

Installation instructions



Refer to installation use and maintenance manual for more information.



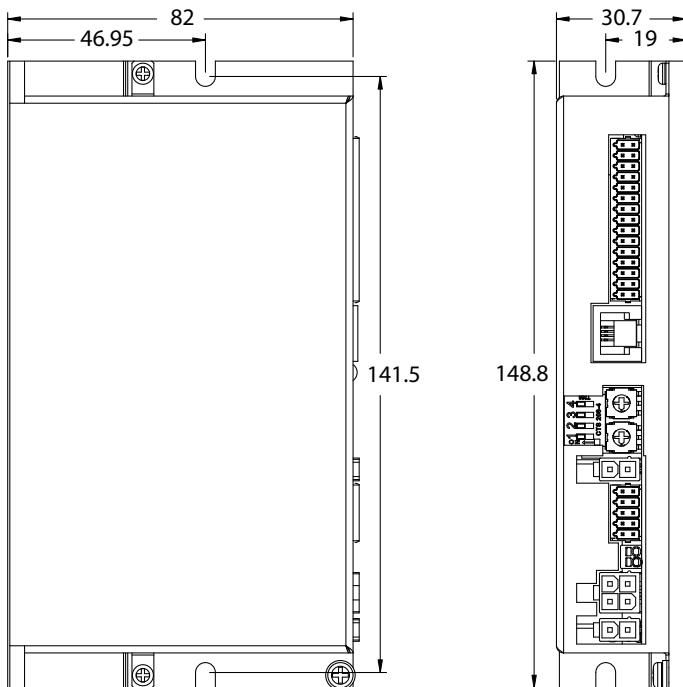
2 phase bipolar stepper drive technical data

- AC power supply: 18 ± 56 Vac
- Phase current: 0.3 ± 4.5 Apeak (3032 serie) or 2.4 ± 10 Apeak (3070 serie)
- Chopper frequency: ultrasonic 40KHz
- Emulated Step angle: Full Step, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{64}$, $\frac{1}{128}$, $\frac{1}{256}$, $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{25}$, $\frac{1}{50}$, $\frac{1}{125}$, $\frac{1}{250}$ configurable by means of Roto-Switches
- Protections against : over current, over/under voltage, overheating, short circuit between motor phase-to-phase and phase-to-ground
- Service SCI interface for real time debugging
- 4 digital inputs (opto-coupled) and 2 digital outputs (opto-coupled)
- Dimensions: 148.8 x 82 x 30.7 mm (without connectors)
- Protection degree: IP20
- Pollution degree: 2
- Category C3 following standard EN 61800-3
- Working temperature $5^{\circ}\text{C} \pm 40^{\circ}\text{C}$; Storage temperature $-25^{\circ}\text{C} \pm 55^{\circ}\text{C}$
- Humidity: $5\% \pm 85\%$ not condensing

TITANIO
VECTOR - STEPPER - DRIVES

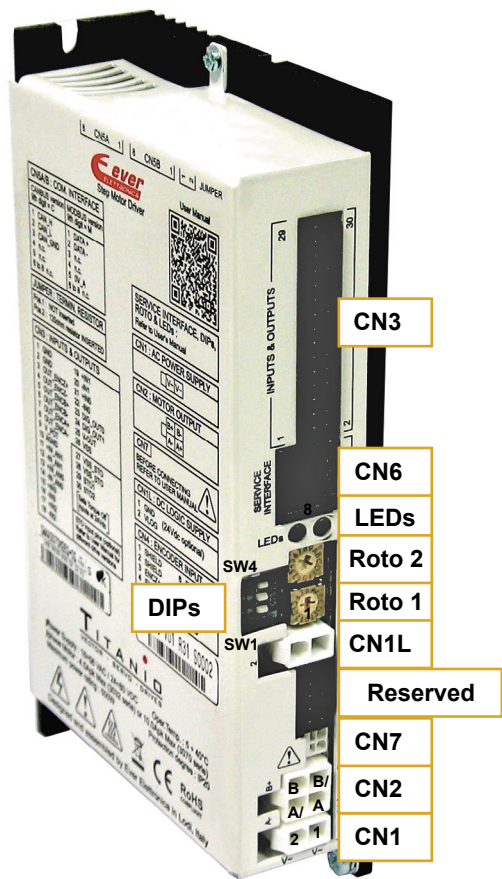
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Mechanical data



System connections

Connectors:



System connection

CN1: Power supply

2 positions, pitch 4.2mm double row, PCB header connector

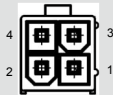
CN1.1	ACin	PWR_IN	AC power supply input
CN1.2	ACin	PWR_IN	AC power supply input



CN2: Motor connection

4 positions, pitch 4.2mm double row, PCB header connector

CN2.1	B/	PWR_OUT	Motor output phase B/
CN2.2	A	PWR_OUT	Motor output phase A
CN2.3	B	PWR_OUT	Motor output phase B
CN2.4	A/	PWR_OUT	Motor output phase A/



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	DNG power out

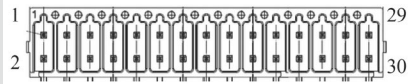


This connection is only possible with hardware and software provided by Ever.

