

Orientalmotor

**α STEP
AZ Series
mini Driver**

DC Input

Modular Automation Products



The **α STEP 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
EtherCAT



AZD-KRED

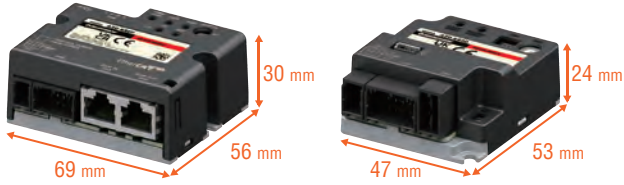
RS-485 Communication Type
Modbus (RTU)



AZD-KR2D

The mini Driver Allows for Smaller and More

Compact Design to Fit in Small Spaces



AZD-KRED

AZD-KR2D

Installation Space is Minimized

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



AZD-KRED



AZD-KR2D

Light Weight Design Reduces Load on Equipment

56 g



AZD-KR2D

*The mass of the **AZD-KRED** is 110 g.

Approx. 60 g



1 medium egg

Example: When mounted inside AMR/AGV.



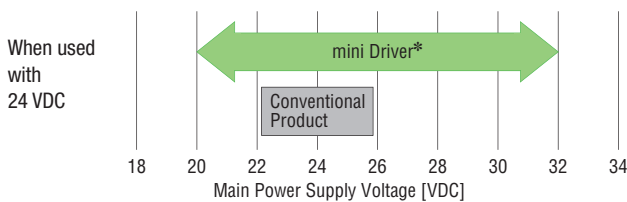
Reduce overall equipment mass
Reduce Power Consumption for Drive Wheels

→ See use examples (Page 4)

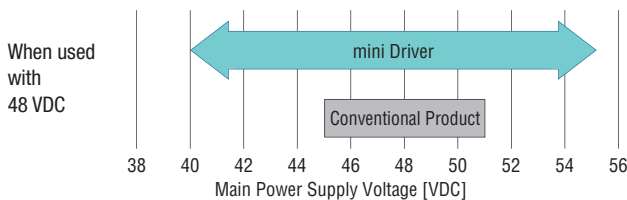
Compatible with Battery Power

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

● Operable Voltage Range

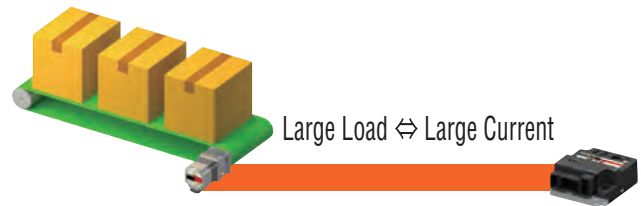


* For a motor with an electromagnetic brake, the range is 22.8 to 32 VDC



Energy Savings through Optimised 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)

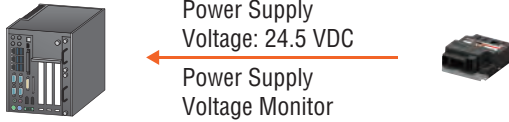
Power-Efficient Devices

What Are Modular Automation Products?

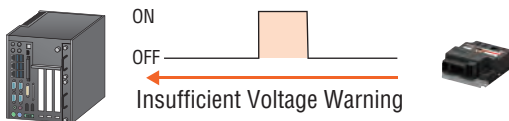
Modular Automation Products are a group of products that share the common features of being battery-powered, compact and lightweight. Optimised for use with self-propelled devices and mobile equipment, they contribute to the realisation of flexible automation lines and mobile automation.

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 the self-propelled devices

Avoid Stoppages Due to Insufficient Battery



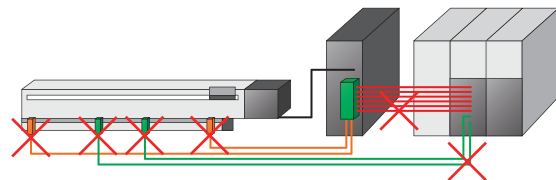
→ See use examples (Page 4)

No External Sensors Required

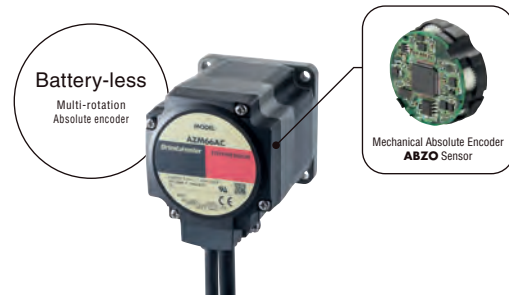
With the **AZ** Series, external sensors and associated wiring are not required.

Example of Wiring when Using External Sensors.

