Oriental motor

Hollow Rotary Actuators

DGII Series

With Built-in AZ Series Battery-Free Absolute Sensor

Additional Lineup

- DC-Input Type
- Pulse-Input Type with RS-485 Communication
- Cable Direction Rotated Type (Right/Left Direction)

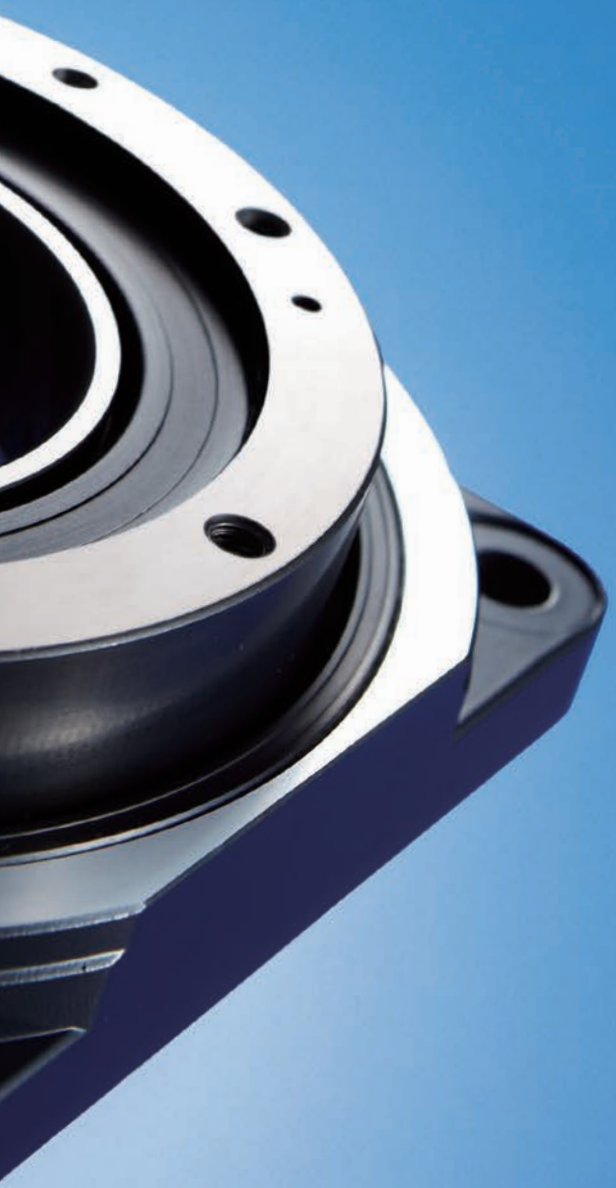
Hollow Rotary Actuators

DGII Series

With Built-in **AZ** Series Battery-Free Absolute Sensor

The **DGII** Series integrated hollow rotary tables and stepper motor product lineup now includes models with built-in **AZ** Series products.
The battery-free absolute system positioning contributes to improved productivity and cost reduction. Presetting just once the home position and there is no need for repeatedly referencing.

Power Supply	Cable Direction Rotated Type	Hollow Rotary Actuator			Driver
		Frame Size			
		85mm	130mm	200mm	
AC-Input	down	●	●	●	Built-In Controller Type Pulse-Input Type with RS-485 Communication Pulse-Input Type
	right	–	●	●	
	left	–	●	●	
DC-Input	down		●	–	Built-In Controller Type Pulse-Input Type with RS-485 Communication Pulse-Input Type
	right	–	●	–	
	left	–	●	–	



Hollow Rotary Actuators ▶ Page 4~5

- Simplified Design through Integrated Actuator and Motor Products
- Hollow Output Table: Maximum Diameter 100 mm
- Maximum Permissible Torque: 50 N·m
- Maximum Permissible Axial Load: 4000 N
- Repetitive Positioning Accuracy: ±15 arc seconds (±0.004°)

With Built-in AZ Series Battery-Free Absolute Sensor ▶ Page 6~7

- Uses Patented ABZO Sensor Mechanical Multi-Turn Absolute Sensor
- No Home Sensor Required
- High-Speed Return-to-Home Operation
- Battery-free Absolute System Configuration

The AZ Series αSTEP Stepper Motor and Driver Package Provides High Performance and High Reliability ▶ Page 8

- Quick Positioning through Agile Responsiveness
- Increased Reliability Through the Unique Closed Loop Control System
- Low Vibration Operation Possible Even at Low Speeds
- No Tuning Required

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Drivers and cables to be combined with the actuators are common to **AZ Series**

For the contents below, please refer to the individual catalog of AZ Series or our website.

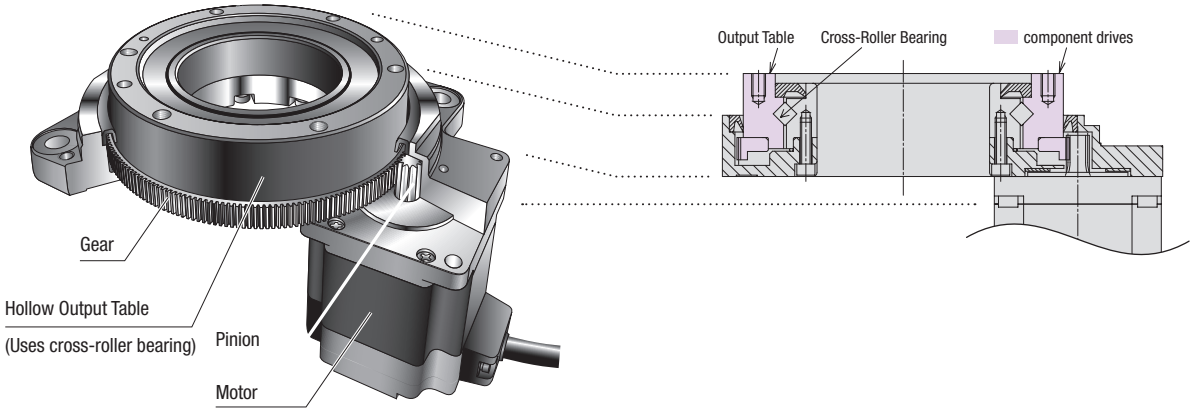
- Driver specifications
- RS-485 communication specifications
- Dimensions (driver, connection cable)
- Notes on using connection cables
- Connection and operation
- Options (extension cables)

Hollow Rotary Actuator Characteristics

The **DGII** Series is a line of integrated products that combines a hollow rotary table with a stepper motor.
The actuator has an internal speed reduction mechanism (gear ratio 18), which makes high power driving possible.

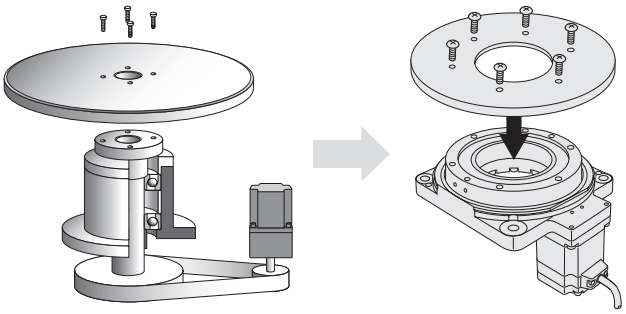
Features

A cross-roller bearing is used on the output table, which allows for both high load and high rigidity.



Simplified Design

Tables and arms can be installed directly onto the output table. This saves the hassle and cost of designing an installation mechanism, arranging necessary mechanism parts, adjusting the belt tension, etc., when mechanical components such as a belt and pulley are used for installation.



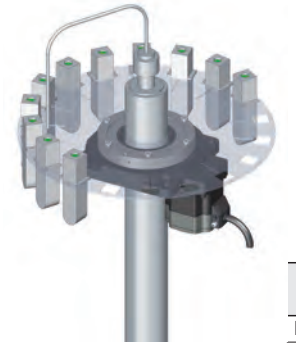
Motor + Mechanical Component
(Designed and arranged separately)

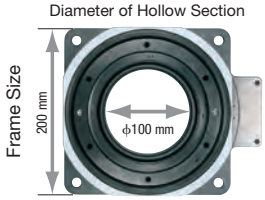
DGII Series
(Integrated product)

Large-Diameter, Hollow Output Table Makes Simple Wiring and Piping Possible

The large diameter hollow hole (through-hole) helps reduce the complexity of wiring and piping, thus simplifying equipment design.

- Filling equipment with piped-in liquid





Example: **DG200R**

Product	Frame Size mm	Diameter of Hollow Section mm
DGM85R	85	ϕ33
DGM130R	130	ϕ62
DGM200R	200	ϕ100

High Positioning Accuracy with Non-Backlash

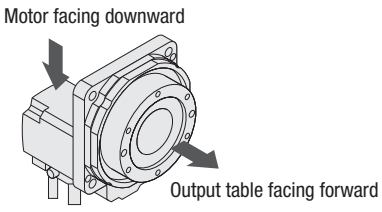
- Non-Backlash
- Repetitive Positioning Accuracy ±15 arc seconds (±0.004°)

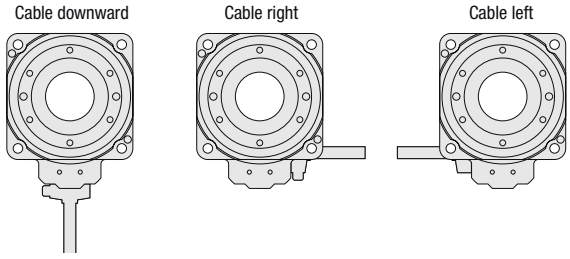
Note The repetitive positioning accuracy is measured at a constant temperature (normal temperature) under a constant load.

Select Cable Direction Rotated Type According to Usage

Select the motor cable direction rotated type from 3 directions according to the application.

- The cable direction rotated type is defined with the output table facing forward and the motor facing downward.





Power Supply	Cable Direction Rotated Type	Hollow Rotary Actuator Frame Size		
		85mm	130mm	200mm
AC-Input	down	●	●	●
	right	–	●	●
	left	–	●	●
DC-Input	down		●	–
	right	–	●	–
	left	–	●	–

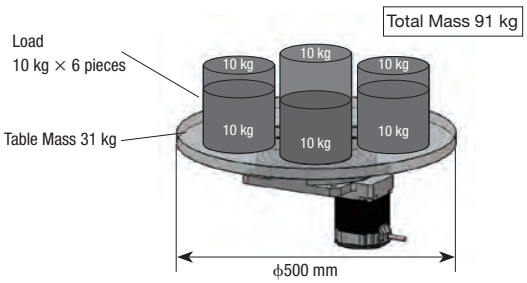
High Load and High Rigidity

The standard type uses a cross-roller bearing on the output table bearing, which allows for both high load and high rigidity.

- Maximum Permissible Axial Load 4000 N
- Maximum Permissible Moment 100 N·m

<Example Operation>

Product Name	:	**DGM200R-AZAC**
Power-Supply Input	:	230 VAC
Load Mass		91 kg (6 load pieces + table)
	:	Load 10 kg/piece × 6 pieces
	:	Table 31 kg
		(Diameter 500 mm, thickness 20 mm, iron)
Overhang Distance	:	160 mm
Installation Direction	:	Horizontal



- High Load

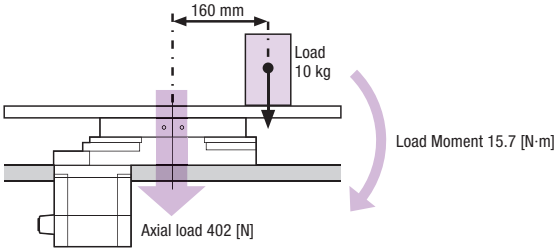
The axial load for a total mass of 91 kg is 893 N.
(10 kg × 6 pieces + 31 kg) × g ≒ 893 N
with g equals gravitational constant in m/s²
The permissible axial load of the **DGM200R** is 4000 N, so this is within the permissible value.

High Load Driving is Possible

- High Rigidity

[Load Moment]
When a 10 kg load is placed 160 mm from the center of the table, the moment is 15.7 N·m.
10 kg × g × 0.16 m ≒ 15.7 N·m with g equals gravitational constant in m/s²
The permissible moment of the **DGM200R** is 100 N·m, so this is within the permissible value.

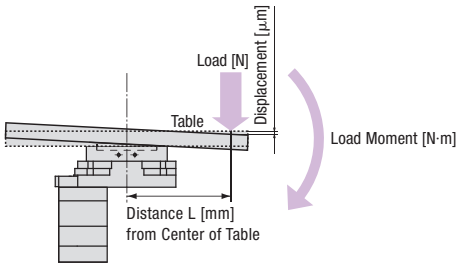
[Axial Load]
The axial load is: table + load (31 kg + 10 kg) × g ≒ 402 N
with g equals gravitational constant in m/s².
The permissible axial load of the **DGM200R** is 4000 N, so this is within the permissible value.



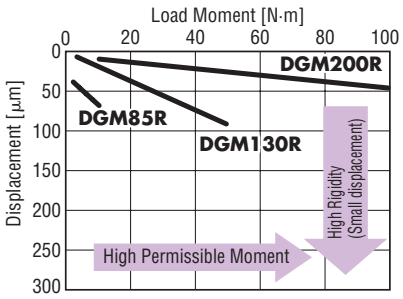
A high-rigidity rotary actuator allows a large load that is far away from the table center to be driven

- Relationship Between Load Moment and Displacement when Distance L=200 mm from Center of Table

The larger the frame size, the received permissible moment increases, but the displacement caused by the load moment decreases.



Displacement at Distance L = 200 mm from Center of Table



Simple Home Position Setting and Return-to-Home Thanks to Absolute System

The patented <ABZO Sensor>, a newly developed small mechanical multi-turn absolute sensor. Contributes to improved productivity and cost reduction.

No Home Sensor Required

Because it is an absolute system, no home sensor is required.

Reduced Cost

Sensor costs and wiring costs can be reduced, allowing for lower system costs.

Simple Wiring

Wiring is simplified, and the degree of freedom for equipment design is increased.

Not Affected by Sensor Malfunctions

No need to worry about sensor malfunctions, sensor damage or sensor disconnection.

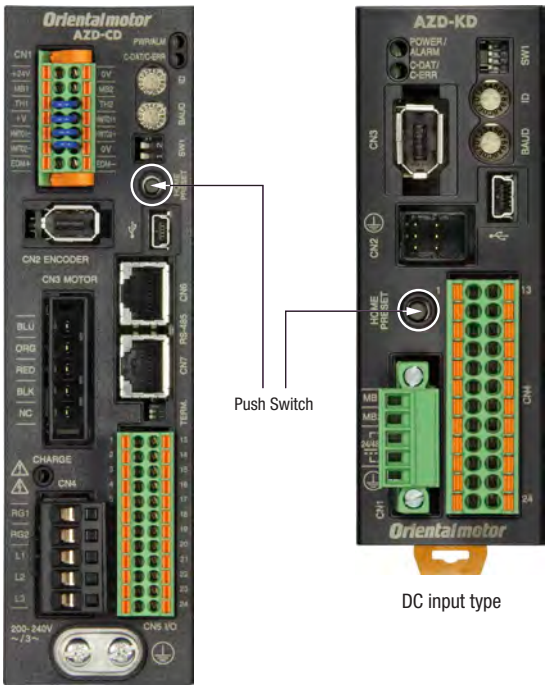
Improved Return-to-Home Accuracy

Home position accuracy is increased because the return-to-home action is performed regardless of any variations in home sensor sensitivity.

*If no limit sensor is installed, movements that exceed the limit values can be avoided through the use of the limits in the driver software.

Easy Home Position Setting

The home position can be easily set by pressing a switch on the driver's surface, which is saved by the ABZO sensor. In addition, home setting is possible with the **MEXE02** data setting software or by using an external input signal.



AC input type

DC input type

High-Speed Return-to-Home Operation

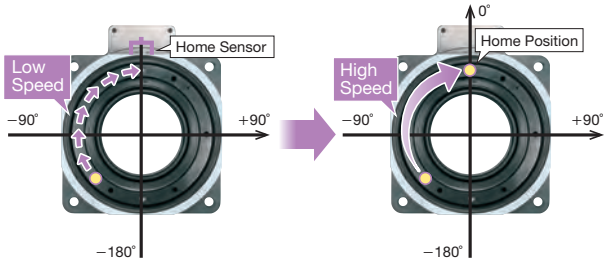
Because return-to-home is possible without using a home sensor, return-to-home can be performed at high speed without taking the specifications for sensor sensitivity into account, allowing for a shortened machine cycle.

Return-to-Home Operation by Home Sensor Detection

Because home recognition is based on the sensor's sensitivity, travel is at low speed

Return-to-Home Operation of Products with AZ Series

Because the home position is known, high speed return-to-home is possible (ZHOME operation)

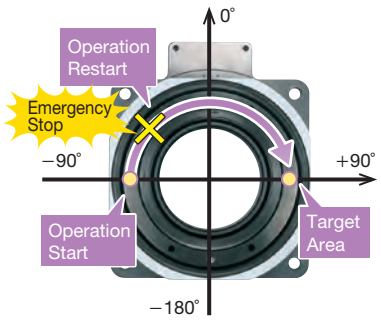


Return-to-Home Not Required

Even if the power shuts down during a positioning operation, the positioning information is retained. Furthermore, for built-in controller types, positioning operations can restart without a return-to-home when recovering from an emergency stop of the production line or a blackout.

Built-In Controller Type

After an Emergency Stop, Operation Can Restart Without Return-to-Home



Battery-Free Because it is a Mechanical-Type Sensor

Battery-Free

No battery is required because it is a mechanical-type sensor. Because positioning information is managed mechanically by the ABZO sensor, the positioning information can be preserved, even if the power turns off, or if the cable between the motor and the driver is disconnected.

Reduced Maintenance

Because there's no battery that needs replacing, maintenance time and costs can be reduced.

Unlimited Driver Installation Possibilities

Because there is no need to secure space for battery replacement, there are no restrictions on the installation location of the driver, improving the flexibility and freedom of the layout design of the control box.

Safe for Overseas Shipping

Normal batteries will self-discharge, so care must be taken when the equipment requires a long shipping time, such as when being sent overseas. The ABZO sensor does not require a battery, so there is no limit to how long the positioning information is maintained. In addition, there's no need to worry about various safety regulations, which must be taken into consideration when shipping a battery overseas.

Position stored even if the cable between motor and driver is being disconnected

Positioning information is stored within the ABZO sensor.

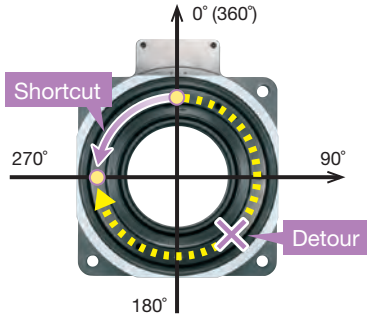
Convenient Functions Thanks to the Use of the **AZ** Series

Convenient Operation & Setting

By using models with **AZ** Series functions, coordinate management on the hollow rotary actuator output table can be carried out, and the follow operations are possible.

