IAI
Quality and Innovation

Horizontal Articulated Robot
IXA Series
Arm Length 180/300/450/600
First Step Guide Fourth 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.

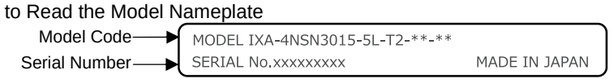
Product Check

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 Number	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 / Encoder Cables	CB-X-MA□□□	3	For 3-axis Type
		CB-X1-PA□□□	4	For 4-axis Type
4	Brake Cable	CB-IXA-BK□□□-1	1	□NNN1805/□NNN3015/□NNN45□□
		CB-IXA-BK□□□-2	1	□NNN60□□
		CB-IXA-BK□□□-3	1	□NSN3015/□NSN45□□/□NSN60□□ 4NSC3015/4NSC45□□/4NSC60□□ 4NSW3015/4NSW45□□/4NSW60□□
5	Hex Socket Head Cap Screw (J1 Turning Limiting Stopper)	M8 × 8 / Black NNN1805 is M5 × 5/ Black	2	Enclosed in NNN/NSN/NSC
6	Hex Socket Set Screw (J1 Rotation Restriction Stopper Screw Hole Plug)	M8 × 10 / Black NNN1805 is M5 × 5/ Black	2	Enclosed in NNN/NSN/NSC
7	Positioning Mark Label		1	
8	Prohibition of Entry into the Operation Area		2	
9	Cable Tie		10	
10	Safety Guide	M0194	1	

2. How to Read the Model Nameplate



3. How to Read the Model Number

IXA-4NSN3015-5L-T2-**-**

<Series>
IXA SCARA Robot

<Degrees of Freedom>
3: 3-axis Type (With No R-axis)
4: 4-axis Type (With R-axis)

<Type>
NNN: Standard type
NSN: High Speed type
NSC: High Speed type
Cleanroom Specification
NSW: High Speed type
Dust-proof/Splash-proof Specification

<Arm Length / Vertical Axis>
1805: Arm length 180mm / Vertical axis 50mm
3015: Arm length 300mm / Vertical axis 150mm
4518: Arm length 450mm / Vertical axis 180mm
4533: Arm length 450mm / Vertical axis 330mm
6018: Arm length 600mm / Vertical axis 180mm
6033: Arm length 600mm / Vertical axis 330mm

Identification for IAI use only (Note 1)

<Option>
LED : Display (NNN, NSN)

<Applicable Controller>
T2 : XSEL-RAX/SAX

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

(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.

Precautions in Handling

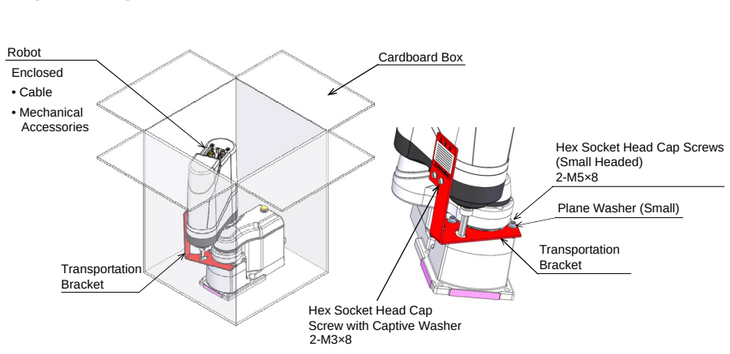
1. Handling of the Robot

Unless otherwise specified, the robot is delivered in the package as shown in the figure below.

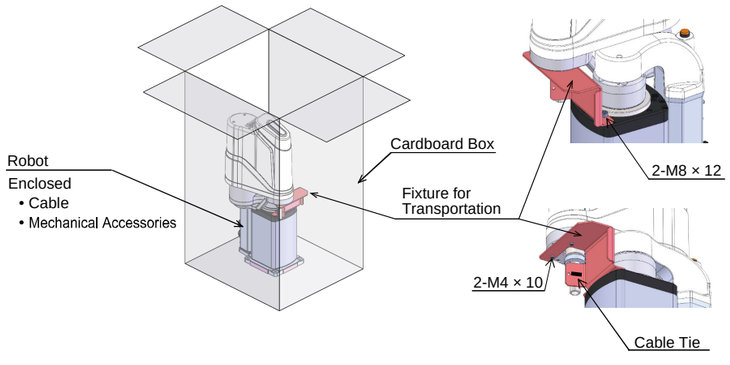
The transportation fixture is attached on the robot body.

