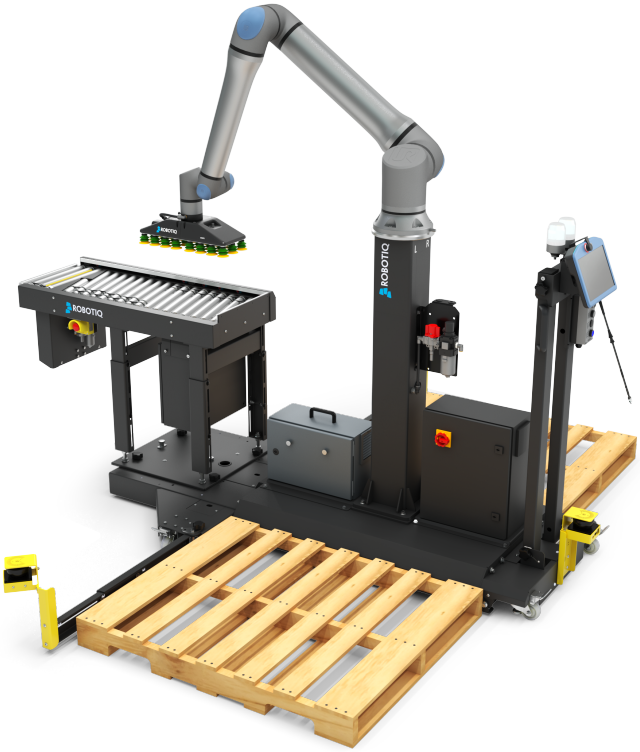


ROBOTIQ

PAL Ready

Original instructions (en)

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Scope and Version Information

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Applicability	This manual applies to all PAL Ready solutions.

If your product's serial number is not included in the applicability defined above, please refer to the documentation available at http://robotiq.com/support to locate the correct manual for your product.

Important Notice:

Robotiq may modify this product or this document without prior notice when required by product improvements, design changes, or specification updates. When such modifications occur, the document's Version, Status, Applicability, and Revision information will be updated accordingly. Always consult these sections to ensure you are using the correct and current documentation. The most up to date version of this manual is available at robotiq.com/support.

Electrical schematics are updated independently of this manual. The diagrams and related information included here may differ from your specific hardware. To ensure you have the correct version, please visit support.robotiq.com and search for the electrical schematic associated with your Robotiq Control Panel's serial number (SN).

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 robotiq.com/support.

2026/06/09

Initial release.

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

1. General Presentation

The terms "Palletizer", "Palletizing Solution", "Robotiq Palletizing Solution", "Solution" and "PAL Ready" used in this manual all refer to the Robotiq PAL Ready Solution for UR20 Universal Robots. The Robotiq PAL Ready Solution is a hardware and software solution preconnected and ready to install. It is composed of a base fully integrated with a Robotiq control box, pallet sensors, a pedestal, and a post with a teach pendant rack and status lights. The standard delivery also contains the Robotiq Mobility Kit, and the Robotiq PowerPick Multi Vacuum Gripper. The Material Handling Copilot software and accessories (e.g., box sensor, anchor kit, cable management system, etc.) are also part of the Solution.



CAUTION

This section presents the key features of the Robotiq PAL Ready Solution and must not be considered as sufficient knowledge to operate the Solution. Each feature is detailed in the appropriate section.

1.1. PAL Ready Solution Components

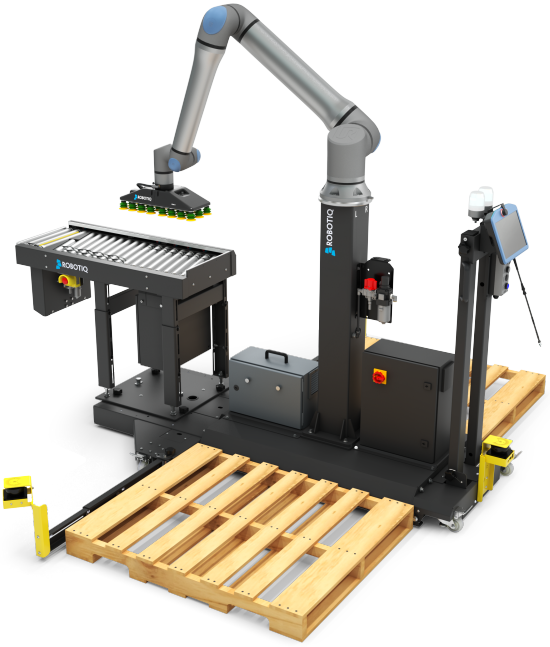


Fig. 1: Robotiq PAL Ready Solution

1. **PE20 Palletizing Solution**

The PE20 Palletizing Solution is composed of a base, on which a pedestal, pallet sensors and Robotiq control box are mounted. The Solution is designed to facilitate the positioning of pallets. For more details, please refer to the PE20 user manual at robotiq.com/support.

2. **Mobility Kit**

- **Robotiq Smart Infeed 100**

The Robotiq Smart Infeed 100 is an intelligent infeed system that supplies cases to the Robotiq Palletizer. It uses a pneumatic gate to control the flow of boxes and angled rollers to ensure they are consistently positioned. Integrated photoelectric box sensors and control system detect each box's position, simplifying its integration with the robot.

- **Infeed Base**

The Infeed Base is designed for movement and stability, incorporating two leveling casters for securing and maneuvering the PE20. This section is configured to integrate the Robotiq Smart Infeed 100.

- **Operator Station Base**

The PE20 Mobility Kit is equipped with an operator station base. This base includes the operator station itself and two leveling caster wheels for precise positioning. The operator station also serves as the primary means for maneuvering the PE20 system.

- **Leveling Caster Wheels**

Leveling caster wheels allow quick switching between fixed and mobile positions using a foot lever. The front casters are swiveltype, while the rear casters are fixed, making the docking to the end of a production line easier.

- **Safety Scanners (optional)**

This component actively detects personnel within a designated safety zone. Depending on your risk assessment (e.g., above certain speeds), this detection system may be a required feature.

3. **PowerPick Multi**

PowerPick Multi is a vacuum gripper that uses a venturi system to generate vacuum from a compressed air energy source. The PowerPick Multi interfaces with the robot via input/output (I/O) cables connected to the robot wrist and the robot controller. The kit consists of a gripper with suction cups, and an integrated vacuum generator. The unit also includes a shut-off valve and an integrated filter regulator. Its design is suitable for the Robotiq Palletizing Solution when used with a UR20 robot (weight, payload, independently controllable channels).



Fig. 1-1: PowerPick Multi Vacuum Gripper - Standard Configuration

4. **UR20 Robot (not provided by Robotiq)**

2. Safety



WARNING

Failure to follow these safety guidelines can result in serious injury or damage to the equipment. Read this section carefully before installation or operation.

2.1. Disclaimer

The intent of this section is to provide general guidelines for the safe use of the Robotiq PAL Ready Solution.

Always follow local regulations.

The installer is responsible for the safe installation and commissioning of the PAL Ready Solution.

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 terms user, operator and installer, refer to anyone responsible for any of the following operations on the Robotiq PAL Ready Solution:

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

The present section is based on the following international standards and technical specifications:

ISO 10218-1:2011: Safety Requirements For Industrial Robots - Robots

ISO 10218-2:2011: Safety Requirements For Industrial Robots - Robots Systems and Integrators

IEC 60204-1: Safety Of Machinery - Electrical Equipment Of Machines

ISO/TS 15066:2016: Robots and robotic devices – Collaborative robots

This manual details the components of the Robotiq PAL Ready Solution, and the general operations regarding the whole lifecycle 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.

2.2. General Safety



DANGER

A collision between a person and the Solution may result in material damage, bodily injury and even death. Make sure anyone working around the Palletizing cell takes all necessary precautions:

Before starting the machine, make sure there is enough clearance around the Palletizer and make sure no one is in the work area of the Solution.

During palletization, it is possible to access the cell from all sides. The customer has to assess the risks accordingly.



WARNING

The user must have read and understood all of the instructions in the following manual before operating the Robotiq PAL Ready Solution. Any use of the PAL Ready Solution in non-compliance with these instructions is deemed inappropriate and may result in material damage, bodily injury or death.

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



WARNING

Unauthorized Modification

DO NOT modify or alter the equipment without the express written consent and approval of the manufacturer.

- Only trained and authorized personnel should install, operate, or service the PAL Ready Solution.
- Keep the area around the Solution clear of obstructions.
- Never wear loose clothing, jewelry, or long hair that could get caught in moving parts.
- Ensure all safety guards and covers are in place before operation.
- Always wear safety shoes when operating the solution.

2.3. Manutention Safety

- The Infeed Module weighs75 kg (165 lb) and requires lifting equipment to move it.
- The Smart Infeed 100 deck weighs 62 kg (137 lb) and requires lifting equipment to move it.

2.4. Mechanical Safety

- **Pinching hazard:**
  - **Do not** place fingers near the caster locking mechanism or between the machine and the floor while lowering the unit onto its casters.
- **Tipping hazard:**
  - **Never** use equipment that could cause the solution to be tipped over in the event of a nearby collision (e.g., a forklift). If a forklift must be used, ensure it is operated safely and by a qualified operator to prevent any risk of it being tipped over.
  - The Robotiq Smart Infeed must always be installed on the mobility kit to ensure stability. Never replace it with another infeed.
- **Crushing hazard:**
  - **Do not** operate on sloping ground.
  - **Always** operate the caster locking mechanism using your feet and wear safety shoes.
  - **Always** lock the Teach Pendant adjustment mechanism before moving the solution.

2.5. Electrical Safety

- All electrical connections must be made by a qualified electrician in accordance with local codes.Always unplug the Palletizing Solution before moving.
- Always check that no cables are pinched when performing adjustment on the Solution.
- Disconnect and lock out all power sources before performing any maintenance or service.
- Verify that the supply voltage matches the voltage specified on the product's rating plate.
- Be aware of the possible residual energy after turning off an electrical device with large capacitive components. Wait the appropriate amount of time before working on the device.
- Secure the work area with temporary barriers and a warning note. Secure the main switch with a padlock to prevent unauthorized switching on.
- Use only isolated tools in the corresponding voltage level.
- Use only fuses with specified cut-off current and appropriate dielectric strength.
- Unauthorized changes to electrical components can lead to increased sensitivity to interference, and increased interference emission. As a result, safety components may be impaired.



CAUTION

Follow the 5 electrical engineering safety rules when working on electrical equipment:

1. Disconnect completely.
2. Secure against reconnection.
3. Make sure there is no voltage.
4. Perform grounding and short-circuiting.
5. Provide protection against adjacent live parts.

2.6. Pneumatic Safety

- Lock pneumatic inlet valve before doing any service.
- The maximum permissible pressure of all pneumatic components must never be exceeded (10 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 pressure can occur due to power failure or air supply interruption.
- Beware of the pneumatically powered gate. There is a risk of pinching.
- Protective eyewear is recommended when handling pneumatic equipment.

2.7. Emergency Stop



WARNING

The Robotiq Palletizer does not feature a dedicated emergency stop button (e-stop). Instead, the PAL Ready Solution relies on the emergency stop button located on the robot's teach pendant. Additionally, an emergency stop button is installed on the Smart Infeed 100 conveyor. When activated, the E-Stop halts all movement, including that of the connected robot.

It is essential to ensure that all operators are trained on how to stop the solution in the event of an emergency.

Depending on the supply source, when the emergency stop button is pressed, the following consequences may occur. The user has the responsibility to perform a risk assessment and choose the appropriate option.

Supply Source	Behavior
Robot Control Box Supply (any 24 V terminal)	The Vacuum Gripper is powered on. • An object is detected: the vacuum level will continue to be regulated and the object will not be lost. Note: the PowerPick Multi gripper connects to the robot control box supply.
Robot tool supply (tool connector)	Power failure to the Vacuum Gripper. • The vacuum level will drop to ambient pressure and the object will be lost. It is not recommended to connect the Vacuum Gripper to the tool connector.

For more information, refer to section 2 of the Robotiq PE20 Palletizing Solution instruction manual and to section 2 of the Robotiq Smart Infeed 100 instruction manual.

2.8. Operational Safety



CAUTION

Tripping Hazard: If the option with safety scanners is chosen, avoid unnecessarily crossing the scanner support arms if no pallet is present. If the solution is not in use, return the arms to the transport position to prevent them from posing a tripping hazard.

The Robotiq and Smart Infeed 100 control boxes generate heat during operation. Internal components of the control boxes may reach high temperatures. Do not open the control boxes while in operation or immediately after operation. You can cool down the components by powering it off and waiting one hour. Refer to UR20 user manual for information related to Robot and robot controller hot surfaces.

For more information, refer to section 2 of the Robotiq PE20 Palletizing Solution instruction manual and to section 2 of the Robotiq Smart Infeed 100 instruction manual.

2.9. Robot Risks



WARNING

All personnel working with and around the robot must be informed of the inherent risks and safety instructions.

To avoid being pinched or crushed when the robot moves toward a stationary object, always keep a minimum distance of 500 mm between the robot reach (or UR safety plane) and any stationary object like safety fences.

To avoid being pinched or crushed when the robot moves toward the floor, always keep a minimum distance of 300 mm.

To avoid being pinched or crushed between the robot (or gripper) and walls or peripherals, always keep a minimum distance of 500 mm after the operation zone.

Those values aforementioned are taken from standard EN 13854:2019 (Minimum gaps to avoid crushing of parts of the human body). The installation must maintain the minimum distances specified in this standard.

- For more information, refer to the robot's instruction manual.
- Robots move quickly and exert high force. A program interruption or stop can be followed by rapid and dangerous movements.
- Even a programmed robot can be affected by external signals and make unexpected movements. Therefore, when entering the work area, all safety instructions must be observed.
- Robot teaching, robot programming and software modification may only be performed by competent and authorized personnel.
- Changes to the robot's safety settings may only be made by competent and authorized personnel. The changes must be verified and documented.
- Reducing the speed and acceleration of the robot reduces the risks as it:
- Gives the operator more time to react appropriately.
- Reduces the robot's braking time.

	**WARNING** Reducing the robot's speed does not reduce the risk of pinching or crushing. Even at its slowest speed, the robot movements can cause material damage and bodily injury.

2.9.1. Movement Without Power Supply

	**DANGER** If a person has been trapped by the robot arm, make sure that attempting to free the person does not aggravate an injury or further increase the risk of injury.

In the case of an undesired event (malfunction, emergency, blockage, etc.), power loss or unwanted power surge, you can refer to UR robot manual for robot forced back-driving.

Performing forced back-driving requires high force and cannot be performed by one person alone. In clamping situations, two or more people are required to do the forced back-driving. In some situations, two or more people are required to disassemble the robot arm if necessary.

	**WARNING** Moving the robot arm manually is intended for urgent/emergency procedures and service purposes only. Do not move the joint more than necessary, not more than 160 degrees, to ensure the robot can find its original physical position.

	**CAUTION** Attempting to release a joint brake manually may cause material damage and bodily injury.

For more information, refer to the robot's instruction manual.

2.10. Cyber Risk

- The customer must provide a safe firewall connection to avoid unauthorized remote control of the robot.
- The customer must set a password to avoid unauthorized access to the robot safety configurations.
- The customer must update PLC firmware when available to maintain the safety of its system.

Refer to the safety section of the Palletizing PE20 and the Robotiq Smart Infeed instruction manuals for details concerning noise level.

2.11. Noise Level

- Smart Infeed noise level is <70 dBa. With the PowerPick Multi Gripper operating at the optimal pressure level, the noise level at the workstation is 79 dBA. For more information, refer to the Specifications section of the PowerPick Multi user manual, available at robotiq.com/support).
- Hearing protection is recommended.
- Make sure that all local safety measures and regulations are met.
- Noise levels should be measured regularly under normal operating conditions.

Refer to the safety section of the Palletizing PE20 and the Robotiq Smart Infeed instruction manuals for details concerning noise level.

2.12. Residual Risks

For the intended use of the robot system, measures have been taken to prevent personal injury and property damage. Nevertheless, residual risk remains in certain situations.

2.13. Use of the Solution

2.13.1. Intended Use



CAUTION

The emergency stop function is intended for use in emergency conditions and not for stops in normal conditions.

The Robotiq PAL Ready Solution is engineered exclusively for palletizing operations in conjunction with the Robotiq Copilot URCap. It must not be used for any other application, nor operated without the appropriate version of the Robotiq Copilot URCap. Moreover, the robot program should primarily make use of the Robotiq Palletizer node. While other robot motion nodes can be used in conjunction with the Palletizer node, any robot joint acceleration must not exceed 165 deg/s² and tool linear acceleration must not exceed 1.7 m/s².

Only use the Solution in its original condition without making unauthorized modifications. Only use the Solution if it is in perfect technical condition.

The Solution is intended to be used with a UR20 robot from Universal Robots. DO NOT install any robot other than the Universal Robots UR20 on the solution.

Always comply with local, state, province and federal laws, regulations and directives, and always operate the Solution in compliance with automation safety and general machine safety guidelines.

Do not use the Solution to handle boxes containing hazardous substances. Should hazardous substances be handled by the Solution, perform a risk assessment that accounts for such substances.

2.13.2. Misuse



WARNING

The Robotiq PAL Ready Solution must be used exclusively within its specified technical limits and only for palletizing tasks in combination with the appropriate version of the Robotiq Copilot URCap. Any deviation from these requirements is considered improper, unintended, and unsafe, and may result in equipment damage, loss of functionality, serious bodily injury, or death. Robotiq assumes no responsibility or liability for any consequences arising from improper or unsafe use of the Solution.

Any use of the Solution other than that described in this manual is considered a misuse and should be avoided. Misuse of the Solution includes but is not limited to the following situations.

Integration misuse:

- Use of the Solution with a robot other than a UR20.
- Use of a payload higher than the robot's maximum payload.
- Use of the Solution outside of the environmental and operating conditions. Operational misuse:
- Standing on the pallet.
- Operation of the Solution by inexperienced or untrained staff members.
- Manual placing or adjustment of a box on the pallet while the Solution is in operation.

Misinstallation



WARNING

Impact / Crush Hazard

Failure to properly set all the robot safety parameters according to the Installation section of the current manual may result in material damage, bodily injury or death.

Improper Moving of the Solution



WARNING

Tip Over Hazard

Failure to follow directions of the Moving and Positioning the Solution section and/or the Solution Mobility (Wash Down and Production Line Shifts) section of the current manual may result in material damage, bodily injury or death.

Maintenance and Repair



WARNING

During maintenance, inspection, cleaning and repair work, make sure that the Solution electrical power and air supply are turned off, deenergized and cannot be accidentally turned on again.

Maintenance and repair work should only be carried by qualified and authorized service personnel.

After maintenance and repair work, make sure to remove all tools and equipment to prevent ejected or falling parts, material damage or bodily injury.

All pneumatic tools and devices must be emptied of compressed air before maintenance and repair work.

All electric tools and devices must be safely isolated before maintenance and repair work.

Always inform the operator before performing maintenance or repair work. Notify a supervisor and lock out/tag out the machine to prevent users from turning on and using the system. Enforce local safety regulations.

If necessary, secure the maintenance and repair area with temporary barriers.

Before performing repair work, clean the affected parts, especially the connections and fittings.

Install the Solution in a safe position. Depending on the maintenance and repair work to carry out, parts may come loose and cause injury.



WARNING

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

Do not bring electrical components into contact with cleaning agents. Electrical components should only be cleaned when the Solution is turned off and de-energized.

- After having performed maintenance, service or repair work, verify screw torque and adjust accordingly if required.
- If the dismantling of safety equipment is necessary before performing maintenance or repair work, the equipment must be reinstalled and assessed immediately after completion of said work.
- Use original spare parts exclusively.
- Perform preventive maintenance, inspection and cleaning work at regular intervals according to the Periodic Inspection and Maintenance section.



WARNING

During maintenance, there is an increased risk of accident due to the parts, tools and equipment used in and around the Solution area.

- Slip, trip and fall hazards can be avoided by maintaining order and cleanliness in the workplace.
- For work in elevated positions (500 mm and more), fall protection equipment must be installed and used.
- When dismantling or replacing machine parts in elevated positions (500 mm and more), suitable lifting devices should be used.

2.13.3. Final Application

Expected System Behavior in Normal Operating Conditions.

	NOTICE
	Category 0 Stop: Stops the Solution by immediate removal of power. Category 1 Stop: A controlled stop of the Solution. Power is removed when the stop is achieved. Category 2 Stop: A controlled stop of the Solution. Power is still available once the stop is achieved. Please refer to IEC 60204-1 for additional information on stop categories.

Normal mode: The palletizer continuously fills pallets when no human operator is in the vicinity of the palletizing cell.

Safeguarded operation

Reduced mode: The palletizer continuously fills pallets, even when an operator enters the palletizing cell. The operator can safely remove a filled pallet or place a pallet in an empty slot. The system will not start to palletize on an empty pallet unless the operator has pressed the “Confirm pallet(s) ready” button. To obtain this behavior, the “Confirm pallet(s) ready” checkbox in the Installation tab must be ticked. Also, to allow cell access to the operator, a complete risk assessment must be performed, and additional parameters must be set (which include, but are not limited to: robot speed, robot force, safety planes, guardrails).

Separation monitoring mode: The system stops when a human operator enters the vicinity of the palletizing cell to manipulate a filled pallet, place a pallet in an empty pallet slot, troubleshoot the system or any other operation requiring human intervention. In such a state the robot will maintain a Category 2 stop. When the safeguards are removed, the system resumes operation in Normal mode.

The system enters emergency stop mode when the emergency stop button is pressed. The following table indicates which stop category corresponds to each operation mode.

Operation Mode	Robot		
	Force (N)	Power (W)	Speed (mm/s)
Normal Mode (Up to Safety Limits)	Up to 400N	Up to 1000	Up to 2500
Robot Stop (Protective Stop)	Stop Category 2		
Safeguard Stop	Stop Category 2		
Emergency Stop	Stop Category 1		
Reduced Mode	Please refer to the Universal Robots user manual for more details.		

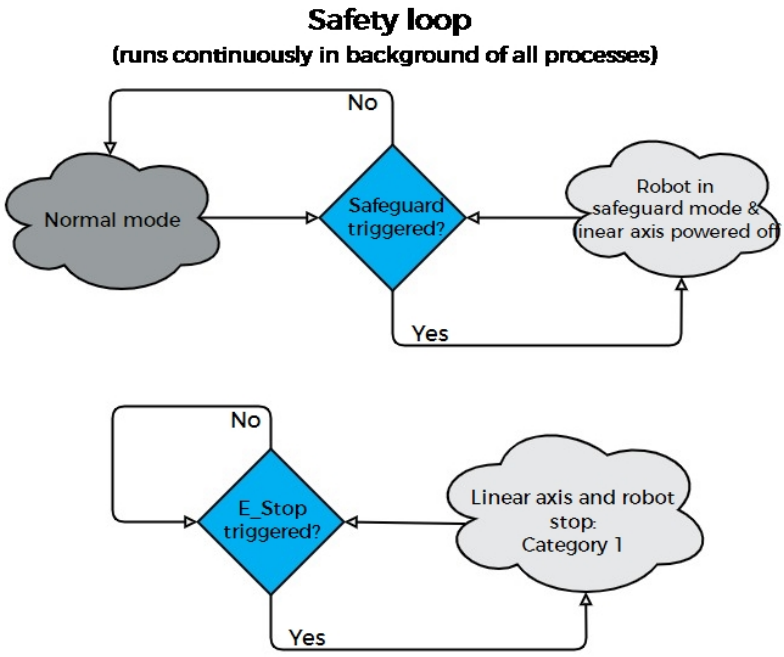


Fig. 2-1: Safety Logic Diagram

WARNING

After a collision or an emergency stop, an inspection of the Solution must be performed before resuming the use of the machine. Special attention must be given to the pedestal, the cable management system, and the gripper components. Please contact support@robotiq.com if any sign of damage is detected.

3. Product Specifications

3.1. Technical Dimensions

3.1.1. Mobility Kit

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

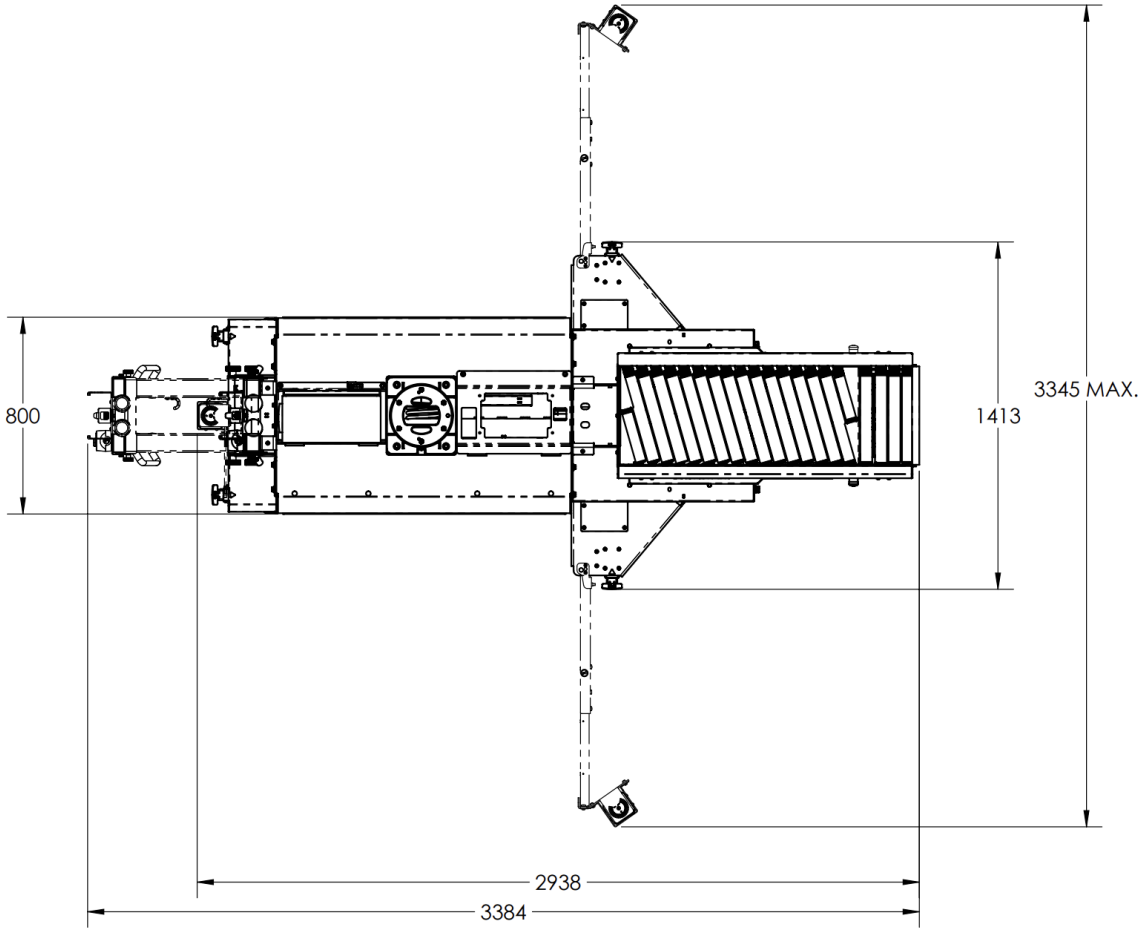


Fig. 3-1: Robotiq PE20 Mobility Kit - Top View 0° Configuration

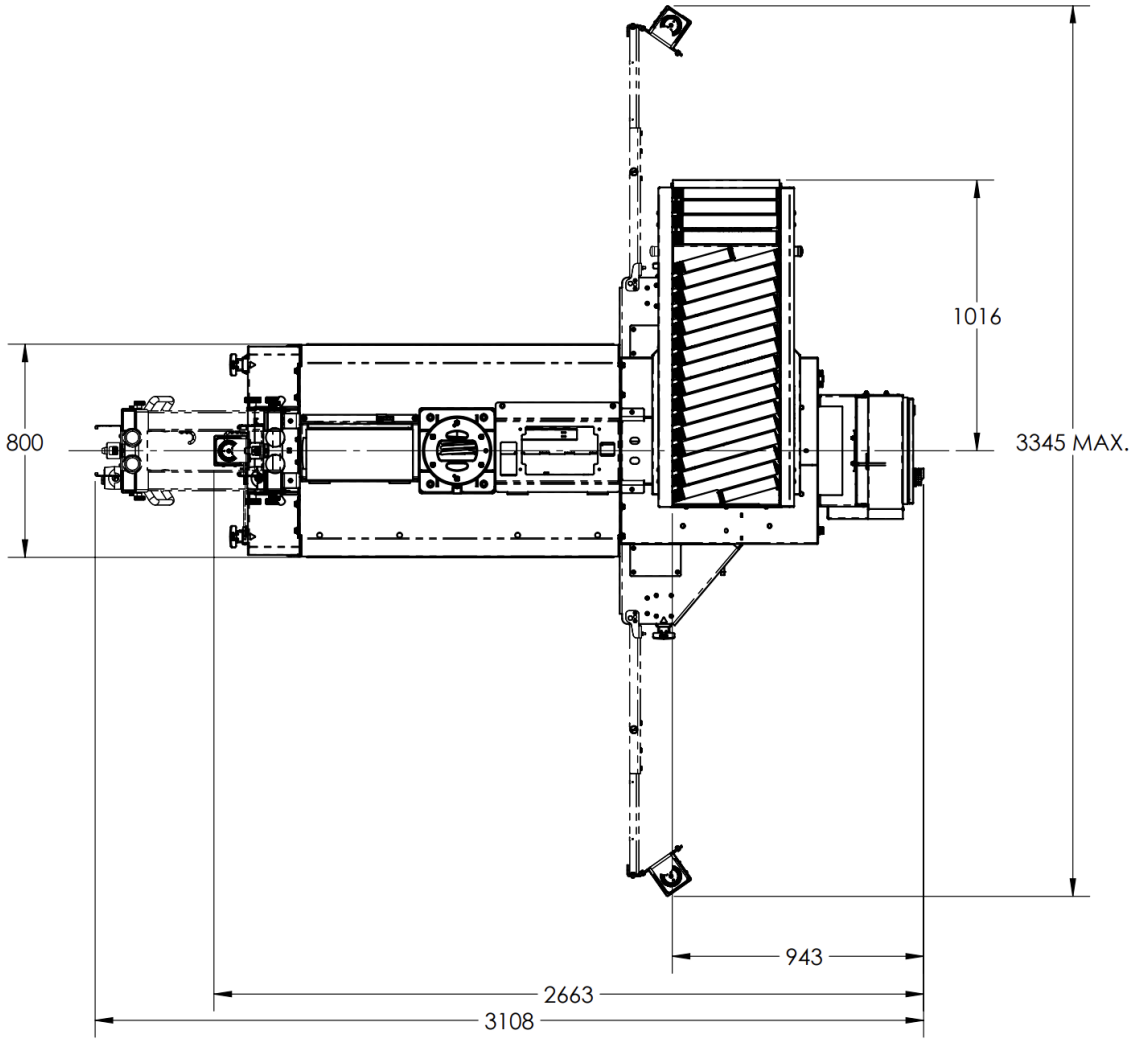


Fig. 3-2: Robotiq PE20 Mobility Kit - Top View 90° Configuration

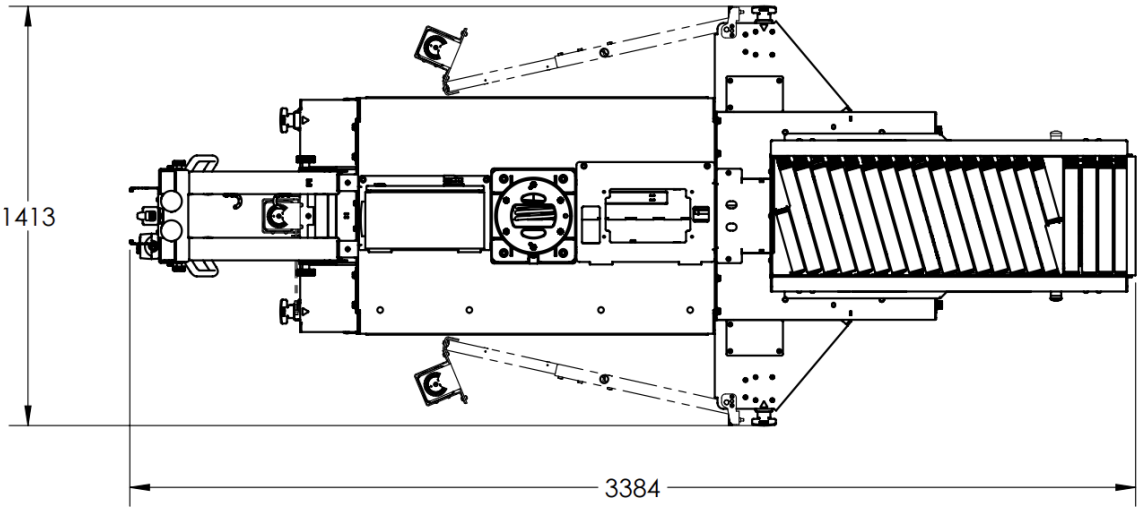


Fig. 3-3: Robotiq PE20 Mobility Kit - Top View - Mobile Configuration

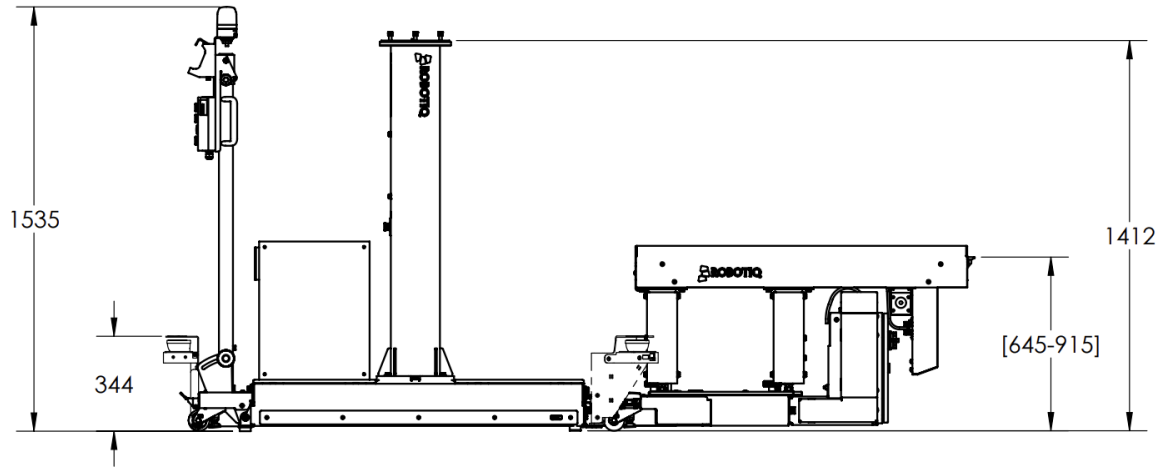


Fig. 3-4: Robotiq PE20 Mobility Kit - Lateral View

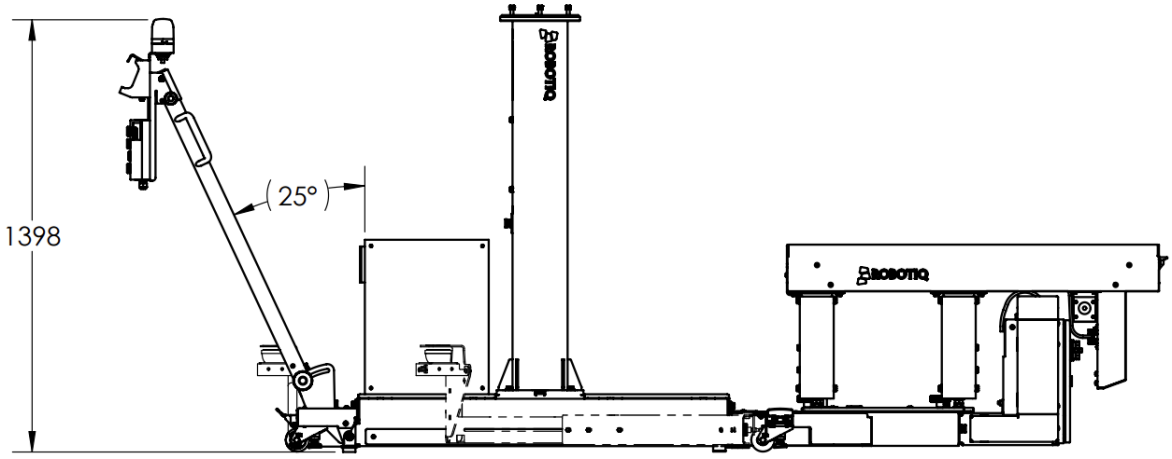


Fig. 3-5: Robotiq PE20 Mobility Kit - Lateral View - Mobile Configuration

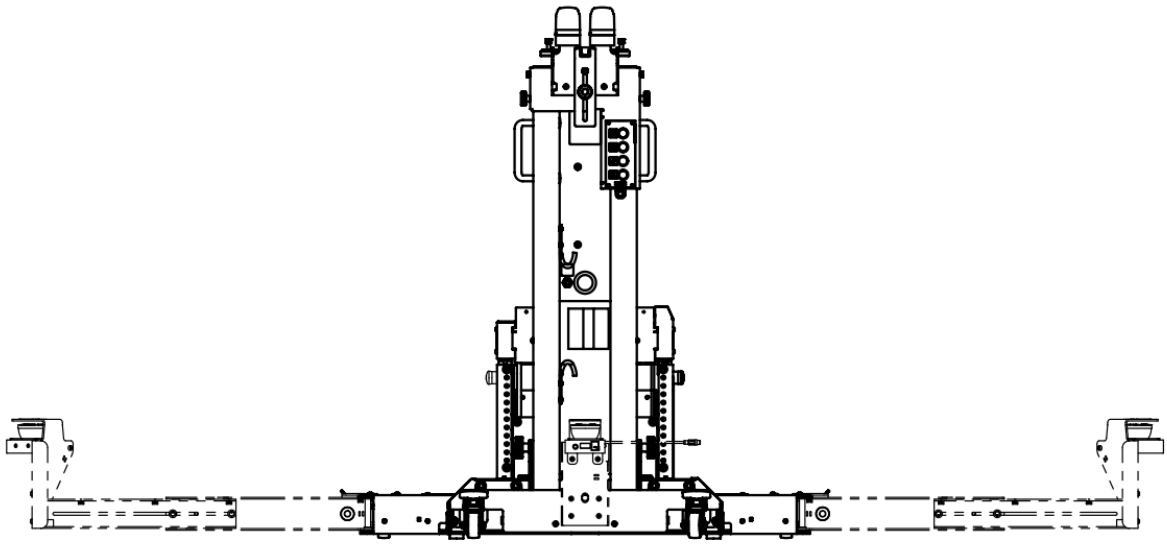


Fig. 3-6: Robotiq PE20 Mobility Kit - Front View

3.1.2. Smart Infeed 100

For the technical dimensions of the Smart Infeed 100, please refer to the Technical Dimensions section of the PowerPick Multi user manual, available at support.robotiq.com.

