



PE20 Robotiq Palletizing *Solution*

INSTALLATION GUIDE



THANK YOU FOR CHOOSING ROBOTIQ

This step-by-step guide will allow you to install and test your Robotiq Palletizing Solution on Universal Robots. Make sure to read the user manual before installing the Palletizing Solution.



1. WHAT IS SUPPLIED?

Standard upon delivery of Robotiq PE20 Palletizing Solution ([SOL-PAL-UR-VAC-PE20](#) and [SOL-PAL-UR-PE20](#)):

In the crate

- 1 x Pedestal base including:
 - 1 x Mechanically welded assembly
 - 1 x Control Box (PLC)
 - 2 x Pallet sensors
 - 2 x Status lights
 - 1 x Teach pendant holder with operator buttons

In the accessory box

- 1 x Cable management system
- 1 x Box detection sensor
- 1 x Material Handling Copilot software dongle license

Additional equipment if gripper included ([SOL-PAL-UR-VAC-PE20](#)):

- (1) x PowerPick20 Vacuum Gripper
 - 1 x Manifold Assembly
 - 1 x Small suction cup bracket assembly
 - 4 x Air Nodes with 110 mm suction cups
 - 1 x Large suction cup bracket assembly
 - 4 x 8mm Air Tubes (275 mm)
 - 1 x 12 mm double Air Tube (3.63m)
 - 1 x Tool and hardware for installation on UR20
- (1) x PowerPick20 Vacuum Generation Unit
 - 1 x PowerPick20 Controller (vacuum generator)
 - 1 x Mounting bracket assembly & Filter Regulator
 - 1 x M12-12 pin I/O Cable
 - 1 x Grommet and pneumatic fitting for installation on PE20
 - 1 x Hardware for protective earth electrical connection
 - 1 x Pneumatic accessories kit (valve, regulator, filter)



2. SAFETY & WARNINGS

The operator(s) must have read and understood all of the Safety section in the user manual (available at support.robotiq.com).

The entire cell must go through a comprehensive risk assessment process before it can be used.

Do not turn on or operate the Palletizing Solution before making sure the device is firmly anchored and the machine area is cleared. Make sure that the air supply source is secured.

Make sure to follow all safety rules and regulations of your workplace. Always wear all recommended personal protective equipment in accordance with your workplace safety standards.



Failure to properly secure and install the equipment can result in material damage and bodily injury.



3. REQUIRED TOOLS AND EQUIPMENT

Included	Not included
<ul style="list-style-type: none">• 1 x 1/2 in x 6 in concrete drill bit• 1 x 13 mm socket, 3/8 in square drive• 1 x 16 mm socket, 3/8 in square drive• 1 x 17 mm socket, 3/8 in square drive• 1 x 3/4 in socket, 3/8 in square drive• 1 x 8 mm hex bit socket, 3/8 in square drive• 1 x 10 mm hex key, L-shape• 1 x 5 mm hex key, L-shape• 1 x 2 mm hex key, L-shape• 1 x 8 mm / 10 mm double-ended wrench• 1 x 2.4 mm flat screwdriver• Included with PowerPick20:<ul style="list-style-type: none">• 1 x 6 mm hex key, L-shape• 1 x 21 mm / 24 mm double-ended wrench	<ul style="list-style-type: none">• Forklift (minimum fork length of 1065 mm [42 in])• Hoisting equipment (minimum payload capacity of 200 kg [440 lb])• 2 x Twisted eye web sling (minimum payload capacity of 100 kg [220 lb])• Power screwdriver• #2 Phillips bit (or #2 Robertson bit)• Utility knife• 3/8 in (10mm) drive ratcheting socket wrench or adapter• 3/8 in (10mm) drive torque wrench or adapter with minimum torque range of 15 - 84 Nm (11 - 62 lb-ft)• Rotary hammer drill• Hammer• 3/8 in (10mm) drive extension with > 3 in (75mm) length



4. UNBOXING



The transport, lifting and moving of the Palletizing Solution should be done by qualified and authorized personnel. Failure to do so may result in machine damage, serious injuries or death.



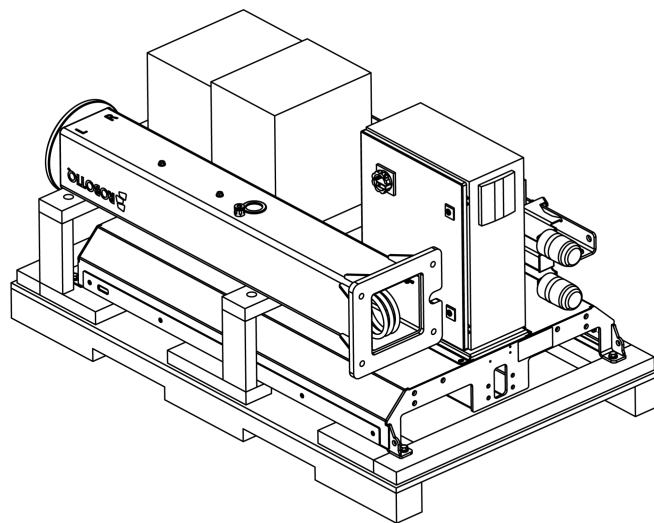
Installation hazard:

- DO NOT install this equipment without having read and understood the Robotiq PE20 User Manual.
- DO NOT install this equipment without having the proper training and experience.
- DO NOT install any robot other than the Universal Robots UR20.



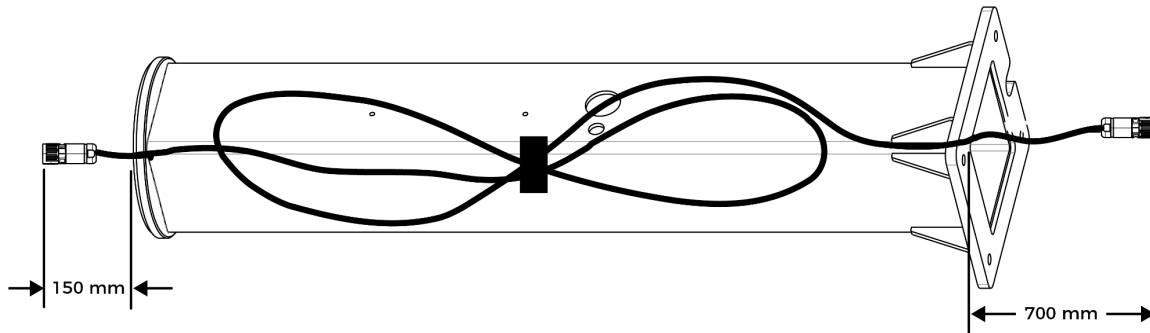
Failure to follow these instructions and to properly secure or install the equipment can result in material damage, death or serious injury. The warranty will not cover material damage resulting from an installation that does not comply with the instructions found in this manual.

1. Remove the top panel and the four (4) sides of the crate by removing the screws that hold them into place.




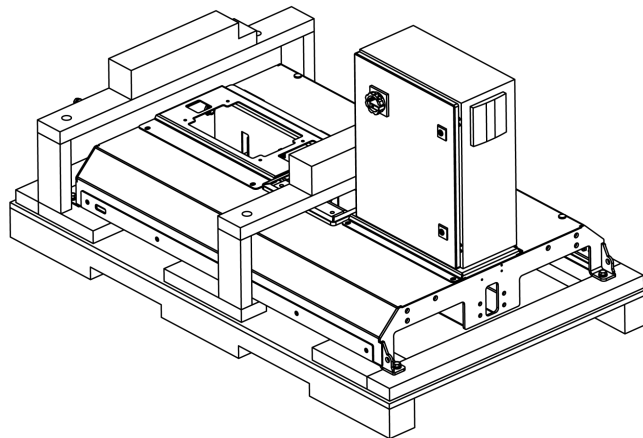
2. Remove the cardboard box (or boxes) from the shipping crate and open the box containing the accessory kit.
3. Cut and remove the strapping material.
4. Remove the operator station and removable stopper from the crate.

5. Before removing the pedestal from the shipping crate, use it to measure the cable length needed to reach the robot arm on one end, and the UR control box on the other end. Here's how:
 - a. Bundle the cable as shown in the figure below. Make sure to leave approximately 150 mm (6 in) of cable on the top side and approximately 700 mm (28 in) on the bottom side. Do not insert the cable in the pedestal.

