

***Orientalmotor***

Hollow Rotary Actuators

# **DGI Series**

With Built-in AZ Series Battery-Free Absolute Sensor



Hollow Rotary Actuators

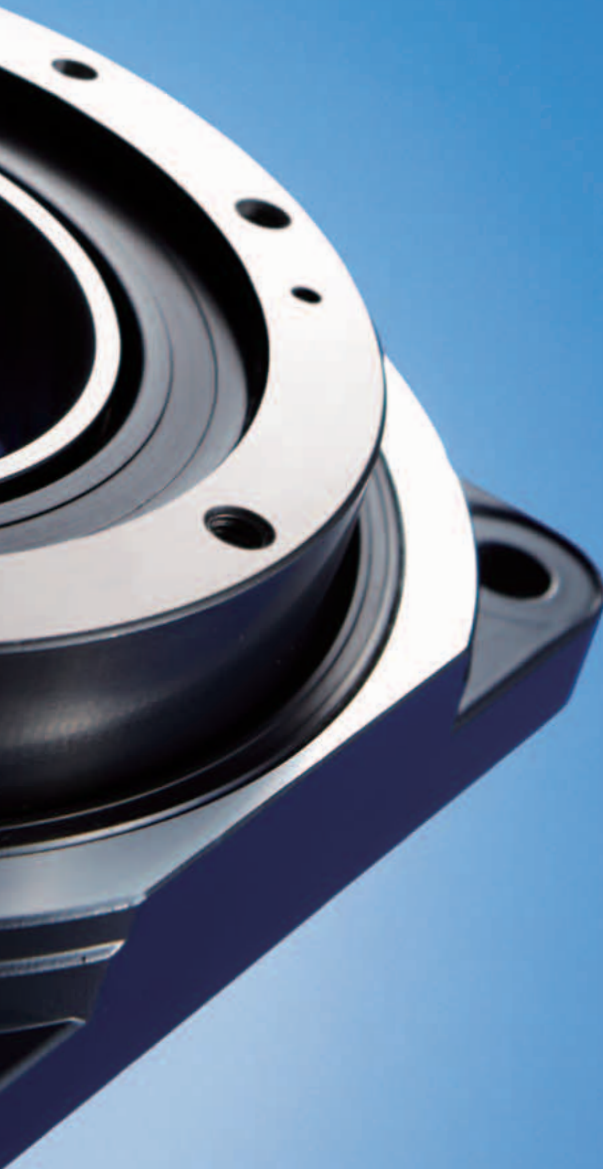
# DGII Series

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.





### 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:  
 $\pm 15$  arc seconds ( $\pm 0.004^\circ$ )

### 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 $\alpha$ STEP 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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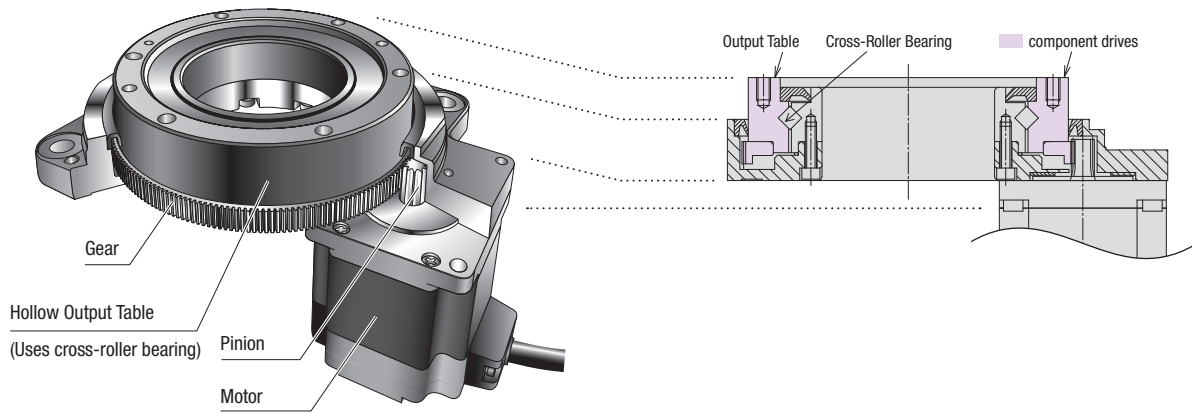


# Hollow Rotary Actuator Characteristics

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.

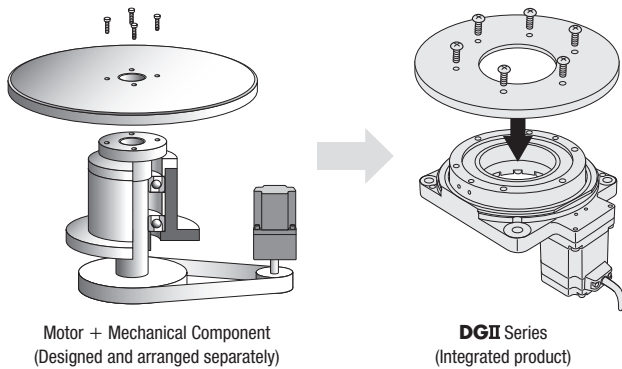
## Features

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



### Simplified Design

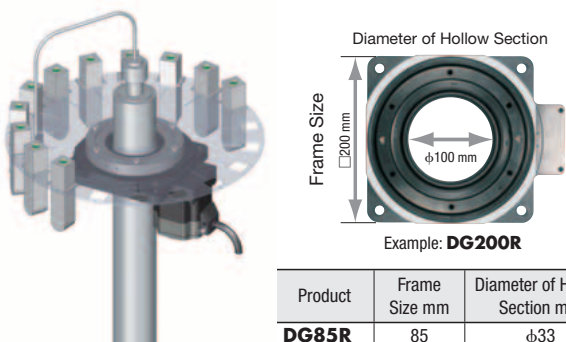
Tables and arms can be installed directly onto the output table. This saves the hassle and cost of designing an installation mechanism, arranging necessary mechanism parts, adjusting the belt tension, etc., when mechanical components such as a belt and pulley are used for installation.



### 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



Product	Frame Size mm	Diameter of Hollow Section mm
DG85R	85	φ33
DG130R	130	φ62
DG200R	200	φ100

### High Positioning Accuracy with Non-Backlash

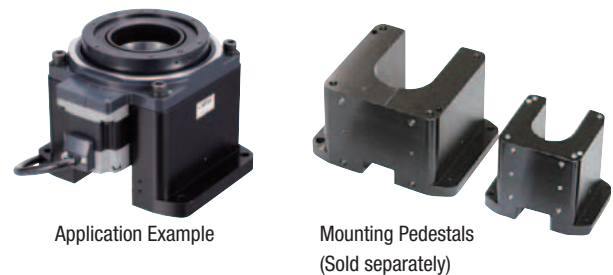
- Non-Backlash
- Repetitive Positioning Accuracy  $\pm 15$  arc seconds ( $\pm 0.004^\circ$ )

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

### Mounting Pedestals (Sold separately) are Available as an Accessory

Mounting pedestal accessories are available to assist with the installation of the **DGII** Series.

- For applicable products, check page 37.



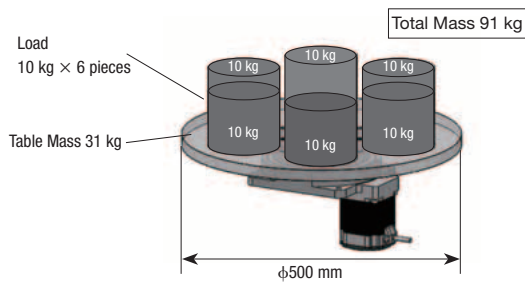
## High Load and High Rigidity

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 : **DG200R-AZAC-1**  
 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.  
 $(10 \text{ kg} \times 6 \text{ pieces} + 31 \text{ kg}) \times \text{gm/s}^2 \doteq 893 \text{ N}$   
 The permissible axial load of the **DG200R** 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.

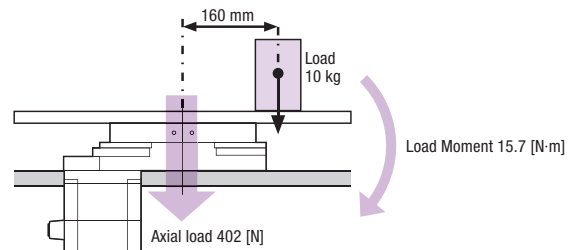
$$10 \text{ kg} \times \text{gm/s}^2 \times 0.16 \text{ m} \doteq 15.7 \text{ N·m}$$

The permissible moment of the **DG200R** is 100 N·m, so this is within the permissible value.

#### [Axial Load]

The axial load is: table + load  $(31 \text{ kg} + 10 \text{ kg}) \times \text{gm/s}^2 \doteq 402 \text{ N}$

The permissible axial load of the **DG200R** is 4000 N, so this is within the permissible value.

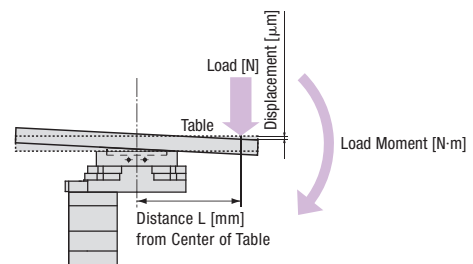


A high-rigidity rotary actuator allows a large load that is far away from the table center to be driven

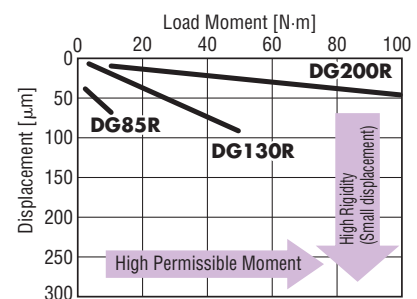
### ● Relationship Between Load Moment and Displacement when

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.

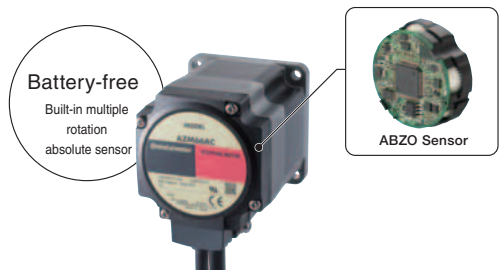


Displacement at Distance L = 200 mm from Center of Table



# 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.

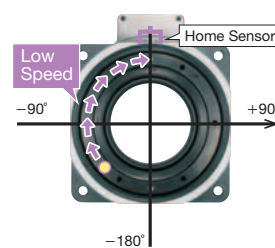
\*If no limit sensor is installed, movements that exceed the limit values can be avoided through the use of the limits in the driver software.

## 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.

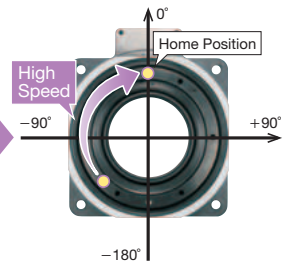
### Return-to-Home Operation by Home Sensor Detection

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



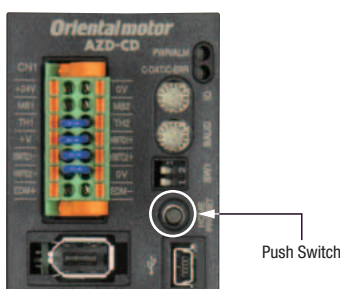
### Return-to-Home Operation of Products with AZ Series

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



## 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.

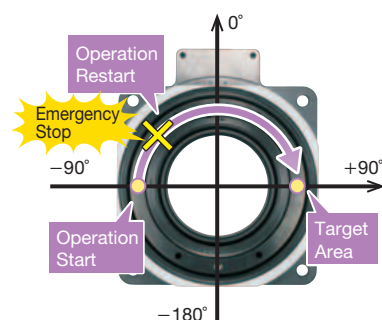


## Return-to-Home Not Required

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 Holding Even When the Cable Between the Motor and Driver is Detached

Positioning information is stored within the ABZO sensor.

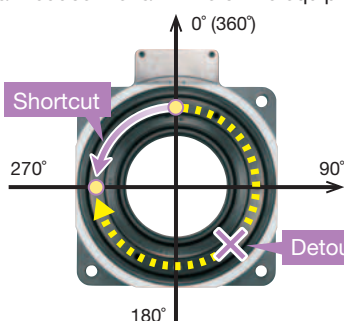
## Convenient Functions Thanks to the Use of the **AZ** Series

### 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

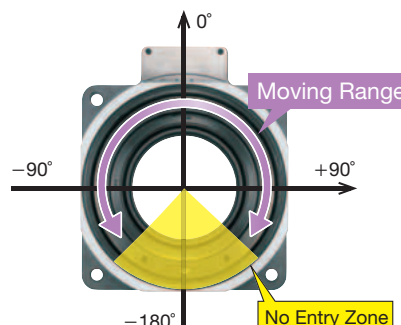
This is an operation method in which the actuator rotates in the direction that is the shortest distance to the target position. This can reduce the takt time of the equipment.



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.

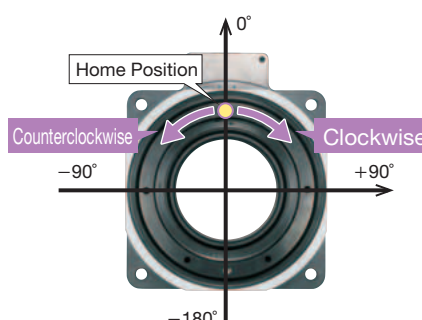


### Reduced Equipment Setup Time

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  $\pm 180^\circ$

● All initial setting values can be changed.



# High Performance and High Reliability Thanks to Stepper Motor and Driver Packages $\alpha$ STEP

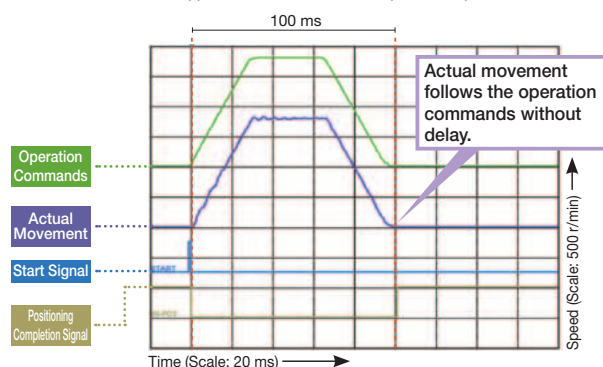
High reliability is provided by using stepper motor and driver packages that employ a control method unique to Oriental Motor, which combines the merits of both open loop control and closed loop control.

