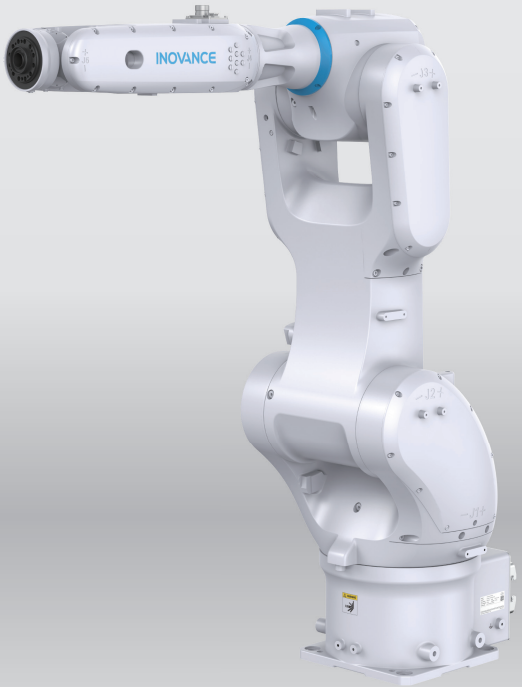
INOVANCE

Advancing industrial technology,
for a better world



IR-R15H&R20H-INT 6-Axis Robot

User Guide - Manipulator

Industrial Automation | New Energy Vehicle | Intelligent Elevator | Intelligent Robot | Digital Energy | Rail Transit

Data code PS00022252A00

Legal Information

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Disclaimer of Liability

Due to continuous updates and improvements of products and technologies, the content of this documentation may not fully match the actual products. In the event of any discrepancies, the actual products shall prevail.

The contents are subject to change without notice due to product upgrade.

Waste Disposal

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

Qualified Personnel

The product/system described in this documentation may be operated only by personnel qualified for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel can identify the risks of the product/system and prevent possible dangers.

Proper Use of the Product

Proper transportation, storage, assembly, installation, commissioning, operation, and maintenance are required to ensure the safe operation of the product without any problems. The required ambient conditions must be met. All operations must follow the guidelines provided in this documentation.

Preface

Introduction

Inovance IR-R15H&R20H-INT series 6-axis robots are new products designed for industries such as displays, photovoltaics, and PCBs, featuring high compactness, high performance, and high cleanliness. They can be widely used in applications such as loading and unloading, assembly, handling, sorting, cutting, dispensing, and gluing.

More Data

Data name	Data code	Description
IRCB501-INT Series Robot Controller 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 the software-related operations of the robot teach pendant.
IR-R15H&R20H-INT Series 6-Axis Robot User Guide - Manipulator (this guide)	PS00022252	Describes the basic information, installation, wiring, motion range, maintenance and more of the product.

Revision History

Revision date	Version	Revision
2026-04	A00	Initial release.

Access to the Guide

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

- Visit *https://www.inovance.com/global*, and choose Service&Support > Support > Documentation Download.
- Scan the QR code on the product with your smart phone.
- Scan the QR code below to install My Inovance app, where you can search for and download user guides.

Warranty Disclaimer

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is caused by proper operation of the user. Maintenance will be charged after the warranty period expires.

Within the warranty period, maintenance will be charged for the following damage:

- Damage caused by operations not following the instructions in the user guide
- Damage caused by fire, flood, or unusual 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 is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see Product Warranty Card.

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1 General Safety Rules

1.1 Safety Precautions

Safety Disclaimer

- This chapter presents essential safety instructions for a proper use of the equipment. Before operating the equipment, read through the guide and comprehend all the safety instructions. Failure to observe the safety instructions may result in death, severe personal injuries, or equipment damage.
- "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 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

- Drawings in the guide are sometimes shown without covers or protective guards. 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 safety shoes, safety clothing, safety glasses, protective gloves, and protective sleeves.

Unpacking
 • 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 equipment if you find water seepage or missing or damaged components upon unpacking. • Do not install the equipment if you find the packing list does not conform to the equipment you received.
 • Before unpacking, check whether the outer package is intact, damaged, wet, damped, or deformed. • Unpack the package in sequence. Do not hit the package violently. • Check whether there is damage, rust, or injuries on the surface of the equipment and equipment accessories before unpacking. • Check whether the package contents are consistent with the packing list before unpacking.

Storage and Transportation

WARNING

- Large-scale or heavy equipment must be handled 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 injuries 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 product with care and mind your steps to prevent personal injuries or product damage.
- When handling the equipment with bare hands, hold the equipment casing firmly with care to prevent the equipment from falling and impact damage. Failure to comply may result in personal injuries.
- Store and transport the equipment based on the storage and transportation requirements. Failure to comply will result in equipment damage.
- Avoid storing or transporting the equipment 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.
- Pack the equipment strictly before transportation. Use a sealed box for long-distance transportation.
- Never transport the equipment with other equipment or materials that may harm or have negative impacts on this equipment.

Installation
 • The equipment can only be operated by professionals with electrical knowledge. Non-professionals are not allowed to operate on the equipment.
 • Read through the guide and safety precautions before installation. • Do not install the equipment 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 will result in mechanical hazards. • Do not wear loose clothes or accessories during installation. Failure to comply may result in an electric shock. • When installing the equipment (such as controller) 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 a fire. • Do not retrofit the equipment. • Do not loosen the fixing bolts of the product parts and components. • When the equipment (such as controller) is installed in a cabinet or final assembly, a fireproof enclosure providing both electrical and mechanical protections must be provided. The IP rating must meet 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 can result in fire accident.
 • Cover the top of the equipment (such as controller) with a piece of cloth or paper during installation. This is 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



- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Before wiring, disconnect the power supplies of all equipments. Wait for at least the time designated on the equipment warning label before further operations because residual voltage still exists after power-off. Measure the direct voltage of the main circuit and ensure that the voltage is within the safety range. Failure to comply can result in an electric shock.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply can result in an electric shock.
- Check that the equipment is grounded properly. Failure to comply can result in an electric shock.



- Do not connect the input power supply to the output side of the equipment. Failure to comply can result in equipment damage or even a fire.
- When connecting a drive to the 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.
- Tighten the terminal screws with the tightening torque specified in the user guide. Improper tightening torque may result in overheat, damage to the connecting parts, or 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 shock or equipment damage.



- Follow the electrostatic discharge (ESD) procedure and wear an anti-static wrist strap to perform wiring. Failure to comply may result in damage to the equipment or to the internal circuit.
- Use shielded twisted pairs 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 a fire.
- Do not open the cabinet door or protective cover of the product, touch any wiring terminal of the product, or remove any part of the product with power on. Failure to comply can result in an electric shock.



- After the completion of wiring and parameter setting, perform a robot test run to confirm that the robot can operate safely. Failure to comply may result in personal 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 accident.
- Before power-on, check that no one is near the equipment, motor, or machine. Failure to comply may result in death or personal injuries.

Operation



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



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

Maintenance



- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Do not maintain the equipment with power ON. Failure to comply can result in an electric shock.
- 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 is powered off. Failure to comply can result in an electric shock.



- Perform routine and regular inspection and maintenance on the equipment in accordance with maintenance requirements and keep a record.

Repair



- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Do not maintain the equipment with power ON. Failure to comply can result in an electric shock.
- 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.



- Submit a request for repair services in accordance with the product warranty agreement.
- When the fuse is blown or the circuit breaker or earth leakage circuit 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 injuries or equipment damage.
- Troubleshooting and repair must be performed by professionals in accordance with the repair instructions, with repair records kept properly.
- Replace quick-wear parts of the equipment in accordance with the replacement instructions.
- Do not operate on damaged equipment. Failure to comply may result in death, personal injuries, 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 death, personal injuries, or property damage. • Recycle retired equipment in accordance with industry waste disposal standards to avoid environmental pollution.

Safety Label

For safe operation and maintenance, comply with the safety labels on the equipment. Do not damage or remove the safety labels. See the following table for descriptions of the safety labels.

Safety Label	Description
	• Read through the safety instructions before operating the equipment. Failure to comply may result in death, personal injuries, or equipment damage. • Do not touch the terminals or remove the cover with power ON or within 10 min after power-off. Failure to comply can result in an electric shock.

1.2 Special Reminder

To prevent accidents with the robot, be sure to set up relevant safety measures according to the specific situation. All operators must fully comply with the requirements.

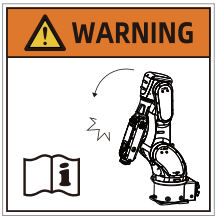
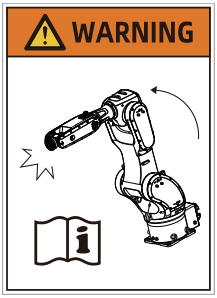
1. Ensure that the safety protection range of the robot is greater than the maximum motion range of the robot. Comprehensive safety protection devices (fences, etc.) must be installed on the periphery, and emergency stop devices must be installed within easy reach of the operator. Leave sufficient space (safe area) 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. The safety latch must be manually removed 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 device.
3. The safety fence must be strong enough to withstand both internal and external impacts and pressures. The position of the safety fence must be fixed to prevent operators from easily dismantling or breaking the safety fence. In addition, the safety fence must be free of any potential hazardous parts such as sharp corners, edges, or spikes.
4. Clearly display the status information of the robot on the safety protection device (fence), such as automatic mode, teaching, emergency stop, etc., so that everyone can see the current status of the robot.

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

1.3 Safety Signs

The following signs are sticked on the robot body. Pay attention that special dangers exist around the positions sticked with safety signs. For safe equipment operation and maintenance, comply with safety signs on the equipment. Do not damage or remove the safety signs.

The following table lists the safety signs.

Safety sign	Description
	To prevent the robot from tilting forward due to its center of gravity, which may cause equipment damage or personal injury, secure the robot first before removing the mounting screws of the base.
	To prevent the robot from tilting forward due to its center of gravity, which may cause equipment damage or personal injury, secure the robot to the base table.
	NEVER enter the action area during robot running. Otherwise, you may bump into the robot, and serious accidents may occur.

Safety sign	Description
	If a lifting is required, follow the lifting diagram, otherwise the robot may tilt and cause damage or injury to personnel. For lifting of the robot, see the manual.
	Do not touch the energized parts when the power is on. Failure to comply may result in an electric shock.

1.4 Industrial Information Security

The product provides an interface to connect to the network and transmits data through the network interface. To protect factories, systems, machines, and networks from cyber attacks and ensure safe operation, a proper industrial information security protection mechanism must be implemented.

The customer is responsible for providing and continuously ensuring a secure connection between the product and the customer network or any other network to prevent unauthorized access to its factories, systems, machines, and networks. The system or machine can be connected to the corporate network or the Internet only when secure connections are ensured and appropriate security measures are taken (for example, anti-virus software or firewall installed).

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 drivestate, 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 longersupported or the latest version of the program is not applied, customers are atincreased risk of cyber-attacks.
- Take proper protection measures (including but not limited to deploying antivirussoftware, firewall, WAF, IPS/IDS, situational awareness system, IDverification, and data encryption) to prevent files in the mobile storage devicefrom being damaged by malware and protect products, networks, systems, andinterfaces from unauthorized access, disturbance, intrusion, data disclosure, orinformation theft.
- Check all safety-related interfaces and settings after commissioning.

2 Product Information

2.1 Model and Nameplate

IR - R 15H - 145 S * - INT
① ② ③ ④ ⑤ ⑥ ⑦

① **Product family** INOVANCE Robot	③ **Max. load** 15H: 15 kg (hollow wrist) 20H: 20 kg (hollow wrist)	⑤ **Installation environment** C: Cleanroom S: Standard P: Protection	⑦ **Version** INT: International (with functional safety)
② **Series** R: 6-axis robot	④ **Arm length** 145: 1455 mm 120: 1218 mm	⑥ **Cable length** Null: standard cable 5: 5 m standard cable G3: 3 m highly flexible cable G10: 10 m highly flexible cable	

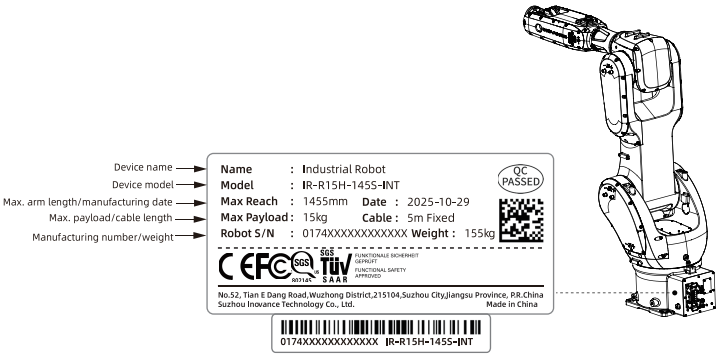


Figure 2-1 Nameplate

Note

- The certification information in the above nameplate is for illustrative purposes only; Refer to the actual product certification for specific details.
- 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 non-standard models, contact the provider.

2.2 Components

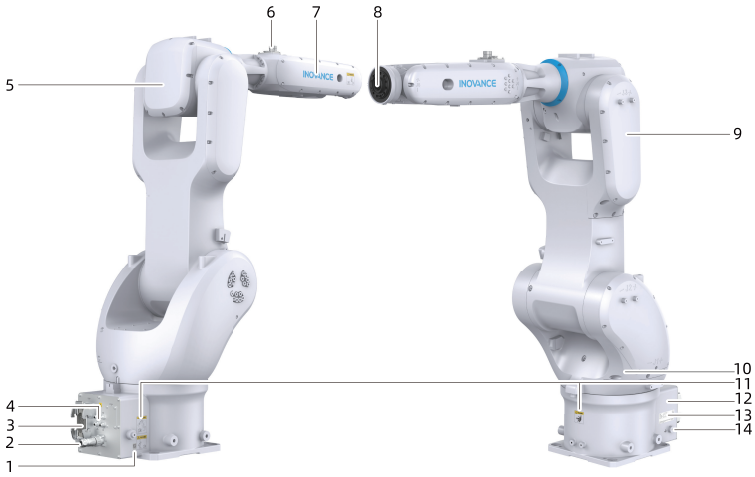


Table 2–1 Component description

No.	Name	No.	Name
1	QR code for more documents	8	Wrist flange
2	26-Pin I/O aviation connector	9	Upper arm
3	Heavy-duty connector	10	Swivel base
4	Air tube interface	11	Warning label
5	Elbow	12	Base
6	26-Pin I/O aviation connector	13	Nameplate
7	Forearm	14	M6 x 10 grounding hole

2.3 Rotating Direction

The rotation direction of the respective axis is shown below.

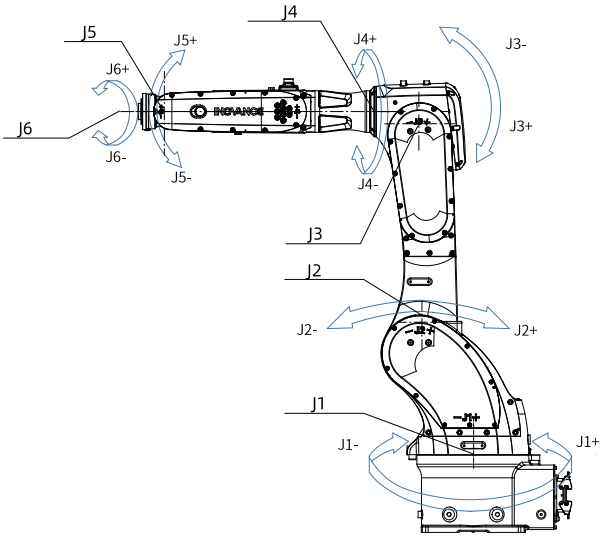


Figure 2-2 Rotation direction of each axis

2.4 Outline Dimensions

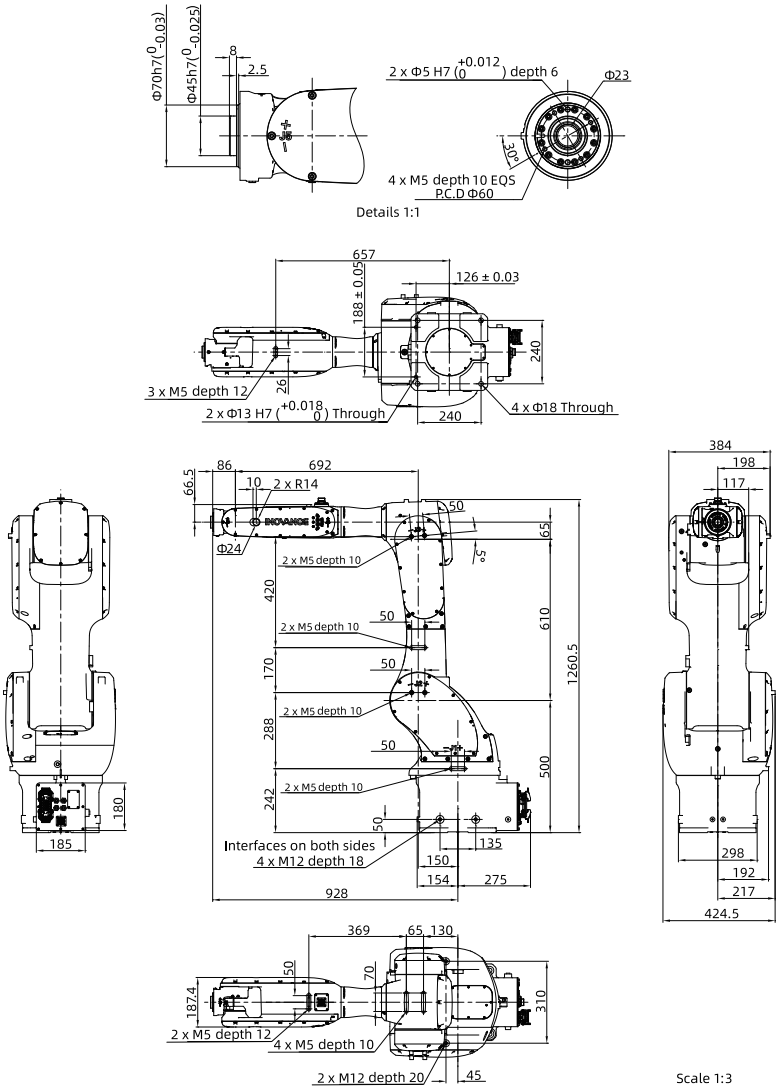


Figure 2-3 Outline dimensions of IR-R15H-145S-INT (unit: mm)

