

Miniature Monocarrier® MCM02, MCM03

Supports small conveyors and test equipment in a wide range of applications.
Compact, lightweight design saves space and delivers high performance.



Patent Pending



Lightweight, space-saving structure made possible through compact design. These all-in-one Monocarriers are easy to use and provide high accuracy and rigidity.

Monocarriers are used in a variety of applications, including production, inspection, packaging and conveyance systems. Already recognized in the industry for improving efficiency and reducing labor, Monocarriers have been increasingly in demand to meet a growing range of needs. NSK has been developing a wide range of Monocarriers, making full use of its world-class technologies in ball screws and linear guides. To meet demand for smaller, lighter Monocarriers, NSK developed the MCM02 and MCM03, a series of compact Monocarriers that realizes unprecedented lightweight and space-saving features. In addition, these Monocarriers feature NSK’s state-of-the art technologies, such as a long life, maintenance-free NSK K1™ lubrication unit, an all-in-one structure for easy use, and high accuracy and rigidity, earning the product line a reputation for outstanding reliability. These small and lightweight Monocarriers are consequently well equipped to meet specific needs.

Monocarrier® MCM02, MCM03

Stroke and lead of products with standard specification
 (● mark: standard inventory, mark: made to order) Unit: mm

Reference number	MCM02				MCM03					
	1		2		1	2	10		12	
	High grade	Precision grade	High grade	Precision grade	Precision grade		High grade	Precision grade	High grade	Precision grade
Stroke										
50	●		●		●	●	—	—	—	—
100	●		●		●	●	●		●	
150	●		●							
200	—	—	—	—	—	—	●			
250	—	—	—	—	—	—				

Features

1. Lightweight, compact design

Integration of components minimizes cross-sectional dimensions, while reducing weight by one-half compared to existing combination units (single-axis tables). This compact design meets the demand for lighter weight and saving more space.

2. All-in-one structure

The all-in-one structure, integrating ball screw and linear guide into a single unit, significantly reduces workload for design and installation.

3. Long-term, maintenance-free operation

The NSK K1™ lubrication unit is incorporated into the guide and ball screw parts for the Monocarrier MCM02 and MCM03. The use of the NSK K1™ lubrication unit maintains smooth lubrication performance for long periods in mechanical environments where lubrication is difficult to apply, such as machinery and equipment for food processing and medical applications requiring a highly clean environment, thus enabling maintenance-free operation over an extended period of time.

4. Available in small and large ball screw leads

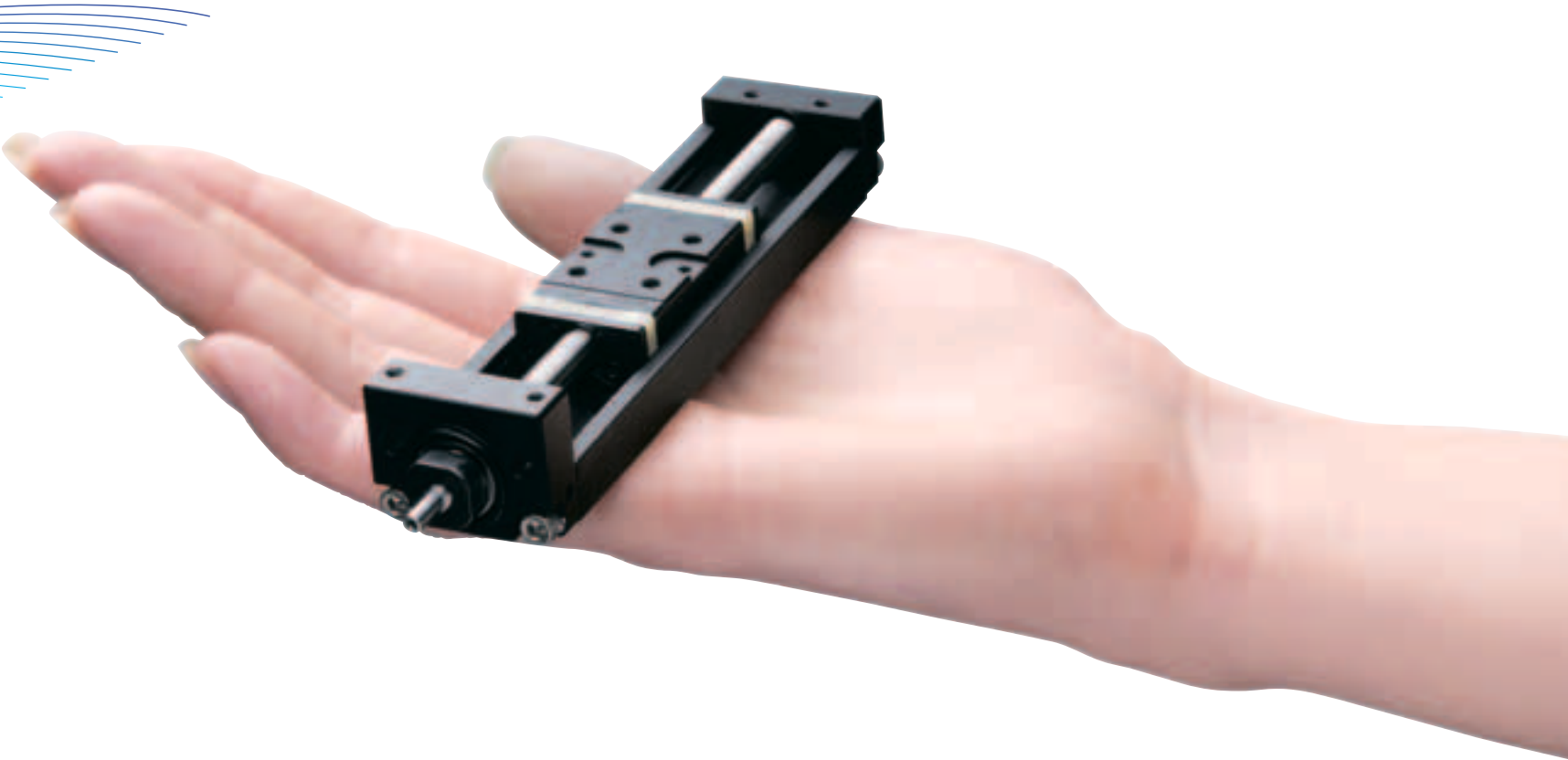
A range of standard sizes is available between 1 millimeter small lead to 12 millimeter large lead.