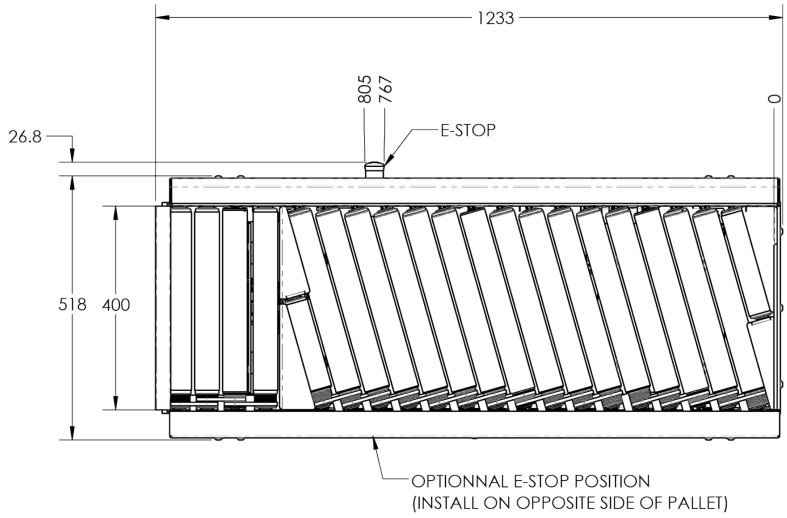


Fig. 3-7: Robotiq Smart Infeed 100 - Top View

3.1.3. PowerPick Multi

For comprehensive information regarding the PowerPick Multi Vacuum Gripper, please refer to the dedicated user manual available at robotiq.com/support.

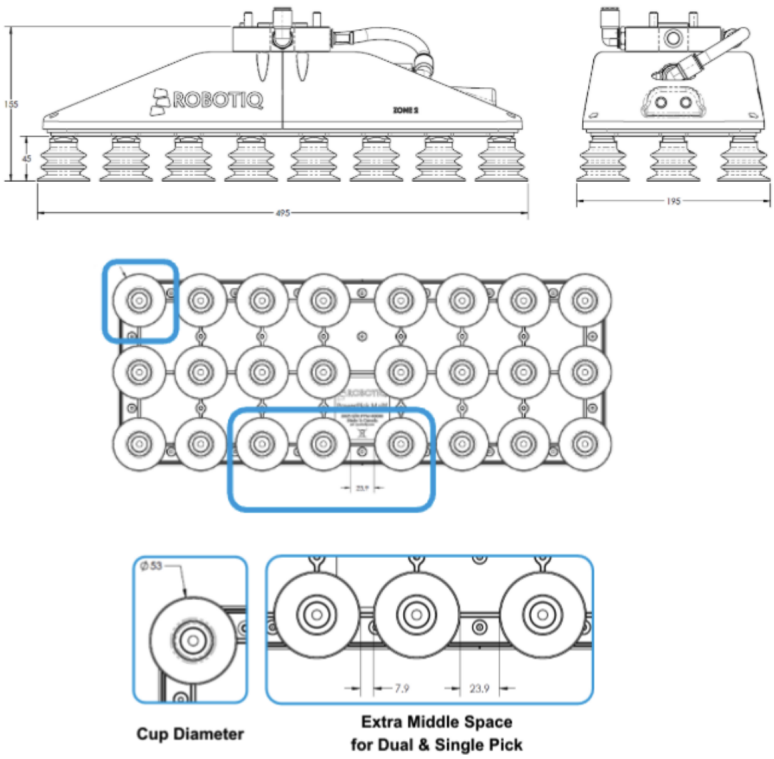


Fig. 3-8: PowerPick Multi - Standard Configuration

3.2. Mechanical Specifications

3.2.1. Combined for PE20, UR20 and Smart Infeed 100

Specification	Value	
	Metric	Imperial
Product Weight (total weight including UR20)	493 kg	1,085 lb
Smart Infeed Height Range (from floor)	645 to 915 mm	24.4 to 36 in
Shipping Weight (net weight)	Crate 1 (Kit): 265 kg Crate 2 (PE20): 154 kg	Crate 1 (Kit): 583 lb Crate 2 (PE20): 339 lb
Shipping Crate Dimensions (PAL Ready, without robot) (L x W x H)	Crate 1 (Kit): 92 mm x 1534 mm x 1296 mm Crate 2 (PE20): 924 mm x 1496 mm x 905 mm	Crate 1 (Kit): 36½ in x 62 in x 51 in Crate 2 (PE20): 36½ in x 59 in x 35⅝ in
Maximum Air Supply Pressure	10 Bar	145 psi
Picks / Minute	Up to 13	

Table 3-1: Mechanical specifications of the PE20 Mobility Kit

*The specifications for robot limits are located in **Installation** section in the Table 1-1: Mechanical Specifications - Speed.

3.2.2. PowerPick Multi Vacuum Gripper

For comprehensive information regarding the PowerPick Multi Vacuum Gripper, please refer to the dedicated user manual available at robotiq.com/support.

Specification	Value	
	Metric	Imperial
Suction Cup Thread	G 1/4	1/4-19 BSPP
Gripping Time	0.14 s	
Release Time (with blow off)	0.04 s	
Minimum Feed Pressure	3 bar	43.5 psi
Optimal Feed Pressure for Compressed Air Consumption	6.5 bar	94.3 psi
Maximum Feed Pressure	8 bar	116 psi
Maximum Vacuum at Optimal Feed Pressure	92%	
Air Consumption at Minimum Pressure	276 lpm	9.75 CFM
Air Consumption at Optimal Pressure	476 lpm	16.81 CFM
Air Consumption at Maximum Pressure	542 lpm	19.14 CFM
Maximum Vacuum Flow at Optimal Feed Pressure	392 lpm	13.84 CFM
Maximum Acceleration in Operating Conditions	1.5 G	
Maximum Acceleration in Emergency Stop Situations	3.5 G	
Maximum Payload PowerPick Mult (Double Bellow Suction Cups / Default Config)	UR20 = 20,72 kg	UR20 = 45.68 lb
Noise Level at Optimal Pressure	79 dBA	
Required Media	Dry and filtered air as per ISO 8573-1 class 7.4.4	

3.3. Electrical Specifications

3.3.1. Combined for PE20, UR20 and Smart Infeed 100

Specification	Value
Nominal Supply Voltage	100-240 Vac 50-60 Hz
Nominal Current	12.7A at 120V 6.5A at 240V
Typical Current Consumption	4.1A at 120V 2.3A at 240V
Cable for Client Connector	M12 A-Coding, 5-Positions, Male
Client Connector Max Voltage	250Vac/dc
Client Connector Max Power 24 Vdc	140W (ohmic load)
Client Connector Max Current 250Vac	3A (AC15)

Table 3-2: Electrical Specifications of the PE20 Mobility Kit

3.3.2. PowerPick Multi Vacuum Gripper

For comprehensive information regarding the PowerPick Multi Vacuum Gripper, please refer to the dedicated user manual available at robotiq.com/support.

Specification	Value
Nominal Supply Voltage	24 VDC ± 10%
Quiescent Power (minimum power consumption)	0.7 W
Peak Current	200 mA
Hot Swappable	Yes
ESD Safe	No
Electrical Connection	12-pole Female M12 Connector

3.3.3. Robotiq Control Box

Parameter	Specification
Operating supply voltage	100 VAC to 240 VAC 60/50 Hz
Current consumption (excluding robot)	2.2 A (100 VAC) 1.9 A (120 VAC) 1.1 A (230 VAC) 1.1 A (240 VAC)
Current consumption (with UR20 robot and 20 kg payload)[1]	8.3 A (100 VAC) 6.9 A (120 VAC) 3.6 A (230 VAC) 3.4 A (240 VAC)

Table 3-3: Electrical specifications of the Robotiq control box.

[1]Measured values. May depend on modifications made by Universal Robots.



WARNING

The Robotiq control box is CE marked and cCSAus certified. Any modification will void the certification.

3.3.4. Universal Robots Controller

Refer to the UR20 user manual for more details about connections to the UR control box.

4. Installation

4.1. Before Installation

This section will guide you through the installation and general setup of the Robotiq PAL Ready Solution.

Before installation:

- This section will guide you through the installation and general setup of the Robotiq PAL Ready Solution. Before installing:
- Read and understand the safety instructions related to the PAL Ready Solution. Refer to the Safety section.
- 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.
- Always wear all recommended personal protective equipment in accordance with the safety standards of the workplace, including but not limited to:
  - Safety glasses
  - Hearing protection
  - Hard hats
  - Steel-toe boots
- Always use proper safety measures when working with tools that have sharp edges, pinching surfaces, or heat sources.
- Always lift heavy objects with the legs, not the back. Ask for help or find alternative solutions if a heavy object cannot be lifted by a single person.



CAUTION

Only trained and authorized personnel should install, operate, or service the PAL Ready Solution.

4.2. Scope of Delivery

Standard upon delivery of Robotiq PAL ready (SOL-PAL-READY-UR):

- 1 x PE20 pedestal base including:
  - 1 x Mechanically welded assembly
  - 1 x Control Box (PLC)
  - 2 x Pallet sensors
  - 2 x Status lights
  - 1 x Cable management system
- 1 x PowerPick Multi Vacuum Gripper kit including:
  - 1 x PowerPick Multi Vacuum Gripper
  - 24 x Vacuum Cup 52mm BX52P
  - 1 x Air Tube Set to fit UR30
  - 1 x Tool and hardware for installation on UR20
- 1 x Gripper Pneumatic accessories kit (valve, regulator, filter)
- 1 x Material Handling Copilot software dongle license
- 1 x PE20 Mobility Kit
  - 1 x Infeed Base
  - 1 x Operator Station Base
  - 1 x Smart Infeed - Mobility Version
  - 1 x Smart Infeed pneumatic accessories kit (valve, regulator, filter)

The SOL-PAL-READY-UR-3-SCAN SKU includes the following additional items:

- 1 x PE20 Safety Package for Mobility Kit
  - 2 x Safety scanner pivoting arms
  - 1 x Front safety scanner bracket
  - 3 x Safety scanners
  - 1 x Safety Relay

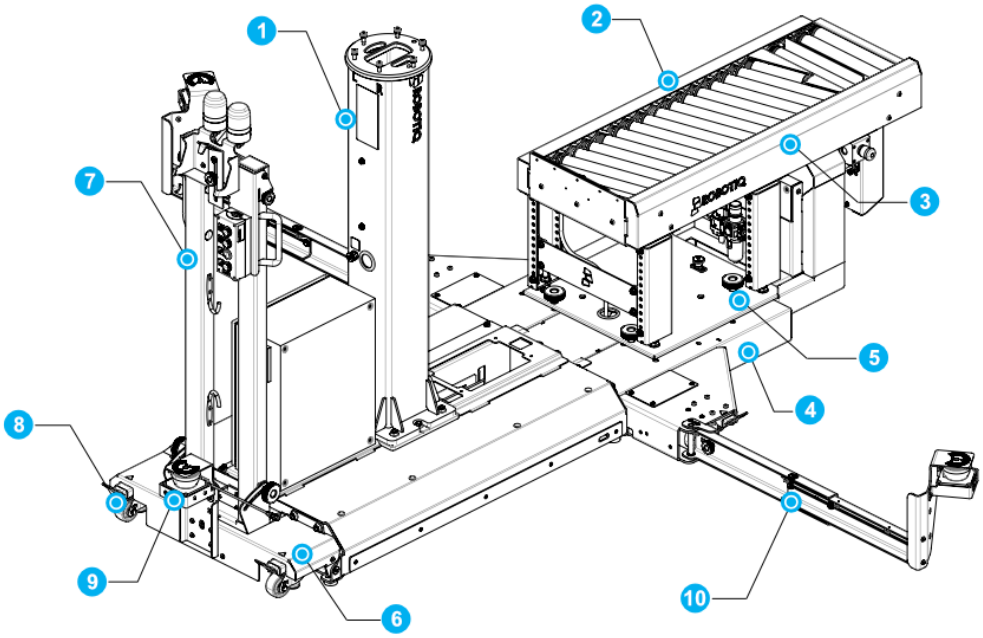


Fig. 4-1: Components of the Robotiq PAL Ready Solution

1. PE20 Palletizing Solution
2. Robotiq Smart Infeed 100
3. Infeed Deck
4. Infeed Base
5. Infeed Positioning Plate
6. Operator Station Base
7. Operator Station
8. Leveling Caster Wheels
9. Safety Scanners (Optional)
10. Scanner Arms (Optional)
11. PowerPick Multi
12. UR20 Robot (not provided by Robotiq)

4.3. Required Tools and Equipment

The following tools are required to install the PAL Ready solution.

Not Included:

- Drill (PH2 bit)
- Lifting Equipment
- Measuring Tape
- Cutter
- Utility Knife
- Level Tool
- Medium-strength Threadlocking Compounds
- Adjustable Torque Wrench
- Phillips Screwdriver (PH3)
- Flat Screwdriver (2.0 mm)
- 13 mm Hex Socket & Wrench
- 15 mm Hex Socket & Wrench
- 16 mm Hex Socket & Wrench
- 17 mm Hex Socket & Wrench
- 18 mm Hex Socket & Wrench
- 22 mm Hex Socket & Wrench
- 24 mm Open End Wrench
- 4 mm Hex Key
- 5 mm Hex Key
- 8 mm Hex Key
- 10 mm Hex Key

4.4. Environmental and Operating Conditions

Attribute	Value
Minimum Storage/Transit Temperature	-25 °C [-13 °F]
Maximum Storage/Transit Temperature	55 °C [131 °F]
Minimum Operating Temperature	0 °C [32 °F]
Maximum Operating Temperature	40 °C [104 °F][1]
Humidity (Non-Condensing)	35-85% RH
IP Rating (PowerPick Multi)	IP2X
Food / Clean room / Intrinsic Safety (IS)	Not compatible
Dust and Water	• **Dust:** Affect maintenance intervals • **Water:** Not compatible
Other	• Free from corrosive liquids or gases • Free from explosive liquids or gases

Table 4-1: Environmental and operating conditions of the Robotiq Palletizing Solution

[1]At ambient temperatures above 35°C, the palletizer may operate at reduced speed and performance.

Contact Robotiq Support for more information.



CAUTION

Use of the Robotiq PAL Ready Solution is not recommended in presence of chemicals.

4.5. Air Supply: Compressed Air Supply System to PowerPick Multi Gripper with Integrated Vacuum Generator

Compressed air must be supplied to the PowerPick Multi Gripper Compressed Air Input according to the technical specifications. For maintenance and other purposes, it is recommended to install a lockout valve before connecting the product.

The air supply tubing must be connected and disconnected to or from, the PowerPick Multi Compressed Air Input, only when the line is depressurized.

When the line is pressurized, the air supply tubing must be securely connected to the PowerPick Multi Gripper Compressed Air Input with the provided safety clip.

Air supply can be routed through the base and secured to the pedestal. Please refer to the Mounting and Installation section and to the Pneumatic Diagram section.

4.6. 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, activate the vacuum Gripper to release the pressure.

4.7. Mechanical Installation



CAUTION

DO NOT install this equipment without having read and understood the Robotiq PAL Ready 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. Make sure to follow all safety rules and regulations of the workplace. Always wear all recommended personal protective equipment in accordance with workplace safety standards.

4.7.1. Visual Inspection

The Robotiq PAL Ready Solution is shipped on pallets, protected from the elements by wooden crates.

The PE20 crate weighs 154 kg (339 lb), and the Mobility Kit crate weighs 265 kg (583 lb). Due to this weight, a forklift or pallet truck operated by qualified personnel is required for transport.

Before disassembling, inspect the crates for any signs of damage or defects. If any issues are found, please contact Robotiq support immediately at support@robotiq.com.

4.7.2. Crates

A minimum of two people is recommended to perform the following steps.

	WARNING
	The transport, lifting, and moving of the Robotiq PAL Ready Solution should be performed by qualified and authorized personnel. Failure to do so may result in material damage, bodily injury or death.

Transport the crates to the designated working space using the forklift or pallet jack.

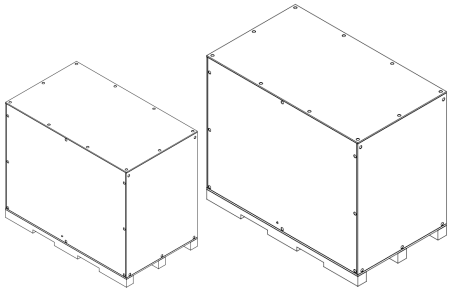


Fig. 4-2: PE20 Crate (smallest) and Mobility Kit Crate (biggest)

4.7.3. PE20 Uncrating

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

b. Inspect the unit for shipping damage and confirm all components listed on the packing slip are present. Report any damage or missing parts to Robotiq support at robotiq.com/support.

c. Remove the cardboard boxes from the shipping crate and open the box containing the accessory kits.

d. Cut and remove the strapping material.

e. 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.

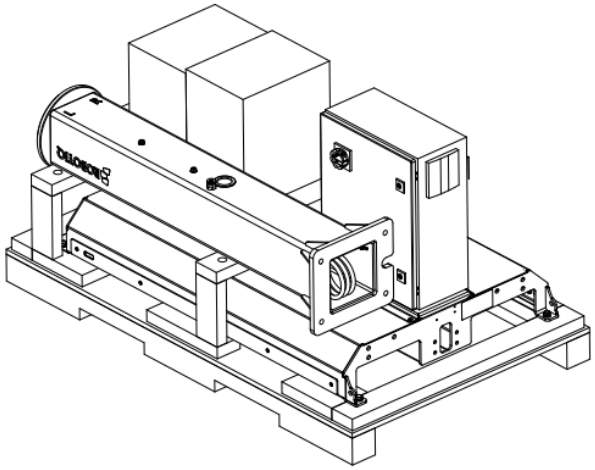


Fig. 4-3: PE20 Crate (Open)

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 (smaller connector) and approximately 700 mm (28 in) on the bottom side (larger connector). Do not insert the cable in the pedestal.

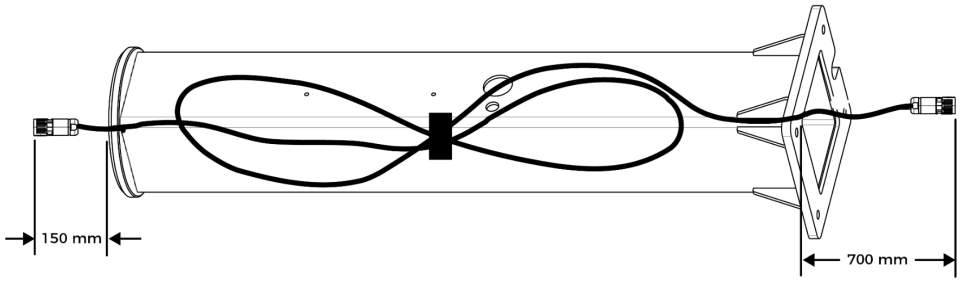


Fig. 4-4: UR20 Cable Inside the Pedestal

b. Use a 17 mm wrench to remove the screw securing the top plate of the pedestal to the crate.

c. Remove the pedestal from the crate. It is recommended to use proper hoisting equipment to perform this operation.

CAUTION

The weight of the pedestal is approximately 54 kg (119 lb).

d. Place the pedestal on a piece of cardboard to prevent damaging the unit.

CAUTION

Make sure that the pneumatic tube and the ground cable located inside the base of the pedestal are not pinched during this operation.

e. Remove the screws that hold the wooden frames to the crate.

f. Remove the wooden frames.

g. 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.

h. Use a forklift to lift the base from the aisle side (i.e., the side where the Robotiq control box is located).

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

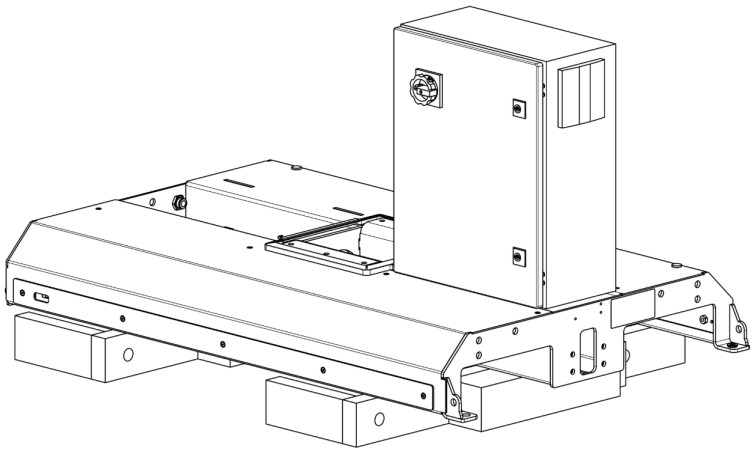


Fig. 4-5: PE20 Base - L-Shaped Aluminum Brackets

4.7.4. PE20 Installation

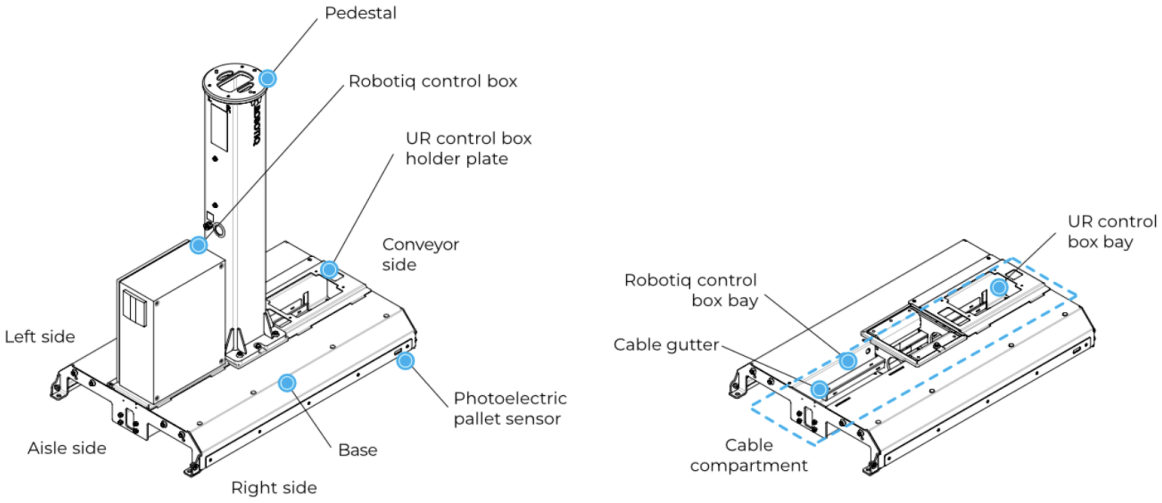


Fig. 4-6: PE20 - Components

Pedestal and Base Installation

a. Use a sling from your lifting equipment, and run it through the openings on the flange of the pedestal, as shown in the figure.



Fig. 4-7: Sling to Lift the Pedestal

b. Using hoisting equipment, lift the pedestal vertically so that it stands above the base.

c. 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.

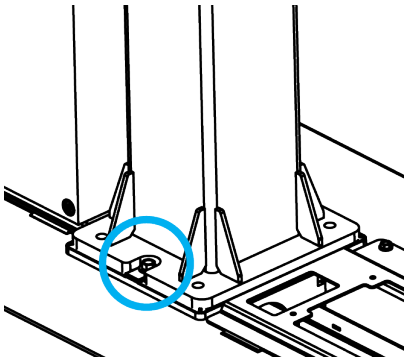


Fig. 4-8: Pedestal Installation - Alignment

d. 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).

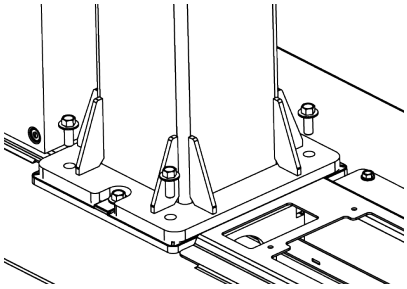


Fig. 4-9: Pedestal Installation - Securing

Robot Installation

a. Insert the robot cable into the pedestal, ensuring the smallest connector is positioned upward.

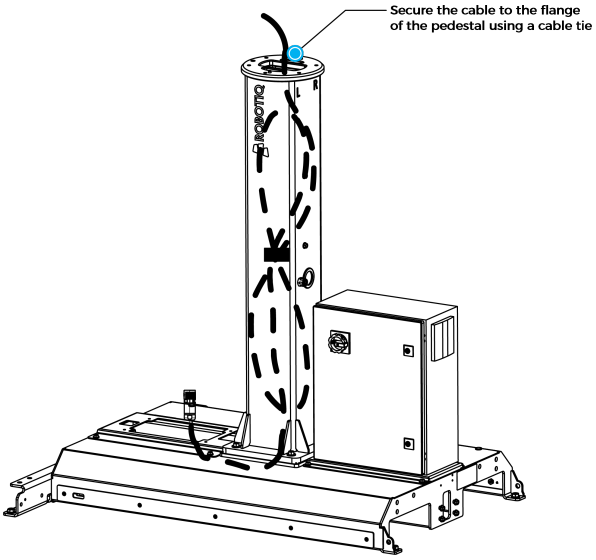


Fig. 4-10: Robot Cable Position

b. Secure the wrapped cable loop to the pedestal flange from the exterior using a cable tie.

c. Locate the rubber plug provided in the robot packaging and use it to seal the aperture typically reserved for the robot pigtail cable in the base.

d. Using appropriate hoisting equipment, lift the robot and position it over the pedestal, following the guidelines in the UR20 manual.

e. Connect the cable to the robot prior to completing the mounting on the pedestal flange; subsequently, remove the cable tie that was applied during the second step.

f. 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).

g. Secure the robot base using the six (6) M10 x 30 screws and the six (6) serrated Belleville washers. Apply a torque of 45 Nm (as of May 2026; always consult the UR20 user manual to verify current specifications). Make sure that the convex part of the washer is at the bolt end of the assembly.

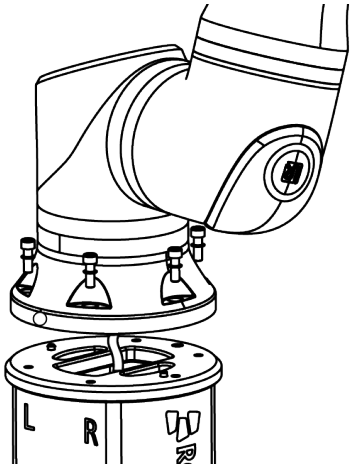


Fig. 4-11: Robot Connection and Mounting

UR Control Box Installation

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

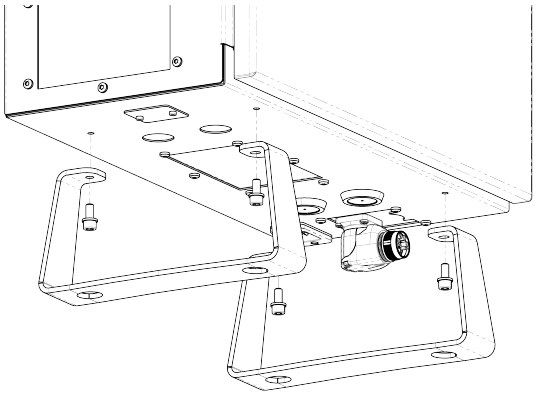


Fig. 4-12: UR Controller - Remove Legs

b. Disconnect the UR teach pendant connector and remove it from the UR control box (refer to the UR20 manual).

c. On the Palletizing Solution base, remove the two (2) M8 x 20 hex cap screws securing the UR control box support plate.

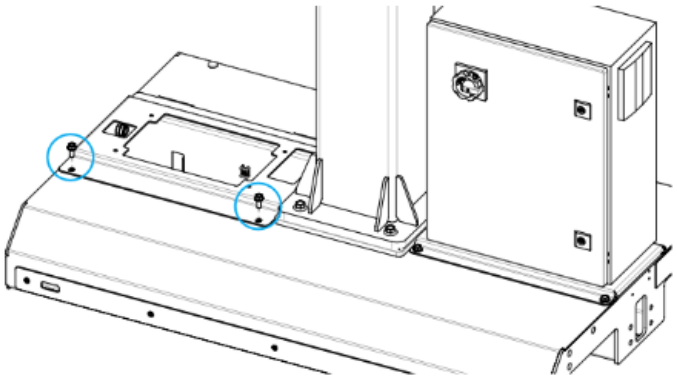


Fig. 4-13: Support Plate Screws Removing

d. While lifting the plate, open and close it to detach it from the base.

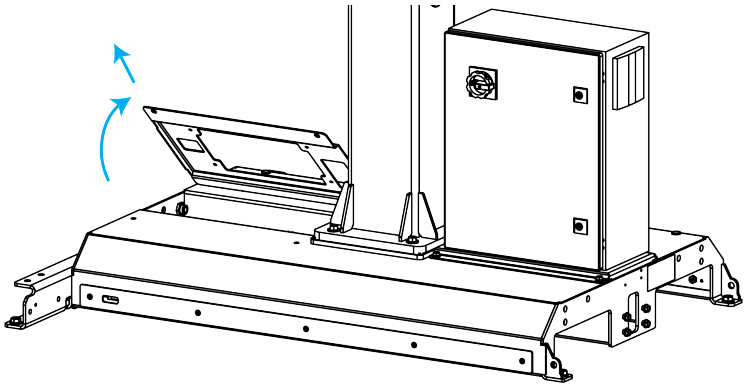


Fig. 4-14: Detaching Support Plate From the Base

e. Using the four (4) screws previously removed from its legs, mount the UR control box onto the support plate. Ensure the cabinet door is positioned on the side opposite the retaining tabs.

