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**ODT Drive Board**



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**\$595.00**

**In Stock**

**Qty Available: 1**

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## CK3A-series Direct PWM Amplifier

**CK3A-G305L/-G310L**

CSM CK3A\_DS\_E\_1\_2

**This servo amplifier provides ultra-low latency servo control by taking signals directly from the controller and flexibility to connect to various motors and encoders.**



CK3A-G3□□L

## Features

### Supported Motors

The CK3A Amplifier, combined with the flexibility of Power PMAC Controller and the ability to interface with various encoder feedback devices, allows the support of the following types of Motors:

- AC/DC synchronous brushless (rotary or linear) - e.g. servo Motor.
- DC Brushed - e.g. voicecoil actuator.
- AC asynchronous - e.g. Induction Motor (contact support for setting up this type of Motor).

### Amplifier Features

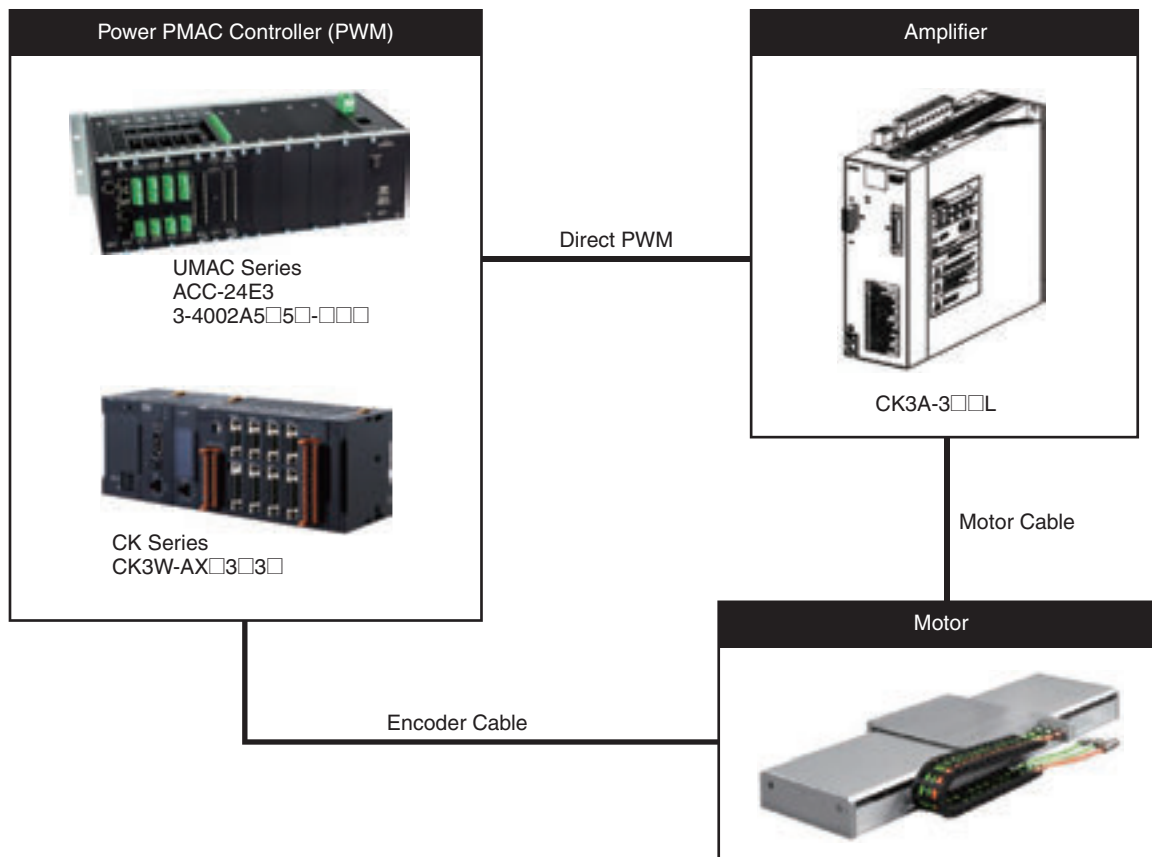
- Nano-scale linear servo positioning accuracy
- High PWM frequency - up to 20 kHz
- High resolution current sensing - 16-bit ADCs
- High speed current ADC sampling - up to 6.125MHz
- Dual STO inputs and status output
- Basic functions - Energy discharge, dynamic braking, fan control
- Basic Data reporting - DC bus voltage, power module temperature, firmware version
- Dual 7-segment LED status display
- Built-in or external shunt resistor
- Support of low voltage main power operation

# CK3A

## System Configurations

The CK3A Direct PWM Amplifier connects to the CK3M or UMAC Controller via PWM cable.

