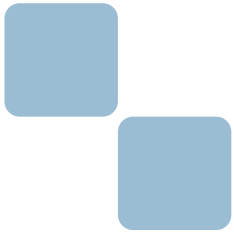


General Purpose Robot Arm for Industry Use

**ZERO**

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## SCARA Robot Specifications



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Document Number : M-0204-211228

December 2021

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# Manipulator Specifications

Item		Unit	ZRB-0440N-15A ZRB-0440C-15A	ZRB-0452N-15A ZRB-0452C-15A	ZRB-0465N-15A ZRB-0465C-15A
Structure		—	Horizontal articulated robot		
Degrees of motion freedom		—	4		
Mount direction		—	Floor		
Drive system		—	BLDC motor		
Position detection method		—	Multi-turn Absolute Encoder (Battery Backup)		
Position control method		—	Servo control		
Break		—	J1,J2(Dynamic Brake) Z(Disk Brake) Roll(Pin Brake)		
Payload <sup>(*)</sup>	Standard	kg	2	1	0.5
	Maximum				
Arm Length ( 1st Arm + 2nd Arm )		mm	400 ( 200 + 200 )	525 ( 200 + 325 )	650 ( 200 + 450 )
Work area		mm	Φ 800 x H150	Φ 1050 x H150	Φ 1300 x H150
Motion range <sup>(*)</sup>	J1	deg	290 ( ± 145 )		
	J2		290 ( ± 145 )		
	Z	mm	150		
	J4	deg	720 ( ± 360 )		
Resultant Velocity <sup>(*)</sup>	XY	mm/s	5100	5990	6880
	Z		1013		
	Roll	deg/s	1018		
Repeatability	XY	mm	±0.01	±0.015	±0.02
	Z		±0.01		
	Roll	deg	±0.01		
TCP permissible load inertia <sup>(*)</sup>	Standard	kg·m <sup>2</sup>	0.03		
	Maximum		0.05		
Dimensions		—	( refer the dimension drawing )		
Weight		kg	13.8	14.2	14.6
Power consumption		W	550		
Compatible controller		—	ZC1***		
Arm I/O ( for Tool )		—	8 input ports, 4 output ports / Asynchronous communication RS-422 1 port / DC 24 power output		
Pneumatic piping		mm	ø4 3 pipes		
Manipulator cable length		m	3		
Manipulator mount		—	M8 screws at 7 spots ( refer the dimension drawing )		
End-effector mount		—	Hollow axle outer radius Φ16, inner radius Φ11 ( refer the dimension drawing )		
Noise		dB	Under 77 ( Based on our test )		
Option specs		—	Cleanroom : ISO 5 ( Based on our test )		

\*1) The payload includes loads of tasks, weight of tools, and so. Allowable torque exceeding error c 13 and overload error c 14 may occur even within specification depending on the posture, speed, acceleration/deceleration time, direction of operation, etc. Adjust motion factors and variables then.

\*2) Refer to "Coordinate Systems" for information on definitions of axes. Depending upon arm postures, unreachable points exist even within the work envelop.

\*3) Value is for a reference.

\*4) Depends on operating conditions, such as acceleration and deceleration.

Replenishment) This product is a stop category "0". Corresponds to PL = d.

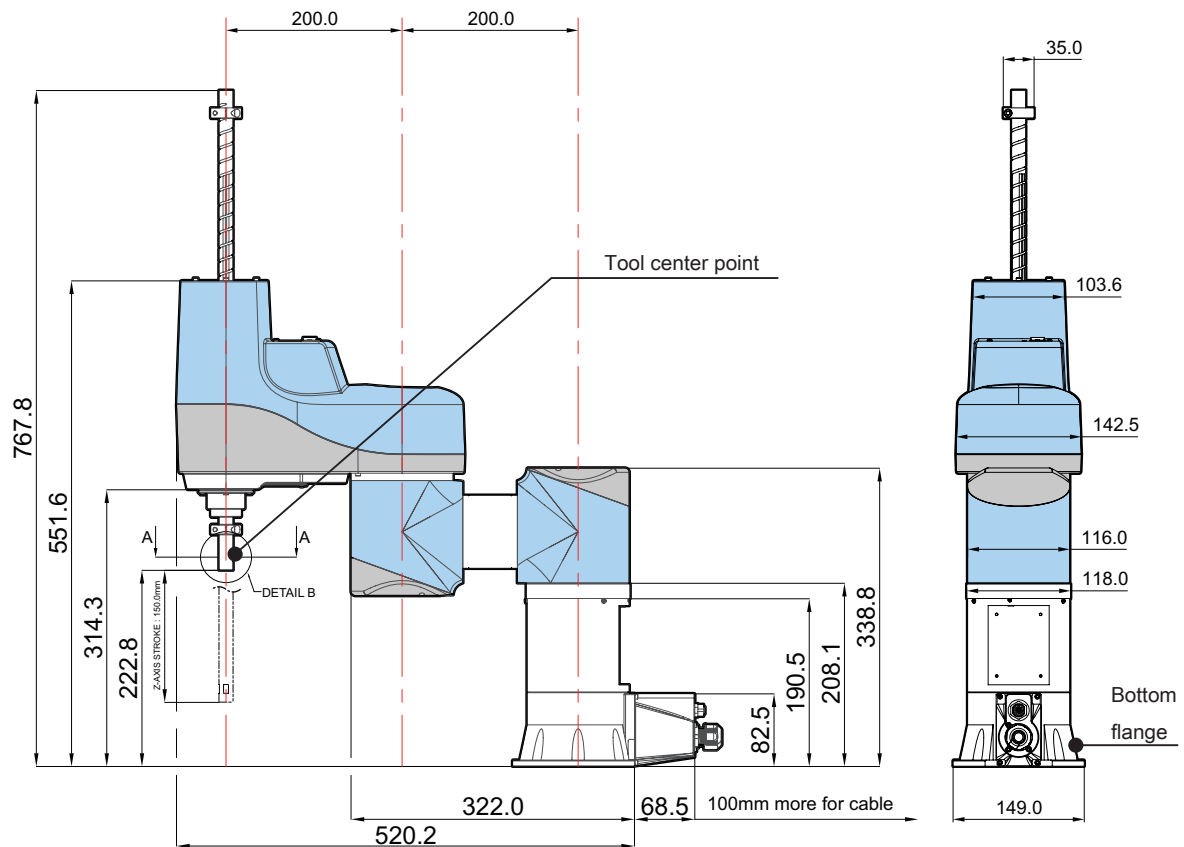
# Manipulator Dimensions

ZRB-0440N-15A

Arm Length: 400 mm

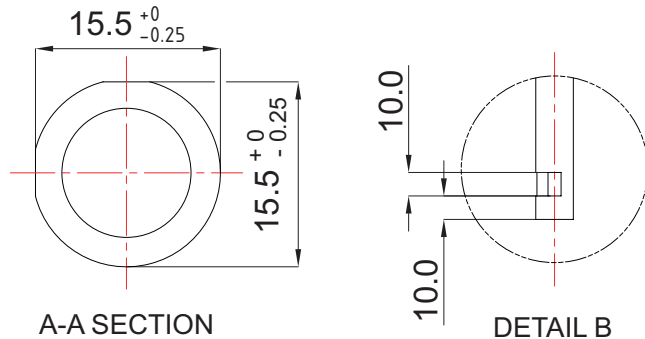
Normal Type

Not to Scale  
(mm)