## 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.

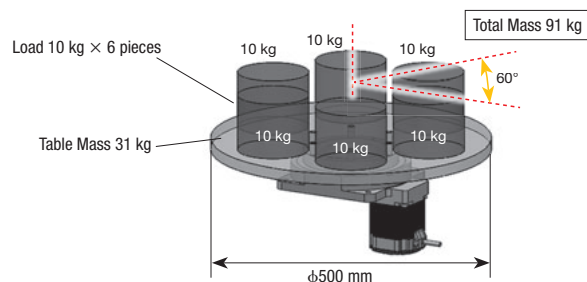
Actual stepper motor movement in response to operation commands



### <Example Operation>

Product Name : **DG200R-AZAC-1**  
 Power-Supply Input : 230 VAC  
 Load Mass : 91 kg (6 load pieces + table)  
 : Load 10 kg/piece  $\times$  6 pieces  
 : Table 31 kg (Diameter 500 mm, thickness 20 mm, iron)  
 Installation Direction : Horizontal  
 Traveling Amount : 60°

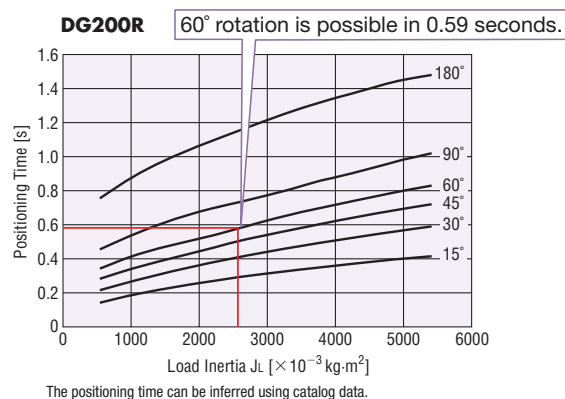
Total inertia of table and load =  $2633 \times 10^{-3} \text{ kg} \cdot \text{m}^2$



### ● Quick Positioning

With the **DG200R**, 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

$\alpha$ 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 that Require High Performance Motors

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



- High Positioning Accuracy Applications (Image inspection equipment)



- Applications with Load Fluctuations (Disc manufacturing equipment)

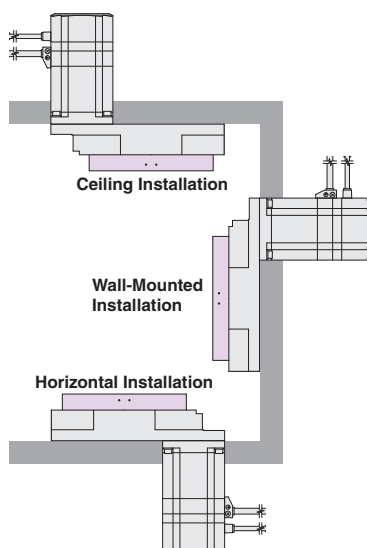


## Installation Direction

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

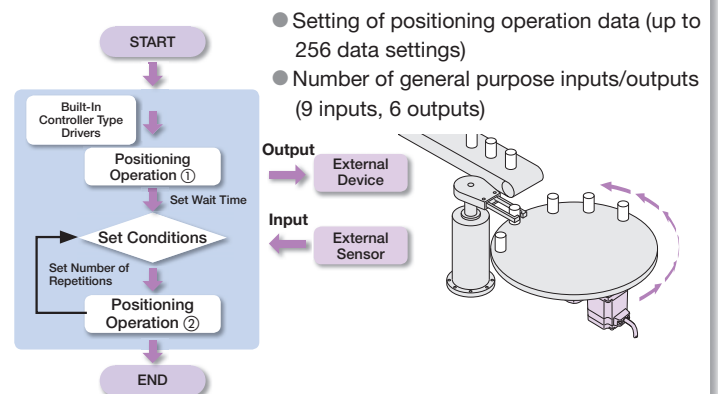
### Note

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)

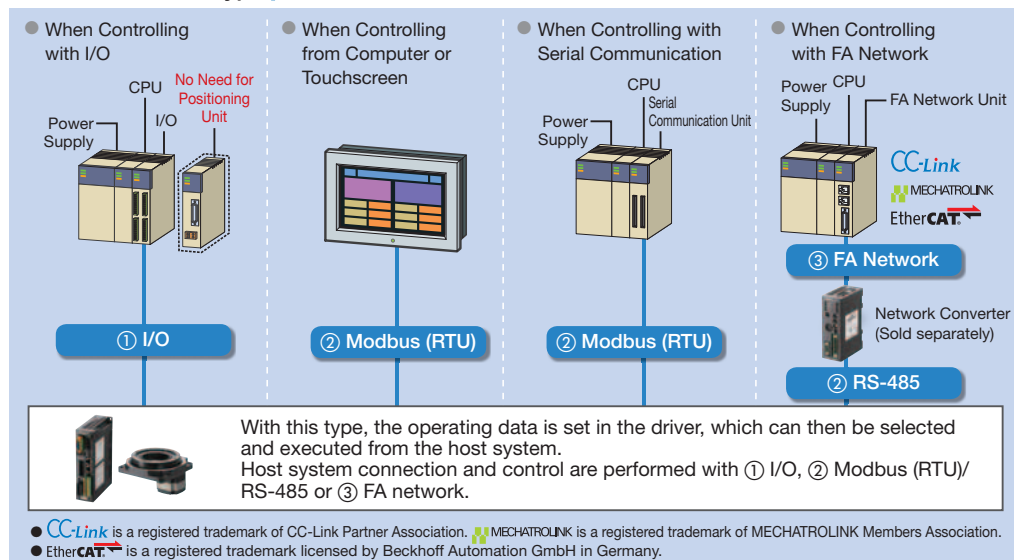
The built-in controller type can simplify sequence control programming by outputting control signals to other devices, and incorporating external input signals from sensors, etc.



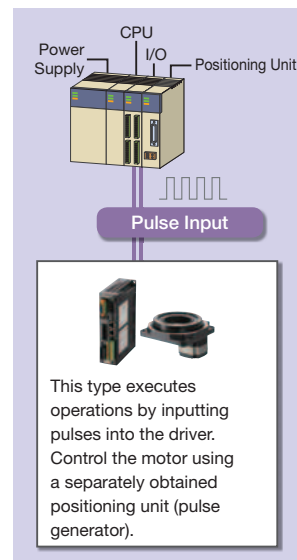
## 2 Driver Types Selectable to Match System Configuration

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

### Built-In Controller Type **C-FLEX**



### Pulse Input Type



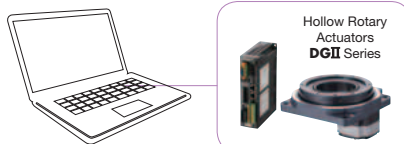
By using a network converter (sold separately), CC-Link communication, MECHATROLINK communication or EtherCAT communication is possible. Operating data, parameter settings and operation commands can be input via various communication types. Its ability to flexibly accommodate the network being used results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

## Simple Operation with Data Setting Software

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

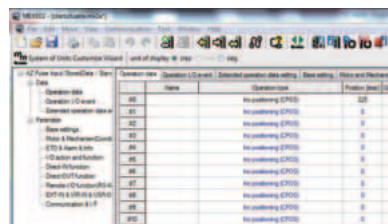
### Data Setting Software (MEXE02)

The data setting software can be downloaded from the website. Oriental Motor also provides it on a CD-ROM free of charge.



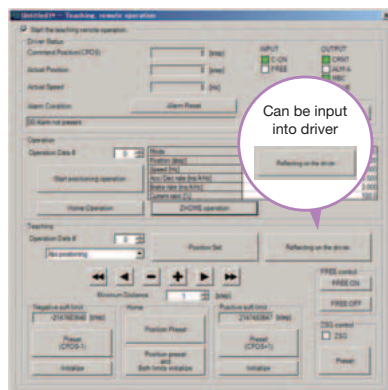
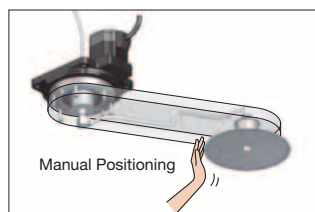
#### Operating Data and Parameter Settings

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

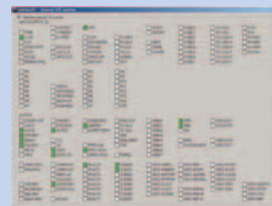
By using the data setting software and manual positioning, the operation command information can be input into the driver. Use when setting up equipment.



### Various Monitoring Functions

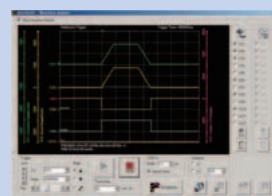
#### I/O Monitoring

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.




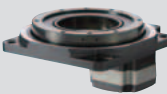

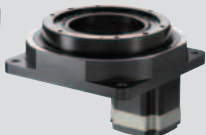


- Multi-monitoring enables remote operation and teaching while monitoring.

# Product Lineup

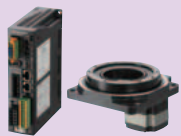

## Hollow Rotary Actuator **DGII** Series With Built-in **AZ** Series Battery-Free Absolute Sensor

### Standard Type (Cross-roller bearing)

Product Rotary Actuator Frame Size		Built-in Motor Series	Electromagnetic Brake	Driver Type	Power Supply Voltage [VAC]	Diameter of Hollow Section [mm]	Permissible Torque [N·m]	Permissible Moment [N·m]				Permissible Axial Load [N]				Lost Motion [arc minute]	Backlash [arc minute]	Angular Transmission Accuracy [arc minute]	Repetitive Positioning Accuracy [arc second]
								20	40	60	80	500	1000	2000	3000				
 <b>DG85R</b> 85 mm		<b>AZ</b>	●	Built-in Controller	Single-Phase 100-120 VAC Single-Phase/ Three-Phase 200-240 VAC	φ33	4.5	10				500				2	Non-Backlash	4	±15
				Pulse Input	Single-Phase 100-120 VAC Single-Phase/ Three-Phase 200-240 VAC														
 <b>DG130R</b> 130 mm		<b>AZ</b>	●	Built-in Controller	Single-Phase 100-120 VAC Single-Phase/ Three-Phase 200-240 VAC	φ62	12	50				2000				2		3	±15
				Pulse Input	Single-Phase 100-120 VAC Single-Phase/ Three-Phase 200-240 VAC														
 <b>DG200R</b> 200 mm		<b>AZ</b>	●	Built-in Controller	Single-Phase 100-120 VAC Single-Phase/ Three-Phase 200-240 VAC	φ100	50	100				4000				2		2	±15
				Pulse Input	Single-Phase 100-120 VAC Single-Phase/ Three-Phase 200-240 VAC														

In addition to these, there is a wide variety of **DGII** Series hollow rotary actuators to suit any requirement, ranging from the Standard Type used in a broad range of applications to the **DG60** with deep groove ball bearing.

## Hollow Rotary Actuator **DGII** Series

Type (Output Table Supporting Bearing)	Built-in Motor Series	Hollow Rotary Actuator Frame Size			
		60 mm	85 mm	130 mm	200 mm
<b>Standard Type (Cross-roller bearing)</b>  High performance rotary actuators and motor units are both used. A standard type that features high load, high rigidity and high accuracy capabilities which can be used in a wide variety of applications.	<b>Newly Released</b>  Stepper Motor and Driver Packages <i>αSTEP</i> With battery-free absolute sensor <b>AZ Series</b> 	—	●	●	●
	Stepper Motor and Driver Packages <i>αSTEP</i> <b>AR Series</b> *The <b>DG60</b> is with deep groove ball bearing 	● *	●	●	●

# How to Read Specifications

## ● Hollow Rotary Actuators

Frame Size			85 mm	130 mm	200 mm
Product Name	Built-in Controller		DG85R-AZ□□D-◇	DG130R-AZ□□D-◇	DG200R-AZ□□D-◇
	Pulse Input		DG85R-AZ□□-◇	DG130R-AZ□□-◇	DG200R-AZ□□-◇
Built-In Motor			AZ Series		
①	Type of Output Table Supporting Bearing		Cross-Roller Bearing		
②	Inertia	J: kg·m <sup>2</sup>	21120 × 10 <sup>-7</sup> [26304 × 10 <sup>-7</sup> ]	147380 × 10 <sup>-7</sup> [199220 × 10 <sup>-7</sup> ]	916400 × 10 <sup>-7</sup> [968240 × 10 <sup>-7</sup> ]
	Gear Ratio		18		
③	Minimum Traveling Amount of the Output Table deg/STEP		0.01		
④	Permissible Torque N·m		4.5	12	50
⑤	Holding Torque at Motor Standstill	Power ON N·m	2.7	12	36 [20]
		Electromagnetic Brake N·m	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 N·m		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)		
Voltage and Frequency			Single-Phase 100-120 VAC, Single-Phase / Three-Phase 200-240 VAC -15~+6% 50/60 Hz		
Power-Supply Input	Input Current A	Single-Phase 100-120 VAC	2.7	3.8	6.4
		Single-Phase 200-240 VAC	1.7	2.3	3.9
		Three-Phase 200-240 VAC	1.0	1.4	2.3
Control Power Supply			24 VDC±5% 0.25 A [0.33 A]	24 VDC±5% 0.25 A [0.5 A]	

### ① Type of Output Table Supporting Bearing

This is the type of the bearing used for the output table.

### ② Inertial 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.

### ③ Minimum Traveling Amount of the Output Table

This is the minimum traveling amount that can be set. (Factory setting)

### ④ Permissible 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.

### ⑤ Holding 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.

### ⑥ Max. Speed

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

### ⑦ Repetitive 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.

### ⑧ Lost 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.

### ⑨ Angular 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.

### ⑩ Permissible Axial Load

This is the permissible value of axial load applied to the output table in the axial direction.

### ⑪ Permissible 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.

### ⑫ Runout 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.

### ⑬ Runout 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.

### ⑭ Parallelism 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.

### ⑮ Degree 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.



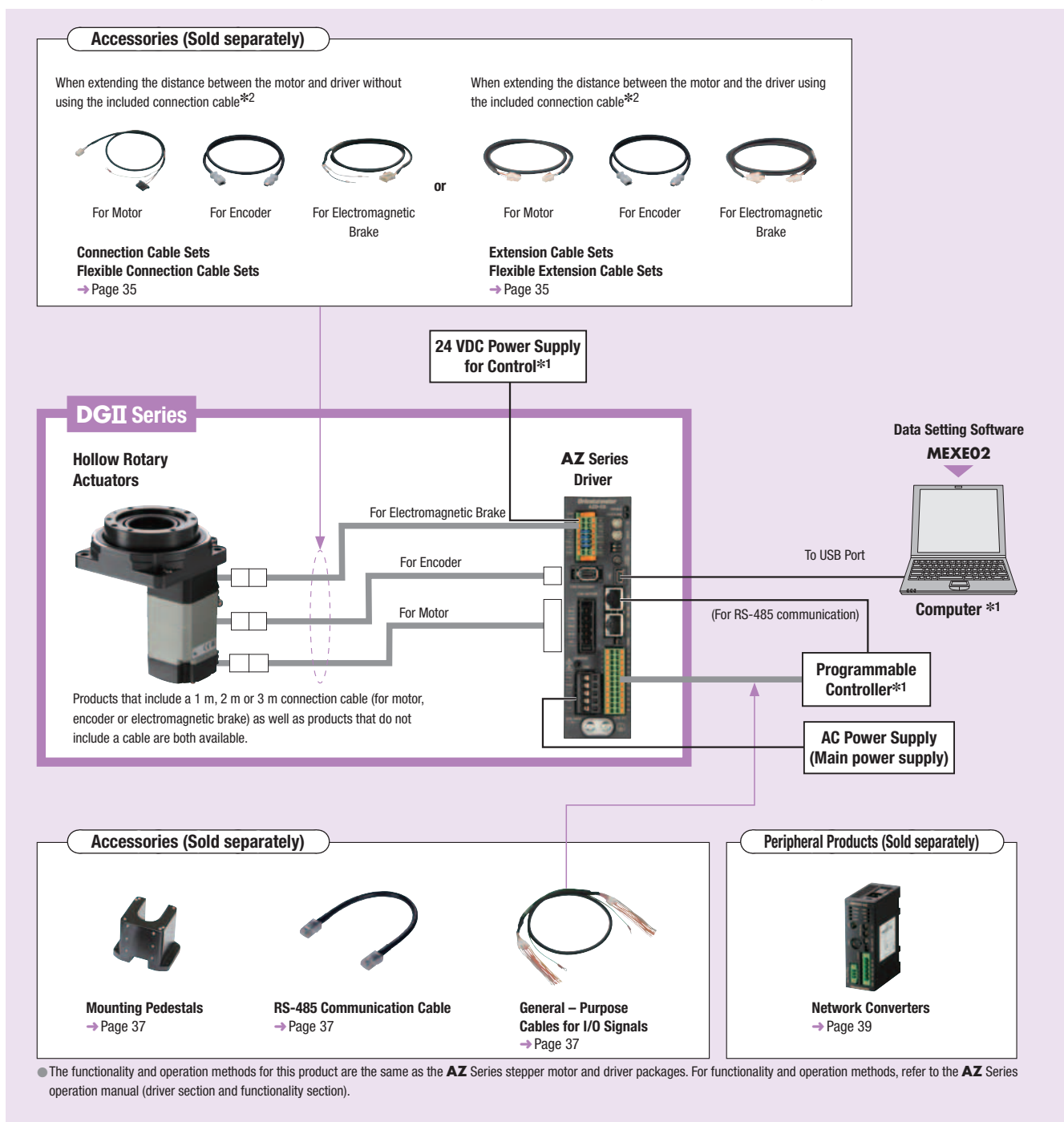
## System Configuration

### With AZ Series Built-In Controller Type

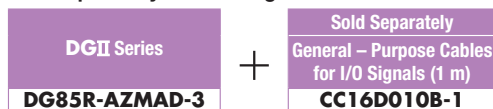
An example of a configuration using I/O control or RS-485 communication is shown below.

