VERSABUILT

HOW-TO INSTALL OR ADJUST GRIPPER SENSORS VBX-160

***APPLIES TO ABB IRB1200 ROBOTS ONLY**

DOCUMENT #D10020
REVISION: A
JUNE 2018

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Parts and Tools Required

Tools

1. 2.5mm Flathead Screwdriver
2. 0.02” and 0.03” Feeler Guages

Parts

1. ABB IRB1200 Sensor Harness (VersaBuilt P/N# 5002142)

FIGURE 1. ABB IRB1200 ROBOT SENSOR HARNESS

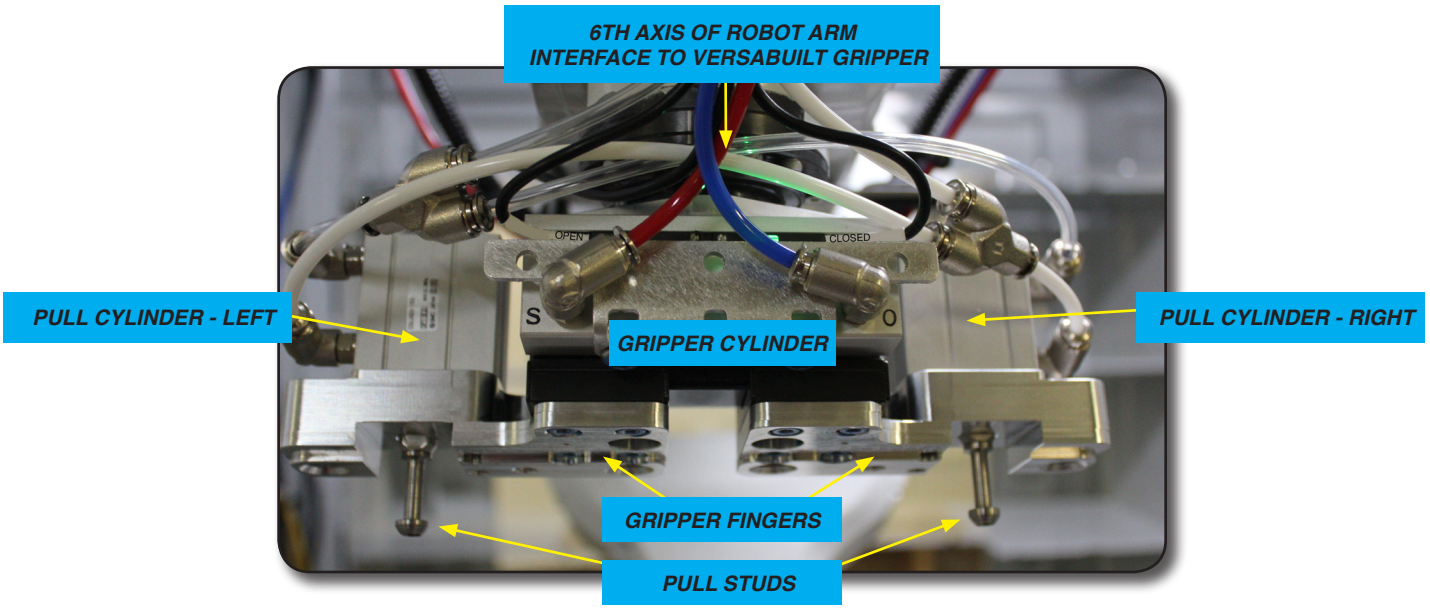

FIGURE 2. GRIPPER CYLINDER

Summary of Gripper Sensors

Gripper sensors are used during operation to detect part drops or vise jaw misses for robot recovery, and general system readiness.

There are 3 gripper sensors:

- Gripper Open - detect fully open
- Gripper Closed - detect fully closed with O.D. Vise Jaws
- Pull Cylinder Retracted - detects fully retracted pull studs (holding vise jaws)

How The Sensors Detect Empty O.D. Vise Jaws, I.D. Vise Jaws and Clamped Parts

1. Detecting if Gripper is empty or holding vise jaws
   a. Pull cylinder sensor detects “fully retracted” cylinder, indicating the gripper is NOT holding vise jaws because the Pull Stud is not in an engaged position near the mid-stroke of the cylinder.
2. Detecting Empty O.D. Vise Jaws
   a. The Gripper Closed sensor should be set to illuminate when empty O.D. Jaws are fully closed without a part.
   b. When this sensor is triggered the system interprets empty O.D. jaws or part fumble (when the vise jaws miss the part) with an O.D. clamped part.
3. Detecting Empty I.D. Vise Jaws
   a. The Gripper Open sensor should be set to illuminate when empty, O.D. or I.D. Jaws are fully open.
   b. When this sensor is triggered the system interprets empty I.D. jaws or part fumble (when the vise jaws miss the part) with an I.D. clamped part.
4. Detecting a Clamped Part
   a. The system should not have any sensor signals when the vise jaws are clamped to a part.
   b. Pull Stud should be engaged with the vise jaws, not fully retracted.
   c. Gripper position is in between the Open and Closed position.

