# Hybrid Control System

## αSTEP

## Battery-Free, Built-in Absolute Sensor

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## Battery-Free, Built-in Absolute Sensor
# AZ Series AC Power Supply Input

● For detailed information about regulations and standards, please refer to the Oriental Motor website.

Built-in Controller Type FLEX
Pulse Input Type with RS-485 Communication

Pulse Input Type

By incorporating the newly developed absolute sensor, an absolute system is now possible without a battery. Advanced positioning is possible at affordable prices.

- Equipped with the newly developed absolute sensor
- External sensors not required
- Shortens the return-to-home time
- Battery not required
- Energy savings and low heat generation
- Select from 3 different drivers based on the system configuration
- Achieve easy operation with the support software **MEXE02**

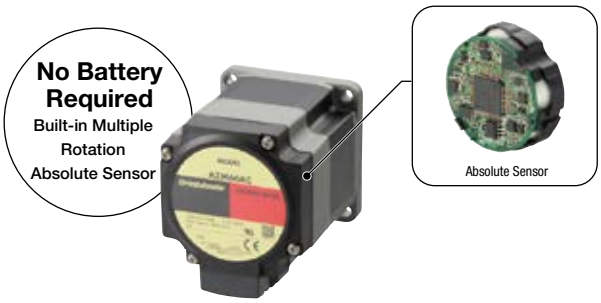
**See Full Product Details Online**
**www.orientalmotor.com**

● Manual ● Specifications ● Dimensions
● CAD ● Characteristics ● Connection and Operation

## Features

### Advanced Technology at Affordable Prices

Oriental Motor has developed and patented a compact, low-cost, battery-free mechanical type absolute sensor.
The **AZ** Series can contribute to improved productivity and cost reductions, and is available at affordable prices.
● List Price starting from $873.00
[Total price of motors, drivers and cables (1 m (3.3 ft.))]

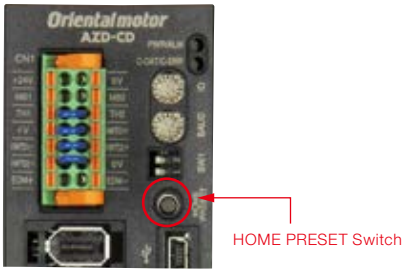



### Newly Developed Absolute Sensor

**●Mechanical-Type Sensor**
A mechanical sensor composed of multiple gears is employed. Positioning information is detected by recognizing the angle of the individual gears. As a result, it does not require a battery.

**●Multiple-Rotation Absolute System**
Absolute position detection is possible with ±900 rotations (1800 rotations) of the motor shaft from the home position.

**●Home Setting Method**
The home position can be easily set by pressing a switch on the driver, which is saved by the absolute system. In addition, home setting is possible with the support software **MEXE02** or by using an external input signal.



## No External Sensors Required

With the use of the absolute system, external sensors such as the home sensor and the limit sensor are not needed.

### ●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

There is no concern about sensor malfunctions (when operating in environments filled with oil mist or filled with metal pieces due to metal processing), sensor failures or sensor wire disconnections.

### ●Improved Return-to-Home Accuracy

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

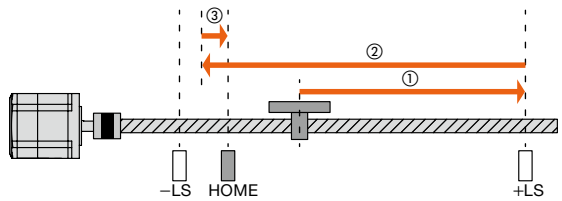
● If no limit sensor is installed, movements that exceed the limit values can be avoided through the use of the limits in the driver software.

## Shortened Reset Time ① High Speed Return-to-Home

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

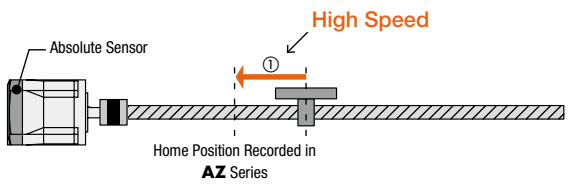
### Previous Home Detection for Control Motor

The home position is detected at low speed by detecting the limit sensor (±LS) and home sensor (HOME).




### Return-to-Home Operation of **AZ** Series

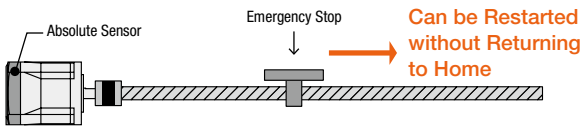
There is no need to detect the limit sensor, and it can travel directly at high speed to the home position recorded by the Absolute Sensor.




## Shortened Reset Time ② Return-to-Home is Not Necessary

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 performing a return-to-home operation when recovering from an emergency stop of the production line or a blackout.

### Built-in Controller Type



## No Battery Required

No battery is required thanks to a mechanical-type sensor.
Because positioning information is managed mechanically by the Absolute 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 is no battery that needs replacement, 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 Absolute Sensor does not require a battery, so there is no limit to how long the positioning information is maintained. In addition, there is 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 Absolute Sensor.

●Because the positioning information is stored in the Absolute Sensor, the home position must be reset if the motor is replaced.

## High Reliability

High reliability is provided by using a Hybrid control method unique to Oriental Motor that combines the merits of both open loop control and closed loop control.

### ●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 response. In an overload condition, it switches immediately to closed loop control to correct the position.

### ●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, positioning is still possible without gain tuning even when the load fluctuates due to the use of a belt mechanism, cam or chain drive, etc.

### ●Holding the Stop Position

During positioning, the motor stops with its own holding force without hunting. Because of this, it is ideal for applications where the low rigidity of the mechanism requires absence of vibration upon stopping.

### ●Smooth Operation Even at Low Speed

Thanks to the standard microstep drive and smooth drive function*, vibration is reduced even at low speed and the motor can move objects smoothly.

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

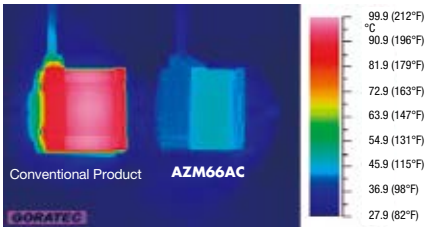
## Energy Savings

Heat generation is reduced thanks to the high efficiency motor, resulting in energy savings.

### Lower Heat Generation

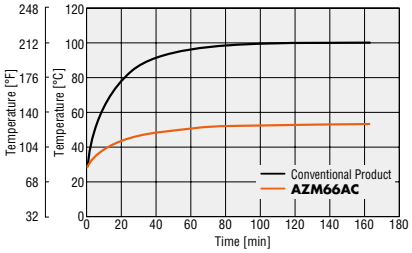
Heat generation by the motor has been significantly reduced through higher efficiency.

● Temperature Distribution by Thermography



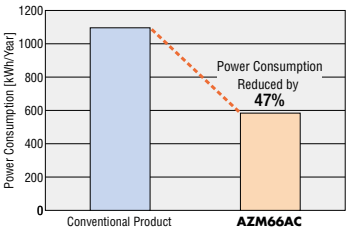

Comparison under the same conditions.

● Motor Surface Temperature during Operation Under the Same Conditions




### 47% Less Power Consumption* than Conventional Oriental Motor Products Due to Energy-Saving Features

● Power Consumption




*Operating Condition
- Speed: 1000 r/min, load factor: 50%
- Operating Time: 24 hours of operation, 365 days/year (70% operating, 25% stand-by, 5% off)
- Power Supply Voltage: Single-Phase 200-240 VAC

## 3 Driver Types Available Depending on the System Configuration

3 Types of **AZ** Series drivers are available, depending on the master control system in use.

### Built-in Controller Type FLEX

With this type, the operating data is set in the driver, and is then selected and executed from the host system. Host system connection and control are performed with I/O, Modbus (RTU)/RS-485 or FA network. By using a network converter (sold separately), EtherCAT, CC-link or MECHATROLINK communication is possible.

**Basic Setting** (Factory Setting)

Motor or Actuator Equipped with **AZ** Series

Driver

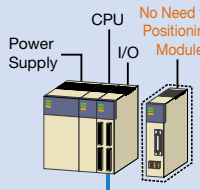
**Setting Operating Data and Changing Parameters**

Support Software **MEXE02**

●Setting using RS-485 communication is also possible.

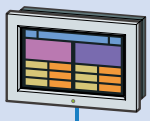
FLEX is the collective name for products that support I/O control, Modbus (RTU) control, and FA network control via network converters.

● When Controlling with I/O



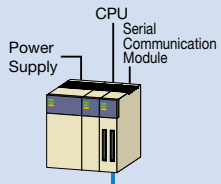

I/O

● When Controlling from Computer or Touch Screen (HMI)



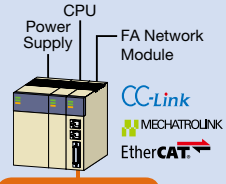
Modbus (RTU)

● When Controlling with Serial Communication




Modbus (RTU)

● When Controlling with FA Network



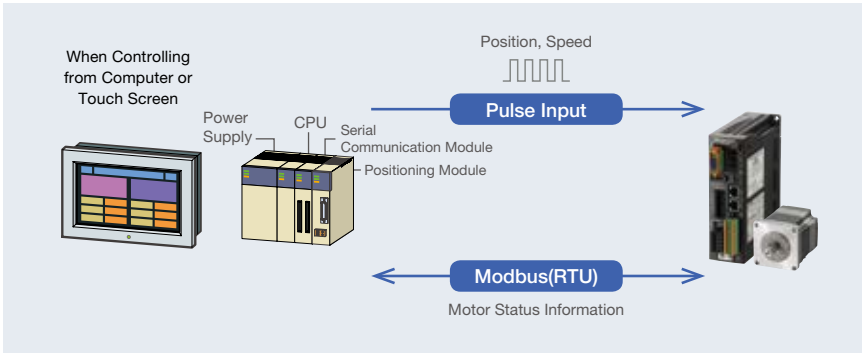

FA Network


RS-485

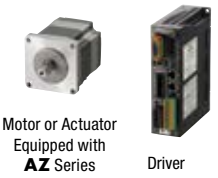
Because the driver has the information necessary for motor operation, the burden on the host PLC is reduced. The system configuration when using multi-axis control has been simplified.
Setting can be done by support software or RS-485 communication.

## ●Pulse Input Type with RS-485 Communication

This type executes operations by inputting pulses into the driver. Control the motor using a positioning module (pulse generator) that you have obtained yourself. Motor status information (position, speed, torque, alarm, temperature, etc.) can be checked by using RS-485 communication.




**Basic Setting (Factory setting)**



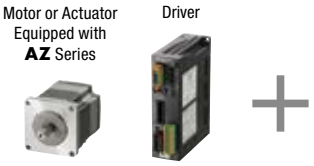

**I/O Assignment Changing Parameter Changing**
Support Software (**MEXE02**)

The support software (**MEXE02**) can be used to check the alarm history and monitor status information.

## ●Pulse Input Type

This type executes operations by inputting pulses into the driver. It controls the motor using a positioning module (pulse generator).

**Basic Setting (Factory Setting)**

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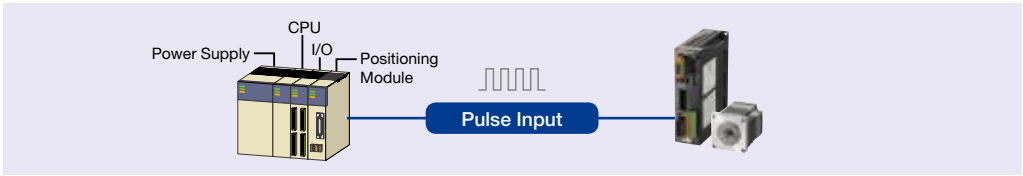



●The support software **MEXE02** can be downloaded from the Oriental Motor website.

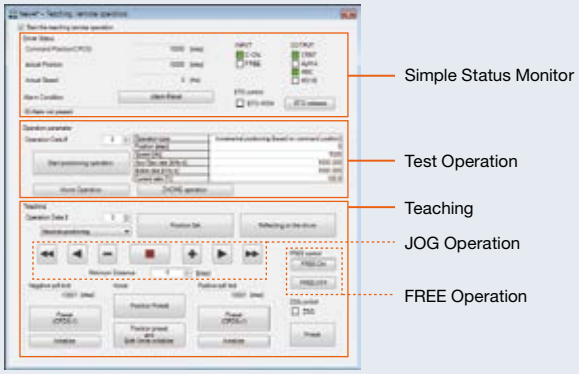
# Easy Operation through the Use of the Support Software **MEXE02**

## ●Test Function

This function enables you to operate a motor alone or check the connection to the host system.
Using this function when starting up the equipment can reduce the overall startup time.

### ◇Teaching and Remote Operation On startup

Support software can be used to easily perform the home setting and also drive the motor. Teaching, test operations, and more can be performed before connecting to the host system, contributing to shorter equipment startup time.



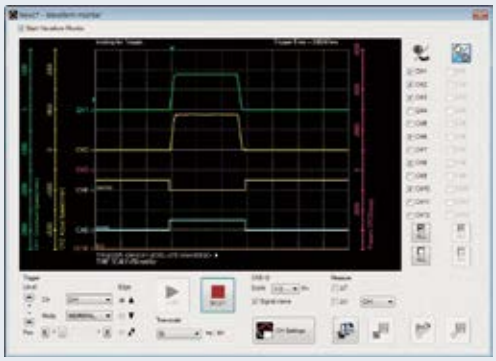

### ◇I/O Test On startup For operation

Monitoring input signals and forced output of output signals can be performed. These are convenient functions for confirming wiring with the host system and network I/O operation.

## Various Monitoring Functions

### ◇Waveform Monitoring On startup

The operating status of the motor and output signals can be checked by an oscilloscope-like image. This can be used for equipment start-up and adjustment.

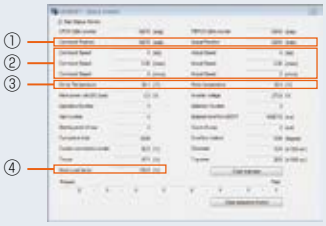


### ◇Alarm Monitoring On startup

When an abnormality occurs, the details of the abnormality, the operating status at the time of the occurrence, and the solution can be checked.

### ◇Status Monitoring On startup

Speed, motor, driver temperature, and load factor during operations, the integrating rotation amount, etc. can be monitored from the start of use. The signal for each item can be output at your discretion, which leads to efficient maintenance.




①Detects the actual position in comparison to the command position.
②Detects the actual speed in comparison to the command speed.
③Detects the temperature of the motor encoder section and inside the driver.
④With the output torque of the motor speed at 100%, the current load factor can be displayed.

### ◇Multi-Monitoring Compatible

Multiple setting screens, such as the data setting, test operation, and monitor screens, can be simultaneously opened and used. This enables smooth equipment startup, adjustment, and more.



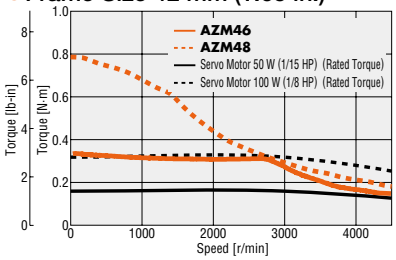
## Reference Output Power of Stepper Motors

The following indicates the output power [W(HP)] as "rated output power" when a servo motor is running at the "rated speed". While high positioning accuracy and high torque at medium to low speeds are features of the stepper motor, because it does not have a "rated speed", there is no "rated output power" noted. The following table lists the wattage of the servo motor rated torque which is equivalent to the **AZ** Series standard type motor torque for reference.

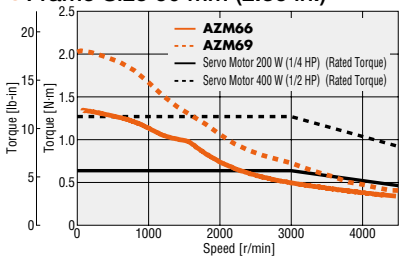
| **AZ** Series (Standard Type) | | | Servo Motor with Rated Torque or Equivalent (Reference) |
|---|---|---|---|
| Frame Size | Product Name | List Price* | |
| 42 mm (1.65 in.) | **AZM46** | $873.00 ~ | 50-100 W (1/15-1/8 HP) Rated Torque or Equivalent |
| | **AZM48** | $891.00~ | |
| 60 mm (2.36 in.) | **AZM66** | $928.00~ | 100-200 W (1/8-1/4 HP) Rated Torque or Equivalent |
| | **AZM69** | $933.00~ | 200-400 W (1/4-1/2 HP) Rated Torque or Equivalent |
| 85 mm (3.35 in.) | **AZM98** | $956.00~ | 400-750 W (1/2-1 HP) Rated Torque or Equivalent |
| | **AZM911** | $978.00~ | |

*Each price shows an example of the total price of a motor, a driver, and a 1 m (3.3 ft.) connection cable.

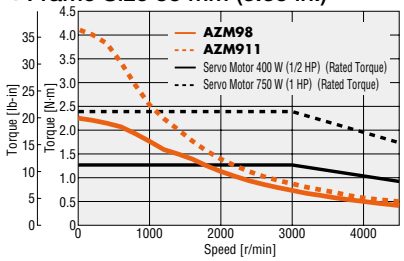
### Frame Size 42 mm (1.65 in.)




### Frame Size 60 mm (2.36 in.)




### Frame Size 85 mm (3.35 in.)




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.

# Product Line of Motors

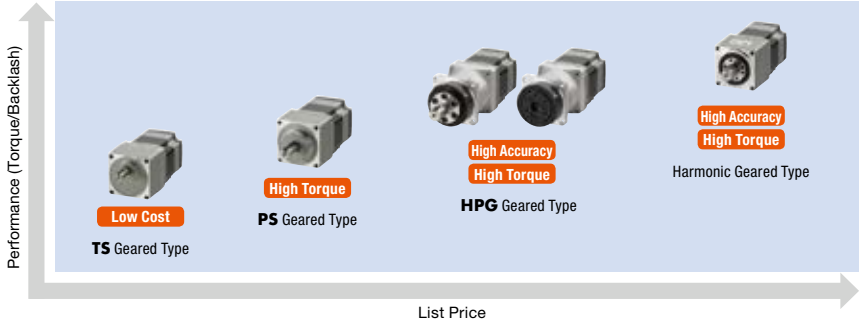
## Types and Features of Standard and Geared Motors

| | Type | | Features | Permissible Torque and Max. Instantaneous Torque [N·m (lb-in)] | Backlash [arcmin] | Basic Resolution [deg/step] | Output Shaft Speed [r/min] |
|---|---|---|---|---|---|---|---|
| | **Standard Type** |  | · Basic motor of the **AZ** Series | Maximum Holding Torque<br>4 (35) | —— | 0.36 | 4500 |
| Low backlash | **TS** Geared Type<br>(Spur Gear Mechanism) |  | · A wide variety of low gear ratios for high-speed operation<br>· Gear ratio:<br>3.6, 7.2, 10, 20, 30 | Permissible Torque / Max. Instantaneous Torque<br>25 (220) 45 (390) | 10 (0.17°) | 0.012 | 833 |
| Low backlash | **PS** Geared Type<br>(Planetary Gear Mechanism) |  | · High permissible/ max. instantaneous torque<br>· A wide variety of gear ratios for selecting the desired step angle<br>· Center shaft<br>· Gear ratio:<br>5, 7.2, 10, 25, 36, 50 | Permissible Torque \ Max. Instantaneous Torque<br>37 (320) 60 (530) | 7 (0.12°) | 0.0072 | 600 |
| Non-backlash | **HPG** Geared Type<br>(Harmonic Planetary)<br>HarmonicDrive SYSTEMS |  | · High positioning accuracy<br>· High permissible/ max. instantaneous torque<br>· Center shaft<br>· Gear ratio:<br>5, 9, 15 | Permissible Torque \ Max. Instantaneous Torque<br>24 (210) 33 (290) | 3 (0.05°) | 0.024 | 900 |
| Non-backlash | **Harmonic Geared Type**<br>(Harmonic Drive)<br>HarmonicDrive SYSTEMS |  | · High positioning accuracy<br>· High permissible/ max. instantaneous torque<br>· High gear ratio, high resolution<br>· Center shaft<br>· Gear ratio:<br>50, 100 | Permissible Torque \ Max. Instantaneous Torque<br>52 (460) 107 (940) | 0 | 0.0036 | 70 |

Note

- Please use the above values as reference to see the differences between each type. These values vary depending on the motor frame size and gear ratio.
- Harmonic Planetary, Harmonic Drive and HarmonicDrive SYSTEMS are registered trademarks of Harmonic Drive Systems Inc.

Oriental Motor offers pre-assembled geared motors.
Based on torque, accuracy (backlash) and list price, the optimal type can be selected from the various geared motors.



## Driver and Motor Product Line

| Motor | | | | | | |
|---|---|---|---|---|---|---|
| Type | Electromagnetic Brake | Frame Size | | | | |
| | | 20 mm (0.79 in.) | 28 mm (1.10 in.) | 42 mm ✻1 (1.65 in.) | 60 mm (2.36 in.) | 85 mm (3.35 in.) 90 mm (3.54 in.) ✻3 |
| Standard Type | Not Equipped | — | — | ● | ● | ● |
| | Equipped | — | — | ● ✻2 | ● | ● ✻4 |
| **TS** Geared Type | Not Equipped | — | — | ● | ● | ● |
| | Equipped | — | — | ● | ● | ● |
| **PS** Geared Type | Not Equipped | — | — | ● | ● | ● |
| | Equipped | — | — | ● | ● | ● |
| **HPG** Geared Type | Not Equipped | — | — | ● | ● | ● |
| | Equipped | — | — | ● | ● | ● |
| Harmonic Geared Type | Not Equipped | — | — | ● | ● | ● |
| | Equipped | — | — | ● | ● | ● |

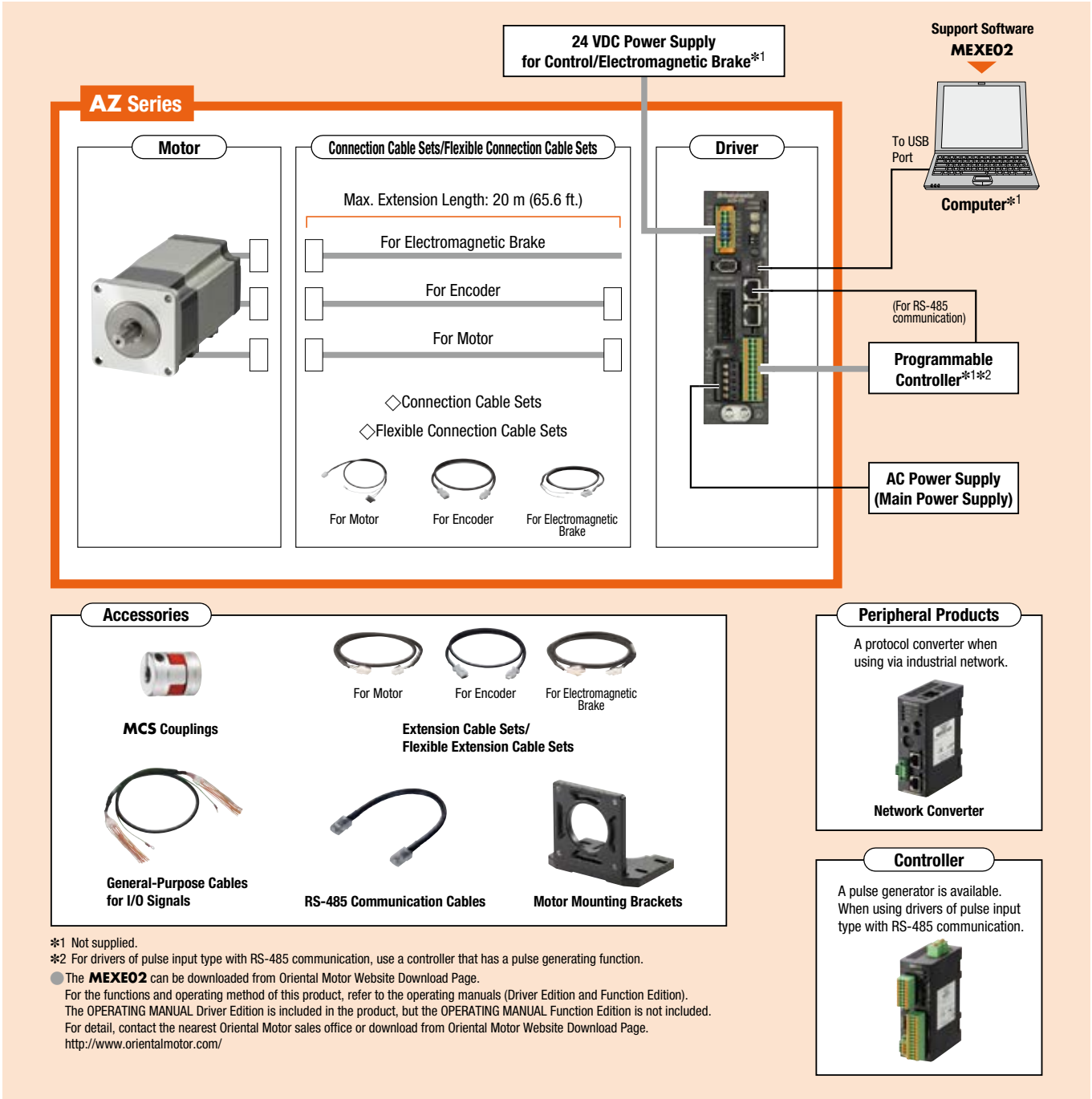
✻1 **HPG** Geared Type is 40 mm (1.57 in.) ✻2 **AZM46** only ✻3 Geared type ✻4 **AZM98** only

| Driver | | |
|---|---|---|
| Power Supply Input | Type | |
| Single-Phase 100-120 VAC<br>Single-Phase/Three-Phase 200-240 VAC | Built-in Controller Type |  FLEX |
| | Pulse Input Type with RS-485 Communication |  |
| | Pulse Input Type |  |

# System Configuration

## ●Combination of Standard Type Motor with an Electromagnetic Brake and Built-in Controller Type Driver or the Pulse Input Type Driver with RS-485 Communication

A configuration example of I/O control with a built-in Controller type driver or using RS-485 communication is shown below.
Motors, drivers, and a connection cable set/flexible connection cable set need to be ordered separately.




*1 Not supplied.
*2 For drivers of pulse input type with RS-485 communication, use a controller that has a pulse generating function.

● The **MEXE02** can be downloaded from Oriental Motor Website Download Page.
For the functions and operating method of this product, refer to the operating manuals (Driver Edition and Function Edition).
The OPERATING MANUAL Driver Edition is included in the product, but the OPERATING MANUAL Function Edition is not included.
For detail, contact the nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.
http://www.orientalmotor.com/

### ●Example of System Configuration Pricing

| AZ Series | | | | Accessories | | |
|---|---|---|---|---|---|---|
| Motor | Driver | Connection Cable Set | + | Motor Mounting Bracket | Flexible Coupling | General-Purpose Cables for I/O Signals 1 m (3.3 ft.) |
| AZM66MC | AZD-CD | CC030VZFB | | PAL2P-5 | MCS201010 | CC16D010B-1 |
| $565.00 | $588.00 | $82.00 | | $17.00 | $50.00 | $25.00 |

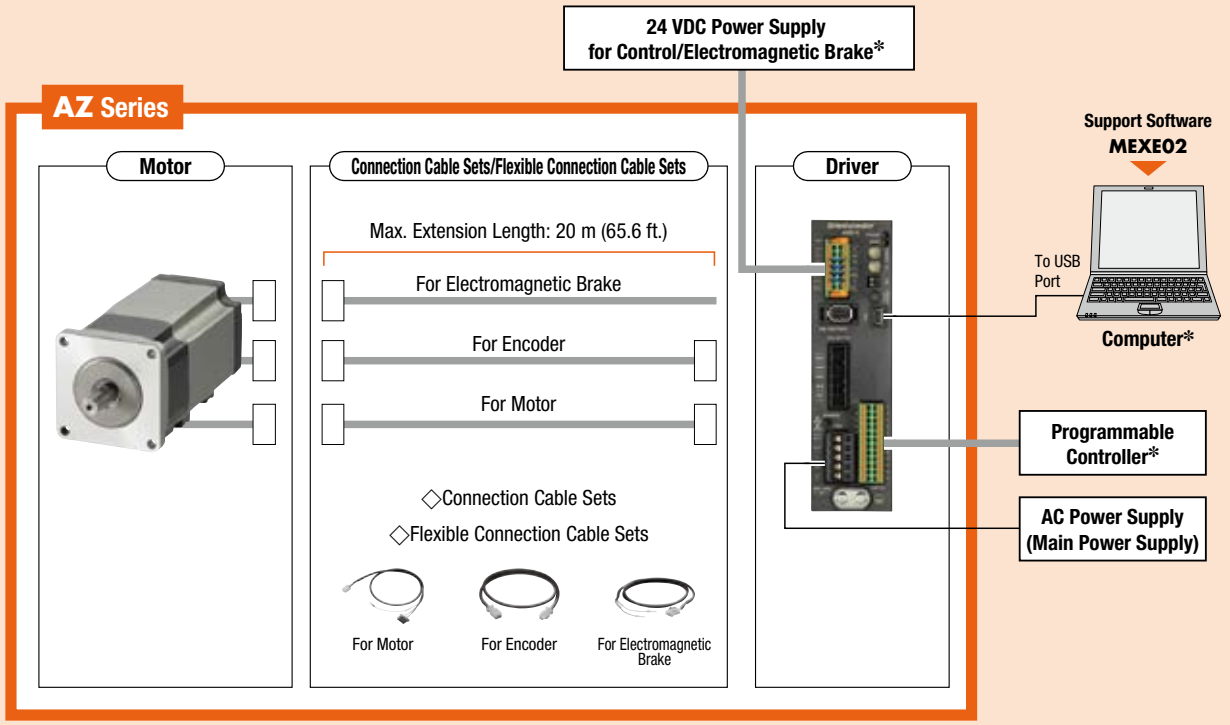
● The system configuration shown above is an example. Other combinations are also available.