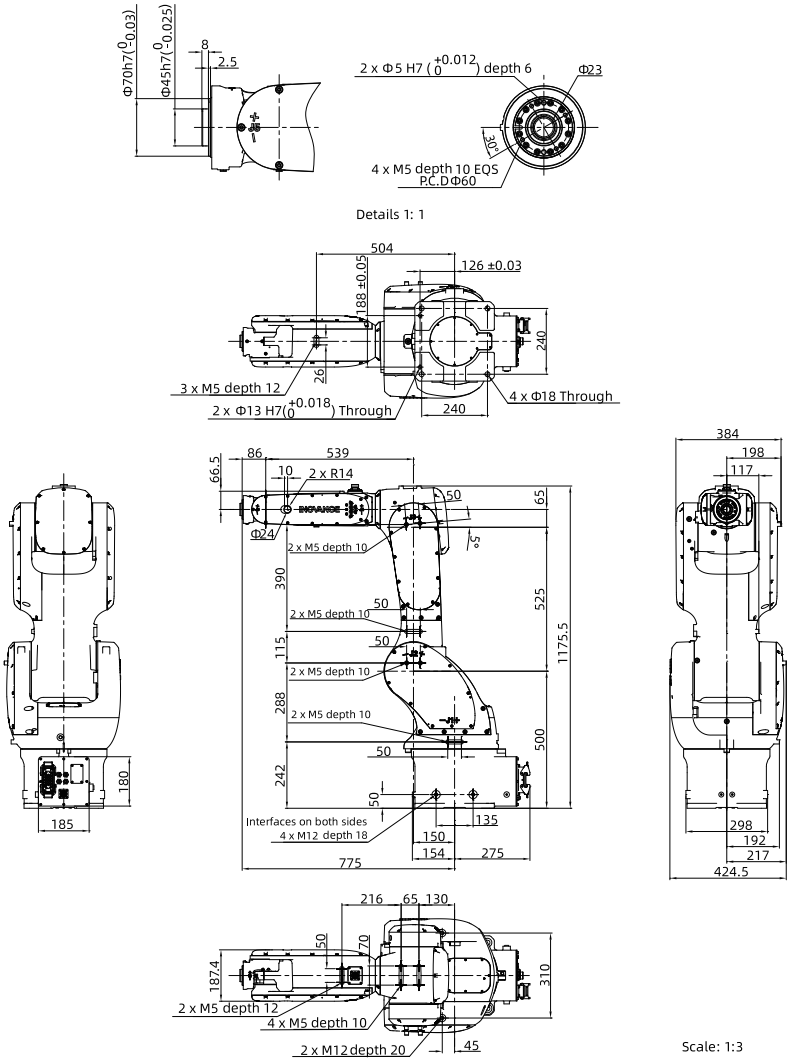


Figure 2-4 Outline dimensions of IR-R20H-120S-INT (unit: mm)

2.5 Technical Specifications

Model	IR-R15H-145S-INT	IR-R20H-120S-INT
Structure	Vertical multi-articulated	Vertical multi-articulated
Number of axes	6 axes	6 axes
Maximum reach	1455 mm	1218 mm

Model		IR-R15H-145S-INT	IR-R20H-120S-INT
Repeatability		±0.04 mm	±0.04 mm
Maximum wrist load		15 kg	20 kg
IP rating		IP54 (standard), IP67 (optional)	IP54 (standard), IP67 (optional)
Maximum speed	J1	260°/s	260°/s
	J2	240°/s	240°/s
	J3	260°/s	260°/s
	J4	470°/s	470°/s
	J5	450°/s	450°/s
	J6	705°/s	705°/s
Maximum motion range	J1	-170° to +170°	-170° to +170°
	J2	-160° to +90°	-160° to +70°
	J3	-76° to +210°	-76° to +200°
	J4	-190° to +190°	-190° to +190°
	J5	-140° to +140°	-140° to +140°
	J6	-360° to +360°	-360° to +360°
Allowed wrist torque	J4	26.5 N·m	35 N·m
	J5	26.5 N·m	35 N·m
	J6	12 N·m	20 N·m
Allowed wrist inertia	J4	0.9 kg·m²	1 kg·m²
	J5	0.9 kg·m²	1 kg·m²
	J6	0.3 kg·m²	0.4 kg·m²
User interface	Wiring	24x signal, 30 V, 0.5 A	24x signal, 30 V, 0.5 A
	Air line	Air tube: Φ6 mm x 4 Pressure resistance: 0.59 MPa	Air tube: Φ6 mm x 4 Pressure resistance: 0.59 MPa
Ambient condition	Operating temperature[1]	0°C to 45°C	0°C to 45°C
	Operating humidity	Normal: 5% RH to 75% RH (without condensation) Short-term: 5% RH to 95% RH (within 1 month, without condensation)	Normal: 5% RH to 75% RH (without condensation) Short-term: 5% RH to 95% RH (within 1 month, without condensation)
	Maximum temperature gradient	1.5°C/min	1.5°C/min
Manipulator weight		155 kg	150 kg
Input power (average power consumption)		3 kVA (0.6 kW)	3 kVA (0.6 kW)
Matching controller (Standard)		IRCB501-6KD-INT	IRCB501-6KD-INT

Model	IR-R15H-145S-INT	IR-R20H-120S-INT
Mounting method	Floor-mounted, ceiling-mounted, wall-mounted[2]	Floor-mounted, ceiling-mounted, wall-mounted[2]
Noise level[3]	$L_{Aeq} \leq 85$ dB(A)	$L_{Aeq} \leq 85$ dB(A)
Robot base mounting dimensions	240 mm x 240 mm (4 x Φ18 mm)	240 mm x 240 mm (4 x Φ18 mm)
Certification	CE certification, cSGSus certification, FCC certification, and functional safety certification (only supported by "-INT" controller and requires a functional safety expansion card), KCs certification (refer to the certifications for the certified models).	

Note

[1] Operating temperature: When used in a low-temperature environment approximating the lowest allowable temperature, or when idle for a long period of time due to holidays and nighttime, it is recommended to warm up the product for 10 minutes before operating it.

[2] Mounting method: When installing the robot in a ceiling-mounted or wall-mounted configuration, contact Inovance technical support for further evaluation of the operating conditions.

[3] Noise level: This value represents the A-weighted equivalent noise level measured in accordance with ISO 11201 (EN 31201). (Measurement conditions: Operating at rated load and maximum speed)

2.6 Motion Range



- 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 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 everyone on-site can easily see the current status of the robot.
- The safety fence must be strong enough to withstand both internal and external impacts and pressures. The safety fences must be fixed and immovable to prevent operators from easily dismantling or breaking them. In addition, the safety fence must be free of any potential hazardous parts such as sharp corners, edges, or spikes.

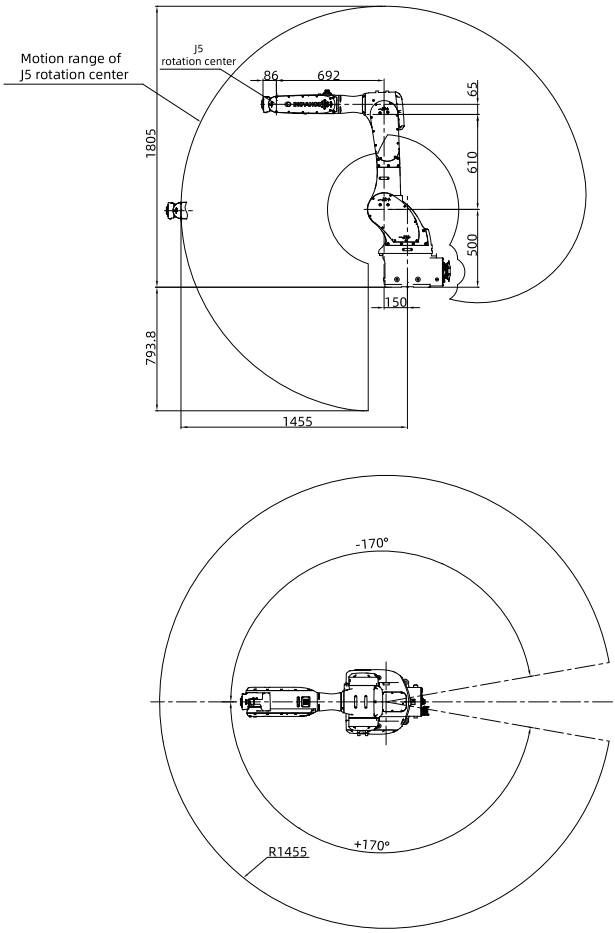


Figure 2-5 Motion range of IR-R15H-145S-INT robot (unit: mm)

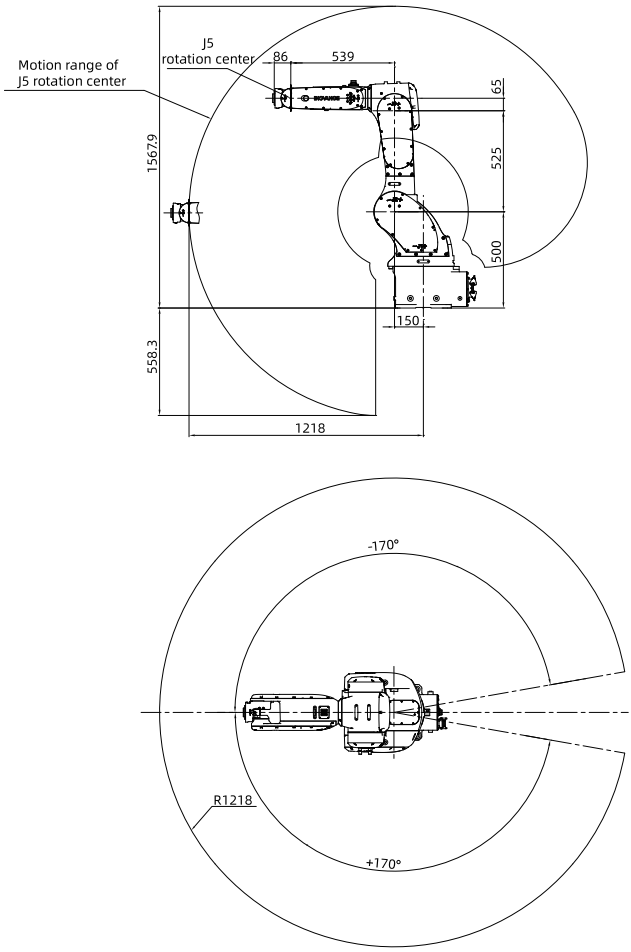


Figure 2-6 Motion range of IR-R20H-120S-INT robot (unit: mm)

2.7 Maximum Load of Wrist Flange

The IR-R15H-145S-INT series and IR-R20H-120S-INT series support a maximum payload of 15 kg and 20 kg, respectively. In addition, the allowed wrist torque and inertia should meet the following conditions. External force (other than gravity) applied to the robot should not exceed the range in the table below.

Wrist load		IR-R15H-145S-INT	IR-R20H-120S-INT
Allowed wrist torque (N·m)	J4	26.5 N·m	35 N·m
	J5	26.5 N·m	35 N·m
	J6	12 N·m	20 N·m
Allowed wrist inertia (kg·m²)	J4	0.9 kg·m²	1.0 kg·m²
	J5	0.9 kg·m²	1.0 kg·m²
	J6	0.3 kg·m²	0.4 kg·m²

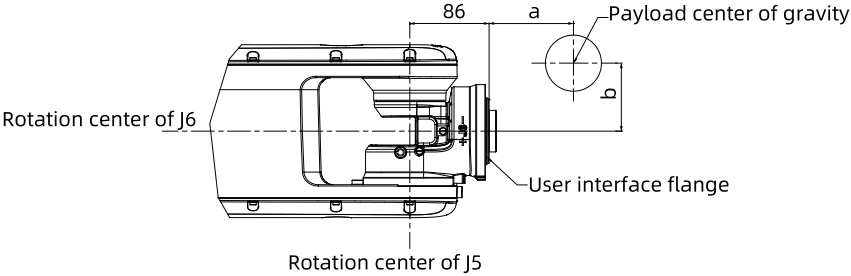


Figure 2-7 Distance from the rotation center of the J5/J6 axis

Note

- Distance from the rotation center of J5 axis: a+86 (mm).
- Distance from the rotation center of J6 axis: b (mm).

2.8 Wrist Load Chart

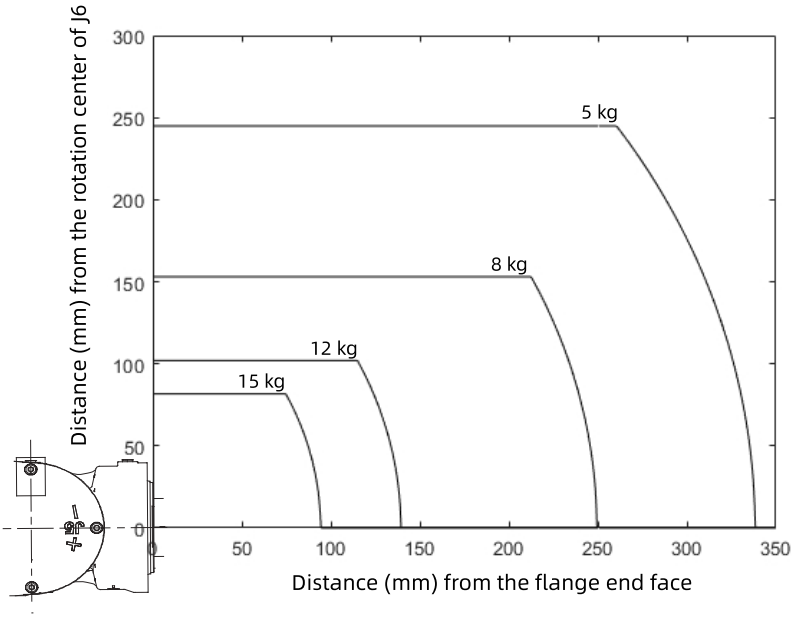


Figure 2-8 Wrist load chart of IR-R15H-145S-INT

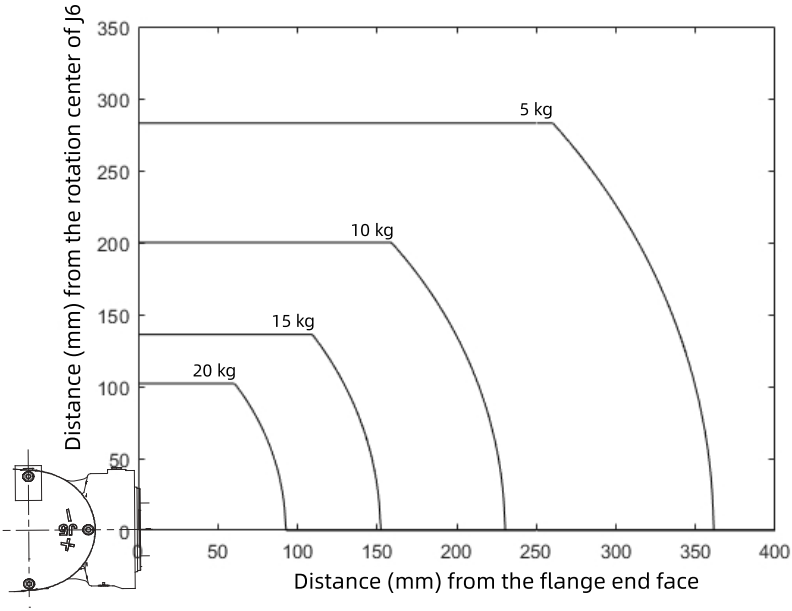


Figure 2-9 Wrist load chart of IR-R20H-120S-INT

3 Preparation

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.
- Product installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.

3.2 Installation Environment Requirements

General environmental requirements

Set up the robot system in an environment that meets the following conditions to ensure its performance and safe operation.