Reduce takt time with short-cut operations

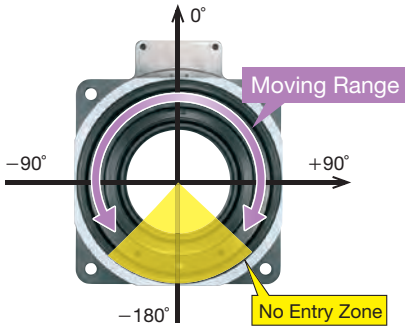
This is an operation method in which the actuator rotates in the direction that is the shortest distance to the target position. This can reduce the takt time of the equipment.



Example)
When moving from the 0° position to 270° position, counterclockwise movement is automatically selected as the shortest rotation direction.

Simple control by setting no-entry zones

If there are obstructions on the equipment, it is possible to set a region on the output table that will be avoided.

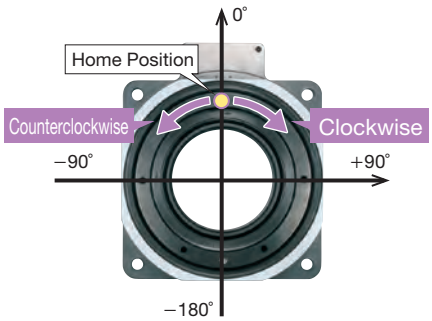


Reduced Equipment Setup Time

The necessary operation parameters for the hollow rotary actuator are set at the time of shipment, which contributes to reduced equipment setup time.

- Home Position
- Resolution Setting (0.01°/step)
- Output Table Rotation Direction Setting
- Round Setting ±180°

●All initial setting values can be changed.



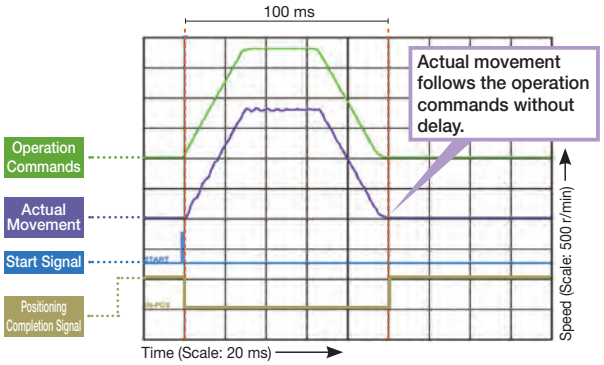
High Performance and High Reliability Thanks to Stepper Motor and Driver Packages α_{STEP}

High reliability is provided by using stepper motor and driver packages that employ a control method unique to Oriental Motor, which combines the merits of both open loop control and closed loop control.

Quick Positioning through Agile Responsiveness

With stepper motors, short distance positioning is carried out in a short period of time.
Stepper motors are operated synchronously with pulse commands, and while they are compact, they still generate high torque and offer excellent acceleration performance and response.

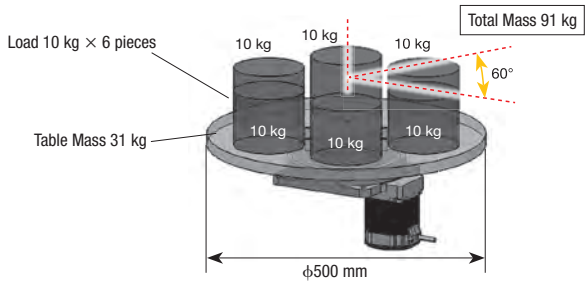
Actual stepper motor movement in response to operation commands



<Example Operation>

Product Name	:	**DGM200R-AZAC**
Power-Supply Input	:	230 VAC
Load Mass		91 kg (6 load pieces + table)
	:	Load 10 kg/piece × 6 pieces
	:	Table 31 kg (Diameter 500 mm, thickness 20 mm, iron)
Installation Direction	:	Horizontal
Traveling Amount	:	60°

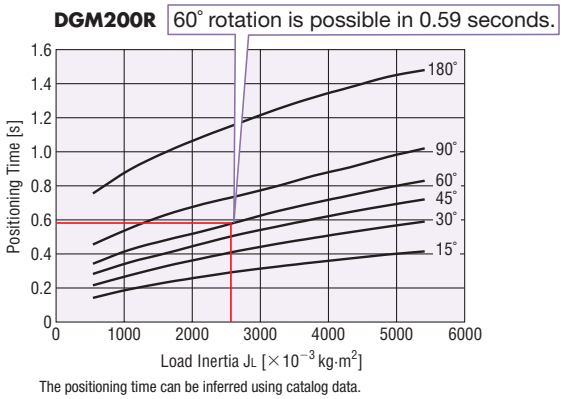
Total inertia of table and load = 2633×10^{-3} kg·m^2



● Quick Positioning

With the **DGM200R**, 60° rotation of a total mass of 91 kg is possible in 0.59 seconds.

Load Inertia – Positioning Time (Reference value)



The positioning time can be inferred using catalog data.

Quick positioning is possible even with large loads.

Stepper Motor and Driver Packages
α_{STEP}

AZ Series

With built-in battery-free absolute sensor

Continues Operation Even with Sudden Load Fluctuation and Sudden Acceleration

In normal conditions, it operates synchronously with pulse commands under open loop control, and because of its compact size and high torque generation, it has excellent acceleration performance and responsiveness. In an overload condition, it switches immediately to closed loop control to correct the position.

Low Vibration Even at Low Speed

Thanks to the microstep drive system and smooth drive function* of the stepper motor, resolution can be improved without mechanical elements such as a speed reduction mechanism. As a result, speed fluctuation is minimal even at low speeds, leading to improved stability.

*About the Smooth Drive Function

The smooth drive function automatically microsteps based on the same traveling amount and traveling speed used in the full step mode, without changing the pulse input settings.

Alarm Signal Output in Case of Abnormality

If a continuous overload is applied, an alarm signal is output. Also, when the positioning is completed, a signal is output. This provides high reliability.

No Tuning Required

Because it is normally operated with open loop control, even when the load fluctuates, no tuning is needed to obtain movement exactly as set.

Maintains Stop Position Without Hunting

Thanks to the normally open loop control, there is no hunting, the minute shaft movements that occur during stopping. Because the stop location is securely maintained, it is best suited for applications that undergo vibration during stops.

Applications & Uses

Applications that Require High Rigidity

- Applications in which a Moment Load is Applied (Ceiling mounted)

Applications that Require High Performance Motors

- High Positioning Accuracy Applications (Image inspection equipment)

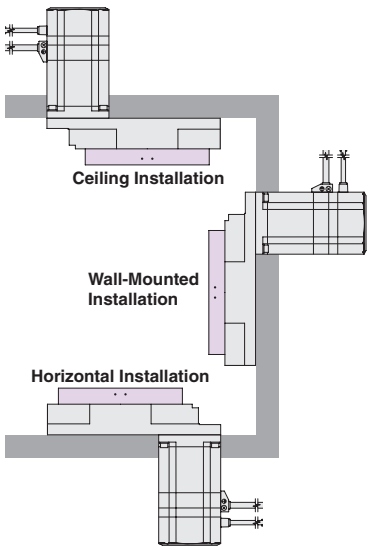
- Applications with Load Fluctuations (Disc manufacturing equipment)

Installation Direction

In addition to horizontal installation, the **DGII** Series can also be ceiling-mounted or wall-mounted, expanding the possibilities of equipment design.

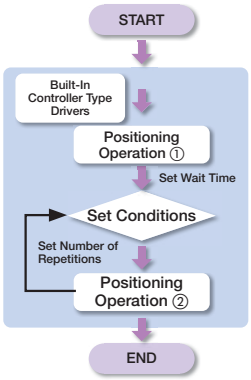
Note

A small amount of grease will occasionally seep out of the hollow rotary actuator. If a grease leak would cause a contamination issue near the machine, either perform routine inspections, or install protective equipment such as an oil sump.

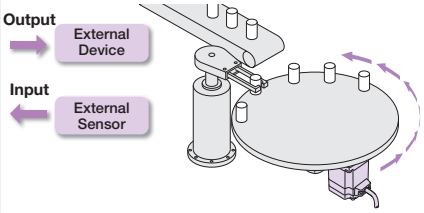


Example Use of Simple Sequence Function (Built-in Controller Type)

The built-in controller type can simplify sequence control programming by outputting control signals to other devices, and incorporating external input signals from sensors, etc.



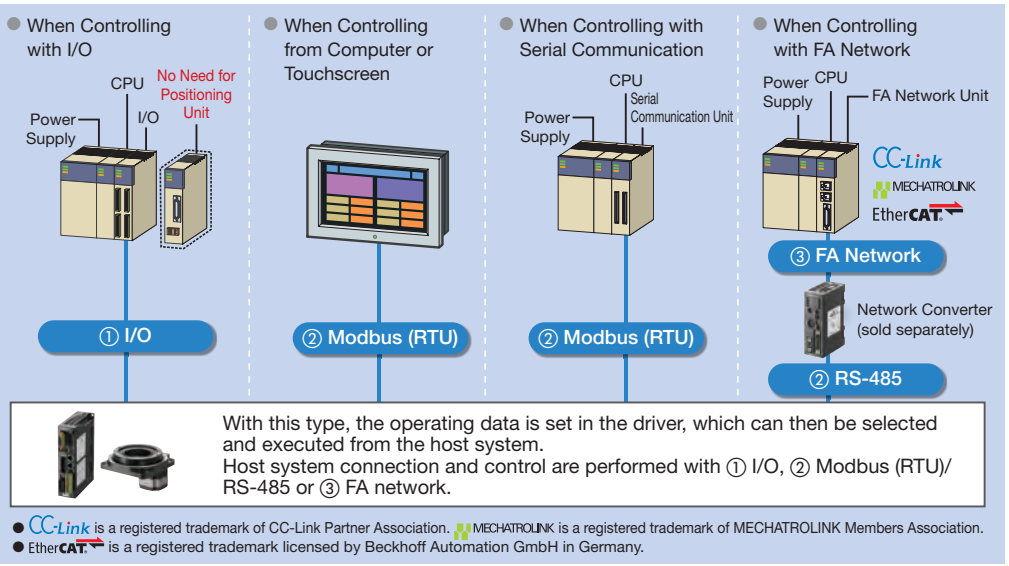
- Setting of positioning operation data (up to 256 data settings)
- Number of general purpose inputs/outputs (9 inputs, 6 outputs)



3 Driver Types Selectable to Match System Configuration

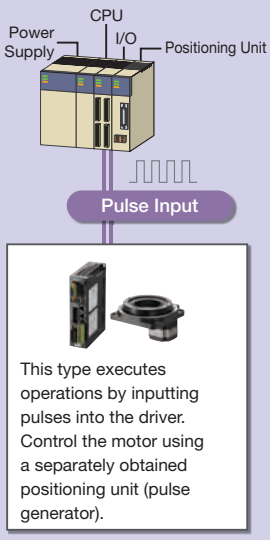
Three types of **DGII** Series drivers are available, depending on the master control system in use.

Built-In Controller Type FLEX



● CC-Link is a registered trademark of CC-Link Partner Association. MECHATROLINK is a registered trademark of MECHATROLINK Members Association.
● EtherCAT is a registered trademark licensed by Beckhoff Automation GmbH in Germany.

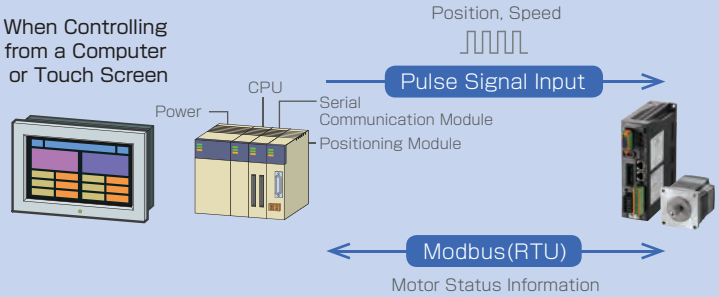
Pulse Input Type



By using a network converter (sold separately), CC-Link communication, MECHATROLINK communication or EtherCAT communication are possible. Operating data, parameter settings and operation commands can be input via various communication types. Its ability to flexibly accommodate the network being used results in a shortened design time.

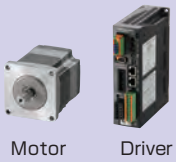
Pulse-Input Type with RS-485 Communication FLEX

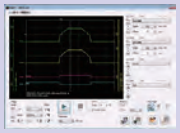
This type executes operations by inputting pulses into the driver. It controls the motor using a pulse generator.
By using RS-485 communication motor status information (position, speed, torque, alarm, temperature, etc.) can be monitored.



Basic Settings (setting when shipped)

Operating Data Settings
Parameter Settings Data setting software **MEXE02**





By using the MEXE02 data setting software, the alarm history can be displayed and a variety of monitoring can be customized according to the customer's needs.

Simple Operation with Data Setting Software (MEXE02)

Easy to use data setting software enables data setting and verification of the actual drive by using a computer.

● Operating Data and Parameter Settings

Setting of operation data and parameters is easily performed via computer. Because the setting data can be saved, when the driver is replaced, the same settings can be used by transferring the saved data.

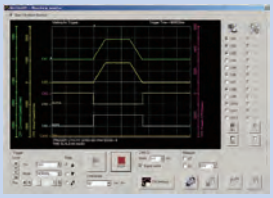
● Teaching and Remote Operation

By using the data setting software and manual positioning, the operation command information can be input into the driver. Use when setting up equipment.

Various Monitoring Functions

● I/O Monitoring

The state of I/O wiring to the driver can be verified by computer. This can be used for post-wiring I/O checks or I/O checks during operation.



● Waveform Monitoring

The operational state of the motor (such as command speed and motor load factor), can be checked by an oscilloscope-like image. This can be used for equipment start-up and adjustment.

● Alarm Monitoring

When an abnormality occurs, the details of the abnormality and the solution can be checked.

Product Lineup

Hollow rotary actuator **DGII** series
Built-in battery-less absolute sensor Built-in **AZ** series

AC Single-Phase 200-240 VAC
DC 24 VDC /48 VDC

Actuator								Driver
Product Rotary Actuator Frame Size Power Supply Input	Diameter of Hollow Section [mm]	Permissible Torque [Nm]	Permissible Moment [Nm] 20 40 60 80	Permissible Axial Load 500 1000 2000 3000	Lost Motion [arcmin]	Backlash [arcmin]	Angular Transmission Accuracy [arcmin]	Repetitive Positioning Accuracy [arcsec]	Type
DGM85R 85 mm AC DC	ϕ33	4.5	10	500	2 [0.033°]	Non-Backlash	4 [0.067°]	±15 [± 0.004°]	Built-in Controller Type FLEX AC DC
DGM130R 130 mm AC DC Selection of cable direction rotated type	ϕ62	12	50	2000			3 [0.05°]		Pulse-Input Type with RS-485 Communication FLEX AC DC
DGM200R 200 mm AC Selection of cable direction rotated type	ϕ100	50	100	4000			2 [0.033°]		Pulse Input Type AC DC

If you want to get more information about **AZ Multi-Axis Driver** and other products please have a look at the **AZ Catalogue**.

Hollow rotary actuator **DGII** Series – Other lineup

Products equipped with stepper motor unit **AR** Series equipped with rotor position detection sensor (resolver) are also available. Please choose according to your purpose.

On-Board Motor Series	Actuator Frame Size			
	60 mm	85mm	130 mm	200 mm
Stepper Motor and Driver Packages αSTEP **AR** Series Equipped *The **DG60** is with deep groove ball bearing	●	●	●	●

How to Read Specifications

●Hollow Rotary Actuators Specifications

	Frame Size			85 mm	130 mm		200 mm
	Product Name			**DGM85R-AZ□□**	**DGM130R-AZ□□**		**DGM200R-AZ□C**
	Driver product name	Built-in Controller		**AZD-CD, AZD-KD**			**AZD-CD**
		Pulse Input Type with RS-485 Communication		**AZD-CX, AZD-KX**			**AZD-CX**
		Pulse Input Type		**AZD-C, AZD-K**			**AZD-C**
	Built-In Motor			**AZ** Series			
①	Type of Output Table Supporting Bearing			Cross-Roller Bearing			
②	Inertia		J: kgm^2	21120×10^{-7} [26304×10^{-7}]*1	147380×10^{-7} [199220×10^{-7}]*1		916400×10^{-7} [968240×10^{-7}]*1
	Gear Ratio			18			
③	Minimum Traveling Amount of the Output Table		deg/STEP	0.01			
④	Permissible Torque		Nm	4.5	12		50
⑤	Holding Torque at Motor Standstill	Power ON	Nm	2.7	12		36 [20]
		Electromagnetic Brake	Nm	2.7	12		20
⑥	Max. Speed		deg/seconds	1200 (200 r/min)			660 (110 r/min)
⑦	Repetitive Positioning Accuracy		arc second	±15 (±0.004°)			
⑧	Lost Motion		arc minute	2 (0.033°)			
⑨	Angular Transmission Accuracy		arc minute	4 (0.067°)	3 (0.05°)		2 (0.033°)
⑩	Permissible Axial Load		N	500	2000		4000
⑪	Permissible Moment		Nm	10	50		100
⑫	Runout of Output Table Surface		mm	0.015			
⑬	Runout of Output Table Inner (Outer) Diameter		mm	0.015			0.030
⑭	Parallelism of Output Table		mm	0.030			0.050
⑮	Degree of Protection			IP40 (IP20 for motor connector)			
	Power-Supply Input	Voltage and Frequency		Single-Phase 200-240 VAC -15 % to +6 % 50/60 Hz	24 VDC / 48 VDC	Single-Phase 200-240 VAC -15 % to +6 % 50/60 Hz	24 VDC / 48 VDC	Single-Phase 200-240 VAC -15 % to +6 % 50/60 Hz
		Input Current A		1.7	1.72[1.8]*1	2.3	3.55[3.8]*1	3.9

●Either **A** (single shaft) or **M** (electromagnetic brake) indicating the configuration is entered where the box □ is located within the product name.
●Either **C** (single-phase 200-240 VAC) or **K** (24/48 VDC) indicating the power supply input is entered where the box □ is located within the product name.
*1 The brackets [ ] indicate the specifications for the electromagnetic brake type.

①Type of Output Table Supporting Bearing
This is the type of the bearing used for the output table.

②Inertial Moment
This is the total sum of the rotor inertial moment of the motor and the inertial moment of the speed reduction mechanism converted to a moment on the output table.

③Minimum Traveling Amount of the Output Table
This is the minimum traveling amount that can be set. (Factory setting)

④Permissible Torque
This is the limit of mechanical strength of the speed reduction mechanism. Make sure the applied torque, including the acceleration torque and load fluctuation, does not exceed the permissible torque.

⑤Holding Torque at Motor Standstill
Power ON: This is the maximum torque with which to hold the output table in position if it stops when the power is on.
Electromagnetic Brake: This is the maximum torque with which to hold the output table in position using an electromagnetic brake when it stops.

⑥Max. Speed
This is the output table speed that the mechanical strength of the speed reduction mechanism can tolerate.