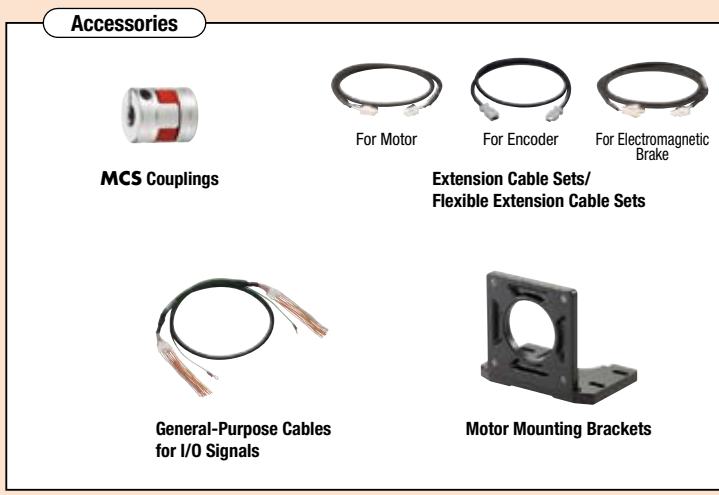
Note

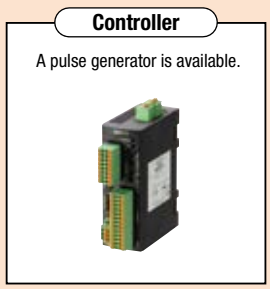
● The motor cable and electromagnetic brake cable from the motor cannot be connected directly to the driver. When connecting to a driver, use a connection cable.

## ●Combination of Standard Type Motor with an Electromagnetic Brake and Pulse Input Type Driver

An example of a single-axis system configuration with the programmable controller (equipped with the pulse oscillation function) is shown below. Motors, drivers, and a connection cable set/flexible connection cable set need to be ordered separately.




* Not supplied.

● The **MEXE02** can be downloaded from Oriental Motor Website Download Page.
For the functions and operating method of this product, refer to the operating manuals (Driver Edition and Function Edition).
The OPERATING MANUAL Driver Edition is included in the product, but the OPERATING MANUAL Function Edition is not included.
For detail, contact the nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.
http://www.orientalmotor.com/

## ●Example of System Configuration Pricing

| AZ Series | | | | Controller | Accessories | | |
|---|---|---|---|---|---|---|---|
| Motor | Driver | Connection Cable Set | + | | Motor Mounting Bracket | Flexible Coupling | General-Purpose Cables for I/O Signals 1 m (3.3 ft.) |
| AZM66MC | AZD-C | CC030VZFB | | SCX11 | PAL2P-5 | MCS201010 | CC16D010B-1 |
| $565.00 | $531.00 | $82.00 | | $349.00 | $17.00 | $50.00 | $25.00 |

● 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

## Motor

◇Standard Type

**AZM 6 6 A C**

① ② ③ ④ ⑤

◇**TS**, **PS**, **HPG**, Harmonic Geared Type

**AZM 6 6 A C - HP 15 F**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

| | | |
|---|---|---|
| ① | Series Name | **AZM**: **AZ** Series Motor |
| ② | Motor Frame Size | **4**: 42 mm (1.65 in.) [**HPG** Geared Type is 40 mm (1.57 in.)]<br>**6**: 60 mm (2.36 in.)<br>**9**: 85 mm (3.35 in.)[Geared type is 90 mm (3.54 in.)] |
| ③ | Motor Case Length | |
| ④ | Motor Shaft Features | **A**: Single Shaft **M**: with Electromagnetic Brake |
| ⑤ | Motor Power Supply Input | **C**: AC Power Supply Input Type |
| ⑥ | Geared Type | **TS**: **TS** Geared Type<br>**PS**: **PS** Geared Type<br>**HP**: **HPG** Geared Type<br>**HS**: Harmonic Geared Type |
| ⑦ | Gear Ratio | |
| ⑧ | Output Shaft Type | **HPG** Geared Type<br>Blank: Shaft Output **F**: Flange Output |

## Driver

**AZD - C D**

① ② ③

| | | |
|---|---|---|
| ① | Driver Type | **AZD**: **AZ** Series Driver |
| ② | Power Supply Input | **A**: Single-Phase 100-120 VAC<br>**C**: Single-Phase/Three-Phase 200-240 VAC |
| ③ | Type | **D**: Built-in Controller Type<br>**X**: Pulse Input Type with RS-485 Communication<br>Blank: Pulse Input Type |

## Connection Cable Sets/Flexible Connection Cable Sets

**CC 050 V Z F B**

① ② ③ ④ ⑤ ⑥

| | | |
|---|---|---|
| ① | | **CC**: Cable |
| ② | Length | **010**: 1 m (3.3 ft.) **020**: 2 m (6.6 ft.) **030**: 3 m (9.8 ft.)<br>**050**: 5 m (16.4 ft.) **070**: 7 m (23.0 ft.) **100**: 10 m (32.8 ft.)<br>**150**: 15 m (49.2 ft.) **200**: 20 m (65.6 ft.) |
| ③ | Reference Number | |
| ④ | Applicable Model | **Z**: **AZ** Series |
| ⑤ | Cable Type | **F**: Connection Cable Set<br>**R**: Flexible Connection Cable Set |
| ⑥ | Electromagnetic Brake | Blank: without Electromagnetic Brake<br>**B**: with Electromagnetic Brake |

## Product Line

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

### ●Motor

#### ◇Standard Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46AC** | $307.00 |
| | **AZM48AC** | $325.00 |
| 60 mm (2.36 in.) | **AZM66AC** | $362.00 |
| | **AZM69AC** | $367.00 |
| 85 mm (3.35 in.) | **AZM98AC** | $390.00 |
| | **AZM911AC** | $412.00 |

#### ◇Standard Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46MC** | $466.00 |
| 60 mm (2.36 in.) | **AZM66MC** | $565.00 |
| | **AZM69MC** | $571.00 |
| 85 mm (3.35 in.) | **AZM98MC** | $616.00 |

#### ◇**TS** Geared Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46AC-TS3.6** | $441.00 |
| | **AZM46AC-TS7.2** | $441.00 |
| | **AZM46AC-TS10** | $457.00 |
| | **AZM46AC-TS20** | $457.00 |
| | **AZM46AC-TS30** | $457.00 |
| 60 mm (2.36 in.) | **AZM66AC-TS3.6** | $519.00 |
| | **AZM66AC-TS7.2** | $519.00 |
| | **AZM66AC-TS10** | $534.00 |
| | **AZM66AC-TS20** | $534.00 |
| | **AZM66AC-TS30** | $534.00 |
| 90 mm (3.54 in.) | **AZM98AC-TS3.6** | $573.00 |
| | **AZM98AC-TS7.2** | $573.00 |
| | **AZM98AC-TS10** | $589.00 |
| | **AZM98AC-TS20** | $589.00 |
| | **AZM98AC-TS30** | $589.00 |

#### ◇**TS** Geared Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46MC-TS3.6** | $599.00 |
| | **AZM46MC-TS7.2** | $599.00 |
| | **AZM46MC-TS10** | $615.00 |
| | **AZM46MC-TS20** | $615.00 |
| | **AZM46MC-TS30** | $615.00 |
| 60 mm (2.36 in.) | **AZM66MC-TS3.6** | $722.00 |
| | **AZM66MC-TS7.2** | $722.00 |
| | **AZM66MC-TS10** | $738.00 |
| | **AZM66MC-TS20** | $738.00 |
| | **AZM66MC-TS30** | $738.00 |
| 90 mm (3.54 in.) | **AZM98MC-TS3.6** | $799.00 |
| | **AZM98MC-TS7.2** | $799.00 |
| | **AZM98MC-TS10** | $815.00 |
| | **AZM98MC-TS20** | $815.00 |
| | **AZM98MC-TS30** | $815.00 |

#### ◇**PS** Geared Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46AC-PS5** | $567.00 |
| | **AZM46AC-PS7.2** | $567.00 |
| | **AZM46AC-PS10** | $567.00 |
| | **AZM46AC-PS25** | $624.00 |
| | **AZM46AC-PS36** | $624.00 |
| | **AZM46AC-PS50** | $624.00 |
| 60 mm (2.36 in.) | **AZM66AC-PS5** | $678.00 |
| | **AZM66AC-PS7.2** | $678.00 |
| | **AZM66AC-PS10** | $678.00 |
| | **AZM66AC-PS25** | $757.00 |
| | **AZM66AC-PS36** | $757.00 |
| | **AZM66AC-PS50** | $757.00 |
| 90 mm (3.54 in.) | **AZM98AC-PS5** | $785.00 |
| | **AZM98AC-PS7.2** | $785.00 |
| | **AZM98AC-PS10** | $785.00 |
| | **AZM98AC-PS25** | $921.00 |
| | **AZM98AC-PS36** | $921.00 |
| | **AZM98AC-PS50** | $921.00 |

#### ◇**PS** Geared Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46MC-PS5** | $725.00 |
| | **AZM46MC-PS7.2** | $725.00 |
| | **AZM46MC-PS10** | $725.00 |
| | **AZM46MC-PS25** | $782.00 |
| | **AZM46MC-PS36** | $782.00 |
| | **AZM46MC-PS50** | $782.00 |
| 60 mm (2.36 in.) | **AZM66MC-PS5** | $881.00 |
| | **AZM66MC-PS7.2** | $881.00 |
| | **AZM66MC-PS10** | $881.00 |
| | **AZM66MC-PS25** | $961.00 |
| | **AZM66MC-PS36** | $961.00 |
| | **AZM66MC-PS50** | $961.00 |
| 90 mm (3.54 in.) | **AZM98MC-PS5** | $1,011.00 |
| | **AZM98MC-PS7.2** | $1,011.00 |
| | **AZM98MC-PS10** | $1,011.00 |
| | **AZM98MC-PS25** | $1,147.00 |
| | **AZM98MC-PS36** | $1,147.00 |
| | **AZM98MC-PS50** | $1,147.00 |

### ◇HPG Geared Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 40 mm (1.57 in.) | **AZM46AC-HP5** | $669.00 |
| | **AZM46AC-HP5F** | $658.00 |
| | **AZM46AC-HP9** | $669.00 |
| | **AZM46AC-HP9F** | $658.00 |
| 60 mm (2.36 in.) | **AZM66AC-HP5** | $904.00 |
| | **AZM66AC-HP5F** | $887.00 |
| | **AZM66AC-HP15** | $1,070.00 |
| | **AZM66AC-HP15F** | $1,053.00 |
| 90 mm (3.54 in.) | **AZM98AC-HP5** | $1,139.00 |
| | **AZM98AC-HP5F** | $1,116.00 |
| | **AZM98AC-HP15** | $1,264.00 |
| | **AZM98AC-HP15F** | $1,242.00 |

### ◇HPG Geared Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 40 mm (1.57 in.) | **AZM46MC-HP5** | $827.00 |
| | **AZM46MC-HP5F** | $816.00 |
| | **AZM46MC-HP9** | $827.00 |
| | **AZM46MC-HP9F** | $816.00 |
| 60 mm (2.36 in.) | **AZM66MC-HP5** | $1,107.00 |
| | **AZM66MC-HP5F** | $1,090.00 |
| | **AZM66MC-HP15** | $1,274.00 |
| | **AZM66MC-HP15F** | $1,257.00 |
| 90 mm (3.54 in.) | **AZM98MC-HP5** | $1,365.00 |
| | **AZM98MC-HP5F** | $1,342.00 |
| | **AZM98MC-HP15** | $1,490.00 |
| | **AZM98MC-HP15F** | $1,468.00 |

### ◇Harmonic Geared Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46AC-HS50** | $901.00 |
| | **AZM46AC-HS100** | $901.00 |
| 60 mm (2.36 in.) | **AZM66AC-HS50** | $1,215.00 |
| | **AZM66AC-HS100** | $1,215.00 |
| 90 mm (3.54 in.) | **AZM98AC-HS50** | $1,458.00 |
| | **AZM98AC-HS100** | $1,458.00 |

### ◇Harmonic Geared Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46MC-HS50** | $1,059.00 |
| | **AZM46MC-HS100** | $1,059.00 |
| 60 mm (2.36 in.) | **AZM66MC-HS50** | $1,418.00 |
| | **AZM66MC-HS100** | $1,418.00 |
| 90 mm (3.54 in.) | **AZM98MC-HS50** | $1,684.00 |
| | **AZM98MC-HS100** | $1,684.00 |

## ●Driver

### ◇Built-in Controller Type

| Power Supply Input | Product Name | List Price |
|---|---|---|
| Single-Phase 100-120 VAC | **AZD-AD** | $588.00 |
| Single-Phase/Three-Phase 200-240 VAC | **AZD-CD** | $588.00 |

### ◇Pulse Input Type

| Power Supply Input | Product Name | List Price |
|---|---|---|
| Single-Phase 100-120 VAC | **AZD-A** | $531.00 |
| Single-Phase/Three-Phase 200-240 VAC | **AZD-C** | $531.00 |

### ◇Pulse Input Type with RS-485 Communication

| Power Supply Input | Product Name | List Price |
|---|---|---|
| Single-Phase 100-120 VAC | **AZD-AX** | $588.00 |
| Single-Phase/Three-Phase 200-240 VAC | **AZD-CX** | $588.00 |

## Connection Cable Sets/Flexible Connection Cable Sets

Use a flexible connection cable set if the cable will be bent. We also offer extension cables and flexible extension cables that can be added to a connection cable.

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.

### ◇For Motor/Encoder


For Motor


For Encoder

| Product Line | Length m (ft.) | Product Name | List Price |
|---|---|---|---|
| Connection Cable Sets | 1 (3.3) | **CC010VZF** | $35.00 |
| | 2 (6.6) | **CC020VZF** | $50.00 |
| | 3 (9.8) | **CC030VZF** | $62.00 |
| | 5 (16.4) | **CC050VZF** | $110.00 |
| | 7 (23.0) | **CC070VZF** | $136.00 |
| | 10 (32.8) | **CC100VZF** | $176.00 |
| | 15 (49.2) | **CC150VZF** | $243.00 |
| | 20 (65.6) | **CC200VZF** | $310.00 |
| Flexible Connection Cable Sets | 1 (3.3) | **CC010VZR** | $84.00 |
| | 2 (6.6) | **CC020VZR** | $99.00 |
| | 3 (9.8) | **CC030VZR** | $111.00 |
| | 5 (16.4) | **CC050VZR** | $141.00 |
| | 7 (23.0) | **CC070VZR** | $180.00 |
| | 10 (32.8) | **CC100VZR** | $236.00 |
| | 15 (49.2) | **CC150VZR** | $332.00 |
| | 20 (65.6) | **CC200VZR** | $426.00 |

### ◇For Motor/Encoder/ Electromagnetic Brake


For Motor


For Encoder


For Electromagnetic Brake

| Product Line | Length L m (ft.) | Product Name | List Price |
|---|---|---|---|
| Connection Cable Sets | 1 (3.3) | **CC010VZFB** | $52.00 |
| | 2 (6.6) | **CC020VZFB** | $67.00 |
| | 3 (9.8) | **CC030VZFB** | $82.00 |
| | 5 (16.4) | **CC050VZFB** | $135.00 |
| | 7 (23.0) | **CC070VZFB** | $166.00 |
| | 10 (32.8) | **CC100VZFB** | $213.00 |
| | 15 (49.2) | **CC150VZFB** | $293.00 |
| | 20 (65.6) | **CC200VZFB** | $372.00 |
| Flexible Connection Cable Sets | 1 (3.3) | **CC010VZRB** | $114.00 |
| | 2 (6.6) | **CC020VZRB** | $134.00 |
| | 3 (9.8) | **CC030VZRB** | $151.00 |
| | 5 (16.4) | **CC050VZRB** | $191.00 |
| | 7 (23.0) | **CC070VZRB** | $240.00 |
| | 10 (32.8) | **CC100VZRB** | $311.00 |
| | 15 (49.2) | **CC150VZRB** | $432.00 |
| | 20 (65.6) | **CC200VZRB** | $551.00 |

# Included

## Motor

| Type \ Included | | Parallel Key | Motor Mounting Screw | Operating Manual |
|---|---|---|---|---|
| Standard | | – | – | 1 Copy |
| **TS** Geared | Frame Size 42 mm (1.65 in.) | – | – | |
| | Frame Size 60 mm (2.36 in.) | 1 pc. | M4×60 P0.7 (4 Screws) | |
| | Frame Size 90 mm (3.54 in.) | 1 pc. | M8×90 P1.25 (4 Screws) | |
| **PS** Geared | | 1 pc. | – | |
| **HPG** Geared | Shaft Output | 1 pc. | – | |
| | Flange Output | – | – | |
| Harmonic Geared | | 1 pc. | – | |

● For product functions and operating methods, refer to the operating manual (for functions). The operating manual for functions is not included with the product. Please contact the nearest Oriental Motor sales office, or download it from the Oriental Motor website.

## Driver

| Type \ Included | Connector | Operating Manual |
|---|---|---|
| Common to All types | • CN4 Connector (1 pc.)<br>• CN1 Connector (1 pc.)<br>• CN5 Connector (1 pc.)<br>• Connector wiring Lever (1 pc.) | 1 Copy |

## Connection Cable Sets/Flexible Connection Cable Sets

| Type \ Included | Operating Manual |
|---|---|
| Connection Cable Set | – |
| Flexible Connection Cable Set | 1 Copy |

# Standard Type Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.), 85 mm (3.35 in.)



## Specifications

| | | | AZM46AC | AZM48AC | AZM66AC | AZM69AC | AZM98AC | AZM911AC |
|---|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46MC | – | AZM66MC | AZM69MC | AZM98MC | – |
| Driver Product Name | Built-in Controller Type | | AZD-AD(Single-Phase 100-120 VAC), AZD-CD(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-AX(Single-Phase 100-120 VAC), AZD-CX(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type | | AZD-A(Single-Phase 100-120 VAC), AZD-C(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| Maximum Holding Torque | | N·m (oz-in) | 0.3 (42) | 0.77 (109) | 1.2 (170) | 2 (280) | 2 (280) | 4 (560) |
| Holding Torque at Motor Standstill | Power On | N·m (oz-in) | 0.15 (21) | 0.38 (53) | 0.6 (85) | 1 (142) | 1 (142) | 2 (280) |
| | with Electromagnetic Brake | N·m (oz-in) | 0.15 (21) | – | 0.6 (85) | 1 (142) | 1 (142) | – |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | $55\times10^{-7}$ (0.30) [$71\times10^{-7}$ (0.39)]*1 | $115\times10^{-7}$ (0.63) | $370\times10^{-7}$ (2) [$530\times10^{-7}$ (2.9)]*1 | $740\times10^{-7}$ (4) [$900\times10^{-7}$ (4.9)]*1 | $1090\times10^{-7}$ (6) [$1250\times10^{-7}$ (6.8)]*1 | $2200\times10^{-7}$ (12) |
| Resolution | | Resolution Setting: 1000 P/R | 0.36°/Pulse | | | | | |
| Power Supply Input | Voltage and Frequency | | Single-Phase 100-120 VAC, Single-Phase/Three-Phase 200-240 VAC −15 to +6% 50/60 Hz | | | | | |
| | Input Current A | Single-Phase 100-120 VAC | 2.7 | 2.7 | 3.8 | 5.4 | 5.5 | 6.4 |
| | | Single-Phase 200-240 VAC | 1.7 | 1.6 | 2.3 | 3.3 | 3.3 | 3.9 |
| | | Three-Phase 200-240 VAC | 1.0 | 1.0 | 1.4 | 2.0 | 2.0 | 2.3 |
| Control Power Supply | | | 24 VDC ±5%*2 0.25 A [0.33 A]*1 | 24 VDC ±5% 0.25 A | 24 VDC ±5%*2 0.25A [0.5 A]*1 | | | |

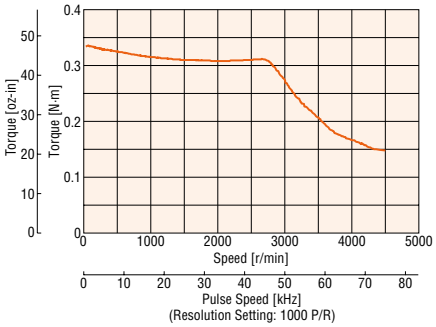
● For detailed information about standards, please see the Oriental Motor website.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

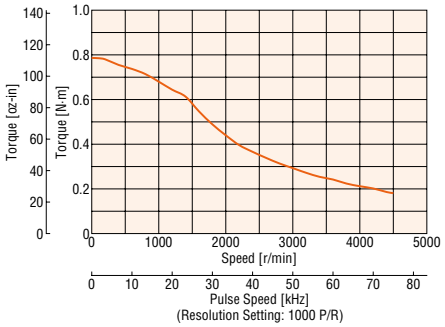
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

## Speed – Torque Characteristics (Reference Values)

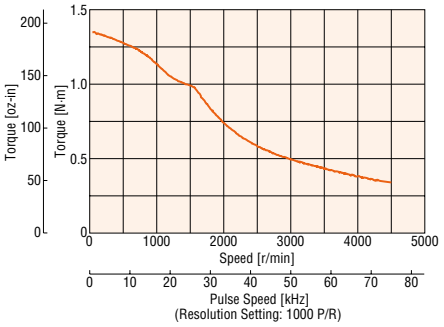
**AZM46**



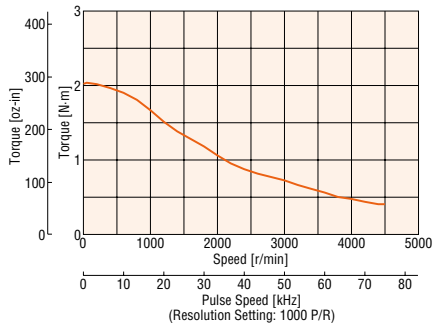

**AZM48**



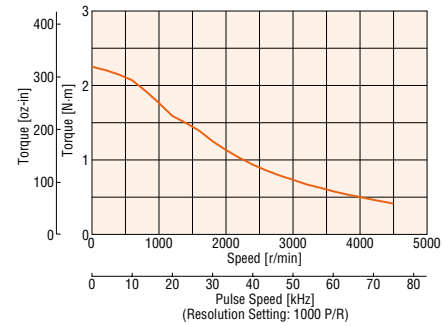

**AZM66**



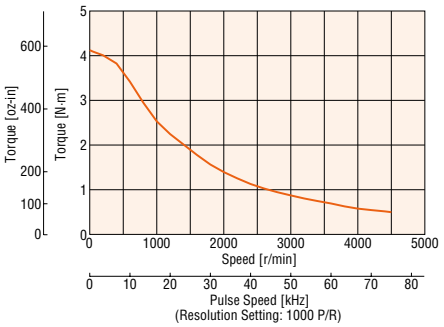

**AZM69**




**AZM98**




**AZM911**




**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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# TS Geared Type Frame Size 42 mm (1.65 in.)

## Specifications

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46AC-TS3.6 | AZM46AC-TS7.2 | AZM46AC-TS10 | AZM46AC-TS20 | AZM46AC-TS30 |
| | with Electromagnetic Brake | | AZM46MC-TS3.6 | AZM46MC-TS7.2 | AZM46MC-TS10 | AZM46MC-TS20 | AZM46MC-TS30 |
| Driver Product Name | Built-in Controller Type | | AZD-AD(Single-Phase 100-120 VAC), AZD-CD(Single-Phase/Three-Phase 200-240 VAC) | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-AX(Single-Phase 100-120 VAC), AZD-CX(Single-Phase/Three-Phase 200-240 VAC) | | | | |
| | Pulse Input Type | | AZD-A(Single-Phase 100-120 VAC), AZD-C(Single-Phase/Three-Phase 200-240 VAC) | | | | |
| Maximum Holding Torque | | N·m (oz-in) | 0.65 (92) | 1.2 (170) | 1.7 (240) | 2 (280) | 2.3 (320) |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | 55×10$^{-7}$ (0.30) [71×10$^{-7}$ (0.39)]*1 | | | | |
| Gear Ratio | | | 3.6 | 7.2 | 10 | 20 | 30 |
| Resolution | | Resolution Setting: 1000 P/R | 0.1°/Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.018°/Pulse | 0.012°/Pulse |
| Permissible Torque | | N·m (oz-in) | 0.65 (92) | 1.2 (170) | 1.7 (240) | 2 (280) | 2.3 (320) |
| Maximum Instantaneous Torque | | N·m (oz-in) | 0.85 (120) | 1.6 (220) | 2 (280) | 3 (420) | |
| Holding Torque at Motor Standstill | Power On | N·m (oz-in) | 0.54 (76) | 1 (142) | 1.5 (210) | 1.9 (260) | 2.2 (310) |
| | Electromagnetic Brake | N·m (oz-in) | 0.54 (76) | 1 (142) | 1.5 (210) | 1.9 (260) | 2.2 (310) |
| Speed Range | | r/min | 0 - 833 | 0 - 416 | 0 - 300 | 0 - 150 | 0 - 100 |
| Backlash | | arcmin | 45 (0.75°) | 25 (0.42°) | | 15 (0.25°) | |
| Power Supply Input | Voltage and Frequency | | Single-Phase 100-120 VAC, Single-Phase/Three-Phase 200-240 VAC −15 to +6% 50/60 Hz | | | | |
| | Input Current A | Single-Phase 100-120 VAC | 2.7 | | | | |
| | | Single-Phase 200-240 VAC | 1.7 | | | | |
| | | Three-Phase 200-240 VAC | 1.0 | | | | |
| Control Power Supply | | | 24 VDC ±5%*2 0.25 A [0.33 A]*1 | | | | |

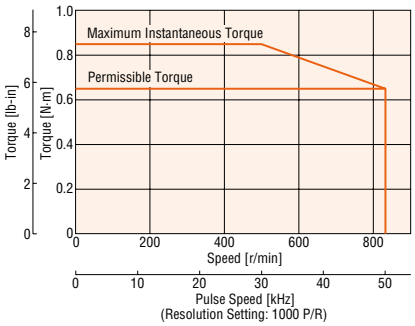
- For detailed information about standards, please see the Oriental Motor website.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

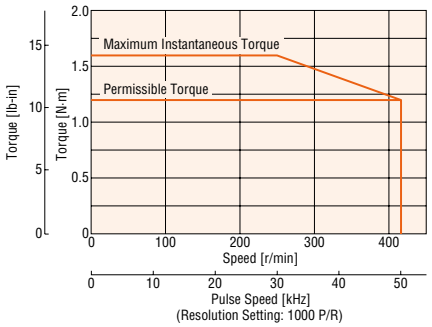
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

## Speed – Torque Characteristics (Reference Values)

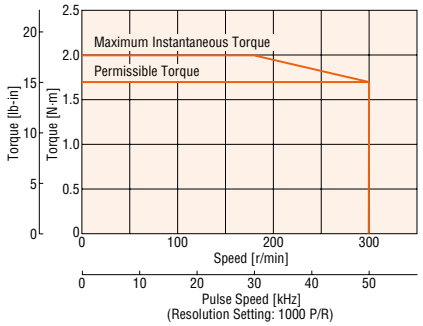
**AZM46** Gear Ratio **3.6**



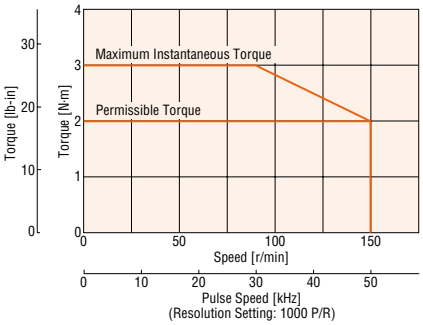

**AZM46** Gear Ratio **7.2**



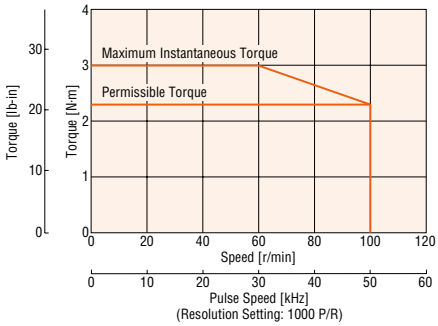

**AZM46** Gear Ratio **10**




**AZM46** Gear Ratio **20**




**AZM46** Gear Ratio **30**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80˚C (176°F) max. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75˚C (167°F) max., since the motor is recognized as heat-resistant class A.)