⚠ Notice:
- Detach the transportation fixture before starting operation. After taking the unit out, put on the enclosed hex socket head cap screw (M8 × 10) to the tapped hole for J1 rotation restriction stopper attachment.
- Keep the transportation fixture so it can be used when transporting or moving the robot.

[□NNN1805]



[□NNN3015/□NSN3015]



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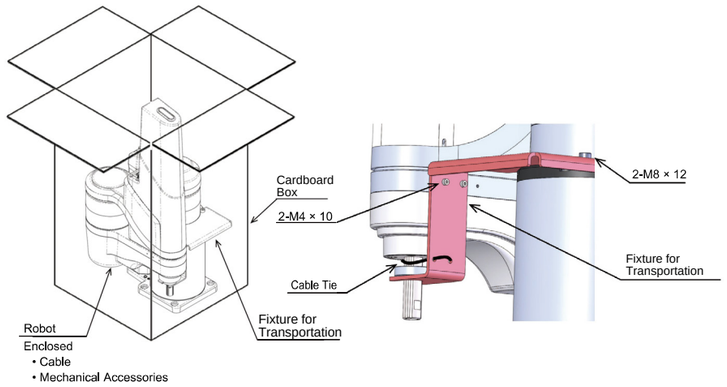

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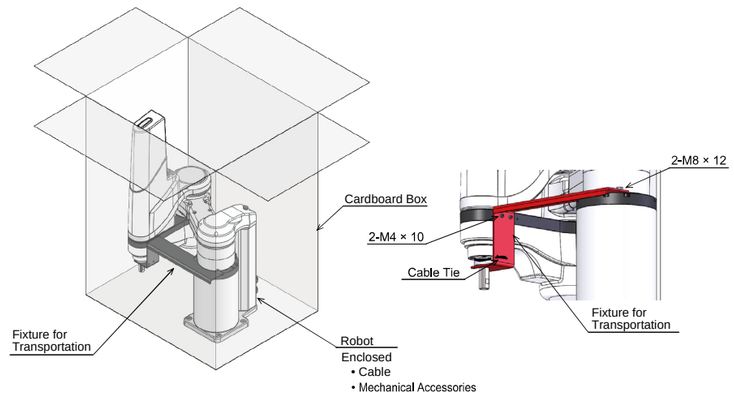

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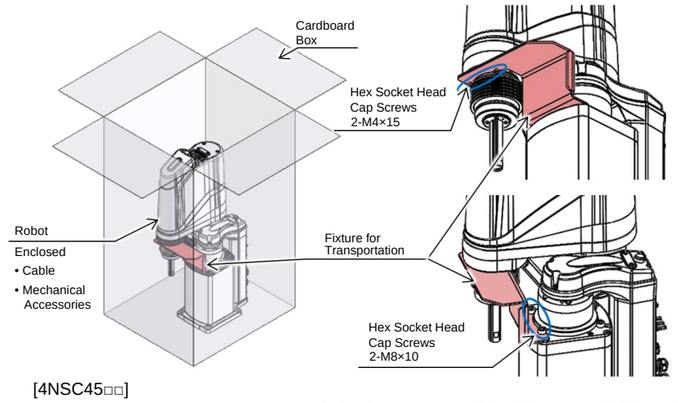

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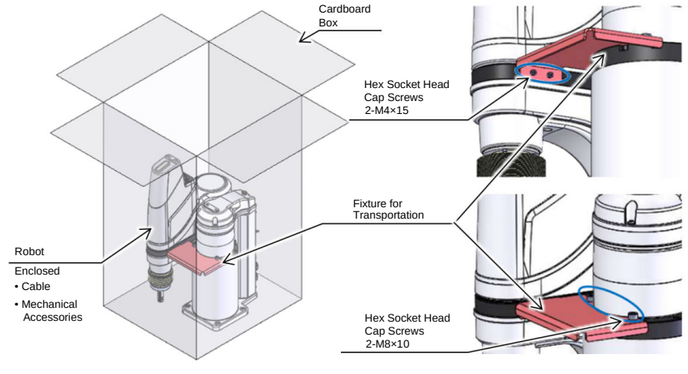

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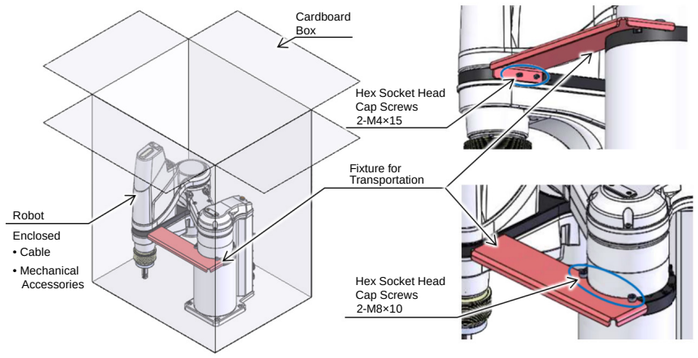