Table 3–1 Ambient condition

Item	Requirement
Operating temperature and humidity	• Operating temperature range: 0°C to 45°C (air temperature change rate less than 1.5°C/min) • Humidity range: ■ Normal: 5% RH to 75% RH (without condensation) ■ Short-term: 5% RH to 95% RH (within 1 month, without condensation)
Storage temperature and humidity	• Storage temperature range: -10°C to +55°C • Storage humidity range: maximum 95% RH (without condensation)
Transportation temperature and humidity	• Transportation temperature range: -10°C to +55°C • Transportation humidity range: maximum 95% RH (without condensation)
EFT/B immunity	≤ 2 kV
Static immunity	≤ 6 kV
Environment	• Place it indoors • Avoid direct sunlight • Keep away from dust, oil smoke, salt, iron filings • Keep away from flammable and corrosive liquids and gases • Keep away from water • Avoid places with shocks or 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 environmental requirements

- The surface of the robot provides certain protection. However, contact your provider and confirm 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 Anti-rust Requirements

3.3.1 Usage Specifications

Environmental control specifications

- Ensure the robot's operating environment temperature and humidity are within the equipment's allowable range, typically 0℃ to 45℃ for temperature and 20% RH to 80% RH for humidity.
- Avoid exposing the robot to corrosive gases or liquids such as acids, alkalis, or salt spray. Use a robot with a higher protection rating (e.g., IP67) and install physical protection if exposure is unavoidable due to process requirements (e.g., in electroplating or painting workshops). Regularly inspect for rust formation. If rust spots are found, remove the rust promptly and apply anti-rust oil[1].

- When there is continuous water splashing or other liquids that are prone to cause rust in the working environment, install physical protection to prevent liquids from splashing onto the robot. Also, regularly inspect for rust formation. If rust spots are found, remove the rust promptly and apply anti-rust oil.
- Keep floors clean. Clean up accumulated water and oil spills promptly to prevent increased humidity or corrosive gas formation due to evaporation.

Note

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

Daily operation specifications

- Before powering on, visually check the robot body and wrist area for obvious signs of water stains, oil contamination, or corrosion.
- Never touch the polished axis arm of the robot directly with bare hands. Hand sweat is one of the main causes of rust. Always wear clean gloves during operation.
- Gently wipe dust, oil, and cutting fluid from the robot surface (especially the wrist flange) using a dry, clean non-woven or cotton cloth.
- Standard models must not be washed with water. For IP67 optional models, add anti-rust agent to the water before washing. Immediately dry the robot after washing and apply anti-rust oil.

Emergency handling

- If the robot is splashed by any liquid (water, oil, chemical agent), stop it immediately. Perform thorough cleaning according to the cleaning steps in *"3.3.2 Maintenance" on page 33*, and reapply anti-rust oil after drying.
- If the robot is scheduled to be out of service for more than 48 hours, perform special preservation and anti-rust treatment. For specific operations, see *"3.3.2 Maintenance" on page 33*.

3.3.2 Maintenance

No.	Scenario	Detailed operations
1	Used for cleaning	1. Stop and power off the robot to ensure safety. 2. Perform initial dust removal: Use a soft brush or dry compressed air (pressure below 0.3 MPa) to remove dust from gaps and hard-to-reach areas. 3. Wipe down: Use a clean cloth dipped in a dedicated metal cleaner[1] to wipe the robot surface[2]. 4. Ensure thorough drying: Use a dry non-woven cloth to completely dry the surface, ensuring no moisture remains.
2	Applying anti-rust oil	1. Apply anti-rust oil to all exposed metal surfaces, especially the J6 axis end flange. 2. Spray a small amount of anti-rust oil onto a non-woven cloth, then evenly apply it to the metal surface to form a very thin oil film. Avoid excessive application that leads to dripping or runs.
3	Rust and contamination prevention for the positioning pin hole	To prevent rust and contamination, rubber plugs are pre-installed in the positioning pin holes on the robot body before leaving the factory. Do not remove the rubber plugs except when using the positioning pin holes.
4	Anti-rust and preservation treatments for long-term shutdown	1. Comprehensive cleaning and drying: Thoroughly clean and dry the robot according to the cleaning procedure. 2. Application of anti-rust oil: Apply anti-rust oil to all exposed metal surfaces. 3. Protection and storage: Operating precautions are as follows: • Move each axis of the robot to the standard parking posture to minimize structural stress. • Completely cover the robot with a dust cover or plastic film. Ensure an adequate amount of desiccant is placed inside the covering and inspect it periodically. • Power on and run the robot periodically for a certain duration to allow electrical components to generate heat and disperse moisture.

Note

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

WARNING

[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 secure 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 M16 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 suppress the vibration, use a steel plate that meets the following requirements as the mounting surface of the robot: thickness > 30 mm; surface roughness < 25 μm; flatness < 0.2 mm.
- Secure 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 details, see the "IRCB501-INT Series Robot Controller User Guide".
- Consider the following torques and reaction forces produced by movements of the robot.

Table 3–2 Maximum force and torque of the robot

Torque in the Vertical Plane, M_K (N·m)	Vertical Force, F_V (N)	Torque in the Horizontal Plane, M_r (N·m)	Horizontal Force, F_O (N)
3739.2	2977.2	1299.6	2742

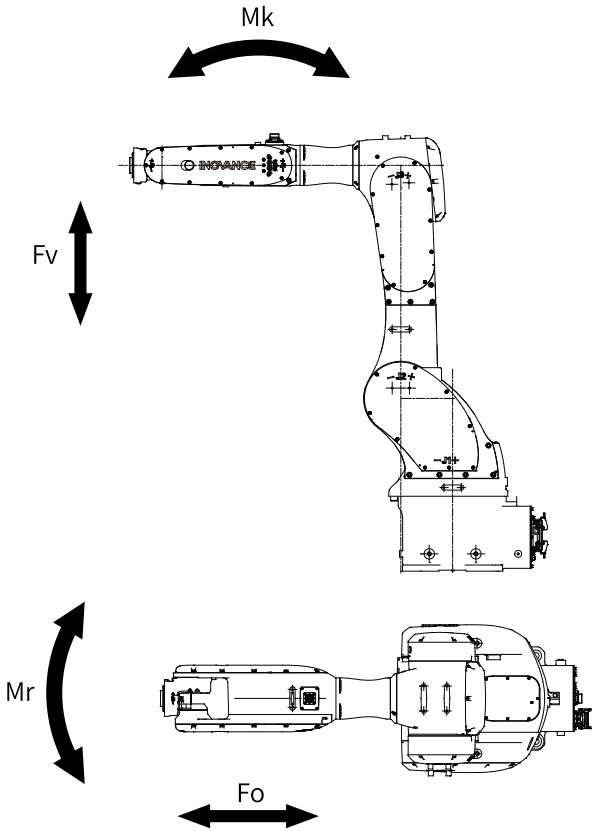


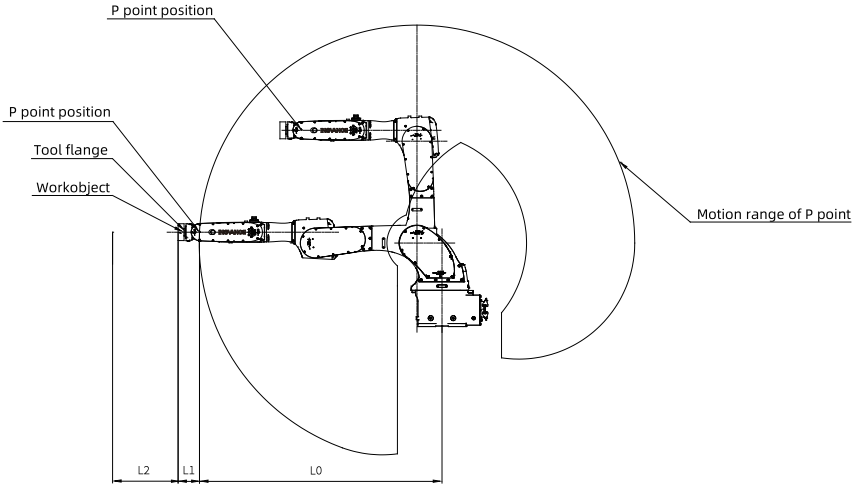
Figure 3-1 Maximum force and torque of the robot

3.5 Mounting Clearance 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 workobject
- L2: Safety space:
  - IR-R15H-145S-INT: L0 + L1 + L2 > 1750 mm
  - IR-R20H-120S-INT: L0 + L1 + L2 > 1500 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 cables and signal cables is 200 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 200 mm between the boundary of the motion range and the safety fence.

3.6 Installation Tool Preparations

Tool	Quantity (PCS)
M12/M5/M6 inner hexagon wrench	1
Scissors or utility knife	1
Straight screwdriver	1
Protective gloves	1
Safety shoes	1
Hoisting sling	1
Forklift	1

4 Unpacking, Storage, and Handling

4.1 Precautions

Unpacking



- Before unpacking, check whether the outer package is intact, damaged,, damped, or deformed.
- Unpack the package in sequence. Do not hit the package violently.
- Check whether there is damage, rust, or injuries on the surface of the equipment and equipment accessories before unpacking.
- Check whether the package contents are consistent with the packing list before unpacking.



- Do not install the equipment if you find damage, rust, or indications of use on the equipment or accessories upon unpacking.
- Do not install the equipment if you find water seepage, component missing or damage upon unpacking.
- Do not install the equipment if you find the packing list does not conform to the equipment you received.
- Unpack the packing box according to the direction instructed.

Handling

Note

Only qualified personnel are allowed to carry out transportation including rigger operation, hoisting by crane, and forklift driving.



- Transport the equipment with a hoist or forklift with the original package.
- Wear personal protective equipment (PPE) during transportation with a hoist or forklift. Prohibit any personnel to stand or stay in the transportation route.
- Stabilize the equipment with hands when hoisting it. Unstable hoisting may result in the equipment falling over. This may cause severe bodily injury or equipment damage.



- Store and transport this equipment based on the storage and transportation requirements for humidity and temperature.
- Avoid transporting the equipment in environments such as water splashing, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Pack the equipment strictly before transportation. Use a sealed box for long-distance transportation.
- Never transport this equipment with other equipment or materials that may harm or have negative impacts on this equipment.
- If condensation occurs on the equipment during transportation or storage, remove the condensation before turning on the power supply.

4.2 Unpacking

1. Unpack the carton.
   Cut the PET straps using scissors or a utility knife, and remove the lid of the carton.
   Move the carton from bottom to top and remove it.

Note

Wear gloves to prevent scratches.

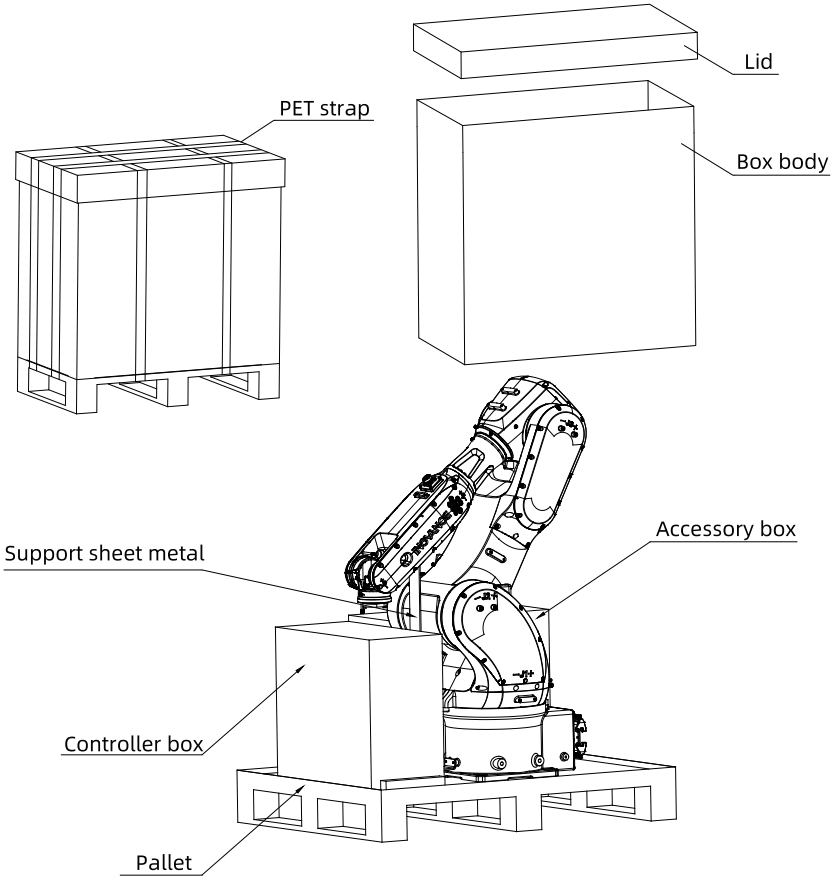
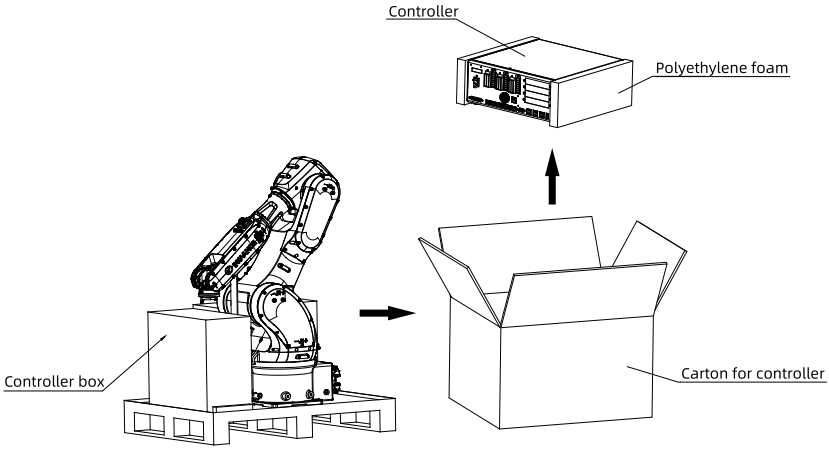


Figure 4-1 Unpacking the carton

2. Unpack the controller.

   a. Cut off the packing straps that fix the cartons for controller and accessories.
   b. After removing the carton for accessories, move the carton for controller to the open ground. Pay attention to the direction indication on the carton.
   c. Cut the sealing tape on the surface of the carton, and then open the carton.
   d. Remove the polyethylene foam on both sides of the robot body, firmly grasp the hand holes on both sides of the controller or hold the bottom of the controller, take the controller out of the packing box, and move it to the destination.



3. Remove the robot fixing bolts and support sheet metal.
   Using an M12 inner hexagon wrench, remove the four M12 x 55 screws that secure the robot body to the wooden pallet. Using an M5 inner hexagon wrench, remove the two M5 x 16 screws that secure the support sheet metal to the forearm; using an M6 inner hexagon wrench, remove the two M6 x 10 screws that secure the support sheet metal to the robot base.

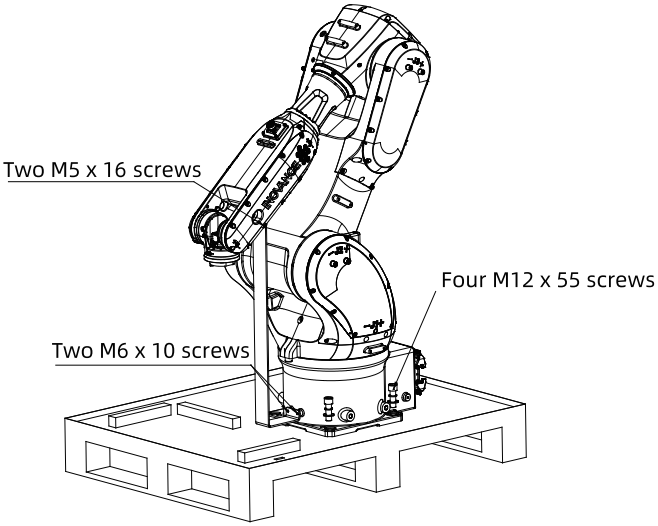


Figure 4-2 Packaging diagram

4. Take out the robot body.
   Take out the robot from bottom to top, move the robot to the destination only after the bottom of the robot does not interfere with the top of the pallet.

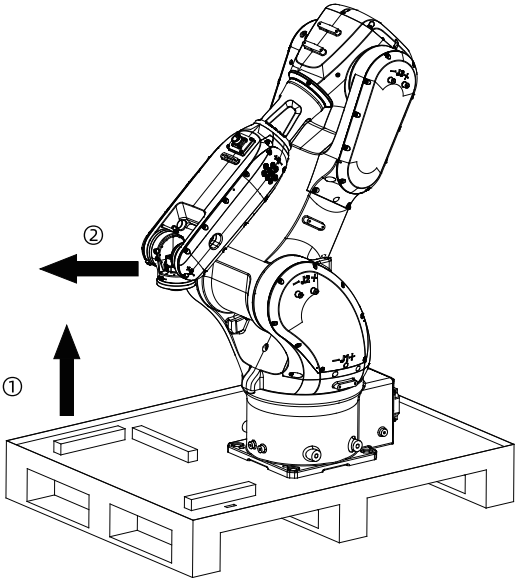


Figure 4-3 Taking out the robot body

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 Post-Unpacking Inspection

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

Table 4–1 Packing list

Name	Quantity (PCS)
Manipulator	1
Robot controller	1
Trailing cable between manipulator and controller	1
Controller cable connection kit	1
Inovance Product Warranty Card	1
List of zero point information	1
Packing list	1
M16 x 50 hexagon screws (GB/T70.1-2008)	4

Name	Quantity (PCS)
Spring washer (GB/T93-1987)-16	4
Flat washer (GB/T97.1-2002)-16	4
Eye bolt - M12	2

4.4 Handling

Note

Only qualified personnel are allowed to carry out handling work including rigger operation, hoisting by crane, and forklift driving.



