

Installation instructions

i Refer to installation use and maintenance manual for more information.
Available user manual at link <http://www.everelettronica.it/manhw.html>



Controller bipolar open frame drive for 2 phase step motor:

- DC Power Supply: 12 ÷ 36Vdc
- DC Logic Supply: 24Vdc (mandatory)
- Phase current: up to 3 ARMS (4,2 APK)
- Chopper frequency: ultrasonic 40KHz
- Stepless Control Technology (65536 position per turn)
- Protections: over-current, over-temperature, short circuit phase-phase motor and phase-ground
- Direct feedback interface: incremental encoder (not isolated) 5Vdc TTL/CMOS or 24Vdc Push-Pull
- EtherCAT communication interfaces
- Service SCI interface for programming and real time debugging
- Enable Torque input not isolated (mandatory)
- 4 digital inputs (not isolated)
- 3 digital outputs (not isolated)
- 1 analog input
- Dimensions : 83 x 42 x 33mm (refer to picture)
- Pollution degree : 2
- Category C3 following standard EN 61800-3
- Working temperature 5°C ÷ 40°C; Storage temperature -25°C ÷ 55°C
- Humidity : 5% ÷ 85% not condensing

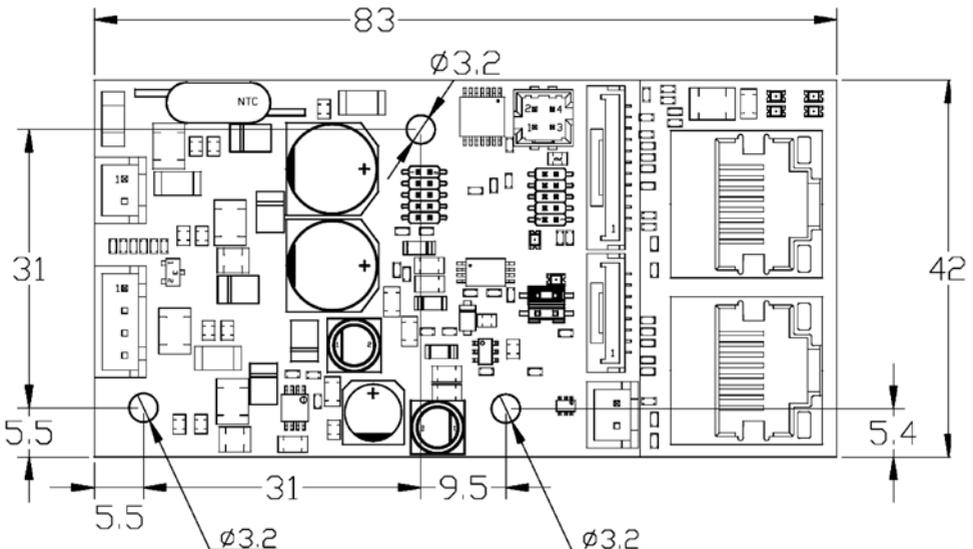
TITANIO
VECTOR - STEPPER - DRIVES



error
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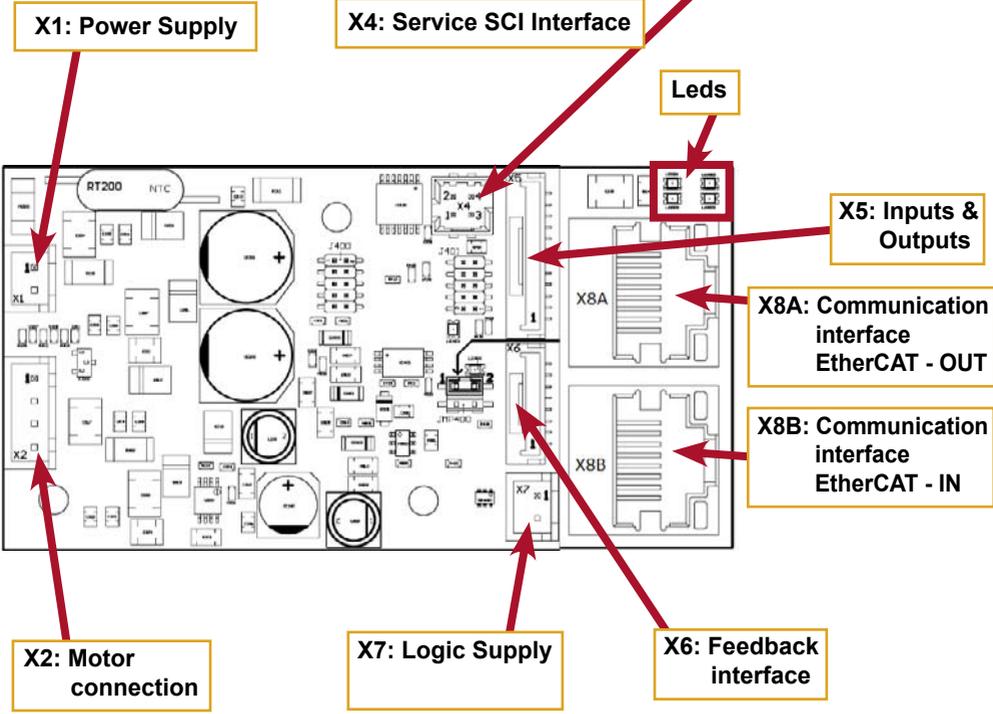
EtherCAT

Mechanical data



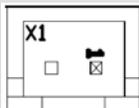
System connections

Connectors: position, function and pinout.



X1: Power supply

X1.1	VPOT	PWR_IN	Positive power supply input
X1.2	PGND	PWR_IN	Negative power supply input



X2: Motor connection

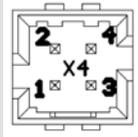
