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CRP-RH Robot Instruction Manual

14/18/20 Series

Robot Instruction Manual

---Version 1.0

CRP ROBOTICS
www.troysupply.com

CRP-WJ2019030801

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Preface

1. Before using the RH Series robot, be sure to read the company's system manual carefully and use the robot based on the understanding of the content.
2. This manual does not guarantee the use with other company's system. At the same time, we will not be liable for accidents, damages and/or problems related to industrial property rights that may result from the use of such systems.
3. The company solemnly recommends that all personnel involved in robot operation, teaching, maintenance, repair, and inspection must learn the operating instructions of the company's system in advance.
4. The company reserves the right to change, revise or update this manual without prior notice.
5. It is illegal to reprint or copy all or part of this manual without the prior written permission of the company.
6. Please store this manual carefully to ensure that this manual reaches the end user. If the robot needs to be reinstalled, moved to a different location, or sold to another user, be sure to attach this manual. In case of loss or damage about this manual, please contact company agent or technician.
7. All parameter specifications and designs may be modified at any time without prior notice if it doesn't affect the use of the robot.
8. We attempt to describe as many situations as possible in this manual. However, for those situations that are not necessary and impossible, we have not described them because of various possibilities. Therefore, for those cases that are not specifically described in this manual, it can be considered as "impossible".
9. In the process of writing this book, omissions and errors is inevitably. If there are errors or incomprehensible during the reading process, please feel free to contact us and correct them.

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Part Ⅰ Robot body installation and connection

1. Preface

This manual describes the installation and connection methods of our RH series robots.

Please read and fully understand the contents of this manual and the safety manual before proceeding with any operation, and please strictly abide by all safety regulations. This manual only describes the installation and connection of the robot arm. For operating, programming of the robot, please refer to other related manuals.

It is emphasized here that you should not do anything before you fully understand the entire contents of this book. The company will not be liable for any accident or damage caused by only operating in accordance with a part of this manual.

Mark

In this manual, the contents of the following symbols should be given special attention.

To ensure proper and safe operation of the robot, to prevent personal injury and property damage, please observe the safety information indicated in the box symbol below.

WARNING

Failure to follow this symbol may result in personal injury or death.

CAUTION

Failure to follow this symbol may result in personal injury and/or mechanical damage.

[ATTENTION]

Indicates cautionary information about robot specifications, operation, and maintenance.

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2. Precautions

2.1 Precautions for transporting, installation and storage

When transporting the company's robot to its installation location, the following precautions must be strictly observed for handling and installation.

- When transporting a robot using a crane or forklift, it is absolutely impossible to manually support the robot body. Never carry on the robot or under the lifted robot during transport.
- Be sure to disconnect the controller power and main power before starting the installation. Set an 'installing' eye-catching sign, lock or hang the external power switch to prevent the operator or others from accidentally turning on the power to avoid accidents such as unpredictable electric shock.
- When starting the robot, be sure to turn on the motor power after confirming that the installation status is normal, etc, and adjust the arm of the robot to the specified posture. Be careful not to approach the arm and squeeze it.

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CAUTION

- Because the robot body is made up of precision parts, it is important to avoid excessive shock and vibration of the robot during transporting.
- When transporting the robot with a crane or a forklift, remove obstacles before to ensure safe transportation to the installation position.
- When transporting and storing the robot,
  Keep the ambient temperature within the range of minus 10 ° C -60 ° C.
  Maintain relative humidity between 35% and 85% RH (no condensation).
  Avoid excessive vibration and shock.

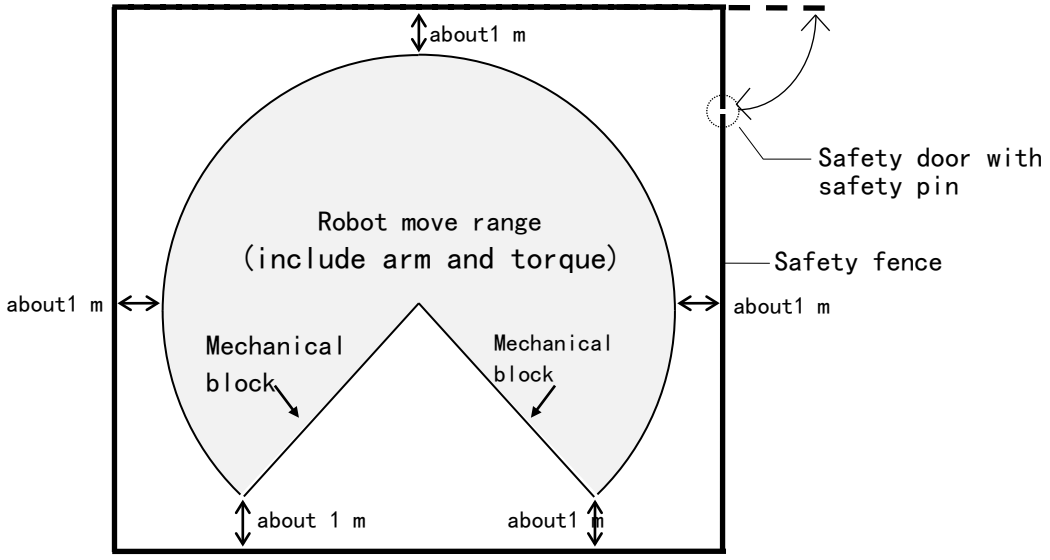
2.2 Robot arm installation environment

Please install the robot arm in a place that meets the following conditions.

- When installing on the ground, please ensure that the level of the ground is within ±5° .
- Ensure that the floor and the mount are sufficiently rigid.
- Ensure flatness to avoid extra force on the base of the robot. (If the flatness is not achieved, use a pad to adjust the flatness.)
- The working environment temperature must be between 0 ° C and 45 ° C. (Because of low temperature start-up, grease and gear oil are too viscous, and there will be abnormal deviation or overload. In this case, please perform low-speed (about half of the normal starting speed) warm-up operation (5-10 minutes).
- The relative humidity must be between 35% and 85 % RH without condensation.
- Ensure that the installation location is rarely exposed to dust, smoke and water.
- Ensure that there are no flammable, corrosive liquids or gases in the installation location.
- Ensure that the installation location is not affected by excessive vibration. (0.5G or less)
- Ensure that the installation location is minimal electromagnetic interference.

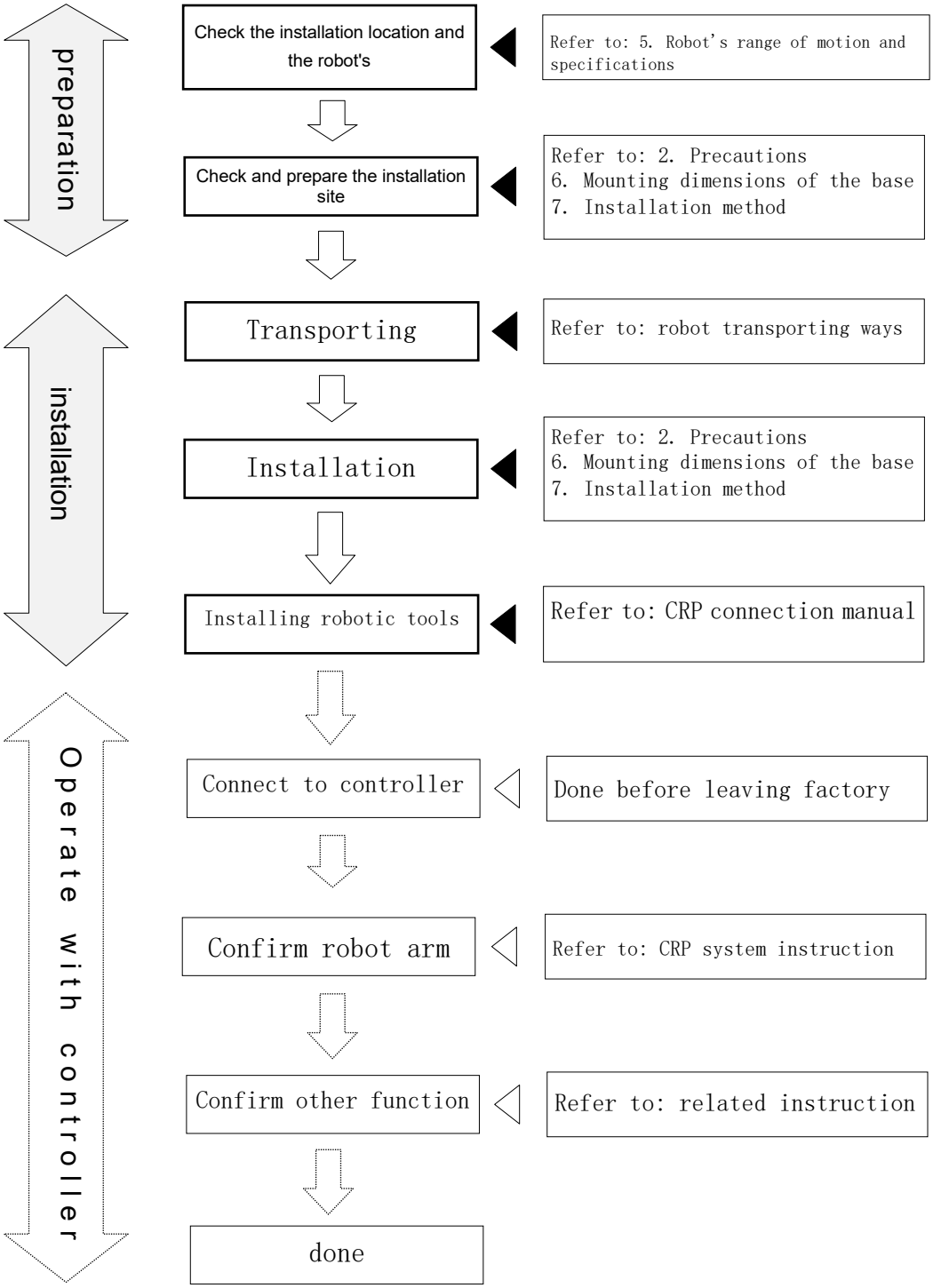
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- Make sure there is enough space for robot movement in the installation location.
- Set a safety fence around the robot to ensure that the robot's maximum movement space, even if the hand and torch are attached to the arm, will not interfere with the surrounding machines.
- Set up safety door with a safety pin at the safety fence (if possible, set up only one safety door and go in and out the safety fence).



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3. Robot installation and connection workflow



This flowchart only describes the robot arm section. For the robot system section, please refer to the CRP system manual.

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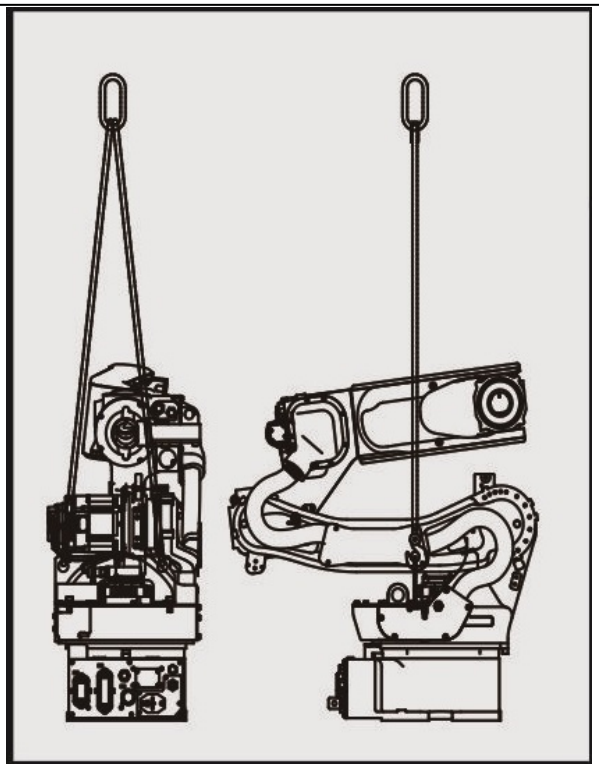
4. Transporting of the robot

CAUTION

When lifting the robot, be careful that the robot will tilt forward/backward depending on the attitude of the robot and the mounting state of the option. If the robot is lifted while tilting, any impact will cause the robot to shake and possibly damage the surrounding objects. Remove the lifting ring attached to the robot after handling.

WARNING

When transporting the robot, the weight of the robot must be considered. For example, the RH14 robot body is about 170kg. If the machine is loaded, be sure to calculate the weight of the load. At the same time, the load capacity of the sling or pallet must be within the safe range.



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Figure 4.1 transporting posture of the robot

4.1Transporting the robot with car

Before the transportation, the following preparations must be made:

（1） The robot must be gathered to the carrying posture (refer to Figure 4.1).

（2） Lock the loop of the waist of the robot.

（3） Using the sling or the wire rope that meets the robot transporting requirements and pass through the sling.

（4） Place a cushioning material on the place where the sling is in contact with the robot body.

（5） It must be slow and stable to prevent the robot from shaking during the transporting.

4.2 Transporting robot with forklift

When using a forklift to transport the robot, it is necessary to use a pallet that can withstand the weight of the robot. At the same time, the robot must be fixed to the transport pallet with M16 screws to prevent the robot from dumping and injuring people during transportation.

Before the transportation, the following preparations must be made:

(1) The robot must be gathered to the carrying posture (refer to Figure 4.1).

(2) Use a pallet that can withstand the weight of the robot.

(3) Fix the robot with M16 bolts in the middle of the pallet. Do not place the robot on the edge of the pallet.

(4) When transporting, it must be slow and stable to prevent the robot from shaking during transporting.

