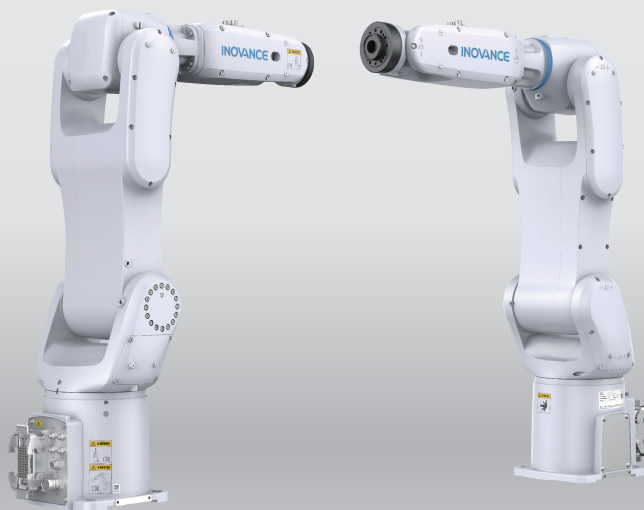




IR-R7H Series International 6-Axis Robot

User Guide - Manipulator



Industrial
Automation



Intelligent
Elevator



New Energy
Vehicle



Industrial
Robot



Rail
Transit



Data code P500021280A02

Legal Notices

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Disclaimer

Product specifications and technologies are subject to continuous improvement, which may lead to discrepancies between this document and the actual product. In such cases, the actual product shall prevail.

This document may be modified due to product upgrades without prior notice.

Disposal

Storage, use, and disposal of this product (including accessories) must comply with local laws and regulations.

Personnel Requirements

The product/system described in this document is intended for operation only by qualified professionals. Their operation must comply with the relevant instructions in this document, particularly the safety and warning notices. Such qualified professionals must possess relevant training and experience to identify risks associated with this product/system and mitigate potential hazards.

Proper Use of the Product

Proper transportation, storage, assembly, installation, commissioning, operation, and maintenance are prerequisites for the safe and normal operation of the product. Ensure compliance with environmental requirements and follow all instructions in this document.

Preface

Introduction

The Inovance IR-R7H series international 6-axis robots are available in two variants: the standard model with an arm length of 722 mm and the extended model with an arm length of 911 mm. Compact and lightweight, these robots offer high accuracy, high speed, and a maximum load capacity of 7 kg. The robots are equipped with a high-performance control system that combines reliability and ease of use. They are widely used in industries including 3C electronics, automotive electronics, healthcare, and pharmaceutical manufacturing for applications such as gluing, assembly, sorting, and labeling.

This guide describes the basic information, installation, wiring, motion range, and maintenance of the product.

More Data

Name	Data Code	Description
IRCB501 International Series Robot Control Cabinet User Guide	PS00017628	Describes the specifications, installation, and wiring of the IRCB501 series controller.
IR-TP200 Series Industrial Robot Teach Pendant User Guide	19012798	Describes relevant operations of the robot teach pendant.
IR-R7H Series International 6-Axis Robot User Guide - Manipulator (this guide)	PS00021280	Describes the basic information, installation, wiring, motion range, and maintenance of the product.

Revision History

Date	Version	Description
September 2025	A02	New - Added "Rust Prevention Requirements" on page 32. - Added "Transportation Protection" on page 49. Update - Updated the air circuit connection diagram of the solenoid valve on "6.6.2 Tubing (Air Tubes)" on page 68. - Updated the connection description of the I/O aviation connector on "6.6.3 Robot Aviation Connector Pins" on page 70. - Updated joint motion precautions on "7.1 Motion Range Setting Methods" on page 74. - Updated periodic inspection items on "8.3 Periodic Inspection" on page 82. - Updated the options information on "8.7 Options" on page 93.
August 2025	A01	Updated the drawings.
June 2025	A00	Initial release.

Access to the Guide

This guide is not delivered with the product. You can obtain the PDF version in the following way:

- **Inovance official website:** Visit <http://www.inovance.com>, go to "Support" > "Download", search by keyword, and then download the PDF file.
- **QR code:** Scan the QR code on the product with your smart phone.
- **My Inovance app:** Scan the QR code below to install the My Inovance app, where you can search for and download guides.



Warranty

For faults and damage incurred during normal use in the warranty period, Inovance provides free repair service. (For details of the warranty period, see the purchase order.) A maintenance fee will be charged out of the warranty period.

Even in the warranty period, a maintenance fee will be charged for repair of the following damage:

- Damage caused by operations not following the instructions in the guide
- Damage caused by fire, flood, or abnormal voltage
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (such as natural disaster, earthquake, and lightning strike)

The maintenance fee will be charged according to our latest Price List if not otherwise agreed upon.

For details, see the Product Warranty Card.

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1 Fundamental Safety Instructions

1.1 Safety Precautions

Safety Disclaimer

- This chapter provides essential safety instructions for proper use of the product. Before using this product, read through the user guide, especially the safety instructions. Failure to observe the safety instructions may result in equipment damage, personal injuries, or even death.
- "DANGER", "WARNING", and "CAUTION" items in this guide do not indicate all safety precautions that need to be followed; instead, they just supplement the safety precautions.
- Use this product according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
- Inovance shall take no responsibility for any personal injuries or property damage caused by improper usage.

Safety Levels and Definitions



indicates that failure to comply with the notice will result in severe personal injuries or even death.



indicates that failure to comply with the notice may result in severe personal injuries or even death.



indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

Safety Precautions

- Some drawings in the guide shows the product without covers or protective guards to display more details. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- Operators must take mechanical precautions to protect personal safety and wear protective equipment, such as anti-smashing shoes, safety clothing, safety glasses, protective gloves, and protective sleeves.

Unpacking **WARNING**

- Do not install the equipment if you find damage, rust, or signs of use on the equipment or accessories upon unpacking.
- Do not install the product when there is water inside the product or any of its parts is missing or damaged.
- Do not install the product when the product name is inconsistent with that in the packing list.

 CAUTION

- Before unpacking, check whether the package is intact, without damage, water seepage, damp, and deformation.
- Unpack the product layer by layer. Do not strike the package violently.
- During unpacking, check whether the product and its accessories have any damage, corrosion, or bump on the surface.
- Check the quantity of the product and its accessories and documents against the packing list.

Storage and Transportation

WARNING

- Large-scale or heavy equipment must be transported by qualified professionals using specialized hoisting equipment. Failure to comply may result in personal injuries or equipment damage.
- Before hoisting the equipment, ensure that components, such as the front cover and terminal blocks, are secured firmly with screws. Loosely-connected components may fall off and result in personal injury or equipment damage.
- Never stand or stay below the equipment when the equipment is being hoisted by the hoisting equipment.
- When hoisting the equipment with a steel rope, ensure the equipment is hoisted at a constant speed without suffering from vibration or shock. Do not turn the equipment over or let the equipment stay hanging in the air. Failure to comply may result in personal injuries or equipment damage.

CAUTION

- Handle the equipment with care during transportation and mind your steps to prevent personal injuries or equipment damage.
- When handling the product by hand, grab the product case tightly to avoid dropping the product and causing injuries.
- Store and transport the equipment based on the storage and transportation requirements. Failure to comply may result in equipment damage.
- Avoid storage and transportation in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Avoid storing the product for more than 3 months. When the product needs to be stored for an extended period, take more strict protection and necessary inspection.
- Package the product strictly before transporting it, and use an enclosed container for long-distance transportation.
- Never transport the equipment with other equipment or materials that may harm or have negative impacts on this equipment.

Installation**DANGER**

- Installation must be carried out by technicians who have received relevant training on electrical equipment and have sufficient electrical expertise. Non-professionals are not allowed to operate the equipment.

**WARNING**

- Read through the guide and safety instructions before installation.
- Do not install the product in places with strong electric or magnetic fields.
- Before installation, check that the mechanical strength of the installation site can bear the weight of the equipment. Failure to comply may result in mechanical hazards.
- Do not wear loose clothes or accessories during installation. Failure to comply may result in electric shocks.
- When installing the equipment (such as the control cabinet) in a closed environment (such as a cabinet or casing), use a cooling device (such as a fan or air conditioner) to cool the environment down to the required temperature. Failure to comply may result in equipment over-temperature or fire.
- Do not modify the product.
- Do not loosen the fixing bolts of the product parts and components.
- When installing the equipment (such as the control cabinet) in a cabinet or final assembly, make sure that the enclosure of the cabinet or final assembly provides adequate fire prevention, electrical protection, and mechanical protection conforming to relevant IEC standards and local laws and regulations.
- Before installing devices with strong electromagnetic interference, such as a transformer, install a shielding device for the equipment to prevent malfunction.
- Install the product on an incombustible object, such as metal, and do not touch or attach the product to combustibles. Failure to comply may result in fire accident.

**CAUTION**

- Cover the top of the equipment (such as the control cabinet) with cloth or paper during installation to prevent unwanted objects such as metal chippings, oil, and water from falling into the equipment and causing faults. After installation, remove the cloth or paper on top of the equipment to prevent over-temperature caused by poor ventilation due to blocked ventilation holes.

Wiring**DANGER**

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
- Before wiring, cut off all the power supplies of the equipment. Wait for at least the time designated on the equipment warning label before further operations because residual voltage still exists after power-off. After waiting for the designated time, measure the DC voltage in the main circuit to ensure the DC voltage is within the safe voltage range. Failure to comply may result in electric shocks.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply may result in electric shocks.
- Check that the equipment is grounded properly. Failure to comply may result in electric shocks.

**WARNING**

- Do not connect the input power supply to the output end of the equipment. Failure to comply may result in equipment damage or even a fire.
- When connecting a drive to a motor, check that the phase sequences of the drive and motor terminals are consistent to prevent reverse motor rotation.
- Cables used for wiring must meet cross sectional area and shielding requirements. The shield of the cable must be reliably grounded at one end.
- Fix the terminal screws with the tightening torque specified in the user guide. Improper tightening torque may overheat or damage the connecting part, resulting in a fire.
- After wiring is done, check that all cables are connected properly and no screws, washers, or exposed cables are left inside the equipment. Failure to comply may result in electric shocks or equipment damage.

**CAUTION**

- During wiring, follow the proper electrostatic discharge (ESD) procedures and wear an anti-static wrist strap. Failure to comply may result in damage to the equipment or its internal circuits.
- Use shielded twisted pair cables for the control circuit. Connect the shield to the grounding terminal of the equipment for grounding purpose. Failure to comply can result in equipment malfunction.

Power-on

- Before power-on, check that the equipment is installed properly with reliable wiring and the motor can be restarted.
- Check that the power supply meets equipment requirements before power-on to prevent equipment damage or fire.
- After power-on, do not open the cabinet door or protective cover of the equipment, touch any terminal, or disassemble any unit or component of the equipment. Failure to comply will result in electric shocks.



- Perform a trial run after wiring and parameter setting to ensure the equipment operates safely. Failure to comply may result in physical injuries or equipment damage.
- Before power-on, check that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may result in fire.
- Before power-on, check that no one is near the equipment, motor, or machine. Failure to comply may result in physical injuries or even death.

Operation

- The equipment must be operated only by professionals. Failure to comply may result in death or personal injury.
- Do not touch any connecting terminals or disassemble any unit or component of the equipment during operation. Failure to comply may result in electric shocks.



- Do not touch the equipment enclosure, fan, or resistor with bare hands. Failure to comply may result in personal injury.
- Prevent metal or other objects from falling into the equipment during operation. Failure to comply may result in a fire or equipment damage.

Maintenance



DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
- Do not maintain the equipment while power is on. Failure to comply may result in electric shocks.
- Before maintenance, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.
- When a permanent magnet motor is used, do not touch the motor terminals immediately after power-off because the motor terminals can generate induced voltage during rotation even after the equipment power supply is off. Failure to comply may result in electric shocks.



WARNING

- Carry out daily and periodic inspection and maintenance on the equipment according to maintenance requirements and retain a maintenance record.

Repair



DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
- Do not repair the equipment while power is on. Failure to comply may result in electric shocks.
- Before inspection and repair, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.



WARNING

- Submit the repair request according to the warranty agreement.
- When the fuse is blown or the circuit breaker or earth leakage current breaker (ELCB) trips, wait for at least the time designated on the equipment warning label before power-on or further operations. Failure to comply may result in death, personal injury or equipment damage.
- When the equipment is faulty or damaged, require professionals to perform troubleshooting and repair by following repair instructions and keep a repair record.
- Replace quick-wear parts of the equipment in according with the replacement instructions.
- Do not perform operations on damaged equipment. Failure to comply may result in death, personal injury, or severe equipment damage.
- After the equipment is replaced, check the wiring and set parameters again.

Disposal**WARNING**

- Dispose of retired equipment in accordance with local regulations and standards. Failure to comply may result in property damage, personal injuries, or even death.
- Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

Safety Signs

For safe equipment operation and maintenance, comply with the safety signs on the equipment. Do not damage or remove the safety signs. The following table describes the safety signs.

Safety Sign	Description
	• Read through the safety instructions before operating the equipment. Failure to comply may result in equipment damage, physical injuries, or even death. • Do not touch the terminals or remove the cover with power ON or within 10 minutes after power-off. Failure to comply may result in electric shocks.

1.2 Special Precautions

To prevent robot-related accidents, be sure to set up appropriate safety measures according to specific situations. All personnel are required to strictly comply with these requirements.

1. Ensure a safety protection range that is greater than the maximum motion range of the robot. Set up comprehensive guard devices (such as fences) around the safety protection range, with an emergency stop device easily accessible to operators. Leave sufficient space (safety zone) around for the operator to avoid abnormal operations or emergency situations.
2. The safety protection devices should only have one entrance and must be equipped with a safety latch. Manually remove the safety latch when closing or opening the entrance. Ensure that the safety devices (such as emergency stop buttons and safety latch) are working properly before accessing the safety protection devices.
3. The safety fences must be sturdy enough to withstand impacts and pressures from both internal and external sources. The safety fences must be fixed and immovable to prevent operators from easily dismantling or breaking them. The safety fences must also be free of sharp angles, edges, or spikes, and must not contain any potentially hazardous components.

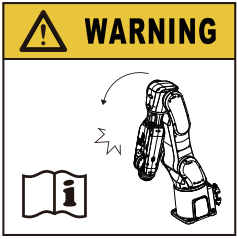
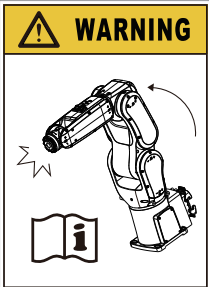
4. On the guard devices (fences), clearly display robot status, such as automatic running, teaching, and emergency stop, so that everyone onsite can easily see the status of the robot.

Before turning on or starting the robot, check all safety conditions to ensure that there are no people or obstructions within the robot's motion range.

1.3 Warning Labels

The following table describes the warning labels affixed on the robot body. Pay special attention that specific dangers exist around the positions where these labels are affixed. Comply with the cautions and warnings on the warning labels to operate and maintain the robot system safely. Do not damage or remove the warning labels.

Description of warning labels:

Warning Label	Description
	Secure the robot before removing the fastening screws on the base to prevent the robot from tilting forward due to its center of gravity, which may cause equipment damage or personnel injury.
	Secure the robot on the base table to prevent the robot from tilting forward due to its center of gravity, which may cause equipment damage or personnel injury.
	Never enter the robot motion range during robot running. Otherwise, you may bump into the robot, and severe safety issues may occur.

Warning Label	Description
 The label features a yellow background with a black border. At the top, it says 'WARNING' in bold black letters. Below the text, there is a black and white illustration of a robot arm and a book with an 'i' icon on its cover.	If a lifting is required, follow the lifting diagram. Otherwise, the robot may tilt and cause damage to the machine or injury to personnel. See the user guide for information on lifting the robot.
 The label is a yellow square with a black border. Inside, there is a black triangle containing a lightning bolt symbol.	Do not touch the energized parts during power-on. Failure to comply may result in electric shocks.

1.4 Industrial Information Security

The product provides interfaces to connect to the network and transmit data through the network interfaces. In order to protect factories, systems, machines and networks from network attacks and ensure their safe operation, implement appropriate industrial information security protection mechanisms.

The customer is responsible for providing and continuously ensuring a secure connection between the product and the network to prevent unauthorized access to its factories, systems, machines and networks. The system can only be connected to the corporate network or the Internet if it is connected securely and appropriate security measures are in place (for example, using anti-virus software and a firewall).

Inovance continuously develops and improves products and solutions to improve safety. It is strongly recommended that you update the product promptly and always use the latest version.



Tampering with software (such as viruses, Trojans, and Worms) can lead to unsafe drive state, which can put the device in an unsafe operation state. This may result in death, serious injury, and property damage. Observe the following strictly.

- Always use the latest software version. If the product version is no longer supported or the latest version of the program is not applied, customers are at increased risk of cyber-attacks.
 - Take proper protection measures (including but not limited to deploying anti-virus software, firewall, WAF, IPS/IDS, situational awareness system, ID verification, and data encryption) to prevent files in the mobile storage device from being damaged by malware and protect products, networks, systems, and interfaces from unauthorized access, disturbance, intrusion, data disclosure, or information theft.
 - Check all safety-related interfaces and settings after commissioning.
-

2 Product Information

2.1 Model and Nameplate

IR-R 7H-70 S-INT

(1)	(2)	(3)	(4)	(5)	(6)
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
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349	350	351	352	353	354
355	356	357	358	359	360
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385	386	387	388	389	390
391	392	393	394	395	396
397	398	399	400	401	402
403	404	405	406	407	40

(1) Product family INOVANCE Robot	(3) Maximum load 7H: 7 kg (hollow wrist)	(5) Installation environment S: Standard
(2) Series S: SCARA robot R: 6-axis robot TS: Ceiling-mounted SCARA robot	(4) Arm length 70: 722 mm 90: 911 mm	(6) Version INT: International (with functional safety)

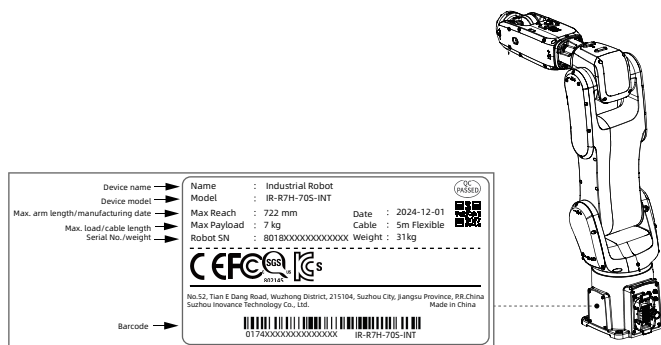


Figure 2-1 Nameplate

Note

- Before use, make sure that the serial number of the robot manipulator is consistent with that of the robot controller. Otherwise, the robot system may not work properly.
- The product information in this guide is the information of standard models in a standard environment. For information about customized models or cleanroom models, contact the provider.

