Frictional resistance of NSK K1 is included in the dynamic torque in the table.
- Grease is packed into ball screw, linear guide parts and support unit.
- Consult NSK for life estimates under large moment loads.
- Stroke limit = stroke + (15[margin] × 2)

Basic load rating

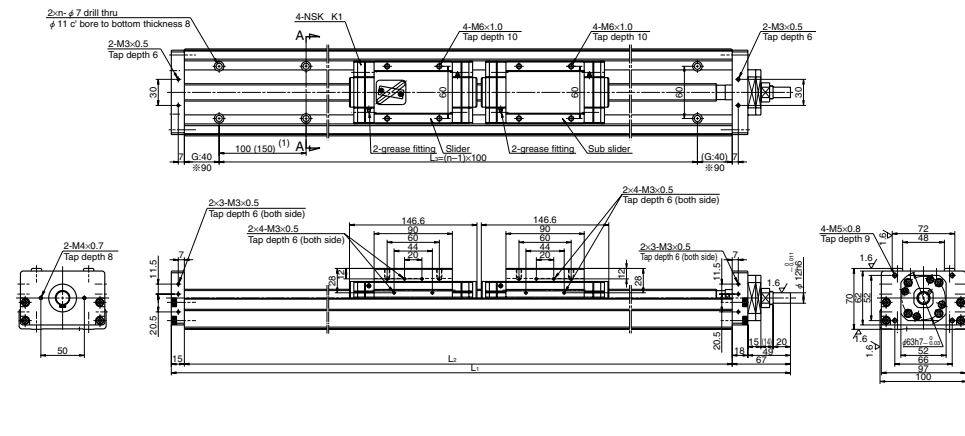
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
10	$\phi 20$	10900	33500	7600	10	21700	29400	3380
20		7060	26600		20	12700		

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
Single	1170	425	425

MCM10 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM10 (Double slider)

$\Delta V$  is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole $n$	Inertia $\times 10^4$ (kg · m <sup>2</sup> )	Mass (kg)
				$L_1$	$L_2$	$L_3$			
★● MCM10007H10D00	70	86 (122)	10	462	380	300	3	0.463	11.0
★ MCM10017H10D00	170	186	10	562	480	400	5	0.557	12.7
★ MCM10017H20D00		(222)	20					0.785	
★ MCM10027H10D00	270	286	10	662	580	500	6	0.650	13.4
★ MCM10027H20D00		(322)	20					0.878	
★ MCM10037H10D00	370	386	10	762	680	600	7	0.744	15.1
★ MCM10037H20D00		(422)	20					0.972	
★ MCM10047H10D00	470	486	10	862	780	700	8	0.838	17.8
★ MCM10047H20D00		(522)	20					1.066	
★ MCM10057H10D00	570	586	10	962	880	800	9	0.931	19.5
★ MCM10057H20D00		(622)	20					1.159	
★ MCM10067H10D00	670	686	10	1062	980	900	10	1.025	21.2
★ MCM10067H20D00		(722)	20					1.253	
★※ MCM10087H10D00	870	886	10	1262	1180	1000	11	1.212	23.6
★※ MCM10087H20D00		(922)	20					1.440	

Dimension G is 90 for those marked with ※.

Items not marked are available from standard stock.

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

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

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

- Frictional resistance of NSK K1 is included in the dynamic torque in the table.
- Grease is packed into ball screw, linear guide parts and support unit.
- Consult NSK for life estimates under large moment loads.
- Stroke limit = stroke + (8.4[margin] × 2)

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	$\phi 20$	10900	33500	7600	10	21700	29400	3380
20		7060	26600		20	12700		

Basic static moment load of linear guide

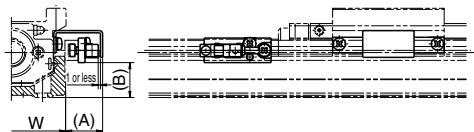
Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
Double	2340	2940	2940

## 2.3 MCM Series Option Part

### 2.3.1 Sensor Unit



#### ● Proximity switch



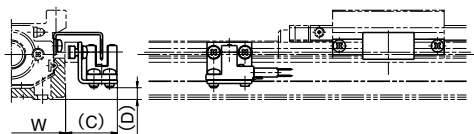
(Example of assembly)

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 (a-contact)	—	3	1	E2S-W13(OMRON Corp.)	
	Proximity switch (b-contact)	3	—	2	E2S-W14(OMRON Corp.)	

\*See page C19 for specification of proximity switch      A sensor unit consists of sensors, a sensor dog and sensor mounring parts.

You require an optional spacer plate when you use a cover unit or a sensor unit for an MCM03 with the lead of 1 or 2 mm. (Refer to page C39.)

#### ● Photo sensor



(Example of assembly)

Type	Reference number	Dimension (C) (mm)	Dimension (D) (mm)	Body width W (mm)	Remarks
MCM03	MC-SR03-13	24	0.5	34	EE-SX674(OMRON Corp.) 3 sets (EE-1001 connector attachment)
MCM05	MC-SR05-13	24	5	48.6	
MCM06	MC-SR06-13	24	9	58	
MCM08	MC-SR08-13	23	17	80	
MCM10	MC-SR10-13	22	24	100	

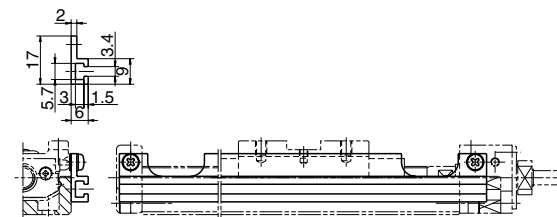
\*See page C20 for specification of photo sensor      A sensor unit consists of sensors, a sensor dog and sensor mounring parts.

You require an optional spacer plate when you use a cover unit or a sensor unit for an MCM03 with the lead of 1 or 2 mm. (Refer to page C39.)

### Sensor rail

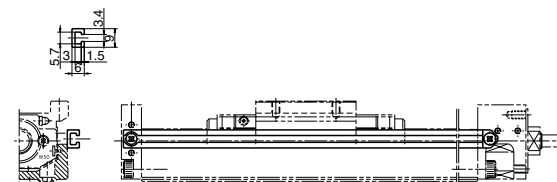


#### Sensor rail for MCM03: MC-SRL3- \* \* \* \*



(Example of assembly)

#### Sensor rail for MCM05: MC-SRL5- \* \* \* \*



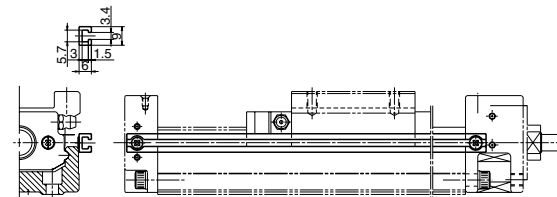
(Example of assembly)

#### Sensor rail for MCM02: MC-SRL2- \* \* \* \*

#### Sensor rail for MCM06: MC-SRL6- \* \* \* \*

#### Sensor rail for MCM08: MC-SRL8- \* \* \* \*

#### Sensor rail for MCM10: MC-SRL1- \* \* \* \*



(Example of assembly)

\* \* \* \* is the same as rail dimension L<sub>2</sub>

Please place and assemble the seat during the attachment between the sensor rail and the support unit attaching part for MCM03 and MCM06.

## Body of MCM Series and Sensor rail combination Table

Table 2-4

Nominal size	Body length L <sub>2</sub> (mm)	Reference number	Sensor rail reference number	
MCM02	100	MCM02005H01K MCM02005P01K MCM02005H02K MCM02005P02K	MC-SRL2-0100	
		MCM02010H01K MCM02010P01K MCM02010H02K MCM02010P02K		MC-SRL2-0150
		MCM02015H01K MCM02015P01K MCM02015H02K MCM02015P02K		
MCM03	115	MCM03005P01K00 MCM03005P02K00	MC-SRL3-0115	
	190	MCM03010P01K00 MCM03010P02K00 MCM03010H10K00 MCM03010H12K00	MC-SRL3-0190	
		MCM03015P01K00 MCM03015P02K00 MCM03015H10K00 MCM03015H12K00		
	290	MCM03020H10K00 MCM03020H12K00	MC-SRL3-0290	
	340	MCM03025H10K00 MCM03025H12K00	MC-SRL3-0340	
MCM05	180	MCM05005H05K00 MCM05005H10K00	MC-SRL5-0180	
	230	MCM05010H05K00 MCM05010H10K00	MC-SRL5-0230	
	280	MCM05015H05K00 MCM05015H10K00 MCM05006H10D00	MC-SRL5-0280	
	330	MCM05020H05K00 MCM05020H10K00 MCM05011H10D00	MC-SRL5-0330	
	380	MCM05025H10K00 MCM05016H10D00	MC-SRL5-0380	
	430	MCM05030H10K00 MCM05030H20K00 MCM05021H10D00 MCM05021H20D00	MC-SRL5-0430	
	530	MCM05040H10K00 MCM05040H20K00 MCM05031H10D00 MCM05031H20D00	MC-SRL5-0530	
	630	MCM05050H10K00 MCM05050H20K00 MCM05041H10D00 MCM05041H20D00	MC-SRL5-0630	
	730	MCM05060H10K00 MCM05060H20K00	MC-SRL5-0730	
		MCM05051H10D00 MCM05051H20D00		

Nominal size	Body length L <sub>2</sub> (mm)	Reference number	Sensor rail reference number
MCM06	190	MCM06005H05K00 MCM06005H10K00	MC-SRL6-0190
	240	MCM06010H05K00 MCM06010H10K00	MC-SRL6-0240
MCM06	340	MCM06020H05K00 MCM06020H10K00 MCM06011H05D00 MCM06011H10D00	MC-SRL6-0340
	440	MCM06030H05K00 MCM06030H10K00 MCM06030H20K00 MCM06021H05D00 MCM06021H10D00 MCM06021H20D00	MC-SRL6-0440
MCM06	540	MCM06040H05K00 MCM06040H10K00 MCM06040H20K00 MCM06031H05D00 MCM06031H10D00 MCM06031H20D00	MC-SRL6-0540
	640	MCM06050H05K00 MCM06050H10K00 MCM06050H20K00 MCM06041H05D00 MCM06041H10D00 MCM06041H20D00	MC-SRL6-0640
MCM06	740	MCM06060H10K00 MCM06060H20K00 MCM06051H10D00 MCM06051H20D00	MC-SRL6-0740
	840	MCM06070H10K00 MCM06070H20K00 MCM06061H10D00 MCM06061H20D00	MC-SRL6-0840
MCM06	940	MCM06080H10K00 MCM06080H20K00 MCM06071H10D00 MCM06071H20D00	MC-SRL6-0940

Nominal size	Body length L <sub>2</sub> (mm)	Reference number	Sensor rail reference number
MCM08	220	MCM08005H05K00	MC-SRL8-0220
	270	MCM08010H05K00 MCM08010H10K00	MC-SRL8-0270
		MCM08015H05K00	
	320	MCM08020H05K00 MCM08020H10K00 MCM08008H10D00	MC-SRL8-0320
	370	MCM08030H10K00 MCM08030H20K00	MC-SRL8-0370
		MCM08018H10D00 MCM08018H20D00	
	470	MCM08040H10K00 MCM08040H20K00	MC-SRL8-0470
		MCM08028H10D00 MCM08028H20D00	
	570	MCM08050H10K00 MCM08050H20K00	MC-SRL8-0570
		MCM08038H10D00 MCM08038H20D00	
670	MCM08060H10K00 MCM08060H20K00	MC-SRL8-0670	
	MCM08048H10D00 MCM08048H20D00		
770	MCM08070H10K00 MCM08070H20K00	MC-SRL8-0770	
	MCM08058H10D00 MCM08058H20D00		
870	MCM08080H10K00 MCM08080H20K00	MC-SRL8-0870	
	MCM08068H10D00 MCM08068H20D00		
970	MCM08090H10K00 MCM08090H20K00	MC-SRL8-0970	
	MCM08078H10D00 MCM08078H20D00		
MCM10	380	MCM10020H10K00 MCM10007H10D00	MC-SRL1-0380
	480	MCM10030H10K00 MCM10030H20K00	MC-SRL1-0480
		MCM10017H10D00 MCM10017H20D00	
	580	MCM10040H10K00 MCM10040H20K00	MC-SRL1-0580
		MCM10027H10D00 MCM10027H20D00	
	680	MCM10050H10K00 MCM10050H20K00	MC-SRL1-0680
		MCM10037H10D00 MCM10037H20D00	
	780	MCM10060H10K00 MCM10060H20K00	MC-SRL1-0780
		MCM10047H10D00 MCM10047H20D00	
	880	MCM10070H10K00 MCM10070H20K00	MC-SRL1-0880
MCM10057H10D00 MCM10057H20D00			
980	MCM10080H10K00 MCM10080H20K00	MC-SRL1-0980	
	MCM10067H10D00 MCM10067H20D00		
1080	MCM10090H10K00 MCM10090H20K00	MC-SRL1-1080	
	MCM10077H10D00 MCM10077H20D00		
1180	MCM10100H10K00 MCM10100H20K00	MC-SRL1-1180	
	MCM10087H10D00 MCM10087H20D00		





### 2.3.2 Cover Unit

#### Cover Unit for MCM02

Stroke	Reference number	Length(L)
50	<b>MC-CV02005-00</b>	115
100	<b>MC-CV02010-00</b>	165
150	<b>MC-CV02015-00</b>	215

(Unit: mm)  
Height of screw head is not included.

