

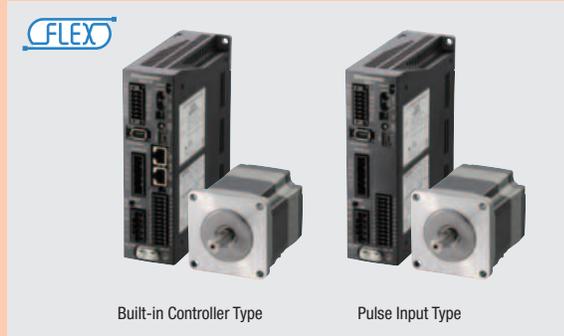
0.36°/Geared Stepper Motor and Driver Package α STEP

AZ Series Battery-Free, Absolute Sensor Equipped

For details on this product please refer to our website.
www.orientalmotor.com/catalog



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



View Expanded Product Information, Specifications, CAD, Accessories & more online. Visit www.orientalmotor.com/catalog or use the QR code and select "AZ Series AC Power Supply Input".

By incorporating the newly developed Absolute Sensor, absolute-type positioning is now possible without a battery. Advanced positioning is possible at affordable prices.

- Incorporates the Newly Developed Absolute Sensor
- No External Sensors Required
- Reduced Reset Time
- No Battery Required
- High Reliability
- Energy Savings
- 2 Driver Types to Choose from
Built-in Controller Type **FLEX**/Pulse Input Type
- Easy Operation through the Use of the **MEXE02** Data Setting Software
- Starting from \$937.00

FLEX What is FLEX?

FLEX is the collective name for products that support I/O control, Modbus (RTU) control, and FA network control via network converters. These products enable simple connection and simple control, shortening the total lead time for system construction.

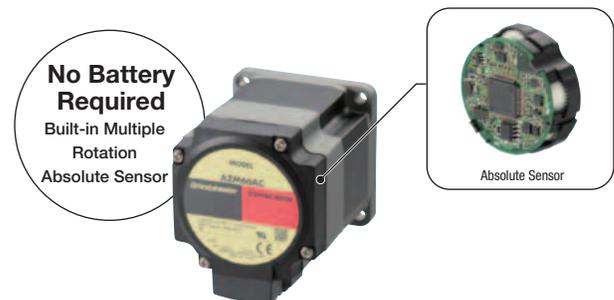
Features

Advanced Technology at Affordable Prices

Oriental Motor has developed and patented a compact, low-cost, battery-free mechanical type absolute sensors.

The **AZ** Series can contribute to improved productivity and cost reductions, and is available at affordable prices.

- List Price starting from \$937.00
(Motor and driver package)



Newly Developed Absolute Sensor

● Mechanical-Type Sensor

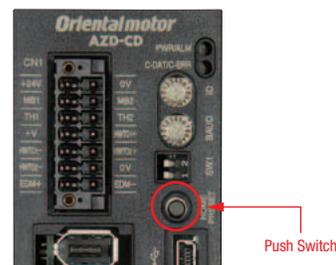
A mechanical sensor composed of multiple gears is employed. Positioning information is detected by recognizing the angle of the individual gears. As a result, it does not require a battery.

● 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's surface, which is saved by the Absolute Sensor. In addition, home setting is possible with the **MEXE02** data setting software 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.

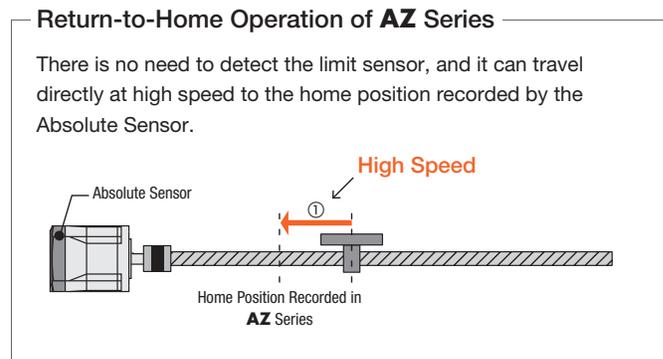
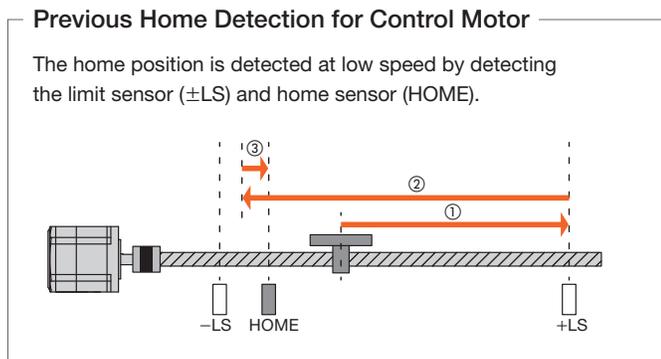
● Improved Return-to-Home Accuracy

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.

