B Servo Motors

This catalog contains information necessary for informed product selection. Additional product details and information not outlined in this catalog can be found in each product's individual operating manual. Operating manuals can be downloaded from our website or obtained by contacting technical support or your nearest Oriental Motor sales office.

Overview of Servo Motors

The servo motor is specialized for high-response, high-precision positioning. As a motor capable of accurate rotation angle and speed control, it can be used for a variety of equipment.

Features

●Closed Loop Control

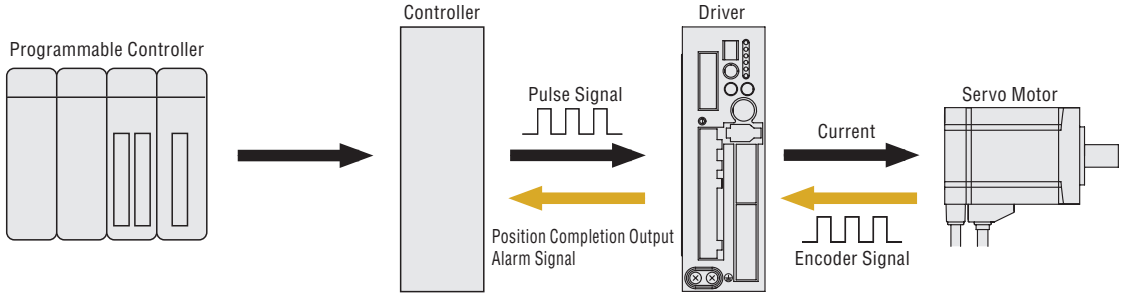
A rotation detector (encoder) is mounted on the motor and feeds the rotation position/speed of the motor shaft back to the driver.
The driver calculates the error of the pulse signal or analog voltage (position command/speed command) from the controller and the feedback signal (current position/speed) and controls the motor rotation so the error becomes zero.
The closed loop control method is achieved with a driver, motor and encoder, so the motor can carry out highly accurate positioning operations.

- An END signal is obtained that communicates the completion of the positioning operation.
- An alarm can be output if there is an abnormality such as an overload, making it possible to communicate equipment abnormalities.

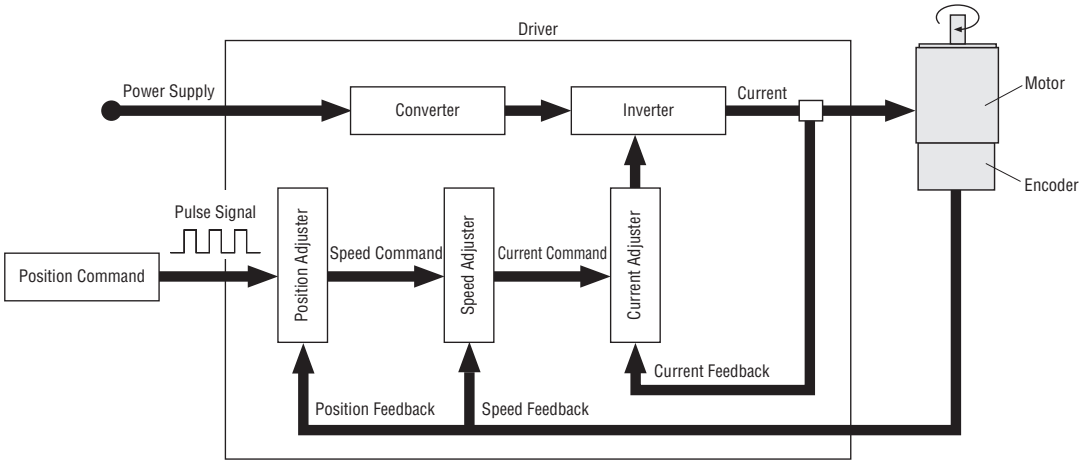
Structure of Servo Motors ➜ Page G-51

◇Position Control Using a Pulse Signal

The controller inputs the pulse signal. The speed and stop position are then controlled according to the pulse number.

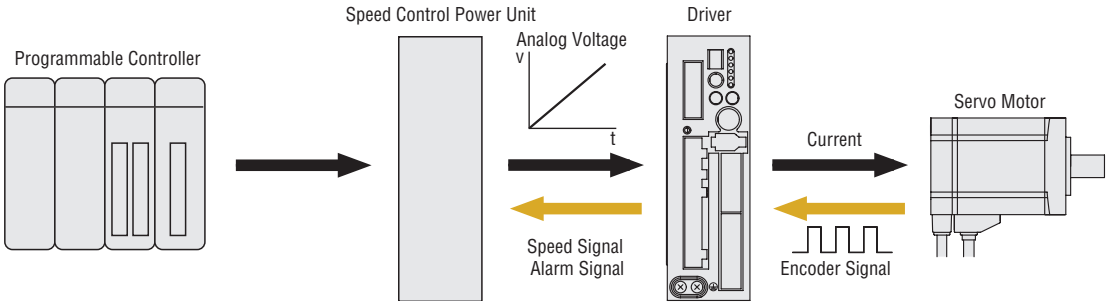


• Position Control Diagram

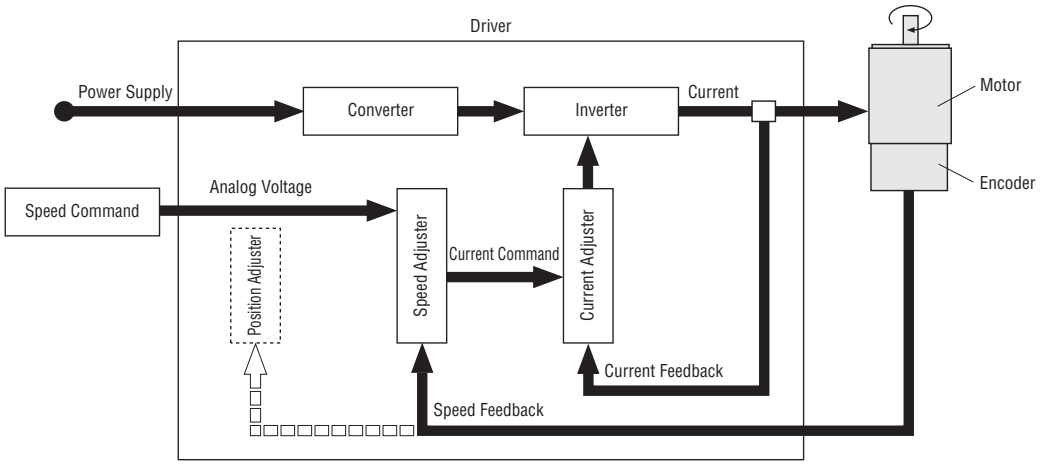


◇Speed Control by Analog Voltage

The analog voltage is input to control the speed.

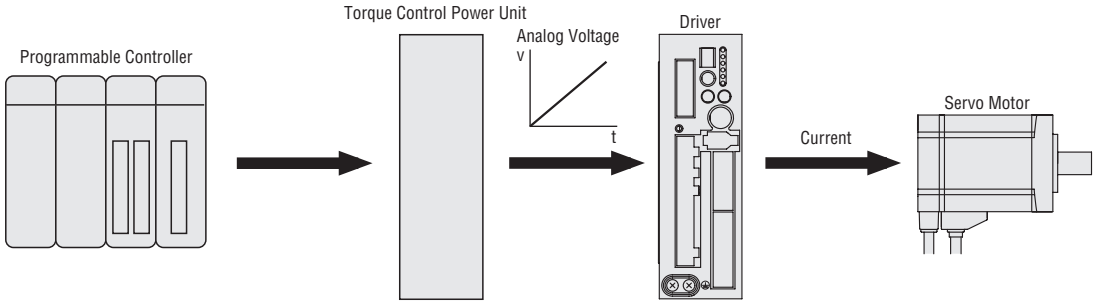


• Speed Control Diagram

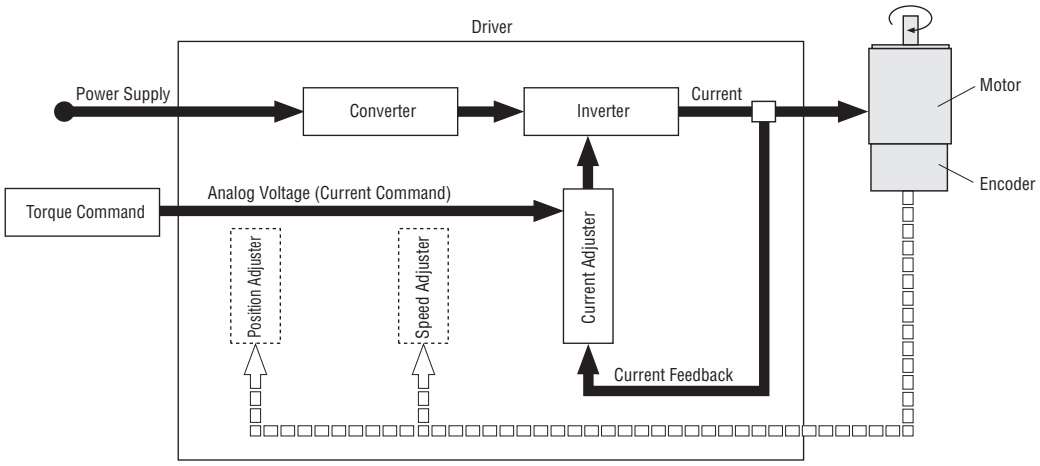


◇Torque Control by Analog Voltage

The analog voltage is input to control the torque.



• Torque Control Diagram

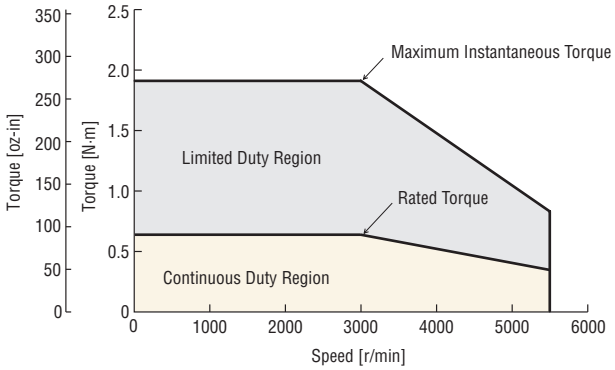


●Compact and High Power

The servo motor is compact and lightweight and outputs high power.

◇Speed – Torque Characteristics

Rated Output Power: 200 W (1/4 HP)
Motor Frame Size: 60 mm (2.36 in.)



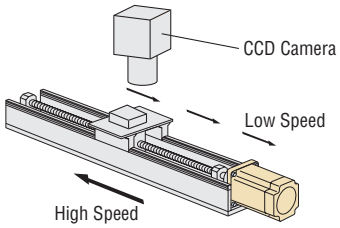
• Continuous Duty Region and Limited Duty Region

A servo motor controls the current according to the state of the load. Because of the efficiency and low heat generation of the motor, continuous operation is possible within the rated torque.
Also, during acceleration and deceleration, the limited duty region is used to obtain a large torque, making it possible to decrease the positioning time.

How to Read Speed – Torque Characteristics ➔ Page B-7

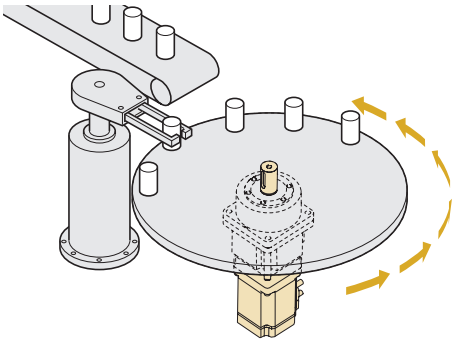
●A Wide Variable Speed Range

A flat, stable torque is generated from low- to high-speed range, so that long-stroke positioning can be carried out quickly.
The machine cycle is improved in testing equipment by quickly returning at high speed after slowly transporting the workpiece at low speed.



●Geared Type also Compatible with Large Inertial Loads

The servo motor has restrictions on the permissible load inertia, but the geared type can be used to greatly increase the load size that can be driven.

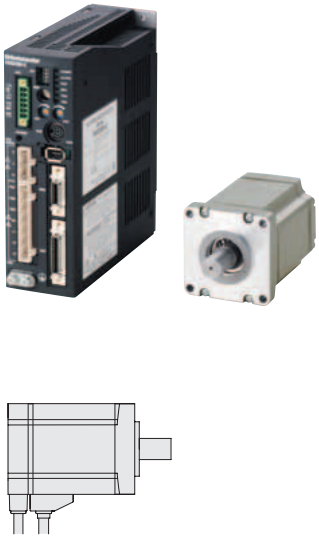


Motor Types

A wide range of servo motors is available, such as the electromagnetic brake type and geared type in addition to the standard type. Such a wide selection means that you can choose the optimal type according to the function and performance required in your specific application. The **NX** Series incorporates a driver, motor and a cable in one package.

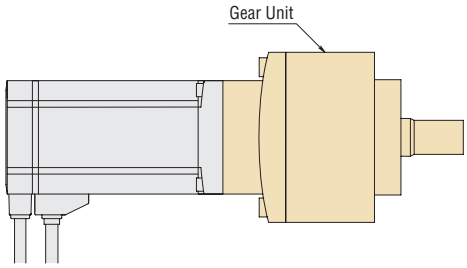
Standard Type

This is the basic motor round shaft type.
Motors are available in a variety of sizes.



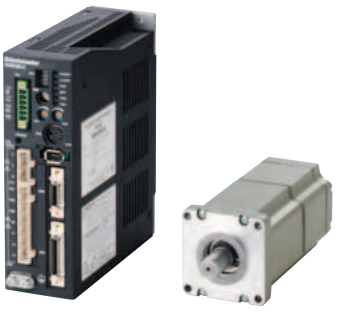
Geared Type

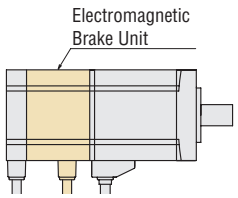
These motors incorporate a gearhead with reduced backlash to make the most of the high controllability of the motors.
The gearhead ensures highly accurate, smooth operation even in applications where a large load torque is received. The inertia of the load converted to the motor shaft is smaller by the square of the gear ratio, improving the start and stop responsiveness.



Electromagnetic Brake Type

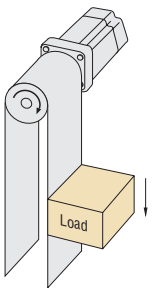
These motors incorporate a non-excitation type electromagnetic brake. When the power is accidentally cut off due to a power outage or another unexpected event, the electromagnetic brake holds the load in position to prevent it from dropping or moving.
Electromagnetic brake motors are available in a round shaft type or geared type package.





● Regeneration Operation
When suddenly starting or stopping a vertical drive (gravitational operation) or big inertia, the motor goes into regeneration operation, working as a generator. For regeneration operation with the **NX** Series, use the regeneration unit, sold separately.
Regeneration Unit ➜ Page B-57

NX Series Regeneration Unit



Gravitational Operation

How to Read Specifications Tables

	Model	Standard Type		NX45A■-3	NX65A■-PS5-3
		Electromagnetic Brake Type		NX45M■-3	NX65M■-PS5-3
①	Rated Output Power		W (HP)	50 (1/15)	50 (1/15)
②	Rated Speed		r/min	3000	–
③	Maximum Speed		r/min	5500	–
④	Motor Permissible Speed		r/min	–	3000
⑤	Rated Torque		N·m (oz-in)	0.159 (22)	–
⑥	Maximum Instantaneous Torque		N·m (oz-in)	0.478 (67)	–
⑦	Permissible Torque		N·m (oz-in)	–	0.716 (101)
⑧	Maximum Torque		N·m (oz-in)	–	2.15 (300)
⑨	Permissible Speed Range		r/min	–	0 to 600
⑩	Rotor Inertia		$kg·m^2(oz-in^2)$	$0.0174\ (0.095)\times10^{-4}$ [$0.0217\ (0.119)\times10^{-4}$]	
⑪	Gearhead Internal Inertia		$kg·m^2(oz-in^2)$	–	$0.0431\ (0.24)\times10^{-4}$
⑫	Permissible Load Inertia		$kg·m^2(oz-in^2)$	$1.74\ (9.5)\times10^{-4}$	0.0022 (120)
⑬	Gear Ratio			–	5
⑭	Resolution		P/R	100 to 100000 (Factory setting 1000)	
	Detector			Absolute Encoder 1 rotation 20 bits, multiple rotation 16 bits	
⑮	Backlash		arc minutes (degrees)	–	15 (0.25°)
	Power-Supply Input	Voltage and Frequency	AC Main Power Supply	Single-Phase 100-115 VAC −15% to +10% 50/60 Hz Single-Phase 200-230 VAC −15% to +10% 50/60 Hz Three-Phase 200-230 VAC −15% to +10% 50/60 Hz	
			DC Control Power Supply	24 VDC±10% 0.8 A	
⑯		Rated Input Current A	Single Phase 100-115 VAC	1.9	2.8
			Single Phase 200-230 VAC	1.2	1.8
			Three Phase 200-230 VAC	0.7	1.0
	Electromagnetic Brake	Type		Power Off Activated Type	
		Power-Supply Input		24 VDC±10%	
		Power Consumption	W	6.1	
		Excitation Current	A	0.25	
⑰		Static Friction Torque	N·m (oz-in)	0.159 (22)	0.716 (101)

① Rated Output Power

The range in which the temperature rise does not exceed the permissible value when operating continuously at the motor's rated speed and rated torque.

② Rated Speed

The speed when the motor is operating at the rated output power.

③ Maximum Speed

The max. speed at which the motor can rotate.

④ Motor Permissible Speed

The max. speed at which the geared type motor can rotate.

⑤ Rated Torque

The torque output when the motor is operating at the rated output power and rated speed.

⑥ Maximum Instantaneous Torque

The maximum torque that can be used instantaneously (for a short period of time). During acceleration and deceleration, the motor can be used up to a max. of this torque.

⑦ Permissible Torque

The permissible torque represents the max. value limited by the mechanical strength of the output gear shaft when operated at a constant speed.

⑧ Maximum Torque

This is the max. torque value that can be applied to the output gear shaft during acceleration/deceleration such as when an inertial load is started and stopped.

⑨ Permissible Speed Range

This is the range for rotation on the output gear shaft.

⑩ 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.

⑪ Gearhead Internal Inertia

The inertia inside the gearhead. This is necessary when the required torque (acceleration torque) for the motor is calculated.

⑫ Permissible Load Inertia

The load inertia at which the motor is stable and can be controlled. If a load exceeding this value is applied, control becomes unstable and speed regulation variance, protective circuit activation, vibration, and other problems occur.

⑬ Gear Ratio

This is the ratio in 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.

⑭ Resolution

This shows the angle that the motor rotates for 1 pulse.
The motor positioning accuracy is determined by the resolution.

⑮ 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.

⑯ Rated Input Current

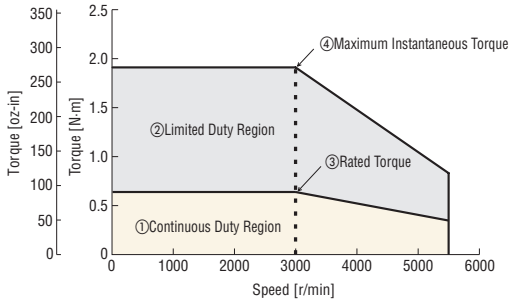
This is the input current value for the main power supply required when the motor is used in the continuous duty region.

⑰ Static Friction Torque

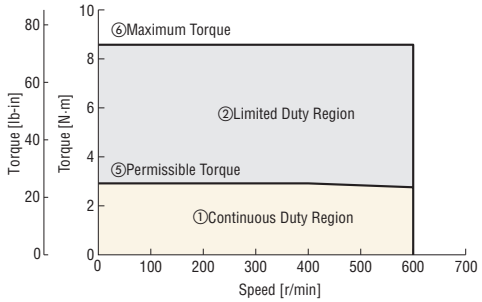
This is an electromagnetic brake specification. This is the max. holding torque (holding force) at which the electromagnetic brake can hold the position.

How to Read Speed – Torque Characteristics

NX620AA-3



NX920AA-PS5-3



① Continuous Duty Region
This refers to the region where a motor can be operated at the continuous ratings. The effective load torque must always be kept in this region.

② Limited Duty Region
This region is used when accelerating/decelerating.

③ Rated Torque
The torque output when the motor is operating at the rated output power and rated speed.

④ Maximum Instantaneous Torque
The maximum torque that can be used instantaneously (for a short period of time). During acceleration and deceleration, the motor can be used up to a max. of this torque.

⑤ Permissible Torque
The permissible torque represents the max. value limited by the mechanical strength of the output gear shaft when operated at a constant speed.

⑥ Maximum Torque
This is the max. torque value that can be applied to the output gear shaft during acceleration/deceleration such as when an inertial load is started and stopped.

Servo Motors

NX Series

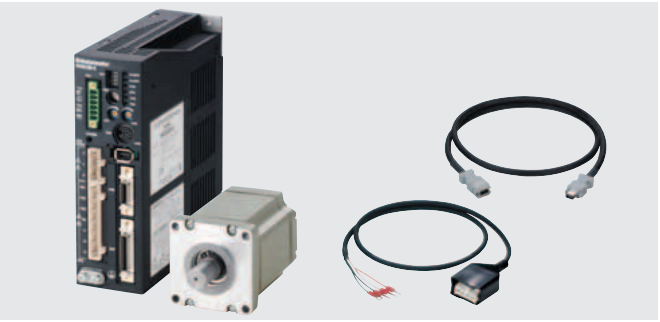
NX Series

●Additional Information●
Technical reference ➜ Page G-1
Safety standards ➜ Page H-2

The tuning-free servo motor and driver package in the **NX** Series are easy to operate and allows for smooth operation with large inertial loads and belt mechanisms.

CE RoHS

●For detailed product safety standard information including standards, file number and certification body, please visit www.orientalmotor.com.
●UL/CSA standards pending



Features

●Easy Operation

As with a stepping motor, stable operation can be achieved in high inertia drive and belt mechanism drive applications without gain adjustment. Also, adjusting the gain manually enables operation under even more stringent load conditions.

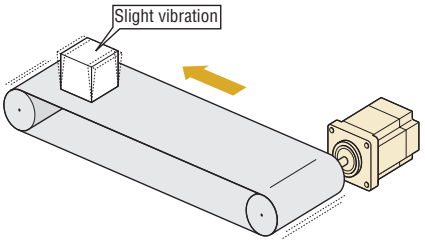
◇Achieves High Inertia Drive

With automatic tuning, operation up to 50 times the rotor inertia is possible. With manual tuning, operation up to 100 times the rotor inertia is possible.

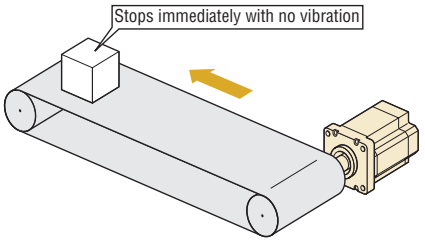
◇Achieves Smooth Operation with Belt Mechanisms

Belt mechanisms can be operated with the same performance as a stepping motor without the occurrence of vibration before stopping.

•Conventional Models



•**NX** Series



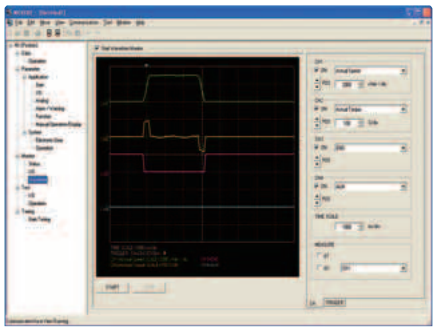
●Easy Handling

Basic settings and adjustments are made with switches and potentiometers on the front panel. This design allows for easy control without a computer and even saves the hassle of complicated UP and DOWN key operations.

●Easy Setting and Easy Monitoring

By using the separately sold control module (**OPX-2A**) or data setting software (**MEXE02**), it is possible to perform changing of parameters, function setting and monitoring that is better suited to your system.

• Operating Status Waveform Monitoring*



*Monitoring the operating status waveform requires the data setting software (**MEXE02**), which is sold separately.

●4 Control Modes

This servo unit can operate in 4 control modes. Also, with the separately sold control module (**OPX-2A**) or data setting software (**MEXE02**), the functions of each control mode can be extended.

Extended functions ➜ Page B-43

◇Position Control

The built-in, high-resolution 20-bit absolute encoder enables highly accurate positioning.

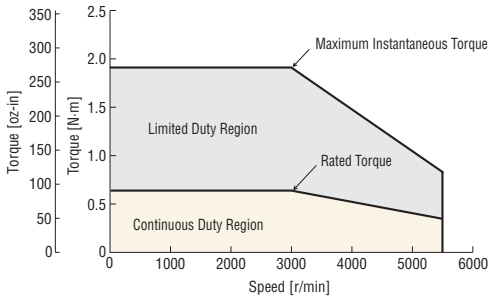
•High Speed and High Response

High-speed positioning can be performed utilizing the high-speed and high-response characteristics.

Maximum Speed 5500 r/min

Factory Settling Time 60 to 70 ms

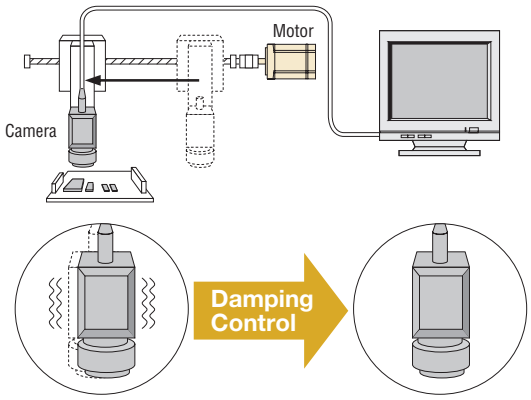
NX620AA-3



•Damping Control

Eliminates load resonance by adjusting the potentiometer. This adjustment can be made easily and without searching for the resonance frequency.

<Application Example: Image inspection equipment>
Camera vibration during stopping can be suppressed by using the damping control.

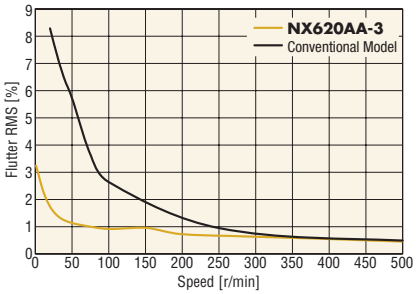


•Absolute System

Use as an absolute system by attaching an optional battery (sold separately) is possible. The current position of the encoder can be stored, so resetting after a blackout or similar occurrence is easy.

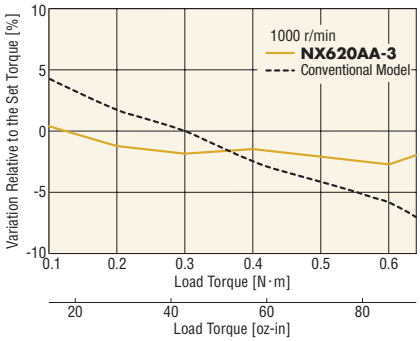
◇Speed Control

The reduction of motor cogging torque and the use of a high-resolution encoder have substantially reduced variation in rotation in the low-speed range (the flutter characteristic), resulting in smooth operation even at low speeds.



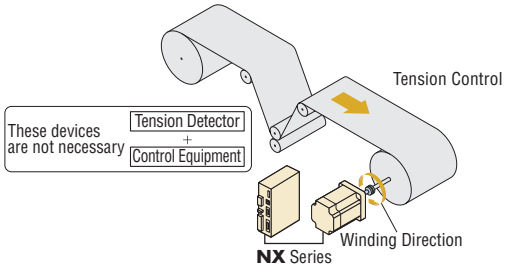
◇Torque Control

Variation of the generated torque relative to the set torque (torque accuracy) has been improved, resulting in highly accurate torque control.



