

***Orientalmotor***

Brushless DC Motors

# BLH Series

**NEW**

Electromagnetic Brake Motor  
RS-485 Communication Type Driver

**Improved DC Input drivers with increased  
functionality and performance**



# Excellent performance just as it is.

The redesigned **BLH** Series has a lineup of motors with electromagnetic brake and RS-485 communication type drivers. The line-up and functions are further enhanced to support customer convenience.

**NEW**

Electromagnetic  
Brake Motor



► Page 8

**NEW**

RS-485 Communication  
Type Driver



► Page 6



## The Versatile BLH Series

- Speed range **80 to 3000 r/min\***
- Maximum of **8** speed settings\*
- Quieter: **13 dB quieter than before**
- **Torque limiting** and **deceleration stop** are supported\*
- Operation data can be set from **PC** or **host system\***
- Monitor operating status **in real time\***

\* Using **MEXE02** support software and digital setting type driver.

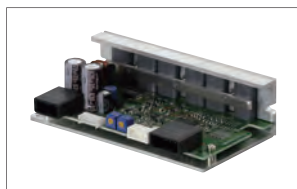
## 3 Driver Types to Choose From

| Motor                                                                                                                                                                                                                                                                                                                                                                            |   | Driver                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <ul style="list-style-type: none"> <li>• Output power<br/>15 W / 30 W / 50 W / 100 W</li> <li>• Motor Type<br/>Standard Type /<br/>Electromagnetic<br/>Brake Type <b>NEW</b></li> <li>• Shaft Types:<br/>Parallel Shaft Gearhead /<br/>Hollow Shaft Flat Gearhead /<br/>Round Shaft</li> </ul> | + | <b>Analogue Setting Type</b> <ul style="list-style-type: none"> <li>• Compatible with the existing <b>BLH</b> product range</li> <li>• Increased performance (Higher torque, reduced audible noise)</li> <li>• For output power 15 W / 30 W / 50 W / 100 W</li> </ul>                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                  |   | <b>Digital Setting Type</b> <ul style="list-style-type: none"> <li>• Compatible with the existing <b>BLH</b> product range</li> <li>• Increased performance (Higher torque, reduced audible noise)</li> <li>• Increased functionality with <b>MEXE02</b> support software</li> <li>• For output power 15 W / 30 W / 50 W</li> </ul>                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                  |   | <b>RS-485 Communication Type <b>NEW</b></b> <ul style="list-style-type: none"> <li>• Supports RS-485 communication (Modbus protocol)</li> <li>• Easy to write and copy data to multiple drive.</li> <li>• Reduced equipment wiring</li> <li>• Compatible with <b>MEXE02</b> support software</li> <li>• Supports remote monitoring via host system</li> <li>• For output power 15 W / 30 W / 50 W</li> </ul>  |

## Compact, Lightweight Drivers

Compact, lightweight drivers that are smaller than a business card.

100 W Driver



Actual Size

55 mm

72 mm

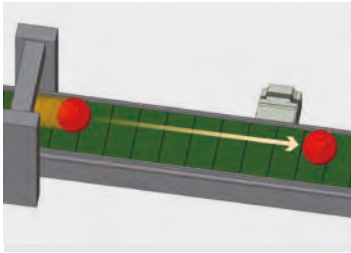


Mass 46 g

• Pictured: 15 W / 30 W / 50 W driver.

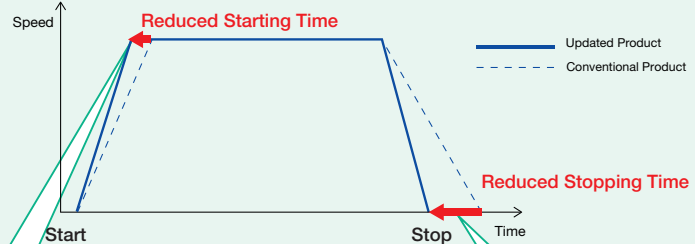
# Increased Performance and Value with New Drivers.

## Reduced Product Cycle Time



- Faster starting time with increased torque
- Stop at the rate set with deceleration stop (Digital setting type / RS-485 Communication type)

### Reduced Product Cycle Time

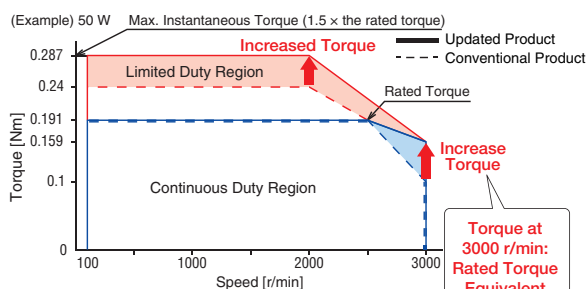


### ► Increased Torque (30 W, 50 W)

#### Max. instantaneous torque: 1.5 times the rated torque

The continuous duty region can be exceeded for a limited time, making the **BLH** Series ideal for applications that require high torque in high speed areas. The machine's product cycle time can be shortened by applying the maximum instantaneous torque 1.25 to 1.5 times higher than the conventional model.

Speed range:  
**100 to 3000 r/min** (Analogue setting)  
**80 to 3000 r/min** (Digital setting)



### ► Deceleration Stop

(Digital setting type / RS-485 Communication type)

In addition to the acceleration time setting, these types of driver are equipped with a deceleration stop function to stop in the set deceleration time. Product cycle time can be reduced more than passive stopping with the conventional type.

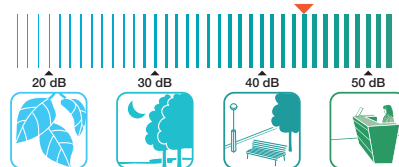
## Suitable for Applications in Quiet Environments

### ► Reduced Audible Noise

Noise is approx. half that of conventional products

- 30 W with parallel shaft gearhead Gear ratio of **5**
- Measurement of noise: OA value

Noise value approx. 44 dB  
(Reduced by approx. 13 dB)

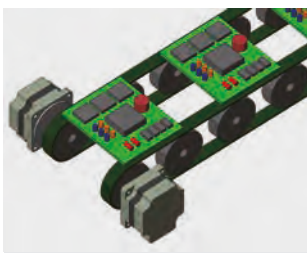


The sound of leaves rustling  
The second hand of a clock  
The suburbs at night  
A whisper  
A quiet park  
A library  
A quiet office  
An air conditioner (outdoor unit)

The **BLH** Series uses a sinusoidal drive method. With little torque ripple and smooth, stable rotation even at low speeds, the motor's audible volume is reduced.

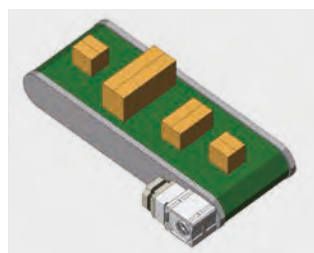
## Synchronized Operation and Operation with Minimal Speed Fluctuation

### ► Synchronized Operation



- With digital settings, speeds can be set at 1 rpm increments. The speed accuracy is improved, and synchronized operations are made possible.

### ► Speed Stability



- Speed remains stable even if the weight of the load changes (Speed regulation  $\pm 0.2\%$  max.)

