IAI
Quality and Innovation

Horizontal Articulated Robot
IXA Series
Arm Length 800/1000/1200
First Step Guide Third Edition

Thank you for purchasing our product.
Make sure to read the Safety Guide and detailed Instruction Manual as well as this First Step Guide to ensure correct use.
This Instruction Manual is original.

⚠ Warning: Read the instruction manual carefully and follow the instruction manual when handling this equipment.
Please downloaded the user's manual from our website.
You can download it free of change. User registration is required for first time users.
URL:www.iai-robot.co.jp/data_dl/CAD_MANUAL/
Keep a printout of the introduction manual near the equipment in which this product is installed so that it can be checked at all times, or display it on your computer, tablet terminal, etc. so that you can check it immediately.
If you need a bound copy of the instruction manual, order it from the nearest sales office listed in the First Step Guide or at the end of the instruction manual. It will be provided for a fee.

- 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.	Item	Model Code	Quantity		Remarks
1	Robot		1 set		[Refer to 2. How to Read the Model Nameplate and 3. How to Read the Model Number]
2	Dedicated Controller		1 set		
Accessories					
3	Motor Cable		NNN	NSN/NHN/NSW/NHW	
		CB-X-MA□□□	4	3	
		CB-XMC-MA□□□	-	1	
4	Encoder Cable	CB-X1-PA□□□	4		
5	Brake Cable	CB-IXA-BK□□□-3	1		
6	Metal Collar		2		J1 Turning Limiting Stopper
7	Hex Socket Head Screw (M10×40)		2		J1 Turning Limiting Stopper
8	Hex Socket Head Screw (M8×20)		2		J2 Turning Limiting Stopper (Not enclosed in NSW/NHW)
9	Hex Socket Head Screw (M6×10)		2		J2 Turning Limiting Stopper (Not enclosed in NSW/NHW)
10	Positioning Mark Label		1		
11	Prohibition of Entry into the Operation Area		2		
12	Zip ties		10		
13	Safety Guide	M0194	1		

2. How to Read the Model Nameplate

Model Code → MODEL IXA-4NSN8020-5L-T2-**-**
Serial Number → SERIAL No.xxxxxxxxx MADE IN JAPAN

3. How to Read the Model Number

IXA-4NNN8020-5L-T2--****

<Series>
IXA SCARA Robot

<Degrees of Freedom>
4: 4-axis Type (With R-axis)

<Type>
NNN : Standard
NSN : High Speed
NHN : High Payload
NSW : High Speed Dust and Splash Proof
NHW : High Payload Dust and Splash Proof

<Arm Length / Vertical Axis>
8020: Arm length 800mm / Vertical axis 200mm
8040: Arm length 800mm / Vertical axis 400mm
10020: Arm length 1000mm / Vertical axis 200mm
10040: Arm length 1000mm / Vertical axis 400mm
12040: Arm length 1200mm / Vertical axis 400mm

<Cable Length>
N : None
5L : 5m
10L : 10m
□L : Length specification (Maximum 15m)

<Applicable Controller>
T2 : XSEL-RAX / SAX (Note 5)

<Option>
LED : Display (Note 2)
EXC : Built-in Extension User Cable Type (Note 3)
COP: Plastic Cover Nickel Plated Type (Note 4)

Identification for IAI use only (Note 1)

Note 1 Identification for IAI use only: This may be marked for the purpose of IAI. It is not an ID to describe the model code.
Note 2 It is an option for the standard type (NNN).
Note 3 It is an option for the standard type (NNN), high speed type (NSN) and high payload type (NHN).
Note 4 It is an option for the high speed dust and splash proof type (NSW) and high payload dust and splash proof type (NHW).
Note 5 The controller applicable for the high speed type (NSN), high payload type (NHN), high speed dust and splash proof type (NSW) and high payload dust and splash proof type (NHW) is only XSEL-SAX4.