◇Tension Control

Tension control such as winding film can be easily performed without using a tension detector or control equipment.



●Degree of Protection IP65

These motors conform to IP65 and are ideal for use in environments requiring dust resistance and water resistance. (Standard type, electromagnetic brake type, **PS** geared type: excluding installation surface and connector locations, **PJ** geared type: excluding connector locations)

●Simple Connections with Included Cables

The **NX** Series comes with cables 3 m (9.8 ft.) to connect the motor and driver. If you need cables longer than 3 m (9.8 ft.) or cables offering superior flexibility, appropriate cables are available as accessories (sold separately).

Separate Main Power Supply and Control Power Supply

A control power supply terminal that is separate from the main power supply is provided. Even when the main power supply is cut off in the case of, for example, an emergency stop, operations such as position detection and alarm contents checking can be performed if 24 VDC power is supplied to the control power supply terminal. (Operation with only the main power supply is also possible.)

Conforms to Semiconductor Equipment and Materials International Standards "SEMI F47"

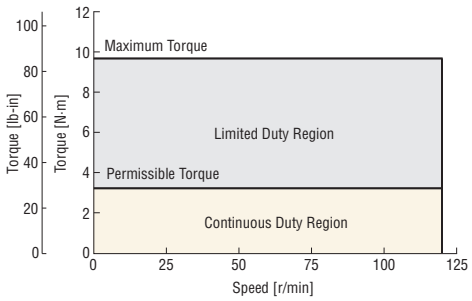
- Conforms to SEMI Standards regarding power supply voltage drop.
- Effective for use in semiconductor equipment. (Always evaluate the product with it mounted on actual equipment.)

High Performance Geared Motors

◇High Permissible Torque and Wide Permissible Speed Range

These geared motors with high permissible torque fully utilize the motor output torque.

NX65AA-PS25-3



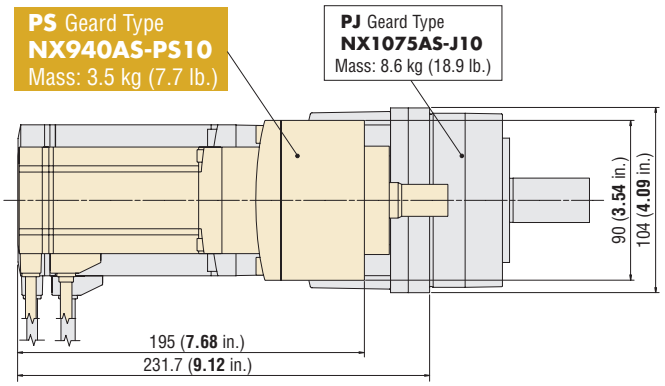
PS Geared Type

◇Low Backlash

The backlash is 15 arc minutes (0.25°) max. These motors can be used in a wide range of applications.

◇Compact and Lightweight Design

Compared to **PJ** geared types, these are compact, lightweight geared motors.



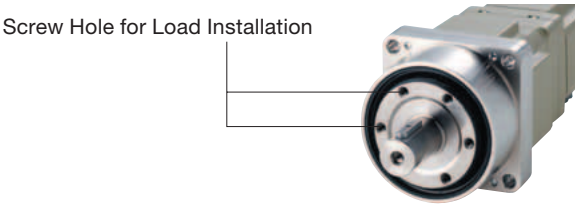
PJ Geared Type

◇Non-Backlash

These geared motors use high accuracy gears with an angular transmission accuracy of 4 arc minutes (0.067°) and backlash of 3 arc minutes (0.05°).

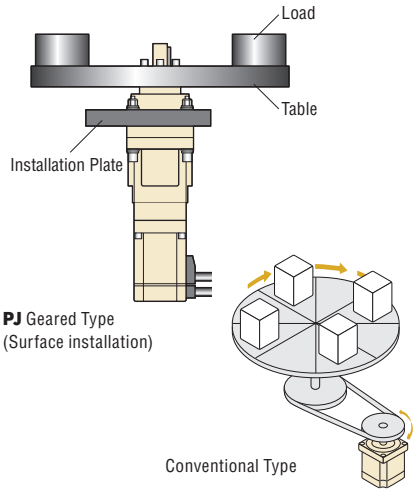
◇Surface Installation is Possible

There are screw holes that permit installation of a load directly on the rotating surface integrated with the shaft. Since the load can be installed here directly (surface installation), the design is simple when using an index table.



Application Example with an Index Table

Parts that had been necessary, such as pulleys and belts, are no longer needed.



Characteristics Comparison for Geared Motor

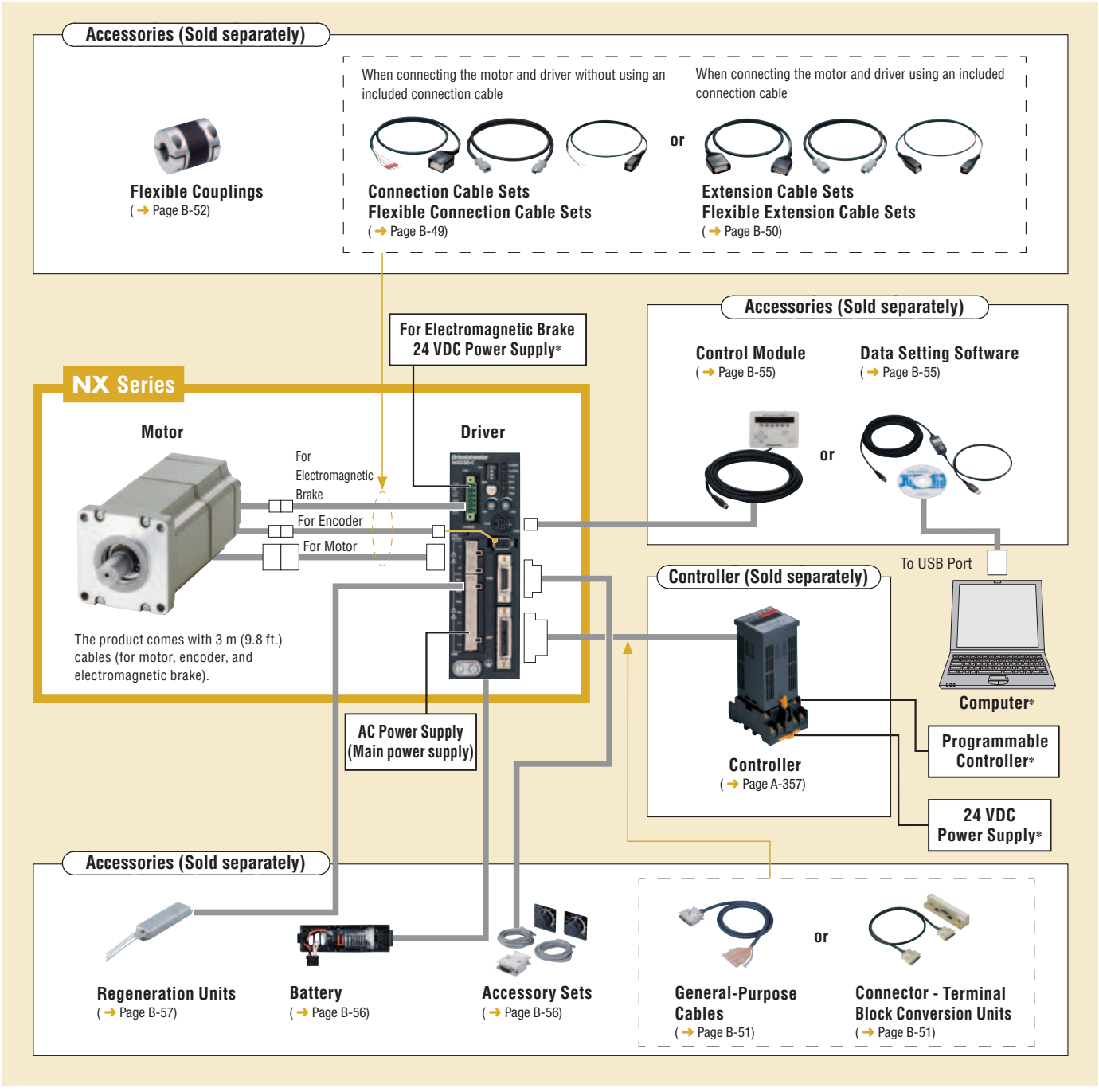
The motor and driver package are available in comes in 3 geared motor frame sizes ranging from 60 mm (2.36 in.) to 104 mm (4.09 in.).
["□60 (□2.36)" indicates a motor frame size of 60 mm (2.36 in.).]

	Geared Type	Features	Power Supply Input	Output Power				
				50 W (1/15 HP)	100 W (1/8 HP)	200 W (1/4 HP)	400 W (1/2 HP)	750 W (1 HP)
Low Backlash	**PS** Geared Type (Planetary gear mechanism) 	・High Speed (Low gear ratio) ・High Permissible Torque/Maximum Torque ・Center Shaft ・Gear Ratio Types 5, 10, 25	Single-Phase 100-115 VAC	□60 (□2.36)	□60 (□2.36)	□90 (□3.54)		
			Single-Phase/Three-Phase 200-230 VAC	□60 (□2.36)	□60 (□2.36)	□90 (□3.54)		
			Three-Phase 200-230 VAC				□90 (□3.54)	
Non-Backlash	**PJ** Geared Type (Planetary gear mechanism) 	・High Speed (Low gear ratio) ・High Positioning Accuracy ・High Permissible Torque/Maximum Torque ・Center Shaft ・Surface installation is possible ・Gear Ratio Types 5, 10, 25	Three-Phase 200-230 VAC					□104 (□4.09)

System Configuration

Standard Type with Electromagnetic Brake

An example of a single axis system configuration with the **SG8030J** controller in position control mode is shown below.



●Example of System Configuration

NX Series		Sold Separately						
	+	Controller	Flexible Coupling	Regeneration Unit	Battery	Accessory Set	Connector – Terminal Block Conversion Unit [1 m (3.3 ft.)]	Data Setting Software
NX620MC-3		SG8030J-D	MCV300814	RGB100	BAT01A	AS-5V2	CC36T1	MEXE02

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

*Not supplied

Product Number Code

NX 6 10 M A - PS 25 - 3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Series Name	**NX**: **NX** Series
②	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) [60 mm (2.36 in.)] **9**: 85 mm (3.35 in.) [90 mm (3.54 in.)] **10**: [104 mm (4.09 in.)] [ ] indicates the frame size for the gearhead
③	Output Power	**5**: 50 W (1/15 HP) **10**: 100 W (1/8 HP) **20**: 200 W (1/4 HP) **40**: 400 W (1/2 HP) **75**: 750 W (1 HP)
④	Configuration	**A**: Standard **M**: Electromagnetic Brake Type
⑤	Power-Supply Input	**A**: Single-Phase 100–115 VAC **C**: Single-Phase/Three-Phase 200–230 VAC **S**: Three-Phase 200–230 VAC
⑥	Gear Type	**PS**: **PS** Geared Type **J**: **PJ** Geared Type Blank: Standard Type
⑦	Gear Ratio	
⑧	Cable Length (Included)	**3**: 3 m (9.8 ft.)

Product Line

Standard Type

Power-Supply Input	Output Power	Model
Single-Phase 100-115 VAC	50 W (1/15 HP)	**NX45AA-3**
	100 W (1/8 HP)	**NX410AA-3**
	200 W (1/4 HP)	**NX620AA-3**
Single-Phase/Three-Phase 200-230 VAC	50 W (1/15 HP)	**NX45AC-3**
	100 W (1/8 HP)	**NX410AC-3**
	200 W (1/4 HP)	**NX620AC-3**
Three-Phase 200-230 VAC	400 W (1/2 HP)	**NX640AS-3**
	750 W (1 HP)	**NX975AS-3**

Standard Type with Electromagnetic Brake

Power-Supply Input	Output Power	Model
Single-Phase 100-115 VAC	50 W (1/15 HP)	**NX45MA-3**
	100 W (1/8 HP)	**NX410MA-3**
	200 W (1/4 HP)	**NX620MA-3**
Single-Phase/Three-Phase 200-230 VAC	50 W (1/15 HP)	**NX45MC-3**
	100 W (1/8 HP)	**NX410MC-3**
	200 W (1/4 HP)	**NX620MC-3**
Three-Phase 200-230 VAC	400 W (1/2 HP)	**NX640MS-3**
	750 W (1 HP)	**NX975MS-3**

PS Geared Type

Power-Supply Input	Output Power	Model
Single-Phase 100-115 VAC	50 W (1/15 HP)	**NX65AA-PS5-3**
		NX65AA-PS10-3
		NX65AA-PS25-3
	100 W (1/8 HP)	**NX610AA-PS5-3**
		NX610AA-PS10-3
		NX610AA-PS25-3
	200 W (1/4 HP)	**NX920AA-PS5-3**
		NX920AA-PS10-3
		NX920AA-PS25-3
Single-Phase/Three-Phase 200-230 VAC	50 W (1/15 HP)	**NX65AC-PS5-3**
		NX65AC-PS10-3
		NX65AC-PS25-3
	100 W (1/8 HP)	**NX610AC-PS5-3**
		NX610AC-PS10-3
		NX610AC-PS25-3
	200 W (1/4 HP)	**NX920AC-PS5-3**
		NX920AC-PS10-3
		NX920AC-PS25-3
Three-Phase 200-230 VAC	400 W (1/2 HP)	**NX940AS-PS5-3**
		NX940AS-PS10-3
		NX940AS-PS25-3

PS Geared Type with Electromagnetic Brake

Power-Supply Input	Output Power	Model
Single-Phase 100-115 VAC	50 W (1/15 HP)	**NX65MA-PS5-3**
		NX65MA-PS10-3
		NX65MA-PS25-3
	100 W (1/8 HP)	**NX610MA-PS5-3**
		NX610MA-PS10-3
		NX610MA-PS25-3
	200 W (1/4 HP)	**NX920MA-PS5-3**
		NX920MA-PS10-3
		NX920MA-PS25-3
Single-Phase/Three-Phase 200-230 VAC	50 W (1/15 HP)	**NX65MC-PS5-3**
		NX65MC-PS10-3
		NX65MC-PS25-3
	100 W (1/8 HP)	**NX610MC-PS5-3**
		NX610MC-PS10-3
		NX610MC-PS25-3
	200 W (1/4 HP)	**NX920MC-PS5-3**
		NX920MC-PS10-3
		NX920MC-PS25-3
Three-Phase 200-230 VAC	400 W (1/2 HP)	**NX940MS-PS5-3**
		NX940MS-PS10-3
		NX940MS-PS25-3

PJ Geared Type

Power-Supply Input	Output Power	Model
Three-Phase 200-230 VAC	750 W (1 HP)	**NX1075AS-J5-3**
		NX1075AS-J10-3
		NX1075AS-J25-3

PJ Geared Type with Electromagnetic Brake

Power-Supply Input	Output Power	Model
Three-Phase 200-230 VAC	750 W (1 HP)	**NX1075MS-J5-3**
		NX1075MS-J10-3
		NX1075MS-J25-3

● If you need cables longer than 3 m (9.8 ft.) or cables offering excellent flexibility, select appropriate cables from the accessories (sold separately). Refer to page B-48 for details.

The following items are included in each product.

Motor, Driver, Cable for Motor*, Cable for Encoder*, Cable for Electromagnetic Brake* (Electromagnetic brake type only), Connector for I/O Signal, Motor Connector, Connector for Regeneration Unit Input/Main Power Input Terminals, Connector for 24 VDC Power-Supply Input/Regeneration Unit Thermal Input/Electromagnetic Brake Terminals, Connector Wiring Lever, Operating Manual, User Manual (CD-ROM)

*The product comes with 3 m (9.8 ft.) cables including a cable for motor, cable for encoder, and cable for electromagnetic brake (electromagnetic brake type only).

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

Specifications RoHS

● UL/CSA standards pending CE

Model		Standard	NX45A□-3	NX410A□-3	NX620A□-3	NX640AS-3	NX975AS-3
		Electromagnetic Brake Type	NX45M□-3	NX410M□-3	NX620M□-3	NX640MS-3	NX975MS-3
Rated Output Power		W (HP)	50 (1/15)	100 (1/8)	200 (1/4)	400 (1/2)	750 (1)
Rated Speed		r/min	3000				
Maximum Speed		r/min	5500				
Rated Torque		N·m (oz-in)	0.159 (22)	0.318 (45)	0.637 (90)	1.27 (180)	2.39 (330)
Maximum Instantaneous Torque		N·m (oz-in)	0.478 (67)	0.955 (135)	1.91 (270)	3.82 (540)	7.16 (1010)
Rotor Inertia		J: kg·m^2 (oz-in^2)	0.0174×10^{-4} (0.095) [0.0217×10^{-4} (0.119)]*1	0.0290×10^{-4} (0.159) [0.0334×10^{-4} (0.183)]*1	0.162×10^{-4} (0.89) [0.185×10^{-4} (1.01)]*1	0.291×10^{-4} (1.59) [0.314×10^{-4} (1.72)]*1	0.948×10^{-4} (5.2) [1.03×10^{-4} (5.6)]*1
Permissible Load Inertia*2		J: kg·m^2 (oz-in^2)	1.74×10^{-4} (9.5)	2.90×10^{-4} (15.9)	16.2×10^{-4} (89)	29.1×10^{-4} (159)	94.8×10^{-4} (520)
Resolution		P/R	100 to 100000 (Factory setting 1000)				
Detector			Absolute Encoder 1 rotation 20 bits, multiple rotations 16 bits				
Power-Supply Input	Voltage and Frequency	AC Main Power Supply	Single-Phase 100-115 VAC −15% to +10% 50/60 Hz Single-Phase 200-230 VAC −15% to +10% 50/60 Hz Three-Phase 200-230 VAC −15% to +10% 50/60 Hz			Three-Phase 200-230 VAC −15% to +10% 50/60 Hz	
		DC Control Power Supply	24 VDC±10% 0.8 A				
	Rated Input Current*3 A	Single-Phase 100-115 VAC	1.9	2.9	4.6	—	
		Single-Phase 200-230 VAC	1.2	1.8	2.8	—	
		Three-Phase 200-230 VAC	0.7	1	1.6	2.8	4.7
Electromagnetic Brake*4		Type	Power Off Activated Type				
		Power-Supply Input	24 VDC±10%				
		Power Consumption W	6.1		7.2		8.5
		Excitation Current A	0.25		0.3		0.35
		Static Friction Torque N·m (oz-in)	0.159 (22)	0.318 (45)	0.637 (90)	1.27 (180)	2.39 (330)

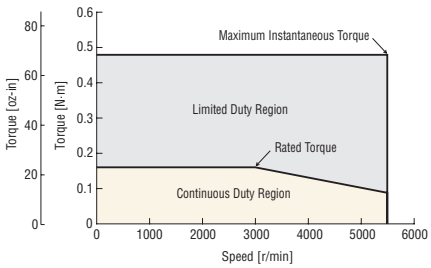
*1 The brackets [ ] indicate the specifications for the electromagnetic brake type.
*2 With automatic tuning, operation up to 50 times the rotor inertia is possible; with manual tuning, operation up to 100 times the rotor inertia is possible.
*3 These values are for operation in the continuous duty region. For operation in the limited duty region, the maximum current is approximately 3 times the value shown.
*4 The electromagnetic brake is for holding the position when the power supply is OFF. The electromagnetic brake cannot be used to stop the motor. A separate power supply for the electromagnetic brake is also required.

Note

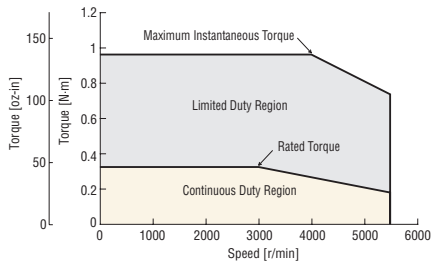
● For continuous operation of the motor at the rated values, a heat sink with aluminum plate size dimensions that are equal to or higher than those shown below is required.
NX45□□**-**◇, **NX410**□□**-**◇, **NX620**□□**-**◇: 250×250 mm (9.84×9.84 in) Thickness 6 mm (0.24 in)
NX640□**S-**◇: 300×300 mm (11.81×11.81 in) Thickness 10 mm (0.39 in)
NX975□**S-**◇: 350×350 mm (13.78×13.78 in) Thickness 10 mm (0.39 in)

Speed – Torque Characteristics

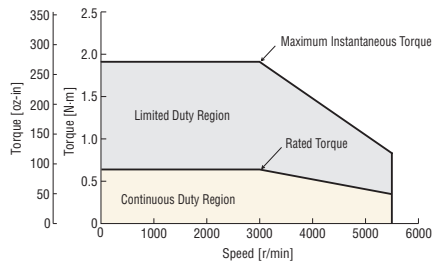
NX45□□**-3**



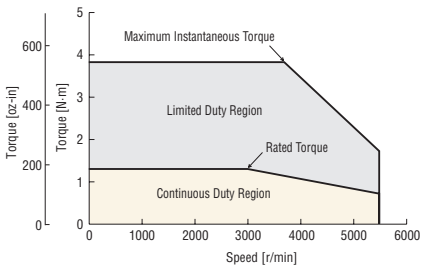
NX410□□**-3**



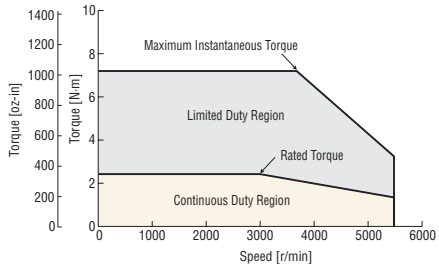
NX620□□**-3**



NX640□**S-3**



NX975□**S-3**



● Either **A** (standard) or **M** (electromagnetic brake type) indicating the motor configuration is entered where the box (□) is located within the product name.
Either **A** (single-phase 100-115 VAC) or **C** (single-phase 200-230 VAC/three-phase 200-230 VAC) indicating the power supply voltage is entered where the box (□) is located within the product name.
● Depending on the operating conditions, a regeneration unit may be required. Regeneration Unit ➜ Page B-57

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

Specifications RoHS

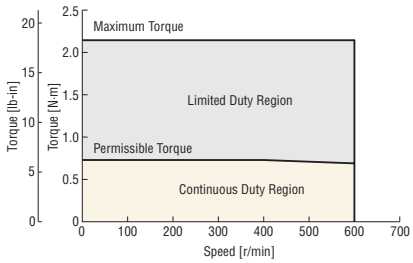
● UL/CSA standards pending CE

Model	Standard	NX65A□-PS5-3	NX65A□-PS10-3	NX65A□-PS25-3	NX610A□-PS5-3	NX610A□-PS10-3	NX610A□-PS25-3
	Electromagnetic Brake Type	NX65M□-PS5-3	NX65M□-PS10-3	NX65M□-PS25-3	NX610M□-PS5-3	NX610M□-PS10-3	NX610M□-PS25-3
Rated Output Power	W (HP)	50 (1/15)			100 (1/8)		
Motor Permissible Speed	r/min	3000					
Permissible Torque	N·m (lb-in)	0.716 (6.3)	1.43 (12.6)	3.22 (28)	1.43 (12.6)	2.86 (25)	6.44 (56)
Maximum Torque	N·m (lb-in)	2.15 (19.0)	4.29 (37)	9.66 (85)	4.29 (37)	8.59 (76)	19.3 (170)
Permissible Speed Range	r/min	0 to 600	0 to 300	0 to 120	0 to 600	0 to 300	0 to 120
Rotor Inertia	J: kg·m² (oz-in²)	0.0174×10^{-4} (0.095) [0.0217×10^{-4} (0.119)]*1			0.0290×10^{-4} (0.159) [0.0334×10^{-4} (0.183)]*1		
Gearhead Internal Inertia*2	J: kg·m² (oz-in²)	0.0431×10^{-4} (0.24)	0.0433×10^{-4} (0.24)	0.0436×10^{-4} (0.24)	0.0431×10^{-4} (0.24)	0.0433×10^{-4} (0.24)	0.0436×10^{-4} (0.24)
Permissible Load Inertia*3	J: kg·m² (oz-in²)	0.0022 (120)	0.0087 (470)	0.054 (3000)	0.0036 (197)	0.0415 (2300)	0.091 (5000)
Gear Ratio		5	10	25	5	10	25
Resolution*4	P/R	100 to 100000 (Factory setting 1000)					
Detector		Absolute Encoder 1 rotation 20 bits, multiple rotations 16 bits					
Backlash	arc minutes (degrees)	15 (0.25)					
Power-Supply Input	Voltage and Frequency / AC Main Power Supply	Single-Phase 100-115 VAC −15 to +10% 50/60 Hz Single-Phase 200-230 VAC −15 to +10% 50/60 Hz Three-Phase 200-230 VAC −15 to +10% 50/60 Hz					
	Voltage and Frequency / DC Control Power Supply	24 VDC±10% 0.8 A					
	Rated Input Current*5 A / Single-Phase 100-115 VAC	1.9			2.9		
	Rated Input Current*5 A / Single-Phase 200-230 VAC	1.2			1.8		
	Rated Input Current*5 A / Three-Phase 200-230 VAC	0.7			1.0		
Electromagnetic Brake*6	Type	Power Off Activated Type					
	Power-Supply Input	24 VDC±10%					
	Power Consumption W	6.1					
	Excitation Current A	0.25					
	Static Friction Torque N·m (lb-in)	0.716 (6.3)	1.43 (12.6)	3.22 (28)	1.43 (12.6)	2.86 (25)	6.44 (56)

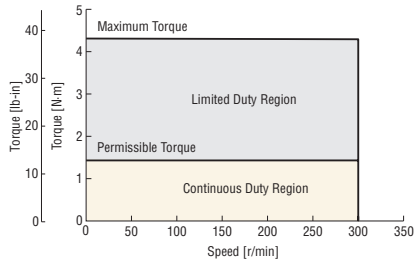
*1 The brackets [ ] indicate the value for the electromagnetic brake type.
*2 The gearhead internal inertia is the motor shaft converted value.
*3 The value for 50 times the rotor inertia.
*4 The resolution for the motor output shaft.
*5 These values are for operation in the continuous duty region. For operation in the limited duty region, the maximum current is approximately 3 times the value shown.
*6 The electromagnetic brake is for holding the position when the power supply is OFF. The electromagnetic brake cannot be used to stop the motor. A separate power supply for the electromagnetic brake is also required.

