



FS/IF Belt-Drive Type

First Step Guide First Edition

Thank you for purchasing our product.
Make sure to read the Safety Guide and detailed Instruction Manual (CD) included with the product in addition to this First Step Guide to ensure correct use.
This Instruction Manual is original.



Warning : Operation of this equipment requires detailed installation and operation instructions which are provided on the CD Manual included in the box this device was packaged in. It should be retained with this device at all times.
A copy of the CD Manual can be requested by contacting your nearest IAI Sales Office listed at the back cover of the Instruction Manual or on the First Step Guide.

- Using or copying all or part of this Instruction Manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

Product Check

This product is comprised of the following parts if it is of standard configuration.
If you find any fault in the contained model or any missing parts, contact us or our distributor.

1. Parts (The option is excluded.)

No.	Part Name	Model	Remarks
1	Actuator Main Body	[Refer to "2. How to read the model plate", "3. How to read the model"]	
Accessories			
2	Motor • Encoder Cable	Please refer to [Wiring] for the applicable cables.	
3	Home Position Marking Sticker		
4	T-Nut		Enclosed in FS(Note)
5	First Step Guide		
6	Instruction Manual (CD)		
7	Safety Guide		

(Note) Quantity of T-nuts enclosed in FS

Stroke	NM, WM	LM
to 1000	5	10
to 1500	6	12
to 2000	7	14
to 2500	8	16
to 3000	9	18
to 3500	10	20
to 4000	11	22

2. How to read the model plate

Model	MODEL FS-11NM-I-60-200-T1-S-NM
Serial number	SERIAL No.800061910 A1 MADE IN JAPAN

3. How to read the model

3.1 FS Actuator

FS - 11NM - I - 60 - 200 - T1 - S - NM

<Series>	<Option>
<Type>	D1 : Stainless Steel Sheet Type (Slider length 200mm) Corresponding to 12NM and 12WM only
11NM : Body width 40mm, Single Slider Type	D2 : Stainless Steel Sheet Type (Slider length 300mm) Corresponding to 12NM and 12WM only
12NM : Body width 40mm, Double Slider Type	NM : Reversed Home Specification
11WM : Body width 52mm, Single Slider Type	NQ : No motor equipped (Motor cover equipped)
12WM : Body width 52mm, Double Slider Type	R : Motor on Other Side
11LM : Body width 75mm, High-Transportable Single Slider Type	U : Motor Located on Bottom
12LM : Body width 75mm, High-Transportable Double Slider Type	
11HM : Body width 75mm, High-Speed Single Slider Type	<Cable Length>
12HM : Body width 75mm, High-Speed Double Slider Type	N : None
	P : 1m
	S : 3m
	M : 5m
	X□□: Specified Length (Example: X07=7m)
<Encoder Type>	<Applicable Controller>
A : Absolute	T1 : XSEL-J/K
I : Incremental	T2 : SCON
	SSEL
	XSEL-P/Q
<Motor Type>	
60 : 60W	200 : 200W
100 : 100W	400 : 400W
<Stroke>	

[Refer to the Catalog or Instruction Manual (CD) for specification details.]

3.2 FS Guide Module

FS - 11NO - 0 - 300 - D1

<Series>	<Option>
<Type>	D1 : Stainless Steel Sheet Type (Slider length 200mm) Corresponding to 12WO and 12WM only
11NO : Body width 40mm, Single Slider Type	D2 : Stainless Steel Sheet Type (Slider length 300mm) Corresponding to 12WO and 12WM only
12NO : Body width 40mm, Double Slider Type	
11WO : Body width 52mm, Single Slider Type	<Stroke>
12WO : Body width 52mm, Double Slider Type	<Motor Type>
11LO : Body width 75mm, Single Slider Type	No motor equipped
12LO : Body width 75mm, Double Slider Type	