2.2 Components

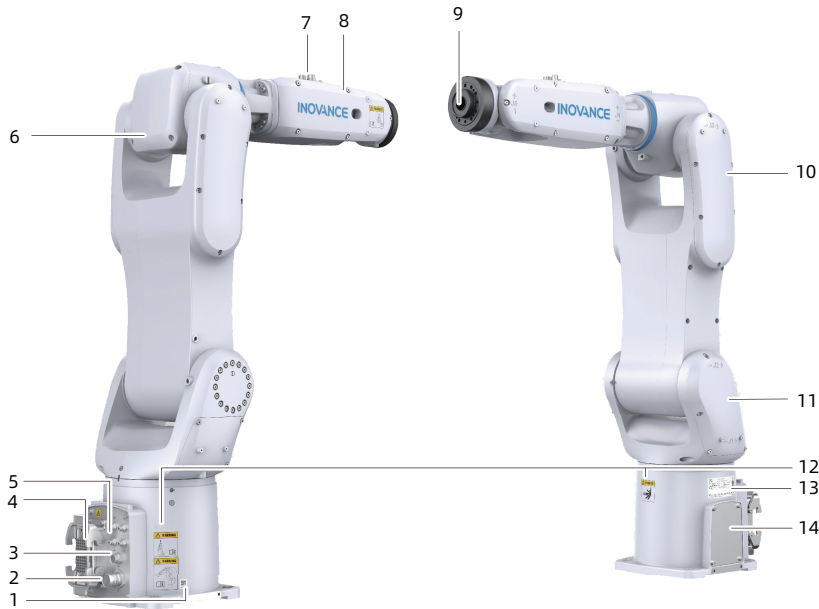


Table 2-1 Components

No.	Component	No.	Component
1	QR code	8	Forearm
2	19-pin I/O aviation connector	9	Wrist flange
3	8-pin network cable aviation connector	10	Upper arm
4	Heavy-duty connector	11	Swivel base
5	Air tube connector	12	Warning label
6	Elbow	13	Nameplate
7	17-pin I/O aviation connector	14	Base

2.3 Rotation Directions

The following figure illustrates the rotation direction of each axis.

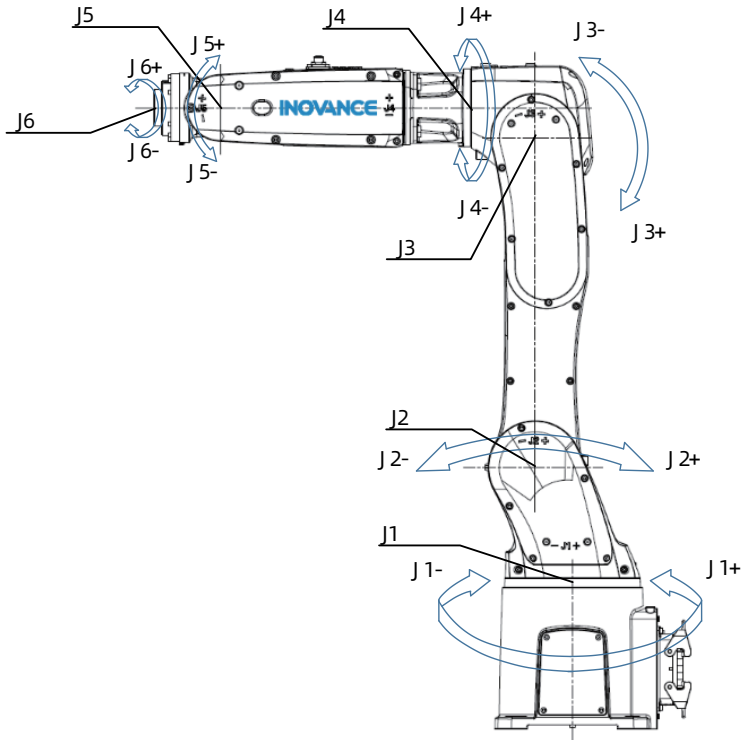


Figure 2-2 Axis rotation directions

2.4 Outline Dimensions

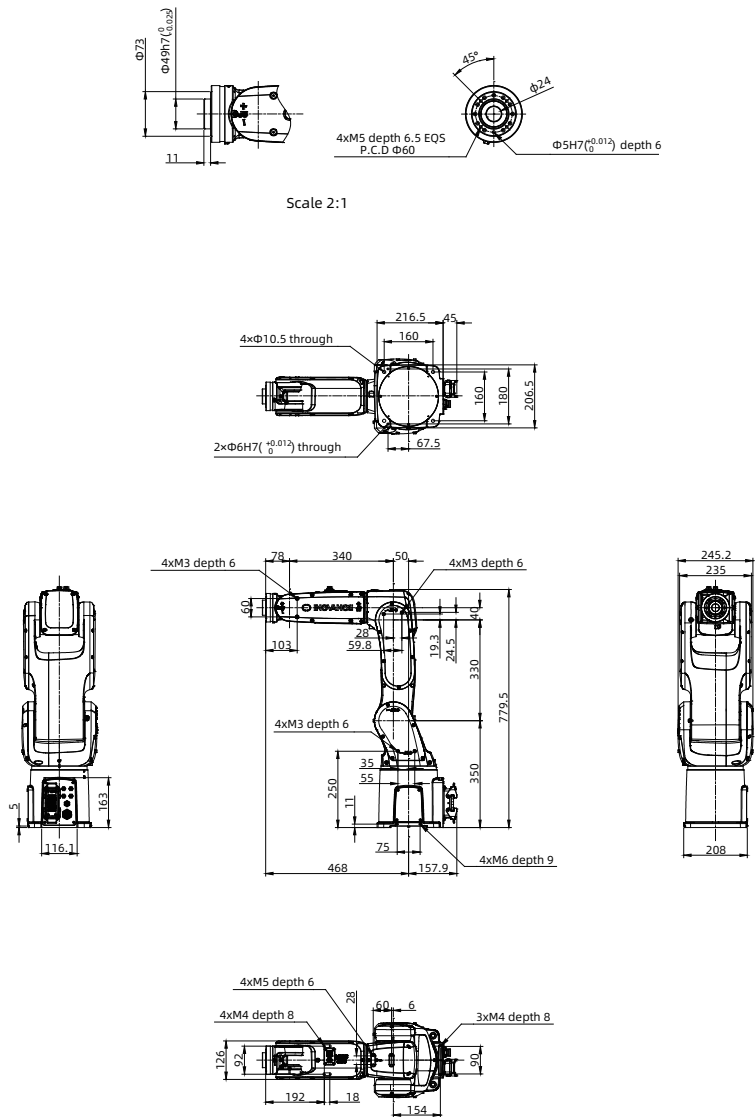
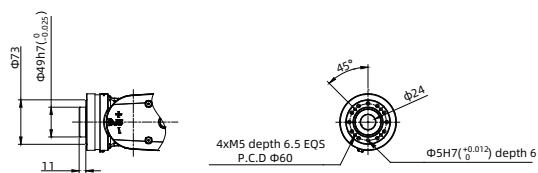


Figure 2-3 Dimensions of IR-R7H-70S-INT (unit: mm)



Scale 2:1

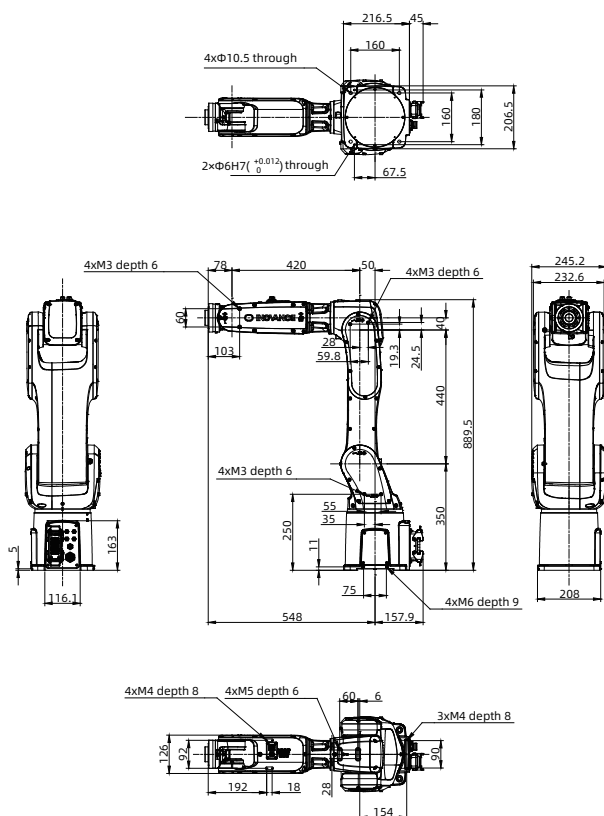


Figure 2-4 Dimensions of IR-R7H-90S-INT (unit: mm)

2.5 Specifications

Model		IR-R7H-70S-INT	IR-R7H-90S-INT
Structure	Structure	Vertical multi-axis cascading structure	Vertical multi-axis cascading structure
Number of axes	Number of axes	6 axes	6 axes
Maximum reach	Maximum reach	722.3 mm	911.9 mm
Repeatability	Repeatability	±0.015 mm	±0.02 mm
Maximum wrist load	Maximum wrist load	7 kg	7 kg
IP rating	IP rating	Standard IP40 Optional IP67	Standard IP40 Optional IP67
Maximum speed	J1	420°/s	336°/s
	J2	336°/s	280°/s
	J3	487.5°/s	390°/s
	J4	550°/s	550°/s
	J5	438°/s	438°/s
	J6	764.7°/s	764.7°/s
Maximum motion range	J1	-170° to +170°	-170° to +170°
	J2	-135° to +80°	-135° to +80°
	J3	-70° to +190°	-70° to +190°
	J4	-190° to +190°	-190° to +190°
	J5	-120° to +120°	-120° to +120°
	J6	-360° to +360°	-360° to +360°
Allowable wrist torque	J4	16.9 N·m	16.9 N·m
	J5	16.9 N·m	16.9 N·m
	J6	9.4 N·m	9.4 N·m
Allowable wrist inertia	J4	0.49 kg·m ²	0.49 kg·m ²
	J5	0.49 kg·m ²	0.49 kg·m ²
	J6	0.15 kg·m ²	0.15 kg·m ²
User interface	Wiring	17 signal channels, 30 V/ 0.5 A 8 signal channels, 30 V/ 0.2 A	17 signal channels, 30 V/ 0.5 A 8 signal channels, 30 V/0.2 A
	Air loop	Air tube: Φ4 mm x 4 Pressure resistance: 0.59 MPa	Air tube: Φ4 mm x 4 Pressure resistance: 0.59 MPa

Model		IR-R7H-70S-INT	IR-R7H-90S-INT
Ambient condition	Ambient temperature ^[1]	0°C to 45°C	0°C to 45°C
	Ambient humidity	• Typical: 5% RH to 75% RH (non-condensing) • Short-term: 5% RH to 95% RH (non-condensing within one month)	• Typical: 5% RH to 75% RH (non-condensing) • Short-term: 5% RH to 95% RH (non-condensing within one month)
	Maximum temperature gradient	1.5°C/min	1.5°C/min
Body weight	Body weight	31 kg	33 kg
Input power (average power consumption)	Input power (average power consumption)	2 kVA (0.5 kW)	2 kVA (0.5 kW)
Applicable controller	Applicable controller	IRCB501-6LD-INT	IRCB501-6LD-INT
Mounting method	Mounting method ^[2]	Floor-standing, ceiling-mounting, and side installation	Floor-standing, ceiling-mounting, and side installation
Noise level	Noise level ^[3]	$L_{Aeq} \leq 80 \text{ dB(A)}$	$L_{Aeq} \leq 80 \text{ dB(A)}$
Base installation dimensions	Base installation dimensions	160 mm x 160 mm (4 x $\Phi 11$ mm)	160 mm x 160 mm (4 x $\Phi 11$ mm)
Certification		CE, cSGSUS, FCC, KCs, and functional safety certification (supported by the "-INT" controller only, requiring a functional safety expansion card)	

Note

[1] Ambient temperature: In low temperatures close to the minimum allowed temperature in the product specifications, or after a long time of unuse during holidays or nights, it is recommended to preheat the robot for 10 minutes before operation.

[2] Installation method: If the ceiling mounting or side installation method is adopted, re-calibrate the accuracy of the robot based on the posture on site.

[3] Noise level: The data in this table represents the equivalent continuous A-weighted sound pressure levels measured in accordance with ISO11201 (EN31201). (Measurement conditions: Operation under rated load at maximum speed)

2.6 Motion Range



- Ensure a safety protection range that is greater than the maximum operating area of the robot. Set up comprehensive guard devices (such as fences) around the safety protection range, with an emergency stop device easily accessible to operators.
 - On the guard devices (fences), clearly display robot status, such as automatic running, teaching, and emergency stop, so that on-site personnel can easily see the status of the robot.
 - The safety fences must be sturdy enough to withstand impacts and pressures from both internal and external sources. The safety fences must be fixed and immovable to prevent operators from easily dismantling or breaking them. The safety fences must also be free of sharp angles, edges, or spikes, and must not contain any potentially hazardous components.
-

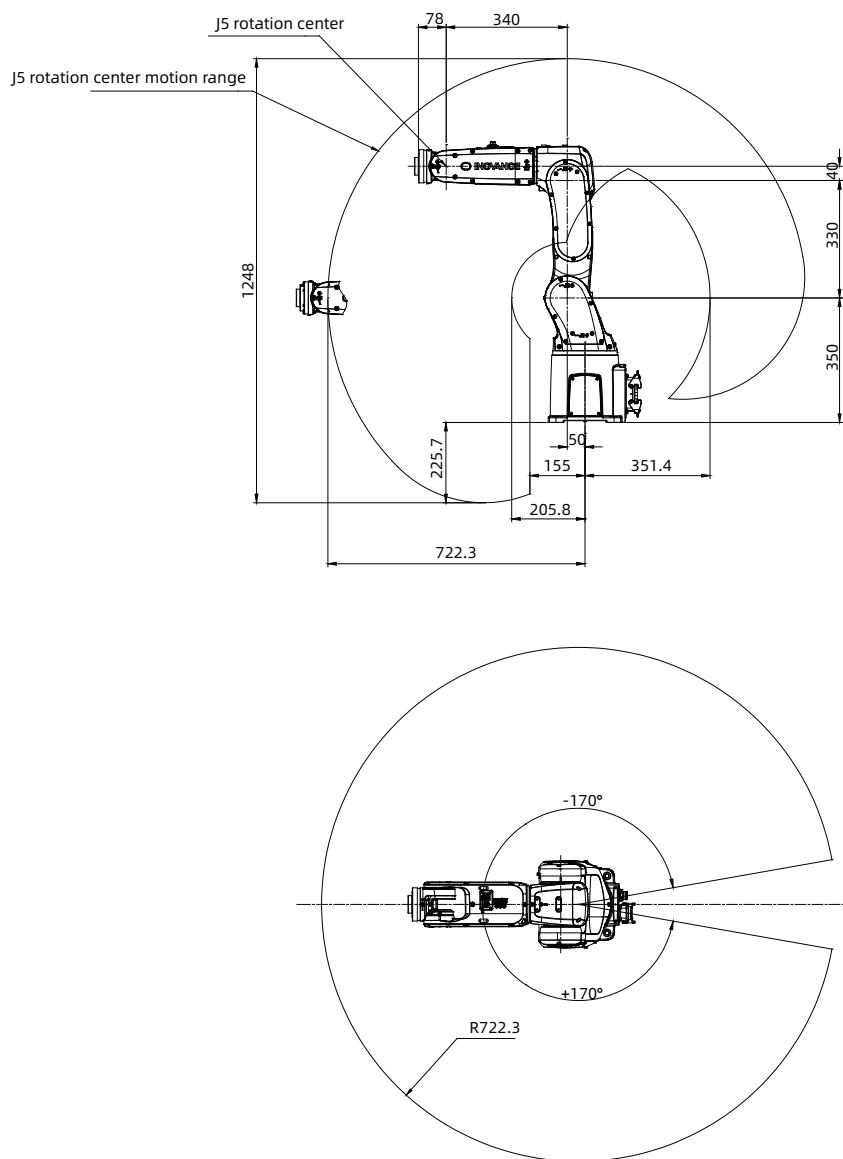


Figure 2-5 Motion range of IR-R7H-70S-INT (unit: mm)

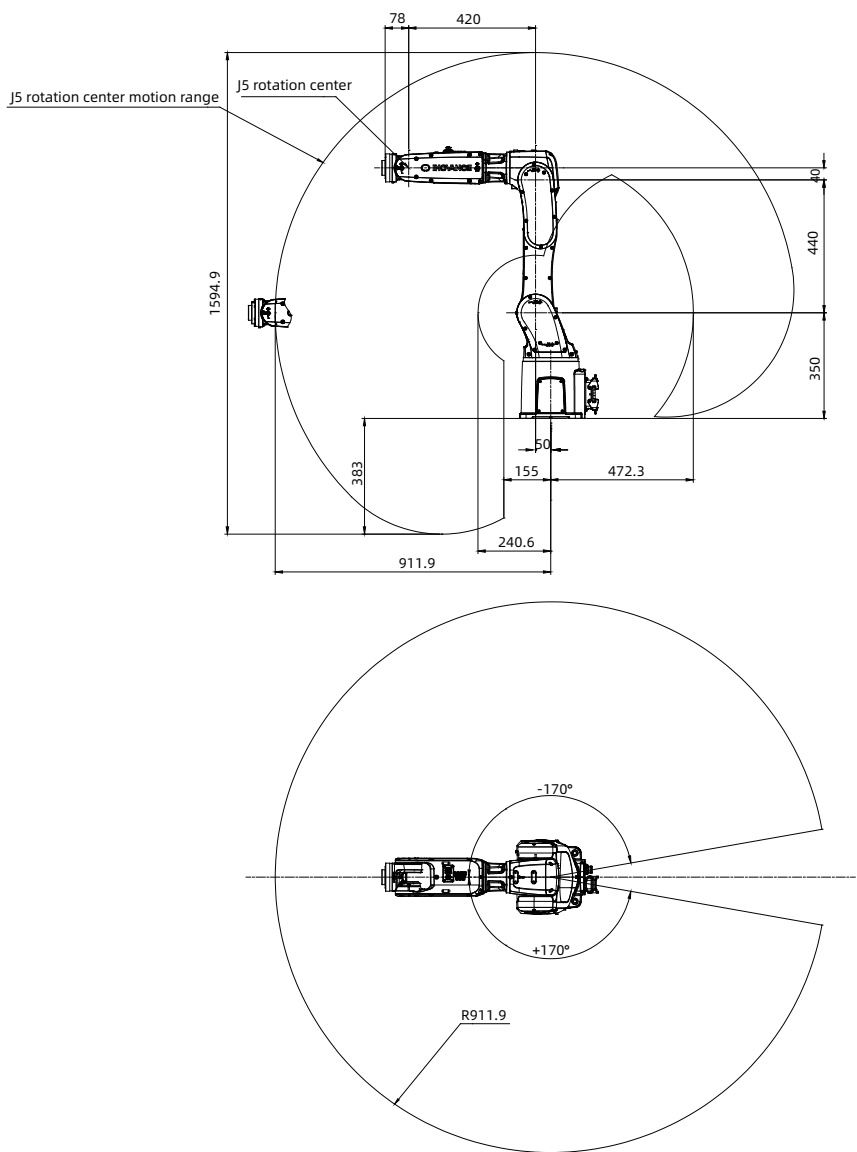


Figure 2-6 Motion range of IR-R7H-90S-INT (unit: mm)

2.7 Maximum Load of Wrist Flange

This series robot supports a maximum load of 7 kg. The allowed wrist torque and inertia should meet the following requirements. External force (other than gravity) applied to the robot should not exceed the range in the table below.

