

Digital I/O units for CK3M Controller



CK3W-MD71□0

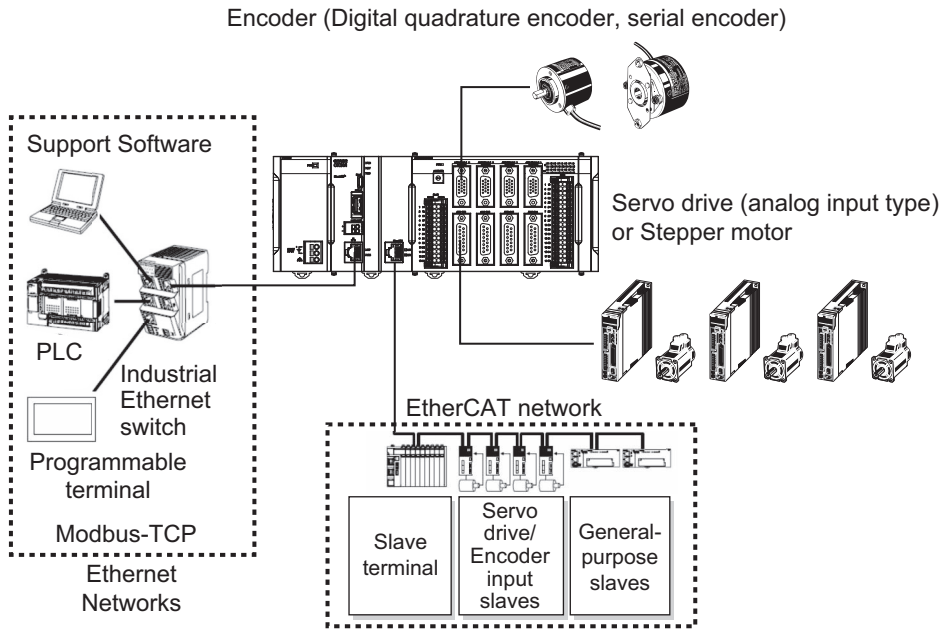
Features

- Built-in 16 DC inputs and 16 transistor outputs
- Two different models: PNP and NPN

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System Configurations

Basic System Configuration



CK3W Unit Configuration (CPU Rack/Expansion Rack)

The following shows the configuration of CK3W Units.

CPU Rack

The CK3W Unit configuration in the CPU Rack consists of a Power Supply Unit, CPU Unit, CK3W-AX Unit, CK3W-MD Unit, CK3W-AD Unit, and End Cover.

Up to four CK3W Units (or up to two CK3W-AX Units) can be connected to the CPU Unit.

Expansion Rack

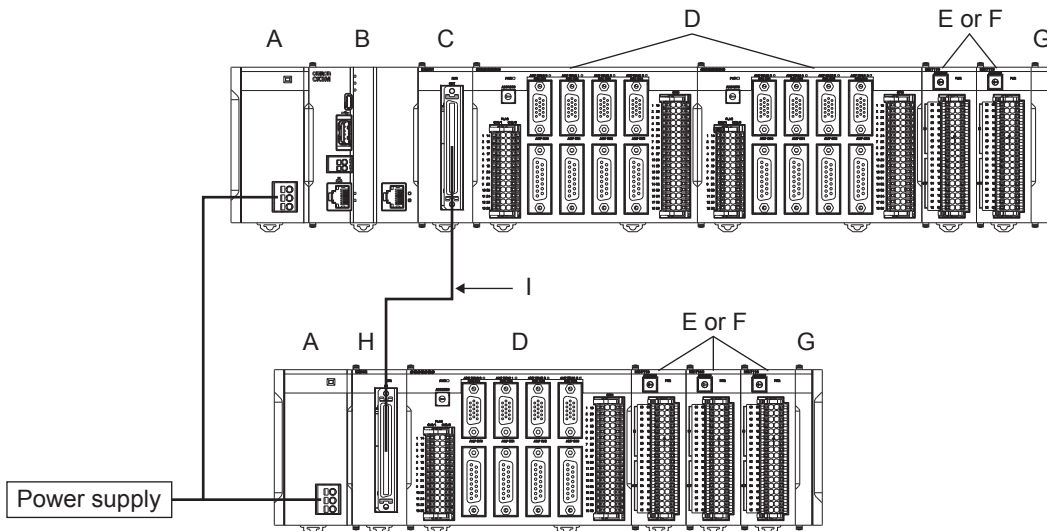
One Expansion Rack can be connected per CPU Unit.

