Installation Guide: NexBot Robotics 311-001 6-Axis Force/Torque Sensor 500N/20Nm

SKU: NXB-SNS-311-001 | Revision: 1.0 | Category: Sensors & Vision > Force/Torque Sensors > 6-Axis Force/Torque 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 a range up to 50 Nm
- Metric hex key set (M4, M5, M6)
- Digital multimeter
- ESD wrist strap
- Lint-free cloths
- Isopropyl alcohol
- M6 mounting bolts of appropriate length for robot flange
- Wire stripper and crimper for power connections

2. Pre-Installation Checks

1. Verify the delivered product SKU is NXB-SNS-311-001.
2. Inspect the sensor and connectors for any signs of shipping damage.
3. Ensure the robot arm is powered down and locked out according to safety procedures.
4. Confirm the robot flange and end-of-arm-tooling (EOAT) mounting surfaces are clean, flat, and free of debris.
5. Verify the 24VDC power supply is stable and can provide sufficient current.
6. Ensure the EtherCAT master is configured and the required network port is available.

3. Installation Procedure

Step 1: Step 1: Power Down and Lockout

Completely power down the robotic system and associated equipment. Apply lockout/tagout procedures to prevent accidental activation during installation.

> **Warning:** Failure to de-energize the system can result in severe electrical shock or unexpected robot motion.

Step 2: Step 2: Prepare Mounting Surfaces

Clean the robot arm flange and the tooling mounting plate with isopropyl alcohol and a lint-free cloth. Ensure both surfaces are perfectly flat to guarantee accurate sensor readings.

Step 3: Step 3: Mount Sensor to Robot Flange

Carefully align the NexBot 311-001 sensor with the mounting holes on the robot flange. Insert and hand-tighten the M6 bolts, then use a torque wrench to tighten them in a star pattern to the robot manufacturer's specified torque.

> **Warning:** Uneven or incorrect torque can introduce measurement errors and create a mechanical failure point.

Step 4: Step 4: Mount End-of-Arm-Tooling

Attach the EOAT to the tool-side face of the sensor. Use the appropriate bolts and tighten them securely in a star pattern to the specified torque value for the tool.

Step 5: Step 5: Connect EtherCAT Communication Cable

Connect a shielded EtherCAT cable to the designated port on the sensor. Route the cable along the robot arm, ensuring it has enough slack for all robot movements without being pinched or stretched.

> **Warning:** Use of unshielded or damaged cables can lead to communication errors and unpredictable behavior.

Step 6: Step 6: Connect 24VDC Power

Connect the 24VDC power supply to the sensor's power input connector. Verify correct polarity with a multimeter before finalizing the connection.

> **Warning:** Reversing the power supply polarity will cause permanent damage to the sensor's internal electronics.

Step 7: Step 7: Update Robot Configuration

In the robot controller software, update the payload data to include the sensor's weight of 0.8 kg. Adjust the Tool Center Point (TCP) to account for the sensor's dimensions (45 mm height).

Step 8: Step 8: Power On and Verify Communication

Remove the lockout/tagout devices and power on the system. Check the status LEDs on the sensor and verify that it is successfully recognized by the EtherCAT master in the robot controller.

4. Post-Installation Verification

1. Confirm the sensor's status LED indicates a stable power supply and an active EtherCAT link.
2. Verify the sensor appears in the list of active slaves on the EtherCAT network bus.
3. In the controller's I/O monitor, confirm that you are receiving data for all six axes (Fx, Fy, Fz, Tx, Ty, Tz).
4. With the EOAT attached and stationary, perform a zero-offset or 'tare' operation to establish a baseline.
5. Gently apply light pressure by hand to the EOAT along each axis and confirm that the corresponding readings change plausibly.

6. Run the robot through its full range of motion at a slow speed to ensure cables are not binding or being stressed.

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