



OPERATING MANUAL

Brushless Motor and Driver Package

BLE Series RS-485 communication type



Introduction

■ Before use

Only qualified personnel of electrical and mechanical engineering should work with the product.

Use the product correctly after thoroughly reading the section "Safety precautions." In addition, be sure to observe the contents described in warning, caution, and note in this manual.

The product described in this document has been designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

■ Operating Manuals for the product

Operating manuals for the **BLE Series FLEX RS-485 communication type** are listed below. Read the manuals carefully before using your **BLE Series FLEX RS-485 communication type**.

- **BLE Series FLEX RS-485 communication type OPERATING MANUAL** (this document)

This manual explains the motor functions as well as installation method, and others.



- **BLE Series FLEX RS-485 communication type USER MANUAL**

This manual explains the function, installation/connection method, operating method of the motor and driver as well as detailed information for using the product. The **USER MANUAL** does not come with the product.

Check the **USER MANUAL** for details on the product.
For details, contact your nearest Oriental Motor sales office or download from Oriental Motor Website [Download Page](#).

Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Use the product only after carefully reading and fully understanding these instructions.

 WARNING	Handling the product without observing the instructions that accompany a "WARNING" symbol may result in serious injury or death.
 CAUTION	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
Note	The items under this heading contain important handling instructions that the user should observe to ensure the safe use of the product.



Thank you for purchasing an Oriental Motor product.

This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

! WARNING

General

- Do not use the product in a place exposed to explosive, flammable or corrosive gases or water splashes or near combustible materials. Doing so may result in fire, electric shock or injury.
- Only qualified and educated personnel should be allowed to perform installation, connection, operation and inspection/troubleshooting of the product. Handling by unqualified personnel may result in fire, electric shock, injury or equipment damage.
- Do not move, install, connect or inspect the product while the power is supplied. Perform these operations after turning off the power. Failure to observe these instructions may result in electric shock.
- The terminals on the driver front panel marked with   symbol indicate the presence of high voltage. Do not touch these terminals while the power is on. Doing so may result in fire or electric shock.
- Do not use a standard type motor (not equipped an electromagnetic brake) in a vertical application. If the driver protective function is activated, the motor will stop and the moving part of the equipment may drop, thereby causing injury or equipment damage.
- Do not use the brake mechanism of the electromagnetic brake motor as a safety brake. It is intended to hold the moving parts and motor position. Doing so may result in injury or damage to equipment.
- If the driver protective function has been activated, remove the cause and reset the protective function. Continuing to operate the equipment without removing the cause of problem will lead to a motor or driver malfunction, resulting in injury or equipment damage.

Installation

- The motor and driver are Class I equipment.
When installing the motor and driver, connect their Protective Earth Terminals. Failure to do so may result in electric shock.
- Install the motor and driver in an enclosure. Failure to do so may result in electric shock or injury.

Connection

- Securely connect the cables in accordance with the connection examples. Failure to do so may result in fire or electric shock.
- Do not forcibly bend, pull or pinch the cables. Doing so may result in fire or electric shock.
- Do not machine or modify the motor cable or connection cable. Doing so may result in electric shock or fire.
- Be sure to observe the specified cable sizes. Use of unspecified cable sizes may result in fire.
- Observe the specified screw tightening torque when connecting terminals to the terminal block. Failure to do so may result in electric shock or equipment damage.

Operation

- Use a specified motor, gearhead and driver combination. Failure to do so may result in fire, electric shock or equipment damage.
- Always keep the power supply voltage of the driver within the specified range. Failure to do so may result in fire or electric shock.
- When using the electromagnetic brake motor, do not turn the MB-FREE input ON while a load is held in vertical direction. Otherwise, the holding power of the motor and electromagnetic brake will be lost, causing personal injury or damage to equipment.

- When using the electromagnetic brake motor in vertical drive (gravitational operation), be sure to operate after checking the load condition. If a load in excess of the rated torque is applied or the small torque limiting value is set, the load may fall. This may result in injury or damage to equipment.

Maintenance and inspection

- Always turn off the power before performing maintenance/inspection. Failure to do so may result in electric shock.
- Do not touch the motor or driver when measuring insulation resistance or performing a dielectric strength test. Accidental contact may result in electric shock.
- Do not touch the connection terminals on the driver immediately until the CHARGE LED turns off after the power is turned off. Residual voltage may cause electric shock.
- Regularly check the openings in the driver for accumulated dust. Accumulated dust may cause fire.

Repair, disassembly and modification

- Do not disassemble or modify the motor, gearhead and driver. Doing so may result in electric shock, injury or equipment damage. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.

⚠ CAUTION

General

- Do not use the product in conditions exceeding the motor, gearhead or driver specifications. Doing so may result in fire, electric shock, injury or equipment damage.
- Do not insert an object into the openings in the driver. Doing so may result in fire, electric shock or injury.
- Do not touch the motor, gearhead or driver while operating or immediately after stopping. The surface of the motor, gearhead or driver may be hot and cause a skin burn(s).

Installation

- Do not leave anything around the motor and driver that would obstruct ventilation. Doing so may result in damage to equipment.
- Do not carry the product by holding the motor, gearhead output shaft or any of the cables. Doing so may result in injury.
- Do not touch the motor output shaft (end of shaft or pinion) with bare hands. Doing so may result in injury.
- When assembling the motor with the gearhead, exercise caution not to pinch your fingers or other parts of your body between the motor and gearhead. Injury may result.
- Securely install the motor, gearhead and driver to their respective mounting plates. Inappropriate installation may cause the motor/driver to detach and fall, resulting in injury or equipment damage.
- Provide a cover on the rotating part (output shaft). Failure to do so may result in injury.
- When installing the motor, gearhead in the equipment, exercise caution not to pinch your fingers or other parts of your body between the equipment and motor or gearhead. Injury may result.
- Securely install the load on output shaft. Inappropriate installation may result in injury.

Connection

- Be sure to ground the motor and driver to prevent them from being damaged by static electricity. Failure to do so may result in fire or damage to equipment.

Operation

- Use a 24 VDC power supply with reinforced insulation on its primary and secondary sides. Failure to do so may result in electric shock.
- Provide an emergency stop device or emergency stop circuit external to the equipment so that the entire equipment will operate safely in the event of a system failure or malfunction. Failure to do so may result in injury.
- Immediately when trouble has occurred, stop running and turn off the driver power. Failure to do so may result in fire, electric shock or injury.
- Do not touch the rotating part (output shaft) while operating. Doing so may result in injury.

- The motor surface temperature may exceed 70 °C (158 °F) even under normal operating conditions. If the operator is allowed to approach a running motor, attach a warning label as shown to the right in a conspicuous position. Failure to do so may result in skin burn(s).



Warning label

- Use an insulated screwdriver to adjust the switches in the driver. Failure to do so may result in electric shock.

Disposal

- Dispose the product correctly in accordance with laws and regulations, or instructions of local governments.

Precautions for use

- Connect protective devices to the power line

Connect a circuit breaker or earth leakage breaker to the driver power line to protect the primary circuit. If an earth leakage breaker is to be installed, use one incorporating high-frequency noise elimination measures.

- Use an electromagnetic brake type motor in an application of vertical drive such as elevating equipment

When the motor is used in an application of vertical drive such as elevating equipment (lifting and lowering device), use an electromagnetic brake type motor so that the load can be held in position.

- Do not use a solid-state relay (SSR) to turn on/off the power

A circuit that turns on/off the power via a solid-state relay (SSR) may damage the motor and driver.

- Do not conduct the insulation resistance measurement or dielectric strength test with the motor and driver connected

Conducting the insulation resistance measurement or dielectric strength test with the motor and driver connected may result in damage to the product.

- Grease measures

On rare occasions, grease may ooze out from the gearhead. If there is concern over possible environmental damage resulting from the leakage of grease, check for grease stains during regular inspections. Alternatively, install an oil pan or other device to prevent leakage from causing further damage. Grease leakage may lead to problems in the user's equipment or products.

- Apply grease to the hollow output shaft of a hollow shaft flat gearhead

When using a hollow shaft flat gearhead, apply grease (molybdenum disulfide grease, etc.) on the surface of the load shaft and inner walls of the hollow output shaft to prevent seizure.

- Noise elimination measures

Refer to the USER MANUAL for the noise elimination measures.

- The driver uses semiconductor elements, so be extremely careful when handling them

Electrostatic discharge can damage the driver.

Be sure to ground the motor and driver to prevent them from being damaged by electric shock or static electricity.

- Preventing leakage current

Stray capacitance exists between the driver's current-carrying line and other current-carrying lines, the earth and the motor, respectively. A high-frequency current may leak out through such capacitance, having a detrimental effect on the surrounding equipment. The actual leakage current depends on the driver's switching frequency, the length of wiring between the driver and motor, and so on.

When connecting an earth leakage breaker, use one of the following products offering resistance against high frequency current:

Mitsubishi Electric Corporation: NV series

- Note on connecting a power supply whose positive terminal is grounded

The data edit connector (CN3), I/O signal connectors (CN5/CN6) and RS-485 communication connectors (CN7/CN8) on the driver are not electrically insulated. When grounding the positive terminal of the power supply, do not connect any equipment (PC, etc.) whose negative terminal is grounded. Doing so may cause the driver and this equipment to short, damaging both.

