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Leadshine

Reliable Motion Control Products

Leading Technology

Shining Value

Stepper Products

(2020)

- ▶ Stepper Drives
- ▶ Stepper Motors
- ▶ Closed Loop Stepper Drives
- ▶ Closed Loop Stepper Motors
- ▶ Integrated Stepper Motors
- ▶ Power Supplies

EtherCAT 

 Modbus



CANopen®



Company Profile

Founded in 1997 by Warren Li, a MIT PhD graduate and former USA professor, Leadshine Technology Co., Ltd. is a leading technology company dedicated to design, manufacture, market, and support reliable and affordable motion control products based on the latest control technologies. Leadshine offers a full complement of products including motion controllers, control systems, integrated servos, servo drives & motors, easy servo drives & motors (closed loop steppers), integrated easy servo motors, integrated steppers, stepper drives & motors. Today, Leadshine is one of the largest motion control companies in the world to provide solutions and quality products to tens of industries, and thousands of OEM clients in Asia, Europe, North & South America, Australia, and Africa.

R&D

Led by Dr. Li, a PhD majored in robotics & servo controls from MIT, Leadshine has one of the strongest R&D teams in the motion control industry. The team consists of more than 100 R&D engineers and all of them are highly educated with most of them carry PhD & Master degrees in controls, electrical & electronics engineering, mechanical engineering, mechatronics, computer engineering, and computer science. Their strong background and experience allow Leadshine capable of designing superior quality products based the latest technology in the most efficient way.

Product Quality

Leadshine operates manufacturing facilities which are superiorly equipped, professionally staffed, and ISO-9001 certified. That allows Leadshine to provide highly reliable quality motion control products OEM clients in the shortest time.

Leadshine's products have proven records of being successfully adopted in thousands of applications such as CNC routers, mills, plasmas, lathes, laser cutters/engravers/markers, inkjet printers, plotters, electronics equipments, medical equipments, semiconductor assembly & inspection machines, electronics machines, packaging equipments, textile machines, robotics, pick-and-place devices, etc. In most cases, Leadshine's standard "off-the-shelf" products are able to satisfy the motion control needs for most applications. For many OEM applications with special requirements, Leadshine also offers customized products with optimized performance.

Support and Service

Leadshine believes the key to be a successful motion product supplier is the commitment to fully understanding our customer's applications and working closely with our OEM clients. In many cases, Leadshine engineers can participate in the whole process of client product development, including initial application evaluation, product selection, design help & suggestion. Our expertise and experience allow us to help OEM clients to produce competitive high quality machines in their industries.



Product Overview

Network Stepper Drives



EM3E Series



EM3RT Series

- Input Voltage:**
- 20-50VDC, 20-80VDC
 - 30-110VDC or 20-80VAC
- Control Type:**
- EtherCAT
 - RTEX
- Inputs and Outputs:**
- EM3E-522 / 556 / 870: 5 digital inputs, 2 digital outputs
 - EM3E-A882: 7 digital inputs, 6 digital outputs
 - EM3RT-556: 7 digital inputs, 3 digital outputs

Fieldbus Stepper Drives



EM2RS Series



EM-CAN Series

- Input Voltage:**
- 20-50VDC
 - 30-110VDC or 20-80VAC
- Control Type:**
- RS485 Modbus
 - CANopen Fieldbus
- Inputs and Outputs:**
- EM2RS-522/556/870: 7 digital inputs, 3 digital outputs
 - EM522-CAN/556-CAN: 3 digital inputs, 1 digital outputs
 - EMA882-CAN: 4 digital inputs, 2 digital outputs

Pulse Control Stepper Drives



EM-S Series



DM-E Series

- Input Voltage:**
- 12-40VDC, 20-50VDC, 20-80VDC
- Control Type:**
- EM-S: Step&Direction, CW&CCW
 - DM-E: Step&Direction
- Inputs and Outputs:**
- EM415S/422S/882S: 3 digital inputs, 1 digital outputs
 - EM542S/556S/870S: 3 digital inputs, 2 digital outputs
 - DM322E/332E/542E/556E/860E/A860E: 3 digital inputs

Special Type Stepper Drives



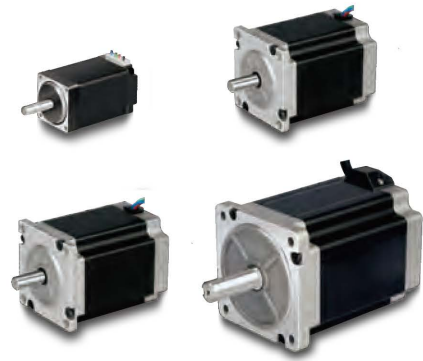
DM Series



MX Series

- Input Voltage:**
- 20-50VDC, 20-80VDC
 - 20-80VAC or 30-110VDC
 - 110±10%VAC, 220±10% VAC
- Control Type:**
- DM Series: AC Input or 3-phase type
 - DM-IO Series: I/O digital control
 - DM805-AI: Step&Direction, 0-5V analog control
 - 3DM series: Step&Direction, CW&CCW
 - MX series: Step&Direction, 3-Axis or 4-Axis

Standard Stepper Motors



CM Series

- Frame Size:**
- From NEMA 08(20mm) to NEMA 51(130mm)
 - 2-phase: 20mm, 28mm, 35mm, 42mm, 57mm, 60mm, 86mm, 110mm, 130mm
 - 3-phase: 57mm, 86mm, 110mm
- Option Type:**
- Dual shaft
 - Encoder
 - Brake
 - IP65 waterproof
 - Gearbox

Vector Control Easy Servo Drives



ES2 Series

- Input Voltage:**
- 20-50VDC
 - 30-110VDC or 20-80VAC
 - 110VAC±10%, 220VAC±10%
- Control Type:**
- Step&Direction
 - CW&CCW
- Inputs and Outputs:**
- 3 digital inputs, 2 digital outputs
 - Encoder outputs

Network Closed Loop Stepper Drives



CS3E Series

- Input Voltage:**
- 20-50VDC
 - 30-110VDC or 20-80VAC
- Control Type:**
- EtherCAT
- Inputs and Outputs:**
- CS3E-D503/507/1008: 7 digital inputs/7 digital outputs

Closed Loop Stepper Motors



CS-M Series & ES2-MH Series

- Frame Size and Encoder:**
- 20mm: 1000 ppr
 - 28mm: 1000/2500/5000 ppr
 - 42mm: 1000/2500/5000 ppr
 - 57mm: 1000/2500/5000 ppr
 - 60mm: 1000/2500/5000 ppr
 - 86mm: 1000/5000 ppr
 - 110mm: 1000 / 5000 ppr
- Option Type:**
- Brake
 - IP65 waterproof
 - Gearbox

Fieldbus Closed Loop Stepper Drives



CS2RS Series

- Input Voltage:**
- 20-50VDC
 - 30-110VDC or 20-80VAC
- Control Type:**
- RS485 Modbus
- Inputs and Outputs:**
- CS2RS-D503/507: 7 digital inputs, 3 digital outputs
 - CS2RS-D1008: 7 digital inputs, 3 digital outputs

Integrated Stepper Motors



Integrated Stepper Motors

- Input Voltage:**
- 20-50VDC
- Control Type:**
- iST/iDM: open loop control
 - IES/iCS: closed loop control
 - Step&Direction, RS485, CANopen
- Inputs and Outputs:**
- iST / iES: 3 digital inputs, 2 digital outputs
 - iDM / iCS: 3 digital outputs, 1 digital outputs

Pulse Control Closed Loop Stepper Drives

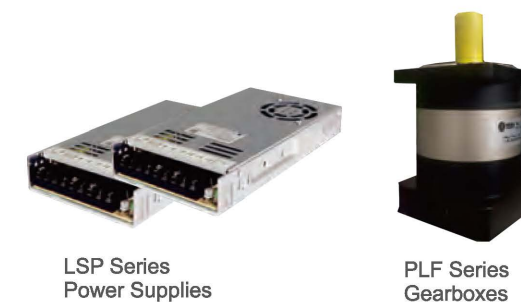


CS1 Series

CS-D Series

- Input Voltage:**
- 20-50VDC or 20-72VDC
 - 20-80VAC or 30-110VDC
- Control Type:**
- Step&Direction
 - CW&CCW
- Inputs and Outputs:**
- CS1-D503S/507S/728S: 4 digital inputs, 3 digital outputs, encoder outputs
 - CS-D403/CS-D508: 3 digital outputs, 1 digital outputs
 - CS-D808/CS-D1008: 3 digital outputs, 1 digital outputs

Other Products



LSP Series Power Supplies

PLF Series Gearboxes

- Power Supplies:**
- 220VAC±10% or 110VAC±10% input
 - 24VDC/36VDC/48VDC/60VDC output

- Gearboxes:**
- 42mm: 1:5, 1:10, 1:20
 - 60mm: 1:3, 1:5, 1:7, 1:10
 - 90mm: 1:3, 1:5, 1:7, 1:10

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Stepper Products

Stepper Product Part Numbers

Network Type

EM3E - 5 56 -

① ② ③ ④ ⑤

- ① **Series Name**
EM3E: EtherCAT Type
EM3RT: RETX Type
- ② **DC or AC Power Input**
Blank: DC Input
A: AC or DC Input Optional

- ③ **Max Operating Voltage**
5: 50V
8: 80V
- ④ **Max Output Current**
56: 5.6A
- ⑤ **Customized Models**

Fieldbus Type

EM 5 56 -

① ② ③ ④ ⑤

- ① **Series Name**
EM2RS: RS485
- ② **DC or AC Power Input**
Blank: DC Input
A: AC or DC Input Optional
- ③ **Max Operating Voltage**
5: 50V
8: 80V

- ④ **Max Output Current**
56: 5.6A
- ⑤ **Type**
CAN: CANopen
Others: Customized Models

Step&Direction, Digital and Analog Inputs Type

EM 5 56 S -

① ② ③ ④ ⑤ ⑥

- ① **Series Name**
EM: EM Series(new)
DM: DM Series(old)
- ② **DC or AC Power Input**
Blank: DC Input
A: AC or DC Input Optional
- ③ **Max Power Voltage**
5: 50V

- ④ **Max Peak Current**
56: Maximum Peak Current = 5.6A
- ⑤ **Feature**
S: Superior
- ⑥ **Customized**
IO: Digital Input

CM Stepper Motor

57 CM 06 - (A) -

① ② ③ ④ ⑤ ⑥

- ① **Motor Size**
20: NEMA 8 motor 28: NEMA 11 motor
35: NEMA 14 motor 42: NEMA 17 motor
57/D57: NEMA 23 motor 60: NEMA 24 motor
86: NEMA 34 motor

- ② **Series Name**
CM: CM series

- ③ **Holding Torque**
For NEMA 8/11/14 motor:
Divide the value by 100
015: 0.15N.m
For NEMA 17/23/24/34 motor:
Divide the value by 10
06: 0.6N.m

- ④ **Motor Rate Current**
Blank: Standard rate current
4A: Rate current 4A

- ⑤ **Type**
SZ: Double shaft motor
BZ: Brake motor
FS: Waterproof motor

- ⑥ **Customized model**

Network Stepper Drives

EM3E/EM3RT Series

- Support CoE control and CiA 402 protocol
- Matching most of master controller
- Conformance tested by ETG
- Support RTEX network protocol



Introduction

EM3E series drives support operating modes: Profile Position (PP), Profile Velocity (PV), Homing(HM), Cyclic Synchronous Position (CSP). The products can be matched with most of EtherCAT controller/PLC such as Beckhoff, Omron, Trio, etc. EM3RT series drives are based on Panasonic RTEX network supports CP operating mode (built in HM mode) and connect up to 32 axes. They have excellent performance including enhanced reliability, super-low stepper noise, anti-resonance, low-speed ripple smoothing and remains 60% less cost than network servo at least.

Features

- ▶ Low noise and vibration, smooth motion
- ▶ EM3E support standard EtherCAT with operation modes of PP, PV, CSP, HM
- ▶ EM3RT support Panasonic RTEX with operation modes of CP (built in HM mode)
- ▶ Configurable I/O features: limit switch, alarm, brake, etc
- ▶ Optically coupled isolated input, strong anti-interference ability
- ▶ Auto-tuning of motor parameters
- ▶ Protections for over voltage, over current, motor cable error, etc.



Models	Operating Voltage	Output Current(A)	Matching Motor	Weight(Kg)	Size(mm)
EM3E-522	20-50VDC	0.3-2.2	NEMA8/11/14/17	0.57	118*90.4*34
EM3E-556	20-50VDC	2.1-5.6	NEMA17/23/24	0.57	118*90.4*34
EM3E-870	20-80VDC	2.1-7.0	NEMA23/24/34	0.57	118*90.4*34
EM3E-A882	20-80VAC or 30-100VDC	2.1-8.0	NEMA34	0.85	118*90.4*34
EM3RT-556	20-50VDC	0.3-5.6	NEMA8/11/14/17/23/24	0.65	130*90.4*34
CABLE-MUSB1M5	Tuning Cable				
CABLE-TX*M*-BUS	Network Cable: 0.1m, 0.2m, 0.3m, 0.4m, 1m, 1.5m, 2m, 3m,5m,7m, 10m,15m, 20m				

CANopen Stepper Drives

EM-CAN Series

- Support CiA 301/402 protocol
- Matching most of master controller

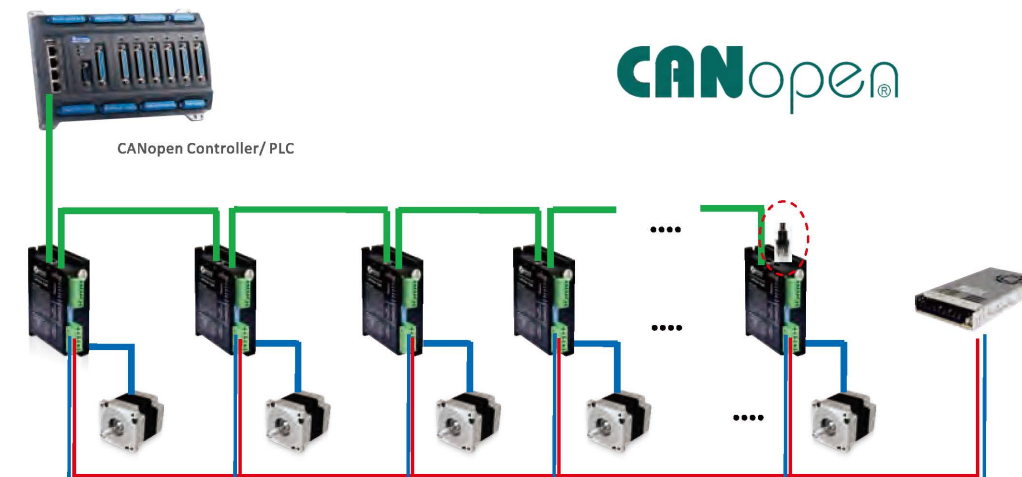


Introduction

EM-CAN series drives support operating modes: Profile Position (PP), Profile Velocity (PV), Homing(HM). They have excellent performance including enhanced reliability, super-low stepper noise, anti-resonance, low-speed ripple smoothing and remain 60% less cost than servo at least.

Features

- ▶ Low noise and vibration, smooth motion
- ▶ EM-CAN support operation modes of PP, PV, HM
- ▶ Configurable I/O features: limit, alarm, brake, etc
- ▶ Optically coupled isolated input, strong anti-interference ability
- ▶ Auto-tuning of motor parameters
- ▶ Protections for over voltage, over current, motor cable error, etc.



