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.

For your use, refer to the USER MANUAL downloaded from Oriental Motor Website for detailed instructions on how to use the product.
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---

* Be sure to ground the Protective Earth Terminal (ground terminal) to ensure the safe use of the product.

Refer to "3. Grounding" for details, and ground securely.
Introduction

1. Before using the product

Only qualified personnel of electrical and mechanical engineering should work with the product. Use the product correctly after thoroughly reading the section “Safety precautions” on p.4. In addition, be sure to observe the contents described in warning, caution, and note in this manual. The product described in this manual 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 compensation for damage caused through failure to observe this warning.

2. Related operating manuals

For operating manuals not included with the product, contact your nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.

<table>
<thead>
<tr>
<th>Motor</th>
<th>Operating manual name</th>
<th>Operating manual number</th>
<th>Included or not included with product</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLM Motor OPERATING MANUAL</td>
<td>Connector type</td>
<td>HM-5188</td>
<td>Included</td>
</tr>
<tr>
<td></td>
<td>With Electromagnetic Brake Connector type</td>
<td>HM-5236</td>
<td>Included</td>
</tr>
<tr>
<td></td>
<td>Right angle Hollow shaft Hypoid gear JH gearhead</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foot mount gearhead JB gearhead</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parallel shaft gearhead JV gearhead</td>
<td>HM-5197</td>
<td>Included</td>
</tr>
<tr>
<td>Driver BLE2 Series OPERATING MANUAL (Basic Function)</td>
<td></td>
<td>HP-5104</td>
<td>Included</td>
</tr>
<tr>
<td>BLE2 Series USER MANUAL</td>
<td></td>
<td>HP-5105</td>
<td>Not included</td>
</tr>
</tbody>
</table>

Refer to the USER MANUAL for details on driver functions and parameters.
Safety precautions

The precautions described below are intended to ensure the safe and correct use of the product, and to prevent the user and other personnel from exposure to the risk of injury. 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 safe use of the product.

### Description of graphic symbols

- Indicates “PROHIBITED” actions that must not be performed.
- Indicates “COMPULSORY” actions that must be performed.

---

## Warning

### Operating environment

- **WARNING**: Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock or injury.

### Handling of this product

- **WARNING**: Do not transport, install, connect or inspect the product while the power is supplied. Always turn off the power before carrying out these operations. This may result in electric shock or damage to equipment.

- **CAUTION**: The terminals on the driver marked symbol indicate the presence of high voltage. Do not touch these terminals while the power is supplied. Doing so may result in fire or electric shock.

- **CAUTION**: Do not use the brake mechanism of the electromagnetic brake motor as a safety brake. Doing so may result in injury or damage to equipment.

- **CAUTION**: Do not use the brake mechanism of the electromagnetic brake motor as a safety brake. Doing so may result in injury or damage to equipment.

- **CAUTION**: Only qualified and educated personnel should be allowed to perform installation, connection, operation and inspection/troubleshooting of the product. Handling by unqualified and uneducated personnel may result in fire, electric shock, injury, or damage to equipment.

- **CAUTION**: Use an electromagnetic brake motor in an application of vertical drive such as elevating equipment. Failure to do so may result in injury or damage to equipment.

- **CAUTION**: If the driver protective function is activated, remove the cause before resetting the protective function.

### Installation

- **WARNING**: The motor and driver are Class I equipment. When installing the motor and driver, ground their Protective Earth Terminals. Failure to do so may result in electric shock.

### Connection

- **WARNING**: Do not machine or modify the connection cable. This may result in fire, electric shock or damage to equipment.

- **CAUTION**: Do not forcibly bend, pull or pinch the cable. This may result in fire, electric shock or damage to equipment.

- **CAUTION**: Do not remove the connector cap until the connection cable is connected so that the O-ring of the connector connection on the motor is not damaged.

- **CAUTION**: Securely connect and ground in accordance with the connection diagram. Be sure to observe the specified cable sizes.

### Operation

- **WARNING**: Do not turn the MB-FREE input ON when the electromagnetic brake motor is used in an application of vertical drive such as elevating equipment. The motor will lose its holding force. This may result in injury or damage to equipment.

- **WARNING**: When the electromagnetic brake motor is used in an application of vertical drive such as elevating equipment, do not set the “Electromagnetic brake function at alarm” parameter to “Lock after coasting to a stop.” Failure to do so may result in fire or electric shock.

- **CAUTION**: Always keep the power supply voltage of the driver within the specified range. Failure to do so may result in fire or electric shock.

- **CAUTION**: Use a motor, gearhead, and driver only in the specified combination. Failure to do so may result in fire, electric shock or damage to equipment.

- **CAUTION**: When the electromagnetic brake motor is used in an application of vertical drive such as elevating equipment, operate it after checking the condition of a load sufficiently so that a load in excess of the rated torque is not applied or a small value is not set in the torque limiting value. Failure to do so may result in injury or damage to equipment.
## Safety precautions

### Maintenance and inspection

<table>
<thead>
<tr>
<th>Safety Precaution</th>
<th>Safety Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not touch the motor or driver when conducting the insulation resistance measurement or dielectric strength test.</td>
<td>Accidental contact may result in electric shock.</td>
</tr>
<tr>
<td>Do not touch the connection terminals on the driver immediately (until the CHARGE LED turns off) after the power is turned off.</td>
<td></td>
</tr>
<tr>
<td>Always turn off the power before performing maintenance or inspection.</td>
<td></td>
</tr>
<tr>
<td>Regularly check the openings in the driver for accumulated dust.</td>
<td>Accumulated dust may cause fire.</td>
</tr>
</tbody>
</table>

### Repair, disassembly and modification

<table>
<thead>
<tr>
<th>Safety Precaution</th>
<th>Safety Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not disassemble or modify the motor, gearhead and driver. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.</td>
<td>This may result in electric shock, injury or equipment damage.</td>
</tr>
</tbody>
</table>

### Handling of this product

<table>
<thead>
<tr>
<th>Safety Precaution</th>
<th>Safety Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not use the motor, gearhead, driver, and regeneration resistor in a state of exceeding the specification values.</td>
<td>Doing so may result in fire, electric shock, injury or equipment damage.</td>
</tr>
<tr>
<td>Do not insert an object into the openings in the driver.</td>
<td>The surface of the motor, gearhead, driver, and regeneration resistor may be hot, thereby causing a skin burn(s).</td>
</tr>
<tr>
<td>Do not touch the motor, gearhead, driver, and regeneration resistor while operating or for a certain time after stopping.</td>
<td></td>
</tr>
</tbody>
</table>

### Installation

<table>
<thead>
<tr>
<th>Safety Precaution</th>
<th>Safety Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not leave anything around the motor and driver that would obstruct ventilation.</td>
<td>Doing so may result in damage to equipment.</td>
</tr>
<tr>
<td>Securely install the motor, gearhead and driver to the mounting plates.</td>
<td>Inappropriate installation may cause the motor, gearhead or driver to detach and fall, resulting in injury or damage to equipment.</td>
</tr>
</tbody>
</table>

### Connection

<table>
<thead>
<tr>
<th>Safety Precaution</th>
<th>Safety Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be sure to ground the motor and driver to prevent them from being damaged by static electricity.</td>
<td>Failure to do so may result in fire or damage to equipment.</td>
</tr>
<tr>
<td>For the power supply of I/O signals, use a DC power supply with reinforced insulation on its primary and secondary sides.</td>
<td>Failure to do so may result in electric shock.</td>
</tr>
</tbody>
</table>

### Operation

<table>
<thead>
<tr>
<th>Safety Precaution</th>
<th>Safety Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not touch the rotating part (output shaft) while operating the motor.</td>
<td>This may result in injury.</td>
</tr>
<tr>
<td>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.</td>
<td>Failure to do so may result in fire, electrical shock or injury.</td>
</tr>
<tr>
<td>Immediately when trouble has occurred, stop operation and turn off the driver power.</td>
<td></td>
</tr>
<tr>
<td>The motor surface temperature may exceed 70 °C (158°F) even under normal operating conditions. If the operator is allowed to approach the motor in operation, attach a warning label in a conspicuous position as shown in the figure.</td>
<td>Failure to do so may result in a skin burn(s).</td>
</tr>
</tbody>
</table>

### Warning information

A warning label with handling instructions is attached on the driver. Be sure to observe the instructions on the label when handling the driver.
Precautions for use

This chapter covers restrictions and requirements the user should consider when using the product. Be sure to match the motor output power with the driver output power.

**Wirings**

- 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 installed, use one incorporating high-frequency noise elimination measures. For selection of the protective device, refer to the following "Preventing leakage current."

- Noise elimination measures
  Provide noise elimination measures to prevent a motor malfunction caused by external noise. For more effective elimination of noise, use a shielded I/O signal cable or attach ferrite cores if a non-shielded cable is used. Refer to p.49 for the noise elimination measures.

- 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 a product offering resistance against high frequency current like the following:
  Mitsubishi Electric Corporation: NV series

- Connecting the motor and driver
  Limit the number of times so that attaching/detaching between the connection cable and the motor or driver will not exceed 100 times.
  To connect the motor and driver, always use the dedicated connection cable (sold separately). "For BRAKE MOTOR" is indicated on the connection cable for electromagnetic brake.
  Check the operating manual included with the motor for details.

- Connection cable
  Do not apply a strong force on the locking lever of the connector for motor connection. Applying a strong force on the locking lever may cause damage.

- Note on connecting a power supply whose positive terminal is grounded
  The USB communication connector on the driver is 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 these equipment to short, damaging both.

**Installation circumstances**

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

- Caution when using in low temperature environment
  When an ambient temperature is low, since the load torque may increase by the oil seal or viscosity increment of grease used in the gearhead, the output torque may decrease or the overload alarm may generate. However, as time passes, the oil seal or grease is warmed up, and the motor can be operated without generating the overload alarm.

**Operations**

- Use an electromagnetic brake 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, use an electromagnetic brake motor in order to hold a load in position.
  When the electromagnetic brake motor is used in an application of vertical drive, although depending on a load condition, the motor shaft rotation may momentarily reverse (within 90 degrees of the motor output shaft) at the time of starting or stopping if it is operated under the setting conditions below.
    - When the set rotation speed is low
    - When the acceleration time or deceleration time is long

- Do not use a solid-state relay (SSR) to turn on or off the power supply.
  A circuit that turns on or off the power supply via a solid-state relay (SSR) may damage the motor and driver.

- If vertical drive (gravitational operation) such as elevating equipment is performed or if sudden start-stop operation of a large inertia is repeated frequently, use the regeneration resistor (sold separately).
  An alarm of overvoltage may be generated depending on the operating condition of the motor. When the alarm of overvoltage is detected, reconsider the operating condition or connect the regeneration resistor (sold separately). Refer to p.19 for connection method.
**Insulation resistance measurement and dielectric strength test**

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.

**Handling of the driver**

The driver uses semiconductor elements, so be extremely careful when handling it.

Static electricity may cause damage to the driver.

Also, be sure to ground the product in order to prevent electric shock or product damage by static electricity.

**Saving the data**

**Notes when saving the data to the non-volatile memory**

The display blinks while the data is being set (writing to the non-volatile memory) by pressing the setting dial or the data is being initialized (about 5 seconds). Do not turn off the power supply while the display on the operation panel is blinking.

Doing so may abort writing the data to the non-volatile memory and cause an alarm of EEPROM error to generate. The non-volatile memory can be rewritten approximately 100,000 times.

---

**Specification change of the driver**

The specifications have been changed in some products (drivers for electromagnetic brake motor are excluded). This manual describes contents for drivers of the version 3.00 or later, which are after the specification change.

The **MEXE02** of the version 3.56 or later supports the drivers after the specification change.

**Note**

Note that some functions described in this manual cannot be used if the version of the driver or **MEXE02** is old.

The version of the driver can be checked using the unit information monitor of the **MEXE02**. (⇒ USER MANUAL)

The version of the **MEXE02** can be checked from the help menu screen.