- Use a connection cable (supplied or accessory) when extending the wiring distance between the motor and driver
- When using the motor in operation such as vertical drive (gravitational operation) or a large inertial load drive, use an accessory regeneration unit (sold separately).

The driver may be damaged if the regeneration energy generated during vertical drive (gravitational operation) or sudden starting/stopping of a large inertial load exceeds the allowable limit that can be absorbed by the driver. The accessory regeneration unit (sold separately) is designed to discharge the regenerated energy, thereby protecting the driver.

- Saving data to the non-volatile memory

Do not turn off the 24 VDC power supply while writing the data to the non-volatile memory, and also do not turn off within 5 seconds after the completion of writing the data. Doing so may abort writing the data and cause an EEPROM error alarm to generate.

The non-volatile memory can be rewritten approximately 100,000 times.

Preparation

■ Checking the product

Verify that the items listed below are included. Report any missing or damaged items to the branch or sales office from which you purchased the product.

- Motor..... 1 unit
(With a gearhead, only for combination type)
- Driver 1 unit
- Connection cable..... 1 piece
(Only models with a supplied connection cable)
- CN5 connector (10 pins)..... 1 piece
- CN6 connector (8 pins)..... 1 piece
- External potentiometer..... 1 piece
- Signal cable for external potentiometer 1 piece [1 m (3.3 ft.)]
- OPERATING MANUAL..... 1 copy (this document)

Accessories for combination type

- Hexagonal socket head screw set..... 1 set
- Parallel key..... 1 piece
- Safety cover..... 1 piece
(Supplied with the hollow shaft flat gearhead)
- Safety cover mounting screw 2 pieces
(Supplied with the hollow shaft flat gearhead)

■ Combinations of motors and drivers

Verify the model number of the purchased product against the number shown on the package label. Check the model number of the motor and driver against the number shown on the nameplate.

- □ in the model names indicates a number representing the gear ratio.
- ■ indicates a number representing the length of a connection cable.
- The combination types come with the motor and gearhead pre-assembled.

● Standard type

- Combination type • parallel shaft gearhead

Model	Motor model	Gearhead model	Driver model
BLE23AR□S-■	BLEM23-GFS	GFS2G□	BLED3AM-R
BLE23CR□S-■			BLED3CM-R
BLE46AR□S-■	BLEM46-GFS	GFS4G□	BLED6AM-R
BLE46CR□S-■			BLED6CM-R
BLE512AR□S-■	BLEM512-GFS	GFS5G□	BLED12AM-R
BLE512CR□S-■			BLED12CM-R

- Combination type • hollow shaft flat gearhead

Model	Motor model	Gearhead model	Driver model
BLE23AR□F-■	BLEM23-GFS	GFS2G□FR	BLED3AM-R
BLE23CR□F-■			BLED3CM-R
BLE46AR□F-■	BLEM46-GFS	GFS4G□FR	BLED6AM-R
BLE46CR□F-■			BLED6CM-R
BLE512AR□F-■	BLEM512-GFS	GFS5G□FR	BLED12AM-R
BLE512CR□F-■			BLED12CM-R

- Round shaft type

Model	Motor model	Driver model
BLE23ARA-■	BLEM23-A	BLED3AM-R
BLE23CRA-■		BLED3CM-R
BLE46ARA-■	BLEM46-A	BLED6AM-R
BLE46CRA-■		BLED6CM-R
BLE512ARA-■	BLEM512-A	BLED12AM-R
BLE512CRA-■		BLED12CM-R

● Electromagnetic brake type

- Combination type • parallel shaft gearhead

Model	Motor model	Gearhead model	Driver model
BLE23AMR□S-■	BLEM23M2-GFS	GFS2G□	BLED3AM-R
BLE23CMR□S-■			BLED3CM-R
BLE46AMR□S-■	BLEM46M2-GFS	GFS4G□	BLED6AM-R
BLE46CMR□S-■			BLED6CM-R
BLE512AMR□S-■	BLEM512M2-GFS	GFS5G□	BLED12AM-R
BLE512CMR□S-■			BLED12CM-R

- Combination type • hollow shaft flat gearhead

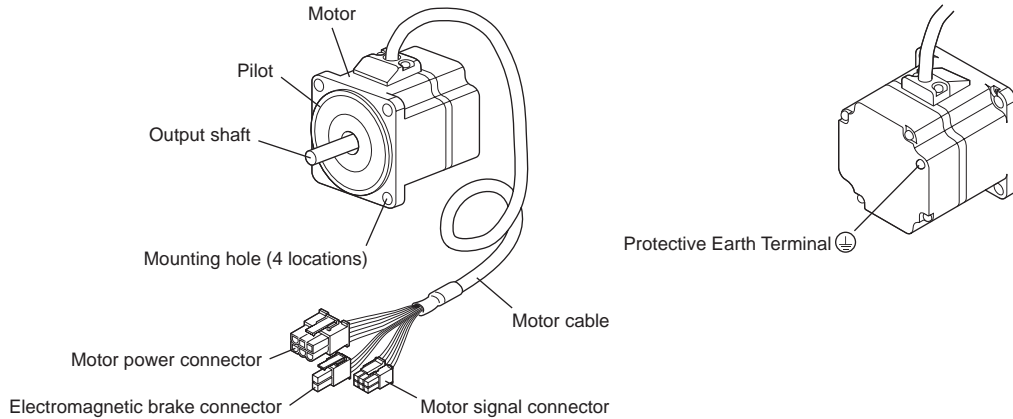
Model	Motor model	Gearhead model	Driver model
BLE23AMR□F-■	BLEM23M2-GFS	GFS2G□FR	BLED3AM-R
BLE23CMR□F-■			BLED3CM-R
BLE46AMR□F-■	BLEM46M2-GFS	GFS4G□FR	BLED6AM-R
BLE46CMR□F-■			BLED6CM-R
BLE512AMR□F-■	BLEM512M2-GFS	GFS5G□FR	BLED12AM-R
BLE512CMR□F-■			BLED12CM-R

- Round shaft type

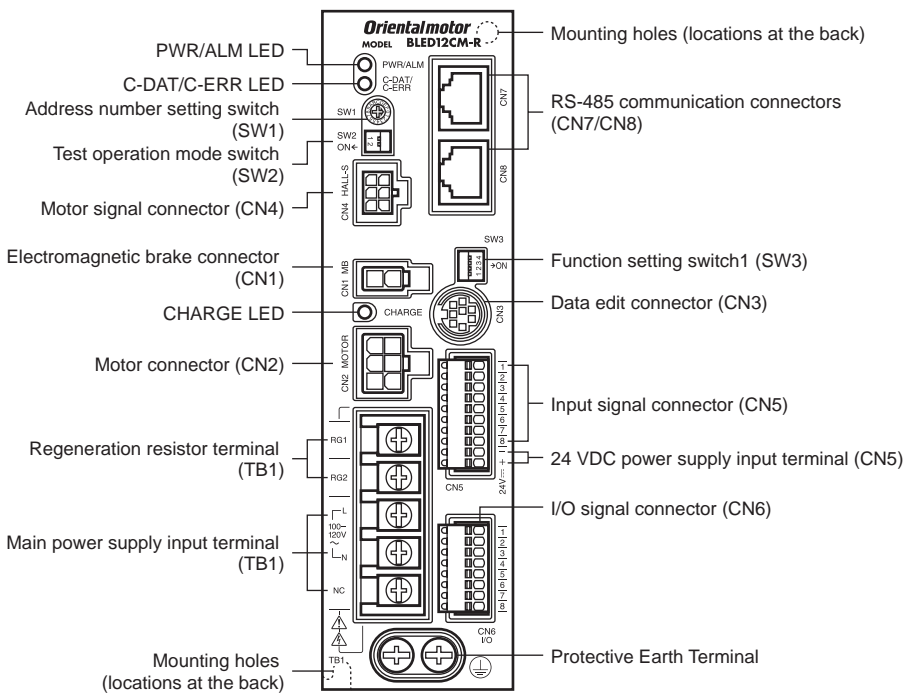
Model	Motor model	Driver model
BLE23AMRA-■	BLEM23M2-A	BLED3AM-R
BLE23CMRA-■		BLED3CM-R
BLE46AMRA-■	BLEM46M2-A	BLED6AM-R
BLE46CMRA-■		BLED6CM-R
BLE512AMRA-■	BLEM512M2-A	BLED12AM-R
BLE512CMRA-■		BLED12CM-R

■ Names and functions of parts

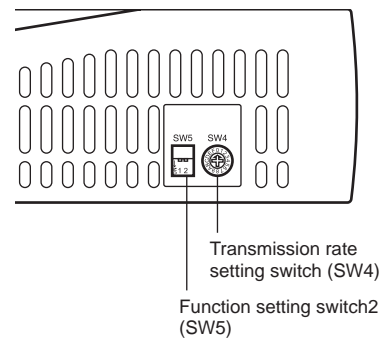
● Motor (Example: Electromagnetic brake type)



● Driver front face



● Driver bottom face



Name	Description
PWR/ALM LED	<ul style="list-style-type: none"> ●PWR (Green): This LED is lit while the 24 VDC power is input. ●ALM (Red): This LED will blink when an alarm generates. It is possible to check the generated alarm by counting the number of times the LED blinks.
C-DAT/C-ERR LED	<ul style="list-style-type: none"> ●C-DAT (Green): This LED will blink or illuminate steadily when the driver is communicating with the master station properly via RS-485 communication. ●C-ERR (Red): This LED will illuminate when the RS-485 communication error occurs with the master station.
CHARGE LED (Red)	This LED is lit while the main power is input. After the main power has been turned off, the LED will turn off once the residual voltage in the driver drops to a safe level.
Address number setting switch (SW1)	Use this switch when controlling the system via RS-485 communication. Using this switch in combination with the SW5-No.1 of the function setting switch2, the address number of RS-485 communication can be set. [Factory setting: 0]
Test operation mode switch (SW2)	<ul style="list-style-type: none"> ●SW2-No.1: This switch is used to check the connection between the motor and driver before establishing a communication. When having connected properly, setting the SW2-No.1 to the ON side causes the motor to rotate at low speed in the forward direction. [Factory setting: OFF] ●SW2-No.2: Not used. (Keep this switch in the OFF position.)

