



ROBOTIQ POWERPICK20 VACUUM GRIPPER

Original Notice

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Robotiq PowerPick20 Vacuum Gripper



Instruction Manual

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Revisions

Robotiq may modify this product without notice, when necessary, due to product improvements, modifications or changes in specifications. If such modification is made, the manual will also be revised, see revision information. See the latest version of this manual online at: support.robotiq.com.

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Initial release



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Information provided by Robotiq in this document is believed to be accurate and reliable. However, no responsibility is assumed by Robotiq for its use. There may be some differences between the manual and the product if the product has been modified after the edition date.

The information contained in this document is subject to change without notice.



1 General Presentation

1.1 Disclaimer

The terms *Gripper*, *PowerPick20 Gripper*, *PowerPick20 Vacuum Gripper* and *PowerPick20* used in the following manual all refer to the Robotiq PowerPick20 Vacuum Gripper. The Robotiq PowerPick20 Vacuum Gripper is a robotic device designed for industrial applications. The vacuum is generated with a venturi system that uses compressed air as an energy source. It is an end-of-arm tool designed to pick, place and handle a range of items (typically cardboard boxes) of varying sizes and weights.

Info

The following section presents the key features of the Robotiq PowerPick Vacuum Gripper and must not be considered as appropriate to the operation of the Gripper. Each feature is detailed in the appropriate section.



12. Nomenclature

12.1 PowerPick20 Gripper

The PowerPick20 Gripper is a mechanical assembly equipped with interchangeable components. It is the end-effector of the robot. It uses the negative pressure generated by the PowerPick20 Vacuum Generator to create a vacuum and, through the multiple suction cups, lifts, holds and moves boxes and other objects weighting up to 18.2 kg (40 lb). To simplify this manual, the word “box” will be used to represent the item to be handled with the Gripper. The PowerPick20 Gripper is directly installed on the wrist of the robot, without a coupling interface.



Fig. 1-1: PowerPick20 Gripper, Default Configuration

12.2. PowerPick20 Vacuum Generator

The PowerPick20 Vacuum Generator is an electrical and pneumatic device composed of two solenoid valves, two pressure sensors and two vacuum generator cartridges. It is an intermediate controller, connected to the robot controller and the PowerPick20 Gripper via I/O terminal blocks and air tubes. The PowerPick20 Vacuum Generator creates and releases the vacuum for the PowerPick20 Gripper.



Fig. 1-2: PowerPick20 Vacuum Generator

2. Safety

2.1 Disclaimer

Caution

Any user of the Robotiq PowerPick20 must have read and understood all of the instructions in the following section before operating it.

It is the installer/operator's responsibility to ensure that all local safety measures and regulations are met.

The intent of this section is to provide general guidelines for safe use of the PowerPick20 vacuum gripper.

Always follow local regulations.

The installer is responsible for the safe installation and commissioning of the PowerPick20 vacuum gripper.

Robotiq accepts no liability for damage, injury or any legal responsibility incurred directly or indirectly from the use of this product.

The user (installer and operator) shall observe safe and lawful practices including but not limited to those set forth in this document.

The term *operator* refers to anyone responsible for any of the following operations on the Robotiq Vacuum Gripper:

- Installation
- Control
- Maintenance
- Inspection
- Calibration
- Programming
- Decommissioning

This manual covers the various components of the PowerPick20 vacuum gripper and the general operations regarding the whole life-cycle of the product, from installation to operation and decommissioning.

The drawings and photos in this manual are representative examples. However, discrepancies may be observed between the visual supports and the actual product.

Warning

Any use of the PowerPick20 vacuum gripper in non-compliance with these instructions is deemed inappropriate and may cause injury or damage.



2.2. Risk Assessment

2.2.1 General Risk Assessment

The robot, the Gripper and any other equipment used in the final application must go through a comprehensive risk assessment process before they can be used.

The following non-exhaustive list presents risks that must be assessed during the integration process:

- Risk of contact between body parts and the gripper and/or suction cups;
- Risk of load ejection resulting from loss of vacuum;
- Risk of load dropping resulting from loss of vacuum;
- Risk of pinching between the Gripper and the items being handled, or other objects in the environment ;

Depending on the application, configuration and items being handled, additional hazards may be present. For instance, the boxes handled by the Gripper could be inherently dangerous to the operator. Such hazards may require additional protection or safety measures (e.g., light curtains, safety scanners, enclosure, etc.).

To ensure an adequate level of safety, floor markings must be applied to delineate safe zones around the work cell. It is the responsibility of the integrator to establish the proper safe distance from the work cell to protect the user.

The software allows for the limiting of the robot's speed, force and working area in order to reduce residual risk. These measures can namely give the operator more time to react appropriately, and reduce the robot's brake time.



Warning

Collisions between a person and the PowerPick20 Gripper may result in material damage, bodily injury and even death. Anyone in the vicinity of the work cell should take the necessary precautions.

- Make sure no individual or asset are in the vicinity of the robot and/or Gripper prior to initializing the robot.
- Always keep body parts and clothing away from the Gripper while the device is powered on.
- Do not use the Gripper on people or animals.
- Never stand under suspended loads held by the Gripper.
- Secure the Gripper properly before operating the robot.
- Always meet the Gripper payload specifications.

Warning

Maintenance and repair work on electrical equipment must only be carried out by qualified and authorized personnel.

- Never supply the PowerPick20 Controller with power from an alternating current source.
- Make sure that the PowerPick20 Controller I/O cable is always secured at both ends.
- Always meet the recommended keying for electrical connections.

222. Noise Level

At the optimal pressure (please refer to the **Specifications** section), the noise level at the workstation is 76 dBa. Hearing protection is recommended but not mandatory. Make sure that all local safety measures and regulations are met.

223. Pneumatic Limitations

- The maximum permissible pressure of all pneumatic components must never be exceeded (8 bar).
- Pneumatic tubing must be inspected at regular intervals and, if necessary, replaced (please refer to the **Maintenance** section for more details).
- Leaky connections must be sealed to avoid breakage, unnecessary or excessive noise, loss of energy, etc.
- Loss of vacuum can occur due to power failure or air supply interruption.

Warning

- Make sure that the air tubes are properly secured before pressurizing the PowerPick20 Gripper.
- Make sure that the air tubes are not pressurized before removing the air supply tube or any other air tube from the



PowerPick20 Vacuum Generator and Gripper.

- Never operate the PowerPick20 Gripper with leaking or worn parts.

2.3. Use of the PowerPick20 Vacuum Gripper

The PowerPick20 Vacuum Gripper is designed to pick, place and handle cardboard boxes. If the Gripper is used for other applications, make sure to consider the type of item to be handled in the risk assessment (please refer to the **General Risk Assessment** section) and take the appropriate safety measures.

Caution

The Gripper is NOT intended for applying force against objects or surfaces.

- Only use the Gripper in its original condition without unauthorized modifications.
- Only use the Gripper if it is in perfect technical condition.
- Follow all safety rules and regulations of the workplace when installing, operating and performing maintenance work on the Gripper.
- Wear all recommended personal protective equipment in accordance with the safety standards of the workplace, including but not limited to safety glasses, hearing protection, safety footwear, head protection.
- Handle with care any tool that contains sharp edges, pinching surfaces or generate heat.
- Comply with local, state, province and/or federal laws, regulations and directives regarding automation safety and general machine safety.

The unit should be used exclusively within the range of its technical data. Any other use of the product is deemed improper and unintended. Robotiq will not be liable for any damages resulting from any improper or unintended use

When manually moving the Gripper installed on the robot (e.g., for teaching, maintenance, inspection purposes) make sure not to insert fingers through bracket cut outs and openings.

Make sure that all workers who operate the Gripper have received the appropriate training to do so in a safe manner.

Perform all necessary maintenance work periodically as specified in the [Maintenance section](#).



3. Installation

This section will guide the user through the installation and general setup of the Robotiq PowerPick20 Vacuum Gripper.

Before installing:

- Read and understand the safety instructions related to the PowerPick20 Vacuum Gripper. Please refer to the [Safety section](#) for more information.
- Verify the package according to the scope of delivery and the order.
- Make sure to have the required parts, equipment and tools listed in the scope of delivery.
- Make sure to meet the recommended environmental conditions.

Info

This manual uses the metric system. Unless specified, **all dimensions are in millimeters.**

Warning

When installing:

- Do not operate the PowerPick20 Vacuum Gripper or even turn on the power supply before confirming the device is firmly attached and the work area is clear.
- Make sure that the air supply source is secured.
- Failure to properly secure and install the equipment can result in material damage and bodily injury.

If the installation is not performed in compliance with the manufacturer's instructions, the warranty will be void.

3.1 Scope of Delivery

3.1.1 PowerPick20 Vacuum Gripper Kit

- 1 x PowerPick20 standard kit:
 - 1 x PowerPick20 Vacuum Generation Unit
 - 1 x I/O cable (M12, 12 pins, 2 m)
 - 1 x 2 in pre-perforated grommet
- 1 x PowerPick20 Vacuum Gripper:
 - 1 x Manifold assembly
 - 1 x Small suction cup bracket assembly with 110 mm suction cups



- 1 x Large suction cup bracket assembly

- 1 x 12 mm double air tube (3.63 m)
- 4 x 8 mm air tubes (275 mm)
- 1 x Hardware kit:
 - 1 x M8 shoulder screw
 - 4 x M8 x 40 mm hex socket head cap screws with captive spring washer
 - 10 x 190 mm cable ties
 - 1 x Tubing curler
 - 1 x Pneumatic adapter 1/2 BSPP to 12 mm tube
 - 2 x M6 external tooth lock washers
 - 1 x M6 flange nut
- 1 x Installation tool kit:
 - 1 x 6 mm hex key, L-shape
 - 1 x 21 mm / 24 mm double-ended wrench
- 1 x 200 mm hollow offset link kit **(optional)**:
 - 1 x 200 mm horizontal offset tube
 - 4 x M8 x 20 mm hex socket head cap screws with captive spring washer
 - 2 x 8 mm air tubes (275 mm)
 - 2 x 8 mm air tubes (475 mm)
- 1 x 100 mm wrist extension kit **(optional)**:
 - 1 x 100 mm wrist extension
 - 4 x M8 x 20 mm hex socket head cap screws with captive spring washer
- 1 x 75 mm suction cup kit **(optional)**:
 - 4 x 75 mm suction cups
 - 4 x 3/8 BSPP threaded adapters



32. Environmental and Operating Conditions

Condition	Values	
	Min	Max
Operating temperature	0°C (32°F)	50°C (122°F)
Storage temperature	-20°C (-4°F)	70°C (158°F)
Humidity (non-condensing)	35% RH	85% RH
IP rating	IP2X	
Dust, soot and water	Affect the time between maintenance	
Food	No	
Clean room		
Intrinsic Safety (IS)		
Corrosive liquids or gases		
Explosive liquids or gases		

Table 3-1: Environmental and operating conditions of the PowerPick20

33. Air Supply

Caution

- Use dry and filtered air only.
- Follow ISO 8573-1 Class 7.4.4.
- The optimal pressure for compressed air consumption is 6 bar (87 psi). The maximum pressure allowed is 8 bar (115 psi).
- Robotiq recommends using a local pressure regulator with a filter and air dryer. The filter should prevent any dust particle larger than 5 µm from getting inside the system.

33.1 Connecting the Supply Line

Compressed air must be supplied to the Vacuum Gripper according to the technical specifications.

The air supply tubing must be connected and disconnected to or from the inlet port only when the line is depressurized.

It is recommended to use a lockout valve before connecting to the product.

To protect against whipping hazards, the air supply tubing (connected to the PowerPick20 vacuum generator) must be firmly secured. An air fuse can also be installed.

At optimal pressure (6 bar / 87 psi), the air supply line must ensure an air flow of 510 lpm.

Make sure any other pneumatic equipment connected to the same supply line is not temporarily reducing the air flow made available for the vacuum generator.



3.3.2. Depressurizing the Supply Line

In order to safely depressurize the supply line, the air supply must first be shut off.