Speed – Torque Characteristics

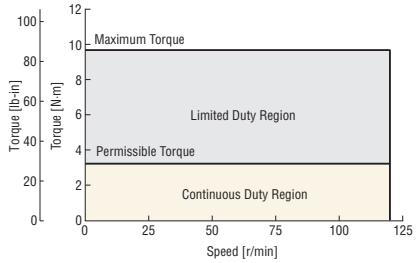
NX65□□-PS5-3



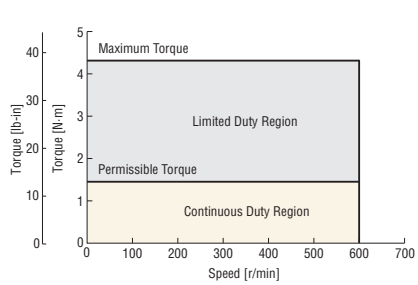
NX65□□-PS10-3



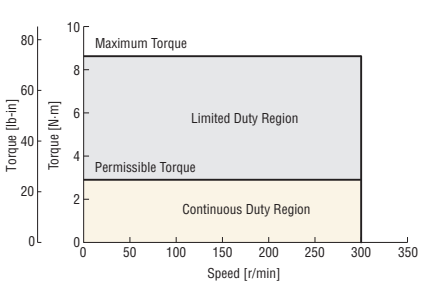
NX65□□-PS25-3



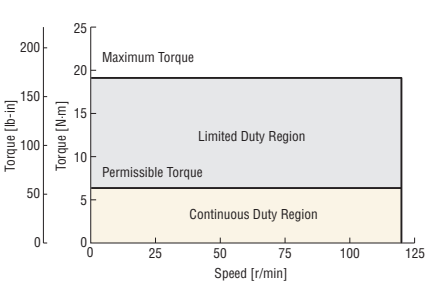
NX610□□-PS5-3



NX610□□-PS10-3



NX610□□-PS25-3



● Either **A** (standard) or **M** (electromagnetic brake type) indicating the motor configuration is entered where the box (□) is located within the product name.
Either **A** (single-phase 100-115 VAC) or **C** (single-phase 200-230 VAC/three-phase 200-230 VAC) indicating the power supply voltage is entered where the box (□) is located within the product name.
● Depending on the operating conditions, a regeneration unit may be required. Regeneration Unit ➜ Page B-57

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

Specifications RoHS

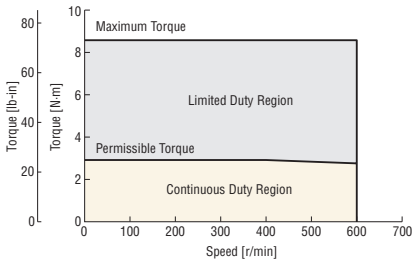
● UL/CSA standards pending CE

Model	Standard	NX920A□-PS5-3	NX920A□-PS10-3	NX920A□-PS25-3	NX940AS-PS5-3	NX940AS-PS10-3	NX940AS-PS25-3
	Electromagnetic Brake Type	NX920M□-PS5-3	NX920M□-PS10-3	NX920M□-PS25-3	NX940MS-PS5-3	NX940MS-PS10-3	NX940MS-PS25-3
Rated Output Power	W (HP)	200 (1/4)			400 (1/2)		
Motor Permissible Speed	r/min	3000					
Permissible Torque	N·m (lb-in)	2.87 (25)	5.73 (50)	12.9 (114)	5.72 (50)	11.4 (100)	25.7 (220)
Maximum Torque	N·m (lb-in)	8.6 (76)	17.2 (152)	38.7 (340)	17.1 (151)	34.3 (300)	77.2 (680)
Permissible Speed Range	r/min	0 to 600	0 to 300	0 to 120	0 to 600	0 to 300	0 to 120
Rotor Inertia	J: kg·m^2 (oz-in^2)	0.162×10^{-4} (0.89) [0.185×10^{-4} (1.01)]*1			0.291×10^{-4} (1.59) [0.314×10^{-4} (1.72)]*1		
Gearhead Internal Inertia*2	J: kg·m^2 (oz-in^2)	0.163×10^{-4} (0.89)	0.160×10^{-4} (0.88)	0.175×10^{-4} (0.96)	0.163×10^{-4} (0.89)	0.160×10^{-4} (0.88)	0.175×10^{-4} (0.96)
Permissible Load Inertia*3	J: kg·m^2 (oz-in^2)	0.02 (1090)	0.081 (4400)	0.51 (28000)	0.036 (1970)	0.146 (8000)	0.91 (50000)
Gear Ratio		5	10	25	5	10	25
Resolution*4	P/R	100 to 100000 (Factory setting 1000)					
Detector		Absolute Encoder 1 rotation 20 bits, multiple rotations 16 bits					
Backlash	arc minutes (degrees)	15 (0.25)					
Power-Supply Input: Voltage and Frequency	AC Main Power Supply	Single-Phase 100-115 VAC −15 to +10% 50/60 Hz Single-Phase 200-230 VAC −15 to +10% 50/60 Hz Three-Phase 200-230 VAC −15 to +10% 50/60 Hz			Three-Phase 200-230 VAC −15% to +10% 50/60 Hz		
	DC Control Power Supply	24 VDC±10% 0.8 A					
Power-Supply Input: Rated Input Current*5 A	Single-Phase 100-115 VAC	4.6			–		
	Single-Phase 200-230 VAC	2.8			–		
	Three-Phase 200-230 VAC	1.6			2.8		
Electromagnetic Brake*6	Type	Power Off Activated Type					
	Power-Supply Input	24 VDC±10%					
	Power Consumption W	7.2					
	Excitation Current A	0.3					
	Static Friction Torque N·m (lb-in)	2.87 (25)	5.73 (50)	12.9 (114)	5.72 (50)	11.4 (100)	25.7 (220)

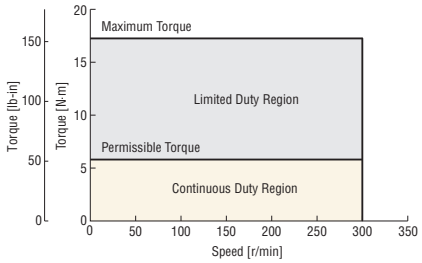
*1 The brackets [ ] indicate the specifications for the electromagnetic brake type.
*2 The gearhead internal inertia is the motor shaft converted value.
*3 The value for 50 times the rotor inertia.
*4 The resolution for the motor output shaft.
*5 These values are for operation in the continuous duty region. For operation in the limited duty region, the maximum current is approximately 3 times the value shown.
*6 The electromagnetic brake is for holding the position when the power supply is OFF. The electromagnetic brake cannot be used to stop the motor. A separate power supply for the electromagnetic brake is also required.

Speed – Torque Characteristics

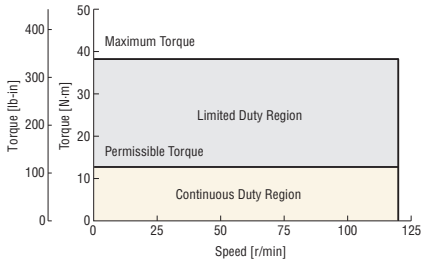
NX920□□-PS5-3



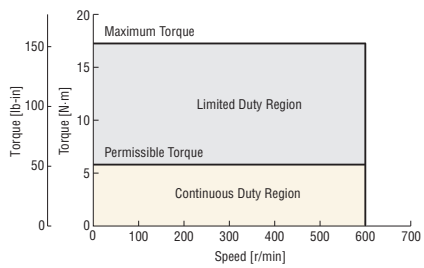
NX920□□-PS10-3



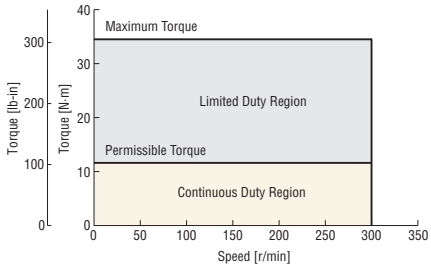
NX920□□-PS25-3



NX940□S-PS5-3



NX940□S-PS10-3



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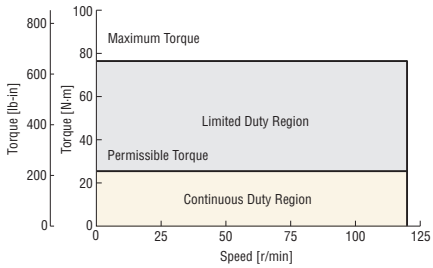


● Either **A** (standard) or **M** (electromagnetic brake type) indicating the motor configuration is entered where the box (□) is located within the product name.
Either **A** (single-phase 100-115 VAC) or **C** (single-phase 200-230 VAC/three-phase 200-230 VAC) indicating the power supply voltage is entered where the box (□) is located within the product name.
● Depending on the operating conditions, a regeneration unit may be required. Regeneration Unit ➜ Page B-57

PJ Geared Type Frame Size 104 mm (4.09 in.)

Specifications RoHS

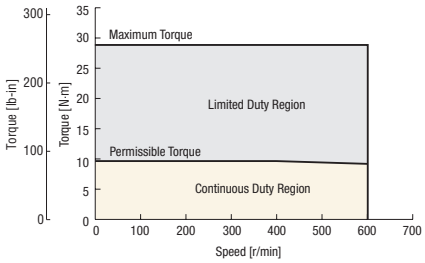
● UL/CSA standards pending CE

Model		Standard / Electromagnetic Brake Type	NX1075AS-J5-3 / NX1075MS-J5-3	NX1075AS-J10-3 / NX1075MS-J10-3	NX1075AS-J25-3 / NX1075MS-J25-3
Rated Output Power		W (HP)	750 (1)		
Motor Permissible Speed		r/min	3000		
Permissible Torque		N·m (lb-in)	9.56 (84)	19.1 (169)	47.8 (420)
Maximum Torque		N·m (lb-in)	28.7 (250)	57.3 (500)	143 (1260)
Permissible Speed Range		r/min	0 to 600	0 to 300	0 to 120
Rotor Inertia		J: kg·m² (oz-in²)	0.941×10^{-4} (5.1) [1.02×10^{-4} (5.6)]*1		
Gearhead Internal Inertia*2		J: kg·m² (oz-in²)	1.31×10^{-4} (7.2)	0.888×10^{-4} (4.9)	0.832×10^{-4} (4.6)
Permissible Load Inertia*3		J: kg·m² (oz-in²)	1180×10^{-4} (6500)	4710×10^{-4} (26000)	29400×10^{-4} (161000)
Gear Ratio			5	10	25
Resolution*4		P/R	100 to 100000 (Factory setting 1000)		
Detector			Absolute Encoder 1 rotation 20 bits, multiple rotations 16 bits		
Backlash		arc minutes (degrees)	3 (0.05)		
Power-Supply Input	Voltage and Frequency	AC Main Power Supply	Three-Phase 200-230 VAC −15% to +10% 50/60 Hz		
		DC Control Power Supply	24 VDC±10% 0.8 A		
	Rated Input Current*5 A	Three-Phase 200-230 VAC	4.7		
Electromagnetic Brake*6		Type	Power Off Activated Type		
		Power-Supply Input	24 VDC±10%		
		Power Consumption W	8.5		
		Excitation Current A	0.35		
		Static Friction Torque N·m (lb-in)	9.56 (84)	19.1 (169)	47.8 (420)

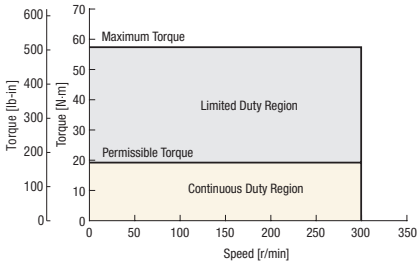
*1 The brackets [ ] indicate the specifications for the electromagnetic brake type.
*2 The gearhead internal inertia is the motor shaft converted value.
*3 The value for 50 times the rotor inertia.
*4 The resolution for the motor output shaft.
*5 These values are for operation in the continuous duty region. For operation in the limited duty region, the maximum current is approximately 3 times the value shown.
*6 The electromagnetic brake is for holding the position when the power supply is OFF. The electromagnetic brake cannot be used to stop the motor. A separate power supply for the electromagnetic brake is also required.

Speed – Torque Characteristics

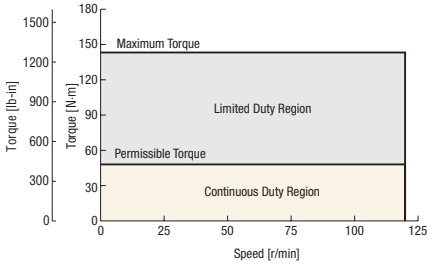
NX1075□S-J5-3



NX1075□S-J10-3



NX1075□S-J25-3



● Either **A** (standard) or **M** (electromagnetic brake type) indicating the motor configuration is entered where the box (□) is located within the product name.
● Depending on the driving conditions, a regeneration unit may be required. Regeneration Unit ➜ Page B-57

Driver Specifications

Interface	Pulse, Analog Speed Command Voltage, Analog Torque Command Voltage
Max. Input Pulse Frequency	Line driver output: 500 kHz (When the pulse duty is 50%) Open collector output: 250 kHz (When the pulse duty is 50%)*
Protective Function	When the following protective functions are activated, an alarm output signal is output and the motor is stopped. Overflow, Overcurrent Protection, Overheat Protection, Overvoltage Protection, Main Power Supply Error, Undervoltage, Motor Overheat Protection, Sensor Error during Operation, Encoder Communication Error, Overload, Overspeed, Position Range Error, Absolute Position Loss, Command Pulse Error, EEPROM Error, Sensor Error during Initialization, Rotor Rotation during Initialization, Encoder EEPROM Error, Motor Combination Error, ABS Not Supported, No Battery, Regeneration Unit Overheat, Electronic Gear Setting Error
Input Signal	・Photocoupler Input, Input Resistance: 3 kΩ Input Signal Voltage: 4.75 to 26.4 VDC (S-ON, CLR/ALM-RST/P-CK, P-REQ/BRAKE, TL/W-RESET, M0, M1, P-PRESET/M2, FREE) ・Photocoupler Input, Input Resistance: 2.7 kΩ Input Voltage: 21.6 to 26.4 VDC (PLS+24 V/CW+24 V, DIR+24 V/CCW+24 V) ・Photocoupler Input, Input Resistance: 200 Ω Input Voltage: 3 to 5.25 VDC (PLS/CW, DIR/CCW) ・Analog Input Set with Internal Potentiometer (VR1, VR2) Analog Input Voltage ±10 VDC Input Impedance 15 kΩ Set with External Potentiometer 20 kΩ 1/4 W (V-REF, T-REF, P-VREF, P-TREF)
Output Signal	・Photocoupler and Open Collector Output External use conditions: 30 VDC, 10 mA max. (ALM, WNG/MOVE/MBC, END/VA, READY/AL0/P-OUTR, TLC/VLC/AL1/P-OUT0, ZSG2/NEAR/ZV/AL2/P-OUT1) ・Line Driver Output External use condition: Connect a terminating resistor of 100 Ω min. between the line receiver inputs. (ASG, BSG, ZSG1) ・Analog Monitor Output Analog Output Voltage ±10 VDC Output Impedance 1 kΩ (V-MON, T-MON, SG)
Other Functions	Position Control, Speed Control, Torque Control, Tension Control Automatic Tuning, Damping Control Function (7 to 30 Hz), Position Preset Function, Current Position Output Function, Torque Limiting Function Pulse Input Mode (2-Pulse Input, 1-Pulse Input), Analog Monitor Output Function (Speed, Torque), Absolute System Enabled/Disabled Warning Output Function, (Overflow, Overheat, Overvoltage, Main Power Supply, Undervoltage, Battery Undervoltage, Overload, Overspeed, Absolute Position Loss, Electronic Gear Setting Error)
Extended Functions [When using the separately-sold control module (**OPX-2A**) or the data setting software (**MEXE02**)]	For details on extended functions, refer to page B-43.

*The values when the separately-sold general-purpose cable (**CC36D1-1**) is used. General-Purpose Cable ➜ Page B-51

Position Control Mode Specifications

Item	Factory Setting	When Using Extended Functions
Command Mode	Pulse Input Mode, Select one of the following: ・2-Pulse Input Mode ・1-Pulse Input Mode (Factory setting)	Pulse Input Mode, Select one of the following: ・2-Pulse Input Mode ・1-Pulse Input Mode ・Phase Difference Input Mode (Internal parameter setting)
Max. Input Pulse Frequency	Line driver output by programmable controller: 500 kHz (When the pulse duty is 50%) Open collector output by programmable controller: 250 kHz (When the pulse duty is 50%)*1	
Resolution	1000 P/R	100 to 100000 P/R
Encoder Output Resolution	1000 P/R	100 to 10000 P/R
Damping Control Frequency	One type of frequency can be established: ● Internal potentiometer VR1 (potentiometer) - one product line Disabled/7-30 Hz (internal potentiometer VR1)	Four types of frequencies can be established in the following two ways: ● Combination of one type of internal potentiometer VR1 (potentiometer) and three types of internal parameters ● Four types of internal parameters Disabled/7-30 Hz (internal potentiometer VR1) Disabled/7-100 Hz (internal parameters established)
Absolute System Position Control Range	−2 147 483 648 to 2 147 483 647 pulses	
Current Position Output	2-bit Serial Output	
Tuning	Automatic tuning only <Automatic> The rigidity setting (SW2) is selected from 16 levels. The load inertia is estimated and the gain is automatically adjusted according to the rigidity setting.	Automatic tuning, semi-auto tuning, and manual tuning can be selected. <Automatic> Select the rigidity setting (SW2 or internal parameter) from 16 levels. The load inertia is estimated and the gain is automatically adjusted according to the rigidity setting. <Semi-Auto> Select the rigidity setting (SW2 or internal parameter) from 16 levels. Input the load inertia ratio. <Manual> Select the rigidity setting (SW2 or internal parameter) from 16 levels. Input the load inertia ratio. All gain can be set manually.
Torque Limiting	0 to 300% (The rated torque is 100%.) External Potentiometer*2 (T-REF)	0 to 300% (The rated torque is 100%. Can be set in steps of 1% with an internal parameter.) Set with External Potentiometer*2 (T-REF), Internal Parameter

● Using extended functions requires the separately-sold control module (**OPX-2A**) or the data setting software (**MEXE02**).

*1 The values when the separately-sold general-purpose cable (**CC36D1-1**) is used. General-Purpose Cable ➜ Page B-51

*2 Accessory sets are available (sold separately). Accessory Set ➜ Page B-56

Speed Control Mode Specifications

Item		Factory Setting	When Using Extended Functions
Command Mode		Two types of speeds can be established: ● Internal potentiometer VR1 (potentiometer) - one speed ● External potentiometer V-REF (potentiometer or external DC voltage selected) - one speed [External potentiometer* V-REF (potentiometer or external DC voltage selected)] ・Set using potentiometer: 20 kΩ 1/4 W ・Set using external DC voltage: ±0 to 10 VDC Input impedance 15 kΩ	Eight types of speeds can be established in the following two ways: ● Combination of one speed of internal potentiometer VR1 (potentiometer), one speed of external potentiometer V-REF (potentiometer or external DC voltage selected), and six internal parameter speeds ● Eight internal parameter speeds [External potentiometer* V-REF (potentiometer or external DC voltage selected)] ・Set using potentiometer: 20 kΩ 1/4 W ・Set using external DC voltage: ±0 to 10 VDC Input impedance 15 kΩ
Speed Setting Range		10 to 5500 r/min (Analog speed setting VR1, V-REF)	10 to 5500 r/min (Analog speed setting VR1, V-REF) 1 to 5500 r/min (Internal parameter setting)
Acceleration/Deceleration Time Setting Range		5 ms to 10 sec./(1000 r/min) (Acceleration and deceleration time per 1000 r/min) Internal Potentiometer (VR2)	5 ms to 10 sec./(1000 r/min) (Acceleration and deceleration time per 1000 r/min) The setting method can be selected: either an internal potentiometer (VR2) or internal parameter.
Speed Regulation	Load	±0.05% max. (0 to rated torque, rated speed, rated voltage, normal temperature)	
	Voltage	±0.05% max. (Power-supply input voltage range, at 3000 r/min no load)	
	Temperature	±0.5% max. (With analog speed setting VR1, V-REF) Common Conditions Operating Ambient Temperature 0 to +50˚C, Rated Speed, No Load, Rated Voltage	±0.5% max. (With analog speed setting VR1, V-REF) ±0.05% max. (When set with internal parameter) Common Conditions Operating Ambient Temperature 0 to +50˚C, Rated Speed, No Load, Rated Voltage
Torque Limiting		0 to 300% (100% is rated torque.) Set with External Potentiometer* (T-REF)	0 to 300% (100% is rated torque. Can be set in steps of 1% with an internal parameter.) Set with External Potentiometer* (T-REF), Internal Parameter
Operation When Motor is Stopped		–	The operation when the motor is stopped can be selected ・Motor Non-Excitation ・Position Holding by Servo Control Stopped (Motor excitation)
Tuning		Automatic tuning only <Automatic> The rigidity setting (SW2) is selected from 16 levels. The load inertia is estimated and the gain is automatically adjusted according to the rigidity setting.	Automatic tuning, semi-auto tuning and manual tuning can be selected. When operation when the motor is stopped is set to "Position holding by servo control stopped", the position loop gain and speed feed-forward are set just like position control. <Automatic> Select the rigidity setting (SW2 or internal parameter) from 16 levels. The load inertia is estimated and the gain is automatically adjusted according to the rigidity setting. <Semi-Auto> Select the rigidity setting (SW2 or internal parameter) from 16 levels. Input the load inertia ratio. <Manual> Select the rigidity setting (SW2 or internal parameter) from 16 levels. Input the load inertia ratio. All gain can be set manually.
Encoder Output Resolution		1000 P/R	100 to 10000 P/R

● Using extended functions requires the separately-sold control module (**OPX-2A**) or the data setting software (**MEXE02**).
✻Accessory sets are available (sold separately). Accessory Set ➜ Page B-56

Torque Control Mode Specifications

Item	Factory Setting	When Using Extended Functions
Command Mode	Two types of torque can be established: ● Internal potentiometer VR1 (potentiometer) - one type ● External potentiometer T-REF (potentiometer or external DC voltage selected) - one type [External potentiometer* T-REF (potentiometer or external DC voltage selected)] ・Set using potentiometer: 20 kΩ 1/4 W ・Set using external DC voltage: ±0 to 10 VDC Input impedance 15 kΩ	Eight types of torque can be established in the following two ways: ● Combination of one type of internal potentiometer VR1 (potentiometer), one type of external potentiometer T-REF (potentiometer or external DC voltage selected), and six types of internal parameters ● Eight types of internal parameters [External potentiometer* T-REF (potentiometer or external DC voltage selected)] ・Set using potentiometer: 20 kΩ 1/4 W ・Set using external DC voltage: ±0 to 10 VDC Input impedance 15 kΩ
Torque Control Range	0 to 300% (100% is rated torque.)	0 to 300% (100% is rated torque. Can be set in steps of 1% with an internal parameter.)
Speed Limit	0 to 5500 r/min Set with internal potentiometer (VR2) or external potentiometer* (V-REF)	0 to 5500 r/min (Can be set in 1 r/min steps with an internal parameter.) Set with internal potentiometer (VR2) or external potentiometer* (V-REF), or with an internal parameter
Encoder Output Resolution	1000 P/R	100 to 10000 P/R

● Using extended functions requires the separately-sold control module (**OPX-2A**) or the data setting software (**MEXE02**).
✻Accessory sets are available (sold separately). Accessory Set ➜ Page B-56

Tension Control Mode Specifications

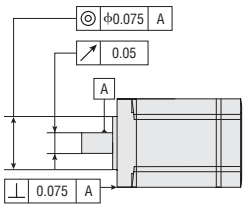
Item		Factory Setting	When Using Extended Functions
Command Mode		Two types of tension can be established: ● Internal potentiometer VR1 (potentiometer) - one type ● External potentiometer T-REF (potentiometer or external DC voltage selected) - one type [External potentiometer* T-REF (potentiometer or external DC voltage selected)] ・Set using potentiometer: 20 kΩ 1/4 W ・Set using external DC voltage: ±0 to 10 VDC Input impedance 15 kΩ	Eight types of tension can be established in the following two ways: ● Combination of one type of internal potentiometer VR1 (potentiometer), one type of external potentiometer T-REF (potentiometer or external DC voltage selected), and six types of internal parameters ● Eight types of internal parameters [External potentiometer* T-REF (potentiometer or external DC voltage selected)] ・Set using potentiometer: 20 kΩ 1/4 W ・Set using external DC voltage: ±0 to 10 VDC Input impedance 15 kΩ
Control Method	Simple Mode	The tension is controlled to be constant when the feed speed is constant.	The tension is controlled to be constant when the feed speed is constant.
	High Function Mode Ⅰ	–	The current winding (winding out) diameter is automatically calculated based on the initial diameter, the material thickness and the final diameter. The tension is controlled to stay constant regardless of the operating speed.
	High Function Mode Ⅱ	–	In addition to the contents of high function mode Ⅰ, the load inertia is calculated within the driver from the material inertia and the core inertia. The tension is controlled to stay constant even during acceleration/deceleration.
Tension Control Range		0 to 100% (100% is rated torque.)	0 to 100% (100% is rated torque. Can be set in steps of 1%.)
Speed Limit		0 to 5500 r/min Set with internal potentiometer (VR2), external potentiometer* (V-REF)	0 to 5500 r/min (Can be set in 1 r/min steps.) Set with internal potentiometer (VR2) or external potentiometer* (V-REF), or with an internal parameter
Minimum Speed		The minimum speed for simple mode can be selected with SW2. The setting range has 16 levels from 0 (10 r/min) to F (3000 r/min).	
Encoder Output Resolution		1000 P/R	100 to 10000 P/R

● Using extended functions requires the separately-sold control module (**OPX-2A**) or the data setting software (**MEXE02**).
✻Accessory sets are available (sold separately). Accessory Set ➔ Page B-56

General Specifications

Specifications		Motor	Driver
Thermal Class		130 (B)	–
Insulation Resistance		100 MΩ min. when measured with a 500 VDC megger between the following locations: ・Case – Motor Windings ・Case – Electromagnetic Brake Windings	100 MΩ min. when measured with a 500 VDC megger between the following locations: ・PE terminal – AC Main Power Supply Connector, Motor Connector ・DC Control Power Supply Connector, I/O Connector, Encoder Connector, Control Module Connector, Battery Connector – AC Main Power Supply Connector, Motor Connector
Dielectric Voltage		No abnormality is judged with the following application for 1 minute: ・Case – Motor Windings 1.5 kVAC 50 Hz or 60 Hz ・Case – Electromagnetic Brake Windings 1.0 kVAC 50 Hz or 60 Hz	No abnormality is judged with the following application for 1 minute: ・PE terminal – AC Main Power Supply Connector, Motor Connector 1.5 kVAC 50 Hz or 60 Hz ・DC Control Power Supply Connector, I/O Connector, Encoder Connector, Control Module Connector, Battery Connector – AC Main Power Supply Connector, Motor Connector 1.8 kVAC 50 Hz or 60 Hz
Operating Environment (In operation)	Ambient Temperature	0 to +40°C (+32 to +104°F) (Non-freezing)	0 to +50°C (+32 to +122°F)*2 (Non-freezing)
	Ambient Humidity	85% max. (Non-condensing)	
	Atmosphere	No corrosive gases. Must not be exposed to oil or other liquids.	No corrosive gases or dust. The product should not be exposed to water, oil or other liquids.
Degree of Protection		IP65 (Standard type, electromagnetic brake type, **PS** geared type: excluding installation surface and connector locations. **PJ** geared type: excluding connector locations)	IP20
Shaft Runout		0.05 mm (0.002 in.) T. I. R.*1	–
Concentricity of Installation Pilot to the Shaft		0.075 mm (0.003 in.) T. I. R.*1	–
Perpendicularity of Installation Surface to the Shaft		0.075 mm (0.003 in.) T. I. R.*1	–

✻1 T. I. R. (Total Indicator Reading): The total dial gauge reading when the measurement section is rotated 1 rotation centered on the reference axis.
✻2 If the driver's ambient temperature exceeds 40°C (104°F), hold the continuous motor output below the derating curve in the figure below.

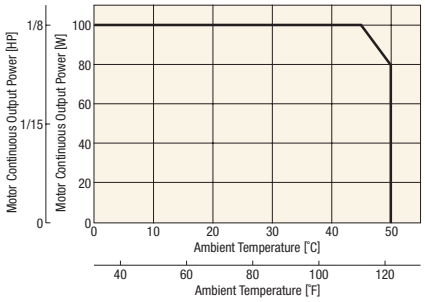


Note
● Do not perform the insulation resistance test or dielectric voltage withstand test while the motor and driver are connected.
Also, do not conduct these tests on the motor encoder section.

