



YAMAHA linear motor single-axis robots

# MF7/7D

**Long-stroke and high-speed – The MF series is a huge favorite!  
The compact high-performance MF7 is now on the scene!**

■ **85mm×80mm compact space-saving design**

Smallest available MF series model with long strokes. Cross section is 15% smaller than MF15. Dimensions are even more compact to support streamlining of production equipment.

■ **Lineup includes upper-edge flat type as a standard feature**

Besides a smaller unit size, a “flat type” cable carrier that does not protrude from the table top surface is available as a standard feature. Even large tools easily install on robot.

■ **Easily substitutes for MR16/MR16H**

Drastic boost in frame strength compared to shaft motor drive types (MR16/MR16H) in same class. Shorter idle period gives better tact time. Replacement is also easier because of compatible installation positions.

■ **Multiple carriages available**

Double-carriage is available as a standard feature. Also supports multiple carriages including three or more carriages. Use of multiple carriages improves the tact time and allows space-saving, expanding the scope of work applications.

■ **Semi-absolute function eliminates return-to-origin operation**

Semi-absolute function drastically cuts time needed to find the origin point on long-stroke robots. After power-on, the current position can be detected by moving just a slight distance. Needs no large movement to return to the origin point.



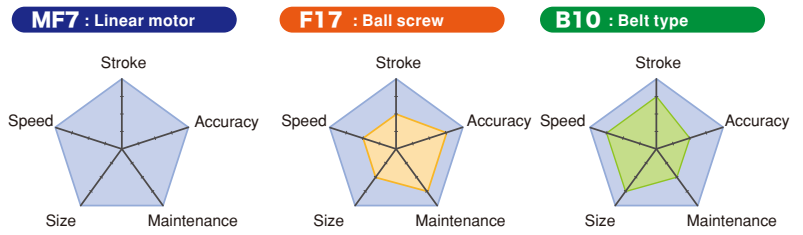
# 1 Low cost models that extend the potential of linear motor robots

Do you still think that "linear motor models are expensive"? Linear motors can be cheaper than ball screw types in some cases due to usage conditions such as payload and stroke.

Linear motor models are the ideal choice for high precision positioning or long distance load conveyance that conventional models cannot handle.

The low-priced MF7 linear motor single-axis robot is a great choice because it handles a wide range of applications.

## ■ Comparison of various single-axis robot models

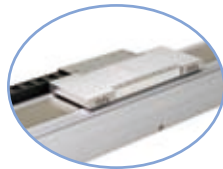


Model name	Main unit price <sup>Note 1</sup>	Maximum speed (mm/s)	Payload (kg)	Repeated positioning accuracy (μm)	Maximum stroke (mm)	Maximum cross-sectional dimension <sup>Note 2</sup> (mm)
MF7-1500		<b>2500</b>	10(7) <sup>Note 3</sup>	<b>±5</b>	<b>4000</b>	<b>W85xH80</b>
F17-40-1450		720 <sup>Note 4</sup>	40	±10	1450	W168xH100
B10-1450		1850	10	±40	2550	W100xH81

Note 1 : Figure when compared with above stroke. Note 2 : Not including cable carrier. Note 3 : 7 kg at 2500mm/s (2100mm/s when conveying 10 kg) Note 4 : Value accounting for critical speed when using 1450mm stroke.

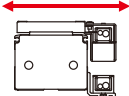
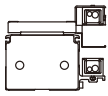
# 2 Flat type prevents outward cable carrier protrusion.

The MF7 body is more compact, so a "flat type" where the cable carrier stays flush with the table upper surface is now provided as a standard feature. Select as needed according to tool and workpiece contours and installation method.



Standard type

Flat type



Flat type prevents cable carrier from springing upward from table top edge, so even large tools are easy to install.

