User Manual

ESS11-P01

Pulse Type Integrated Motor Manual

Version: V1.0

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1 Overview

1.1 Product Introduction

The ESS11-P01 pulse integrated motor adopts a new-generation 32-bit ARM control technology combined with advanced torque angle control algorithms. The maximum speed exceeds 3000 rpm, with significantly reduced torque attenuation at high speeds compared to conventional open-loop drivers. This effectively improves motor efficiency, reduces vibration and heat generation, and enhances machining accuracy.

A load-based current control algorithm is implemented to minimize heat and extend service life. The integrated alarm output enables convenient monitoring and control by upper-level systems.

1.2 Features

- Advanced 32-bit ARM control technology
- Maximum speed up to 3000 rpm
- Low torque attenuation at high speed
- Built-in alarm output for monitoring
- Intelligent current control reduces noise and vibration
- Type-C communication/debug interface
- Operating voltage: DC 24V
- Integrated motor and driver design
- Compact size and easy installation
- Comprehensive protections: overvoltage, undervoltage, overcurrent

1.3 Applications

Suitable for wire stripping machines, marking systems, cutting equipment, plotters, medical devices, and various industrial automation systems.

2 Specifications

2.1 Electrical Characteristics

Parameter	ESS11-P01			
	Min.	Typ.	Max.	Unit
Continuous Output Current	0.1	-	1.2	A
Input Power Supply	20	24	30	Vdc
Logic Input Voltage	-	5	5	V
Insulation Resistance	100	-	-	MΩ

