



Product Manual

Product Model: EM-HA-60-SE

Product version number: v1.0



Ningbo ENVO Robot Co. Ltd

1. Precautions

1.1 Usage Requirements

Before using this product, users must carefully read this manual and follow its instructions. The company assumes no responsibility for any property damage or personal injury resulting from failure to comply with this manual. Due to the complexity of product components, keep the product out of reach of children to prevent accidents.

Operate the product within the specified working parameters. Do not exceed parameter ranges or use in high-temperature/high-pressure environments, as this may cause irreversible damage.

Before use, check that all components are intact. If any parts are missing or damaged, please contact us via our official website or scan the QR code at the bottom of this manual for technical support.

This manual has been compiled to include all available function descriptions and usage instructions at the time of printing. However, due to continuous product iteration, discrepancies may exist with the product you purchased. If you notice any inconsistencies, contact us promptly for technical support.

Do not remove or damage the SN label on the product. If you encounter any product issues, this label serves as an essential reference for product support.

1.2 Electrical Safety

Ensure no short circuits when connecting the motor. Connect interfaces according to the specified pinout.

Ensure the motor operates within its permitted voltage range.

1.3 Prohibition of Disassembly, Modification, and Overuse

Do not disassemble the motor arbitrarily, as this may damage components and lead to irrecoverable faults.

Do not modify motor properties while the actuator is running.

2. Model Definition

Model Definition: EM-CA-89-29-(SE/DE/CO/D/B)

Others:

SE: Single Encoder

DE: Dual Encoder

CO: CANopen Communication

D: Multi-turn Absolute Encoder

B: Brake

Gear Ratio

Outer Diameter, Unit: mm

Drive Category

Series Number

Envo Motor abbreviation

This definition applies to various series of products of actuator motors



3. Product Information

This product is a integrated harmonic drive actuator, model: EM-HA-58L-100.

This product has the characteristics of high energy density, high precision, and low transmission loss, and is equipped with corresponding software for easy debugging. It supports CAN communication and multiple control modes. Meet the application needs of different scenarios, including humanoid robots, quadruped robots etc.

2.1 Main Parameters

Drive Type: Harmonic drive

Motor Type: Frameless Inner Rotor

Backlash: 20 arcsec

Gear ratio: 100

Rated Current: 3.5 Arms

Peak Current: 6.0 Arms

Rated Output Power: 33 W

Rated Torque at 20 rpm: 15.7 Nm

Max. Allowable Value of Average Load Torque: 22.5 Nm

Peak Torque: 36 Nm

Rated Speed: 20 rpm

Peak Speed: 39 rpm

Phase-to-Phase Resistance: 1.40 Ω

Phase-to-Phase Inductance: 0.74 mH

Motor Demagnetization Temp: 120 $^{\circ}\text{C}$

Weight: 520 g

2.2 Operating Standards

Rated Voltage: DC 48 V

Voltage Range: DC 16-58 V

Standard Operating Temp: 20 ± 10 $^{\circ}\text{C}$

Operating Temp Range: -20-50 $^{\circ}\text{C}$

Standard Operating Humidity: 65 %

Operating Humidity Range: 5-85 %, non-condensing

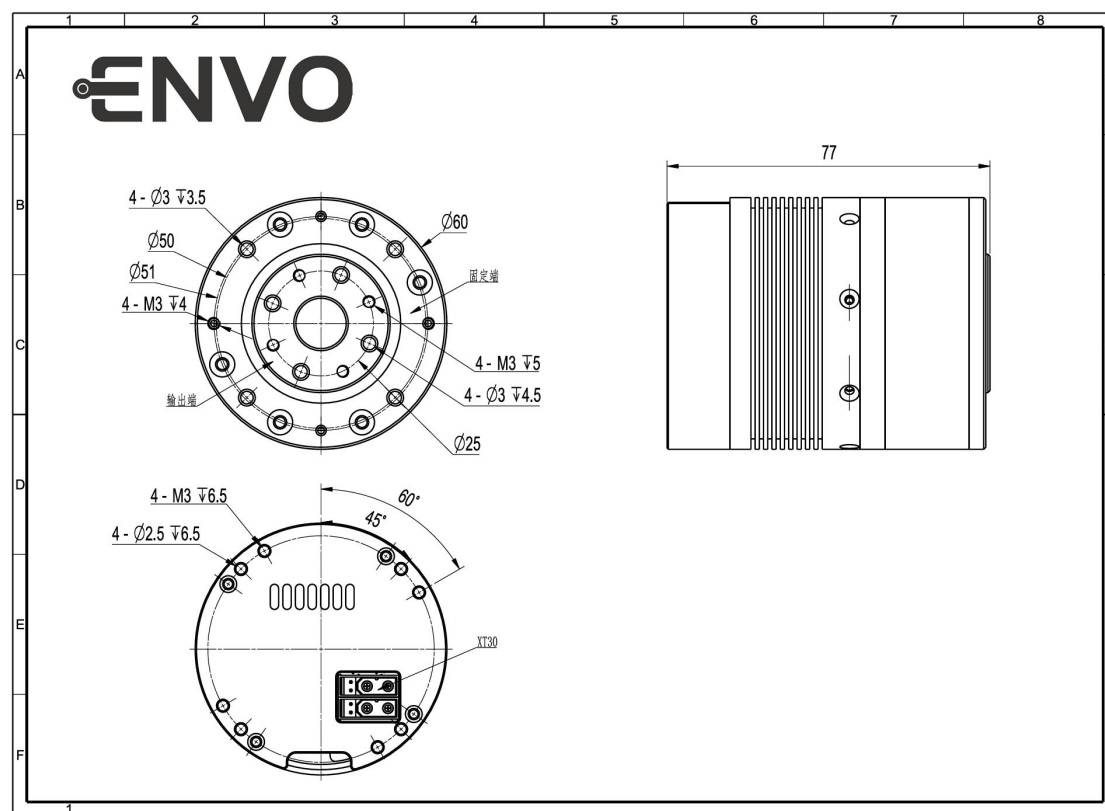
Storage Temp Range: -30-70 $^{\circ}\text{C}$

2.3 Installation

Download 3D model:

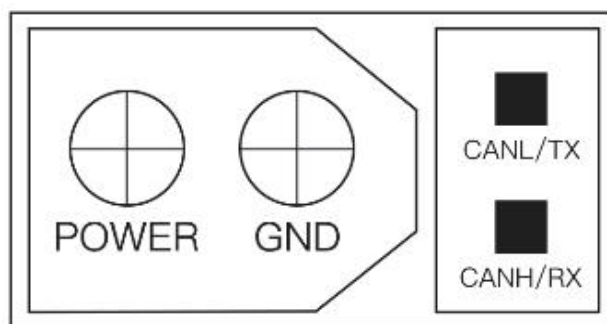
EM-HA-60 External.step

Installation Dimensions:



2.4 Motor Driver Product Information

Interface Diagram



Drive Method: FOC

Encoder Count: 1

Max. Motor Driver Board Temp: 100 °C

CAN Bus Max. Baud Rate: 1 Mbps

4. Communication

Communication Mode:

Supported communication modes: USB mode (for host Computer Software only) and CAN modes

Mode Switching:

default CAN@1Mbps

After inserting USB-C, enable USB communication while disabling CAN

EM-HA60 CAN Communication Manual

5. Host Computer Software

Download Host Computer Software:

envo.zip

Download User Manual:

Host Computer Software User Manual

6. Technical after-sales and contact information

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