General Purpose Robot Arm for Industry Use

ZERØ

Delta Robot Specifications

Document Number : M-0304-211021

Manipulator Specifications

Item		Unit	ZRC-0306N	ZRC-0306R
Structure		—	Parallel robot	
Degrees of motion freedom		—	3	4
Mount direction		—	Floor (frame option), Ceiling	
Drive system		—	BLDC motor	
Position detection method		—	Multi-turn Absolute Encoder (Battery Backup)	
Position control method		—	Servo control	
Break		—	Electromagnetic Brake	
Payload [*1]	Standard	kg	1	
	Maximum		3	
Work area		—	Φ 600 x H200	
Motion range	J1	deg	160 (-60 ~ +100)	
	J2		160 (-60 ~ +100)	
	J3		160 (-60 ~ +100)	
	Roll		—	720 (± 360)
Resultant Velocity [*2]	XYZ	mm/s	1800	
	Roll	deg/s	—	1000
Repeatablity	XYZ	mm	±0.1	
	Roll	deg	—	±0.02
TCP permissible load inertia [*3]	Standard	kg· m²	0.025	
	Maximum		0.05	
Dimensions			827 x 827 x 667	
Weight		kg	16(body only), 26(include frame)	17(body only), 27(include frame)
Power consumption		W	600	
Compatible controller		—	ZC1***	
Manipulator cable length		m	3	
Manipulator mount		—	M10 screws at 6 spots (refer the dimension drawing)	
End-effector mount		—	(refer the dimension drawing)	

*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) Value is for a reference.
*3) Depends on operating conditions, such as acceleration and deceleration.

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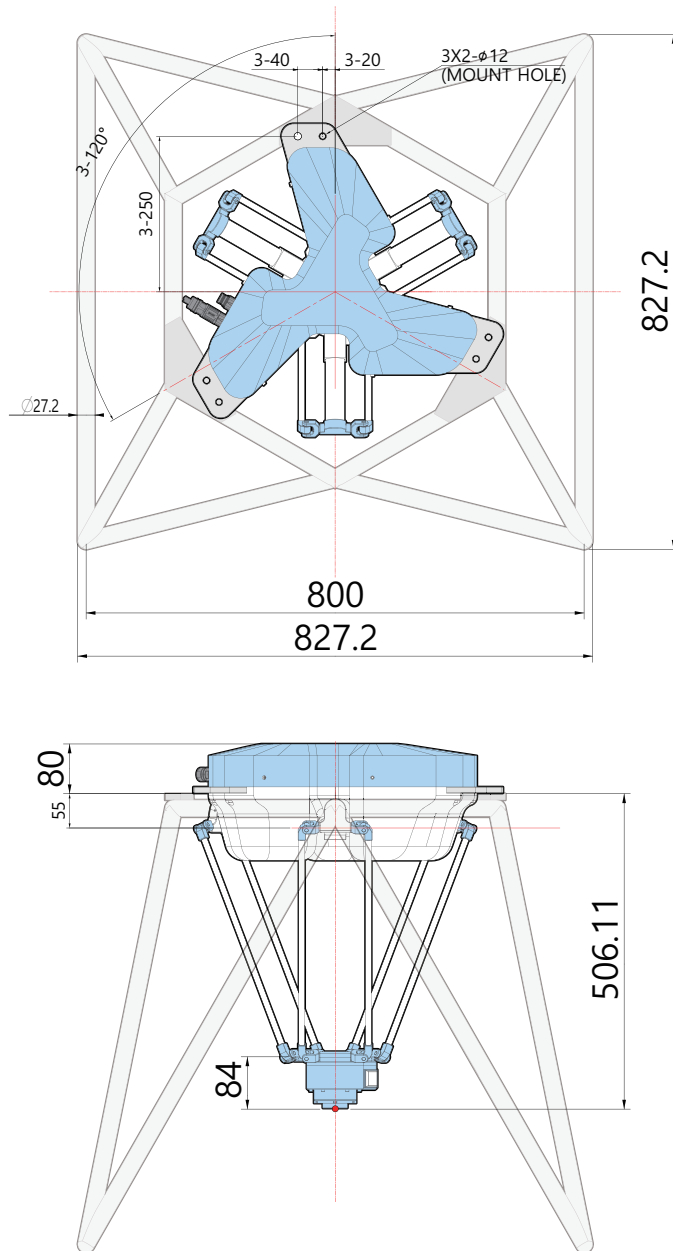
Manipulator Dimensions