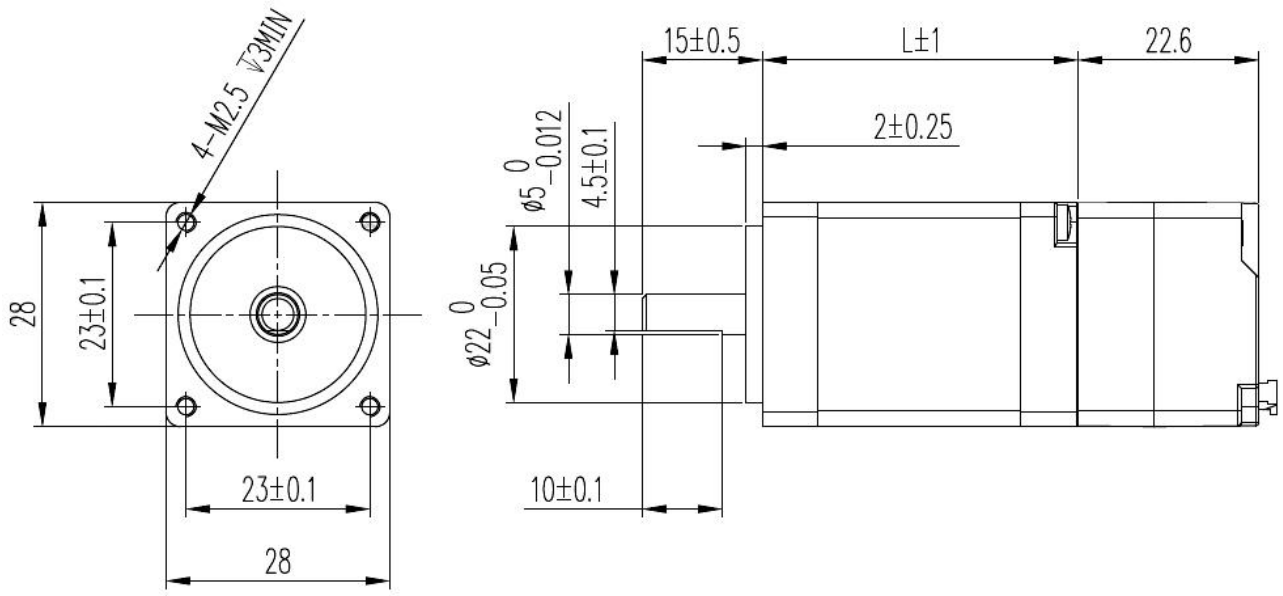
2.2 Environmental Conditions

Cooling Method	Heat Sink Cooling	
Operating Temperature	Application Environment	Keep away from other heat-generating equipment. Avoid dust, oil mist, corrosive gases, and locations with strong vibration. Prohibited in areas with flammable gases or conductive dust.
	Temperature	0℃~50℃
	Humidity	40－90%RH（non-condensing）
	Vibration	10~55Hz/0.15mm
Storage Temperature	-20℃~+80℃	

3 Installation

3.1 Mounting Dimensions

Front View **Side View**



Model	Motor Length L(mm)
ESS11-P01	32

Mounting Dimensions（unit：mm）

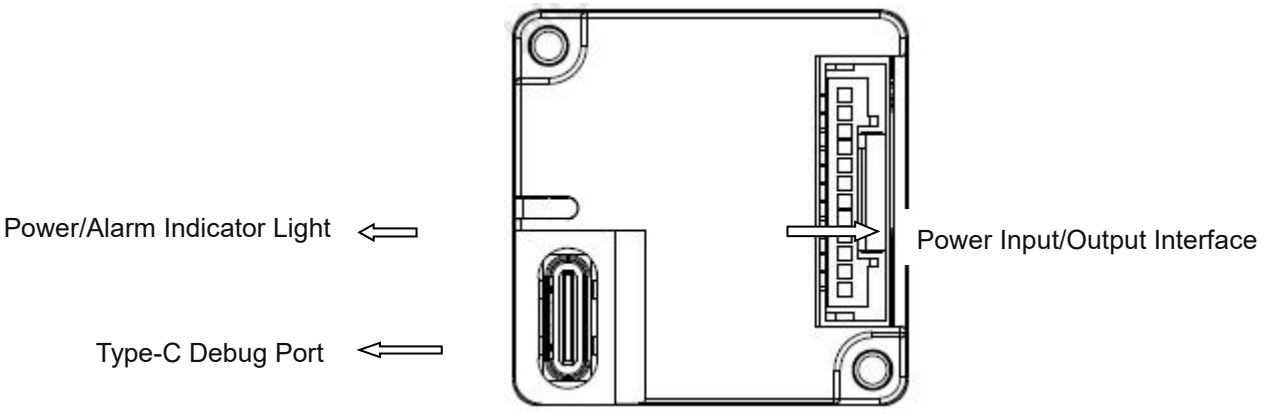
3.2 Mounting Tips

The motor should be mounted on a stable and flat surface with sufficient airflow for heat dissipation. Improper installation may lead to vibration and internal damage.

Ensure proper shaft alignment within allowable tolerance. Forced cooling is recommended if necessary to maintain operating temperature below 80° C.

4 Wiring and Interfaces

4.1 Wiring Diagram



Wiring Diagram

Cautions：

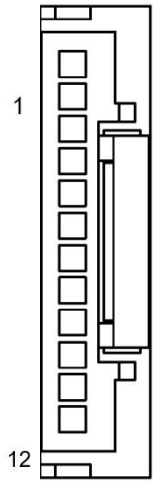
- Installation and wiring must be performed by qualified personnel.
- Do not connect or disconnect wiring under power.
- Secure installation before wiring.
- Ensure correct power polarity and voltage (24V).

