

**Kawasaki Robot
MG Series (Ver. B)**

**Installation and
Connection Manual**

(Complementary Version)

Robot

Kawasaki Heavy Industries, Ltd.

Preface

This manual describes the transportation method excerpted from installation and connection procedures for Kawasaki Robot MG Series (Ver. B).

Read and understand the contents of this and “Safety Manual” thoroughly and strictly observe all rules for safety before proceeding with any operation. This manual describes only the transportation method excerpted from installation and connection procedures for the robot arm. Refer to “Installation and Connection Manual” for MG series (90202-1179) for other details about installation and connection of arms.

Never proceed with any operation until you understand the contents of this manual completely. Kawasaki cannot take any responsibility for any accidents and/or damages caused by operations that are based on only the limited part of this manual.

This manual is applicable to the following robot arms.

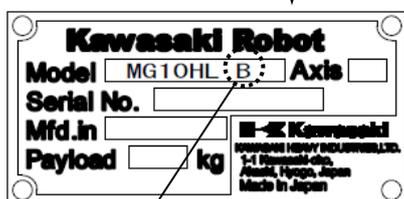
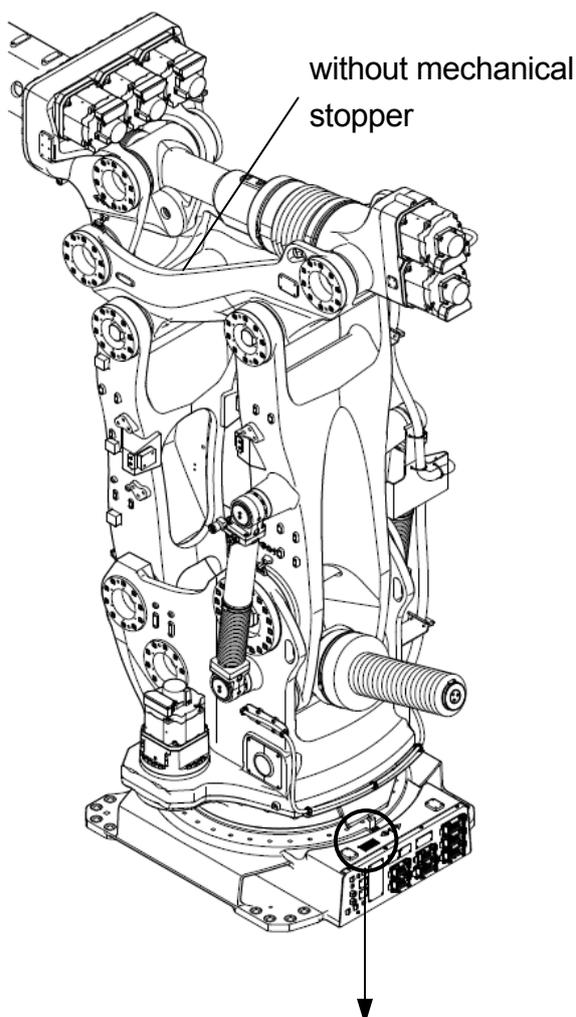
MG10HL, MG15HL

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1. This manual does not constitute a guarantee of the systems in which the robot is utilized. Accordingly, Kawasaki is not responsible for any accidents, damages, and/or problems relating to industrial property rights as a result of using the system.
 2. It is recommended that all personnel assigned for activation of operation, teaching, maintenance or inspection of the robot attend the necessary education/training course(s) prepared by Kawasaki, before assuming their responsibilities.
 3. Kawasaki reserves the right to change, revise, or update this manual without prior notice.
 4. This manual may not, in whole or in part, be reprinted or copied without the prior written consent of Kawasaki.
 5. Store this manual with care and keep it available for use at any time. If the robot is reinstalled or moved to a different site or sold off to a different user, attach this manual to the robot without fail. In the event the manual is lost or damaged severely, contact Kawasaki.
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Applicable Robots

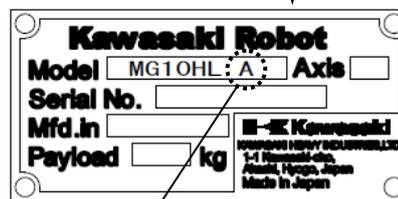
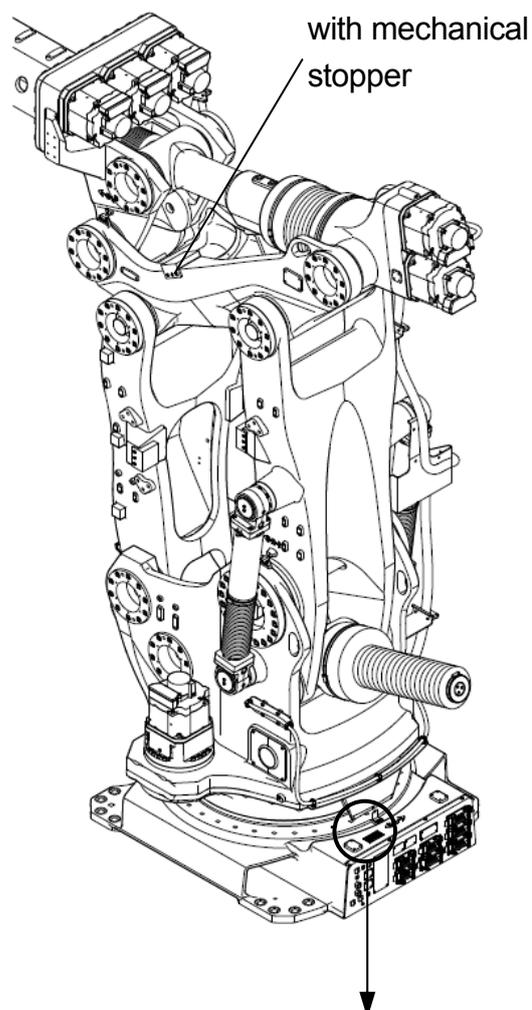
This manual is applicable to MG Series (Ver. B) robots. Check the position of the JT3 mechanical stopper and the machine nameplate to know if the robot is MG Series (Ver. B) or not.

MG series (Ver. B) robots



“B” is written in the Model column.

Robots other than MG series (Ver. B)



“A” is written in the Model column.

Symbols

The items that require special attention in this manual are designated with the following symbols.

Ensure proper and safe operation of the robot and prevent physical injury or property damages by complying with the safety matters given in the boxes with these symbols.

 **DANGER**

Failure to comply with indicated matters can result in imminent injury or death.

 **WARNING**

Failure to comply with indicated matters may possibly lead to injury or death.