# 3 Depend on YAMAHA for a full lineup!

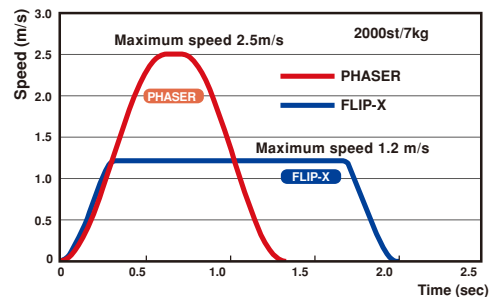
The compact MF7 model now joins the popular PHASER MF series to make a great lineup even better!

Double carriage provided as standard on all models, a maximum stroke available up to 4 m, select to match the payload.

# 4 Conveys payload at high speed even over long distances.

The best feature of linear motor single-axis robots is that there is no critical speed such as on ball screw models. There is no drop in maximum speed even when carrying loads over long distances. Another feature is a maximum stroke up to 4 m as standard. Gives a much better cycle time when conveying loads over long distances.

## ■ Comparison of linear motor single-axis PHASER and single-axis robot FLIP-X movement times



Model	Linear motor single-axis robot PHASER series: MF type lineup				
	MF7 / MF7D	MF15 / MF15D	MF20 / MF20D	MF30 / MF30D	MF75 / MF75D
Maximum payload (kg) <sup>Note</sup>	10 (7)	30 (15)	40 (20)	60 (30)	160 (75)
Rated thrust (N)	37	54	86	125	260
Maximum stroke (mm)	4000 / 3800	4000 / 3800	4050 / 3850	4000 / 3750	4000 / 3680
Maximum cross-sectional dimension (mm)	W85xH80	W100xH80	W150xH80	W150xH80	W210xH100
Common specifications	Maximum speed : 2500 mm/s, Repeatability: ±5 μm				

Note. Keep payload within ( ) if using at maximum speed.

## ■ Linear motor single-axis robot MF7 applicable controller

Name	For 1 axis (One unit is required for one carriage.)			For 2 axes
	RDP-10	TS-P210	SR1-P-10	RCX221
Type	Pulse-train control	Positioner	Controller	Controller
External view				
Position detection	Incremental		Incremental / Semi-absolute	
Maximum number of programs	—	—	100 programs	
Number of points	—	255 points	1000 points	10000 points
Programming box / Support software	— / TOP	HT1 / TS-Manager	HPB / POPCOM	RPB / VIP+
Network option	—	CC-Link, DeviceNet	CC-Link, DeviceNet, Profibus	CC-Link, DeviceNet, Profibus, Ethernet

## Ordering method

### Single carriage model

### MF7

Model	Mounting method/ Cable carrier extraction direction	Option for user Cable carrier <small>Note 2</small>	Origin position	Grease type	Stroke	Cable length
MF7 : Incremental MF7A : Semi-absolute <small>Note 1</small>	RH : Horizontal, right LH : Horizontal, left FRH : Horizontal, right (flat) FLH : Horizontal, left (flat)	No entry : None S : S type M : M type L : L type	No entry : L side Z : R side	No entry : standard GC : Clean	100 to 4000 (100mm pitch)	3L : 3.5m 5L : 5m 10L : 10m

### TS-P210

Applicable controller	LCD monitor selection	Input/output selection
	No entry : None L : With LCD	NP : NPN PN : PNP CC : CC-Link DN : DeviceNet

### SR1-P10

Applicable controller	Usable for CE	Input/output selection
	No entry : Standard E : CE marking	N : NPN P : PNP CC : CC-Link DN : DeviceNet PB : Profibus

### RDP-10

Applicable controller	Regenerative unit
	RBR1

Note 1. Semi-absolute models are supported by the SR1-P, TS-P and RCX221. RDP has an incremental model only.

Note 2. Strokes exceeding 2000mm can only be handled using an optional L-type cable carrier.

Note. TS-P complies with CE as standard.

Note. Models without cable carriers are also available. For wiring in the cable carrier (cable terminal), refer to our general catalog or consult us.