Install or Adjust Gripper Sensors

Open Sensor

1. Put the robot in position for sensor adjustment and observation.
   a. Put robot in “Home” position.
   b. On VBXC Screen, set Gripper and Pull Studs to “Float.”
   c. Manually pull out studs into an extended position.
   d. Manually place OD Vise Jaws on Gripper.
   e. Using VBXC screen, retract pull studs to secure jaws to Gripper
   f. Using VBXC Screen, with OD Vise Jaws on Gripper, set Gripper to Open Position.

   Safety: Be careful of pinch points

2. Adjust Gripper Open Sensor.
   a. Verify Gripper is set to Open Position.
   b. Check lights on Sensors (Gripper Open). If the sensors are not illuminated, the sensor needs to be adjusted. The sensor only illuminates if vise jaws are fully open.
   c. With screwdriver, loosen the sensor and adjust until the sensor light is illuminated (as shown in Figure 3). Secure in place by tightening the set screw with screwdriver.
   d. Verify Gripper is set to “Gripper Open” on the VBXC Screen (a green light should appear next to the Gripper Open button).

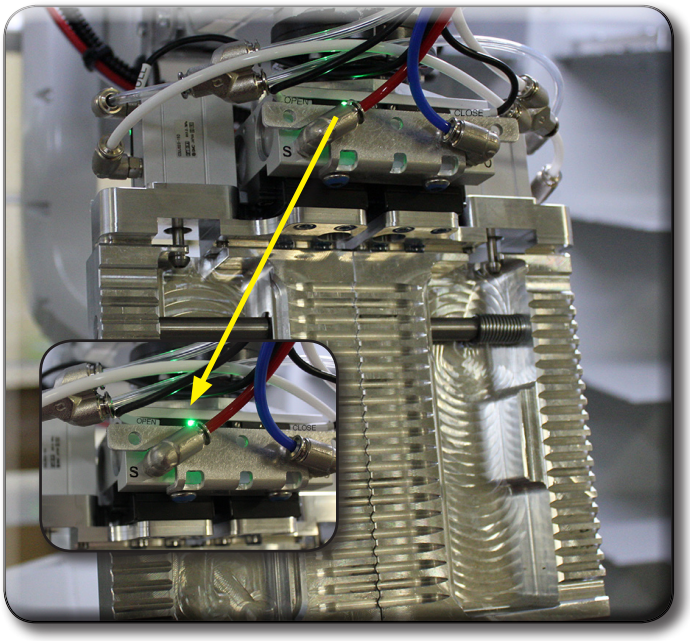

FIGURE 3. OPEN GRIPPER SENSOR

Closed Sensor

1. Using VBXC Screen, with OD Vise Jaws on Gripper, set Gripper to Closed Position.
2. Check light on the Closed Sensor (Gripper Closed).
   If the 2nd sensor is not illuminated, the sensor needs to be adjusted.
   a. Near the gripper fingers, clamp the 0.02” feeler gauge with the O.D. vise jaws. Adjust the sensor to make the sensor light illuminate (as shown in Figure 4).
   b. To ensure the sensor will activate when fully closed, clamp the 0.03” feeler gauge and check that the sensor is not illuminated (as shown in Figure 5). Secure in place by tightening the set screw with the screwdriver.
   c. Verify gripper is set to “Gripper Closed” on the VBXC Screen (a green light should appear next to the Gripper Closed button).

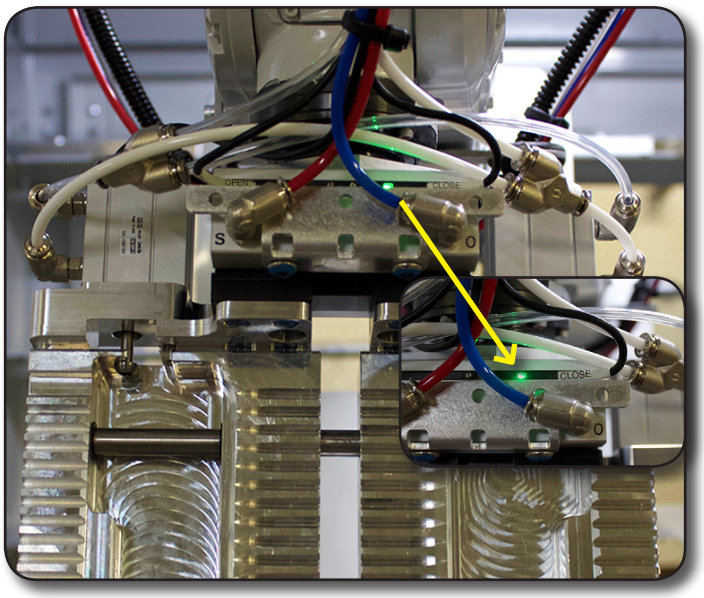

FIGURE 4. CLOSED GRIPPER SENSOR

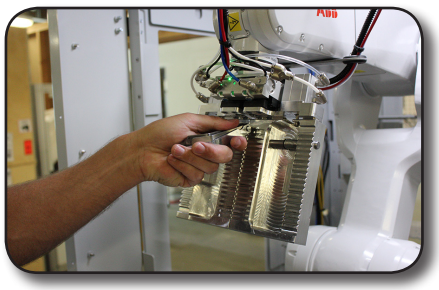

FIGURE 5. FEELER GUAGE TEST

Testing Vise Jaws

1. O.D. Vise Jaws
   a. Using VBXC Screen, with O.D. Vise Jaws on Gripper, set Gripper to Open Position.
   b. Place matching part in vise jaws.

