EtherCAT



ECAT-2094S

4-Axis Stepper Motor Controller/ Driver

Features

- Supports 4 stepper motor (2-phase bipolar)
- Stepper motors are controlled in an open loop operation
- Programmable coil current level: up to 1.5 A/phase
- Programmable microstep size: maximum 256 microsteps per full step
- Supported motor voltage range: 6 to 46 V_{DC}
- 4 × Encoder interfaces (A, B, Z), diff erential
- 8 × Digital input. Two DI channels for each axis: reference switch input, latch input
- 2 × Digital output
- Automatic current reduction to reduce heat when motor is not moving
- Drive protection:
  - Over-temperature
  - Under voltage
  - Short circuit
- Optically isolated I/O
- LED indicators for I/O, EtherCAT and motion status
- Internal memory for storing confi guration data
- EtherCAT:
  - 2 × RJ-45 bus interface
  - Distance between stations up to 100 m (100BASE-TX)
  - Support daisy chain connection
  - EtherCAT conformance test tool verified
  - Supports Free-Run, SM synchron and Distributed Clock (DC) operation modes
  - Supports CoE and FoE
- Removable terminal block connector
- Two 16-position rotary switch for station alias addressing

Introduction

The ECAT-2094S stepper motor controller is a cost-effective, two-phase bipolar stepper driver. The ECAT-2094S simultaneously controls up to four stepper motors. A motor voltage range between 6 and 46V DC and a maximum motor coil current of 1.5A/phaseis being supported. The running motor current, microstep resolution and other motion parameters are software selectable.

Two-phase bipolar stepper motors can be directly connected to the ECAT-2094S device. The device is designed to operate in a open loop. Configuration and motion control has to be done by the EtherCAT MDevice and the application program. The torque and step control is done by an internal stepper motor driver IC. Each stepper motor is being independently controlled by a separated driver IC. The four driver ICs are not synchronized and work independently from each other. An integrated ramp generator automatically calculates the acceleration and deceleration distance. The motion controller drives the motor to the target position or accelerates the motor to the target velocity. All motion parameters can be changed on the fly. A minimum set of configuration data consists of acceleration, deceleration and maximum motion velocity. After receiving the target position the motor driver starts controlling the motion movement.

The ECAT-2094S has four integrated incremental encoder interfaces. Four 32 bit high frequency encoder counter counts the input signal of external incremental encoders. The encoder can for example be used for homing purposes and for consistency checks.

High resolution of up to 256 microsteps per full step is supported for a ensuring smooth and precise motor operation.

For each motor two digital input channels are provided. The digital inputs can be set to act as a simple DI, as a left and right hardware limit switch which automatically stops the motor when activated, or a latch trigger for latching the current motor and encoder position.

The module must be supplied by three power sources. Two motor supply and a 24Vdc control supply. Two motors share one power supply.

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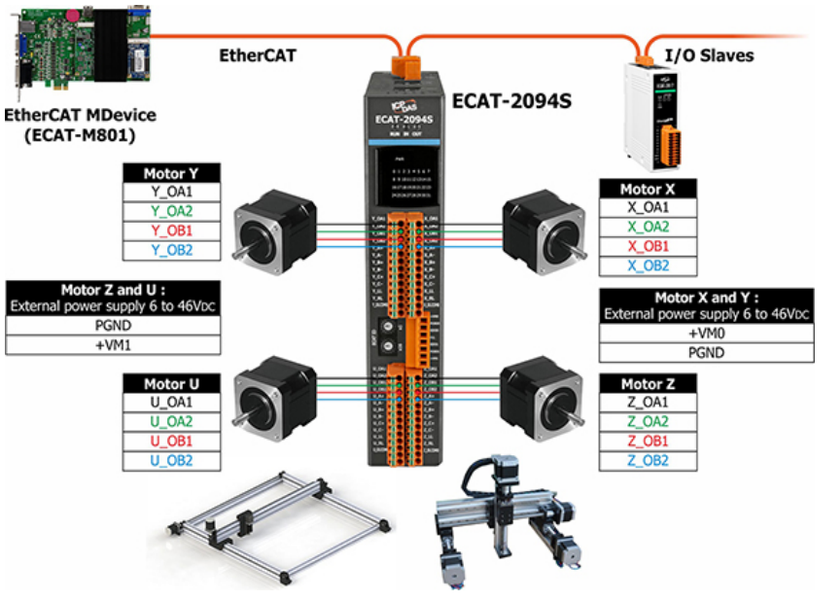
Specifications