⑦Repetitive Positioning Accuracy
This is a value indicating the degree of error that generates when positioning is performed repeatedly to the same position in the same direction.

⑧Lost Motion
This is the difference in stopped angles achieved when the output table is positioned to the same position in the forward and reverse directions.

⑨Angular Transmission Accuracy
This is the difference between the theoretical rotation angle of the output table as calculated from the input pulse counter, and the actual rotation angle.

⑩Permissible Axial Load
This is the permissible value of axial load applied to the output table in the axial direction.

⑪Permissible Moment
When a load is applied to a position away from the center of the output table, the output table receives a tilting force. The permissible moment load refers to the permissible value of moment load calculated by multiplying the offset distance from the center by the applied load.

⑫Runout of Output Table Surface
This is the maximum value of runout of the installation surface of the output table when the output table is rotated under no load.

⑬Runout of Output Table Inner (Outer) Diameter
This is the maximum value of runout of the inner diameter or outer diameter of the table when the output table is rotated under no load.

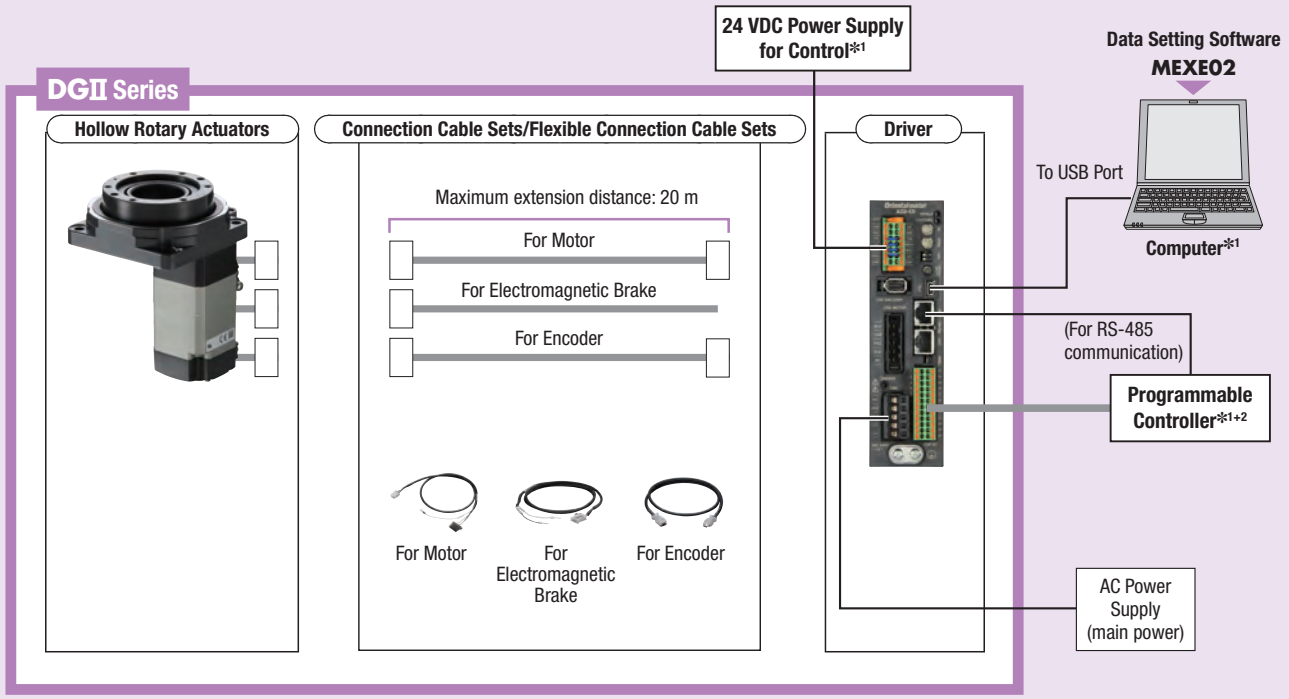
⑭Parallelism of Output Table
This is the inclination of the installation surface of the output table compared with the actuator installation surface on the equipment side.

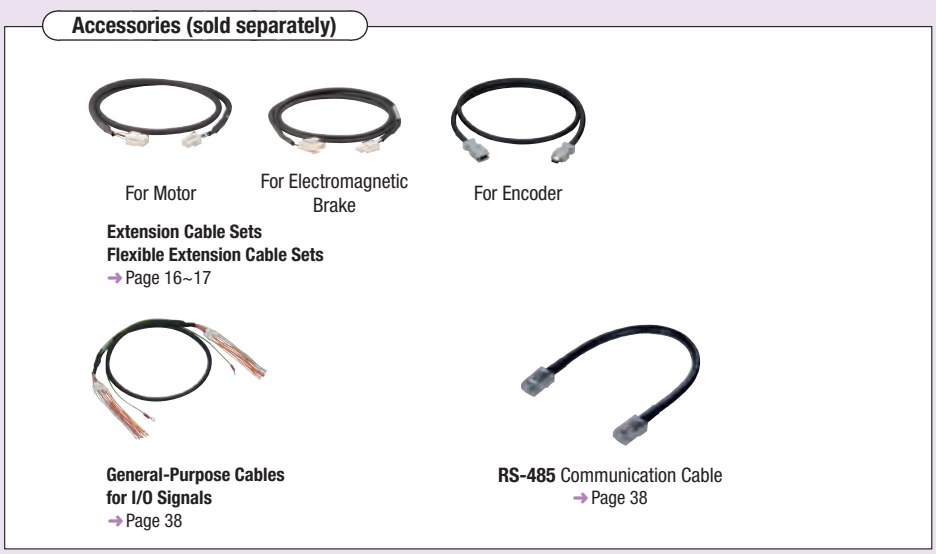
⑮Degree of Protection
Based on IEC60529 and EN60034-5 (=IEC60034-5), dust-resistance and waterproofing regarding the degree of protection of the device is classified using a grade.

System Configuration

●Combination of Electric Actuator with Electromagnetic Brake and Built-In Controller Type Driver or Pulse-Input Type Driver with RS-485 Communication

An example of a configuration using I/O control or RS-485 communication is shown below.





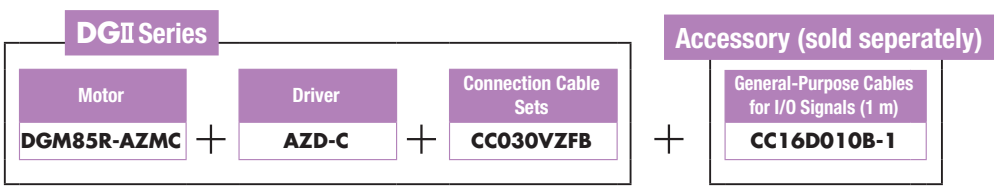
*1 To be supplied by the customer.

*2 The Pulse-Input Type with RS-485 communcation requires a pulse generator.

● **MEXE02** can be downloaded from the Oriental Motor webstite https://www.orientalmotor.eu

● The functionality and operation methods for this product are the same as the **AZ** Series stepper motor and driver packages. For functionality and operation methods, refer to the **AZ** Series operation manual (driver section and functionality section).

●Example of System Configuration



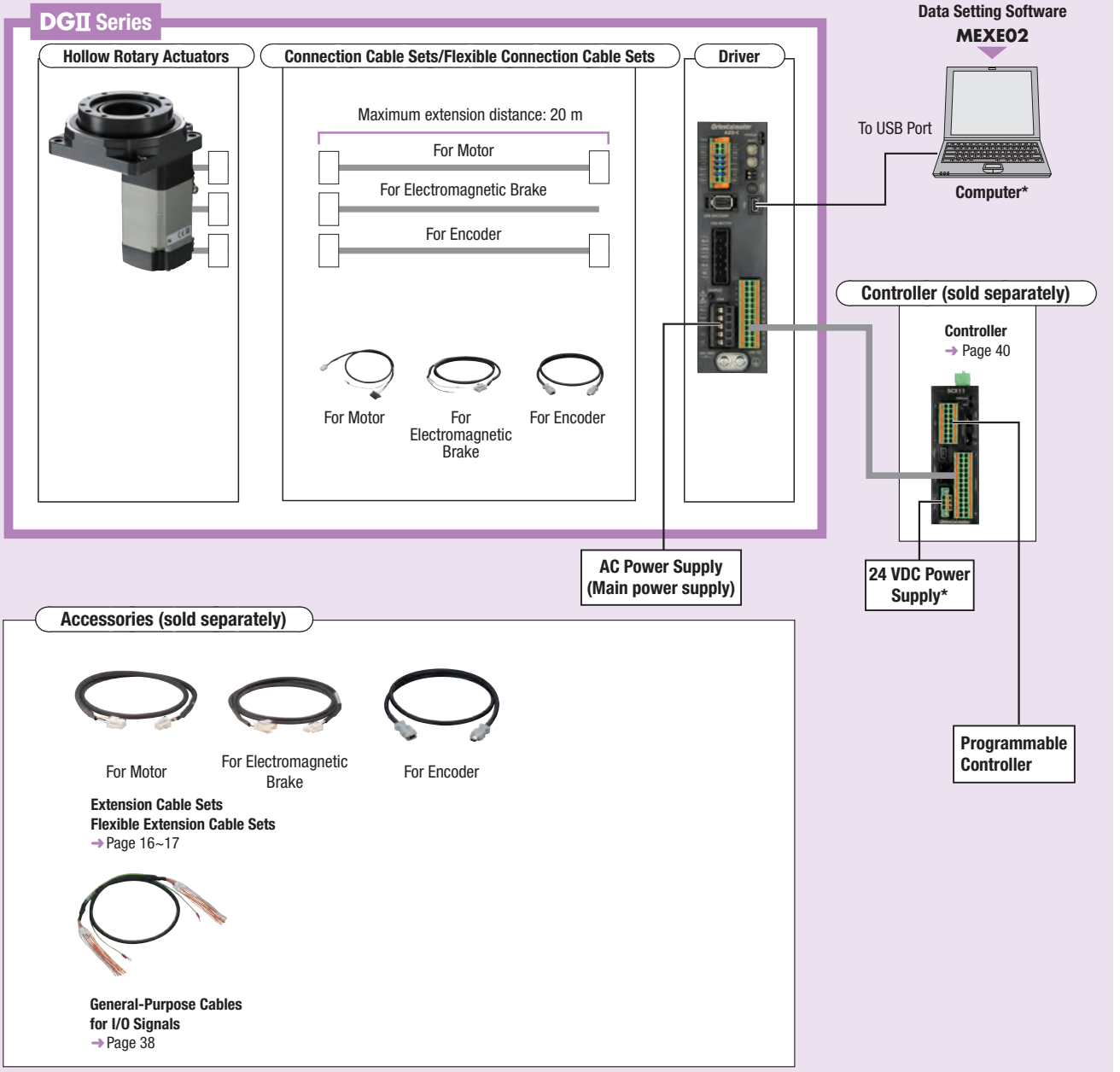
● The system configuration shown above is an example. Other combinations are also available.

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.

●Combination of Electric Actuator with Electromagnetic Brake and Pulse-Input Driver

A single-axis system configuration with the **SCX11** Series controller is shown below.



✻ To be supplied by the customer.

- **MEXE02** can be downloaded from the Oriental Motor webstite https://www.orientalmotor.eu
- The functionality and operation methods for this product are the same as the **AZ** Series stepper motor and driver packages. For functionality and operation methods, refer to the **AZ** Series operation manual (driver section and functionality section).

●Example of System Configuration

DGII Series						Accessory (sold seperately)
Motor	+	Driver	+	Connection Cable Sets	+	General-Purpose Cables for I/O Signals (1 m)
DGM85R-AZMK		AZD-KD		CC030VZFB2		CC16D010B-1

- 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 Number Code

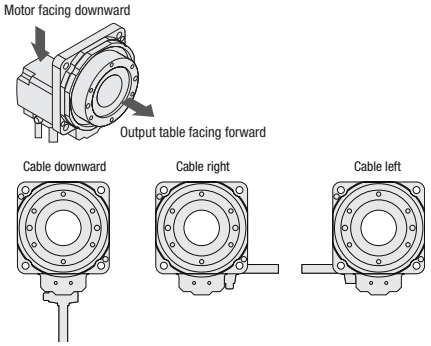
Motor

DGM 130 R - AZ A C R

① ② ③ ④ ⑤ ⑥ ⑦

①	Series	**DGM**: **DGII** Series
②	Frame Size	**85**: 85 mm **130**: 130 mm **200**: 200 mm
③	Type of Output Table Supporting Bearing	**R**: Cross-Roller Bearing
④	Motor Type	**AZ**: **AZ** Series
⑤	Motor Shaft	**A**: Single Shaft **M**: With Electromagnetic Brake
⑥	Power Supply Input	**C**: Single-Phase 200-240 VAC **K**: 24/48 VDC
⑦	Cable Withdrawing Direction*	**R**: Right Direction **L**: Left Direction

*The cable withdrawing direction is defined with the output table facing forward and the motor facing downward.



Driver

AZD - C D

① ② ③

①	Driver Type	**AZD**: **AZ** Series Driver
②	Power Supply Input	**C**: Single-Phase 200-240 VAC **K**: 24/48 VDC
③	Type	**D**: Built-in Controller Type **X**: Pulse Input Type with RS-485 Communication Blank: Pulse Input Type

Connection Cable Sets/Flexible Connection Cable Sets

CC 050 V Z F B 2

① ② ③ ④ ⑤ ⑥ ⑦

①		**CC**: Cable
②	Length	**005**: 0.5 m **010**: 1 m **015**: 1.5 m **020**: 2 m **025**: 2.5 m **030**: 3 m **040**: 4 m **050**: 5 m **070**: 7 m **100**: 10 m **150**: 15 m **200**: 20 m
③	Reference Number	
④	Applicable Models	**Z**: **AZ** Series
⑤	Cable Type	**F**: Connection Cable Sets **R**: Flexible Connection Cable Sets
⑥	Electromagnetic Brake	Blank: Without Electromagnetic Brake **B**: With Electromagnetic Brake
⑦	Cable Specifications	Blank: AC Power Supply Input **2**: DC Power Supply Input

Product Line (Single-Phase 200-240 VAC)

Hollow Rotary Actuators

◇Standard Type

Frame Size	Product Name
85 mm	**DGM85R-AZAC**
130 mm	**DGM130R-AZAC** **DGM130R-AZACR** **DGM130R-AZACL**
200 mm	**DGM200R-AZAC** **DGM200R-AZACR** **DGM200R-AZACL**

◇Standard Type with Electromagnetic Brake

Frame Size	Product Name
85 mm	**DGM85R-AZMC**
130 mm	**DGM130R-AZMC** **DGM130R-AZMCR** **DGM130R-AZMCL**
200 mm	**DGM200R-AZMC** **DGM200R-AZMCR** **DGM200R-AZMCL**

Driver

◇Built-In Controller Type

Power Supply Input	Product Name
Single-Phase 200-240 VAC	**AZD-CD**

◇Pulse Input Type

Power Supply Input	Product Name
Single-Phase 200-240 VAC	**AZD-C**

◇Pulse Input Type with RS-485 Communication

Power Supply Input	Product Name
Single-Phase 200-240 VAC	**AZD-CX**

●Cable

◇Without Electromagnetic Brake


For Motor For Encoder

Product Line	Length L [m]	Product Name
Connection Cable Sets	0.5	**CC005VZF**
	1	**CC010VZF**
	1.5	**CC015VZF**
	2	**CC020VZF**
	2.5	**CC025VZF**
	3	**CC030VZF**
	4	**CC040VZF**
	5	**CC050VZF**
	7	**CC070VZF**
	10	**CC100VZF**
	15	**CC150VZF**
	20	**CC200VZF**

Product Line	Length L [m]	Product Name
Flexible Connection Cable Sets	0.5	**CC005VZR**
	1	**CC010VZR**
	1.5	**CC015VZR**
	2	**CC020VZR**
	2.5	**CC025VZR**
	3	**CC030VZR**
	4	**CC040VZR**
	5	**CC050VZR**
	7	**CC070VZR**
	10	**CC100VZR**
	15	**CC150VZR**
	20	**CC200VZR**

◇Type with an Electromagnetic Brake


For Motor For Encoder For Electromagnetic Brake

Product Line	Length L %m)	Product Name
Connection Cable Sets	0.5	**CC005VZFB**
	1	**CC010VZFB**
	1.5	**CC015VZFB**
	2	**CC020VZFB**
	2.5	**CC025VZFB**
	3	**CC030VZFB**
	4	**CC040VZFB**
	5	**CC050VZFB**
	7	**CC070VZFB**
	10	**CC100VZFB**
	15	**CC150VZFB**
	20	**CC200VZFB**

Product Line	Length L (m)	Product Name
Flexible Connection Cable Sets	0.5	**CC005VZRB**
	1	**CC010VZRB**
	1.5	**CC015VZRB**
	2	**CC020VZRB**
	2.5	**CC025VZRB**
	3	**CC030VZRB**
	4	**CC040VZRB**
	5	**CC050VZRB**
	7	**CC070VZRB**
	10	**CC100VZRB**
	15	**CC150VZRB**
	20	**CC200VZRB**

■Product Line (24 VDC / 48 VDC)

●Hollow Rotary Actuators

◇Standard Type

Frame Size	Product Name
85 mm	**DGM85R-AZAK**
130 mm	**DGM130R-AZAK** **DGM130R-AZAKR** **DGM130R-AZAKL**

◇Standard Type with Electromagnetic Brake

Frame Size	Product Name
85 mm	**DGM85R-AZMK**
130 mm	**DGM130R-AZMK** **DGM130R-AZMKR** **DGM130R-AZMKL**

●Driver

◇Built-In Controller Type

Power Supply Input	Product Name
24 VDC / 48 VDC	**AZD-KD**

◇Pulse Input Type

Power Supply Input	Product Name
24 VDC / 48 VDC	**AZD-K**

◇Pulse-Input Type with RS-485 Communication

Power Supply Input	Product Name
24 VDC / 48 VDC	**AZD-KX**

●Cable

◇Without Electromagnetic Brake


For Motor For Encoder

Product Line	Length L [m]	Product Name
Connection Cable Sets	0.5	**CC005VZF2**
	1	**CC010VZF2**
	1.5	**CC015VZF2**
	2	**CC020VZF2**
	2.5	**CC025VZF2**
	3	**CC030VZF2**
	4	**CC040VZF2**
	5	**CC050VZF2**
	7	**CC070VZF2**
	10	**CC100VZF2**
	15	**CC150VZF2**
	20	**CC200VZF2**

Product Line	Length L [m]	Product Name
Flexible Connection Cable Sets	0.5	**CC005VZR2**
	1	**CC010VZR2**
	1.5	**CC015VZR2**
	2	**CC020VZR2**
	2.5	**CC025VZR2**
	3	**CC030VZR2**
	4	**CC040VZR2**
	5	**CC050VZR2**
	7	**CC070VZR2**
	10	**CC100VZR2**
	15	**CC150VZR2**
	20	**CC200VZR2**