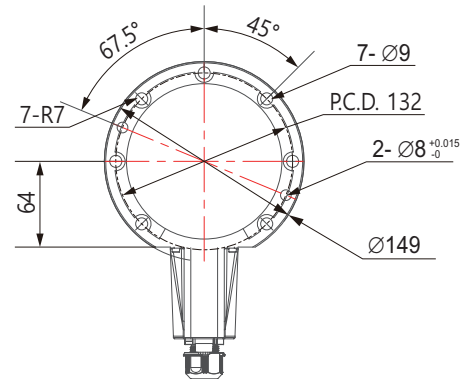
## Tool center point

for end-effector attachment



## Bottom flange

for mounting



## Mounting bottom flange

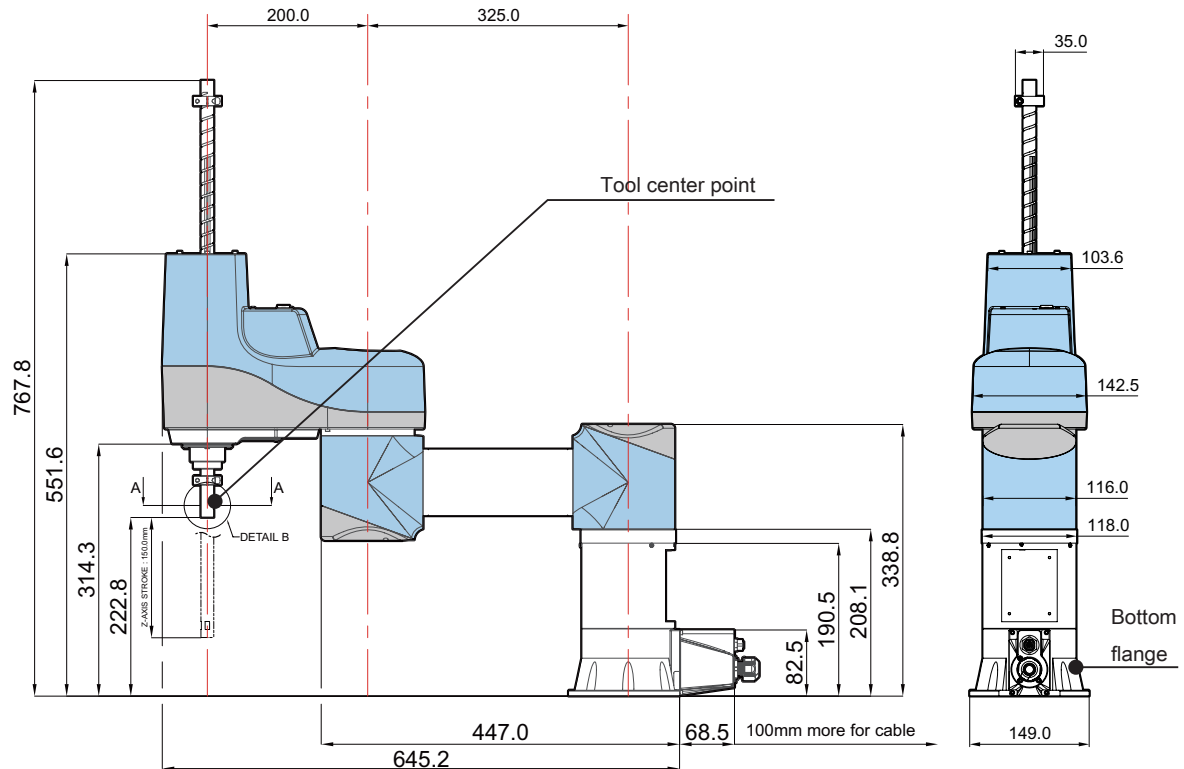
To mount bottom flange, Using M8 hex sockethead cap screws of at least 30 mm long is recommended.  
The recommended tightening torque is 22 Nm.

ZRB-0452N-15A

Arm Length: 525 mm

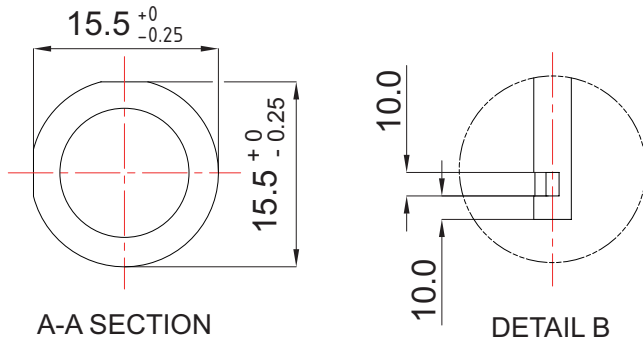
Normal Type

Not to Scale  
(mm)