Model	ECAT-2094S
EMS Protection	
EFT (IEC 61000-4-4)	Signal : 1 KV Class A; Power : 1 KV Class A
ESD (IEC 61000-4-2)	4 KV Contact for each channel
Surge (IEC 61000-4-5)	1 KV Class A
LED Indicators	
Status	1 x Power 1 x Operation State 2 x Communication 8 x DI status 2 x DO status 16 x Motion status
Encoder Input	
No. of Axes	4, differential
Mode	A/B phase, CW/CCW, Pules/Dir
Frequency	4 MHz Max.
Motor Output	
No. of Axes	4x Stepper motor, 2 phases
Current Controller Frequency	24.5 kHz
Microsteps Per Step	256, 128, 64, 32, 16, 8, 4, 2
Output Current	1.5 A/phase
Step Frequency	8.388 MHz Max.
Voltage Range of The Motor Output	6 to 46 V_{DC}
Digital Input	
Channels	8 (2x Limit position for each motor)
Type	Wet Contact
ON Voltage Level	10 ~ 30 VDC
OFF Voltage Level	5 VDC Max.
Isolation	3750 VDC
Digital Output	
Channels	2
Type	Open collector
ON Voltage Level	+5 to 30 VDC
OFF Voltage Level	100 mA
Isolation	3750 VDC
EtherCAT	
Ports	2 x RJ-45
Distance Between Stations	100 m Max. (100Base-TX)
Data Transfer Medium	Ethernet/EtherCAT Cable (Min. CAT 5), Shielded
Distributed Clocks	Yes
Power	
Input Range	+20 VDC ~ +30 VDC
Mechanical	
Casing	Metal
Dimensions (W x L x H)	37 mm x 123.5 mm x 181 mm
Installation	DIN-rail mounting or wall mounting
Environmental	
Operating Temperature	-25 ~ +40 °C
Storage Temperature	-30 ~ +80 °C
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)

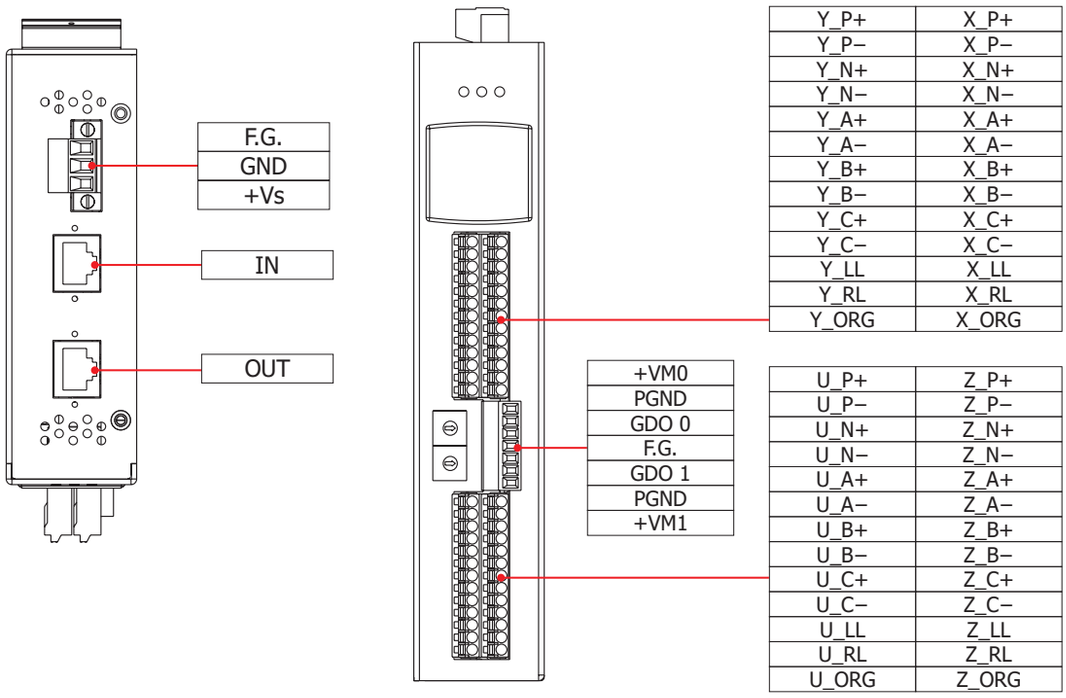
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Applications

