



**CANopen**  
**EM-CAN**  
**Field-bus Stepper Drive**

**Leadshine Technology Co., Ltd.**

Website: [www.leadshine.com](http://www.leadshine.com)

**Service:**

Tel: 86-755-2641-8774 (for Asia, Australia, Africa region)

86-755-8654-2465 (for Europe region)

86-755-2665-5136 (for America region)

86-755-2641-0546

Email: [tech@leadshine.com](mailto:tech@leadshine.com)

**Sales Hot Line:**

Tel: 86-755-2641-7674 (for Asia, Australia, Africa region)

86-755-2640-9254 (for Europe region)

86-755-2641-7617 (for America region)

Email: [sales@leadshine.com](mailto:sales@leadshine.com)



- ▶ Support CiA 301/402 communication protocols
- ▶ Maximum communication rate of 1 Mbps
- ▶ Simplicity & High reliability
- ▶ Excellent performance
- ▶ Matched with most of CANopen master brands

## EM-CAN Series

EM-CAN is a new series of digital stepper drives with standard CANopen protocol. The new products have excellent performance include enhanced reliability, super-low stepper noise, anti-resonance, low-speed ripple smoothing. Adding CANopen allows the drives not only to support operating modes including Profile Position (PP), Profile Velocity (PV), Homing (HM), etc, but also to build a CANopen networks with 127 nodes maximumly. Therefore, Leadshine EM-CAN series is an ideal choice for field-bus applications, which need high reliability and good performance.



## EM-CAN Series Advantages

No.1 stepper products manufacturer in terms of shipment volume globally nowadays.



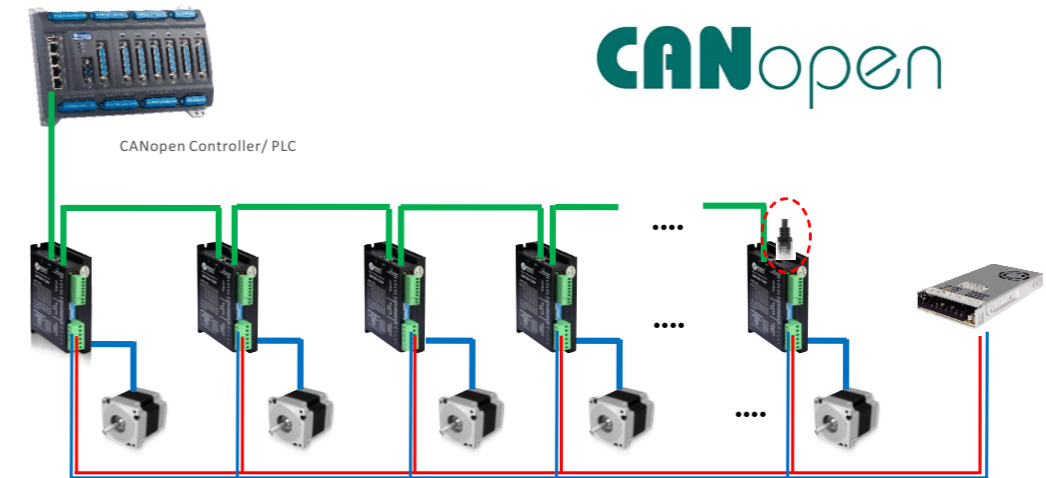
- **High Reliability:**  
19-years continuous improvement & 13-years ISO system implementation.
- **Widely matching CANopen master:**  
Matched with most of mainstream CANopen master brands, such as Leadshine, Schneider, Delta, etc.
- **Excellent performance:**  
Adopt Leadshine mature DSP control technology which enables super-low noise, anti-resonance, low-speed ripple smoothing, etc.

## Customer Benefits



- **Significantly reduced equipment cost:**  
60% lower cost to replace field-bus servo when the required speed of application is under 1500 RPM.
- **Significantly reduced potential cost:**  
Lower labor cost, lower cable cost and maintenance cost.
- **Real-time data transfer:**  
Online monitoring of the status of motor and drive.

