

# FS FLEXIBLE SYSTEM SERIES



Actuator Module



Example of Gantry System



Guide Module

## FS Narrow/Wide/Large Type Actuator

### FEATURES:

- The slim design enables the FS Linear Axes to provide from 300 up to 3000 mm stroke.
- The FS Large Type focuses on 2 main types: A High-Speed Type (max. speed: 2000 mm/s) and a High-Payload Type (max. payload: 60 kg).
- Timing Belt Drive Method provides a quieter motion.
- Gantry-Type Systems with larger work areas are achievable using guide modules also available in this series.

# FS-NM-60

Single-axis robot / Narrow belt type / Actuator width: 40mm / 60W



## Model Specification Items

<b>FS</b>	Series	Type	Encoder type	Motor type	Stroke	Applicable controller	Cable length	Options
11NM: Single slider specification 12NM: Double slider specification	A: Absolute specification I: Incremental specification	60: 60W 300: 300mm 1000: 1000mm (in 100mm increments)	T1: XSEL-KE/KET T2: SCON SSEL XSEL-P/Q	N: None S: 3m M: 5m X□□: Specified length	Refer to the options table below.			

## Model Number/Specification

Model number	Encoder type	Motor output (W)	Slider	Stroke in 100mm increments (mm)	Speed (mm/s)	Payload (Note 1)		Rated thrust (N)
						Horizontal (kg)	Vertical (kg)	
FS-11NM -①-60-②-③-④-⑤	Absolute Incremental	60	Single	300~1000	1~1250	2	Designed exclusively for horizontal use	29
FS-12NM -①-60-②-③-④-⑤			Double			9 (Note 2)		

\* In the above model numbers, ① indicates the encoder type, ② indicates the stroke, ③ indicates the applicable controller, ④ indicates the cable length, and ⑤ indicates the option(s).

## Option

Name	Model number	Reference page	Notes
Slider length equal to 200mm	D1	—	Available for 12NM only
Slider length equal to 300mm	D2	—	Available for 12NM only
Reversed-home specification	NM	—	
No motor (cover only)	NQ	—	
Motor positioned on the opposite side	R	—	
Motor positioned at the bottom	U	—	Custom-order

## Common Specifications

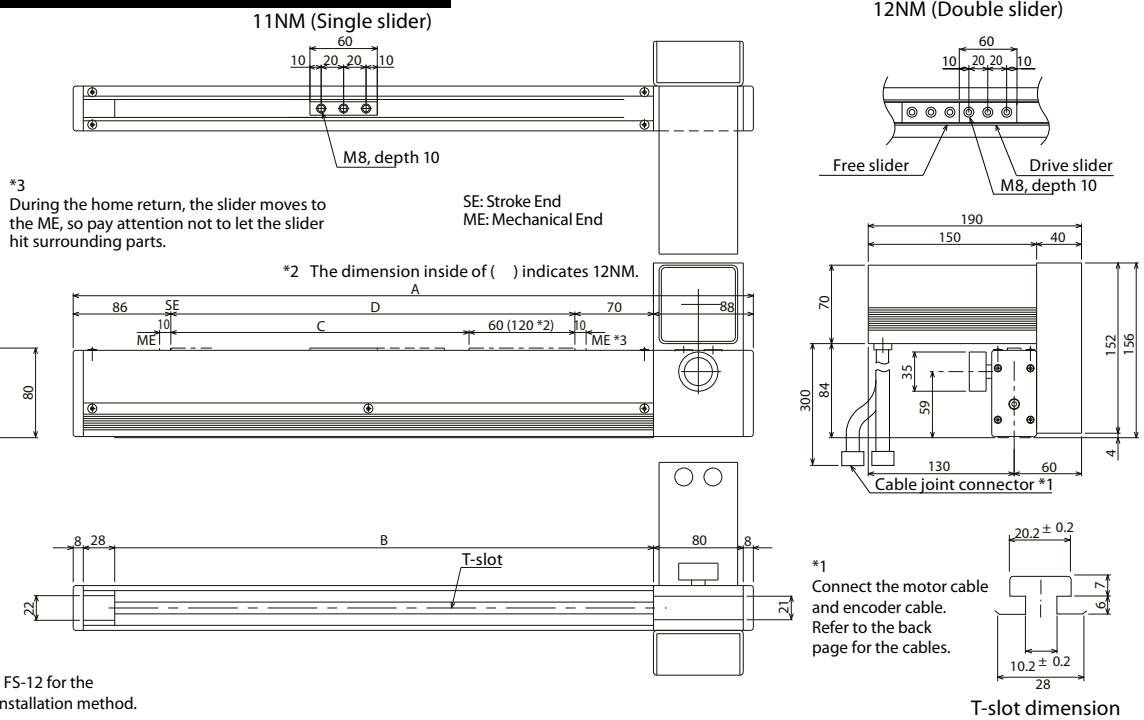
Positioning repeatability	±0.08mm
Drive method	Timing belt
Lost Motion	0.1mm max.
Allowable static load moment	Refer to P. FS-10 (Technical Reference)
Allowable dynamic load moment	Refer to P. FS-11 (Technical Reference)
Overhang load length	Refer to P. FS-11 (Technical Reference)
Base	Material: Aluminum, with white alumite treatment
Applicable controller	T1: XSEL-KE/KET T2: XSEL-P/Q, SSEL, SCON
Cable length (Note 3)	N: None, S: 3m, M: 5m, X□□: Specified length
Ambient operating temperature/humidity	0 to 40°C, 85%RH max. (non-condensing)

## Diagram

CAD drawings are available for download from our website.

2D CAD

RoHS



\* Refer to P. FS-12 for the actuator installation method.

## FS-11NM-60

Stroke	300	400	500	600	700	800	900	1000
A	604	704	804	904	1004	1104	1204	1304
B	480	580	680	780	880	980	1080	1180
C	300	400	500	600	700	800	900	1000
D	360	460	560	660	760	860	960	1060
Mass (kg)	5.0	5.4	5.8	6.2	6.6	7.0	7.4	7.8
Payload (kg)	2							

## FS-12NM-60

Stroke	300	400	500	600	700	800	900	1000
A	704	804	904	1004	1104	1204	1304	1404
B	580	680	780	880	980	1080	1180	1280
C	340	440	540	640	740	840	940	1040
D	460	560	660	760	860	960	1060	1160
Mass (kg)	5.7	6.0	6.5	6.9	7.3	7.7	8.1	8.5
Payload (kg)	9		7			5		

\* 300~1000mm strokes are available in 100mm increments. Dimensions A~D increase by 100mm for every 100mm stroke increment.

## Applicable Controller Specifications

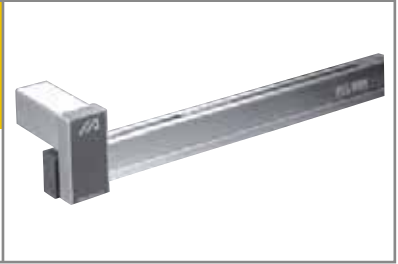
Applicable Controller	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page
X-SEL-P/Q	6 axes	Absolute/ incremental	Program	Single/three-phase 230VAC	—
X-SEL-KE/KET	4 axes			Single-phase 115/230VAC	—
SSEL	2 axes			Single-phase 230VAC	—
SCON	1 axis		Positioner pulse train control	Single-phase 230VAC	—



- (Note 1) The payload is the value when operated at 0.3 G acceleration.
- (Note 2) Note that when the stroke increases, the payload will drop. (Refer to the tables above for payload by stroke.)
- (Note 3) The maximum cable length is 30 m. Specify a desired length in meters. (Example. X08 = 8 m)

# FS-NM-100

Single-axis robot / Narrow belt type / Actuator width: 40mm / 100W



## Model Specification Items

<b>FS</b>	Series	Type	Encoder type	Motor type	Stroke	Applicable controller	Cable length	Options
11NM: Single slider specification 12NM: Double slider specification	A: Absolute specification I: Incremental specification	100: 100W 300: 300mm 1000: 1000mm (in 100mm increments)	T1: XSEL-KE/KET T2: SCON SSEL XSEL-P/Q	N: None S: 3m M: 5m X□□: Specified length	Refer to the options table below.			

## Model Number/Specification

Model number	Encoder type	Motor output (W)	Slider	Stroke in 100mm increments (mm)	Speed (mm/s)	Payload (Note 1)		Rated thrust (N)
						Horizontal (kg)	Vertical (kg)	
FS-11NM - [1]-100-[2]-[3]-[4]-[5]	Absolute Incremental	100	Single	300~1000	1~1250	3	Designed exclusively for horizontal use	49
FS-12NM - [1]-100-[2]-[3]-[4]-[5]			Double			15 (Note 2)		

\* In the above model numbers, [1] indicates the encoder type, [2] indicates the stroke, [3] indicates the applicable controller, [4] indicates the cable length, and [5] indicates the option(s).