3.3 IF Actuator

IF - SA1L - I - 60 - 200 - T1 - S - AQ

<Series>	<Option>
<Type>	AQ : AQ Seal
SA1L : Small, Standard	C : Creep Sensor (CL : Located on Other Side)
SA2L : Small, Motor Located on Side	L : Home Limit Switch (LL : Located on Other Side)
SA3L : Small, Motor Located on Bottom	NM : Reversed Home Specification
SA1R : Small, Motor on Other Side	RT : Ball Retainer Guide
SA2R : Small, Motor Horizontally Located on Other Side	W : 2nd-Slider
SA3R : Small, Motor Located on Bottom on Other Side	<Cable Length>
MA1L : Medium, Standard	N : None
MA2L : Medium, Motor Located on Side	S : 3m
MA3L : Medium, Motor Located on Bottom	M : 5m
MA1R : Medium, Motor on Other Side	X□□: Specified Length (Example: X07=7m)
MA2R : Medium, Motor Horizontally Located on Other Side	<Applicable Controller>
MA3R : Medium, Motor Located on Bottom on Other Side	T1 : XSEL-J/K
	T2 : SCON
	SSEL
	XSEL-P/Q
<Encoder Type>	<Stroke>
A : Absolute	
I : Incremental	
<Motor Type>	
60 : 60W	200 : 200W
100 : 100W	400 : 400W

[Refer to the Catalog or Instruction Manual (CD) for specification details.]

Precautions in Handling

1. Handling of Robot

1.1 Handling of the Packed Product

- Unless otherwise specified, the actuator is shipped with each axis packaged separately.
- Do not damage or drop. The package is not supplied with any special treatment that enables it to resist an impact caused by a drop or crash.
- Transport a heavy package with at least more than two operators. Consider an appropriate method for transportation.
- If the shipping box is to be left standing, it should be in a horizontal position. Follow the instruction if there is any for the packaging condition.
- Do not step or sit on the package.
- Do not put any load that may cause a deformation or breakage of the package.

1.2 Handling of Robot without Package

- Do not carry the actuator by holding the cable, or do not move it by pulling the cable.
- Hold the body base when transporting the actuator.
- When carrying the actuator, exercise caution not to bump it against nearby objects or structures.
- Do not give any excessive force to any of the sections in the actuator.

2. Handling of Multi-Axes Type

2.1 Handling of the Packed Product

- Sliders are fixed so they would not accidentally move while in transportation. The end of the actuator is also fixed to avoid it swinging by external vibration.
- Do not damage or drop. The package is not supplied with any special treatment that enables it to resist an impact caused by a drop or crash.
- Transport a heavy package with at least more than two operators. Consider an appropriate method for transportation.
- When suspending the package using ropes, pass the ropes from underneath the reinforcement frames at the bottom of the base. When lifting with a forklift, also place the forks underneath the base.
- Do not apply an impact on the package or let it bounce when putting it down.
- Do not step or sit on the package.
- Do not put any load that may cause a deformation or breakage of the package.

2.2 Handling of Robot without Package

- Secure the sliders to prevent sudden movement during transport.
- If any end of the actuator is overhanging, secure it properly to avoid significant movement due to external vibration.
- If the actuator assembly is transported without the ends being secured, do not apply an impact of 0.3G or more.
- In the case that the actuator needs to be carried up with ropes or another method, be sure to use an appropriate cushioning to avoid the robot being deformed or put on an excessive pressure. And also, be sure to keep the robot in a stable and horizontal posture. Utilize the tapped holes on the bottom of the base to attach a tool to suspend the package if necessary.
- Be careful not to apply a load on any of the actuator brackets or covers or on the connector box. Also, avoid the cables being pinched or caused an excessive deformation.

3. Handling of Robot Mounted on Mechanical Equipment (System)

- Note the following when the whole mechanical equipment (system) that the actuator is mounted on needs to be transported.
- Secure the sliders to prevent sudden movement during transport.
- If any end of the actuator is overhanging, secure it properly to avoid significant movement due to external vibration.
- If the actuator assembly is transported without the ends being secured, do not apply an impact of 0.3G or more.
- When suspending the mechanical equipment (system) with ropes, avoid applying force to actuator, connector box, etc. Also, avoid the cables being pinched or caused an excessive deformation.

