

# 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

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

### 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

### 2 All-in-one structure

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

### 4 Long term maintenance free

- Use of NSK K1 Lubrication Units and grease maintains a smooth lubricating performance for long periods in mechanical environments where lubrication is difficult to apply, where use of oil is not permitted because of hygienic issues, or where the mechanical equipment is subjected to frequent wash downs.
- NSK K1 lubrication unit is available for food processing machines and medical equipment.
- Grease for clean environments and for general machinery is available.

### 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.



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

### 5 Quick Delivery

M O N O C A R R I E R™

## 1.2 Classification and Series

Table 2.1

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

◎: Excellent ○: Suitable in use

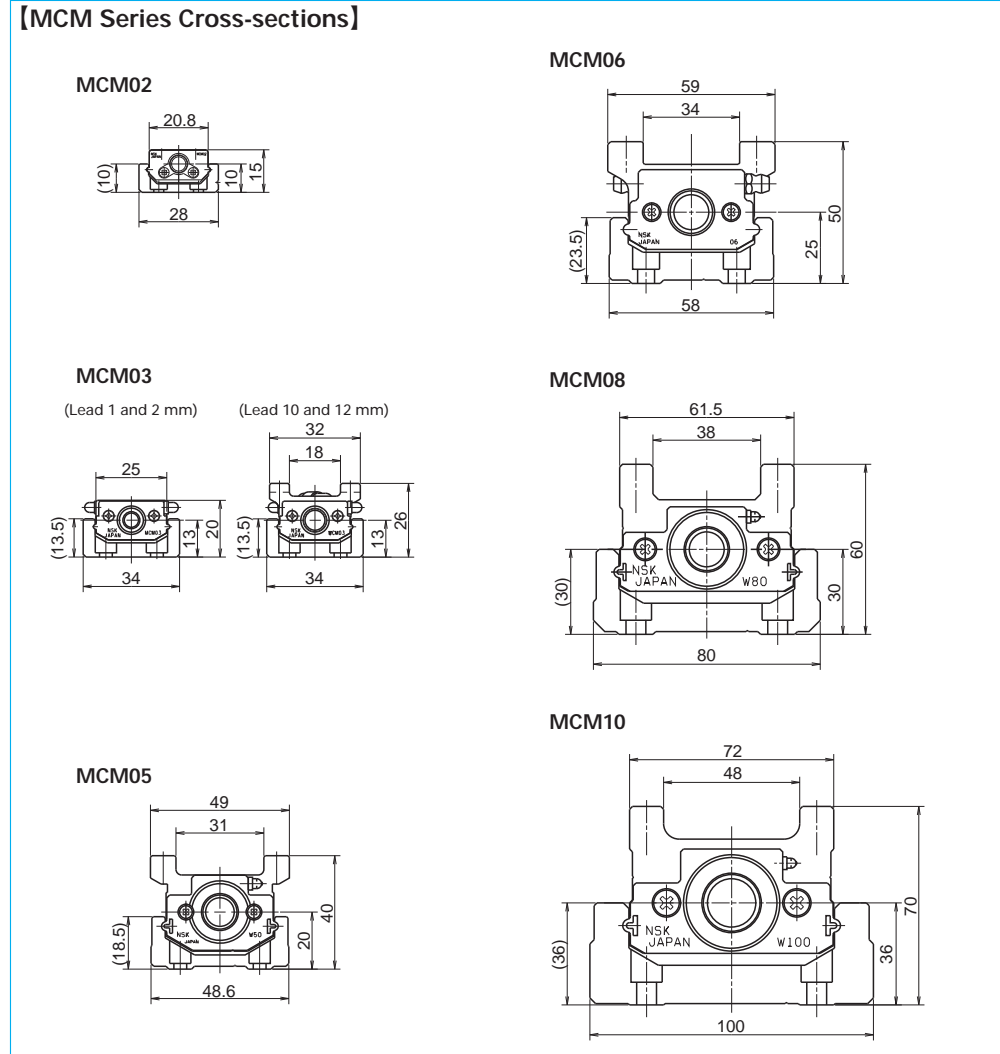


Fig. 2.1

Accuracy	Long Stroke	Size Variation
◎	○	◎
◎	◎	○

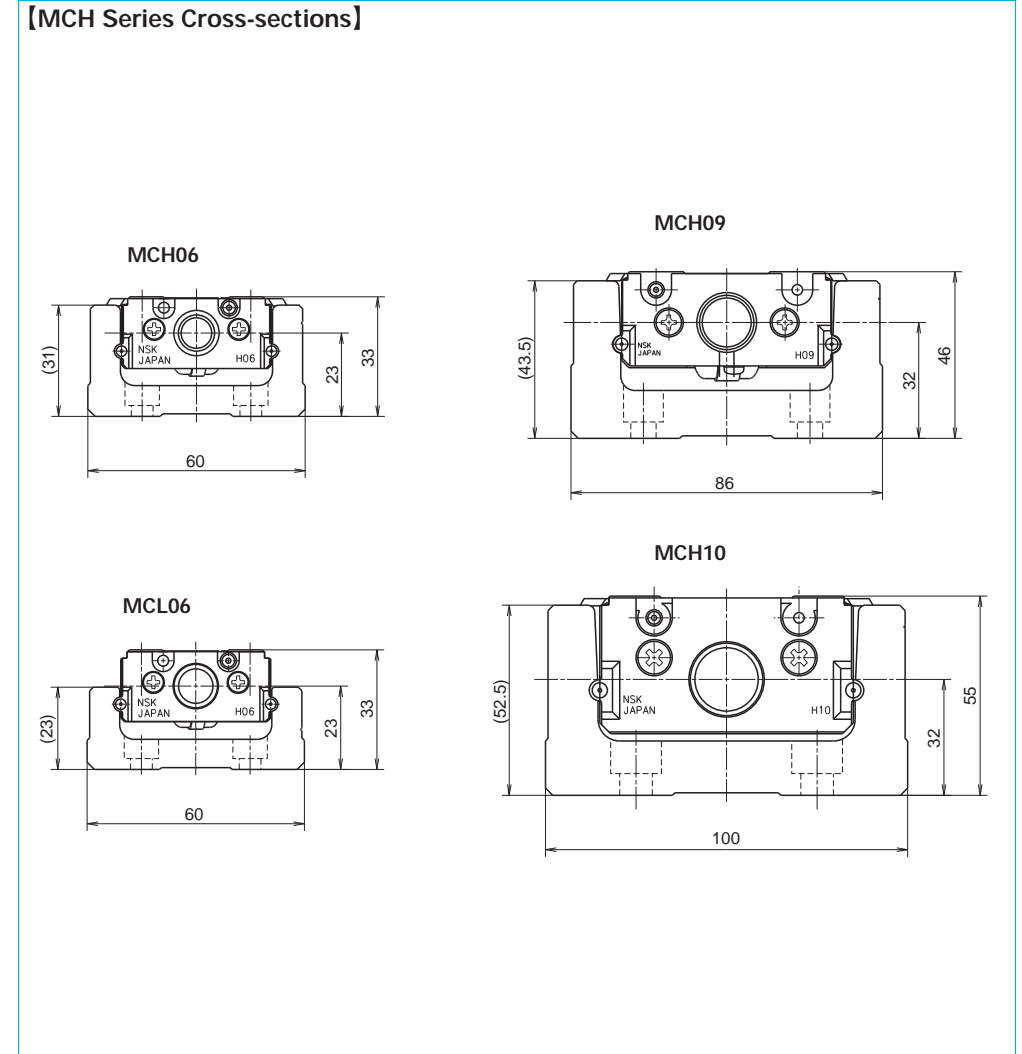


Fig. 2.2

### 1.3 Optional Components

#### MCM Series

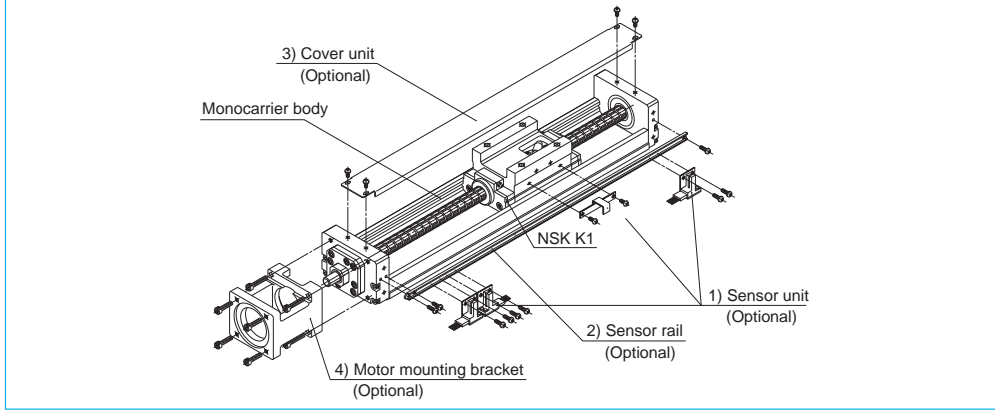


Fig. 3.1 Assembly: Optional components for MCM10 (example)

1) Sensor unit: Sensors, sensor mounting parts and a sensor dog are available in a set.  
 \* When a sensor unit is used, the full cover unit cannot be used.

2) Sensor rail: Rail for sensor mounting is available.  
 3) Cover unit: Top cover or full cover (included top cover and side cover) is available.  
 4) Motor bracket for motor mounting: Available for a variety of models.

Note: We assemble optional components upon request.

#### MCH Series

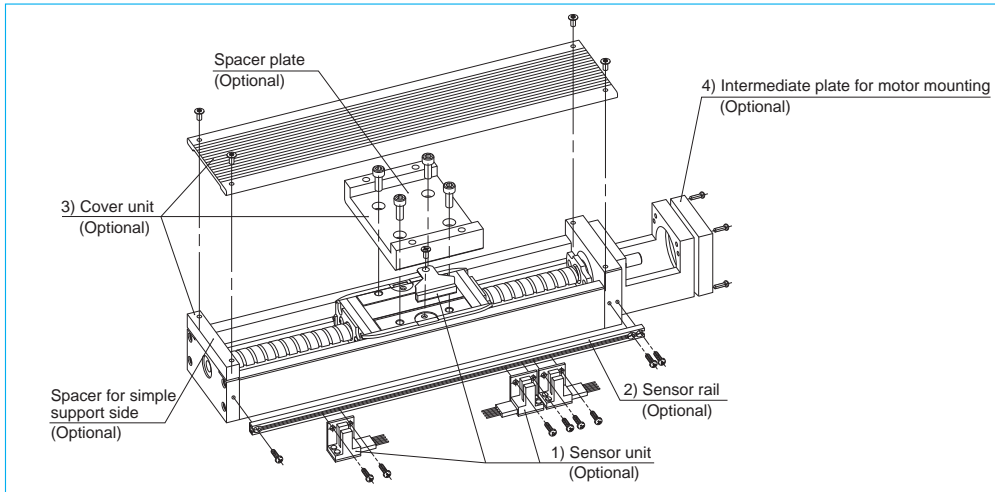


Fig. 3.2 Assembly: Optional components for MCH10 (example)

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: Available for a variety of models.

Note: We assemble optional components upon request.

### 1.4 Selection of Monocarrier

#### 1.4.1 Procedures for Selecting Monocarrier

Select a model number of Monocarrier based on stroke and rigidity (refer to Figs. 4.2, and 4.3).



Select a ball screw lead referring to "1.4.3 Maximum 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 13. Obtain the mean effective load ( $F_m$ ) substituting them for equation 3) on page 14, 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 14, then calculate the life.

#### 1.4.2 Rigidity

##### Rigidity of rail

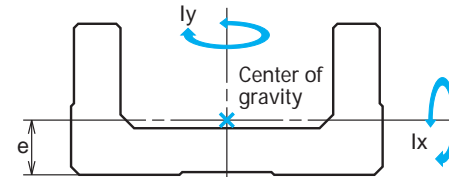


Fig. 4.1

Table 4.1 Rigidity of rail

Model No.	Geometrical moment of inertia $\times 10^4$ (mm <sup>4</sup> )		Center of gravity (mm)	Mass (kg/100 mm)
	$I_x$	$I_y$	e	w
MCM02	0.097	1.32	3.3	0.11
MCM03	0.30	3.3	4.5	0.18
MCM05	0.78	11.4	6.0	0.31
MCM06	2.14	26.1	7.0	0.57
MCM08	5.90	81.0	9.2	0.88
MCM10	15.6	219	12.2	1.52
MCH06	6.5	38.2	10.8	0.67
MCL06	2.58	29.6	7.8	0.56
MCH09	28.7	172	15.5	1.48
MCH10	54.0	307	18	1.93

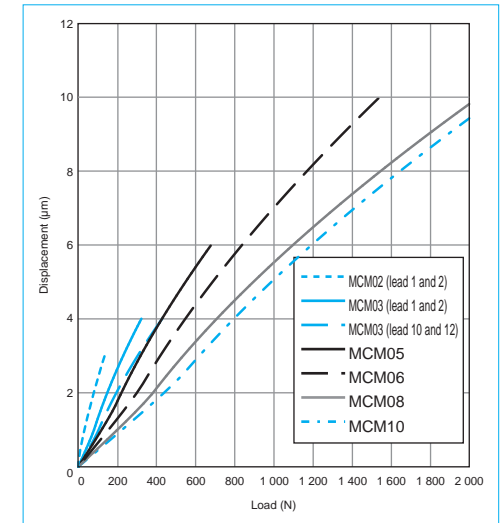


Fig. 4.2 MCM Series rigidity in radial direction

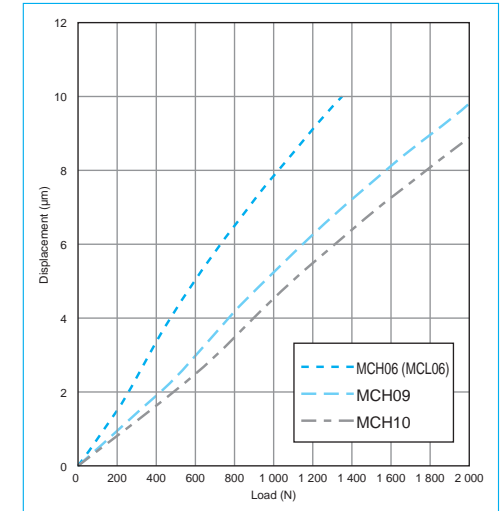


Fig. 4.3 MCH Series rigidity in radial direction

1.4.3 Maximum Speed

(1) Maximum Speed of MCM Series

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

Do not exceed maximum speeds on the table below.

Table 4.2

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

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

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

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

(2) Maximum Speed of MCH Series

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

Do not exceed maximum speeds on the table below.

Table 4.3

	Ball screw lead	Stroke (mm)	Rail length L <sub>2</sub> (mm)	Maximum 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	5	50	150	1 000
		500	600	
		100	300	
	10	400	600	500
		100	300	
		400	600	
MCH09 Single slider	5	200	340	250
		600	740	
		800	940	
	10	200	340	500
		600	740	
		800	940	
MCH09 Double slider	5	150	440	250
		650	940	
		150	440	
	10	650	940	500
		150	440	
		650	940	
20	150	440	1 000	
	650	940		
	650	940		

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

	Ball screw lead	Stroke (mm)	Rail length L <sub>2</sub> (mm)	Maximum speed (mm/s)
MCH10 Single slider	10	400	580	500
		900	980	
		800	980	
		900	1 080	
		1 000	1 180	
		1 100	1 280	
	20	400	580	1 000
		800	980	
		900	1 080	
		1 000	1 180	
		1 100	1 280	
		1 200	1 380	
MCH10 Double slider	10	250	580	500
		750	1 080	
		850	1 180	
		950	1 280	
		1 050	1 380	
		250	580	
	20	750	1 080	1 000
		850	1 180	
		950	1 280	
		1 050	1 380	
		250	580	
		750	1 080	

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

### 1.4.4 Accuracy Grade

The accuracy grade of Monocarrier standard series is high grade (H), except for lead 1 and 2 mm of MCM02, and MCM03.

When you require strokes longer than 1 200 mm, please consult NSK about the accuracy grade.

**Table 4.4** Unit : μm

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

### 1.4.5 Stroke and Ball Screw Lead

#### (1) MCM Series Standard Combinations of Stroke and Ball Screw Lead

**Table 4.5** Single slider Unit : mm

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

**Table 4.6** Double slider Unit : mm

Model No.	MCM05		MCM06			MCM08				MCM10			
	10	20	5	10	20	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												✓	✓

Note: Please consult NSK about double slider of MCM02 and MCM03.

#### (2) MCH Series Standard Combinations of Stroke and Ball Screw Lead

**Table 4.7** Single slider Unit : mm

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

**Table 4.8** Double slider Unit : mm

Model No.	MCH06			MCH09			MCH10	
	5	10	20	5	10	20	10	20
100	✓	✓						
150				✓	✓			
200	✓	✓						
250				✓	✓		✓	✓
300	✓	✓						
350				✓	✓		✓	✓
400		✓	✓					
450					✓	✓	✓	✓
550							✓	✓
650					✓	✓	✓	✓
750								✓
850								✓
950								✓
1 050								✓

**Table 4.9** Limitations

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

\*) Applicable only to single slider



### 1.4.6 Basic Load Rating

#### (1) MCM Series Basic Load Rating

Table 4.10 Basic Load Rating

Model No.	Lead $\ell$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Limit load (N)	
			Ball screw $C_a$	Linear guide $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guide $C_0$		
MCM02	1	$\phi 6$	340 (High grade) 405 (Precision)	4 910	615	1	555 (High grade) 615 (Precision)	2 120	490	
	2		340 (High grade) 405 (Precision)				2			555 (High grade) 615 (Precision)
MCM03	1	$\phi 6$	735	10 900	2 670	1	1 230	4 900	1 040	
	2		735			2				1 230
	10	1 230	10	1 690						
	12	1 230	12							
MCM05	5	$\phi 12$	3 760	15 600	4 400	5	6 310	10 900	1 450	
	10		2 260			10				3 780
	20		2 260			20				3 780
	30		3 260			30				5 400
MCM06	5	$\phi 16$	7 310	25 200	6 550	5	13 500	17 000	2 730	
	10		7 060			10				12 700
	20	4 560	20	7 750						
MCM08	5	$\phi 16$	7 310	30 800	7 100	5	13 500	22 800	3 040	
	10		7 060			10				12 700
	20	4 560	20	7 750						
	30	5 070	30	8 730						
MCM10	10	$\phi 20$	10 900	33 500	7 600	10	21 700	29 400	3 380	
	20		7 060			20				12 700
	30		11 700			30				22 700

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

Table 4.11 Basic static moment load of linear guide

Model No.	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, 30*	Single	229	89	89
		Double	455	765	765
MCM06	5, 10, 20	Single	415	174	174
		Double	825	1 220	1 220
MCM08	5, 10, 20, 30*	Single	770	300	300
		Double	1 540	2 050	2 050
MCM10	10, 20, 30*	Single	1 170	425	425
		Double	2 340	2 940	2 940

Notes: ● Basic static moment of double slider is value when two sliders equipped with NSK K1 are butted against each other. ● Basic static moment is value when rolling contact pressure of balls exceeds 4 000 N/mm<sup>2</sup>. ● If extremely heavy load is required, please consult NSK for estimation of fatigue life.

\*) Applicable only to single slider

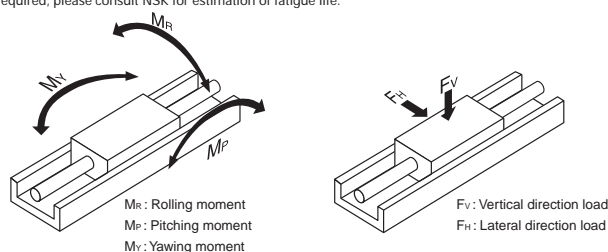


Fig. 4.4

#### (2) MCH Series Basic Load Rating

Table 4.12 Basic Load Rating

Model No.	Lead $\ell$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Limit load (N)	
			Ball screw $C_a$	Linear guide $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guide $C_0$		
MCH06 (MCL06)	5	$\phi 12$	3 000 (High grade) 3 760 (Precision)	22 800	4 400	5	5 410 (High grade) 6 310 (Precision)	16 300	1 450	
	10		1 930 (High grade) 2 260 (Precision)				18 100			10
	20		1 930 (High grade) 2 260 (Precision)	14 400			20			3 160 (High grade) 3 780 (Precision)
			5	6 820 (High grade) 7 100 (Precision)			40 600			5
MCH09	5	$\phi 15$	5 110 (High grade) 7 060 (Precision)	32 200	7 100	10	9 290 (High grade) 12 700 (Precision)	30 500	3 040	
	10		3 290 (High grade) 4 560 (Precision)				25 500			20
	20		8 230 (High grade) 10 900 (Precision)	44 600			10			17 100 (High grade) 21 700 (Precision)
			5 300 (High grade) 7 060 (Precision)	35 400			20			10 300 (High grade) 12 700 (Precision)

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

Table 4.13 Basic static moment load of linear guide

Model No.	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	1 780	2 070	2 070
MCH10	Single	1 460	610	610
	Double	2 920	3 430	3 430

Notes: ● Basic static moment of double slider is value when two sliders equipped with NSK K1 are butted against each other. ● Basic static moment is value when rolling contact pressure of balls exceeds 4 000 N/mm<sup>2</sup>. ● If extremely heavy load is required, please consult NSK for estimation of fatigue life.

