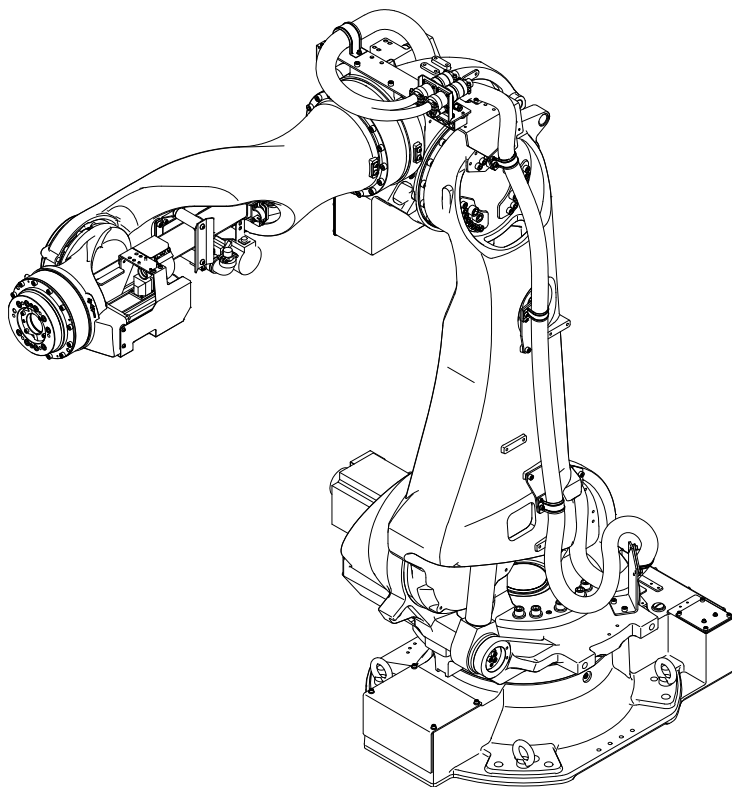


NACHI

Standard specifications

**SRA-H-01-FD11
SRA-HL-01-FD11**

6th edition



NACHI-FUJIKOSHI CORP.

1608, SSRAEN-071-006,001

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1. Outline

NACHI ROBOT “SRA-H series” is optimal robot for spot welding, material handling and other applications, and provides dramatically improved productivity by its overwhelming speed and compact body.

This series contains not only the “Standard type” but also the “Long arm type” which spreads its operating range

Standard type

Installation	Max. payload 100 kg	Max. payload 133 kg	Max. payload 166 kg	Max. payload 210 kg
Floor mount	SRA100H-01	SRA133H-01	SRA166H-01	SRA210H-01

Long arm type

Installation	Max. payload 133 kg
Floor mount	SRA133HL-01

■ **World class speed robot**

- Cycle time reduced by 3 improvements of light weight, high rigidity and quick motion control, resulting in high acceleration and minimum vibration.

■ **Ease of use**

- Operating range of robot is irrelevant to the payload mass. Axis 5 (wrist) operating range is maximum in its class. These features open the robot to more diverse applications, thus resulting in easier application design (*1).
- By installing the balance unit inside arm, swivel base becomes slim. Slim and compact design allows closer installation in less floor space.
- Sufficient application wires and tubes are installed inside arm in order to apply to bigger and high function tool.

■ **Improved energy efficiency**

- Power consumption reduced 15% from existing model by reducing the robot’s weight by 20% and using cutting edge motor drive controls.

*1; “Application” is the purpose of robot’s usage. For example, spot welding and material handling.

2. Basic specifications

Item		Specifications				
Robot model		SRA100H-01	SRA133H-01	SRA166H-01	SRA210H-01	SRA133HL-01
Construction		Articulated				
Number of axis		6				
Drive system		AC servo motor				
Max. working envelope	Axis 1	±3.14 rad (±180°)				
	Axis 2	-1.40 ~ +1.05 rad (-80 ~ +60°)				
	Axis 3	-2.56 ~ +2.62 rad (-146.5 ~ +150°)			-2.33 ~ +2.62 rad (-133.4 ~ +150°)	
	Axis 4	±3.66 rad (±210°)				
	Axis 5	±2.18 rad (±125°)				
	Axis 6	±3.66 rad (±210°)				
Max. speed	Axis 1	2.18 rad/s (125°/s)	2.09 rad/s (120°/s)		2.01 rad/s (115°/s)	
	Axis 2	2.00 rad/s (115°/s)	1.92 rad/s (110°/s)		1.83 rad/s (105°/s)	
	Axis 3	2.11 rad/s (121°/s)	2.06 rad/s (118°/s)	2.00 rad/s (115°/s)	1.97 rad/s (113°/s)	
	Axis 4	3.66 rad/s (210°/s)		3.05 rad/s (175°/s)	2.27 rad/s (130°/s)	3.66 rad/s (210°/s)
	Axis 5	3.05 rad/s (175°/s)		2.98 rad/s (171°/s)	2.27 rad/s (130°/s)	3.05 rad/s (175°/s)
	Axis 6	5.41 rad/s (310°/s)		4.88 rad/s (280°/s)	3.58 rad/s (205°/s)	5.41 rad/s (310°/s)
Max. pay load	Wrist	100 kg	133 kg	166 kg	210 kg	133 kg
	Forearm *1	20kg				
Allowable static load torque	Axis 4	830 N·m		960 N·m	1337 N·m	830 N·m
	Axis 5	830 N·m		960 N·m	1337 N·m	830 N·m
	Axis 6	441 N·m		520 N·m	720 N·m	441 N·m
Allowable moment of inertia *2	Axis 4	85 kg·m ²		100 kg·m ²	200 kg·m ²	85 kg·m ²
	Axis 5	85 kg·m ²		100 kg·m ²	200 kg·m ²	85 kg·m ²
	Axis 6	45 kg·m ²		50 kg·m ²	155 kg·m ²	45 kg·m ²
Position repeatability *3		±0.1 mm			±0.15 mm	
Installation		Floor mount				
Ambient conditions		Temperature: 0 to 45 °C *4 Humidity: 20 to 85%RH (No dew condensation allowed) Vibration to the installation face: Not more than 0.5G (4.9 m/s ²)				
Dust-proof / Drip-proof performance		Wrist & Body ; IP54 equivalent,				
Noise *5		79.6 dB				
Robot mass		1040 kg		1100 kg	1070 kg	

1[rad] = 180/π[°], 1[N·m] = 1/9.8[kgf·m]

- On controller display, axis 1 to 6 is displayed JT1 to JT6 for each.

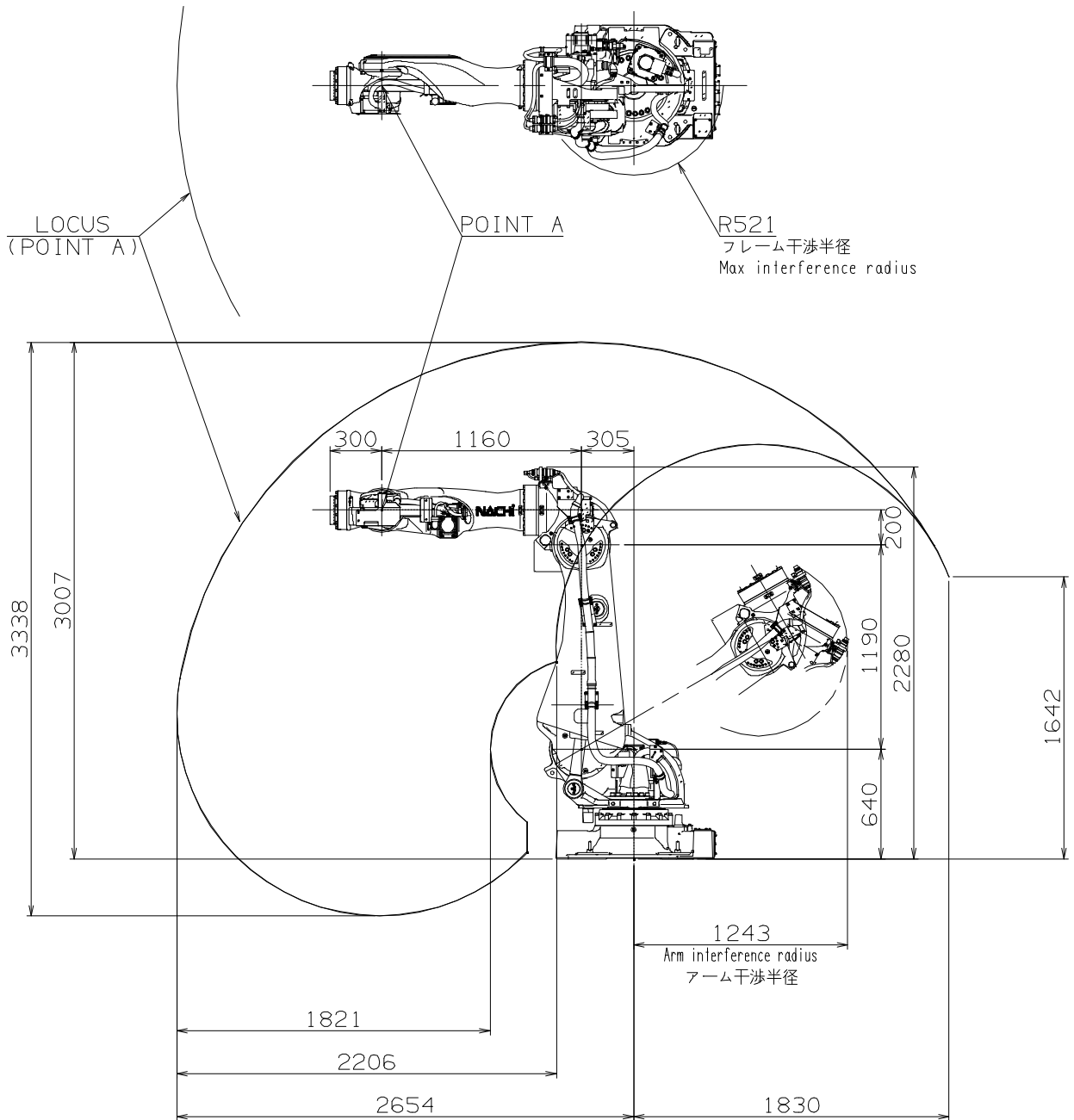
- The specification and externals described in this specifications might change without a previous notice for the improvement.

- Explosion-proof is not available.