# TS Geared Type Frame Size 60 mm (2.36 in.)



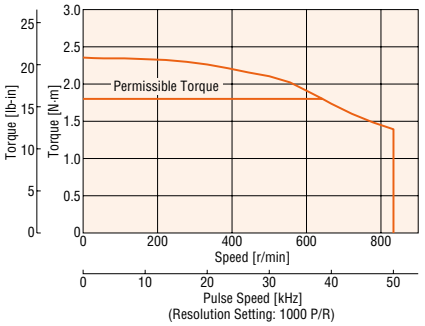
## Specifications

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM66AC-TS3.6 | AZM66AC-TS7.2 | AZM66AC-TS10 | AZM66AC-TS20 | AZM66AC-TS30 |
| | with Electromagnetic Brake | | AZM66MC-TS3.6 | AZM66MC-TS7.2 | AZM66MC-TS10 | AZM66MC-TS20 | AZM66MC-TS30 |
| Driver Product Name | Built-in Controller Type | | AZD-AD(Single-Phase 100-120 VAC), AZD-CD(Single-Phase/Three-Phase 200-240 VAC) | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-AX(Single-Phase 100-120 VAC), AZD-CX(Single-Phase/Three-Phase 200-240 VAC) | | | | |
| | Pulse Input Type | | AZD-A(Single-Phase 100-120 VAC), AZD-C(Single-Phase/Three-Phase 200-240 VAC) | | | | |
| Maximum Holding Torque | | N·m (lb-in) | 1.8 (15.9) | 3 (26) | 4 (35) | 5 (44) | 6 (53) |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | 370×10$^{-7}$ (2) [530×10$^{-7}$ (2.9)]*1 | | | | |
| Gear Ratio | | | 3.6 | 7.2 | 10 | 20 | 30 |
| Resolution | | Resolution Setting: 1000 P/R | 0.1° /Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.018°/Pulse | 0.012°/Pulse |
| Permissible Torque | | N·m (lb-in) | 1.8 (15.9) | 3 (26) | 4 (35) | 5 (44) | 6 (53) |
| Maximum Instantaneous Torque* | | N·m (lb-in) | * | 4.5 (39) | 6 (53) | 8 (70) | 10 (88) |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 1.3 (11.5) | 2.6 (23) | 3.7 (32) | 5 (44) | 6 (53) |
| | Electromagnetic Brake | N·m (lb-in) | 1.3 (11.5) | 2.6 (23) | 3.7 (32) | 5 (44) | 6 (53) |
| Speed Range | | r/min | 0 - 833 | 0 - 416 | 0 - 300 | 0 - 150 | 0 - 100 |
| Backlash | | arcmin | 35 (0.59°) | 15 (0.25°) | | 10 (0.17°) | |
| Power Supply Input | Voltage and Frequency | | Single-Phase 100-120 VAC, Single-Phase/Three-Phase 200-240 VAC −15 to +6% 50/60 Hz | | | | |
| | Input Current A | Single-Phase 100-120 VAC | 3.8 | | | | |
| | | Single-Phase 200-240 VAC | 2.3 | | | | |
| | | Three-Phase 200-240 VAC | 1.4 | | | | |
| Control Power Supply | | | 24 VDC ±5%*2 0.25 A [0.5 A]*1 | | | | |

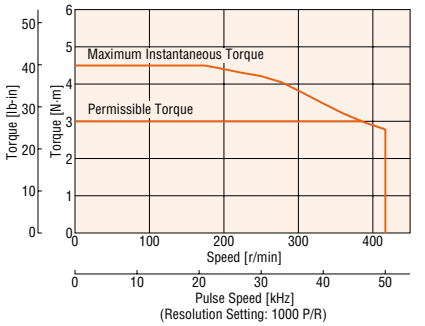
*For the geared motor output torque, refer to the speed – torque characteristics.
● For detailed information about standards, please see the Oriental Motor website.
*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

## Speed – Torque Characteristics (Reference Values)

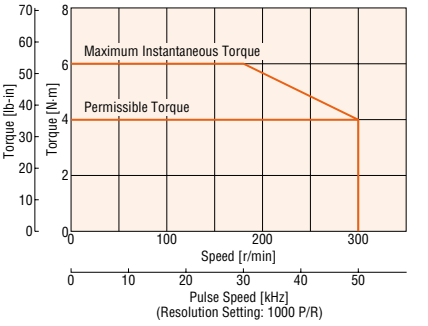
**AZM66** Gear Ratio **3.6**



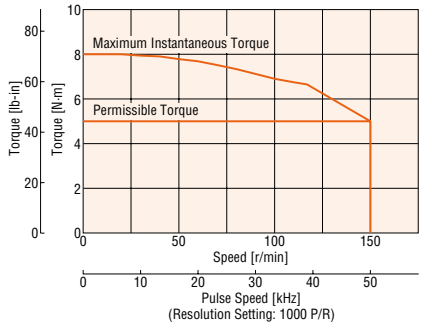

**AZM66** Gear Ratio **7.2**



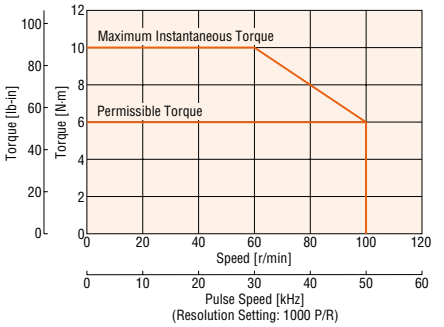

**AZM66** Gear Ratio **10**




**AZM66** Gear Ratio **20**




**AZM66** Gear Ratio **30**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# TS Geared Type Frame Size 90 mm (3.54 in.)

## Specifications

| | | | AZM98AC-TS3.6 | AZM98AC-TS7.2 | AZM98AC-TS10 | AZM98AC-TS20 | AZM98AC-TS30 |
|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM98AC-TS3.6 | AZM98AC-TS7.2 | AZM98AC-TS10 | AZM98AC-TS20 | AZM98AC-TS30 |
| | with Electromagnetic Brake | | AZM98MC-TS3.6 | AZM98MC-TS7.2 | AZM98MC-TS10 | AZM98MC-TS20 | AZM98MC-TS30 |
| Driver Product Name | Built-in Controller Type | | AZD-AD(Single-Phase 100-120 VAC), AZD-CD(Single-Phase/Three-Phase 200-240 VAC) | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-AX(Single-Phase 100-120 VAC), AZD-CX(Single-Phase/Three-Phase 200-240 VAC) | | | | |
| | Pulse Input Type | | AZD-A(Single-Phase 100-120 VAC), AZD-C(Single-Phase/Three-Phase 200-240 VAC) | | | | |
| Maximum Holding Torque | | N·m (lb-in) | 6 (53) | 10 (88) | 14 (123) | 20 (177) | 25 (220) |
| Rotor Inertia | | J: kg·m² (oz-in²) | 1090×10⁻⁷ (6) [1250×10⁻⁷ (6.8)]*1 | | | | |
| Gear Ratio | | | 3.6 | 7.2 | 10 | 20 | 30 |
| Resolution | | Resolution Setting: 1000 P/R | 0.1°/Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.018°/Pulse | 0.012°/Pulse |
| Permissible Torque | | N·m (lb-in) | 6 (53) | 10 (88) | 14 (123) | 20 (177) | 25 (220) |
| Maximum Instantaneous Torque* | | N·m (lb-in) | * | * | 20 (177) | * | 45 (390) |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 3.6 (31) | 7.2 (63) | 10 (88) | 20 (177) | 25 (220) |
| | Electromagnetic Brake | N·m (lb-in) | 3.6 (31) | 7.2 (63) | 10 (88) | 20 (177) | 25 (220) |
| Speed Range | | r/min | 0 - 833 | 0 - 416 | 0 - 300 | 0 - 150 | 0 - 100 |
| Backlash | | arcmin | 25 (0.42°) | 15 (0.25°) | | 10 (0.17°) | |
| Power Supply Input | Voltage and Frequency | | Single-Phase 100-120 VAC, Single-Phase/Three-Phase 200-240 VAC −15 to +6% 50/60 Hz | | | | |
| | Input Current A | Single-Phase 100-120 VAC | 5.5 | | | | |
| | | Single-Phase 200-240 VAC | 3.3 | | | | |
| | | Three-Phase 200-240 VAC | 2.0 | | | | |
| Control Power Supply | | | 24 VDC ±5%*2 0.25 A [0.5 A]*1 | | | | |

*For the geared motor output torque, refer to the speed – torque characteristics.

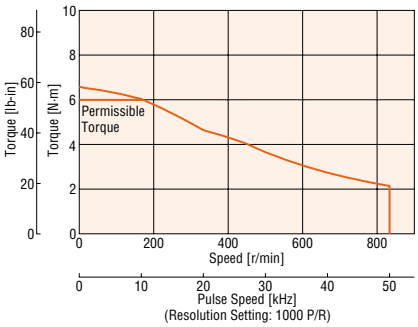
● For detailed information about standards, please see the Oriental Motor website.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

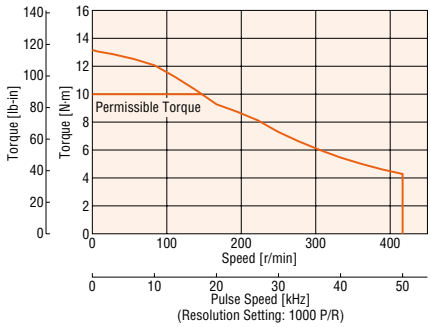
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

## Speed – Torque Characteristics (Reference Values)

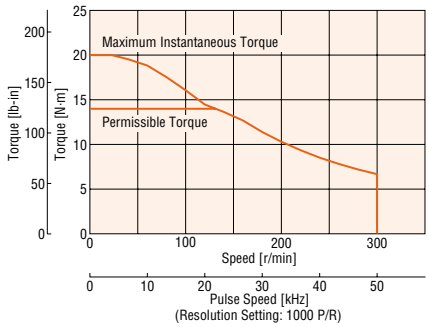
**AZM98** Gear Ratio **3.6**



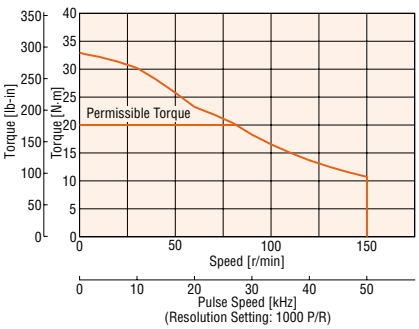

**AZM98** Gear Ratio **7.2**



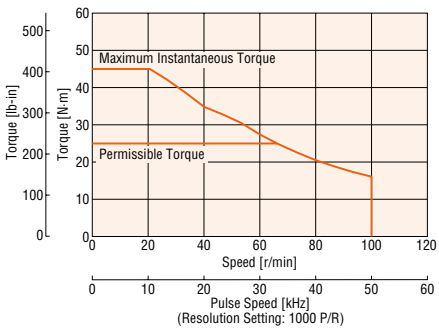

**AZM98** Gear Ratio **10**




**AZM98** Gear Ratio **20**




**AZM98** Gear Ratio **30**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# PS Geared Type Frame Size 42 mm (1.65 in.)



## Specifications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46AC-PS5 | AZM46AC-PS7.2 | AZM46AC-PS10 | AZM46AC-PS25 | AZM46AC-PS36 | AZM46AC-PS50 |
| | with Electromagnetic Brake | | AZM46MC-PS5 | AZM46MC-PS7.2 | AZM46MC-PS10 | AZM46MC-PS25 | AZM46MC-PS36 | AZM46MC-PS50 |
| Driver Product Name | Built-in Controller Type | | AZD-AD(Single-Phase 100-120 VAC), AZD-CD(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-AX(Single-Phase 100-120 VAC), AZD-CX(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type | | AZD-A(Single-Phase 100-120 VAC), AZD-C(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| Maximum Holding Torque | | N·m (oz-in) | 1 (142) | 1.5 (210) | | 2.5 (350) | 3 (420) | |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | 55×10$^{-7}$(0.3) [71×10$^{-7}$(0.39)]*1 | | | | | |
| Gear Ratio | | | 5 | 7.2 | 10 | 25 | 36 | 50 |
| Resolution | | Resolution Setting: 1000 P/R | 0.072°/Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.0144°/Pulse | 0.01°/Pulse | 0.0072°/Pulse |
| Permissible Torque | | N·m (oz-in) | 1 (142) | 1.5 (210) | | 2.5 (350) | 3 (420) | |
| Maximum Instantaneous Torque | | N·m (oz-in) | 1.5 (210) | 2 (280) | | 6 (850) | | |
| Holding Torque at Motor Standstill | Power On | N·m (oz-in) | 0.75 (106) | 1 (142) | 1.5 (210) | 2.5 (350) | 3 (420) | |
| | Electromagnetic Brake | N·m (oz-in) | 0.75 (106) | 1 (142) | 1.5 (210) | 2.5 (350) | 3 (420) | |
| Speed Range | | r/min | 0 - 600 | 0 - 416 | 0 - 300 | 0 - 120 | 0 - 83 | 0 - 60 |
| Backlash | | arcmin | 15 (0.25°) | | | | | |
| Power Supply Input | Voltage and Frequency | | Single-Phase 100-120 VAC, Single-Phase/Three-Phase 200-240 VAC −15 to +6% 50/60 Hz | | | | | |
| | Input Current A | Single-Phase 100-120 VAC | 2.7 | | | | | |
| | | Single-Phase 200-240 VAC | 1.7 | | | | | |
| | | Three-Phase 200-240 VAC | 1.0 | | | | | |
| Control Power Supply | | | 24 VDC ±5%*2 0.25 A [0.33 A]*1 | | | | | |

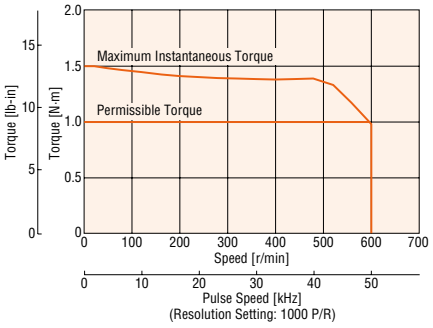
● For detailed information about standards, please see the Oriental Motor website.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

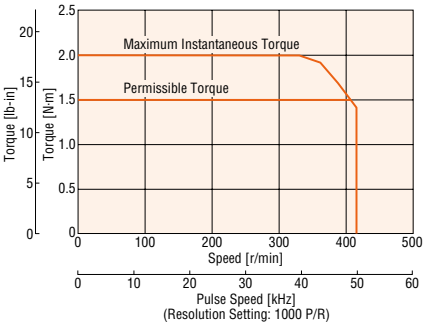
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

## Speed – Torque Characteristics (Reference Values)

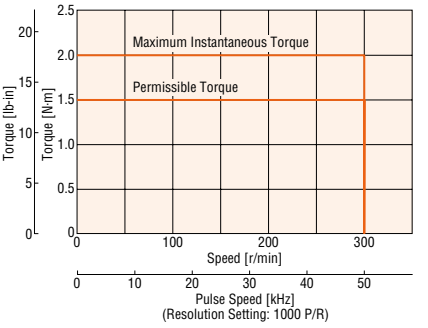
**AZM46** Gear Ratio **5**



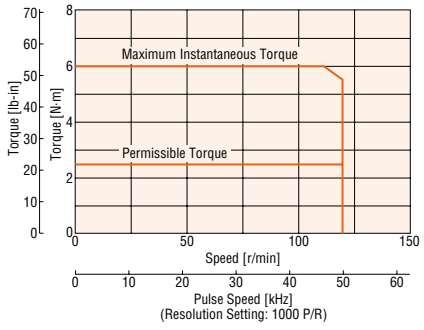

**AZM46** Gear Ratio **7.2**



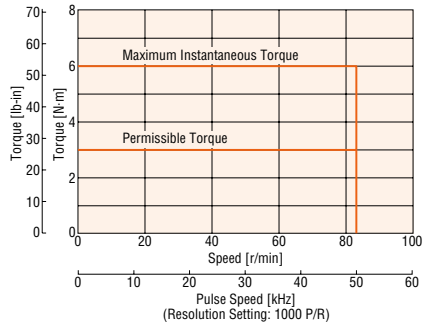

**AZM46** Gear Ratio **10**



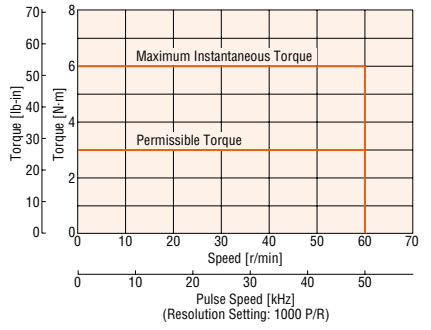

**AZM46** Gear Ratio **25**




**AZM46** Gear Ratio **36**




**AZM46** Gear Ratio **50**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# PS Geared Type Frame Size 60 mm (2.36 in.)

## Specifications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM66AC-PS5 | AZM66AC-PS7.2 | AZM66AC-PS10 | AZM66AC-PS25 | AZM66AC-PS36 | AZM66AC-PS50 |
| | with Electromagnetic Brake | | AZM66MC-PS5 | AZM66MC-PS7.2 | AZM66MC-PS10 | AZM66MC-PS25 | AZM66MC-PS36 | AZM66MC-PS50 |
| Driver Product Name | Built-in Controller Type | | AZD-AD(Single-Phase 100-120 VAC), AZD-CD(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-AX(Single-Phase 100-120 VAC), AZD-CX(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type | | AZD-A(Single-Phase 100-120 VAC), AZD-C(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| Maximum Holding Torque | | N·m (lb-in) | 3.5 (30) | 4 (35) | 5 (44) | 8 (70) | | |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | 370×10$^{-7}$ (2) [530×10$^{-7}$ (2.9)]*1 | | | | | |
| Gear Ratio | | | 5 | 7.2 | 10 | 25 | 36 | 50 |
| Resolution | | Resolution Setting: 1000 P/R | 0.072°/Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.0144°/Pulse | 0.01°/Pulse | 0.0072°/Pulse |
| Permissible Torque | | N·m (lb-in) | 3.5 (30) | 4 (35) | 5 (44) | 8 (70) | | |
| Maximum Instantaneous Torque* | | N·m (lb-in) | * | * | 11 (97) | 16 (141) | 20 (177) | |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 3 (26) | 4 (35) | 5 (44) | 8 (70) | | |
| | Electromagnetic Brake | N·m (lb-in) | 3 (26) | 4 (35) | 5 (44) | 8 (70) | | |
| Speed Range | | r/min | 0 - 600 | 0 - 416 | 0 - 300 | 0 - 120 | 0 - 83 | 0 - 60 |
| Backlash | | arcmin | 7 (0.12°) | | | 9 (0.15°) | | |
| Power Supply Input | Voltage and Frequency | | Single-Phase 100-120 VAC, Single-Phase/Three-Phase 200-240 VAC −15 to +6% 50/60 Hz | | | | | |
| | Input Current A | Single-Phase 100-120 VAC | 3.8 | | | | | |
| | | Single-Phase 200-240 VAC | 2.3 | | | | | |
| | | Three-Phase 200-240 VAC | 1.4 | | | | | |
| Control Power Supply | | | 24 VDC ±5%*2 0.25 A [0.5 A]*1 | | | | | |

*For the geared motor output torque, refer to the speed – torque characteristics.

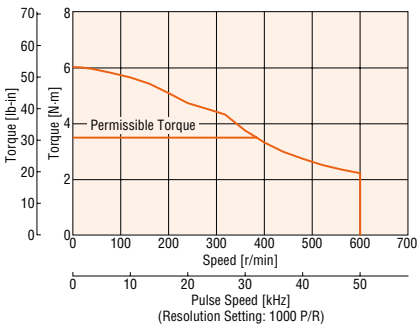
● For detailed information about standards, please see the Oriental Motor website.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

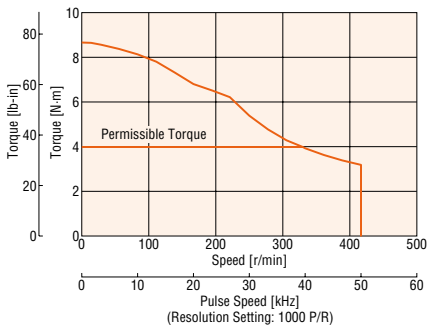
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

## Speed – Torque Characteristics (Reference Values)

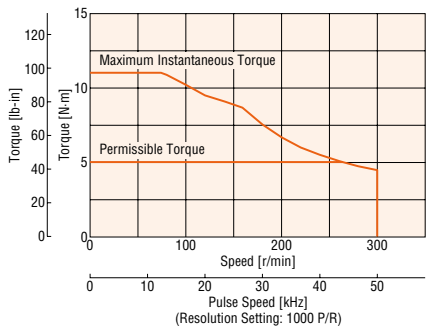
**AZM66** Gear Ratio **5**



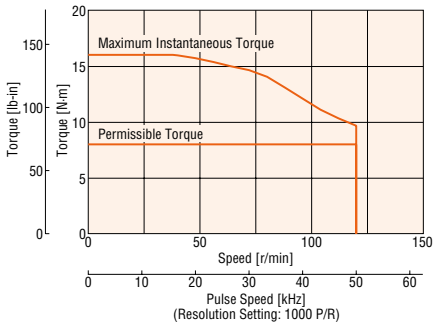

**AZM66** Gear Ratio **7.2**



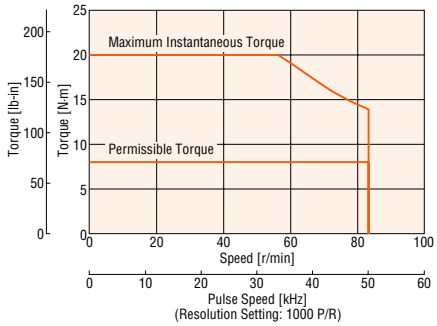

**AZM66** Gear Ratio **10**



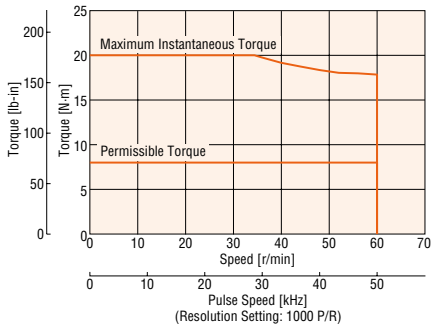

**AZM66** Gear Ratio **25**




**AZM66** Gear Ratio **36**




**AZM66** Gear Ratio **50**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# PS Geared Type Frame Size 90 mm (3.54 in.)



## Specifications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM98AC-PS5 | AZM98AC-PS7.2 | AZM98AC-PS10 | AZM98AC-PS25 | AZM98AC-PS36 | AZM98AC-PS50 |
| | with Electromagnetic Brake | | AZM98MC-PS5 | AZM98MC-PS7.2 | AZM98MC-PS10 | AZM98MC-PS25 | AZM98MC-PS36 | AZM98MC-PS50 |
| Driver Product Name | Built-in Controller Type | | AZD-AD(Single-Phase 100-120 VAC), AZD-CD(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-AX(Single-Phase 100-120 VAC), AZD-CX(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type | | AZD-A(Single-Phase 100-120 VAC), AZD-C(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| Maximum Holding Torque | | N·m (lb-in) | 10 (88) | 14 (123) | 20 (177) | 37 (320) | | |
| Rotor Inertia | | J: kg·m²(oz-in²) | 1090×10⁻⁷(6) [1250×10⁻⁷(6.8)]*1 | | | | | |
| Gear Ratio | | | 5 | 7.2 | 10 | 25 | 36 | 50 |
| Resolution | | Resolution Setting: 1000 P/R | 0.072°/Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.0144°/Pulse | 0.01°/Pulse | 0.0072°/Pulse |
| Permissible Torque* | | N·m (lb-in) | * | * | 20 (177) | 37 (320) | | |
| Maximum Instantaneous Torque* | | N·m (lb-in) | * | * | * | * | 60 (530) | |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 5 (44) | 7.2 (63) | 10 (88) | 25 (220) | 36 (310) | 37 (320) |
| | Electromagnetic Brake | N·m (lb-in) | 5 (44) | 7.2 (63) | 10 (88) | 25 (220) | 36 (310) | 37 (320) |
| Speed Range | | r/min | 0 - 600 | 0 - 416 | 0 - 300 | 0 - 120 | 0 - 83 | 0 - 60 |
| Backlash | | arcmin | 7 (0.12°) | | | 9 (0.15°) | | |
| Power Supply Input | Voltage and Frequency | | Single-Phase 100-120 VAC, Single-Phase/Three-Phase 200-240 VAC −15 to +6% 50/60 Hz | | | | | |
| | Input Current A | Single-Phase 100-120 VAC | 5.5 | | | | | |
| | | Single-Phase 200-240 VAC | 3.3 | | | | | |
| | | Three-Phase 200-240 VAC | 2.0 | | | | | |
| Control Power Supply | | | 24 VDC ±5%*2 0.25 A [0.5 A]*1 | | | | | |

*For the geared motor output torque, refer to the speed – torque characteristics.

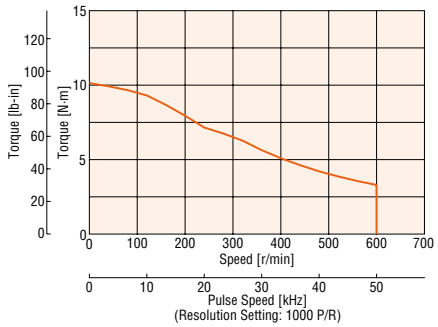
● For detailed information about standards, please see the Oriental Motor website.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

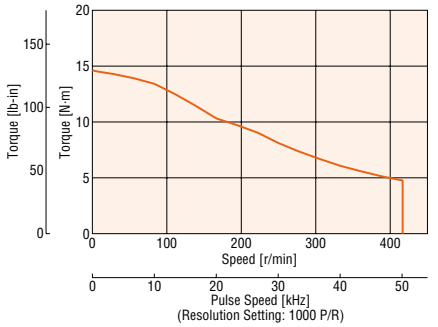
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

## Speed – Torque Characteristics (Reference Values)

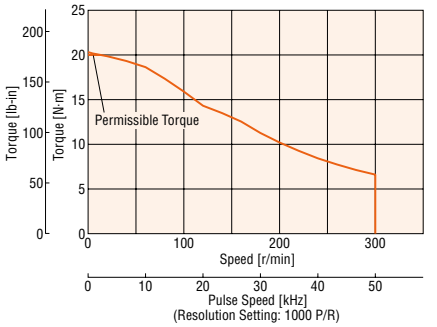
**AZM98** Gear Ratio **5**



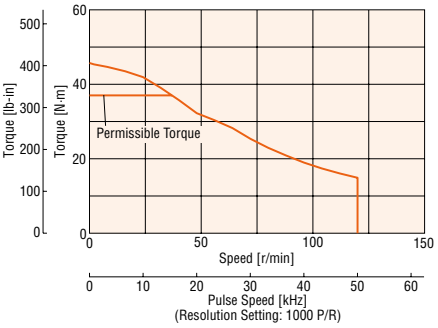

**AZM98** Gear Ratio **7.2**



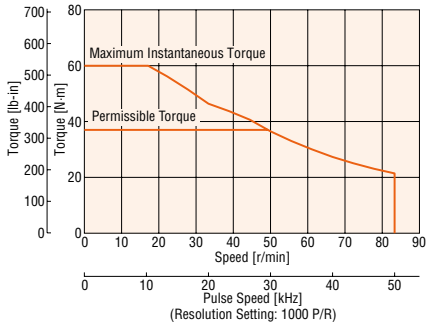

**AZM98** Gear Ratio **10**



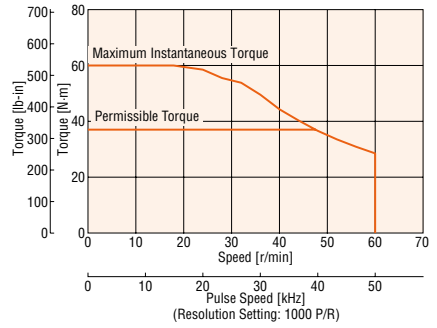

**AZM98** Gear Ratio **25**




**AZM98** Gear Ratio **36**




**AZM98** Gear Ratio **50**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# HPG Geared Type Frame Size 40 mm (1.57 in.), 60 mm (2.36 in.), 90 mm (3.54 in.)

## Specifications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46AC-HP5□ | AZM46AC-HP9□ | AZM66AC-HP5□ | AZM66AC-HP15□ | AZM98AC-HP5□ | AZM98AC-HP15□ |
| | with Electromagnetic Brake | | AZM46MC-HP5□ | AZM46MC-HP9□ | AZM66MC-HP5□ | AZM66MC-HP15□ | AZM98MC-HP5□ | AZM98MC-HP15□ |
| Driver Product Name | Built-in Controller Type | | AZD-AD(Single-Phase 100-120 VAC), AZD-CD(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-AX(Single-Phase 100-120 VAC), AZD-CX(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type | | AZD-A(Single-Phase 100-120 VAC), AZD-C(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| Maximum Holding Torque | | N·m (lb-in) | 1.5 (13.2) | 2.5 (22) | 5.9 (52) | 9 (79) | 10 (88) | 24 (210) |
| Rotor Inertia | | J: kg·m²(oz-in²) | $55\times10^{-7}$ (0.30) [$71\times10^{-7}$ (0.39)]*1 | | $370\times10^{-7}$ (2) [$530\times10^{-7}$ (2.9)]*1 | | $1090\times10^{-7}$ (6) [$1250\times10^{-7}$ (6.8)]*1 | |
| Rotor Inertia*2 | | J: kg·m²(oz-in²) | $5.8\times10^{-7}$ (0.032) [$4.2\times10^{-7}$ (0.023)] | $3.4\times10^{-7}$ (0.0186) [$2.9\times10^{-7}$ (0.0159)] | $92\times10^{-7}$ (0.50) [$86\times10^{-7}$ (0.47)] | $78\times10^{-7}$ (0.43) [$77\times10^{-7}$ (0.42)] | $629\times10^{-7}$ (3.4) [$589\times10^{-7}$ (3.2)] | $488\times10^{-7}$ (2.7) [$488\times10^{-7}$ (2.7)] |
| Gear Ratio | | | 5 | 9 | 5 | 15 | 5 | 15 |
| Resolution | | Resolution Setting: 1000 P/R | 0.072°/Pulse | 0.04°/Pulse | 0.072°/Pulse | 0.024°/Pulse | 0.072°/Pulse | 0.024°/Pulse |
| Permissible Torque* | | N·m (lb-in) | * | 2.5 (22) | 5.9 (52) | 9 (79) | * | 24 (210) |
| Maximum Instantaneous Torque* | | N·m (lb-in) | * | * | * | * | * | * |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 0.75 (6.6) | 1.35 (11.9) | 3 (26) | 9 (79) | 5 (44) | 15 (132) |
| | Electromagnetic Brake | N·m (lb-in) | 0.75 (6.6) | 1.35 (11.9) | 3 (26) | 9 (79) | 5 (44) | 15 (132) |
| Speed Range | | r/min | 0 - 900 | 0 - 500 | 0 - 900 | 0 - 300 | 0 - 900 | 0 - 300 |
| Backlash | | arcmin | 3 (0.05°) | | | | | |
| Power Supply Input | Voltage and Frequency | | Single-Phase 100-120 VAC, Single-Phase/Three-Phase 200-240 VAC −15 to +6% 50/60 Hz | | | | | |
| | Input Current A | Single-Phase 100-120 VAC | 2.7 | | 3.8 | | 5.5 | |
| | | Single-Phase 200-240 VAC | 1.7 | | 2.3 | | 3.3 | |
| | | Three-Phase 200-240 VAC | 1.0 | | 1.4 | | 2.0 | |
| Control Power Supply | | | 24 VDC ±5%*4 0.25 A [0.33 A]*1 | | 24 VDC ±5%*4 0.25 A [0.5A]*1 | | | |
| Output Flange Surface Runout*3 | | mm (in.) | 0.02 (0.0008) | | | | | |
| Output Flange Inner Diameter Runout*3 | | mm (in.) | 0.03 (0.0012) | | 0.04 (0.0016) | | | |

*For the geared motor output torque, refer to the speed – torque characteristics.

