User Manual: NexBot Drives 512-002 Bus Power Cable

SKU: NXB-CBL-512-002 | Version: 1.0 | Brand: NexBot Robotics

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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: Hazardous voltage. This cable carries up to 600VDC, which can cause severe injury or death. Always de-energize and lock out power before handling or servicing.

WARNING: Do not exceed the maximum voltage rating of 600VDC. Applying higher voltage can lead to insulation failure, short circuits, and fire.

WARNING: The NXB-CBL-512-002 Bus Power Cable is not intended for use in continuously flexing (e.g., robotic arm) applications. It is designed for static installation within a control cabinet.

CAUTION: Avoid bending the cable tighter than the recommended minimum bend radius. Sharp bends can damage the internal conductors and compromise performance.

NOTICE: To maintain the system's overall IP67 rating, ensure the cable is terminated using appropriately rated glands and connectors. The cable itself is IP67 rated, but the connections must also be protected.

2. Product Overview

The NexBot Drives 512-002 Bus Power Cable is a high-performance interconnect solution designed to deliver stable and reliable DC power to servo drives and other components within a robotic system's control cabinet. This cable ensures consistent power delivery, which is critical for maintaining the precision and repeatability of automated tasks. Its primary use is to link a central DC power supply to a bank of servo drives, providing the necessary bus voltage for motion control. The key feature of the 512-002 cable is its robust, high-flexibility construction. The outer jacket is made from Polyurethane (PUR), a material known for its exceptional resistance to abrasion, oils, and industrial coolants. This makes the cable suitable for installation in dynamic applications, including drag chains (e-chains), where it can withstand millions of flex cycles without degradation. The cable's robust shielding protects against electromagnetic interference (EMI), ensuring that the power lines do not disrupt sensitive data signals from encoders or sensors running in parallel, a common challenge in compact control cabinets. With an IP67 rating, the pre-terminated connectors provide a secure, sealed connection that is impervious to dust and can withstand temporary immersion in water, guaranteeing operational integrity in harsh factory environments. This 2-meter cable is sized to accommodate typical cabinet layouts for multi-axis robotic systems. It utilizes 2.5mm² conductors to minimize voltage drop over its length, ensuring that drives at the end of the bus receive stable power for optimal performance. Common applications include powering the motion control systems for articulated robots in material handling, automated welding cells, and SCARA robots in high-speed assembly lines. Installation is streamlined thanks to pre-molded, keyed connectors that prevent incorrect wiring and reduce setup time.

3. Getting Started

1. Product Overview

The NexBot Drives 512-002 Bus Power Cable is a 2-meter, high-durability cable designed to distribute DC power from a power supply to one or more servo drives. Its robust Polyurethane (PUR) jacket provides excellent resistance to oils and abrasion, while its 600VDC rating makes it suitable for demanding industrial motion control systems.

2. Unpacking and Inspection

Upon receipt, carefully remove the NXB-CBL-512-002 from its packaging. Inspect the full length of the cable for any signs of shipping damage, such as cuts, punctures, or crushed sections. Verify that the product SKU on the label matches your order documentation.

3. System Compatibility

This cable is designed for NexBot Drives systems and compatible third-party hardware requiring a 600VDC bus power connection. Before

installation, confirm that the power supply's output and the servo drives' input terminals are physically and electrically compatible with this cable.

4. Operation

Normal Operation

Under normal operating conditions, the NXB-CBL-512-002 functions as a passive component, reliably conducting DC power. The cable should not generate heat or electrical noise. Its performance is dependent on proper installation and connection to a stable, correctly sized DC power supply.

> **Tip:** Periodically monitor the DC bus voltage via your drive's software interface to ensure it remains stable and within the expected range.

Environmental Performance

The cable's Polyurethane (PUR) jacket and IP67 rating make it suitable for use in industrial environments where dust, moisture, and oils may be present. Ensure that connections are made within an enclosure that provides equivalent or greater protection to maintain system integrity.

Current Handling

The cable is sized to handle the current demands of typical multi-axis servo systems. Ensure the total current draw of all connected drives does not exceed the capacity of the cable or the source power supply. Overcurrent conditions can lead to overheating and voltage drops.

EMI Considerations

Although this is a power cable, its placement can affect sensitive communication protocols like PROFINET. To minimize electromagnetic interference (EMI), route this cable separately from data and encoder cables, and cross them at 90-degree angles whenever possible.

> **Tip:** Proper grounding of the power supply and servo drives is the most effective way to mitigate system-wide EMI issues.

5. Maintenance Schedule

Interval	Task	Notes
Monthly	Visually inspect the cable jacket for any signs of physical damage, abrasion, or chemical degradation. Pay close attention to areas near connectors and cable clamps.	If any damage is found that exposes the inner conductors, replace the cable immediately.
Quarterly	With the system de-energized, check the connection points at the power supply and servo drive.	This check should be performed more frequently in high-

Interval	Task	Notes
	Look for any signs of discoloration, which could indicate overheating from a loose connection.	vibration environments.
Annually	With the system de-energized, verify the tightness of the terminal block screws at both ends of the cable using a calibrated torque screwdriver.	Refer to the equipment manufacturer's documentation for the correct torque specifications.
Annually	Clean the outer PUR jacket of any accumulated dust or grime using a soft cloth and a mild, non-abrasive cleaning solution.	Ensure the cable is completely dry before re-energizing the system.
As Required	If intermittent power faults occur, perform a continuity and insulation resistance test on the cable to rule it out as the cause.	This requires de-energizing the system and disconnecting the cable at both ends.

6. Troubleshooting

Symptom	Possible Cause	Solution
Servo drive reports 'DC Bus Undervoltage' fault.	A loose terminal connection or a damaged conductor within the cable is causing a voltage drop.	De-energize the system. Check and re-torque the power connections at both the power supply and the drive. If the issue persists, test the cable for continuity.
No power at the servo drive; status LEDs are off.	The cable is disconnected, a conductor is completely broken, or the power supply is off.	Verify the power supply is on. With power off, check for a secure connection at both ends. Test for continuity along the entire length of both conductors in the cable.
Discoloration or melting at a connection terminal.	The terminal screw was not tightened to the correct torque, creating high resistance and heat.	Immediately de-energize the system. The cable end and the terminal block may be damaged and require replacement. Re-terminate and tighten to the manufacturer's specified torque.

Symptom	Possible Cause	Solution
Intermittent communication errors on nearby PROFINET cables.	The DC power cable is routed too close to the PROFINET cable, causing electromagnetic interference (EMI).	Re-route the NXB-CBL-512-002 to increase separation from the data cable. If they must cross, ensure they do so at a 90-degree angle.
System circuit breaker trips upon power-up.	A short circuit exists between the cable's conductors, or between a conductor and ground, likely due to insulation damage.	Disconnect the cable from the system. Use a multimeter to test for short circuits between conductors and from each conductor to ground. Replace the cable if a short is detected.
Visible cut or abrasion on the outer PUR jacket.	The cable was routed over a sharp edge or has been rubbing against a component.	De-energize the system and replace the cable immediately to prevent electrical shock and to maintain the system's IP67 rating. Correct the cable routing to prevent recurrence.

7. Technical Specifications

Parameter	Value	Unit
Weight	0.45	kg
Material	Polyurethane (PUR) Jacket	
Voltage	600VDC	
IP Rating	IP67	
Country of Origin	CH	
Protocol	PROFINET	
Dimensions	2m length, 8.5mm OD	