If no lockout valve is present to depressurize the line, the Gripper can be activated until the pressure is fully released.

3.4. Reception of the Product

3.4.1 Visual Inspection

Inspect the package for damage or defects before and after opening it.

Make sure to have all components in hand before discarding the box and packaging material.

If damage or defects are discovered, or if components are missing, contact the Robotiq support team at support@robotiq.com.

3.5. Mechanical Installation

Warning

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

The warranty will not cover material damage resulting from an installation that did not comply with the instructions found in this manual.



3.5.1 PowerPick20 Vacuum Generation Unit Installation

Installation

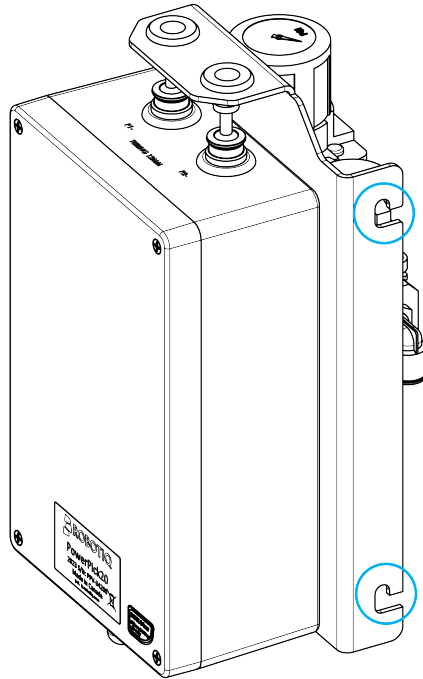


Fig. 3-1: PowerPick20 Vacuum Generation Unit

1. Identify the area where the PowerPick20 Vacuum Generation Unit will be installed. Choose a location so that the electrical cable and air tubes will not encumber the working environment.
2. Install the Powerpick20 Vacuum Generation Unit using two (2) M8 bolts (tools and hardware not provided).

Caution

Make sure the installation of the PowerPick20 vacuum generator on a machine or piece of equipment does not alter the warranty or certification of said machine or piece of equipment.

3. Connect a 12 mm air tube (not provided) to the air supply source and to the Powerpick20 vacuum generator.
4. Connect the PowerPick20 vacuum generator to the robot control box. Please refer to **Electrical Installation** section for more details.

Tip

If the PowerPick20 Vacuum Gripper is used in conjunction with the PE20 Robotiq Palletizing Solution, follow the PowerPick20 Vacuum Generation Unit installation instructions found in the PE20 user manual.



3.5.2. PowerPick20 Gripper Installation

Required Tools

Included:

- 1 x 6 mm hex key
- 1 x 21 mm / 24 mm double-ended wrench

Not included:

- Torque wrench
- 10mm hex key

Overview

Upon receipt, the PowerPick20 Gripper is pre-assembled with the following components:

- 1 x PowerPick20 Gripper, default configuration:
- 1 x Manifold Assembly
- 1 x Small suction cup brackets assembly
- 4 x 110 mm suction cups
- 4 x 8 mm air tubes (275 mm)
- 1 x Large suction cup bracket assembly

The following instructions detail how to install any Gripper configuration. However, you must use the configuration corresponding to your needs. For more detail about the possible Gripper configurations, see section **Configuration Steps and Tips**.

Info

Please use the Robotiq Configurator to simulate the configuration that corresponds best to the application at hand. Should the application require more than one configuration, consider using a gripper arrangement that adapts to every situation.





Fig. 3-2: PowerPick20 Gripper, Default Configuration

Caution

Any unused manifold port should be covered with a port plug to avoid air leakage.

Installation of Manifold Assembly

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).**



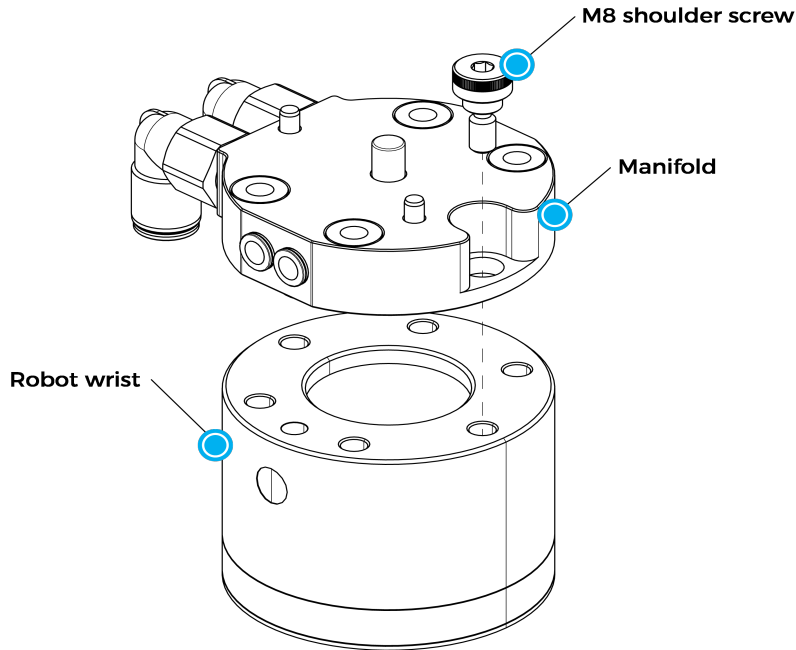


Fig. 3-3: Installation of the Manifold Assembly on the Robot Wrist

Installation of Gripper Offset Equipment on the Manifold

For more detail about the different Gripper configurations, please refer to the **Configurations Steps and Tips** section. Skip this step if no offset is necessary.

Wrist Extension

Align the holes of the wrist extension with the corresponding pins on the manifold.

Install the wrist extension onto the robot wrist with four (4) **M8 x 40 mm** hex socket head cap screws with captive spring washer using the provided 6 mm hex key. Required torque is **16 Nm (11.8 lb ft)**.

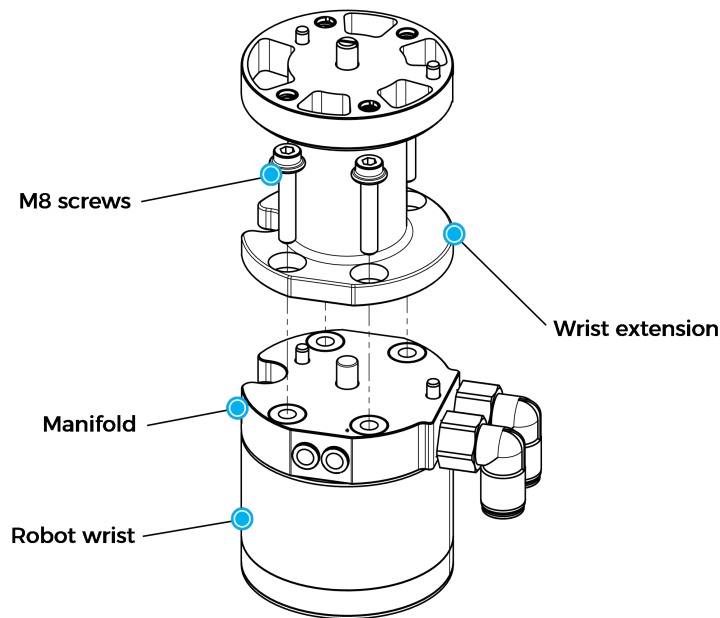


Fig. 3-4: Installation of the Wrist Extension on the Manifold

Hollow Offset Link on Manifold

Align the holes of the hollow offset link with the corresponding pins on the manifold.

Install the hollow offset link onto the robot wrist with four (4) **M8 x 40 mm** hex socket head cap screws with captive spring washer using the provided 6 mm hex key. **Required torque is 16 Nm (11.8 lb-ft).**

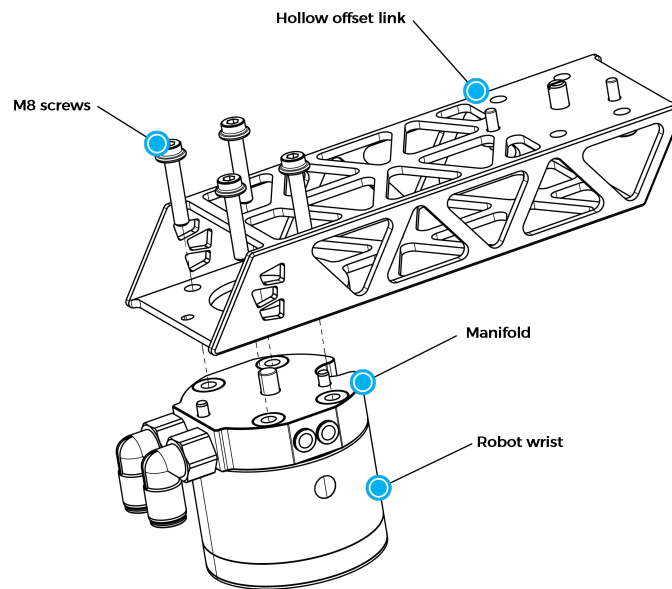
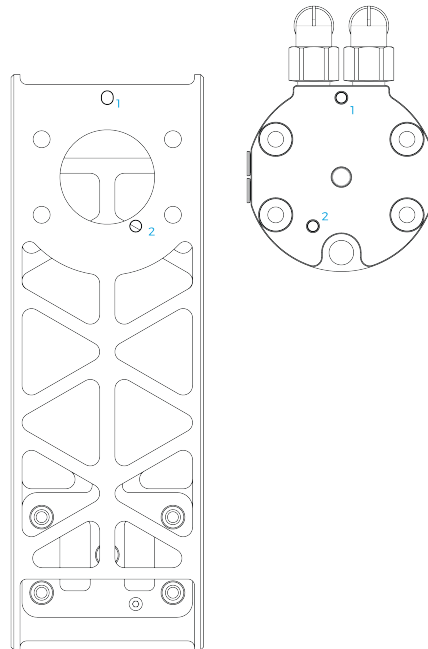


Fig. 3-5: Installation of the Hollow Offset Link on the Manifold

Hollow Offset Link on Wrist Extension

Align the holes of the hollow offset link with the corresponding pins on the Wrist Extension.

Install the hollow offset link onto the wrist extension with four (4) **M8 x 20 mm** socket head cap screws with captive spring washer using the provided 6 mm hex key. Required torque is 16 Nm (11.8 lb-ft).



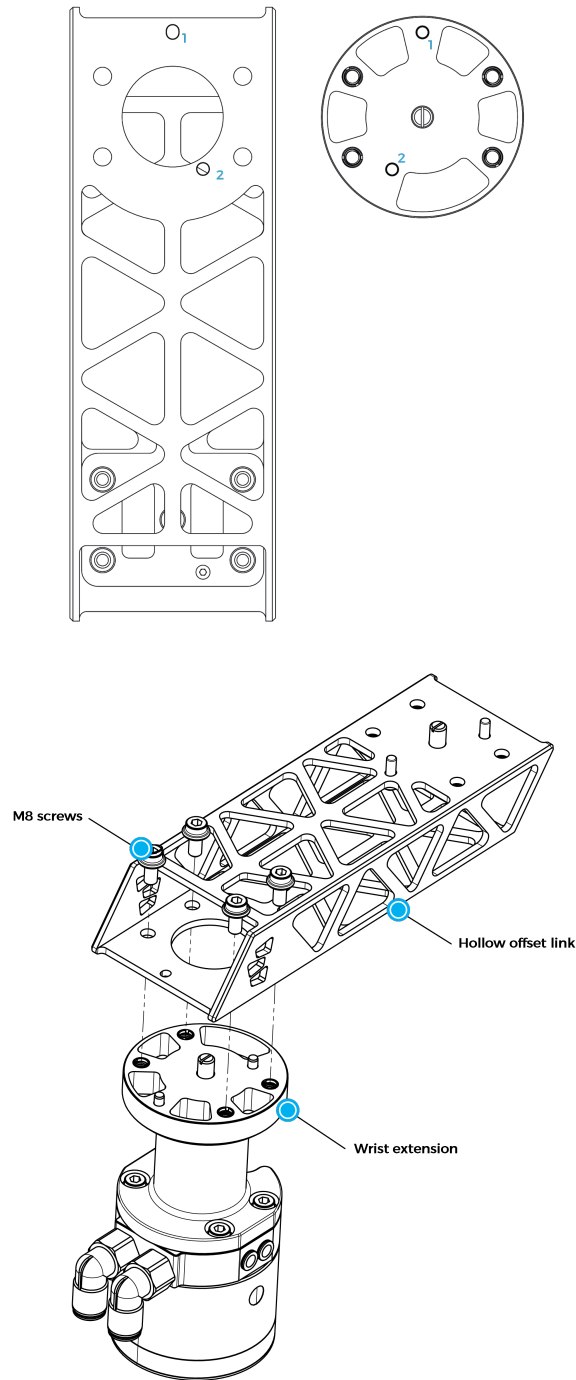


Fig. 3-6: Installation of the Hollow Offset Link on the Wrist Extension

Installation of Suction Cup Brackets

Suction Cup Brackets on Manifold

Align the holes of the suction cup brackets with the corresponding pins on the manifold.

