

## Servo Motors

# AZX Series

## Battery-Free Absolute Mechanical Sensor Equipped Motor

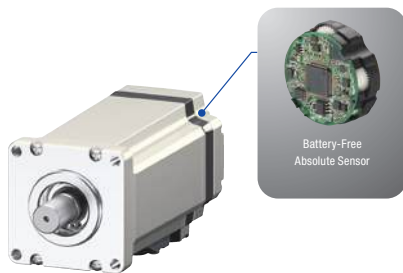
### Standard Type / PS Geared Type 400 W, 600 W



These servo motors are equipped with a battery-free absolute sensor. They are suitable for positioning applications with a large amount of travel, since they achieve high torque in the high speed range. The basic operations are the same as the **AZ** Series, making combined use in equipment easy.

### Battery-Free Absolute Sensor Equipped Servo Motor

The **AZX** Series is equipped with the same battery-free mechanical absolute sensor (**ABZO** sensor) as the **AZ** Series. These are dedicated servo motors for positioning and continuous operation.



- **Mechanical-Type Sensor**  
Holds positioning information even when powered off
- **Multi-Turn Absolute Sensor**  
Absolute position detection is possible with  $\pm 900$  rotations (1800 rotations) of the motor shaft from the reference home position

● For details about the advantages, please see the Oriental Motor website.

#### ● No External Sensors Required

Thanks to the absolute system, a home sensor or external sensor is not required.

#### Advantages

- High-Speed Return-to-Home + Improved Return-to-Home Accuracy
- Reduced Cost
- Simple Wiring
- Not Affected by External Sensor Malfunctions

#### ● Battery-Free

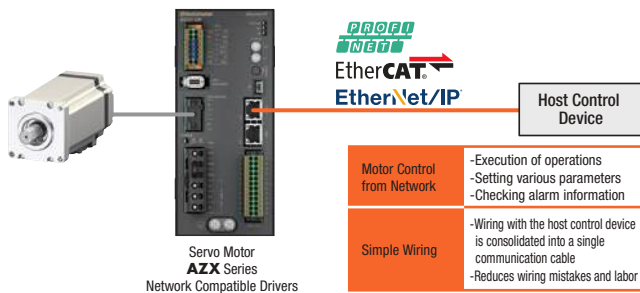
No battery is necessary for a mechanical-type sensor. Positioning information is managed mechanically by the ABZO sensor.

#### Advantages

- No Battery Replacement Required
- No Battery Installation Space Required (Unlimited driver installation possibilities)
- Safe for Overseas Shipping

### Network Compatible Drivers

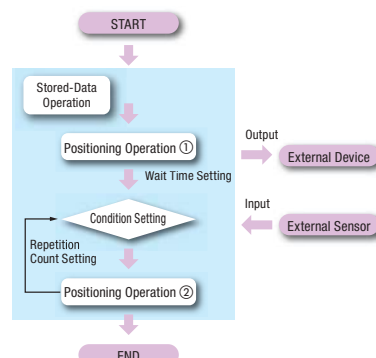
These drivers are EtherCAT, EtherNet/IP and PROFINET-compatible. The host control device and driver are connected with one communication cable, reducing wiring.



### Sequence Function Simplifies Programming\*

**AZX** Series positioning operations come with a variety of sequence functions, such as a timer setting between operations and linked operation, conditional branching, and loop counting. These can be set using the support software **MEXE02**, which helps simplify the host system's sequence program.

\*Only EtherNet/IP-compatible drivers.



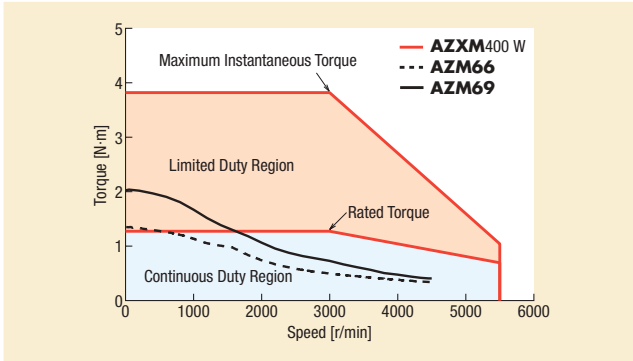
- Positioning Operation Data Setting (Max. 256 points)
- General-Purpose I/O Signal Counts (Input 6, output 6)
- Communication I/O Signal Counts (Input 16, output 16)

## Achieves High Torque in the High Speed Range

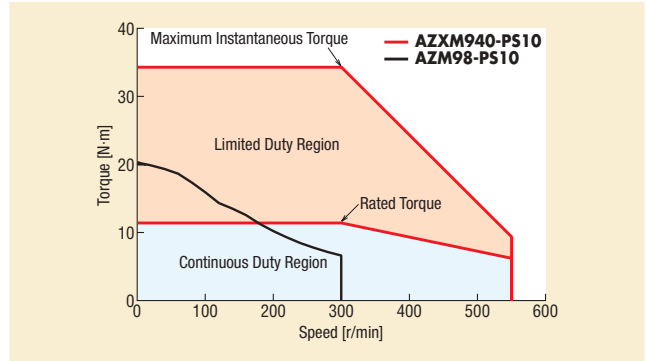
The **AZX** Series achieves high torque in the high speed range.

It is suitable for positioning applications with a large amount of travel (e.g.: ball screw driving).

Standard Type



PS Geared Type

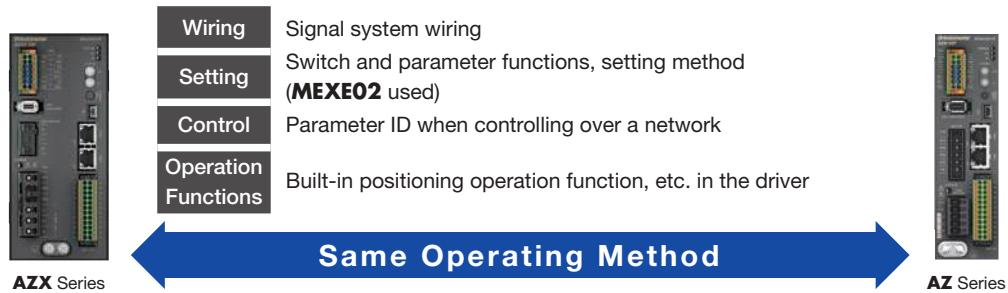


● This is a comparison of the speed – torque characteristics of the **AZX** Series and **AZ** Series.

The **AZX** Series offers superior torque in the high speed range, the **AZ** Series is better in the low speed range.







## The Basic Operations are the Same as the AZ Series

Using the **AZX** Series and **AZ** Series together in the same equipment can eliminate the work of operational changes.



## Product Line

Motors, drivers, and cables must be ordered individually.

Motor			Driver	Cables	
Type	Output Power	Frame Size		Cable Type	Cable Length
Standard Standard Type with Electromagnetic Brake  	400 W	60 mm	 EtherCAT EtherNet/IP PROFINET	Connection Cable Sets 	1 to 20 m
	600 W	85 mm			
PS Geared PS Geared Type with Electromagnetic Brake  -Gear Ratio 5 10 25  	400 W	90 mm		Flexible Connection Cable Sets 	
	600 W	90mm (Gear ratio 5) 120mm (Gear ratios 10 and 25)		-For Motor / Encoder / Electromagnetic Brake 	

● EtherCAT-compatible drivers have passed the official EtherCAT conformance test.

● EtherCAT® is a patented technology licensed from Beckhoff Automation GmbH (Germany) and is a registered trademark of that company.

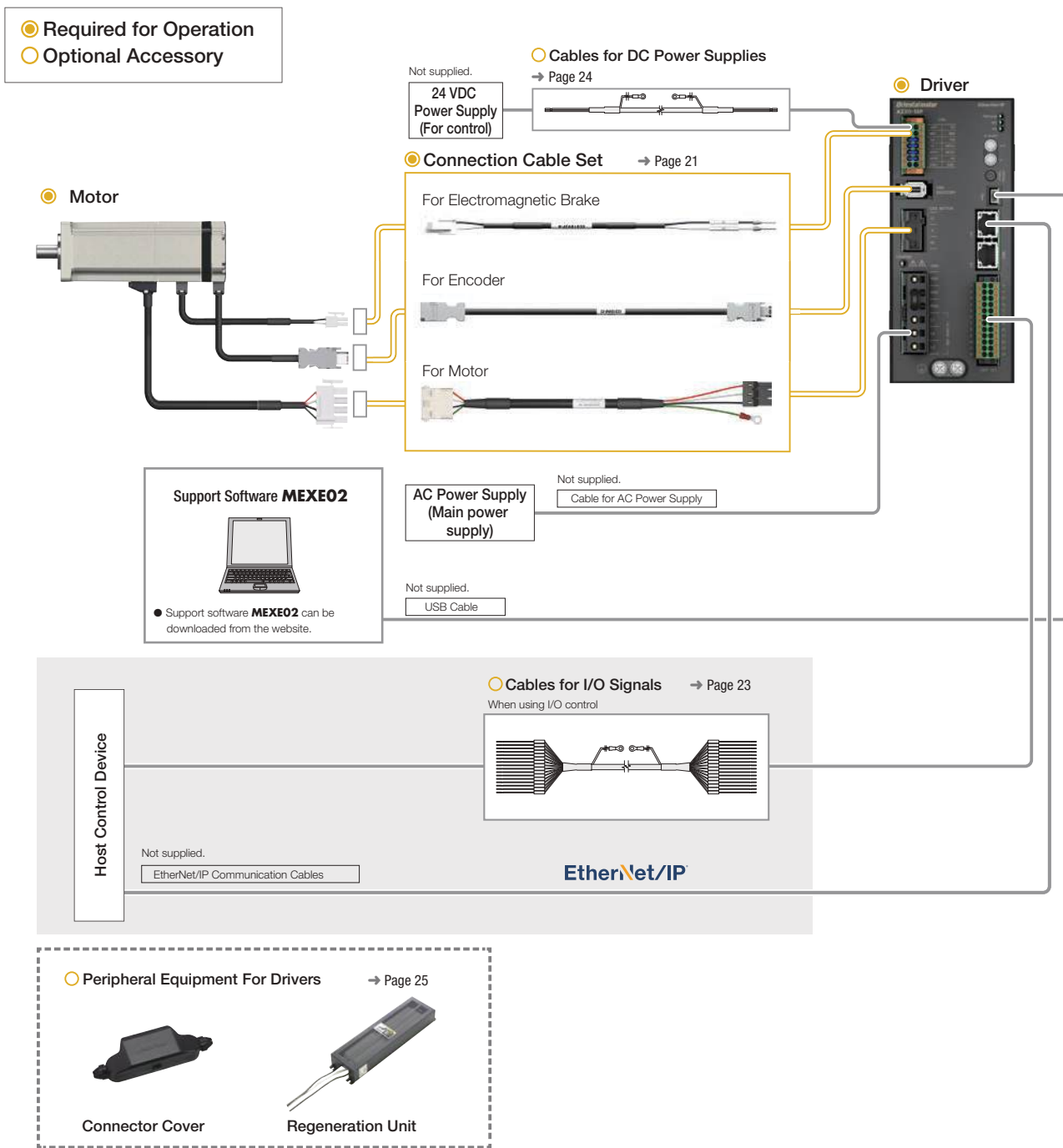
● EtherNet/IP™ is a trademark of ODVA.

● PROFINET is a registered trademark of PROFIBUS Nutzerorganisation e.V. (PNO).