### Double carriage model

### MF7D

Model	Mounting method	Option for user Cable carrier <small>Note 2</small>	Origin position	Grease type	Stroke	Cable length
MF7D : Incremental MF7AD : Semi-absolute <small>Note 1</small>	H : Horizontal mount FH : Horizontal mount (flat)	No entry : None S : S type M : M type L : L type	No entry : L side Z : R side	No entry : standard GC : Clean	100 to 3800 (100mm pitch)	3L : 3.5m 5L : 5m 10L : 10m

### RCX221

Applicable controller	Usable for CE	Input/output selection 1	Input/output selection 2
RCX221	No entry : Standard E : CE marking	N : NPN P : PNP CC : CC-Link DN : DeviceNet PB : Profibus EN : Ethernet	No entry : None N1 : OP.DIO24/16 (NPN) P1 : OP.DIO24/17 (PNP) EN : Ethernet

Note 1. Semi-absolute models are supported by the SR1-P, TS-P and RCX221. RDP has an incremental model only.

Note 2. Strokes exceeding 2000mm can only be handled using an optional L type cable carrier.

Note 3. For information on options selectable for each controller, refer to the ordering method shown on each controller page of our general catalog.

Note. Models without cable carriers are also available. For wiring in the cable carrier (cable terminal), refer to our general catalog or consult us.

## Product specifications

### Basic specifications

Model	MF7	MF7D
<b>Driving method</b>	Linear motor with flat core	
<b>Repeated positioning accuracy (μm)</b>	±5	
<b>Scale (μm)</b>	Magnetic method : Resolution 1	
<b>Maximum speed <small>Note 2</small> (mm/sec)</b>	2500	
<b>Rated thrust (N)</b>	37	
<b>Maximum payload <small>Note 1</small> (kg)</b>	10	
<b>Stroke (mm)</b>	100 to 4000 (100mm pitch)	100 to 3680 (100mm pitch)
<b>Bearing type</b>	One guide rail, 2 blocks (with retainer)	
<b>Linear guide</b>	Four-row circular arc x 1 rail	
<b>Maximum cross-section outside dimensions (mm)</b>	W85 x H80 (excluding cable carrier)	
<b>Overall length (mm)</b>	Stroke +280	Stroke +480
<b>Cable length (m)</b>	Standard : 3.5 / Option : 5 and 10	
<b>Controller</b>	SR1-P-10 TS-P210-R	RCX221
<b>Robot driver</b>	RDP-10-RBR1	RDP-10-RBR1

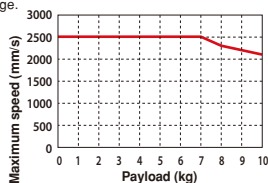
Note. A vertical model (with brake) is not available with the PHASER series.

Note. The basic specifications of semi-absolute model are the same as those of the incremental model.

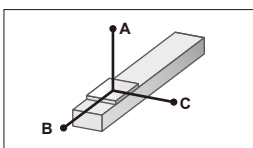
Note 1. Maximum payload per carriage.

Note 2. Maximum speed table

Payload (kg)	Maximum speed (mm/s)
7 or less	2500
8	2300
9	2200
10	2100



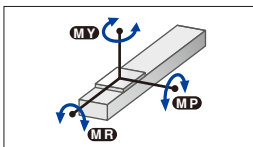
### Allowable overhang Note



	A	B	C
<b>1kg</b>	3000	3000	680
<b>3kg</b>	3000	1350	215
<b>5kg</b>	2900	830	125
<b>7kg</b>	2400	580	85
<b>9kg</b>	2200	460	60
<b>10kg</b>	2100	410	55

Note. Distance from center of slider top to center of gravity of object being carried at a guide service life of 10,000 km.