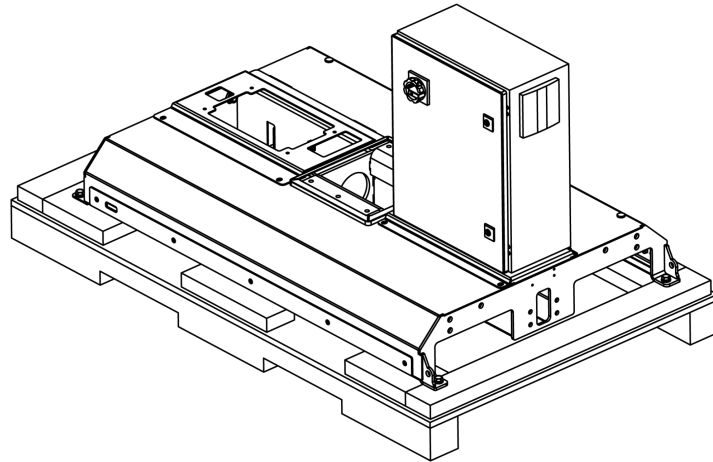


6. Use a 17 mm wrench to remove the lag bolt securing the top plate of the pedestal.
7. Remove the pedestal from the crate. It is recommended to use proper hoisting equipment to perform this operation.
8. Place the pedestal on a piece of cardboard to prevent damaging the unit.

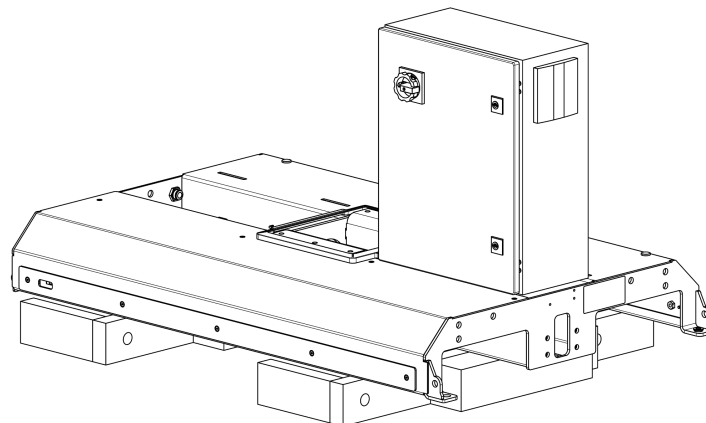
 Make sure that the pneumatic tube and the ground cable located inside the base of the pedestal are not pinched during this operation. The weight of the pedestal is approximately 54 kg (119 lb). Proceed with caution.



9. Remove the screws that hold the wooden frames to the crate.
10. Remove the wooden frames.



11. Use a 17 mm wrench to remove the four (4) lag bolts that hold the base of the Solution to the bottom of the crate.
12. Use a forklift to lift the base from the aisle side (i.e., the side where the Robotiq control box is located).
13. Place the solution on shims with a thickness of at least 10 mm (3/8 in). (The two (2) wooden frames can be used as shims for this step.)



Make sure that the shims are not beneath the two L-shaped aluminum brackets located at the conveyor side of the base. The weight of the base is approximately 82 kg (180 lb). Proceed with caution.

14. Remove the two (2) L-shaped aluminum brackets using a 16 mm wrench.

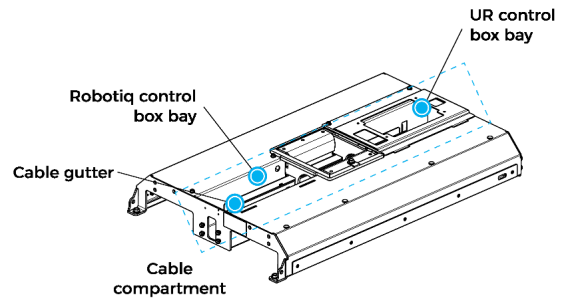
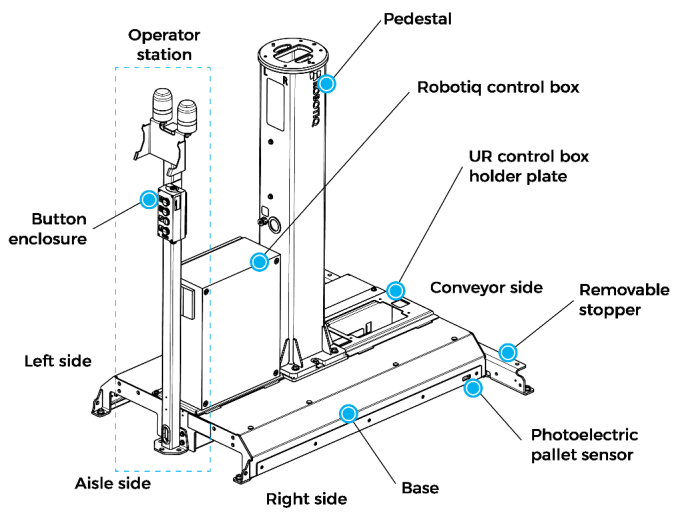


5. MECHANICAL & ELECTRICAL INSTALLATION

Main steps

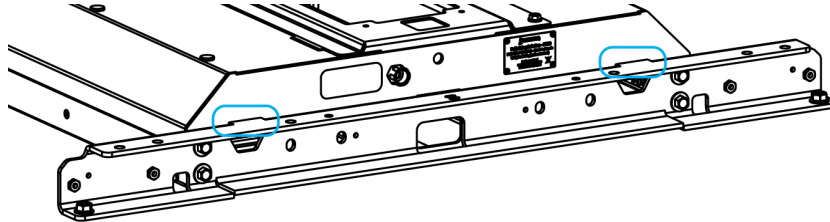
- A. Pedestal and Base Installation
- B. Robot Installation
- C. UR Control Box Installation
- D. Pneumatic Tubing Installation
- E. Grounding of the Pedestal
- F. Grounding of the Operator Station
- G. Power and Control Connections
- H. Power and Control Connections for operator station
- I. Operator Station Installation
- J. Centering the Solution
- K. PowerPick 20 Installation (only for [SOL-PAL-UR-VAC-PE20](#))
- L. Cable Management System
- M. Box Sensor(s) Installation
- N. Moving and Positioning the Solution
- O. Anchoring the Solution
- P. Finalization and Power On
- Q. Joint Limits Setting

For details of each step, refer to the corresponding sections.



A. Pedestal and Base Installation

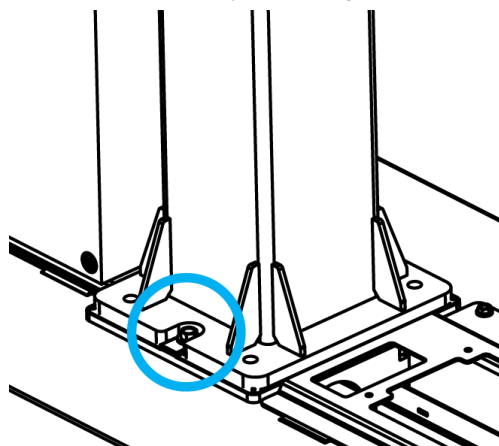
1. Screw the removable stopper to the base of the Solution using the four (4) M12 x 30 hex cap screws. Do not fully tighten the screws.
2. Use a forklift truck or pallet truck to lift the base and remove the shims underneath it.
3. Place the base directly on the ground.
4. Fully tighten the four (4) M12 x 30 hex cap screws to a torque of 84 Nm (62 lb-ft), making sure the tabs are in contact with the base, as shown in the figure below. Use the 16 mm socket and a 3/8 in drive extension.



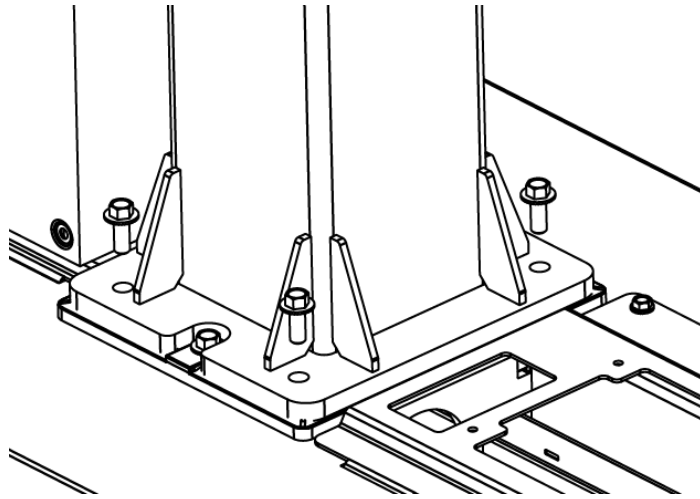
5. Run one of the slings through the openings on the flange of the pedestal, as shown in the figure below.