Name	Description
Function setting switch1 (SW3)	<ul style="list-style-type: none"> •SW3-No.1: Not used. (Keep this switch in the OFF position.) •SW3-No.2: Not used. (Keep this switch in the OFF position.) •SW3-No.3: This switch is used to select the power supply for I/O signals (use the built-in power supply or external power supply). To control the operation using relays and switches, set the SW3-No.3 to the ON side to select the built-in power supply. [Factory setting: OFF] •SW3-No.4: Use this switch when controlling the system via RS-485 communication. The termination resistor (120 Ω) of RS-485 communication can be set. [Factory setting: OFF]
Transmission rate setting switch (SW4)	Use this switch when controlling the system via RS-485 communication. The transmission rate of RS-485 communication can be set. [Factory setting: 7]
Function setting switch2 (SW5)	Use this switch when controlling the system via RS-485 communication. <ul style="list-style-type: none"> •SW5-No.1: Using this switch in combination with the address number setting switch (SW1), the address number of RS-485 communication can be set. [Factory setting: OFF] •SW5-No.2: The protocol of RS-485 communication can be set. [Factory setting: OFF]
Electromagnetic brake connector (CN1)	Connects the electromagnetic brake connector. (Electromagnetic brake type only)
Motor connector (CN2)	Connects the motor power connector.
Data edit connector (CN3)	Connect a PC in which the support software MEXE02 has been installed, or an accessory data setter OPX-2A (sold separately).
Motor signal connector (CN4)	Connects the motor signal connector.
Input signal connector (CN5)	Connects the input signals.
24 VDC power supply input terminal (CN5)	Connects the control power supply of the driver. +: +24 VDC power supply input –: Power supply GND [This is shared with the common wire of input signals (0 V)]
I/O signal connector (CN6)	<ul style="list-style-type: none"> •Connects the external potentiometer (supplied) or external DC power supply. •Connects the output signals.
RS-485 communication connectors (CN7/CN8)	Connects the RS-485 communication cable.
Regeneration resistor terminal (TB1)	Connects an accessory regeneration unit EPRC-400P (sold separately).
Main power supply input terminal (TB1)	Connects the main power supply. <ul style="list-style-type: none"> •Single-phase 100-120 VAC L, N: Connects a single-phase 100-120 VAC power supply NC: Not used. •Single-phase 200-240 VAC L1, L2: Connects a single-phase 200-240 VAC power supply L3: Not used. •Three-phase 200-240 VAC L1, L2, L3: Connects a three-phase 200-240 VAC power supply.
Protective Earth Terminal	Ground this terminal using a grounding wire of AWG18 to 14 (0.75 to 2.0 mm ²).
Mounting holes (two locations at the back)	These mounting holes are used to install the driver with screws (M4).

Installation

Installation location

Install them in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

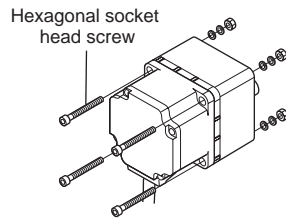
- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature: 0 to +50 °C (+32 to +122 °F) (non-freezing)
- Operating ambient humidity: 85% or less (non-condensing)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum
- Altitude Up to 1000 m (3300 ft.) above sea level

Installing the combination type

- Note**
- Do not forcibly assemble the motor and gearhead. Also, do not let metal objects or other foreign matters enter the gearhead. The pinion of the motor output shaft or gear may be damaged, resulting in noise or shorter service life.
 - Do not allow dust to attach to the pilot sections of the motor and gearhead. Also, assemble the motor and gearhead carefully by not pinching the O-ring at the motor's pilot section. If the O-ring is crushed or severed, grease may leak from the gearhead.

Combination type • parallel shaft gearhead

Secure the motor using the supplied hexagonal socket head screws through the four mounting holes. Tighten the nuts until no gaps remain between the motor and mounting plate.



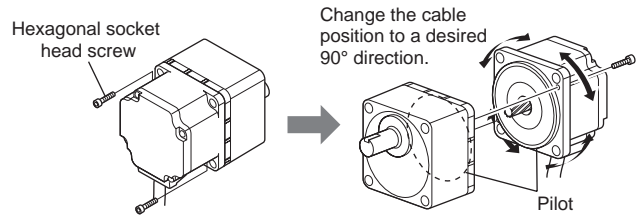
Model	Screw size	Tightening torque	Maximum applicable plate thickness *
BLE23	M4	1.8 N·m (15.9 lb-in)	5 mm (0.20 in.)
BLE46	M6	6.4 N·m (56 lb-in)	8 mm (0.31 in.)
BLE512	M8	15.5 N·m (137 lb-in)	12 mm (0.47 in.)

* When the supplied hexagonal socket head screw set is used.

Removing/Installing the gearhead

To replace the gearhead or change the cable outlet direction, remove the screws assembling the gearhead. The gearhead can be removed and the motor cable position changed to a desired 90° direction.

1. Remove the hexagonal socket head screws (2 pcs) assembling the motor and gearhead and detach the motor from the gearhead.
2. Using the pilot sections of the motor and gearhead as guides, install the gearhead to the motor and tighten the hexagonal socket head screws. When installing the gearhead, slowly rotate it clockwise/counterclockwise to prevent the pinion of the motor output shaft from contacting the side panel or gear of the gearhead.



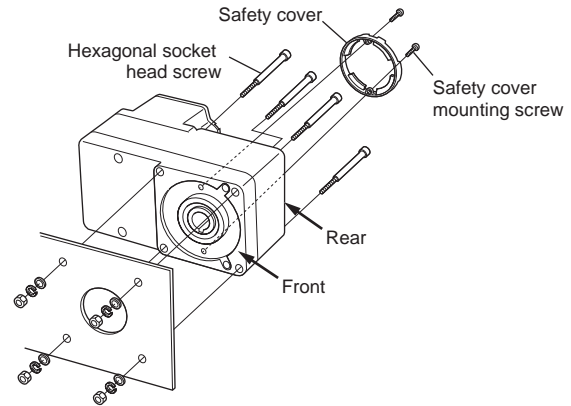
Assembly screws	Model	Screw size	Tightening torque
	BLE23 BLE46	M2.6	0.4 N·m (3.5 lb-in)
	BLE512	M3	0.6 N·m (5.3 lb-in)

Combination type • hollow shaft flat gearhead

A combination type hollow shaft flat gearhead can be installed by using either its front or rear side as the mounting surface.

Secure the hollow shaft flat gearhead using the supplied hexagonal socket head screws through the four mounting holes you drilled. Tighten the nuts until no gaps remain between the gearhead and mounting plate.

Attach the supplied safety cover to the hollow output shaft on the end opposite from the one where the load shaft is installed.



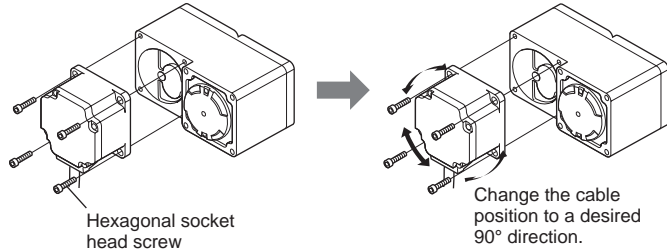
Model	Screw size	Tightening torque	Maximum applicable plate thickness *
BLE23	M5	3.8 N·m (33 lb-in)	5 mm (0.20 in.)
BLE46	M6	6.4 N·m (56 lb-in)	8 mm (0.31 in.)
BLE512	M8	15.5 N·m (137 lb-in)	12 mm (0.47 in.)

* When the supplied hexagonal socket head screw set is used.

Removing/Installing the gearhead

To replace the gearhead or change the cable outlet direction, remove the screws assembling the gearhead. The gearhead can be removed and the motor cable position changed to one of three 90° directions. Note that the motor cable cannot be positioned in the direction where the cable faces the gearhead output shaft.