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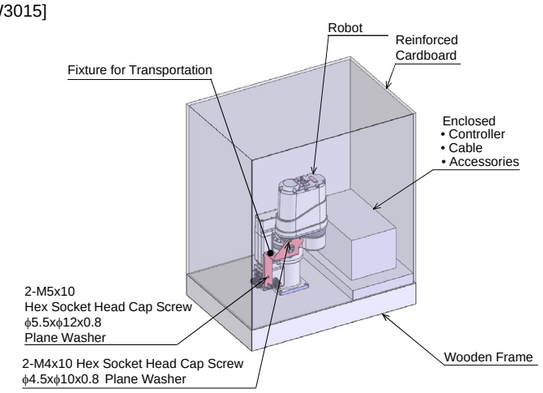

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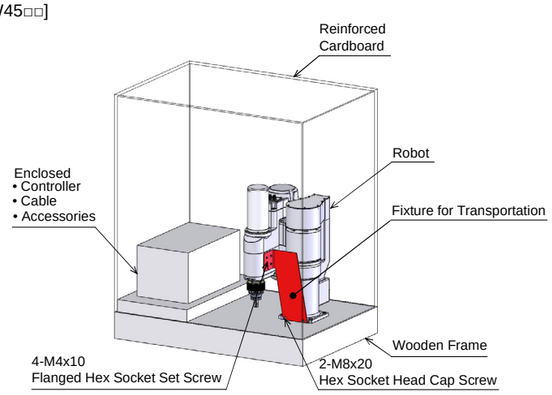

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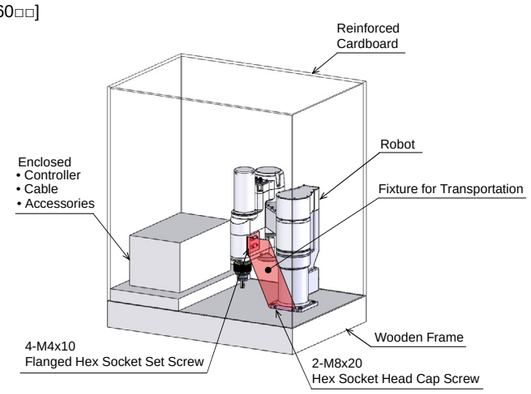


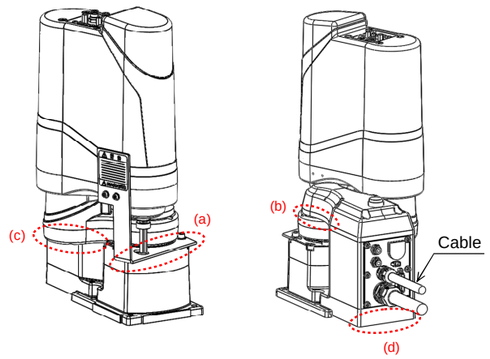
1.1 Handling of the Carton

- 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.
- Transport a heavy package with at least more than two operators. 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.

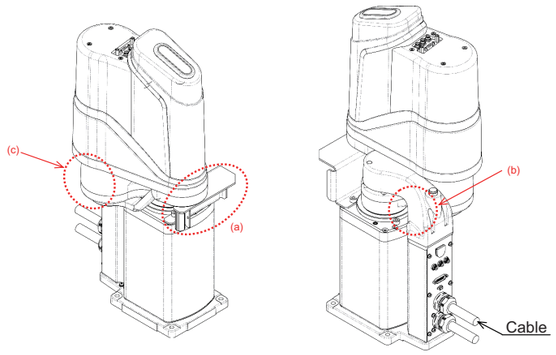
1.2 Handling After Unpacking

- Transportation should be conducted with two persons with the attachment fixture for transportation being attached on the robot body.
- As the figure shows, hold two places of either the transportation attachment fixture (a), J1 joint bracket (b), J2 arm (c) or base (d) while transporting for IXA-□NNN1805.
- As the figure shows, one person holds the transportation attachment fixture (a) while the other holds the J1 joint bracket (b) and J2 arm (c) for models other than IXA-□NNN1805.
- 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.