CN3: Inputs and outputs

26 positions, pitch 2mm double row, PCB header connector

CN3.1	Reserved		Reserved
CN3.2	Reserved		Reserved
CN3.3	Reserved		Reserved
CN3.4	Reserved		Reserved
CN3.5	Reserved		Reserved
CN3.6	Reserved		Reserved
CN3.7	Reserved		Reserved
CN3.8	Reserved		Reserved
CN3.9	Reserved		Reserved
CN3.10	N.C.		Not connected
CN3.11	N.C.		Not connected
CN3.12	N.C.		Not connected
CN3.13	N.C.		Not connected
CN3.14	N.C.		Not connected
CN3.15	STEP+	DIG_IN	Clock frequency + input
CN3.16	STEP-	DIG_IN	Clock frequency - input
CN3.17	DIR+	DIG_IN	Motor direction + input
CN3.18	DIR-	DIG_IN	Motor direction - input
CN3.19	EN+	DIG_IN	Enable + input
CN3.20	EN-	DIG_IN	Enable - input
CN3.21	BOOST+	DIG_IN	Boost + input
CN3.22	BOOST-	DIG_IN	Boost - input
CN3.23	FAULT	DIG_OUT	PNP FAULT digital output
CN3.24	SW_OUT	DIG_OUT	PNP SW_OUT digital output
CN3.25	V-OUT	PWR_IN	24 Vdc supply for digital output
CN3.26	VSS	PWR_IN	Negative input supply
CN3.27	N.C.		Not connected
CN3.28	N.C.		Not connected
CN3.29	N.C.		Not connected
CN3.30	N.C.		Not connected



OPTIONAL EXTERNAL CAPACITOR CONNECTION (refer to “Adding ad External Capacitor” paragraph at pag. 7)

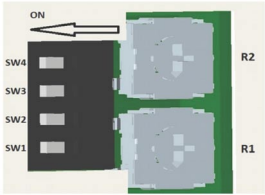
CN7		
CN7.1		RESERVED PIN - DO NOT CONNECT
CN7.2	+DC_Bus	Positive side of the DC-bus



CN1L		
CN1L.1	PGND	Negative side of the DC-bus
CN1L.2		RESERVED PIN - DO NOT CONNECT



Dip-Switches Settings



DIP	Motor Phase Current Selection
1	
OFF (default)	Idle current reduction to 70%
ON	Idle current reduction to 30%
DIP	Drive Enable polarity
2	
OFF (default)	Enable Asserted = Drive Disable
ON	Enable Asserted = Drive Enable
DIP	Drive Control Mode
7	
OFF (default)	Step and Dir mode
ON	Clock_up / Clock_down Mode
DIP	Motor Stall Detection
8	
OFF (default)	Motor stall detection disabled
ON	Motor stall detection enabled

 **NOTE:** the device reads the Dip-Switches 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.

Roto-Switch Settings (Step Resolution)

R1: Step Resolution

Position	Step angle	Position	Step angle	Position	Step angle
0	Reserved	5	1/32	A	1/10
1	1/2	6	1/64	B	1/25
2 (default)	1/4	7	1/128	C	1/50
3	1/8	8	1/256	D	1/125
4	1/16	9	1/5	E	1/250
				F	Full step

 **NOTE :** the device reads the Roto-Switch R1 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.

R2: Motor Phase Current (Apeak)

R2	Motor Phase Current (Apeak)	
Position	LW4A3032	LW4A3070
0	0.3 (default)	2.4 (default)
1	0.4	2.8
2	0.5	3.0
3	0.5	3.2
4	0.7	3.5
5	1.0	3.8
6	1.2	4.2
7	1.5	4.5
8	1.8	5.0
9	2.0	5.6
A	2.2	6.0
B	2.5	6.3
C	3.0	7.0
D	3.5	8.0
E	4.0	9.0
F	4.5	10.0

 **NOTE :** the device reads the Roto-Switch R2 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.

Working Status (Led)