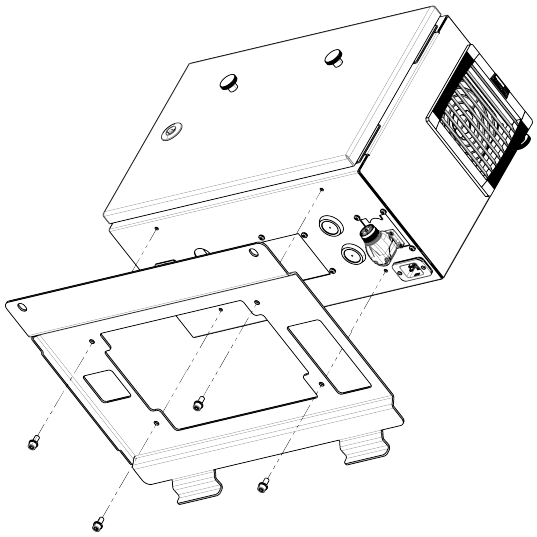


Fig. 4-15: UR Control Box Mounting onto Support Plate

f. Align the retaining tabs with their respective cutouts, then tilt the control box back and forth until the hinging mechanism is fully reassembled.

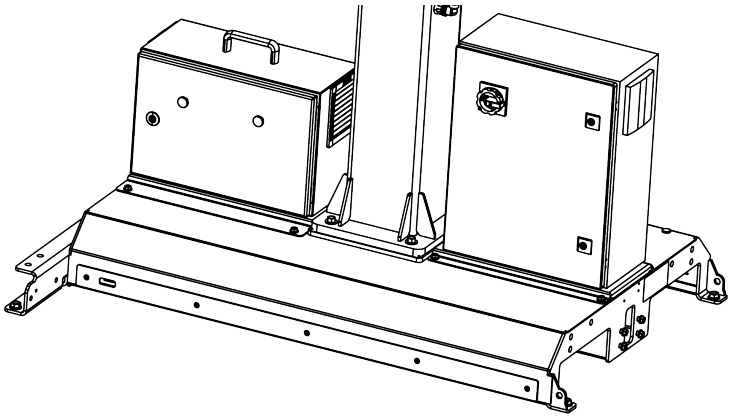


Fig. 4-16: UR Controler - Final Installation

4.7.5. Mobility Kit Uncrating

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

b. Inspect the unit for shipping damage and confirm all components listed on the packing slip are present. Report any damage or missing parts to Robotiq support at robotiq.com/support.

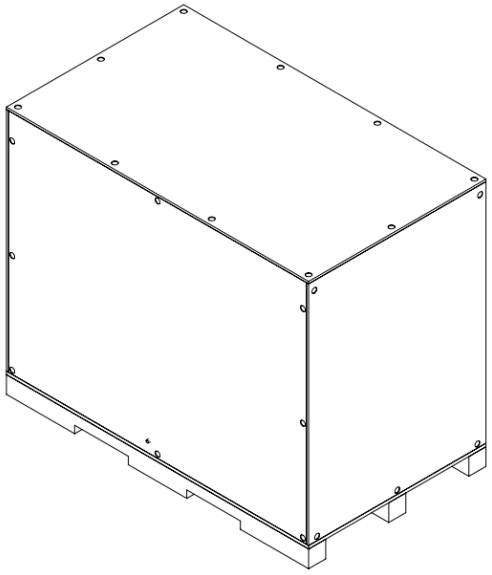


Fig. 4-17: Crate of the Robotiq PE20 Mobility Kit

c. Keep the straps securing the Smart Infeed Deck in place. All other straps should be removed.

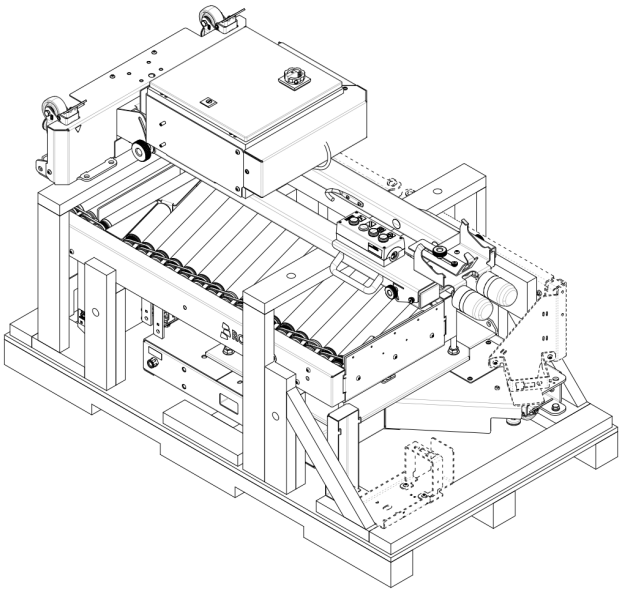


Fig. 4-18: Crate of the Robotiq PE20 Mobile Kit - Side Panels Removed

d. Carefully remove all components from the crate, following the order specified in the subsequent steps. Be sure to securely store all hardware boxes and bags, as these materials will be required later.

- Remove the Smart Infeed 100 control box.
- Remove the Operator Station by unscrewing the two (2) screws fixing it to the crate.

	CAUTION
	When laying it on the floor, ensure no stress is placed on the status lights.

- Remove the highest trestles to gain access to the remaining components.
- Remove the Smart Infeed Control Box support bracket.
- If included, remove the Safety Scanner by unscrewing the two (2) screws securing it to the crate.
- Remove the Scanner Arms (if included). Note that a scanner is attached to each arm.
- Remove the Infeed Deck and Trestles from the crate:
  - Unscrew and remove the diagonal trestles while the Infeed Deck is supported by the main trestles.
  - Next, unscrew the main trestles from the crate that secure the Infeed Deck.
  - Finally, lift both the trestles and the Infeed Deck out of the crate.

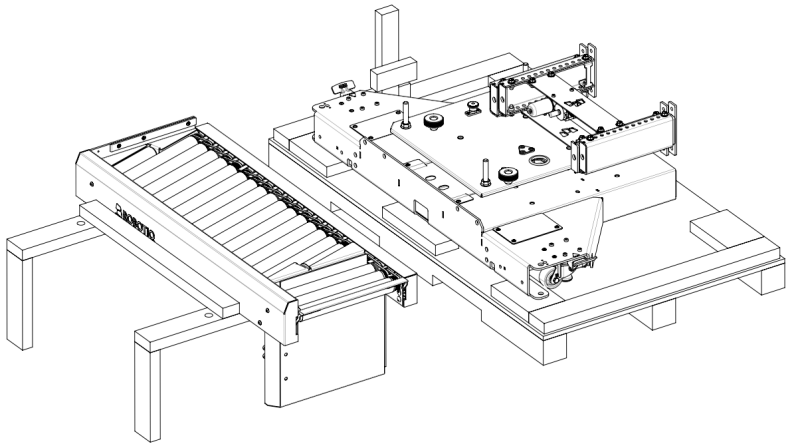


Fig. 4-19: Infeed Deck Uncrating

	CAUTION
	The Infeed Deck and the Infeed Base must be moved using appropriate lifting equipment or at least 3 people.

- Locate the Adjustable Legs positioned on the mobile base and remove them.
- Using a 17 mm wrench, remove the four (4) lag bolts securing the Infeed Base.
- Remove the Infeed Base from the crate.
- Remove all packaging materials from the components.
- Dispose of all materials, including cardboard, plastic straps, wrappers, and crate wood.

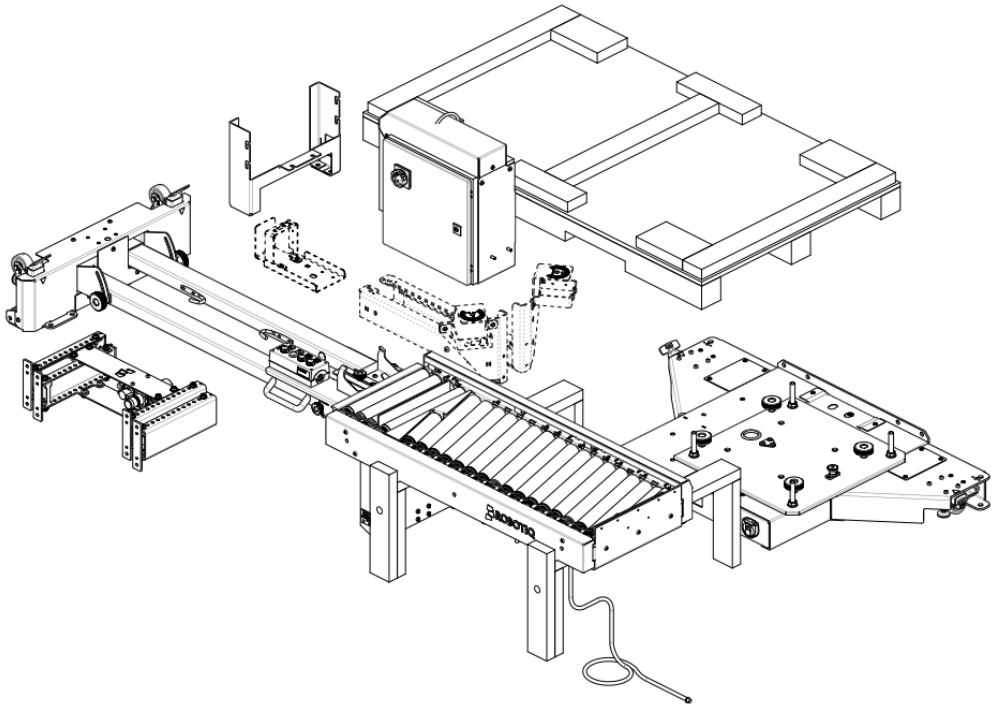


Fig. 4-20: PE20 Mobility Kit - Components Unpacked

4.7.6. Mobility Kit Installation

Spacers Installation

	CAUTION
	Crushing Hazard: Do not place fingers near the caster locking mechanism or between the machine and the floor when lifting or lowering the unit.

a. Once the PE20 Palletizer is installed, add the provided spacers designed to simplify the installation process.

- Use a forklift to lift the PE20 Palletizer base. This is necessary to allow for the installation of the spacers.

b. To ensure clearance for the Infeed Base and Operator Station Base, install the four (4) provided spacers beneath the PE20 base. Install the two (2) slightly taller spacers on the side where the Infeed Base will be mounted (UR Control Box side in the image).

	DANGER
	Keep the spacers exactly where they are during this process; do not try to relocate the PE20. Disregarding this instruction may cause the PE20 to fall off the spacers.

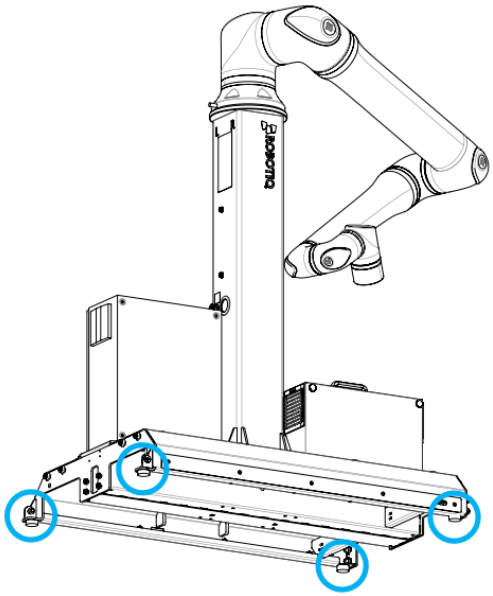


Fig. 4-21: Spacers Under the PE20 Base

Operator Base Installation (Robotiq Controller Side)

a. Remove the four (4) screws securing the Operator Station Base cover using a 5 mm hex key. Then, set the cover aside.

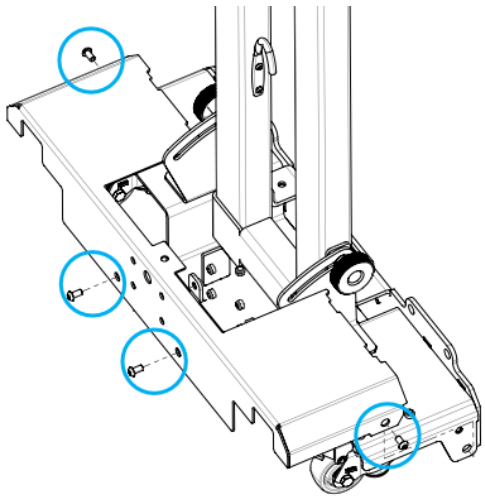


Fig. 4-22: Operator Station Base Cover - Exploded View

b. Secure the Operator Station Base to the PE20 base. Align the mounting holes; if alignment is difficult, lock the wheels to raise the base. Mount the four (4) provided M12 x 30 hex head flange screws and use a 16 mm hex socket to partially tighten them into place.

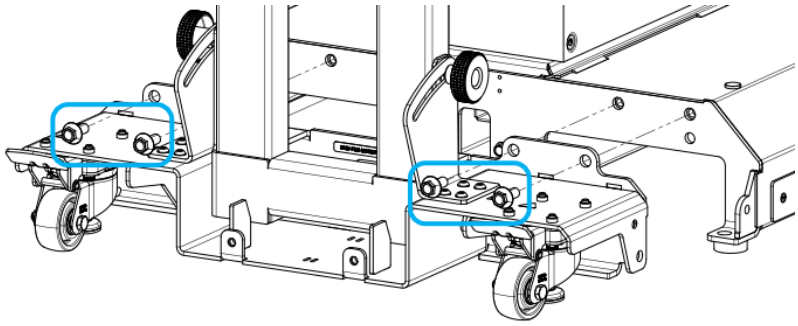


Fig. 4-23: Secure the Operator Station Base to the PE20

c. Secure the side of the Operator Station Base using the two (2) M12 x 30 flat head screws and M12 nylon locknuts. Tighten these using an 18 mm and an 8 mm hex key to a torque of 92 Nm (68 ft-lb).

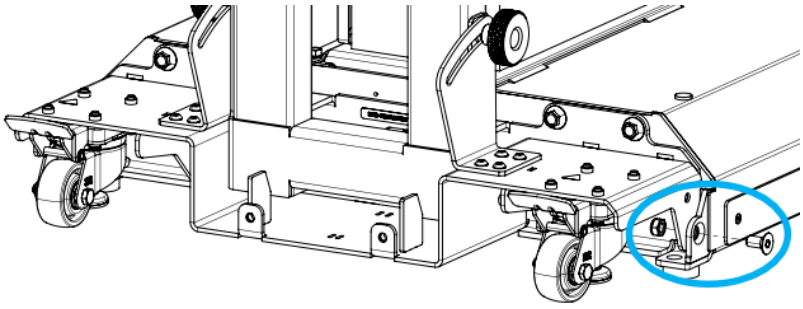


Fig. 4-24: M12 Flat Head Screws and Nylon Locknuts - Side

d. Complete the tightening of the M12 x 30 hex head flange screws (from step 2) to a final torque of 84 Nm (62 ft-lb).

e. To reach the middle section, pivot the Operator Station by turning the screw knob. Using a 13 mm socket, install and tighten the four (4) M8 x 20 hex head flange bolts to a torque of 25 Nm (18 ft-lb).

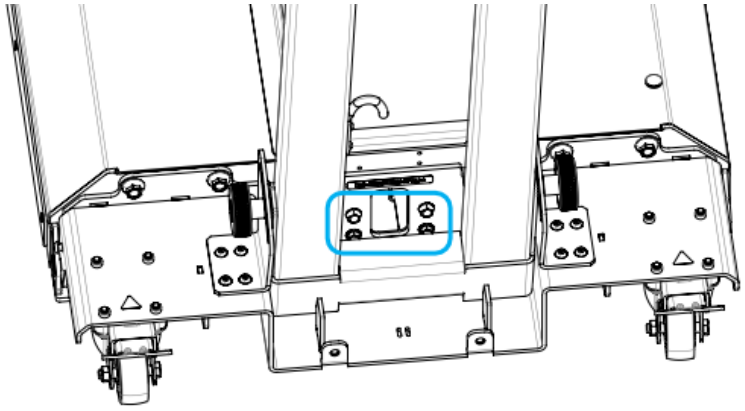


Fig. 4-25: M8 x 20 Hex Head Flange Bolts - Middle

f. Reinstall the Operator Station Base Cover, securing it with the four (4) screws removed in step 1, using a 5 mm hex key.

Infeed Base Installation (UR controller side)

a. To position the Infeed Base, first remove the four (4) screw knobs from the rotating plate. Next, lift the locking pin and turn the rotating plate to its central position until the locking pin snaps into place. Finally, reattach the four (4) screw knobs.

	CAUTION
	The Infeed Base weighs 75 kg (165 lb). Observe safe and lawful handling practices.

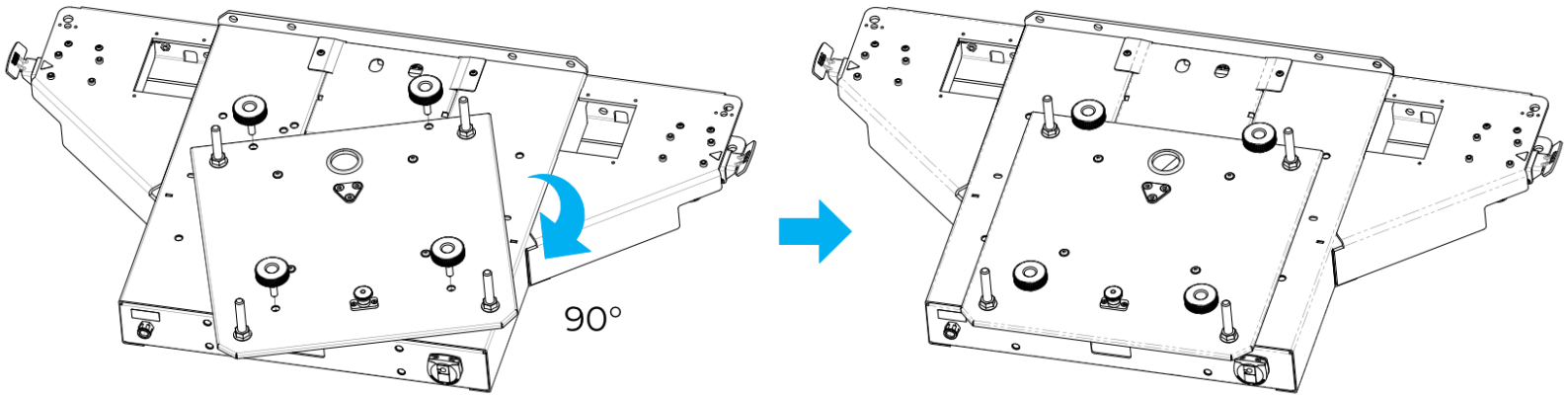


Fig. 4-26: Infeed Base and Rotating Plate

b. Use the eight (8) M12 x 30 hex head flange screws, which are included, to attach the Infeed Base to the PE20. If necessary, lock the wheels, which will raise the holes. Using a 16 mm hex socket, tighten the screws to a torque of 84 Nm (62 ft-lb).

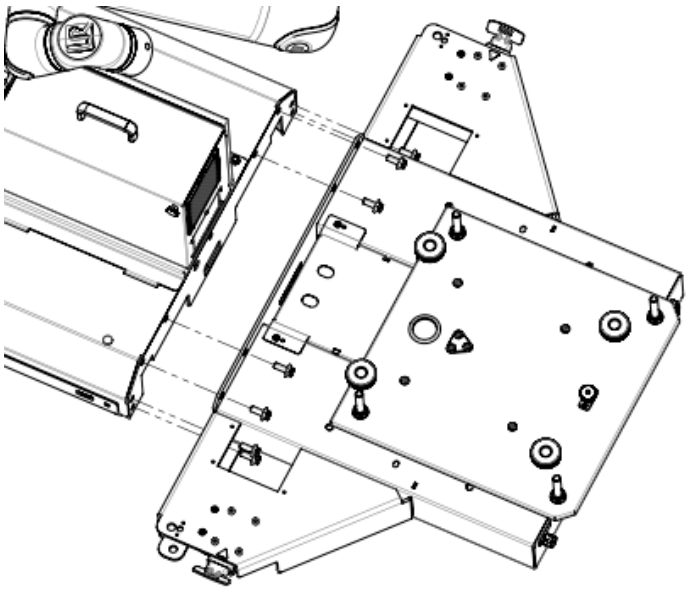


Fig. 4-27: Mount Infeed Base

c. Ensure the foot levers are locked and that the Infeed Base is resting on the two feet of the Leveling Caster Wheels. Then, on a perfectly flat surface, measure the distance Y between the end of the Infeed Base and the floor.

d. If the distance Y is 22 mm (7⁄8 in) or more, skip this step and go to Robotiq Smart Infeed 100 Installation section. If the distance Y is less than 22 mm (7⁄8 in), shimming is advised.

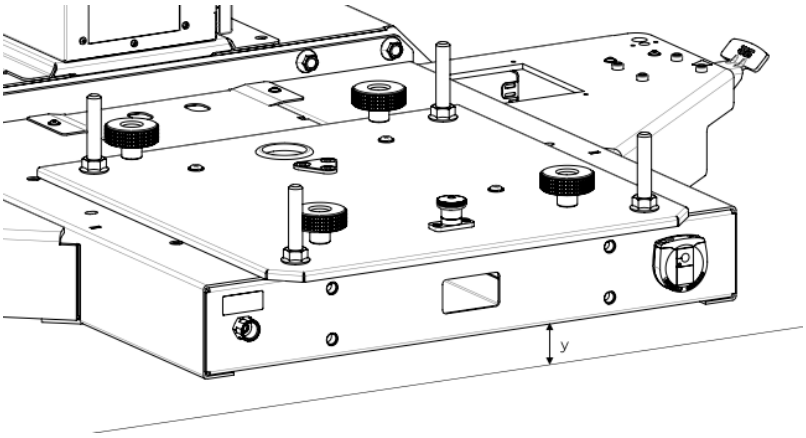


Fig. 4-28: Distance Between the End of the Infeed Base and the Floor (y)

e. Remove the height (8) bolts and the Infeed Module.

f. Install the provided spacing washer(s) on the lower bolts, positioning them between the two bases.

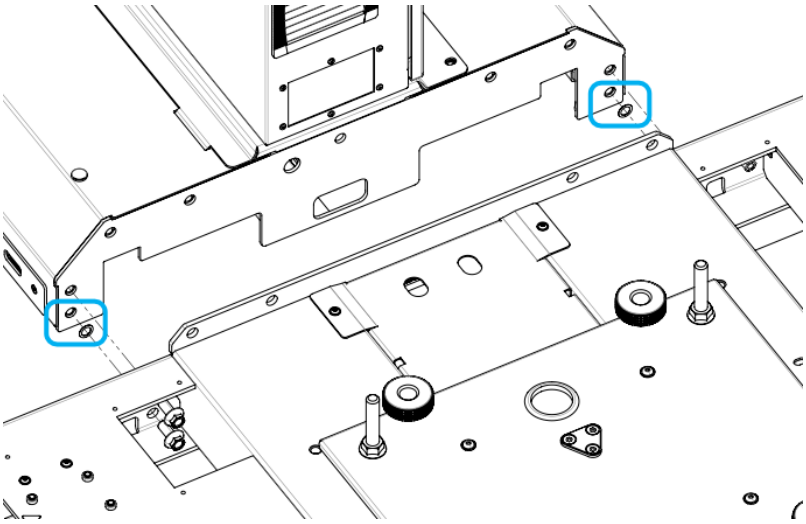


Fig. 4-29: Shims Installation

g. Each ring shim increases the distance by 2 mm [5/64 in]. For instance, if the measured distance 'Y' is 17 mm, you should add three (3) ring shims onto each bottom screw (a total of six (6) ring shims).

h. Reinstall the Infeed Base and torque to 84 Nm (62 ft-lb). Check that the minimum dimension Y is respected.

	NOTICE
	Tip: Insert the screws through the Infeed Base holes first, then place the ring shims directly onto the screw before reattaching the base.

Robotiq Smart Infeed 100 Installation

Initially, install the Robotiq Smart Infeed 100 in its inline configuration. You will have the opportunity to adjust it to your final required orientation in a subsequent step.

	DANGER
	Risk of tipping over The PAL Ready must always be installed with the Smart Infeed 100 to ensure stability. Never replace it with another infeed.

	WARNING
	Pinching hazard Use Tool, Not Fingers.

a. Using the foot lever, lift all four (4) wheels. Next, use a tool to take off the installation spacers.

b. Using a 16 mm hex socket and four (4) M12 x 30 hex head flange bolts, mount the support bracket for the Smart Infeed Control Box onto the Infeed Base.

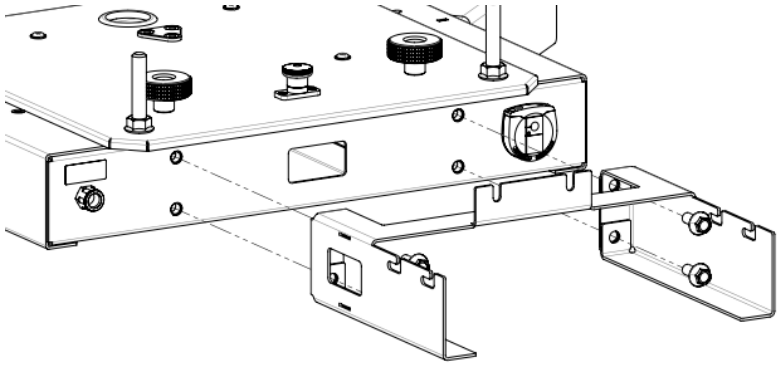


Fig. 4-30: Smart Infeed Control Box Support

c. Insert the Smart Infeed Control Box into the support bracket. Push it toward the infeed base, ensuring the studs are aligned with the slots. Fasten it securely using the six (6) M8 serrated flange nuts.

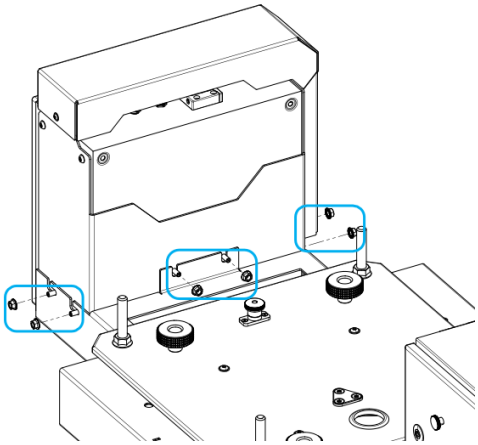


Fig. 4-31: Smart Infeed Control Box - Internal View

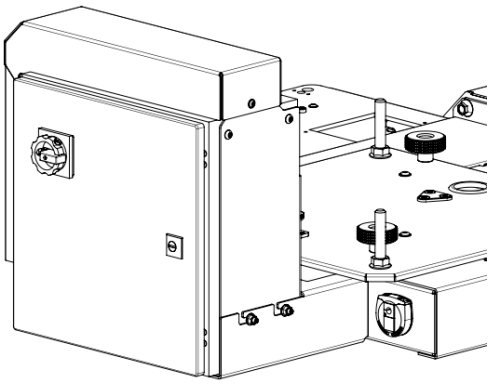


Fig. 4-32: Smart Infeed Control Box - External View

d. Install the four (4) M16 nuts and washers onto the stud, positioning the flange upward.

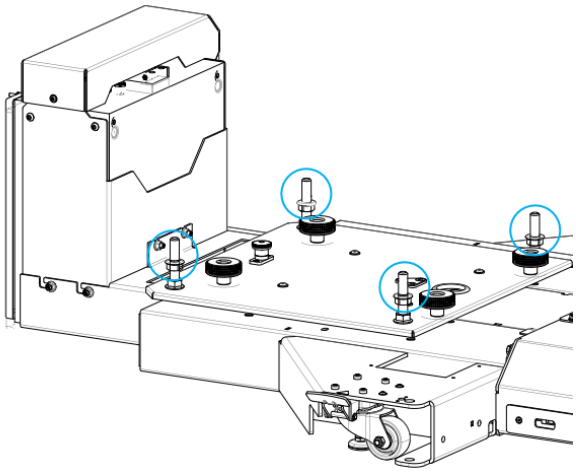


Fig. 4-33: Four (4) Flange Nuts Onto Studs

e. Then, install the adjustable legs as shown below. Pay special attention to the position of the pneumatic filter regulator. Using the remaining four (4) flange nuts, secure the adjustable legs.

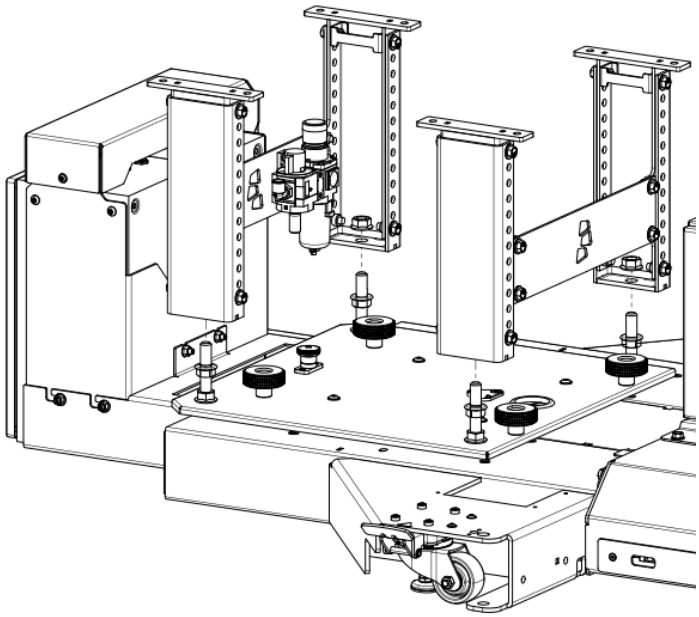


Fig. 4-34: Smart Infeed - Adjustable Legs

f. Using the four nuts, position the four legs so that the bottom faces are halfway along the stud. Do not tighten them yet; the final height adjustment will be completed later.

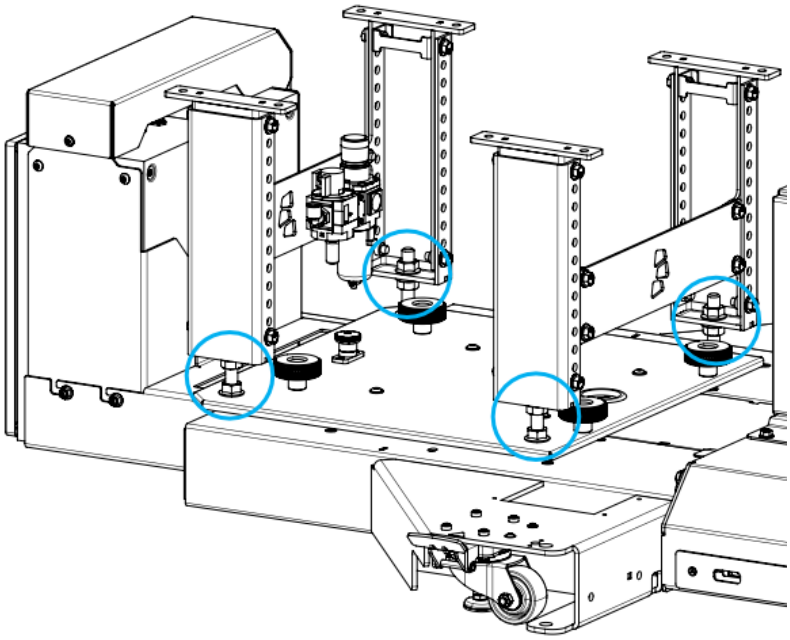


Fig. 4-35: Adjustable Legs Correct Position

g. Before the Smart Infeed deck is installed, it is essential to coarsely adjust the height of the Smart Infeed's adjustable legs.

- This step is more conveniently performed with two (2) people.
- To achieve accurate height, all four (4) leveling casters must be locked. If the conveyor feeding the Smart Infeed is not positioned immediately adjacent to the solution, both dimensions can be measured, provided the floor is flat and level.
- Each leg requires four (4) M10 x 20 screws for installation. Two (2) screws are already factory-installed on each leg. The remaining eight (8) screws needed for the assembly are included in the kit. Use a 16 mm hex key.

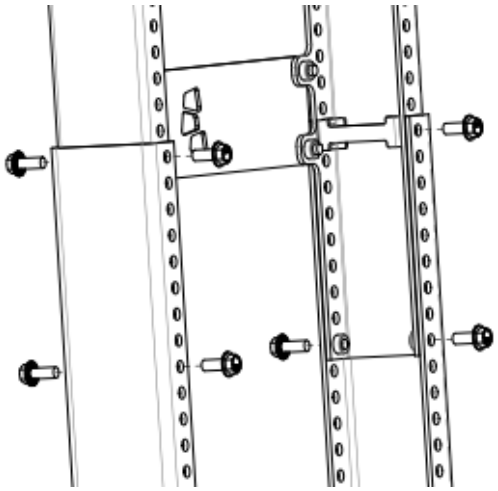


Fig. 4-36: Adjustable Legs - Coarse Adjustment

- Hold the small U-shape bracket securely while unscrewing the two (2) top bolts on the first pair of legs. Discard the plastic washers.
- While holding the bottom of the leg, unscrew the two (2) lower bolts. This frees the inner portion of the leg for height adjustment. Discard the plastic washers.
- Adjust the position of the Adjustable Legs until the distance from their top surface to the top of the end-of-line conveyor measures between 115 mm and 140 mm (4 1⁄2 to 5 1⁄2 in).
- **Lower bolts:** Install the two (2) lower bolts with the matching holes, and screw to fix the height (do not forget to remove the plastic washer used for shipment).
- **Upper bolts:** Install the brackets in the highest available hole on the lower leg section. Place the bracket so that its protruded side is completing a square shape. Screw the two (2) higher bolts through the bracket (do not forget to remove the plastic washer used for shipment).

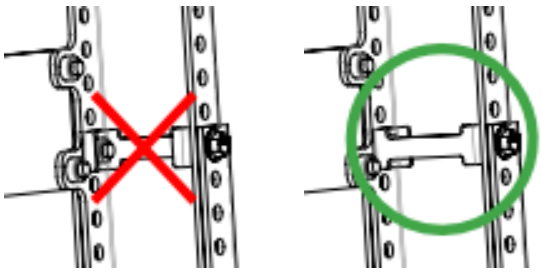


Fig. 4-37: Bracket - Wrong Orientation (Left) Correct Orientation (Right)

- Torque the four (4) M10 bolts to 45 Nm.
- Repeat the previous steps for the second set of Adjustable Legs.

h. Cut the straps and raise the Smart Infeed Deck using lifting equipment. Place the Infeed Deck on the Adjustable Legs and secure it using the eight (8) M10 x 20 flange hex cap screws. Tighten to 45 Nm.