## EM-CAN Series Field-bus System Connection Topology



Fast communication rate

Long communication distance

Lower cost

Strong anti-interference ability

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# 01 EM-CAN Series Overview

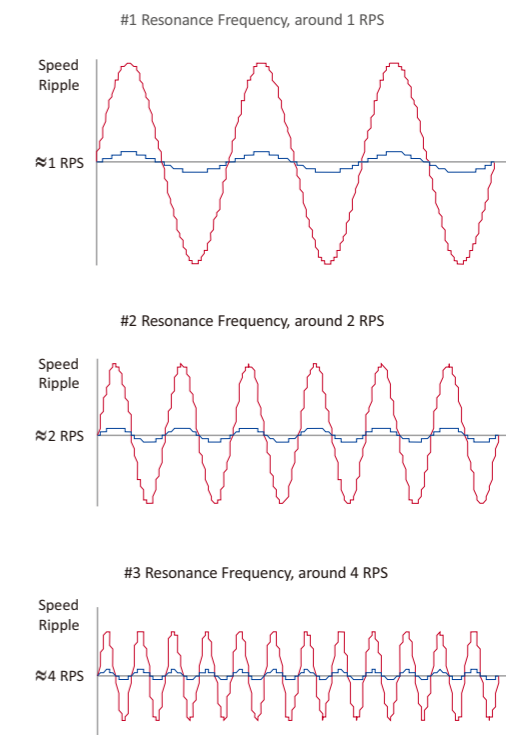
## 1.1 Overview

	Item	Description
CANopen Specifications	link layer protocol	CAN Field-bus
	Application layer protocol	CANopen protocol
	CAN-ID Type	CAN 2.0A
	Communication Rate	1Mbit/s, 500Kbit/s, 250Kbit/s, 125Kbit/s, 100Kbit/s, 50Kbit/s, 20Kbit/s
	Sub-protocol	DS 301 V4.02: CANopen application layer protocol and communication protocol DSP 402 V2.0: Device profile for drives and motion control
	CANopen length	0 - 8bit
	Support service	NMT: Network Management Service SDO: Service Data Objects PDO: Process Data Object Devices Monitor: Node protection and heartbeat message SYNC: Synchronous generator and synchronous detection, applied to the PDO transmission EMCY: Emergency object Services
	PDO transmission modes	Time trigger, event trigger, synchronization trigger
	PDO number	3 TPDOs, 3 RPDOs
	Control modes	PP (Profile Position) PV (Profile Velocity) HM (Homing)
General Specifications	Input Power	20 - 80VDC or 20 - 80VAC
	Bus Address Setting	DIP switch or PC software
	Digital Input	Max 4 input signals, include single - ended / differential connections, maximum frequency 20KHz, 5-24V input voltage
	Digital Output	Max 2 output signal, optically isolated, maximum 24/20mA
	Alarm Output	Over voltage, over current, etc.

## 1.2 Features

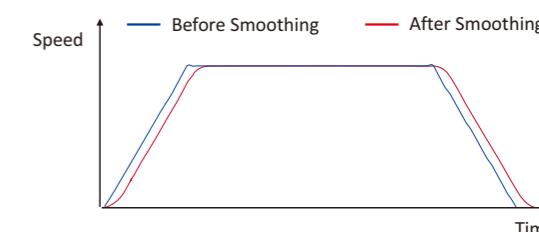
### 1. Low-speed Ripple Smoothing

Electronic damping for 3 major resonance frequencies for stepper motors at low speed range, eliminating undesirable motor speed oscillation and delivering unique level of smoothness.



### 2. Command Signal Smoothing

Command signal smoothing can soften the effect of sudden changes in velocity and direction, thus delivering smoother performance and improving system lifetime.



### 3. Alarm Output

Using alarm indicator and output signal feedback failure such as over-voltage or over-current timely to ensure the safety and reliability of equipment operation.