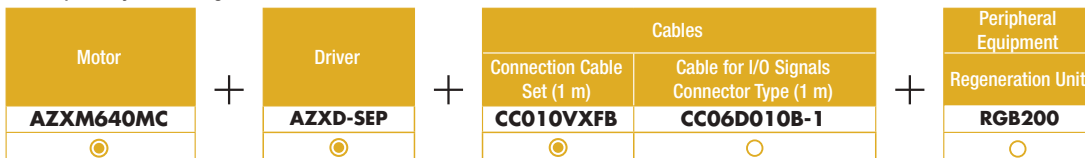
## System Configuration

### Combination of Standard Type Motor with Electromagnetic Brake and Network Compatible Driver

An example of a configuration using I/O control or EtherNet/IP with an EtherNet/IP compatible driver is shown below. Motors, drivers, and connection cable sets / flexible connection cable sets must be ordered individually.



### Example of System Configuration



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

#### Note

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

## Product Number

### ● Motor

#### ◇ Standard Type

**AZXM 6 40 A C**

①      ②      ③      ④      ⑤

#### ◇ PS Geared Type

**AZXM 9 40 A C-PS 10**

①      ②      ③      ④      ⑤      ⑥      ⑦

### ● Driver

**AZXD-S EP**

①      ②      ③

### ● Connection Cable Sets / Flexible Connection Cable Sets

**CC 010 V X F B**

①      ②      ③      ④      ⑤      ⑥

①	Motor Type	<b>AZXM: AZX</b> Series Motor
②	Motor Frame Size	<b>6:</b> 60 mm <b>9:</b> 85 mm
③	Output Power	<b>40:</b> 400 W <b>60:</b> 600 W
④	Output Shaft Type	<b>A:</b> Single Shaft <b>M:</b> Type with Electromagnetic Brake
⑤	Motor Type	<b>C:</b> AC Input Specification

①	Motor Type	<b>AZXM: AZX</b> Series Motor
②	Motor Frame Size	<b>9:</b> 90 mm <b>12:</b> 120 mm
③	Output Power	<b>40:</b> 400 W <b>60:</b> 600 W
④	Output Shaft Type	<b>A:</b> Single Shaft <b>M:</b> Type with Electromagnetic Brake
⑤	Motor Type	<b>C:</b> AC Input Specification
⑥	Geared Type	<b>PS: PS</b> Geared Type
⑦	Gear Ratio	

①	Driver Type	<b>AZXD: AZX</b> Series Driver
②	Power Supply Input	<b>S:</b> Single-Phase/Three-Phase 200-240 VAC
③	Product Line	<b>ED:</b> EtherCAT-Compatible <b>EP:</b> EtherNet/IP-Compatible <b>PN:</b> PROFINET-Compatible

①		<b>CC:</b> Cable
②	Length	<b>010:</b> 1 m <b>020:</b> 2 m <b>030:</b> 3 m <b>050:</b> 5 m <b>070:</b> 7 m <b>100:</b> 10 m <b>150:</b> 15 m <b>200:</b> 20 m
③	Reference Number	
④	Applicable Model	<b>X:</b> For <b>AZX</b> Series
⑤	Cable Type	<b>F:</b> Connection Cable Set <b>R:</b> Flexible Connection Cable Set
⑥	Description	Blank: For Type without Electromagnetic Brake <b>B:</b> For Type with Electromagnetic Brake

## Product Line

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

### Motor

#### Standard Type



Frame Size	Output Power	Product Name
60 mm	400 W	<b>AZXM640AC</b>
85 mm	600 W	<b>AZXM960AC</b>

#### Standard Type with an Electromagnetic Brake



Frame Size	Output Power	Product Name
60 mm	400 W	<b>AZXM640MC</b>
85 mm	600 W	<b>AZXM960MC</b>

#### PS Geared Type



Frame Size	Output Power	Product Name
90 mm	400 W	<b>AZXM940AC-PS5</b>
		<b>AZXM940AC-PS10</b>
		<b>AZXM940AC-PS25</b>
120 mm	600 W	<b>AZXM960AC-PS5</b>
		<b>AZXM1260AC-PS10</b> <b>AZXM1260AC-PS25</b>

#### PS Geared Type with Electromagnetic Brake



Frame Size	Output Power	Product Name
90 mm	400 W	<b>AZXM940MC-PS5</b>
		<b>AZXM940MC-PS10</b>
		<b>AZXM940MC-PS25</b>
120 mm	600 W	<b>AZXM960MC-PS5</b>
		<b>AZXM1260MC-PS10</b> <b>AZXM1260MC-PS25</b>

### Driver

#### EtherCAT-Compatible

Power Supply Input	Product Name
Single-Phase/Three-Phase 200-240 VAC	<b>AZXD-SED</b>



#### EtherNet/IP-Compatible

Power Supply Input	Product Name
Single-Phase/Three-Phase 200-240 VAC	<b>AZXD-SEP</b>



#### PROFINET-Compatible

Power Supply Input	Product Name
Single-Phase/Three-Phase 200-240 VAC	<b>AZXD-SPN</b>



### Connection Cable Sets / Flexible Connection Cable Sets

Use the flexible connection cable set in applications where the cable is bent and flexed. Extension cable sets and flexible extension cable sets are also available. Refer to page 21.

## Included Items

### Motor

Type	Included Items	Parallel Key
Standard Type		-
PS Geared Type		1 piece

### Driver

Type	Included Items	Connector
EtherCAT-Compatible		-For CN1 (1 piece)
EtherNet/IP-Compatible		-For CN4 (1 piece)
PROFINET-Compatible		-For CN7 (1 piece)
		-Connector wiring lever (1 piece)

## List of Combinations

Product	Type	Product Name
Motor	Standard Type	<b>AZXM640</b> ■C, <b>AZXM960</b> ■C
	PS Geared Type	<b>AZXM940</b> ■C-PS□, <b>AZXM960</b> ■C-PS5, <b>AZXM1260</b> ■C-PS□

+

Product	Type	Product Name
Driver	EtherCAT-Compatible	<b>AZXD-SED</b>
	EtherNet/IP-Compatible	<b>AZXD-SEP</b>
	PROFINET-Compatible	<b>AZXD-SPN</b>

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Product	Type	Product Name
Connection Cable Sets / Flexible Connection Cable Sets	Connection Cable Set	For Motor / Encoder: <b>CC</b> ◇◇◇◇ <b>VXF</b> For Motor / Encoder / Electromagnetic Brake: <b>CC</b> ◇◇◇◇ <b>VXFB</b>
	Flexible Connection Cable Sets	For Motor / Encoder: <b>CC</b> ◇◇◇◇ <b>VXR</b> For Motor / Encoder / Electromagnetic Brake: <b>CC</b> ◇◇◇◇ <b>VXRB</b>

● A letter or number indicating the following is specified where the box is located in the product name.

- : Output Shaft Shape
- : Gear Ratio
- ◇: Cable Length

# How to Read Specifications

Motor Product Name	Single Shaft With Electromagnetic Brake	AZXM640AC	AZXM940AC-PS5
		AZXM640MC	AZXM940MC-PS5
Driver Product Name		AZXD-S□	
① Rated Output Power	W	400	400
② Rated Speed	r/min	3000	-
③ Max. Speed	r/min	5500	-
④ Rated Torque	Nm	1.27	5.72
⑤ Maximum Instantaneous Torque	Nm	3.82	17.1
⑥ Permissible Speed Range	r/min	-	0 - 1100
⑦ Rotor Inertia	J: kgm <sup>2</sup>	$0.294 \times 10^{-4}$ $[0.316 \times 10^{-4}]$	$0.294 \times 10^{-4}$ $[0.316 \times 10^{-4}]$
⑧ Inertia	J: kgm <sup>2</sup>	-	$0.163 \times 10^{-4}$
⑨ Permissible Load Inertia	J: kgm <sup>2</sup>	$14.7 \times 10^{-4}$	0.037
⑩ Gear Ratio	-	-	5
⑪ Resolution	P/R	100 - 10000 (Factory setting 1000)	500 - 50000 (Factory setting 5000)
Detector		Mechanical Multi-Turn Absolute Encoder 1 Turn: 16 bit Multi-Turn: ±900 rotations (1800 rotations)	
⑫ Backlash	arcmin	-	15
⑬ Power Supply	Main Power Supply	Input Voltage: Single-Phase/Three-Phase 200-240 VAC -15 ~ +6% 50/60 Hz Rated Current: A: Single-Phase: 5.3 Three-Phase: 3.0	
	Control Power	Input Voltage: 24 VDC±5% Input Current: A: 0.27 [0.57]	
	Supply	Type: Power Off Activated Type Power Supply Input: 24 VDC±10%	
		Power Consumption	W: 7.2
Electromagnetic Brake	Rated Current	A: 0.3	
	Static Friction Torque	Nm: 1.27	

## ① Rated Output Power

This is the permissible range the temperature rise may not exceed when continuously operated at the motor's rated speed and rated torque.

## ② Rated Speed

This is the rotation speed when the motor is operated at rated output power.

## ③ Max. Speed

This is the maximum rotation speed the motor can turn at.

## ④ Rated Torque

This is the output torque when the motor is operated at rated output power and rated speed.

## ⑤ Maximum Instantaneous Torque

This is the maximum torque that can be used instantaneously (in a short period of time).

It is the maximum for acceleration and deceleration, and up to this torque can be used.

## ⑥ Permissible Speed Range

This is the range of the operable rotation speed on the output gear shaft.

## ⑦ Rotor Inertia

This refers to the inertia of the rotor inside the motor.

This is necessary when the required torque (acceleration torque) for the motor is calculated.

## ⑧ Inertia

This is the inertia in the gearhead.

This is necessary when the required torque (acceleration torque) for the motor is calculated.

## ⑨ Permissible Load Inertia

This is the load inertia that the motor can stably control.

Control can become unstable if a load exceeding this value is applied, resulting in speed regulation variation and issues with protection circuit operation, vibration, etc.

## ⑩ Gear Ratio

This is the ratio of the rotation speed between the input speed from the motor and the speed of the output gear shaft. For example, a gear ratio of 10 indicates that when the input speed from the motor is 10 r/min, the output gear shaft speed is 1 r/min.

## ⑪ Resolution

This indicates the angle of rotation of the output shaft in one pulse. For example, if the resolution = 1000 p/rev, one rotation of the motor (360°) can be divided into 1000.

## ⑫ Backlash

This is the play of the output gear shaft when the motor shaft is fixed.

When positioning in bi-direction, the positioning accuracy is affected.

## ⑬ Rated Current

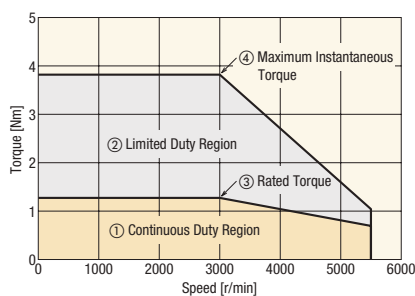
This is the input current of the main power supply required for use in the continuous duty region.

## ⑭ Static Friction Torque

This is the electromagnetic brake specifications. It is the maximum holding torque (holding force) at which the electromagnetic brake can hold position.

# How to Read Speed – Torque Characteristics

AZXM640□C



## ① Continuous Duty Region

This is the region that can be used at continuous rating. The effective load torque must be corrected to this region.

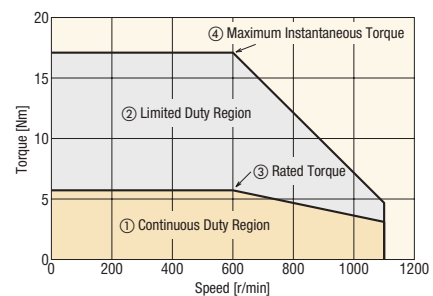
## ② Limited Duty Region

This is the region used for acceleration and deceleration.