Models	Operating Voltage	Output Current(A)	Matching Motor	Weight(Kg)	Size(mm)
EM522-CAN	20-50VDC	0.3-2.2	NEMA8/11/14/17	0.28	118*75.5*33
EM556-CAN	20-50VDC	0.5-5.6	NEMA17/23/24	0.28	118*75.5*33
EMA882-CAN	20-80VAC or 30-100VDC	0.5-8.0	NEMA23/24/34	0.85	151*97*48
Terminal Resistance	The last node needs to add the terminal resistance generally				
CABLE-TX*M*-BUS	Network Cable: 0.1m, 0.2m, 0.3m, 0.4m, 1m, 1.5m, 2m, 3m,5m,7m, 10m,15m, 20m				
CAN to USB Converter	Not necessary, need to order this converter if using Leadshine Protuner				

RS485 Modbus Stepper Drives EM2RS Series

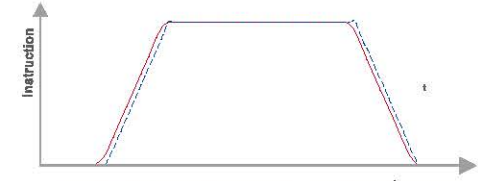
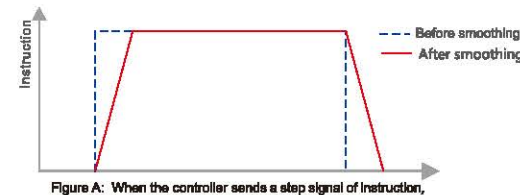


- Standard Isolated RS485 Modbus
- Smooth motion & Anti-resonance
- Built-in Uni-axial Control Instruction
- HMI, PLC or External I/O start motion

■ Features

- ▶ 7 Programmable Inputs
 - Limit + / - or Origin inputs
 - Quick stop, Alarm reset and Enable inputs
 - JOG + / - or Position Table inputs
- ▶ 3 Programmable Outputs
 - Alarm, Brake outputs
 - Homing / Instruction / Path complete
- ▶ Modes of Operation
 - Velocity
 - Position
 - Homing
- ▶ Support Functions
 - Teaching
 - Interrupt
 - Skip, Suspend, Circulate motion
- ▶ PC Software for Easy Setup, Fine Tune
- ▶ Matching Motors:
 - NEMA8, 11, 17, 23, 24, 34
 - Standard, dual shaft, brake, waterproof

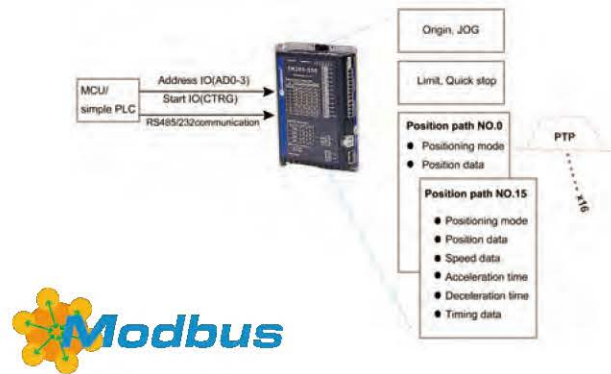
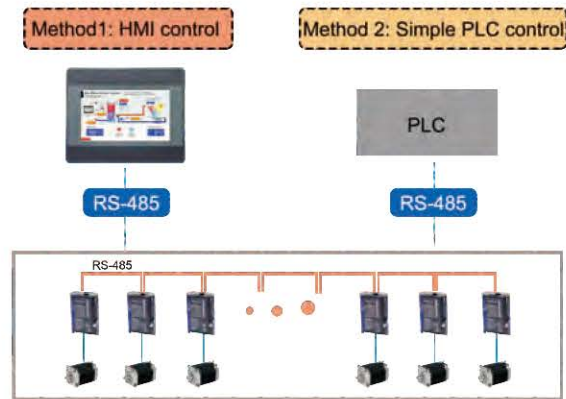
2. Instruction smoothing



3. Built-in uni-axial control instruction

Programmable 16-segment position table, support positioning/homing/limit/quick stop/ JOG...

1.Support RS485 communication



Models	Operating Voltage	Output Current(A)	Matching Motor	Weight(Kg)	Size(mm)
EM2RS-522	20-50VDC	0.3-2.2	NEMA8/11/14/17	0.55	118*79.5*25.5
EM2RS-556	20-50VDC	0.5-5.6	NEMA17/23/24	0.55	118*79.5*25.5
EM2RS-870	20-80VDC	0.5-7.0	NEMA23/24/34	0.55	118*79.5*25.5
CABLE-PC-1	Tuning Cable				
CABLE-TX*M*-BUS	Network Cable: 0.1m, 0.2m, 0.3m, 0.4m, 1m, 1.5m, 2m, 3m,5m,7m, 10m,15m, 20m				

Pulse Control Stepper Drives



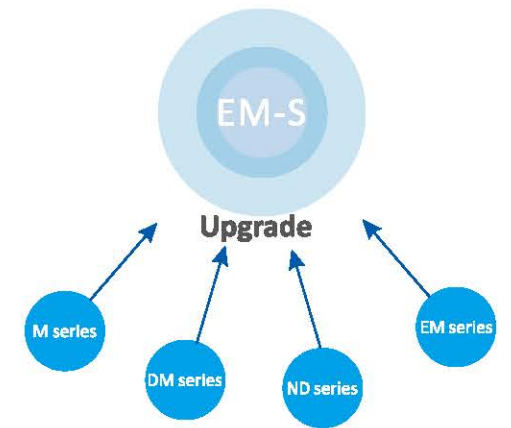
- EM-S---Enhanced Version
- DM-E---Cost-effective Version

EM-S Series---Enhanced Performance

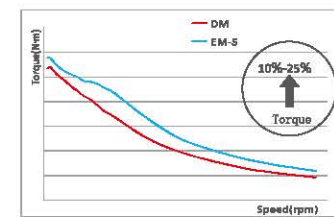
As chips and software are constantly updated and optimized, Leadshine made the new EM-S series stepper drives based on 20 years accumulation of application and production experiences. They not only retain DM series' features such as reliability, low noise, low heat, and low vibration, but also add ten new features such as alarm, brake, smoothing time, etc. They can drive step motors with NEMA 8/11/14/17/23/24/34.

■ Features

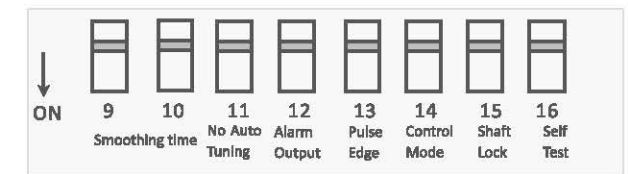
- ▶ Torque increased by 10%-25%
- ▶ Step & DIR or CW & CCW control
- ▶ Alarm and Brake outputs
- ▶ 200KHz (500KHz optional) max frequency
- ▶ 5V or 24V signal voltage optional
- ▶ Soft-start with no "jump"
- ▶ Over-voltage, over-current and motor cable error protections



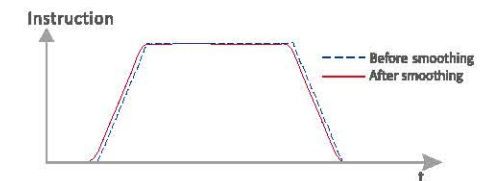
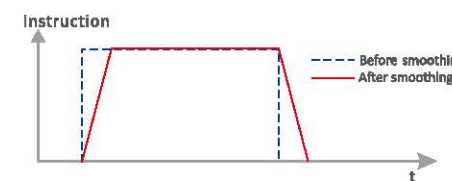
■ Torque comparison (same condition)



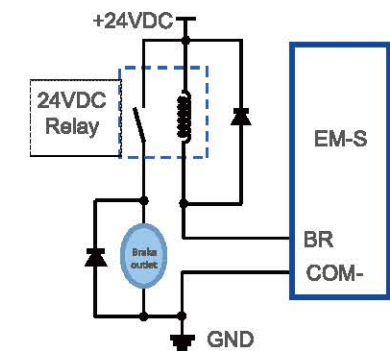
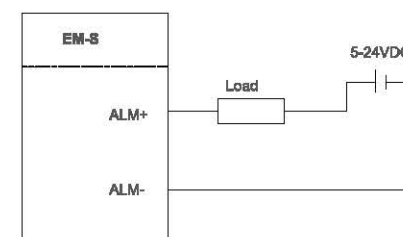
■ Features of Second DIP Switch



■ Pulse Smoothing Filter



■ Alarm and Brake Outputs

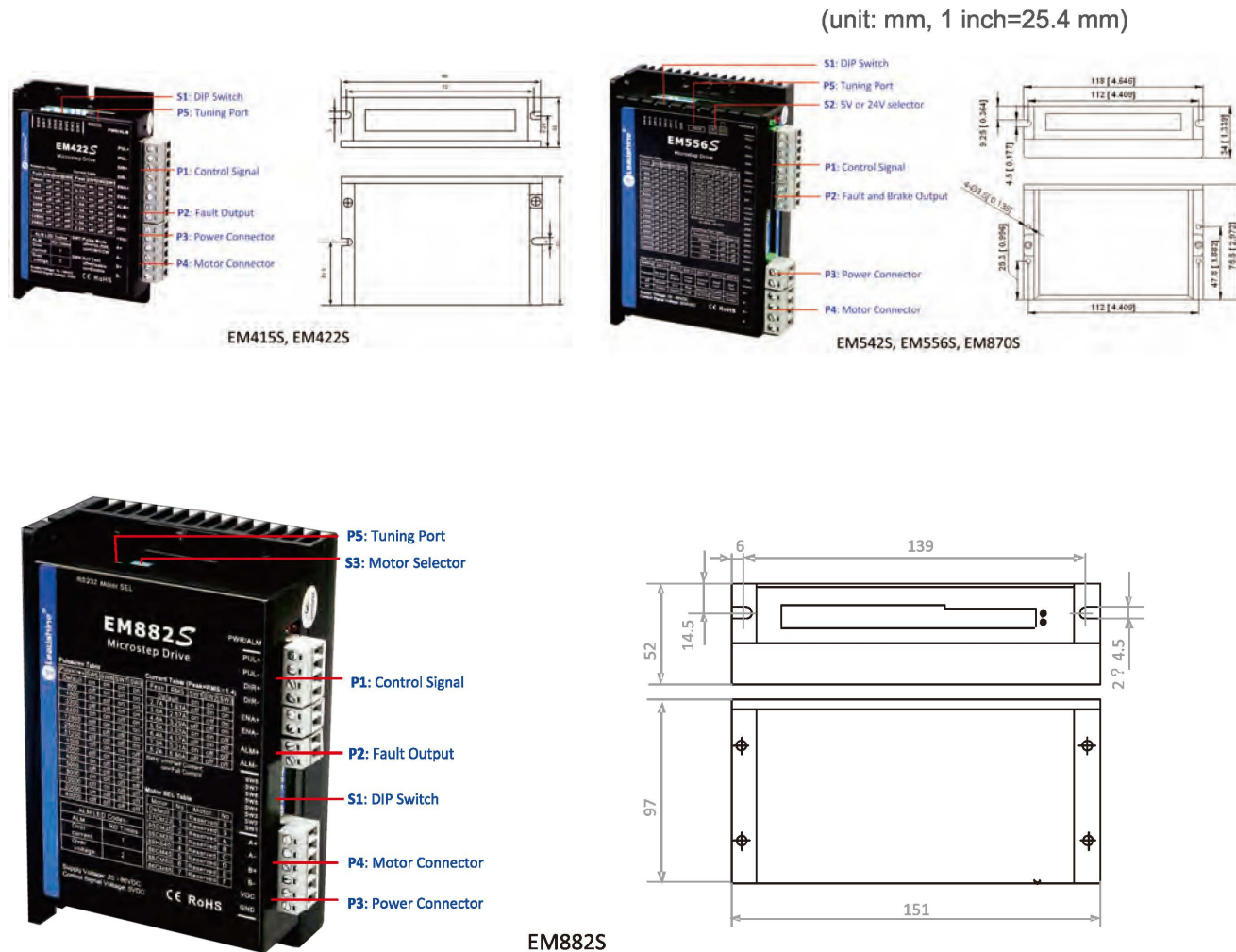


EM-S Series Electrical Specifications

Items	EM415S		EM422S		EM542S		EM556S		EM870S		EM882S	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Output Current (A)	0.3	1.5	0.3	22	0.5	4.2	0.5	4.2	0.5	7.0	0.5	8.2
Power Voltage (VDC)	12	40	12	40	20	50	20	50	20	80	20	80
Max Input Frequency (KHz)	-	70	-	70	-	200	-	200 or 500*	-	200	-	200 or 500*
Logical Current (mA)	7	16	7	16	7	16	7	16	7	16	7	16
Logical Voltage (VDC)	0	5	0	5	0	5 or 24	0	5 or 24	0	5 or 24	0	5
Min Pulse Width (us)	7.5		7.5		2.5		2.5 or 1		2.5		2.5 or 1	
Matched Motors Size	NEMA8/11/14/17		NEMA17		NEMA17/23		NEMA23/24		NEMA23/24/34		NEMA34	

Note: (*) The drive with 500KHz is another model.

EM-S Series Connector and Mechanical



DM-E Series----Cost-effective

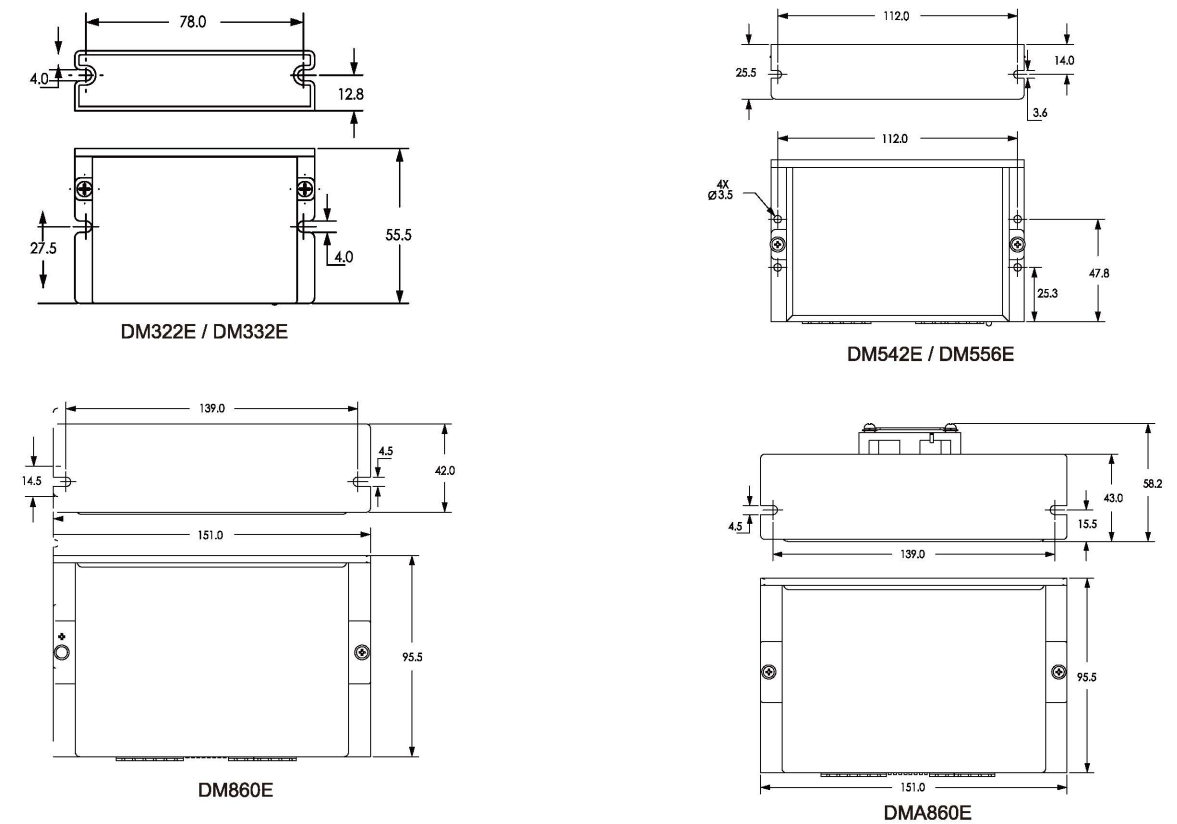
The DM-E series consists of stepper drives adopting Leadshine latest advanced stepper control technology. Those stepper drives are highly reliable with good performance and highly competitive cost. They can power a wide range of stepper motors from NEMA 8 to NEMA 34 (model dependent). DM-E stepper drives are easy to configure and setup. Output current and micro step resolution can be simply set up via DIP switches.