Wrist Load Condition		IR-R7H-70S-INT	IR-R7H-90S-INT
Allowed wrist torque (N·m)	J4	16.9	16.9
	J5	16.9	16.9
	J6	9.4	9.4
Allowed wrist inertia (kg·m ²)	J4	0.49	0.49
	J5	0.49	0.49
	J6	0.15	0.15

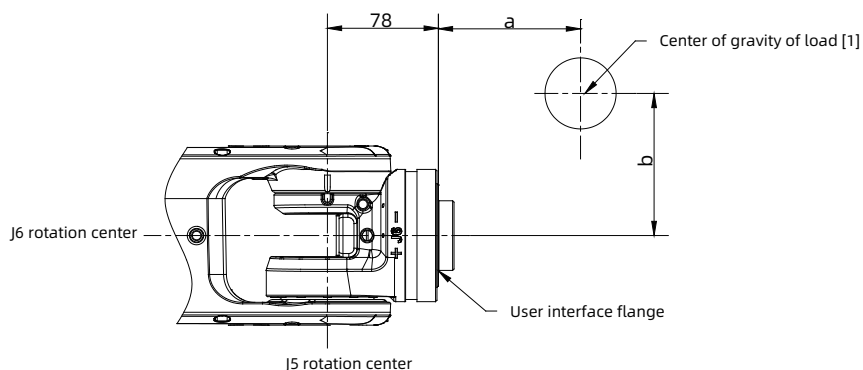


Figure 2-7 Distance from J5/J6 rotation center

Note

- Distance from J5 rotation center: $a + 78$ (mm)
- Distance from J6 rotation center: b (mm)

2.8 Wrist Load Curve

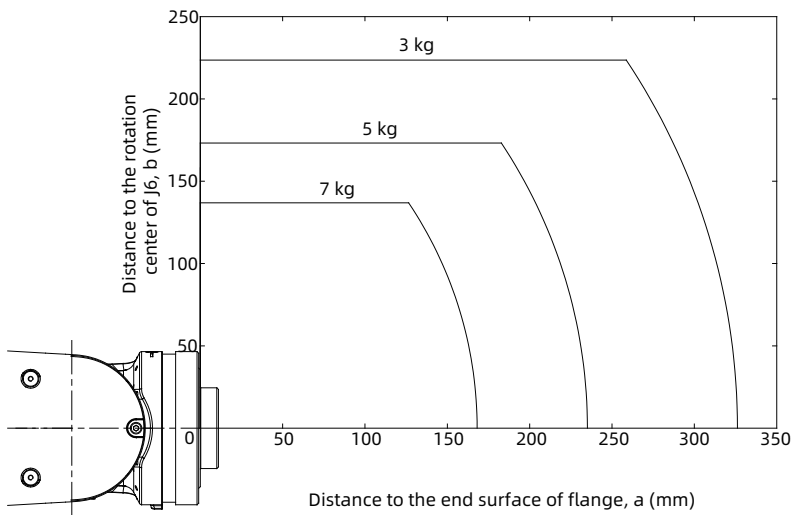


Figure 2-8 Wrist load curve of IR-R7H

3 Preparations Before Installation

3.1 Installation Personnel Requirements

- Ensure that the installation personnel have obtained mechanics knowledge or received mechanics training in advance to understand various dangers and risks in the installation process.
- The installation personnel must be familiar with the installation requirements and relevant technical information.
- Non-professionals are strictly prohibited from product installation, wiring, maintenance, inspection and part replacement.

3.2 Installation Environment Requirements

General environment requirements

Set up the robot system in accordance with the following environment requirements to maximize and maintain the performance of the robot and to use it safely.

Table 3-1 Ambient condition

Item	Requirement
Ambient temperature and humidity	• Temperature range: 0°C to 45°C; variation less than 1.5° C/min • Humidity range: Typically below 75% RH (non-condensing); below 95% RH for short term (within one month)
Storage temperature and humidity	• Temperature range: -10°C to +55°C • Humidity range: Typically below 75% RH (non-condensing); below 95% RH for short term (within one month)
Transportation temperature and humidity	• Temperature range: -10°C to +55°C • Humidity range: Typically below 75% RH (non-condensing); below 95% RH for short term (within one month)
Electrical fast transient	≤ 2 kV
Static immunity	≤ 6 kV
Environment	• Indoor. • Avoid direct sunlight. • Keep away from dust, oil mist, salt, and metal shavings. • Keep away from flammable/corrosive liquids and gases. • Keep away from water. • Keep away from shocks and vibrations. • Keep away from sources of electrical interference.



The robot is not suitable for use in harsh environments such as explosive spraying operations. Contact your provider if the robot needs to be used in an environment that does not meet the preceding conditions.

The EMC test is performed according to IEC 61800-3:2017.

Special environment requirements

- The surface of the robot provides certain protection. However, consult your provider in advance if the robot may come into contact with special liquid or gas during use.
- There may be condensation inside the robot if it is used in an environment with large changes in temperature and humidity. Consult your provider.
- If you want to use the robot to handle food directly, consult your provider in advance to avoid contamination of the food by the robot.



Do not wipe the robot hard with alcohol or benzene, as this may cause the gloss of the painted surface to deteriorate.

3.3 Rust Prevention Requirements

3.3.1 Instructions

Environment control instructions

- Ensure that the operating ambient temperature and humidity of the robot are within the allowable range of the robot. Typically, the temperature should be in the range of 0°C to 45°C, and the humidity is in the range of 20% RH to 80% RH.
- Avoid exposing the robot to corrosive gases or liquids such as acid, alkali, and salt mist. If it cannot be avoided due to process requirements (such as electroplated coating or painting), use a robot with a higher IP rating (such as IP67) and install a physical protection device. Check for rust regularly. If rust spots are present, remove the rust promptly and apply the anti-rust oil^[1].
- If there is continuous water splashing or other similar rust-prone liquids in the operating environment, install a physical protection device to prevent liquids from

splashing onto the robot. Check for rust regularly. If rust spots are present, remove the rust promptly and apply the anti-rust oil.

- Keep the floor clean and promptly clear accumulated water and oil stains to prevent increased environment humidity caused by evaporation or corrosive gases.

Note

[1]: Contact Inovance to obtain the rust remover and anti-rust oil models.

Routine operation instructions

- Before power-on, visually inspect the robot body, cables, and wrist parts for obvious water stains, oil contamination, or corrosion.
- Do not directly contact the polished arms of the robot with bare hands. Hand sweat is one of the key causes of rusting. Wear clean gloves during operation.
- Use dry and clean non-woven fabrics or cotton cloth to gently wipe off dust, oil, and cutting fluid from the robot surfaces, especially the wrist flange.
- Do not clean the standard models with water. Clean optional models of IP67 with water supplemented with the anti-rust agent. Immediately dry the robot after cleaning and apply the anti-rust oil.

Emergency handling

- If any liquid (such as water, oil, or chemical reagent) splashes onto the robot, shut down the robot immediately. Then, thoroughly clean the robot by referring to ["3.3.2 Maintenance Operations" on page 34](#) and reapply the anti-rust oil after the robot is dry.
- If the robot is scheduled to be out of service for more than 48 hours, take special anti-rust treatment before storage. For details, see ["3.3.2 Maintenance Operations" on page 34](#).

3.3.2 Maintenance Operations

No.	Scenario	Operation
1	Cleaning	1. Stop the robot and cut off the power to ensure safety. 2. Use a soft-bristle brush or dry compressed air (with pressure below 0.3 MPa) to remove dust from gaps and hard-to-clean areas. 3. Use clean cloth dipped with special metal cleaning agent^[1] to wipe the surface of the robot^[2]. 4. Use dry non-woven fabrics to wipe the surface thoroughly until no moisture remains.
2	Applying the anti-rust oil	1. Apply the anti-rust oil to all exposed metal surfaces, especially the end flange of J6. 2. Spray a small amount of anti-rust oil onto the non-woven fabrics, and then apply it evenly to the metal surfaces to form an extremely thin oil film. Avoid oil dripping during this process.
3	Rust prevention for long-term suspension and storage	1. Thoroughly clean and dry the robot in accordance with the cleaning procedure. 2. Apply the anti-rust oil to all exposed metal surfaces. 3. Take protective measures and store the robot. Pay attention to the following points: • Move each axis of the robot to the standard storing posture to reduce the impact of structural stress. • Completely cover the robot with a dust cover or plastic film. Place an appropriate amount of desiccant inside the robot and check regularly. • Power on and run the robot for a period at regular intervals to dispel moisture through heat generated by the electrical components.

Note

[1]: Contact Inovance to obtain the rust remover models.



[2]: Do not wipe the surface of the robot with corrosive solvents such as strong acid, strong alkali, and absolute ethanol.

3.4 Installation Base Table Requirements

You need to make a base table to fix the robot. The shape and size of the base table vary depending on the purpose of the robot system. You may refer to the following requirements when designing a base table.

- The base table supports not only the weight of the robot, but also the dynamic forces produced by the robot when it moves at maximum acceleration. Ensure that the base table has sufficient bearing capacity by reinforcing it with materials like connecting beams.
- Use M10 threaded holes on the base table to mount the robot. Use screws with a strength equivalent to the performance level of Grade 12.9 specified in GB/T 3098.1.
- To dampen vibrations, use a steel plate with a thickness over 30 mm, a surface roughness of 25 μm , and a flatness below 0.2 mm as the robot mounting surface.
- Fix the base table firmly on the ground.
- Keep the Z axis of the robot perpendicular to the horizontal plane during installation.
- Reserve enough space for the robot controller in the base table design. For space requirements of controllers, see IRCB501 International Series Robot Control Cabinet User Guide.
- Consider the following torques and reaction forces produced by movements of the robot.

Table 3–2 Maximum force and torque on the robot

Series	Max. Vertical Torque $M_k (\text{N}\cdot\text{m})$	Max. Vertical Action Force $F_v (\text{N})$	Max. Horizontal Torque $M_r (\text{N}\cdot\text{m})$	Max. Horizontal Action Force $F_o (\text{N})$
IR-R7H-70S-INT	900	1600	1000	1800
IR-R7H-90S-INT	1600	1700	1300	1900

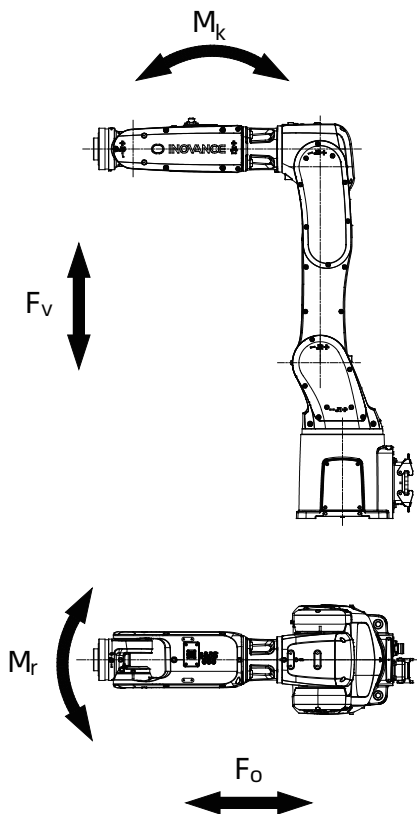


Figure 3-1 Forces and torques on the robot

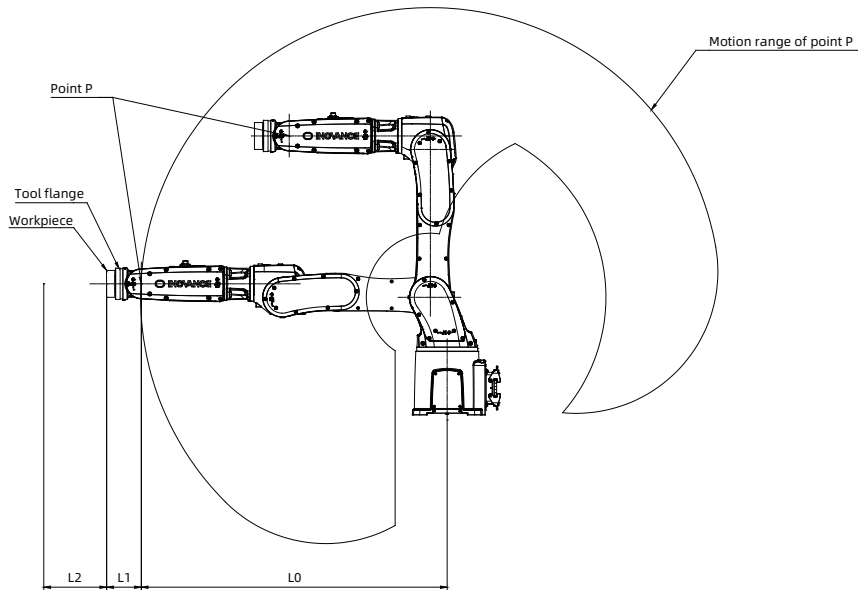
3.5 Installation Space Requirements

3.5.1 Safety Fence Range



CAUTION

- Ensure a safety protection range that is greater than the maximum motion range of the robot. Set up comprehensive guard devices (such as fences) around the safety protection range, with an emergency stop device easily accessible to operators.
- On the guard devices (fences), clearly display robot status, such as automatic running, teaching, and emergency stop, so that personnel outside the safety fences can easily see the status of the robot.
- The safety fences must be sturdy enough to withstand impacts and pressures from both internal and external sources. The safety fences must be fixed and immovable to prevent operators from easily dismantling or breaking them. The safety fences must also be free of sharp angles, edges, or spikes, and must not contain any potentially hazardous components.



- L0: Motion range of the robot
- L1: Total length of the wrist, tool flange, and workpiece
- L2: Safety space

- IR-R7H-70S-INT: $L0 + L1 + L2 > 1000$ mm
- IR-R7H-90S-INT: $L0 + L1 + L2 > 1200$ mm

3.5.2 Installation Space

1. In addition to the space required for the robot body, controller, and peripherals, ensure the following minimum required spaces:
 - Space for teaching
 - Space for maintenance and inspection (for mounting fixtures)
 - Space for cables
2. The minimum bending radius of power cords and signal cables is 170 mm. When installing the robot, pay attention to the distance from obstacles. Reserve enough space for cable bending radius to avoid cable damage or breakage caused by extreme bending. For details, see ["6.5.3 Cable Hole Dimensions" on page 65](#).
3. Reserve at least 100 mm between the boundary of the motion range and the safety fence.

3.6 Installation Tools

Tool	Quantity (pcs)
M5/M6/M8 internal hexagonal wrench	1
Scissors or utility knife	1
Protective gloves	1
Anti-smash shoes	1
Lifting rope	1
Forklift	1

4 Unpacking and Handling

4.1 Precautions

Precautions for unpacking



Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking.

Unpack the product layer by layer. Do not strike the package violently.

Check the surfaces of the equipment and accessories for any damage, rust, and scratches.

Check the equipment, accessories, and materials in the package against the packing list.



Do not install the equipment if you find damage, rust, or indications of use on the equipment or accessories.

Do not install the equipment if water seepage or component missing or damage is found upon unpacking.

Do not install the equipment if the packing list does not conform to the equipment received.

Unpack the packing box according to the direction instructed.

Precautions for handling

Note

Allow only qualified personnel to carry out handling operation including rigger operation, hoisting by crane, and forklift driving.



- Transport the equipment with a crane or forklift with the original package.
 - Wear personal protective equipment (PPE) during transportation with a crane or forklift. Prohibit any personnel from standing or staying around the transportation route.
 - Hold the equipment with hands to keep its balance when hoisting the equipment. Otherwise, the equipment may fall, resulting in serious injury or damage.
-



- Store and transport this equipment based on the storage and transportation requirements for humidity and temperature.
 - Avoid storage and transportation in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
 - Pack the equipment properly before transportation by vehicle. Use an enclosed box for long-distance transportation.
 - Never transport the equipment with devices or materials that may damage or have negative impacts on the equipment.
 - If condensation occurs on the device during transportation or storage, remove the condensation before turning on the power.
-

4.2 Unpacking

1. Remove the outer carton.

Cut the PET straps on the carton with scissors or a utility knife. Remove the carton cover and the paper corner protectors. Lift the carton vertically to remove it.

Note

Wear gloves to prevent scratches.

