

Installation instructions



Refer to installation use and maintenance manual for more information.



2 phase servo drive technical data:

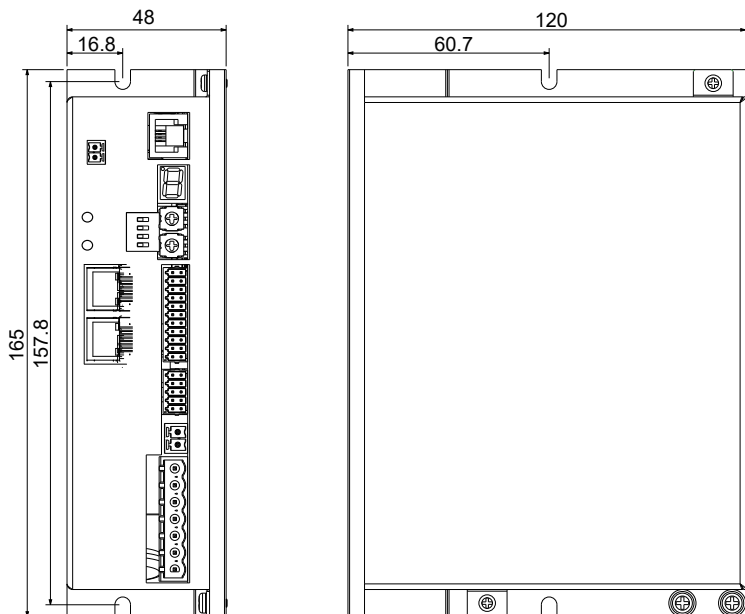
- AC power supply: $18 \div 100$ Vac (mono or three-phase)
- AC logic supply: $18 \div 100$ Vac (monophase) (optional and not isolated)
- Phase current: up to 8.5 Arms (12Apeak)
- Chopper frequency: ultrasonic 40KHz
- Stepless Control Technology (65536 position per turn)
- Protections against: over current, over/under voltage, overheating, short circuit between motor phase-to-phase and phase-to-ground
- Profinet communication interfaces
- Encoder input (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) incremental encoder
- Service SCI interface for programming and real time debugging
- 6 digital inputs (opto-coupled)
- 4 digital outputs (opto-coupled)
- 2 analog inputs (NOT isolated)
- Dimensions: 165 x 120 x 48 mm (without connectors)
- Protection degree: IP20
- Pollution degree: 2
- Category C3 following standard EN 61800-3
- Working temperature $5^{\circ}\text{C} \div 40^{\circ}\text{C}$; Storage temperature $-25^{\circ}\text{C} \div 55^{\circ}\text{C}$
- Humidity: $5\% \div 85\%$ not condensing