DM322E	DM332E	DM542E	DM556E	DM860E	DMA860E
12-30 VDC	12-30 VDC	20-50 VDC	20-50 VDC	20-80 VDC	20-80 VAC/ 30-110 VDC
0.3-2.2 A	1.0-3.2 A	1.0-4.2 A	1.7-5.6 A	2.4-7.2 A	2.4-7.2 A

DM-E Series Mechanical Specifications

(unit: mm, 1 inch=25.4 mm)



Special Type Stepper Drives

- DM Series: AC Input or 3-phase Type
- DM-IO Series: I/O digital control
- MX Series: 3-Axis or 4-Axis

DM Series---AC Power Input or 3-phase Type

Model	Phase	Power Voltage	Output Current(A)	Control Type	Logical Voltage(VDC)	Mechanical Size(mm)	Matched Motor Size
DMA882S	2	20-80 VAC or 30-110 VDC	0.5-8.2	Step&Dir, CW&CCW	5	151*97*48	NEMA23/24/34
DM1182	2	70-130 VAC	0.5-8.2	Step&Dir, CW&CCW	5	202*167*63	NEMA34/42
DM2282	2	180-240 VAC	0.5-8.2	Step&Dir, CW&CCW	5	202*167*63	NEMA34/42/53
3DM580S	3	20-50 VDC	0.5-8.0	Step&Dir, CW&CCW	5	118*76*33	NEMA17/23/24/34
3DM883	3	20-80 VDC	2.2-8.3	Step&Dir, CW&CCW	5	151*97*48	NEMA24/34
3DM2283	3	180-240 VAC	2.2-11.7	Step&Dir, CW&CCW	5	202*167*63	NEMA 34/42/53

DM-IO Series---Digital / Analog Input Control Type

- ▶ External digital or analog input control
- ▶ Speed control by DIP switches
- ▶ PUL+ and PUL- signals indicate Start and Stop
- ▶ DIR+ and DIR- signals indicate motor running direction
- ▶ Easy to use in speed control applications, save controller/PLC

Model	Phase	Power Voltage	Output Current(A)	Control Type	Logical Voltage(VDC)	Mechanical Size(mm)	Matched Motor Size
DM422S-IO	2	18-36 VDC	0.3-2.2	Digital Input	5 or 24	78*55*25	NEMA8/11/17
DM442-IO-24	2	18-36 VDC	1.0-4.2	Digital Input	24	116*69*27	NEMA17/23/24
DM556-IO	2	20-50 VDC	1.8-5.6	Digital Input	5 or 24	118*76*33	NEMA17/23/24
DM805-AI	2	20-80 VDC	0.5-7.0	Step&Dir, Analog Input	5 or 0-5V analog	118*76*33	NEMA17/23/24/34
DMA882S-IO	2	20-80 VAC or 30-110 VDC	2.1-8.2	Digital Input	5 or 24	151*97*48	NEMA 23/24/34
DM2282-IO-24	2	180-240 VAC	2.1-8.2	Digital Input	24	202*167*63	NEMA34/42/53

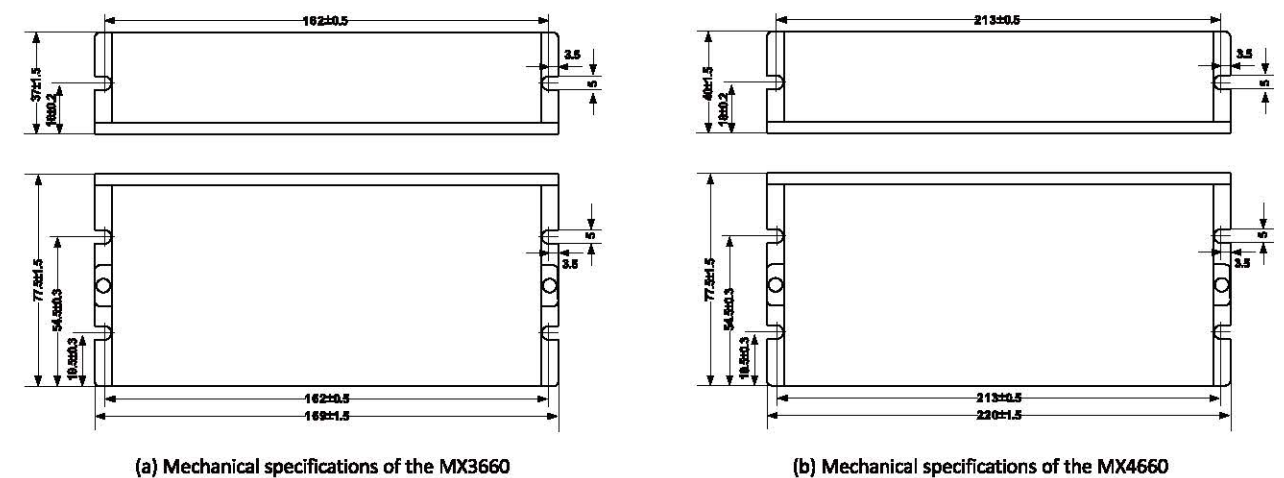
MX Series---Multi-in-one Type

- ▶ Multiple-axis digital stepper drives built on latest DSP technology
- ▶ Built-in breakout boards and IO's
- ▶ Able to drive NEMA 17, 23 and 24 stepper motors
- ▶ Analog output 0-10V t to control spindle VFD
- ▶ Compact size and effective cost
- ▶ Direct connection to popular control system like Mach3 and EMC...

Model	MX3660	MX4660
Axis No.	3	4
Phase	2	2
Control Type	Step & Direction	Step & Direction
Operating Voltage	20 - 60 VDC	20 - 60 VDC
Suggested Power Input	24 - 54 VDC	24 - 54 VDC
Output Current (Per Axis)	1.41 - 6.0 A	1.41 - 6.0 A
Max Input Frequency	200 KHz	200 KHz
Microstep Settings	Full, Half, 1/4, 1/8, 1/10, 1/16, 1/32, 1/64	Full, Half, 1/4, 1/8, 1/10, 1/16, 1/32, 1/64
Output Current Settings (Peak)	1.41A, 2.12A, 2.83A, 3.54A, 3.96A, 4.24A, 4.95A, 6.0A	1.41A, 2.12A, 2.83A, 3.54A, 3.96A, 4.24A, 4.95A, 6.0A
Output Current Settings (RMS)	1.0A, 1.5A, 2.0A, 2.5A, 2.8A, 3.0A, 3.5A, 4.25A	1.0A, 1.5A, 2.0A, 2.5A, 2.8A, 3.0A, 3.5A, 4.25A
# of Digital Inputs	4	8
# of Digital Outputs	4	6
# of Analog Inputs	1	1
Digital Input Voltage	0 - 12 VDC	0 - 12 VDC or optional
Digital Output Voltage	0 - 24 VDC or optional	0 - 24 VDC or optional
Analog Output Signal Voltage	0 - 8.9 VDC (at 10VDC supplied voltage)	0 - 8.9 VDC (at 10VDC supplied voltage)
Minimum Step Width	2.5 μ s	2.5 μ s
Minimum Direction Setup Time	5 μ s	5 μ s
Idle Current Percentage	50%	50%
Protection Functions	Over current, over-voltage, emergency	Over current, over-voltage, emergency
Dimension	169 X 77.5 X 37 mm	220 X 77.5 X 40 mm

Mechanical specification

(unit: mm, 1 inch=25.4 mm)



(a) Mechanical specifications of the MX3660

(b) Mechanical specifications of the MX4660

Stepper Motors

CM Series

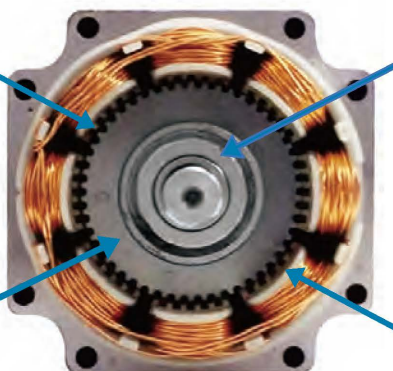
- Replace HS series stepper motors
- Frame size of NEMA8 to 42
- High reliability, Low motor heating, noise and vibration
- Multiple phase current optional for the same motor



Introduction

Leadshine designs the new CM series stepper motors by using the latest technique and quality materials. It provides greater torque, lower heat, and better running stability compared with most of stepper motors on the market. As a result of large-scale automated production lines and strict quality management system, CM series stepper motors are more stable, reliable, superior, consistent and lower cost. **Most of HS series stepper motors will be replaced by CM series motors till the end of 2019.**

Large Torque:
Uses the latest magnetic circuit optimization design solution to realize small volume and large torque.



High Stability:
Core components are made of preferential imported materials to ensure the stable and reliable running of the motor.

Low Heating:
Employs high grade and high performance punches to reduce the motor heating.

High Consistency:
Large-scale automated production lines and strict quality management system ensure the batch consistency of products.

In addition to standard stepper motors, the CM series also includes the stepper motors with double shafts, brake, and waterproof to apply to various applications.

Compared with ordinary spring brakes, **permanent magnet brakes** produce less noise (no mechanical noise), respond fast (30 ms response time, only 1/10 of that of spring brakes), have a long service life, generate low heat, and consume low power. CM series stepper motor with a brake is configured with the cutting-edge permanent magnet brake that is more suitable for vertical motion and protects better against power failure.



Stepper Motor with brake



CM Series Stepper Motor



Permanent magnet brake

Low noise
Quick response
Low heat

Different from a standard stepper motor, CM series waterproof stepper motor is protected to **IP65** with its rear cover redesigned, its lead replaced with a waterproof connector, a new type of sealing material used between the front and rear end covers and the motor body, the motor body completely waterproofed, and the shaft end of the motor applied with high-quality oil seal. Therefore CM series **waterproof** stepper motor is suitable for application with damp, water spray, and oil spray.



Protection Rating **IP65**
Dustproof:
Prevents dust from entering
Waterproof:
Prevents water intrusion from different directions.

General Specifications

Step Angle	1.8°
Position Accuracy	±0.09°
Temp Rise(Max.)	Max. 85K
Operation Environment	Temperature: -10°C+50°C ; Humidity: 85% Max
Insulation Class	B
Insulation Resistance	MIN 100 MΩ, 500 V DC
Dielectric Strength	500 VAC, 1 min
Radial Play	0.025 mm Max. (Load 5N)
Axial Play	0.075 mm Max. (Load 10N)

Installation & Operation Conditions

Motor Size	NEMA17	NEMA23	NEMA24	NEMA34
Store Temperature	-10°C+50°C			
Store Humidity	85% Max.			
Operation Environment	Non-corrosive gas and dust; No direct contact with water, oil (except the waterproof type)			
Radial Load(N) (Distance to the flange 10mm)	30	75	90	300
Axial Load(N)	Less than motor weight			

Stepper Motor Overview

1. Below matched drive is default Step&Direction type, other control types of drive also can be matched;
2. 3-phase stepper motors still keep selling HS series, others recommend CM series;
3. Contact Leadshine for other customized model such as inch shaft diameters, modified cable, etc.

Phase/ Series	Frame Size	Length(mm)	Model	Rate Current (A)	Holding Torque(N.m)	Matched Drives	Remark		
2-Phase/ CM	NEMA 8	33	20CM003	0.6	0.03	EM415S			
		45	20CM005	0.6	0.05	EM415S			
	NEMA 11	32	28CM006	1.2	0.06	EM415S			
		41	28CM010	1.2	0.1	EM415S			
		51	28CM013	1.2	0.13	EM415S			
	NEMA 14	31	35CM015	2.0	0.15	EM422S			
		47	35CM04	2.0	0.4	EM422S			
	NEMA 17	33	42CM02-1A	1.0	0.2	EM415S			
			42CM02	1.5	0.2	EM422S			
			42CM04-1A	1.0	0.4	EM415S			
			42CM04	1.5	0.4	EM422S			
		47	42CM06-1A	1.5	0.6	EM422S			
			42CM06	2.5	0.6	EM422S/EM542S	Performance in high-speed		
			42CM06-SZ	2.5	0.6	EM422S/EM542S	Motor with dual shaft		
			42CM08-1A	1.5	0.8	EM422S			
		60	42CM08	2.5	0.8	EM422S/EM542S	Performance in high-speed		
			42CM08-SZ	2.5	0.8	EM422S/EM542S	Motor with dual shaft		
			NEMA 23	41	57CM06	3.0	0.6	EM542S	
				56	57CM13-3A	3.0	1.3	EM542S	
	57CM13	4.0			1.3	EM556S	Performance in high-speed		
	57CM13-SZ	4.0			1.3	EM556S	Motor with dual shaft		
	96	57CM13-BZ		4.0	1.3	EM556S	Motor with brake		
	65	57CM13-FS		4.0	1.3	EM556S	IP65 waterproof		
	NEMA 23	76	57CM23-3A	3.0	2.3	EM542S			
			57CM23-4A	4.0	2.3	EM556S			
			57CM23	5.0	2.3	EM556S/EM870S	Performance in high-speed		
			57CM23-SZ	5.0	2.3	EM556S/EM870S	Motor with dual shaft		
		116	57CM23-BZ	5.0	2.3	EM556S/EM870S	Motor with brake		
		90	57CM23-FS	5.0	2.3	EM556S/EM870S	Motor with waterproof		
		84	57CM26-4A	4.0	2.6	EM556S			
			57CM26	5.0	2.6	EM556S/EM870S	Performance in high-speed		
			57CM26-SZ	5.0	2.6	EM556S/EM870S	Motor with dual shaft		
		67	D57CM21-4A	4.0	2.1	EM556S			
	D57CM21		5.0	2.1	EM556S/EM870S	Performance in high-speed			
	D57CM21-SZ		5.0	2.1	EM556S/EM870S	Motor with dual shaft			
	88	D57CM31-4A	4.0	3.1	EM556S				
		D57CM31	5.0	3.1	EM556S/EM870S	Performance in high-speed			
		D57CM31-SZ	5.0	3.1	EM556S/EM870S	Motor with dual shaft			

Phase/Series	Frame Size	Length(mm)	Model	Rate Current (A)	Holding Torque(N.m)	Matched Drives	Remark	
2-Phase/ CM	NEMA 34	68	60CM22X	5.0	2.2	EM556S/EM870S	Motor with dual shaft	
			60CM22X-SZ	5.0	2.2	EM556S/EM870S	Motor with brake	
			60CM22X-BZ	5.0	2.2	EM556S/EM870S		
		86	60CM30X	5.0	3.0	EM556S/EM870S		
			60CM30X-SZ	5.0	3.0	EM556S/EM870S	Motor with dual shaft	
			60CM30X-BZ	5.0	3.0	EM556S/EM870S	Motor with brake	
		66	86CM35	4.0	4.0	EM556S/EM870S		
			86CM45	6.0	4.5	EM882S		
		80	86CM45-SZ	6.0	4.5	EM882S	Motor with dual shaft	
			86CM45-BZ	6.0	4.5	EM882S	Motor with brake	
			86CM45-FS	6.0	4.5	EM882S	Motor with waterproof	
		98	86CM80	6.0	8.0	EM882S		
	86CM85		6.0	8.5	EM882S			
	86CM85-SZ		6.0	8.5	EM882S	Motor with dual shaft		
	86CM85-BZ		6.0	8.5	EM882S	Motor with brake		
	118	86CM85-FS	6.0	8.5	EM882S	Motor with waterproof		
		86CM120	6.0	12	EM882S/DM1182			
		115	110CM12	6.0	12	DM2282		
	NEMA 42/ NEMA 51	150	110CM20	6.5	20	DM2282		
		201	110CM28	6.0	28	DM2282		
		283	130HS45	7.0	45	DM2282		
3-Phase/ HS		NEMA 23	50	573S09	3.5	0.9	3DM580S	
			76	573S15	5.8	1.5	3DM580S	
	80		573S20-LS	5.8	1.5	3DM580S		
	NEMA 34	71	863S22	5.0	2.2	3ND883		
103		863S42	5.0	4.2	3ND883			
135		863S68H	2.3	6.8	3DM2283			

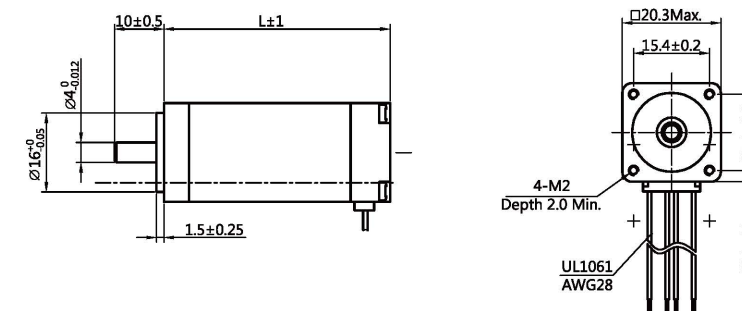
Standard Stepper Motor Specifications

NEMA 8 (20mm)



Standard Model:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Inertia (Kg.cm ²)	Matched Drives
20CM003	33	0.03	0.6	5.7	2.6	0.003	EM415S
20CM005	45	0.05	0.6	7	3.4	0.004	EM415S



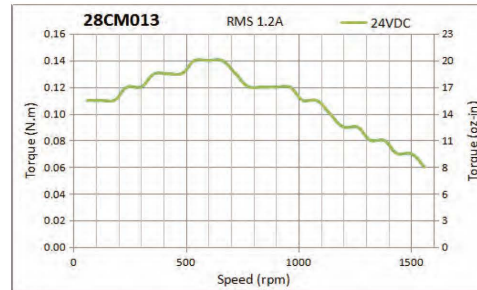
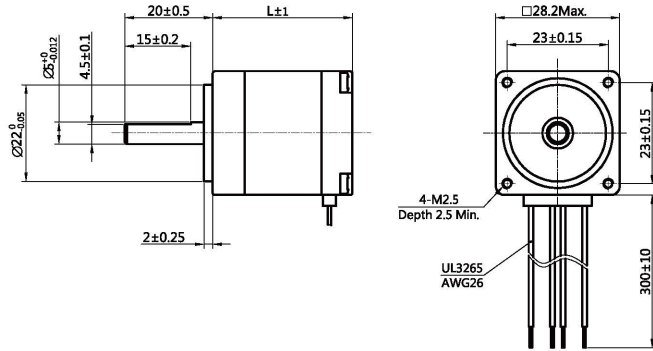
NEMA 11 (28mm)