◇Type with an Electromagnetic Brake


For Motor


For Encoder


For Electromagnetic Brake

Product Line	Length L [m]	Product Name
Connection Cable Sets	0.5	**CC005VZFB2**
	1	**CC010VZFB2**
	1.5	**CC015VZFB2**
	2	**CC020VZFB2**
	2.5	**CC025VZFB2**
	3	**CC030VZFB2**
	4	**CC040VZFB2**
	5	**CC050VZFB2**
	7	**CC070VZFB2**
	10	**CC100VZFB2**
	15	**CC150VZFB2**
	20	**CC200VZFB2**

Product Line	Length L [m]	Product Name
Flexible Connection Cable Sets	0.5	**CC005VZRB2**
	1	**CC010VZRB2**
	1.5	**CC015VZRB2**
	2	**CC020VZRB2**
	2.5	**CC025VZRB2**
	3	**CC030VZRB2**
	4	**CC040VZRB2**
	5	**CC050VZRB2**
	7	**CC070VZRB2**
	10	**CC100VZRB2**
	15	**CC150VZRB2**
	20	**CC200VZRB2**

Specifications

Hollow Rotary Actuators Specifications

Frame Size			85 mm		130 mm		200 mm
Product Name			**DGM85R-AZ□□◇**		**DGM130R-AZ□□◇**		**DGM200R-AZ□C◇**
Driver product name	Built-in Controller		**AZD-CD, AZD-KD**				**AZD-CD**
	Pulse Input Type with RS-485 Communication		**AZD-CX, AZD-KX**				**AZD-CX**
	Pulse Input Type		**AZD-C, AZD-K**				**AZD-C**
Built-In Motor			**AZ** Series				
Type of Output Table Supporting Bearing			Cross-Roller Bearing				
Inertia		J: kgm^2	21120×10^{-7} [26304×10^{-7}]*1		147380×10^{-7} [199220×10^{-7}]*1		916400×10^{-7} [968240×10^{-7}]*1
Gear Ratio			18				
Minimum Traveling Amount of the Output Table		deg/STEP	0.01				
Permissible Torque		Nm	4.5		12		50
Holding Torque at Motor Standstill	Power ON	Nm	2.7		12		36 [20]*2
	Electromagnetic Brake	Nm	2.7		12		20
Max. Speed		deg/seconds	1200 (200 r/min)				660 (110 r/min)
Repetitive Positioning Accuracy		arc second	±15 (±0.004°)				
Lost Motion		arc minute	2 (0.033°)				
Angular Transmission Accuracy		arc minute	4 (0.067°)		3 (0.05°)		2 (0.033°)
Permissible Axial Load		N	500		2000		4000
Permissible Moment		Nm	10		50		100
Runout of Output Table Surface		mm	0.015				
Runout of Output Table Inner (Outer) Diameter		mm	0.015				0.030
Parallelism of Output Table		mm	0.030				0.050
Degree of Protection			IP40 (IP20 for motor connector)				
Power-Supply Input	Voltage and Frequency		Single-Phase 200-240 VAC -15 % to +6 % 50/60 Hz	VDC24 ±5%*2 VDC48 ±5%*3	Single-Phase 200-240 VAC -15 % to +6 % 50/60 Hz	VDC24 ±5%*2 VDC48 ±5%*3	Single-Phase 200-240 VAC -15 % to +6 % 50/60 Hz
	Input Current A		1.7	1.72[1.8]*1	2.3	3.55[3.8]*1	3.9

- Either **A** (single shaft) or **M** (electromagnetic brake) indicating the configuration is entered where the box □ is located within the product name.
- Either **C** (single-phase 200-240 VAC) or **K** (24/48 VDC) indicating the power supply input is entered where the box ▢ is located within the product name.
- Either **R** (right) or **L** (left) is entered for the cable withdrawing direction in ◇ in the product name.

*1 The brackets [ ] indicate the specifications for the electromagnetic brake type.

*2 Changes to 24 VDC±4% if the electromagnetic brake type has been extended with the 20 m accessory cable.

*3 When operating with 48 VDC, please keep the load intertia up to 10 times the rotor inertia, and keep the torque safety factor 2 or more when calculating the acceleration torque (excluding **DGM85** type)

Note

- Depending on the driving conditions, a considerable amount of heat may be generated by the motor. Please keep the motor case temperature at a maximum of 80˚C to protect the ABZO sensor. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75˚C or less, since the motor is recognized as heat-resistant class A.)
- The repetitive positioning accuracy is measured at a constant temperature (normal temperature) under a constant load.

Electromagnetic brake specification

Product Name		**DGM85**	**DGM130**	**DGM200**
Operation Mode		Power Off Activated Type		
Input voltage		24VDC±5%*		
Input current	A	0.08	0.25	
Brake operation time	ms	20		
Brake time releasing	ms	30		
Rating		Continuous		

*Changes to 24 VDC ± 4% if the electromagnetic brake type has been extended with the 20 m accessory cable.

●General Specifications

		Actuator Built-in Motor: **AZ** Series	Driver	
			Built-In Controller Type Pulse Input Type with RS-485 Communication	Pulse Input Type
Heat-Resistant Class		130 (B) [Recognized as 105 (A) by the UL Standards]	–	
Insulation Resistance		The measured value is 100 MΩ or more when a 500 VDC megger is applied between the following locations: · Case – Motor windings · Case – Electromagnetic brake windings*1	The measured value is 100 MΩ or more when a 500 VDC megger is applied between the following locations: · Protective earth terminal – Power supply terminal	
Dielectric Voltage		Sufficient to withstand the following for 1 minute: · Case – Motor windings 1.0 kVAC, 50 Hz or 60 Hz · Case – Electromagnetic brake windings*1 1.0 kVAC, 50 Hz or 60 Hz		
Operating Environment (In operation)	Ambient Temperature	0 - +40˚C (Non-freezing)	0 - +50˚C (non-freezing)	
	Ambient Humidity	85% or less (Non-condensing)		
	Atmosphere	Use in an area without corrosive gases and dust. The product should not be exposed to water, oil or other liquids.		
Degree of Protection		IP40 (IP20 for motor connector)	IP10	
Multiple rotation detection range in non-electrified state (Motor output shaft)		±900 rotations (1800 rotations)		

*1 Only for electromagnetic brake type

Note

● Do not perform the insulation resistance measurement or dielectric voltage withstand test while the actuator and driver are connected.
Also, do not conduct these tests on the motor ABZO sensor component.

●Driver Specifications

Classification	Name		Built-In Controller Type	Pulse Input Type
Input/Output Function	Pulse Input		–	Max. Input Pulse Frequency Line driver output by programmable controller: 1 MHz (When the pulse duty is 50%) Open-collector output by programmable controller: 250 kHz (When the pulse duty is 50%) Negative Logic Pulse Input (Initial value)
	Direct Input		Number of Inputs: 10 points	Number of Inputs: 6 points
	Direct Output		Number of Outputs: 6 points	
	RS-485 Communication	Network Input	16 Points	–
		Network Output	16 Points	–

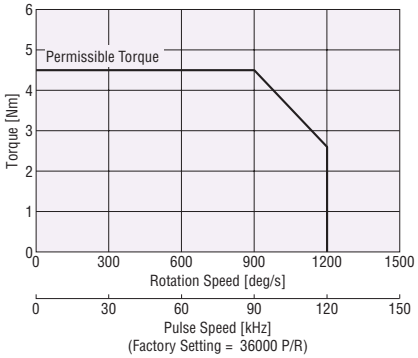
●Built-In Controller Type RS-485 Communication Specification

Protocol	Modbus RTU Mode
Electrical Characteristics	EIA-485 Based, Straight Cable Use shielded twisted-pair cables (TIA/EIA-568B CAT5e or better recommended). The maximum total extension length is 50 m.
Communication Mode	Half duplex and start-stop synchronization (data: 8 bits, stop bit: 1 bit or 2 bits, parity: none, even, or odd)
Baud Rate	Select from 9600 bps / 19200 bps / 38400 bps / 57600 bps / 115200 bps / 230400 bps
Connection Type	Up to 31 units can be connected to a single programmable controller (master unit).

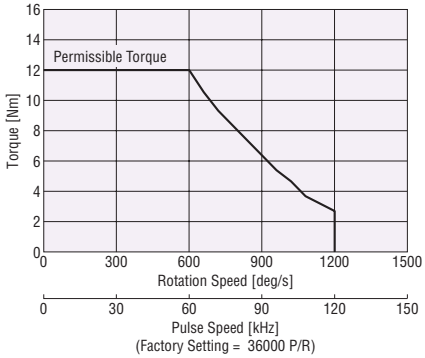
Speed – Torque Characteristics (Reference values)

Single-Phase 200-240 VAC

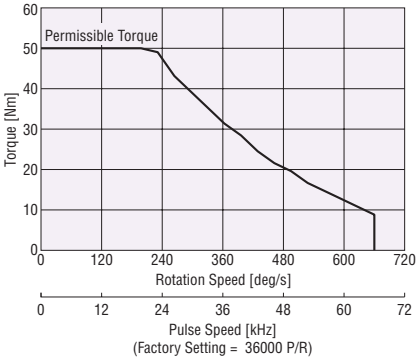
DGM85R-AZ



DGM130R-AZ

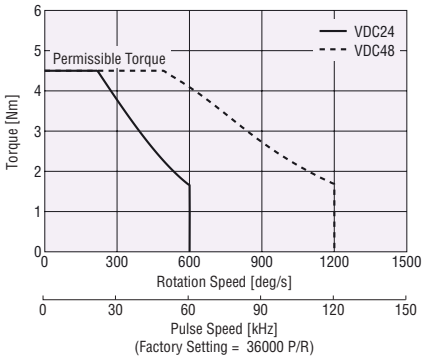


DGM200R-AZ

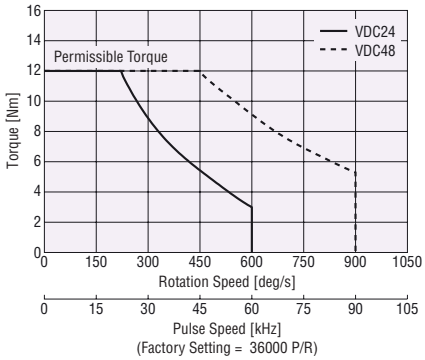


24 VDC / 48 VDC

DGM85R-AZ



DGM130R-AZ



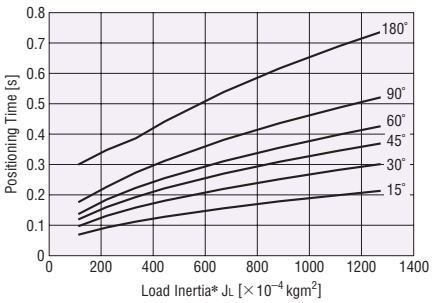
Note

- Data for the speed – torque characteristics is based on Oriental Motor's internal measurement conditions. If the conditions are changed, the characteristics may also change as a result.
- Depending on the driving conditions, a considerable amount of heat may be generated by the motor. Please keep the motor case temperature at a maximum of 80˚C to protect the ABZO sensor. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75˚C or less, since the motor is recognized as heat-resistant class A.)

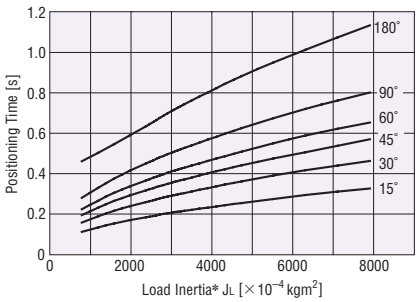
Load Inertia – Positioning Time (Reference value)

Single-Phase 200-240 VAC

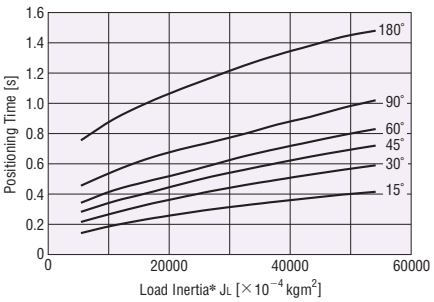
DGM85R-AZ



DGM130R-AZ

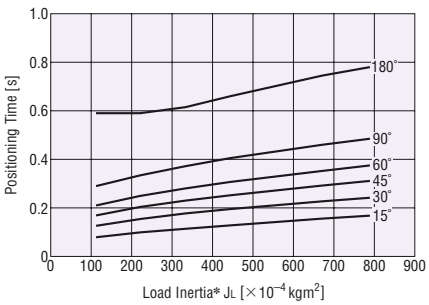


DGM200R-AZ

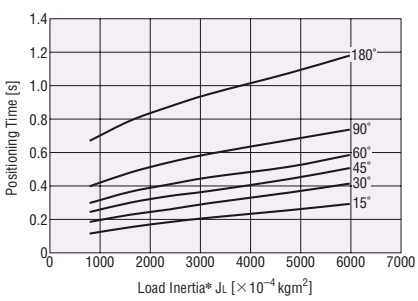


24 VDC

DGM85R-AZ



DGM130R-AZ

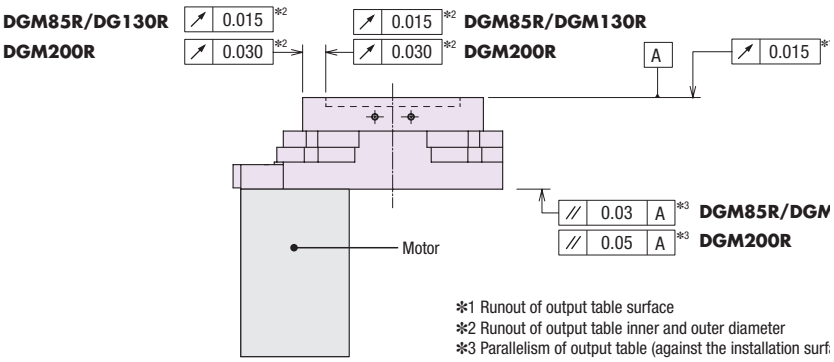


∗The load inertia refers to the inertia of the customer's load.

Note

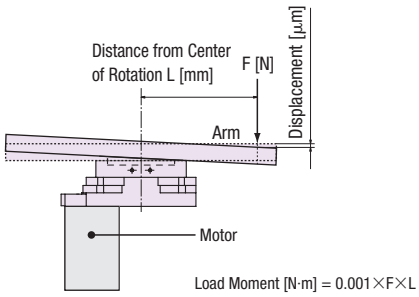
- The load intertia - positioning time is the theoretical value under normal temperature with a safety factor of 1.5 for torque. If the condition changes, the positioning time may change.

Mechanical Precision (At no load)

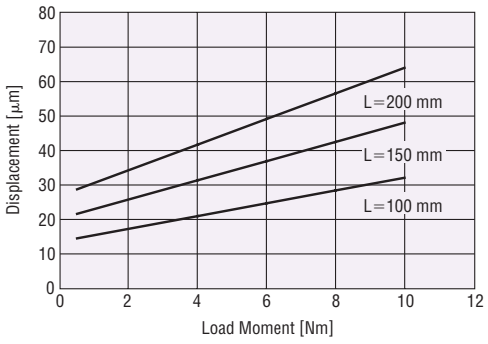


Displacement by Load Moment (Reference value)

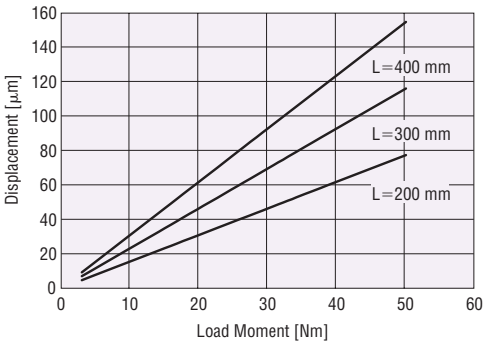
The output table will be displaced when it receives a load moment.
The graph plots the table displacement that occurs at distance L from the rotation center of the output table when a given load moment is applied in one direction.
The displacement becomes approximately twice the size when the load moment is applied in both the positive and negative directions.



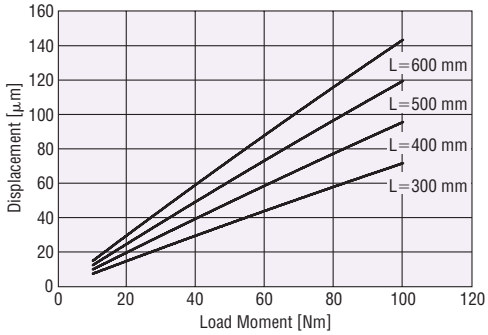
DGM85R



DGM130R



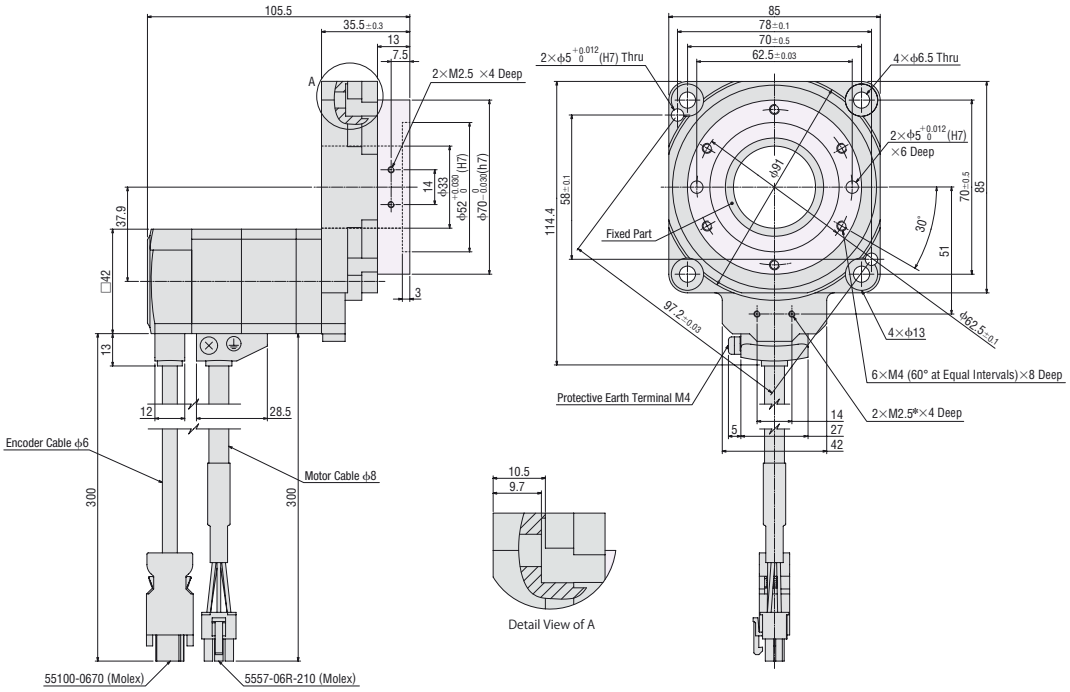
DGM200R



Dimensions (Unit = mm)