● For the output flange type, the box □ in the product name indicates **F**.

● For detailed information about standards, please see the Oriental Motor website.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

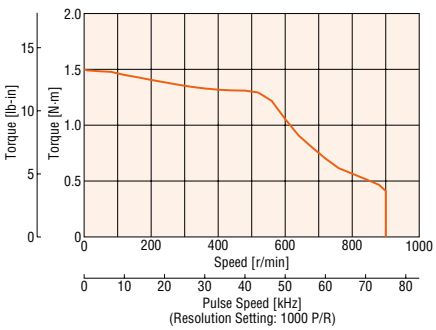
*2 The value is calculated by converting the inertia inside the gear unit into the motor shaft. The bracket [ ] indicates the value for the flange output type.

*3 Indicates the value for the flange output type.

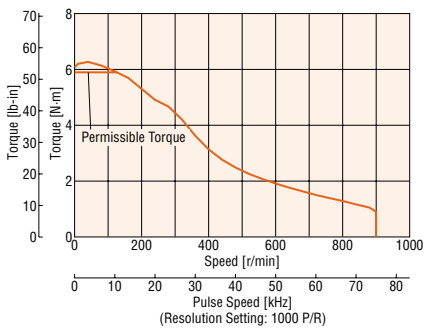
*4 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

## Speed – Torque Characteristics (Reference Values)

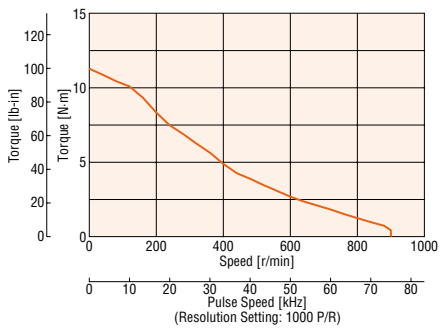
**AZM46** Gear Ratio **5**



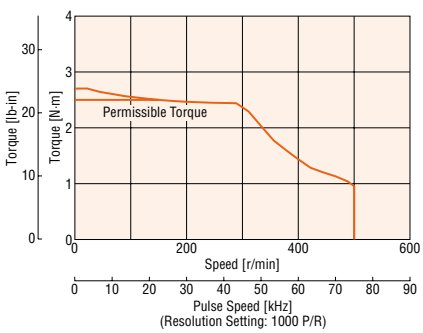

**AZM66** Gear Ratio **5**



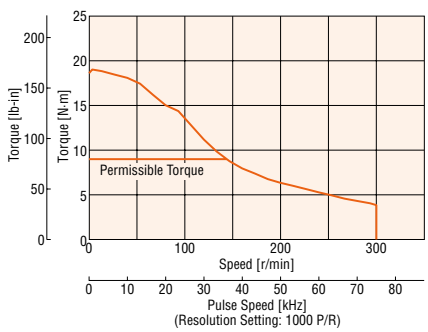

**AZM98** Gear Ratio **5**



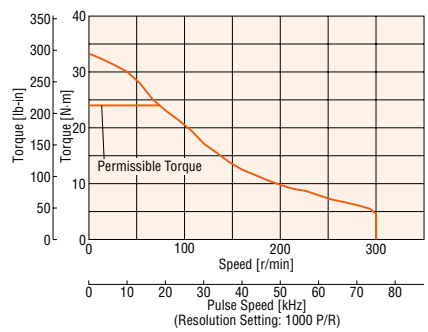

**AZM46** Gear Ratio **9**




**AZM66** Gear Ratio **15**




**AZM98** Gear Ratio **15**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# Harmonic Geared Type Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.), 90 mm (3.54 in.)



## Specifications

| | | | AZM46AC-HS50 | AZM46AC-HS100 | AZM66AC-HS50 | AZM66AC-HS100 | AZM98AC-HS50 | AZM98AC-HS100 |
|---|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46AC-HS50 | AZM46AC-HS100 | AZM66AC-HS50 | AZM66AC-HS100 | AZM98AC-HS50 | AZM98AC-HS100 |
| | with Electromagnetic Brake | | AZM46MC-HS50 | AZM46MC-HS100 | AZM66MC-HS50 | AZM66MC-HS100 | AZM98MC-HS50 | AZM98MC-HS100 |
| Driver Product Name | Built-in Controller Type | | AZD-AD(Single-Phase 100-120 VAC), AZD-CD(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-AX(Single-Phase 100-120 VAC), AZD-CX(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| | Pulse Input Type | | AZD-A(Single-Phase 100-120 VAC), AZD-C(Single-Phase/Three-Phase 200-240 VAC) | | | | | |
| Maximum Holding Torque | | N·m (lb-in) | 3.5 (30) | 5 (44) | 7 (61) | 10 (88) | 33 (292) | 52 (460) |
| Rotor Inertia | | J: kg·m² (oz-in²) | $72\times10^{-7}$ (0.39) [$88\times10^{-7}$ (0.48)]*1 | | $405\times10^{-7}$ (2.2) [$565\times10^{-7}$ (3.1)]*1 | | $1290\times10^{-7}$ (7.1) [$1450\times10^{-7}$ (7.9)]*1 | |
| Gear Ratio | | | 50 | 100 | 50 | 100 | 50 | 100 |
| Resolution | | Resolution Setting: 1000 P/R | 0.0072°/Pulse | 0.0036°/Pulse | 0.0072°/Pulse | 0.0036°/Pulse | 0.0072°/Pulse | 0.0036°/Pulse |
| Permissible Torque | | N·m (lb-in) | 3.5 (30) | 5 (44) | 7 (61) | 10 (88) | 33 (290) | 52 (460) |
| Maximum Instantaneous Torque* | | N·m (lb-in) | 8.3 (73) | 11 (97) | 23 (200) | 36 (310) | * | 107 (940) |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 3.5 (30) | 5 (44) | 7 (61) | 10 (88) | 33 (290) | 52 (460) |
| | Electromagnetic Brake | N·m (lb-in) | 3.5 (30) | 5 (44) | 7 (61) | 10 (88) | 33 (290) | 52 (460) |
| Speed Range | | r/min | 0 - 70 | 0 - 35 | 0 - 70 | 0 - 35 | 0 - 70 | 0 - 35 |
| Lost Motion (Load Torque) | | arcmin | 1.5 max. (±0.16 N·m) | 1.5 max. (±0.20 N·m) | 0.7 max. (±0.28 N·m) | 0.7 max. (±0.39 N·m) | 0.7 max. (±1.2 N·m) | |
| Power Supply Input | Voltage and Frequency | | Single-Phase 100-120 VAC, Single-Phase/Three-Phase 200-240 VAC −15 to+6% 50/60 Hz | | | | | |
| | Input Current A | Single-Phase 100-120 VAC | 2.7 | | 3.8 | | 5.5 | |
| | | Single-Phase 200-240 VAC | 1.7 | | 2.3 | | 3.3 | |
| | | Three-Phase 200-240 VAC | 1.0 | | 1.4 | | 2.0 | |
| Control Power Supply | | | 24 VDC ±5%*2 0.25 A [0.33 A]*1 | | 24 VDC ±5%*2 0.25 A [0.5A]*1 | | | |

*For the geared motor output torque, refer to the speed – torque characteristics.

● For detailed information about standards, please see the Oriental Motor website.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

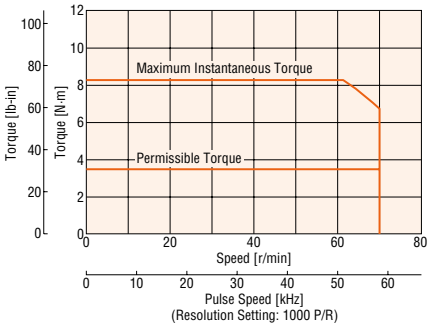
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

Note

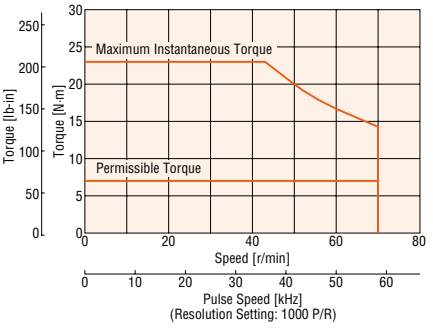
● The rotor inertia represents a sum of the inertia of the harmonic gear converted to motor shaft values.

## Speed – Torque Characteristics (Reference Values)

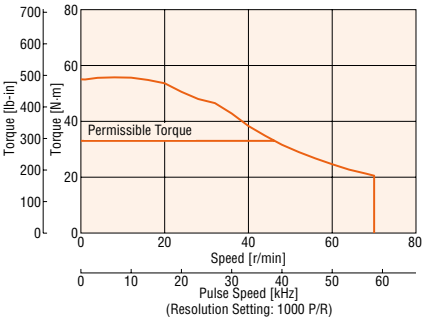
**AZM46** Gear Ratio **50**



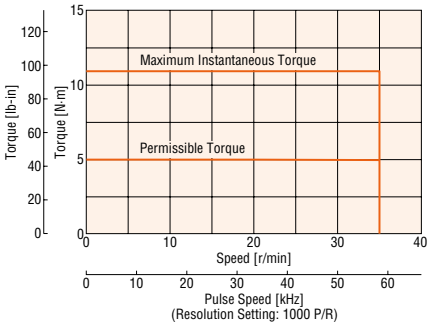

**AZM66** Gear Ratio **50**



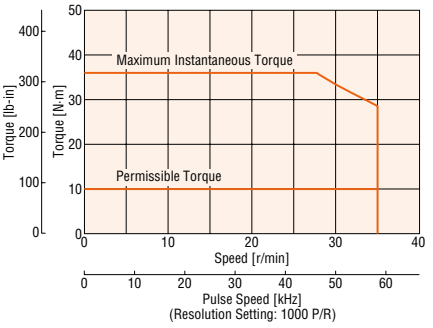

**AZM98** Gear Ratio **50**



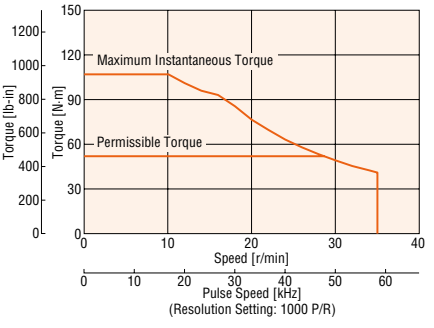

**AZM46** Gear Ratio **100**




**AZM66** Gear Ratio **100**




**AZM98** Gear Ratio **100**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

## Driver Specifications

| Driver Type | | | | Built-in Controller Type | Pulse Input Type with RS-485 Communication | Pulse Input Type |
|---|---|---|---|---|---|---|
| Driver Product Name | | | | **AZD-AD AZD-CD** | **AZD-AX AZD-CX** | **AZD-A AZD-C** |
| I/O Function | | | Max. Input Pulse Frequency | – | Line driver output by programmable controller: 1 MHz (When the pulse duty is 50%)<br>Open-collector output by programmable controller: 250 kHz (When the pulse duty is 50%)<br>Negative Logic Pulse Input | |
| | | | Positioning Data Points | 256 Points | 256 Points*1 | |
| | | | Direct Input | 10 Points | 6 Points | |
| | | | Direct Output | 6 Points | | |
| | | | RS-485 Communication Remote Input | 16 Points | | – |
| | | | RS-485 Communication Remote Output | 16 Points | | – |
| Setting Tool | | | Support Software **MEXE02** | ○ | | |
| Position Coordinate Management Method | | | | Battery-Free Absolute System | | |
| Operation | Positioning Operation | Operation Method | Positioning Operation | ○ | ○ | ○*1 |
| | | | Positioning Push-Motion Operation*2 | ○ | ○ | ○*1 |
| | | Linked Mode | Single-Motion Operation | ○ | ○ | ○*1 |
| | | | Sequential Operation | ○ | ○ | ○*1 |
| | | | Multi-Speed Operation (Continuous Form Connection) | ○ | ○ | ○*1 |
| | | Sequence Control | Loop Operation (Repetitive) | ○ | ○ | ○*1 |
| | | | Event Jump Operation | ○ | ○ | ○*1 |
| | Continuous Operation | Position Control | | ○ | ○ | ○*1 |
| | | Speed Control | | ○ | ○ | ○*1 |
| | | Torque Control | | ○ | ○ | ○*1 |
| | | Push-Motion*2 | | ○ | ○ | ○*1 |
| | Return-to-Home Operation | | Return-to-Home Operation | ○ | ○ | ○ |
| | | | High-Speed Return-to-Home Operation | ○ | ○ | ○ |
| | JOG Operation | | | ○ | ○ | ○ |
| Monitoring/Information | | | Waveform Monitor | ○ | ○ | ○ |
| | | | Overload Detection | ○ | ○ | ○ |
| | | | Overheat Detection (Motor and Driver) | ○ | ○ | ○ |
| | | | Position and Speed Information | ○ | ○ | ○ |
| | | | Temperature Detection (Motor and Driver) | ○ | ○ | ○ |
| | | | Motor Load Factor | ○ | ○ | ○ |
| | | | Travel Distance and Integrated Travel Distance | ○ | ○ | ○ |
| Alarm | | | | ○ | ○ | ○ |

*1 This can be used by setting with the support software **MEXE02**.

*2 The push-motion operation cannot be performed with geared motors or rotary actuators **DG II** Series.

## RS-485 Communication Specification

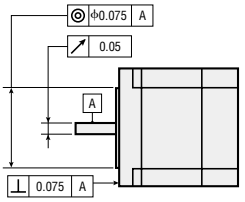
| | |
|---|---|
| Protocol | Modbus RTU Mode |
| Electrical Characteristics | EIA-485 Based, Straight Cable<br>Use a shielded twisted pair cable (TIA/EIA-568B CAT5e or higher is recommended) and keep the total wiring distance including extension to 50 m (164 ft.) or less.* |
| Communication Mode | Half duplex, asynchronous communication (data: 8 bits, stop bit: 1 bit or 2 bits, parity: none, even, or odd) |
| Transmission Rate | Select either from 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps, or 230400 bps. |
| Connection Units | Up to 31 drivers can be connected to a single programmable controller (master device). |

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

## General Specifications

| | | Motor | Driver | |
|---|---|---|---|---|
| | | | Built-in Controller Type Pulse Input Type with RS-485 Communication | Pulse Input Type |
| Thermal Class | | 130 (B) [UL Recognized 105 (A) ] | – | |
| Insulation Resistance | | 100 MΩ or more when 500 VDC megger is applied between the following places: ・Case – Motor windings ・Case – Electromagnetic Brake Windings*1 | 100 MΩ or more when 500 VDC megger is applied between the following places: ・PE Terminal – Power Supply Terminal ・Encoder Connector – Power Supply Terminal ・I/O Signal Terminal – Power Supply Terminal | |
| Dielectric Strength | | Sufficient to withstand the following for 1 minute: ・Case – Motor Winding 1.5 kVAC 50/60 Hz ・Case – Electromagnetic Brake Windings*1 1.5 kVAC 50/60 Hz | Sufficient to withstand the following for 1 minute: ・PE Terminal – Power Supply Terminal 1.5 kVAC 50/60 Hz ・Encoder Connector – Power Supply Terminal 1.8 kVAC 50/60 Hz ・I/O Signal Terminal – Power Supply Terminal 1.8 kVAC 50/60 Hz | |
| Operating Environment | Ambient Temperature | 0 to +40°C (+32 to +104°F) (Non-Freezing)*2 | 0 to +55°C (+32 to +131°F) (Non-Freezing)*3 | |
| | Ambient Humidity | 85% or less (Non-Condensing) | | |
| | Surrounding Atmosphere | No corrosive gas or dust. No water or oil. | | |
| Degree of Protection | | IP66 (excluding the mounting surface and connectors) | IP10 | IP20 |
| Stop Position Accuracy | | **AZM46**, **AZM48**: ±4 arcmin (±0.067°) **AZM66**, **AZM69**, **AZM98**, **AZM911**: ±3 arcmin (±0.05°) | | |
| Shaft Runout | | 0.05 mm (0.002 in.) T.I.R.*4 | – | |
| Concentricity of Installing Pilot to the Shaft | | 0.075 mm (0.003 in.) T.I.R.*4 | – | |
| Perpendicularity of Installation Surface to the Shaft | | 0.075 mm (0.003 in.) T.I.R.*4 | – | |
| Multiple Rotation Detection Range Upon Power OFF | | ±900 Revolutions (1,800 Revolutions) | | |

*1 Electromagnetic brake type only.
*2 Based on Oriental Motor's measurement conditions.
*3 When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 200×200 mm (7.87×7.87 in.), 2 mm (0.08 in.) thick is installed.
*4 T. I. R. (Total Indicator Reading): The total dial gauge reading when the measurement section is rotated once around the reference axis center.




Note

● Disconnect the motor and driver when taking an insulation resistance measurement or performing a dielectric voltage withstand test. Also, do not perform these tests on the absolute sensor part of the motor.

## Electromagnetic Brake Specification

| Product Name | | AZM46 | AZM66 | AZM69 | AZM98 |
|---|---|---|---|---|---|
| Brake Type | | Power Off Activated Type | | | |
| Power Supply Voltage | | 24 VDC±5%* | | | |
| Power Supply Current | A | 0.08 | 0.25 | 0.25 | 0.25 |
| Brake Operating Time | ms | 20 | | | |
| Brake Releasing Time | ms | 30 | | | |
| Time Rating | | Continuous | | | |

*For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.
● The product names are listed such that the applicable product names can be determined.

## Permissible Moment Load

→ Page B-11

## Permissible Radial Load and Permissible Axial Load

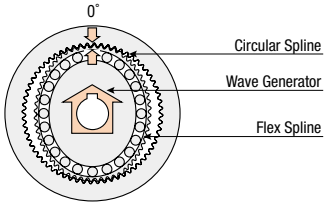
→ Page B-12

## Rotation Direction

→ Page B-13

# Details of the Harmonic Geared Type Accuracy

## Principle and Structure




## Details of the Accuracy

Unlike the conventional spur gear gearhead, the harmonic gear has no backlash. The harmonic gear has many teeth in simultaneous meshing engagement, and is designed to average out the effects of tooth pitch error and cumulative pitch error on rotation accuracy to ensure high positioning accuracy.
Also, harmonic gears have high gear ratios, so torsion when the load torque is applied to the output shaft is much smaller than a single motor and other geared motor. Rigidity is high and less subject to load fluctuation and enables stable positioning. When the high positioning accuracy and rigidity are required, refer to the following characteristics.

### ◇Angular Transmission Accuracy

Angular transmission error is the difference between the theoretical rotation angle of the output shaft, as calculated from the input pulse count, and actual rotation angle. It is represented as the difference between the min. and max. error value in the set of measurements taken for a single rotation of the output shaft starting from an arbitrary position.

| Product Name | Angular Transmission Accuracy [arcmin] |
|---|---|
| **AZM24-HS□** | 2 (0.034°) |
| **AZM46-HS□** | 1.5 (0.025°) |
| **AZM66-HS□** | |
| **AZM98-HS□** | 1 (0.017°) |

●Values in no-load condition (reference of gear part)

### ◇Torque – Torsion Characteristics

In actual applications, there is always frictional load, and displacement is produced as a result of this load. If the frictional load is constant, the displacement will be constant for unidirectional operation. However, in bidirectional operation, double the displacement is produced over a round trip. This displacement can be estimated from the following torque – torsion characteristics. This displacement occurs when an external force is applied as the gear is stopped, or when the gear is driven under a frictional load. The slope can be approximated with the spring constant in the following 3 classes, depending on the size of the load torque, and can be estimated through calculation.

1. Load torque $T_L$ is $T_1$ max.

$$\theta = \frac{T_L}{K_1} \text{ [min]}$$

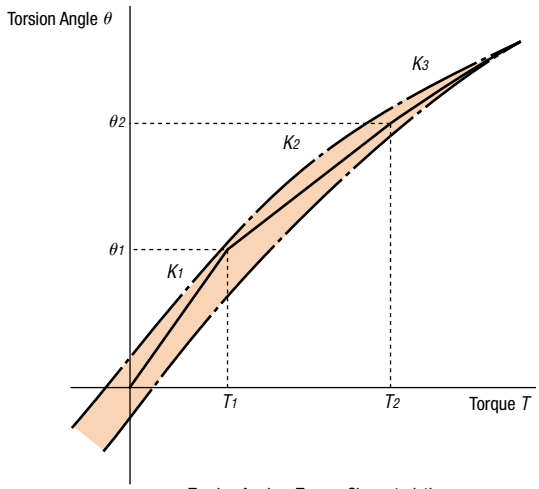
2. Load torque $T_L$ exceeds $T_1$ and is $T_2$ max.

$$\theta = \theta_1 + \frac{T_L - T_1}{K_2} \text{ [min]}$$

3. Load torque $T_L$ exceeds $T_2$

$$\theta = \theta_2 + \frac{T_L - T_2}{K_3} \text{ [min]}$$

The torsion angle of the harmonic gear alone is calculated according to the size of the load torque.




Torsion Angle – Torque Characteristics

Values for Determining Torsion Angle

| Product Name | Gear Ratio | T1 N·m | K1 N·m/min | θ1 min | T2 N·m | K2 N·m/min | θ2 min | K3 N·m/min |
|---|---|---|---|---|---|---|---|---|
| **AZM24-HS50** | 50 | 0.29 | 0.08 | 3.7 | – | 0.12 | – | – |
| **AZM24-HS100** | 100 | 0.29 | 0.1 | 2.9 | 1.5 | 0.15 | 11 | 0.21 |
| **AZM46-HS50** | 50 | 0.8 | 0.64 | 1.25 | 2 | 0.87 | 2.6 | 0.93 |
| **AZM46-HS100** | 100 | 0.8 | 0.79 | 1.02 | 2 | 0.99 | 2.2 | 1.28 |
| **AZM66-HS50** | 50 | 2 | 0.99 | 2 | 6.9 | 1.37 | 5.6 | 1.66 |
| **AZM66-HS100** | 100 | 2 | 1.37 | 1.46 | 6.9 | 1.77 | 4.2 | 2.1 |
| **AZM98-HS50** | 50 | 7 | 3.8 | 1.85 | 25 | 5.2 | 5.3 | 6.7 |
| **AZM98-HS100** | 100 | 7 | 4.7 | 1.5 | 25 | 7.3 | 4 | 8.4 |

# Load Torque – Driver Input Current Characteristics

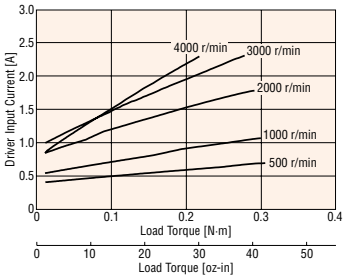
This is the relationship between the load torque and driver input current at each speed when the motor is actually operated. Due to these characteristics, it is possible to estimate the power supply capacity required to use the multi-axis. For geared types, use the speed and torque at the motor shaft.

$$\text{Motor Shaft Speed [r/min]} = \text{Gear Output Shaft Speed} \times \text{Gear Ratio}$$

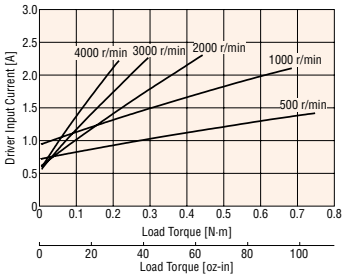
$$\text{Motor Shaft Torque [N·m (oz-in)]} = \frac{\text{Gear Output Shaft Torque}}{\text{Gear Ratio}}$$

## Single-Phase 100-120 VAC

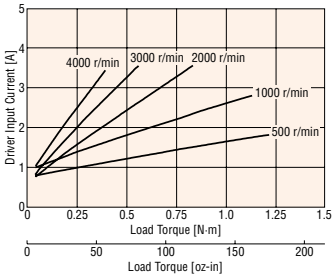
### AZM46□C



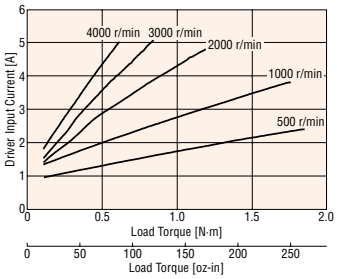

### AZM48□C




### AZM66□C

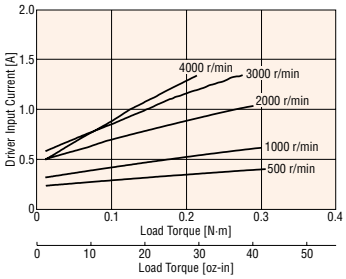



### AZM69□C

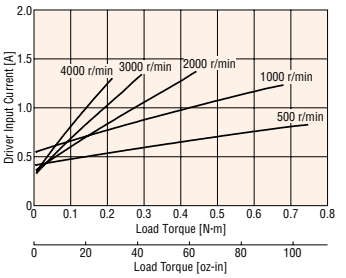



## Single-Phase 200-240 VAC

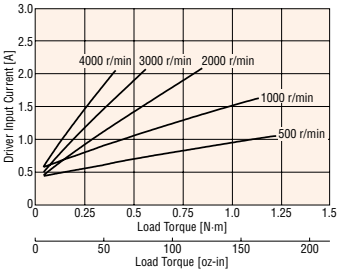
### AZM46□C



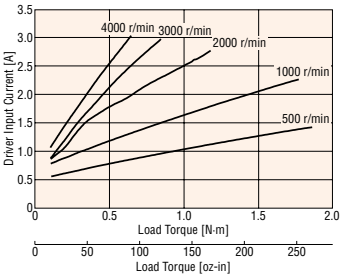

### AZM48□C




### AZM66□C

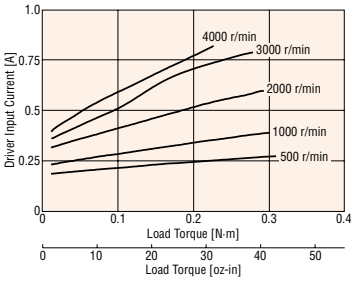



### AZM69□C

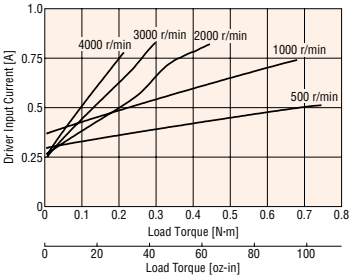



## Three-Phase 200-240 VAC

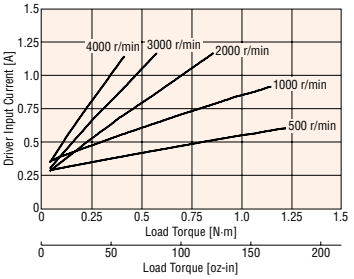
### AZM46□C



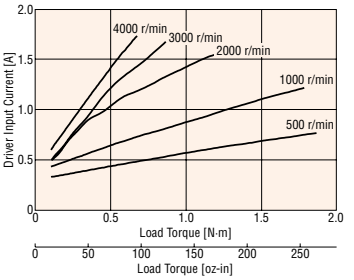

### AZM48□C




### AZM66□C

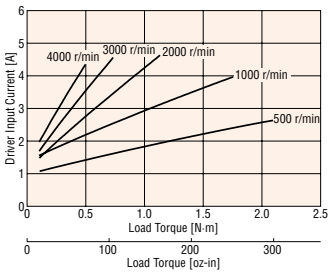



### AZM69□C

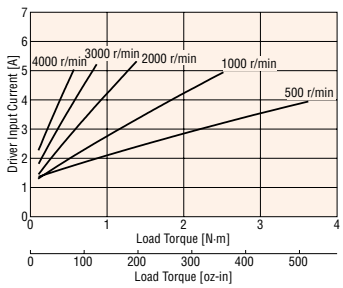


## Single-Phase 100-120 VAC

### AZM98□C

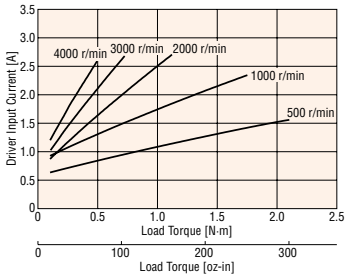



### AZM911□C

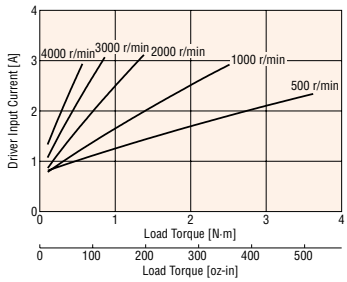



## Single-Phase 200-240 VAC

### AZM98□C

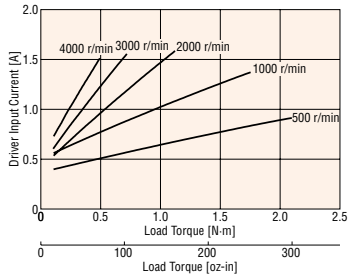



### AZM911□C

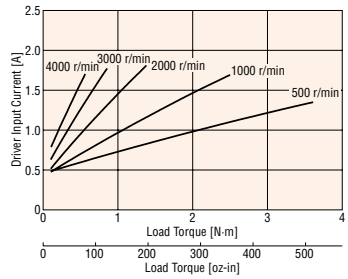



## Three-Phase 200-240 VAC

### AZM98□C




### AZM911□C



# Hybrid Control System $\alpha$STEP
## Battery-Free, Built-in Absolute Sensor
# AZ Series DC Power Supply Input

CE

● For detailed information about regulations and standards, please refer to the Oriental Motor website.