- The Motor connects directly to the CK3A Direct PWM Amplifier.
- The encoder connects directly to the Controller.



## Ordering Information

### CK3A series Direct PWM Amplifier

| Product name                        | Main circuit power supply          | Rated Current       | Model             |
|-------------------------------------|------------------------------------|---------------------|-------------------|
| CK3A series<br>Direct PWM Amplifier | 3-Phase AC, 1-Phase AC, 1-Phase DC | 5 A <sub>rms</sub>  | <b>CK3A-G305L</b> |
|                                     | 3-Phase AC, 1-Phase AC             | 10 A <sub>rms</sub> | <b>CK3A-G310L</b> |

**Note:** The Amplifier comes with the following accessories. Customers are responsible for procuring items other than those listed below.

- Main Power Connector (CN1)
- Control Power Connector (CN2)
- Motor Connector (CN3)
- STO Connector (CN4)

### DirectPWM Cable

| Product name    | Cable length | Model                |
|-----------------|--------------|----------------------|
| DirectPWM Cable | 0.9 m        | <b>CK3W-CAAD009A</b> |
|                 | 1.8 m        | <b>CK3W-CAAD018A</b> |
|                 | 3.6 m        | <b>CK3W-CAAD036A</b> |

**Note:** The amplifier connection side of the CK3W-CAA03A Cable has discrete wires. Wire in accordance with the servo drive specifications.

Refer to Selecting Peripheral Components in the *CK3A-series Direct PWM Amplifier User's Manual (Cat. No. O050)* for details.

# CK3A

## General/Mechanical

| Item                              |                              | Specification                                                                                                                              |
|-----------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Number of axes                    |                              | 1                                                                                                                                          |
| Enclosure                         |                              | Panel mount                                                                                                                                |
| Protective case                   |                              | IP20 (built into IP54 panel)                                                                                                               |
| Grounding                         |                              | 200 V class D grounding, 100 $\Omega$ or less                                                                                              |
| Vibration resistance              |                              | 10 to 60 Hz at an acceleration of 5.88 m/s <sup>2</sup> or less<br>(Not to be run continuously at the resonant frequency)                  |
| Air flow clearance                |                              | Refer to installation section                                                                                                              |
| Mounting screws tightening torque |                              | 1.2 Nm                                                                                                                                     |
| Cooling                           |                              | Natural convection and built-in fan                                                                                                        |
| Weight                            | CK3A-G305L                   | 1.81 kg                                                                                                                                    |
|                                   | CK3A-G310L                   | 2.67 kg                                                                                                                                    |
| Dimensions                        | CK3A-G305L                   | 212.5 x 65.0 x 180.0 mm                                                                                                                    |
|                                   | CK3A-G310L                   | 238.0 x 90.0 x 180.0 mm                                                                                                                    |
| Regulations and Standards         | Conformance to EU Directives | EMC Directive: EN61800-3 second environment<br>Low Voltage Directive: EN61800-5-1 C2 category<br>Functional Safety: EN61800-5-2 SIL3 (STO) |
|                                   | Conformance to UL Directives | UL Standards: UL 61800-5-1<br>CSA Standards: CSA C22.2 No. 274                                                                             |
|                                   | Conformance to KC Standards  | Applicable                                                                                                                                 |

## Environmental

| Item                             |  | Specification                                |
|----------------------------------|--|----------------------------------------------|
| Operating ambient temperature    |  | 0 to 55 °C                                   |
| Operating ambient humidity       |  | 10 to 90% RH (without condensation or icing) |
| Storage ambient temperature      |  | -25 to 70 °C                                 |
| Storage ambient humidity         |  | 10 to 90% RH (without condensation or icing) |
| Operating and storage atmosphere |  | Must be free of corrosive gases              |
| Maximum operating altitude       |  | 1,000 m                                      |