To connect an Expansion Rack, use the Expansion Master Unit (CK3W-EXM01) and Expansion Slave Unit (CK3W-EXS02).

Up to four CK3W Units (or up to two CK3W-AX Units) can be installed to the Expansion Rack.

Connect the Expansion Master Unit (CK3W-EXM01) adjacent to the right side of the CPU Unit. Connect the Expansion Slave Unit (CK3W-EXS02) adjacent to the right side of the Power Supply Unit.

Unless the Expansion Master Unit (CK3W-EXM01) is connected adjacent to the right side of the CPU Unit, the Sys.Status register CK3WConfigErr becomes "5".

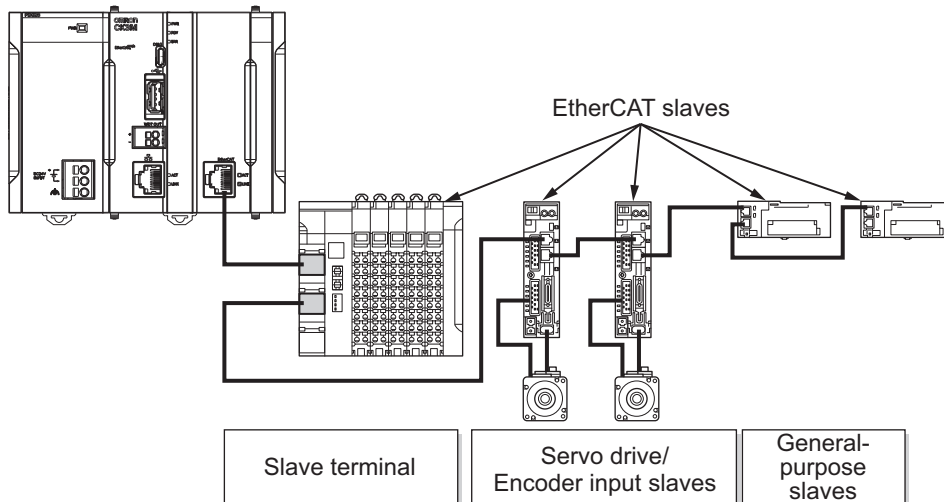


| Letter | Configuration | Remarks |
|--------|----------------------|--|
| A | Power Supply Unit | Input the 24 V power source. Always wire the CPU Rack and Expansion Rack to the same power supply. |
| B | CK3M-series CPU Unit | This is the Unit at the center of the motion control, which executes the motion program. |
| C | CK3W-EXM01 | Expansion Master Unit. Connect this Unit adjacent to the right side of the CPU Unit in the Expansion Rack. |
| D | CK3W-AX Unit | Axis Interface Unit. For axis control, connect this to a Servo Drive and encoder. |
| E | CK3W-MD Unit | Digital I/O Unit. You can add 16 digital inputs and 16 digital outputs. |

| Letter | Configuration | Remarks |
|--------|-----------------|---|
| F | CK3W-AD Unit | Analog Input Unit. You can add 4 or 8 voltage inputs. |
| G | End Cover | Must be connected to the right end of the CPU Rack and Expansion Rack. The CPU Unit and the Expansion Slave Unit are each provided with one End Cover. |
| H | CK3W-EXS02 | Expansion Slave Unit. Use this in the Expansion Rack. Connect this Unit adjacent to the right side of the Power Supply Unit. |
| I | Expansion cable | Use this cable to connect the Expansion Master Unit and the Expansion Slave Unit. The cable length is 30 cm. Be sure to use the CK3W-CAX003A (30 cm) cable. |

EtherCAT Network Configuration

The EtherCAT network configuration consists of a Power Supply Unit, CPU Unit, End Cover, and EtherCAT slaves. Use the built-in EtherCAT port on the CK3M-series CPU Unit to connect EtherCAT slaves.



EtherCAT is synchronized with the servo cycle of the CK3M-series CPU Unit. This enables acquisition of the I/O data of slave terminals that are synchronized with the servo cycle.