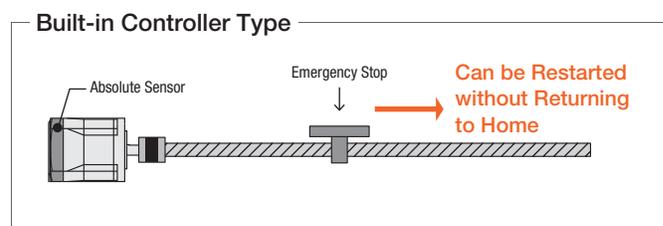
Shortened Reset Time ① High Speed Return-to-Home

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.



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.



Overview,
Product
Series

AC Input
Motor &
Driver

0.36°/Geared
Q_{STEP}
AR

0.36°/Geared
Q_{STEP}
Absolute
AZ

0.72°/Geared
RKII

DC Input
Motor &
Driver

0.36°/Geared
Q_{STEP}
AR

0.36°/Geared
Q_{STEP}
Absolute
AZ

0.72°/0.36°
/Geared
CRK

1.8°/Geared
RBK

1.8°/0.9°
/Geared
CMK

0.72°
All-in-One
PKA

Motor Only

1.8°/0.9°
PKP/PK

Geared
PKP

0.72°/0.36°
PKP

Accessories

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 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.

Energy Savings

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

● Lower Heat Generation

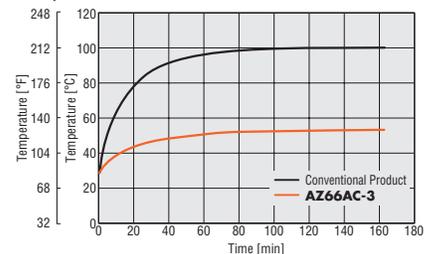
Heat generation by the motor has been significantly reduced through higher efficiency.

● Temperature Distribution by Thermography



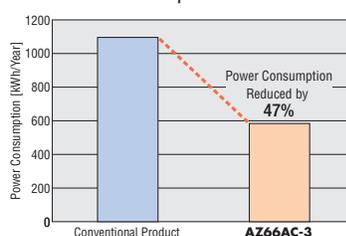
Comparison under the same conditions.

● 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)

2 Driver Types Available Depending on the System Configuration

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

● Built-in Controller Type **C/FLEX**

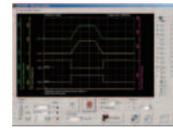
With this type, the operating data is set in the driver, and is then selected and executed from the host system. Host system connection and control are performed with ① I/O, ② Modbus (RTU)/RS-485 or ③ FA network.

Basic Setting (Factory Setting)

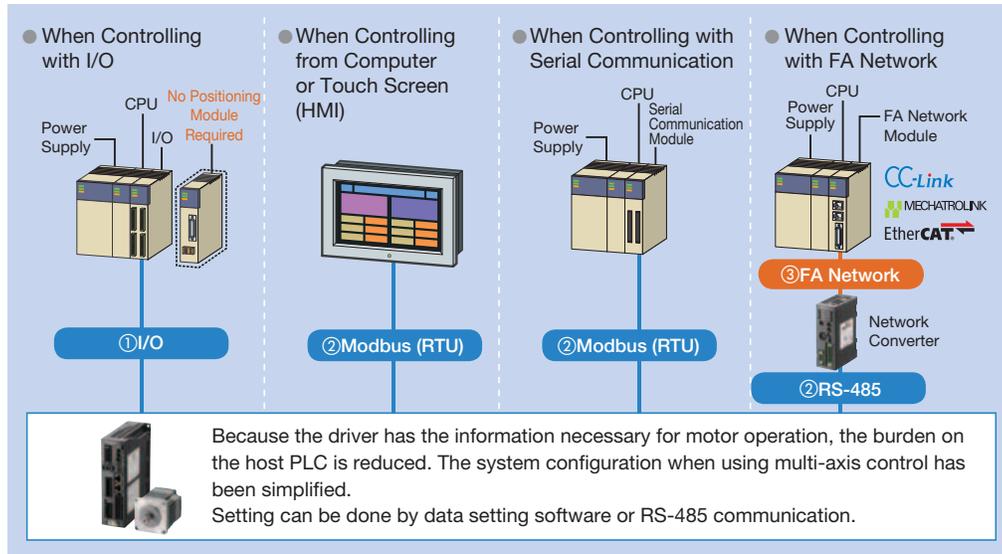


Setting Operating Data and Changing Parameters

Data Setting Software **MEXE02**



● Setting using RS-485 communication is also possible.