#### Cover Unit for MCM03

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

Stroke	Reference number		Cover Length	
	Top cover Unit	Full cover Unit	Length (L)	Length (M)
50	<b>MC-CV03005-02</b>	<b>*MC-CV03005-01</b>	139	133
100	<b>MC-CV03010-02</b>	<b>*MC-CV03010-01</b>	214	208
150	<b>MC-CV03015-02</b>	<b>*MC-CV03015-01</b>	264	258
200	<b>MC-CV03020-02</b>	<b>*MC-CV03020-01</b>	314	308
250	<b>MC-CV03025-02</b>	<b>*MC-CV03025-01</b>	364	358

(Unit: mm)  
\*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)

<<Example of assembly>>

#### Cover Unit for MCM05, 06, 08, and 10

Top cover Unit

(Unit: mm)

Reference number	Stroke		Cover unit Reference number		Cover length			
	Single slider	Double slider	Top cover Unit	Full cover Unit	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-CV05060-01	MC-CV05060-00	750	48.5	75	—
	50	—	MC-CV06005-01	MC-CV06005-00	225			
	100	—	MC-CV06010-01	MC-CV06010-00	275			
	200	110	MC-CV06020-01	MC-CV06020-00	375			
	300	210	MC-CV06030-01	MC-CV06030-00	475			
	400	310	MC-CV06040-01	MC-CV06040-00	575			
	500	410	MC-CV06050-01	MC-CV06050-00	675			
	600	510	MC-CV06060-01	MC-CV06060-00	775			
MCM08	700	610	MC-CV06070-01	MC-CV06070-00	875	56.5	90	2.6
	800	710	MC-CV06080-01	MC-CV06080-00	975			
	50	—	MC-CV08005-01	MC-CV08005-00	248			
	100	—	MC-CV08010-01	MC-CV08010-00	298			
	200	80	MC-CV08020-01	MC-CV08020-00	398			
	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			
MCM10	600	480	MC-CV08060-01	MC-CV08060-00	798	66.5	110	2.6
	700	580	MC-CV08070-01	MC-CV08070-00	898			
	800	680	MC-CV08080-01	MC-CV08080-00	998			
	200	70	MC-CV10020-01	MC-CV10020-00	408			
	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			
	800	670	MC-CV10080-01	MC-CV10080-00	1008			
	900	—	MC-CV10090-01	MC-CV10090-00	1108			
	1000	870	MC-CV10100-01	MC-CV10100-00	1208			

Not include height such as screw  
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.

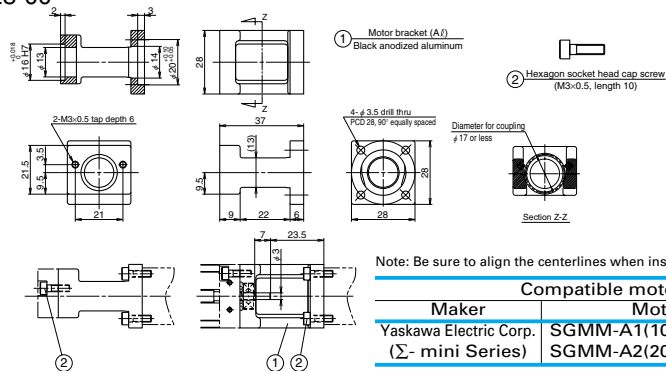
\*When you use a sensor unit, the full-cover unit cannot be used.

2.3.3 Motor Bracket



Motor Bracket for MCM02

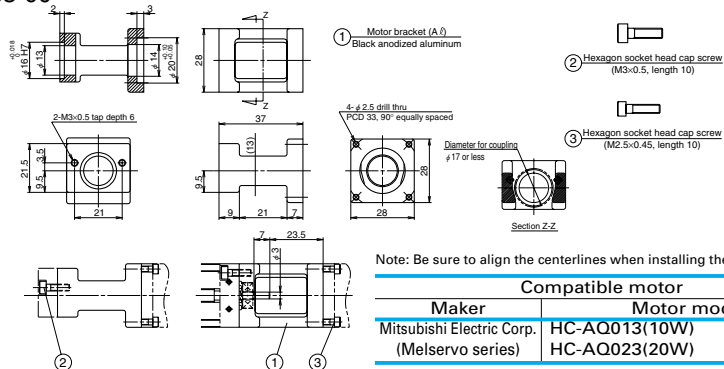
Reference number  
MC-BK02-128-00



Note: Be sure to align the centerlines when installing the motor.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMM-A1(10W) Σ- mini Series
	SGMM-A2(20W)

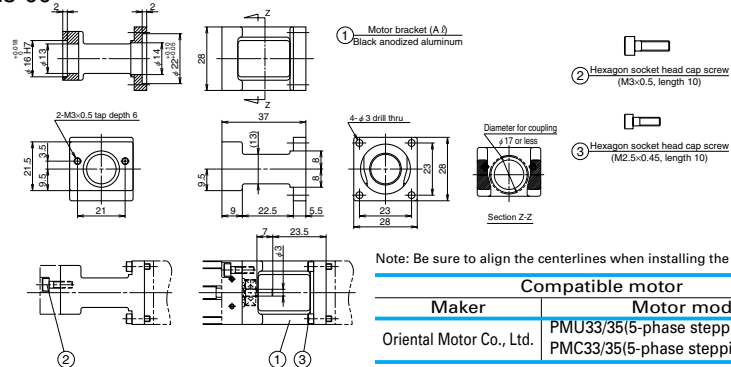
Reference number  
MC-BK02-133-00



Note: Be sure to align the centerlines when installing the motor.

Compatible motor	
Maker	Motor models
Mitsubishi Electric Corp.	HC-AQ013(10W) (Melservo series)
	HC-AQ023(20W)

Reference number  
MC-BK02-223-00



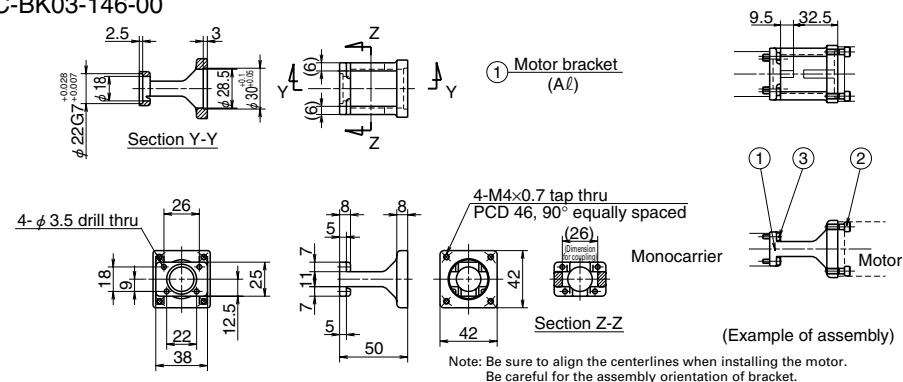
Note: Be sure to align the centerlines when installing the motor.

Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	PMU33/35(5-phase stepping motor) PMC33/35(5-phase stepping motor)



Motor Bracket for MCM03

Reference number  
MC-BK03-146-00

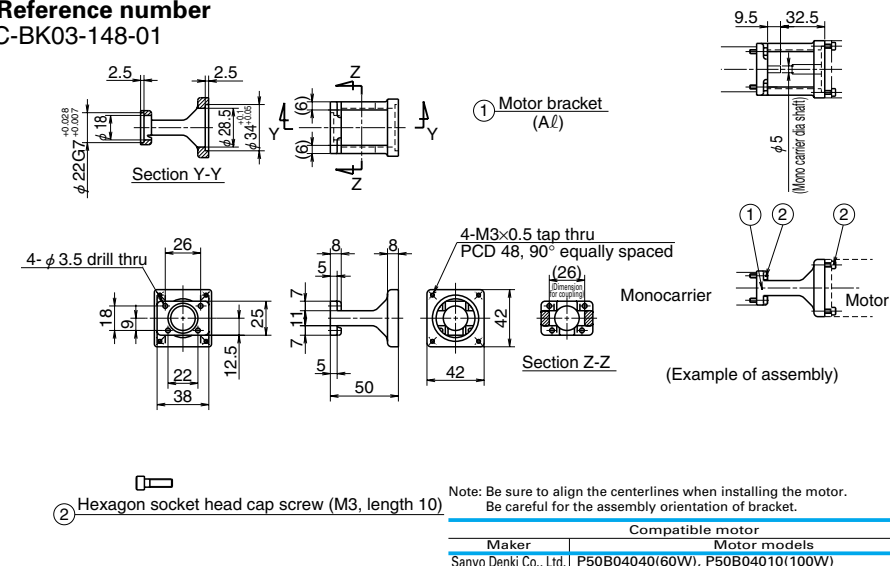


Note: Be sure to align the centerlines when installing the motor. Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMAH-A5(50W), SGMAS-A5A(50W) SGMAH-01(100W), SGMAS-01A(100W)
Mitsubishi Electric Corp.	HF-KP063(50W), HF-MP063(50W), HC-KFS053(50W), HC-MFS063(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), P30B04006(60W), P30B04010(100W)

Motor Bracket for MCM03

Reference number  
MC-BK03-148-01



Note: Be sure to align the centerlines when installing the motor. Be careful for the assembly orientation of bracket.

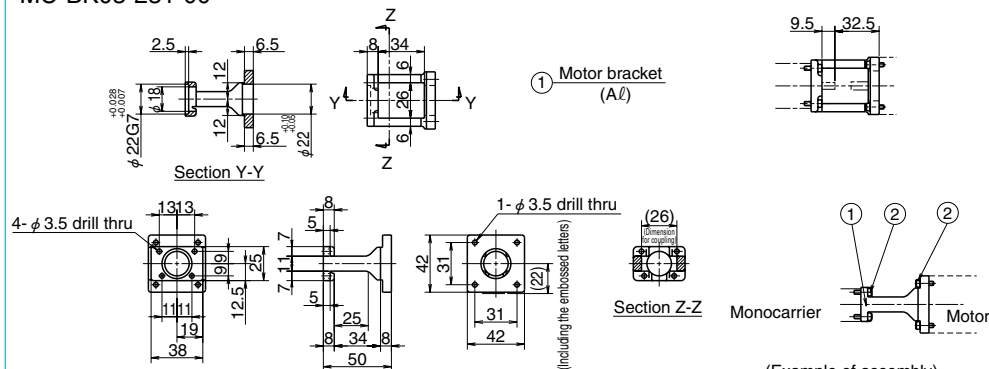
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	P50B04040(60W), P50B04010(100W)



Standard stock

Motor Bracket for MCM03

■Reference number  
MC-BK03-231-00



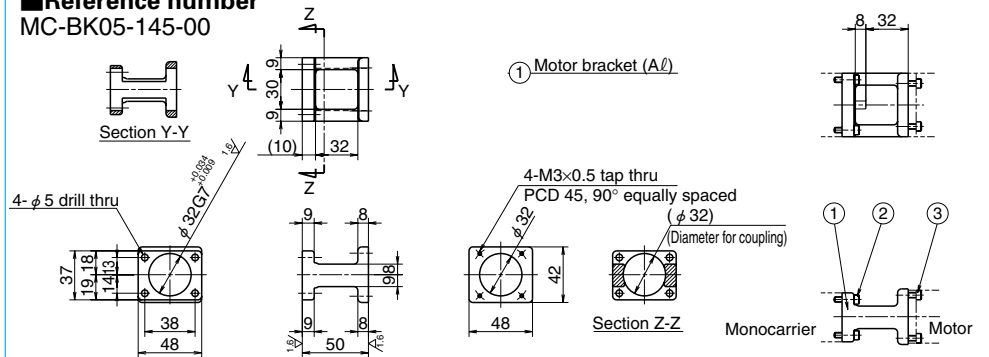
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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

② Hexagon socket head cap screw (M3, length 10)

Motor Bracket for MCM05

■Reference number  
MC-BK05-145-00



Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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

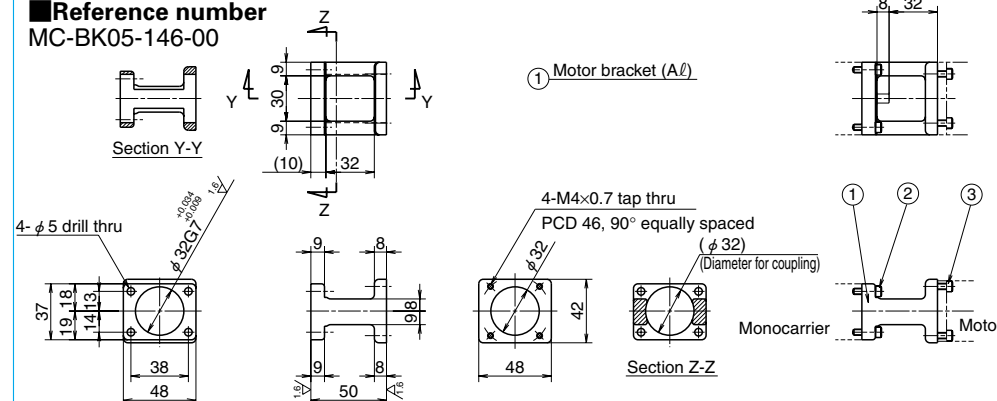
② Hexagon socket head cap screw (M4, length 15)