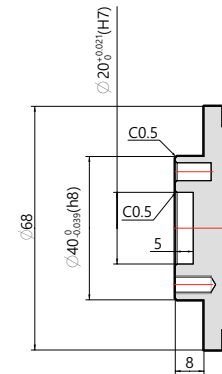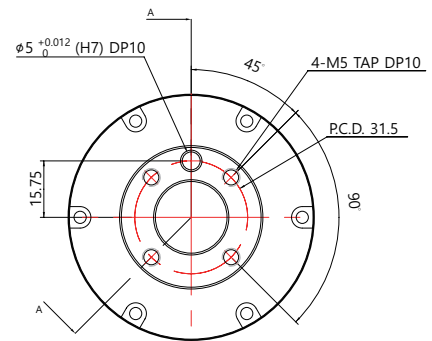ZRC-0306N   DOF: 3   Normal Type

Not to Scale

(mm)

3-40   3-20   3X2-φ12
                  (MOUNT HOLE)

3-120°

3-250

827.2

∅27.2

800
827.2

80
55

506.11

84

Tool center point

for end-effector attachment

φ5 +0.012/0 (H7) DP10   45°   4-M5 TAP DP10

P.C.D. 31.5

15.75   90°

A

A

∅20 +0.021/0 (H7)

C0.5

∅68

∅40 0/-0.039 (h8)

C0.5

5

8

단면 A-A

The shape of the frame is an example. The shape and dimension can be changed due to product improvement or circumstances.

Mounting on frame

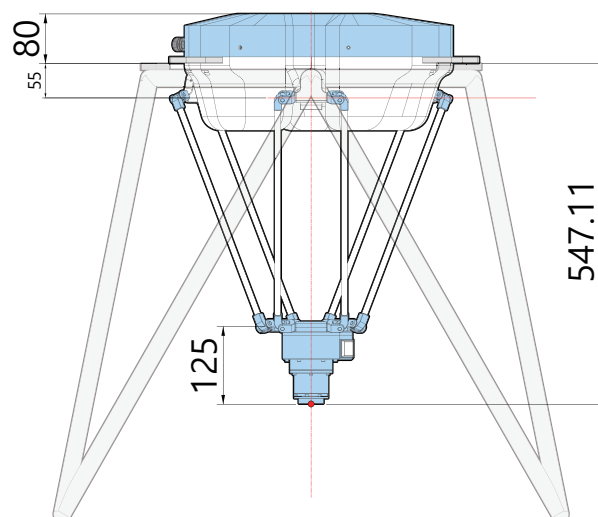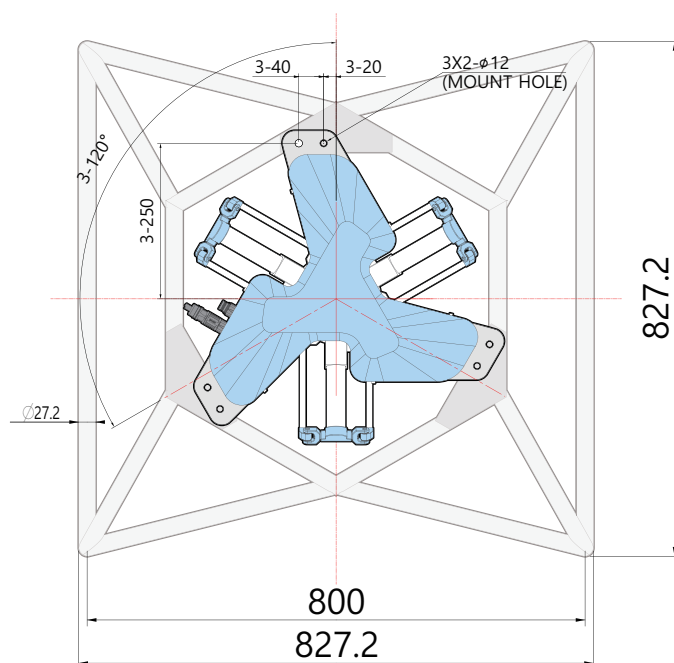To mount on frame, Using M10 hex sockethead cap screws of at least 30 mm long is recommended.
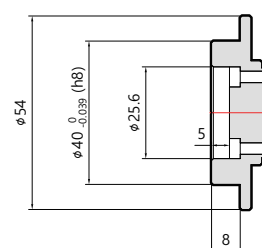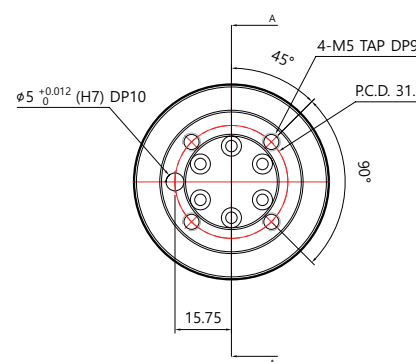
ZRC-0306R — DOF: 4 — Normal Type