6. Using hoisting equipment, lift the pedestal vertically so that it stands above the base.
7. Carefully align the notch in the pedestal base plate with the hex cap screw already installed on the base. Be careful not to pinch any cable.



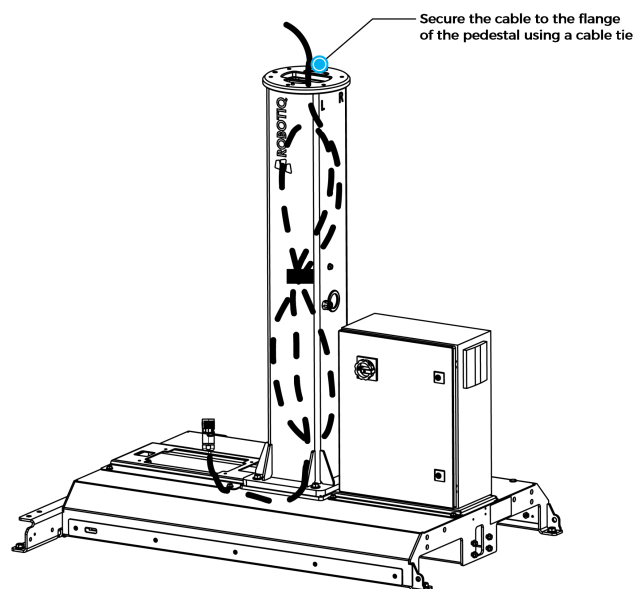
- Secure the pedestal to the base using the four (4) M12 x 30 screws provided. Tighten to a torque of 84 Nm (62 lb-ft).



B. Robot Installation

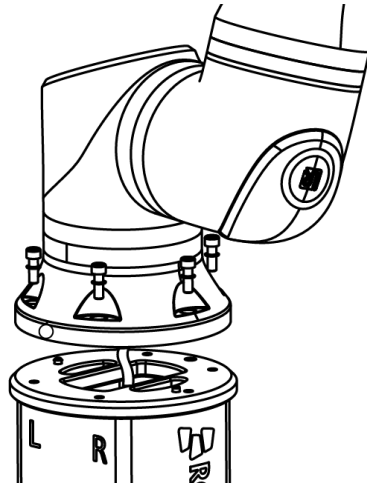
See UR Manual for full instructions on how to move the robot from the box to its final destination

- Slide the robot cable that was previously bundled inside the pedestal (see section 4.5 Unboxing).
- From the outside, attach one of the loops of the wrapped cable to the flange of the pedestal using a long cable tie.



- Use the rubber plug found in the robot box to close off the hole commonly used to run the robot pigtail cable through the robot base.
- Following the procedure described in the UR20 manual, lift the robot and move it above the pedestal using proper hoisting equipment.
- Connect the robot to the cable before fully seating it on the flange of the pedestal.

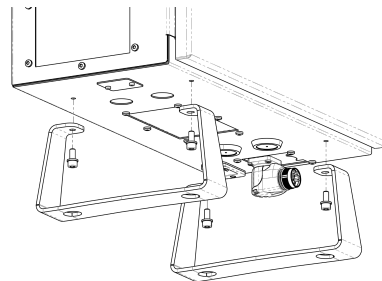
6. Use the two (2) dowel pins to position the robot so that the hole that was previously plugged is oriented towards the “L” and “R” decals on the pedestal (aisle side).



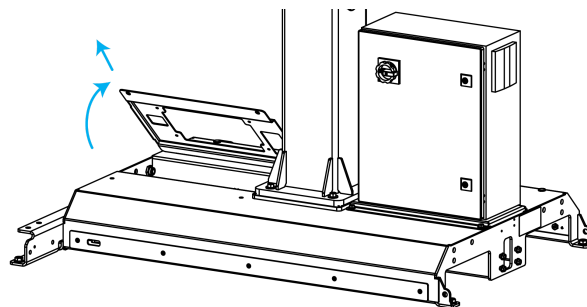
7. Secure the robot base using the six (6) M10 x 30 screws and the six (6) serrated Belleville washers; tighten to the torque specified by UR (please refer to the UR20 user manual). Make sure that the convex part of the washer is at the bolt end of the assembly.

C. UR Control Box Installation

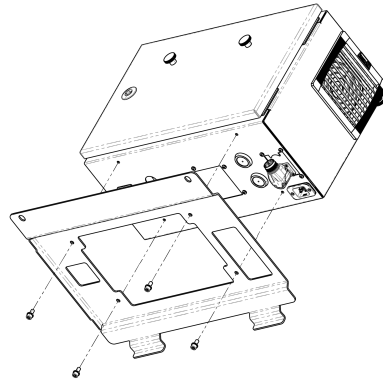
1. Use a 5 mm hex key to remove the four (4) screws securing the two (2) legs of the UR control box



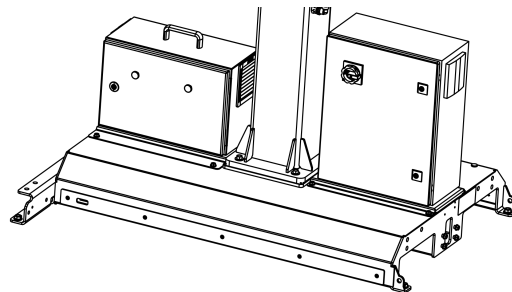
2. Disconnect the UR teach pendant connector and remove it from the UR control box (refer to the UR20 service manual).
3. On the Palletizing Solution base, remove the two (2) M8 x 20 hex cap screws securing the UR control box support plate.
4. Detach the plate from the base by opening and closing it while lifting.



5. Fasten the UR control box to the control box support plate using the four (4) screws that were previously removed. Make sure that the cabinet door is on the side opposite to the retaining tabs.

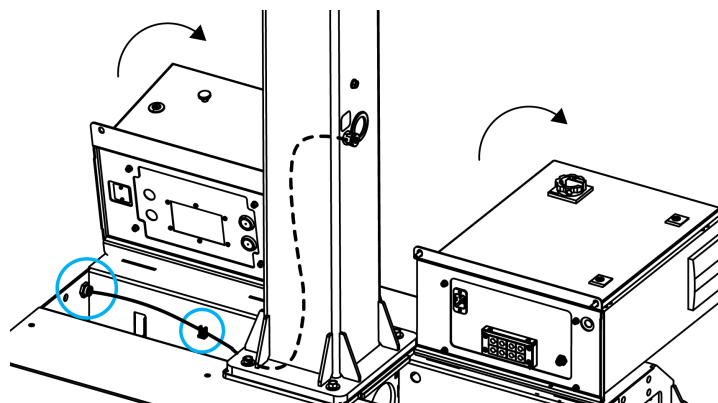


6. Insert the retaining tabs in their respective cutouts, and tilt the control box back and forth to reassemble the hinging mechanism.



D. Pneumatic Tubing Installation

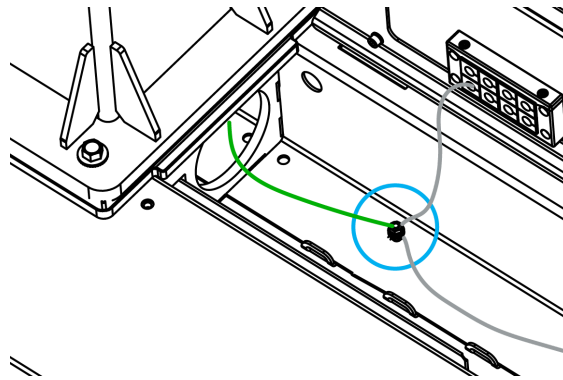
1. Remove the two (2) M8 x 20 hex cap screws to tilt back the Robotiq control box.
2. Tilt back the UR control box.
3. Take the 12 mm pneumatic tubing out of the base of the pedestal.
4. Connect the free end of the pneumatic cable to the push-to-connect bulkhead inside the base on the conveyor side.
5. Using a cable tie, secure the pneumatic cable to the cable tie mount on the cable compartment side.