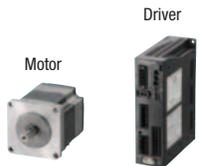


By using a network converter (sold separately), CC-link, MECHATROLINK or EtherCAT communication are possible. Operating data, parameter settings and operation commands can be input via various communication types. Its ability to accommodate the network being used results in a shortened design time.

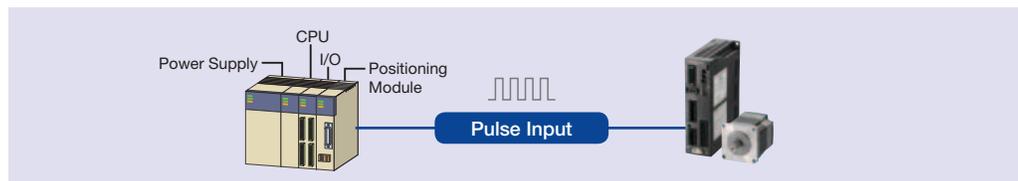
● Pulse Input Type

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

Basic Setting (Factory Setting)



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



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

Overview, Product Series

AC Input Motor & Driver

0.36°/Geared **Q_{STEP} AR**

0.36°/Geared **Q_{STEP} Absolute AZ**

0.72°/Geared **RKII**

DC Input Motor & Driver

0.36°/Geared **Q_{STEP} AR**

0.36°/Geared **Q_{STEP} Absolute AZ**

0.72°/0.36°/Geared **CRK**

1.8°/Geared **RBK**

1.8°/0.9°/Geared **CMK**

0.72° All-in-One **PKA**

Motor Only

1.8°/0.9° **PKP/PK**

Geared **PKP**

0.72°/0.36° **PKP**

Accessories

Easy Operation through the Use of the **MEXE02** Data Setting Software

● Easy Setting and Easy Driving

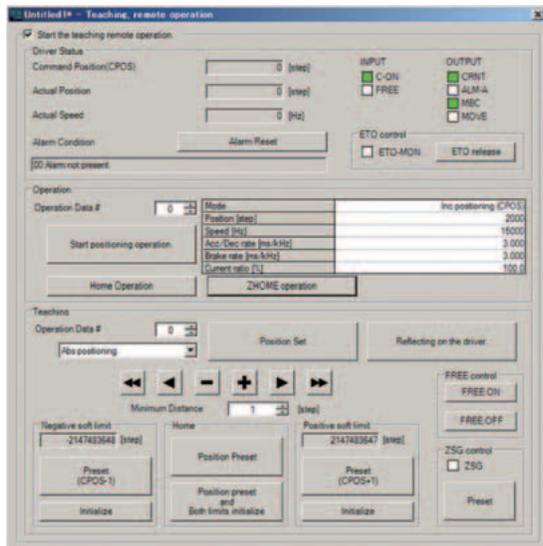
◇ Unit Setting Wizard

This is a function that allows the traveling amount, speed, etc. to be displayed and input in the designated units. It can be easily set by following the directions displayed on the screen.



◇ Teaching and Remote Operation

Data setting software can be used to easily perform the home setting or also drive the motor. This can be used for teaching or test drive purposes.

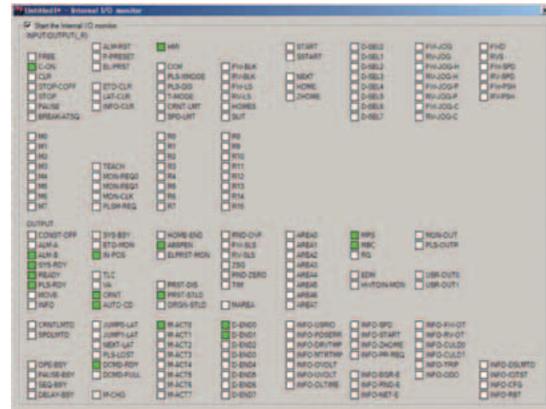


● Multi-monitoring enables remote operation and teaching while monitoring.