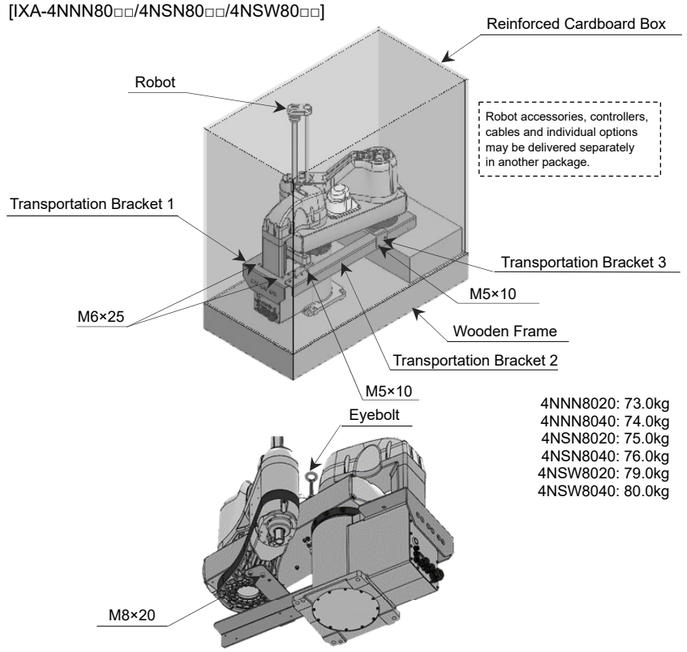
Precautions in Handling

1. Handling of the Robot

Unless otherwise specified, the robot is delivered in the package as shown in the figure below.
The transportation bracket is attached on the robot body.

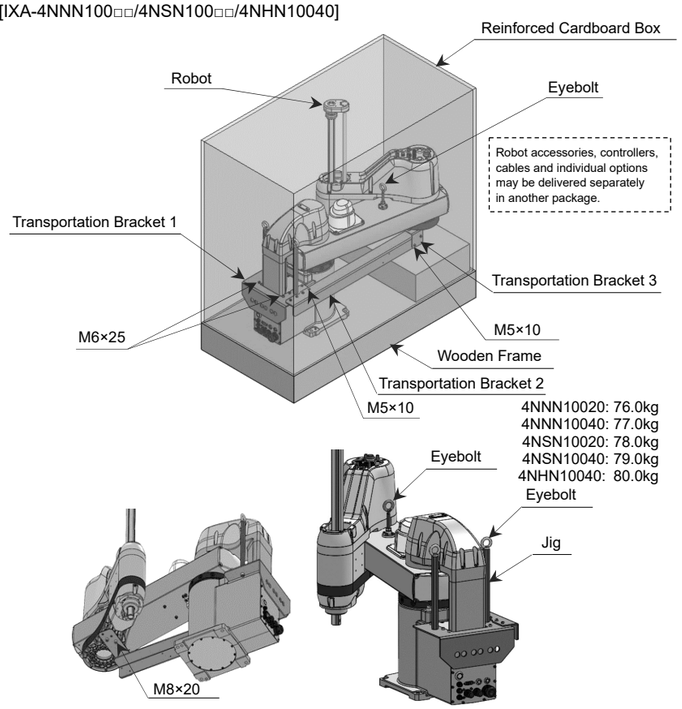
⚠ Notice:
- Detach the transportation bracket before starting operation.
- Keep the transportation bracket so it can be used when transporting or moving the robot.

[IXA-4NNN80□□/4NSN80□□/4NSW80□□]



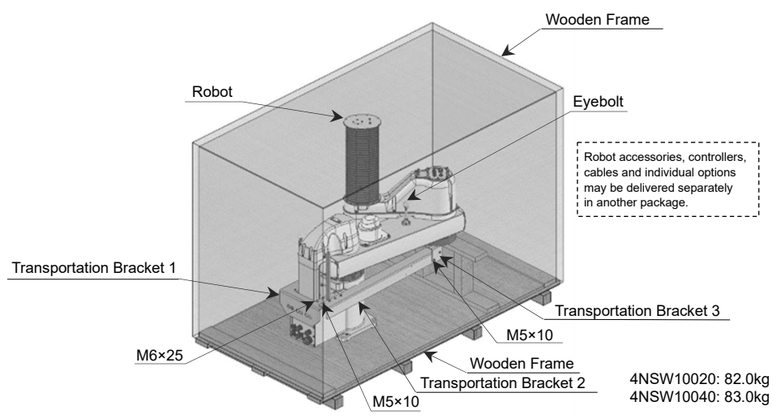
4NNN8020: 73.0kg
4NNN8040: 74.0kg
4NSN8020: 75.0kg
4NSN8040: 76.0kg
4NSW8020: 79.0kg
4NSW8040: 80.0kg