[□NNN1805]



[□NNN3015/□NSN3015]



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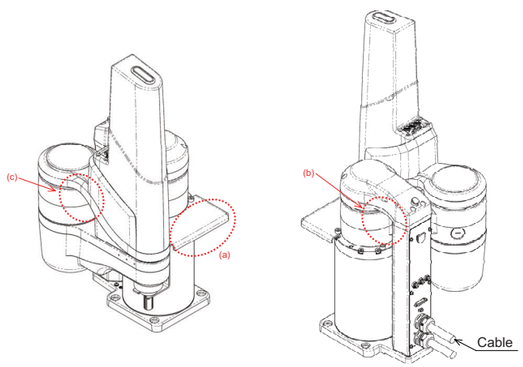

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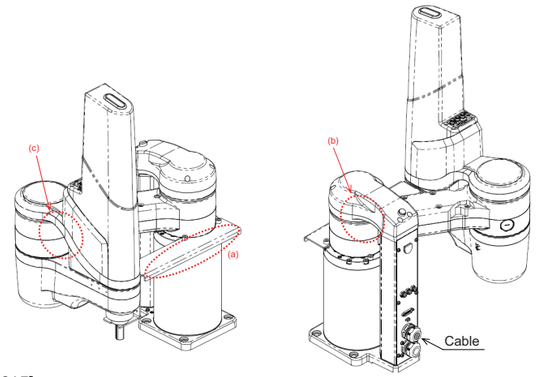

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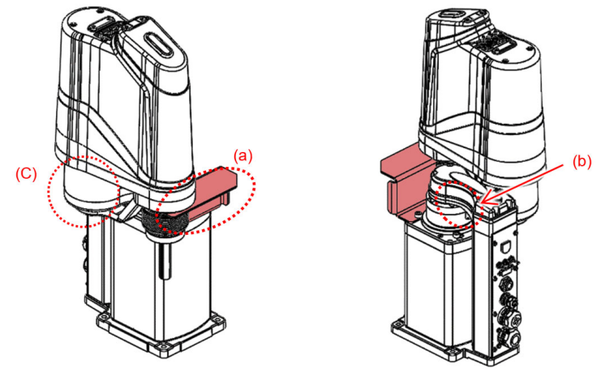

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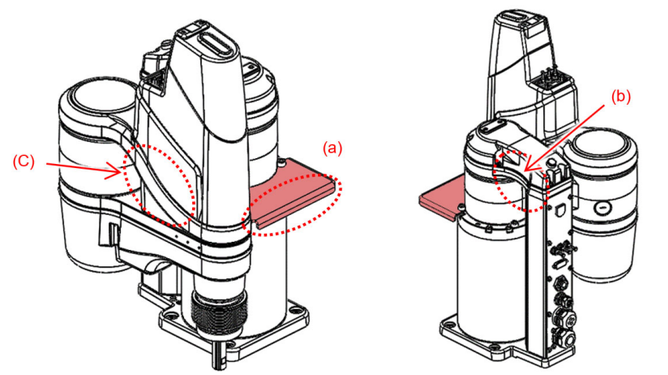

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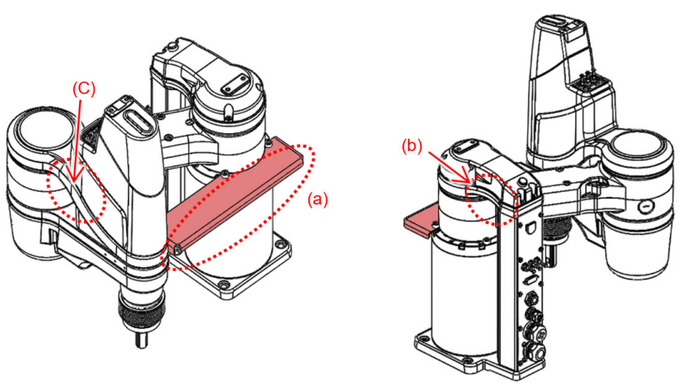

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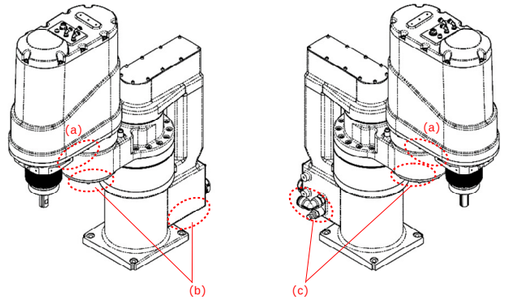

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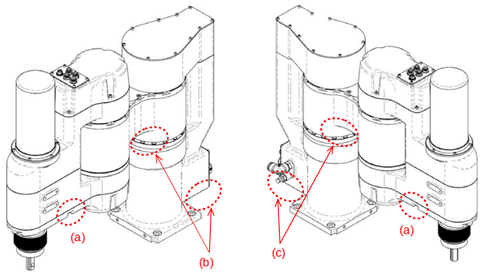