## Electrical

Values in parentheses indicate the range of acceptable variation. Rated values are outside of parentheses.

| Item                      |                                       |               | CK3A-G305L                     | CK3A-G310L            |
|---------------------------|---------------------------------------|---------------|--------------------------------|-----------------------|
| Logic power supply        | Voltage                               |               | 24 VDC (22.0 to 26.4)          |                       |
|                           | Current consumption                   |               | 1.5 A                          |                       |
|                           | Inrush current                        |               | 2.5 A                          |                       |
|                           | Inrush time                           |               | 5 msec                         |                       |
| Main circuit power supply | 3-Phase AC                            | Voltage       | 240 VAC (170 to 252 VAC)       |                       |
|                           |                                       | F.L.A.        | 6 A <sub>rms</sub>             | 11 A <sub>rms</sub>   |
|                           |                                       | Frequency     | 50 / 60 Hz                     |                       |
|                           | 1-Phase AC                            | Voltage       | 110 to 240 VAC (85 to 252 VAC) |                       |
|                           |                                       | F.L.A.        | 10.5 A <sub>rms</sub>          | 19.5 A <sub>rms</sub> |
|                           |                                       | Frequency     | 50 / 60 Hz                     |                       |
|                           | 1-Phase DC *1                         | (Low) Voltage | 48 VDC *1, 3 (44 to 60 VDC)    | N/A *2, 3             |
|                           |                                       | F.L.A.        | 6 A <sub>rms</sub>             | N/A                   |
| Output                    | Rated Current                         |               | 5 A <sub>RMS</sub>             | 10 A <sub>RMS</sub>   |
|                           | Maximum (peak) Current                |               | 10 A <sub>RMS</sub>            | 20 A <sub>RMS</sub>   |
|                           | Maximum Rated Power (3-Phase AC)      |               | 1195 W                         | 2390 W                |
|                           | Maximum Rated Power (1-Phase 240 VAC) |               | 1195 W                         | 2390 W                |
|                           | Maximum Rated Power (1-Phase 110 VAC) |               | 550 W                          | 1095 W                |
|                           | Maximum Rated Power (1-Phase DC)      |               | 195 W                          | N/A *2                |
|                           | Time at Peak Current                  |               | 2 sec                          |                       |
| PWM Interface             | Current feedback resolution           |               | 16 bits                        |                       |
|                           | Maximum current ADC reading           |               | 15.735 A                       | 31.470 A              |
|                           | Minimum PWM deadtime                  |               | 2 µsec                         | 3 µsec                |
|                           | PWM Frequency                         |               | 8 to 20 kHz                    |                       |
| Shunt Resistor            | Internal shunt resistor               |               | 30 W                           |                       |
|                           | External shunt resistor               |               | 20 Ω, 60 W                     | 17 Ω, 60 W            |

\*1. Must install low voltage short-circuit wire and set up ADC Strobe Word correctly.

\*2. The CK3A-G310L requires a special part number, and factory modification to operate with low voltage main power input. Contact your local Omron representative for this option.

\*3. The CK3A (both models) can functionally operate in the 100 to 350 VDC main supply input range without short-circuit wire or special consideration. Operation and setup are same as described in the *CK3A-series Direct PWM Amplifier User's Manual* (Cat. No. O050) however, the specifications and performance are not defined in this case.

## CK3A

### Performance

| Specification                          | Value              | Notes                                     |
|----------------------------------------|--------------------|-------------------------------------------|
| STO input to power drivers OFF         | < 30 msec          |                                           |
| Overcurrent I2T to IPM OFF             | < 10 msec          | A8 fault                                  |
| Phase short to IPM OFF                 | < 3 $\mu$ sec      | AC fault                                  |
| Current loop response time             | < 1 msec           | 1 mH 3-Ph brushless Motor Y-winding       |
| Dynamic brake relay response time      | < 20 msec          | Mechanical relay time constant            |
| I2T time to Amplifier OFF              | < 2.5 sec          | At 200% output                            |
| Soft start time                        | < 650 msec         | Do not enable Amplifier during soft start |
| Hold at momentary power interruption   | 10 msec            | 3-ph 208VAC @ rated load                  |
| DC bus discharge to less than < 36 VDC | < 2.5 sec          | Forced discharge to shunt resistor        |
|                                        | < 5 min            | Natural discharge                         |
| Current ADC clock frequency range      | 2.450 to 6.250 MHz | Set in Controller                         |
| Time between main circuit power cycles | 1 min minimum      | If discharge ON                           |
|                                        | 10 sec minimum     | If discharge OFF                          |