---

**Contents about the change**

- **Addition**

  INFO action parameters shown below are added.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Addition</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO action (Driver temperature information (INFO-DRVTMP))</td>
<td>INFO action (Speed information (INFO-SPD))</td>
</tr>
<tr>
<td>INFO action (Load information (INFO-LOAD))</td>
<td>INFO action (Overvoltage information (INFO-OVOLT))</td>
</tr>
<tr>
<td>INFO action (Undervoltage information (INFO-UVOLT))</td>
<td>INFO action (Operation prohibited information (INFO-DRV))</td>
</tr>
<tr>
<td>INFO action (Tripmeter information (INFO-TRIPI))</td>
<td>INFO action (Odometer information (INFO-ODO))</td>
</tr>
<tr>
<td>INFO action (Main power supply time information (INFO-PTIME))</td>
<td>INFO action (Main power supply count information (INFO-PCOUNT))</td>
</tr>
<tr>
<td>INFO action (Start operation restricted mode information (INFO-DLSMNTD))</td>
<td>INFO action (I/O test mode information (INFO-IOTEST))</td>
</tr>
<tr>
<td>INFO action (Configuration request information (INFO-CFG))</td>
<td>INFO action (Power cycling request information (INFO-RBT))</td>
</tr>
</tbody>
</table>
System configuration

The system configuration of the BLE2 Series is shown below. The figure below shows the driver for the electromagnetic brake motor.

- **Setting of operation data and parameters**
  
  PC in which the support software MEXEO2 has been installed

  To connect to the driver, provide a commercially available USB cable. The PC must be supplied by the user.

- **Setting of operation speed and torque limiting**
  
  (for external analog setting devices)

  **External potentiometer**
  
  (sold separately)

  Connect the potentiometer when setting the motor speed or torque limiting value externally.

  Or

  **External DC voltage**
  
  Connect a DC power supply when setting the motor speed or torque limiting value by DC voltage.

  ⇒ p.19

---

Motor (sold separately)

- **Connection cable**
  
  (sold separately)

- **Sensor connector**

- **Electromagnetic brake connector**

- **Motor connector**

---

Power supply

Make sure power supply voltage does not exceed the rated voltage.

Circuit breaker or earth leakage breaker

Always connect a breaker to protect the primary circuit.

Regeneration unit RGB100 (sold separately)

Use the regeneration resistor when continuous regeneration operation such as gravitational operation in vertical drive is performed or an inertia load is operated with round shaft type motors of 300 W or higher. ⇒ p.19

---

Driver

- **Input**
  
  External control equipment
  
  Connects I/O signals.

- **Output**

---

PC in which the support software MEXEO2 has been installed

- **Connection cable**
  
  (sold separately)
Checking the product

This chapter explains the items you should check, as well as the name and function of each part.

1. Package contents

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.

- Driver...............................................1 unit
- Operating manual (this document).....1 copy

2. How to identify the product model

- Driver

**BLE2D**  **200** - **C**  **M**

1. Driver type
   - BLE2D: BLE2 Series driver
2. Output power
   - 30: 30 W  60: 60 W  120: 120 W  200: 200 W  300: 300 W  400: 400 W
3. Power supply voltage
   - A: Single-phase 100 - 120 VAC
   - C: Single-phase, Three-phase 200 - 240 VAC
   - S: Three-phase 200 - 240 VAC
4. Driver additional function
   - M: For electromagnetic brake motor

3. Information about nameplate

![BRUSHLESS MOTOR DRIVER MODEL](image)

- Driver model
- Serial number
- Manufacturing date

ORIENTAL MOTOR CO., LTD.
TOYOCITY 1-19-62, HANUMI
MADE IN JAPAN
Products with which the drivers can be combined are listed below. Verify the driver model and the motor model against the model name described on the package label. Motor model columns in the table below describes part of the motor model name. Refer to the operating manual included with the motor for details about the motor models.

<table>
<thead>
<tr>
<th>Output power</th>
<th>Power supply voltage</th>
<th>Driver model</th>
<th>Motor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 W</td>
<td>Single-phase 100-120 VAC</td>
<td>BLE2D30-A</td>
<td>BLM230HP</td>
</tr>
<tr>
<td></td>
<td>Single-phase 200-240 VAC</td>
<td>BLE2D30-C</td>
<td></td>
</tr>
<tr>
<td>60 W</td>
<td>Single-phase 100-120 VAC</td>
<td>BLE2D60-A</td>
<td>BLM460SHP</td>
</tr>
<tr>
<td></td>
<td>Single-phase 200-240 VAC</td>
<td>BLE2D60-C</td>
<td>BLM260HP</td>
</tr>
<tr>
<td>120 W</td>
<td>Single-phase 100-120 VAC</td>
<td>BLE2D120-A</td>
<td>BLM5120HP</td>
</tr>
<tr>
<td></td>
<td>Single-phase 200-240 VAC</td>
<td>BLE2D120-C</td>
<td></td>
</tr>
<tr>
<td>200 W</td>
<td>Single-phase 200-240 VAC</td>
<td>BLE2D200-C</td>
<td>BLM6200SHP</td>
</tr>
<tr>
<td></td>
<td>Three-phase 200-240 VAC</td>
<td>BLM5200HP</td>
<td></td>
</tr>
<tr>
<td>300 W</td>
<td>Single-phase 200-240 VAC</td>
<td>BLE2D300-C</td>
<td>BLM6300SHP</td>
</tr>
<tr>
<td></td>
<td>Three-phase 200-240 VAC</td>
<td>BLM5300HP</td>
<td></td>
</tr>
<tr>
<td>400 W</td>
<td>Three-phase 200-240 VAC</td>
<td>BLE2D400-S</td>
<td>BLM6400SHP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BLM5400HP</td>
<td></td>
</tr>
</tbody>
</table>

* With Electromagnetic Brake

<table>
<thead>
<tr>
<th>Output power</th>
<th>Power supply voltage</th>
<th>Driver model</th>
<th>Motor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 W</td>
<td>Single-phase 100-120 VAC</td>
<td>BLE2D120-AM</td>
<td>BLM5120HPM</td>
</tr>
<tr>
<td></td>
<td>Single-phase 200-240 VAC</td>
<td>BLE2D120-CM</td>
<td></td>
</tr>
<tr>
<td>200 W</td>
<td>Single-phase 200-240 VAC</td>
<td>BLE2D200-CM</td>
<td>BLM6200SHPM</td>
</tr>
<tr>
<td></td>
<td>Three-phase 200-240 VAC</td>
<td>BLM5200HPM</td>
<td></td>
</tr>
</tbody>
</table>
## 5. Names and functions of parts

<table>
<thead>
<tr>
<th>Item</th>
<th>Indication</th>
<th>Description</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation panel</td>
<td>MODE LOCAL RUN STOP</td>
<td>Operation keys: These keys are used to switch the operation mode or change parameters. When the local control operation is performed, the motor can be operated and stopped using the [RUN] key and the [STOP] key.</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>PUSH-SET</td>
<td>Setting dial: Turn - Setting of parameter value, screen transitions Press - Determine (SET)</td>
<td></td>
</tr>
<tr>
<td>LOCAL LED</td>
<td>LOCAL</td>
<td>This LED is lit in green when the local control operation is performed.</td>
<td>32</td>
</tr>
<tr>
<td>ALARM LED</td>
<td>ALARM</td>
<td>This LED blinks in red when an alarm is generated. This LED blinks in orange when information is generated. (Information ⇒ USER MANUAL)</td>
<td>44</td>
</tr>
<tr>
<td>CHARGE LED</td>
<td>CHARGE</td>
<td>This LED is lit in red while the main power is supplied. After the main power is turned off, the LED will turn off once the residual voltage in the driver drops to a safe level.</td>
<td>–</td>
</tr>
<tr>
<td>Main power supply input terminal (CN1)</td>
<td>L, N, NC</td>
<td>Single-phase 100-120 VAC: Connects a single-phase 100-120 VAC power supply to L and N. NC is not used.</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>L1, L2, NC L1, L2, L3</td>
<td>Single-phase 200-240 VAC: Connects a single-phase 200-240 VAC power supply to L1 and L2. NC is not used.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Three-phase 200-240 VAC: Connects a three-phase 200-240 VAC power supply to L1, L2, L3.</td>
<td></td>
</tr>
<tr>
<td>Regeneration resistor terminal (CN1)</td>
<td>RG1, RG2</td>
<td>Connects the main power supply.</td>
<td>19</td>
</tr>
<tr>
<td>Motor connector (CN2)</td>
<td>MOTOR</td>
<td>Connects the power connector (white) of the connection cable.</td>
<td></td>
</tr>
<tr>
<td>Electromagnetic brake connector (CN3)</td>
<td>MB</td>
<td>Connects the electromagnetic brake connector (white) of the connection cable.</td>
<td>15</td>
</tr>
<tr>
<td>Sensor connector (CN4)</td>
<td>HALL-S</td>
<td>Connects the sensor connector (black) of the connection cable.</td>
<td></td>
</tr>
<tr>
<td>USB communication connector</td>
<td></td>
<td>Connects a PC in which the MEXE02 has been installed.</td>
<td>19</td>
</tr>
<tr>
<td>I/O signals connector (CN5)</td>
<td>I/O</td>
<td>Connects input signals and output signals.</td>
<td>17</td>
</tr>
<tr>
<td>Protective Earth Terminal</td>
<td></td>
<td>Connects the external potentiometer (sold separately) or external DC power supply.</td>
<td></td>
</tr>
<tr>
<td>Mounting holes (two places at the rear)</td>
<td></td>
<td>Connects the ground terminal of the connection cable and the grounding wire.</td>
<td>16</td>
</tr>
</tbody>
</table>

* Only drivers for electromagnetic brake motor*
This chapter explains the installation location and installation method.

1. Installation location

Install the product 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 free of excessive salt
- Area not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids
- 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

2. Installation method

The driver is designed so that heat is dissipated via air convection and conduction through the enclosure. When installing the driver, provide clearances of at least 25 mm (0.98 in.) in the horizontal and vertical directions between the driver and enclosure or other equipment within the enclosure.

Installation conditions and operating ambient temperature for the driver vary depending on the installation method.

**Note**
- Install the driver in an enclosure whose pollution degree is 2 or better environment, or whose degree of protection is IP54 minimum.
- Do not install any equipment that generates a large amount of heat or noise near the driver.
- Do not install the driver underneath the controller or other equipment vulnerable to heat.
- If the ambient temperature of the driver exceeds the upper limit of the operating ambient temperature, reconsider the ventilation condition or forcibly cool the area around the driver using a fan in order to keep within the operating ambient temperature.
- Be sure to install the driver vertically (in vertical position).

**When a driver is installed with screws**

Install the driver to a flat metal plate offering high heat conductivity [corresponding to an aluminum plate of 200×200×2 mm (7.87×7.87×0.08 in.)].

Install the driver through the mounting holes using two screws (M4: not included).

**Operating ambient temperature: 0 to +50 °C (32 to 122 °F)**
Installing

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

- When drivers are installed in a close contact state
  Install drivers to a flat metal plate offering high heat conductivity [corresponding to an aluminum plate of 350×350×2 mm (13.78x13.78x0.08 in.) or larger].

  Operating ambient temperature:
  - 30 W, 60 W, 120 W: 0 to +50 °C (+32 to +122 °F)
  - 200 W, 300 W, 400 W: 0 to +40 °C (+32 to +104 °F)

- When a driver is installed to a DIN rail
  Use the DIN rail mounting plate MADP02 (sold separately), and install it to a 35 mm (1.38 in.) wide DIN rail.
  After installing to the DIN rail, secure the both sides of the driver with end plates that the customer provides.
  Refer to "MADP02 handling guideline" for installation method.

  Operating ambient temperature: 0 to +40°C (+32 to +104 °F)

- Dimensions (Unit: mm (in.))
  Mass: 0.8 kg (1.76 lb.)
This chapter explains how to connect the motor, I/O signals and power supply to the driver, as well as grounding method using the driver for electromagnetic brake motor.

For protection against electric shock, do not turn on the power supply until the wiring is completed.

Note
• Be sure to connect the connectors securely. Insecure connections may cause malfunction or damage to the motor or driver.
• When turning on the power again or inserting/pulling off the connector, turn off the power and wait for the CHARGE LED to turn off before doing so. Residual voltage may cause electric shock.

1. Connecting the power supply (CN1)

Check the power-supply voltage specifications of the driver before applying the voltage. If the voltage exceeding the rated range is applied, the driver may be damaged.