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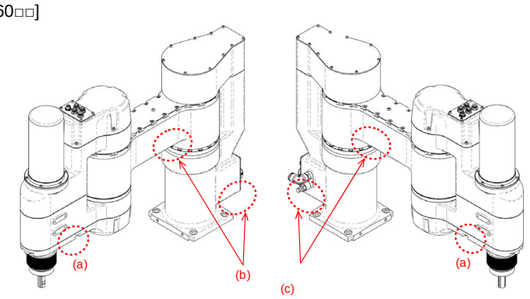


2. Handling of the Robot Mounted on Mechanical Equipment (System)

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 fixture 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
- In the environment that the product cannot be protected with a structure satisfying IP65 (NSW Dust-proof/Splash-proof)
- 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 2000m

Conditions added for NSW Dust-proof/Splash-proof

- Location immersed in liquid
- Location where chip power gets generated that could damage the bellows and seals
- Location where mist of cutting fluid or grinding fluid containing sulfur or chlorine gets generated

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

Refer to [Instruction Manual] for appearance figures, appearance dimensions and mounting dimensions.

- Standard (NNN) and high speed (NSN) types Instruction Manual ME3776
- High speed type cleanroom specification (NSC) Instruction Manual ME3813
- High speed type dust-proof/splash-proof specification (NSW) Instruction Manual ME3797

Installation

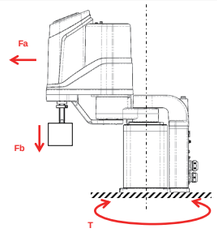
Installation of the robot is acceptable only in standard horizontal orientation.
Horizontally oriented wall mount or ceiling mount is not available.

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 20mm 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, IXA-□NNN1805 requires M6 tapped holes with effective thread length 10mm or more.
  In order to install the robot unit, IXA-□NNN3015/□NSN3015/4NSC3015/4NSW3015 requires M8 tapped holes with effective thread length 20mm or more.
  In order to install the robot unit, IXA-□NNN45□□/□NNN60□□/□NSN45□□/□NSN60□□/4NSC45□□/4NSC60□□/4NSW45□□/4NSW60□□ requires M10 tapped holes with effective thread length 20mm 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 Number	Fa (Max.) [N]	Fb (Max.) [N]	T (Max.) [N·m]
IXA-□NNN1805	44	42	24
IXA-□NNN3015	336	151	167
IXA-□NSN3015	879	193	301
IXA-□NNN45□□	474	144	172
IXA-□NSN45□□	660	165	395
IXA-□NNN60□□	290	176	338
IXA-□NSN60□□	536	186	638
IXA-4NSC3015	545	195	301
IXA-4NSC45□□	604	179	394
IXA-4NSC60□□	569	203	638
IXA-4NSW3015	1370	216	301
IXA-4NSW45□□	738	221	394
IXA-4NSW60□□	691	248	638



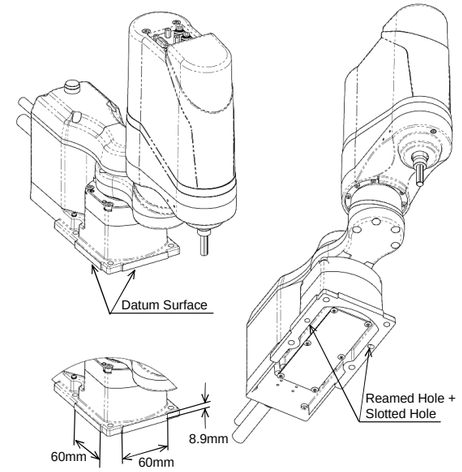
- Secure the platform to the floor or other rigid structure in a manner that prevents any movement due to operation of the robot.
- The installation platform must allow the robot to be mounted on a level surface.