### Amplifier Internal Regeneration Absorption Capacity

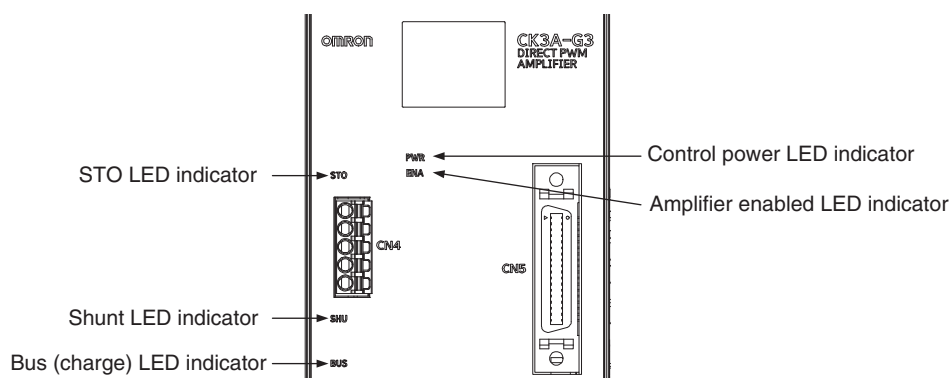
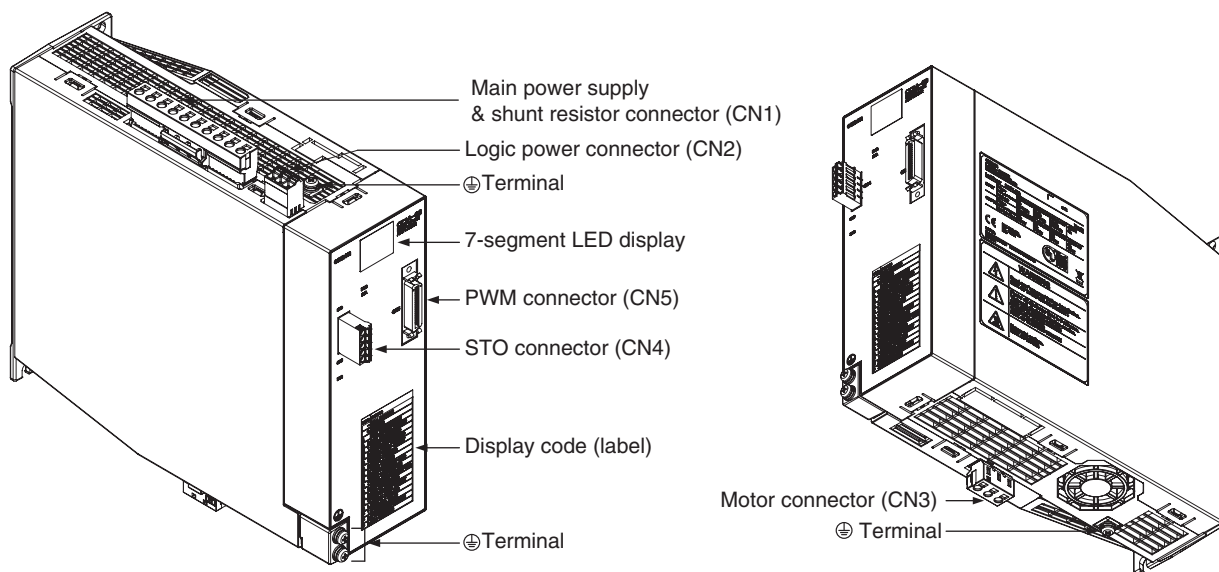
The following table shows the Amplifier power, internal shunt resistor specifications, regenerative power absorption capacity and maximum duration. These values are based on a 200VAC main power supply.