Install the suction cup brackets onto the Manifold with four (4) **M8 x 40 mm** hex socket head cap screws with captive spring washer using the provided 6 mm hex key. Required torque is **16 Nm (11.8 lb-ft)**.

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.



Tip

If necessary, when using the small brackets, cut the tubes to the required length.

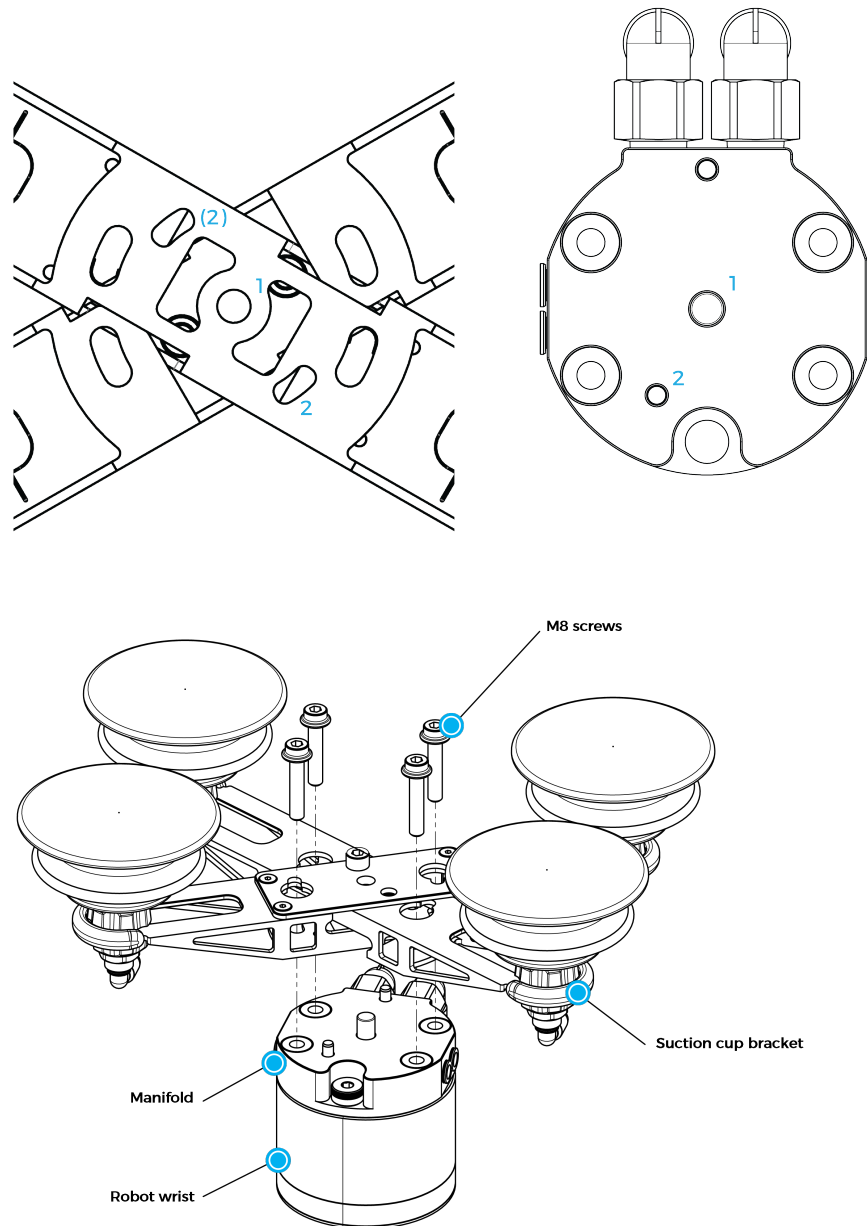


Fig. 3-7: Installation of Suction Cup Brackets

Suction Cup Brackets on Gripper Offset Equipment

Align the holes of the suction cup brackets with the corresponding pins on the gripper offset equipment. Please refer to the figure below for alignment.

Install the suction cup brackets onto the gripper offset equipment with four (4) **M8 x 20 mm** socket head cap screws with captive spring washer using the provided 6 mm hex key. **Required torque is 16 Nm (11.8 lb-ft).**

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.



Note

If working with the hollow offset link, install two (2) 275 mm and two (2) 475 mm air tubes (8 mm) in lieu of the above. The longer 8 mm air tubes are part of the PowerPick20 hollow offset link kit.

Tip

If necessary, when using the small brackets, cut the tubes to the required length.

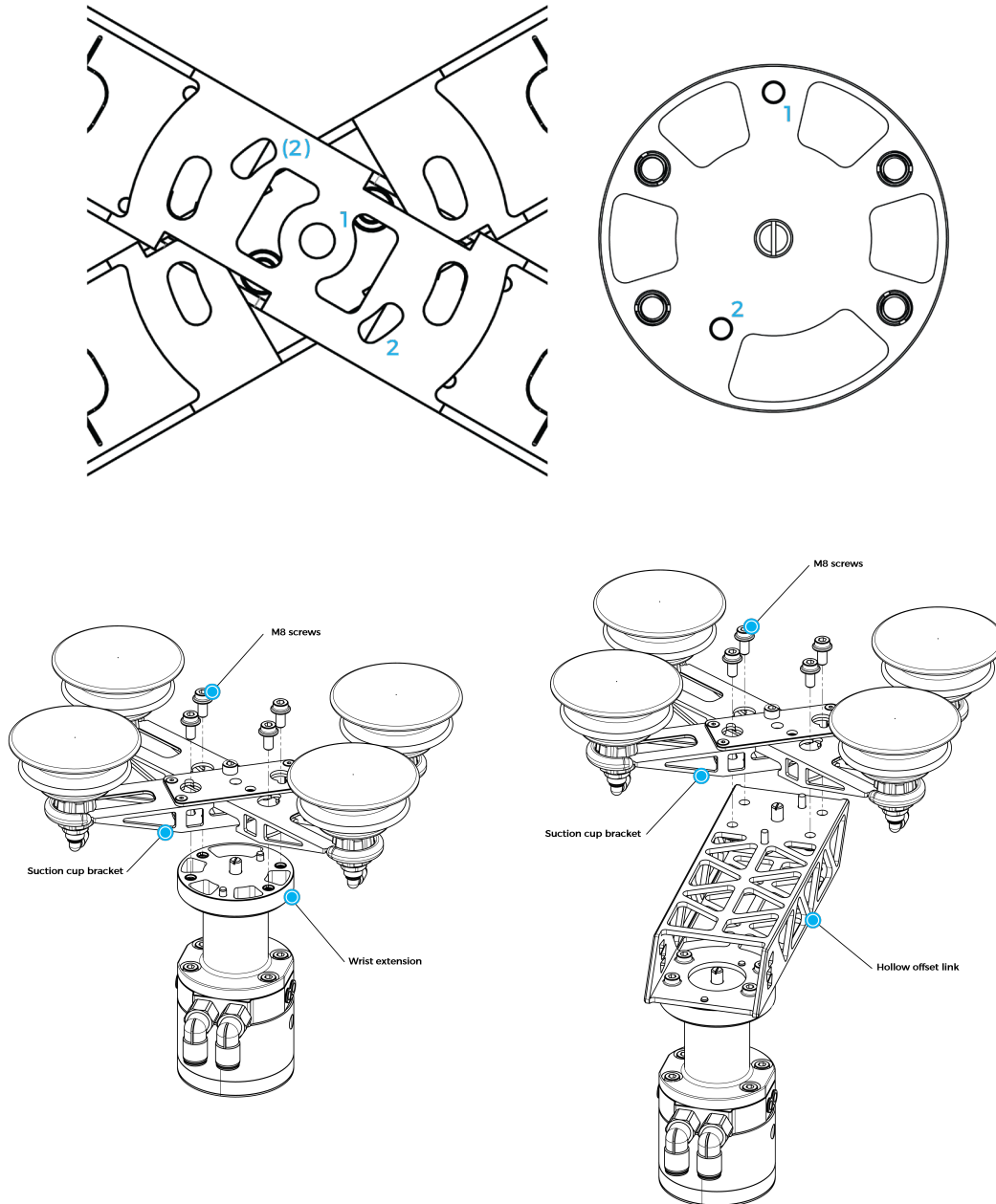


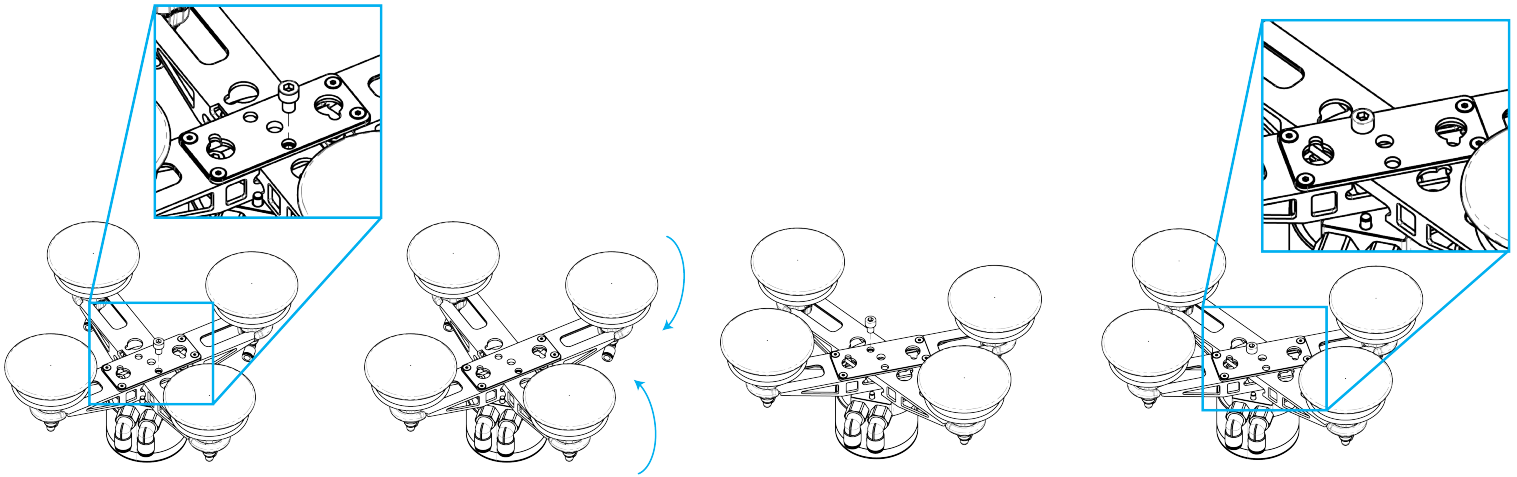
Fig. 3-8: Installation of Suction Cup Brackets on Gripper Offset Equipment

Changing Suction Cup Pattern

1. Remove the M8 socket head screw under the PowerPick20 Gripper, near the center, using the provided 6 mm hex key.
2. Loosen (do not remove) the four (4) M8 socket head cap screws with captive spring washer holding the suction cup brackets to the robot wrist or gripper offset equipment using the provided 6 mm hex key.



