

2. Specifications

2.1 Features of G1 series Manipulators

The G1 series Manipulators are high-performance manipulators intended to space saving, achieve high speed, high DUTY, and high rigidity.

The features of the G1 series Manipulators are as follows:

High Accuracy & High Speed & High Rigidity

Repeating positioning accuracy is ± 0.005 mm

→ Optimum for precision assembling production line

Cycle time under 0.3 seconds (with 175 mm arm)

* When moving 100 mm in horizontally, 25 mm in vertically with load 0.5 kg

Small body yet powerful (Press force: 50N)

Space Saving

Achieves the motion area equivalent to the upper class robot with 225 mm arm

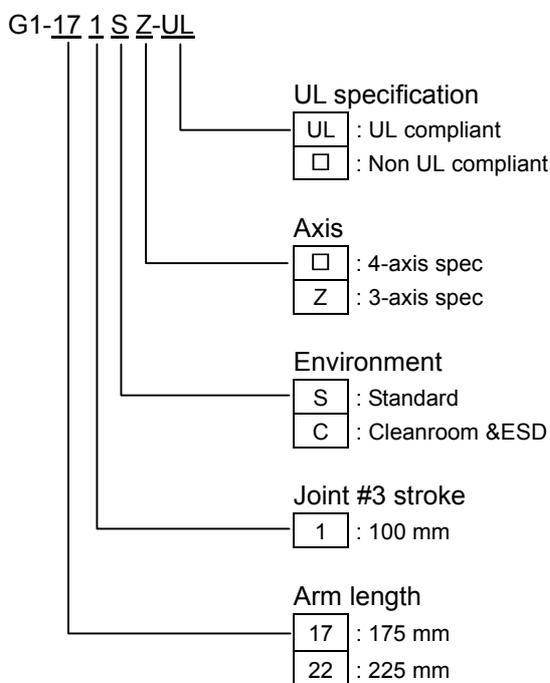
Easy-to-Use

You can easily operate the Light & Compact body

3-Axis Spec

Optimum for screw driving and pressing work using the hand offset

2.2 Model Number

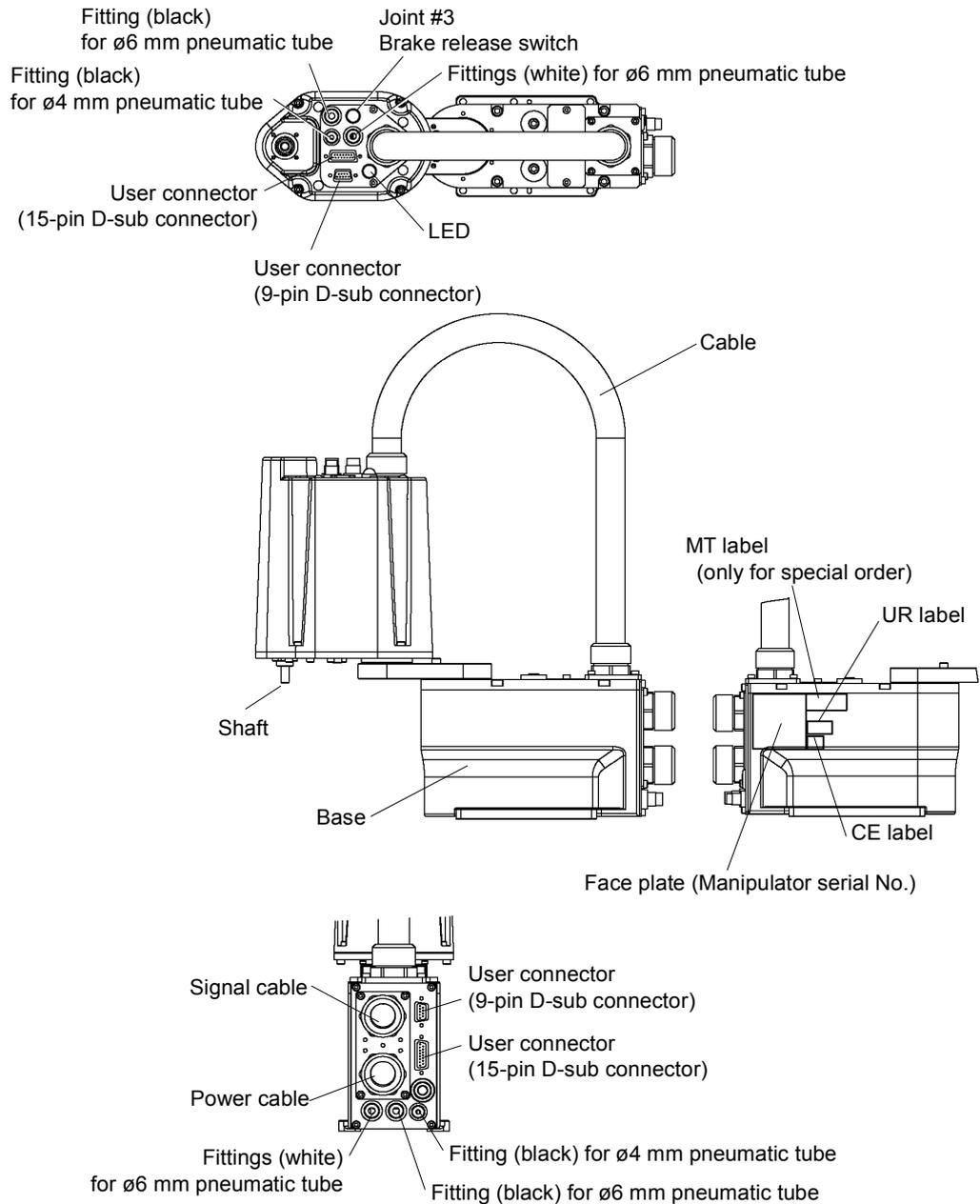


For details of the specifications, refer to *Setup & Operation: 2.4 Specifications*.