 **CAUTION**

Failure to comply with indicated matters may lead to physical injury and/or mechanical damage.

[NOTE]

Denotes precautions regarding robot specification, handling, teaching, operation, and maintenance.

 **WARNING**

- 1. The accuracy and effectiveness of the diagrams, procedures, and detail explanations given in this manual cannot be confirmed with absolute certainty. Accordingly, it is necessary to give one's fullest attention when using this manual to perform any work. Should any unexplained questions or problems arise, please contact Kawasaki.**
- 2. Safety related contents described in this manual apply to each individual work and not to all robot work. In order to perform every work in safety, read and fully understand "Safety Manual", all pertinent laws, regulations and related materials as well as all the safety explanation described in each chapter, and prepare safety measures suitable for actual work.**

For the transportation of arms, this manual describes two types of transporting stands and the corresponding transportation methods. The contents of this manual apply to 4 Robot Transportation Method described in the original manual (90202-1179).

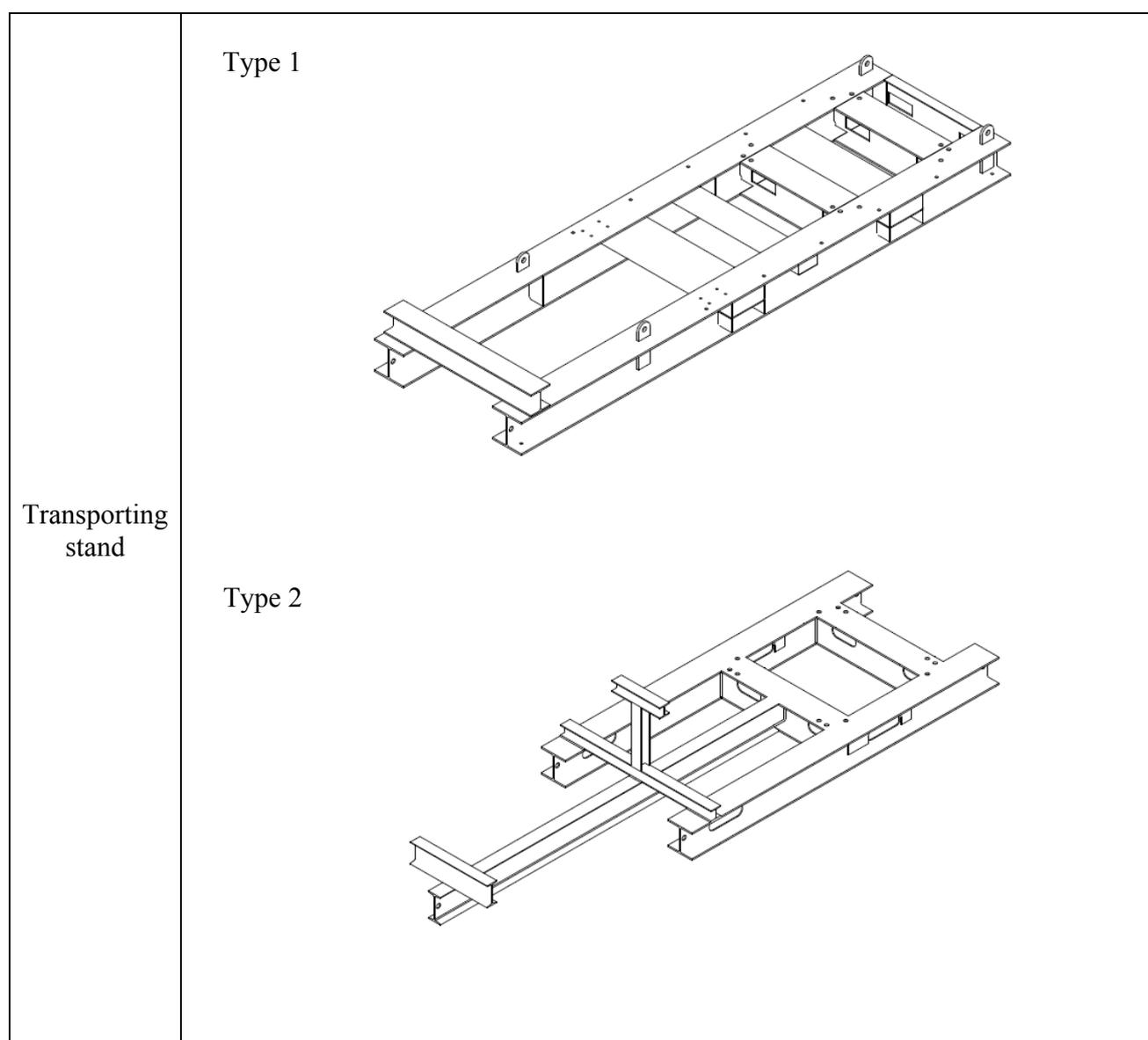
4 Robot Transportation Method

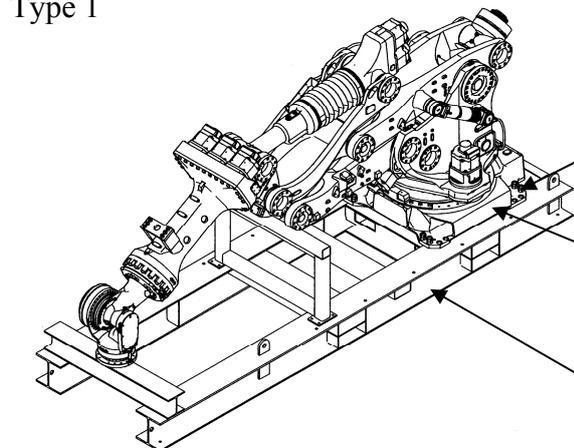
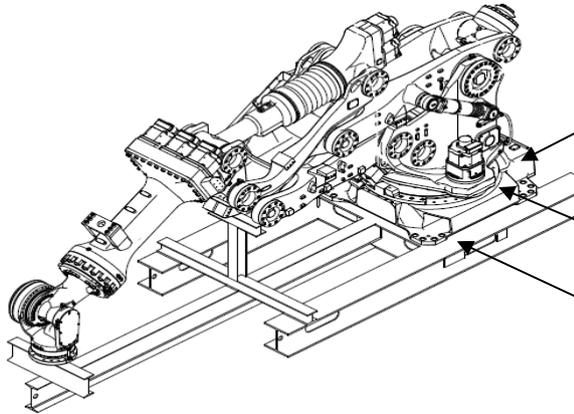
The robot can be transported by the following two methods: using a crane or a forklift. The procedures differ for when a transporting stand is used or when only the arm is transported without the stand.