5. Anticorrosion feature

Special surface treatment is provided as a standard feature to prevent corrosion under various operating conditions.

6. High accuracy and rigidity

The concave main base, although lightweight, resists bending and can be used as cantilever beams. The structure, composed of several rolling elements, reduces friction and provides higher positioning accuracy.



Reference number coding

The Monocarrier reference number is composed of the main basic specifications.

Example:

MC

M

02

010

H

01

K

Monocarrier

Series (M: MCM type)

Nominal size (rail width, unit: 10 mm)

Stroke (unit: 10 mm)

K: Single slider
D: Double slider (made to order)

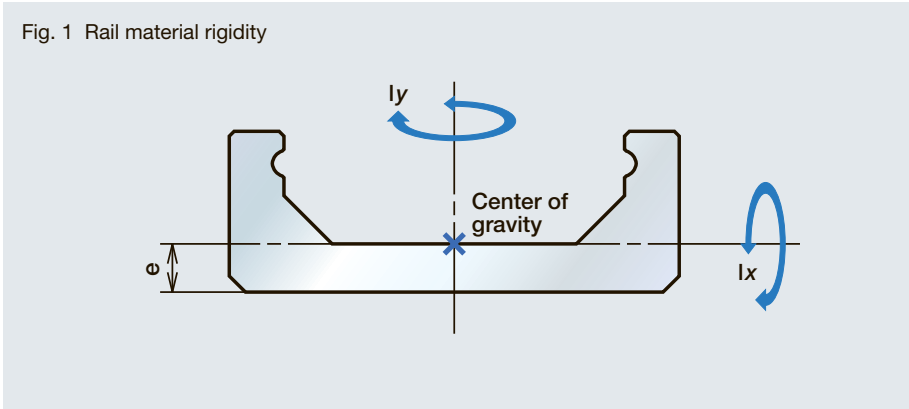
Ball screw lead (mm)

Accuracy grade:
H: high grade
P: precision grade

Monocarrier rigidity

Rail material rigidity

The Monocarrier MCM02 and MCM03 rail features a special concave shape with a small space to maintain high resistance to deflection and distortion. The geometrical moment of inertia of rail area in each direction is shown in Fig. 1.

