Oriental motor

# αSTEP AZ Series mini Driver

## DC Input

Modular Automation Products

## The αSTEP **AZ Series** now includes a **mini driver** option.

Compatible with battery power operation for use in a wider range of applications.

EtherCAT
Drive Profile-Compatible

**AZD-KRED**

EtherNet/IP™

**AZD-KREP**

PROFINET

**AZD-KRPN**

**AZD-KREN**

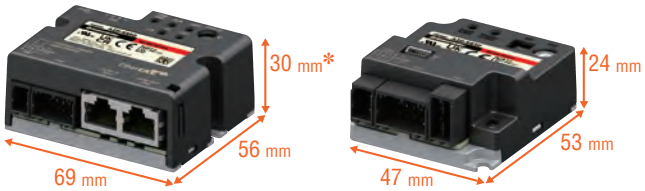
**AZD-KR2D**

Pulse Input Type with
RS-485 Communication

**AZD-KRX**

# The mini Driver Allows for Smaller and More

## Compact Design to Fit in Small Spaces




**AZD-KRED** **AZD-KREP**
**AZD-KRPN** **AZD-KRX**
**AZD-KREN**

**AZD-KR2D**

✻The **AZD-KRX** is 25 mm.

### Installation Space is Minimized

No DIN rail required. Can be installed directly to equipment with 2 screws.

**AZD-KRED** **AZD-KREP**
**AZD-KRPN** **AZD-KRX**
**AZD-KREN**



**AZD-KR2D**

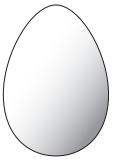
## Light Weight Design Reduces Load on Equipment

56 g

**AZD-KR2D**

● The mass of all models except the **AZD-KR2D** is 84-110 g.

Approx. 60 g



1 medium egg

Example: When mounted inside AMR/AGV.

Reduce overall equipment mass
Reduce Power Consumption for Drive Wheels

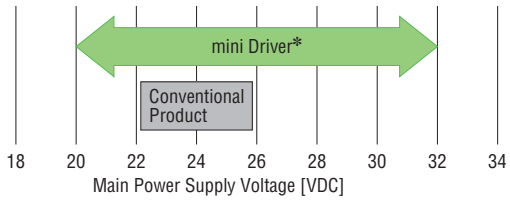
→ See use examples (Page 4)

## Compatible with Battery Power

Accepts a wide power supply voltage range for battery power operation. Supports 24 VDC and 48 VDC.

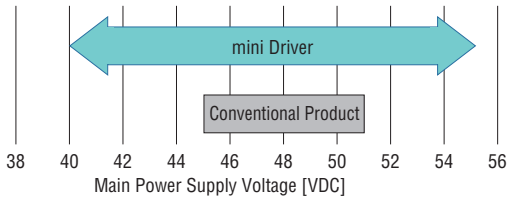
● Operable Voltage Range

When used with 24 VDC



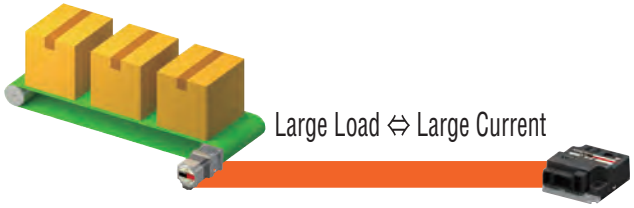

* For a motor with an electromagnetic brake, the range is 22.8 to 32 VDC

When used with 48 VDC




## Energy Savings through Optimized Current Control

The servo emulation mode optimises the current provided to the motor to match the load conditions.





Example: When mounted inside AMR/AGV.

Reduce Power Consumption.
Increase Battery Life

→ See use examples (Page 4)

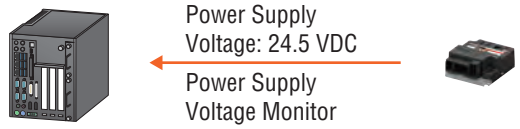
# Power-Efficient Devices

**What Are Modular Automation Products?**

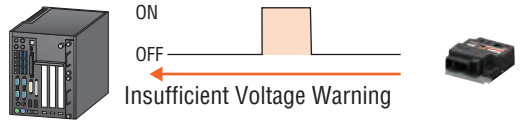
Modular Automation Products are a group of products that share the common features of being battery-powered, compact and lightweight. Optimised for use with self-propelled devices and mobile equipment, they contribute to the realisation of exible automation lines and mobile automation.

## Power Supply Voltage Monitoring

It is possible to monitor the driver power supply voltage from the host controller.




If the driver power supply voltage drops below a pre-set threshold a signal is output.




When mounted inside self-propelled devices

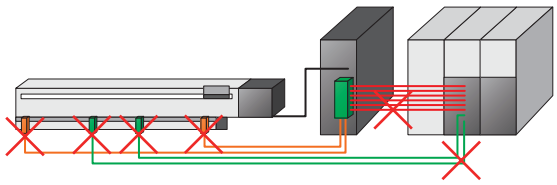
### Avoid Stoppages due to Insufficient Battery

→ See use examples (Page 4)

## No External Sensors Required

With the **AZ** Series, external sensors and associated wiring are not required.

Example of Wiring when Using External Sensors.
The **AZ** Series eliminates the need for these external sensors and wires shown in green and red.



High positioning accuracy can be achieved by using the mechanical battery-free absolute sensor (ABZO Sensor).


## Compatible with Various Interfaces

These are compatible with the major industrial networks used around the globe. Pulse control is also possible.

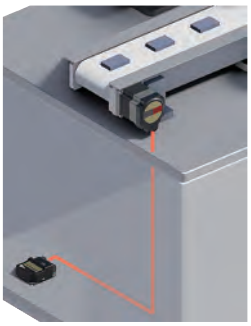
| Interface | Driver Type (Driver type name) |
|---|---|
| EtherCAT | EtherCAT Drive Profile-Compatible |
| EtherNet/IP | EtherNet/IP |
| PROFINET | PROFINET |
| Modbus TCP/IP | Ethernet Type NEW |
| Modbus RTU | RS-485 Communication Type |
| Pulse | Pulse Input Type with RS-485 Communication |

- The **AZD-KRED** passes the official EtherCAT conformance test.
- The **AZD-KR2D** is also compatible with CC-Link and MECHATROLINK control when used with a network converter (gateway).

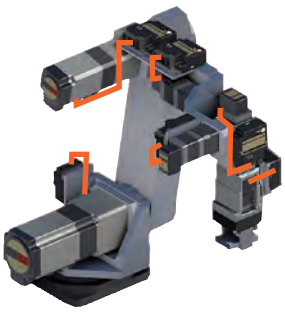
## Up to 10 m Connection Cable Extension

Connection cables can be selected to suit the installation environment, with lengths of 0.5 m, 1 m, 3 m, 5 m, 10 m available.

When the motor and driver are far apart, 3 m, 5 m and 10 m cables are recommended.



When the motor and driver are close, 0.5 m and 1 m cables are recommended.



- Flexible connection cables in the same lengths are also available.

Examples of mini drivers in use are shown on the next page

# Example A: Incorporation into Self-propelled Devices

## Equipment Problem Battery operation time must be maximized.

The equipment's overall power consumption can be reduced by lowering the equipment's overall mass, and by reducing the motor's running current when large amounts of torque aren't required.

## With the αSTEP AZ Series mini Driver...

### Light Design Reduces Load on Equipment

By reducing the overall equipment mass, the power consumption for the drive wheels can be reduced.

56 g ≒ Approx. 60 g

● The mass of all models except the **AZD-KR2D** is 84-110 g.