3. Rotate the suction cup brackets until the holes for the desired pattern are aligned.
4. Tighten the M8 socket head screw under the PowerPick20 Gripper, near the center, to secure the pattern, using the provided 6 mm hex key. **Required torque is 8 Nm (5.9 lb-ft).**
5. Tighten the four (4) M8 socket head cap screws with captive spring washer holding the suction cup brackets to the robot wrist or gripper offset equipment using the provided 6 mm hex key. **Required torque is 16 Nm (11.8 lb-ft).**



Repositioning Suction Cups

1. Unscrew the four (4) air bolts by hand just enough to allow the air nodes to move freely in the openings of the suction cup brackets.
2. Reposition the four (4) air nodes as desired along the openings of the suction cup brackets.
3. Tighten the four (4) air bolts by hand at the desired location.
 - a. The part of the air bolt that fits in the bracket openings has two flat edges; align the flat edges of the air bolt with the flat edges of the bracket openings.
 - b. Make sure that all air bolts are at the same position relative to the positioning grooves located on either side of the bracket openings.
 - c. Tighten the air bolts enough so that the air nodes do not move when operating the Gripper. If necessary, use the 21 mm / 24 mm double-ended wrench provided.
 - d. Make sure the air tubes are securely connected to the air nodes and that the suction cups are screwed on tight enough to prevent any leak. If necessary, insert a 10 mm hex key (not provided) at the bottom of the suction cups and tighten them while holding the air bolts with the 21 mm / 24 mm double-ended wrench provided.



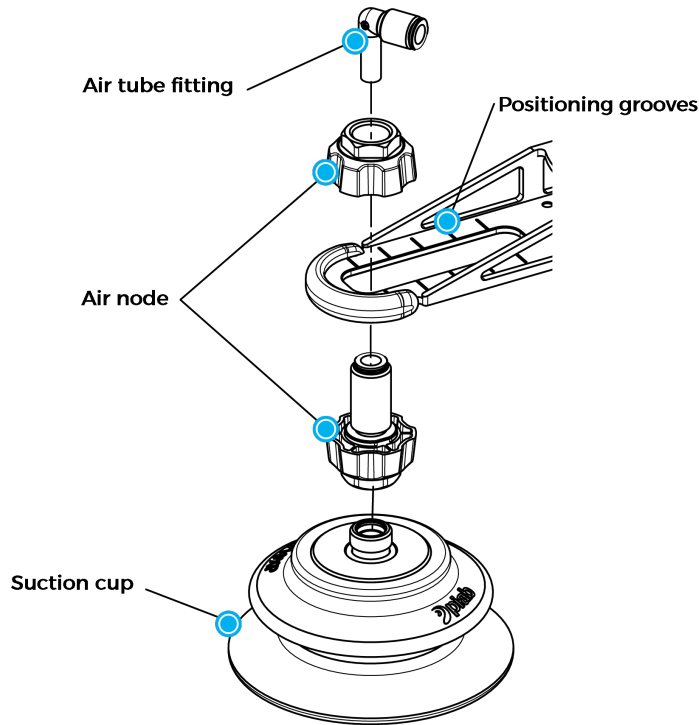


Fig. 3-9: PowerPick20 Air Node Assembly

Replacing or Changing Suction Cups

1. Using a 10 mm hex key (not provided), unscrew the suction cups and remove them from the air nodes. If necessary, use the 21 mm / 24 mm double-ended wrench provided to hold the air bolts.
2. Select suction cups that correspond to the application at hand, and that fit with the 3/8 BSPP (G 3/8) female thread under the air bolt.
3. Using the appropriate tool, install the desired suction cups on the air nodes. Make sure the suction cups are screwed on tight enough to prevent any leak. If necessary, hold the air bolts with the 21 mm / 24 mm double-ended wrench provided.

Changing Suction Cup Brackets

1. Disconnect the four (4) elbow fittings from the air nodes.
2. Unscrew the four (4) air bolts by hand and remove the air nodes from the suction cup brackets.
3. Follow the instructions in the **Changing Suction Cup Pattern** section to position the suction cup brackets in a rectangular pattern.
4. Remove the four (4) M8 socket head cap screws with captive spring washer under the PowerPick20 Gripper, holding the suction cup brackets to the robot wrist or gripper offset equipment using the provided 6 mm hex key.
5. Remove the suction cup brackets.
6. Install the four (4) air nodes on the desired suction cup brackets. Please refer to the **Configurations Steps and Tips** section to select the appropriate brackets.
7. Install the desired suction cup brackets onto the robot wrist or gripper offset equipment with the four (4) M8 socket head cap screws with captive spring washer, using the provided 6 mm hex key. Required torque is 16 Nm (11.8 lb-ft).
8. Connect the four (4) elbow fittings to the air nodes.

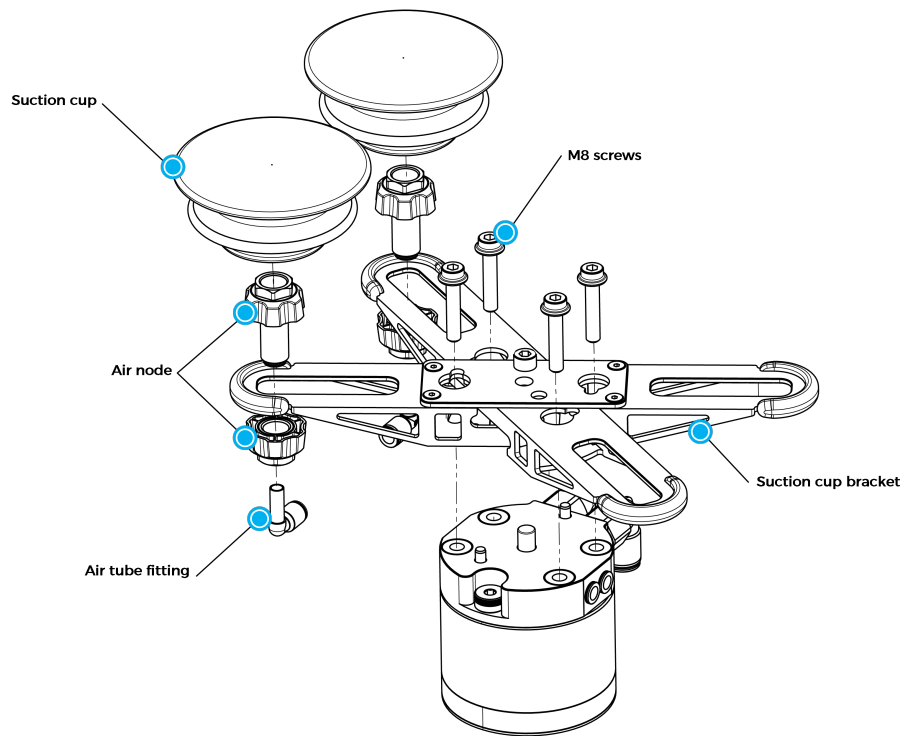


Fig. 3-10: Changing Powerpick20 Suction Cup Brackets

Info

In the figure above, two (2) air nodes have been removed for ease of viewing.



3.5.3. Air Tubing

Required Tools

Not included:

- Tube cutter

Routing

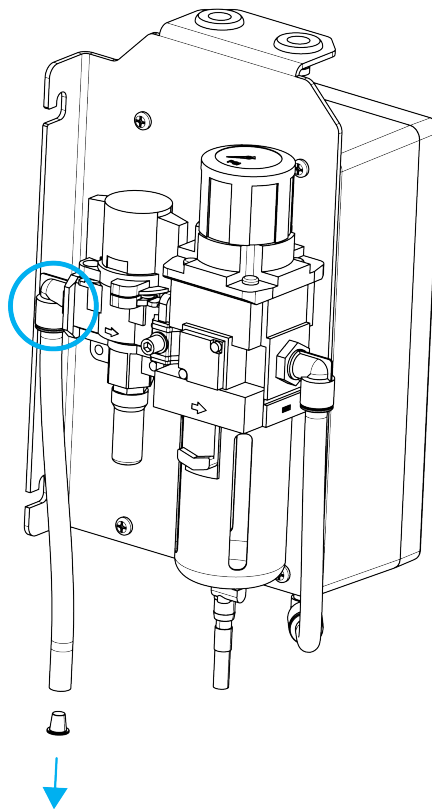
Tip

Follow cable management good practices: position and secure the air tubes so they do not clutter the working environment. Cut the air tubes to the right length if necessary.

Air Supply to PowerPick20 Vacuum Generation Unit

If the supplied 12 mm air tube is long enough, connect the end of the 12 mm air tube to the air filter or air supply (please refer to the **Air Supply** section for more information). Push the air tube until it cannot go any further.

If the supplied 12 mm air tube is not long enough, remove the 12 mm air tube from the pneumatic elbow fitting entering the air filter/regulator (see figure below). With the appropriate length of 12 mm air tubing (not supplied), connect one end to the pneumatic elbow fitting entering the air filter/regulator and the other end to the air filter or air supply (please refer to the **Air Supply** section for more information). Push the air tube until it cannot go any further.



PowerPick20 Vacuum Generator to PowerPick20 Gripper

1. Connect the end of the 12 mm double air tube identified as “base side” to the fittings identified “P1-” and “P2-”. Push the air tube until it cannot go any further.
2. Connect the other end of the 12 mm double air tube identified as “tool side” to the pneumatic elbow fittings of the PowerPick20 Gripper’s manifold at the end of the robot arm. Push the air tube until it cannot go any further. Please refer to the Cable Management System section of the PE20 Palletizing Solution user manual for more information.

Info

Make sure the air tube is neither too tight nor too loose so that the robot can move freely, without the air tube getting stuck when moving. A tubing curler and 190 mm zip ties are supplied to help in that matter.

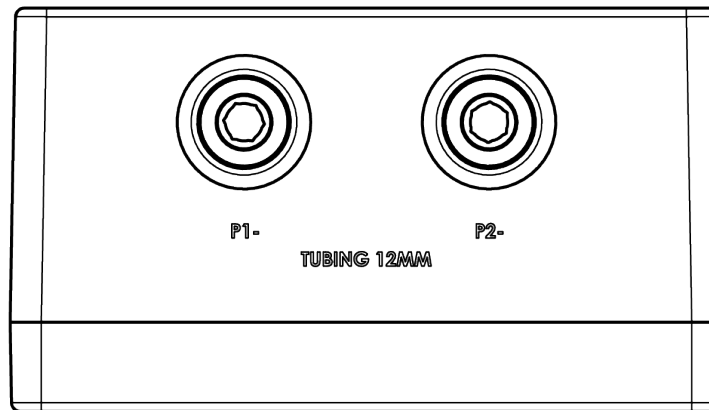


Fig. 3-11: PowerPick20 Vacuum Generator- air tubes routing



3.6. Electrical Installation

3.6.1 PowerPick20 Vacuum Generator

1. Connect the M12 connector of the I/O cable to the PowerPick20 Controller, using the port identified as “device control.”
2. Connect the open end of the I/O cable to the robot control box according to the table and figure below.
3. 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).
4. Tighten the nut so that the lock washers are properly engaged.

Tip

Refer to the figure below for an example of the ground connection.

When using the PowerPick20 Vacuum Gripper in conjunction with the PE20 Robotiq Palletizing Solution, use the provided 8 mm / 10 mm double-ended wrench to tighten the M6 flange nut.