### Static loading moment

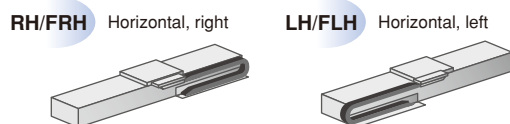


MY	MP	MR
156	156	194

### Controller

Controller (regenerative unit)	Operating method
SR1-P10	Programming / I/O point trace / Remote command / Operation using RS-232C communication
RCX221	Operation using RS-232C communication
TS-P210	I/O point trace
RDP-10-RBR1	Pulse train control

### Mounting method / Cable carrier extraction direction



Note. Be sure to install in the direction as specified (in cable carrier take-out direction drawing and various specification drawings) individually. Installation in any other way will cause a failure. For requirement of installation in any way other than the above standard installation, please consult YAMAHA as special arrangement will be available.

### Precaution for use

Before using, read the user's manual carefully to have full understanding of its contents and always comply with the precautions.



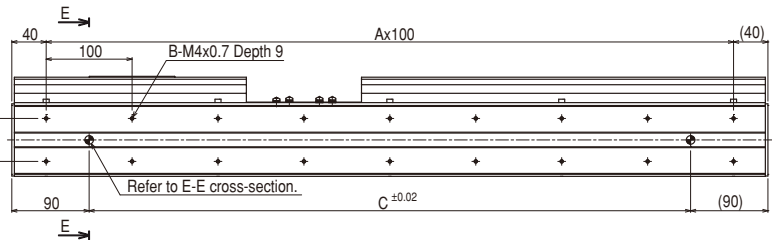
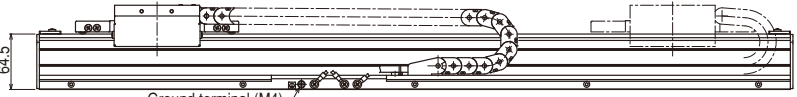
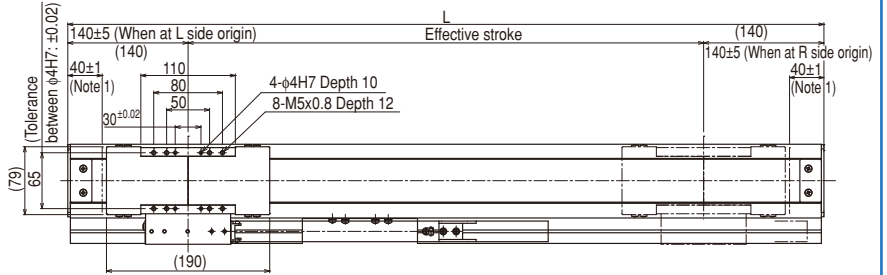
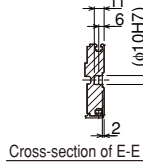
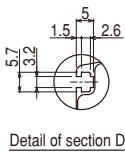
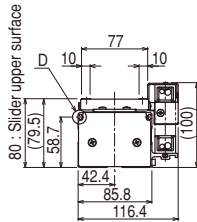
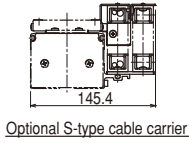
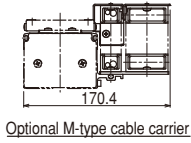
### IM Operations

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**URL** <http://www.yamaha-motor.co.jp/global/industrial/robot/>  
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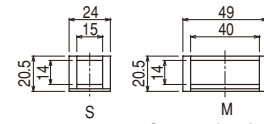
● Specifications and appearance are subject to change without prior notice.