Actuator

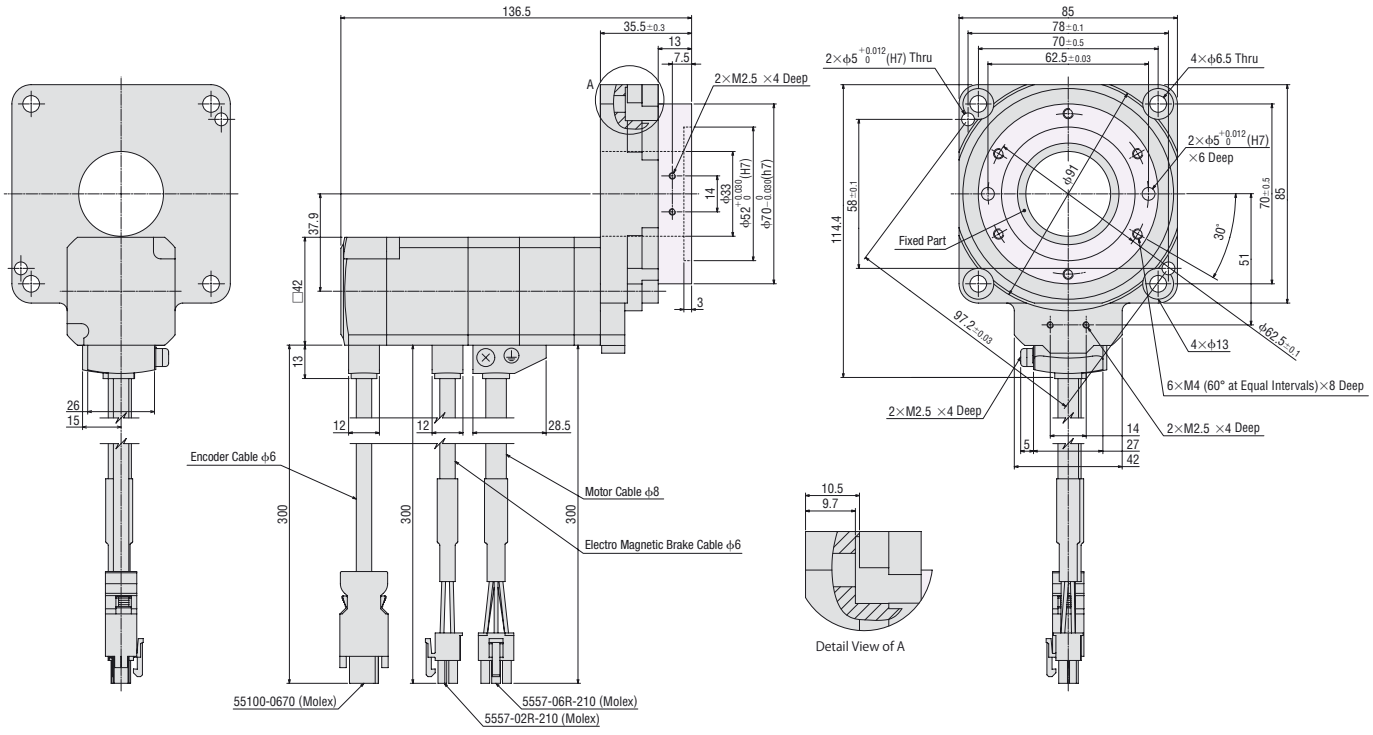
Product Name	Mass
DGM85R-AZAC	1.1 kg
DGM85R-AZAK	



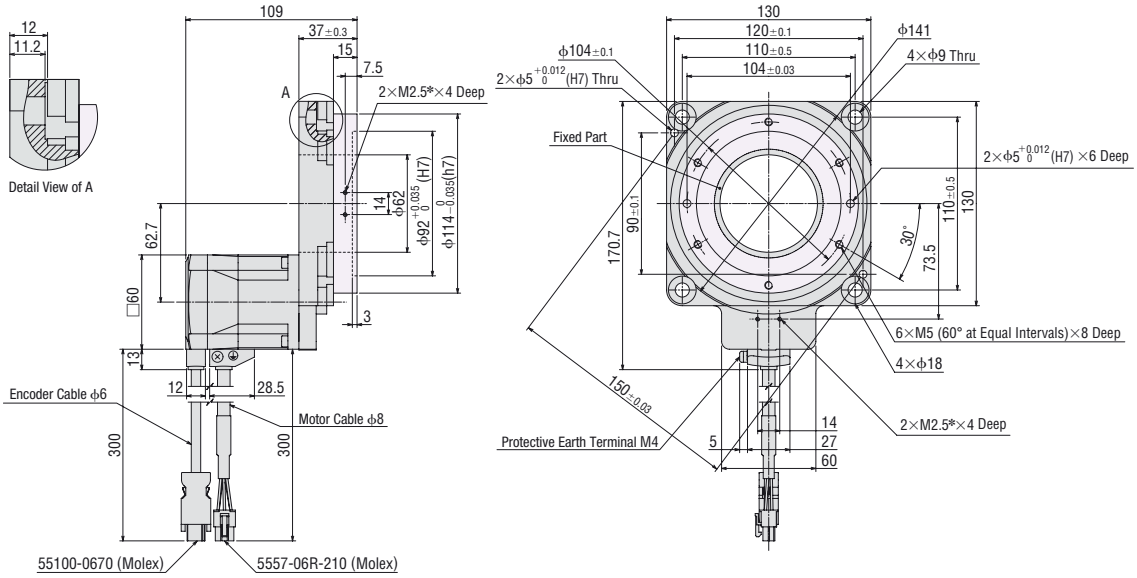
● The ▭ shaded areas are rotating parts.

✻Use M2.5 screw holes when installing the home sensor set (sold separately).
Do not use these holes for any purpose other than to install the home sensor.

Product Name	Mass
DGM85R-AZMC	1.1 kg
DGM85R-AZMK	



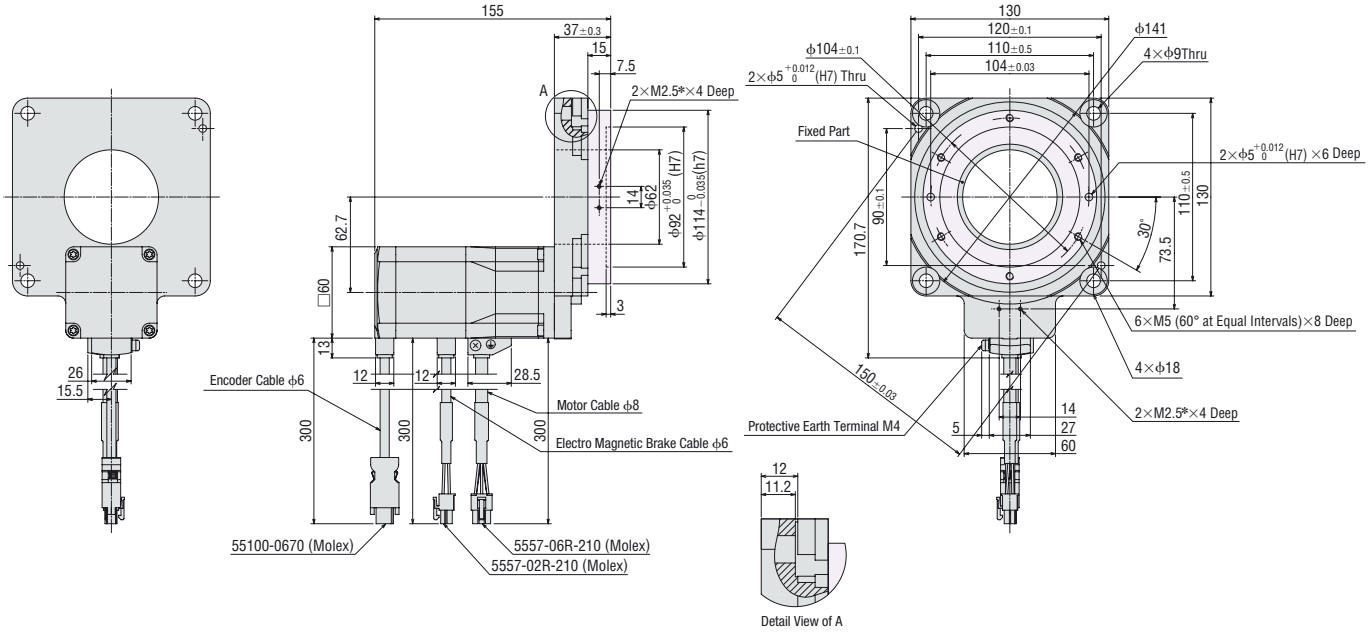
Product Name			Mass
DGM130R-AZAC	**DGM130R-AZACR**	**DGM130R-AZACL**	2.7 kg
DGM130R-AZAK	**DGM130R-AZAKR**	**DGM130R-AZAKL**	



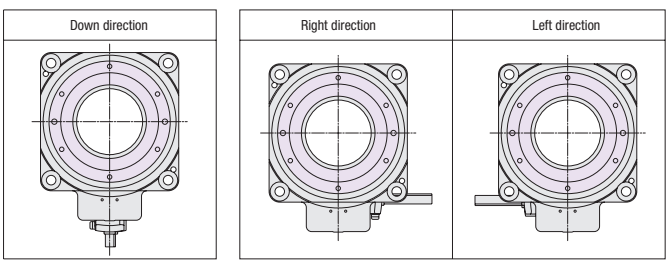
● The ▭ shaded areas are rotating parts.

✻Use M2.5 screw holes when installing the home sensor set (sold separately).
Do not use these holes for any purpose other than to install the home sensor.

Product Name			Mass
DGM130R-AZMC	**DGM130R-AZMCR**	**DGM130R-AZMCL**	3.1 kg
DGM130R-AZMK	**DGM130R-AZMKR**	**DGM130R-AZMKL**	



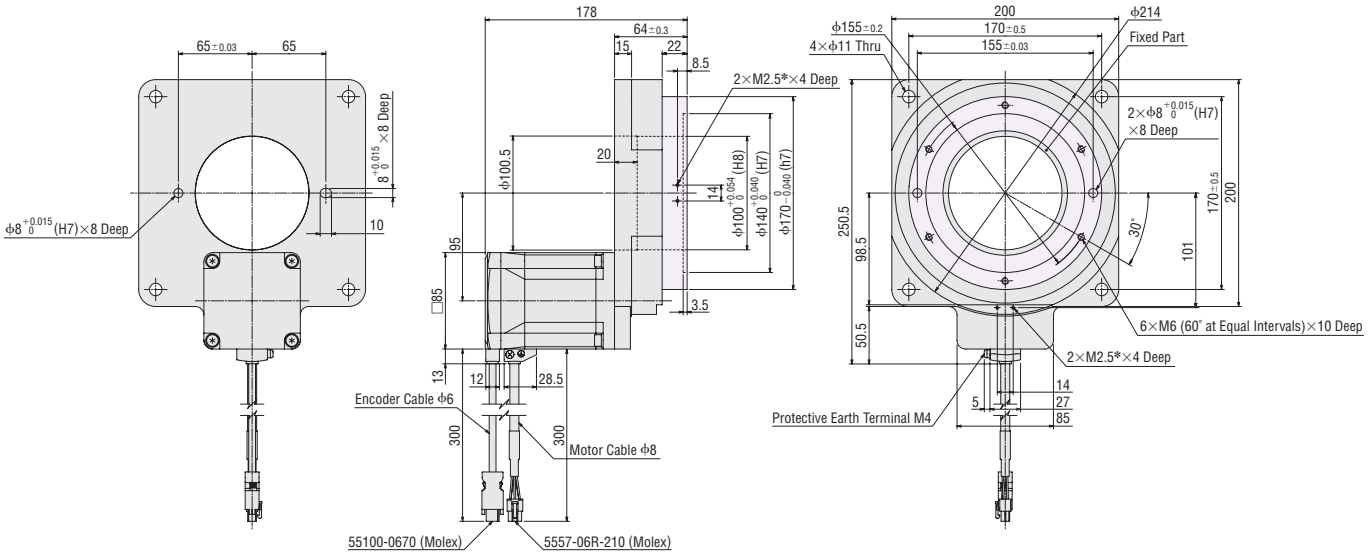
Cable Direction



● The ▭ shaded areas are rotating parts.

✻Use M2.5 screw holes when installing the home sensor set (sold separately).
Do not use these holes for any purpose other than to install the home sensor.

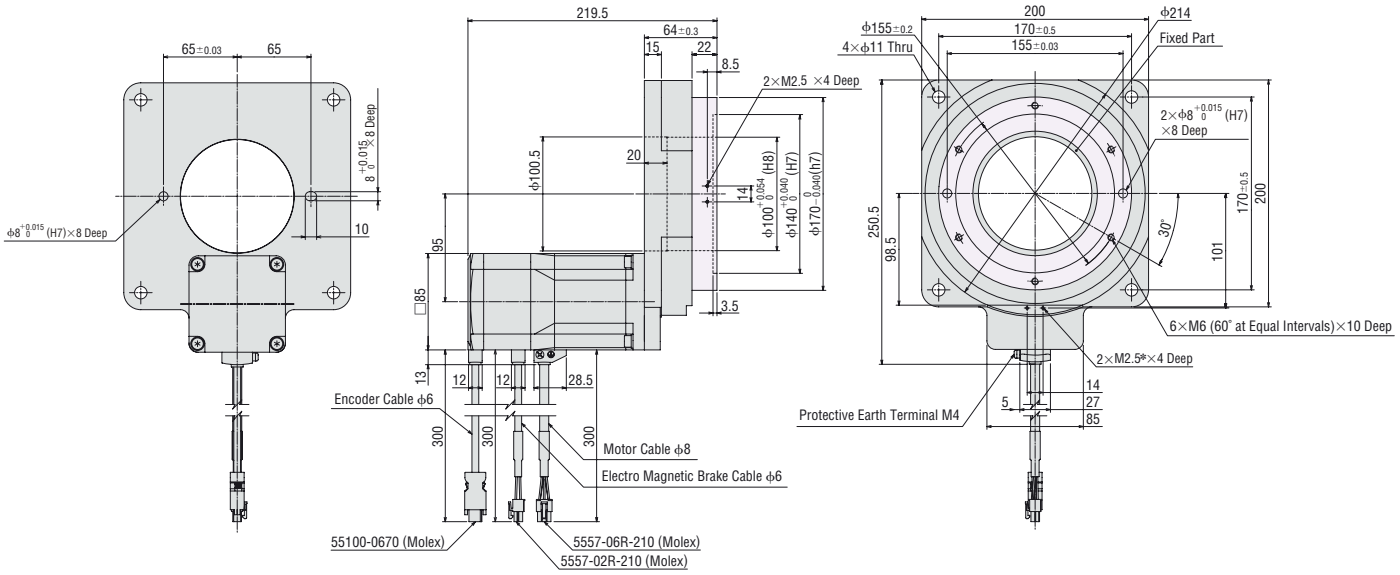
Product Name			Mass
DGM200R-AZAC	**DGM200R-AZACR**	**DGM200R-AZACL**	9.4 kg



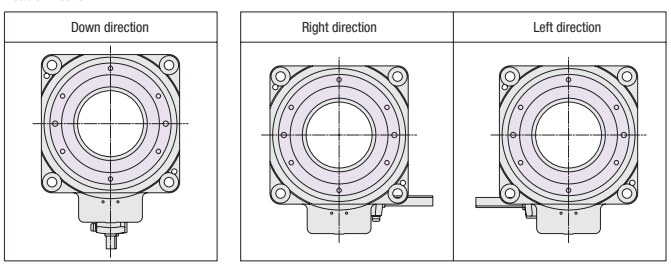
● The ▭ shaded areas are rotating parts.

✻Use M2.5 screw holes when installing the home sensor set (sold separately).
Do not use these holes for any purpose other than to install the home sensor.

Product Name			Mass
DGM200R-AZMC	**DGM200R-AZMCR**	**DGM200R-AZMCL**	10 kg



Cable Direction



● The ▭ shaded areas are rotating parts.

✻Use M2.5 screw holes when installing the home sensor set (sold separately).
Do not use these holes for any purpose other than to install the home sensor.

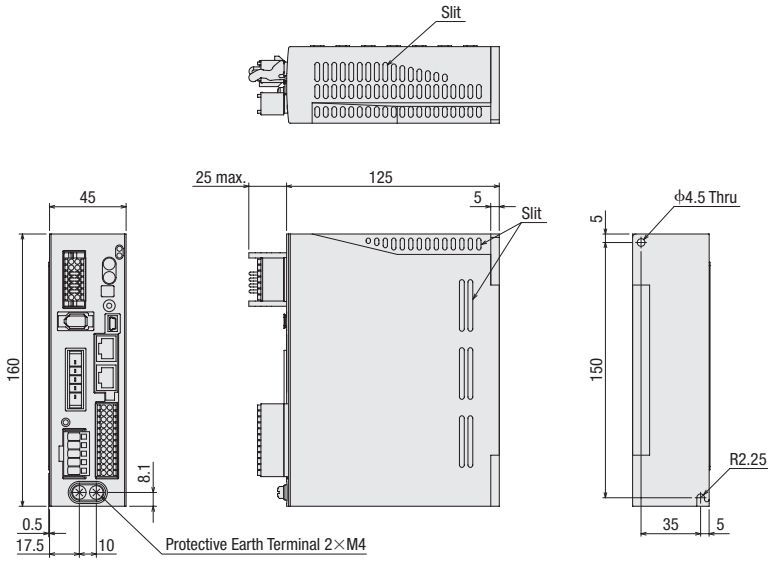
●Driver

◇Built-In Controller Type (Single-Phase 200-240 VAC)

◇Pulse-Input Type with RS-485 Communication (Single-Phase 200-240 VAC)

Driver Product Name: AZD-CD, AZD-CX

Mass: 0.65 kg



●Included

Main Power/Regeneration Unit Connector (CN4)
Connector: 05JFAT-SAXGDK-H5.0
(J.S.T. Mfg. Co., Ltd.)

I/O Signals Connector (CN5)
Connector: DFMC1, 5/12-ST-3, 5
(Phoenix Contact)

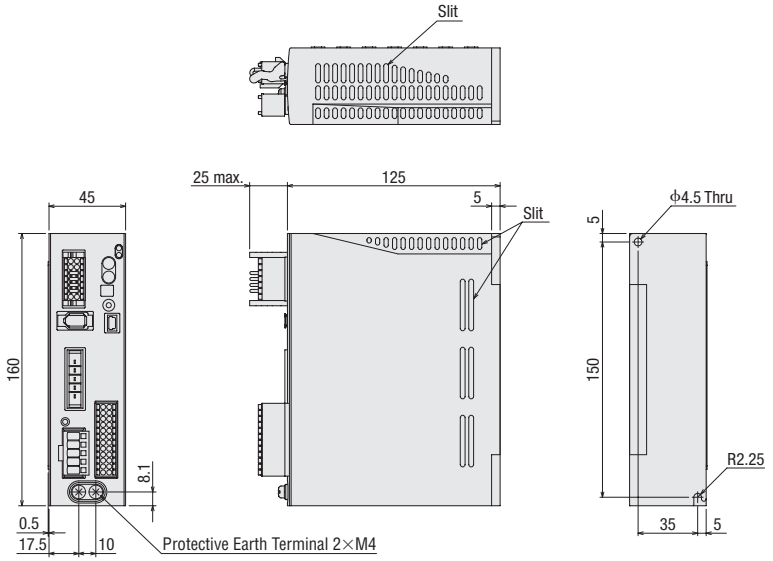
24 VDC Power Supply Input/Electromagnetic Brake Connection/ Regeneration Unit Thermal Input/Power Cutoff Signal I/O Connector (CN1)
Connector: DFMC1, 5/7-ST-3, 5-LR
(Phoenix Contact)

Connector Wiring Lever: J-FAT-0T
(J.S.T. Mfg. Co., Ltd.)