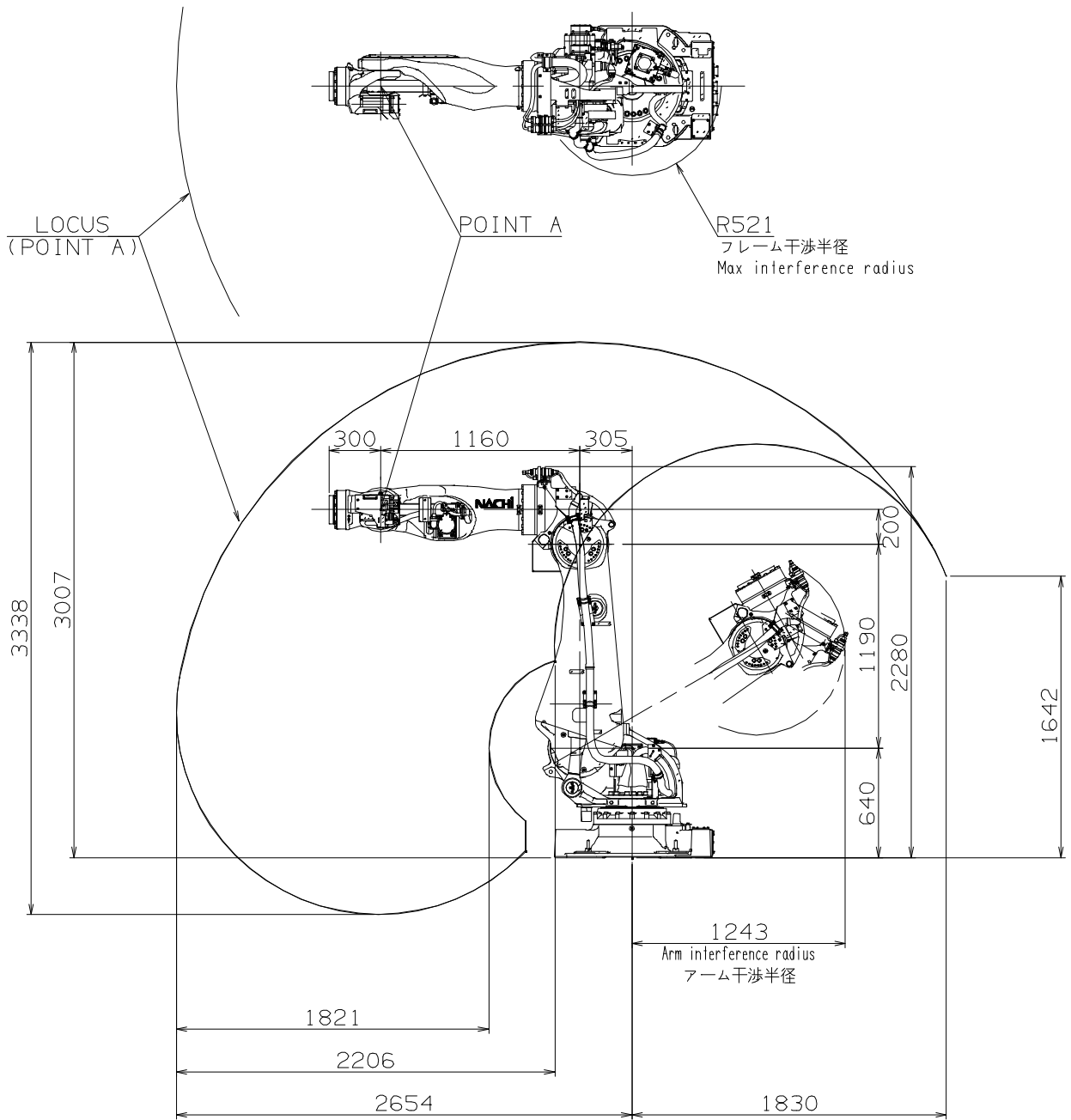
*1: This value changes by placement and load conditions of a wrist. *2: The Allowable moment of inertia of a wrist changes with load conditions of a wrist. *3: This value conforms to "JIS B 8432". *4: Permitted height is not higher than 1,000m above sea level. If used in higher place, permitted temperature is affected by height. *5: Robot noise is A-weighted equivalent sound level measured under "JIS Z 8737-1" (ISO 11201) with max. payload and max. speed.

3. Robot dimensions and working envelope

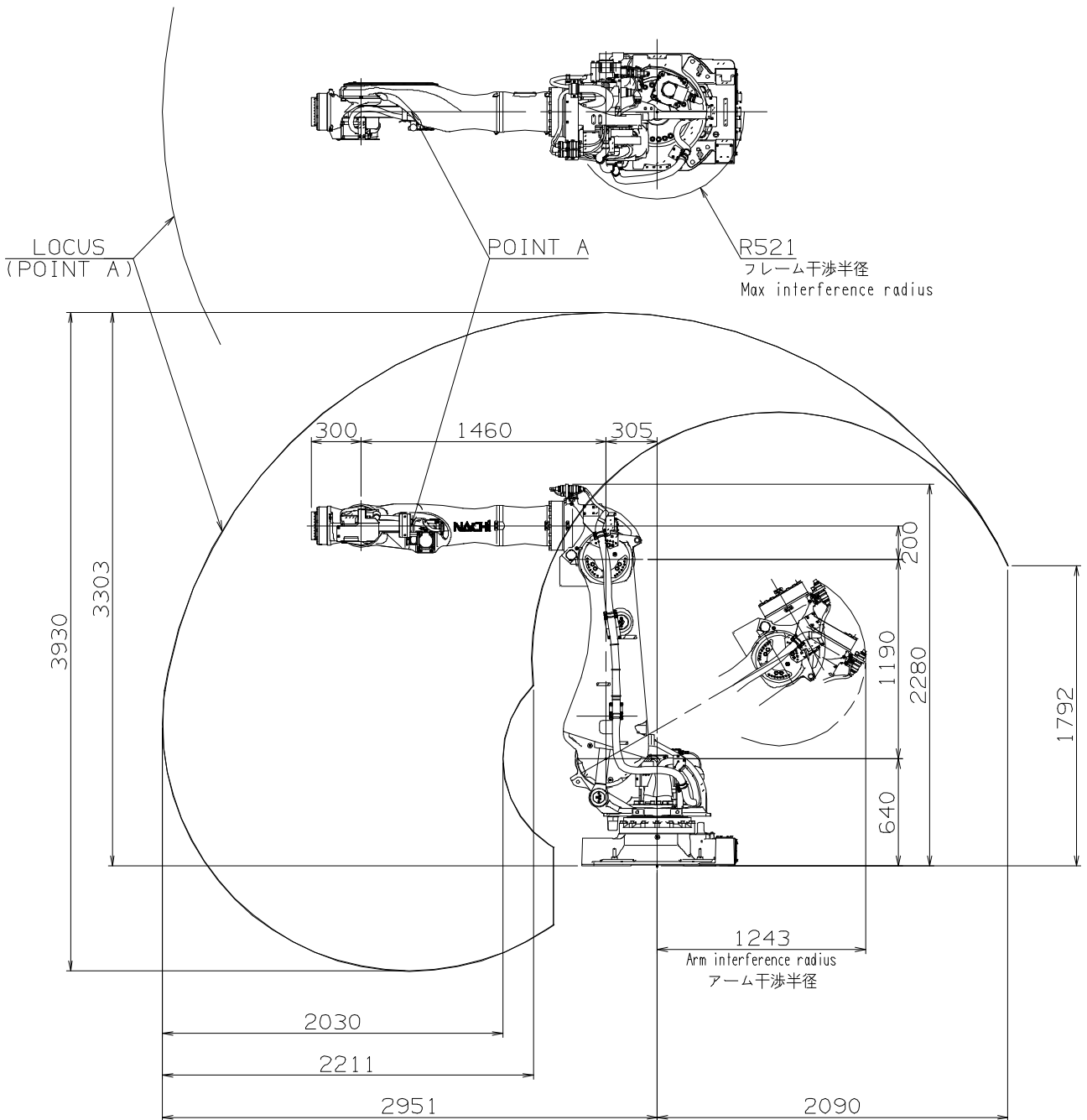
【SRA100H-01】 【SRA133H-01】



【SRA166H-01】 【SRA210H-01】



【SRA133HL-01】





4. Detail of load mounting plate

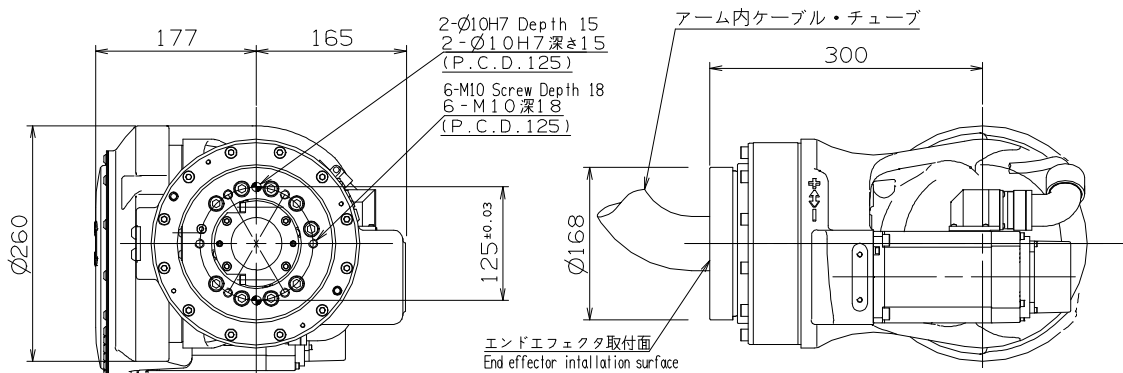
■ Wrist

For the end effector fixing bolts, use the mounting P.C.D. shown in the following figures.

Another P.C.D. is prepared as option. Consult with each NACHI-FUJIKOSHI office for the details

 CAUTION	Be sure to screw the M10 tool fixing bolts in the wrist not deeper than the screw depth in the mounting face. Screwing the bolts deeper than the screw depth may damage the wrist.
 IMPORTANT	Cables and tubes are pulled out from the center portion of end effector. So please make a hole of $\phi 100$ on end effector for easier maintenance without dismounting it. If making hole on end effector is impossible, extension flange (option) is prepared in order to pull out cables from the side.