\*) Applicable only to single slider

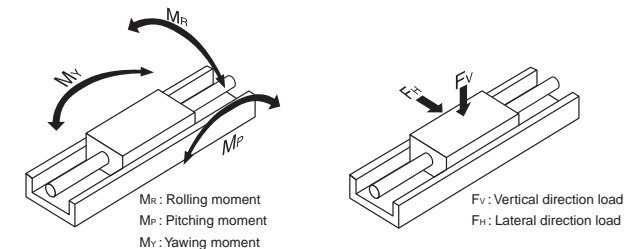


Fig. 4.5

### 1.4.7 Estimation of Life Expectancy

#### (1) Life of Linear Guide

Study the load to be applied to the linear guide of Monocarrier (Fig. 4.6). 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

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

● In case of the double slider

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

- $F_H$  : 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 4.14 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.

Table 4.14 Dynamic equivalent coefficient

Model No.	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)

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

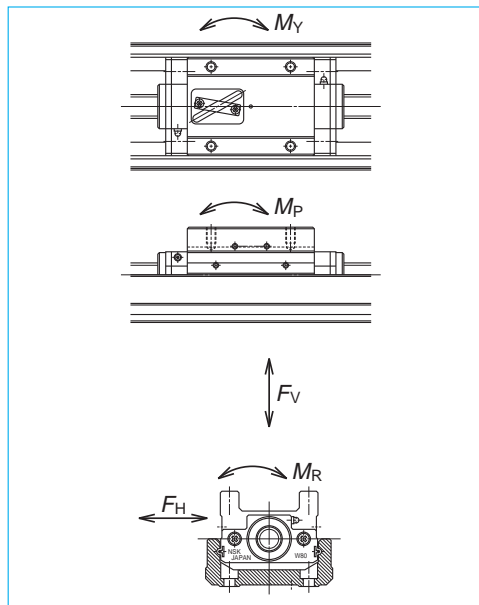


Fig. 4.6 Direction of load

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

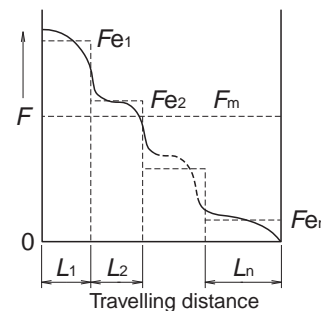


Fig. 4.7 Stepwise Fluctuating Load

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  $F_{eN}$  :  $L_n$

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

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

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

$$L = L_a \times \left( \frac{C}{f_w \cdot F_m} \right)^3 \dots\dots\dots 4)$$

- $L$  : 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 4.15)

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

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

#### (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).

$$L = \ell \times \left( \frac{C_a}{f_w \cdot F_m} \right)^3 \times 10^6 \dots\dots\dots 5)$$

- $\ell$  : Lead of ball screw (mm)
- $L$  : Life of ball screw (km)
- $C_a$  : 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 4.15)

The life of a 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. After applying the calculations mentioned above, selection of the Monocarrier is completed.

Table 4.15 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.

<<Example of calculation-1>>

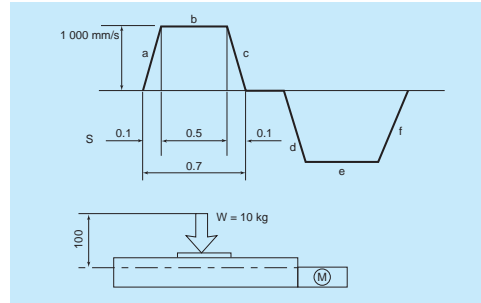


Fig. 4.8

1. Use condition

- Stroke : 600 mm
- Maximum speed : 1000 mm/s
- Load mass : W = 10 kg
- Acceleration : g = 9.8 m/s<sup>2</sup>
- Setting position : Horizontal
- Operating profile : See above figure

2. Selection of Model number (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 4.14 single slider) to convert the load volume. From above operation profile,

- i) Constant speed  $Fe_1 = Y_V F_V = Y_V W g = 1 \cdot 10 \cdot 9.8 = 98 \text{ N}$
- ii) Accelerating  $Fe_2 = Y_V F_V + Y_P \epsilon_P M_P = 0.5 \cdot 10 \cdot 9.8 + 1 \cdot 65.1 \cdot 0.1 \cdot 100 = 700 \text{ N}$
- iii) Decelerating  $Fe_3 = Y_V F_V + Y_P \epsilon_P M_P = 0.5 \cdot 10 \cdot 9.8 + 1 \cdot 65.1 \cdot 0.1 \cdot 100 = 700 \text{ N}$

Mean effective load  $F_m$

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

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

$$= 387 \text{ N}$$

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

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

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

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

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

3-2. Ball screw

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

By the process above,

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

Axial mean effective load  $F_m$

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

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

$$= 55 \text{ N}$$

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

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

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

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

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

3-2-3. Maximum rotational speed: According to the table of maximum speed on page 7, MCM06 with 20 mm lead and 600 mm stroke, is possible to operate under the maximum speed of 1 000 mm/s.

3-3. Support unit

3-3-1. Fatigue life: Use the axial load  $F_m = 55 \text{ N}$ , that is the result of above calculation 3-2-1.

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

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

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

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

3-4. Result

MCM06060H20K00	Linear guide	Ball screw	Support unit
Fatigue life	8.02 × 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

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

<<Example of calculation-2>>

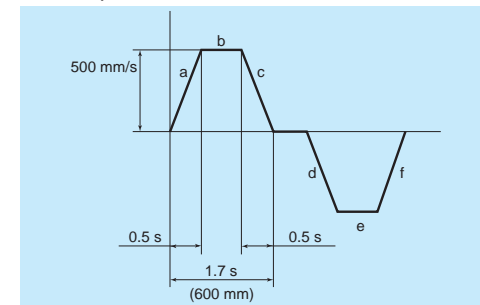


Fig. 4.9

1. Use condition

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

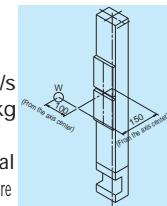


Fig. 4.10

2. Selection of Model number (Interim Selection)  
Select a 10 mm lead ball screw as the maximum speed is 500 mm/s.

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

3. Calculation

3-1. Linear guide

3-1-1. Fatigue life: Multiply the result of the Eq. 2) by the dynamic equivalent coefficient (Table 4.14. double slider) to convert the load volume. From operation profile (Fig. 4.9), the acceleration is 1 m/s<sup>2</sup>.

- i) Constant speed  $Fe_1 = Y_P \times \epsilon_{Pd} \times M_P + Y_V \times \epsilon_{Vd} \times M_V$   
 $= 1 \cdot 7.6 \cdot 20 \cdot 9.8 \cdot 0.15 + 0.5 \cdot 7.6 \cdot 20 \cdot 9.8 \cdot 0.1 = 298 \text{ N}$
- ii) Accelerating  $Fe_2 = Y_P \times \epsilon_{Pd} \times M_P + Y_V \times \epsilon_{Vd} \times M_V$   
 $= 1 \cdot 7.6 \cdot 20 \cdot (9.8 + 0.15) \cdot 0.15 + 0.5 \cdot 7.6 \cdot 20 \cdot (9.8 + 1.0) \cdot 0.1 = 329 \text{ N}$
- iii) Decelerating  $Fe_3 = Y_P \times \epsilon_{Pd} \times M_P + Y_V \times \epsilon_{Vd} \times M_V$   
 $= 1 \cdot 7.6 \cdot 20 \cdot (9.8 - 1.0) \cdot 0.15 + 0.5 \cdot 7.6 \cdot 20 \cdot (9.8 - 1.0) \cdot 0.1 = 268 \text{ N}$

Mean effective load  $F_m$

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

$$= \sqrt[3]{\frac{1}{600} (298^3 \cdot 350 + 329^3 \cdot 125 + 268^3 \cdot 125)}$$

$$= 300 \text{ N}$$

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

$$= 10 \times \left( \frac{24\,400}{1.2 \cdot 300} \right)^3$$

$$= 3.11 \times 10^6 \text{ km}$$

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

$$F_s = \frac{C_0}{F_e} = \frac{C_0}{F_{e2}} = \frac{22\,800}{329} = 69.3$$

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.

- i) Constant speed  $Fe_1 = W \cdot g = 20 \cdot 9.8 = 196 \text{ N}$
- ii) Accelerating  $Fe_2 = Fe_1 + W \cdot \alpha = 196 + 20 \cdot 1 = 216 \text{ N}$
- iii) Decelerating  $Fe_3 = Fe_1 - W \cdot \alpha = 196 - 20 \cdot 1 = 176 \text{ N}$

Axial mean effective load  $F_m$

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

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

$$= 197 \text{ N}$$

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

$$= 10 \times \left( \frac{7\,060}{1.2 \cdot 197} \right)^3 \times 10^6 \text{ (mm)}$$

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

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

$$F_s = \frac{C_{0a}}{F_e} = \frac{C_{0a}}{F_{e2}} = \frac{12\,700}{216} = 58.7$$

## 1.5 Maintenance

### 1.5.1 Maintenance Method

- For standard Monocarrier, we pack grease in the slider, linear guides and ball screw.
- Monocarriers are equipped with NSK K1 Lubrication Unit as a standard feature, therefore, you may use it for 5 years or 10 000 km depending on your application, whichever comes first, without maintenance. However, replenishment of preceded grease may extend its life substantially.
- The NSK K1 Lubrication Unit is ideal in environments where oily dust exists. However, the life may be shorter than described in Clause 2 above. In such a case, it requires increasing the frequency of replenishment.

3-3. Support unit

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

$$L = \ell \times \left( \frac{C_a}{f_w \cdot F_m} \right)^3 \times 10^6 = 10 \times \left( \frac{7\,100}{1.2 \times 197} \right)^3 \times 10^6 \text{ (mm)}$$

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

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

$$F_s = \frac{C_{0a}}{F_e} = \frac{C_{0a}}{F_{e2}} = \frac{3\,040}{216} = 14.0$$

3-4. Result

MCM08068H10D00	Linear guide	Ball screw	Support unit
Fatigue life	3.11 × 10 <sup>6</sup> km	2.66 × 10 <sup>6</sup> km	2.70 × 10 <sup>6</sup> km
Static safety factor	69.3	58.7	14.0

4. A Nozzle for the NSK grease pump for MCH Monocarriers is available as an option. NSK reference number: NSK HGP NZ8

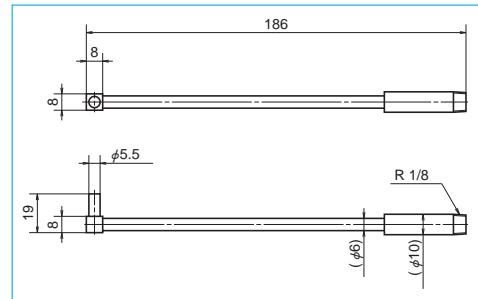


Fig. 5.1 NSK HGP NZ8

### 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 load 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 a linear guide without lubricant are shown in Fig. 5.2. 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: 1 800 mm
No lubricant	All grease removed
NSK K1	All grease removed + NSK K1

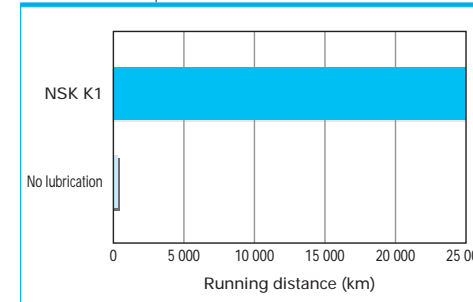


Fig. 5.2 Results of high-speed durability test of linear guides without lubricant

#### (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. 5.3. 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: 1.3 m/s (4 000 min <sup>-1</sup> )
No lubricant	All grease removed
	NSK K1
	All grease removed + NSK K1

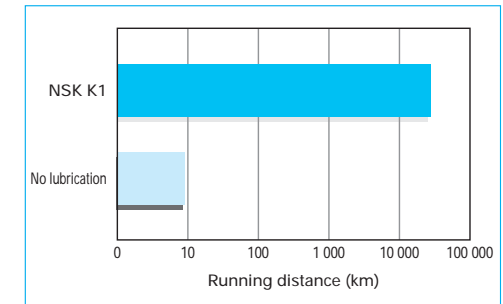


Fig. 5.3 Results of high-speed durability test of ball screws without lubricant

●NSK K1 Lubrication Units for food processing and medical devices are 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 materials approved by the FDA. 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), and higher rust prevention.

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

### ● Applications

LG2 is lubrication grease for rolling contact machine components such as linear guides and ball screws for processing equipment for semiconductors and LCD which require highly clean environment at normal pressure in 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, 22 hr)
Copper plate corrosion test	Satisfactory (Method B, 100°C, 24 hr)
Oil separation	0.8% (100°C, 24 hr)
Base oil kinematic Viscosity	30 mm <sup>2</sup> /s (40°C)

## 1.7 Characteristics and Evaluation Method

### 1.7.1 Positioning Accuracy

Perform successive positioning 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 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.

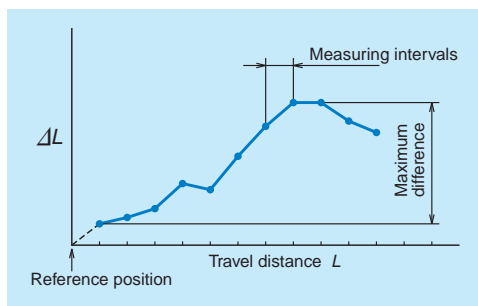


Fig. 7.1

### 1.7.2 Repeatability

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

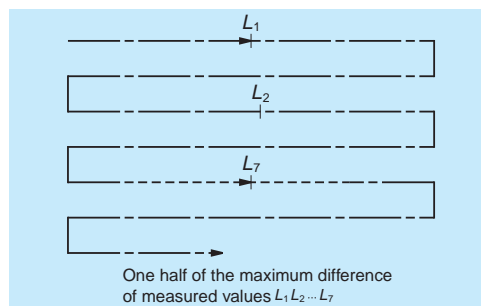


Fig. 7.2

### 1.7.3 Running Parallelism (Vertical direction)

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

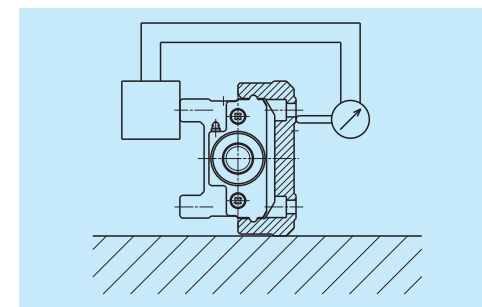


Fig. 7.3 Setting of indicator

## 1.8 Special Specifications

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

### (1) Surface Treatment

- Fluoride low temperature chrome plating

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

### (2) Special Machining (Processing)

- i) Shaft end processing
  - Key way processing
  - One flat or two flats processing
- ii) Pin hole processing
  - Slider
  - Rail

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

### (3) Motor Bracket and Intermediate Plate for Motor Mounting

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

Note: Motion check of the motor is unavailable.

### (4) Reversed Motor Mount

The reversed motor mount is available. Please consult NSK.

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

- 2) Please refer to the bottom of pages 85 to 87 for the configuration of reversed motor mounting of the MCH series.

### (5) Right and Left Turn Thread

Right and left turn ball screw is available. Please consult with NSK for available leads.

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

A ball-screw-less rail part with the same cross section of standard Monocarriers is available for a driven linear guide. It will lessen a height adjustment work compared with a construction with two standard Monocarriers. Note: Height grinding adjustment of the two axes assembly is not available.

## 1.9 Sensor Specification

### 1.9.1 Proximity Switch

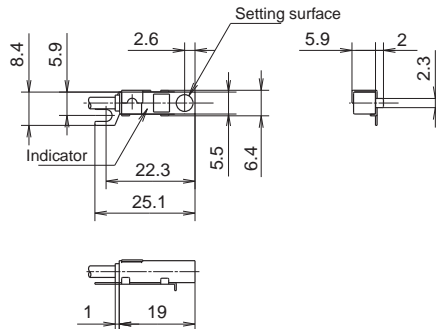
#### Use of OMRON E2S-W13 and E2S-W14

Item	E2S-W13 type	E2S-W14 type
Setting surface	Front face	
Sensing distance	1.6 mm ±15%	
Setting distance	0 to 1.2 mm	
Differential travel	10% max. of sensing distance	
Detectable object type	Ferrous metal	
Standard sensing object	Iron, 12 × 12 × 1 mm	
Response frequency	1 kHz min.	
Power supply voltage (operating voltage range)	12 to 24 VDC; ripple (p-p), 10% max (10 to 30 VDC)	
Current consumption	13 mA max. at 24 VDC with no load	
Control output (Switching Capacity)	NPN open collector output, 50 mA max. (30 VDC 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 (Normally open contact)	NC (Normally close contact)
Wire lead length	1 000 mm	

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

Movement mode	Output type	Type	Time chart	Output circuit
NO	NPN	E2S-W13 type		
NC	NPN	E2S-W14 type		

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



### 1.9.2 Photo Sensor

#### Use of OMRON EE-SX674

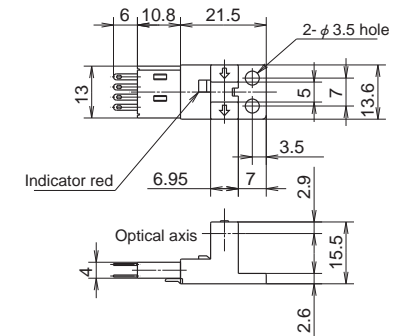
Item	EE-SX674 type
Slot width	5 mm
Standard reference object	Opaque, 2 × 0.8 mm
Differential distance	0.025 mm
Light source	GaAs infrared LED with peak wavelength of 940 nm
Indicator (without detecting object)	ON GaP red LED (peak emission wavelength, 690 nm)
Supply voltage	5 to 24 VDC ±10%; ripple (p-p),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

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

Type	Movement mode	Time chart	Connection terminal	Output circuit
EE-SX674 type	Light-ON		When terminals L and ⊕ are short circuited	
	Dark-ON		When terminals L and ⊕ are open circuited	

EE-SX674 (Sensor)  
EE-1001 (Connector)

A connector is mounted to the sensor in the right figure.





1 MCM Series Reference Number Coding	P25
2 MCM Series Dimension Table of Standard Products	
MCM02	P26
MCM03	P27
MCM05	P29
MCM06	P33
MCM08	P37
MCM10	P41
3 MCM Series Option Part	
3.1 Sensor Unit	P45
3.2 Cover Unit	P49
3.3 Motor Bracket	P51

# MCM Series

# 2 MCM Series

## 2.1 MCM Series Reference Number Coding

[Body]  
**Example: M C M 08 040 H 10 K 0 0**  
 Monocarrier  
 M type: MCM Series  
 Nominal size (rail width, Unit: 10 mm)  
 Stroke (Unit: 10 mm)  
 Accuracy grade (H, high grade; P, precision grade)

NSK management number  
 Standard grease specification: O (AS2)  
 Clean grease specification: B (LG2)  
 Slider specification K: Single slider  
 D: Double slider (See page 9.)  
 Ball screw lead (mm)

[With Option part]  
**Example: M C 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: Option parts are available separately.

**Table 1 Sensor unit (See page 45.)**

Reference No. code	Specification	Reference No.
0	N/A	—
1	Proximity switch (normally close contact 3 pieces)	MC - SRxx - 10
2	Proximity switch (normally open contact 3 pieces)	MC - SRxx - 11
3	Proximity switch (normally open contact 1 piece, normally close contact 2 pieces)	MC - SRxx - 12
4	Photo sensor 3 pieces	MC - SRxx - 13

Note 1) xx: Reference number  
 2) Sensor rail is not included in sensor unit. If you require the rail, please request separately. (See pages 46 to 48.)

**Table 2 Cover unit (See pages 49 to 50.)**

Reference No. code	Specification	Reference No.
0	N/A	—
1	With top cover	MC - CVxxxx - 01 (02) *
2	Full cover	MC - CVxxxx - 00

Note 1) xxxxx: Reference number and stroke number  
 2)\*: "-02" is only used for Monocarrier MCM03.  
 3) When a sensor unit is used, full cover unit cannot be used.