## ③ Rated Torque

This is the output torque when the motor is operated at rated output power and rated speed.

AZXM940□C-PS5



## ④ Maximum Instantaneous Torque

This is the maximum torque that can be used instantaneously (in a short period of time).

It is the maximum for acceleration and deceleration, and up to this torque can be used.

# Standard Type

Frame Size 60 mm

## Specifications



Motor Product Name	Single Shaft	<b>AZXM640AC</b>
	With Electromagnetic Brake	<b>AZXM640MC</b>
Driver Product Name		<b>AZXD-S</b> <input type="checkbox"/>
Rated Output Power	W	400
Rated Speed	r/min	3000
Max. Speed	r/min	5500
Rated Torque	Nm	1.27
Maximum Instantaneous Torque	Nm	3.82
Rotor Inertia	J: kgm <sup>2</sup>	0.294 × 10 <sup>-4</sup> [0.316 × 10 <sup>-4</sup> ]* <sup>1</sup>
Permissible Inertia* <sup>2</sup>	J: kgm <sup>2</sup>	14.7 × 10 <sup>-4</sup>
Resolution	P/R	100 - 10000 (Factory setting 1000)
Detector		Mechanical Multi-Turn Absolute Encoder 1 Turn: 16 bit Multi-Turn: ±900 rotations (1800 rotations)
Power Supply Input	Main Power Supply	Input Voltage
		Rated Current* <sup>3</sup>
	Control Power Supply	Input Voltage
		Input Current
Electromagnetic Brake* <sup>4</sup>		Type
		Power Supply Input
		Power Consumption
		Rated Current
		Static Friction Torque

● A letter indicating the driver type is specified where the box  is located in the product name. Check "List of Combinations" on page 5 for driver product names.

\*1 The value inside the [ ] represents the value when connecting an electromagnetic brake motor.

\*2 50 times the rotor inertia.

\*3 The value when operated in the continuous duty region. When operated in the limited duty region, a maximum of approximately 3 times the current flows.

\*4 The electromagnetic brake holds position when the power is off. It cannot be used for braking applications.

### Note

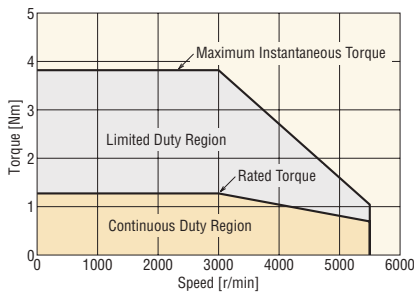
● When the motor is continuously operated at rating, a heat sink of a capacity at least equivalent to an aluminum plate of the following size is required.

**AZXM640**  **C**: 300 mm × 300 mm, 10 mm thick

## Speed – Torque Characteristics

### AZXM640 C

Power supply specification: Three-phase/single-phase 200-240 VAC



### Note

● A regeneration unit may be needed depending on the operating conditions. Regeneration units → Page 25

● Either **A** (standard) or **M** (type with an electromagnetic brake) indicating the configuration is specified where the box  is located in the product name.

# Standard Type

Frame Size 85 mm

## Specifications



Motor Product Name		Single Shaft	<b>AZXM960AC</b>	
		With Electromagnetic Brake	<b>AZXM960MC</b>	
Driver Product Name			<b>AZXD-S</b>	
Rated Output Power		W	600	
Rated Speed		r/min	3000	
Max. Speed		r/min	5500	
Rated Torque		Nm	1.91	
Maximum Instantaneous Torque	Single-Phase 200-240 VAC	Nm	3.82	
	Three-Phase 200-240 VAC	Nm	7.16	
Rotor Inertia		J: kgm <sup>2</sup>	$0.948 \times 10^{-4}$ [ $1.03 \times 10^{-4}$ ]* <sup>1</sup>	
Permissible Inertia* <sup>2</sup>		J: kgm <sup>2</sup>	$47.4 \times 10^{-4}$	
Resolution		P/R	100~10000 (Factory setting 1000)	
Detector			Mechanical Multi-Turn Absolute Encoder 1 Turn: 16 bit Multi-Turn: ±900 rotations (1800 rotations)	
Power Supply Input	Main Power Supply	Input Voltage	Single-Phase/Three-Phase 200-240 VAC -15 - +6% 50/60 Hz	
		Rated Current* <sup>3</sup>	Single-Phase: 7.1 Three-Phase: 3.9	
	Control Power Supply	Input Voltage	24 VDC±5%	
		Input Current	0.27 [0.62]* <sup>1</sup>	
Electromagnetic Brake* <sup>4</sup>		Type	Power Off Activated Type	
		Power Supply Input	24 VDC±10%	
		Power Consumption	W	8.5
		Rated Current	A	0.35
		Static Friction Torque	Nm	1.91

● A letter indicating the driver type is specified where the box  is located in the product name. Check "List of Combinations" on page 5 for driver product names.

\*1 The value inside the [ ] represents the value when connecting an electromagnetic brake motor.

\*2 50 times the rotor inertia.

\*3 The value when operated in the continuous duty region. When operated in the limited duty region, a maximum of approximately 4 times the current flows for three-phase input, and a maximum of approximately 2 times the current flows for single-phase input.

\*4 The electromagnetic brake holds position when the power is off. It cannot be used for braking applications.

### Note

● When the motor is continuously operated at rating, a heat sink of a capacity at least equivalent to an aluminum plate of the following size is required.

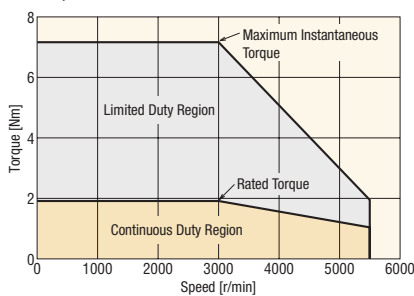
**AZXM960**C: 350 mm×350 mm, 10 mm thick

## Speed – Torque Characteristics

### AZXM960C

Power supply specification:

Three-phase 200-240 VAC



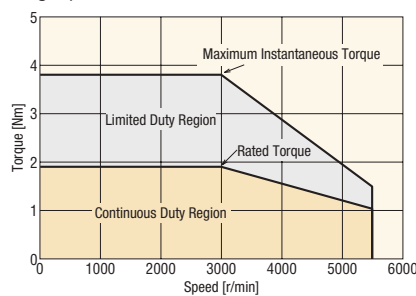
### Note

● A regeneration unit may be needed depending on the operating conditions. Regeneration units → Page 25

### AZXM960C

Power supply specification:

Single-phase 200-240 VAC



● Either **A** (standard) or **M** (type with an electromagnetic brake) indicating the configuration is specified where the box  is located in the product name.



# PS Geared Type

Frame Size 90 mm



## Specifications

Motor Product Name	Single Shaft	<b>AZXM940AC-PS5</b>	<b>AZXM940AC-PS10</b>	<b>AZXM940AC-PS25</b>	<b>AZXM960AC-PS5</b>	
	With Electromagnetic Brake	<b>AZXM940MC-PS5</b>	<b>AZXM940MC-PS10</b>	<b>AZXM940MC-PS25</b>	<b>AZXM960MC-PS5</b>	
Driver Product Name	<b>AZXD-S</b>					
Rated Output Power	W	400			600	
Rated Torque	Nm	5.72	11.4	25.7	8.6	
Maximum Instantaneous Torque	Single-Phase 200-240 VAC	17.1	34.3	77.2	17.2	
	Three-Phase 200-240 VAC				32.2	
Permissible Speed Range	r/min	0 - 1100	0 - 550	0 - 220	0 - 1100	
Rotor Inertia	J: kgm <sup>2</sup>	0.294 × 10 <sup>-4</sup> [0.316 × 10 <sup>-4</sup> ]*1			0.948 × 10 <sup>-4</sup> [1.03 × 10 <sup>-4</sup> ]*1	
Inertia*2	J: kgm <sup>2</sup>	0.163 × 10 <sup>-4</sup>	0.160 × 10 <sup>-4</sup>	0.175 × 10 <sup>-4</sup>	0.163 × 10 <sup>-4</sup>	
Permissible Inertia*3	J: kgm <sup>2</sup>	0.037	0.147	0.919	0.119	
Gear Ratio		5	10	25	5	
Resolution	P/R	500 - 50000 (Factory setting 5000)	1000 - 100000 (Factory setting 10000)	2500 - 250000 (Factory setting 25000)	500 - 50000 (Factory setting 5000)	
Detector	Mechanical Multi-Turn Absolute Encoder 1 Turn: 16 bit Multi-Turn: ±900 rotations (1800 rotations)					
Backlash	arcmin	15 (0.25)				
Power Supply Input	Main Power Supply	Input Voltage	Single-Phase/Three-Phase 200-240 VAC -15~+6% 50/60 Hz			
		Rated Current*4	Single-Phase: 5.3 Three-Phase: 3.0		Single-Phase: 7.1 Three-Phase: 3.9	
	Control Power Supply	Input Voltage	24 VDC ±5%			
		Input Current	0.27 [0.57]*1		0.27 [0.62]*1	
Electromagnetic Brake*5	Type	Power Off Activated Type				
	Power Supply Input	24 VDC ±10%				
	Power Consumption	W	7.2		8.5	
	Rated Current	A	0.3		0.35	
	Static Friction Torque	Nm	1.27		1.91	

● A letter indicating the driver type is specified where the box  is located in the product name. Check "List of Combinations" on page 5 for driver product names.

\*1 The value inside the [ ] represents the value when connecting an electromagnetic brake motor.

\*2 This is the value of the internal inertia of the gear converted to the motor shaft.

\*3 The square of 50 times the rotor inertia × the gear ratio.

\*4 The value when operated in the continuous duty region (the region that can be used at continuous rating).

When operated in the limited duty region (the region used for acceleration and deceleration), the following current flows.

● **AZXM940**: Approx. 3 times max.

● **AZXM960** single-phase: Approx. 2 times max.

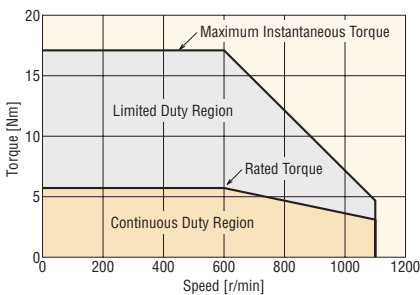
● **AZXM960** three-phase: Approx. 4 times max.

\*5 The electromagnetic brake holds position when the power is off. It cannot be used for braking.