Installation Environment, Storage Environment

1. Installation Environment

An environment that satisfies the following conditions is required during installation.

- There should be no direct sunlight.
- Any radiant heat from a large heat source such as a heat treatment furnace should not be directed at the machine main body.
- The ambient temperature should be 0 to 40°C.
- The relative humidity should be 85% or less. There should not be dew condensation.
- There should be no corrosive gas or flammable gas.
- There should be no flammable dust or ignitable liquid in the surroundings.
- Oil mist or cutting liquid should not be directed at the machine.
- Chemical liquid should not be splashed on it.
- An impact or vibration should not be transmitted to it.
- There should be no strong electromagnetic waves, ultraviolet rays or radiation.
- The actuator should not be installed where it gets dipped in liquid.
- The working space required for maintenance or inspection should be secured.

2. Storage and Preservation Environment

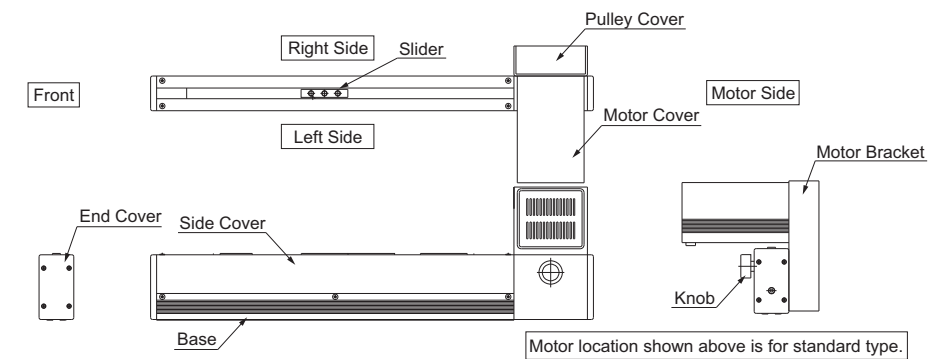
The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no dew condensation forms.
Unless specially specified, moisture absorber protection is not included in the package when the machine is delivered. In the case that the machine is to be stored in an environment where dew condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.

For storage temperature, the machine withstands temperatures up to 60°C for a short time, but in the case of the storage period of 1 month or more, control the temperature to 50°C or less.

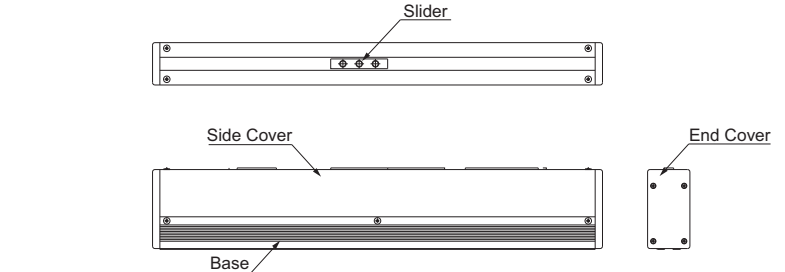
Storage and preservation should be performed in the horizontal condition.