## Option

Name	Model number	Reference page	Notes
Slider length equal to 200mm	D1	—	Available for 12NM only
Slider length equal to 300mm	D2	—	Available for 12NM only
Reversed-home specification	NM	—	
No motor (cover only)	NQ	—	
Motor positioned on the opposite side	R	—	
Motor positioned at the bottom	U	—	Custom-order

## Common Specifications

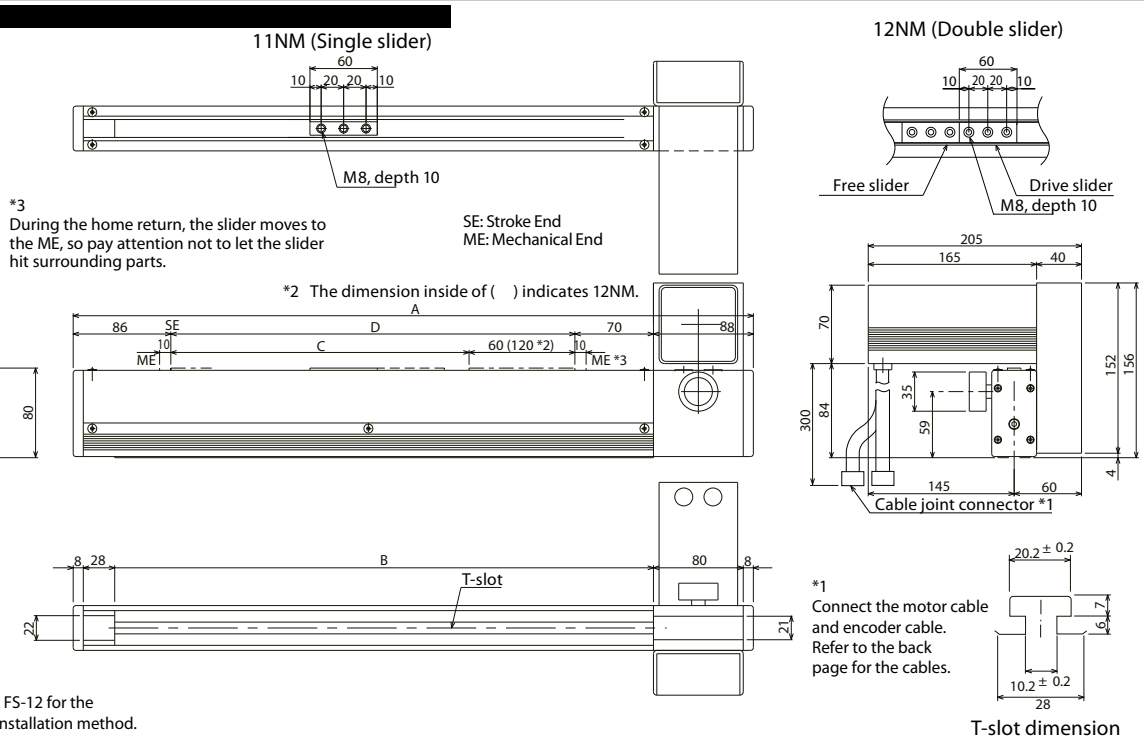
Positioning repeatability	±0.08mm
Drive method	Timing belt
Lost Motion	0.1mm max.
Allowable static load moment	Refer to P. FS-10 (Technical Reference)
Allowable dynamic load moment	Refer to P. FS-11 (Technical Reference)
Overhang load length	Refer to P. FS-11 (Technical Reference)
Base	Material: Aluminum, with white alumite treatment
Applicable controller	T1: XSEL-KE/KET T2: XSEL-P/Q, SSEL, SCON
Cable length (Note 3)	N: None, S: 3m, M: 5m, X□□: Specified length
Ambient operating temperature/humidity	0 to 40°C, 85%RH max. (non-condensing)

## Diagram

CAD drawings are available for download from our website.

2D CAD

RoHS



\* Refer to P. FS-12 for the actuator installation method.

## FS-11NM-100

Stroke	300	400	500	600	700	800	900	1000
A	604	704	804	904	1004	1104	1204	1304
B	480	580	680	780	880	980	1080	1180
C	300	400	500	600	700	800	900	1000
D	360	460	560	660	760	860	960	1060
Mass (kg)	5.0	5.4	5.8	6.2	6.6	7.0	7.4	7.8
Payload (kg)	3							

## FS-12NM-100

Stroke	300	400	500	600	700	800	900	1000
A	704	804	904	1004	1104	1204	1304	1404
B	580	680	780	880	980	1080	1180	1280
C	340	440	540	640	740	840	940	1040
D	460	560	660	760	860	960	1060	1160
Mass (kg)	5.7	6.0	6.5	6.9	7.3	7.7	8.1	8.5
Payload (kg)	15		11			9		

\* 300~1000mm strokes are available in 100mm increments. Dimensions A~D increase by 100mm for every 100mm stroke increment.

## Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page
X-SEL-P/Q	6 axes	Absolute/ incremental	Program	Single/three-phase 230 VAC	—
X-SEL-KE/KET	4 axes			Single-phase 115/230 VAC	—
SSEL	2 axes			Single-phase 230 VAC	—
SCON	1 axis		Positioner pulse train control	Single-phase 230 VAC	—



- (Note 1) The payload is the value when operated at 0.3 G acceleration.
- (Note 2) Note that when the stroke increases, the payload will drop. (Refer to the tables above for payload by stroke.)
- (Note 3) The maximum cable length is 30 m. Specify a desired length in meters. (Example. X08 = 8 m)

# FS-NO

Single-axis robot / Actuator width: 40mm / Narrow guide module



## Model Specification Items

<b>FS</b>	Type	<b>0</b>	Stroke	Options
11NO: Single slider specification 12NO: Double slider specification		0: No motor	300: 300mm 1000: 1000mm (in 100mm increments)	Refer to the options table below.

## Model Number/Specification

Model number	Encoder type	Motor output (W)	Slider	Stroke in 100mm increments (mm)	Speed (mm/s)	Payload		Rated thrust (N)
						Horizontal (kg)	Vertical (kg)	
FS-11NO-0-①-②	—	—	Single	300~1000	—	—	—	—
FS-12NO-0-①-②			Double					

\* In the above model numbers, ① indicates the stroke, and ② indicates the option(s).

## Option

Name	Model number	Reference page	Notes
Slider length equal to 200mm	D1	—	Available for 12NO only
Slider length equal to 300mm	D2	—	Available for 12NO only

## Common Specifications

Positioning repeatability	—
Drive method	—
Lost Motion	—
Allowable static load moment	Refer to P.FS-10 (Technical Reference)
Allowable dynamic load moment	Refer to P.FS-11 (Technical Reference)
Overhang load length	Refer to P.FS-11 (Technical Reference)
Base	Material: Aluminum, with white alumite treatment
Cable length	—
Ambient operating temperature/humidity	0 to 40°C, 85%RH max. (non-condensing)

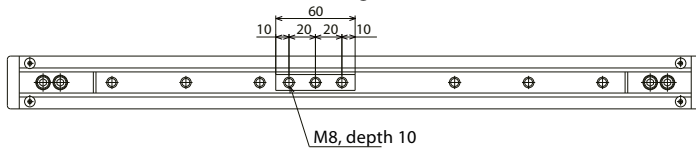
## Diagram

CAD drawings are available for download from our website.

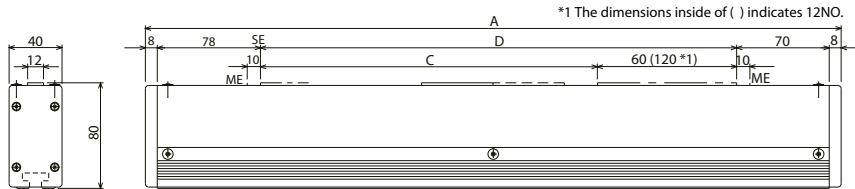
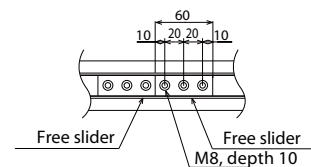
2D CAD

RoHS

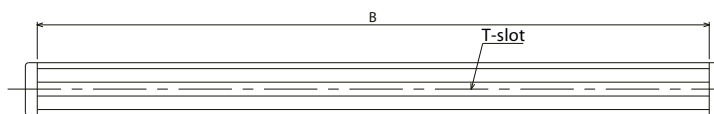
11NO (Single slider)



12NO (Double Slider)



SE: Stroke End  
ME: Mechanical End



T-slot dimension

\* Refer to P.FS-12 for the actuator installation method.