③ Hexagon socket head cap screw (M3, length 12)

Standard stock

Motor Bracket for MCM05

■Reference number  
MC-BK05-146-00



Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMAH-A5(50W), SGMAS-A5A(50W), SGMAH-01(100W), SGMAS-01A(100W)
Mitsubishi Electric Corp.	HF-KP03(50W), HF-MP03(50W), HC-KFS03(50W), HC-MFS03(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), P30B04006(60W), P30B04010(100W)

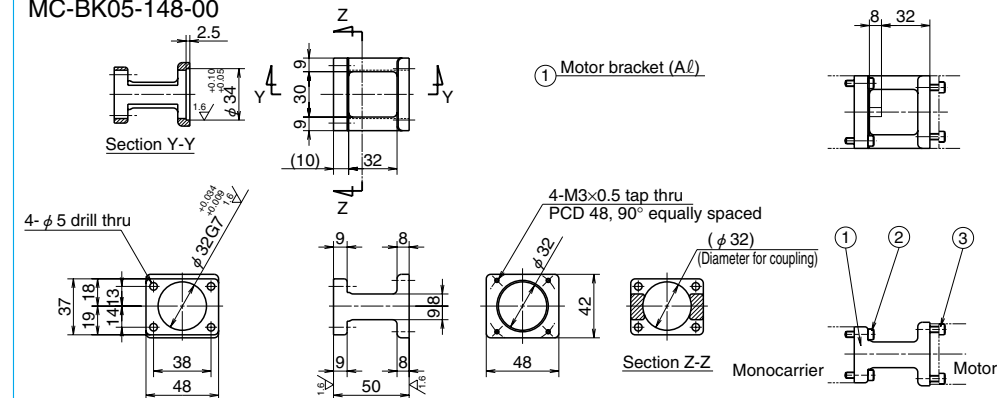
② Hexagon socket head cap screw (M4, length 15)

③ Hexagon socket head cap screw (M4, length 12)

Standard stock

Motor Bracket for MCM05

■Reference number  
MC-BK05-148-00



Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Co., Ltd.	MAMA01(100W)

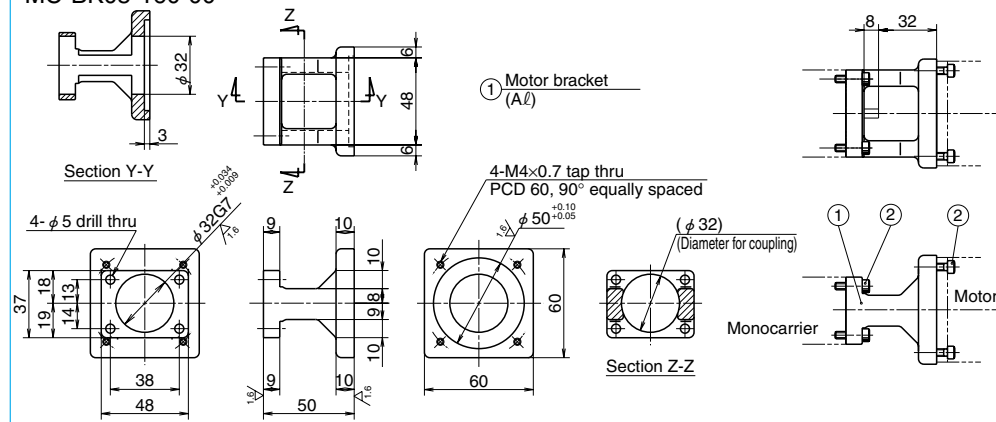
② Hexagon socket head cap screw (M4, length 15)

③ Hexagon socket head cap screw (M3, length 12)



Motor Bracket for MCM05

Reference number  
MC-BK05-160-00



Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

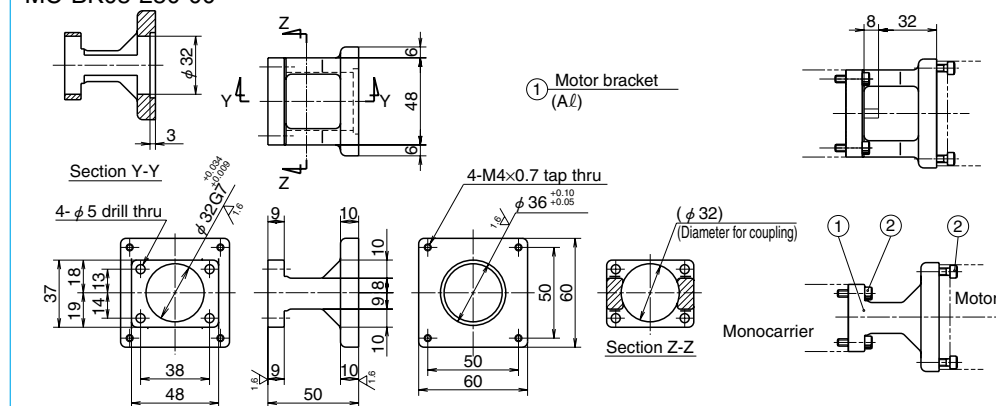
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	P50B05005(50W), P50B05010(100W), P50B05020(200W)

② Hexagon socket head cap screw  
(M4, length 15)



Motor Bracket for MCM05

Reference number  
MC-BK05-250-00



Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

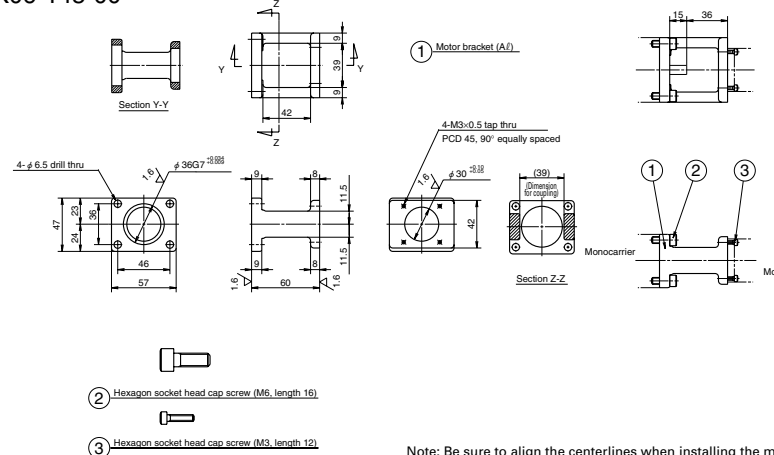
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, UFK56x PK56x, CSK56x, CFK56x

② Hexagon socket head cap screw  
(M4, length 15)



Motor Bracket for MCM06

Reference number  
MC-BK06-145-00



Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

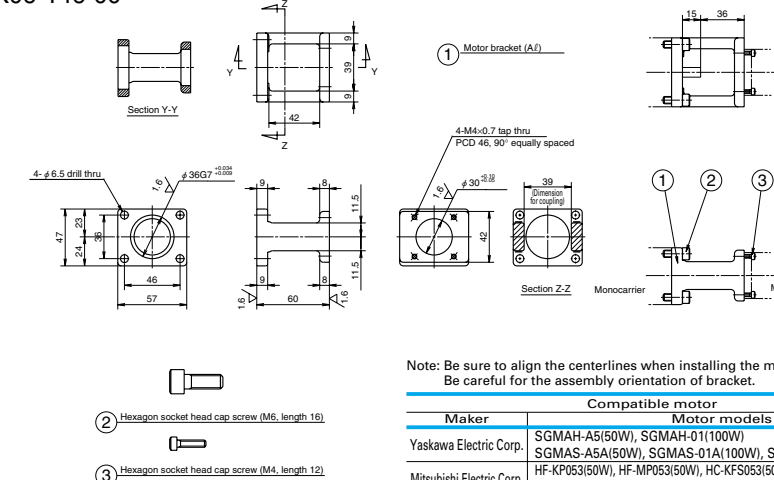
Compatible motor	
Maker	Motor models
Matsushita Electric Industrial Co., Ltd.	MSMD5A(50W), MSMD01(100W)

② Hexagon socket head cap screw (M6, length 16)  
③ Hexagon socket head cap screw (M3, length 12)



Motor Bracket for MCM06

Reference number  
MC-BK06-146-00



Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

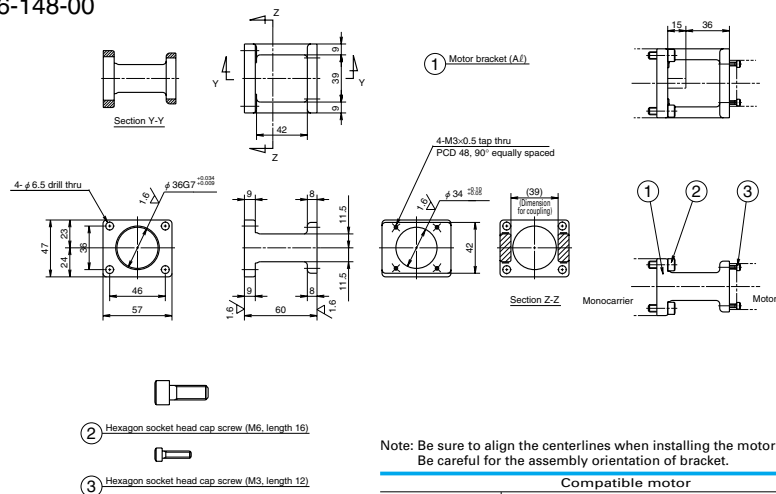
Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A5(50W), SGMAH-01(100W) SGMAS-A5A(50W), SGMAS-01A(100W), SGMAS-C2A(150W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KF5053(50W), HC-MFS053(50W) HF-KP13(100W), HF-MP13(100W), HC-KF513(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
Sanyo Denki Co., Ltd.	P30B04003(30W), P30B04005(50W), P30B04006(60W), P30B04010(100W)

② Hexagon socket head cap screw (M6, length 16)  
③ Hexagon socket head cap screw (M4, length 12)



Motor Bracket for MCM06

Reference number  
MC-BK06-148-00



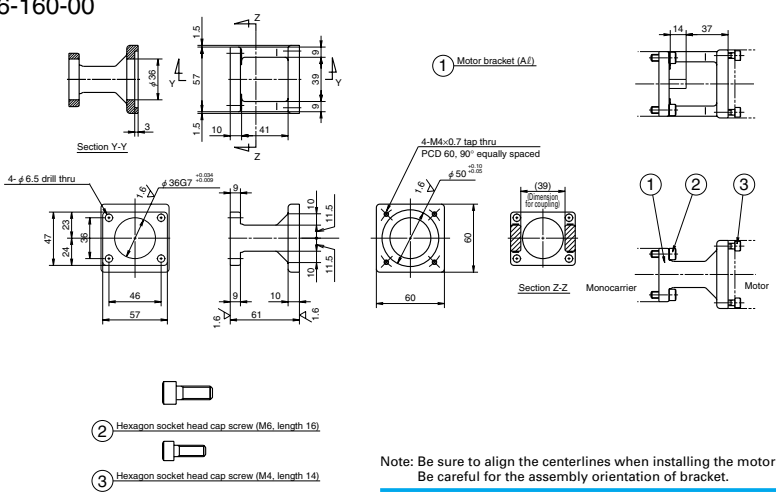
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Co., Ltd.	MAMA01(100W)
Sanyo Denki Co., Ltd.	P50B04040(60W), P50B04010(100W)



Motor Bracket for MCM06

Reference number  
MC-BK06-160-00



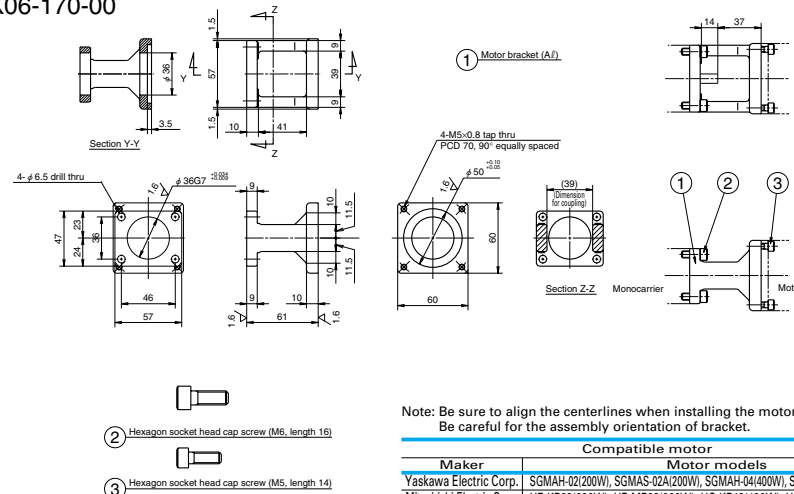
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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