# 02 EM-CAN Series Drives

## 2.1 Part Number



- ① Series Name:  
EM - EM Series
- ② DC or AC Power Input:  
Blank: DC Input  
A: AC or DC Input Optional
- ③ Operating Voltage:  
5: Max 50V  
8: Max 80V
- ④ Max Output Current:  
56: 5.6A
- ⑤ CAN:  
CANopen
- ⑥ Custom Models

## 2.2 Electrical Specifications

CANopen Field-bus Stepper Drives						
Models						
Operating Voltage	20 - 50VDC	20 - 50VDC	20 - 50VDC	20 - 80VDC	20 - 80VDC	20 - 80VDC or 30 - 110VDC
Output Current	0.5 - 2.2A (RMS 1.6A)	1.0 - 4.2A (RMS 3A)	1.0 - 5.6A (RMS 4A)	2.1 - 7.0A (RMS 5A)	2.1 - 8.2A (RMS 5.8A)	2.1 - 8.2A (RMS 5.8A)
Matched Motor	NEMA 8,11,14,17	NEMA 17,23	NEMA 23, 24	NEMA 23, 24, 34	NEMA 34	NEMA 34

## 1 DC Power Input

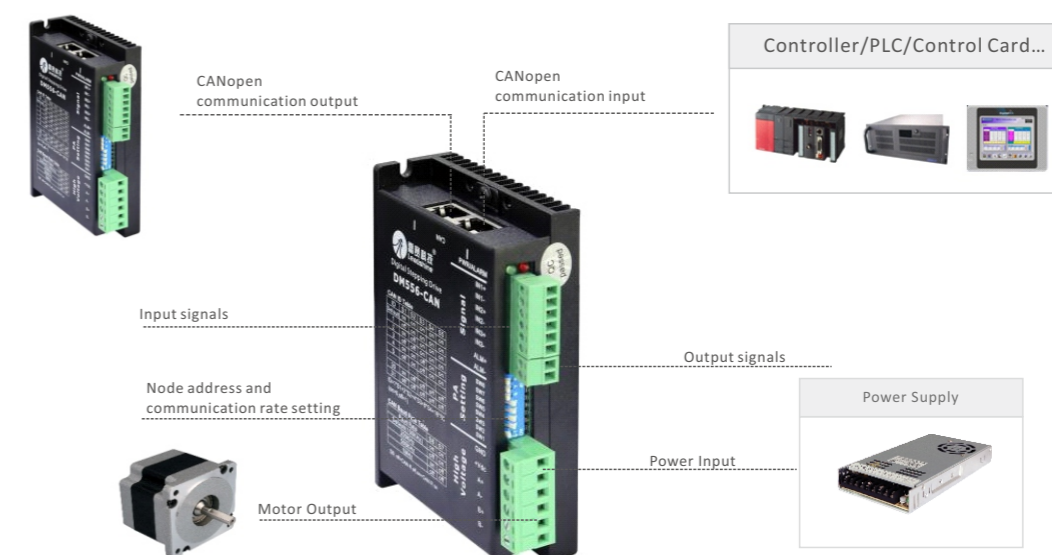
Models	Operating Voltage (VDC)			Peak Output Current <sup>①</sup> (A)		Control Signal Current (mA)		Control Signal Voltage <sup>②</sup> (VDC)
	Min	Typical	Max	Min	Max	Min	Max	
EM522-CAN	20	24	50	0.5	2.2	6	16	5 - 24
EM542-CAN	20	24, 36	50	1.0	4.2	6	16	5 - 24
EM556-CAN	20	24, 36	50	1.0	5.6	6	16	5 - 24
EM870-CAN	20	48, 70	80	2.1	7.0	6	16	5 - 24
EM882-CAN	20	70	80	2.1	8.2	6	16	5 - 24

## 2 AC Power Input

Models	Operating Voltage (VDC)			Peak Output Current <sup>①</sup> (A)		Control Signal Current (mA)		Control Signal Voltage <sup>②</sup> (VDC)
	Min	Typical	Max	Min	Max	Min	Max	
EMA882-CAN	20VAC 30VDC	70VAC 95VDC	80VAC 110VDC	2.1	8.2	6	16	5 - 24