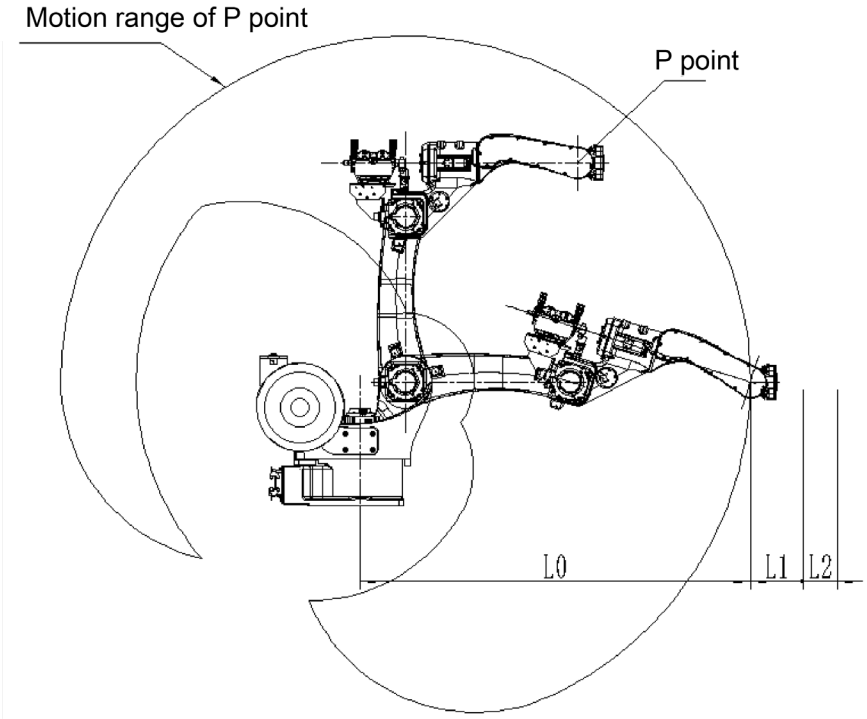
WARNING

Safety must be ensured if the robot is transported in other ways.

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5. Robot motion range and specification

5.1 The position of the safety fence is determined by the range of motion



If the motion range of point P in the figure below is taken as the range of motion of the robot, then:

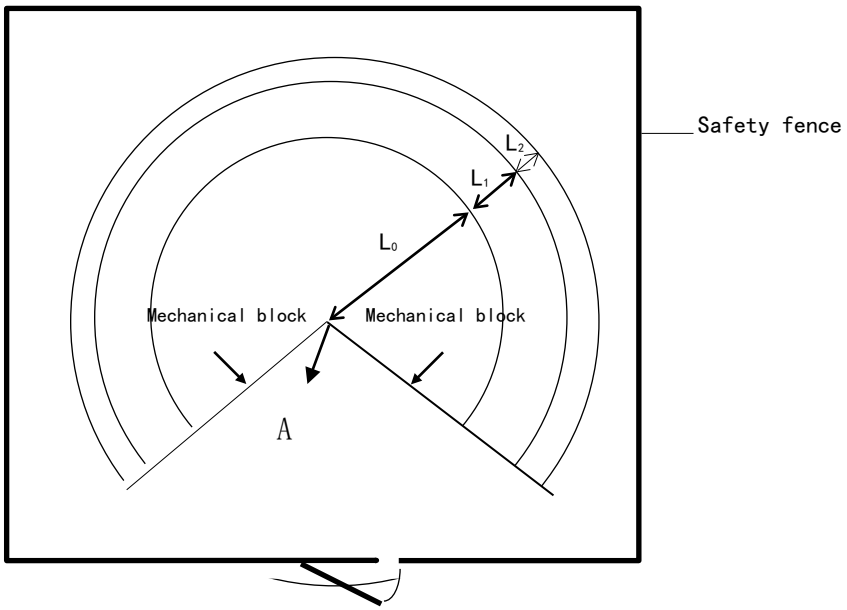
L0 : Robot motion range(refer to 4.2 robot motion range and specification)

L1 : Total length of wrist flange, tool and working piece

L2 : Safety space

The size of the safety fence should be greater than L0+L1+L2 from the center of the arm (A point).

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5.2 Robot motion range and specification

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5.2.1 RH14 model

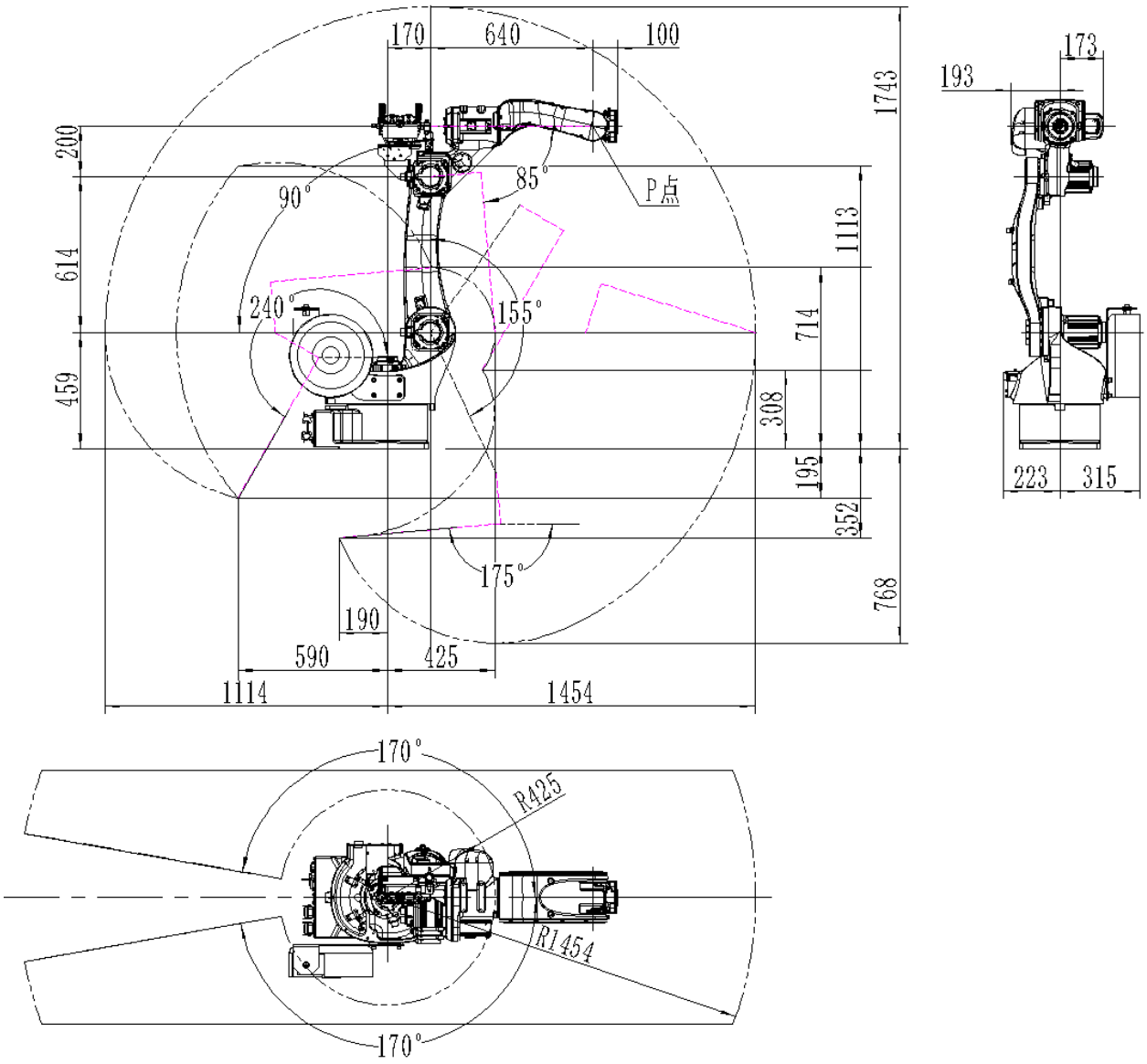


Figure 5.2.1 CRP-RH14-10-W

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Table 5.2.1 CRP-RH14-10-W

<table>
<tr><td colspan="5">CRP-RH14-10-W</td></tr>
<tr><td>Arm form</td><td colspan="3">Vertical multiple joints</td><td rowspan="12">※ measuring condition
• The robot must be firmly fixed to a flat surface.
• Measuring at the distance joint1(J1) Rotation center 2900 mm.
• Noise level changes according to conditions.</td></tr>
<tr><td>Degree of Freedom</td><td colspan="3">6</td></tr>
<tr><td rowspan="7">Motion range and max speed</td><td>J</td><td>Motion range</td><td>Max speed</td></tr>
<tr><td>1</td><td>±170°</td><td>169 °/s</td></tr>
<tr><td>2</td><td>0° - -175°</td><td>169 °/s</td></tr>
<tr><td>3</td><td>+80° - -150°</td><td>169 °/s</td></tr>
<tr><td>4</td><td>±190°</td><td>280 °/s</td></tr>
<tr><td>5</td><td>-105° - -130°</td><td>240 °/s</td></tr>
<tr><td>6</td><td>±210°</td><td>520 °/s</td></tr>
<tr><td>Max payload</td><td colspan="3">10 kg</td></tr>
<tr><td rowspan="4">Wrist payload</td><td>J</td><td>Moment of force</td><td>moment of inertia</td></tr>
<tr><td>4</td><td>10.0 N·m</td><td>0.25 kg·m^2</td></tr>
<tr><td>5</td><td>10.0 N·m</td><td>0.25 kg·m^2</td></tr>
<tr><td>6</td><td>3 N·m</td><td>0.05 kg·m^2</td></tr>
<tr><td>Repeated positioning accuracy</td><td colspan="3">±0.08 mm</td></tr>
<tr><td>Weight</td><td colspan="3">170 kg</td></tr>
<tr><td>Noise Level</td><td colspan="3">＜70 dB (A)※</td></tr>
</table>