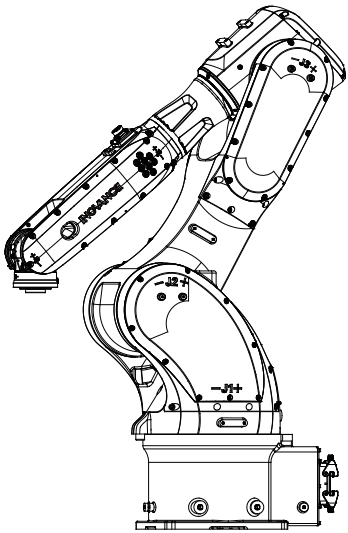
- Keep the equipment in its original package when handling with a hoist or forklift.
- Wear personal protective equipment (PPE) when handling with a hoist or forklift. Prohibit personnel from standing or staying in the handling route.
- Ensure the equipment is balanced when hoisting. Unstable lifting may cause the equipment to fall, resulting in serious personal injury or significant equipment damage.

CAUTION

- Store and transport this equipment based on the storage and transportation requirements for humidity and temperature.
- Avoid storing or transporting the equipment in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Pack the equipment strictly before transportation. Use a sealed box for long-distance transportation.
- Never transport this equipment with other equipment or materials that may harm or have negative impacts on this equipment.
- When a device that has been stored for a long time is reassembled into the system for use, conduct a trial run and then switch to normal running if no abnormality is found.
- If condensation occurs on the equipment during transportation or storage, remove the condensation before turning on the power.
- After transportation or relocation is complete, remove the eye bolts from the robot. If the robot is operated without removing the eye bolts, the robot arm may collide with the eye bolt, potentially causing damage or malfunction to the robot.
- Cranes or forklifts should stop slowly to avoid any impact.
- When transporting the robot using a transport fixture, check the fixing bolts of the transport fixture beforehand and tighten any loose bolts.

Pre-Handling Preparation

1. Before handling a newly shipped robot, keep it in the factory-set posture, as shown in the figure below.



Angle of each joint:

Model	J1	J2	J3	J4	J5	J6
IR-R15H-145S-INT	0°	+30°	-70°	0°	-50°	0°
IR-R20H-120S-INT	0°	+30°	-60°	0°	-60°	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.

Handling Procedure

Note

- The equipment is heavy and manual handling is strictly prohibited.
- 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 avoid collision hazards.

WARNING

- 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 up the robot in the factory posture as shown in the figure below.
   Use two M6 x 10 screws and two M5x16 screws to fix the handling bracket to the robot base and the forearm through the corresponding mounting holes. Install two M12 eye bolts into the threaded mounting holes of the robot swivel base. Use two steel slings with a total load-bearing capacity of ≥500 kg (recommended length: 1.3 m) for lifting, and protect the contact part between the steel slings and the robot with rubber hoses.

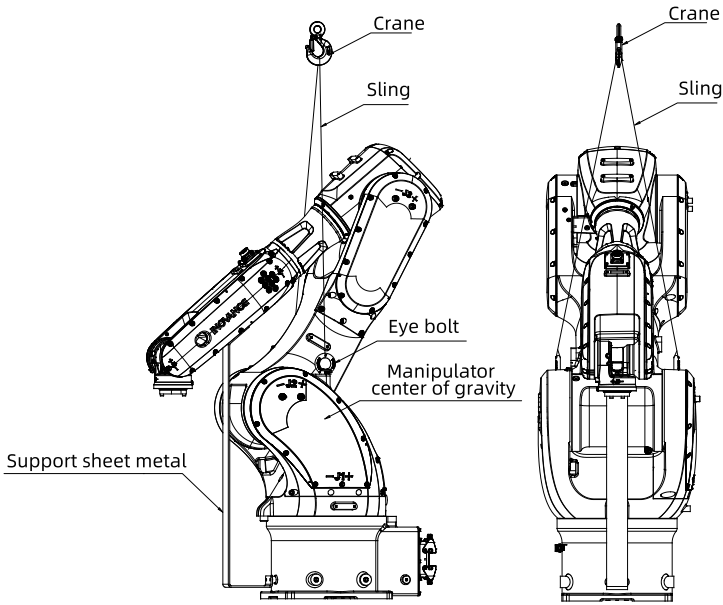


Figure 4-4 Lifting the robot

2. Ensure that the robot is balanced before moving the overhead crane; always ensure that the robot does not tip over or tilt.
3. Move the robot by two people, with one observing in the safety zone, ensuring the surrounding environment is safe during the operation, and the other operating the crane to lift the robot and move it to the installation base table.

Note

The above schematic diagram illustrates the lifting for the floor-mounted robot. For details regarding the wall-mounting or ceiling-mounted robot, 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 handling the robot together with the pallet or baseplate.

Handle the robot slowly to prevent it from tipping over or tilting.

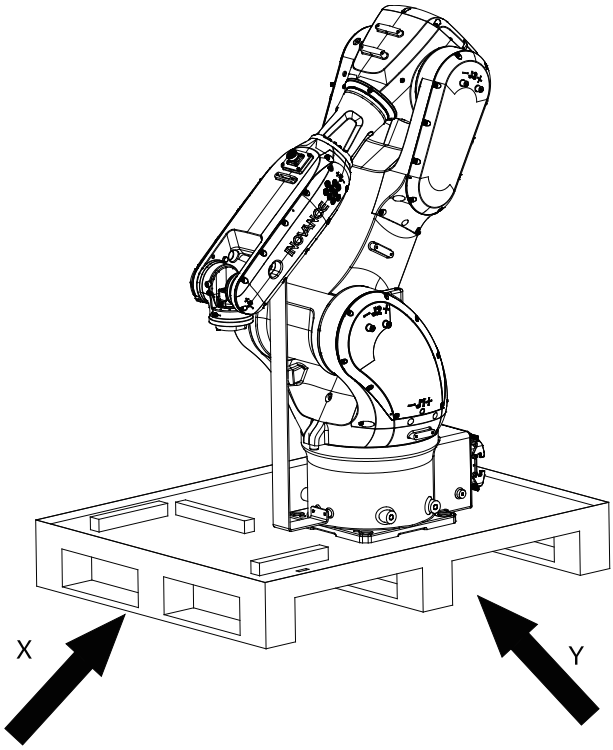


Figure 4-5 Moving the robot with forklift

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 Bill of Materials

The recommended bill of materials is as follows:

Name	Material	Dimensions	Quantity	Description
Bubble wrap	LLDPE	-	Several	For protecting cable plugs
Compression-resistant carton	2A	-	1PCS	Select size as per equipment packaging requirements.
Hexagon socket bolt (individually packaging)	-	M12 x 55	4PCS	For robot individual packaging. Use original factory-configured bolts.
Desiccant	Montmorillonite/Silica gel desiccant	-	8 packets	30 g/packet
PE bag	LDPE	-	3PCS/1PCS	Use the bag based on the product size For packaging loose parts For packaging robot body/ cables
Eye bolt	Cast iron	M10 standard eye bolt	2PCS	-
Nylon tie	NYLON 66	Length: 150 mm	4PCS	-
Packing strap	PET	Width: 16 mm, thickness: 0.6 mm	8 m to 10 m	-
Industrial tape	BOPP	60 mm	Several	-
Carton box	K=K	-	2PCS	1 piece for packaging controller 1 piece for packaging accessories
Wooden pallet	Plywood	-	1PCS	Select size as per equipment packaging requirements.

CAUTION

Materials such as PE bags must comply with the laws and regulations of the destination country. Inovance packaging materials must meet the REACH certification requirements.

5.2 Packaging Guide

5.2.1 Packaging Posture

Transport Pose

The robot must be placed in the transport pose before transportation. The angle of each joint is as follows:

Position	Angle of each joint	
	IR-R15H-145S-INT	IR-R20H-120S-INT
J1	0°	0°
J2	+30°	+30°
J3	-70°	-60°
J4	0°	0°
J5	-50°	-60°
J6	0°	0°

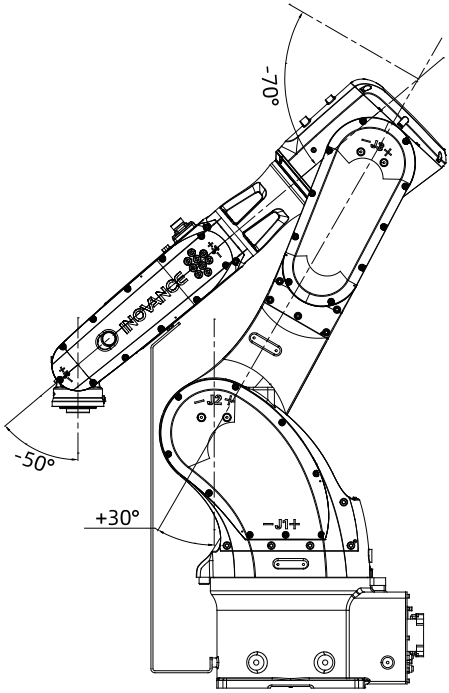


Figure 5-1 Transport pose of IR-R15H-145S-INT series

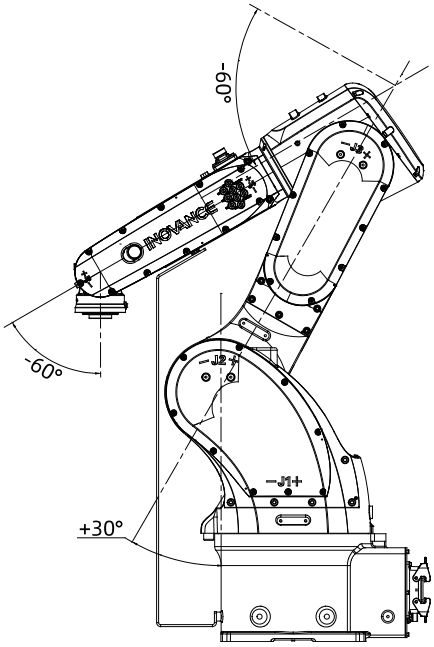


Figure 5-2 Transport pose of IR-R20H-120S-INT series

Package dimensions

Table 5–1 Package dimensions for robot (unit: mm)

Height	Width	Length
1400	820	1070



Note

The factory dimensions (robot + controller) above are for customer reference only.

5.2.2 Packaging Procedure

Robot individual packaging

1. Before packaging the robot, ensure it is in the factory-set posture. For details, see *"5.2.1 Packaging Posture" on page 50*.
2. Using the provided bolts, install the robot body and the sheet metal onto the packaging pallet through the four designated mounting holes. Secure the support sheet metal to the robot base and forearm with screws.
3. Place the robot's cable set (with both ends of the cables wrapped in bubble wrap; it is recommended to coil the cables to a diameter of 400 mm and secure them with nylon ties), the guide, and other accessories into the carton (carton code: 19050318).
4. Install the robot body on one side of the pallet, and place the controller on the other. When placing the controller of the IRCB501 series, place the carton with its narrow side down and secure it with packing straps.

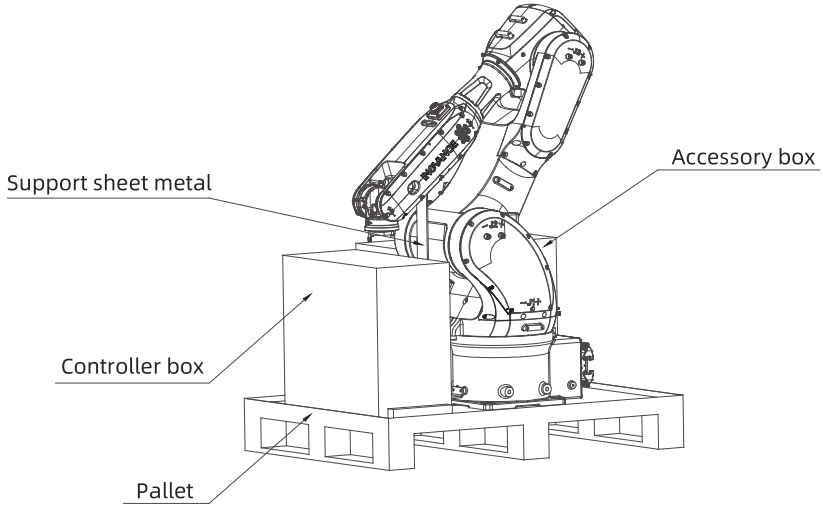


Figure 5-3 Packaging of robot body and controller

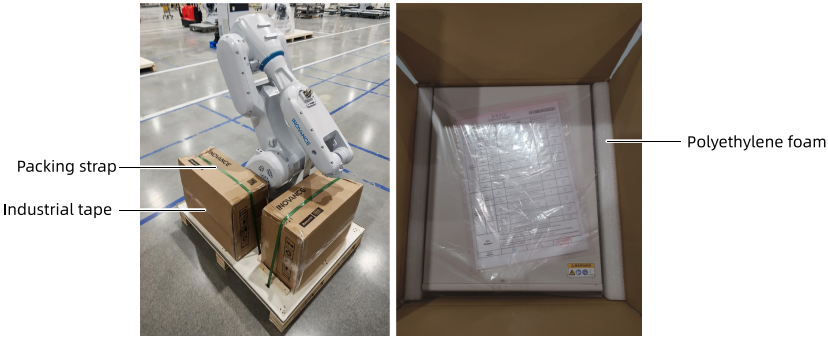
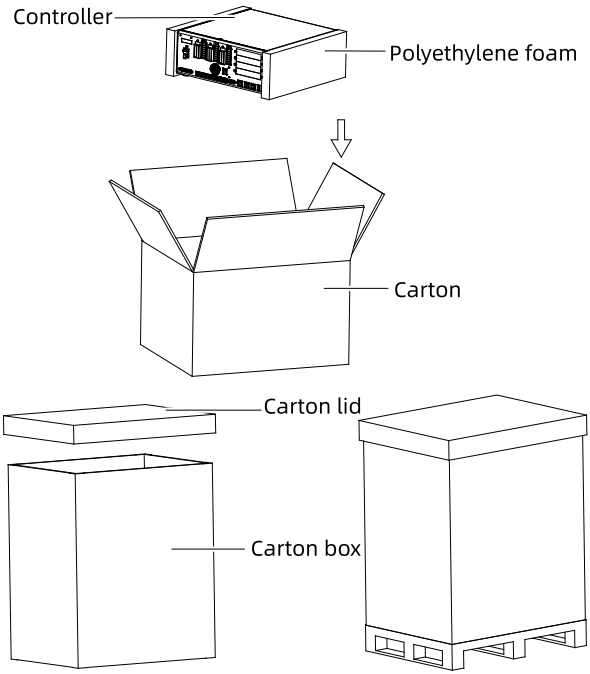


Figure 5-4 Physical packaging

5. Place the carton containing the accessories on the opposite side of the robot body, and secure it with packing straps. Place polyethylene foam between the carton containing the accessories and the robot body to prevent the carton from scratching the robot body.
6. Place the carton body in position, and cover it with the lid.



7. Use PET straps to seal the carton in a grid pattern ("#"-shape).

Note

When the controller and the robot support individual packaging, it is recommended to prioritize the original factory packaging method to ensure transportation safety and compliance with equipment protection standards.

CAUTION

- Place the product together with desiccant into a plastic bag. Fold the bag flat and seal the opening with transparent adhesive tape.
- Place the product in a carton box and protect both ends of the product with polyethylene foam.
- Attach the guide, zero point information attachment, etc., to the inner side of the carton box.
- Place desiccant and cover with a PE bag to prevent dust and rust.
- Prevent collisions and scratches throughout the entire process.
- It is not recommended to transport with a load (tooling or fixture) for secondary transportation.
- During packaging and transportation, the robot's gravity axis should be locked (the method is not specified, but it must ensure that there is no possibility of downward movement).

Packaging together with client's automated equipment

Package the robot together with the client's automated equipment in the following two methods:

Method 1: Package both the manipulator and the controller together with the client's automated equipment.

Method 2: Package the manipulator together with the client's automated equipment, and package the controller separately.

- For method 1, perform the following operations:

1. Secure the controller to the base using four M5 x 10 SEMS screws (recommended torque: 2.5 N·m) in accordance with Inovance's mounting specifications.
2. Place four packets of desiccant (30 g/packet) beside the manipulator, and confirm that the desiccant packets are intact and the labels are clearly legible.
3. Adjust each robot arm to the proper angle, then secure each arm to the metal bracket provided with the original packaging to prevent damage during transportation due to displacement or collisions with the surrounding environment, and also protect the reducer.
4. After securing, completely wrap the manipulator with stretch film to ensure the dust and moisture prevention.
5. After wrapping, perform a sealing inspection to ensure the product is protected from moisture and rust.
6. Perform final inspection to ensure that the stretch film surface has no broken straps and that the protective layer extends beyond the outline of the manipulator by at least 20 mm.