1. Remove the hexagonal socket head screws (4 pcs) attaching the motor and gearhead and detach the motor from the gearhead.
2. Using the pilot sections of the motor and gearhead as guides, install the motor to the gearhead and tighten the hexagonal socket head screws. Install the motor carefully to prevent the pinion of the motor output shaft from contacting the casing or gear of the gearhead.



Assembly screws	Model	Screw size	Tightening torque
	BLE23	M4	1.8 N·m (15.9 lb-in)
	BLE46	M6	6.4 N·m (56 lb-in)
	BLE512	M8	15.5 N·m (137 lb-in)

■ Installing the round shaft type

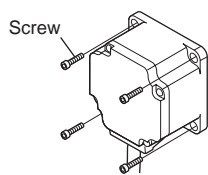
Install the motor to a mounting plate of the following size or larger, so that the motor case temperature will not exceed 90 °C (194 °F).

Model	Size of mounting plate	Thickness	Material
BLE23	115×115 mm (4.53×4.53 in.) *	5 mm (0.20 in.)	Aluminum alloy
BLE46	135×135 mm (5.31×5.31 in.)		
BLE512	165×165 mm (6.50×6.50 in.)		

* Electromagnetic brake type: 135×135 mm (5.31×5.31 in.)

Secure the motor using the hexagonal socket head screws (not supplied) through the four mounting holes. Tighten the nuts until no gaps remain between the motor and mounting plate.

Model	Screw size
BLE23	M4
BLE46	M6
BLE512	M8



■ Installing a load to the combination type • parallel gearhead or round shaft type

When installing a load on the motor, gearhead, align the center of the motor output shaft (gearhead output shaft) with the center of the load shaft.

- Note**
- When coupling the motor, gearhead with a load, pay attention to centering, belt tension, parallelism of pulleys, etc. Also, firmly secure the tightening screws of the coupling or pulleys.
 - When installing a load, do not damage the motor output shaft (gearhead output shaft) or bearing. Forcing in the load by driving it with a hammer, etc., may break the bearing. Do not apply any excessive force to the output shaft.
 - Do not modify or machine the motor, gearhead output shaft. The bearing may be damaged or motor, gearhead may break.

● Output shaft shape

Combination type • parallel shaft gearhead

A key slot is provided on the output shaft of each combination type parallel shaft gearhead. Form a key slot on the load side and secure the load using the supplied parallel key.

Round shaft type

A flat section is provided on the motor output shaft of each round shaft type. Apply a double-point screw, etc., at the flat section to firmly secure the load and prevent it from spinning.

● How to install a load

Using a coupling

Align the centerline of the motor, gearhead output shaft with the centerline of the load shaft.

Using a belt drive

Adjust the motor, gearhead output shaft to lie parallel with the load shaft and form right angles between the output shaft/load shaft and the line connecting the centers of both pulleys.

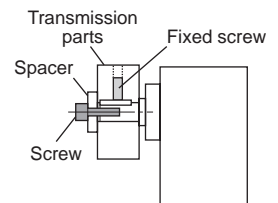
Using a gear drive

Adjust the motor, gearhead output shaft to lie parallel with the gear shaft and allow the output shaft to mesh correctly with the centers of the gear teeth.

When using the output shaft end tapped hole of a gearhead

Use a tapped hole provided at the end of the output shaft as an auxiliary means for preventing the transfer mechanism from disengaging. (The output shaft end tapped hole is not provided for the GFS2G type.)

Gearhead model name	Output shaft end tapped hole
GFS4G	M5, Effective depth 10 mm (0.39 in.)
GFS5G	M6, Effective depth 12 mm (0.47 in.)



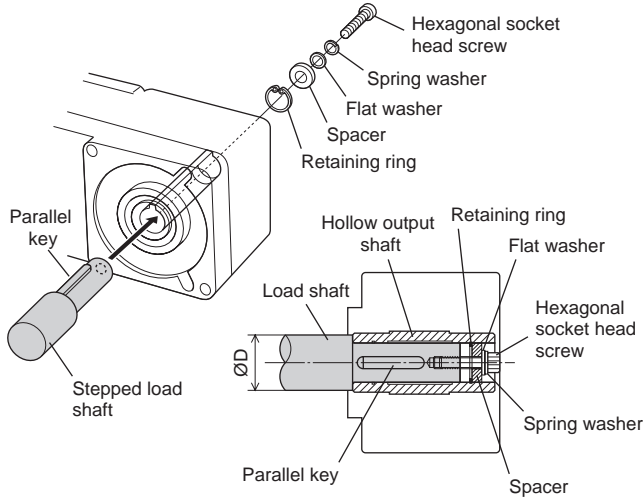
■ Installing a load to the combination type • hollow shaft flat gearhead

If the motor is subject to a strong impact upon instantaneous stop or receives a large radial load, use a stepped load shaft.

- Note**
- Apply grease (molybdenum disulfide grease, etc.) on the surface of the load shaft and inner walls of the hollow output shaft to prevent seizure.
 - When installing a load, do not damage the hollow output shaft or bearing of the gearhead. Forcing in the load by driving it with a hammer, etc. may break the bearing. Do not apply any excessive force to the hollow output shaft.
 - Do not modify or machine the hollow output shaft of the gearhead. Doing so may damage the bearings and destroy the gearhead.

● **Stepped load shaft**

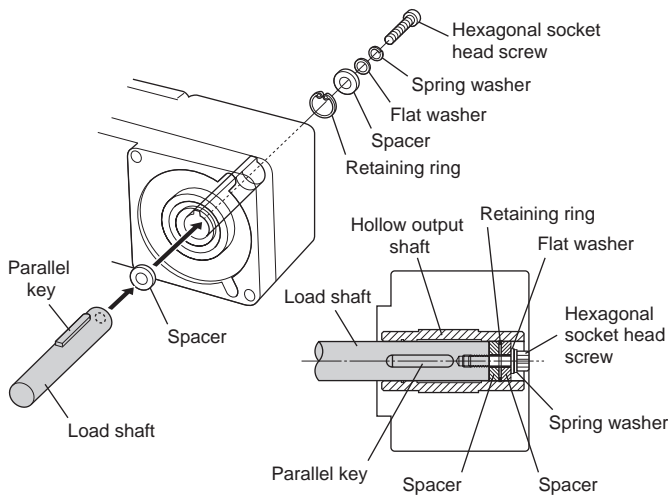
Secure the retaining ring to the load shaft by tightening the hexagonal socket head screw over a spacer, flat washer and spring washer.



The load can be mounted using an end plate. Refer to the USER MANUAL for details.

● **Non-stepped load shaft**

Install a spacer on the load shaft side and secure the retaining ring to the load shaft by tightening the hexagonal socket head screw over a spacer, flat washer and spring washer.



Recommended load shaft installation dimensions [Unit: mm (in.)]

Model	Inner diameter of hollow shaft (H8)	Recommended diameter of load shaft (h7)	Nominal diameter of retaining ring	Outer diameter of stepped shaft (ØD)
BLE23	Ø12 ^{+0.027} / ₀ (Ø0.4724 ^{+0.0011} / ₀)	Ø12 ⁰ / _{-0.018} (Ø0.4724 ⁰ / _{-0.0007})	Ø12 (Ø0.47)	20 (0.79)
BLE46	Ø15 ^{+0.027} / ₀ (Ø0.5906 ^{+0.0011} / ₀)	Ø15 ⁰ / _{-0.018} (Ø0.5906 ⁰ / _{-0.0007})	Ø15 (Ø0.59)	25 (0.98)
BLE512	Ø20 ^{+0.033} / ₀ (Ø0.7874 ^{+0.0013} / ₀)	Ø20 ⁰ / _{-0.021} (Ø0.7874 ⁰ / _{-0.0008})	Ø20 (Ø0.79)	30 (1.18)

Model	Applicable screw	Spacer thickness
BLE23	M4	3 (0.12)
BLE46	M5	4 (0.16)
BLE512	M6	5 (0.20)

■ **Permissible radial load and permissible axial load**

Make sure the radial load and axial load received by the motor, gearhead output shaft will not exceed the allowable values shown in the table below.

● **Combination type • parallel shaft gearhead**

Model	Gear ratio	Distance from output shaft end of gearhead and permissible radial load [N (lb.)] *		Permissible axial load [N (lb.)]
		10 mm (0.39 in.)	20 mm (0.79 in.)	
BLE23	5	100 (22) [90 (20)]	150 (33) [110 (24)]	40 (9)
	10 to 20	150 (33) [130 (29)]	200 (45) [170 (38)]	
	30 to 200	200 (45) [180 (40)]	300 (67) [230 (51)]	
BLE46	5	200 (45) [180 (40)]	250 (56) [220 (49)]	100 (22)
	10 to 20	300 (67) [270 (60)]	350 (78) [330 (74)]	
	30 to 200	450 (101) [420 (94)]	550 (123) [500 (112)]	
BLE512	5	300 (67) [230 (51)]	400 (90) [300 (67)]	150 (33)
	10 to 20	400 (90) [370 (83)]	500 (112) [430 (96)]	
	30 to 200	500 (112) [450 (101)]	650 (146) [550 (123)]	

* The values assume a rated speed of 3000 r/min or below. The values in [] are based on a rated speed of 4000 r/min.