TITANIO
VECTOR - STEPPER - DRIVES

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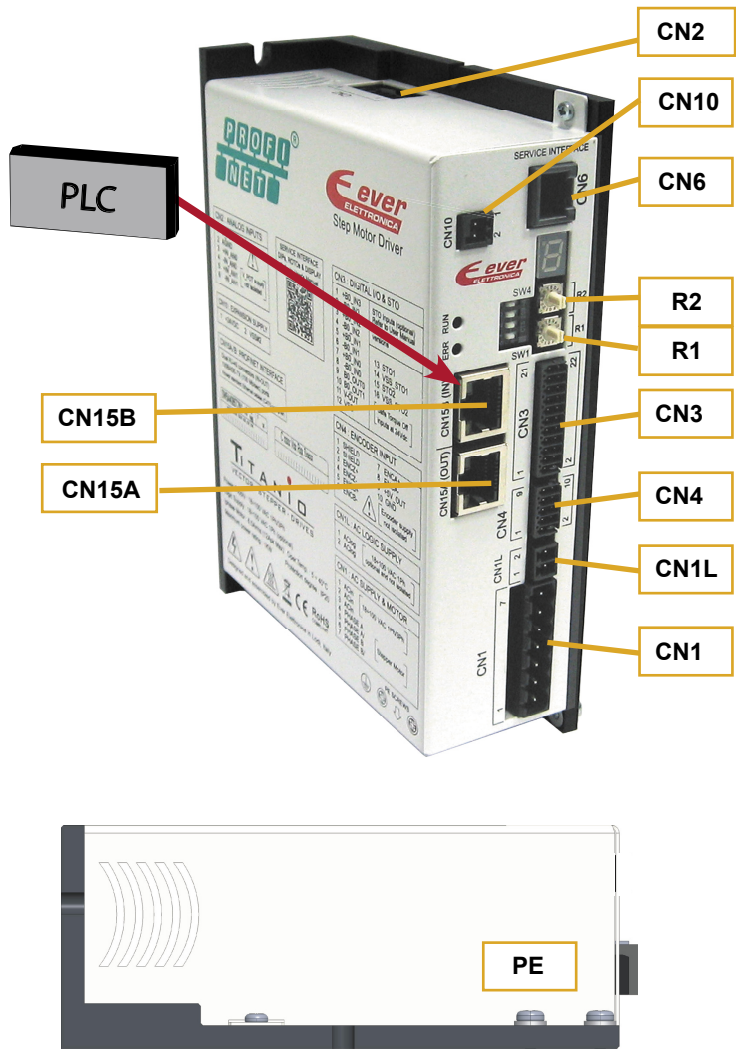
PROFINET

Mechanical data



System connections

Connectors:

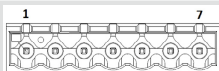


System connection

CN1: AC Power supply & Motor

7 positions, pitch 5.08mm, PCB header connector

CN1.1	ACin	PWR_IN	AC power supply input (18-100Vac)
CN1.2	ACin	PWR_IN	AC power supply input (18-100Vac)
CN1.3	ACin	PWR_IN	AC power supply input (18-100Vac)
CN1.4	A	PWR_OUT	Motor output phase A
CN1.5	A/	PWR_OUT	Motor output phase A/
CN1.6	B	PWR_OUT	Motor output phase B
CN1.7	B/	PWR_OUT	Motor output phase B/



CN1L: AC Logic Supply

2 positions, pitch 3.81mm, PCB header connector

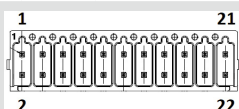
CN1L.1	AClog	PWR_IN	AC logic supply input (18-100Vac)
CN1L.2	AClog	PWR_IN	AC logic supply input (18-100Vac)



CN3: Digital Inputs / Outputs

22 positions, pitch 2.54mm double row, PCB header connector

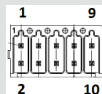
CN3.1	+B0_IN3	DIG_IN	Digital input B0_IN3 positive side
CN3.2	-B0_IN3	DIG_IN	Digital input B0_IN3 negative side
CN3.3	+B0_IN2	DIG_IN	Digital input B0_IN2 positive side
CN3.4	-B0_IN2	DIG_IN	Digital input B0_IN2 negative side
CN3.5	+B0_IN1	DIG_IN	Digital input B0_IN1 positive side
CN3.6	-B0_IN1	DIG_IN	Digital input B0_IN1 negative side
CN3.7	+B0_IN0	DIG_IN	Digital input B0_IN0 positive side
CN3.8	-B0_IN0	DIG_IN	Digital input B0_IN0 negative side
CN3.9	B0_OUT0	DIG_OUT	PNP digital output B0_OUT0
CN3.10	B0_OUT1	DIG_OUT	PNP digital output B0_OUT1
CN3.11	V-OUT	PWR_IN	24Vdc input supply for digital output
CN3.12	VSS	PWR_IN	Negative input supply for digital output
CN3.13	B0_OUT2	DIG_OUT	PNP digital output B0_OUT2
CN3.14	B0_OUT3	DIG_OUT	PNP digital output B0_OUT3
CN3.15	+B0_IN9	DIG_IN	Digital input B0_IN9 positive side
CN3.16	-B0_IN9	DIG_IN	Digital input B0_IN9 negative side
CN3.17	+B0_IN8	DIG_IN	Digital input B0_IN8 positive side
CN3.18	-B0_IN8	DIG_IN	Digital input B0_IN8 negative side
CN3.19	n.c.		Not connected
CN3.20	n.c.		Not connected
CN3.21	n.c.		Not connected
CN3.22	n.c.		Not connected