Standard Models:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Inertia (Kg.cm ²)	Matched Drives
28CM006	32	0.06	1.2	1.4	1.0	0.009	EM415S
28CM010	41	0.1	1.2	1.8	1.6	0.013	EM415S
28CM013	51	0.13	1.2	2.2	2.3	0.018	EM415S

Unit: mm 1inch=25.4mm



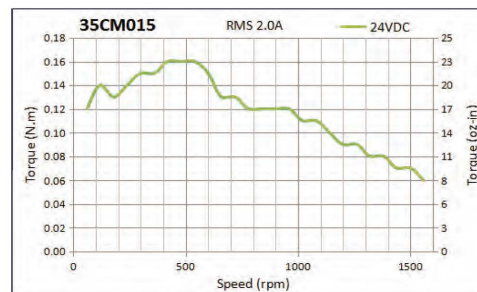
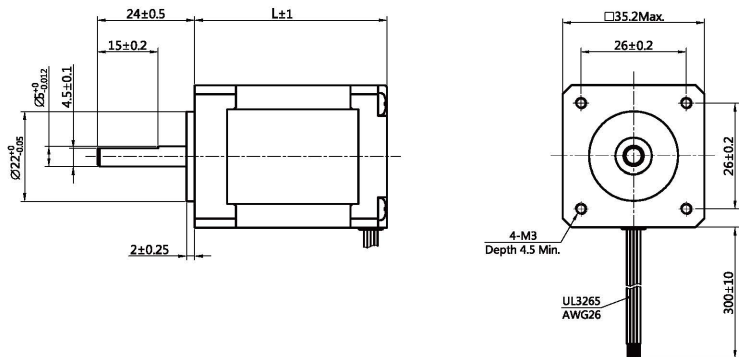
NEMA 14 (35mm)



Standard Models:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Inertia (Kg.cm ²)	Matching Drives
35CM015	31	0.15	2	0.8	1.3	0.019	EM422S
35CM04	47	0.36	2	1.2	1.9	0.026	EM422S

Unit: mm 1inch=25.4mm



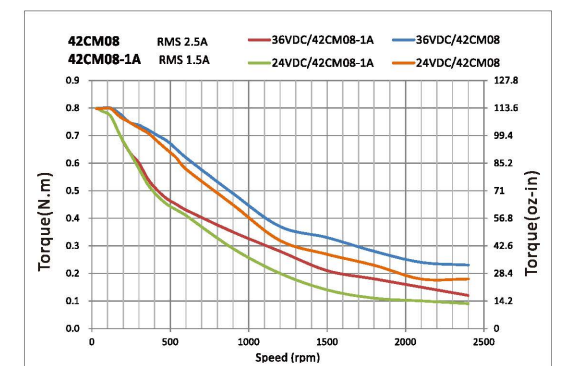
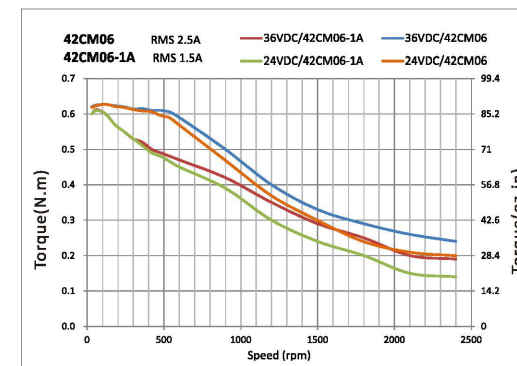
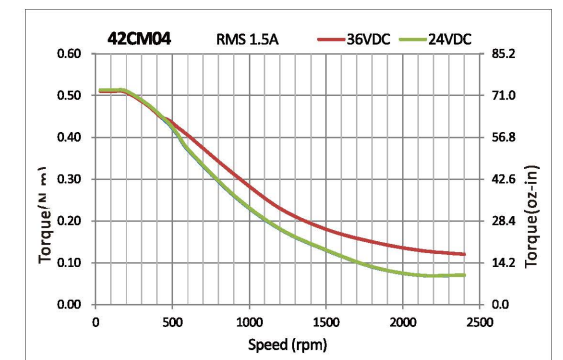
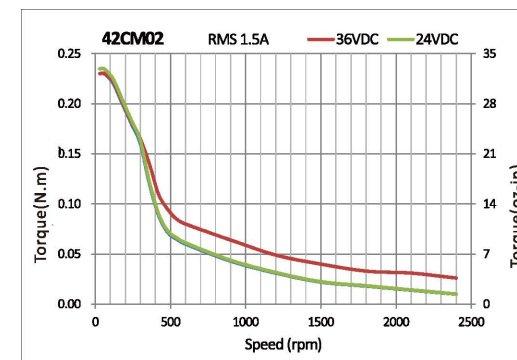
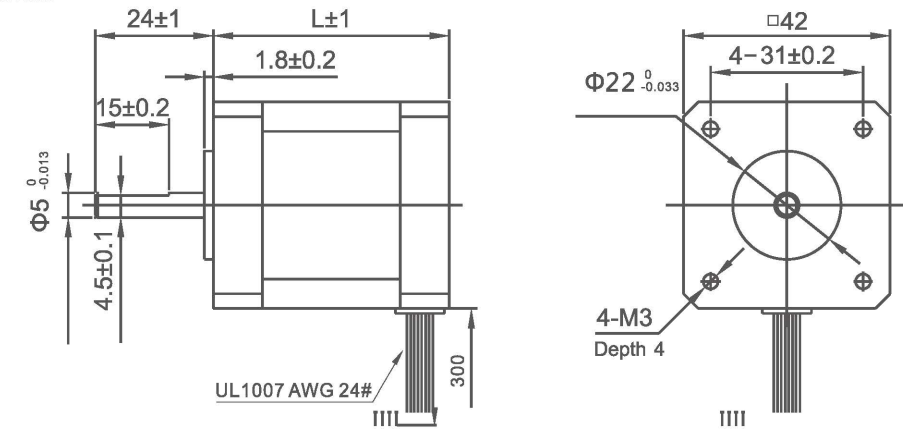
NEMA 17 (42mm)



Standard Models:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Inertia (Kg.cm ²)	Matching Drives
42CM02-1A	33	0.21	1	4.5	6.5	0.035	EM415S
42CM02		0.21	1.5	1.4	1.4	0.035	EM422S
42CM04-1A	40	0.4	1	4.0	7.9	0.054	EM415S
42CM04		0.4	1.5	2.3	4.3	0.054	EM422S
42CM06-1A	47	0.6	1.5	2.2	4.5	0.072	EM422S
42CM06		0.6	2.5	0.9	1.6	0.072	EM432S
42CM08-1A	60	0.8	1.5	3.0	6.9	0.110	EM422S
42CM08		0.8	2.5	1.0	2.4	0.110	EM542S

Unit: mm 1inch=25.4mm



NEMA 23 (57mm)

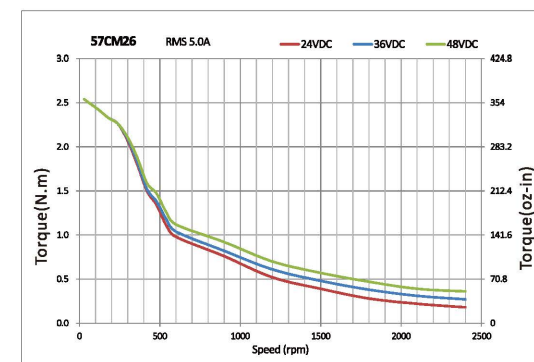
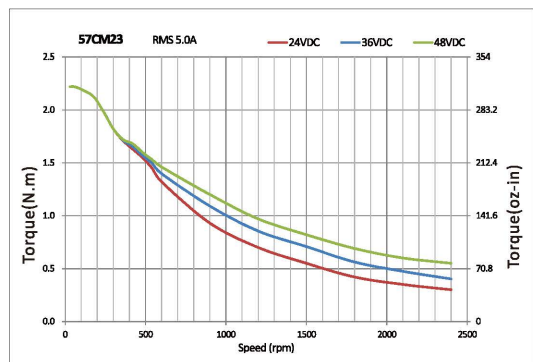
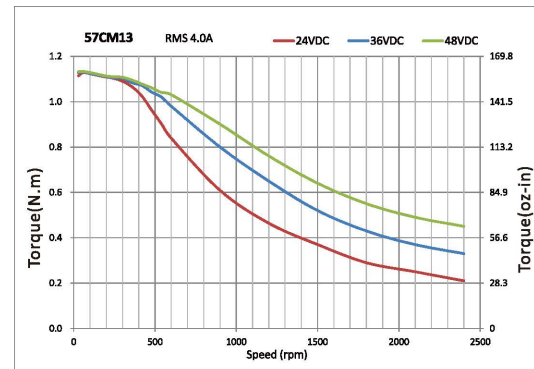
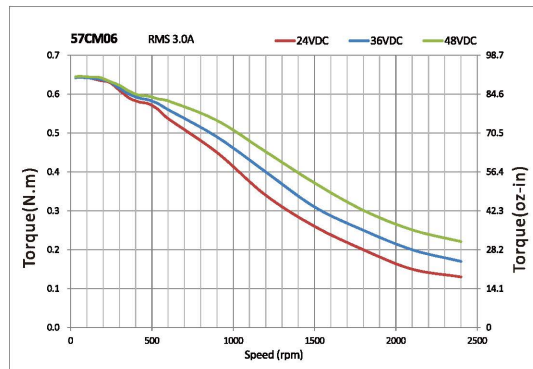
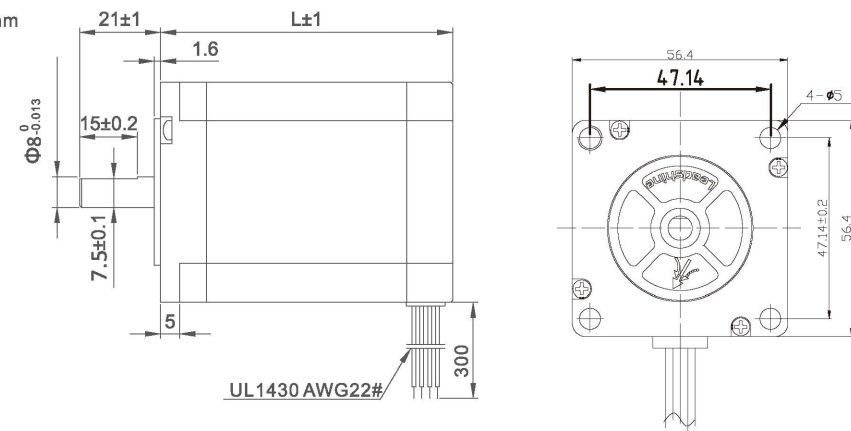


Standard Models:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Detent Torque	Inertia (Kg.cm ²)	Matching Drives
57CM06	41	0.6	3	0.7	1.4	0.02	0.12	EM542S
57CM13-3A	55	1.3	3	0.8	2.8	0.04	0.3	EM542S
57CM13		1.3	4	0.42	1.6			EM542S/EM556S
57CM12X		1.2	4	0.6	1.4			EM542S/EM556S
57CM21X	76	2.1	4	0.6	2.4	0.07	0.48	EM542S/EM556S
57CM23-3A	76	2.1	3	1.1	4.2			EM542S
57CM23-4A		2.3	4	0.5	2			EM542S/EM556S
57CM23		2.3	5	0.38	1.75	EM556S		
57CM22X	80	2.2	5	0.34	1.74	0.07	0.5	EM556S/EM870S
57CM26-4A	85	2.6	4	0.8	3.2	0.08	0.52	EM542S/EM556S
57CM26		2.6	5	0.44	2			EM556S/EM870S

Note: Motors with 1/4 in(6.35mm) shaft diameter are available.

Unit: mm 1inch=25.4mm



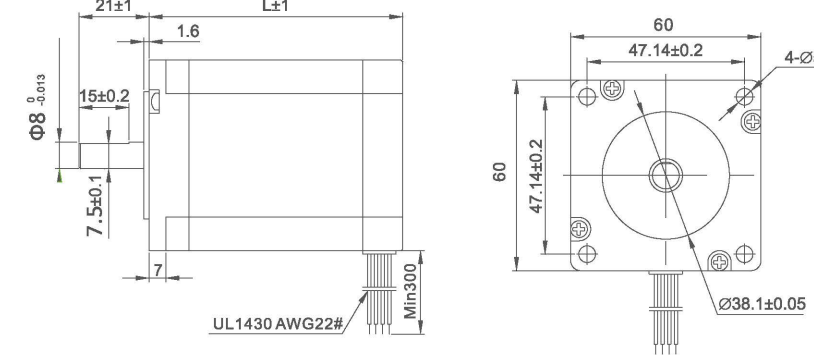
NEMA 23 (57mm)



Standard Models:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Detent Torque(N.m)	Inertia (Kg.cm ²)	Matching Drives
D57CM21-4A	67	2.1	4	0.5	1.77	0.09	0.57	EM556S
D57CM21		2.1	5	0.21	0.75			EM556S/EM870S
D57CM31-4A	88	3.1	4	0.62	2.8	0.10	0.84	EM556S
D57CM31		3.1	5	0.26	1.18			EM556S/EM870S

Unit: mm 1inch=25.4mm



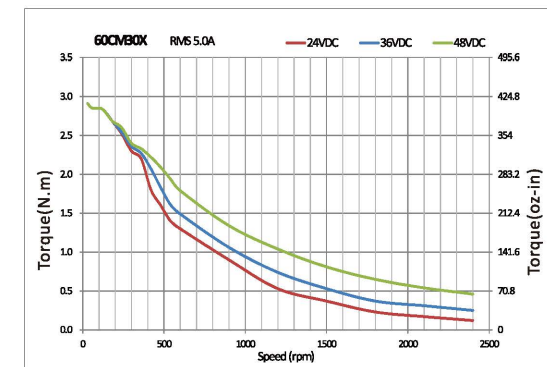
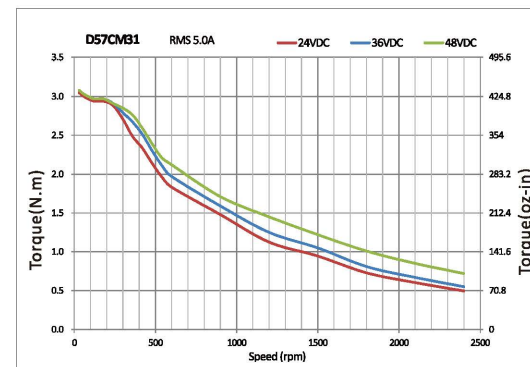
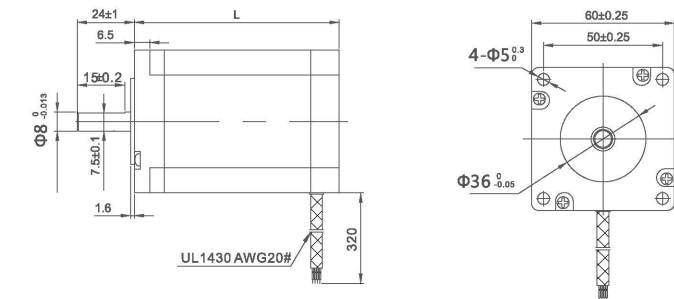
NEMA 24 (60mm)



Standard Models:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Detent Torque(N.m)	Inertia (Kg.cm ²)	Matching Drives
60CM22X	67	2.2	5	0.33	1.05	0.07	0.49	EM556S/EM870S
60CM30X	85	3.0	5	0.46	2.0	0.08	0.69	EM556S/EM870S

Unit: mm 1inch=25.4mm



NEMA 34 (86mm)

