

Autonics Controller Intergrated 2-Phase Colsed-Loop Stepper Motor Driver [AC type, Frame size 60/86, RS485 Comm.] AiCA-D SERIES

INSTRUCTION MANUAL

Thank you for choosing our Autonics product. Please read the following safety considerations before use.

Safety Considerations

Please observe all safety considerations for safe and proper product operation to avoid hazards. Warning symbol represents caution due to special circumstances in which hazards may occur.

- Warning: Failure to follow these instructions may result in serious injury or death. Caution: Failure to follow these instructions may result in personal injury or product damage.

Warning

- 1. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. 2. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present. 3. Do not connect, repair or inspect the unit while connected to a power source. 4. Install the unit after considering counter plan against power failure. 5. Re-supply power after min. 20 sec from disconnected power. 6. Check 'Connections' before wiring. 7. For installing the unit, ground it exclusively and use AWG 18(0.75mm²) ground cable. 8. Do not disassemble or modify the unit. 9. Insulate the connector not to be exposed. 10. Install the driver in the housing or ground it. 11. Do not touch the unit during or after operation for a while. 12. Do not remove the connector during or after operation for a while. 13. Emergency stop directly when error occurs.

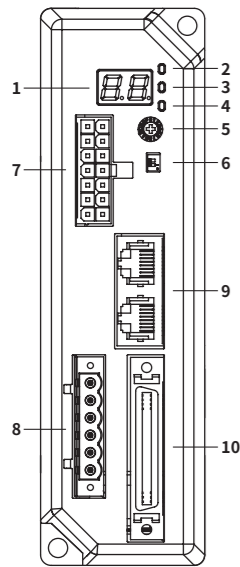
Caution

- 1. When connecting the power input, use AWG 18(0.75mm²) cable or over. 2. Install overcurrent prevention device (e.g. the current breaker, etc) to connect the driver with power. 3. Check the control input signal before supplying power to the driver. 4. Install a safety device to maintain the vertical position after turn off the power of this driver. 5. Use the unit within the rated specifications. 6. Use a dry cloth to clean the unit and do not use water or organic solvent. 7. The driver may overheat depending on the environment. 8. Keep metal chip, dust and wire residue from flowing into the unit. 9. Use the designated motor only.

Product Components

Before use the product, check all components are contained. The components are contained each one. Motor driver, Power connector, Instruction manual, Communication protect connector, I/O connector.

Unit Descriptions



- 1. Alarm/Status display part (orange) : Displays the corresponding number, when alarm occurs. 2. Power/Alarm indicator (PWR/ALM) (green/red) 3. In-Position indicator (INP) (orange) : Turns ON when motor is placed at command position after positioning input. 4. Servo On/Off indicator (SERVO) (blue) : Turns ON when servo is operating, turns OFF when servo is not operating 5. Communication ID setting rotary switch (ID Sel: 0 to F) : [OFF] Node ID 0 (disable), 1 (factory default) to 15 [ON] Node ID 16 to 31 6. Communication ID setting/Terminating resistance setting DIP switch (ID, TERM) : ID - Communication ID setting (factory default: OFF) TERM - Set to use terminating resistance (factory default: OFF) 7. Motor+Encoder connector (CN1)

The above specifications, dimensions, etc. are subject to change and some models may be discontinued without notice.

Be sure to follow cautions written in the instruction manual, user manual and the technical descriptions (catalog, website).

Specifications

Table with columns for Model (AiCA-D-60MA, AiCA-D-60LA, AiCA-D-86MA, AiCA-D-86LA) and rows for Power supply, Power consumption, Max. Run current, STOP current, Rotation speed, Resolution, Applied motor, Motor GAIN, Positioning range, In-Position, Motor rotation direction, Status indicator, I/O voltage level, I/O Input/Output, External power supply, Operation mode, Index step, Program function, RS485 Comm. Speed, Multiaxial control, ID setting switch, Alarm, Warning, Input resistance, Insulation resistance, Dielectric strength, Vibration, Shock, Environ. Ambient temp./humid., Protection structure, Sold separately, Approval, Weight.

- 1: Based on the ambient temperature 25°C, ambient humidity 55%RH and STOP current 20%. 2: RUN current varies depending on the input RUN frequency and max. RUN current at the moment varies also. 3: Settable with the dedicated program (atMotion). 4: of model name indicates cable length (010, 020, 030, 050, 070, 100, 150, 200) E.g.) C050-MP070-R: 7m I/O cable. For corresponding EMC standard, cable length should be below 2m. 5: of model name indicates cable length (1, 2, 3, 5, 7, 10, 15, 20) E.g.) C1DF14M-10: 10m moving type motor+encoder cable. 6: The weight includes packaging. The weight in parenthesis is for unit only. Environment resistance is rated at no freezing or condensation.