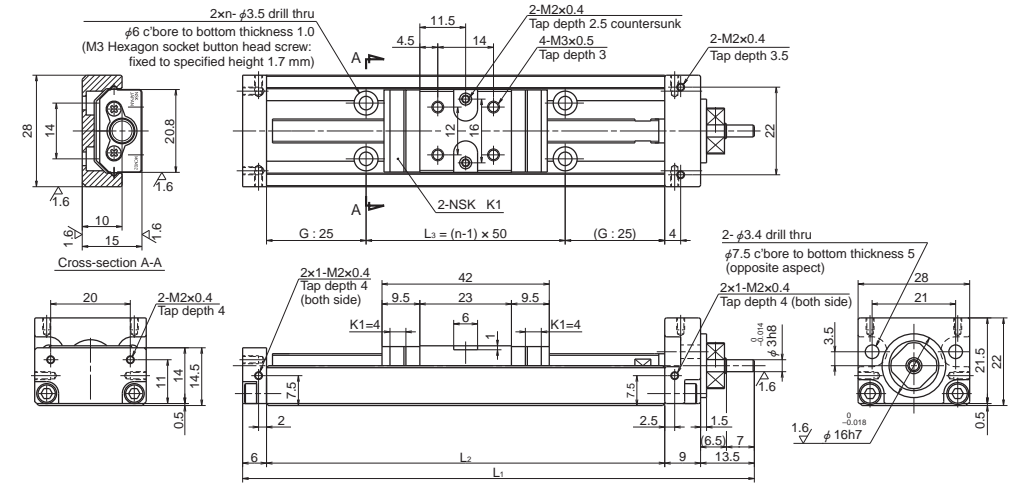
**Table 3 Motor bracket (See pages 51 to 67.)**

Reference No. code	Reference No.				
	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	—

N/A: Not applicable

## 2.2 MCM Series Dimension Table of Standard Products

### MCM02



Dimension of MCM02 (Single slider)

Reference No.	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									

Monocarrier dynamic torque specification (N · cm)

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

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

Basic load rating

Lead <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		2	555 (High grade)		
		405 (Precision)				615 (Precision)		

Basic static moment load of linear guide

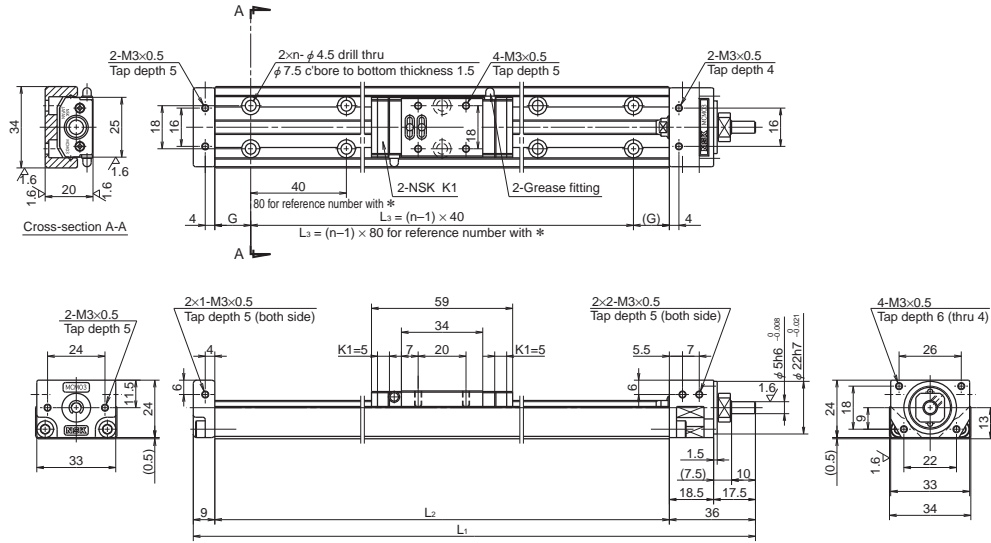
Slider	Basic static moment load (N · m)		
	Rolling <i>M<sub>RO</sub></i>	Pitching <i>M<sub>PO</sub></i>	Yawing <i>M<sub>YO</sub></i>
Single	24	8	8



MCM03

Accuracy grade: Precision (P)

Ball screw lead 1 and 2



Dimension of MCM03 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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 (66)	1	160	115	17.5	80	2	0.015	0.6
*MCM03005P02K00		2	0.016							
MCM03010P01K00	100	131 (141)	1	235	190	15	160	5	0.021	0.7
MCM03010P02K00		2	0.022							
MCM03015P01K00	150	181 (191)	1	285	240	20	200	6	0.025	0.8
MCM03015P02K00		2	0.026							

Note: Bolt hole pitch L<sub>3</sub> on items marked with \* is 80 mm.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	1	0.2 – 1.7
	2	

Notes:

- Frictional resistance of NSK K1 is included in dynamic torque in table.
- Grease is packed into ball screw, linear guide parts and support unit.
- Consult NSK for life estimates under large moment loads.
- A spacer plate is required when using a cover unit or sensor unit for MCM03 with the lead of 1 or 2 mm. (See page 49)

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	φ 6	735	10 900	2 670	1	1 230	4 900	1 040
2					2			

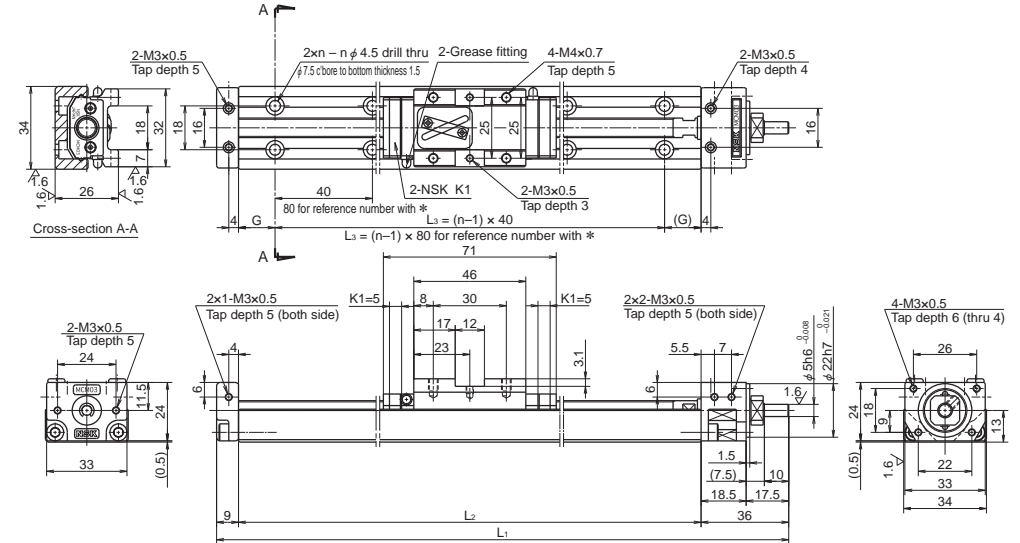
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>YO</sub>
Single	68	28	28

MCM03

Accuracy grade: High grade (H)

Ball screw lead 10 and 12



Dimension of MCM03 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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>			
*MCM03005H10K00	50	69 (79)	10	185	140	30	80	2	0.080	0.6
*MCM03005H12K00		12	0.097							
MCM03010H10K00	100	119 (129)	10	235	190	15	160	5	0.092	0.7
MCM03010H12K00		12	0.109							
MCM03015H10K00	150	169 (179)	10	285	240	20	200	6	0.105	0.8
MCM03015H12K00		12	0.122							
MCM03020H10K00	200	219 (229)	10	335	290	25	240	7	0.118	0.9
MCM03020H12K00		12	0.135							
MCM03025H10K00	250	269 (279)	10	385	340	30	280	8	0.131	1.0
MCM03025H12K00		12	0.147							

Note: Bolt hole pitch L<sub>3</sub> on items marked with \* is 80 mm.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	10	0.3 – 3.0
	12	

Notes:

- Frictional resistance of NSK K1 is included in dynamic torque in 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 <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	φ 8	1 230	6 250	2 670	10	1 690	6 620	1 040
12					12			

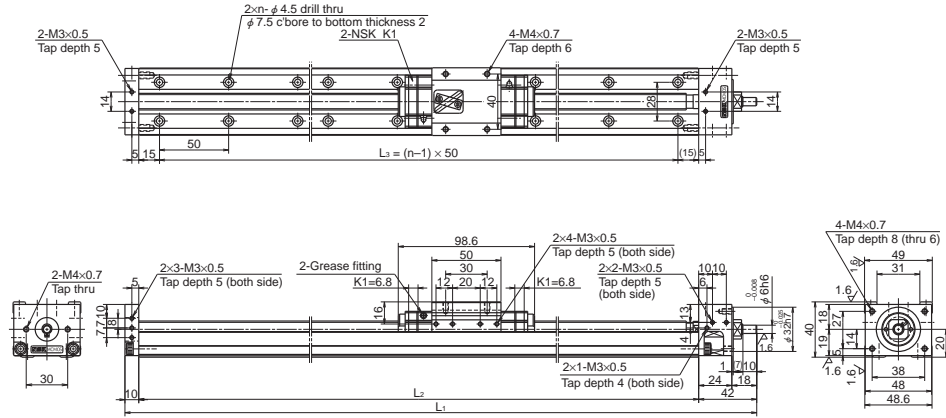
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>YO</sub>
Single	92	51	51

MCM05

Accuracy grade: High grade (H)

Ball screw lead 5, 10 and 20



Dimension of MCM05 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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 (95)	5	232	180	150	4	0.025	1.4
MCM05005H10K00			10						
MCM05005H20K00			20						
MCM05010H05K00	100	130 (145)	5	282	230	200	5	0.031	1.6
MCM05010H10K00			10						
MCM05010H20K00			20						
MCM05015H05K00	150	180 (195)	5	332	280	250	6	0.036	1.8
MCM05015H10K00			10						
MCM05015H20K00			20						
MCM05020H05K00	200	230 (245)	5	382	330	300	7	0.042	2.0
MCM05020H10K00			10						
MCM05020H20K00			20						
MCM05025H05K00	250	280 (295)	5	432	380	350	8	0.047	2.2
MCM05025H10K00			10						
MCM05025H20K00			20						

Monocarrier dynamic torque specification (N · cm)

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

Notes:

- Frictional resistance of NSK K1 is included in dynamic torque in 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	$\phi 12$	3 760	15 600	4 400	5	6 310	10 900	1 450
10		2 260	12 400		10			
20		2 260	9 850		20			
30		3 260	8 600		30			

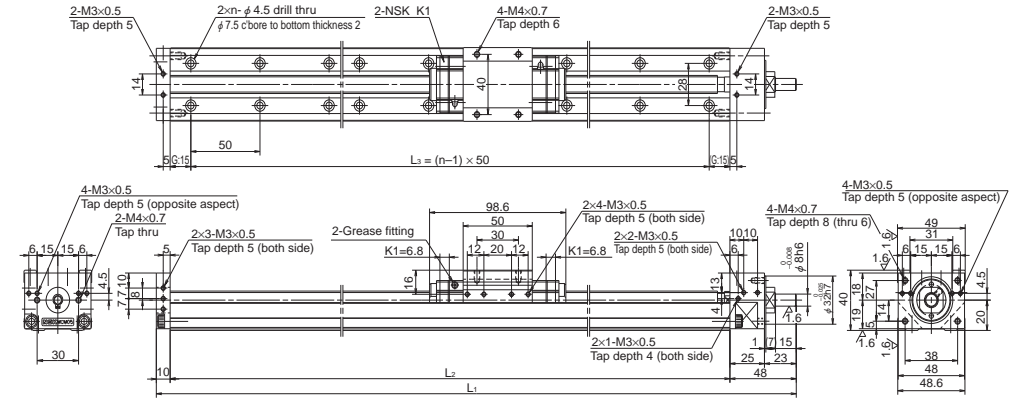
Basic static moment load of linear guide

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

MCM05

Accuracy grade: High grade (H)

Ball screw lead 30



Dimension of MCM05 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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>			
MCM05030H05K00	300	330 (345)	5	482	430	400	9	0.053	2.3
MCM05030H10K00			10						
MCM05030H20K00			20						
MCM05030H30K00			30						
MCM05040H05K00	400	430 (445)	5	582	530	500	11	0.064	2.7
MCM05040H10K00			10						
MCM05040H20K00			20						
MCM05040H30K00			30						
MCM05050H05K00	500	530 (545)	5	682	630	600	13	0.076	3.1
MCM05050H10K00			10						
MCM05050H20K00			20						
MCM05050H30K00			30						
MCM05060H05K00	600	630 (645)	5	782	730	700	15	0.087	3.5
MCM05060H10K00			10						
MCM05060H20K00			20						
MCM05060H30K00			30						

Monocarrier dynamic torque specification (N · cm)

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

Notes:

- Frictional resistance of NSK K1 is included in dynamic torque in 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

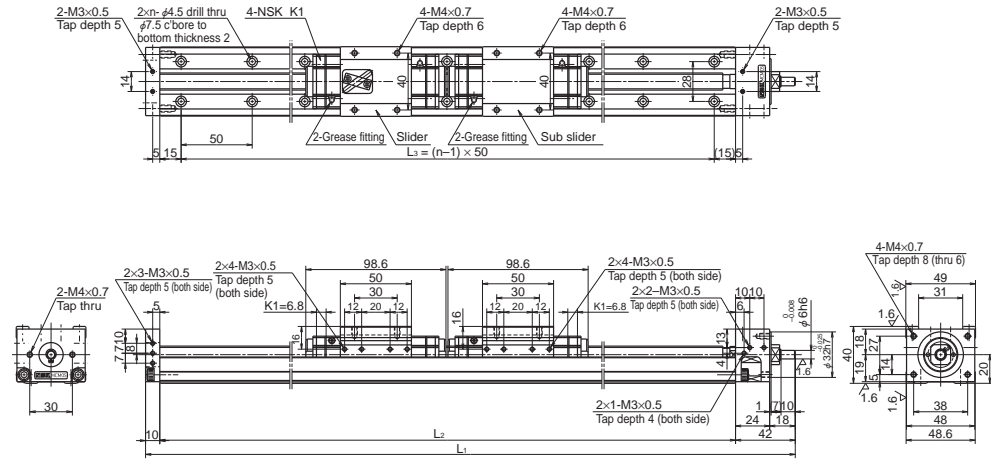
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
		Ball screw $C_a$	Linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi 12$	3 760	15 600	4 400	5	6 310	10 900	1 450
10		2 260	12 400		10			
20		2 260	9 850		20			
30		3 260	8 600		30			

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

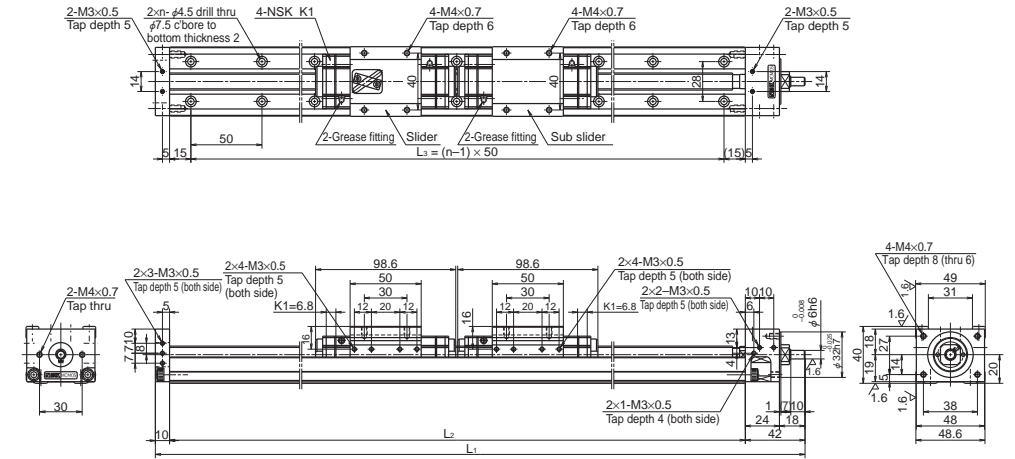
MCM05 (Double slider)

Accuracy grade: High grade (H)



MCM05 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM05 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia ×10 <sup>-4</sup> (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)	20					0.151	

Dimension of MCM05 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia ×10 <sup>-4</sup> (kg·m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
MCM05031H10D00	310	333	10	582	530	500	11	0.086	3.2
MCM05031H20D00		(360)	20					0.162	
MCM05041H10D00	410	433	10	682	630	600	13	0.098	3.6
MCM05041H20D00		(460)	20					0.174	
MCM05051H10D00	510	533	10	782	730	700	15	0.109	4.2
MCM05051H20D00		(560)	20					0.185	

Monocarrier dynamic torque specification (N·cm)

Ball screw lead (mm)	Notes:	
	10	1.5 - 7.6
20	2.3 - 11.8	

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

Monocarrier dynamic torque specification (N·cm)

Ball screw lead (mm)	Notes:	
	10	1.5 - 7.6
20	2.3 - 11.8	

- Notes:
- Frictional resistance of NSK K1 is included in dynamic torque in 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 <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	φ12	3 760	15 600	4 400	5	6 310	10 900	1 450
10		2 260	12 400		10			
20		2 260	9 850		20			

Basic static moment load of linear guide

Slider	Basic static moment load (N·m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>YO</sub>
Double	455	765	765

Basic load rating

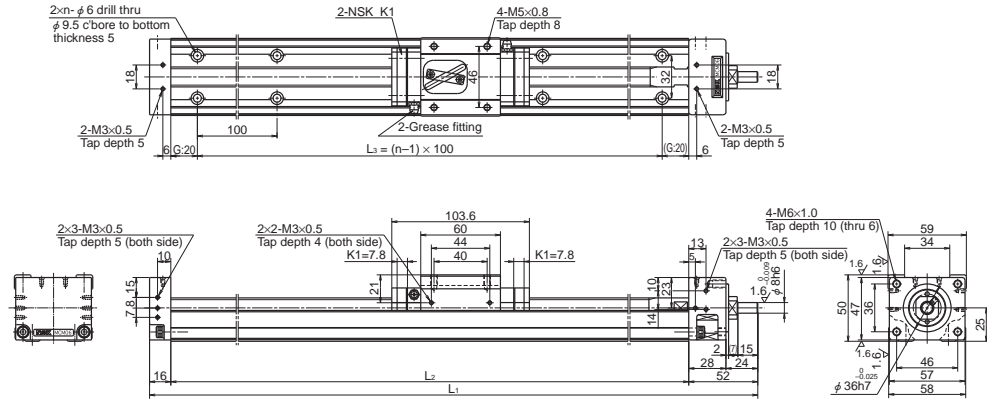
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
		Ball screw C <sub>a</sub>	Linear guides C	Support unit C <sub>a</sub>	Rated running distance L <sub>a</sub> (km)	Ball screw C <sub>0a</sub>	Linear guides C <sub>0</sub>	
5	φ12	3 760	15 600	4 400	5	6 310	10 900	1 450
10		2 260	12 400		10			
20		2 260	9 850		20			

Basic static moment load of linear guide

Slider	Basic static moment load (N·m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>YO</sub>
Double	455	765	765

MCM06

Accuracy grade: High grade (H)



Dimension of MCM06 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole <i>n</i>	Inertia ×10 <sup>-4</sup> (kg·m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
◇MCM06005H05K00	50	85 (102)	5	258	190	100	2	0.083	2.7
◇MCM06005H10K00			10					0.077	
◇MCM06005H20K00			20					0.122	
MCM06010H05K00	100	135 (152)	5	308	240	200	3	0.103	3.0
MCM06010H10K00			10					0.092	
MCM06010H20K00			20					0.137	
◇MCM06015H05K00	150	185 (202)	5	358	290	200	3	0.122	3.5
◇MCM06015H10K00			10					0.106	
◇MCM06015H20K00			20					0.152	
MCM06020H05K00	200	235 (252)	5	408	340	300	4	0.142	3.8
MCM06020H10K00			10					0.121	
MCM06020H20K00			20					0.167	
◇MCM06025H05K00	250	285 (302)	5	458	390	300	4	0.161	4.2
◇MCM06025H10K00			10					0.136	
◇MCM06025H20K00			20					0.181	
MCM06030H05K00	300	335 (352)	5	508	440	400	5	0.180	4.5
MCM06030H10K00			10					0.150	
MCM06030H20K00			20					0.196	

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

Monocarrier dynamic torque specification (N·cm)

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

Notes:

- Frictional resistance of NSK K1 is included in dynamic torque in 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

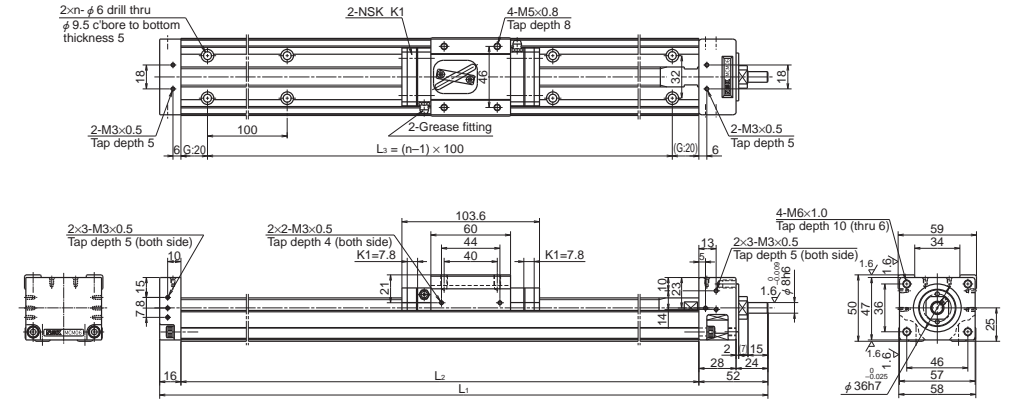
Lead <i>ℓ</i> (mm)	Shaft dia <i>d</i> (mm)	Basic dynamic load rating (N)				Basic static load rating (N)			Support unit load limit (N)
		Ball screw <i>C<sub>a</sub></i>	Linear guides <i>C</i>	Support unit <i>C<sub>a</sub></i>	Rated running distance <i>L<sub>a</sub></i> (km)	Ball screw <i>C<sub>0a</sub></i>	Linear guides <i>C<sub>0</sub></i>		
5	φ16	7 310	25 200	6 550	5	13 500	17 000	2 730	
10	φ15	7 060	20 000		10	12 700			
20		4 560	15 900		20	7 750			