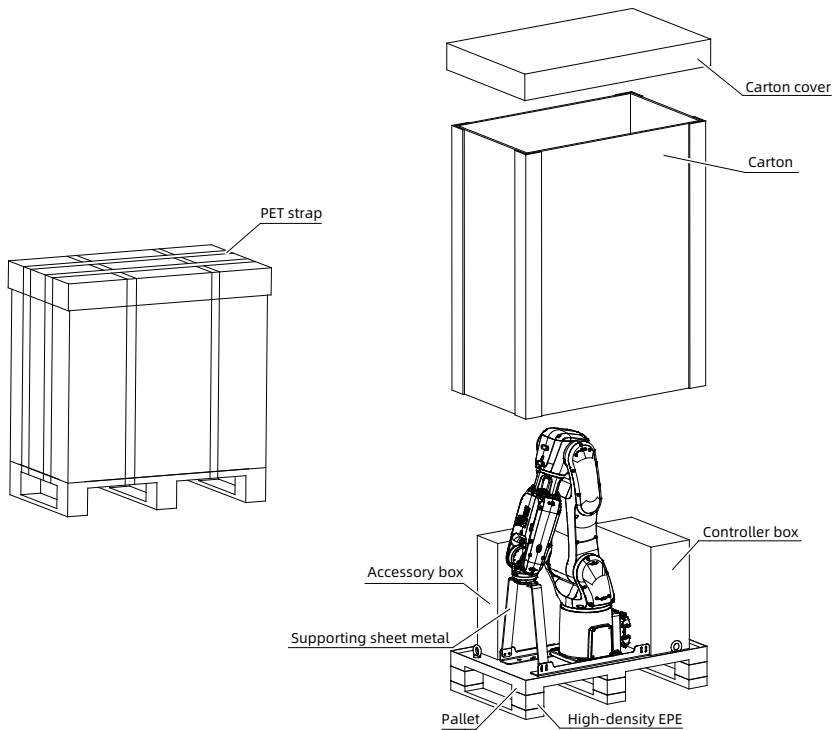
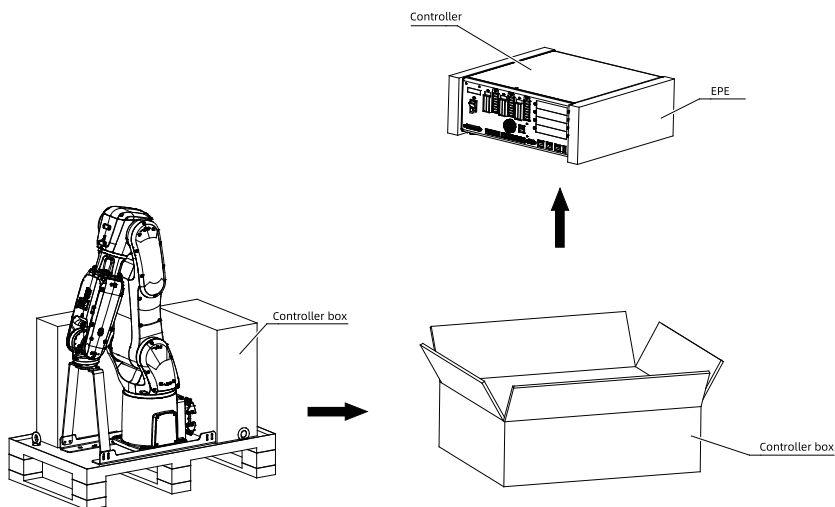


Figure 4-1 Removing the outer carton

2. Unpack the controller.

- Cut the packing straps securing the controller and accessory packing boxes with scissors.
- Remove the accessory packing box from the pallet. Then, transfer the controller packing box from the pallet to an open area, ensuring to follow the orientation instructions on the box.
- Cut the sealing tape on the controller packing box with scissors, and then open the box.
- Remove the expanded polyethylene (EPE) foam from the sides of the controller. Grip the holes on the sides of the controller or hold the bottom to remove the controller from the packing box. Transfer the controller to the desired location.



3. Remove the bolts securing the robot body.
- Use the M5 internal hexagonal wrench to remove the four M5x12 screws securing the supporting sheet metal to the end flange. Use the M8 internal hexagonal wrench to remove the four M8x50 screws securing the robot body to the wooden pallet.

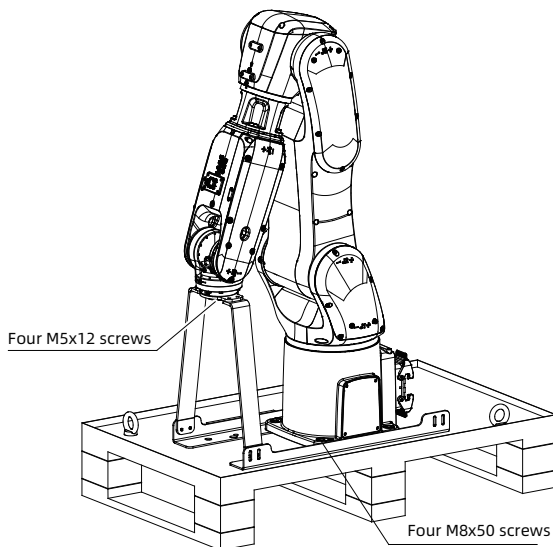


Figure 4-2 Packing of the robot

4. Take out the robot body.

- a. Lift the robot vertically and then move it horizontally to remove it from the pallet.
Avoid interference between the bottom of the robot body and the top of the fixtures.
Then, transfer the robot body to the desired location.
- b. Use the M5 and M8 internal hexagonal wrenches to loosen the screws securing the lifting sheet metal. Remove the lifting sheet metal for robot handling and lifting.

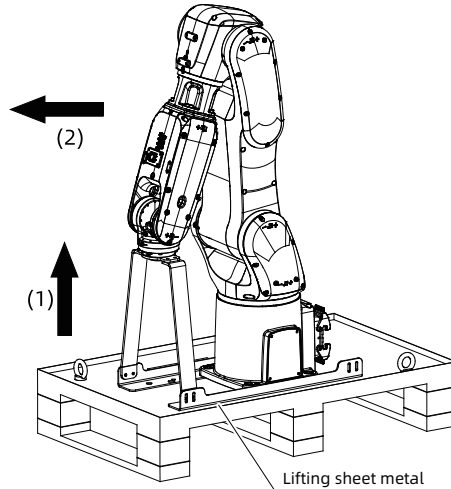


Figure 4-3 Taking out the robot body

Note

- Take out the robot carefully to avoid collision.
- To repack the robot, reverse the steps above. Please wear protective gloves to prevent scratches and work carefully to prevent damaging the machine.

4.3 Check After Unpacking

Check the product and accessories against the packing list after unpacking.

Table 4-1 Packing list

Part Name	Quantity (pcs)
Robot body	1
Robot controller	1
Inovance Product Warranty Card	1
Controller cable connection kit	1
Cable between the robot body and the controller	1

Part Name	Quantity (pcs)
M10x35 hexagon bolt (GB/T 70.1-2008)	4
Spring washer (GB/T 93-1987)-10	4
Plain washer (GB/T 97.1-2002)-10	4

4.4 Handling

Preparation before handling



- Store and transport this equipment based on the humidity and temperature requirements for storage and transportation.
 - Avoid storage and transportation in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
 - Pack the equipment properly before transportation by vehicle. Use an enclosed box for long-distance transportation.
 - Never transport the equipment with devices or materials that may damage or have negative impacts on the equipment.
 - If the equipment is reassembled into the system after long-term storage, conduct a trial run before putting it into normal operation.
 - If condensation occurs on the equipment during transportation or storage, remove the condensation before turning on the power.
 - After transportation or relocation, remove the lifting sheet metal from the robot. If the robot is operated without removing the lifting sheet metal, the robot arm may collide with the lifting sheet metal, potentially causing damage or malfunction to the robot.
 - Cranes or forklifts should come to a slow stop to avoid impact.
 - When transporting the robot using transport components, check the fixed bolts of the transport components beforehand and tighten any loose bolts.
-

1. For a newly shipped robot, move it in the factory posture as it was delivered, as shown below.

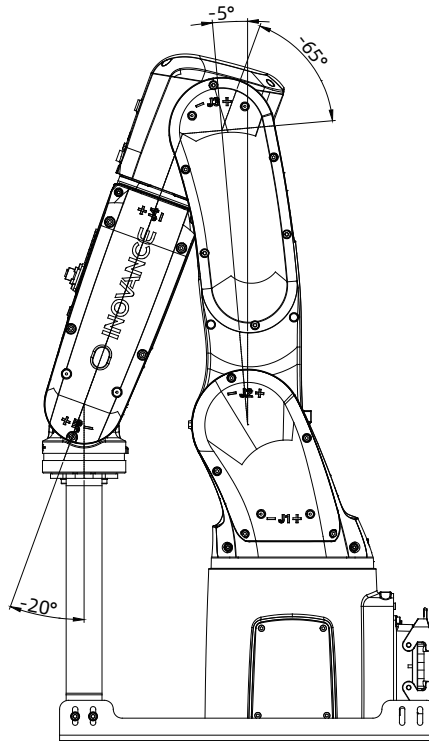


Figure 4-4 Factory posture of the robot

Angles of the axes:

J1	J2	J3	J4	J5	J6
0°	-5°	-65°	0°	-20°	0°

2. If the robot has been used and needs to be moved to another location, complete the following steps before handling:
 - a. Adjust the robot to the transport state.
 - b. Disconnect all power supplies of the equipment.
 - c. Disconnect the power and signal cables from the controller.
 - d. Remove the bolts fixing the robot to the base and then remove the robot from the installation base.
 - e. Secure the robot to the handling equipment.

Relocation

- Transport in the original packaging: When relocating the robot, dismantle end effectors and other devices to ensure that the robot is unloaded. Restore the robot to the factory posture and use the original factory packaging for the relocation.

- Transport with the gravity axis locked: If unable to both restore the factory posture and use the original packaging, at least ensure that the robot is in the factory posture with its gravity axis locked (in any suitable way to prevent downward movement) for packaging and transport.
- Due to the precision nature of the robot, handle it with care to avoid dropping, bumping, or collisions. Maintain a smooth transportation surface and avoid obvious unevenness and bumps.

Note

Before proceeding with relocation, it is advisable to first restore the robot to its factory default posture.

Handling procedure

Note

- The device is heavy. Do not handle it with bare hands.
 - Wear safety shoes for handling and at least two people are required.
 - Wear protective equipment and ensure that the lifting area is safe enough to prevent collision hazards.
-



- Take care when lifting the robot with a crane or forklift. When placing the robot on the ground, avoid any strong collision between the robot mounting face and the ground.
 - Before handling the robot, remove the end effector and the pallet. When it is necessary to handle the robot with the pallet, observe the following precautions.
 - The end effector may oscillate due to vibration during transportation and excessive loads may be applied to the robot.
 - When handling the robot with the pallet installed, lift the pallet rather than the robot directly.
-

Handling with a crane

In principle, use a crane to move and transport the robot.

1. Set the robot to the factory posture, as shown in the diagram.
Secure the lifting sheet metal to the robot base using an M6 internal hexagonal wrench and M6x12 screws. Lift the robot with four steel slings.

It is recommended that the steel sling length be 1 m and its total load capacity be at least 100 kg. Use sleeve rubber hoses or similar protection at contact points between the steel slings and the robot body.

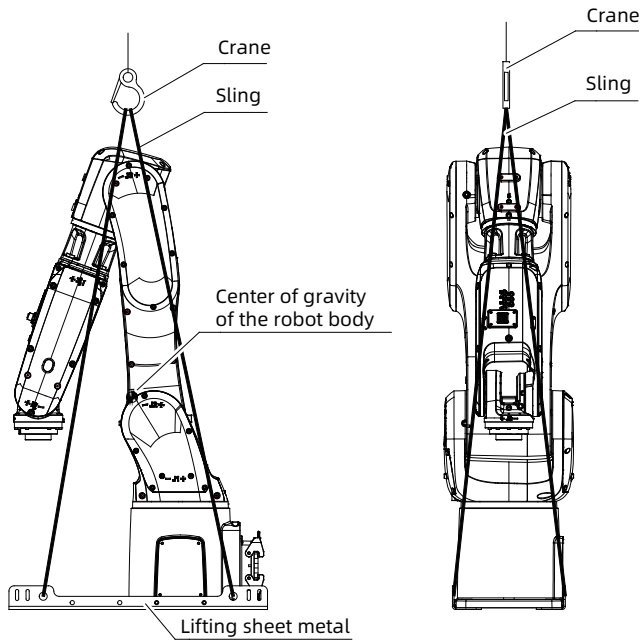


Figure 4-5 Lifting the robot

2. Ensure the robot remains balanced before moving to prevent tilting or tipping.
3. The handling needs two-person coordination. One person should observe in the safety zone to ensure that the ambient conditions are met during the operation, while the other operates the crane to slowly lift the robot body and move it to the base table.

Note

The lifting shown above applies for floor-standing installation. For lifting and transport applicable to ceiling-mounting and side installation, consult Inovance for technical support.

Handling with a forklift

When handling the robot using a forklift, use screws to secure the robot onto its original pallet or use screws to secure it on a baseplate with sufficient load-carrying capacity, and lift the robot together with the pallet or baseplate.

Transport the robot slowly and carefully to prevent it from toppling or tilting over.

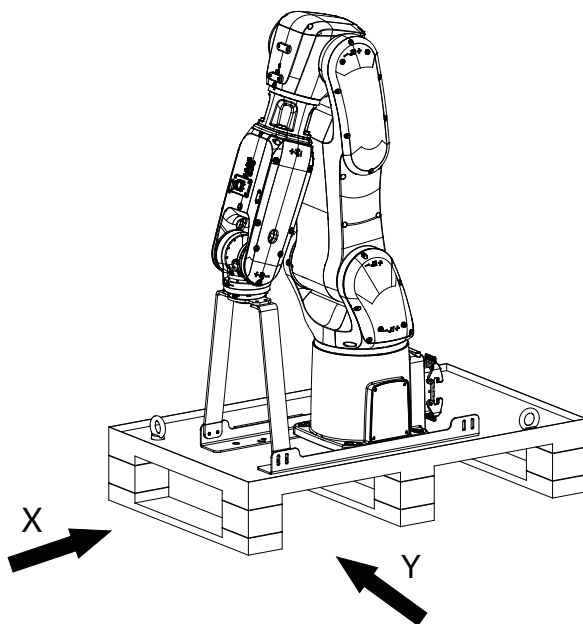


Figure 4-6 Handling the robot with a forklift

Note

When the factory pallet is used and the robot is located on one side of the pallet, apply a counterweight on the other side upon forklift insertion, to prevent the robot from tipping over.

5 Transportation Protection

5.1 List of Materials

The following table lists the materials recommended for packing.

Material Name	Material	Size	Quantity	Description
Paper corner protector	Bobbin paper	-	4 PCS	-
Bubble wrap	LLDPE	-	Several	Use it to protect the cable connectors.
Pressure-resistant carton	2A	-	1 PCS	Select an appropriate size based on the device package.
Hexagon bolt (for separate packing)	-	M8x50	4 PCS	Directly use the bolts delivered by Inovance to pack the robot separately.
Hexagon bolt (for integration with customer device)	-	M8x30 M10x30	4 PCS each	Directly use the bolts delivered by Inovance to integrate the robot into the automation device of the customer.
Desiccant	Montmorillonite or silica gel	-	8 bags	30 g/bag
PE bag	LDPE	-	3 PCS/1 PCS	Select an appropriate size based on the product dimensions. Use it to store spare parts. Use it to cover the robot and cables.
EPE	96 kg/m ³	150 mm x 60 mm x 60 mm	-	Ensure that the EPE height is proper.

Material Name	Material	Size	Quantity	Description
Iron bracket	Q235	-	-	Directly use the bracket delivered by Inovance for fixing.
Eyebolt	Cast iron	Standard M10 eyebolt	2 PCS	-
Nylon tie	NYLON 66	Length: 150 mm	4 PCS	-
Packing belt	PET	Width: 16 mm; thickness: 0.6 mm	8 m to 10 m	-
Industrial tape	BOPP	60 mm	Several	-
Carton	K=K	-	2 PCS	Use one carton to pack the controller. Use one carton to pack the accessories.
Wooden pallet	Plywood	-	1 PCS	Select an appropriate size based on the device package.



Materials such as the PE bag shall comply with laws and regulations of the target country. Packing materials provided by Inovance shall meet REACH certification requirements.

5.2 Packing Guide

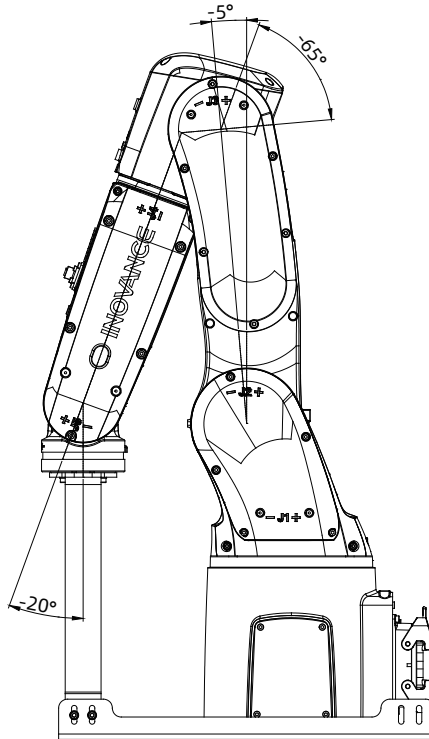
5.2.1 Packing Postures

Transportation postures

Before transporting a robot, ensure that the robot is in the transportation postures. The posture and angle of each axis are as follows:

Position of the Transportation Posture	Angle of Each Axis
J1	0°
J2	-5°

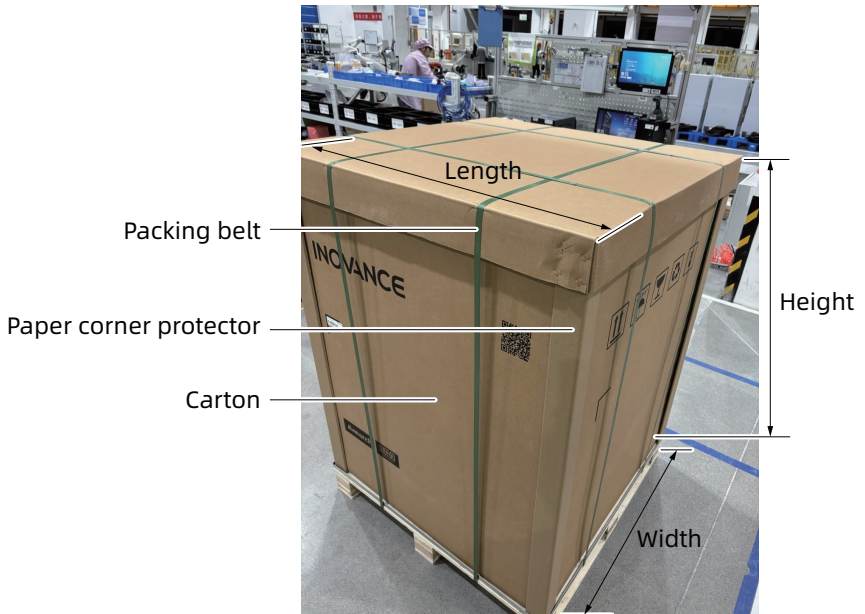
Position of the Transportation Posture	Angle of Each Axis
J3	-65°
J4	0°
J5	-20°
J6	0°



Package dimensions

Table 5-1 Robot package dimensions (unit: mm)

Arm Length	Height	Width	Length
722/911	1150	500	820



Note

The preceding factory dimensions (of the robot body and controller) are for reference only.

