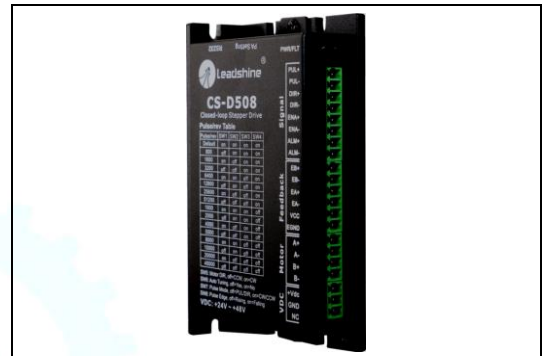# CS-D508   Closed Loop Stepper Driver

Closed Loop Stepper Driver
Model CS-D508

Digital Technology, max. 50 VDC/ 8.0 A

Product Description: .

Leadshine CS-D508 is a closed-loop stepper motor driver which is designed to solve the problem of step loss in open-loop stepper motor controllers and increasing system reliability with minimal cost. The CS-D508 implements Leadshine's advanced control algorithm based on their ten years of experience in stepper motor and servo control. The CS-D508 is highly reliable and competitively priced and is ideal for many industrial applications such as CNC, medical, electronics, packaging.
The CS-D508 can power 2-phase stepper motors with incremental encoders. Compared to conventional open-loop stepper motor systems, a closed-loop CS-D508 can eliminate possible step losses, perform real-time position error correction, and does not require torque reservation (100 % torque implementation). It operates the stepper motor with reduced heating, noise, vibration, etc.

Features:

- Closed-loop, eliminates loss of synchronization
- Enhance performance at low speed application (< 60 RPM)
- No torque reservation required for readjustment control
- No Tuning required for easy commissioning
- Supply voltage of 20 - 50 VDC
- Output current of max. 8 A
- Pulse input frequency up to max. 200 kHz
- A configurable digital output for "In Target Position Range" signal, or as brake command signal
- Micro step resolution of 15 settings of 800 - 51,200 via DIP switches, or 200 - 51,200 via software (increments of 200)
- Protections for over voltage, over current and position error
- Low noise and vibration, smooth motion

Electrical Specifications:

Parameters	Min	Typ.	Max	Unit
Output current	0.5	-	8.0 (Peak)	A
Supply voltage	+20		+50	VDC
Logic signal current	7	10	16	mA
Pulse input frequency	0	-	200	kHz
Minimal pulse width	2.5	-	-	µs
Minimal direction timing	5.0	-	-	µs
Insulation resistance	500			MΩ

Environment:

Cooling		Natural cooling or forced cooling
Operating Environment	Environment	Avoid dust, oil fog and corrosive gases
	Ambient Temperature	0 - 65 °C
	Humidity	40 - 90 % RH
	Operating	0 - 50 °C
	Vibration	10 - 50 Hz/ 0.15 mm
Storage Temperature		20 - 65 °C
Weight		Approx. 280 g

Connector Configuration:

Control Signal Connector		
Name	**I/O**	**Description**
PUL+	I	Pulse signal: (1) In single pulse control mode (step & direction) the input pulse signal is to be applied to this input (DIP switch SW8 if for configuring whether the rising or falling edge triggers). (2) In double pulse control mode (CW/ CCW), set via DIP switch SW7,
PUL-	I	this signal input represents a clockwise (CW) pulse and is active at both high voltage level and low voltage level. (3) High voltage: 4.5 - 5 V / Low voltage: 0 - 0.5 V (also applies to DIR and ENA signals). (4) The pulse width should be set to 2.5 μs or longer.
DIR+	I	Direction Signal: (1). In single pulse mode (step & direction), the two directions of the motor are controlled via this input with low or high level (CW/ CCW). (2) In double pulse control mode (CW/ CCW), the input pulse signal is to be applied to this
DIR-	I	input, which controls the counterclockwise movement (CCW) with the levels High and Low. (3) The minimum setup time of the DIR signal should be at least 5 μs. (4) The direction of rotation depends on the wiring of the motor/ drive. You can reverse the default direction of rotation by switching DIP switch SW5.
ENA+	I	Enable signal: This signal is used for enabling/ disabling the driver. High voltage level of 4.5 - 24 V (NPN control signal) for enabling the drive and low voltage level of 0 - 0.5 VDC for disabling the
ENA-	I	driver). On the contrary please note that that PNP and Differential control signals with low voltage enable the drivers. By default, this signal is left **UNCONNECTED & ENABLED.**
ALM+	O	Configurable Digital Output Signal: A configurable OC output signal. It can be configured as one of 3 types, ALARM (default), IN
ALM-	O	POSITION or BRAKE CONTROL via Leadshine ProTuner CS-D software. This port can sink or source 20 mA current at 5 - 24 V.