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5.2.2 RH18 model

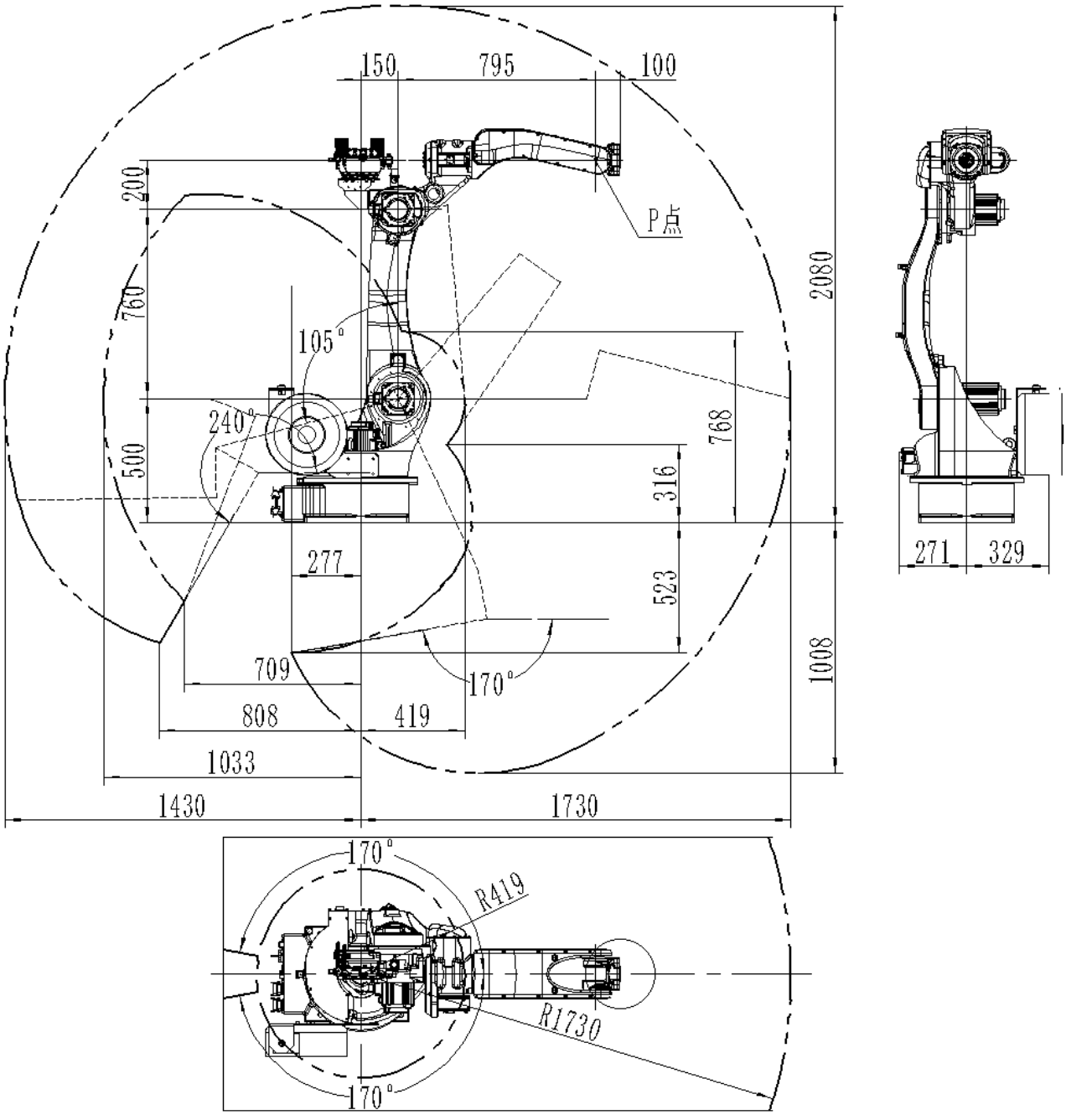


Figure 5.2.2 CRP-RH18-20-W

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Table 5.2.2 CRP-RH18-20-W

<table>
<tr><td colspan="4">CRP-RH18-20-W</td><td rowspan="15">※ measuring condition
• The robot must be firmly fixed to a flat surface.
• Measuring at the distance joint1(J1) Rotation center 2900 mm.
Noise level changes according to conditions.</td></tr>
<tr><td>Arm form</td><td colspan="3">Vertical multiple joints</td></tr>
<tr><td>Degree of Freedom</td><td colspan="3">6</td></tr>
<tr><td rowspan="7">Motion range and max speed</td><td>J</td><td>Motion range</td><td>Max speed</td></tr>
<tr><td>1</td><td>±170°</td><td>169 °/s</td></tr>
<tr><td>2</td><td>0° - -175°</td><td>169 °/s</td></tr>
<tr><td>3</td><td>+80° - -150°</td><td>169 °/s</td></tr>
<tr><td>4</td><td>±190°</td><td>280 °/s</td></tr>
<tr><td>5</td><td>-105° - -130°</td><td>240 °/s</td></tr>
<tr><td>6</td><td>±210°</td><td>483 °/s</td></tr>
<tr><td>Max payload</td><td colspan="3">20 kg</td></tr>
<tr><td rowspan="4">Wrist payload</td><td>J</td><td>Moment of force</td><td>Moment of inertia</td></tr>
<tr><td>4</td><td>48.0 N • m</td><td>1.8 kg • m^2</td></tr>
<tr><td>5</td><td>48.0 N • m</td><td>1.8 kg • m^2</td></tr>
<tr><td>6</td><td>28.0 N • m</td><td>0.8 kg • m^2</td></tr>
<tr><td>Repeated positioning accuracy</td><td colspan="3">±0.08 mm</td></tr>
<tr><td>Weight</td><td colspan="3">285 kg</td></tr>
<tr><td>Noise level</td><td colspan="3">＜70 dB (A)※</td></tr>
</table>

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5.2.3 RH20 model

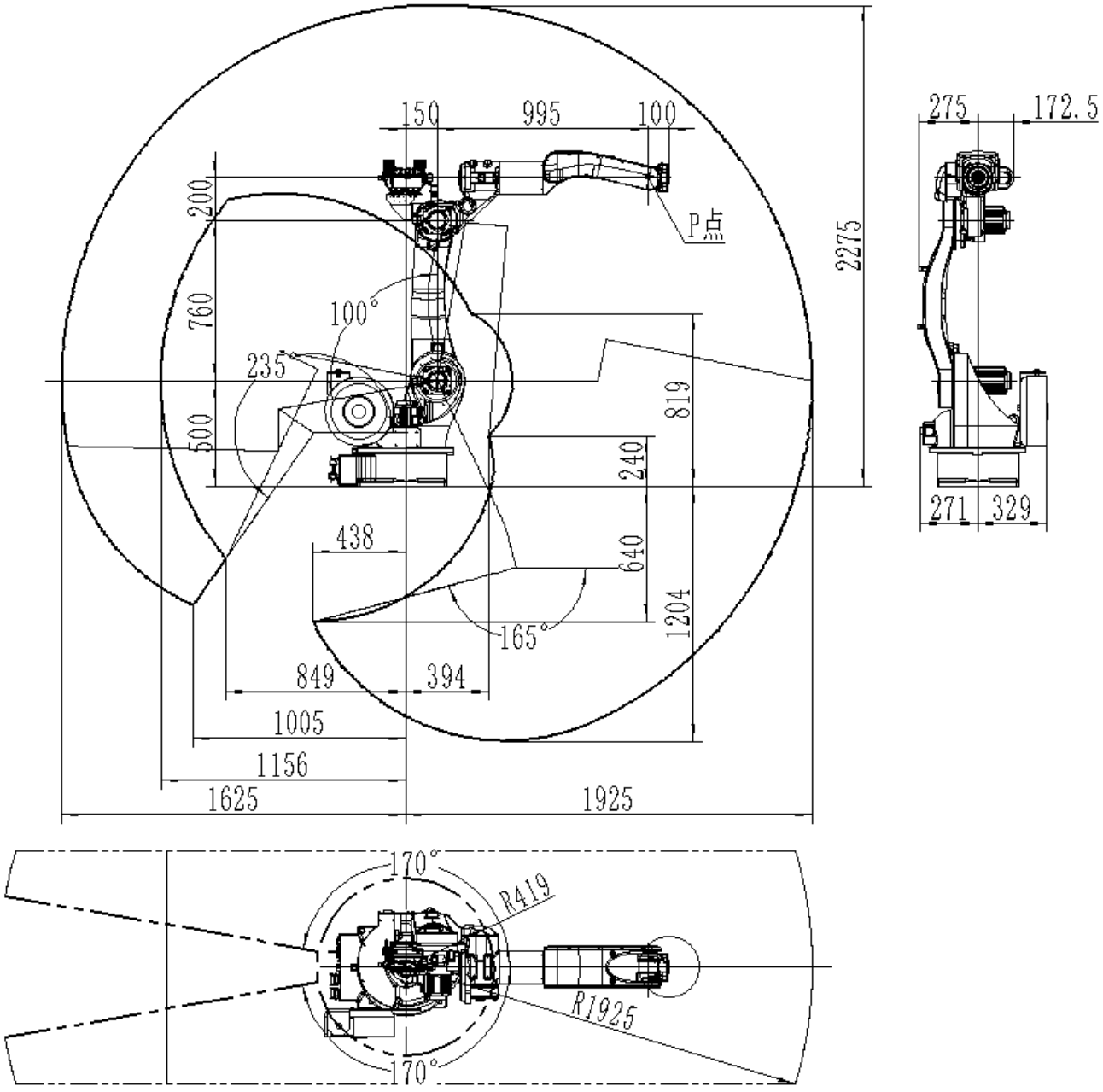


Figure 5.2.3 CRP-RH20-10-W

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Table 5.2.3 CRP-RH20-10-W

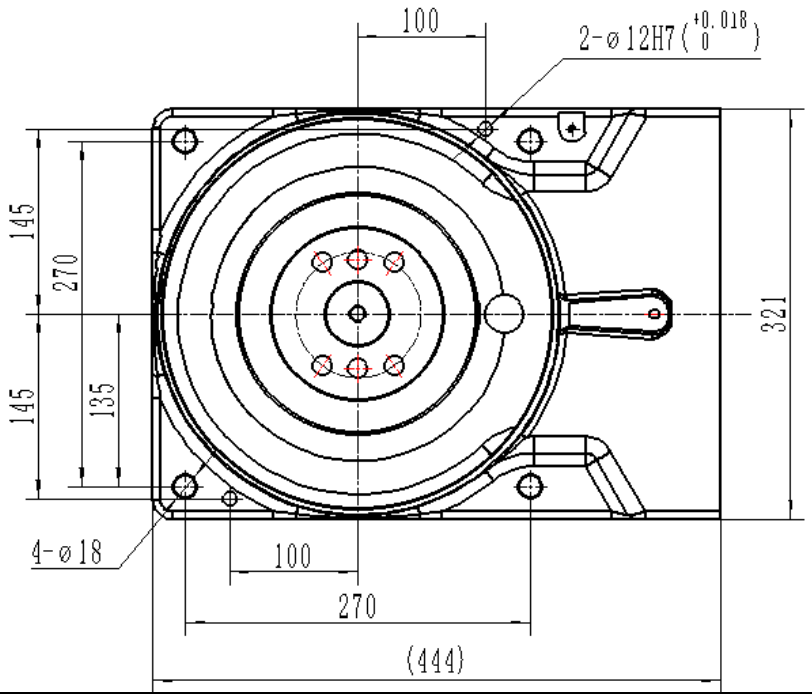
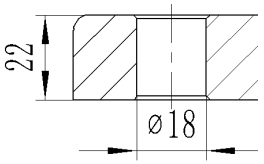
<table>
<tr><td colspan="5">CRP-RH20-10-W</td></tr>
<tr><td>Arm form</td><td colspan="3">Vertical multiple joints</td><td rowspan="13">※ measuring condition
• The robot must be firmly fixed to a flat surface.
• Measuring at the distance joint1(J1) Rotation center 2900 mm.
Noise level changes according to conditions.</td></tr>
<tr><td>Degree of Freedom</td><td colspan="3">6</td></tr>
<tr><td rowspan="7">Motion range and max speed</td><td>JT</td><td>Motion range</td><td>Max speed</td></tr>
<tr><td>1</td><td>±170°</td><td>169 °/s</td></tr>
<tr><td>2</td><td>0° - -175°</td><td>169 °/s</td></tr>
<tr><td>3</td><td>+80° - -150°</td><td>169 °/s</td></tr>
<tr><td>4</td><td>±190°</td><td>280 °/s</td></tr>
<tr><td>5</td><td>-105° - -130°</td><td>240 °/s</td></tr>
<tr><td>6</td><td>±210°</td><td>483 °/s</td></tr>
<tr><td>Max payload</td><td colspan="3">10 kg</td></tr>
<tr><td rowspan="4">Wrist payload</td><td>JT</td><td>Moment of force</td><td>Moment of inertia</td></tr>
<tr><td>4</td><td>10.0 N·m</td><td>0.25 kg·m^2</td></tr>
<tr><td>5</td><td>10.0 N·m</td><td>0.25 kg·m^2</td></tr>
<tr><td>6</td><td>3 N·m</td><td>0.05 kg·m^2</td></tr>
<tr><td>Repeated positioning accuracy</td><td colspan="3">±0.08 mm</td></tr>
<tr><td>Weight</td><td colspan="3">290 kg</td></tr>
<tr><td>Noise level</td><td colspan="3">＜70 dB (A)※</td></tr>
</table>

6 Mounting dimensions of base

6.1 RH14

When mounting the robot base, use high-strength bolts to secure it through the bolt holes.

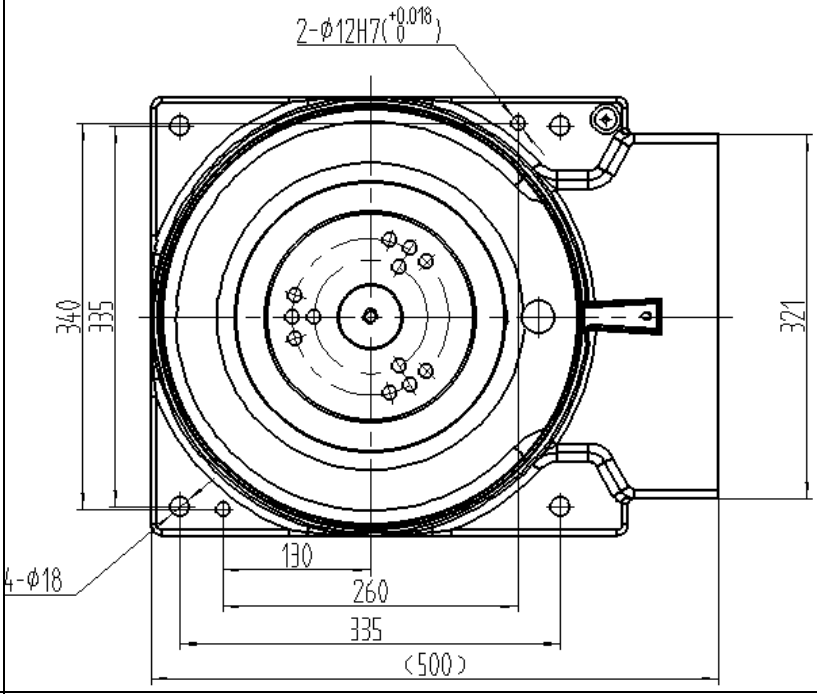
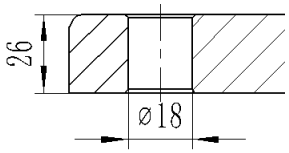
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Model	CRP-RH14-10-W
Installation dimension	
Cross section	
Bolt hole	4-Φ18
High-strength bolt	4-M16 strength grade: 10.9 以上
Level of mounting surface	Within ±5°

6.2 RH18/20

When mounting the robot base, use high-strength bolts to secure it through the bolt holes.

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Model	CRP-RH18-20-W/CRP-RH20-10-W
Installation dimension	
Cross section	
Bolt hole	4-Φ18
High-strength bolt	4-M16 strength grade: 10.9 以上
Level of mounting surface	Within ±5°

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7. Wrist axes load and wrist flange

7.1 Wrist axial load value

Although the movable weight of wrist shaft (including workpiece) each model has a fixed weight (see the parameter table of each model), due to the limitation of torque and moment of inertia, the following requirements shall be met when using it.When the load is not the weight, but the force, please be careful not to exceed the allowable load value of the wrist shaft (see the parameter table of each model).When the load volume is small, the limit installation size (LB, LT) is shown in FIG. 7.3.1 "limit installation size".