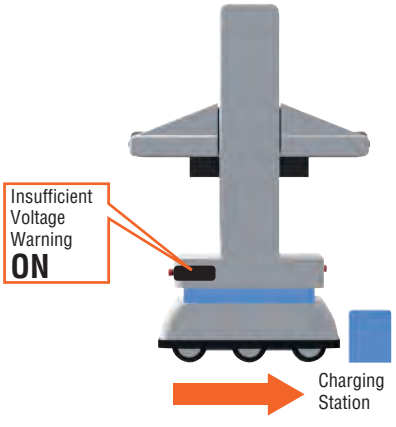
### Energy Savings through Optimized Current Control

The current supplied to the motor is optimized to suit the load (also called servo emulation mode), thus reducing power consumption. This allows for a reduction in the number of times the battery must be charged.

When the load is light, the current supplied to the motor is automatically reduced.

### Power Supply Voltage Monitoring

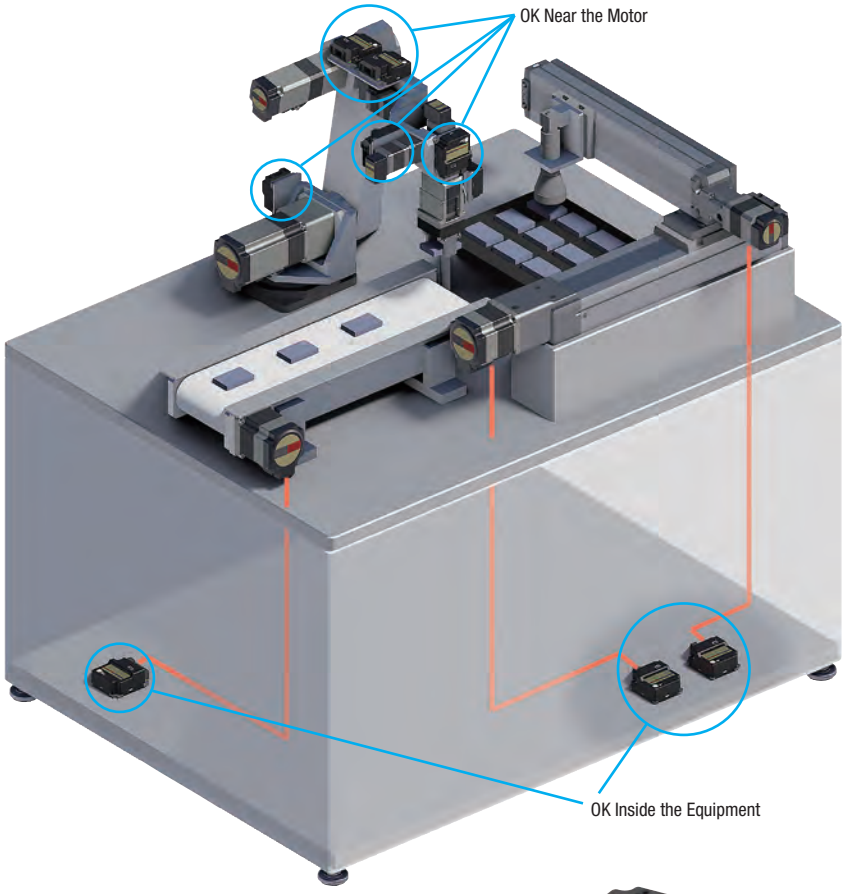
The power supply voltage can be monitored using the monitoring function, and the battery is recharged at the appropriate time.



# Example B: Incorporation in Stationary Equipment

**Equipment Problem** Install the diver and control systems in separate locations to reduce overall equipment size.

Install the mini drivers in the empty enclosure space, or install the mini drivers alongside the work allowing for a smaller control cabinet design.




## The αSTEP AZ Series mini Driver Provides

### Compact Design to Fit in Small Spaces

Volume is greatly reduced in comparison to a box-type DC driver.

AZD-KD

Size Reduced More Than 60%!

AZD-KR2D

### No External Sensors Required

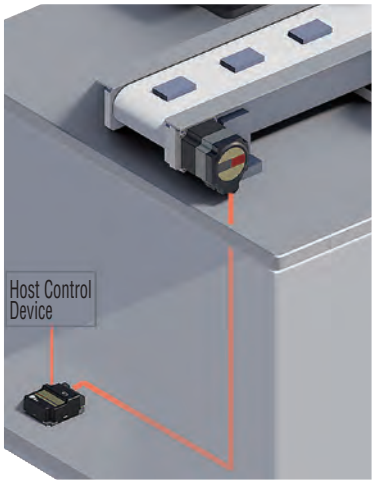
No external sensor or related wiring is necessary. Because there are no external sensors and wiring, the size and weight of the equipment can be reduced. Additionally, the work time for wiring can be reduced.

### FA Network Compatible

Common Network Protocals are available to support the host controller, reduce the burden of programing and support quicker installation time.

### Up to 10 m Connection Cable Extension

The length of the cable between the motor and driver can be selected to suit the installation environment. Extension of up to 10 m are available.



## Applicable Series

The **AZ** Series mini Driver DC Power Input can be used in combination with the following motors and linear & rotary actuators.

### Motors

· **AZ** Series DC Power Input

### Electric Linear & Rotary Actuators

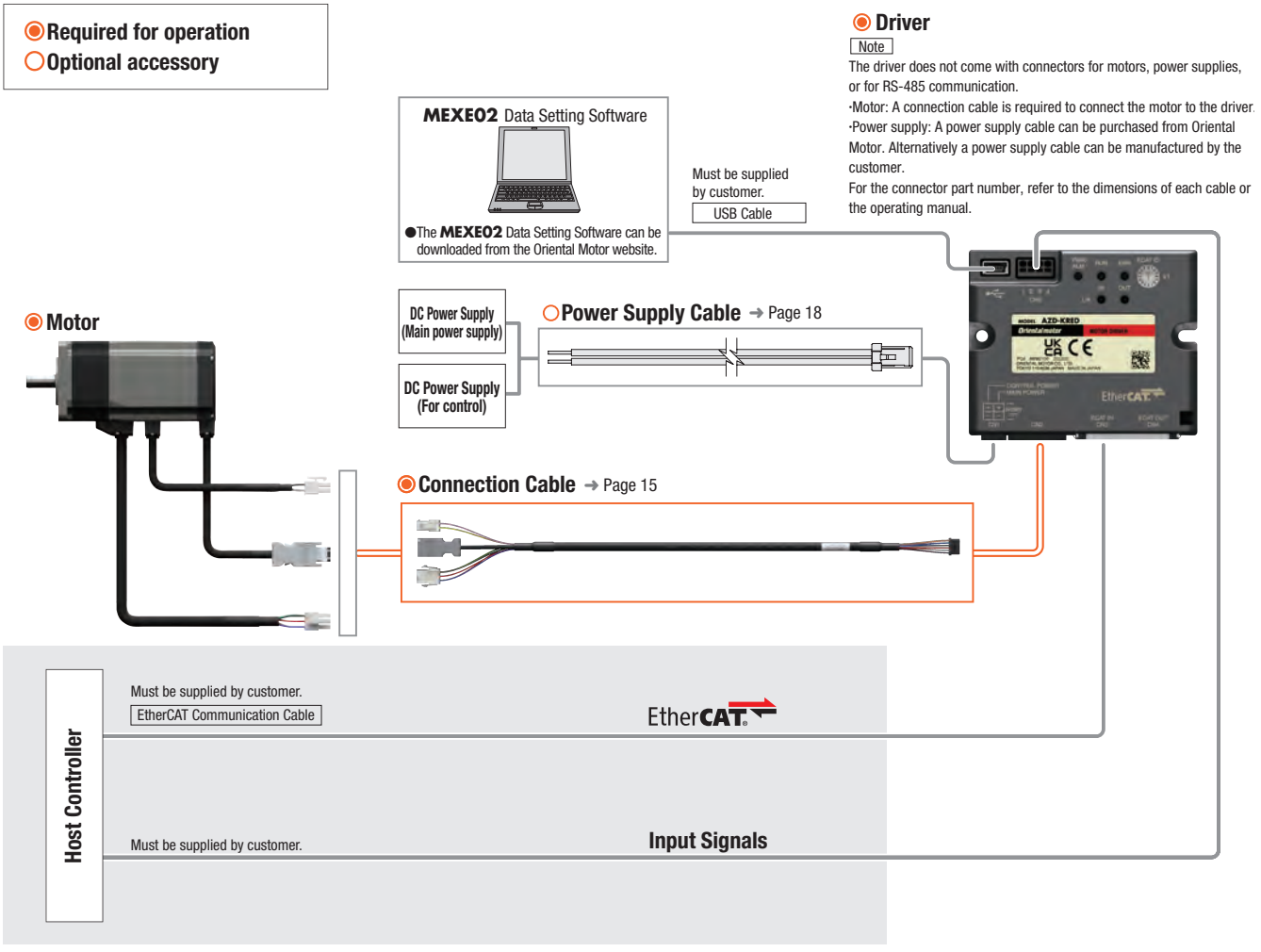
· Electric Linear Slides **EZS** Series DC Power Input **AZ** Series Equipped
· Electric Cylinders **EAC** Series DC Power Input **AZ** Series Equipped
· Compact Electric Cylinders **DR** Series / **DRS2** Series **AZ** Series Equipped
· Electric Grippers **EH** Series **AZ** Series Equipped
· Hollow Rotary Actuators **DGII** Series DC Power Input **AZ** Series Equipped
· Rack and Pinion System **L** Series DC Power Input **AZ** Series Equipped