### • Speed Regulation

| Speed Setting Method | Driver Type           |                                                   |
|----------------------|-----------------------|---------------------------------------------------|
|                      | Analogue Setting Type | Digital Setting Type<br>RS-485 Communication Type |
| Analogue Setting     | $\pm 0.5\%$ max.      |                                                   |
| Digital Setting      | —                     | <b><math>\pm 0.2\%</math> max.</b>                |
| PWM Input Setting    | —                     | $\pm 0.5\%$ max.                                  |



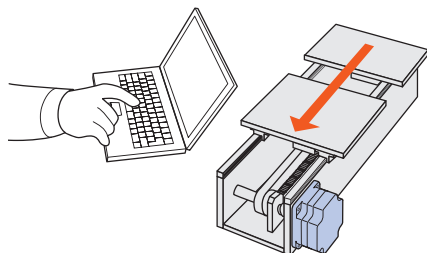
This is a demo of an Automated Guided Vehicle (AGV) using the **BLH** Series. You can see the synchronization and high level of response.



# Startup and Maintenance with Digital Settings and Support Software.

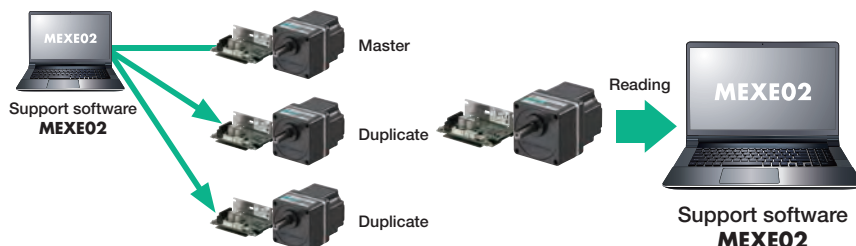
## Equipment Startup Assistance

### ► Teaching and Remote Operation



Operation data can be set up on your computer. This makes it possible to create a motion profile without being connected to the machine's motion control system, then save the operation data in place.

### ► Operating Data Duplication



When using multiple units, the operation data used in the first unit can be treated as a master file, and duplicated into subsequent units. Helping to reduce setup time.

## Predictive Maintenance with Visualization

**What is predictive maintenance?** By constantly monitoring the status of the motor and performing maintenance when signs of change are observed, machine down time can be avoided.

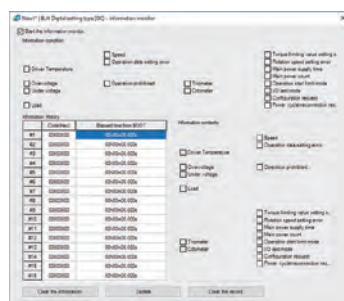


### ► Status Monitoring



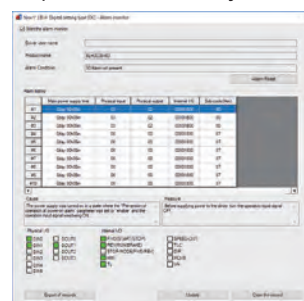
The load factor, driver temperature, and other conditions can be constantly checked.

### ► Information Monitoring



Output signals can be set to trigger at preset thresholds, showing that periodic maintenance is now due.

### ► Alarm Monitoring (When an abnormality occurs)

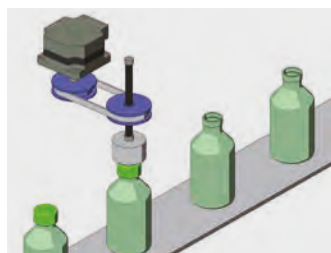


Alarm information can also be monitored. The cause of the alarm is listed, with suggested solutions to resolve the problem. There is also a history record of any previous alarms.

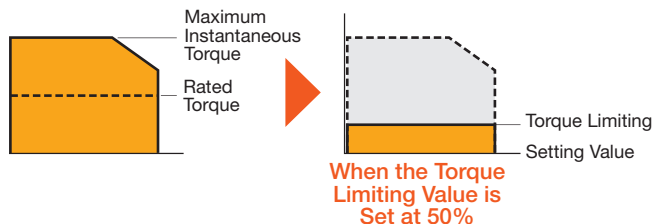
## Torque Adjustment

### ► Torque Limiting Function

**What is torque limiting?** It is a limiting function that suppresses the motor's torque by limiting the current to the motor.



- Adjust tightening force, etc.
- Damage prevention (Low thrust)
- Load factor monitoring is possible



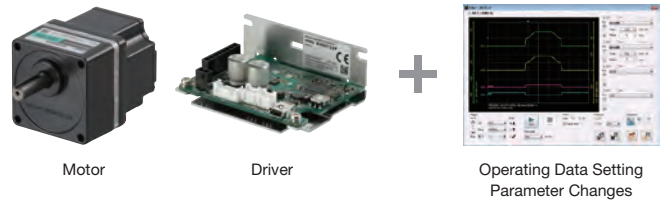
- As well as tightening applications, torque limiting can also be used as a safety measure.
- Status monitoring can be used to highlight when the operating status of the motor deviates from the normal range. Increased torque requirement from wear and tear, or pinching, can be flagged to help prevent damage to machinery.
- The max. instantaneous torque range can be set between 0% and 200% of the rated torque of the motor.

# Central Control and Batch Setting Via Network Communication. **NEW**

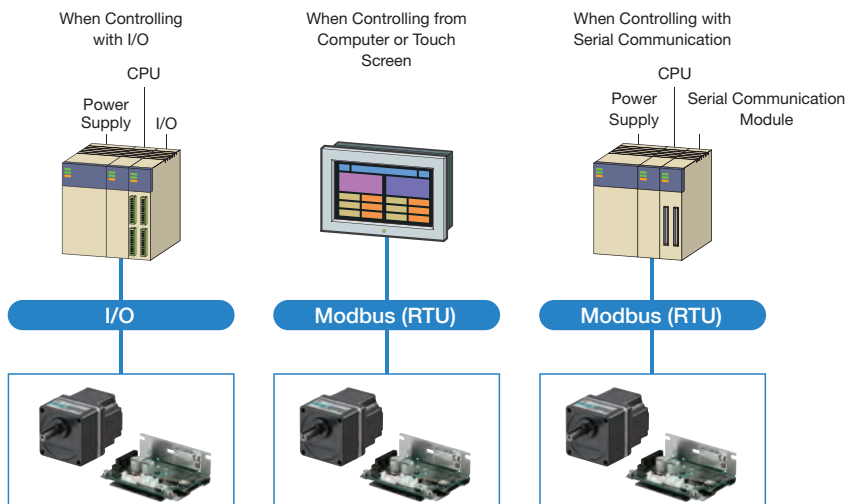
RS-485 Communication Type Driver

RS-485 communication can be used to set operating data and parameters, as well as input operation commands. Thanks to support for the Modbus (RTU) protocol, control via connection to a panel computer or a programmable controller is possible.

\* Operation command input can also be performed via I/O, which is useful for setting during startup.