<table>
<thead>
<tr>
<th>Voltage Range</th>
<th>Terminal Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-phase 100 - 120 VAC 50/60 Hz</td>
<td>L, N to CN1</td>
</tr>
<tr>
<td>Single-phase 200 - 240 VAC 50/60 Hz</td>
<td>L1, L2 to CN1</td>
</tr>
<tr>
<td>Three-phase 200 - 240 VAC 50/60 Hz</td>
<td>R, S, T to CN1</td>
</tr>
</tbody>
</table>

Connecting method

- Applicable lead wire
  - Lead wire size: Stranded wire AWG18 to 14 (0.75 to 2.0 mm²)
  - Conductive material: Use only copper wires.

- Applicable crimp terminal
  Manufacturer: PHOENIX CONTACT GmbH & Co. KG
  Model:
  - AI 0,75-10 (Conductor cross-sectional area: 0.65 - 0.82 mm² [AWG18])
  - AI 1-10 (Conductor cross-sectional area: 0.82 - 1.2 mm² [AWG18])
  - AI 1,5-10 (Conductor cross-sectional area: 1.25 - 1.8 mm² [AWG16])
  - AI 2,5-10 (Conductor cross-sectional area: 2.0 - 3.0 mm² [AWG14])

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: 10 A
- Recommended circuit breaker: Mitsubishi Electric Corporation NF30
2. Connecting the motor and driver

Connect the motor and driver using the connection cable (sold separately). The connection cables are provided up to 20 m (65.6 ft.). For about the connection methods of the motor and connection cable, refer to the operating manual included with the motor.

**Extension between motor and driver**

Use a connection cable for extension (sold separately) when extending the wiring distance between the motor and driver. The connection cable for extension can be used by connecting up to two pieces. The wiring distance between the motor and driver can be extended to a maximum of 20.5 m (67.2 ft.).

Example of use: Extension example when two connection cables are connected

- Secure each connector part not to apply stress on the connector part. If not secured, the cables may damage due to stress.
- Securely insert the connectors straight. Insecure connections may cause malfunction or damage to the motor or driver.
3. Grounding

Ground using the Protective Earth Terminals \( \text{\ding{152}} \) of the motor and driver, as well as the ground terminal of the connection cable.

**Note**  
Be sure to ground the product. Failure to do so may result in electric shock or damage to the product. Static electricity may cause damage to the product if the Protective Earth Terminals are not grounded.

Two Protective Earth Terminals \( \text{\ding{152}} \) are provided on the driver. Be sure to ground one of the Protective Earth Terminals. Do not share the Protective Earth Terminal with a welder or any other power equipment. Connect the ground terminal of the connection cable to the other terminal.

However, the grounding resistance value provided in the standards applied to the equipment may not be satisfied depending on the type or length of the connection cable. In this case, ground near the motor using the Protective Earth Terminal \( \text{\ding{152}} \) on the motor. If the ground terminal of the connection cable is not used, be sure to insulate.

**Reference**  
Protective earth wire of the connection cable  
Conductor size: AWG18 (0.75 mm\(^2\))  
Maximum conductor resistance: 25.0 Ω/km

Ground terminal
- Applicable crimp terminal: Round crimp terminal with insulation cover  
- Terminal screw size: M4  
- Tightening torque: 1.2 N·m (10.6 lb-in)  
- Applicable lead wire: AWG18 to 14 (0.75 to 2.0 mm\(^2\))

**Precautions about static electricity**  
Static electricity may cause the driver to malfunction or suffer damage. Be sure to ground the motor and driver to prevent them from being damaged by static electricity.
Connecting

4. Connecting the I/O signals (CN5)

Connect the input signals and output signals to CN5.

### Connection method

**Applicable lead wire**
- Lead wire size: Stranded wire AWG24 to 18 (0.2 to 0.75 mm²)
- Conductive material: Use only copper wires.

**Applicable crimp terminal**
Manufacturer: PHOENIX CONTACT GmbH & Co. KG
Model: AI 0,25-10 [Conductor cross-sectional area: 0.14 - 0.34 mm² (AWG24)]
AI 0,34-10 [Conductor cross-sectional area: 0.14 - 0.34 mm² (AWG22)]
AI 0,5-10 [Conductor cross-sectional area: 0.40 - 0.65 mm² (AWG20)]
AI 0,75-10 [Conductor cross-sectional area: 0.65 - 0.82 mm² (AWG18)]

**Pin assignment**

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>Function *1</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IN-COM0</td>
<td>Input signals common (for external power supply)</td>
<td>Connect when using an external power supply.</td>
</tr>
<tr>
<td>2</td>
<td>IN0</td>
<td>[FWD]</td>
<td>The motor rotates in the forward direction while this signal is being ON.</td>
</tr>
<tr>
<td>3</td>
<td>IN1</td>
<td>[REV]</td>
<td>The motor rotates in the reverse direction while this signal is being ON.</td>
</tr>
<tr>
<td>4</td>
<td>IN2</td>
<td>[STOP-MODE]</td>
<td>Select how to stop the motor. When it is OFF, the motor decelerates to a stop.</td>
</tr>
<tr>
<td>5</td>
<td>IN3</td>
<td>[M0]</td>
<td>Select a desired operation data number by switching the ON-OFF status of the M0 and M1 inputs.</td>
</tr>
<tr>
<td>6</td>
<td>IN4</td>
<td>[M1]</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>IN5</td>
<td>[ALARM-RESET]</td>
<td>Reset the alarm presently generated.</td>
</tr>
<tr>
<td>8</td>
<td>IN6</td>
<td>[MB-FREE] *2</td>
<td>Select how the electromagnetic brake would operate (hold/release) when the motor stops. If this signal is turned ON, the electromagnetic brake can be released.</td>
</tr>
<tr>
<td>9</td>
<td>IN-COM1</td>
<td>0 V (for internal power supply)</td>
<td>Connect when using the internal power supply.</td>
</tr>
<tr>
<td>10</td>
<td>TH</td>
<td>TH</td>
<td>When a regeneration resistor is used, connect the thermostat output of the regeneration resistor (normally closed). If the regeneration resistor overheats to turn the thermostat output OFF, the “regeneration resistor overheat” alarm is generated.</td>
</tr>
<tr>
<td>12</td>
<td>VH</td>
<td>External analog setting input</td>
<td>Connect when the rotation speed or torque limiting value is set externally using an external potentiometer or external DC voltage. (Refer to p.18)</td>
</tr>
<tr>
<td>13</td>
<td>VM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>VL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>OUT0+</td>
<td>[SPEED-OUT]</td>
<td>30 pulses are output while the motor output shaft makes one revolution.</td>
</tr>
<tr>
<td>16</td>
<td>OUT0−</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>OUT1+</td>
<td>[ALARM-OUT]</td>
<td>This signal will be output if an alarm is generated. (Normally closed)</td>
</tr>
<tr>
<td>18</td>
<td>OUT1−</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 Signals in brackets [ ] are functions assigned at the time of shipment. For the pin Nos. 2 to 8 and Nos. 15 to 18, the assigned function can be changed. Refer to p.24 for signals that can be assigned.

*2 Available for only drivers for electromagnetic brake motor

### Input signals circuit

All input signals of the driver are photocoupler inputs.
When an external power supply is used: 20.4 to 28.8 VDC, 100 mA or more

![Electrical diagram of a photocoupler circuit with components labeled](image)

- Changing the logic level setting of input signals
  The logic level setting for input terminals IN0 to IN6 can be changed using the MEXE02 or operation panel. Refer to the USER MANUAL for details.
Connecting

### Output signals circuit
All output signals of the driver are photocoupler/open-collector outputs.
- **ON voltage**: 1.6 VDC maximum
- **External power supply**: 4.5 to 30 VDC, 100 mA or less (5 mA or more for the SPEED-OUT output)

#### Changing the logic level setting of output signals
The logic level setting for output terminals OUT0 and OUT1 can be changed using the MEXEO2 or operation panel. However, if the SPEED-OUT output is assigned, it cannot be changed. Refer to the USER MANUAL for details.

**Note**
- Be sure to suppress a current flowing to the output circuit to 100 mA or less. Connect an external current limiting resistor if the current exceeds this specified value. If the power supply voltage is connected to the output circuit directly without connecting a current-limiting resistor in between, the driver will be damaged.
- When connecting a relay (inductive load), etc., to detect alarm outputs, provide a fly-back voltage control measure based on diode, etc., for the inductive load. Or use a relay with built-in flywheel diode.

#### When using a controller with a built-in clamp diode
If a controller with a built-in clamp diode is used, a leakage path may form and cause the motor to rotate even when the controller power is turned off, as long as the driver power is on. Since the current capacity of the controller is different from that of the driver, the motor may rotate when the controller and driver powers are turned on or off simultaneously.
When powering down, turn off the driver power first, followed by the controller power, and when powering up, turn on the controller power first, followed by the driver power.

### 5. Connecting external analog setting devices
Using an external potentiometer (sold separately) or external DC voltage, the analog setting for the rotation speed or torque limiting value can be performed. Refer to p.28 and p.29 as well as the USER MANUAL for the setting method.

#### Using an external potentiometer
Connect to the pin Nos. 12 to 14 of CN5.

#### Using external DC voltage
For the external voltage, use a DC power supply (0 to 10 VDC) with reinforced insulation on its primary and secondary sides, and connect to the pin Nos. 13 and 14 of CN5.
The input impedance between the VM input and VL input is approximately 41.8 kΩ.
The VL input is connected to IN-COM1 inside the driver.

**Note**
Be sure to use the external DC voltage at 10 V or lower. When connecting the external DC power supply, make sure the polarities are correct. Reversing the polarities may cause damage to the driver.
6. Connecting the USB cable

Connect the USB cable to the USB communication connector when using the MEXE02.

Specifications of USB cable

<table>
<thead>
<tr>
<th>Specifications</th>
<th>USB2.0 (full speed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable</td>
<td>Length: 3 m (9.8 ft.) or less</td>
</tr>
<tr>
<td></td>
<td>Shape: A to mini-B</td>
</tr>
</tbody>
</table>

**Note**
- Connect the driver and PC directly using the USB cable without using a hub or extension cable.
- In large electrically noisy environments, use the USB cable with a ferrite core or install a ferrite core to the USB cable.

7. Connecting the regeneration resistor

If continuous regeneration operation such as gravitational operation in vertical drive is performed or an inertia load is operated with the round shaft type motor of 300 W or higher, use the regeneration resistor RGB100 (sold separately).

Also, if the stopping time gets longer when starting and stopping operations of a large inertia load are repeated frequently, use the regeneration resistor.

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

7-1 Connection method

Connect the regeneration resistor before turning on the main power.
- A regenerative current flows through the two thick lead wires (AWG18: 0.75 mm²) of the regeneration resistor. Connect them to the RG1 and RG2 terminals of CN1.
- The two thin lead wires (AWG22: 0.3 mm²) of the regeneration resistor are the thermostat outputs. Connect to the TH input (pin Nos. 10 and 11) of CN5.

**Note**
- Be sure to connect the thermostat output to the TH input when using the regeneration resistor.
- If the regeneration resistor overheats to exceed the permissible temperature, the thermostat output is turned OFF to generate the “regeneration resistor overheat” alarm. If the “regeneration resistor overheat” alarm is generated, reconsider the driving condition, ambient temperature and others.

7-2 Regeneration resistor specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Continuous regenerative power</th>
<th>Instantaneous regenerative power</th>
<th>Resistance value</th>
<th>Thermostat operating temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGB100</td>
<td>70 W</td>
<td>720 W</td>
<td>150 Ω</td>
<td>Operation: Opens at 150±7 °C (302±13 °F) Reset: Closes at 145±12 °C (293±22 °F) [normally closed]</td>
</tr>
</tbody>
</table>

About regeneration resistor overheat alarm
The regeneration resistor overheat alarm “ XL " may be generated even if the regeneration resistor is not connected. Once the main power supply is turned on in a state where the pin Nos. 10 and 11 (TH input) of CNS are short-circuited, the driver recognizes that the regeneration resistor is connected and changes to the setting that the regeneration resistor is used. After that, if the power supply is turned on again in a state where nothing is connected to the pin Nos. 10 and 11 of CNS, the regeneration resistor overheat alarm will be generated.