● Monitoring Function

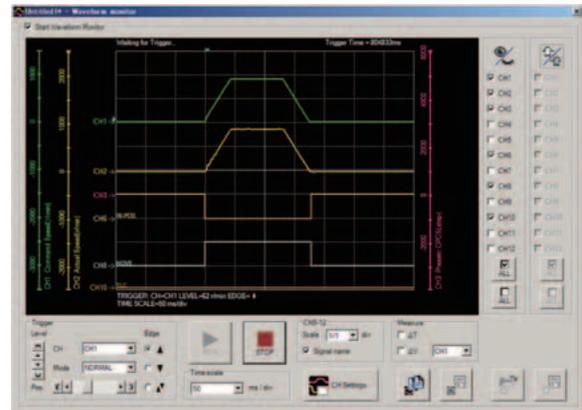
◇ I/O Monitoring

The status of the I/O wired to the driver can be checked on a computer. This can be used for post-wiring I/O checks or I/O checks during operation.



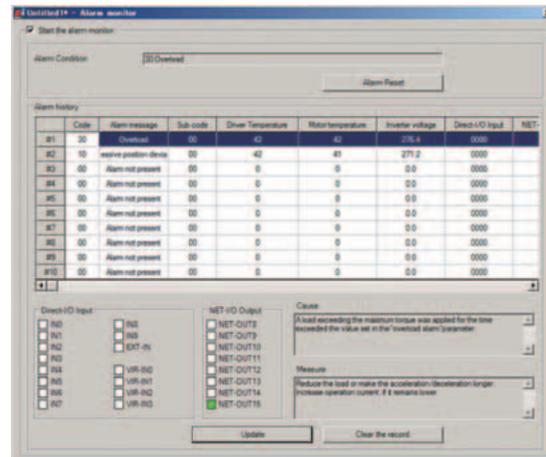
◇ Waveform Monitoring

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



◇ Alarm Monitoring

When an abnormality occurs, the details of the abnormality and the solution can be checked. Because the solution can be checked, it is possible to respond to abnormalities quickly.



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 (degrees)]	Basic Resolution [deg/step]	Output Shaft Speed [r/min]
Standard Type 	<ul style="list-style-type: none"> Basic motor of the AZ Series 	Maximum Holding Torque 2 (17.7)	—	0.36	4500
Low backlash	TS Geared Type (Spur Gear Mechanism) 	Permissible Torque / Max. Instantaneous Torque 6 (53) 10 (88)	10 (0.17°)	0.012	833
	PS Geared Type (Planetary Gear Mechanism) 	<ul style="list-style-type: none"> High permissible/ max. instantaneous torque A wide variety of gear ratios for selecting the desired step angle Center shaft Gear ratio: 5, 7.2, 10, 25, 36, 50 	Permissible Torque / Max. Instantaneous Torque 8 (70) 20 (177)	7 (0.12°)	0.0072
Non-backlash	HPG Geared Type (Harmonic Planetary) 	Permissible Torque / Max. Instantaneous Torque 9 (79) 19 (168)	3 (0.05°)	0.024	900
	Harmonic Geared Type (Harmonic Drive) 	<ul style="list-style-type: none"> High positioning accuracy High permissible/ max. instantaneous torque High gear ratio, high resolution Center shaft Gear ratio: 50, 100 	Permissible Torque / Max. Instantaneous Torque 10 (88) 36 (310)	0	0.0036

Note

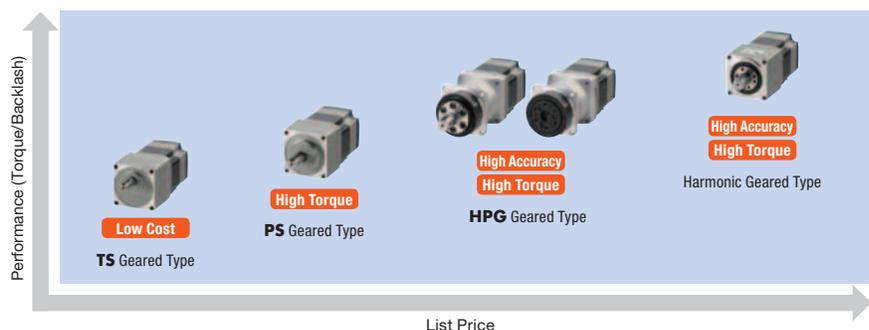
- Please use the above values as reference to see the differences between each type. These values vary depending on the motor frame size and gear ratio.
- Harmonic Planetary, Harmonic Drive and  are registered trademarks of Harmonic Drive Systems Inc.