X2.1	A	PWR_OUT	Motor output phase A
X2.2	A/	PWR_OUT	Motor output phase A/
X2.3	B	PWR_OUT	Motor output phase B
X2.4	B/	PWR_OUT	Motor output phase B/



System connections

X4: Service SCI Interface

X4.1	TX/RX	Transmit / Receive Line
X4.2	DE/RE	Drive Enable Negated / Receive Enable
X4.3	+5V	+5Vdc power out
X4.4	GND	GND power out



X7: Logic supply

X7.1	VLOG	PWR_IN	Positive logic supply input
X7.2	GND	PWR_IN	Negative logic supply input

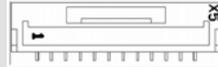


X8A and X8B: EtherCAT interface

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

X5: Inputs & Outputs:

5 digital inputs, 3 digital output and 1 analog input			
X5.1	V_POT	PWR_OUT	+5Vdc supply output for potentiometer
X5.2	DIG_IN0	DIG_IN	Digital input IN0
X5.3	DIG_IN1	DIG_IN	Digital input IN1
X5.4	EN_TORQUE	DIG_IN	Digital input EN_TORQUE
X5.5	DIG_IN3	DIG_IN	Digital input IN3
X5.6	DIG_IN2	DIG_IN	Digital input IN2
X5.7	IN_AN0	AN_IN	Analog input 0
X5.8	Reserved		Reserved pin (see EN_TORQUE input connection paragraph pag.5)
X5.9	DIG_OUT0	DIG_OUT	PNP digital output OUT0
X5.10	DIG_OUT1	DIG_OUT	PNP digital output OUT1
X5.11	DIG_OUT2	DIG_OUT	PNP digital output OUT2
X5.12	GND	DIG_OUT	Reference ground for potentiometer



X6: Feedback interface

X6.1	+5E	PWR_OUT	Positive +5Vdc power supply output
X6.2	ENC_PHA	DIG_IN	Encoder Phase A input
X6.3	ENC_PHB	DIG_IN	Encoder Phase B input
X6.4	ENC_ZERO	DIG_IN	Encoder Zero Signal input
X6.5	Reserved	---	Reserved pin (do not connect)
X6.6	Reserved	---	Reserved pin (do not connect)
X6.7	Reserved	---	Reserved pin (do not connect)
X6.8	GND	PWR_OUT	Negative side of supply