◇Pulse Input Type (Single-Phase 200-240 VAC)

Driver Product Name: AZD-C

Mass: 0.65 kg



●Included

Main Power/Regeneration Unit Connector (CN4)
Connector: 05JFAT-SAXGDK-H5.0
(J.S.T. Mfg. Co., Ltd.)

I/O Signals Connector (CN5)
Connector: DFMC1, 5/12-ST-3, 5
(Phoenix Contact)

24 VDC Power Supply Input/Electromagnetic Brake Connection/ Regeneration Unit Thermal Input/Power Cutoff Signal I/O Connector (CN1)
Connector: DFMC1, 5/7-ST-3, 5-LR
(Phoenix Contact)

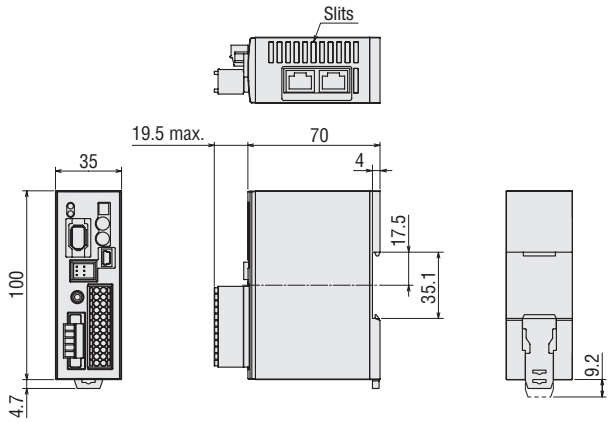
Connector Wiring Lever: J-FAT-0T
(J.S.T. Mfg. Co., Ltd.)

Note

The motor cable and electromagnetic brake cable from the hollow rotary actuator cannot be connected directly to the driver. When connecting to a driver, use the accessory connection cable (sold separately) or use the included connection cable (for products which include a connection cable).

◇Built-In Controller Type (24 VDC / 48 VDC)
◇Pulse-Input Type with RS-485 Communication (24 VDC / 48 VDC)

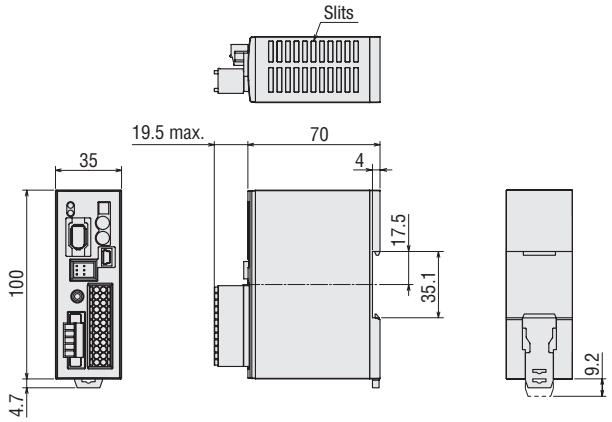
Driver Product Name: AZD-KD, AZD-KX
Mass: 0.15kg



● Accessories
Connector form in power/electromagnetic brake connections (CN1)
Connector: MC1,5/5-STF-3,5
(PHOENIX CONTACT GmbH & Co. KG)
Connector for Input/Output Signal (CN4)
Connector: DFMC1,5/12-ST-3,5
(PHOENIX CONTACT GmbH & Co. KG)

◇Pulse Input Type (24 VDC / 48 VDC)

Driver Product Name: AZD-K
Mass: 0.15kg

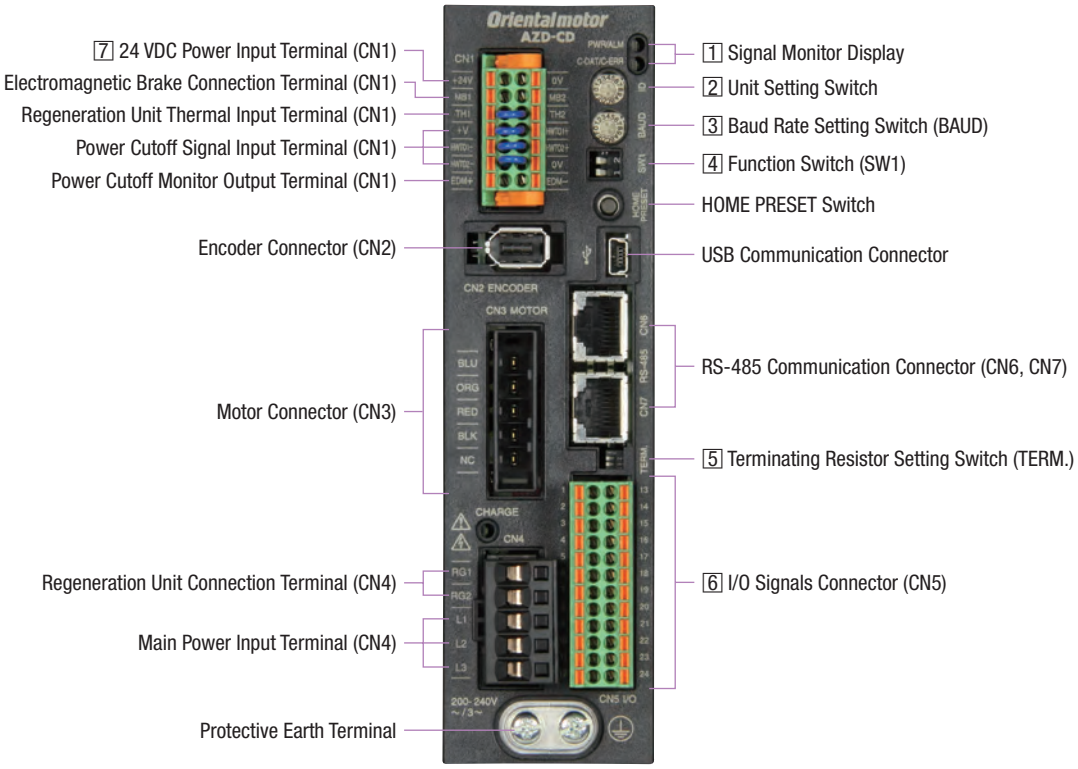


● Accessories
Connector form in power/electromagnetic brake connections (CN1)
Connector: MC1,5/5-STF-3,5
(PHOENIX CONTACT GmbH & Co. KG)
Connector for Input/Output Signal (CN4)
Connector: DFMC1,5/12-ST-3,5
(PHOENIX CONTACT GmbH & Co. KG)

■Connection and Operation (Single-Phase 200-240 VAC)

●Built-In Controller Type and Pulse Input Type with RS-485 Communication

◇Names and Functions of Driver Parts



Driver Product Name: AZD-CD

1 Signal Monitor Displays

◇LED Indicators

Indication	Color	Function	Lighting Condition
PWR	Green	Power supply indication	When 24 VDC power supply is input
ALM	Red	Alarm indication	When a protective function is activated (blinking)
C-DAT	Green	Communication indication	When communication data is being sent or received
C-ERR	Red	Communication error indication	When communication data is in error

2 Unit Setting Switch

Indication	Function
ID	Set this when RS-485 communication is used. Set the unit number (factory setting: 0).

3 Baud Rate Setting Switch

Indication	Function
BAUD	Set this when RS-485 communication is used. Set the baud rate (factory setting: 7).

4 Function Switch

Indication	No.	Function
SW1	1	Use in combination with the unit setting switch (ID) to set the unit number (factory setting: OFF).
	2	Set the RS-485 communication protocol (factory setting: OFF).

◇RS-485 Baud Rate Setting

No.	Baud Rate (bps)
0	9600
1	19200
2	38400
3	57600
4	115200
5	230400
6	Not used
7	Network Converters
8 - F	Not used

5 Terminating Resistor Setting Switch

Indication	No.	Function
TERM.	1	Set the RS-485 communication termination resistance (120 Ω) (factory setting: OFF).
	2	OFF: Terminating resistor not used, ON: Terminating resistor used

● Configure both No. 1 and No. 2 to the same setting.

6 I/O Signal Connector (CN5)

Indication	Pin No.	Signal Name	Description	
CN5	1	IN0	START	This signal is used to start positioning operation.
	2	IN2	M1	Use 3 bits (M0, M1, M2) to select the operating data number.
	3	IN4	ZHOME	Travels to home location set via HOME PRESET switch.
	4	IN6	STOP	Stop the motor.
	5	IN-COM [0-7]*1	Input common for IN0～IN7	
	6	IN8	FW-JOG	Starts the JOG operation.
	7	OUT0	HOME-END	When home is determined, output when the high speed return-to-home operation is completed.
	8	OUT2	PLS-RDY	Not used.
	9	OUT4	MOVE	Output when the motor is operating.
	10	OUT-COM*1	Output Common	
	11	ASG+	A-Phase Pulse Output+	
	12	BSG+	B-Phase Pulse Output+	
	13	IN1	M0	Use 3 bits (M0, M1, M2) to select the operating data number.
	14	IN3	M2	Use 3 bits (M0, M1, M2) to select the operating data number.
	15	IN5	FREE	Switches the motor into its non-excitation state.
	16	IN7	ALM-RST	Resets the alarm.
	17	IN-COM [8-9]*1	IN8 and IN9 input common	
	18	IN9	RV-JOG	Starts the JOG operation.
	19	OUT1	IN-POS	Output when motor operation is completed.
	20	OUT3	READY	Output when the driver is ready for operation.
	21	OUT5	ALM-B	Outputs the alarm status for the driver (normal close).
	22	GND*1	Ground	
	23	ASG−	A-Phase Pulse Output−	
	24	BSG−	B-Phase Pulse Output−	

● Functions to assign can be set by specifying parameters. Initial values are shown above. For details, please refer to the **AZ** Series operating manual (functionality section).

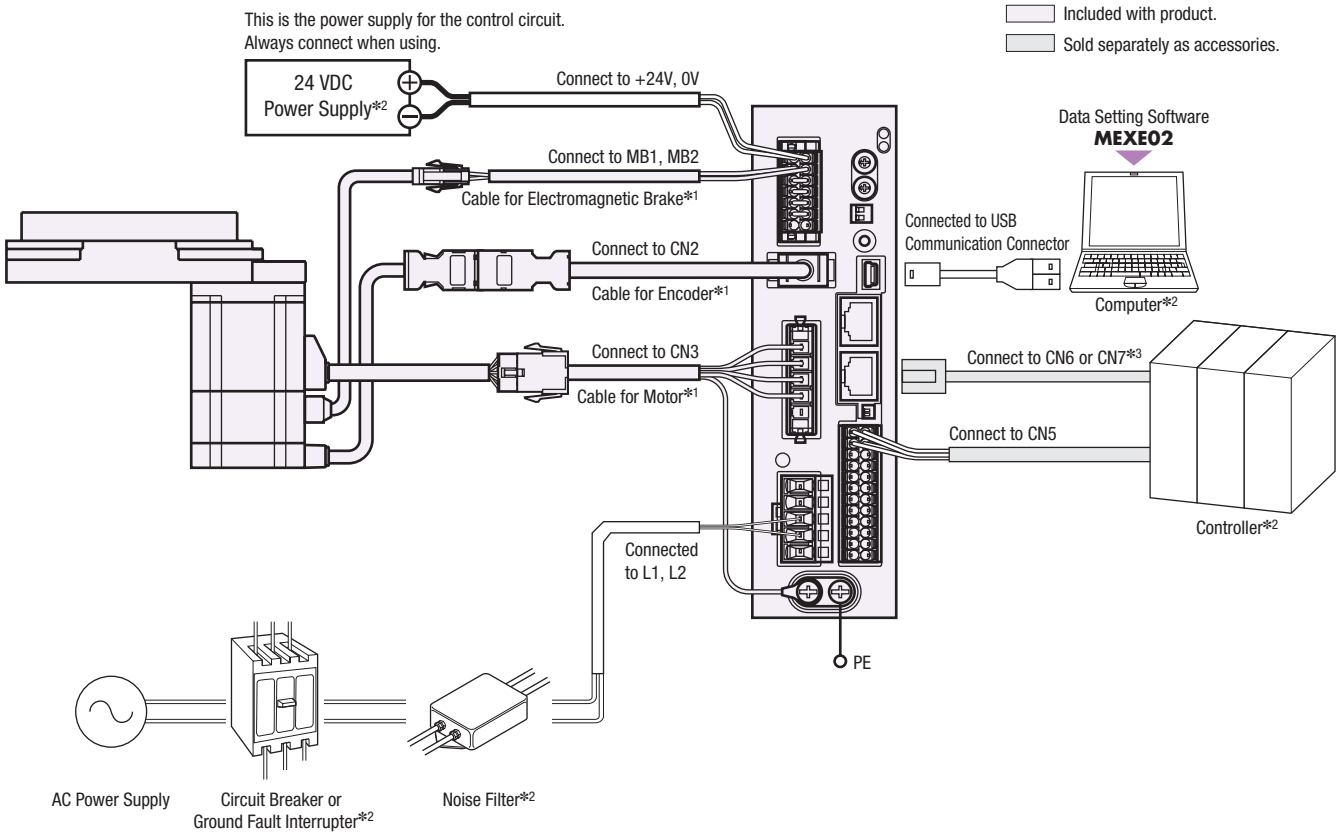
*1 Initial setting values cannot be changed.

7 24 VDC Power Supply Input Terminal / Electromagnetic Brake Connection Terminal / Regeneration Unit Thermal Input Terminal / Power Cutoff Signal Input Terminal / Power Cutoff Monitor Output Terminal (CN1)

Indication	I/O	Terminal Name	Description
+24 V	Input	24 VDC Power Supply Input Terminal +	The power supply for the driver control circuit. Always connect when using.
0 V		24 VDC Power Supply Input Terminal −	
MB1	Output	Electromagnetic brake terminal −	Connect the electromagnetic brake cable for motors with the electromagnetic brake.
MB2		Electromagnetic brake terminal +	
TH1	Input	Regeneration Unit Thermal Input Terminal	Connect the accessory (sold separately) regeneration unit (**RGB100**). When not connecting a regeneration unit, short these 2 terminals to each other.
TH2		Regeneration Unit Thermal Input Terminal	
HWTO1+	Input	Power Cutoff Signal Input Terminal 1+	Connects to switch and host controller. If either HWTO1 input or HWTO2 input is OFF, the motor power supply is cut off directly via hardware (CPU bypassed).
HWTO1−		Power Cutoff Signal Input Terminal 1−	
HWTO2+		Power Cutoff Signal Input Terminal 2+	
HWTO2−		Power Cutoff Signal Input Terminal 2−	
EDM+	Output	Power Cutoff Monitor Output Terminal +	Connects to host controller. If both HWTO1 input HWTO2 input are OFF, the EDM output turns ON.
EDM−		Power Cutoff Monitor Output Terminal −	

●Connection Diagram

◇Connections with Peripheral Equipment

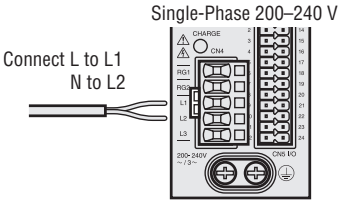


*1 Products are available with a 1 m, 2 m or 3 m cable for motor and driver, and also without.
If cables longer than 3 m or flexible cables are required, select the appropriate cables from the accessories (sold separately).
When wiring the motor and the driver, keep a maximum distance of 20 m.

*2 Not supplied.

*3 Connect to controller when controlling the system via RS-485 communication.

◇Connecting the Main Power Supply



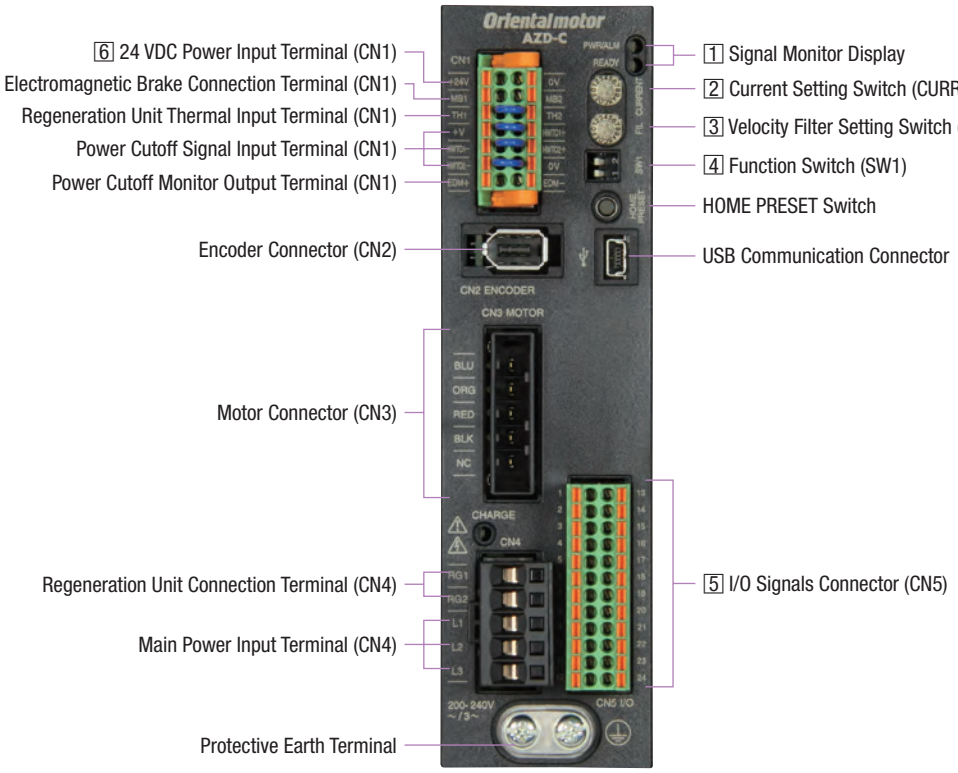
◇USB Cable Connection

Connect to the computer on which the data setting software **MEXE02** is installed to the driver with a USB cable.
Please use USB cables which meet the follow specifications.

Specifications	USB2.0 (Full speed)
Cable	Length: 3 m or less
	Type: A-mini-B

●Pulse Input type

◇Names and Functions of Driver Parts



Driver Product Name: AZD-C

1 Signal Monitor Displays

◇LED Indicators

Indication	Color	Function	Lighting Condition
PWR	Green	Power supply indication	When 24 VDC power supply is input
ALM	Red	Alarm indication	When a protective function is activated (blinking)
READY	Green	READY Output	When READY output is ON

2 Current Setting Switch

Indication	Function
CURRENT	Sets the basis current used by the operating current and motor standstill current (factory setting: F)

3 Command Filter Setting Switch

Indication	Function
FIL	Adjusts the responsiveness of the motor (factory setting: 1).