● For applicable motor and electric linear & rotary actuator combinations, please see the Oriental Motor website or refer to each brochure of product series.

## System Configuration

### When the Standard Type Electromagnetic Brake Motor Combined with an EtherCAT Drive Profile-Compatible mini Driver

Motors, drivers, and connection cables / flexible connection cables must be ordered separately.




○ **Peripheral Equipment** ➜ Page 19

Mounting Bracket for Circuit Products

Regeneration Unit

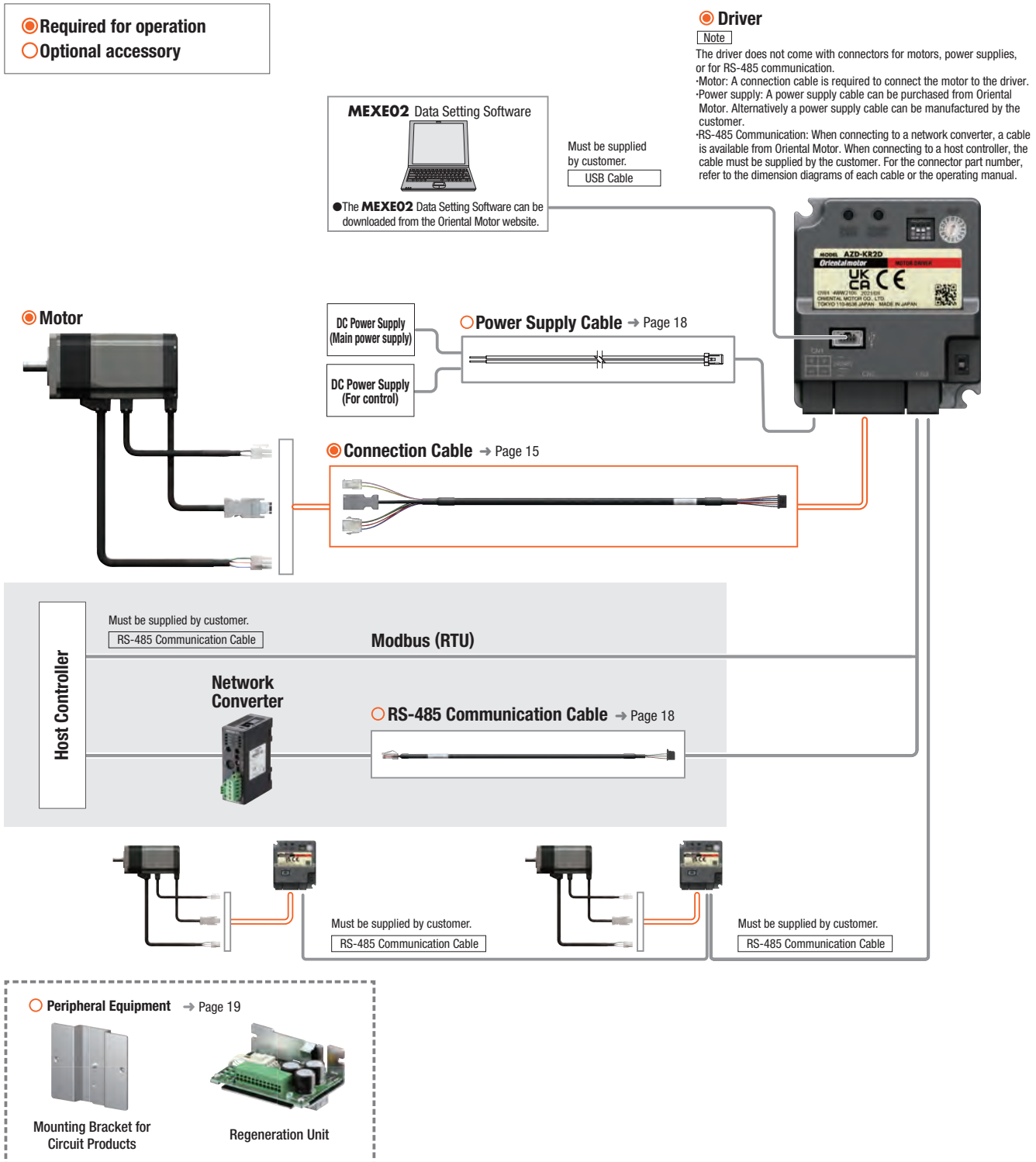
● The system configuration shown above is an example. Other combinations are also available.

Note

● The motor cable and electromagnetic brake cable from the motor cannot be connected directly to the driver. When connecting to a driver, use a connection cable.

## ●AZ Series Standard Type Electromagnetic-Brake Motor Combined with RS-485 Communication Type Mini Driver

Motors, drivers, and connection cables / flexible connection cables must be ordered separately.




● The system configuration shown above is an example. Other combinations are also available.

Note

● The motor cable and electromagnetic brake cable from the motor cannot be connected directly to the driver. When connecting to a driver, use a connection cable.

## ●AZ Series Standard Type Electromagnetic-Brake Motor Combined with Pulse Input Type with RS-485 Communication Type mini Driver

Motors, drivers, and connection cables / flexible connection cables must be ordered separately.

**◉Required for operation**
**○Optional accessory**

**◉Driver**

Note

The driver does not come with connectors for motors, power supplies, I/O signals, or for RS-485 communication.
· Motor: A connection cable is required to connect the motor to the driver.
· Power Supply: A power supply cable can be purchased from Oriental Motor. Alternatively a power supply cable can be manufactured by the customer.
· I/O Signal: An I/O signal cable can be purchased from Oriental Motor. Alternatively a I/O signal cable can be manufactured by the customer.
· RS-485 Communication: Connector not supplied.
Check either page 14 or the operating manual for connector part numbers.

**Support Software MEXE02**

● The **MEXE02** Data Setting Software can be downloaded from the Oriental Motor website.

Must be supplied by customer.