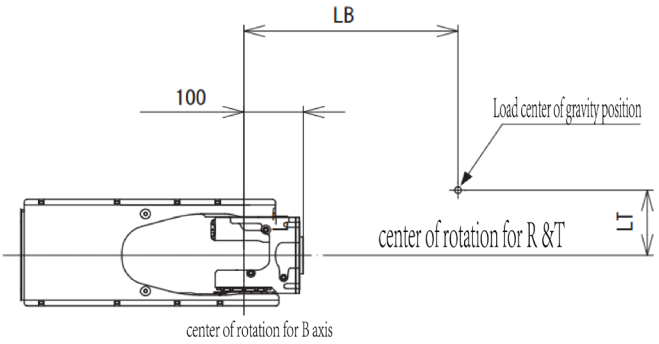
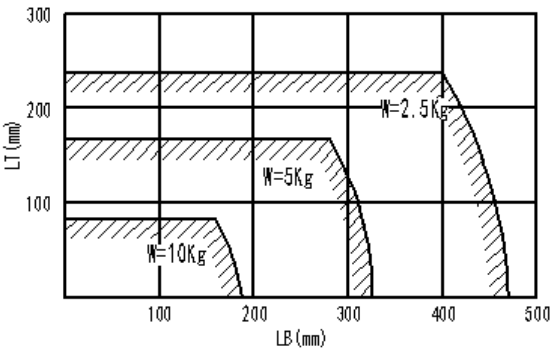
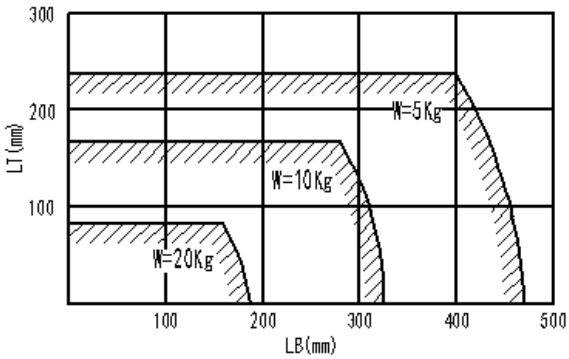


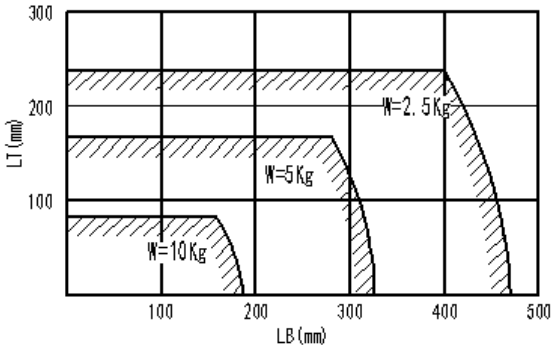
figure7.3.1 limit installation size



CRP-RH14-10-W



CRP-RH18-20-W



CRP-RH20-10-W

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7.2 Wrist flange

CAUTION

When installing the arm and other tools, please be sure to disconnect the power supply of the controller and the external power switch, set up a striking sign "in the process of installation", and lock or hang the sign of the external power supply switch to prevent the operation personnel or other people from accidentally turning on the power supply to avoid the occurrence of unpredictable electric shock and other accidents.

At the end of the robot arm, there is a flange for mounting the claw and welding gun. The size of flange at the front end of the wrist shaft is shown in figure 7.3.2. The depth of the contact surface between the accessories and the flange should be less than 5 mm. Also, do not install accessories outside the enclosure shown in figure 7.3.2. Flange interface size applicable model: CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W。

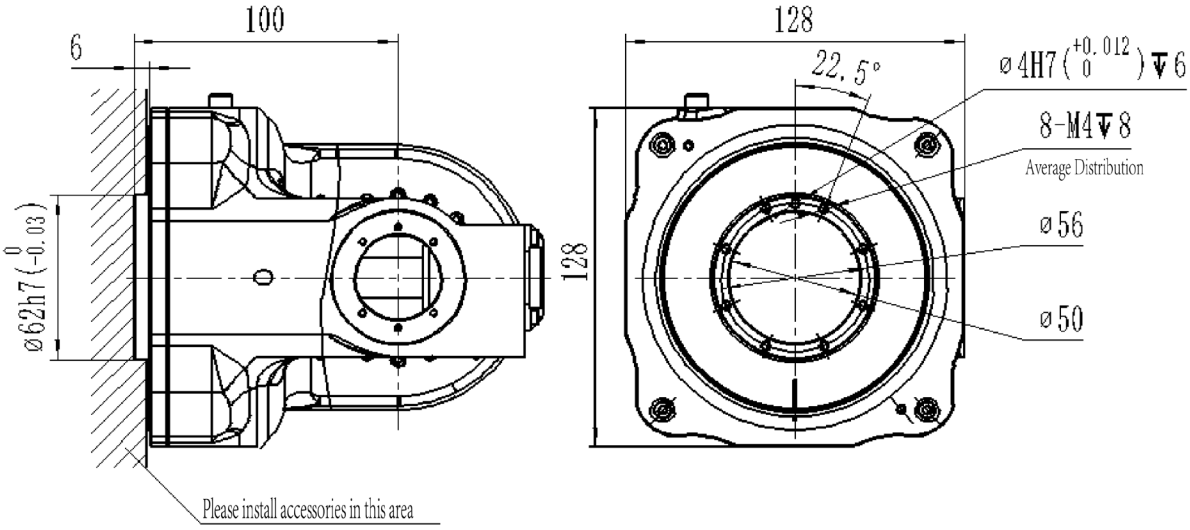
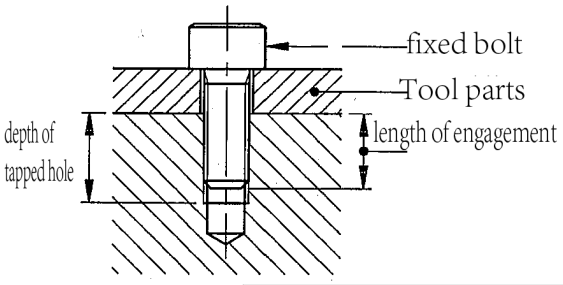


Figure 7.3.2 flange

7.3 Specification for mounting bolts

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Please select the length of the fixing bolt according to the screw hole depth of the mounting flange and the thread depth (engagement length) specified to ensure reliable thread connection. Please use high strength bolts in screw holes and tighten with standard torque.

If the depth of thread (engagement length) screwed in exceeds the specified depth, the anchor bolt may be pushed to the bottom of the threaded hole so that the tool cannot be tightened reliably.

Model	CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W
Screw hole	8-M4
Position circle	Φ56
dowel hole	Φ4H7 depth 6
Center reference hole	Φ62H7depth 6
depth of tapped hole	12 mm
Length of action	8 mm
high strength bolt	≥10.9

8. Robot line link

8.1 Robot to the cabinet

Power requirements for control cabinet

Model	Rated voltage	Power capacity
CRP-RH14-10-W CRP-RH18-20-W CRP-RH20-10-W	3 phase/380V(10%-15%) 50/60HZ	3KVA 5KVA 5KVA

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Connection method:

（1）Connect the X1 (encoder wire cable) and X2 (power wire cable) cable overload head of the control cabinet to the corresponding position of the base plate of the robot body.

（2）According to the power requirements of the control cabinet, connect the power incoming line.

8.2 Connection of ground wire of robot body。

After the robot body is fixed, the grounding wire connection of the robot body shall be connected to the ground wire and reliably connected to the user's grounding network. Yellow and green wires with a sectional area of no less than 4mm³ are required.

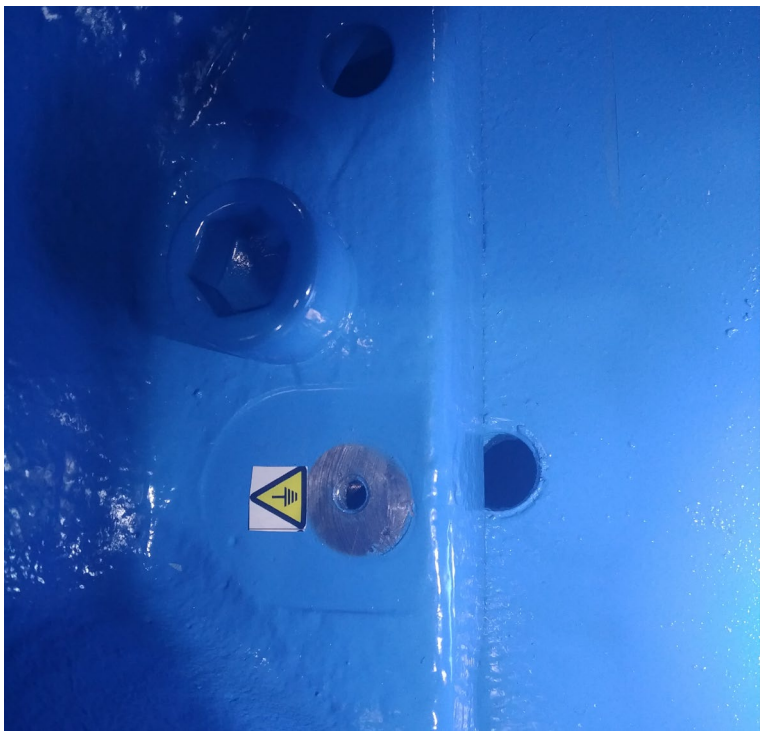


Figure 8.1 Ground wire connection of robot base

9. Robot comprehensive description

9.1 Robot load installation instructions

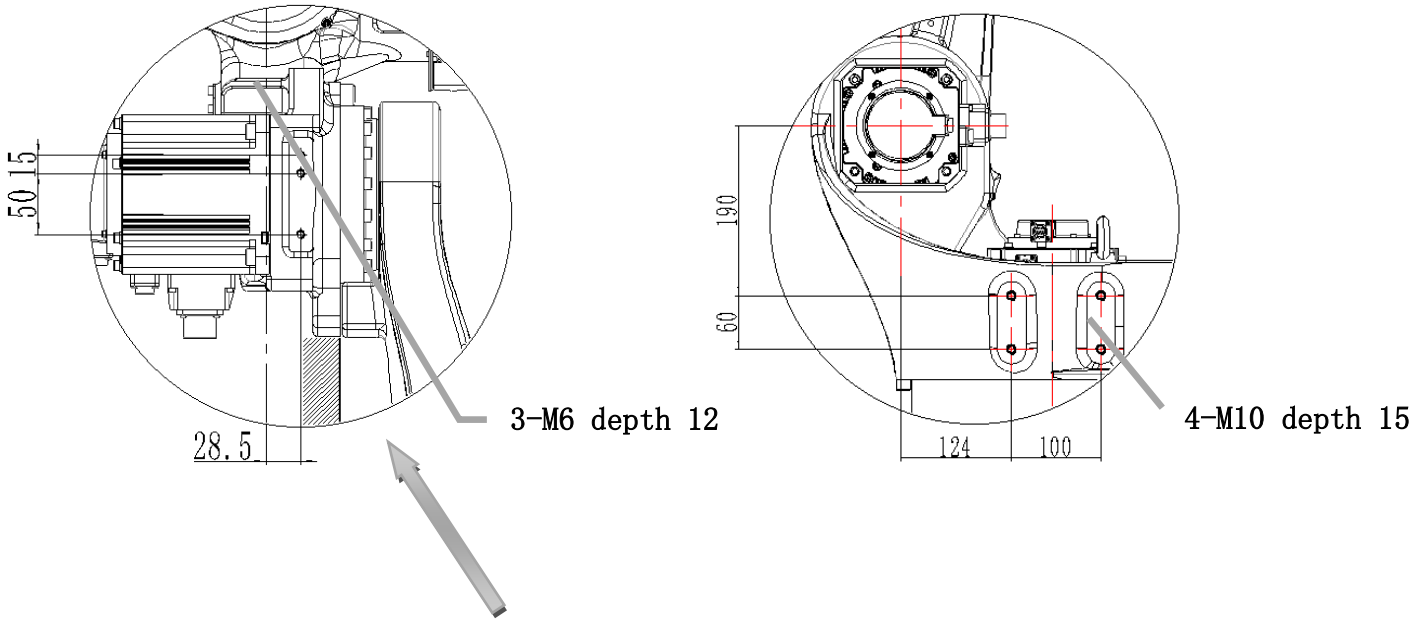
welding robot as an example.The welding wire plate is installed on axis 1 of the robot, wire feeder is installed on axis 3, and welding gun is installed on the end of axis 6.

