

EM Series Stepper Drive

The EM series is a new digital stepper drive based on Leadshine's widely implemented DM stepper drives (10+ millions of units in field). While retaining features of simple design, easy setup, high precision and reliability, Leadshine has also upgraded it by adopting the latest stepper control technology and added additional advanced features for better torque (10-25%), quicker response time, control command smoothing, easy self-test, etc.

The EM series is able to power 2 phase (1.8°) and 4 phase (0.9°) stepper motors smoothly with very low motor heating & noise. All the micro step and output current configurations can be easily done via built in DIP switches. Its control type (step & direction or CW/CCW) and command smooth filtering can also be configured via DIP switches. Therefore, the EM series is an ideal choice for many applications requiring simple step & direction or CW/CCW control of NEMA 17, 23, and 24 stepper motors.



Feature

- Step & direction (PUL/DIR) or CW/CCW (double pulse) control
- 200 KHz (500KHz optional) max pulse input frequency
- 16 microstep resolutions of 200-25,600 via DIP switches, or 200-51,200 via software (increase by 200)
- Configurable control command smoothing for reducing motor vibration
- Idle current reduction to 50% or 90% selection
- Convenient self-test for easy diagnosis
- Auto-tuning to match wide-range NEMA 17, 23, 24 stepper motors
- Anti-Resonance for optimal torque, extra smooth motion, low motor heating and noise
- Soft-start with no “jump” when powered on
- Optically isolated inputs with 5V or 24V
- Fault and Brake output
- Over-voltage and over-current protections
- CE certified and RoHS compliant

Model Designation

EM 5 42 - S

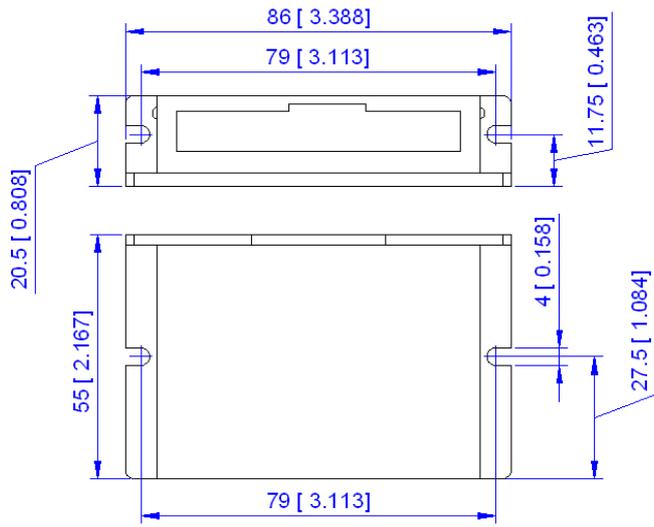
① ② ③ ④

- ① Series Name
EM: Open loop stepper drive
- ② Max operatoin Voltage
4: 40VDC
5: 50VDC
8: 80VDC
- ③ Output Current (Peak)
15: 1.5A
22: 2.2A
32: 3.2A
42: 4.2A
56: 5.6A
70: 7.0A
82: 8.2A
- ④ Remark
S: Normal type
MINI: Compact size
CAN: CANopen communication

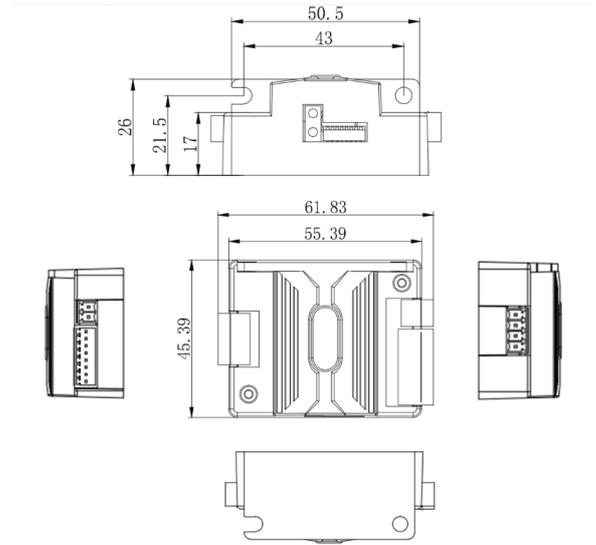
Technical Specification

Name	EM415S	EM422S	EM532 -MINI	EM542S	EM556S	EM870S	EM882S	EM522 -CAN	EM556 -CAN
Command Source	PUL&DIR CW&CCW	PUL&DIR CW&CCW	PUL&DIR	PUL&DIR CW&CCW	PUL&DIR CW&CCW	PUL&DIR CW&CCW	PUL&DIR CW&CCW	CANopen	CANopen
Operation Voltage (VDC)	20-40	20-40	20-50	20-50	20-50	20-80	20-80	20-50	20-50
Output Current (A, Peak)	1.5	2.2	3.2	4.2	5.6	7.0	8.2	2.2	5.6
Input Frequency (KHz, Max.)	70	70	1000	200	200	200	200	10	10
Logical Voltage (VDC)	5	5	5	5 or 24	5 or 24	5 or 24	5	5-24	5-24