CN4: Encoder input connection

10 positions, pitch 2.54mm double row, PCB header connector

CN4.1	SHIELD	/	Cable shield connection
CN4.2	SHIELD	/	Cable shield connection
CN4.3	ENCZ+	DIG_IN	Encoder Zero input positive
CN4.4	ENCZ-	DIG_IN	Encoder Zero input negative
CN4.5	ENCB+	DIG_IN	Encoder Phase B input positive
CN4.6	ENCB-	DIG_IN	Encoder Phase B input negative
CN4.7	ENCA+	DIG_IN	Encoder Phase A input positive
CN4.8	ENCA-	DIG_IN	Encoder Phase A input negative
CN4.9	+5V	PWR_OUT	+5Vdc power supply output
CN4.10	GND	PWR_OUT	Negative side of supply



CN15A e CN15B: Profinet Interface

RJ45, 8 positions shielded, PCB header connector

Dual RJ45 connectors (IN-OUT)
100BASE-TX (100Mb/sec) ports
Accept standard Ethernet cable (CAT5 or higher)

CN15A (P1) CN15B (P2)



CN6: Service SCI Interface

RJ11, 6P4C, PCB header connector

CN6.1	TX/RX	Transmit / Receive Line
CN6.2	DE/RE	Drive Enable Negated /Receive Enable
CN6.3	+5V	+5V power out
CN6.4	GND	GND power out



This connection is only possible with hardware and software provided by Ever.

CN2: Analog Inputs

6 positions, pitch 3.81mm, PCB header connector

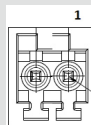
CN2.1	V_POT	PWR Output	Voltage supply output for potentiometer
CN2.2	AGND	PWR Output	Output negative reference for potentiometer
CN2.3	+IN_AN0	Analog Input	Analog input 0 positive side
CN2.4	-IN_AN0	Analog Input	Analog input 0 negative side
CN2.5	+IN_AN1	Analog Input	Analog input 1 positive side
CN2.6	-IN_AN1	Analog Input	Analog input 1 negative side



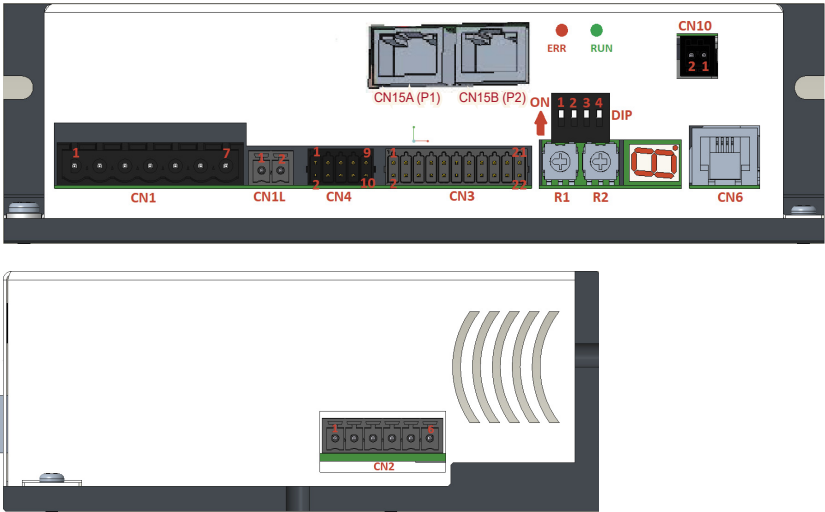
CN10: I/O Expansion Supply (see drive version)