【SRA100H-01】【SRA133L-01】【SRA133HL-01】

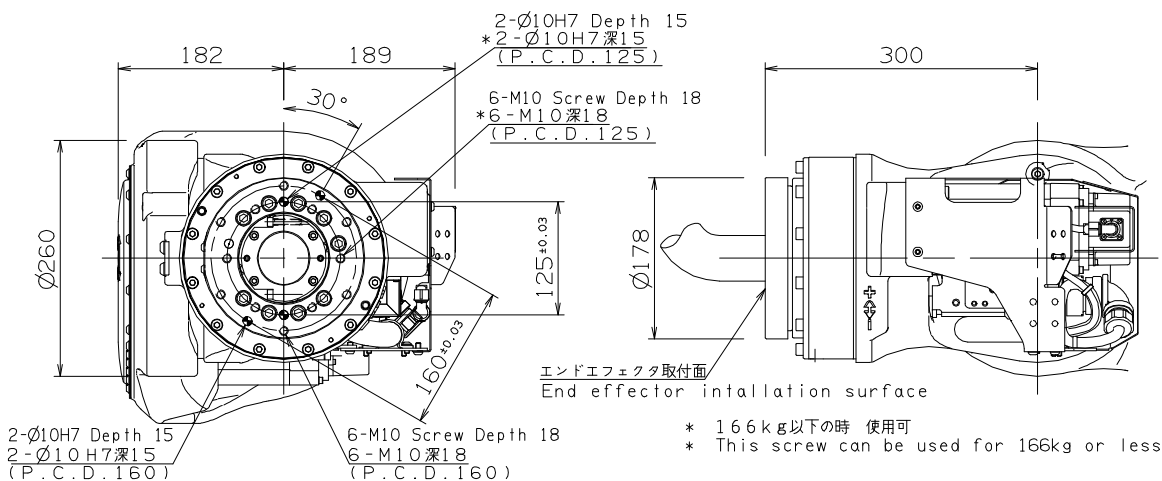


Tightening torque of
M10 Hex. socket head cap screw

JIS: Strength class 10.9	55 N·m
JIS: Strength class 12.9	67 N·m

【SRA166H-01】【SRA210H-01】

 IMPORTANT	Be sure to use P.C.D.160 tap hole when tool weight is more than 166 kg.
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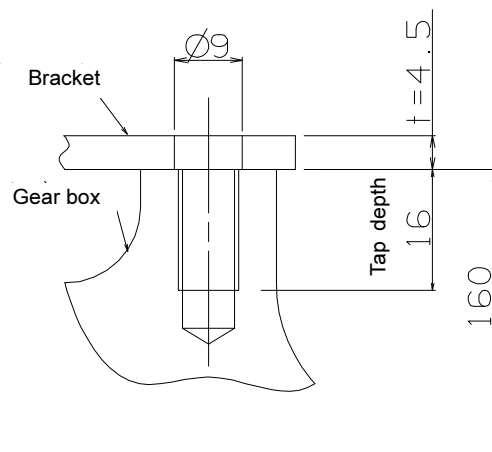
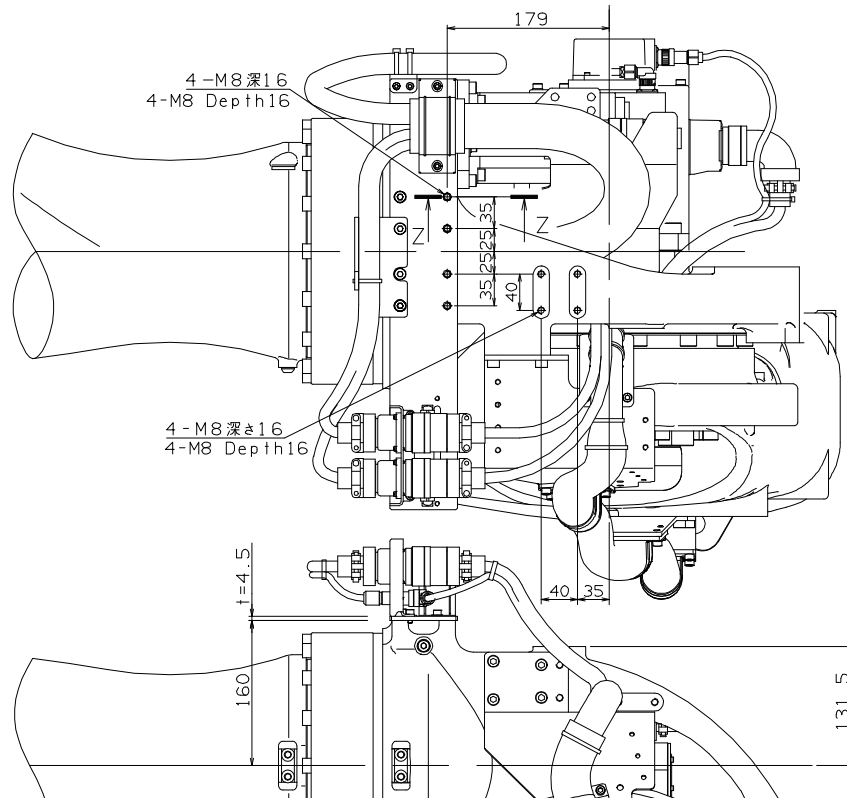
Tightening torque of
M10 Hex. socket head cap screw

JIS: Strength class 10.9	55 N·m
JIS: Strength class 12.9	67 N·m

■ Upper part of forearm

Ancillary equipment can be mounted to the upper part of robot forearm.

【SRA100H-01】【SRA133H-01】【SRA166H-01】【SRA210H-01】【SRA133HL-01】



Cross section view of Z-Z (4 portions)


5. Installation procedure

The installation location and the installation procedure of the robot are critical factors to maintain robot functions. The ambient conditions of installation location not only have influence on the life of mechanical sections of the robot, but also get involved in safety issues. Consequently, strictly observe the environmental conditions shown below. Furthermore, utmost care should be exerted for the installation procedure and the foundation for the robot in order to maintain the robot performance. Strictly observe the installation procedure for the robot provided below.


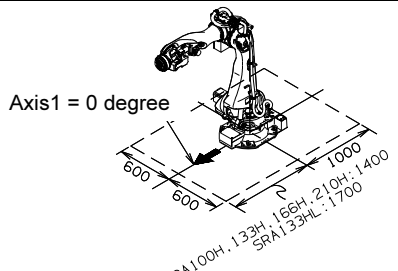
Installation

To install the robot, give it first priority to thoroughly consider safety of workers and take safety measures. The following describes precautions for this purpose.

Safety measures against entry in the robot operating area

 <p>WARNING</p>	<p>While the robot is in operation, workers are in danger of coming in contact with the robot. To avoid that, install a guard fence so as to keep the worker away from the robot. Not doing so will cause the workers or other persons to accidentally enter the operating area, thus resulting in accidents.</p>
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Space surrounding robot

 <p>IMPORTANT</p>	<p>When installing this robot, open space written in figure is necessary for maintenance work such as motor replacement, balancer replacement and other work.</p>	
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Installation location and ambient conditions

Conditions (temperature, humidity, height and vibration) are written in “2. Basic Specifications”. Further ambient conditions listed below must be observed.

- (1) Location with the drainage structure so that swivel base is not flooded, when the liquid such as water or cutting fluid is splashed on the robot body
- (2) Location with no flammable or corrosive fluid or gas.
- (3) Type D grounding (the grounding resistance is 100Ω or less) is necessary.

Installation procedure

While robot moves, large reaction force is applied to the swiveling base from all directions. Consequently, the robot should be installed in such a manner that the foundation endures not only the static loads but also the reaction force caused by robot movement.

Repair uneven spots, cracks, and others on the floor, and then install the robot by following to the table below. If thickness of floor concrete is less than needed level, an independent foundation should be constructed. Inspect the foundation prior to the robot installation, and then construct the foundation, if necessary.

Robot Model	SRA100H-01	SRA133H-01	SRA166H-01	SRA210H-01	SRA133HL-01
Thickness of floor concrete	Not less than 160 mm				
Installation parts *1	8 bolts of M20 (JIS: Strength class 12.9) not less than 65mm 8 plain washers of not less than 4.5 mm in thickness and HRC35 in hardness				
Tightening torque *2	560 ± 30 N·m				
Allowable repeated tensile *3	Approx. 22,000 N	Approx. 28,000 N	Approx. 30,000 N	Approx. 28,000 N	Approx. 28,000 N




*1 : Installation parts are not accessory of robot.

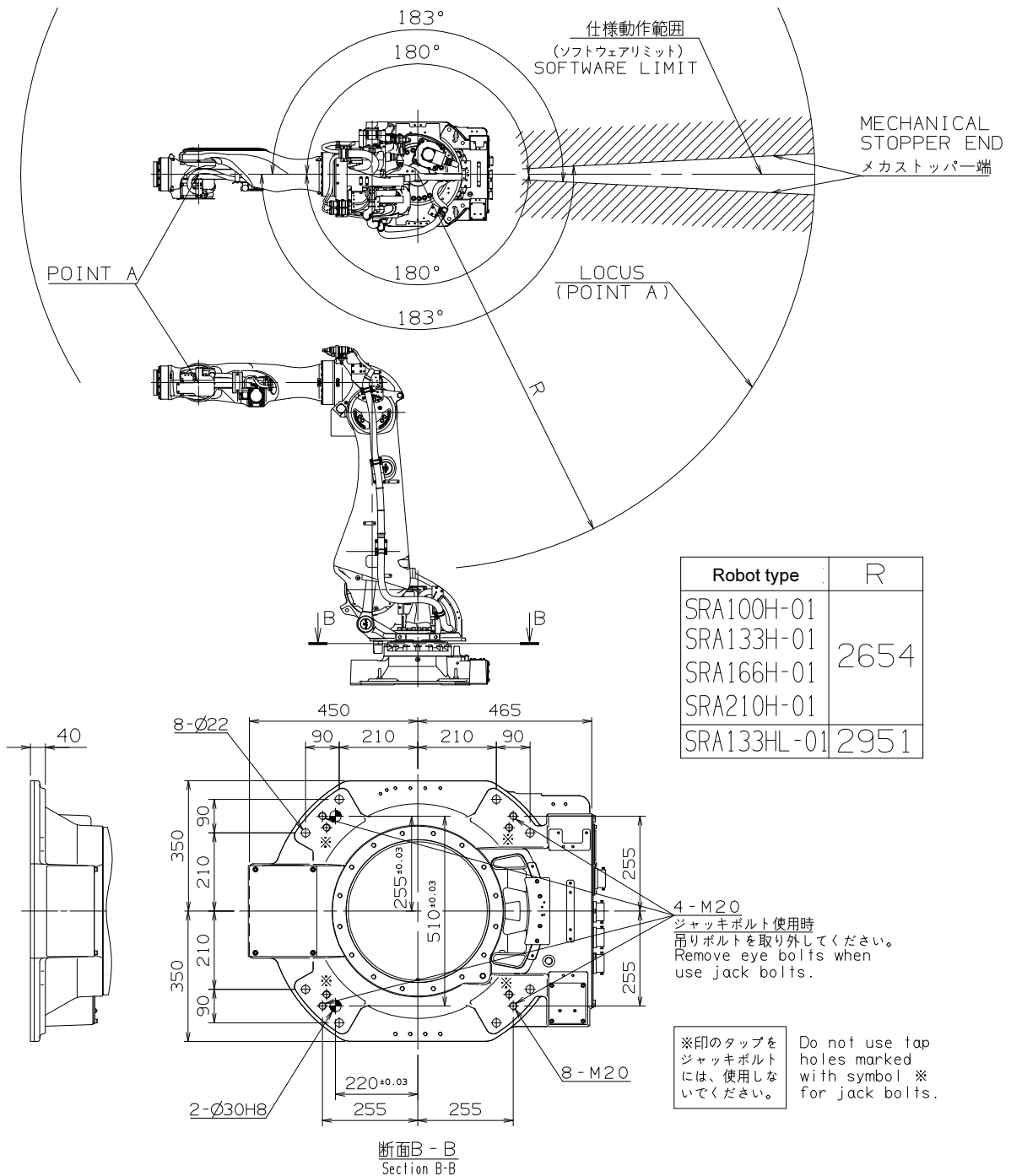
*2 : Apply a coating of lubricating oil to the threaded parts of bolts, and then tighten bolts by using torque wrench to the specified tightening torque.

*3 : This tensile is per installation bolt when robot is installed with all bolts written in table above.

■ Installation space

To install the robot, lock the swiveling base of the robot.

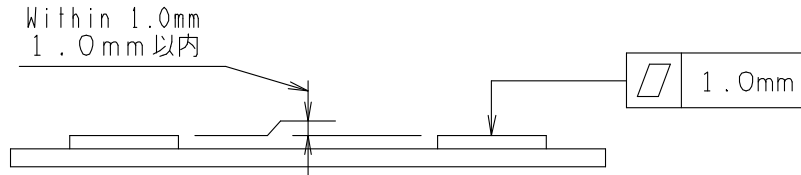
 CAUTION	The mechanical stopper end is located in a position exceeding the specified working envelope (software limit) of axis 1 by 3°. To install the safety fence, with consideration given to the wrist configuration and the shape of end effector.
 WARNING	On axes 1, 2 and 3, the robot working envelope can be regulated for safety (optional function). Since optional parts should be installed to enable this function, do not independently move the standard parts (e.g. mechanical stopper).
 WARNING	If mechanical stopper collides and robot stops, it's possible that some parts are already damaged, for example, mechanical stopper is transformed or fixing bolts are broken. In this case, sufficient intensity and function can not be kept. Mechanical stopper and reduction gear of collided joint are needed to be replaced to the new one.



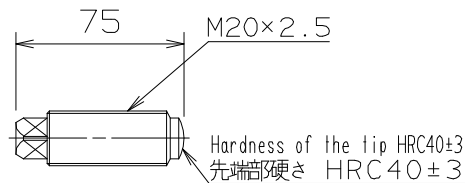
■ Accuracy of installation surface

When installing robot, strictly observe precautions listed below to cause no deformation in the swivel base.

- (1) Make the deviation from the flatness of the 4 plates on the robot installation surface fall within 1.0 mm.
- (2) Make the deviation in height between the 4 places of each base plate installation surface and the robot installation surface fall in the range of 1.0 mm (± 0.5 mm).



- (3) If the two precautions above cannot be observed, use jack bolts to bring the four places into even contact with the installation surface.