[IXA-4NNN100□□/4NSN100□□/4NHN10040]

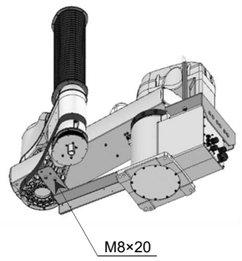


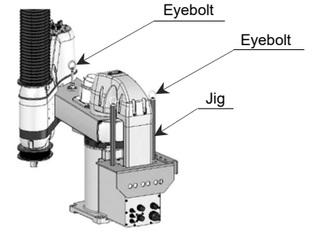
4NNN10020: 76.0kg
4NNN10040: 77.0kg
4NSN10020: 78.0kg
4NSN10040: 79.0kg
4NHN10040: 80.0kg

[IXA-4NSW100□□]

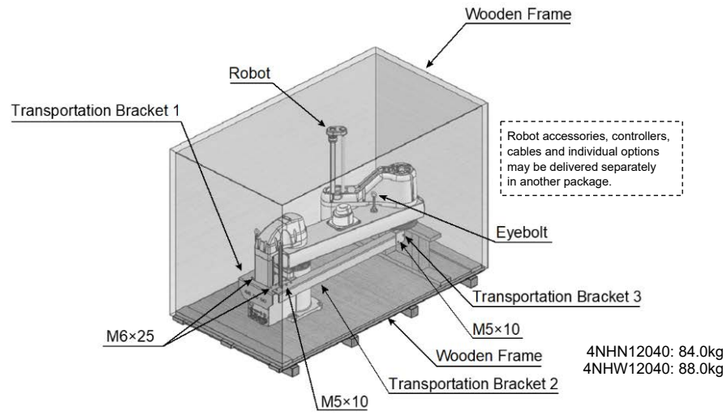


4NSW10020: 82.0kg
4NSW10040: 83.0kg

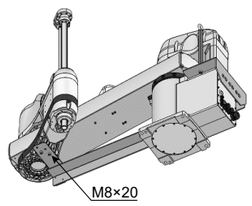


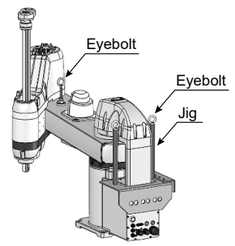


[IXA-4NHN12040/4NHW12040]



4NHN12040: 84.0kg
4NHW12040: 88.0kg



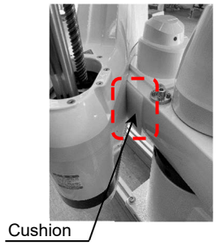


1.1 Handling of the Carton

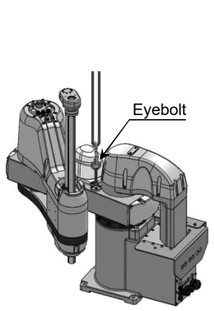
- Do not damage or drop. The package is not applied with any special treatment that enables it to resist an impact caused by a drop or crash.
- An operator should never attempt to carry on their own. Also, use an appropriate way for transportation.
- When placing the package, settle it horizontally following the posture instruction of the package.
- 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 After Unpacking

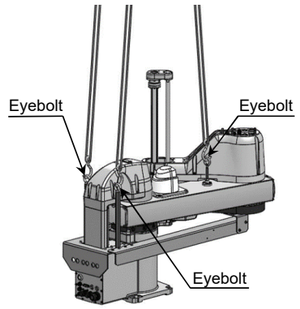
- Transportation should be conducted with the attachment fixture for transportation being attached on the robot body.
  Also, put a cushion between arm 1 and arm 2 when attaching the transportation bracket.



- For transportation, hang a wire hook on an enclosed eyebolt and lift it up carefully.
  (Use one point for the arm length 800 and three points for the arm length 1000/1200)
  Make sure to detach the eyebolts and transportation tools after use.