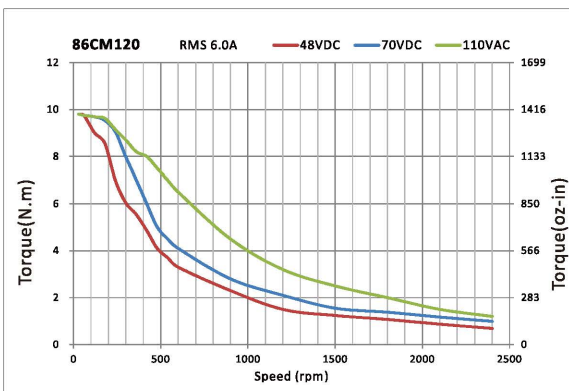
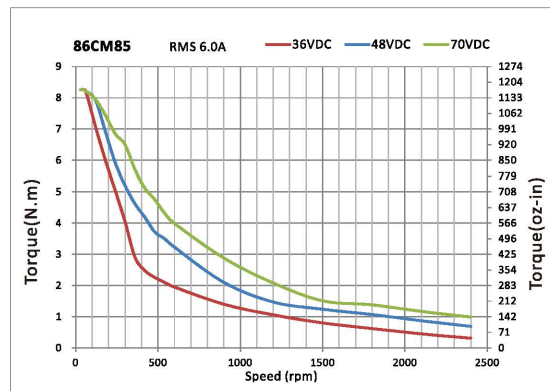
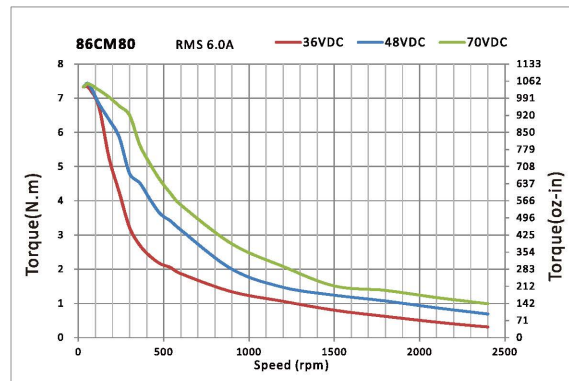
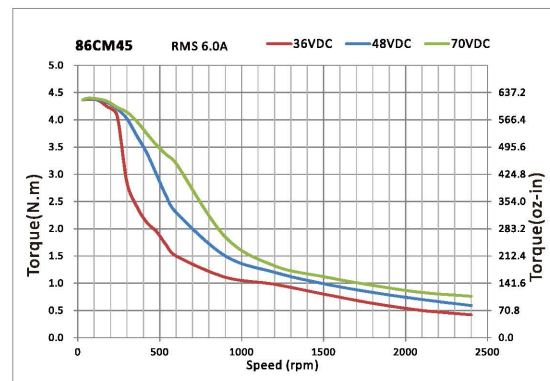
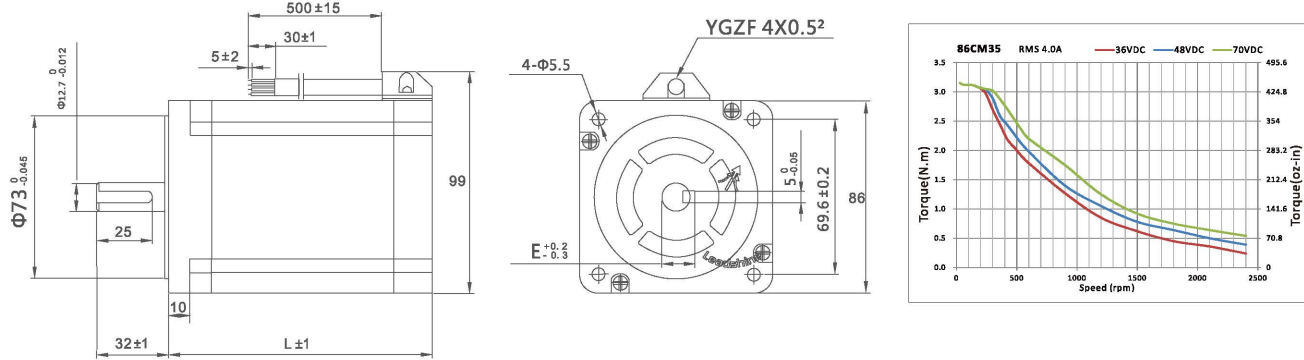


Standard Models:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Inertia (Kg.cm ²)	Matching Drives
86CM35	65	3.5	4	0.42	2.67	1.00	EM556S/EM870S
86CM45	80	4.5	6	0.43	2.95	1.40	EM882S
86CM80	98	8.0	6	0.63	4.0	2.50	EM882S
86CM85	118	8.5	6	0.53	4.25	2.70	EM882S
86CM120	129	12.0	6	0.75	5.30	2.94	EM882S/DMA882S

Note: Motors with 14mm shaft diameter are available.

Unit: mm 1inch=25.4mm



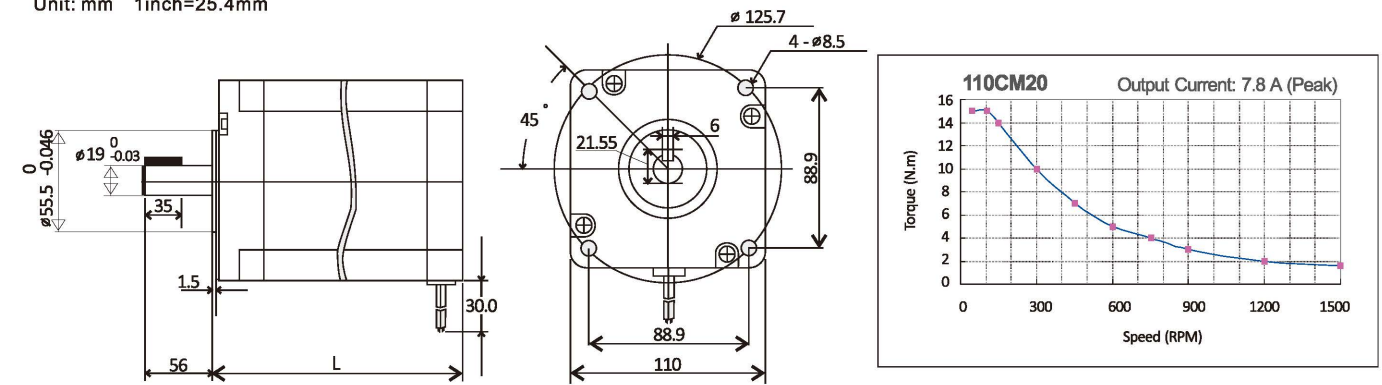
NEMA 42 & 51 (110mm & 130mm)



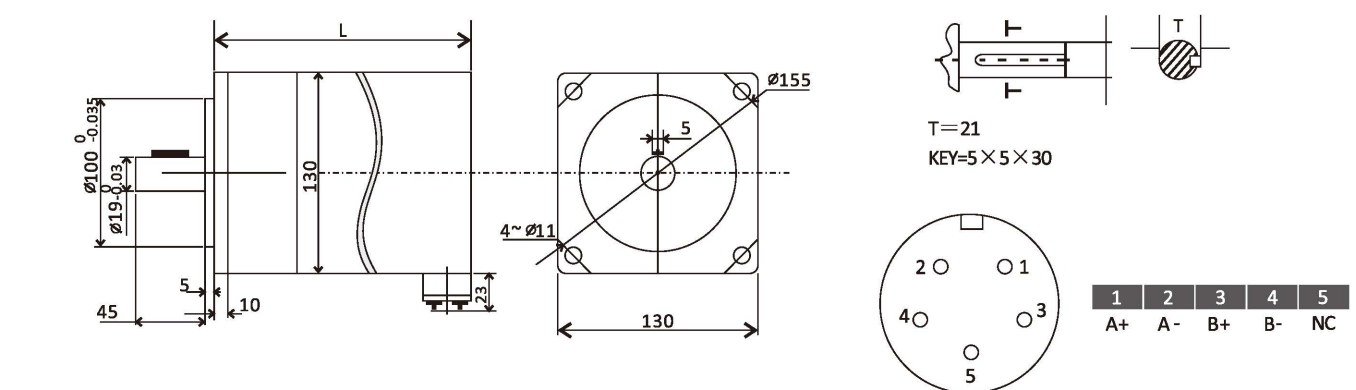
Standard Models:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Inertia (Kg.cm ²)	Matching Drives
110CM12	115	12	6	0.53	6.5	7.2	DM2282
110CM20	150	20	6	0.8	15	10.9	DM2282
110CM28	201	28	6.5	1.2	22	16.2	DM2282
130HS27	227	27	6	0.86	12.5	15.7	DM2282
130HS45	283	45	7	0.66	9.0	22.9	DM2282

Unit: mm 1inch=25.4mm



Unit: mm 1inch=25.4mm

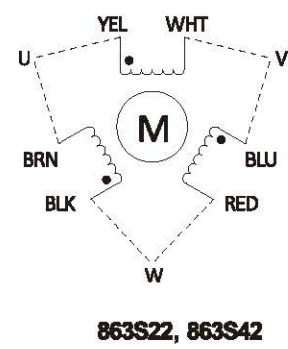
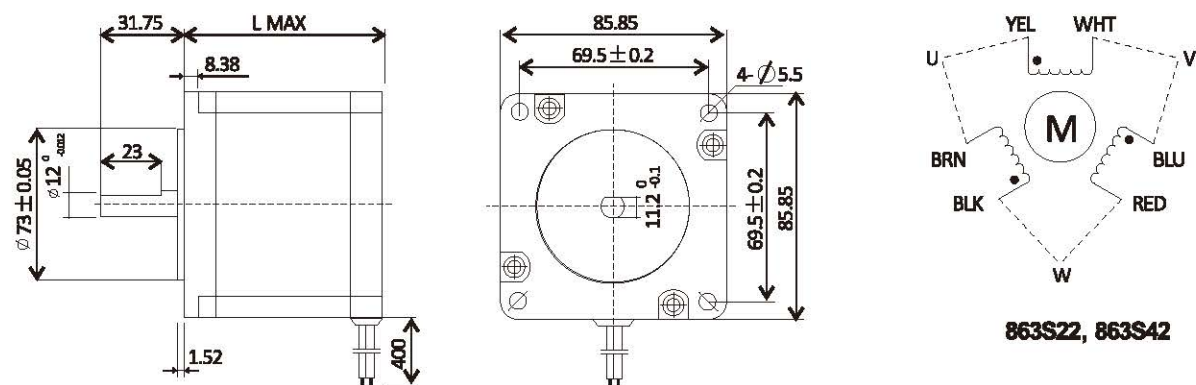
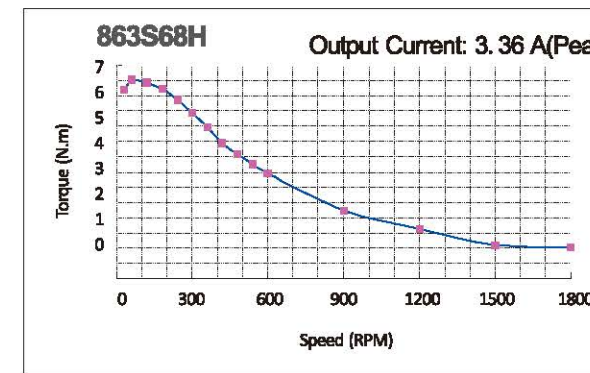
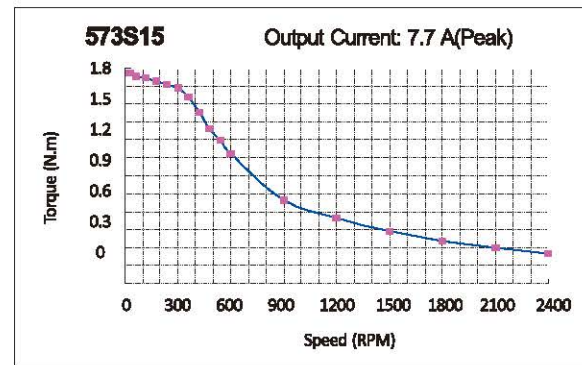
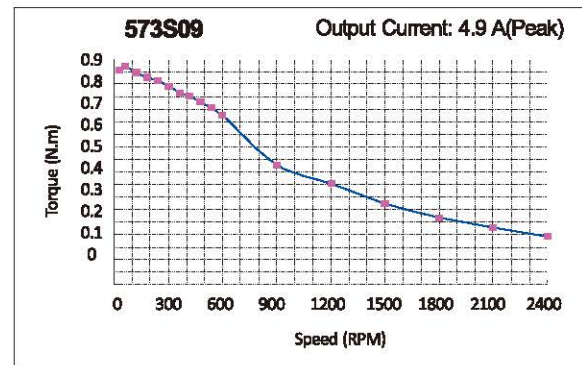
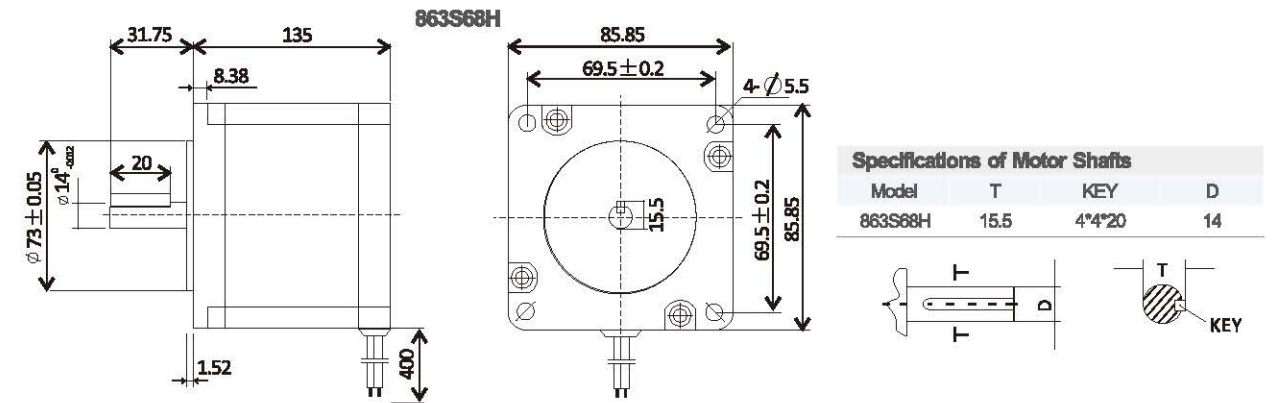
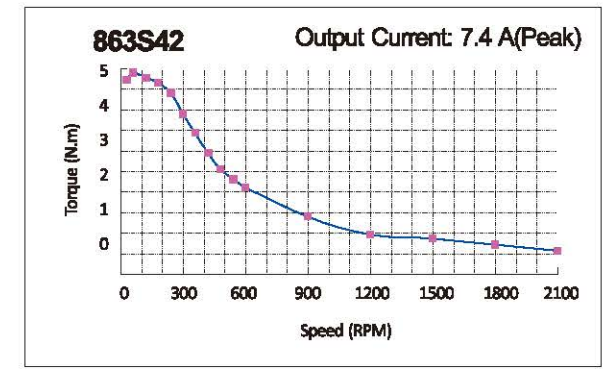
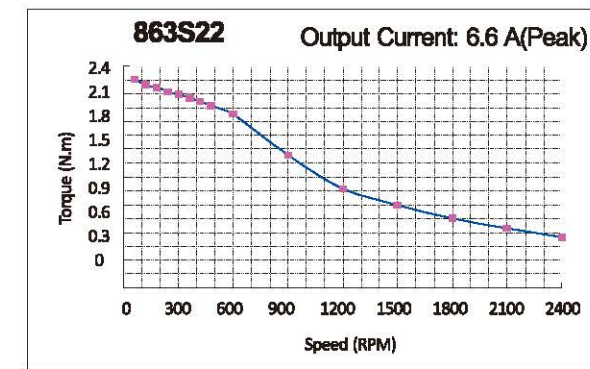
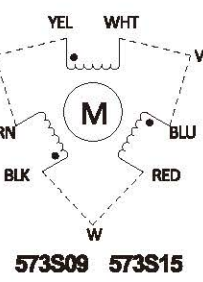
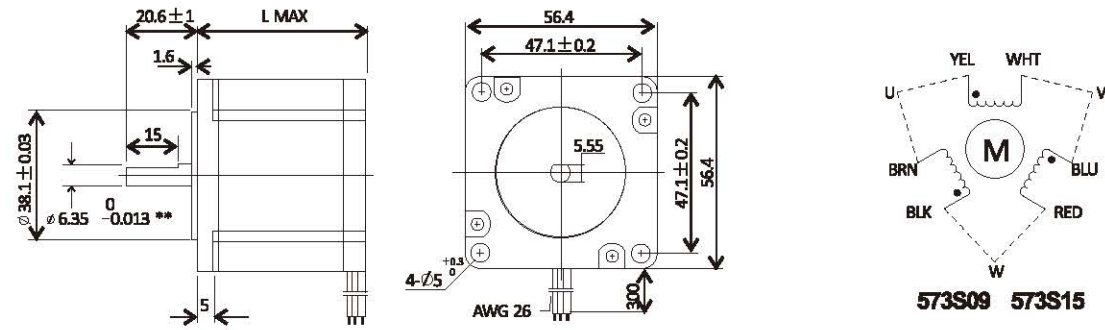


3-phase:NEMA 23, 34, 42

Standard Models:

Model	Length (mm)	Holding Torque(N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance/Phase(mH)	Inertia (Kg.cm ²)	Matching Drives
573S09	50	0.9	3.5	0.77	1.8	1.00	3DM580S
573S15	76	1.3	5.8	0.86	2.0	1.40	3DM580S
863S22	71	2.3	5	0.9	2.8	2.50	3ND883
863S42	103	4.3	5	1.35	4.5	2.70	3ND883
863S68H	135	6.8	2.3	4.5	20	2.94	3DM2283

Unit: mm 1inch=25.4mm



Closed Loop Stepper Products

Closed Loop Stepper Product Part Numbers

Network Type

CS3E - D 50 7 - □

① ② ③ ④ ⑤

- ① **Series Name**
CS3E: EtherCAT
- ② **Product Type**
D: Drive
- ③ **Max Operating Voltage**
50: 50V
100: 100VDC or 80VAC
- ④ **Max Output Current**
3: 3.0A
7: 7.0A
8: 8.0A
- ⑤ **Customized Models**