Driver and Motor Product Line

Driver Type	Motor Type	Frame Size	Electromagnetic Brake Type	Power Supply Input
Built-in Controller Type  	Standard Type	42 mm (1.65 in.) 60 mm (2.36 in.)	●	Single-Phase 100-120 VAC Single-Phase/Three-Phase 200-240 VAC
	Pulse Input Type 	TS Geared Type PS Geared Type HPG Geared Type Harmonic Geared Type	42 mm (1.65 in.)* 60 mm (2.36 in.)	

*HPG Geared Type is 40 mm (1.57 in.)

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



Overview, Product Series

AC Input Motor & Driver

0.36°/Geared **AZ**

0.36°/Geared **AZ**

0.72°/Geared **RKII**

DC Input Motor & Driver

0.36°/Geared **AZ**

0.36°/Geared **AZ**

0.72°/0.36°/Geared **CRK**

1.8°/Geared **RBK**

1.8°/0.9°/Geared **CMK**

0.72° All-in-One **PKA**

Motor Only

1.8°/0.9° **PKP/PK**

Geared **PKP**

0.72°/0.36° **PKP**

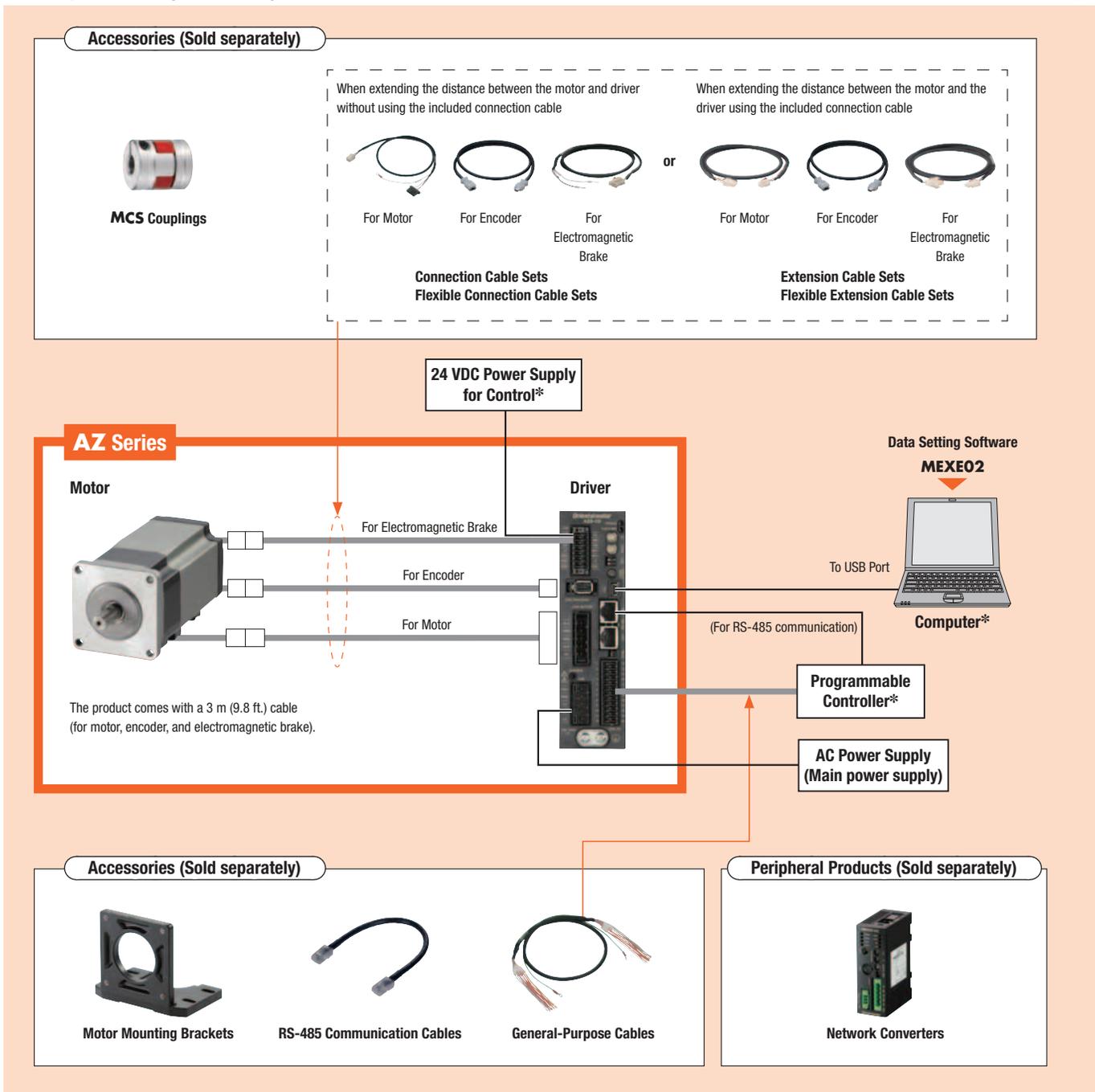
Accessories

System Configuration

Built-in Controller Type, Standard Type with Electromagnetic Brake

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

* Not supplied

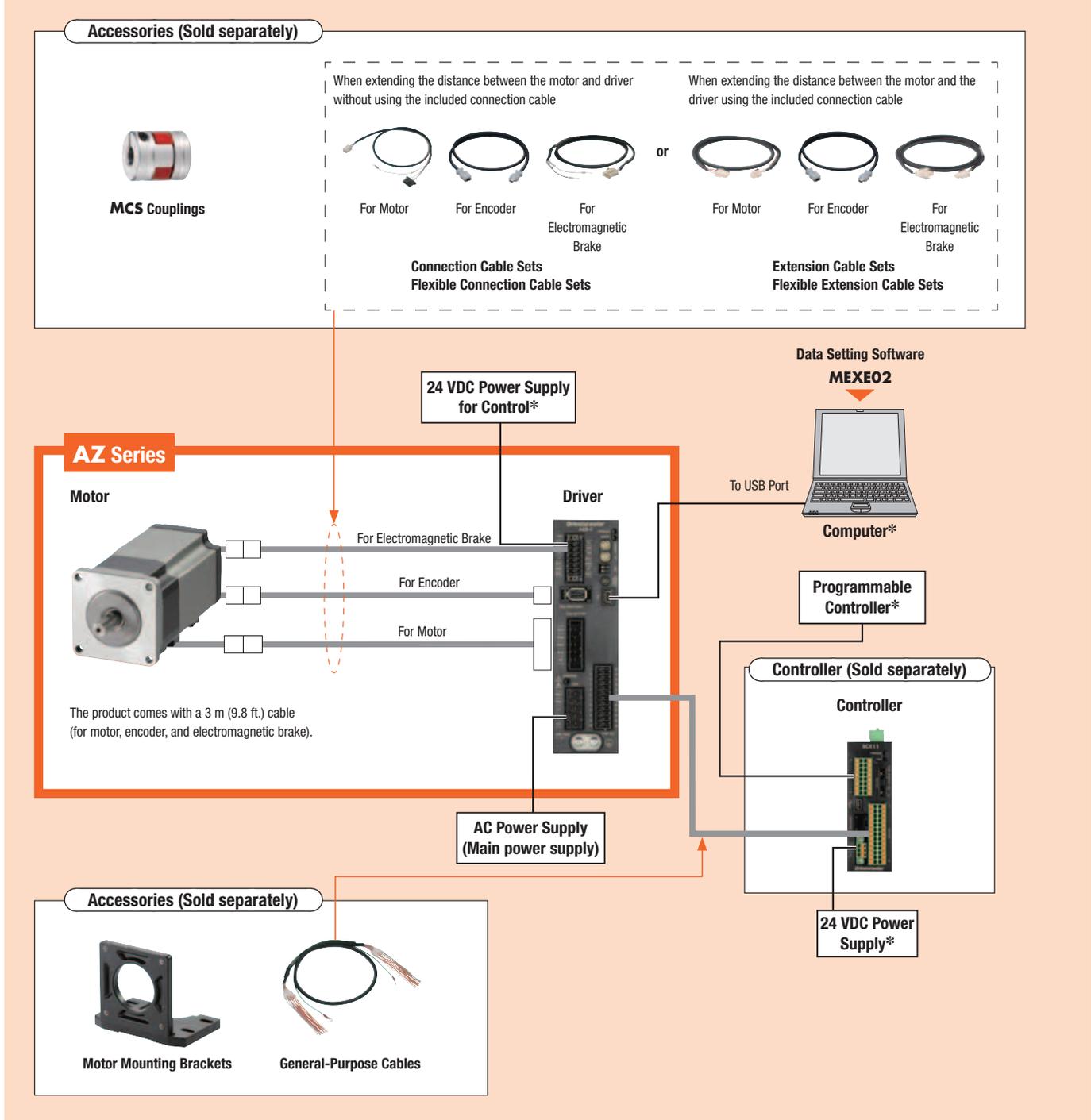


● The system configuration shown above is an example. Other combinations are also available.