To cancel the setting to use the regeneration resistor, execute initialization of parameters without connecting anything to the pin Nos. 10 and 11 of CNS. Then, turning on the main power supply again will reset the alarm.
8. Connection diagram

■ Sink logic

- When using the internal power supply

This is a connection example when the electromagnetic brake motor and the driver of single-phase 100-120 VAC are used, the rotation speed is externally set, and the internal power supply is used for input signals.

I/O signals in brackets [ ] are set at the time of shipment.

Assignment of I/O signals ⇒ USER MANUAL

* Be sure to ground. Refer to “3. Grounding” on p.16 for how to ground.

Connecting the motor

Grounding the motor*

Be sure to ground.

Connecting the regeneration unit

Normally closed 150 °C (302 °F)

Connecting the power supply

L N

Connecting the driver*

Be sure to ground.

Connecting input signals

IN0 [FWD]
IN1 [REV]
IN2 [STOP-MODE]
IN3 [M0]
IN4 [M1]
IN5 [ALARM-RESET]
IN6 [MB-FREE]
IN-COM1

Connecting the USB

Speed setting by the external potentiometer

(10 VDC or lower)

Speed setting by the external DC voltage

Refer to p.23 for connection of output signals.
When using an external power supply

This is a connection example when the electromagnetic brake motor and the driver of single-phase 100-120 VAC are used, and the motor is operated by setting the rotation speed externally.

I/O signals in brackets [ ] are set at the time of shipment.

Assignment of I/O signals ⇒ USER MANUAL

Connecting

Connecting the regeneration unit

Normally closed
150 °C (302 °F)

R

Circuit breaker

Connecting the power supply

N

Connecting the motor

Grounding the motor

Be sure to ground.

Grounding the driver

Be sure to ground.

Connecting the USB

Connecting input signals

20.4 to 28.8 VDC
100 mA or more

IN-COM0

IN0 [FWD]

0

IN1 [REV]

3

IN2 [STOP-MODE]

4

IN3 [M0]

5

IN4 [M1]

6

IN5 [ALARM-RESET]

7

IN6 [MB-FREE]

8

TH

10

TH

11

CN5

6.6 kΩ

+5 V

0 V

Command voltage value

Refer to p.23 for connection of output signals.

* Be sure to ground. Refer to “3. Grounding” on p.16 for how to ground.

Note

Use a power supply of 20.4 VDC to 28.8 VDC, 100 mA or more, for connecting input signals.
Source logic

When using an external power supply

This is a connection example when the electromagnetic brake motor and the driver of single-phase 100-120 VAC are used, and the motor is operated by setting the rotation speed externally.

I/O signals in brackets [ ] are set at the time of shipment.

Assignment of I/O signals ⇒ USER MANUAL

Note
Use a power supply of 20.4 VDC to 28.8 VDC, 100 mA or more, for connecting input signals.
Connection example for I/O signals and programmable controller

**Sink logic**

Programmable controller

- IN-COM0
- IN0
- IN1
- IN2
- IN3
- IN4
- IN5
- IN6
- IN-COM1
- OUT0+
- OUT0–
- OUT1+
- OUT1–

Driver

- CNS
- 24 VDC
- 0 V
- 4.5 to 30 VDC

Note

- Use output signals at 4.5 VDC to 30 VDC.
- Be sure to use the current of the OUT0 and OUT1 at 100 mA or less. If the current exceeds this value, connect the current limiting resistor R.
- Pass the current of 5 mA or more for the SPEED-OUT output.
- Do not connect anything to the pin No. 9 when using an external power supply.

**Source logic**

Programmable controller

- IN-COM0
- IN0
- IN1
- IN2
- IN3
- IN4
- IN5
- IN6
- IN-COM1
- OUT0+
- OUT0–
- OUT1+
- OUT1–

Driver

- CNS
- 24 VDC
- 0 V
- 4.5 to 30 VDC

Note

- Use output signals at 4.5 VDC to 30 VDC.
- Be sure to use the current of the OUT0 and OUT1 at 100 mA or less. If the current exceeds this value, connect the current limiting resistor R.
- Pass the current of 5 mA or more for the SPEED-OUT output.
- Do not connect anything to the pin No. 9 when using an external power supply.
### 9. I/O signals list

This section explains about input signals and output signals. Refer to the USER MANUAL when changing the signal assigned to the I/O signal terminals.

#### Input signals

<table>
<thead>
<tr>
<th>Signal name</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN0</td>
<td>FWD</td>
<td>This is a signal to operate the motor. When either the FWD input or the REV input is turned ON, the motor rotates. The motor rotates in the direction set in the &quot;Rotation direction&quot; parameter. 2-Wire mode</td>
</tr>
<tr>
<td>IN1</td>
<td>REV</td>
<td>This is a signal to select how to stop the motor. Deceleration stop or instantaneous stop can be selected.</td>
</tr>
<tr>
<td>IN2</td>
<td>STOP-MODE</td>
<td>This is a signal to select how to stop the motor. Deceleration stop or instantaneous stop can be selected.</td>
</tr>
<tr>
<td>IN3</td>
<td>M0</td>
<td>These are signals to select the operation data number. They are used to switch the operation data number when multi-speed operation is performed. Up to 4 data can be switched using the M0 and M1 inputs.</td>
</tr>
<tr>
<td>IN4</td>
<td>M1</td>
<td>These are signals to select the operation data number. Up to 16 data can be switched using the M0, M1, M2, and M3 inputs.</td>
</tr>
<tr>
<td>IN5</td>
<td>ALARM-RESET</td>
<td>This is a signal to reset the present alarm when a driver protective function is activated.</td>
</tr>
<tr>
<td>IN6</td>
<td>MB-FREE +</td>
<td>This is a signal to select how the electromagnetic brake would operate (hold or release) when the motor stops. If this signal is turned ON, the electromagnetic brake can be released.</td>
</tr>
</tbody>
</table>

#### Signals possible to change the assignment

<table>
<thead>
<tr>
<th>Signal name</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>START/STOP</td>
<td>These signals are used to operate the motor. The motor rotates when both the START/STOP input and the RUN/BRAKE input are turned ON. If the START/STOP input is turned OFF, the motor decelerates to a stop. If the RUN/BRAKE input is turned OFF, the motor stops instantaneously. 3-Wire mode</td>
<td></td>
</tr>
<tr>
<td>RUN/BRAKE</td>
<td>CW/CCW</td>
<td>This is a signal to change the motor rotation direction.</td>
</tr>
<tr>
<td></td>
<td>M0</td>
<td>These are signals to select the operation data number. Up to 4 data can be switched using the M0 and M1 inputs.</td>
</tr>
<tr>
<td></td>
<td>M1</td>
<td>These are signals to select the operation data number. Up to 16 data can be switched using the M0, M1, M2, and M3 inputs.</td>
</tr>
<tr>
<td></td>
<td>H-FREE</td>
<td>This is a signal to select whether to enable or disable the slight position-keeping function. You can switch whether to hold the motor shaft by the slight position-keeping function when the motor stops.</td>
</tr>
<tr>
<td></td>
<td>TL</td>
<td>This is a signal to switch whether to enable or disable the torque limiting function. (Normally closed) You can switch whether to limit the output torque of the motor.</td>
</tr>
<tr>
<td></td>
<td>INFO-CLR</td>
<td>This is a signal to clear the information presently generated.</td>
</tr>
<tr>
<td></td>
<td>HMI</td>
<td>This is a signal to restrict the operation using the operation panel or MEXE02. (Normally closed)</td>
</tr>
<tr>
<td></td>
<td>EXT-ERROR</td>
<td>This is a signal to stop the motor forcibly. (Normally closed) If this signal is turned OFF, the external stop alarm is generated.</td>
</tr>
</tbody>
</table>

* Available for only drivers for electromagnetic brake motor

#### Output signals

<table>
<thead>
<tr>
<th>Signal name</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT0</td>
<td>SPEED-OUT</td>
<td>This is a signal to output in synchronization with the motor rotation. 30 pulses are output while the motor output shaft makes one revolution.</td>
</tr>
<tr>
<td>OUT1</td>
<td>ALARM-OUT</td>
<td>This is a signal to output when a driver protective function is activated. (Normally closed)</td>
</tr>
</tbody>
</table>

#### Signals possible to change the assignment

<table>
<thead>
<tr>
<th>Signal name</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOVE</td>
<td>This is a signal to be output when the motor is rotating by turning the operation input signal ON.</td>
<td></td>
</tr>
<tr>
<td>INFO</td>
<td>This is a signal to be output when information is generated.</td>
<td></td>
</tr>
<tr>
<td>TLC</td>
<td>This is a signal to be output when the motor output torque reached the torque limiting value.</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>This is a signal to be output when the motor detection speed reached the plus or minus range of &quot;VA detection width&quot; against the setting speed.</td>
<td></td>
</tr>
<tr>
<td>DIR</td>
<td>This is a signal to output information of the motor rotation direction.</td>
<td></td>
</tr>
</tbody>
</table>

* These are functions to be assigned at the time of shipment.
Operating using the operation panel

This chapter explains how to rotate the motor using only the operation panel without connecting an external control device.

1 AC power ON
When the power supply is turned on, the display shows as follows.

Display: Rotation speed
0 r/min (standstill)

Refer to p.32 for details about the operation panel.

2 Operation selection
Press the LOCAL key.

LOCAL
Press
LOCAL
The LOCAL LED is lit in green.

The operation using the operation panel is set, and the rotation speed and rotation direction are alternately continued to show on the display.

Interval of approximately 1 second

3 Rotation direction selection
Press

The motor rotation direction changes whenever the MODE key is pressed.

Check the operating manual included with the motor for the rotation direction of the gearhead output shaft.

4 Start of motor
Press

The motor rotates.

50 r/min (factory setting)

5 Changing speed of motor [example: 50 to 1000 r/min]

Press

The display blinks.
You can adjust the speed while blinking.

The display changes to lighting from blinking, and the speed will be set.
When you start the motor next time, it will rotate at the set speed.
Operating using external signals

1. Guidance

![Diagram of motor, driver, and external control equipment]

**Installation and wiring**
- Install and wire the motor and driver.
- Set the operation data.
- Select the operation data number.
- Operate the motor.

[Operation/stop ⇒ p.30]

2. Operation data

Up to 16 operation data can be set. (Operation data Nos. 0 to 15)
To set the data with the analog setting, the “Speed, torque limiting command selection” parameter is required to change.

### Setting method

<table>
<thead>
<tr>
<th>Item</th>
<th>Data setting</th>
<th>Digital setting</th>
<th>Analog setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Operation panel</td>
<td>MEXE02</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factory setting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotation speed</td>
<td>50 to 4000 [r/min]</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Torque limiting value</td>
<td>0 to 300 [%]</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Acceleration time</td>
<td>0.0 to 15.0 [s]</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Deceleration time</td>
<td>0.5</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Selection method

Select a desired operation data number by switching the ON-OFF status of the M0 and M1 inputs.
If the M0 and M1 inputs are not connected, the motor rotates at the rotation speed set in the operation data No.0.

<table>
<thead>
<tr>
<th>Operation data No.</th>
<th>M1 input</th>
<th>M0 input</th>
<th>Setting method</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>OFF</td>
<td>OFF</td>
<td>Digital setting *</td>
</tr>
<tr>
<td>1</td>
<td>OFF</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ON</td>
<td>ON</td>
<td></td>
</tr>
</tbody>
</table>

* The setting method can be changed to the analog setting.

If the M2 input and M3 input are assigned to the input terminals, the operation data can be extended up to 16 data.
3. Setting of rotation speed

The rotation speed can be set with the digital setting at the time of shipment. To set the data with the analog setting, the "Speed, torque limiting command selection" parameter is required to change. Each setting procedure is shown below.

[Setting range: 50 to 4000 r/min] (Factory setting: 50 r/min)

**Setting method**

<table>
<thead>
<tr>
<th>Digital setting</th>
<th>Analog setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation panel</td>
<td>MEXE02</td>
</tr>
<tr>
<td>External potentiometer</td>
<td>External DC voltage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Setting range: 50 to 4000 r/min</th>
<th>(Factory setting: 50 r/min)</th>
</tr>
</thead>
</table>

**Procedure to set the rotation speed with the operation panel**

**Example:** Set the rotation speed of the operation data No.0 to 1000 r/min.

1. Turn on the AC power supply

2. Press twice

3. Press

4. Press

5. Set (store) the data

6. Turn the operation input signal ON

Details about operation and stop ⇒ Refer to p.30 for details.