4.2 Interface Description

4.2.1 Status Indicator

Color	Symbol	Name	Function
Green	PWR	Power Indicator	Stays solid when power is on.
Red	ALM	Alarm Indicator	Flashes in cycles based on the fault type: • Overcurrent: flashes once per cycle • Overvoltage: flashes twice per cycle • Undervoltage: flashes three times per cycle • Phase loss / incorrect phase sequence: flashes four times per cycle • Position error / out of tolerance: flashes five times per cycle

4.2.2 Wiring Port

Port	Pin	Symbol	Name	Function
	1	DC+	Power Interface	DC24V+
	2	GND		GND
	3	PU+	Pulse Signal Optocoupler Positive Terminal	Connect to signal power supply, +5V drive. For voltages higher than 5V, a current-limiting resistor must be connected in series at the PU- terminal.
	4	PU-	Pulse Signal Optocoupler Negative Terminal	Active on falling edge. The motor takes one step each time the pulse transitions from high to low. Requirements: Low level 0~0.5V, high level 3.3~5V.
	5	DR+	Direction Signal Optocoupler Positive Terminal	Connect to signal power supply, +5V drive. For voltages higher than 5V, a current-limiting resistor must be connected in series at the DR- terminal.
	6	DR-	Direction Signal Optocoupler Negative Terminal	Used to change motor direction. Requirements: Low level 0~0.5V, high level 3.3~5V.
	7	MF+	Motor Release Signal Optocoupler Positive Terminal	Connect to signal power supply, +5V drive. For voltages higher than 5V, a current-limiting resistor must be connected in series at the MF- terminal.
	8	MF-	Motor Release Signal Optocoupler Negative Terminal	When active, cuts off motor coil current and the motor shaft is not locked.
	9	ALM+	Alarm Signal Output Positive Terminal	When the integrated motor alarms, the alarm signal becomes active (output optocoupler conducts).
	10	ALM-	Alarm Signal Output Negative Terminal	
	11	Pend+	Position Ready Signal Output Positive Terminal	When the integrated motor is powered and the shaft is stationary, the position ready signal becomes active (output optocoupler conducts).
	12	Pend-	Position Ready Signal Output Negative Terminal	

4.3 Input/Output Port Operation

- **Port Hardware Description**

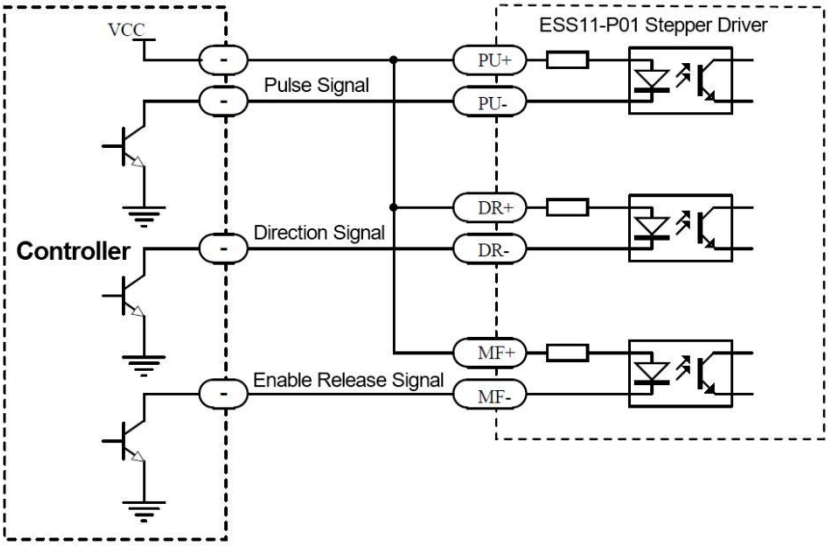
The ESS11-P01 driver provides 3 optically isolated input interfaces, compatible with both NPN and PNP wiring.

The 3 input signals include PU, DR, and MF. These are isolated from the external control interface via optocouplers. The driver internally supports both common cathode and common anode configurations, as shown in the figure below. To ensure reliable conduction of the internal optocouplers, the controller side must provide a driving current of at least 10mA. The standard input signal voltage for the integrated motor is 5V.