2.3 Part Names and Outer Dimensions

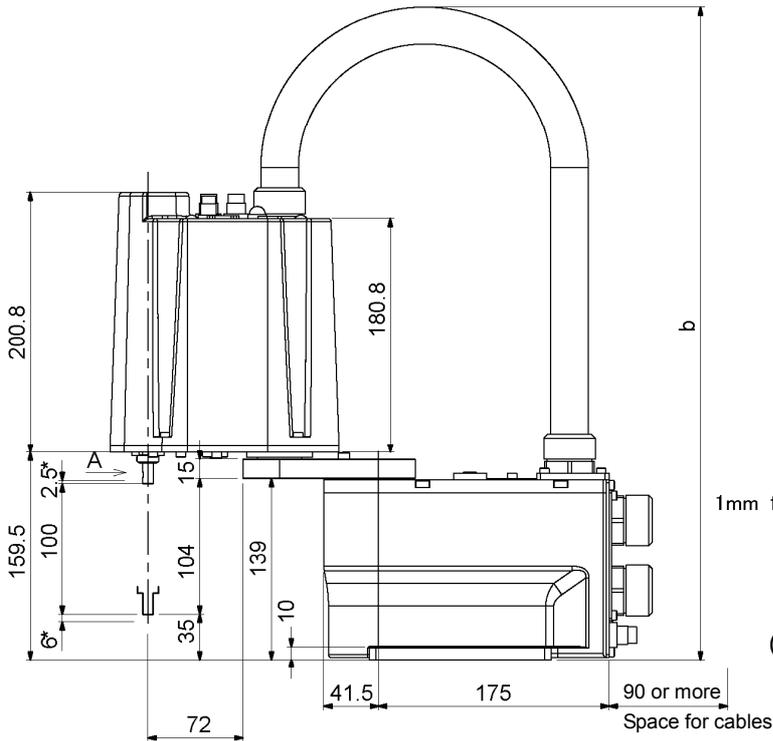
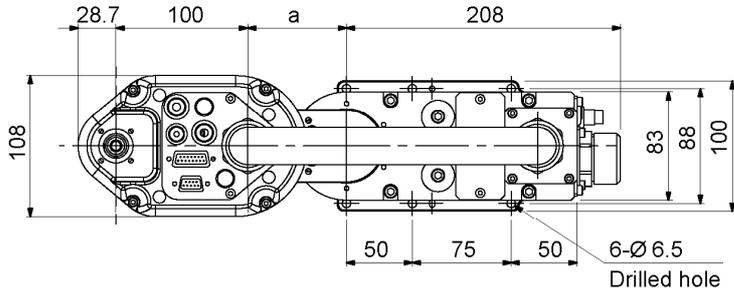
2.3.1 4-axis spec

Part Names : Standard-model (G1-***S)

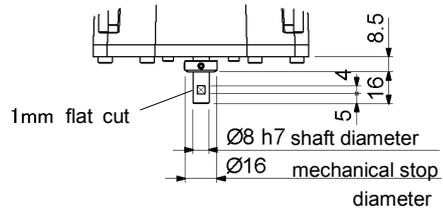


- The brake release button affects only Joint #3. When the brake release button is pressed in emergency mode, the brake for Joint #3 is released simultaneously.
- When the LED lamp is lighting or the controller power is on, the current is being applied to the manipulator. Performing any work with the power ON is extremely hazardous and it may result in electric shock and/or improper function of the robot system. Make sure to turn OFF the controller power before the maintenance work.

Part Dimension : Standard-model (G1-***S)