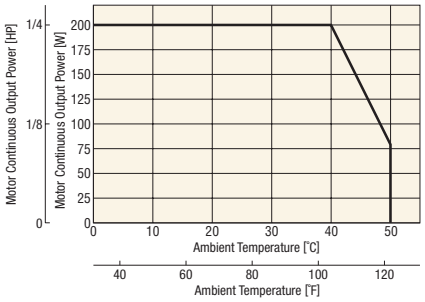
Motor Continuous Output Derating Curve

If the driver's operating ambient temperature exceeds 40˚C (104˚F), hold the continuous motor output below the derating curve in the figure below. There is no need for derating for the types with rated output power of 50 W (1/15 HP) or 400 W (1/2 HP).

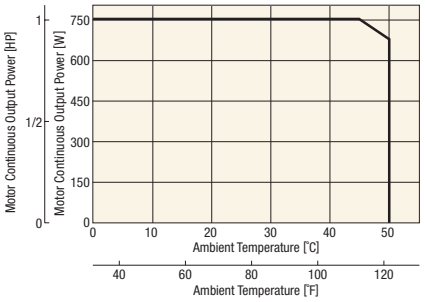
◇Rated Output Power 100 W (1/8 HP)



◇Rated Output Power 200 W (1/4 HP)



◇Rated Output Power 750 W (1 HP)



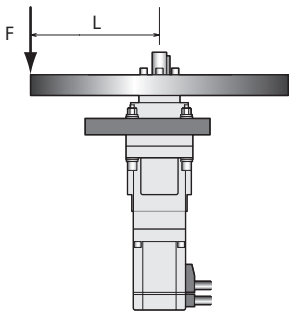
Permissible Overhung Load, Permissible Thrust Load and Permissible Moment Load

Type	Frame Size [mm (in.)]	Type	Gear Ratio	Permissible Overhung Load [N (lb.)] Distance from Shaft End [mm (in.)] 0 (0)	5 (0.2)	10 (0.39)	15 (0.59)	20 (0.79)	25 (0.98)	30 (1.18)	35 (1.38)	Permissible Thrust Load [N (lb.)]	Permissible Moment Load [N·m (lb-in)]
Standard Type	42 (1.65)	**NX45 NX410**	–	81 (18.2)	88 (19.8)	95 (21)	104 (23)	–	–	–	–	59 (13.2)	–
	60 (2.36)	**NX620 NX640**		230 (51)	245 (55)	262 (58)	281 (63)	304 (68)	–	–	–	98 (22)	–
	85 (3.35)	**NX975**		376 (84)	392 (88)	408 (91)	426 (95)	446 (100)	467 (105)	491 (110)	–	147 (33)	–
PS Geared Type	60 (2.36)	**NX65 NX610**	**5**	200 (45)	220 (49)	250 (56)	280 (63)	320 (72)	–	–	–	100 (22)	–
			10	250 (56)	270 (60)	300 (67)	340 (76)	390 (87)	–	–	–		–
			25	330 (74)	360 (81)	400 (90)	450 (101)	520 (117)	–	–	–		–
	90 (3.54)	**NX920 NX940**	**5, 10**	480 (108)	540 (121)	600 (135)	680 (153)	790 (177)	–	–	–	300 (67)	–
			25	850 (191)	940 (210)	1050 (230)	1190 (260)	1380 (310)	–	–	–		–
PJ Geared Type	104 (4.09)	**NX1075**	**5**	650 (146)	700 (157)	730 (164)	750 (168)	800 (180)	830 (186)	880 (198)	920 (200)	500 (112)	30 (260)
			10	900 (200)	950 (210)	1000 (220)	1050 (230)	1100 (240)	1180 (260)	1230 (270)	1300 (290)	650 (146)	66 (580)
			25	1350 (300)	1400 (310)	1480 (330)	1550 (340)	1600 (360)	1650 (370)	1750 (390)	1850 (410)	1000 (220)	120 (1060)

PJ Geared Type Permissible Moment Load

When installing an arm or table on the flange face, if an eccentric load is applied, calculate the moment load with the following formula.

Moment load: M [N·m (lb-in)] = F × L



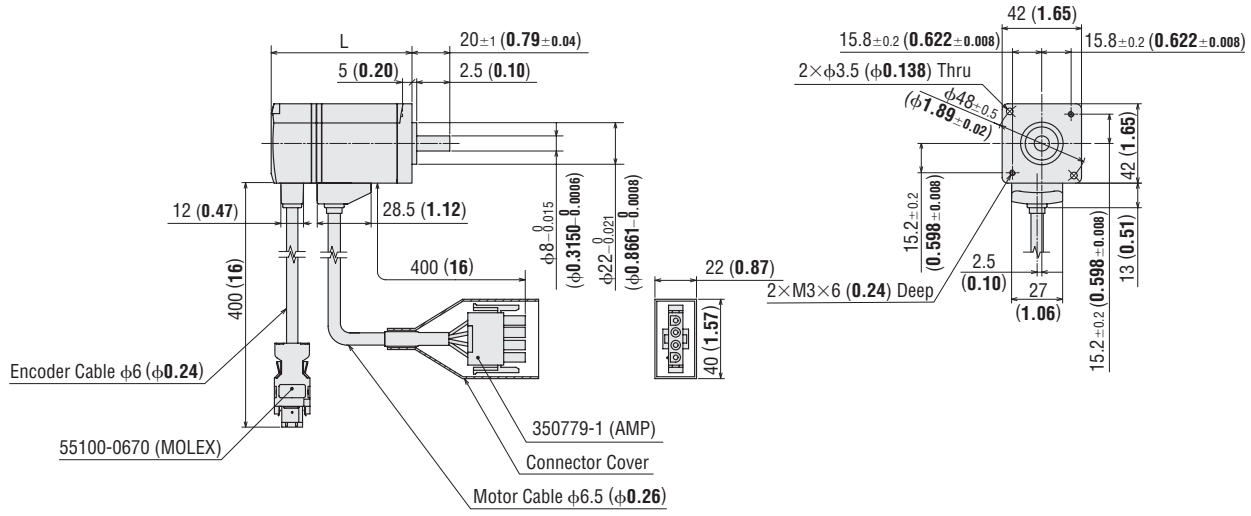
Dimensions Unit = mm (in.)

Motor

◇Standard Type

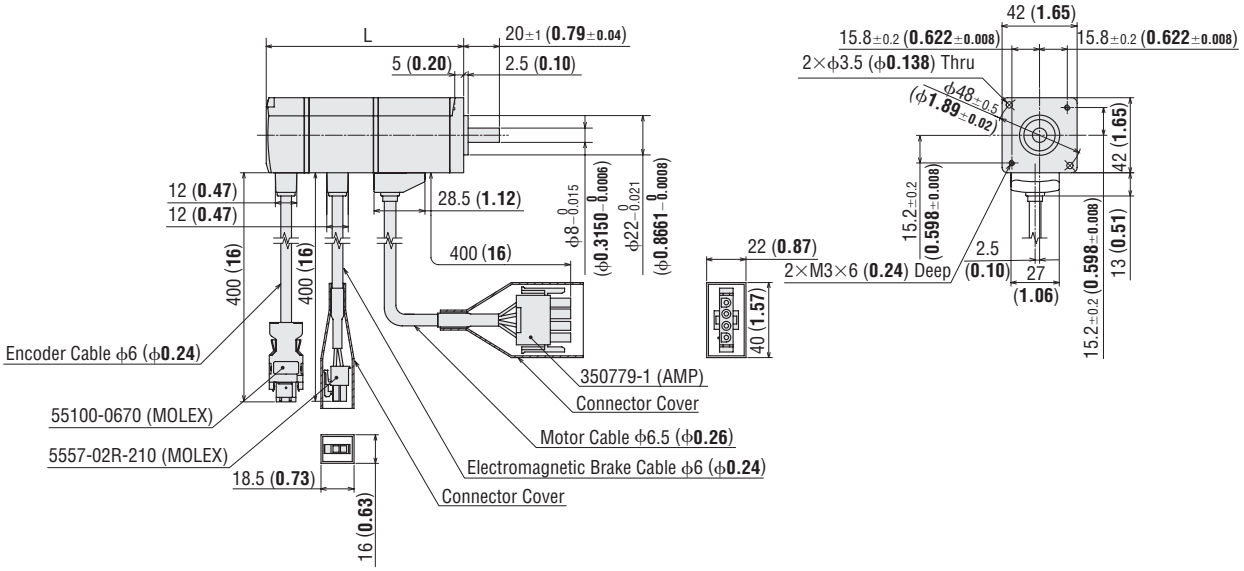
Motor Frame Size 42 mm (1.65 in.)

Model	Motor Model	L	Mass kg (lb.)	DXF
NX45A□-3	NXM45A	74.5 (2.93)	0.5 (1.1)	C210
NX410A□-3	NXM410A	88.8 (3.50)	0.6 (1.3)	C211



Motor Frame Size 42 mm (1.65 in.) Electromagnetic Brake Type

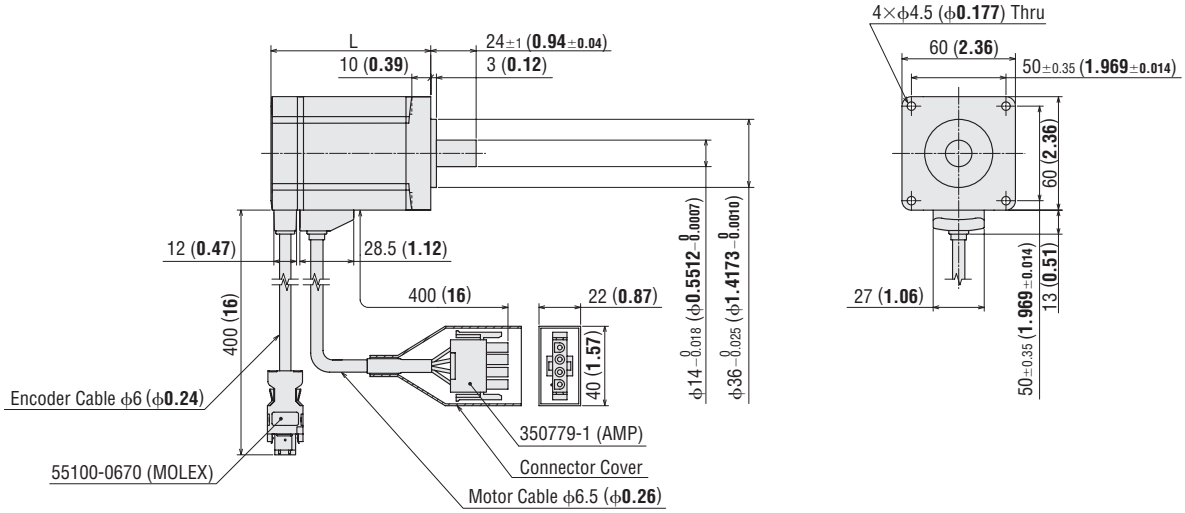
Model	Motor Model	L	Mass kg (lb.)	DXF
NX45M□-3	NXM45M	110.5 (4.35)	0.7 (1.5)	C212
NX410M□-3	NXM410M	124.8 (4.91)	0.8 (1.8)	C213



● Either **A** (single-phase 100-115 VAC) or **C** (single-phase 200-230 VAC/three-phase 200-230 VAC) indicating the power supply voltage is entered where the box (□) is located within the product name.

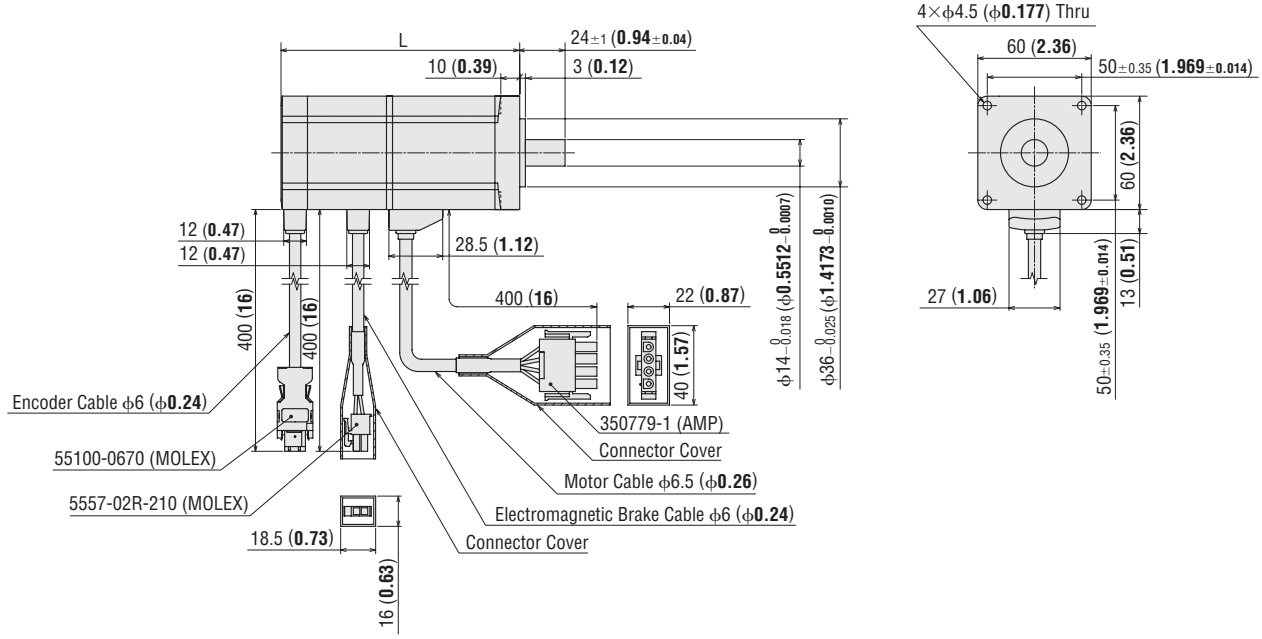
Motor Frame Size 60 mm (2.36 in.)

Model	Motor Model	L	Mass kg (lb.)	DXF
NX620A□-3	NXM620A	84.5 (3.33)	1 (2.2)	C203
NX640AS-3	NXM640A	114.8 (4.52)	1.5 (3.3)	C216



Motor Frame Size 60 mm (2.36 in.) Electromagnetic Brake Type

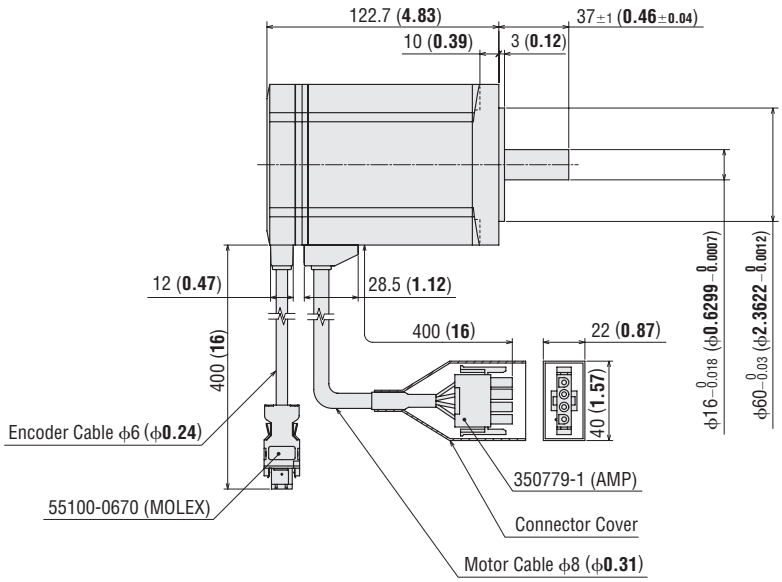
Model	Motor Model	L	Mass kg (lb.)	DXF
NX620M□-3	NXM620M	126.3 (4.97)	1.5 (3.3)	C204
NX640MS-3	NXM640M	156.6 (6.17)	2 (4.4)	C217

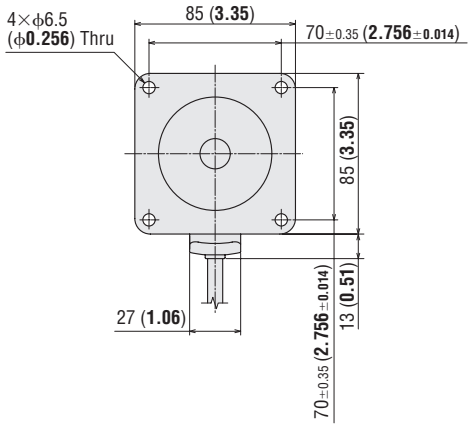


● Either **A** (single-phase 100-115 VAC) or **C** (single-phase 200-230 VAC/three-phase 200-230 VAC) indicating the power supply voltage is entered where the box (□) is located within the product name.

Motor Frame Size 85 mm (3.35 in.)

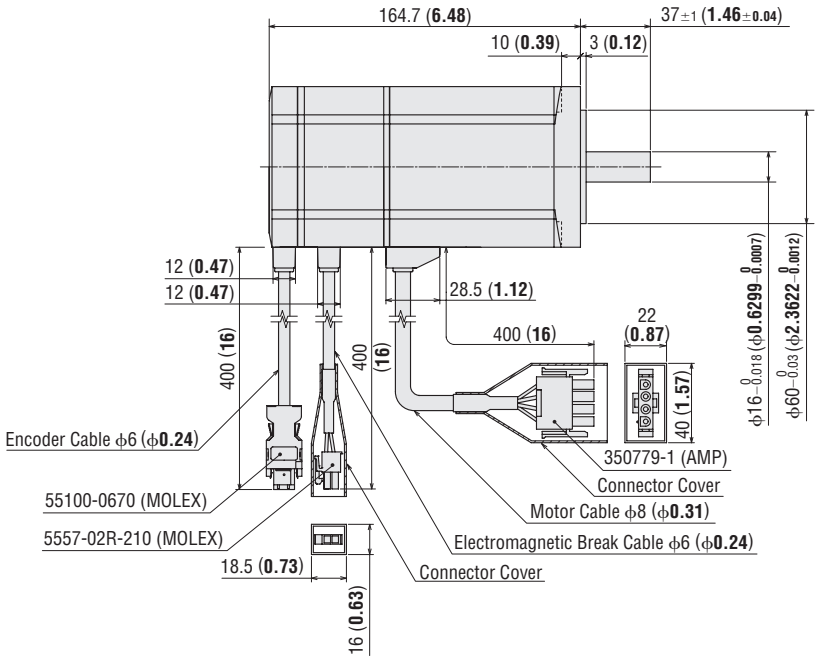
Model	Motor Model	Mass kg (lb.)	DXF
NX975AS-3	NXM975A	3.1 (6.8)	C218

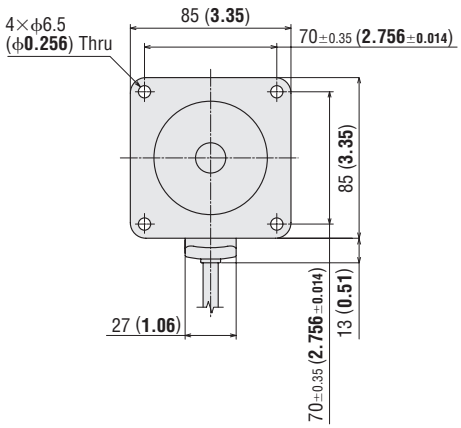




Motor Frame Size 85 mm (3.35 in.) Electromagnetic Brake Type

Model	Motor Model	Mass kg (lb.)	DXF
NX975MS-3	NXM975M	4.1 (9.0)	C219

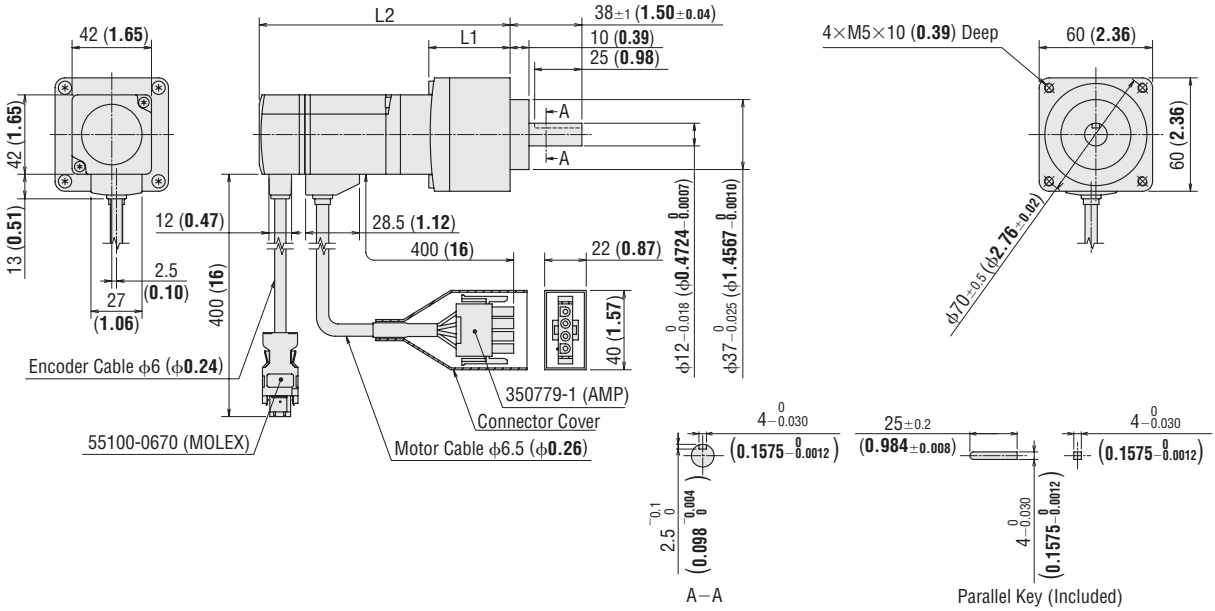




◇PS Geared Type

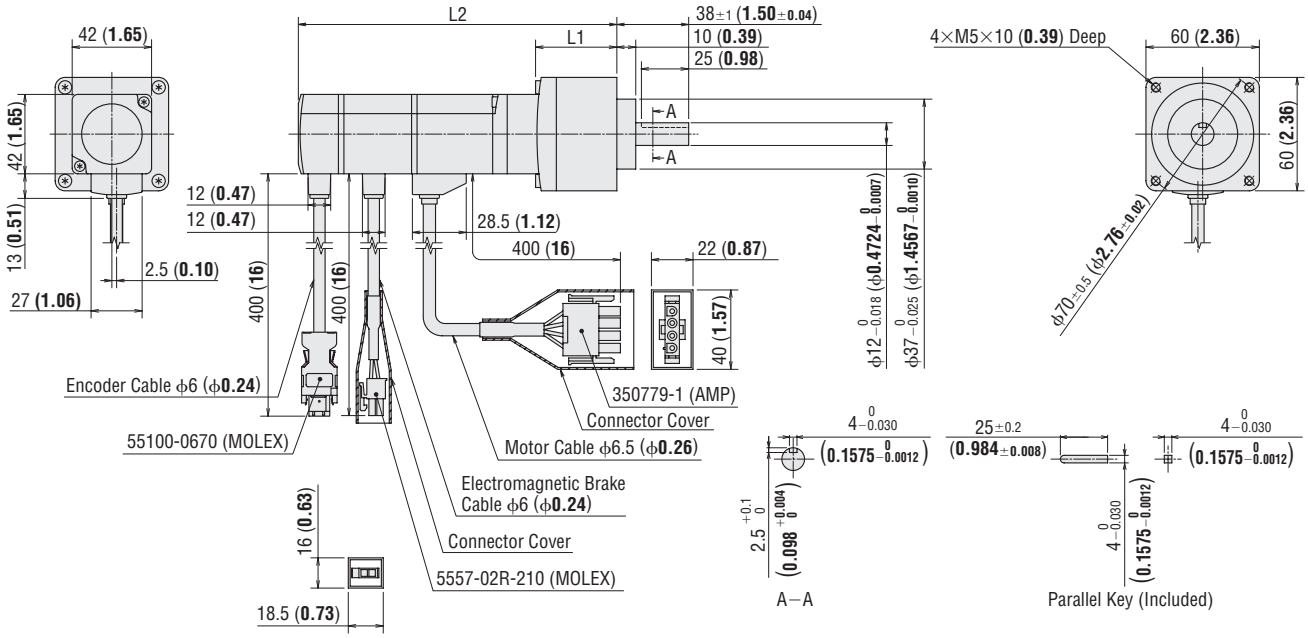
Motor Frame Size 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
NX65A□-PS□-3	NXM65A-PS□	**5**, **10**	43 (1.69)	132.5 (5.22)	1.15 (2.5)	C241
		25	63.2 (2.49)	153 (6.02)	1.45 (3.2)	C242
NX610A□-PS□-3	NXM610A-PS□	**5**, **10**	43 (1.69)	147 (5.79)	1.25 (2.8)	C243
		25	63.2 (2.49)	167 (6.57)	1.55 (3.4)	C244



Motor Frame Size 60 mm (2.36 in.) Electromagnetic Brake Type

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
NX65M□-PS□-3	NXM65M-PS□	**5**, **10**	43 (1.69)	168.5 (6.63)	1.35 (3.0)	C245
		25	63.2 (2.49)	189 (7.44)	1.65 (3.6)	C246
NX610M□-PS□-3	NXM610M-PS□	**5**, **10**	43 (1.69)	183 (7.20)	1.45 (3.2)	C247
		25	63.2 (2.49)	203 (7.99)	1.75 (3.9)	C248

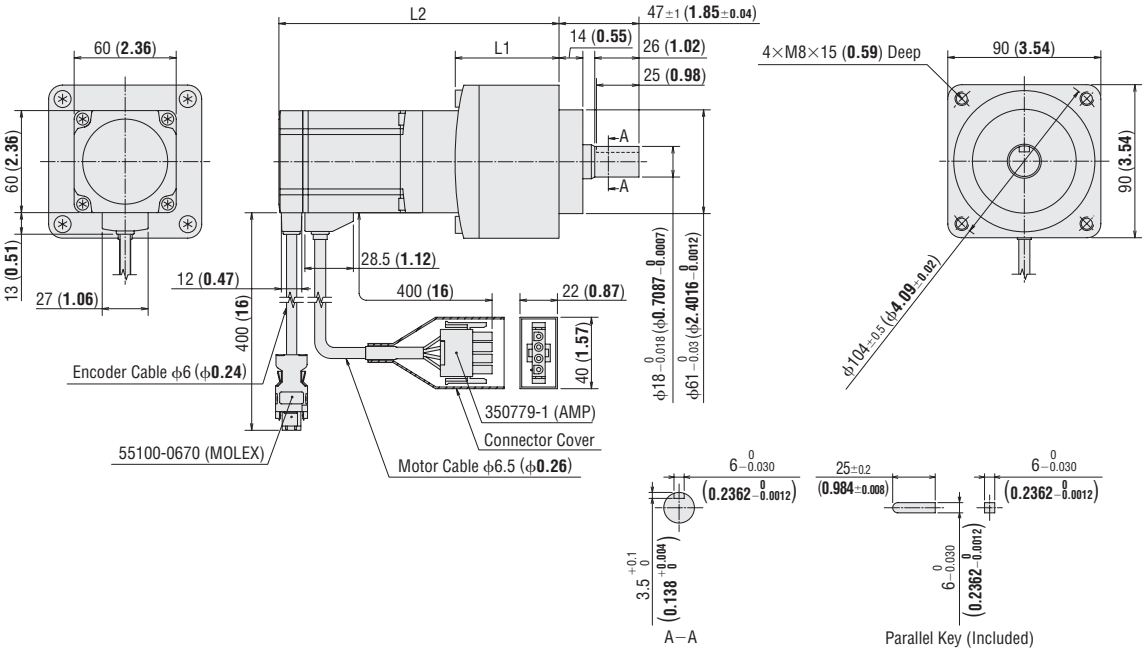


● Either **A** (single-phase 100-115 VAC) or **C** (single-phase 200-230 VAC/three-phase 200-230 VAC) indicating the power supply voltage is entered where the box (□) is located within the product name.
A number indicating the gear ratio is entered where the box (□) is located within the product name.