2. Installation Robot Unit

[□NNN1805]

- The robot body has to be securely fastened with using hex socket cap screws and steel ring plain washers 6.5 × 13 × 1.0 (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]
ϕ6.6 through (8.9mm from seated surface to installation surface)	M6	12.3

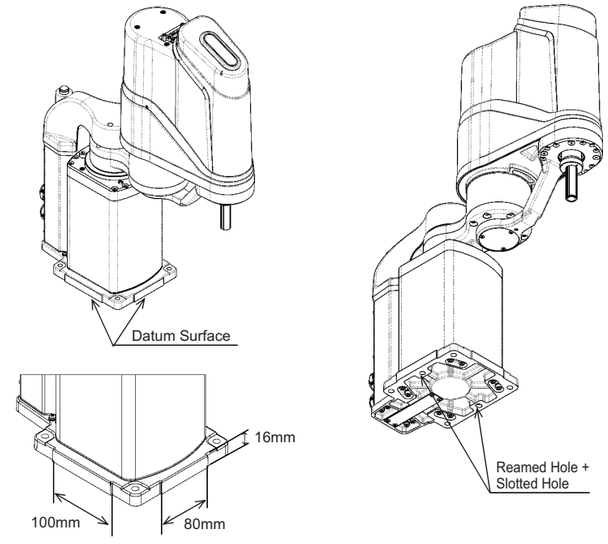


In the figure above shows the effective range of the datum surface.
The surrounding of the effective range is painted surfaces.
(Except for installation surface)

[□NNN3015/□NSN3015]

- The robot body has to be securely fastened with using hex socket cap screws and steel ring plain washers 8.5 × 18 × 1.6 (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]
ϕ9 through (16mm from seated surface to installation surface)	M8	30

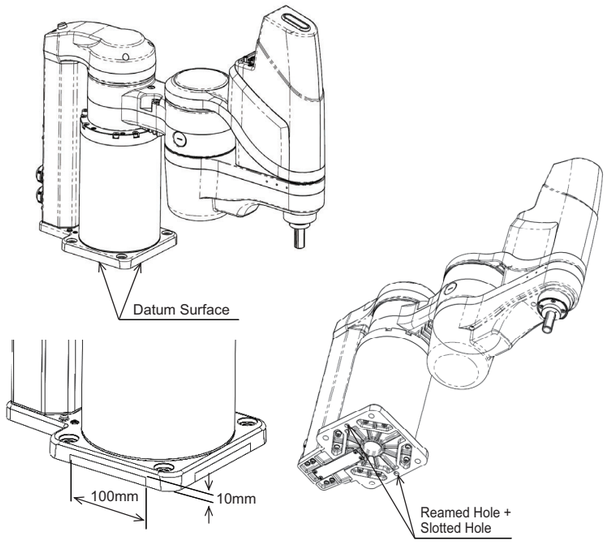


In the figure above shows the effective range of the datum surface.
The surrounding of the effective range is painted surfaces.

[□NNN45□□/□NSN45□□/□NNN60□□/□NSN60□□]

- The robot body has to be securely fastened with using hex socket cap screws and steel ring plain washers 10.5 × 18 × 1.6 (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]
ϕ11 through (15mm from seated surface to installation surface)	M10	60

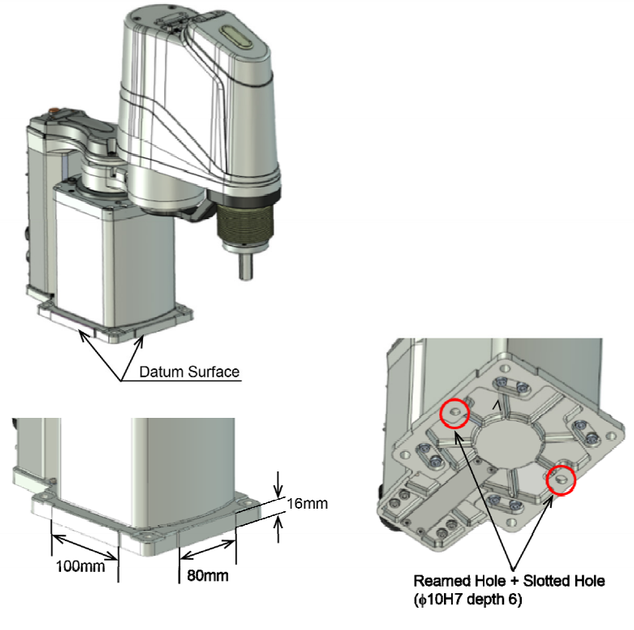


In the figure above shows the effective range of the datum surface.
The surrounding of the effective range is painted surfaces.

[4NSC3015]

- The robot body has to be securely fastened with using hex socket cap screws and steel ring plain washers 8.5 × 18 × 1.6 (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.