\*1 To be supplied by the customer.

\*2 Only products in which a connection cable is included.



### Example of System Configuration



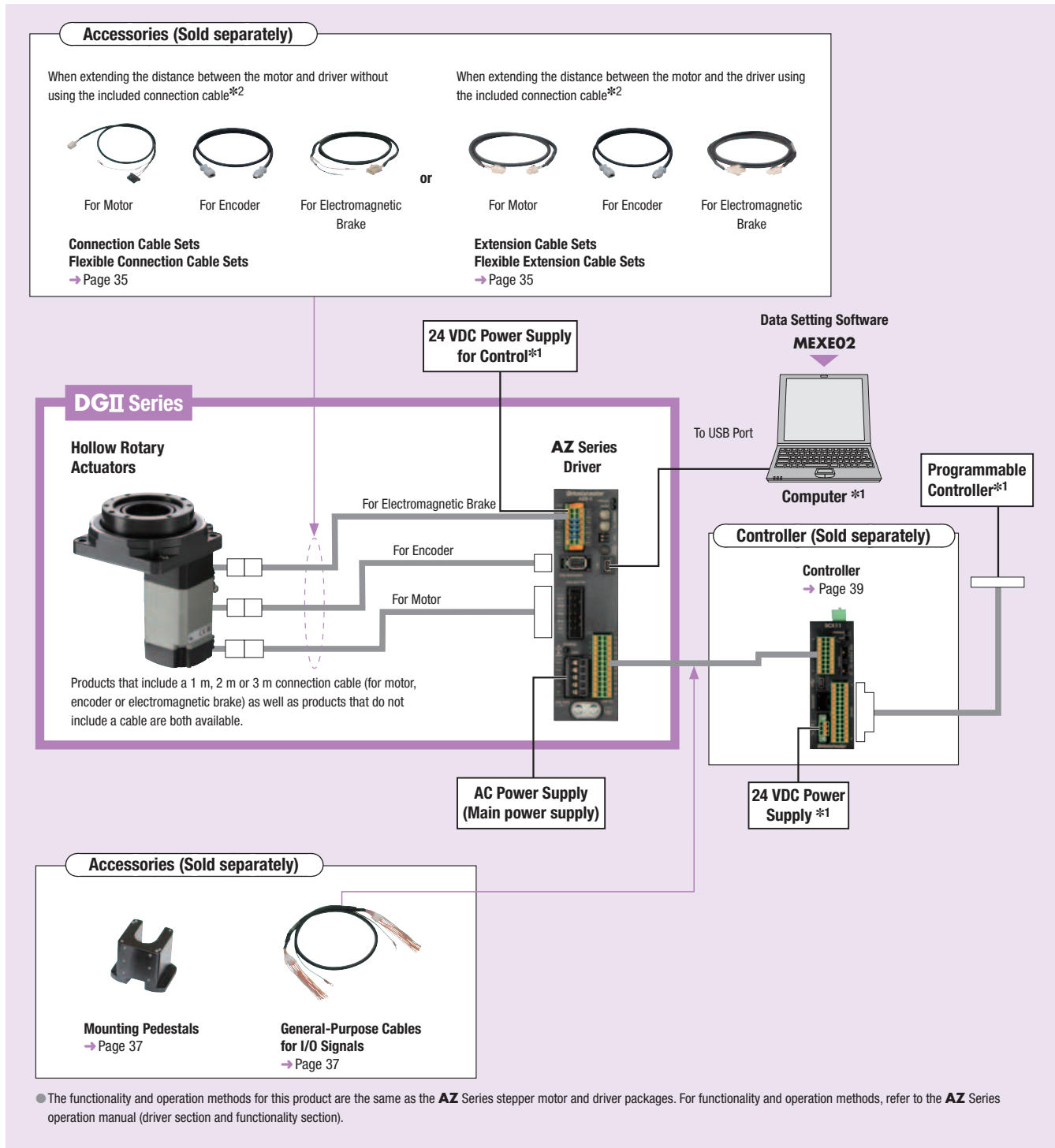
● The system configuration shown above is an example. Other combinations are also available.

## ●Pulse Input Type with Built-in **AZ** Series

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

\*1 To be supplied by the customer.

\*2 Only products in which a connection cable is included.



## ●Example of System Configuration

DGII Series	Sold Separately	
	Controller	General-Purpose Cables for I/O Signals (1 m)
<b>DG85R-AZMA-3</b>	<b>SCX11</b>	<b>CC16D010B-1</b>

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

## Product Number Code

# DG 130 R - AZ A C D - 3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Series	<b>DG: DGII</b> Series
②	Frame Size	<b>85:</b> 85 mm <b>130:</b> 130 mm <b>200:</b> 200 mm
③	Type of Output Table Supporting Bearing	<b>R:</b> Cross-Roller Bearing
④	Motor Type	<b>AZ: AZ</b> Series
⑤	Motor Shaft	<b>A:</b> Single Shaft <b>M:</b> With Electromagnetic Brake
⑥	Power Supply Input	<b>A:</b> Single-Phase 100-120 VAC <b>C:</b> Single-Phase, Three-Phase 200-240 VAC
⑦	Driver Type	<b>D:</b> Built-In Controller Type Blank: Pulse Input Type
⑧	Connection Cable*	Number: Included Connection Cable Length <b>1:</b> 1 m <b>2:</b> 2 m <b>3:</b> 3 m None: Connection cable not included

\*Connection cables 3 m and longer are available as accessories (sold separately).  
Connection Cables → Page 35

## Product Line

### Built-In Controller Type

#### ◇ Single Shaft

Single-Phase 100-120 VAC	Single-Phase / Three-Phase 200-240 VAC
Product Name	Product Name
<b>DG85R-AZAAD</b>	<b>DG85R-AZACD</b>
<b>DG85R-AZAAD-◇</b>	<b>DG85R-AZACD-◇</b>
<b>DG130R-AZAAD</b>	<b>DG130R-AZACD</b>
<b>DG130R-AZAAD-◇</b>	<b>DG130R-AZACD-◇</b>
<b>DG200R-AZAAD</b>	<b>DG200R-AZACD</b>
<b>DG200R-AZAAD-◇</b>	<b>DG200R-AZACD-◇</b>

### Pulse Input Type

#### ◇ Single Shaft

Single-Phase 100-120 VAC	Single-Phase / Three-Phase 200-240 VAC
Product Name	Product Name
<b>DG85R-AZAA</b>	<b>DG85R-AZAC</b>
<b>DG85R-AZAA-◇</b>	<b>DG85R-AZAC-◇</b>
<b>DG130R-AZAA</b>	<b>DG130R-AZAC</b>
<b>DG130R-AZAA-◇</b>	<b>DG130R-AZAC-◇</b>
<b>DG200R-AZAA</b>	<b>DG200R-AZAC</b>
<b>DG200R-AZAA-◇</b>	<b>DG200R-AZAC-◇</b>

#### ◇ With Electromagnetic Brake

Single-Phase 100-120 VAC	Single-Phase / Three-Phase 200-240 VAC
Product Name	Product Name
<b>DG85R-AZMAD</b>	<b>DG85R-AZMCD</b>
<b>DG85R-AZMAD-◇</b>	<b>DG85R-AZMCD-◇</b>
<b>DG130R-AZMAD</b>	<b>DG130R-AZMCD</b>
<b>DG130R-AZMAD-◇</b>	<b>DG130R-AZMCD-◇</b>
<b>DG200R-AZMAD</b>	<b>DG200R-AZMCD</b>
<b>DG200R-AZMAD-◇</b>	<b>DG200R-AZMCD-◇</b>

#### ◇ With Electromagnetic Brake

Single-Phase 100-120 VAC	Single-Phase / Three-Phase 200-240 VAC
Product Name	Product Name
<b>DG85R-AZMA</b>	<b>DG85R-AZMC</b>
<b>DG85R-AZMA-◇</b>	<b>DG85R-AZMC-◇</b>
<b>DG130R-AZMA</b>	<b>DG130R-AZMC</b>
<b>DG130R-AZMA-◇</b>	<b>DG130R-AZMC-◇</b>
<b>DG200R-AZMA</b>	<b>DG200R-AZMC</b>
<b>DG200R-AZMA-◇</b>	<b>DG200R-AZMC-◇</b>

● A number indicating the desired length of **1** (1 m), **2** (2 m) or **3** (3 m) for the cable included with the product is entered where the box ◇ is located within the product name.

The following items are included with each product.

Hollow Rotary Actuator, Driver, Cable for Motor\*<sup>1</sup>, Cable for Encoder\*<sup>1</sup>, Cable for Electromagnetic Brake (Electromagnetic Brake Type Only)\*<sup>1</sup>, Connector for Driver, Operating Manual (Hollow Rotary Actuator Section, Driver Section)\*<sup>2</sup>

\* 1 Only products that include a connection cable. Accessory cables (sold separately) must be purchased in the following situations:

- When using a flexible extension cable
- When using a cable longer than 3 m
- When purchasing a product that does not include a cable

\* 2 For details about the driver functionality and operation, refer to the **AZ** Series stepper motor and driver package functionality section and actuator function setting section.

#### 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).

## Specifications

### Hollow Rotary Actuators Specifications



Frame Size			85 mm	130 mm	200 mm
Product Name	Built-in Controller		<b>DG85R-AZ</b> □□ <b>D</b> -◇	<b>DG130R-AZ</b> □□ <b>D</b> -◇	<b>DG200R-AZ</b> □□ <b>D</b> -◇
	Pulse Input		<b>DG85R-AZ</b> □□□-◇	<b>DG130R-AZ</b> □□□-◇	<b>DG200R-AZ</b> □□□-◇
Built-In Motor			AZ Series		
Type of Output Table Supporting Bearing			Cross-Roller Bearing		
Inertia	J: kg·m <sup>2</sup>		$21120 \times 10^{-7}$ [26304×10 <sup>-7</sup> ]*2	$147380 \times 10^{-7}$ [199220×10 <sup>-7</sup> ]*2	$916400 \times 10^{-7}$ [968240×10 <sup>-7</sup> ]*2
Gear Ratio			18		
Minimum Traveling Amount of the Output Table deg/STEP			0.01		
Permissible Torque N·m			4.5	12	50
Holding Torque at Motor Standstill	Power ON N·m		2.7	12	36 [20]*2
	Electromagnetic Brake N·m		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 N·m			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)		
Voltage and Frequency			Single-Phase 100-120 VAC, Single-Phase / Three-Phase 200-240 VAC    -15~+6%    50/60 Hz		
Power-Supply Input	Input Current A	Single-Phase 100-120 VAC	2.7	3.8	6.4
		Single-Phase 200-240 VAC	1.7	2.3	3.9
		Three-Phase 200-240 VAC	1.0	1.4	2.3
Control Power Supply			24 VDC±5%*3 0.25 A [0.33 A]*2	24 VDC±5%*3 0.25 A [0.5 A]*2	

● Either **A** (single shaft) or **M** (electromagnetic brake) indicating the configuration is entered where the box □ is located within the product name.

● Either **A** (single-phase 100-120 VAC) or **C** (single-phase / three-phase 200-240 VAC) indicating the power supply input is entered where the box □ is located within the product name.

● For products that include a connection cable, a number indicating the length of the cable, **1** (1 m), **2** (2 m) or **3** (3 m), is specified in the box ◇ in the product name. If no connection cable is included, there will be no "-◇" within the product name.

\*1 For motor product names, not actuator product names.

\*2 The brackets [ ] indicate the specifications for the electromagnetic brake type.

\*3 Changes to 24 VDC±4% if the electromagnetic brake type has been extended with the 20 m accessory cable.

#### 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 ABZ0 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.

### General Specifications

		Actuator Built-in Motor: <b>AZ</b> Series	Driver	
			Built-In Controller Type	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 · Encoder connector – Power supply terminal · I/O signal terminals – Power supply terminal	
Dielectric Voltage		Sufficient to withstand the following for 1 minute: · Case – Motor windings 1.5 kVAC, 50 Hz or 60 Hz · Case – Electromagnetic brake windings*1 1.5 kVAC, 50 Hz or 60 Hz	Sufficient to withstand the following for 1 minute: · Protective earth terminal – Power supply terminal 1.5 kVAC, 50 Hz or 60 Hz · Encoder connector – Power supply terminal 1.8 kVAC, 50 Hz or 60 Hz · I/O signal terminals – Power supply terminal 1.8 kVAC, 50 Hz or 60 Hz	
Operating Environment (In operation)	Ambient Temperature	0 ~ +40°C (Non-freezing)	0 ~ +55°C (non-freezing)*2	
	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	IP20
Multiple rotation detection range in non-electrified state (Motor output shaft)		±900 rotations (1800 rotations)		

\*1 Only for electromagnetic brake type

\*2 When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 200×200 mm and 2 mm thickness.