## Speed – Torque Characteristics

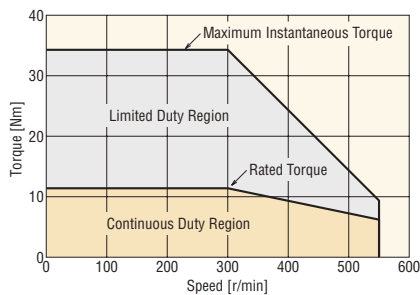
### AZXM940C-PS5

Power supply specification: Three-phase/single-phase 200-240 VAC



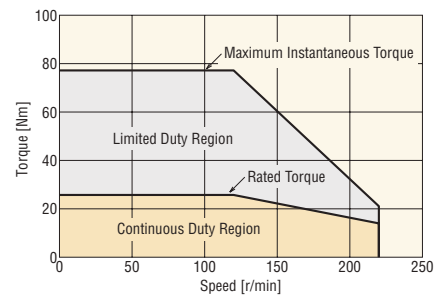
### AZXM940C-PS10

Power supply specification: Three-phase/single-phase 200-240 VAC



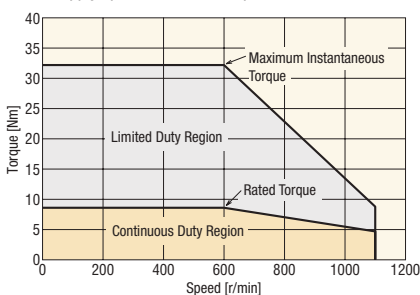
### AZXM940C-PS25

Power supply specification: Three-phase/single-phase 200-240 VAC



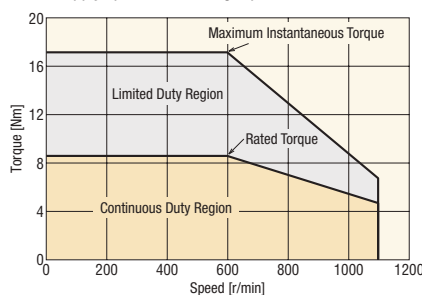
### AZXM960C-PS5

Power supply specification: Three-phase 200-240 VAC



### AZXM960C-PS5

Power supply specification: Single-phase 200-240 VAC



#### Note

● A regeneration unit may be needed depending on the operating conditions. Regeneration units → Page 25

● Either **A** (standard) or **M** (type with an electromagnetic brake) indicating the configuration is specified where the box  is located in the product name.

# PS Geared Type

Frame Size 120 mm

## Specifications

Motor Product Name		Single Shaft	<b>AZXM1260AC-PS10</b>	<b>AZXM1260AC-PS25</b>
		With Electromagnetic Brake	<b>AZXM1260MC-PS10</b>	<b>AZXM1260MC-PS25</b>
Driver Product Name		<b>AZXD-S</b>		
Rated Output Power		600		
Rated Torque		Nm	18.1	43.1
Maximum Instantaneous Torque		Single-Phase 200-240 VAC	36.3	86.2
		Three-Phase 200-240 VAC	68	162
Permissible Speed Range		r/min	0 - 550	0 - 220
Rotor Inertia		J: kgm <sup>2</sup>	$0.948 \times 10^{-4}$ [ $1.03 \times 10^{-4}$ ] <sup>*1</sup>	
Inertia <sup>*2</sup>		J: kgm <sup>2</sup>	$0.188 \times 10^{-4}$	$0.175 \times 10^{-4}$
Permissible Inertia <sup>*3</sup>		J: kgm <sup>2</sup>	0.474	2.963
Gear Ratio			10	25
Resolution		P/R	1000 - 100000 (Factory setting 10000)	2500 - 250000 (Factory setting 25000)
Detector		Mechanical Multi-Turn Absolute Encoder 1 Turn: 16 bit Multi-Turn: ±900 rotations (1800 rotations)		
Backlash		arcmin	15 (0.25°)	
Power Supply Input		Main Power Supply	Single-Phase/Three-Phase 200-240 VAC -15 - +6% 50/60 Hz	
		Control Power Supply	Single-Phase: 7.1 Three-Phase: 3.9	
Electromagnetic Brake <sup>*5</sup>		Input Voltage	24 VDC ±5%	
		Input Current	0.27 [0.62] <sup>*1</sup>	
		Type	Power Off Activated Type	
		Power Supply Input	24 VDC ±10%	
		Power Consumption	8.5	
		Rated Current	0.35	
		Static Friction Torque	1.91	

● A letter indicating the driver type is specified where the box **S** is located in the product name. Please check “List of Combinations” on page 5 for driver product names.

\*1 The value inside the [ ] represents the value when connecting an electromagnetic brake motor.

\*2 This is the value of the internal inertia of the gear converted to the motor shaft.

\*3 The square of 50 times the rotor inertia × the gear ratio.

\*4 The value when operated in the continuous duty region (the region that can be used at continuous rating).

When operated in the limited duty region (the region used for acceleration and deceleration), the following current flows.

● **AZXM1260** single-phase: Approx. 2 times max.

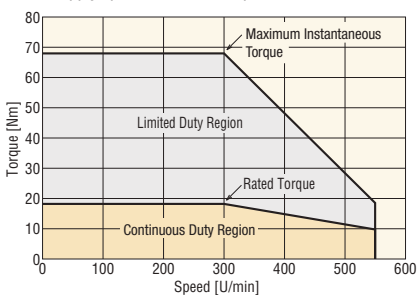
● **AZXM1260** three-phase: Approx. 4 times max.

\*5 The electromagnetic brake maintains its position when power is disconnected, but it cannot be used as an active braking mechanism.

## Speed – Torque Characteristics

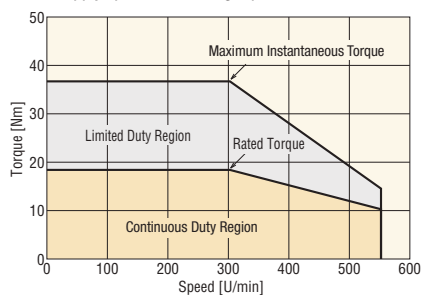
### AZXM1260□C-PS10

Power supply specification: Three-phase 200-240 VAC



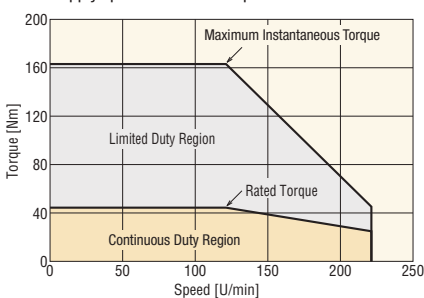
### AZXM1260□C-PS10

Power supply specification: Single-phase 200-240 VAC



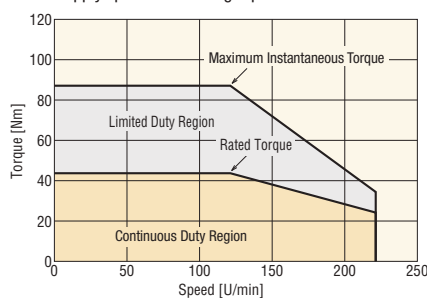
### AZXM1260□C-PS25

Power supply specification: Three-phase 200-240 VAC



### AZXM1260□C-PS25

Power supply specification: Single-phase 200-240 VAC



### Note

● A regeneration unit may be needed depending on the operating conditions. Regeneration units → Page 25

● Either **A** (standard) or **M** (type with an electromagnetic brake) indicating the configuration is specified where the box **□** is located in the product name.

## Driver Specifications

Driver Product Name		AZXD-SED	AZXD-SEP	AZXD-SPN
Interface	Control Input	6 Points, Photocoupler		
	Pulse Output	2 Points, Line Driver		
	Control Output	6 Points, Photocoupler and Open-Collector		
	Power Shut Down Signal Input	2 Points, Photocoupler		
	Power Shut Down Monitor Output	1 Point, Photocoupler and Open-Collector		
	Field Network	EtherCAT	EtherNet/IP	PROFINET

## Driver Functions

### EtherCAT-Compatible

Driver Product Name		AZXD-SED
Remote I/O	Input	16 Points
	Output	16 Points
Operation Modes		Profile Position Mode (PP)
		Profile Speed Mode (PV)
		Return-to-Home Mode (HM)
		Cyclic Synchronous Position Mode (CSP)
		Cyclic Synchronous Speed Mode (CSV)
Setting Tool		Support Software <b>MEXE02</b>
Coordinates Management Method		Battery-Free Absolute System
Monitor and Information		As shown in the table below.
Alarm		<input type="radio"/>

### EtherNet/IP-Compatible

Driver Product Name		AZXD-SEP, AZXD-SPN		
Number of Positioning Data Sets		256 Points		
Remote I/O	Input	16 Points		
	Output	16 Points		
Setting Tool		Support Software <b>MEXE02</b>		
Coordinates Management Method		Battery-Free Absolute System		
Operation	Positioning Operation	Independent Operation	<input type="radio"/>	
		Linked Operation	Sequential Operation	<input type="radio"/>
		Multi-Speed Operation (Continuous Sequential Operation)	<input type="radio"/>	
	Sequence Control	Loop Operation (Repeating)	<input type="radio"/>	
		Event Jump Operation	<input type="radio"/>	
	Continuous Operation		<input type="radio"/>	
	Return-To-Home Operation	Return-To-Home Operation	<input type="radio"/>	
		High-Speed Return-to-Home Operation	<input type="radio"/>	
	JOG Operation		<input type="radio"/>	
	Monitor and Information		Waveform Monitoring	<input type="radio"/>
		Overload Detection	<input type="radio"/>	
		Overheat Detection (Motor and driver)	<input type="radio"/>	
		Position and Speed Information	<input type="radio"/>	
		Temperature Detection (Motor and driver)	<input type="radio"/>	
		Motor Load Factor	<input type="radio"/>	
Alarm		Distance Traveled / Integrating Distance Traveled	<input type="radio"/>	
Alarm			<input type="radio"/>	

## Communication Specifications

### EtherCAT-Compatible

Communication Protocol	IEC 61158 Type12
Physical Layer/Protocol	100 BASE-TX (IEEE 802.3)
Baud Rate	100 Mbps
Communication Cycle	-Free Run Mode: 1 ms min. -SM2 Event Synchronous Mode: 1 ms min. -DC Mode: 0.25 ms, 0.5 ms, 1 ms, 2 ms, 3 ms, 4 ms, 5 ms, 6 ms, 7 ms, 8 ms, 9 ms, 10 ms
Communication Port/Connector	RJ45×2 (Shield-compatible) ECAT IN: EtherCAT Input ECAT OUT: EtherCAT Output
Topology	Daisy Chain (Max. 65,535 nodes)
Process Data	Variable PDO Mapping
Sync Manager	-SM0: Mailbox Output -SM1: Mailbox Input -SM2: Process Data Output -SM3: Process Data Input
Mailbox (CoE)	-Emergency Messages -SDO Request -SDO Response -SDO Information
Synchronous Mode	-Free Run Mode (Asynchronous) -SM2 Event Synchronous Mode -DC Mode (SYNCO Event Synchronous)
Device Profile	IEC 61800-7 CiA402 Drive Profile

## ● EtherNet/IP-Compatible

Communication Protocol	EtherNet/IP (Complies with CT18)	
Vendor ID	187: Oriental Motor Co., Ltd	
Device Type	43: Generic Device	
Baud Rate	10/100 Mbps (Autonegotiation)	
Communication Mode	Full Duplex/Half Duplex (Autonegotiation)	
Cable Specifications	Shielded Twisted-Pair (STP) Cable Stroke/Cross, Category 5e min. Recommended	
Bytes	Output (Scanner→Driver)	40 bytes
	Input (Driver→Scanner)	56 bytes
Implicit Communication	Compatible Connections	2
	Connection Type	Exclusive Owner, Input Only
	Communication Cycle (RPI)	1 - 3200 ms
	Connection Type (Scanner→Driver)	Point-to-Point
	Connection Type (Driver→Scanner)	Point-to-Point, Multicast
	Data Reflection Trigger	Cyclic
IP Address Setting Method	IP Address Setting Switch, Parameter, DHCP	
Compatible Topologies	Star, Linear, Ring (Device Level Ring)	