USB Cable

**◉Motor**

DC Power Supply (Main power supply)

DC Power Supply (For control)

**○Power Supply Cable** ➜ Page 18

**◉Connection Cables** ➜ Page 15

Host Control

**○Cables for I/O Signals** ➜ Page 17

Not supplied.

RS-485 Communication Cable

**Modbus (RTU)**

Must be supplied by customer.

RS-485 Communication Cable

Must be supplied by customer.

RS-485 Communication Cable

**○Peripheral Equipment** ➜ Page 19

Mounting Bracket for Circuit Products

Regeneration Unit

● The system configuration shown above is an example. Other combinations are also available.

Note

● The motor cable and electromagnetic brake cable from the motor cannot be connected directly to the driver. When connecting to a driver, use a connection cable.

## Product Name

**AZD - K R 2 D**

① ② ③ ④ ⑤

| | | |
|---|---|---|
| ① | Driver Type | **AZD**: **AZ** Series Driver |
| ② | Power Supply Input | **K**: 24 VDC/48 VDC |
| ③ | Driver Figure | **R**: Compact |
| ④ | Reference Number | |
| ⑤ | Type | **ED**: EtherCAT Drive Profile-Compatible<br>**EP**: EtherNet/IP<br>**PN**: PROFINET<br>**EN**: Ethernet Type<br>**D**: RS-485 Communication Type<br>**X**: Pulse Input Type with RS-485 Communication |

## Product Line

### EtherCAT Drive Profile-Compatible

| Product Name |
|---|
| **AZD-KRED** |

### EtherNet/IP

| Product Name |
|---|
| **AZD-KREP** |

### PROFINET

| Product Name |
|---|
| **AZD-KRPN** |

### Ethernet Type

| Product Name |
|---|
| **AZD-KREN** |

### Pulse Input Type with RS-485 Communication

| Product Name |
|---|
| **AZD-KRX** |

### RS-485 Communication Type

| Product Name |
|---|
| **AZD-KR2D** |

## List of Combinations

| Product | Type | Product Name |
|---|---|---|
| Motor | Standard Type | **AZM14AK**, **AZM15AK**<br>**AZM24AK**, **AZM26AK**<br>**AZM46**□□**K**□, **AZM48A**□**K**□<br>**AZM66**□□**K**□, **AZM69**□□**K**□ |
| | **TS** Geared Type | **AZM46**□**K-TS**□■<br>**AZM66**□**K-TS**□■ |
| | **FC** Geared Type | **AZM46**□**K-FC**□■**A**<br>**AZM66**□**K-FC**□■**A** |
| | **PS** Geared Type | **AZM24AK-PS**□<br>**AZM46**□**K-PS**□<br>**AZM66**□**K-PS**□ |
| | **HPG** Geared Type | **AZM46**□**K-HP**□□<br>**AZM66**□**K-HP**□□ |
| | Harmonic Geared Type | **AZM24AK-HS**□<br>**AZM46**□**K-HS**□<br>**AZM66**□**K-HS**□ |

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| Product | Type | Product Name |
|---|---|---|
| Driver | EtherCAT Drive Profile-Compatible | **AZD-KRED** |
| | EtherNet/IP | **AZD-KREP** |
| | PROFINET | **AZD-KRPN** |
| | Ethernet Type | **AZD-KREN** |
| | RS-485 Communication Type | **AZD-KR2D** |
| | Pulse Input Type with RS-485 Communication | **AZD-KRX** |

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| Product | Type | | Product Name |
|---|---|---|---|
| Connection Cable / Flexible Connection Cable | For **AZM14**, **AZM15**, **AZM24**, **AZM26** | Connection Cable | **CCM**◇◇◇**Z2AAF** |
| | | Flexible Connection Cable | **CCM**◇◇◇**Z2AAR** |
| | For **AZM46**, **AZM48**, **AZM66**, **AZM69** | Connection Cable | For Motor / Encoder: **CCM**◇◇◇**Z2ABF**<br>For Motor / Encoder / Electromagnetic Brake: **CCM**◇◇◇**Z2ACF** |
| | | Flexible Connection Cable | For Motor / Encoder: **CCM**◇◇◇**Z2ABR**<br>For Motor / Encoder / Electromagnetic Brake: **CCM**◇◇◇**Z2ACR** |

● A code or a number indicating either one of the followings is entered where the box is located within the product name.

- □: Output Shaft Shape
- □: Additional Function
- □: Motor Cable Type
- □: Gear Ratio
- ■: Cable Outlet Direction
- □: Output Shaft Type
- ◇: Cable Length

## Driver Specifications

| Driver Product Name | | AZD-KRED | AZD-KREP | AZD-KRPN | AZD-KREN | AZD-KR2D |
|---|---|---|---|---|---|---|
| Main Power Supply | Rated Voltage | · 24 VDC±5%<br>· 48 VDC±5% | | | | |
| | Input Current*1 | **AZM14**: 0.4A, **AZM15**: 0.5A, **AZM24**: 1.4A, **AZM26**: 1.4A<br>**AZM46**: 1.6A, **AZM48**: 2.1A, **AZM66**: 3.7A, **AZM69**: 3.5A<br>**DGM60**: 1.4A, **DGM85**: 1.6A, **DGM130**: 3.7A, **DGB85**: 1.6A, **DGB130**: 3.7A<br>**DR20**: 0.4A, **DR28**: 1.3A, **DRSM42**: 1.5A, **DRSM60**: 2.6A<br>**EH3**: 0.4A, **EH4**: 1.4A, **LM2**: 3.7A, **LM4**: 3.7A | | | | |
| | Permissible Operating Voltage | 24 VDC Input: 20 VDC to 32 VDC (22.8 VDC to 32 VDC)*2<br>48 VDC Input: 40 VDC to 55 VDC | | | | |
| Control Power Supply | Rated Voltage | · 24 VDC±5%<br>· 48 VDC±5% | | | | |
| | Input Current | 0.15 A (0.4 A)*3 | | | | |
| | Permissible Operating Voltage | 24 VDC Input: 20 VDC to 32 VDC (22.8 VDC to 32 VDC)*2<br>48 VDC Input: 40 VDC to 55 VDC | | | | |
| | Control Input | 20–32 VDC<br>2 Points, Photocoupler | | | | – |
| | Control Output | – | | | | |
| | Field Network | EtherCAT | EtherNet/IP | PROFINET | Modbus TCP, Modbus UDP | RS-485 Communication |

*1 The value of the input current depends on the motor used in combination.
*2 The values in parentheses ( ) indicate the specifications when connected to the electromagnetic brake motor.
*3 The value in parentheses ( ) indicates the specification when connected to the electromagnetic brake motor. **AZM46** is 0.23 A.
*4 Excluding pulse input type with RS-485 communication.

| Driver Product Name | | AZD-KRX |
|---|---|---|
| Main Power Supply | Rated Voltage | · 24 VDC±5%<br>· 48 VDC±5% |
| | Input Current*1 | **AZM14**: 0.4A, **AZM15**: 0.5A, **AZM24**: 1.4A, **AZM26**: 1.4A<br>**AZM46**: 1.6A, **AZM48**: 2.1A, **AZM66**: 3.7A, **AZM69**: 3.5A<br>**DGM60**: 1.4A, **DGM85**: 1.6A, **DGM130**: 3.7A, **DGB85**: 1.6A, **DGB130**: 3.7A<br>**DR20**: 0.4A, **DR28**: 1.3A, **DRSM42**: 1.5A, **DRSM60**: 2.6A<br>**EH3**: 0.4A, **EH4**: 1.4A, **LM2**: 3.7A, **LM4**: 3.7A |
| | Permissible Operating Voltage | 24 VDC Input: 20 VDC to 32 VDC (22.8 VDC to 32 VDC)*2<br>48 VDC Input: 40 VDC to 55 VDC |
| Control Power Supply | Rated Voltage | · 24 VDC±5%<br>· 48 VDC±5% |
| | Input Current | 0.15 A (0.4 A)*3 |
| | Permissible Operating Voltage | 24 VDC Input: 20 VDC to 32 VDC (22.8 VDC to 32 VDC)*2<br>48 VDC Input: 40 VDC to 55 VDC |
| Interface | Pulse Input | - 2 Points, Photocoupler<br>- Maximum Input Pulse Frequency<br>Line Driver: 1 MHz (50% duty)<br>Open Collector: 250 kHz (50% duty) |
| | Control Input | 4.5–32 VDC<br>5 Points, Photocoupler |
| | Control Output | 4.5–32 VDC<br>3 Points, Photocoupler/ Open Collector |
| | Field Network | RS-485 Communication |

*1 The value of the input current depends on the motor used in combination.
*2 The values in parentheses ( ) indicate the specifications when connected to the electromagnetic brake motor.
*3 The value in parentheses ( ) indicates the specification when connected to the electromagnetic brake motor. **AZM46** is 0.23 A.