Built-in Controller Type FLEX

Pulse Input Type

Pulse Input Type
with RS-485 Communication

By incorporating the newly developed absolute sensor, an absolute system is now possible without a battery. The driver is a highly functional, compact DC power supply input type. Advanced positioning is possible at affordable prices.

- Equipped with the newly developed absolute sensor
- External sensors not required
- Shortens the return-to-home time
- Battery not required
- Energy savings and low heat generation
- Select from 3 different drivers based on the system configuration
- Achieve easy operation with the support software **MEXE02**

**See Full Product Details Online**
**www.orientalmotor.com**

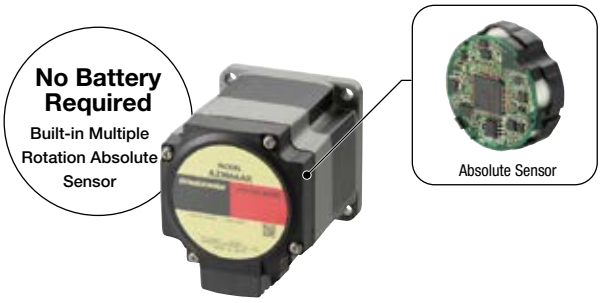
● Manual ● Specifications ● Dimensions
● CAD ● Characteristics ● Connection and Operation

## Features

### Advanced Technology at Affordable Prices

Oriental Motor has developed and patented a compact, low-cost, battery-free mechanical type absolute sensor.
The **AZ** Series can contribute to improved productivity and cost reductions, and is available at affordable prices.

● List Price starting from $702.00
[Total price of motors, drivers and cables (1 m (3.3 ft.))]




### Newly Developed Absolute Sensor

#### ●Mechanical-Type Sensor

A mechanical sensor composed of multiple gears is employed. Positioning information is detected by recognizing the angle of the individual gears. As a result, it does not require a battery.

#### ●Multiple-Rotation Absolute System

Absolute position detection is possible with ±900 rotations (1800 rotations) of the motor shaft from the home position.
✻ ±450 rotations (900 rotations) for products of with 20 mm or 28 mm frame sizes.

#### ●Home Setting Method

The home position can be easily set by pressing a switch on the driver, which is saved by the absolute system. In addition, home setting is possible with the support software **MEXE02** or by using an external input signal.

## No External Sensors Required

With the use of the absolute system, external sensors such as the home sensor and the limit sensor are not needed.

### ●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

There is no concern about sensor malfunctions (when operating in environments filled with oil mist or filled with metal pieces due to metal processing), sensor failures or sensor wire disconnections.

### ●Improved Return-to-Home Accuracy

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

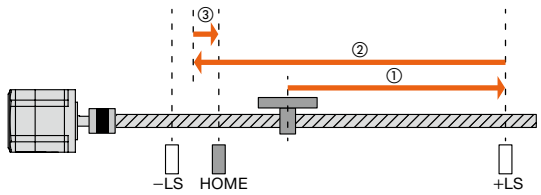
●If no limit sensor is installed, movements that exceed the limit values can be avoided through the use of the limits in the driver software.

## Shortened Reset Time ① High Speed Return-to-Home

Because return-to-home is possible without using an external 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.

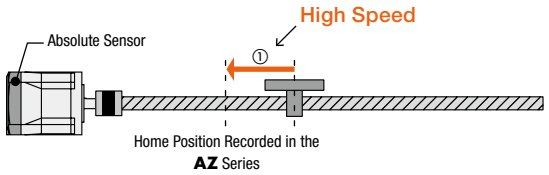
### Previous Home Detection for Control Motor

The home position is detected at low speed by detecting the limit sensor (±LS) and home sensor (HOME).




### Return-to-Home Operation of the **AZ** Series

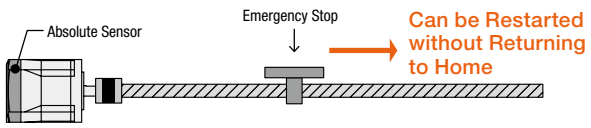
There is no need to detect the limit sensor, and it can travel directly at high speed to the home position recorded by the Absolute Sensor.




## Shortened Reset Time ② Return-to-Home is Not Necessary

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 performing a return-to-home operation when recovering from an emergency stop of the production line or a blackout.

### Built-in Controller Type



## No Battery Required

No battery is required thanks to a mechanical-type sensor.
Because positioning information is managed mechanically by the Absolute 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 is 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 Absolute Sensor does not require a battery, so there is no limit as to how long the positioning information is maintained. In addition, there is 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 Absolute Sensor.

●Because the positioning information is stored in the Absolute Sensor, the home position must be reset if the motor is replaced.

## High Reliability

High reliability is provided by using a hybrid control method unique to Oriental Motor that combines the merits of both open loop control and closed loop control.

### ●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.

### ●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, positioning is still possible without gain tuning even when the load fluctuates due to the use of a belt mechanism, cam or chain drive, etc.

### ●Holding the Stop Position

During positioning, the motor stops with its own holding force without hunting. Because of this, it is ideal for applications where the low rigidity of the mechanism requires absence of vibration upon stopping.

### ●Smooth Operation Even at Low Speed

Thanks to the standard microstep drive and smooth drive function*, vibration is reduced even at low speed and the motor can move objects smoothly.

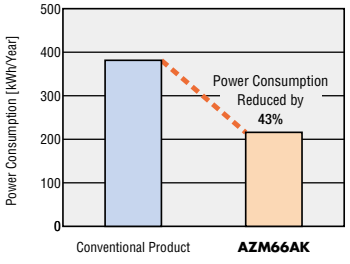
*The smooth drive function automatically microsteps based on the same traveling amount and speed used in the full step mode, without changing the pulse input settings.

## Energy Savings

Energy savings are realized with a high efficiency motor.

### ●43% Less Power Consumption* than Conventional Oriental Motor Products Due to Energy-Saving Features

●Power Consumption




*Operating Condition
- Speed: 1000 r/min, load factor: 50%
- Operating Time: 24 hours of operation, 365 days/year (70% operating, 25% stand-by, 5% off)
- Power Supply Voltage: 24 VDC

## 3 Driver Types Available Depending on the System Configuration

3 Types of **AZ** Series drivers are available, depending on the master control system in use.

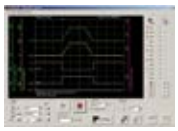
### ●Built-in Controller Type FLEX

With this type, the operating data is set in the driver, which can then be selected and executed from the host system. Host system connection and control are performed with I/O, Modbus (RTU)/RS-485 or FA network. By using a network converter (sold separately), EtherCAT, CC-link or MECHATROLINK communication is possible.

**Basic Setting** (Factory Setting)

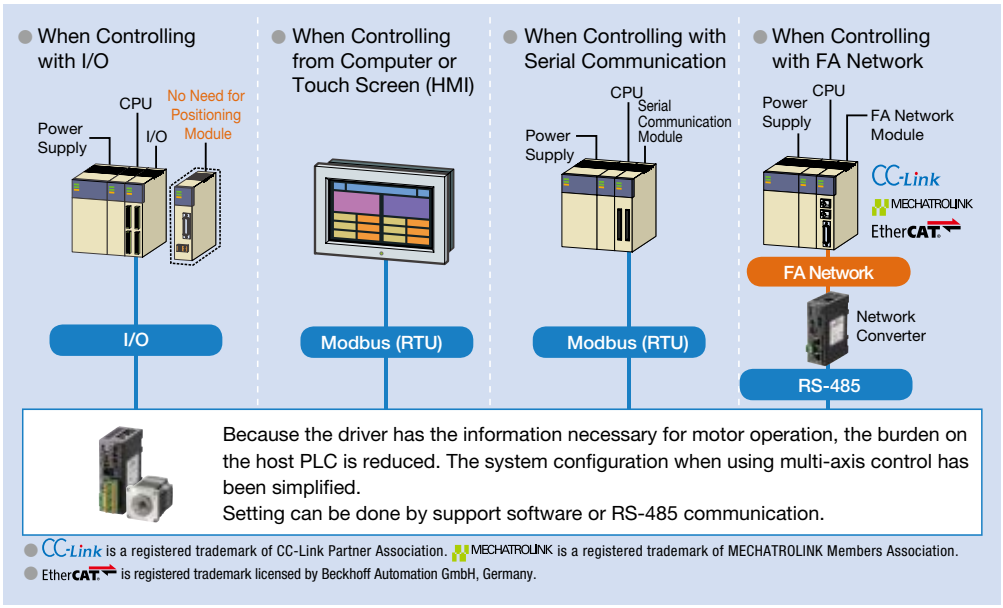

**Setting Operating Data and Changing Parameters**

Support Software **MEXE02**



●Setting using RS-485 communication is also possible.

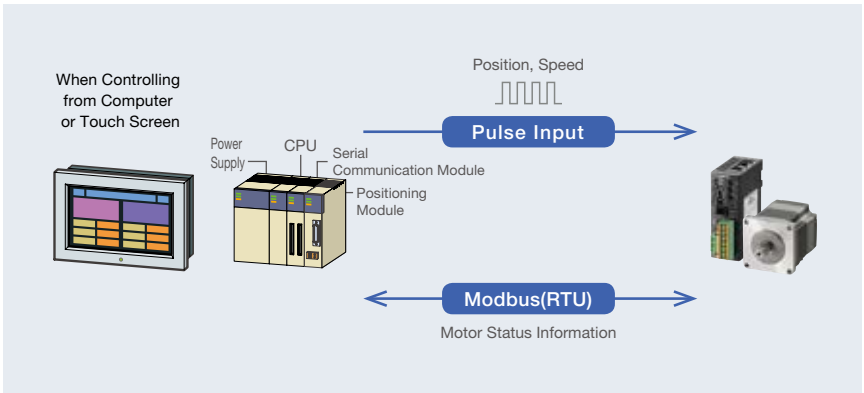
FLEX is the collective name for products that support I/O control, Modbus (RTU) control, and FA network control via network converters.



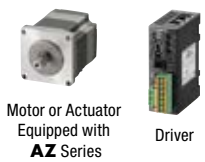



### ●Pulse Input Type with RS-485 Communication

This type executes operations by inputting pulses into the driver. Control the motor using a positioning module (pulse generator) that you have obtained yourself. Motor status information (position, speed, torque, alarm, temperature, etc.) can be checked by using RS-485 communication.




**Basic Setting (Factory setting)**




**I/O Assignment Changing** **Parameter Changing**

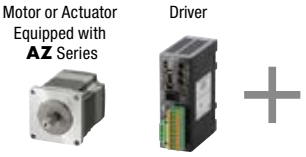
Support Software (**MEXE02**)

The support software (**MEXE02**) can be used to check the alarm history and monitor status information.

## Pulse Input Type

This type executes operations by inputting pulses into the driver. It controls the motor using a positioning module (pulse generator).

**Basic Setting** (Factory setting)

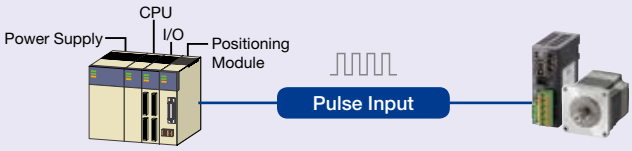



**I/O Assignment Changing**

**Parameter Changing**

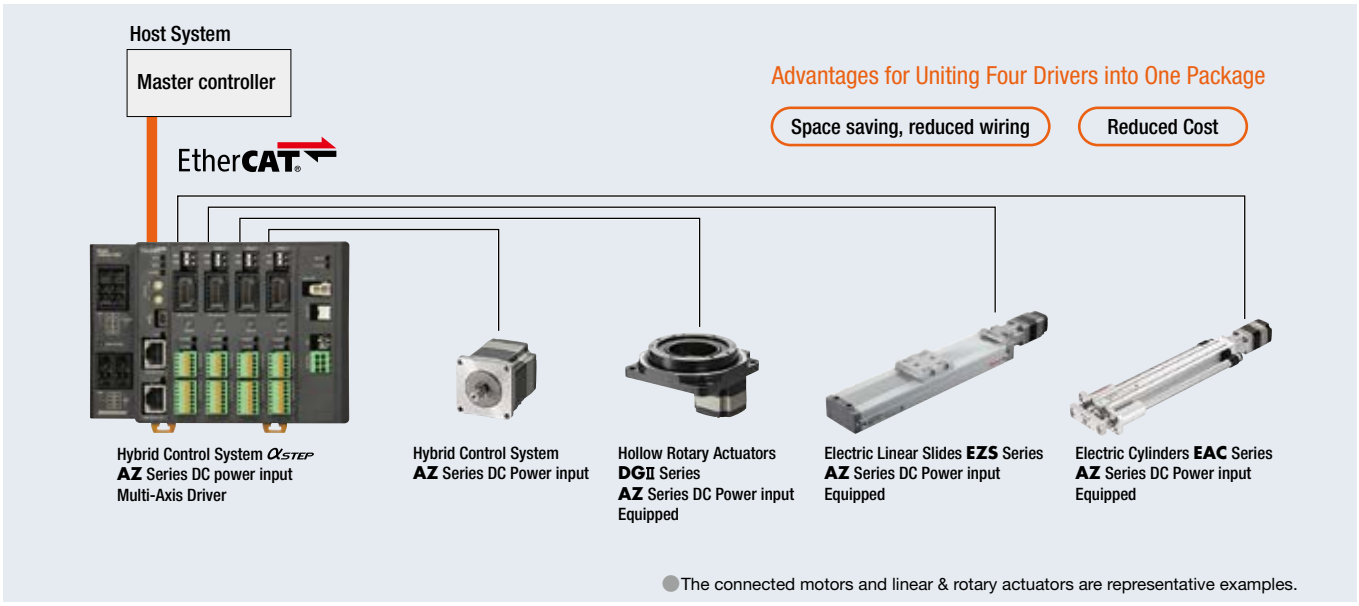
Support Software (**MEXE02**)

The support software (**MEXE02**) can be used to check the alarm history and monitor status information.




## EtherCAT Compatible Multi-Axis Driver

This multi-axis driver supports EtherCAT driver profiles. It allows you to connect **AZ** Series DC input motors as well as linear & rotary actuators equipped with these motors. Drivers that can connect to 2, 3 or 4 axes are available.




● The connected motors and linear & rotary actuators are representative examples.

● EtherCAT is registered trademark licensed by Beckhoff Automation GmbH, Germany.

● The support software **MEXE02** can be downloaded from the Oriental Motor website. Oriental Motor can also provide media (free).

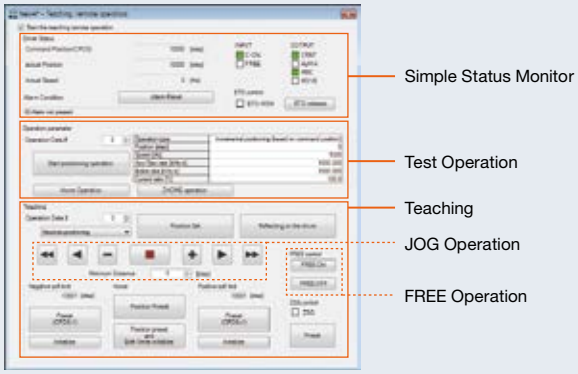
# Easy Operation through the Use of the Support Software **MEXE02**

## ●Test Function

This function enables you to operate a motor alone or check the connection to the host system.
Using this function when starting up the equipment can reduce the overall startup time.

### ◇Teaching and Remote Operation On startup

Support software can be used to easily perform the home setting and also drive the motor. Teaching, test operations, and more can be performed before connecting to the host system, contributing to shorter equipment startup time.



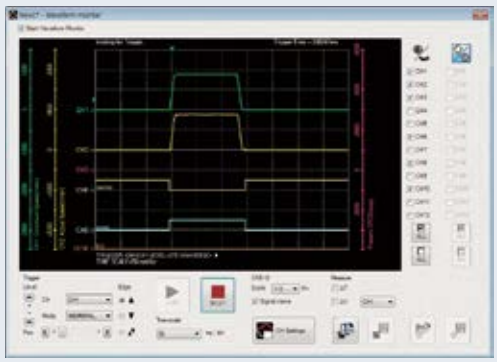

### ◇I/O Test On startup For operation

Monitoring input signals and forced output of output signals can be performed. These are convenient functions for confirming wiring with the host system and network I/O operation.

## ●Various Monitoring Functions

### ◇Waveform Monitoring On startup

The operating status of the motor and output signals can be checked by an oscilloscope-like image. This can be used for equipment start-up and adjustment.

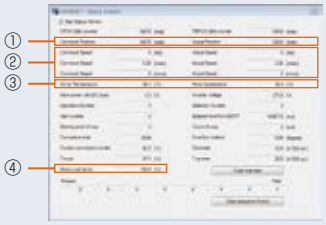


### ◇Alarm Monitoring On startup

When an abnormality occurs, the details of the abnormality, the operating status at the time of the occurrence, and the solution can be checked.

### ◇Status Monitoring On startup

Speed, motor, driver temperature, and load factor during operations, the integrating rotation amount, etc. can be monitored from the start of use. The signal for each item can be output at your discretion, which leads to efficient maintenance.




①Detects the actual position in comparison to the command position.
②Detects the actual speed in comparison to the command speed.
③Detects the temperature of the motor encoder section and inside the driver.
④With the output torque of the motor speed at 100%, the current load factor can be displayed.

### ◇Multi-Monitoring Compatible

Multiple setting screens, such as the data setting, test operation, and monitor screens, can be simultaneously opened and used. This enables smooth equipment startup, adjustment, and more.

# Product Line of Motors

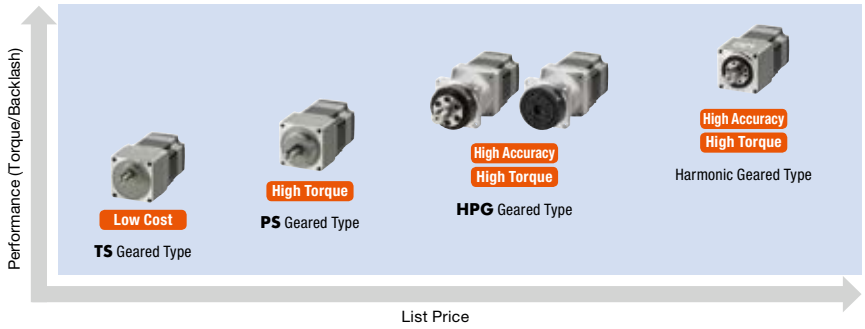
## Types and Features of Standard and Geared Motors

| | Type | | Features | Permissible Torque and Max. Instantaneous Torque [N·m (lb-in)] | Backlash [arcmin] | Basic Resolution [deg/step] | Output Shaft Speed [r/min] |
|---|---|---|---|---|---|---|---|
| | **Standard Type** |  | · Basic motor of the **AZ** Series | Maximum Holding Torque<br>2 (17.7) | — | 0.36 | 6000 |
| Low backlash | **TS** Geared Type<br>(Spur Gear Mechanism) |  | · A wide variety of low gear ratios, high-speed operations<br>· Gear ratio: 3.6, 7.2, 10, 20, 30 | Permissible Torque / Max. Instantaneous Torque<br>6 (53) 10 (88) | 10 (0.17°) | 0.012 | 833 |
| Low backlash | **PS** Geared Type<br>(Planetary Gear Mechanism) |  | · High permissible/ max. instantaneous torque<br>· A wide variety of gear ratios for selecting the desired step angle<br>· Center shaft<br>· Gear ratio: 5, 7.2, 10, 25, 36, 50 | Permissible Torque \ Max. Instantaneous Torque<br>8 (70) 20 (177) | 7 (0.12°) | 0.0072 | 600 |
| Non-backlash | **HPG** Geared Type<br>(Harmonic planetary)<br>HarmonicDrive SYSTEMS |  | · High positioning accuracy<br>· High permissible/ max. instantaneous torque<br>· Center shaft<br>· Gear ratio: 5, 9, 15 | Permissible Torque \ Max. Instantaneous Torque<br>9 (79) 23 (200) | 3 (0.05°) | 0.024 | 800 |
| Non-backlash | **Harmonic Geared Type**<br>(Harmonic drive)<br>HarmonicDrive SYSTEMS |  | · High positioning accuracy<br>· High permissible/ max. instantaneous torque<br>· High gear ratio, high resolution<br>· Center shaft<br>· Gear ratio: 50, 100 | Permissible Torque \ Max. Instantaneous Torque<br>10 (88) 36 (310) | 0 | 0.0036 | 70 |

Note

- Please use the above values as reference to see the differences between each type. These values vary depending on the motor frame size and gear ratio.
- Harmonic Planetary, Harmonic Drive and HarmonicDrive SYSTEMS are registered trademarks of Harmonic Drive Systems Inc.

Oriental Motor offers pre-assembled geared motors.
Based on torque, accuracy (backlash) and list price, the optimal type can be selected from the various geared motors.



## Motor and Driver Product Line

| Motor | | | | | |
|---|---|---|---|---|---|
| Type | Electromagnetic Brake | Frame Size | | | |
| | | 20 mm (0.79 in.) | 28 mm (1.10 in.) | 42 mm*2 (1.65 in.) | 60 mm (2.36 in.) |
| Standard Type | Not Equipped | ●*1 | ●*1 | ● | ● |
| | Equipped | — | — | ●*3 | ● |
| **TS** Geared Type | Not Equipped | — | — | ● | ● |
| | Equipped | — | — | ● | ● |
| **PS** Geared Type | Not Equipped | — | — | ● | ● |
| | Equipped | — | — | ● | ● |
| **HPG** Geared Type | Not Equipped | — | — | ● | ● |
| | Equipped | — | — | ● | ● |
| Harmonic Geared Type | Not Equipped | — | — | ● | ● |
| | Equipped | — | — | ● | ● |

*1 24 VDC only *2 **HPG** Geared Type is 40 mm (1.57 in.) *3 **AZM46** only

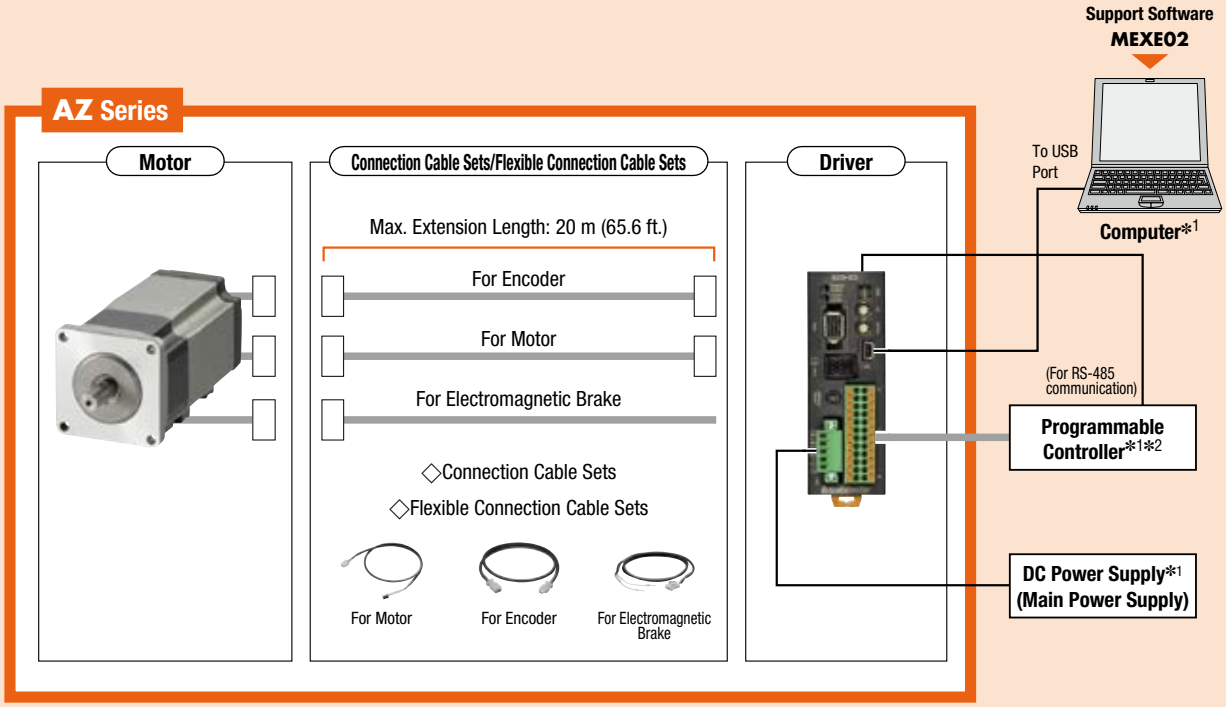
| Driver | |
|---|---|
| Power Supply Input | Type |
| 24/48 VDC | Built-in Controller Type  |
| | Pulse Input Type with RS-485 Communication  |
| | Pulse Input Type  |
| | Network Compatible Multi-Axis Driver EtherCAT  |

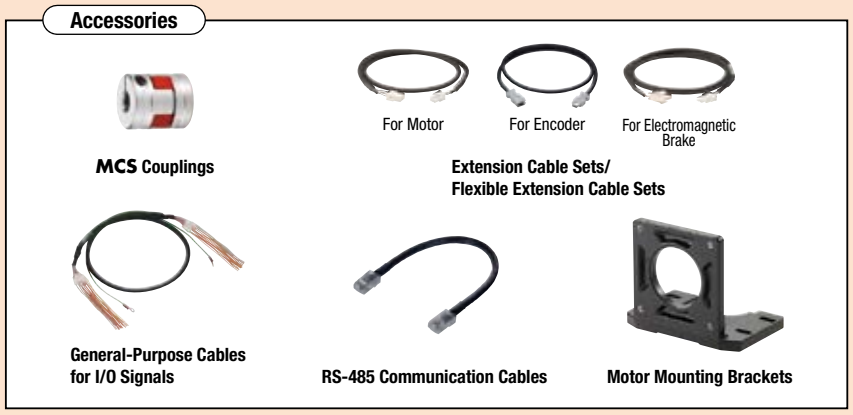
Overview
αSTEP Absolute AZ
Linear Slides αSTEP EZS
Cylinders αSTEP EAC
Cylinders αSTEP DRS2
Rotary Actuators αSTEP DGII
αSTEP AR

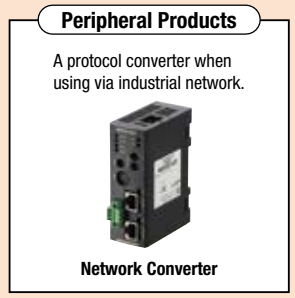
# System Configuration

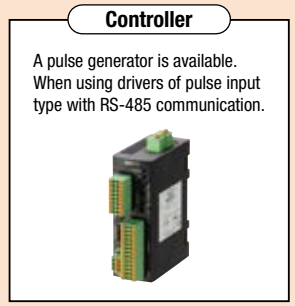
## ●Combination of Standard Type Motor with an Electromagnetic Brake and Built-in Controller Type Driver or the Pulse Input Type Driver with RS-485 Communication

A configuration example of I/O control with a built-in controller type driver or using RS-485 communication is shown below.
Motors, drivers, and a connection cable set/flexible connection cable set need to be ordered separately.




*1 Not supplied.
*2 For drivers of pulse input type with RS-485 communication, use a controller that has a pulse generating function.

● The **MEXE02** can be downloaded from Oriental Motor Website Download Page.
For the functions and operating method of this product, refer to the operating manuals (Driver Edition and Function Edition).
The OPERATING MANUAL Driver Edition is included in the product, but the OPERATING MANUAL Function Edition is not included.
For detail, contact the nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.
http://www.orientalmotor.com/

### ●Example of System Configuration Pricing

| AZ Series | | | | Accessories | | |
|---|---|---|---|---|---|---|
| Motor | Driver | Connection Cable Set | + | Motor Mounting Bracket | Flexible Coupling | General Purpose Cables for I/O Signals 1 m (3.3 ft.) |
| AZM66MK | AZD-KD | CC030VZFB2 | | PAL2P-5 | MCS201010 | CC16D010B-1 |
| $565.00 | $441.00 | $82.00 | | $17.00 | $50.00 | $25.00 |

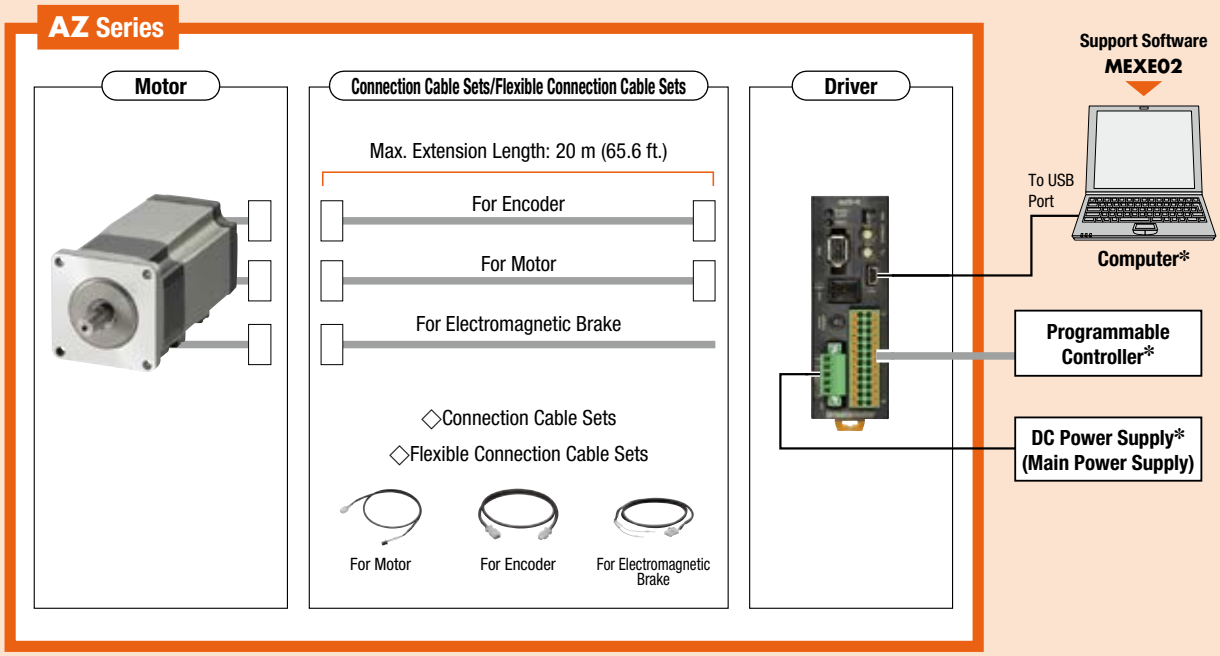
● The system configuration shown above is an example. Other combinations are also available.