The **AZ** Series eliminates the need for these external sensors and wires shown in green and red.

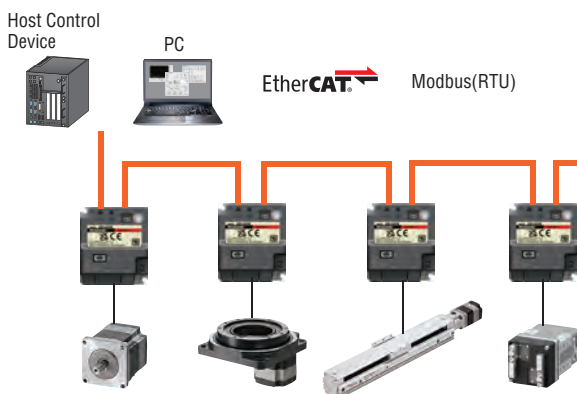


High positioning accuracy can be achieved by using the mechanical battery-free absolute sensor (**ABZO** Sensor).



FA Network Compatible

Direct control over the network is possible. This contributes to centralised equipment management and simplified wiring.

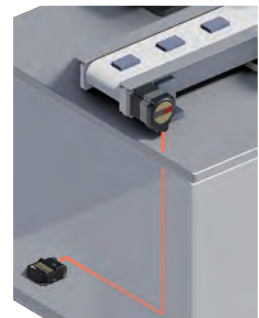


*The **AZD-KRED** passes the official EtherCAT conformance test.
*The **AZD-KR2D** is also compatible with CC-Link and MECHATROLINK control when used with a network converter (gateway).

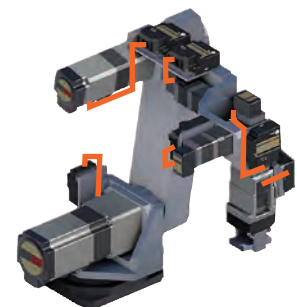
Up to 10 m Connection Cable Extension

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.

Example A: Incorporation into Self-propelled Devices

Equipment Problem Battery operation time must be maximised.

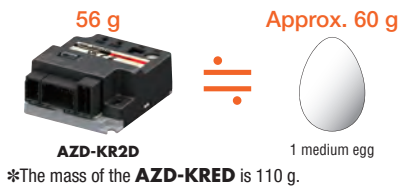
The equipment's overall power consumption can be reduced by lowering the equipment's overall mass, and by reducing the motor's running current when large amounts of torque aren't required.



With the α STEPAZ Series mini Driver...

Lightweight Design Reduces Load on Equipment

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



Energy Savings through Optimised Current Control

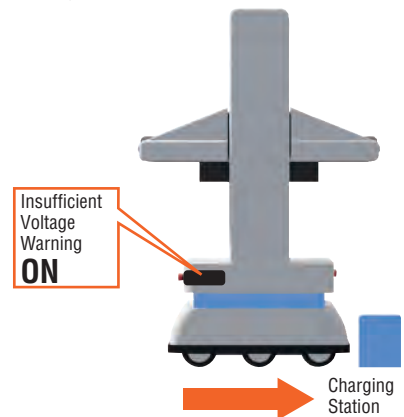
The current supplied to the motor is optimised to suit the load (also called servo emulation mode), thus reducing power consumption. This allows for a reduction in the number of times the battery must be charged.



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

Power Supply Voltage Monitoring

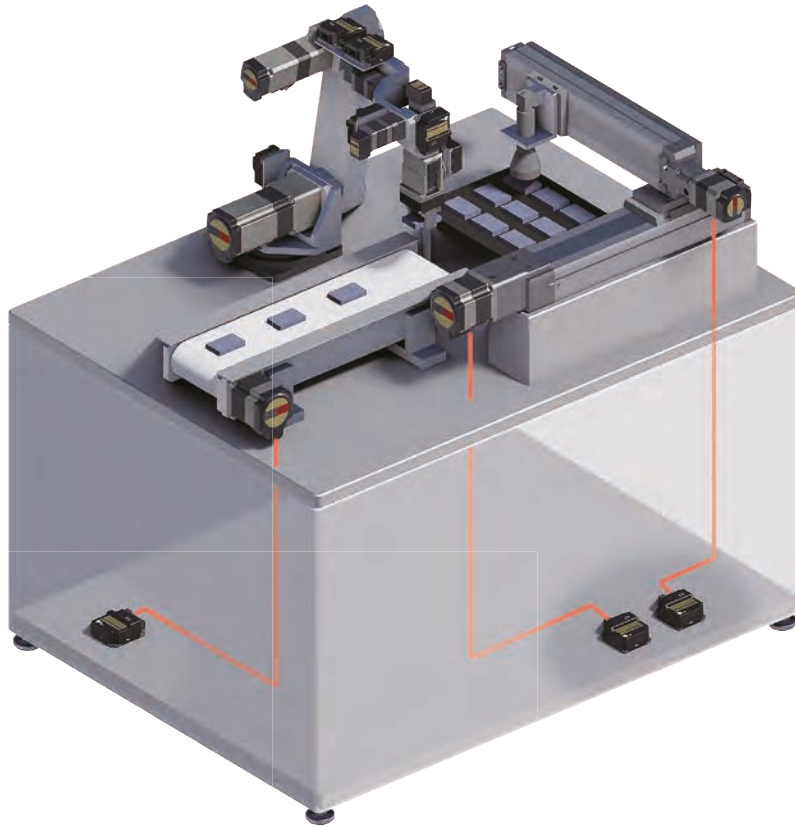
The power supply voltage can be monitored using the monitoring function, and the battery recharged at the appropriate time.



