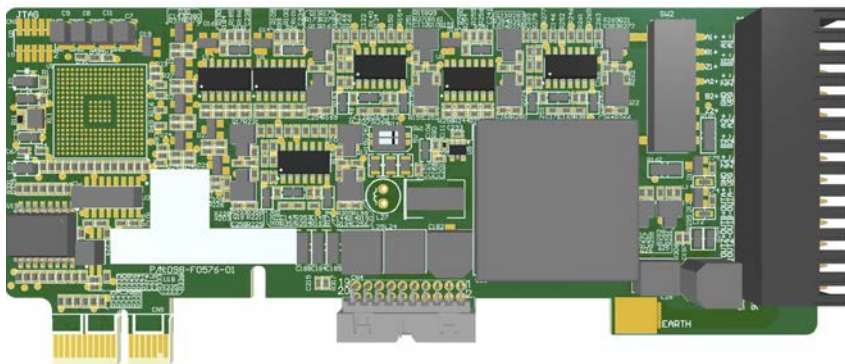


User manual (DXX-EXT-ABZ)



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Cover Photo: Eaton PowerXL DX1 series drive

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Support services

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Safety



Warning!
Dangerous electrical voltage!

Before commencing the installation

- Disconnect the power supply of the device
- Ensure that devices cannot be accidentally restarted
- Verify isolation from the supply
- Earth and short circuit the device
- Cover or enclose any adjacent live components
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system
- Before installation and before touching the device ensure that you are free of electrostatic charge
- The functional earth (FE, PES) must be connected to the protective earth (PE) or the potential equalization. The system installer is responsible for implementing this connection
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automation functions
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation
- Suitable safety hardware and software measures should be implemented for the I/O interface so that an open circuit on the signal side does not result in undefined states in the automation devices
- Ensure a reliable electrical isolation of the extra-low voltage of the 24V supply. Only use power supply units complying with IEC 60364-4-41 (VDE 0100 Part 410) or HD384.4.41 S2
- Deviations of the input voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause a restart
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed and with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings
- Measures should be taken to ensure the proper restart of programs interrupted after a voltage DIP or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented
- Wherever faults in the automation system may cause injury or material damage, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks, and so on)
- Depending on their degree of protection, variable frequency drives may contain live bright metal parts, moving or rotating components, or hot surfaces during and immediately after operation
- Removal of the required covers, improper installation, or incorrect operation of motor or variable frequency drive may cause the failure of the device and may lead to serious injury or damage
- The applicable national accident prevention and safety regulations apply to all work carried out on live variable frequency drives
- The electrical installation must be carried out in accordance with the relevant regulations (for example, with regard to cable cross sections, fuses, PE)
- Transport, installation, commissioning, and maintenance work must be carried out only by qualified personnel (IEC 60364, HD 384 and national occupational safety regulations)
- Installations containing variable frequency drives must be provided with additional monitoring and protective devices in accordance with the applicable safety regulations. Modifications to the variable frequency drives using the operating software are permitted
- All covers and doors must be kept closed during operation
- To reduce hazards for people or equipment, the user must include in the machine design measures that restrict the consequences of a malfunction or failure of the drive (increased motor speed or sudden standstill of motor). These measures include:
 - Other independent devices for monitoring safety-related variables (speed, travel, end positions, and so on)
 - Electrical or non-electrical system-wide measures (electrical or mechanical interlocks)
 - Never touch live parts or cable connections of the variable frequency drive after it has been disconnected from the power supply. Due to the charge in the capacitors, these parts may still be live after disconnection. Fit appropriate warning signs

Read this manual thoroughly and make sure you understand the procedures before you attempt to install, set up, operate or carry out any maintenance work on this PowerXL™ variable frequency drive.

Definitions and symbols

WARNING

This symbol indicates high voltage. It calls your attention to items or operations that could be dangerous to you and other persons operating this equipment. Read the message and follow the instructions carefully.



This symbol is the “Safety Alert Symbol.” It occurs with either of two signal words: **CAUTION** or **WARNING**, as described below.

WARNING

Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage to the product. The situation described in the **CAUTION** may, if not avoided, lead to serious results. Important safety measures are described in **CAUTION** (as well as **WARNING**).

Hazardous high voltage

WARNING

Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, there may be exposed components with housings or protrusions at or above line potential. Extreme care should be taken to protect against shock.

- Stand on an insulating pad and make it a habit to use only one hand when checking components
- Always work with another person in case an emergency occurs
- Disconnect power before checking controllers or performing maintenance
- Be sure equipment is properly earthed
- Wear safety glasses whenever working on electronic controllers or rotating machinery

WARNING

The components in the drive's power section remain energized after the supply voltage has been switched off. After disconnecting the supply, wait at least five minutes before removing the cover to allow the intermediate circuit capacitors to discharge.

Pay attention to hazard warnings!

WARNING

The components in the drive's power section remain energized after the supply voltage has been switched off. After disconnecting the supply, wait at least five minutes before removing the cover to allow the intermediate circuit capacitors to discharge.

Pay attention to hazard warnings!



DANGER
5 MIN

WARNING

Electric shock hazard—risk of injuries! Carry out wiring work only if the unit is de-energized.

WARNING

Do not perform any modifications on the AC drive when it is connected to mains.

Warnings and cautions

WARNING

Be sure to ground the unit following the instructions in this manual. Ungrounded units may cause electric shock and/or fire.

WARNING

This equipment should only be installed, adjusted, and serviced by qualified electrical maintenance personnel familiar with the construction and operation of this type of equipment and the hazards involved. Failure to observe this precaution could result in death or severe injury.

WARNING

Components within the drive are live when it is connected to power. Contact with this voltage is extremely dangerous and may cause death or severe injury.

⚠ WARNING

Line terminals (L1, L2, L3), motor terminals (U, V, W) and the DC link/brake resistor terminals (DC-, DC+/R+, R-) are live when the drive is connected to power, even if the motor is not running. Contact with this voltage is extremely dangerous and may cause death or severe injury.