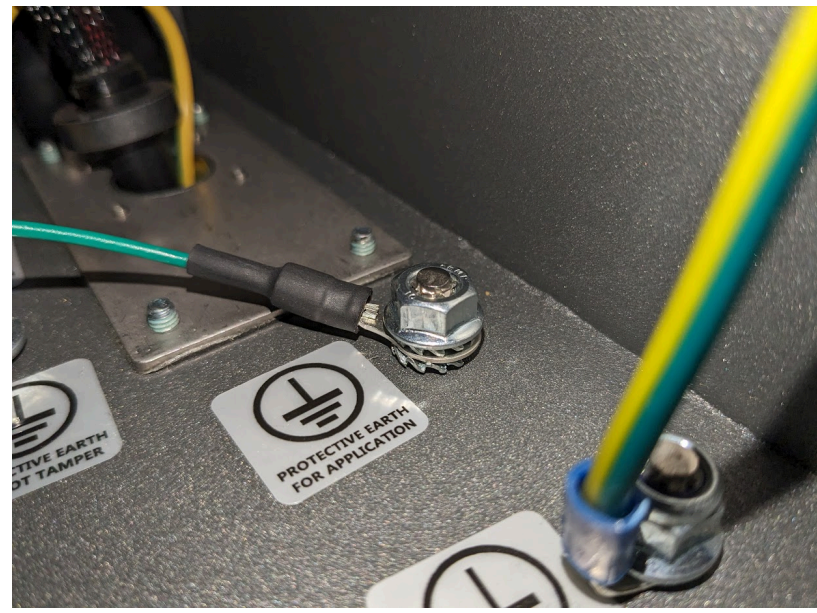
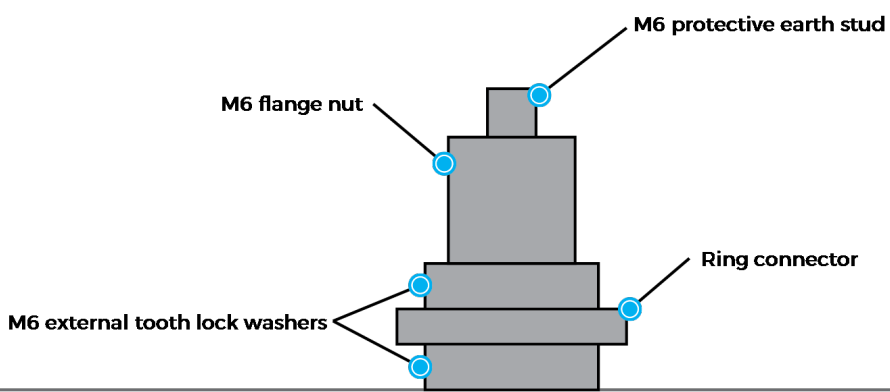
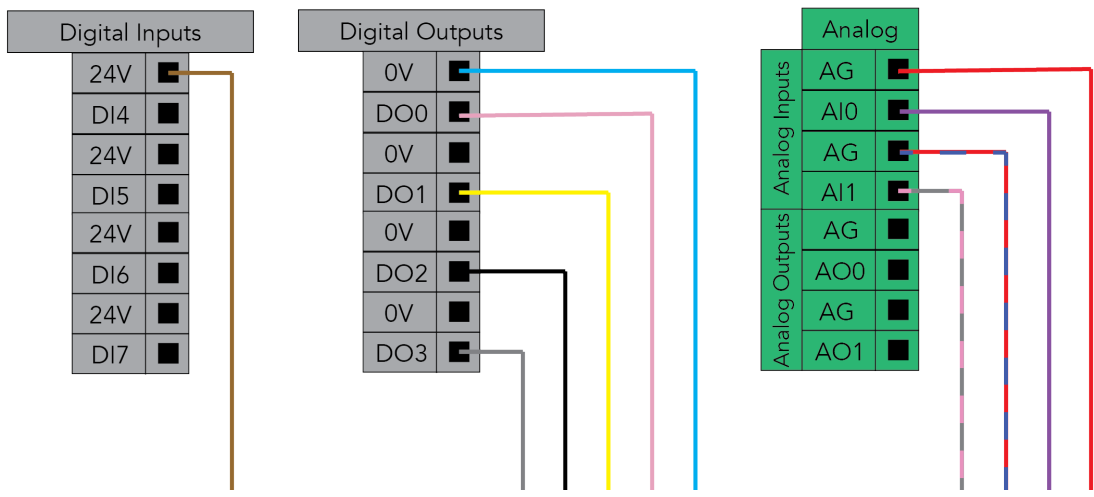
Below are examples of the electrical connections when working with a UR20 robot.

Table 3-2: Identification of I/O Cable Connections

Color	Connection	Function
Red	AG (Analog Ground)	0 V Pressure Sensor # 1 (S1)
Violet	AI (Analog Input)	AI Pressure Sensor # 1 (S1)
Red/Blue	AG (Analog Ground)	0 V Pressure Sensor # 2 (S2)
Gray/Pink	AI (Analog Input)	AI Pressure Sensor # 2 (S2)
Blue	0V	0 VDC
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	24 V	24 VDC
Green	GND (Ground)	Ground



Fig. 3-12: PowerPick20 Controller Connections to Robot Control Box



Tip

If you're using the PowerPick20 Vacuum Gripper with the PE20 Robotiq Palletizing Solution, follow the electrical installation instructions in the PE20 User manual.



3.7. Supply Pressure Adjustment

The optimal pressure for compressed air consumption is 6 bar (87 psi). However, it is possible to reduce the supply pressure in order to reduce air consumption or noise level. If so, further tests must be performed to ensure the payload is always maintained in operating conditions.

Follow these instructions to adjust the supply pressure of the PowerPick20 Vacuum Gripper Unit.

Caution

Make sure all pneumatic tubes connected to the Vacuum Generation Unit and the Vacuum Gripper are pushed all the way in.

Info

The digital outputs are identified in the **Electrical Installation** section.

1. Open the shut-off valve by turning it in "SUP" position
2. Remove all objects from under the suction cups and activate both suction valves.
3. While the vacuum is activated, adjust the pressure to the desired value on the filter-regulator by turning the knob at the top.
4. Let the valves open for at least 30 seconds to stabilize the pressure (optimal pressure is 6 bar (87 psi)).
5. Deactivate both suction valves.
6. Validate the adjustment by repeatedly activating and deactivating both suction valves.
7. Verify the pressure value shown on the filter-regulator.



3.8. Configurations Steps and Tips

Info

Please use the Robotiq Configurator to simulate the configuration that corresponds best to the application at hand. Should the application require more than one configuration, consider using a gripper arrangement that adapts to every situation.

3.8.1 TCP and Center of Mass

Refer to the **Tool Center Point and Center of Mass** section to identify the values of your configuration.



3.8.2. Suction Cup Brackets

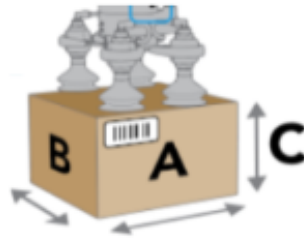


Fig. 3-13: A-B-C box dimensions





Component combination		Configuration	Box dimensions by configuration	
			Metric	Imperial
Small suction cup brackets 	110 mm suction cups 	Square	A: 250 mm + B: 250 mm +	A: 9-7/8 in + B: 9-7/8 in +
		Rectangle	A: 325 mm + B: 240 mm +	A: 12-3/4 in + B: 9-7/16 in +
Large suction cup brackets 	110 mm suction cups 	Square	A: 390 mm + B: 390 mm +	A: 15-3/8 in + B: 15-3/8 in +
		Rectangle	A: 470 mm + B: 310 mm +	A: 18-1/2 in + B: 12-3/16 in +

Table 3-3: Combinations of Suction Cups and Suction Cup Brackets

Tip

To ensure stability when operating the Gripper, always position the Gripper so that it is aligned with the center of the box, with the suction cups as close to the edge of the box as possible.



3.8.3. Wrist Extension

Install the wrist extension if additional vertical reach is required.


Component		Additional vertical reach
Wrist Extension (optional)		100 mm (3-15/16 in)

Table 3-4: Wrist extension




Fig. 3-14: Wrist Extension with Small Suction Cup Brackets

3.8.4. Choice of Horizontal Offset Component

Choose your offset component according to:

- the necessary horizontal reach.
- the weight of the items to be moved.

Component		Payload
0 mm offset ¹	-	Boxes up to 18.2 kg (40 lb)
200 mm hollow offset link (optional)		Boxes up to 17.5 kg (38.5 lb)

¹ Default configuration of the Gripper

Table 3-5: Offset components



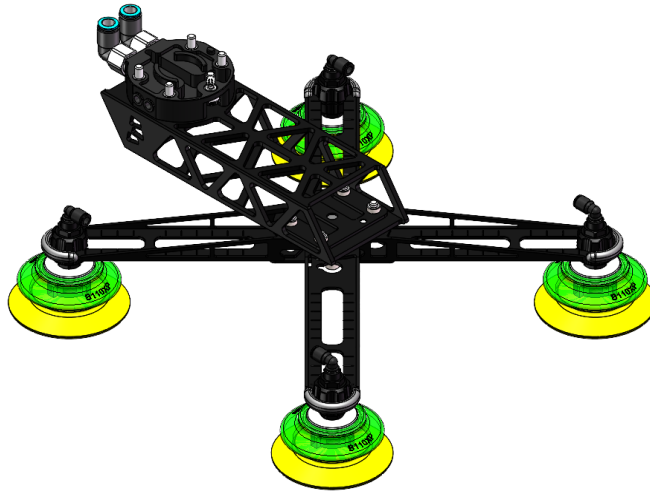


Fig. 3-15: 200 mm Hollow Offset Link with Large Suction Cup Brackets

4. Software

4.1 Grip Check

A grip check may be necessary depending on the application. The grip check consists in testing the vacuum action of the system.

The PowerPick20 comes with two (2) analog sensors (one (1) per channel) that indicate the current vacuum level of each channel.

Please refer to the **Electrical Installation** section for additional information on wiring.

1. In the I/O menu, identify the analog input for each of the two (2) pressure sensors of the Powerpick20 vacuum generator; each analog input will display the voltage value of the corresponding vacuum sensor.
2. Remove all objects from under the suction cups and activate the vacuum on both channels. Once it stabilizes, note the voltage value of each analog input.
3. Place a suitable box under the suction cups, position it appropriately, and activate the vacuum on both channels. Once it stabilizes, note the voltage value of each analog input.
4. Calculate the average value between the two previous voltage values for each pressure sensor. These average values act as thresholds used to verify whether or not a box is being held by the Gripper.