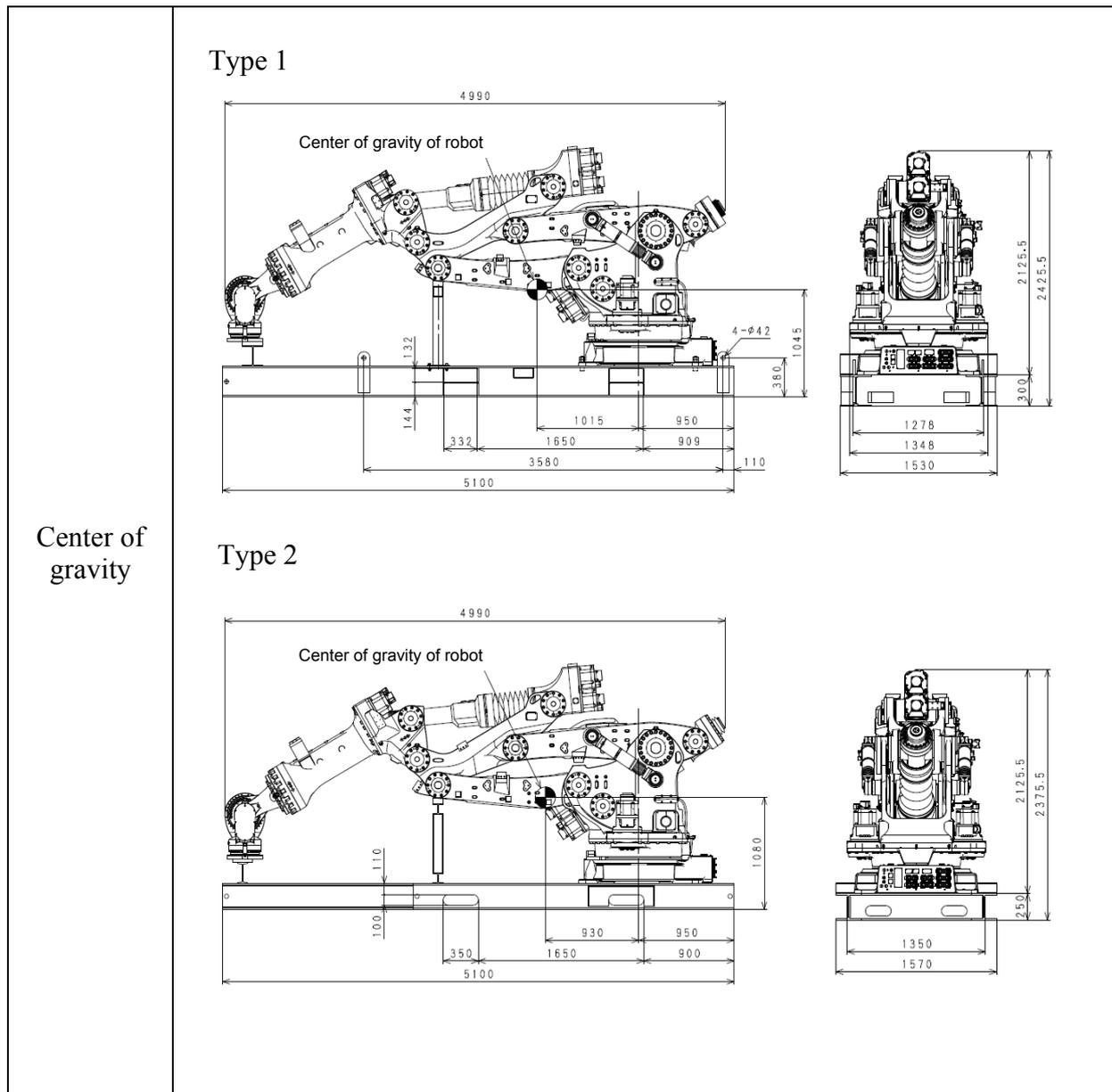
4.1 Using a Transporting Stand

The arm is transported on a stand as shown in the figure below.

There are two types of transporting stands. See figures below for each shape.



Posture when delivered	Type 1	 <p>Hexagon socket bolt M30 x110L (8 bolts) Nut: 2 nuts each for M30 (16 nuts)</p> <p>Robot arm MG10HL: 6500 kg (except options) MG15HL: 6550 kg (except options)</p> <p>Transporting stand: 1600 kg</p>
	Type 2	 <p>Hexagon socket bolt M30 x110L (8 bolts) Nut: 2 nuts each for M30 (16 nuts)</p> <p>Robot arm MG10HL: 6500 kg (except options) MG15HL: 6550 kg (except options)</p> <p>Transporting stand: 830 kg</p>
	JT1	0°
	JT2	90°
	JT3	-30°
	JT4	0°
	JT5	-60°
	JT6	0°



4.1.1 Using Wire Sling

1. When transporting a robot using a crane in the method of type 1 shown on the next page, hang hooks to the four hoisting points of the transporting table and hoist up the robot with wire slings. In the method of type 2, attach the hoisting jig to the upper arm, hang hooks to the four hoisting points of the arm and one point of jig, and then hoist up the robot by wire slings.



WARNING

1. Use wire slings with proper length to distribute the load to all slings without slack of the wire slings.
2. When hoisting up the robot, recognize the gravity center and be careful so that the arm does not fall in hoisting and transporting.
3. The hoisting method depends on the type of transporting stand. Confirm the transporting stand shape in Section 4.1 first, and then perform hoisting work.
4. When using the method of type 2, never directly hoist up the transporting stand in the state that a robot is loaded on it.

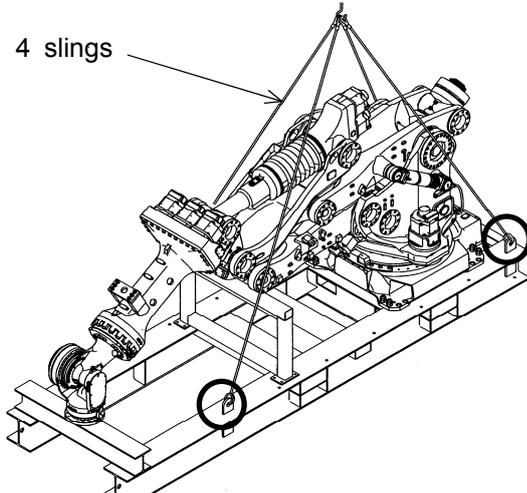


CAUTION

1. When hoisting up the robot, do not hoist up the robot with wire slings touching ball screws or motors to avoid early damage on the ball screws and the motors.
2. When hoisting up the robot, be careful as robot may lean forward/backward depending on robot posture and installation condition of the options. If the robot is hoisted up in an inclined posture, it may swing, damage or the wire may interfere with the harness, piping etc., or it may damage due to interfering with surrounding objects.
3. Remove the wire slings attached to the arm once the transportation of robot is complete.
4. Never use hoisting points other than the specified points when hoisting up a robot with wire slings.