Example B: Installation in Stationary Equipment

Equipment Problem Install the driver 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 α STEPAZ 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

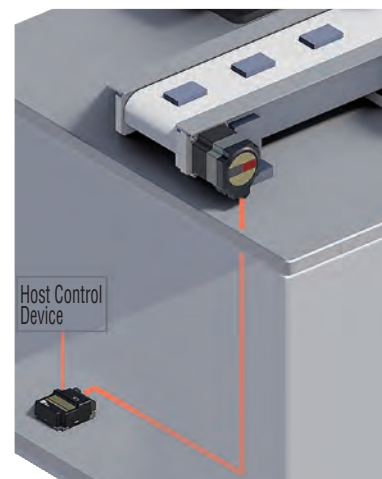
No external sensor or related wiring is necessary. Because there are no external sensors and wiring, the size and weight of the equipment can be reduced. Additionally, the work time for wiring can be reduced.

FA Network Compatible

Common Network Protocols are available to support the host controller, reduce the burden of programming 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. Extensions 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

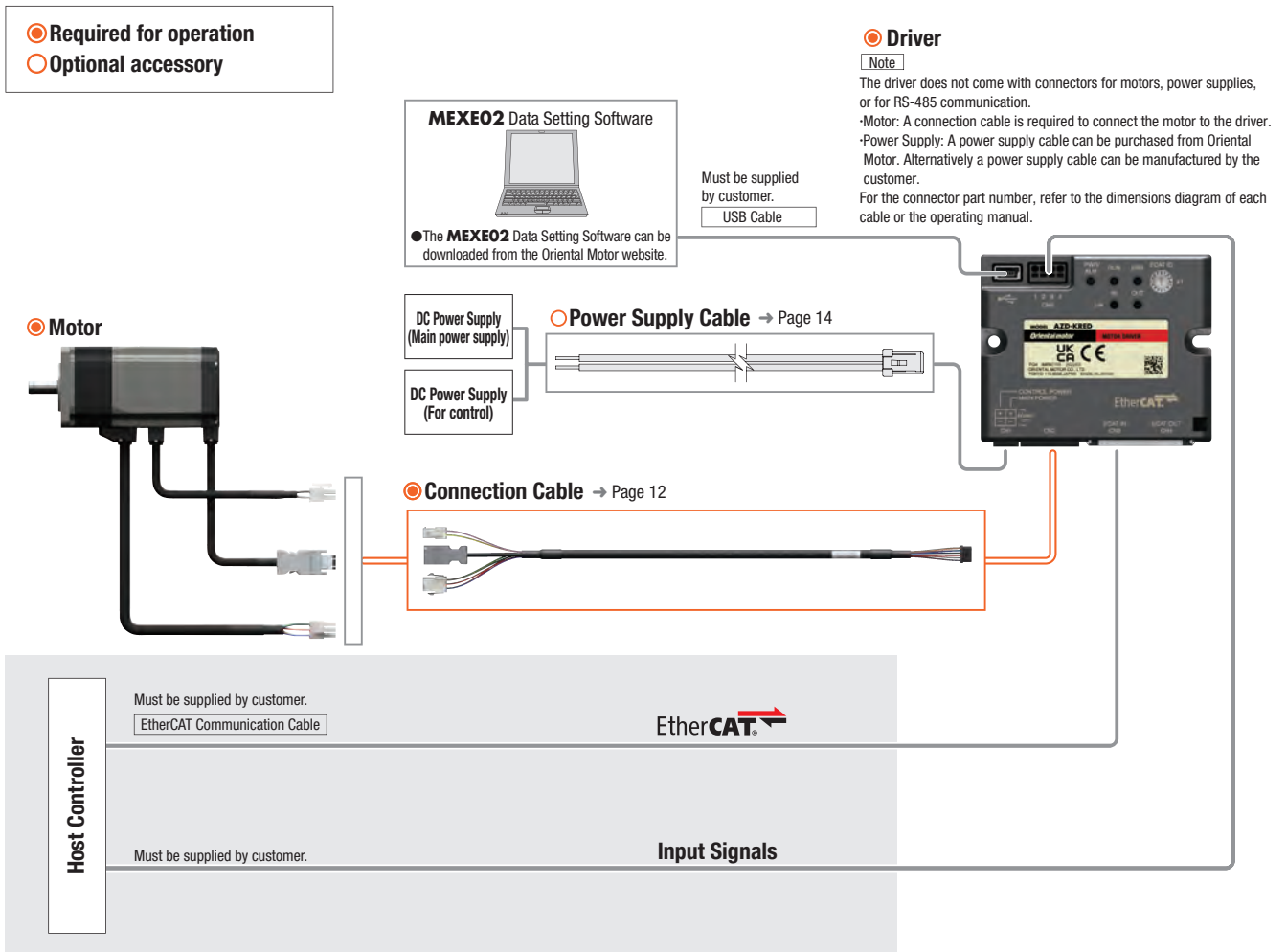
Electric Linear & Rotary Actuators

- Electric Linear Slides **EZS** Series DC Power Input / **EAS** 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 **DGI** 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 product series brochure.

System Configuration