E. Grounding of the Pedestal

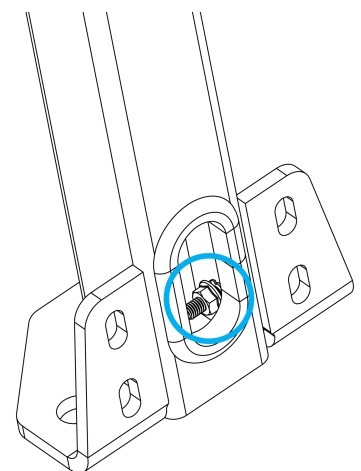
Three (3) components should be grounded: 1) the Robotiq control box, 2) the pedestal, and 3) the operator station. The Robotiq Control Box is already grounded. When grounding the other components, make sure that the eyelet connector of the control box's ground wire remains in place.

1. Using a 10 mm wrench, remove the M6 nut and the top lock washer from the main ground stud inside the Robotiq control box bay.
2. Take one of the remaining ground wire (green) out of the pedestal base.
3. Slide the eyelet connector of the pedestal's ground wire on the ground stud and reinstall the lock washer and M6 nut.
4. Make sure that the eyelet connectors of all three (3) components (the Robotiq control box, the pedestal and the operator station) are on the ground stud, in between the two lock washers.
5. Tighten the M6 nut to a torque of 5 Nm (3.7 lb-ft).



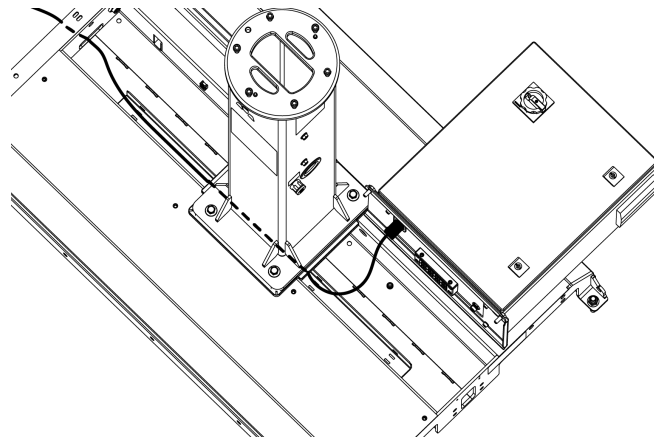
F. Grounding of the Operator Station

1. Route the last ground wire to the base of the operator station post.
2. Using a 10 mm wrench, remove the M6 nut and one (1) lock washer from the ground stud inside the base of the operator station post.
3. Slide the eyelet connector of the third ground wire on the ground stud inside the base of the operator station post.
4. Reinstall the lock washer and the M6 nut.
5. Tighten the M6 nut to a torque of 5 Nm (3.7 lb-ft).



G. Power and Control Connections in UR control box

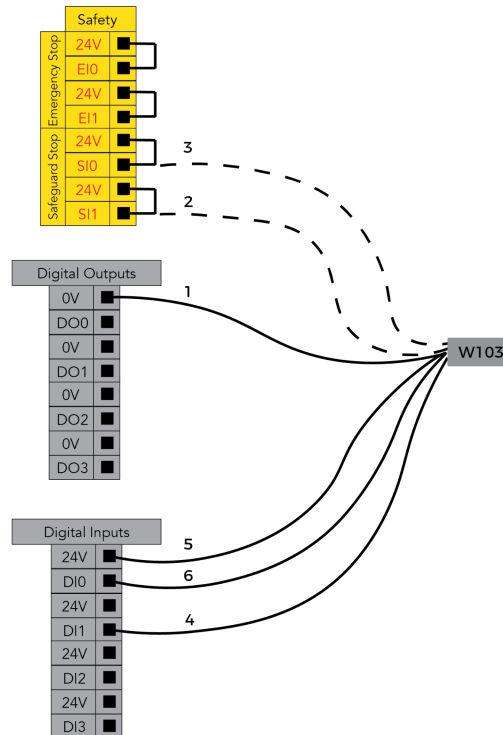
1. Run the power cable provided with the robot through the hole on the conveyor side of the base, and channel it through the cable gutter.
2. Connect the cable to the power entry connector of the Robotiq control box. Depending on the controller version, a converter cable (provided) may be required.
3. Secure the cable to the cable gutter using cable ties.



Warning : Electrical Hazard

The power supply cable should be protected to prevent any risk of pinching, cutting or otherwise damaging the sheathing or sleeve of the cable. Failure to follow these instructions may result in material damage, serious injury or death.

4. Connect the female power plug from the UR control box bay to the power entry connector of the UR control box. Depending on the controller version, a converter cable (provided) may be required.
5. Connect the robot cable tucked into the pedestal to the UR control box.
6. Open the UR control box.
7. Connect the provided USB/Ethernet adapter directly to a USB port of the UR control box.
8. Run the W200 Ethernet cable from the UR control box bay to the UR control box.
9. Connect the W200 Ethernet cable to the USB/Ethernet adapter.
10. Run the W103 cable from the Robotiq control box to the UR control box.
11. Wire the W103 cable in the UR control box based on the figure below.

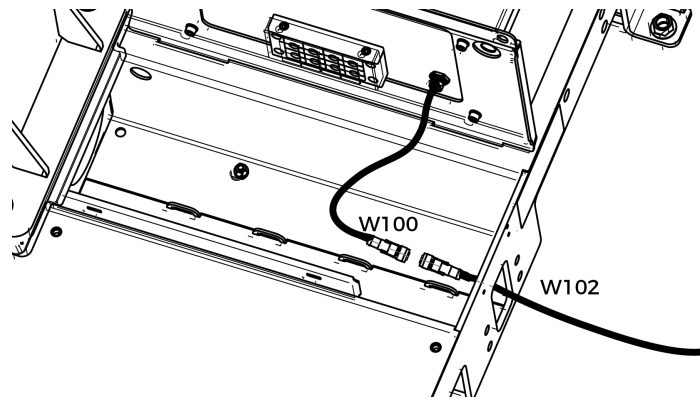


Wire #	Function	Description
1	0 VDC	0 VDC supply
2	UR Safeguard input 2	Emits a safeguard status signal when a safeguard device is connected to safeguard input SI1. To be connected only when an optional safety kit or other safety device is used (remove jumper in this situation).
3	UR Safeguard input 1	Emits a safeguard status signal when a safeguard device is connected to safeguard input SI0. To be connected only when an optional safety kit or other safety device is used (remove jumper in this situation).
4	Stop Button Input	Emits a stop signal from the stop button in the push button enclosure. Connected to a digital input (DI1 in the example).
5	24 VDC	24 VDC supply
6	Start Button Input	Emits a start signal from the start button in the push button enclosure. Connected to a digital input (DI0 in the example).

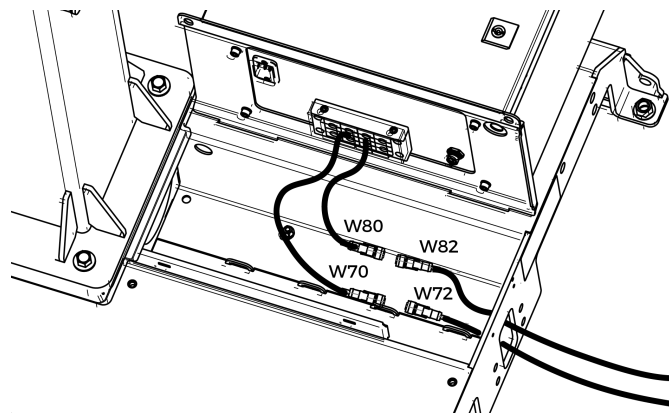
12. Run the box sensor cable(s) through the opening located on the conveyor side of the Solution, and to the UR Control box.
13. Wire the box sensor cable(s) based on the configuration of the palletizing cell (Single Box Type or Multiple Box Types / Multi-Pick Feature).
14. Connect the provided USB hub to the second USB port.
15. Connect the Copilot license dongle to one of the ports of the USB hub of the UR control box.

H. Power and Control Connections for operator station

16. Bring the operator station near the base of the Solution, on the aisle side. Keep it on the floor for performing the next steps (do not install it yet).
17. Run the teach pendant cable through the opening on the lower section of the operator station, and through the base.
To install the operator station remotely, **do not** route the teach pendant cable through the opening on the lower section of the operator station. Instead route it directly through the base opening on the aisle side.
18. Connect the teach pendant cable to the teach pendant connector of the UR control box.
19. Run the W102 cable (button box) from the operator station to the base.
20. Connect the W102 cable to the W100 cable.



