

User Manual: NexBot Robotics NXB-CBL-512-001 Bus Power Cable, 48VDC, IP67

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1. Safety Information

READ ALL SAFETY INSTRUCTIONS BEFORE OPERATION. Failure to follow safety procedures may result in serious injury or equipment damage.

DANGER: Risk of electric shock. The NXB-CBL-512-001 carries 48VDC, which can be hazardous. Always de-energize and lock out the power source before installation, inspection, or maintenance.

WARNING: Do not use a damaged or frayed cable. If the outer PUR jacket is breached, immediately remove the cable from service to prevent electrical shorts or personnel injury.

WARNING: Cable is designed for dynamic applications but has limits. Do not subject the cable to torsion or flexing beyond its specified cycle life or physical constraints, as this will lead to conductor fatigue and failure.

CAUTION: Do not exceed the cable's minimum bend radius. Over-bending can cause permanent damage to the internal wiring and shielding, leading to intermittent power and communication issues.

NOTICE: The IP67 rating is only valid when the cable is connected to an equally rated IP67 connector and receptacle. Ensure all connection points are properly sealed.

2. Product Overview

The NexBot Robotics NXB-CBL-512-001 is a high-performance bus power cable engineered to provide stable and continuous 48VDC power to critical components within NexBot Robotics systems. This cable is specifically designed for dynamic applications where constant movement, torsion, and environmental exposure are common challenges, ensuring uninterrupted operation of your automated workcells. Constructed with a rugged PUR (Polyurethane) outer jacket, the NXB-CBL-512-001 offers exceptional resistance to abrasion, oils, coolants, and industrial solvents. Its high-flex design is rated for millions of bending cycles without compromising electrical integrity, making it an ideal choice for articulated robot arms and other moving machinery. The robust construction minimizes downtime associated with cable fatigue and failure. Internally, the cable features finely stranded copper conductors and comprehensive shielding to protect against electromagnetic interference (EMI) and radio-frequency interference (RFI), preserving power quality in electrically noisy factory settings. With an ingress protection rating of IP67, this power cable is fully protected against dust ingress and can withstand temporary immersion in water. This feature makes it suitable for use in washdown environments or areas where exposure to liquids is a constant factor. The NXB-CBL-512-001 is a crucial component for maintaining system reliability in applications such as automated welding, material handling, assembly, and packaging. Proper installation involves routing the cable according to the robot's service manual, ensuring it is secured correctly to prevent snagging or excessive wear during operation. This cable serves as a direct replacement part, ensuring seamless integration with compatible NexBot Robotics systems.

3. Getting Started

1. Product Overview

The NXB-CBL-512-001 is a 5-meter bus power cable designed to deliver a stable 48VDC supply in demanding industrial environments. Its primary function is to power NexBot Robotics components within automated systems, ensuring high reliability and uptime.

2. Key Features

This cable features a highly durable PUR (Polyurethane) outer jacket, providing excellent resistance to oils, abrasion, and tearing. It is rated IP67 for protection against dust and water ingress, making it suitable for washdown environments. The construction is optimized for continuous flexing and torsional stress common in robotic applications.

3. Intended Application

The NXB-CBL-512-001 is intended for use in NexBot Robotics automation cells, particularly for connecting power to servo drives, controllers, or I/O blocks mounted on moving parts like robot arms or linear transfer systems. Its robust design ensures uninterrupted power delivery during machine operation.

4. PROFINET Environment Compatibility

While this is a power cable, it is constructed and shielded to operate reliably in environments with high-frequency data signals like PROFINET. This allows it to be routed in the same cable tracks or bundles as data cables with minimal risk of electromagnetic interference (EMI).

4. Operation

Normal Operating Conditions

Under normal conditions, the NXB-CBL-512-001 will deliver continuous 48VDC power. The cable is designed for an ambient temperature range typically found in industrial manufacturing facilities. Ensure the current draw of the connected device does not exceed the cable's rated amperage.

Tip: Periodically check that the cable is free from accumulated debris, especially in dynamic applications, to prevent snagging.

Dynamic Performance

The cable is engineered for high cycle counts of flexing and torsion. To maximize its service life, ensure the movement path is smooth and that the cable's bend radius and twist limits are respected throughout the machine's entire range of motion.