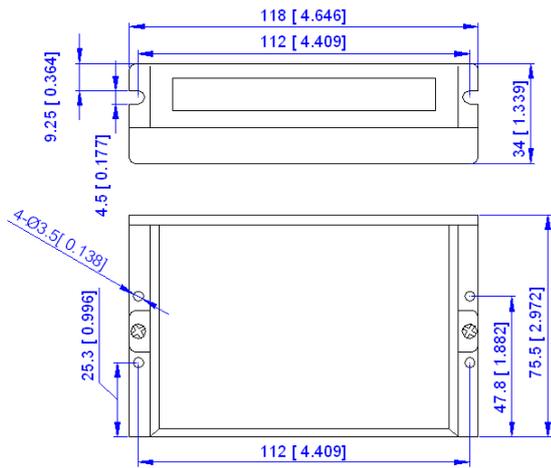
Dimension



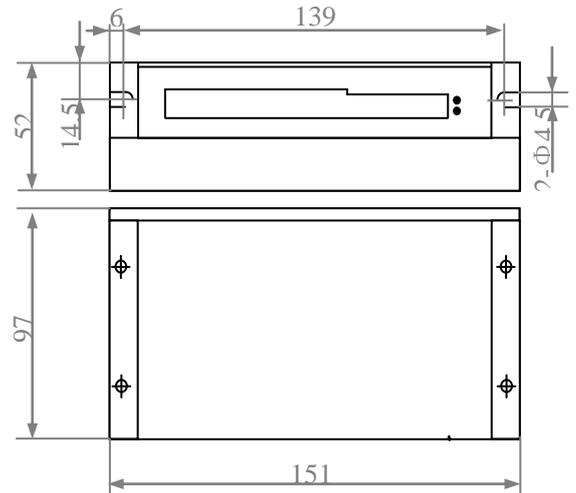
EM415S/ EM422S



EM532-MINI

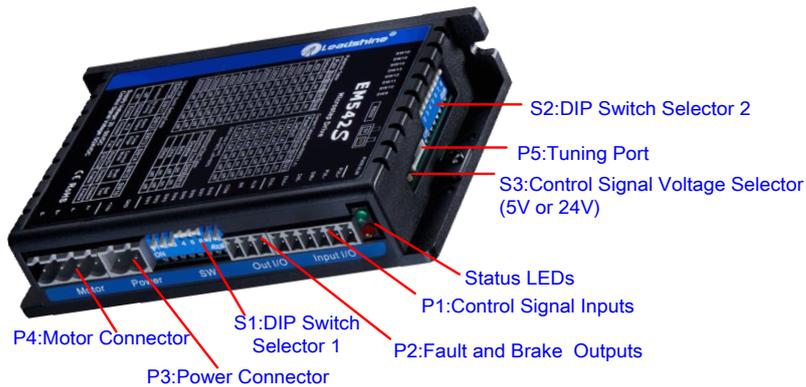


EM542S/ EM556S/ EM870S/ EM522-CAN/ EM556-CAN



EM882S

Connector and Pin Assignment



The EM series has 5 connectors P1, P2, P3, P4 and P5, 3 DIP switches S1, S2 and S3. P1 is for control signal connections, P2 is for fault output, P3 is for power connection, P4 is for motor connection and P5 is for fine tuning.

Note: This segment is not available for EM522-CAN and EM556-CAN.