- For method 2, perform the following operations:

1. Secure the manipulator to the base using four M16 x 50 screws.
2. Place two packets of desiccant (30 g/packet) beside the manipulator, and confirm that the desiccant packets are intact and the labels are clearly legible.
3. Adjust each robot arm to the proper angle, then secure each arm to the metal bracket provided with the original packaging to prevent damage during transportation due to displacement or collisions with the surrounding environment, and also protect the reducer.
4. After securing, completely wrap the manipulator with stretch film to ensure the dust and moisture prevention.
5. After wrapping, perform a sealing inspection to ensure the product is protected from moisture and rust.
6. check that the stretch film surface has no broken straps and that the protective layer extends beyond the outline of the manipulator by at least 20 mm.
7. Select a compression-resistant carton box of appropriate size, with cushioning material pre-placed inside (bubble wrap or polyethylene foam is recommended).
8. After packaging, apply industrial tape in an "H"-shape pattern to seal the carton box.
9. Secure the packaged controller to the base using bolts at four points (a dedicated mounting bracket is provided at the bottom of the controller).
10. Check the stability of the center of gravity of the packaging to ensure there is no risk of shifting during transportation.

6 Installation

6.1 Installation Precautions

Note

- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Install a safety fence for the system. Failure to comply will result in serious accidents.
- 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 manipulator before turning on the power or operating the system. Otherwise, the manipulator 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 power to all devices.
2. Clean the surface onto which the robot is to be mounted.

Note

The plate for the robot mounting face should be 30 mm thick or more and made of steel to reduce vibration. The surface roughness of the steel plate should be 25 μm or less.

3. Move the robot near the mounting surface.
4. Align the robot base with the two positioning pin holes.
5. Install the two positioning pins.

6. Install four spring washers and four flat washers, and tighten them with four M16 x 50 hexagon screws (tightening torque: 220 N·m). Use screws with a strength equivalent to the performance level of Grade 12.9 specified in GB/T 3098.1.

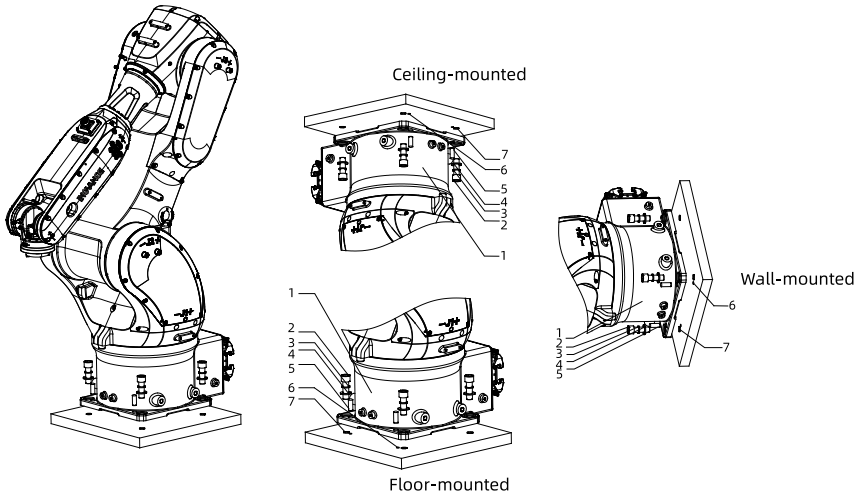


Figure 6-1 Installing the robot base

No.	Component
1	Robot base
2	Four M16 x 50 hexagon screws (GB/T70.1-2008)
3	Four spring washers (GB/T93-1987)-16
4	Four flat washers (GB/T97.1-2002)-16
5	Two parallel pins (GB/T119.1-2000)-Φ13 x 30
6	Threaded mounting holes (depth: > 20 mm)
7	Mounting pin holes (depth: > 20 mm)

6.3 Installing an End Effector

Customers shall prepare end effectors. 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 workobject is not placed. If the emergency stop switch is pressed when the power is still connected, the workobject may be released, resulting in damage to the robot system and workobject.
- Pay attention to the interference area of the end effector during system layout design. After the end effector is installed, the end effector or workobject may come into contact with the manipulator during motion due to the outer diameter of the end effector, the size of the workobject, or the position of the robot arm, which may cause damage to the robot system and the workobject.

Connect the end effector to the wrist flange by using M5 screws (Grade 12.9).

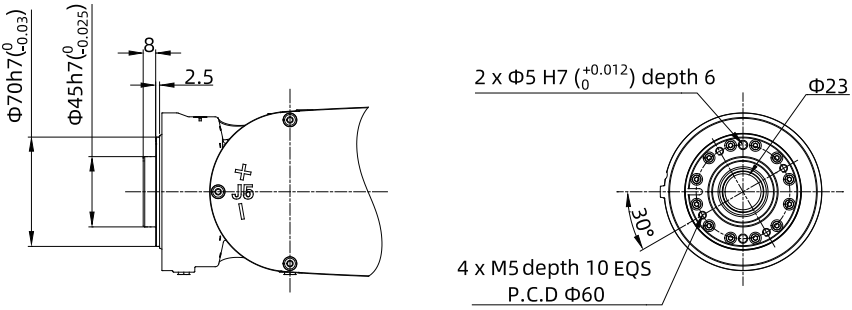


Figure 6-2 Wrist flange dimensions

6.4 Installing Auxiliary Accessories

The robot is equipped with installation interfaces on the base, swivel base and both sides of the upper arm, as well as on the upper ends of the swivel base, elbow and forearm, which are used for installing auxiliary accessories such as the pneumatic valve. The specifications and dimensions of the interfaces are shown below.

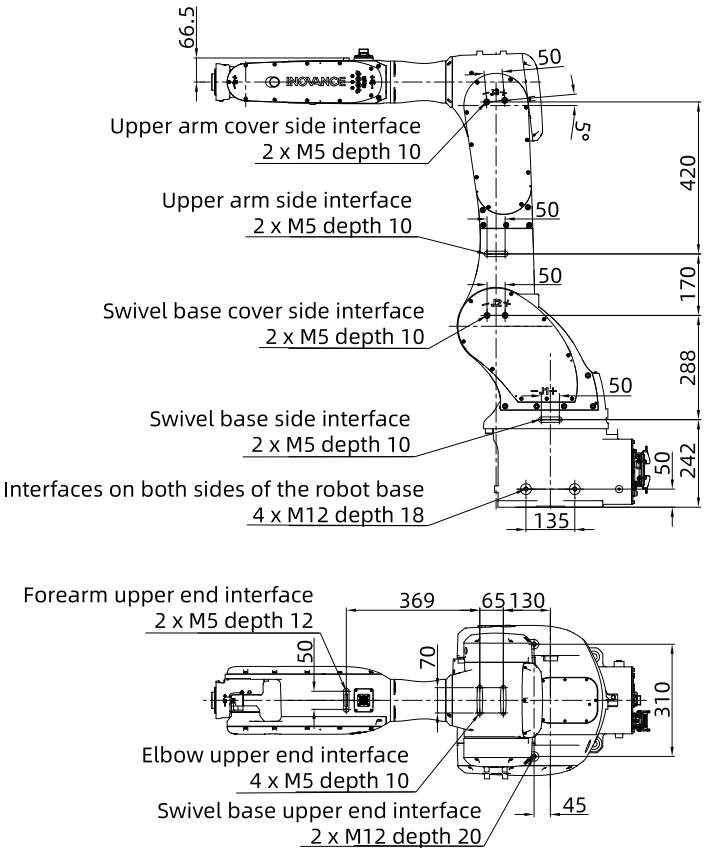


Figure 6-3 IR-R15H-145S5: Dimensions of the auxiliary accessory installation interfaces

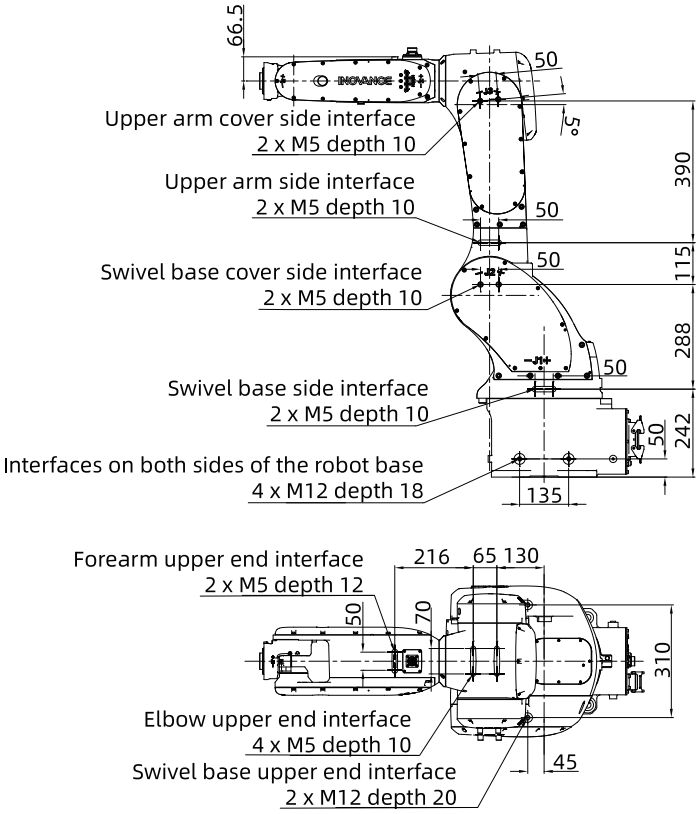


Figure 6-4 IR-R20H-120S5: Dimensions of the auxiliary accessory installation interfaces

6.5 Cable Connection

6.5.1 Connecting Power Cable and Signal Cable

Note

- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Always disconnect the power supply before wiring. Failure to comply will result in electric shock or system fault.
- Before wiring, disconnect the power supplies of all equipments. After disconnecting the power supply, wait for at least 10 minutes before further operations because residual voltage still exists in the internal capacitor even after power-off.
- Ensure that the safety input signals, such as the emergency stop switch and safety door switch are connected correctly before wiring. Otherwise, the safety protection will not work properly in emergency cases, causing serious injury or damage.
- Check that the equipment is grounded properly. Failure to comply may result in an electric shock.
- Follow the electrostatic discharge (ESD) procedure and wear an anti-static wrist strap to perform wiring. Failure to comply may result in damage to the equipment internal circuit.



- Connect the cables securely. Do not lay heavy objects on the cables, or bend or pull the cables forcibly. Failure to comply will result in cable damage, wire breaking, or poor contact, causing electric shock or system fault.
- Wiring cables must meet diameter and shielding requirements. The shielding layer of the shielded cable must be reliably grounded 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 there are no fallen screws and exposed cables inside the equipment.

Connecting 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 package to the corresponding terminals of the controller.
4. After connecting the power terminals in the accessory package, plug them into the power connector of the controller and check that the L/PE/N sequence of the cables is correct.

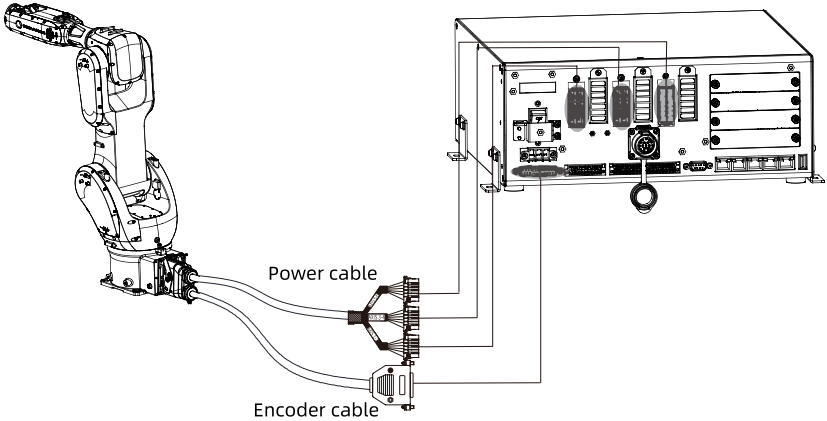
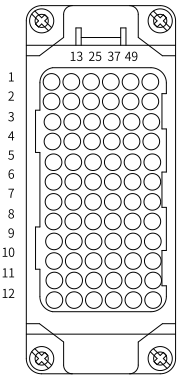


Figure 6-5 Connecting the power and encoder cables

6.5.2 Terminal Assignment of the Heavy-Duty Connector

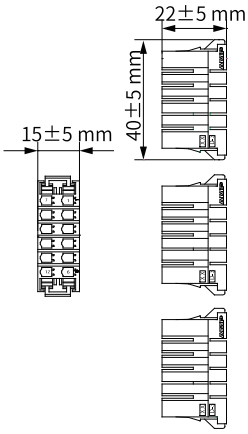
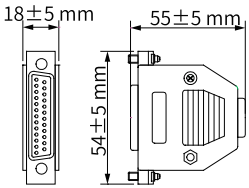
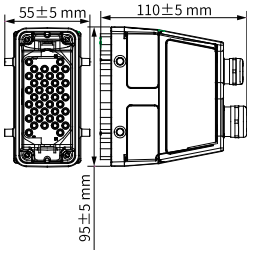
Table 6–1 Terminal assignment

Connector pin layout	Pin No.	Definition	Pin No.	Definition	Pin No.	Definition
	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	-	33	-	57	24V
	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	-	45	-	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

See the connector dimensions shown in the figure below when cutting a cable hole.

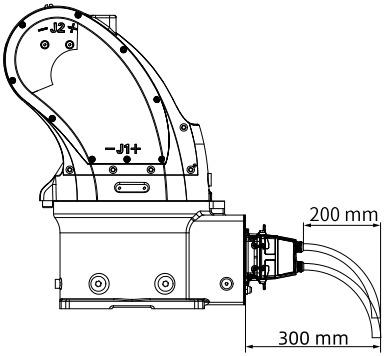
Table 6–2 Cable hole dimensions

Name	Power cable connector (controller side)	Encoder cable connector (controller side)	Heavy-duty connector (robot side)
Dimensions			
	40 m 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)

CAUTION

- 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 (200 mm).
- Do not bind the redundant power cables 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.

The reserved space for the manipulator cable (connector size+cable bending radius) is 300 mm, and the bending radius of the cable is approximately 200 mm, as shown in the following figure.



Cable-hole dimensions: The size of opening reserved on the casing or sheet metal for the robot connector to pass through, as shown in the following figure.

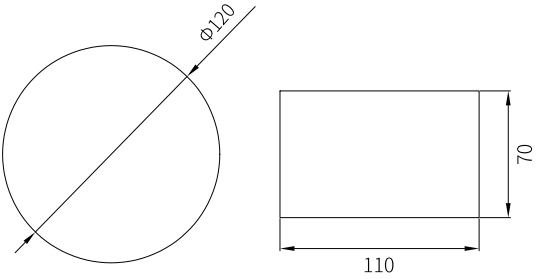


Figure 6-6 Cut-out dimensions (mm)

6.6 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.
- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.

Available cables are built in the robot body. The following cable describes the specifications of signal cables.

Rated voltage	Allowable current	Wires	Nominal sectional area	Remarks
30 VAC/VDC	0.5 A	24	25AWG	Signal cable



Current higher than 0.5 A is not allowed.

The specifications of the connector are described in the following table.

Cable	Code
26-pin I/O cable + aviation plug (180°, 2-m cable)	1504UP81
26-pin I/O cable + aviation plug (180°, without cable)	1504CU41

6.6.2 Tubing (Air Tube)

User tubing (air tube)

The following table describes the specifications of air ducts.

Maximum operating pressure	Quantity	Dimensions (outer diameter x inner diameter)
0.59 MPa (5.9 kgf/cm^2)	4	Φ6 mm x Φ4 mm

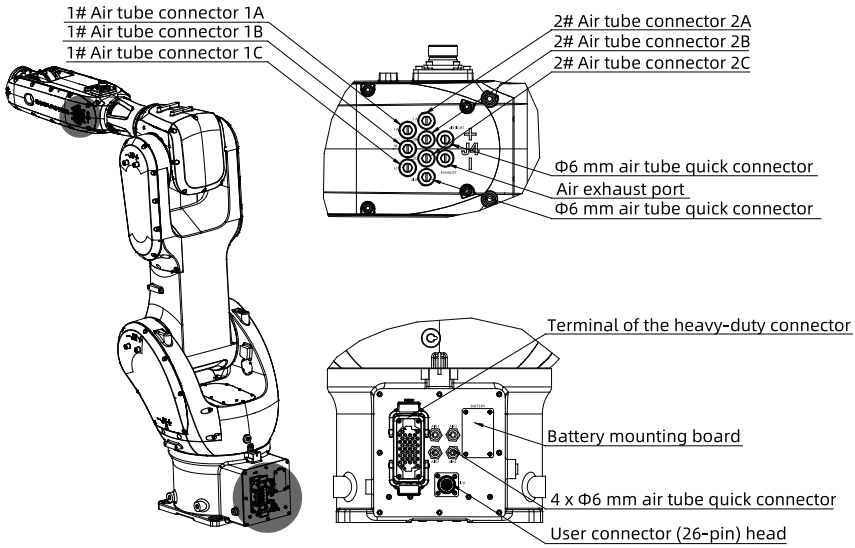


Figure 6-7 Standard wiring/tubing interfaces

Note

The standard model does not come with an Ethernet port, and the optional model comes with an Ethernet port.