● **Combination type • hollow shaft flat gearhead**

Model	Gear ratio	Distance from gearhead mounting surface and permissible radial load [N (lb.)] *		Permissible axial load [N (lb.)]
		10 mm (0.39 in.)	20 mm (0.79 in.)	
BLE23	5, 10	450 (101) [410 (92)]	370 (83) [330 (74)]	200 (45)
	15 to 200	500 (112) [460 (103)]	400 (90) [370 (83)]	
BLE46	5, 10	800 (180) [730 (164)]	660 (148) [600 (135)]	400 (90)
	15 to 200	1200 (270) [1100 (240)]	1000 (220) [910 (200)]	
BLE512	5, 10	900 (200) [820 (184)]	770 (173) [700 (157)]	500 (112)
	15, 20	1300 (290) [1200 (270)]	1110 (240) [1020 (220)]	
	30 to 200	1500 (330) [1400 (310)]	1280 (280) [1200 (270)]	

* The values assume a rated speed of 3000 r/min or below. The values in [] are based on a rated speed of 4000 r/min.

● **Round shaft type**

Model	Distance from output shaft end of motor and permissible radial load [N (lb.)]		Permissible axial load [N (lb.)]
	10 mm (0.39 in.)	20 mm (0.79 in.)	
BLE23	80 (18)	100 (22)	Not to exceed one-half the motor's mass *
BLE46	110 (24)	130 (29)	
BLE512	150 (33)	170 (38)	

* Minimize the axial load. If an axial load must be applied, do not let it exceed one-half the motor's mass.

Note If the radial load or axial load exceeds the specified allowable value, repeated load applications may cause the bearing or output shaft of the motor, gearhead to undergo a fatigue failure.

■ **Installing the driver**

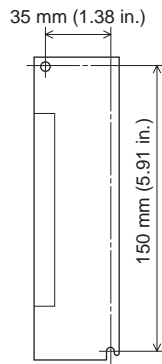
The driver is designed so that heat is dissipated via air convection and conduction through the enclosure. Install the driver to a flat metal plate offering excellent vibration resistance.

When two or more drivers are to be installed side by side, provide 20 mm (0.79 in.) and 25 mm (0.98 in.) clearances in the horizontal and vertical directions, respectively.

- Note**
- Install the driver in an enclosure whose pollution degree is 2 or better environment, or whose degree of protection is IP54 minimum.
 - Be sure to install the driver vertically (in vertical position). Do not block the radiation openings.
 - Do not install any equipment that generates a large amount of heat or noise near the driver.
 - If the ambient temperature of the driver exceeds 50 °C (122 °F), revise the ventilation condition or force-cool the area around the driver using a fan.

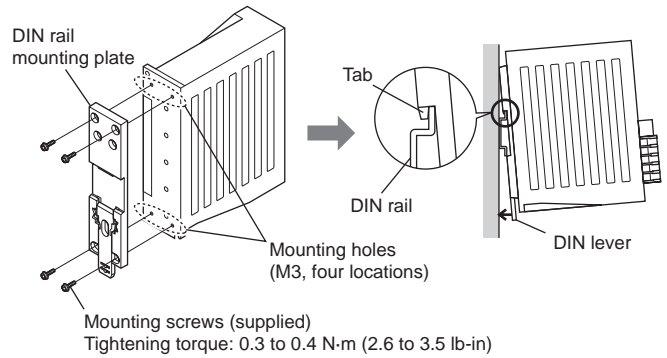
● **Installing with screws**

Install the driver vertically (in vertical position) and secure the driver through the mounting holes using two screws (M4: not supplied).



● **Mounting to DIN rail**

Use a separately sold DIN rail mounting plate (model number: **PADP03**) and attach it to a 35 mm (1.38 in.) wide DIN rail. After installation, fix the both sides of the driver with the end plate (not supplied).



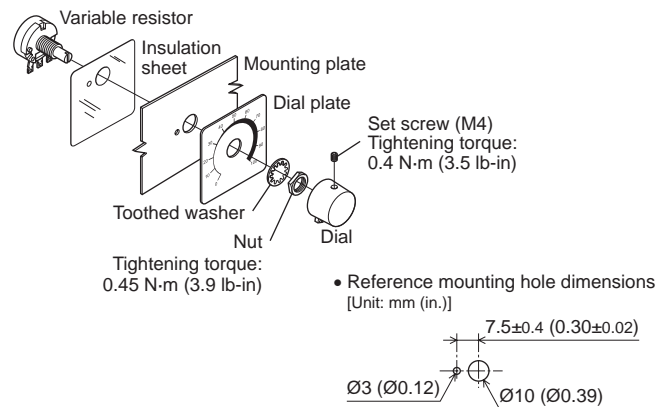
- Note**
- Do not use the mounting holes of the DIN rail mounting plate for any purpose other than securing the DIN rail mounting plate.
 - Be sure to use the supplied screws when securing the DIN rail mounting plate. The use of screws that would penetrate 3 mm (0.12 in.) or more through the surface of the driver may cause damage to the driver.

● **Removing from DIN rail**

Pull the DIN lever down until it locks using a flat tip screwdriver, and lift the bottom of the driver to remove it from the rail. Use force of about 10 to 20 N (2.2 to 4.5 lb.) to pull the DIN lever to lock it. Excessive force may damage the DIN lever.

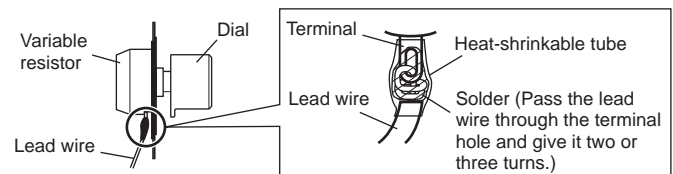
■ **Installing the external potentiometer (supplied)**

Install the external potentiometer as shown below.



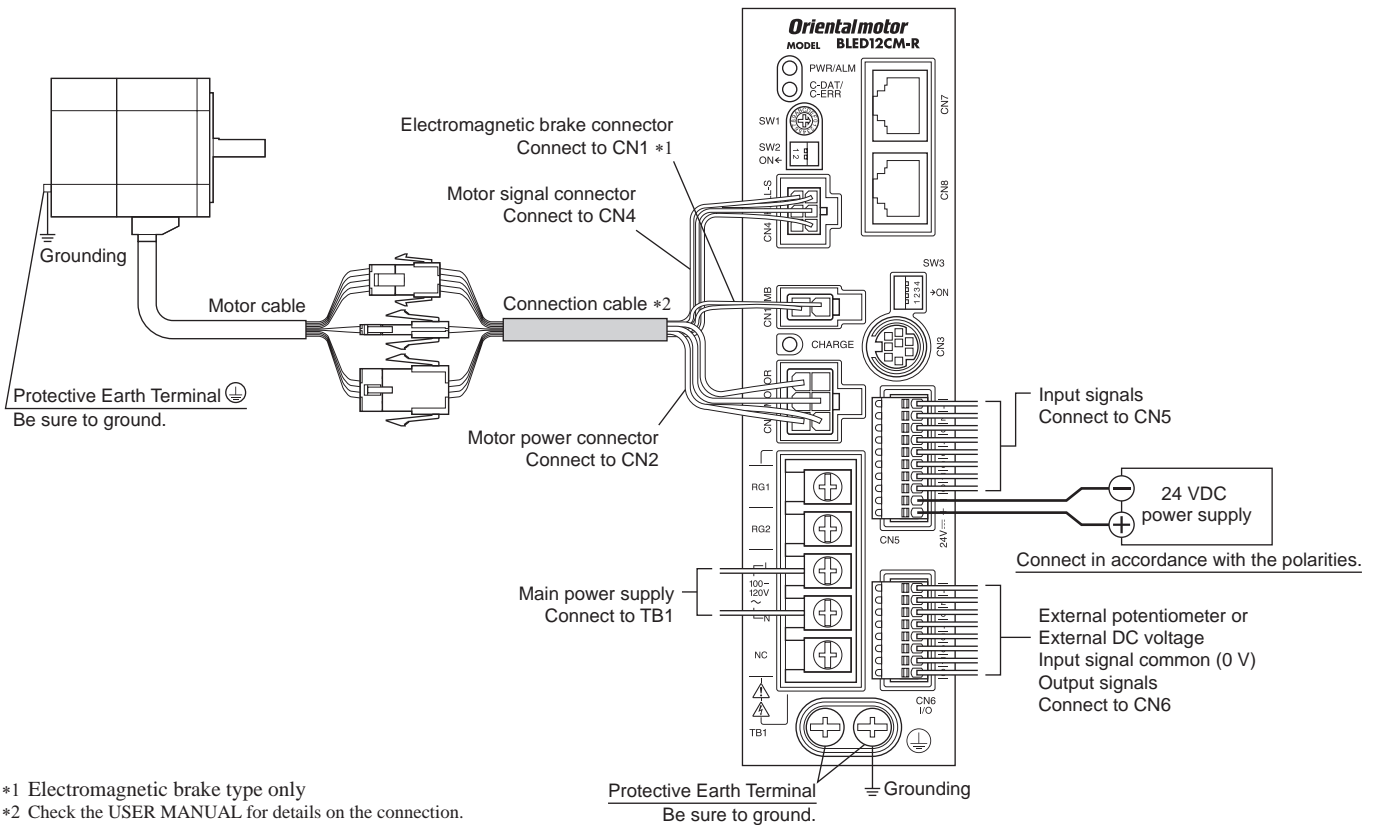
● **Soldering the variable resistor terminal and the lead wires**

Cover a heat-shrinkable tube over the soldered part to insulate. Soldering condition: 235 °C (455 °F), less than 5 sec.