### FS-11NO-0

Stroke	300	400	500	600	700	800	900	1000
A	524	624	724	824	924	1024	1124	1224
B	508	608	708	808	908	1008	1108	1208
C	300	400	500	600	700	800	900	1000
D	360	460	560	660	760	860	960	1060
Mass (kg)	2.4	2.8	3.2	3.6	4.1	4.4	4.8	5.2
Payload (kg)	—							

### FS-12NO-0

Stroke	300	400	500	600	700	800	900	1000
A	624	724	824	924	1024	1124	1224	1324
B	608	708	808	908	1008	1108	1208	1308
C	340	440	540	640	740	840	940	1040
D	460	560	660	760	860	960	1060	1160
Mass (kg)	3.1	3.5	3.9	4.3	4.8	5.1	5.5	5.9
Payload (kg)	—							

\* 300~1000mm strokes are available in 100mm increments.  
Dimensions A~D increase by 100mm for every 100mm stroke increment.

## Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—

# FS-WM-100

Single-axis robot / Wide belt type / Actuator width: 52mm / 100W



## Model Specification Items

<b>FS</b>	Series	Type	Encoder type	<b>100</b>	Motor type	Stroke	Applicable controller	Cable length	Options
11WM: Single slider specification 12WM: Double slider specification		A: Absolute specification I: Incremental specification		100: 100W	300: 300mm 2500: 2500mm (in 100mm increments)	T1: XSEL-KE/KET T2: SCON SSEL XSEL-P/Q	N: None S: 3m M: 5m X□□: Specified length	Refer to the options table below.	

## Model Number/Specification

Model number	Encoder type	Motor output (W)	Slider	Stroke in 100mm increments (mm)	Speed (mm/s)	Payload (Note 1)		Rated thrust (N)
						Horizontal (kg)	Vertical (kg)	
FS-11WM-①-100-②-③-④-⑤	Absolute Incremental	100	Single	300~2500	1~1250	3	Designed exclusively for horizontal use	49
FS-12WM-①-100-②-③-④-⑤			Double			15 (Note 2)		

\* In the above model numbers, ① indicates the encoder type, ② indicates the stroke, ③ indicates the applicable controller, ④ indicates the cable length, and ⑤ indicates the option(s).

## Option

Name	Model number	Reference page	Notes
Slider length equal to 200mm	D1	—	Available for 12WM only
Slider length equal to 300mm	D2	—	Available for 12WM only
Reversed-home specification	NM	—	
No motor (cover only)	NQ	—	
Motor positioned on the opposite side	R	—	
Motor positioned at the bottom	U	—	Custom-order

## Common Specifications

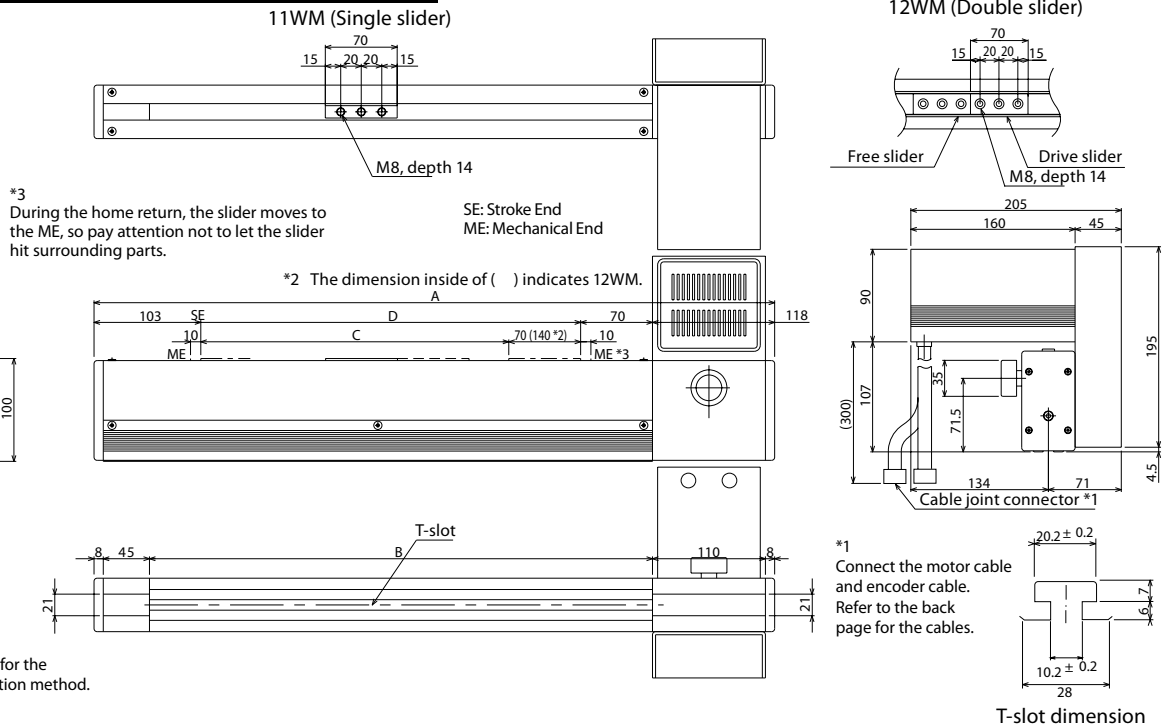
Positioning repeatability	±0.08mm
Drive method	Timing belt
Lost Motion	0.1mm max.
Allowable static load moment	Refer to P. FS-10 (Technical Reference)
Allowable dynamic load moment	Refer to P. FS-11 (Technical Reference)
Overhang load length	Refer to P. FS-11 (Technical Reference)
Base	Material: Aluminum, with white alumite treatment
Applicable controller	T1: XSEL-KE/KET T2: XSEL-P/Q, SSEL, SCON
Cable length (Note 3)	N: None, S: 3m, M: 5m, X□□: Specified length
Ambient operating temperature/humidity	0 to 40°C, 85%RH max. (non-condensing)

## Diagram

CAD drawings are available for download from our website.

2D CAD

RoHS



\* Refer to P. FS-12 for the actuator installation method.

### FS-11WM-100

Stroke	300	400	600	800	1000	1500	2000	2500
A	661	761	961	1161	1361	1861	2361	2861
B	490	590	790	990	1190	1690	2190	2690
C	300	400	600	800	1000	1500	2000	2500
D	370	470	670	870	1070	1570	2070	2570
Mass (kg)	8.7	9.3	10.5	11.7	12.9	15.9	18.9	21.9
Payload (kg)	3							

### FS-12WM-100

Stroke	300	400	600	800	1000	1500	2000	2500
A	761	861	1061	1261	1461	1961	2461	2961
B	590	690	890	1090	1290	1790	2290	2790
C	330	430	630	830	1030	1530	2030	2530
D	470	570	770	970	1170	1670	2170	2670
Mass (kg)	9.9	10.5	11.7	12.9	14.1	17.1	20.1	23.1
Payload (kg)	15							

\* 300~2500mm strokes are available in 100mm increments. Dimensions A~D increase by 100mm for every 100mm stroke increment.

## Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page
X-SEL-P/Q	6 axes	Absolute/ incremental	Program	Single/three-phase 230 VAC	—
X-SEL-KE/KET	4 axes			Single-phase 115/230 VAC	—
SSEL	2 axes			Single-phase 230 VAC	—
SCON	1 axis		Positioner pulse train control	Single-phase 230 VAC	—



- (Note 1) The payload is the value when operated at 0.3 G acceleration.
- (Note 2) Note that when the stroke increases, the payload will drop. (Refer to the tables above for payload by stroke.)
- (Note 3) The maximum cable length is 30 m. Specify a desired length in meters. (Example. X08 = 8 m)

# FS-WM-200

Single-axis robot / Wide belt type / Actuator width: 52mm / 200W



## Model Specification Items

<b>FS</b>	Series	<input type="checkbox"/>	Type	<input type="checkbox"/>	Encoder type	<b>200</b>	Motor type	<input type="checkbox"/>	Stroke	<input type="checkbox"/>	Applicable controller	<input type="checkbox"/>	Cable length	<input type="checkbox"/>	Options
11WM: Single slider specification 12WM: Double slider specification		A: Absolute specification I: Incremental specification		200: 200W 300: 300mm 2500: 2500mm (in 100mm increments)	T1: XSEL-KE/KET T2: SCON SSEL XSEL-P/Q	N: None S: 3m M: 5m X□□: Specified length									Refer to the options table below.