● Pulse Input Type, Standard Type with Electromagnetic Brake

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

* Not supplied



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

Overview, Product Series

AC Input Motor & Driver

0.36°/Geared **Q₁STEP AR**

0.36°/Geared **Q₁STEP Absolute AZ**

0.72°/Geared **RKII**

DC Input Motor & Driver

0.36°/Geared **Q₁STEP AR**

0.36°/Geared **Q₁STEP Absolute AZ**

0.72°/0.36°/Geared **CRK**

1.8°/Geared **RBK**

1.8°/0.9°/Geared **CMK**

0.72° All-in-One **PKA**

Motor Only

1.8°/0.9° **PKP/PK**

Geared **PKP**

0.72°/0.36° **PKP**

Accessories

Product Number

● Standard Type

AZ 6 6 A C D - 3

① ② ③ ④ ⑤ ⑥ ⑩

● Geared Type

AZ 6 6 A C D - HP 15 F - 3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

①	Series Name	AZ: AZ Series
②	Motor Frame Size	4: 42 mm (1.65 in.) [HPG Geared Type is 40 mm (1.57 in.)] 6: 60 mm (2.36 in.)
③	Motor Case Length	
④	Configuration	A: Single Shaft M: With Electromagnetic Brake
⑤	Power Supply Input	A: Single-Phase 100-120 VAC C: Single-Phase/Three-Phase 200-240 VAC
⑥	Driver Type	D: Built-in Controller Type None: Pulse Input Type
⑦	Geared Type	TS: TS Geared Type PS: PS Geared Type HP: HPG Geared Type HS: Harmonic Geared Type