Working Status (Led)

Visualization status		Description
1		Green OFF Bus status 'Init'
2		Green ON Bus status 'Operational'
3		Green Blinking (1s) Bus status 'Pre-Operational'
4		Green Single Flash Bus status 'Safe-Operational'
5		Blue ON Error : connect with Service SCI kit and check with software.
6		Blue ON & Yellow ON Drive in boot mode. A new firmware should be downloaded to drive.
7		Blue ON & Yellow Blinking (200ms) Firmware update in progress. Do not power off the drive until the update process is completed.
8		Blue ON & Red Blinking (200ms) Initialization phase. Should last few seconds. While in this condition the drive is not fully operational.
9		Yellow ON & Red OFF & Blue OFF Missing setting of Inominal
10		Yellow Blinking (200ms) & Red OFF & Blue OFF Warning : connect with Service SCI kit and check with software.
11		Red ON Protection: Motor is in open phase condition
12		Red Blinking (200ms) Current protection
13		Red ON (1sec) & Yellow 1 Blink Overvoltage protection
14		Red ON (1sec) & Yellow 2 Blink Undervoltage protection
15		Red ON (1sec) & Yellow 3 Blink Thermal protection
16		Red ON (1sec) & Yellow 4 Blink Motor Feedback Error
17		Red ON (1sec) & Yellow 6 Blink Motor Current Regulation is out of range
18		Red ON (1sec) & Yellow 7 Blink eePLC User Protection (generated by setting bit #0 of eePLC_User_Settings)

Note: Drive could be considered in a correct status if leds Red, Yellow and Blue are all OFF.

- In general:
- Led Blue indicates a software internal fault or a non-operative condition
 - Led Red indicates an alarm or a drive protection
 - Led Yellow indicates a warning



Service SCI connection

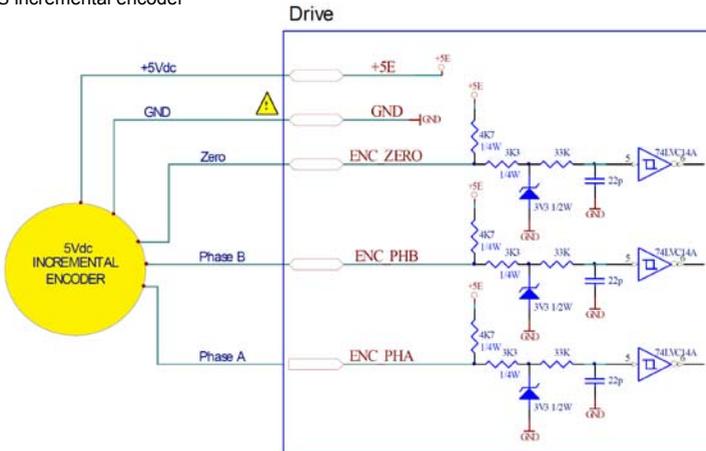


This connection is only possible with hardware and software provided by Ever.
Kit code: SW4_SERV00-SL or SW4-SERV00-EE.

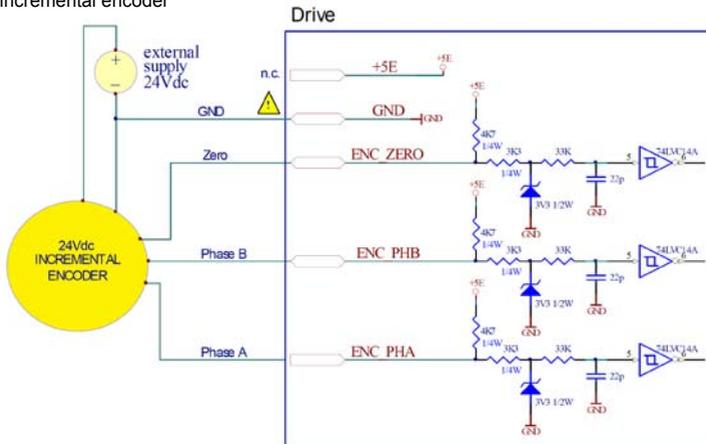


Feedback connection (not isolated)