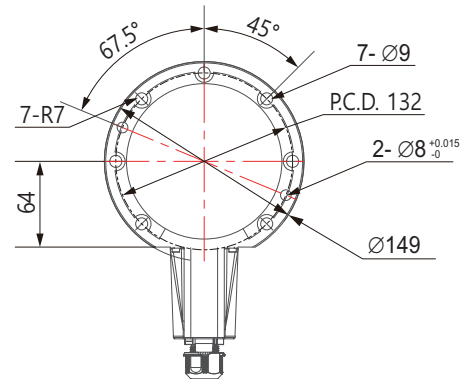
## Tool center point

for end-effector attachment



## Bottom flange

for mounting



## Mounting bottom flange

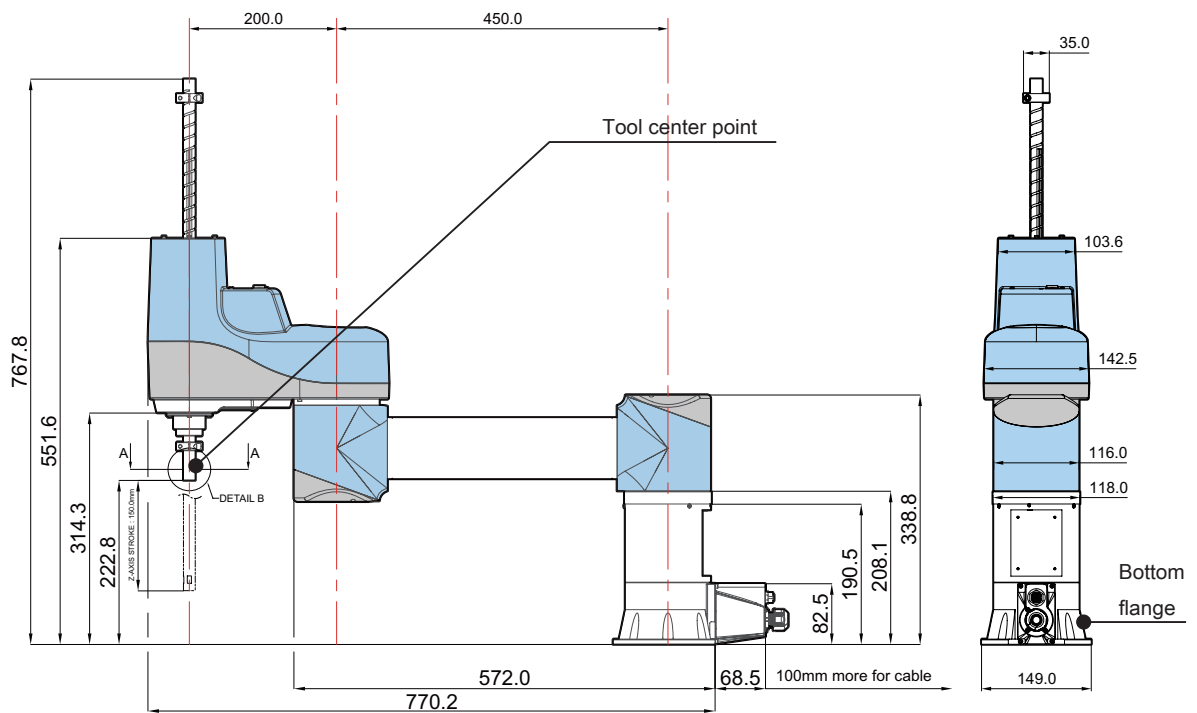
To mount bottom flange, Using M8 hex sockethead cap screws of at least 30 mm long is recommended.  
The recommended tightening torque is 22 Nm.

ZRB-0465N-15A

Arm Length: 650 mm

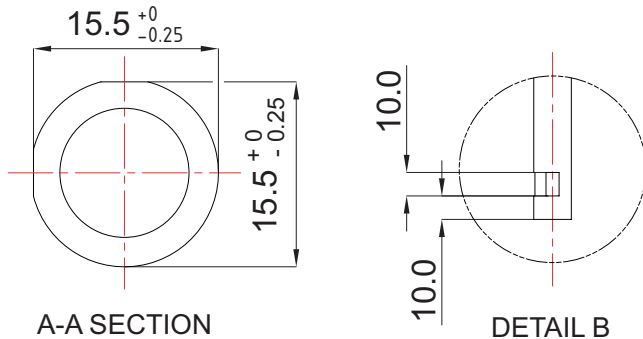
Normal Type

Not to Scale  
(mm)



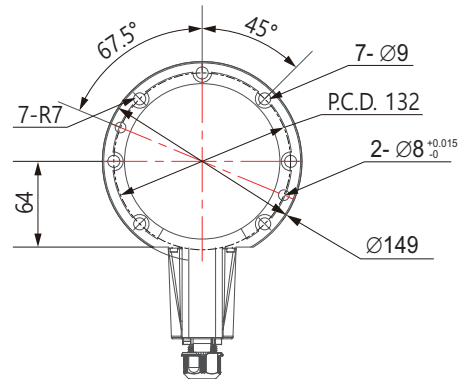
### Tool center point

for end-effector attachment



### Bottom flange

for mounting



### Mounting bottom flange

To mount bottom flange, Using M8 hex sockethead cap screws of at least 30 mm long is recommended.

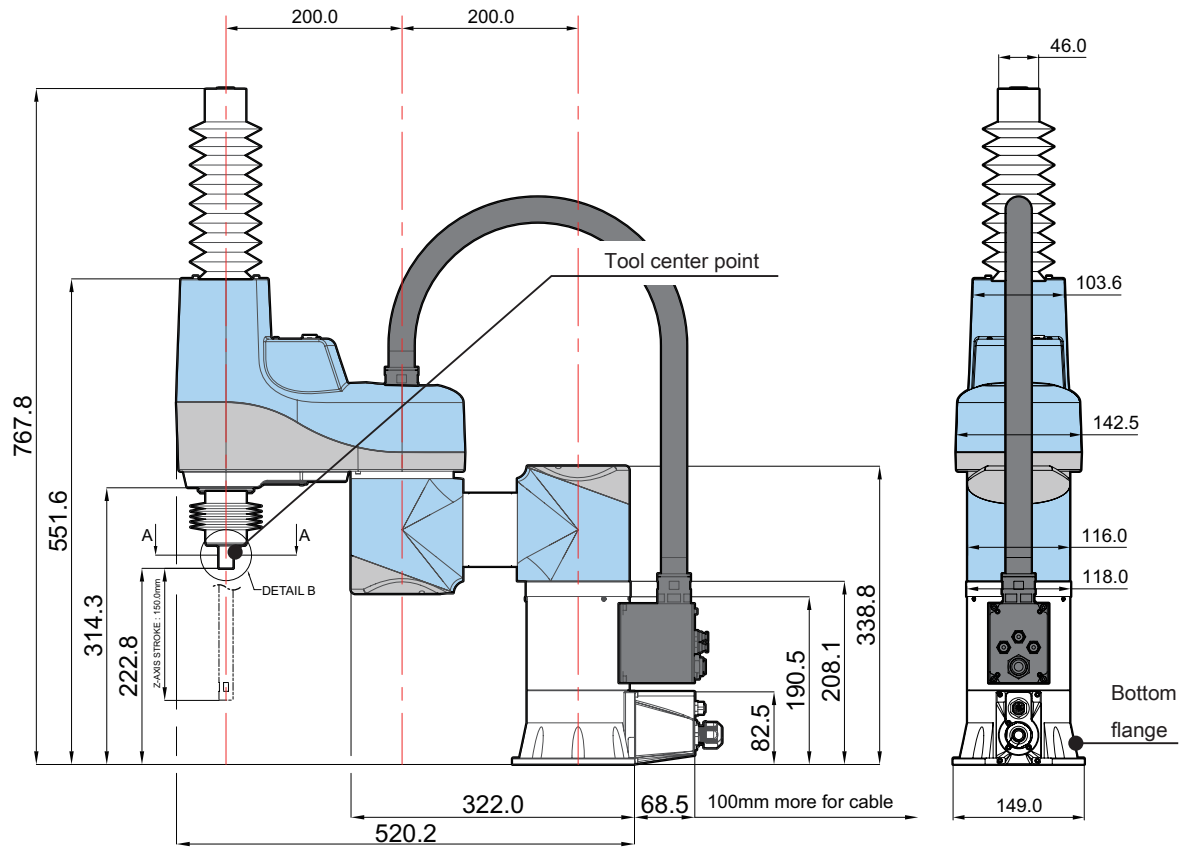
The recommended tightening torque is 22 Nm.