## ● PROFINET

Communication Protocol	PROFINET IO Ver.2.43	
Vendor ID	0x33E: ORIENTAL MOTOR	
Baud Rate	100 Mbps (Autonegotiation)	
Communication Mode	Full Duplex (Autonegotiation)	
Cable Specifications	Shielded Twisted-Pair (STP) Cable Stroke/Cross, Category 5e min. Recommended	
Communication Connector	RJ45×2 (Shield-compatible)	
Conformance Class	B	
RT/IRT	RT	
NetLoad Class	I	
Protocol to be supported	DCP, LLDP, SNMP, MRP	
Number of occupied bytes	Output (Host Controller → Driver)	40 bytes
	Input (Driver → Host Controller)	56 bytes
Compatible Topologies	Star, Tree, Line, Ring	

## ■ General Specifications

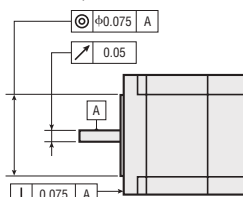
	Motor	Driver
Thermal Class	130 (B)	—
Insulation Resistance	100 MΩ or more when a 500 VDC megger is applied between the following places: -Case-Motor Winding -Case-Electromagnetic Brake Winding*1	100 MΩ or more when a 500 VDC megger is applied between the following places: -Protective Earth Terminal-Main Power Supply Terminal -Encoder Connector-Main Power Supply Terminal -I/O Signal Terminal-Main Power Supply Terminal
Dielectric Strength	Sufficient to withstand the following for 1 minute: -Case-Motor Winding 1.5 kVAC 50 Hz or 60 Hz -Case-Electromagnetic Brake Winding*1 1.0 kVAC 50 Hz or 60 Hz	Sufficient to withstand the following for 1 minute: -Protective Earth Terminal-Main Power Supply Terminal 1.5 kVAC 50 Hz or 60 Hz -Encoder Connector-Main Power Supply Terminal 1.8 kVAC 50 Hz or 60 Hz -I/O Signal Terminal-Main Power Supply Terminal 1.8 kVAC 50 Hz or 60 Hz
Operating Environment (In operation)	Ambient Temperature	0 ~ +40°C (Non-freezing)*2
	Ambient Humidity	85% or less (Non-condensing)
	Atmosphere	No corrosive gases or dust. The product should not be exposed to water, oil or other liquids.
Degree of Protection	IP65 (excluding installation surfaces and connectors)	IP10
Shaft Runout	0.05T.I.R. (mm)*4	—
Concentricity of Installation Pilot to the Shaft	0.075T.I.R. (mm)*4	—
Perpendicularity of Installation Surface to the Shaft	0.075T.I.R. (mm)*4	—

\*1 Only for products with an electromagnetic brake

\*2 Based on Oriental Motor's internal measurement conditions

\*3 When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 200×200 mm and 2 mm thickness

\*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

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

## Permissible Radial Load and Permissible Axial Load

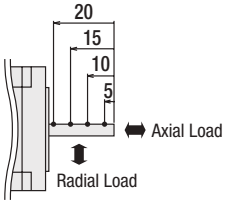
Unit: N

Type	Motor Frame Size	Product Name	Gear Ratio	Permissible Radial Load					Permissible Axial Load
				Distance from Shaft End [mm]					
				0	5	10	15	20	
Standard Type	60 mm	<b>AZXM640</b>	-	230	245	262	281	304	98
	85 mm	<b>AZXM960</b>	-	376	392	408	426	446	147
PS Geared Type	90 mm	<b>AZXM940</b>	5	380	420	470	540	630	600
			10	480	530	590	680	790	
			25	650	720	810	920	1070	
	120 mm	<b>AZXM1260</b>	5	380	420	470	540	630	600
			10	970	1040	1130	1230	1350	1200
			25	1320	1420	1530	1670	1830	

- The product names are listed such that the product names are distinguishable.
- When the **PS** geared type with an input speed of 3000 r/min operates with either a radial load or axial load, a lifetime of 10000 hours is the permissible value.  
For the life of gearhead, please contact the nearest Oriental Motor sales office, or visit the Oriental Motor website.

### Radial Load and Axial Load

Distance from Shaft End [mm]



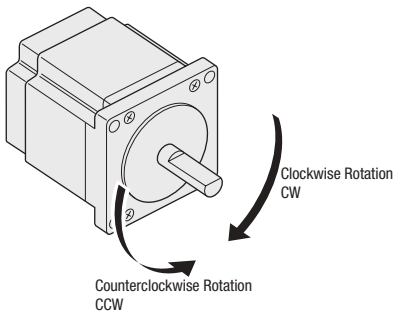
## Rotation Direction

This indicates the rotation direction when viewed from the output shaft side of the motor.

Please check the following table for the rotation direction of the output gear shaft when viewed from the output shaft side of the standard type motor.

Type	Gear Ratio	When Viewed from the Output Shaft Side of the Motor Rotation Direction
<b>PS</b> Geared Type	Total Gear Ratio	Same Direction

### Standard Type Motor



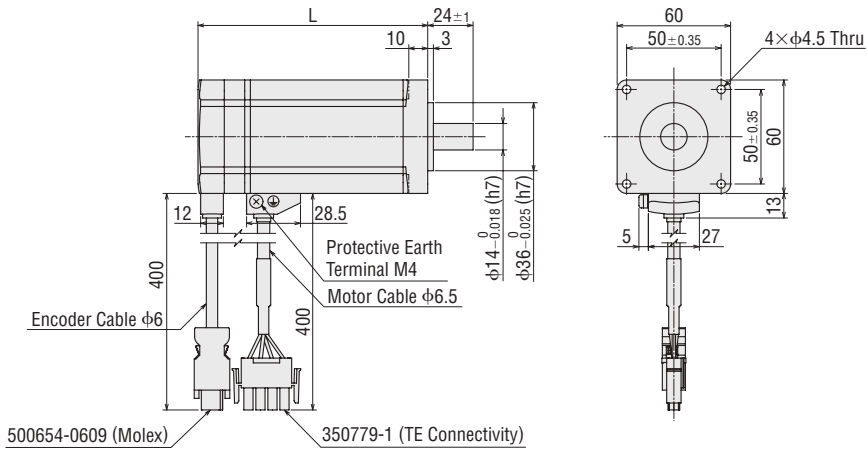
## Dimensions (Unit = mm)

● Motor

◇ Standard Type

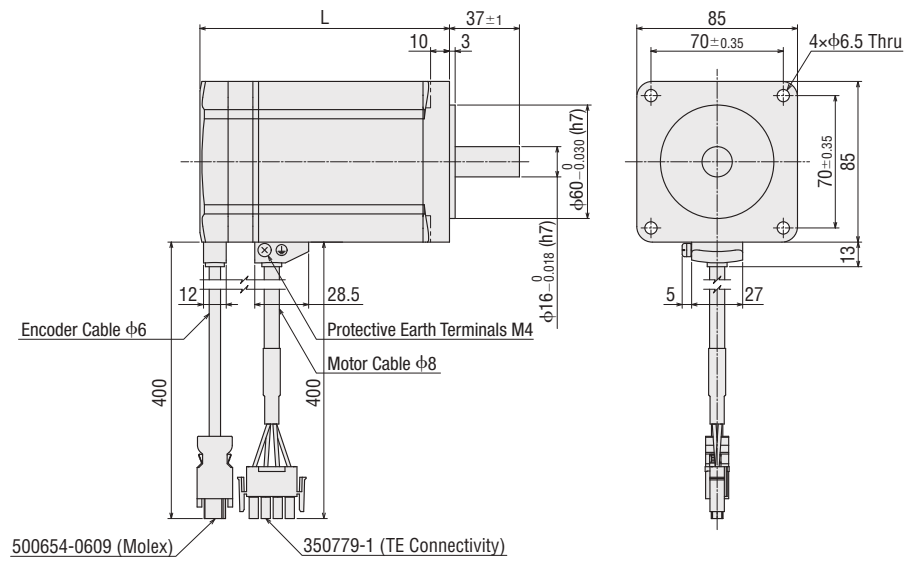
Frame Size 60 mm 400 W

Product Name	L	Mass [kg]
<b>AZXM640AC</b>	121.5	1.5



Frame Size 85 mm 600 W

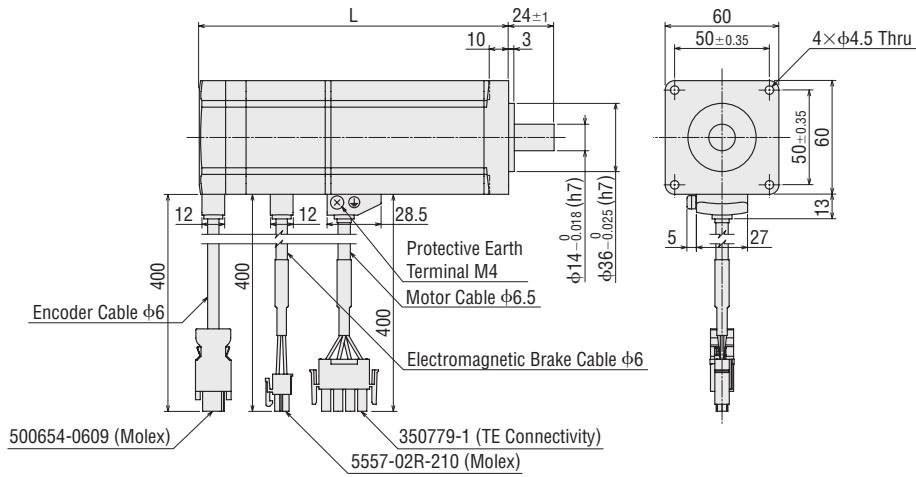
Product Name	L	Mass [kg]
<b>AZXM960AC</b>	132	3.1