◇PS Geared Type

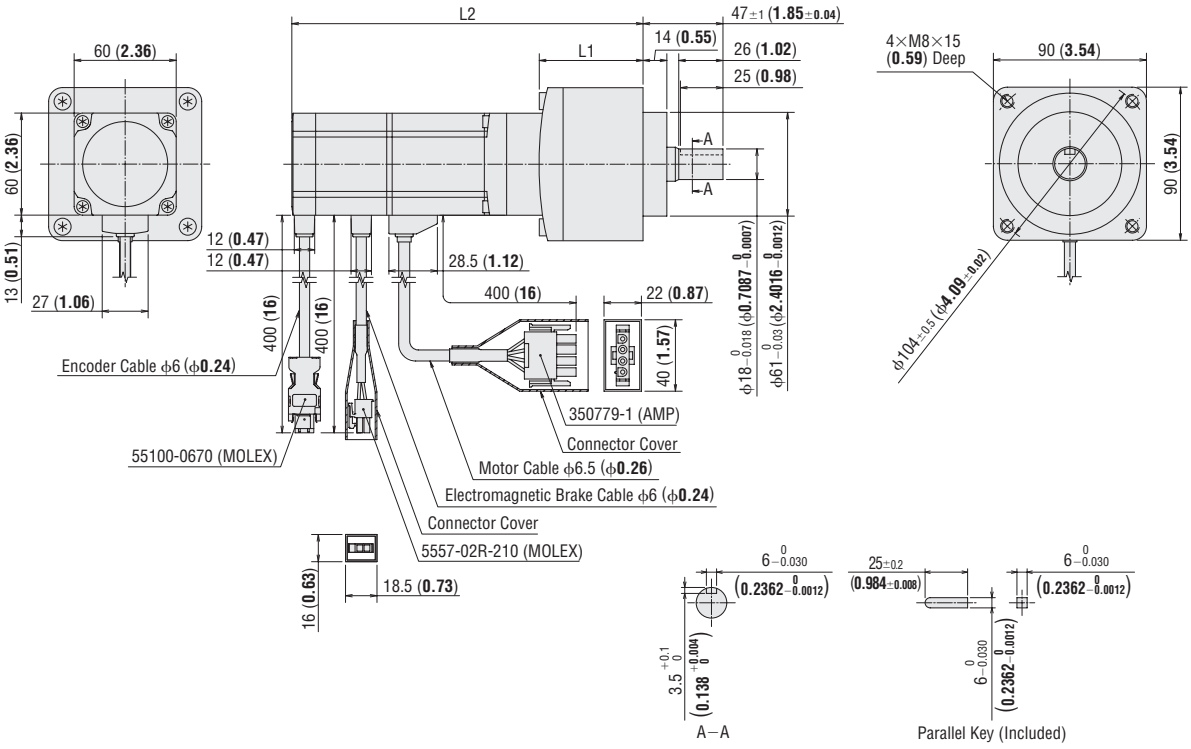
Motor Frame Size 90 mm (3.54 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
NX920A□-PS□-3	NXM920A-PS□	**5**, **10**	61 (2.40)	164.5 (6.48)	3.0 (6.6)	C249
		25	88.3 (3.48)	192 (7.65)	3.9 (8.6)	C250
NX940AS-PS□-3	NXM940A-PS□	**5**, **10**	61 (2.40)	195 (7.68)	3.5 (7.7)	C251
		25	88.3 (3.48)	222 (8.74)	4.4 (9.7)	C252



Motor Frame Size 90 mm (3.54 in.) Electromagnetic Brake Type

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
NX920M□-PS□-3	NXM920M-PS□	**5**, **10**	61 (2.40)	206.5 (8.13)	3.5 (7.7)	C253
		25	88.3 (3.48)	233.5 (9.19)	4.4 (9.7)	C254
NX940MS-PS□-3	NXM940M-PS□	**5**, **10**	61 (2.40)	236.5 (9.31)	4.0 (8.8)	C255
		25	88.3 (3.48)	264 (10.39)	4.9 (10.8)	C256

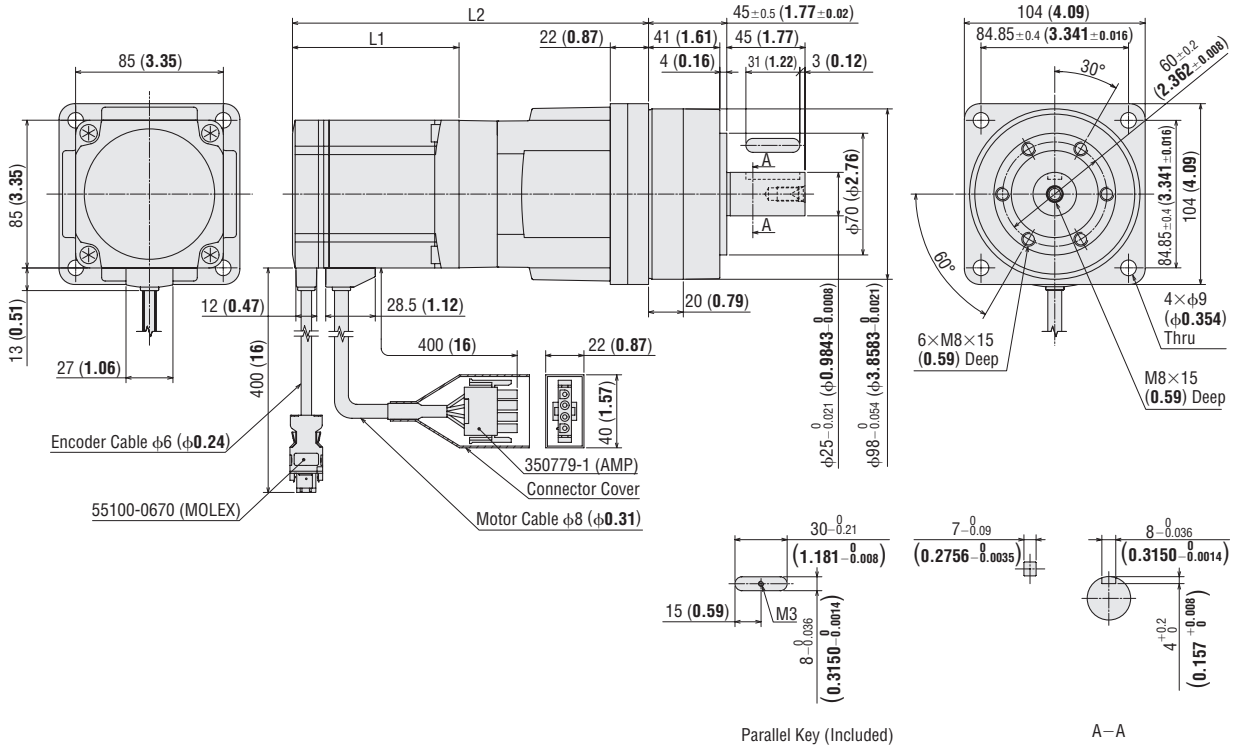


● Either **A** (single-phase 100-115 VAC) or **C** (single-phase 200-230 VAC/three-phase 200-230 VAC) indicating the power supply voltage is entered where the box (□) is located within the product name.
A number indicating the gear ratio is entered where the box (□) is located within the product name.

◇PJ Geared Type

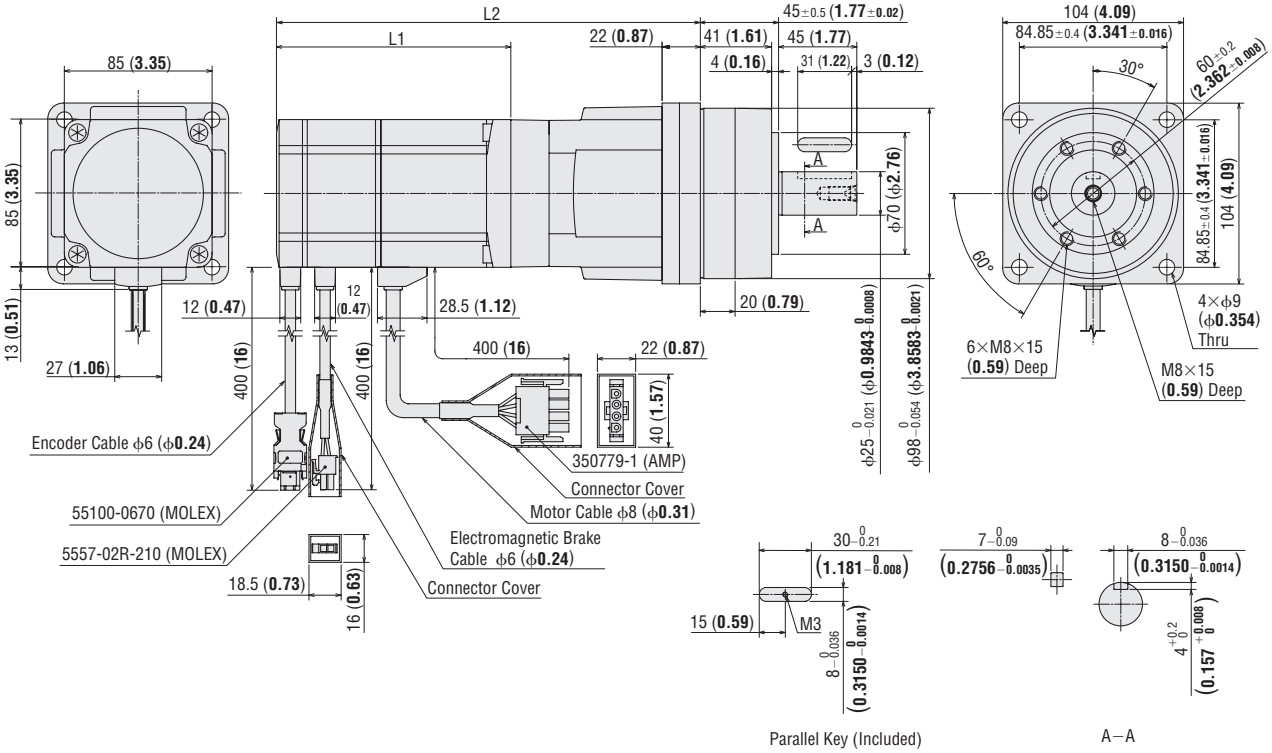
Motor Frame Size 104 mm (4.09 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
NX1075AS-J□-3	NXM1075A-J□	**5, 10**	122.7 (4.83)	231.7 (9.12)	8.6 (18.9)	C221
		25			9.1 (20.0)	



Motor Frame Size 104 mm (4.09 in.) Electromagnetic Brake Type

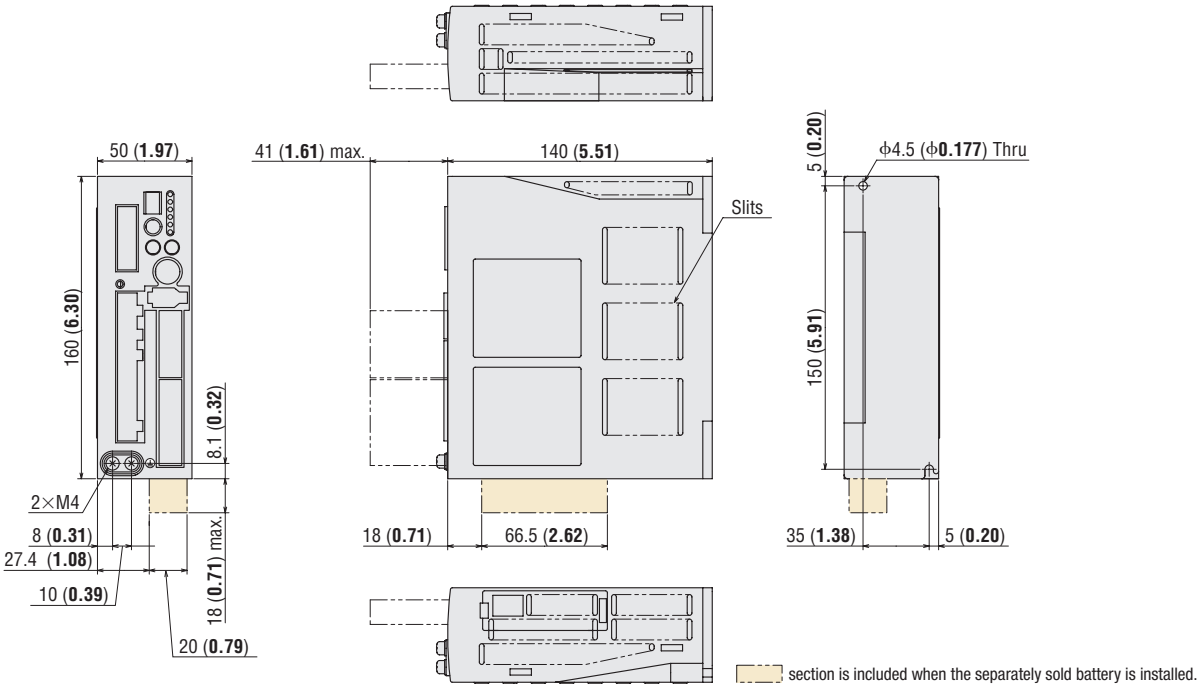
Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
NX1075MS-J□-3	NXM1075M-J□	**5, 10**	164.7 (6.48)	273.7 (10.78)	9.6 (21.1)	C223
		25			10.1 (22.2)	



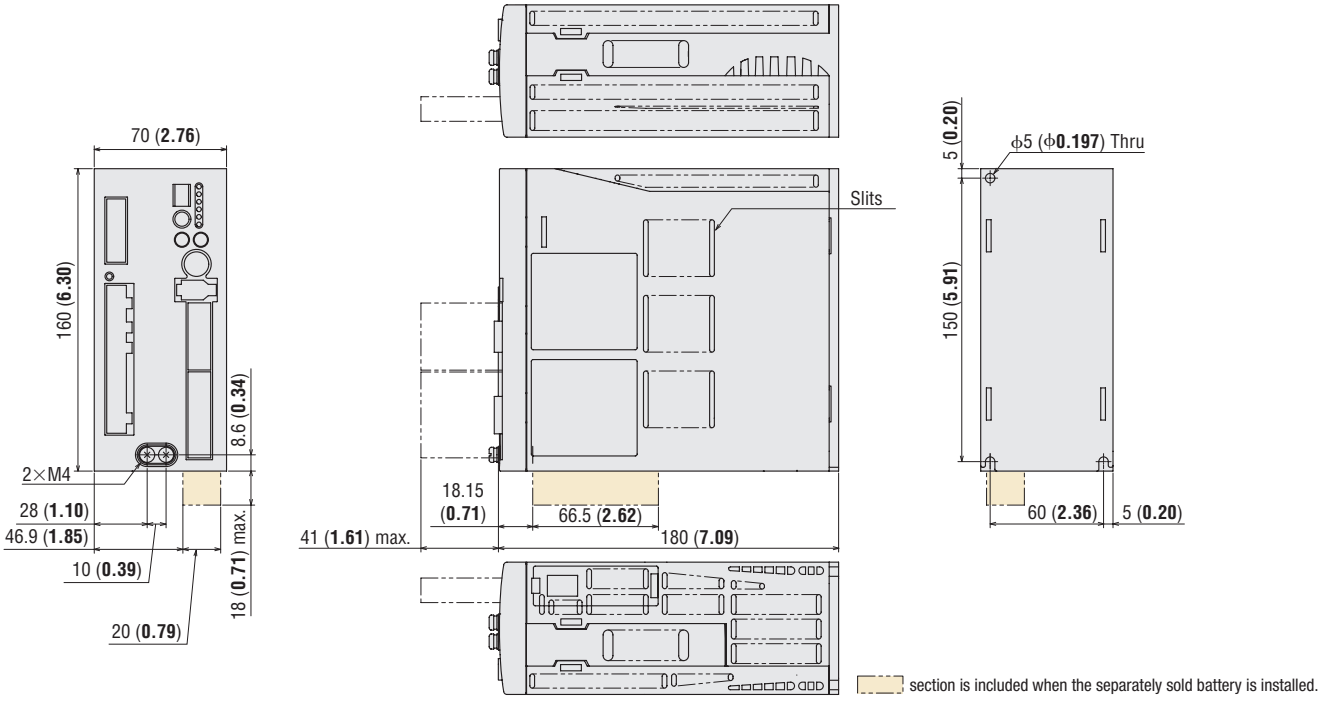
● A number indicating the gear ratio is entered where the box (□) is located within the product name.

Driver

Driver Model: NXD20-A, NXD20-C
Mass: 0.9 kg (1.98 lb.)
DXF C209



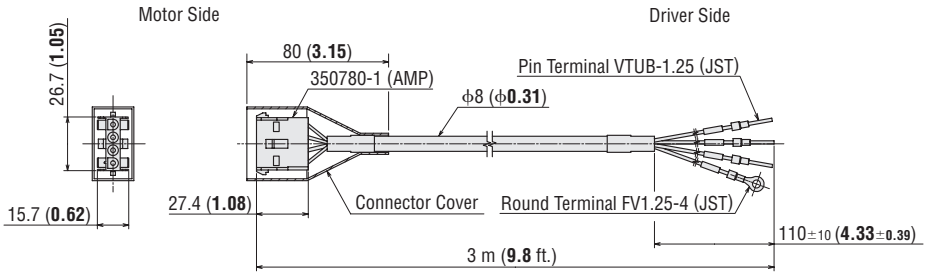
Driver Model: NXD75-S
Mass: 1.6 kg (3.52 lb.)
DXF C224



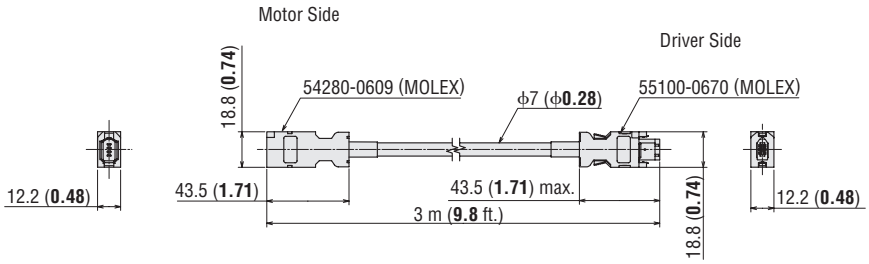
● Included
I/O Signal Connector (CN7)
Case: 10336-52A0-008 (SUMITOMO 3M)
Connector: 10136-3000PE (SUMITOMO 3M)
Connector for Regeneration Unit Input/Main Power Input Terminals (CN3)
Connector: 54928-0770 (MOLEX)
Connector for 24 VDC Power-Supply Input/Regeneration Unit Thermal Input/Electromagnetic Brake Terminals (CN1)
Connector: MC1,5/6-STF-3,5 (PHOENIX CONTACT Inc.)
Motor Connector (CN2)
Connector: 54928-0370 (MOLEX)

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

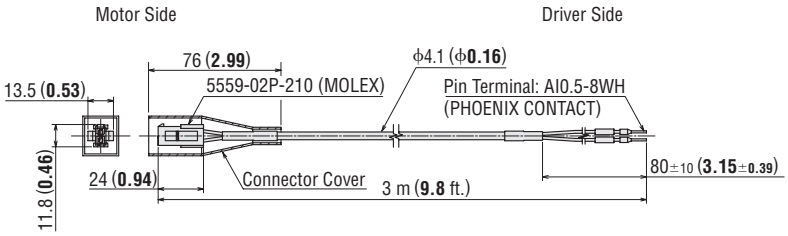
•Cable for Motor



•Cable for Encoder

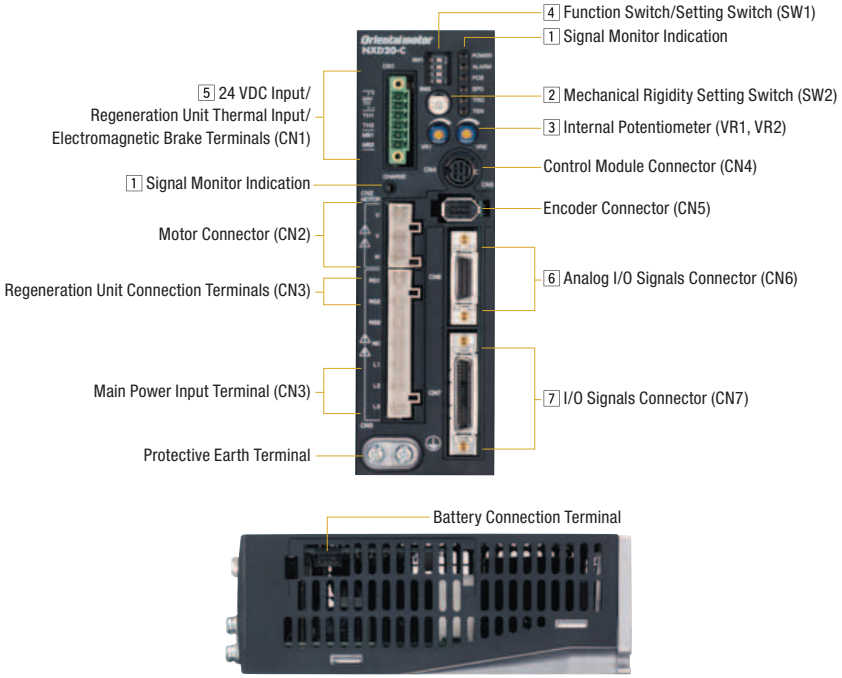


•Cable for Electromagnetic Brake (Electromagnetic brake type only)



Connection and Operation

Names and Functions of Driver Parts (Common to position control, speed control, torque control, tension control modes)



1 Signal Monitor Indication

◇LED Indicator

Indication	Color	Function	Lighting Condition
POWER	Green	Power Supply Indication	When the main power supply or 24 VDC power supply is input
ALARM	Red	Alarm Indication	When a protective function is activated (blinking)
POS	Green	Control Mode Indication	For Position Control Mode
SPD	Green	Control Mode Indication	For Speed Control Mode
TRQ	Green	Control Mode Indication	For Torque Control Mode
TEN	Green	Control Mode Indication	For Tension Control Mode
CHARGE	Red	Power Supply Indication	When the main power supply is on

◇Alarm Contents

Blink Count	Function	Operating Condition
2	Overheat Protection	When the temperature inside the driver exceeds 85˚C (185˚F)
	Motor Overheat Protection	When the motor temperature reaches 85˚C (185˚F)
	Overload Protection	When a load exceeding the rated torque is applied for longer than the permissible time
	Overspeed	When the motor output shaft speed exceeds 6000 r/min
	Command Pulse Error*	When a command pulse frequency that exceeds the maximum speed has been input with the motor output shaft speed
	Regeneration Unit Overheat	When the signal thermal protector for the regeneration unit has been activated
3	Overvoltage Protection	When the primary voltage of the driver's inverter exceeds the upper limit value
	Main Power Supply Error	When the main power supply has been cut off while an operation command is being input to the driver
	Undervoltage	When the primary voltage of the driver's inverter has fallen below the lower limit
4	Overflow*	When the positioning deviation has exceeded the overflow rotation amount (Initial value: 10 rotations)
5	Overcurrent Protection	An excessive current has flowed through the inverter power component inside the driver
7	Position Range Error*	When the command position has exceeded the absolute control coordinates while the absolute functions are enabled (control coordinates: −2 147 483 648 to 2 147 483 647)
	Absolute Position Loss*	When the absolute position is lost while the absolute functions are enabled
	ABS Not Supported*	When the battery is connected while the absolute functions are disabled
	No Battery*	When the battery is not connected or the battery cable is disconnected while the absolute functions are enabled
	Electronic Gear Setting Error	When the resolution set by the electronic gear is outside the range of the specifications
8	Sensor Error during Operation	When an abnormality has occurred in a sensor while the motor is rotating
	Encoder Communication Error	When an abnormality has occurred in communications between the driver and encoder
	Sensor Error during Initialization	When the main power supply or control power supply was turned on before the motor cable was connected to the driver
	Rotor Rotation during Initialization	The main power supply or control power supply was turned on while the motor was rotating
	Encoder EEPROM Error	The saved data for the encoder communications circuit was damaged
	Motor Combination Error	A motor that cannot be combined with the other components was connected
9	EEPROM Error	A motor control parameter is damaged

*An alarm generated when used in position control mode.

2 Mechanical Rigidity Setting Switch (SW2)

Indication	Switch Name	Function	
SW2	Mechanical Rigidity Setting Switch	Position Control Mode Speed Control Mode	Sets the mechanical rigidity and the corresponding gain adjustment level with automatic tuning and semi-auto tuning. Factory setting: "6"
		Torque Control Mode	Not used.
		Tension Control Mode	Sets the minimum speed in simple control mode. (Not used in high function mode Ⅰ and high function mode Ⅱ.) Factory setting: "6"

3 Internal Potentiometer (VR1, VR2)

Indication	Switch Name	Function	
VR1 VR2	Internal Potentiometer	Position Control Mode	VR1: Sets the vibration suppression frequency. VR2: Not used.
		Speed Control Mode	VR1: Sets the speed command value. VR2: Sets the acceleration/deceleration time.
		Torque Control Mode	VR1: Sets the torque command value. VR2: Sets the speed limit.
		Tension Control Mode	VR1: Sets the tension command value. VR2: Sets the speed limit.