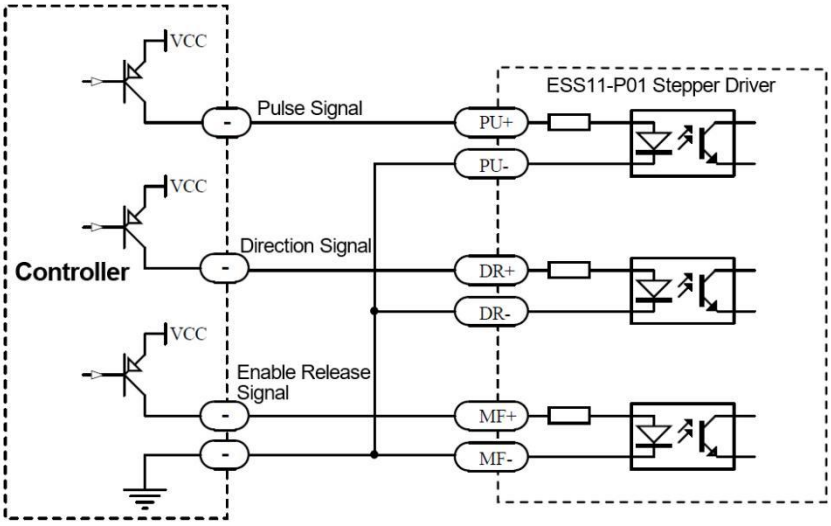
The ESS11-P01 integrated motor provides 2 optically isolated output terminals, including alarm and position ready signals. It supports common cathode wiring and is compatible with both active-high and active-low controllers.

- **Signal Interface Wiring Diagram Reference**

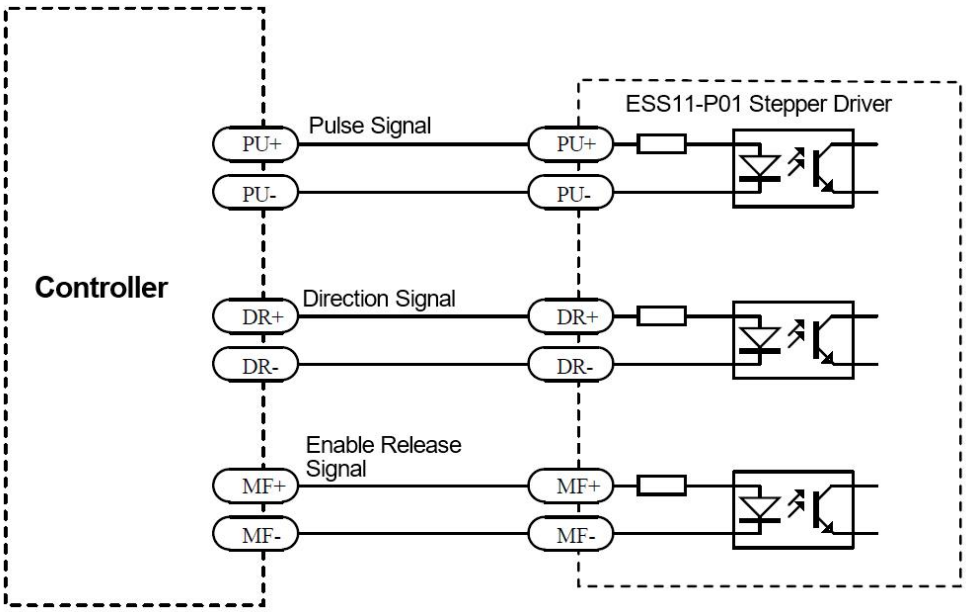
Input Signal Wiring Diagram:



