Installation Guide: NexBot Drives SD312-006 Single-Axis Force Sensor

SKU: NXB-SNS-SD312-006 | 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

- Hex key set (metric)
- Torque wrench with appropriate sockets
- Digital multimeter
- Wire stripper and crimping tool (if not using pre-made cables)
- Small flathead screwdriver for terminal blocks
- IO-Link master for configuration and testing
- Laptop with IO-Link configuration software
- Safety glasses and gloves

2. Pre-Installation Checks

1. Ensure the robot controller and all related power sources are in a de-energized, locked-out/tagged-out (LOTO) state.
2. Verify the mounting flange on the robot arm or end-of-arm tooling (EOAT) is clean, flat, and free of debris.
3. Confirm the mounting bolt pattern matches the sensor's 75 x 75 mm dimensions and that you have the correct length and grade of bolts.
4. Inspect the sensor's M12 connector and the corresponding cable for any signs of damage, bent pins, or contamination.
5. Verify that the power supply can provide stable 24VDC power as required by the SD312-006.
6. Confirm the IO-Link master port is available, configured correctly, and compatible with the sensor's IODD file.

3. Installation Procedure

Step 1: Step 1: De-energize and Lock Out Equipment

Before beginning installation, completely de-energize the robotic system and apply appropriate lockout/tagout procedures. This is a critical safety step to prevent unexpected movement or electrical shock.

> **Warning:** Failure to de-energize the system can result in severe injury or death.

Step 2: Step 2: Prepare the Mounting Surface

Thoroughly clean the mounting surface on the robot flange. Ensure it is flat and free from any burrs, oils, or particulates that could interfere with a secure mechanical connection and accurate force transmission.

Step 3: Step 3: Mount the Sensor

Carefully align the NexBot Drives SD312-006 sensor onto the prepared mounting surface. Insert the mounting bolts through the sensor's mounting holes and thread them into the robot flange by hand until snug.

> **Warning:** Do not cross-thread the mounting bolts. Ensure the sensor is oriented correctly for the intended axis of force measurement.

Step 4: Step 4: Torque Mounting Bolts

Using a calibrated torque wrench, tighten the mounting bolts in a star or cross pattern to the torque value specified in your robot or EOAT documentation. This ensures even clamping force and prevents distortion of the sensor body.

> **Warning:** Over-tightening can damage the sensor's housing, while under-tightening can lead to inaccurate readings or mechanical failure.

Step 5: Step 5: Attach End-of-Arm Tooling

Mount the EOAT to the tool-side face of the SD312-006 sensor. Use the same procedure of aligning, hand-tightening, and then torqueing the bolts to the recommended specification for the tool.

Step 6: Step 6: Connect the IO-Link Cable

Connect the M12 connector of the data cable to the sensor, ensuring the keying is aligned correctly. Screw the locking collar down until it is hand-tight to secure the IP67-rated seal. Do not use tools to tighten the collar.

> **Warning:** An improper connection can lead to data loss or allow moisture ingress, voiding the IP67 rating.

Step 7: Step 7: Route and Secure Cabling

Route the cable along the robot arm, following existing cable management pathways. Secure the cable with appropriate clips or ties, leaving enough slack for full robot articulation without straining the cable or connectors.

> **Warning:** Ensure the cable is not pinched, kinked, or exposed to sharp edges, as this can lead to premature failure.

Step 8: Step 8: Connect to IO-Link Master

Connect the other end of the cable to the designated port on your IO-Link master module. Ensure the connection is secure and that the port is configured for IO-Link communication.

4. Post-Installation Verification

1. Remove all lockout/tagout devices and safely re-energize the robotic system.
2. Using the IO-Link software, verify that the SD312-006 sensor is detected by the IO-Link master and is communicating correctly.
3. Check the sensor's diagnostic status for any initial faults or warnings.

4. With the EOAT attached but not touching any surfaces, perform a tare or zeroing function to establish a zero-force baseline.
5. Manually apply a gentle, known force to the EOAT and verify that the sensor reading changes logically and proportionally.
6. Run the robot through its full range of motion at a slow speed to ensure the cable routing is correct and does not bind or snag.

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