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STEPPERONLINE A6-EC1000H2A1-M17

STEPPERONLINE A6 Series 1000W EtherCAT AC Servo Motor Kit User Manual

Model: A6-EC1000H2A1-M17

Introduction

This manual provides essential instructions for the installation, operation, and maintenance of the STEPPERONLINE A6 Series AC Servo Motor Kit. This kit includes a 1000W AC servo motor and a single/three-phase 220V 1000W servo driver, designed for industrial applications requiring high precision and dynamic control. The system features EtherCAT communication and a 17-bit multi-turn absolute encoder for superior performance.

Kit Components

The STEPPERONLINE A6 Series AC Servo Motor Kit typically includes the following components:

- **1 x A6-1000EC:** 1000W EtherCAT AC Servo Motor Driver
- **1 x A6M80-1000H2A1-M17:** 1000W AC Servo Motor (3000rpm, 3.18Nm, 17-Bit Encoder, IP67)
- **1 x AS7-C-PWR075-3.0:** 3.0m Motor Power Cable
- **1 x AS7-C-ENC075-3.0:** 3.0m Encoder Cable

Setup and Installation

Proper installation is crucial for the safe and efficient operation of the servo system. Ensure all power is disconnected before making any connections.

1. Servo Driver Overview

Figure 1: STEPPERONLINE A6-1000EC EtherCAT AC Servo Motor Driver. This image shows the front panel of the servo driver with various connection ports labeled, including power input, motor output, encoder input, and EtherCAT communication ports.

The A6-1000EC servo driver is the control unit for the motor. It features multiple ports for power, motor connection, encoder feedback, and EtherCAT communication. Familiarize yourself with the port layout before proceeding with connections.

2. Servo Motor Overview

Figure 2: STEPPERONLINE A6M80-1000H2A1-M17 AC Servo Motor. This image displays the servo motor with its shaft, mounting flange, and electrical connectors for power and encoder feedback.

The A6M80-1000H2A1-M17 servo motor is a 1000W unit with a 17-bit multi-turn absolute encoder. It is designed for precise motion control and features an IP67 rating for environmental protection. Ensure the motor is securely mounted to a stable surface before connecting cables.

3. Cable Connections

Figure 3: STEPPERONLINE Motor Power Cable (top) and Encoder Cable (bottom). The motor power cable has three main wires and a ground, while the encoder cable features a multi-pin connector for data transmission and a battery box for absolute encoder functionality.

1. **Motor Power Cable (AS7-C-PWR075-3.0):** Connect the motor power cable from the servo motor to the designated motor output terminals on the servo driver. Ensure correct phase connections (U, V, W) and ground.
2. **Encoder Cable (AS7-C-ENC075-3.0):** Connect the encoder cable from the servo motor's encoder port to the encoder input port on the servo driver. This cable is essential for feedback and enables the 17-bit multi-turn absolute encoder functionality, especially when used with the integrated battery box.
3. **Power Supply:** Connect the main power supply (single/three-phase 220VAC) to the servo driver's power input terminals. Verify voltage compatibility before applying power.
4. **EtherCAT Communication:** Connect your EtherCAT master controller to the EtherCAT IN port on the servo driver using a standard Ethernet cable. If daisy-chaining multiple devices, connect the EtherCAT OUT port to the next device.

Operating Instructions

After successful installation, follow these steps for initial operation:

1. **Power On:** Apply power to the servo driver. Observe the status indicators on the driver for any error codes.
2. **EtherCAT Communication Setup:** Configure your EtherCAT master controller to recognize and communicate with the A6-1000EC servo driver. Refer to your EtherCAT master's documentation for specific setup procedures. The driver supports a 125µs synchronization period.
3. **Parameter Configuration:** Use the driver's interface or software provided by STEPPERONLINE to configure motor parameters. The driver features automatic motor identification, one-button self-tuning, and automatic inertia detection to simplify initial setup.
4. **Test Run:** Perform a low-speed, low-load test run to verify motor direction, response, and stability. Gradually increase speed and load as confidence in the system grows.
5. **Absolute Encoder Functionality:** The 17-bit multi-turn absolute encoder requires the 3m encoder cable with a battery box to function as a multi-turn absolute encoder. Ensure the battery is correctly installed and functional for position retention after power cycles.

Maintenance

Regular maintenance ensures the longevity and reliable performance of your servo system.

- **Environmental Conditions:** Ensure the operating environment remains within specified temperature and humidity ranges. The motor has an IP67 rating, indicating protection against dust and temporary immersion in water, but the driver should be protected from moisture.
- **Cable Inspection:** Periodically inspect all cables for signs of wear, damage, or loose connections. Secure any loose connections immediately.
- **Cleaning:** Keep the servo motor and driver free from dust and debris. Use a soft, dry cloth for cleaning. Avoid using solvents or abrasive cleaners.
- **Firmware Updates:** Check the manufacturer's website for any available firmware updates for the servo driver to ensure optimal performance and access to new features.

Troubleshooting

This section provides general guidance for common issues. For detailed diagnostics, refer to the specific error codes displayed on the servo driver or consult the manufacturer's technical support.

- **Motor Not Moving/Responding:**
  - Check power supply to the driver.
  - Verify all cable connections (motor power, encoder, EtherCAT).
  - Ensure EtherCAT communication is established and the master controller is sending commands.
  - Check for error codes on the driver display.
- **Abnormal Noise or Vibration:**
  - Check motor mounting for looseness.
  - Verify motor and load coupling.
  - Review tuning parameters; perform self-tuning if necessary.
- **Positioning Errors:**
  - Ensure the encoder cable is securely connected and the absolute encoder battery is functional.
  - Check for mechanical backlash in the system.
  - Verify control loop parameters and tuning.
- **EtherCAT Communication Issues:**

- Check Ethernet cable integrity.
- Verify network configuration on the EtherCAT master.
- Ensure the driver's EtherCAT address is correctly set.

Technical Specifications

Servo Driver (A6-1000EC)

Feature	Specification
Part Number	A6-1000EC
Communication	EtherCAT
Speed Loop Bandwidth	2KHz
Encoder Support	17-bit absolute encoder
Synchronization Period	125µs
Rated Voltage	Single/Three-phase 220VAC
Rated Power	1000W
Features	Automatic motor identification, One-button self-tuning, Automatic inertia detection
Dimensions	170 x 174 x 55mm

Servo Motor (A6M80-1000H2A1-M17)

Feature	Specification
Part Number	A6M80-1000H2A1-M17
Rated Voltage	220VAC
Rated Power	1000W
Rated Torque	3.18Nm
Peak Torque	11.13Nm
Rated Speed	3000rpm
Peak Speed	6000rpm
Rated Current	6.30A
Peak Current	20.90A
Torque Constant	0.50N.m/A
Back EMF Constant	33.90V/krpm
Resistance	0.35ohms
Inductance	2.04mH

Inertia	$2.23kg*m^2*10^{-4}$
Poles	10
Encoder	17-bit multi-turn absolute, magnetic encoder
IP Rating	IP67
Shaft Diameter	19mm
Cable Length	3m (for both power and encoder cables)

General Specifications

Feature	Specification
Package Dimensions	13.5 x 11.5 x 7.75 inches
Item Weight	11.62 pounds
Manufacturer	OMC Corporation Limited
Date First Available	December 9, 2024

Warranty and Support

For warranty information, technical support, or service inquiries, please contact STEPPERONLINE directly or refer to their official website. The manufacturer of this product is OMC Corporation Limited.
It is recommended to retain your purchase receipt for warranty validation.