Encoder Feedback Connector		
Name	**I/O**	**Description**
EB+	I	Encoder channel B+ input
EB-	I	Encoder channel B- input
EA+	I	Encoder channel A+ input
EA-	I	Encoder channel A- input
VCC	O	Encoder +5 V voltage output connection
EGND	GND	Power ground connection

Encoder Extension Cable Wire Out							
Wire	**Color**	**Name**	**Description**	**Wire**	**Color**	**Name**	**Description**
1	**Red**	VCC	+5 V power input	4	**Blue**	EA-	Encoder Channel A-
2	**White**	GND	GND	5	**Yellow**	EB+	Encoder Channel B+
3	**Black**	EA+	Encoder Channel A+	6	**Green**	EB-	Encoder Channel B-

Notes: (1) Shielding control signal wires are suggested

(2) to avoid/reduce interference, do not tie control signal cables and power wires together

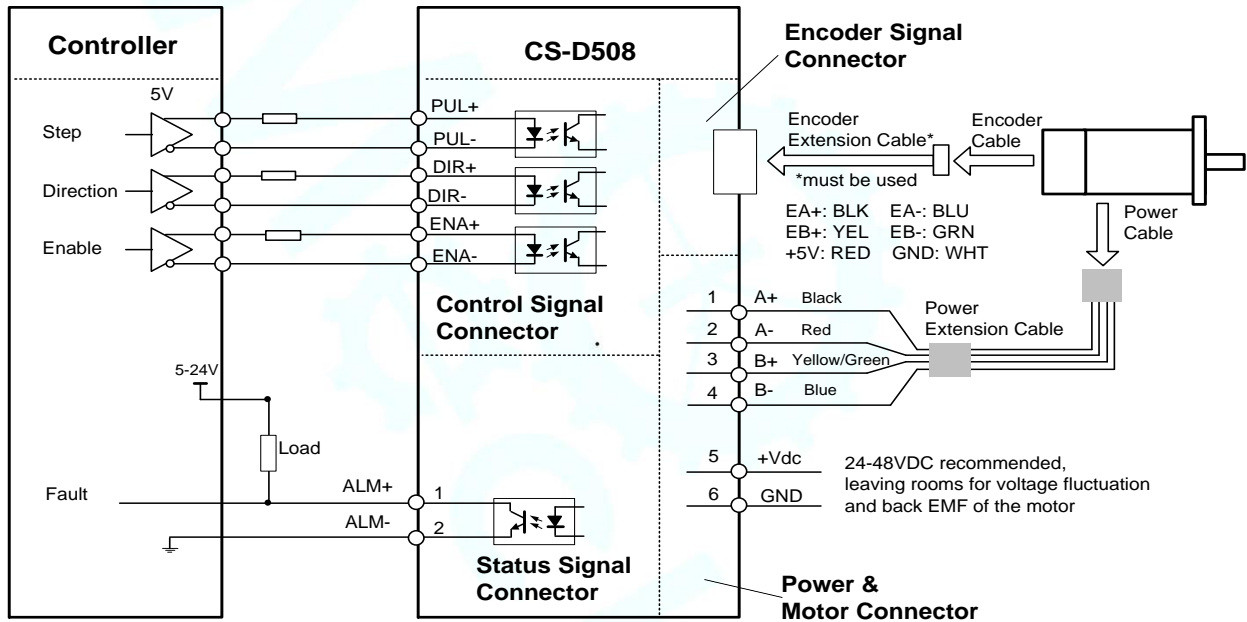| Power and Motor Connector				
Pin	**Name**	**I/O**	**Description**	
1	**A+**	O	Stepper motor A+ connection	Connect motor A+ wire to this pin
2	**A-**	O	Stepper motor A- connection	Connect motor A- wire to this pin
3	**B+**	O	Stepper motor B+ connection	Connect motor B+ wire to this pin
4	**B-**	O	Stepper motor B- connection	Connect motor B- wire to this pin
5	**+V**	I	Power supply positive connection	20 - 50 VDC power supply voltage
6	**GND**	GND	Power supply ground connection	
RS232 Communication Port				
Pin	**Name**	**I/O**	**Description**	
1	**NC**	-	Not connected	
2	**+5 V**	O	+5 V power output	
3	**TxD**	O	RS232 transmit	
4	**GND**	GND	Ground	
5	**RxD**	I	RS232 receive	
6	**NC**	-	Not connected	
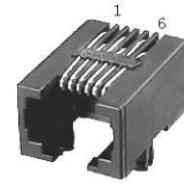
Mechanical Specifications:

(unit: mm)
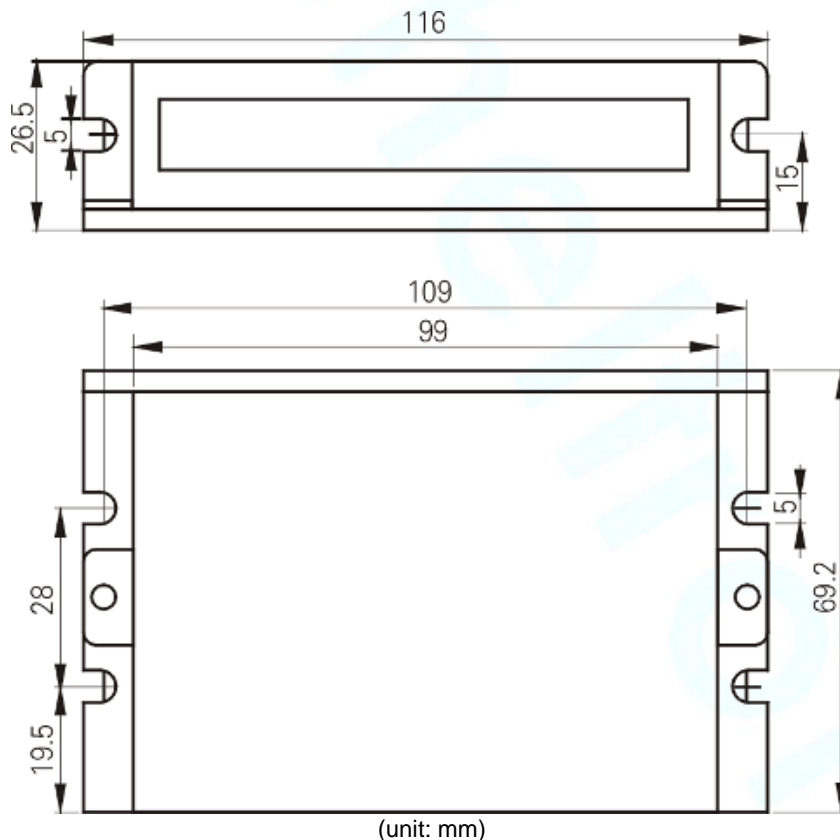
CS-D508

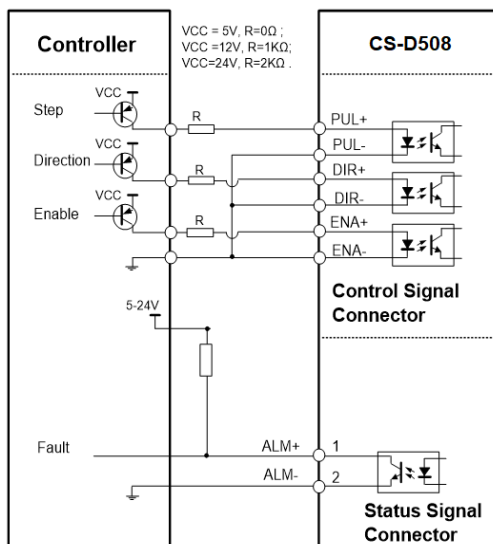# Closed Loop Stepper Driver

Typical Connections:

A complete closed loop stepper system should include a stepper motor with encoder, CS-D508 driver, power supply and controller (pulse generator). A typical connection is illustrated.
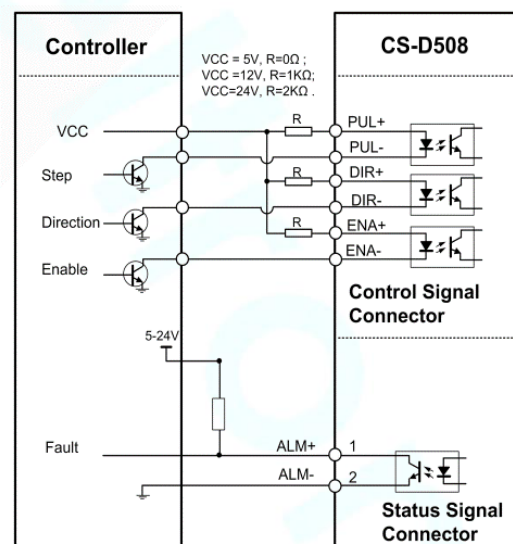

EA+: BLK EA-: BLU
EB+: YEL EB-: GRN
+5V: RED GND: WHT

1	A+	Black
2	A-	Red
3	B+	Yellow/Green
4	B-	Blue
5	+Vdc	24-48VDC recommended, leaving rooms for voltage fluctuation and back EMF of the motor
6	GND	

Typical Control and Fault Output Connections:

The CS-D508 can accept differential and single-ended control signal inputs (open-collector and PNP output).
A CS-D508 has 3 optically isolated control inputs, PUL, DIR, and ENA. Refer to the following two figures for connections of open-collector and PNP signals.

Connections to PNP signal
(common-cathode)

Connections to open-collector signal
(common-anode)

Right of techn. modifications is reserved

Technische Änderungen vorbehalten

06.04.2021