## Reduced Wiring and Easy Setting & Modification of Operating Data



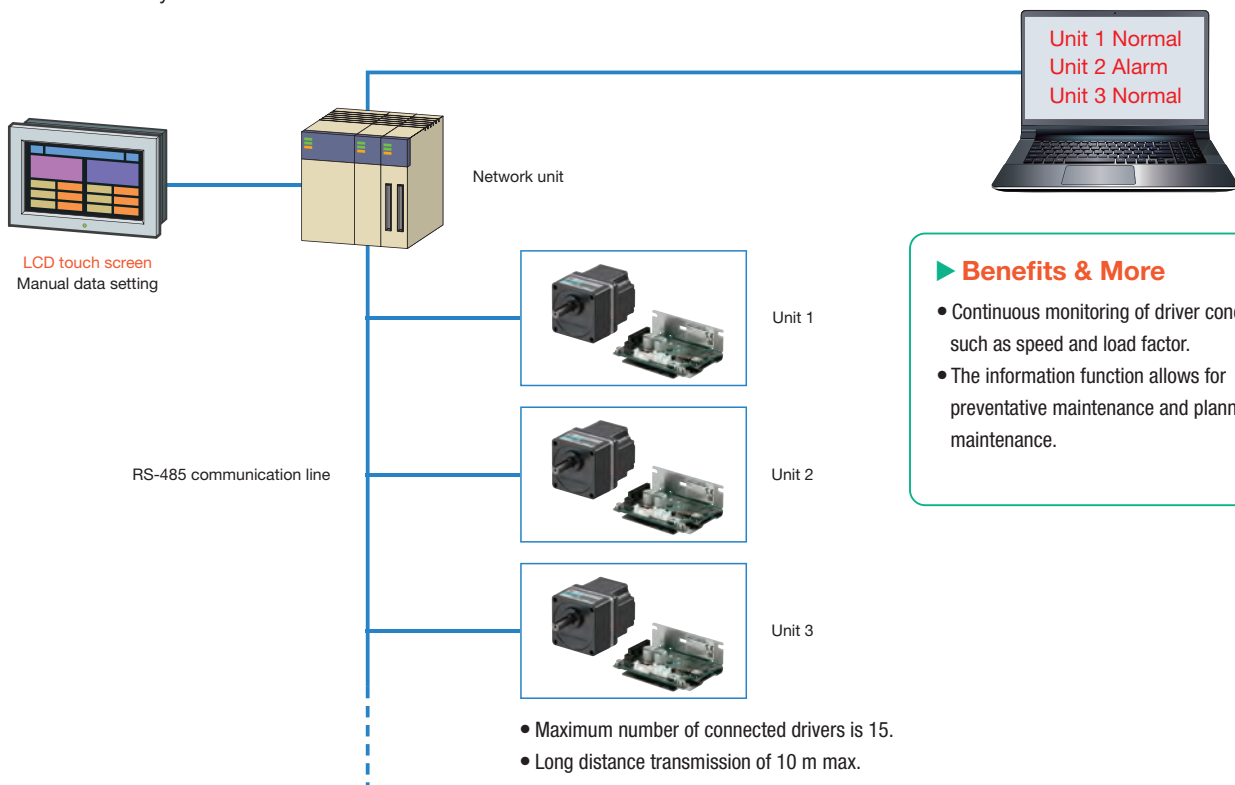
### ► Benefits & More

- Operating data, such as speed and torque control values, can be easily amended.
- Simultaneous multi-axis setting of operating data and parameters.
- Remote I/O and serial communication help to reduce wiring.

## Continuous Remote Monitoring

Because the status of each driver can be monitored by serial communication, it is possible to remotely observe the motor and driver conditions on a continuous basis.

Remote PC  
Continuous monitoring is possible



# Choose From 3 Types Based on Setting Method and Functions

## Operating Data Setting

With the digital settings type, you can set up to 8 different sets of operation data (speed of rotation, torque limit value, acceleration time, deceleration time).

### Setting Method

| Setting Method                   |                           | Digital Setting                                                                                                        |                                                                                                           | External Analogue Potentiometer                                                                                   |                                                                                                          | Internal Potentiometer (Driver)                                                            |                                                                                            | PWM Input                                                                                         |
|----------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Setting Item                     |                           | <br>Support software<br><b>MEXE02</b> | <br>RS-485 communication | <br>External speed potentiometer | <br>External DC voltage | <br>VR1 | <br>VR2 | <br>PWM signal |
| Speed                            | Analogue setting type     | -                                                                                                                      | -                                                                                                         | ●                                                                                                                 | ●                                                                                                        | ●                                                                                          | -                                                                                          | -                                                                                                 |
|                                  | Digital setting type      | ●                                                                                                                      | -                                                                                                         | ●                                                                                                                 | ●                                                                                                        | ●                                                                                          | ●                                                                                          | ●                                                                                                 |
|                                  | RS-485 communication type | ●                                                                                                                      | ●                                                                                                         | ●                                                                                                                 | ●                                                                                                        | -                                                                                          | -                                                                                          | ●                                                                                                 |
| Acceleration / Deceleration Time | Analogue setting type     | -                                                                                                                      | -                                                                                                         | -                                                                                                                 | -                                                                                                        | -                                                                                          | ●                                                                                          | -                                                                                                 |
|                                  | Digital setting type      | ●                                                                                                                      | -                                                                                                         | -                                                                                                                 | -                                                                                                        | ●                                                                                          | ●                                                                                          | -                                                                                                 |
|                                  | RS-485 communication type | ●                                                                                                                      | ●                                                                                                         | -                                                                                                                 | -                                                                                                        | -                                                                                          | -                                                                                          | -                                                                                                 |
| Torque Limiting                  | Analogue setting type     | -                                                                                                                      | -                                                                                                         | -                                                                                                                 | -                                                                                                        | -                                                                                          | -                                                                                          | -                                                                                                 |
|                                  | Digital setting type      | ●                                                                                                                      | -                                                                                                         | ●                                                                                                                 | ●                                                                                                        | ●                                                                                          | ●                                                                                          | ●                                                                                                 |
|                                  | RS-485 communication type | ●                                                                                                                      | ●                                                                                                         | ●                                                                                                                 | ●                                                                                                        | -                                                                                          | -                                                                                          | ●                                                                                                 |

## Functions List

| Function |                                           | Analogue Setting Type                                     | Digital Setting Type/RS-485 Communication Type                 |
|----------|-------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------|
| ①        | Digital Speed Indicator                   | ●<br>Pulse signals can be converted to an external device | ●<br>Monitoring function of the <b>MEXE02</b> support software |
| ②        | Instantaneous Stop                        | ●                                                         | ●                                                              |
| ③        | Acceleration / Deceleration Time Setting  | ●<br>0.1 to 12.0 seconds*1                                | ●<br>0.1 to 15.0 seconds (Individual settings)                 |
| ④        | Multistep Speed-Change Operation          | ●                                                         | ●                                                              |
| ⑤        | Parallel-Motor Operation                  | ●                                                         | ●                                                              |
| ⑥        | Protective Function                       | ●                                                         | ●                                                              |
| ⑦        | Torque Limiting                           | -                                                         | ●                                                              |
| ⑧        | Speed Upper and Lower Limit Setting       | -                                                         | ●                                                              |
| ⑨        | Shock Alleviation Filter                  | -                                                         | ●                                                              |
| ⑩        | I/O Signal Assignment                     | -                                                         | ●                                                              |
| ⑪        | I/O Signal Operation Selection            | -                                                         | ●                                                              |
| ⑫        | Overload Alarm Detection Time Setting     | -<br>Fixed at 10.0 seconds*2                              | ●<br>0.1 to 10.0 seconds                                       |
| ⑬        | Prevention of Operation at Power-on Alarm | -                                                         | ●                                                              |
| ⑭        | Various Information Detection             | -                                                         | ●                                                              |

\*For ⑦ to ⑭, when using the **MEXE02** support software and digital setting type and RS-485 communication type driver.

\*1 0.5 to 10.0 seconds for 100 W

\*2 Fixed at 5.0 seconds for 100 W

# A Wide Range of Options

## Product Line

Motor, driver, connection cables (flexible connection cables), and cable sets (power supply cable, I/O signals cable) sold separately.