- Automated Test Equipment
- Surveillance Systems
- Labeling Machinery
- Packaging
- Semiconductor Manufacturing
- Engraving Machine
- Automatic Feeding Machine



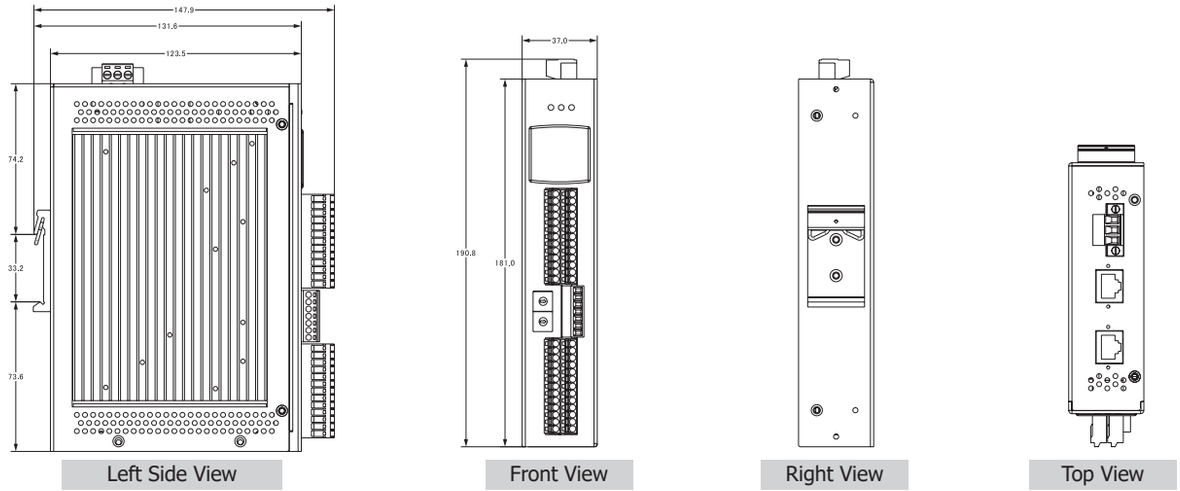
Pin Assignments



Y_P+	X_P+
Y_P–	X_P–
Y_N+	X_N+
Y_N–	X_N–
Y_A+	X_A+
Y_A–	X_A–
Y_B+	X_B+
Y_B–	X_B–
Y_C+	X_C+
Y_C–	X_C–
Y_LL	X_LL
Y_RL	X_RL
Y_ORG	X_ORG

U_P+	Z_P+
U_P–	Z_P–
U_N+	Z_N+
U_N–	Z_N–
U_A+	Z_A+
U_A–	Z_A–
U_B+	Z_B+
U_B–	Z_B–
U_C+	Z_C+
U_C–	Z_C–
U_LL	Z_LL
U_RL	Z_RL
U_ORG	Z_ORG

Dimensions (Units: mm)