Not to Scale

(mm)

3-40   3-20   3X2-φ12 (MOUNT HOLE)

3-120°

3-250

827.2

Ø27.2

800

827.2

80

55

547.11

125

Tool center point

for end-effector attachment

45°

4-M5 TAP DP9

P.C.D. 31.5

φ5 +0.012/0 (H7) DP10

90°

15.75

A – A

φ54

φ40 0/-0.039 (h8)

φ25.6

5

8

단면 A-A

The shape of the frame is an example. The shape and dimension can be changed due to product improvement or circumstances.

Mounting on frame

To mount on frame, Using M10 hex sockethead cap screws of at least 30 mm long is recommended.
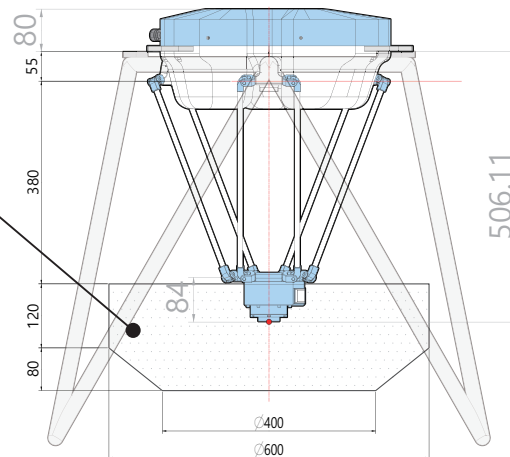
Range of Movement

ZRC-0306N   Diameter of range: 600 mm

Maximum reachable range of the tool center point：
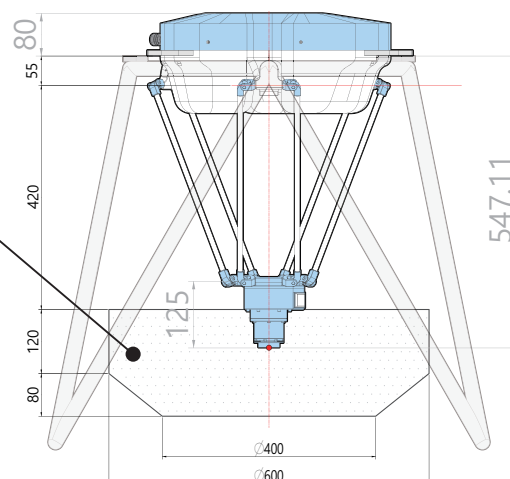
∅ 600, H200 Cylinder

80
55
380
120
80
84
506.11
∅400
∅600

ZRC-0306R   Diameter of range: 600 mm

Maximum reachable range of the tool center point：

∅ 600, H200 Cylinder

80
55
420
125
120
80
547.11
∅400
∅600

The shape of the frame is an example. The shape and dimension can be changed due to product improvement or circumstances.