## Model Number/Specification

Model number	Encoder type	Motor output (W)	Slider	Stroke in 100mm increments (mm)	Speed (mm/s)	Payload (Note 1)		Rated thrust (N)
						Horizontal (kg)	Vertical (kg)	
FS-11WM-①-200-②-③-④-⑤	Absolute Incremental	200	Single	300~2500	1~1250	6	Designed exclusively for horizontal use	98
FS-12WM-①-200-②-③-④-⑤			Double			30 (Note 2)		

\* In the above model numbers, ① indicates the encoder type, ② indicates the stroke, ③ indicates the applicable controller, ④ indicates the cable length, and ⑤ indicates the option(s).

## Option

Name	Model number	Reference page	Notes
Slider length equal to 200mm	D1	—	Available for 12WM only
Slider length equal to 300mm	D2	—	Available for 12WM only
Reversed-home specification	NM	—	
No motor (cover only)	NQ	—	
Motor positioned on the opposite side	R	—	
Motor positioned at the bottom	U	—	Custom-order

## Common Specifications

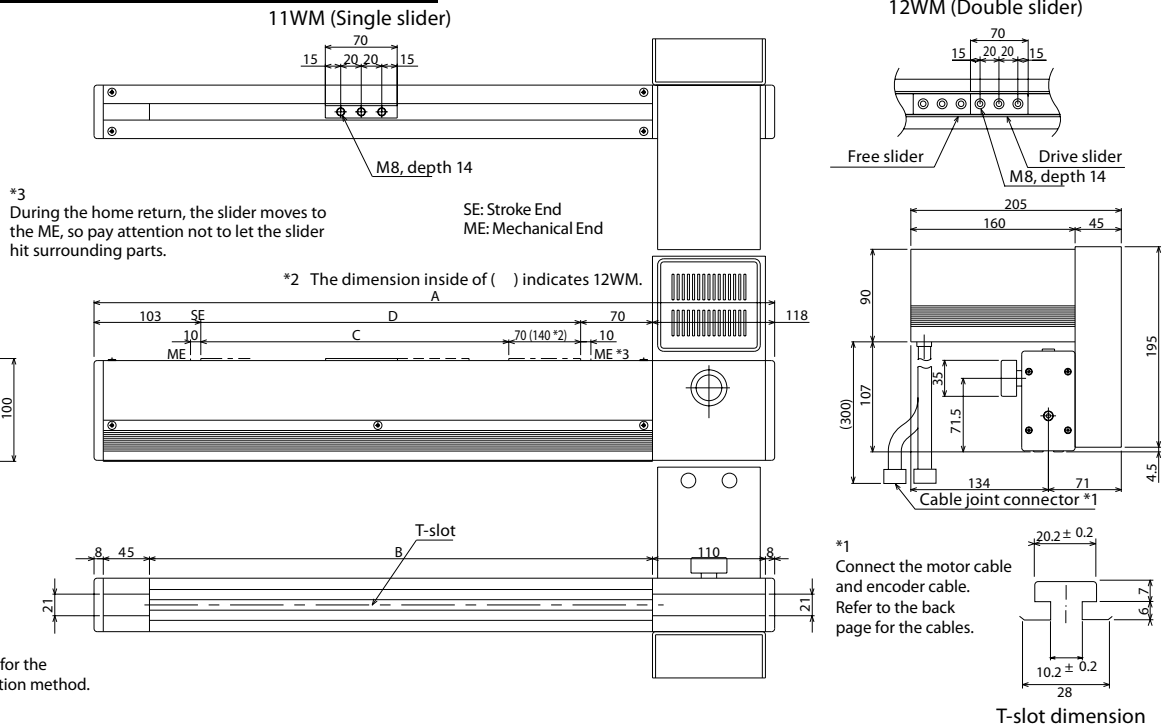
Positioning repeatability	±0.08mm
Drive method	Timing belt
Lost Motion	0.1mm max.
Allowable static load moment	Refer to P. FS-10 (Technical Reference)
Allowable dynamic load moment	Refer to P. FS-11 (Technical Reference)
Overhang load length	Refer to P. FS-11 (Technical Reference)
Base	Material: Aluminum, with white alumite treatment
Applicable controller	T1: XSEL-KE/KET T2: XSEL-P/Q, SSEL, SCON
Cable length (Note 3)	N: None, S: 3m, M: 5m, X□□: Specified length
Ambient operating temperature/humidity	0 to 40°C, 85%RH max. (non-condensing)

## Diagram

CAD drawings are available for download from our website.

2D CAD

RoHS



## FS-11WM-200

Stroke	300	400	600	800	1000	1500	2000	2500
A	661	761	961	1161	1361	1861	2361	2861
B	490	590	790	990	1190	1690	2190	2690
C	300	400	600	800	1000	1500	2000	2500
D	370	470	670	870	1070	1570	2070	2570
Mass (kg)	9.8	10.4	11.6	12.8	14.0	17.0	20.0	23.0
Payload (kg)	6							

## FS-12WM-200

Stroke	300	400	600	800	1000	1500	2000	2500
A	761	861	1061	1261	1461	1961	2461	2961
B	590	690	890	1090	1290	1790	2290	2790
C	330	430	630	830	1030	1530	2030	2530
D	470	570	770	970	1170	1670	2170	2670
Mass (kg)	11.0	11.6	12.8	14.0	15.2	18.2	21.2	24.2
Payload (kg)	30							

\* 300~2500mm strokes are available in 100mm increments. Dimensions A~D increase by 100mm for every 100mm stroke increment.

## Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page
X-SEL-P/Q	6 axes	Absolute/ incremental	Program	Single/three-phase 230 VAC	—
X-SEL-KE/KET	4 axes			Single-phase 115/230 VAC	—
SSEL	2 axes			Single-phase 230 VAC	—
SCON	1 axis		Positioner pulse train control	Single-phase 230 VAC	—



- (Note 1) The payload is the value when operated at 0.3 G acceleration.
- (Note 2) Note that when the stroke increases, the payload will drop. (Refer to the tables above for payload by stroke.)
- (Note 3) The maximum cable length is 30 m. Specify a desired length in meters. (Example. X08 = 8 m)

# FS-WO

Single-axis robot / Actuator width: 52mm / Wide guide module



## Model Specification Items

<b>FS</b> Series	Type	<b>0</b> Motor type	Stroke	Options
11WO: Single slider specification 12WO: Double slider specification		0: No motor	300: 300mm 2500: 2500mm (in 100mm increments)	Refer to the options table below.

## Model Number/Specification

Model number	Encoder type	Motor output (W)	Slider	Stroke in 100mm increments (mm)	Speed (mm/s)	Payload		Rated thrust (N)
						Horizontal (kg)	Vertical (kg)	
FS-11WO-0--	—	—	Single	300~2500	—	—	—	—
FS-12WO-0--			Double					

\* In the above model numbers, indicates the stroke, and indicates the option(s).

## Option

Name	Model number	Reference page	Notes
Slider length equal to 200mm	D1	—	Available for 12WO only
Slider length equal to 300mm	D2	—	Available for 12WO only

## Common Specifications

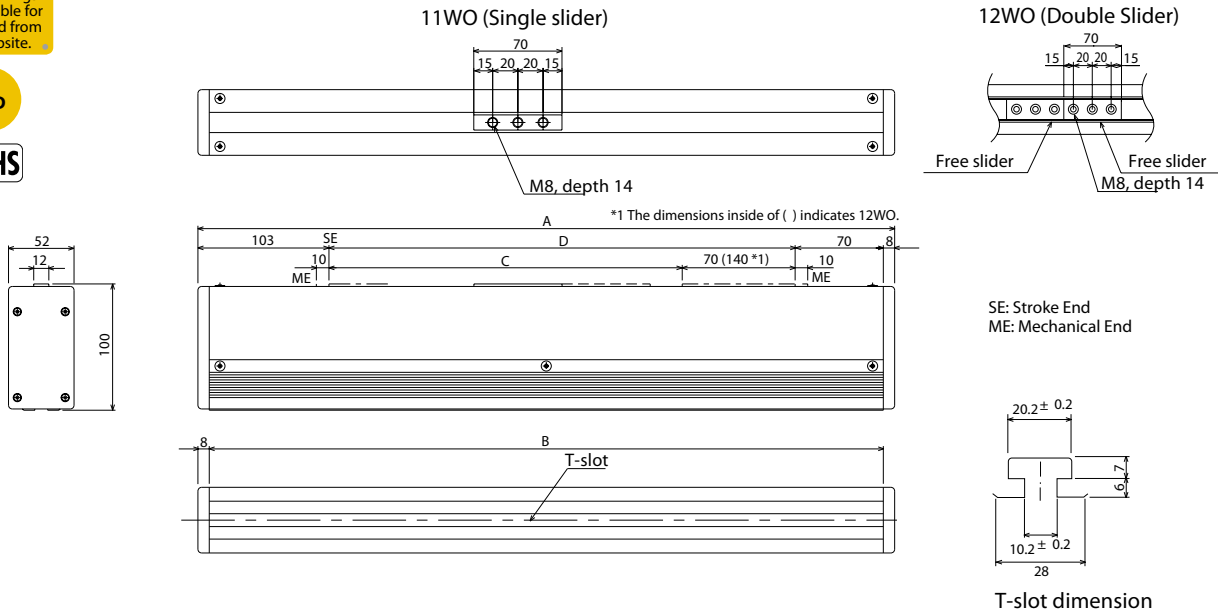
Positioning repeatability	—
Drive method	—
Lost Motion	—
Allowable static load moment	Refer to P. FS-10 (Technical Reference)
Allowable dynamic load moment	Refer to P. FS-11 (Technical Reference)
Overhang load length	Refer to P. FS-11 (Technical Reference)
Base	Material: Aluminum, with white alumite treatment
Cable length	—
Ambient operating temperature/humidity	0 to 40°C, 85%RH max. (non-condensing)

## Diagram

CAD drawings are available for download from our website.