Motor Bracket for MCM06

Reference number  
MC-BK06-170-00



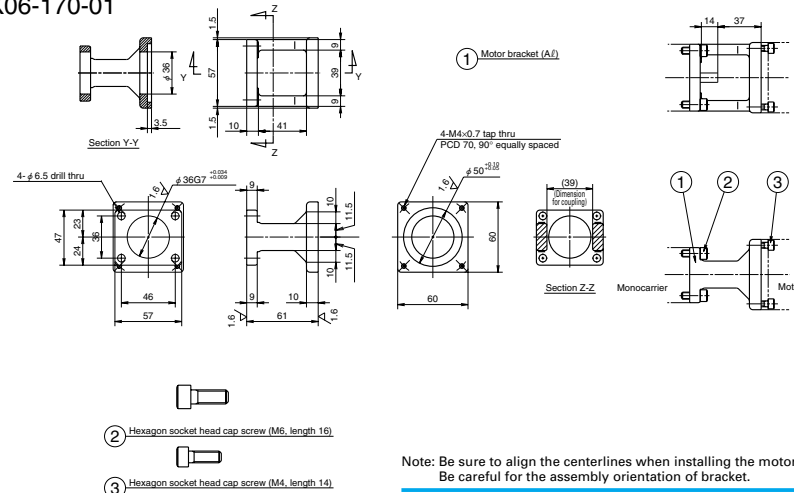
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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



Motor Bracket for MCM06

Reference number  
MC-BK06-170-01



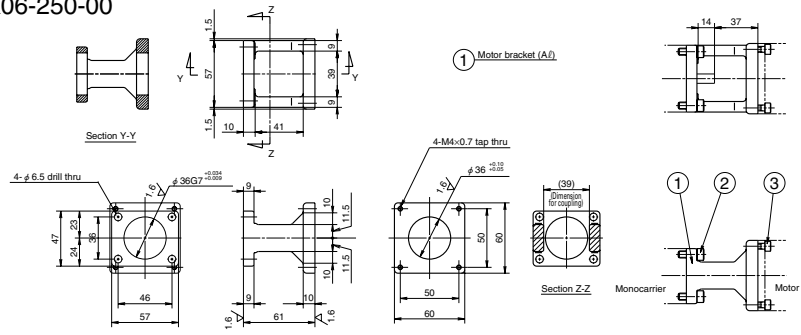
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Industrial Co., Ltd.	MSMD02(200W), NAMA02(200W), MSMD04(400W), NAMA04(400W)



Motor Bracket for MCM06

■Reference number  
MC-BK06-250-00



- ② Hexagon socket head cap screw (M6, length 16)
- ③ Hexagon socket head cap screw (M4, length 14)

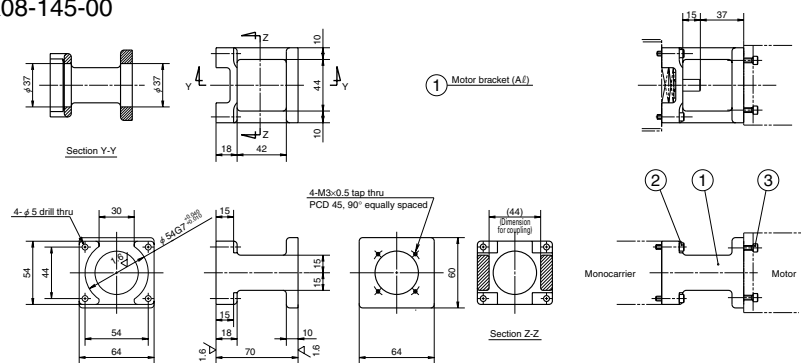
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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



Motor Bracket for MCM08

■Reference number  
MC-BK08-145-00



- ② Hexagon socket head cap screw (M4, length 20)
- ③ Hexagon socket head cap screw (M3, length 12)

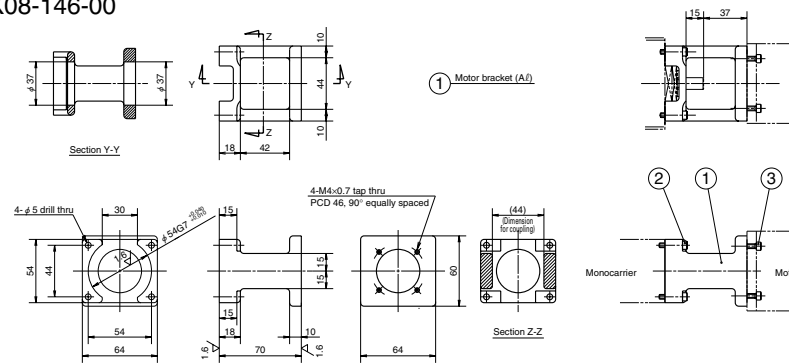
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Industrial Co., Ltd.	MSMD01(100W)



Motor Bracket for MCM08

■Reference number  
MC-BK08-146-00



- ② Hexagon socket head cap screw (M4, length 20)
- ③ Hexagon socket head cap screw (M4, length 14)

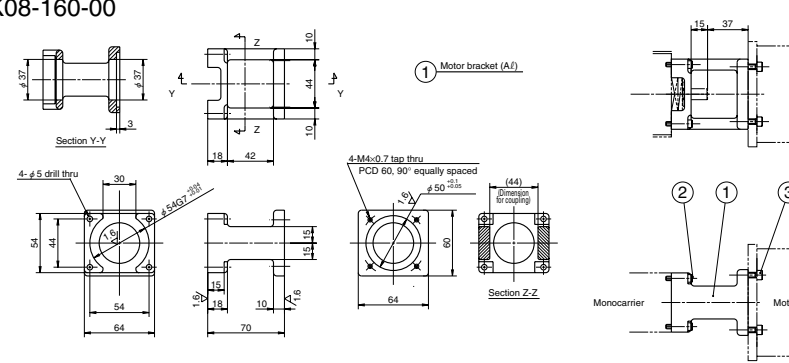
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-01(100W), SGMAS-01A(100W), SGMAS-C2A(150W)
Mitsubishi Electric Corp.	HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)
Sanyo Denki Co., Ltd.	P30B04003(30W), P30B04005(50W), P30B04006(60W), P30B04010(100W)



Motor Bracket for MCM08

■Reference number  
MC-BK08-160-00



- ② Hexagon socket head cap screw (M4, length 20)
- ③ Hexagon socket head cap screw (M4, length 14)

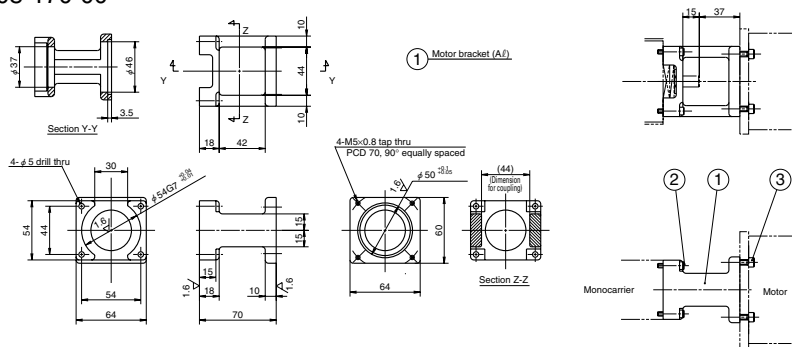
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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

Motor Bracket for MCM08



Reference number  
MC-BK08-170-00



- ② Hexagon socket head cap screw (M4, length 20)
- ③ Hexagon socket head cap screw (M5, length 14)

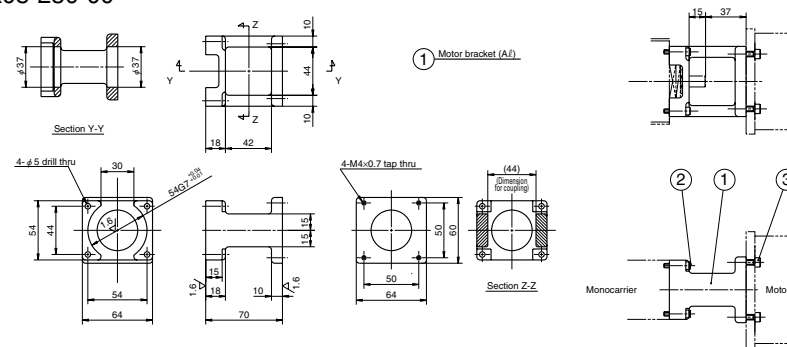
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-02(200W), SGMAS-02A(200W), SGMAM-04(400W), SGMAS-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W)
OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
Sanyo Denki Co., Ltd.	P30B06020(200W), P30B06040(400W)



Motor Bracket for MCM08

Reference number  
MC-BK08-250-00



- ② Hexagon socket head cap screw (M4, length 20)
- ③ Hexagon socket head cap screw (M4, length 14)

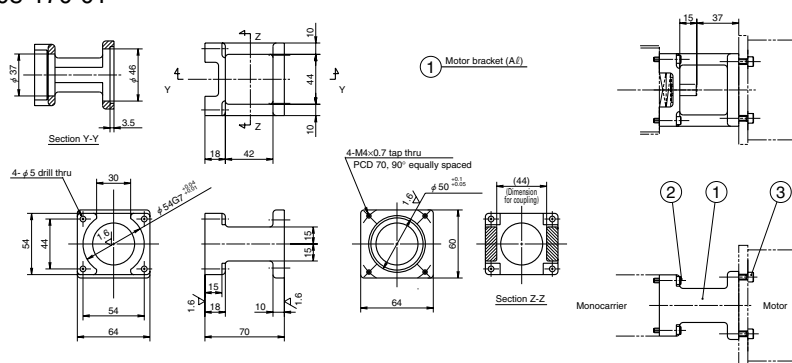
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56xx, PK56xx, CSK56x
	CFK56x, UMK56x, UFK56x

Motor Bracket for MCM08



Reference number  
MC-BK08-170-01



- ② Hexagon socket head cap screw (M4, length 20)
- ③ Hexagon socket head cap screw (M4, length 14)

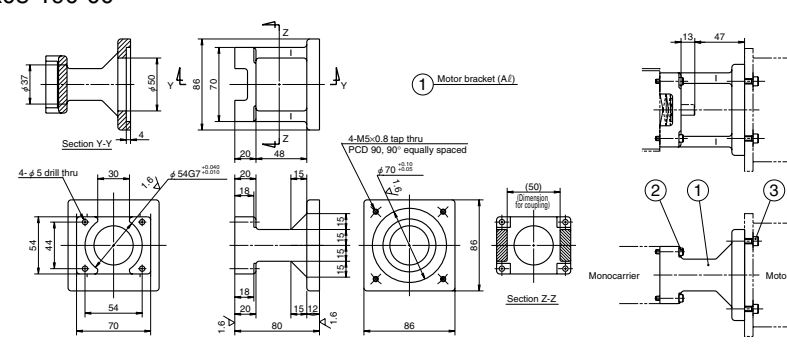
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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

Motor Bracket for MCM08



Reference number  
MC-BK08-190-00



- ② Hexagon socket head cap screw (M4, length 22)
- ③ Hexagon socket head cap screw (M5, length 16)

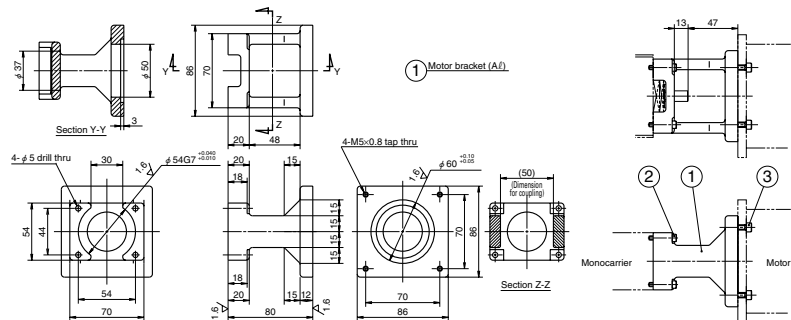
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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



Motor Bracket for MCM08

Reference number  
MC-BK08-270-00



- ② Hexagon socket head cap screw (M4, length 22)
- ③ Hexagon socket head cap screw (M5, length 16)

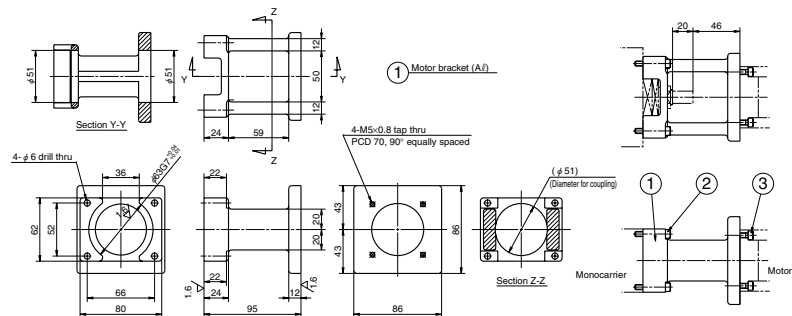
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	AS98, ASC98, UPK59x, PK59x
Sanyo Denki Co., Ltd.	CSK59x, CFK59x, UMK59x, UFK59x
	103F85xx



Motor Bracket for MCM10

Reference number  
MC-BK10-170-00



- ② Hexagon socket head cap screw (M5, length 30)
- ③ Hexagon socket head cap screw (M5, length 16)