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.
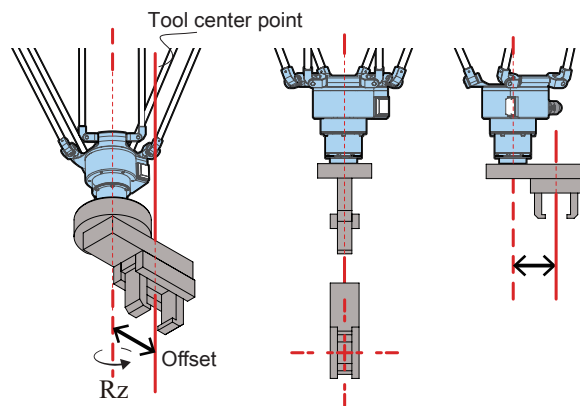
Note that the longer the distance between the tool center point and the end of the tool is, the larger the payload to the manipulator becomes, which may result in vibrations or slower motion speed.
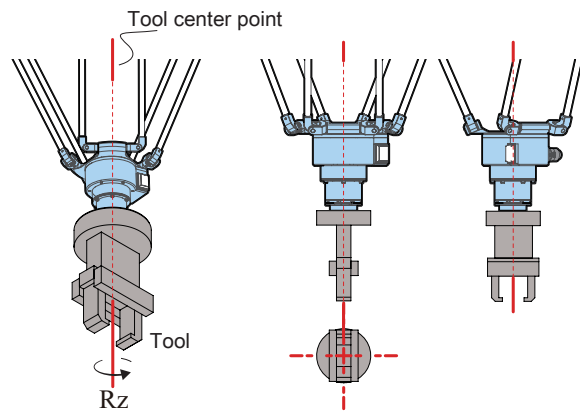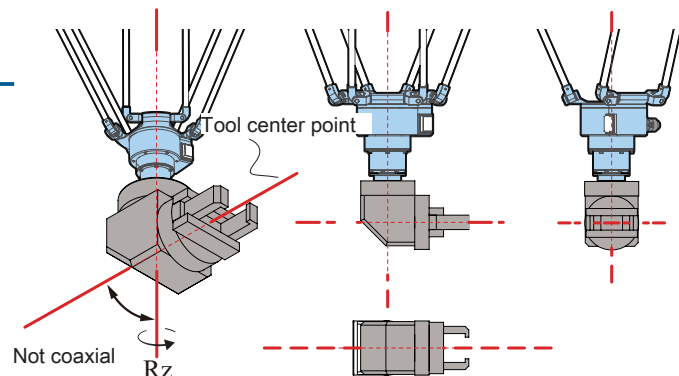
Example 2
Not Recommended

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.

MEMO

Controller Specifications

Item		ZC1000	ZC1001	Note
General Specifications	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		—
	Programming Method	Off-line programming with a PC		Application programs are transferred with TFP and executed.
	Programming language	Python		Use the special libraries for the robot operation
	Storage Memory	eMMC		—
	Teaching method	PC Jog Stick	PC Jog Stick Teaching Pendant	Monitoring, storing and controlling data via http with a web browser
Display function	7-segment display panel	3 digits		—
	Status LED indicators	3 lamps		—
Interface (Controller)	Manipulator Connector	1 Port		—
	Input	16 Bit		Isolated; selection of high-side or low-side
	Output	16 Bit		Isolated; selection of high-side or low-side
	Safety	1 Port		EMS x 2; Mode; Servo-On input Servo power monitor
	Ethernet	2 Port		—
	USB	2 Port		—
	JOG Stick	1 Port		A special input device I/F for teaching
Interface (Arm I/O)	Digital input	8 Bit		Not isolated; comparator input
	Digital output	4 Bit		Non-isolated; high-side switch
	Asynchronous communication	1 Ch		RS422/RS485
	Power output	24 V		0.2 A max
Specifications of Power supply(*)	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		Certified
	Voltage-resistance	1,500 VAC		Primary-FG, 1 minute
	Insulation resistance	1 M Ω or above		I/P - FG 500VDC / 25℃ / 70%RH
EMC		EN61000-6-2:2005 EN55011 : 2009+A1:2010		Heavy industrial level