2D CAD

RoHS



\* Refer to P. FS-12 for the actuator installation method.

### FS-11WO-0

Stroke	300	400	600	800	1000	1500	2000	2500
A	551	651	851	1051	1251	1751	2251	2751
B	535	635	835	1035	1235	1735	2235	2735
C	300	400	600	800	1000	1500	2000	2500
D	370	470	670	870	1070	1570	2070	2570
Mass (kg)	4.9	5.6	6.7	8.3	9.6	12.9	16.3	19.6
Payload (kg)	—							

### FS-12WO-0

Stroke	300	400	600	800	1000	1500	2000	2500
A	651	751	951	1151	1351	1851	2351	2851
B	635	735	935	1135	1335	1835	2335	2835
C	330	430	630	830	1030	1530	2030	2530
D	470	570	770	970	1170	1670	2170	2670
Mass (kg)	5.6	6.2	7.6	8.9	10.2	13.6	16.9	20.3
Payload (kg)	—							

\* 300~2500mm strokes are available in 100mm increments.  
Dimensions A~D increase by 100mm for every 100mm stroke increment.

## Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—

# FS-LM-400

Single-axis robot / Large belt type / Actuator width: 75mm / 400W  
High-payload specification



## Model Specification Items

<b>FS</b>	Series	Type	Encoder type	<b>400</b>	Motor type	Stroke	Applicable controller	Cable length	Options
11LM: Single slider specification 12LM: Double slider specification		A: Absolute specification I: Incremental specification	400: 400W 1000: 1000mm 3000: 3000mm (in 100mm increments)	T1: XSEL-KE/KET T2: SCON SSEL XSEL-P/Q	N: None S: 3m M: 5m X□□: Specified length	Refer to the options table below.			

## Model Number/Specification

Model number	Encoder type	Motor output (W)	Slider	Stroke in 100mm increments (mm)	Speed (mm/s)	Payload (Note 1)		Rated thrust (N)
						Horizontal (kg)	Vertical (kg)	
FS-11LM-①-400-②-③-④-⑤	Absolute Incremental	400	Single	1000~3000	1~1250	15	Designed exclusively for horizontal use	196
FS-12LM-①-400-②-③-④-⑤			Double			60 (Note 2)		

\* In the above model numbers, ① indicates the encoder type, ② indicates the stroke, ③ indicates the applicable controller, ④ indicates the cable length, and ⑤ indicates the option(s).

## Option

Name	Model number	Reference page	Notes
Reversed-home specification	NM	—	Available for 11LM only
No motor (cover only)	NQ	—	
Motor positioned on the opposite side	R	—	
Motor positioned at the bottom	U	—	Custom-order

## Common Specifications

Positioning repeatability	±0.08mm
Drive method	Timing belt
Lost Motion	0.1mm max.
Allowable static load moment	Refer to P. FS-10 (Technical Reference)
Allowable dynamic load moment	Refer to P. FS-11 (Technical Reference)
Overhang load length	Refer to P. FS-11 (Technical Reference)
Base	Material: Aluminum, with white alumite treatment
Applicable controller	T1: XSEL-KE/KET T2: XSEL-P/Q, SSEL, SCON
Cable length (Note 3)	N: None, S: 3m, M: 5m, X□□: Specified length
Ambient operating temperature/humidity	0 to 40°C, 85%RH max. (non-condensing)

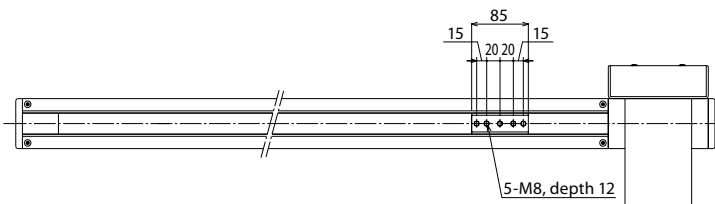
## Diagram

CAD drawings are available for download from our website.

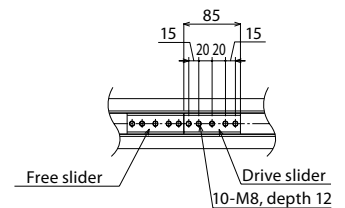
2D CAD

RoHS

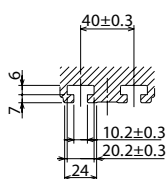
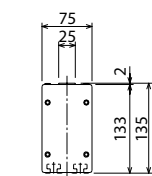
11LM (Single slider)



12LM (Double slider)



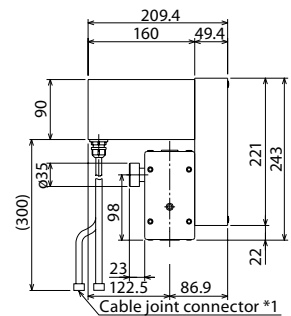
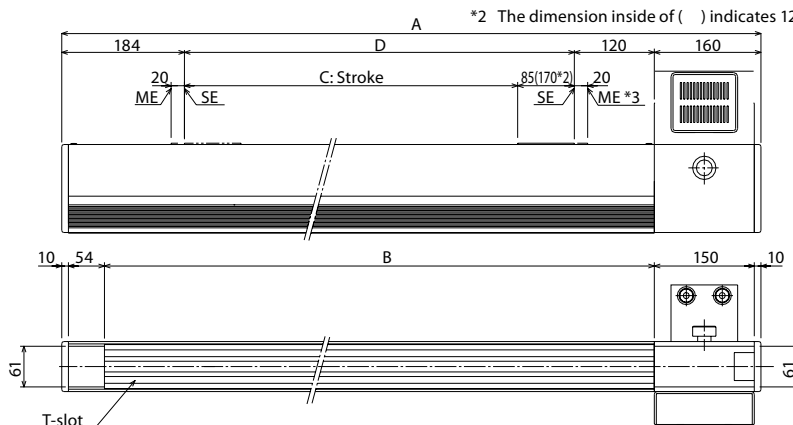
SE: Stroke End  
ME: Mechanical End



T-slot dimension

\* Refer to P. FS-12 for the actuator installation method.

\*2 The dimension inside of ( ) indicates 12LM.



\*1 Connect the motor cable and encoder cable. Refer to the back page for the cables.

\*3 During the home return, the slider moves to the ME, so pay attention not to let the slider hit surrounding parts.

FS-11LM-400

Stroke	1000	1500	2000	2500	3000
A	1549	2049	2549	3049	3549
B	1325	1825	2325	2825	3325
C	1000	1500	2000	2500	3000
D	1085	1585	2085	2585	3085
Mass (kg)	28	34	40	47	53
Payload (kg)	15				

\* 1000~3000mm strokes are available in 100mm increments.  
Dimensions A~D increase by 100mm for every 100mm stroke increment.

FS-12LM-400

Stroke	1000	1500	2000	2500	3000
A	1649	2149	2649	3149	3649
B	1425	1925	2425	2925	3425
C	1015	1515	2015	2515	3015
D	1185	1685	2185	2685	3185
Mass (kg)	31	37	43	49	56
Payload (kg)	60				

## Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page
X-SEL-P/Q	6 axes	Absolute/ incremental	Program	Single/three-phase 230 VAC	—
X-SEL-KE/KET	4 axes			Single-phase 115/230 VAC	—
SSEL	2 axes			—	—
SCON	1 axis			Positioner pulse train control	Single-phase 230 VAC



- (Note 1) The payload is the value when operated at 0.3 G acceleration.
- (Note 2) Note that when the stroke increases, the payload will drop. (Refer to the tables above for payload by stroke.)
- (Note 3) The maximum cable length is 30 m. Specify a desired length in meters. (Example. X08 = 8 m)



# FS-HM-400

Single-axis robot / Large belt type / Actuator width: 75mm / 400W  
High-speed specification



## Model Specification Items

<b>FS</b>	Type	Encoder type	<b>400</b>	Motor type	Stroke	Applicable controller	Cable length	Options
11HM: Single slider specification 12HM: Double slider specification	A: Absolute specification I: Incremental specification	400: 400W 1000: 1000mm 3000: 3000mm (in 100mm increments)	T1: XSEL-KE/KET T2: SCON SSEL XSEL-P/Q	N: None S: 3m M: 5m X□□: Specified length	Refer to the options table below.			