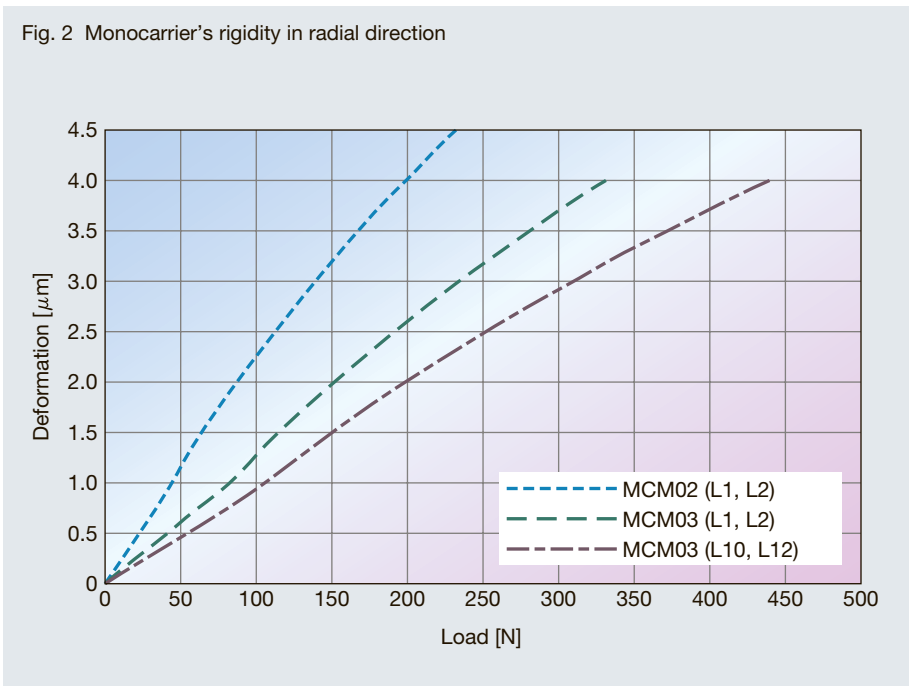


●Rail material rigidity

	Geometrical moment of inertia [mm ⁴]		Center of gravity [mm]
	l_x	l_y	e
MCM02	9.71×10^2	1.32×10^4	3.3
MCM03	0.30×10^4	3.30×10^4	4.5

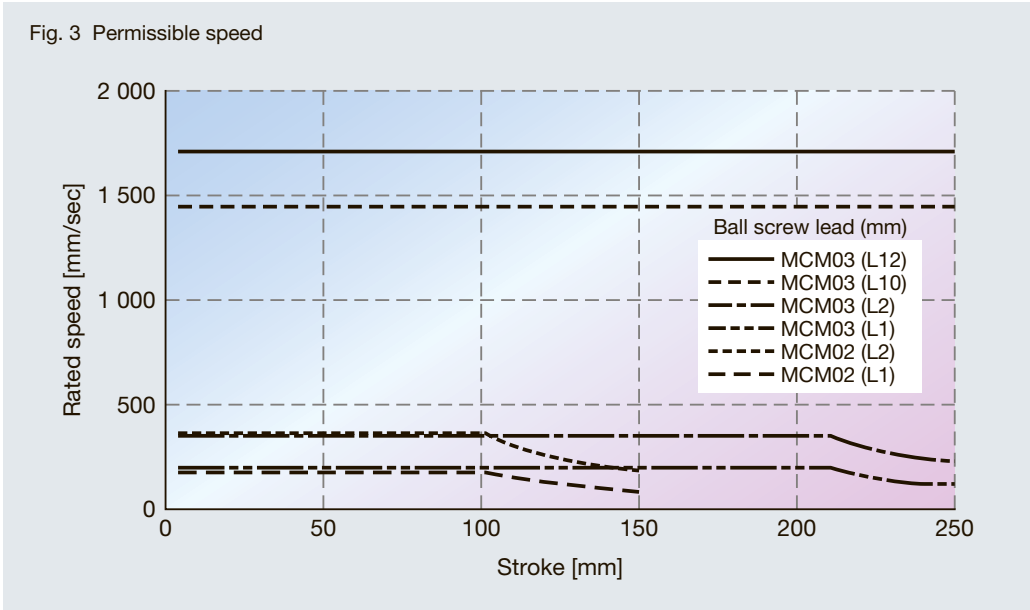
Rigidity in radial direction

NSK has succeeded in fully eliminating clearance of the Monocarrier’s linear guide at micron-meter processing accuracy through its own high-precision processing technique. The linear guide has virtually no clearance and exhibits the load/deformation characteristics shown in Fig. 2.



Permissible speed

The relationship in permissible speed between rated speed and stroke is shown as follows:



Accuracy standard

MCM02 unit: μm

Stroke [mm]	High grade [H]			Precision grade [P]			
	Repeatability positioning accuracy	Running parallelism (vertical)	Backlash	Repeatability positioning accuracy	Running parallelism (vertical)	Backlash	Positioning accuracy
50	± 10	14	20 or less	± 3	8	3 or less	20
100							
150							

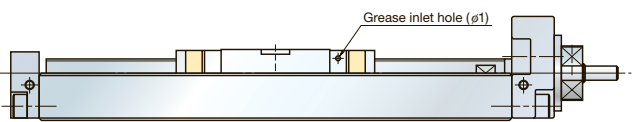
MCM03 unit: μm

Stroke [mm]	High grade [H]			Precision grade [P]			
	Repeatability positioning accuracy	Running parallelism (vertical)	Backlash	Repeatability positioning accuracy	Running parallelism (vertical)	Backlash	Positioning accuracy
50	± 10	14	20 or less	± 3	8	3 or less	20
100							
150							
200							
250							