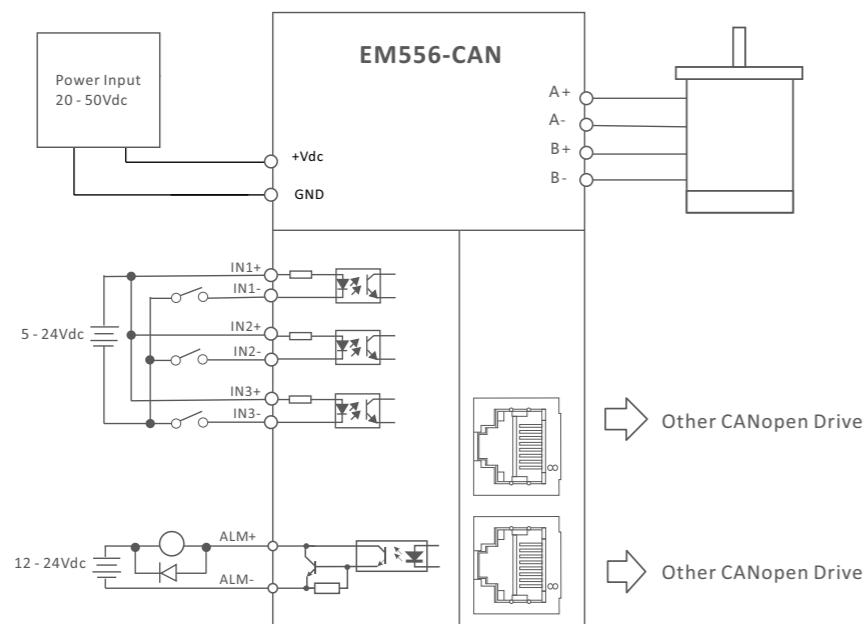
Note: ① The minimum output current is default value, can be set to 0.1A via PC software;  
 ② No additional resistance for 5V, 12V, 24V normally, while recommended to connect 1KΩ or 2KΩ resistance when using 12V or 24V in strong interference condition.

## 2.3 Typical Configuration



## 2.4 Connector Description

### EM-CAN Connector Description

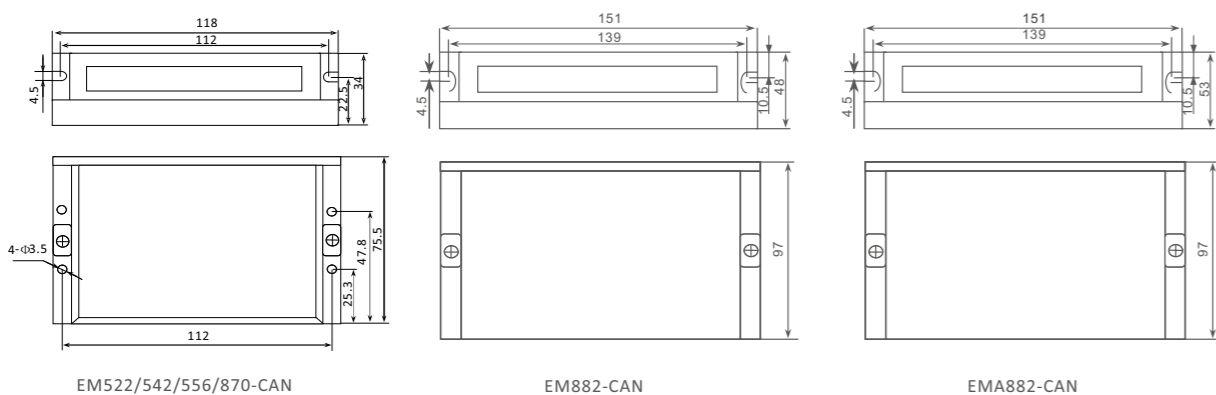


RJ45 Connector:  
CAN connector uses binary RJ45 terminals with shielding (standard RJ45 specifications as below)

RJ45 Picture	PIN	Name	Description
	1	CAN_H	CAN signal high
	2	CAN_L	CAN signal low
	3	CAN_GND	CAN signal ground
	4~5	NC	Reserved
	6	NC	
	7	---	
	8	NC	

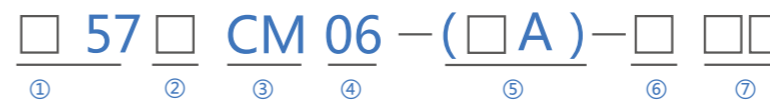
## 2.5 Mechanical Specifications

Unit: mm 1 inch=25.4mm



# 03 Matching Stepper Motor — CM Series

## 3.1 Part Number



- ① Motor Frame Size
  - 42: NEMA 17 motor
  - 57: NEMA 23 motor
  - D57: NEMA 23 motor with larger body
  - 60: NEMA 24 motor
  - 86: NEMA 34 motor
- ② Motor Phase
  - Blank: 2 phase motor
  - 3 : 3 phase motor
- ④ Holding Torque
  - For NEMA 8/11/14 motor:  
Divide the value by 100  
044: 0.44N.m
  - For NEMA 17/23/24/34 motor:  
Divide the value by 10  
06: 0.6N.m
- ⑤ Motor Rate Current
  - Blank: Standard rate current
  - 4A : Rate current 4A
- ⑥ Standard Customized Specification
  - SZ: Double shaft motor
  - BZ: Brake motor
  - FS: Waterproof motor
- ⑦ Customized model