	NOTICE
	To ease the installation of the Infeed Deck, you may loosen the horizontal plates that secure the legs. Remember to tighten these plates again after the adjustment is complete.

	CAUTION
	The Smart Infeed Deck weighs at least 62 kg (137 lb) and requires lifting equipment to move it.

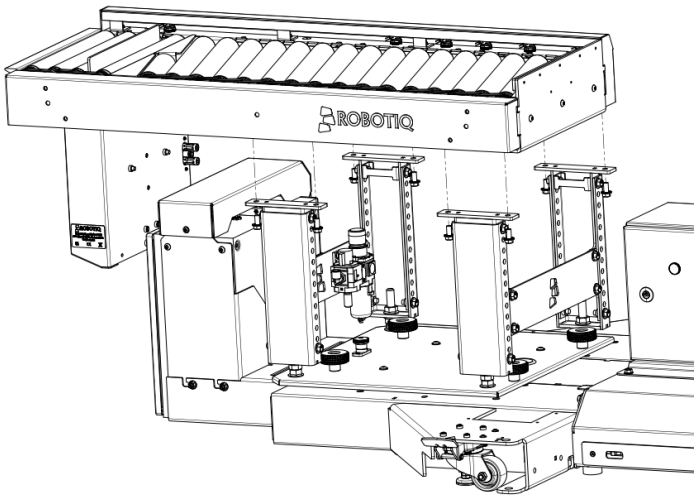


Fig. 4-38: Attach Adjustable Legs to Smart Infeed Deck

i. Install the Emergency Stop (E-Stop) button using the two (2) provided M5 x 8 socket head screws and a 4 mm hex key. There are two (2) predefined mounting locations for the E-Stop button—one on each side of the Smart Infeed (blue on the image). Determine the most accessible mounting position based on your specific factory layout and the results of your risk assessment.

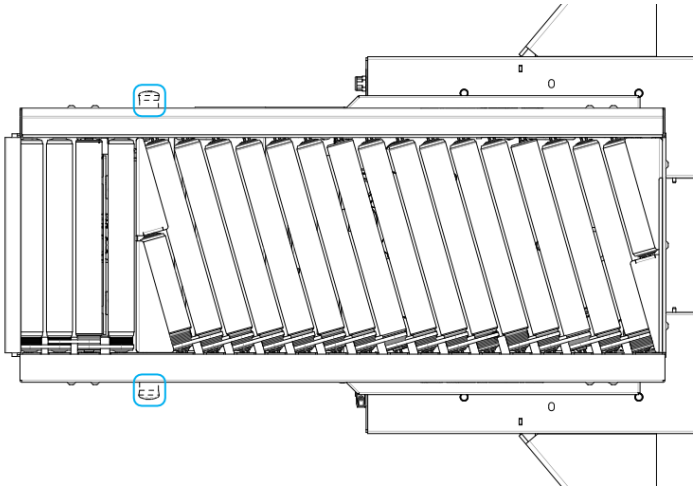


Fig. 4-39: E-Stops Predefined Mounting Locations

4.8. Electrical Connections

	CAUTION
	Before you proceed, confirm that the main power is off.

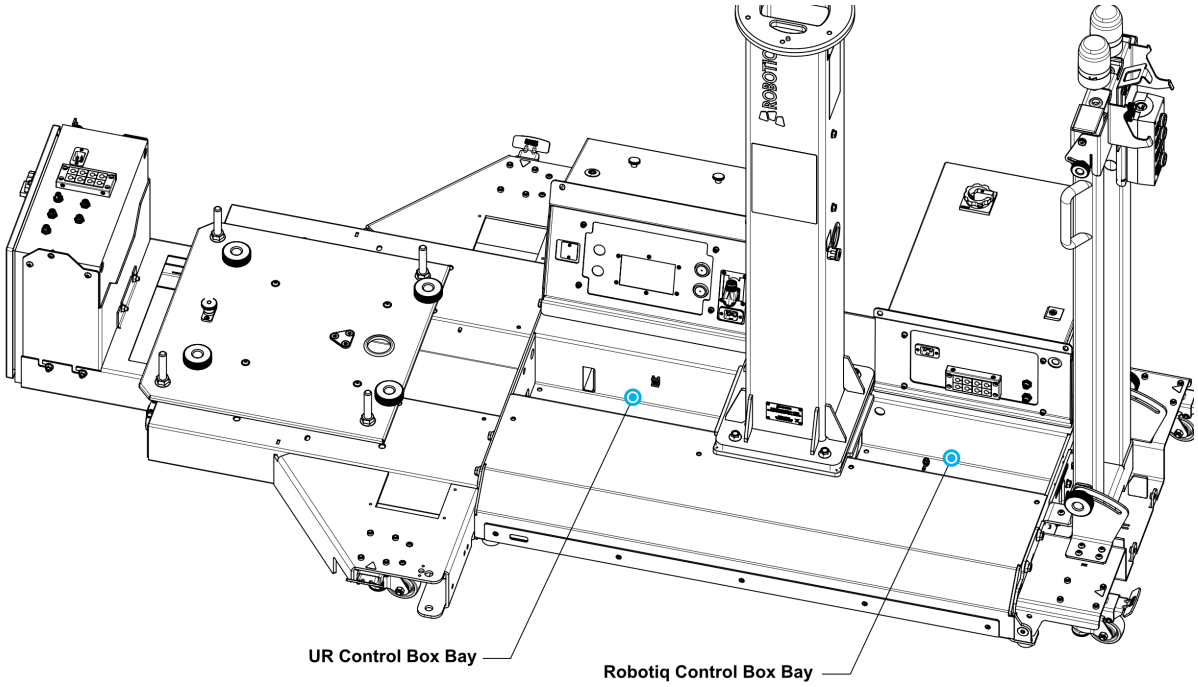


Fig. 4-40: UR and Robotiq Control Box Bay

4.8.1. Preparation

a. Remove the Infeed Control Box covers. Unscrew the four (4) M6 x 16mm screws using a 4 mm hex key.

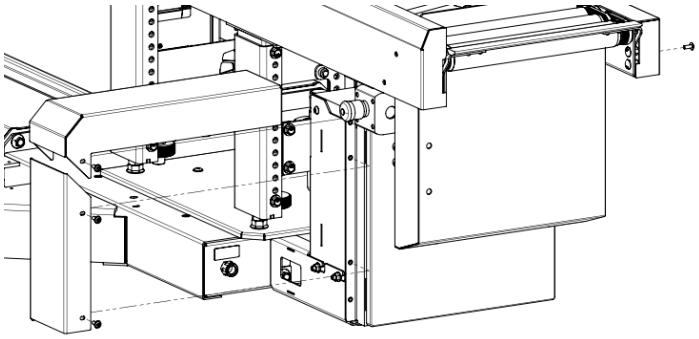


Fig. 4-41: Smart Infeed 100 Control Box Covers

b. Remove the cover located on the Infeed Base, tilt backward the UR control box and the palletizer control box.

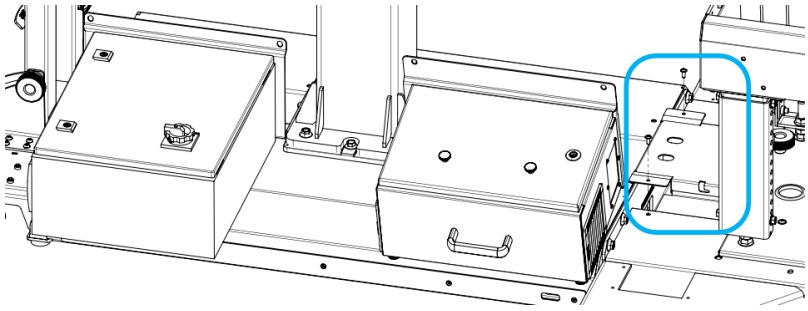


Fig. 4-42: Access Cables Compartment

c. Remove the Smart Infeed side covers on both sides. Remove the eight (8) M8 x 16 mm screws using a 5 mm hex key.

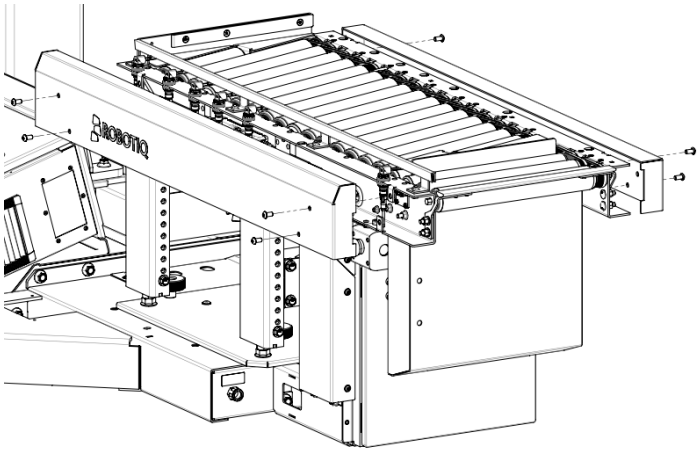


Fig. 4-43: Smart Infeed Side Covers

d. Gather all cables connected to the Smart Infeed Control Box, as well as the additional cables located in the Smart Infeed accessories box.

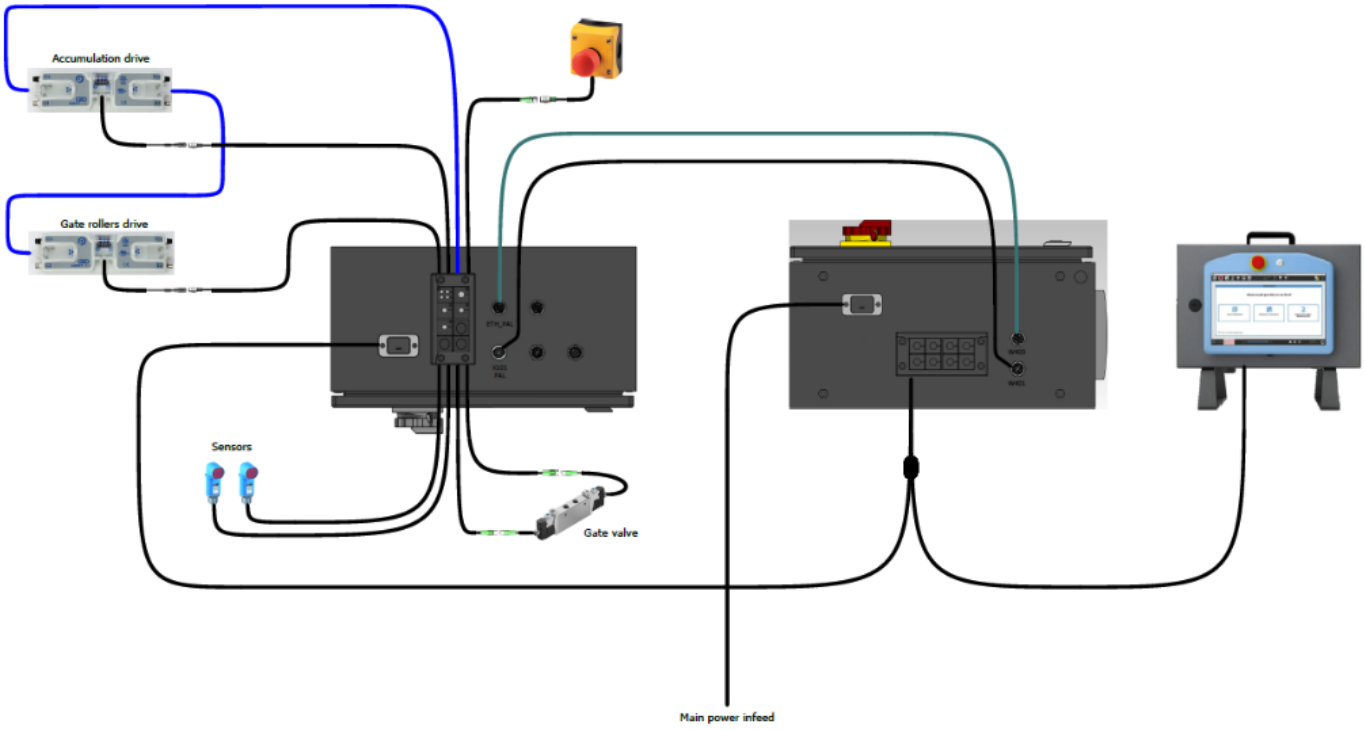


Fig. 4-44: Final Connection Result - Overview

4.8.2. Grounding the Pedestal

The operator station and the Robotiq control box are pre-grounded. You must manually ground the pedestal, ensuring the eyelet connectors for the operator station and control box ground wires stay securely in place during the process.

a. Using a 10 mm wrench, remove the (1) M6 nut and the (1) top lock washer from the main grouUsing a 10 mm wrench, remove the (1) M6 nut and the (1) top lock washer from the main ground stud inside the Robotiq control box bay.

b. Take the remaining ground wire (green) out of the pedestal base.

c. Slide the eyelet connector of the pedestal's ground wire on the ground stud and reinstall the lock washer and M6 nut.

d. Make sure that the eyelet connectors of all three (3) components (the pedestal, the Robotiq controller and the operator station) are on the ground stud, in between the two (2) lock washers.

e. Tighten the (1) M6 nut to a torque of 5 Nm (3.7 lb-ft).

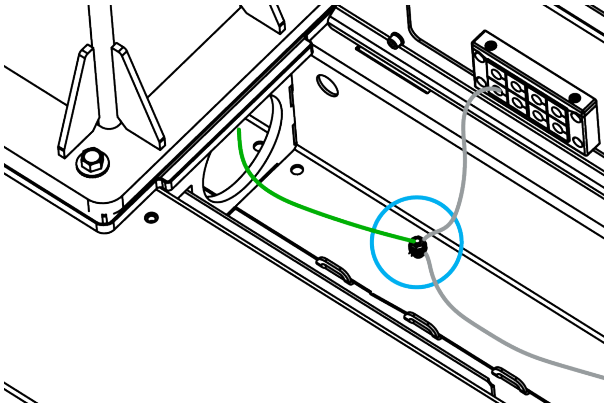


Fig. 4-45: Pedestal Ground Cable (Green)

4.8.3. Connections Between Control Boxes (Smart Infeed, PE20 and UR)

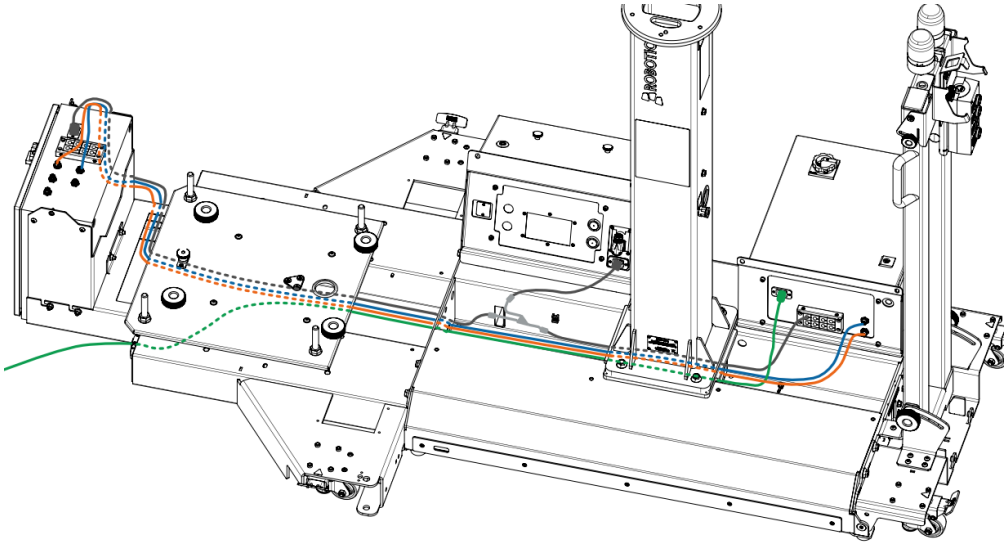


Fig. 4-46: Final Cable Routing in Bases (Smart Infeed Not Shown for Better Clarity)

Power Connections

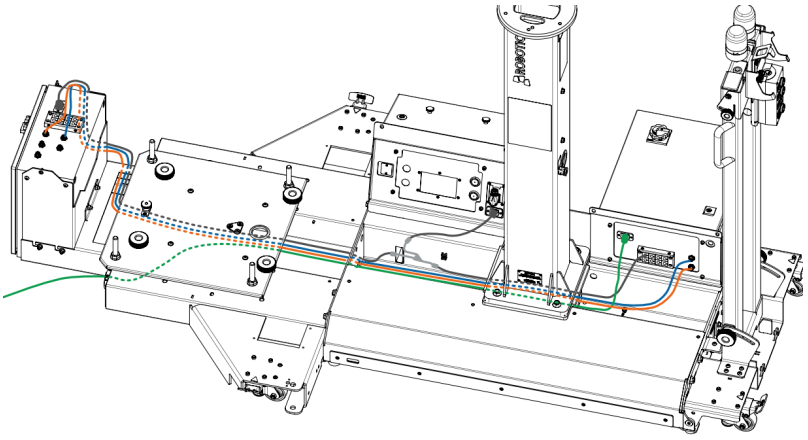


Fig. 4-47: Power Connections Overview (Smart Infeed Not Shown for Better Clarity)

a. Connect the main power cable (indicated in green in the figure below, not the actual cable color) coming from the power input (factory installed into the Infeed Base) to the Robotiq PE20 Control Box power input.

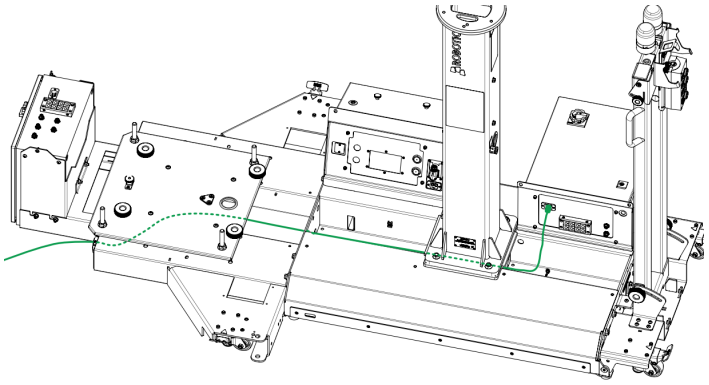


Fig. 4-48: Main Power Connection (Smart Infeed Not Shown for Better Clarity)

b. Using the splitter power cable provided, connect its male end to the outfeed power cable (the cable originating from the PE20 Control Box, located beneath the UR Control Box). Next, take one female end of the splitter cable and attach it to the IEC C20 to IEC C13 adapter, which is included in the Mobility PE20 Accessory Kit.

c. Connect the IEC C20 to IEC C13 adapter to the UR Control Box.

d. Connect the other female end of the splitter cable to the provided Smart Infeed power cable, which is included in the Smart Infeed Accessory Kit.

e. Guide the Smart Infeed power cable beneath the rotating plate and connect it to the Smart Infeed controller.

Communication and Safety Connections

a. Connect the M12 Ethernet cable (indicated in blue in the figure below, not the actual cable color) and the male end of the safety cable (orange) from the Smart Infeed accessory kit to the Palletizer Control Box.

b. Route the M12 Ethernet and safety cables through the Palletizer base channel towards the Smart Infeed, following the path illustrated in the figure below.

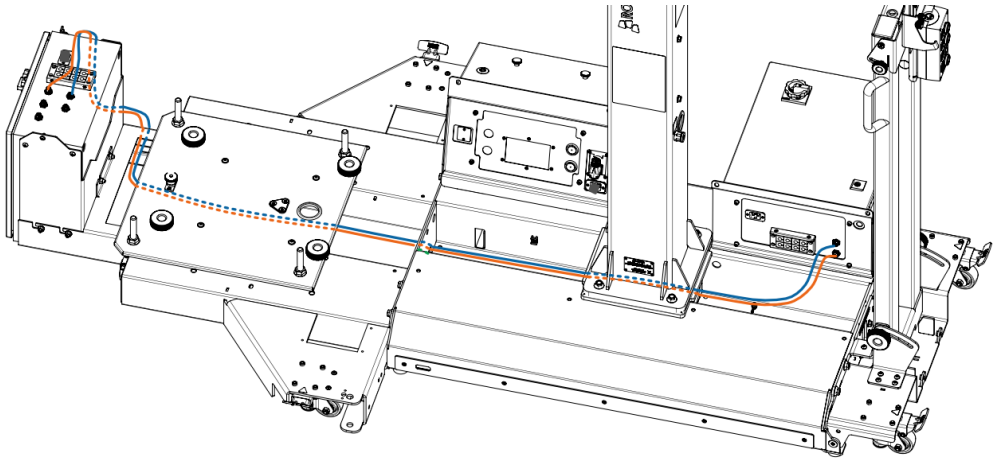


Fig. 4-49: Cables Routing Path (Smart Infeed Not Shown for Better Clarity)

c. Route the cables to the top of the Smart Infeed control box. Plug the cables to their respective ports. Before plugging the cables into the control box, ensure they are routed through the side opening of the bracket.

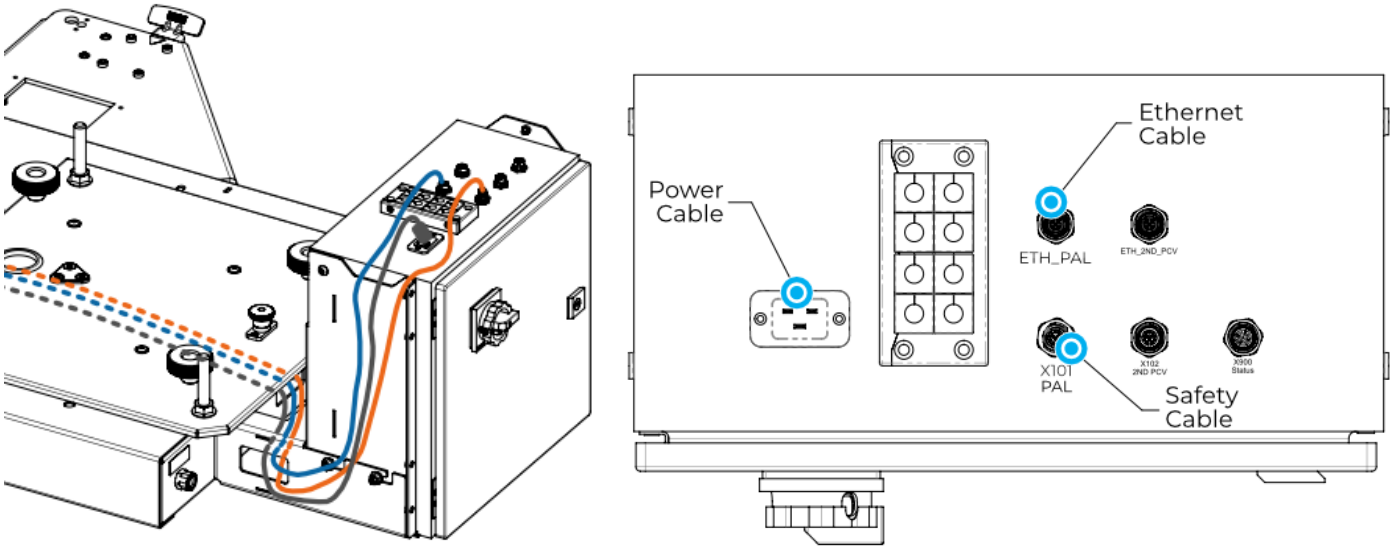


Fig. 4-50: Smart Infeed Cable Routing and Control Box (Top View) (Smart Infeed Not Shown for Better Clarity)

	WARNING
	Next step is mandatory to interconnect both system Emergency Stop buttons together.

d. Open the Palletizer Control Box door. Using a small flat head screwdriver, remove and discard the yellow jumper wires E-Stop PCV (1) and E-Stop PCV (2) located in the lower section of the control box. Close the Palletizer Control Box door.

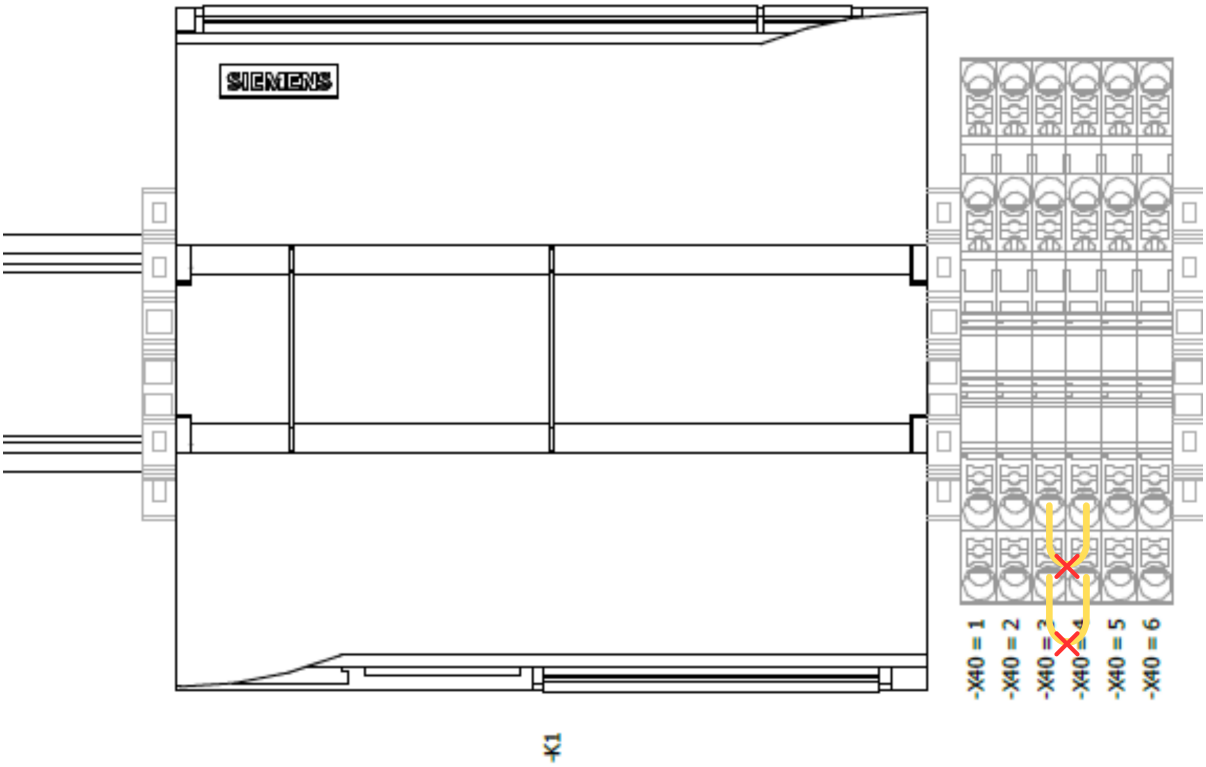


Fig. 4-51: Yellow Jumper Wires

4.8.4. Connections Between the Smart Infeed Control Box and the Smart Infeed Components

Pass the following cables from the Smart Infeed Control Box (top side) through the Infeed Base and connect them to the appropriate Smart Infeed components. Ensure the cables are routed through the bracket's side opening before guiding them into the Smart Infeed Base.

- E-Stop cable (-W20)
- Two (2) roller drive power cables (-W10 and -W11)
- Two (2) sensor cables (-W30 and -W31)
- Two (2) solenoid valve cables (-W35 and -W36)
- Drive Ethernet cable (-W51)

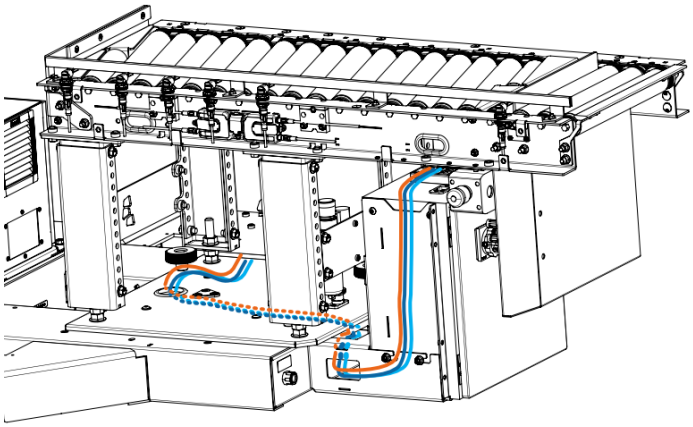


Fig. 4-52: Path the Cables Must Follow to Reach the Smart Infeed

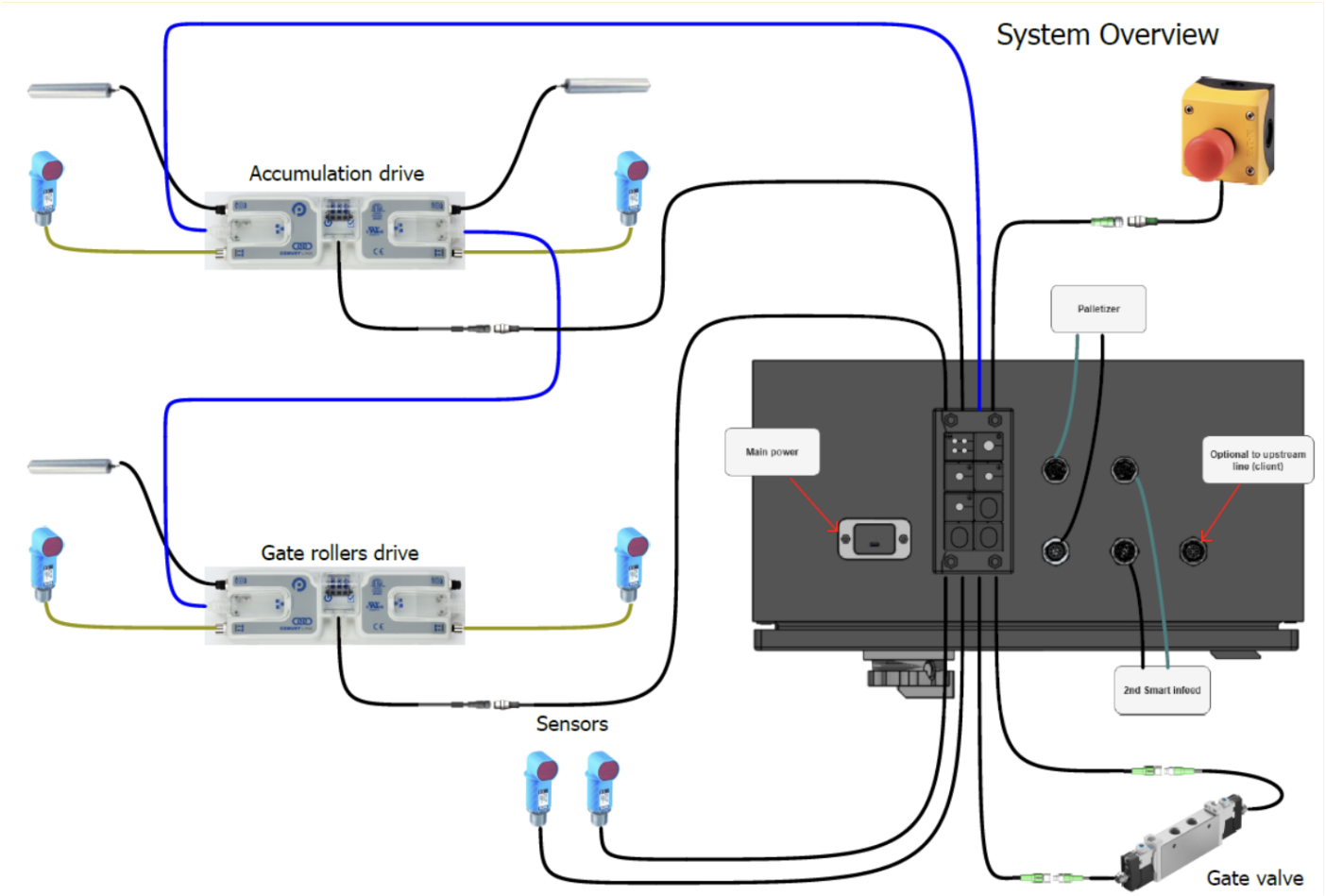


Fig. 4-53: Smart Infeed Connections - Overview

Photoelectric Sensors Cable (Gate Side)

Thread the -W30 and -W31 sensor cables through the cover grommet located on the same side as the sensors. Connect -W30 to sensor -BG6 and -W31 to sensor -BG1, ensuring the connectors are correctly aligned to prevent damaging the pins. Route the cables toward the Smart Infeed as illustrated in the figure.

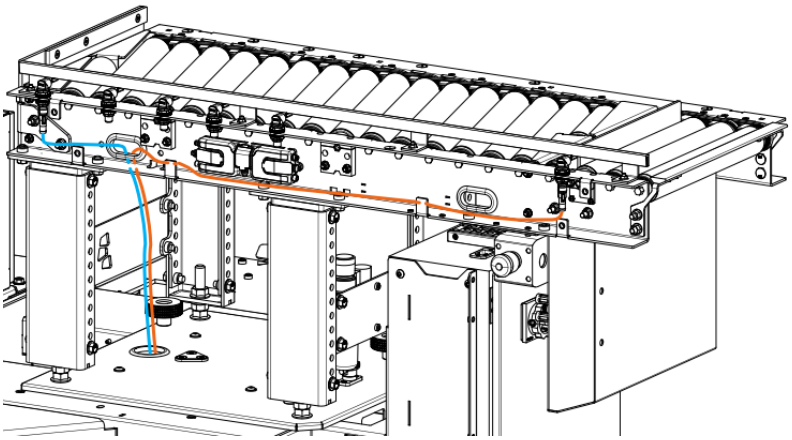


Fig. 4-54: Sensors Cables Connections

RD1 Drive Module Power Cable and Ethernet Cable (Gate Side)

- For better access, temporarily unscrew the W17 sensor cable.
- Route the -W10 drive module power cable (light blue) through the cover grommet and connect it to the -W10A drive module power cable (dark blue).
- Remove the cover of the -RD1 roller drive module. Then route the -W51 Ethernet cable (orange) through the cover grommet and connect it to the -RD1 roller drive module left Ethernet port.
- Reinstall the cover of the -RD1 roller drive module.
- Reattach and tighten the W17 sensor cable.