◇Standard Type with an Electromagnetic Brake

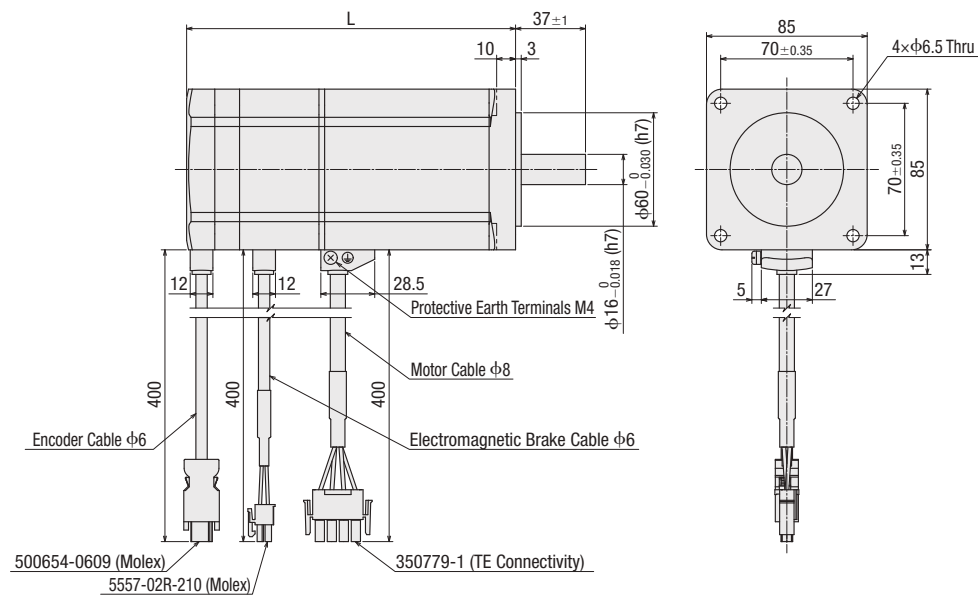
Frame Size 60 mm 400 W

Product Name	L	Mass [kg]
<b>AZXM640MC</b>	163.5	2.0



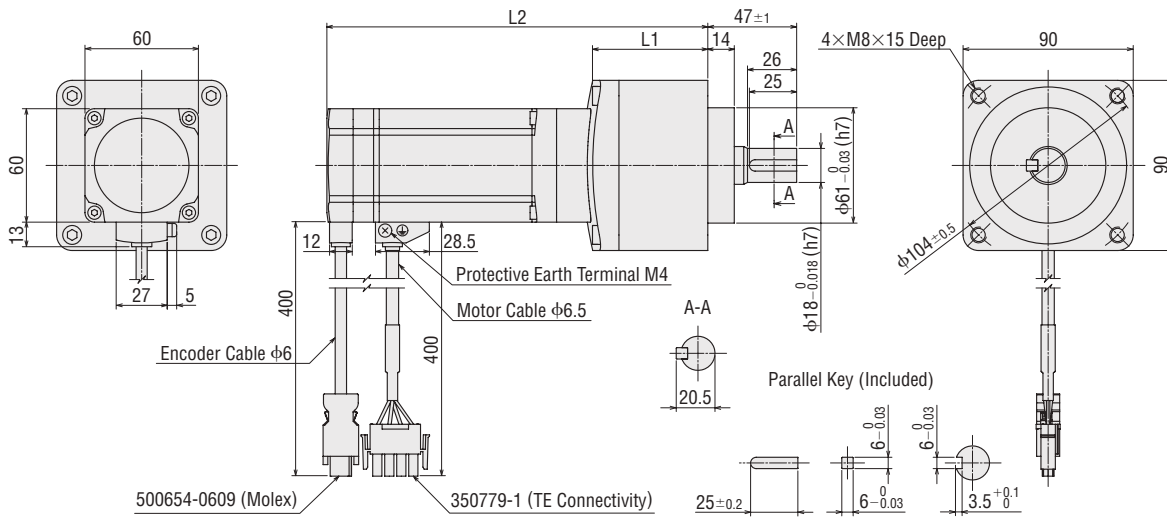
Frame Size 85 mm 600 W

Product Name	L	Mass [kg]
<b>AZXM960MC</b>	174	4.0



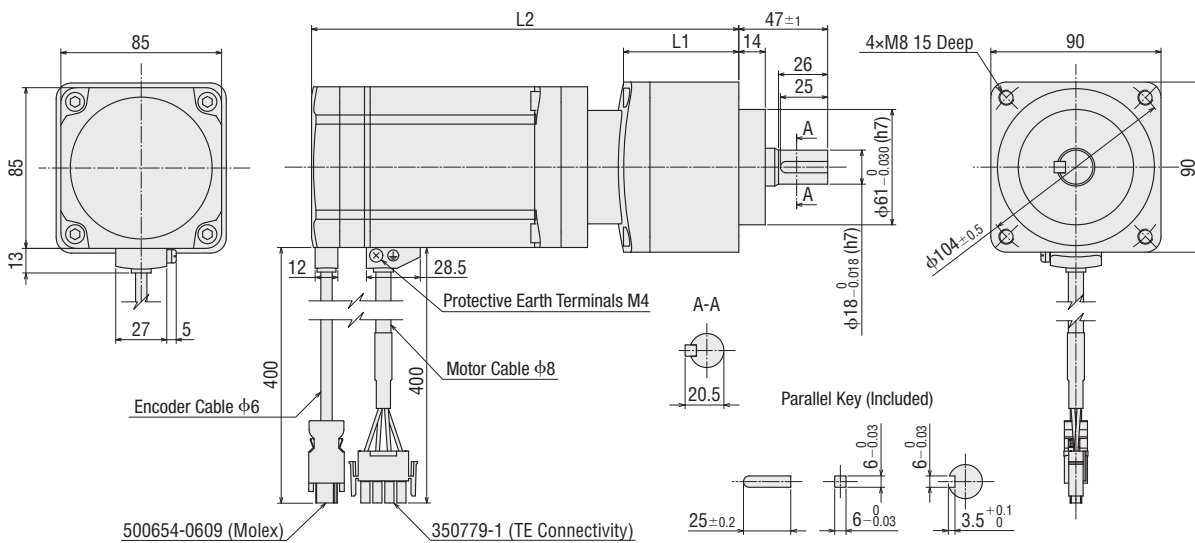
◆PS Geared Type  
Frame Size 90 mm 400 W

Product Name	Gear Ratio	L1	L2	Mass [kg]
<b>AZXM940AC-PS</b> ■	<b>5, 10</b>	61	201.5	3.5
	<b>25</b>	88.3	229	4.4



Frame Size 90 mm 600 W

Product Name	Gear Ratio	L1	L2	Mass [kg]
<b>AZXM960AC-PS</b> ■	<b>5</b>	61	226	5.3



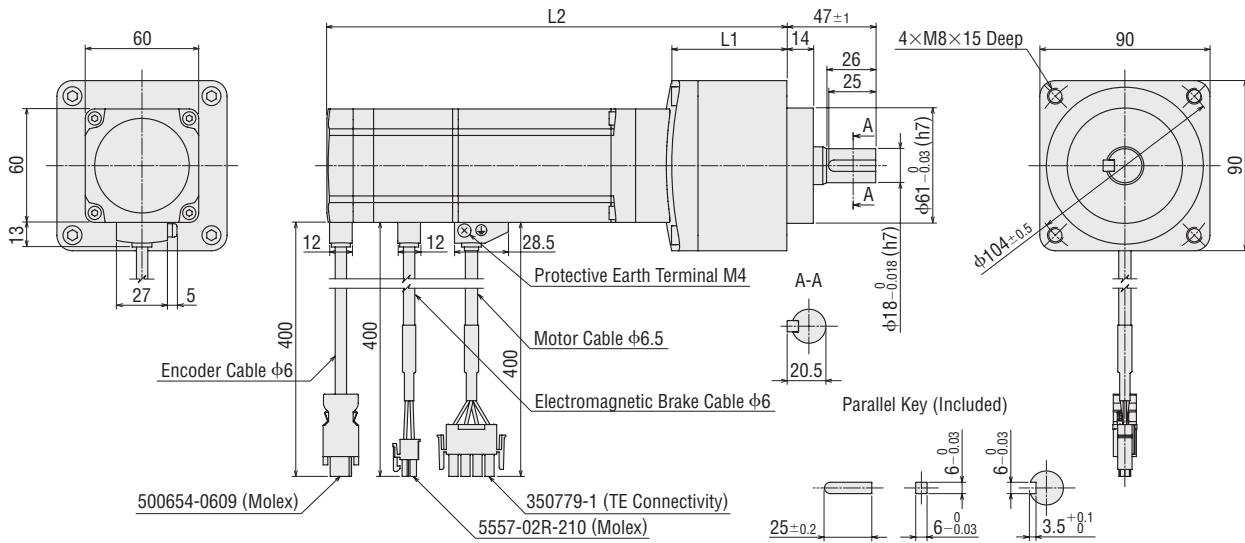
● A number indicating the gear ratio is specified where the box ■ is located in the product name.



◆PS Geared Type with Electromagnetic Brake

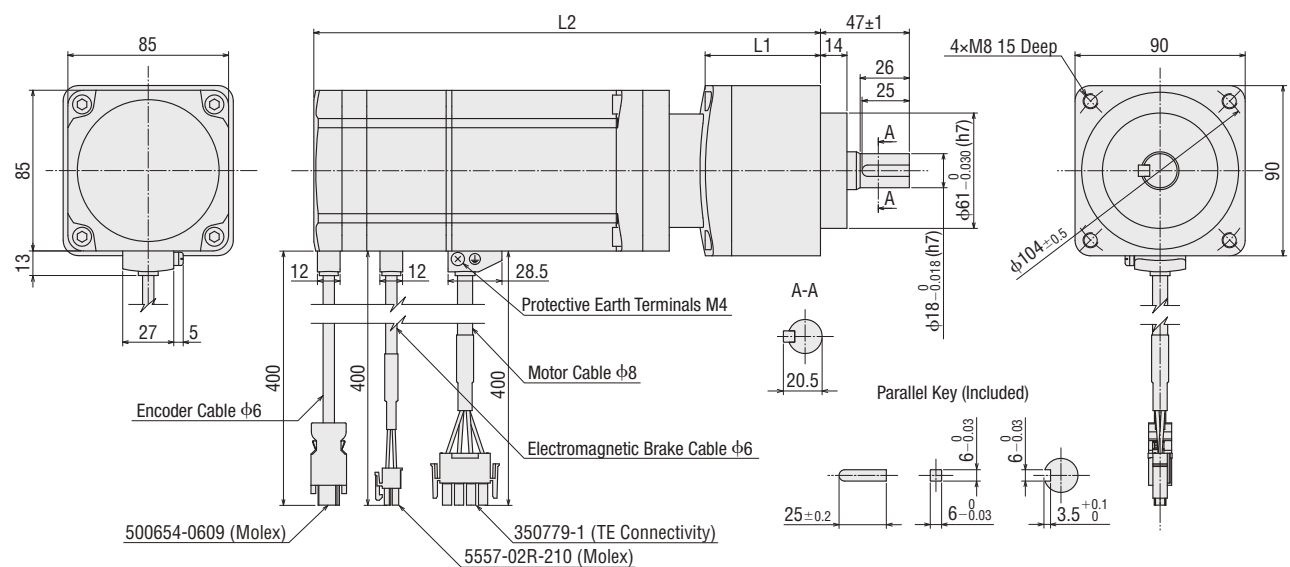
Frame Size 90 mm 400 W

Product Name	Gear Ratio	L1	L2	Mass [kg]
<b>AZXM940MC-PS</b> ■	<b>5, 10</b>	61	243.5	4.0
	<b>25</b>	88.3	270.5	4.9



Frame Size 90 mm 600 W

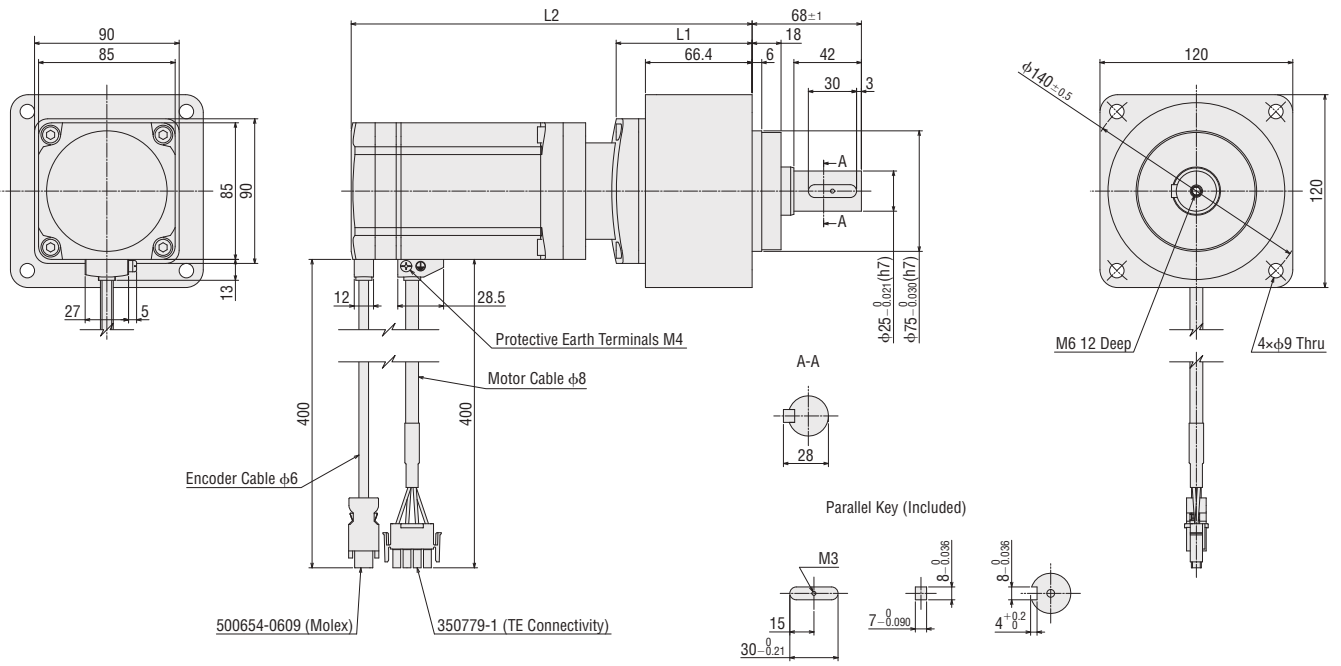
Product Name	Gear Ratio	L1	L2	Mass [kg]
<b>AZXM960MC-PS</b> ■	<b>5</b>	61	268	6.2



● A number indicating the gear ratio is specified where the box ■ is located in the product name.