## Model Number/Specification

Model number	Encoder type	Motor output (W)	Slider	Stroke in 100mm increments (mm)	Speed (mm/s)	Payload (Note 1)		Rated thrust (N)
						Horizontal (kg)	Vertical (kg)	
FS-11HM-①-400-②-③-④-⑤	Absolute Incremental	400	Single	1000~3000	1~2000	10	Designed exclusively for horizontal use	127
FS-12HM-①-400-②-③-④-⑤			Double			40 (Note 2)		

\* In the above model numbers, ① indicates the encoder type, ② indicates the stroke, ③ indicates the applicable controller, ④ indicates the cable length, and ⑤ indicates the option(s).

## Option

Name	Model number	Reference page	Notes
Reversed-home specification	NM	—	Available for 11HM only
No motor (cover only)	NQ	—	
Motor positioned on the opposite side	R	—	
Motor positioned at the bottom	U	—	Custom-order

## Common Specifications

Positioning repeatability	±0.08mm
Drive method	Timing belt
Lost Motion	0.1mm max.
Allowable static load moment	Refer to P. FS-10 (Technical Reference)
Allowable dynamic load moment	Refer to P. FS-11 (Technical Reference)
Overhang load length	Refer to P. FS-11 (Technical Reference)
Base	Material: Aluminum, with white alumite treatment
Applicable controller	T1: XSEL-KE/KET T2: XSEL-P/Q, SSEL, SCON
Cable length (Note 3)	N: None, S: 3m, M: 5m, X□□: Specified length
Ambient operating temperature/humidity	0 to 40°C, 85%RH max. (non-condensing)

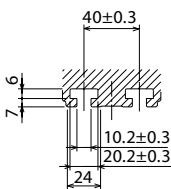
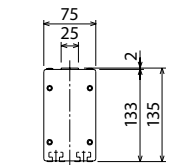
## Diagram

CAD drawings are available for download from our website.

2D CAD

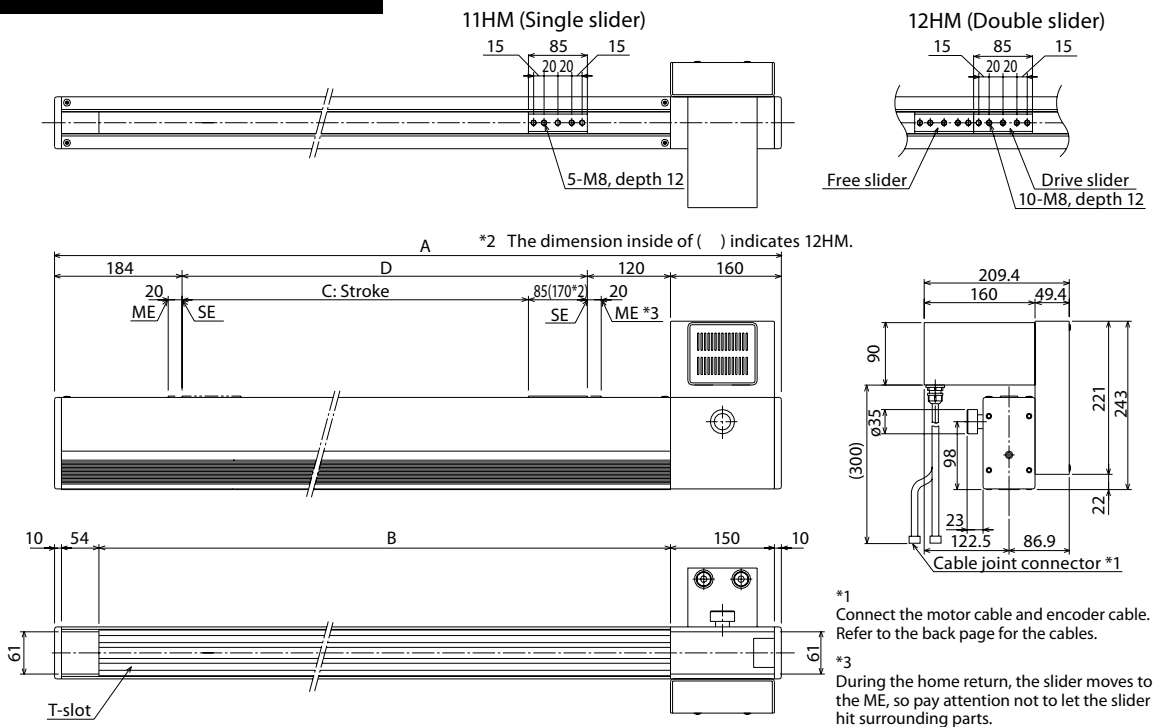
RoHS

SE: Stroke End  
ME: Mechanical End



T-slot dimension

\* Refer to P. FS-12 for the actuator installation method.



### FS-11HM-400

Stroke	1000	1500	2000	2500	3000
A	1549	2049	2549	3049	3549
B	1325	1825	2325	2825	3325
C	1000	1500	2000	2500	3000
D	1085	1585	2085	2585	3085
Mass (kg)	28	34	40	47	53
Payload (kg)	10				

\* 1000~3000mm strokes are available in 100mm increments.  
Dimensions A~D increase by 100mm for every 100mm stroke increment.

### FS-12HM-400

Stroke	1000	1500	2000	2500	3000
A	1649	2149	2649	3149	3649
B	1425	1925	2425	2925	3425
C	1015	1515	2015	2515	3015
D	1185	1685	2185	2685	3185
Mass (kg)	31	37	43	49	56
Payload (kg)	40				

## Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page
X-SEL-P/Q	6 axes	Absolute/ incremental	Program	Single/three-phase 230 VAC	—
X-SEL-KE/KET	4 axes			Single-phase 115/230 VAC	—
SSEL	2 axes			—	—
SCON	1 axis			Positioner pulse train control	Single-phase 230 VAC



- (Note 1) The payload is the value when operated at 0.3 G acceleration.
- (Note 2) Note that when the stroke increases, the payload will drop. (Refer to the tables above for payload by stroke.)
- (Note 3) The maximum cable length is 30 m. Specify a desired length in meters. (Example. X08 = 8 m)

# FS-LO

Single-axis robot / Actuator width: 75mm / Large guide module



## Model Specification Items

<b>FS</b> Series	<input type="checkbox"/> Type	<b>0</b> Motor type	<input type="checkbox"/> Stroke
11LO: Single slider specification 12LO: Double slider specification		0: No motor 1000: 1000mm 3000: 3000mm (in 100mm increments)	

## Model Number/Specification

Model number	Encoder type	Motor output (W)	Slider	Stroke in 100mm increments (mm)	Speed (mm/s)	Payload		Rated thrust (N)
						Horizontal (kg)	Vertical (kg)	
FS-11LO-0- <input type="checkbox"/>	—	—	Single	1000~3000	—	—	—	—
FS-12LO-0- <input type="checkbox"/>			Double					

\* In the above model numbers,  indicates the stroke.

## Option

Name	Model number	Reference page	Notes

## Common Specifications

Positioning repeatability	—
Drive method	—
Lost Motion	—
Allowable static load moment	Refer to P. FS-10 (Technical Reference)
Allowable dynamic load moment	Refer to P. FS-11 (Technical Reference)
Overhang load length	Refer to P. FS-11 (Technical Reference)
Base	Material: Aluminum, with white alumite treatment
Cable length	—
Ambient operating temperature/humidity	0 to 40°C, 85%RH max. (non-condensing)

## Diagram

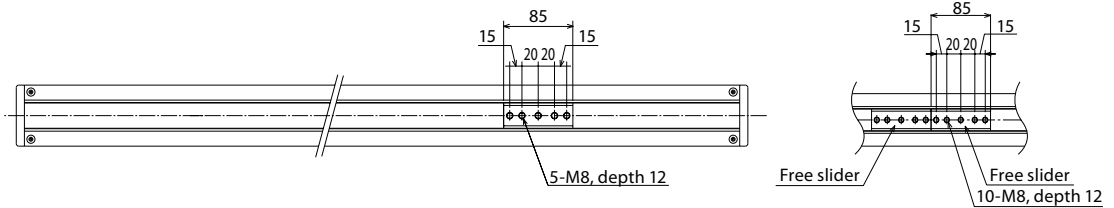
CAD drawings are available for download from our website.