Route the cables following the path indicated in the figure to reach the Smart Infeed.

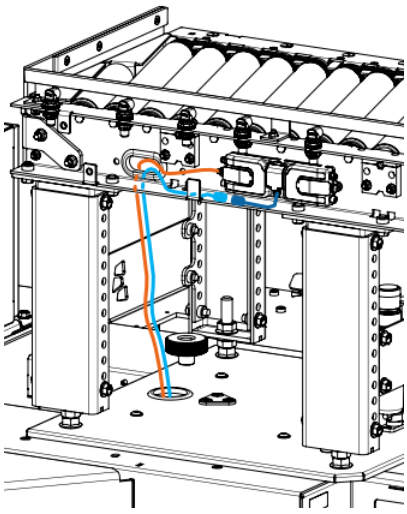


Fig. 4-55: Drive Module - RD1

Solenoid Valve Cables (Gate Side)

Route cables -W35 and -W36 upward through the closest cover grommet, leading them to their respective connection points (-W35A and -W36A) located next to the second grommet. Route the cables following the path indicated in the figure to reach the Smart Infeed.

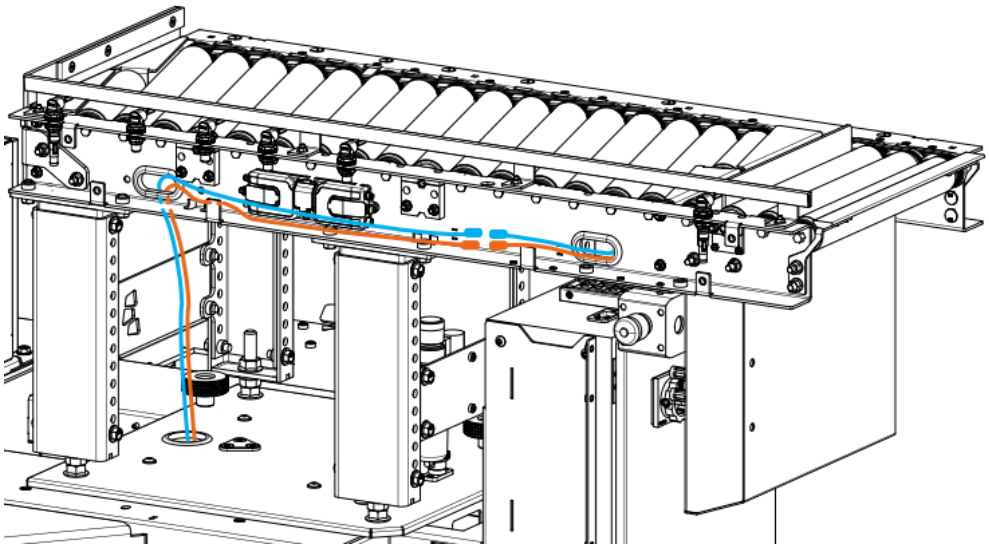


Fig. 4-56: Solenoid Valve Cables Connections

RD2 Drive Module Power Cable (Side Opposite to Gate)

Route the -W11 drive module power cable (blue) through the cover grommet on the same side as the RD2 drive module. Then, connect this cable to the -W11A drive module power cable on the drive side (orange). Route the cables following the path indicated in the figure to reach the Smart Infeed.

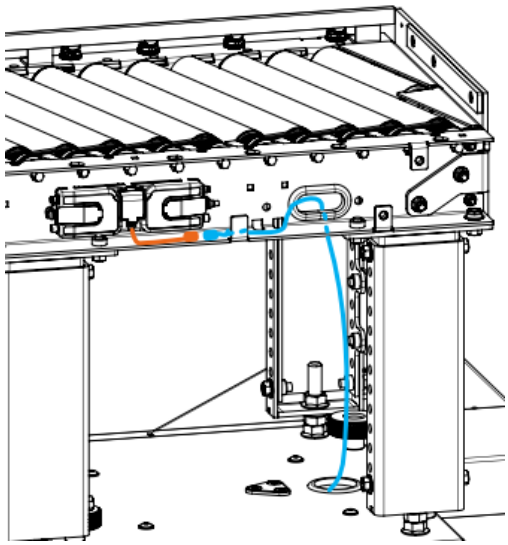


Fig. 4-57: Drive Module - RD2

E-Stop Cable (Depending on the E-Stop Button’s Location)

Begin by routing the -W20 E-Stop cable (blue) through the side cover grommet on the side opposite the E-Stop button's location. Following the path shown in the figure, lead the cable toward the Smart Infeed, then connect -W20 to the -W20A E-Stop button cable (orange).

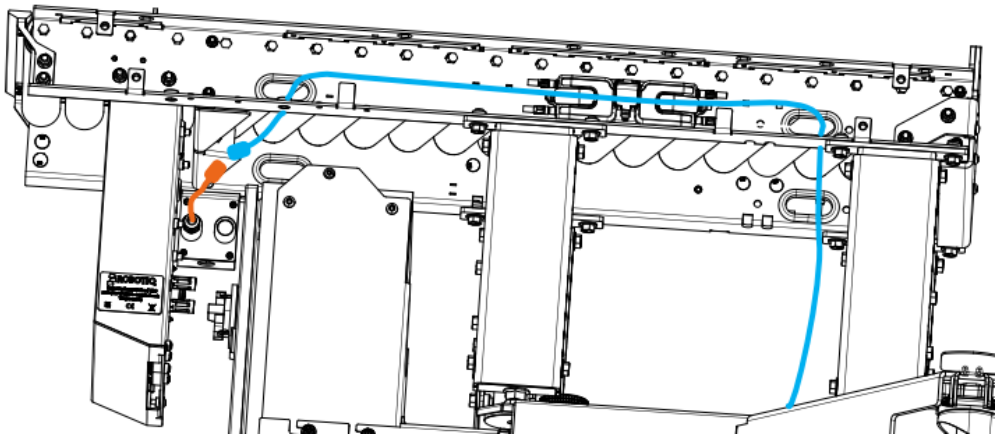


Fig. 4-58: E-Stop Cable

Next Steps

- Neatly tuck any excess cabling into the Infeed Base and secure the entire run with cable ties for a clean finish.
- Ensure no cables obstruct the conveyor or the covers to prevent any pinching or damage.
- Reinstall the side covers on both sides.
- Reinstall the control box covers with the four (4) M6 x 16 button head flange screws.
- Install the control box bottom side cover with the (1) M6 x 16 button head flange screw.

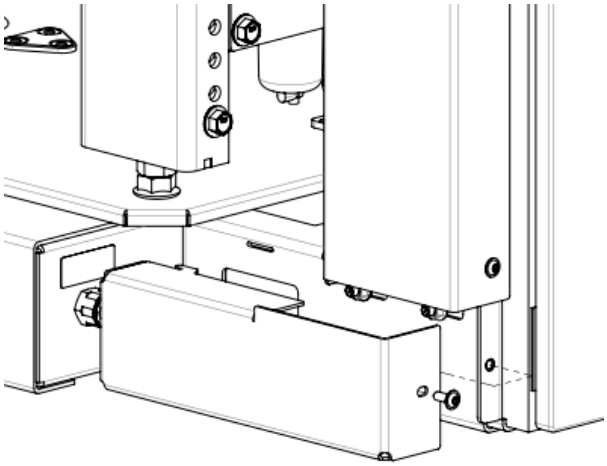


Fig. 4-59: Side Cover

4.8.5. Operator Station Connections

	CAUTION
	Ensure that the operator station is securely locked in its tilted position prior to beginning the cable routing process.

a. Route the push-button enclosure and tower light cables from the base of the operator station tubing through the access hole into the Robotiq Controller Bay. Secure these cables to the Operator Station Base using cable ties.

- Connect the W102 cable to the W100 cable (push-button enclosure).
- Connect the W72 cable to the W70 cable (right tower light).
- Connect the W82 cable to the W80 cable (left tower light).

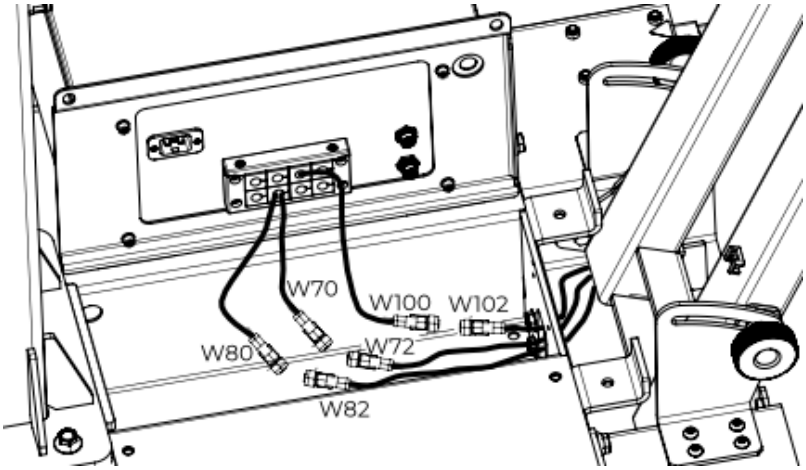


Fig. 4-60: Cables for the Push-Button Enclosure and Tower Lights

b. Route the teach pendant cable through the palletizer base opening toward the UR control box.

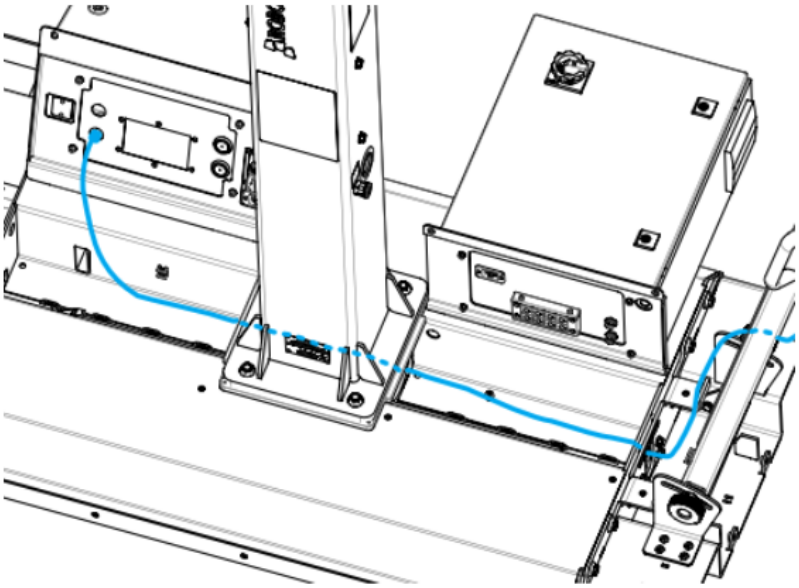


Fig. 4-61: Teach Pendant Cable Routing

c. Connect the teach pendant cable to the teach pendant connector of the UR control box. Wrap excess cable around the two (2) hooks located on the operator station.

d. When all cables are routed inside the cable compartment, secure them to mounting points using cable ties.

4.8.6. Connections in UR Controller

	WARNING
	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.

a. Connect the robot cable tucked into the pedestal to the UR control box.

b. Open the UR control box.

c. Connect the provided USB/Ethernet adapter directly to a USB port of the UR control box.

d. Run the W201 Ethernet cable from the UR control box bay to the UR control box.

e. Connect the W201 Ethernet cable to the USB/Ethernet adapter.

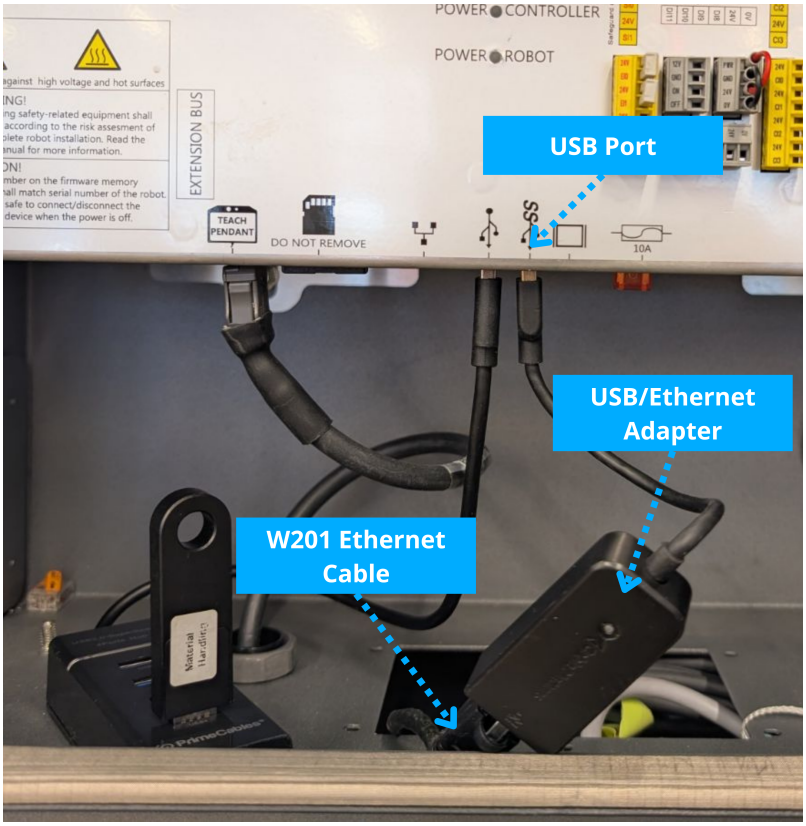


Fig. 4-62: USB/Ethernet Connection in UR Control Box

f. Guide the W103 cable, currently stored in the UR Controller Box Bay, into the UR control box.

g. Wire the W103 cable in the UR control box based on the figure below.

h. Upon completion, ensure all unused cable pins are properly secured.

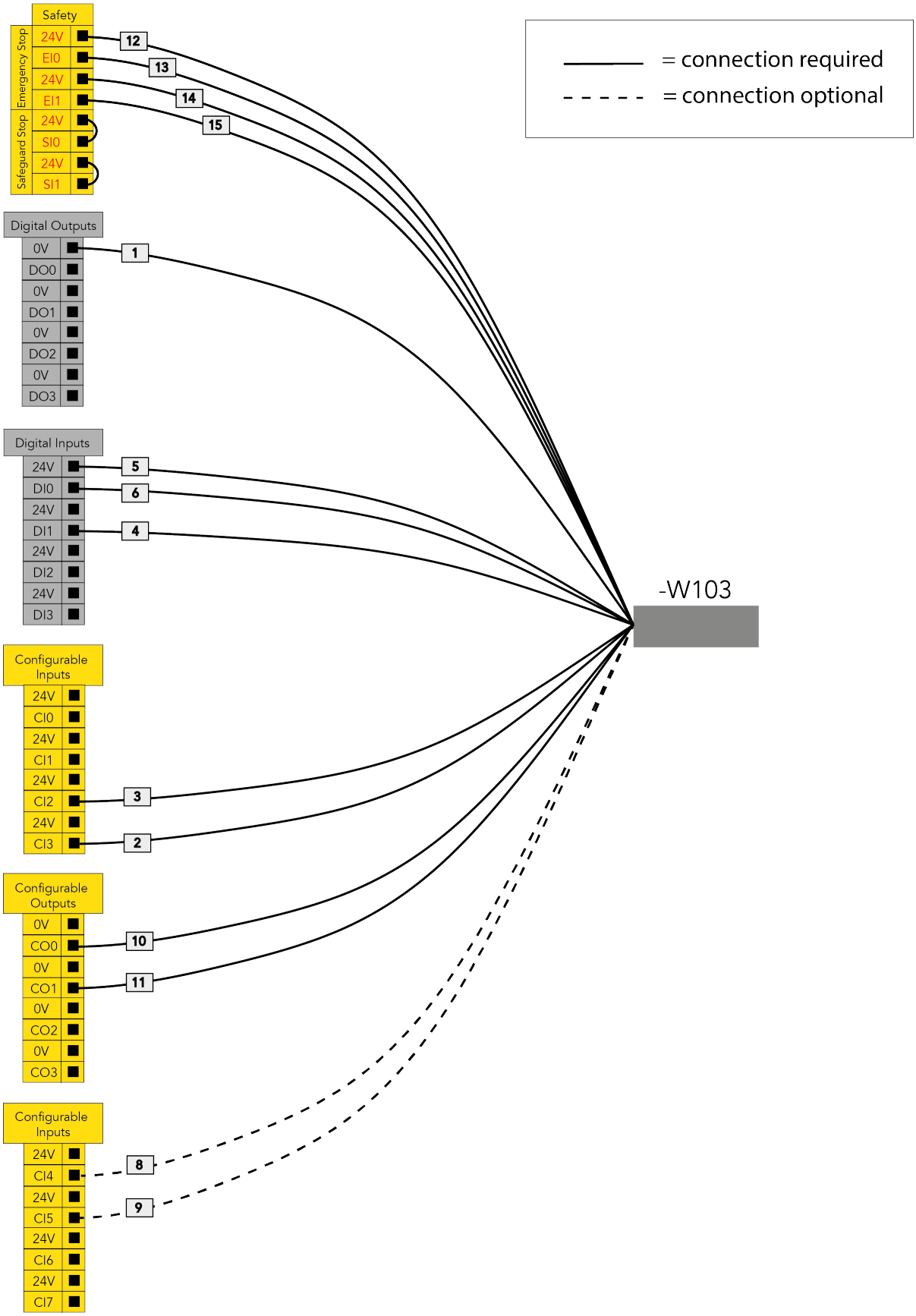


Fig. 4-63: W103 Cable Connections in UR Controler

Wire #	Function	Description
1	0 VDC	0 VDC supply
2	Automatic mode safeguard stop #1 input	Emits a safeguard status signal when a safeguard signal is applied to CI3.
3	Automatic mode safeguard stop #2 input	Emits a safeguard status signal when a safeguard signal is applied to CI2.
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).
8	Reduced Mode #1 input	Emits a reduced mode signal to CI4. Optionally connected when reduced mode is used.
9	Reduced Mode #2 input	Emits a reduced mode signal to CI5. Optionally connected when reduced mode is used.
10	System Emergency Stop #1 output	Send the E-Stop signal from CO0 to the Smart Infeed.
11	System Emergency Stop #2 output	Send the E-Stop signal from CO1 to the Smart Infeed.
12	24 VDC	24 VDC supply to emergency stop #1 input.
13	Emergency Stop #1 input	Performs a stop category 1 #1 input.
14	24 VDC	24 VDC supply to emergency stop #2 input.
15	Emergency Stop #2 input	Performs a stop category 1 #2 input.

Table 4-2: -W103 Cable Connections Function and Description

i. Connect the provided USB hub to the second USB port.

j. Connect the Copilot license dongle to one of the ports of the USB hub of the UR control box.

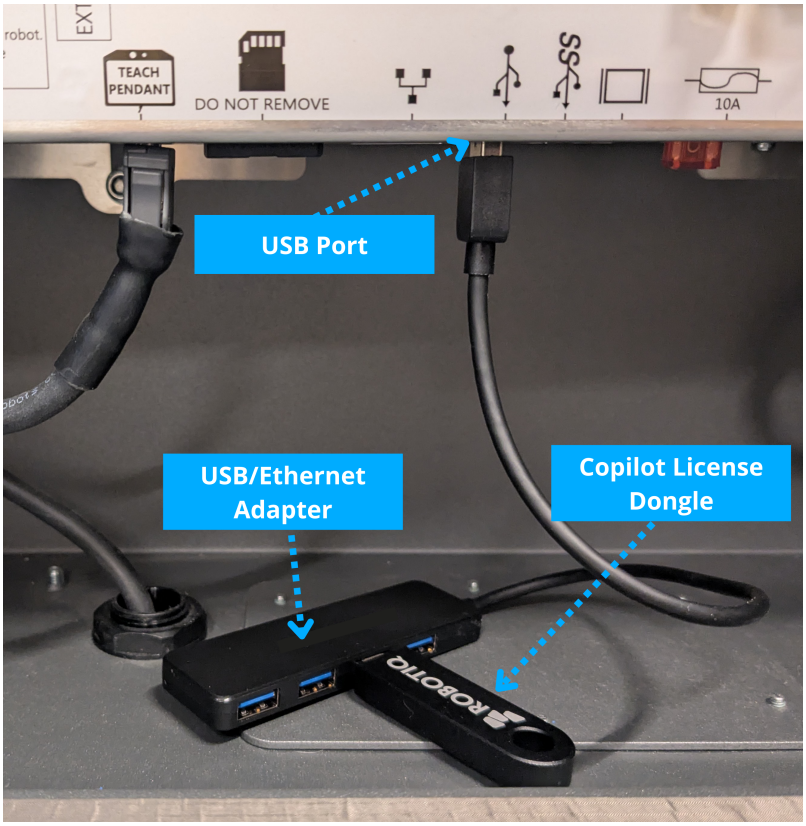


Fig. 4-64: Copilot License Dongle Connection to UR Control Box

4.9. Pneumatic Connections

 	**WARNING** This step must be performed by personnel competent in pneumatics. Protective eyewear is recommended when handling pneumatic equipment.

a. Turn off the manual shut-off valve on the Robotiq Smart Infeed 100 system.

b. Make sure that the line is fully depressurized.

c. Remove the red plastic cover from the Smart Infeed gate's Ø8 mm tubing (indicated in blue in the figure below, not the actual cable color), then connect the tubing to the output of the Smart Infeed pressure regulator.

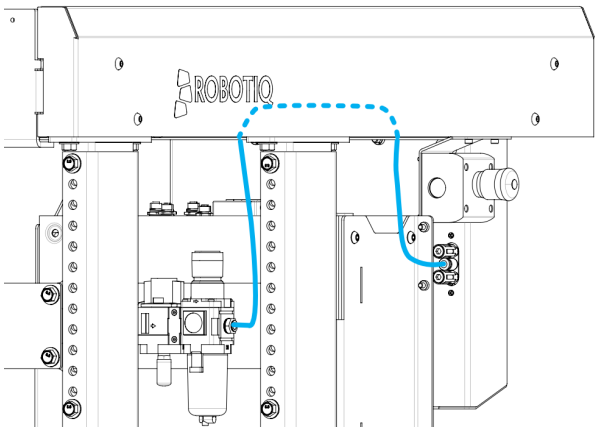


Fig. 4-65: Smart Infeed Gate Tubing

d. Connect the Ø12 mm (indicated in orange in the figure below, not the actual cable color) main infeed line to the Robotiq Smart Infeed 100 shut-off valve.

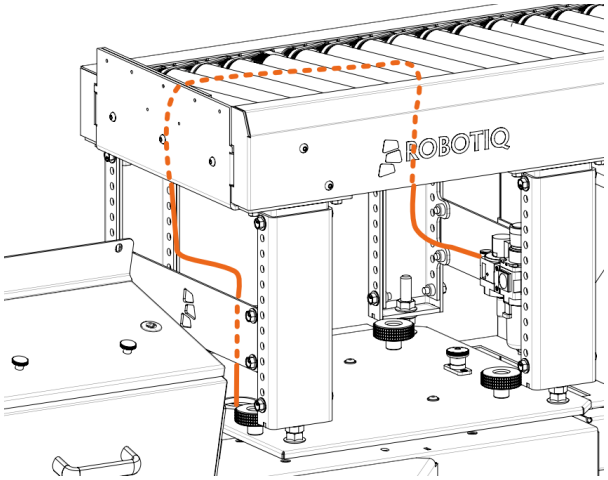


Fig. 4-66: Main Infeed Line

e. Route the Ø12 mm (indicated in orange in the figure below, not the actual cable color) main infeed line from the Robotiq Smart Infeed 100 into the rotating plate grommet through the UR Control Box Bay.

f. Find the Ø12 mm main infeed line (indicated in light blue in the figure below, not the actual cable color) located in the PE20, below the UR control box.

g. Use the Ø12 mm Y pneumatic fitting from the mobility accessory kit to connect the following pneumatic lines:

- PowerPick Multi air tube (light blue)
- Smart Infeed air tube (orange)
- Main pneumatic supply lines (dark blue)

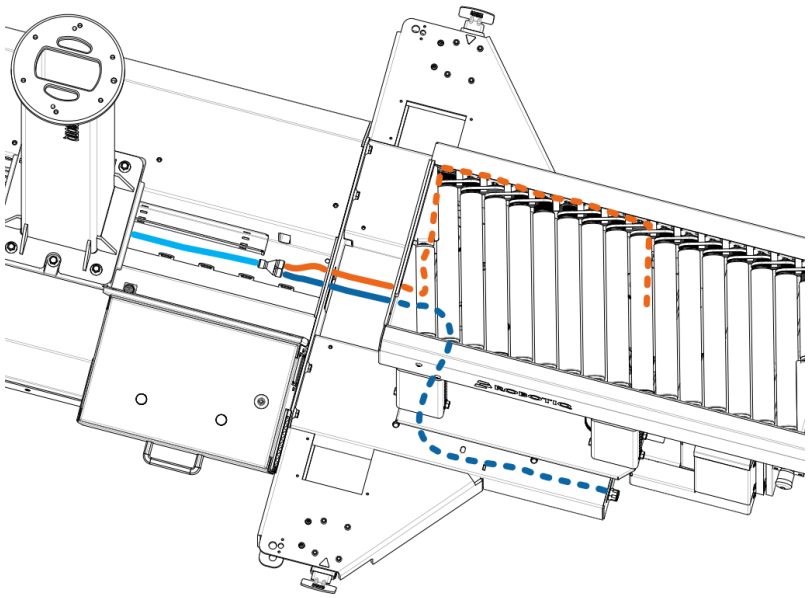


Fig. 4-67: Main Infeed Line - Y Pneumatic Fitting

h. Secure all tubings using cable ties.

i. For ease of use, install a quick connect fitting (not provided) that matches your factory's standard on the G ½ air supply intake port. If preferred, you can use the included ½ NPT adapter.

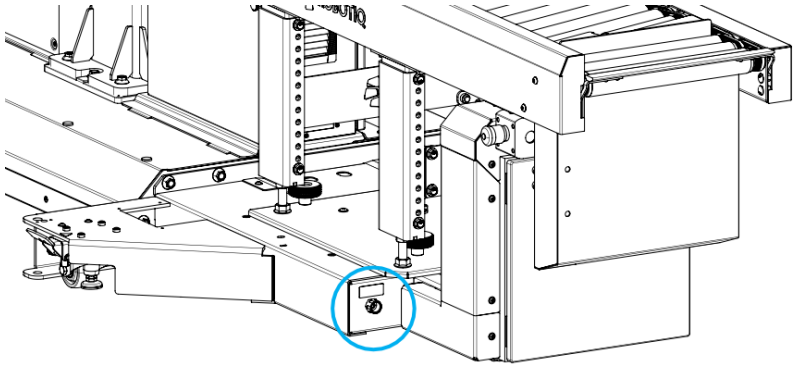


Fig. 4-68: G ½ Air Supply Intake Port

If your PAL Ready has the optional safety scanners, you must complete the steps in **Safety Scanners Installation (Optional)** section, before moving forward.

4.9.1. Safety Scanners Installation (Optional)

If the optional safety scanners were purchased along with the solution, follow the next steps to complete the installation.

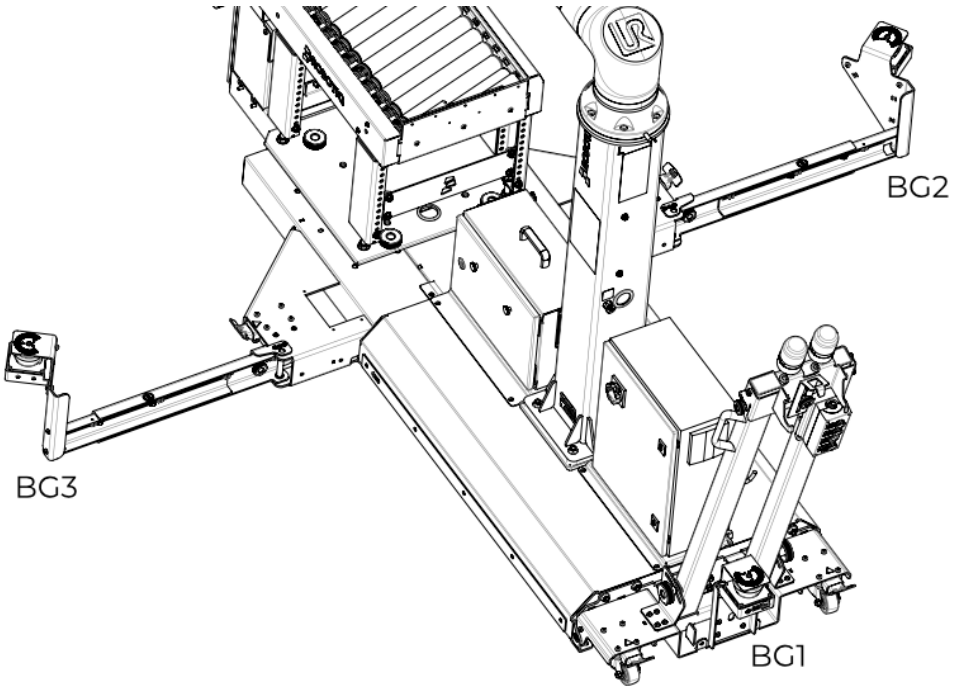


Fig. 4-69: Safety Scanners Identification

Mechanical Installation

a. Make sure that the operator station is secured at its vertical position.

b. To install the center safety scanner (BG1), use the four (4) M8 x 16 mm button head cap screws provided in the mobility safety accessory kit.

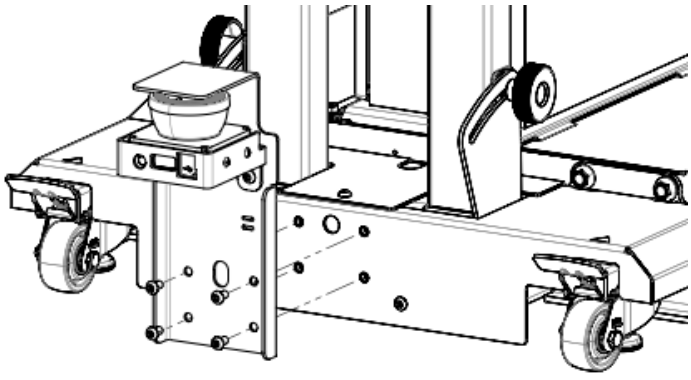


Fig. 4-70: Safety Scanner - Front

c. Before installing the scanners, ensure that the plastic bushing shown below is still in place on the scanner arm.

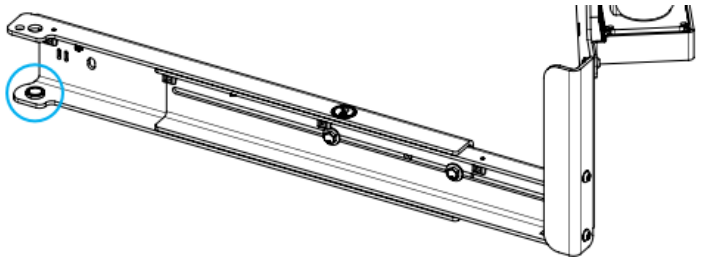


Fig. 4-71: Scanner Arm - Plastic Bushing

d. Then, insert the scanner arm at its location and use the provided pivot assembly to hold it in place. Secure the pivot assembly using the two (2) M6 x 10 flat head screws.

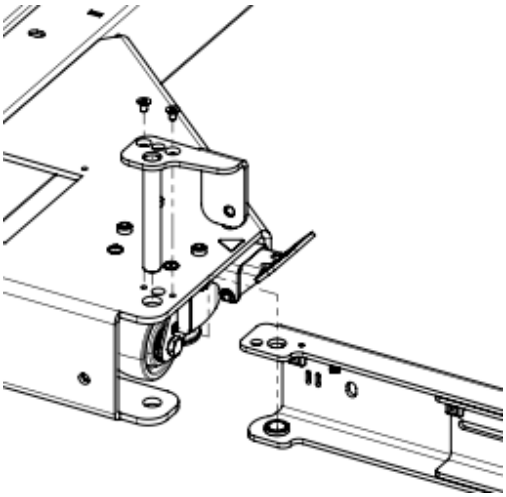


Fig. 4-72: Scanners Arm - Pivot Assembly

e. Loosen the two (2) M8 screws to extend the scanner arm.

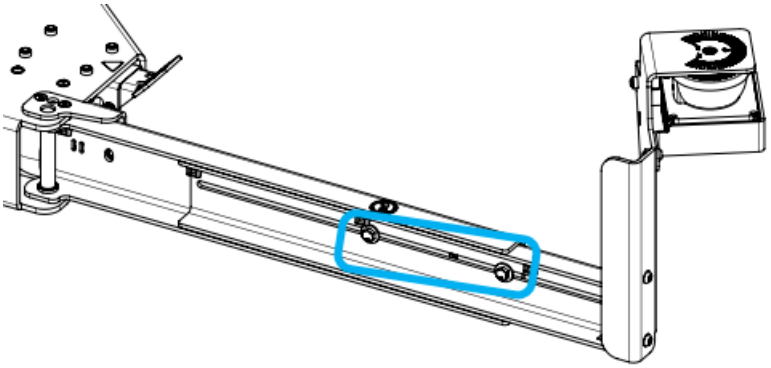


Fig. 4-73: Scanner Arm - Retracted

f. Extend the scanner arm to the desired length. It is recommended to use a distance X that is approximately 180 mm [7 in] larger than the width of the pallet that will be used, including any overhangs. Contact Robotiq Support if the distance X needs to be greater than 1200 mm [47 ¼ in].