● **AZ** Series Standard Type Electromagnetic-Brake Motor Combined with EtherCAT Drive Profile Compatible Mini Driver
Motors, drivers, and connection cables / flexible connection cables must be ordered separately.



● **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.

- Required for operation
- Optional accessory


● **Driver**

[Note]

The driver does not come with connectors for motors, power supplies, or for RS-485 communication.

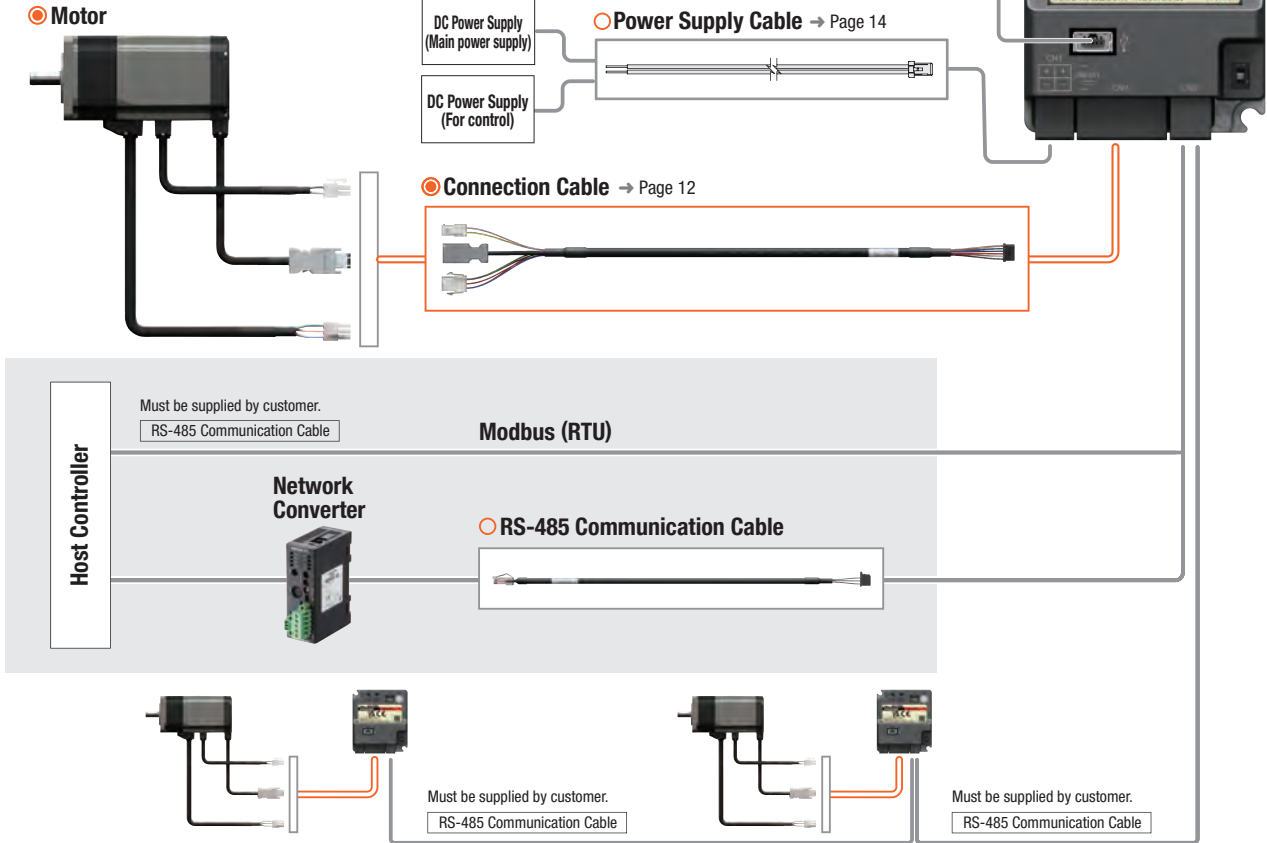
- Motor: A connection cable is required to connect the motor to the driver.
- Power Supply: A power supply cable can be purchased from Oriental Motor. Alternatively a power supply cable can be manufactured by the customer.
- RS-485 Communication: When connecting to a network converter, a cable is available from Oriental Motor. When connecting to a host controller, the cable must be supplied by the customer. For the connector part number, refer to the dimension diagrams of each cable or the operating manual.