2 positions, pitch 2.5mm, PCB header connector

CN10.1	+24V	PWR_IN	24 Vdc supply for I/O Expansion
CN10.2	VSS#2	PWR_IN	Negative supply for I/O Expansion



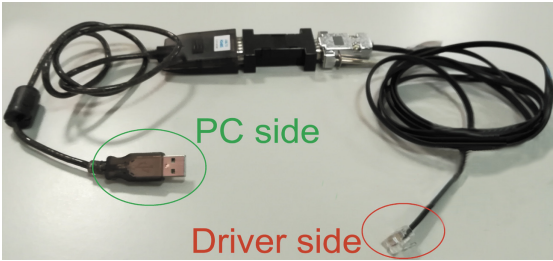
Drive connectors layout



Service SCI connection



This connection is *only possible with hardware and software provided by Ever.*
Kit code: SW5_SERV00-SL or SW5-SERV00-EE.



Profinet Leds

Run (Green) and Error (Red) Leds configuration as reported in Profinet specification.
Refer to Software manual for more details.

Roto-Switches and Dip-Switches settings

Refer to Software manual.



NOTE: the device reads the Dip-Switches and the Roto-Switch only during the Power up.
If it's necessary a setting change, shut down the system, change the settings and start up the system again to make the changes operating.

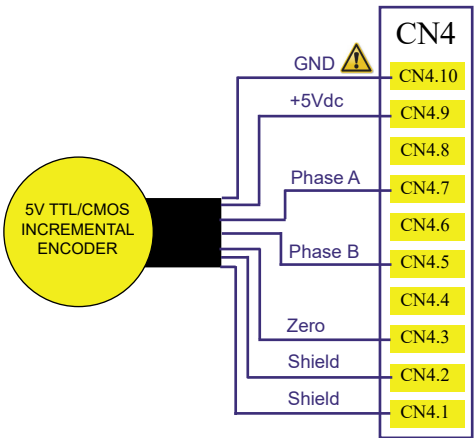
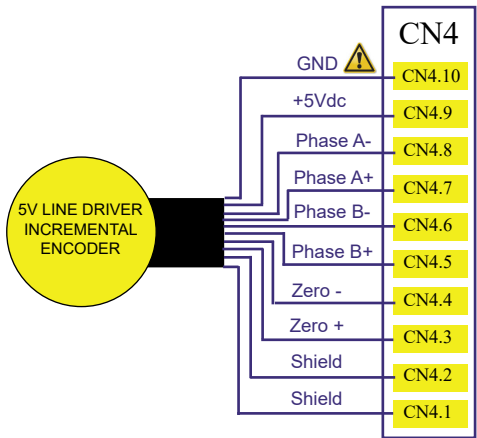
Display Status

Operational statuses and their signals

	Missing Operating System: no software application stored on drive
	Firmware update: Updating of new software in progress.
	Initialization: the drive executes the start-up procedure (a few seconds after the start-up procedure has begun).
	Correct functioning
	Voltage of DC bus near to the limit value (minimum or maximum)
	Drive temperature is near to the maximum value
	Warning: EEprom near Write Overrun
	Warning: EEprom near End of Life
	Enable OFF, current zero
	I _{nominal} not computed
	Error: expired e3PLC software trial
	Security intervention of watchdog
	Internal Software Error
	Missing calibration values
	Management EEPROM
	EEPROM fail
	Error: e3PLC application error
	Error: EEprom Write Overrun
	Error: feature unavailable
	Open motor phases
	Over/under voltage;
	Over current on the motor output;
	Over temperature of the drive;
	Mising Torque Enable ("missing Safe Torque Off")
	Drive Over Power Protection and/or Current Regulation out of range
	e3PLC User Protection (generated by setting bit #0 of e3PLC_User_Settings)
	Motor feedback error

Encoder input connection

- Electrically NOT-isolated digital inputs:
- differential 5Vdc that meet the RS422 standard
 - single-ended 5Vdc TTL/CMOS



Maximum supply current 100mA.