* The figures show the rotation direction of the round shaft type motor with the factory setting.
Operating using external signals

■ Procedures to set the rotation speed with an analog setting device

When the rotation speed is set using the external potentiometer or external DC voltage, the setting of the “Speed, torque limiting command selection” parameter is required to change.

1. Check the connection

   | Streamer connector CN5 | DC power supply 0-5 VDC |
   | Pin No.13 | Pin No.14 |
   | 3 | Pin No.1.2 VH input |
   | 2 | Pin No.1.3 VM input |
   | 1 | Pin No.1.4 VL input |

2. Turn on the AC power supply

   Rotation speed: 0 r/min

3. Change the setting of the “Speed, torque limiting command selection” parameter (ID: 1820) to “1”

   Press three times [Parameter mode]

4. Press twice

   ID input screen

   Turn clockwise to select 1820

5. Press

   Parameter setting range
   0: Digital setting
   1: Analog setting for the rotation speed of the operation data No.1
   2: Analog setting

6. Turn clockwise to select 2

7. Press once

   Turn clockwise to select Configuration

8. Press twice

   Execute

9. Set the rotation speed

   - External potentiometer - Rotation speed characteristics (representative values)
   - External DC voltage - Rotation speed characteristics (representative values)

   Changing the parameter can set the rotation speed using DC voltage of 0 VDC to 10 VDC.

10. When the operation input signal is turned ON, the motor rotates. Refer to p.27 for the operating method.

Details of parameters ⇒ USER MANUAL
4. Setting of torque limiting

The maximum output torque of the motor can be limited. Set when suppressing the motor output torque for safe uses or limiting according to a load.

[Setting range: 0 to 300%] (Factory setting: 300%)

If the time to lock the motor shaft exceeds five seconds, use the torque limiting value at 50% or less.

- Setting method

<table>
<thead>
<tr>
<th>Operation panel</th>
<th>MEXE02</th>
<th>External potentiometer</th>
<th>External DC voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital setting</td>
<td>Analog setting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Setting method

<table>
<thead>
<tr>
<th>Operation panel</th>
<th>MEXE02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital setting</td>
<td>Analog setting</td>
</tr>
</tbody>
</table>

5. Setting of acceleration/deceleration time

The acceleration time and deceleration time can be set to prevent a load from receiving a shock upon starting or stopping.

[Setting range: 0.0 to 15.0 seconds] (Factory setting: 0.5 seconds)

Acceleration time refers to the time needed for the motor to reach the rated rotation speed (3000 r/min) from the standstill status.

Deceleration time refers to the time needed for the motor to stop from the rated rotation speed (3000 r/min).

The actual acceleration time and deceleration time vary depending on the conditions of use, load inertia, load torque, etc. If smooth acceleration or deceleration cannot be performed, reconsider the acceleration time or deceleration time.

- About motor movement

If the acceleration time and deceleration time are set to 0 second, the motor moves at a longer time than the setting.

If they are set more than 0.1 seconds, the motor can move at the set time. (With no load)

If the frictional load or inertia load becomes larger, the moving time against the setting tends to be longer.

- Setting method

- If the rotation speed is set with the digital setting, the acceleration time and deceleration time can be set by the time needed to reach the set speed. Details ⇒ USER MANUAL
To switch between operation and stop of the motor in the 2-wire mode, the FWD input and the REV input are used. This section explains as an example when the “2-Wire mode 1” is selected with the “Operation input mode selection” parameter. Refer to the USER MANUAL for the operation input mode.

| FWD input | REV input | Motor movement | Turn the input signal having turned ON to OFF *
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td>Rotates in the forward direction</td>
<td>Deceleration stop</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>Rotates in the reverse direction</td>
<td>Deceleration stop</td>
</tr>
<tr>
<td>Turn both signals ON during rotation</td>
<td>Deceleration stop</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

* How to stop the motor can be changed by the setting of the STOP-MODE input.

<table>
<thead>
<tr>
<th>STOP-MODE input</th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stopping movement</td>
<td>Deceleration stop</td>
<td>Instantaneous stop</td>
</tr>
</tbody>
</table>

**Note**
When the electromagnetic brake motor is used in an application of vertical drive such as elevating equipment, although depending on a load condition, the motor shaft rotation may momentarily reverse (within 90 degrees of the motor output shaft) at the time of starting or stopping if it is operated under the setting conditions below.
- When the set rotation speed is low
- When the acceleration time or deceleration time is long

### Operation example

The chart below is an example when the operation data No.0 and No.1 are set to 3000 r/min and 1000 r/min respectively, and the speed of the electromagnetic brake motor is switched between these two levels. Refer to the USER MANUAL for the when operating at two or more speeds.

**Note**
- Make sure each signal remains ON for at least 10 ms.
- When switching the motor rotation direction, provide an interval of at least 10 ms to turn the signal ON.
7. Setting of rotation direction

- **Rotation direction of the motor output shaft**
The rotation direction of the motor output shaft represents the direction when viewed from the motor output shaft side. The motor rotation direction when the FWD input is turned ON can be changed using the MEXE02 or operation panel. The figure shows when the "Motor rotation direction" parameter is set to "Positive direction=CW."

- **Rotation direction of the gearhead output shaft**
The rotation direction of the gearhead output shaft varies depending on the type or the gear ratio of the gearhead. Check the operating manual included with the motor for the rotation direction of the gearhead output shaft.

- **Rotation direction when the local control operation is performed**
During the local control operation, the rotation direction is continuously displayed blinking when the motor is at standstill. At this time, the motor rotation direction can be changed by pressing key.

In the case of FWD: **FWD** (Factory setting)

In the case of REV: **REV**

Local control operation: Using 3 keys of **Loc**, **Run** and **Top**, the motor can be operated.
This chapter explains how to set data and how to operate a motor using the operation panel on the driver.

1. Operation panel

This section explains the name and function of each part of the operation panel as well as function modes.

1-1 Names and functions of parts

Local control operation: This is a method to operate using the operation panel.
Remote control operation: This is the method to operate using the external signals or MEXE02.

- The local control operation can be enabled when the monitor mode is selected. If the LOCAL key is pressed when the other operation mode is selected, a "" indicator is displayed.
- The operation input signal is disabled during the local control operation. (Other input signals are enabled.)
- The operating method is described on p.27.

The operation panel cannot remove from the driver.

1-2 How to read the display

The display shows as follows.

- Arabic number

- Alphabet

- Sign

* Arabic number "5" and alphabet "S" are the same sign.
1-3 Function mode types

There are four operation modes in this product.
On the top screen of each mode, pressing the key or turning the setting dial will switch the operation mode.
The top screens for each mode are shown below.

- **Monitor mode (p.34)**
  This is a mode to be displayed when turning on the power.
The motor rotation speed is displayed at the factory setting.
Use the monitor mode when operating the motor.

- **Data mode (p.36)**
  Sets the operation data of up to 16 speeds.

- **Parameter mode (p.37)**
  Sets various parameters.

- **Test mode (p.38)**
  The connection status of each I/O signal can be checked.
With drivers for electromagnetic brake motor, you can test whether the electromagnetic brake holds or releases.
2. Operation transitions

2-1 Items that can be monitored

Top screen of monitor mode
- Press

Rotation speed
- Press

Speed teaching function
- Press

Detailed settings are in the next page

Load factor
- Press

Operation data number
- Press

Alarm
- Press

Alarm reset
- Press

Alarm record 1 (newest)
- Press

Alarm record 9 (oldest)
- Press

Example: Sensor error

Alarm records clear
- Press

To alarm reset

I/O monitor
- Press

Input signal monitor
- Press

Output signal monitor
- Press

External voltage monitor
- Press

To input signal monitor

To rotation speed
- Press

When the power is turned on, "rotation speed" is displayed. (Factory setting)

How to read the marks
- Turn clockwise
- Turn counterclockwise
- Increase
- Decrease
- Set

In the lower level except the top screen, press mode to return to the previous level.

- "Speed teaching function" "Alarm records clear" "Information records clear": When operations are limited by the edit lock function, you cannot execute since these screen are not displayed.
 Operation panel

■ Rotation speed
The motor rotation speed can be checked. The rotation speed can be displayed as the rotation speed of the gearhead output shaft. To do this, set with the "Speed reduction ratio" parameter (ID: 2033) and "Speed reduction ratio digit setting" parameter (ID: 2038). It is also possible to increase the rotation speed and display the increased speed. Set with the "Speed increasing ratio" parameter (ID: 2039).

Note When the "Speed increasing ratio" parameter is set to 1.00, the speed reduction ratio is enabled. When the "Speed increasing ratio" parameter is set to other than 1.00, the speed increasing ratio is enabled.

■ Speed teaching function
In the monitor mode, the rotation speed of the data number presently being operated can be changed while the motor is rotating. The speed teaching function cannot be used when the rotation speed is set using the external potentiometer or external DC voltage.

![Monitor](image1)

■ Load factor
The output torque of the motor can be checked. When the load factor is 0 to 300%, the present load factor of the output torque is displayed in units of 1% based on the motor rated torque being 100%. The display is the load factor on the motor output shaft. It is not for the gearhead output shaft. In the case of the gearhead output shaft, the permissible torque varies depending on the gear ratio of the gearhead used. Use the product so that the load does not exceed the permissible torque of the gearhead output shaft.

■ Operation data number
The operation data number presently selected can be checked.

■ Alarm
If an alarm is generated, 2-digit alarm code will be displayed. The present alarm can be reset, and also alarm history can be checked and cleared. Refer to p.44 for the causes or actions of alarms.

■ Information
A content of information presently generated can be checked. Also, information history can be checked and cleared. Refer to the USER MANUAL for details about the information.

■ I/O monitor
The ON-OFF status of each I/O signal for the driver can be checked. Each digit on the 7-segment LED display corresponds to a signal. The corresponding digit is lit when the signal is ON, and the digit is unlit when the signal is OFF. Also, the voltage value that was set using the external potentiometer or external DC voltage can be checked.
2-2 Setting of operation data

How to read the marks

Operation panel

Setting dial

Turn clockwise - Increase
Turn counterclockwise - Decrease
Press - Set

In the lower level except the top screen, press [ ] to return to the previous level.

Operation panel

Top screen of data mode

Press

Setting items

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Setting range</th>
<th>Setting unit</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotation speed</td>
<td>Sets the motor rotation speed. Even if the speed reduction ratio or speed increasing ratio is set, set the rotation speed based on the motor shaft.</td>
<td>50 to 4000 r/min</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Torque limiting value</td>
<td>Sets if the output torque is limited while the motor rotates. Set the maximum torque based on the motor rated torque being 100%.</td>
<td>0 to 300%</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td>Acceleration time</td>
<td>Sets the acceleration time as the time needed for the motor to reach the rated rotation speed (3000 r/min) from the standstill state. If the acceleration time needed to reach the setting speed is set, change the value of the &quot;Acceleration/deceleration unit selection&quot; parameter to &quot;1.&quot; [USER MANUAL]</td>
<td>0.0 to 15.0 s</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Deceleration time</td>
<td>Sets the deceleration time as the time needed for the motor to stop from the rated rotation speed (3000 r/min). If the deceleration time needed to stop from the speed being rotated is set, change the value of the &quot;Acceleration/deceleration unit selection&quot; parameter to &quot;1.&quot; [USER MANUAL]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initialization</td>
<td>Restores the data for each data number to the factory setting.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2-3 Setting of parameters

- **Parameter ID**
  - There is a unique ID in each parameter. Input the ID and set.
  - Refer to p.40 for parameter ID. Refer to the USER MANUAL for details of parameters.
  - [Setting method of the parameter selecting a sign]
    - Selecting a sign after setting ID and pressing the setting dial will appear the data setting screen.
  - [Setting method of the parameter possible to set up to 9 digits]
    - The operation panel is 4-digit LED display. Input the setting value of up to nine digits by dividing into an “upper,” “middle,” and “lower.”