| Model                                                   | CK3A-G305L       | CK3A-G310L       |
|---------------------------------------------------------|------------------|------------------|
| Rated RMS power [W]                                     | 1195 W           | 2390 W           |
| Internal shunt resistor specification                   | 25 $\Omega$ 30 W | 17 $\Omega$ 80 W |
| Built-in capacitors absorption energy [J]               | 46 J             | 62 J             |
| Internal shunt resistor average regeneration energy [W] | 18 W             | 32 W             |
| Maximum duration of continuous regeneration [sec]       | 2 sec            | 2 sec            |
| Minimum allowable shunt resistance [ $\Omega$ ]         | 20 $\Omega$      | 15 $\Omega$      |

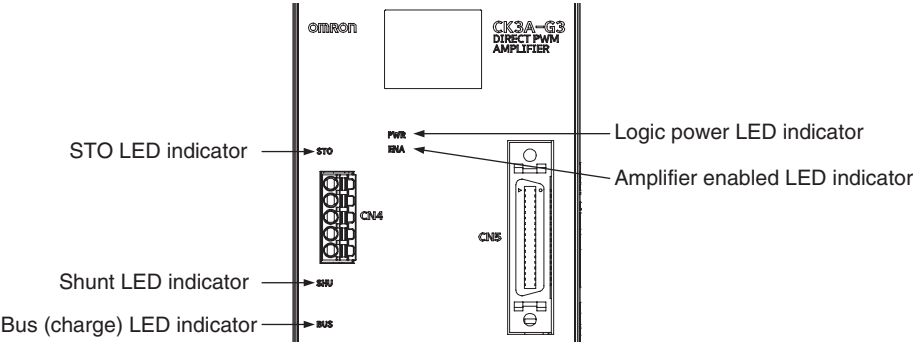
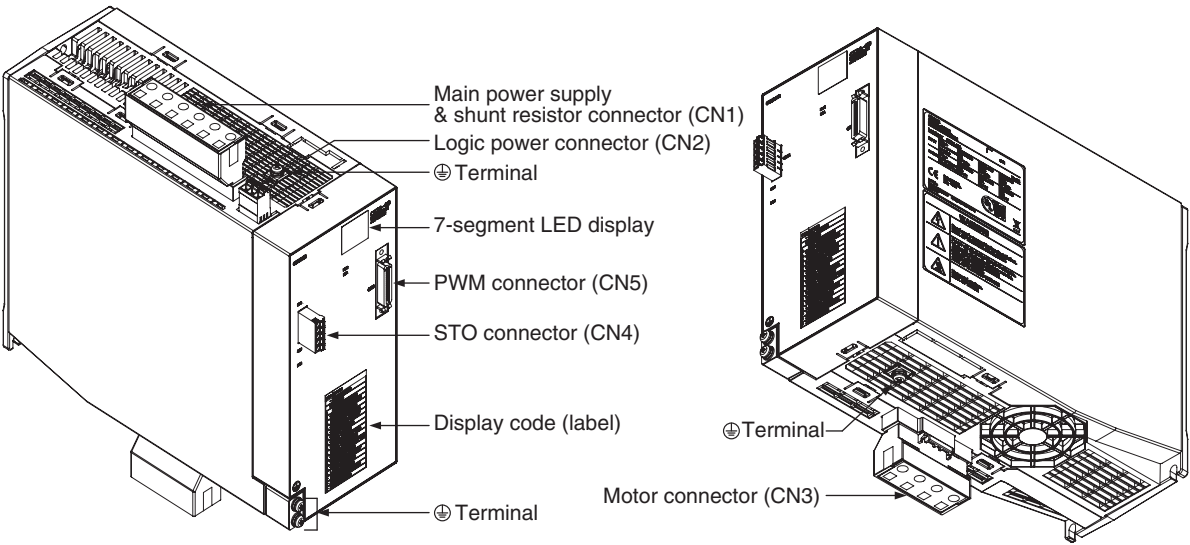
## Part Names and Functions

### Part Names

CK3A-G305L







## Part Functions

### Status LED Indicators

The following LED indicators are located on the front of the Amplifier:

| Name | Color     | Description                             |
|------|-----------|-----------------------------------------|
| PWR  | Green     | Indicates the logic power supply status |
| ENA  | Green     | Indicates the amplifier enabled status  |
| SHU  | Red       | Indicates if shunt operation is active  |
| STO  | Red/Green | Indicates STO input status              |
| BUS  | Red       | Indicates bus charge status             |

Refer to the *CK3A-series Direct PWM Amplifier User's Manual (Cat. No. 0050)* for details.