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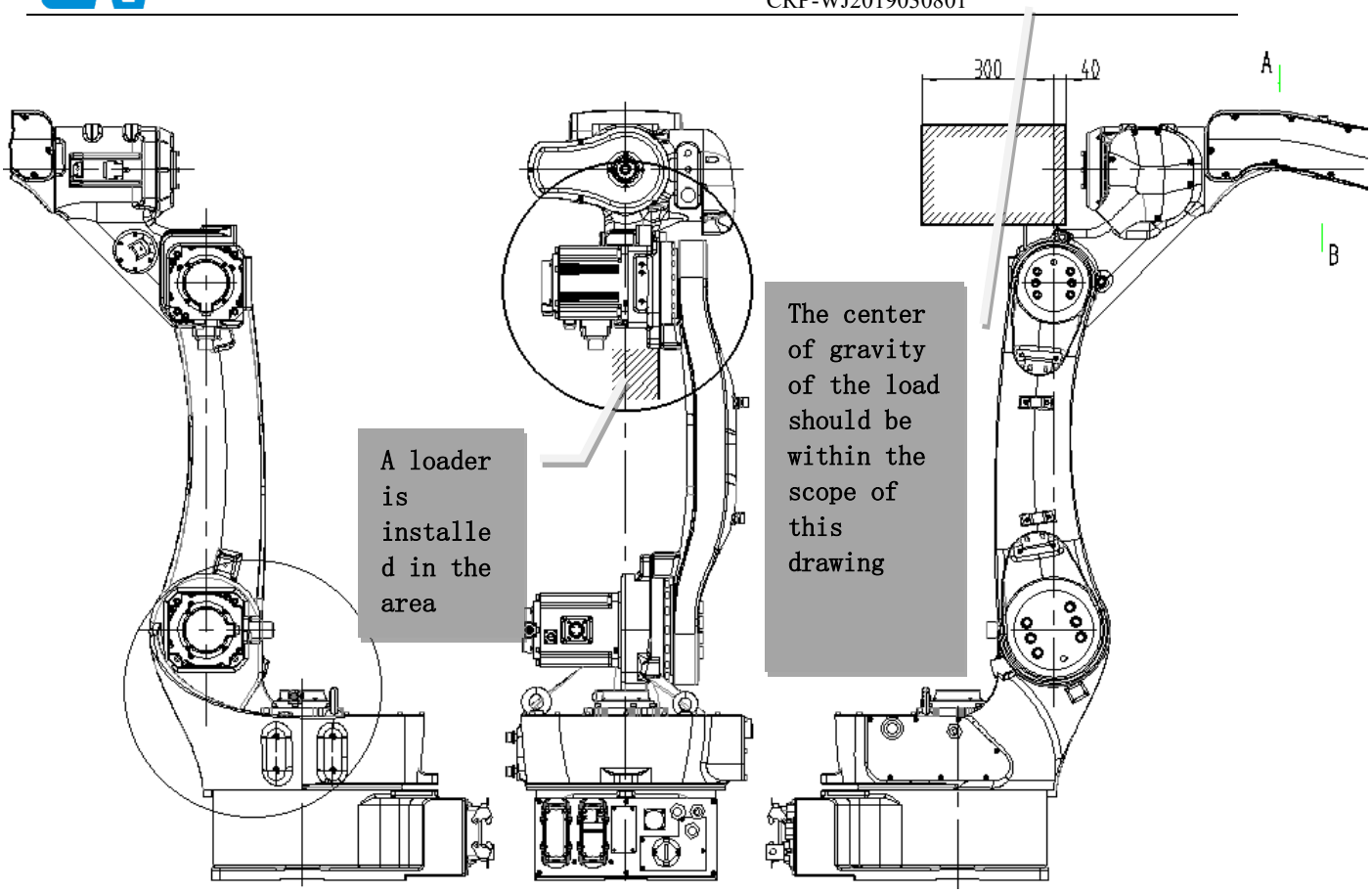
If the load calculation is carried out by dividing the load part into multiple parts (such as the claw part and the workpiece part, etc.), then the total value should be used to calculate the load moment and load inertia moment.Please strictly observe the following restrictions on flange ends.Load capacity includes the mass of the claw, which should be less than or equal to the following values.Crp-rh14-10-w = 10 kg;Crp-rh18-20-w = 20 kg;CRP RH20-10 - W = 10 kg.The load moment and load inertia moment around each wrist joint (J4, J5, J6) are limited. Please refer to the robot parameter table for relevant parameters。

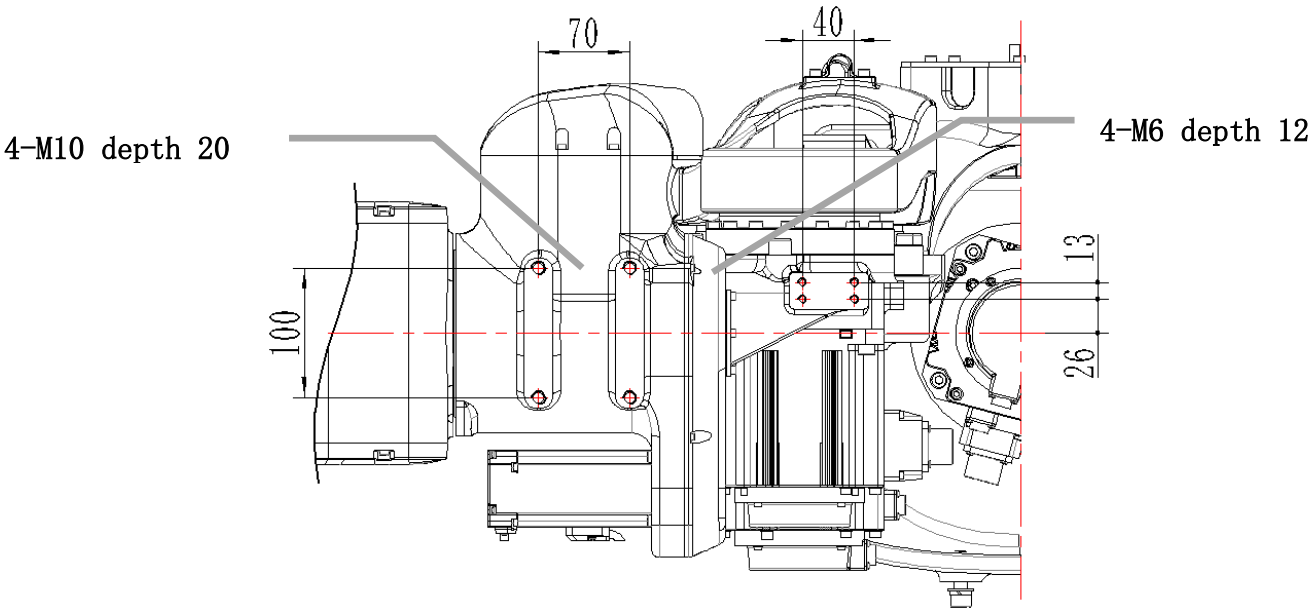
	CRP-RH14-10	CRP-RH18-20	CRP-RH20-10
J6(end load)(Kg)	≤10	≤20	≤10
J3（Kg）	≤8	≤12	≤8
J1（Kg）	≤25	≤25	≤25

Load installation position



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* note: due to the slightly different sizes of the mounting objects for different models, please carry out the installation in combination with the real objects.

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9.2 Robot user terminal definition

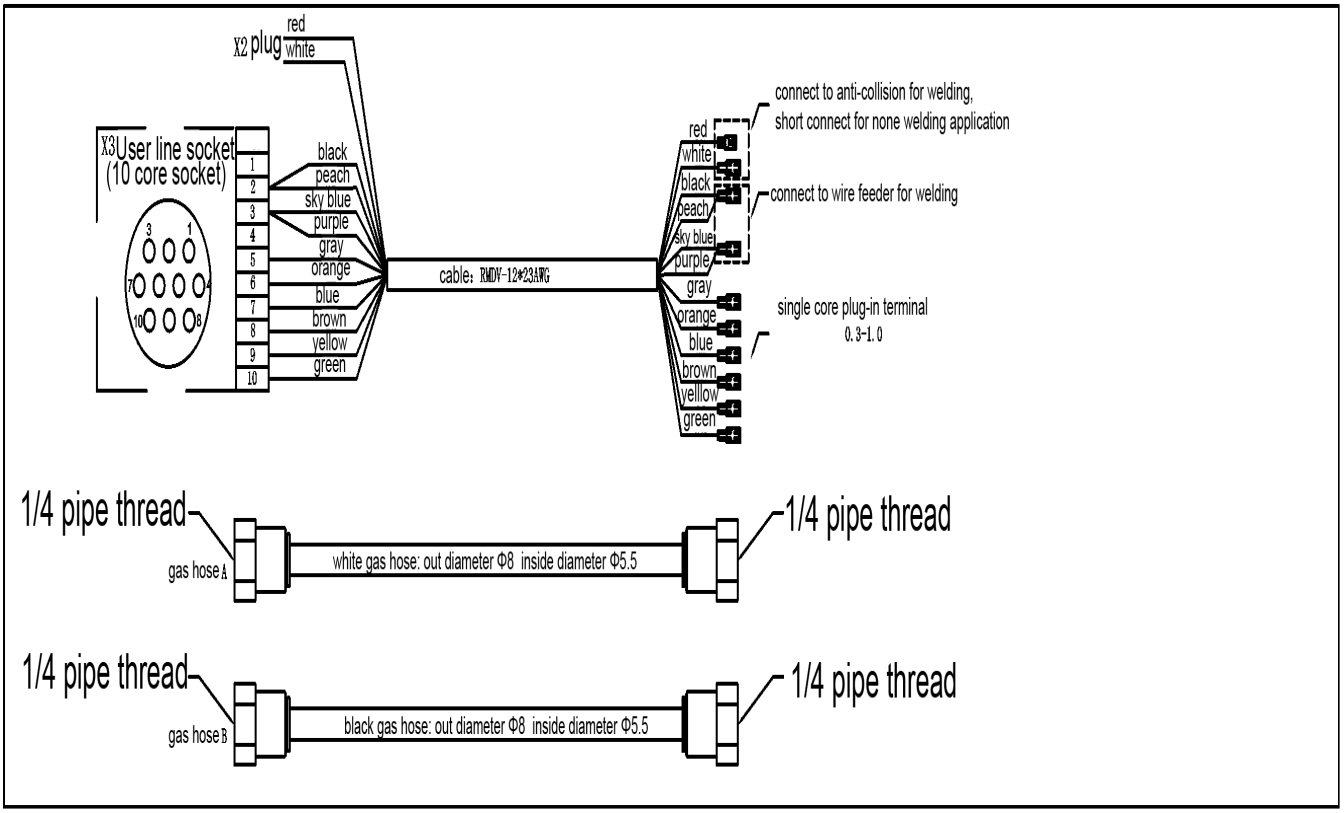


Figure 2.5.1 X3 User line definition (Assembly application)

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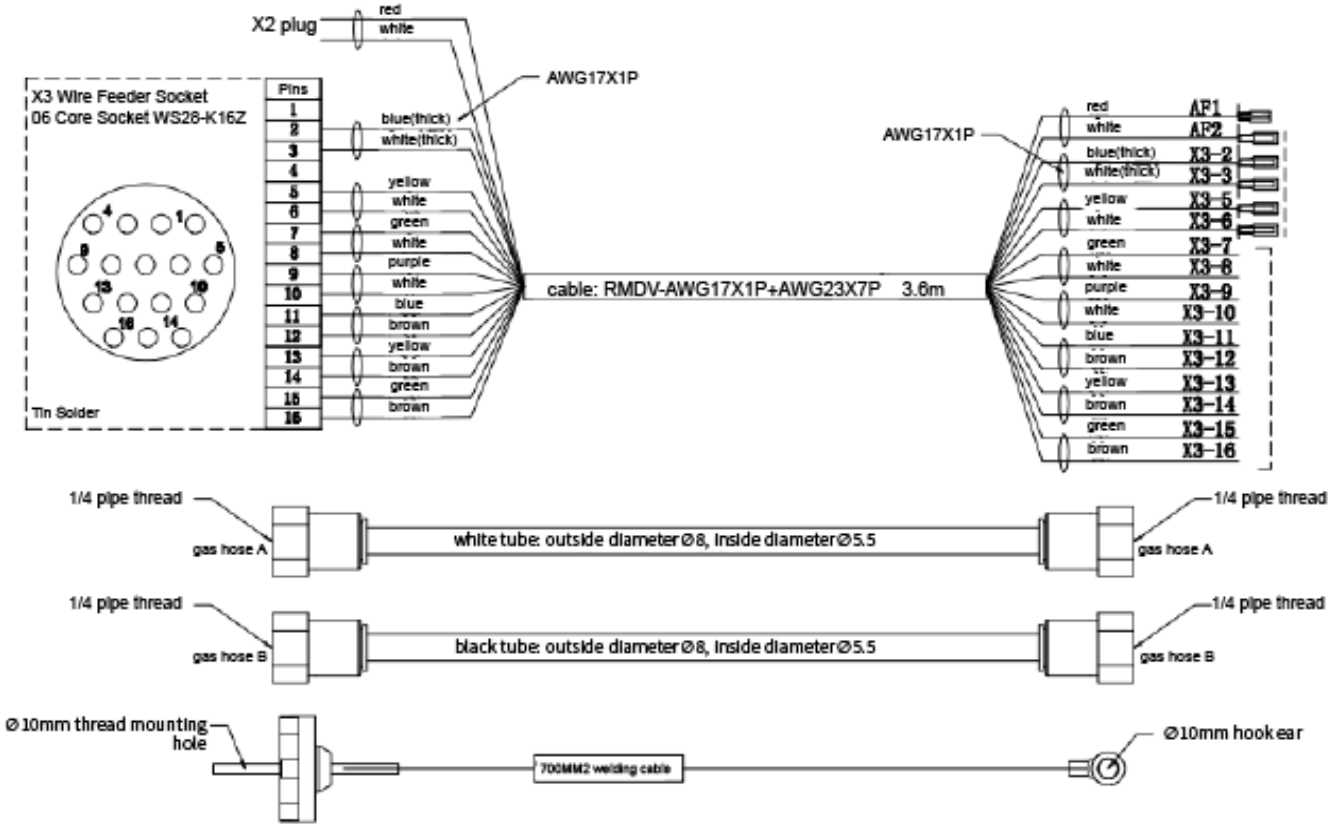


Figure 2.5.2 X3 X3 User line definition (welding application)

9.3 Welding cable and air pipe

9.3.1 Welding cable (welding version)

The welding cables configured on the RH robot body of our company are 70mm². The welding current is 350A and the usage rate is below 60%.

9.3.2 Air pipe

Our robot is equipped with two sets of air pipes, A and B. Φ8diameter of the trachea, one group for black, one group for white. The quick connect tracheal plug with 1/4 at both ends of the trachea needs to be blocked with a plug when not in use to prevent dust or foreign matter from entering the trachea and affecting future use.

Take the welding robot rh14-10-w as an example, and the welding protection gas path is group B trachea. Both ends of the trachea in group A were sealed with A plug. Prevent foreign matter from entering the trachea.