MEXE02 Data Setting Software



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

Must be supplied by customer.
 USB 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 D: RS-485 Communication Type

Product Line

EtherCAT Drive Profile-Compatible

Product Name	List Price
AZD-KRED	440.00 €



RS-485 Communication Type

Product Name	List Price
AZD-KR2D	341.00 €



List of Combinations

Product	Type	Product Name
Motor	Standard Type	AZM14AK, AZM15AK AZM24AK, AZM26AK AZM46 <input type="checkbox"/> K <input type="checkbox"/> , AZM48A <input type="checkbox"/> K <input type="checkbox"/> AZM66 <input type="checkbox"/> K <input type="checkbox"/> , AZM69 <input type="checkbox"/> K <input type="checkbox"/>
	TS Geared Type	AZM46 <input type="checkbox"/> K-TS <input type="checkbox"/> <input type="checkbox"/> AZM66 <input type="checkbox"/> K-TS <input type="checkbox"/> <input type="checkbox"/>
	FC Geared Type	AZM46 <input type="checkbox"/> K-FC <input type="checkbox"/> <input type="checkbox"/> A AZM66 <input type="checkbox"/> K-FC <input type="checkbox"/> <input type="checkbox"/> A
	PS Geared Type	AZM24AK-PS <input type="checkbox"/> AZM46 <input type="checkbox"/> K-PS <input type="checkbox"/> AZM66 <input type="checkbox"/> K-PS <input type="checkbox"/>
	HPG Geared Type	AZM46 <input type="checkbox"/> K-HP <input type="checkbox"/> <input type="checkbox"/> AZM66 <input type="checkbox"/> K-HP <input type="checkbox"/> <input type="checkbox"/>
	Harmonic Geared Type	AZM24AK-HS <input type="checkbox"/> AZM46 <input type="checkbox"/> K-HS <input type="checkbox"/> AZM66 <input type="checkbox"/> K-HS <input type="checkbox"/>

+

Product	Type	Product Name
Driver	EtherCAT Drive Profile-Compatible	AZD-KRED
	RS-485 Communication Type	AZD-KR2D

+

Product	Type	Product Name	
Connection Cable / Flexible Connection Cable	For AZM14, AZM15, AZM24, AZM26	Connection Cable	CCM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Z2AAF
		Flexible Connection Cable	CCM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Z2AAR
	For AZM46, AZM48, AZM66, AZM69	Connection Cable	For Motor / Encoder: CCM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Z2ABF For Motor / Encoder / Electromagnetic Brake: CCM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Z2ACF
		Flexible Connection Cable	For Motor / Encoder: CCM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Z2ABR For Motor / Encoder / Electromagnetic Brake: CCM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 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 Product Name		AZD-KRED	AZD-KR2D
Main Power Supply	Rated Voltage	· 24 VDC±5% · 48 VDC±5%	
	Input Current*1	AZM14: 0.4A, AZM15: 0.5A, AZM24: 1.4A, AZM26: 1.4A AZM46: 1.6A, AZM48: 2.1A, AZM66: 3.7A, AZM69: 3.5A DGM60: 1.4A, DGM85: 1.6A, DGM130: 3.7A, DGB85: 1.6A, DGB130: 3.7A DR20: 0.4A, DR28: 1.3A, DRSM42: 1.5A, DRSM60: 2.6A EH3: 0.4A, EH4: 1.4A, LM2: 3.7A, LM4: 3.7A	
	Permissible Voltage Range	24 VDC Input: 20 VDC to 32 VDC (22.8 VDC to 32 VDC)*2 48 VDC Input: 40 VDC to 55 VDC	
Control Power Supply	Rated Voltage	· 24 VDC±5% · 48 VDC±5%	
	Input Current	0.15 A (0.4 A)*3	
	Permissible Voltage Range	24 VDC Input: 20 VDC to 32 VDC (22.8 VDC to 32 VDC)*2 48 VDC Input: 40 VDC to 55 VDC	
Interface	Control Input	24 VDC±10% 2 Points, Photocoupler	—
	Field Network	EtherCAT	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		Support Software MEXE02
Coordinates Management Method		Battery-free Absolute System
Monitor/Information		As shown in the table below.
Alarm		○