Common Anode Connection

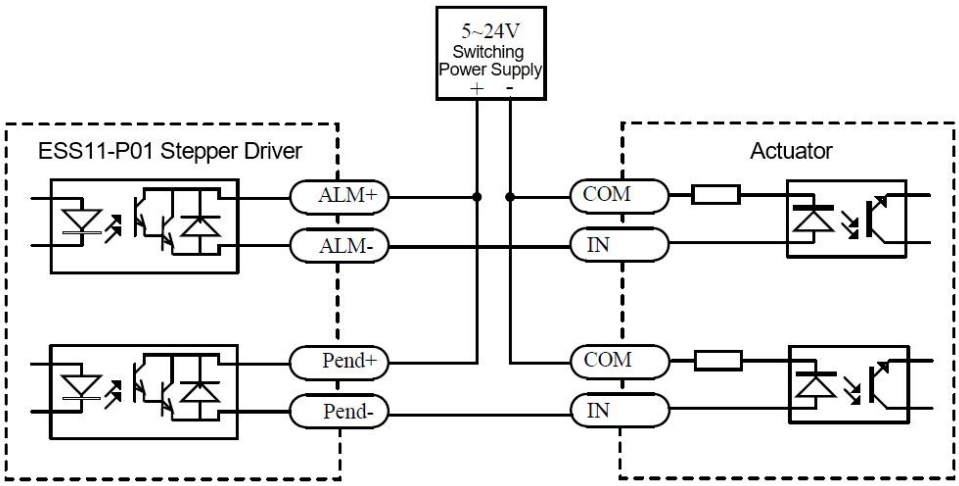


Common Cathode Connection

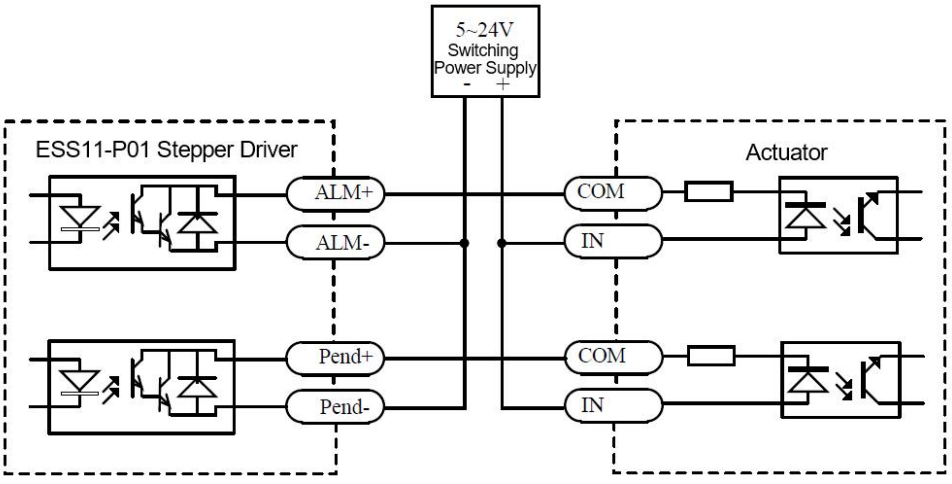


Differential Connection

Output Signal Wiring Diagram：



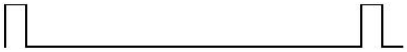
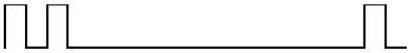
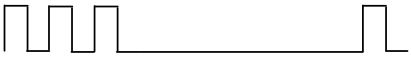
Sourcing output



Sinking output

5 Alarm and Troubleshooting

The ESS11-P01 driver has 4 types of alarm messages. When the driver alarms, the alarm indicator (ALM) flashes a different number of times according to the alarm code. The specific alarm codes and corresponding handling methods are shown in the table below.

Fault Code	Fault information	ALM	Reset Method
Err1：0x01	Overcurrent or phase-to-phase short circuit		Power cycle recovery
Err2：0x02	Overvoltage (power supply voltage too high)		Lock / Auto recovery
Err3：0x03	Undervoltage (power supply voltage too low)		Lock / Auto recovery
Err5：0x05	Position error / Out of tolerance		Power cycle recovery / Reset