

Installation instructions

i For more information about drive installation, use and maintenance

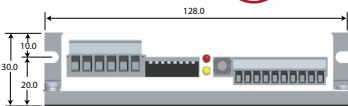
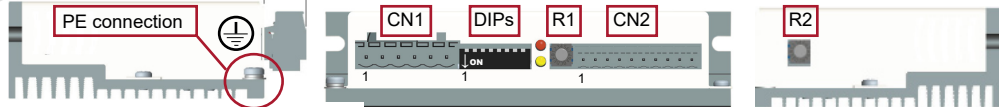


2 phase step motor bipolar chopper drive technical data

- DC power supply: 24 ± 80 Vdc;
- 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, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, 1/5, 1/10, 1/25, 1/50, 1/125, 1/250 configurable by means of Roto-Switches;
- Torque Filter to reduce vibrations, resonance and noise, configurable by means of Roto-Switches;
- Protections against: over current, over/under voltage, overheating, phase-to-phase and phase-to-ground short circuit;
- Dimensions: 128 x 74 x 30 mm (without connectors);
- Protection degree: IP20;
- Pollution degree: 2 ;
- Working temperature 5°C + 40°C ; Storage temperature -25°C + 55°C ;
- Humidity : 5% + 85% not condensing;



Connections



CN1: Power supply and Motor 6 position, pitch 5.08mm, PCB header connector

CN1.1	GND	PWR_IN	Power supply GND
CN1.2	V+	PWR_IN	Power supply Voltage
CN1.3	A	PWR_OUT	Motor Output phase A
CN1.4	A/	PWR_OUT	Motor Output phase A/
CN1.5	B	PWR_OUT	Motor Output phase B
CN1.6	B/	PWR_OUT	Motor Output phase B/

CN2: Digital inputs and output 10 position, pitch 3.81mm, PCB header connector

CN2.1	Boost+	DIG_IN	Boost + input
CN2.2	Boost-	DIG_IN	Boost - input
CN2.3	EN+	DIG_IN	Enable + input
CN2.4	EN-	DIG_IN	Enable - input
CN2.5	Step+	DIG_IN	Clock frequency + input (Clock_up +)
CN2.6	Step-	DIG_IN	Clock frequency - input (Clock_up -)
CN2.7	Dir+	DIG_IN	Motor direction + input (Clock down +)
CN2.8	Dir-	DIG_IN	Motor direction - input (Clock down -)
CN2.9	Out+	PWR_IN	Positive 24Vdc power supply digital output
CN2.10	Out-	DIG_OUT	Open emitter FAULT output

Dip-Switches Settings

Motor Phase Current (Apeak)		DIPs				Default
LW3D3070	LW3D3032	1	2	3	4	
2.4	0.3	off	off	off	off	X
2.8	0.4	on	off	off	off	
3.0	0.5	off	on	off	off	
3.2	0.6	on	on	off	off	
3.5	0.7	off	off	on	off	
3.8	1.0	on	on	on	off	
4.2	1.2	off	on	on	off	
4.5	1.5	on	on	on	off	
5.0	1.8	off	off	off	on	
5.6	2.0	on	off	off	on	
6.0	2.2	off	on	off	on	
6.3	2.5	on	on	off	on	
7.0	3.0	off	off	on	on	
8.0	3.5	on	off	on	on	
9.0	4.0	off	on	on	on	
10.0	4.5	on	on	on	on	

DIP 5	Current reduction range	Default
off	Idle current reduction to 70%	X
on	Idle current reduction to 30%	
DIP 6	Drive enable polarity	Default
off	Enable Asserted = Drive Disable	X
on	Enable Asserted = Drive Enable	
DIP 7	Drive Control Mode	Default
off	Step and Dir. mode	X
on	Clock_up / Clock_down mode	
DIP 8	Motor stall detection	Default
off	Motor stall detection disabled	X
on	Motor stall detection enabled	



NOTE: the device reads the Dip-Switches only at powering up. To change the setting, shut down the drive, change the settings and power the system up again to make the new setting operating.

R1 Roto-Switch Settings (Step Resolution and Clock Test)

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

Clock Test

To activate the clock test function set the Roto-switch R1 at F position. The test shows by the drive's leds the step input frequency range. During the test the drive is disabled.

Clock [Hz]	Green	Red	Yellow
0	on	on	off
1 < clock < 1000	Blinking (200 ms)	off	on
clock ≥ 1000	Blinking (200 ms)	on	off



NOTE: the device reads the R1 Roto-Switches only at powering up. To change the setting, shut down the drive, change the settings and power the system up again to make the new setting operating.

R2 Roto-Switch Settings (Torque Filter)

Position	0	7	F
Torque Filter	None (default)		Medium		High



NOTE: the R2 Roto-Switches is read and executed in real time. Before a setting change, take all the measures necessary to avoid possible dangerous events.