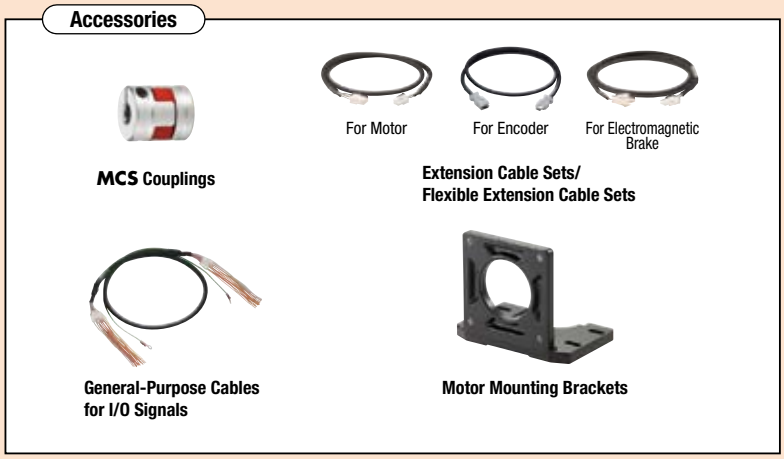
Note

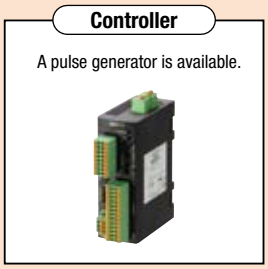
● The motor cable and electromagnetic brake cable from the motor cannot be connected directly to the driver. When connecting to a driver, use a connection cable.

## Combination of Standard Type Motor with an Electromagnetic Brake and Pulse Input Type Driver

An example of a single-axis system configuration with the programmable controller (equipped with the pulse oscillation function) is shown below. Motors, drivers, and a connection cable set/flexible connection cable set need to be ordered separately.




✻ Not supplied.

● The **MEXE02** can be downloaded from Oriental Motor Website Download Page.
For the functions and operating method of this product, refer to the operating manuals (Driver Edition and Function Edition).
The OPERATING MANUAL Driver Edition is included in the product, but the OPERATING MANUAL Function Edition is not included.
For detail, contact the nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.
http://www.orientalmotor.com/

## Example of System Configuration Pricing

| AZ Series | | | | Controller | Accessories | | |
|---|---|---|---|---|---|---|---|
| Motor | Driver | Connection Cable Set | + | | Motor Mounting Bracket | Flexible Coupling | General Purpose Cables for I/O Signals 1 m (3.3 ft.) |
| AZM66MK | AZD-K | CC030VZFB2 | | SCX11 | PAL2P-5 | MCS201010 | CC16D010B-1 |
| $565.00 | $384.00 | $82.00 | | $349.00 | $17.00 | $50.00 | $25.00 |

● 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

## Motor

◇Standard Type

**AZM 6 6 A K**
① ② ③ ④ ⑤

◇**TS**, **PS**, **HPG**, Harmonic Geared Type

**AZM 6 6 A K - HP 15 F**
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

| | | |
|---|---|---|
| ① | Series Name | **AZM**: **AZ** Series Motor |
| ② | Motor Frame Size | **1**: 20 mm (0.79 in.)<br>**2**: 28 mm (1.10 in.)<br>**4**: 42 mm (1.65 in.) (**HPG** Geared Type is 40 mm (1.57 in.))<br>**6**: 60 mm (2.36 in.) |
| ③ | Motor Case Length | |
| ④ | Motor Shaft Features | **A**: Single Shaft **M**: with Electromagnetic Brake |
| ⑤ | Motor Power Supply Input | **K**: DC Power Supply Input Type |
| ⑥ | Gear Type | **TS**: **TS** Geared Type<br>**PS**: **PS** Geared Type<br>**HP**: **HPG** Geared Type<br>**HS**: Harmonic Geared Type |
| ⑦ | Gear Ratio | |
| ⑧ | Output Shaft Type | **HPG** Geared Type<br>Blank: Shaft Output **F**: Flange Output |

## Driver

**AZD - K D**
① ② ③

| | | |
|---|---|---|
| ① | Driver type | **AZD**: **AZ** Series Driver |
| ② | Power Supply Input | **K**: 24 VDC/48 VDC |
| ③ | Type | **D**: Built-in Controller Type<br>**X**: Pulse Input Type with RS-485 Communication<br>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 ⑧

| | | |
|---|---|---|
| ① | | **CC**: Cable |
| ② | Length | **010**: 1 m (3.3 ft.) **020**: 2 m (6.6 ft.) **030**: 3 m (9.8 ft.)<br>**050**: 5 m (16.4 ft.) **070**: 7 m (23.0 ft.) **100**: 10 m (32.8 ft.)<br>**150**: 15 m (49.2 ft.) **200**: 20 m (65.6 ft.) |
| ③ | Reference Number | |
| ④ | Applicable Model | **Z**: **AZ** Series |
| ⑤ | Reference Number | Blank: Frame Size 42 mm (1.65 in.) (**HPG** Geared Type is 40 mm (1.57 in.)), 60 mm (2.36 in.)<br>**2**: Frame Size 20 mm (0.79 in.), 28 mm (1.10 in.) |
| ⑥ | Cable Type | **F**: Connection Cable Set<br>**R**: Flexible Connection Cable Set |
| ⑦ | Electromagnetic Brake | Blank: without Electromagnetic Brake<br>**B**: with Electromagnetic Brake |
| ⑧ | Power Supply Cable | **2**: DC Power Supply Input |

## Product Line

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

### ●Motor

#### ◇Standard Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 20 mm (0.79 in.) | **AZM14AK** | $283.00 |
| | **AZM15AK** | $283.00 |
| 28 mm (1.10 in.) | **AZM24AK** | $283.00 |
| | **AZM26AK** | $283.00 |
| 42 mm (1.65 in.) | **AZM46AK** | $307.00 |
| | **AZM48AK** | $325.00 |
| 60 mm (2.36 in.) | **AZM66AK** | $362.00 |
| | **AZM69AK** | $367.00 |

#### ◇Standard Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46MK** | $466.00 |
| 60 mm (2.36 in.) | **AZM66MK** | $565.00 |
| | **AZM69MK** | $571.00 |

#### ◇**TS** Geared Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46AK-TS3.6** | $441.00 |
| | **AZM46AK-TS7.2** | $441.00 |
| | **AZM46AK-TS10** | $457.00 |
| | **AZM46AK-TS20** | $457.00 |
| | **AZM46AK-TS30** | $457.00 |
| 60 mm (2.36 in.) | **AZM66AK-TS3.6** | $519.00 |
| | **AZM66AK-TS7.2** | $519.00 |
| | **AZM66AK-TS10** | $534.00 |
| | **AZM66AK-TS20** | $534.00 |
| | **AZM66AK-TS30** | $534.00 |

#### ◇**TS** Geared Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46MK-TS3.6** | $599.00 |
| | **AZM46MK-TS7.2** | $599.00 |
| | **AZM46MK-TS10** | $615.00 |
| | **AZM46MK-TS20** | $615.00 |
| | **AZM46MK-TS30** | $615.00 |
| 60 mm (2.36 in.) | **AZM66MK-TS3.6** | $722.00 |
| | **AZM66MK-TS7.2** | $722.00 |
| | **AZM66MK-TS10** | $738.00 |
| | **AZM66MK-TS20** | $738.00 |
| | **AZM66MK-TS30** | $738.00 |

#### ◇**PS** Geared Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46AK-PS5** | $567.00 |
| | **AZM46AK-PS7.2** | $567.00 |
| | **AZM46AK-PS10** | $567.00 |
| | **AZM46AK-PS25** | $624.00 |
| | **AZM46AK-PS36** | $624.00 |
| | **AZM46AK-PS50** | $624.00 |
| 60 mm (2.36 in.) | **AZM66AK-PS5** | $678.00 |
| | **AZM66AK-PS7.2** | $678.00 |
| | **AZM66AK-PS10** | $678.00 |
| | **AZM66AK-PS25** | $757.00 |
| | **AZM66AK-PS36** | $757.00 |
| | **AZM66AK-PS50** | $757.00 |

#### ◇**PS** Geared Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46MK-PS5** | $725.00 |
| | **AZM46MK-PS7.2** | $725.00 |
| | **AZM46MK-PS10** | $725.00 |
| | **AZM46MK-PS25** | $782.00 |
| | **AZM46MK-PS36** | $782.00 |
| | **AZM46MK-PS50** | $782.00 |
| 60 mm (2.36 in.) | **AZM66MK-PS5** | $881.00 |
| | **AZM66MK-PS7.2** | $881.00 |
| | **AZM66MK-PS10** | $881.00 |
| | **AZM66MK-PS25** | $961.00 |
| | **AZM66MK-PS36** | $961.00 |
| | **AZM66MK-PS50** | $961.00 |

#### ◇**HPG** Geared Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 40 mm (1.57 in.) | **AZM46AK-HP5** | $669.00 |
| | **AZM46AK-HP5F** | $658.00 |
| | **AZM46AK-HP9** | $669.00 |
| | **AZM46AK-HP9F** | $658.00 |
| 60 mm (2.36 in.) | **AZM66AK-HP5** | $904.00 |
| | **AZM66AK-HP5F** | $887.00 |
| | **AZM66AK-HP15** | $1,070.00 |
| | **AZM66AK-HP15F** | $1,053.00 |

#### ◇**HPG** Geared Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 40 mm (1.57 in.) | **AZM46MK-HP5** | $827.00 |
| | **AZM46MK-HP5F** | $816.00 |
| | **AZM46MK-HP9** | $827.00 |
| | **AZM46MK-HP9F** | $816.00 |
| 60 mm (2.36 in.) | **AZM66MK-HP5** | $1,107.00 |
| | **AZM66MK-HP5F** | $1,090.00 |
| | **AZM66MK-HP15** | $1,274.00 |
| | **AZM66MK-HP15F** | $1,257.00 |

### ◇Harmonic Geared Type

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46AK-HS50** | $901.00 |
| | **AZM46AK-HS100** | $901.00 |
| 60 mm (2.36 in.) | **AZM66AK-HS50** | $1,215.00 |
| | **AZM66AK-HS100** | $1,215.00 |

### ◇Harmonic Geared Type with an Electromagnetic Brake

| Frame Size | Product Name | List Price |
|---|---|---|
| 42 mm (1.65 in.) | **AZM46MK-HS50** | $1,059.00 |
| | **AZM46MK-HS100** | $1,059.00 |
| 60 mm (2.36 in.) | **AZM66MK-HS50** | $1,418.00 |
| | **AZM66MK-HS100** | $1,418.00 |

## ●Driver

### ◇Built-in Controller Type

| Power Supply Input | Product Name | List Price |
|---|---|---|
| 24/48 VDC | **AZD-KD** | $441.00 |

### ◇Pulse Input Type with RS-485 Communication

| Power Supply Input | Product Name | List Price |
|---|---|---|
| 24/48 VDC | **AZD-KX** | $441.00 |

### ◇Pulse Input Type

| Power Supply Input | Product Name | List Price |
|---|---|---|
| 24/48 VDC | **AZD-K** | $384.00 |

## ●Connection Cable Sets/Flexible Connection Cable Sets

Use a flexible connection cable set if the cable will be bent. We also offer extension cables and flexible extension cables that can be added to a connection cable.

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.

[For **AZM14**, **AZM15**, **AZM24**, and **AZM26**]

### ◇For Motor/Encoder

| Product Line | Length m (ft.) | Product Name | List Price |
|---|---|---|---|
| Connection Cable Sets | 1 (3.3) | **CC010VZ2F2** | $35.00 |
| | 2 (6.6) | **CC020VZ2F2** | $50.00 |
| | 3 (9.8) | **CC030VZ2F2** | $62.00 |
| | 5 (16.4) | **CC050VZ2F2** | $110.00 |
| | 7 (23.0) | **CC070VZ2F2** | $136.00 |
| | 10 (32.8) | **CC100VZ2F2** | $176.00 |
| | 15 (49.2) | **CC150VZ2F2** | $243.00 |
| | 20 (65.6) | **CC200VZ2F2** | $310.00 |
| Flexible Connection Cable Sets | 1 (3.3) | **CC010VZ2R2** | $84.00 |
| | 2 (6.6) | **CC020VZ2R2** | $99.00 |
| | 3 (9.8) | **CC030VZ2R2** | $111.00 |
| | 5 (16.4) | **CC050VZ2R2** | $141.00 |
| | 7 (23.0) | **CC070VZ2R2** | $180.00 |
| | 10 (32.8) | **CC100VZ2R2** | $236.00 |
| | 15 (49.2) | **CC150VZ2R2** | $332.00 |
| | 20 (65.6) | **CC200VZ2R2** | $426.00 |

[For **AZM46**, **AZM48**, **AZM66**, and **AZM69**]

### ◇For Motor/Encoder


For Motor


For Encoder

| Product Line | Length m (ft.) | Product Name | List Price |
|---|---|---|---|
| Connection Cable Sets | 1 (3.3) | **CC010VZF2** | $35.00 |
| | 2 (6.6) | **CC020VZF2** | $50.00 |
| | 3 (9.8) | **CC030VZF2** | $62.00 |
| | 5 (16.4) | **CC050VZF2** | $110.00 |
| | 7 (23.0) | **CC070VZF2** | $136.00 |
| | 10 (32.8) | **CC100VZF2** | $176.00 |
| | 15 (49.2) | **CC150VZF2** | $243.00 |
| | 20 (65.6) | **CC200VZF2** | $310.00 |
| Flexible Connection Cable Sets | 1 (3.3) | **CC010VZR2** | $84.00 |
| | 2 (6.6) | **CC020VZR2** | $99.00 |
| | 3 (9.8) | **CC030VZR2** | $111.00 |
| | 5 (16.4) | **CC050VZR2** | $141.00 |
| | 7 (23.0) | **CC070VZR2** | $180.00 |
| | 10 (32.8) | **CC100VZR2** | $236.00 |
| | 15 (49.2) | **CC150VZR2** | $332.00 |
| | 20 (65.6) | **CC200VZR2** | $426.00 |

### ◇For Motor/Encoder/ Electromagnetic Brake


For Motor


For Encoder


For Electromagnetic Brake

| Product Line | Length m (ft.) | Product Name | List Price |
|---|---|---|---|
| Connection Cable Sets | 1 (3.3) | **CC010VZFB2** | $52.00 |
| | 2 (6.6) | **CC020VZFB2** | $67.00 |
| | 3 (9.8) | **CC030VZFB2** | $82.00 |
| | 5 (16.4) | **CC050VZFB2** | $135.00 |
| | 7 (23.0) | **CC070VZFB2** | $166.00 |
| | 10 (32.8) | **CC100VZFB2** | $213.00 |
| | 15 (49.2) | **CC150VZFB2** | $293.00 |
| | 20 (65.6) | **CC200VZFB2** | $372.00 |
| Flexible Connection Cable Sets | 1 (3.3) | **CC010VZRB2** | $114.00 |
| | 2 (6.6) | **CC020VZRB2** | $134.00 |
| | 3 (9.8) | **CC030VZRB2** | $151.00 |
| | 5 (16.4) | **CC050VZRB2** | $191.00 |
| | 7 (23.0) | **CC070VZRB2** | $240.00 |
| | 10 (32.8) | **CC100VZRB2** | $311.00 |
| | 15 (49.2) | **CC150VZRB2** | $432.00 |
| | 20 (65.6) | **CC200VZRB2** | $551.00 |

## Included

### Motor

| Type | | Parallel key | Motor Mounting Screws | Operating Manual |
|---|---|---|---|---|
| Standard | | — | — | 1 Copy |
| **TS** Geared | Frame Size 42 mm (1.65 in.) | — | — | |
| | Frame Size 60 mm (2.36 in.) | 1 pc. | M4×60 P0.7 (4 Screws) | |
| **PS** Geared | Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.) | 1 pc. | — | |
| **HPG** Geared | Shaft Output | 1 pc. | — | |
| | Flange Output | — | — | |
| Harmonic Geared | Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.) | 1 pc. | — | |

● For product functions and operating methods, refer to the operating manual (for functions). The operating manual for functions is not included with the product. Please contact the nearest Oriental Motor sales office, or download it from the Oriental Motor website.

### Driver

| Type | Connector | Operating Manual |
|---|---|---|
| Common to All types | • CN4 Connector (1 pc.)<br>• CN1 Connector (1 pc.) | 1 Copy |

### Connection Cable Sets/Flexible Connection Cable Sets

| Type | Operating Manual |
|---|---|
| Connection Cable Sets | — |
| Flexible Connection Cable Sets | 1 Copy |

# Standard Type Frame Size 20 (0.79 in.) mm, 28 mm (1.10 in.)



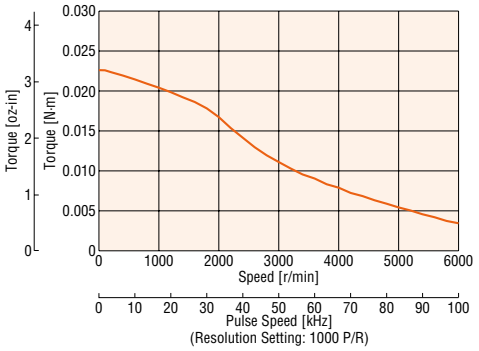
## Specifications

CE

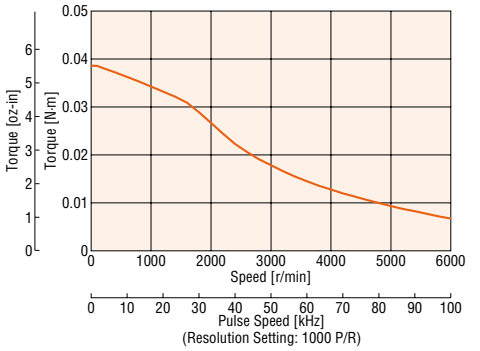
| Motor Product Name | Single Shaft | | AZM14AK | AZM15AK | AZM24AK | AZM26AK |
|---|---|---|---|---|---|---|
| Driver Product Name | Built-in Controller Type | | AZD-KD | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-KX | | | |
| | Pulse Input Type | | AZD-K | | | |
| Maximum Holding Torque | | N·m (oz-in) | 0.02 (2.8) | 0.036 (5.1) | 0.095 (13.4) | 0.19 (26) |
| Holding Torque at Motor Standstill | | N·m (oz-in) | 0.01 (1.42) | 0.018 (2.5) | 0.047 (6.6) | 0.095 (13.4) |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | 2.7×10$^{-7}$ (0.0148) | 3.9×10$^{-7}$ (0.021) | 9.2×10$^{-7}$ (0.050) | 17×10$^{-7}$ (0.093) |
| Resolution | | Resolution Setting: 1000 P/R | 0.36°/Pulse | | | |
| Power Supply Input | Voltage | | 24 VDC±5% | | | |
| | Input Current | A | 0.5 | 0.6 | 1.6 | 1.6 |

## Speed – Torque Characteristics (Reference Values)

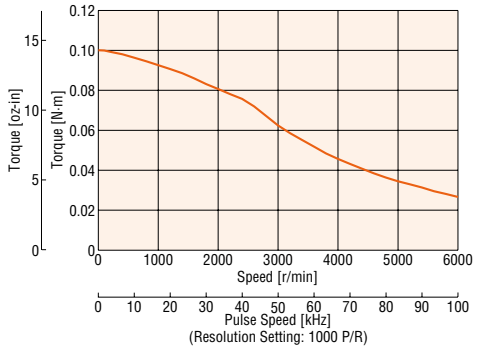
**AZM14**



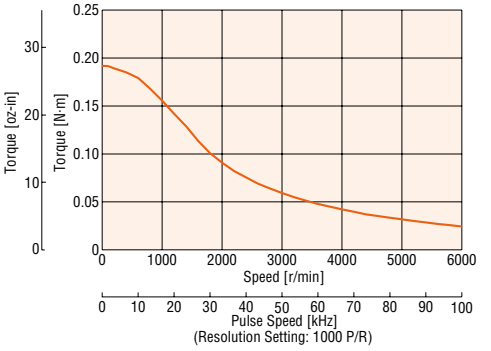

**AZM15**




**AZM24**




**AZM26**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max.

# Standard Type Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.)

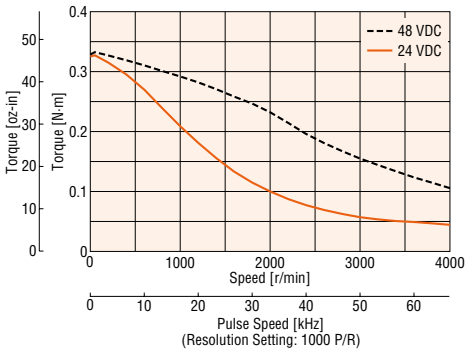
## Specifications

| | | | AZM46AK | AZM48AK | AZM66AK | AZM69AK |
|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46MK | – | AZM66MK | AZM69MK |
| Driver Product Name | Built-in Controller Type | | AZD-KD | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-KX | | | |
| | Pulse Input Type | | AZD-K | | | |
| Maximum HoldingTorque | | N·m (oz-in) | 0.3 (42) | 0.72 (102) | 1 (142) | 2 (280) |
| Holding Torque at Motor Standstill | Power On | N·m (oz-in) | 0.15 (21) | 0.36 (51) | 0.5 (71) | 1 (142) |
| | Electromagnetic Brake | N·m (oz-in) | 0.15 (21) | – | 0.5 (71) | 1 (142) |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | $55\times10^{-7}$ (0.30) [$71\times10^{-7}$ (0.39)]*1 | $115\times10^{-7}$ (0.63) | $370\times10^{-7}$ (2.0) [$530\times10^{-7}$(2.9)]*1 | $740\times10^{-7}$ (4.0) [$900\times10^{-7}$(4.9)]*1 |
| Resolution | Resolution Setting: 1000 P/R | | 0.36°/Pulse | | | |
| Power Supply Input | Voltage | | 24 VDC±5%*2/ 48 VDC±5%*3 | 24 VDC±5%/ 48 VDC±5%*3 | 24 VDC±5%*2/ 48 VDC±5%*3 | |
| | Input current | A | 1.72 [1.8]*1 | 2.2 | 3.55 [3.8]*1 | 3.45 [3.7]*1 |

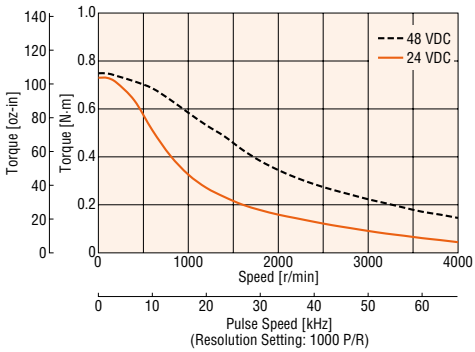
*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.
*3 When the motor is operated with 48 VDC input, as a reference, keep the load inertia 10 times the rotor inertial ratio or less and twice the safety factor or more when calculating the acceleration torque. (Excluding **AZM46**)
*4 Only for the motor part.

## Speed – Torque Characteristics (Reference Values)

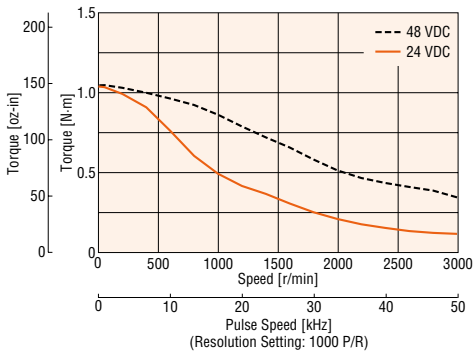
**AZM46**



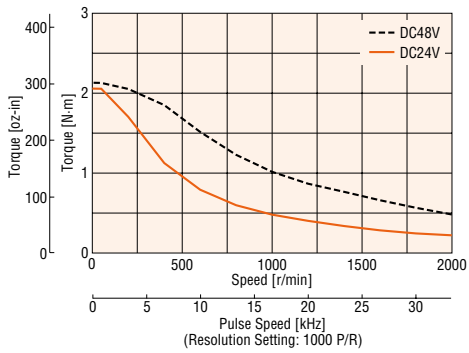

**AZM48**




**AZM66**




**AZM69**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL/CSA Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# TS Geared Type Frame Size 42 mm (1.65 in.)



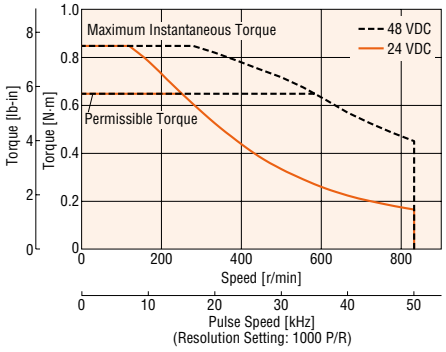
## Specifications

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46AK-TS3.6 | AZM46AK-TS7.2 | AZM46AK-TS10 | AZM46AK-TS20 | AZM46AK-TS30 |
| | with Electromagnetic Brake | | AZM46MK-TS3.6 | AZM46MK-TS7.2 | AZM46MK-TS10 | AZM46MK-TS20 | AZM46MK-TS30 |
| Driver Product Name | Built-in Controller Type | | AZD-KD | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-KX | | | | |
| | Pulse Input Type | | AZD-K | | | | |
| Maximum Holding Torque | | N·m (oz-in) | 0.65 (92) | 1.2 (170) | 1.7 (240) | 2 (280) | 2.3 (320) |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | $55\times10^{-7}$ (0.30) [$71\times10^{-7}$ (0.39)]*1 | | | | |
| Gear Ratio | | | 3.6 | 7.2 | 10 | 20 | 30 |
| Resolution | | Resolution Setting: 1000 P/R | 0.1°/Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.018°/Pulse | 0.012°/Pulse |
| Permissible Torque | | N·m (oz-in) | 0.65 (92) | 1.2 (170) | 1.7 (240) | 2 (280) | 2.3 (320) |
| Maximum Instantaneous Torque* | | N·m (oz-in) | 0.85 (120) | 1.6 (220) | 2 (280) | * | 3 (420) |
| Holding Torque at Motor Standstill | Power On | N·m (oz-in) | 0.54 (76) | 1 (142) | 1.5 (210) | 1.8 (250) | 2.3 (320) |
| | Electromagnetic Brake | N·m (oz-in) | 0.54 (76) | 1 (142) | 1.5 (210) | 1.8 (250) | 2.3 (320) |
| Speed Range | | r/min | 0 - 833 | 0 - 416 | 0 - 300 | 0 - 150 | 0 - 100 |
| Backlash | | arcmin | 45 (0.75°) | 25 (0.42°) | | 15 (0.25°) | |
| Power Supply Input | Voltage | | 24V DC±5%*2/48 VDC ±5% | | | | |
| | Input current | A | 1.72 [1.8]*1 | | | | |

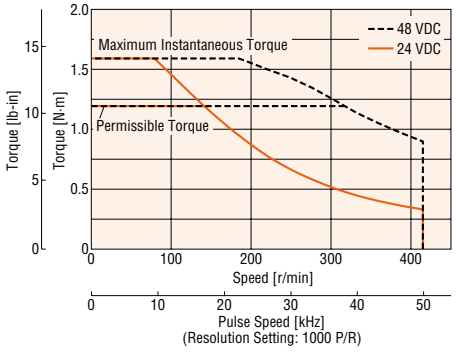
*For the geared motor output torque, refer to the speed – torque characteristics.
*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.
*3 Only for the motor part.

## Speed – Torque Characteristics (Reference Values)

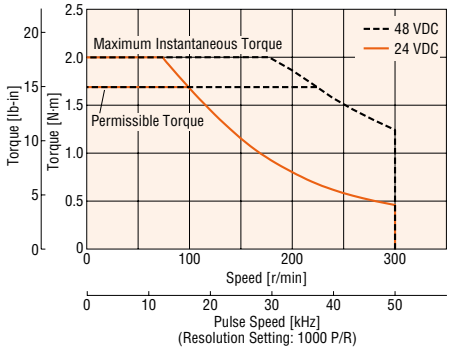
**AZM46** Gear Ratio **3.6**



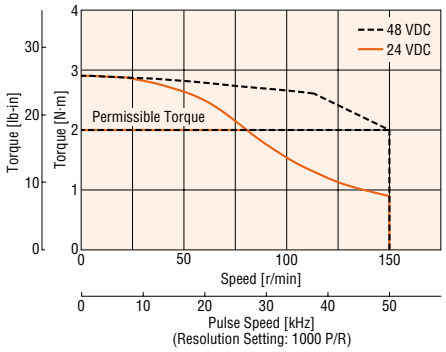

**AZM46** Gear Ratio **7.2**



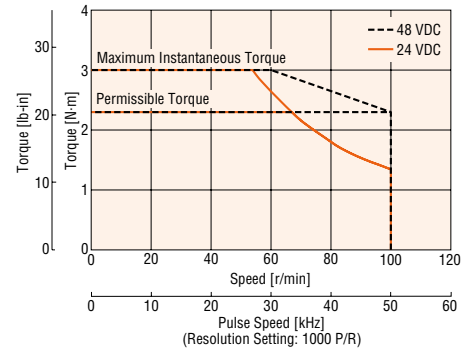

**AZM46** Gear Ratio **10**




**AZM46** Gear Ratio **20**




**AZM46** Gear Ratio **30**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL/CSA Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# TS Geared Type Frame Size 60 mm (2.36 in.)