Load factor

Model numbers	MCM02		MCM03			
	1	2	1	2	10	20
ϵ_R	95.2		79.4		79.4	
ϵ_P	174		113.9		84.2	
ϵ_V	174		113.9		84.2	

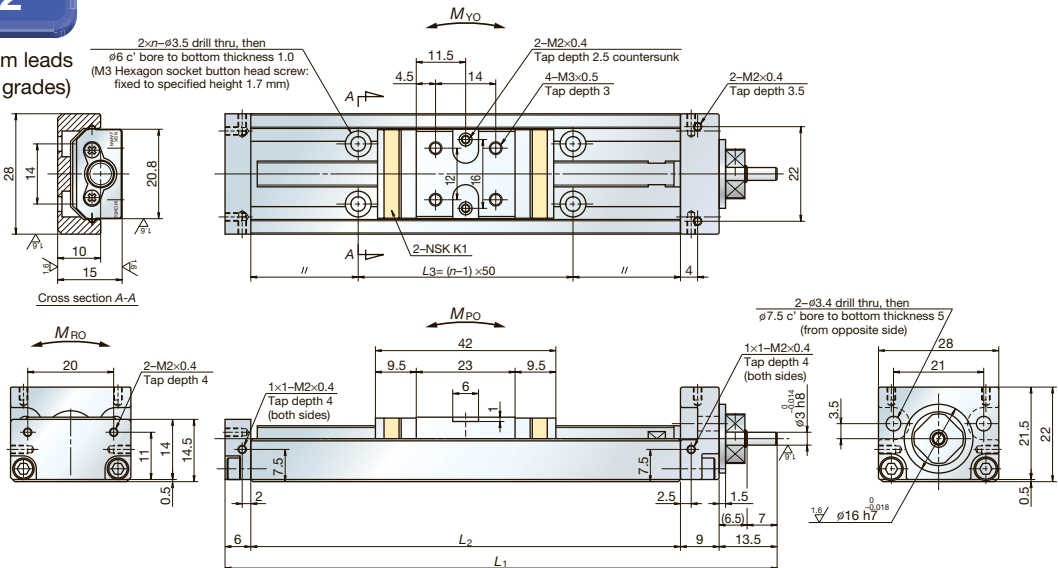
Guide for grease replenishment (for MCM02)



When packing grease into the unit, apply it directly to the rail groove or ball screw groove or use a grease gun or similar tool to pack it into the grease inlet hole located on the side of end cap (as shown above). Generally, the applied area must be filled with grease to the point where a small amount of supplied grease is discharged around the area surrounding the ball slide.

Monocarrier® MCM02, MCM03

For 1-mm and 2- mm leads
(high and precision grades)



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

Ball screw specification

		MCM02				MCM03					
		High grade		Precision grade		High grade		Precision grade			
Lead	[mm]	1	2	1	2	10	12	1	2	10	12
Shaft diameter [mm]		6				8		6		8	
Effective turns of balls		1×2				1.5×1		1×4		1.5×1	
Basic load rating [N]	Dynamic C _a	340		405		1 230		735		1 230	
	Static C _{0a}	555		615		1 690		1 230		1 690	

Linear guide specification

		MCM02		MCM03			
Lead [mm]		1	2	1	2	10	12
Basic load rating [N]	Dynamic C_a	4 910	3 900	10 900	8 650	6 250	5 880
	Static C_{0a}	2 120	2 120	4 900		6 620	
Preload [N]		16		34			
Static moment [N·m]	M_{R0}	24		68		92	
	M_{P0}	8		28		51	
	M_{Y0}	8		28		51	