5Vdc TTL/CMOS incremental encoder



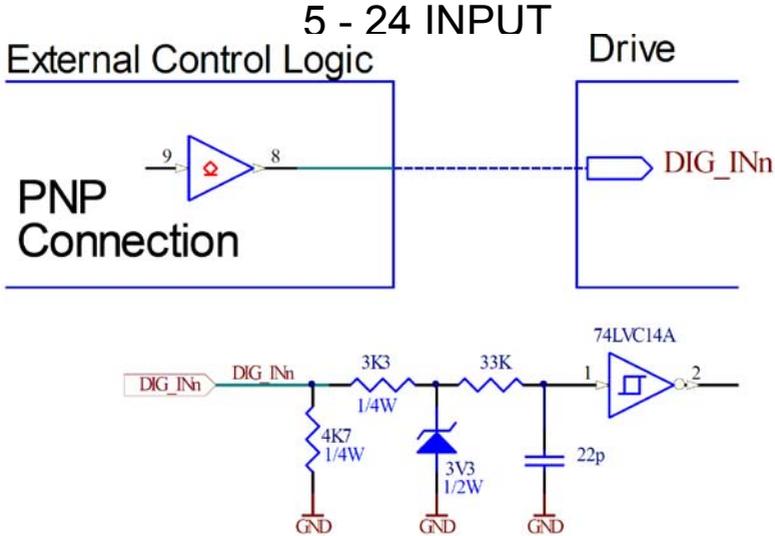
24Vdc Push-pull incremental encoder



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

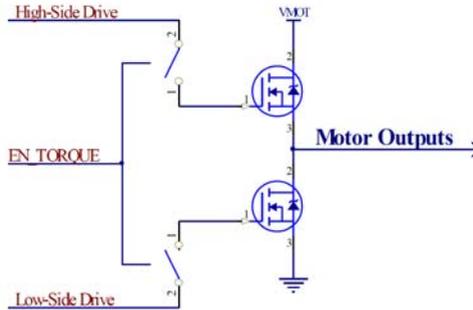
Digital inputs connection

i 5-24Vdc single-ended PNP (TTL/CMOS compatible) digital inputs (not isolated).



EN_TORQUE input connection

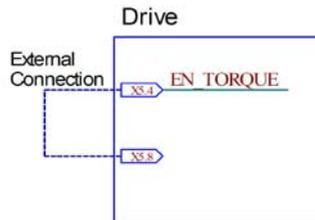
i 5-24Vdc single-ended PNP (TTL/CMOS compatible) digital inputs (not isolated).



This is the enable signal for H-bridges that cannot be overridden by the control firmware:

- Input floating or connected to GND = H-bridges are open (Safe state) and the High&Low Side drive outputs cannot be activated to drive the motor (motor not powered and without torque).
- Input connected to High voltage (5-24Vdc) = the microcontroller is able to control the outputs of the High&Low side drive and also to drive the motor.

i If EN_TORQUE input is not used, it must be connected externally to pin X5.8 in order to enable the drive to control the motor.