2D CAD

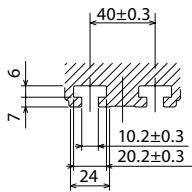
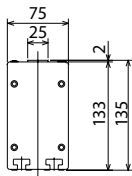
RoHS

11LO (Single slider)

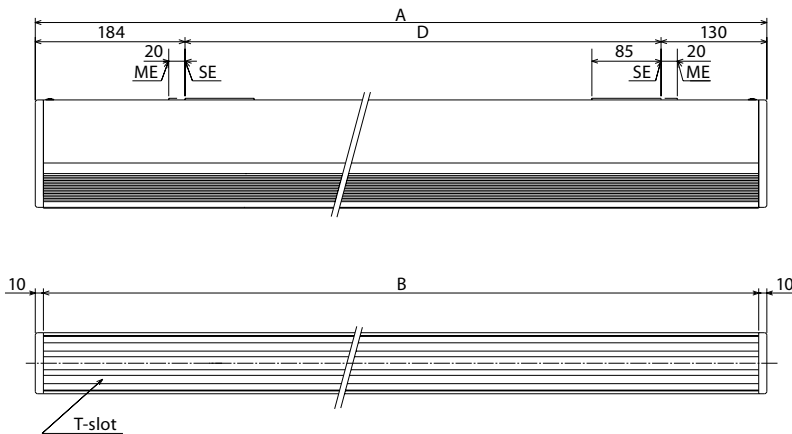
12LO (Double slider)



SE: Stroke End  
ME: Mechanical End



T-slot dimension



FS-11LO-0

Stroke	1000	1500	2000	2500	3000
A	1403	1903	2403	2903	3403
B	1379	1879	2379	2879	3379
C	1000	1500	2000	2500	3000
D	1085	1585	2085	2585	3085
Mass (kg)	19	25	31	38	44
Payload (kg)	—				

FS-12LO-0

Stroke	1000	1500	2000	2500	3000
A	1503	2003	2503	3003	3503
B	1479	1979	2479	2979	3479
C	1015	1515	2015	2525	3025
D	1185	1685	2185	2685	3185
Mass (kg)	22	28	34	40	46
Payload (kg)	—				

\* Refer to P. FS-12 for the actuator installation method.

\* 1000~3000mm strokes are available in 100mm increments.  
Dimensions A~D increase by 100mm for every 100mm stroke increment.

## Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—

# Allowable Dynamic Moment and Allowable Static Moment

There are two types of moment that can be applied to the the guide: the allowable dynamic moment and the allowable static moment. The allowable dynamic moment is calculated from the travel life (when flaking occurs) when moved with the moment load applied. In contrast, the static moment is calculated from the load that causes permanent deformation to the steel ball or its rolling surface (i.e. rated static moment), taking into account the rigidity and deformity of the base.

## [Allowable Dynamic Moment]

IAI's catalog contains the allowable dynamic moments based on a load coefficient of 1.2 and 10 000km or 5 000km. This value is different from the so-called basic rated dynamic moment, which is based on a 50km travel life. To calculate the basic rated dynamic moment for a 50km travel life, use the following equation.

$$M_{50} = f_w \times M_s \div \left(\frac{50}{S}\right)^{\frac{1}{3}} \dots \text{Equation 1}$$

$M_s$  : Allowable dynamic moment at an assumed travel distance (catalog value)  
 $S$  : IAI catalog assumed travel life (5000km or 10000km)  
 $f_w$  : Load coefficient (=1.2)  
 $M_{50}$  : Basic rated dynamic moment (50km travel life)

The allowable dynamic moments mentioned in the catalog (10,000km or 5,000km life) are based on a load coefficient  $f_w=1.2$ . To calculate the service life of a guide with a different load coefficient, use Table 1 below to determine the load coefficient that matches your requirements.

Table 1: Load Coefficients

Operation and Load Requirements	Load Coefficient $f_w$
Slow operation with light vibration/shock (1500mm/s or less, 0.3G or less)	1.0~1.5
Moderate vibration/shock, abrupt braking and accelerating (2500mm/s or less, 1.0G or less)	1.5~2.0
Operation with abrupt acceleration/deceleration with heavy vibration/shock (2500mm/s or faster, 1.0G or faster)	2.0~3.5

$$L_{10} = \left(\frac{C_{IA}}{P} \cdot \frac{1.2}{f_w}\right)^3 \times S \dots \text{Equation (2)}$$

$L_{10}$  : Service life (90% Survival Probability)  
 $C_{IA}$  : Allowable dynamic moment in IAI Catalog (5000km or 10000km)  
 $P$  : Moment used ( $\leq C_{IA}$ )  
 $S$  : IAI catalog assumed travel life (5000km or 10000km)  
 $f_w$  : Load coefficient (from Table 1)

## [Allowable Static Moment]

The maximum moment that can be applied to a slider at rest. These values are calculated by taking the basic rated static moment of the slider and multiplying with the safety rate that takes into consideration any effects from the rigidity and deformity of the base. Therefore, if a moment load is applied to the slider at rest, keep the moment within this allowable static moment. However, use caution to avoid adding any unexpected shock load from any inertia that reacts on the load.

## [Basic Rated Static Moment]

The basic rated static moment is the moment value at which the sum of the permanent deformation at the center of contact between the rolling body (steel ball) and the rolling surface (rail) is 0.0001 times the diameter of the rolling body. These values are simply calculated strictly from the permanent deformation done to the steel ball and its rolling surface. However, the actual moment value is restricted by the rigidity and deformation of the base. Hence, the allowable static moment the actual moment that can be applied statically, taking into account those factors.

# FS Series Technical Reference

## Allowable dynamic moment, Overhang load length

With each type of FS Series, a single or double slider can be selected. The allowable dynamic moment and overhang load length vary depending on the length of the slider. Refer to the typical examples shown below.

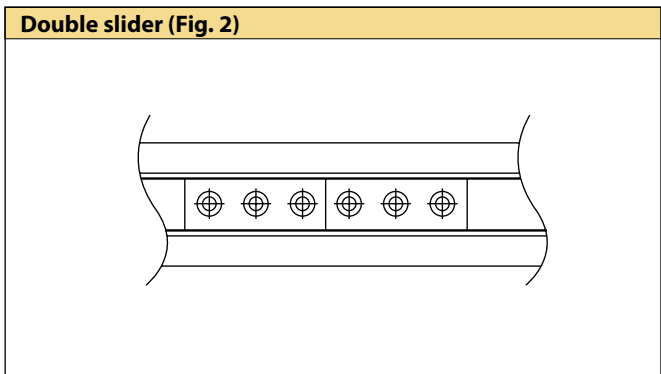
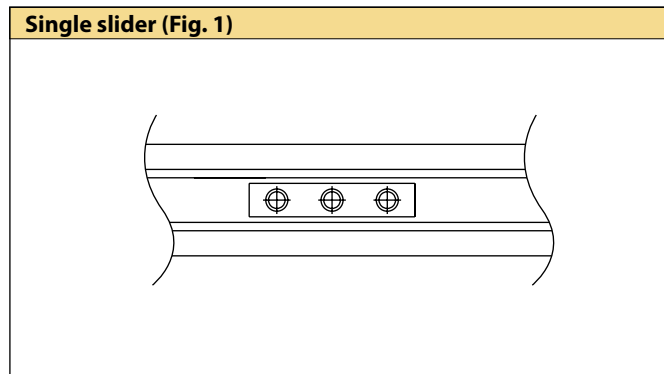
**Directions of allowable dynamic moments**

■ Allowable dynamic moment values are based on a 20000 km service life. Please note that applying a moment exceeding the allowable value will reduce the service life of the guide.

**Directions of load moments**

**Overhang load length**

■ When each model is used with an overhang load exceeding the allowable length, vibration may occur. Be sure to keep the overhang load length within the allowable value.