## Driver Functions

### EtherCAT Drive Profile-Compatible

| Driver Product Name | | AZD-KRED |
|---|---|---|
| Remote I/O | Input | 16 Points |
| | Output | 16 Points |
| Operation Mode | | Profile Position Mode (PP) |
| | | Profile Velocity Mode (PV) |
| | | Return-to-Home Mode (HM) |
| | | Cyclic Synchronous Position Mode (CSP) |
| | | Cyclic Synchronous Velocity Mode (CSV) |
| Function | | Touch Probe (Position Latch) Function |
| Settings Tool | | Data Setting Software **MEXE02** |
| Coordinates Management Method | | Battery-free Absolute System |
| Monitor/Information | | As shown in the table below. |
| Alarm | | ○ |

### ●EtherNet/IP, PROFINET, Ethernet Type, RS-485 Communication Type, Pulse Input Type with RS-485 Communication

| Driver Product Name | | | | **AZD-KREP**, **AZD-KRPN**, **AZD-KREN**, **AZD-KR2D**, **AZD-KRX** |
|---|---|---|---|---|
| Number of Positioning Data Sets | | | | 256 Points*1 |
| Remote I/O | | Input | | 16 Points |
| | | Output | | 16 Points |
| Setting Tool | | | | Data Setting Software **MEXE02** |
| Coordinates Management Method | | | | Battery-Free Absolute System |
| Operation | Positioning Operation | Operation Method | Positioning Operation | ○ |
| | | | Positioning Push-Motion Operation*2 | ○ |
| | | Linked Operation | Independent Operation | ○ |
| | | | Sequential Operation | ○ |
| | | | Multi-Speed Operation (Continuous Sequential Operation) | ○ |
| | | Sequence Control | Loop Operation (Repeating) | ○ |
| | | | Event Jump Operation | ○ |
| | Speed Control Operation (Continuous Operation) | | | ○ |
| | Return-To-Home Operation | | Return-To-Home Operation*3 | ○ |
| | | | High-Speed Return-to-Home Operation | ○ |
| | JOG Operation | | | ○ |
| Monitor and Information | | | Waveform Monitoring | ○ |
| | | | Overload Detection | ○ |
| | | | Overheat Detection (Motor and Driver) | ○ |
| | | | Position and Speed Information | ○ |
| | | | Temperature Detection (Motor and Driver) | ○ |
| | | | Motor Load Factor | ○ |
| | | | Distance Traveled/Integrating Distance Traveled | ○ |
| Alarm | | | | ○ |

*1 **AZD-KRX** can be used via the support software **MEXE02**.
*2 The push-motion operation cannot be operated with the geared motors and the Rotary Actuators **DGII** Series.
*3 **AZD-KR2D** is not available for return-to-home operation using direct I/O.

## ■Communication Specifications

### ●EtherCAT

| | |
|---|---|
| Communication Protocol | IEC 61158 Type12 |
| Physical Layer/Protocol | 100 BASE-TX (IEEE 802.3) |
| Baud Rate | 100 Mbps |
| Communication Cycle | Free Run Mode: 1 ms min.<br>SM2 Event Synchronous Mode: 1 ms min.<br>DC Mode: 0.25 ms, 0.5 ms, 1 ms, 2 ms, 3 ms, 4 ms, 5 ms, 6 ms, 7 ms, 8 ms |
| Communication Port/ Connector | RJ45×2 (Shield-compatible)<br>ECAT IN: EtherCAT Input<br>ECAT OUT: EtherCAT Output |
| Topology | Daisy Chan (Max. 65,535 nodes) |
| Process Data | Variable PDO Mapping |
| Sync Manager | SM0: Mailbox Output<br>SM1: Mailbox Input<br>SM2: Process Data Output<br>SM3: Process Data Input |
| Mailbox (CoE) | Emergency Message<br>SDO Request<br>SDO Response<br>SDO Information |
| Synchronous Modes | Free Run Mode (Asynchronous)<br>SM2 Event Synchronous Mode<br>DC Mode (SYNC0 Event Synchronous) |
| Device Profile | IEC 61800-7 CiA402 Drive Profile |

### ●EtherNet/IP

| | | |
|---|---|---|
| Communication Protocol | | EtherNet/IP (Complies with CT18) |
| Vendor ID | | 187: Oriental Motor Company |
| Device Type | | 43: Generic Device |
| Baud Rate | | 10/100 Mbps (Autonegotiation) |
| Communication Mode | | Full Duplex/Half Duplex (Autonegotiation) |
| Cable Specifications | | Shielded Twisted-Pair (STP) Cable<br>Stroke/Cross, Category 5e min. Recommended |
| Number of Occupied Bytes | Output (Scanner → Driver) | 40 bytes |
| | Input (Driver → Scanner) | 56 bytes |
| Implicit Communication | Number of Supported Connections | 2 |
| | Connection Type | Exclusive Owner, Input Only |
| | Communication Cycle (RPI) | 1～3200 ms |
| | Connection Type (Scanner → Driver) | Point–to–Point |
| | Connection Type (Driver → Scanner) | Point–to–Point, Multicast |
| | Data Trigger | Cyclic |
| IP Address Setting Method | | IP address setting switch, Parameter, DHCP |
| Compatible Topologies | | Star, Linear, Ring (Device Level Ring) |

### ●PROFINET

| | | |
|---|---|---|
| Communication Protocol | | PROFINET IO Ver.2.4 |
| Vendor ID | | 0x33E: ORIENTAL MOTOR |
| Transmission Rate | | 100 Mbps (Autonegotiation) |
| Communication Mode | | Full Duplex (Autonegotiation) |
| Cable Specifications | | Shielded Twisted-Pair (STP) Cable<br>Stroke/Cross, Category 5e min. Recommended |
| Communication Connector | | RJ45×2 (Shield-compatible) |
| Conformance Class | | B |
| RT/IRT | | RT |
| NetLoad Class | | I |
| Protocol to be supported | | DCP, LLDP, SNMP, MRP |
| Number of occupied bytes | Output (Host Controller → Driver) | 40 byte |
| | Input (Driver → Host Controller) | 56 byte |
| Compatible Topologies | | Star, Tree, Line, Ring |

### ●Ethernet Type

| | |
|---|---|
| Transmission Rate | 100 Mbps |
| Communication Mode | Full Duplex (Autonegotiation) |
| Cable Specifications | Shielded Twisted-Pair (STP) Cable<br>Stroke/Cross, Category 5e min. Recommended |
| Communication Connector | RJ45×2 (Shield-compatible) |
| Compatible Topologies | Star, Tree, Line |

### ●RS-485 Communication

| | |
|---|---|
| Protocol | Modbus RTU Mode |
| Electrical Characteristics | EIA-485 Based, Straight Cable<br>Use a shielded twisted pair cable (TIA/EIA-568B CAT5e or higher is recommended) and keep the total wiring distance including extension to 50 m or less.* |
| Communication Mode | Half duplex, asynchronous communication (data: 8 bits, stop bit: 1 bit or 2 bits, parity: none, even, or odd) |
| Transmission Rate | Select either from 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps, or 230400 bps. |
| Connection Units | Up to 31 drivers can be connected to a single programmable controller (master device). |

*If the motor cable or power supply cable generates an undesirable amount of noise depending on the wiring or configuration, shield the cable or install a ferrite core.