#### 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 ABZ0 sensor component.



## Driver Specifications

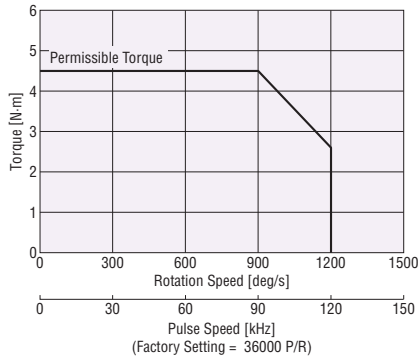
Classification	Name		Built-In Controller Type	Pulse Input Type
Input/Output Function	Pulse Input		—	Max. Input Pulse Frequency Line driver output by programmable controller: 1 MHz (When the pulse duty is 50%) Open-collector output by programmable controller: 250 kHz (When the pulse duty is 50%) Negative 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

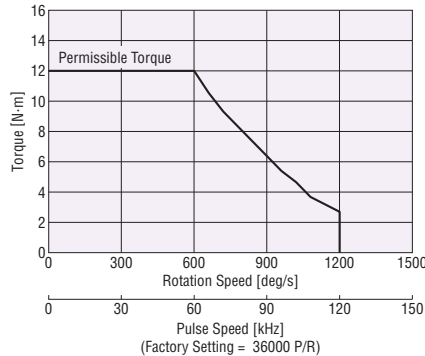
Protocol	Modbus RTU Protocol
Electrical Characteristics	EIA-485 Based, Straight Cable Use shielded twisted-pair cables (TIA/EIA-568B CAT5e or better recommended). The maximum total extension length is 50 m.
Communication Mode	Half duplex and start-stop synchronization (data: 8 bits, stop bit: 1 bit or 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)

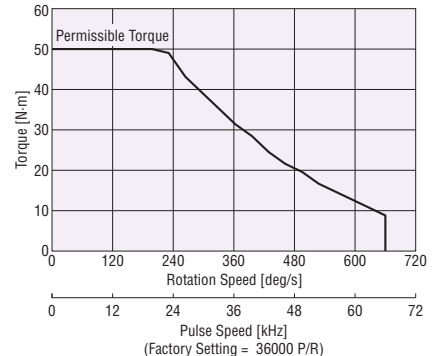
**DG85R-AZ**



**DG130R-AZ**



**DG200R-AZ**

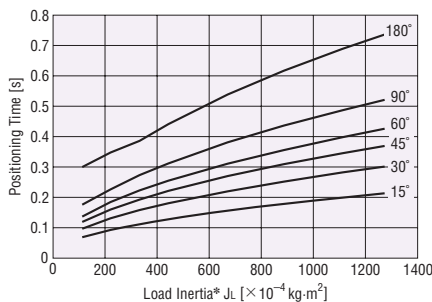


### Note

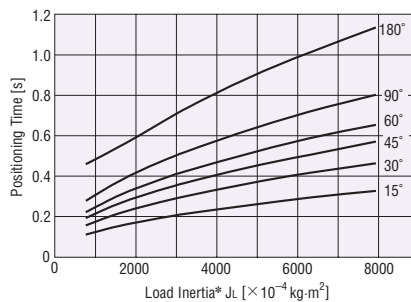
- Data for the speed – torque characteristics is based on Oriental Motor's internal measurement conditions. If the conditions are changed, the characteristics may also change as a result.
- Depending on the driving conditions, a considerable amount of heat may be generated by the motor. Please keep the 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)

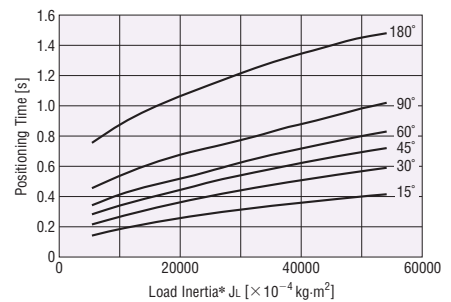
**DG85R-AZ**



**DG130R-AZ**

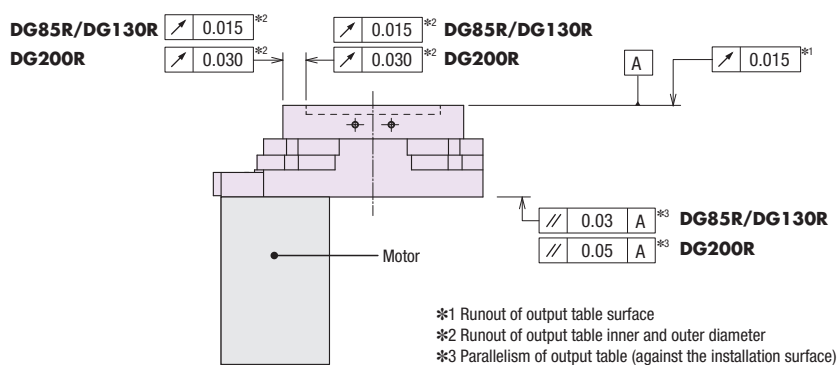


**DG200R-AZ**



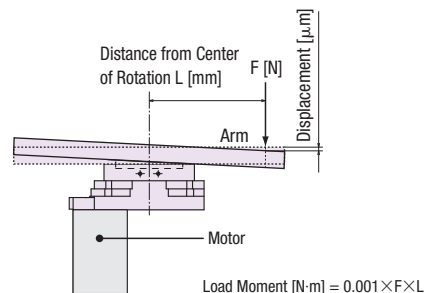
\*The load inertia refers to the inertia of the customer's load.

## Mechanical Precision (At no load)

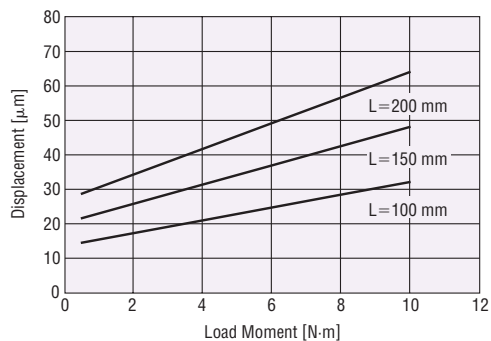


## Displacement by Load Moment (Reference value)

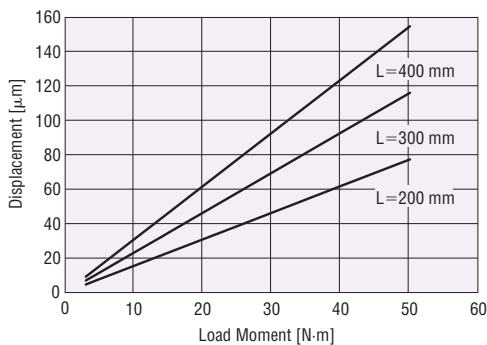
The output table will be displaced when it receives a load moment. The graph plots the table displacement that occurs at distance L from the rotation center of the output table when a given load moment is applied in one direction. The displacement becomes approximately twice the size when the load moment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



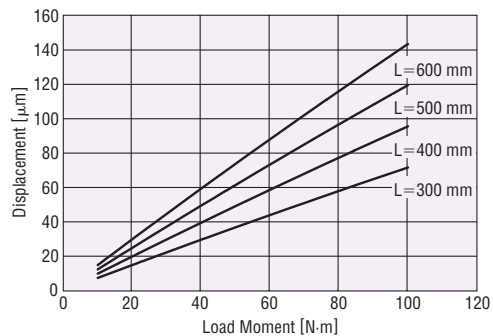
**DG85R**



**DG130R**



**DG200R**



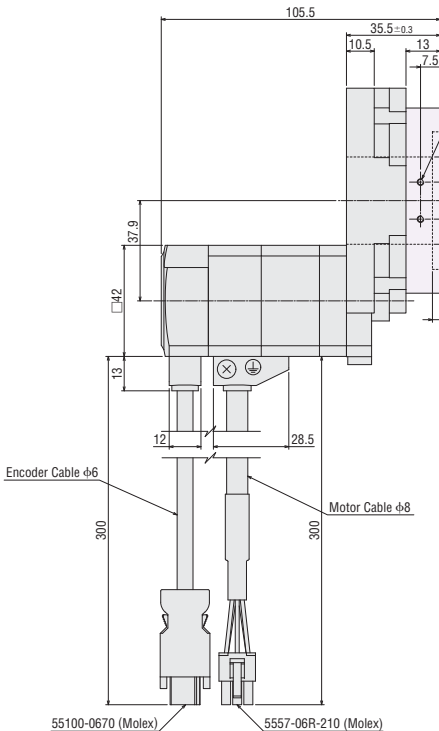
● **A**

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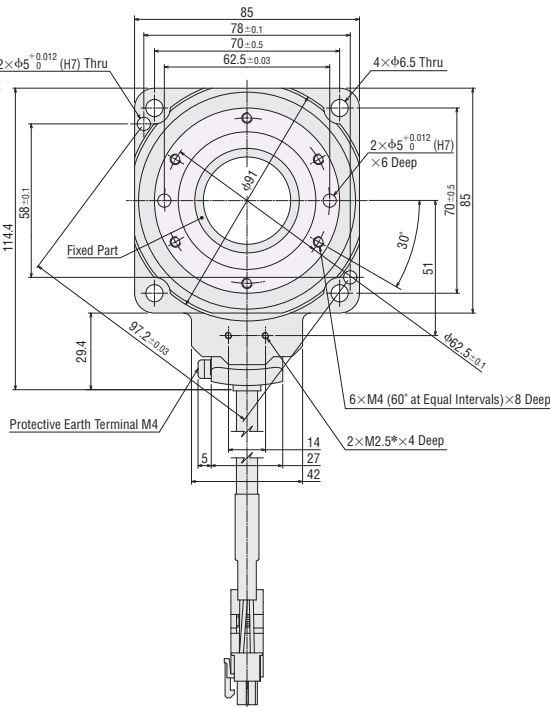
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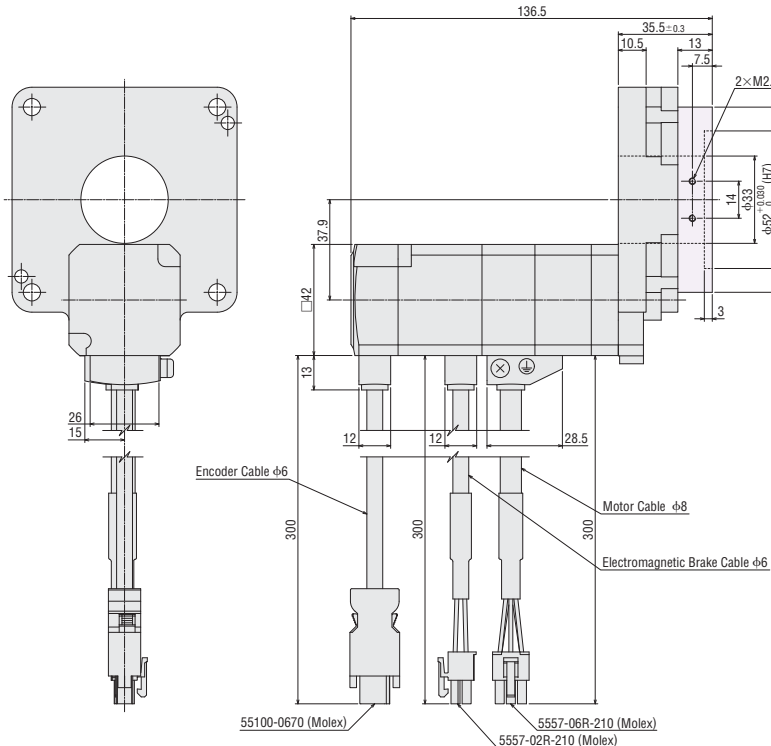


● **THE**



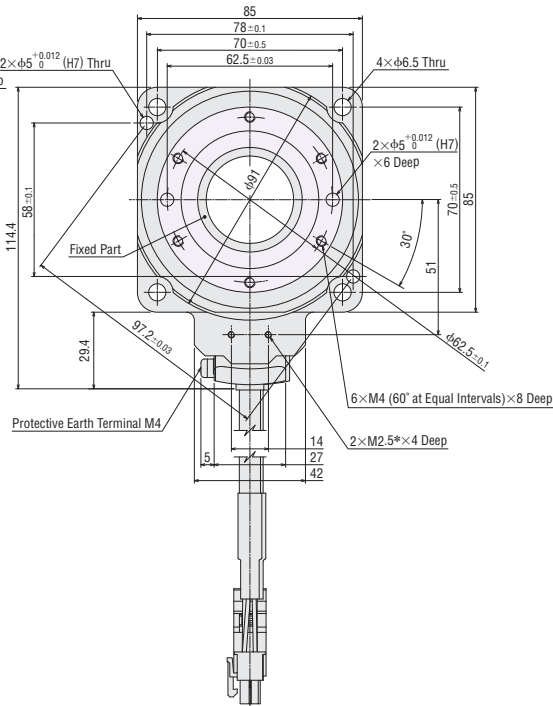
\*Use M2.5 screw holes when installing the home sensor set (sold separately).  
Do not use these holes for any purpose other than to install the home sensor.

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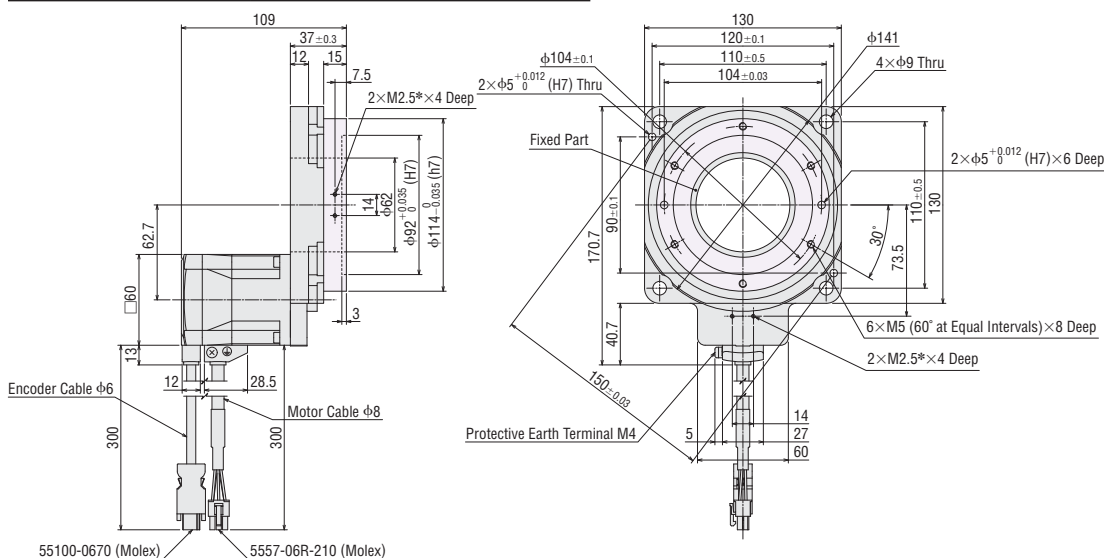
● **THE**

● Fo



\*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.