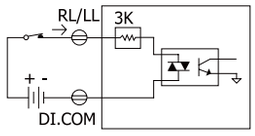
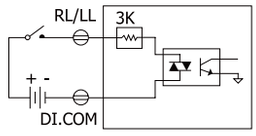
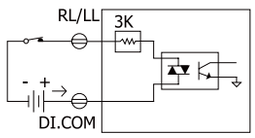
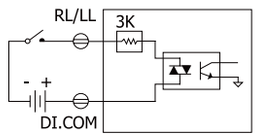


Left Side View | Front View | Right View | Top View

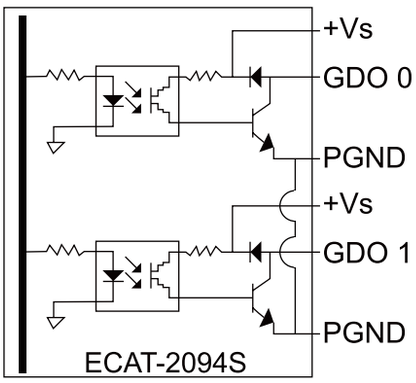
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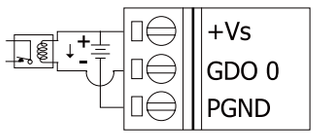
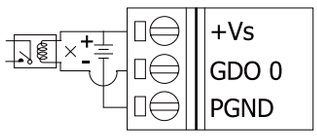
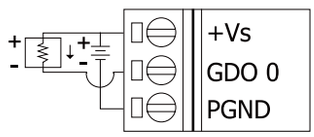
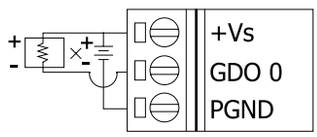
Wire Connections

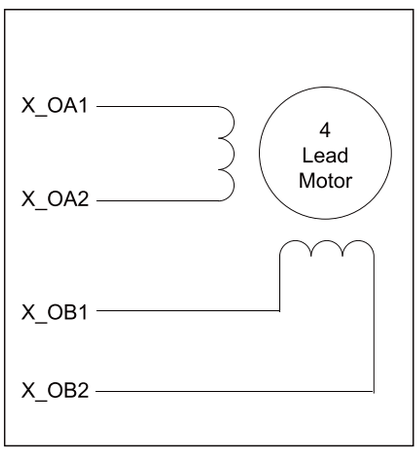
Digital Input Channel

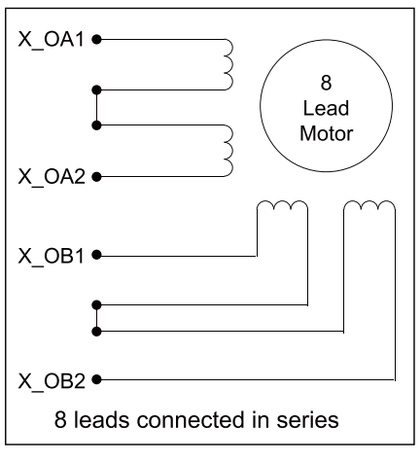
Digital Input	Readback as 1	Readback as 0
Sink	+10 ~ +24 VDC	OPEN or <4 VDC
		
Source	+10 ~ +24 VDC	OPEN or <4 VDC
		

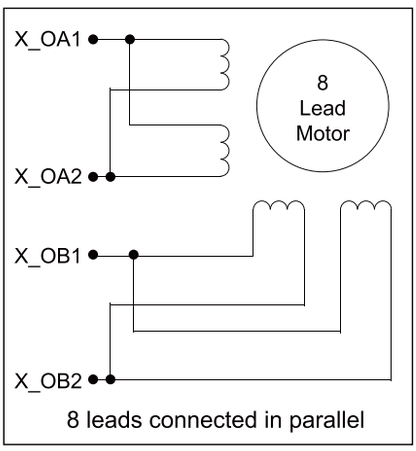
Digital Output Channel



Output Type	ON State Readback as 1	OFF State Readback as 0
Drive Relay		
Resistance Load		







Ordering Information

ECAT-2094S CR	EtherCAT SubDevice 4-axis stepper motor controller/driver (Metal Case) (RoHS)

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