8. Power connector (CN2)

Table for Power connector (CN2) with columns: Pin arrangement, Pin no., Function. Rows 1-6: 1-Regenerative resistance, 2-3-N-C, 4-AC power input, 5-6-PE.

9. Communication cable connector (CN3)

Table for Communication cable connector (CN3) with columns: Pin arrangement, Pin no., Function. Rows 1-4: 1-N-C, 2-N-C, 3-RS485 DATA+, 4-N-C.

10. I/O connector (CN4)

Table for I/O connector (CN4) with columns: Pin arrangement, Pin no., Function. Rows 1-17: 1-17 various control and status functions like Alarm Reset, VEX, GEX, Alarm, Compare1, etc.

Connector specifications

Table for Connector specifications with columns: Type, Recommended specifications, Manufacture. Rows: CN1 (Motor+Encoder), CN2 (Power), CN3 (Communication), CN4 (I/O connector).

Configuration Diagram & Cautions for Wiring

In case of unwanted noise generating from peripherals and power, use ferrite core in the wiring. The thickness of cable should be same or thicker than the below specifications when connecting the cable for connector. CN1 (motor+encoder connector): AWG22, CN2 (power connector): AWG18, CN3 (communication connector): AWG28, CN4 (I/O connector): AWG28

When connecting wires, please purchase separately.

Noise filter for signal line: Connect to wiring to suppress external noise. Depending on frequency, filtered noise may be different.

Table for Noise filter for signal line with columns: Type, Model, Manufacture. Row: Motor line (28A5776-0A2), Power line (28A5131-0A2), Comm. line (28A2025-0A2), Manufacture: Lairdtech.

When connecting power, please purchase separately.

Regenerative resistance: Connect Pin no. 1, 2 on power connector (CN2). Use in condition of the high inertia load or the short deceleration time. Forced cooling is required in condition of high surface temperature of regenerative resistance.

Table for Regenerative resistance with columns: Model, Specification, Manufacture. Row: IRC100, Resistance: 100Ω ±5%, Rated power: 60W(standby), 100W(heatsink attached), Manufacture: Rara Electronics Corp.

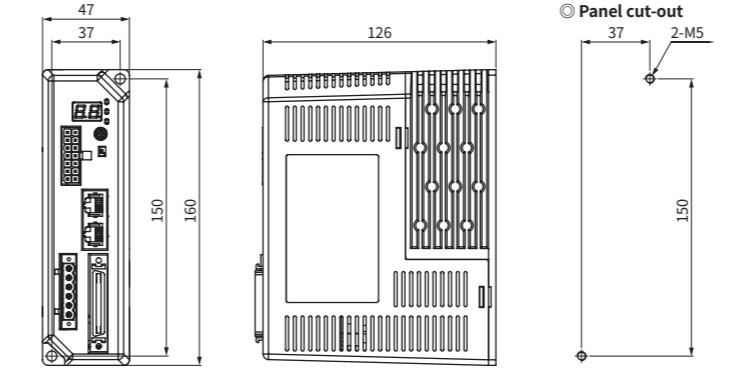
Noise filter for power: Connect the power to suppress external noise. The wires should be connected as short as possible and grounded.

Table for Noise filter for power with columns: Model, Specification, Manufacture. Row: RNS-2006, Rated voltage: 250V, Rated current: 6A, Max. leakage current: 1mA, Manufacture: Orient Electronics.

Surge protector: Protect the product from external noise and surge by connecting power. Be sure to disconnect the surge protector when testing internal pressure. it may result in product damage.

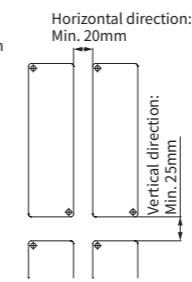
Table for Surge protector with columns: Model, Specification, Manufacture. Row: LT-C12G801W, Manufacture: OTOWA Electric Co. Ltd.

Dimensions



Installation

- 1. Install on the metal plate with high thermal conductivity for heat dissipation of the driver. 2. Install in the well-ventilated area and install the cooling fan in the unventilated environment. 3. Failure to heat dissipation may result in damage or malfunction due to the stress on the product. 4. Check the environment of use within the rated specifications and install on the well-heat dissipated area. 5. In case of installing the drivers more than two, keep distance at least 20mm in the horizontal direction and at least 25mm in the vertical direction.