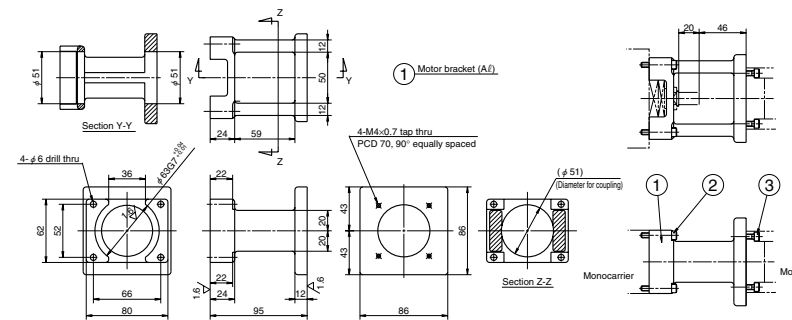
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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



Motor Bracket for MCM10

Reference number  
MC-BK10-170-01



- ② Hexagon socket head cap screw (M5, length 30)
- ③ Hexagon socket head cap screw (M4, length 16)

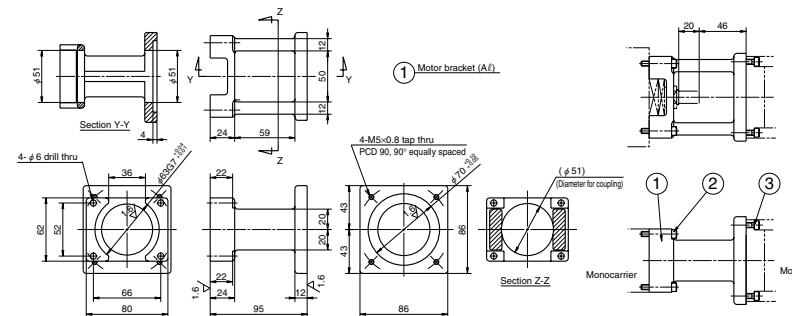
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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



Motor Bracket for MCM10

Reference number  
MC-BK10-190-00



- ② Hexagon socket head cap screw (M5, length 30)
- ③ Hexagon socket head cap screw (M5, length 16)

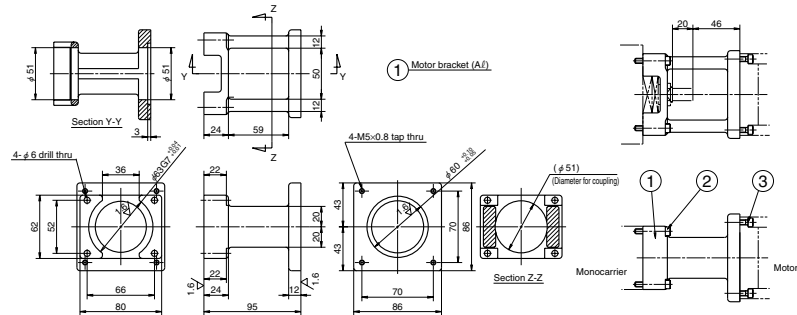
Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

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



Motor Bracket for MCM10

Reference number  
MC-BK10-270-00



- ① Motor bracket (A1)
- ② Hexagon socket head cap screw (M5, length 30)
- ③ Hexagon socket head cap screw (M5, length 18)

Note: Be sure to align the centerlines when installing the motor.  
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	103F85xx
Oriental Motor Co., Ltd.	AS98, ASC98, UPK59x, PK59x, CSK59x CFK59x, UMK59x, UFK59x

Availability Motor Table of Motor Bracket for MCM Series

Table 2-5

Nominal size	Reference number code	Motor bracket reference number	Motor manufacturer	Stepping motor model number	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-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	SGMAH-A5 SGMAS-A5A	SGMAH-A1 SGMAS-A1A												
			Mitsubishi Electric Corp.			HF-KP03 HF-MP03 HC-KF03 HC-MF03	HF-KP13 HF-MP13 HC-KF13 HC-MF13												
			OMRON Corp.			R88M-V03 R88M-V05	R88M-V10												
MCM05	2	MC-BK03-148-01	Sanyo Denki Co., Ltd.	PBM423xxx															
			Sanyo Denki Co., Ltd.	103F85xxx															
			Oriental Motor Co., Ltd.	AS46, ASC46 UPK54x, PK54x CSK54x, CFK54x UMK54x, CSK24x PK24x															
MCM05	1	MC-BK05-145-00	Masuhita Electric Industrial Co., Ltd.		MSMD5A	MSMD01													
	2	MC-BK05-146-00	Yaskawa Electric Corp.		SGMAH-A3	SGMAH-A5 SGMAS-A5A	SGMAH-A1 SGMAS-A1A												
			Mitsubishi Electric Corp.			HF-KP03 HF-MP03 HC-KF03 HC-MF03	HF-KP13 HF-MP13 HC-KF13 HC-MF13												
MCM05	3	MC-BK05-148-00	Masuhita Electric Industrial Co., Ltd.																
	4	MC-BK05-160-00	Sanyo Denki Co., Ltd.	103F78xxx															
			Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx															
MCM05	5	MC-BK05-250-00	Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x, CFK56x															
	MCM06	1	MC-BK06-145-00	Masuhita Electric Industrial Co., Ltd.		MSMD5A	MSMD01												
				Yaskawa Electric Corp.		SGMAH-A5	SGMAH-A1 SGMAS-A1A	SGMAS-C2A											
			Mitsubishi Electric Corp.			HF-KP03 HF-MP03 HC-KF03 HC-MF03	HF-KP13 HF-MP13 HC-KF13 HC-MF13												
MCM06	3	MC-BK06-148-00	Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx															
	4	MC-BK06-160-00	Sanyo Denki Co., Ltd.	103F78xxx															
			Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx															
MCM06	5	MC-BK06-170-00	Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UMK56x, UFK56x															
	6	MC-BK06-170-01	Masuhita Electric Industrial Co., Ltd.																
			Sanyo Denki Co., Ltd.	103F78xxx															
MCM08	1	MC-BK08-145-00	Masuhita Electric Industrial Co., Ltd.																
	2	MC-BK08-146-00	Yaskawa Electric Corp.																
			Mitsubishi Electric Corp.			HF-KP13 HF-MP13 HC-KF13 HC-MF13	HF-KP23 HF-MP23 HC-KF23 HC-MF23												
MCM08	3	MC-BK08-160-00	Sanyo Denki Co., Ltd.	103F78xxx															
			Yaskawa Electric Corp.																
			Mitsubishi Electric Corp.			HF-KP03 HF-MP03 HC-KF03 HC-MF03	HF-KP13 HF-MP13 HC-KF13 HC-MF13												
MCM08	5	MC-BK08-170-01	Masuhita Electric Industrial Co., Ltd.																
	6	MC-BK08-190-00	Sanyo Denki Co., Ltd.	103F85xxx															
			Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx															
MCM08	7	MC-BK08-250-00	Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UMK56x, UFK56x															
			Sanyo Denki Co., Ltd.	103F85xxx															
			Oriental Motor Co., Ltd.	AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x															
MCM10	1	MC-BK10-170-00	Yaskawa Electric Corp.																
			Mitsubishi Electric Corp.																
			OMRON Corp.																
MCM10	2	MC-BK10-170-01	Masuhita Electric Industrial Co., Ltd.																
	3	MC-BK10-190-00	Sanyo Denki Co., Ltd.	103F85xxx															
			Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx															
MCM10	4	MC-BK10-270-00	Oriental Motor Co., Ltd.	AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x															
			Yaskawa Electric Corp.																
			Mitsubishi Electric Corp.			HF-KP03 HF-MP03 HC-KF03 HC-MF03	HF-KP13 HF-MP13 HC-KF13 HC-MF13												





3. 1	MCH Series Reference Number Coding	C59
3. 2	MCH Series dimension table of standard products	
	MCL06	C60
	MCH06	C61
	MCH09	C63
	MCH10	C65
3. 3	MCH Series Option Part	
3. 3. 1	Sensor Unit	C67
3. 3. 2	Cover Unit	C69
3. 3. 3	Intermediate Plate For Motor	C71

# MCH Series



# 3 MCH Series

## 3.1 MCH Series Reference Number Coding

[Body]

Reference number : **MC H 06 040 H 10 K (B0)**

Mono carrier  
H Type: MCH Series  
L Type: MCH Series low profile rail (only for 06 size)  
Nominal size (rail width, Unit: 10mm)  
Stroke (Unit: 10mm)  
Accuracy grade (H: High grade, P: Precision grade).

※1

Special specification  
Grease specification: B (LG2)(See page C18)  
Slider specification K: Single slider  
(See page C10) D: Double slider  
Ball screw lead (mm)

※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 Option part]

Reference number : **MC S 06 040 H 10 K 0 0 K 0 0 0**

S : With MCH optional components  
R : With MCL optional components

NSK management number  
Sensor unit  
Cover unit  
Intermediate plate for motor bracket

Note : Optional components are available separately.

Table 3-1 Sensor unit (See page C67~68)

Reference number code	Specification	Reference number
0	N/A	—
1	Proximity switch (b-contact 3pieces)	MC—SRHxx—10
2	Proximity switch (a-contact 3pieces)	MC—SRHxx—11
3	Proximity switch (a-contact 1pieces, b-contact 2pieces)	MC—SRHxx—12
4	Photo sensor 3pieces	MC—SRHxx—13

Note xx: Reference number

Table 3-2 Cover unit (See page C69~70)

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

Note xxxxx: Reference number and stroke number

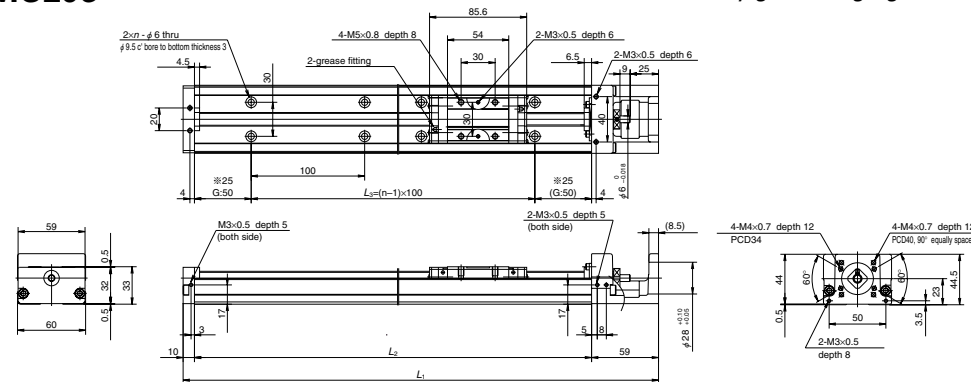
Table 3-3 Intermediate plate for motor bracket (See page C71~74)

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

## 3.2 MCH Series dimension table of standard products

### 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)				Inertia ×10 <sup>6</sup> (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	n		
★※MCL06005H05K	50	53 (65)	5	219	150	100	2	2.38	1.0
★※MCL06005H10K			10						
★ MCL06010H05K	100	103 (115)	5	269	200	100	2	3.17	1.3
★ MCL06010H10K			10						
★ MCL06020H05K	200	203 (215)	5	369	300	200	3	4.51	1.9
★ MCL06020H10K			10						
★ MCL06030H10K	300	303 (315)	10	469	400	300	4	6.80	2.6
★ MCL06030H20K			20						
★ MCL06040H10K	400	403 (415)	10	569	500	400	5	8.13	3.2
★ MCL06040H20K			20						
★ MCL06050H10K	500	503 (515)	10	669	600	500	6	9.47	3.9
★ MCL06050H20K			20						

Dimension of G is 25 instead of 50 for those marked with ※. Items not marked are available from standard stock. Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

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

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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

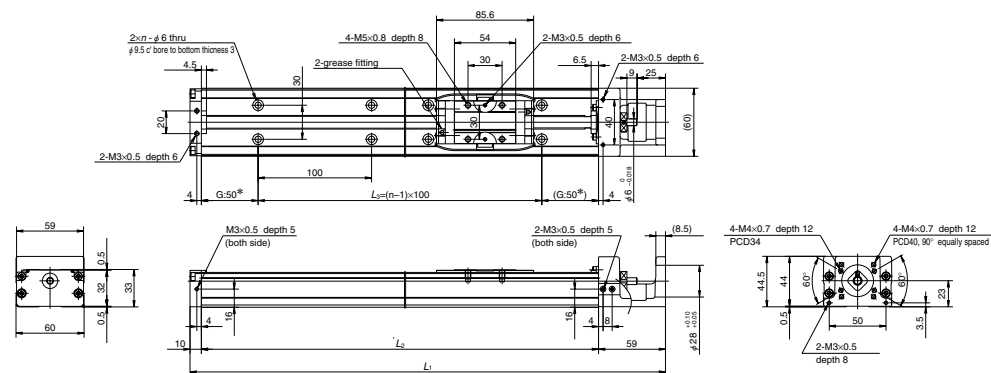
Lead (mm)	Shaft dia (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C <sub>a</sub>	linear guides C	Support unit C <sub>a</sub>	Rated running distance L <sub>a</sub> (km)	Ball screw C <sub>0a</sub>	Linear guides C <sub>0</sub>	
5	φ 12	3000 (High grade)	22800	4400	5	5410 (High grade)	10900	1450
10		3760 (Precision)				6310 (Precision)		
20		1930 (High grade)	3160 (High grade)					
		2260 (Precision)	3780 (Precision)					
20	1930 (High grade)	3160 (High grade)						
	2260 (Precision)	3780 (Precision)						