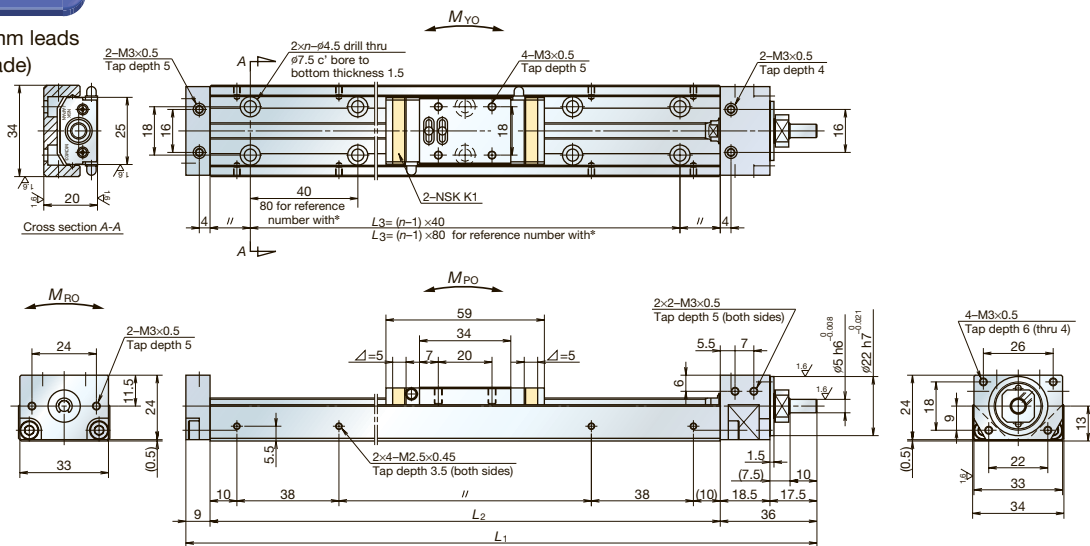
Load rating of support unit

	MCM02	MCM03
Basic dynamic load rating [N]	615	2 670
Basic static load rating [N]	490	1 040

Monocarrier dynamic torque specification

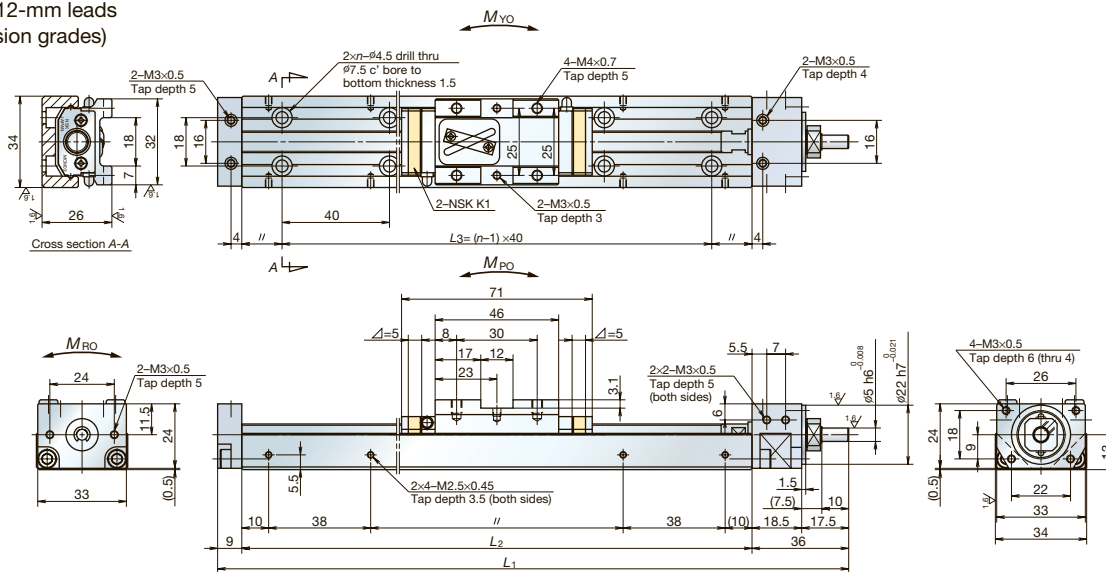
	MCM02				MCM03					
	High grade		Precision		High grade		Precision			
Ball screw lead (mm)	1	2	1	2	10	12	1	2	10	12
	0.1–1.3		0.2–1.6		0.3–3.0		0.2–1.7		0.7–5.0	

For 1-mm and 2-mm leads
(precision grade)



Reference number [model number]	Nominal stroke [mm]	Stroke limit [mm]	Ball screw lead [mm]	Body length [mm]			No. of mounting holes <i>n</i>	Inertia ×10 ⁻⁵ [kg·m ²]	Mass [kg]
				<i>L</i> ₁	<i>L</i> ₂	<i>L</i> ₃			
*MCM03005P01K	50	56	1	160	115	80	2	0.015	0.6
*MCM03005P02K			2					0.016	
MCM03010P01K	100	131	1	235	190	160	5	0.021	0.7
MCM03010P02K			2					0.022	
MCM03015P01K	150	181	1	285	240	200	6	0.025	0.8
MCM03015P02K			2					0.026	

For 10-mm and 12-mm leads
(high and precision grades)