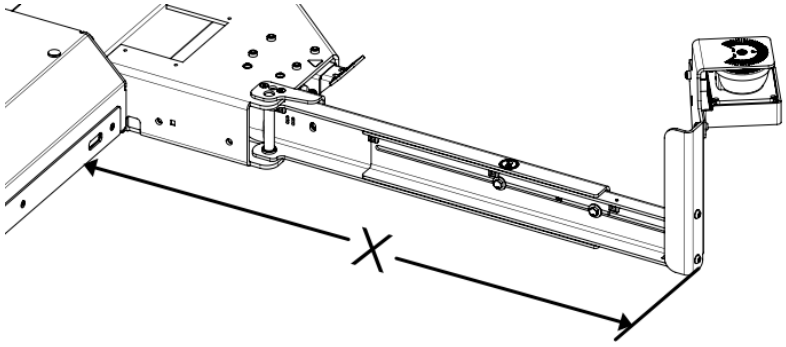


Fig. 4-74: Scanner Arm - Length Measurement

g. Install the screw knob to secure the scanner arm in its current position.

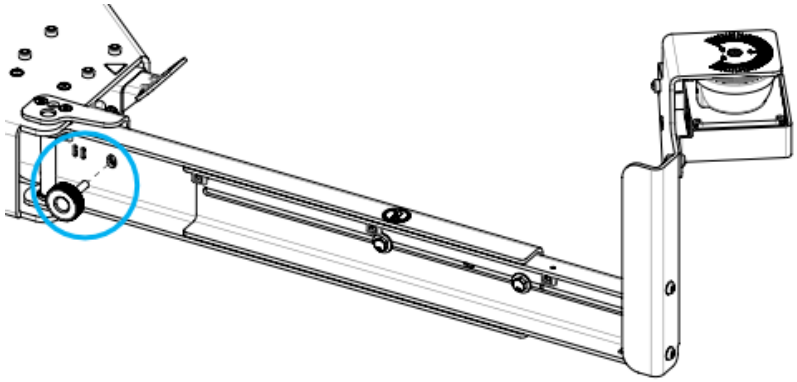


Fig. 4-75: Scanner Arm - Screw Knob

h. Repeat the steps to install the scanner arm on the opposite side.

Electrical Installation

a. Route cable -W121 from under the palletizer control box to the front scanner via the hole in front of the bracket, and connect it to the scanner pigtail W120. Secure the cable with an additional cable tie as shown in the figure.

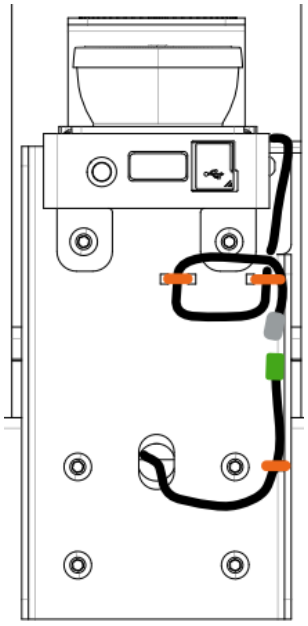


Fig. 4-76: Scanner - Cables -W121 and W120 Connection

b. Tilt the operator station mechanism forward to ensure that the cable cannot be pinched.

c. Route the safety scanner cables from under the palletizer control box to the respective safety scanners.
   - Connect cable W123 to the W122 pigtail on scanner BG2.
   - Connect cable W125 to the W124 pigtail on scanner BG3.
   - Secure both cables using cable ties.

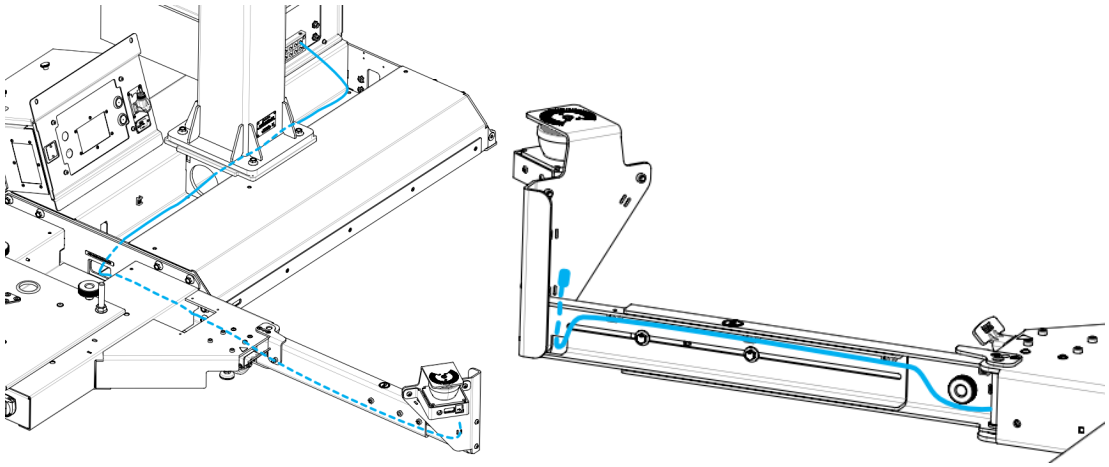


Fig. 4-77: Cable Routing - PE20 Control Box to Safety Scanner

	**WARNING**
	Ensure the cables are positioned so they cannot be pinched when the scanner arms are folded.

Detection Zones Setup

Required material: Windows laptop and micro USB cable.

a. Download the SICK Safety Designer application from the SICK website, then install and run the application.

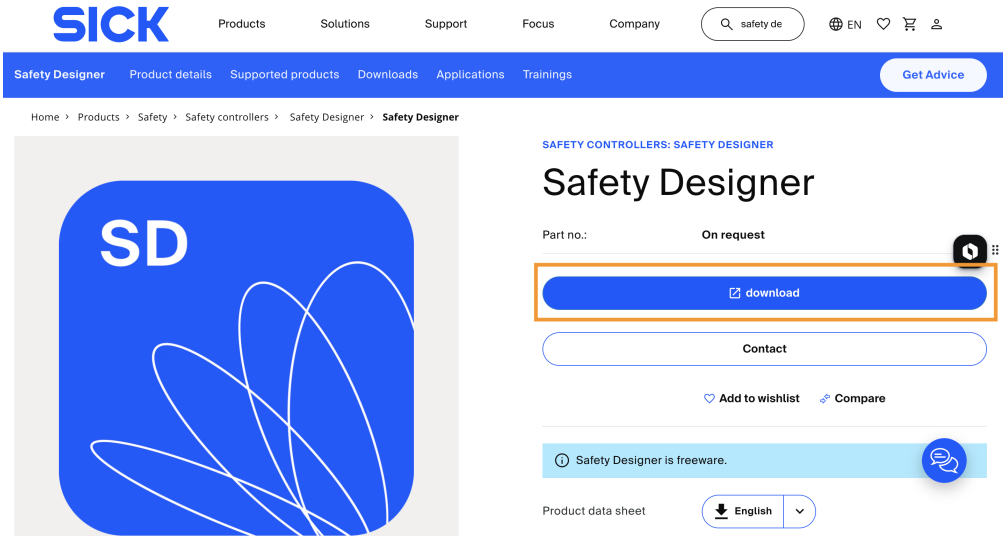


Fig. 4-78: SICK Safety Designer Application - Download

b. Connect the scanner to your computer using a micro USB cable (not provided).

c. Following startup, Safety Designer displays the Home screen.

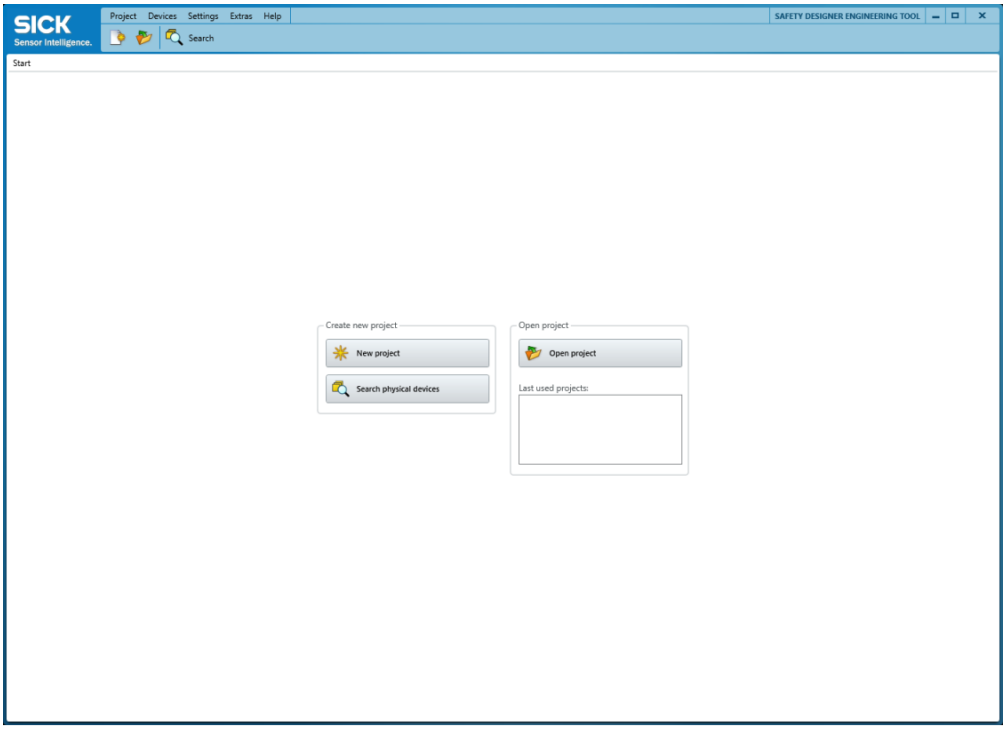


Fig. 4-79: SICK Safety Designer Application - Home Screen

d. Choose one of two configuration methods: starting from a template (Option 1) or starting from scratch (Option 2):

Option 1: Starting from a template

Download the Safety Kit Program Template file (available at robotiq.com/support). This template is helpful when installing a new program on the scanner.

a. Select Open project, and open the Safety Kit Program Template file.

b. Under Device management, in the Search tab on the right side, search for the connected scanner.

c. Drag and drop the detected scanner from the search results onto the corresponding template configuration.

	NOTICE
	The template provides standard detection zone settings for GMA pallets (1016 x 1219 mm), maximizing the operational range of all three scanners while maintaining, when possible, a 180 mm clearance around the pallets to prevent nuisance tripping from robot movements. Pre-configured non-detection zones (in gray) are included for the pallets, Smart Infeed Adjustable Legs and Control Box, and the front of the Operator's Station.

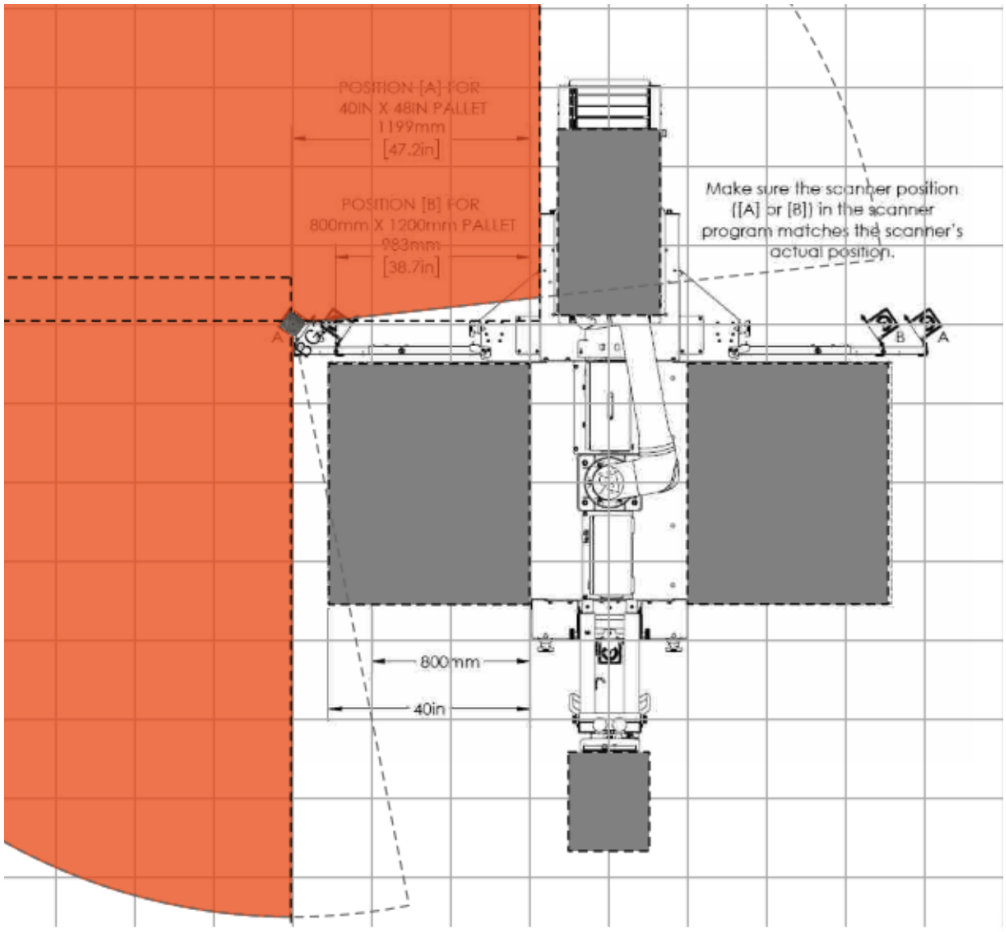


Fig. 4-80: Non-Detection Zones

Option 2. Start from scratch

Download the Safety Kit Program Template file (available at robotiq.com/support). This template is helpful when installing a new program on the scanner.

a. Select Search physical devices under Create new project.

b. Drag and drop the found device from the search results on the left tab onto the Device Overview window.

NOTICE

Tip: To assist with orientation, you may optionally use a background image. A visual is available in Appendix A-1: Safety Kit Program Template Background Image at the end of this document.

c. After the scanner appears in the Device Overview window, double-click its icon to access the settings.

d. In Configuration → Application, set the display language for the scanner.

e. In Configuration → Monitoring plane, select Leg (70mm) for object detection.

f. To modify the zone, go to Configuration → Fields, right-click Detection zone, and choose Settings.

g. In the toolbox, switch to the non-detection zone settings.



Fig. 4-81: Toolbox

h. Define non-detection zones for fixed obstructions in the area, including the operator station, conveyor supports, or scanner brackets.

CAUTION

- To avoid nuisance tripping from robot movements, Robotiq recommends maintaining a clearance of at least 180 mm around the pallets.
- When modifying detection zones, installers must perform a comprehensive risk assessment to verify that the final configuration adheres to all environmental safety standards.
- By installing the Robotiq palletizer, you accept full responsibility for meeting all applicable local regulations and safety codes.

NOTICE

Pre-configured non-detection zones (in gray) represent both pallets (GMA), Smart Infeed adjustable legs and control box. An additional non-detection zone is placed in front of the operator's station.

i. Go to Configuration → Transfer and click Transfer to the device.

j. Click Transfer selection.

k. Enter the password (default is SICKSAFE) and click Login.

l. Click Verify configuration.

m. When the safety laser scanner verification report displays, review the report and save a copy as a PDF.

n. Save the configuration file.

o. Repeat steps 1 through 6 for each safety laser scanner.

p. To ensure the area scanners operate correctly, properly set up the following Configurable Inputs on the UR20 robot: config_in [2] and config_in[3] for Automatic Safeguard Stop.

For complete instructions on using the Safety Designer software, refer to the Operating Instructions.

4.10. URCap Package Installation



WARNING

Starting in July 2023, all new Palletizing Solutions sold are not compatible and not supported on Universal Robots CB Series. Only e-Series and new generations of Universal Robots can be used.

For more information, please contact the Robotiq support department.

The Robotiq URCap package provides a graphical user interface and enables direct serial communication to the robot control box. You will need both the Copilot and Gripper URCaps to run the PAL Ready.

a. Make sure the PAL Ready is installed properly.

b. Connect the power supply cable to a power outlet.

c. Power on the robot.

d. Before proceeding with the installation of the URCaps, validate the Universal Robots's PolyScope version for compatibility with the URCap package.

e. To download the latest version of the Copilot URCap, refer to robotiq.com/support under the sections PAL Ready - Palletizing Solution, Universal Robots and Software.

f. To download the latest version of the Gripper URCap, refer to robotiq.com/support under the sections Vacuum Grippers, Universal Robots and Software.

g. Download the Copilot and Gripper URCaps, then extract it on the root of a blank USB storage device.

h. Insert the USB storage device in the UR teach pendant or robot control box.

i. On the teach pendant, tap the triple bar icon in the upper right corner of the screen.

j. Tap Settings.

k. Tap the System button in the navigation pane on the left.

l. Tap the URCaps button.

m. Tap the plus (+) button to look for the .urcap file in the available drives.

n. To install the URCaps, choose the Copilot and Gripper URCaps (UCS-X.X.X.).

o. Once the files are selected, tap the Open button.

p. Tap the Restart button to complete the URCaps installation. By doing so, you accept the license agreement detailed in the URCaps information textbox.

4.11. Centering the Solution

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

a. 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.

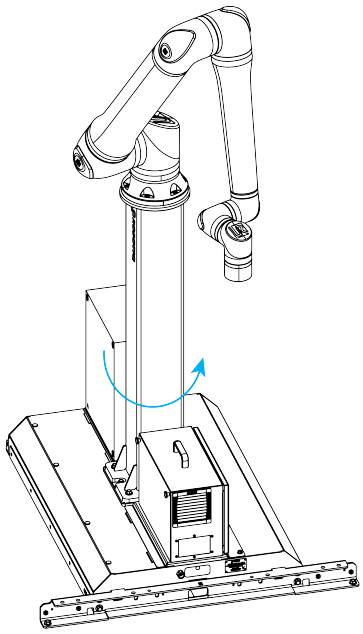


Fig. 4-82: Centering - Step 1

b. Rotate the column counterclockwise as much as possible.

c. In the Installation tab, make sure that the TCP value is set to [0, 0, 0].

d. Go to Installation tab -> URCaps -> Copilot -> Configuration -> Installation positions.

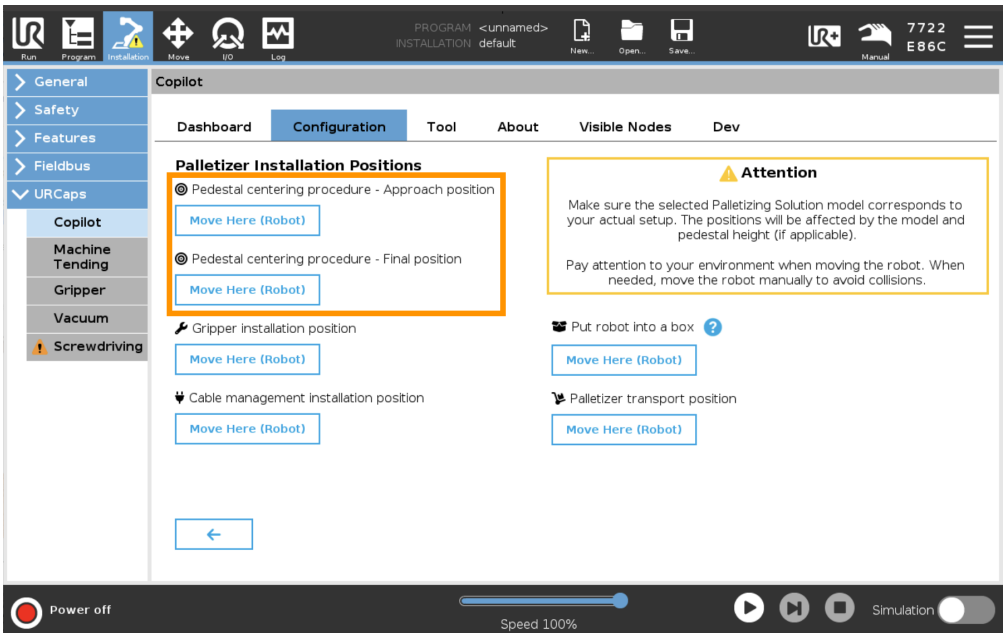


Fig. 4-83: Copilot - Installation Positions - Pedestal Centering Procedure

e. Under Pedestal centering procedure - Approach position, press Move Here (Robot).

f. Once the movement is completed, under Pedestal centering procedure - Final position, press Move Here (Robot).

g. The wrist of the robot should be on the outer left side of the base, as shown in the figure below.

h. 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.

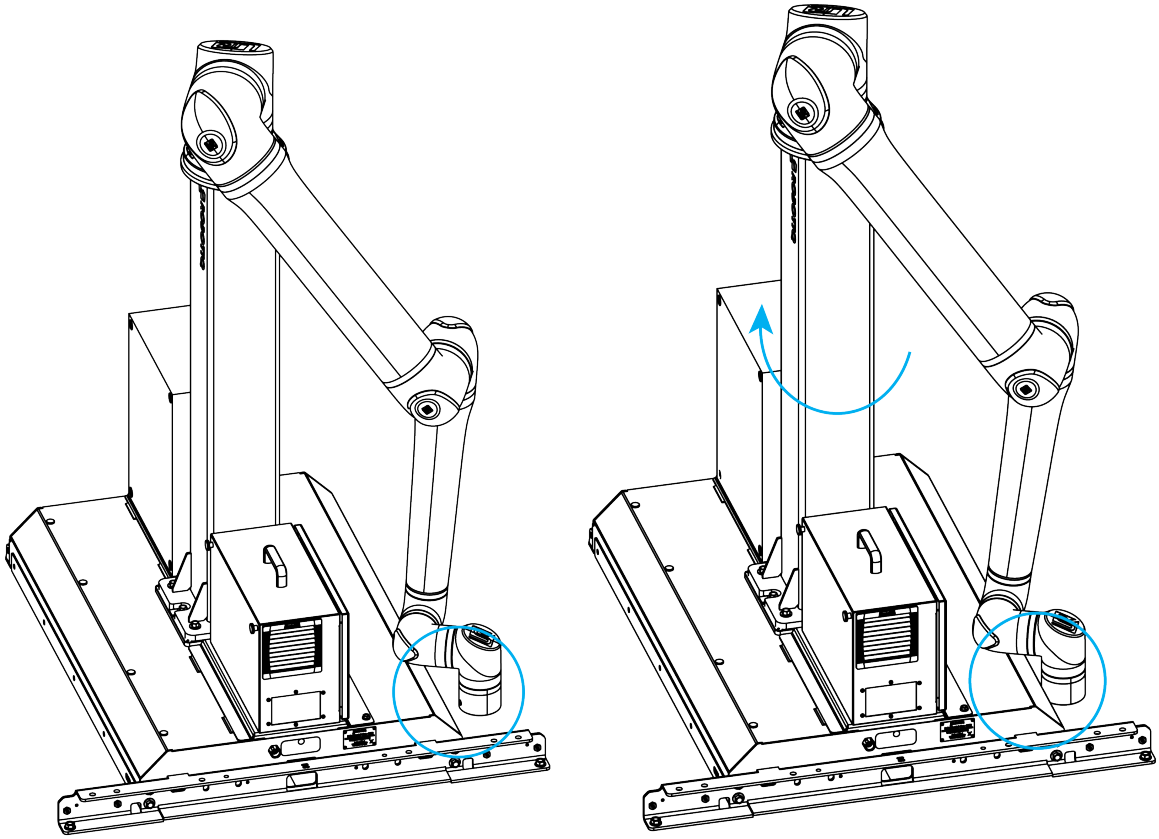


Fig. 4-84: Centering - Step 2 (Left) and Step 3 (Right)

i. Tighten the four (4) screws to secure the pedestal to the base. Tightening torque must be 84 Nm (62 lb-ft).

j. 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.

k. When the X position is within the specified range, remove the M12 x 30 screws, one at a time, apply medium-strength threadlocker on the threaded part of the screws, and retighten to 84 Nm (62 lb-ft).

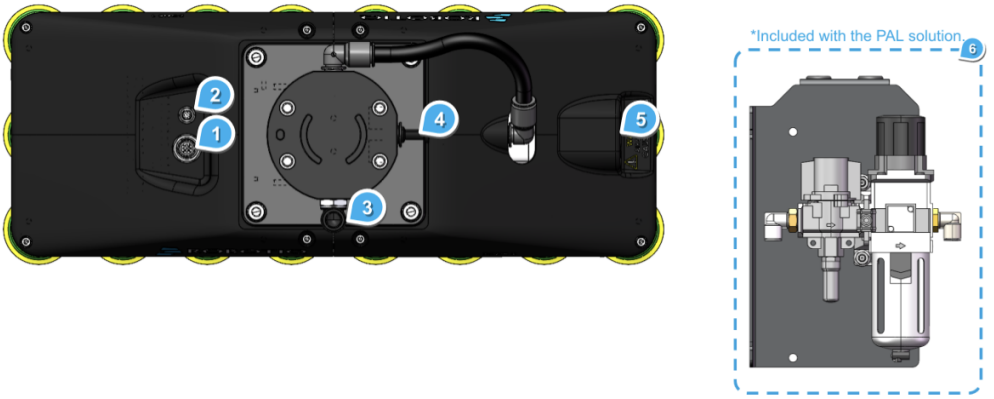
4.12. PowerPick Multi Installation

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 the PowerPick Multi manual.

4.12.1. Overview: Control

1. I/O Cable M12-5 Pins
2. Tool I/O Cable M8-8 Pins
3. Gripper Compressed Air Input (Push-in Fitting for 12 mm tubing)
4. Alternate Gripper Compressed Air Input
5. Venturi Silencer Exhaust
6. Air Filtration Unit (Provided with the PE20)



NOTICE

The following instructions guide you through the standard installation. You should select the configuration that best fits your specific application. For additional technical details and alternative gripper configurations, please consult the PowerPick Multi User Manual available at robotiq.com/support.

We recommend using the Robotiq Configurator to simulate and identify the optimal setup for your workflow. If your application requires multiple configurations, consider an adaptable gripper arrangement to suit various tasks.



Fig. 4-85: PowerPick Multi - Standard Configuration

4.12.2. PowerPick Multi Air Filtration Unit Installation

Components:

- Air Filtration Unit
- Pneumatic elbow fitting, 12 mm tube x G1/2 thread, 24 mm drive (tool supplied with PowerPick Multi)

Installation Steps:

a. Using a 13 mm hex socket, loosen the two (2) pre-installed M8 x 20 hex head cap screws on the pedestal for the Air Filtration Unit, ensuring a 4 mm (3/16 in) gap remains between the screw head and the surface.

b. Slide the Air Filtration Unit onto the two (2) M8 x 20 hex head cap screws.

c. Tighten the screws using a 13 mm socket. The required torque is 5 Nm.

d. Using a 10 mm hex key, remove the pneumatic plug from the bulk head fitting located on the column.

e. On the bulk head fitting, install the 1/2 BSPP to 12 mm tube pneumatic elbow fitting provided using a 24 mm wrench. The required torque is 26 Nm.

f. Insert the 12 mm air tube (for pneumatic pressure to the Air Filtration Unit) into the elbow fitting.

g. Push the air tube until it stops, then install the safety clip.

h. You will complete the installation, during the Cable Management step.

4.12.3. Mechanical Installation

a. Go to: Gripper installation position (Installation tab -> URCaps -> Copilot -> Configuration -> Installation positions).

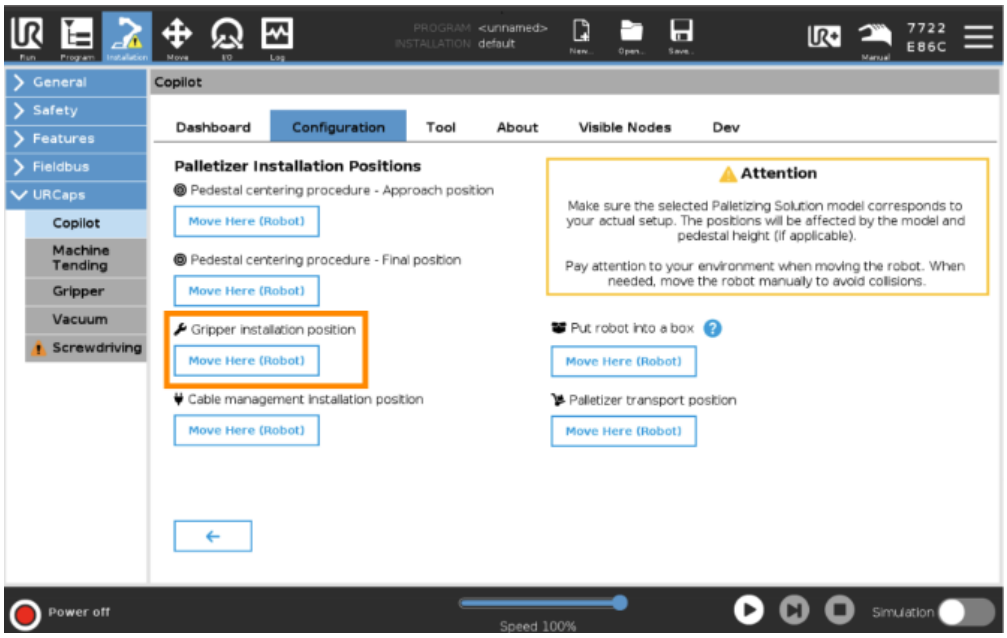


Fig. 4-86: Copilot URCap - Gripper Installation Position

b. Remove the 12 mm air tube connected between the Manifold and the Gripper Compressed Air Input.

c. Remove the four (4) M8 x 14 mm screws holding the mounting plate to the support frame using the 6 mm hex key.

d. Remove the cable tie securing the manifold.

Standard Configuration

NOTICE

For information regarding other PowerPick Multi configurations, please refer to the PowerPick Multi user manual, available at robotiq.com/support.

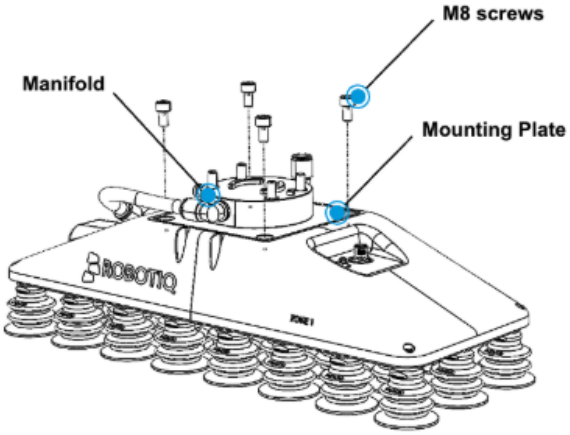


Fig. 4-87: PowerPick Multi - Standard Configuration Components

a. Install the manifold assembly and mounting plate onto the robot wrist with the four (4) provided M8 x 45 screws and belleville washers using the 6 mm hex key.

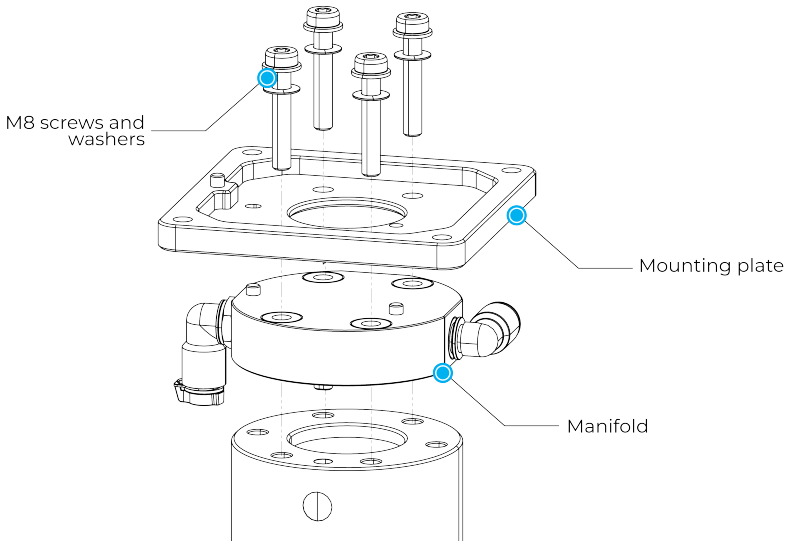


Fig. 4-88: Mounting Plate and Manifold Installation

b. Reattach the Mounting Plate to the gripper with the four (4) M8x14 mm screws. Required torque is 16 Nm (11.8 lb-ft).

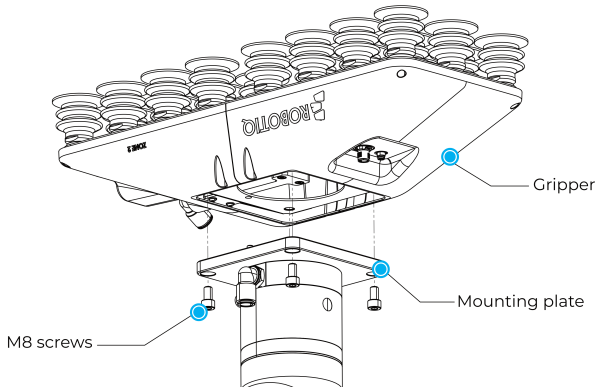
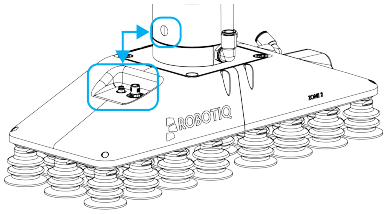


Fig. 4-89: Gripper Installation to Mounting Plate

CAUTION

Make sure the gripper cables are aligned with the robot wrist cable.



CAUTION

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

c. Join the end of the 12 mm air tube, which was previously detached, to the elbow fitting on the PowerPick Multi.

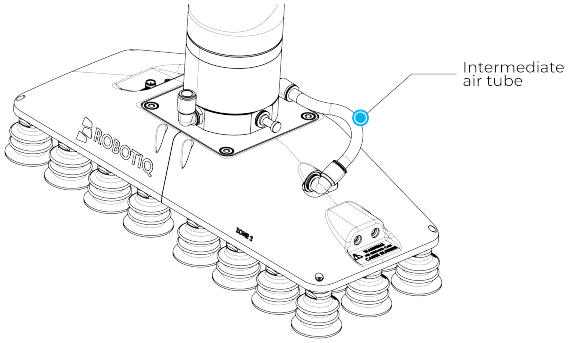


Fig. 4-90: Intermediate Air Tube Connection

4.12.4. Cable Management

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

- 3 x cable clips + 0.5 m hook and loop (VELCRO®) fastener
- 1 x cable clip + 1 m hook and loop (VELCRO®) fastener
- 1 x tubing curler
- 1 x 12 mm double air tube (4.2 m length)
- 20 x cable ties low-profile
- 10 x 190 mm cable ties

Robot Positioning

Change the robot's position to the following pre-programmed position: Cable management installation position (Installation tab -> URCaps -> Copilot -> Installation positions-> Cable management installation position).