Basic static moment load of linear guide

Slider	Basic static moment load (N·m)		
	Rolling <i>M<sub>RO</sub></i>	Pitching <i>M<sub>PO</sub></i>	Yawing <i>M<sub>VO</sub></i>
Single	415	174	174

MCM06

Accuracy grade: High grade (H)



Dimension of MCM06 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole <i>n</i>	Inertia ×10 <sup>-4</sup> (kg·m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
MCM06040H05K00	400	435 (452)	5	608	540	500	6	0.219	5.2
MCM06040H10K00			10					0.180	
MCM06040H20K00			20					0.225	
MCM06050H05K00	500	535 (552)	5	708	640	600	7	0.258	6.0
MCM06050H10K00			10					0.209	
MCM06050H20K00			20					0.255	
MCM06060H05K00	600	635 (652)	5	808	740	700	8	0.297	6.7
MCM06060H10K00			10					0.239	
MCM06060H20K00			20					0.284	
MCM06070H05K00	700	735 (752)	5	908	840	800	9	0.335	7.4
MCM06070H10K00			10					0.268	
MCM06070H20K00			20					0.314	
MCM06080H05K00	800	835 (852)	5	1 008	940	900	10	0.374	8.1
MCM06080H10K00			10					0.298	
MCM06080H20K00			20					0.343	

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

Notes:

- Frictional resistance of NSK K1 is included in dynamic torque in 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

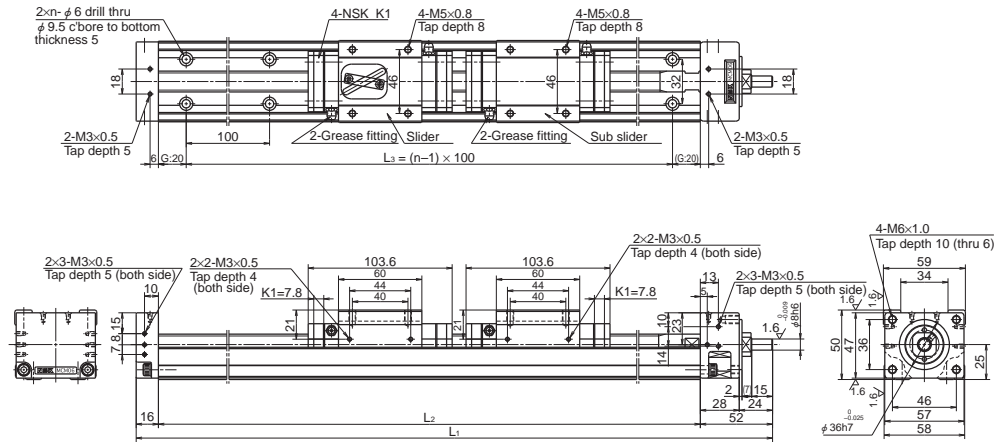
Lead <i>ℓ</i> (mm)	Shaft dia <i>d</i> (mm)	Basic dynamic load rating (N)				Basic static load rating (N)			Support unit load limit (N)
		Ball screw <i>C<sub>a</sub></i>	Linear guides <i>C</i>	Support unit <i>C<sub>a</sub></i>	Rated running distance <i>L<sub>a</sub></i> (km)	Ball screw <i>C<sub>0a</sub></i>	Linear guides <i>C<sub>0</sub></i>		
5	φ16	7 310	25 200	6 550	5	13 500	17 000	2 730	
10	φ15	7 060	20 000		10	12 700			
20		4 560	15 900		20	7 750			

Basic static moment load of linear guide

Slider	Basic static moment load (N·m)		
	Rolling <i>M<sub>RO</sub></i>	Pitching <i>M<sub>PO</sub></i>	Yawing <i>M<sub>VO</sub></i>
Single	415	174	174

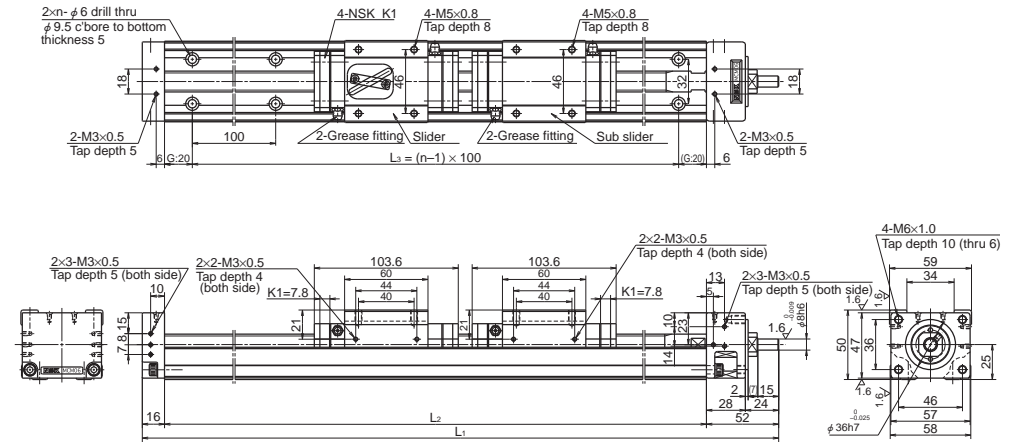
### MCM06 (Double slider)

Accuracy grade: High grade (H)



### MCM06 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM06 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia × 10 <sup>-4</sup> (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
MCM06011H05D00	110	133 (164)	5	408	340	300	4	0.145	4.4
MCM06011H10D00			10						
MCM06021H05D00	210	233 (264)	5	508	440	400	5	0.184	5.1
MCM06021H10D00			10						
MCM06021H20D00			20						
MCM06031H05D00	310	333 (364)	5	608	540	500	6	0.223	5.8
MCM06031H10D00			10						
MCM06031H20D00			20						

Dimension of MCM06 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia × 10 <sup>-4</sup> (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
MCM06041H05D00	410	433 (464)	5	708	640	600	7	0.262	6.6
MCM06041H10D00			10						
MCM06041H20D00			20						
MCM06051H10D00	510	533 (564)	10	808	740	700	8	0.254	7.3
MCM06051H20D00			20						
MCM06061H10D00	610	633 (664)	10	908	840	800	9	0.283	8.0
MCM06061H20D00			20						
MCM06071H10D00	710	733 (764)	10	1 008	940	900	10	0.313	8.7
MCM06071H20D00			20						

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

Notes:

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

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

Notes:

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

#### Basic load rating

Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)			Support unit load limit (N)
		Ball screw C <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	φ16	7 310	25 200	6 550	5	13 500	17 000	2 730	
10	φ15	7 060	20 000		10	12 700			
20		4 560	15 900		20	7 750			

#### 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 <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	φ16	7 310	25 200	6 550	5	13 500	17 000	2 730	
10	φ15	7 060	20 000		10	12 700			
20		4 560	15 900		20	7 750			

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>YO</sub>
Double	825	1 220	1 220

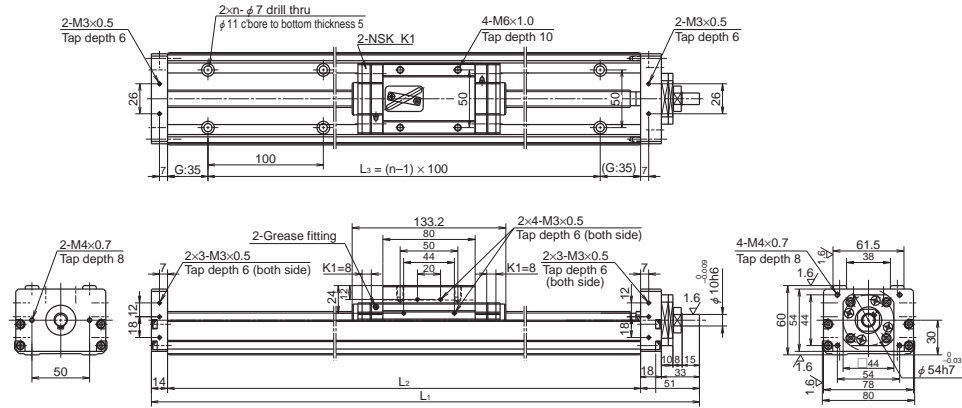
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>YO</sub>
Double	825	1 220	1 220

MCM08

Accuracy grade: High grade (H)

Ball screw lead 5, 10 and 20



Dimension of MCM08 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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>			
◇MCM08005H05K00	50	85 (101)	5	285	220	100	2	0.101	4.1
◇MCM08005H10K00			10						
MCM08010H05K00			5						
MCM08010H10K00	100	135 (151)	10	335	270	200	3	0.114	4.6
MCM08010H20K00			20						
◇MCM08015H05K00			5						
◇MCM08015H10K00	150	185 (201)	10	385	320	200	3	0.129	5.1
◇MCM08015H20K00			20						
MCM08020H05K00			5						
MCM08020H10K00	200	235 (251)	10	435	370	300	4	0.144	5.5
MCM08020H20K00			20						
◇MCM08025H05K00			5						
◇MCM08025H10K00	250	285 (301)	10	485	420	300	4	0.159	6.0
◇MCM08025H20K00			20						
MCM08030H05K00			5						
MCM08030H10K00	300	335 (351)	10	535	470	400	5	0.173	6.5
MCM08030H20K00			20						

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

Monocarrier dynamic torque specification (N · cm)

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

Notes:

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

Basic load rating

Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)			Support unit load limit (N)
		Ball screw $C_a$	Linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$		
5	φ15	7 310	30 800	7 100	5	13 500	22 800	3 040	
10		7 060	24 400		10				
20		4 560	19 400		20				
30		5 070	169 300		30				

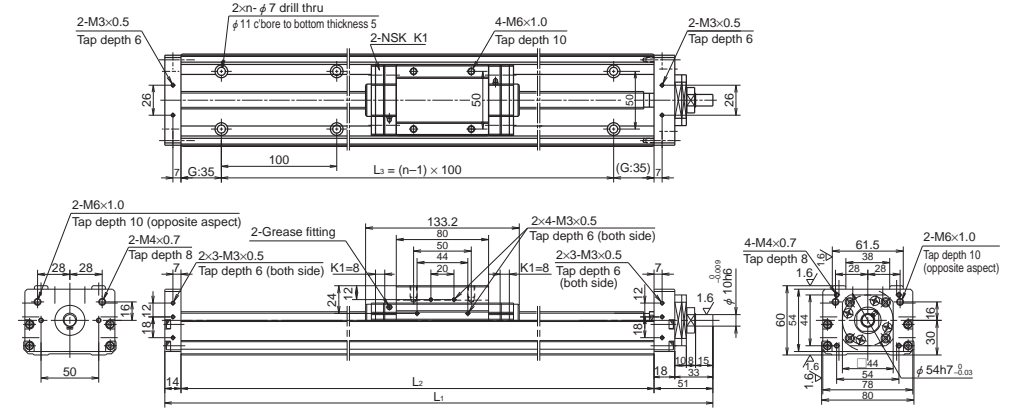
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
Single	770	300	300

MCM08

Accuracy grade: High grade (H)

Ball screw lead 30



Dimension of MCM08 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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>			
MCM08040H05K00	400	435 (451)	5	635	570	500	6	0.236	7.4
MCM08040H10K00			10						
MCM08040H20K00			20						
MCM08040H30K00			30						
MCM08050H05K00	500	535 (551)	5	735	670	600	7	0.275	8.4
MCM08050H10K00			10						
MCM08050H20K00			20						
MCM08050H30K00			30						
MCM08060H05K00	600	635 (651)	5	835	770	700	8	0.314	9.3
MCM08060H10K00			10						
MCM08060H20K00			20						
MCM08060H30K00			30						
MCM08070H05K00	700	735 (751)	5	935	870	800	9	0.353	10.5
MCM08070H10K00			10						
MCM08070H20K00			20						
MCM08070H30K00			30						
MCM08080H05K00	800	835 (851)	5	1 035	970	900	10	0.391	11.2
MCM08080H10K00			10						
MCM08080H20K00			20						
MCM08080H30K00			30						

Monocarrier dynamic torque specification (N · cm)

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

Notes:

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

Basic load rating

Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)			Support unit load limit (N)
		Ball screw $C_a$	Linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$		
5	φ15	7 310	30 800	7 100	5	13 500	22 800	3 040	
10		7 060	24 400		10				
20		4 560	19 400		20				
30		5 070	169 300		30				

Basic static moment load of linear guide

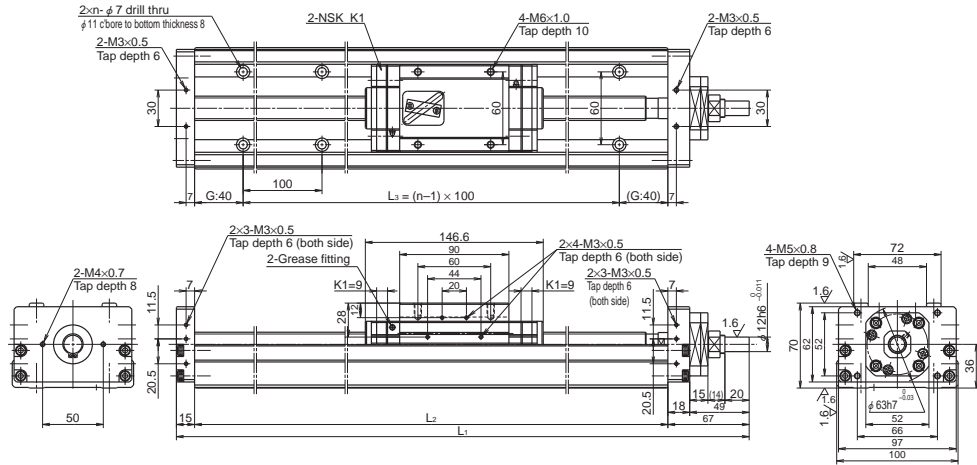
Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{YO}$
Single	770	300	300



### MCM10

Accuracy grade: High grade (H)

#### Ball screw lead 10 and 20



Dimension of MCM10 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole <i>n</i>	Inertia $\times 10^{-4}$ (kg · m <sup>2</sup> )	Mass (kg)
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
MCM10010H10K00	100	130	10	362	280	200	2*	0.332	7.8
MCM10010H20K00		(151)	20						
◇MCM10015H10K00	150	180	10	412	330	300	4	0.378	8.7
◇MCM10015H20K00		(201)	20						
MCM10020H10K00	200	230	10	462	380	300	4	0.425	9.5
MCM10020H20K00		(251)	20						
◇MCM10025H10K00	250	280	10	512	430	400	5	0.472	10.4
◇MCM10025H20K00		(301)	20						
MCM10030H10K00	300	330	10	562	480	400	5	0.519	11.2
MCM10030H20K00		(351)	20						
MCM10040H10K00	400	430	10	662	580	500	6	0.612	13.0
MCM10040H20K00		(451)	20						
MCM10050H10K00	500	530 (551)	10	762	680	600	7	0.706	14.6
MCM10050H20K00			20					0.820	
MCM10050H30K00			30					1.010	

Note: 1) Dimension G is 15 for items marked with ◇.

2) \*: Use mounting holes on each end of the rail.

#### Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	Notes:	
	10	2.7 – 10.8
	20	3.1 – 12.7
30	5.1 – 18.0	

- Frictional resistance of NSK K1 is included in dynamic torque in 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 <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	φ 20	10 900	33 500	7 600	10	21 700	29 400	3 380	
20		7 060	26 600		20				
30		11 700	23 200		30				

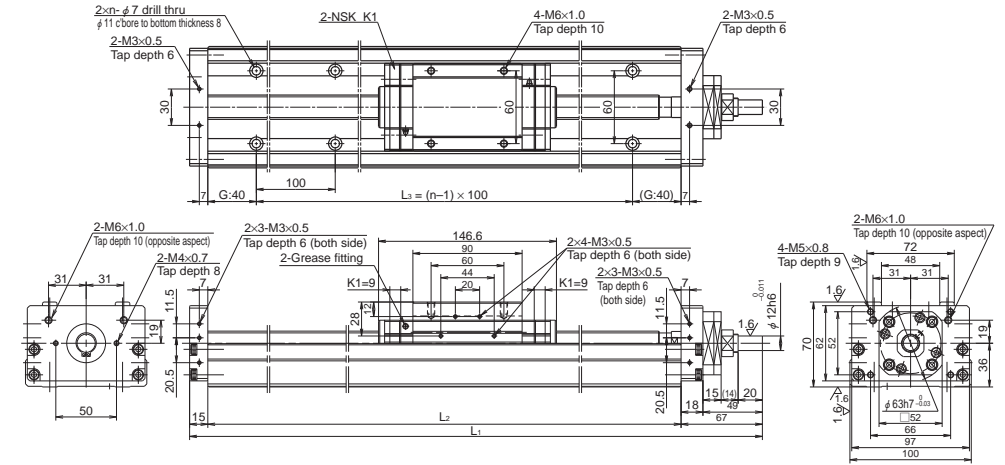
#### Basic static moment load of linear guide

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>VO</sub></i>
Single	1 170	425	425

### MCM10

Accuracy grade: High grade (H)

#### Ball screw lead 30



Dimension of MCM10 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole <i>n</i>	Inertia $\times 10^{-4}$ (kg · m <sup>2</sup> )	Mass (kg)	
				L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>				
MCM10060H10K00	600	630 (651)	10	862	780	700	8	0.800	16.3	
MCM10060H20K00			20							0.914
MCM10060H30K00			30							1.104
MCM10070H10K00	700	730 (751)	10	962	880	800	9	0.893	18.0	
MCM10070H20K00			20							1.007
MCM10070H30K00			30							1.197
MCM10080H10K00	800	830 (851)	10	1 062	980	900	10	0.987	19.7	
MCM10080H20K00			20							1.101
MCM10080H30K00			30							1.291
MCM10090H10K00	900	930 (951)	10	1 162	1 080	1 000	11	1.081	21.4	
MCM10090H20K00			20							1.195
◇MCM10100H10K00			1 000							1 030 (1 051)
◇MCM10100H20K00	20	1.288								

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

#### Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	Notes:	
	10	2.7 – 10.8
	20	3.1 – 12.7
30	5.1 – 18.0	

- Frictional resistance of NSK K1 is included in dynamic torque in 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 <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	φ 20	10 900	33 500	7 600	10	21 700	29 400	3 380	
20		7 060	26 600		20				
30		11 700	23 200		30				

#### 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>VO</sub></i>
Single	1 170	425	425

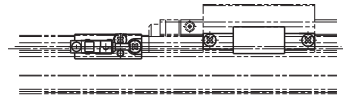
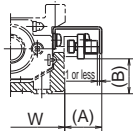




## 2.3 MCM Series Option Part

### 2.3.1 Sensor Unit

#### ● Proximity switch

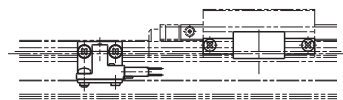
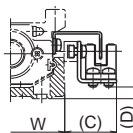


(Example of assembly)

Model No.	Reference No.			A (mm)	B (mm)	Body width W (mm)
MCM02	MC-SR02-00	MC-SR02-01	MC-SR02-02	17	2	28
MCM03	MC-SR03-10	MC-SR03-11	MC-SR03-12	17	3	34
MCM05	MC-SR05-10	MC-SR05-11	MC-SR05-12	17	15	48.6
MCM06	MC-SR06-10	MC-SR06-11	MC-SR06-12	17	19	58
MCM08	MC-SR08-10	MC-SR08-11	MC-SR08-12	16	27	80
MCM10	MC-SR10-10	MC-SR10-11	MC-SR10-12	16	35	100
Quantity	Proximity switch (normally open contact)	—	3	1	E2S-W13 (OMRON Corp.)	
	Proximity switch (normally close contact)	3	—	2	E2S-W14 (OMRON Corp.)	

- Notes: 1. See page 21 for proximity switch specification.  
 2. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.  
 3. Sensor unit for MCM02 contains two sensor dogs.  
 4. A spacer plate is required when using a cover unit or sensor unit for MCM03 with the lead of 1 or 2 mm. (Refer to page 49.)

#### ● Photo sensor



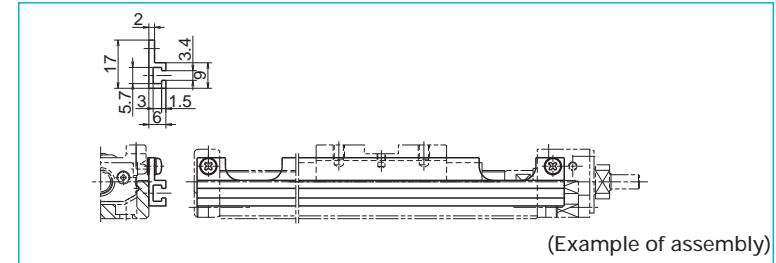
(Example of assembly)

Model No.	Reference No.	C (mm)	D (mm)	Body width W (mm)	Remarks
MCM03	MC-SR03-13	24	0.5	34	EE-SX674 (OMRON Corp.)
MCM05	MC-SR05-13	24	5	48.6	
MCM06	MC-SR06-13	24	9	58	3 sets
MCM08	MC-SR08-13	23	17	80	(EE-1001 connector attachment)
MCM10	MC-SR10-13	22	24	100	

- Notes: 1. See page 22 for photo sensor specification.  
 2. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.  
 3. A spacer plate is required when using a cover unit or sensor unit for MCM03 with the lead of 1 or 2 mm. (Refer to page 49.)