Environmental Resistance

The PUR jacket provides superior resistance to common industrial oils, coolants, and solvents. The IP67 rating ensures protection against dust and temporary immersion in water, making it ideal for harsh or washdown environments when properly connected.

Tip: After exposure to harsh chemicals, it is good practice to wipe down the cable jacket with a clean, damp cloth to prolong its life.

Electrical Characteristics

The cable is specified for 48VDC operation. Exceeding this voltage can damage the cable's insulation and the connected equipment. The conductors are sized to minimize voltage drop over the 5-meter length for typical NexBot component loads.

5. Maintenance Schedule

Interval	Task	Notes
Daily	Visually inspect the cable for obvious signs of damage, such as being pinched, crushed, or snagged by machinery.	This check can be part of the operator's pre-shift machine inspection.
Weekly	Inspect the cable along its entire length for any signs of abrasion or chafing on the PUR jacket, especially at points of contact with cable management or machine frames.	Pay close attention to areas where the cable flexes or bends repeatedly.
Monthly	Check the security of the connectors at both ends. Ensure they are still fully seated and that any locking mechanisms are properly engaged.	Vibration can cause connectors to loosen over time.
Quarterly	With the power off and cable disconnected, inspect connector pins for any signs of corrosion, pitting, or contamination. Clean with an approved contact cleaner if necessary.	This is especially important in humid or corrosive environments.
Annually	Perform an insulation resistance test (megger test) with the cable disconnected from all equipment. This proactive test can identify degradation in the insulation before it leads to a failure.	This task should only be performed by qualified electrical personnel with appropriate test equipment.
As Needed	Clean the outer jacket of the cable to remove buildup of oil, dirt, or other contaminants.	Use a mild detergent and water; avoid harsh solvents that are not compatible with Polyurethane.

6. Troubleshooting

Symptom	Possible Cause	Solution
Device has no power.	Cable is disconnected, internal conductor is broken, or power source is off.	Verify power source is on. Check that connectors at both ends are fully seated. Disconnect cable and check for continuity on both power conductors using a multimeter.

Symptom	Possible Cause	Solution
Device experiences intermittent power loss during motion.	A conductor is partially broken inside the cable, or a connector pin is making a poor connection.	Inspect the cable for pinch points or sharp bends. Wiggle the connector while monitoring power; if it cuts out, the connector or termination is faulty. Replace the NXB-CBL-512-001 cable.
Low voltage measured at the device.	High resistance in a connection, damaged conductor, or power supply issue.	De-energize and re-seat both connectors. Check for corrosion on pins. Measure voltage directly at the power supply. If the issue persists, the cable may have internal damage and should be replaced.
Connector is hot to the touch.	Poor connection due to loose or contaminated pins, causing high electrical resistance.	IMMEDIATELY de-energize the circuit. Inspect the connector for damage, contamination, or loose pins. Clean or replace the cable as necessary. Ensure connector is torqued correctly.
Visible damage to the outer PUR jacket.	Mechanical impact, abrasion against a sharp edge, or chemical attack.	Immediately de-energize and replace the NXB-CBL-512-001 cable. Do not attempt to repair a damaged power cable jacket with electrical tape, as this will compromise its integrity and IP67 rating.
Device reports power bus faults.	Voltage fluctuations caused by a failing cable or intermittent short circuit.	Isolate the issue by temporarily using a known-good NXB-CBL-512-001 cable. If the fault disappears, the original cable is faulty and must be replaced.
Water or fluid ingress at connector.	Connector not fully seated or an incompatible/damaged mating connector, compromising the IP67 seal.	De-energize and disconnect. Thoroughly dry and clean both connectors. Inspect seals and O-rings for damage. Reconnect and ensure the locking mechanism is fully engaged to restore the IP67 seal.

7. Technical Specifications

Parameter	Value	Unit
Weight	1.2	kg
Material	PUR (Polyurethane)	
Voltage	48VDC	
IP Rating	IP67	
Country of Origin	KR	
Protocol	PROFINET	
Dimensions	5 m length, 8.5 mm outer diameter	