

Designing a Custom Robot Pedestal

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Collaborative robots are making strong inroads on manufacturing floors all across the globe. Every day at Vention, we hear about new use cases for cobots, most of which require custom equipment to adapt to their respective environments. Whether it's part presentation fixtures, pedestals, or complete robotic cells, we have helped thousands of users customize the equipment they need to get the most out of their cobot investment.

One of the most frequent pieces of equipment included in Vention applications is a robot pedestal. Vention offers robot pedestals in three heights; 585mm, 945mm, and 1215mm. However, a custom height pedestal is required in certain use cases and can be designed in MachineBuilder.

Below is the list of our top seven design considerations when designing a custom cobot pedestal.

7 Design Considerations for Collaborative Robot Pedestals

Considerations	Rationale	Example
1. Should the pedestal withstand light-duty or heavy-duty applications?	Use a light-duty pedestal for applications where the robot doesn't operate at any of its limits in terms of peak acceleration, arm extension or payload. Tradeshow pedestals are the most frequent use case. Use a heavy-duty pedestal for use cases where the robot operates at its full potential and where robot stability is required.	
2. How wide should be the robot base?	Design the pedestal so that the components in contact with the floor (i.e., leveling feet or caster wheels) are positioned within a calculated 18° cone, which starts from the center of mass of the entire cobot and pedestal assembly. Make sure to include the robot's maximum payload in the calculation.	
3. Should the robot arm be mounted "flat" or at an angle?	Use a flat configuration when the robot's working area is horizontal and has to be 270° to 360°. Position the robot at an angle to increase the robot arm's reach in a particular direction (e.g., CNC lathe unloading).	
4. Should the pedestal be mounted on leveling feet, floor anchors or caster wheels?	Floor anchors are bolted to the ground, hence providing highly stable designs where robots can easily extend well beyond the base without tipping over. Use leveling feet when drilling into the ground is prohibited. Although not the most solid mounting option, they allow for easy calibration of the assembly given their adjustable height. Lastly, use caster wheels with brakes for applications where the stand needs to be moved frequently. Designs based on caster wheels are often used in conjunction with floor locating pins for proper positioning of the equipment.	
5. Should the pedestal have floor locating pins?	Use floor locating pins for agile robot cell setup where the cobot is often moved from one workspace to another. Floor locating pins enable quick removal and precise re-positioning of the entire cobot pedestal, minimizing alignment error.	
6. Should the pedestal include a pallet or tray locator?	Use pallet or tray locators for palletizing operations. These enable human operators to act as end stops to precisely position various types of pallets or trays relative to the pedestal. Repeatable positioning of the pallet and tray minimizes position errors found in palletizing applications.	

Considerations	Rationale	Example
7. Should the robot controller box be attached to the pedestal?	Mount the controller box directly to the pedestal for easy transportation of the entire cobot. Given the weight and position of the assembly, it lowers the overall center of gravity and can provide higher stability to the pedestal.	

Mounting Screws for Vention Robot Mounting Plates

This table is only provided as a reference. Final selection of the screws appropriate for robot mounting are the responsibility of the robot installer/integrator.

Vention does not include robot-to-plate mounting screws with robot mounting plates.

Robot brand	Robot model	Vention mounting plate	Robot-to-Plate screw quantity	Screw specification (metric)	OEM recommended torque	Suggested Vention screw
ABB	IRB 14050 CRB 15000	ST-RB-022-0001	4	M10-1.5 x 33	30 Nm +/- 10%	-
ABB	CRB 1100 IRB 1100	ST-RB-022-0002	4	M12-1.75 x 33	50 Nm +/- 10%	-
Aubo	i5	ST-RB-003-0001	4	M6-1.0 x 44	-	-
Aubo	i10	ST-RB-003-0002	4	M10-1.5 x 42	-	-
Automata	Eva	ST-RB-024-0001	4	M6-1.0 x 16	-	HW-FN-005-0016
Doosan	M-Series	ST-RB-017-0001	4	M8-1.25 x 19	20 Nm	HW-FN-003-0018
Doosan	H-Series	ST-RB-017-0005	4	M8-1.25 x 39	20 Nm	HW-FN-003-0035
Epson	G3	ST-RB-019-0001	4	M8-1.25 x 32	32 +/- 1.6 Nm	HW-FN-003-0030
Epson	T3	ST-RB-019-0002	4	M8-1.25 x 30	32 +/- 1.6 Nm	HW-FN-003-0030
Epson	T6	ST-RB-019-0003	4	M8-1.25 x 30	32 +/- 1.6 Nm	HW-FN-003-0030
Epson	VT6L	ST-RB-019-0004	4	M8-1.25 x 39	32 +/- 1.6 Nm	HW-FN-003-0035
FANUC	CRX-10iA CRX-10iA/L	ST-RB-006-0002	4	M8-1.25 x 37	If steel: 27.5 +/- 4.5 Nm If stainless: 11.9 +/- 2.1 Nm	HW-FN-003-0035