⑧	Gear Ratio	
⑨	Output Shaft Type*	None: Shaft Output F: Flange Output
⑩	Connection Cable	3: 3 m (9.8 ft.)

***HPG** Geared Type only

Product Line

● Built-in Controller Type

◇ Standard Type

Product Name (Single shaft)	List Price
AZ46A □ D-3	\$937.00
AZ66A □ D-3	\$993.00
AZ69A □ D-3	\$998.00

◇ Standard Type with Electromagnetic Brake

Product Name	List Price
AZ46M □ D-3	\$1,098.00
AZ66M □ D-3	\$1,200.00
AZ69M □ D-3	\$1,205.00

◇ **TS** Geared Type

Product Name	List Price
AZ46A □ D-TS3.6-3	\$1,073.00
AZ46A □ D-TS7.2-3	\$1,073.00
AZ46A □ D-TS10-3	\$1,089.00
AZ46A □ D-TS20-3	\$1,089.00
AZ46A □ D-TS30-3	\$1,089.00
AZ66A □ D-TS3.6-3	\$1,152.00
AZ66A □ D-TS7.2-3	\$1,152.00
AZ66A □ D-TS10-3	\$1,168.00
AZ66A □ D-TS20-3	\$1,168.00
AZ66A □ D-TS30-3	\$1,168.00

◇ **PS** Geared Type

Product Name	List Price
AZ46A □ D-PS5-3	\$1,202.00
AZ46A □ D-PS7.2-3	\$1,202.00
AZ46A □ D-PS10-3	\$1,202.00
AZ46A □ D-PS25-3	\$1,259.00
AZ46A □ D-PS36-3	\$1,259.00
AZ46A □ D-PS50-3	\$1,259.00
AZ66A □ D-PS5-3	\$1,315.00
AZ66A □ D-PS7.2-3	\$1,315.00
AZ66A □ D-PS10-3	\$1,315.00
AZ66A □ D-PS25-3	\$1,395.00
AZ66A □ D-PS36-3	\$1,395.00
AZ66A □ D-PS50-3	\$1,395.00