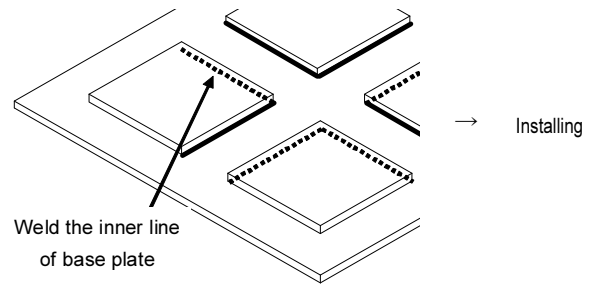
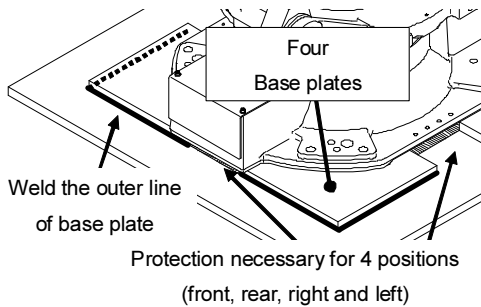


■ Welding of base plate

Protect the space (4 places of the front, back, left and right) on robot bottom and installed side by the cover etc. as follows when you weld with the base plate installed in the robot body by the welding spatter and the spark, etc. so that wiring in the robot should not receive damage. After welding the outer line, once remove the robot and weld the inner line.

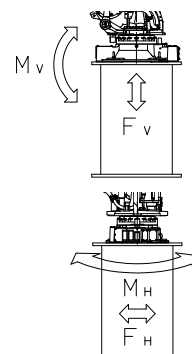
Temporary install the robot, and weld the outer line of base plate.

Once remove the robot and weld the inner line.



■ Maximum robot generative force

Robot model	Max. vertical generative force F_V	Max. horizontal generative force F_H	Max. vertical generative moment M_V	Max. horizontal generative moment M_H
SRA100H-01	43,500 N	31,800 N	88,200 N·m	75,700 N·m
SRA133H-01	46,800 N	35,200 N	92,300 N·m	79,700 N·m
SRA166H-01 SRA133HL-01	52,800 N	40,500 N	113,200 N·m	98,300 N·m
SRA210H-01	56,300 N	43,700 N	122,000 N·m	106,300 N·m



6. Allowable wrist load



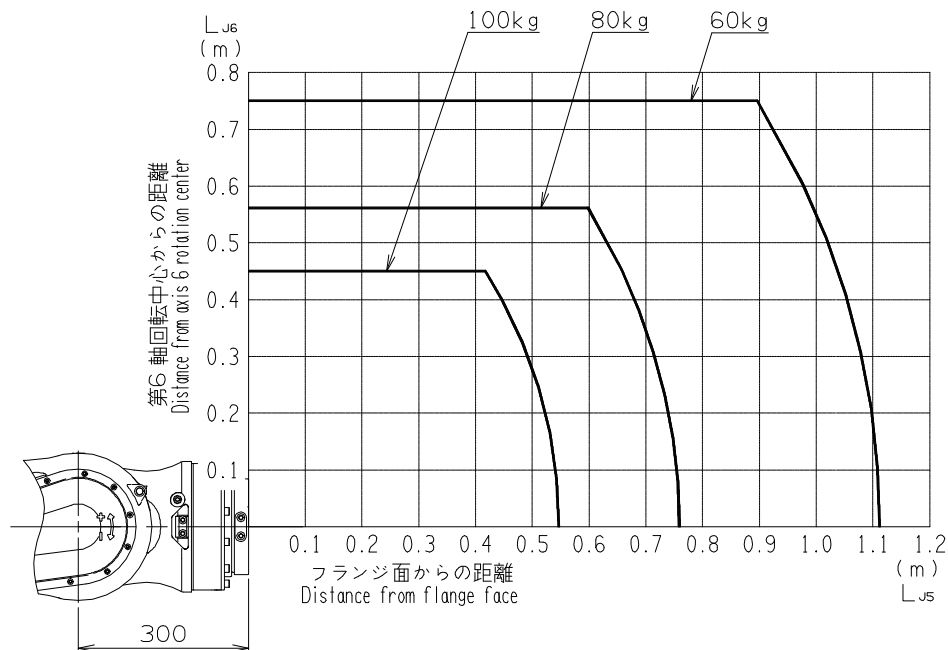
CAUTION

Load fixed on the tip of wrist is regulated by “allowable payload mass”, “allowable static load torque”, and “allowable moment of inertia”. Strictly keep the wrist load within each allowable value. If wrist load exceeds the allowable value, this robot is out of guarantee. Refer to the table of “2. Basic specifications” and following figures for the detail of each specification.

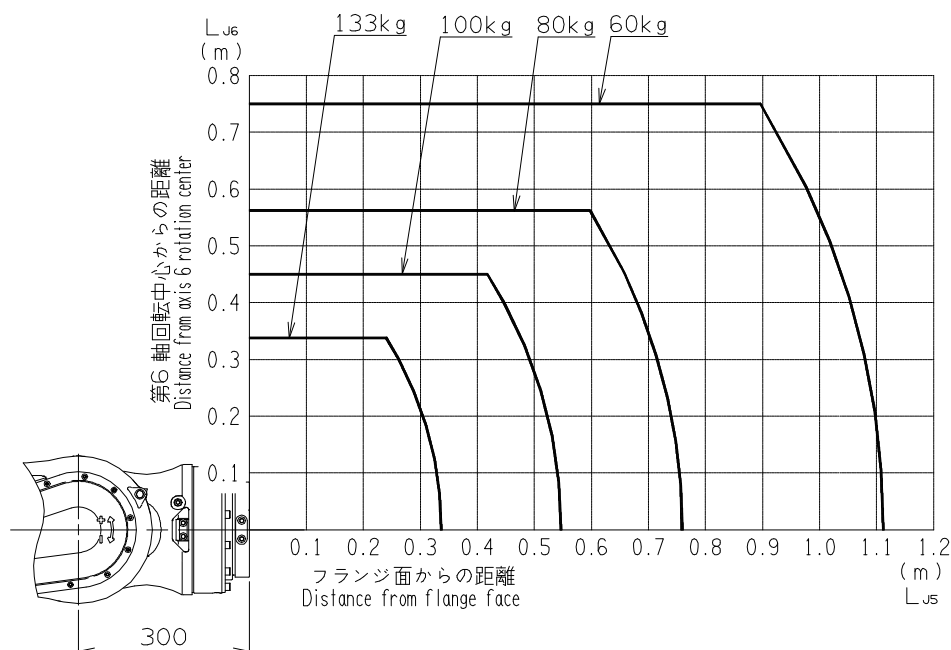
■ Torque map

C.O.G. of wrist load should exist inside the range shown below.

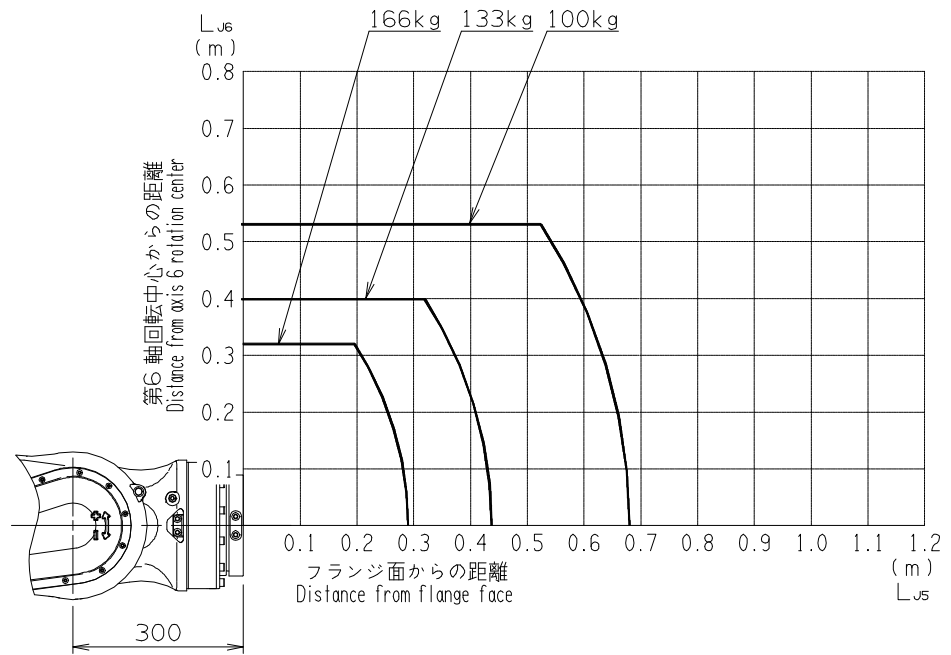
[SRA100H-01]



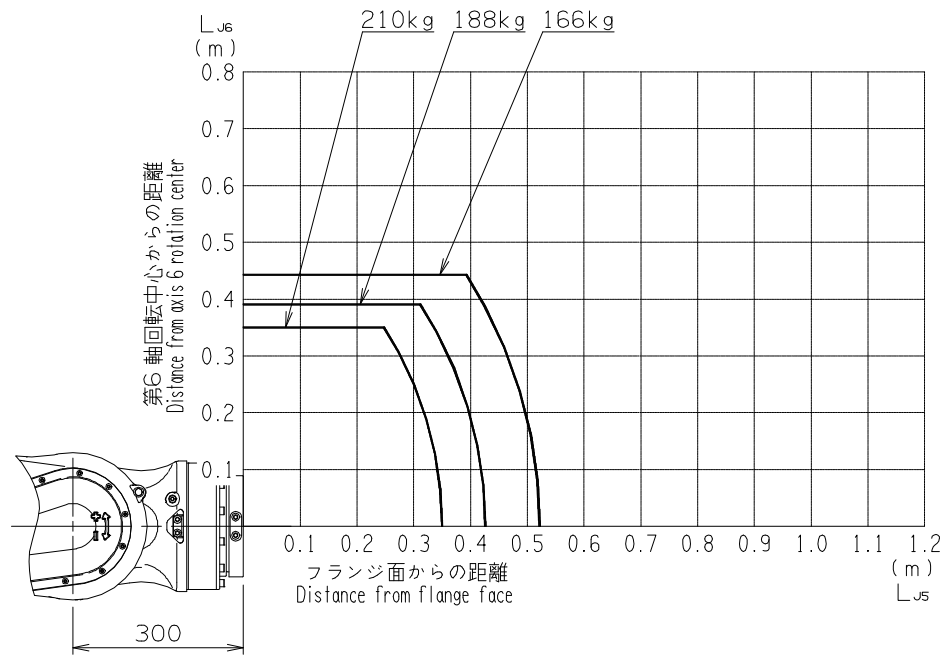
[SRA133H-01]
[SRA133HL-01]



[SRA166H-01]