ZRB-0440C-15A

Arm Length: 400 mm

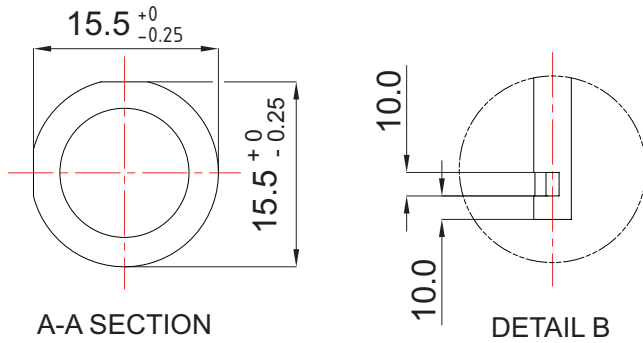
Cleanroom Type

Not to Scale  
(mm)



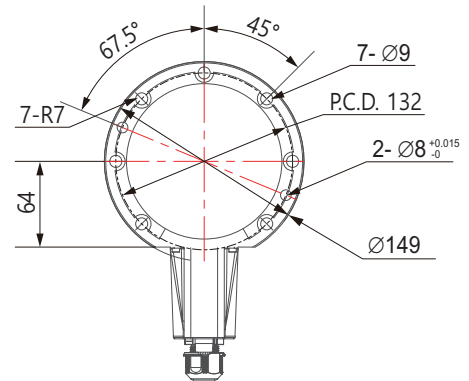
### Tool center point

for end-effector attachment



### Bottom flange

for mounting



### Mounting bottom flange

To mount bottom flange, Using M8 hex sockethead cap screws of at least 30 mm long is recommended.  
The recommended tightening torque is 22 Nm.

# Manipulator Dimensions



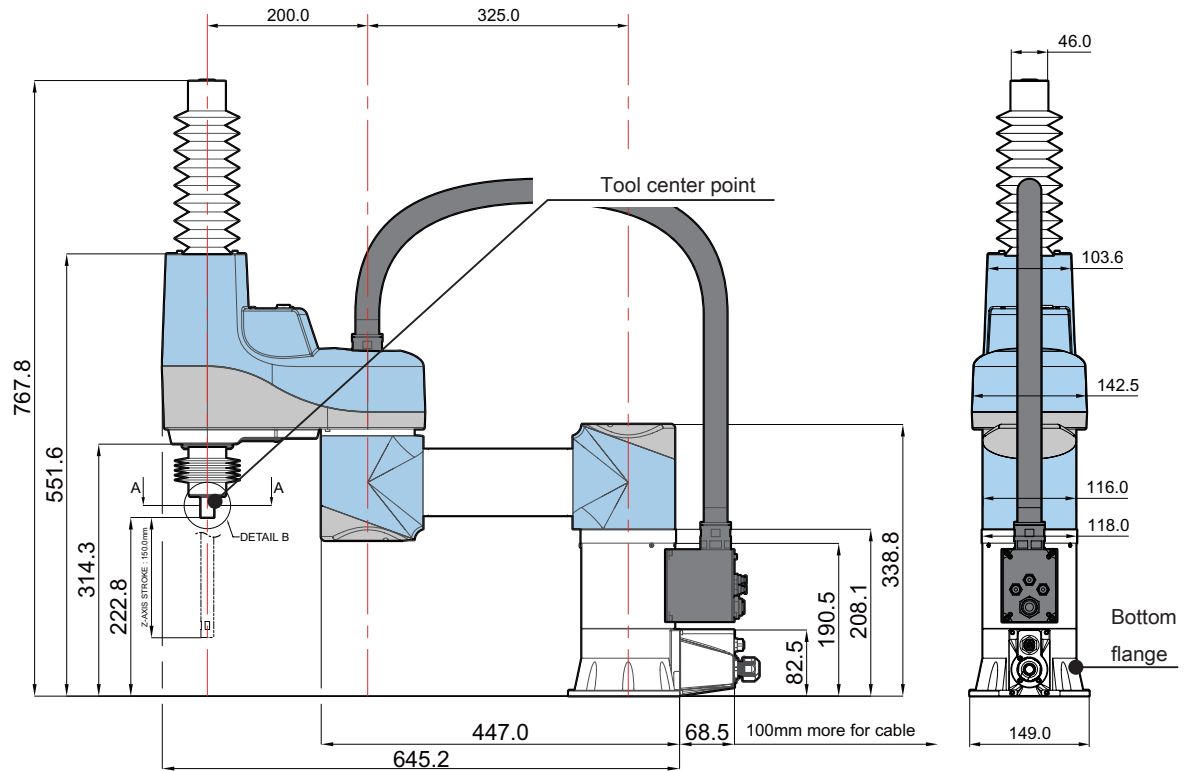
ZRB-0452C-15A

Arm Length: 525 mm

Cleanroom Type

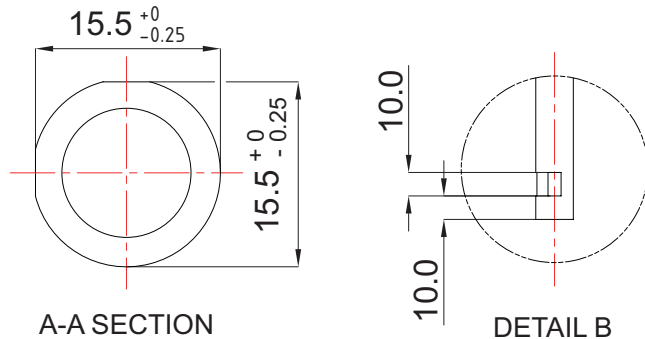
Not to Scale

(mm)



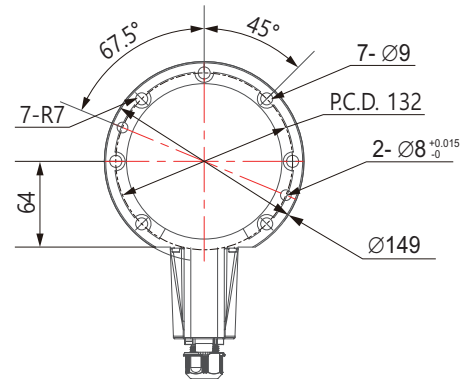
## Tool center point

for end-effector attachment



## Bottom flange

for mounting



## Mounting bottom flange

To mount bottom flange, Using M8 hex sockethead cap screws of at least 30 mm long is recommended.