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Part II robot body inspection and maintenance

1. Preface

This paper introduces the inspection and maintenance method of RH series.

Be sure to read and understand this and the safety section thoroughly before doing anything, and follow all safety rules. In addition, please refer to the relevant manual if necessary.

In particular, don't do anything until you fully understand the content of this article. The company shall not be liable for any accident or damage caused by the operation of the company only in accordance with a limited part of this article。

Suitable for

CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W

SYMBOL

In this manual, special attention should be paid to the following symbols. To ensure the correct and safe operation of the robot, and to prevent personal injury and property damage, please follow the safety information expressed in the following box symbols

DANGER

Failure to comply with this notice may result in death.

CAUTION

Failure to comply with this notice may result in personal injury or death.

BE CAREFUL

Failure to comply with this mark may result in personal injury and/or mechanical injury.

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[Caution]

Indicates attention information about robot specification, processing, instruction, operation, and maintenance.

2. Matters need attention

Before the maintenance and operation of our robot, please pay attention to the following matters to ensure safety.

⚠ CAUTION

1. Be sure to disconnect the controller power and external power before starting the inspection. Set up a "inspection and maintenance" eye-catching signs, the external power switch lock or hang signs to prevent the operation of personnel or other unexpected turn on the power, to avoid the occurrence of unpredictable electric shock and other accidents.
2. If grease replacement and other operations need to change the joint Angle, then first turn on the motor power. The robot's arm is then adjusted to the desired position, taking care not to approach the arm and be pinched. After adjusting the robot to the specified posture, disconnect the controller power and external power again, lock the external power switch, hang up the "check and maintenance" sign, and then start the operation.
3. When checked immediately after stopping continuous operation, part of the arm may become hot due to ambient temperature. Touching this part with bare hands will cause burns. Please operate after confirming the temperature drops.
4. Electric shock, clamping and high temperature warning signs are pasted on the corresponding position of the arm. Please confirm in advance. The warning tag and its location are shown on the following page.

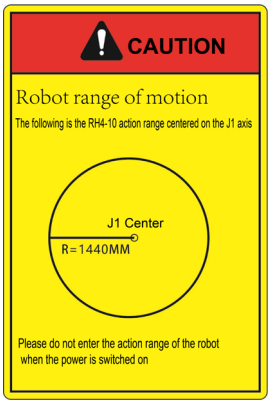
The paste position of the warning sign
(CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W)

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（1）High temperature warning. Heat warnings are posted on the motors. In the robot is working, the temperature of the motor will be up to 50 ℃. If the machine is stopped immediately after touching the motor, may cause burns.



（2）Warning of robot range of motion If the movement of the robot, into the range of motion of the robot, will cause unexpected accidents. It is forbidden to enter the motion range of a robot while it is working。





3. Maintenance inspection items

The maintenance and inspection of the robot mainly includes daily inspection, regular inspection (5000 hours, 10000 hours and 15000 hours) and overhaul.

This manual describes maintenance and inspection items, as well as inspection and adjustment methods. These projects are important for robots to function in a stable environment for long periods of time. Therefore, it is important to perform the following maintenance and inspections.

Examination period / Items	Daily check	5000 hours	10000 hours	15000 hours	20000 hours
Appearance	○	○	○	○	
Movement and abnormal noise	○	○	○	○	
The positioning accuracy	○	○	○	○	
gear grease supplement		○	○	○	
Grease replenishment of deceleration unit		○	○	○	

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Grease replacement of reduction unit			○		
Battery pack replacement			○		
retightened			○		
overhaul					○

Note * for CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W

4. Details of routine inspections

Please implement the following routine inspection items for our robots.

NO.	Item	Content inspection	false exclusion
1	Is there any damage to the robot?	1. Check all parts of the robot for damage caused by interference, especially the wrist joint.	1. Remove interference, etc.
2	Are cables and hoses abnormal?	1. Check hose and cable connection with tools for local bending, distortion and damage.	1. Readjust fixture to eliminate error cause.
3	Is the robot moving abnormally?	1. Check that the axes are moving smoothly. 2. Check for abnormal noise and vibration. 3. Check for overshoot.	1. Check lubrication status. 2. Check the internal of the drive system for any abnormal phenomena. 3. If the problem is caused by the increase of the tooth clearance, please contact our company.
4	Does the positioning accuracy change?	1. Check whether the last reproduced motion is all positioned in the same exact position. 2. Check whether the stop position is uneven.	1. Check the internal of the drive system for any abnormal phenomena. 2. If the problem is caused by the increase of the tooth clearance, please contact our company.

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If the above abnormal conditions cannot be solved through inspection and mechanical error elimination, please contact our company to check and adjust the control system.

5. Grease Replenishment and Replacement of Gears

CAUTION

1. Be sure to disconnect the controller power supply and external power supply before replenishing or replacing the grease. Set a “check and maintain” caution symbol, lock or hang the external power switch to prevent the operator from accidentally turning on the power.
2. Before replenishing or replacing grease, be sure to remove the plug from the discharge port. Otherwise, the internal pressure of the replenishing grease may damage the seal or cause grease to penetrate into the motor.

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CAUTION

1. When replenishing or replacing grease, please do not add too much according to the prescribed amount of supplement.
2. Use a manual grease gun to replenish or replace grease.
3. If you need to use an air pump grease gun, please use ZM-45 (produced by Zhengmao Company, pressure ratio is 50:1). Use the regulator to adjust the air supply pressure to less than 0.26 MPa (2.5 kgf/cm^2). (If you are not using the above-mentioned air pump grease gun, please contact CRP.)
4. Do not connect the long fat discharge pipe directly to the discharge port during grease replenishment. Due to the filling pressure, if the grease is not discharged smoothly, the internal pressure will rise, which may cause seal damage or grease backflow, resulting in grease leakage.
5. Prior to grease replenishment, follow the precautions for the latest grease Material Safety Data Sheet (MSDS).
6. When replenishing or replacing grease, prepare a container and a rag to handle the grease flowing from the inlet and outlet.
7. The used grease is industrial waste related to waste disposal and cleaning methods (commonly known as waste disposal and cleaning methods). Therefore, please follow the local rules and regulations.

[CAUTION]

When loading and unloading the plug, use a hex wrench of the following size or a torque wrench attached to the hex.

Plug	Width[mm]
M5	4
M6	3
R1/4	6

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5.1 Grease replenishment and replacement of J1 reducer

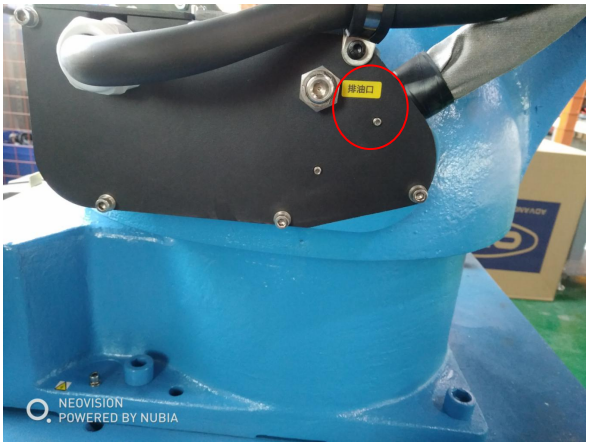
5.1.1 Grease replenishment of J1 reducer

CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W

Robot model	CRP-RH14-10-W	CRP-RH18-20-W	CRP-RH20-10-W
Standard fill	70cc	90cc	90cc
Grease type	Kyodo Yushi RE NO.00 grease		
Working position	As showed in Figure 5.1.1		



(a) J1 injection port



(b) J1 drain port

Figure 5.1.1

Operating Steps

1. Move the robot to put the arm in the zero position and turn off the power.
2. Unscrew the plug on the drain port.
3. Unscrew the plug on the injection port and screw it into the grease nipple.
4. Replenish new grease from the injection port.
5. Unscrew the grease nipple on the injection port, use a rag to remove the grease around the injection port, and wrap the plug with a sealing tape for 3 turns and a half, and screw it into the injection port. (R1/4-tightening torque: 6.9 N·m)
6. Before installing the plug at the drain port, turn the JT1 axis for a few minutes to allow excess grease to drain from the drain port.
7. Wipe the grease around the drain port with a rag, wrap the plug three times

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and a half with a sealing tape, and screw it into the drain port. (R1/4-tightening torque: 6.9 N·m)

5.1.2 Grease replacement of J1 reducer

CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W

Robot model	CRP-RH14-10-W	CRP-RH18-20-W	CRP-RH20-10-W
Standard fill	420cc	470cc	280cc
Grease type	Kyodo Yushi RE NO.00 grease		
Working position	As showed in Figure 5.1.1		

Operating Steps

1. Move the robot to put the arm in the zero position and turn off the power.
2. Unscrew the plug on the drain port.
3. Unscrew the plug on the injection port and screw it into the grease nipple.
4. Replenish the new grease from the injection port until the old oil is completely drained from the drain port and the new oil is drained. (see color to judge old oil and new oil)
5. Unscrew the grease nipple on the injection port, use a rag to remove the grease around the injection port, and wrap the plug with a sealing tape for 3 turns and a half, and screw it into the injection port. (R1/4-tightening torque: 6.9 N·m)
6. Before installing the plug at the drain port, turn the JT1 axis for a few minutes to allow excess grease to drain from the drain port.
7. Wipe the grease around the discharge port with a rag, wrap the plug three times and a half with a sealing tape, and screw it into the discharge port. (R1/4-tightening torque: 6.9 N·m)

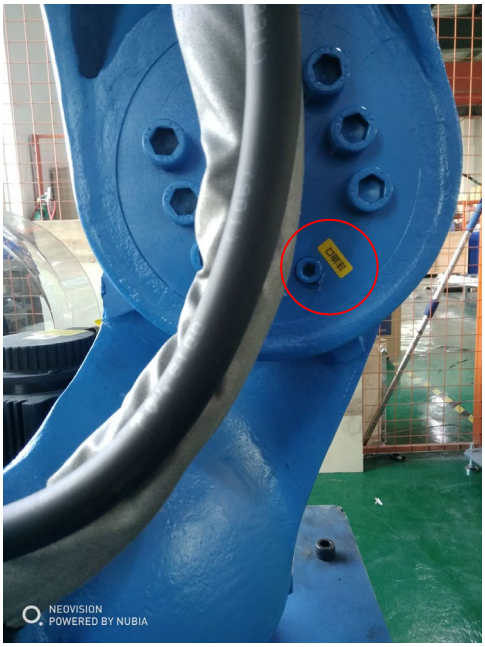
5.2 Grease replenishment and replacement of J2 reducer

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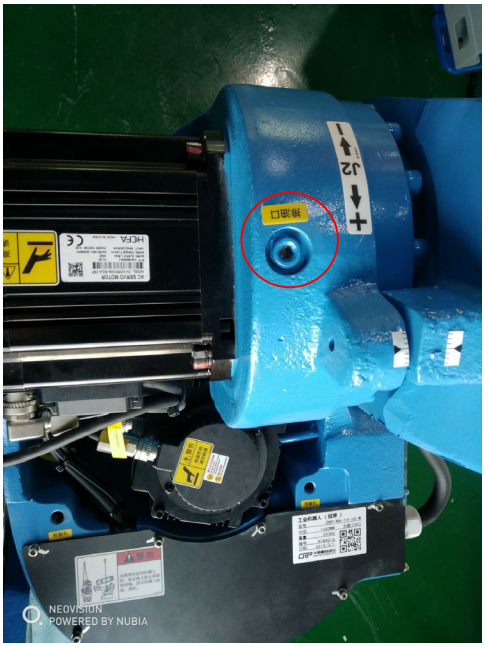
5.2.1 Grease replenishment of J2 reducer

CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W

Robot model	CRP-RH14-10-W	CRP-RH18-20-W	CRP-RH20-10-W
Standard fill	65cc	65cc	65cc
Grease type	Kyodo Yushi RE NO.00 grease		
Working position	As showed in Figure 5.2.1		



(a) J2 injection port



(b) J2 drain port

Figure 5.2.1

Operating Steps

1. Move the robot to put the arm in the zero position and turn off the power.
2. Unscrew the plug on the drain port.
3. Unscrew the plug on the injection port and screw it into the grease nipple.
4. Replenish new grease from the injection port.
5. Unscrew the grease nipple on the injection port, use a rag to remove the grease around the injection port, and wrap the plug with a sealing tape for 3 turns and a half, and screw it into the injection port. (R1/4-tightening torque: 6.9 N·m)
6. Before installing the plug at the drain port, turn the JT2 axis for a few

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minutes to allow excess grease to drain from the drain port.
7. Wipe the grease around the drain port with a rag, wrap the plug three times and a half with a sealing tape, and screw it into the drain port. (R1/4-tightening torque: 6.9 N·m)

5.2.2 Grease replacement of J2 reducer

CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W

Robot model	CRP-RH14-10-W	CRP-RH18-20-W	CRP-RH20-10-W
Standard fill	470cc	550cc	550cc
Grease type	Kyodo Yushi RE NO.00 grease		
Working position	As showed in Figure5.2.1		

Operating Steps
1. Move the robot to put the arm in the zero position and turn off the power.
2. Unscrew the plug on the drain port.
3. Unscrew the plug on the injection port and screw it into the grease nipple.
4. Replenish the new grease from the injection port until the old oil is completely drained from the drain port and the new oil is drained. (see color to judge old oil and new oil)
5. Unscrew the grease nipple on the injection port, use a rag to remove the grease around the injection port, and wrap the plug with a sealing tape for 3 turns and a half, and screw it into the injection port. (R1/4-tightening torque: 6.9 N·m)
6. Before installing the plug at the drain port, turn the JT2 axis for a few minutes to allow excess grease to drain from the drain port.
7. Wipe the grease around the discharge port with a rag, wrap the plug three times and a half with a sealing tape, and screw it into the discharge port. (R1/4-tightening torque: 6.9 N·m)