### 7-segment LED Displays

Dual 7-segment displays are located on the front of the Amplifier. These displays report Amplifier operation and error status. On power-up, the 7-segment displays scroll through all indicators six times.



### Main Circuit and Shunt Connector (CN1)

The CN1 connector is used for the following functions:

#### CK3A-G305L (10-pin)

- Main circuit power supply connection
- Internal shunt resistor connection (by short-circuit wire), or external shunt resistor connection
- Low voltage mode (by short-circuit wire)

#### CK3A-G310L (6-pin)

- Main circuit power supply connection
- Internal shunt resistor connection (by short-circuit wire), or external shunt resistor connection

### Logic Power Supply Connector (CN2)

The CN2 connector (3-pin) is used to supply 24 VDC logic power to the Amplifier.

### Motor Connector (CN3)

The CN3 connector is used to connect the Motor to the Amplifier. It is a 3-pin connector for the CK3A-G305L model and 4-pin connector for the CK3A-G310L model.

### Safe Torque OFF Connector (CN4)

The CN4 connector (5-pin) is used to disable or connect the STO input(s), and STO status output. The short-circuit wire to disable the STO is installed on the connector from the factory.

### Direct PWM Connector (CN5)

The CN5 connector (36-pin) is used to connect the Amplifier to the Controller. This is a pre-configured cable connector.

### Ground Terminals

Following, are the location and number of ground (⏏) terminals of the Amplifier:

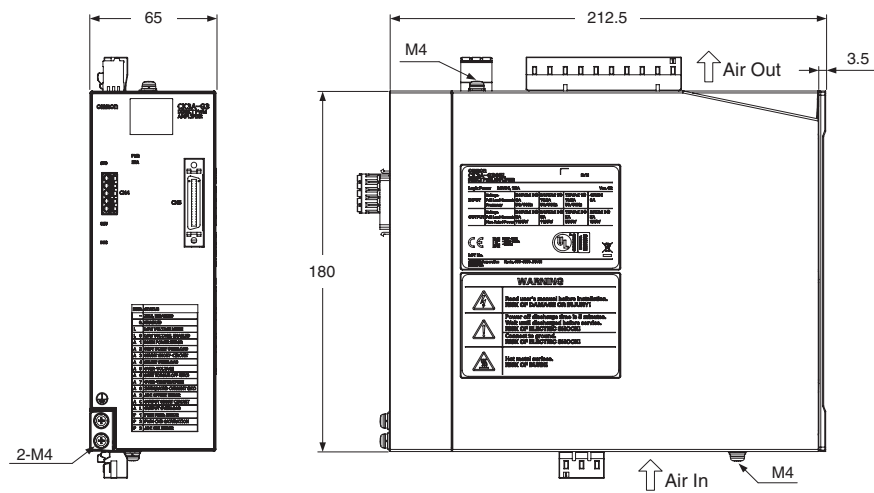
| Location | No. of Terminals | Suggested Use                                   |
|----------|------------------|-------------------------------------------------|
| Top      | 1                | Protective earth PE of main circuit power input |
| Front    | 2                | Frame Ground FG inside the control panel        |
| Bottom   | 1                | Frame Ground FG of Motor cable and shield       |

CK3A

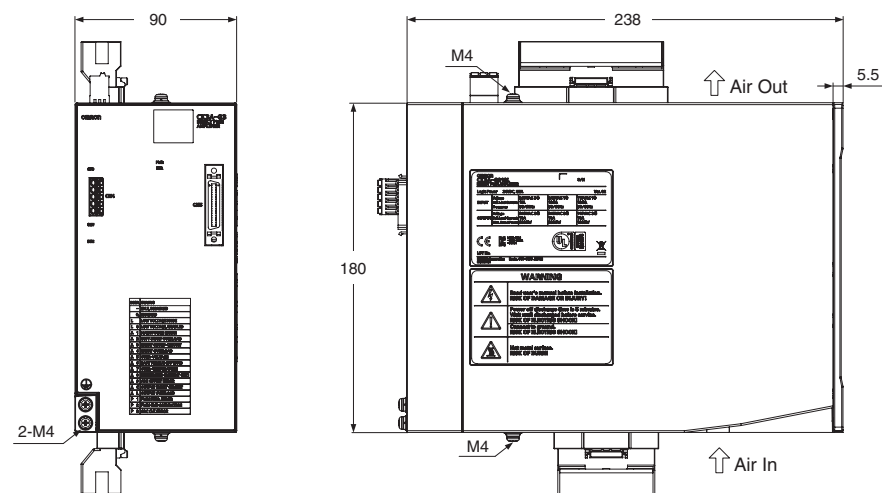
Dimensions

(Unit: mm)