**MF7 single carriage horizontal mount model RH Standard type**

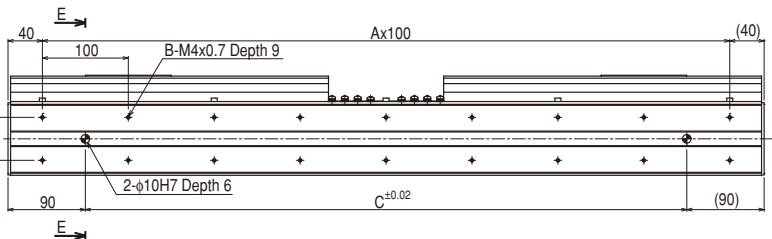
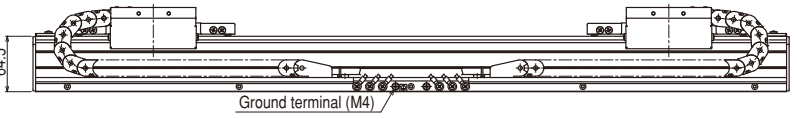
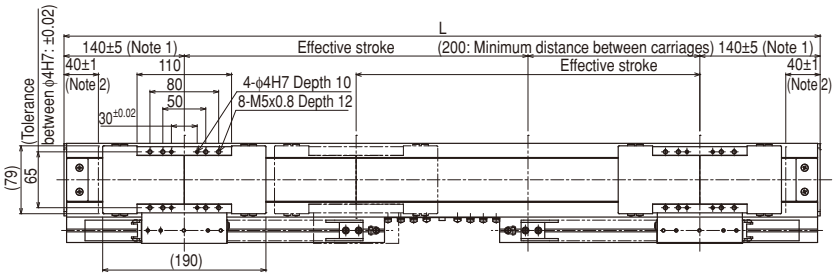
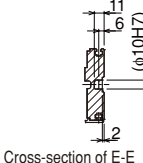
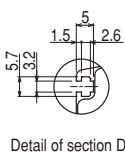
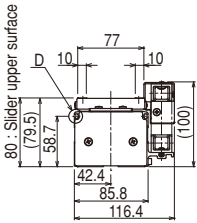
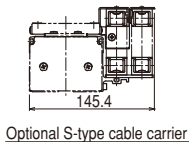
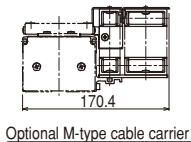


Note 1. Positions from both ends to the mechanical stoppers.  
 Note 2. The origin is set on the L side (as shown above) at the time of shipping. It can be changed to the R side origin point by parameter setting.  
 Note 3. The figure shows a horizontal right cable carrier extraction type (RH).

Effective stroke	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
L	380	480	580	680	780	880	980	1080	1180	1280	1380	1480	1580	1680	1780	1880	1980	2080	2180	2280
A	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
B	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46
C	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100
Weight (kg)	5.8	6.5	7.3	8	8.7	9.4	10.1	10.9	11.6	12.3	13	13.7	14.5	15.2	15.9	16.6	17.3	18.1	18.8	19.5

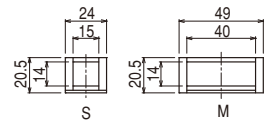


**MF7D double carriage horizontal mount model H Standard type**

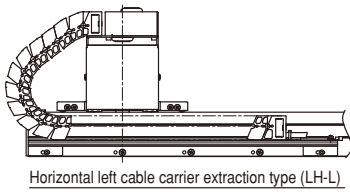


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 Note 2. The origin is set on the L side (as shown above) at the time of shipping. It can be changed to the R side origin point by parameter setting.  
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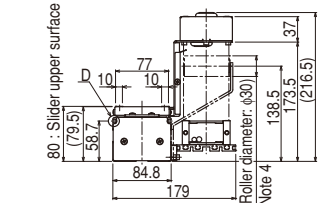
Effective stroke	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
L	580	680	780	880	980	1080	1180	1280	1380	1480	1580	1680	1780	1880	1980	2080	2180	2280	2380	2480
A	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
B	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
C	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
Weight (kg)	9	10	11	11	12	13	14	14	15	16	17	17	18	19	19	20	21	22	22	23



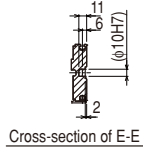
**MF7 single carriage horizontal mount model RH-L Standard type (For optional L-type cable carrier)**