⚠ WARNING

Even though the control I/O-terminals are isolated from line voltage, the relay outputs and other I/O-terminals may have dangerous voltage present even when the drive is disconnected from power. Contact with this voltage is extremely dangerous and may cause death or severe injury.

⚠ WARNING

This equipment has a large capacitive leakage current during operation, which can cause enclosure parts to be above ground potential. Proper grounding, as described in this manual, is required. Failure to observe this precaution could result in death or severe injury.

⚠ WARNING

Before applying power to this drive, make sure that the front and cable covers are closed and fastened to prevent exposure to potential electrical fault conditions. Failure to observe this precaution could result in death or severe injury.

⚠ WARNING

An upstream disconnect/protective device must be provided as required by the National Electrical Code® (NEC®). Failure to follow this precaution may result in death or severe injury.

⚠ WARNING

This drive can cause a DC current in the protective earthing conductor. Where a residual current-operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed on the supply side of this product.

⚠ WARNING

Carry out wiring work only after the drive has been correctly mounted and secured.

⚠ WARNING

Before opening the drive covers:

- Disconnect all power to the drive, including external control power that may be present
- Wait a minimum of five minutes after all the lights on the keypad are off. This allows time for the DC bus capacitors to discharge
- A hazard voltage may still remain in the DC bus capacitors even if the power has been turned off. Confirm that the capacitors have fully discharged by measuring their voltage using a multimeter set to measure the DC voltage

Failure to follow these precautions may cause death or severe injury.

⚠ WARNING

The opening of the branch-circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

⚠ WARNING

Operation of this equipment requires detailed installation and operation instructions provided in the Installation/Operation manual intended for use with this product. This information is provided on the CD-ROM, floppy diskette(s) or other storage device included in the container this device was packaged in. It should be retained with this device at all times.

⚠ WARNING

Before servicing the drive:

- Disconnect all power to the drive, including external control power that may be present
- Place a "DO NOT TURN ON" label on the disconnect device
- Lock the disconnect device in the open position

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

The drive outputs (U, V, W) must not be connected to the input voltage or the utility line power as severe damage to the device may occur and there may be a risk of fire.

⚠ WARNING

The heat sink and/or outer enclosure may reach a high temperature.

Pay attention to hazard warnings!



Hot Surface—Risk of Burn. DO NOT TOUCH!

⚠ CAUTION

Any electrical or mechanical modification to this drive without prior written consent of Eaton will void all warranties and may result in a safety hazard in addition and voiding of the UL® listing.

⚠ CAUTION

Install this drive on flame-resistant material such as a steel plate to reduce the risk of fire.

⚠ CAUTION

Install this drive on a perpendicular surface that is able to support the weight of the drive and is not subject to vibration, to lessen the risk of the drive falling and being damaged and/or causing personal injury.

⚠ CAUTION

Prevent foreign material such as wire clippings or metal shavings from entering the drive enclosure, as this may cause arcing damage and fire.

⚠ CAUTION

Install this drive in a well-ventilated room that is not subject to temperature extremes, high humidity, or condensation, and avoid locations that are directly exposed to sunlight, or have high concentrations of dust, corrosive gas, explosive gas, inflammable gas, grinding fluid mist, etc. Improper installation may result in a fire hazard.

⚠ CAUTION

When selecting the cable cross-section, take the voltage drop under load conditions into account. The consideration of other standards is the responsibility of the user.

The user is responsible for compliance with all international and national electrical standards in force concerning protective grounding of all equipment.

⚠ CAUTION

The specified minimum PE conductor cross-sections in this manual must be maintained.

Touch current in this equipment exceeds 3.5 mA (AC). The minimum size of the protective earthing conductor shall comply with the requirements of EN 61800-5-1 and/or the local safety regulations.

⚠ CAUTION

Touch currents in this frequency inverter are greater than 3.5 mA (AC). According to product standard IEC/EN 61800-5-1, an additional equipment grounding conductor of the same cross-sectional area as the original protective earthing conductor must be connected, or the cross-section of the equipment grounding conductor must be at least 10 mm² Cu. Drive requires that only copper conductor should be used.

⚠ CAUTION

Debounced inputs may not be used in the safety circuit diagram. Residual current circuit breakers (RCD) are only to be installed between the AC power supply network and the drive.

⚠ CAUTION

Debounced inputs may not be used in the safety circuit diagram. If you are connecting multiple motors on one drive, you must design the contactors for the individual motors according to utilization category AC-3.

Selecting the motor contactor is done according to the rated operational current of the motor to be connected.

⚠ CAUTION

Debounced inputs may not be used in the safety circuit diagram. A changeover between the drive and the input supply must take place in a voltage-free state.

⚠ CAUTION

Debounced inputs may not be used in the safety circuit diagram. Fire hazard!

Only use cables, protective switches, and contactors that feature the indicated permissible nominal current value.

⚠ CAUTION

Before connecting the drive to AC mains make sure that the EMC protection class settings of the drive are appropriately made according to instructions in this manual.

- If the drive is to be used in a floating distribution network, remove screws at MOV and EMC
- Disconnect the internal EMC filter when installing the drive on an IT system (an ungrounded power system or a high-resistance-grounded [over 30 ohm] power system), otherwise the system will be connected to ground potential through the EMC filter capacitors. This may cause danger, or damage the drive
- Disconnect the internal EMC filter when installing the drive on a corner grounded TN system, otherwise the drive will be damaged

Note: When the internal EMC filter is disconnected, the drive might be not EMC compatible.

- Do not attempt to install or remove the MOV or EMC screws while power is applied to the drive's input terminals

Motor and equipment safety

CAUTION

Do not perform any meggar or voltage withstand tests on any part of the drive or its components. Improper testing may result in damage.