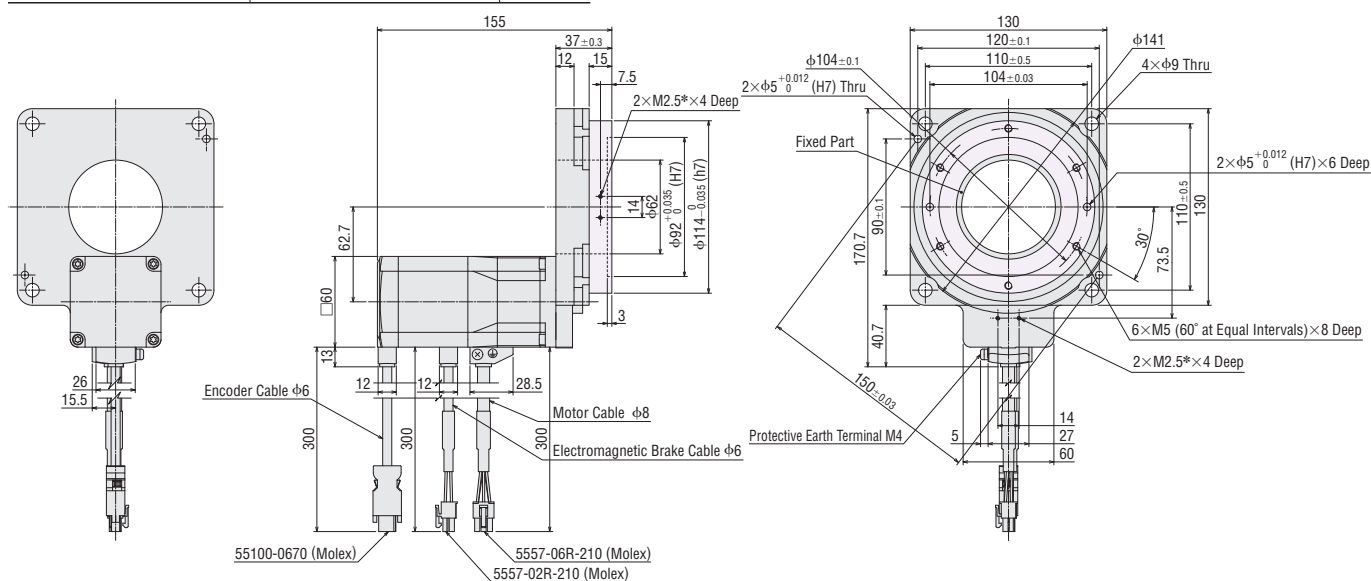
Product Name	Actuator Product Name	Mass
<b>DG130R-AZAA</b> -◇	DGM130R-AZAC	2.7 kg
<b>DG130R-AZAC</b> -◇		
<b>DG130R-AZAAD</b> -◇		
<b>DG130R-AZACD</b> -◇		



● 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	Actuator Product Name	Mass
<b>DG130R-AZMA</b> -◇	DGM130R-AZMC	3.1 kg
<b>DG130R-AZMC</b> -◇		
<b>DG130R-AZMAD</b> -◇		
<b>DG130R-AZMCD</b> -◇		



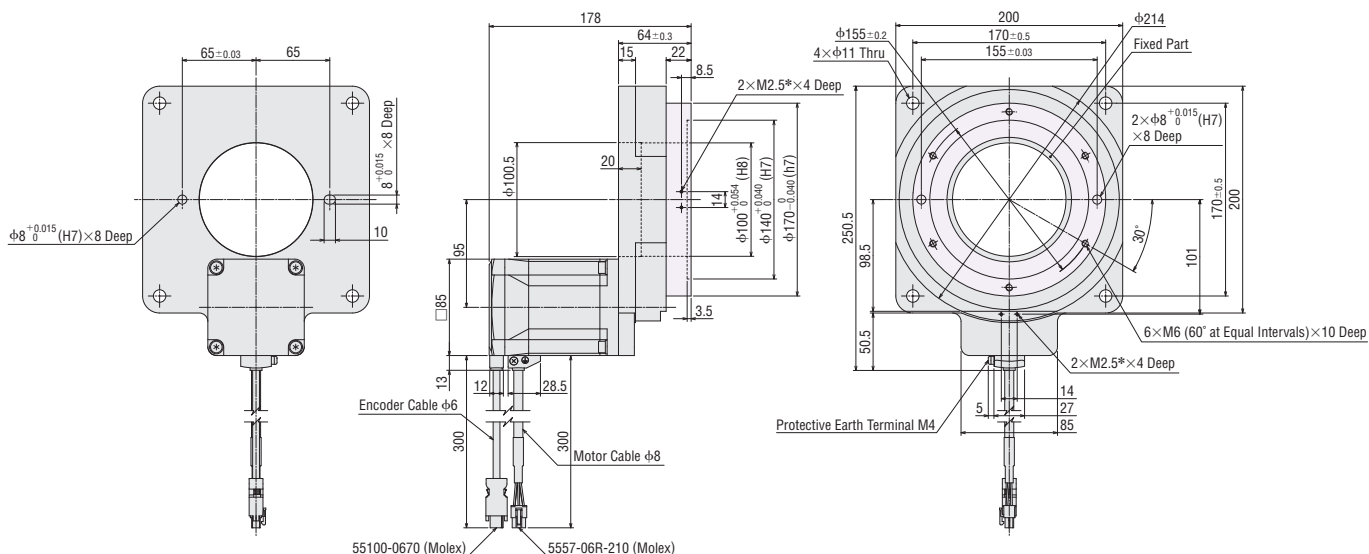
● The shaded areas are rotating parts.

\*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.

● For products that include a connection cable, a number indicating the length of the cable, **1** (1 m), **2** (2 m) or **3** (3 m), is specified in the box ◇ in the product name.  
If no connection cable is included, there will be no "-◇" within the product name.



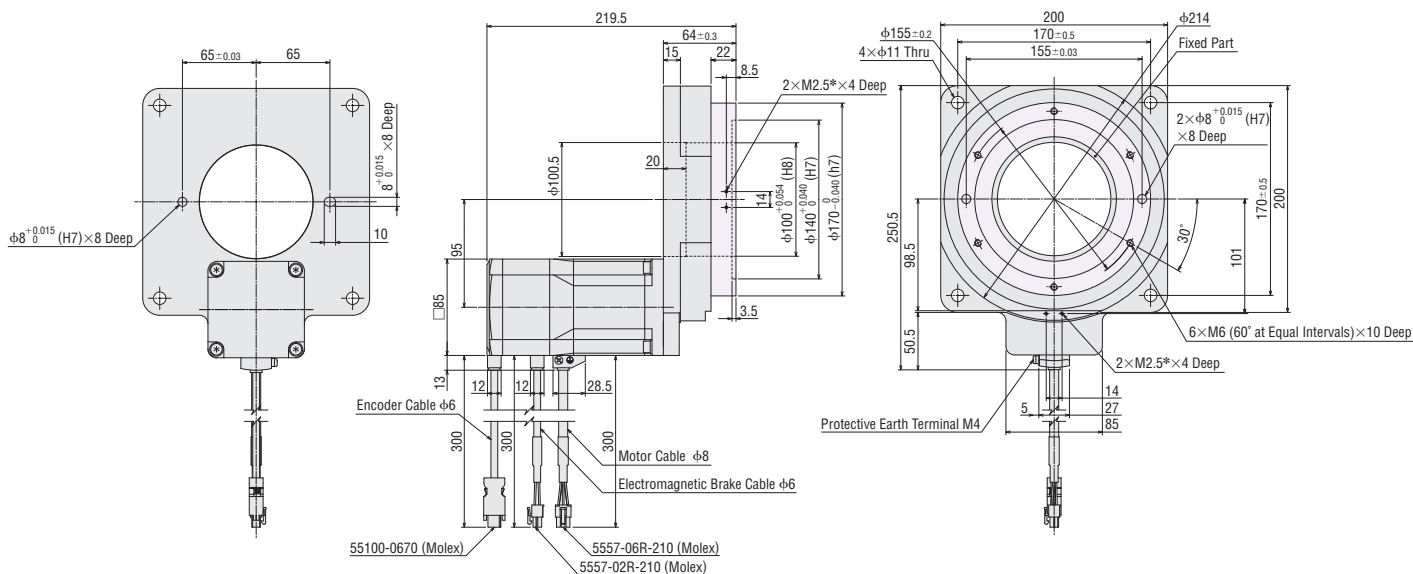
Product Name	Actuator Product Name	Mass
<b>DG200R-AZAA</b> -◇	DGM200R-AZAC	9.4 kg
<b>DG200R-AZAC</b> -◇		
<b>DG200R-AZAAD</b> -◇		
<b>DG200R-AZACD</b> -◇		



● 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	Actuator Product Name	Mass
<b>DG200R-AZMA</b> -◇	DGM200R-AZMC	10 kg
<b>DG200R-AZMC</b> -◇		
<b>DG200R-AZMAD</b> -◇		
<b>DG200R-AZMCD</b> -◇		



● 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.

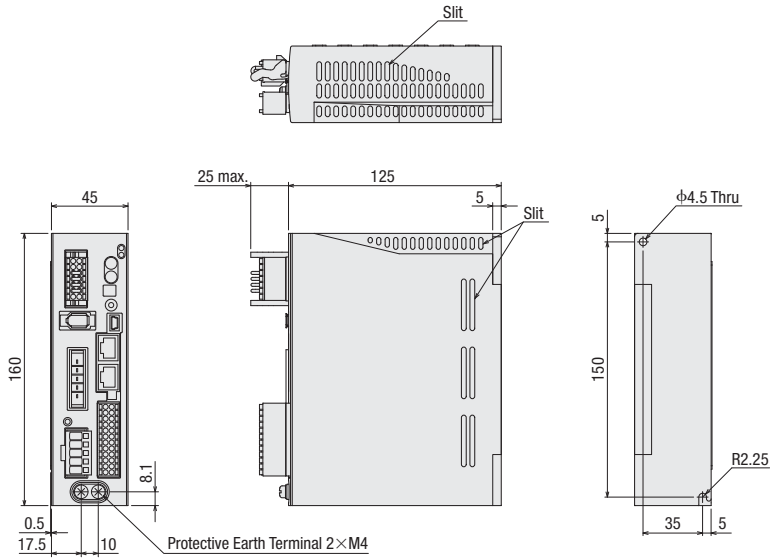
● For products that include a connection cable, a number indicating the length of the cable, **1** (1 m), **2** (2 m) or **3** (3 m), is specified in the box ◇ in the product name.  
If no connection cable is included, there will be no "-◇" within the product name.

## ● Driver

### ◇ Built-In Controller Type

Driver Product Name: AZD-AD, AZD-CD

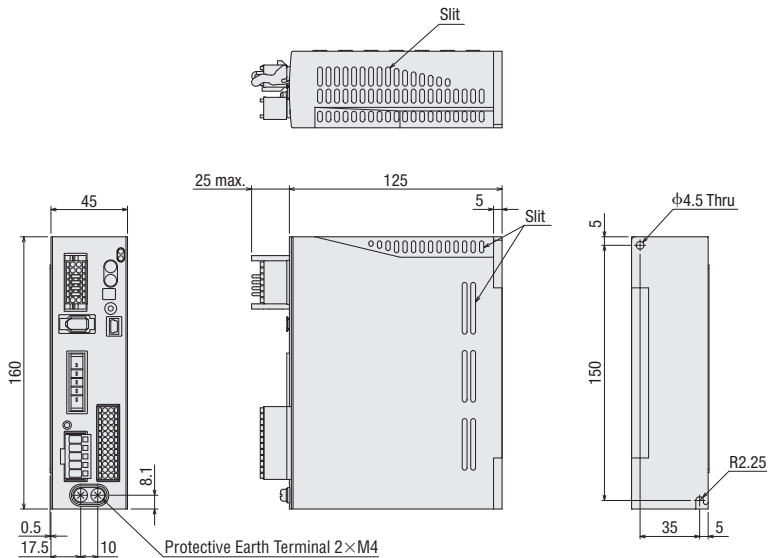
Mass: 0.65 kg



### ◇ Pulse Input Type

Driver Product Name: AZD-A, AZD-C

Mass: 0.65 kg



#### 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).

#### ● 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.)

#### ● 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

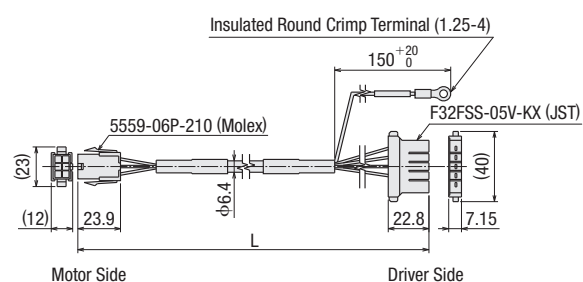
(J.S.T. Mfg. Co., Ltd.)

● Cables for Motor (Included), Cables for Encoder (Included), Cables for Electromagnetic Brake (Included)

● Only products that include a connection cable

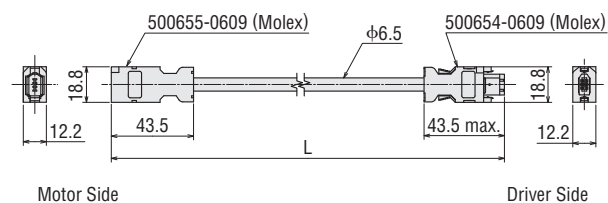
◇ Cable for Motor

Cable Type	Length L (m)
Cable for Motor 1 m	1
Cable for Motor 2 m	2
Cable for Motor 3 m	3



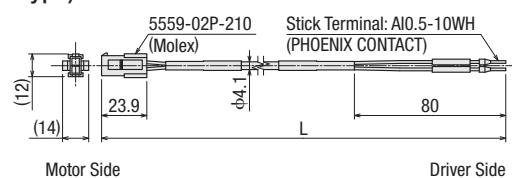
◇ Cable for Encoder

Cable Type	Length L (m)
Cable for Encoder 1 m	1
Cable for Encoder 2 m	2
Cable for Encoder 3 m	3



◇ Cable for Electromagnetic Brake (Only for electromagnetic brake type)

Cable Type	Length L (m)
Cable for Electromagnetic Brake 1 m	1
Cable for Electromagnetic Brake 2 m	2
Cable for Electromagnetic Brake 3 m	3

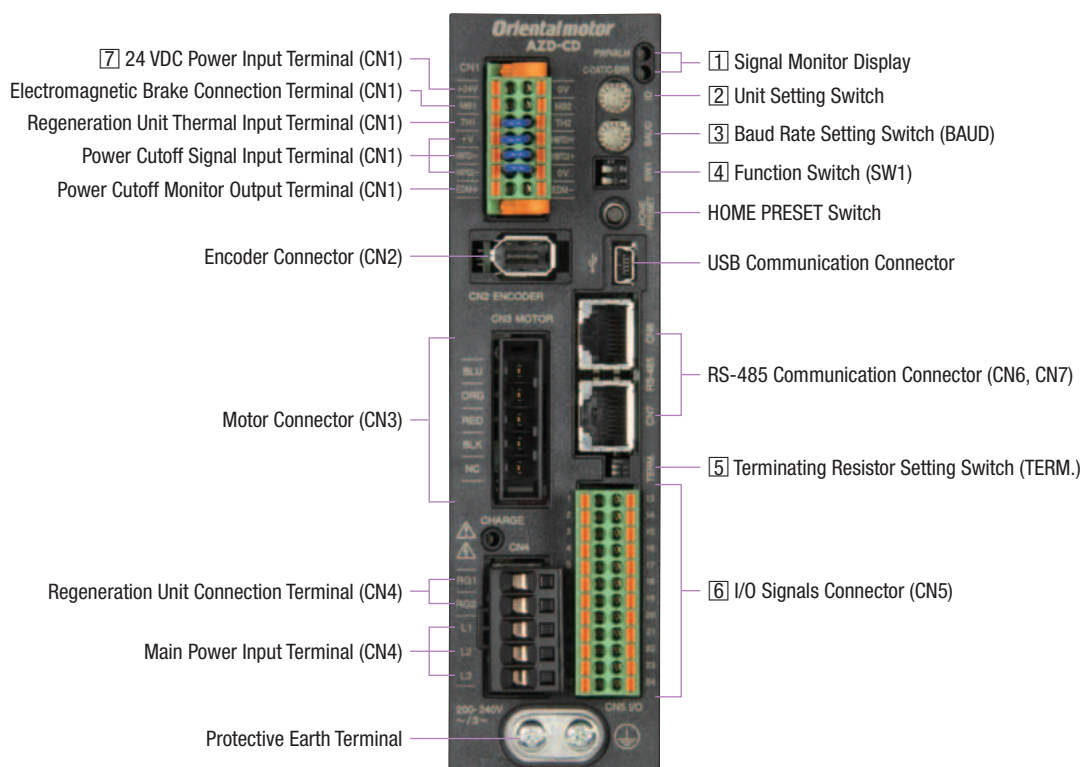


Note

● 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 products which include a connection cable).