4 Function Switch/Setting Switch (SW1)

Indication	Switch Name	Function
1 2	Control Mode Setting Switch	Selects the control mode. 1 "OFF" 2 "OFF"→Position Control Mode [Factory setting] 1 "ON" 2 "OFF"→Speed Control Mode 1 "OFF" 2 "ON"→Torque Control Mode 1 "ON" 2 "ON"→Tension Control Mode
3	Absolute System Setting Switch	Set when the accessory battery (sold separately) is installed to use the absolute functions. (This is effective in position control mode.) ON: Absolute Functions Enabled OFF: Absolute Functions Disabled [Factory setting]
4	Pulse Input Mode Select Switch	Switches the pulse input mode between 1-pulse input mode and 2-pulse input mode. ON: 1-Pulse Input Mode OFF: 2-Pulse Input Mode [Factory setting]

5 24 VDC Input/Regeneration Unit Thermal Input/ Electromagnetic Brake Terminals (CN1)

Indication	I/O	Terminal Name	Content
24V+	Input	24 VDC Power Input Terminal +	To separate the main power supply and control power supply, connect the power supplies here. The control power supply is not mandatory. When using an electromagnetic brake type motor, connect it as the power supply for the electromagnetic brake.
24V−		24 VDC Power Input Terminal −	
TH1		Regeneration Unit Thermal Input Terminal	Connect the **RGB100** or **RGB200** regeneration unit which are sold separately. When not connecting a regeneration unit, short these 2 terminals to each other.
TH2		Regeneration Unit Thermal Input Terminal	
MB1	Output	Electromagnetic Brake Terminal −	For an electromagnetic brake type motor, connect the electromagnetic brake line here.
MB2		Electromagnetic Brake Terminal +	

6 Analog I/O Signals Connector (CN6)

Indication	I/O	Pin Number	Code	Signal Name
CN6	Input	1	V-REF	Analog Speed (Command/limit) Input
	GND	2	SG	Signal Ground
	Output	3	P-VREF	Reference Output Voltage for Analog Speed (Command/limit) Input
		4	P-TREF	Analog Torque (Command/limit) Input
	Input	5	T-REF	Analog Torque (Command/limit) Input
	GND	6	SG	Signal Ground
	Output	7	V-MON	Analog Speed Monitor Output
	GND	8	SG	Signal Ground
	Output	9	T-MON	Analog Torque Monitor Output
	GND	10	SG	Signal Ground
	−	11	−	−
		12		
		13		
		14		
		15		
		16		
		17		
		18		
		19		
		20		

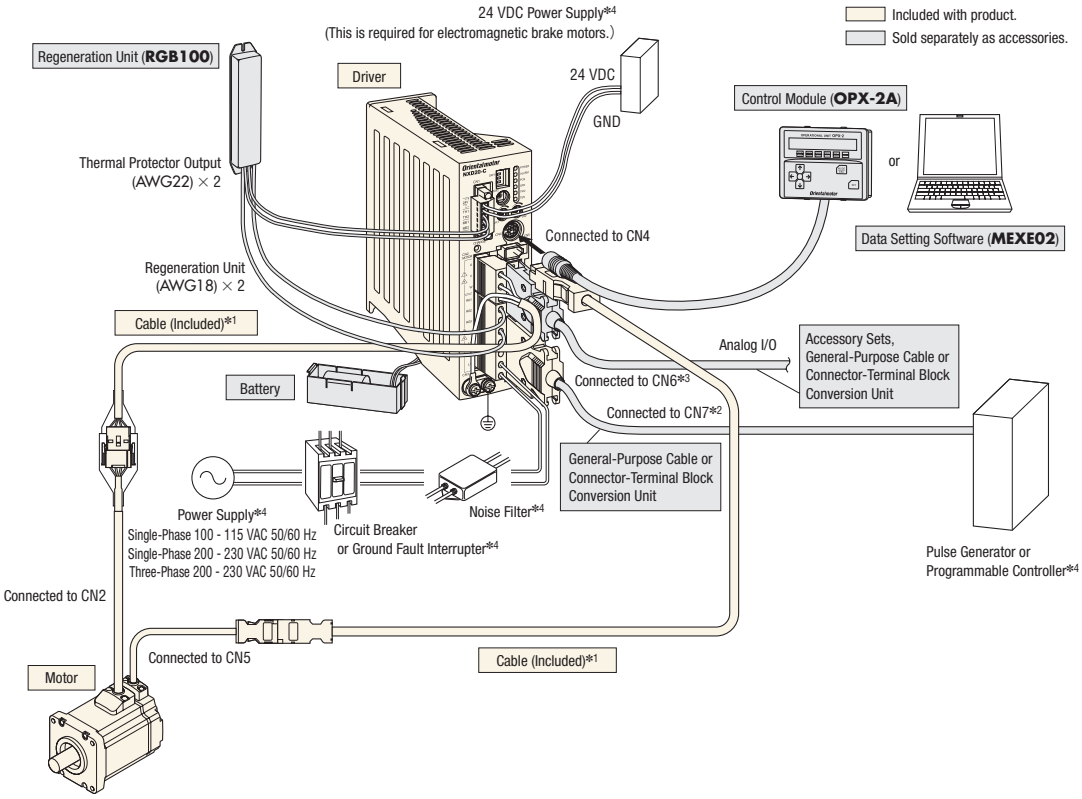
7 I/O Signals Connector (CN7)

- Position control mode → Page B-40
- Speed control mode → Page B-40
- Torque control mode → Page B-41
- Tension control mode → Page B-41

●Connection Diagram (Common to position control, speed control, torque control, and tension control modes)

◇Connections with Peripheral Equipment

•For **NX620AC-3**



*1 3 m (9.8 ft.) cables are included with the product. If you need cables longer than 3 m or flexible cables, select appropriate cables from the accessories (sold separately).

*2 The control I/O connector (CN7) is included with the product, but you can also purchase an accessory general-purpose cable or connector – terminal block conversion unit (sold separately). Choose one or the other.

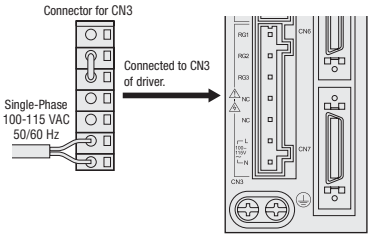
*3 The Analog I/O Signals Connector (CN6) is not included with the product. You can also purchase an accessory set, general-purpose cable or connector – terminal block conversion unit (sold separately). Choose one that suits your needs.

*4 Not supplied.

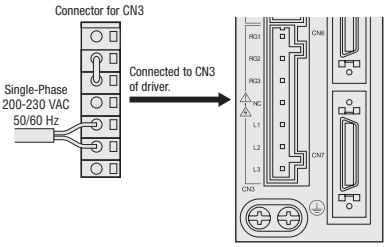
◇Connecting the Main Power Supply

Prepare the following cable for the power supply lines.
Single-Phase 100-115 VAC: Three-Core Cable (AWG16 to 14)
Single-Phase 200-230 VAC: Three-Core Cable (AWG16 to 14)
Three-Phase 200-230 VAC: Four-Core Cable (AWG16 to 14)

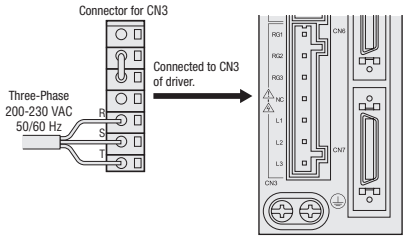
•Single-Phase 100-115 VAC



•Single-Phase 200-230 VAC

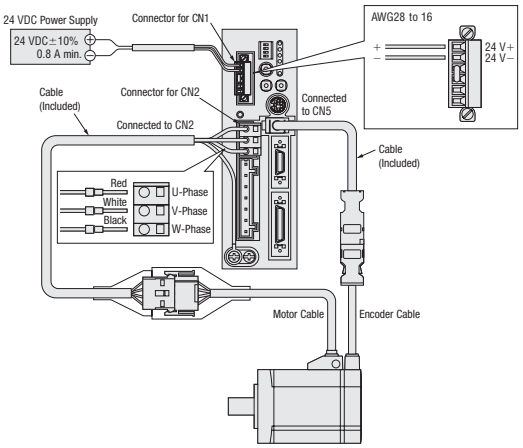


•Three-Phase 200-230 VAC



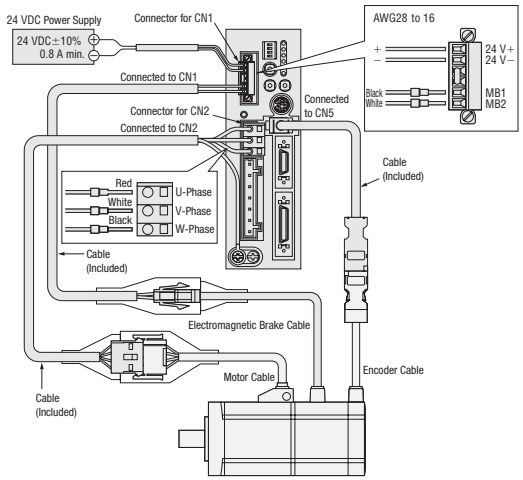
◇Connecting the Control Power Supply

To separate the main power supply and control power supply, connect 24 VDC.
The control power supply is not mandatory.



◇Connecting the Electromagnetic Brake

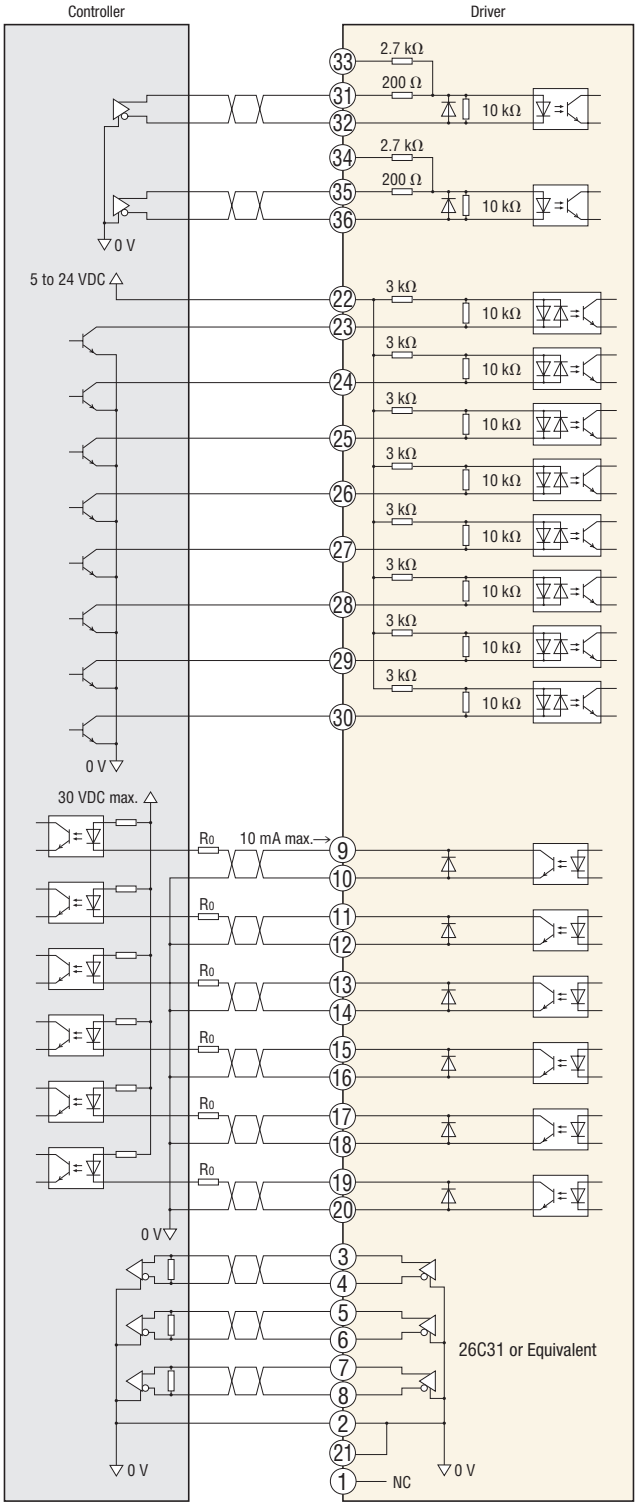
Connect 24 VDC.
The main power supply and control power supply are separated in this case too.



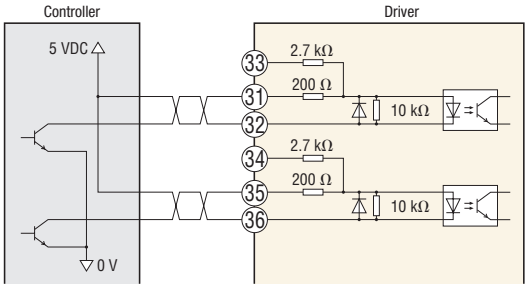
◇Connection to Programmable Controller

- Connection Diagram for Connection with Current Sink Output Circuit

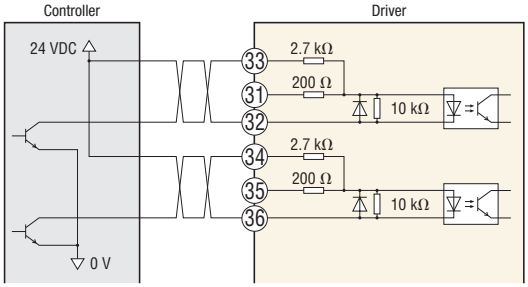
When pulse input is performed using the line driver mode



When the input voltage is 5 VDC



When the input voltage is 24 VDC



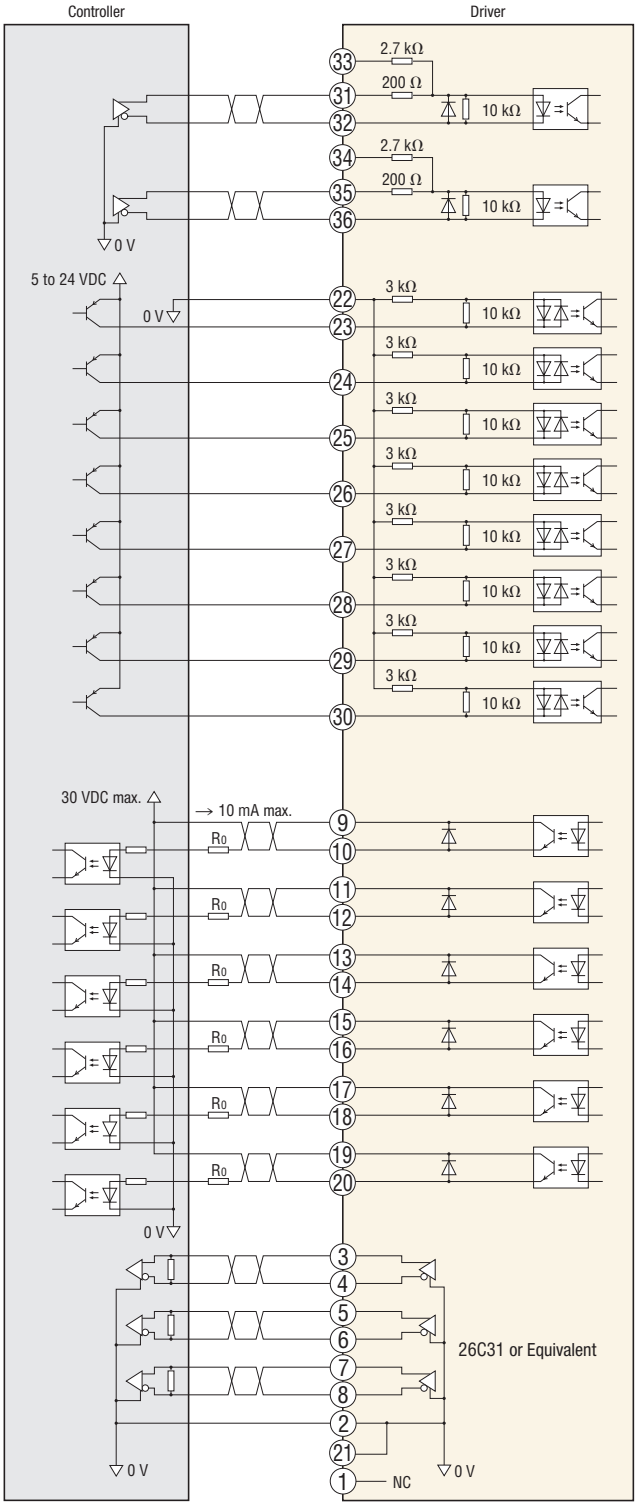
Notes

- Use output signals of 30 VDC max. When the current value exceeds 10 mA, connect the external resistor R_0.
- Connect a terminating resistor of 100 Ω min. between the line receiver inputs.
- For the control I/O signal lines (CN7), use a multi-core shielded twisted-pair wire (AWG28 to 26) and keep the wiring length as short as possible [no more than 2 m (6.6 ft.)].
- Note that as the length of the pulse line increases, the maximum frequency decreases.
- Provide a distance of 200 mm (7.87 ft.) min. between the control I/O signal lines and power lines (power supply lines, motor lines and other large-current circuits).

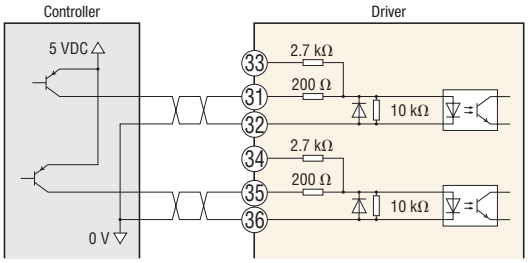
◇Connection to Programmable Controller

- Connection Diagram for Connection with Current Source Output Circuit

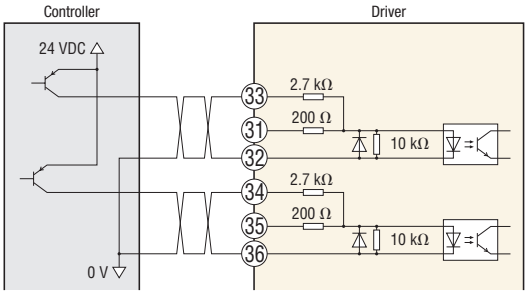
When pulse input is performed using the line driver mode



When the input voltage is 5 VDC



When the input voltage is 24 VDC



Notes

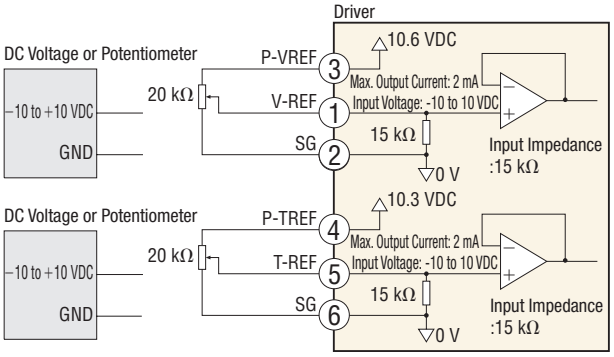
- Use output signals of 30 VDC max. When the current value exceeds 10 mA, connect the external resistor R_0.
- Connect a terminating resistor of 100 Ω min. between the line receiver inputs.
- For the control I/O signal lines (CN7), use a multi-core shielded twisted-pair wire (AWG28 to 26) and keep the wiring length as short as possible [no more than 2 m (6.6 ft.)].
- Note that as the length of the pulse line increases, the maximum frequency decreases.
- Provide a distance of 200 mm (7.87 ft.) min. between the control I/O signal lines and power lines (power supply lines, motor lines and other large-current circuits).

◇Analog I/O Connection

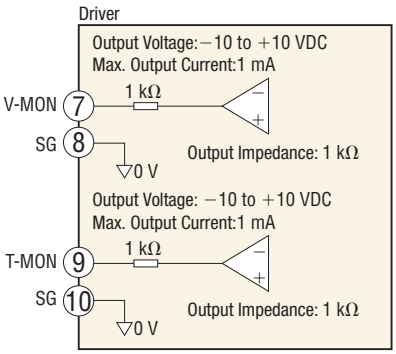
When using analog I/O, the accessory set is required (sold separately).

Accessory Set ➜ Page B-56

• Input Circuit



• Output Circuit



Description of Position Control Mode I/O Signals

Position Control Mode

In position control mode, the following functions are enabled:

- External positioning operation using pulse input
- Torque limiting
- Absolute system
- Current position output
- Tuning
- Damping control

I/O Signals (CN7, 36 pins)

Indication	I/O	Pin Number	Code	Signal Name
CN7	–	1	–	–
	GND	2	GND	Ground Connection
	Output	3	ASG+	A-Phase Pulse Line Driver Output
		4	ASG–	
		5	BSG+	B-Phase Pulse Line Driver Output
		6	BSG–	
		7	ZSG1+	Z-Phase Pulse Line Driver Output
		8	ZSG1–	
		9	ALM+	Alarm Output
		10	ALM–	
		11	WNG+/MOVE+*/MBC+*	Warning Output/ Motor Moving Output*/ Electromagnetic Brake Control Signal Output*
		12	WNG–/MOVE–*/MBC–*	
		13	END+	Positioning Completion Output
		14	END–	
		15	READY+/AL0+*/P-OUTR+	Operation Ready Output/ Alarm Code Output Bit 0*/ Position Data Output Ready Output
		16	READY–/AL0–*/P-OUTR–	
		17	TLC+/AL1+*/P-OUT0+	Torque Limiting Output/Alarm Code Output Bit 1*/Position Data Output Bit 0
		18	TLC–/AL1–*/P-OUT0–	
		19	ZSG2+/NEAR+*/AL2+*/ P-OUT1+	Z-Phase Pulse Open Collector Output/Positioning Near Output*/Alarm Code Output Bit 2*/Position Data Output Bit 1
		20	ZSG2–/NEAR–*/AL2–*/ P-OUT1–	
	GND	21	GND	Ground Connection
	Input	22	IN-COM	Input Common
		23	S-ON	Position Holding Input by Servo Control
		24	CLR/ALM-RST/P-CK	Deviation Clear Input/Alarm Reset Input/Position Data Transmission Clock Input
		25	P-REQ	Position Data Request Input
		26	TL	Torque Limit Enable Input
		27	M0	Data Selection Input
		28	M1	
		29	P-PRESET	Position Preset Input
		30	FREE	Shaft Free Input
		31	PLS+/CW+	Pulse Input/CW Pulse Input
		32	PLS–/CW–	
		33	PLS+24 V/CW+24 V	Pulse Input for 24 VDC/ CW Pulse Input
		34	DIR+24 V/CCW+24 V	Rotation Direction Input for 24 VDC/CCW Pulse Input
		35	DIR+/CCW+	Rotation Direction Input/ CCW Pulse Input
		36	DIR–/CCW–	

✻Enabled when the settings are changed with the separately-sold control module (**OPX-2A**) or data setting software (**MEXE02**).

Description of Speed Control Mode I/O Signals

Speed Control Mode

In speed control mode, the following functions are enabled:

- Speed control operation
- Torque limiting
- Tuning

I/O Signals (CN7, 36 pins)

Indication	I/O	Pin Number	Code	Signal Name
CN7	–	1	–	–
	GND	2	GND	Ground Connection
	Output	3	ASG+	A-Phase Pulse Line Driver Output
		4	ASG–	
		5	BSG+	B-Phase Pulse Line Driver Output
		6	BSG–	
		7	ZSG1+	Z-Phase Pulse Line Driver Output
		8	ZSG1–	
		9	ALM+	Alarm Output
		10	ALM–	
		11	WNG+/MOVE+*/MBC+*	Warning Output/ Motor Moving Output*/ Electromagnetic Brake Control Signal Output*
		12	WNG–/MOVE–*/MBC–*	
		13	VA+	Speed Attainment Output
		14	VA–	
		15	READY+/AL0+*	Operation Ready Output/ Alarm Code Output Bit 0*
		16	READY–/AL0–*	
		17	TLC+/AL1+*	Torque Limiting Output/Alarm Code Output Bit 1*
		18	TLC–/AL1–*	
		19	ZSG2+/ZV+*/AL2+*	Z-Phase Pulse Open Collector Output/Motor Zero Speed Output*/Alarm Code Output Bit 2*
		20	ZSG2–/ZV–*/AL2–*	
	GND	21	GND	Ground Connection
	Input	22	IN-COM	Input Common
		23	S-ON	Position Holding Input by Servo Control
		24	ALM-RST	Alarm Reset Input
		25	BRAKE	Instantaneous Stop Input
		26	TL	Torque Limit Enable Input
		27	M0	Data Selection Input
		28	M1	
		29	M2	
		30	FREE	Shaft Free Input
		31	CW+	CW Input
		32	CW–	
		33	CW+24 V	CW Input for 24 VDC
		34	CCW+24 V	CCW Input for 24 VDC
		35	CCW+	CCW Input
		36	CCW–	

✻Enabled when the settings are changed with the separately-sold control module (**OPX-2A**) or data setting software (**MEXE02**).

Description of Torque Control Mode I/O Signals

Torque Control Mode

In torque control mode, the following functions are enabled:

- Torque control operation
- Speed limit

I/O Signals (CN7, 36 pins)

Indication	I/O	Pin Number	Code	Signal Name
CN7	–	1	–	–
	GND	2	GND	Ground Connection
	Output	3	ASG+	A-Phase Pulse Line Driver Output
		4	ASG–	
		5	BSG+	B-Phase Pulse Line Driver Output
		6	BSG–	
		7	ZSG1+	Z-Phase Pulse Line Driver Output
		8	ZSG1–	
		9	ALM+	Alarm Output
		10	ALM–	
		11	WNG+/MOVE+*/MBC+*	Warning Output/ Motor Moving Output*/ Electromagnetic Brake Control Signal Output*
		12	WNG–/MOVE–*/MBC–*	
		13	–	–
		14	–	–
		15	READY+/AL0+*	Operation Ready Output/ Alarm Code Output Bit 0*
		16	READY–/AL0–*	
		17	VLC+/AL1+*	Speed Limit Output/Alarm Code Output Bit 1*
		18	VLC–/AL1–*	
		19	ZSG2+/ZV+*/AL2+*	Z-Phase Pulse Open Collector Output/Motor Zero Speed Output*/Alarm Code Output Bit 2*
		20	ZSG2–/ZV–*/AL2–*	
	GND	21	GND	Ground Connection
	Input	22	IN-COM	Input Common
		23	–	–
		24	ALM-RST	Alarm Reset Input
		25	–	–
		26	–	–
		27	M0	Data Selection Input
		28	M1	
		29	M2	
		30	FREE	Shaft Free Input
		31	CW+	CW Input
		32	CW–	
		33	CW+24 V	CW Input for 24 VDC
		34	CCW+24 V	CCW Input for 24 VDC
		35	CCW+	CCW Input
		36	CCW–	

*Enabled when the settings are changed with the separately-sold control module (**OPX-2A**) or data setting software (**MEXE02**).

Description of Tension Control Mode I/O Signals

Tension Control Mode

When winding a roll of film, paper or the like, the diameter of the material is different at the start of the winding and at the end of the winding. Accordingly, control is required to vary the torque with the diameter in order to hold the tension constant. In tension control mode, such control is enabled.

In tension control mode, there are 3 operating modes. The operating mode can be selected and the operating data is set with the separately-sold control module (**OPX-2A**) or data setting software (**MEXE02**).

Operating Mode	Content
Simple Mode	The tension is controlled so it is constant when the feed speed is constant such as during winding operation. The motor speed and the torque are inversely proportional.
High Function Mode Ⅰ	The current winding (winding out) diameter is automatically calculated based on the initial diameter, the material thickness and the final diameter. The tension is controlled to stay constant regardless of the operating speed.
High Function Mode Ⅱ	In addition to the contents of high function mode Ⅰ, the load inertia is calculated within the driver from the material inertia and the core inertia. The tension is controlled to stay constant even during acceleration/deceleration.

Setting Item	Operating Mode		
	Simple Mode	High Function Mode Ⅰ	High Function Mode Ⅱ
Tension Command Value	○	○	○
Material Thickness	–	○	○
Initial Diameter	–	○	○
Final Diameter	–	○	○
Material Inertia	–	–	○
Core Inertia	–	–	○
Taper Setting	–	○	○
Speed Limit	○	○	○

I/O Signals (CN7, 36 pins)

Indication	I/O	Pin Number	Code	Signal Name
CN7	–	1	–	–
	GND	2	GND	Ground Connection
	Output	3	ASG+	A-Phase Pulse Line Driver Output
		4	ASG–	
		5	BSG+	B-Phase Pulse Line Driver Output
		6	BSG–	
		7	ZSG1+	Z-Phase Pulse Line Driver Output
		8	ZSG1–	
		9	ALM+	Alarm Output
		10	ALM–	
		11	WNG+/MOVE+*/MBC+*	Warning Output/ Motor Moving Output*/ Electromagnetic Brake Control Signal Output*
		12	WNG–/MOVE–*/MBC–*	
		13	–	–
		14	–	–
		15	READY+/AL0+*	Operation Ready Output/ Alarm Code Output Bit 0*
		16	READY–/AL0–*	
		17	VLC+/AL1+*	Speed Limit Output/Alarm Code Output Bit 1*
		18	VLC–/AL1–*	
		19	ZSG2+/ZV+*/AL2+*	Z-Phase Pulse Open Collector Output/Motor Zero Speed Output*/Alarm Code Output Bit 2*
		20	ZSG2–/ZV–*/AL2–*	
	GND	21	GND	Ground Connection
	Input	22	IN-COM	Input Common
		23	–	–
		24	ALM-RST	Alarm Reset Input
		25	–	–
		26	W-RESET	Winding Diameter Reset Input
		27	M0	Data Selection Input
		28	M1	
		29	M2	
		30	FREE	Shaft Free Input
		31	CW+	CW Input
		32	CW–	
		33	CW+24 V	CW Input for 24 VDC
		34	CCW+24 V	CCW Input for 24 VDC
		35	CCW+	CCW Input
		36	CCW–	

*Enabled when the settings are changed with the separately-sold control module (**OPX-2A**) or data setting software (**MEXE02**).