Optional tubing (air tube)

Optional solenoid valves are available to support one Φ6 mm straight-through air supply, and conversion of up to one Φ8 mm input to six Φ6 mm outputs.

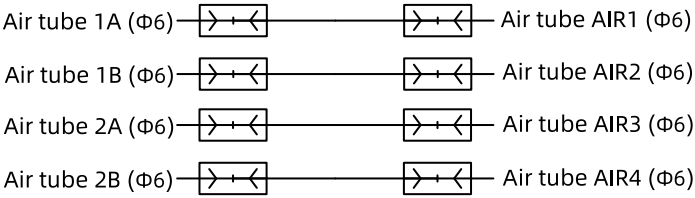


Figure 6-8 Standard air connection diagram

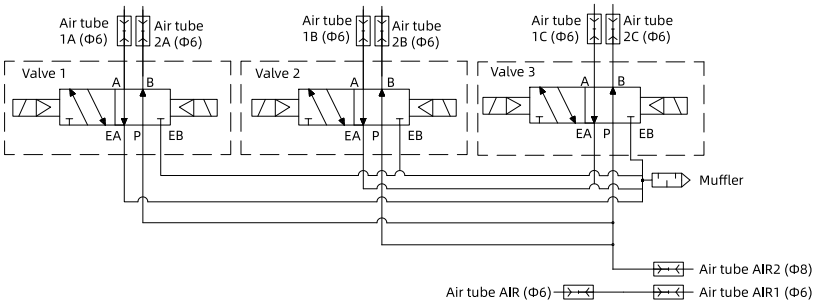


Figure 6-9 Optional solenoid valve air connection diagram

Table 6–3 Solenoid valve air connection

Interface on the base	Solenoid valve	Interface on the forearm
AIR1	-	AIR
AIR2	Solenoid valve 1	1 A
		2 A
	Solenoid valve 2	1B
		2B
	Solenoid valve 3	1C
		2C

6.6.3 Robot Aviation Connector Pins

I/O aviation connector

The robot provides a 26-pin aviation connector respectively on the base and the forearm top. The two connectors are connected by cables routed inside the robot body.

The connection between the two aviation connectors is described as follows:

- Pins 1 to 24 of the 26-pin aviation connector on the base are connected to pins 1 to 24 of the 26-pin aviation connector on the forearm top.
- if the optional solenoid valves are equipped, pins 18 to 24 of the 26-pin aviation connector on the base are dedicated to solenoid valve signals, and pins 1 to 17 are directly connected internally to the corresponding pins 1 to 17 of the 26-pin aviation connector on the forearm top.

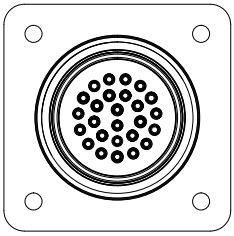


Figure 6-10 Distribution of I/O aviation connector pins

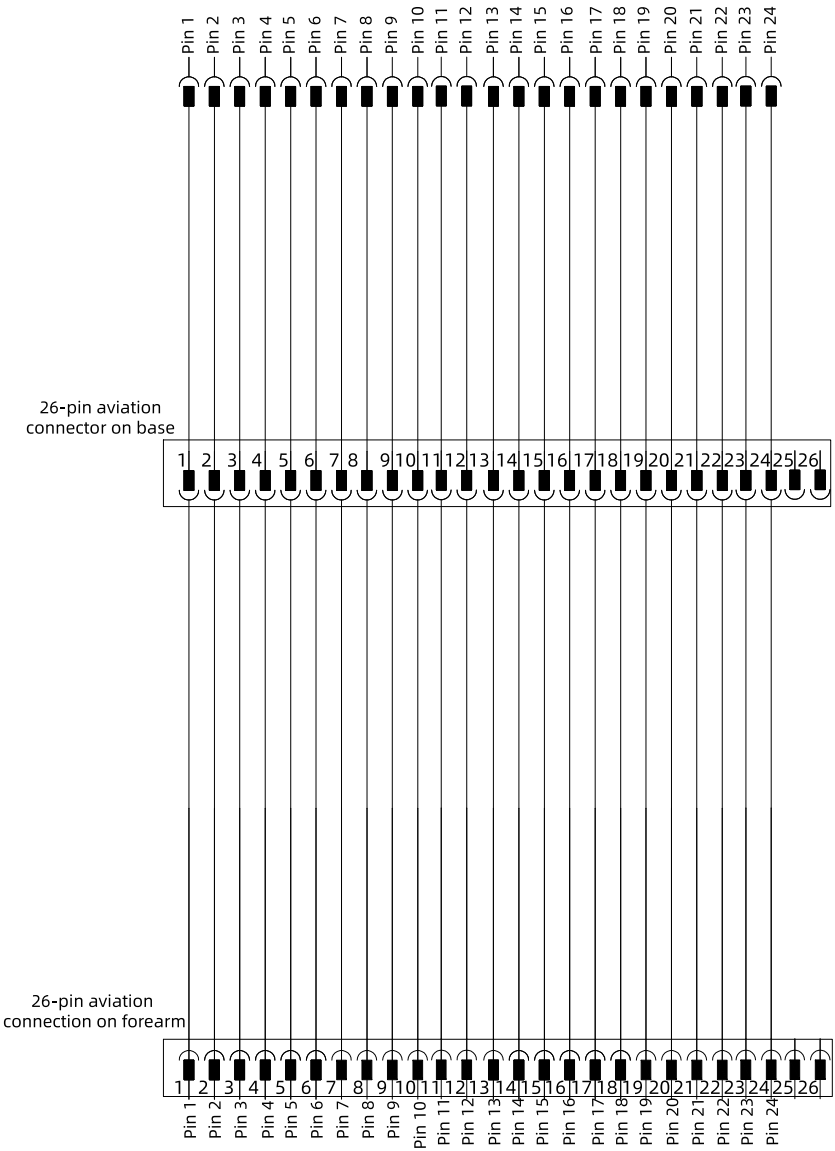


Figure 6-11 Standard I/O wiring

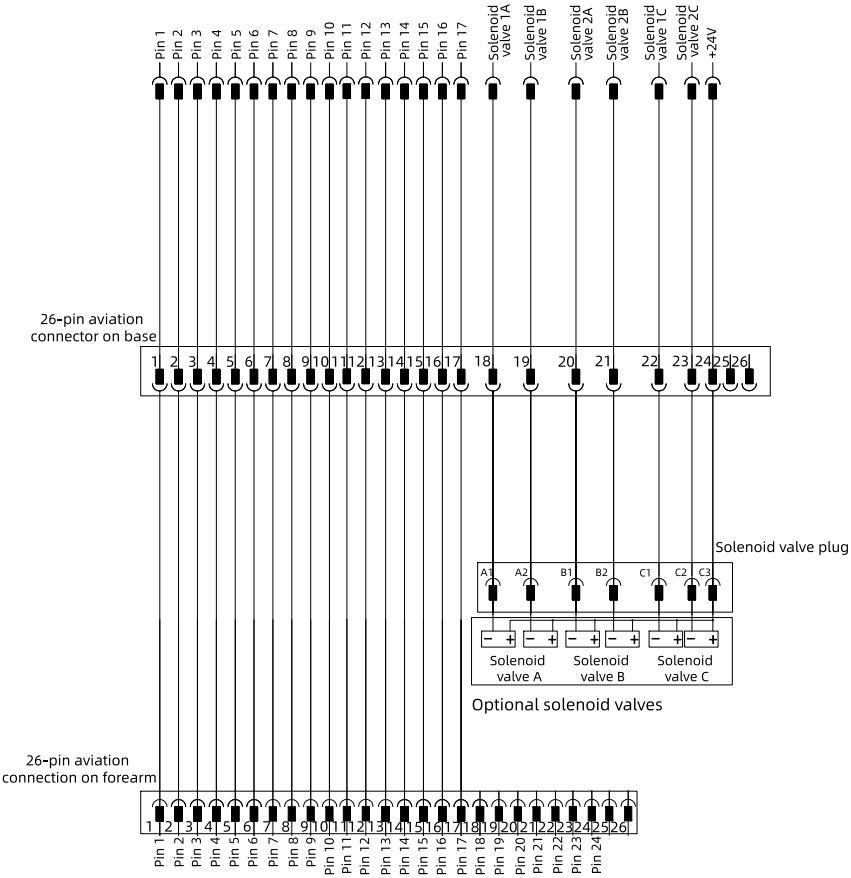


Figure 6-12 Wiring for solenoid valves

Optional Ethernet aviation connector

The Ethernet aviation connector is optional and can be mounted on the electrical installation plate of the robot base and on the robot forearm.

The following table describes the specifications of the Ethernet aviation connector.

Name	Parameter
Number of pins	8
Rated current (40°C)	0.2 A
Rated voltage	30 VAC/VDC
Cable type	CAT5e
Network cable specifications	0.05 mm^2 (30AWG)

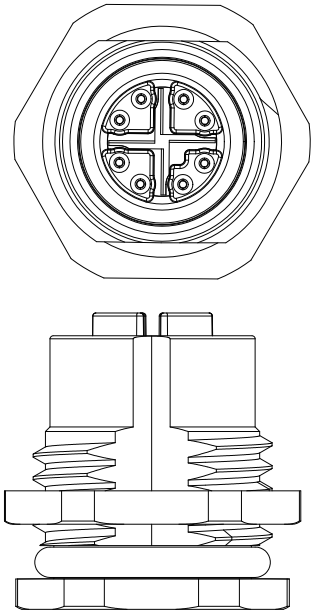


Figure 6-13 Ethernet aviation connector pins

6.6.4 Grounding Method

Purpose

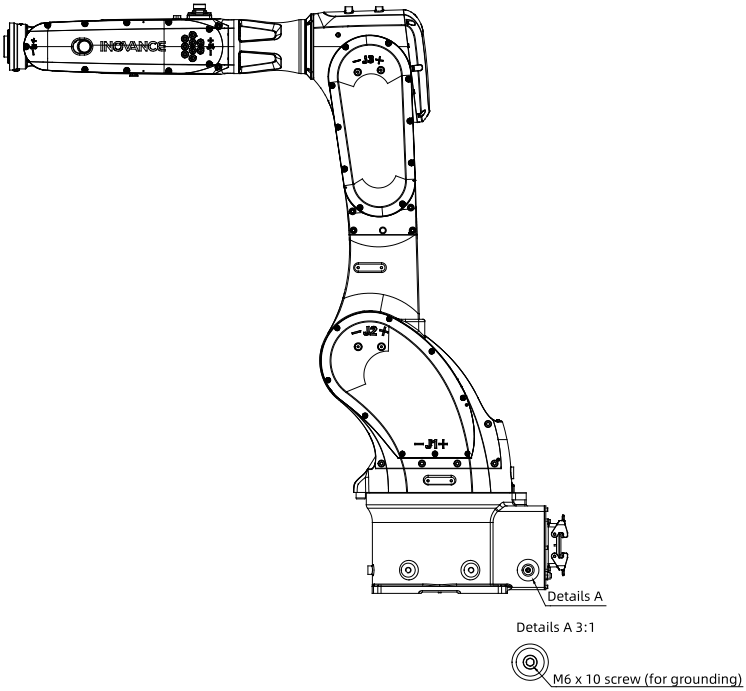
- Safety: To prevent electric shock hazards and ensure personnel safety.
- Functionality/Interference resistance: To prevent communication errors or servo alarms caused by external interference and electrical noise.

Material requirement

- Grounding cable: Two-color (yellow and green) insulated copper wire, with a cross-sectional area of ≥4 mm^2 or ≥12 AWG.
- Terminal: Ring terminal. The grounding cable must be securely crimped or welded to the terminal.

Installing the grounding cable

1. Inspect and clean the grounding hole on the robot body, ensuring it is free from rust and dirt.
2. Use the M6 x 10 screws to securely fasten the grounding terminal to the grounding hole on the robot body.
3. Connect the other end of the grounding cable securely to the factory's dedicated grounding electrode (grounding rod).


INOVANCE
J3
J2
J1
Details A
Details A 3:1
M6 x 10 screw (for grounding)

7 Motion Range

7.1 Method for Setting the Motion Range

CAUTION

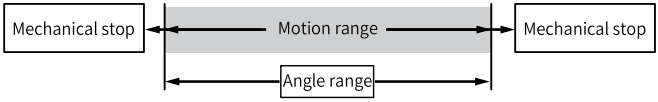
- To prevent premature wear of joint reducer bearings and gears due to insufficient oil film, avoid prolonged repetitive motion of joints within a small angular range of less than 10°.
- If the actual operating conditions require prolonged operation within an angle of less than 10°, it is recommended to cycle the mechanical joint once per hour, moving each joint more than 50° to ensure effective lubrication and extend service life.

Note

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

To improve layout efficiency and to take into account the maximum safe motion range of the robot, the following motion range setting methods are provided:

- Angle range (all joints)
- Mechanical stop (for J1 to J3)



7.2 Motion Range Setting by Angle Range

7.2.1 Description of Angle Range

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 joint.

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 a motion command, it checks whether the target position specified by the command is within the angle range before initiating the movement. 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