*) 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.
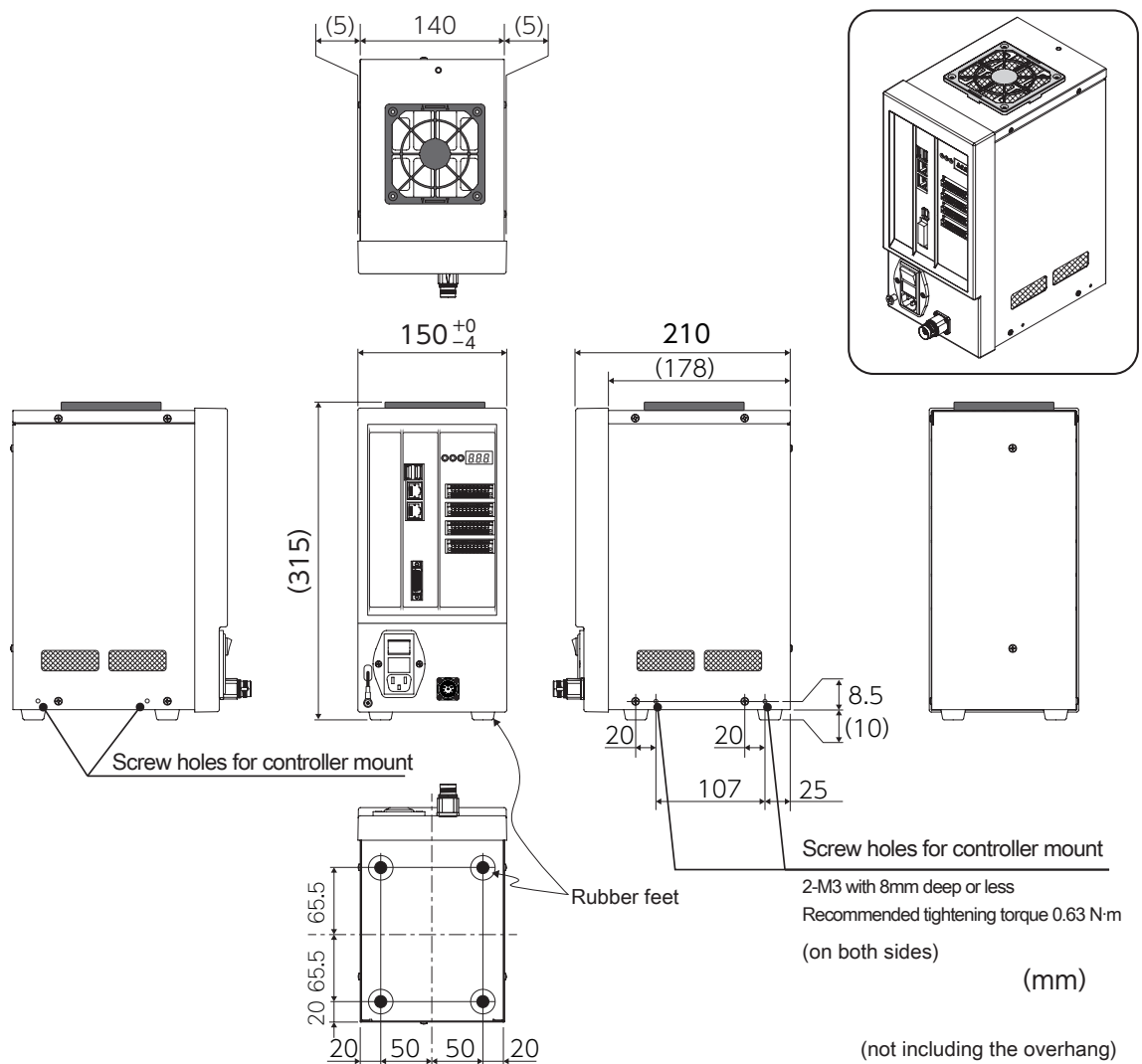
Controller Dimensions

⚠ 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.

(5) 140 (5)

$150 \, ^{+0}_{-4}$ 210

(315)   (178)

Screw holes for controller mount

8.5
(10)

20   20

107   25

Screw holes for controller mount

2-M3 with 8mm deep or less
Recommended tightening torque 0.63 N·m
(on both sides)

(mm)

Rubber feet

65.5
65.5
20   20 50 50 20

(not including the overhang)

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 ℃ – 40 ℃	—
	Operating humidity	30 % – 85 %	—
	Storage temperature	- 40 ℃ – 85 ℃	—
	Storage humidity	10 % – 90 %	—
	Cooling	Natural cooling	—

JOG Stick Dimensions

(40)

(206)

(155)

(51)

(56)