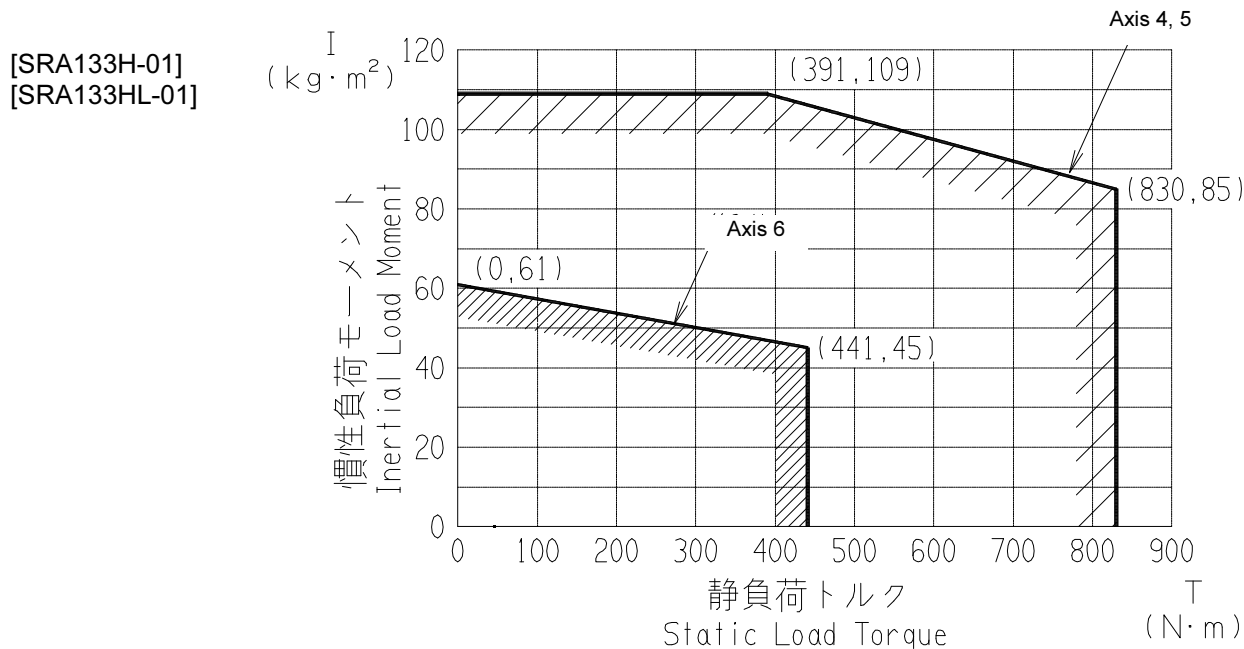
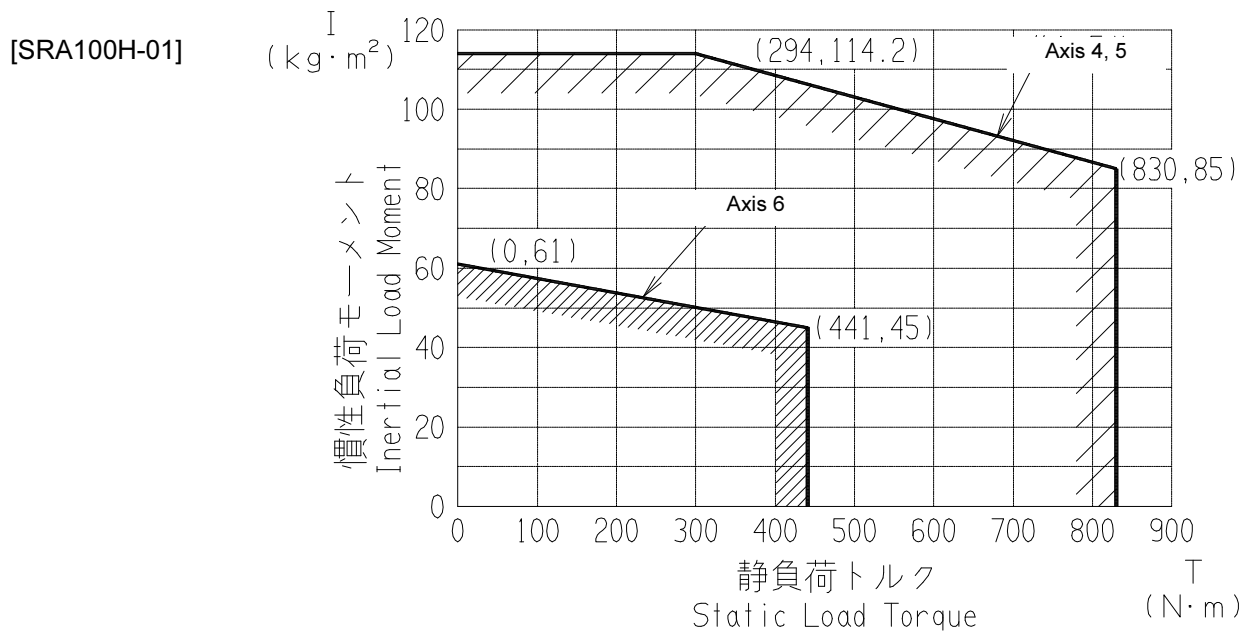
[SRA210H-01]



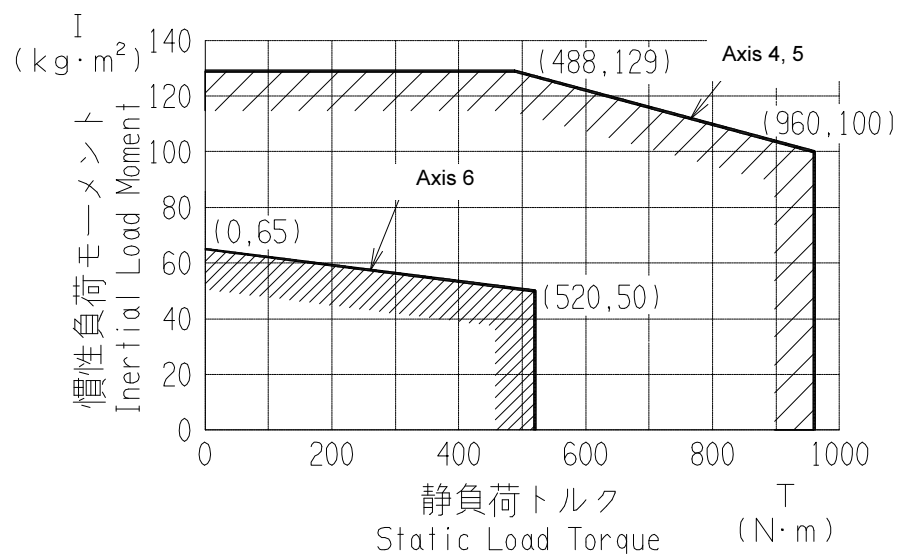
■ **Wrist load conditions**

Static load torque and moment of inertia of wrist load should exist inside the range shown below.

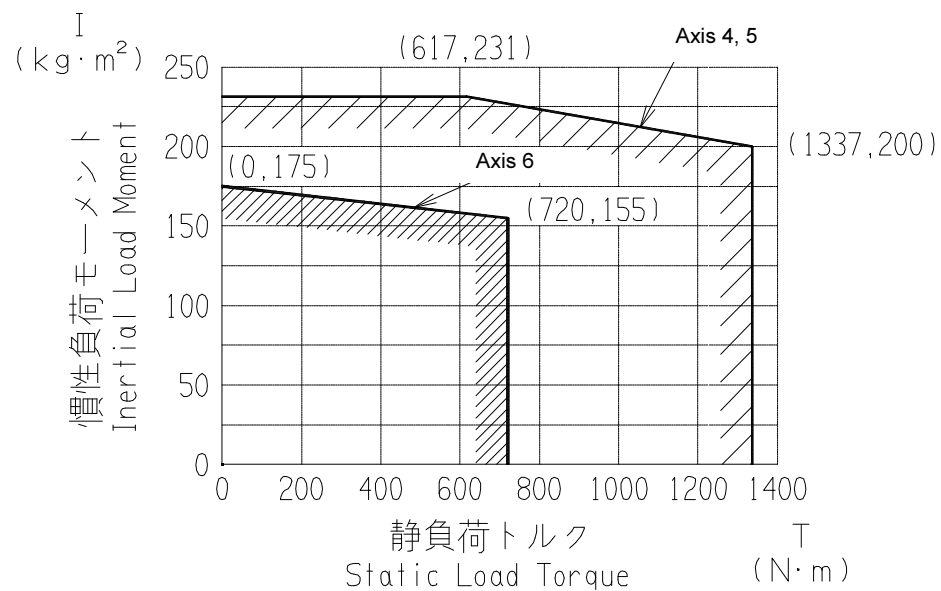
 IMPORTANT	If the real inertia is over the limit written in "2. Basic specifications", maximum speed will be restrained by software.
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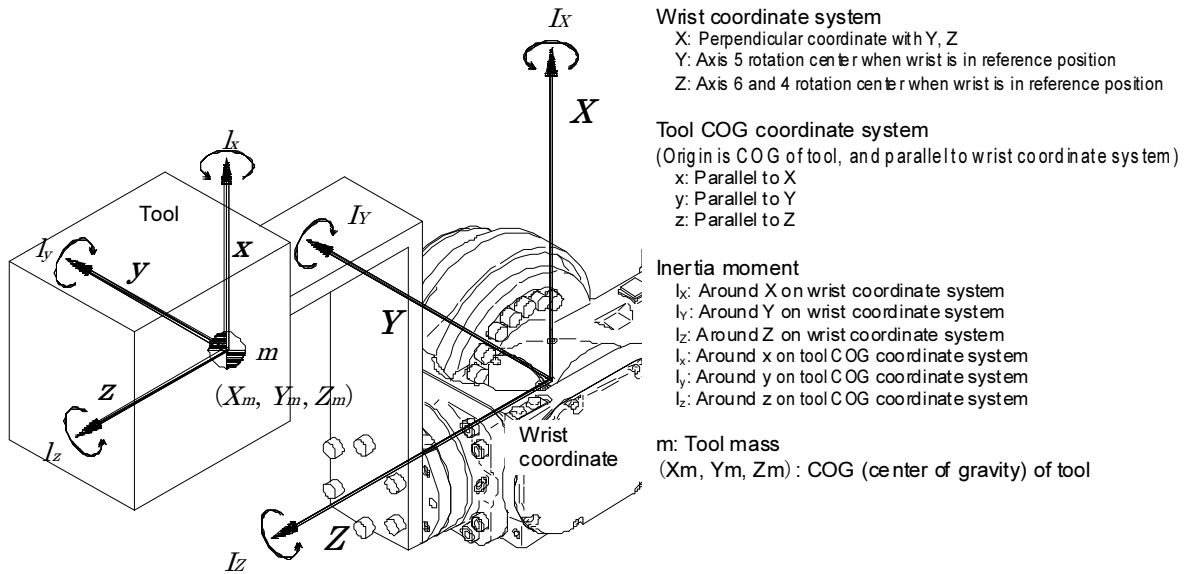
[SRA166H-01]

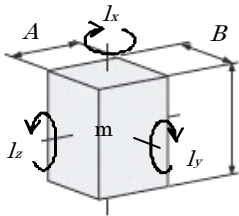
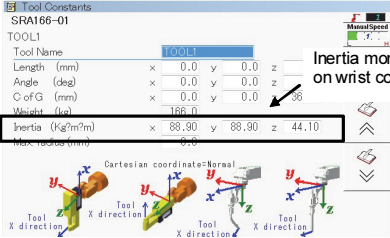


[SRA210H-01]



■ How to find the inertia moment

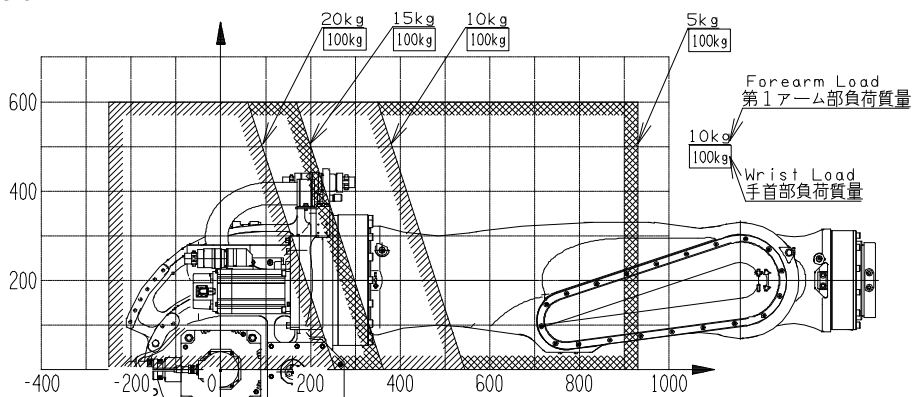


<p>1 Calculate inertia moment on tool COG coordinate system (xyz). If tool is regarded as prism, it is calculated as right formula.</p>	<p>Inertia moment example on tool COG coordinate system</p> <p>If tool is regarded as prism</p>  $I_x = \frac{1}{12} m \cdot (A^2 + B^2)$ $I_y = \frac{1}{12} m \cdot (A^2 + C^2)$ $I_z = \frac{1}{12} m \cdot (B^2 + C^2)$
<p>2 Calculate inertia moment on wrist coordinate system (XYZ). If tool is regarded as aggregate of more than one solid, all inertia moment must be combined.</p>	$I_X = m \cdot (Y_m^2 + Z_m^2) + I_x$ $I_Y = m \cdot (X_m^2 + Z_m^2) + I_y$ $I_Z = m \cdot (X_m^2 + Y_m^2) + I_z$ <p>"Inertia moment on wrist coordinate system" is registered to controller.</p> 
<p>3 Calculate inertia moment around robot wrist joint (axis 4, 5 and 6). This result must not be larger than "Allowable moment of inertia" written in robot specification sheet.</p>	<p>Axis 4 and 5 inertia moment is adopted larger value of around wrist coordinate system X and Y. (Because this depends on the axis 6 position.) Axis 6 inertia moment is around wrist coordinate system Z itself.</p> $I_{J4} = I_{J5} = \max (I_X , I_Y)$ $I_{J6} = I_Z$