## ■ Connection and Operation (Built-in controller type)

### ● Names and Functions of Driver Parts



#### 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).

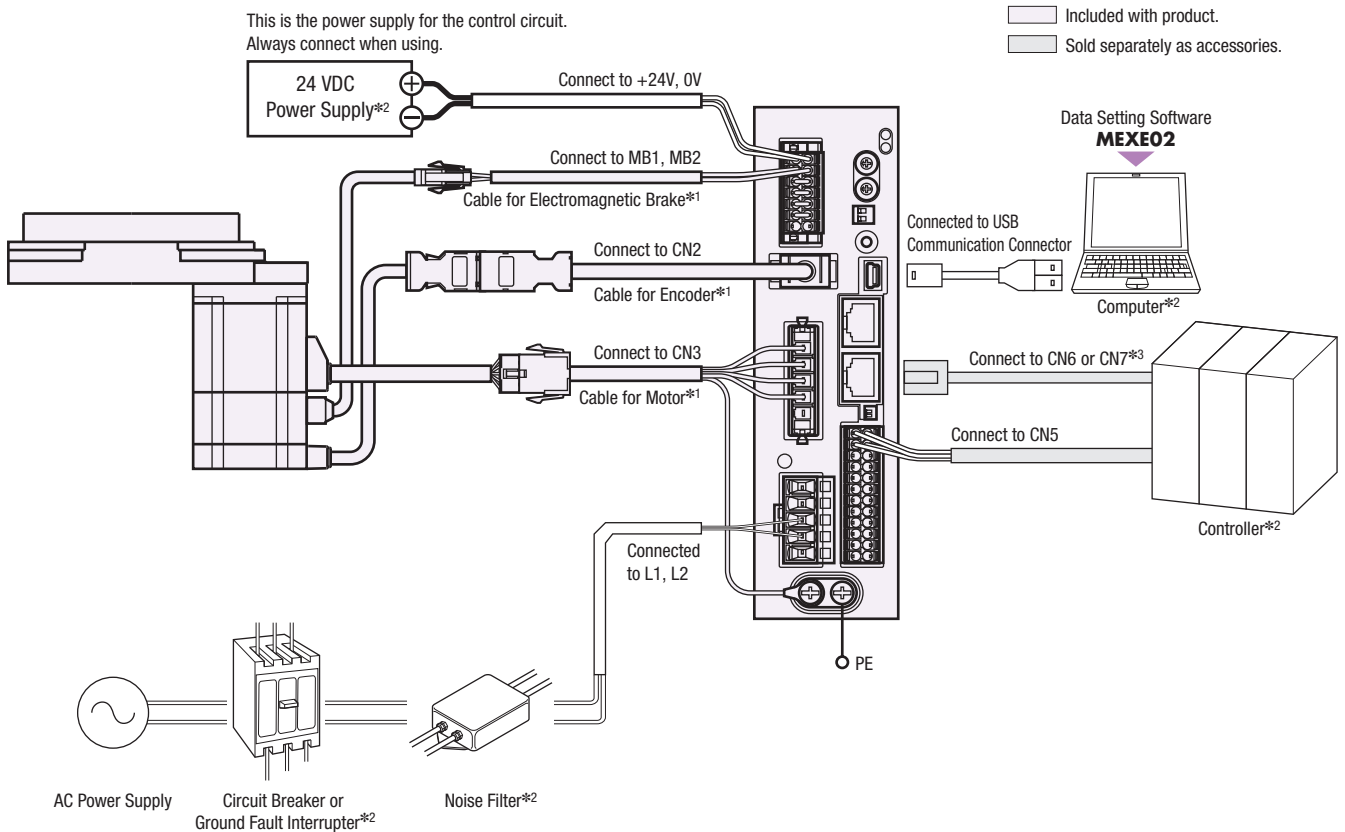
\*1 Initial setting values cannot be changed.

## 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 ( <b>RGB100</b> ). When not connecting a regeneration unit, short these 2 terminals to each other.
TH2		Regeneration Unit Thermal Input Terminal	
HWT01 +	Input	Power Cutoff Signal Input Terminal 1 +	Connects to switch and host controller. If either HWT01 input or HWT02 input is OFF, the motor power supply is cut off directly via hardware (CPU bypassed).
HWT01 –		Power Cutoff Signal Input Terminal 1 –	
HWT02 +		Power Cutoff Signal Input Terminal 2 +	
HWT02 –		Power Cutoff Signal Input Terminal 2 –	
EDM +	Output	Power Cutoff Monitor Output Terminal +	Connects to host controller. If both HWT01 input HWT02 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).

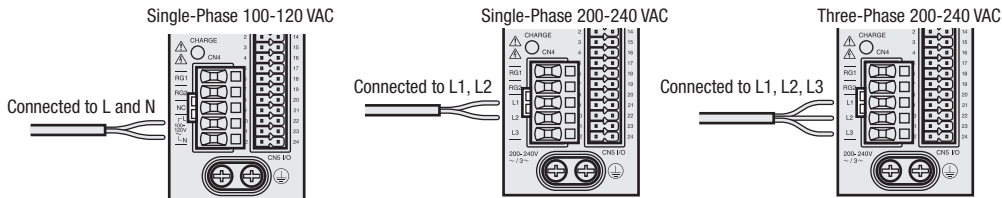
When wiring the motor and the driver, keep a maximum distance of 20 m.

\*2 Not supplied.

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

### ◇ Connecting the Main Power Supply

The connection method differs according to the power supply specifications.



### ◇ USB Cable Connection

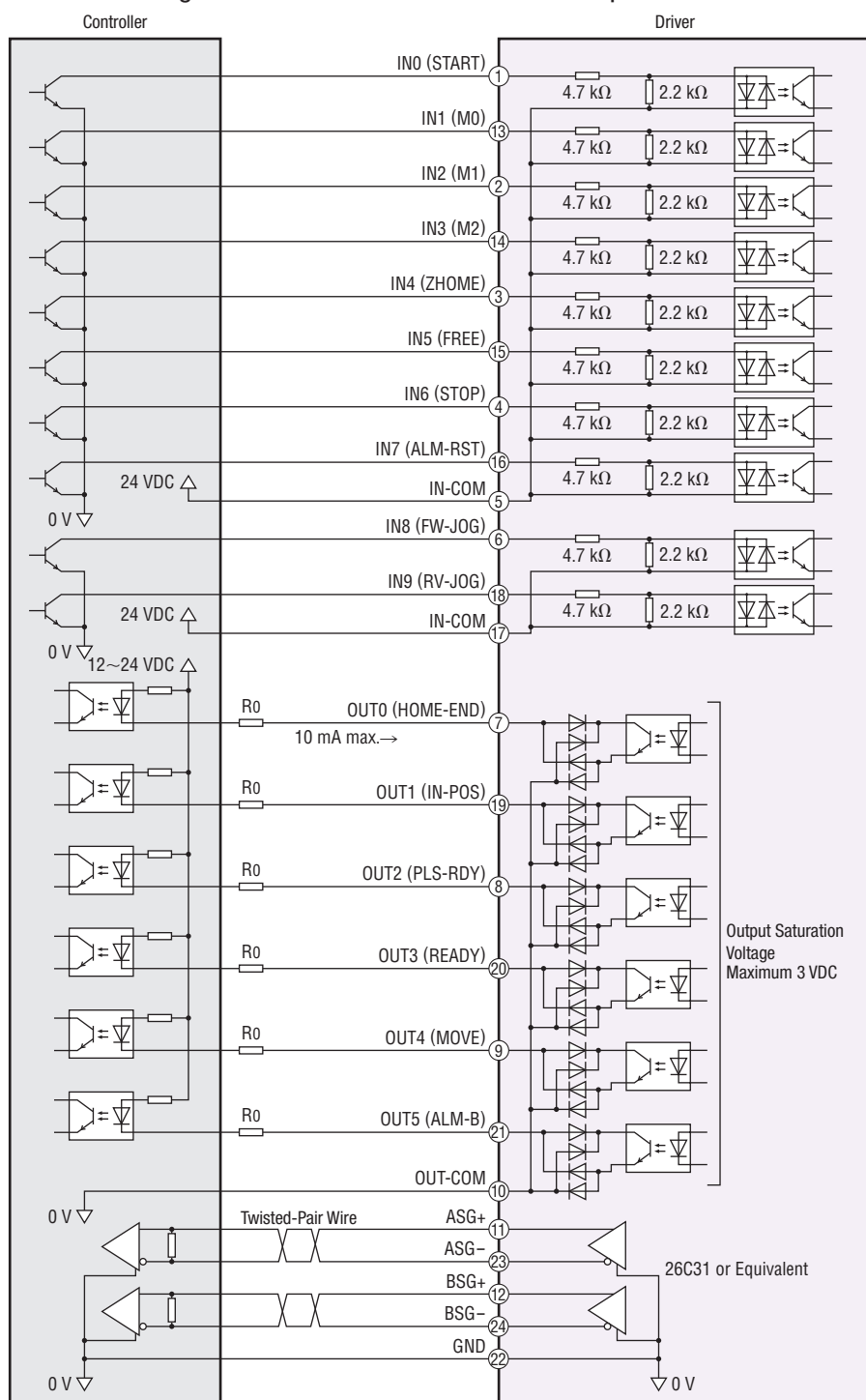
Connect to the computer on which the data setting software **MEXE02** is installed to the driver with a USB cable.

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 to Programmable Controller

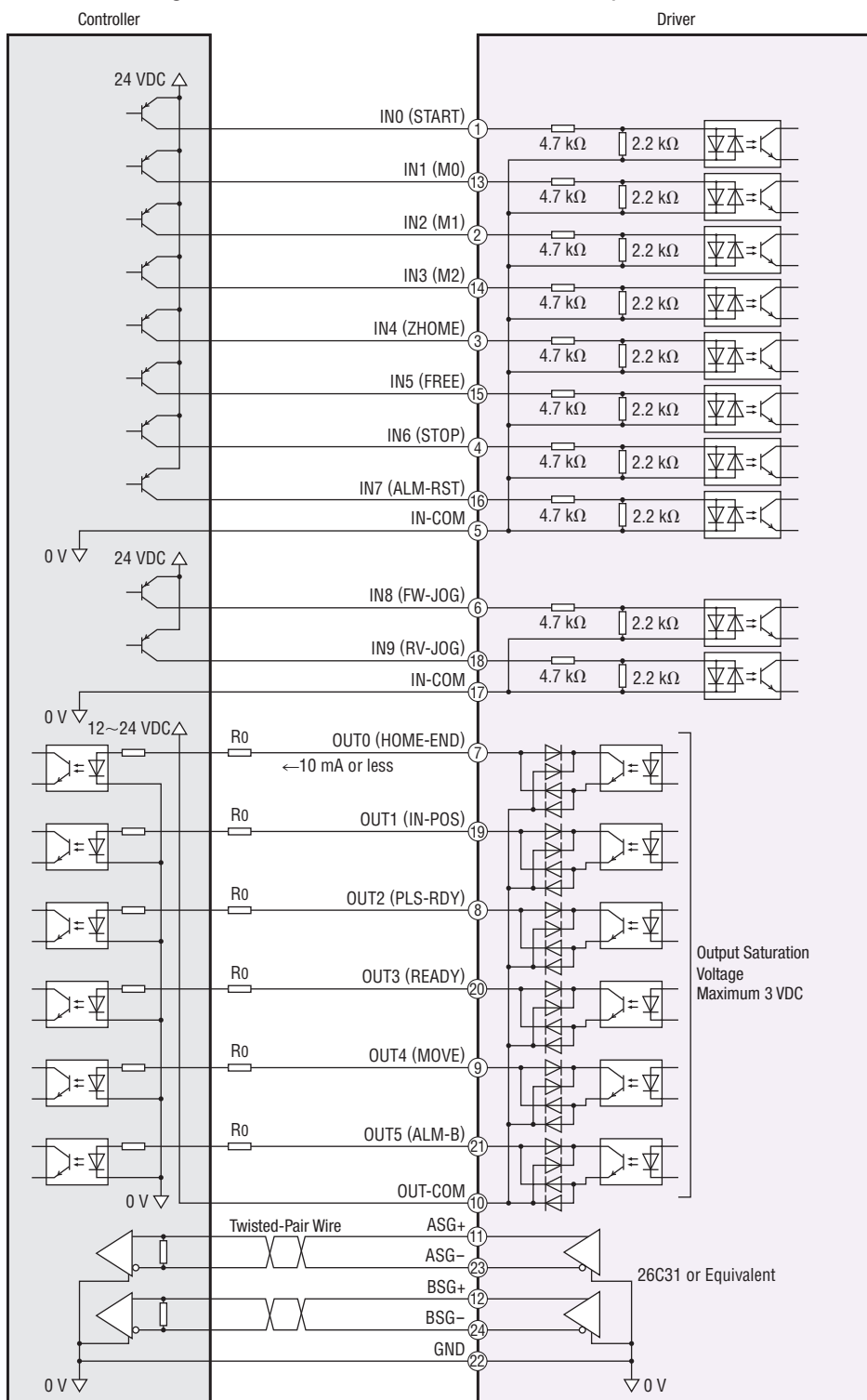
● Connection Diagram for Connection with Current Sink Output Circuit



**Note**

- Use 24 VDC for the input signals.
- Use output signal at 12~24 VDC 10 mA or less. When the current value exceeds 10 mA, connect an external resistor  $R_0$  to reduce the current to 10 mA or less.
- Provide a distance of 200 mm or more between the signal lines and power lines (power supply lines, motor lines).  
Do not run the signal lines in the same piping as power lines or bundle them with power lines.
- If noise generated by the motor cable or power supply cable causes a problem with the specific wiring or layout, shield the cable or use ferrite cores.