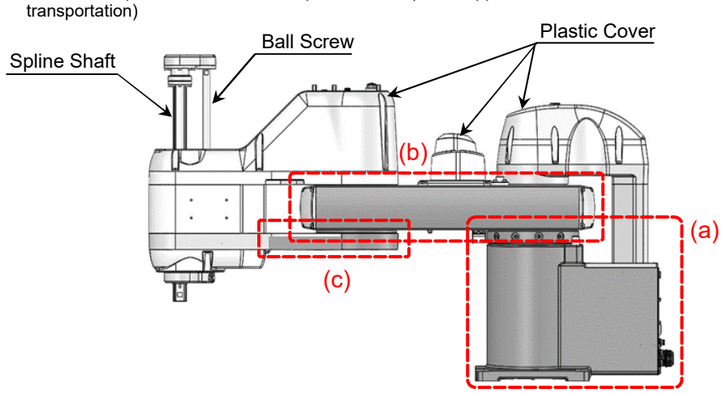


IXA-4NNN80□□/4NSN80□□
/4NSW80□□



IXA-4NNN100□□/4NSN100□□/4NSW100□□
IXA-4NHN10040/4NHN12040/4NHW12040

- Pay attention to the wires not to interfere with the robot main unit or cover.
  In case interference occurs, have cloth between them to avoid a direct contact.
- Work involving operation of sling, crane or forklift has to be carried out by a certified operator.
- Hold the base (a), J1 arm (b) and J2 main arm (c) for transportation when hanging up.
  Do not attempt to hold the cables or plastic cover. (Same applied to manual transportation)



- Make sure to do the work with two or more operators when transportation is held without lifting up.
- Do not attempt to apply excess force on each part of robot body.
- Pay attention to cables on the back panel to avoid pinching or excess force being applied on them.
- Do not attempt to touch the spline shaft and ball screw with bore hand. It will make them rust earlier. Wear gloves to touch them.

2. Handling of the Robot Mounted on Mechanical Equipment (System)

The following are the cautions for when transporting robot installed in the machinery equipment (system) in the whole system.

- Transport the robot with the transportation fixture attached on the body.
- When suspending the mechanical equipment with ropes, avoid applying force to robot, connector, etc. Pay attention to cables on the back panel to avoid pinching or excess force being applied on them.

⚠ Caution: If the robot is transported without the transportation bracket on it, it may cause malfunction on the main bearing or drop in the life due to the excitation force during transportation.

Installation Environment, Preservation Environment

1. Installation Environment

Do not use this product in the following environments.
In general, the installation environment should be one in which an operator can work without protective gear.

- Location exposed to radiant heat from a huge heat source such as the heat treatment
- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Location where relative humidity smaller than 20% or larger than 85%RH
- Location exposed to direct sunlight
- Location exposed to corrosive gases or combustible gases
- Location exposed to significant amount of dust, salt or iron powder (Outside of an ordinary assembly plant)
- Location where water, oil (includes oil mist and cutting fluid) or a chemical is splashed
- Location where the product main body receives vibration or hit impact
- Where the altitude is more than 2,000m

Also, provide sufficient work space for the following maintenance and inspection:

- Space to replenish grease
- Space to replace the motor

If the unit is used in any of the following locations, provide sufficient shielding measures:

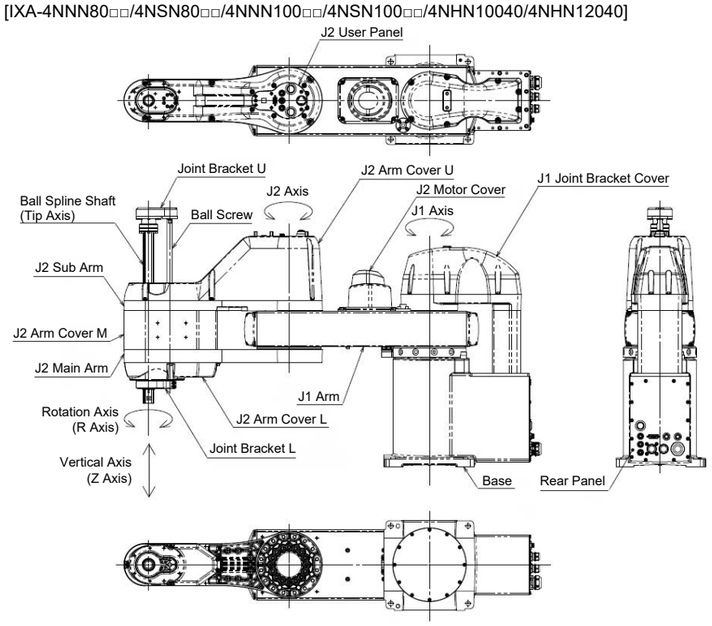
- Place subject to electrostatic noise
- Location where exposed to the influence of strong electric or magnetic field
- Location where exposed to the influence of ultraviolet or radiant rays