## Specifications

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM66AK-TS3.6 | AZM66AK-TS7.2 | AZM66AK-TS10 | AZM66AK-TS20 | AZM66AK-TS30 |
| | with Electromagnetic Brake | | AZM66MK-TS3.6 | AZM66MK-TS7.2 | AZM66MK-TS10 | AZM66MK-TS20 | AZM66MK-TS30 |
| Driver Product Name | Built-in Controller Type | | AZD-KD | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-KX | | | | |
| | Pulse Input Type | | AZD-K | | | | |
| Maximum Holding Torque | | N·m (lb-in) | 1.8 (15.9) | 3 (26) | 4 (35) | 5 (44) | 6 (53) |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | 370×10$^{-7}$ (2.0) [530×10$^{-7}$ (2.9)]*1 | | | | |
| Gear Ratio | | | 3.6 | 7.2 | 10 | 20 | 30 |
| Resolution | | Resolution Setting: 1000 P/R | 0.1°/Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.018°/Pulse | 0.012°/Pulse |
| Permissible Torque | | N·m (lb-in) | 1.8 (15.9) | 3 (26) | 4 (35) | 5 (44) | 6 (53) |
| Maximum Instantaneous Torque* | | N·m (lb-in) | * | * | * | 8 (70) | 10 (88) |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 1.1 (9.7) | 2.2 (19.4) | 3 (26) | 5 (44) | 6 (53) |
| | Electromagnetic Brake | N·m (lb-in) | 1.1 (9.7) | 2.2 (19.4) | 3 (26) | 5 (44) | 6 (53) |
| Speed Range | | r/min | 0 - 833 | 0 - 416 | 0 - 300 | 0 - 150 | 0 - 100 |
| Backlash | | arcmin | 35 (0.59°) | 15 (0.25°) | | 10 (0.17°) | |
| Power Supply Input | Voltage | | 24 VDC±5%*2/48 VDC ±5%*3 | | | | |
| | Input current | A | 3.55 [3.8]*1 | | | | |

*For the geared motor output torque, refer to the speed – torque characteristics.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

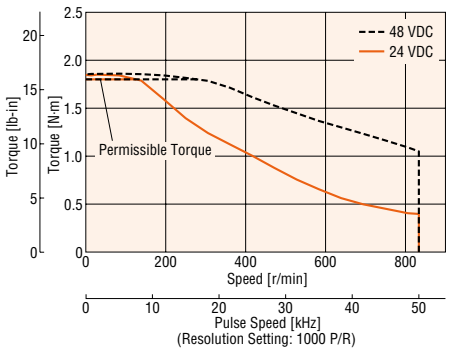
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

*3 When the motor is operated with 48 VDC input, as a reference, keep the load inertia 10 times the rotor inertial ratio or less and twice the safety factor or more when calculating the acceleration torque.

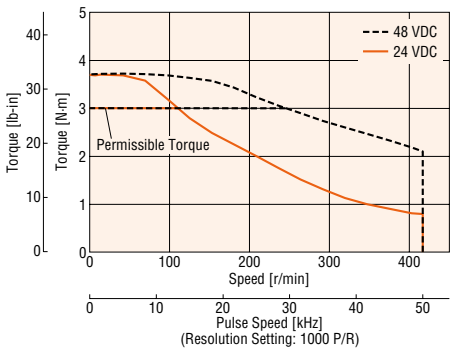
*4 Only for the motor part.

## Speed – Torque Characteristics (Reference Values)

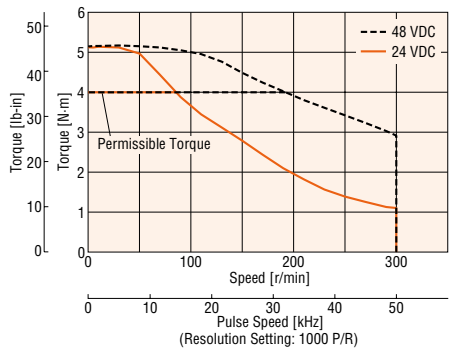
**AZM66** Gear Ratio **3.6**



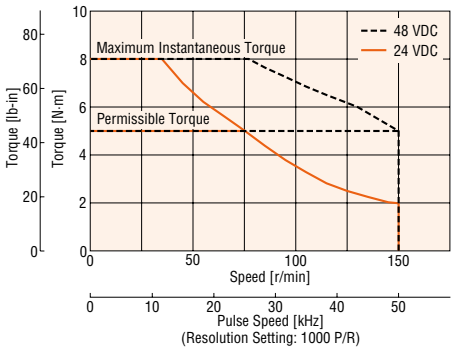

**AZM66** Gear Ratio **7.2**



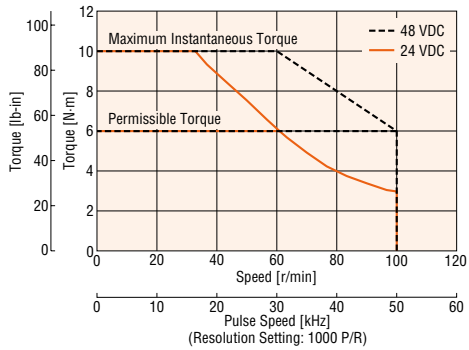

**AZM66** Gear Ratio **10**




**AZM66** Gear Ratio **20**




**AZM66** Gear Ratio **30**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL/CSA Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# PS Geared Type Frame Size 42 mm (1.65 in.)



## Specifications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46AK-PS5 | AZM46AK-PS7.2 | AZM46AK-PS10 | AZM46AK-PS25 | AZM46AK-PS36 | AZM46AK-PS50 |
| | with Electromagnetic Brake | | AZM46MK-PS5 | AZM46MK-PS7.2 | AZM46MK-PS10 | AZM46MK-PS25 | AZM46MK-PS36 | AZM46MK-PS50 |
| Driver Product Name | Built-in Controller Type | | AZD-KD | | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-KX | | | | | |
| | Pulse Input Type | | AZD-K | | | | | |
| Maximum Holding Torque | | N·m (oz-in) | 1 (142) | 1.5 (210) | | 2.5 (350) | 3 (420) | |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | 55×10$^{-7}$ (0.30) [71×10$^{-7}$ (0.39)]*1 | | | | | |
| Gear Ratio | | | 5 | 7.2 | 10 | 25 | 36 | 50 |
| Resolution | | Resolution Setting: 1000 P/R | 0.072°/Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.0144°/Pulse | 0.01°/Pulse | 0.0072°/Pulse |
| Permissible Torque | | N·m (oz-in) | 1 (142) | 1.5 (210) | | 2.5 (350) | 3 (420) | |
| Maximum Instantaneous Torque* | | N·m (oz-in) | * | 2 (280) | | 6 (850) | * | 6 (850) |
| Holding Torque at Motor Standstill | Power On | N·m (oz-in) | 0.75 (106) | 1 (142) | 1.5 (210) | 2.5 (350) | 3 (420) | |
| | Electromagnetic Brake | N·m (oz-in) | 0.75 (106) | 1 (142) | 1.5 (210) | 2.5 (350) | 3 (420) | |
| Speed Range | | r/min | 0 - 600 | 0 - 416 | 0 - 300 | 0 - 120 | 0 - 83 | 0 - 60 |
| Backlash | | arcmin | 15 (0.25°) | | | | | |
| Power Supply Input | Voltage | | 24 VDC±5%*2/48 VDC±5% | | | | | |
| | Input current | A | 1.72 [1.8]*1 | | | | | |

*For the geared motor output torque, refer to the speed – torque characteristics.

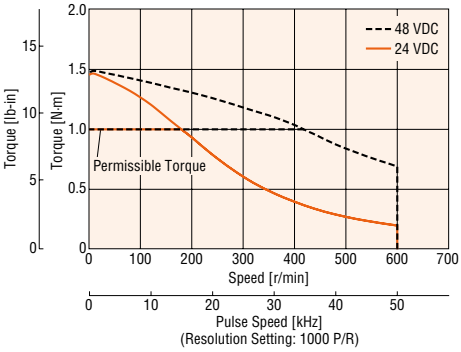
*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

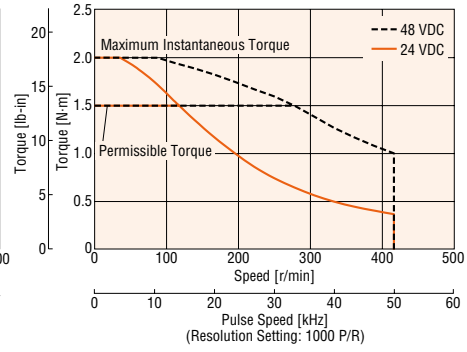
*3 Only for the motor part.

## Speed – Torque Characteristics (Reference Values)

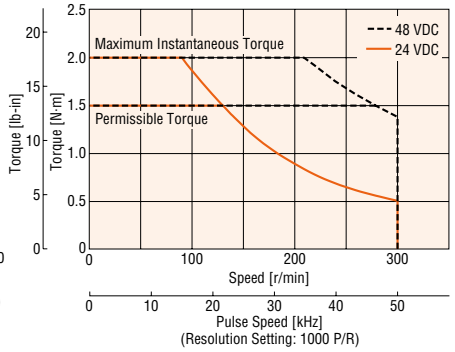
**AZM46** Gear Ratio **5**



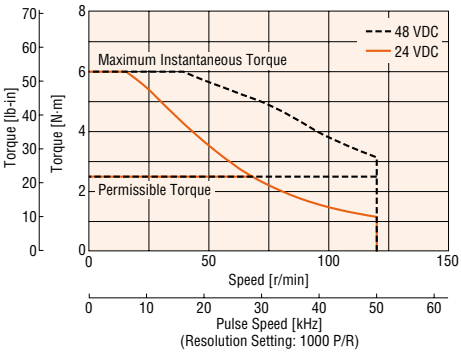

**AZM46** Gear Ratio **7.2**



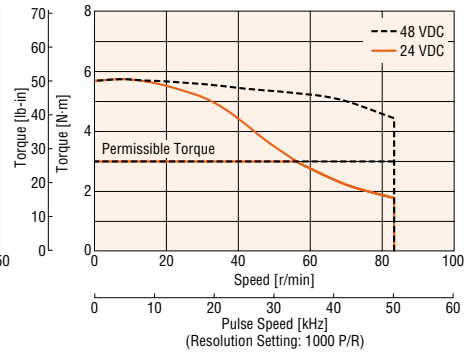

**AZM46** Gear Ratio **10**



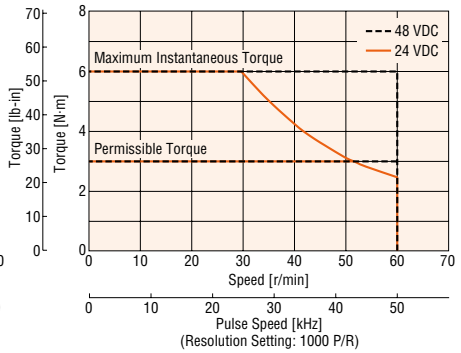

**AZM46** Gear Ratio **25**




**AZM46** Gear Ratio **36**




**AZM46** Gear Ratio **50**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL/CSA Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# PS Geared Type Frame Size 60 mm (2.36 in.)

## Specifications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM66AK-PS5 | AZM66AK-PS7.2 | AZM66AK-PS10 | AZM66AK-PS25 | AZM66AK-PS36 | AZM66AK-PS50 |
| | with Electromagnetic Brake | | AZM66MK-PS5 | AZM66MK-PS7.2 | AZM66MK-PS10 | AZM66MK-PS25 | AZM66MK-PS36 | AZM66MK-PS50 |
| Driver Product Name | Built-in Controller Type | | AZD-KD | | | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-KX | | | | | |
| | Pulse Input Type | | AZD-K | | | | | |
| Maximum Holding Torque | | N·m (lb-in) | 3.5 (30) | 4 (35) | 5 (44) | 8 (70) | | |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | 370×10$^{-7}$ (2) [530×10$^{-7}$ (2.9)]*1 | | | | | |
| Gear Ratio | | | 5 | 7.2 | 10 | 25 | 36 | 50 |
| Resolution | | Resolution Setting: 1000 P/R | 0.072°/Pulse | 0.05°/Pulse | 0.036°/Pulse | 0.0144°/Pulse | 0.01°/Pulse | 0.0072°/Pulse |
| Permissible Torque | | N·m (lb-in) | 3.5 (30) | 4 (35) | 5 (44) | 8 (70) | | |
| Maximum Instantaneous Torque* | | N·m (lb-in) | * | * | * | * | * | 20 |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 2.5 (22) | 3.6 (31) | 5 (44) | 7.6 (67) | 8 (70) | |
| | Electromagnetic Brake | N·m (lb-in) | 2.5 (22) | 3.6 (31) | 5 (44) | 7.6 (67) | 8 (70) | |
| Speed Range | | r/min | 0 - 600 | 0 - 416 | 0 - 300 | 0 - 120 | 0 - 83 | 0 - 60 |
| Backlash | | arcmin | 7 (0.12°) | | | | 9 (0.15°) | |
| Power Supply Input | Voltage | | 24 VDC±5%*2/48 VDC ±5%*3 | | | | | |
| | Input current | A | 3.55 (3.8)*1 | | | | | |

*For the geared motor output torque, refer to the speed – torque characteristics.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

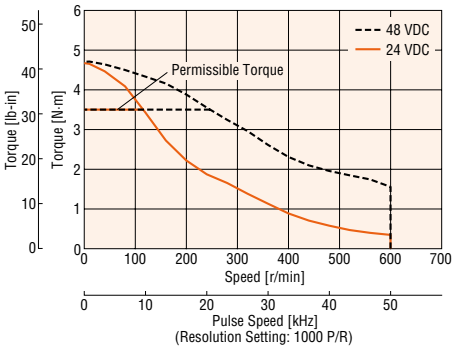
*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

*3 When the motor is operated with 48 VDC input, as a reference, keep the load inertia 10 times the rotor inertial ratio or less and twice the safety factor or more when calculating the acceleration torque.

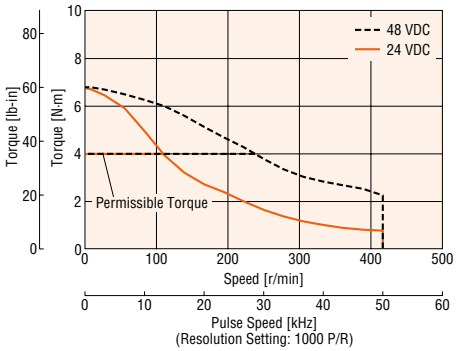
*4 Only for the motor part.

## Speed – Torque Characteristics (Reference Values)

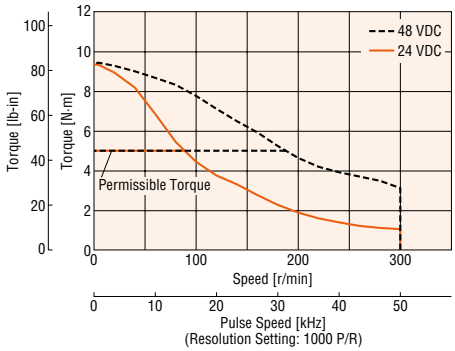
**AZM66** Gear Ratio **5**



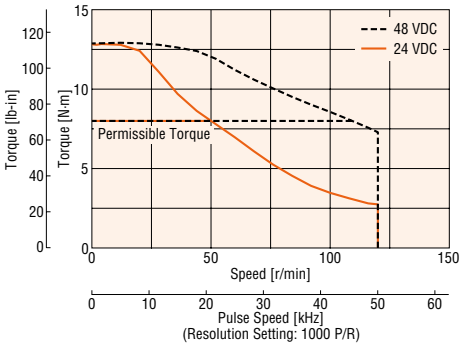

**AZM66** Gear Ratio **7.2**



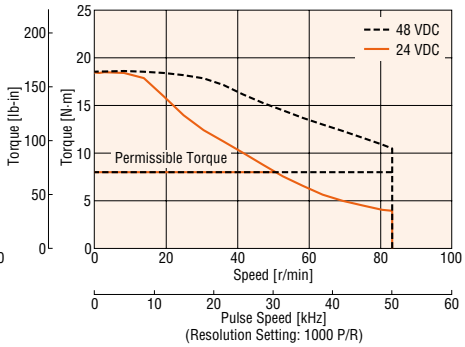

**AZM66** Gear Ratio **10**



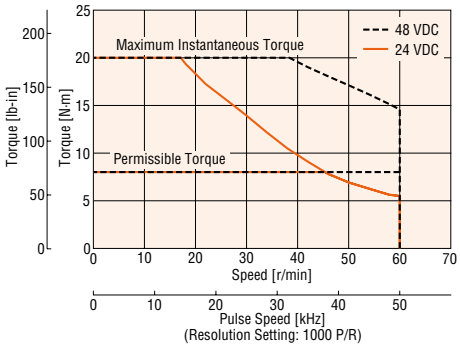

**AZM66** Gear Ratio **25**




**AZM66** Gear Ratio **36**




**AZM66** Gear Ratio **50**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL/CSA Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# HPG Geared Type Frame Size 40 mm (1.57 in.), 60 mm (2.36 in.)



## Specifications

| | | | | | | |
|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46AK-HP5□ | AZM46AK-HP9□ | AZM66AK-HP5□ | AZM66AK-HP15□ |
| | with Electromagnetic Brake | | AZM46MK-HP5□ | AZM46MK-HP9□ | AZM66MK-HP5□ | AZM66MK-HP15□ |
| Driver Product Name | Built-in Controller Type | | AZD-KD | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-KX | | | |
| | Pulse Input Type | | AZD-K | | | |
| Maximum Holding Torque | | N·m (lb-in) | 1.5 (13.2) | 2.5 (22) | 5 (44) | 9 (79) |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | $55\times10^{-7}$ (0.3) [$71\times10^{-7}$ (0.39)]*1 | | $370\times10^{-7}$ (2.0) [$530\times10^{-7}$ (2.9)]*1 | |
| Rotor Inertia*2 | | J: kg·m$^2$ (oz-in$^2$) | $5.8\times10^{-7}$ (0.032) [$4.2\times10^{-7}$ (0.023)] | $3.4\times10^{-7}$ (0.0186) [$2.9\times10^{-7}$ (0.0159)] | $92\times10^{-7}$ (0.50) [$86\times10^{-7}$ (0.47)] | $78\times10^{-7}$ (0.43) [$77\times10^{-7}$ (0.42)] |
| Gear Ratio | | | 5 | 9 | 5 | 15 |
| Resolution | | Resolution Setting: 1000 P/R | 0.072°/Pulse | 0.04°/Pulse | 0.072°/Pulse | 0.024°/Pulse |
| Permissible Torque* | | N·m (lb-in) | * | 2.5 (22) | * | 9 (79) |
| Maximum Instantaneous Torque* | | N·m (lb-in) | * | * | * | * |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 0.75 (6.6) | 1.35 (11.9) | 2.5 (22) | 7.5 (66) |
| | Electromagnetic Brake | N·m (lb-in) | 0.75 (6.6) | 1.35 (11.9) | 2.5 (22) | 7.5 (66) |
| Speed Range | | r/min | 0 - 800 | 0 - 444 | 0 - 600 | 0 - 200 |
| Backlash | | arcmin | 3 (0.05°) | | | |
| Power Supply Input | Voltage | | 24 VDC±5%*4/48 VDC ±5%*5 | | | |
| | Input Current | A | 1.72 (1.8)*1 | | 3.55 (3.8)*1 | |
| Output Flange Surface Runout*3 | | mm | 0.02 | | | |
| Output Flange Inner Diameter Runout*3 | | mm | 0.03 | | 0.04 | |

*For the geared motor output torque, refer to the speed – torque characteristics.

● For the output flange type, the box □ in the product name indicates **F**.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

*2 The value is calculated by converting the inertia inside the gear unit into the motor shaft. The bracket [ ] indicates the value for the flange output type.

*3 Indicates the value for the flange output type.

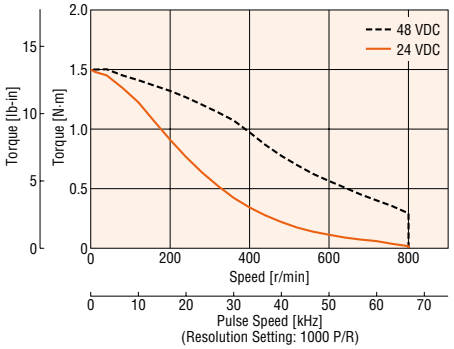
*4 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

*5 When the motor is operated with 48 VDC input, as a reference, keep the load inertia 10 times the rotor inertial ratio or less and twice the safety factor or more when calculating the acceleration torque. (Excluding **AZM46**)

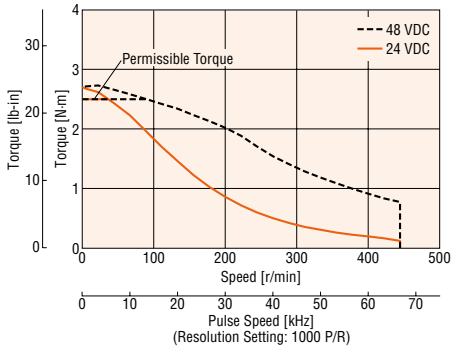
*6 Only for the motor part.

## Speed – Torque Characteristics (Reference Values)

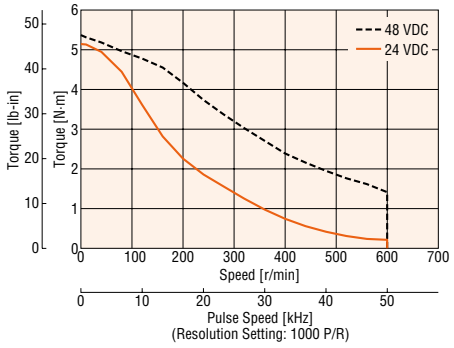
**AZM46** Gear Ratio **5**



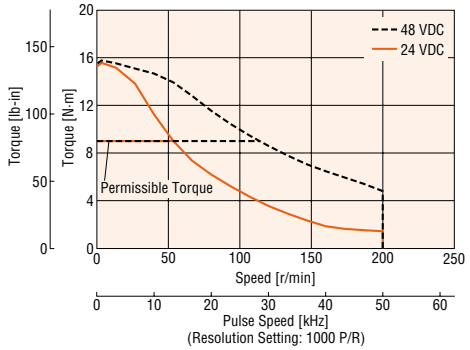

**AZM46** Gear Ratio **9**




**AZM66** Gear Ratio **5**




**AZM66** Gear Ratio **15**




**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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL/CSA Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

# Harmonic Geared Type Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.)

## Specifications

| | | | | | | |
|---|---|---|---|---|---|---|
| Motor Product Name | Single Shaft | | AZM46AK-HS50 | AZM46AK-HS100 | AZM66AK-HS50 | AZM66AK-HS100 |
| | with Electromagnetic Brake | | AZM46MK-HS50 | AZM46MK-HS100 | AZM66MK-HS50 | AZM66MK-HS100 |
| Driver Product Name | Built-in Controller Type | | AZD-KD | | | |
| | Pulse Input Type with RS-485 Communication | | AZD-KX | | | |
| | Pulse Input Type | | AZD-K | | | |
| Maximum Holding Torque | | N·m (lb-in) | 3.5 (30) | 5 (44) | 7 (61) | 10 (88) |
| Rotor Inertia | | J: kg·m$^2$ (oz-in$^2$) | $72\times10^{-7}$ (0.39) [$88\times10^{-7}$ (0.48)]*1 | | $405\times10^{-7}$ (2.2) [$565\times10^{-7}$ (3.1)]*1 | |
| Gear Ratio | | | 50 | 100 | 50 | 100 |
| Resolution | | Resolution Setting: 1000 P/R | 0.0072°/Pulse | 0.0036°/Pulse | 0.0072°/Pulse | 0.0036°/Pulse |
| Permissible Torque | | N·m (lb-in) | 3.5 (30) | 5 (44) | 7 (61) | 10 (88) |
| Maximum Instantaneous Torque* | | N·m (lb-in) | 8.3 (73) | 11 (97) | * | 36 (310) |
| Holding Torque at Motor Standstill | Power On | N·m (lb-in) | 3.5 (30) | 5 (44) | 7 (61) | 10 (88) |
| | Electromagnetic Brake | N·m (lb-in) | 3.5 (30) | 5 (44) | 7 (61) | 10 (88) |
| Speed Range | | r/min | 0 - 70 | 0 - 35 | 0 - 60 | 0 - 30 |
| Lost Motion (Load Torque) | | arcmin | 1.5 max. (±0.16 N·m) | 1.5 max. (±0.20 N·m) | 0.7 max. (±0.28 N·m) | 0.7 max. (±0.39 N·m) |
| Power Supply Input | Voltage | | 24 VDC±5%*2/48 VDC ±5%*3 | | | |
| | Input Current | A | 1.72 (1.8)*1 | | 3.55 (3.8)*1 | |

*For the geared motor output torque, refer to the speed – torque characteristics.

*1 The bracket [ ] indicates the value for the product with an electromagnetic brake.

*2 For the type with an electromagnetic brake, 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.

*3 When the motor is operated with 48 VDC input, as a reference, keep the load inertia 10 times the rotor inertial ratio or less and twice the safety factor or more when calculating the acceleration torque. (Excluding **AZM46**)

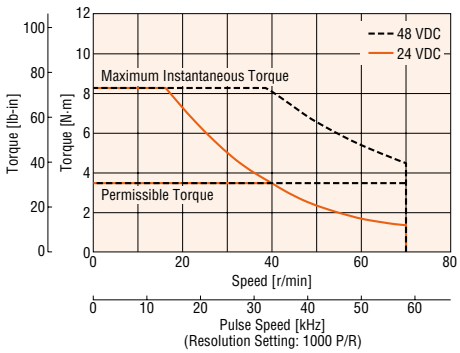
*4 Only for the motor part.

Note

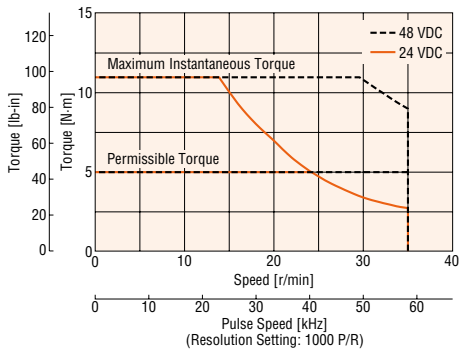
- The rotor inertia represents a sum of the inertia of the harmonic gear converted to motor shaft values.

## Speed – Torque Characteristics (Reference Values)

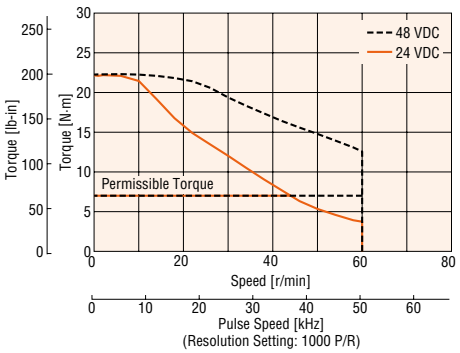
**AZM46** Gear Ratio **50**



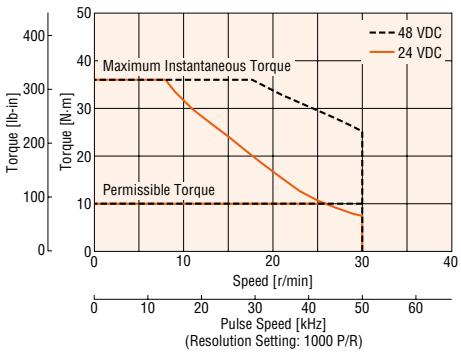

**AZM46** Gear Ratio **100**




**AZM66** Gear Ratio **50**




**AZM66** Gear Ratio **100**




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. To protect the absolute sensor, be sure to keep the motor case temperature at 80°C (176°F) max. (When conforming to the UL/CSA Standards, the temperature of the motor case must be kept at 75°C (167°F) max., since the motor is recognized as heat-resistant class A.)