# ● Connection Diagram for Connection with Current Source Output Circuit

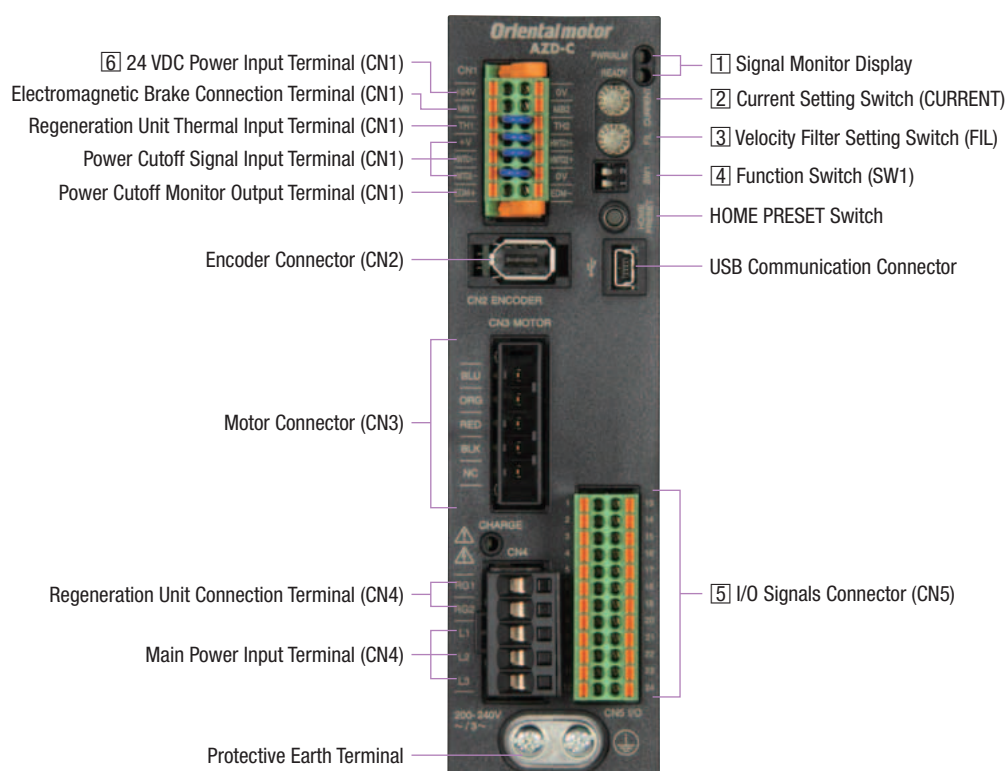


## Note

- Use 24 VDC for the input signals.
- Use output signal at 12~24 VDC 10 mA or less. When the current value exceeds 10 mA, connect an external resistor  $R_0$  to reduce the current to 10 mA or less.
- Provide a distance of 200 mm or more between the signal lines and power lines (power supply lines, motor lines).  
Do not run the signal lines in the same piping as power lines or bundle them with power lines.
- If noise generated by the motor cable or power supply cable causes a problem with the specific wiring or layout, shield the cable or use ferrite cores.

## ■ Connection and Operation (Pulse input type)

### ● Names and Functions of Driver Parts



#### 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).

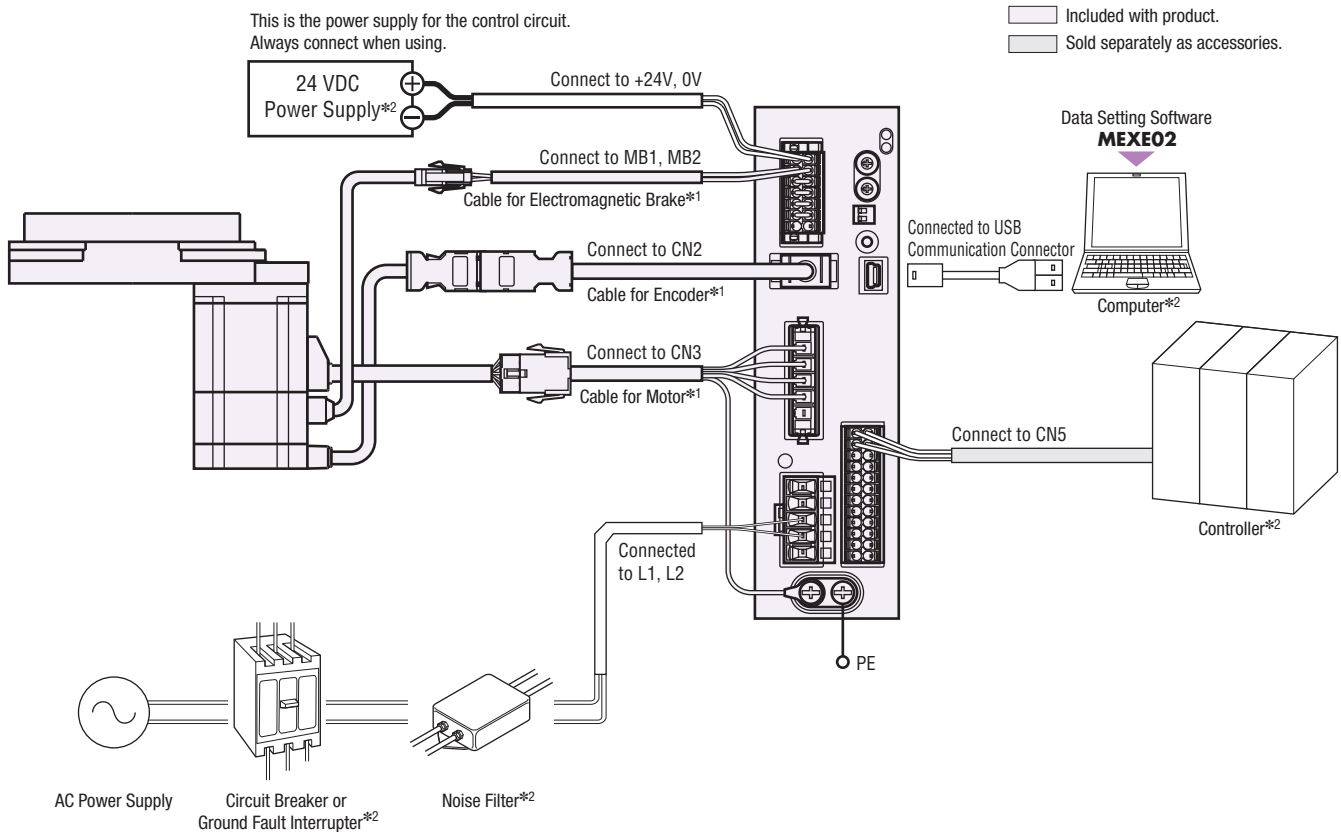
\*1 Initial setting values cannot be changed.

## 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 ( <b>RGB100</b> ). When not connecting a regeneration unit, short these 2 terminals to each other.
TH2		Regeneration Unit Thermal Input Terminal	
HWT01+	Input	Power Cutoff Signal Input Terminal 1+	Connects to switch and host controller. If either HWT01 input or HWT02 input is OFF, the motor power supply is cut off directly via hardware (CPU bypassed).
HWT01-		Power Cutoff Signal Input Terminal 1-	
HWT02+		Power Cutoff Signal Input Terminal 2+	
HWT02-		Power Cutoff Signal Input Terminal 2-	
EDM+	Output	Power Cutoff Monitor Output Terminal +	Connects to host controller. If both HWT01 input HWT02 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.

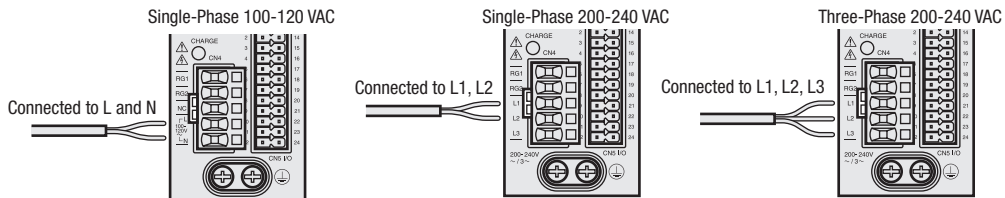
If cables longer than 3 m or flexible cables are required, select the appropriate cables from the accessories (sold separately).

When wiring the motor and the driver, keep a maximum distance of 20 m.

\*2 Not supplied.

### ◇ Connecting the Main Power Supply

The connection method differs according to the power supply specifications.



### ◇ USB Cable Connection

Connect to the computer on which the data setting software **MEXE02** is installed to the driver with a USB cable.

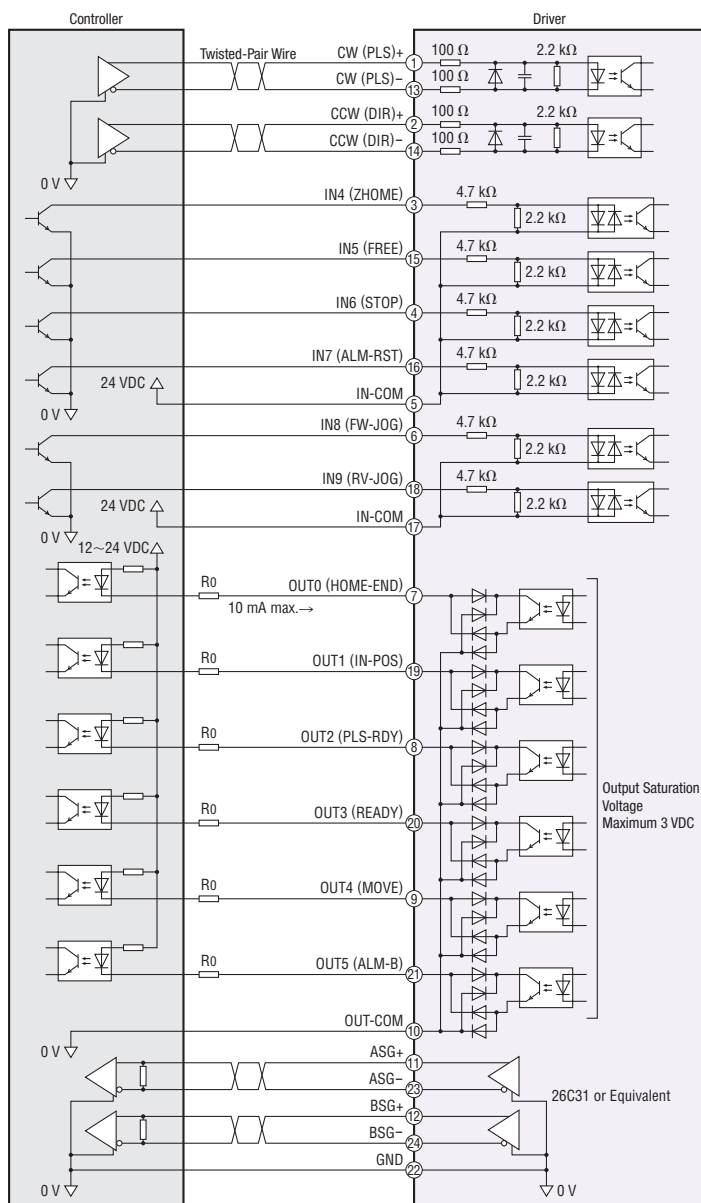
Please use USB cables which meet the follow specifications.

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

## ◇ Connection to Programmable Controller

### ● Connection Diagram for Connection with Current Sink Output Circuit

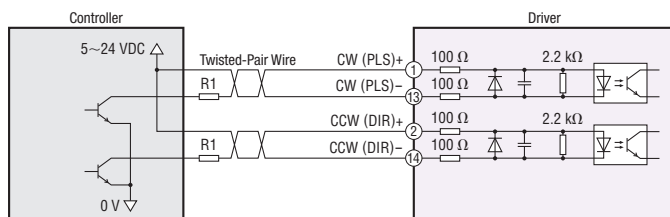
When the pulse input is the line driver



#### Note

- Use 24 VDC for the input signals.
- Use output signal at 12~24 VDC 10 mA or less. When the current value exceeds 10 mA, connect an external resistor  $R_0$  to reduce the current to 10 mA or less.
- Provide a distance of 200 mm or more between the signal lines and power lines (power supply lines, motor lines).  
Do not run the signal lines in the same piping as power lines or bundle them with power lines.
- If noise generated by the motor cable or power supply cable causes a problem with the specific wiring or layout, shield the cable or use ferrite cores.

When the Pulse Input is Open Collector



#### Note

- Use CW (PLS) input and CCW (DIR) input at 5~24 VDC. If voltage exceeding 5 VDC is applied, connect an external resistor  $R_1$  so that the current becomes 7 to 20 mA.

### When the pulse input is the line driver



- Use 24 VDC for the input signals.
- Use output signal at 12~24 VDC 10 mA or less. When the current value exceeds 10 mA, connect an external resistor  $R_0$  to reduce the current to 10 mA or less.
- Provide a distance of 200 mm or more between the signal lines and power lines (power supply lines, motor lines).  
Do not run the signal lines in the same piping as power lines or bundle them with power lines.
- If noise generated by the motor cable or power supply cable causes a problem with the specific wiring or layout, shield the cable or use ferrite cores.

The diagram illustrates a 2-wire CAN transceiver circuit. It is divided into two main sections: the **Controller** and the **Driver**.

- Controller:** Powered by a 5~24 VDC supply. It has two CAN pins. The circuit includes two resistors labeled **R1** connected to the twisted-pair wires.
- Driver:** Powered by a 5V supply (indicated by a 5V regulator symbol). It has two CAN pins. The circuit includes two resistors labeled **R1** connected to the twisted-pair wires. Each CAN pin is connected to a 100  $\Omega$  resistor, a Schottky diode, and a 2.2 k $\Omega$  pull-up resistor connected to the 5V supply.
- Connections:** The two CAN lines are connected via twisted-pair wires (labeled **CW (PLS)+** and **CCW (DIR)-**) between the Controller and Driver. The wires are connected to pins 1 and 13 on the Driver side.

#### Note

- 33

## List of Actuator and Driver Combinations

Product names for actuator and driver combination products are shown below.

### Built-In Controller Type

#### ◇ Single-Phase 100-120 VAC

Electromagnetic Brake	Product Name	Actuator Product Name	Driver Product Name
Not Equipped	<b>DG85R-AZAAD</b> -◇	DGM85R-AZAC	AZD-AD
	<b>DG130R-AZAAD</b> -◇	DGM130R-AZAC	
	<b>DG200R-AZAAD</b> -◇	DGM200R-AZAC	
Equipped	<b>DG85R-AZMAD</b> -◇	DGM85R-AZMC	
	<b>DG130R-AZMAD</b> -◇	DGM130R-AZMC	
	<b>DG200R-AZMAD</b> -◇	DGM200R-AZMC	

#### ◇ Single-Phase / Three-Phase 200-240 VAC

Electromagnetic Brake	Product Name	Actuator Product Name	Driver Product Name
Not Equipped	<b>DG85R-AZACD</b> -◇	DGM85R-AZAC	AZD-CD
	<b>DG130R-AZACD</b> -◇	DGM130R-AZAC	
	<b>DG200R-AZACD</b> -◇	DGM200R-AZAC	
Equipped	<b>DG85R-AZMCD</b> -◇	DGM85R-AZMC	
	<b>DG130R-AZMCD</b> -◇	DGM130R-AZMC	
	<b>DG200R-AZMCD</b> -◇	DGM200R-AZMC	

### Pulse Input Type

#### ◇ Single-Phase 100-120 VAC

Electromagnetic Brake	Product Name	Actuator Product Name	Driver Product Name
Not Equipped	<b>DG85R-AZAA</b> -◇	DGM85R-AZAC	AZD-A
	<b>DG130R-AZAA</b> -◇	DGM130R-AZAC	
	<b>DG200R-AZAA</b> -◇	DGM200R-AZAC	
Equipped	<b>DG85R-AZMA</b> -◇	DGM85R-AZMC	
	<b>DG130R-AZMA</b> -◇	DGM130R-AZMC	
	<b>DG200R-AZMA</b> -◇	DGM200R-AZMC	

#### ◇ Single-Phase / Three-Phase 200-240 VAC

Electromagnetic Brake	Product Name	Actuator Product Name	Driver Product Name
Not Equipped	<b>DG85R-AZAC</b> -◇	DGM85R-AZAC	AZD-C
	<b>DG130R-AZAC</b> -◇	DGM130R-AZAC	
	<b>DG200R-AZAC</b> -◇	DGM200R-AZAC	
Equipped	<b>DG85R-AZMC</b> -◇	DGM85R-AZMC	
	<b>DG130R-AZMC</b> -◇	DGM130R-AZMC	
	<b>DG200R-AZMC</b> -◇	DGM200R-AZMC	

● For products that include a connection cable, a number indicating the length of the cable, **1** (1 m), **2** (2 m) or **3** (3 m), is specified in the box ◇ in the product name.  
If no connection cable is included, there will be no "-◇" within the product name.