The recommended tightening torque is 22 Nm.

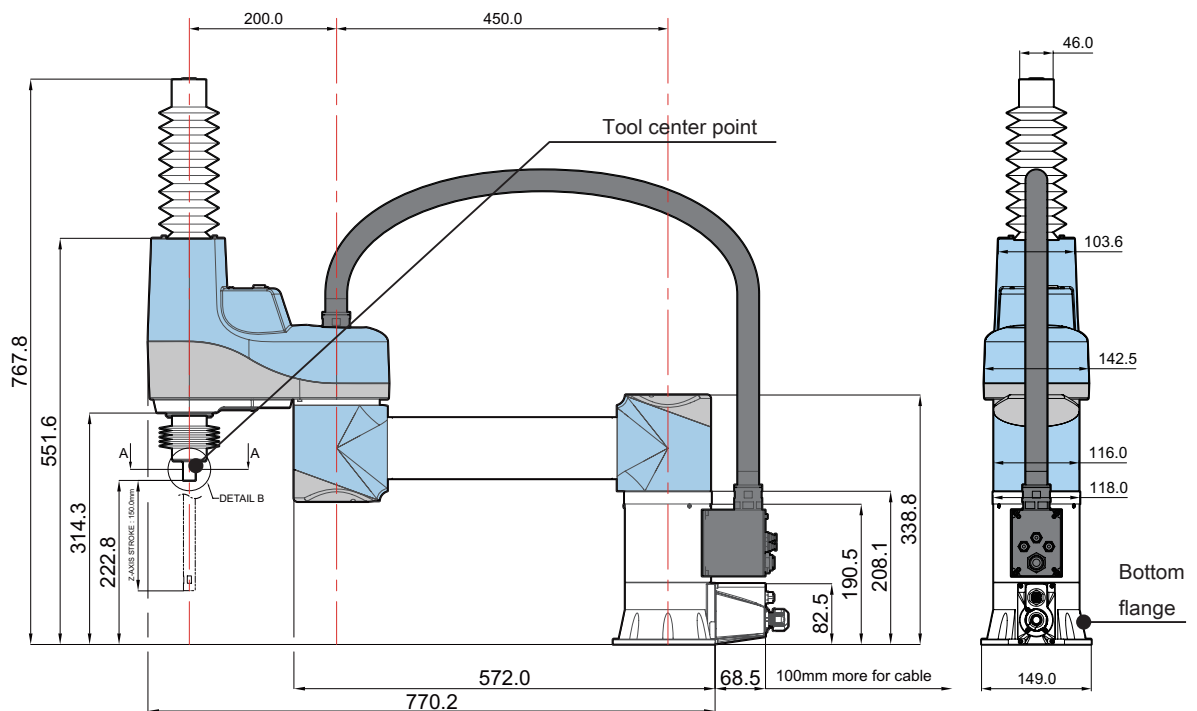
ZRB-0465C-15A

Arm Length: 650 mm

Cleanroom Type

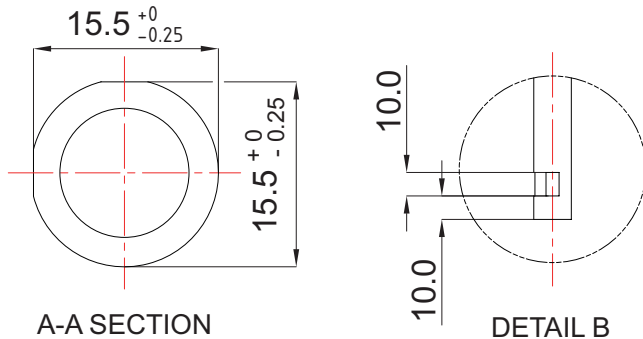
Not to Scale

(mm)



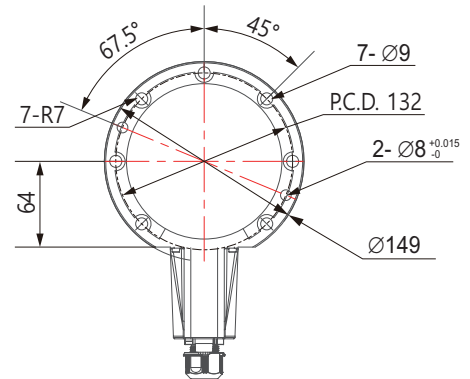
## Tool center point

for end-effector attachment



## Bottom flange

for mounting



## Mounting bottom flange

To mount bottom flange, Using M8 hex sockethead cap screws of at least 30 mm long is recommended.

The recommended tightening torque is 22 Nm.



# Range of Movement

ZRB-0440N-15A / ZRB-0440C-15A

Arm Length: 400 mm

Maximum reachable range of the tool center point :

∅ 800, H150 Cylinder ( around J1 rotational axis )

Unreachable points of the tool center point

∅ 240.6 Cylinder ( around J1 rotational axis )

1st Arm movable range

( where contact with the manipulator or pinch point risk exists )

∅ 400 Cylinder ( around J1 rotational axis )

1st Arm rotational range

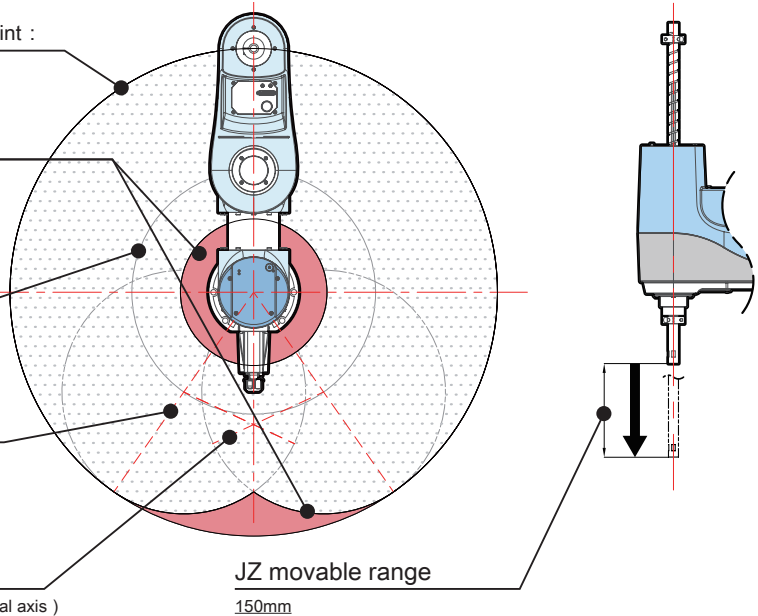
± 145° ( around J1 rotational axis )