### Motor

| Output Shaft Type                                                                                                                 | Electromagnetic Brake                                                                           | Output [W] | Frame Size [mm] | Gear Ratio                                     |
|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------|-----------------|------------------------------------------------|
| Parallel Shaft Gearhead<br><b>GFS</b> Gear*1<br> | —                                                                                               | 15         | 42              | <b>5, 10, 15<br/>20, 30, 50<br/>100, 200</b>   |
|                                                                                                                                   | <b>NEW</b><br> | 30         | 60              |                                                |
|                                                                                                                                   |                                                                                                 | 50         | 80              |                                                |
|                                                                                                                                   |                                                                                                 | 100        | 90              |                                                |
| Hollow Shaft Flat Gearhead<br><b>FR</b> Gear<br> | <b>NEW</b><br> | 30         | 60              | *15 W does not have a gear ratio of <b>200</b> |
|                                                                                                                                   |                                                                                                 | 50         | 80              |                                                |
|                                                                                                                                   |                                                                                                 | 100        | 90              |                                                |
| Round Shaft Type<br>                           | —                                                                                               | 15         | 42              | —                                              |
|                                                                                                                                   |                                                                                                 | 30         | 60              |                                                |
|                                                                                                                                   |                                                                                                 | 50         | 80              |                                                |
|                                                                                                                                   |                                                                                                 | 100        | 90              |                                                |

\*1 The 15 W geared motor has an integrated motor and gearhead.

\*2 Power supply cable and I/O signal cable are included with the 100 W driver.

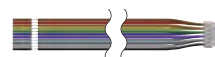
### Driver

| Output [W] | Type                                                                                                                             |
|------------|----------------------------------------------------------------------------------------------------------------------------------|
| 15         | Analogue Setting Type<br>                     |
| 30         |                                                                                                                                  |
| 50         |                                                                                                                                  |
| 100*2      |                                                                                                                                  |
| 15         | Digital Setting Type<br>                      |
| 30         |                                                                                                                                  |
| 50         |                                                                                                                                  |
| 15         | <b>NEW</b><br>RS-485 Communication Type<br> |
| 30         |                                                                                                                                  |
| 50         |                                                                                                                                  |

### Cable

| Connection Cable<br>Flexible Connection Cable                                                |
|----------------------------------------------------------------------------------------------|
| <br>1.5 m |

### Cable Sets

| Power Supply Cable                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------|
| <br>300 mm<br><b>NEW</b> 1000 mm   |
| Cable for I/O Signals                                                                                                 |
| <br>300 mm<br><b>NEW</b> 1000 mm |

## Stop and Hold Using Electromagnetic Brake **NEW**

### ► Able to hold position in horizontal applications

- The stop position can be maintained when equipment needs to be stationary to load and unload or process work pieces.
- Holds the load when an unexpected event such as a power failure occurs.



- Cannot be used for vertical drive applications such as gravitational operation.
- Customer must provide the electromagnetic brake control.

### ► Confirm motor is stopped by MOVE output

- With the digital setting type and RS-485 communication type, you can use the MOVE output to check the timing for turning off the electromagnetic brake.

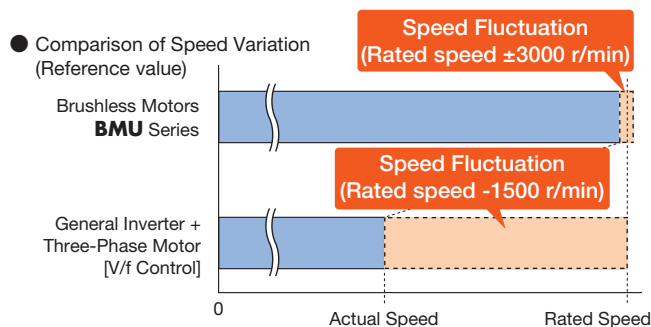
- Before holding the load with the electromagnetic brake, ensure that the motor has stopped. Using the brake during rotation may damage the product.
- The analogue setting type does not have a MOVE output. To detect rotation, it is necessary to install an external sensor.

## Features of Brushless DC Motors

Brushless DC motors have slim bodies and provide high output and high efficiency due to built-in permanent magnets. The built-in sensors (Hall IC) constantly monitor the motor's speed. No matter the load conditions, feedback control is carried out at all times so that the command speed and actual speed remain consistent.

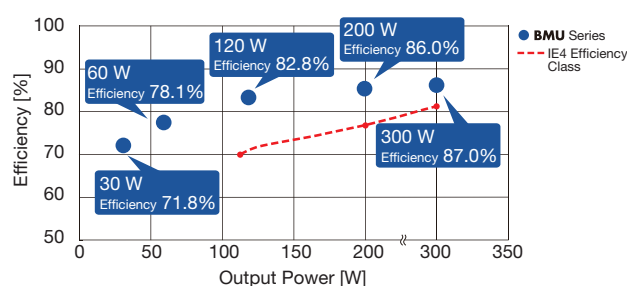
### Speed Stability with Feedback Control

Brushless DC motor drivers compare the set speed with the speed feedback signals from the motor at all times and adjust the motor's applied voltage. Speed is kept stable over the entire speed range from low to high even when the load fluctuates.



### IE4-equivalent\* High-Efficiency and Energy-Saving Motor

Brushless DC motors are higher efficiency than single and three phase induction motors. For example, the efficiency of the 200 W **BMU Series** motor and driver is increased to 86%, and the IE4 standard is increased to 75.8%, contributing to energy-saving requirements.

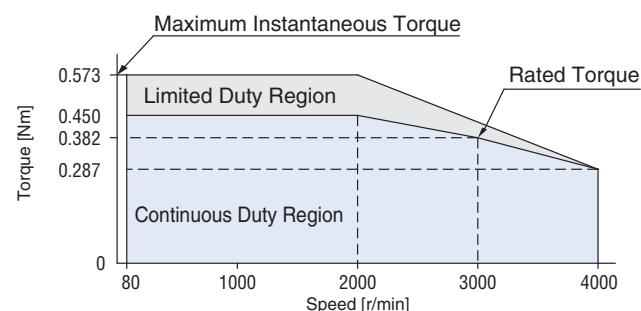


\*Induction motors 120 W and higher are subject to the efficiency classes under the international standard IEC 60034-30-1.

\*IE4 efficiency values are at 50 Hz and 1500 r/min, while brushless motor efficiency values are at rated speed.

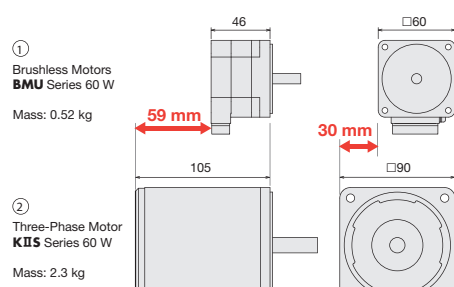
### Broad Speed Control Range and even Torque

Rated torque is consistent over the entire speed range from low to high. In contrast to a three-phase motor with inverter, the rated torque is available even at low speed.



### Compact, Lightweight, and High Power

Since these are brushless DC motors with built-in permanent magnets, they offer high output power even though they are compact. Installation is easy, and both equipment weight and space can be reduced.