CAUTION

Prior to any tests or measurements of the motor or the motor cable, disconnect the motor cable at the drive output terminals (U, V, W) to avoid damaging the drive during motor or cable testing.

CAUTION

Do not touch any components on the circuit boards. Static voltage discharge may damage the components.

CAUTION

Before starting the motor, check that the motor is mounted properly and aligned with the driven equipment. Ensure that starting the motor will not cause personal injury or damage equipment connected to the motor.

CAUTION

Set the maximum motor speed (frequency) in the drive according to the requirements of the motor and the equipment connected to it. Incorrect maximum frequency settings can cause motor or equipment damage and personal injury.

CAUTION

Before reversing the motor rotation direction, ensure that this will not cause personal injury or equipment damage.

CAUTION

Make sure that no power correction capacitors are connected to the drive output or the motor terminals to prevent drive malfunction and potential damage.

CAUTION

Make sure that the drive output terminals (U, V, W) are not connected to the utility line power as severe damage to the drive may occur.

CAUTION

When the control terminals of two or more drive units are connected in parallel, the auxiliary voltage for these control connections must be taken from a single source which can either be one of the units or an external supply.

CAUTION

The drive will start up automatically after an input voltage interruption if the external run command is on.

CAUTION

Do not control the motor with the disconnecting device (disconnecting means); instead, use the control panel start and stop keys and, or commands via the I/O board of the drive. The maximum allowed number of charging cycles of the DC capacitors (i.e. power-ups by applying power) is five in ten minutes.

CAUTION

Improper drive operation:

- If the drive is not turned on for a long period, the performance of its electrolytic capacitors will be reduced
- If it is stopped for a prolonged period, turn the drive on at least every six months for at least 5 hours to restore the performance of the capacitors, and then check its operation. It is recommended that the drive is not connected directly to the line voltage. The voltage should be increased gradually using an adjustable AC source

Failure to follow these instructions can result in injury and/or equipment damage.

For more technical information, contact the factory or your local Eaton sales representative.

PowerXL encoder feedback cards overview

This chapter describes the purpose and contents of this manual, the receiving inspection of the encoder option card and the catalog numbering system.

The encoder card is an interface between the control board and a speed monitoring device / encoder on a motor shaft, usually at the non-drive end. This card helps the VFD determine the precise motor speed and direction based on the digital pulse signals. This manual addresses the following encoder option card:

DXX-EXT-ABZ. Dual channel incremental encoder card.

Table 1. Encoder specifications

Specification	Description
Compatible encoders	Single ended / differential type incremental encoders
Supply voltage	+5 Vdc / +15 Vdc / +24 Vdc The two-channel power supply for encoder combined maximum power is 4.8 W.

How to use this manual

The purpose of this manual is to provide you with information necessary to install, set and customize parameters, start up, troubleshoot and maintain the encoder option card in the Eaton PowerXL DX1 drive. To provide for safe installation and operation of the equipment, read the safety guidelines at the beginning of this manual and follow the procedures outlined in the following chapters before connecting power to the PowerXL series VFD. Keep this operating manual handy and distribute to all users, technicians and maintenance personnel for reference.

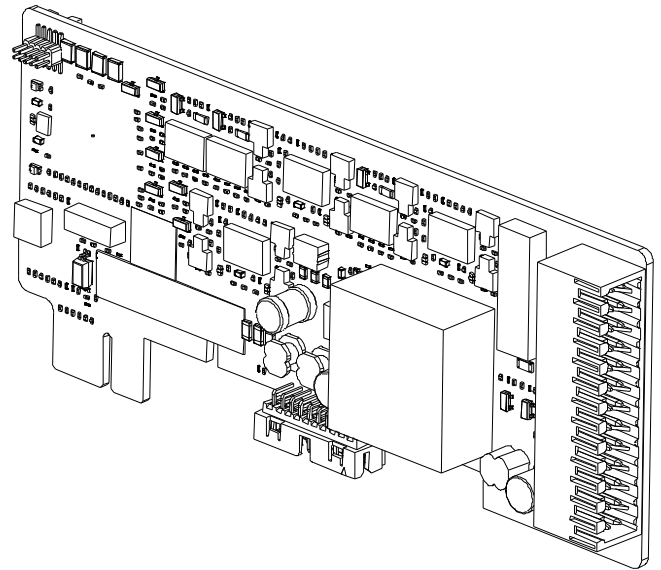
Receiving and inspection

The PowerXL series VFDs and option cards have met a stringent series of factory quality requirements before shipment. It is possible that packaging or equipment damage may have occurred during shipment.

Please check to make sure that the package includes the following:

- Encoder module (DXX-EXT-ABZ)
- Instruction Leaflet IL040084EN

Figure 1. Scope of delivery for the DX1-EXT-ABZ encoder card

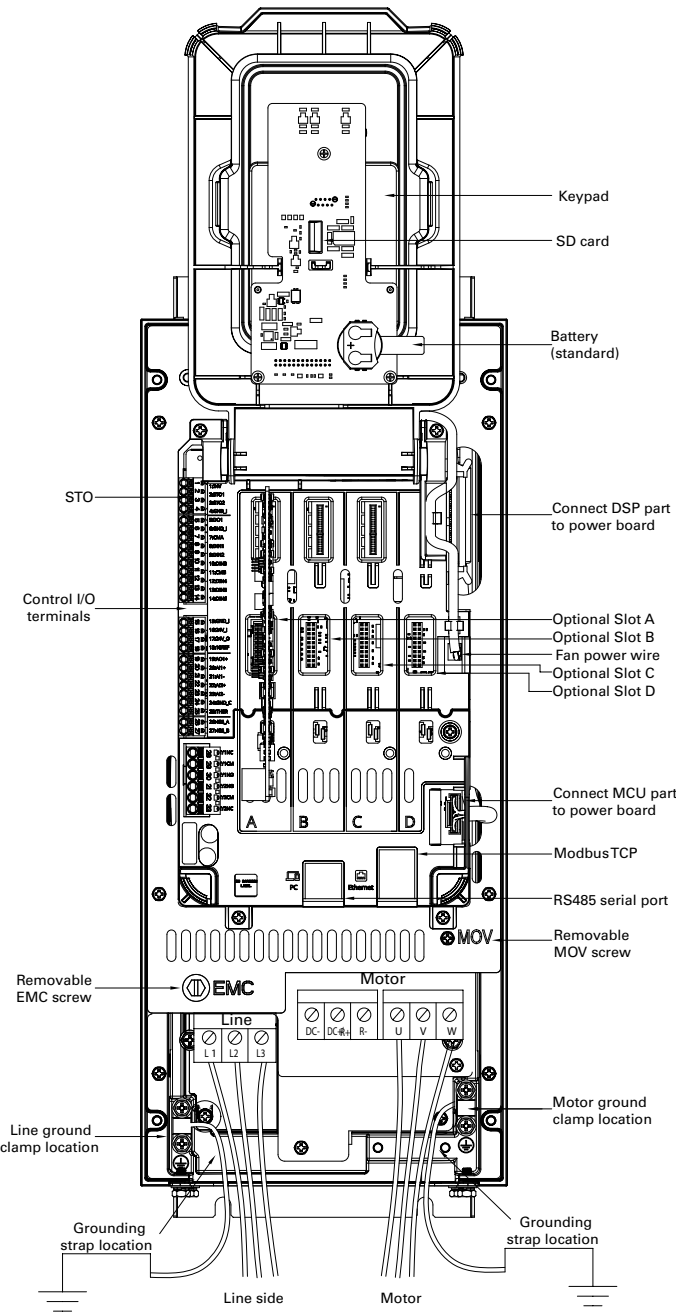


Make sure that the part number indicated on the package corresponds with the catalog number on your order. If shipping damage has occurred, please contact and file a claim with the carrier involved immediately. If the delivery does not correspond to your order, please contact your Eaton representative.

Option card slot compatibility

PowerXL DX1 has 4 option slots (A, B, C and D) but there is a slot compatibility matrix in place. The figure below shows the orientation of the option card slots.

Figure 2. PowerXL DX1 option card slots A, B, C, D orientation



The table below shows the option cards and their slot compatibility.

Option cards	Description	Slot position
DXX-EXT-3DI3D01T	I01—3 x DI, 3 x DO, 1 x Thermistor, 24 Vdc/EXT option card	Slot A/B/C/D
DXX-EXT-1AI2A0	I02—1 x AI, 2 x AO option card	Slot A/B/C/D
DXX-EXT-3R0	I03—3 x Relay dry contact (2NO + 1NO/NC) option card	Slot A/B/C/D
DXX-EXT-THER1	I04—3 x PT100 RTD thermistor input option card	Slot A/B/C/D
DXX-EXT-6DI	I05—6 x DI 120 Vac / 240 Vac input option card	Slot A/B/C/D
DXX-EXT-ABZ	PowerXL DX1 ABZ Encoder Card	Slot A
DXX-EXT-FS	PowerXL DX1 Functional Safety Card	Slot B
DXX-NET-EIP	PowerXL DX1 Dual-Port EIP Card	Slot D
DXX-NET-PROFINET	PowerXL DX1 Dual-Port ProfiNet Card	Slot D
DXX-EXT-OF	PowerXL DX1 Fiber Optic Card	Slot C

An encoder option card shall only be installed in **Slot A** of PowerXL DX1 drive.

⚠ WARNING

Installation of the encoder in any other slot will result in a fault condition.

Encoder option card installation

Follow these steps to install the encoder option card in Slot A.

Step 1: Flip the B-cover up and stop at a specific angle (120° or 150°).

Step 2: Insert the option cards to the corresponding slots according to Figure 2. Make sure the option cards have been inserted into the slots fully.

Step 3: Flip the B-cover down for snap fit with C-cover to fix the option cards firmly.

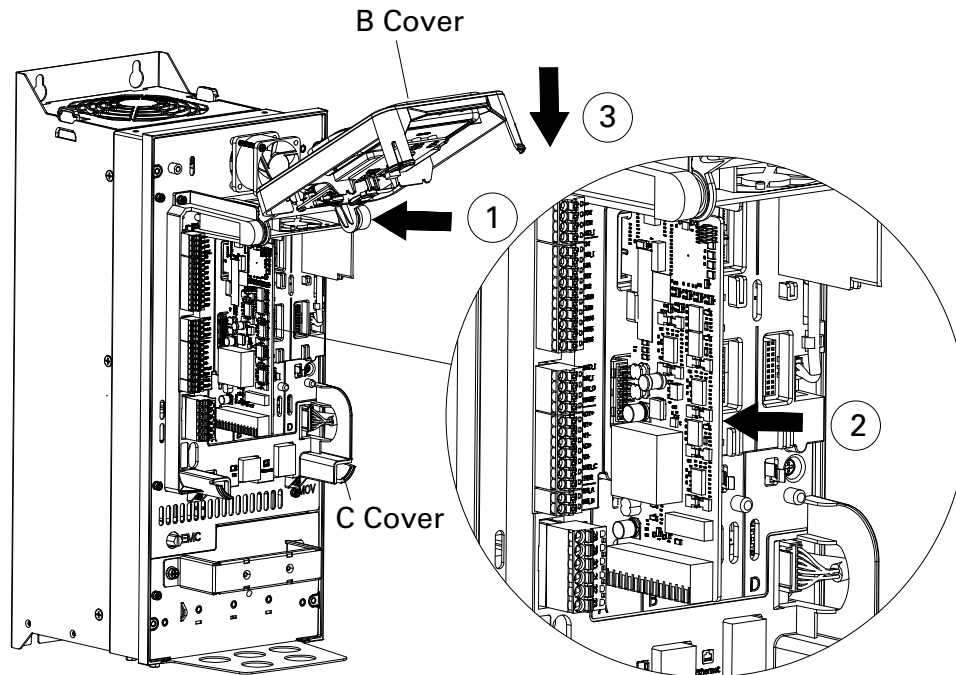
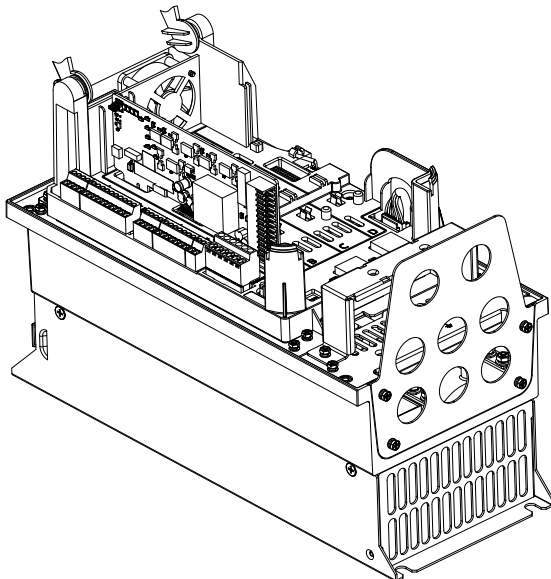