GND is internally in common with power ground, this is potentially dangerous.
Take all necessary measures to avoid possible contacts in the final installation.

B0_IN0 to B0_IN3 and B0_IN8 to B0_IN11



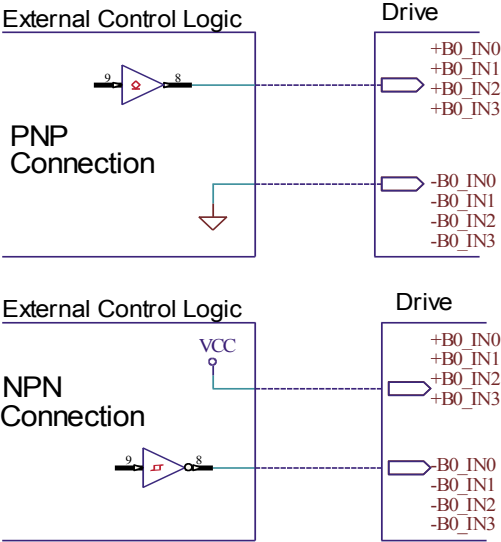
Differential PNP, NPN and Line Driver type.

Standard Digital Inputs (B0_IN0, B0_IN1 and B0_IN8 to B0_IN11)			
Characteristics	MIN.	MAX.	Unit
Supply voltage	2 ⁽¹⁾	24	Vdc
Inputs frequency	--	10	kHz
Threshold switching voltage	1.61 ⁽¹⁾	--	Vdc
Current at 2 Vdc	--	2.53	mA
Current at 3.3 Vdc	--	5.84	mA
Current at 5 Vdc	--	6.28	mA
Current at 24 Vdc	--	8.75	mA

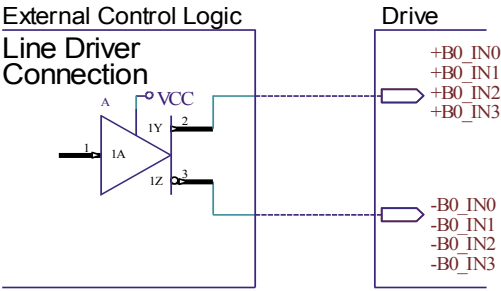
High-Speed Digital Inputs (B0_IN2 and B0_IN3)			
Characteristics	MIN.	MAX.	Unit
Supply voltage	2 ⁽¹⁾	24	Vdc
Inputs frequency	--	500	kHz
Threshold switching voltage	1.61 ⁽¹⁾	--	Vdc
Current at 2 Vdc	--	2.53	mA
Current at 3.3 Vdc	--	5.84	mA
Current at 5 Vdc	--	6.28	mA
Current at 24 Vdc	--	8.75	mA

(1) N.B.: It's recommended to use 2Vdc digital inputs only in differential Line-Driver configuration to have more noise immunity.