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	RollingM <sub>RO</sub>	PitchingM <sub>PO</sub>	YawingM <sub>YO</sub>
Single	335	133	133

MCH06

Accuracy grade: High grade (H)



Dimension of MCH06 (Single slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				Inertia $\times 10^6$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	n		
※ MCH06005H05K	50	53 (65)	5	219	150	100	2	2.38	1.8
※ MCH06005H10K		10	3.45						
MCH06010H05K	100	103 (115)	5	269	200	100	2	3.17	2.2
MCH06010H10K		10	4.12						
MCH06020H05K	200	203 (215)	5	369	300	200	3	4.51	3.0
MCH06020H10K		10	5.46						
MCH06030H10K	300	303 (315)	10	469	400	300	4	6.80	3.7
MCH06030H20K		20	10.6						
MCH06040H10K	400	403 (415)	10	569	500	400	5	8.13	4.5
MCH06040H20K		20	11.9						
MCH06050H10K	500	503 (515)	10	669	600	500	6	9.47	5.2
MCH06050H20K		20	13.3						

Dimension of G is 25 instead of 50 for those marked with ※. Items not marked are available from standard stock. Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

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

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

Basic load rating

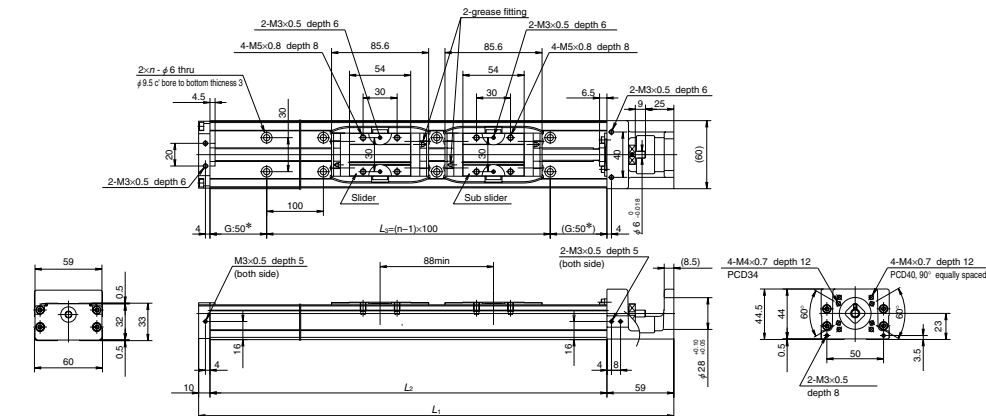
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi 12$	3000 (High grade)	22800	4400	5	5410 (High grade)	16300	1450
		3760 (Precision)				6310 (Precision)		
10	$\phi 12$	1930 (High grade)	18100	4400	10	3160 (High grade)	16300	1450
		2260 (Precision)				3780 (Precision)		
20	$\phi 12$	1930 (High grade)	14400	4400	20	3160 (High grade)	16300	1450
		2260 (Precision)				3780 (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)				Inertia $\times 10^6$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	n		
★ MCH06010H05D	100	115 (139)	5	369	300	200	3	4.82	3.5
★ MCH06010H10D		10	6.72						
★ MCH06020H05D	200	215 (239)	5	469	400	300	4	8.06	4.2
★ MCH06020H10D		10	15.7						
★ MCH06030H05D	300	315 (339)	5	569	500	400	5	9.40	5.0
★ MCH06030H10D		10	17.0						
★ MCH06040H10D	400	415 (439)	10	669	600	500	6	10.7	5.7
★ MCH06040H20D		20	18.3						

Items not marked are available from standard stock. Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	5	
	1.2~5.2	1.5~9.6
	2.3~11.8	

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

Basic load rating

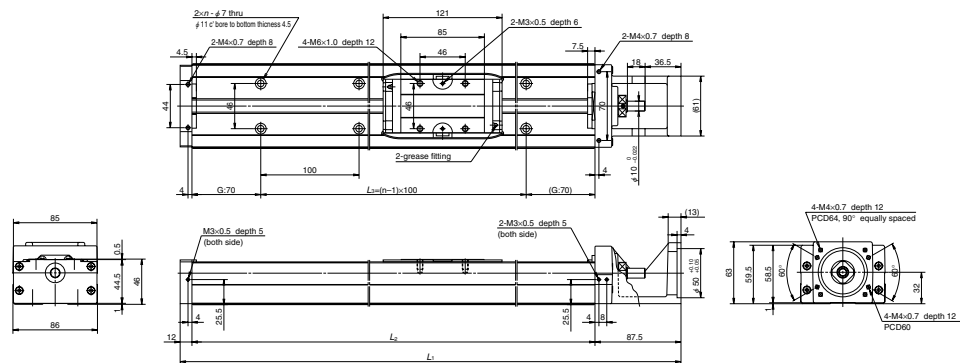
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi 12$	3000 (High grade)	22800	4400	5	5410 (High grade)	16300	1450
		3760 (Precision)				6310 (Precision)		
10	$\phi 12$	1930 (High grade)	18100	4400	10	3160 (High grade)	16300	1450
		2260 (Precision)				3780 (Precision)		
20	$\phi 12$	1930 (High grade)	14400	4400	20	3160 (High grade)	16300	1450
		2260 (Precision)				3780 (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

MCH09

Accuracy grade: High grade (H)



Dimension of MCH09 (Single slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				Inertia $\times 10^6(\text{kg} \cdot \text{m}^2)$	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	n		
MCH09020H05K	200	207	5	439.5	340	200	3	12.4	6.5
MCH09020H10K		(221)	10					13.9	
MCH09030H05K	300	307	5	539.5	440	300	4	15.6	8.1
MCH09030H10K		(321)	10					17.1	
MCH09040H05K	400	407	5	639.5	540	400	5	18.8	9.7
MCH09040H10K		(421)	10					20.3	
MCH09050H10K	500	507	10	739.5	640	500	6	23.5	11
MCH09050H20K		(521)	20					29.6	
MCH09060H10K	600	607	10	839.5	740	600	7	26.7	13
MCH09060H20K		(621)	20					32.8	
MCH09080H10K	800	807	10	1 039.5	940	800	9	33.2	16
MCH09080H20K		(821)	20					39.2	

Items not marked are available from standard stock.  
Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	5	
	1.0~5.9	2.0~7.8
	2.0~10.8	

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

Basic load rating

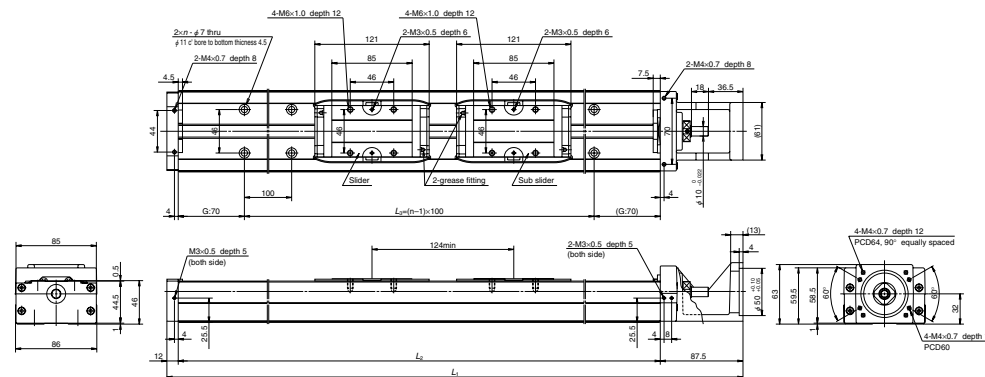
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi 15$	6820 (High grade)	40600	7100	5	13200 (High grade)	30500	3040
		7100 (Precision)				13000 (Precision)		
10	$\phi 15$	5110 (High grade)	32200	7100	10	9290 (High grade)	30500	3040
		7060 (Precision)				12700 (Precision)		
20	$\phi 15$	3290 (High grade)	25500	7100	20	5620 (High grade)	30500	3040
		4560 (Precision)				7750 (Precision)		

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
Single	890	385	385

MCH09 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCH09 (Double slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				Inertia $\times 10^6(\text{kg} \cdot \text{m}^2)$	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	n		
★MCH09015H05D	150	183	5	539.5	440	300	4	16.1	8.9
★MCH09015H10D		(211)	10					19.2	
★MCH09025H05D	250	283	5	639.5	540	400	5	19.3	11
★MCH09025H10D		(311)	10					22.4	
★MCH09035H05D	350	383	5	739.5	640	500	6	22.5	12
★MCH09035H10D		(411)	10					25.6	
★MCH09045H10D	450	483	10	839.5	740	600	7	28.8	14
★MCH09045H20D		(511)	20					40.9	
★MCH09065H10D	650	683	10	1 039.5	940	800	9	35.2	17
★MCH09065H20D		(711)	20					47.3	

Items not marked are available from standard stock.  
Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	5	
	1.5~7.0	2.5~10.8
	4.0~17.2	

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

Basic load rating

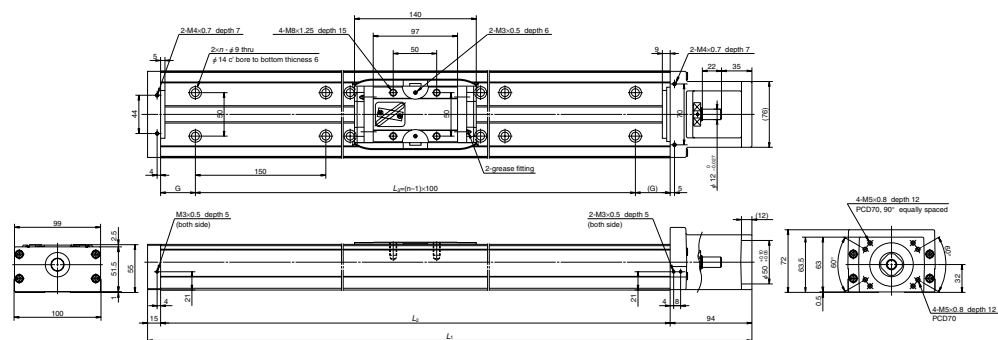
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi 15$	6820 (High grade)	40600	7100	5	13200 (High grade)	30500	3040
		7100 (Precision)				13000 (Precision)		
10	$\phi 15$	5110 (High grade)	32200	7100	10	9290 (High grade)	30500	3040
		7060 (Precision)				12700 (Precision)		
20	$\phi 15$	3290 (High grade)	25500	7100	20	5620 (High grade)	30500	3040
		4560 (Precision)				7750 (Precision)		

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
Double	1780	2070	2070

MCH10

Accuracy grade: High grade (H)



Dimension of MCH10 (Single slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)					Inertia $\times 10^6(\text{kg} \cdot \text{m}^2)$	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	G	L <sub>3</sub>	n		
MCH10040H10K	400	426 (442)	10	689	580	65	450	4	62.4	14
MCH10040H20K		20	71.8							
MCH10050H10K	500	526 (542)	10	789	680	40	600	5	74.7	16
MCH10050H20K		20	82.3							
MCH10060H10K	600	626 (642)	10	889	780	15	750	6	84.9	19
MCH10060H20K		20	92.5							
MCH10070H10K	700	726 (742)	10	989	880	65	750	6	95.1	21
MCH10070H20K		20	103							
MCH10080H10K	800	826 (842)	10	1 089	980	40	900	7	105	23
MCH10080H20K		20	113							
MCH10090H20K	900	926(942)	20	1 189	1 080	15	1 050	8	123	25
MCH10100H20K	1 000	1 026(1 042)	20	1 289	1 180	65	1 050	8	133	27
★MCH10110H20K	1 100	1 126(1 142)	20	1 389	1 280	40	1 200	9	143	29
★MCH10120H20K	1 200	1 226(1 242)	20	1 489	1 380	15	1 350	10	154	32

Items not marked are available from standard stock. Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

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

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

Basic load rating

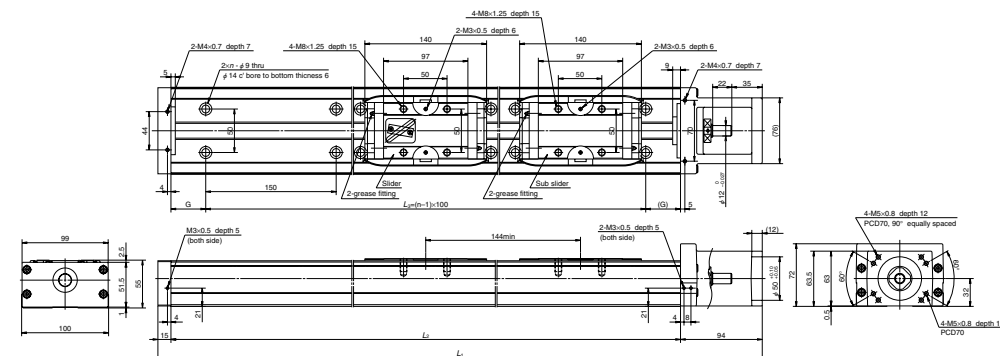
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw $C_a$	linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
10	$\phi 20$	8230 (High grade)	44600	7600	10	17100 (High grade)	42000	3380
		10900 (Precision)				21700 (Precision)		
20	$\phi 20$	5300 (High grade)	35400	7600	20	10300 (High grade)	42000	3380
		7060 (Precision)				12700 (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	1460	610	610