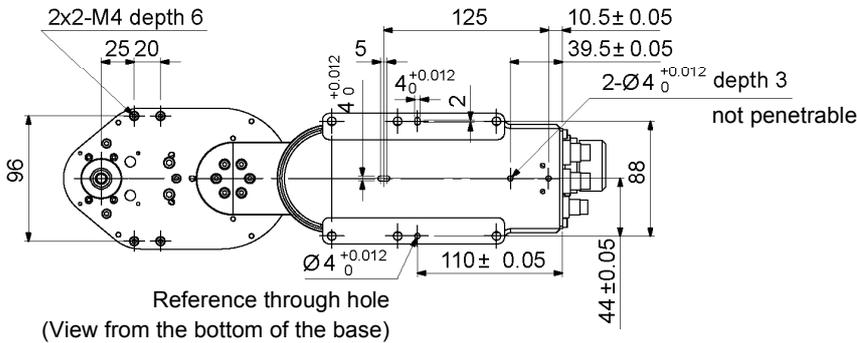


	G1-171S	G1-221S
a	75	125
b	Max.515	Max.545

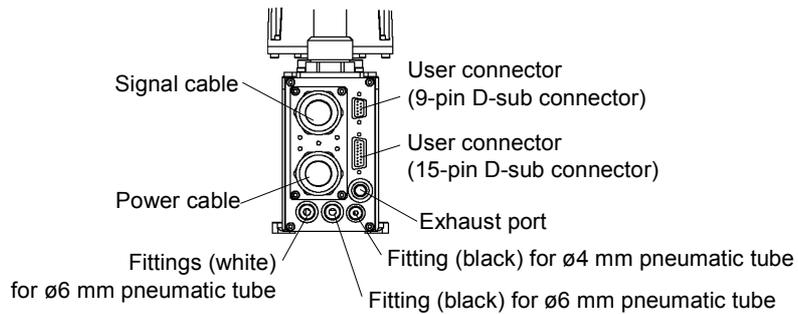
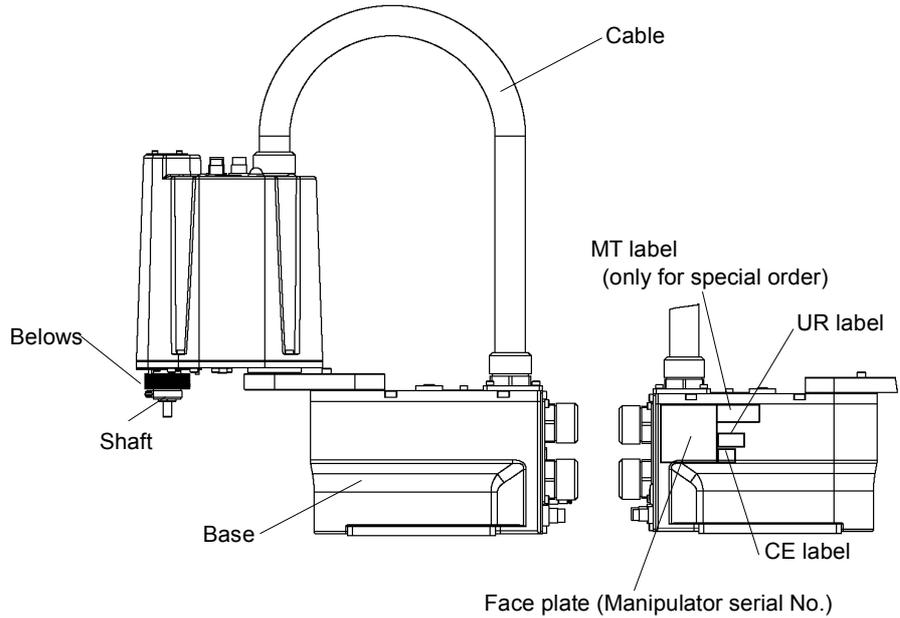
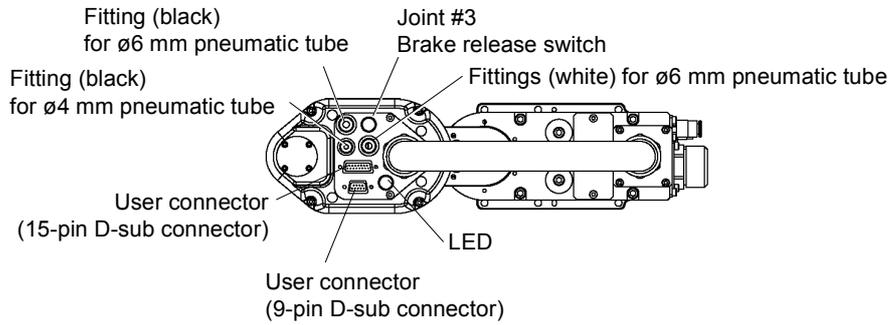


Detail of "A"
(Calibration point position of Joints #3 and #4)

(*) indicates the stroke margin by mechanical stop.