- **Initialization**
  - Initialization is used to restore the data stored in the driver to the factory setting. Any of the operating data only, parameter only or all data can be selected, and the selected data can be restored to the factory setting.

- **Configuration**
  - Executing Configuration can apply the parameters which timing to update is “C: Configuration” to the driver setting.
2-4 Test mode

When pressing the setting dial while operating a motor
The screen cannot move from the top screen of the test mode to the I/O test screen or electromagnetic brake test screen during operation. An error occurs even when the setting dial is pressed, and Err is displayed. Be sure to stop the motor operation before pressing the setting dial.
I/O test
With the I/O test, the ON-OFF status of each input signal can be checked, and the ON-OFF status of each output signal can be switched. The ALARM LED on the driver blinks in orange when the screen is moved to the I/O test. During the I/O test screen, the I/O terminals of CN5 are disabled, and the motor does not rotate even if the operation input signal is turned ON.

Note If the setting dial is pressed to move to the I/O test screen while the slight position-keeping function is enabled, the holding force is lost. When the screen is returned to the top screen of the test mode, the holding force is generated.

Input signal
Each digit on the 7-segment LED display corresponds to a signal. The corresponding digit is lit when the signal is ON, and the digit is unlit when the signal is OFF. The connection with a programmable controller can be checked. In this time, the motor does not rotate even if the input signal is turned ON.

Output signal
The ON-OFF status of the output signal can be switched using the setting dial.

External voltage
The voltage value input by the external analog setting device can also be checked.

Electromagnetic brake test
The electromagnetic brake can be released to bring the motor shaft in a free-run state at motor standstill even if input signals are not connected. It cannot be executed while an alarm is generated.

Note When a load is installed vertically, do not perform the electromagnetic brake test. The motor loses its holding torque, and the load may fall.

3. Edit lock function
This is a function to prohibit the local control operation in addition to editing and erasing of data and parameters by the operation panel.

Lock

<table>
<thead>
<tr>
<th>Monitor mode</th>
<th>Panel display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locking</td>
<td></td>
</tr>
</tbody>
</table>

Monitor mode
Press and hold the key (about 5 seconds)

Panel display
The display blinks several times

Reset

<table>
<thead>
<tr>
<th>Monitor mode</th>
<th>Panel display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset locking</td>
<td></td>
</tr>
</tbody>
</table>

Monitor mode
Press and hold the key (about 5 seconds)

Panel display
The display blinks several times

* The edit lock function can be set when the top screen of each mode is displayed.

Display while the edit lock function is enabled
If the setting value of the operation data or parameter is tried to change while the edit lock function is enabled, " is displayed for about one second.
## Parameter list

Refer to the USER MANUAL for details.

<table>
<thead>
<tr>
<th>ID</th>
<th>Parameter name</th>
<th>Setting range</th>
<th>Factory setting</th>
<th>Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>1820</td>
<td>Speed, torque limiting command selection</td>
<td>0: Digital setting 1: Analog setting for the speed 2: Analog setting for others 3: Digital setting for speed, and analog setting for torque limiting</td>
<td>0</td>
<td>C</td>
</tr>
<tr>
<td>2033</td>
<td>Speed reduction ratio</td>
<td>100 to 9999</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2038</td>
<td>Speed reduction ratio digit setting</td>
<td>0: ×1, 1: ×0.1, 2: ×0.01</td>
<td>2</td>
<td>A</td>
</tr>
<tr>
<td>2039</td>
<td>Speed increasing ratio</td>
<td>1.00 to 2.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>450</td>
<td>Motor rotation direction</td>
<td>0: Positive direction=CCW 1: Positive direction=CW</td>
<td>1</td>
<td>C</td>
</tr>
<tr>
<td>2085</td>
<td>Speed upper limit</td>
<td>50 to 4000 [r/min]</td>
<td>4000</td>
<td>B</td>
</tr>
<tr>
<td>2086</td>
<td>Speed lower limit</td>
<td>50 to 4000 [r/min]</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>1821</td>
<td>Analog operation speed command gain</td>
<td>0 to 4000 [r/min/V]</td>
<td>850</td>
<td>A</td>
</tr>
<tr>
<td>1822</td>
<td>Analog operation speed command offset</td>
<td>-2000 to +2000 [r/min]</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1823</td>
<td>Analog torque limiting gain</td>
<td>0 to 300 [%/V]</td>
<td>65</td>
<td>A</td>
</tr>
<tr>
<td>1824</td>
<td>Analog torque limiting offset</td>
<td>-150 to +150 [%]</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1825</td>
<td>Analog torque limiting maximum value</td>
<td>0 to 300 [%]</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>384</td>
<td>Overload alarm detection time</td>
<td>0.1 to 40.0 [s]</td>
<td>30.0</td>
<td>A</td>
</tr>
<tr>
<td>414</td>
<td>Prevention of operation at power-on alarm</td>
<td>0: Disable, 1: Enable</td>
<td>1</td>
<td>C</td>
</tr>
<tr>
<td>413</td>
<td>Electromagnetic brake function at alarm #2</td>
<td>0: Lock after coasting to a stop 1: Lock immediately</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>447</td>
<td>INFO auto clear</td>
<td>0: Disable 1: Enable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>416</td>
<td>Driver temperature information</td>
<td>40 to 85 [°C]</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>418</td>
<td>Speed information</td>
<td>50 to 5000 [r/min]</td>
<td>5000</td>
<td></td>
</tr>
<tr>
<td>422</td>
<td>Load information</td>
<td>10 to 300 [%]</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>425</td>
<td>Overvoltage information</td>
<td>280 to 440 [V]</td>
<td>435</td>
<td></td>
</tr>
<tr>
<td>426</td>
<td>Undervoltage information</td>
<td>120 to 280 [V]</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>431</td>
<td>Tripmeter information</td>
<td>0: Disable 1 to 999,999,999 (1=0.1 kRev)</td>
<td>0</td>
<td>A</td>
</tr>
<tr>
<td>432</td>
<td>Odometer information</td>
<td>0: Disable 1 to 999,999,999 (1=0.1 kRev)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>438</td>
<td>Main power supply time information</td>
<td>0: Disable 1 to 999,999,999 [min]</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>439</td>
<td>Main power supply count information</td>
<td>0: Disable 1 to 999,999,999 [times]</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1954</td>
<td>INFO action (Driver temperature information (INFO-DRVTMP)) #3</td>
<td>0: INFO action is not applied 1: INFO action is applied</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1956</td>
<td>INFO action (Overvoltage information (INFO-OVOLT)) #3</td>
<td>0: INFO action is not applied 1: INFO action is applied</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1957</td>
<td>INFO action (Undervoltage information (INFO-UVOLT)) #3</td>
<td>0: INFO action is not applied 1: INFO action is applied</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1959</td>
<td>INFO action (Load information (INFO-LOAD)) #3</td>
<td>0: INFO action is not applied 1: INFO action is applied</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>INFO action (Speed information (INFO-SPD)) #3</td>
<td>0: INFO action is not applied 1: INFO action is applied</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*1 Timing to update
A: Update immediately (Recalculation and setup are immediately executed when the parameter is written.)
B: Update after operation stop (Recalculation and setup are executed when the operation is stopped.)
C: Update after executing configuration or turning on the power again (Recalculation and setup are executed after the configuration is executed or the power is turned on again.)
D: Update after turning on the power again (Recalculation and setup are executed after the power is turned on again.)

*2 Only drivers for electromagnetic brake motor are available.

*3 It is enabled for drivers with software version 3.00 or later.
<table>
<thead>
<tr>
<th>ID</th>
<th>Parameter name</th>
<th>Setting range</th>
<th>Factory setting</th>
<th>Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>INFO action (Operation prohibited information (INFO-DRV))</td>
<td>0: INFO action is not applied 1: INFO action is applied</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>1972</td>
<td>INFO action (Tripmeter information (INFO-TRIP))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td>INFO action (Odometer information (INFO-ODO))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>INFO action (Main power supply time information (INFO-PTIME))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>INFO action (Main power supply count information (INFO-PCOUNT))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>INFO action (Start operation restricted mode information (INFO-DSLMTD))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>INFO action (I/O test mode information (INFO-IOTEST))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>INFO action (Configuration request information (INFO-CFG))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>INFO action (Power cycling request information (INFO-RBT))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2069</td>
<td>Slight position-keeping function selection</td>
<td>0: Disable 1: Enable</td>
<td>0</td>
<td>C</td>
</tr>
<tr>
<td>329</td>
<td>Acceleration/deceleration unit selection</td>
<td>0: [s / 3000 r/min] 1: [s]</td>
<td>0</td>
<td>B</td>
</tr>
<tr>
<td>330</td>
<td>Impact softening filter</td>
<td>0: No filter 1: Filter 1 2: Filter 2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1819</td>
<td>Operation input mode selection</td>
<td>0: 2-Wire input mode 1 1: 3-Wire input mode 1 2: 2-Wire input mode 2 3: 2-Wire input mode 3 4: 3-Wire input mode 2 5: 3-Wire input mode 3</td>
<td>0</td>
<td>C</td>
</tr>
<tr>
<td>1817</td>
<td>VA detection width</td>
<td>1 to 400 [r/min]</td>
<td>200</td>
<td>A</td>
</tr>
<tr>
<td>2113</td>
<td>IN1 input function selection</td>
<td></td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>2114</td>
<td>IN2 input function selection</td>
<td></td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>2115</td>
<td>IN3 input function selection</td>
<td></td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>2116</td>
<td>IN4 input function selection</td>
<td></td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>2117</td>
<td>IN5 input function selection</td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>2118</td>
<td>IN6 input function selection</td>
<td></td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>2128</td>
<td>to I0 logic level setting to IN6 logic level setting</td>
<td>0: Not invert 1: Invert</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2145</td>
<td>OUT1 output function selection</td>
<td></td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>2160</td>
<td>OUT0 logic level setting</td>
<td>0: Not invert 1: Invert</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2161</td>
<td>OUT1 logic level setting</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>488</td>
<td>Operation panel editing</td>
<td>0: Disable, 1: Enable</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>489</td>
<td>Operation panel initial view</td>
<td>0: Rotation speed [r/min] 1: Load factor [%] 2: Operation data number</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>498</td>
<td>USB-ID enable</td>
<td>0: Disable, 1: Enable</td>
<td>1</td>
<td>D</td>
</tr>
<tr>
<td>499</td>
<td>USB-ID</td>
<td>0 to 999,999,999</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2555</td>
<td>USB-PID</td>
<td>0 to 31</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

*1 Timing to update
A: Update immediately (Recalculation and setup are immediately executed when the parameter is written.)
B: Update after operation stop (Recalculation and setup are executed when the operation is stopped.)
C: Update after executing configuration or turning on the power again
D: Update after turning on the power again (Recalculation and setup are executed after the power is turned on again.)

*2 Only drivers for electromagnetic brake motor are available.
*3 It is enabled for drivers with software version 3.00 or later.
Maintenance and inspection

1. 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.

**Note**
- Do not conduct the insulation resistance measurement or dielectric strength test with the motor and driver connected. Doing so may cause damage to the product.
- The driver uses semiconductor elements, so be extremely careful when handling them. Static electricity may damage the driver.

**Inspection item**
- Check if any of the mounting screws of the motor and gearhead is loose.
- Check if the bearing part (ball bearings) of the motor generates unusual noises.
- Check if the bearing part (ball bearings) or gear meshing part of the gearhead generates unusual noises.
- Check if the output shaft of the motor and gearhead and a load shaft are out of alignment.
- Check if a damage or stress is applied on the cable or the connection part between the cable and driver is loose.
- Check if the openings in the driver are clogged.
- Check if any of the driver mounting screws or the connection part of the main power supply input is loose.
- Check if there is any abnormality or unusual smell inside the driver.

2. Warranty

Check on the Oriental Motor Website for the product warranty.

3. Disposal

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

During motor operation, the motor or driver may fail to function properly due to an improper speed setting or wiring. When the motor cannot be operated properly, refer to the contents provided in this chapter and take appropriate action. If the problem persists, contact your nearest Oriental Motor sales office.

- Check the alarm contents when an alarm is generated.
- I/O signals can be monitored with the monitor mode. Use it to check the wiring condition of the I/O signals.