2. Preservation Environment

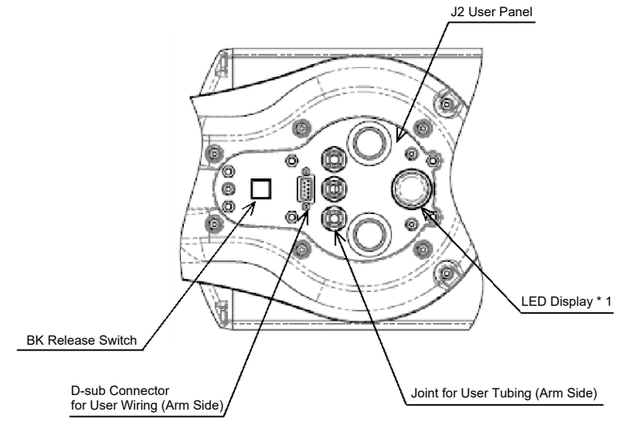
- For the storage and preservation environment, see the installation environment. However, give especial consideration to the prevention of condensation during long-term storage/preservation.
- Unless especially specified, desiccant is not included in the package at shipping. If the product is to be stored/preserved in an environment where condensation is anticipated, take condensation preventive measures.
- For short-term storage, it can be stored at 60°C or below.
  For storage of one month or more, make sure that the temperature does not exceed 50°C.
- Storage and preservation should be performed in the horizontal condition.
  If storing in the packaged condition, observe the conditions, if any, regarding storage orientation.

External Dimensions

[IXA-4NNN80□□/4NSN80□□/4NNN100□□/4NSN100□□/4NHN10040/4NHN12040]

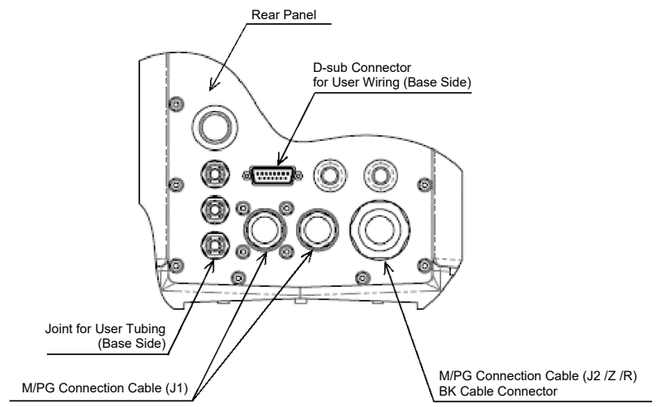


■J2 User Panel Part



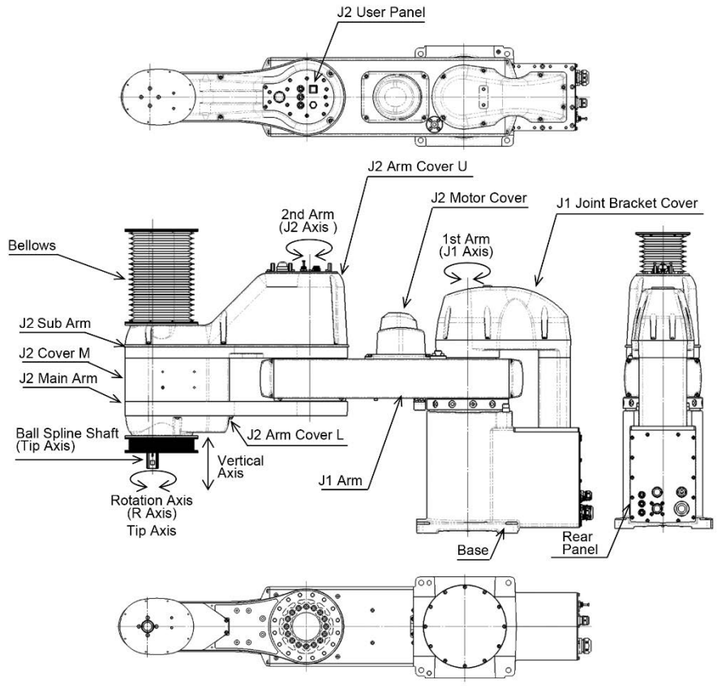
*1 It should be equipped as an option (Model: LED) for the standard type NNN, and as a standard for the high-speed type NSN.