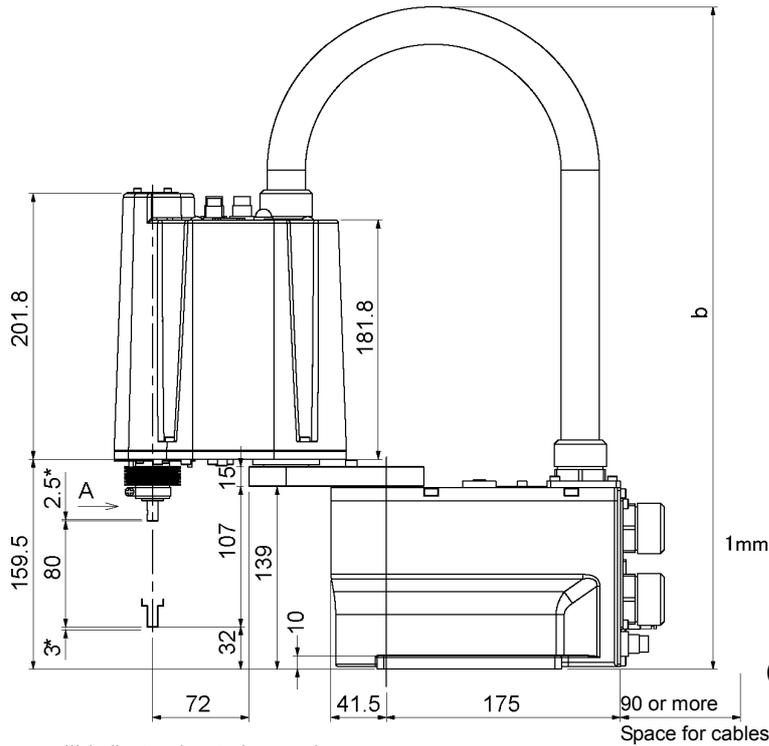
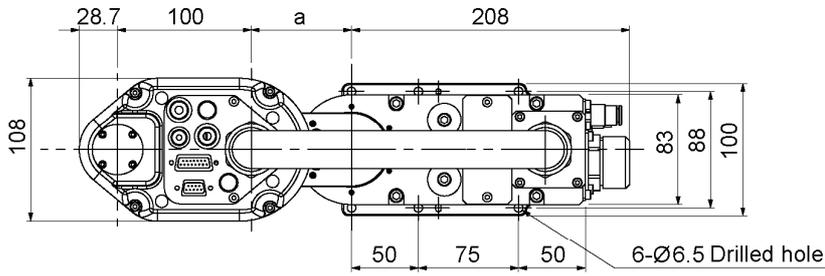


Part Names : Cleanroom-model (G1-***C)

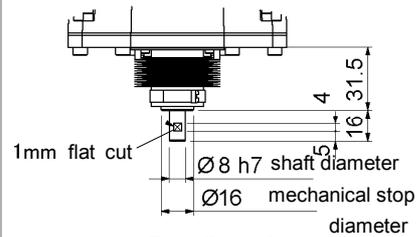


- The brake release button affects only Joint #3. When the brake release button is pressed in emergency mode, the brake for Joint #3 is released simultaneously.
- When the LED lamp is lighting or the controller power is on, the current is being applied to the manipulator. Performing any work with the power ON is extremely hazardous and it may result in electric shock and/or improper function of the robot system. Make sure to turn OFF the controller power before the maintenance work.

Part Dimension : Cleanroom-model (G1-***C)

