Autonics

EtherCAT Comm. Type 2-Phase Closed-loop Stepper Motor Driver

AiC-D-EC Series
CATALOG

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Features

- Closed-loop system with real-time position control
- High speed & high torque drive without missing steps
- Multi-axis simultaneous control with EtherCAT communication
- Windows-based software (atMotion) for easy parameter setting and monitoring
- 7-segment display for alarm / status reading
- Built-in brake type motors available (AiC-D-B-EC Series)

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.
Select a model that matches the ordering information of the motor and the driver.

AiC	-	D	-	❶	❷	❸	-	❹	-	EC

❶ Frame size
Number: Frame size (mm)

❸ Encoder resolution

	☐ 20 / 28 / 35 mm	☐ 42 / 56 / 60 mm
A	4,000 PPR (1,000 PPR × 4)	10,000 PPR (2,500 PPR × 4)
B	16,000 PPR (4,000 PPR × 4)	-

❷ Axial length
S: Short
M: Medium
L: Long

❹ Motor type
No mark: Standard type
B: Built-in brake type

Product Components

- Product
- Instruction manual

- Power connector × 1
- I/O connector × 1
- Brake connector (AiC-D-B-EC Series) × 1

Software

Download the installation file and the manuals from the Autonics website.

■ **atMotion**
The program allows to manage the motor driver's parameter setting and monitoring data.

Specifications

Model	AiC-D-20□A-EC	AiC-D-28□B-EC	AiC-D-35□B-EC
Power supply	24 VDC⎓ ±10%		
Max. RUN power [01]	≤ 60 W		
Stop power [02]	≤ 10 W		
Max. RUN current [03]	0.6 A / Phase	1.0 A / Phase	1.2 A / Phase
Stop current	20 to 100% of max. RUN current		
Basic step angle	1.8° / Phase		
Resolution	500, 1000, 1600, 2000, 3600, 4000, 5000, 6400, 7200, 10000 (factory default) PPR	500, 1000, 1600, 2000, 3600, 5000, 6400, 7200, 10000 (factory default), 16000 PPR	

Model	AiC-D-42□A-□-EC	AiC-D-56□A-□-EC	AiC-D-60□A-□-EC
Power supply	24 VDC⎓ ±10%		
Max. RUN power [01]	≤ 60 W	≤ 120 W	≤ 240 W
Stop power [02]	≤ 10 W	≤ 12 W	≤ 15 W
Max. RUN current [03]	1.7 A / Phase	3.5 A / Phase	
Stop current	20 to 100% of max. RUN current		
Basic step angle	1.8° / Phase		
Resolution	500, 1000, 1600, 2000, 3200, 3600, 5000, 6400, 7200, 10000 (factory default) PPR		

01) When changing the load rapidly, instantaneous peak current may increase. The capacity of power supply should be over 1.5 to 2 times of max. RUN power.
02) Based on ambient temp. 25°C, ambient humi. 55%RH, stop current 50%
03) RUN current varies depending on the input RUN frequency and max. RUN current at the moment varies also.

Run method	2-phase bipolar closed-loop control method
Speed filter	Disable, 2, 4, 6, 8, 10, 20, 40, 60 (factory default), 80, 100, 120, 140, 160, 180, 200 ms
Control Gain	0 (factory default) to 15, (15: Fine Gain)
Max. rotation speed	3,000 rpm
In-Position	Fast Response: 0 (factory default) to 7, Accurate Response: 0 to 7
Operation mode	CSP, CSV, PP, PV, HM
Home search	Homing on the negative limit switch and index pulse Homing on the positive limit switch and index pulse Homing on the home switch and index pulse (Positive) Homing on the home switch and index pulse (Negative) Homing without an index pulse (negative limit switch) Homing without an index pulse (positive limit switch) Homing without an index pulse (Positive and Home sensor ON) Homing without an index pulse (Negative and Home sensor ON) Homing on the index pulse (Negative) Homing on the index pulse (Positive) Set the Origin with Home offset Set the Origin and Reset Current Position Torque Homing Search- with Home offset Torque Homing Search+ with Home offset

I/O voltage level	[H]: 5 - 30 VDC⎓, [L]: 0 - 2 VDC⎓
Input	Exclusive input: 7, General input: 5
Output	Exclusive output: 2, General output: 4
External power supply	VEX (Default: 24 VDC⎓), GEX (GND)
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	1,000 VAC∼ 60 Hz for 1 minute
Vibration	1.5 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	300 m/s² (≈ 30 G) in each X, Y, Z direction for 3 times
Ambient temp.	0 to 50°C, storage: -10 to 60°C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 10 to 90%RH (no freezing or condensation)
Protection rating	IP20 (IEC standard)
Approval	CE ℅ RoHS
Unit weight (packaged)	≈ 350 g (≈ 500 g)