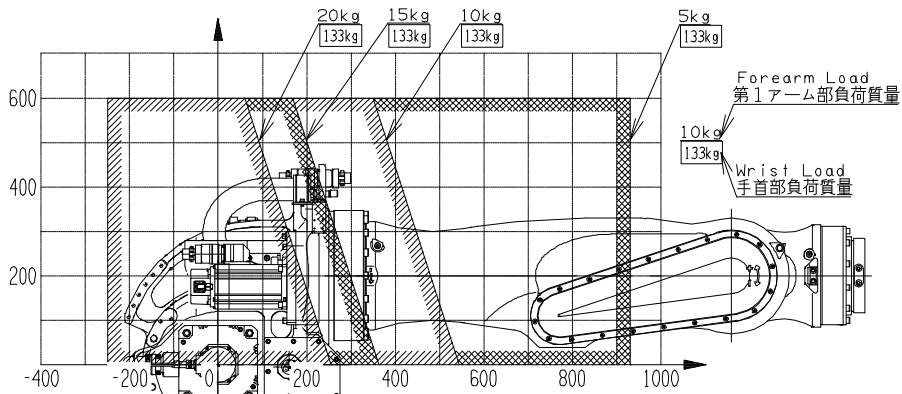
■ Allowable forearm load

Use the robot under condition that COG of the ancillary equipment on the forearm falls in the range shown below.

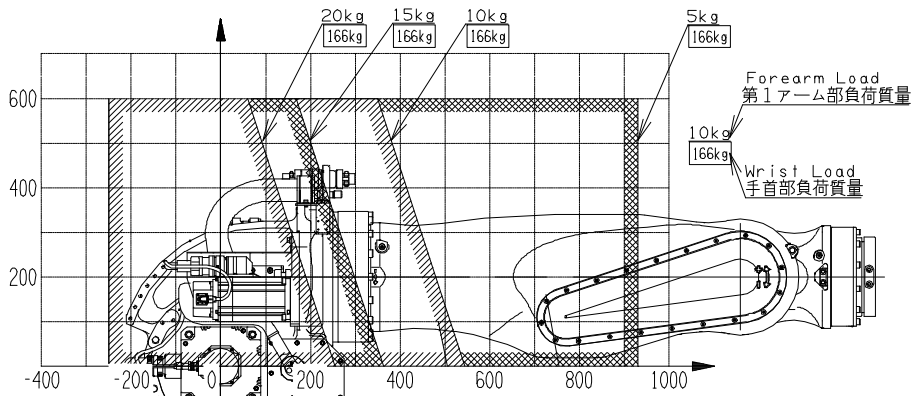
【SRA100H-01】
When wrist load is 100kg



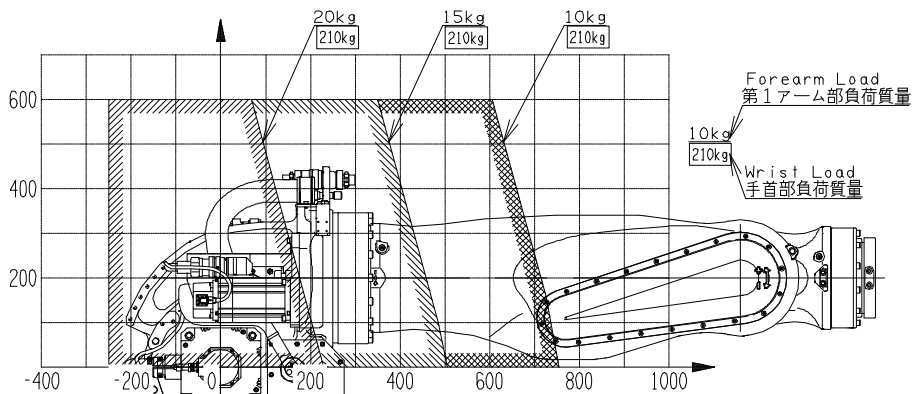
【SRA133H-01】
When wrist load is 133kg



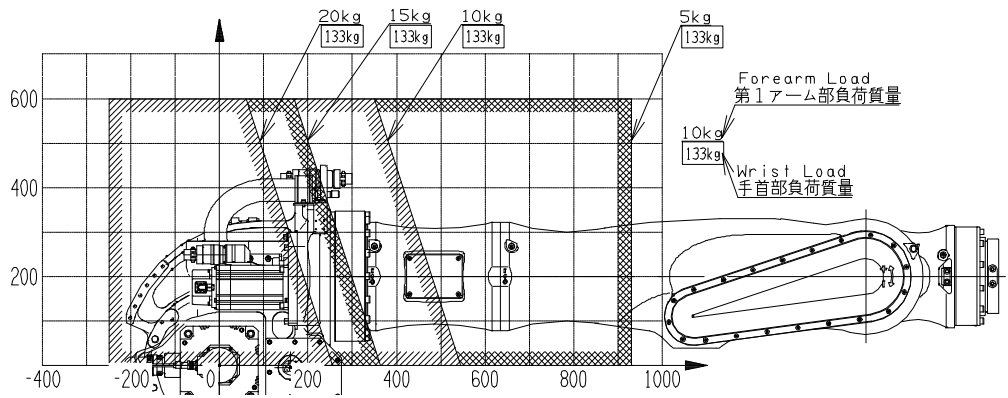
【SRA166H-01】
When wrist load is 166kg



【SRA210H-01】
When wrist load is 210kg



【SRA133HL-01】
When wrist load
is 133kg



7. Option specifications

○: Possible to correspond / —: Impossible to correspond

No.	Item	Specifications	Parts No.	Robot model				
				SRA100H-01	SRA133H-01	SRA166H-01	SRA210H-01	SRA133HL-01
1	Installation parts *1	Chemical anchor specification with pin hole	OP-F1-024	○	○	○	○	○
		Base plate welded (anchors not included) without pin hole	OP-F1-028	○	○	○	○	○
		Ore anchor specification with pin hole	OP-F2-018	○	○	○	○	○
		Base plate welded (anchors not included) without pin hole	OP-F2-019	○	○	○	○	○
		Pins set (Installation pins & polyethylene plug)	OP-F1-025	○	○	○	○	○
		Leveling plate (□200mm×t=32mm, 4 plates)	OP-F1-026	○	○	○	○	○
		Installation bolts & washers	OP-F1-027	○	○	○	○	○
		Chemical anchor	OP-F1-038	○	○	○	○	○
		Ore anchor	OP-F2-023	○	○	○	○	○
2	Axis 1 adjustable stopper *1, *2, *3	Restriction of axis 1 operation edge (±2.61 rad ~±0 rad every 0.17 rad)	OP-S5-019	○	○	○	○	○
3	Axis 2 adjustable stopper *1, *3	Restriction of axis 2 operation edge (-0.26 and -0.52 rad from the operation edge)	OP-A5-027	○	○	○	○	○
4	Axis 3 adjustable stopper *1, *3	Restriction of axis 3 upside operation edge (-0.52, -0.79, -1.05, -1.31 and -1.57 rad from the operation edge)	OP-A6-027	○	○	○	○	○
5	Axis 2 adjustable LS dog *1, *3	Axis 2 axis adjustable limit switch dog set	OP-S8-007	○	○	○	○	○
6	Axis 3 adjustable LS dog *1, *3	Axis 3 axis adjustable limit switch dog set	OP-S4-013	○	○	○	○	○
7	Dual circuit limit switch	For axes 1, 2 and 3 (3pcs. of dual circuit LS)	OP-D7-013	○	○	○	○	○
8	Transfer jig	Fork bracket for floor mounting type	OP-S2-033	○	○	○	○	○
9	Zeroing pin & Zeroing block *1	For 100, 133, 210kg payload	OP-T2-077	○	○	○	○	○
10	Extension flange	Flange to pull out cable from side (P.C.D.92/P.C.D.125 and P.C.D.160) (Pin arrangement vertical)	OP-W3-013	○	○	○	○	○
		Flange to pull out cable from side (P.C.D.92/P.C.D.125 and P.C.D.160) (Pin arrangement horizontal)	OP-W3-014	○	○	○	○	○
11	Scale seal	For wrist three axes	OP-N2-020	○	○	○	○	○
12	Water proof coolant Paint	For 100, 133kg payload	OP-N5-036	○	○	—	—	—
		For 166kg payload	OP-N5-049	—	—	○	—	—
		For 210kg payload	OP-N5-047	—	—	—	○	—
		For 133kg Long arm type	OP-N5-037	—	—	—	—	○
13	Encoder connector Protector	For axis 3	OP-P6-005	○	○	○	○	○
14	Bypass cable *1	Bypass of motor and encoder cables	BCUNIT20-30	○	○	○	○	○
		Bypass of hollow arm cables	BCABLE-20	○	○	○	○	○
		Attachment for bypass of hollow arm cables	KP-ZJ-027	○	○	○	○	○
15	Arm fixed jig *1	For axis 2	KP-ZD-005	○	○	○	○	○
		For axis 3	KP-ZJ-011	○	○	○	○	○
16	Gas balancer unit Pressure gauge *1	Analog pressure gauge	KP-ZJ-013	○	○	○	○	○
		Digital pressure gauge	KP-ZJ-014	○	○	○	○	○
17	Gas balancer unit Charging equipment. *1, *4	Charging unit (W22, pitch14, Female)	KP-ZJ-015	○	○	○	○	○
		Charging unit (W23, pitch14, Male)	KP-ZJ-016	○	○	○	○	○
		Joint of Female->Male (W22)	KP-ZJ-019	○	○	○	○	○

*1 : These parts are packed separately from the robot. (Not attached on the robot)

*2 : A dog part for adjustable LS is included. If motion limit LS is not used, this dog is also not used.

*3 : Concerning the motion range limit options, please refer to the table in the next page.

*4 : If diameter of charging equipment is "W22, pitch14, Female, Right screw, Metal contacts", please prepare the charging equipment "KP-ZJ-015" and the joint "KP-ZJ-019".

Charging equipment guaranteed by manufacturer is prepared also.

Guaranteed equipment of KP-ZJ-015 is KP-ZJ-056, Guaranteed equipment of KP-ZJ-016 is KP-ZJ-057.

*5 : Two specification of pin arrangement (vertical and horizontal) exists for P.C.D92/P.C.D125 tool mounting face.

Please select the suitable extension flange in accordance with spot welding gun, by referring to the detail drawing in following page.

■ Motion range limit option table (Please select the option part number to order referring to the following table.)

Function		Axis name	Motion range Limit Switch (dual circuit) 3pcs. set	Axis 1 adjustable stopper (including dog part for adjustable LS)	Axis 2 Adjustable LS dog part set	Axis 3 Adjustable LS dog part set	Axis 2 Adjustable stopper	Axis 3 Adjustable stopper
			OP-D7-013	OP-S5-019 *1	OP-S8-007 *1	OP-S4-013 *1	OP-A5-027 *1	OP-A6-027 *1
Without LS	Only adjustable stopper	Axis 1	—	● ‡				
		Axis 2	—			●		
		Axis 3	—					●
Dual circuit Limit Switch	Motion range Limit Switch	Axis 1·2·3 (3 pcs.set)	●					
	Adjustable LS	Axis 2	●		●			
		Axis 3	●			●		
	Adjustable stopper and Adjustable LS	Axis 1	●	●				
		Axis 2	●		●		●	
		Axis 3	●			●		●

*1 : These parts are packed separately from the robot. (Not attached on the robot)

*2 : In this option, both axis 1 adjustable stopper and axis 1 adjustable LS dog part are supplied in 1 package.