21. Run the W72 and W82 cables from the operator station to the base.
22. Connect the W72 cable to the W70 cable. (Right stacklight)
23. Connect the W82 cable to the W80 cable. (Left stacklight)



24. When all cables are routed inside the cable compartment, secure them to mounting points using cable ties.
25. Put both control boxes back in place by tilting them forward.
26. Secure the support plate of each control box using four (4) M8 x 20 hex cap screws.

I. Operator Station Installation

- If the operator station needs to be attached to the base, tuck the excess cable inside the base through the opening and fasten the post to the base on the aisle side with four (4) M8 x 20 mm screws, using a 13 mm wrench. Tighten to 25 Nm (37 lb-ft).
- If the operator station needs to be anchored to the ground, use the three (3) provided concrete wedge anchors. Tighten the nut of each anchor to 70 Nm (52 lb-ft).

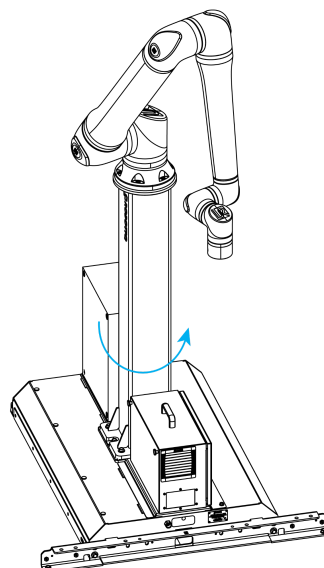
J. Centering the Solution

This procedure needs to be performed before installing the vacuum gripper. It will ensure the proper functioning of the Solution.

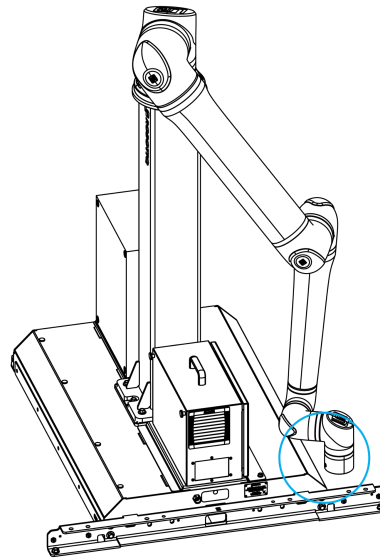
1. Connect the power supply cable to a power outlet.
2. Power on the robot and move it to the following pose.

Joint	Position
Base	-32°
Shoulder	-215°
Elbow	-70°
Wrist 1	16°
Wrist 2	90°
Wrist 3	-123°

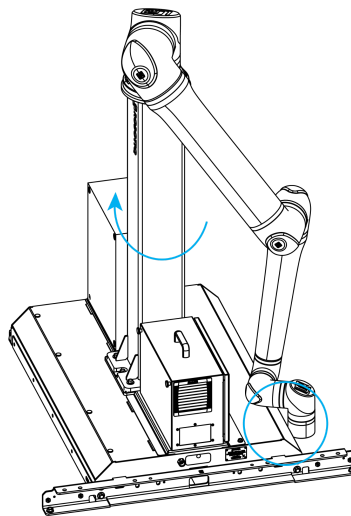
3. Slightly loosen the four (4) screws that secure the column to the base. Unscrewing the screws approximately half a turn counterclockwise should provide enough clearance to allow for the adjustment of the column's orientation.
4. Rotate the column counterclockwise as much as possible.



5. Position the robot so that the wrist is on the outer left side of the base, as shown in the figure below



6. Jog the robot so that the robot tool flange is parallel to the ground.
7. In the Installation tab, make sure that the TCP value is set to [0, 0, 0].
8. In the **Move** tab, in the base reference frame, move the robot to the following pose: X=447 mm, Y=-525 mm, Z=-1325 mm and RX=180°, RY=0°, RZ=0° for RPY.
9. Rotate the column clockwise so that the side of the robot wrist touches the painted surface on the side of the base, as depicted in the figure below.



10. Tighten the four (4) screws to secure the pedestal to the base. Tightening torque must be 84 Nm (62 lb-ft).
11. On the teach pendant, confirm that the X value of the current position is 447 mm (+/-1mm), and the wrist is still in contact with the painted surface on the side of the base.
12. When the X position is within the specified range, remove the M12 x 30 screws, **one at a time**, apply threadlocker on the threaded part of the screws, and retighten to 84 Nm (62 lb-ft).

K. PowerPick 20 Installation (only for SOL-PAL-UR-VAC-PE20)

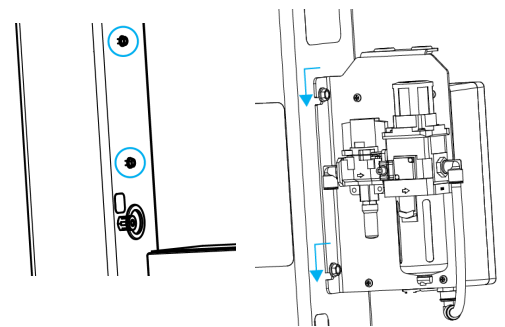
To streamline the installation of grippers and accessories, power on the robot and rotate the joints as described in the table below, then power off the robot.

Joint	Position
Base	-90°
Shoulder	-190°
Elbow	-15°
Wrist 1	-65°
Wrist 2	-90°
Wrist 3	90°

PowerPick20 Vacuum Generation Unit

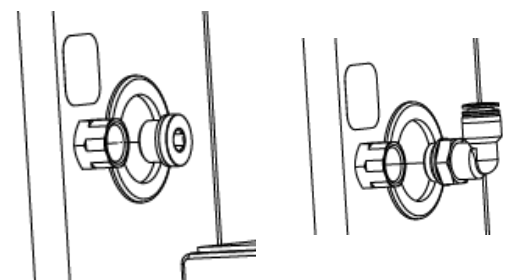
! At optimal pressure (6 bar / 87 psi), the air supply line must ensure an air flow of 510 L/m or 18 CFM. It is recommended that the pressured air hose and fittings have a minimum diameter of 12mm (½ inch) for the full air supply line.

1. Loosen the two (2) M8 x 20 hex head cap screws, intended to hold the vacuum generation unit, until their head is at a distance of approximately 4 mm (3/16 in) from the surface.
2. Slide the vacuum generation unit onto the two (2) M8 x 20 hex head cap screws.
3. Tighten the screws using the provided 13 mm socket.



4. Remove the pneumatic plug from the bulkhead fitting located on the pedestal using the provided 10 mm hex key.

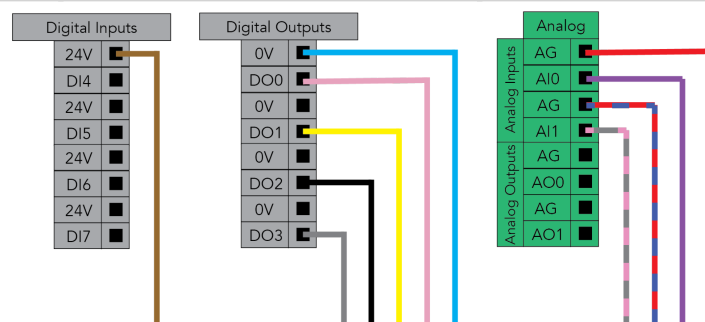
5. On the bulkhead fitting, install the 1/2 BSPP to 12 mm tube pneumatic elbow fitting (provided) using the 21 mm / 24 mm double-ended wrench. Tighten to 26 Nm (19 lb-ft).



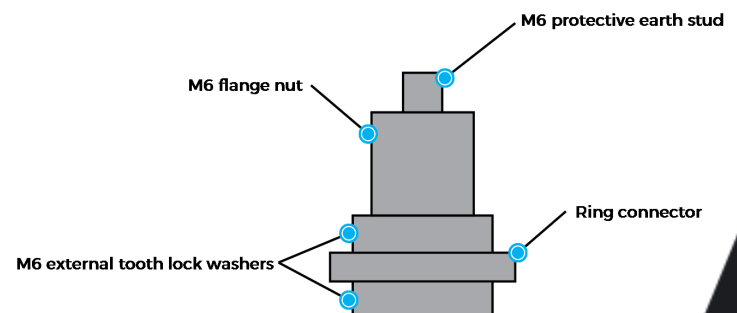
6. Insert the end of the 12 mm air tube providing pneumatic pressure to the vacuum generation unit into the elbow fitting.
7. Push the air tube until it is fully seated.