■Rear Panel Part

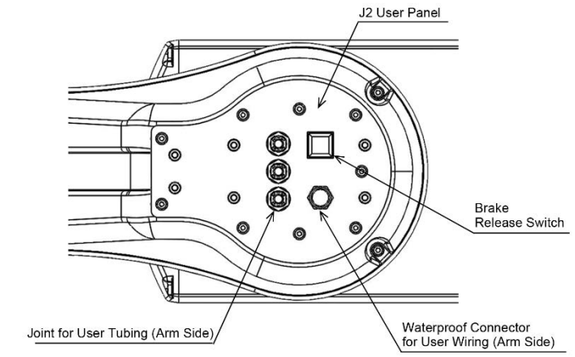


External Dimensions (Dust and Splash Proof Type)

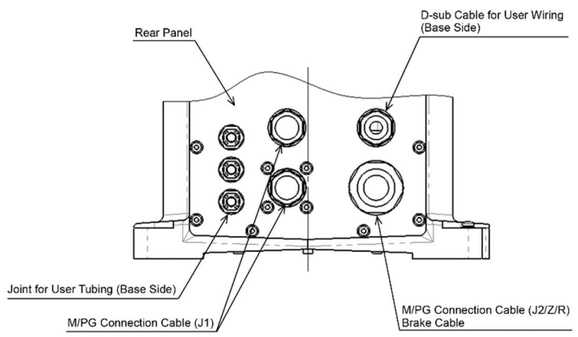
[IXA-4NSW80□□/4NSW100□□/4NHW12040]



■J2 User Panel Part



■Rear Panel Part

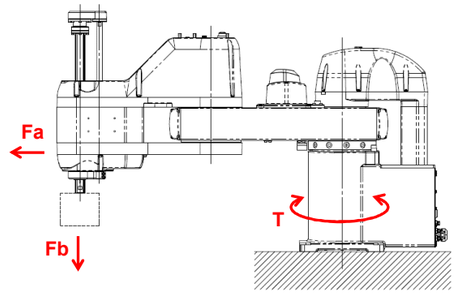


Installation

Installation of the robot is acceptable only in standard horizontal orientation. Horizontally oriented wall mount or ceiling mount is not available.

1. Installation Platform
   The platform to mount the robot receives an enormous reactive force. Be certain to prepare a platform with rigidity enough to withstand the force.
   - The surface on which the robot is fixed must have a thickness of 25mm or more.
   - Flatness of Platform　Have a platform made with an accuracy of 0.05mm/500mm or less.
   - In order to install the robot unit, requires M12 tapped holes with effective thread length 24mm or more.
   - It is necessary, not simply to endure the weight of the robot, but to be strong, stiff and stable enough to endure the reaction force caused during operation as shown in the table below.

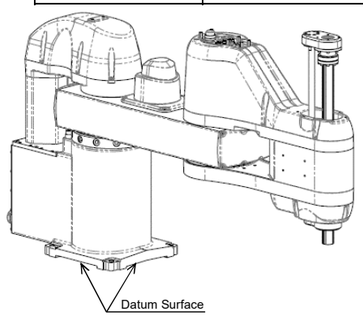
Model Code	Fa (Max.) [N]	Fb (Max.) [N]	T (Max.) [N·m]
IXA-4NNN80□□	2600	500	900
IXA-4NNN100□□	2300	500	1100
IXA-4NSN80□□/4NSW80□□	1500	700	1500
IXA-4NSN100□□/4NSW100□□	1600	700	1500
IXA-4NHN10040	1600	600	1200
IXA-4NHN12040/4NHW12040	1700	600	1200