Figure 3. DXX-EXT-ABZ encoder card installation



Encoder option card installation

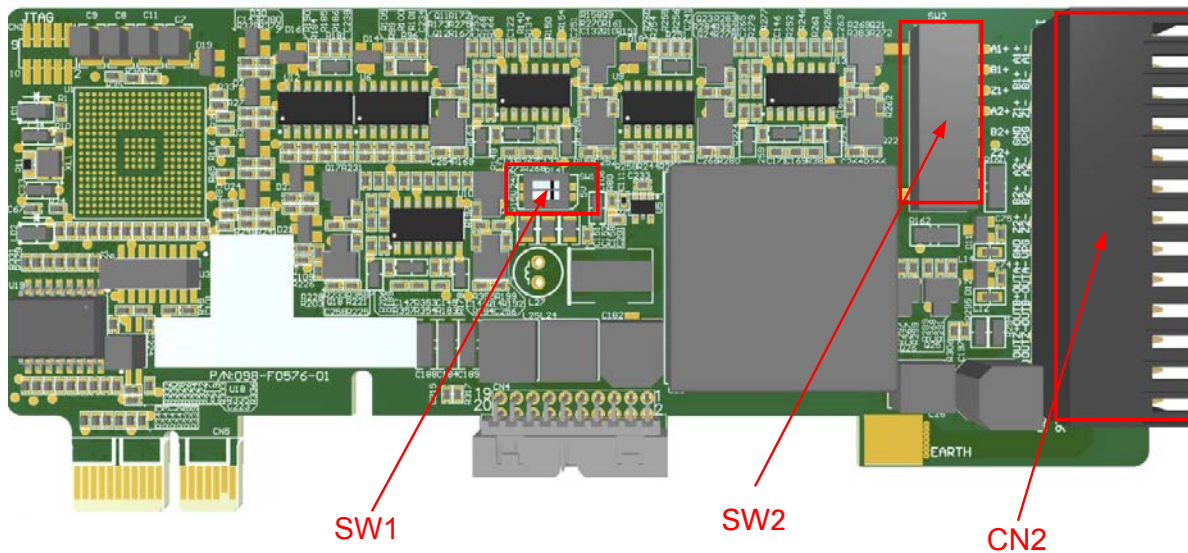
Encoder card user interface

The picture below shows the layout of the ABZ encoder card. The following user Interface components are available:

SW1—Set the encoder supply voltage

SW2—Pull-up resistor configuration

CN2—Connector for encoder input and output connections



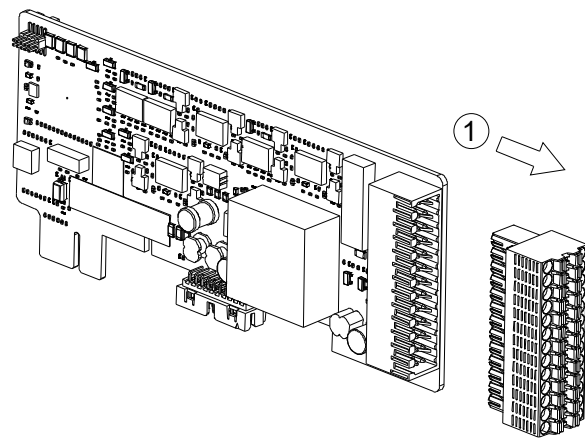
Connecting cables and shield

ABZ card wire (push-in design) 16–28 AWG (0.2–1.5 mm²)

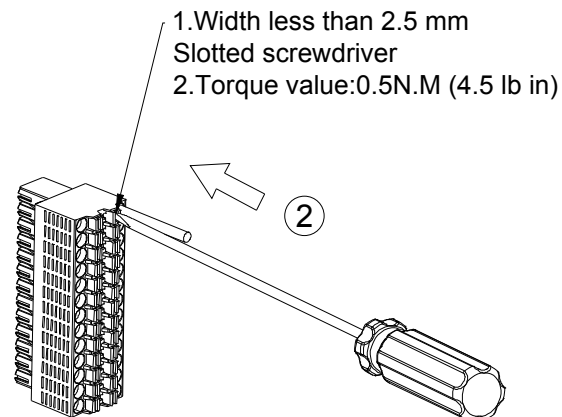
Now connect the cable shield of the signal cable with the earthing terminal to the frame of the frequency inverter.

- A shielded cable must be used.
- The connection must be made in accordance with best practice.

Step 1: Remove the removable terminal block from the option card.