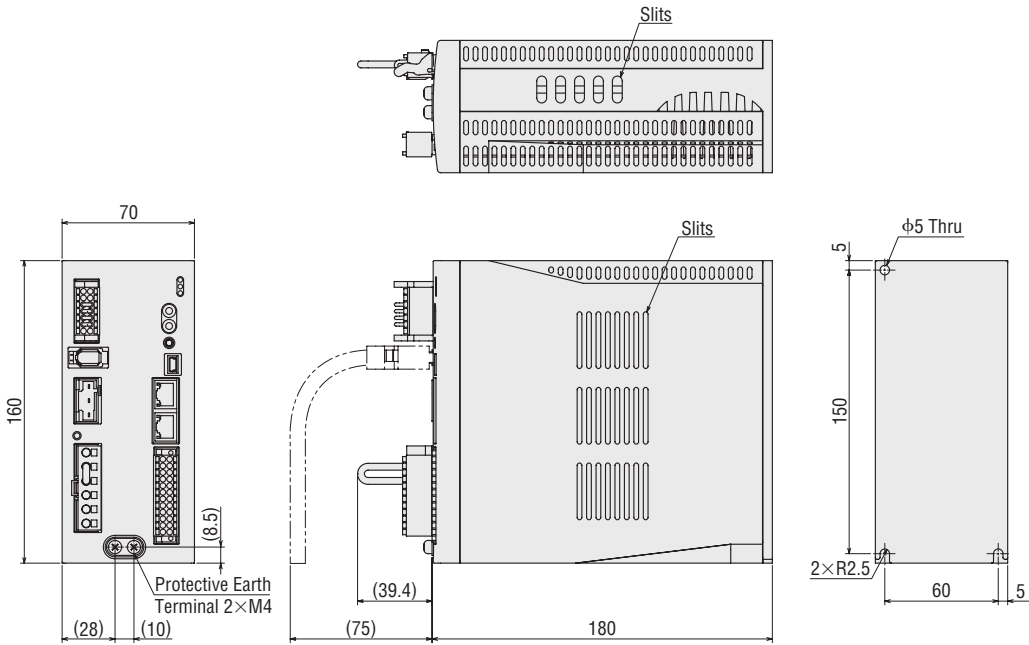
Size 120 mm 600 W

Product Name	Gear Ratio	L1	L2	Mass [kg]
<b>AZXM1260AC-PS</b>	<b>10</b>	84.6	249.5	7.4
	<b>25</b>	111.9	277	8.2



● Driver

Type	Product Name	Mass [kg]
EtherCAT-Compatible	<b>AZXD-SED</b>	1.5
EtherNet/IP-Compatible	<b>AZXD-SEP</b>	
PROFINET-Compatible	<b>AZXD-SPN</b>	



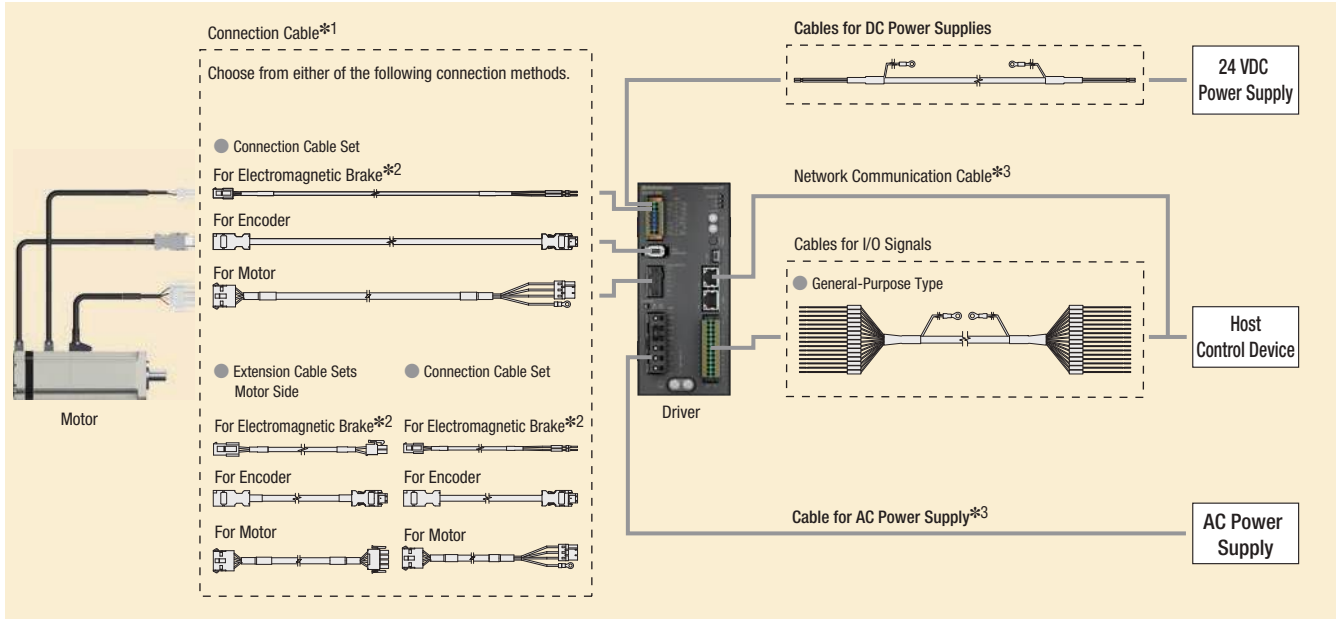
● Included Items

- Control Power Supply Input/Electromagnetic Brake Connection/Regeneration Unit Thermal Input/Power Shut Down Signal I/O Connector (CN1)
  - Connector: DFMC1,5/7-ST-3,5-LR (Phoenix Contact)
- Connector for Main Power/Regeneration Unit (CN4)
  - Connector: 1-2271454-6 (TE Connectivity)
  - Connector Wiring Lever
- I/O Signals Connector (CN7)
  - Connector: DFMC1,5/12-ST-3,5 (Phoenix Contact)

# Cable

## Cable System Configuration

### Network Compatible Driver



\*1 Flexible connection cable sets and flexible extension cable sets with excellent durability are also available.

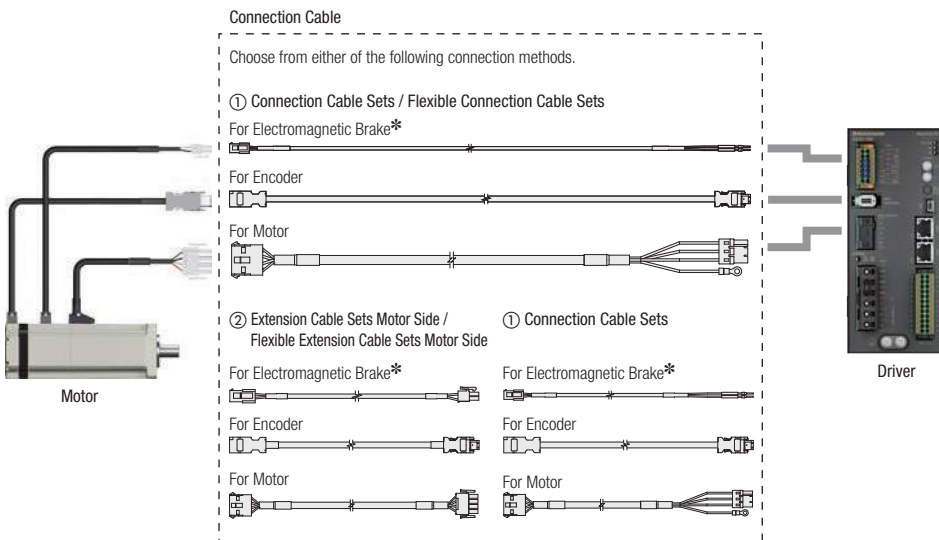
\*2 Required for motors with an electromagnetic brake.

\*3 Not supplied.

#### Note

- Up to 3 cables can be used to connect the motor and driver.
- The maximum extension distance between the motor and driver is 20 m.
- 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.

## Connection Cable



\*Required for motors with an electromagnetic brake.

#### Note

- Up to 3 cables can be used to connect the motor and driver.
- The maximum extension distance between the motor and driver is 20 m.

# ① Connection Cable Sets / Flexible Connection Cable Sets

This is a connection cable set used to connect the motor and the driver. Use a flexible extension cable set in applications where the cable is bent and flexed repeatedly. 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 Line

### ◇ Connection Cable Set

· For Motor / Encoder



#### ● For Motor / Encoder

Length L [m]	Product Name
1	CC010VXF
2	CC020VXF
3	CC030VXF
5	CC050VXF
7	CC070VXF
10	CC100VXF
15	CC150VXF
20	CC200VXF

· For Motor / Encoder / Electromagnetic Brake



#### ● For Motor / Encoder / Electromagnetic Brake

Length L [m]	Product Name
1	CC010VXFB
2	CC020VXFB
3	CC030VXFB
5	CC050VXFB
7	CC070VXFB
10	CC100VXFB
15	CC150VXFB
20	CC200VXFB

### ◇ Flexible Connection Cable Sets

· For Motor / Encoder



#### ● For Motor / Encoder

Length L [m]	Product Name
1	CC010VXR
2	CC020VXR
3	CC030VXR
5	CC050VXR
7	CC070VXR
10	CC100VXR
15	CC150VXR
20	CC200VXR

· For Motor / Encoder / Electromagnetic Brake



#### ● For Motor / Encoder / Electromagnetic Brake

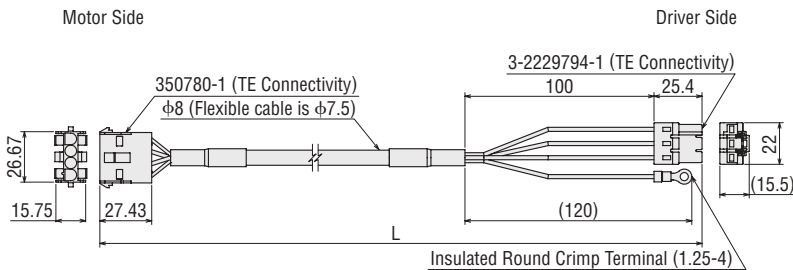
Length L [m]	Product Name
1	CC010VXRB
2	CC020VXRB
3	CC030VXRB
5	CC050VXRB
7	CC070VXRB
10	CC100VXRB
15	CC150VXRB
20	CC200VXRB