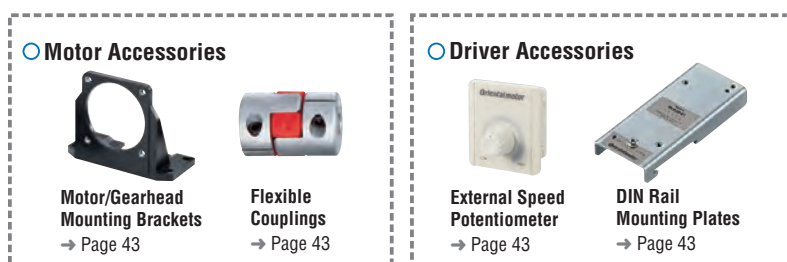
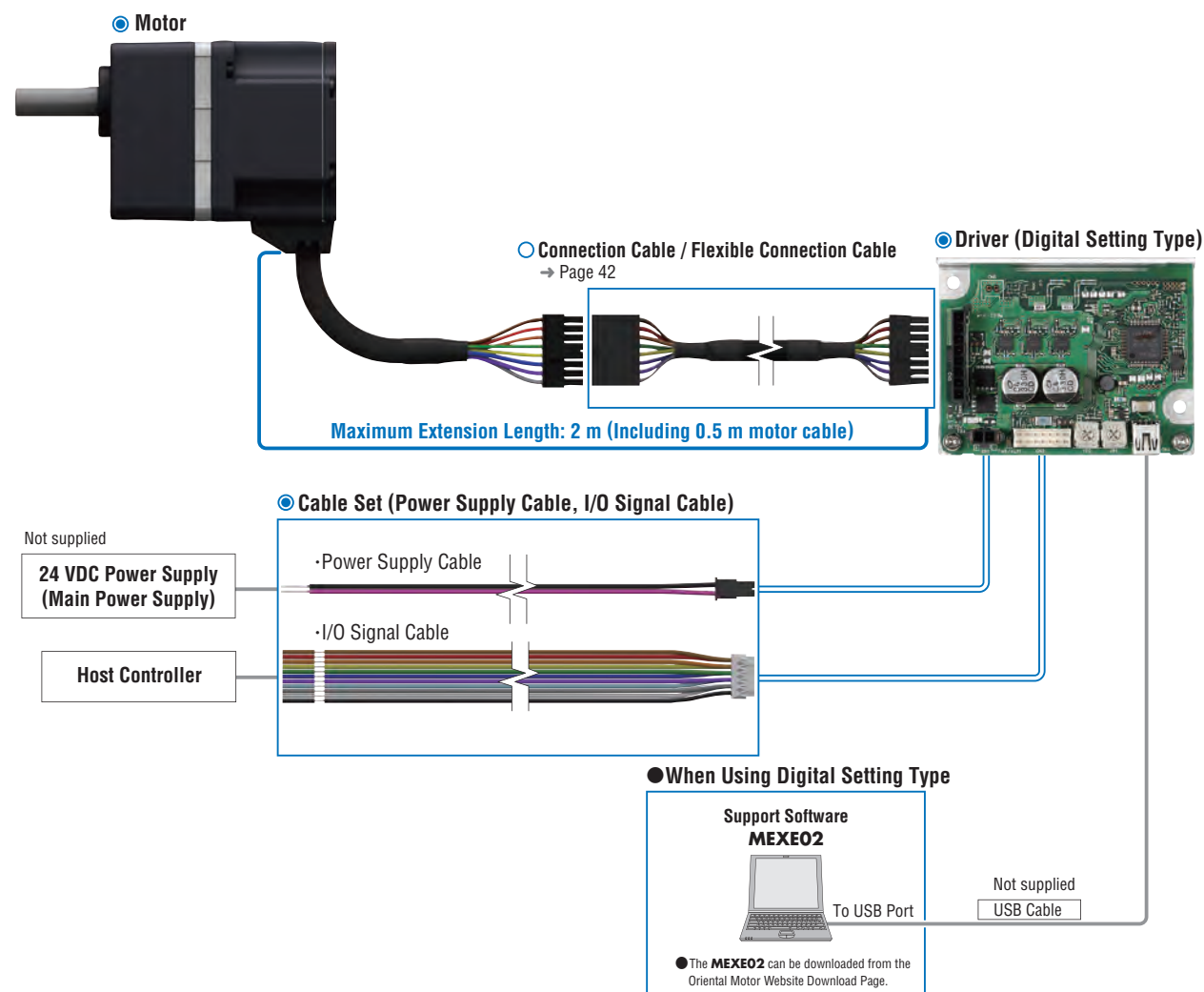


## System Configuration

### Digital Setting Type

● Required for operation

○ Optional accessories



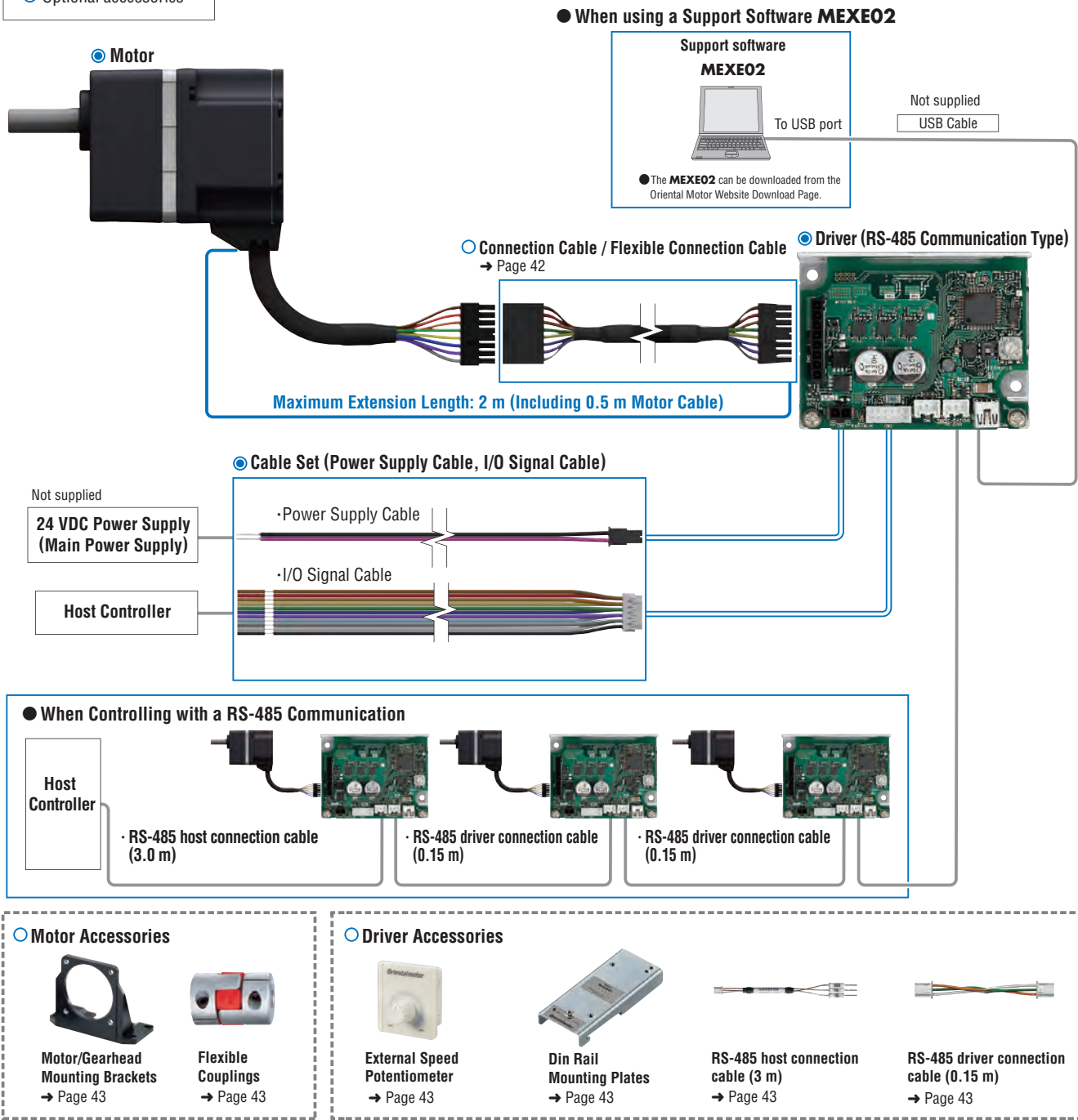
### Example of System Configuration

| Motor       |  | Driver     |  | Cables           |           | Accessories                       |                   |                         |
|-------------|--|------------|--|------------------|-----------|-----------------------------------|-------------------|-------------------------|
|             |  |            |  | Connection Cable | Cable Set | Motor / Gearhead Mounting Bracket | Flexible Coupling | DIN Rail Mounting Plate |
| BLHM230KC-5 |  | BLH2D30-KD |  | CC02BLH          | LHS003CD  | SOL2M4                            | MCL301010         | MADP01                  |