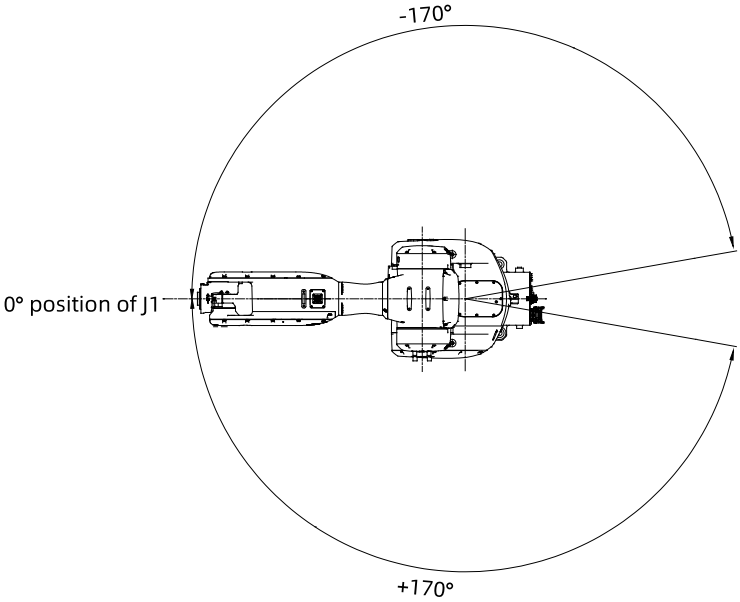


Figure 7-1 Maximum angle range of J1

7.2.3 Maximum Angle Range of J2

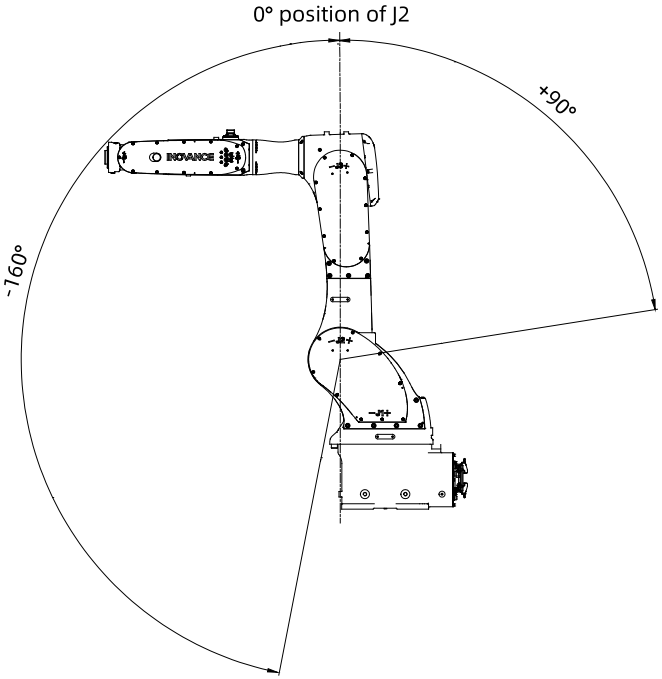


Figure 7-2 J2 motion range of IR-R15H-145S-INT

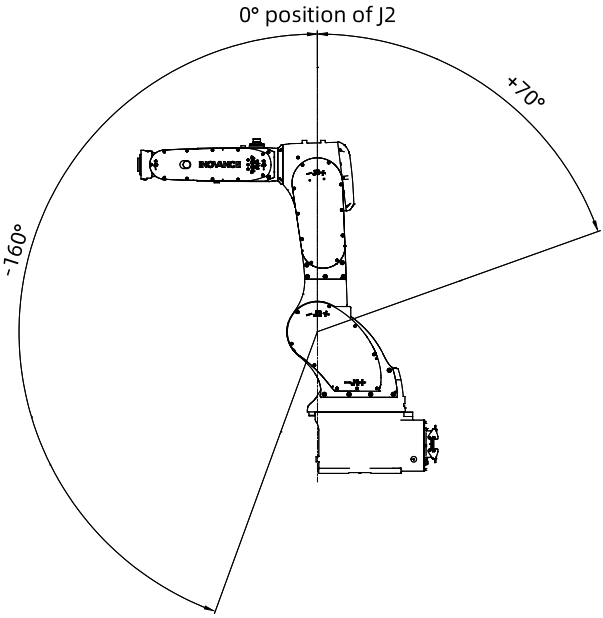


Figure 7-3 J2 motion range of IR-R20H-120S-INT

7.2.4 Maximum Angle Range of J3

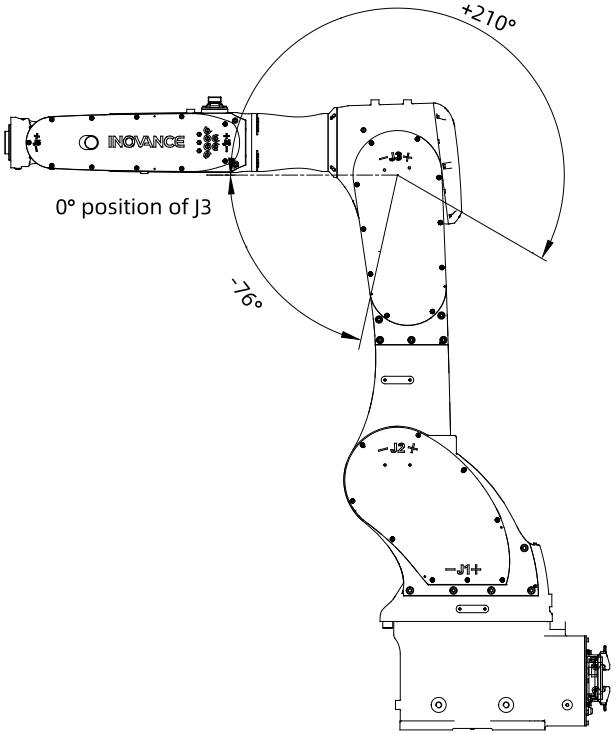


Figure 7-4 Maximum J3 angle range of IR-R15H-145S-INT

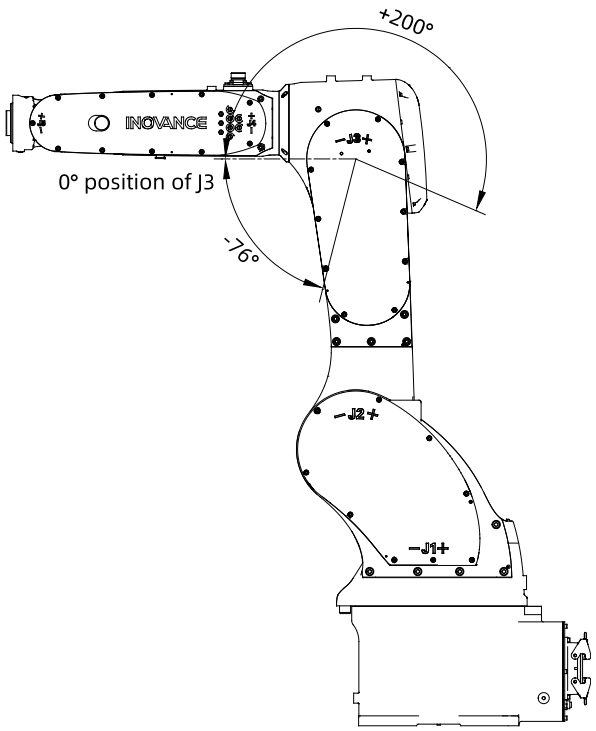


Figure 7-5 Maximum J3 angle range of IR-R20H-120S-INT

7.2.5 Maximum Angle Range of J4

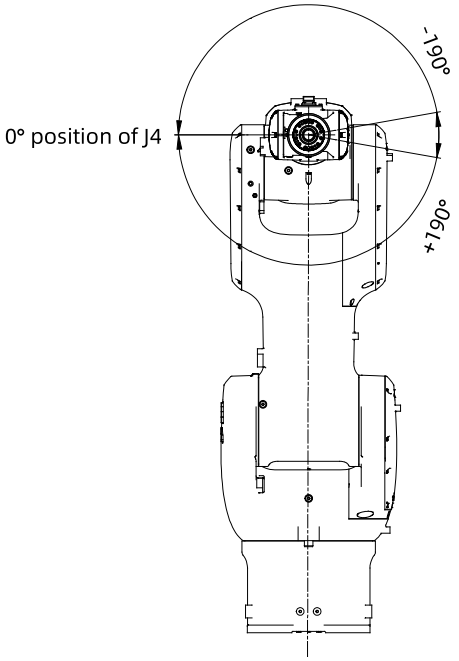


Figure 7-6 Maximum angle range of J4

7.2.6 Maximum Angle Range of J5

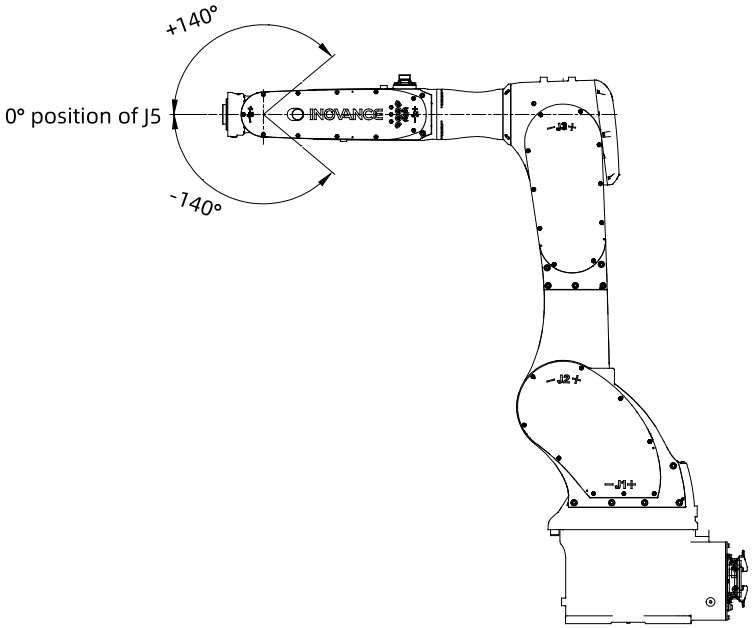


Figure 7-7 Maximum angle range of J5

7.2.7 Maximum Angle Range of J6

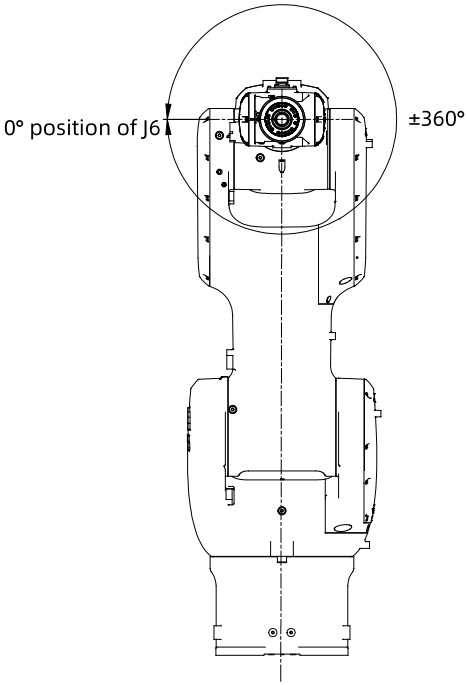


Figure 7-8 Maximum angle range of J6

7.3 Mechanical Limit Stops

As shown in the figure below, IR-R15H-145S-INT and IR-R20H-120S-INT models have mechanical stops pre-installed at joint 1, joint 2 and joint 3. The setting of the angle range cannot exceed the set angle range of the mechanical stops.

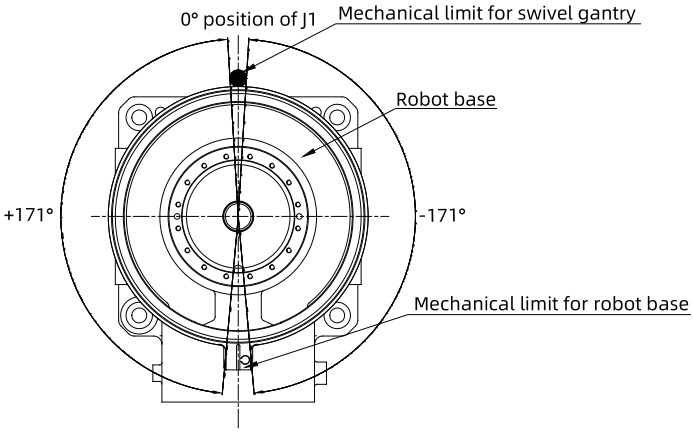


Figure 7-9 Mechanical limit stops for J1

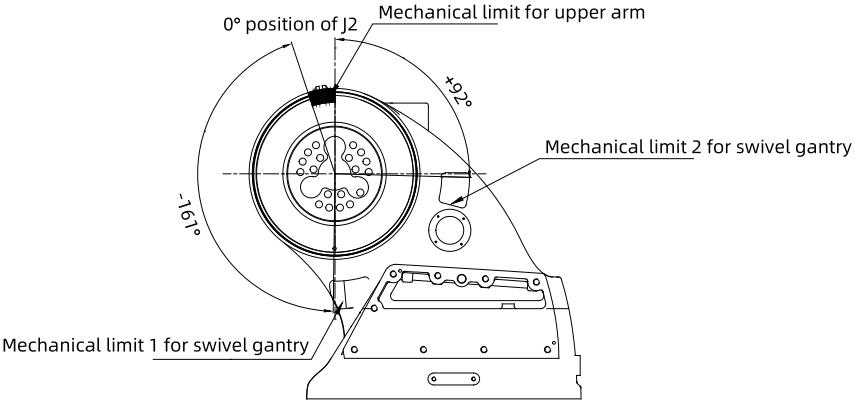


Figure 7-10 Mechanical limit stops for J2 of IR-R15H-145S-INT

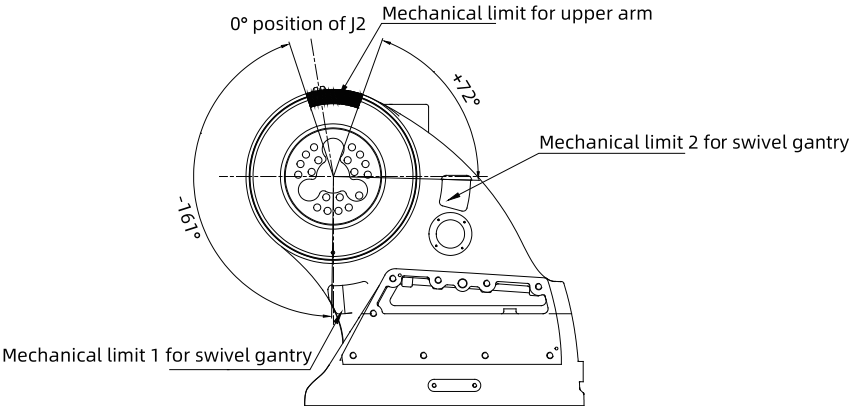


Figure 7-11 Mechanical limit stops for J2 of IR-R20H-120S-INT

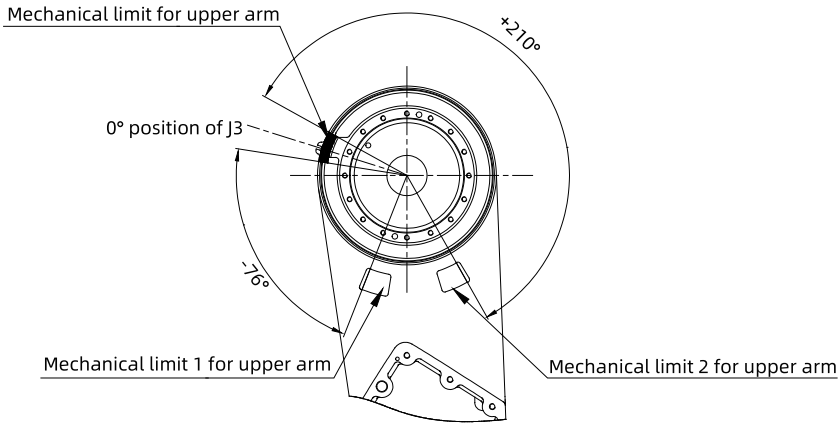


Figure 7-12 Mechanical limit stops for J3 of IR-R15H-145S-INT

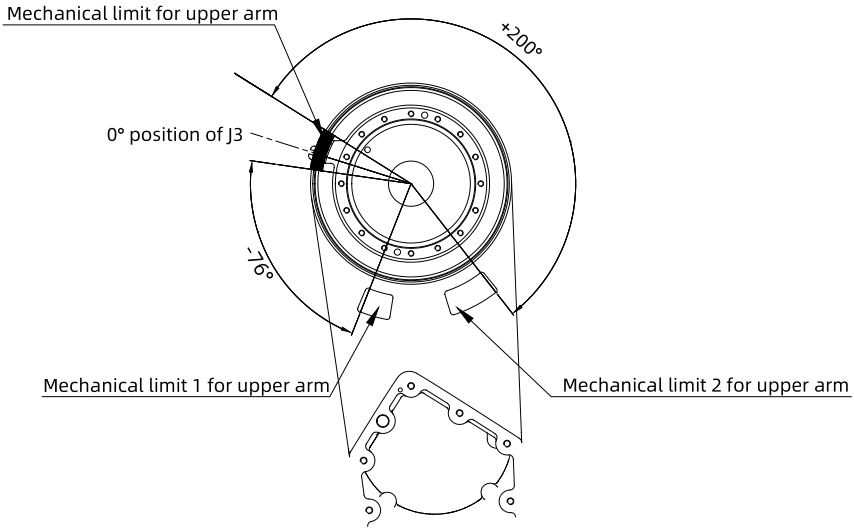


Figure 7-13 Mechanical limit stops for J3 of IR-R20H-120S-INT

8 Inspection and Maintenance

8.1 Maintenance Precautions

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



- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by professionals.
- Do not maintain the equipment after power-on. Failure to comply will result in an electric shock.
- Do not remove the parts not mentioned in this document. Do not maintain any part with a method different from that described in this document.
- 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 function will not work properly in emergency cases, causing serious injury or damage.



- Require for repair services according to the product warranty agreement.
- Perform daily and periodic inspection and maintenance for the equipment according to maintenance requirements and keep a maintenance record.
- 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 according to the replacement guide.
- Prevent foreign objects from entering the equipment and terminals during maintenance.
- Open the equipment cover only when 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 five stages: daily, monthly, quarterly, biannual, and annual. The inspection points are added every 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.

Inspection item	Inspection item					
	Daily inspection	Monthly inspection	Quarterly inspection	Biannual inspection	Annual inspection	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 Regular Inspection Items

In order to ensure the robot operates more safely and efficiently, regular inspections and maintenance are required. Based on the parts to be inspected and maintained, it can be categorized into daily inspection, weekly inspection, monthly inspection, biannual inspection, annual inspection, as well as inspections before and during shutdown.

1. Daily inspection and maintenance

Inspection item	Inspection point
Visual inspection	• Check all joint gaps, grease fitting 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.
Abnormal noise inspection	Check all transmission mechanisms for abnormal noise.
Joint transmission mechanism inspection	Check for unstable running and abnormal jittering of the transmission mechanisms.
Pipeline accessory inspection	Check whether the pipeline accessories are complete, worn and rusted.
Electrical component control inspection	Check whether the control buttons of all electrical components of the robot are normal.
Grease seepage inspection	Check for grease seepage at each joint. Wipe clean any grease seepage present.
Anti-rust inspection	Visually check for any water stains, contaminants, or rust spots.

2. Weekly inspection and maintenance

Inspection item	Inspection point
Brake inspection	Check whether the brake of each axis of the robot is effective.
Axis motion range inspection	• 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

Inspection item	Inspection point
Controller heat dissipation inspection	Check whether the rear controller fan is ventilated smoothly. It is recommended to replace or maintain the fan once a month.

4. Biannual inspection and maintenance

Inspection item	Inspection point
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 cables of the teach pendant for bending, corrosion and falling off.
Routine cleaning and maintenance	Check and, if necessary, apply anti-rust oil.

5. Annual inspection and maintenance

Inspection item	Inspection point
Controller DI/DO signals	Check whether the DI/DO signal response of the controller is normal.
Axis reducer	Check whether the lubrication for each axis reducer is normal and whether there is abnormal noise.
Electrical components cleanliness	Check the cleanliness of all electrical components. Under normal circumstances, remove dust for all electrical components annually.
Controller fan filter cotton	Check the cleanliness of the controller fan filter cotton, and replace the filter cotton annually under normal circumstances.
Synchronous belt	Check the synchronous belt for any signs of abnormal wear.
Routine cleaning and maintenance	Check and, if necessary, apply anti-rust oil.

6. Inspection and maintenance every 1.5 years

Inspection item	Inspection point
Battery inspection	Check the battery voltage. If the battery voltage is below 3.1 V or the software issues a battery level alarm, replace the battery promptly.

7. Inspection and maintenance every 2 years

Inspection item	Inspection point
In-depth inspection and maintenance	Perform a comprehensive inspection of concealed areas and perform professional anti-rust treatment on key components.

8. Inspection and maintenance before and during shutdown

Inspection item	Inspection point
Long-term shutdown maintenance	Perform comprehensive cleaning, anti-rust, and preservation treatments.



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 Grease Seepage Inspection

8.4.1 Daily Inspection

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

Inspection items	Content
Grease seepage inspection	Check for grease seepage at each joint. Wipe clean any grease seepage present.