● Note on use of flexible cables → Page 24

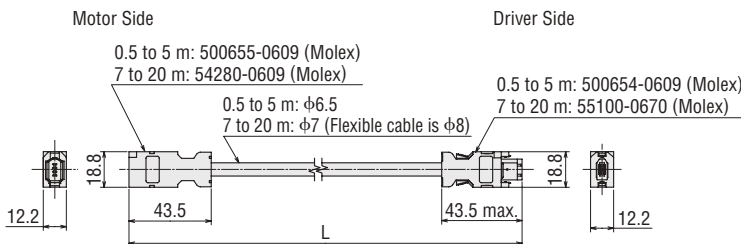
● Note on use of flexible cables → Page 24

## ● Dimensions (Unit = mm)

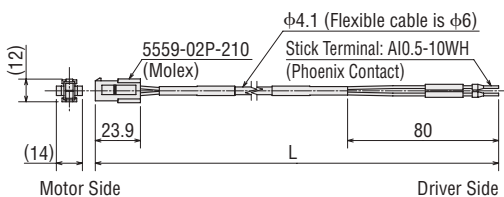
### ◇ Cable for Motor



### ◇ Cable for Encoder



### ◇ Cable for Electromagnetic Brake



## ② Extension Cable Set - Motor Side / Flexible Extension Cable Set - Motor Side

This is a cable to extend the connection cable to the motor. When using an extension, the total length of the cable must be less than 20 m. Use the flexible extension cable set in applications where the cable is bent and flexed repeatedly.

### ● Product Line

#### ◇ Extension Cable Sets

· For Motor / Encoder



#### ● For Motor / Encoder

Length L [m]	Product Name
1	<b>CC010VXFT</b>
2	<b>CC020VXFT</b>
3	<b>CC030VXFT</b>
5	<b>CC050VXFT</b>
7	<b>CC070VXFT</b>
10	<b>CC100VXFT</b>
15	<b>CC150VXFT</b>

· For Motor / Encoder / Electromagnetic Brake



#### ● For Motor / Encoder / Electromagnetic Brake

Length L [m]	Product Name
1	<b>CC010VXFBT</b>
2	<b>CC020VXFBT</b>
3	<b>CC030VXFBT</b>
5	<b>CC050VXFBT</b>
7	<b>CC070VXFBT</b>
10	<b>CC100VXFBT</b>
15	<b>CC150VXFBT</b>

#### ◇ Flexible Extension Cable Sets · For Motor / Encoder



#### ● For Motor / Encoder

Length L [m]	Product Name
1	<b>CC010VXRT</b>
2	<b>CC020VXRT</b>
3	<b>CC030VXRT</b>
5	<b>CC050VXRT</b>
7	<b>CC070VXRT</b>
10	<b>CC100VXRT</b>
15	<b>CC150VXRT</b>

● Note on use of flexible cables → Page 24

· For Motor / Encoder / Electromagnetic Brake



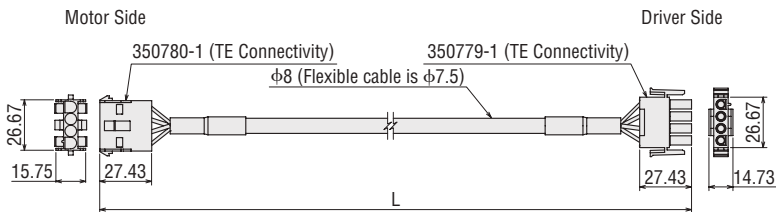
#### ● For Motor / Encoder / Electromagnetic Brake

Length L [m]	Product Name
1	<b>CC010VXRBT</b>
2	<b>CC020VXRBT</b>
3	<b>CC030VXRBT</b>
5	<b>CC050VXRBT</b>
7	<b>CC070VXRBT</b>
10	<b>CC100VXRBT</b>
15	<b>CC150VXRBT</b>

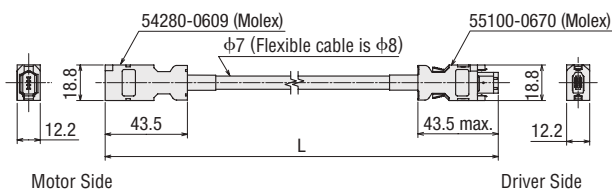
● Note on use of flexible cables → Page 24

### ● Dimensions (Unit = mm)

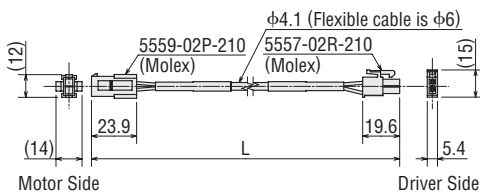
#### ◇ Cable for Motor



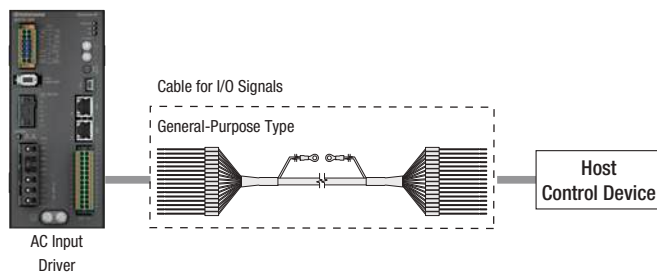
#### ◇ Cable for Encoder



#### ◇ Cable for Electromagnetic Brake



## Cable for I/O Signals



### General-Purpose Type

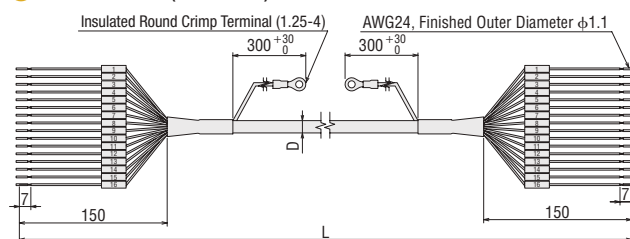
- Multi-core Shielded Cable
- Unbundled wires on both ends
- Easy shield grounding using ground wire with a round terminal
- The number of lead wire cores can be selected to suit the functions that will be used



### Product Line

Product Name	Length L [m]	Number of Lead Wire Cores	Outer Diameter D [mm]	AWG
CC06D005B-1	0.5	6	φ5.4	24
CC06D010B-1	1			
CC06D015B-1	1.5			
CC06D020B-1	2			
CC10D005B-1	0.5	10	φ6.7	
CC10D010B-1	1			
CC10D015B-1	1.5			
CC10D020B-1	2			
CC12D005B-1	0.5	12	φ7.5	
CC12D010B-1	1			
CC12D015B-1	1.5			
CC12D020B-1	2			
CC16D005B-1	0.5	16	φ7.5	
CC16D010B-1	1			
CC16D015B-1	1.5			
CC16D020B-1	2			

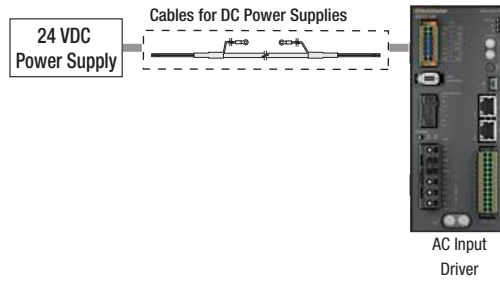
### Dimensions (Unit = mm)



● The figure depicts 16 core wires.

## Cables for DC Power Supplies

These cables are used to connect the driver and the DC power supply.

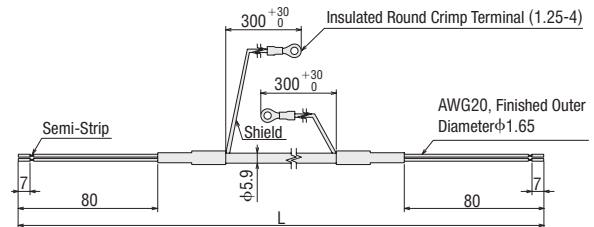


### Product Line

Product Name	Length L [m]
<b>CC02D005-3</b>	0.5
<b>CC02D010-3</b>	1
<b>CC02D015-3</b>	1.5
<b>CC02D020-3</b>	2
<b>CC02D050-3</b>	5



### Dimensions (Unit = mm)



## Note on Use of Cables

### Note when Connecting Connectors

When inserting or removing connectors, always hold the connector.

Pulling on the cable may result in connection faults.

#### ◇ When Inserting the Connector

Hold the connector body and insert as straight as possible.

If the connector is angled while inserted, it may result in damage to the terminals or connection faults.

#### ◇ When Removing the Connector

Disengage the connector's lock and pull straight out.

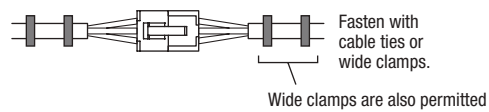
If the connector is disengaged by pulling the cable, it may result in damage to the connector.

### Notes on Routing of Flexible Cables

Do not bend the cable at the connector. This will apply stress to the connector and the terminal, and may result in connection faults or disconnections.

#### ◇ Cable Fixing Method

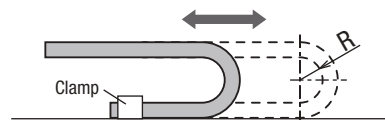
Please fix in 2 locations to prevent movement of the connector.



#### ◇ Cable Routing Length and Bend Radius

When routing cables, use an appropriate length that prevents pulling when the cable is moved.

The bend radius must be at least 6 times the cable diameter



#### ◇ Cable Interference

When routing cables inside a cable holder, ensure that the cables do not interfere with each other. This will apply stress to the connector and the terminal, and may result in premature disconnection. Please carefully check the cautions when using cable holders.

#### ◇ Twisting of Cables

Route the cables so that they do not become twisted. Premature wire breaking may occur if they are bent while twisted.

After routing the wires, use the markings on the surface of the cable to ensure that the cables are not twisted.



# Peripheral Equipment

## Regeneration Unit

The regenerative power generated by the motor may exceed the driver's regenerative power absorption capacity. In such case, a regeneration unit is connected to the driver to dissipate the regenerative power.

### <Conditions in Which a Regeneration Unit is Likely Required>

- Vertical drive
- Acceleration or deceleration with an inertial load installed



Product Name
<b>RGB200</b>

### Specifications

Item	Description
Continuous Regenerative Power	200 W
Resistance Value	50 Ω
Thermal Protector Operating Temperature	Operation: 175±5°C Return: 115±15°C (Normally closed)
Thermal Protector Electrical Rating	227 VAC 8 A 115 VAC 22 A

- Install the regeneration unit in a place that has the same heat radiation capability as the heat sink (material: aluminum, 350×350 mm, 3 mm thick).

## Connector Cover

### <Application Example>

This is a resin cover for protecting and securing the connected connector part of the cable.

- Protection level equivalent to IP20
- It can be installed after connecting the motors and drivers.
- It is a structure to secure cables and protect lead wires.
- It can be attached to the equipment using two mounting holes (φ4.5).



Material: Polyamide

Product Name
<b>MAC-D*</b>
<b>MAC-D02</b>

\*Excluding encoder cable and motor cable





# ***Orientalmotor***

These products are manufactured at plants certified with the international standards **ISO 9001** (for quality assurance) and **ISO 14001** for systems of environmental management).

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