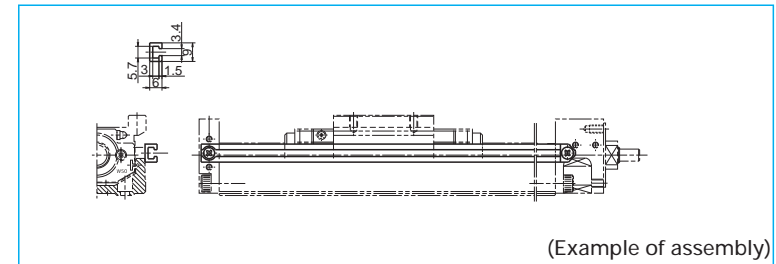
#### (1) Sensor Rail

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



(Example of assembly)

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



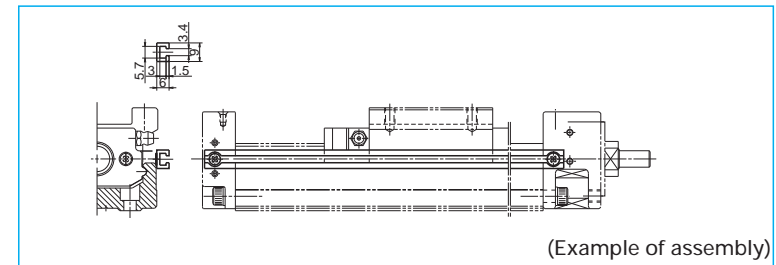
(Example of assembly)

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)

- Notes: 1. \* \* \* \* is the same as rail dimension L<sub>2</sub>.  
 2. Please assemble the attached seat between the sensor rail and the support unit for MCM03, MCM05, MCM06 and MCM08.  
 3. For combinations of sensors and rails, see pages 47 to 48.

MCM Series and Sensor Rail Combination Table

Table 4

Model No.	Body length L <sub>2</sub> (mm)	Reference No.	Sensor rail reference No.
MCM02	100	MCM02005H01K MCM02005P01K MCM02005H02K MCM02005P02K	MC-SRL2-0100*
		MCM02010H01K MCM02010P01K MCM02010H02K MCM02010P02K	MC-SRL2-0150
		MCM02015H01K MCM02015P01K MCM02015H02K MCM02015P02K	MC-SRL2-0200
MCM03	115	MCM03005P01K00 MCM03005P02K00	MC-SRL3-0115
	140	MCM03005H10K00 MCM03005H12K00	MC-SRL3-0140
	190	MCM03010P01K00 MCM03010P02K00 MCM03010H10K00 MCM03010H12K00	MC-SRL3-0190
	240	MCM03015P01K00 MCM03015P02K00 MCM03015H10K00 MCM03015H12K00	MC-SRL3-0240
	290	MCM03020H10K00 MCM03020H12K00	MC-SRL3-0290
	340	MCM03025H10K00 MCM03025H12K00	MC-SRL3-0340
MCM05	180	MCM05005H05K00 MCM05005H10K00 MCM05005H20K00	MC-SRL5-0180
	230	MCM05010H05K00 MCM05010H10K00 MCM05010H20K00	MC-SRL5-0230
	280	MCM05015H05K00 MCM05015H10K00 MCM05015H20K00 MCM05006H10D00	MC-SRL5-0280
	330	MCM05020H05K00 MCM05020H10K00 MCM05020H20K00 MCM05011H10D00	MC-SRL5-0330
	380	MCM05025H05K00 MCM05025H10K00 MCM05025H20K00 MCM05016H10D00	MC-SRL5-0380
MCM06	430	MCM05030H05K00 MCM05030H10K00 MCM05030H20K00 MCM05030H30K00 MCM05021H10D00 MCM05021H20D00	MC-SRL5-0430
	530	MCM05040H05K00 MCM05040H10K00 MCM05040H20K00 MCM05040H30K00 MCM05031H10D00 MCM05031H20D00	MC-SRL5-0530
	630	MCM05050H05K00 MCM05050H10K00 MCM05050H20K00 MCM05050H30K00 MCM05041H10D00 MCM05041H20D00	MC-SRL5-0630

Model No.	Body length L <sub>2</sub> (mm)	Reference No.	Sensor rail reference No.
MCM05	730	MCM05060H05K00 MCM05060H10K00 MCM05060H20K00 MCM05060H30K00 MCM05051H10D00 MCM05051H20D00	MC-SRL5-0730
		MCM06005H05K00 MCM06005H10K00 MCM06005H20K00	MC-SRL6-0190
MCM06	190	MCM06010H05K00 MCM06010H10K00 MCM06010H20K00	MC-SRL6-0240
	240	MCM06015H05K00 MCM06015H10K00 MCM06015H20K00	MC-SRL6-0290
MCM06	290	MCM06020H05K00 MCM06020H10K00 MCM06020H20D00	MC-SRL6-0340
	340	MCM06025H05K00 MCM06025H10K00 MCM06025H20K00	MC-SRL6-0390
MCM06	390	MCM06030H05K00 MCM06030H10K00 MCM06030H20K00	MC-SRL6-0440
	440	MCM06035H05K00 MCM06035H10K00 MCM06035H20K00 MCM06021H10D00 MCM06021H20D00	MC-SRL6-0540
MCM06	490	MCM06040H05K00 MCM06040H10K00 MCM06040H20K00 MCM06031H05D00 MCM06031H10D00 MCM06031H20D00	MC-SRL6-0640
	540	MCM06045H05K00 MCM06045H10K00 MCM06045H20K00 MCM06041H05D00 MCM06041H10D00 MCM06041H20D00	MC-SRL6-0740
MCM06	590	MCM06050H05K00 MCM06050H10K00 MCM06050H20K00 MCM06041H05D00 MCM06041H10D00 MCM06041H20D00	MC-SRL6-0840
	640	MCM06055H05K00 MCM06055H10K00 MCM06055H20K00 MCM06051H10D00 MCM06051H20D00	MC-SRL6-0940
MCM06	690	MCM06060H05K00 MCM06060H10K00 MCM06060H20K00 MCM06051H10D00 MCM06051H20D00	MC-SRL6-0940
	740	MCM06065H05K00 MCM06065H10K00 MCM06065H20K00 MCM06061H10D00 MCM06061H20D00	MC-SRL6-0940
MCM06	790	MCM06070H05K00 MCM06070H10K00 MCM06070H20K00 MCM06061H10D00 MCM06061H20D00	MC-SRL6-0940
	840	MCM06075H05K00 MCM06075H10K00 MCM06075H20K00 MCM06061H10D00 MCM06061H20D00	MC-SRL6-0940
MCM06	890	MCM06080H05K00 MCM06080H10K00 MCM06080H20K00 MCM06071H10D00 MCM06071H20D00	MC-SRL6-0940
	940	MCM06085H05K00 MCM06085H10K00 MCM06085H20K00 MCM06071H10D00 MCM06071H20D00	MC-SRL6-0940

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

Model No.	Body length L <sub>2</sub> (mm)	Reference No.	Sensor rail reference No.
MCM10	280	MCM10010H10K00 MCM10010H20K00	MC-SRL1-0280
		MCM10015H10K00 MCM10015H20K00	MC-SRL1-0330
	380	MCM10020H10K00 MCM10020H20K00 MCM10020H30K00	MC-SRL1-0380
	430	MCM10025H10K00 MCM10025H20K00	MC-SRL1-0430
	480	MCM10030H10K00 MCM10030H20K00 MCM10017H10D00 MCM10017H20D00	MC-SRL1-0480
	580	MCM10040H10K00 MCM10040H20K00 MCM10027H10D00 MCM10027H20D00	MC-SRL1-0580
	680	MCM10050H10K00 MCM10050H20K00 MCM10050H30K00 MCM10037H10D00 MCM10037H20D00	MC-SRL1-0680
	780	MCM10060H10K00 MCM10060H20K00 MCM10060H30K00 MCM10047H10D00 MCM10047H20D00	MC-SRL1-0780
	880	MCM10070H10K00 MCM10070H20K00 MCM10070H30K00 MCM10057H10D00 MCM10057H20D00	MC-SRL1-0880
	980	MCM10080H10K00 MCM10080H20K00 MCM10080H30K00 MCM10067H10D00 MCM10067H20D00	MC-SRL1-0980
	1080	MCM10090H10K00 MCM10090H20K00	MC-SRL1-1080
	1180	MCM10100H10K00 MCM10100H20K00 MCM10087H10D00 MCM10087H20D00	MC-SRL1-1180

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

2.3.2 Cover Unit

Cover Unit for MCM02

Unit: mm

Stroke	Reference No.	Length(L)
50	MC-CV02005-00	115
100	MC-CV02010-00	165
150	MC-CV02015-00	215

Height of screw head is not included.

Cover Unit for MCM03

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

Unit: mm

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

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

Spacer for MCM03 (Optional) MC-SP03-00 (for ball screw lead 1 and 2 mm)

Note: Spacer is required when using sensor unit and cover unit.

<<Example of assembly>>

Cover unit for MCM05, 06, 08, and 10

Unit: mm

Model No.	Stroke		Cover unit reference No.		Cover length			
	Single slider	Double slider	Top cover Unit		Length (L)	Height (H)	Width (W)	End part (D)
			Top cover Unit	Full cover Unit*1				
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			
	600	510	MC-CV05060-01	MC-CV05060-00	750			
	MCM06	50	—	MC-CV06005-01	MC-CV06005-00			
100		—	MC-CV06010-01	MC-CV06010-00	275			
150		—	MC-CV06015-01	MC-CV06015-00	325			
200		110	MC-CV06020-01	MC-CV06020-00	375			
250		—	MC-CV06025-01	MC-CV06025-00	425			
300		210	MC-CV06030-01	MC-CV06030-00	475			
400		310	MC-CV06040-01	MC-CV06040-00	575			
500		410	MC-CV06050-01	MC-CV06050-00	675			
600		510	MC-CV06060-01	MC-CV06060-00	775			
700		610	MC-CV06070-01	MC-CV06070-00	875			
MCM08	800	710	MC-CV06080-01	MC-CV06080-00	975	56.5	90	2.6
	50	—	MC-CV08005-01	MC-CV08005-00	248			
	100	—	MC-CV08010-01	MC-CV08010-00	298			
	150	—	MC-CV08015-01	MC-CV08015-00	348			
	200	80	MC-CV08020-01	MC-CV08020-00	398			
	250	—	MC-CV08025-01	MC-CV08025-00	448			
	300	180	MC-CV08030-01	MC-CV08030-00	498			
	400	280	MC-CV08040-01	MC-CV08040-00	598			
	500	380	MC-CV08050-01	MC-CV08050-00	698			
	600	480	MC-CV08060-01	MC-CV08060-00	798			
MCM10	700	580	MC-CV08070-01	MC-CV08070-00	898	66.5	110	3.6
	800	680	MC-CV08080-01	MC-CV08080-00	998			
	100	—	MC-CV10010-01	MC-CV10010-00	308			
	150	—	MC-CV10015-01	MC-CV10015-00	358			
	200	70	MC-CV10020-01	MC-CV10020-00	408			
	250	—	MC-CV10025-01	MC-CV10025-00	458			
	300	170	MC-CV10030-01	MC-CV10030-00	508			
	400	270	MC-CV10040-01	MC-CV10040-00	608			
	500	370	MC-CV10050-01	MC-CV10050-00	708			
	600	470	MC-CV10060-01	MC-CV10060-00	808			
700	570	MC-CV10070-01	MC-CV10070-00	908				
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				

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

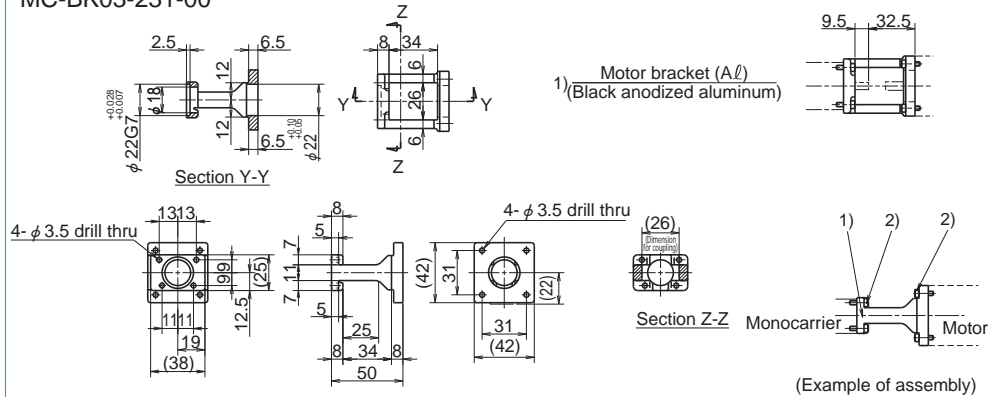
\*1) When using sensor unit, full-cover unit cannot be used.

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



Motor bracket for MCM03

Reference number  
MC-BK03-231-00



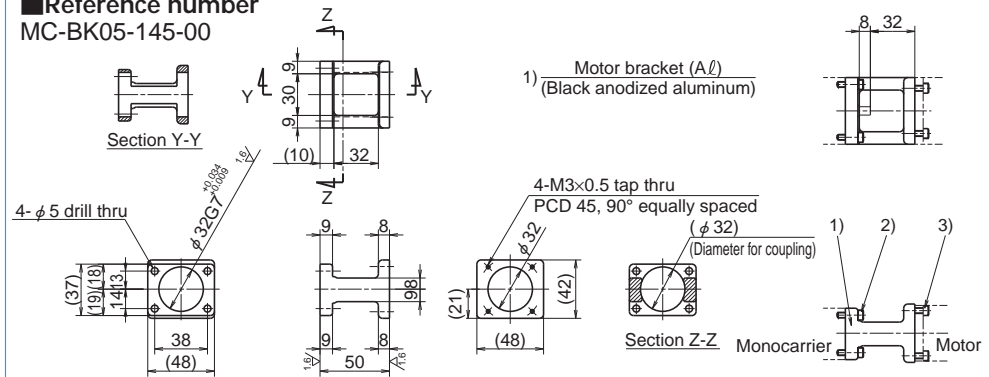
Notes: 1. Be sure to align centerlines when installing motor.  
2. Be careful in the assembly orientation of bracket.  
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	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



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

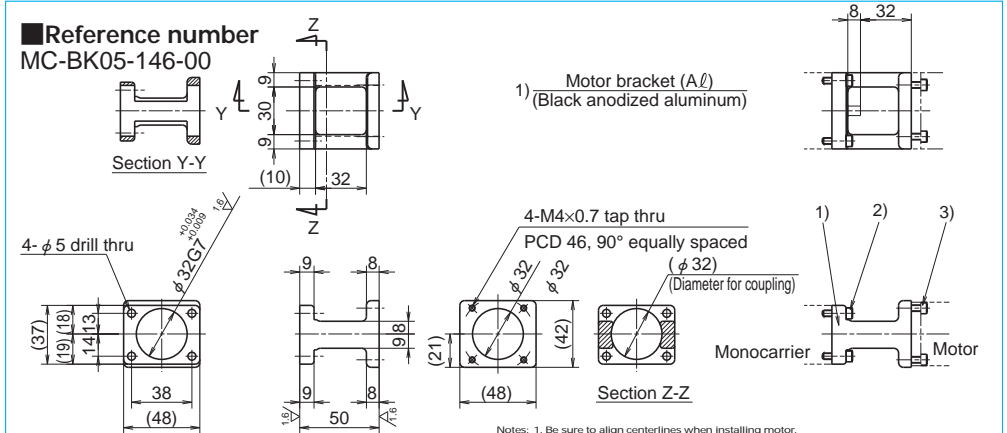
Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)

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-BK05-146-00



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

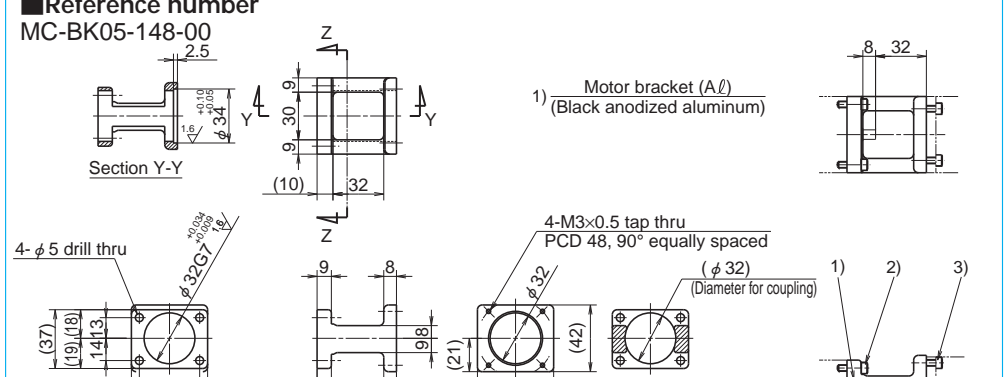
Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMJV-A5A(50W), SGMVA-A5A(50W), SGMJV-01A(100W), SGMVA-01A(100W), SGMVA-C2A(150W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W), HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)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

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

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

Motor bracket for MCM05

Reference number  
MC-BK05-148-00



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

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

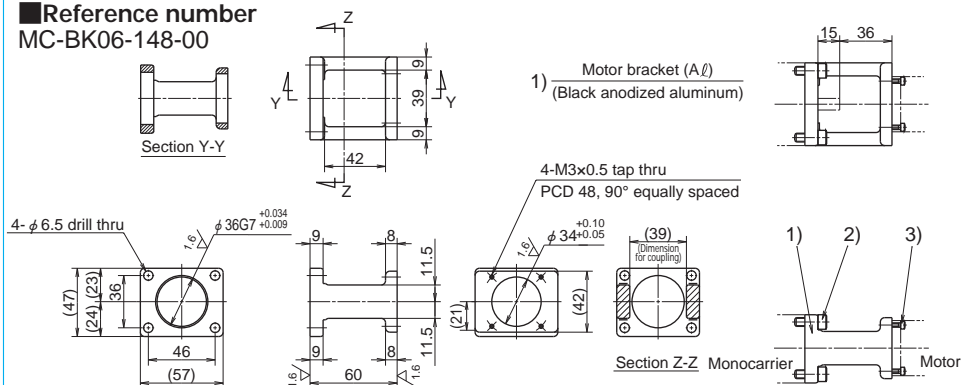
2) Hexagon socket head cap screw (M4, length 15)

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



Motor bracket for MCM06

Reference number  
MC-BK06-148-00



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

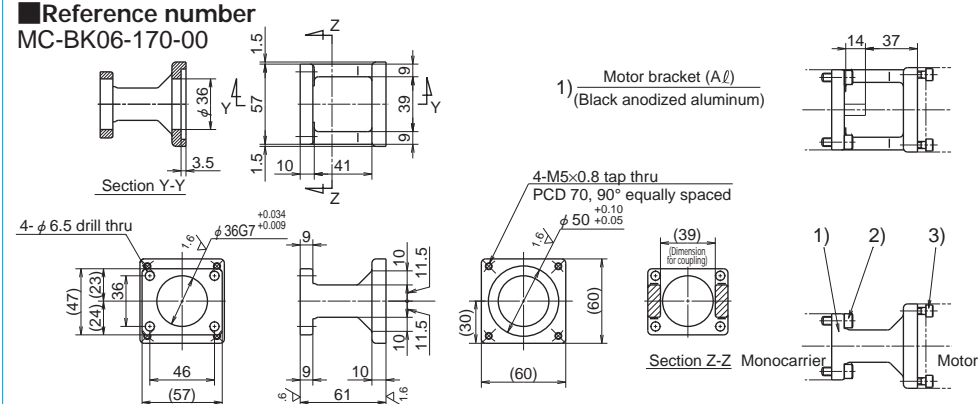
3) Hexagon socket head cap screw (M3, length 12)

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

Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MAMA01(100W)
Sanyo Denki Co., Ltd.	P50B04006(60W), P50B04010(100W)

Motor bracket for MCM06

Reference number  
MC-BK06-170-00



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

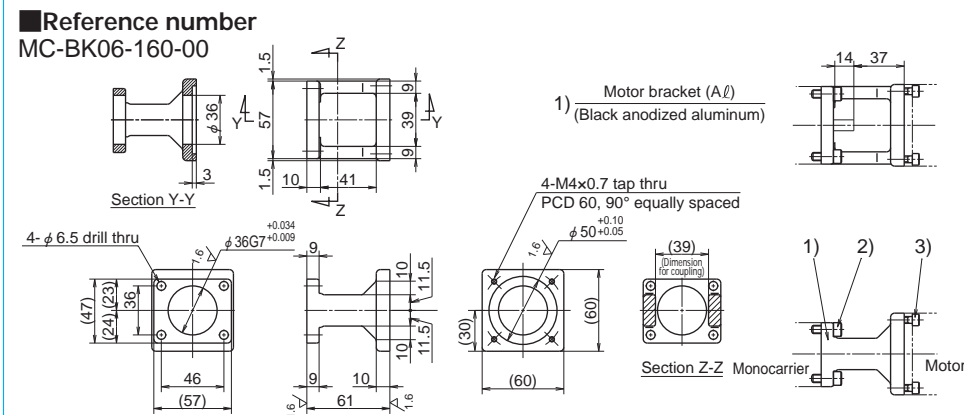
3) Hexagon socket head cap screw (M5, length 14)