Motor and Driver Combinations

Model names for motor and driver combinations are shown below.

Standard Type

Power-Supply Input	Output Power	Model	Motor Model	Driver Model
Single-Phase 100-115 VAC	50 W (1/15 HP)	**NX45AA-3**	NXM45A	NXD20-A
	100 W (1/8 HP)	**NX410AA-3**	NXM410A	
	200 W (1/4 HP)	**NX620AA-3**	NXM620A	
Single-Phase/ Three-Phase 200-230 VAC	50 W (1/15 HP)	**NX45AC-3**	NXM45A	NXD20-C
	100 W (1/8 HP)	**NX410AC-3**	NXM410A	
	200 W (1/4 HP)	**NX620AC-3**	NXM620A	
Three-Phase 200-230 VAC	400 W (1/2 HP)	**NX640AS-3**	NXM640A	NXD75-S
	750 W (1 HP)	**NX975AS-3**	NXM975A	

Standard Type with Electromagnetic Brake

Power-Supply Input	Output Power	Model	Motor Model	Driver Model
Single-Phase 100-115 VAC	50 W (1/15 HP)	**NX45MA-3**	NXM45M	NXD20-A
	100 W (1/8 HP)	**NX410MA-3**	NXM410M	
	200 W (1/4 HP)	**NX620MA-3**	NXM620M	
Single-Phase/ Three-Phase 200-230 VAC	50 W (1/15 HP)	**NX45MC-3**	NXM45M	NXD20-C
	100 W (1/8 HP)	**NX410MC-3**	NXM410M	
	200 W (1/4 HP)	**NX620MC-3**	NXM620M	
Three-Phase 200-230 VAC	400 W (1/2 HP)	**NX640MS-3**	NXM640M	NXD75-S
	750 W (1 HP)	**NX975MS-3**	NXM975M	

PS Geared Type

Power-Supply Input	Output Power	Model	Motor Model	Driver Model
Single-Phase 100-115 VAC	50 W (1/15 HP)	**NX65AA-PS5-3**	NXM65A-PS5	NXD20-A
		NX65AA-PS10-3	NXM65A-PS10	
		NX65AA-PS25-3	NXM65A-PS25	
	100 W (1/8 HP)	**NX610AA-PS5-3**	NXM610A-PS5	
		NX610AA-PS10-3	NXM610A-PS10	
		NX610AA-PS25-3	NXM610A-PS25	
	200 W (1/4 HP)	**NX920AA-PS5-3**	NXM920A-PS5	
		NX920AA-PS10-3	NXM920A-PS10	
		NX920AA-PS25-3	NXM920A-PS25	
Single-Phase/ Three-Phase 200-230 VAC	50 W (1/15 HP)	**NX65AC-PS5-3**	NXM65A-PS5	NXD20-C
		NX65AC-PS10-3	NXM65A-PS10	
		NX65AC-PS25-3	NXM65A-PS25	
	100 W (1/8 HP)	**NX610AC-PS5-3**	NXM610A-PS5	
		NX610AC-PS10-3	NXM610A-PS10	
		NX610AC-PS25-3	NXM610A-PS25	
	200 W (1/4 HP)	**NX920AC-PS5-3**	NXM920A-PS5	
		NX920AC-PS10-3	NXM920A-PS10	
		NX920AC-PS25-3	NXM920A-PS25	
Three-Phase 200-230 VAC	400 W (1/2 HP)	**NX940AS-PS5-3**	NXM940A-PS5	NXD75-S
		NX940AS-PS10-3	NXM940A-PS10	
		NX940AS-PS25-3	NXM940A-PS25	

PS Geared Type with Electromagnetic Brake

Power-Supply Input	Output Power	Model	Motor Model	Driver Model
Single-Phase 100-115 VAC	50 W (1/15 HP)	**NX65MA-PS5-3**	NXM65M-PS5	NXD20-A
		NX65MA-PS10-3	NXM65M-PS10	
		NX65MA-PS25-3	NXM65M-PS25	
	100 W (1/8 HP)	**NX610MA-PS5-3**	NXM610M-PS5	
		NX610MA-PS10-3	NXM610M-PS10	
		NX610MA-PS25-3	NXM610M-PS25	
	200 W (1/4 HP)	**NX920MA-PS5-3**	NXM920M-PS5	
		NX920MA-PS10-3	NXM920M-PS10	
		NX920MA-PS25-3	NXM920M-PS25	
Single-Phase/ Three-Phase 200-230 VAC	50 W (1/15 HP)	**NX65MC-PS5-3**	NXM65M-PS5	NXD20-C
		NX65MC-PS10-3	NXM65M-PS10	
		NX65MC-PS25-3	NXM65M-PS25	
	100 W (1/8 HP)	**NX610MC-PS5-3**	NXM610M-PS5	
		NX610MC-PS10-3	NXM610M-PS10	
		NX610MC-PS25-3	NXM610M-PS25	
	200 W (1/4 HP)	**NX920MC-PS5-3**	NXM920M-PS5	
		NX920MC-PS10-3	NXM920M-PS10	
		NX920MC-PS25-3	NXM920M-PS25	
Three-Phase 200-230 VAC	400 W (1/2 HP)	**NX940MS-PS5-3**	NXM940M-PS5	NXD75-S
		NX940MS-PS10-3	NXM940M-PS10	
		NX940MS-PS25-3	NXM940M-PS25	

PJ Geared Type

Power-Supply Input	Output Power	Model	Motor Model	Driver Model
Three-Phase 200-230 VAC	750 W (1 HP)	**NX1075AS-J5-3**	NXM1075A-J5	NXD75-S
		NX1075AS-J10-3	NXM1075A-J10	
		NX1075AS-J25-3	NXM1075A-J25	

PJ Geared Type with Electromagnetic Brake

Power-Supply Input	Output Power	Model	Motor Model	Driver Model
Three-Phase 200-230 VAC	750 W (1 HP)	**NX1075MS-J5-3**	NXM1075M-J5	NXD75-S
		NX1075MS-J10-3	NXM1075M-J10	
		NX1075MS-J25-3	NXM1075M-J25	

Extended Functions

With the separately-sold control module (**OPX-2A**) or data editing software (**MEXE02**), the parameters, operating data, resolution, etc. can be set to suit your equipment. The settings that can be set with extended functions depend on the mode used.

Control Module (**OPX-2A**)
➜ Page B-55

Data setting software (**MEXE02**)
➜ Page B-55

●Position Control Mode

◇Operating Data

Item	Content
Torque Limiting	Sets the torque limiting value.
Vibration Suppression Frequency	Sets the damping control frequency.

◇System Parameters

Item	Content
Electronic Gear A	Sets the electronic gear denominator.
Electronic Gear B	Sets the electronic gear numerator.
Encoder Output Electronic Gear A	Sets the electronic gear denominator for encoder output.
Encoder Output Electronic Gear B	Sets the electronic gear numerator for encoder output.
Pulse Input Mode	Selects the pulse input mode.
Operation after Absolute Position Loss Alarm Reset	Selects the operation mode for after the absolute position loss alarm is reset.
Analog Input Signal	Enables/disables analog input signals.
Motor Rotation Direction	Selects the motor rotation direction.
Control Module Initial Display	Selects the initial display for when communications start between the control module and the driver. If an item is selected that is not displayed in position control mode, the monitor mode top screen becomes the initial display.

◇Application Parameters

Item	Content
Gain Tuning Mode Selection	Selects the gain tuning mode.
Load Inertia Ratio	Sets the ratio of the load inertia and motor inertia.
Mechanical Rigidity Setting	Selects the rigidity of automatic tuning, semi-auto tuning, and manual tuning.
Position Loop Gain	Sets the position loop gain. The larger this value, the higher the responsiveness.
Speed Loop Gain	Sets the speed loop gain. The larger this value, the higher the responsiveness.
Speed Loop Integration Time Constant	Sets the speed loop integration time constant. The smaller this value, the higher the responsiveness.
Speed Feed-Forward Ratio	Sets the speed feed-forward ratio. The larger this value, the higher the responsiveness.
S-ON Signal Logic	Switches the S-ON input logic.
Output Signal Selection 1	Selects the output signal.
Output Signal Selection 2	Selects the output signal.
Positioning Completion Output Range	Sets the END output conditions.
Positioning Near Output Range	Sets the NEAR output conditions.
MOVE Signal Min. ON Time	Sets the min. duration that MOVE output is ON.
Preset Value	Sets the preset position.
Alarm Code Output	Enables/disables alarm code output.
Analog Torque Limit Gain	Sets the torque limiting for 1 V of analog input voltage.
Analog Torque Limiting Offset Voltage	Sets the offset voltage for analog torque limiting input.
Analog Input Signal Automatic Offset	Enables/disables analog input signal automatic offset.
Analog Speed Monitor Max. Value	Sets the max. value for the analog speed monitor. The slope for the analog speed monitor output is decided.
Analog Speed Monitor Max. Voltage	Sets the monitor output voltage for the max. value of the analog speed monitor.
Analog Speed Monitor Offset Voltage	Sets the offset voltage for the analog speed monitor.
Analog Torque Monitor Max. Value	Sets the max. value for the analog torque monitor. The slope for the analog torque monitor output is decided.
Analog Torque Monitor Max. Voltage	Sets the monitor output voltage for the max. value of the analog torque monitor.
Analog Torque Monitor Offset Voltage	Sets the offset voltage for analog torque monitor.
Mechanical Rigidity Setting Switch	Enables/disables the driver's mechanical rigidity setting switch (SW2).
Command Filter	Sets the command filter time constant.
Damping Control	Enables/disables damping control.
Overflow Alarm	Sets the condition for an overflow alarm with a motor shaft rotation amount.
Overflow Warning	Sets the condition for an overflow warning with a motor shaft rotation amount.
Overvoltage Warning	Sets the voltage at which an overvoltage warning is issued.
Undervoltage Warning	Sets the voltage at which a undervoltage warning is issued.
Overheat Warning	Sets the temperature at which an overheat warning is issued.
Overload Warning	Sets the condition for which an overload warning is issued.
Overspeed Warning	Sets the speed at which an overspeed warning is issued.
Gear Ratio for Speed Monitor	Sets the geared motor gear ratio for speed monitor.

Speed Control Mode

◇Operating Data

Item	Content
Operating Speed	Sets the operating speed.
Torque Limiting	Sets the torque limiting value.
Acceleration Time	Sets the acceleration time per 1000 r/min.
Deceleration Time	Sets the deceleration time per 1000 r/min.

◇System Parameters

Item	Content
Encoder Output Electronic Gear A	Sets the electronic gear denominator for encoder output.
Encoder Output Electronic Gear B	Sets the electronic gear numerator for encoder output.
Operation Selection during Speed Control Mode Stop	Sets the operation during speed control mode is stopped.
Analog Input Signal	Enables/disables analog input signals.
Motor Rotation Direction	Selects the motor rotation direction.
Control Module Initial Display	Selects the initial display for when communications start between the control module and the driver. If an item is selected that is not displayed in speed control mode, the monitor mode top screen becomes the initial display.

◇Application Parameters

Item	Content
Gain Tuning Mode Selection	Selects the gain tuning mode.
Load Inertia Ratio	Sets the ratio of the load inertia and motor inertia.
Mechanical Rigidity Setting	Selects the rigidity of automatic tuning semi-auto tuning, and manual tuning.
Position Loop Gain*	Sets the position loop gain. The larger this value, the higher the responsiveness.
Speed Loop Gain*	Sets the speed loop gain. The larger this value, the higher the responsiveness.
Speed Loop Integration Time Constant*	Sets the speed loop integration time constant. The smaller this value, the higher the responsiveness.
Speed Feed-Forward Ratio*	Sets the speed feed-forward ratio. The larger this value, the higher the responsiveness.
S-ON Signal Logic	Switches the S-ON input logic.
BRAKE Signal Logic	Switches the BRAKE input logic.
Output Signal Selection 1	Selects the output signal.
Output Signal Selection 2	Selects the output signal.
Zero Speed Output Range	Sets the ZV output conditions.
Speed Attainment Output Range	Sets the VA output conditions.
MOVE Signal Min. ON Time	Sets the min. duration that MOVE output is ON.
Alarm Code Output	Enables/disables alarm code output.
Analog Speed Command Gain	Sets the speed command for 1 V of analog input voltage.
Analog Speed Command Clamp	Sets the speed at which the analog speed command is clamped to zero.
Analog Speed Command Offset Voltage	Sets the offset voltage for analog speed command input.
Analog Torque Limit Gain	Sets the torque limiting for 1 V of analog input voltage.
Analog Torque Limiting Offset Voltage	Sets the offset voltage for analog torque limiting input.
Analog Input Signal Automatic Offset	Enables/disables analog input signal automatic offset.
Analog Speed Monitor Max. Value	Sets the max. value for the analog speed monitor. The slope for the analog speed monitor output is decided.
Analog Speed Monitor Max. Voltage	Sets the monitor output voltage for the max. value of the analog speed monitor.
Analog Speed Monitor Offset Voltage	Sets the offset voltage for the analog speed monitor.
Analog Torque Monitor Max. Value	Sets the max. value for the analog torque monitor. The slope for the analog torque monitor output is decided.
Analog Torque Monitor Max. Voltage	Sets the monitor output voltage for the max. value of the analog torque monitor.
Analog Torque Monitor Offset Voltage	Sets the offset voltage for analog torque monitor.
Mechanical Rigidity Setting Switch	Enables/disables the driver's mechanical rigidity setting switch (SW2).
Overvoltage Warning	Sets the voltage at which an overvoltage warning is issued.
Undervoltage Warning	Sets the voltage at which a undervoltage warning is issued.
Overheat Warning	Sets the temperature at which an overheat warning is issued.
Overload Warning	Sets the condition for which an overload warning is issued.
Overspeed Warning	Sets the speed at which an overspeed warning is issued.
Gear Ratio for Speed Monitor	Sets the geared motor gear ratio for speed monitor.

* When the parameter for selecting operation when the speed control mode is stopped is set to "servo lock".

●Torque Control Mode

◇Operating Data

Item	Content
Torque Command	Sets the torque command value. 100% is the rated torque.
Speed Limit	Sets the speed limiting value.

◇System Parameters

Item	Content
Encoder Output Electronic Gear A	Sets the electronic gear denominator for encoder output.
Encoder Output Electronic Gear B	Sets the electronic gear numerator for encoder output.
Analog Input Signal	Enables/disables analog input signals.
Motor Rotation Direction	Sets the torque direction.
Control Module Initial Display	Selects the initial display for when communications start between the control module and the driver. If an item is selected that is not displayed in torque control mode, the monitor mode top screen becomes the initial display.

◇Application Parameters

Item	Content
Output Signal Selection 1	Selects the output signal.
Output Signal Selection 2	Selects the output signal.
Zero Speed Output Range	Sets the ZV output conditions.
MOVE Signal Min. ON Time	Sets the min. duration that MOVE output is ON.
Alarm Code Output	Enables/disables alarm code output.
Analog Speed Limiting Gain	Sets the speed limit for 1 V of analog input voltage.
Analog Speed Limit Clamp	Sets the speed at which the analog speed limit is clamped to zero.
Analog Speed Limit Offset Voltage	Sets the offset voltage for analog speed limit input.
Analog Torque Command Gain	Sets the torque command for 1 V of analog input voltage.
Analog Torque Command Offset Voltage	Sets the offset voltage for analog torque command input.
Analog Input Signal Automatic Offset	Enables/disables analog input signal automatic offset.
Analog Speed Monitor Max. Value	Sets the max. value for the analog speed monitor. The slope for the analog speed monitor output is decided.
Analog Speed Monitor Max. Voltage	Sets the monitor output voltage for the max. value of the analog speed monitor.
Analog Speed Monitor Offset Voltage	Sets the offset voltage for the analog speed monitor.
Analog Torque Monitor Max. Value	Sets the max. value for the analog torque monitor. The slope for the analog torque monitor output is decided.
Analog Torque Monitor Max. Voltage	Sets the monitor output voltage for the max. value of the analog torque monitor.
Analog Torque Monitor Offset Voltage	Sets the offset voltage for analog torque monitor.
Overvoltage Warning	Sets the voltage at which an overvoltage warning is issued.
Undervoltage Warning	Sets the voltage at which a undervoltage warning is issued.
Overheat Warning	Sets the temperature at which an overheat warning is issued.
Overload Warning	Sets the condition for which an overload warning is issued.
Overspeed Warning	Sets the speed at which an overspeed warning is issued.
Gear Ratio for Speed Monitor	Sets the geared motor gear ratio for speed monitor.

●Tension Control Mode

◇Operating Data

Item	Content
Tension Command	Sets the tension command. 100% is the rated torque.
Material Thickness*1*2	Sets the material thickness.
Initial Diameter*1*2	Sets the initial diameter for winding or winding out.
Final Diameter*1*2	Sets the final diameter for winding or winding out.
Taper Setting*1*2	This function prevents winding drawing. As the winding diameter increases, the tension is adjusted lower. When it is 100%, the tension becomes constant.
Core Inertia*2	Sets the core inertial moment.
Material Inertia*2	Sets the material inertial moment for the max. material diameter.
Speed Limit	Sets the speed limiting value.

*1 Set in high function mode Ⅰ.
*2 Set in high function mode Ⅱ.

◇System Parameters

Item	Content
Encoder Output Electronic Gear A	Sets the electronic gear denominator for encoder output.
Encoder Output Electronic Gear B	Sets the electronic gear numerator for encoder output.
Tension Control Mode Selection	Sets the operating mode.
Tension Control Gear Ratio	Sets the gear ratio from the motor shaft to the winding shaft.
Analog Input Signal	Enables/disables analog input signals.
Motor Rotation Direction	Sets the torque direction.
Control Module Initial Display	Selects the initial display for when communications start between the control module and the driver. If an item is selected that is not displayed in tension control mode, the monitor mode top screen becomes the initial display.

◇Application Parameters

Item	Content
Output Signal Selection 1	Selects the output signal.
Output Signal Selection 2	Selects the output signal.
Zero Speed Output Range	Sets the ZV output conditions.
MOVE Signal Min. ON Time	Sets the min. duration that MOVE output is ON.
Alarm Code Output	Enables/disables output.
Analog Speed Limiting Gain	Sets the speed limit for 1 V of analog input voltage.
Analog Speed Limit Clamp	Sets the speed at which the analog speed limit is clamped to zero.
Analog Speed Limit Offset Voltage	Sets the offset voltage for analog speed limit input.
Analog Tension Command Gain	Sets the tension command for 1 V of analog input voltage.
Analog Tension Command Offset Voltage	Sets the offset voltage for analog tension command input.
Analog Input Signal Automatic Offset	Enables/disables analog input signal automatic offset.
Analog Speed Monitor Max. Value	Sets the max. value for the analog speed monitor. The slope for the analog speed monitor output is decided.
Analog Speed Monitor Max. Voltage	Sets the monitor output voltage for the max. value of the analog speed monitor.
Analog Speed Monitor Offset Voltage	Sets the offset voltage for the analog speed monitor.
Analog Torque Monitor Max. Value	Sets the max. value for the analog torque monitor. The slope for the analog torque monitor output is decided.
Analog Torque Monitor Max. Voltage	Sets the monitor output voltage for the max. value of the analog torque monitor.
Analog Torque Monitor Offset Voltage	Sets the offset voltage for analog torque monitor.
Acceleration/Deceleration Correction Filter*2	Sets the acceleration/deceleration correction filter time constant. If the winding operation vibrates during acceleration/deceleration, set this value larger.
Friction Torque Correction*1*2	Sets the friction torque correction. Corrects the torque load for the friction in the mechanism. The value of the torque detected during idling.
Overvoltage Warning	Sets the voltage at which an overvoltage warning is issued.
Undervoltage Warning	Sets the voltage at which a undervoltage warning is issued.
Overheat Warning	Sets the temperature at which an overheat warning is issued.
Overload Warning	Sets the condition for which an overload warning is issued.
Overspeed Warning	Sets the speed at which an overspeed warning is issued.
Gear Ratio for Speed Monitor	Sets the geared motor gear ratio for speed monitor.

*1 Set in high function mode Ⅰ.
*2 Set in high function mode Ⅱ.

Servo Motors

Accessories

Cables

1 Connection Cable Sets RoHS
Flexible Connection Cable Sets RoHS

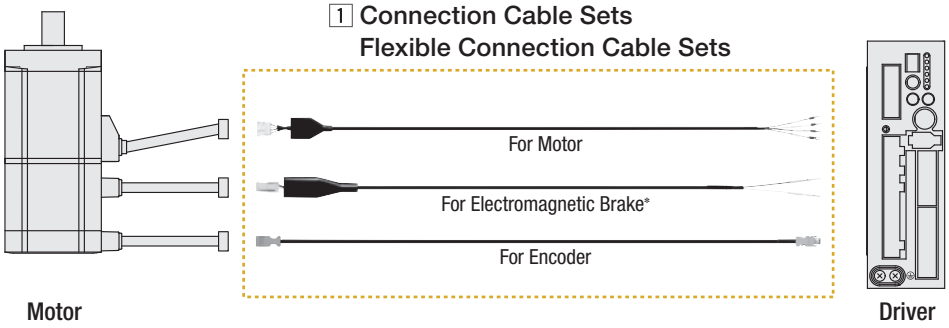
2 Extension Cable Sets RoHS
Flexible Extension Cable Sets RoHS

The **NX** Series comes with cables of 3 m (9.8 ft.) for the connection between the motor and driver.
When the distance between the motor and driver is extended longer than 3 m (9.8 ft.), a connection cable set or extension cable set must be used.
Use a flexible extension cable if the cable will be bent repeatedly.

Cable System Configuration

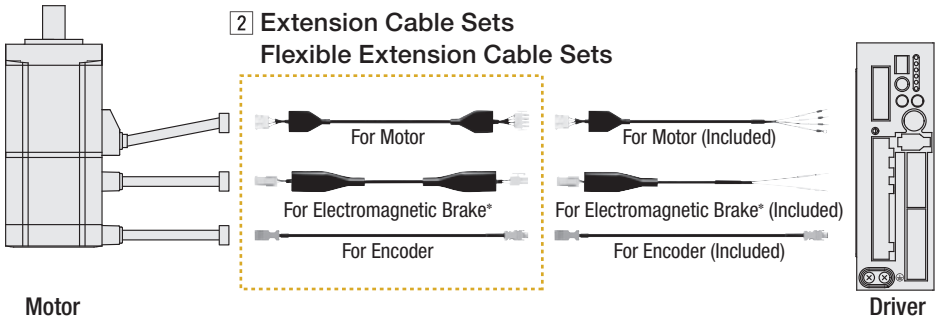
●When Connecting the Motor and Driver without Using the Included Cables

Use a connection cable set or use a flexible connection cable set if the cables will be bent.



●When Extending the Distance between the Motor and the Driver Using Included Cables

Use an extension cable set and connect it to the included cables, or use a flexible extension cable set added if the cables will be bent.



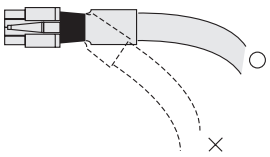
*Cables for electromagnetic brake are for use when using electromagnetic brake type motors.

Note

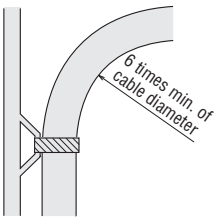
● Keep the overall cable length 20 m (65.6 ft.) max. when using an extension cable set or a flexible extension cable set to connect with cables included with the **NX** Series.

Note on Use of Flexible Cables

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

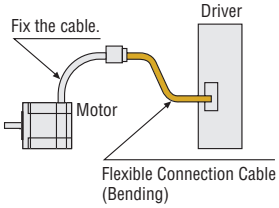


② For the bending radius, use 6 times min. of the cable diameter.

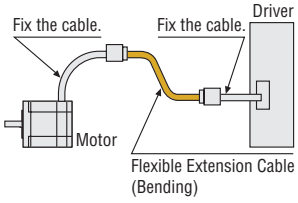


③ The connection cable is not for bending. If the cable is to be bent, bend it at the flexible connection cable.

● Flexible Connection Cable



● Flexible Extension Cable



1 Connection Cable Sets RoHS
Flexible Connection Cable Sets RoHS

Product Line

Connection Cable Sets

◇For Standard Type Motor

Cable for Motor　Cable for Encoder

Model	Length L m (ft.)
CC010VNF	1 (3.3)
CC020VNF	2 (6.6)
CC030VNF	3 (9.8)
CC050VNF	5 (16.4)
CC070VNF	7 (23)
CC100VNF	10 (32.8)
CC150VNF	15 (49.2)
CC200VNF	20 (65.6)

◇For Electromagnetic Brake Type Motor

Cable for Motor　Cable for Encoder　Cable for Electromagnetic Brake

Model	Length L m (ft.)
CC010VNFB	1 (3.3)
CC020VNFB	2 (6.6)
CC030VNFB	3 (9.8)
CC050VNFB	5 (16.4)
CC070VNFB	7 (23)
CC100VNFB	10 (32.8)
CC150VNFB	15 (49.2)
CC200VNFB	20 (65.6)

Flexible Connection Cable Sets

◇For Standard Type Motor

Cable for Motor　Cable for Encoder

Model	Length L m (ft.)
CC010VNR	1 (3.3)
CC020VNR	2 (6.6)
CC030VNR	3 (9.8)
CC050VNR	5 (16.4)
CC070VNR	7 (23)
CC100VNR	10 (32.8)
CC150VNR	15 (49.2)
CC200VNR	20 (65.6)

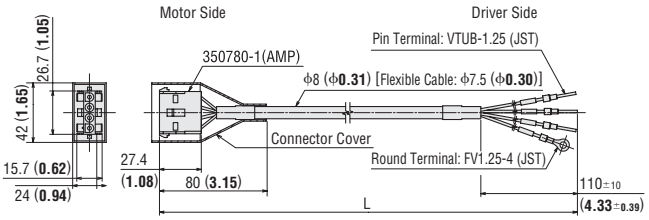
◇For Electromagnetic Brake Type Motor

Cable for Motor　Cable for Encoder　Cable for Electromagnetic Brake

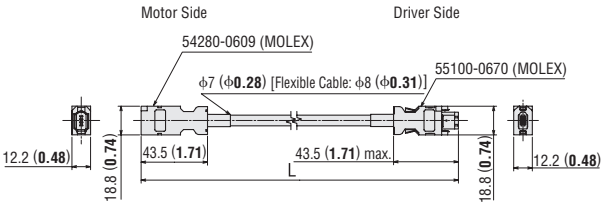
Model	Length L m (ft.)
CC010VNRB	1 (3.3)
CC020VNRB	2 (6.6)
CC030VNRB	3 (9.8)
CC050VNRB	5 (16.4)
CC070VNRB	7 (23)
CC100VNRB	10 (32.8)
CC150VNRB	15 (49.2)
CC200VNRB	20 (65.6)

Dimensions Unit = mm (in.)