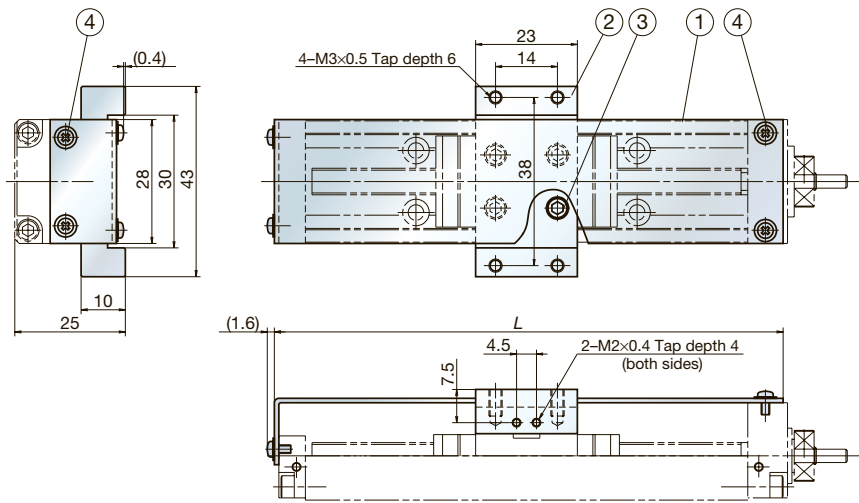
Reference number [model number]	Nominal stroke [mm]	Stroke limit [mm]	Ball screw lead [mm]	Body length [mm]			No. of mounting holes <i>n</i>	Inertia ×10 ⁻⁶ [kg·m ²]	Mass [kg]
				<i>L</i> ₁	<i>L</i> ₂	<i>L</i> ₃			
MCM03010H10K	100	119	10	235	190	160	5	0.092	0.7
MCM03010P10K			12					0.109	
MCM03010H12K									
MCM03010P12K									
MCM03015H10K	150	169		10	285	240	200		6
MCM03015P10K			12	0.122					
MCM03015H12K									
MCM03015P12K									
MCM03020H10K	200	219			10	335	290	240	7
MCM03020P10K			12	0.135					
MCM03020H12K									
MCM03020P12K									
MCM03025H10K	250	269			10	385	340	280	8
MCM03025P10K			12	0.147					
MCM03025H12K									
MCM03025P12K									

Optional Components for MCM02

Monocarrier MCM02 offers optional parts as standard inventory to quickly meet any requirements.

Cover unit

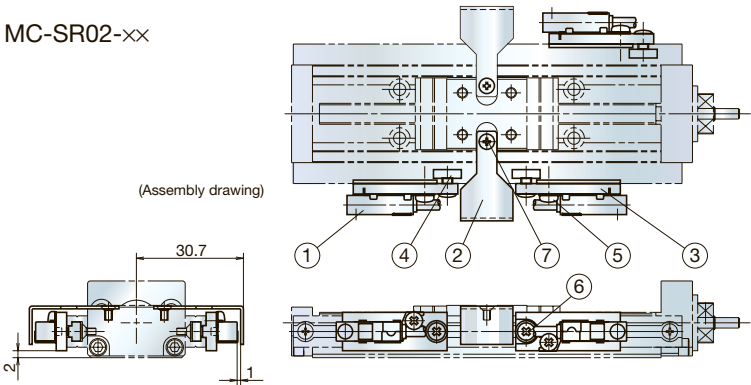
MC-CV020××-00



				Unit: mm		
No.	Part name	Quantity	Remarks	Stroke	Reference number	L
①	Top cover	1		50	MC-CV02005-00	115
②	Spacer	1		100	MC-CV02010-00	165
③	Hexagon socket head cap bolt	4	M3×6	150	MC-CV02015-00	215
④	Cross-recessed pan-head machine screw with flat washer	4	M2×4			

Sensor unit

MC-SR02-××

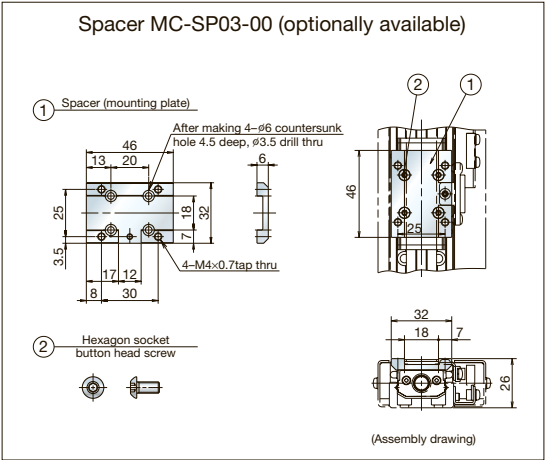
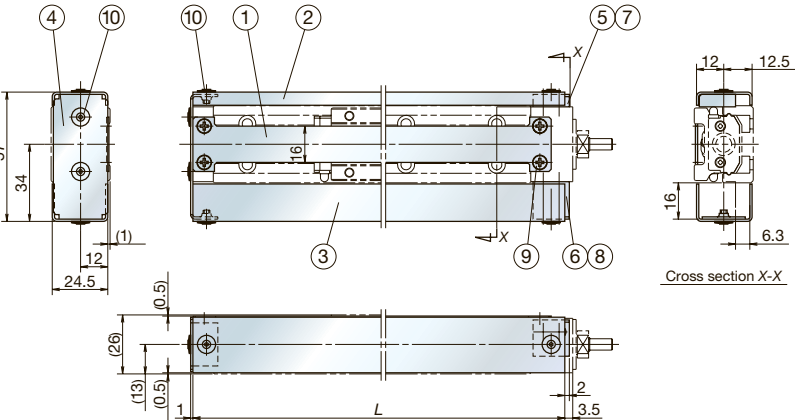