(mm)
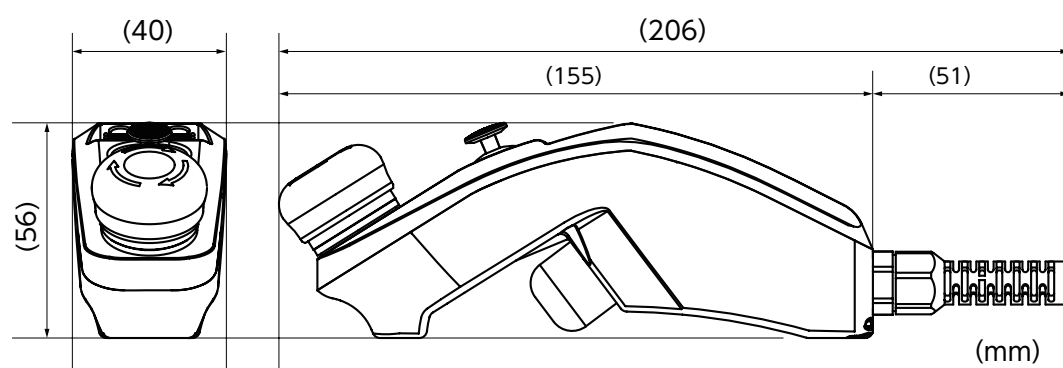
Teaching Pendant Specifications

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 ℃ – 40 ℃	—
	Operating humidity	30 % – 85 %	—
	Storage temperature	- 40 ℃ – 85 ℃	—
	Storage humidity	10 % – 90 %	—
	Cooling	Natural cooling	—

Teaching Pendant Dimensions

232.0
205.0
211.0
257.0
(mm)
20.0
64.1
95.1
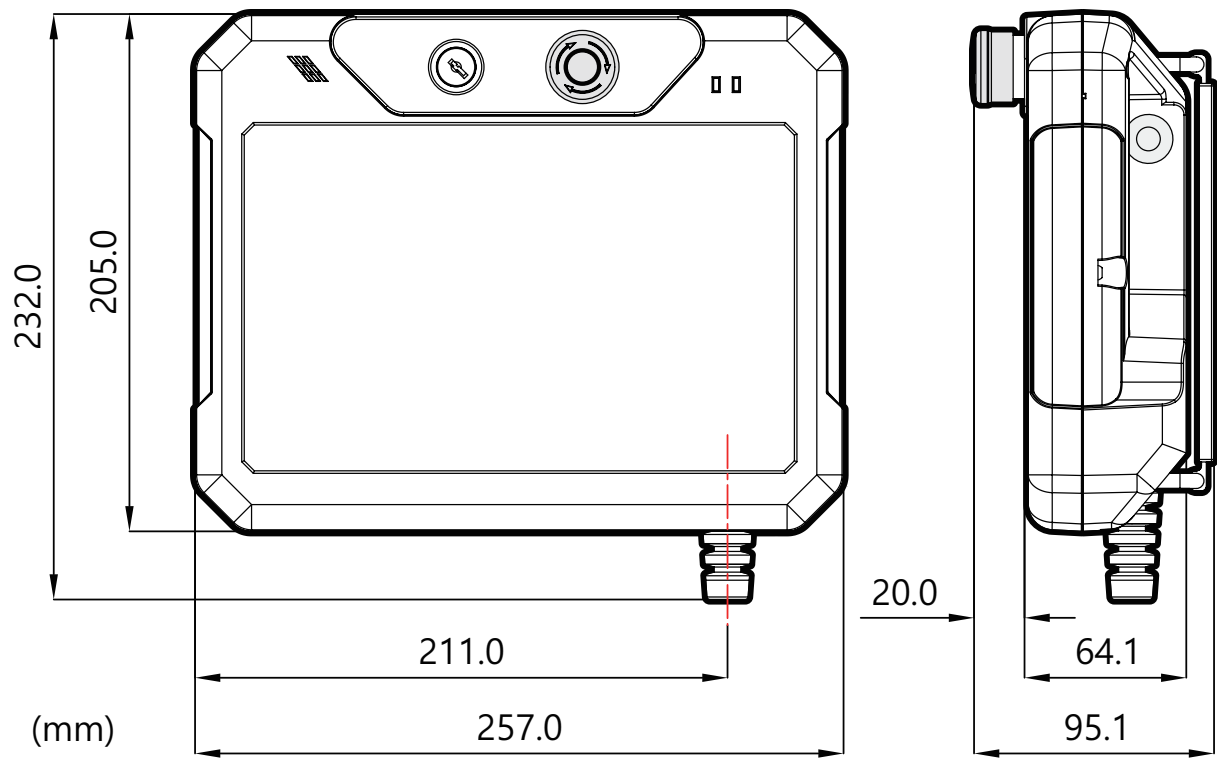
(not including the bumper and cable)