RS-485 Communication Type

Driver Product Name		AZD-KR2D		
Number of Positioning Data Sets		256 Points		
Remote I/O	Input	16 Points		
	Output	16 Points		
Setting Tool		Support Software MEXE02		
Coordinates Management Method		Battery-Free Absolute System		
Operation	Operation Method	Positioning Operation	○	
		Positioning Push-Motion Operation*1	○	
	Positioning Operation	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*2	○	
		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 The push-motion operation cannot be operated with the geared motors and the Rotary Actuators **DGII** Series.

*2 The return-to-home operation using direct I/O is not available.

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. SM2 Event Synchronous Mode: 1 ms min. 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) ECAT IN: EtherCAT Input ECAT OUT: EtherCAT Output
Topology	Daisy Chan (Max. 65,535 nodes)
Process Data	Variable PDO Mapping
Sync Manager	SM0: Mailbox Output SM1: Mailbox Input SM2: Process Data Output SM3: Process Data Input
Mailbox (CoE)	Emergency Message SDO Request SDO Response SDO Information
Synchronous Modes	Free Run Mode (Asynchronous) SM2 Event Synchronous Mode DC Mode (SYNCO Event Synchronous)
Device Profile	IEC 61800-7 CiA402 Drive Profile

● RS-485 Communication

Protocol	Modbus RTU Mode
Electrical Characteristics	EIA-485 Based, Straight Cable 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

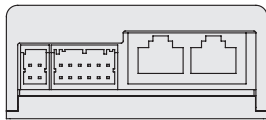
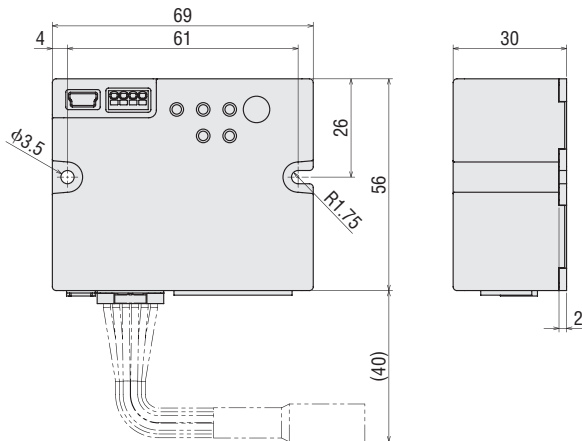
	AZD-KRED	AZD-KR2D
Degree of Protection	IP20	IP10
Operating Environment	Ambient Temperature	0 to +50°C (Non-freezing)
	Ambient Humidity	85% or less (Non-condensing)
	Altitude	Up to 1000 m above sea level
	Atmosphere	No corrosive gases or dust. The product should not be exposed to water, oil or other liquids.
Storage Conditions	Ambient Temperature	-25 to +70°C (Non-freezing)
	Ambient Humidity	85% or less (Non-condensing)
Transportation Conditions	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.

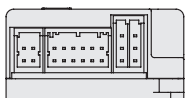
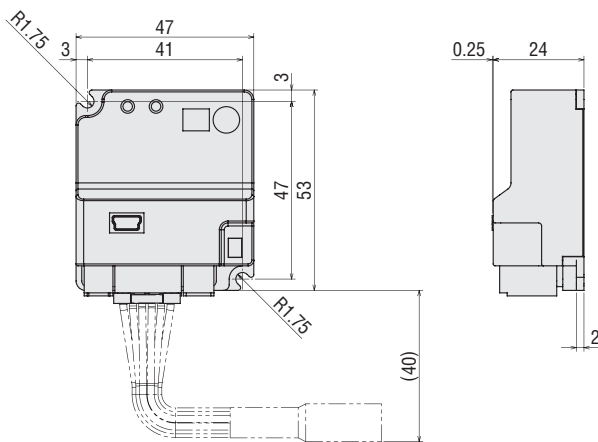
Dimensions Unit: mm