Type			Allowable dynamic moment (*) N·m (Kgf·m)	Overhang L mm
FS-11NM FS-11NO	Fig. 1	Single slider	Ma: 2.9(0.3) Mb: 2.9(0.3) Mc: 4.5(0.46)	Ma, Mb, Mc directions: 200mm or less
FS-12NM FS-12NO	Fig. 2	Double slider (when sliders are joined together)	Ma: 20.5(2.1) Mb: 18.6(1.9) Mc: 9.1(0.93)	Ma, Mb, Mc directions: 500mm or less
FS-11WM FS-11WO	Fig. 1	Single slider	Ma: 4.4(0.45) Mb: 3.9(0.4) Mc: 5.8(0.6)	Ma, Mb, Mc directions: 240mm or less
FS-12WM FS-12WO	Fig. 2	Double slider (when sliders are joined together)	Ma: 27.4(2.8) Mb: 25.4(2.6) Mc: 11.7(1.2)	Ma, Mb, Mc directions: 600mm or less
FS-11LM FS-11LO FS-11HM	Fig. 1	Single slider	Ma: 8.8(0.9) Mb: 7.8(0.8) Mc: 12.7(1.3)	Ma, Mb, Mc directions: 300mm or less
FS-12LM FS-12LO FS-12HM	Fig. 2	Double slider (when sliders are joined together)	Ma: 51.9(5.3) Mb: 47.0(4.8) Mc: 25.4(2.6)	Ma, Mb, Mc directions: 750mm or less

(\*) For case of 20000km service life (fw=1.2)

# FS Actuator Installation Method / Mounting Orientation

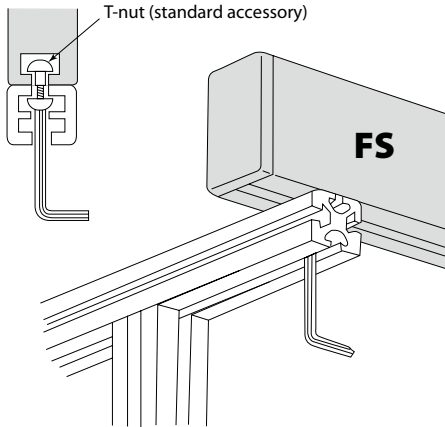
## Installation method

### FS Series

**NM, NO, WM, WO, LM, LO, HM**

■ Using the T-groove on the back of the base, secure the body with the T-nut supplied with the actuator.

- FS-NM (T-slot 1 line) : T-nut M8
- FS-NO (T-slot 1 line) : T-nut M8
- FS-WM (T-slot 1 line) : T-nut M8
- FS-WO (T-slot 1 line) : T-nut M8
- FS-LM (T-slot 2 lines) : T-nut M8
- FS-LO (T-slot 2 lines) : T-nut M8
- FS-HM (T-slot 2 lines) : T-nut M8



T-nut (standard accessory)





■ Quantity of T-nut included

Stroke	Quantity
300~1000	5
1100~1500	6
1600~2000	7
2100~2500	8
2600~3000	9

\* Double the numbers for LM/LO/HM models.

## Mounting orientation

○: Installable —: Not installable

		Orientation			
					
Series	Type	Horizontal, flat	Vertical	Side-mounted	Ceiling mounted
FS	HL-400 HM-400 LO	○	—	—	○

# Spare Parts

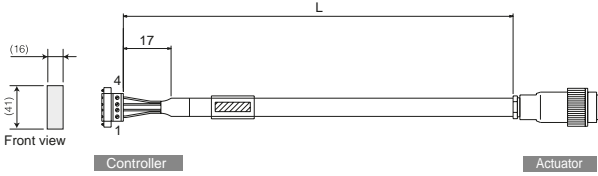
## Motor Cable / Encoder Cable

These are joint robot cables to connect the actuator cable joint connector and the controller. There are two kinds of cables; a motor cable for the motor power, and an encoder cable for the encoder signals. All the motor/encoder cables are high-flexible robot cables with metal connectors.

### EU Motor Cable (for XSEL-KE/KET/P/Q, SSEL, SCON)

Model: **CB-XEU-MA**□□□

\* □□□ is the cable length (L); supports up to 30m.  
Example: 080 = 8m

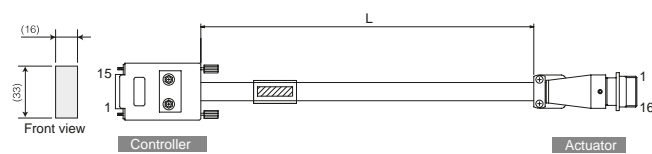


Wire	Color	Signal	No.	No.	Signal	Color	Wire
0.75sq	Green	PE	1	1	U	Red	0.75sq (Crimp)
	Red	U	2	2	V	White	
	White	V	3	3	W	Black	
	Black	W	4	4	PE	Green	

### EU Encoder Cable (for XSEL-KE/KET)

Model: **CB-XEU-PA**□□□

\* □□□ is the cable length (L); supports up to 30m.  
Example: 080 = 8m



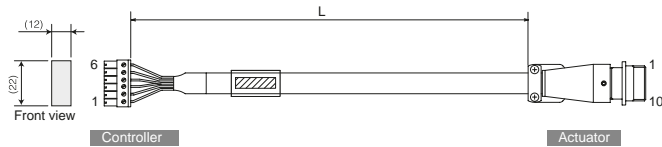
Wire	Color	Signal	No.	No.	Signal	Color	Wire
0.15sq (Crimp)	-	-	1	1	SD	Blue	0.15sq soldered
	-	-	2	2	SD	Orange	
	-	-	3	3	-	-	
	-	-	4	4	-	-	
	-	-	5	5	-	-	
	-	-	6	6	-	-	
	-	-	7	7	-	-	
	Blue	SD	8	8	-	-	
	Orange	SD	9	9	-	-	
	Black	BAT+	10	10	VCC	Green	
	Yellow	BAT-	11	11	GND	Brown	
	Green	VCC	12	12	BAT+	Black	
	Brown	GND	13	13	BAT-	Yellow	
	Gray	BK-	14	14	-	-	
	Red	BK+	15	15	BK-	Gray	
-	-	16	16	BK+	Red		

Connect the shielded wire to the hood using a clamp.  
A shield is connected to shield soldered part.  
Drain line or shield braided wire

### EU Limit Switch Cable (for XSEL-KE/KET)

Model: **CB-XEU-LC**□□□

\* □□□ is the cable length (L); supports up to 30m.  
Example: 080 = 8m



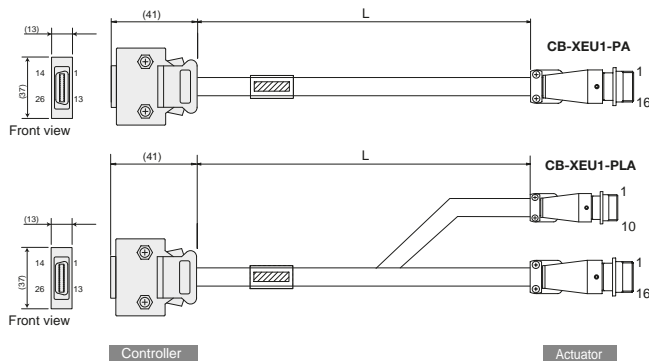
Wire	Color	Signal	No.	No.	Signal	Color	Wire	
AWG24	Light Blue	24VOUT	6	1	24V OUT	Sky Blue	AWG 24 (crimp)	
	Pink	N	5	2	n	Pink		
	Grass	LS	4	3	-	-		
	Pink	CREEP	3	4	LS	Line Green		
	Gray	OT	2	5	CREEP	Orange		
	1B/Light Blue	RSV	1	6	O.T	Gray		
	-	-	-	2	7	RSV		1B/Sky Blue
	-	-	-	3	8	-		-
	-	-	-	4	9	-		-
	-	-	-	5	10	-		-

Note) "1B" indicates one black dot mark.

### EU Encoder Cable / EU Limit Switch Encoder Cable (for XSEL-P/Q, SSEL, SCON, and LS Limit Switch equipped connection)

Model: **CB-XEU1-PA**□□□ / **CB-XEU1-PLA**□□□

\* □□□ is the cable length (L); supports up to 30m.  
Example: 080 = 8m



Wire	Color	Signal	No.	No.	Signal	Color	Wire		
AWG26 (soldered)	-	-	10	1	E24V	White/Blue	0.15sq soldered		
	White/Blue	E24V	12	2	0V	White/Yellow			
	White/Yellow	OV	13	3	LS	White/Blue			
	White/Red	LS	26	4	CLEEP	White/Blue			
	White/Black	CLEEP	25	5	OT	White/Pink			
	White/Purple	OT	24	6	RSV	White/Gray			
	White/Gray	RSV	23	7	-	-			
	-	-	-	8	8/9/10	-			
	-	-	-	9	-	-			
	-	-	-	18	1	SD		Orange	0.15sq soldered
	-	-	-	19	2	SD		Green	
	-	-	A+	1	3	-		-	
	-	-	A-	2	4	-		-	
-	-	B+	3	5	-	-			
-	-	B-	4	6	-	-			
-	-	Z+	5	7	-	-			
-	-	Z-	6	8	-	-			
Orange	SRD+	7	9	-	-				
Green	SRD-	8	10	VCC	Red				
Purple	BAT+	14	11	GND	Black				
Gray	BAT-	15	12	BAT+	Purple				
Red	VCC	16	13	BAT-	Gray				
Black	GND	17	14	-	-				
Blue	BKR-	20	15	BK-	Blue				
Yellow	BKR+	21	16	BK+	Yellow				
-	-	22	-	-	-				

Connect the shield to the hood via a clamp.  
A shield is connected to shield soldered part.  
Drain line or shield braided wire