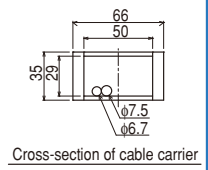
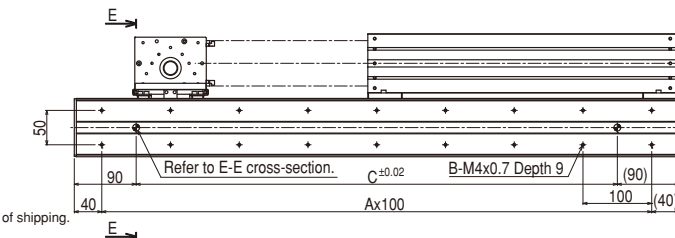
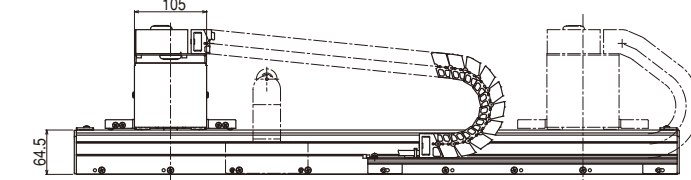
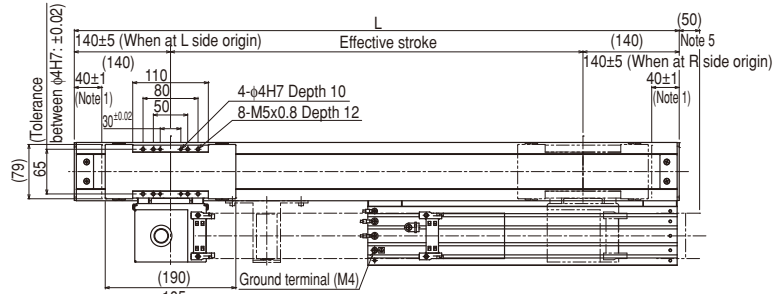
Horizontal left cable carrier extraction type (LH-L)



Detail of section D



Cross-section of E-E

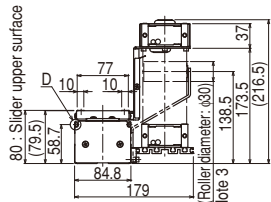


Cross-section of cable carrier

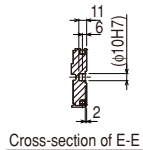
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Effective stroke	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000
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A	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
B	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86
C	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000	4100
Weight (kg)	6	7	7	8	9	9	10	11	12	12	13	14	15	15	16	17	17	18	19	20	20	21	22	22	23	24	25	25	26	27	28	29	30	31	31	32	33	34	34	35

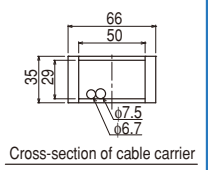
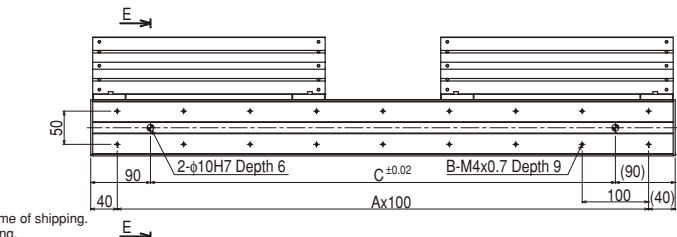
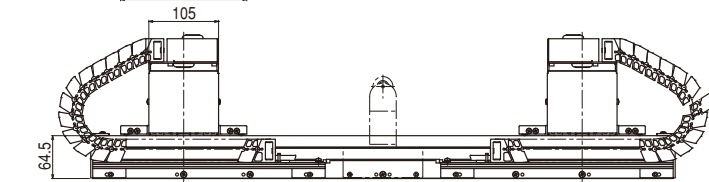
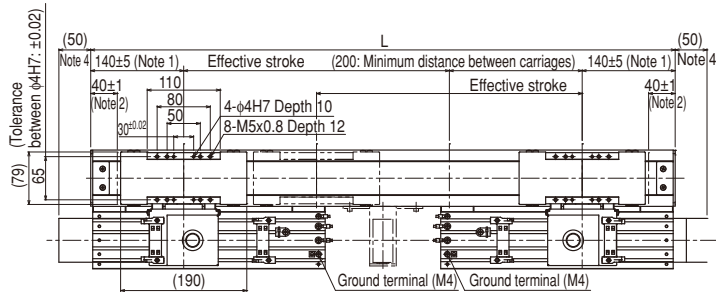
**MF7D double carriage horizontal mount model H-L Standard type (For optional L-type cable carrier)**