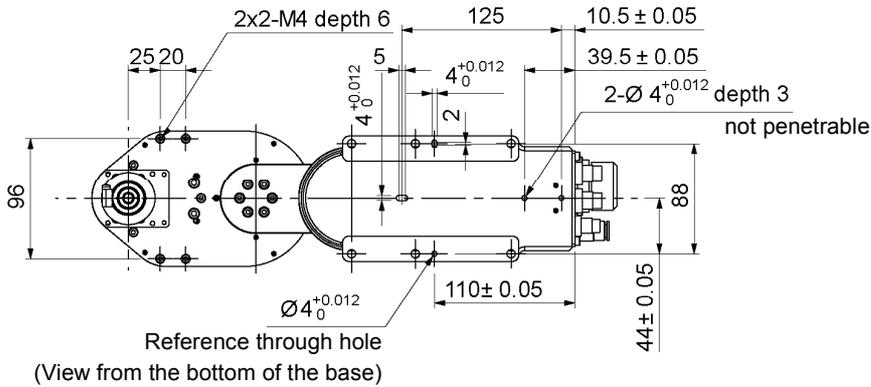


	G1-171C	G1-221C
a	75	125
b	Max.515	Max.545



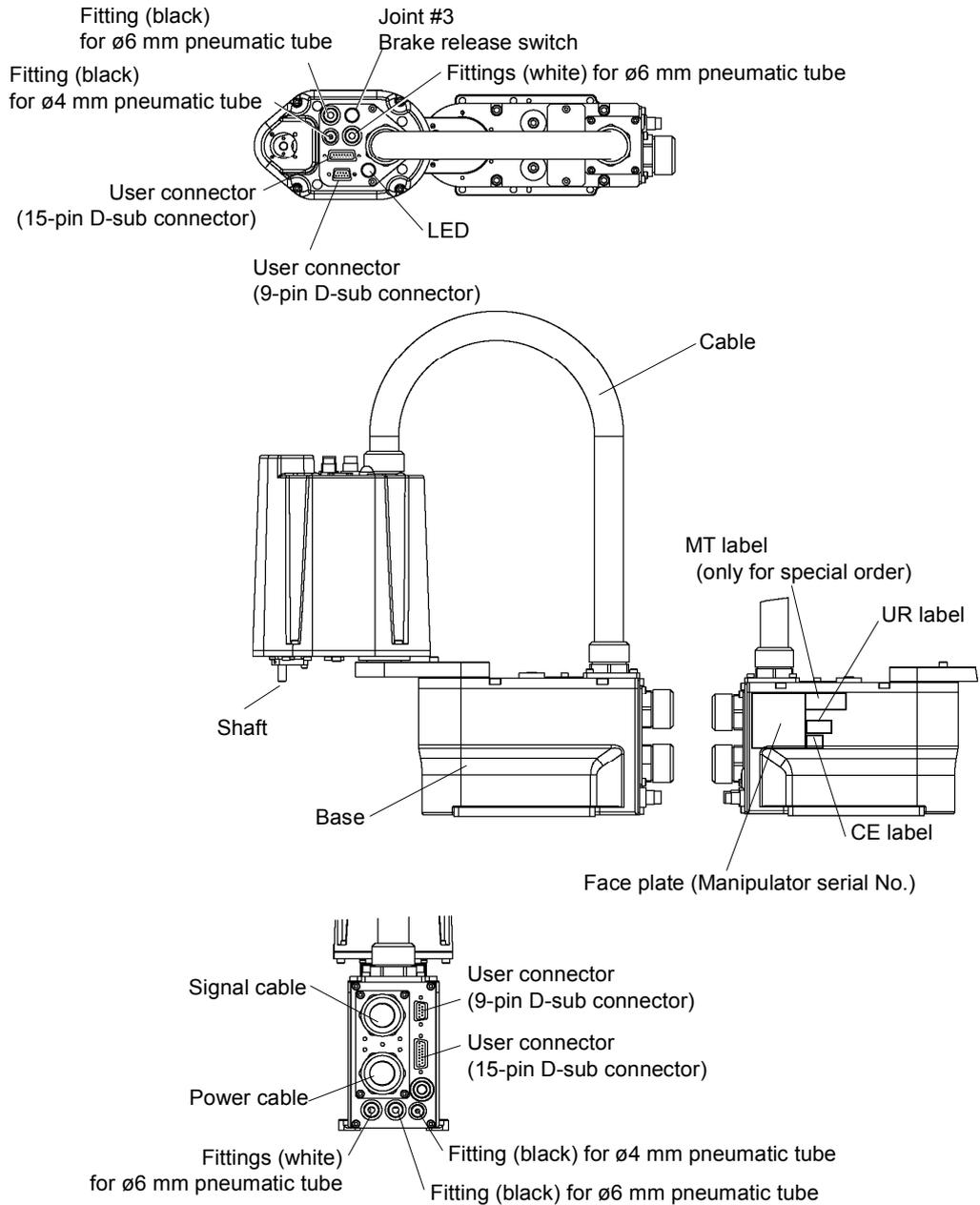
Detail of "A"
(Calibration point position of Joints #3 and #4)

(*) indicates the stroke margin by mechanical stop.



2.3.2 3-axis spec

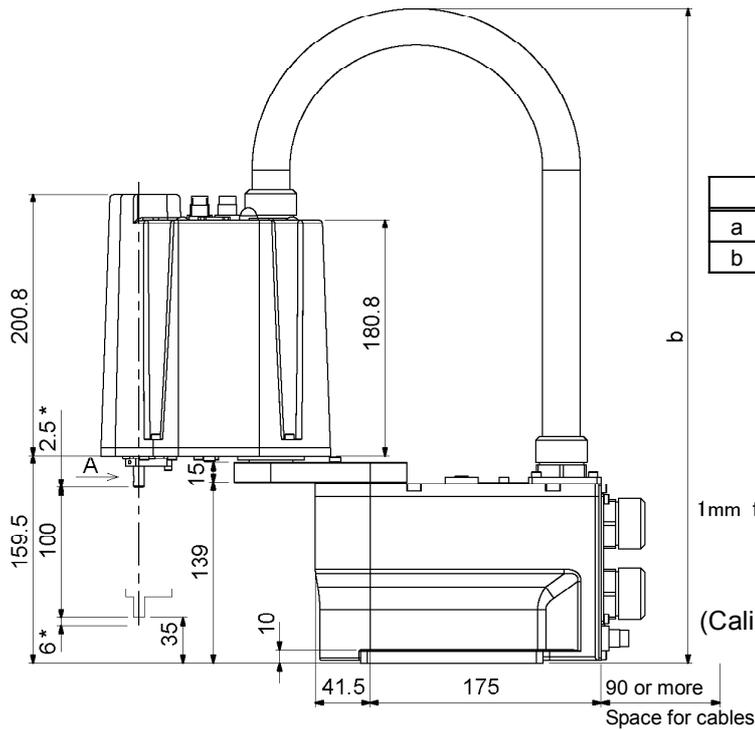
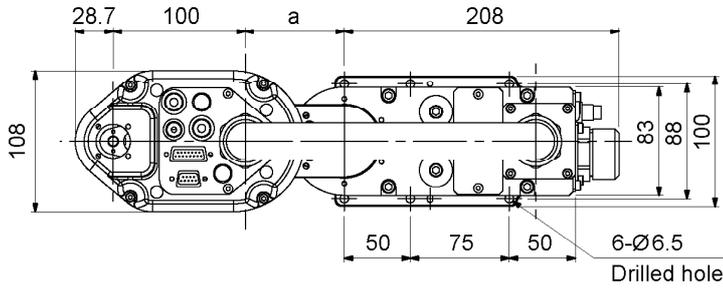
Part Names : Standard-model (G1-***Z)



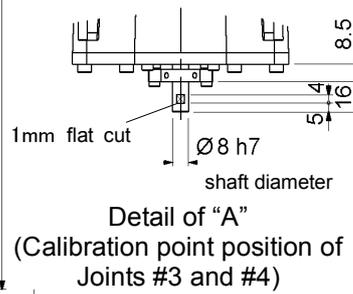
NOTE


- The brake release button affects only Joint #3. When the brake release button is pressed in emergency mode, the brake for Joint #3 is released simultaneously.
- When the LED lamp is lighting or the controller power is on, the current is being applied to the manipulator. Performing any work with the power ON is extremely hazardous and it may result in electric shock and/or improper function of the robot system. Make sure to turn OFF the controller power before the maintenance work.