Visualization status			Description
1		Green ON	Correct functioning
2		Green Blinking	Enable OFF, current zero
3		Blue ON	Error: connect with Service SCI kit and check with software
4		Blue ON Yellow ON	Drive in boot mode. A new firmware should be downloaded to drive
5		Blue ON Red Blinking (200ms)	Initialization phase. Should last few seconds. While in this condition the drive is not fully operational.
6		Yellow ON Blue OFF Red OFF	Missing setting of I nominal
7		Yellow Blinking (500 ms) Blue OFF Red OFF	Warning: missing Enable signal or connect with Service SCI kit and check with software
8		Red ON	Protection: Motor is in open phase condition
9		Red Blinking (200 ms)	Current protection
10		Red ON (1 sec) Yellow 1 Blink	Under/Over voltage protection
11		Red ON (1 sec) Yellow 3 Blink	Thermal protection
12		Red ON (1 sec) Yellow 6 Blink	Motor current regulation is out of range



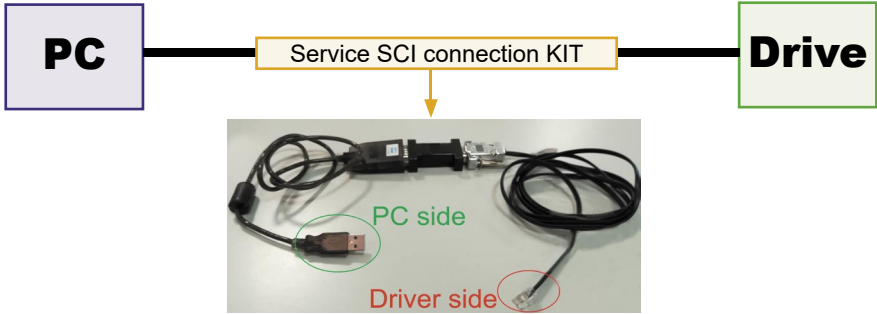
NOTE: Drive could be considered in a correct status if leds Red, Yellow and Blue are all OFF.
In general:

- 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

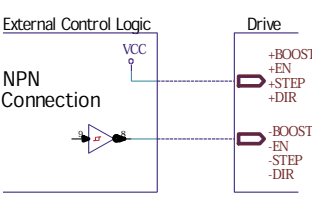
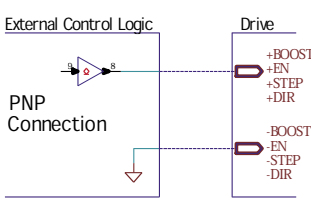


Digital inputs connection

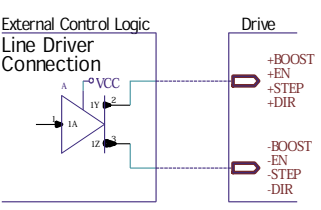


When a clock is applied to the STEP and/or DIR inputs, the initial frequency has to be lower then 8kHz ($T>125\mu\text{sec}$). The frequency can be increased further until the maximum value.

Voltage range: 3,3 – 24 VDC



Voltage range: 2 – 24 VDC



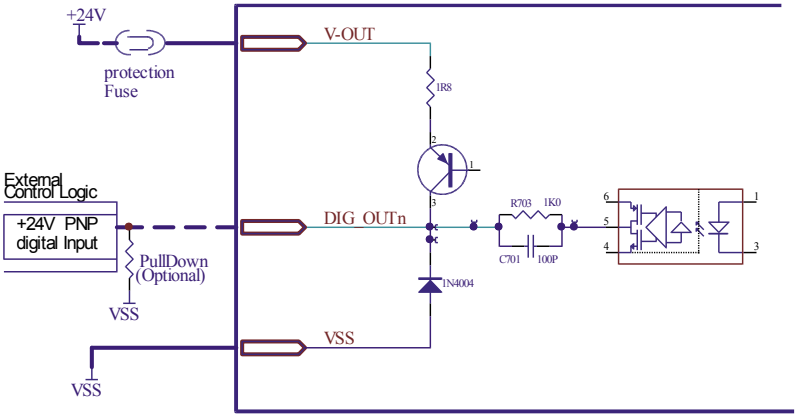
Type	Characteristics	MIN.	MAX.	Unit
Standard ⁽¹⁾ (EN, BOOST)	Supply voltage	2 ⁽¹⁾	24	Vdc
	Inputs frequency	--	10	khz
	Threshold switching voltage	1.61 ⁽¹⁾	--	Vdc
	Current at 2 Vdc ⁽¹⁾	--	3.13	mA
	Current at 3.3 Vdc	--	5.84	mA
	Current at 5 Vdc	--	6.28	mA
High-Speed ⁽¹⁾ (STEP, DIR)	Current at 24 Vdc	--	8.75	mA
	Supply voltage	2 ⁽¹⁾	24	Vdc
	Inputs frequency	--	1	Mhz
	Threshold switching voltage	1.61 ⁽¹⁾	--	Vdc
	Current at 2 Vdc ⁽¹⁾	--	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 2 Vdc digital inputs only in differential Line-Driver configuration to have more noise immunity.