## ■General Specifications

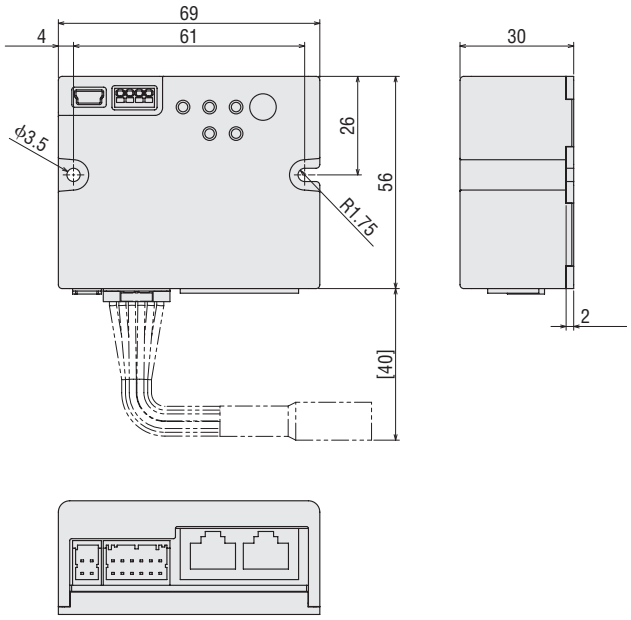
| | | AZD-KRED, AZD-KREP<br>AZD-KRPN, AZD-KREN, AZD-KRX | AZD-KR2D |
|---|---|---|---|
| Degree of Protection | | IP20 | IP10 |
| Operating Environment | Ambient Temperature | 0 to +50°C (+32 to +122°F) (Non-freezing) | |
| | Ambient Humidity | 85% or less (Non-condensing) | |
| | Altitude | Up to 1000 m above sea level | |
| | Atmosphere | No corrosive gases or dust. The product should not be exposed to water, oil or other liquids. | |
| Storage Conditions<br>Transportation Conditions | Ambient Temperature | −25 to +70°C (−13 to +158°F) (Non-freezing) | |
| | Ambient Humidity | 85% or less (Non-condensing) | |
| | Altitude | Up to 3000 m above sea level | |
| | Atmosphere | No corrosive gases or dust. The product should not be exposed to water, oil or other liquids. | |

Note

- When measuring insulation resistance or performing dielectric strength test, disconnect the motor and driver.
  Also, do not perform these tests on the ABZO Sensor (Absolute Sensor) part of the motor.

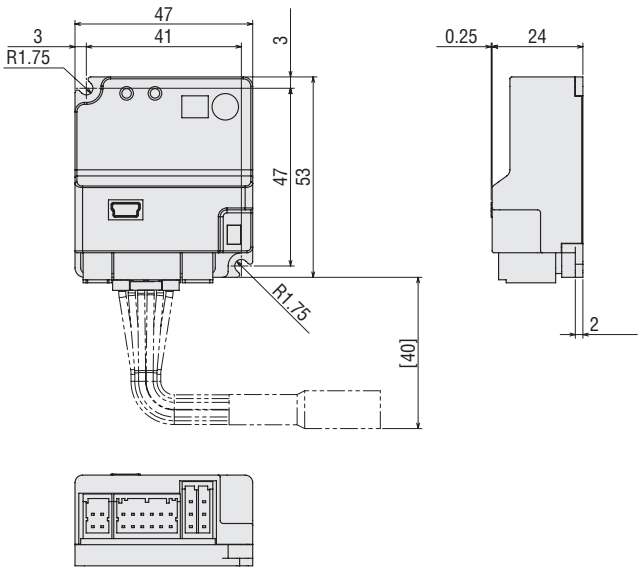
## Dimensions Unit: mm

| Type | Product Name | Mass [kg] |
|---|---|---|
| EtherCAT Drive Profile-Compatible | **AZD-KRED** | 0.11 |
| EtherNet/IP | **AZD-KREP** | |
| PROFINET | **AZD-KRPN** | |
| Ethernet Type | **AZD-KREN** | |



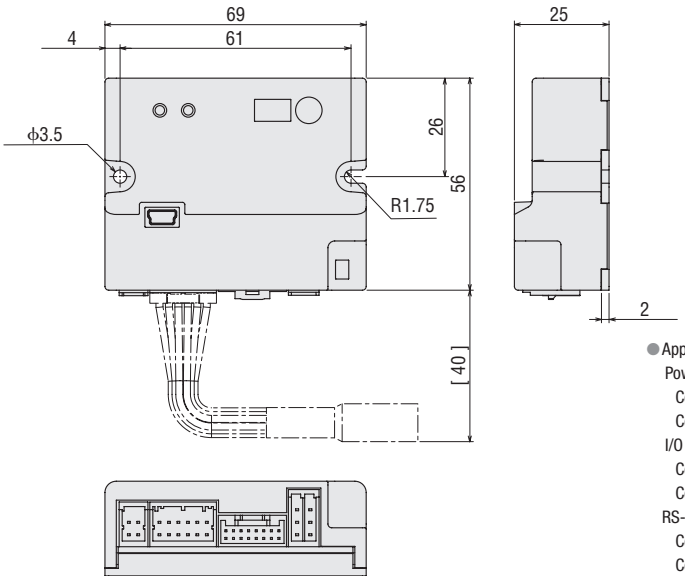

● Applicable Connector
Power Connector (CN1)
Connector Housing: 1-1827864-2 (TE Connectivity)
Contact: 1827589-2 (TE Connectivity)

| Type | Product Name | Mass [g] |
|---|---|---|
| RS-485 Communication Type | **AZD-KR2D** | 56 |




● Applicable Connectors
Power Connector (CN1)
Connector Housing: 1-1827864-2 (TE Connectivity)
Contact: 1827589-2 (TE Connectivity)
RS-485 Communication Connector (CN3)
Connector Housing: 1-1827579-1 (TE Connectivity)
Contact: 1827588-2 (TE Connectivity)

| Type | Product Name | Mass [g] |
|---|---|---|
| Pulse Input Type with RS-485 Communication | **AZD-KRX** | 84 |




● Applicable Connectors

Power Connector (CN1)

Connector Housing: 1-1827864-2 (TE Connectivity)

Contact: 1827589-2 (TE Connectivity)

I/O signal connector (CN3)

Connector Housing: 501646-1600 (molex)

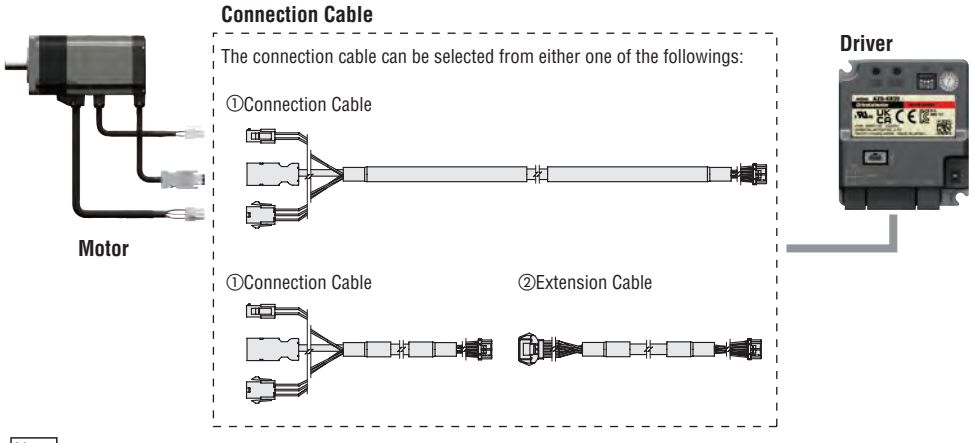
Contact: 501647-1100 (molex)

RS-485 Communication Connector (CN4)

Connector Housing: 1-1827579-1 (TE Connectivity)

Contact: 1827588-2 (TE Connectivity)

## Connection Cables




Note
- Up to 3 cables can be used to connect the motor and driver.
- The maximum distance between the motor and driver is 10 m.