Part Dimension : Standard-model (G1-***Z)

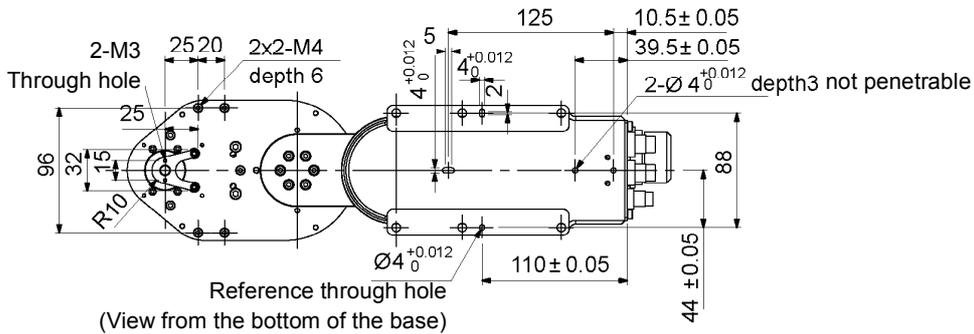


	G1-171Z	G1-221Z
a	75	125
b	Max.515	Max.545



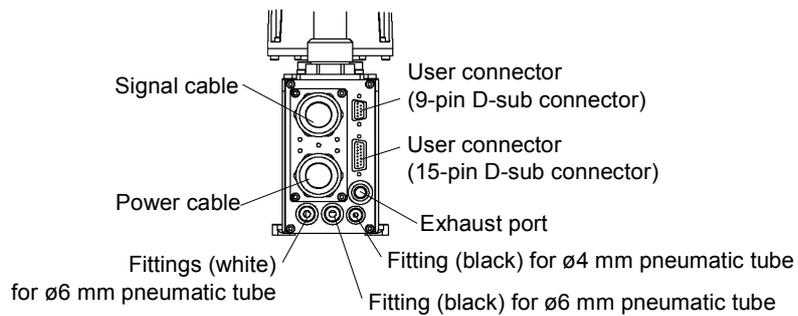
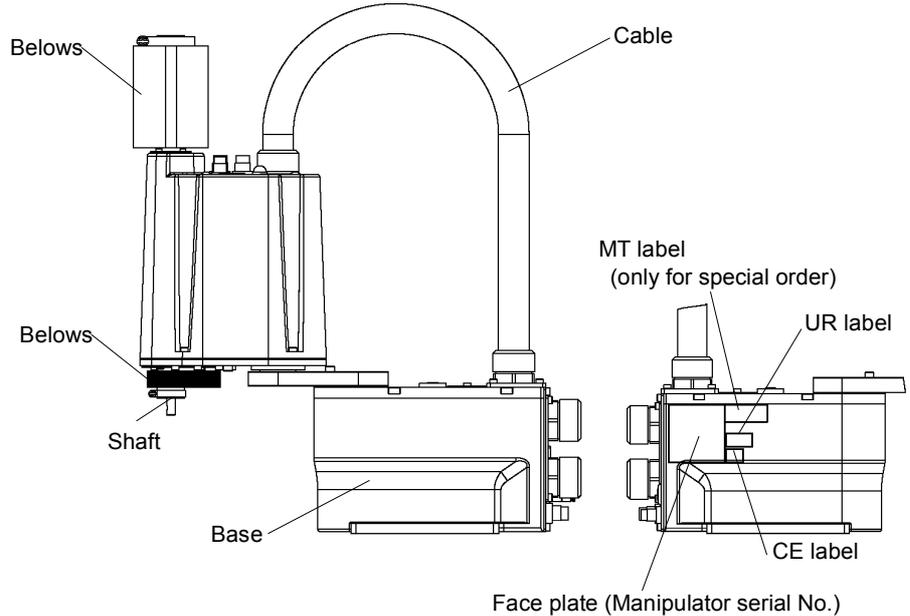
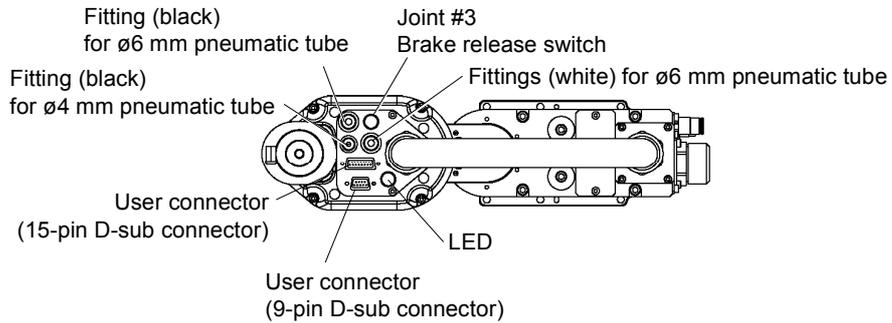
Detail of "A"
(Calibration point position of Joints #3 and #4)

(*) indicates the stroke margin by mechanical stop.