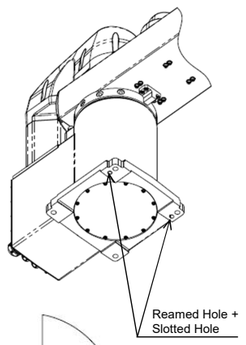


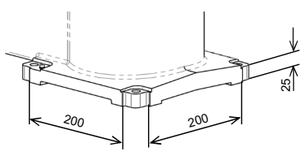
   - Secure the platform to the floor or other rigid structure in a manner that prevents any movement due to operation of the robot.
   - The installation platform must allow the robot to be mounted on a level surface.

2. Installation Robot Unit
   - The robot body has to be securely fastened with using hex socket cap screws and steel ring plain washers 13 × 24 × 3.2 (4pcs each).
   - Use high-strength screws with 10.9 or higher in the strength category for installation.
   - For the robot installation position, either refer to the datum surface or insert parallel pins to the reamed hole and slotted hole for positioning.

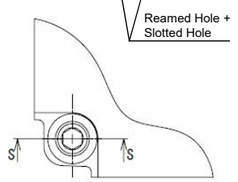
Attachment Hole	Attachment Screw	Tightening Torque [N·m]
Φ13 through	M12	104 (Tensile Class 10.9) 122 (Tensile Class 12.9)

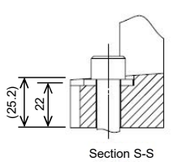






In the figure above shows the effective range of the datum surface.
The surrounding of the effective range is painted surfaces.
(Except for installation surface)





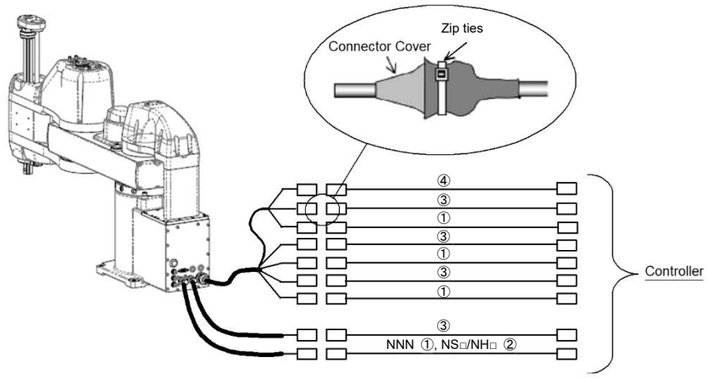
Section S-S

Wiring

1. Wiring with Controller
   Use the enclosed motor cable and encoder cable to establish connection between the robot main unit and the controller.

Model Code	Applicable Controller
IXA-4NNN80□□/4NNN100□□	XSEL-RAX/SAX
IXA-4NSN80□□/4NSW80□□ IXA-4NSN100□□/4NSW100□□ IXA-4NHN10040/4NHN12040/4NHW12040	XSEL-SAX4

It should be four places of the motor cable and four places of the encoder cable.



Balloon Number	Parts Name	Model Code			
		IXA-4NNN80□□ IXA-4NNN100□□	Quantity	IXA-4NSN80□□ IXA-4NSW80□□ IXA-4NSN100□□ IXA-4NSW100□□ IXA-4NHN10040 IXA-4NHN12040 IXA-4NHW12040	Quantity
1	Motor Cable	CB-X-MA□□□	4	CB-X-MA□□□	3
2	Motor Cable	-	0	CB-XMC-MA□□□	1
3	Encoder Cable	CB-X1-PA□□□	4	CB-X1-PA□□□	4
4	Brake Cable	CB-IXA-BK□□□-3	1	CB-IXA-BK□□□-3	1

Refer to the [Instruction manuals for the controller] and [Instruction manuals for the PC teaching software] for the procedures to connect the I/O cable, controller power cable, PC connection cable, etc.