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

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

Motor bracket for MCM06

Reference number  
MC-BK06-160-00



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

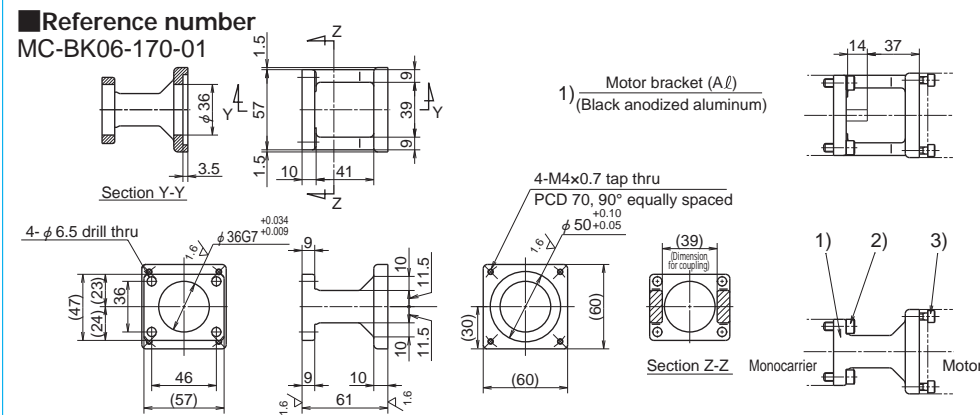
3) Hexagon socket head cap screw (M4, length 14)

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

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

Motor bracket for MCM06

Reference number  
MC-BK06-170-01



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

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

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

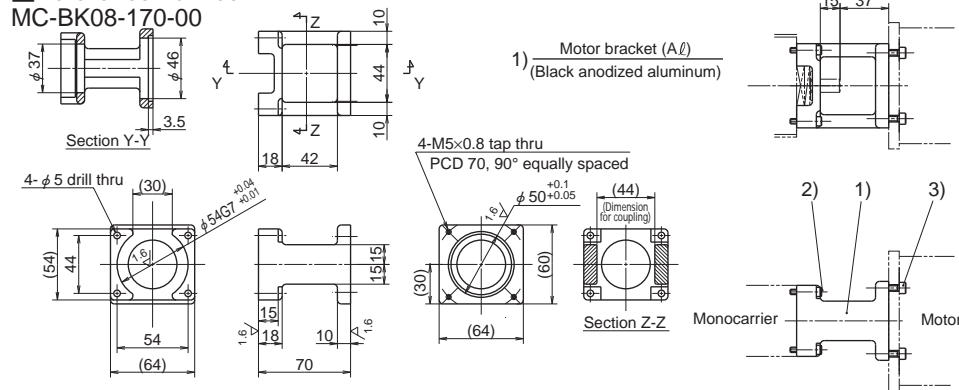
Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD02(200W), MAMA02(200W), MSM04(400W), MAMA04(400W)





Motor bracket for MCM08

Reference number  
MC-BK08-170-00



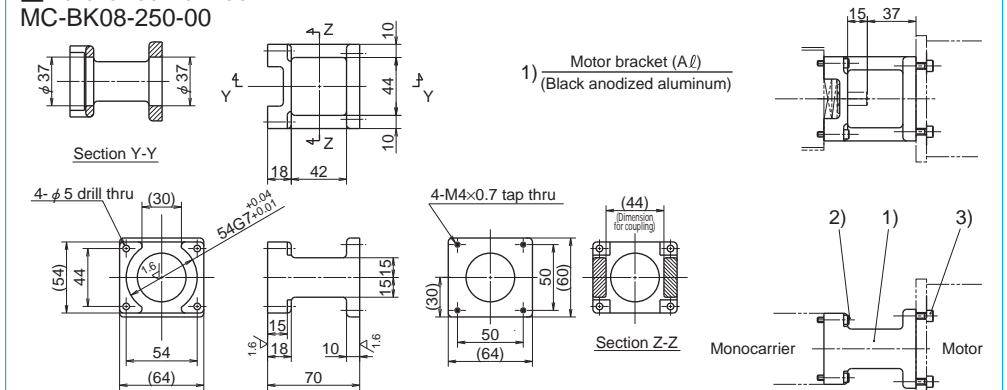
Notes: 1. Be sure to align centerlines when installing motor.  
2. Be careful in the assembly orientation of bracket.  
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMJV-02A(200W), SGM4V-02A(200W), SGMJV-04A(400W), SGM4V-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W) HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
Sanyo Denki Co., Ltd.	P30B06020(200W), P30B06040(400W)

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

Motor bracket for MCM08

Reference number  
MC-BK08-250-00



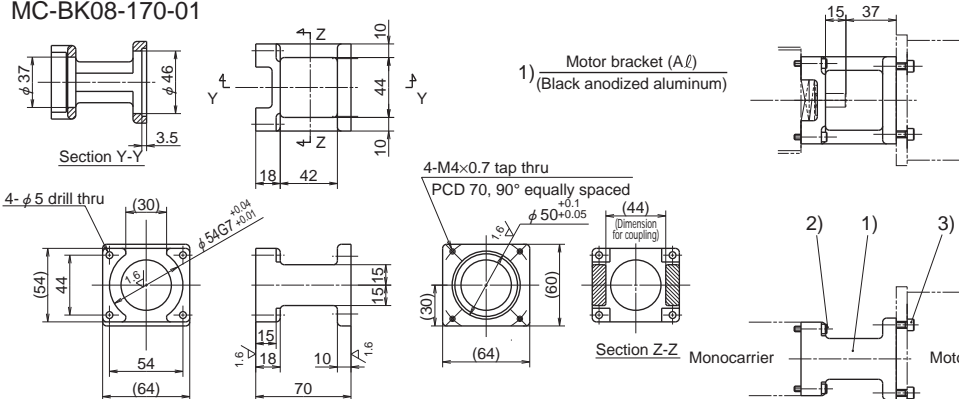
Notes: 1. Be sure to align centerlines when installing motor.  
2. Be careful in the assembly orientation of bracket.  
3. Because bracket is made by sand casting, external dimensions are for reference only.

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

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

Motor bracket for MCM08

Reference number  
MC-BK08-170-01



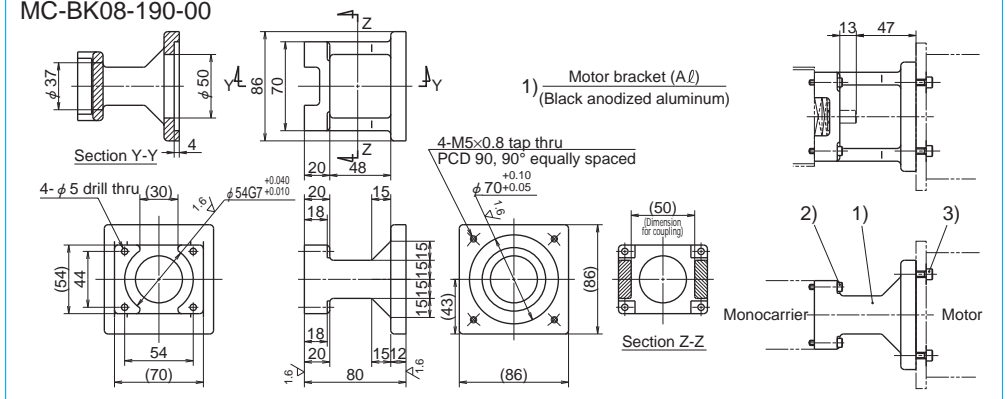
Notes: 1. Be sure to align centerlines when installing motor.  
2. Be careful in the assembly orientation of bracket.  
3. Because bracket is made by sand casting, external dimensions are for reference only.

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

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

Motor bracket for MCM08

Reference number  
MC-BK08-190-00



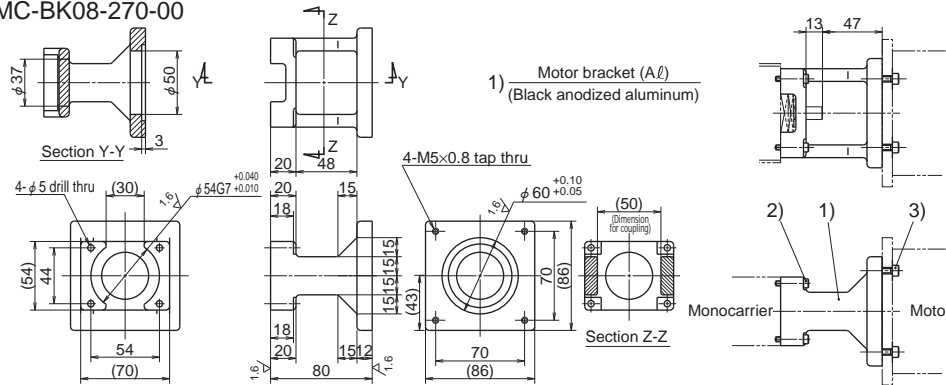
Notes: 1. Be sure to align centerlines when installing motor.  
2. Be careful in the assembly orientation of bracket.  
3. Because bracket is made by sand casting, external dimensions are for reference only.

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

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

Motor bracket for MCM08

Reference number  
MC-BK08-270-00



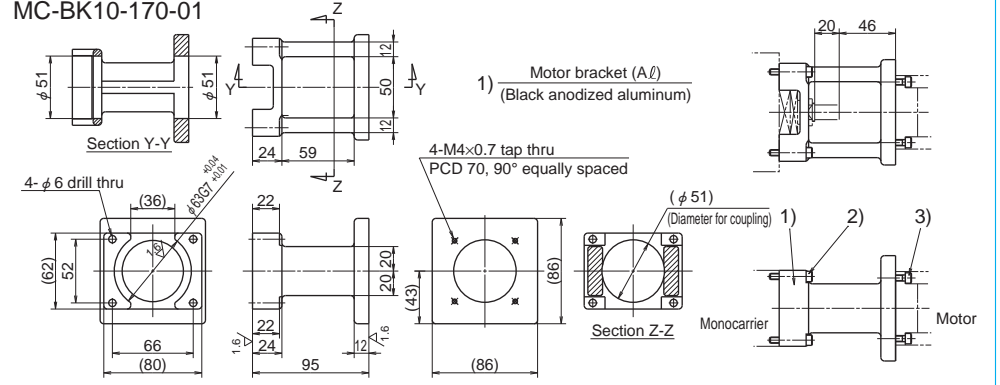
Notes: 1. Be sure to align centerlines when installing motor.  
2. Be careful in the assembly orientation of bracket.  
3. Because bracket is made by sand casting, external dimensions are for reference only.

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

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

Motor bracket for MCM10

Reference number  
MC-BK10-170-01



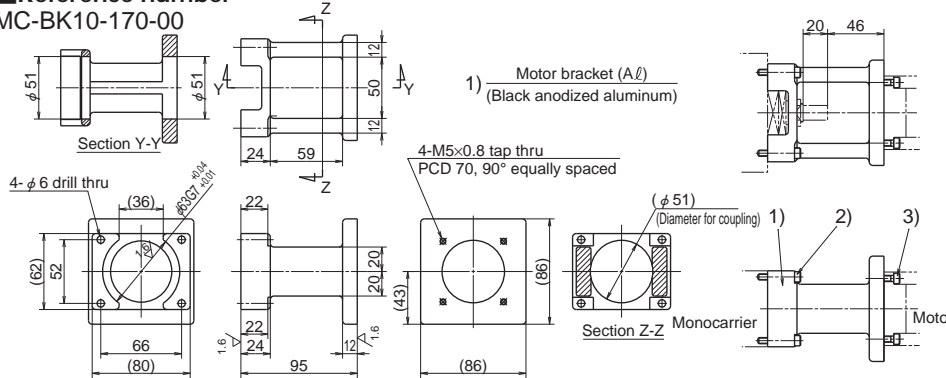
Notes: 1. Be sure to align centerlines when installing motor.  
2. Be careful in the assembly orientation of bracket.  
3. Because bracket is made by sand casting, external dimensions are for reference only.

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

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

Motor bracket for MCM10

Reference number  
MC-BK10-170-00



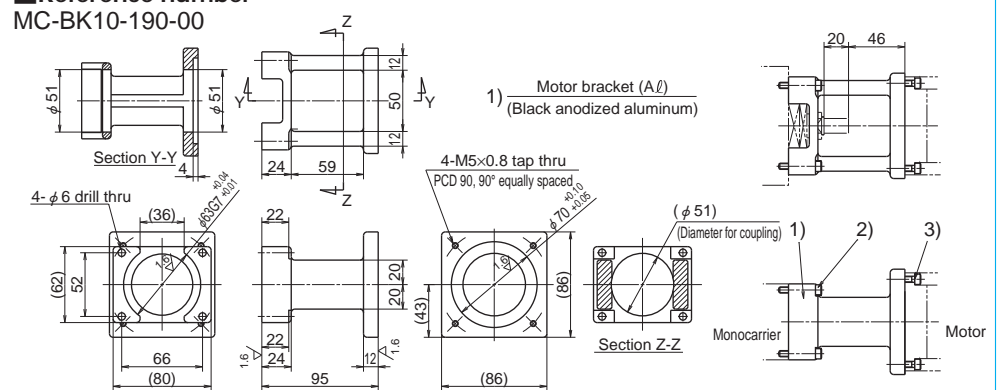
Notes: 1. Be sure to align centerlines when installing motor.  
2. Be careful in the assembly orientation of bracket.  
3. Because bracket is made by sand casting, external dimensions are for reference only.

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

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

Motor bracket for MCM10

Reference number  
MC-BK10-190-00



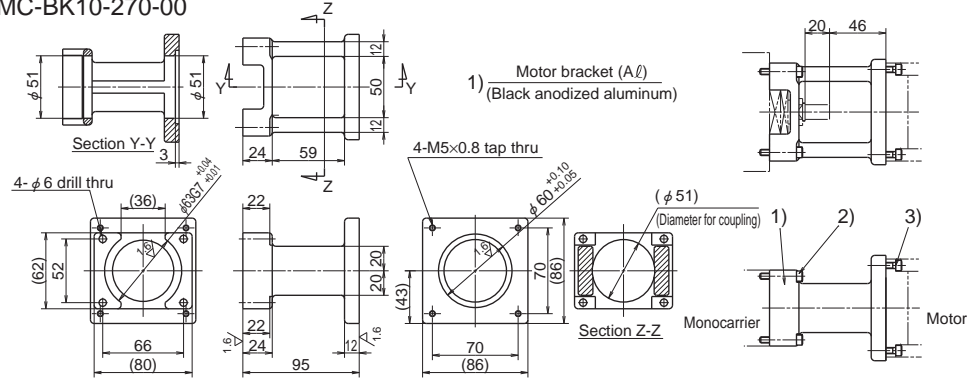
Notes: 1. Be sure to align centerlines when installing motor.  
2. Be careful in the assembly orientation of bracket.  
3. Because bracket is made by sand casting, external dimensions are for reference only.

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

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

Motor bracket for MCM10

Reference number  
MC-BK10-270-00



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

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

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

3) Hexagon socket head cap screw (M5, length 18)

Motor Availability Table of Motor Bracket for MCM Series  
Table 5

Model No.	Reference No. code	Motor bracket reference No.	Motor manufacturer	Stepping motor model No.	Wattage of AC servo motor													
					10	20	30	50	60	100	150	200	300	400	750			
MCM02	1	MC-BK02-128-00	Yaskawa Electric Corp.	SGMM-A1	SGMM-A2													
	2	MC-BK02-133-00	Mitsubishi Electric Corp.	HC-AQ013	HC-AQ023													
	3	MC-BK02-223-00	Oriental Motor Co., Ltd.	PMU3335 (5-phase) PMC3335 (5-phase)														
MCM03	1	MC-BK03-146-00	Yaskawa Electric Corp.			SGMAH-A3	SGMJV-A5A SGMAV-A5A	SGMJV-01A SGMAV-01A	SGMAV-C2A									
			Mitsubishi Electric Corp.				HF-KP03 HF-MP03 HC-KFS03 HC-MFS03	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13										
			OMRON Corp.				R88M-W03 R88M-W05	R88M-W10										
MCM05	1	MC-BK05-145-00	Panasonic Co., Ltd.				MSMD5A	MSMD01										
			Yaskawa Electric Corp.			SGMAH-A3	SGMJV-A5A SGMAV-A5A	SGMJV-01A SGMAV-01A	SGMAV-C2A									
			Mitsubishi Electric Corp.				HF-KP03 HF-MP03 HC-KFS03 HC-MFS03	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13										
MCM06	1	MC-BK06-145-00	Panasonic Co., Ltd.				MSMD5A	MSMD01										
			Yaskawa Electric Corp.				SGMJV-A5A SGMAV-A5A	SGMJV-01A SGMAV-01A	SGMAV-C2A									
			Mitsubishi Electric Corp.				HF-KP03 HF-MP03 HC-KFS03 HC-MFS03	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13										
MCM07	1	MC-BK06-170-01	Panasonic Co., Ltd.				MSMD02	MSMD04										
			Yaskawa Electric Corp.				SGMAV-02A SGMAV-04A	SGMAV-02A SGMAV-04A										
			Mitsubishi Electric Corp.				HF-KP23 HF-MP23 HC-KFS23 HC-MFS23	HF-KP43 HF-MP43 HC-KFS43 HC-MFS43										

Model No.	Reference No. code	Motor bracket reference No.	Motor manufacturer	Stepping motor model No.	Wattage of AC servo motor														
					10	20	30	50	60	100	150	200	300	400	750				
MCM08	1	MC-BK08-145-00	Panasonic Co., Ltd.							MSMD01									
			Yaskawa Electric Corp.						SGMJV-01A SGMAV-01A	SGMAV-C2A									
	2	MC-BK08-146-00	Mitsubishi Electric Corp.							HF-KP13 HF-MP13 HC-KFS13 HC-MFS13									
			Sanyo Denki Co., Ltd.			P30B04003	P30B04005		P30B04010										
			Sanyo Denki Co., Ltd.				P50B05005		P50B05010			P50B05020							
	4	MC-BK08-170-00	Yaskawa Electric Corp.								SGMJV-02A SGMAV-02A				SGMJV-04A SGMAV-04A				
			Mitsubishi Electric Corp.							HF-KP23 HF-MP23 HC-KFS23 HC-MFS23				HF-KP43 HF-MP43 HC-KFS43 HC-MFS43					
			OMRON Corp.								R88M-W20			R88M-W40					
			Sanyo Denki Co., Ltd.								P30B06020			P30B06040					
	5	MC-BK08-170-01	Panasonic Co., Ltd.										MSMD02 MAMA02		MSMD04 MAMA04				
	6	MC-BK08-190-00	Sanyo Denki Co., Ltd.										P50B07020	P50B07030	P50B07040				
	7	MC-BK08-250-00	Sanyo Denki Co., Ltd.	PBM603xxx PBM604xxx															
			Sanyo Denki Co., Ltd.	103F78xx															
			Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UFK56x															
8	MC-BK08-270-00	Sanyo Denki Co., Ltd.	103F85xx																
		Oriental Motor Co., Ltd.	AS98 UPK59x, PK59x CSK59x, CFK59x UFK59x																
MCM10	1	MC-BK10-170-00	Yaskawa Electric Corp.										SGMJV-02A SGMAV-02A		SGMJV-04A SGMAV-04A				
			Mitsubishi Electric Corp.								HF-KP23 HF-MP23 HC-KFS23 HC-MFS23			HF-KP43 HF-MP43 HC-KFS43 HC-MFS43					
			OMRON Corp.									R88M-W20		R88M-W40					
			Sanyo Denki Co., Ltd.									P30B06020		P30B06040					
	2	MC-BK10-170-01	Panasonic Co., Ltd.										MSMD02 MAMA02		MSMD04 MAMA04				
	3	MC-BK10-190-00	Panasonic Co., Ltd.														MSMD08 MAMA08		
			Sanyo Denki Co., Ltd.											P50B07020	P50B07030	P50B07040			
	4	MC-BK10-270-00	Sanyo Denki Co., Ltd.	103F85xx															
			Oriental Motor Co., Ltd.	AS98 UPK59x, PK59x CSK59x, CFK59x UFK59x															



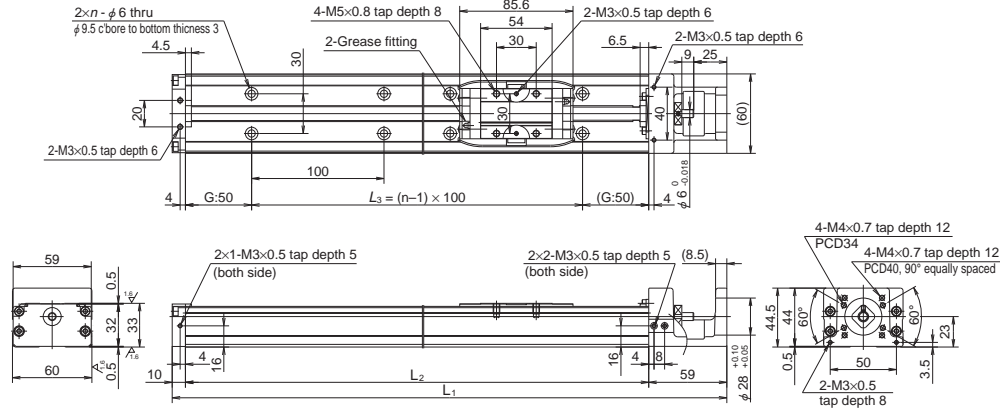
1	MCH Series Reference Number Coding	P71
2	MCH Series Dimension Table of Standard Products	
	MCL06	P72
	MCH06	P73
	MCH09	P75
	MCH10	P77
3	MCH Series Option Part	
3.1	Sensor Unit	P79
3.2	Cover Unit	P81
3.3	Intermediate Plate for Motor	P85

# MCH Series



MCH06

Accuracy grade: High grade (H)



Dimension of MCH06 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)				Inertia $\times 10^{-6}(\text{kg} \cdot \text{m}^2)$	Mass (kg)
				$L_1$	$L_2$	$L_3$	$n$		
◇ MCH06005H05K	50	53 (65)	5	219	150	100	2	2.38	1.8
◇ MCH06005H10K			10					3.45	
◇ MCH06005H20K			20					7.25	
MCH06010H05K	100	103 (115)	5	269	200	100	2	3.17	2.2
MCH06010H10K			10					4.12	
MCH06010H20K			20					7.92	
MCH06020H05K	200	203 (215)	5	369	300	200	3	4.51	3.0
MCH06020H10K			10					5.46	
MCH06020H20K			20					9.26	
MCH06030H05K	300	303 (315)	5	469	400	300	4	5.85	3.7
MCH06030H10K			10					6.80	
MCH06030H20K			20					10.6	
MCH06040H05K	400	403 (415)	5	569	500	400	5	7.18	4.5
MCH06040H10K			10					8.13	
MCH06040H20K			20					11.9	
MCH06050H05K	500	503 (515)	5	669	600	500	6	8.52	5.2
MCH06050H10K			10					9.47	
MCH06050H20K			20					13.3	

Note: Dimension G is 25 for items marked with ◇.