5.2.2 Packing Procedure

Packing the robot separately

1. Before packing, keep the robot in the same posture as it was delivered. For details, see ["5.2.1 Packing Postures" on page 50](#).
2. Fix the robot body and sheet metal parts to the four fixing holes of the packing pallet with a set of bolts. Fix the sheet metal parts of the J5 axis and the base with screws.
3. Put accessories such as the cable suite and user guide into a carton (code: 19050965). Protect both ends of the cables with bubble wrap. It is recommended to coil a cable into a reel with the diameter of 400 mm and fasten it tightly with nylon cable ties.
4. Put the robot body on one end of the pallet, and the controller on the other end. To pack the robot with the IRCB501 series controller, place the controller box with the narrow side facing down, and fix it with packing belts.

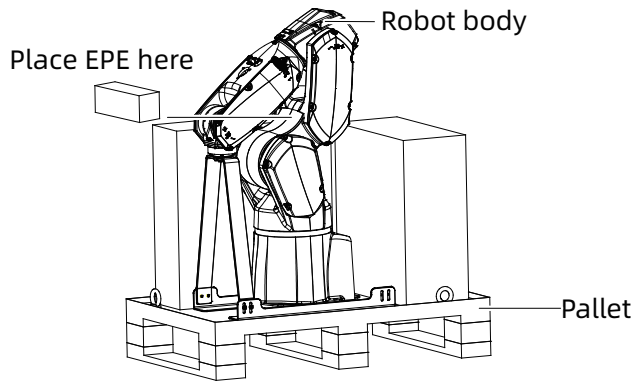


Figure 5-1 Packing the IR-R7H series robot and IRCB501 series controller

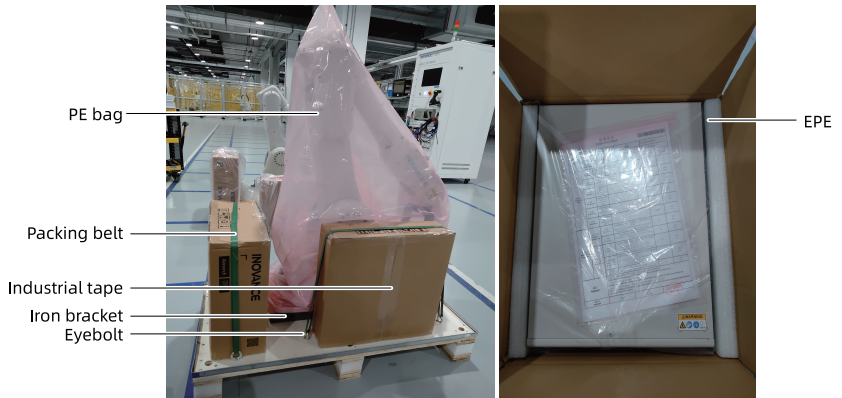


Figure 5-2 Photos of materials used for packing

To pack the robot with the IRCB501 high-protection series controller, wrap the controller with a PE bag, and put desiccant inside the controller.

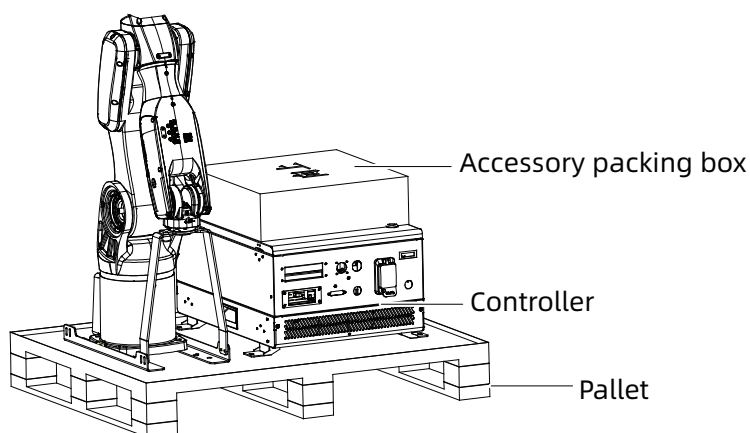
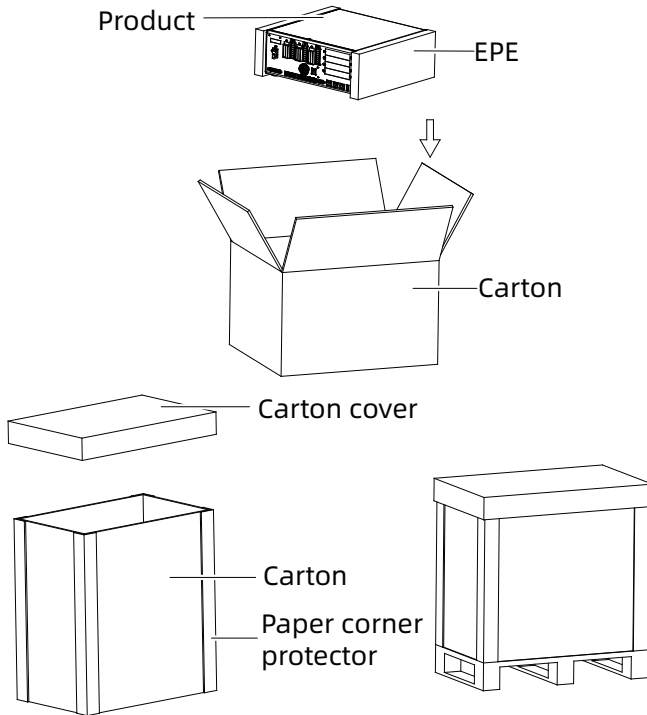


Figure 5-3 Packing the IR-R7H series robot and IRCB501 high-protection series controller

Note

Do not place desiccant on the controller surface.

5. To pack the robot with the IRCB501 series controller, place the carton containing accessories on the other side of the robot body, and fix it with packing belts. Place expanded polyethylene (EPE) between the carton and the robot body to protect the robot body against scratches from the carton.
To pack the robot with the IRCB501 high-protection series controller, place the carton containing accessories on the top of the controller, and fix it with packing belts. Place paper corner protectors between the carton and the robot.
6. To pack the robot with the IRCB501 series controller, place the carton in position and attach a shockproof label at the corresponding corner mark position. Attach paper corner protectors at four corners of the carton and put on the cover to fix the paper corner protectors.
To pack the robot with the IRCB501 high-protection series controller, place the carton in position, attach paper corner protectors at four corners of the carton, and then put on the cover to fix the paper corner protectors.



7. Use PET straps to pack the carton in a "#" shaped pattern.

Note

If the controller and robot body support separate packing, it is recommended to preferentially use the packing materials from the original manufacturers to ensure transportation safety and compliance with device protection standards.



CAUTION

- Put the product together with the desiccant into a plastic bag, fold the plastic bag to make it flat, and then use transparent tape to seal it.
 - Place the product in the carton and add EPE at both ends of the product for protection.
 - Place accessories such as the user guide and zero-point information sheet inside the carton.
 - Put the desiccant into the carton and cover a PE bag to prevent dust and rust.
 - Be careful to prevent bumps and scratches during the entire process.
 - Secondary transportation with loads (tools or fixtures) is not recommended.
-

Packing the robot with the automation device of the customer

Use either of the following methods to pack the robot with the automation device of the customer:

Method 1: Integrate the robot body and controller into the automation device of the customer.

Method 2: Integrate the robot body into the automation device of the customer and pack the controller separately.

- Method 1: Integrate the robot body and controller into the automation device of the customer. Perform the following steps:
 1. Use four M8x30 bolts to fix the controller to the base according to the fixing specifications provided by Inovance.
 2. Place four bags of desiccant (30 g per bag) on the side of the robot body, and confirm that the desiccant packaging is free from damage and has clear labels.
 3. Adjust the angle of each robot arm in advance and fix the arms to the sheet metal brackets that come with the original package. This prevents damage caused by displacement or collision with the surrounding environment during transportation and protects the reducers.
 4. After the robot arms are fixed, fully wrap the robot body with stretch wrap to protect it against dust and water.
 5. Conduct a tightness inspection to protect the product against moisture and rust.
 6. Check the surface of the stretch wrap for broken strips, and ensure that the edge of the protective layer extends beyond the contour of the robot body by more than 20 mm.
- Method 2: Integrate the robot body into the automation device of the customer and pack the controller separately. Perform the following steps:
 1. Use four M10x30 bolts to fix the robot body to the system base. Adopt a separate packing solution for the controller.

2. Place two bags of desiccant (30 g per bag) on the side of the robot body, and confirm that the desiccant packaging is free from damage and has clear labels.
3. Adjust the angle of each robot arm in advance and fix the arms to the sheet metal brackets that come with the original package. This prevents damage caused by displacement or collision with the surrounding environment during transportation and protects the reducers.
4. After the robot arms are fixed, fully wrap the robot body with stretch wrap to protect it against dust and water.
5. Conduct a tightness inspection to protect the product against moisture and rust.
6. Check the surface of the stretch wrap for broken strips, and ensure that the edge of the protective layer extends beyond the contour of the robot body by more than 20 mm.
7. Select a pressure-resistant carton of appropriate size, with cushioning materials inside. (Bubble wrap or EPE is recommended.)
8. After packing, use industrial tapes to seal the carton in an "I" shaped pattern.
9. Secure the packed controller to the base with four bolts. (There is a dedicated fixing bracket at the bottom of the controller.)
10. Check the center-of-gravity stability of the packed product to avoid displacement risks during transportation.

6 Installation

6.1 Precautions for Installation

Note

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
 - Install a safety fence for the system. Failure to comply may result in severe safety issues.
 - Reserve sufficient space between the equipment and surrounding buildings, structural parts, and devices. Failure to comply may cause serious injury or major damage.
 - Fix the robot body before turning on the power or operating the system. Otherwise, the robot body may fall over and cause serious injury or major damage.
-

Note

- Do not modify the equipment.
 - Do not install this equipment in places with strong electric or magnetic fields.
 - Remove the mounting screws of the manipulator and adjust the robot to its transport posture.
 - For the tabletop mounting, at least two people are required for the operation.
-

6.2 Installing the Robot Body

Follow the following steps to install the robot body:

1. Disconnect all power supplies of the robot.
 2. Clean the surface onto which the robot is to be mounted.
-

Note

To dampen vibrations, use a steel plate with a thickness over 30 mm and a surface roughness below 25 μm as the robot mounting surface.

3. Move the robot to the vicinity of the table top.

Note

- When carrying the robot to the table top, avoid lifting the J3 forearm.
- Move the robot slowly to align it with the screw holes; exercise caution to prevent the robot from falling during this process.

4. Align the robot base with the two locating pin holes.
5. Install the two locating pins.
6. Install four spring washers and four plain washers, and tighten them with four M10x35 hexagon bolts (tightening torque: 75 N·m). Use screws with a strength equivalent to the performance level of Grade 12.9 specified in GB/T 3098.1.

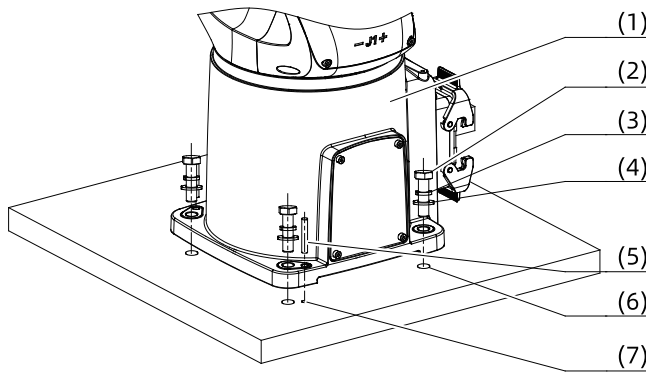


Figure 6-1 Installing the base

No.	Component
(1)	Robot base
(2)	Hexagon bolt (GB/T 70.1-2008)-M10x35 (4 PCS)
(3)	Spring washer (GB/T 93-1987)-10 (4 PCS)
(4)	Plain washer (GB/T 97.1-2002)-10 (4 PCS)
(5)	Parallel pin with internal thread (GB/T 119.1-2000)-Φ6x32 (2 PCS) (customer-supplied)
(6)	Threaded mounting hole (depth: > 20 mm)
(7)	Mounting pin hole (depth: > 20 mm)

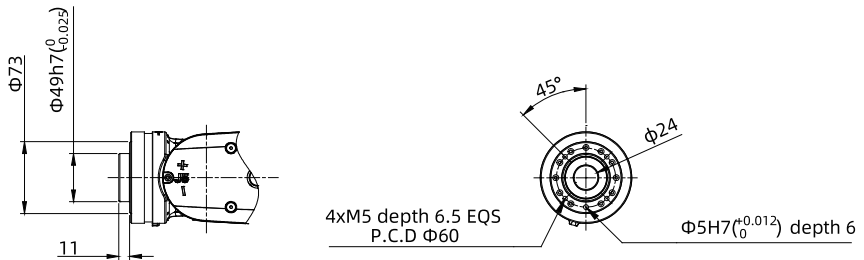
6.3 Installing an End Effector

Customers shall prepare end effectors on their own. Observe the following precautions when installing an end effector.

**CAUTION**

- Perform wiring and air tubing of the chuck only when the power supply is disconnected and the workpiece is not placed. If the emergency stop switch is pressed when the power is still connected, the workpiece may be released, resulting in damage to the robot system and workpiece.
- Pay attention to the interference area of the end effector during system layout design. After the end effector is installed, the end effector or workpiece may come into contact with the robot body during motion due to the outer diameter of the end effector, the size of the workpiece, or the position of the robot arm, which may cause damage to the robot system and the workpiece.

Use M5 screws (Grade 12.9) to attach the end effector to the wrist flange.



Scale 2:1

Figure 6-2 Wrist flange of IR-R7H

6.4 Installing Pneumatic Valves and Other Auxiliary Accessories

The robot is equipped with connectors on both sides of the forearm and upper arm and on upper end of the elbow, which are used for installing auxiliary accessories such as the pneumatic valve. The following figure shows the specifications and dimensions of these connectors.

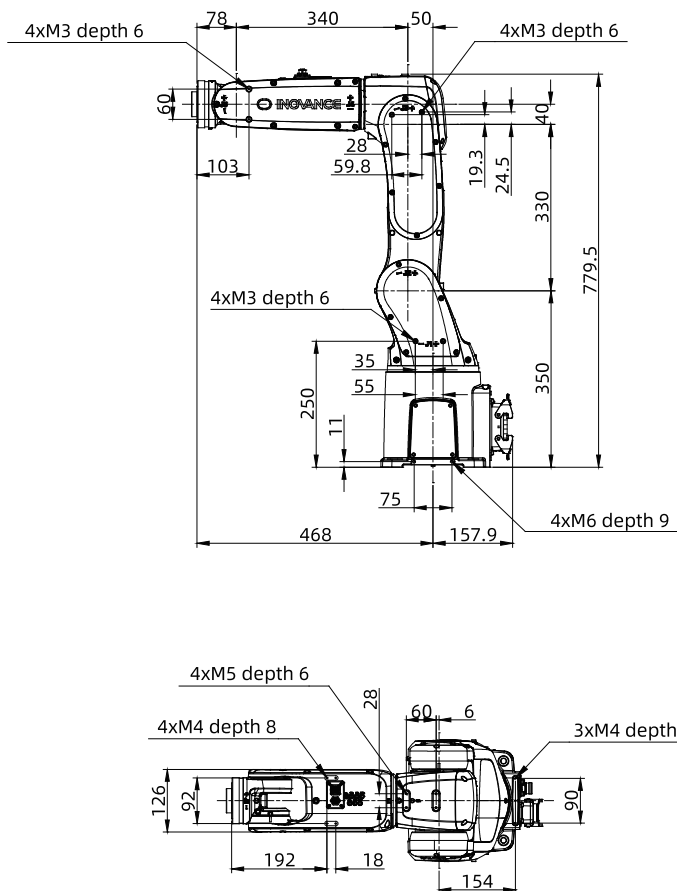


Figure 6-3 Auxiliary accessory mounting positions on IR-R7H-70S-INT (unit: mm)

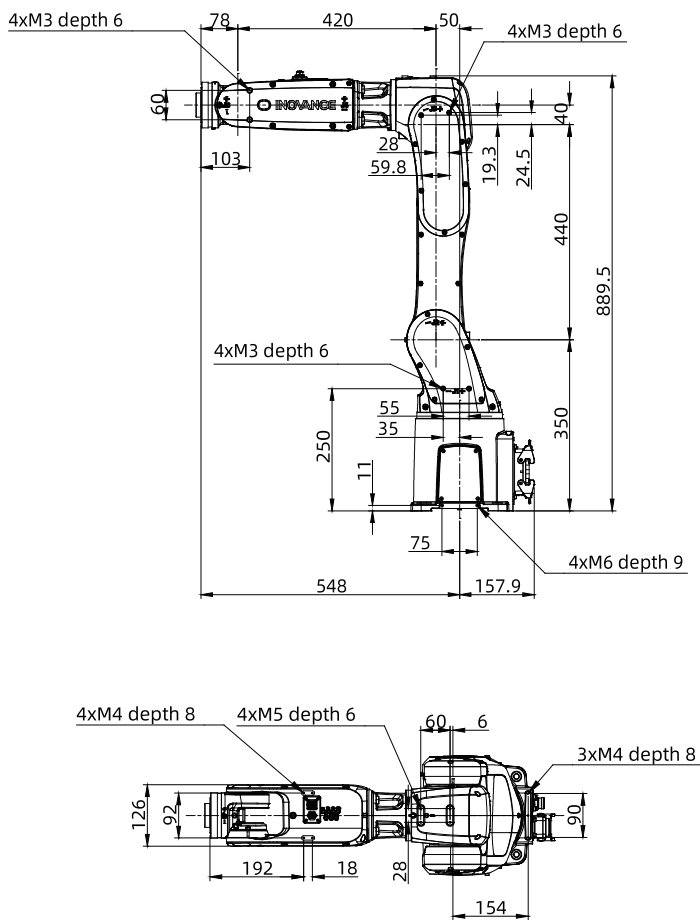


Figure 6-4 Auxiliary accessory mounting positions on IR-R7H-90S-INT (unit: mm)

6.5 Connecting Cables

6.5.1 Power Cable and Signal Cable Connection

Note

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
 - Cut off the power before wiring. Failure to comply may result in an electric shock or system failure.
 - Before wiring, cut off all the power supplies of the equipment. Wait at least 10 minutes before further operations because residual voltage exists after power-off.
 - Ensure that safety input signals, such as the emergency stop switch and safety door switch, are connected correctly. Otherwise, safety protection functions will not work properly in emergency cases, causing serious injury or damage.
 - Make sure that the equipment is well grounded. Failure to comply may result in an electric shock.
 - During wiring, follow the proper electrostatic discharge (ESD) procedure, and wear an antistatic wrist strap. Failure to comply will damage the equipment or the internal circuits of the equipment.
-



- Connect the cables securely. Do not lay heavy objects on the cables, or bend or drag the cables forcibly. Failure to comply will result in cable damage, wire breaking, or poor contact, causing electric shocks or system faults.
 - Ensure that the diameter and shielding of the cables used meet corresponding requirements, and that the cable shield is grounded reliably at one end.
 - Make the connections in correct sequence. Otherwise, the system may not work properly, which may cause safety hazards.
 - After wiring, make sure that no dropped screws and exposed cables are inside the equipment.
-

Connection method:

1. Connect the heavy-duty connector of the user cable to the heavy-duty connector of the robot base.
2. Connect the power connector and signal connector of the user cables to the controller.
3. Connect the safety terminals in the accessory kit to the corresponding terminals on the controller.