(Please be sure that even if only the stopper part is used and no LS is used, the dog part is also included in this package)

(Example 1) To add only an adjustable stopper for axis 2, please order;
OP-A5-027.

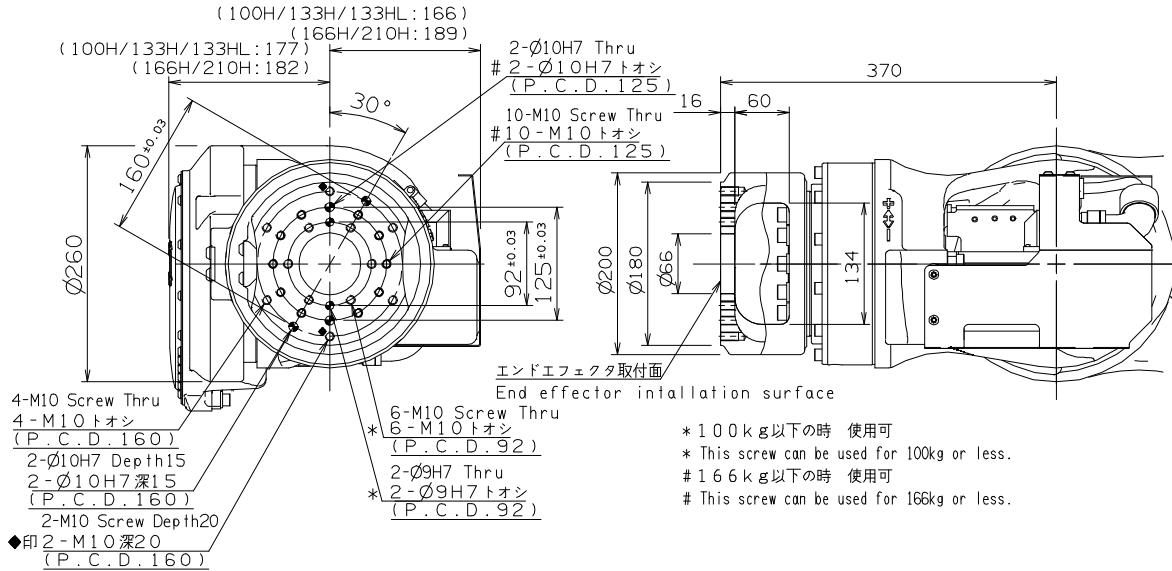
(Example 2) To add dual circuit adjustable limit switch for axis 2 and 3, please order the following options.
OP-D7-013、OP-S8-007、OP-S4-013

(NOTE) To use the limit switch for axis 1 as an adjustable limit switch, OP-S5-019 is also necessary.

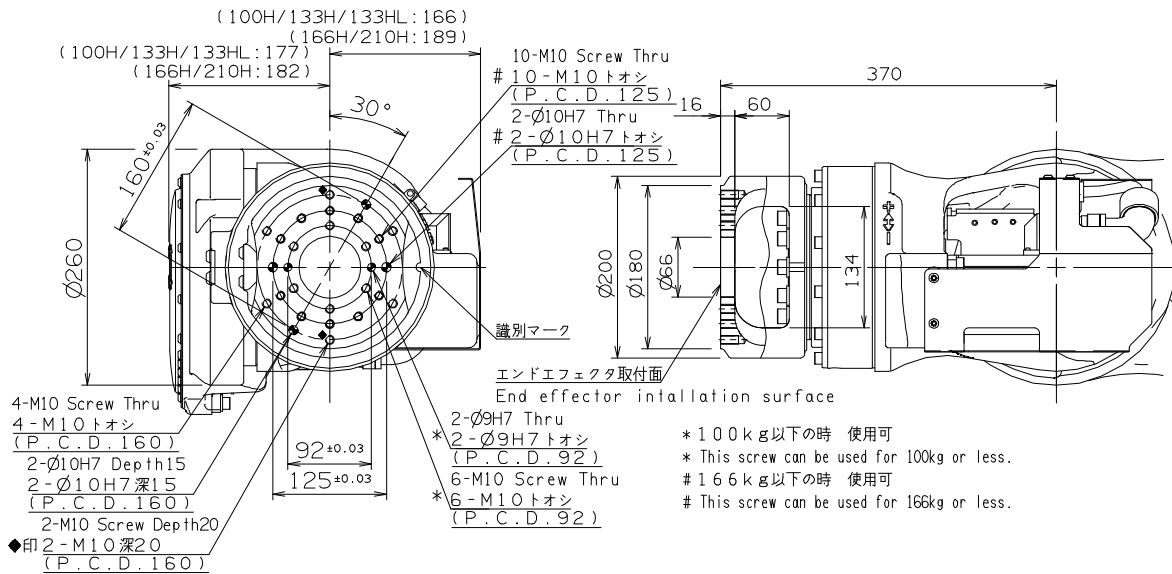
■ Extension flange tool mounting face

Cables and tubes are pulled out from the side. Applicable for P.C.D.92/P.C.D.125 and P.C.D.160. Two type is prepared for attachment phase of P.C.D.92/P.C.D.125. Attachment phase of P.C.D.160 is same for both flanges.

(Pin arrangement is direction of P.C.D.92/P.C.D.125 pins when axis 6 is in 0 degree)



Tool mounting face of OP-W3-013 (Pin arrangement is vertical)

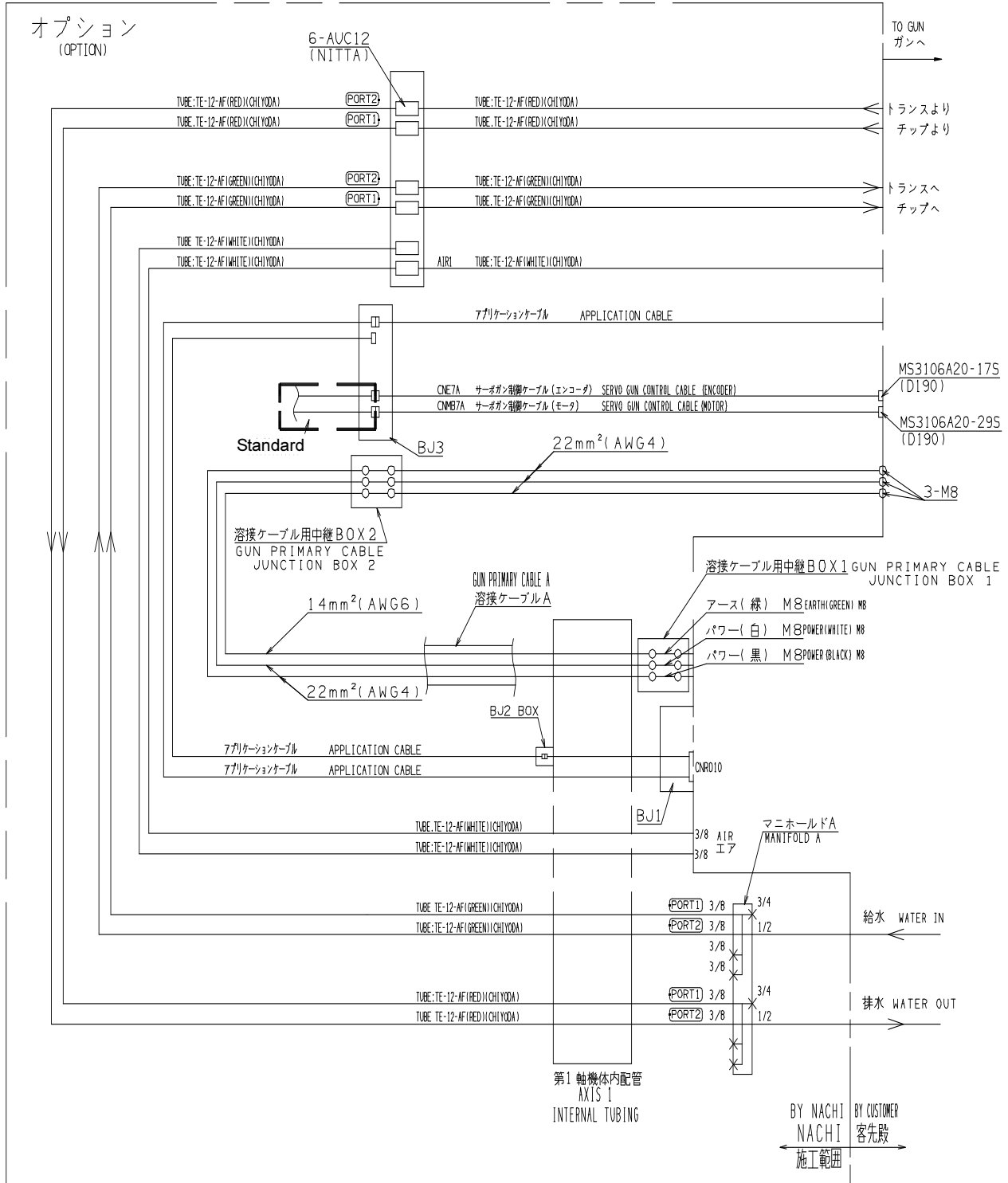


Tool mounting face of OP-W3-014 (Pin arrangement is horizontal)

8. Application wiring and piping diagram

Application wiring and piping written here is the best designed specification for spot welding usage.
 No free space is remained in hollow space.
 If another specification is required, please contact to NACHI-FUJIKOSHI office.

■ Spot welding specification



Connecting diagram

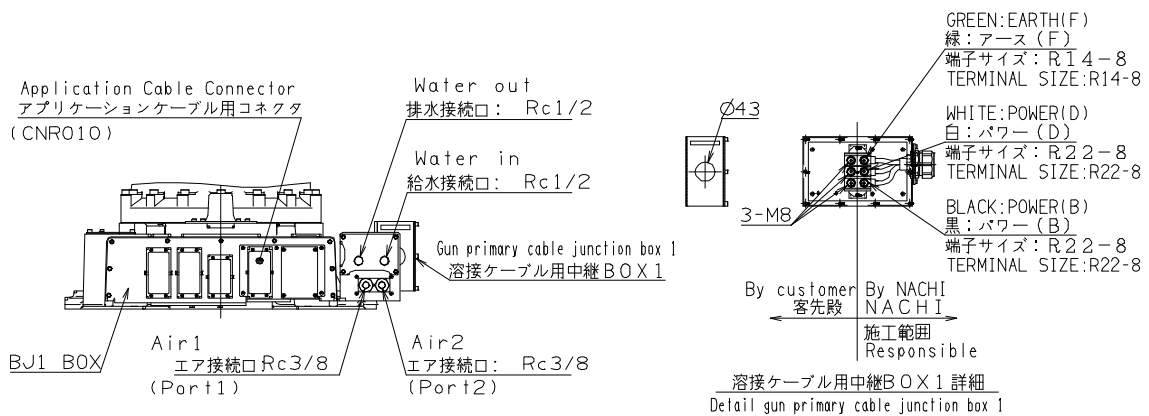
Tool side wiring specification

No.	Name	Item	Specification	Cable diameter (mm)	Edge manufacturing (Length from end effector mounting face) 1.5m (SRA100H,133H,166H,210H) 1.2m (SRA133HL)
1	Spot welding specification	Cable	•Welding cable 22 mm ² (single wire) x3 (Piping of axis 1 ; 22 mm ² x2 14 mm ² x1 (complex cable))	12.9~13.5	3-M8 terminal (R22-8S) Without seal connector
			•Signal cable 0.2mm ² x20 wires	11.5	Cut, with seal connector (AYS12-14) Hole diameter 21mm
			•Servo gun cable (power) x1	11.5	Connector type: MS3106A20-17S(D190)
			•Servo gun cable (signal) x1	9	Connector type: MS3106A20-29S(D190)
		Utility	•Water inlet tube: Green (*1,*2) φ12×φ8 - 2 •Water outlet tube: Red (*1,*2) φ12×φ8 - 2 •Air tube: White (*1,*3) φ12×φ8 - 1		Manufacturer : Chiyoda engineering Cut, (tube type: TE-12-AF) Recommended joint: one touch joint for φ12) (*1)

*1) Joint is not included.