8. Using a 13 mm wrench, remove the two (2) M8 x 20 hex head cap screws from the UR control box support plate.
9. Tilt back the UR control box support plate and open the UR control box.
10. Remove the grommet on the pedestal.
11. Run the open end of the M12-12 pin I/O cable through the opening and down into the cable compartment.
12. Route the M12-12 pin I/O cable inside the UR control box.
13. Plug the hole on the pedestal using the pre-perforated grommet attached to the I/O cable.
14. Tuck any excess cable inside the pedestal.
15. Connect the M12 connector of the I/O cable to the PowerPick20 Controller at the port identified as DEVICE CONTROL.
16. Connect the open end of the I/O cable to the robot control box according to the table and figure below. The figure shows an example of which terminal can be used as a reference only.

Color	Connection	Function
Red	AG (Analog Ground)	0V Pressure Sensor #1 (S1)
Violet	AI (Analog input)	AI Pressure Sensor #1 (S1)
Red/Blue	AG (Analog Ground)	0V Pressure Sensor #2 (S2)
Gray/Pink	AI (Analog input)	AI Pressure Sensor #2 (S2)
Blue	0V	0V DC
Pink	DO (Digital Output)	Suction #1 (Y1)
Yellow	DO (Digital Output)	Suction #2 (Y2)
Black	DO (Digital Output)	Blow off #1 (Y3)
Gray	DO (Digital Output)	Blow off #2 (Y4)
Brown	24V	24V DC
Green	GND (Ground)	Ground



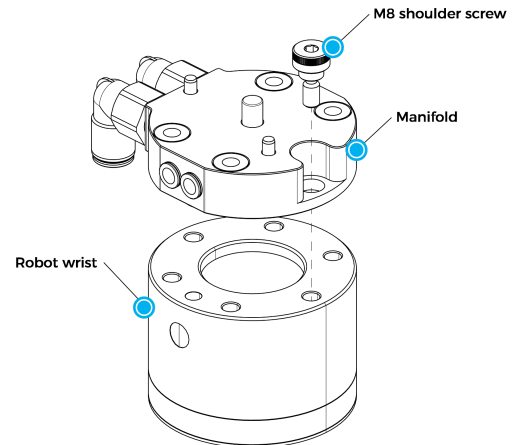
17. Complete the ground (GND) connection by securing the green cable's ring connector to a M6 protective earth stud with the provided two (2) M6 external-tooth lock washers and one (1) M6 flange nut (tool not supplied). Follow the stack-up shown on the right. Make sure the nut is tight enough to ensure the lock washers are properly engaged.



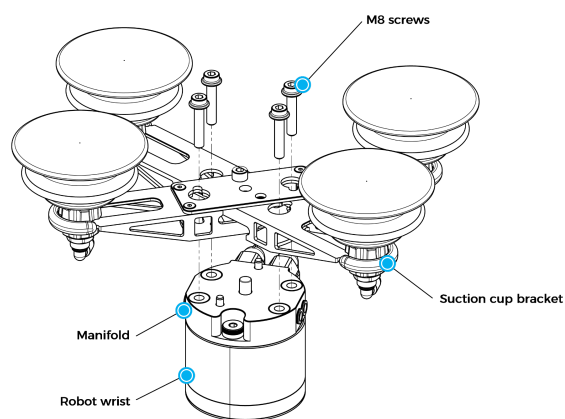
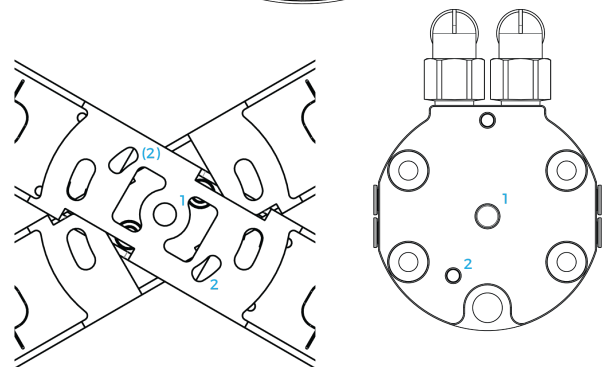
PowerPick20 Vacuum Gripper

These instructions are valid for a typical configuration of the PowerPick20 gripper (without horizontal or vertical offset). For more instructions on how to choose the proper configuration and how to install the PowerPick20 Vacuum Gripper, please refer to the section **Mechanical Installation** of the PowerPick20 user manual available at support.robotiq.com.

1. Install the Manifold directly on the robot wrist (no coupling required). Align with the dowel pin on the robot wrist. Secure the manifold onto the robot wrist with one (1) M8 shoulder screw using the provided 6 mm hex key. Required torque is 16 Nm (11.8 lb-ft).





2. Align the holes in the Suction cup brackets with the corresponding pins on the manifold. Install the Suction cups brackets onto the Manifold with four (4) M8 x 40 mm socket head flange screws using the provided 6 mm hex key. Required torque is 16 Nm (11.8 lb-ft).
3. Insert one end of the 8 mm air tube (275 mm) into the manifold, and the other end into the elbow fitting of the air node. Repeat for all four (4) air nodes.
4. If necessary, when using the small brackets, cut the tubes to the required length.



TCP and Center of Mass

1. In the PolyScope interface, go to Installation > General.
2. Expand the TCP dropdown menu, then select Payload.
3. Enter the appropriate center of mass and TCP of the gripper.

As a reference, the TCP, gripper weight and Center of mass values for the most common configurations of PowerPick20 (without vertical or horizontal offsets) are shown in the following table.

Configuration	Suction cups brackets	Center of mass (mm)			TCP (mm)			Mass (g)
		X	Y	Z	X	Y	Z	
	Small	-6	0	57	0	0	117	1805
	Large	-6	0	56	0	0	117	1963

L. Cable Management System

Cable Management with Generic Gripper

If the PowerPick20 Vacuum Gripper is not part of the scope of delivery along with the PE20, the following components are provided for the cable management of another generic gripper.

- 3x cable clips + 0.5 m hook and loop (VELCRO®) fastener
- 1x cable clip + 1 m hook and loop (VELCRO®) fastener

Cable management with PowerPick20 Vacuum Gripper (optional)

When mounting a Robotiq PowerPick20 Vacuum Gripper on the PE20 Palletizing Solution, the following components are provided for the cable management system.

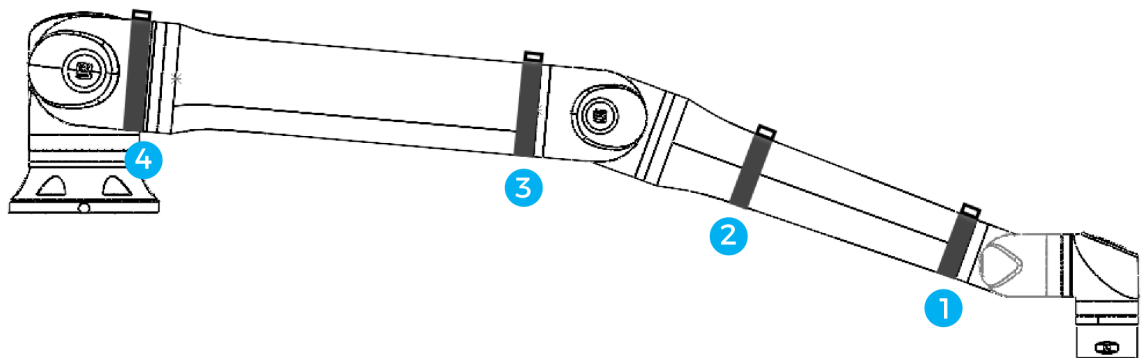
- 3x cable clips + 0.5 m hook and loop (VELCRO®) fastener
- 1x cable clip + 1 m hook and loop (VELCRO®) fastener
- 1x tubing curler
- 1x 12 mm double air tube (3.63 m length)
- 10x 190 mm cable ties

1. Robot Positioning

- Change the robot's position to install the cable routing system appropriately. Refer to the table below.