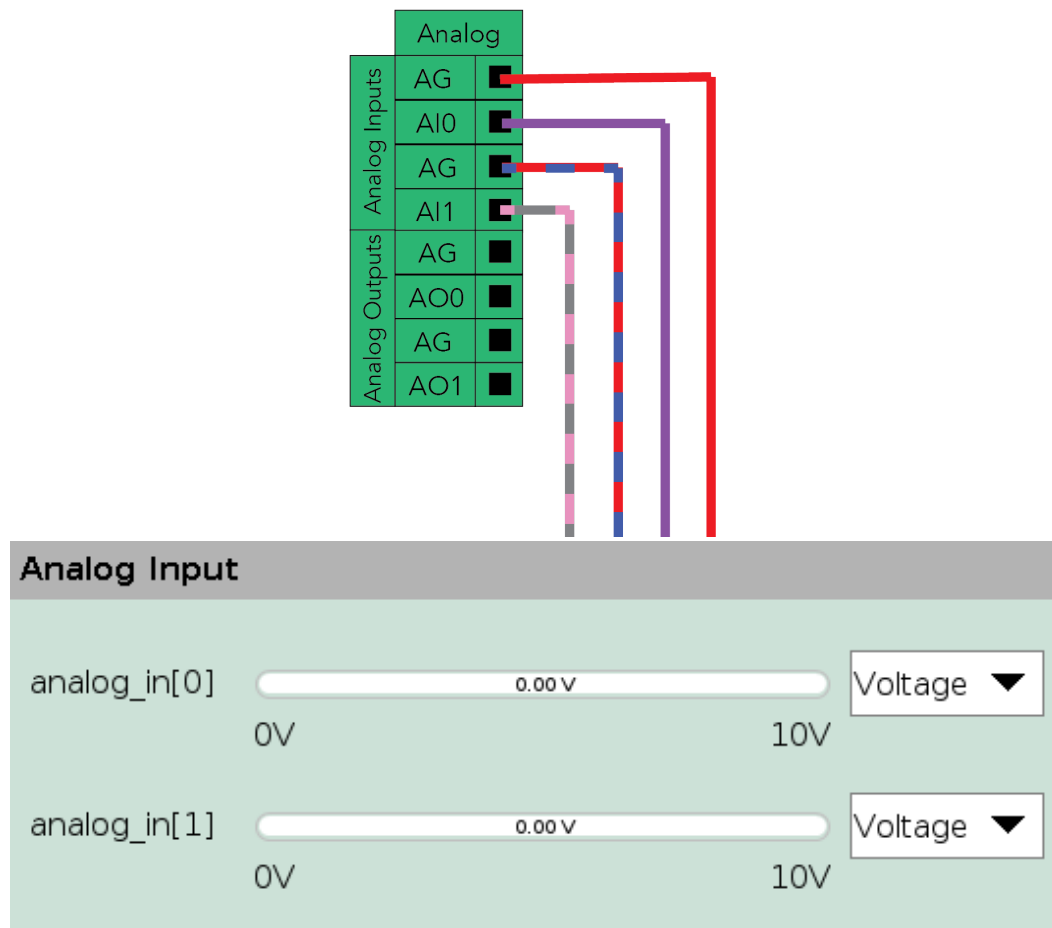


Fig. 4-1: Analog inputs



5. Go to the program tree and tap where you want to activate the PowerPick20 Gripper.
 - a. Insert a Set node (Program > Basic).
 - b. In the Command window, set the Digital Output linked to the first pressure sensor to High; this will activate the vacuum for half of the suction cups.
 - c. Insert another Set node (Program > Basic).
 - d. In the Command window, set the Digital Output linked to the second pressure sensor to High; this will activate the vacuum for the other half of the suction cups.
 - e. Insert a Wait node (Program > Basic) of x seconds (example: 0.2 seconds) to allow time for the signal to activate.
 - f. Insert an If node (Program > Advanced) to verify whether or not the part was picked using the value noted in the previous step.
 - i. In the If node, tap the f(x) box (leave the Check expression continuously box unticked).
 - ii. In the window that displays, open the Input scrolling menu and select analog_in[0] and analog_in[1].
 - iii. Complete the following expression using the keyboard and the values gathered previously: if analog_in[0] < (average value from the first pressure sensor) or analog_in[1] < (average value from the second pressure sensor).
 - iv. Tap <empty> in the If node and insert a Popup node (Program > Basic).
 - v. Select the Message popup type and tap the message to display when the Gripper does not hold an object (example: no_grip).

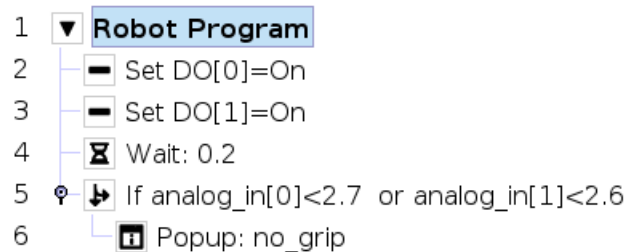


Fig. 4-2: Program Tree

5. Specifications

Info

This manual uses the metric system. Unless specified, **all dimensions are in millimeters.**