Alarm/Warning Display

Depending on the alarm/warning type, it displays as a segment on the Alarm/Status display part. Depending on the alarm type, it flashes for 0.4 sec interval and it turns OFF for 0.8 sec repeatedly.

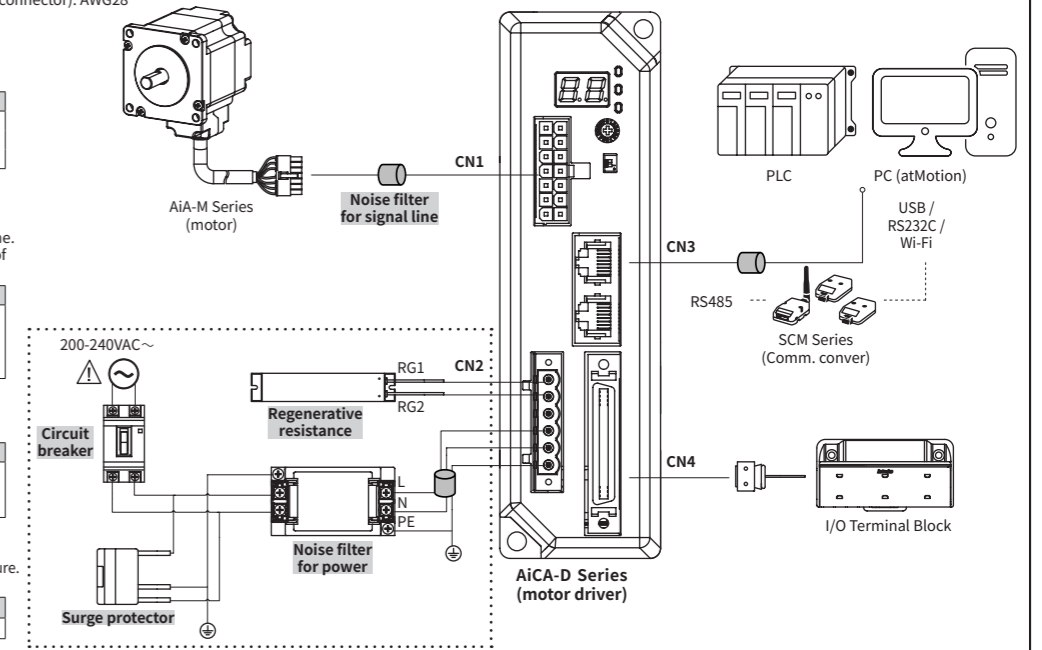
Table for Alarm/Warning Display with columns: Alarm/Status, ALM (flashing), Alarm type, Alarm/Status, ALM (flashing), Alarm type. Rows 1-9: 1-9 various error types like Overcurrent error, Overspeed error, Position tracking error, etc.

When warning occurs, it may result in damage of the product. (maintain operation) Take appropriate troubleshooting for each warning.

Table for Warning/Status with columns: Warning/Status, Warning type. Rows: 1-5: +Software limit, -Software limit, +Hardware limit, -Hardware limit, Overload warning.

Manual

For the detail information and instructions, please refer to user manual, communication manual, library manual and quick manual, and be sure to follow cautions written in the technical descriptions (catalog, website). Visit our website (www.autonics.com) to download manuals.



Motion Device Management Program [atMotion]

atMotion provides GUI control for easy and convenient parameter setting and monitoring data management of multiple devices. Visit our website (www.autonics.com) to download the user manual and software.

Table for Motion Device Management Program [atMotion] with columns: Item, Minimum requirements. Rows: System, Operations, Memory, Hard disk, VGA, Others.

Troubleshooting

Table for Troubleshooting with columns: Malfunction, Causes, Troubleshooting. Rows: When communication is not connected, When motor does not excite, When motor rotates to the opposite direction of the designated direction, When motor drive is unstable.

Cautions during Use

- 1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents. 2. It is recommended to use 485 converter with the separate power. (Autonics product, SCM-381, recommended) 3. Use designated cable to extend motor+encoder wire. 4. Install vertically so that the Alarm/Status display part located on top. 5. Keep the distance between power cable and signal cable more than 10cm. 6. Motor vibration and noise can occur in specific frequency period. 7. For using motor, it is recommended to maintenance and inspection regularly. 8. This product does not prepare protection function for a motor. 9. This unit may be used in the following environments.