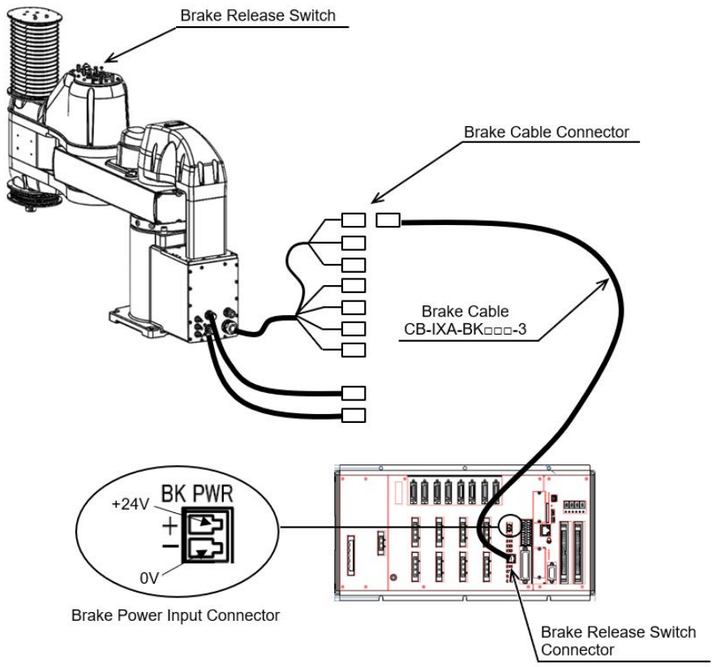
After joining connectors, get the connector covers one overlapped on the other and clamp the covers with an enclosed zip ties at the overlapped area.

⚠ Caution:
- Connect to the robot of the serial number specified on the robot designation label provided on the front panel of the controller. Connecting to a robot which is not specified may cause unexpected operation which may end up with a critical injury.
- Make sure to use the dedicated cables for connection. Using a cable which is not dedicated may cause not only unexpected operation but also may cause fire or injury which may end up with serious accident.
- When the cable is connected or disconnected, make to turn off the power to the controller. Working on the product with the power kept on may cause unexpected operation which may end up with a critical injury.
- Check before connecting the connectors that there is no bent or breakage on the connector pins or no damage on the cables. Also, check that the connectors are certainly locked after connection is established.

2. Brake Cable Connection

For the brake on the Z-axis, the brake switch on the rear panel gets activated by connecting the controller to the robot unit with the enclosed brake cable.
Press the brake switch and the Z-axis brake gets compulsorily released.
Supply power of +24V to the brake power supply input connector on the controller.

* 0.4A for standard type (NNN) and 1.2A for high speed type (NSN), high speed dust and splash proof type (NSW), high payload type (NHN) and high payload dust and splash proof type (NHW)

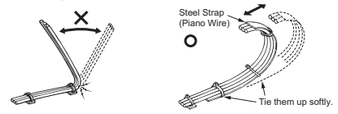


⚠ Caution:

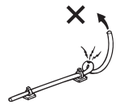
- When the brake is released, the tip shaft could drop and if it contacts with the bottom surface, the shaft may get bent. Also, when it drops, your hand could get pinched between the workpiece attached on the tip shaft and the bottom surface which could cause serious injury. Pay special attention when releasing the brake.
- After releasing the brake compulsorily, turn the brake switch OFF so the automatic control of the brake by the controller can work. While the brake is compulsorily released, it is very dangerous as the brake would not work when an emergency stop is held or the servo is turned OFF. The tip shaft could drop and may cause a critical accident.

[Prohibited Items in the Cable Processing]

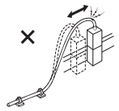
- Do not pull or bend forcibly the cable so as not to give any extra load or tension to the cable.
- Do not process the cable for extension or shortening by means of cutting out, combination or connecting with another cable.
- Do not let the cable flex at a single point.



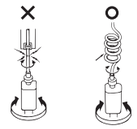
- Do not let the cable bend, kink or twist.



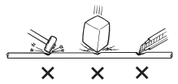
- Do not pull the cable with a strong force.



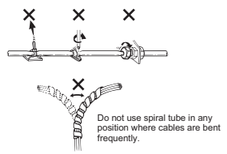
- Do not let the cable receive a turning force at a single point.



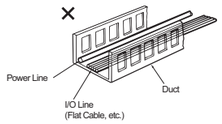
- Do not pinch, drop a heavy object onto or cut the cable.



- 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.



⚠ Caution:

- 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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