Connection

■ Connection example (electromagnetic brake motor)



Note

- Have the connector plugged in securely. Insecure connections may cause malfunction or damage to the motor or driver.
- When connecting the 24 VDC power supply, check the indication of the driver case and pay attention to the polarity of the power supply. Reverse-polarity connection may cause damage to the driver.
- Do not wire the power supply cable of the driver in the same cable duct with other power lines or motor cables. Doing so may cause malfunction due to noise.
- When cycle the power or plugging/unplugging the connector, turn off the power and wait for the CHARGE LED to turn off before doing so. Residual voltage may cause electric shock.
- When installing the motor to a moving part, use an accessory flexible cable offering excellent flexibility. Refer to the USER MANUAL for details.

■ Connecting the power supply (TB1)

Connect the power cable to the main power supply input terminals (TB1) on the driver.

Input power supply	Connecting method
Single-phase 100-120 V	Connect the live side to terminal L, and the neutral side to terminal N.
Single-phase 200-240 V	Connect the live side to terminal L1, and the neutral side to terminal L2.
Three-phase 200-240 V	Connect the R, S and T phase lines to the L1, L2 and L3 terminals, respectively.

● Power connection terminal and cable

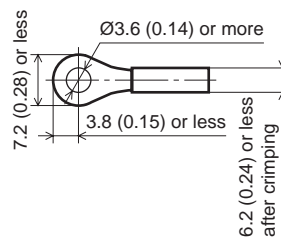
Applicable crimp terminal: Round crimp terminal with insulation cover

Thread size of terminal: M3.5

Tightening torque: 1.0 N·m (8.8 lb-in)

Applicable lead wire: AWG18 to 14 (0.75 to 2.0 mm²)

Conductive material: Use only copper wire.



Unit: mm (in.)

■ Circuit breaker

Be sure to connect a circuit breaker to the power line of the driver to protect the primary circuit.

Rated current of protective device: Single-phase input 10 A, three-phase input 5 A

Circuit breaker: Mitsubishi Electric Corporation NF30

■ Grounding

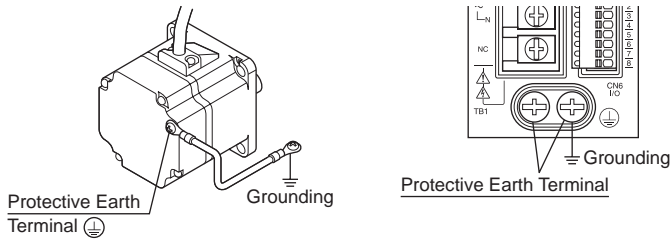
When installing the motor and driver, connect their Protective Earth Terminals (PE).

Two Protective Earth Terminals (PE) are provided on the driver.

Either of the two Protective Earth Terminals can be used for grounding the driver. The terminal that is not grounded can be used as a spare terminal.

Use the spare terminal according to your specific need, such as connecting it to the motor in order to ground the motor.

Do not share the Protective Earth Terminal with a welder or any other power equipment.



● Protective Earth Terminal of the motor

Applicable crimp terminal:

Round crimp terminal with insulation cover

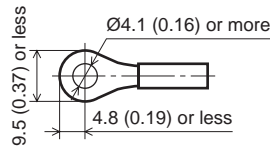
Thread size of terminal: M4

Tightening torque:

0.8 to 1.0 N·m (7.0 to 8.8 lb-in)

Applicable lead wire:

AWG18 to 14 (0.75 to 2.0 mm²)



Unit: mm (in.)

● Protective Earth Terminal of the driver

Applicable crimp terminal: Round crimp terminal with insulation cover

Thread size of terminal: M4

Tightening torque: 1.2 N·m (10.6 lb-in)

Applicable lead wire: AWG18 to 14 (0.75 to 2.0 mm²)

● Precautions about static electricity

Static electricity may cause the driver to malfunction or suffer damaged.

Be sure to ground the motor and driver to prevent them from being damaged by static electricity.

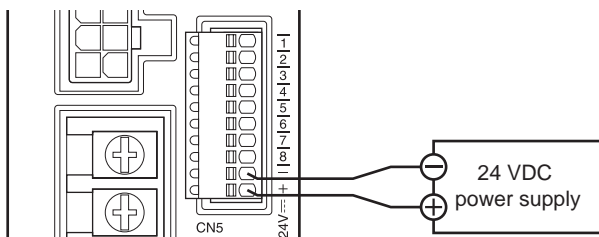
■ Connecting the motor (CN1/CN2/N4)

Connect the motor power connector to the CN2, and the motor signal connector to the CN4 on the driver. When using an electromagnetic brake type motor, also connect the electromagnetic brake connector to the CN1. When extending the wiring distance between the motor and driver, use the connection cable (supplied or accessory). Connection can be extended to a maximum of 20.4 m (66.9 ft.).

■ Connecting the 24 VDC power supply

The 24 VDC power supply is for the control circuit of the driver.

Be sure to connect a power supply which voltage is 24 VDC -15% to +20% and current is 1 A or more, to the CN5.



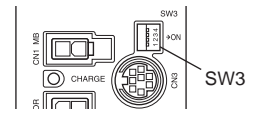
- Note**
- When connecting the 24 VDC power supply, check the indication of the driver case and pay attention to the polarity of the power supply. Reverse-polarity connection may cause damage to the driver.
 - When cycling the 24 VDC power, turn off the power and wait for the PWR/ALM LED to turn off.

■ Selecting a power supply for I/O signals

The driver comes with a built-in power supply.

To control the operation using relays and switches, set the SW3-No.3 of the function setting switch1 to the ON side to select the built-in power supply.

Factory setting: OFF (an external power supply is used)



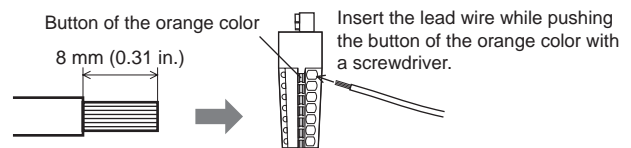
Note The built-in power supply cannot be used with the source logic. If the source logic is used, do not turn the SW3-No.3 of the function setting switch1 to the ON side.

■ Connecting the I/O signals (CN5/CN6)

Connect the input signals to the CN5, and connect the speed setting input signals and output signals to the CN6.

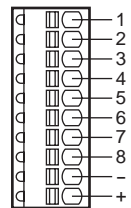
Applicable lead wire: AWG26 to 20 (0.14 to 0.5 mm²)

Length of the insulation cover which can be peeled: 8 mm (0.31 in.)



● CN5 pin assignment

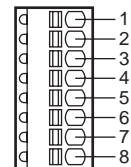
Pin No.	Name	Description *
1	IN0	Input terminal 0 [FWD]
2	IN1	Input terminal 1 [REV]
3	IN2	Input terminal 2 [STOP-MODE]
4	IN3	Input terminal 3 [M0]
5	IN4	Input terminal 4 [ALARM-RESET]
6	IN5	Input terminal 5 [MB-FREE]
7	IN6	Input terminal 6 [TH]
8	IN-COM0	Input signals common
-	-	Power supply GND/ Input signal common (0 V)
+	-	24 VDC power supply



* The signal in brackets [] is a function that is assigned at the time of shipment. The assignments can be changed using the **OPX-2A** or **MEXE02**, or via RS-485 communication.

● CN6 pin assignment

Pin No.	Name	Description *2
1	VH	External speed setting input
2	VM	
3	VL *1	
4	IN-COM1	Input signals common (0 V)
5	OUT0+	Output terminal 0 (+) [SPEED-OUT]
6	OUT0-	Output terminal 0 (-) [SPEED-OUT]
7	OUT1+	Output terminal 1 (+) [ALARM-OUT1]
8	OUT1-	Output terminal 1 (-) [ALARM-OUT1]



*1 The VL input is connected to the IN-COM1 inside the driver.

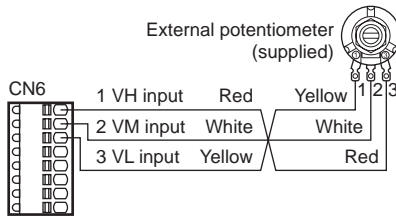
*2 The signal in brackets [] is a function that is assigned at the time of shipment. The assignments can be changed using the **OPX-2A** or **MEXE02**, or via RS-485 communication.

■ Connecting an external speed setter

The rotation speed can be set using an external potentiometer (supplied) or external DC voltage. Connect the external potentiometer to the CN6 on the driver with the supplied signal wire.