Ordering Information

Digital I/O Units

| Product name | Number of inputs | Number of outputs | I/O type | Model |
|------------------|------------------|-------------------|----------|-------------|
| Digital I/O Unit | 16 | 16 | NPN | CK3W-MD7110 |
| | | | PNP | CK3W-MD7120 |

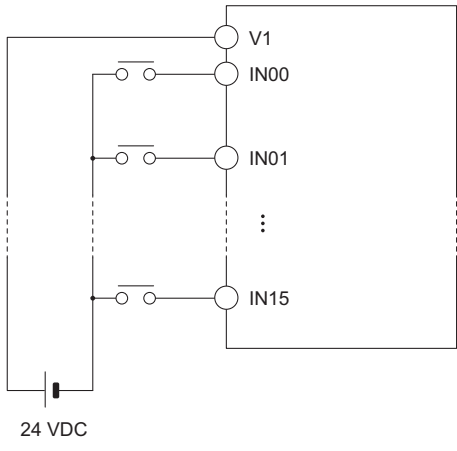
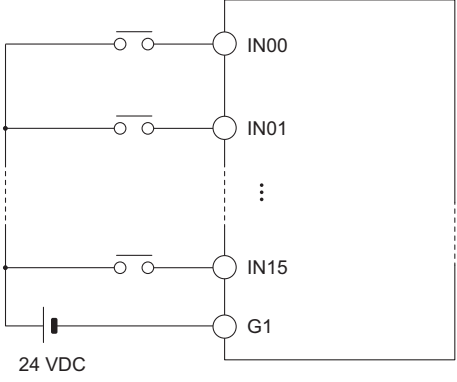
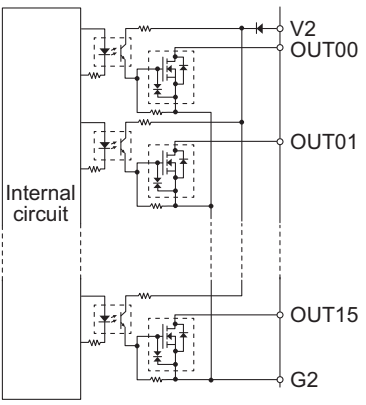
General Specifications

This section describes the Motion Controller specifications.

| Item | | Specification |
|------------------------------|--------------------------------------|--|
| Enclosure | | Mounted in a panel |
| Grounding Method | | Ground to less than 100 Ω. |
| Operating Environment | Ambient Operating Temperature | 0 to 55°C |
| | Ambient Operating Humidity | 10% to 95% (with no condensation or icing) |
| | Atmosphere | Must be free of corrosive gases. |
| | Ambient Storage Temperature | -25 to 70°C (with no condensation or icing) |
| | Vibration Resistance | Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 m/s ² 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total) |
| | Shock Resistance | Conforms to IEC 60068-2-27. 147 m/s ² , 3 times each in X, Y, and Z directions |
| Insulation Resistance | | 20 MΩ min. between isolated circuits (at 100 VDC) |
| Dielectric Strength | | 510 VAC between isolated circuits for 1 minute with a leakage current of 5 mA max. |
| Applicable Standards | | cULus, EU: EN 61326, RCM, KC, EAC |

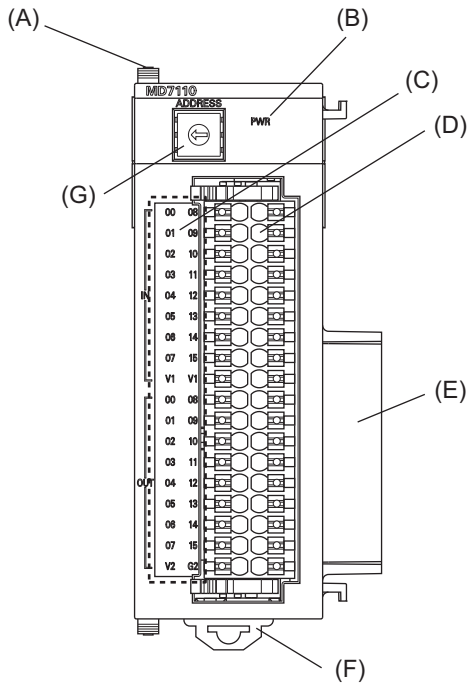
Specifications

| | | | |
|-------------------------|--------------------------------|--|--|
| Digital input (NPN/PNP) | Number of inputs | 16 points | |
| | Rated input voltage | 24 VDC | |
| | Maximum input voltage | 26.4 VDC | |
| | Input current | 3.9 mA typical (24 VDC) | |
| | ON voltage/ON current | 15 VDC min./3 mA min. | |
| | OFF voltage/OFF current | 5 VDC max./1 mA max. | |
| | ON/OFF response time | 20 μs max./400 μs max. | |
| | Isolation method | Isolation by Photocoupler (between input and internal circuit) | |
| | Circuit configuration | <p>NPN type</p> | |
| | | <p>PNP type</p> | |