Type	Product Name	Mass [g]
EtherCAT Drive Profile-Compatible	AZD-KRED	110



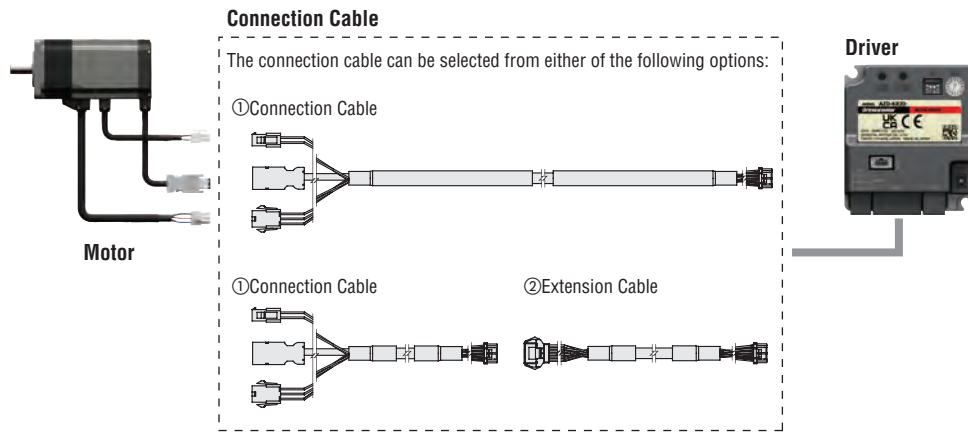
- Applicable Connector
Power Connector (CN1)
Connector Housing: 1-1827864-2 (TE Connectivity)
Contact: 1827589-2 (TE Connectivity)

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)

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.

① Connection 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	List Price
0.5	CCM005Z2AAF	32.00 €
1	CCM010Z2AAF	32.00 €
3	CCM030Z2AAF	53.00 €
5	CCM050Z2AAF	92.00 €
10	CCM100Z2AAF	149.00 €



◇ Flexible Connection Cables

● For Motor / Encoder

Length L [m]	Product Name	List Price
0.5	CCM005Z2AAR	72.00 €
1	CCM010Z2AAR	72.00 €
3	CCM030Z2AAR	93.00 €
5	CCM050Z2AAR	119.00 €
10	CCM100Z2AAR	200.00 €



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

◇ Connection Cables

● For Motor / Encoder

Length L [m]	Product Name	List Price
0.5	CCM005Z2ABF	32.00 €
1	CCM010Z2ABF	32.00 €
3	CCM030Z2ABF	53.00 €
5	CCM050Z2ABF	92.00 €
10	CCM100Z2ABF	149.00 €



● For Motor / Encoder / Electromagnetic Brake

Length L [m]	Product Name	List Price
0.5	CCM005Z2ACF	44.00 €
1	CCM010Z2ACF	44.00 €
3	CCM030Z2ACF	69.00 €
5	CCM050Z2ACF	113.00 €
10	CCM100Z2ACF	180.00 €



◇ Flexible Connection Cables

● For Motor / Encoder

Length L [m]	Product Name	List Price
0.5	CCM005Z2ABR	72.00 €
1	CCM010Z2ABR	72.00 €
3	CCM030Z2ABR	93.00 €
5	CCM050Z2ABR	119.00 €
10	CCM100Z2ABR	200.00 €



● For Motor / Encoder / Electromagnetic Brake

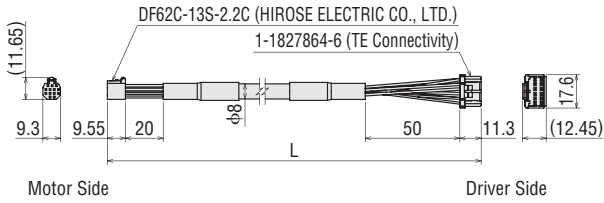
Length L [m]	Product Name	List Price
0.5	CCM005Z2ACR	95.00 €
1	CCM010Z2ACR	95.00 €
3	CCM030Z2ACR	127.00 €
5	CCM050Z2ACR	161.00 €
10	CCM100Z2ACR	261.00 €