4 Function Switch

Indication	No.	Function
SW1	1	Sets the resolution per one rotation of the motor output shaft (factory setting: OFF [1000 p/r]). *
	2	Switches the pulse input mode between 1-pulse input mode and 2-pulse input mode. (Factory setting: OFF [2-pulse input Mode])

* For details, please refer to the **DGII** Series operating manual.

5 I/O Signal Connector (CN5)

Indication	Pin No.	Signal Name	Description	
CN5	1	CW+ [PLS+]*1	CW pulse input+ [pulse input+]	
	2	CCW+ [DIR+]*1	CCW pulse input+ [Rotation Direction Input+]	
	3	IN4	ZHOME	Travels to home location set via HOME PRESET switch.
	4	IN6	STOP	Stop the motor.
	5	IN-COM [4-7]*1	Input common for IN4～IN7	
	6	IN8	FW-JOG	Starts the JOG operation.
	7	OUT0	HOME-END	When home is determined, output when the high speed return-to-home operation is completed.
	8	OUT2	PLS-RDY	Output when pulse input preparation is completed.
	9	OUT4	MOVE	Output when the motor is operating.
	10	OUT-COM*1	Output Common	
	11	ASG+	A-Phase Pulse Output+	
	12	BSG+	B-Phase Pulse Output+	
	13	CW− [PLS-]*1	CW pulse input− [pulse input−]	
	14	CCW− [DIR-]*1	CCW pulse input− [Rotation Direction Input−]	
	15	IN5	FREE	Switches the motor into its non-excitation state.
	16	IN7	ALM-RST	Resets the alarm.
	17	IN-COM [8-9]*1	IN8 and IN9 input common	
	18	IN9	RV-JOG	Starts the JOG operation.
	19	OUT1	IN-POS	Output when motor operation is completed.
	20	OUT3	READY	Output when the driver is ready for operation.
	21	OUT5	ALM-B	Outputs the alarm status for the driver (normal close).
	22	GND*1	Ground	
	23	ASG−	A-Phase Pulse Output−	
	24	BSG−	B-Phase Pulse Output−	

● Functions to assign can be set by specifying parameters. Initial values are shown above. For details, please refer to the **AZ** Series operating manual (functionality section).

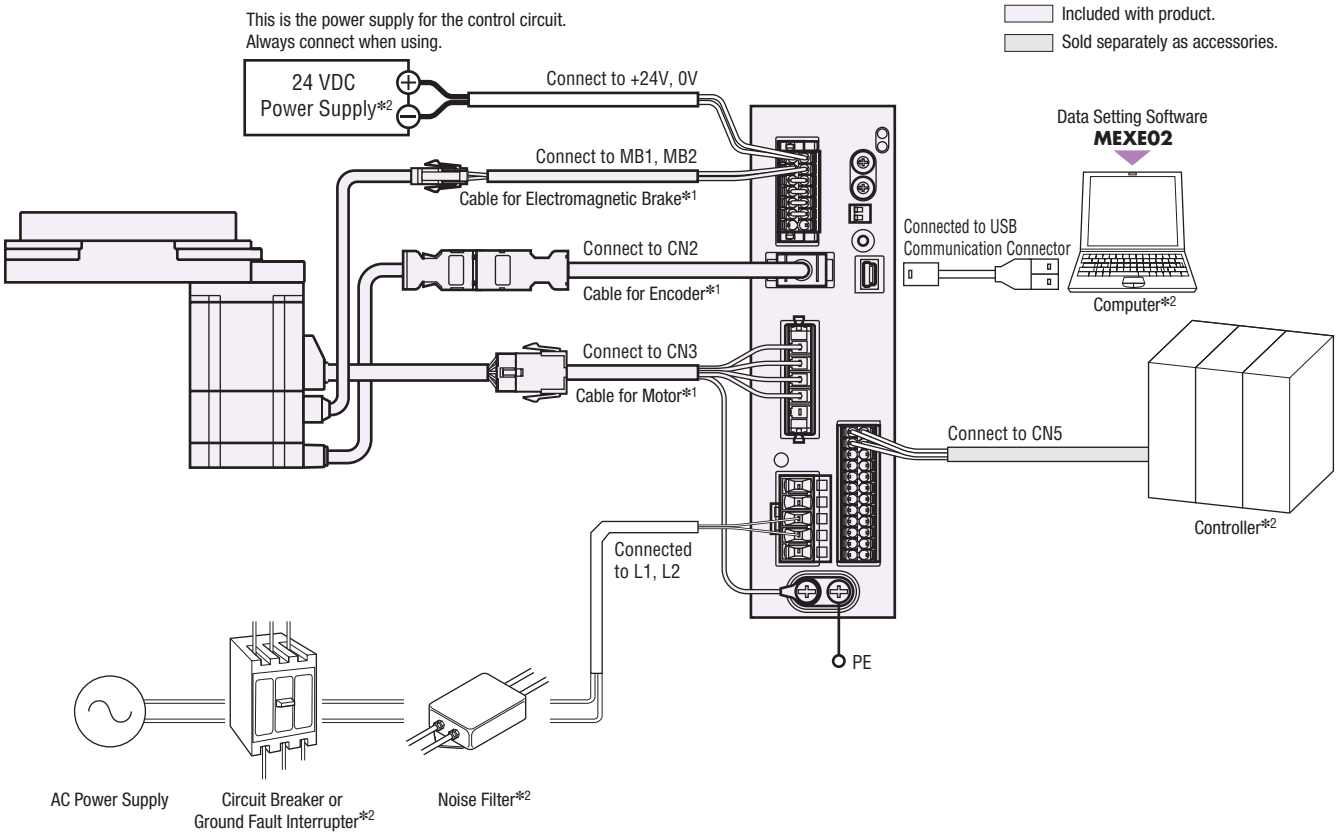
*1 Initial setting values cannot be changed.

6 24 VDC Power Supply Input Terminal / Electromagnetic Brake Connection Terminal / Regeneration Unit Thermal Input Terminal / Power Cutoff Signal Input Terminal / Power Cutoff Monitor Output Terminal (CN1)

Indication	I/O	Terminal Name	Description
+24 V	Input	24 VDC Power Supply Input Terminal +	The power supply for the driver control circuit. Always connect when using.
0 V		24 VDC Power Supply Input Terminal −	
MB1	Output	Electromagnetic brake terminal −	Connects the electromagnetic brake cable on motors with electromagnetic brake.
MB2		Electromagnetic brake terminal +	
TH1	Input	Regeneration Unit Thermal Input Terminal	Connect the accessory (sold separately) regeneration unit (**RGB100**). When not connecting a regeneration unit, short these 2 terminals to each other.
TH2		Regeneration Unit Thermal Input Terminal	
HWTO1+	Input	Power Cutoff Signal Input Terminal 1+	Connects to switch and host controller. If either HWTO1 input or HWTO2 input is OFF, the motor power supply is cut off directly via hardware (CPU bypassed).
HWTO1−		Power Cutoff Signal Input Terminal 1−	
HWTO2+		Power Cutoff Signal Input Terminal 2+	
HWTO2−		Power Cutoff Signal Input Terminal 2−	
EDM+	Output	Power Cutoff Monitor Output Terminal +	Connects to host controller. If both HWTO1 input HWTO2 input are OFF, the EDM output turns ON.
EDM−		Power Cutoff Monitor Output Terminal −	

●Connection Diagram

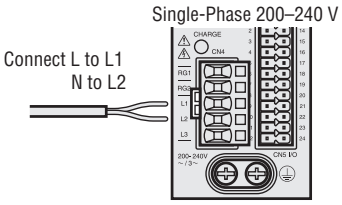
◇Connections with Peripheral Equipment



*1 Products are available with a 1 m, 2 m or 3 m cable for motor and driver, and also without.
If cables longer than 3 m or flexible cables are required, select the appropriate cables from the accessories (sold separately).
When wiring the motor and the driver, keep a maximum distance of 20 m.

*2 Not supplied.

◇Connecting the Main Power Supply



◇USB Cable Connection

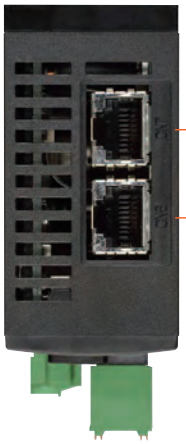
Connect to the computer on which the data setting software **MEXE02** is installed to the driver with a USB cable.
Please use USB cables which meet the follow specifications.

Specifications	USB2.0 (Full speed)
Cable	Length: 3 m or less
	Type: A-mini-B

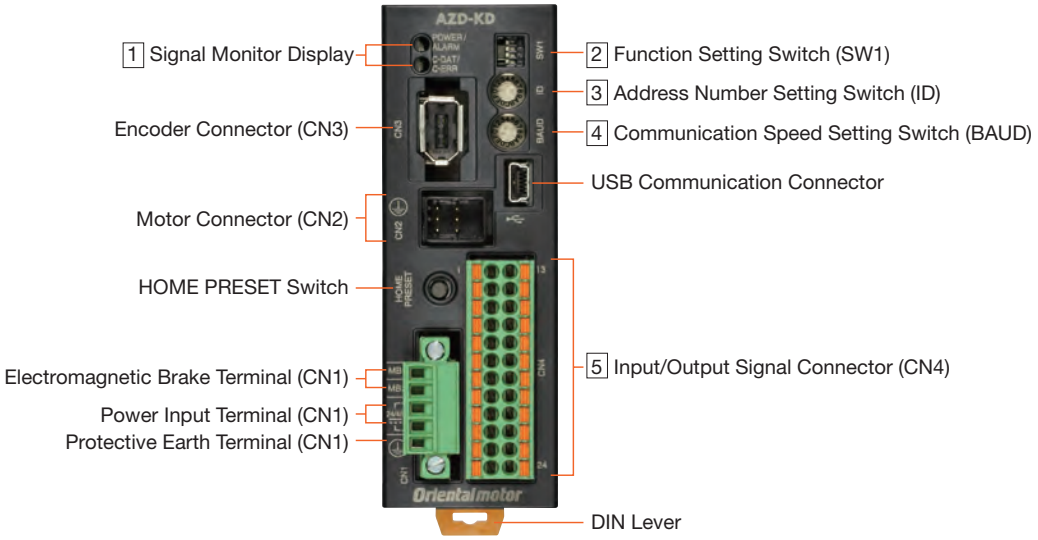
Connection and Operation (24 VDC / 48 VDC)

●Built-In Controller Type and Pulse Input Type with RS-485 Communication

◇Name and Functions of Driver Parts



RS-485 Communication Connector (CN6 and CN7)



Driver Product Name: AZD-KD

1 Signal Monitor Display

◇LED Display

Display	Colour	Function	When Activated
POWER	Green	Power Display	When power is on.
ALARM	Red	Alarm Display	Blinks when protective functions are activated.
C-DAT	Green	Communication Display	When communication data is received or sent.
C-ERR	Red	Communication Error Display	When there is an error with communication data.

2 Function Setting Switch

Display	No.	Function
SW1	1	This sets the address number in combination with the address number setting switch (ID) (Factory Setting: OFF).
	2	This sets the protocol for RS-485 communication (Factory Setting: OFF).
	3	Set the RS-485 communication terminal resistor (120Ω) (Factory Setting: OFF). OFF: no terminal resistor, ON: terminal resistor connected.
	4	

∗Please use the same settings for both No. 3 and No. 4.

3 Address Number Setting Switch (ID)

Display	Function
ID	Set the address number for RS-485 communication (Factory Setting: 0).

4 Communication Speed Setting Switch

Display	Function
BAUD	Set this when using RS-485 communications. Set the communication speed (Factory Setting: 7).

◇Settings of the RS-485 Communication Speed

No.	Baud Rate (bps)
0	9600
1	19200
2	38400
3	57600
4	115200
5	230400
6	Not used
7	Network Converter
8–F	Not used

5 Input/Output Signal Connector (CN4)

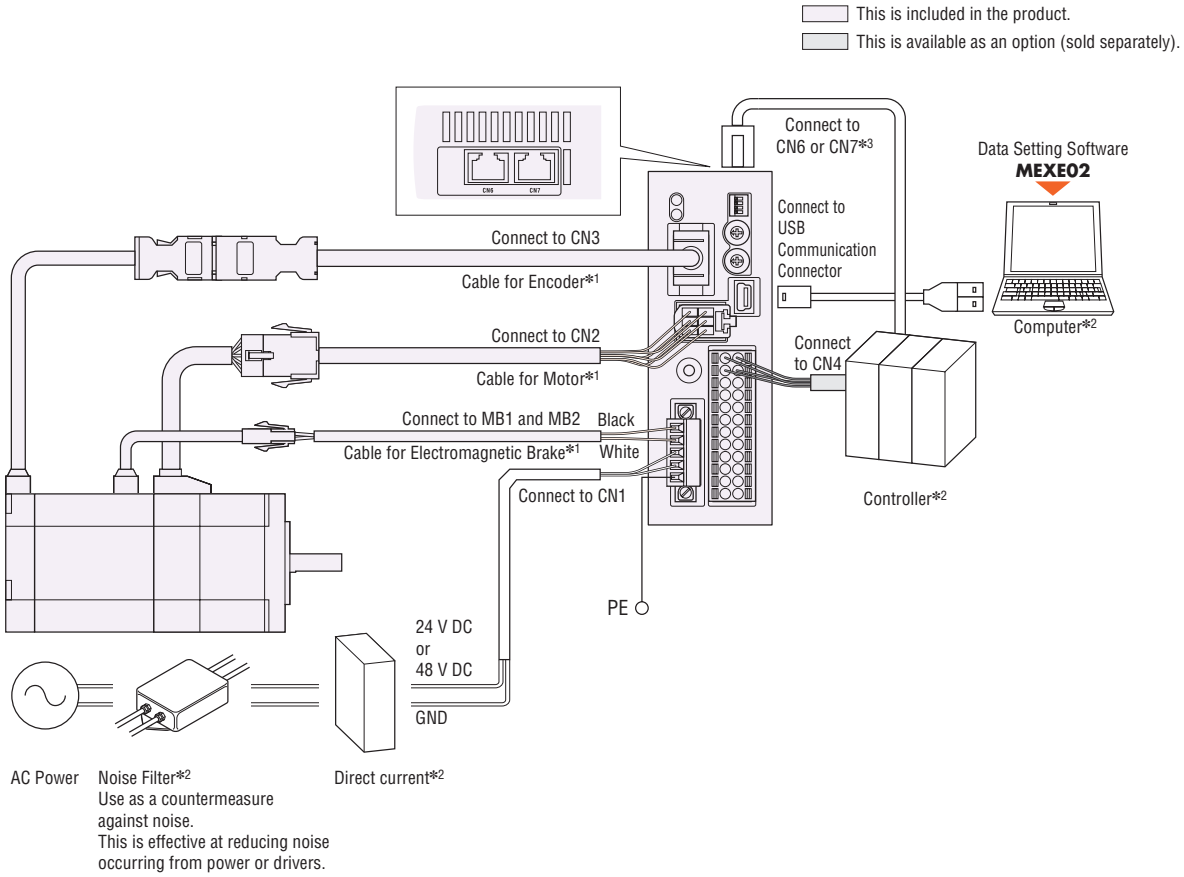
Display	Pin Number	Signal Name	Content	
CN4	1	IN0	START	This signal is used to start positioning operation.
	2	IN2	M1	Use the 3 bits of M0, M1, M2, to select the drive data No.
	3	IN4	ZHOME	Move to the home position set with the HOME PRESET switch.
	4	IN6	STOP	Stop the motor.
	5	IN-COM [0–7]*1	IN0~IN7 input common	
	6	IN8	FW-JOG	Start JOG operation.
	7	OUT0	HOME-END	Output when determining the home position or completing high speed point of return-to-home operation.
	8	OUT2	PLS-RDY	Not used
	9	OUT4	MOVE	Output while operating the motor.
	10	OUT-COM*1	Output common	
	11	ASG+	A phase pulse output+	
	12	BSG+	B phase pulse output+	
	13	IN1	M0	Use the 3 bits of M0, M1, M2, to select the drive data No.
	14	IN3	M2	Use the 3 bits of M0, M1, M2, to select the drive data No.
	15	IN5	FREE	The motor is set to non-excitation.
	16	IN7	ALM-RST	Reset the alarm.
	17	IN-COM [8-9]*1	IN8, IN9 input common	
	18	IN9	RV-JOG	Start JOG operation.
	19	OUT1	IN-POS	Output when the motor operation is complete.
	20	OUT3	READY	Output when the driver is ready for operation.
	21	OUT5	ALM-B	Output the driver alarm state (normal close).
	22	GND*1	Ground	
	23	ASG−	A phase pulse output−	
	24	BSG−	B phase pulse output−	

● Assigned functions are set by means of the parameter settings. The above is the initial value. For details, refer to the User's Manual.

✻1 The initial value setting cannot be changed.

●Connection Diagram

◇Connection to Peripheral Equipment



*1 Products with cable for connecting between motor and driver (1 m, 2 m, 3 m) are available as well as those to which such cable is not attached.
Cables longer than 3 m or flexible cables can be selected as an option (sold separately).
Make sure a cabling distance between the motor and the driver is 20 m or less.

*2 Prepared by the customer.

*3 When controlling with RS-485 communications, connect to the controller.

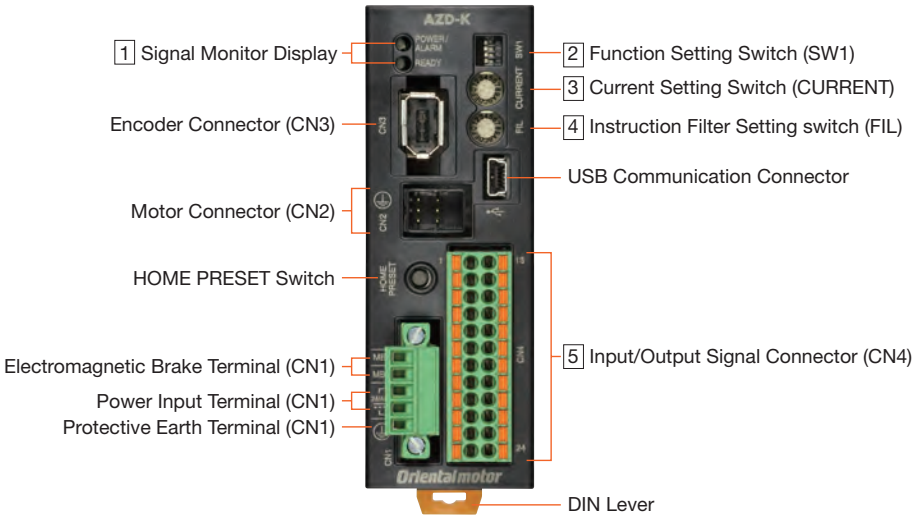
◇USB Cable Connection

The computer on which the data setting software **MEXE02** is installed and driver are connected with a USB cable.
Use the following specifications for the USB cable.