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)					Inertia $\times 10^6(\text{kg} \cdot \text{m}^2)$	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	G	L <sub>3</sub>	n		
★MCH10025H10D	250	282 (314)	10	689	580	65	450	4	67.1	15
★MCH10025H20D		20	82.4							
★MCH10035H10D	350	382 (414)	10	789	680	40	600	5	77.3	17
★MCH10035H20D		20	92.5							
★MCH10045H10D	450	482 (514)	10	889	780	15	750	6	87.5	20
★MCH10045H20D		20	103							
★MCH10055H10D	550	582 (614)	10	989	880	65	750	6	97.7	22
★MCH10055H20D		20	113							
★MCH10065H10D	650	682 (714)	10	1 089	980	40	900	7	108	24
★MCH10065H20D		20	123							
★MCH10075H20D	750	782(814)	20	1 189	1 080	15	1 050	8	133	26
★MCH10085H20D	850	882(914)	20	1 289	1 180	65	1 050	8	143	28
★MCH10095H20D	950	982(1 014)	20	1 389	1 280	40	1 200	9	154	30
★MCH10105H20D	1 050	1 082(1 114)	20	1 489	1 380	15	1 350	10	164	33

Items not marked are available from standard stock. Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N · cm)

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

- Frictional resistance of NSK K1 is included in the dynamic torque in the table.
- Grease is packed into ball screw, linear guide parts and support unit.
- 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	$\phi 20$	8230 (High grade)	44600	7600	10	17100 (High grade)	42000	3380
		10900 (Precision)				21700 (Precision)		
20	$\phi 20$	5300 (High grade)	35400	7600	20	10300 (High grade)	42000	3380
		7060 (Precision)				12700 (Precision)		

Basic static moment load of linear guide

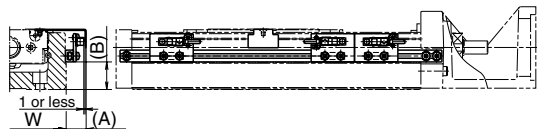
Slider	Basic static moment load (N · m)		
	Rolling $M_{R0}$	Pitching $M_{P0}$	Yawing $M_{Y0}$
Double	2920	3430	3430

### 3.3 MCH Series Option Part

#### 3.3.1 Sensor Unit



##### ● Proximity switch

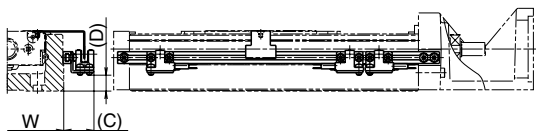


(Example of assembly)

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 (a-contact)	—	3	1	E2S-W13 (OMRON Corp.)	
	Proximity switch (b-contact)	3	—	2	E2S-W14 (OMRON Corp.)	

\*See page C19 for specification of proximity switch. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.

##### ● Photo sensor



(Example of assembly)

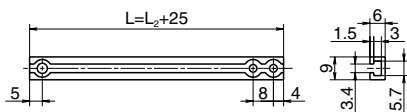
Type	Reference number	Dimension(C) (mm)	Dimension(D) (mm)	Body width W (mm)	Remarks
MCH06	MC-SRH06-13	24	2	60	EE-SX674 (OMRON Corp.) 3 sets (EE-1001 connector attachment)
MCH09	MC-SRH09-13	23	12	86	
MCH10	MC-SRH10-13	22	16	100	

\*See page C20 for specification of photo sensor. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.

##### ● Sensor rail

Reference number : MC-SRL- \* \* \* \*

● \* \* \* \* is the same as rail dimension  $L_2$ .



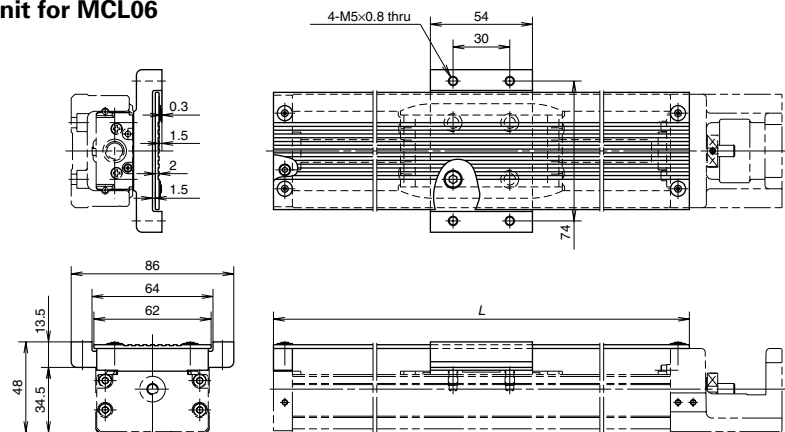
### Body of MCH Series and Sensor rail combination Table

Table 3-4

Nominal size	Body length $L_2$ (mm)	Reference number	Sensor rail reference number
MCH06	150	MCH06005H05K	MC-SRL-0150
		MCH06005H10K	
		MCH06010H05K	
	200	MCH06010H05K	MC-SRL-0200
		MCH06010H10K	
		MCH06020H05K	
	300	MCH06020H05K	MC-SRL-0300
		MCH06020H10K	
		MCH06010H05D	
	400	MCH06030H10K	MC-SRL-0400
		MCH06030H20K	
		MCH06020H05D	
500	MCH06020H10D	MC-SRL-0500	
	MCH06040H10K		
	MCH06040H20K		
600	MCH06030H05D	MC-SRL-0600	
	MCH06030H10D		
	MCH06030H10K		
MCH09	150	MCL06005H05K	MC-SRL-0150
		MCL06005H10K	
		MCL06010H05K	
	200	MCL06010H05K	MC-SRL-0200
		MCL06010H10K	
		MCL06020H05K	
	300	MCL06020H05K	MC-SRL-0300
		MCL06020H10K	
		MCL06030H10K	
	400	MCL06030H10K	MC-SRL-0400
		MCL06030H20K	
		MCL06040H10K	
500	MCL06040H20K	MC-SRL-0500	
	MCL06050H10K		
	MCL06050H20K		
600	MCL06050H10K	MC-SRL-0600	
	MCL06050H20K		
	MCH09020H05K		
MCH10	340	MCH09020H05K	MC-SRL-0340
		MCH09020H10K	
		MCH09030H05K	
	440	MCH09030H10K	MC-SRL-0440
		MCH09015H05D	
		MCH09015H10D	
	540	MCH09040H05K	MC-SRL-0540
		MCH09040H10K	
		MCH09025H05D	
	640	MCH09025H10D	MC-SRL-0640
		MCH09050H10K	
		MCH09050H20K	
740	MCH09035H05D	MC-SRL-0740	
	MCH09035H10D		
	MCH09060H10K		
940	MCH09060H20K	MC-SRL-0940	
	MCH09045H10D		
	MCH09045H20D		
1040	MCH09080H10K	MC-SRL-1040	
	MCH09080H20K		
	MCH09065H10D		
1140	MCH09065H20D	MC-SRL-1140	
	MCH10070H10K		
	MCH10070H20K		
1280	MCH10055H10D	MC-SRL-1280	
	MCH10055H20D		
	MCH10080H10K		
1380	MCH10080H20K	MC-SRL-1380	
	MCH10075H20D		
	MCH10100H20K		
1480	MCH10085H20D	MC-SRL-1480	
	MCH10100H20K		
	MCH10105H20D		

3.3.2 Cover Unit

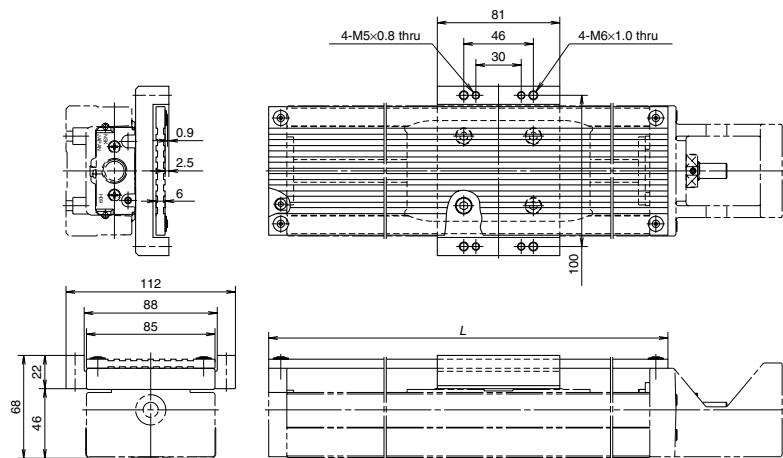
Cover unit for MCH06  
Cover unit for MCL06



(Unit: mm)

Single slider		Double slider		Top cover length
Stroke	Reference number	Stroke	Reference number	L
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

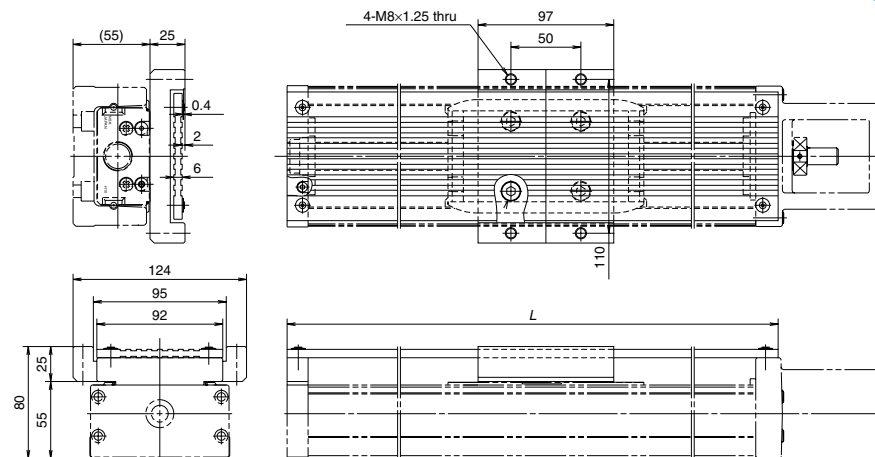
Cover unit for MCH09



(Unit: mm)

Single slider		Double slider		Top cover length
Stroke	Reference number	Stroke	Reference number	L
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
800	MC-HV09080-00	650	MC-HV09065D00	964

Cover unit for MCH10

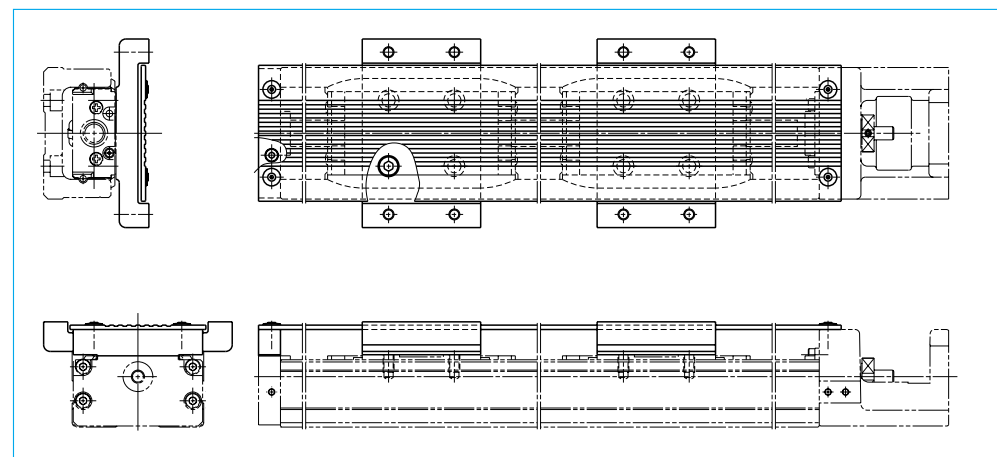


(Unit: mm)

Single slider		Double slider		Top cover length
Stroke	Reference number	Stroke	Reference number	L
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	1010
900	MC-HV10090-00	750	MC-HV10075D00	1110
1000	MC-HV10100-00	850	MC-HV10085D00	1210
1100	MC-HV10110-00	950	MC-HV10095D00	1310
1200	MC-HV10120-00	1050	MC-HV10105D00	1410

●Cover unit for double sliders (reference drawing)

Two spacers are attached for the double slider.





### 3.3.3 Intermediate Plate For Motor

- Please ask NSK for a motor that is not listed in the compatible motor list.
- In case of motor indirect mount, please consult with NSK.

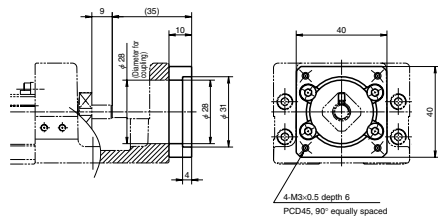


- Be sure to align the center lines when installing the motor.