      Safety: Be careful of pinch points.

   c. Using VBXC Screen, set Gripper to Closed Position.
   d. Verify part is O.D. clamped by the vise jaws.
   e. Verify that neither sensor light is illuminated (sensors only detect fully open and fully closed, the absence of an illuminate sensor indicates a part is in the gripper). If one or both of the lights are illuminated, you will need to adjust the sensors.
   f. If neither light is illuminated, remove the part and check open and closed one more time, then put the robot in position for operation.
2. I.D. Vise Jaws
   a. Using VBXC Screen, with I.D. Vise Jaws on Gripper, set Gripper to Closed Position (using VBXC screen float, place vise jaws, gripper closed).
   b. Place matching part in the vise jaws.

      Safety: Be careful of pinch points.

   c. Using VBXC Screen, set Gripper to Open Position.
   d. Verify part is I.D. clamped by the vise jaws.
   e. Verify that neither sensor light is illuminated (sensors only detect fully open and fully closed, the absence of an illuminate sensor indicates a part is in the gripper). If one or both of the lights are illuminated, the sensor will need to be adjusted.
   f. If neither light is illuminated, remove the part and check open and closed one more time, then put the robot in position for operation.

Note: If available, check multiple I.D. Vise Jaws with associated parts clamped for proper sensor settings.

Put Robot in Production Operation

1. On VBXC Screen, set Gripper and Pull Studs to “Float.”
2. Manually remove the vise jaws from Gripper.
3. Place jaws in the appropriate slot in the VBX-160.
4. Put the robot in “Home” position.
5. Exit Recovery.
6. Cycle Start.
7. If there are pneumatic test failures, the sensors may not have been set properly or are set backward.
8. If the system is not detecting fumbles, check the configuration and select gripper fumble check.

Install or Adjust Pull Cylinder Sensors

1. Put the robot in position for sensor adjustment and observation.
   a. Put the robot in “Home” position.
   b. On VBXC Screen, set Gripper to “Float.”
   c. Manually put Pull Studs into an extended position (hold the stud in position).
   d. Place O.D. or I.D. vise jaws on Gripper.
   e. Check lights on the Pull Sensor.
   f. If the sensor does illuminate (as shown in Figure 6) the sensor needs to be adjusted.
   g. With screwdriver, loosen the sensor and adjust until the sensor does NOT illuminate. Secure the sensor in place by tightening the set screw with screwdriver.

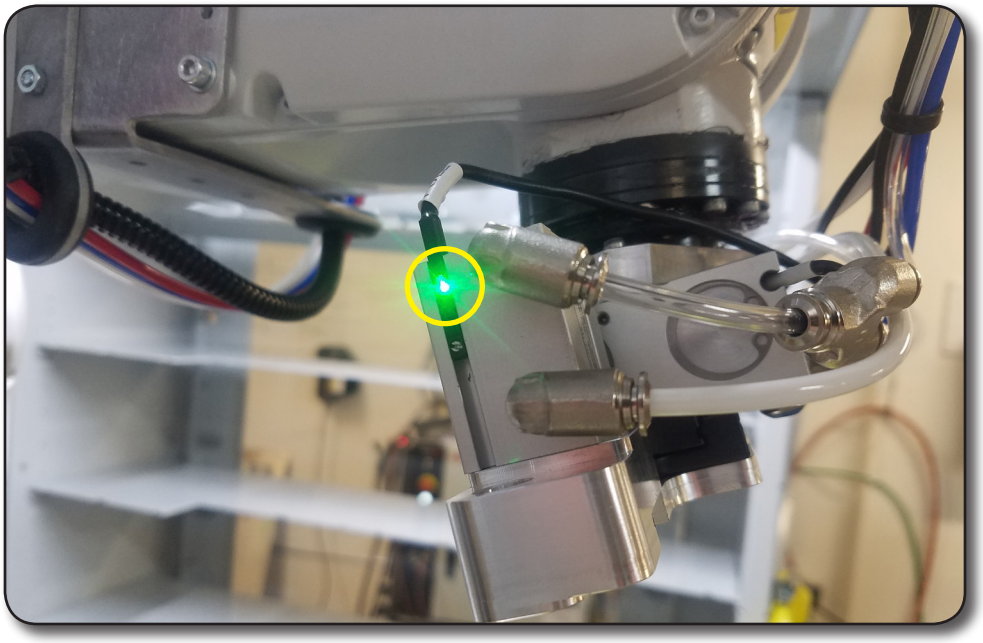

FIGURE 6 ILLUMINATED PULL CYLINDER SENSOR