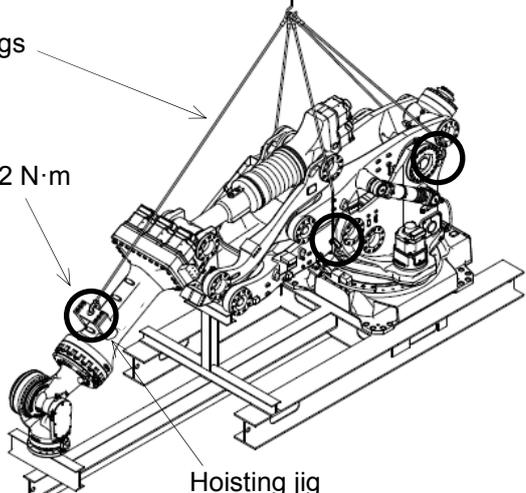
Hoisted up posture

Type 1



4 slings

Type 2



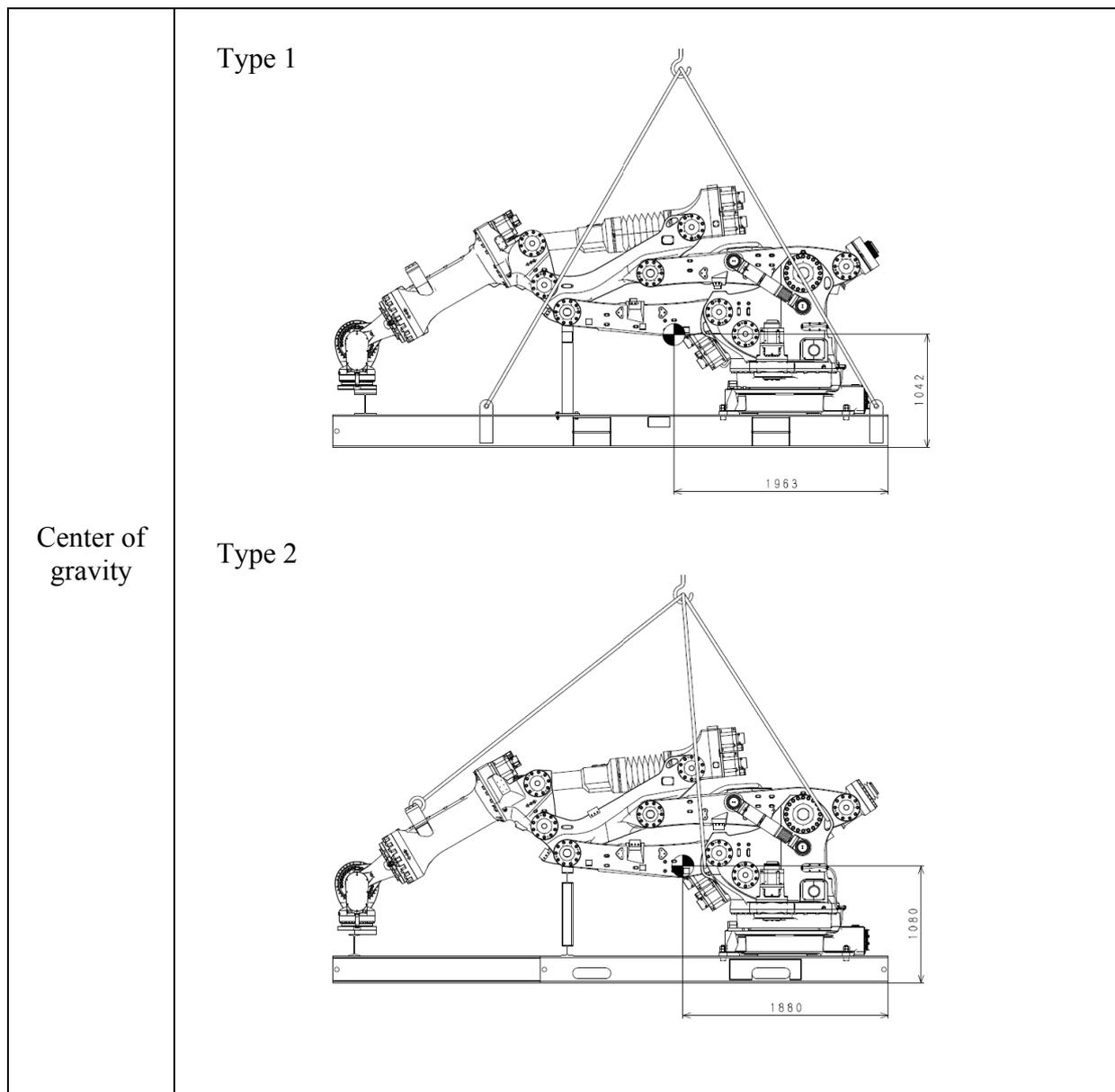
5 slings

Hexagon socket bolt
M20 x 230 (6 bolts)
Tightening torque: 431.2 N·m

Hoisting jig

○ Hoisting point

JT1	0°
JT2	90°
JT3	-30°
JT4	0°
JT5	-60°
JT6	0°



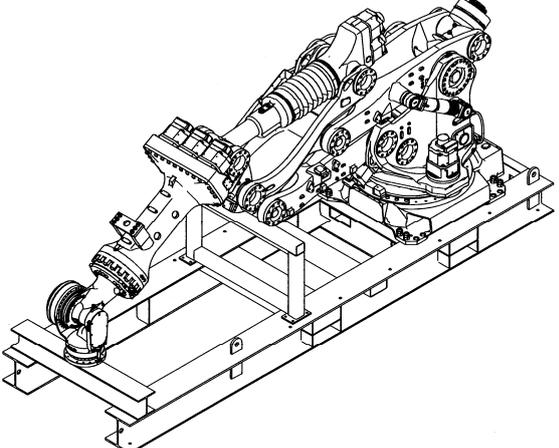
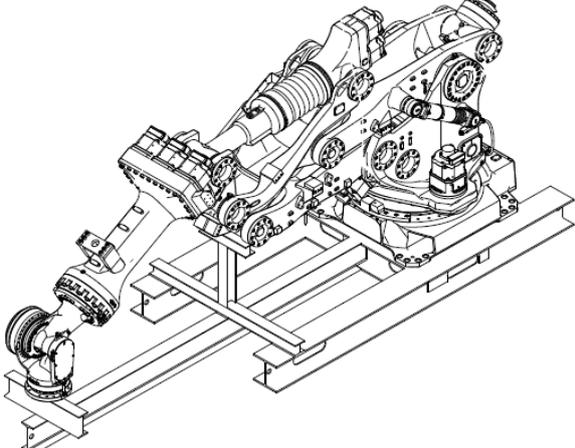
2. The arm should be detached from the transporting stand in installation. (See section 4.2.)