4. Connect the power terminals in the accessory kit and then plug them into the power connectors of the controller. Check that the L/PE/N sequence of the cable is correct.

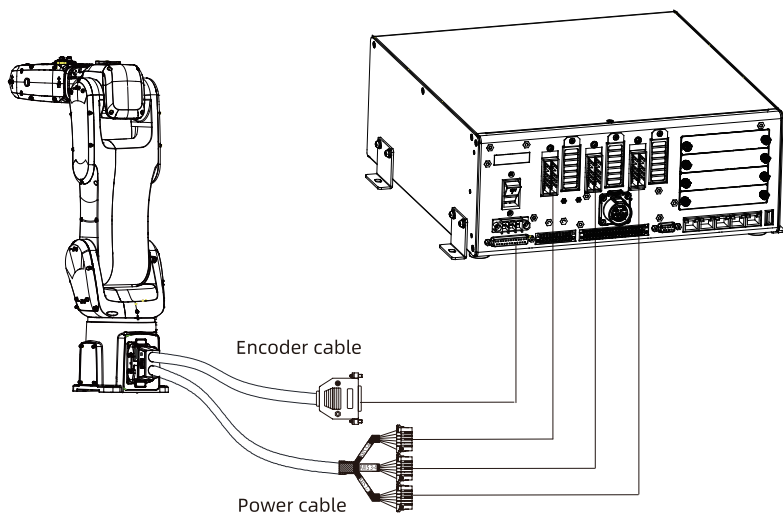
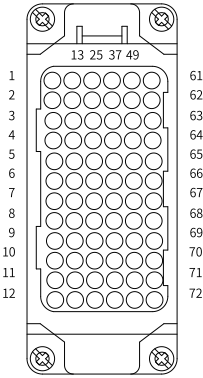


Figure 6-5 Power cable and encoder cable connection

6.5.2 Terminal Assignment of the Heavy-Duty Connector

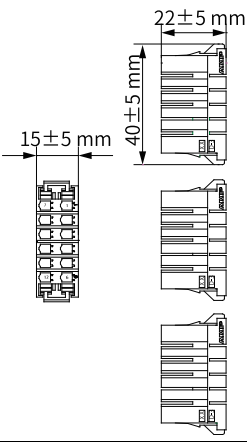
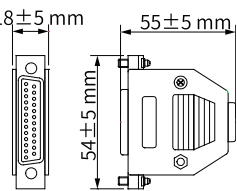
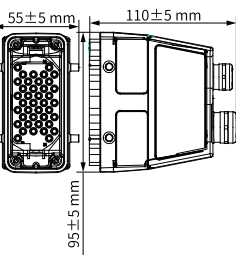
Table 6-1 Terminal assignment

Pin Layout	Pin No.	Assign ment	Pin No.	Assign ment	Pin No.	Assign ment
	1	1U	25	3U	49	5U
	2	1V	26	3V	50	5V
	3	1W	27	3W	51	5W
	4	1PE	28	3PE	52	5PE
	5	1BK-	29	3BK-	53	5BK-
	6	0V	30	34BK+	54	-
	7	-	31	-	55	-
	8	-	32	R-	56	T+
	9	1FG	33	4FG	57	24 V
	10	14VCC	34	23VCC	58	56VCC
	11	1PS-	35	3PS-	59	5PS-
	12	1PS+	36	3PS+	60	5PS+
	13	2U	37	4U	61	6U
	14	2V	38	4V	62	6V
	15	2W	39	4W	63	6W
	16	2PE	40	4PE	64	6PE
	17	2BK-	41	4BK-	65	6BK-
	18	12BK+	42	56BK+	66	-
	19	-	43	-	67	-
	20	R+	44	DGND	68	T-
	21	23FG	45	56FG	69	GND
	22	14GND	46	23GND	70	56GND
	23	2PS-	47	4PS-	71	6PS-
	24	2PS+	48	4PS+	72	6PS+

6.5.3 Cable Hole Dimensions

When cutting cable holes on the base table, refer to the following connector dimensions.

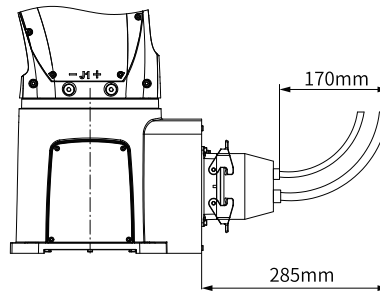
Table 6-2 Cable hole dimensions

Name	Power Cable Connector (Controller Side)	Encoder Cable Connector (Controller Side)	Heavy-Duty Connector (Robot Side)
Dimensions			
	40 mm x 22 mm x 15 mm (L x W x H)	55 mm x 54 mm x 18 mm (L x W x H)	110 mm x 95 mm x 55 mm (L x W x H)



- During cable connection, reserve a margin for cables at turns and do not pull the cables tight. The bending radius of a cable is about 10 times its diameter (170 mm).
- Do not bind the redundant power cords into a bundle of coils (two coils are acceptable) stacked together. Otherwise, cables may be damaged due to overheating.
- Connect the male heavy-duty connector straight to the female connector to avoid damaging the guide pin or contact.
- Never violently connect heavy-duty connectors (male and female) to avoid pin displacement or bending.
- The clips on the heavy-duty connectors are only used to fasten the connectors.

Reserved space (connector size+cable bending radius) for cables on the robot side: 285 mm. The bending radius of cables is approximately 170 mm, as shown in the following figure.



Opening size: the size of the opening reserved on the housing or sheet metal for the robot plug to pass through, as shown in the following figure.

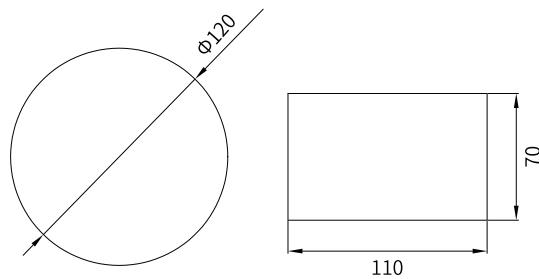


Figure 6-6 Opening size (unit: mm)

6.6 User Wiring and Tubing

6.6.1 Wiring (Cables)



CAUTION

- Perform wiring and air tubing of the chuck only when the power supply is disconnected and the workpiece is not placed.
- Do not allow non-professionals to perform equipment installation, wiring, maintenance, inspection, or parts replacement.

The electrical wires are included in the robot body. The following table describes the specifications of the wires.

Model	Rated Voltage	Allowable Current	Number of Wires	Nominal Cross-Sectional Area of Conductor	Remarks
IR-R7H	30 VAC/VDC	0.5 A	17	26 AWG	Signal cable



Current higher than 0.5 A is not allowed.

The following table describes the specifications of the connectors.

Model	Code of 17-pin Aviation Connector Cable on Forearm	Code of 5 m 19-pin I/O Cable on the Base
IR-R7H-70S-INT	15051387	1504B978
IR-R7H-90S-INT		

6.6.2 Tubing (Air Tubes)

User tubing (air tubes)

The following table describes the specifications of air tubes.

Max Operating Pressure	Quantity	Size (Outer Diameter x Inner Diameter)
0.59 MPa (0.59 kgf/cm ²)	4	Φ4 mm x Φ2.5 mm

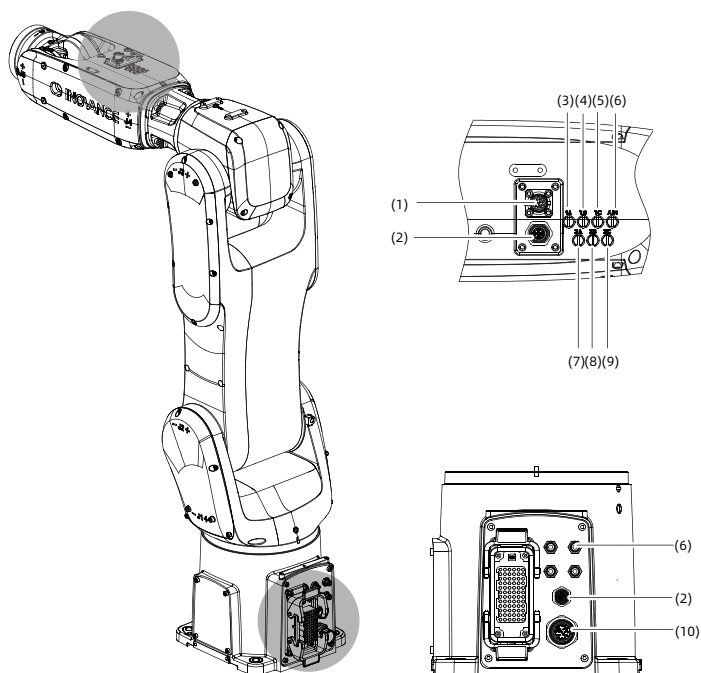


Figure 6-7 User wiring/tubing connectors of the standard model

No.	Name
(1)	User connector (17-pin)
(2)	User connector (8-pin)
(3)	1# air tube connector 1A
(4)	2# air tube connector 1B
(5)	3# air tube connector 1C
(6)	4xΦ4 mm air tube quick connector
(7)	1# air tube connector 2A
(8)	2# air tube connector 2B
(9)	3# air tube connector 2C
(10)	User connector (19-pin)

Air tubes for the optional model

The optional model can include a solenoid valve, which supports one Φ4 mm straight-through line and the conversion of up to three Φ4 mm input lines to six Φ4 mm output lines.

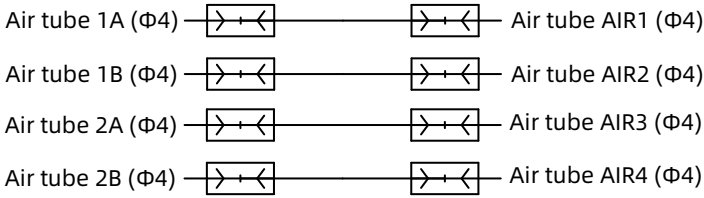


Figure 6-8 Air circuit connection for the IR-R7H standard model

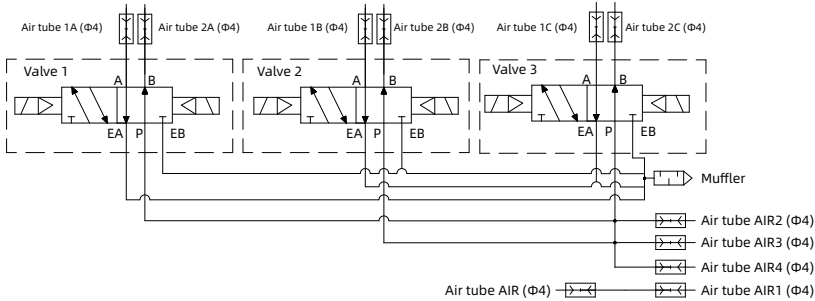


Figure 6-9 Air circuit connection for the solenoid valve

Table 6-3 Solenoid valve air circuit

Base Connector	Solenoid Valve	Forearm Connector
AIR1	-	AIR
AIR2	Solenoid valve 1	1A
		2A
AIR3	Solenoid valve 2	1B
		2B
AIR4	Solenoid valve 3	1C
		2C

Note

If the solenoid valve needs to be replaced, use the spare part with the code 98070340.

6.6.3 Robot Aviation Connector Pins

I/O aviation connector

The robot provides a 17-pin aviation connector on the forearm top and a 19-pin aviation connector on the base. The two connectors are interconnected by a special cable inside the robot body.

The two connectors are interconnected in the following way:

- Pins 1 to 17 of the 19-pin connector on the base are directly connected to pins 1 to 17 of the 17-pin connector on the forearm top. Pins 18 and 19 of the 19-pin connector are reserved.
- If a solenoid valve is used, pins 13 to 19 of the 19-pin connector on the base are specially for the solenoid valve signals. (See the table below for detailed signal description.) Pins 1 to 12 of the 19-pin connector on the base are directly connected to pins 1 to 12 of the 17-pin connector on the forearm top.

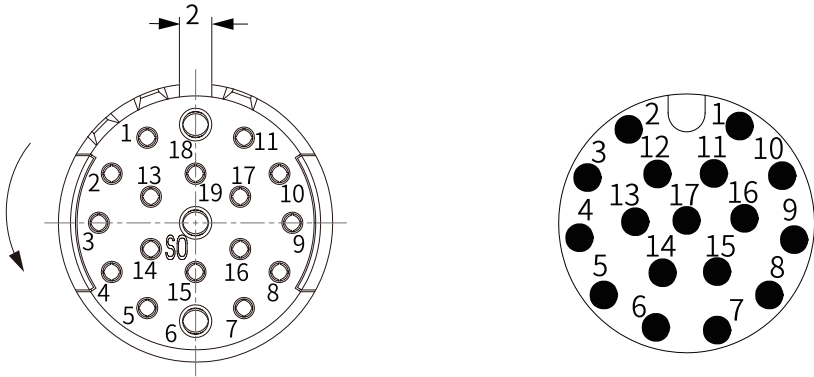


Figure 6-10 Pin arrangement of the 19-pin and 17-pin connectors

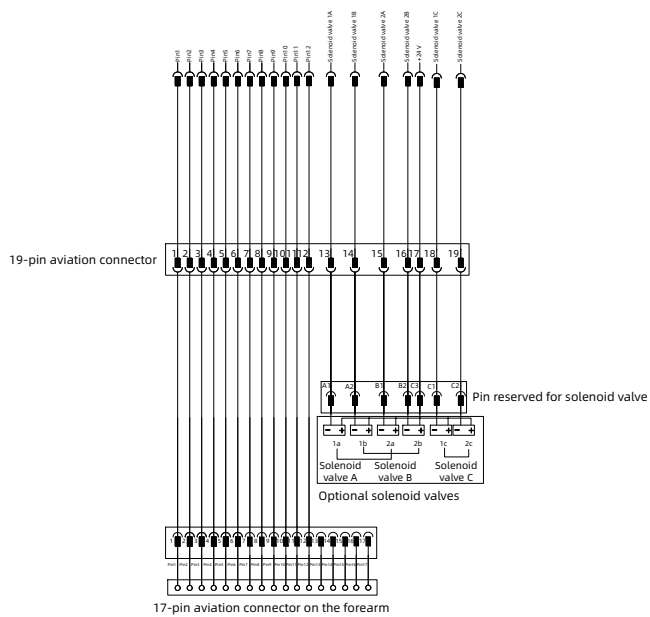


Figure 6-11 Solenoid valve wiring

Table 6-4 Solenoid valve signals

Pins of the 19-pin I/O Aviation Connector	Solenoid Valve Signal	Solenoid Valve
13	1A	Solenoid valve 1
15	2A	
14	1B	Solenoid valve 2
16	2B	
18	1C	Solenoid valve 3
19	2C	
17	Common terminal 24 V+	-

Network cable aviation connector

Network cable aviation connectors are provided on the electrical mounting plates of the base and the forearm.

Technical data of the network cable aviation connector:

Name	IR-R7H
Number of pins	8
Rated current (40°C)	0.2 A
Rated voltage	30 VAC/VDC
Network cable type	CAT5A
Cable specifications	0.05 mm ² (30 AWG)

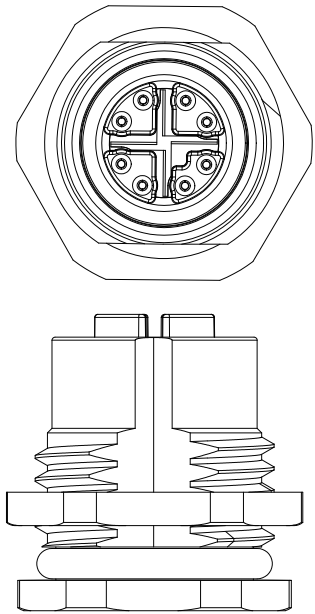


Figure 6-12 Pins of the network cable aviation connector

7 Motion Range

7.1 Motion Range Setting Methods



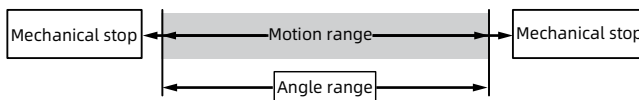
- To prevent premature wear of bearings and gears in joint reducers due to insufficient oil film, repeated movement of the joints within a small angle range of less than 10° for a long period should be avoided.
- If the joints need to move within the angle range of less than 10° for a long period, it is recommended to operate the mechanical joints once per hour in the angle range more than 50°. This measure helps effective lubrication and extends the service life of the joints.