CK3A-G305L

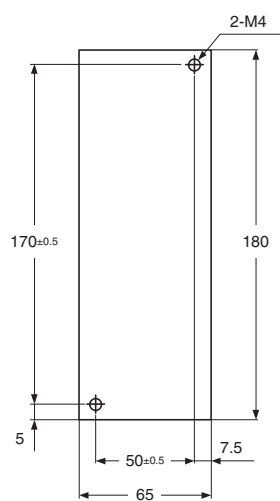


CK3A-G310L

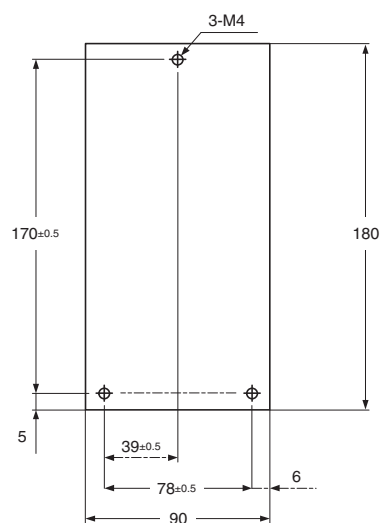


## Mounting Dimensions

CK3A-G305L



CK3A-G310L



## CK3A

### Related Manuals

| Manual Name                                                           | Cat. No. | Application                                                                                                                                            | Description                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CK3A-series Direct PWM Amplifier User's Manual                        | O050     | Learning about the specifications, including installation, wiring, basic software configuration, maintenance, and troubleshooting.                     | <ul style="list-style-type: none"><li>• Introduction to the Amplifier</li><li>• Configuration, features, and specifications</li><li>• Mounting, installation and wiring</li><li>• Basic software configuration</li><li>• Maintenance, and troubleshooting</li></ul> |
| CK3M-series Programmable Multi-Axis Controller Hardware User's Manual | O036     | Learning the basic specifications of the CK3M, including introductory information, design, installation, and maintenance. Mainly hardware information. | <ul style="list-style-type: none"><li>• Features and system configuration</li><li>• Introduction</li><li>• Part names and functions</li><li>• General specifications</li><li>• Installation and wiring</li><li>• Maintenance and inspection</li></ul>               |
| Power PMAC Software Reference Manual                                  | O015     | Learning the command set and structure elements of the Power PMAC Controller.                                                                          | <ul style="list-style-type: none"><li>• Power PMAC Data structure</li><li>• List and description of all commands</li><li>• List and description of all ASIC, Coordinate System and Motor structure elements, including CK3M and UMAC</li></ul>                      |
| Power PMAC User's Manual                                              | O014     | Learning the features and usage examples of the Power PMAC Controller.                                                                                 | <ul style="list-style-type: none"><li>• Parameter settings relevant to the Amplifier</li><li>• Motor basic functions</li><li>• Encoder configuration examples</li><li>• Motor setup examples</li><li>• Power PMAC programming examples</li></ul>                    |
| Power PMAC IDE User Manual                                            | O016     | Learning how to use the integrated development environment IDE of the Power PMAC Controller.                                                           | <ul style="list-style-type: none"><li>• Operating procedures of the Power PMAC IDE software</li><li>• Configuration of the Direct PWM Amplifier using system setup</li></ul>                                                                                        |
| ACC-24E3 Hardware Reference Manual                                    | N/A      | Learning the basic specifications of the UMAC accessory ACC-24E3, including introductory information, design, installation, maintenance.               | <ul style="list-style-type: none"><li>• Features and system configuration</li><li>• Introduction</li><li>• Part names and functions</li><li>• General specifications</li><li>• Installation and wiring</li></ul>                                                    |

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