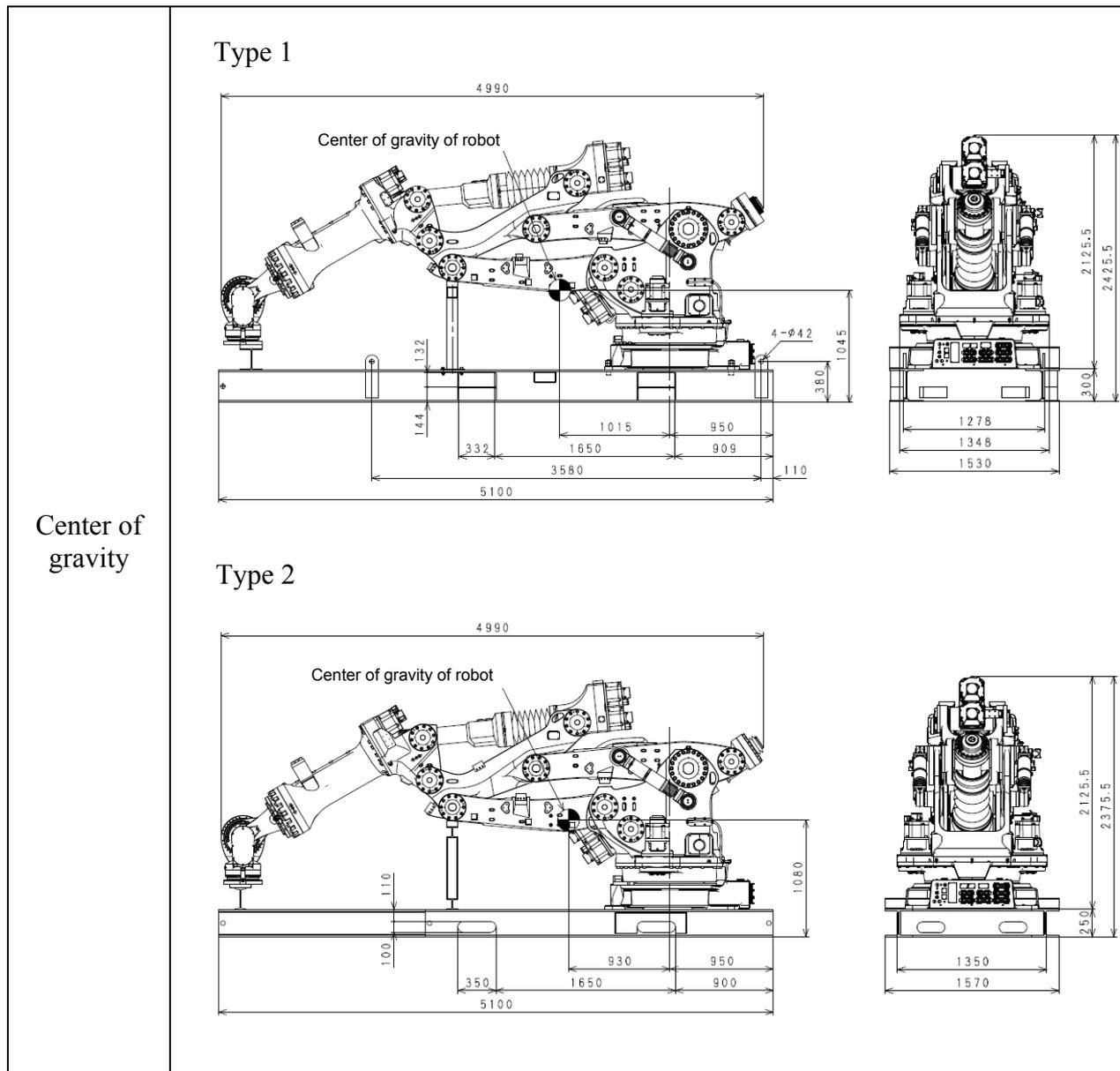
4.1.2 Using Forklift

1. When using a forklift, transport the robot by using the forklift pocket on the transporting stand as shown below.

⚠ CAUTION

1. Check if a fork of the forklift penetrates the forklift pocket sufficiently without fail.
2. When transporting robot on an inclined or rough surface, be careful to maintain balance to prevent forklift/robot from falling.

Transported posture	Type 1		
	Type 2		
	JT1		0°
	JT2		90°
	JT3		-30°
	JT4		0°
	JT5		-60°
	JT6		0°



2. The arm should be detached from the transporting stand in installation. (See section 4.2.)

4.2 When Transporting only Arm

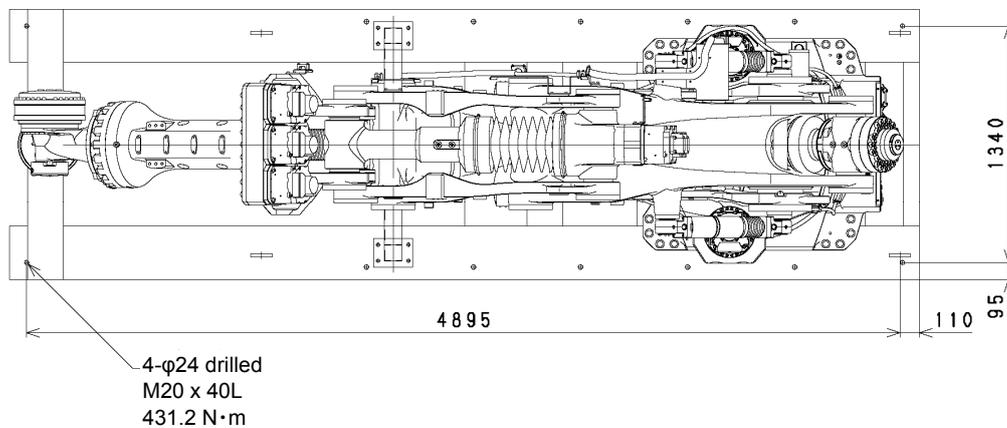
Only the arm detached from the transporting stand is transported to the installation place.