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

● RS-485 Communication Type

- Required for operation
- Optional accessories



● Example of System Configuration

| Motor       |  | Driver     |  | Cables           |           | Accessories                       |                   |                         |
|-------------|--|------------|--|------------------|-----------|-----------------------------------|-------------------|-------------------------|
| Motor       |  | Driver     |  | Connection Cable | Cable Set | Motor / Gearhead Mounting Bracket | Flexible Coupling | DIN Rail Mounting Plate |
| BLHM230KC-5 |  | BLH2D30-KR |  | CC02BLH          | LHS003CC  | SOL2M4                            | MCL301010         | MADP01                  |

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

## Product Number

### Motor

**BLHM 4 50 K C M-5 FR**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

|   |                                    |                                                                                                                   |
|---|------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| ① | Motor Type                         | <b>BLHM</b> : Brushless Motor                                                                                     |
| ② | Frame Size                         | <b>0</b> : 42 mm <b>2</b> : 60 mm <b>4</b> : 80 mm <b>5</b> : 90 mm                                               |
| ③ | Output Power                       | <b>15</b> : 15 W <b>30</b> : 30 W <b>50</b> : 50 W <b>100</b> : 100 W                                             |
| ④ | Power Supply                       | <b>K</b> : 24 VDC                                                                                                 |
| ⑤ |                                    | <b>C</b> : Cable Type                                                                                             |
| ⑥ |                                    | <b>M</b> : Electromagnetic Brake Motor                                                                            |
| ⑦ | Gear Ratio/<br>Shaft Configuration | Number: Gear ratio for combination types<br><b>A</b> : Round Shaft Type                                           |
| ⑧ |                                    | Blank: Parallel Shaft Gearhead <b>GFS</b> Gear Type<br><b>FR</b> : Hollow Shaft Flat Gearhead <b>FR</b> Gear Type |

### Driver

**BLH2D 50 - K D**

① ② ③ ④

|   |              |                                                                                                              |
|---|--------------|--------------------------------------------------------------------------------------------------------------|
| ① | Driver Type  | <b>BLH2D</b> : <b>BLH</b> Series Driver (15 W, 30 W, 50 W)<br><b>BLHD</b> : <b>BLH</b> Series Driver (100 W) |
| ② | Output Power | <b>15</b> : 15 W <b>30</b> : 30 W <b>50</b> : 50 W <b>100</b> : 100 W                                        |
| ③ | Power Supply | <b>-K</b> : 24 VDC (15 W, 30 W, 50 W)<br><b>K</b> : 24 VDC (100 W)                                           |
| ④ | Type         | Blank: Analogue Setting<br><b>D</b> : Digital Setting<br><b>R</b> : RS-485 Communication                     |

### Connection Cable, Flexible Connection Cable

**CC 02 BLH R**

① ② ③ ④

|   |                   |                                                                                                |
|---|-------------------|------------------------------------------------------------------------------------------------|
| ① | Cable Type        | <b>CC</b> : Connection Cable                                                                   |
| ② | Length            | <b>02</b> : 1.5 m                                                                              |
| ③ | Applicable Motors | <b>BLH</b> : Brushless Motor (15 W, 30 W, 50 W)<br><b>AXH2, BLH2</b> : Brushless Motor (100 W) |
| ④ |                   | Blank: Connection Cable<br><b>R</b> : Flexible Connection Cable                                |

### Power Supply Cable and I/O Signal Cable Set (For 15 W, 30 W, 50 W)

**LH S 003 C D**

① ② ③ ④ ⑤

|   |                    |                                                                                                |
|---|--------------------|------------------------------------------------------------------------------------------------|
| ① | Cable Type         | <b>LH</b> : Cable Set                                                                          |
| ② |                    | <b>S</b> : Set                                                                                 |
| ③ | Length             | <b>003</b> : 0.3 m <b>010</b> : 1 m                                                            |
| ④ |                    | <b>C</b> : Cable                                                                               |
| ⑤ | Applicable Drivers | <b>C</b> : Analogue Setting Type, RS-485 Communication Type<br><b>D</b> : Digital Setting Type |

## Product Line

Motors, drivers and connection cables are sold separately.

### Motor

#### Parallel Shaft Gearhead **GFS** Gear

| Output Power [W] | Product Name         | Gear Ratio                                               |
|------------------|----------------------|----------------------------------------------------------|
| 15               | <b>BLHM015K</b> -□*  | <b>5, 10, 15, 20</b><br><b>30, 50, 100</b>               |
| 30               | <b>BLHM230KC</b> -□  | <b>5, 10, 15, 20</b><br><b>30, 50, 100</b><br><b>200</b> |
| 50               | <b>BLHM450KC</b> -□  | <b>5, 10, 15, 20</b><br><b>30, 50, 100</b><br><b>200</b> |
| 100              | <b>BLHM5100KC</b> -□ | <b>5, 10, 15, 20</b><br><b>30, 50, 100</b><br><b>200</b> |



\*The geared type has an integrated motor and gearhead.  
The combination of motor and gearhead cannot be changed.

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

#### Hollow Shaft Flat Gearhead **FR** Gear

| Output Power [W] | Product Name                   | Gear Ratio                                               |
|------------------|--------------------------------|----------------------------------------------------------|
| 30               | <b>BLHM230KC</b> -□ <b>FR</b>  | <b>5, 10, 15, 20</b><br><b>30, 50, 100</b><br><b>200</b> |
| 50               | <b>BLHM450KC</b> -□ <b>FR</b>  | <b>5, 10, 15, 20</b><br><b>30, 50, 100</b><br><b>200</b> |
| 100              | <b>BLHM5100KC</b> -□ <b>FR</b> | <b>5, 10, 15, 20</b><br><b>30, 50, 100</b><br><b>200</b> |



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

#### Round Shaft Type

| Output Power [W] | Product Name        |
|------------------|---------------------|
| 15               | <b>BLHM015K-A</b>   |
| 30               | <b>BLHM230KC-A</b>  |
| 50               | <b>BLHM450KC-A</b>  |
| 100              | <b>BLHM5100KC-A</b> |



## ● Electromagnetic Brake Motor

### ◇ Parallel Shaft Gearhead **GFS** Gear

| Output Power [W] | Product Name          | Gear Ratio           |
|------------------|-----------------------|----------------------|
| 30               | <b>BLHM230KCM</b> -□  | <b>5, 10, 15, 20</b> |
|                  |                       | <b>30, 50, 100</b>   |
|                  |                       | <b>200</b>           |
| 50               | <b>BLHM450KCM</b> -□  | <b>5, 10, 15, 20</b> |
|                  |                       | <b>30, 50, 100</b>   |
|                  |                       | <b>200</b>           |
| 100              | <b>BLHM5100KCM</b> -□ | <b>5, 10, 15, 20</b> |
|                  |                       | <b>30, 50, 100</b>   |
|                  |                       | <b>200</b>           |