## ①Connection Cables / Flexible Connection Cables

These cables are used to connect the motor and the driver. Use the flexible connection cable in applications where the cable is bent and flexed repeatedly.

### Product Line

For **AZM14**, **AZM15**, **AZM24**, **AZM26**

◇Connection Cables

•For Motor / Encoder

| Length L [m] | Product Name |
|---|---|
| 0.5 | **CCM005Z2AAF** |
| 1 | **CCM010Z2AAF** |
| 3 | **CCM030Z2AAF** |
| 5 | **CCM050Z2AAF** |
| 10 | **CCM100Z2AAF** |

◇Flexible Connection Cables

•For Motor / Encoder

| Length L [m] | Product Name |
|---|---|
| 0.5 | **CCM005Z2AAR** |
| 1 | **CCM010Z2AAR** |
| 3 | **CCM030Z2AAR** |
| 5 | **CCM050Z2AAR** |
| 10 | **CCM100Z2AAR** |

For **AZM46**, **AZM48**, **AZM66**, **AZM69**

◇Connection Cables

•For Motor / Encoder

| Length L [m] | Product Name |
|---|---|
| 0.5 | **CCM005Z2ABF** |
| 1 | **CCM010Z2ABF** |
| 3 | **CCM030Z2ABF** |
| 5 | **CCM050Z2ABF** |
| 10 | **CCM100Z2ABF** |

•For Motor / Encoder / Electromagnetic Brake

| Length L [m] | Product Name |
|---|---|
| 0.5 | **CCM005Z2ACF** |
| 1 | **CCM010Z2ACF** |
| 3 | **CCM030Z2ACF** |
| 5 | **CCM050Z2ACF** |
| 10 | **CCM100Z2ACF** |

◇Flexible Connection Cables

•For Motor / Encoder

| Length L [m] | Product Name |
|---|---|
| 0.5 | **CCM005Z2ABR** |
| 1 | **CCM010Z2ABR** |
| 3 | **CCM030Z2ABR** |
| 5 | **CCM050Z2ABR** |
| 10 | **CCM100Z2ABR** |

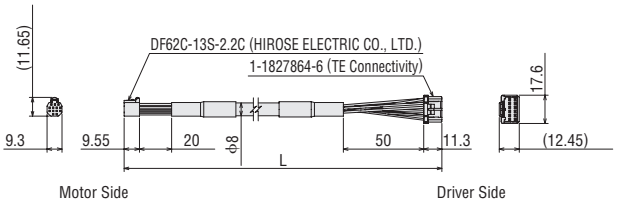
•For Motor / Encoder / Electromagnetic Brake

| Length L [m] | Product Name |
|---|---|
| 0.5 | **CCM005Z2ACR** |
| 1 | **CCM010Z2ACR** |
| 3 | **CCM030Z2ACR** |
| 5 | **CCM050Z2ACR** |
| 10 | **CCM100Z2ACR** |

## ●Dimensions Unit: mm

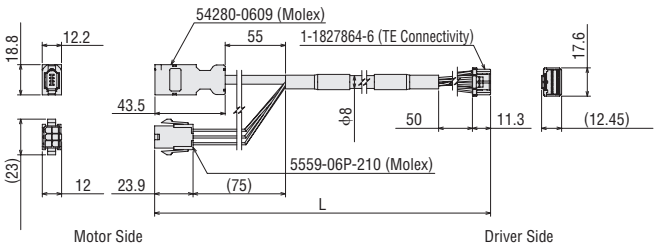
### For **AZM14**, **AZM15**, **AZM24**, **AZM26**

•For Motor / Encoder

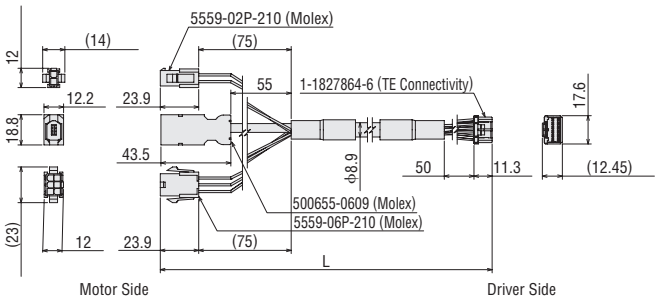



### For **AZM46**, **AZM48**, **AZM66**, **AZM69**

•For Motor / Encoder




•For Motor / Encoder / Electromagnetic Brake




## ②Extension Cables / Flexible Extension Cables Driver Side

These are cables to provide an extension between the connection cable and the driver. When extending the connection, keep the overall cable length at 10 m or less.

Use the flexible extension cable in applications where the cable is bent and flexed repeatedly.

## ●Product Line

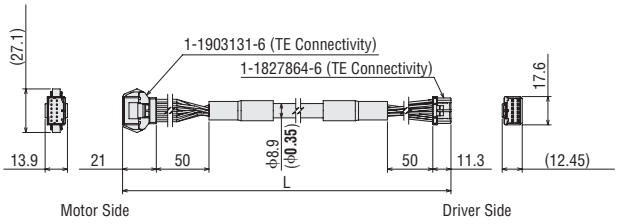
### ◇Extension Cables

| Length L [m] | Product Name |
|---|---|
| 1 | **CCM010Z2ADFT** |
| 3 | **CCM030Z2ADFT** |
| 5 | **CCM050Z2ADFT** |

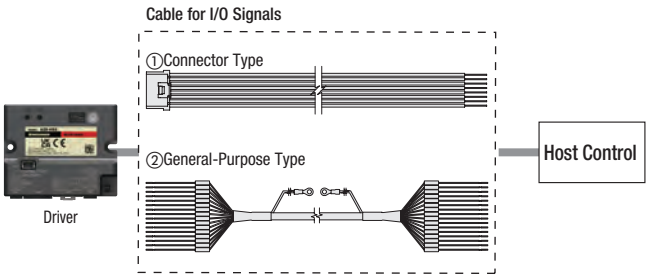
### ◇Flexible Extension Cables

| Length L [m] | Product Name |
|---|---|
| 1 | **CCM010Z2ADRT** |
| 3 | **CCM030Z2ADRT** |
| 5 | **CCM050Z2ADRT** |

## ●Dimensions Unit: mm



# Cable for I/O Signals



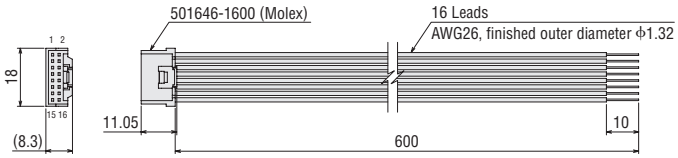

## ①Connector Type

- Unbundled wires on one end

### Product Line

| Product Name | Applicable Drivers | Number of Lead Wire Cores | AWG |
|---|---|---|---|
| **LCD06Z2BY** | Pulse Input Type with RS-485 Communication | 16 | 26 |