Note

The default motion range at delivery is the maximum motion range of the robot.

To improve layout efficiency and ensure the maximum safety margin for robot motion, the following motion range setting methods are provided:

- Setting by angle range (for all axes)
- Setting by mechanical stops (for J1 to J3)



7.2 Motion Range Setting by Angle Range

7.2.1 Description of Angle Ranges

The basic unit of robot motion is degree. The motion limit (motion range) of the robot is set based on the angle lower limit and angle upper limit (angle range) of each axis.

The motion angle is determined by the encoder output pulse value of the servo motor, and the angle range must be set within the mechanical stop range.

Once the robot receives an operating command, it checks whether the target position specified by the command is within the angle range before operating. If the target position is beyond the set angle range, an error occurs and the robot does not move.

Note

You can set the angle range by choosing Set > Motion > AxisPara > AxisLimit on the teach pendant.

7.2.2 Maximum Angle Range of J1

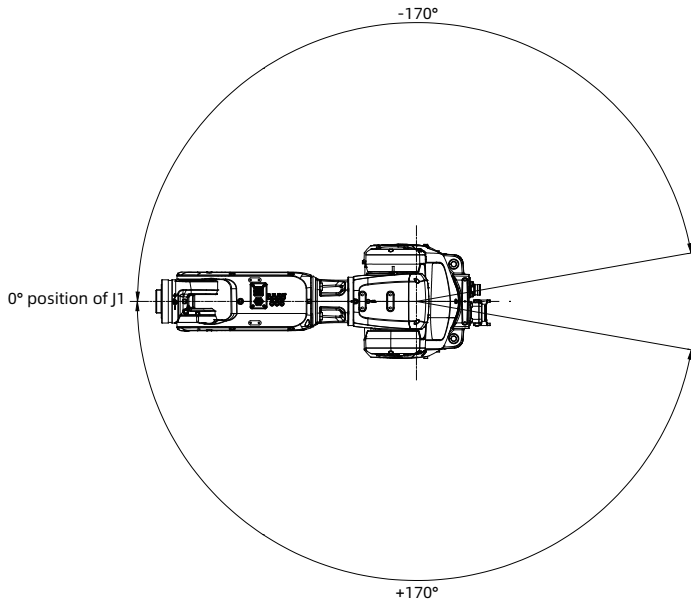


Figure 7-1 Maximum angle range of J1

7.2.3 Maximum Angle Range of J2

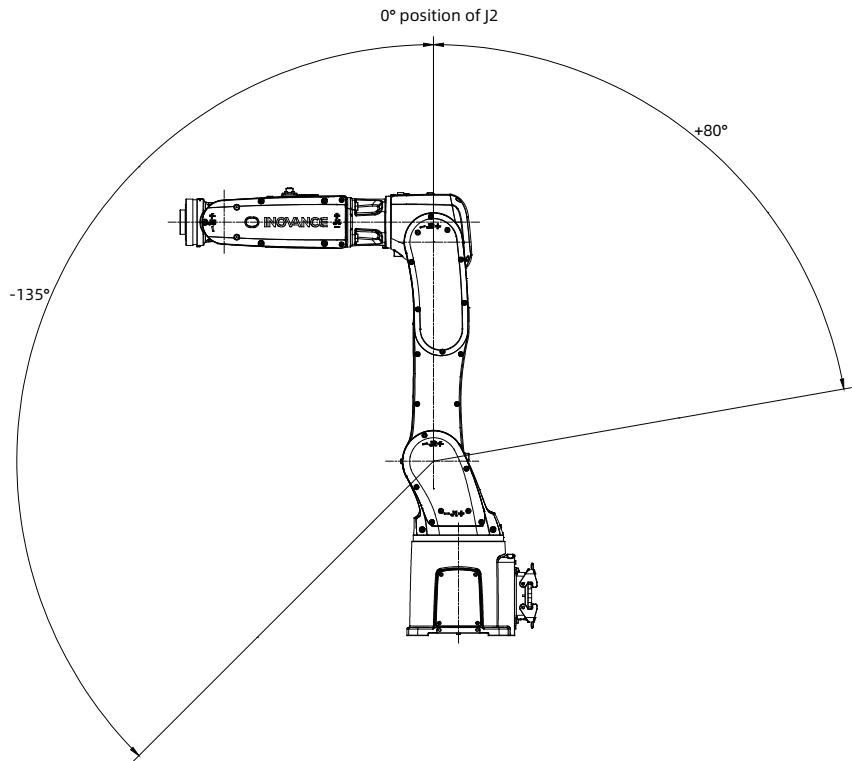


Figure 7-2 Maximum angle range of J2

7.2.4 Maximum Angle Range of J3

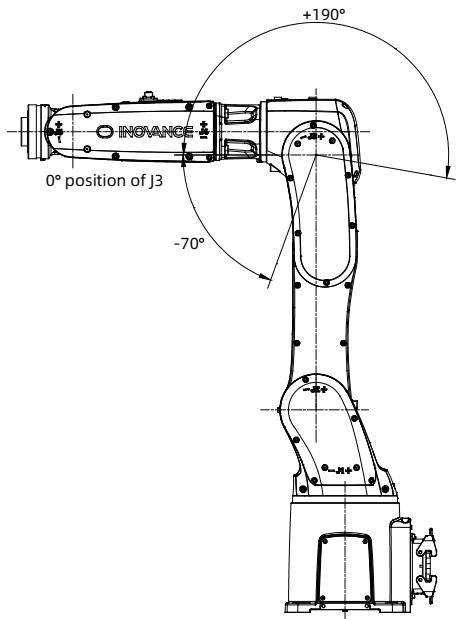


Figure 7-3 Maximum angle range of J3

7.2.5 Maximum Angle Range of J4

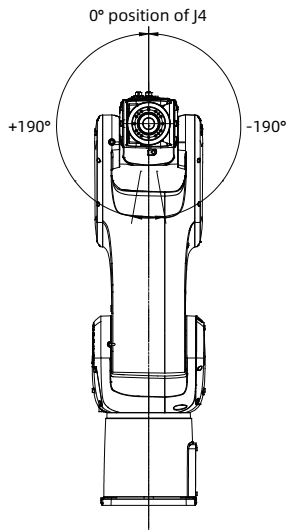


Figure 7-4 Maximum angle range of J4

7.2.6 Maximum Angle Range of J5

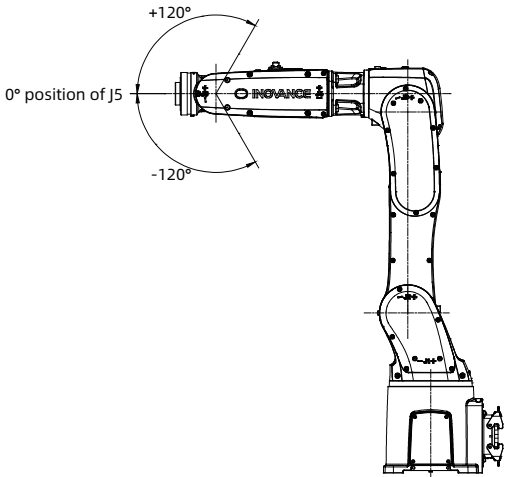


Figure 7-5 Maximum angle range of J5

7.2.7 Maximum Angle Range of J6

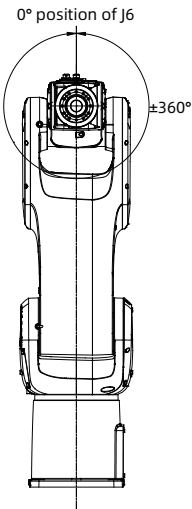


Figure 7-6 Maximum angle range of J6

7.3 Mechanical Limit Stops

As shown in the following figure, the IR-R7H-70S-INT and IR-R7H-90S-INT models have limit screws at the first joint and mechanical limits provided by the casing at the second,

third, and fifth joints. Mechanical stops are pre-installed at the positions indicated in the following figure. The angle range setting must not exceed the angle range allowed by the mechanical stops.

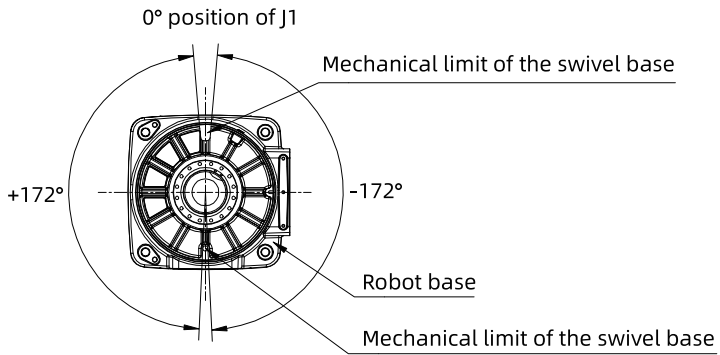


Figure 7-7 Mechanical limit stops for J1

8 Inspection and Maintenance

8.1 Precautions for Maintenance

Before maintenance, read the precautions for maintenance, this guide, and other related guides carefully to fully understand the methods of safe maintenance.

Note

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
 - Do not maintain the equipment after power-on. Failure to comply will result in an electric shock.
 - Do not remove any parts that are not covered in this guide. Follow the maintenance procedure strictly as described in this guide.
 - Check the motion of the robot after parts replacement outside the safety fence. Failure to comply may cause severe safety issues due to abnormal movement of the robot.
 - Make sure that the emergency stop switch and safety door switch work properly before operation. Otherwise, safety protection functions will not work properly in emergency cases, causing serious injury or damage.
-



- Submit the repair request according to the warranty agreement.
 - Perform daily and periodic inspection and maintenance on the equipment according to maintenance requirements and retain a maintenance record.
 - When the equipment fails or is damaged, arrange for qualified technicians to troubleshoot and repair the equipment in accordance with the maintenance instructions and retain a maintenance record.
 - Replace quick-wear parts of the equipment according to the replacement guide.
 - Prevent foreign objects from entering the equipment and terminals during maintenance.
 - Open the equipment cover only for repair and maintenance.
 - After the equipment is replaced, perform wiring inspection and parameter settings again.
-

8.2 Schedule for Inspection and Maintenance

Inspection points are divided into the following stages: daily, 1-month, 3-month, 6-month, 12-month, and 36-month. The inspection points can be added by stage. If the robot is operated for 250 hours or longer per month, the inspection points must be added every 250 hours, 750 hours, 1500 hours, and 3000 hours operation.

Check Item	Check Item					
	Daily Check	1-Month Check	3-Month Check	6-Month Check	12-Month Check	Overhaul (Replacement)
1 month (250 h)	Yes	Yes	-	-	-	-
2 months (500 h)	Yes	Yes	-	-	-	-
3 months (750 h)	Yes	Yes	Yes	-	-	-
4 months (1000 h)	Yes	Yes	-	-	-	-
5 months (1250 h)	Yes	Yes	-	-	-	-
6 months (1500 h)	Yes	Yes	Yes	Yes	-	-
7 months (1750 h)	Yes	Yes	-	-	-	-
8 months (2000 h)	Yes	Yes	-	-	-	-
9 months (2250 h)	Yes	Yes	Yes	-	-	-
10 months (2500 h)	Yes	Yes	-	-	-	-
11 months (2750 h)	Yes	Yes	-	-	-	-
12 months (3000 h)	Yes	Yes	Yes	Yes	Yes	-
...	-	-	-	-	-	-
36 months (9000 h)	Yes	Yes	Yes	Yes	Yes	Yes
...	-	-	-	-	-	-

8.3 Periodic Inspection

Inspect and maintain the robot regularly for the robot to run more safely and efficiently. The target parts can be inspected and maintained daily, weekly, monthly, semi-annually, annually, and before or during suspension as needed.

1. Daily inspection and maintenance

Check Item	Check Measure
Visual inspection	• Check all joint gaps, oil filler ports, and drain ports for grease leakage. • Check robot exterior for any impact damage.
Screw tightening inspection	Check all screws for looseness throughout the robot and check whether the screw tightening torques meet the requirements.
Noise inspection	Check all transmission mechanisms for unusual sounds.
Joint transmission mechanism inspection	Check whether the transmission mechanisms run smoothly and abnormal jitter occurs.
Pipeline accessory inspection	Check whether the pipeline accessories are complete, worn and rusted.
Control inspection of all electrical components	Check whether the control buttons of all electrical components of the robot are normal.
Oil seepage inspection	Check for oil seepage at each joint. Wipe off any oil seeped.
Rust prevention inspection	Visually check for obvious water stain, dirt, and rust.

2. Weekly inspection and maintenance

Check Item	Check Measure
Brake inspection	Check whether the brake of each axis of the robot is effective.
Motion range of each axis	• Check whether the motion range of each axis is within the normal angle range. • Check whether the zero point position of each axis is aligned.

3. Monthly inspection and maintenance

Check Item	Check Measure
Controller heat dissipation inspection	Check whether the fan behind the controller is ventilated smoothly. It is recommended to replace or maintain the fan once a month.

4. Inspection and maintenance every six months

Check Item	Check Measure
All wiring harnesses for each electrical component	• Check all cable connectors of the robot body for bending, corrosion and falling off. • Check the cables outside the controller for bending, corrosion and falling off. • Check the cable of the teach pendant for bending, corrosion and falling off.
Routine cleaning and maintenance	Check and apply the anti-rust oil.

5. Inspection and maintenance every year

Check Item	Check Measure
Controller DI/DO signal	Check whether the DI/DO signal response of the controller is normal.
Reducer of each axis	Check whether the lubrication of the reducer of each axis of the robot is normal and whether there is abnormal noise.
Cleaning of all electrical components	Check the cleanliness of all electrical components. Under normal circumstances, remove dust for all electrical components every year.
Controller fan filter	Check the cleanliness of the controller fan filter, and replace the filter once a year under normal circumstances.
Timing belt	Check the timing belts for abnormal wear-out.
Routine cleaning and maintenance	Check and apply the anti-rust oil.

6. Inspection and maintenance every 1.5 years

Check Item	Check Measure
Battery inspection	Check the battery voltage. If the battery voltage is lower than 3.1 V or a battery capacity alarm is reported, replace the battery in time.

7. Inspection and maintenance every 2 years

Check Item	Check Measure
In-depth inspection and maintenance	Comprehensively check the obscured parts and carry out professional rust prevention on key parts.

8. Inspection and maintenance before or during suspension

Check Item	Check Measure
Maintenance for long-term suspension	Carry out comprehensive cleaning, rust prevention, and sealing.

**CAUTION**

Improper use of tools will lead to screw thread stripping. Inspect the torque wrench and hexagon screwdriver bit for wear before use and replace if necessary.

8.4 Oil Leakage Inspection

8.4.1 Daily Inspection

Check the following items each day when the system is running.

Check Item	Content
Oil seepage inspection	Check for oil seepage at each joint. Wipe off any oil seeped.

8.4.2 Oil Leakage Inspection Points

- Insert a dust-free cloth or scouring pad into the gap of each joint. Check for lubricating grease leakage at each joint. Wipe off any lubricating grease leaked.
- Depending on operating conditions and the surrounding environment, a small amount of lubricating grease may seep out from the outer side of the oil seal lip (minor adhesion). When this lubricating grease accumulates into droplets, it may drip under certain movements. Before operating the robot, wipe off any lubricating grease residue beneath the oil seal.
- If significant lubricating grease seepage is observed, contact the manufacturer for technical support.

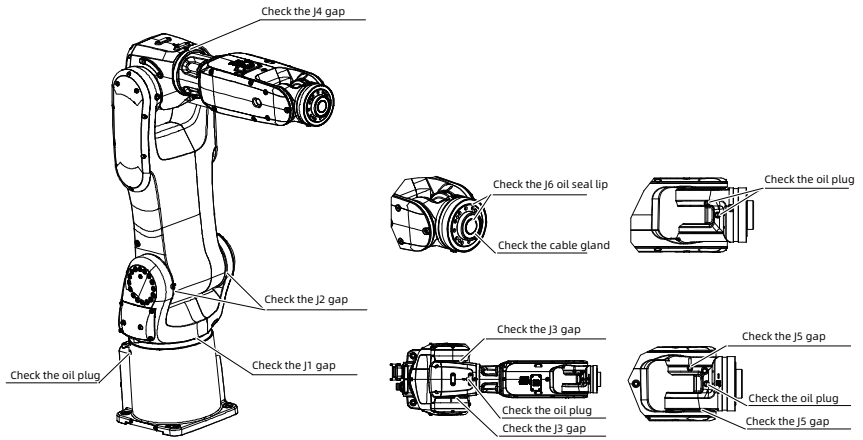


Figure 8-1 Oil leakage inspection points



If oil leakage persists after repeated cleaning, see ["8.4.3 Lubricating Grease Leakage and Solution" on page 86](#) for corrective actions.

8.4.3 Lubricating Grease Leakage and Solution

Problem	Problem Description	Cause Analysis	Solution
Oil seepage or leakage at gearbox	Oil leakage at joints	The robot has been used for an extended period, causing aging of sealing rubber parts or O-shaped seal rings.	Replace the sealing rubber parts or O-shaped sealing rings.
		Improper disassembly/ reassembly operations may damage sealing rubber parts or O-shaped sealing rings.	
		Oil seal damage may be caused by foreign particles (such as dust) scratching the oil seal lip.	If the oil seal at the reducer is damaged (based on leakage position), replace the reducer. If the motor oil seal is damaged, replace the motor.
		Gaps exist on sealing surfaces.	Re-tighten mounting screws to ensure a tight fit between surfaces.
		Threadlocker LT518 on motor or reducer mounting surfaces becomes invalid.	Re-apply the threadlocker LT518.
		The screw plugs at oil filling and draining ports of joints do not match the combined sealing washers.	Replace the screw plugs.
		Cracks on castings or oil chamber damage occurs due to collisions or other impacts.	Replace with new parts.