| | | |
|--------------------------------------|-------------------------------------|---|
| Digital input (NPN/PNP) | Connection diagram | <p>NPN type</p>  <p>24 VDC</p> |
| | | <p>PNP type</p>  <p>24 VDC</p> |
| Digital output (NPN) | Internal common | NPN |
| | Rated voltage | 12 to 24 VDC |
| | Current consumption | 40 mA max. |
| | Operating load voltage range | 10.2 to 26.4 VDC |
| | Maximum load current | 0.5 A/point, 2 A/Unit |
| | Maximum inrush current | 4.0 A/point, 10 ms max. |
| | Leakage current | 0.1 mA max. |
| | Residual voltage | 1.0 V max. |
| | ON/OFF response time | 0.1 ms max./0.8 ms max. |
| | Isolation method | Isolation by Photocoupler (between output and internal circuit) |
| Load short-circuit prevention | Not provided | |
| Digital output (NPN) | Circuit configuration |  |

| | | |
|---|---|--|
| <p>Digital output (NPN)</p> | <p>Connection diagram</p> | |
| <p>Digital output (PNP)</p> | <p>Internal common</p> | <p>PNP</p> |
| | <p>Rated voltage</p> | <p>12 to 24 VDC</p> |
| | <p>Current consumption</p> | <p>80 mA max.</p> |
| | <p>Operating load voltage range</p> | <p>10.2 to 26.4 VDC</p> |
| | <p>Maximum load current</p> | <p>0.5 A/point, 2 A/Unit</p> |
| | <p>Maximum inrush current</p> | <p>4.0 A/point, 10 ms max.</p> |
| | <p>Leakage current</p> | <p>0.1 mA max.</p> |
| | <p>Residual voltage</p> | <p>1.0 V max.</p> |
| | <p>ON/OFF response time</p> | <p>0.1 ms max./0.8 ms max.</p> |
| | <p>Isolation method</p> | <p>Isolation by Photocoupler (between output and internal circuit)</p> |
| | <p>Load short-circuit prevention</p> | <p>Provided</p> |
| <p>Digital output (PNP)</p> | <p>Circuit configuration</p> | |
| | <p>Connection diagram</p> | |
| <p>Power consumption</p> | <p>5 V: 1.0 W max.</p> | |
| <p>Dimensions (height x depth x width)</p> | <p>90(H)/80(D)/31.6(W)</p> | |
| <p>Weight</p> | <p>150 g max.</p> | |

Part Names and Functions



| Letter | Name | Function |
|--------|---------------------------------------|--|
| A | Slider | Holds the Units together. |
| B | Power supply status indicator | Shows the power supply status. |
| C | Digital input/output status indicator | Shows the digital input/output status. |
| D | Terminal block | Connects the digital input/output. |
| E | Unit connector | Connector that connects to the Unit. |
| F | DIN Track mounting hook | Used to mount the Unit to a DIN Track. |
| G | Address switch | Sets the Gate3 Index. |

Wiring

Applicable Wires

The wires that you can connect to the terminal block are twisted wires, solid wires, and ferrules that are attached to the twisted wires. The following section describes the dimensions and processing methods for applicable wires.

Using Ferrules

If you use ferrules, attach the twisted wires to them.

Observe the application instructions for your ferrules for the wire stripping length when attaching ferrules.

Always use plated one-pin ferrules. Do not use unplated ferrules or two-pin ferrules.

The applicable ferrules, wires, and crimping tools are listed in the following table.

| Manufacturer | Ferrule model | Applicable wire (mm ² (AWG)) | Crimping Tool (applicable wire size given in parentheses) |
|-----------------|---------------|---|---|
| Phoenix Contact | AI0,5-10 | 0.5 (#20) | Phoenix Contact CRIMPFOX 6 (0.25 to 6 mm ² , AWG24 to 10) |
| | AI0,75-10 | 0.75 (#18) | |
| | AI1,0-10 | 1.0 (#18) | |
| | AI1,5-10 | 1.5 (#16) | |
| Weidmüller | H0.5/16 | 0.5 (#20) | Weidmüller PZ6 Roto (0.14 to 6 mm ² , AWG26 to 10) |
| | H0.75/16 | 0.75 (#18) | |
| | H1.0/16 | 1.0 (#18) | |
| | H1.5/16 | 1.5 (#16) | |

Using Twisted or Solid Wires

| Wire type | Conductor cross-sectional area | Conductor length (stripping length) |
|--------------|--------------------------------|-------------------------------------|
| Solid wire | 0.14 to 1.5 mm ² | 10 mm |
| Twisted wire | | |

Required Tools

Use a flat-blade screwdriver to remove wires.