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	Notes:	
	5	1.0 - 4.8
	10	1.1 - 5.8
20	1.6 - 7.9	

- Frictional resistance of NSK K1 is included in dynamic torque in 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

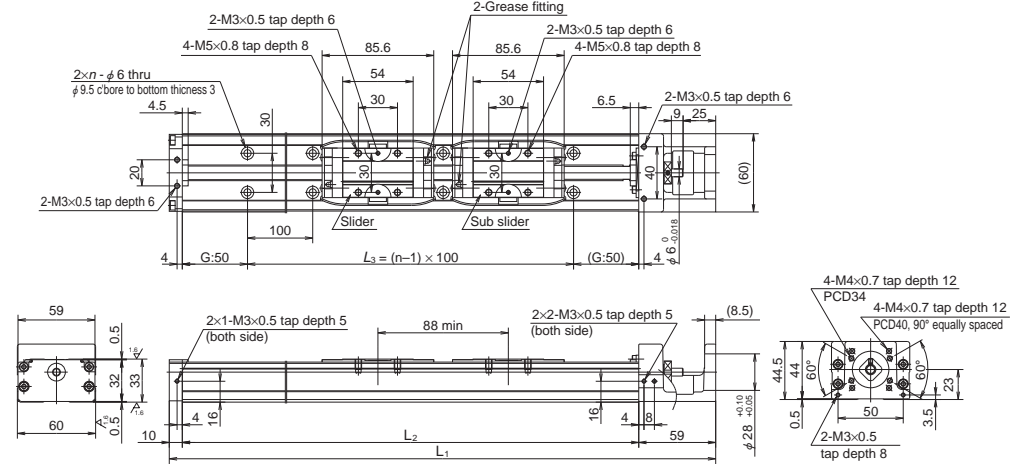
Lead $l$ (mm)	Shaft dia $d$ (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
		Ball screw $C_a$	Linear guides $C$	Support unit $C_a$	Rated running distance $L_a$ (km)	Ball screw $C_{0a}$	Linear guides $C_0$	
5	$\phi 12$	3 000 (High grade)	22 800	4 400	5	5 410 (High grade)	16 300	1 450
		3 760 (Precision)				6 310 (Precision)		
10	$\phi 12$	1 930 (High grade)	18 100	4 400	10	3 160 (High grade)	16 300	1 450
		2 260 (Precision)				3 780 (Precision)		
20	$\phi 12$	1 930 (High grade)	14 400	4 400	20	3 160 (High grade)	16 300	1 450
		2 260 (Precision)				3 780 (Precision)		

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{VO}$
Single	335	133	133

MCH06 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCH06 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)				Inertia $\times 10^{-6}(\text{kg} \cdot \text{m}^2)$	Mass (kg)
				$L_1$	$L_2$	$L_3$	$n$		
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	

Monocarrier dynamic torque specification (N · cm)

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

- Frictional resistance of NSK K1 is included in dynamic torque in 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	$\phi 12$	3 000 (High grade)	22 800	4 400	5	5 410 (High grade)	16 300	1 450
		3 760 (Precision)				6 310 (Precision)		
10	$\phi 12$	1 930 (High grade)	18 100	4 400	10	3 160 (High grade)	16 300	1 450
		2 260 (Precision)				3 780 (Precision)		
20	$\phi 12$	1 930 (High grade)	14 400	4 400	20	3 160 (High grade)	16 300	1 450
		2 260 (Precision)				3 780 (Precision)		

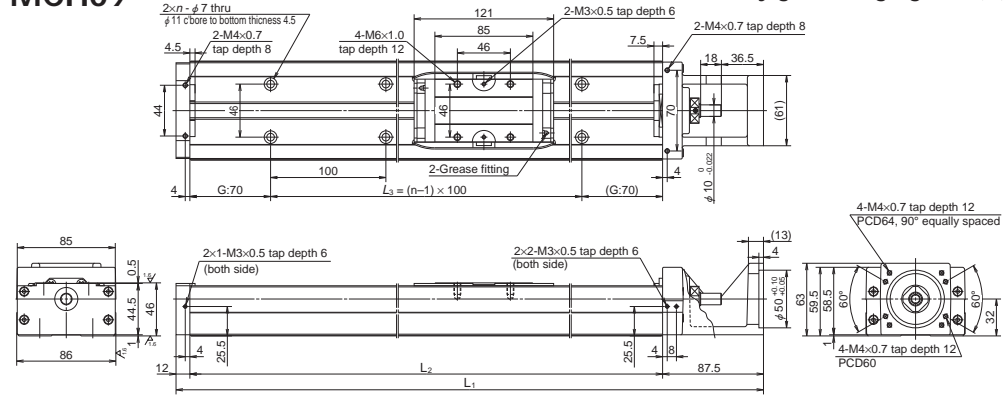
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling $M_{RO}$	Pitching $M_{PO}$	Yawing $M_{VO}$
Double	770	730	730



MCH09

Accuracy grade: High grade (H)



Dimension of MCH09 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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		
MCH09010H05K	100	107 (121)	5	339.5	240	100	2	9.2	5.0
MCH09010H10K			10					10.7	
MCH09010H20K			20					16.8	
MCH09020H05K	200	207 (221)	5	439.5	340	200	3	12.4	6.5
MCH09020H10K			10					13.9	
MCH09020H20K			20					20.0	
MCH09030H05K	300	307 (321)	5	539.5	440	300	4	15.6	8.1
MCH09030H10K			10					17.1	
MCH09030H20K			20					23.2	
MCH09040H05K	400	407 (421)	5	639.5	540	400	5	18.8	9.7
MCH09040H10K			10					20.3	
MCH09040H20K			20					26.4	
MCH09050H05K	500	507 (521)	5	739.5	640	500	6	22.0	11
MCH09050H10K			10					23.5	
MCH09050H20K			20					29.6	
MCH09060H05K	600	607 (621)	5	839.5	740	600	7	25.2	13
MCH09060H10K			10					26.7	
MCH09060H20K			20					32.8	
MCH09070H05K	700	707 (721)	5	939.5	840	700	8	28.4	14.5
MCH09070H10K			10					30.0	
MCH09070H20K			20					36.0	
MCH09080H05K	800	807 (821)	5	1 039.5	940	800	9	31.6	16
MCH09080H10K			10					33.2	
MCH09080H20K			20					39.2	

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	Notes:	
	5	1.0 – 5.9
	10	2.0 – 7.8
20	2.0 – 10.8	

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

Basic load rating

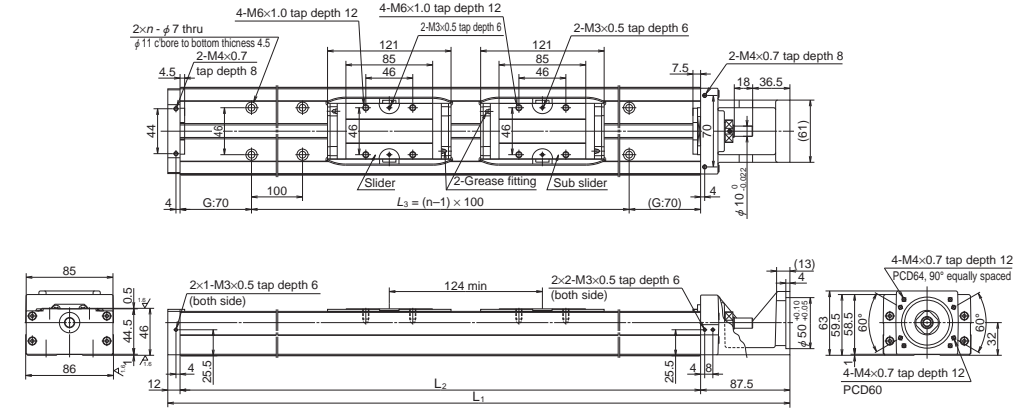
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
		Ball screw C <sub>a</sub>	Linear guides C	Support unit C <sub>a</sub>	Rated running distance L <sub>a</sub> (km)	Ball screw C <sub>0a</sub>	Linear guides C <sub>0</sub>	
5	φ 15	6 820 (High grade)	40 600	7 100	5	13 200 (High grade)	30 500	3 040
		7 100 (Precision)				13 000 (Precision)		
10		5 110 (High grade)	32 200		10	9 290 (High grade)		
		7 060 (Precision)				12 700 (Precision)		
20	3 290 (High grade)	25 500	20	5 620 (High grade)				
	4 560 (Precision)			7 750 (Precision)				

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>VO</sub>
Single	890	385	385

MCH09 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCH09 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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		
MCH09015H05D	150	183 (211)	5	539.5	440	300	4	16.1	8.9
MCH09015H10D			10					19.2	
MCH09025H05D	250	283 (311)	5	639.5	540	400	5	19.3	11
MCH09025H10D			10					22.4	
MCH09035H05D	350	383 (411)	5	739.5	640	500	6	22.5	12
MCH09035H10D			10					25.6	
MCH09045H10D	450	483 (511)	10	839.5	740	600	7	28.8	14
MCH09045H20D			20					40.9	
MCH09065H10D	650	683 (711)	10	1 039.5	940	800	9	35.2	17
MCH09065H20D			20					47.3	

Monocarrier dynamic torque specification (N · cm)

Ball screw lead (mm)	Notes:	
	5	1.5 – 7.0
	10	2.5 – 10.8
20	4.0 – 17.2	

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

Basic load rating

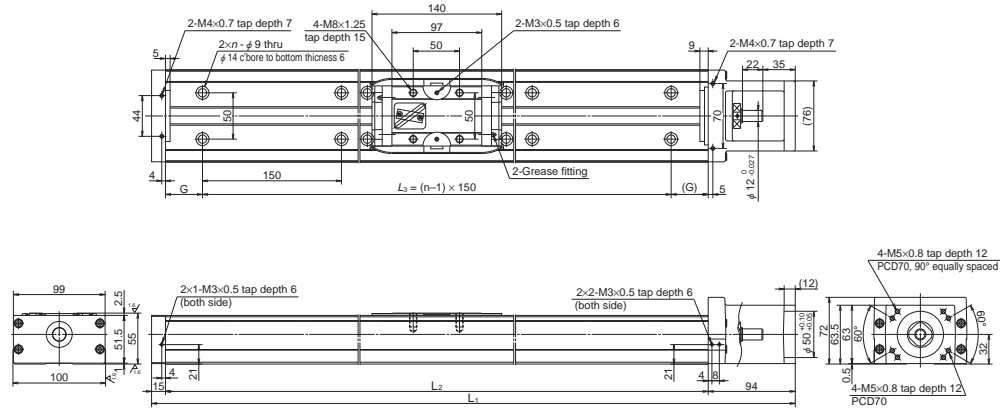
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
		Ball screw C <sub>a</sub>	Linear guides C	Support unit C <sub>a</sub>	Rated running distance L <sub>a</sub> (km)	Ball screw C <sub>0a</sub>	Linear guides C <sub>0</sub>	
5	φ 15	6 820 (High grade)	40 600	7 100	5	13 200 (High grade)	30 500	3 040
		7 100 (Precision)				13 000 (Precision)		
10		5 110 (High grade)	32 200		10	9 290 (High grade)		
		7 060 (Precision)				12 700 (Precision)		
20	3 290 (High grade)	25 500	20	5 620 (High grade)				
	4 560 (Precision)			7 750 (Precision)				

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>VO</sub>
Double	1 780	2 070	2 070

MCH10

Accuracy grade: High grade (H)



Dimension of MCH10 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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		
MCH10010H10K	100	126	10	389	280	65	150	2	33.2	7.3
MCH10010H20K		(142)	20						41.1	
MCH10020H10K	200	226	10	489	380	40	300	3	43.4	9.5
MCH10020H20K		(242)	20						51.3	
MCH10030H10K	300	326	10	589	480	15	450	4	53.7	12
MCH10030H20K		(342)	20						61.6	
MCH10040H10K	400	426	10	689	580	65	450	4	62.4	14
MCH10040H20K		(442)	20						71.8	
MCH10050H10K	500	526	10	789	680	40	600	5	74.7	16
MCH10050H20K		(542)	20						82.3	
MCH10060H10K	600	626	10	889	780	15	750	6	84.9	19
MCH10060H20K		(642)	20						92.5	
MCH10070H10K	700	726	10	989	880	65	750	6	95.1	21
MCH10070H20K		(742)	20						103	
MCH10080H10K	800	826	10	1 089	980	40	900	7	105	23
MCH10080H20K		(842)	20						113	
MCH10090H10K	900	926	10	1 189	1 080	15	1 050	8	116	25
MCH10090H20K		(942)	20						123	
MCH10100H10K	1 000	1 026	10	1 289	1 180	65	1 050	8	126	27
MCH10100H20K		(1 042)	20						133	
MCH10110H10K	1 100	1 126	10	1 389	1 280	40	1 200	9	136	29
MCH10110H20K		(1 142)	20						143	
MCH10120H10K	1 200	1 226	10	1 489	1 380	15	1 350	10	146	32
MCH10120H20K		(1 242)	20						154	

Monocarrier dynamic torque specification (N · cm)

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

Notes:

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

Basic load rating

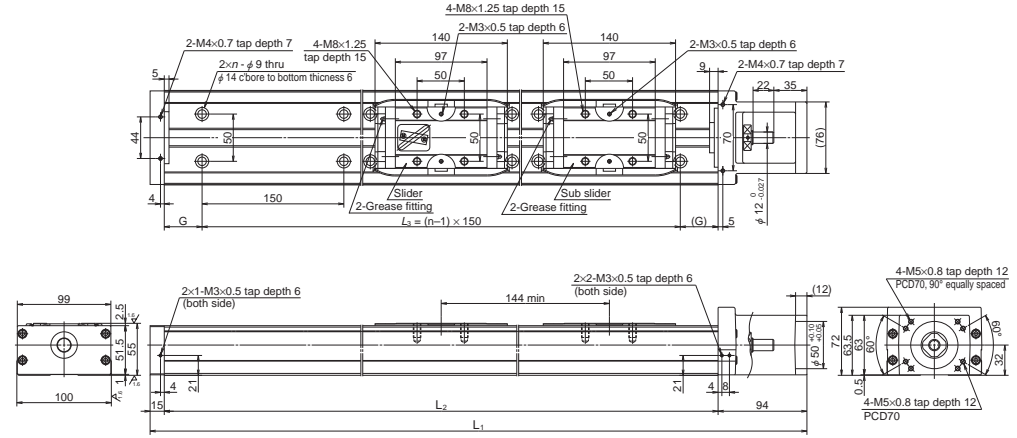
Lead (mm)	Shaft dia (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
		Ball screw C <sub>a</sub>	Linear guides C	Support unit C <sub>a</sub>	Rated running distance L <sub>a</sub> (km)	Ball screw C <sub>0a</sub>	Linear guides C <sub>0</sub>	
10	φ20	8 230 (High grade)	44 600	7 600	10	17 100 (High grade)	42 000	3 380
		10 900 (Precision)				21 700 (Precision)		
20	φ20	5 300 (High grade)	35 400	7 600	20	10 300 (High grade)	42 000	3 380
		7 060 (Precision)				12 700 (Precision)		

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>VO</sub>
Single	1 460	610	610

MCH10 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCH10 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	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	10	689	580	65	450	4	67.1	15
MCH10025H20D		(314)	20						82.4	
MCH10035H10D	350	382	10	789	680	40	600	5	77.3	17
MCH10035H20D		(414)	20						92.5	
MCH10045H10D	450	482	10	889	780	15	750	6	87.5	20
MCH10045H20D		(514)	20						103	
MCH10055H10D	550	582	10	989	880	65	750	6	97.7	22
MCH10055H20D		(614)	20						113	
MCH10065H10D	650	682	10	1 089	980	40	900	7	108	24
MCH10065H20D		(714)	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

Monocarrier dynamic torque specification (N · cm)

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

Notes:

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

Basic load rating

Lead (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>	
10	φ20	8 230 (High grade)	44 600	7 600	10	17 100 (High grade)	42 000	3 380
		10 900 (Precision)				21 700 (Precision)		
20	φ20	5 300 (High grade)	35 400	7 600	20	10 300 (High grade)	42 000	3 380
		7 060 (Precision)				12 700 (Precision)		

Basic static moment load of linear guide

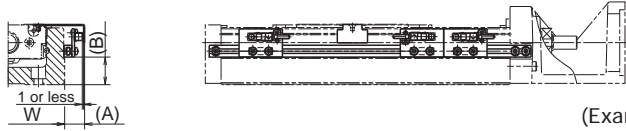
Slider	Basic static moment load (N · m)		
	Rolling M <sub>RO</sub>	Pitching M <sub>PO</sub>	Yawing M <sub>VO</sub>
Double	2 920	3 430	3 430

### 3.3 MCH Series Option Part

#### 3.3.1 Sensor Unit

##### ● Proximity switch

Sensor rail is not included in a sensor unit.



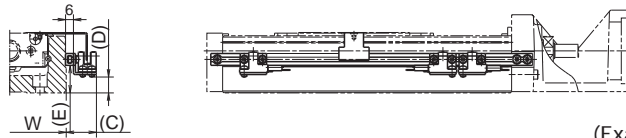
(Example of assembly)

Model No.	Reference No.			A (mm)	B (mm)	Body width W (mm)
MCH06	MC-SRH06-10	MC-SRH06-11	MC-SRH06-12	17	10	60
MCH09	MC-SRH09-10	MC-SRH09-11	MC-SRH09-12	16	21	86
MCH10	MC-SRH10-10	MC-SRH10-11	MC-SRH10-12	16	16	100
Quantity	Proximity switch (normally open contact)	—	3	1	E2S-W13 (OMRON Corp.)	
	Proximity switch (normally close contact)	3	—	2	E2S-W14 (OMRON Corp.)	

Notes: 1. See page 21 for proximity switch specifications. 2. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.

##### ● Photo sensor

Sensor rail is not included in a sensor unit.



(Example of assembly)

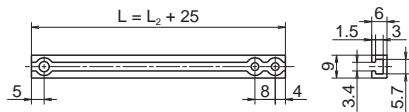
Model No.	Reference No.	C (mm)	D (mm)	E (mm)	Body width W (mm)	Remarks
MCH06	MC-SRH06-13	24	2	11	60	EE-SX674 (OMRON Corp.) 3 sets (EE-1001 connector attachment)
MCH09	MC-SRH09-13	23	12	21	86	
MCH10	MC-SRH10-13	23	29	16	100	

Notes: 1. See page 22 for proximity switch specifications. 2. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.

#### (1) Sensor rail

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

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



Note: For combinations of sensors and rails, see page 80.