● Using an external potentiometer (supplied)

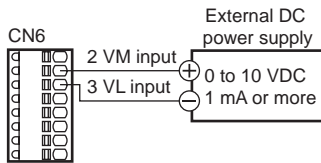
Connect the shielded wire of the signal wire to the VL input terminal and make sure the shield wire does not contact other terminals.



● Using an external DC voltage

For the external voltage, use a DC power supply with reinforced insulation on its primary and secondary sides.

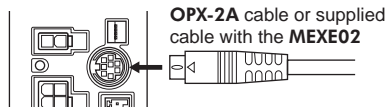
The input impedance between the VM input and VL input is approximately 30 kΩ.



Note Be sure to set the external DC voltage to 10 VDC or lower. When connecting the external DC power supply, make sure the polarities are correct. If the polarities are reversed, the driver may be damaged.

■ Connecting the data setter (CN3)

Connect **OPX-2A** cable or supplied cable with the **MEXE02** to CN3 on the driver.

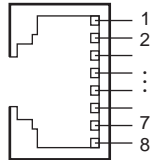


■ Connecting the RS-485 communication cable (CN7/CN8)

Connect the RS-485 communication cable to the CN7 or CN8 on the driver.

CN7/CN8 pin assignment

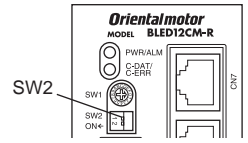
Pin No.	Name	Description
1	N.C.	Not used
2	GND	GND
3	TR+	RS-485 communication signal (+)
4	N.C.	Not used
5	N.C.	Not used
6	TR-	RS-485 communication signal (-)
7	N.C.	Not used
8	N.C.	Not used



■ Test operation mode

Once a main power supply and 24 VDC power supply are connected, the connection status can be checked by driving the motor tentatively without setting the data.

1. Turn on the main power supply and 24 VDC power supply after completing the wiring.
2. Turn the test operation mode switch (SW2-No.1) ON.
3. Check that the motor rotates at low speed (100 r/min) in the forward direction.
If the motor did not rotate or malfunction could be seen, check the wiring after turning off the power.
4. Turn the test operation mode switch OFF.
The motor stops.



Note If the FWD input or REV input is turned ON while the motor rotates in test operation, the motor will stop. (A warning or alarm signal is not output.) To reset this condition, turn all of test operation mode switch, FWD input and REV input OFF. The motor will be able to operate after turning all of them OFF.

■ Connecting the regeneration unit

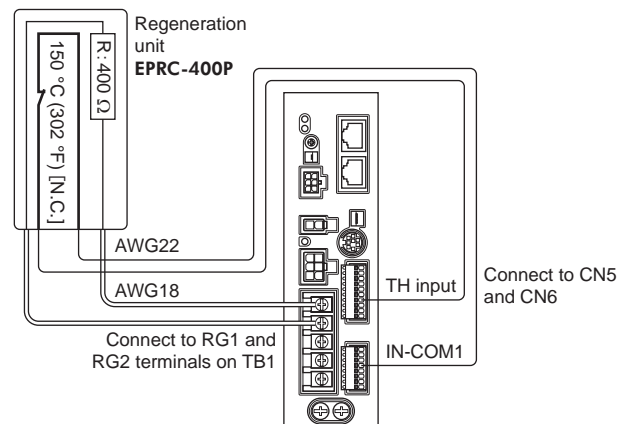
If vertical drive (gravitational operation) such as elevator applications is performed or if sudden start-stop operation of a large inertial load is repeated frequently, connect an accessory regeneration unit **EPRC-400P** (sold separately).

Install the regeneration unit in a location where heat dissipation capacity equivalent to a level achieved with a heat sink [made of aluminum alloy, 350×350×3 mm (13.78×13.78×0.12 in.)] is ensured.

Connecting method

Connect the regeneration unit before turning on the main power and 24 VDC power. The regeneration unit does not perform its control function if connected after the main power and 24 VDC power has been turned on.

- Regenerative current flows through the two thick lead wires (AWG18: 0.75 mm²) of the regeneration unit. Connect them to the RG1 and RG2 terminals of the TB1. The applicable crimp terminal is the same as the one used to connect the power supply.
- The two thin lead wires (AWG22: 0.3 mm²) of the regeneration unit are thermostat outputs. Connect them to the CN5 and CN6.

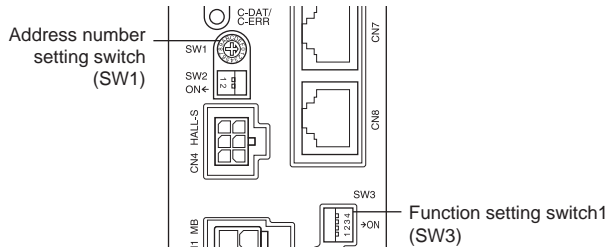


Note

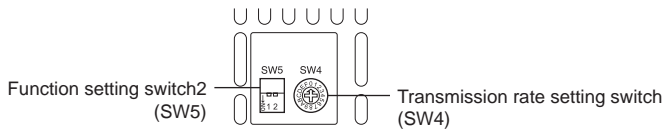
- If the current consumption of the regeneration unit exceeds the allowable level, the thermostat will be triggered and the regeneration unit overheat alarm will generate. If the regeneration unit overheat alarm generates, turn off the power and check the content of the error.
- If an external power supply is used for the power supply of input signals, turn on the external power supply before turning on the driver main power supply.

Setting the communication

• Driver front face



• Driver bottom face



Note Be sure to turn off the driver power before setting the switches. If the switches are set while the power is still on, the new switch settings will not become effective until the driver power is cycled.

■ Protocol

The protocol of RS-485 communication can be set using the SW5-No.2 of the function setting switch2.

Factory setting: OFF (Connecting with network converter)

SW5-No.2	Protocol
ON	Modbus RTU mode
OFF	Connecting with network converter

■ Address number

The address number (slave address) can be set using the address number setting switch (SW1) in combination with the SW5-No.1 of the function setting switch2. Make sure each address number (slave address) you set for each driver is unique.

Factory setting SW1: 0, SW5-No.1: OFF (Address number 0)

Address number	SW1	SW5-No.1	Address number	SW1	SW5-No.1
0 *	0	OFF	16	0	ON
1	1		17	1	
2	2		18	2	
3	3		19	3	
4	4		20	4	
5	5		21	5	
6	6		22	6	
7	7		23	7	
8	8		24	8	
9	9		25	9	
10	A		26	A	
11	B		27	B	
12	C		28	C	
13	D		29	D	
14	E		30	E	
15	F	31	F		

* In the case of Modbus protocol, the address number 0 is reserved for broadcasting, so do not use this address.

■ Transmission rate

The transmission rate can be set using the transmission rate setting switch (SW4).

The transmission rate to be set should be the same as the transmission rate of the master device.

Factory setting: 7 (Network converter)

SW4	Transmission rate (bps)	SW4	Transmission rate (bps)
0	9600	5	Not used
1	19200	6	
2	38400	7	Network converter
3	57600	8 to F	Not used
4	115,200		

Note Do not set the SW4 to positions 5, 6 and 8 to F.

■ Termination resistor

The termination resistor for RS-485 communication (120 Ω) can be set using the SW3-No.4 of the function setting switch1.

Factory setting: OFF (termination resistor disabled)

SW3-No.4	Termination resistor (120 Ω)
OFF	Disabled
ON	Enabled

Operation

This section explains the minimum requirements in order to operate the product. Refer to the USER MANUAL for details on other descriptions.

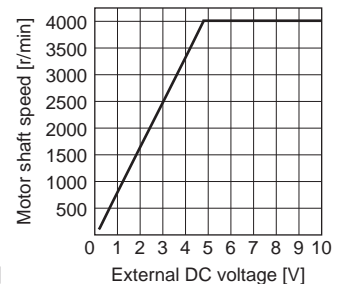
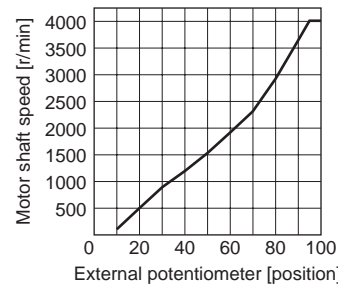
■ Setting the rotation speed

The rotation speed can be set using an external potentiometer (supplied) or external DC voltage.

Turning the external potentiometer in the clockwise direction makes the motor to rotate faster. Turning it in the counterclockwise direction makes the motor to rotate slower.

Setting range: 100 to 4000 r/min

Initial value: 0 r/min



Note

- For the speed setting by external DC voltage, a range of 0 to 5 VDC is set at the time of shipment. Therefore, even if 10 VDC is connected, the speed setting is enabled between 0 and 5 VDC. When setting the speed by a range of 0 to 10 VDC, it is required to change the parameter. Refer to the USER MANUAL for details.
- Be sure to set the external DC voltage to 10 VDC or lower. When connecting the external DC power supply, make sure the polarities are correct. If the polarities are reversed, the driver may be damaged.