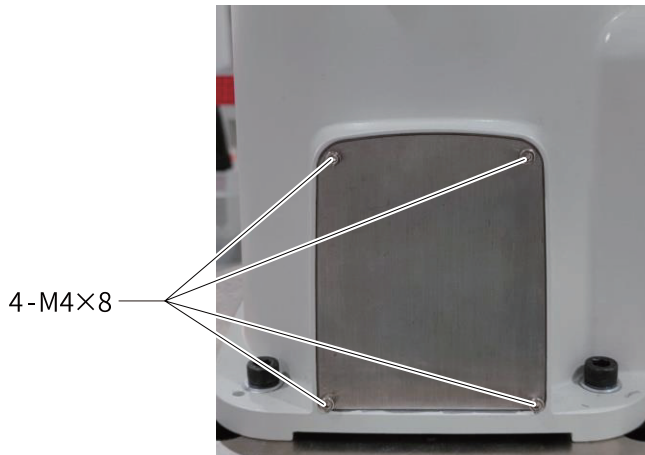
8.5 Battery (Lithium Battery) Replacement

This section describes how to replace battery cells (lithium battery). For details about how to replace other parts, see the IR-R7H Series 6-Axis Robot Maintenance Guide.



- Do not perform equipment maintenance or servicing while power is on. Failure to comply will result in an electric shock.
- When disposing of waste batteries, consult a professional disposal company or follow relevant local regulations.
- Use lithium batteries correctly. Incorrect usage may result in overheating, leakage, explosion, or fire, causing severe risks to personal and property safety.
 - Charging lithium batteries is prohibited.
 - Applying pressure to deform lithium batteries is prohibited.
 - Disassembling lithium batteries is prohibited.
 - Short-circuiting or incorrect connections to lithium batteries are prohibited.
 - Heating lithium batteries is prohibited.
 - Disposing of lithium batteries in fire is prohibited.
 - Welding battery terminals is prohibited.
 - Forcing discharge of lithium batteries is prohibited.

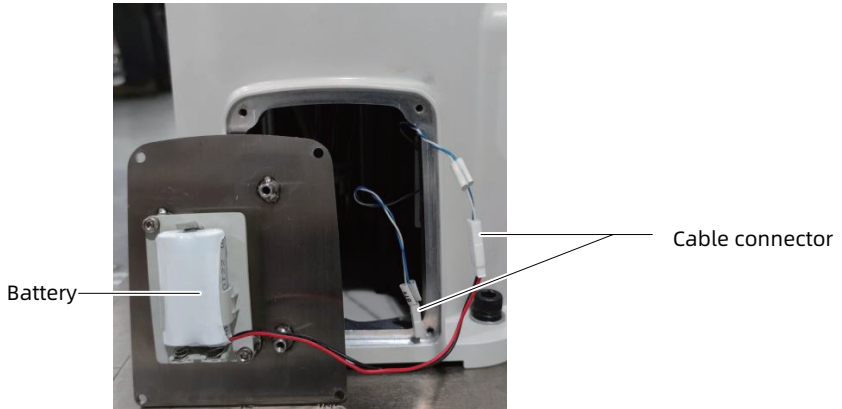
1. Remove the four M4x8 screws securing the back cover and remove the back cover.



2. Remove the battery.

Detailed procedure:

1. Cut off the zip tie fixing the battery to the cable board.
2. Tie the new battery onto the cable board with a zip tie.
3. Connect the terminal of the new battery to the empty white 2P connector.
4. Remove the used battery.



Note

If the zero point is lost due to failure to comply with the preceding steps, see ["8.6.2 Procedure of Zero Point Adjustment" on page 89](#).

8.6 Zero Point Adjustment

8.6.1 Overview of Zero Point Calibration

The zero point is the reference point and baseline point for the robot. After a robot part (such as the motor, reducer, timing belt, and cables) is replaced, a deviation may occur between the zero point stored on the motor and the zero point stored on the controller, leading to inaccurate positioning. Therefore, after replacing a part, it is necessary to calibrate the zero point to ensure correct positioning.

Note

After home position calibration, the absolute accuracy of the robot may deviate from the default absolute accuracy at delivery.



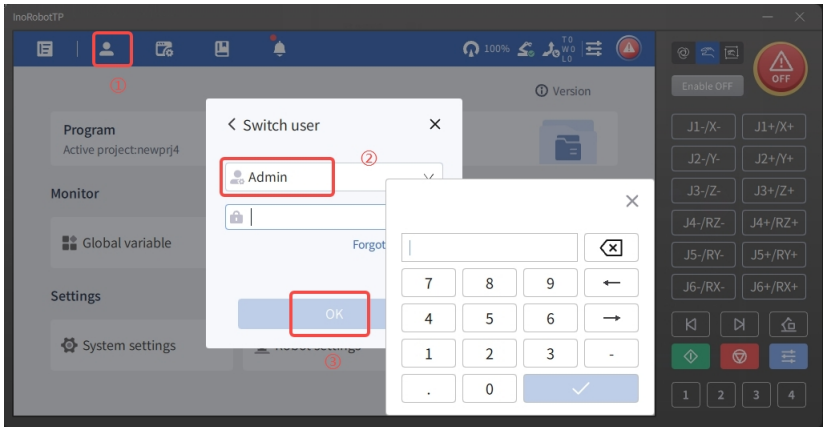
- Install a safety fence for the system to prevent people from entering the motion range of the system. Failure to comply may result in severe safety issues.
- Before operation, ensure that there is no person within the safety fence. Do not enter the motion range during system running. Failure to comply may result in severe safety issues.
- Operating the robot system in teach mode can ensure the safety of the operator to a certain extent, although the motion is limited (low speed and low power). However, severe safety issues may also occur when the robot performs unexpected actions.

8.6.2 Procedure of Zero Point Adjustment

Both the PC-based teach pendant and the hand-held teach pendant provide an operation interface for zero point adjustment. The following is an explanation using the PC-based teach pendant, with similar operations for the hand-held teach pendant.

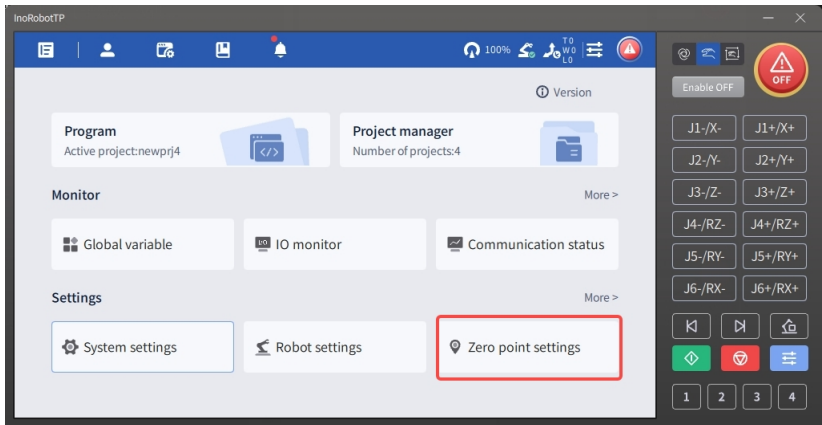
When performing zero point adjustment using the teach pendant, adjust J4 and J3 at the same time.

1. Select a role and log in to the system.
 - a. On the main screen of the PC-based or hand-held teach pendant, click the user icon to open the "User Login" screen.
 - b. Enter the password in the password input box and click "Log In".

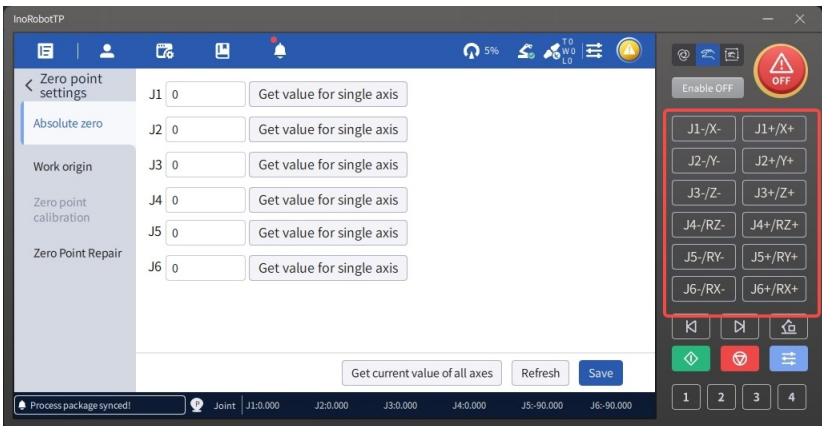


2. Switch to the ZeroPoint setting screen.

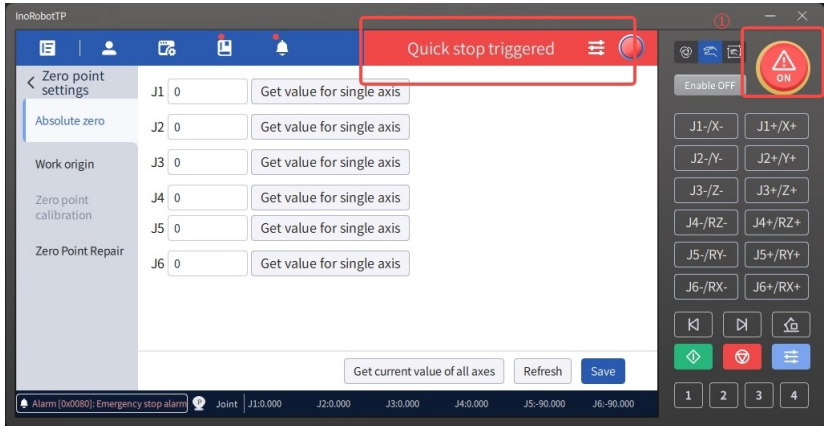
On the main screen of the PC-based or hand-held teach pendant, choose "Set" > "BasePos" > "ZeroPoint" to open the "ZeroPoint" screen.



3. Move each axis of the robot to the corresponding zero point.
 - a. Move the robot axes to their respective zero points by using the joystick on the hand-held teach pendant or the operation interface of the PC-based teach pendant. For details, see the IR-TP200 Series Industrial Robot Teach Pendant User Guide.
 - b. For the zero point of each axis, see ["8.6.3 Zero Point Position of Each Joint" on page 91](#). Calibrate the zero points using the calibration tool.

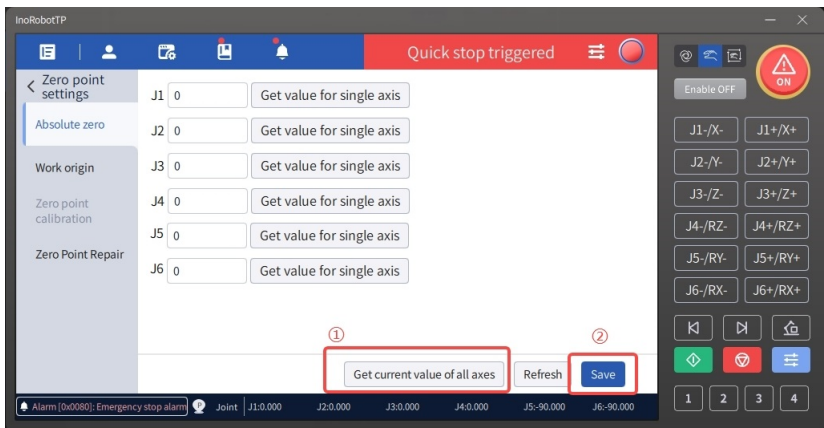


4. Switch to the emergency stop state.
 - a. Click the virtual emergency stop button on the PC-based teach pendant, or press the red "EmStop" button on the hand-held teach pendant.
 - b. The status indicator in the upper right corner of the PC-based teach pendant (or the display of the hand-held teach pendant) indicates the emergency stop state (red).



5. Obtain and save the zero point information.

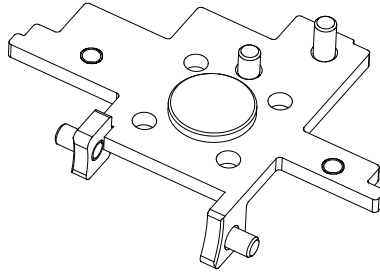
- When the robot axes are at their zero points, click "Get All Cur-Val" to obtain the encoder pulses.
- Click "Save" to complete zero point adjustment.



8.6.3 Zero Point Position of Each Joint

- **Calibration tool**

The calibration tool is used to calibrate the rotary axes of the robot manually.



Note

- To obtain the size and drawing of the calibration tool, contact Inovance technical support personnel.
- The material code of the zero point calibration tool is 32022076.

- **Calibration of J1 to J6**

During calibration, control the robot to move at the lowest speed by using the teach pendant. Adjust J1 to J6 until the calibration tool fits snugly in the reference slot, as shown in the figure below.

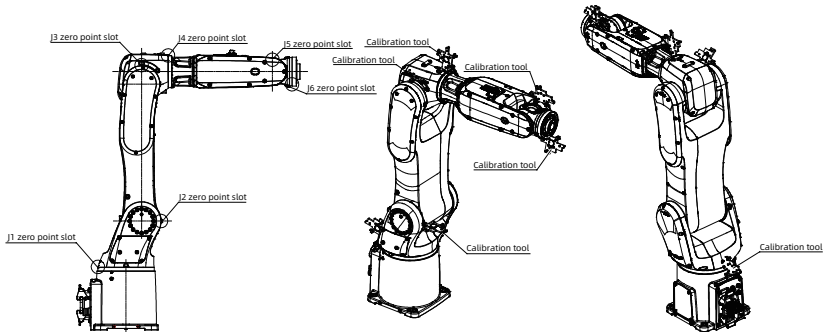


Figure 8-2 Calibration of J1 to J6

8.7 Options

Option	Description	Specifications	Code
I/O aviation connector on the base	Connects a cable to the aviation connector on the base of the IR-R7H series 6-axis robot.	8-pin, 5 m (180° flexible cable)	15310427
		8-pin, 10 m (180° flexible cable)	15310428
		8-pin, 10 m (180° static cable)	1504WN06
		19-pin, 5 m (static cable)	1504B978
		19-pin, 5 m (flexible cable)	1504RP67
		19-pin, 10 m (flexible cable)	1504RP68
I/O aviation connector on the forearm (90°)	Connects a cable to the aviation connector on the forearm of the IR-R7H series 6-axis robot.	17-pin, 1 m (flexible cable)	15051387
		17-pin, 2 m (flexible cable)	15310429
		8-pin, 2 m (flexible cable)	15051627
Network cable accessory	Connects a cable to the network port of the IR-R7H series 6-axis robot.	CAT5	1504NN47
Zero point calibration tool	Calibrates axes J1 to J6 of the robot manually.	-	32022076
Teach pendant	Matching teach pendant for the IRCB501 series controller	Teach pendant with standard 5 m cable	01640055
		Teach pendant with standard 10 m cable	01640056
		Teach pendant with standard 20 m cable	01640057
		Teach pendant with standard 30 m cable	01640058
Extended cable for the teach pendant	Cable suite - IR-TP200-L5 - extended cable for the teach pendant	5 m	1504R444
		15 m	1504R445
		25 m	1504R446
Aviation connector of the teach pendant controller	Cable suite - for connection between the IR-TP200 series teach pendant and the aviation connector of the IRT80 series teach pendant controller - 0.2 m (RoHS)	0.2 m	1504R443

Option	Description	Specifications	Code
Battery pack	Is used on the encoder of the IR-R7H series 6-axis robot.	-	98051002

9 Certification and Standard Compliance

Third party certification

Certification Identification	Certification	Description	Directives
	CE	The product complies with the LVD, MD, EMC, and RoHS directives and is labeled with the CE mark.	• EN 60204-1:2018 • EN ISO 10218-1:2011 • EN ISO 12100:2010 • EN 61000-6-2:2019 • EN 61000-6-4:2019 • ISO 13849-1:2023 • EN ISO 13849-1:2015
	SGS-TUV Saar	This product has obtained the SGS-TUV Saar functional safety certification.	
	cSGSUS	This product has obtained North American safety certification from the Nationally Recognized Testing Laboratory (NRTL) - SGS.	• UL 1740, 4th Ed., Jan. 26, 2018 • NFPA 79 2021 Edition, Dated Oct. 25, 2020 • CAN/CSA Z434-14 (R2019), Reaffirmed 2019
	FCC	This product has passed the mandatory electromagnetic compatibility test for wireless devices in the United States and bears the FCC label.	-
	KCs	This product has been evaluated and certified by the Korea Occupational Safety and Health Agency (KOSHA) for safety compliance with special equipment, labor protection supplies, and protective devices, bearing the KCs mark.	-

Note

The preceding certification standards only apply to standard models of products. For specific certification information about customized products, consult Inovance technical personnel.

Declaration of Conformity with EU Directives

Inovance Robot has been certified in accordance with the following directives, meeting the essential requirements of the CE Machinery Directive, CE Low Voltage Directive, CE Electromagnetic Compatibility Directive, and RoHS Directive.

Machinery Directive (MD)	2006/42/EC
Low Voltage Directive (LVD)	2014/35/EU
Electromagnetic Compatibility Directive (EMC)	2014/30/EU
ROHS directive	2011/65/EU Amended by (EU)2015/863
Applicable Harmonized Standards	● EN 60204-1:2018 ● EN ISO 10218-1:2011 ● EN ISO 12100:2010 ● EN 61000-6-2:2019 ● EN 61000-6-4:2019 ● ISO 13849-1:2023 ● EN ISO 13849-1:2015

10 Service and Support

Should you encounter a safety accident during the use or operation of the product, or face challenges in operating and maintaining the equipment, which remain unresolved after the relevant documentation is consulted, we provide multiple channels to ensure prompt resolution:

- Channel #1: Contact service@inovance.com.
- Channel #2: Visit <https://www.inovance.com/global> to access document downloads, after-sales support, spare parts ordering, repair applications, and authenticity verification services.
- Channel #3: Download My Inovance app (<https://zshc-eu.inovance.com/download-pc/>) where you can access products info and documentation, and query product parameters.

We are committed to providing you with quick and professional technical support, and we look forward to your satisfaction and trust.



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