Names of the Parts

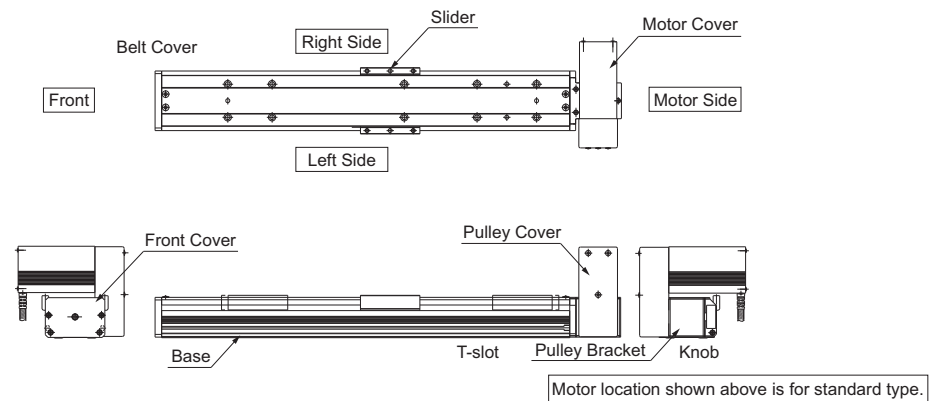
1. FS



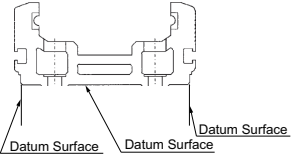
2. FS Guide Module



3. IF



Please refer to the Catalog or the Instruction Manual (CD) for the dimensions and profile.

Attachment			
Refer to the Instruction Manual (CD) for the attachments of the actuator and loads. [Precautions for Attachments]			
No.	Item	Precautions	
		FS	IF
1	Attachment Surface	<ul style="list-style-type: none">• The base has to have a structure with sufficient rigidity to prevent oscillation.• The actuator mounting surface and other surfaces that are used as a datum should be flat enough with an accuracy of machining or equivalent treatment, and the flatness of the mounting surface needs to be $\pm 0.05\text{mm/m}$ or less.• Secure the space where maintenance work can be performed. 	<ul style="list-style-type: none">• The base has to have a structure with sufficient rigidity to prevent oscillation.• For the Slider Type, the sides and the bottom surfaces of the actuator work as the datum for the slider's run. If accuracy for its run is required, use these surfaces as datums of the installation.• The actuator mounting surface and other surfaces that are used as a datum should be flat enough with an accuracy of machining or equivalent treatment, and the flatness of the mounting surface needs to be $\pm 0.05\text{mm/m}$ or less.• Secure the space where maintenance work can be performed.
2	Bolts to be used	<ul style="list-style-type: none">• For the bolts to be used, a high-tensile bolt complying with ISO-10.9 or more is recommended.• If using the tapped holes, use screws with the thread length dimension being less than the effective depth of the holes.• In case the tapped hole is a through hole, be careful so the screw tip does not exceed the surface of the tapped hole.• For the actuator mounting, use a bolt with the dimension of its effective mating length to the tapped hole size as stated below. If tapped hole in steel → thread length same as nominal diameter If tapped hole in aluminum → thread length 2 times longer than nominal diameter• If the seat for a bolt is made of aluminum, and the bolt size is M8 or above, utilize a washer dedicated for high-strength bolt to prevent the bolt seat getting sunk. It is not necessary if the bolt is M6 or smaller. Please do not apply a standard spring lock washer.	
3	Tightening Torque	<ul style="list-style-type: none">• Please follow the specification values stated in the Instruction Manual (CD) for the tightening torque. Failure to do so may cause an operation problem.	
4	Load Moment and Overhung length	<ul style="list-style-type: none">• Please follow the specification values stated in the Instruction Manual (CD) for the load moment and the overhung length. Failure to do so may cause abnormal vibration or noise, and also may remarkably shorten the product life.	