■ Running/stopping the motor

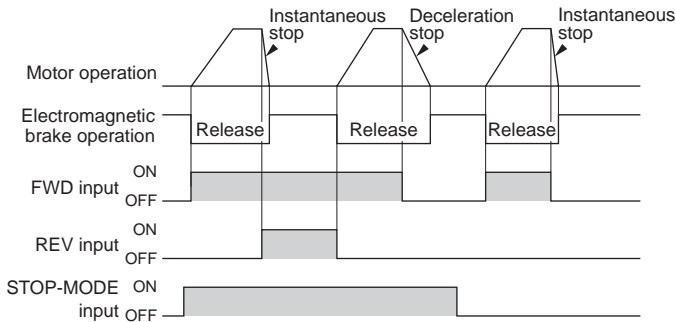
Run/stop the motor by inputting operation control signals.

● Operation

Since signals required to operate the motor are assigned to the control inputs of the CN5, it is possible to perform operation without any change from factory default.

CN5 Pin No.	Name	Initial value	Description
1	IN0	FWD input	This signal is used to rotate a motor in the clockwise direction.
2	IN1	REV input	This signal is used to rotate a motor in the counterclockwise direction.
3	IN2	STOP-MODE input	This signal is used to select how to stop the motor.

- When the FWD input is turned ON, the motor rotates in the clockwise direction. When the FWD input is turned OFF, the motor stops.
- When the REV input is turned ON, the motor rotates in the counterclockwise direction. When the REV input is turned OFF, the motor stops.
- If both the FWD input and REV input are turned ON, the motor stops instantaneously.



Note When using the motor in vertical drive (gravitational operation), although it depends on the load condition, if operation is performed with the setting below, the motor shaft may momentarily rotate in the reverse direction (about one-fourth revolution of the motor output shaft) at the time of starting/stopping the motor.

- When the set rotation speed is low
- When the acceleration time and deceleration time is long

● Stop

When the STOP-MODE input is ON, the motor decelerates to a stop. When the STOP-MODE input is OFF, the motor stops instantaneously.

Inspection

It is recommended that periodic inspections for the items listed below are conducted after each operation of the motor.

If an abnormal condition is noted, discontinue any use and contact your nearest Oriental Motor sales office.

Inspection item

- The motor/gearhead mounting screws are not loose.
- Check for any unusual noises in the motor bearings (ball bearings) or other moving parts.
- The bearing (ball bearing) and gear meshing parts of the gearhead are not generating noise.
- The motor/gearhead output shaft is not misaligned with the load shaft.
- Are there any scratches, signs of stress or loose driver connections in the cable?
- Are the openings in the driver blocked?
- The driver mounting screws and power connection terminal screws are not loose.
- Are there any strange smells or appearances within the driver?

- Note**
- Conduct the insulation resistance measurement or dielectric strength test separately on the motor and the driver. Conducting the insulation resistance measurement or dielectric strength test with the motor and driver connected may result in damage to the product.
 - The driver uses semiconductor elements, so be extremely careful when handling them.

Related products (sold separately)

■ Network converter

NETC01-CC (CC-Link Ver.1.1 compatible)

NETC02-CC (CC-Link Ver.2 compatible)

NETC01-M2 (MECHATROLINK-Ⅱ compatible)

NETC01-M3 (MECHATROLINK-Ⅲ compatible)

NETC01-ECT (EtherCAT compatible)

When the BLE Series FLEX RS-485 communication type is used in a CC-Link system or MECHATROLINK system, EtherCAT system while connecting the driver via the network converter, the converted data from the each communication protocol to the RS-485 communication protocol can be sent to the driver.

Alarms and other data output from the driver, which normally conform to the RS-485 communication protocol, can also be converted to each communication protocol and sent to the master station accordingly.

Accessories (sold separately)

■ Connection cable

This cable is used to extend the wiring distance between the driver and motor. Connection can be extended to a maximum of 20.4 m (66.9 ft.). Up to three connection cables can be connected consecutively.

Flexible connection cables are also available.

● Standard type

●Connection cable		●Flexible connection cable	
Length [m (ft.)]	Model	Length [m (ft.)]	Model
1 (3.3)	CC01BLE	1 (3.3)	CC01BLER
2 (6.6)	CC02BLE	2 (6.6)	CC02BLER
3 (9.8)	CC03BLE	3 (9.8)	CC03BLER
5 (16.4)	CC05BLE	5 (16.4)	CC05BLER
7 (23.0)	CC07BLE	7 (23.0)	CC07BLER
10 (32.8)	CC010BLE	10 (32.8)	CC010BLER
15 (49.2)	CC015BLE	15 (49.2)	CC015BLER
20 (65.6)	CC020BLE	20 (65.6)	CC020BLER

● Electromagnetic brake type

●Connection cable		●Flexible connection cable	
Length [m (ft.)]	Model	Length [m (ft.)]	Model
1 (3.3)	CC01BLEM	1 (3.3)	CC01BLEMR
2 (6.6)	CC02BLEM	2 (6.6)	CC02BLEMR
3 (9.8)	CC03BLEM	3 (9.8)	CC03BLEMR
5 (16.4)	CC05BLEM	5 (16.4)	CC05BLEMR
7 (23.0)	CC07BLEM	7 (23.0)	CC07BLEMR
10 (32.8)	CC010BLEM	10 (32.8)	CC010BLEMR
15 (49.2)	CC015BLEM	15 (49.2)	CC015BLEMR
20 (65.6)	CC020BLEM	20 (65.6)	CC020BLEMR

■ Regeneration unit

If vertical drive (gravitational operation) such as elevator applications is performed or if sudden start-stop operation of a large inertial load is repeated frequently, connect the regeneration unit **EPRC-400P**.

Model: **EPRC-400P**

■ Data setter

The data setter lets you set data and parameters for your **BLE** Series **FLEX RS-485** communication type with ease and also functions as a monitor.

Model: **OPX-2A**

■ Communication cable for the support software

Be sure to purchase the communication cable for the support software when connecting a driver to the PC in which the **MEXE02** has been installed.

This is a set of a PC interface cable and USB cable. The cable is connected to the USB port on the PC.

Model: **CC05IF-USB** [5 m (16.4 ft.)]

The **MEXE02** can be downloaded from Oriental Motor Website Download Page. Also, the **MEXE02** is provided in the form of a storage medium. For details, check out our web site or contact your nearest Oriental Motor sales office.

■ DIN rail mounting plate

When mounting the driver to a DIN rail, use a DIN rail mounting plate.

Use a DIN rail 35 mm (1.38 in.) wide.

Model: **PADP03**

Regulations and standards

This product is recognized by UL under the UL and CSA standards.

Recognized name is motor model name and driver model name.

The product is affixed the CE Marking under the Low Voltage Directive.

■ UL Standards and CSA Standards

	Applicable Standards	Certification Body	Standards File No.
Motor *	UL 1004-1 CSA C22.2 No.100	UL	E335369
Driver	UL 61800-5-1		E171462

* Thermal class UL/CSA Standards: 105(A)

■ EU Directive

● CE Marking

● Low Voltage Directive

- This product has been designed and manufactured for use as a component to be installed in equipment.
- This product cannot be used in IT distribution system.
- Install the product inside an enclosure in order to avoid contact with hands.
- When installing the motor and driver, securely connect their Protective Earth Terminals.
- Isolate the motor cable, power-supply cable and other drive cables from the signal cables (CN3, CN5 to CN8) by means of double insulation.

Applicable Standards

Motor: EN 60034-1, EN 60034-5, EN 60664-1, EN 60950-1

Driver: EN 60950-1, EN 61800-5-1

Installation conditions (EN Standard)

Motor *1	Driver
For incorporating in equipment Overvoltage category: III *2 Pollution degree: 3 Protection against electric shock: Class I	For incorporating in equipment Overvoltage category: II Pollution degree: 2 Protection against electric shock: Class I

*1 Thermal class EN Standards: 120(E)

*2 Overvoltage category II when EN 60950-1 is applicable.

● EMC Directive

This product has received EMC compliance under the conditions specified in "Example of motor and driver installation and wiring" on the USER MANUAL. Since the compliance of the final machinery with the EMC Directive will depend on such factors as the configuration, wiring, layout and risk involved in the control-system equipment and electrical parts, it therefore must be verified through EMC measures by the customer of the machinery.

Applicable Standards

EMI	Emission Tests	EN 55011 group1 classA EN 61000-6-4, EN 61800-3
EMS	Immunity Tests	EN 61000-6-2, EN 61800-3

Caution: This equipment is not intended for use in residential environments nor for use on a low-voltage public network supplied in residential premises, and it may not provide adequate protection to radio reception interference in such environments.

A temperature test has been conducted with a heatsink plate. The size, thickness and material of the heatsink plates are as below table.

Motor model	Size [mm (in.)]	Thickness [mm (in.)]	Material
BLEM23	115×115 (4.53×4.53) *	5 (0.20)	Aluminum alloy
BLEM46	135×135 (5.31×5.31)		
BLEM512	165×165 (6.50×6.50)		

* Electromagnetic brake type: 135×135 mm (5.31×5.31 in.)

■ Republic of Korea, Radio Waves Act

KC Mark is affixed to this product under the Radio Waves Act, the republic of Korea.

■ RoHS Directive

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).

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Published in June 2020

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