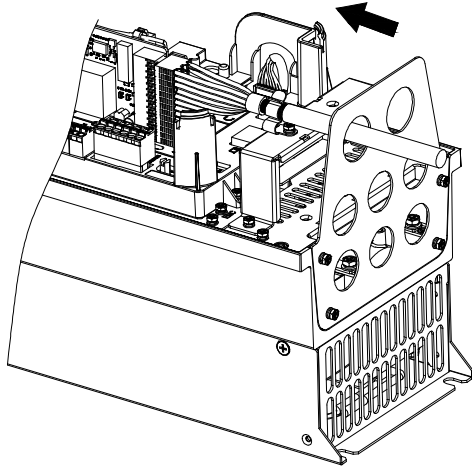
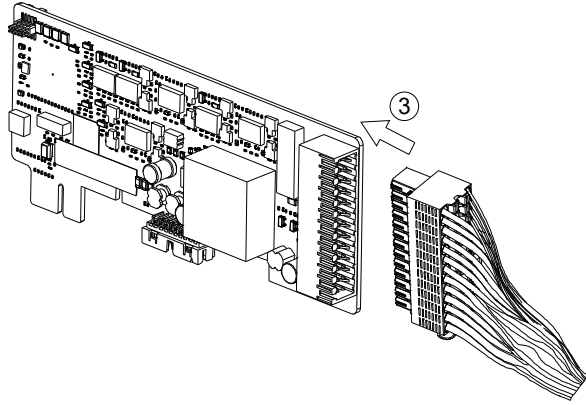


Step 2: For solid wires or strand wires with ferrules, push in the wires directly. For strand wires without ferrules, use a slotted screwdriver to press the grooves on terminal block to open the corresponding wire cages, then push in the wires.



Step 3: Install the removable terminal block back to the option card after completing all wire connections.

Step 4: The cables should be screened, and the corresponding cable screen must be earthed (PES).



Close the cover.

Setting up encoder supply voltage

Two supply voltages are available on pins 8 and 16 in connector CN2. They can power two encoders separately at the same time. The supply voltage is selected by DIP switch (SW1).

⚠ WARNING

Selecting the wrong supply voltage may damage or break the encoder.

The following supply voltages can be selected:

Encoder supply voltage	SW1 selection
VPG = 5 V	
VPG = 15 V	
VPG = 24 V	

⚠ WARNING

Selecting the wrong supply voltage may damage the encoder.

PowerXL encoder feedback cards overview

Terminal designations

Encoder input and emulation output order (CN2)

Pin	Name	Direction	Description
1	A1+	DI	A1 channel
2	A1-	DI	A1 channel - inverted
3	B1+	DI	B1 channel
4	B1-	DI	B1 channel - inverted
5	Z1+	DI	Z1 channel
6	Z1-	DI	Z1 channel - inverted
7	GND		0V
8	VPG	PO	Encoder1 supply voltage
9	A2+	DI	A2 channel
10	A2-	DI	A2 channel - inverted
11	B2+	DI	B2 channel
12	B2-	DI	B2 channel - inverted
13	Z2+	DI	Z2 channel
14	Z2-	DI	Z2 channel - inverted
15	GND		0V
16	VPG	PO	Encoder2 supply voltage
17	OUTA+	DO	Channel A+
18	OUTA-	DO	Channel A-
19	OUTB+	DO	Channel B+
20	OUTB-	DO	Channel B-
21	OUTZ+	DO	Channel Z+
22	OUTZ-	DO	Channel Z-
23	GND		0V
24	GND		0V
25	SHLD		Chassis
26	SHLD		Chassis

Notes: Channel A/B/Z output signal threshold VOH: 2–3.4 V.
Channel A/B/Z output signal threshold VOL: 0.2–0.4 V.
Channel A/B/Z output signal maximum frequency: 200 kHz.

Amplitude and frequency requirements of input and output signals

Channel	A/B/Z signal threshold V_{IH}
5 V	Min. 3.4 V
15 V	Min. 11 V
24 V	Min. 18 V

Channel	A/B/Z signal threshold V_{IL}
5 V	Max. 1 V
15 V	Max. 3 V
24 V	Max. 3 V

Channel	A/B/Z signal frequency
5 V	Max. 200 kHz
15 V	Max. 200 kHz
24 V	Max. 200 kHz

Resistor configuration for open collector encoder

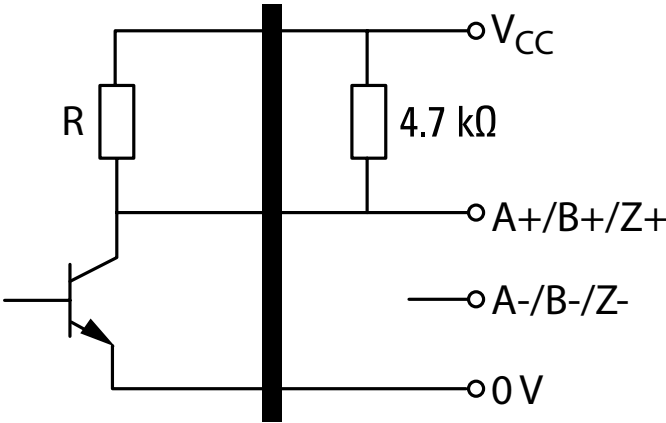


Figure 4. Resistor configuration for open collector encoder

For open collector encoder, the channel A+/B+/Z+ is actively driven low when the transistor closes the circuit. When the transistor opens the circuit, the signal line is passively pulled high by the 4.7 kΩ load resistor.