Detail of section D



Cross-section of E-E

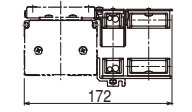


Cross-section of cable carrier

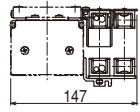
Note 1. Positions from both ends to the mechanical stoppers.  
 Note 2. The origin position is set on the L side (as shown above) at the time of shipping.  
 It can be changed to the R side origin position by parameter setting.  
 Note 3. The figure shows a horizontal right cable carrier extraction type (RH).

Effective stroke	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800
L	580	680	780	880	980	1080	1180	1280	1380	1480	1580	1680	1780	1880	1980	2080	2180	2280	2380	2480	2580	2680	2780	2880	2980	3080	3180	3280	3380	3480	3580	3680	3780	3880	3980	4080	4180	4280
A	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
B	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86
C	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000	4100
Weight (kg)	9	10	11	11	12	13	14	14	15	16	17	17	18	19	19	20	21	22	22	23	24	24	25	26	27	27	28	29	30	31	32	33	33	34	35	36	37	38

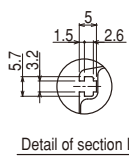
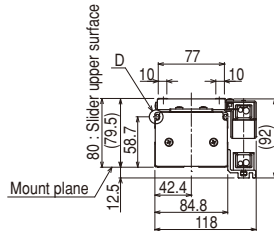
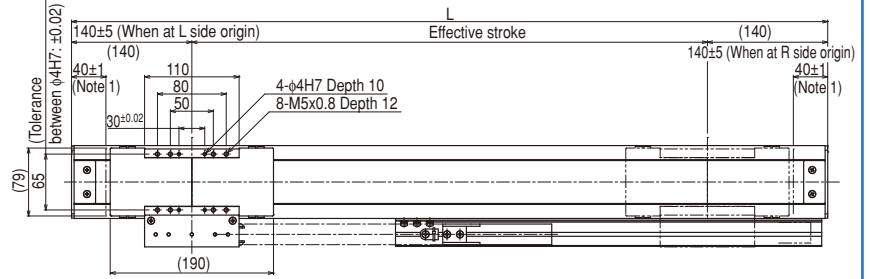
## MF7 single carriage horizontal mount model **FRH** Flat type



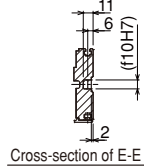
Optional M-type cable carrier



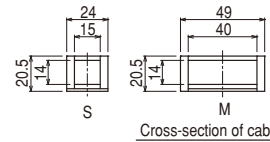
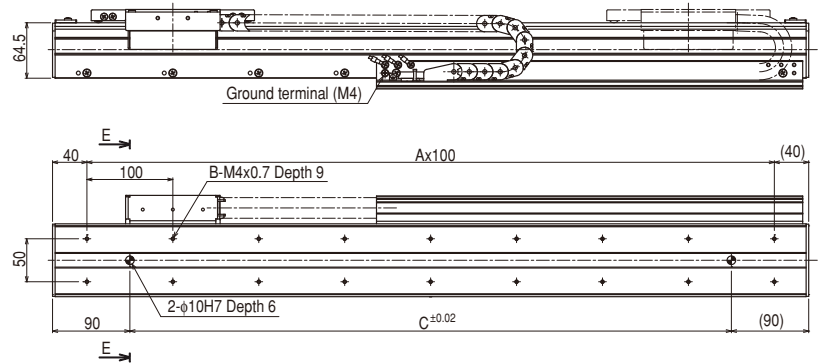
Optional S-type cable carrier



Detail of section D



Cross-section of E-E



Cross-section of cable carrier

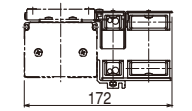
Note 1. Positions from both ends to the mechanical stoppers.