5.3 Grease replenishment and replacement of J3 reducer

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5.3.1 Grease replenishment of J3 reducer

CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W

Robot model	CRP-RH14-10-W	CRP-RH18-20-W	CRP-RH20-10-W
Standard fill	40cc	40cc	40cc
Grease type	Kyodo Yushi RE NO.00 grease		
Working position	As showed in Figure 5.3.1		



(a) J3 injection port



(b) J3 drain port

Figure 5.3.1

Operating Steps

1. Move the robot to put the arm in the zero position and turn off the power.
2. Unscrew the plug on the drain port.
3. Unscrew the plug on the injection port and screw it into the grease nipple.
4. Replenish new grease from the injection port.
5. Unscrew the grease nipple on the injection port, use a rag to remove the grease around the injection port, and wrap the plug with a sealing tape for 3 turns and a half, and screw it into the injection port. (R1/4-tightening torque: 6.9 N·m)
6. Before installing the plug at the drain port, turn the JT3 axis for a few minutes to allow excess grease to drain from the drain port.
7. Wipe the grease around the drain port with a rag, wrap the plug three times and a half with a sealing tape, and screw it into the drain port. (R1/4-tightening torque: 6.9 N·m)

5.3.2 Grease replacement of J3 reducer

CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W

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Robot model	CRP-RH14-10-W	CRP-RH18-20-W	CRP-RH20-10-W
Standard fill	280cc	450cc	450cc
Grease type	Kyodo Yushi RE NO.00 grease		
Working position	As showed in Figure 5.3.1		

Operating Steps

1. Move the robot to put the arm in the zero position and turn off the power.
2. Unscrew the plug on the drain port.
3. Unscrew the plug on the injection port and screw it into the grease nipple.
4. Replenish the new grease from the injection port until the old oil is completely drained from the drain port and the new oil is drained. (see color to judge old oil and new oil)
5. Unscrew the grease nipple on the injection port, use a rag to remove the grease around the injection port, and wrap the plug with a sealing tape for 3 turns and a half, and screw it into the injection port. (R1/4-tightening torque: 6.9 N·m)
6. Before installing the plug at the drain port, turn the JT3 axis for a few minutes to allow excess grease to drain from the drain port.
7. Wipe the grease around the discharge port with a rag, wrap the plug three times and a half with a sealing tape, and screw it into the discharge port.

5.4 Grease replenishment of J6 reducer unit

Robot model	CRP-RH14-10-W	CRP-RH18-20-W	CRP-RH20-10-W
Standard fill	5cc	5cc	5cc
Grease type	Mobil sp2		
Working position	As showed in Figure 5.4.1		

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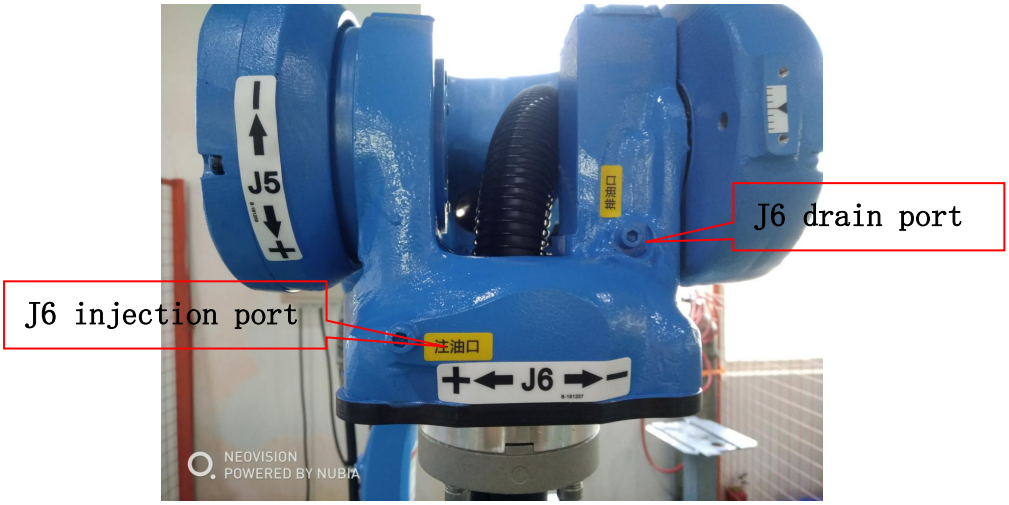


Figure 5.4.1 J6 reducer unit

CAUTION

1. Before replenishing or replacing grease, be sure to remove the plug from the drain port. Otherwise, the internal pressure of the replenishing grease may damage the seal or cause the grease to seep out.
2. The main function of the J6 drain port is to vent, please do not inject excessive grease.

Operating Steps

1. Move the robot to the zero position and turn off the power.
2. Unscrew the M5 bolt on the drain port.
3. Unscrew the plug on the injection port and screw it into the grease nipple.
4. Add new grease from the injection port.
5. Unscrew the grease nipple on the injection port, use a rag to remove the grease around the injection port, apply the M5 bolt to the 1206C sealant, and screw it into the injection port. (M5 tightening torque: 6 N·m)
6. Before installing the plug at the drain port, let the JT6 axis rotate for a few minutes to allow excess grease to drain from the drain port.
7. Wipe the grease around the drain port with a rag, apply the M6 bolt to the 1206C sealant, and screw it into the drain port. (M5 tightening torque: 6 N·m)

5.5 Description of J4、J5 reducer units

Our RH14-10-W, RH18-20-W, RH20-10-W robot J4/J5 reducer units use an integrated harmonic reducer, no need to replenish or replace the reducer grease.

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6. Replacement of Battery Pack

WARNING

1. When replacing the battery, be sure to disconnect the controller power supply and external power supply. Set a “check and maintain” caution symbol, lock or hang the external power switch to prevent the operator or others from accidentally turning on the power to avoid accidents such as unpredictable electric shock.
2. Only use the battery specified by our company
3. Do not recharge, heat, change, or disassemble the battery.
4. Do not discard the battery in water or fire.
5. Do not short the battery positive and negative electrode.
6. Dispose of the used batteries in accordance with local rules and regulations.

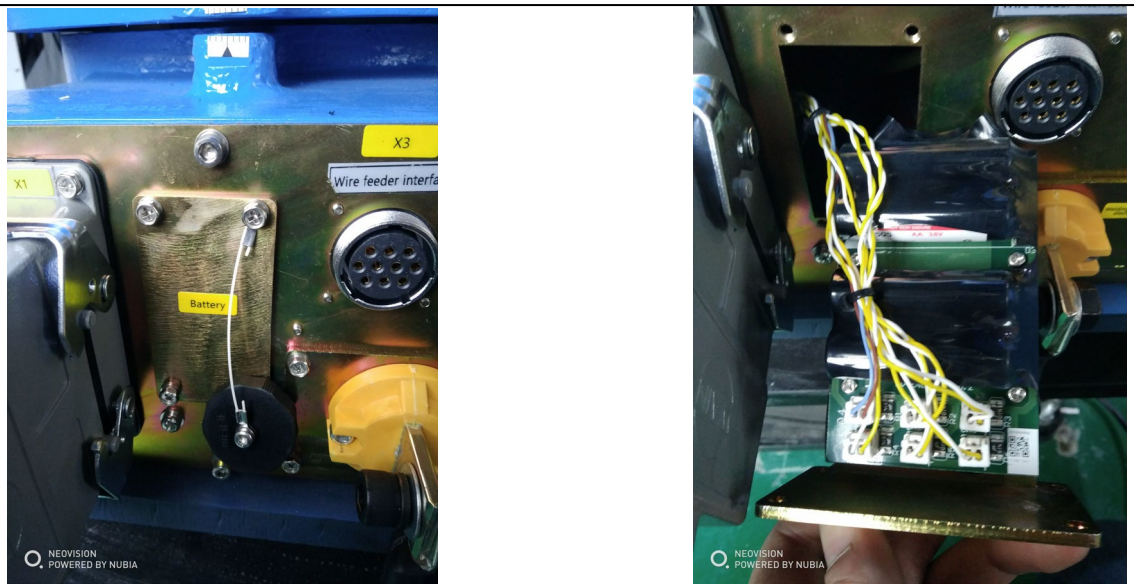


Figure 8.1 replace battery pack

CRP-RH14-10-W/CRP-RH18-20-W/CRP-RH20-10-W

Robot model	All robot models
Working position	As showed in Figure 8.1

Operating Steps

1. Be sure to return the robot to zero coordinates before replacing the battery. [Running Preparation] - [Robot Zero Position Setting] - [To Zero Return

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Coordinates]. (If you do not return to zero coordinates, replacing the battery will lose the zero position)

2. Turn off the controller's controller power, then unscrew the battery holder's mounting bolts and remove the battery holder. Be careful not to damage the harness when disassembling.

3. Unplug the battery connector, remove the screws that secure the battery, and remove the battery.

4. Set the new battery in the battery holder, secure it with screws, and insert the battery connector. Install the battery holder to its original position.

5. Turn on the controller and re-record the J1-J6 axis zero position on the teach pendant. (You can move the robot after recording the zero position, otherwise the zero position will be lost).

CAUTION

Do not dispose of used batteries in garbage that needs to be incinerated, landfilled, or dumped to the ground. When discarding the batteries, wrap them in a bag to prevent them from coming into contact with other metals, and dispose of them in accordance with local rules and regulations.

7. Retighten

Check each bolt or nut for looseness. If necessary, tighten the bolts and nuts firmly. Among the items that need to be retightened, the following six items are the most important.

A. Servo motor fixing bolt
B. J5/J6 motor mounting plate fixing bolt
C. Reducer fixing bolt
D. Tool fixing bolt
E. Base fixing bolt
F. Cover fixing bolt

The company's screw torque standard (N.m)		
Screws size	Fe-based	Al-based
M3	1.4	1.4
M4	4.8	2.8
M5	10	6
M6	16.5	10

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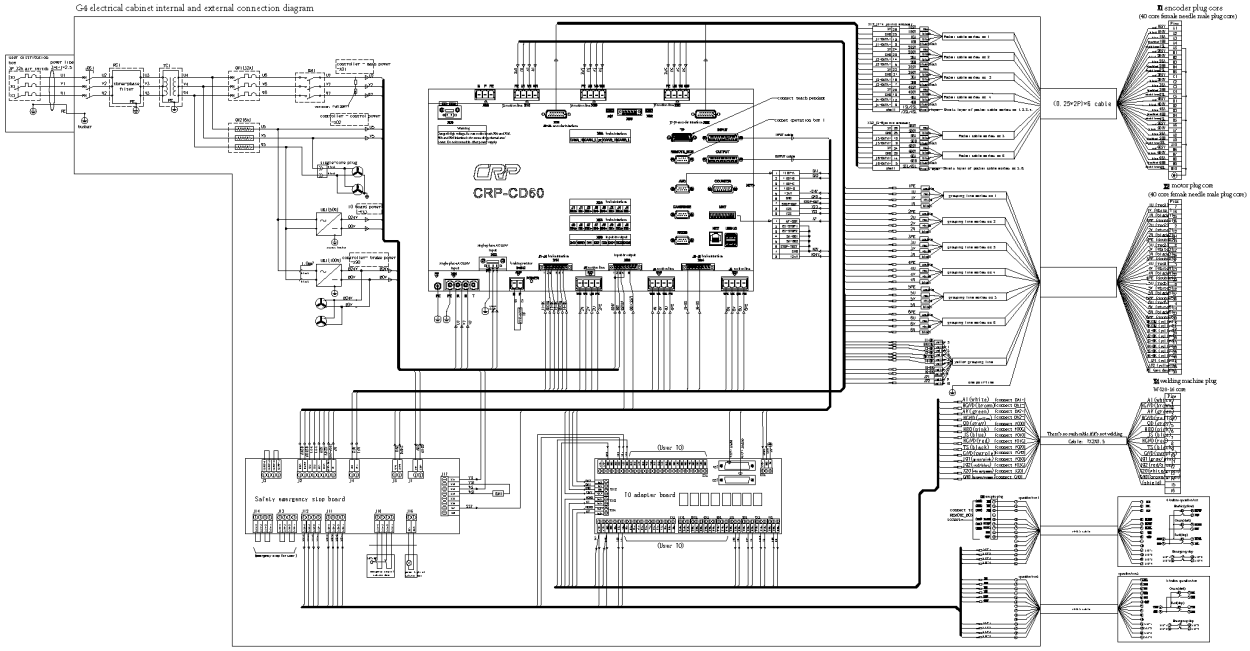
M8	40	24.5
M10	82	50
M12	120	82
M14	180	130

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8. Electrical connection diagram