Modbus Type

CS2RS - D 50 7 - □

① ② ③ ④ ⑤

- ① **Series Name**
CS2RS: RS485
- ② **Product Type**
D: Drive
- ③ **Max Operating Voltage**
50: Max 50V
100: Max 100V
- ④ **Max Output Current**
3: 3.0A
7: 7.0A
8: 8.0A
- ⑤ **Customized Models**

Step&Direction Type

CS - D 50 7 - □

① ② ③ ④ ⑤

- ① **Series Name**
CS: CS Series
CS1: Enhanced version
- ② **Product Type**
D: Drive
- ③ **Max Operating Voltage**
50: 50V
100: 100V
- ④ **Max Output Current**
3: 3.0A
7: 7.0A
8: 8.0A
- ⑤ **Customized Model**

Closed Loop Stepper Motor

CS-M 2 34 85 □ - □

① ② ③ ④ ⑤ ⑥

- ① **Motor Series**
CS-M series closed loop stepper motor
- ② **Motor Phase**
2: 2 phase motor
- ③ **Motor Frame Size**
08: NEMA 8
11: NEMA 11
17: NEMA 17 motor
23: NEMA 23 motor
34: NEMA 34 motor
- ④ **Holding Torque**
85: 8.5N.m
- ⑤ **Standard Customized Specification**
B: Brake
WP: Waterproof
- ⑥ **Customized**
-S: Inch diameter(6.35mm, 12.7mm)
-L: Large NEMA 23 motor
Blank: 1000 ppr encoder
-E2Z: 2500 ppr encoder with Z signal
-E5Z: 5000 ppr encoder with Z signal

EtherCAT Closed Loop Stepper Drives

CS3E Series



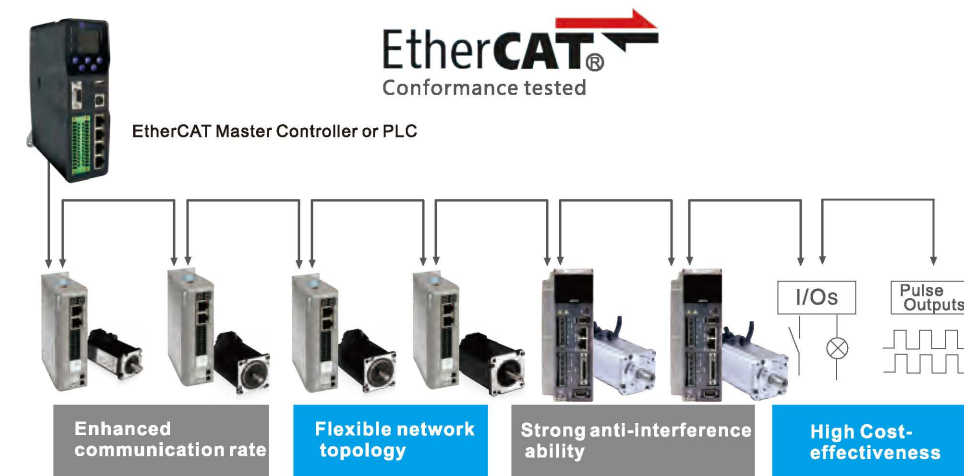
- Support CoE control and CiA 402 protocol
- Matching most of master controller
- Conformance tested by ETG
- No loss of step, Excellent performance

Introduction

The CS3E series drives support operating modes: Cyclic Synchronous Position (CSP), Profile Position (PP), Profile Velocity (PV), Homing(HM). The products can be matched with most of EtherCAT controller/PLC such as Beckhoff, Omron, Trio, etc. They have excellent performance including enhanced reliability, super-low stepper noise, anti-resonance, low-speed ripple smoothing and remains 40% less cost than network servo at least. Can power 2-phase NEMA8, 11, 14, 17, 23, 24 and 34 stepper motors with incremental encoder in many industrial applications such as CNC, medical, electronics, packaging...

Features

- ▶ No loss of step, No hunting, No torque reservation
- ▶ CS3E support standard EtherCAT protocol with operation modes of PP, PV, CSP, HM
- ▶ 7 configurable digital inputs, 7 optically isolated digital outputs include brake output
- ▶ USB port for parameters configuration
- ▶ Two 7-segment display velocity or slave ID or operation mode or error code
- ▶ Encoder resolution: 1000 / 5000 line for NEMA11/14/17/23/24/ 34 CS motors
- ▶ Protections for over voltage, over current and position following error, encoder cable error, etc.



Models	Operating Voltage	Output Current(A)	Matching Motor	Weight(Kg)	Size(mm)
CS3E-D503	20-50VDC	0.5-3.0	NEMA8/11/14/17	0.28	116*69.2*26.5
CS3E-D507	20-50VDC	0.5-5.6	NEMA17/23/24	0.28	116*69.2*26.5
CS3E-D1008	20-80VAC or 30-110VDC	0.5-8.0	NEMA34	0.85	151*97*52
CABLE-MUSB1M5	Tuning Cable				
CABLE-TX*M*-BUS	Network Cable: 0.1m, 0.2m, 0.3m, 0.4m, 1m, 1.5m, 2m, 3m,5m,7m, 10m,15m, 20m				
CABLEM-BM*M*	Encoder Extension Cable				
CABLEM-RZ*M*	Motor Extension Cable				

Modbus Closed Loop Stepper Drives CS2RS Series

- Standard Isolated RS485 Modbus
- No loss of step & smooth motion
- Built-in Uni-axial Control Instruction
- HMI, PLC or External I/O start motion

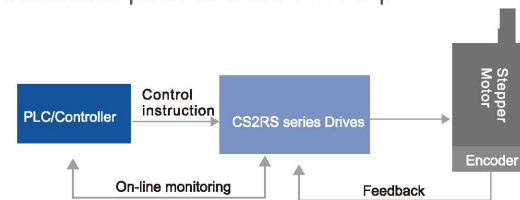


Features

- 7 Programmable Inputs
 - Limit + / - or Origin inputs
 - Quick stop, Alarm reset and Enable inputs
 - JOG + / - or Position Table inputs
- 3 Programmable Outputs
 - Alarm, Brake outputs
 - Homing / Instruction / Path complete
- Modes of Operation
 - Velocity
 - Position
 - Homing
- Support Functions
 - Teaching
 - Interrupt
 - Skip, Suspend, Circulate motion
- PC Software for Easy Setup, Fine Tune
- Matching Motors:
 - NEMA8, 11, 17, 23, 24, 34
 - Standard, dual shaft, brake, waterproof

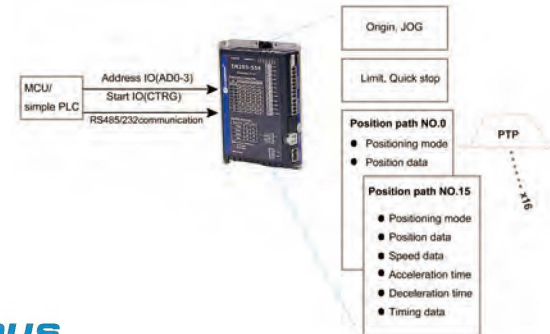
2. No Loss of step

Adopted closed loop step system to make real-time position error correction, can eliminate potential loss of step.



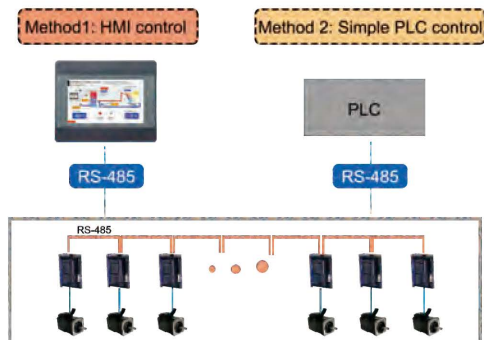
3. Built-in uni-axial control instruction

Programmable 16-segment position table, support positioning/homing/ limit/ quick stop/ JOG...



1. Support RS485 communication

Standard Modbus RTU protocol, RS485 communication can network up to 31 axes



Models	Operating Voltage	Output Current(A)	Matching Motor	Weight(Kg)	Size(mm)
CS2RS-D503	20-50VDC	0.5-3.0	NEMA8/11/14/17	0.38	116*69.2*26.5
CS2RS-D507	20-50VDC	0.5-7.0	NEMA17/23/24	0.38	116*69.2*26.5
CS2RS-D1008*	20-80VAC or 30-100VDC	0.5-8.0	NEMA24/34	0.57	-
CABLE-PC-1	Tuning Cable				
CABLEM-BM*M*	Encoder Extension Cable				
CABLEM-RZ*M*	Motion Extension Cable				

Pulse Control Closed Loop Stepper Drives

- CS1 Series---Enhanced Version
- CS Series---Cost-effective Version



CS1 Series----Enhanced Performance

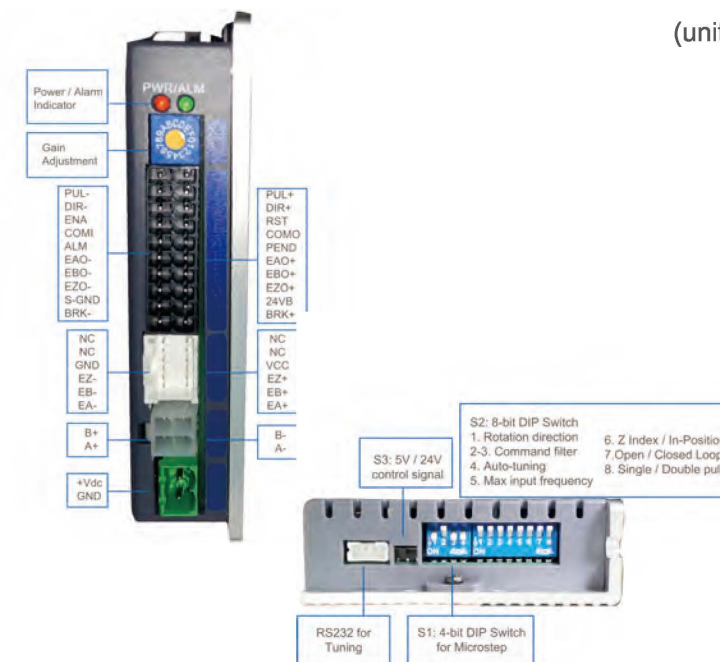
Inputs and Outputs

- Step & DIR (CW & CCW) inputs
- Enable input and Error Reset input
- Alarm output and In Position output
- Brake outputs
- Encoder A/B/Z outputs

Switch Settings

- Microstep resolution
- Rotation direction
- Pulse Mode
- Positional command filter
- Closed / Open Loop Mode
- Encoder resolution
- Gain adjustment and output current
- 5V or 24V signal voltage optional

Connectors



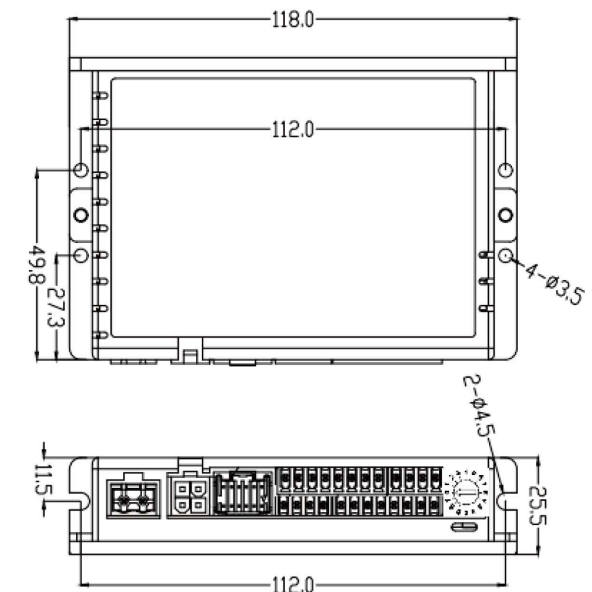
Electrical Specifications

Items	CS1-D503S		CS1-D507S		CS1-D728S	
	Min	Max	Min	Max	Min	Max
Output Current (A)	0.5	3	0.5	7	0.5	8
Power Voltage (VDC)	20	50	20	50	20	72
Input Frequency (KHz)	-	500	-	500	-	500
Input Signal Current(mA)	7	20	7	20	7	20
Output Signal Current(mA)	-	100	-	100	-	100

Note: CS1 Series drives with vector control are coming soon

Mechanical Specifications





(unit: mm 1 inch=25.4mm)



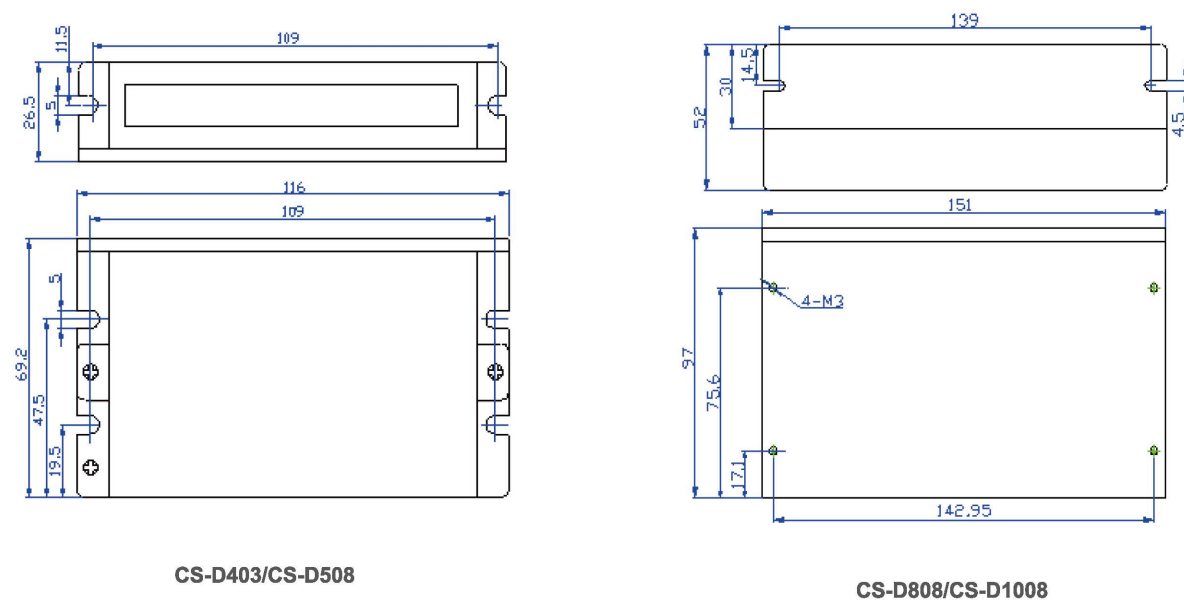
CS Series----Cost-effective

The CS series consists of ES seasy servo drives adopting Leadshine latest advanced closed loop control technology. Those drives are highly reliable with good performance and highly competitive cost. They can power a wide range of closed loop stepper motors from NEMA 8 to NEMA 34 (model dependent) with incremental encoders. CS series drives are easy to configure and setup.

Electrical Specifications

CS Series Drives				
Model				
	CS-D403	CS-D508	CS-D808	CS-D1008
Operating Voltage	20-50VDC	20-50VDC	20-80VDC	20-80VAC or 30-110VDC
Peak Output Current	0.3-3.0A	0.5-7.0A	0.5-8.0A	
Control Signal Voltage	5-24V			
Max. Input Frequency	200KHz (500KHz optional)			

Mechanical Specifications



Vector Control Type ES2 Series

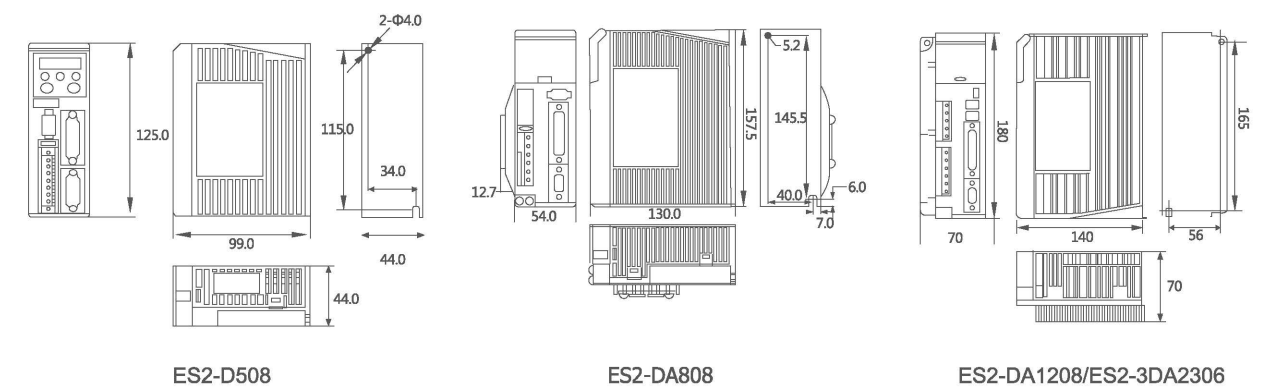
- Quicker Response
- Lower Heating
- Lower Noise



The ES2 series easy servos cleverly combined the advantages of AC servo and stepper motor, while it remains high cost-effective. It adopts the advanced vector control technology, using the internal encoder to close the position, velocity and current loops in real time. It guarantees close to and even better performance than AC servos in applications with less than 2500RPM speed at much lower prices, which can help to enhance the competitiveness of your equipment.