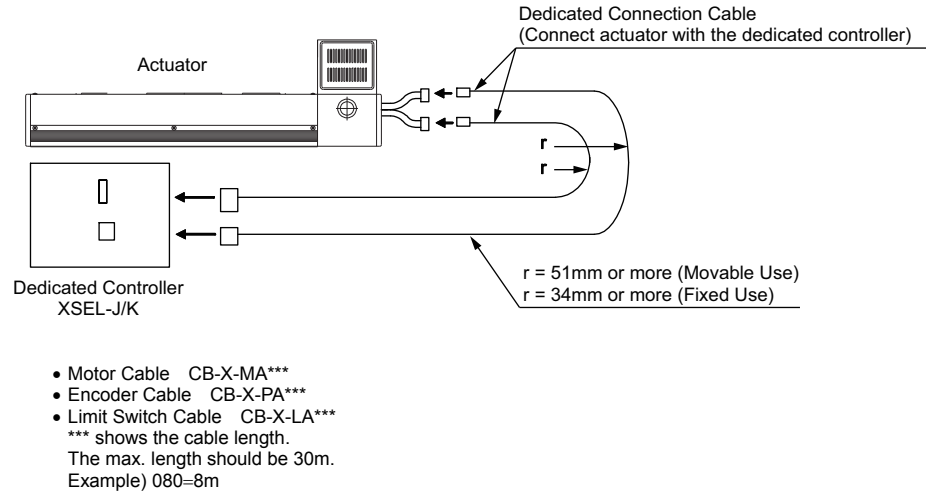
Wiring

For the controller, only the dedicated controller manufactured by our company can be used.
Use the dedicated cable enclosed in the package when connecting the actuator and the controller.

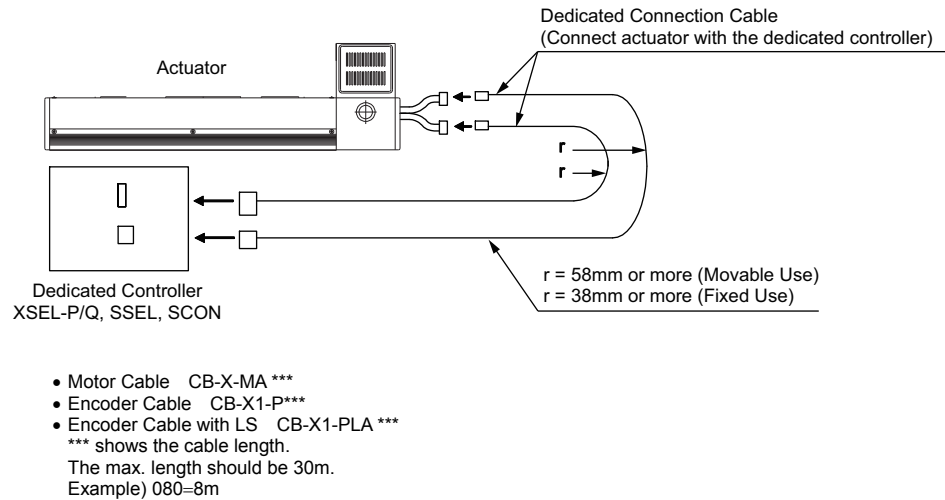
Pictures show FS, It should be the same for IF.

1. Standard Cable

[Connection to the XSEL-J/K controller]

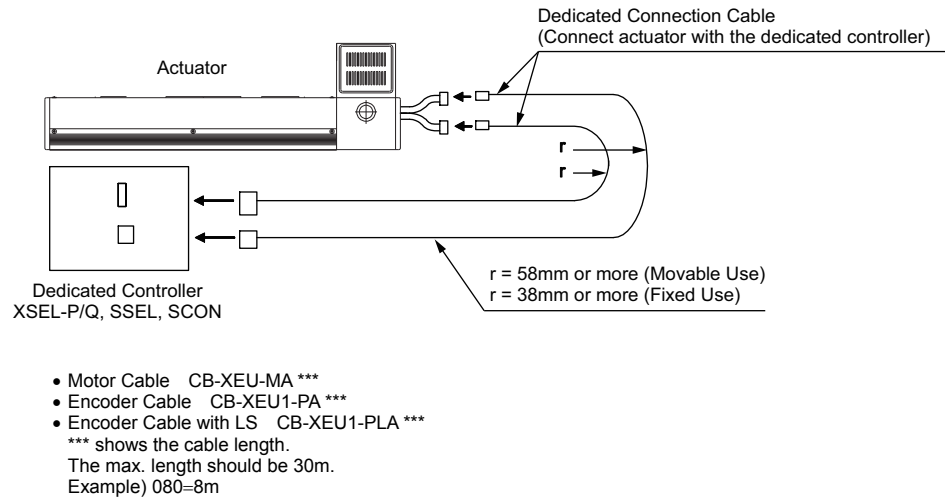


[Connection to the XSEL-P/Q, SSEL, SCON controller]