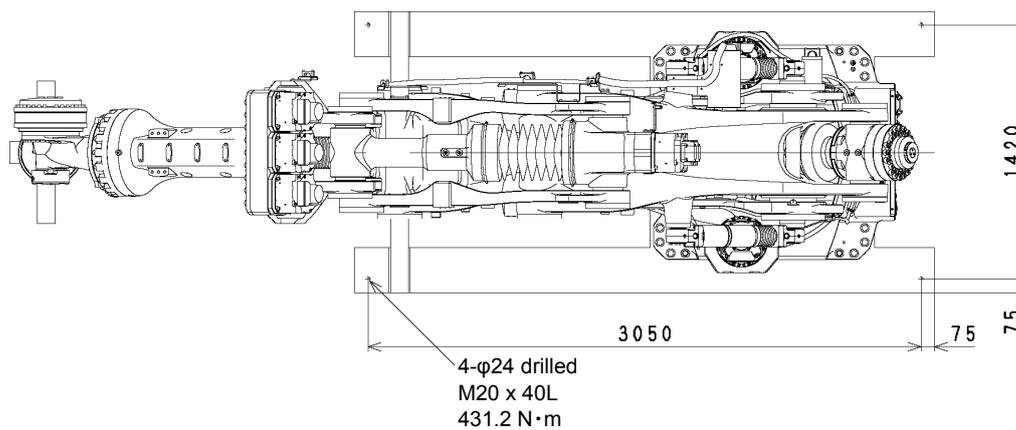
WARNING

1. When transporting the arm by wire slings while keeping the delivered posture, confirm that there is no slack on the wire, and then unscrew the screws bolting the arm to the transporting stand. If there is slack on the wire, the arm may fall when the tightening screws are unscrewed. (See subsection 4.2.1.2.)
2. Take measures to prevent the third person from executing the automatic operation and/or closing to the arm before changing the arm posture on the transporting stand. Read and understand the contents of “Safety Manual” thoroughly before preceding any work.
3. Fix the transporting stand as shown on the next page when changing the arm posture on the transporting stand. Moreover, move each axis in Teach mode following the procedure below, with the transporting stand and arm fixed. Otherwise, the arm may interfere with the transporting stand or fall. Moving JT1 may increase the probability for the arm falling. Do not move the axis in Repeat mode because the arm may fall. Turn OFF the controller power switch and the external power switch after changing the arm posture, and then unscrew the screws bolting the arm to the transporting stand. (See subsections 4.2.1.1 and 4.2.2.)
4. Do not change the posture with a brake release switch.
5. For changing the posture in transporting, qualify only persons who have completed the special course(s) on robot operations, teaching and operations. Read the contents of “Safety Manual” and “Installation and Connection Manual” and “Operation Manual” of the controller thoroughly, and start the work.

Type 1



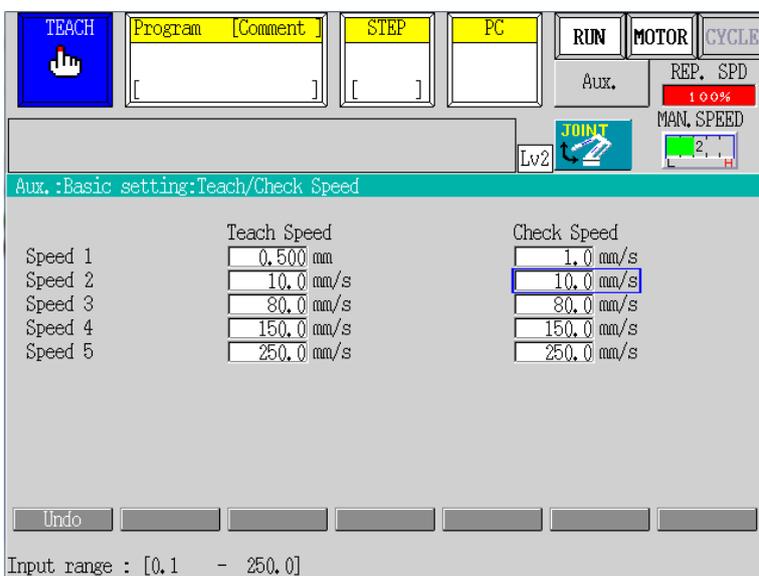
Type 2



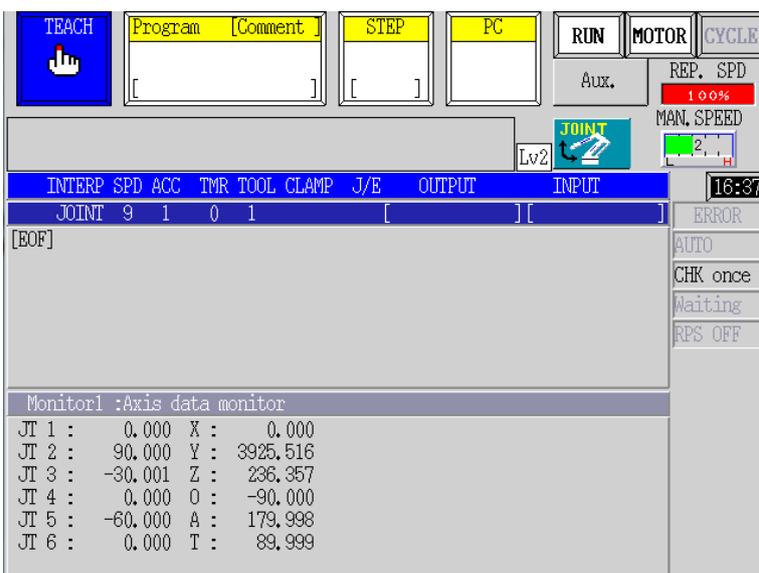
Procedure for changing postures

Refer to section 1.2 and change the arm posture in the following procedure.

1. Connect the robot arm to the controller. For details, refer to “Installation and Connection Manual” for controller.
2. Set to Teach mode and turn ON the motor power. For details, refer to “Operation Manual” for controller.
3. Make sure that Teach speed 2 is set to 10.0 mm/s on teach pendant (hereinafter called TP) screen. For details, refer to “Operation Manual” for controller.