Digital outputs connection



The output is sized to function at $V_{OUTmax} = 24\text{ Vdc}$, $I_{OUTmax} = 100\text{ mA}$



FAULT Output Logic: OK = transistor Output Closed - FAULT = transistor Output Open

SW Output Logic: Defined by software (connect with Service SCI kit and check with software)

Adding an External Capacitor

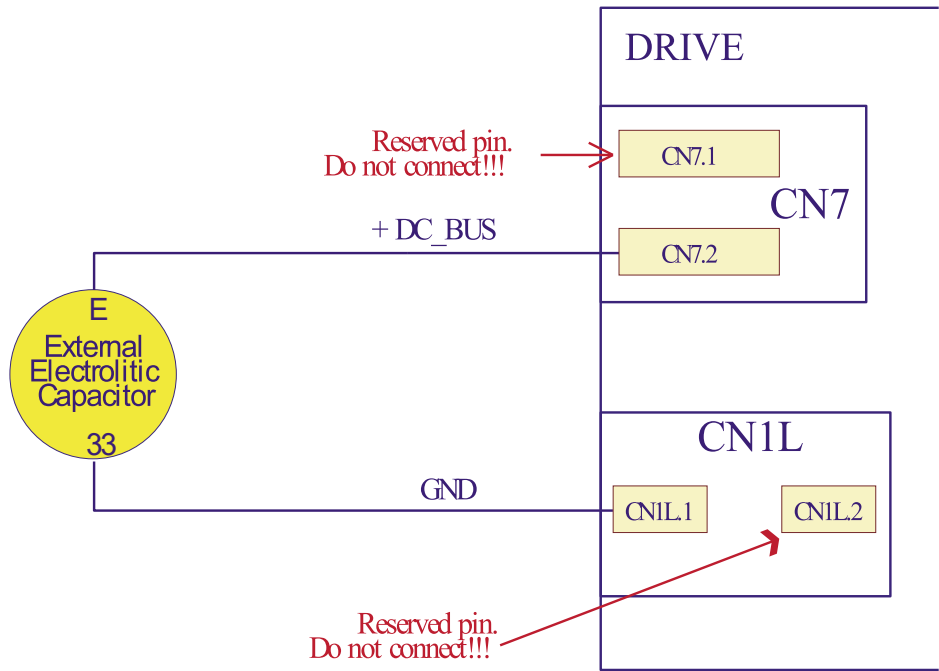


On CN7 connector (pin 2) is reported only the **POSITIVE SIDE** of the DC_BUS.
Pin 1 **MUST BE NOT CONNECTED**.



On CN1L connector (pin 1) is reported only the **NEGATIVE SIDE** of the DC_BUS.
Pin 2 **MUST BE NOT CONNECTED**.

Drive has an internal capacitor of 1000uF on DC_BUS.
If it necessary in the application to extend the capacitance of the drive, it will be possible to add an external capacitor following the below connection diagram:



Before making this connection shut down the drive.



This connection is potentially dangerous. Take all necessary measures to avoid possible contacts in the final installation.



Cables between capacitor and drive must be short as possible and have also a very low inductance.

Mating connectors

Connector	Description
CN1	Molex 39-01-2025
CN1L	Molex 39-01-2025
CN2	Molex 39-01-2045
CN3	Phoenix 1844701

Section of the cables

Function	Cable	
	Minimum	Maximum
Power supply and PE	0.5 mm ² (AWG20)	1.3 mm ² (AWG16)
Motor outputs	0.5 mm ² (AWG20)	1.3 mm ² (AWG16)
Inputs and Outputs	0.14 mm ² (AWG26)	0.5 mm ² (AWG20)

Verify the installation

- Check all connection: power supply, stepper motor and control logics.
- Make sure that all settings are correct for the application.
- Make sure that the characteristics of the power supply are appropriate for the drive.
- If possible, remove the load from the rotor of the motor to avoid wrong movements and eventual damages.
- Supply power and make sure that the green led is ON. If the led is OFF, shut down immediately and check if all connections are correct.
- Enable the current in the motor (without STEP Clock) and, if possible, verify the presence of the holding torque.
- Execute a movement of some steps and verify if the rotation direction is the desired one.



If the motion direction is not the desired one, it is possible to change it by leaving the DIR input unchanged and reversing the connection of a single phase of the motor to CN2, for example A with A/.

- Disconnect the power supply, fix the motor to the load 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 a 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 for the supply voltage.
Open phase motor protection.	Motor windings to drive not proper connection.	Check motor cables and connections to the drive.



When any of the following situations occur, the drive doesn't work and isn't placed in an error condition.

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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