3.3 - 24V INPUT



2 - 24V INPUT

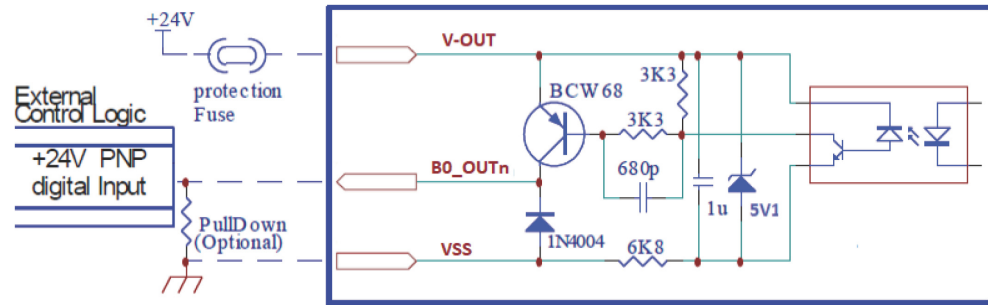


Digital outputs connection

B0_OUT0, B0_OUT1 and B0_OUT3



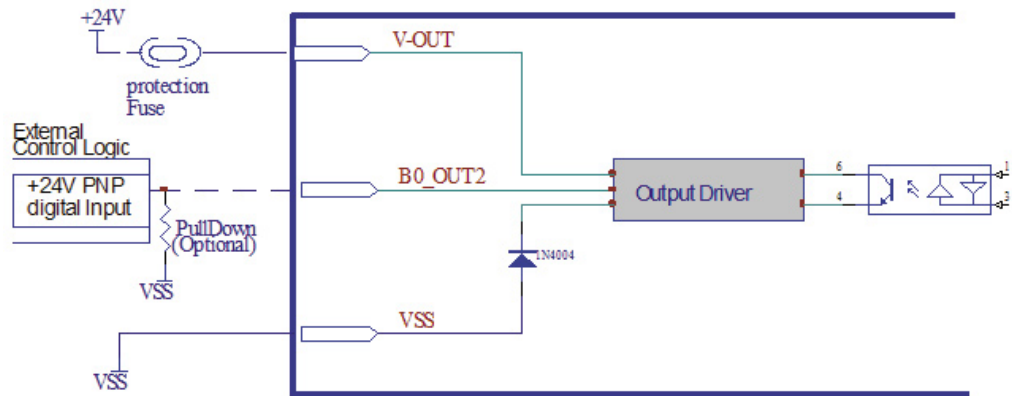
PNP with $V_{OUTmax}=24Vdc$, $I_{OUTmax}=100mA$, $F_{max} = 250kHz$