### The motor does not operate.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
</table>
| The power supply is not connected correctly or it is improper connection. Check the connection of the power supply. | An operation using external signals is being tried while the local control operation is performed. Press the 
| | key to set the remote control operation. |
| When the local control operation is not set, the 
| | key is pressed. Press the 
| | key to set the local control operation before pressing the 
| | key. |
| Both the FWD input and the REV input are being OFF. Both the FWD input and the REV input are being ON. Turn either the FWD input or the REV input ON. | An alarm is present. A protective function is triggered and an alarm is being generated. Refer to p.44 and reset the alarm after removing the cause of the alarm. |

### The rotation speed is not displayed.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The &quot;Operation panel initial view&quot; parameter is not set to the rotation speed. Set the &quot;Operation panel initial view&quot; parameter to the rotation speed.</td>
<td>The &quot;Speed reduction ratio&quot; and &quot;Speed increasing ratio&quot; parameters are being set. Check the &quot;Speed reduction ratio&quot; and &quot;Speed increasing ratio&quot; parameters.</td>
</tr>
</tbody>
</table>

### is displayed and the setting is unable

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The analog setting is applied to the rotation speed, and the speed teaching function is being executed. When the speed teaching function is performed, set to the digital setting.</td>
<td>The ALARM-RESET is being executed using the operation panel in a state where both the FWD input and the REV input are not turned OFF while an alarm is generated. During communication, do not change the data on the operation panel. Also, do not set to the local control operation. Rewriting the data on the operation panel or setting to the local control operation is tried while the communication is performed via the MEXE02.</td>
</tr>
</tbody>
</table>

### ALARM LED (orange) blinks

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information is present. Information is present because of any of causes. Refer to the USER MANUAL, and check the cause of information and how to reset.</td>
<td></td>
</tr>
</tbody>
</table>

### The motor rotates in the opposite direction against the specified direction.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The FWD input and the REV input are connected wrongly or otherwise not connected correctly. Check the connection of the FWD input and the REV input.</td>
<td>The gearhead with a reduction ratio which rotation direction is opposite to the motor output shaft is used. Check the operating manual included with the motor for the rotation direction of the gearhead output shaft.</td>
</tr>
<tr>
<td>The &quot;Motor rotation direction&quot; parameter is set to 0 (positive direction=CCW). Change the setting for the &quot;Motor rotation direction&quot; parameter to 1 (positive direction=CW).</td>
<td></td>
</tr>
</tbody>
</table>

### The setting cannot be performed using the setting dial.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The edit lock function is enabled or the &quot;Operation panel editing&quot; parameter is set to disable. Release the edit lock function or enable the setting of the &quot;Operation panel editing&quot; parameter.</td>
<td></td>
</tr>
</tbody>
</table>

### The rotation speed cannot be increased.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The speed upper limit is set. Increase the speed upper limit.</td>
<td></td>
</tr>
</tbody>
</table>

### The rotation speed cannot be decreased.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The speed lower limit is set. Decrease the speed lower limit.</td>
<td></td>
</tr>
</tbody>
</table>

### The motor movement is not stable. Motor vibration is too large.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The motor and gearhead output shaft and a load shaft are out of alignment. Check the installation status of the motor (gearhead) output shaft and load shaft.</td>
<td>The product is affected by electrical noise. Check the operation using the motor, driver, and a minimum of external devices required to operate. If an effect of noise has been confirmed, implement the following countermeasures: Keep away from the noise sources. Reconsider the wiring. Change the signal cable to a shielded cable. Install ferrite cores.</td>
</tr>
</tbody>
</table>

---

43
Alarm

This driver has the alarm function to protect from temperature rise, poor connection, error in operation, and others. If an alarm is generated, the ALARM-OUT output is turned OFF, and the motor stops. At the same time, the alarm code is displayed on the operation panel, and the ALARM LED blinks in red. (With the drivers for electromagnetic brake motor, the electromagnetic brake holds the motor shaft.) Refer to the USER MANUAL for the information function that are output before an alarm is generated.

1. Alarm reset

Before resetting an alarm by one of the following methods, be sure to remove the cause of the alarm and ensure safety.

- Turn the ALARM-RESET input ON. (The alarm will be reset at the ON edge of the input.)
- Execute an alarm reset using the operation panel.
- Execute the alarm reset using the MEXE02.
- Turn on the power again.

**Note**
- Some alarms cannot be reset other than turning on the power again.
  - Check with "3. Alarm lists."
  - Continuing the operation without removing the cause of the alarm may cause damage to equipment.

When an alarm is reset by the ALARM-RESET input

To reset an alarm, turn both the FWD input and the REV input OFF, and remove the cause of the alarm before turning the ALARM-RESET input ON. If either the FWD input or the REV input is being ON, the ALARM-RESET input is disabled. (In the case of the 3-wire mode, when both the START/STOP input and the RUN/BRAKE input are being ON, the ALARM-RESET input is disabled.) When the alarm cannot be reset by the ALARM-RESET input, once turn off the driver power, and turn on the power again after the CHARGE LED is turned off.

2. Alarm history

Up to 10 generated alarms are saved in the non-volatile memory in order of the latest to oldest. The alarm history is not cleared even if the power is shut off. The history can be checked and cleared by the following methods.

- Operation panel: The alarm history can be checked and cleared with the monitor mode.
- MEXE02: The alarm history can be checked and cleared with the alarm monitor.

3. Alarm lists

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Cause</th>
<th>Remedial action</th>
<th>Reset by the ALARM-RESET</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL20</td>
<td>Excessive current was flown through the driver due to ground fault, etc.</td>
<td>Check whether the wiring between the driver and motor is damaged.</td>
<td>Not possible</td>
</tr>
<tr>
<td></td>
<td>A different combination in output powers for the motor and the driver was used.</td>
<td>Match the output powers for the motor and the driver.</td>
<td></td>
</tr>
</tbody>
</table>

* The electromagnetic brake will activate to hold the load at the moment an alarm generates. (The action of the electromagnetic brake can be changed with the “Electromagnetic brake function at alarm” parameter. However, do not change the parameter setting when using the motor in an application of vertical drive such as elevating equipment.)
<table>
<thead>
<tr>
<th>Alarm Code</th>
<th>Alarm Cause</th>
<th>Remedial action</th>
<th>Reset by</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.21</td>
<td>Main circuit overheat</td>
<td>● The temperature inside the driver exceeded the detection temperature of the alarm. ● Reconsider the ambient temperature. ● Reconsider the ventilation condition in the enclosure.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.22</td>
<td>Overvoltage</td>
<td>● The power supply voltage exceeded approximately 120% of the rated voltage. ● A large inertia load was stopped abruptly. ● Check the power supply voltage. ● If this alarm is generated during operation, decrease the load or increase the acceleration/deceleration time.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.25</td>
<td>Undervoltage</td>
<td>● The power supply voltage dropped below approximately 60% of the rated voltage. ● Check the power supply voltage. ● Check the wiring of the power supply cable.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.28</td>
<td>Sensor error</td>
<td>● The sensor line of the connection cable was disconnected. Or the connection cable was come off. ● Check the wiring between the driver and motor.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.29</td>
<td>Main circuit output error</td>
<td>● The power lines of the connection cable were all disconnected. ● A different combination in output powers for the motor and the driver was used. ● Check the wiring between the driver and motor. ● Match the output powers for the motor and the driver.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.30</td>
<td>Overload</td>
<td>● A load exceeding the rated torque was applied to the motor for the time set in the “Overload alarm detection time” parameter. The time when the overload alarm is generated varies according to the load torque. Refer to the USER MANUAL for details. ● Decrease the load. ● Reconsider the operating conditions such as the acceleration/deceleration time. ● If this alarm is generated in low temperature environment, perform a trial operation in a light load state.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.31</td>
<td>Overspeed</td>
<td>● The motor detection speed was exceeded 5200 [r/min]. ● A different combination in output powers for the motor and the driver was used. ● Decrease the load. ● Reconsider the operating conditions such as the acceleration/deceleration time. ● Match the output powers for the motor and the driver.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.41</td>
<td>EEPROM error</td>
<td>● The stored data of the driver was damaged. ● Initialize the parameters.</td>
<td>Not possible</td>
</tr>
<tr>
<td>A.42</td>
<td>Sensor error at power-on</td>
<td>● The sensor line of the connection cable was disconnected before the power is supplied. Or the connection cable was come off. ● Check the wiring between the driver and motor.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.46</td>
<td>Prevention of operation at power-on</td>
<td>● The power supply was turned on again when the operation input signal was being ON. ● Before supplying power to the driver, turn the operation input signal OFF.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.51</td>
<td>Regeneration resistor overheat</td>
<td>● The regeneration resistor is not connected properly. ● The regeneration resistor was overheated extraordinarily. ● Check the connection for the thermostat output and the TH input of the regeneration resistor. ● The power consumption of the regeneration resistor exceeds the allowable level. Reconsider the load condition and operating conditions.</td>
<td>Possible</td>
</tr>
<tr>
<td>A.52</td>
<td>External stop</td>
<td>● The EXT-ERROR input was turned OFF. ● Check the EXT-ERROR input.</td>
<td>Possible</td>
</tr>
</tbody>
</table>

*1 This alarm is not generated when the torque limit value is set to approximately 60% or less.

*2 This alarm can be disabled with the “Prevention of operation at power-on alarm” parameter.

---

**About regeneration resistor overheat alarm**

The regeneration resistor overheat alarm “A.51” may be generated even if the regeneration resistor is not connected. Once the main power supply is turned on in a state where the pin Nos. 10 and 11 (TH input) of CNS are short-circuited, the driver recognizes that the regeneration resistor is connected and changes to the setting that the regeneration resistor is used. After that, if the power supply is turned on again in a state where nothing is connected to the pin Nos. 10 and 11 of CNS, the regeneration resistor overheat alarm will be generated.

To cancel the setting to use the regeneration resistor, execute initialization of parameters without connecting anything to the pin Nos. 10 and 11 of CNS. Then, turning on the main power supply again will reset the alarm.
### Specifications

#### 1. Specifications

Values in the rated torque, peak torque, rated rotation speed, and speed control range represent those in a state where the gearhead is not combined.

Refer to the operating manual included with the motor for the motor model name.

**● 30 W and 60 W**

<table>
<thead>
<tr>
<th>Model</th>
<th>Motor</th>
<th>BLM230HP</th>
<th>BLM460SHP</th>
<th>BLM720HP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Driver</td>
<td>BLE2D30-A</td>
<td>BLE2D60-A</td>
<td>BLE2D60-C</td>
</tr>
<tr>
<td></td>
<td>Rated output power</td>
<td>30 W</td>
<td>60 W</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>Continuous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage range</td>
<td>-15% to +10%</td>
<td>-15% to +10%</td>
<td>-15% to +10%</td>
<td>-15% to +10%</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Permissible frequency range</td>
<td>±5%</td>
<td>±5%</td>
<td>±5%</td>
<td>±5%</td>
</tr>
<tr>
<td>Rated input current</td>
<td>Single-phase: 1.1 A</td>
<td>Single-phase: 0.67 A</td>
<td>Single-phase: 1.7 A</td>
<td>Single-phase: 1.0 A</td>
</tr>
<tr>
<td>Maximum input current</td>
<td>Single-phase: 3.3 A</td>
<td>Single-phase: 2.2 A</td>
<td>Single-phase: 5.4 A</td>
<td>Single-phase: 3.5 A</td>
</tr>
<tr>
<td>Rated torque</td>
<td>0.096 N·m</td>
<td>0.191 N·m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak torque</td>
<td>0.2 N·m (80 to 2000 r/min)</td>
<td>0.4 N·m (80 to 2000 r/min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated rotation speed</td>
<td>3000 r/min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed control range</td>
<td>80 to 4000 r/min</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* There are products which maximum rotation speed is 3600 r/min depending on the type of gearhead. Check the operating manual included with the motor.