2st Arm rotational range

± 100° from 1st Arm movable range ( around J2 rotational axis )

JZ movable range

150mm



ZRB-0452N-15A / ZRB-0452C-15A

Arm Length: 525 mm

Maximum reachable range of the tool center point :

∅ 1050, H150 Cylinder ( around J1 rotational axis )

Unreachable points of the tool center point

∅ 395.7 Cylinder ( around J1 rotational axis )

1st Arm movable range

( where contact with the manipulator or pinch point risk exists )

∅ 650 Cylinder ( around J1 rotational axis )

1st Arm rotational range

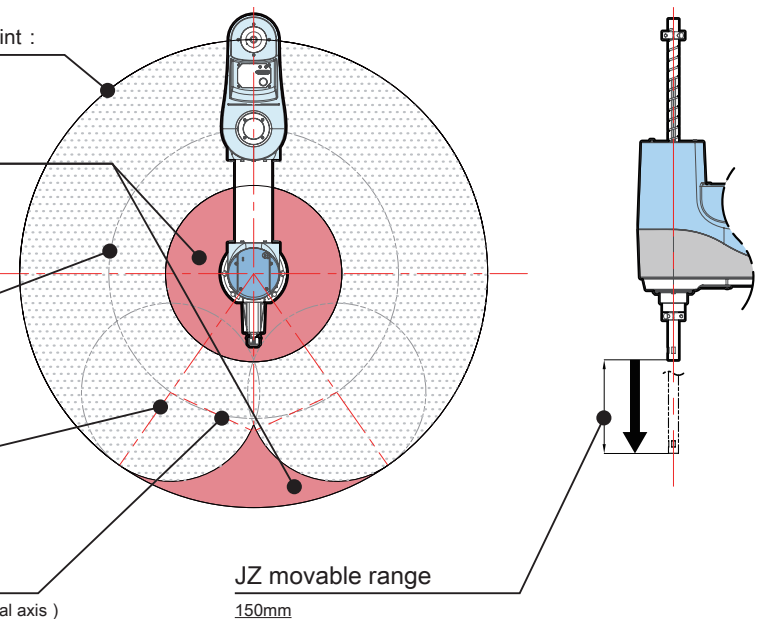
± 145° ( around J1 rotational axis )

2st Arm rotational range

± 100° from 1st Arm movable range ( around J2 rotational axis )

JZ movable range

150mm



## ZRB-0465N-15A / ZRB-0465C-15A

Arm Length: 650 mm

Maximum reachable range of the tool center point :

∅ 1300. H150 Cylinder ( around J1 rotational axis )

Unreachable points of the tool center point

∅ 616.6 Cylinder ( around J1 rotational axis )

1st Arm movable range

( where contact with the manipulator or pinch point risk exists )

∅ 900 Cylinder ( around J1 rotational axis )

1st Arm rotational range

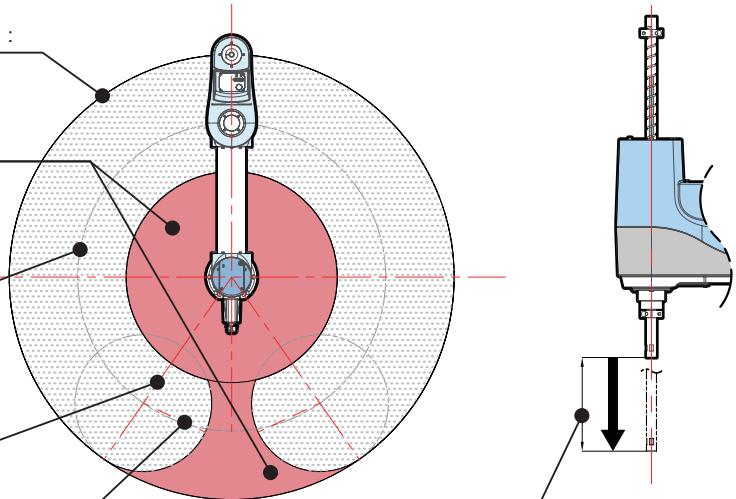
± 145° ( around J1 rotational axis )

2st Arm rotational range

± 100° from 1st Arm movable range ( around J2 rotational axis )

JZ movable range

150mm



# Recommended End-effector Structure



## Caution



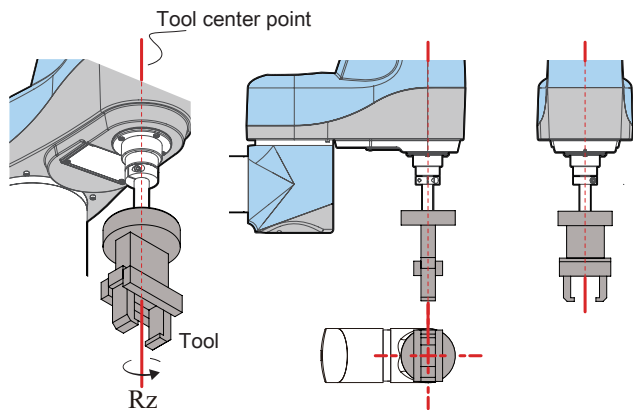
When designing an end-effector which will be attached to the tool center point, thoroughly validate manipulator postures and motion ranges. See below for examples.



### Example 1 Recommended

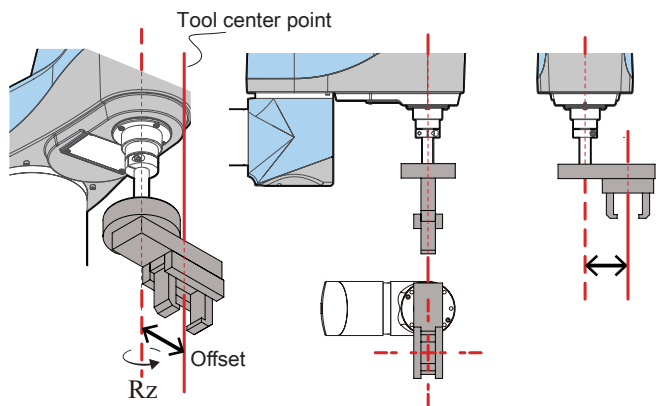
The rotational axis of Rz and the central axis of the tool are coaxial.

Note that the longer the distance between the tool center point and the end of the tool is, the larger the payload to the manipulator becomes, which may result in vibrations or slower motion speed.



