Installation Guide: NexBot Vision SD312-015 1500N Single-Axis Force Sensor

SKU: NXB-SNS-SD312-015 | Revision: 1.0 | Category: Sensors & Vision > Force/Torque Sensors > Single-Axis Force Sensors

> **DANGER:** Disconnect all power sources before beginning installation. Follow lockout/tagout (LOTO) procedures per OSHA 1910.147.

1. Required Tools & Materials

- Torque wrench with 5-50 Nm range
- Set of metric hex keys (M6 for mounting)
- Digital multimeter
- Wire stripper and crimper for power connections
- Laptop with NexBot Integrated Control Environment (NICE) software
- M12 X-coded EtherCAT network cables
- Anti-static wrist strap
- Lint-free cloths and isopropyl alcohol for surface cleaning

2. Pre-Installation Checks

1. Verify the received product SKU is NXB-SNS-SD312-015 and inspect the sensor for any signs of shipping damage.
2. Ensure the mounting surface on the robot flange or fixture is clean, flat, and rigid to prevent measurement inaccuracies.
3. Confirm the 24VDC power supply is de-energized and locked out before making any electrical connections.
4. Verify that a compatible EtherCAT master is available on the network and that you have the correct ESI (EtherCAT Slave Information) file for the SD312-015.
5. Check that the mounting bolt pattern matches the 80 x 80 mm dimensions of the sensor base.
6. Ensure the ambient temperature and operating environment are within the sensor's operational limits.

3. Installation Procedure

Step 1: Prepare Mounting Surface

Thoroughly clean the robot arm flange and the tool-side mounting plate. Ensure both surfaces are free of debris, oils, and burrs that could interfere with a flush mount.

Step 2: Mount Sensor to Robot Flange

Carefully align the NexBot Vision SD312-015 sensor on the robot flange. Insert and hand-tighten the appropriate M6 mounting bolts, then use a torque wrench to tighten them in a star pattern to the specified torque value found in the full data sheet.

> **Warning:** Uneven or improper torque can introduce measurement errors and stress the sensor housing. Always use a calibrated torque wrench.

Step 3: Mount End-Effector to Sensor

Attach the tool or end-effector to the opposite face of the sensor. Use the same procedure for alignment and torque application as in the previous step to ensure a secure and rigid assembly.

Step 4: Connect EtherCAT Communication Cables

Connect an M12 X-coded EtherCAT cable from the network master or previous slave device to the 'ECAT IN' port. If this is not the last device in the chain, connect another cable from the 'ECAT OUT' port to the next slave device.

> **Warning:** Ensure connectors are fully seated and locked to maintain IP67 rating and prevent communication loss due to vibration.

Step 5: Connect 24VDC Power

Connect the 24VDC power supply cable to the designated power port on the sensor. Verify correct polarity before connecting the other end to the power source.

> **Warning:** Reversing the power supply polarity can cause permanent damage to the sensor's internal electronics. Double-check wiring before applying power.

Step 6: Secure and Route Cabling

Route all cables along the robot arm using appropriate cable management solutions. Ensure there is enough slack for the robot's full range of motion without pinching, stretching, or snagging the cables.

Step 7: Power On and Verify Connectivity

Remove the lockout/tagout and apply power to the 24VDC supply. Observe the status LEDs on the sensor; they should illuminate to indicate power and EtherCAT link status.

> **Warning:** Keep personnel clear of the robotic cell during the initial power-up sequence.

Step 8: Configure Sensor in Software

Launch the NexBot NICE software and scan the EtherCAT network. The SD312-015 sensor should be detected automatically. Load the corresponding ESI file if prompted and configure the sensor's operating parameters.

4. Post-Installation Verification

1. Verify the sensor's status LEDs indicate a stable power supply and an active EtherCAT connection (e.g., solid green lights).
2. Confirm that the sensor appears online in the NexBot NICE software device tree.
3. With no load on the end-effector, perform a tare (zero) operation and confirm the force reading is stable at or near 0.0N.
4. Manually and gently apply a light force to the end-effector and verify that the force readings in the software respond logically and proportionally.
5. Recalibrate the robot's Tool Center Point (TCP) to account for the sensor's 45 mm height.

6. Execute a test program at low speed to ensure cables do not bind or interfere with the robot's movement.

> **Note:** For technical support, contact your authorized service provider or visit *https://robotics.barca.group/support*.