Optional Components for MCM03

Monocarrier MCM03 offers optional parts as standard inventory to quickly meet various requirements.

Cover unit

MC-CV030xx-00



Unit: mm

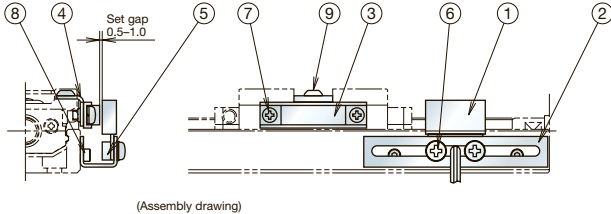
No.	Part name	Quantity per set	Remarks
①	Top cover	1	Baked finish (Black)
②	Side cover	1	
③	Side cover	1	
④	Cover-mounting plate	1	
⑤	Cover-mounting plate	1	Black anodized aluminum
⑥	Cover-mounting plate	1	
⑦	Hexagon socket head cap bolts	2	
⑧	Hexagon socket head cap bolts	2	
⑨	Countersunk-head machine screws	4	
⑩	Hexagon socket-brazier head cap bolts	6	

Strokes	Reference numbers	L
50	MC-CV03005-00	139
100	MC-CV03010-00	214
150	MC-CV03015-00	264
200	MC-CV03020-00	314
250	MC-CV03025-00	364

1. Units that are specified to use 1-mm or 2-mm lead require optional spacer (MC-SP03-00).
2. When a sensor is not required, a symmetrical cover unit (MC-CV03★-00) is available.
In this case, the dimension marked with ★ should be 46 mm.

Sensor unit

MC-SR03-xx



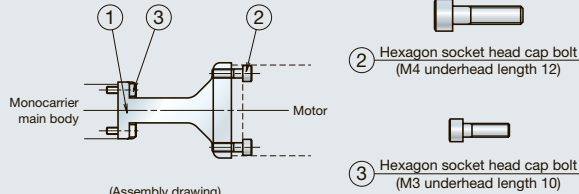
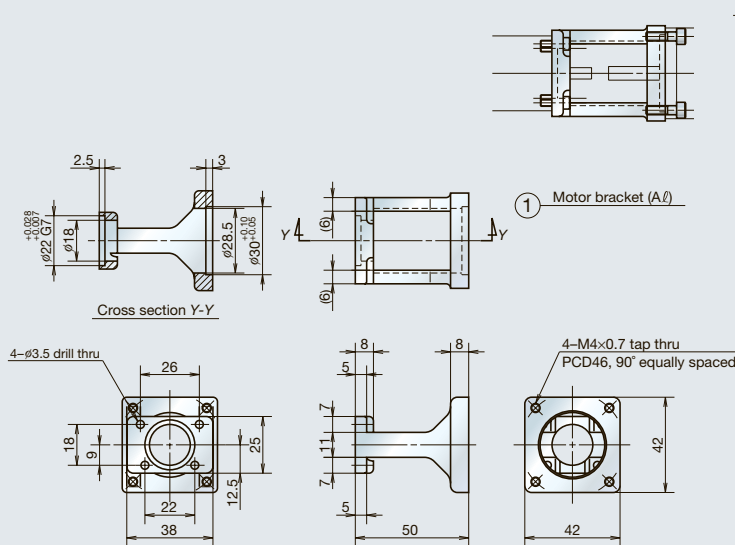
No.	Part name	Quantity			Remarks
		MC-SR02-00	MC-SR03-01	MC-SR03-02	
①	Sensor (a-contact point)		3	1	
	Sensor (b-contact point)	3		2	
②	Sensor-mounting plate	2	2	2	
③	Magnet yoke	1	1	1	
④	Plate for mounting magnet yoke	1	1	1	
⑤	Nut for sensor	3	3	3	
⑥	Cross-recessed pan-head machine screw with flat washer	5	5	5	M3
⑦	Cross-recessed pan-head machine screw with spring washer	2	2	2	M2
⑧	Hexagon socket head cap bolt	4	4	4	M2.5
⑨	Hexagon socket button head screw	1	1	1	M3