### Dimensions Unit: mm



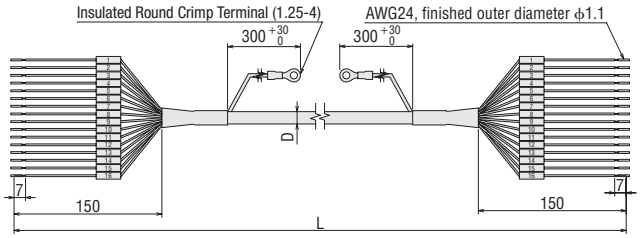

## ②General-Purpose Type

- Shielded cable
- Unbundled wires on both ends
- Easy shield grounding using ground wire with a round terminal
- The number of lead wire cores can be selected to suit the functions that will be used

### Product Line

| Product Name | Length L [m] | Number of Lead Wire Cores | Outer Diameter D [mm] | AWG |
|---|---|---|---|---|
| **CC06D005B-1** | 0.5 | 6 | ϕ5.4 | 24 |
| **CC06D010B-1** | 1 | | | |
| **CC06D015B-1** | 1.5 | | | |
| **CC06D020B-1** | 2 | | | |
| **CC10D005B-1** | 0.5 | 10 | ϕ6.7 | |
| **CC10D010B-1** | 1 | | | |
| **CC10D015B-1** | 1.5 | | | |
| **CC10D020B-1** | 2 | | | |
| **CC12D005B-1** | 0.5 | 12 | ϕ7.5 | |
| **CC12D010B-1** | 1 | | | |
| **CC12D015B-1** | 1.5 | | | |
| **CC12D020B-1** | 2 | | | |
| **CC16D005B-1** | 0.5 | 16 | ϕ7.5 | |
| **CC16D010B-1** | 1 | | | |
| **CC16D015B-1** | 1.5 | | | |
| **CC16D020B-1** | 2 | | | |

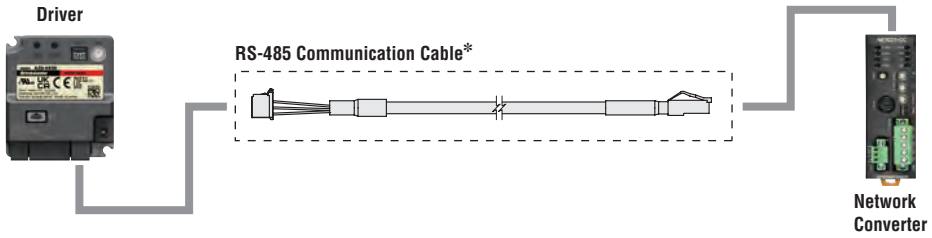
### Dimensions Unit: mm




The figure depicts 16 core wires.

## RS-485 Communication Cables

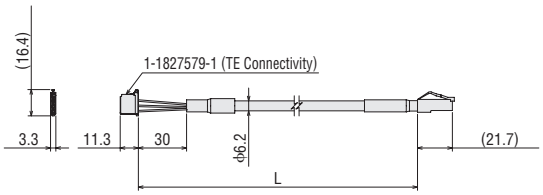
These cables are used to connect the driver to a network converter or a robot controller **MRC01**.




### Product Line

| Product Name | Length L [m] |
|---|---|
| **CC02FLT6** | 2 |
| **CC05FLT6** | 5 |

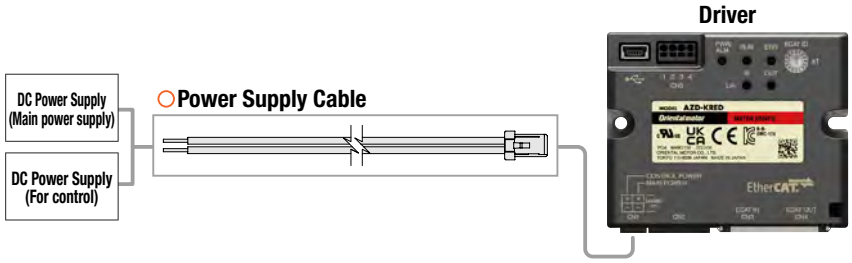
### Dimensions Unit: mm




*This cable cannot be used to connect the drivers together.

## Power Supply Cable

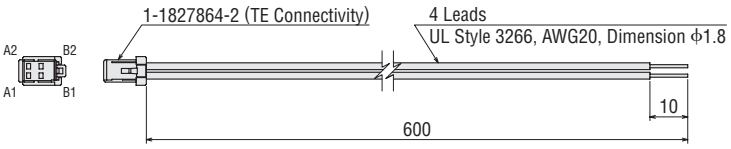
These cables are used to connect the driver and the power supply. Connecting with the main power supply and control power supply is simple.




### Product Line

| Product Name |
|---|
| **LCD06Z2AY** |

### Dimensions Unit: mm



## Regeneration Unit

Regeneration Unit exclusively for DC power supply input products.
By connecting the Regeneration Unit, the voltage rise caused by the regenerative power of motor can be suppressed.

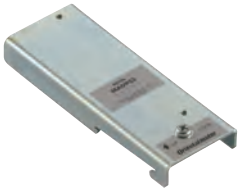
### Product Line

| Product Name | Input Voltage |
|---|---|
| **RG4-K** | 24 VDC |
| **RG4-N** | 48 VDC |

## Mounting Bracket for Circuit Products

**MADP08**

**MADP08W**



**MADP03**

### Product Line

Material: SPCC (Hook: Stainless Steel)
Surface Treatment: Electroless Nickel Plating

| Product Name | Applicable Products | Overview / Features |
|---|---|---|
| **MADP08** | **AZD-KR2D** | Mounting brackets used to mount the Driver to a DIN rail |
| **MADP08W** | **AZD-KRED**, **AZD-KREP**, **AZD-KRPN**, **AZD-KREN**, **AZD-KRX** | |
| **MADP03** | **RG4-**□ | Mounting brackets used to mount the Regeneration Unit to a DIN rail |

## Robot Controller

The **MRC01** robot controller supports easy programing and control of in-house designed custom built robots with 3 simple steps: “Initial Setup”, “Operation Programing” and “Operational Checking”.
Use the **αSTEP AZ** Series family of products to support your in-house design for improved performance and ease of use.

### Robot Controller

### MRC01

• Easily introduce custom-built robots to existing systems
The connection between the **MRC01** and host system is controlled directly via EtherNet/IP™. Custom-built robots can be added easily, without the need to make major changes to the control system from the existing equipment.

## Suitable for Mobile Automation

This product line has been designed under the concept of being compact, lightweight, and able to be battery driven. Ideal for installation in transportation devices such as autonomous mobile robots and automated guided vehicles. These products contribute to the creation of an automation line that can be easily altered as desired, as well as achieving modular automation, both of which are expected to become key elements of production lines in the future.

### Brushless DC Motors
### BLV-R Series

These are DC power input brushless motors that contribute to machine downsizing and weight reduction.
Low-speed operation from 1 r/min can be performed. Operation by battery-drive is also possible.

- Output Power: 60 W, 100 W, 200 W, 400W
- Speed Control Range: 1 to 4000 r/min
- Modbus (RTU) and CANopen Communications Compatible

Oriental motor

These products are manufactured at plants certified with the international standards **ISO 9001** (for quality assurance) and **ISO 14001** for systems of environmental management).

Specifications are subject to change without notice. This catalogue was published in May 2024.

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