8.4.2 Grease Seepage Inspection Points

- Insert a dust-free cloth or scouring pad into the gap of each joint. Check for any lubricating grease seepage at each joint. Wipe clean any grease seepage present.
- 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 the 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 you observe excessive grease seepage, contact Inovance technical support for assistance.

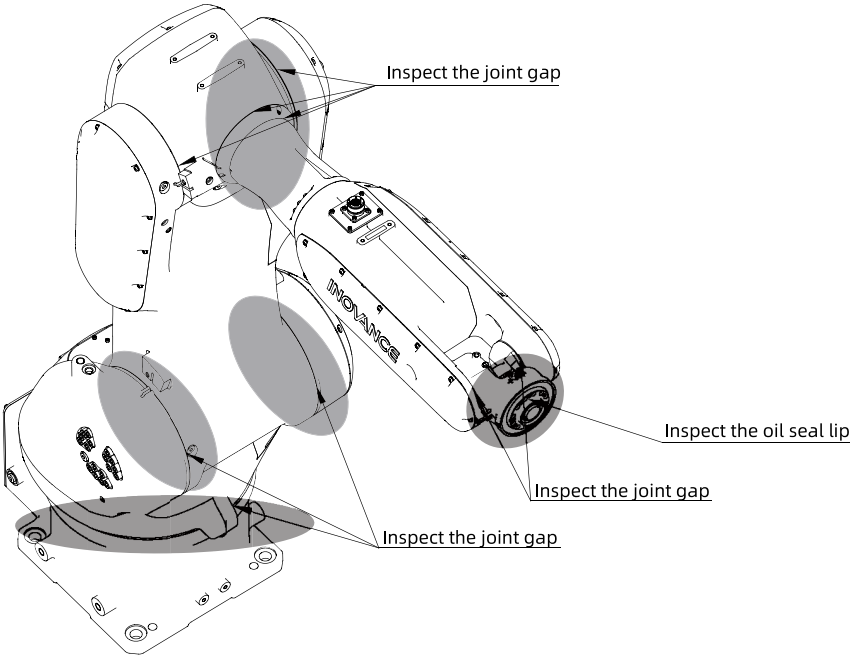


Figure 8-1 Grease seepage inspection points

CAUTION

- When opening the grease fitting port, lubricating grease may be sprayed out at high temperature. Prepare plastic bags in advance and lay them under the grease drain port.
- Wear heat-resistant gloves, protective goggles, masks, and protective clothing as needed.
- If grease leakage persists after frequent wiping, see *"8.4.3 Lubricating Grease Leakage and Solution" on page 94* for handling.
- When reinstalling the screw plug into the grease fitting port, check whether the tightening torque meets the standard torque value (1.8 N·m for M5 screw plug and 7 N·m for M10 screw plug).

8.4.3 Lubricating Grease Leakage and Solution

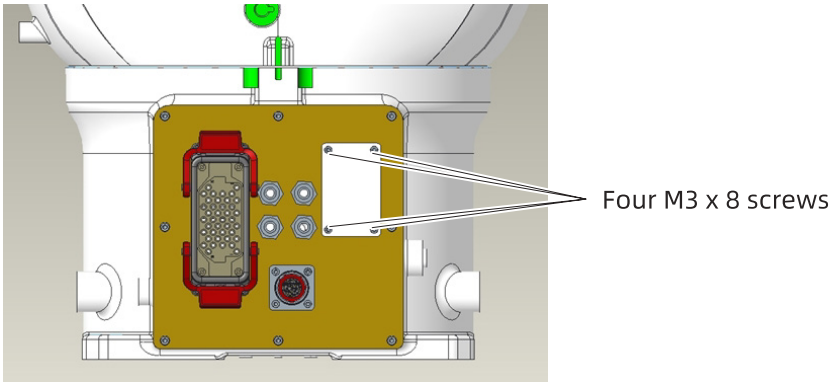
Symptom	Problem description	Cause analysis	Solution
Grease seepage or leakage at gearbox	Grease leakage at each joint	The robot has been used for an extended period, causing aging of sealing rubber parts or O-rings.	Replace the sealing rubber parts or O-rings.
		Improper disassembly/ reassembly operations may damage sealing rubber parts or O-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.
		LT518 sealant on motor or reducer mounting surfaces becomes invalid.	Re-apply the LT518 sealant.
		The screw plug and its matching composite sealing washer at the grease fitting and drain ports of each joint are defective.	Replace the screw plugs with new ones.
		Cracks on castings or oil chamber damage occurs due to collisions or other impacts.	Replace with new parts.

8.5 Replacing Battery (Lithium Battery)

WARNING

- Do not maintain the equipment after power-on. Failure to comply will result in an electric shock.
- When disposing the battery, consult with the professional disposal services or comply with the local regulation.
- Be sure to use lithium batteries correctly, the wrong way of use may lead to lithium battery heat, leakage, explosion or even fire, resulting in serious damage to personal and property safety.
  - Do not charge the lithium battery.
  - Do not pressurize or deform the lithium battery.
  - Do not disassemble the lithium battery.
  - Do not short-circuit or misconnect the lithium battery.
  - Do not heat the lithium battery.
  - Do not put the lithium battery into fire.
  - Do not solder the battery terminals.
  - Do not force discharge the lithium battery.

1. Remove the four M3 x 8 screws fixing the back cover, and then remove the back cover.



2. Remove the battery to be replaced.

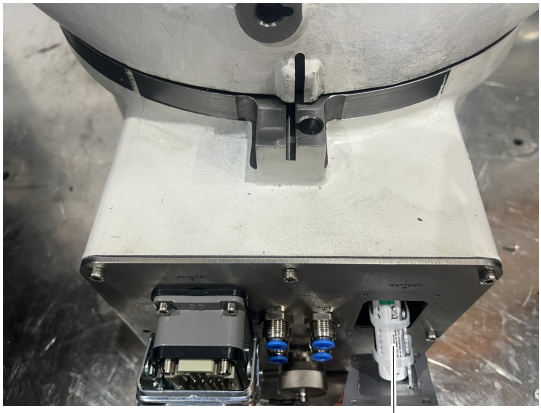
   The detailed replacement procedure is as follows:

   a. Cut the binding strap securing the battery to the battery mounting board.

   b. Tie the new battery to the battery mounting board with a binding strap.

   c. Connect the new battery to the empty white 2-pin cable end connector.

   d. Remove the old battery.



Note

Failure to comply with the procedure described above may cause loss of zero points. For details, see *"8.6.1 Overview" on page 96*.

8.6 Zero Point Calibration

8.6.1 Overview

The zero point is the reference point for the operation of the robot. After parts (motors, reducer, synchronous belt, and cables etc.) have been replaced, the robot cannot position properly because a gap exists between the zero point stored in each motor and its corresponding zero point stored in the controller. Therefore, after the parts are replaced, zero point calibration is required.

Note

After zero point calibration, the absolute accuracy of the robot may deviate from the default absolute accuracy at delivery.

WARNING

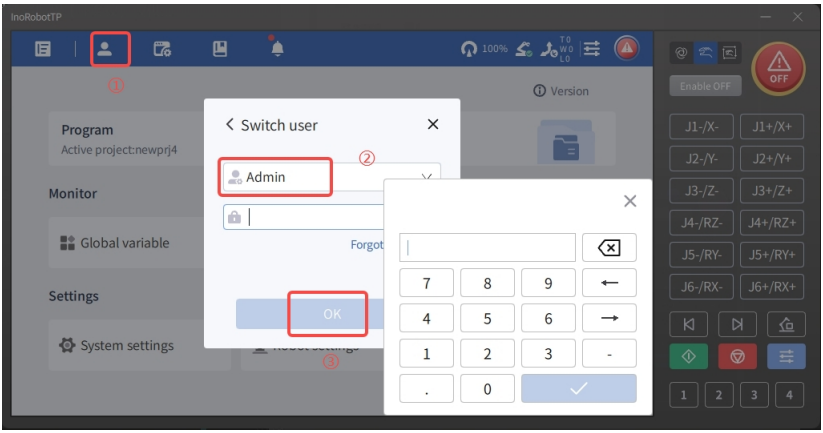
- Install a safety fence for the system to prevent people from entering the motion range of the system. Failure to comply may result in severe safety issues.
- Before operation, ensure that there is no person within the safety fence. Do not enter the motion range during system running. Failure to comply 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 Zero Point Calibration Procedure

Both the PC-based teach pendant software (InoRobotTP) and the hand-held teach pendant provide an operation interface for zero point calibration. The following describes the zero point calibration operations on the InoRobotTP software. The operations on the hand-held teach pendant are similar.

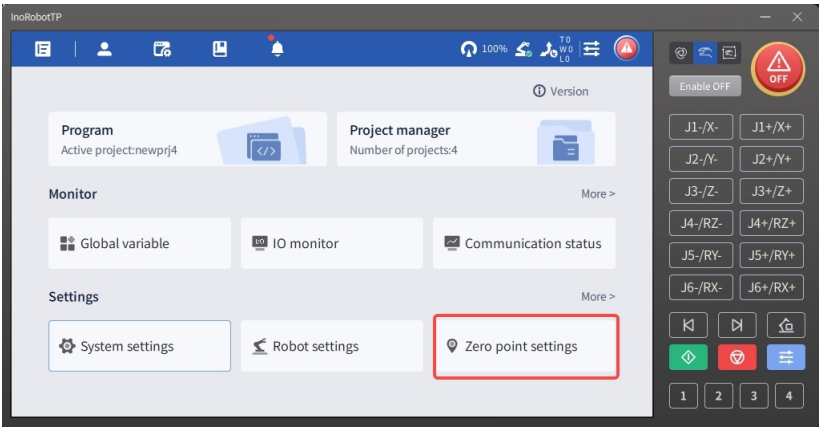
When calibrating the zero point using the teach pendant, calibrate J3 and J4 at the same time.

1. Log in to the user account.
   a. Click the "User" shortcut key on the main interface of the teach pendant to open the "User mode" interface.
   b. Enter the password in the password input box and click the "OK" button.

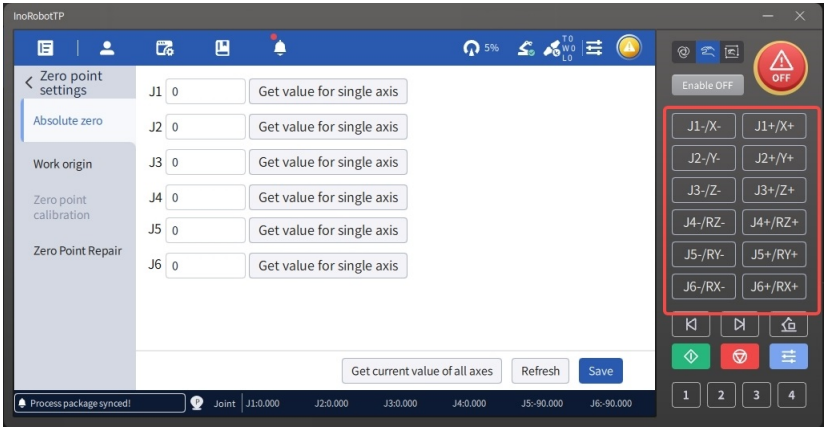


2. Go to the absolute zero setting interface.

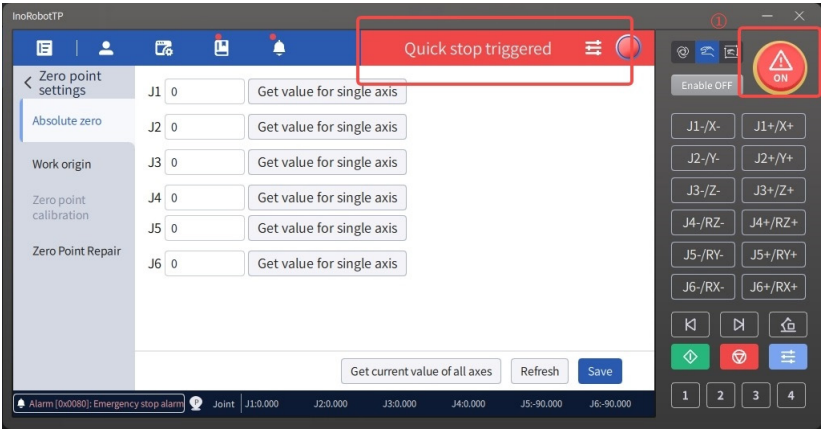
Choose "Settings" > "Zero point settings" > "Absolute zero" on the InoRobotTP main interface.



3. Move each joint of the robot to the zero point.
   - You can use the hand-held teach pendant or the InoRobotTP software to move the robot to the position near the zero point. See the "IR-TP200 Series Industrial Robot Teach Pendant User guide".
   - Also, you can manually push the robot to the position near the zero point when the robot is not enabled.



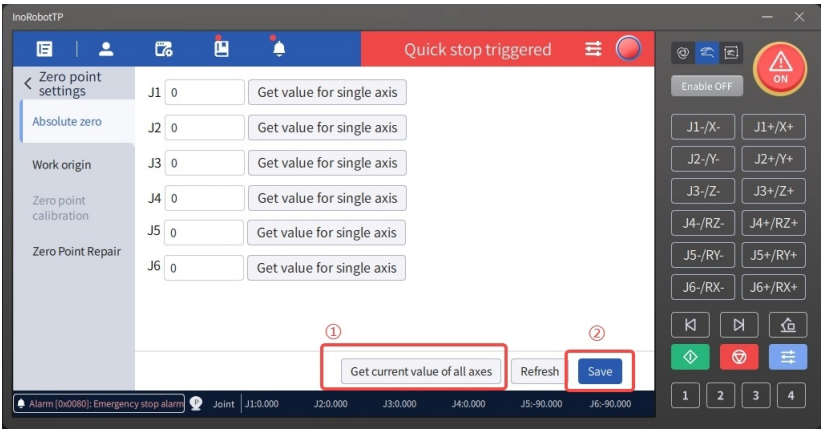
4. Switch to the emergency stop state.
   a. Click the virtual emergency stop button on the InoRobotTP software or press the red emergency stop button on the hand-held teach pendant.
   b. The status indicator on the upper right corner of the InoRobotTP (or the hand-held teach pendant) shows the "Emergency stop" state (in red).



5. Obtain and save the zero point information.

   a. When the robot is at the zero point position, click the "Get current values for all axes" button to obtain the encoder pulse counts.

   b. Click the "Save" button to complete the zero point calibration.



8.7 Options

Options	Description	Specification	Code
I/O cable	Used for connection between IR-R15H & R20H series 6-axis robot manipulator and the controller.	7 m	1504UP81
I/O male aviation connector (180°)	Used for wiring of the aviation connector on the upper end of the forearm in IR-R15H and R20H series 6-axis robots.	26-Pin, 2 m	
I/O cable	Used for connection between IR-R15H & R20H series 6-axis robot manipulator and the controller.	7 m	1504CU41
I/O male aviation connector (180°)	Used for wiring of the aviation connector on the upper end of the forearm in IR-R15H and R20H series 6-axis robots.	26-Pin	
Ethernet cable	Used for network connection of the IR-R15H&R20H series 6-axis robots (optional Ethernet function for manipulator).	CAT5e	1504NN47
Teach pendant	Equipped for IRCB501 series controller	Standard 5-meter cable teach pendant	01640055
		Standard 10-meter cable teach pendant	01640056
		Standard 20-meter cable teach pendant	01640057
		Standard 30-meter cable teach pendant	01640058
Teach pendant extension cable	Cable set - IR-TP200-L5 - teach pendant extension cable	5 m	1504R444
		15 m	1504R445
		25 m	1504R446
Controller aviation connector for teach pendant	Cable set - IR-TP200 series teach pendant to controller aviation connector for IRTP80 teach pendant - 0.2M (RoHS)	0.2 m	1504R443
Battery assembly	Used for the manipulator encoder of IR-R15H&R20H series 6-axis robot.	-	98051002

9 Certification and Standard Compliance

Third-party certification

Certification mark	Certification	Description	Directive
	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 is certified by SGS-TUV Saar for functional safety.	
	cSGSus	This product is certified by SGS North America of Nationally Recognized Test Laboratory (NRTL).	• 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 Federal Communications Commission (FCC) EMC testing and carries the FCC mark.	-
	KCs	This product is certified by Korea Occupational Safety and Health Agency (KOSHA) in terms of special equipment, labor protection supplies, and guard devices and carries the KCs mark.	Refer to the certifications for the certified models.

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 robots have been certified by the following directives and meet basic requirements of the CE-MD, CE-LVD, CE-EMC, and RoHS directives.

Machinery Directive (MD)	2006/42/EC
Low Voltage Directive (LVD)	2014/35/EU
Electromagnetic Compatibility (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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Shenzhen Inovance Technology Co., Ltd.

www.inovance.com

Add.: Inovance Headquarters Tower, High-tech Industrial Park,
Guanlan Street, Longhua New District,
Shenzhen 518000, P.R. China
Tel: (0755) 2979 9595 Fax: (0755) 2961 9897

Suzhou Inovance Technology Co., Ltd.

www.inovance.com

Add.: No. 52, Tian E Dang Road, Wuzhong District, 215104,
Suzhou City, Jiangsu Province, P.R. China
Tel: (0512) 6637 6666 Fax: (0512) 6285 6720