Joint	Position
Base	-90°
Shoulder	-190°
Elbow	-15°
Wrist 1	-65°
Wrist 2	90°
Wrist 3	90°

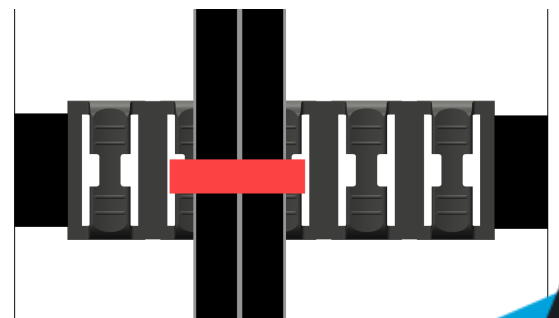
2. Cable Clip Installation



- Install the three (3) cable clips with a 0.5 m hook and loop fastener at positions #1, #2 and #3 as shown in the figure above.
- Install the cable clip with a 1 m hook and loop fastener at position #4 (dark gray section of the shoulder joint) as shown in the figure above.
- If applicable, rotate all cable clips so that the plastic mount is facing up; this will ensure the good positioning of the tubing.

3. Tubing Installation

- Connect the end of the 12 mm double air tube labeled BASE SIDE to the fittings labeled P1- and P2-.
- Push the air tube until fully seated.
- Find the metallic mark on the tubing that is closest to the vacuum generation unit (there are four (4) metallic marks in total on the tubing).
- At the metallic mark, tightly attach the tubing to the cable clip using a cable tie (red comp. in the figure on the right).



- e. Attach the tubing to a cable clip at every metallic mark, up to the wrist.
- f. Connect the end of the 12 mm double air tube labeled TOOL SIDE to the pneumatic elbow fittings of the PowerPick20 Vacuum Gripper's manifold at the end of the robot arm.
- g. Push the air tube until fully seated..

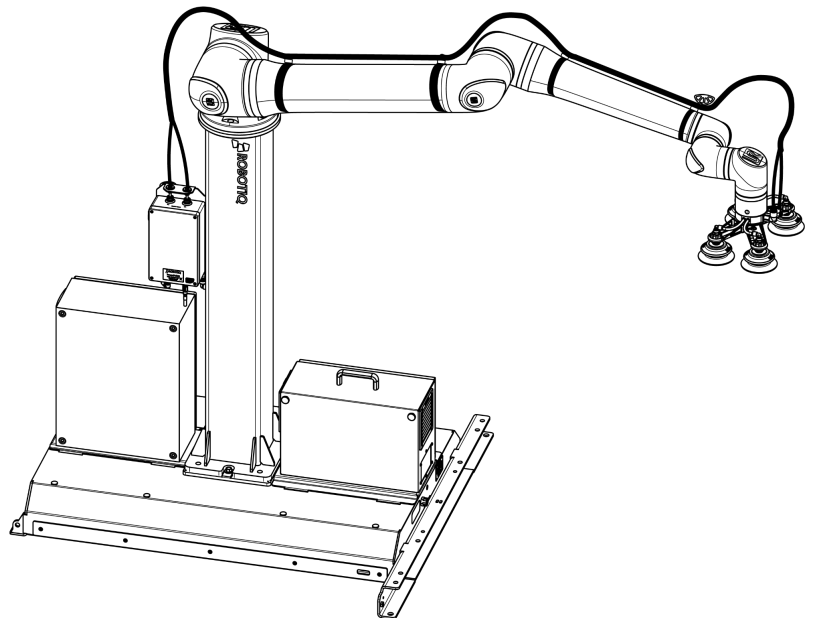
4. Tubing Curler Installation

- a. Place the tubing curler on top of the tubing, as depicted in the figure above.
- b. Align the tubing curler's notch with the cable tie attached to the cable clip (#1) (the longer section of the tube curler should point towards the wrist of the robot).
- c. Use the three provided cable ties (red component in the figure above) to secure the tubing to the tubing curler, and make the tubing follow the arch of the tubing curler.



5. Finalization

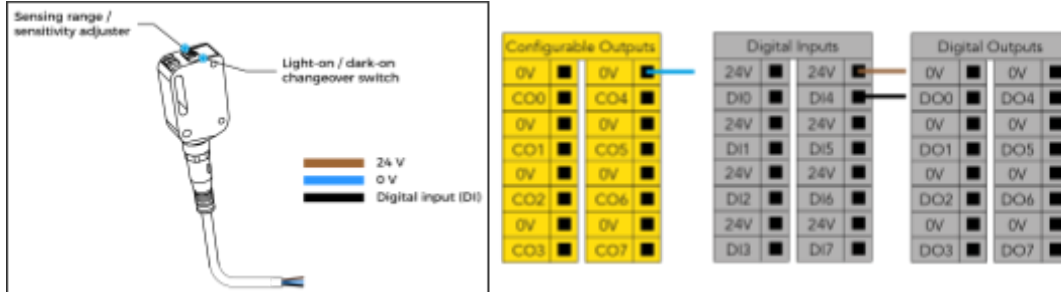
- a. Verify that the tubing travels along each straight section of the robot.
- b. Rotate the tubes to remove twists in the tubing, if any.
- c. Verify each hook and loop fastener and tighten them until the cable clips cannot move when being pulled or pushed.
- d. Verify each cable clip and tighten the cable tie to prevent the tubing from sliding.
- e. Cut the excess length from the cable ties.



M. Box Sensor(s) Installation

Box Sensor (Single Box Type)

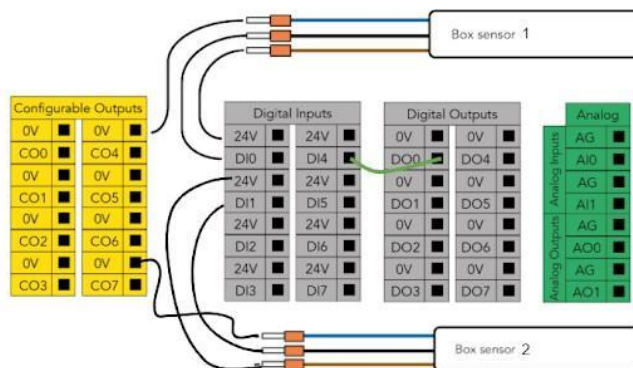
1. Run the box sensor cable through a hole under the robot control box.
2. Connect the wires to the terminal blocks of the robot control box:



- Connect the brown wire to a 24 V terminal in a Digital Inputs block
 - Connect the blue wire to a 0 V terminal in a Configurable Outputs block
 - Connect the black wire to a digital input (DI) terminal (e.g. DI4, as shown in the figure below)
3. Secure each connection using a 2 mm flat head screwdriver (not provided).
 4. Install the box sensor on the provided bracket using the provided screws.
 5. Position the box sensor bracket on the conveyor system so it can detect the box to be picked.
 6. Connect the box sensor's M8 connector cable to the corresponding sensor.
 7. Once the system is running, adjust the detection distance of each box sensor using the sensitivity adjuster.

Box Sensors (Multiple Box Types - Multi-Pick Feature)

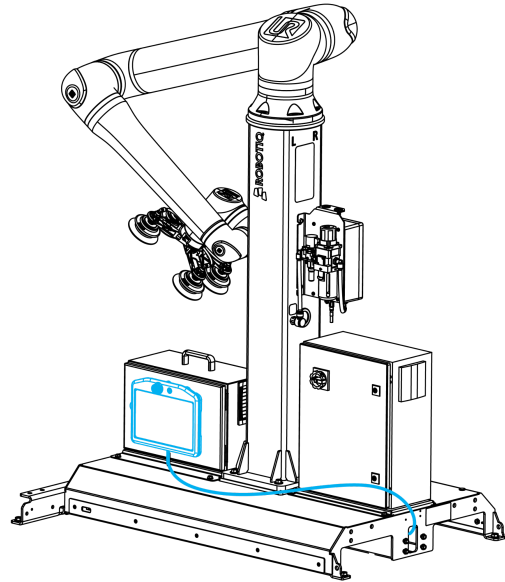
1. Connect each box sensor as described in the Box Sensor (Single Box Type) section.
2. Take note of the digital input terminal to which each box sensor is connected.
3. Lay a wire between an unused digital input terminal and an unused digital output terminal (this is depicted by the green wire in the figure on the right).
4. Refer to the user manual (Software Section) to go through the software steps and enable the multi-pick feature. The DO used by the wire in the previous step needs to be set in the robot program when both sensors detect a box.