ATTENTION: Different Torque Filter settings can cause a variation of available motor's torque and power. The user must evaluate for any motor type and application the best tradeoff between noise and torque. It's good practice to execute tests starting with no torque filtering (R2 at 0 position) and increasing the filter until the best suitable value has been reached.

Working Status (Leds)

Driver disabled : green blinking (1s)

Driver enabled : green on

Motor open phase: red on

Motor phase shortcut : red blinking (200 ms)

Over voltage: red on (2 sec) – yellow on (1 sec)

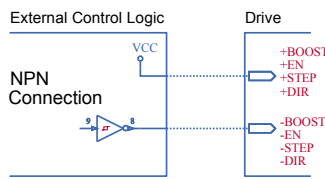
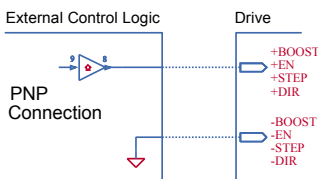
Under Voltage: red on (2 sec) – yellow on (1 sec) – yellow on (1 sec)

Motor stall : yellow blinking (200 ms)

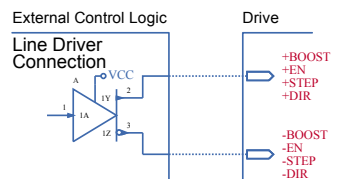
Over temperature : red on (2 sec) – yellow on (1 sec) – yellow on (1 sec) – yellow on (1 sec)

Drive's inputs connection

Digital input voltage range: 3.3 - 24 Vdc



Voltage range: 2 - 24 VDC



Drive's inputs electrical characteristics

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 2Vdc ⁽¹⁾	-	3.13	mA
	Current at 3,3Vdc	-	5.84	mA
	Current at 5Vdc	-	6.28	mA
	Current at 24Vdc	-	8.75	mA
High-Speed ⁽¹⁾ (STEP, DIR)	Supply Voltage	2 ⁽¹⁾	24	Vdc
	Inputs Frequency	-	1	MHz
	Threshold switching voltage	1.61 ⁽¹⁾	-	Vdc
	Current at 2Vdc ⁽¹⁾	-	2.53	mA
	Current at 3,3Vdc	-	5.84	mA
	Current at 5Vdc	-	6.28	mA
	Current at 24Vdc	-	8.75	mA

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

Drive's output connection

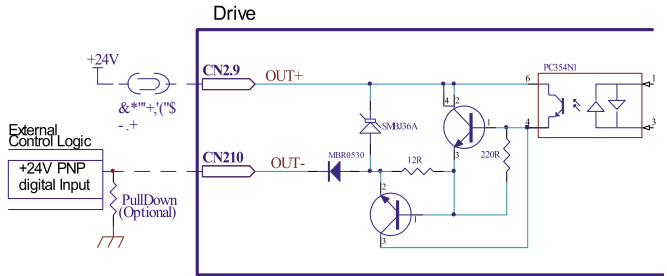
Output maximum ratings: $V_{OUTmax}=24Vdc$, $I_{OUTmax}=100mA$ and it's protected from inversion of the polarity.
Drive status: OK = Output Transistor Closed - FAULT = Output Transistor Open



Attention: the FAULT output is not protected in current.

Provide an external current limitation device ($I_{OUTmax} = 100mA$).

The protective device may be placed on the output power conductor +24VDC (CN2.10).



Mating connectors


CN1	PHOENIX CONTACT	1757051
CN2	PHOENIX CONTACT	1803659

Cables section

Function	Cable	
	Minimum	Maximum
Power supply and PE	0.5 mm ² (AWG20)	1.5 mm ² (AWG15)
Motor output	0.5 mm ² (AWG20)	1.5 mm ² (AWG15)
Digital inputs	0.14 mm ² (AWG25)	0.5 mm ² (AWG20)
Digital output	0.14 mm ² (AWG25)	0.5 mm ² (AWG20)

Before first powering on:


- Check all connections : Power supply, Stepper motor and control logics.
- Make sure that all settings are correct for the application.
- Make sure that the characteristics of the DC power supply are appropriate for the drive.
- If possible, remove the load from the rotor of the motor to avoid wrong movements and possible damagings.
- Supply power and make sure that the green led is on or blinking. If the led is OFF, shut power down immediately and check if all the connections are correct.
- Enable the current supply to the motor (without STEP Clock) and, if possible, check its Holding Torque.
- Execute a movement of some steps to be sure that the rotation direction is the expected one.

 To reverse the rotation direction leaving the DIR input unchanged turn the connection of a phase leads of the motor on CN1, for example A with A/.


- Disconnect the power supply, fit the motor to the load and check the full functionality.

Drive's faults analysis

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.

At any of the following situations occurring the drive stops working entering a fault 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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