● Dimensions Unit: mm

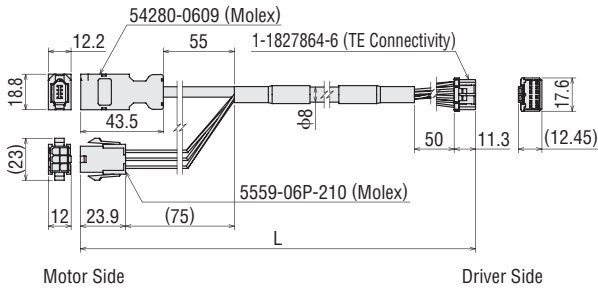
For **AZM14, AZM15, AZM24, AZM26**

● For Motor / Encoder

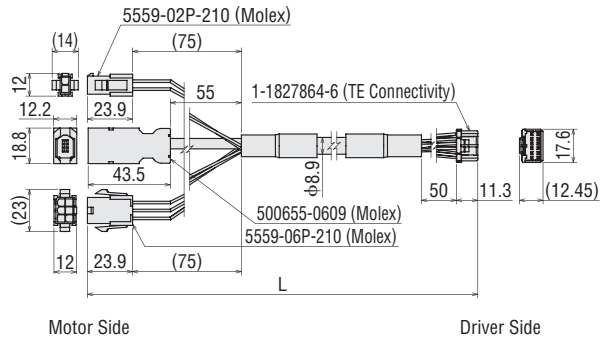


For **AZM46, AZM48, AZM66, AZM69**

● For Motor / Encoder



● For Motor / Encoder / Electromagnetic Brake



② Extension 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	List Price
1	CCM010Z2ADFT	60.00 €
3	CCM030Z2ADFT	77.00 €
5	CCM050Z2ADFT	92.00 €

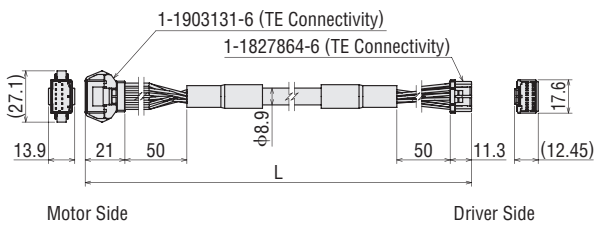


◇ Flexible Extension Cables

Length L [m]	Product Name	List Price
1	CCM010Z2ADRT	72.00 €
3	CCM030Z2ADRT	93.00 €
5	CCM050Z2ADRT	119.00 €

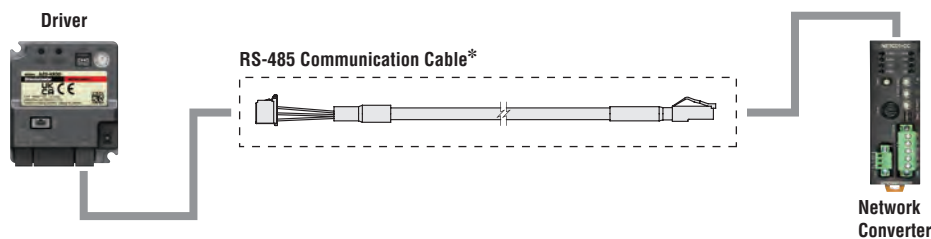


● Dimensions Unit: mm



■ RS-485 Communication Cables

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

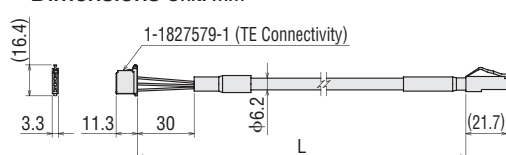


● Product Line

Product Name	Length L [m]	List Price
CC02FLT6	2	52.00 €
CC05FLT6	5	75.00 €



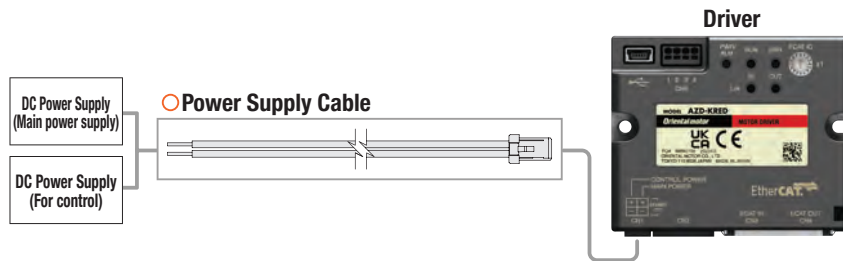
● Dimensions Unit: mm



*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.

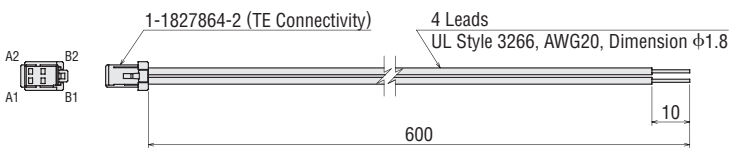


Product Line

Product Name	List Price
LCD06Z2AY	15.00 €



Dimensions Unit: mm



Products Suitable for Modular 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: 100 W, 200 W
- Speed Control Range: 1 to 4000 r/min
- Modbus (RTU) and CANopen Communications Compatible



Orientalmotor

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. Published in August 2022.

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