➤ P1 - Control Connector Configurations

PIN	Details	
PUL+ (CW+)	<u>Pulse and Direction Connection:</u> (1) Optically isolated, high level 4.5-5V or 24V, low voltage 0-0.5V (2) Maximum 200 KHz input frequency, 500KHz customized model is available (3) The width of PUL signal is at least 2.5 μ s, duty cycle is recommended 50% (4) Single pulse (step & direction) or double pulse (CW/CCW) is set by DIP Switch SW14 (5) DIR signal requires advance PUL signal minimum 5 μ s in single pulse mode (6) The activated edge of PUL and DIR is set by DIP Switch SW13 (7) The factory setting of control signal voltage is 24V, must need to set S3 (figure 2) if it is 5V	
PUL- (CW-)		
DIR+ (CCW+)		
DIR- (CCW-)		
ENA+		<u>Enable Connection:</u> Optional. (1) Optically isolated, differential. (2) Disable the drive by 4.5-5.0V or 24V input connection; enable the drive by 0-0.5V connection(default no connection)
ENA-		(3) ENA signal requires advance DIR signal minimum 5 μ s in single pulse mode (4) The default control signal voltage is 24V, to set S3 (figure 2) if it is 5V (5) Enable time to be at least 200ms

Note: (1) shield cables are required for P1; (2) don't tie P1/P2 cables and P3/P4 cables together.

➤ P2 - Fault and Brake Output Connector

Pin	Details
ALM	<u>Output Connection:</u> Optional. (1) Maximum 30V/100mA output (2) Sinking or sourcing (3) The resistance between ALM and COM- is low impedance as default (configurable by DIP switch SW12), and will change to high when the drive goes into error protection.
BR	
COM-	

Datasheet of EM Series Stepper Drive

➤ P3 - Power Connector

Pin	Details
GND	Connect to power supply ground connection.
+VDC	Connect to power supply positive connection. Suggest 24-48VDC power supply voltage

Warning: Don't plug/unplug P3 or P4 connector to avoid drive damage or injury while powered on.

➤ P4 - Motor Connector

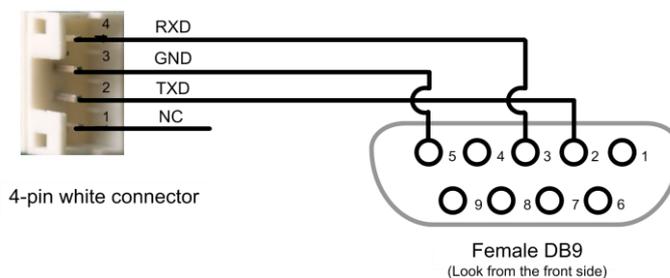
PIN	Details
A+	Connect to motor A+ wire
A-	Connect to motor A- wire
B+	Connect to motor B+ wire
B-	Connect to motor B- wire

➤ P5 - Tuning Port

EM series has a tuning port with RS232 to modify the drive parameters, it's only for tuning, not for equipment control because neither precision nor stability is sufficient. If you need a field bus drive, use a Leadshine RS485 or EtherCAT type drives:

<http://www.leadshine.com/ProductSubType.aspx?type=products&category=stepper-products&producttype=stepper-drives&subtype=network-stepper-drives>

The interface definition is as follows:



Wiring

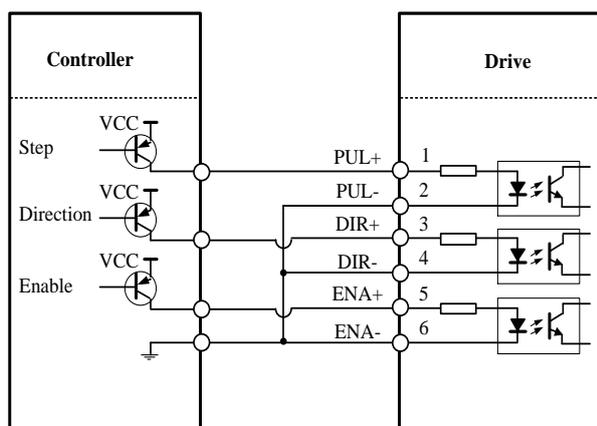


Figure 1 Connections to open-collector signals
(Common-anode)

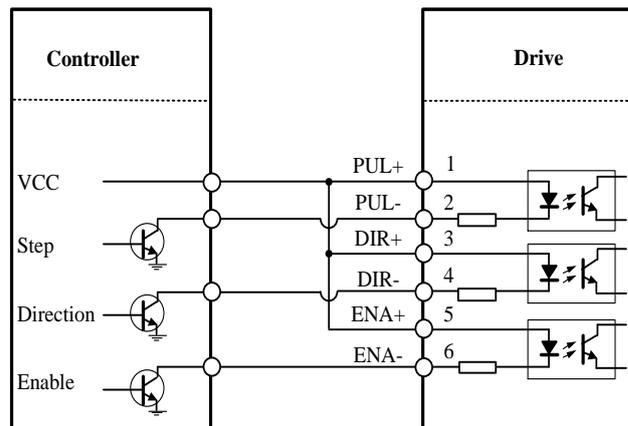


Figure 2 Connections to PNP signals
(Common-cathode)