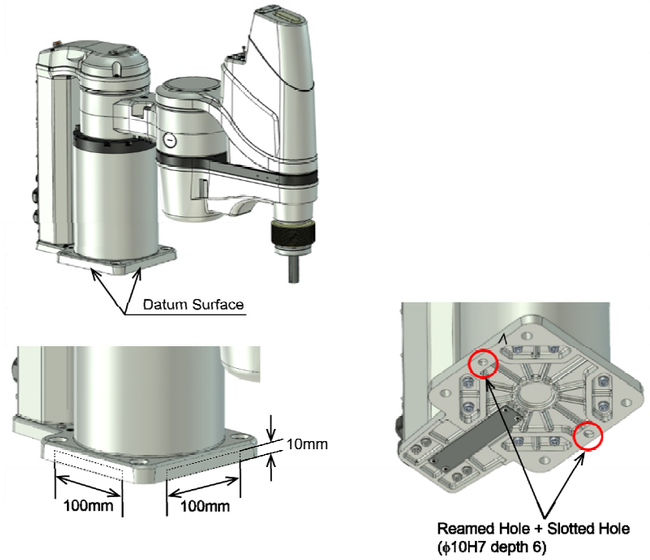
Attachment Hole	Attachment Screw	Tightening Torque [N·m]
ϕ9 through (16mm from seated surface to installation surface)	M8	30



[4NSC45□□/60□□]

- The robot body has to be securely fastened with using hex socket cap screws and steel ring plain washers 10.5 × 18 × 1.6 (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.

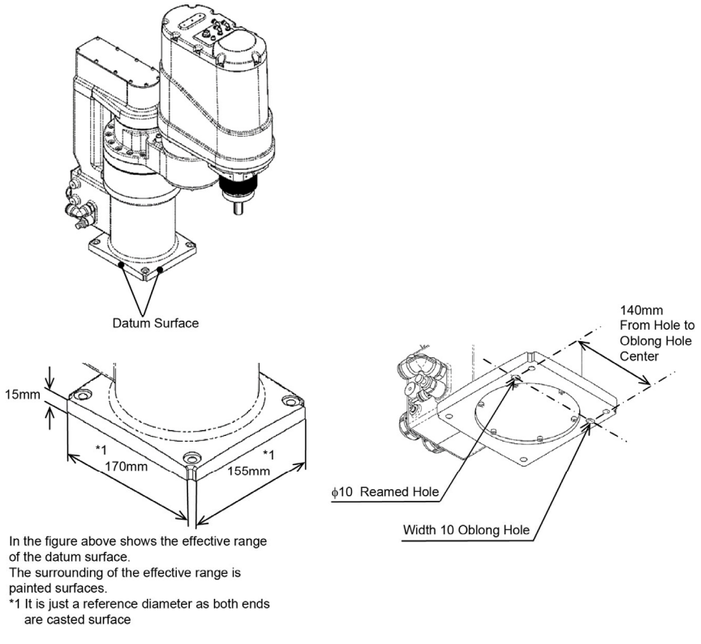
Attachment Hole	Attachment Screw	Tightening Torque [N·m]
ϕ11 through (15mm from seated surface to installation surface)	M10	60



[4NSW3015]

- The robot body has to be securely fastened with using hex socket cap screws and steel ring plain washers 8.5 × 18 × 1.6 (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]
ϕ9 through ϕ18 counterboring (15mm from seated surface to installation surface)	M8	30

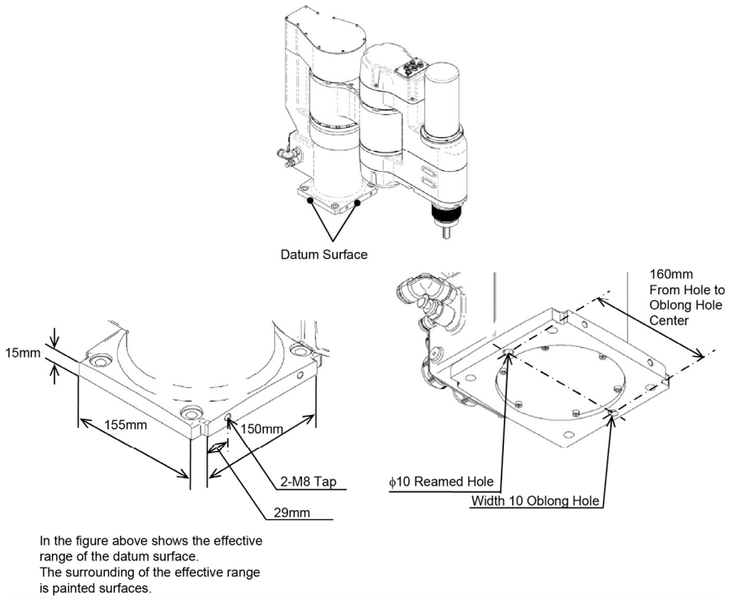


In the figure above shows the effective range of the datum surface.
The surrounding of the effective range is painted surfaces.
*1 It is just a reference diameter as both ends are casted surface

[4NSW45□□/60□□]

- The robot body has to be securely fastened with using hex socket cap screws and steel ring plain washers 10.5 × 18 × 1.6 (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]
ϕ11 through ϕ22 counterboring (15mm from seated surface to installation surface)	M10	60



In the figure above shows the effective range of the datum surface.
The surrounding of the effective range is painted surfaces.