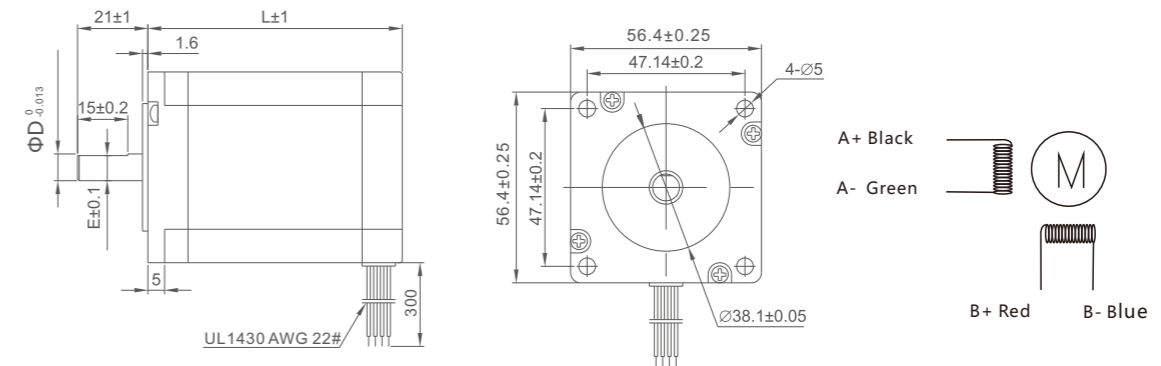
## 3.2 Models

Motor Size	Model	Holding Torque (N.m)	Standard Type Length(mm)	Rate Current (A)	Matched CANopen Drive
NEMA 8	20CM003	0.03	33	0.6	EM522-CAN
	20CM005	0.05	45	0.6	EM522-CAN
NEMA 11	28CM006	0.06	32	1.2	EM522-CAN
	28CM010	0.10	41	1.2	EM522-CAN
	28CM013	0.13	51	1.2	EM522-CAN
NEMA 14	35CM015	0.15	31	1.5	EM522-CAN
	35CM044	0.44	47	1.5	EM522-CAN
NEMA 17	42CM02	0.2	33	1.5	EM522-CAN/EM542-CAN
	42CM04	0.4	40	1.5	EM522-CAN/EM542-CAN
	42CM06	0.6	47	2.5	EM542-CAN
	42CM08	0.8	60	2.5	EM542-CAN

Motor Size	Model	Holding Torque (N.m)	Standard Type Length(A)	Rate Current (A)	Matched CANopen Drive
NEMA 23	57CM06	0.6	41	3	EM542-CAN/EM556-CAN
	57CM13	1.3	56	4	EM542-CAN/EM556-CAN
	57CM23	2.3	76	5	EM556-CAN
	57CM23-4A	2.3	76	4	EM542-CAN/EM556-CAN
	57CM26	2.6	84	5	EM556-CAN
	57CM26-4A	2.6	84	4	EM542-CAN/EM556-CAN
	D57CM21-4A	2.1	67	4	EM542-CAN/EM556-CAN
	D57CM31-4A	3.1	88	4	EM542-CAN/EM556-CAN
	D57CM21	2.1	67	6	EM556-CAN/EM870-CAN
	D57CM31	3.1	88	6	EM556-CAN/EM870-CAN
NEMA 24	60CM22X	2.2	67	5	EM556-CAN/EM870-CAN
	60CM30X	3.0	85	5	EM556-CAN/EM870-CAN
NEMA 34	86CM35	3.5	66	4	EM870-CAN/EM882-CAN/EMA882-CAN
	86CM45	4.5	80	6	EM870-CAN/EM882-CAN/EMA882-CAN
	86CM80	8.0	98	6	EM870-CAN/EM882-CAN/EMA882-CAN
	86CM85	8.5	118	6	EM870-CAN/EM882-CAN/EMA882-CAN
	86CM120	12	129	6	EM870-CAN/EM882-CAN/EMA882-CAN