Reference through hole
(View from the bottom of the base)

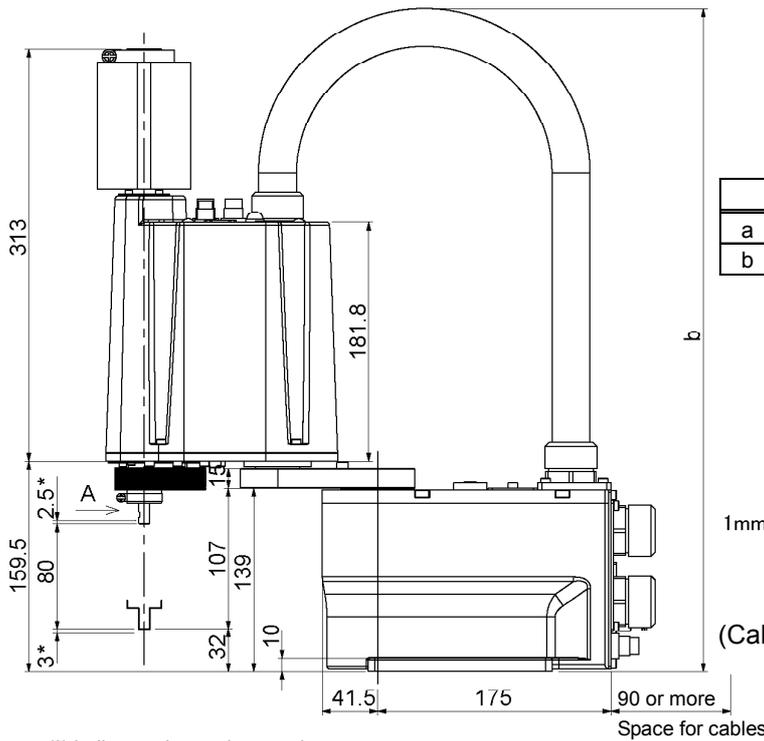
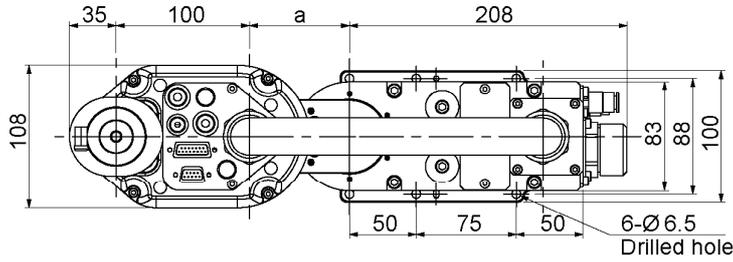
Part Names : Cleanroom-model (G1-***CZ)



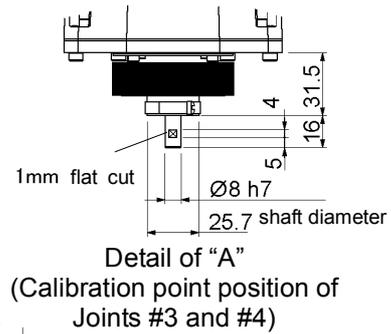
NOTE


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- When the LED lamp is lighting or the controller power is on, the current is being applied to the manipulator. Performing any work with the power ON is extremely hazardous and it may result in electric shock and/or improper function of the robot system. Make sure to turn OFF the controller power before the maintenance work.

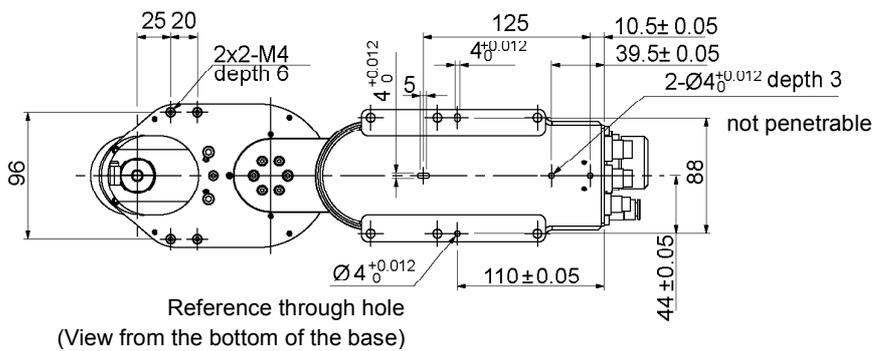
Part Dimension : Cleanroom-model (G1-***CZ)



	G1-171CZ	G1-221CZ
a	75	125
b	Max.515	Max.545



(* indicates the stroke margin by mechanical stop.