Robot brand	Robot model	Vention mounting plate	Robot-to-Plate screw quantity	Screw specification (metric)	OEM recommended torque	Suggested Vention screw
FANUC	200iD	ST-RB-006-0001	4	M10-1.5 x 26	If steel : 56 +/- 10 Nm If stainless : 23 +/- 4 Nm	-
FANUC	SR-3iA	ST-RB-010-0001	4	M8-1.25 x 26	If steel : 27.5 +/- 4.5 Nm If stainless : 11.9 +/- 2.1 Nm	HW-FN-003-0035
FANUC	SR-6iA	ST-RB-011-0001	4	M10-1.5 x 25	If steel : 56 +/- 10 Nm If stainless : 23 +/- 4 Nm	-
Franka Emika	Panda	ST-RB-013-0001	4	M8-1.25 x 19	23 Nm	HW-FN-003-0018
Kawasaki	RS003N 5N 5L	ST-RB-016-0001	4	M8-1.25 x 19	29.4 Nm	HW-FN-003-0018
Kawasaki	RS007N 7L	ST-RB-016-0002	4	M10-1.5 x 34	57 Nm	-
Kinova	Gen3 Gen3Lite	ST-RB-005-0004	4	M6-1.0 x 27	-	-
Kuka	LBR iiwa 7 R800	ST-RB-015-0001	4	M8-1.25 x 33	-	HW-FN-003-0030
Kuka	LBR iiwa 14 R820	ST-RB-015-0002	4	M10-1.5 x 34	-	-
Mecademic	Meca500	ST-RB-007-0001 v2	4	M6-1.0 x 21	-	HW-FN-005-0020
Mecademic	Meca500 PS	ST-RB-007-0002	4	M6-1.0 x 53	-	-
Omron	TM5	ST-RB-014-0001	4	M10-1.5 x 21	40 Nm	-
Omron	TM12/14	ST-RB-014-0002	4	M10-1.5 x 37	40 Nm	-
Universal Robots	UR3 180x180mm plate	ST-RB-001-0004	4	M8-1.25 x 46	6.5 Nm	HW-FN-003-0035
Universal Robots	UR3 225x225mm plate	ST-RB-001-0005	4	M8-1.25 x 46	6.5 Nm	HW-FN-003-0035
Universal Robots	UR5 180x180mm plate	ST-RB-001-0002	4	M8-1.25 x 47	10 Nm	HW-FN-003-0035

Robot brand	Robot model	Vention mounting plate	Robot-to-Plate screw quantity	Screw specification (metric)	OEM recommended torque	Suggested Vention screw
Universal Robots	UR5 225x225mm plate	ST-RB-001-0003	4	M8-1.25 x 47	10 Nm	HW-FN-003-0035
Universal Robots	UR10-CB3	ST-RB-001-0006	4	M8-1.25 x 47	10 Nm	HW-FN-003-0035
Universal Robots	UR10e/16e	ST-RB-001-0009	4	M8-1.25 x 47	10 Nm	HW-FN-003-0035
Universal Robots	UR3/5/10/16 universal plate	ST-RB-001-0007	4	M8-1.25 x 47	UR3: 6.5 Nm Others: 10 Nm	HW-FN-003-0035
Yaskawa	HC10	ST-RB-012-0001 v2	4	M12-1.75 x 48	84 Nm	-
Yaskawa	MotoMini	ST-RB-012-0003	4	M5-0.5 x 26	6 Nm	-
Yaskawa	GP7/8	ST-RB-012-0004	4	M10-1.75 x 32	48 Nm	-