B0_OUT2

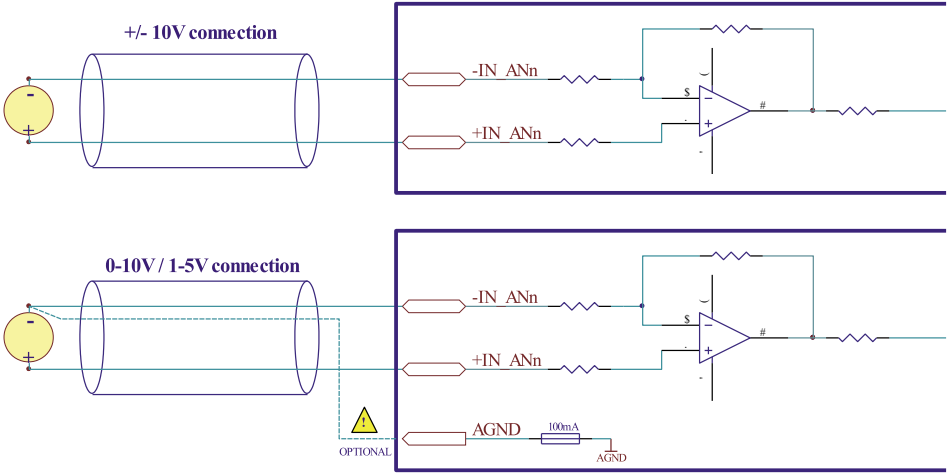


PNP with $V_{OUTmax}=24Vdc$, $I_{OUTmax}=1.3A$, $F_{max} = 1kHz$

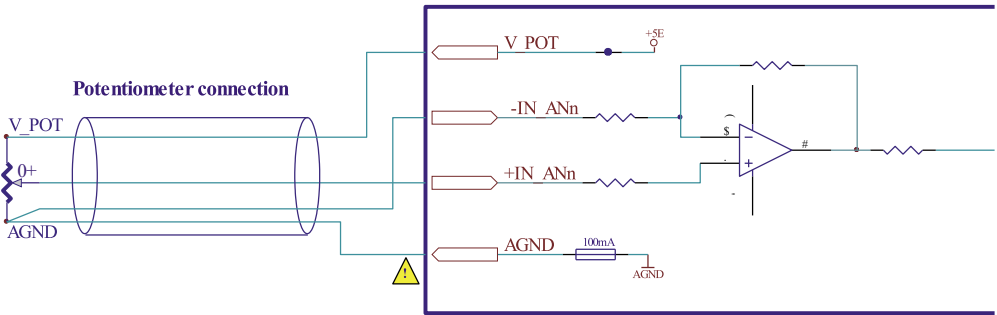


Analog inputs connection

i The resolution of the analog inputs depends from the type of the connection which could be defined by software: differential or potentiometer.



! The connection from an external reference and $AGND$ should be preceded by a thorough risk analysis on the machine/circuit in which the drive will be installed.



! $AGND$ is internally in common with power ground, this is potentially dangerous. Take all necessary measures to avoid possible contacts in the final installation.

Mating connectors

Connector	Description
CN1	Phoenix 1758623
CN1L	Phoenix 1827635
CN2	Phoenix 1839652
CN3	Phoenix 1844662
CN4	Phoenix 1844604
CN15A / CN15B	RJ45 for Ethernet standard cables (CAT5 or higher)
CN10	Phoenix 1709565

Section of the cables

Function	Cable	
	Minimum	Maximum
Power supply, Motor output and PE	0.50 mm² (AWG20)	2.50 mm² (AWG12)
Logic supply	0.14 mm² (AWG26)	1.50 mm² (AWG16)
Encoder input	0.14 mm² (AWG26)	0.50 mm² (AWG20)
Digital Inputs / Outputs and STO	0.14 mm² (AWG26)	0.50 mm² (AWG20)
Analog inputs	0.14 mm² (AWG26)	1.50 mm² (AWG16)
Ethernet interfaces	Ethernet standard cables CAT5 or higher	

Verify the installation

- Check all connection: power supply, logic supply, STO inputs and inputs/outputs.
- Make sure all settings right for the application.
- Make sure the power supply is suitable for the drive.
- If possible, remove the load from the motor shaft to avoid that wrong movements cause damage.
- Enable the current to the motor and verify the applied torque.
- Enable a movement of some steps and verify if the rotation direction is the desired one.
- Disconnect the power supply, connect the load on the motor and check the full functionality.

Analysis of malfunctions



When any of the following situations occur, the drive is placed in a fault condition.

DEFECT	CAUSE	ACTION
Intervention of the thermal protection.	Can be caused by a heavy working cycle or a high current in the motor.	Improve the drive cooling by natural or fan air flow. Consider to use a motor with a higher torque vs current rating.
Intervention of the current protection.	Short circuit on the motor powering stage(s) of the drive.	Check motor windings and cables to remove the short circuits replacing faulty cables or motor if necessary.
Intervention of the over/under voltage protection.	Supply voltage out of range	Check the value of the supply voltage
Open phase motor protection.	Motor windings to drive not proper connection.	Check motor cables and connections to the drive.



When one of the following situations occur, the drive doesn't function correctly and it is reported an error.

DEFECT	CAUSE	ACTION
Noisy motor movement with vibrations.	Can be caused by a lack of power supply to a phase of the motor or a poor regulation of the winding currents.	Check the cables and connections of the motor and/or change the motor speed to avoid a resonance region.
The external fuse on the power supply of the drive is burned.	Can be caused by a wrong connection of the power supply.	Connect the power supply correctly and replace the fuse.
At high speed, the motor torque is not enough.	Can be due to a "self-limitation" of motor current and torque.	Increase the motor current (always within the limits), increase the supply voltage, change motor connection from series to parallel.

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