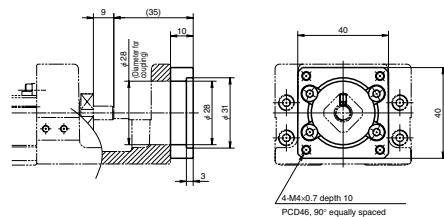
#### Motor Bracket for MCH06 and MCL06

Reference number : MC-BKH06-145-00



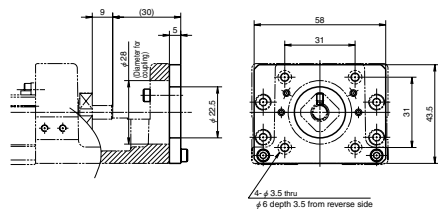
Compatible motor	
Maker	Motor models
Matsushita Electric Industrial Co., Ltd.	MSMD5A(50W), MSMD01(100W)

Reference number : MC-BKH06-146-00



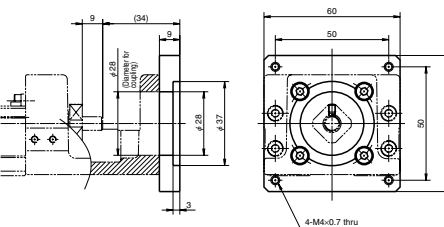
Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMAH-A5(50W), SGMAH-A5A(50W) SGMAH-01(100W), SGMAH-01A(100W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W) HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W) HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
Sanyo Denki Co., Ltd.	P30B04xxx P Series

Reference number : MC-BKH06-231-00



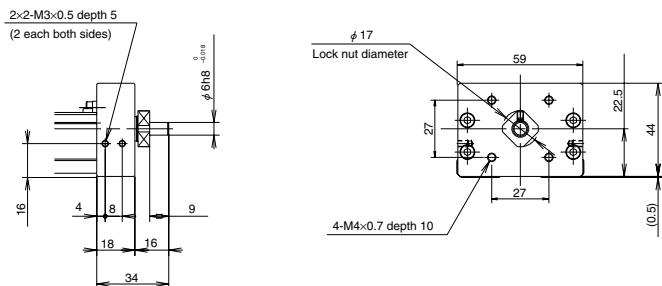
Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x, UMK24x, CSK24x, PK24x
Sanyo Denki Co., Ltd.	PBM423xxx, 103F55xx

Reference number : MC-BKH06-250-00



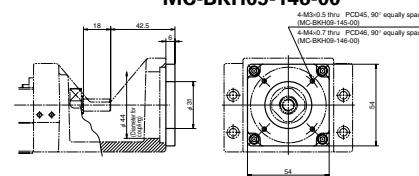
Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x, CSK56x, CFK56x MUMS02(200W), MUMS04(400W)
Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx, 103F78xx

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



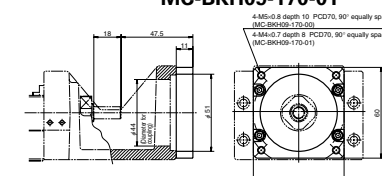
#### Motor Bracket for MCH09

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



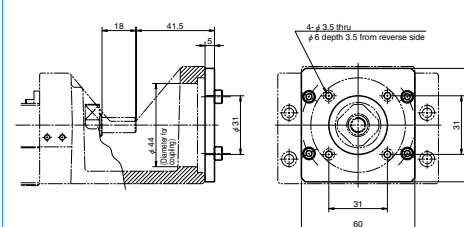
Reference number	Compatible motor	
	Maker	Motor models
MC-BKH09-145-00	Matsushita Electric Industrial Co., Ltd.	MSMD5A(50W), MSMD01(100W)
MC-BKH09-146-00	Yaskawa Electric Corp.	SGMAH-A5(50W), SGMAH-A5A(50W) SGMAH-01(100W), SGMAH-01A(100W)
	Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W) HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W) HC-KFS13(100W), HC-MFS13(100W)
	OMRON Corp.	R88M-W05(50W), R88M-W10(100W)
	Sanyo Denki Co., Ltd.	P30B04xxx P Series

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



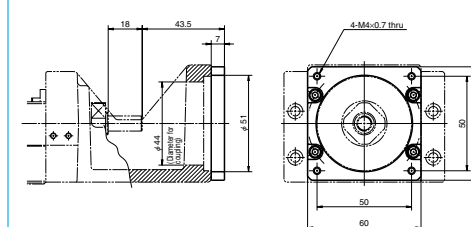
Reference number	Compatible motor	
	Maker	Motor models
MC-BKH09-170-00	Yaskawa Electric Corp.	SGMAH-02(200W), SGMAH-02A(200W) SGMAH-04(400W), SGMAH-04A(400W)
	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W) HF-KP43(400W), HF-MP43(400W)
	OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
	Sanyo Denki Co., Ltd.	P30B06xxx P Series
MC-BKH09-170-01	Matsushita Electric Industrial Co., Ltd.	MSMD02(200W), MSMA02(200W) MSMA04(400W), MSMD04(400W)

Reference number : MC-BKH09-231-00



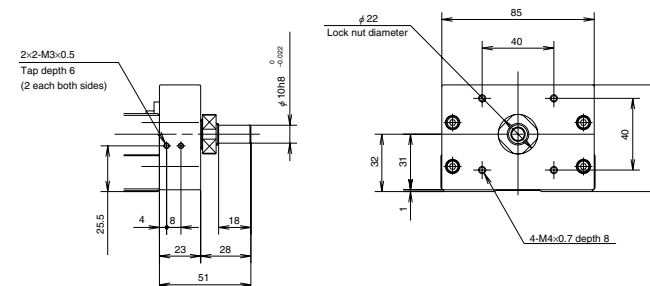
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM423xxx, 103F55xx
Oriental Motor Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x UMK24x, CSK24x, PK24x

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

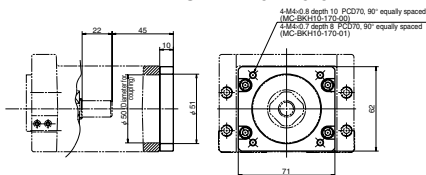
#### Diameter of ball screw shaft end to install a pulley for indirect motor mount of MCH09



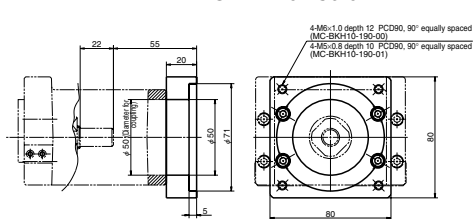


Motor Bracket for MCH10

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



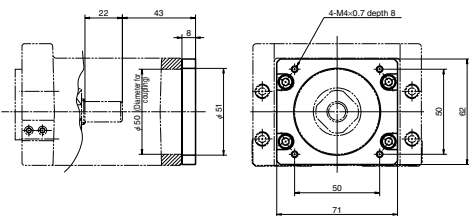
Reference number : MC-BKH10-190-00  
MC-BKH10-190-01



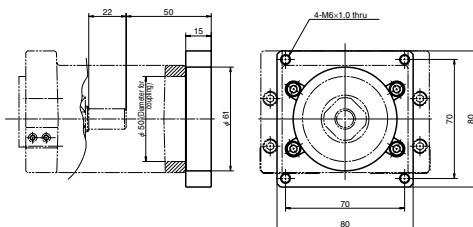
Reference number	Compatible motor	
	Maker	Motor models
MC-BKH10-170-00	Yaskawa Electric Corp.	SGMAH-02(200W), SGMAS-02A(200W) SGMAH-04(400W), SGMAS-04A(400W)
	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W) HF-KP43(400W), HF-MP43(400W)
	OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
	Sanyo Denki Co., Ltd.	P30B06xxx P Series
MC-BKH10-170-01	Mitsubishi Electric Industrial Co., Ltd.	MSMD02(200W), MSMA02(200W) MSMD04(400W), MSMA04(400W)

Reference number	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



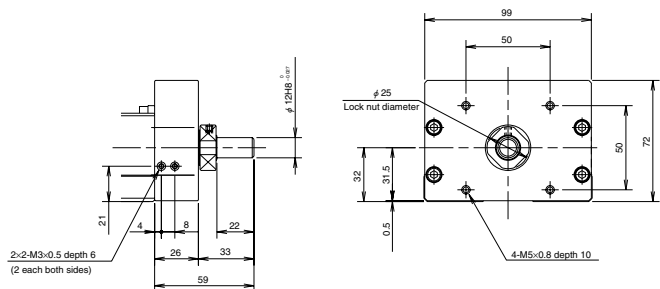
Reference number : MC-BKH10-270-00



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

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



Availability Motor Table of Intermediate Plate for MCH Series

Table 3-5

Nominal size	Reference number code	Motor bracket reference number	Motor manufacturer	Stepping motor model number	Wattage of AC servo motor						
					30	50	100	200	400	750	
MCH06	1	MC-BKH06-145-00	Matsushita Electric Industrial Co., Ltd.			MSMD5A	MSMD01				
			Yaskawa Electric Corp.		SGMAH-A3	SGMAH-A5 SGMAS-A5A	SGMAH-01 SGMAS-01A				
			Mitsubishi Electric Corp.			HF-KP053 HF-MP053 HC-KFS053 HC-MFS053	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13				
			OMRON Corp. Sanyo Denki Co., Ltd.		R88M-W03	R88M-W05	R88M-W10				
MCH06	2	MC-BKH06-146-00	Sanyo Denki Co., Ltd.	P30B04xxx (P Series)							
			Oriental Motor Co., Ltd.		PBM423xxx 103F55xx						
			Oriental Motor Co., Ltd.		AS46, ASC46 UPK54x, PK54x CSK54x, CFK54x UMK24x, CSK24x PK24x						
			Oriental Motor Co., Ltd.		PBM603xx PBM604xx 103F78xx						
MCH06	3	MC-BKH06-231-00	Oriental Motor Co., Ltd.								
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x			MUMS02	MUMS04		
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
MCH06	4	MC-BKH06-250-00	Oriental Motor Co., Ltd.								
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
MCH09	1	MC-BKH09-145-00	Matsushita Electric Industrial Co., Ltd.			MSMD5A	MSMD01				
			Yaskawa Electric Corp.		SGMAH-A5 SGMAS-A5A	SGMAH-01 SGMAS-01A					
			Mitsubishi Electric Corp.		HF-KP053 HF-MP053 HC-KFS053 HC-MFS053	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13					
			OMRON Corp. Sanyo Denki Co., Ltd.		R88M-W05	R88M-W10					
MCH09	2	MC-BKH09-146-00	Mitsubishi Electric Corp.			HF-KP053 HF-MP053 HC-KFS053 HC-MFS053	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13				
			OMRON Corp. Sanyo Denki Co., Ltd.		P30B04xxx (P Series)						
			Yaskawa Electric Corp.						SGMAH-02 SGMAS-02A	SGMAH-04 SGMAS-04A	
			Mitsubishi Electric Corp.					HF-KP23 HF-MP23	HF-KP43 HF-MP43		
MCH09	3	MC-BKH09-170-00	OMRON Corp. Sanyo Denki Co., Ltd.					R88M-W20	R88M-W40		
			Sanyo Denki Co., Ltd.	P30B06xxx (P Series)							
			Matsushita Electric Industrial Co., Ltd.					MSMD02 MSMA02	MSMD04 MSMA04		
			Sanyo Denki Co., Ltd.		PBM423xxx 103F55xx						
MCH09	4	MC-BKH09-170-01	Matsushita Electric Industrial Co., Ltd.								
			Oriental Motor Co., Ltd.		AS46, ASC46 UPK54x, PK54x CSK54x, CFK54x UMK24x, CSK24x PK24x						
			Oriental Motor Co., Ltd.		PBM603xx PBM604xx 103F78xx						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
MCH09	5	MC-BKH09-231-00	Oriental Motor Co., Ltd.								
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
MCH09	6	MC-BKH09-250-00	Oriental Motor Co., Ltd.								
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x CFK56x						
MCH10	1	MC-BKH10-170-00	Yaskawa Electric Corp.						SGMAH-02 SGMAS-02A	SGMAH-04 SGMAS-04A	
			Mitsubishi Electric Corp.			HF-KP23 HF-MP23	HF-KP43 HF-MP43				
			OMRON Corp. Sanyo Denki Co., Ltd.		P30B06xxx (P Series)			R88M-W20	R88M-W40		
			Matsushita Electric Industrial Co., Ltd.					MSMD02 MSMA02	MSMD04 MSMA04		
MCH10	2	MC-BKH10-170-01	Matsushita Electric Industrial Co., Ltd.								
			Mitsubishi Electric Corp.								HC-KFS73 HC-MFS73 HF-KP73
			Mitsubishi Electric Corp.								
			Sanyo Denki Co., Ltd.	P50B07xxx (P Series)							
MCH10	3	MC-BKH10-190-00	Mitsubishi Electric Corp.								
			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						
MCH10	4	MC-BKH10-190-01	Sanyo Denki Co., Ltd.	P50B07xxx (P Series)							
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UMK56x, UFK56x						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UMK56x, UFK56x						
			Oriental Motor Co., Ltd.		AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x						
MCH10	5	MC-BKH10-250-00	Oriental Motor Co., Ltd.								
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UMK56x, UFK56x						
			Oriental Motor Co., Ltd.		AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UMK56x, UFK56x						
			Oriental Motor Co., Ltd.		AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x						
MCH10	6	MC-BKH10-270-00	Oriental Motor Co., Ltd.								
			Oriental Motor Co., Ltd.		AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x						
			Oriental Motor Co., Ltd.		AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x						
			Oriental Motor Co., Ltd.		AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x						



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