## Driver Specifications

| Driver Type | | | | Built-in Controller Type | Pulse Input Type with RS-485 Communication | Pulse Input Type |
|---|---|---|---|---|---|---|
| Driver Product Name | | | | **AZD-KD** | **AZD-KX** | **AZD-K** |
| I/O Function | | | Max. Input Pulse Frequency | – | Line driver output by programmable controller: 1 MHz (When the pulse duty is 50%)<br>Open-collector output by programmable controller: 250 kHz (When the pulse duty is 50%) Negative Logic Pulse Input | |
| | | | Positioning Data Points | 256 Points | 256 Points※1 | |
| | | | Direct Input | 10 Points | 6 Points | |
| | | | Direct Output | 6 Points | | |
| | | | RS-485 Communication Remote Input | 16 Points | | – |
| | | | RS-485 Communication Remote Output | 16 Points | | – |
| Setting Tool | | | Support Software **MEXE02** | ○ | | |
| Position Coordinate Management Method | | | | Battery-Free Absolute System | | |
| Operation | Positioning Operation | Operation Method | Positioning Operation | ○ | ○ | ○※1 |
| | | | Positioning Push-Motion Operation※2 | ○ | ○ | ○※1 |
| | | Linked Mode | Single-Motion Operation | ○ | ○ | ○※1 |
| | | | Sequential Operation | ○ | ○ | ○※1 |
| | | | Multi-Speed Operation (Continuous Form Connection) | ○ | ○ | ○※1 |
| | | Sequence Control | Loop Operation (Repetitive) | ○ | ○ | ○※1 |
| | | | Event Jump Operation | ○ | ○ | ○※1 |
| | Continuous Operation | Position Control | | ○ | ○ | ○※1 |
| | | Speed Control | | ○ | ○ | ○※1 |
| | | Torque Control | | ○ | ○ | ○※1 |
| | | Push-Motion※2 | | ○ | ○ | ○※1 |
| | Return-to-Home Operation | | Return-to-Home Operation | ○ | ○ | ○ |
| | | | High-Speed Return-to-Home Operation | ○ | ○ | ○ |
| | JOG operation | | | ○ | ○ | ○ |
| Monitoring/Information | | | Waveform Monitor | ○ | ○ | ○ |
| | | | Overload Detection | ○ | ○ | ○ |
| | | | Overheat Detection (Motor and Driver) | ○ | ○ | ○ |
| | | | Position and Speed Information | ○ | ○ | ○ |
| | | | Temperature Detection (Motor and Driver) | ○ | ○ | ○ |
| | | | Motor Load Factor | ○ | ○ | ○ |
| | | | Travel Distance and Integrated Travel Distance | ○ | ○ | ○ |
| Alarm | | | | ○ | ○ | ○ |

※1 This can be used by setting with the support software **MEXE02**.
※2 The push-motion operation cannot be performed with geared motors or rotary actuators **DG**Ⅱ Series.

## RS-485 Communication Specification

| | |
|---|---|
| Protocol | Modbus RTU Mode |
| Electrical Characteristics | EIA-485 Based, Straight Cable<br>Use a shielded twisted pair cable (TIA/EIA-568B CAT5e or higher is recommended) and keep the total wiring distance including extension to 50 m (164 ft.) or less.※ |
| Communication Mode | Half duplex, asynchronous communication (data: 8 bits, stop bit: 1 bit or 2 bits, parity: none, even, or odd) |
| Transmission Rate | Select either from 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps, or 230400 bps. |
| Connection Units | Up to 31 drivers can be connected to a single programmable controller (master device). |

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

## Electromagnetic Brake Specification

| Product Name | | AZM46 | AZM66 | AZM69 |
|---|---|---|---|---|
| Brake Type | | Power Off Activated Type | | |
| Power Supply Voltage | | 24 VDC±5%※ | | |
| Power Supply Current | A | 0.08 | 0.25 | 0.25 |
| Brake Operating Time | ms | 20 | | |
| Brake Releasing Time | ms | 30 | | |
| Time Rating | | Continuous | | |

※For the type with an electromagnetic brake, a 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended to 20 m (65.6 ft.) using a cable.
● The product names are listed such that the applicable product names can be determined.

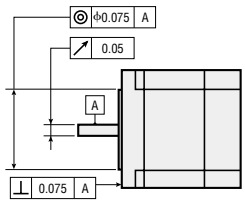
## General Specifications

| | | Motor | Driver |
|---|---|---|---|
| Thermal Class: | | 130 (B)<br>[UL Recognized 105 (A)*1] | – |
| Insulation Resistance | | 100 MΩ or more when 500 VDC megger is applied between the following places:<br>• Case – Motor Windings<br>• Case – Electromagnetic Brake Windings*2 | 100 MΩ or more when 500 VDC megger is applied between the following places:<br>• PE Terminals – Power Supply Terminal |
| Dielectric Strength | | Sufficient to withstand the following for 1 minute:<br>**AZM14**, **AZM15**, **AZM24**, **AZM26**<br>• Case – Motor Winding 0.5 kVAC 50/60 Hz<br>**AZM46**, **AZM48**, **AZM66**, **AZM69**<br>• Case – Motor Winding 1.0 kVAC 50/60 Hz<br>• Case – Electromagnetic Brake Windings*2 1.0 kVAC 50/60 Hz | – |
| Operating Environment | Ambient Temperature | 0 to +40°C (+32 to +104°F) (Non-Freezing) | 0 to +50°C (+32 to +122°F) (Non-Freezing) |
| | Ambient Humidity | 85% or less (Non-Condensing) | |
| | Surrounding Atmosphere | No corrosive gas or dust. No water or oil. | |
| Degree of Protection | | **AZM14**, **AZM15**, **AZM24**, **AZM26**: IP40 (excluding the mounting surface and connectors)<br>**AZM46**, **AZM48**, **AZM66**, **AZM69**: IP66 (excluding the mounting surface and connectors) | IP10 |
| Stop Position Accuracy | | **AZM14**, **AZM15**, **AZM24**, **AZM26**: ±5 arcmin (±0.083°)<br>**AZM46**, **AZM48**: ±4 arcmin (±0.067°)<br>**AZM66**, **AZM69**: ±3 arcmin (±0.05°) | |
| Shaft Runout | | 0.05 mm (0.002 in.) T.I.R.*3 | – |
| Concentricity of Installing Pilot to the Shaft | | 0.075 mm (0.003 in.) T.I.R.*3 | – |
| Perpendicularity of Installation Surface to the Shaft | | 0.075 mm (0.003 in.) T.I.R.*3 | – |
| Multi-Rotation Detection Range Upon Power OFF | | **AZM14**, **AZM15**, **AZM24**, **AZM26**: ±450 revolutions (900 revolutions)<br>**AZM46**, **AZM48**, **AZM66**, **AZM69**: ±900 revolutions (1800 revolutions) | |

*1 Excluding **AZM14**, **AZM15**, **AZM24**, **AZM26**

*2 Electromagnetic brake type only.

*3 T.I.R. (Total Indicator Reading) : The total dial gauge reading when the measurement section is rotated once around the reference axis center.




**Note**

- Disconnect the motor and driver when taking an insulation resistance measurement or performing a dielectric voltage withstand test. Also, do not perform these tests on the absolute sensor part of the motor.

## Motor Installation

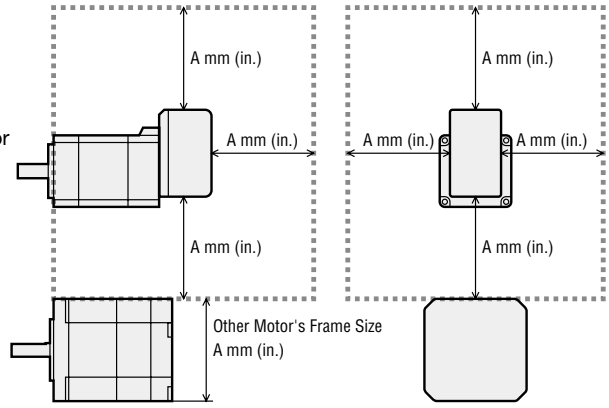
When installing the motor, pay close attention to the installation location, because the absolute sensor can easily be affected by magnetic force.

### Installation of a Motor with a Max. Frame Size of 28 mm (1.10 in.)

When installing the motor parts in parallel, leave a buffer space that is equal to or greater than the motor's size (frame size) both horizontally and vertically.

● Reference

| The Other Motor | A mm (in.) |
|---|---|
| Frame Size 20 mm (0.79 in.) | 20 (0.79) |
| Frame Size 28 mm (1.10 in.) | 28 (1.10) |
| Frame Size 42 mm (1.65 in.) | 42 (1.65) |
| Frame Size 60 mm (2.36 in.) | 60 (2.36) |




● Leave a buffer space equal to or greater than the motor's frame size A.

### Installing a Motor in an Environment Subject to a Magnetic Field System

Make sure that the magnetic flux density of the absolute sensor surface does not exceed the table value.

| Motor Frame Size | Magnetic Flux Density |
|---|---|
| 28 mm (1.10 in.) or less | 2 mT* |
| 42 mm (1.65 in.) or more | 10 mT |

*When the magnetic flux density is from 1 mT to 2 mT, use the motor with the ambient temperature from 20°C (68 °F) to 40°C (104 °F).

## Permissible Moment Load

→ Page B-11

## Permissible Radial Load and Permissible Axial Load

→ Page B-12

## Rotation Direction

→ Page B-13

## Details of the Harmonic Geared Type Accuracy

→ Page B-41

## Load Torque – Driver Input Current Characteristics

This is the relationship between the load torque and driver input current at each speed when the motor is actually operated. Due to these characteristics, it is possible to estimate the power supply capacity required to use the multi-axis. For geared types, use the speed and torque at the motor shaft.

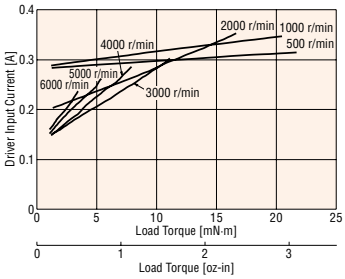
Motor Shaft Speed [r/min] = Gear Output Shaft Speed × Gear Ratio

Motor Shaft Torque [N·m(oz-in)] = Gear Output Shaft Torque / Gear Ratio

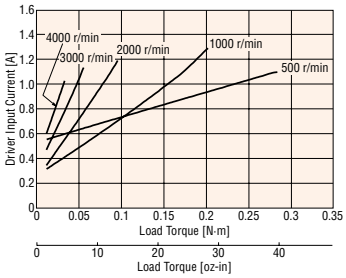
Overview
αSTEP Absolute AZ
Linear Slides αSTEP EZS
Cylinders αSTEP EAC
Cylinders αSTEP DRS2
Rotary Actuators αSTEP DGII
αSTEP AR

### ●24 VDC

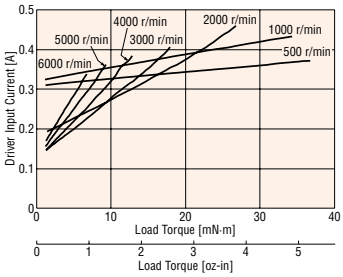
#### AZM14



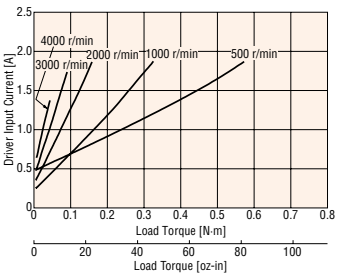

#### AZM46



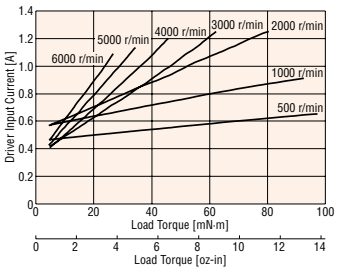

#### AZM15



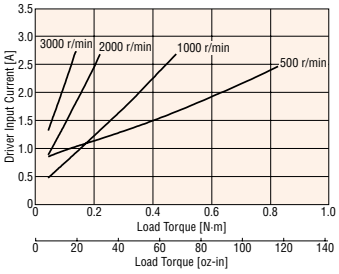

#### AZM48



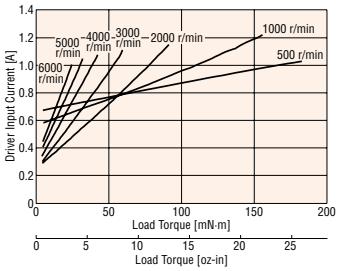

#### AZM24



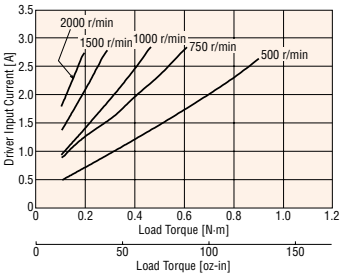

#### AZM66




#### AZM26

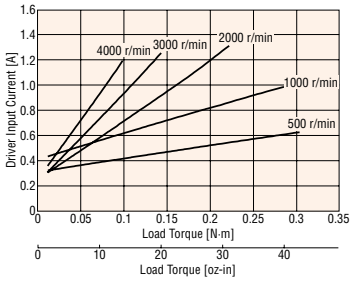



#### AZM69

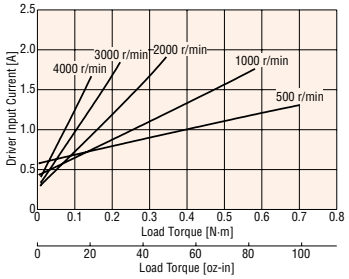



### ●48 VDC

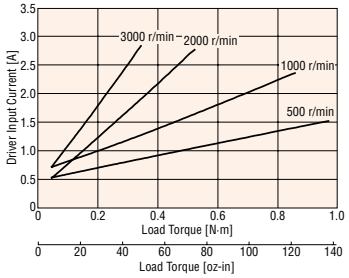
#### AZM46



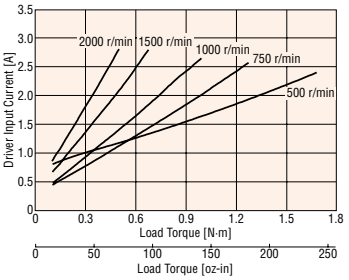

#### AZM48




#### AZM66




#### AZM69



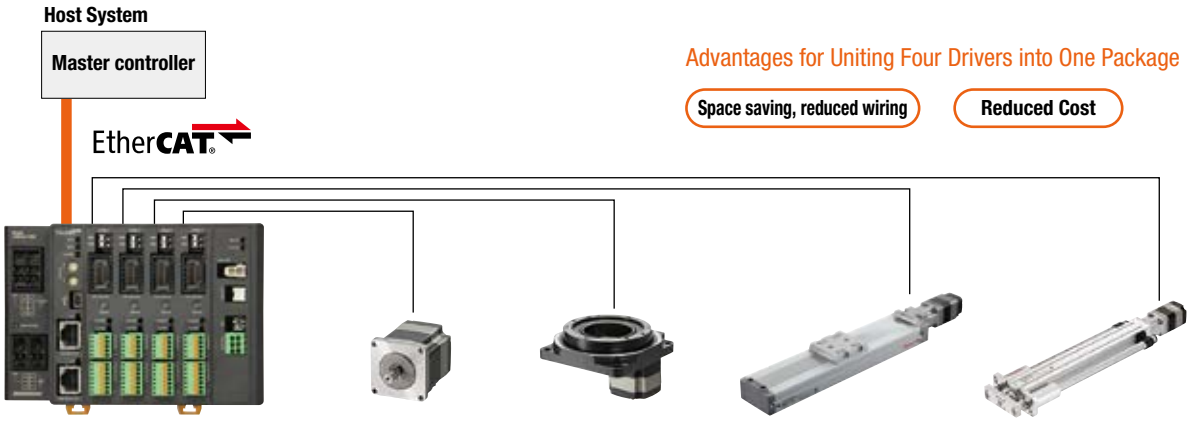
## EtherCAT Drive Profile Support

# AZ Series Multi-Axis Driver DC Power Supply Input

The multi-axis driver can connect the Oriental Motor **AZ** Series DC power supply input motors or linear & rotary actuators that equip them.
We supply products that support EtherCAT drive profiles.
Number of Axes: 2-axis, 3-axis, 4-axis


## Features

### Space saving multi-axis driver (max. of 4 axes) which reduces costs




●The connected motors and linear & rotary actuators are representative examples.

### ●ESI File

An ESI file is prepared so that EtherCAT can be more easily used.
The ESI file can be downloaded from the Oriental Motor website.
Furthermore, please contact OMRON Corporation regarding connections with PLCs manufactured by OMRON.
An EtherCAT connection guide has been prepared.

## Applicable Series

The **AZ** Series multi-axis driver DC power supply input can be used in combination with the following linear & rotary actuators.

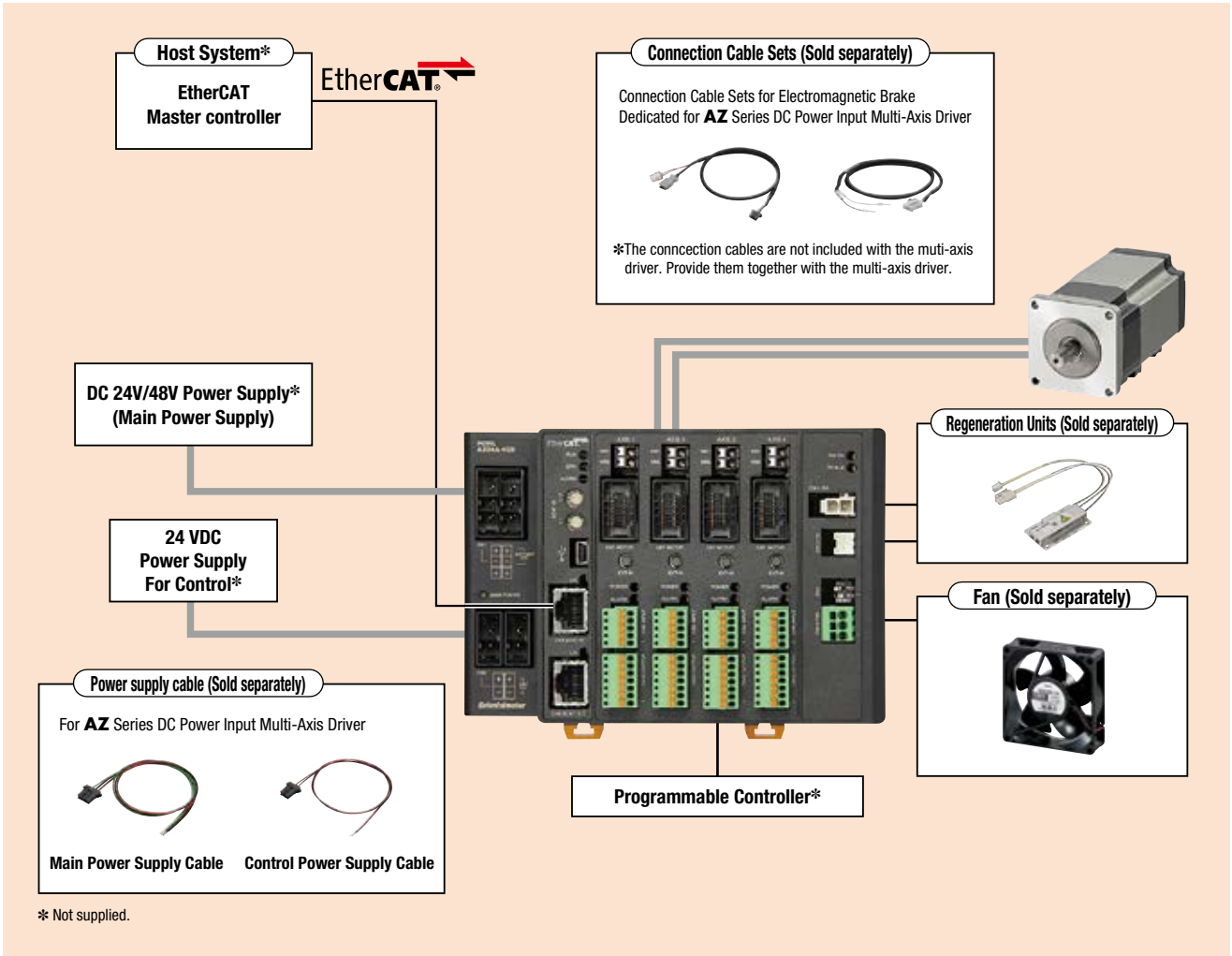
- Compact linear actuators **DRS2** Series equipped with the **AZ** Series
- Hollow rotary actuator **DGII** Series equipped with the **AZ** Series DC power supply input
- Electric linear slides **EZS** Series equipped with the **AZ** Series DC power supply input
- Electric cylinders **EAC** Series equipped with the **AZ** Series DC power supply input

●For details about motor and linear & rotary actuator combinations, please contact your nearest Oriental Motor sales office.

## System Configuration

### EtherCAT Drive Profile Support

The following is a system configuration example combining with the **AZ** Series DC power supply input standard type with an electromagnetic brake.




### Example of System Configuration Pricing

| AZ Series | | | | Sold Seperately | | | |
|---|---|---|---|---|---|---|---|
| Motor | Driver | Connection Cable Set | + | Cable for Main Power Supply | Cable for Control Power Supply | Regeneration Resistor | Fan |
| AZM66MK | AZD4A-KED | CC030VZFBA | | LC03D06A | LC02D06A | RGC40 | MD825B-24L |
| $565.00 | $1,370.00 | $123.00 | | $29.00 | $25.00 | $62.00 | $28.00 |

- 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

### Multi-Axis Driver

**AZD 4A - K ED**
① ② ③ ④

| | | |
|---|---|---|
| ① | Driver Type | **AZD**: **AZ** Series Driver |
| ② | Number of Axes | **2A**: 2 Axes **3A**: 3 Axes **4A**: 4 Axes |
| ③ | Power Supply Input | **K**: 24/48 VDC |
| ④ | Network Type | **ED**: EtherCAT Drive Profile |

### **AZ** Series Multi-Axis Driver Dedicated Connection Cable Set/Flexible Connection Cable Set

◇Connection Cable for Motor

**CC 050 V Z □ F A**
① ② ③ ④ ⑤ ⑥ ⑧

◇Connection Cable Set for a Motor with an Electromagnetic Brake

**CC 050 V Z F B A**
① ② ③ ④ ⑥ ⑦ ⑧

| | | |
|---|---|---|
| ① | | **CC**: Cable |
| ② | Length | **005**: 0.5 m (1.6 ft.) **010**: 1 m (3.3 ft.) **015**: 1.5 m (4.9 ft.) **020**: 2 m (6.6 ft.) **025**: 2.5 m (8.2 ft.) **030**: 3 m (9.8 ft.) **040**: 4 m (13.1 ft.) **050**: 5 m (16.4 ft.) **070**: 7 m (23.0 ft.) **100**: 10 m (32.8 ft.) **150**: 15 m (49.2 ft.) **200**: 20 m (65.6 ft.) |
| ③ | Reference Number | |
| ④ | Applicable Model | **Z**: **AZ** Series |
| ⑤ | Reference Number | Blank: Frame Size 42 mm (1.65 in.) (**HPG** Geared Type is 40 mm (1.57 in.)), 60 mm (2.36 in.)<br>**2**: Frame Size 20 mm (0.79 in.), 28 mm (1.10 in.) |
| ⑥ | Cable Type | **F**: Connection Cable Set<br>**R**: Flexible Connection Cable Set |
| ⑦ | Electromagnetic Brake | **B**: with Electromagnetic Brake |
| ⑧ | Driver Type | **A**: Multi-Axis Driver |

## Product Line

### Multi-Axis Driver

◇EtherCAT Drive Profile Support

| Product Name | Number of Axes | List Price |
|---|---|---|
| **AZD2A-KED** | 2 Axes | $860.00 |
| **AZD3A-KED** | 3 Axes | $1,140.00 |
| **AZD4A-KED** | 4 Axes | $1,370.00 |

### **AZ** Series Multi-Axis Driver Dedicated Connection Cable Sets/Flexible Connection Cable Sets

◇Connection Cable for Motor

| Length m (ft.) | Frame Size 20 mm (0.79 in.), 28 mm (1.10 in.) | | | | Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.) | | | |
|---|---|---|---|---|---|---|---|---|
| | Connection Cable | List Price | Flexible Connection Cable | List Price | Connection Cable | List Price | Flexible Connection Cable | List Price |
| 0.5 (1.6) | **CC005VZ2FA** | $79.00 | **CC005VZ2RA** | $93.00 | **CC005VZFA** | $79.00 | **CC005VZRA** | $93.00 |
| 1 (3.3) | **CC010VZ2FA** | $79.00 | **CC010VZ2RA** | $93.00 | **CC010VZFA** | $79.00 | **CC010VZRA** | $93.00 |
| 1.5 (4.9) | **CC015VZ2FA** | $84.00 | **CC015VZ2RA** | $102.00 | **CC015VZFA** | $84.00 | **CC015VZRA** | $102.00 |
| 2 (6.6) | **CC020VZ2FA** | $89.00 | **CC020VZ2RA** | $110.00 | **CC020VZFA** | $89.00 | **CC020VZRA** | $110.00 |
| 2.5 (8.2) | **CC025VZ2FA** | $95.00 | **CC025VZ2RA** | $117.00 | **CC025VZFA** | $95.00 | **CC025VZRA** | $117.00 |
| 3 (9.8) | **CC030VZ2FA** | $101.00 | **CC030VZ2RA** | $123.00 | **CC030VZFA** | $101.00 | **CC030VZRA** | $123.00 |
| 4 (13.1) | **CC040VZ2FA** | $108.00 | **CC040VZ2RA** | $139.00 | **CC040VZFA** | $108.00 | **CC040VZRA** | $139.00 |
| 5 (16.4) | **CC050VZ2FA** | $122.00 | **CC050VZ2RA** | $156.00 | **CC050VZFA** | $122.00 | **CC050VZRA** | $156.00 |
| 7 (23.0) | **CC070VZ2FA** | $150.00 | **CC070VZ2RA** | $199.00 | **CC070VZFA** | $150.00 | **CC070VZRA** | $199.00 |
| 10 (32.8) | **CC100VZ2FA** | $194.00 | **CC100VZ2RA** | $260.00 | **CC100VZFA** | $194.00 | **CC100VZRA** | $260.00 |
| 15 (49.2) | **CC150VZ2FA** | $269.00 | **CC150VZ2RA** | $366.00 | **CC150VZFA** | $269.00 | **CC150VZRA** | $366.00 |
| 20 (65.6) | **CC200VZ2FA** | $342.00 | **CC200VZ2RA** | $470.00 | **CC200VZFA** | $342.00 | **CC200VZRA** | $470.00 |

### ◇Connection Cable Set for a Motor with an Electromagnetic Brake

| Length m (ft.) | Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.) | | | |
|---|---|---|---|---|
| | Connection Cable Set | List Price | Flexible Connection Cable Set | List Price |
| 0.5 (1.6) | **CC005VZFBA** | $95.00 | **CC005VZRBA** | $126.00 |
| 1 (3.3) | **CC010VZFBA** | $95.00 | **CC010VZRBA** | $126.00 |
| 1.5 (4.9) | **CC015VZFBA** | $102.00 | **CC015VZRBA** | $137.00 |
| 2 (6.6) | **CC020VZFBA** | $108.00 | **CC020VZRBA** | $148.00 |
| 2.5 (8.2) | **CC025VZFBA** | $116.00 | **CC025VZRBA** | $158.00 |
| 3 (9.8) | **CC030VZFBA** | $123.00 | **CC030VZRBA** | $167.00 |
| 4 (13.1) | **CC040VZFBA** | $134.00 | **CC040VZRBA** | $189.00 |
| 5 (16.4) | **CC050VZFBA** | $149.00 | **CC050VZRBA** | $211.00 |
| 7 (23.0) | **CC070VZFBA** | $183.00 | **CC070VZRBA** | $265.00 |
| 10 (32.8) | **CC100VZFBA** | $236.00 | **CC100VZRBA** | $343.00 |
| 15 (49.2) | **CC150VZFBA** | $324.00 | **CC150VZRBA** | $476.00 |
| 20 (65.6) | **CC200VZFBA** | $410.00 | **CC200VZRBA** | $607.00 |

Cable for Motor

Cable for Electromagnetic Brake

Note

- Only connection cables are offered for the dedicated multi-axis driver cables. **AZ** Series extension cables cannot be used.

## Included

### ●Multi-Axis Driver

| Network Type, Number of Axes \ Included | | CN1 Connector | CN2 Connector | CN1, CN2 Contact | CN9 Connector | CN10 Connector | Operating Manual |
|---|---|---|---|---|---|---|---|
| EtherCAT Compatible | 2 Axes | 2 pcs. | 2 pcs. | 10 pcs. | 2 pcs. | 2 pcs. | 1 Copy |
| | 3 Axes | 2 pcs. | 2 pcs. | 10 pcs. | 3 pcs. | 3 pcs. | 1 Copy |
| | 4 Axes | 2 pcs. | 2 pcs. | 10 pcs. | 4 pcs. | 4 pcs. | 1 Copy |

## Specifications

### ●Power Supply Input

Main Power Supply Use: 24 VDC/48 VDC ±10% 7.0 A (7.0 A max. Use with an average of 4.0 A max.)
Control Power Supply Use: 24 VDC ±10% 1.5 A (If it is the type with an electromagnetic brake, use a 24 VDC ±5% power supply)
(If it is the type with an electromagnetic brake (when using a connection cable with a length of 20 m (65.6 ft.)), use a 24 VDC ±4% power supply)

### ●Communication Specifications

#### ◇EtherCAT Specification

| Item | Description |
|---|---|
| Transmission Speed | 100 Mbps |
| Communication Cycle | 0.5 ms, 1 ms, 2 ms, 3 ms, 4 ms, 5 ms, 6 ms, 7 ms, 8 ms |
| Node Address | 0 to 255（00h to FFh, Initial Value: 00h） |
| Communication Protocol | Dedicated Protocol for EtherCAT (CoE)<br>CiA402 Drive Profile |

### ●General Specifications

| Item | Description |
|---|---|
| Degree of Protection | IP10 |
| Operating Environment | Ambient Temperature: 0 to +50℃ (+32 to +122°F) (non-freezing)<br>Humidity: 85% or less (non-condensing)<br>Altitude: Up to 1000 m (3300 ft.) above sea level<br>Surrounding Atmosphere: No corrosive gas or dust. No water or oil. |
| Storage and Shipping Environment | Ambient Temperature: −25 to +70℃ (−13 to +158°F) (non-freezing)<br>Humidity: 85% or less (non-condensing)<br>Altitude: Up to 3000 m (10000 ft.) above sea level<br>Surrounding Atmosphere: No corrosive gas or dust. No water or oil. |
| Insulation Resistance | 100 MΩ or more when 500 VDC megger is applied between the following places:<br>FG terminal – Power supply terminal |
| Dielectric Strength | Sufficient to withstand the following for 1 minute:<br>FG terminal – Power supply terminal 1 kVAC 50/60 Hz Leak current 10 mA or less |

Note

- Disconnect the motor and driver when taking an insulation resistance measurement or performing a dielectric voltage withstand test. Also, do not perform these tests on the absolute sensor part of the motor.