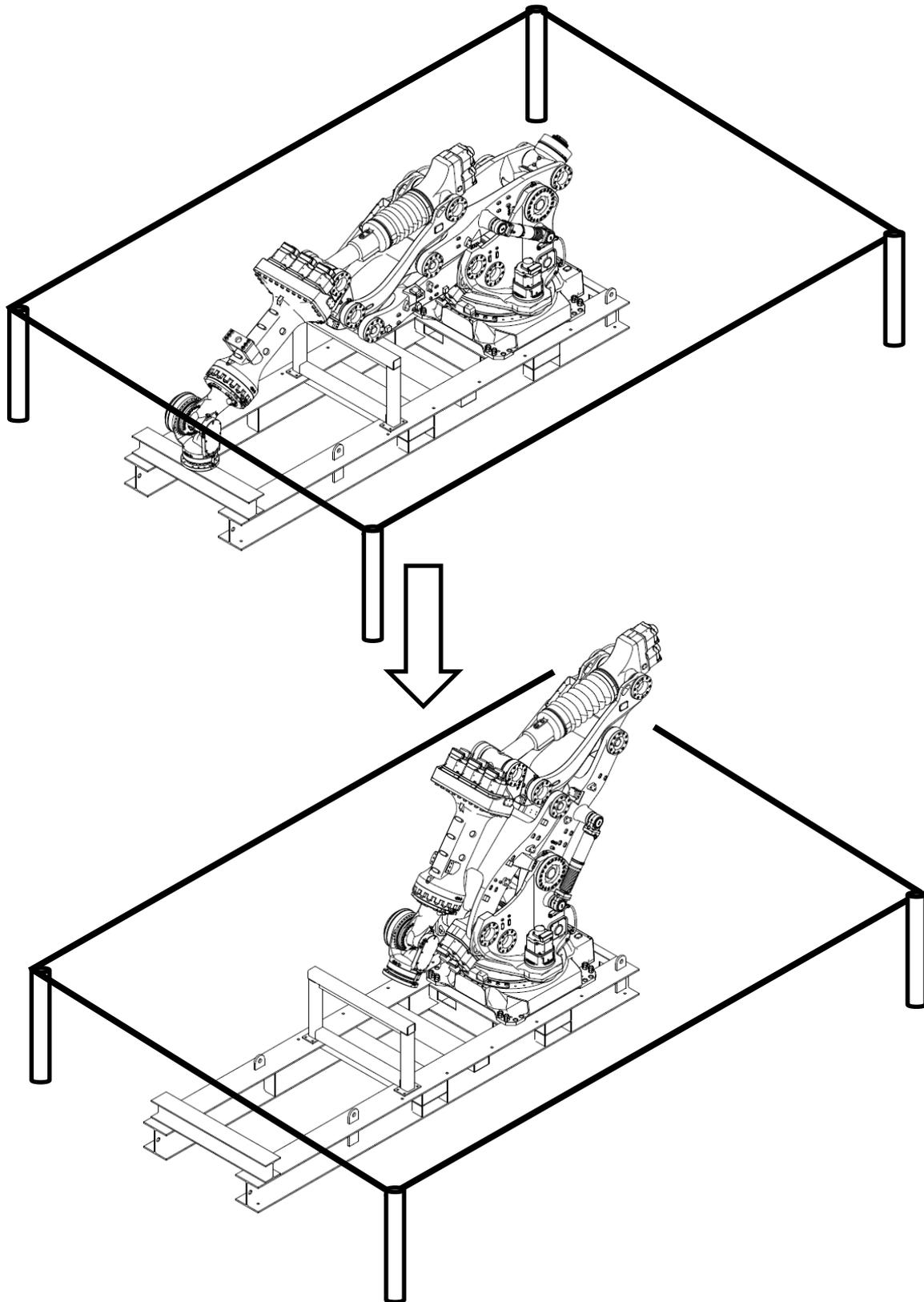


4. Display Axis data monitor on TP screen. For details, refer to “Operation Manual” for controller.



5. See the axis data on Axis data monitor screen of TP and move JT2 from 90° to -40° in Teach speed 2.*
6. See the axis data on Axis data monitor screen of TP and move JT5 from -60° to 0° in Teach speed 2.*
7. See the axis data on Axis data monitor screen of TP and move JT3 from -30° to -55° in Teach speed 2.*

* Do not move the axes other than the specified axis.



4.2.1 Using Wire Sling

Using wire slings, robot can be hoisted up in two different arm poses.



WARNING

1. Use wire slings with proper length to distribute the load to all slings without slack of the wire slings.
2. When hoisting up the robot, recognize the gravity center of arm and be careful so that the arm does not fall in hoisting and transporting.

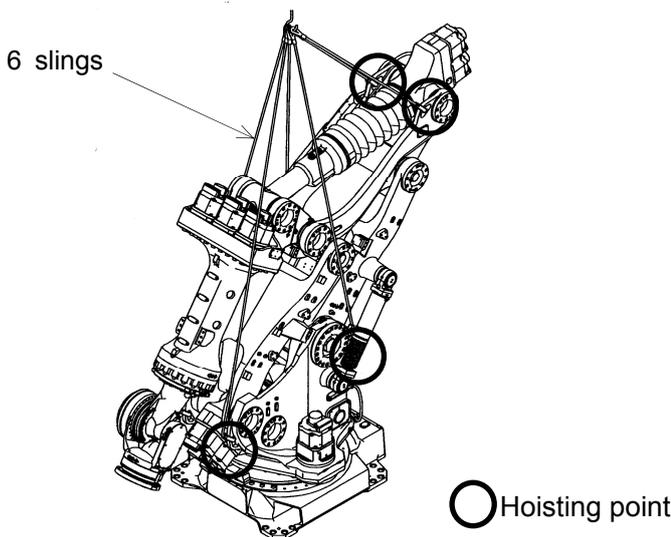
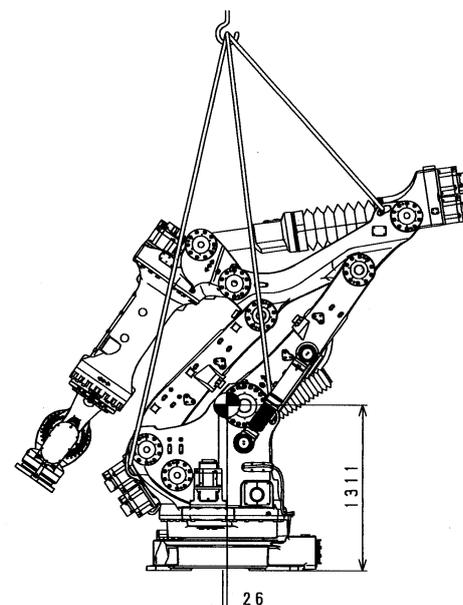


CAUTION

1. When hoisting up the robot, do not hoist up the robot with wire slings touching ball screws or motors to avoid early damage on the ball screws and the motors.
2. When hoisting up the robot, be careful as robot may lean forward/backward depending on robot posture and installation condition of the options. If the robot is hoisted up in an inclined posture, it may swing, damage or the wire may interfere with the harness, piping etc., or it may damage due to interfering with surrounding objects.
3. Remove the wire slings attached to the arm once the transportation of robot is complete.
4. Never use hoisting points other than the specified points when hoisting up the robot with wire slings.