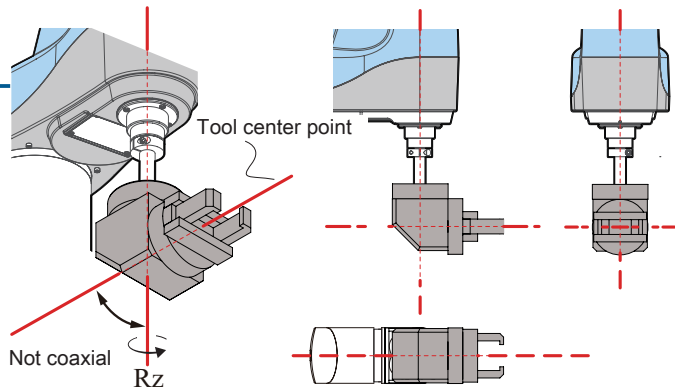
### Example 2 Not Recommended

Because an offset exists between the central axis of the tool and the Rz rotational axis, the robot may become unable to handle a workpiece.



### Example 3 Not Recommended

Because the central axis of the tool and the Rz rotational axis are not coaxial, the robot may become unable to handle a work piece.



# Controller Specifications

Item	ZC1000	ZC1001	Note
Compatible Manipulator	ZERO series		In case using Teaching Pendant(ZP1000) ZC1001 is necessary
Dimensions	(See a dimension drawing)		The overhang is not included
Weight	5 kg		—
Number of Control Axes	6 axes		—
General Specifications	Programming Method	Off-line programming with a PC	
	Programming language	Python	
	Storage Memory	eMMC	
	Teaching method	PC Jog Stick	PC Jog Stick Teaching Pendant
Display function	7-segment display panel	3 digits	
	Status LED indicators	3 lamps	
Interface (Controller)	Manipulator Connector	1 Port	
	Input	16 Bit	
	Output	16 Bit	
	Safety	1 Port	
	Ethernet	2 Port	
	USB	2 Port	
	JOG Stick	1 Port	
Interface (Arm I/O)	Digital input	8 Bit	
	Digital output	4 Bit	
	Asynchronous communication	1 Ch	
	Power output	24 V	
Specifications of Power supply <sup>(*)</sup>	Voltage	Single-phase 100 VAC - 240 VAC	
	Frequency	50 Hz - 60 Hz	
	Current	2.7 A, 230 VAC / 5.4 A, 115 VAC	
	In-rush current	75 A, 230 VAC	
	leakage current	5.0 mA, 240 VAC	
Rated short circuit current	1,500 A		UL File No. E10480
Grounding	Type 3 grounding or above		Grounding resistance value of 100 Ω or below
Safety	Rating	ISO 10218-1	
	Voltage-resistance	1,500 VAC	
	Insulation resistance	1 M Ω or above	
EMC	EN61000-6-2:2005 EN55011 : 2009+A1:2010		Heavy industrial level

<sup>\*)</sup> Voltage variation should be within input voltage range

Be no power outage more than 20 ms.

Gain sufficient power including in-rush current

Use fuses with rated current: 8A, rated breaking capacity: AC250 V / 1,500A

The specification items and their contents described in this document are general information. For more details, please refer to a copy of the document " SPECIFICATIONS" included in the product.