Resistor configuration for open emitter encoder

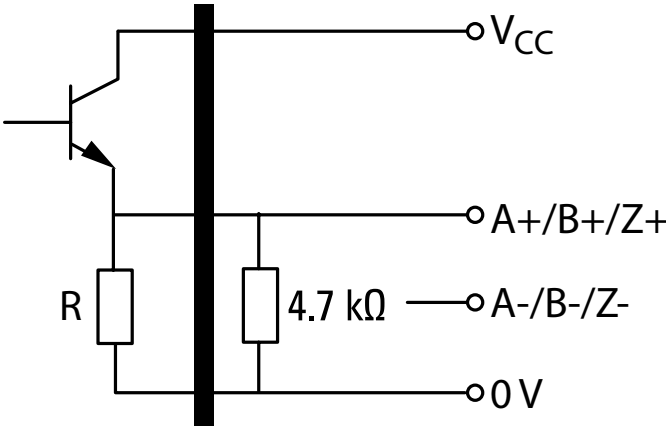


Figure 5. Resistor configuration for open emitter encoder

For open emitter encoder, the channel (A+/B+/Z+) is actively driven high when the transistor closes the circuit. When the transistor opens the circuit, the signal line is passively pulled low by the 4.7 kΩ load resistor.

In this card, a 4.7 kΩ resistor is connected to each signal line (A+/B+/Z+) from one end and the other end is, by default, floating. These floating ends can be connected via DIP switches with VPG or GND.

The configuration of the DIP switches is shown in the table below:

Encoder output type	SW2 configuration (Switch toggle from 1–6 digits)
Differential push-pull	000000 (Default setting)
Single-ended push-pull	000000 (Default setting)
Collector pull up	000000 (Default setting)
Collector pull down	000000 (Default setting)
Open collector (sinking)	+++++ (Resistors pull up)
Open emitter	----- (Resistors pull down)

Note: Because this switch has three positions: +/–/0, the 6-bit symbols in the table are the respective states of these six-bit switches.

ABZ card user I/O connection test procedure

When installation is complete, the ABZ card input signal shall be verified. The encoder signal shall be verified according to the following steps.

For Encoder 1:

- Step 1:** Write the encoder pulse count to B7.2.1 (Encoder 1 Pulse Count).
- Step 2:** Set P8.1.1 (Motor control mode) to Freq control.
- Step 3:** Set P7.2.3 (Frequency reference) to 10 (Hz).
- Step 4:** Run the motor and observe B7.1.3 (Encoder 1 speed).
- Step 5:** If B7.1.3 is equal to M2.3 (motor speed), the wiring is correct. If the two values are opposite, you need to set B7.2.2 (Encoder 1 Ration Reverse) to YES.

For Encoder 2:

- Step 1:** Write the encoder pulse count to B7.2.3 (Encoder 2 pulse count).
- Step 2:** Set P8.1.1 (Motor control mode) to frequency control.
- Step 3:** Set P7.2.3 (Frequency reference) to 10 (Hz).
- Step 4:** Run the motor and observe B7.1.4 (Encoder 2 speed).
- Step 5:** If B7.1.4 is equal to M2.3 (Motor speed), the wiring is correct. If the two values are opposite, you need to set B7.2.4 (Encoder 2 Ration Reverse) to YES.

⚠ WARNING

It is necessary to ensure that the motor can operate normally. If there is any discrepancy with the above description, please recheck the wiring.

Example wiring diagrams

The following diagrams show examples of encoder terminations to the ABZ encoder card.