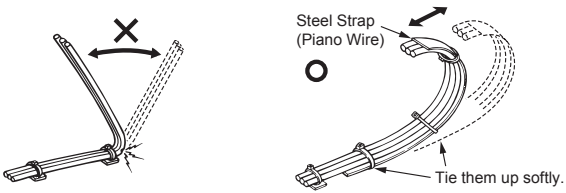
2. CE Compliance Cable

[Connection to the XSEL-P/Q, SSEL, SCON controller]

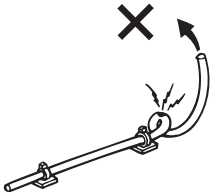


[Prohibited Items in the Cable Processing]

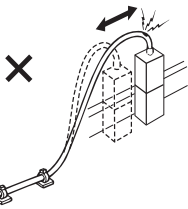
- Do not pull or bend forcibly the cable so as not to give any extra load or tension to the cable.
- Do not process the cable for extension or shortening by means of cutting out, combination or connecting with another cable.
- Do not let the cable flex at a single point.



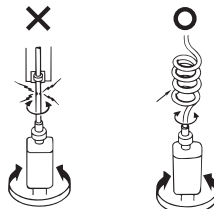
- Do not let the cable bend, kink or twist.



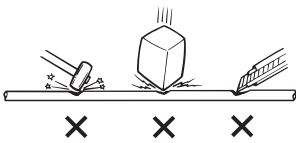
- Do not pull the cable with a strong force.



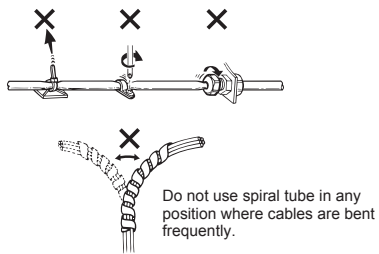
- Do not let the cable receive a turning force at a single point.



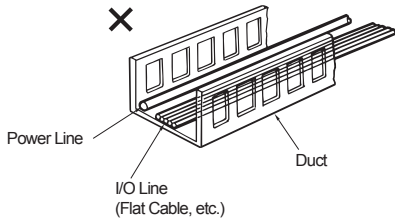
- Do not pinch, drop a heavy object onto or cut the cable.



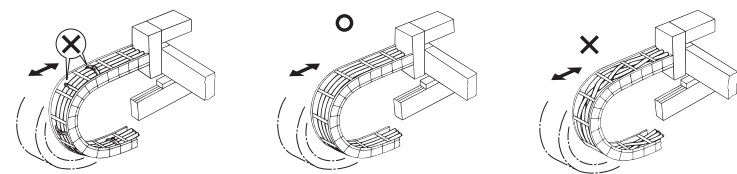
- When fixing the cable, provide a moderate slack and do not tension it too tight.



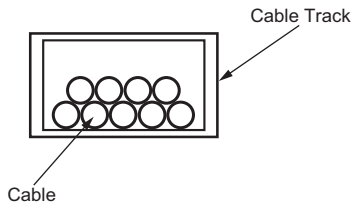
- Separate the I/O line, communication line and power line from each other. Arrange so that such lines are independently routed in the duct.



- Take care of the following items using the cable carrier.
- Arrange the wiring so that there is no entanglement or kink of the cables in the cable carrier or flexible tube, and do not bind the cables so that the cables are relatively free. (Do not bend it at an angle of 90° or less)



- The cable track capacity for cables to put in should be 60% or less to prevent cables from breaking. (Cable heat is not considered.)



Note:

- When the cable is connected or disconnected, make sure to turn off the power to the controller. When the cable is connected or disconnected with the controller power turned ON, it might cause a malfunction of the actuator and result in a serious injury or damage to the machinery.
- When the connector connection is not correct, it would be dangerous because of a malfunction of the actuator. Make sure to confirm that the connector is connected correctly.



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