**● 120 W and 200 W**

<table>
<thead>
<tr>
<th>Model</th>
<th>Motor</th>
<th>BLM5120HP</th>
<th>BLM6200SHP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Driver</td>
<td>BLE2D120-A</td>
<td>BLE2D120-C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BLE2D120-AM</td>
<td>BLE2D120-CM</td>
</tr>
<tr>
<td></td>
<td>Rated output power</td>
<td>120 W</td>
<td>200 W</td>
</tr>
<tr>
<td>Power supply</td>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage range</td>
<td>-15% to +10%</td>
<td>-15% to +10%</td>
<td>-15% to +10%</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Permissible frequency range</td>
<td>±5%</td>
<td>±5%</td>
<td>±5%</td>
</tr>
<tr>
<td>Rated input current</td>
<td>Single-phase: 2.7 A (2.8 A)</td>
<td>Single-phase: 1.7 A (1.7 A)</td>
<td>Single-phase: 2.4 A (2.5 A)</td>
</tr>
<tr>
<td>Rated torque</td>
<td>0.382 N·m</td>
<td>0.637 N·m</td>
<td></td>
</tr>
<tr>
<td>Peak torque</td>
<td>0.8 N·m (80 to 2000 r/min)</td>
<td>1.15 N·m (80 to 2000 r/min)</td>
<td></td>
</tr>
<tr>
<td>Rated rotation speed</td>
<td>3000 r/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed control range</td>
<td>80 to 4000 r/min</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 There are products which maximum rotation speed is 3600 r/min depending on the type of gearhead. Check the operating manual included with the motor.

*2 Values in parentheses ( ) indicate those of drivers for electromagnetic brake motor.
300 W and 400 W

<table>
<thead>
<tr>
<th>Model</th>
<th>Motor</th>
<th>BLM6300SHP</th>
<th>BLM5300HP</th>
<th>BLM6400SHP</th>
<th>BLM5400HP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>BLE2D300-C</td>
<td>BLE2D300-C</td>
<td>BLM6400SHP</td>
<td>BLM5400HP</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply input</th>
<th>Specified</th>
<th>300 W</th>
<th>400 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated output power (Continuous)</td>
<td>300 W</td>
<td>400 W</td>
<td></td>
</tr>
<tr>
<td>Driver</td>
<td>BLE2D300-C</td>
<td>BLE2D300-C</td>
<td>BLM6400SHP</td>
</tr>
</tbody>
</table>

| Rated output power (Continuous) | 300 W | 400 W |
| Driver              | BLE2D300-C | BLE2D300-C | BLM6400SHP | BLM5400HP  |

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Single-phase 200-240 VAC, Three-phase 200-240 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissible voltage range</td>
<td>-15% to +10%</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Permissible frequency range</td>
<td>±5%</td>
</tr>
<tr>
<td>Rated input current</td>
<td>Single-phase: 3.2 A, Three-phase: 1.8 A</td>
</tr>
<tr>
<td>Maximum input current</td>
<td>Single-phase: 8.5 A, Three-phase: 6.0 A</td>
</tr>
<tr>
<td>Rated torque</td>
<td>0.955 N·m</td>
</tr>
<tr>
<td>Peak torque</td>
<td>1.72 N·m (80 to 2000 r/min)</td>
</tr>
<tr>
<td>Rated rotation speed</td>
<td>3000 r/min</td>
</tr>
<tr>
<td>Speed control range</td>
<td>80 to 4000 r/min *</td>
</tr>
</tbody>
</table>

* There are products which maximum rotation speed is 3600 r/min depending on the type of gearhead. Check the operating manual included with the motor.

2. General specifications

<table>
<thead>
<tr>
<th>Operating environment</th>
<th>Specified</th>
<th>300 W</th>
<th>400 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>Driver: 0 to +50 °C [=32 to +122 °F] (non-freezing) *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>85% or less (non-condensing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>Up to 1000 m (10000 ft.) above sea level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surrounding atmosphere</td>
<td>No corrosive gas or dust. Not exposed to oil. Cannot be used in radioactive materials, magnetic field, vacuum or other special environment. (For details about installation locations, refer to p.12.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>Not subject to continuous vibrations or excessive impact. In conformance with JIS C 60068-2-6 “Sine-wave vibration test method” Frequency range: 10 to 55 Hz Pulsating amplitude: 0.15 mm (0.006 in.) Sweep direction: 3 directions (X, Y, Z) Number of sweeps: 20 times</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage environment</th>
<th>Specified</th>
<th>300 W</th>
<th>400 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>Driver: -25 to +70 °C [= -13 to +158 °F] (non-freezing) *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>85% or less (non-condensing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>Up to 3000 m (10000 ft.) above sea level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surrounding atmosphere</td>
<td>No corrosive gas, dust, water or oil. Cannot be used in radioactive materials, magnetic field, vacuum or other special environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>Driver: IP20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The conditions of use vary when two or more drivers are installed closely in the horizontal direction. Refer to p.13 for details.

3. Pin assignment

The pin assignments of the connectors for driver connection of the connection cable are shown here. The following figures represent as the view from the direction of the lead wires side of the connection cable.

- Power connector (white) | CN2

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Lead wire color</th>
<th>Lead wire size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Blue</td>
<td>AWG18</td>
</tr>
<tr>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>–</td>
<td>AWG24 or equivalent</td>
</tr>
<tr>
<td>4</td>
<td>Purple</td>
<td>AWG18</td>
</tr>
<tr>
<td>5</td>
<td>Gray</td>
<td>–</td>
</tr>
<tr>
<td>6</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

- Sensor connector (black) | CN4

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Lead wire color</th>
<th>Lead wire size</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>A2</td>
<td>Green</td>
<td>–</td>
</tr>
<tr>
<td>A1</td>
<td>Yellow</td>
<td>–</td>
</tr>
<tr>
<td>B3</td>
<td>Brown</td>
<td>–</td>
</tr>
<tr>
<td>B2</td>
<td>Red</td>
<td>–</td>
</tr>
<tr>
<td>B1</td>
<td>Orange</td>
<td>–</td>
</tr>
</tbody>
</table>

- Electromagnetic brake connector (white) | CN3

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Lead wire color</th>
<th>Lead wire size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black</td>
<td>AWG22</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>–</td>
</tr>
</tbody>
</table>

* Only drivers for electromagnetic brake motor
Regulations and standards

1. UL Standards, CSA Standards

This products is recognized by UL under the UL and CSA Standards.

<table>
<thead>
<tr>
<th>Applicable Standards</th>
<th>Certification body</th>
<th>Standards File No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL 61800-5-1</td>
<td>UL</td>
<td>E171462</td>
</tr>
<tr>
<td>CSA C22.2 No.274</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. EU Directives

This products is affixed the CE Marking under the Low Voltage Directive and EMC Directive.

- **CE Marking**
  - **Low Voltage Directive**
    - Applicable standards: EN 61800-5-1
    - Installation conditions (EN Standards):
      - For incorporating in equipment
      - Overvoltage category: II
      - Pollution degree: 2
      - Degree of protection: IP20
      - Protection against electric shock: Class I equipment
    - This product is designed and manufactured to be incorporated in equipment.
    - This product cannot be used in IT power distribution systems.
    - Install the product inside an enclosure in order to avoid contact with hands.
    - Be sure to ground (protective earth) if the product can be made contact with hands. Ground the Protective Earth Terminals for the motor (or connection cable) and driver securely.
    - Isolate power cables such as the connection cable, power supply cable and other drive cables from the signal cable (CNS) and USB cable by means of double insulation.

- **EMC Directive**
  - This product has received EMC compliance under the conditions specified in "Example of installation and wiring" on p.50. The final level of conformance of your mechanical equipment to the EMC Directive will vary depending on such factors as the control system equipment used with the motor and driver, configuration of electrical parts, wiring, layout and hazard level. It therefore must be verified through conducting EMC measures on your mechanical equipment.
  - Applicable standards:
    - EMI: EN 55011 Group 1 Class A
    - EN 61000-6-4, EN 61800-3
    - EMS: 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.

3. Republic of Korea, Radio Waves Act

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

4. RoHS Directive

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).
5. Installing and wiring in compliance with EMC Directive

This product has been designed and manufactured to be incorporated in equipment. The EMC Directive requires that your mechanical equipment in which the product is installed satisfies the applicable requirements. The installation and wiring methods of the motor and driver explained here represent the basic methods that are effective in helping your mechanical equipment conform to the EMC Directive.

The final level of conformance of your mechanical equipment to the EMC Directive will vary depending on such factors as the control system equipment used with the motor/driver, configuration of electrical parts, wiring, layout and hazard level. It therefore must be verified through conducting EMC measures on your mechanical equipment.

Without effective measures to suppress the electromagnetic interference (EMI) caused by the product in the surrounding control system equipment or the electromagnetic spectrum (EMS) generated by the product, the function of your mechanical equipment may be seriously affected.

The use of the following installation and wiring methods will enable this product to be compliant with the EMC directive.

### Connecting a mains filter

Install a mains filter which the customer provides, in the power line in order to prevent the noise generated within the driver from propagating outside via the AC input line. For a mains filter, use the products as shown in the table, or an equivalent.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Single-phase 100-120 VAC</th>
<th>Single-phase 200-240 VAC</th>
<th>Three-phase 200-240 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soshin Electric Co., Ltd.</td>
<td>HF2010A-UPF, NF2010A-UP</td>
<td>HF3010C-SZA, NFU3010C-Z1</td>
<td></td>
</tr>
<tr>
<td>Schaffner EMC</td>
<td>FN2070-10-06</td>
<td>FN302SHP-10-71</td>
<td></td>
</tr>
</tbody>
</table>

- Overvoltage category II applies to mains filters.
- Install the mains filter as close to the driver as possible.
- Use cable clamps and other means to secure the input and output cables firmly to the surface of the enclosure.
- Connect the ground terminal of the mains filter to the grounding point, using as thick and short a wire as possible.
- Do not place the AC input cable (AWG18 to 14: 0.75 to 2.0 mm²) parallel with the mains-filter output cable (AWG18 to 14: 0.75 to 2.0 mm²). Parallel placement will reduce mains filter effectiveness if the enclosure’s internal noise is directly coupled to the power supply cable by means of stray capacitance.

### Connecting an external power supply

Use an external power supply conforming to the EMC Directive. Use a shielded cable to wire the external power supply over the shortest possible distance. Refer to “Wiring the power supply cable” for how to ground the shielded cable.

### How to ground

The cable used to ground the motor, driver, mains filter and power supply cable (shielded cable) must be as thick and short as possible so that no potential difference is generated among the grounding points. Choose a large, thick and uniformly conductive surface for the grounding point. Refer to the p.16 for the recommended grounding method.

### Wiring of the power supply cable

Use a shielded cable of AWG18 to 14 (0.75 to 2.0 mm²) in diameter for the power supply cable and keep it as short as possible.

Strip a part of the shielded cable and ground the stripped part using a metal cable clamp that contacts the stripped cable around its entire circumference, or use a drain wire to make the ground connection.

Connect both ends (mains filter side and power supply side) of the shielded cable to the grounding points so that no potential difference is generated between grounds.

### Notes about installation and wiring

- Connect the motor, driver and other peripheral control equipment directly to the grounding point so as to prevent a potential difference from developing between grounds.
- When relays or electromagnetic switches are used together with the product, use mains filters or CR circuits to suppress surges generated by them.
- Keep cables as short as possible without coiling and bundling extra lengths.
- Wire the power lines such as the connection cable and power supply cable away from the signal cables by providing a minimum clearance of 100 mm (3.94 in.) between them. If they must cross, do so at a right angle.
- Place the AC input cable and output cable of a mains filter separately from each other.
- Use a dedicated connection cable (sold separately) for the connection between the motor and driver.

The EMC measures are conducted using the Oriental Motor connection cable.
**Example of installation and wiring**

- **Regeneration unit**
  - RGB100

- **Connection cable**

- **AC power supply**
  - L, N, PE
  - Power supply cable [2 m (6.6 ft.)]

- **Mains filter**

- **Ground plate (aluminum plate)**

- **I/O signals cable**
  - [2 m (6.6 ft.)]

- **External potentiometer cable**
  - [2 m (6.6 ft.)]

- **Regeneration unit lead wire**
  - [0.3 m (0.98 ft.)]

- **Grounding**

---

*1 The connection cables for up to 20.5 m (67.2 ft.) have been evaluated.

*2 Non-shielded cable

---

**Precautions about static electricity**

Static electricity may cause damage to the driver. Be sure to ground the product in order to prevent electric shock or product damage by static electricity. Except when operating the operation panel on the driver, do not approach or touch the driver while the power is on.