### ■ NEMA23

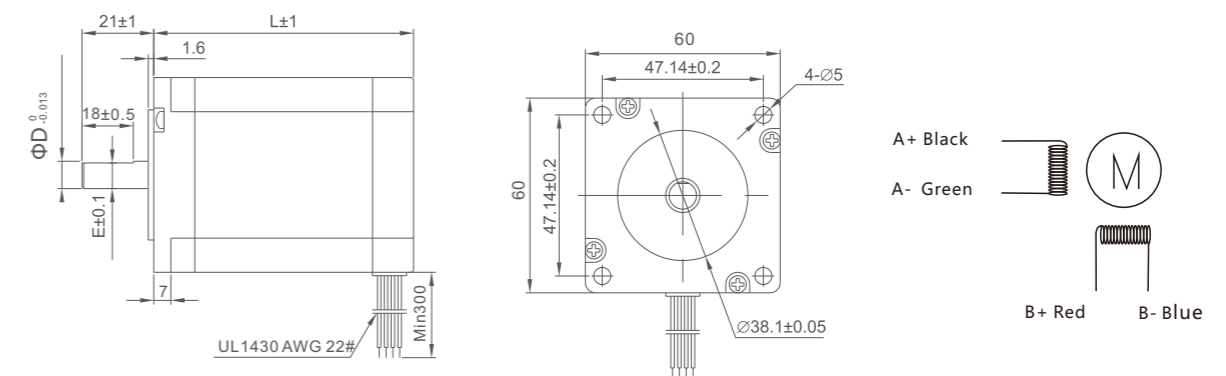
Model	Standard Type Length(mm)	Holding Torque (N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance / Phase (mH)	Inertia (Kg.cm <sup>2</sup> )
57CM06	41	0.6	3	0.7	1.4	0.12
57CM13	56	1.3	4	0.42	1.4	0.3
57CM23	76	2.3	5	0.38	1.75	0.48
57CM26	84	2.6	5	0.44	2.0	0.52



Model	L (mm)	D (mm)	E (mm)
57CM06	41	6.35	5.8
57CM13	56	6.35	5.8
57CM23	76	8	7.5
57CM26	84	8	7.5

### ■ NEMA23(Continous)

Model	Standard Type Length(mm)	Holding Torque (N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance / Phase (mH)	Inertia (Kg.cm <sup>2</sup> )
D57CM21	67	2.1	4/6	0.21	0.75	0.57
D57CM31	88	3.1	4/6	0.26	1.18	0.84



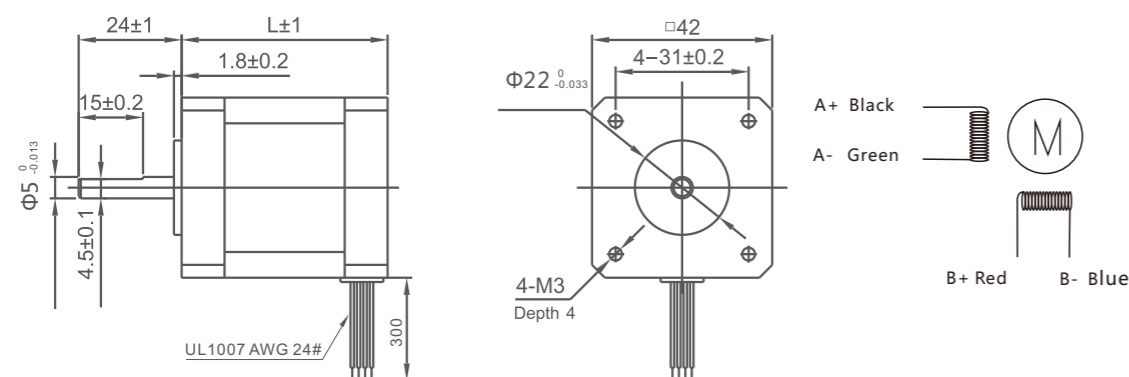
Model	L (mm)	D (mm)	E (mm)
D57CM21	67	8	7.5
D57CM31	88	8	7.5