5.1 Technical dimensions

5.1.1 PowerPick20 Vacuum Generator

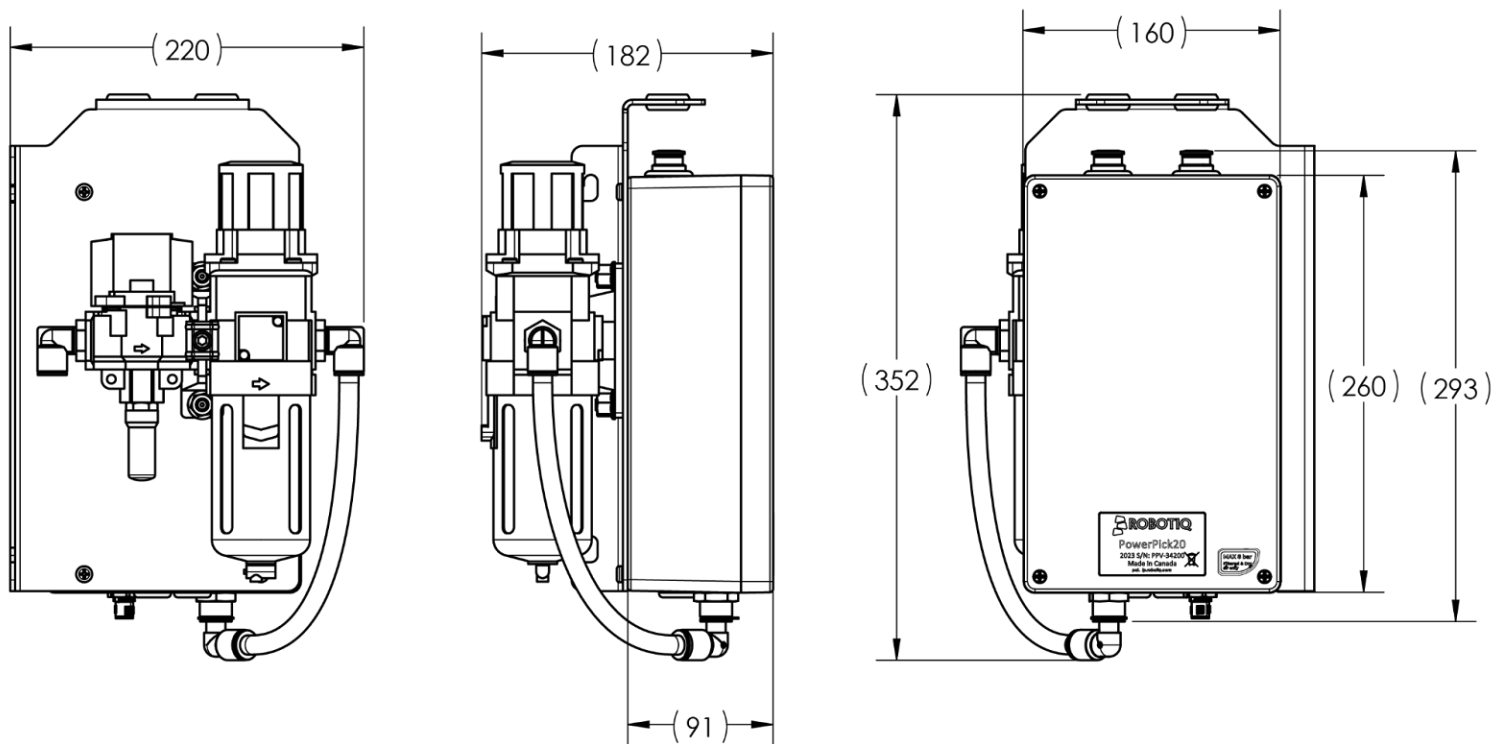


Fig. 5-1: Technical Dimensions of the PowerPick20 Vacuum Generation Unit



5.12. 200 mm Hollow Offset Link

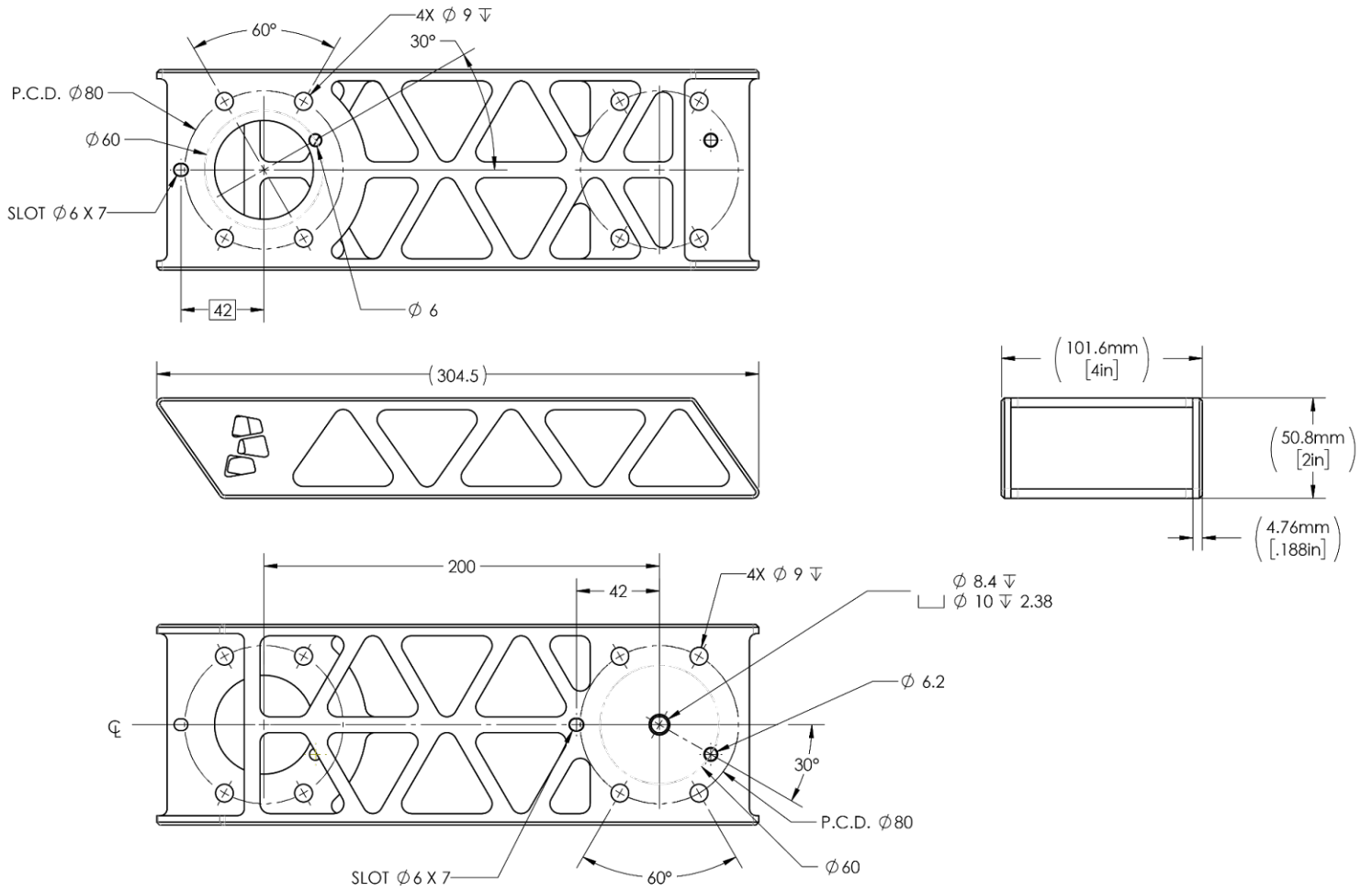


Fig. 5-2: Technical Dimensions of the 200 mm Hollow Offset Link

5.13. Small Suction Cup Brackets

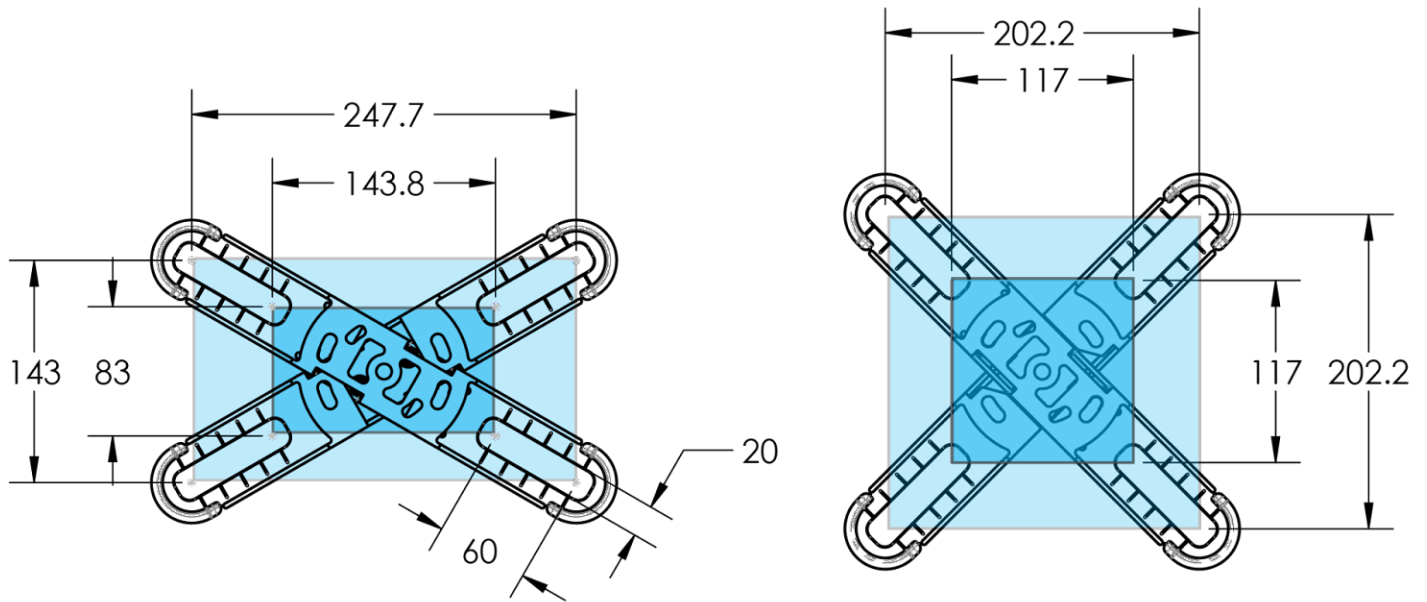


Fig. 5-3: Technical Dimensions of Small Suction Cup Brackets

5.14. Large Suction Cup Brackets

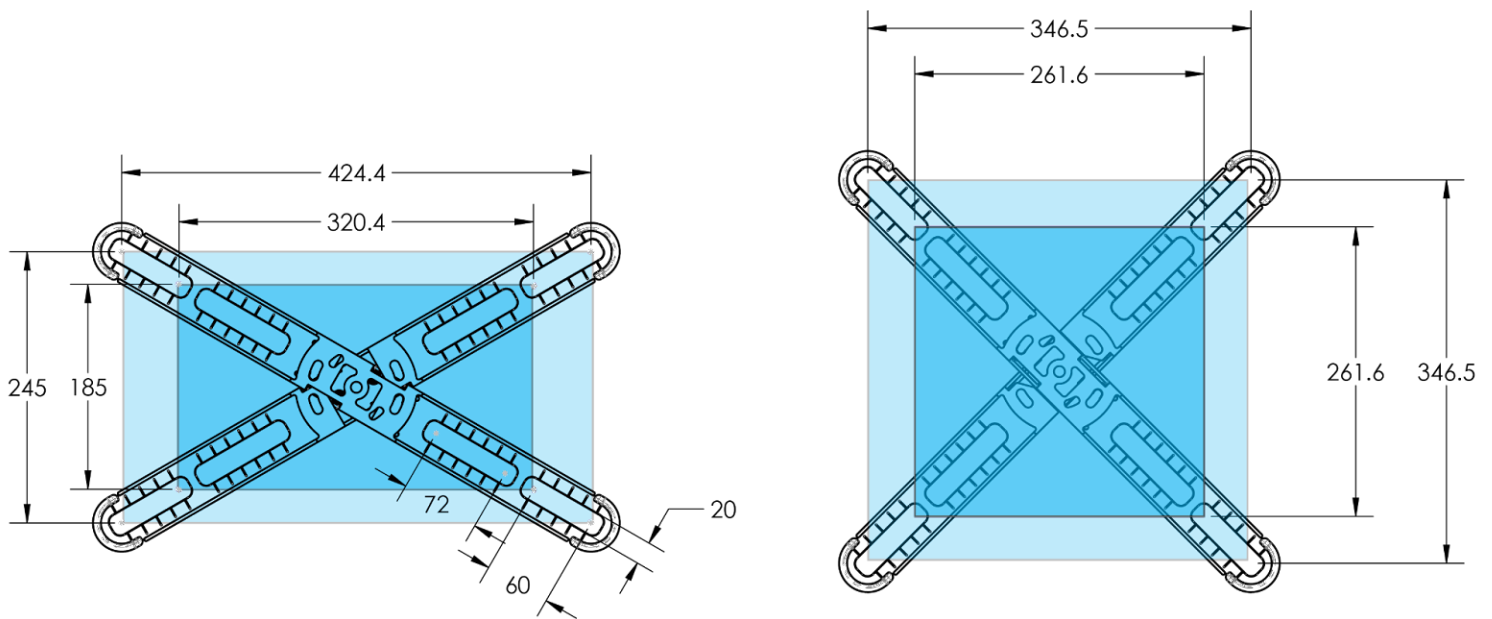


Fig. 5-4: Technical Dimensions of Large Suction Cup Brackets



5.15. Air Nodes

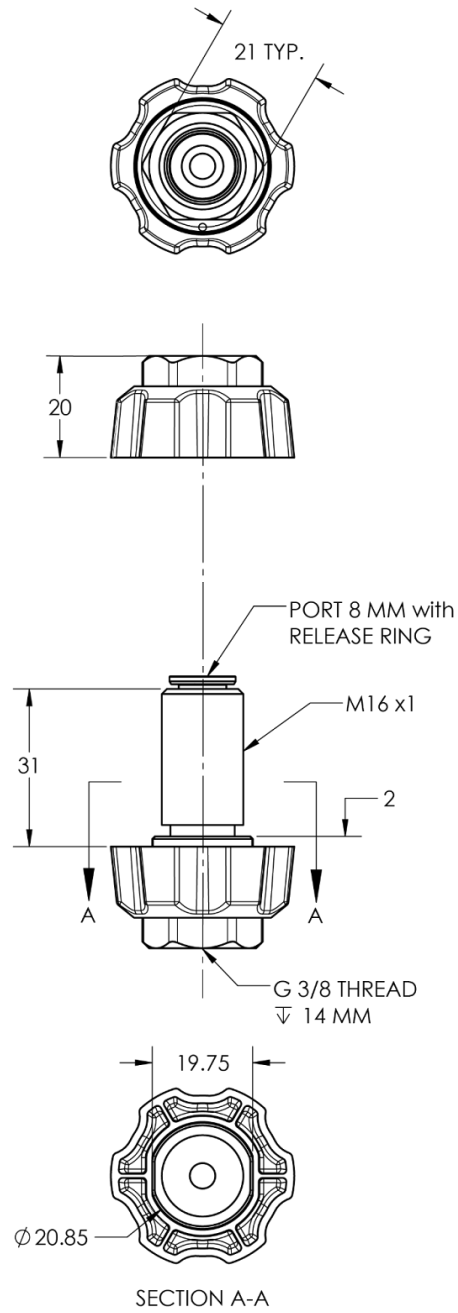


Fig. 5-5: Technical Dimensions of Air Nodes

5.2. Mechanical Specifications

5.2.1 PowerPick20 Vacuum Gripper

Specification	Value	
	Metric	Imperial
Energy source	Compressed air and electricity	
Gripper mass	See the Tool Center Point and Center of Mass section.	
Vacuum Generation Unit mass	6.7 kg	14.6 lb
Air tube to Vacuum Generator	12 mm OD	N/A
Air tube to Gripper	12 mm OD	N/A
Suction Cup Thread	G 3/8	3/8-19 BSPP
Gripping time	0.4 s	
Release time (with blow off)	0.15 s	
Minimal feed pressure	3 bar	435 psi
Optimal feed pressure for compressed air consumption	6 bar	87 psi
Maximal feed pressure	8 bar	116 psi
Maximal vacuum at optimal feed pressure	92%	
Air consumption at minimum pressure	282 lpm	10.0 CFM
Air consumption at optimal pressure	510 lpm	18.0 CFM
Air consumption at maximum pressure	564 lpm	19.9 CFM
Maximum vacuum flow at optimal feed pressure	376 lpm	13.3 CFM
Maximal acceleration in operating conditions	15 G ¹	
Maximal acceleration in emergency stop situations	3.5 G ¹	
Maximal payload ²	18.2 kg	40 lb
Noise level at optimal pressure	79 dBA	



Required media	Dry and filtered air as per ISO 8573-1 class 7.4.4
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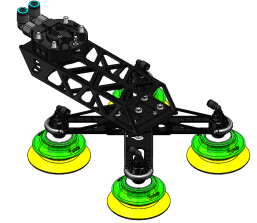
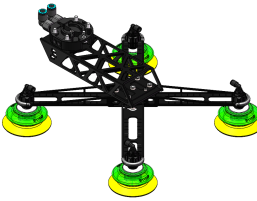

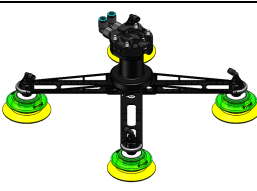

¹Includes gravitational acceleration.


²This value is only valid for the PowerPick20 Gripper used in conjunction with a UR20 robot. The payload may be limited by the robot used. Please refer to the user manual of the robot for additional information.

Table 5-1: Mechanical Specifications of the PowerPick20 Vacuum Gripper



5.3. Tool Center Point and Center of Mass

Configuration	Hollow Off-set Link	Suction Cup Bracket	Wrist extension	Center of mass (mm)			TCP (mm)			Mass (g)
				X	Y	Z	X	Y	Z	
	0 mm	Small	No	-6	0	57	0	0	117	1805
	0 mm	Large	No	-6	0	56	0	0	117	1963
	200 mm	Small	No	133	0	84	200	0	168	2429
	200 mm	Large	No	137	0	85	200	0	168	2587
	0 mm	Small	Yes	-5	0	122	0	0	217	2271
	0 mm	Large	Yes	-5	0	123	0	0	217	2428
	200 mm	Small	Yes	112	0	152	200	0	268	2895

	200 mm	Large	Yes	116	0	154	200	0	268	3053
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5.4. Electrical specifications

5.4.1 PowerPick20 Vacuum Generator

Specification	Value
Nominal supply voltage	24 VDC \pm 10%
Quiescent power (minimum power consumption)	0.7W
Peak current	200 mA
Hot swappable	Yes
ESD safe	No
Electrical connection	12-pole female M12 connector

Table 5-2: Electrical Specifications of the PowerPick20 Vacuum Generator

5.5. Control specifications

Specification	Value
Communication protocol options	Digital I/O
Feedback	Vacuum level (1-5V analog)
Object detection (grip check)	Yes, via vacuum level

Table 5-3: Control Specifications of the PowerPick20 Gripper



6. Maintenance

The maintenance operations presented in this section are for the average normal usage of the Robotiq PowerPick20 Vacuum Gripper. The maintenance intervals must be adjusted according to the environmental conditions such as:

- Operating temperature
- Humidity
- Presence of chemical(s)
- Presence of physical objects (debris, scraps, dust, grease etc.)
- Interaction with parts and objects (sharp or rough)
- Dynamics of the operation (e.g., accelerations).

The Vacuum Gripper only requires external maintenance with limited downtime. Following the maintenance interval will ensure :

- The correct functioning of the Vacuum Gripper.
- The validity of the warranty.
- The prescribed lifetime of the Vacuum Gripper.

Caution

- Unless specified, any repair work performed on the PowerPick20 Vacuum Gripper must be done by Robotiq.
- The warranty will be void if the PowerPick20 Vacuum Generator is opened by anyone other than a Robotiq employee.

6.1 Safety Measures

6.11 General Guidelines

Warning

Before performing maintenance operations, make sure that the system is turned off and de-energized, and that it cannot be accidentally turned on.

Caution

- Maintenance must only be carried by qualified and authorized service personnel.
- Refer to the **Safety** section for more safety instructions.

- All pneumatic tools and devices must be emptied before work.
- Always turn off and lock out electrical disconnect switches.