8.1 Electrical cabinet side connection diagram

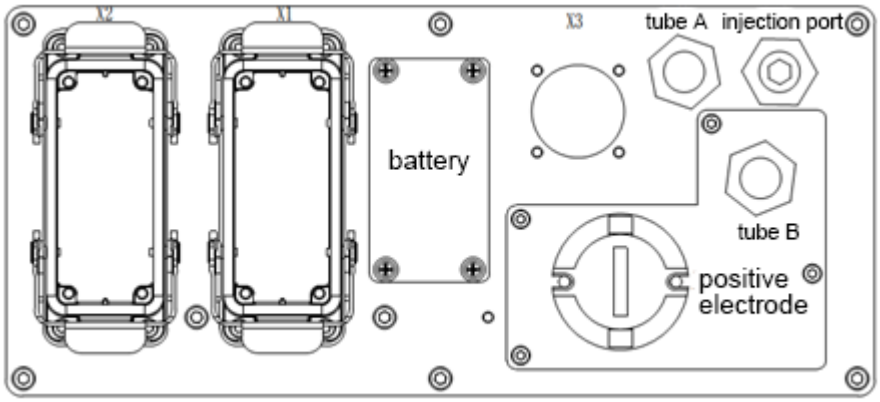
For detailed inspection, please refer to “CRP-R Robotic Electrical Manual (G4)”



8.2 Robot body side pipeline diagram

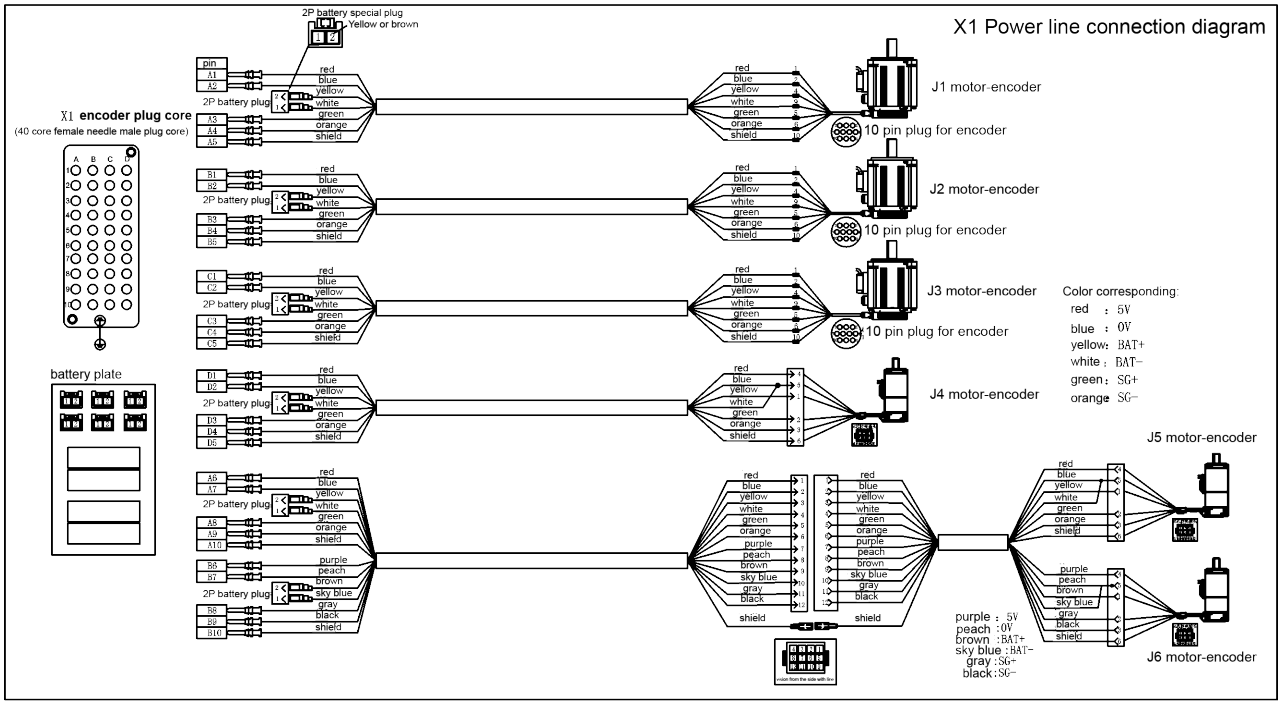
✧ For detailed inspection, please refer to “CRP-R Robotic Electrical Manual (G4)”

✧ Component mounting board

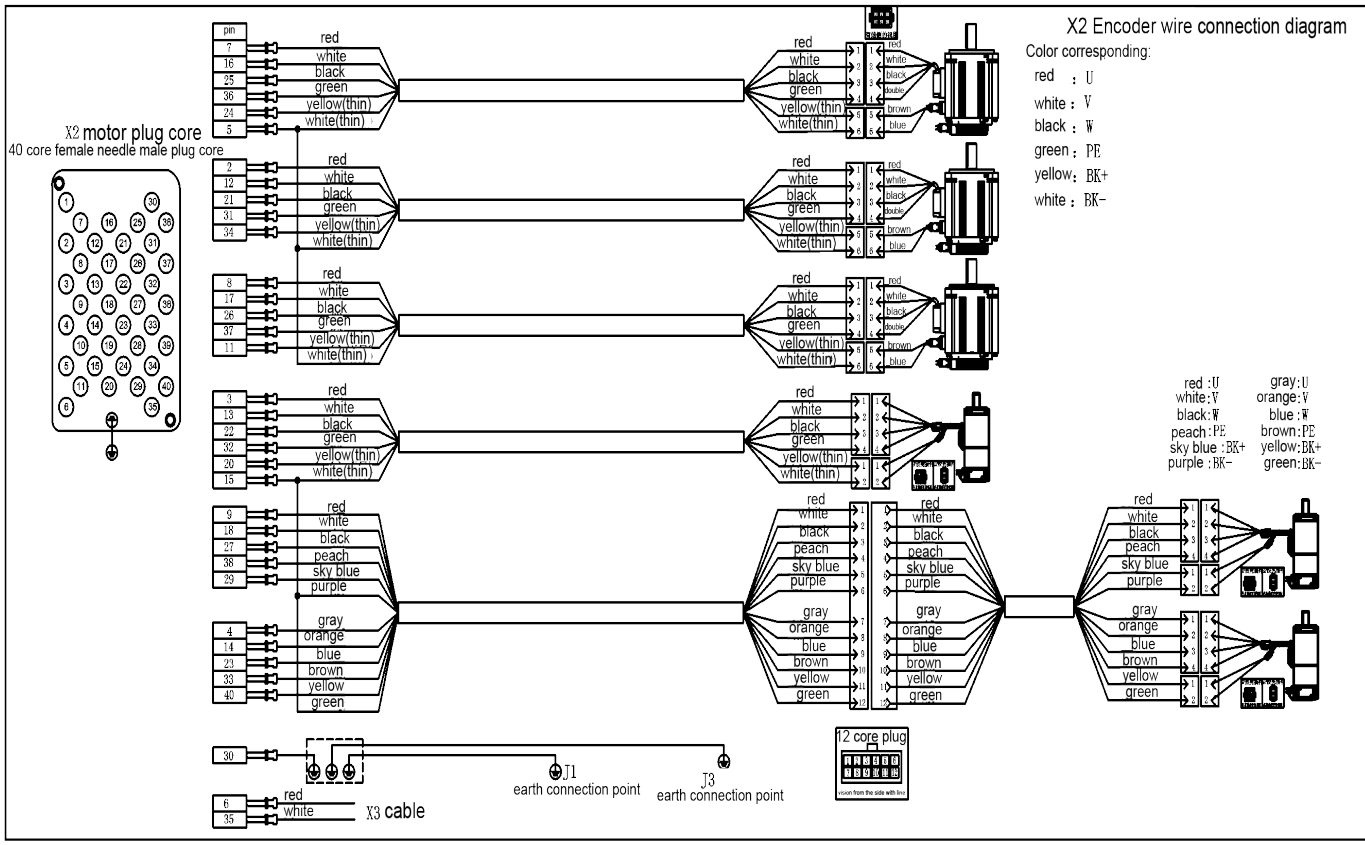


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✧ X1 encoder connection



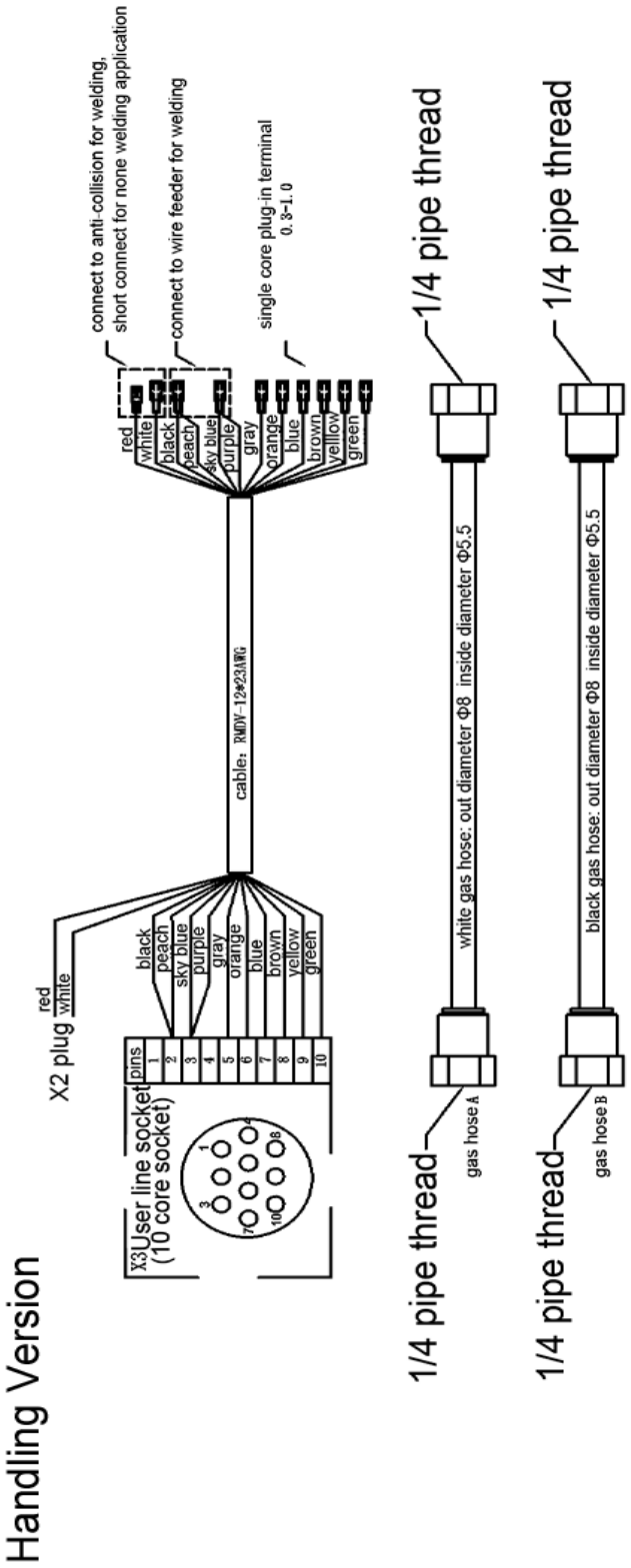
✧ X2 motor connection



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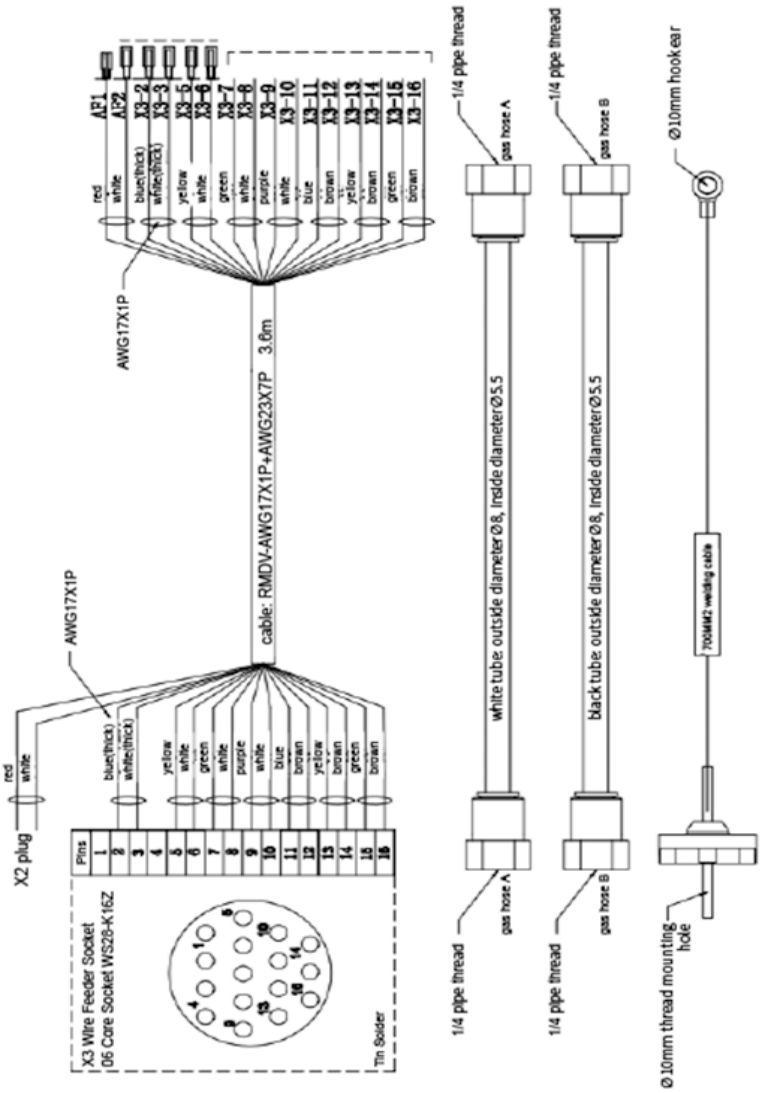
8.3 Robot body side user line X3

✧ Handling Version



✧ Welding Version

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Welding Version