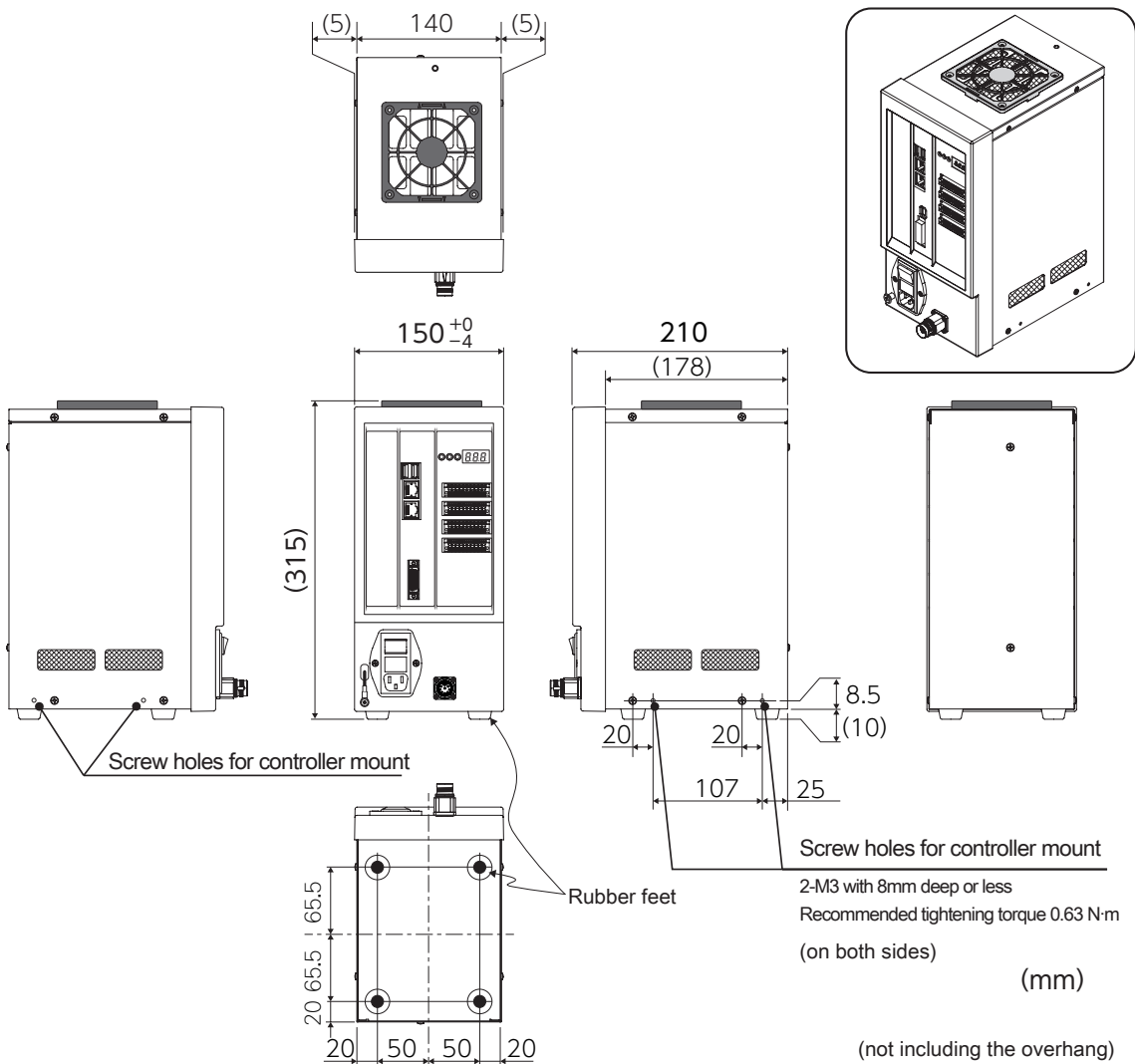
# Controller Dimensions



## CAUTION



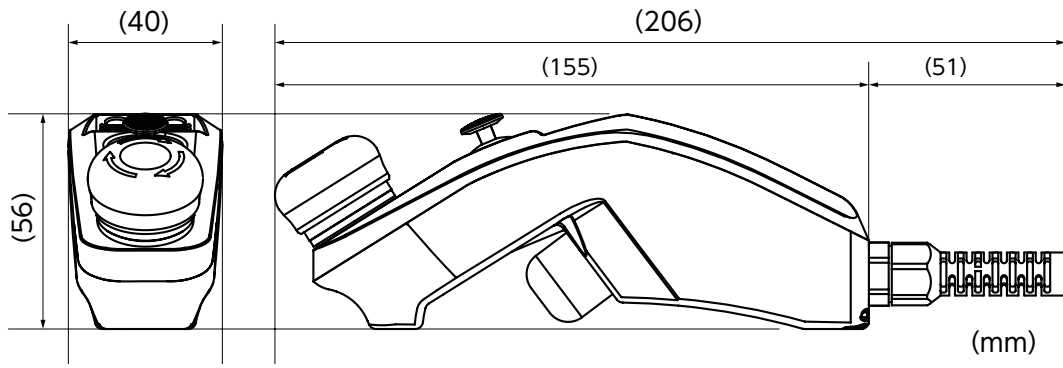
When designing a metal fitting, make it so that the cover fixing screws are 20 mm away from the controller mount holes and also the air inlets will not be blocked.



# JOG Stick Specifications

	Item	Specification	Remark
General Specifications	Model	ZJ1000	—
	Dimensions	H56 mm × D155 mm × W40 mm	Not including a cable
	Weight	600 g or less	—
	Frame material	ABS resin	Color: Yellow / Black
	Power supply volatage	DC24 V ± 10%	—
	Power consumption	5 W or less	—
	Cable length	5 m	—
Environmental Specifications	Operating temperature	0 °C – 40 °C	—
	Operating humidity	30 % – 85 %	—
	Storage temperature	- 40 °C – 85 °C	—
	Storage humidity	10 % – 90 %	—
	Cooling	Natural cooling	—

# JOG Stick Dimensions

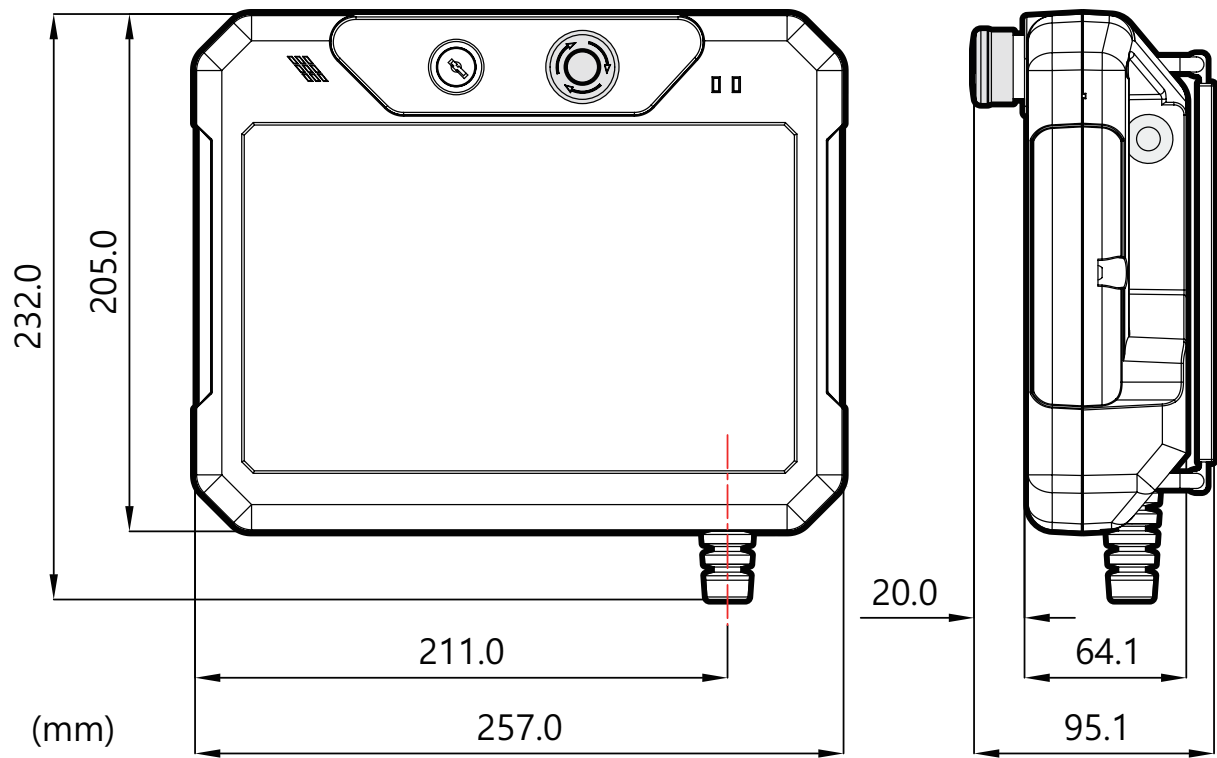


# Teaching Pendant Specifications

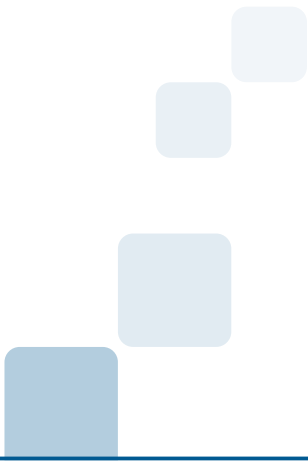
	Item	Specification	Remark
General Specifications	Model	ZP1000	—
	Dimensions	H95.1 mm × D257 mm × W205 mm	Not including a cable
	Weight	1.2 kg or less	—
	Frame material	PC + ABS resin	Color: Black
	Power supply volatage	DC24 V ± 10%	—
	Power consumption	12 W or less	—
	Cable length	3 m	—
Environmental Specifications	Operating temperature	0 °C – 40 °C	—
	Operating humidity	30 % – 85 %	—
	Storage temperature	- 40 °C – 85 °C	—
	Storage humidity	10 % – 90 %	—
	Cooling	Natural cooling	—



# Teaching Pendant Dimensions



(not including the bumper and cable)



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Customer service center

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