Caution

For maintenance on pneumatic components, install a lockout valve before connecting to the product.

Always lockout prior to performing maintenance on pneumatic components.

- Always inform the operator before performing maintenance operations and tag out the system.
- Secure the maintenance area with temporary barriers if needed.
- Clean the affected parts, especially the connections and fittings.
- If the dismantling of safety equipment is necessary, reinstall and inspect it immediately after completion of the maintenance work.
- Make sure to remove all tools and equipment after performing maintenance work to avoid ejecting or falling parts, material damage and bodily injury.
- Always verify fastener torque after performing maintenance work..
- Use only original spare parts.

6.2. Maintenance

The Vacuum Gripper only requires external maintenance with limited downtime.

Maintenance is required after specified usage, measured in cycles (workpiece pick-up and release) or use time (hours).

6.2.1 Cleaning of Suction Cups

Workspace conditions	Interval
Dirty	Daily
Normal	Monthly

Table 6-1: Suction cups cleaning frequency

- Clean the suction cups with warm water and soap. Remove all debris, dirt and dust from their surfaces.
- If wear is visible, replace the suction cups. See the **Spare Parts, Kits and Accessories** section.

6.2.2. Periodic Inspection

Operation	Interval
Visual inspection of the electrical cables and fixtures for excessive wear	Monthly
Visual inspection of the pneumatic tubing and fixtures for excessive wear	Monthly
Visual inspection of suction cups for cracks or damage	Every six (6) months



Table 6-2: Periodic inspection frequency

- Visually inspect the PowerPick Vacuum Gripper and pay attention to any visible damage or wear. If necessary, contact support@robotiq.com.
- If wear is visible on the suction cups, replace them. See the **Spare Parts, Kits and Accessories** section. If grip reliability is reduced or the grip time is increased (boxes are regularly dropped or vacuum level takes more time to be obtained, even if the rest of the elements are in good condition), replace the cups.
- If an air tube is crushed or kinked, replace it.

6.2.3. Fasteners

Inspect the fasteners on a monthly basis to make sure that all the bolts are tightened.

If necessary, tighten the fasteners according to the torque values specified in the table below.

Designation	Location	Torque	
		Metric	Imperial
M8 x 125 Socket Head Cap Screw with captive spring washer	Robot wrist	16 Nm	118 lb-ft
	Hollow offset link	16 Nm	118 lb-ft
	Wrist Extension	16 Nm	118 lb-ft
M8 x 1.25 shoulder screw	Robot wrist	16 Nm	118 lb-ft
M8 x 1.25 Socket head hex cap screw	Suction cup brackets	8 Nm	5.9 lb-ft

Table 6-3: PowerPick20 Gripper Fastener Torque Settings



7. Spare Parts, Kits and Accessories

Item	Description	Ordering number
PowerPick20 Vacuum Gripper Standard Kit	PowerPick20 Vacuum Gripper Kit: - 1 x PowerPick20 Vacuum Generation Unit <ul style="list-style-type: none"> • 1 x Vacuum Generator • 1 x Mounting bracket & Filter-regulator assembly • 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 PowerPick20 Gripper Unit <ul style="list-style-type: none"> • 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 8 mm air tubes (275 mm) • 1 x 12 mm double air tube (3.63 m) • 1 x Tools and hardware for installation on UR20 	VAC-POWERPICK20-KIT
PowerPick20 Gripper Offset Kit	PowerPick20 Gripper "X" Offset Kit1: - 1 x 200 mm Hollow Offset Link - 4 x M8 x 20 mm socket head cap screws with captive spring washer - 2 x 8 mm air tubes (275 mm) - 2 x 8 mm air tubes (475 mm)	VAC-POWERPICK20-XOFFSET-KIT
PowerPick20 Wrist Extension Kit	PowerPick20 Wrist Extension "Z" Offset1: - 1 x 100 mm Wrist Extension	VAC-POWERPICK20-ZOFFSET-KIT



	- 4 x M8 x 20 mm socket head cap screws with captive spring washer	
PowerPick20 Vacuum Generation Unit	PowerPick20 Controller Unit that includes ² : - 1 x PowerPick20 Vacuum Generator - 1 x M12-12 pin I/O cable	VAC-POWERPICK20-CTRL-UNIT
PowerPick20 Gripper Unit	PowerPick20 Gripper Unit ³ : - 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 8 mm air tubes (275 mm) - 1 x 12 mm double air tube (3.63 m) - 1 x Tools and hardware for installation on UR20	VAC-POWERPICK20-GRP-UNIT
75 mm suction cups	Kit of 4 suction cups that includes: - 4 x Piab 75 mm (1.5 bellows) - 4 x 3/8 BSPP threaded adapters	VAC-CUP-PIAB-75MM-G38-KIT-4

¹ This SKU does not contain the PowerPick20 Gripper Unit or the PowerPick20 Vacuum Generation Unit.

² This SKU does not contain the PowerPick20 Gripper Unit or the mounting bracket & filter-regulator assembly.

³ This SKU does not contain the PowerPick20 Vacuum Generation Unit.

Table 7-1: PowerPick20 Spare Parts, Kits and Accessories



8. Troubleshooting

Symptom / Issue	Cause	Solution
The boxes are not picked or dropped reliably	The vacuum level at the suction cups is not at the right level.	Validate that the PowerPick20 vacuum generator input pressure is at the right level. If needed, increase it to 7 bar (100 psi).
		Verify that the suction cups are in good condition. If needed, clean them (please refer to the Maintenance section). If wear is visible, replace them (please refer to the Spare Parts, Kits and Accessories section).
		Verify that there is no air leak in the circuit between the PowerPick Controller and the suction cups.
		Verify that the air path and manifold are clean and not obstructed.
Nothing happens when the vacuum and/or blowoff is activated	There must be an electrical or pneumatic issue	Make sure the wires are correctly connected (please refer to the Electrical Installation section).
		Verify that the feed air pressure is at least 3 bar (43.5 psi)

Table 8-1: PowerPick20 Troubleshooting Guidelines



9. Warranty

9.1 Conditions

Robotiq covers the PowerPick20 and all its components against defects in material and workmanship for a period of one (1) year from the date of reception, when utilized as intended. Robotiq also guarantees that the equipment will meet applicable specifications under normal use.

The warranty applies under the following conditions:

- Compliance with the operating and storage conditions specified in the **Environmental and Operating Conditions** section.
- Compliance with the installation specified in the **Installation** section and the following subsections.
- Compliance with the maintenance specified in the **Maintenance** section.
- Compliance with the recommended values specified in the **Specifications** section and in the **Electrical specifications** section.

9.2 Warranty

The warranty applies until one of these conditions is reached, whichever comes first:

- one (1) year
- 2 000 000 opening and closing cycle count for each valve. Once one of the valves reaches the count, the warranty is not applicable anymore.

Info

Cycle count definition: One cycle count is defined as the activation of the component, which in this case is creating and releasing the vacuum.

During the warranty period, Robotiq will repair or replace any defective PowerPick and any of its components, as well as verify and adjust the equipment free of charge if it needs to be repaired or if the original adjustment is erroneous. If the equipment is sent back for verification during the warranty period and found to meet all pertaining specifications, Robotiq will charge standard verification fees. If the PowerPick feedback necessary for the robot program is not accessible, the unit is considered defective.

9.3. Warranty Void and Exclusions

The warranty will become void if:

- The unit has been tampered with, repaired or worked on by unauthorized individuals.
- The screws and hardware, other than as explained in this guide, have been removed.
- The unit has been opened other than as explained in this guide.



- The unit serial number has been altered, erased, or removed.
- The unit has been misused, neglected, or damaged.

This warranty is in lieu of all other expressed, implied, or statutory warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Robotiq shall not be liable for damages resulting from the use of the PowerPick, nor from special, incidental, or consequential damages. Robotiq shall also not be responsible for any failure in the performance of other items to which the PowerPick and any of its component is connected or the operation of any system of which it may be a part.

This warranty excludes failure resulting from: improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the PowerPick and any of its components or other factors beyond Robotiq's control. It also excludes all consumable parts, such as suction cups, and their normal wear.

Robotiq reserves the right to make changes in the design or construction of any of its products at any time without incurring any obligation to make any changes whatsoever on units already purchased.



10. Harmonized Standards

The standards listed in the table below were followed, as far as applicable, for the design and production of the Robotiq PowerPick Vacuum Gripper.

Standard	Year	Description
ISO 12100	2010	Safety of machinery — General principles for design — Risk assessment and risk reduction
ISO 9409-1	2004	Manipulating industrial robots – Mechanical interfaces – Part 1: Plates
ISO 4414	2010	Pneumatic fluid power – General rules and safety requirements for systems and their components
IEC 61000-6-2	2016	Generic standards – Immunity standard for industrial environments
IEC 61000-6-4	2018	Generic standards – Emission standard for industrial environments

Table 10-1: PowerPick20 applicable standards



11 Appendix

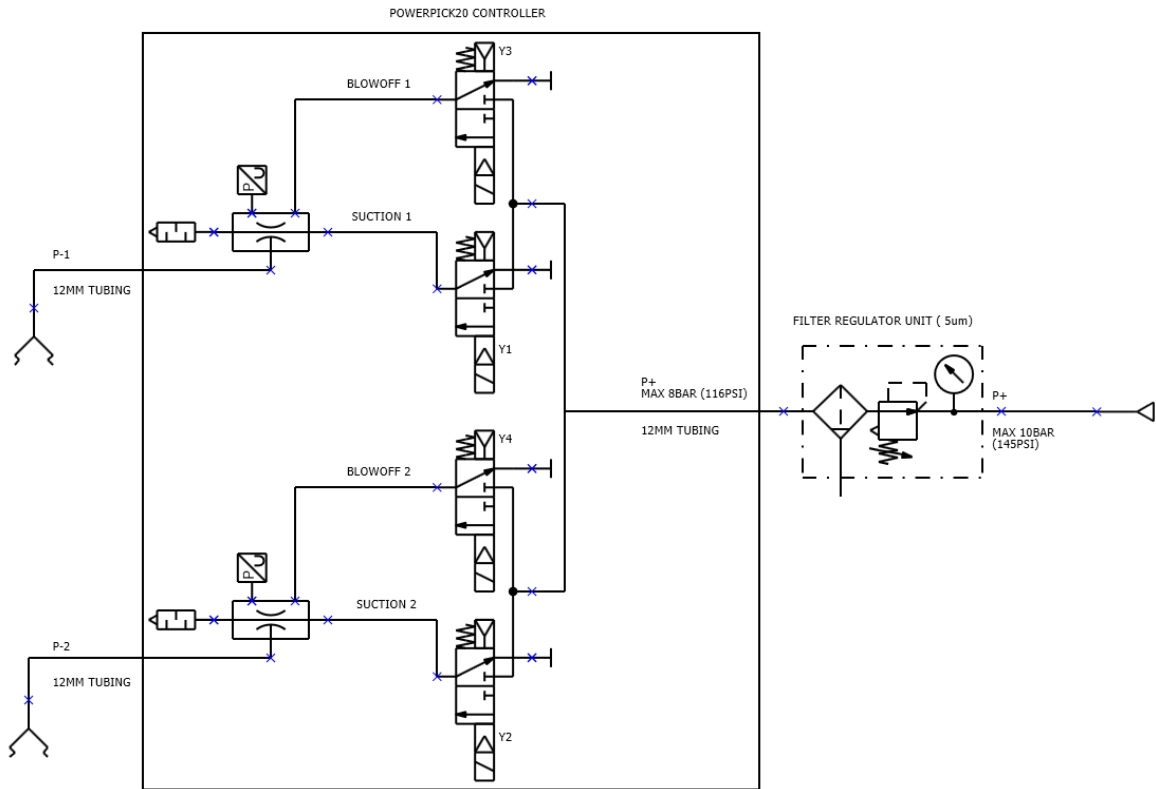


Fig. 11-1: Pneumatic Scheme of PowerPick20 with the Filter-Regulator

12. Contact

www.robotiq.com

Contact Us

Phone

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