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

### ◇ Hollow Shaft Flat Gearhead **FR** Gear

| Output Power [W] | Product Name                    | Gear Ratio           |
|------------------|---------------------------------|----------------------|
| 30               | <b>BLHM230KCM</b> -□ <b>FR</b>  | <b>5, 10, 15, 20</b> |
|                  |                                 | <b>30, 50, 100</b>   |
|                  |                                 | <b>200</b>           |
| 50               | <b>BLHM450KCM</b> -□ <b>FR</b>  | <b>5, 10, 15, 20</b> |
|                  |                                 | <b>30, 50, 100</b>   |
|                  |                                 | <b>200</b>           |
| 100              | <b>BLHM5100KCM</b> -□ <b>FR</b> | <b>5, 10, 15, 20</b> |
|                  |                                 | <b>30, 50, 100</b>   |
|                  |                                 | <b>200</b>           |



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

## ● Driver

### ◇ Analogue Setting Type

| Output Power [W] | Product Name     |
|------------------|------------------|
| 15               | <b>BLH2D15-K</b> |
| 30               | <b>BLH2D30-K</b> |
| 50               | <b>BLH2D50-K</b> |
| 100              | <b>BLHD100K</b>  |



### ◇ Digital Setting Type

| Output Power [W] | Product Name      |
|------------------|-------------------|
| 15               | <b>BLH2D15-KD</b> |
| 30               | <b>BLH2D30-KD</b> |
| 50               | <b>BLH2D50-KD</b> |



### ◇ RS-485 Communication Type

| Output Power [W] | Product Name      |
|------------------|-------------------|
| 15               | <b>BLH2D15-KR</b> |
| 30               | <b>BLH2D30-KR</b> |
| 50               | <b>BLH2D50-KR</b> |



## ● Connection Cable, Flexible Connection Cable

These cables are used when extending the wiring distance between the motor and the driver to 2 m.

### ◇ For 15 W, 30 W, 50 W

| Type                      | Length [m] | Product Name    |
|---------------------------|------------|-----------------|
| Connection Cable          | 1.5        | <b>CC02BLH</b>  |
| Flexible Connection Cable |            | <b>CC02BLHR</b> |



### ◇ For 100 W

| Type                      | Length [m] | Product Name     |
|---------------------------|------------|------------------|
| Connection Cable          | 1.5        | <b>CC02AXH2</b>  |
| Flexible Connection Cable |            | <b>CC02BLH2R</b> |

## ● Power Supply Cable and I/O Signal Cable Set (For 15 W, 30 W, 50 W)

Cables come as a set of power supply cable and I/O signal cable.

| Setting Type              | Length [m] | Product Name    |
|---------------------------|------------|-----------------|
| Analogue Setting Type     | 0.3        | <b>LHS003CC</b> |
| RS-485 Communication Type | 1          | <b>LHS010CC</b> |
| Digital Setting Type      | 0.3        | <b>LHS003CD</b> |
|                           | 1          | <b>LHS010CD</b> |



Power Supply Cable  
I/O Signal Cable

## ■ Included

### ● Motor

| Gear Type                                 | Parallel Key | Safety Cover | Installation Screws | Operating Manual |
|-------------------------------------------|--------------|--------------|---------------------|------------------|
| Gear Motor                                | —            | —            | —                   | 1 Copy           |
| Parallel Shaft Gearhead <b>GFS</b> Gear   | 1 pc.        | —            | 1 Set               |                  |
| Hollow Shaft Flat Gearhead <b>FR</b> Gear | 1 pc.        | 1 Set        | 1 Set               |                  |
| Round Shaft Type                          | —            | —            | —                   |                  |

### ● Electromagnetic Brake Motor

| Type                                      | Varistor | Parallel Key | Safety Cover | Installation Screws | Operating Manual |
|-------------------------------------------|----------|--------------|--------------|---------------------|------------------|
| Parallel Shaft Gearhead <b>GFS</b> Gear   | 1 pc.    | 1 pc.        | —            | 1 Set               | 1 Copy           |
| Hollow Shaft Flat Gearhead <b>FR</b> Gear | 1 pc.    | 1 pc.        | 1 Set        | 1 Set               |                  |

### ● Driver

| Output Power [W] | Power Supply Cable | I/O Signal Cable | Operating Manual |
|------------------|--------------------|------------------|------------------|
| 15               | —                  | —                | 1 Copy           |
| 30               |                    |                  |                  |
| 50               |                    |                  |                  |
| 100              | 1 pc.              | 1 pc.            | 1 Copy           |

## About the Gearheads

### ● Parallel Shaft Gearhead **GFS** Gear

### ● Hollow Shaft Flat Gearhead **FR** Gear

Motor and gearhead are delivered pre-assembled.

The combination of motors and gearheads can be changed.



Screw Fitting

The motor assembly position can be changed in 90° increments.

### ● Geared Motor (15 W)

The geared motor has an integrated motor and gearhead.

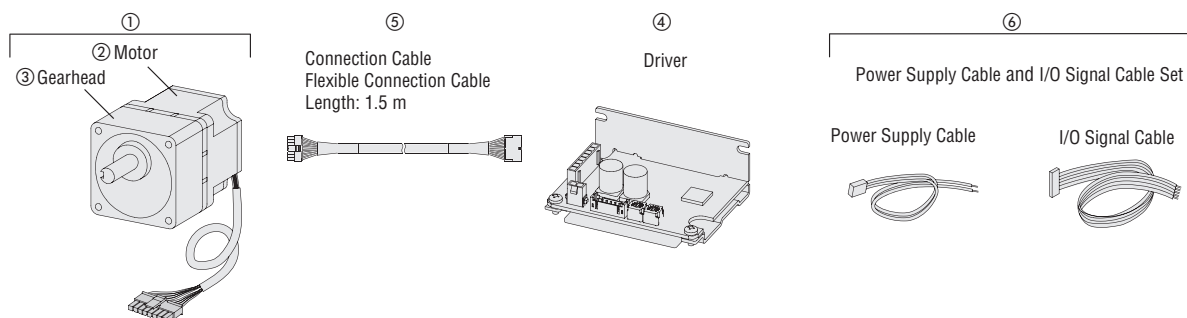
Motor and gearhead combinations cannot be changed.



Integrated Motor and Gearhead

## Combination List

### 15 W, 30 W, 50 W



- The motor cable can also be connected directly to the driver without using a connection cable (Or a flexible connection cable).
- The maximum extension length between the motor and driver is 2 m (Including 0.5 m motor cable).