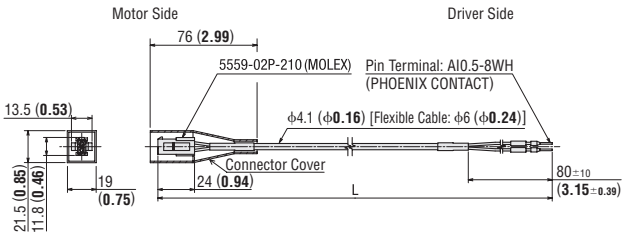
◇Cable for Motor



◇Cable for Encoder



◇Cable for Electromagnetic Brake

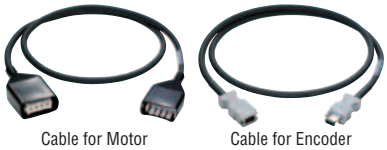


2 Extension Cable Sets RoHS
Flexible Extension Cable Sets RoHS

Product Line

●Extension Cable Sets

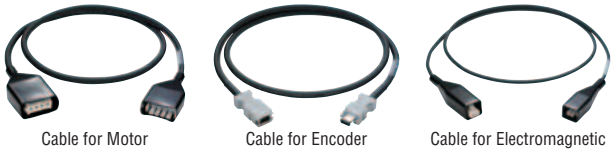
◇For Standard Type Motor



Cable for Motor　Cable for Encoder

Model	Length L m (ft.)
CC010VNFT	1 (3.3)
CC020VNFT	2 (6.6)
CC030VNFT	3 (9.8)
CC050VNFT	5 (16.4)
CC070VNFT	7 (23)
CC100VNFT	10 (32.8)
CC150VNFT	15 (49.2)

◇For Electromagnetic Brake Type Motor



Cable for Motor　Cable for Encoder　Cable for Electromagnetic Brake

Model	Length L m (ft.)
CC010VNFBT	1 (3.3)
CC020VNFBT	2 (6.6)
CC030VNFBT	3 (9.8)
CC050VNFBT	5 (16.4)
CC070VNFBT	7 (23)
CC100VNFBT	10 (32.8)
CC150VNFBT	15 (49.2)

●Flexible Extension Cable Sets

◇For Standard Type Motor

Cable for Motor　Cable for Encoder

Model	Length L m (ft.)
CC010VNRT	1 (3.3)
CC020VNRT	2 (6.6)
CC030VNRT	3 (9.8)
CC050VNRT	5 (16.4)
CC070VNRT	7 (23)
CC100VNRT	10 (32.8)
CC150VNRT	15 (49.2)

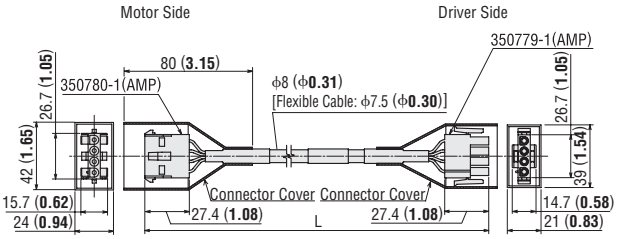
◇For Electromagnetic Brake Type Motor

Cable for Motor　Cable for Encoder　Cable for Electromagnetic Brake

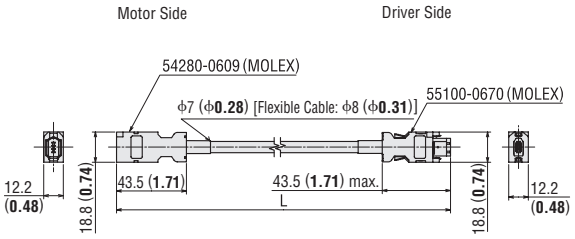
Model	Length L m (ft.)
CC010VNRBT	1 (3.3)
CC020VNRBT	2 (6.6)
CC030VNRBT	3 (9.8)
CC050VNRBT	5 (16.4)
CC070VNRBT	7 (23)
CC100VNRBT	10 (32.8)
CC150VNRBT	15 (49.2)

Dimensions Unit = mm (in.)

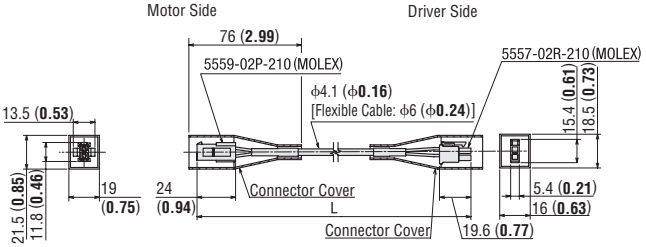
◇Cable for Motor



◇Cable for Encoder



◇Cable for Electromagnetic Brake



Driver Cables

General-Purpose Cables RoHS

These shielded cables have a half-pitch connector at one end of the cable for easy connection to the driver.

Product Line

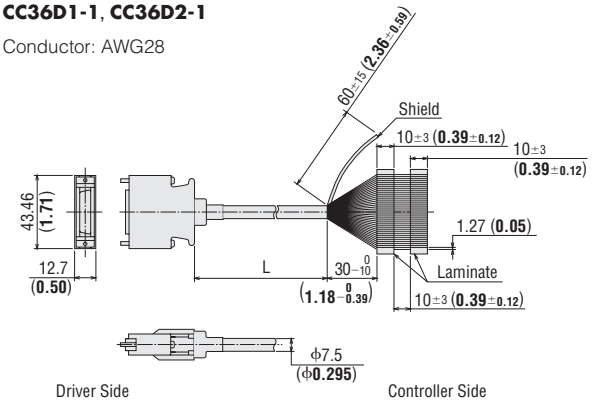
Model	Applicable	Length L m (ft.)
CC36D1-1	For CN7 (36 pins)	1 (3.3)
CC36D2-1		2 (6.6)
CC20D1-1	For CN6 (20 pins)	1 (3.3)
CC20D2-1		2 (6.6)

Notes
- Note that as the length of the pulse line between the driver and controller increases, the maximum frequency decreases.
- Install a connector that matches the controller you are using to the other end of the cable.

Dimensions Unit = mm (in.)

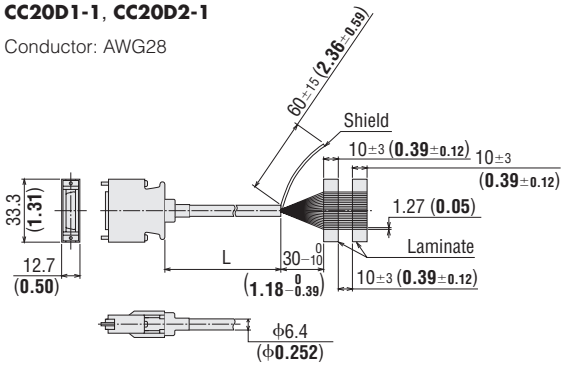
CC36D1-1, **CC36D2-1**

Conductor: AWG28



CC20D1-1, **CC20D2-1**

Conductor: AWG28



Connector – Terminal Block Conversion Units RoHS

These are conversion units that connect a driver to a programmable controller using a terminal block.
- Include a signal name plate for easy, one-glance identification of driver signal names
- DIN rail installable
- Cable length: 1 m (3.3 ft.)

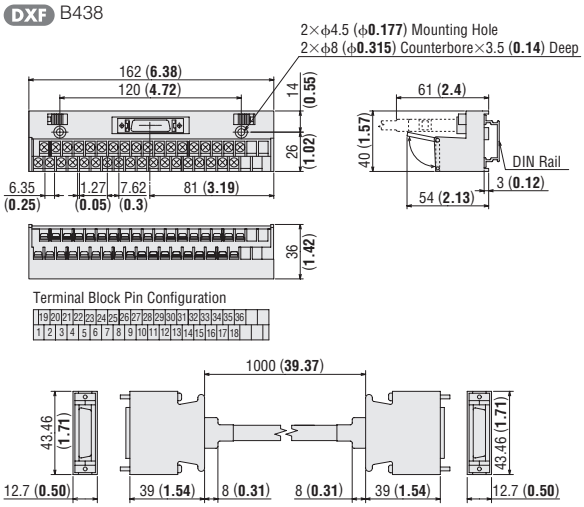
CC36T1

CC20T1

Dimensions Unit = mm (in.)

CC36T1

DXF B438

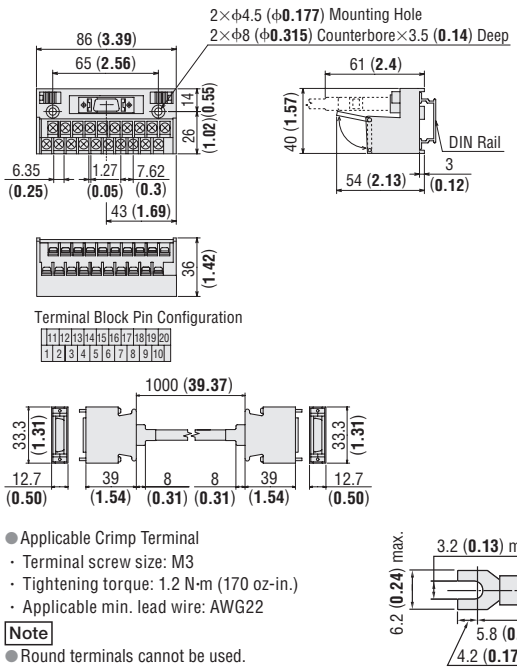


Product Line

Model	Applicable	Length L m (ft.)
CC36T1	For CN7 (36 pins)	1 (3.3)
CC20T1	For CN6 (20 pins)	

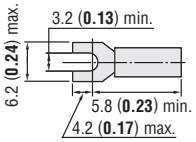
CC20T1

DXF B437



- Applicable Crimp Terminal
  - Terminal screw size: M3
  - Tightening torque: 1.2 N·m (170 oz-in.)
  - Applicable min. lead wire: AWG22

Note
- Round terminals cannot be used.



Flexible Couplings
MCV Couplings RoHS

Features

- Compatible with servo motors, which support low resonance and high gain
- Anti-vibration rubber absorbs vibration generated by the motor
- High response
- Non-backlash
- Electrical insulation

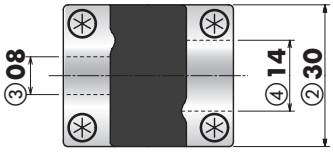
Product Number Code

MCV 30 08 14

① ② ③ ④

①	**MCV** Couping
②	Outer Diameter Dimension of Coupling
③	Inner Diameter d1 (Smaller inner diameter)
④	Inner Diameter d2 (Larger inner diameter)

- For inner diameter d1, the smaller of the motor shaft diameter or the driven shaft diameter is entered.
- For inner diameter d2, the larger of the motor shaft diameter or the driven shaft diameter is entered.



Product Line

Model
MCV19□
MCV25□
MCV30□
MCV34□
MCV39□

- A number indicating the coupling inner diameter is entered where the box □ is located within the product name.

Selecting a Coupling

The following examples explain the procedure for selecting a coupling by driven shaft diameter and motor and driver package name.

Example: Motor/Driver Package Name: **NX620AA-3** Driven shaft diameter: ϕ8 (ϕ0.3150 in.)

1. The coupling type that matches **NX620AA-3** from the coupling selection table is **MCV30**.
2. The inner diameter of the coupling according to the motor shaft diameter will be **14** [ϕ14 (ϕ0.5512 in.)], and will be **8** [ϕ8 (ϕ0.3150 in.)] according to the driven shaft diameter.
3. In the coupling product name, smaller inner diameters come before larger ones and thus the coupling product name will be **MCV300814**.

- When the inner diameter is ϕ6.35 (ϕ0.2500 in.), the number is **06A**.

Coupling Selection Table

Applicable Products			Type	Motor Shaft Diameter mm (in.)		Driven Shaft Diameter mm (in.)								
Type	Frame Size mm (in.)	Model				**05** ϕ5 (ϕ0.1969)	**06** ϕ6 (ϕ0.2362)	**06A** ϕ6.35 (ϕ0.2500)	**08** ϕ8 (ϕ0.3150)	**10** ϕ10 (ϕ0.3937)	**12** ϕ12 (ϕ0.4724)	**14** ϕ14 (ϕ0.5512)	**15** ϕ15 (ϕ0.5906)	**16** ϕ16 (ϕ0.6299)
Standard Type	42 (1.65)	**NX45 NX410**	**MCV19**	**8**	ϕ8 (ϕ0.3150)	●	●		●					
	60 (2.36)	**NX620 NX640**	**MCV30**	**14**	ϕ14 (ϕ0.5512)				●	●	●	●	●	
	85 (3.35)	**NX975**	**MCV39**	**16**	ϕ16 (ϕ0.6299)					●	●	●	●	●

- The applicable products are listed such that the series name can be determined.

Specifications

Model	Diamensions					Normal Torque	Maximum Torque*1	Mass	Inertia*2	Static Torsion Spring Constant	Permissible Eccentricity	Permissible Declination	Permissible Endplay
	Outer Diameter mm (in.)	Length mm (in.)	Shaft Hole Diameter d1 mm (in.)	Shaft Hole Diameter d2 mm (in.)	Screw Used	N·m (lb-in)	N·m (lb-in)	g (oz.)	kg·m^2 (lb-in^2)	N·m/rad (lb-in/rad)	mm (in.)	deg	mm (in.)
MCV190508	19 (0.75)	26 (1.02)	5 (0.1969)	8 (0.3150)	M2	2.1 (18.5)	4.2 (37)	14 (0.49)	8.4×10^{-7} (0.046)	88 (770)	0.15 (0.0059)	1.5	±0.2 (±0.0079)
MCV190608			6 (0.2362)	8 (0.3150)									
MCV190808			8 (0.3150)	8 (0.3150)									
MCV250508	25 (0.98)	32 (1.26)	5 (0.1969)	8 (0.3150)	M2.5	4.0 (35)	8.0 (70)	28 (0.98)	30×10^{-7} (0.164)	170 (1500)	0.15 (0.0059)	1.5	±0.2 (±0.0079)
MCV250608			6 (0.2362)	8 (0.3150)									
MCV250610			6 (0.2362)	10 (0.3937)									
MCV2506A08			6.35 (0.2500)	8 (0.3150)									
MCV2506A10			6.35 (0.2500)	10 (0.3937)									
MCV250808			8 (0.3150)	8 (0.3150)									
MCV250810			8 (0.3150)	10 (0.3937)									
MCV250812			8 (0.3150)	12 (0.4724)									
MCV251010			10 (0.3937)	10 (0.3937)									
MCV251012			10 (0.3937)	12 (0.4724)									
MCV300808	30 (1.18)	36 (1.42)	8 (0.3150)	8 (0.3150)	M3	6.3 (55)	12.6 (111)	45 (1.59)	69×10^{-7} (0.38)	220 (1940)	0.20 (0.0079)	1.5	±0.3 (±0.0118)
MCV300810			8 (0.3150)	10 (0.3937)									
MCV300812			8 (0.3150)	12 (0.4724)									
MCV300814			8 (0.3150)	14 (0.5512)									
MCV300815			8 (0.3150)	15 (0.5906)									
MCV301010			10 (0.3937)	10 (0.3937)									
MCV301012			10 (0.3937)	12 (0.4724)									
MCV301014			10 (0.3937)	14 (0.5512)									
MCV301015			10 (0.3937)	15 (0.5906)									
MCV301214			12 (0.4724)	14 (0.5512)									
MCV301414			14 (0.5512)	14 (0.5512)									
MCV301415			14 (0.5512)	15 (0.5906)									
MCV340814	34 (1.34)	38 (1.50)	8 (0.3150)	14 (0.5512)	M3	8.0 (70)	16.0 (141)	65 (2.2)	130×10^{-7} (0.71)	390 (3400)	0.20 (0.0079)	1.5	±0.3 (±0.0118)
MCV341014			10 (0.3937)	14 (0.5512)									
MCV341214			12 (0.4724)	14 (0.5512)									
MCV341414			14 (0.5512)	14 (0.5512)									
MCV341415			14 (0.5512)	15 (0.5906)									
MCV341416			14 (0.5512)	16 (0.6299)									
MCV391014	39 (1.54)	48 (1.89)	10 (0.3937)	14 (0.5512)	M4	13.5 (119)	27.0 (230)	98 (3.4)	270×10^{-7} (1.48)	520 (4600)	0.20 (0.0079)	1.5	±0.3 (±0.0118)
MCV391016			10 (0.3937)	16 (0.6299)									
MCV391214			12 (0.4724)	14 (0.5512)									
MCV391216			12 (0.4724)	16 (0.6299)									
MCV391414			14 (0.5512)	14 (0.5512)									
MCV391415			14 (0.5512)	15 (0.5906)									
MCV391416			14 (0.5512)	16 (0.6299)									
MCV391516			15 (0.5906)	16 (0.6299)									
MCV391616			16 (0.6299)	16 (0.6299)									

*1 Take the maximum torque into consideration when the limited duty region of the AC servo motor is being used.
*2 The inertia is the value at the maximum shaft hole diameter.

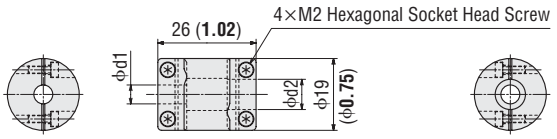
Temperature Correction Factor

Operating Ambient Temperature	−20 to +30°C (−4 to +86°F)	+30 to +40°C (+86 to +104°F)	+40 to +50°C (+104 to +122°F)
Temperature Correction Factor	1.00	0.80	0.70

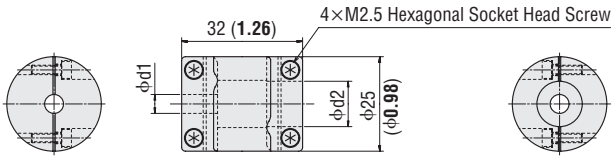
● If the operating ambient temperature exceeds 30°C (86°F), correct the maximum torque with the temperature correction factor.

Dimensions Unit = mm (in.)

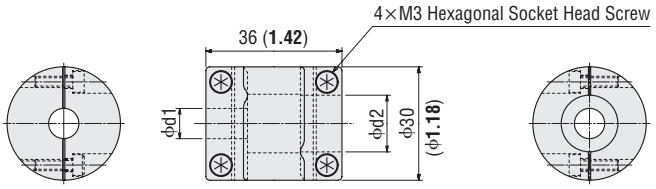
MCV19
Mass: 14 g (0.49 oz.)
DXF B550



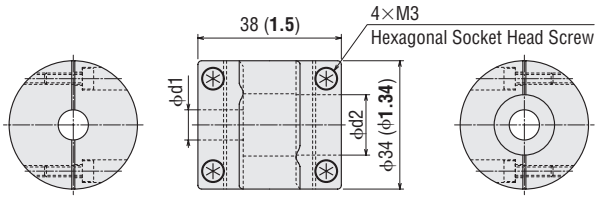
MCV25
Mass: 28 g (0.98 oz.)
DXF B551



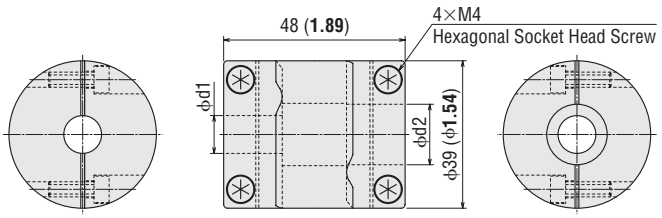
MCV30
Mass: 45 g (1.59 oz.)
DXF B552



MCV34
Mass: 65 g (2.2 oz.)
DXF B553



MCV39
Mass: 98 g (3.4 oz.)
DXF B554



Control Module RoHS

For use with the **NX** Series extended functions. Makes it possible to change parameters, add functions, etc.

Product Line

Model
OPX-2A

Specifications

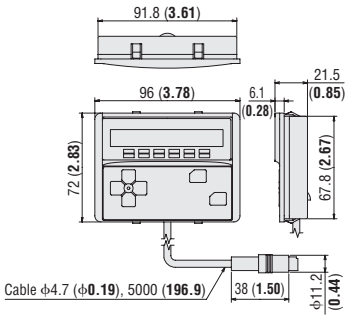
Indication	LED
Cable Length	5 m (16.4 ft.)
Operating Ambient Temperature	0 to +40°C (+32 to +104°F) (non-freezing)

Dimensions Unit = mm (in.)

Control Module

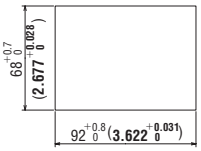
Mass: 0.25 kg (8.8 oz.)

DXF B453



Panel Cut-Out for Control Module

[Thickness of the mounting plate: 1~3 mm (0.04~0.12 in.)]



Data Setting Software RoHS

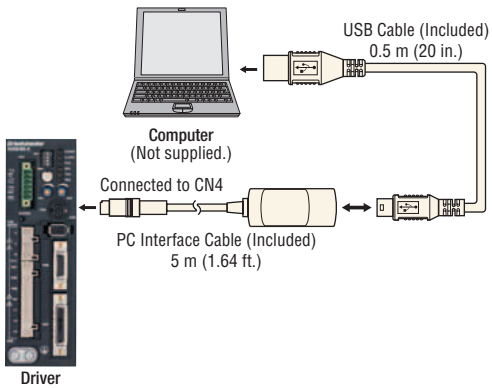
For use with the **NX** Series extended functions. Allows to change parameters, add functions, use waveform monitoring to confirm the operation etc. with a computer.

Product Line

Model
MEXE02

● 5 m (1.64 ft.) PC interface cable, 0.5 m (20 in.) USB cable included

Connection between Computer and Driver



Operating Environment

Operating Systems	The OS supports 32-bit (x86) and 64-bit (x64) versions only. Windows® 2000 Professional Service Pack 4 or later*1 Windows® XP Home Edition Service Pack 3 or later Windows® XP Professional Service Pack 2 Windows® XP Professional Service Pack 3*2 or later Windows® Vista Home Basic Service Pack 2 or later Windows® Vista Home Premium Service Pack 2 or later Windows® Vista Business Service Pack 2 or later Windows® Vista Ultimate Service Pack 2 or later Windows® Vista Enterprise Service Pack 2 or later Windows® 7 Starter Service Pack 1 or later Windows® 7 Home Premium Service Pack 1 or later Windows® 7 Professional Service Pack 1 or later Windows® 7 Ultimate Service Pack 1 or later Windows® 7 Enterprise Service Pack 1 or later
CPU*3	Intel Core Processor 2 GHz or more (The OS must be supported.)
Memory *3	32-bit (x86) version: 1 GB or more 64-bit (x64) version: 2 GB or more
Hard Disk*4	Available disk space of 30 MB or more
Disk Device	CD-ROM drive
Serial Interface	USB 1.1 1 port

*1 Rollup 1 must be applied.
*2 Service Pack 3 supports 32-bit (x86) version only.
*3 The OS operating conditions must be satisfied.
*4 Microsoft NET framework 2.0 Service Pack 2 is required to use **MEXE02**. If it is not already installed, it will be installed automatically, in which case up to 500 MB in additional space is required.

● Windows and Windows Vista are registered trademark of Microsoft Corporation in the United States and other countries. Pentium is a trademark of Intel Corporation.

Accessory Sets RoHS

When using analog I/O, purchase an accessory set.

Product Line

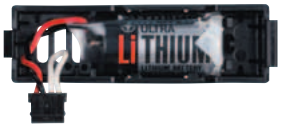
Model	Applicable
AS-SV2	20-Pin Connector for CN6 × 1 Set, External Potentiometers × 2 Sets (Potentiometer × 2, Scale plate × 2, Insulation sheet × 2, Knob × 2, Shielded cable × 2)
AS-SD1	20-Pin Connector for CN6 × 1 set

AS-SV2

AS-SD1

Battery RoHS

This battery is for constructing an absolute system. Position information can be stored during power blackouts or if the driver's power supply is switched OFF.



With the battery installed on an **NX** Series driver

Product Line

Model
BAT01A

Specifications

Battery Type	Thionyl Chloride Lithium Battery
Nominal Voltage	3.6 V
Rated Capacity	1700 mAh
Mass	25 g (0.88 oz.)
Expected Life	About 4 years*
Data Retention Period	2 years*
Operating Ambient Temperature	0 to +50°C (+32 to +122°F) (non-freezing)
Operating Ambient Humidity	85% or less (non-condensing)
Storage Temperature/ Transportation Temperature	+5 to +35°C (+41 to +95°F) (non-freezing)
Storage Humidity/ Transportation Humidity	70% or less (non-condensing)

*When the ambient temperature is 20°C (68°F)

Regeneration Units RoHS

Sometimes the regenerative power generated by the motor exceeds the driver's regenerative power absorption capacity.
In such a case, a regeneration unit is connected to the driver to release the regenerative power.

Conditions under which a regeneration unit may be required:
- When using for vertical operation
- During acceleration and deceleration time when an inertial load is installed

Specifications

Model	RGB100	RGB200
Continuous Power	50 W (1/15 HP)	200 W (1/4 HP)
Resistance Value	150 Ω	50 Ω
Thermal Protector Operating Temperature	Open: 150±7°C (302±13°F) Close: 145±12°C (293±22°F) (Normally closed)	Open: 175±5°C (347±9°F) Close: 115±15°C (239±27°F) (Normally closed)
Thermal Protector Rated Electricity	120 VAC, 4 A 30 VDC, 4 A (Min.current 5 mA)	227 VAC, 8 A 115 VAC, 22 A

● Install the regeneration unit in a location that has the same heat radiation capability as the heat sink [Material: aluminum, 350×350 mm (13.78×13.78 in.), 3 mm (0.12 in.) thick].

Product Line

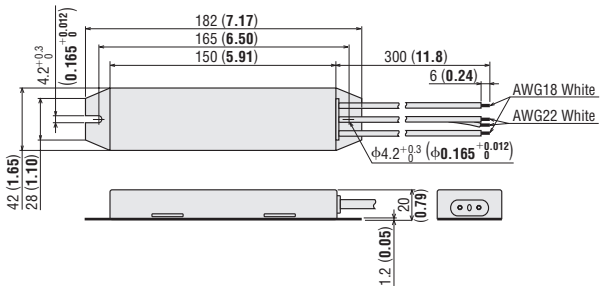
Model	Applicable Product Name
RGB100	**NX45, NX410, NX65, NX610, NX620, NX920**
RGB200	**NX640, NX940, NX975, NX1075**

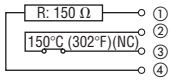
● The applicable products are listed such that the product name can be determined.

Dimensions Unit = mm (in.)

●RGB100

Mass: 0.25 kg (8.8 oz.)
DXF C194

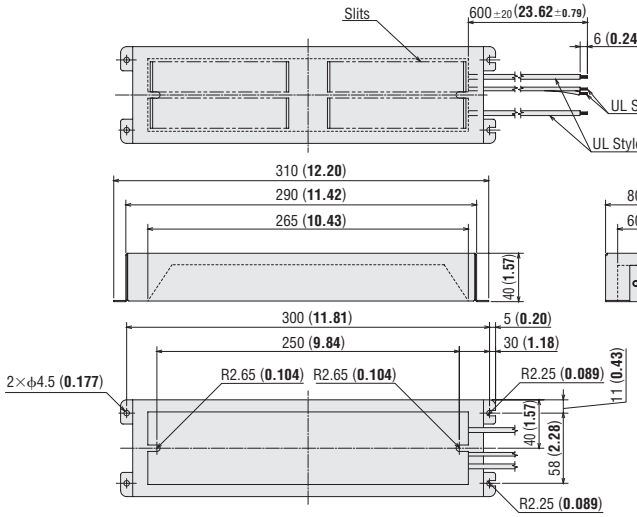


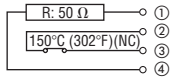


①−④ : AWG18×2
For regeneration current
Connect to RG Terminal
②−③ : AWG22×2
This is the thermostat output.
When an abnormality has been detected, cut off the power supply side with the thermostat contact.

●RGB200

Mass: 1.1 kg (2.42 lb.)
DXF C225





①−④ : AWG18×2
For regeneration current
Connect to RG Terminal
②−③ : AWG20×2
This is the thermostat output.
When an abnormality has been detected, cut off the power supply side with the thermostat contact.