◇ **HPG** Geared Type

Product Name	List Price
AZ46A □ D-HP5-3	\$1,305.00
AZ46A □ D-HP5F-3	\$1,294.00
AZ46A □ D-HP9-3	\$1,305.00
AZ46A □ D-HP9F-3	\$1,294.00
AZ66A □ D-HP5-3	\$1,545.00
AZ66A □ D-HP5F-3	\$1,527.00
AZ66A □ D-HP15-3	\$1,714.00
AZ66A □ D-HP15F-3	\$1,696.00

◇ Harmonic Geared Type

Product Name	List Price
AZ46A □ D-HS50-3	\$1,541.00
AZ46A □ D-HS100-3	\$1,541.00
AZ66A □ D-HS50-3	\$1,861.00
AZ66A □ D-HS100-3	\$1,861.00

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

The following items are included with each product.

Motor, Parallel Key*1, Motor Installation Screws*2, Driver, Cable for Motor*3, Cable for Encoder*3, Cable for Electromagnetic Brake (units with electromagnetic brake only)*3, Connector Set for Driver, Operating Manual

*1 Only for products with a key slot on the output shaft.

*2 Only **TS** geared type with frame size of 60 mm (2.36 in.).

*3 Accessory cables (sold separately) must be purchased in the following situations:

- When using a flexible cable
- When using a cable longer than 3 m (9.8 ft.)

Note

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

● Pulse Input Type

◇ Standard Type

Product Name (Single shaft)	List Price
AZ46A □-3	\$937.00
AZ66A □-3	\$993.00
AZ69A □-3	\$998.00

◇ Standard Type with Electromagnetic Brake

Product Name	List Price
AZ46M □-3	\$1,098.00
AZ66M □-3	\$1,200.00
AZ69M □-3	\$1,205.00

◇ TS Geared Type

Product Name	List Price
AZ46A □- TS3.6-3	\$1,073.00
AZ46A □- TS7.2-3	\$1,073.00
AZ46A □- TS10-3	\$1,089.00
AZ46A □- TS20-3	\$1,089.00
AZ46A □- TS30-3	\$1,089.00
AZ66A □- TS3.6-3	\$1,152.00
AZ66A □- TS7.2-3	\$1,152.00
AZ66A □- TS10-3	\$1,168.00
AZ66A □- TS20-3	\$1,168.00
AZ66A □- TS30-3	\$1,168.00

◇ PS Geared Type

Product Name	List Price
AZ46A □- PS5-3	\$1,202.00
AZ46A □- PS7.2-3	\$1,202.00
AZ46A □- PS10-3	\$1,202.00
AZ46A □- PS25-3	\$1,259.00
AZ46A □- PS36-3	\$1,259.00
AZ46A □- PS50-3	\$1,259.00
AZ66A □- PS5-3	\$1,315.00
AZ66A □- PS7.2-3	\$1,315.00
AZ66A □- PS10-3	\$1,315.00
AZ66A □- PS25-3	\$1,395.00
AZ66A □- PS36-3	\$1,395.00
AZ66A □- PS50-3	\$1,395.00

◇ HPG Geared Type

Product Name	List Price
AZ46A □- HP5-3	\$1,305.00
AZ46A □- HP5F-3	\$1,294.00
AZ46A □- HP9-3	\$1,305.00
AZ46A □- HP9F-3	\$1,294.00
AZ66A □- HP5-3	\$1,545.00
AZ66A □- HP5F-3	\$1,527.00
AZ66A □- HP15-3	\$1,714.00
AZ66A □- HP15F-3	\$1,696.00

◇ Harmonic Geared Type

Product Name	List Price
AZ46A □- HS50-3	\$1,541.00
AZ46A □- HS100-3	\$1,541.00
AZ66A □- HS50-3	\$1,861.00
AZ66A □- HS100-3	\$1,861.00

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*¹ Only for products with a key slot on the output shaft.

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*³ Accessory cables (sold separately) must be purchased in the following situations:

- When using a flexible cable
- When using a cable longer than 3 m (9.8 ft.)

Note

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

Overview,
Product
Series

AC Input
Motor &
Driver

0.36°/Geared
Q_{STEP}
AR

0.36°/Geared
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RBK

1.8°/0.9°
/Geared
CMK

0.72°
All-in-One
PKA

Motor Only

1.8°/0.9°
PKP/PK

Geared
PKP

0.72°/0.36°
PKP

Accessories



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