Note 2. The origin position is set on the L side (as shown above) at the time of shipping. It can be changed to the R side origin position by parameter setting.

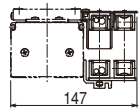
Note 3. The figure shows a horizontal right cable carrier extraction type (RH).

Effective stroke	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
L	380	480	580	680	780	880	980	1080	1180	1280	1380	1480	1580	1680	1780	1880	1980	2080	2180	2280
A	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
B	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46
C	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100
Weight (kg)	5.8	6.5	7.3	8	8.7	9.4	10.1	10.9	11.6	12.3	13	13.7	14.5	15.2	15.9	16.6	17.3	18.1	18.8	19.5

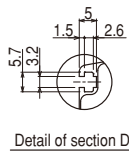
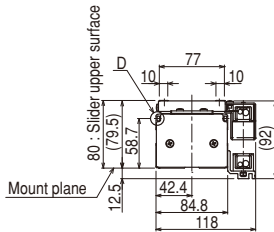
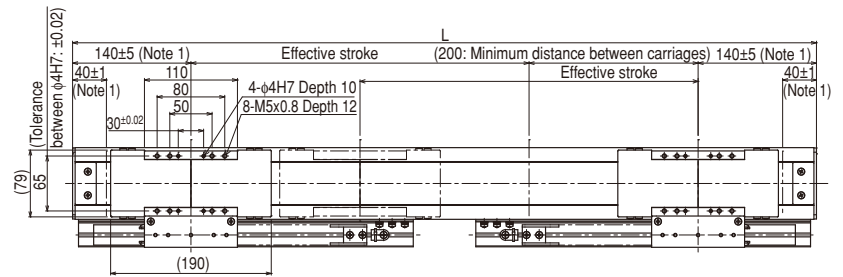
## MF7D double carriage horizontal mount model **FH** Flat type



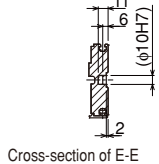
Optional M-type cable carrier



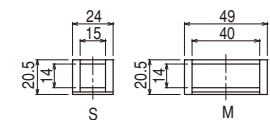
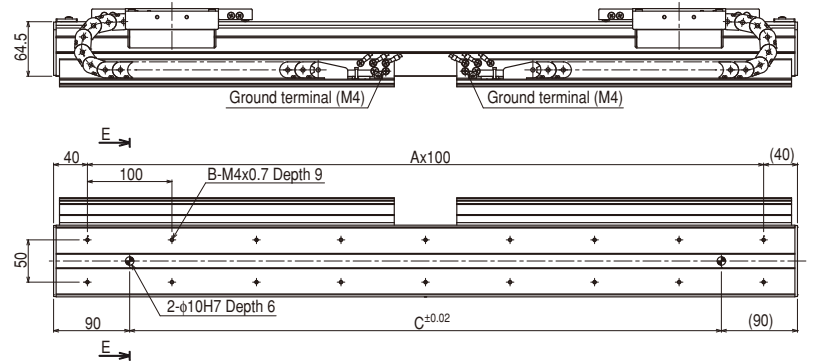
Optional S-type cable carrier



Detail of section D



Cross-section of E-E



Cross-section of cable carrier

Note 1. Positions from both ends to the mechanical stoppers.

Note 2. The origin position is set on the L side (as shown above) at the time of shipping. It can be changed to the R side origin position by parameter setting.

Note 3. The figure shows a horizontal right cable carrier extraction type (RH).

Effective stroke	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
L	580	680	780	880	980	1080	1180	1280	1380	1480	1580	1680	1780	1880	1980	2080	2180	2280	2380	2480
A	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
B	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
C	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
Weight (kg)	9	10	11	11	12	13	14	14	15	16	17	17	18	19	19	20	21	22	22	23