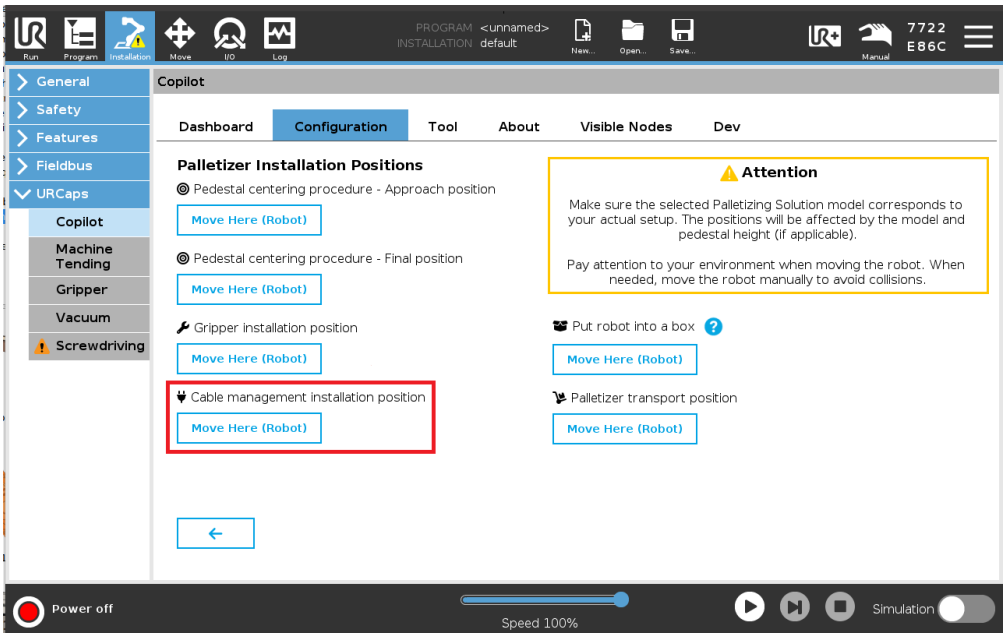


Fig. 4-91: Copilot URCap - Cable Management Installation Position

Cable Clips Installation

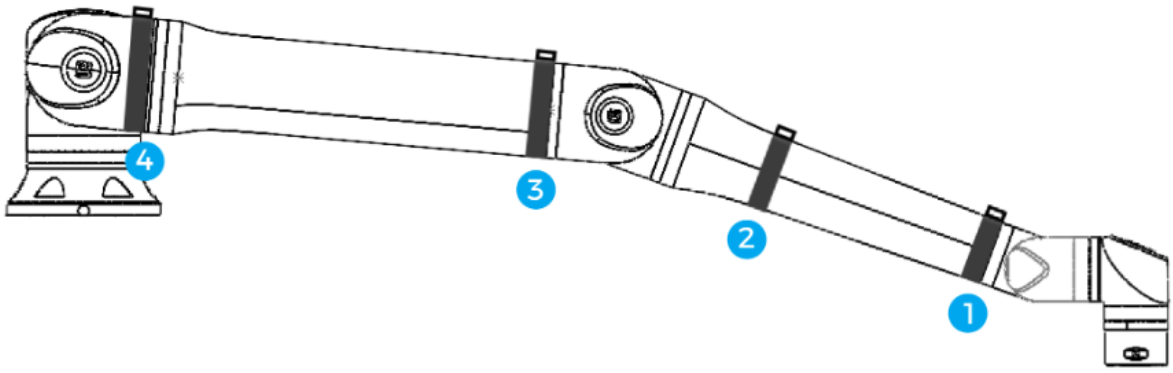


Fig. 4-92: Cable Management - Cable Clips Installation

a. Install 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.

b. 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.

c. If applicable, rotate all cable clips so that the plastic mount is facing up; this will ensure the good positioning of the tubing.

Air Tubing and Electrical Cable Installation

Air Tubing Installation

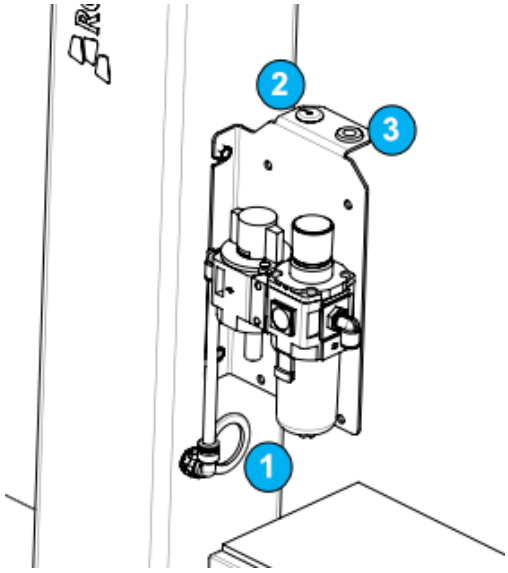


Fig. 4-93: Air Filtration Bracket

a. Pass the end of the 12 mm air tube labeled BASE SIDE through hole #3 on top of the air filtration bracket and connect it to the exit of the air filtration unit.

b. Push the air tube in until it stops, then install a safety clip.

c. Find the silver mark on the tubing that is closest to the vacuum generation unit. At the silver mark, tightly attach the tubing to the cable clip #4 using a cable tie (red component in the figure).

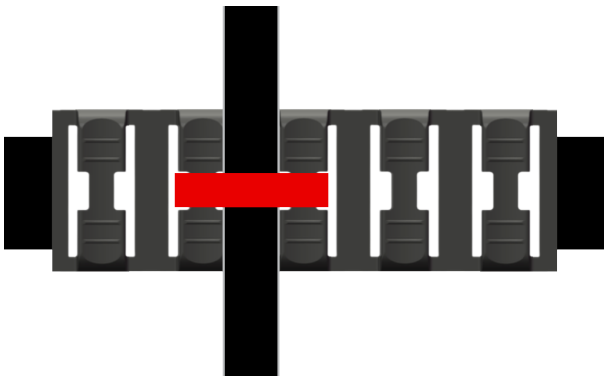


Fig. 4-94: Cable Clip

d. Find the silver mark on the tube closest to the gripper. At the silver mark, tightly attach the tubing to the cable clip #1 using a cable tie.

e. Place the tubing curler on top of the tubing, as depicted in the figure below.



Fig. 4-95: Tubing Curler

f. 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).

g. Fasten the tubing to the tubing curler with the supplied cable ties, ensuring it conforms to the curler's curved profile.

h. At the designated silver marks, fix the tubing to cable clips #2 and #3.

i. Cut the remaining length of the cable ties.

M12-5 pin I/O Electric Cable Installation

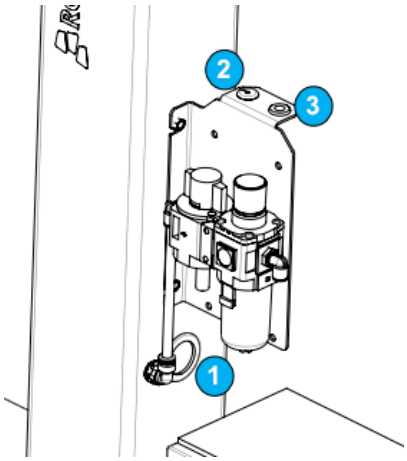


Fig. 4-96: Filter Kit

a. Position the M12-5 pin I/O electric cable so that it extends 235 mm (9 1⁄4 in) beyond the air tubing at the robot wrist.

b. Fasten the cable to the pneumatic tubing at every red reference mark using cable ties, continuing until you reach the filtration unit.

c. Take out the grommet from hole #1 and discard it. Next, extract the grommet from hole #2, but set it aside; you will need it to seal the opening once the cable has been threaded through in a later step.

d. Detach the grommet already mounted on the M12-5 pin I/O cable and keep it nearby; it will be reattached shortly.

e. Insert the open end of the M12-5 pin I/O cable through hole #2, ensuring it is then passed through the previously removed grommet.

f. Then, route the open end of the M12-5 pin I/O cable through hole #1 and down the pedestal. Retrieve it from the bottom of the pedestal and continue routing the cable into the UR control box. You will do the connections in a later step.

g. Plug the hole #1 using the pre-perforated grommet attached to the M12-5 pin I/O cable.

h. Plug hole #2 using the pre-perforated grommet.

Connection to the Gripper

a. Establish the pneumatic connection by attaching the air tube labeled TOOL SIDE to the gripper's available elbow fitting, then install the safety clip.

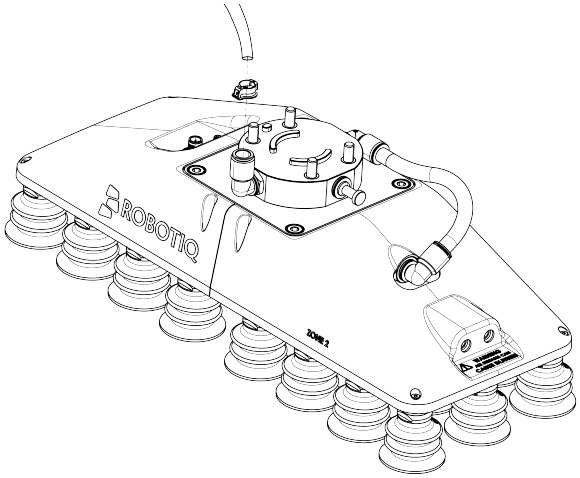


Fig. 4-97: Pneumatic Connection - Tool Side

b. Connect the M12 and M8 I/O cables to the PowerPick Multi as shown in the image.

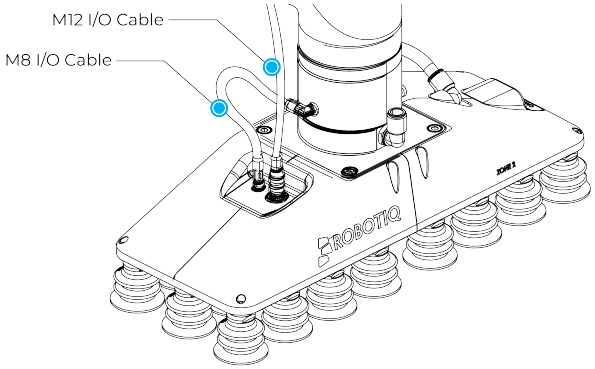


Fig. 4-98: Electric Cable Connection - Tool Side

Connection to the UR control box

a. Locate the open end of the M12 I/O cable that was previously threaded into the UR control box.

b. Connect it to the robot control box according to the figure.

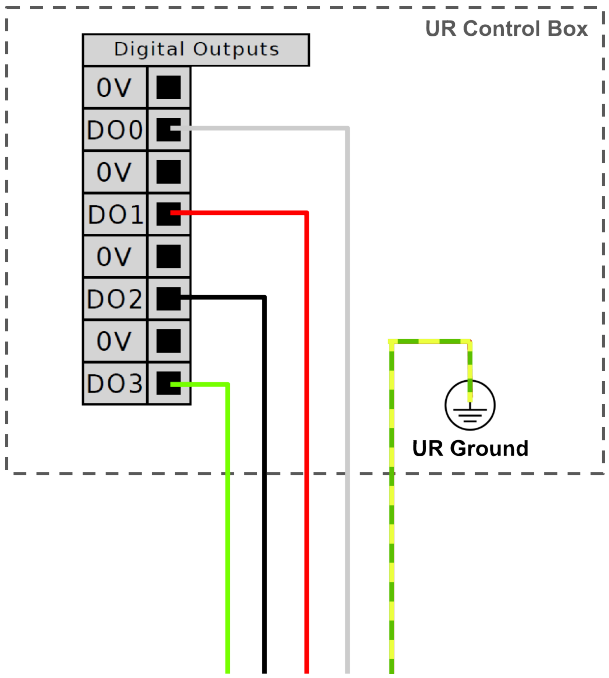


Fig. 4-99: Electric Cable Connections - UR Control Box

c. Complete the ground (GND) connection by securing the cable with the ring connector to an M6 protective earth stud with two (2) M6 external tooth lock washers and one (1) M6 flange nut (not supplied).



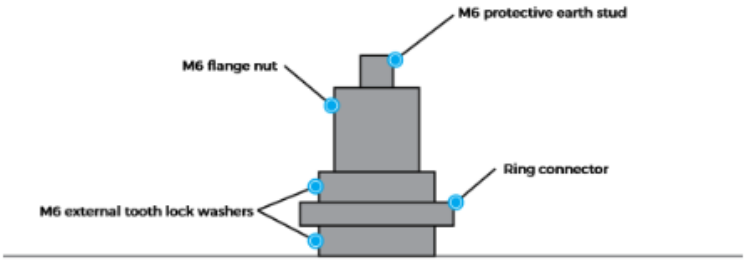


Fig. 4-100: Ground Connection

d. Tighten the nut so that the lock washers are properly engaged.

4.12.5. Configuration Steps

Digital Outputs

a. In the Installation tab, under URCaps/Vacuum, select PowerPick Multi as the vacuum gripper model.

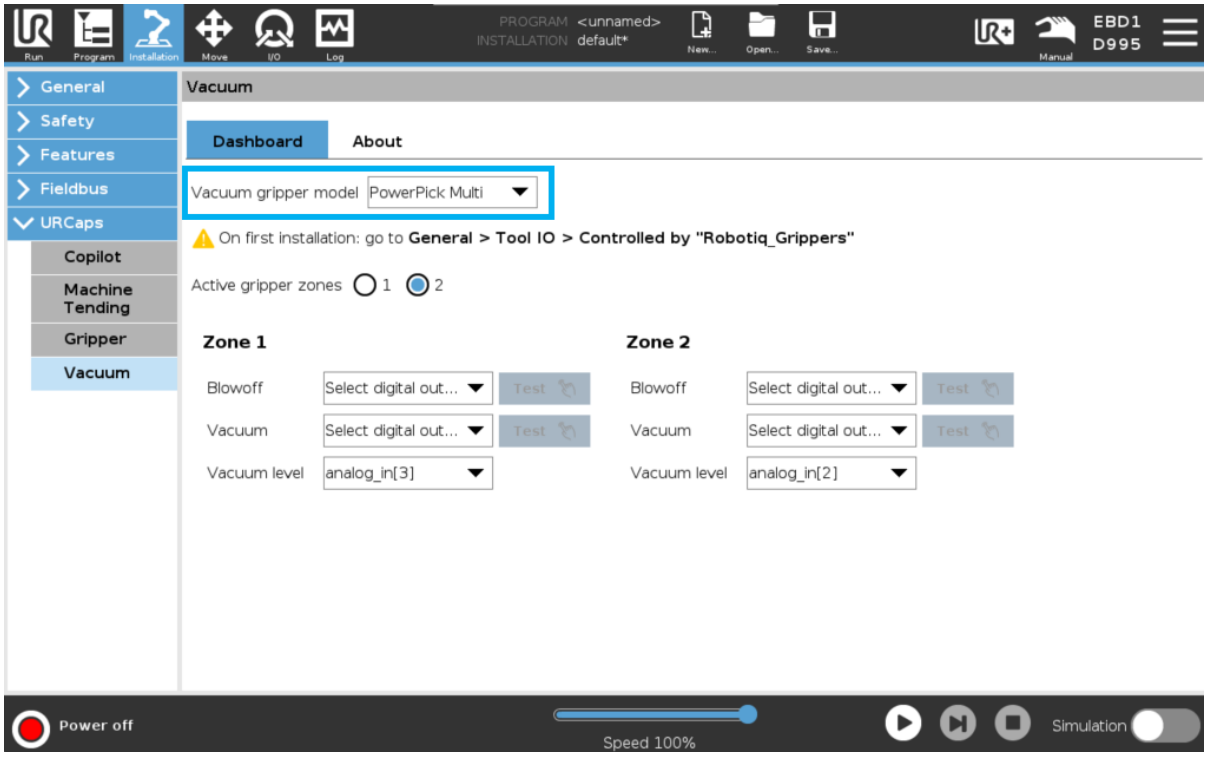


Fig. 4-101: Vacuum URCap - Vacuum Gripper Model

b. Use the following table to link each UR Connection to its assigned function, mirroring the hardware wiring in the UR control box.

Wire Color	UR Connection	Assigned Function
WHITE	DO0	Vacuum #1
RED	DO1	Vacuum #2
BLACK	DO2	Blow off #1
GREEN	DO3	Blow off #2
GREEN / YELLOW	GND	Ground

c. In the Installation tab, under General/Tool I/O, select Robotiq_Grippers in the Controlled by drop down menu. It will automatically select the right information for the gripper.

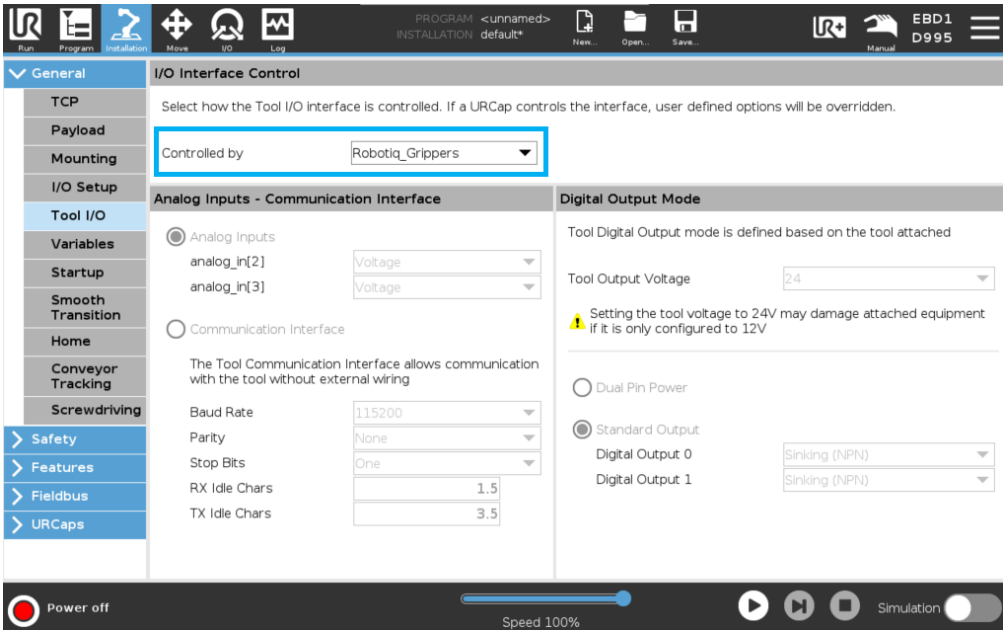


Fig. 4-102: General - Tool I/O - Controlled by

TCP and Center of Mass

The following table lists the appropriate values for the standard configuration. For details on other configurations, consult the PowerPick Multi User Manual at robotiq.com/support.

Configuration	Center of Mass (mm)			TCP (mm)			Mass (g)
	X	Y	Z	X	Y	Z	
	0	-5	82	0	0	155	4277

a. In the PolyScope interface, go to Installation > General/TCP.

b. Enter TCP values.

c. Then, go to Installation > General/Payload.

d. Enter Payload and center of mass values.

4.12.6. Cable Management Finalization

a. Verify that the tubing travels along each straight section of the robot. Move cable clips #2 or #3 to adjust the position of the tubing if needed.

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.

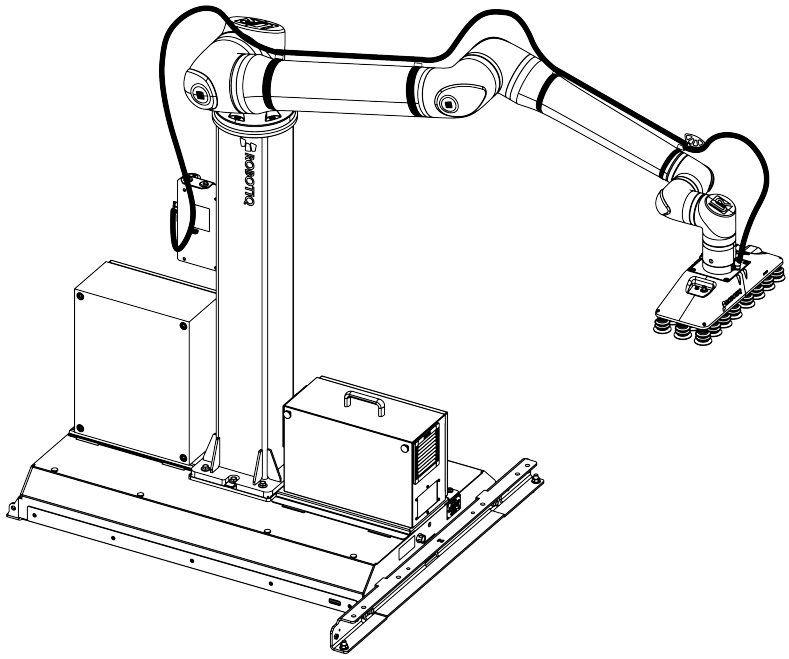


Fig. 4-103: PowerPick Multi - Final Cable Management

4.13. Replacing Controllers and Covers

a. Reposition the Palletizer and UR control boxes upright and fasten them with the provided screws.

b. Re-install all covers with the provided screws.

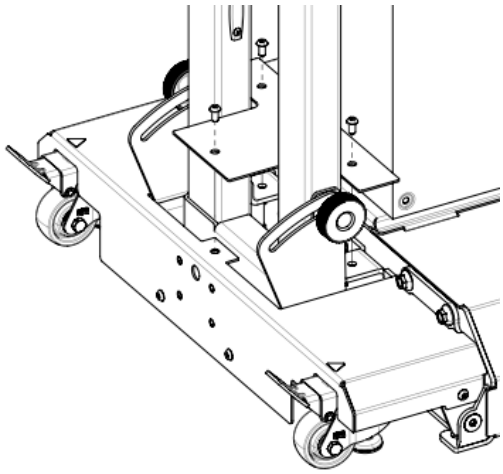


Fig. 4-104: Operator Station Cover

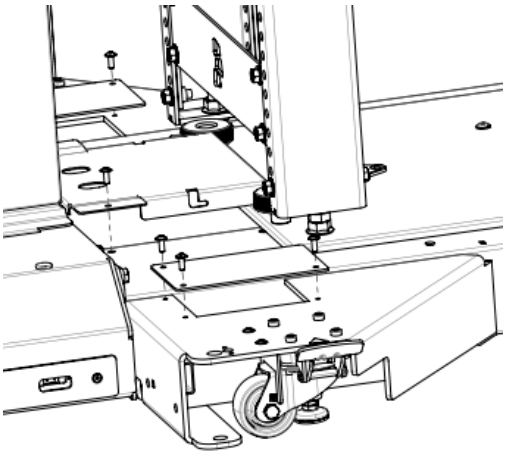


Fig. 4-105: Smart Infeed Base Covers

4.14. Robot and Palletizer Configuration

4.14.1. Joint Limits Setting

a. Go to Installation->Safety->Joint Limits.

b. Unlock the section with the proper password and change the Elbow and Wrist 3 values as follows.

Joint	Minimum	Maximum
Elbow	-172°	3°
Wrist 3	-293°	293°

4.14.2. Robot Limits Setting

WARNING

Excessive Tool Speed Hazard

Tool speed (1) must not exceed 2000 mm/s under any circumstance. Operating the Solution above this limit is considered improper and unsafe, and may result in material damage, equipment malfunction, serious bodily injury, or death. Always ensure tool speed settings comply with the specified maximum before running the system.

a. Set Robot Limits at the Least Restrictive setting by navigating to Installation->Safety->Robot Limits.

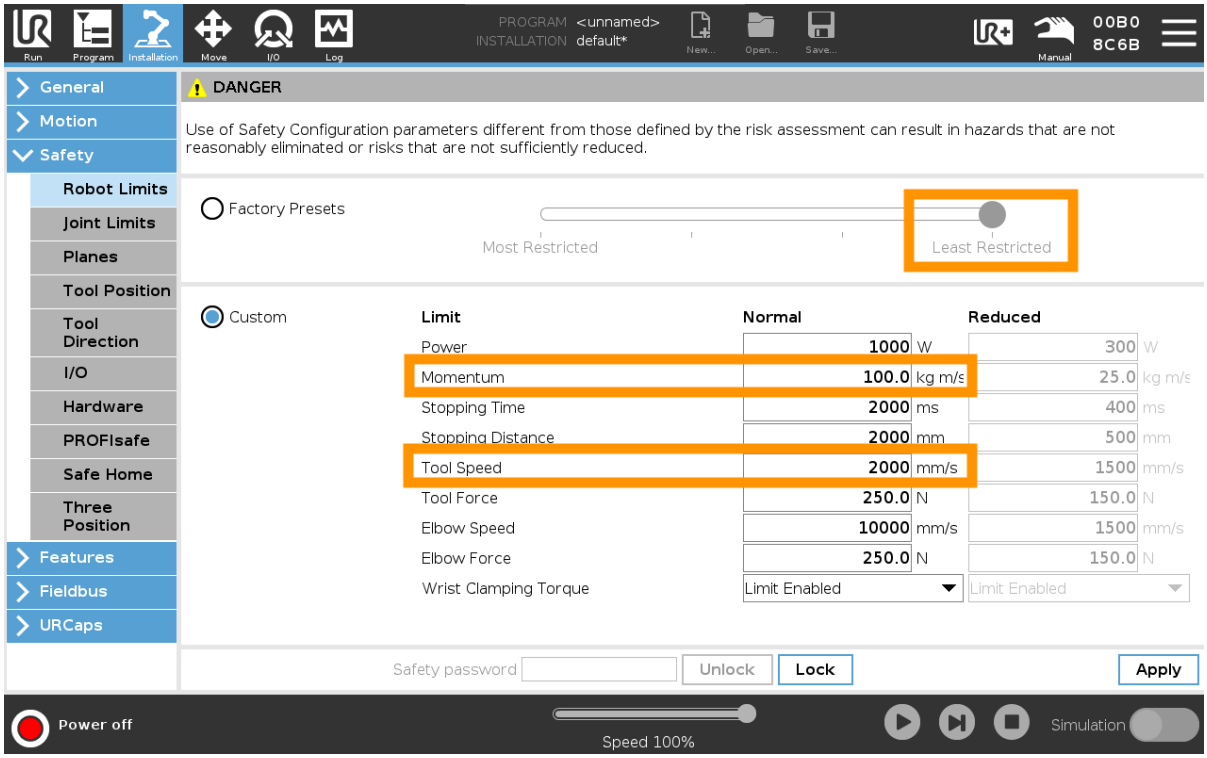


Fig. 4-106: Robot Limits Settings

b. The limits specified in the table below or lower values must be applied in the robot's safety configuration parameters or in the Robotiq Copilot URCap settings.

Mechanical Specifications	Metric	Imperial
Limit / Momentum	100.0 kg m/s	8680 lb in/s
Limit / Tool Speed	2000 mm/s	78.7 in/s

4.14.3. Palletizer Limits Setting

a. In the palletizer node, go to Settings.

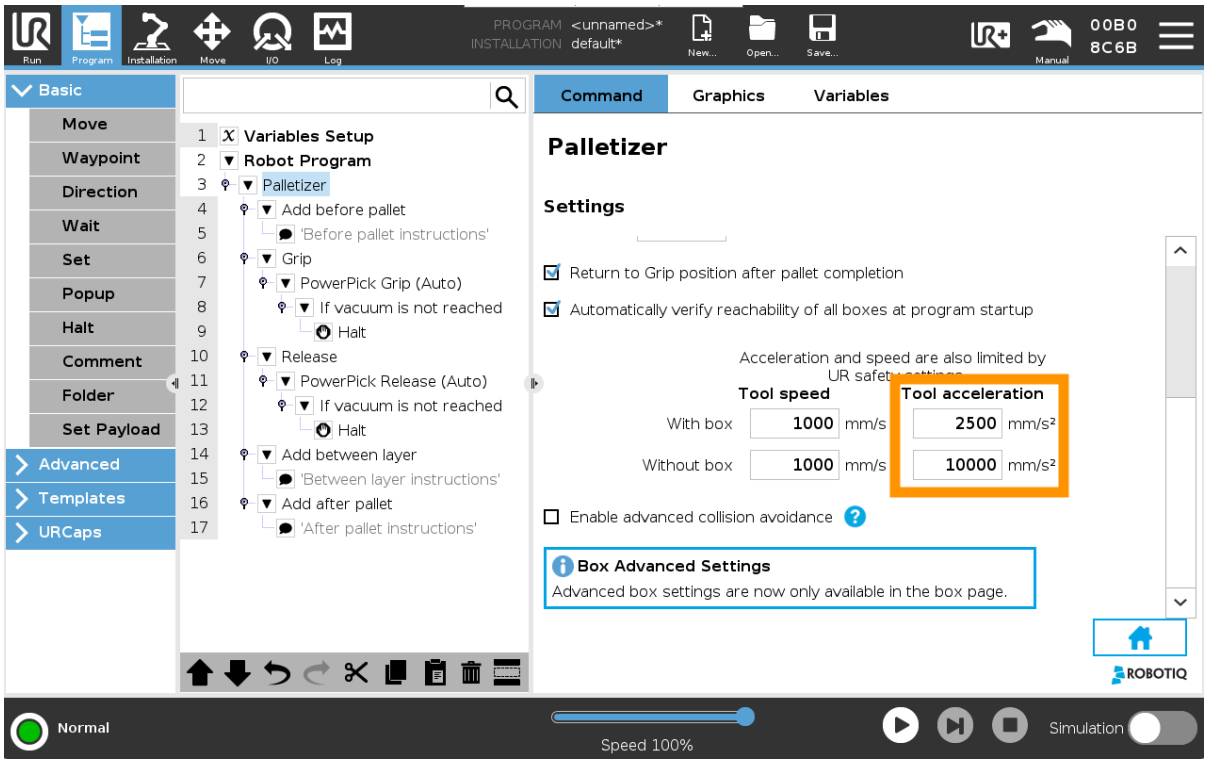


Fig. 4-107: Palletizer Settings

b. The limits specified in the table below or lower values must be applied in the palletizer settings.

Mechanical Specifications	Metric	Imperial
Palletizer / Settings / Tool acceleration (with box)	2500 mm/s²	98 in/s²
Palletizer / Settings / Tool acceleration (without box)	10000 mm/s²	393.7 in/s²

c. The tool's force and speed may be reduced if necessary. Keep in mind that making these changes might lead to a slower cycle time for the Solution.

WARNING

Risk of tipping over

To ensure stability, it is mandatory to limit the momentum and speed values in the robot's safety parameters.

4.14.4. Configurable Inputs

Two of the buttons found on the push button enclosure can be configured to trigger Pause and Restart commands. The direct input (DI) terminals to which the Pause and Restart wires need to be connected are at the user's choice.

a. Tap Installation > General > I/O Setup.

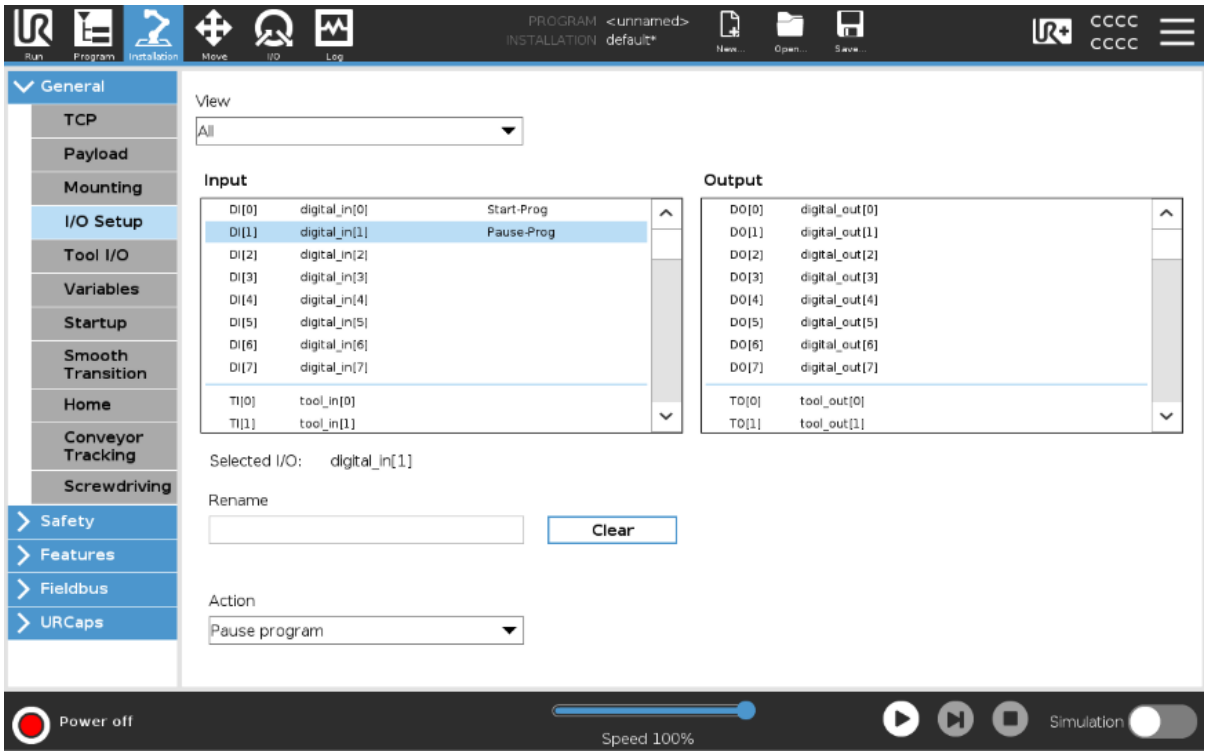


Fig. 4-108: Configurable Inputs

b. Set the Input Signal digital_in[0] to Start-Prog and digital_in[1] to Pause-Prog.

4.15. Supply Pressure Adjustment

For best performance, compressed air consumption should be set at an optimal pressure of 6.5 bar (94.3 psi) for the gripper and between 4 bar (58 psi) and 6 bar (87 psi) for the Smart Infeed. However, it is possible to reduce the supply pressure in order to reduce air consumption or noise level. It is also possible to increase the supply pressure if more vacuum force is necessary. If so, further tests must be performed to ensure the payload is always maintained in operating conditions.