Specification	USB2.0 (full speed)
Cable	Length: 3 m (or less)
	Format: A-mini-B

●Pulse Input type

◇Names and Functions of Driver Parts



Driver Product Name: AZD-K

1 Signal Monitor Display

◇LED Display

Display	Colour	Function	When Activated
POWER	Green	Power Display	When power is on.
ALARM	Red	Alarm Display	Blinks when protective functions are activated.
READY	Green	READY output	When READY output is set to ON

2 Function Setting Switch

Display	No.	Function
SW1	1	Set the resolution for each motor output axis rotation (Factory Setting : OFF [1000p/r]).
	2	Set the pulse input format to 1 pulse input mode or 2 pulse input mode. (Factory Setting: OFF [2 pulse input mode])
	3, 4	Not used

3 Current Setting Switch

Display	Function
CURRENT	Set basic current that is the base for the operation current and stop current (Factory Setting: F).

4 Command Filter Setting Switch

Display	Function
FIL	Adjust the responsiveness of the motor (Factory Setting: 1).

5 Input/Output Signal Connector (CN4)

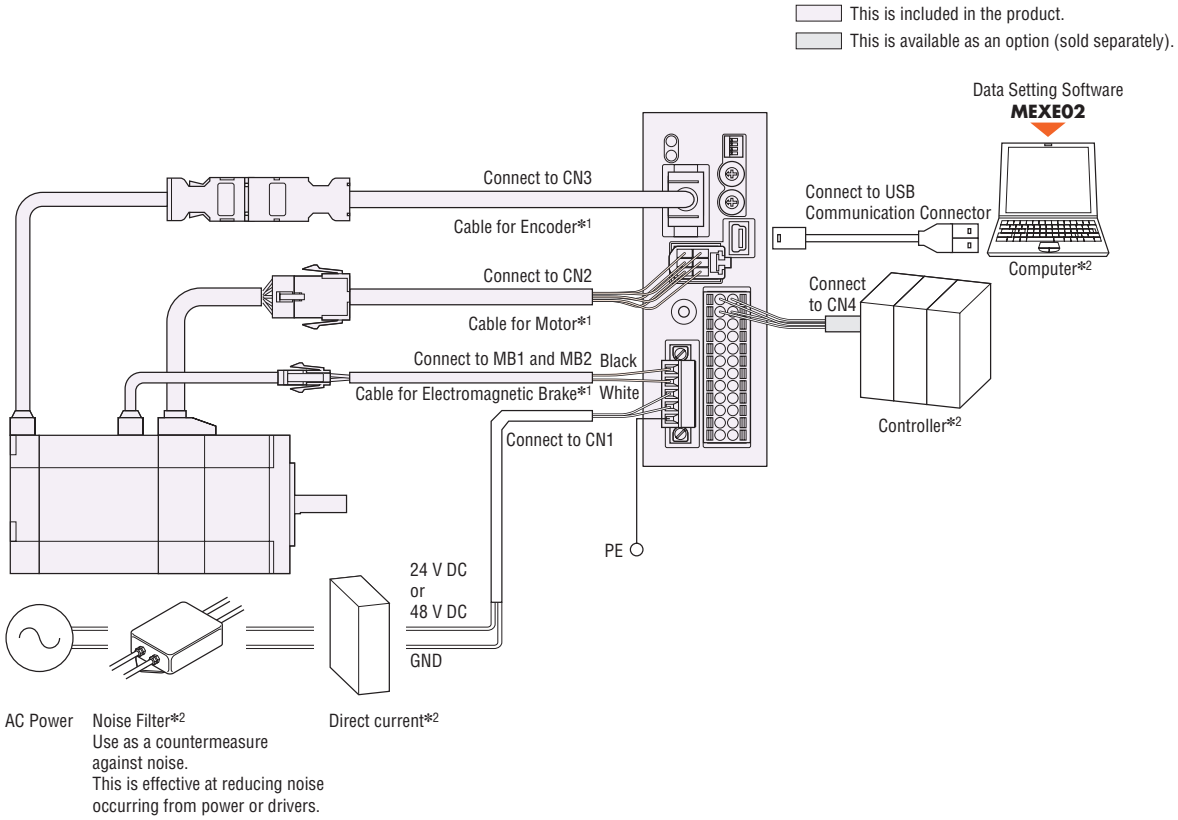
Display	Pin Number	Signal Name	Content	
CN4	1	CW+[PLS+]*1	CW pulse input+[pulse input+]	
	2	CCW+[DIR+]*1	CCW pulse input+[rotation direction input+]	
	3	IN4	ZHOME	Move to the home position set with the HOME PRESET switch.
	4	IN6	STOP	Stop the motor.
	5	IN-COM [4–7]*1	IN4–IN7 input common	
	6	IN8	FW-JOG	Start JOG operation.
	7	OUT0	HOME-END	Output when determining the home position or completing high speed home position return operation.
	8	OUT2	PLS-RDY	Output when the pulse input preparation is complete.
	9	OUT4	MOVE	Output while operating the motor.
	10	OUT-COM*1	Output common	
	11	ASG+	A phase pulse output+	
	12	BSG+	B phase pulse output+	
	13	CW−[PLS−]*1	CW pulse input−[pulse input−]	
	14	CCW−[DIR−]*1	CCW pulse input−[rotation direction input−]	
	15	IN5	FREE	The motor is set to non-excitation.
	16	IN7	ALM-RST	Reset the alarm.
	17	IN-COM [8–9]*1	IN8, IN9 input common	
	18	IN9	RV-JOG	Start JOG operation.
	19	OUT1	IN-POS	Output when the motor operation is complete.
	20	OUT3	READY	Outputs when the driver is ready for operation.
	21	OUT5	ALM-B	Output the driver alarm state (normal close).
	22	GND*1	Ground	
	23	ASG−	A phase pulse output−	
	24	BSG−	B phase pulse output−	

●Assigned functions are set by means of the parameter settings. The above is the initial value. For details, refer to the User's Manual.

*1 The initial value setting cannot be changed.

●Connection Diagram

◇Connection to Peripheral Equipment



*1 Products with cable for connecting between motor and driver (1 m, 2 m, 3 m) are available as well as those to which such cable is not attached.
Cables longer than 3 m or flexible cables can be selected as an option (sold separately).
Make sure a cabling distance between the motor and the driver is 20 m or less.

*2 Prepared by the customer.

◇USB Cable Connection

The computer on which the data setting software **MEXE02** is installed and driver are connected with a USB cable.
Use the following specifications for the USB cable.

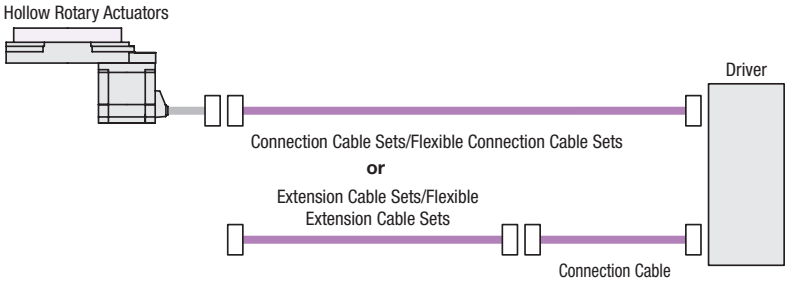
Specification	USB2.0 (full speed)
Cable	Length: 3 m (or less)
	Format: A-mini-B

Accessories (sold separately)

Connection Cable Sets, Flexible Connection Cable Sets Extension Cable Sets, Flexible Extension Cable Sets

If the distance between the motor and driver is extended to 3 m or longer, a connection cable set or extension cable set must be used.
The maximum length of the cable extension is 20 m (using included connection cable).
For the single shaft motors, cables come as a set of motor and encoder cables. For the electromagnetic brake type motor, cables come as a set of motor, encoder and electromagnetic brake cables.
Use a flexible connection cable set or flexible extension cable set if the cable will be bent repeatedly.

Connection Example:



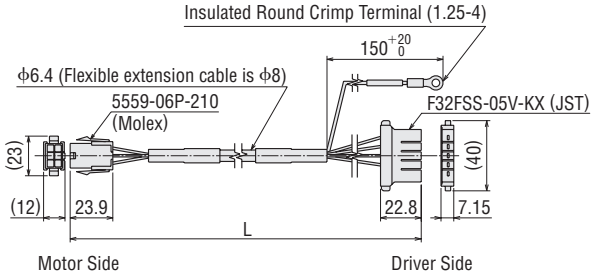
Note

- The motor cable and electromagnetic brake cable from the motor cannot be connected directly to the driver. When connecting to a driver, use the accessory connection cable (sold separately) or use the included connection cable (for types which include a connection cable).

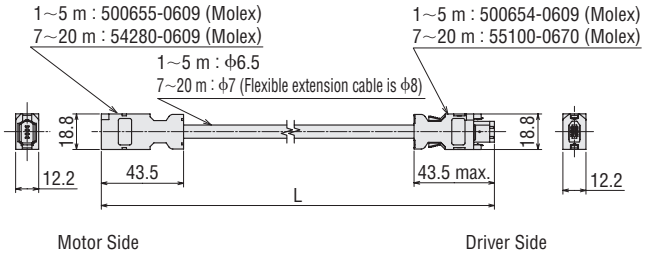
Dimensions (Unit: mm)

Connection Cable

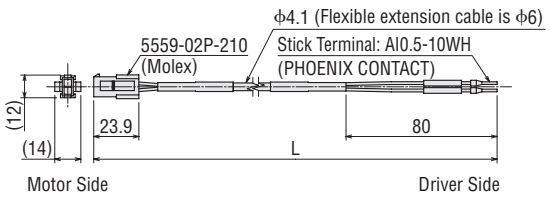
◇Cable for Motor



◇Cable for Encoder

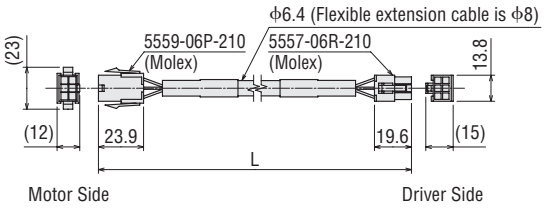


◇Cable for Electromagnetic Brake

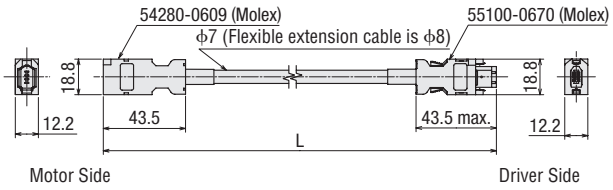


Extension Cable

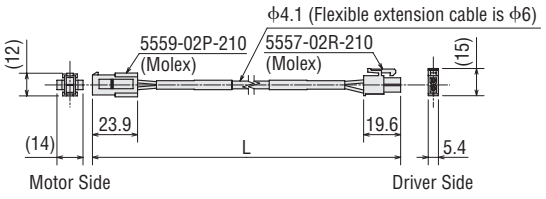
◇Cable for Motor



◇Cable for Encoder

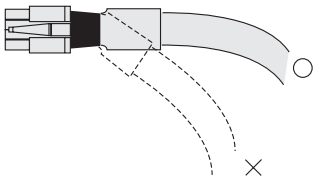


◇Cable for Electromagnetic Brake

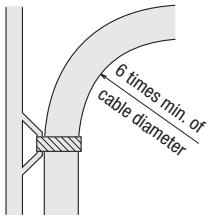


Notes on Use of Flexible Cable

①Do not allow the cable to bend at the cable connector.

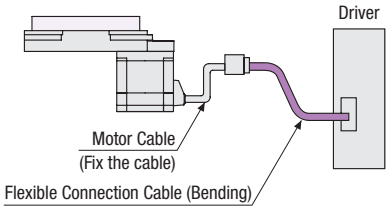


②Bending radius should be at least 6 times the cable diameter.

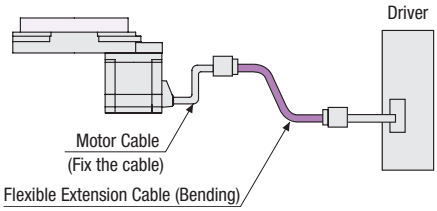


③The actuator cable and supplied connection cable is not flexible. If your application requires flexibility a flexible cable will be required.

- **Flexible Connection Cable**



- **Flexible Extension Cable**



General-Purpose Cables for I/O Signals

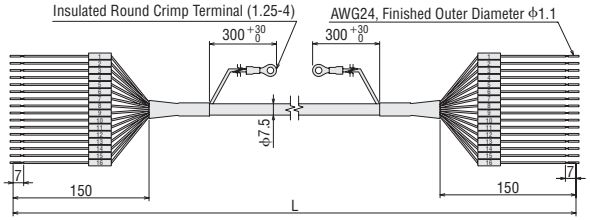
General-purpose multiconductor cable which is convenient for connection between the driver and the host controller.

Product Line

Product Name	Length L [m]
CC16D005B-1	0.5
CC16D010B-1	1.0
CC16D015B-1	1.5
CC16D020B-1	2.0

● The products above are 16 core. 6, 10 and 12 core types are also available.

Dimensions (Unit: mm)



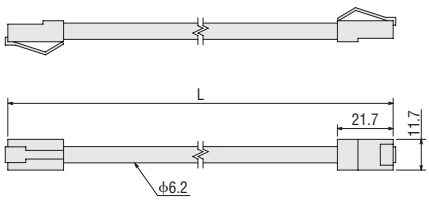
RS-485 Communication Cable

This cable is used to link drivers in multi-axis operations with the built-in controller type.
It also connects the network converter to the driver.

Product Line

Product Name	Length L [m]
CC001-RS4	0.1
CC002-RS4	0.25

Dimensions (Unit: mm)



Home Sensor Sets

A home sensor set, which consists of a photomicro sensor, cable type connector, sensor mounting bracket, shield plate and installation screws, is provided.


PADG-SB

Product Line

Product Name	Sensor Type	Applicable
PADG-SB	NPN (for sourcing Input)	**DGM85R-AZ** **DGM130R-AZ** **DGM200R-AZ**
PADG-SBY	PNP (for sinking Input)	

●PNP type

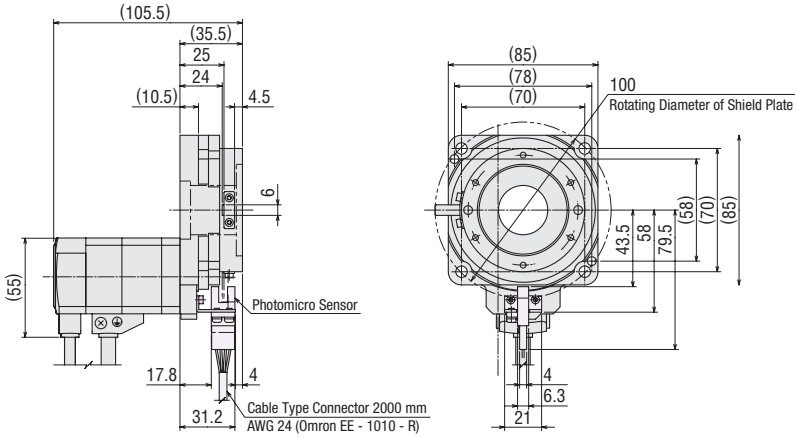
Product	**DGM85**, **DGM130**, **DGM200**: EE-SX673R (manufactured by Omron)
Power Supply	5 - 24 VDC±10%, ripple (P-P) 10% or less
Current Consumption	30mA or less
Control Output	PNP open-collector output, 5 - 24 VDC, 50 mA or less Residual voltage 1.3 VDC or less (at load current of 50 mA)
Indicator LED	Detection display (red)
Sensor Logic	Normally open/normally closed (selectable, depending on connection)

●NPN type

Product	**DGM85**, **DGM130**, **DGM200**: EE-SX 673 A (manufactured by Omron)
Power Supply	5 - 24 VDC±10%, ripple (P-P) 10% or less
Current Consumption	35 mA or less
Control Output	NPN open-collector output, 5~24 VDC, 100 mA or less Residual voltage 0.8 VDC or less (at load current of 100 mA)
Indicator LED	Detection indicator (red)
Sensor Logic	Normally open/normally closed (selectable, depending on connection)

Reference Point when Mounting the Home-Sensor Set (Unit mm)

The figure below shows the dimensions when the home-sensor set is attached to the **DGM 85**.
For the dimensions of other models please visit our website.



Applicable products
DGM85R-AZA□
DGM85R-AZM□
DGM130R-AZA□
DGM130R-AZA□R
DGM130R-AZA□L
DGM130R-AZM□
DGM130R-AZM□R
DGM130R-AZM□L
DGM200R-AZAC
DGM200R-AZACR
DGM200R-AZACL
DGM200R-AZMC
DGM200R-AZMCR
DGM200R-AZMCL

● Either **C** (AC power supply input) or **K** (DC power supply input) is entered in the box □ within the product name.

Regeneration Unit

During vertical drive (gravitational operation) or sudden start/stop in high inertia, an external force causes the motor to rotate and function as a power generator. When the regenerative power exceeds the driver's regenerative power absorption capacity, it may cause damage to the motor.
In such a case, the regeneration unit is connected to the driver to convert regenerative energy into thermal energy for dissipation.

Product Line

Product Name
RGB100

Specifications

Item	Description
Continuous Regenerative Power	50 W
Resistance Value	150 Ω
Thermostat Operating Temperature	Open: 150±7°C Close: 145±12°C (Normally closed)
Thermostat Electrical Rating	120 VAC 4 A 30 VDC 4 A (Min. current 5 mA)

● Attach the regeneration unit to a location that has the same heat radiation capability as an aluminum heat radiation plate that is 350×350 mm and 3 mm thick.

Network-Compatible Products (sold separately)

Network Converters

Network converters convert host communication protocol to Oriental Motor's original RS-485 communication protocol. You can use a network converter to control Oriental Motor's RS-485-compatible products within the host communication environment.

NETC01-CC NETC02-CC NETC01-M2 NETC01-M3 NETC01-ECT

Product Line

Network Type	Product Name
CC-Link Ver.1.1-Compatible	**NETC01-CC**
CC-Link Ver.2-Compatible	**NETC02-CC**
MECHATROLINK-Ⅱ Compatible	**NETC01-M2**
MECHATROLINK-Ⅲ Compatible	**NETC01-M3**
EtherCAT-Compatible	**NETC01-ECT**

Universal Controller

SCX11

Equipped with program editing and execution functions, the highly-functional and sophisticated **SCX11** controller is now available. Use the **SCX11** as a stored program controller to connect to any of Oriental Motor's standard pulse input drivers. The **SCX11** is also able to control the motor via various serial ports such as USB, RS-232C and CANopen

- 100 Sequence Programs can be Stored
- Easy Operation
- Intelligent Setting

Product Line

Product Name	Compatible Driver
SCX11	AZD-C, AZD-K

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 January 2024.

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