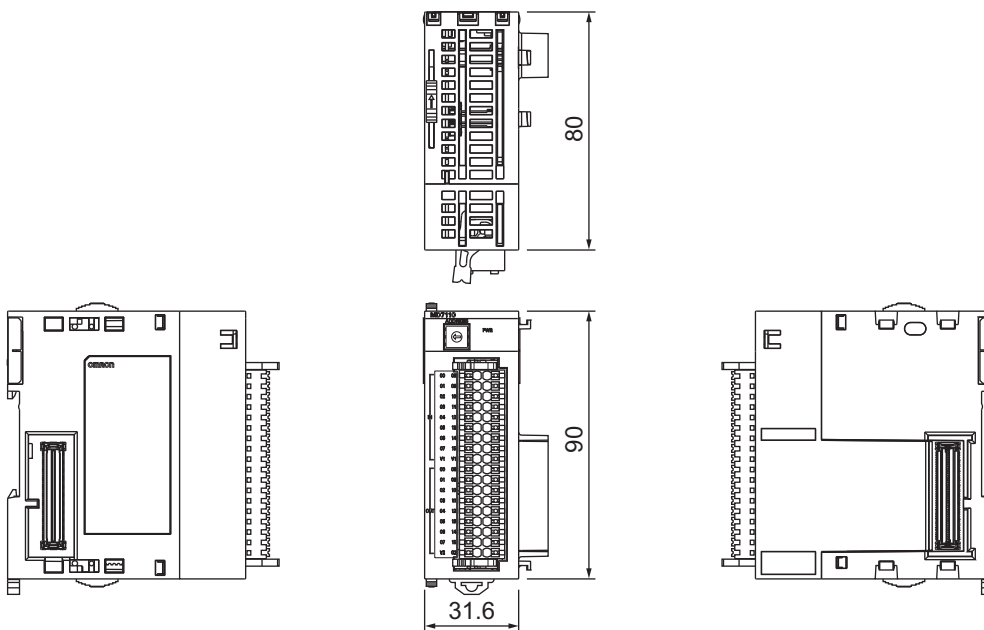
The recommended screwdriver is as follows.

| Model | Manufacturer |
|---------------|-----------------|
| SZF 0-0,4X2,5 | Phoenix Contact |

Dimensions

(Unit: mm)

Digital I/O Unit



Related Manuals

The following manuals are related. Use these manuals for reference. Contact your OMRON representative for information on how to procure these manuals.

| Manual name | Cat. No. | Application | Description |
|---|----------|--|---|
| CK3M-series Programmable Multi-Axis Controller Hardware User's Manual | O036 | Learning the basic specifications of the CK3M-series Programmable Multi-Axis Controller, including introductory information, design, installation, and maintenance. Mainly hardware information is provided. | An introduction to the entire CK3M-series system is provided along with the following information. <ul style="list-style-type: none"> • Features and system configuration • Introduction • Part names and functions • General specifications • Installation and wiring • Maintenance and inspection |
| Power PMAC User's Manual | O014 | Learning the features and usage examples of the CK3M-series Programmable Multi-Axis Controller. | The following information is provided on the CK3M-series Programmable Multi-Axis Controller. <ul style="list-style-type: none"> • Basic functions • Setup examples • Programming examples |
| Power PMAC Software Reference Manual | O015 | Learning how to program a CK3M-series Programmable Multi-Axis Controller. | The following information is provided on the CK3M-series Programmable Multi-Axis Controller. <ul style="list-style-type: none"> • Details of commands • Details of data structure |
| Power PMAC IDE User Manual | O016 | Learning how to operate Power PMAC IDE, the integrated development environment of the Controller. | Describes the operating procedures of Power PMAC IDE, and examples of how to start the system. |
| Power PMAC-NC-16 Quick Start Manual | O017 | Briefly understanding the basic usage of Power PMAC-NC16. | Describes the Quick setup procedure to run Power PMAC-NC16 on a desktop PC by showing some examples. |
| Power PMAC-NC16 .ini Configuration Manual | O018 | Configuring an application for CNC devices by using Power PMAC-NC16. | Describes how to set up <i>PowerPmacNC.ini</i> , the setup data file to be loaded when Power PMAC-NC16 starts. |
| Power PMAC-NC16 Software User Manual | O019 | Learning about usage and features of Power PMAC-NC16, Support Software required to use the Controller for CNC devices. | The following information is provided on Power PMAC-NC16. <ul style="list-style-type: none"> • How to use the software • Features included in the software • Features that can be customized |
| Power PMAC-NC16 Mill G-Code Manual | O020 | Creating programs for CNC devices by using Power PMAC-NC16. | Describes the basic G-code set that can be used for Power PMAC-NC16, and relevant instructions. |

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