*2) Water pressure is 0.2MPa or lower.

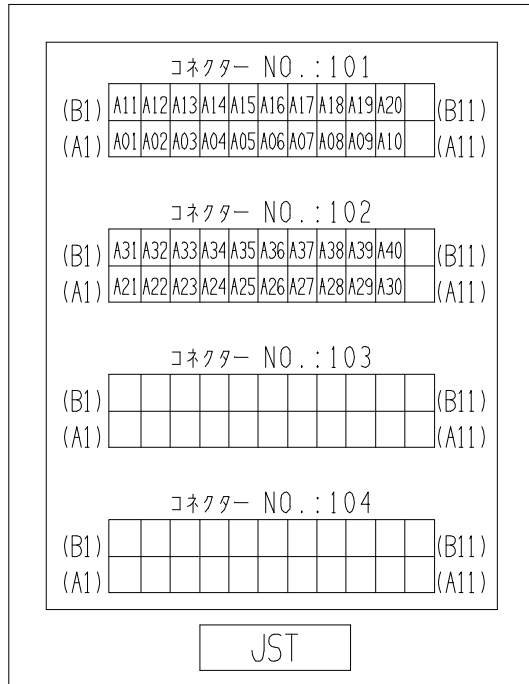
*3) Air pressure is 0.49MPa or lower.



Application wires and tubes at base frame

■ Detailed diagram of the application connectors

BJ1 side (connector) (option)



User-side Connectors

Wire-side shell: JFM-WSA-4-A (JST)
 or JFM-WSA-4-C (JST)
 Guide plate A kit: JFM-GPAK-4 (JST)
 Receptacle housing: JFM2FDN-22V-K (JST)
 Receptacle contact:
 a: SJ2F-01GF-P1.0 (JST) (0.20 ~ 0.50 mm²)
 b: SJ2F-21GF-P1.0 (JST) (0.30 ~ 0.75 mm²)

Manual crimp tool:

a: YRS-8861
 b: YRF-1120

Cable diameter suitable for wire-side shell:

JFM-WSA-4-A φ26.2~φ28.0

JFM-WSA-4-C φ15.5~φ16.5

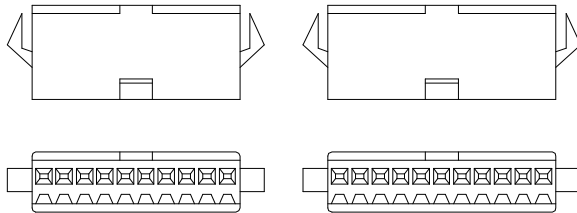
(This figure is drawn seeing from the backside of the robot.)

Application wiring specification

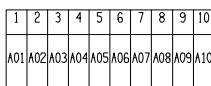
Rated voltage Max. AC/DC 115 V

Rated current rating Max. 1 A

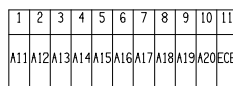
BJ3 side (connector) (option)



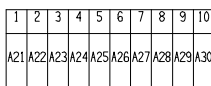
CN61



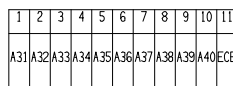
CN62



CN63



CN64



Connector form (CN61, CN63)

Housing SMP-10V-BC (JST)

User-side Connectors

Housing SMR-10V-B (JST)

Contact SYM-001T-P0.6

(applicable wire : AWG#22~28)

Manual crimp tool: YRS-121

Connector form (CN62, CN64)

Housing SMP-11V-BC (JST)

User-side Connectors

Housing SMR-11V-B (JST)





Contact SYM-001T-P0.6

(applicable wire : AWG#22~28)

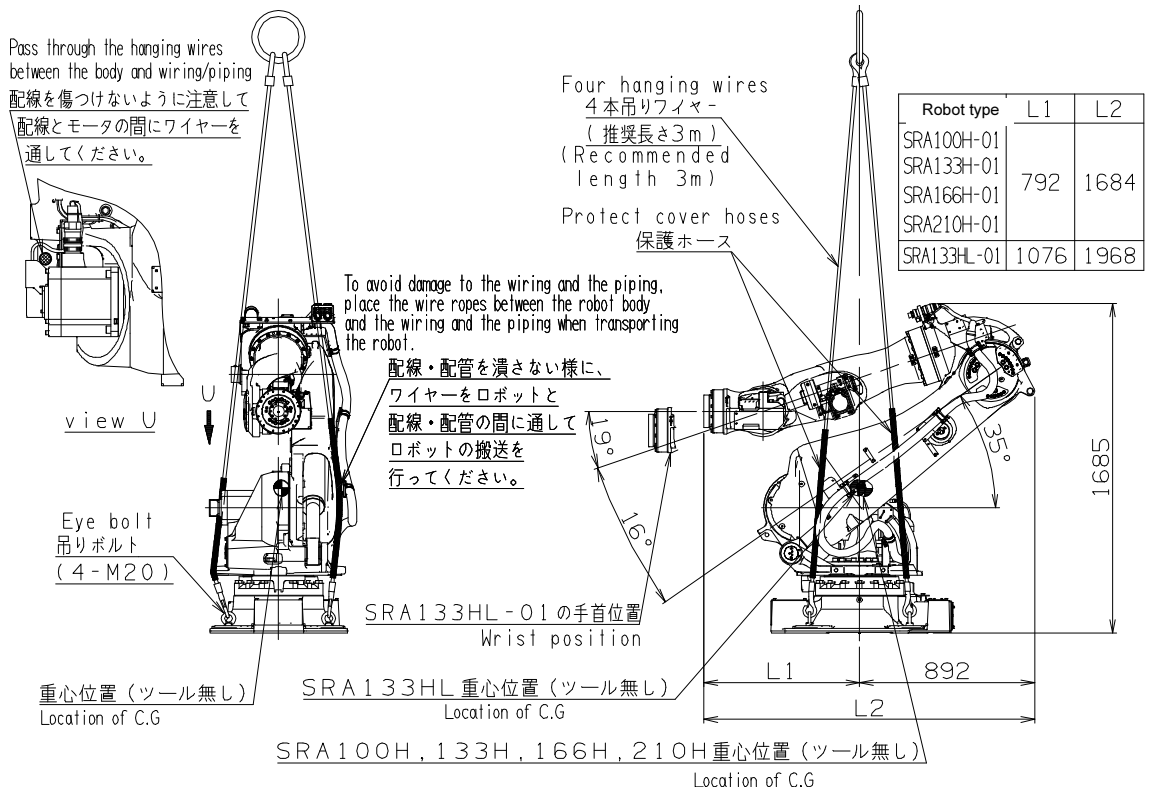
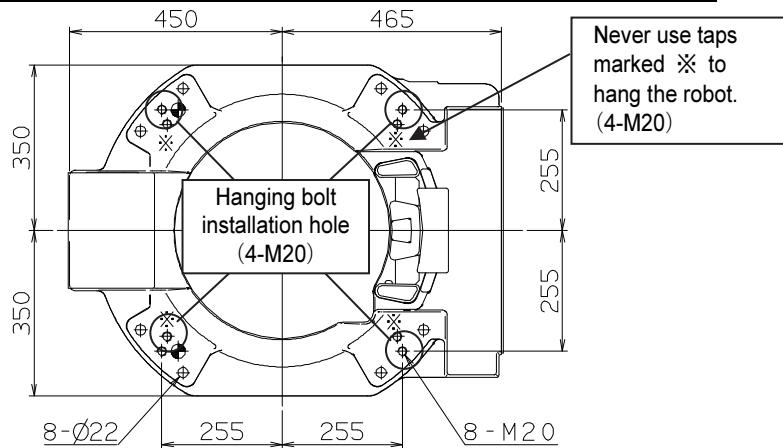
Manual crimp tool: YRS-121

In case of spot welding specification, CN61 and CN62 are already connected as application cable to the tool side. So these connectors are not prepared inside BJ3 box.

9. Safety measures against transport

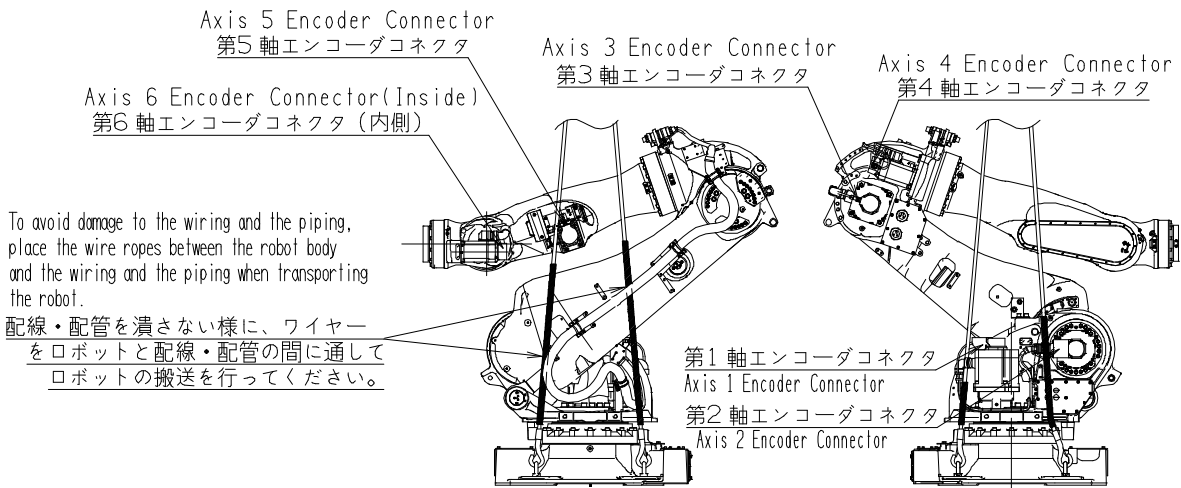
 WARNING	The robot must be transported by personnel who have licenses required for slinging work, crane operation, forklift truck operation, and others. The weight of the robot and controller is listed in the Operating Manual and the Maintenance Manual. Check for the weight, and then handle them according to procedures suitable for the weight.
 WARNING	To lift the robot or the controller, follow the procedures specified in the Maintenance Manual. Following any procedures other than those specified will cause the robot to topple over or drop during transport, thus resulting in accidents.
 WARNING	During transport or installation work of the robot, pay utmost care not to cause damage to wirings. Furthermore, after installing the robot, take protective measures such as using protective guards so that the wirings will not be damaged by workers or other persons, or forklift trucks or else.
 WARNING	Gas in balancer must be released when robot is transported by air. Gas in balancer must be charged before using robot, so customer needs to prepare the nitrogen gas and charging unit. Charging procedure is written in manipulator maintenance manual. (👉 Refer to "7. Option specifications")

To transport the robot, make it a rule to use a crane.
 At first, move the robot to the configuration shown in figure and mount four M16 hanger bolts to the robot frame. Then, be sure to lift the robot using four hanging wires (recommended length is 3m). Protect areas that contact the robot by rubber hoses to cover the wire ropes. For the areas to be covered, please refer to figure.





If hanging wires push the encoder connectors or wiring/piping, they may be broken when hanging the robot. When hanging the robot, please pay attention not to make the wires touch the encoder connectors and wiring/piping.



To avoid damage to the wiring and the piping, place the wire ropes between the robot body and the wiring and the piping when transporting the robot.

配線・配管を潰さない様に、ワイヤーをロボットと配線・配管の間に通してロボットの搬送を行ってください。

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