## 3.3 Motor Specifications

Unit: mm 1 inch=25.4mm

### ■ NEMA17

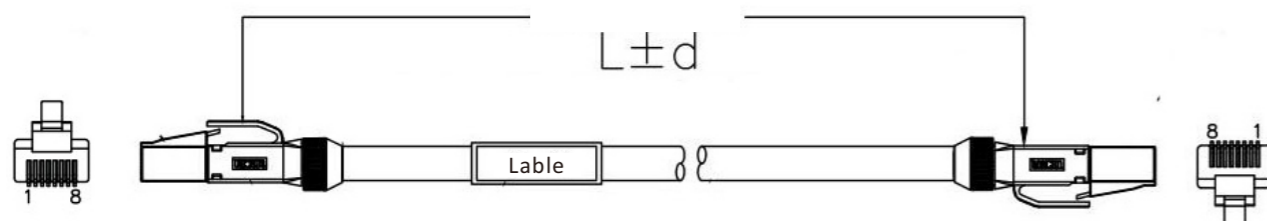
Model	Standard Type Length(mm)	Holding Torque (N.m)	Rate Current (A)	Resistance/Phase(Ω)	Inductance / Phase (mH)	Inertia (Kg.cm <sup>2</sup> )
42CM02	33	0.2	1.5	1.4	1.4	0.035
42CM04	39	0.4	1.5	2.4	4.3	0.054
42CM06	47	0.6	2.5	0.9	1.6	0.072
42CM08	60	0.8	2.5	1.0	2.4	0.11





## 4.2 Cables

### 1 Cables for Communication



### 2 Specification

Model	Length (L)	Tolerance (d)
CABLE-TX0M1-BUS RoHS	100mm	±10mm
CABLE-TX0M2-BUS RoHS	200mm	±10mm
CABLE-TX0M3-BUS RoHS	300mm	±10mm
CABLE-TX0M5-BUS RoHS	400mm	±10mm
CABLE-TX1M0-BUS RoHS	1000mm	±10mm
CABLE-TX1M5-BUS RoHS	1500mm	±10mm
CABLE-TX2M0-BUS RoHS	2000mm	±10mm
CABLE-TX3M0-BUS RoHS	3000mm	±10mm
CABLE-TX5M0-BUS RoHS	5000mm	±10mm
CABLE-TX7M0-BUS RoHS	7000mm	±10mm
CABLE-TX10M0-BUS RoHS	10000mm	±10mm
CABLE-TX15M0-BUS RoHS	15000mm	±10mm
CABLE-TX20M0-BUS RoHS	20000mm	±10mm

### 3 Terminate Resistance

Model	Picture
RJ45 Terminate Resistance	

Note: Please connect a terminate resistance in the end node

## 05 Ordering Information

CANopen Drive Model	Input Power Voltage	Output Peak Current(A)	Matched Motor	Holding Torque (N.m)
EM522-CAN	20 - 50 (VDC)	0.3 - 2.2 (A)	20CM003	0.03
			20CM005	0.05
			28CM006	0.06
			28CM010	0.10
			28CM013	0.13
			35CM015	0.15
EM542-CAN	20 - 50 (VDC)	1.0 - 4.2 (A)	35CM044	0.44
			42CM02	0.2
			42CM04	0.4
			42CM06	0.6
EM556-CAN	20 - 50 (VDC)	1.0 - 5.6 (A)	42CM08	0.8
			57CM06	0.6
			57CM13	1.3
			57CM23	2.3
			57CM23-4A	2.3
			57CM26	2.6
			57CM26-4A	2.6
			D57CM21-4A	2.1
			D57CM31-4A	3.1
			EM870-CAN	20 - 80 (VDC)
D57CM31	3.1			
60CM22X	2.2			
60CM30X	3.0			
EM882-CAN	20 - 80 (VDC)	2.1 - 8.2 (A)	86CM35	3.5
			86CM45	4.5
			86CM80	8.0
			86CM85	8.5
			86CM120	12
EMA882-CAN	20 - 80 (VAC)	2.1 - 8.2 (A)	86CM35	3.5
			86CM45	4.5
			86CM80	8.0
			86CM85	8.5
			86CM120	12
Accessories	Cables of communication			
	Terminate resistance			