2.4 Specifications

Item		4-axis spec		3-axis spec	
		G1-171*	G1-221*	G1-171*	G1-221*
Mounting type		Table Top			
Arm length #1, #2	Arm #1, #2	175 mm	225 mm	175 mm	225 mm
	Arm #1	75 mm	125 mm	75 mm	125 mm
	Arm #2	100 mm		100 mm	
Weight (cables not included)		8 kg		8 kg	
Driving method	All joints	AC servo motor			
Max. operating speed *1	Joints #1, #2	2630 mm/s	3000 mm/s	2630 mm/s	3000 mm/s
	Joints #3 (Z)	1200 mm/s		1200 mm/s	
	Joints #4 (U)	3000 deg/s		-	
Repeatability	Joints #1, #2	± 0.005 mm	± 0.008 mm	± 0.005 mm	± 0.008 mm
	Joints #3 (Z)	± 0.01 mm		± 0.01 mm	
	Joints #4 (U)	± 0.01 deg.		-	
Max. motion range	Joints #1	± 125 deg.		± 125 deg	
	Joints #2 (Cleanroom model)	± 140 deg. (± 140 deg.)	± 152 deg. (± 149 deg.)	± 135 deg. (± 123 deg.)	± 135 deg. (± 132 deg.)
	Z stroke (Cleanroom model)	± 100 (80) mm		± 100 (80) mm	
	Joints #4	± 360 deg		-	
Max. pulse range (pulse)	Joints #1	- 1019449 ~ 6262329 pulse			
	Joints #2 (Cleanroom model)	± 2548623 (± 2548623)	± 2767076 (± 2712463)	± 2457600 (± 2239147)	± 2457600 (± 2402987)
	Joints #3 (Cleanroom model)	- 1092267 ~ 0 (- 873813 ~ 0)			
	Joints #4	- 393216 ~ 393216			
Resolution	Joints #1	3.43322E-05 deg/pulse			
	Joints #2	5.49316E-05 deg/pulse			
	Joints #3	9.15527E-05 mm/pulse			
	Joints #4	9.15527E-04 deg/pulse			
Motor power consumption		All joints: 50 W			
Payload	Rated	0.5 kg		0.5 kg	
	Maximum	1 kg		1.5 kg	
Joint #4 allowable moment of inertia *2	Rated	0.0003 kg·m ²		-	
	Maximum	0.004 kg·m ²		-	
Shaft diameter		ø 8 mm			
Mounting hole		125×88 (4-M6)			
Joint #3 down force		50 N			
Installed wire for customer use		24 pin (9 + 15)			
Installed pneumatic tube for customer use		1 pneumatic tube (ø 4 mm): 0.59 Mpa (6 kgf/cm ² : 86 psi) 2 pneumatic tubes (ø 6 mm): 0.59 Mpa (6 kgf/cm ² : 86 psi)			
Environmental requirements	Ambient temperature	5 to 40 degree C (with minimum temperature variation)			
	Ambient relative humidity	10 to 80 % RH (no condensation)			
	Vibration level	4.9 m/s ² (0.5G) or less			
Noise level *3		65dB			
Installation environment		Standard / Cleanroom + ESD (ISO Class 3) *4			
Applicable Controller		RC180, RC620			

Item		4-axis spec		3-axis spec	
		G1-171*	G1-221*	G1-171*Z	G1-221*Z
Assignable Value () Default values	Speed	1 ~ (5) ~ 100			
	Accel *5	1 ~ (10) ~ 120			
	SpeedS	1 ~ (50) ~ 2000			
	AccelS	1 ~ (200) ~ 25000			
	Fine	0 ~ (10000) ~ 65000			
	Weight	0,100 ~ (0.5,100) ~ 1,100	0,100 ~ (0.5,100) ~ 1.5,100		
MTBF		3 years			
Safety standard		UL1740 (Third Edition, Dated December 7, 2007) ANSI/RIA R15.06-1999 NFPA 79 (2007 Edition) CSA/CAN Z434-03 (February 2003) CE Marking – Machinery Directive, Low Voltage Directive, EMC Directive			

*1: In the case of PTP command. Maximum operating speed for CP command is 2000 mm/s on horizontal plane.

*2: In the case where the center of gravity is at the center of Joint #4. If the center of gravity is not at the center of Joint #4, set the parameter using Inertia command.

*3: Conditions of Manipulator during measurement as follows:

Operating conditions : Under rated load, 4-joints simultaneous motion, maximum speed, maximum acceleration, and duty 50%.

Measurement point : In front of the Manipulator, 1000 mm apart from the motion range, 50 mm above the base-installed surface.

*4: The exhaust system in the Cleanroom-model Manipulator draws air from the base interior and arm cover interior.

A crack or other opening in the base unit can cause loss of negative air pressure in the outer part of the arm, which can cause increased dust emission.

Seal firmly the exhaust port and the exhaust tube with vinyl tape.

If the exhaust flow is not sufficient, dust particle emission may exceed the specified maximum level.

Cleanliness level: Class ISO 3 (ISO14644-1)

In previous criteria; Clean Class: 10 or its equivalent

Amount of Dust (0.1 μm diameter or larger) in 28317 cm³ (1cft) sample-air around the center of the motion rang: 10 particles or less.)

Exhaust System : Exhaust port : Inner diameter: ø8 mm

Exhaust tube : Polyurethane tube

Outer diameter ø8 mm

or Inner diameter ø16mm or larger

Recommended exhaust flow rate: approx. 1000 cm³/s (Normal)

*5: In general use, Accel setting 100 is the optimum setting that maintains the balance of acceleration and vibration when positioning.

However, you may require an operation with high acceleration to shorten the cycle time by decreasing the vibration at positioning. In this case, set Accel to larger than 100.

If you specify a larger Accel value, the frequency of the overload error and over heat may rise during continuous operation. The use of large Accel setting is recommended only for necessary motions.