Figure 6. Wiring for differential push-pull encoder

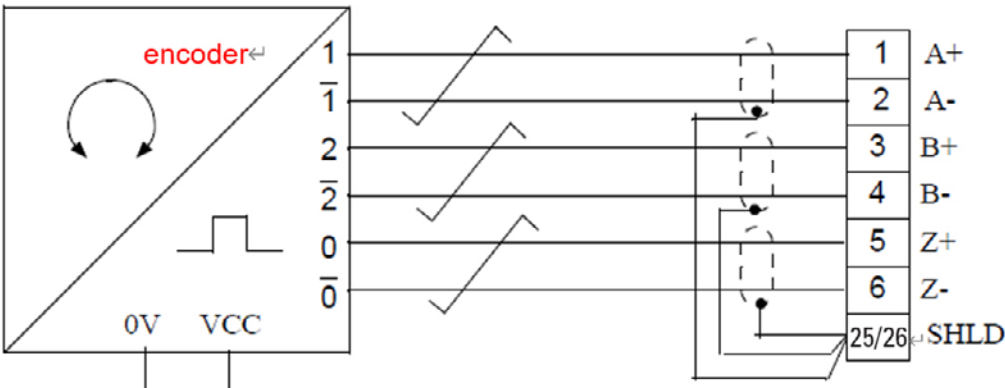
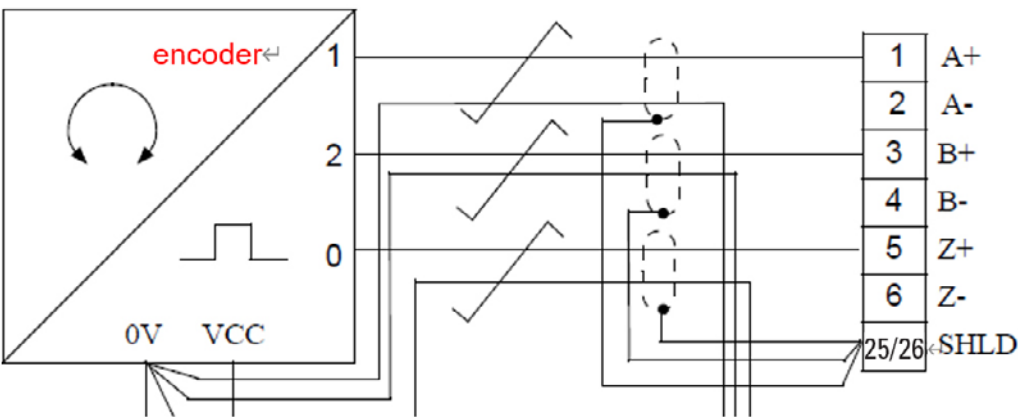
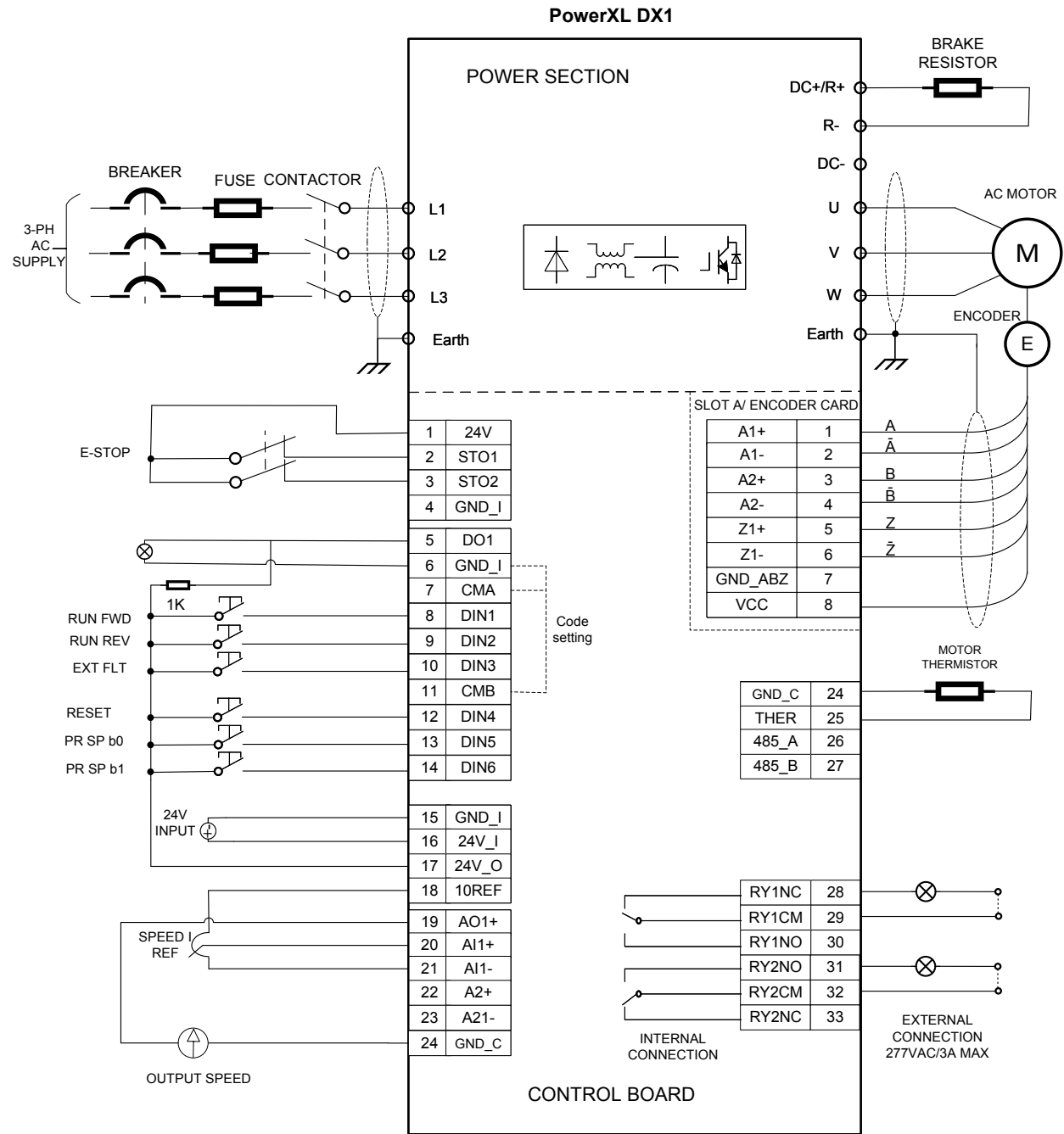


Figure 7. Wiring for single-ended push-pull HTL encoder



Typical PowerXL DX1 wiring schematic for closed loop configuration

Figure 8. Closed loop wiring schematic diagram



Encoder card parameter list

Encoder card parameter list

The following tables show the parameters and descriptions for the ABZ encoder card monitor and setup parameters.

Table 2. Monitor B7.1

Code	Parameter	Min.	Max.	Unit	Default	ID	Special Note	Note
B7.1.1	Board Status					883		
B7.1.2	Slot A: FW Version					1064		
B7.1.3	Encoder 1 speed			rpm		3502		
B7.1.4	Encoder 2 speed			rpm		3504		
B7.1.5	Encoder Power Supply			V		3973		

Table 3. Monitor B7.2

Code	Parameter	Min.	Max.	Unit	Default	ID	Special note	Note
B7.2.1	Encoder 1 Pulse Count	1	60000	ppr	1024	3503	①	
B7.2.2	Encoder 1 Rotation Reverse				0	3505	①	0 = No
B7.2.3	Encoder 2 Pulse Count	1	60000	ppr	1024	3507	①	1 = Yes
B7.2.4	Encoder 2 Rotation Reverse				0	3508	①	See Par ID 3505
B7.2.5	Encoder 1 Type				0	3835	①	0 = A/B/Z differential output 1 = A/B/Z Single end output 2 = Not Used
B7.2.6	Encoder 2 Type				2	3836	①	See Par ID 3835
B7.2.7	Encoder Output Select				0	3780		0 = Off 1 = SlotA:Encoder 1 2 = SlotA:Encoder 2
B7.2.8	Encoder Output Divider				0	3781		0 = /1 1 = /2 2 = /4 3 = /8 4 = /16 5 = /32 6 = /64 7 = /128 8 = /256 9 = /512 10 = /1024 11 = /2048
B7.2.9	Encode1 Speed filter Time	See Par ID 3916	32000	ms	MaxFreqMFG	3967		
B7.2.10	Encode2 Speed Filter Time	See Par ID 3916	32000	ms	MaxFreqMFG	3968		

① Parameter value can only be changed after the drive has stopped.

[illegible]

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