### Body of MCH Series and Sensor Rail Combination Table

Table 4

Model No.	Body length $L_2$ (mm)	Reference No.	Sensor rail reference No.	
MCH06	150	MCH06005H05K MCH06005H10K MCH06005H20K	MC-SRL-0150	
	200	MCH06010H05K MCH06010H10K MCH06010H20K	MC-SRL-0200	
	300	MCH06020H05K MCH06020H10K MCH06020H20K	MC-SRL-0300	
MCH06	400	MCH06030H05K MCH06030H10K MCH06030H20K MCH06020H05D MCH06020H10D MCH06020H10D	MC-SRL-0400	
	500	MCH06040H05K MCH06040H10K MCH06040H20K MCH06030H05D MCH06030H10D MCH06030H10D	MC-SRL-0500	
	600	MCH06050H05K MCH06050H10K MCH06050H20K MCH06040H10D MCH06040H20D MCH06040H20D	MC-SRL-0600	
	150	MCL06005H05K MCL06005H10K	MC-SRL-0150	
	200	MCL06010H05K MCL06010H10K	MC-SRL-0200	
	300	MCL06020H05K MCL06020H10K	MC-SRL-0300	
MCH06	400	MCL06030H10K MCL06030H20K	MC-SRL-0400	
	500	MCL06040H10K MCL06040H20K	MC-SRL-0500	
	600	MCL06050H10K MCL06050H20K	MC-SRL-0600	
MCH09	240	MCH09010H05K MCH09010H10K MCH09010H20K	MC-SRL-0240	
	340	MCH09020H05K MCH09020H10K MCH09020H20K	MC-SRL-0340	
	440	MCH09030H05K MCH09030H10K MCH09030H20K MCH09015H05D MCH09015H10D	MC-SRL-0440	
	540	MCH09040H05K MCH09040H10K MCH09040H20K MCH09025H05D MCH09025H10D	MC-SRL-0540	
	640	MCH09050H05K MCH09050H10K MCH09050H20K MCH09035H05D MCH09035H10D	MC-SRL-0640	
	740	MCH09060H05K MCH09060H10K MCH09060H20K MCH09045H10D MCH09045H20D	MC-SRL-0740	
	MCH10	840	MCH09070H05K MCH09070H10K MCH09070H20K	MC-SRL-0840
		940	MCH09080H05K MCH09080H10K MCH09080H20K MCH09065H10D MCH09065H20D	MC-SRL-0940
		280	MCH10010H10K MCH10010H20K	MC-SRL-0280
		380	MCH10020H10K MCH10020H20K	MC-SRL-0380
480		MCH10030H10K MCH10030H20K	MC-SRL-0480	
580		MCH10040H10K MCH10025H10D	MC-SRL-0580	
680		MCH10050H10K MCH10050H20K MCH10035H10D MCH10035H20D	MC-SRL-0680	
780		MCH10060H10K MCH10060H20K MCH10045H10D MCH10045H20D	MC-SRL-0780	
880		MCH10070H10K MCH10070H20K MCH10055H10D MCH10055H20D	MC-SRL-0880	
980		MCH10080H10K MCH10080H20K MCH10065H10D MCH10065H20D	MC-SRL-0980	
1 080	MCH10090H10K MCH10090H20K MCH10075H20D	MC-SRL-1080		
1 180	MCH10100H10K MCH10100H20K MCH10085H20D	MC-SRL-1180		
1 280	MCH10110H10K MCH10110H20K MCH10095H20D	MC-SRL-1280		
1 380	MCH10120H10K MCH10120H20K MCH10105H20D	MC-SRL-1380		

### 3.3.2 Cover Unit

#### Cover unit for MCH06 and MCL06

4-M5×0.8 tap thru

54  
30

0.3  
1.5  
2  
1.5

74

86  
64  
62

13.5  
48  
34.5

L

Unit: mm

Single slider		Double slider		Top cover length L
Stroke	Reference No.	Stroke	Reference No.	
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

4-M5×0.8 tap thru

81  
46  
30

4-M6×1.0 tap thru

0.9  
2.5  
6

112  
88  
85

68  
46  
22

100

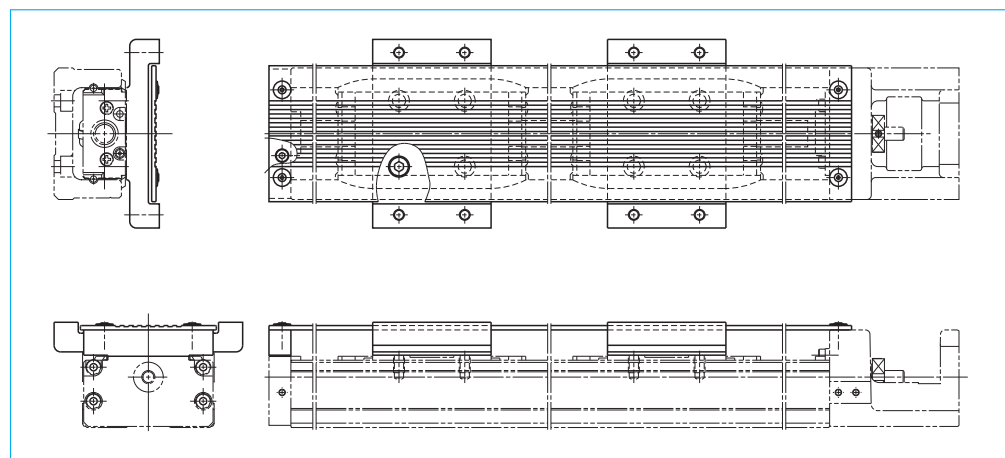
L

Unit: mm

Single slider		Double slider		Top cover length L
Stroke	Reference No.	Stroke	Reference No.	
100	MC-HV09010-00	-	-	264
200	MC-HV09020-00	-	-	364
300	MC-HV09030-00	150	MC-HV09015D00	464
400	MC-HV09040-00	250	MC-HV09025D00	564
500	MC-HV09050-00	350	MC-HV09035D00	664
600	MC-HV09060-00	450	MC-HV09045D00	764
700	MC-HV09070-00	-	-	864
800	MC-HV09080-00	650	MC-HV09065D00	964

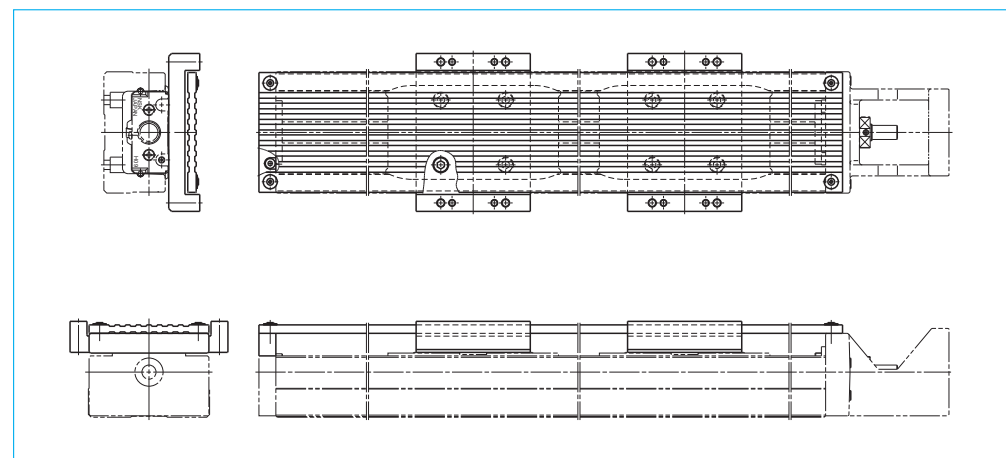
#### ● Cover unit for double sliders

Two spacers are provided for double slider.

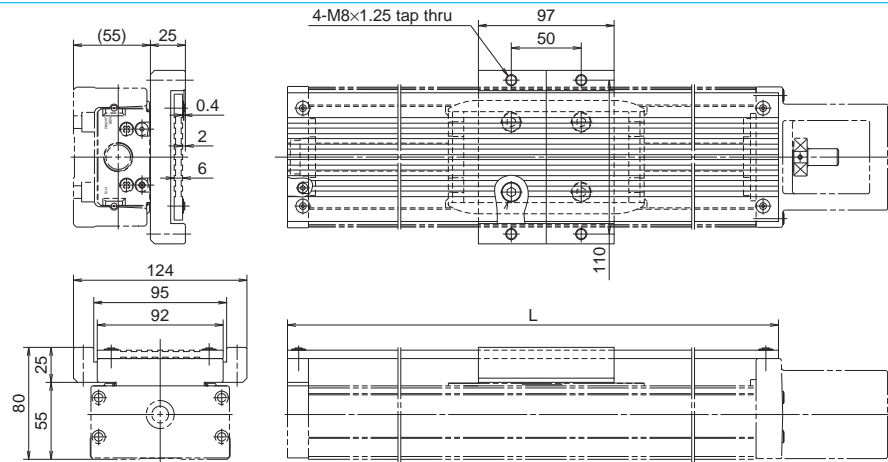


#### ● Cover unit for double sliders

Two spacers are provided for double slider.



Cover unit for MCH10

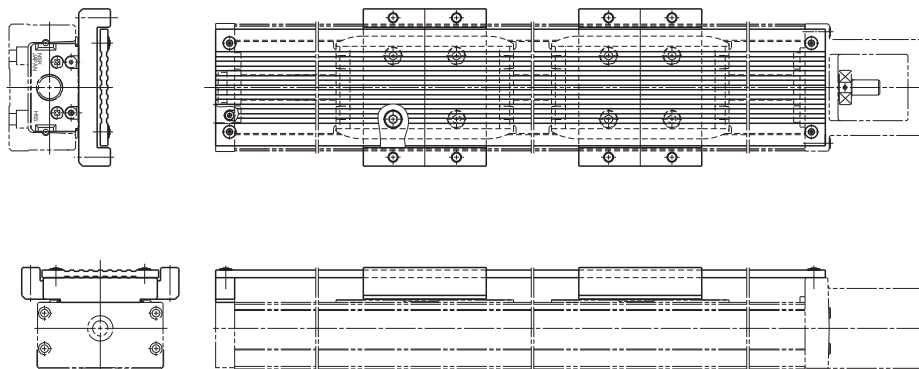


Unit: mm

Single slider		Double slider		Top cover length L
Stroke	Reference No.	Stroke	Reference No.	
100	MC-HV10010-00	-	-	310
200	MC-HV10020-00	-	-	410
300	MC-HV10030-00	-	-	510
400	MC-HV10040-00	250	MC-HV10025D00	610
500	MC-HV10050-00	350	MC-HV10035D00	710
600	MC-HV10060-00	450	MC-HV10045D00	810
700	MC-HV10070-00	550	MC-HV10055D00	910
800	MC-HV10080-00	650	MC-HV10065D00	1 010
900	MC-HV10090-00	750	MC-HV10075D00	1 110
1000	MC-HV10100-00	850	MC-HV10085D00	1 210
1100	MC-HV10110-00	950	MC-HV10095D00	1 310
1200	MC-HV10120-00	1050	MC-HV10105D00	1 410

●Cover unit for double sliders

Two spacers are provided for double slider.

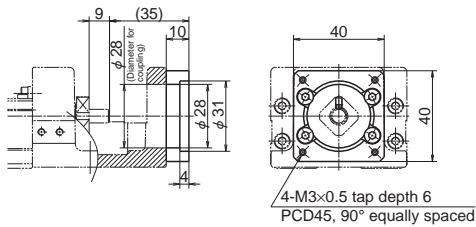


### 3.3.3 Intermediate Plate for Motor

- Please ask NSK about motors not listed in compatible motor list.
- In case of parallel motor mount, please consult with NSK. ● Be sure to align centerlines when installing motor.
- Motor models are subject to change at the motor manufacturers. For details, please contact the manufacturer.

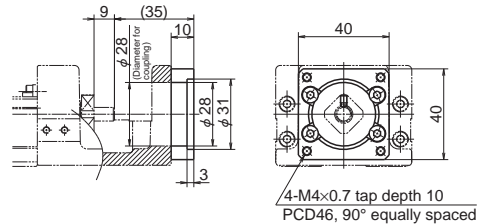
#### Motor Bracket for MCH06 and MCL06

Reference number: MC-BKH06-145-00



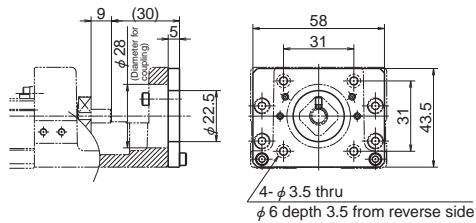
Compatible motor	
Maker	Motor models
Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)

Reference number: MC-BKH06-146-00



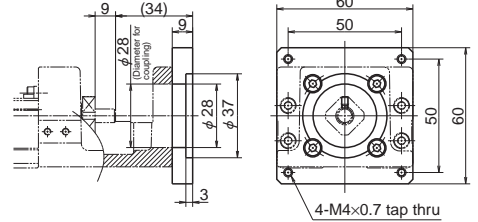
Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMJV-A5A(50W), SGMVA-A5A(50W) SGMJV-01A(100W), SGMVA-01A(100W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W) HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W) HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W),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

Reference number: MC-BKH06-231-00



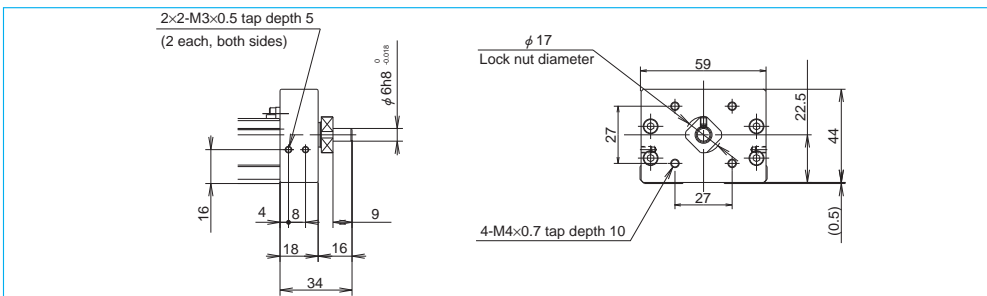
Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x, UMK24x, CSK24x, PK24x
Sanyo Denki Co., Ltd.	PBM423xxx, 103F55xx

Reference number: MC-BKH06-250-00



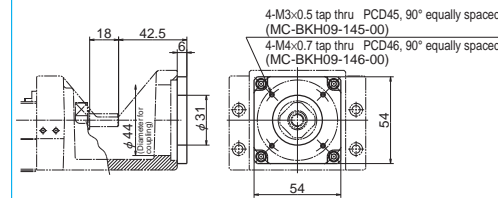
Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x, CSK56x, CFK56x
OMRON Corp.	MUMS02(200W), MUMS04(400W)
Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx, 103F78xx

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



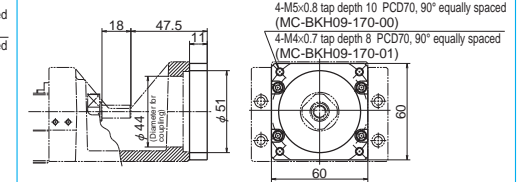
#### Motor Bracket for MCH09

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



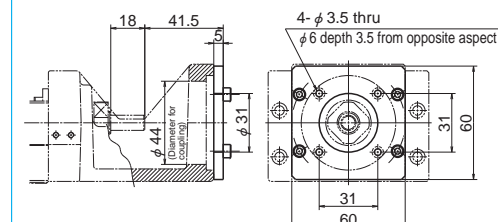
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH09-145-00	Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)
MC-BKH09-146-00	Yaskawa Electric Corp.	SGMJV-ASA(50W), SGMVA-ASA(50W) SGMJV-01A(100W), SGMVA-01A(100W)
	Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W) HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W) HC-KFS13(100W), HC-MFS13(100W)
MC-BKH09-146-00	OMRON Corp.	R88M-W05(50W), R88M-W10(100W)
	Sanyo Denki Co., Ltd.	P30B04xxx P Series

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



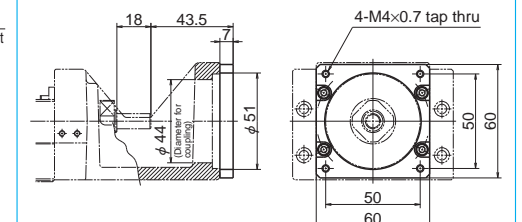
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH09-170-00	Yaskawa Electric Corp.	SGMJV-02A(200W), SGMVA-02A(200W) SGMJV-04A(400W), SGMVA-04A(400W)
	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W) HF-MP43(400W), HC-KFS23(200W), HC-MFS23(200W) HC-KFS43(400W), HC-MFS43(400W)
MC-BKH09-170-01	OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
	Sanyo Denki Co., Ltd.	P30B06xxx P Series
MC-BKH09-170-01	OMRON Corp.	R88M-W05(50W), R88M-W10(100W)
	Sanyo Denki Co., Ltd.	MSMD02(200W), MSMA02(200W) MSMA04(400W), MSMD04(400W)

Reference number: MC-BKH09-231-00



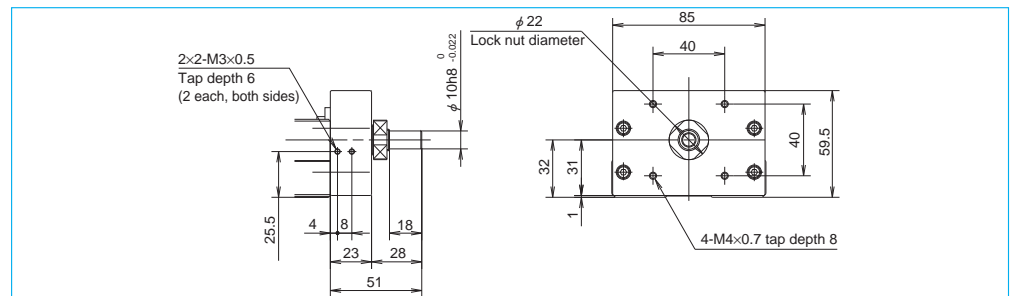
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM423xxx, 103F55xx
Oriental Motor Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x UMK24x, CSK24x, PK24x

Reference number: MC-BKH09-250-00



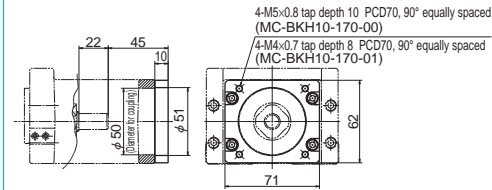
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x CSK56x, CFK56x

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



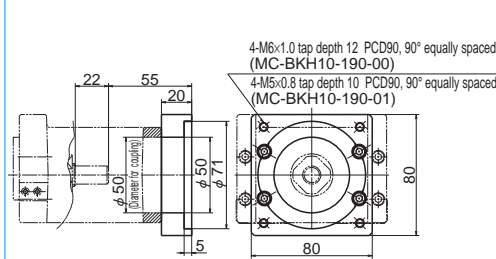
Motor Bracket for MCH10

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



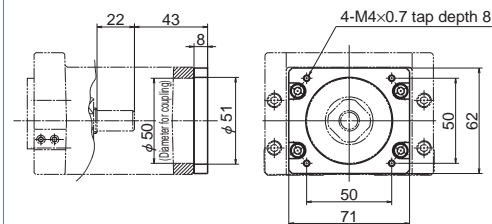
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH10-170-00	Yaskawa Electric Corp.	SGMJV-02A(200W), SGMJV-02A(200W) SGMJV-04A(400W), SGMJV-04A(400W)
	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W) HF-MP43(400W), HC-KFS23(200W), HC-MFS23(200W) HC-KFS43(400W), HC-MFS43(400W)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

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



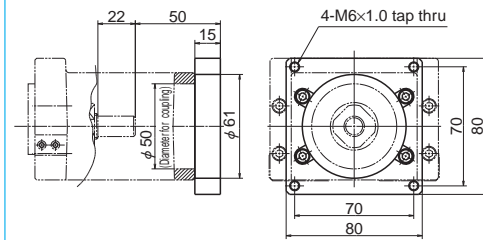
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH10-190-00	Mitsubishi Electric Corp.	HC-KFS73(750W), HC-MFS73(750W) HF-KP73(750W), HF-MP73(750W)
MC-BKH10-190-01	Sanyo Denki Co., Ltd.	P50B07xxx P Series

Reference number: MC-BKH10-250-00



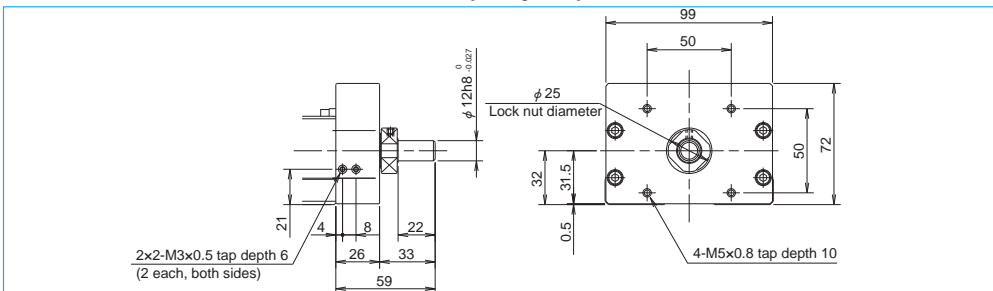
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, PK56x, CSK56x, CFK56x UMK56x, UFK56x

Reference number: MC-BKH10-270-00



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

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



Motor Availability Table of Intermediate Plate for MCH Series

Table 5

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