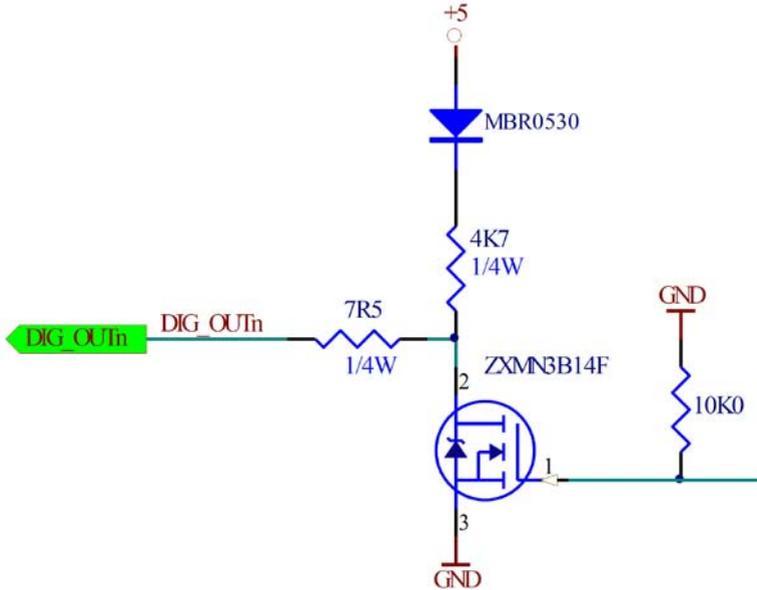


Digital outputs connection

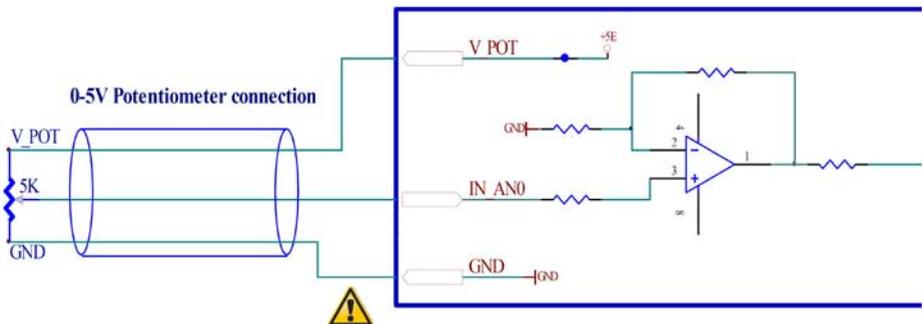


Digital output Open-Drain digital outputs (not isolated).

They can sink up to 100mA from external loads operating from power supplies to +24Vdc. The internal diode in the output is for driving inputs that are opto-isolated and connected to +24Vdc. The diode prevents conduction from +24Vdc through the 4,7 kΩ resistor to +5Vdc in the drive. This could turn the input on, giving a false indication of the drive output state.



Analog input connection



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Mating connector kit

Connector	Description	
X1, X7	JST cod. XHP-2	con crimp SXH-001T-P0.6
X2	JST cod. XHP-4	con crimp SXH-001T-P0.6
X5	JST cod. GHR-12V-S	con crimp SSSL-002T-P0.2
X6	JST cod. GHR-08V-S	con crimp SSSL-002T-P0.2
X8A and X8B	Ethernet standard cables CAT5 or higher.	

Section of the cables

Function	Cable	
	Minimum	Maximum
Power supply	0.3 mm ² (AWG22)	
Motor outputs	0.3 mm ² (AWG22)	
Feedback interface	0.05 mm ² (AWG30)	0.12 mm ² (AWG26)
Inputs and Outputs	0.05 mm ² (AWG30)	0.12 mm ² (AWG26)
Ethernet interface	Ethernet standard cables CAT5 or higher.	

Verify the installation

- Check all connection: power supply, logic supply and inputs/outputs.
- Make sure all settings right for the application.
- Make sure the power and logic supplies are 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.

Check the detected fail fuction



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

DEFECT	CAUSE	ACTION
The external fuse to the drive burns.	May be due to a wrong connection of the power supply.	Adjust the connection and recover the fuse. Use a fuse suitable for the application.
Over temperature protection.	May be due to a duty cycle.	Increase the air flux and if it is possible chose a motor with higher torque at same current value.
Over current protection.	May be due to a short circuit on the motor power stage.	Shut down the power supply and check if the motor is damaged.
Noisy motor movement with vibrations.	May be caused due to a state of resonance.	Increase the resolution of the step angle and/or change the motor velocity to avoid resonance area.
The motor produce torque but doesn't rotate.	May be caused due to a wrong connection of the I/O's.	Check the connection of the I/O's.

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