			
ES2-D508	ES2-DA808	ES2-DA1208	ES2-3DA2306
NEMA8,11,14,17,23,24 motor	NEMA34 motor	NEMA34 motor	NEMA34,NEMA42 motor
50VDC, 8A	70VAC, 8A	110VAC, 8A	220VAC, 6A

Mechanical Specifications



Closed Loop Stepper Motors

CS-M Series

- Replace ES-M series easy servo motor
- Frame size of NEMA 8 to 34
- High reliability and high precision
- Reliable encoder solution



Introduction

CS-M series closed loop stepper motor integrated the CM series stepper motor and encoder, which can provide large torque, low heat and reliable position feedback signals. CS-M series also includes the types with brake, waterproof and different resolution. As a result of large-scale automated production lines and strict quality management system, CS-M series motors are more stable, reliable, superior, consistent and has a lower lost. **Most of ES-M easy servo motors will be replaced by CS-M motors.**

Encoder Specifications

Encoder Resolution	1000 ppr, 2500 ppr, 5000 ppr
Encoder Current	Typical 56mA /Max. 59mA
Low Level	0.4v@20mA Max
High Level	2.4v@-20mA Min

Motor Specifications

Step Angle	1.8°
Position Accuracy	±0.09°
Temp Rise(Max.)	Max. 85K
Operation Environment	Temperature: -10°C+50°C ; Humidity: 85% Max
Insulation Class	B
Insulation Resistance	MIN 100 MΩ, 500 V DC
Dielectric Strength	500 VAC, 1 min
Radial Play	0.025 mm Max. (Load 5N)
Axial Play	0.075 mm Max. (Load 10N)

Installation & Operation Conditions

Motor Size	NEMA17	NEMA23	NEMA24	NEMA34
Store Temperature	-10°C+50°C			
Store Humidity	85% Max.			
Operation Environment	Non-corrosive gas and dust; No direct contact with water, oil (except the waterproof type)			
Radial Load(N) (Distance to the flange 10mm)	30	75	90	300
Axial Load(N)	Less than motor weight			

Closed Loop Stepper Motor Overview

1. Below matched drives are Pulse Control type, EtherCAT and Modbus RS485 types are also available;
2. 3-phase high voltage closed loop stepper motors are ES2-MH series, others are CS-M series;
3. Contact Leadshine for other model such as NEMA 8 to NEMA14 motors, inch shaft diameter, etc.

Phase/ Series	Frame Size	Length(mm)	Model	Holding Torque(N.m)	Matching Drives	Remark
2-phase/ CS-M	NEMA 17	56	CS-M21702	0.2	CS1-D503S	
		63	CS-M21704	0.4	CS1-D503S	This motor is not recommended
		70	CS-M21706	0.6	CS1-D503S	
		83	CS-M21708	0.8	CS1-D503S	
	NEMA 23	60	CS-M22306	0.6	CS1-D507S	
		75	CS-M22313	1.3	CS1-D507S	Replace ES-M22310
		109	CS-M22313B	1.3	CS1-D507S	Motor with brake
		94	CS-M22313WP	1.3	CS1-D507S	Motor with waterproof
		95	CS-M22323	2.3	CS1-D507S	Replace ES-M22320
		131	CS-M22323B	2.3	CS1-D507S	Motor with brake
		115	CS-M22323WP	2.3	CS1-D507S	Motor with waterproof
		103	CS-M22326	2.6	CS1-D507S	
		86	CS-M22321-L	2.1	CS1-D507S	NEMA23 motor with large body
		105	CS-M22331-L	3.1	CS1-D507S	NEMA23 motor with large body
	NEMA 24	89	CS-M22422	2.2	CS1-D507S	
		129	CS-M22422B	2.2	CS1-D507S	Motor with brake
		113	CS-M22422WP	2.2	CS1-D507S	Motor with waterproof
		107	CS-M22430	3.0	CS1-D507S	
		143	CS-M22430B	3.0	CS1-D507S	Motor with brake
		130	CS-M22430WP	3.0	CS1-D507S	Motor with waterproof
		NEMA 34	95	CS-M23435	3.5	CS-D808
	109		CS-M23445	4.5	CS-D808	
	134		CS-M23445B	4.5	CS-D808	Motor with brake
	115		CS-M23445WP	4.5	CS-D808	Motor with waterproof
	127		CS-M23480	8.0	CS-D808	
	152		CS-M23480B	8.0	CS-D808	Motor with brake
	133		CS-M23480WP	8.0	CS-D808	Motor with waterproof
	147		CS-M23485	8.5	CS-D808/ES2-DA1208	
	172		CS-M23485B	8.5	CS-D808/ES2-DA1208	Motor with brake
	153		CS-M23485WP	8.5	CS-D808/ES2-DA1208	Motor with waterproof
	158		CS-M234120	12	CS-D808/ES2-DA1208	
	183		CS-M234120B	12	CS-D808/ES2-DA1208	Motor with brake
164	CS-M234120WP		12	CS-D808/ES2-DA1208	Motor with waterproof	
3-phase/ ES2-MH	NEMA 34		157	ES2-MH33480	8.0	ES2-3DA2306
		190	ES2-MH33480B	8.0	ES2-3DA2306	Motor with brake
		162	ES2-MH33480WP	8.0	ES2-3DA2306	Motor with waterproof
		184	ES2-MH334100	10	ES2-3DA2306	
		218	ES2-MH334100B	10	ES2-3DA2306	Motor with brake
		191	ES2-MH334100WP	10	ES2-3DA2306	Motor with waterproof
	NEMA 42	162	ES2-MH342120	12	ES2-3DA2306	
		207	ES2-MH342120B	12	ES2-3DA2306	Motor with brake
		167	ES2-MH342120WP	12	ES2-3DA2306	Motor with waterproof
		244	ES2-MH342200	20	ES2-3DA2306	

Note: Contact Leadshine for Gearboxes and Encoder information.

■ Closed Loop Stepper Motor Specifications

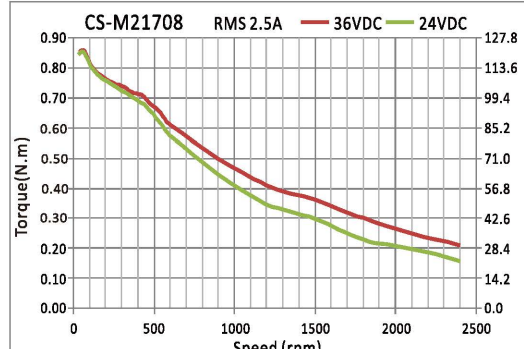
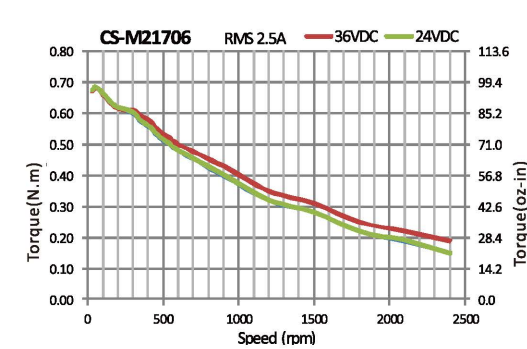
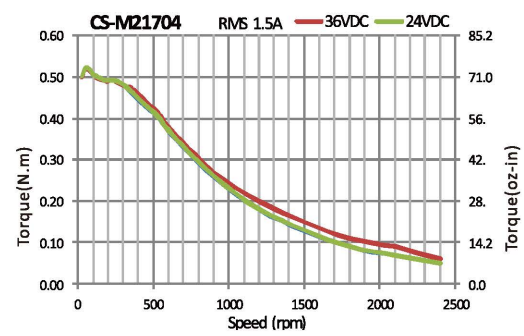
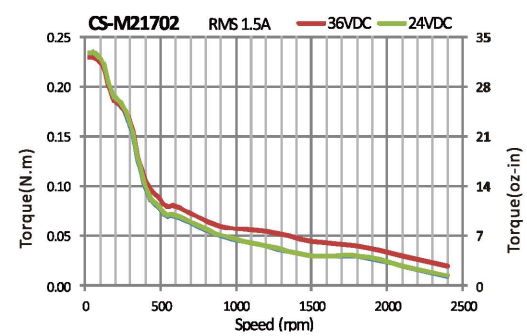
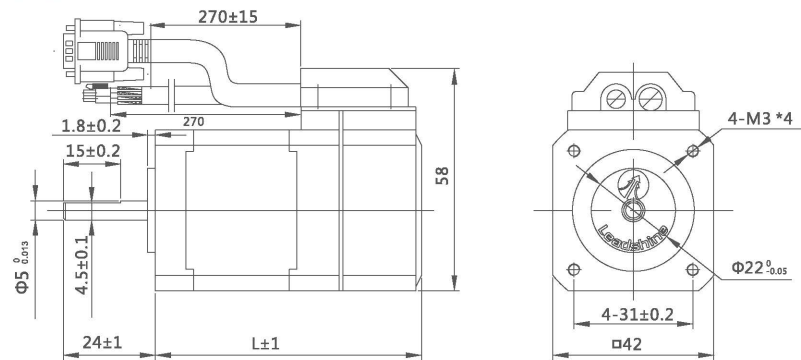
■ NEMA 17 (42mm)



■ Standard Models:

Model	Length (mm)	Holding Torque(N·m)	Rated Current (A)	Inertia (Kg·cm ²)
CS-M21702	56	0.2	1.5	0.023
CS-M21704	63	0.4	1.5	0.045
CS-M21706	70	0.6	2.5	0.077
CS-M21708	83	0.8	2.5	0.11

Unit: mm 1inch=25.4mm



■ NEMA 23 (57mm)

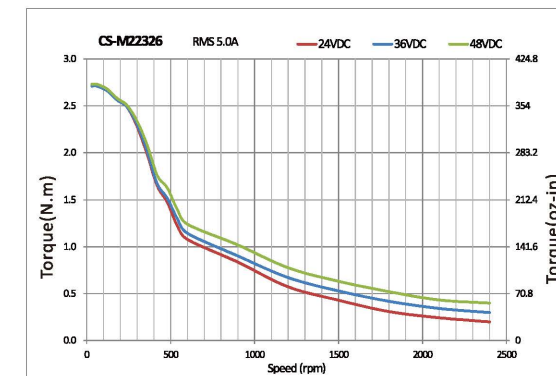
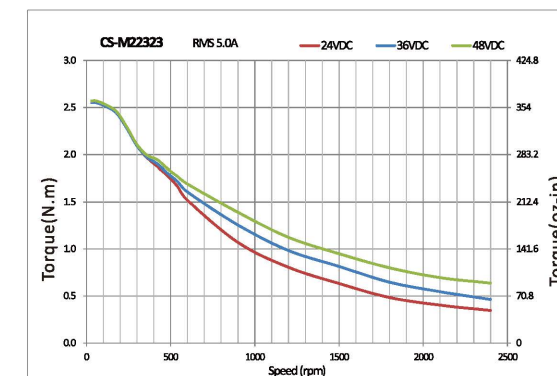
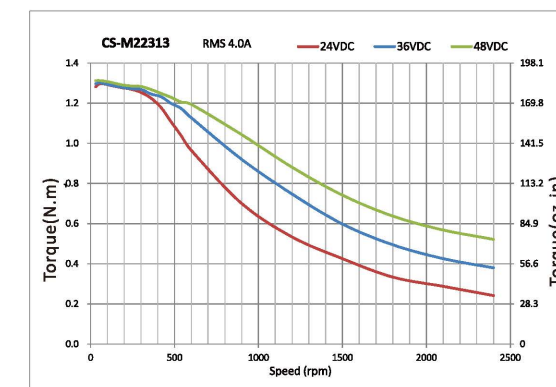
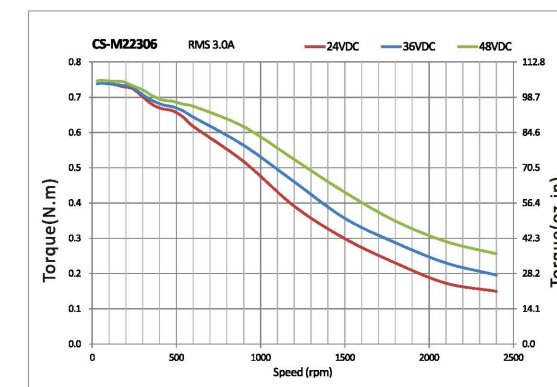
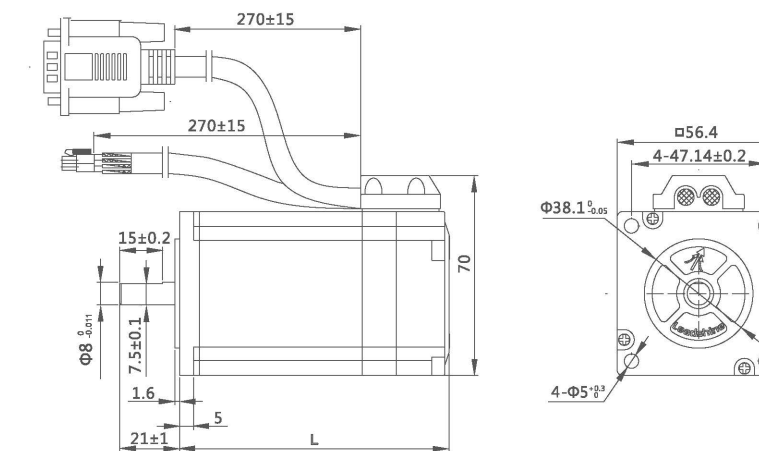
■ Standard Models:



Model	Length (mm)	Holding Torque(N·m)	Rated Current (A)	Inertia (Kg·cm ²)
CS-M22306	60	0.6	3.0	0.131
CS-M22313	75	1.3	4.0	0.3
CS-M22323	95	2.3	5.0	0.48
CS-M22326	103	2.6	5.0	0.7

Note: Motors with 1/4 in(6.35mm) shaft diameter are available.