	WARNING
	Never exceed the maximum allowed pressure of 8 bar (115 psi) for the gripper, and 6 bar (87 psi) for the Smart Infeed.

Follow these instructions to adjust the supply pressure of the Air Filtration Unit:

a. Connect the air supply to the main air inlet located at the end of the mobility base.

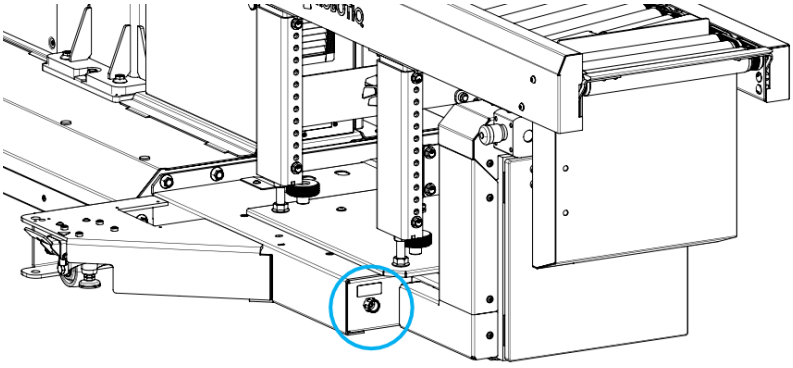


Fig. 4-109: Air Supply Main Inlet

b. Turn the shut-off valve for the Smart Infeed 100 and PowerPick Multi to the "SUP" position.

c. Ensure the conveyor air pressure does not surpass the 6 bar limit.

d. Remove all objects from under the suction cups and test suction valves.

e. Go to Installation->URCaps->Vacuum to test the suction valves.

f. While the vacuum is activated, adjust the pressure to the desired value on the filter-regulator by turning the knob at the top.

g. Let the valves open for at least 30 seconds to stabilize the pressure (optimal pressure is 0.65 MPa (6.5 bar / 94.3 psi) for the gripper).

h. Deactivate both suction valves.

i. Validate the adjustment by repeatedly activating and deactivating both suction valves.

j. Verify the pressure value shown on the filter-regulator.

4.16. Smart Infeed 100 Height Adjustment

Verify that the Infeed Deck is level by using a leveling tool and modifying the leg height.

a. To make fine adjustments to the Adjustable Legs, use a 24 mm open-end wrench on the nuts situated under the legs.

b. Rotating the nuts counter-clockwise will raise the legs, while rotating them clockwise will lower them.

c. The goal is to make the Smart Infeed perfectly level with, or slightly lower than, the upstream conveyor (a maximum of 2 mm [1/16 in] lower). The Smart Infeed must be stable, with all four (4) foot plates resting on the underlying nut. Once stable, tighten the top nuts to 120 Nm (89 ft-lb).

Consult the Smart Infeed 100 user manual at robotiq.com/support for detailed configuration instructions, specifically sections 4.5, 4.6, 5.2, and 5.3.

4.17. Additional Information



WARNING

Make sure to perform a risk assessment before using the Solution. For more details, please refer to robotiq.com/support.

- For each operating station, mark on the ground the machine area and, if scanners are present, the safety zones.
- For detailed information about the PAL Ready, please refer to the corresponding sections of the user manual at robotiq.com/support.

4.17.1. Atypical and Custom-Sized Pallets

By default, the PE20 Palletizing Solution is designed to be used with a wide range of standard-sized pallets.

If it is used in conjunction with atypical- or custom-sized pallets, it may be necessary to adjust the pallet sensors so that they trigger properly and accurately. If the application requires such a configuration, please contact the Robotiq support team.

Certain pallet types may prove difficult to detect relative to the base of the Solution (i.e., if the top of pallet does not rest against the base of the Solution, which is often the case with stackable plastic pallets). In such cases, Robotiq recommends installing offset spacers and to make them rest against the pallet blocks, legs or feet. Please refer to the Overhang Spacers section for more information.

4.17.2. Physical Clearance and Reachable Area of the Robot

The computed trajectories allow the boxes or the robot to overrun the edges of the pallet when the robot moves the boxes to their final position. Mitigation measures can be put in place to prevent a transient or quasi-static impact between a box, or the robot itself, and an operator.

Below are some examples:

- Physical assets such as guardrails and bollards, which prevent the operator from accessing the area.
- Sensors such as light curtains or area scanners which can detect the presence of a person, and stop the system before that person reaches the danger zone.
- The Add virtual planes around pallet(s) option available in the Settings tab of the Palletizer node of the Robotiq URCap to contain the overrun within a certain distance of the pallet. Please refer to the Palletizer Node section to learn more about this option.

4.17.3. Safety Planes

Safety planes, programmable via UR's PolyScope, can be added to the front and sides of pallet zones as safeguarding measures in case of system failure, mainly to prevent the robot from overrunning the edges of the pallet while carrying boxes. Please refer to the instruction manual of the UR robot used for more details in regard to adding and setting up safety planes.

	**NOTICE**
	The trajectories computed in the Palletizer node allow boxes to overrun the edge of the pallet. This should be accounted for when adding and setting up safety planes. Please refer to the Physical Clearance and Reachable Area of the Robot section for more information. The values can vary depending on your configuration.

For PE20, the boxes won't overrun over the pallet edges if the height of the pallet is greater than 12cm (4.75in). However, for smaller pallets, potential overrun can be determined by the following formulae:

Front overrun

The potential front overrun is the highest value obtained using the following formula:

Potential front overrun (mm) = max (0.1 x box height, 1280 - pallet depth, 180 + extra bracket reach + (0.1 x box height) - (minimum horizontal box dimension /2))

Side overrun

Potential side overrun (mm) = (box diagonal/2) + robot reach + extra bracket reach - pallet width - 295

Trajectories are not limited to hovering over the picking position, the base of the Solution, and the pallets. It is thus important to implement physical safeguarding devices next to the picking area, depending on the layout of the palletizing cell. The robot's reachable area should be clearly identified and marked on the ground.

	**NOTICE**
	When the robot is palletizing on one side, and no pallet is present on the opposite side, the Palletizing Solution computes trajectories based on the assumption that there are no obstacles on the opposite side. The robot’s elbow (joint #2) can therefore extend to the side where no pallet is present. For a UR20, the potential overrun is represented by a cylinder with a radius of 1000 mm, with its axis aligned with the Z-axis of the robot base.

Floor marking

Floor marking to delineate the working zone should be added.

5. Software

5.0.1. Advanced Settings

Within the installation tab's advanced settings, there is an option labeled *Set tilted operator station in the collision mode*.Selecting this option will incorporate a tilted operator station into the collision model.

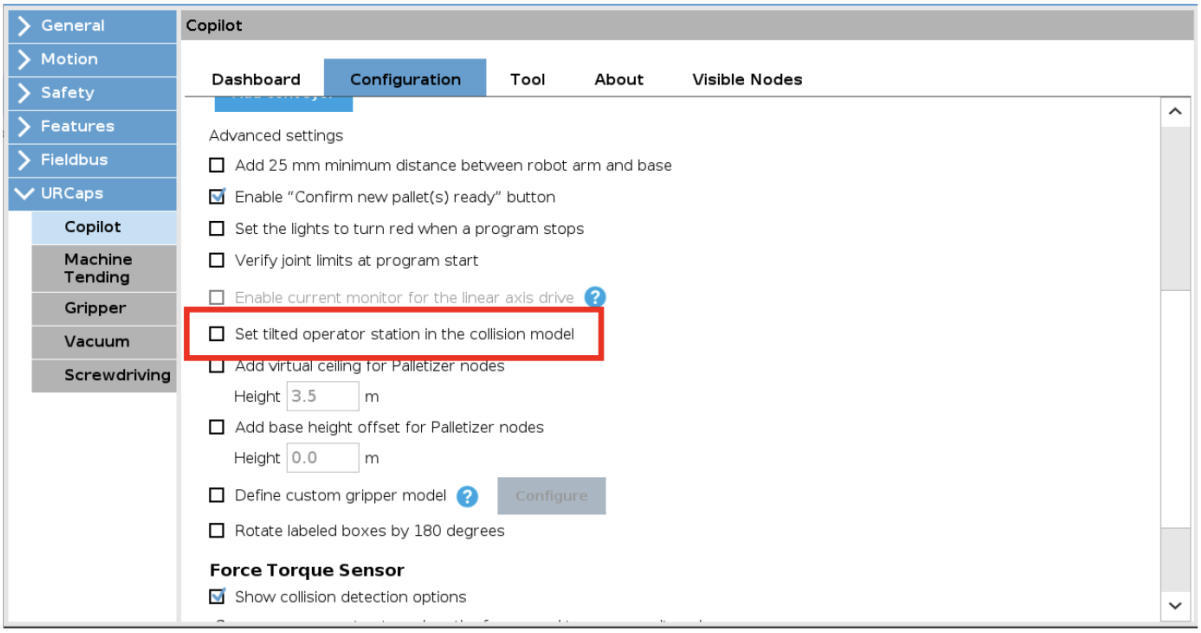


Fig. 5-1: Copilot Advanced Settings - Set Titled Operator Station in the Collision Model

5.1. Copilot URCap Instructions

For software instructions of the Robotiq PE20 Palletizing Solution, Mobility Kit, Smart Infeed 100 or PowerPick Multi gripper, refer to the relevant sections of their respective instruction manuals.

6. Operation

For complete operation instructions of the Robotiq PE20 Palletizing Solution or the Robotiq Mobility Kit, refer to the relevant sections of their respective instruction manuals.



CAUTION

All information in this section must be read and understood before using the Solution.

6.1. Start Up

Perform the following steps after the mechanical and electrical installation.

a. Connect the power cable to the power outlet.

b. Pressurize the system using the shut-off valve if needed.

c. Turn on the main power switch located on the Robotiq control box.

d. Power on the robot.

e. Make sure the URCap package is installed.

f. Configure the TCP. Use the appropriate values based on the gripper configuration.

g. Test the Vacuum Gripper: Make sure the compressed air is supplied. Go to the I/O interface in PolyScope and manually activate the digital output (DO) that corresponds to the vacuum of the gripper. Repeat for the DO corresponding to the blow off action of the gripper.

6.2. Palletizing Operation Instructions



WARNING

There is no emergency stop button directly on the Robotiq Palletizer. The emergency stop button used by the Palletizing Solution is the one found on the robot’s teach pendant. Make sure operators know how to stop the Solution in case of emergency.

The following section explains the logical operation of the Palletizing Solution based on the operator's actions, as well as responses such as signals, pallet and box sensor behaviors, etc. These steps are also represented in the form of diagrams in the Palletizing Operation Diagrams section.

Once the program is selected:

a. Tap the Play button on the robot teach pendant.

- If the Validate pallet state at program startup option is checked in the Palletizer node settings, the Confirm current pallet state window will appear on the robot teach pendant. Enter the pallet state and tap OK. The Palletizer will then start palletizing.

b. The operator has access to a Pause button and a Restart button, both available on the push button enclosure. If an accident occurs, an emergency stop button is also present on the robot teach pendant.

c. To safely resume the solution after a protective stop:

- Ensure the work area is clear and safe.
- Validate the protective stop window and press the resume button to restart the program.
- If necessary, stop the program, reposition the robot and restart the program.



CAUTION

When adding safety components, make sure to respect all electrical wiring standards (example for redundant signals).

d. To safely resume the solution after a protective stop:

- Ensure the work area is clear and safe.
- Validate the protective stop window and press the resume button to restart the program.
- If necessary, stop the program, reposition the robot and restart the program.

e. To safely resume after an emergency stop:

- Ensure the work area is clear and safe.
- Release the emergency stop button and validate the emergency stop window.
- Restart the robot.
- If necessary, reposition the robot and restart the program.

6.3. Palletizing Operation Diagrams

The following diagrams explain the logic of the Palletizing Solution process based on the operator's actions, as well as responses such as signals, pallet and box sensor behaviors, etc. These steps are also explained in the Palletizing Operation Instructions section.

Please refer to the Status Light States section for further information about light states.

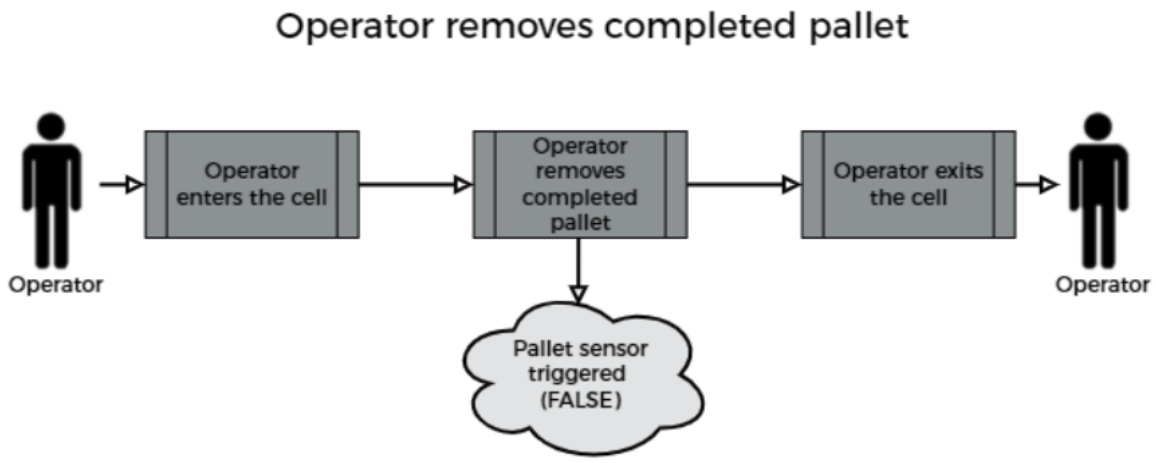


Fig. 6-1: Operation - Operator Removes Completed Pallet

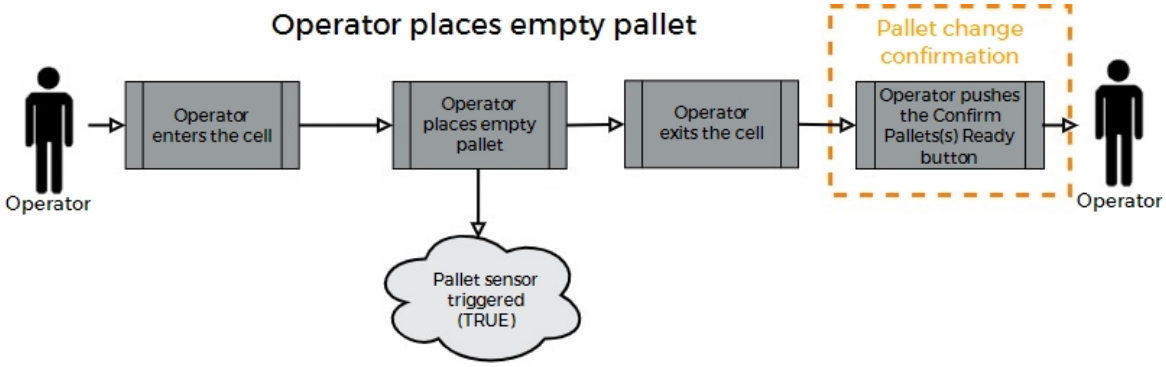


Fig. 6-2: Operation - Operator Places Empty Pallet

6.4. Status Light States

Status Light Activity

- Fast blink: 2 Hz (0.25 s ON, 0.25 s OFF)
- Slow blink: 0.5 Hz (1 s ON, 1 s OFF)

Color and signal type	Condition status	Cause or action needed
RED Fast blink	The Robotiq control box (PLC) is unable to communicate with the robot control box (UR).	• The robot has been started and needs time to boot up (Polyscope has not loaded yet) • Make sure your Ethernet/USB adapter is connected: the LED on the Ethernet adapter should be ON. • Make sure the Ethernet cable between the Robotiq control box and robot control box is properly connected to the USB adapter. • Try powering off the system (both the robot and the Robotiq control box). Wait 1 minute. Power up the system again.
RED Solid	A Protective or Emergency stop has occurred.	Follow the procedure required by the system to recover from either a Protective or Emergency stop.
YELLOW Slow blink	A Safeguard Stop has occurred.	Press the safeguard reset button.
BLUE Solid	Pallet is complete or missing; AND The system is palletizing on the other side.	Place a new pallet
BLUE Fast blink	Pallet is complete, system is idle; OR Pallet is not detected, system is idle.	Place a new pallet
WHITE Solid	The Robotiq control box (PLC) is connected to the robot control box. Program running without Palletizer node.	N/A
GREEN Solid	A program with a Palletizer node is running but the pallet present is not completed.	N/A

6.5. Solution Mobility (Wash Down and Production Line Shifts)

DANGER

Risk of tipping over

The Robotiq Smart Infeed must always be installed on the PE20 Mobility Kit to ensure stability. Never replace it with another type of infeed.

Never transport the unit on a steep slope.

CAUTION

- Always wear safety shoes when operating the solution.
- Keep hands and any objects clear from under the unit.
- Always secure the teach pendant using the securing mechanism before operating or transporting the unit.
- Only trained and authorized personnel should operate the PAL Ready.
- Pay close attention to avoid any collision when moving the solution.
- For each operating station, mark on the ground the machine area.

a. Before disconnecting, ensure the pneumatic power to the solution is:
   - Properly shut off
   - Locked out upstream
   - Depressurized

b. Change the robot's position to the following pre-programmed position: Palletizer transport position (Installation tab -> URCaps -> Copilot -> Configuration -> Installation positions-> Palletizer transport position).

c. Power down the robot and the solution, and then turn off the compressed air and both shutoff valves. Unplug the pneumatic and power supplies, along with any other cables that could obstruct the movement of the unit.

d. Mount the teach pendant onto its rack at the operator station and secure the cable to ensure it does not interfere with any system movement.

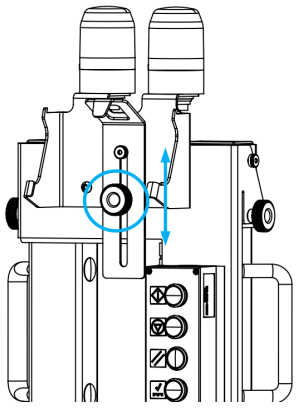


Fig. 6-3: Teach Pendant - Locking Arm and Knob

e. Adjust the operator station to an angle that facilitates easy movement of the PAL Ready.

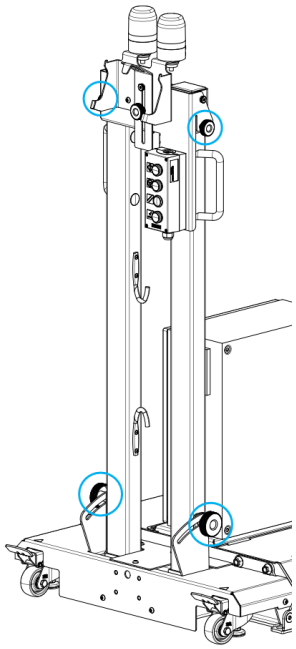


Fig. 6-4: Operator Station Knobs

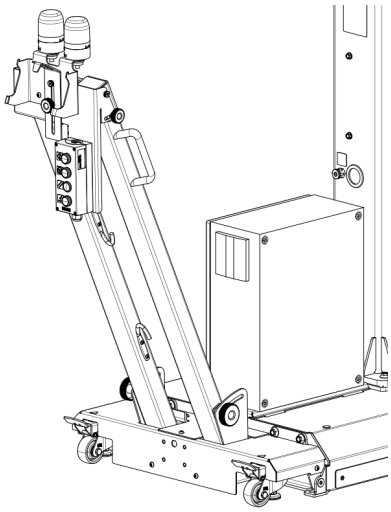


Fig. 6-5: Operator Station - Deployed

f. Retract the safety scanner arms (if present).

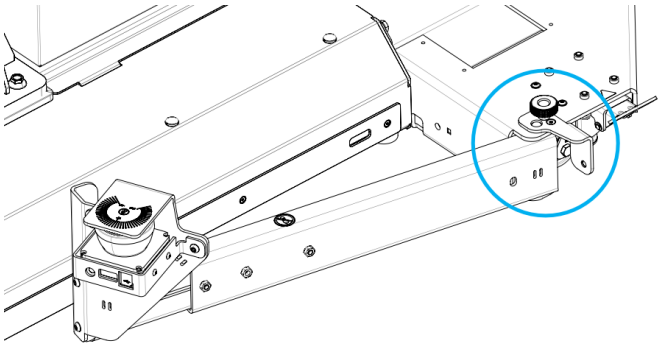


Fig. 6-6: Scanner Arm Folded

g. Lower the four (4) levelling caster wheels by unlatching their foot lever.

DANGER

Pinching risk

Do not place fingers near the caster locking mechanism or between the machine and the floor while lowering the unit onto its casters.

CAUTION

Only operate the caster locking mechanism using a foot and wear safety shoes.

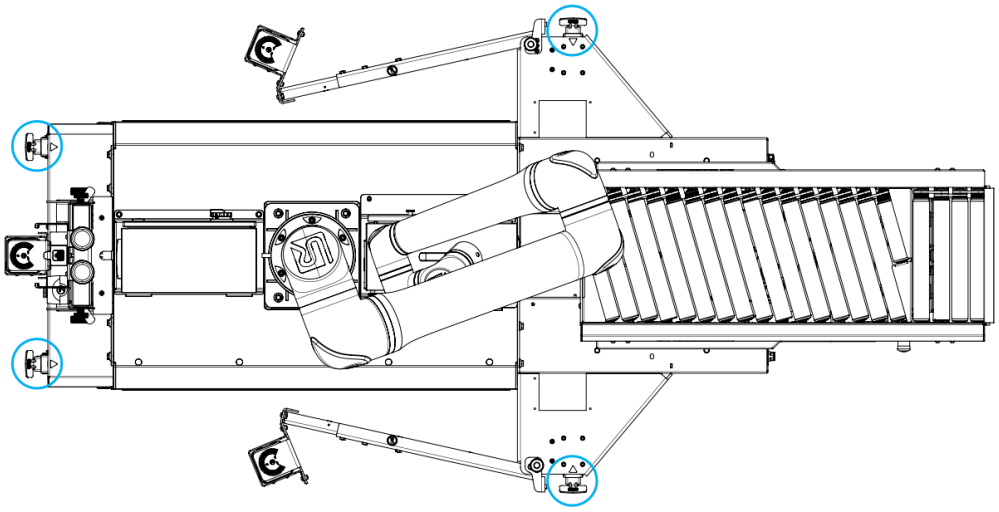


Fig. 6-7: Levelling Caster Wheels - Top View

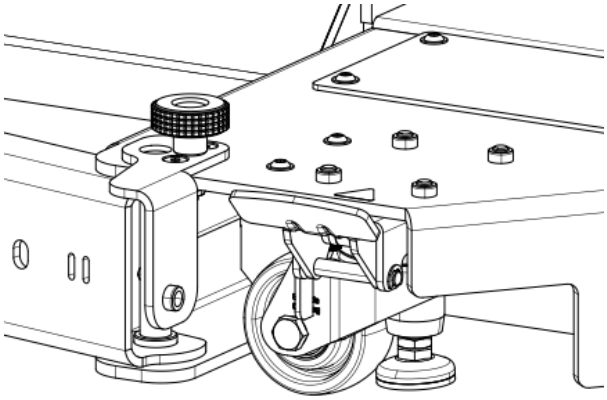


Fig. 6-8: Levelling Caster Wheels - Side View

h. Slowly and carefully move the Solution to its final location.

i. If applicable, redeploy the scanner arms and the operator station. Lock them in place.

j. Reconnect the pressurized air input and pressurize the system.

k. Reconnect the power cable, turn on all control box disconnect switches and power up the system.

6.6. Smart Infeed Height and Orientation Adjustment

The Smart Infeed 100 can be rotated in 90° increments, if necessary.

a. To do so, start by removing the four (4) screw knobs.

b. Pull the locking pin and simultaneously rotate the Smart Infeed 100 to the desired orientation.

c. Once completed, reinstall and tighten the screw knobs.

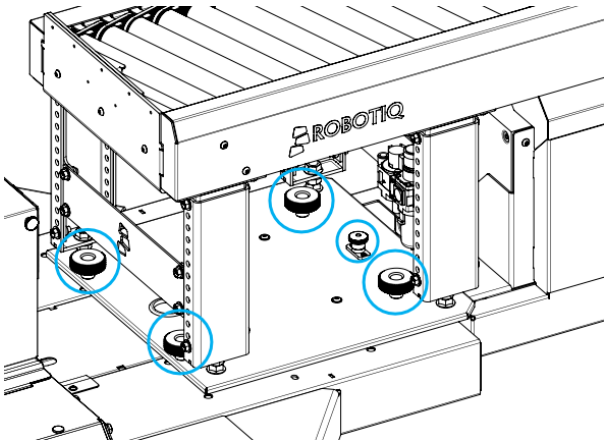


Fig. 6-9: Rotating Plate - Screw Knobs and Locking Pin

	NOTICE
	While minor fine adjustments to the Smart Infeed height are possible when changing production lines, it is strongly recommended to instead adjust the upstream conveyor's height. Aligning the upstream conveyor with the Smart Infeed ensures consistently accurate box pick positions and minimizes setup time.

6.7. Placement of the Operator Station

If the safety scanners are used, the operator station must remain fully deployed during operation. This allows the operator to interact with it without entering the safeguarded zone.

If the safety scanners are not used, the operator station can be fully retracted or fully deployed. Never place the operator station between those two positions.

	WARNING
	In rare instances, collisions may be detected with the fully retracted operator station. In such cases, the system must always run with the operator station fully deployed.

7. Maintenance

For complete information about the inspection guidelines for the Robotiq PE20 Palletizing Solution, Mobility Kit, Smart Infeed 100, and PowerPick Multi, please refer to the Maintenance section of their respective user manual available at robotiq.com/support.



CAUTION

Maintenance operations are for the average normal use of the Robotiq Palletizing Solution. Maintenance intervals should be adjusted according to the environmental conditions.

Following maintenance intervals will ensure:

- The correct functioning of the equipment
- The validity of the warranty
- The prescribed lifetime of the equipment
- The safe operation of the equipment



CAUTION

Pneumatic Pressure Hazard

To prevent injuries from an unexpected release of pneumatic pressure, always lock out and tag out the pneumatic valve before performing any system maintenance.



WARNING

Take all safety measures during maintenance operations on the Robotiq Palletizing Solution. Please refer to the Safety section for additional information.

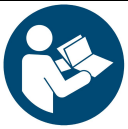
7.1. Power Off and Lock Out Procedure

Pneumatic System

- Pneumatic power to the solution must be shut off and locked out upstream, then entirely disconnected.
- Depressurize the system. When using a vacuum gripper, this can be done by activating the gripper and waiting a few seconds for the pressure to drop.

Electric System

- Turn the robot off.
- To switch off the electrical power to the equipment located downstream of the Robotiq control box, turn the main isolator to the off position and secure it there.
- Disconnect the main power cable from the power outlet.



NOTICE

Regular maintenance ensures maximum up-time and performance.

7.2. Maintenance Tasks

Regular maintenance ensures maximum up-time and performance.

Task	Frequency	Procedure
Visually inspect for wear or damage	Every month	If damage is observed, please contact support.robotiq.com
Verify that the nuts and bolts are properly tightened	Every month	Tighten the nuts and bolts to the appropriate torque.
Visually inspect wheels for wear and debris	Weekly	If damage is observed, please contact support.robotiq.com

Table 7-1: Maintenance Tasks

7.3. Fastener Specifications

Inspect all screws and bolts periodically to make sure they are tightened to the appropriate torque, as represented in the table below.

Diameter / TPI	Location	Torque	
		[Nm]	[lb-ft]
M12	Pedestal - Base	84[1]	62[1]
M10	Robot-pedestal link	Refer to UR20 User Manual[2]	
M8	Operator station - Base	25	37
M8	Control box and Vacuum Generation Unit holder plates	5	3.7

Table 7-2: Torque Values - Palletizing Solution

[1] Medium strength threadlocker must be applied.

[2] Use serrated Belleville washers.

7.4. Cleaning

The solution should be cleaned at regular intervals depending on the environment in which it is located.

- Clean the mechanical components with a soft cloth, as required.
- Use non-abrasive cleaning agents and media.
- Periodically clean the Robotiq control box air filters and replace them when necessary.
- Gently clean the photoelectric pallet sensor window using a soft cloth as needed.

7.5. Storage

Choose cool, dry and well-shaded environments.



8. Troubleshooting

For troubleshooting of the Robotiq PE20 Palletizing Solution, the Robotiq Smart Infeed 100, or the PowerPick Multi, refer to the relevant sections of their respective instruction manual.

Problem	Cause	Solution
The PE20 seems unstable when the robot is moving, potentially triggering protective stops.	The 4 feet are not all in contact with the ground.	Adjust the length of the feet every time the PE20 is moved or repair the floor so it is sufficiently flat.
Box transition between the end of line and the Smart Infeed is not consistent across all lines.	The end of line conveyor height is not consistent across all lines.	For all production lines, adjust the end of line conveyors height (not the Smart Infeed height). For each line, use the Smart Infeed height as a reference.

Table 8-1: PAL Ready -Troubleshooting Guidelines

9. Warranty

9.1. Conditions

Robotiq warrants the PAL Ready 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 warrants that this equipment will meet applicable specifications under normal use.



WARNING

The warranty applies under the following conditions:

- Usage is made in accordance with the operating and storage conditions specified in the Environmental and Operating Conditions section.
- The product and all its components have been properly installed as specified in the Installation section and following subsections.
- Maintenance is performed in accordance with the conditions specified in the Maintenance section.
- Usage complies with payload, force and speed limits specified in this user manual.

The warranty will come to an end when the following condition is reached:

- One (1) year

During the warranty period, Robotiq will repair or replace any defective PAL Ready 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.

9.2. 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.

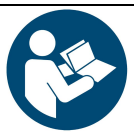
This warranty is in lieu of all other expressed, implied, or statutory warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Robotiq shall not be liable for damages resulting from the use of the PAL Ready, 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 PAL Ready and any of its components 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 PAL Ready and any of its components or other factors beyond Robotiq's control. It also excludes all consumable parts, such as belts, 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



NOTICE

The EC Declaration of Incorporation is available at http://robotiq.com/support.

11. Appendix

A-1: Safety Kit Program Template Background Image

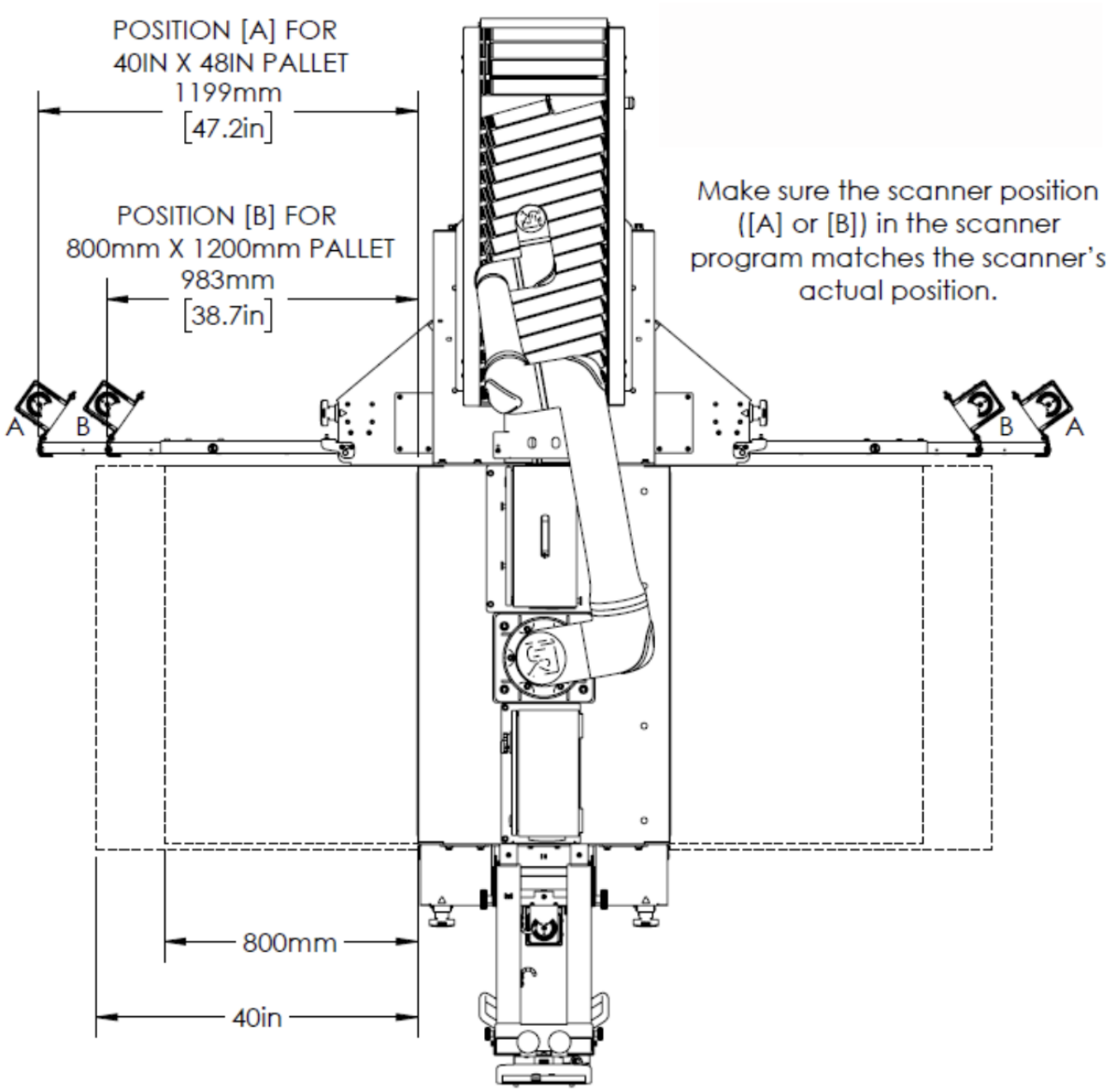


Fig. 11-1: Safety Kit Program Template Background Image

12. Contact

Robotiq
www.robotiq.com ## Contact Us **Phone** 1-888-ROBOTIQ (762-6847) (01) 418-380-2788 Outside US and Canada **Technical support and engineering** option 3 **Sales** option 2 **Head office** Robotiq: 966, chemin Olivier Suite 500 Lévis, Québec G7A 2N1 Canada