Wiring

1. Connection with Controller

Use the enclosed motor cable and encoder cable to establish connection between the robot main unit and the controller.
It should be three places of the motor cable and three places of the encoder cable for the three-axis type while four places of the motor cable and four places of the encoder cable for the four-axis type.

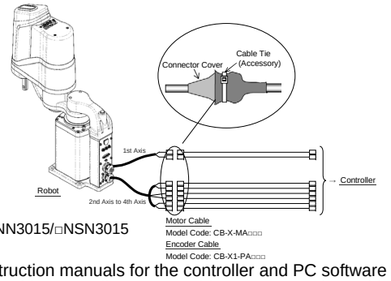


Figure shows IXA-□NNN3015/□NSN3015

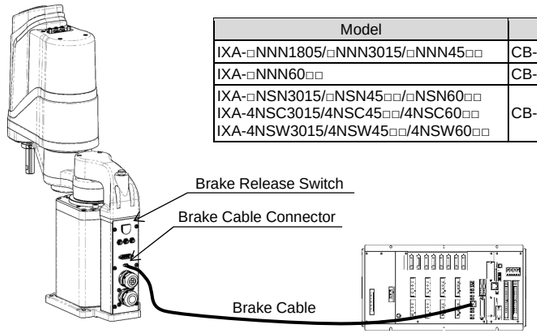
Refer to the Instruction manuals for the controller and PC software for the procedures to connect the I/O cable, controller power cable, PC connection cable, etc.
After joining connectors, get the connector covers one overlapped on the other and clamp the covers with an enclosed cable tie at the overlapped 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.

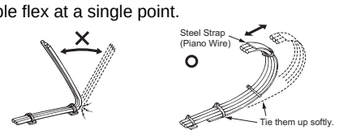


Model	Model Code
IXA-□NNN1805/□NNN3015/□NNN45□□	CB-IXA-BK□□□-1
IXA-□NNN60□□	CB-IXA-BK□□□-2
IXA-□NSN3015/□NSN45□□/□NSN60□□ IXA-4NSC3015/4NSC45□□/4NSC60□□ IXA-4NSW3015/4NSW45□□/4NSW60□□	CB-IXA-BK□□□-3

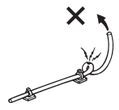
⚠ Caution:
- When the brake is released, the tip shaft could drop and if it contacts with the bottom surface, the shaft may get bent. Also, when it drops, your hand could get pinched between the workpiece attached on the tip shaft and the bottom surface which could cause serious injury. Pay special attention 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]

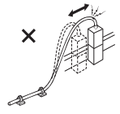
- Do not pull or bend forcibly the cable so as not to give any extra load or tension to the cable.
- Do not process the cable for extension or shortening by means of cutting out, combination or connecting with another cable.
- Do not let the cable flex at a single point.



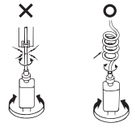
- Do not let the cable bend, kink or twist.



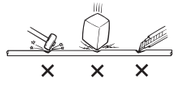
- Do not pull the cable with a strong force.



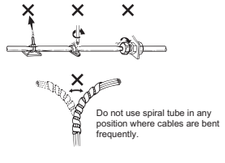
- Do not let the cable receive a turning force at a single point.



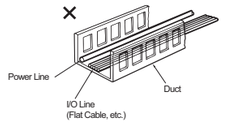
- Do not pinch, drop a heavy object onto or cut the cable.



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

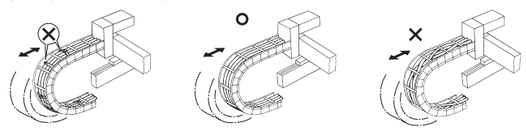


- Separate the I/O line, communication line and power line from each other. Arrange so that such lines are independently routed in the duct.



Follow the instructions below when using a cable carrier.

- If there is an indication to the cable for the space factor in a cable carrier, refer to the wiring instruction given by the supplier when storing the cable in the cable carrier.
- Avoid the cables to get twined or twisted in the cable carrier, and also to have the cables move freely and do not tie them up. (Avoid tension being applied when the cables are bent.)
  Do not pile up cables. It may cause faster abrasion of the sheaths or cable breakage.



⚠ 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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