Communication Interface

■ EtherCAT

|	
Comm. specifications	EtherCAT
Association approval [01]	EtherCAT. Conformance tested
Support protocol	CoE (support CiA402 profile)
Physical layer	100BASE-TX (IEEE802.3)
Connection cable	CAT5e class or over (Shield type: SF/FTP, S/FTP, SF/UTP)
Max. comm. distance	Within 100 m distance between nodes
Baud rate	10 / 100 Mbps
Distributed clock	DC cycle: 250 us, 500 us, 1 ms, 2 ms, 4 ms
Node ID setting	ECAT ID switch setting: 1 to 99 Physical address setting at Master: 1 to 65535
Topology	Star, Line, Tree

01) EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Dimensions

• Unit: mm, For the detailed drawings, follow the Autonics website.
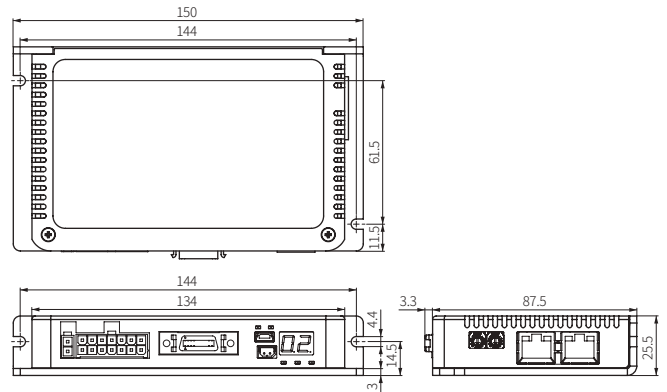
Unit Descriptions
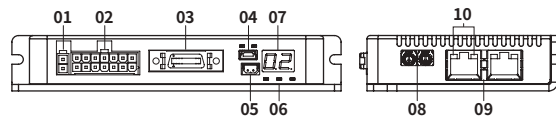
01. **Power connector**
02. **Motor + Encoder connector**
03. **I/O connector**
04. **USB connector**
05. **Brake connector (AiC-D-B-EC Series)**
06. **Status indicators**
07. **Status display part**
08. **Comm. ID setting rotary switch**
09. **Comm. connector**
10. **Comm. indicator**

Sold Separately

- Power cable: CJ-PW-□
- I/O cable: CO20-MP□-R (specifications: AiC-EC TAG)
- Motor + Encoder cable: C1D14M(B)-□ (fixed type), C1DF14M(B)-□ (flexible type)

Sold Separately : Power Cable
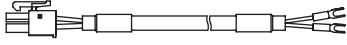
■ CJ-PW-□

- Recommended to use ferrite core at both ends of the cable.
- The model name is 010, 020 which indicates the cable length.
  E.g.) CJ-PW-010: 1 m power cable

Sold Separately : Motor + Encoder Cable

■ Fixed type: C1D14M-□, Flexible type: C1DF14M-□

- Recommended to use ferrite core at both ends of the cable.
- The model name is 1, 2, 3, 5, 7, 10, 15, 20 which indicates the cable length.
  E.g.) C1DF14M-10: 10 m flexible type Motor + Encoder cable
- For built-in brake type, use dedicated cable.
  (fixed type: C1D14MB-□, flexible type: C1DF14MB-□)

Sold Separately : I/O Cable

■ CO20-MP□-R (Specifications: AiC-EC TAG)

Pin	Function (Name TAG)	Cable Color	Dot line color-number
1	VEX	Yellow	Black-1
2	ORG		Red-1
3	+Limit		Black-2
4	-Limit		Red-2
5	Alarm Reset		Black-3
6	Hold Off		Red-3
7	Stop		Black-4
8	EMG		Red-4
9	IN1		Black-5
10	IN2		Red-5
11	IN3	White	Black-1
12	IN4		Red-1
13	IN5		Black-2
14	In-Position		Red-2
15	Alarm		Black-3
16	OUT1		Red-3
17	OUT2		Black-4
18	OUT3		Red-4
19	OUT4		Black-5
20	GEX		Red-5

- Recommended to use ferrite core at both ends of the cable.
- The model name is 010, 020, 030, 050, 070, 100, 150, 200 which indicates the cable length.
  E.g.) CO20-MP070-R: 7 m I/O cable