Unit: mm 1inch=25.4mm



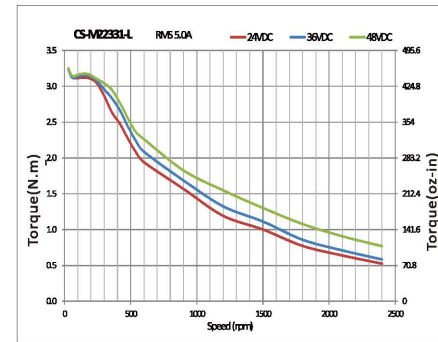
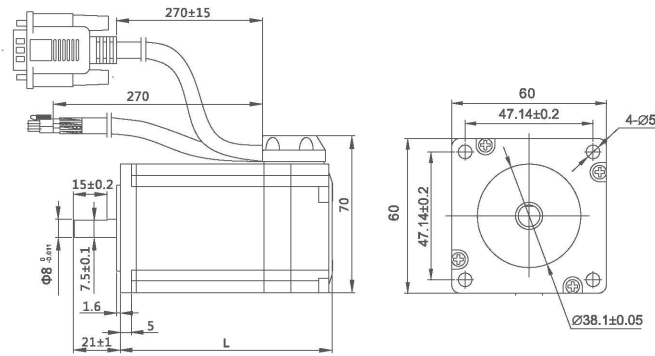
NEMA 23 (57mm)



Standard Models:

Model	Length (mm)	Holding Torque(N·m)	Rated Current (A)	Inertia (Kg·cm ²)
CS-M22321-L	86	2.1	5.0	0.49
CS-M22331-L	105	3.1	5.0	0.69

Unit: mm 1inch=25.4mm



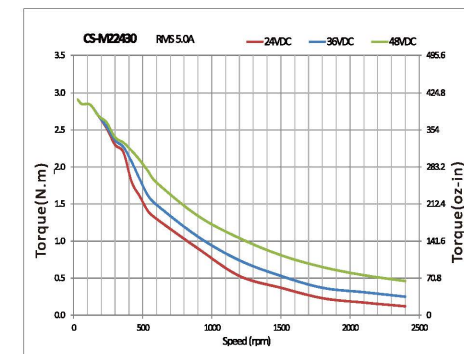
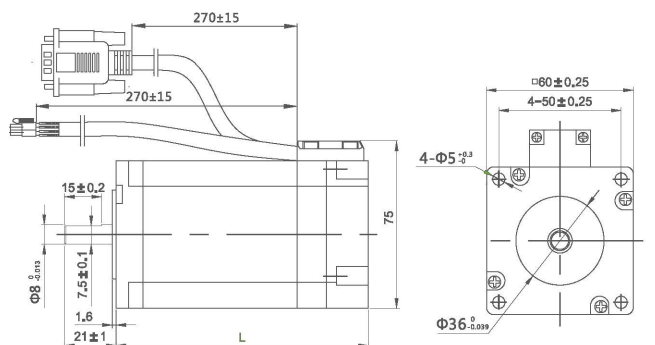
NEMA 24 (60mm)



Standard Models:

Model	Length (mm)	Holding Torque(N·m)	Rated Current (A)	Inertia (Kg·cm ²)
CS-M22422	86	2.2	5.0	0.49
CS-M22430	103	3.0	5.0	0.69

Unit: mm 1inch=25.4mm



NEMA 34 (86mm)

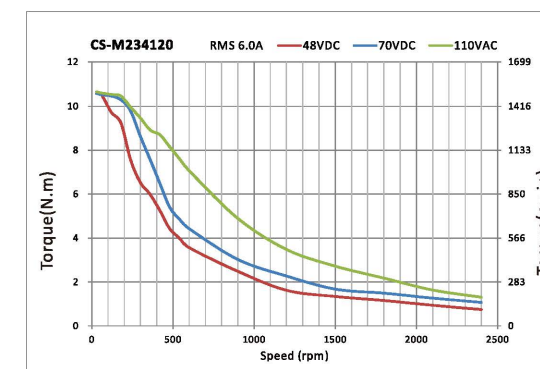
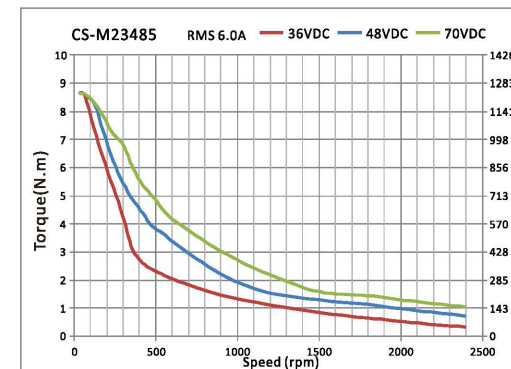
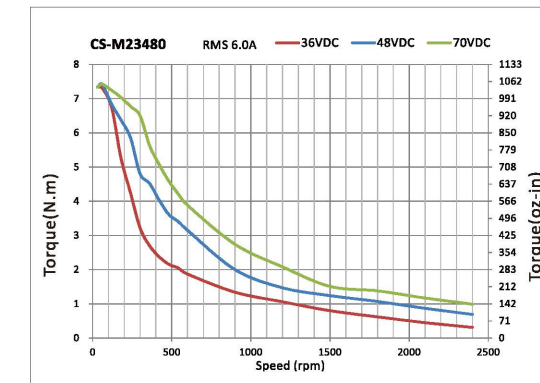
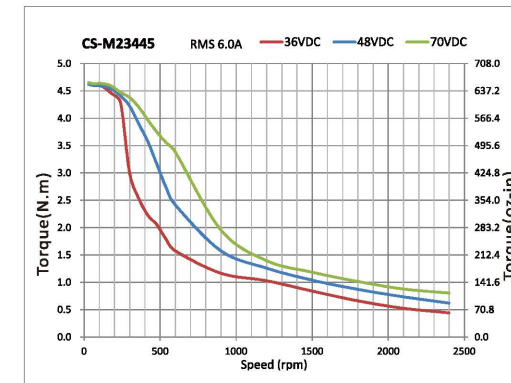
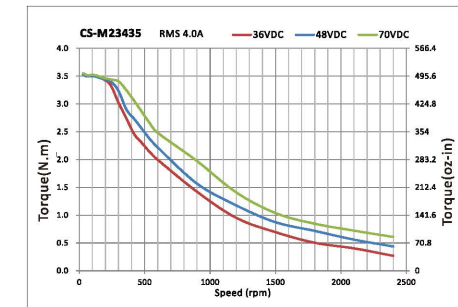
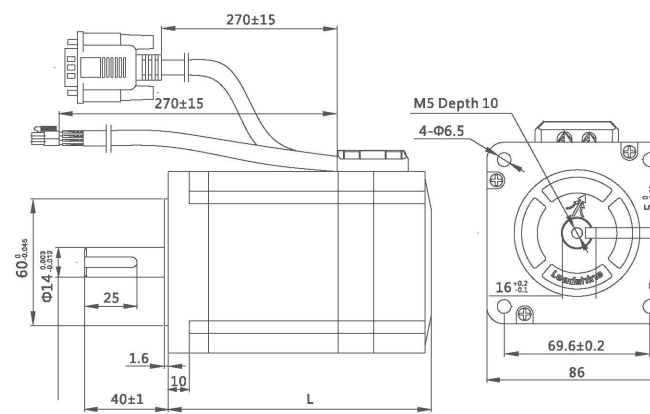


Standard Models:

Model	Length (mm)	Holding Torque (N·m)	Rated Current (A)	Inertia (Kg·cm ²)
CS-M23435	95	3.5	4.0	1.0
CS-M23445	109	4.5	6.0	1.95
CS-M23480	127	8.0	6.0	2.5
CS-M23485	147	8.5	6.0	2.8
CS-M234120	158	12.0	6.0	3.0

Note: Motors with 1/2 in(12.7mm) shaft diameter are available.

Unit: mm 1inch=25.4mm



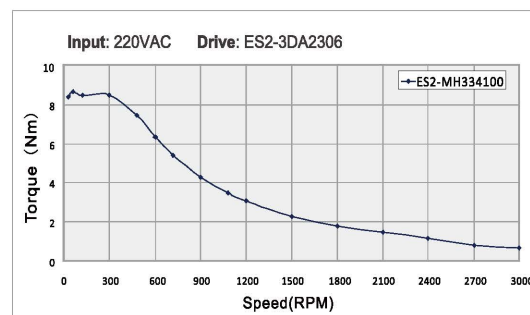
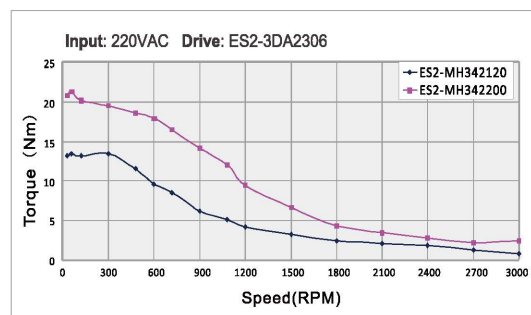
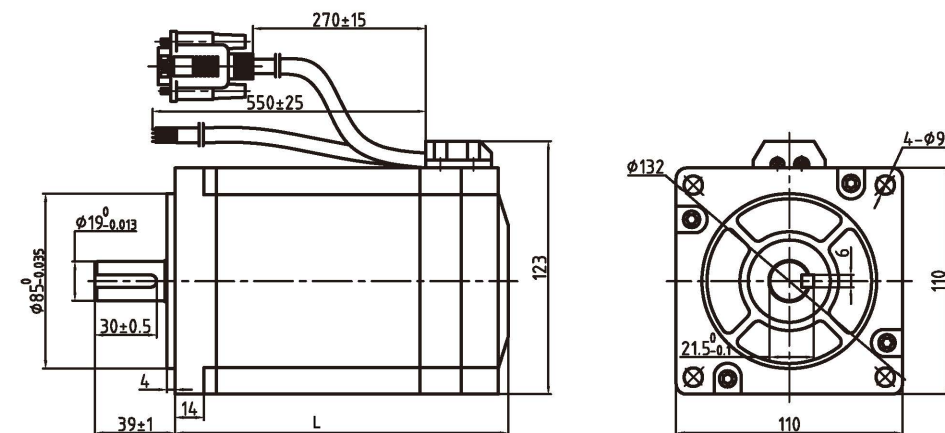
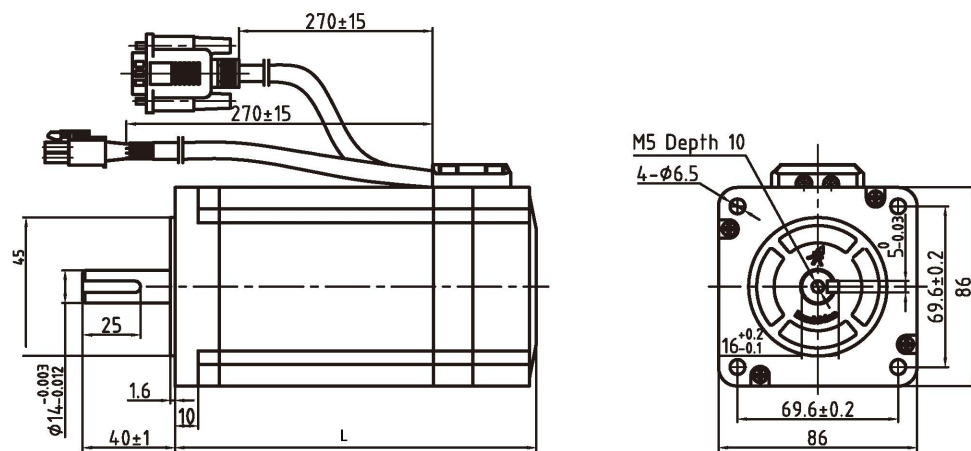
3-phase: NEMA 34, 42

Standard Models:



Model	Length (mm)	Holding Torque (N·m)	Rated Current (A)	Inertia (Kg·cm ²)
ES2-MH33480	158	8.0	6.0	3.0
ES2-MH334100	185	10.0	6.0	3.0
ES2-MH342120	162	12.0	4.2	10.8
ES2-MH342200	244	20.0	5.2	17

Unit: mm 1inch=25.4mm



Integrated Steppers

- Open Loop: iST/iDM
- Closed Loop: iES/iCS



Features

- All-In-One Solution
- Easy Setup, High Reliability
- Built-in Motion Commands
- Smooth, Quick, Accurate, Low Heating
- Compact Design
- 1000 ppr encoder optional



Specification

Model	iST/iDM	iES/iCS
Motor Type	Open Loop	Closed Loop
Holding Torque (Nm)	0.3, 0.6, 1.0, 2.0	0.6, 1.0, 2.0
Operation Modes	Step & Direction, RS485, CANopen	
Maximum Input Frequency (kHz)	500	
Protection Functions	Over-current, Over-voltage	
Inputs	Step & Direction	Step & Direction, Enable (differential)
	RS485 / CANopen	4 digital inputs, 1 analog input (single-end)
Outputs	Step & Direction	fault out (differential)
	RS485 / CANopen	2 digital outputs (open collector)
Storage Temperature	-20 °C to 80 °C	
Ambient Temperature	0 °C to 50 °C (Heat sink)	
Humidity	40%RH to 90%RH	

Please visit Leadshine's website at www.leadshine.com for the latest information about the iDM and iCS series integrated stepper motors.

Other Products

- Power Supplies
- Gearboxes



LSP Series----Power Supplies

Features

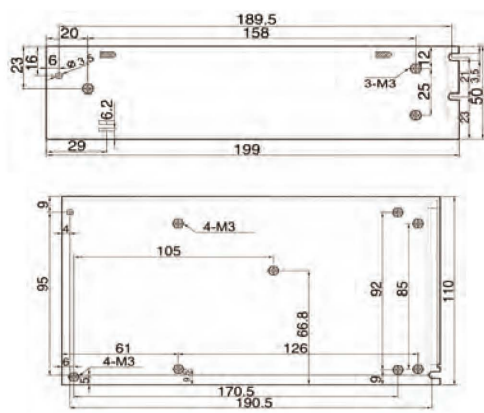
- ▶ 1.8-multiple of current overload
- ▶ Compact Size, Light in Weight
- ▶ Use Switch to select input voltage 220VAC ± 10% or 110 VAC ± 10%
- ▶ Over-current, Over-voltage, Low-voltage Protections
- ▶ Big Power with High Efficiency
- ▶ CE and RoHS

Electrical Specifications

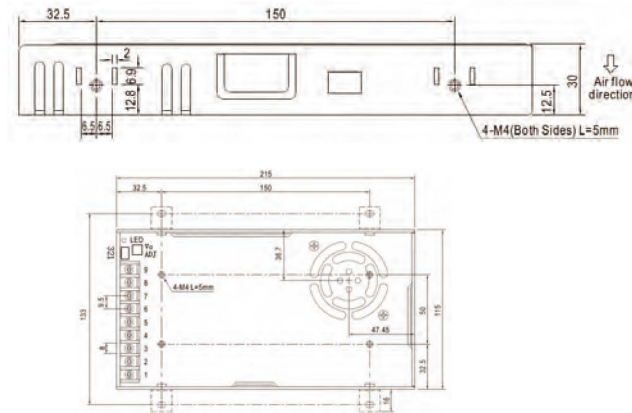
Model	Output Voltage (VDC)	Continuous Current(A)	Peak Current(A)	Input Voltage	Power (W)	Dimensions (mm)	Weight (Kg)
LSP-260-24	24	10.8	19.4	220VAC ± 10% or 110 VAC ± 10%	260	199*110*50	0.8
LSP-360-24	24	15	27		360	199*110*50	0.8
LSP-360-36	36	10	18		360	215*115*30	0.7
LSP-360-48	48	7.5	13.5		360	215*115*30	0.7
LSP-400-60	60	6.7	12		400	215*115*30	0.7

Mechanical Specifications

(unit: mm, 1inch=25.4mm)



LSP-260-24, LSP-360-24



LSP-360-36, LSP-360-48, LSP-400-60

PLF Series---- Gearboxes

Features

- ▶ Straight tooth planetary Gearbox
- ▶ Matched NEMA 17, 23, 24, 34 stepper motors
- ▶ Gear ratio 1:3, 1:5, 1:7, 1:10 are available

Specifications

Size	60mm				90mm			
	3	5	7	10	3	5	7	10
Gear Ratio	3	5	7	10	3	5	7	10
Rated Output Torque (Nm)	16.5	29.5	19.5	8.5	60	94	64	40
Max Output Torque(Nm)	33.0	59.0	39.0	17.0	120	188	128	80
Rotation Inertial(Kgcm ²)	0.107	0.092	0.091	0.091	0.4	0.291	0.285	0.283
Rated Input Rotation Speed (RPM)	4000				3500			
Maximum Input Rotation Speed (RPM)	8000				6000			
Maximum Radial Force (N)	485				1020			
Maximum Axial Force (N)	380				850			
Free-load torque (N.m)	0.6				0.8			
Full-load Efficiency	96%				96%			
Backlash (arcmin)	<12				<12			
Noise (dB)	≤58				≤62			
Weight (Kg)	1.0				2.8			
Torsional Rigidity	2.3				7.5			
Average Life (h)	>20000							
Lubricant	Long-term Lubrication							
Rotation Direction	Input and output in the same direction							
Protection Class	IP65							
Installation Way	Arbitrariness							

Model	Gear Ratio	Matched Motors
PLF060-3-P2-BJ-6.35-38.1	1:3	NEMA 23 Stepper Motor with 6.35mm Shaft Diameter
PLF060-5-P2-BJ-6.35-38.1	1:5	
PLF060-7-P2-BJ-6.35-38.1	1:7	
PLF060-10-P2-BJ-6.35-38.1	1:10	
PLF060-3-P2-BJ-8-38.1	1:3	NEMA 23 Stepper Motor with 8mm Shaft Diameter
PLF060-5-P2-BJ-8-38.1	1:5	
PLF060-7-P2-BJ-8-38.1	1:7	
PLF060-10-P2-BJ-8-38.1	1:10	
PLF090-3-P2-BJ-12.7-73	1:3	NEMA 34 Stepper Motor with 12.7mm Shaft Diameter
PLF090-5-P2-BJ-12.7-73	1:5	
PLF090-7-P2-BJ-12.7-73	1:7	
PLF090-10-P2-BJ-12.7-73	1:10	
PLF090-3-P2-BJ-14-73	1:3	NEMA 34 Stepper Motor with 14mm Shaft Diameter
PLF090-5-P2-BJ-14-73	1:5	
PLF090-7-P2-BJ-14-73	1:7	
PLF090-10-P2-BJ-14-73	1:10	
PLF090-3-P2-BJ-14-60	1:3	NEMA 34 Closed Loop Stepper Motor with 14mm Shaft Diameter
PLF090-5-P2-BJ-14-60	1:5	
PLF090-7-P2-BJ-14-60	1:7	
PLF090-10-P2-BJ-14-60	1:10	
42CM08-RD05	1:5	42CM08
42CM08-RD10	1:10	
42CM06-RD05	1:5	42CM06
42CM06-RD10	1:10	
42CM06-RD20	1:20	