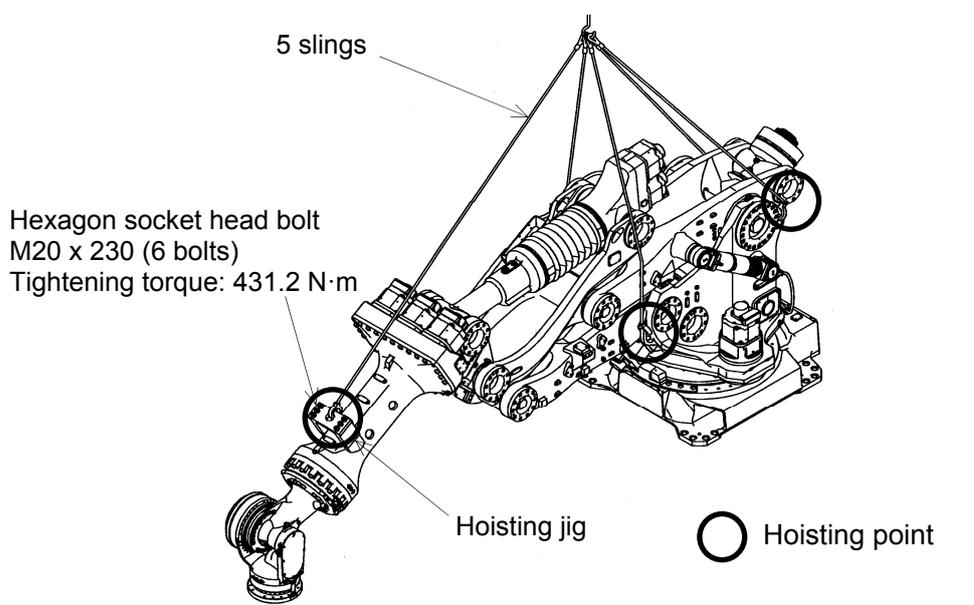
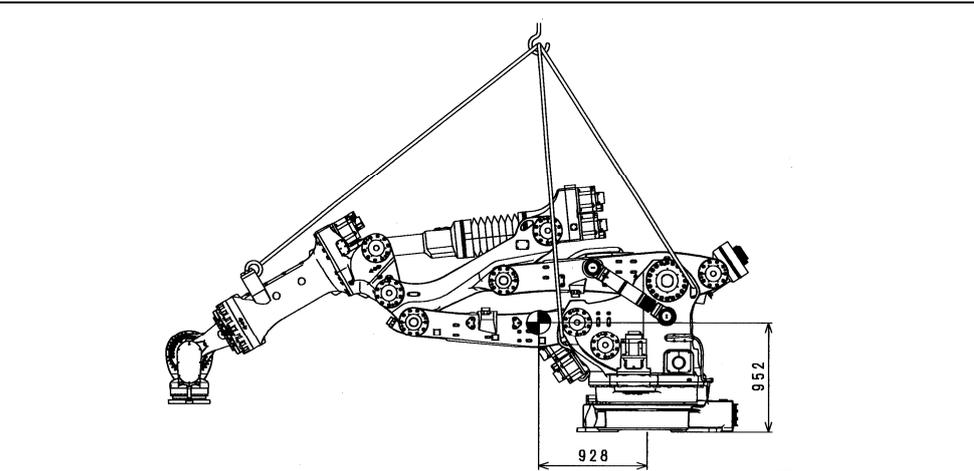
4.2.1.1 When Wiring on Arm Directly with the Arm Folded

As shown in the figure below, hoist up the robot by hanging hooks to the six hoisting points of the arm.

Model		MG10HL, MG15HL	
Hoisted up posture			
Hoisted up posture	JT1	0°	
	JT2	-40°	
	JT3	-55°	
	JT4	0°	
	JT5	0°	
	JT6	0°	
Center of gravity		 <p>*Except tool mass</p>	

4.2.1.2 When Using Hoisting Jig in Forward-Bent Posture of the Arm

As shown in the figure below, attach a hoisting jig (60154-6675) on the upper arm, hang hooks to the four hoisting points of the arm and one point of the jig, and then hoist up the robot by wire. Remove the hoisting jig once hoisting work is completed.

Model		MG10HL, MG15HL	
Hoisted up posture		 <p>5 slings</p> <p>Hexagon socket head bolt M20 x 230 (6 bolts) Tightening torque: 431.2 N·m</p> <p>Hoisting jig</p> <p>○ Hoisting point</p>	
Hoisted up posture	JT1	0°	
	JT2	90°	
	JT3	-30°	
	JT4	0°	
	JT5	-60°	
	JT6	0°	
Center of gravity		 <p>928</p> <p>955</p> <p>*Except tool mass</p>	

⚠ WARNING

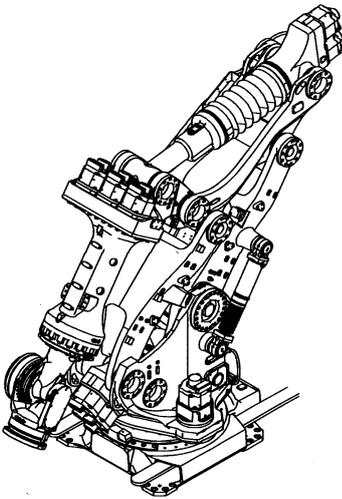
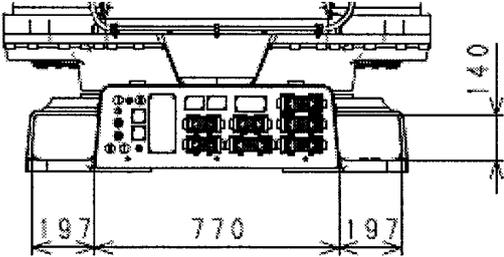
Use a hoisting jig without fail when hoisting up robot in the posture shown in the figure above. If the robot is hoisted up without using the jig, robot may fall.

4.2.2 Using Forklift

Transport the robot by using a forklift pocket on the base section as shown below.

⚠ CAUTION

1. Check if a fork of the forklift penetrates the forklift pocket sufficiently without fail.
2. When transporting robot on an inclined or rough surface, be careful to maintain balance to prevent forklift/robot from falling.

Transported posture		
Details of transported posture	JT1	0°
	JT2	-40°
	JT3	-55°
	JT4	0°
	JT5	0°
	JT6	0°
Fork pocket dimensions		

⚠ WARNING

Use a hoisting jig without fail when hoisting up robot. If the robot is hoisted up without using the jig, robot may fall.



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