1. Units that are specified to use 1-mm or 2-mm lead require optional spacer (MC-SP03-00).

Monocarrier® MCM02, MCM03

Motor bracket

MC-BK03-146-00



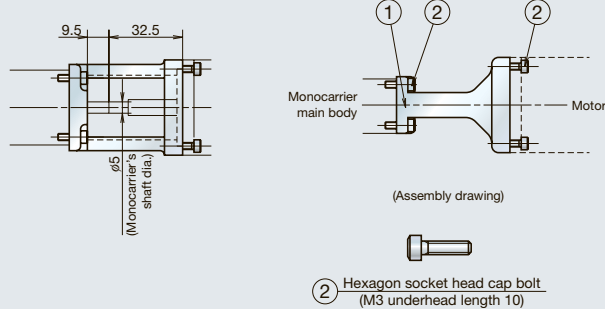
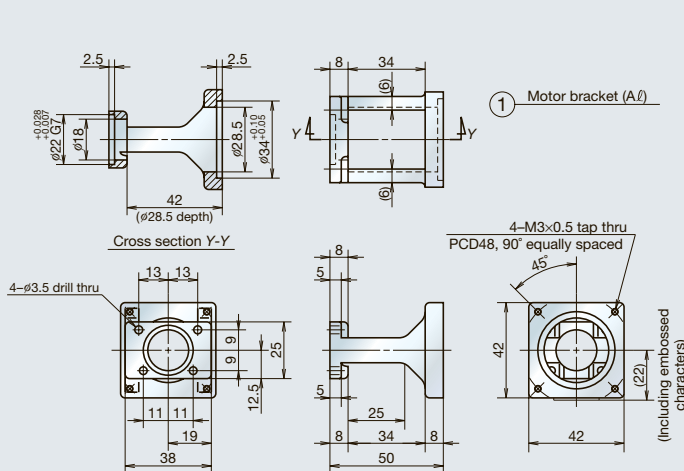
(Assembly drawing)

Compatible motors with MC-BK03-146-00

Makers	Motor models
Yaskawa Electric Corp.	SGMAH-A3 [30W]
	SGMAH-A5 [50W]
	SGMAH-01 [100W]
Mitsubishi Electric Corp.	HC-MFS053 [50W]
	HC-MFS13 [100W]
	HC-KFS053 [50W]
	HC-KFS13 [100W]
Sanyo Denki Co., Ltd.	P30B04003 [30W]
	P30B04005 [50W]
	P30B04010 [100W]

1. Be sure to center the motor bracket and the motor when mounting the motor in place.

MC-BK03-148-01

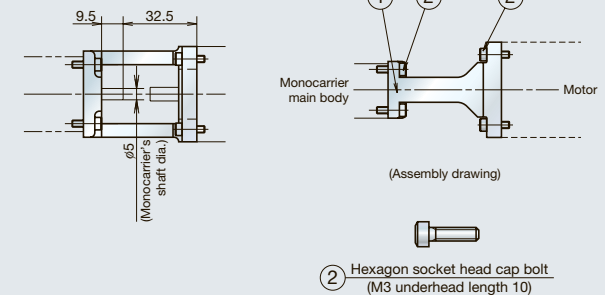
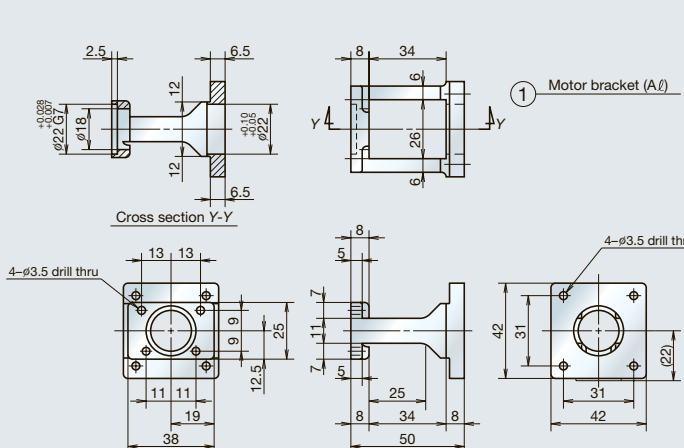


Compatible motors with MC-BK03-148-01

Maker	Motor models
Sanyo Denki Co., Ltd.	P50B04006 [60W]
	P50B04010 [100W]

1. Be sure to center the motor bracket and the motor when mounting the motor in place.

MC-BK03-231-00



Compatible motors with MC-BK03-231-00

Maker	Motor models
Oriental Motor Co., Ltd.	AS46, ASC46, PK54, UPK54
	CSK54*, CFK54*

1. Be sure to center the motor bracket and the motor when mounting the motor in place.

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