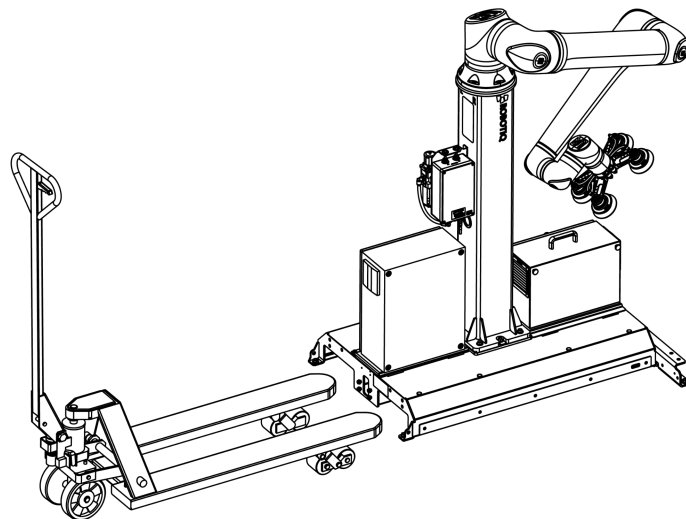
N. Moving and Positioning the Solution

1. Set the robot in a transport position by referring to the joint positions below. Disregard this step if the robot has not been installed yet.

Joint	Position
Base	-63°
Shoulder	-200°
Elbow	-125°
Wrist 1	90°
Wrist 2	90°
Wrist 3	90°



2. Shut down the robot, power off the solution and disconnect the power and pneumatic supplies as well as any other cabling that may interfere with the movement of the Solution.
3. Place the teach pendant on its rack at the operator station, or place it on the support rack of the robot's control box and run the teach pendant cable on the base of the Solution.
4. Insert the forks of the pallet truck or forklift truck in the fork entry openings.

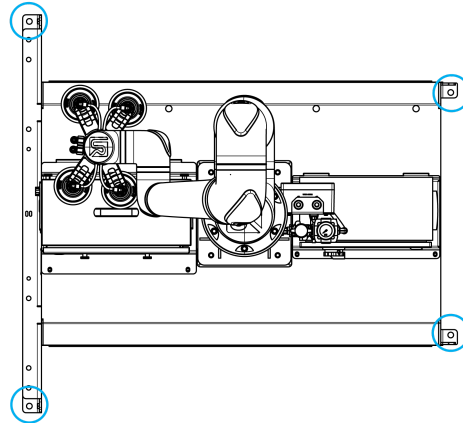


5. Slightly raise the forks so that the Solution remains close to the ground for transport.
6. Slowly and carefully move the Solution to its final location.

O. Anchoring the Solution

The Robotiq Palletizing Solution must be anchored for it to be used. Contact Robotiq if anchoring is not possible.

1. Position the base at its final location.
2. Use a rotary hammer and a 1/2 in concrete drill bit to drill a hole with a depth of at least 80 mm (3 in) at each of the four (4) anchoring points at the base.



3. Clear the dust around and in the drilled holes.
4. Insert the wedge anchors in the holes and make sure that they penetrate at least 65 mm (2-1/2 in) .
5. Should the gap between the anchoring points and the ground be greater than 2 mm (0.08 in), use the 1.9 mm (0.075 in) shim washers to compensate (use a pallet truck or forklift truck to lift the base and install the shim washers).
6. Add the four (4) 1/2 in-13 serrated flange nuts.
7. Tighten to a torque ranging between 68 Nm and 74 Nm (50-54 lb-ft) using a 3/4 in (19 mm) socket.

P. Finalization and Power On

1. Connect the power cable to the power outlet.
2. Turn on the main power switch located on the Robotiq control box.
3. Power on the robot.

Q. Joint Limits Setting

1. Go to **Installation** □ **Safety** □ **Joint Limits**
2. Unlock the section with the proper password and change the **Elbow** and **Wrist 3** values as follows.

Joint	Minimum	Maximum
Elbow	-167°	3°
Wrist 3	-273°	273°

3. To ensure the effective operation of the Solution, Robot Limits should stay at the Least Restrictive setting. To do so, go to **Installation** □ **Safety** □ **Robot Limits**. Tool speed and tool force can be adjusted as required. Please note that adjusting these settings will reduce the Solution's cycle time.



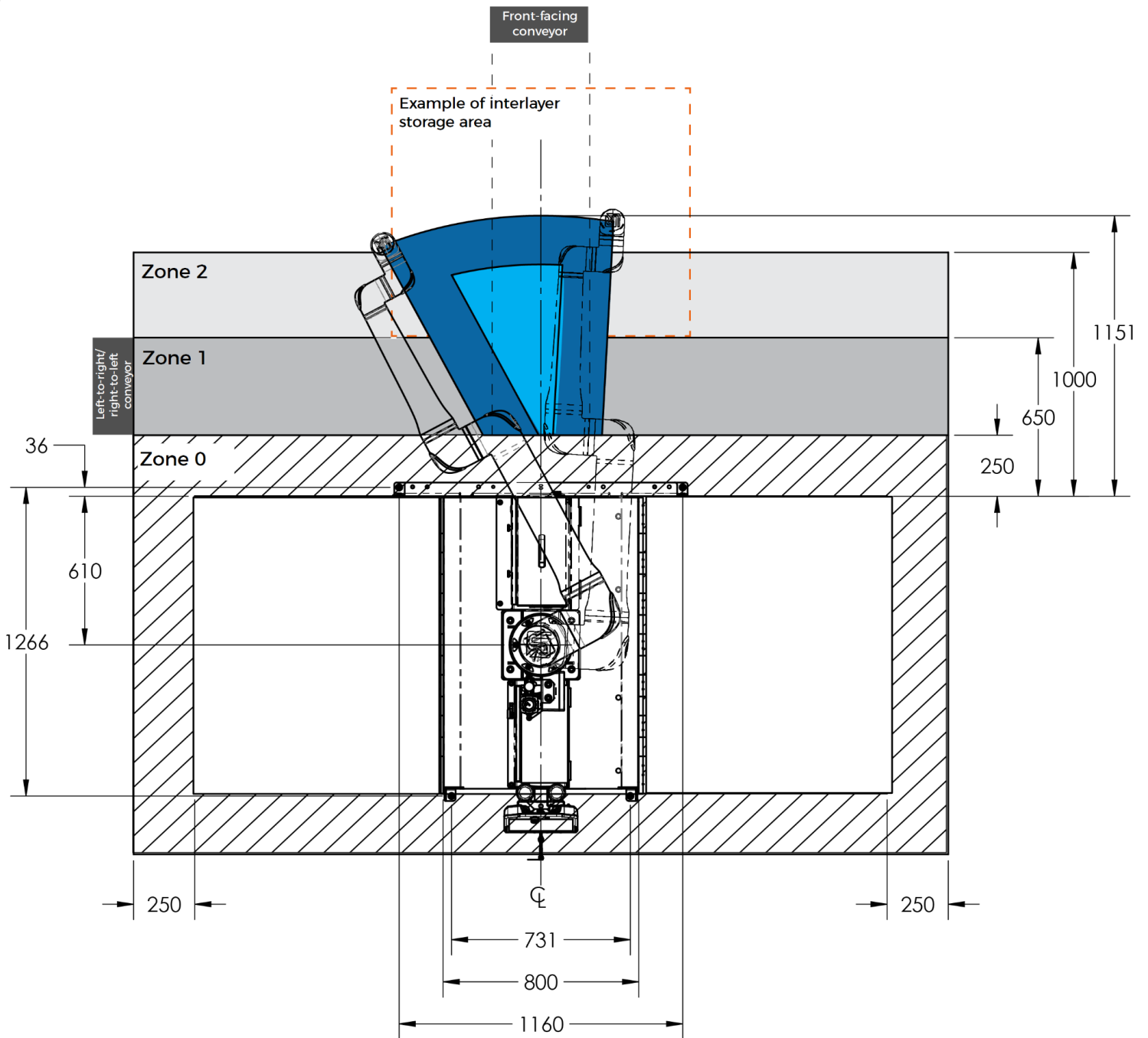
Make sure to perform a risk assessment before using the Solution. For more details, please refer to the Safety section of the user manual.



6. SOFTWARE & OTHER INFOS

To complete the installation and for all additional information about the Robotiq Palletizing Solution and its software, please refer to the corresponding sections of the instruction manual at robotiq.com/support.

Appendix A - Recommended layout (top view)



- Picking zone (any Gripper orientation) with 0 mm offset plate
- Picking zone (any Gripper orientation) with 200 mm hollow offset tube