# Accessories (Sold separately)

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

**DGII** Series and **AZ** Series products are available with a 1 m, 2 m or 3 m cable to connect motor and driver, and also without.

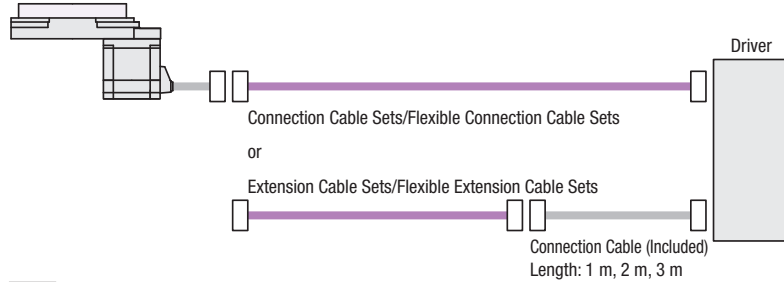
If the distance between the motor and driver is extended to 3 m or longer, a connection cable set or extension cable set must be used.

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.

Hollow Rotary Actuators



### Note

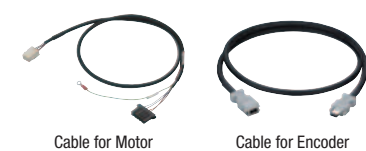
● The motor cable and electromagnetic brake cable from the motor cannot be connected directly to the driver. When connecting to a driver, use the accessory connection cable (sold separately) or use the included connection cable (for types which include a connection cable).

## Connection Cable Sets, Flexible Connection Cable Sets

### Product Line

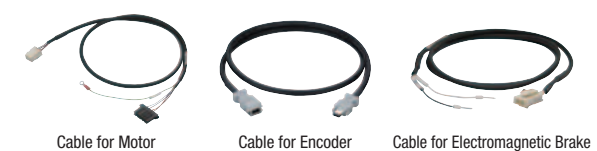
#### Connection Cable Sets

##### ◇ For Single Shaft



Product Name	Length L (m)
<b>CC010VZF</b>	1
<b>CC020VZF</b>	2
<b>CC030VZF</b>	3
<b>CC050VZF</b>	5
<b>CC070VZF</b>	7
<b>CC100VZF</b>	10
<b>CC150VZF</b>	15
<b>CC200VZF</b>	20

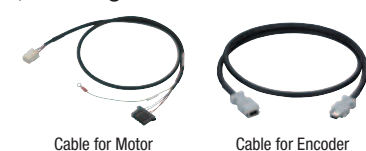
##### ◇ For Electromagnetic Brake Type



Product Name	Length L (m)
<b>CC010VZFB</b>	1
<b>CC020VZFB</b>	2
<b>CC030VZFB</b>	3
<b>CC050VZFB</b>	5
<b>CC070VZFB</b>	7
<b>CC100VZFB</b>	10
<b>CC150VZFB</b>	15
<b>CC200VZFB</b>	20

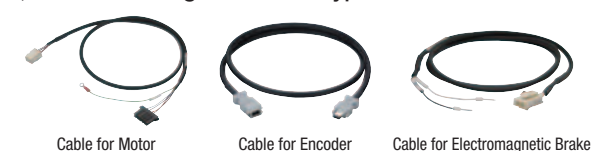
#### Flexible Connection Cable Sets

##### ◇ For Single Shaft



Product Name	Length L (m)
<b>CC010VZR</b>	1
<b>CC020VZR</b>	2
<b>CC030VZR</b>	3
<b>CC050VZR</b>	5
<b>CC070VZR</b>	7
<b>CC100VZR</b>	10
<b>CC150VZR</b>	15
<b>CC200VZR</b>	20

##### ◇ For Electromagnetic Brake Type



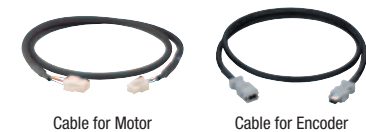
Product Name	Length L (m)
<b>CC010VZRB</b>	1
<b>CC020VZRB</b>	2
<b>CC030VZRB</b>	3
<b>CC050VZRB</b>	5
<b>CC070VZRB</b>	7
<b>CC100VZRB</b>	10
<b>CC150VZRB</b>	15
<b>CC200VZRB</b>	20

# Extension Cable Sets, Flexible Extension Cable Sets

## Product Line

### Extension Cable Sets

#### For Single Shaft



Product Name	Length L (m)
<b>CC010VZFT</b>	1
<b>CC020VZFT</b>	2
<b>CC030VZFT</b>	3
<b>CC050VZFT</b>	5
<b>CC070VZFT</b>	7
<b>CC100VZFT</b>	10
<b>CC150VZFT</b>	15

### Flexible Extension Cable Sets

#### For Single Shaft



Product Name	Length L (m)
<b>CC010VZRT</b>	1
<b>CC020VZRT</b>	2
<b>CC030VZRT</b>	3
<b>CC050VZRT</b>	5
<b>CC070VZRT</b>	7
<b>CC100VZRT</b>	10
<b>CC150VZRT</b>	15

#### For Electromagnetic Brake Type



Product Name	Length L (m)
<b>CC010VZFBT</b>	1
<b>CC020VZFBT</b>	2
<b>CC030VZFBT</b>	3
<b>CC050VZFBT</b>	5
<b>CC070VZFBT</b>	7
<b>CC100VZFBT</b>	10
<b>CC150VZFBT</b>	15

#### For Electromagnetic Brake Type

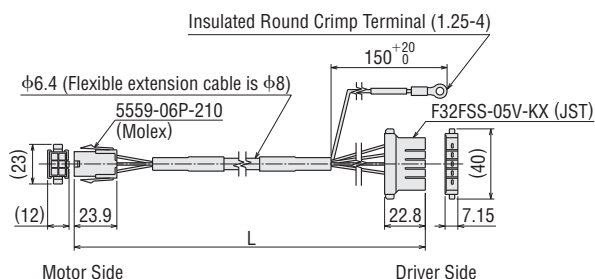


Product Name	Length L (m)
<b>CC010VZRBt</b>	1
<b>CC020VZRBt</b>	2
<b>CC030VZRBt</b>	3
<b>CC050VZRBt</b>	5
<b>CC070VZRBt</b>	7
<b>CC100VZRBt</b>	10
<b>CC150VZRBt</b>	15

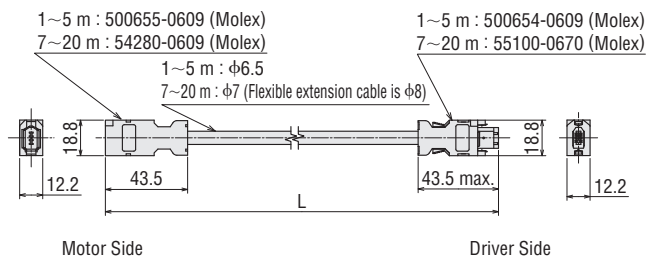
## Dimensions (Unit = mm)

### Connection Cable

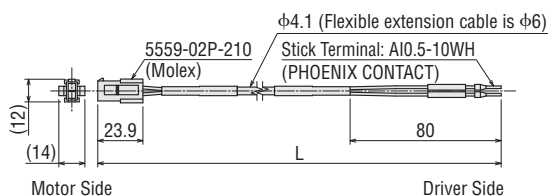
#### Cable for Motor



#### Cable for Encoder

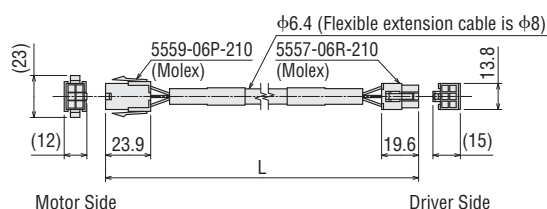


#### Cable for Electromagnetic Brake

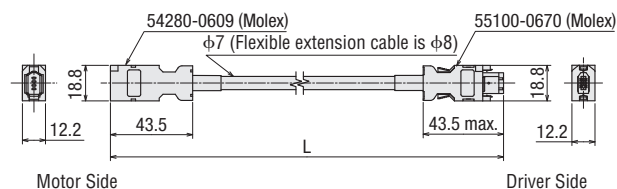


### Extension Cable

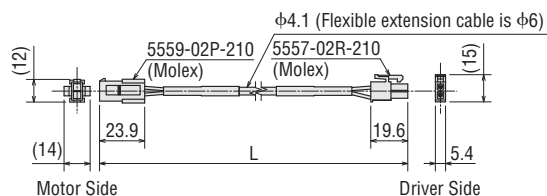
#### Cable for Motor



#### Cable for Encoder

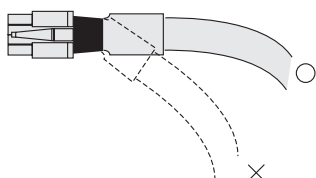


#### Cable for Electromagnetic Brake

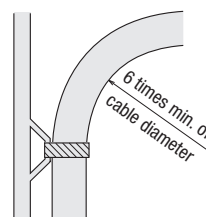


## Notes on Use of Flexible Cable

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

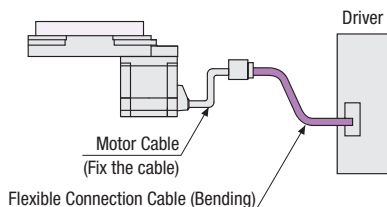


② Bending radius should be at least 6 times the cable diameter.

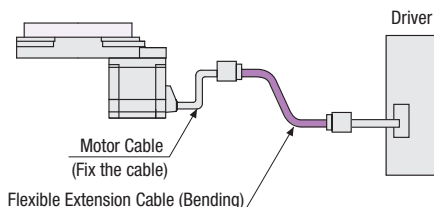


③ The actuator cable and supplied connection cable is not flexible. If your application requires flexibility a flexible cable will be required.

### • 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.

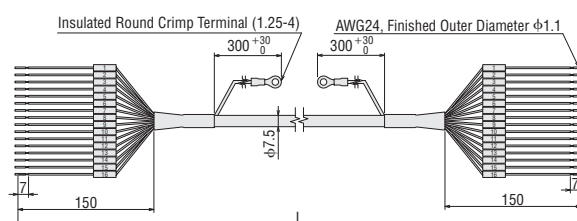


### Product Line

Product Name	Length L (m)
<b>CC16D005B-1</b>	0.5
<b>CC16D010B-1</b>	1.0
<b>CC16D015B-1</b>	1.5
<b>CC16D020B-1</b>	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.

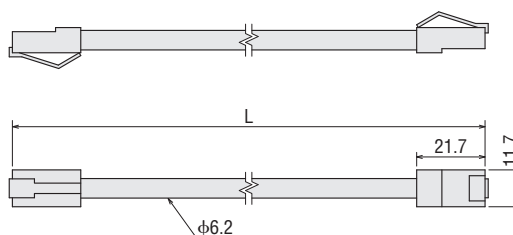
It also connects the network converter to the driver.



### Product Line

Product Name	Length L (m)
<b>CC002-RS4</b>	0.25

### Dimensions (Unit = mm)



## Mounting Pedestal for DGII Series

The mounting pedestal enables the **DGII** Series to be used as a direct drive motor. Applications that require height and installation from the side can also be performed, expanding the range of available operations.

### Product Line

Product Name	DGII Series Applicable Products	
	Type	Product Name
<b>MDG85B</b>	Single Shaft	<b>DG85R-AZA</b>
<b>MDG130B</b>	Single Shaft	<b>DG130R-AZA</b>

● The product names of the applicable products are described with text by which the product name can be identified.



# Data Setting Software MEXE02

In addition to setting and editing the operating data and various parameters with a computer, you can perform teaching and monitor I/O and operating speed waveform with Data Setting Software.

The data setting software can be downloaded from the website.

It can also be sent on CD-ROM. Request one from our website, or contact the nearest Oriental Motor sales office.

## Computer and Driver Connection

Please use USB cables which meet the follow specifications.

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

## Operating Environment

### Operating System (OS)

32-bit (x86) versions and 64-bit (x64) versions are supported.

- Microsoft Windows XP Service Pack 3\*
- Microsoft Windows Vista Service Pack 2
- Microsoft Windows 7 Service Pack 1
- Microsoft Windows 8
- Microsoft Windows 8.1

\*The 64-bit (x64) version runs with Service Pack 2.

### Computer

Recommended CPU*1	Intel Core processor 2 GHz or faster (compatible with the OS)
Display	High resolution video adapter and monitor with a minimum resolution of XGA (1024×768)
Recommended Memory*1	32-bit (x86) version: 1 GB or more 64-bit (x64) version: 2 GB or more
Hard Disk*2	At least 60 MB of free disk space
USB Port	USB2.0 One port
Disk Device	CD-ROM Drive (Used for installation)

\*1 The system requirements for the OS must be met.

\*2 **MEXE02** requires Microsoft .NET Framework 4 Client Profile. It will be automatically installed if it is not already installed, so 1.5 GB of free space for the 64-bit (x64) version and 600 MB of free space for the 32-bit (x86) version may be required.

- Windows and Windows Vista are registered trademarks of Microsoft Corporation in the United States and other countries.
- Intel and Core are registered trademarks or trademarks of Intel Corporation in the United States and other countries.
- For the latest information on operating environment, refer to the Oriental Motor website.

#### Note

- The required memory and hard disk space may vary depending on the system environment.

# 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.

## Product Line

Product Name	Sensor Output	Applicable
<b>PADG-SB</b>	NPN	<b>DG85R-AZ</b> <b>DG130R-AZ</b> <b>DG200R-AZ</b>
<b>PADG-SBY</b>	PNP	



# 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
<b>RGB100</b>

## 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.

### Product Line

Network Type	Product Name
CC-Link Ver.1.1-Compatible	<b>NETC01-CC</b>
MECHATROLINK-IICompatible	<b>NETC01-M2</b>
MECHATROLINK-IIICompatible	<b>NETC01-M3</b>
EtherCAT-Compatible	<b>NETC01-ECT</b>



NETC01-CC



NETC01-M2



NETC01-M3



NETC01-ECT

### Universal Controller

## SCX11 RoHS

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	Driver Product Name
<b>SCX11</b>	AZD-C, AZD-A



# ***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.  
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