### ◇ Analogue Setting Type

| Output Power [W] | Type                                      | Brushless Motor |                        |          | Driver       | Connection Cable Flexible Connection Cable | Power Supply Cable and I/O Signal |
|------------------|-------------------------------------------|-----------------|------------------------|----------|--------------|--------------------------------------------|-----------------------------------|
|                  |                                           | Product Name    | Component Product Name |          | Product Name | Product Name                               | Product Name                      |
|                  |                                           | ①               | ②                      | ③        | ④            | ⑤                                          | ⑥                                 |
| 15               | Geared Type*                              | BLHM015K-□      | —                      | —        | BLH2D15-K    | CC02BLH<br>CC02BLHR                        | LHS003CC,<br>LHS010CC             |
|                  | Round Shaft Type                          | BLHM015K-A      | —                      | —        |              |                                            |                                   |
| 30               | Parallel Shaft Gearhead <b>GFS</b> Gear   | BLHM230KC□-□    | BLHM230KC□-GFS         | GFS2G□   | BLH2D30-K    | CC02BLH<br>CC02BLHR                        | LHS003CC,<br>LHS010CC             |
|                  | Hollow Shaft Flat Gearhead <b>FR</b> Gear | BLHM230KC□-□FR  | BLHM230KC□-GFS         | GFS2G□FR |              |                                            |                                   |
|                  | Round Shaft Type                          | BLHM230KC-A     | —                      | —        |              |                                            |                                   |
| 50               | Parallel Shaft Gearhead <b>GFS</b> Gear   | BLHM450KC□-□    | BLHM450KC□-GFS         | GFS4G□   | BLH2D50-K    | CC02BLH<br>CC02BLHR                        | LHS003CC,<br>LHS010CC             |
|                  | Hollow Shaft Flat Gearhead <b>FR</b> Gear | BLHM450KC□-□FR  | BLHM450KC□-GFS         | GFS4G□FR |              |                                            |                                   |
|                  | Round Shaft Type                          | BLHM450KC-A     | —                      | —        |              |                                            |                                   |

\*The geared type has an integrated motor and gearhead. The combination of motor and gearhead cannot be changed.

- For the electromagnetic brake type **M** is entered where the box □ is located in the product code.
- A number indicating the gear ratio is specified where the box □ is located in the product name.

### ◇ Digital Setting Type

| Output Power [W] | Type                                      | Brushless Motor |                        |          | Driver     | Connection Cable Flexible Connection Cable | Power Supply Cable and I/O Signal |              |              |              |
|------------------|-------------------------------------------|-----------------|------------------------|----------|------------|--------------------------------------------|-----------------------------------|--------------|--------------|--------------|
|                  |                                           | Product Name    | Component Product Name |          |            |                                            |                                   | Product Name | Product Name | Product Name |
|                  |                                           | ①               | ②                      | ③        |            |                                            |                                   | ④            | ⑤            | ⑥            |
| 15               | Geared Type*                              | BLHM015K-□      | —                      | —        | BLH2D15-KD | CC02BLH<br>CC02BLHR                        | LHS003CD,<br>LHS010CD             |              |              |              |
|                  | Round Shaft Type                          | BLHM015K-A      | —                      | —        |            |                                            |                                   |              |              |              |
| 30               | Parallel Shaft Gearhead <b>GFS</b> Gear   | BLHM230KC□-□    | BLHM230KC□-GFS         | GFS2G□   | BLH2D30-KD | CC02BLH<br>CC02BLHR                        | LHS003CD,<br>LHS010CD             |              |              |              |
|                  | Hollow Shaft Flat Gearhead <b>FR</b> Gear | BLHM230KC□-□FR  | BLHM230KC□-GFS         | GFS2G□FR |            |                                            |                                   |              |              |              |
|                  | Round Shaft Type                          | BLHM230KC-A     | —                      | —        |            |                                            |                                   |              |              |              |
| 50               | Parallel Shaft Gearhead <b>GFS</b> Gear   | BLHM450KC□-□    | BLHM450KC□-GFS         | GFS4G□   | BLH2D50-KD | CC02BLH<br>CC02BLHR                        | LHS003CD,<br>LHS010CD             |              |              |              |
|                  | Hollow Shaft Flat Gearhead <b>FR</b> Gear | BLHM450KC□-□FR  | BLHM450KC□-GFS         | GFS4G□FR |            |                                            |                                   |              |              |              |
|                  | Round Shaft Type                          | BLHM450KC-A     | —                      | —        |            |                                            |                                   |              |              |              |

\*The geared type has an integrated motor and gearhead. The combination of motor and gearhead cannot be changed.

- For the electromagnetic brake type **M** is entered where the box □ is located in the product code.
- A number indicating the gear ratio is specified where the box □ is located in the product name.

### ◇ RS-485 Communication Type

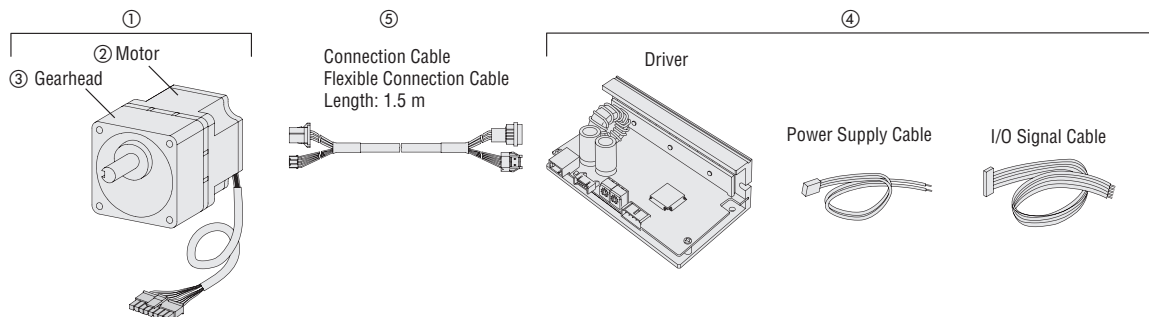
| Output Power [W] | Type                                      | Brushless Motor                |                        |          | Driver            | Connection Cable<br>Flexible Connection Cable | Power Supply Cable and I/O signal Cable Set |
|------------------|-------------------------------------------|--------------------------------|------------------------|----------|-------------------|-----------------------------------------------|---------------------------------------------|
|                  |                                           | Product Name                   | Component Product Name |          | Product Name      | Product Name                                  | Product Name                                |
|                  |                                           | ①                              | ②                      | ③        | ④                 | ⑤                                             | ⑥                                           |
| 15               | Geared Type*                              | <b>BLHM015K</b> -□             | —                      | —        | <b>BLH2D15-KR</b> | <b>CC02BLH<br/>CC02BLHR</b>                   | <b>LHS003CC,<br/>LHS010CC</b>               |
|                  | Round Shaft Type                          | <b>BLHM015K-A</b>              | —                      | —        |                   |                                               |                                             |
| 30               | Parallel Shaft Gearhead <b>GFS</b> Gear   | <b>BLHM230KC</b> □-□           | BLHM230KC□-GFS         | GFS2G□   | <b>BLH2D30-KR</b> | <b>CC02BLH<br/>CC02BLHR</b>                   | <b>LHS003CC,<br/>LHS010CC</b>               |
|                  | Hollow Shaft Flat Gearhead <b>FR</b> Gear | <b>BLHM230KC</b> □-□ <b>FR</b> | BLHM230KC□-GFS         | GFS2G□FR |                   |                                               |                                             |
|                  | Round Shaft Type                          | <b>BLHM230KC-A</b>             | —                      | —        |                   |                                               |                                             |
| 50               | Parallel Shaft Gearhead <b>GFS</b> Gear   | <b>BLHM450KC</b> □-□           | BLHM450KC□-GFS         | GFS4G□   | <b>BLH2D50-KR</b> | <b>CC02BLH<br/>CC02BLHR</b>                   | <b>LHS003CC,<br/>LHS010CC</b>               |
|                  | Hollow Shaft Flat Gearhead <b>FR</b> Gear | <b>BLHM450KC</b> □-□ <b>FR</b> | BLHM450KC□-GFS         | GFS4G□FR |                   |                                               |                                             |
|                  | Round Shaft Type                          | <b>BLHM450KC-A</b>             | —                      | —        |                   |                                               |                                             |

\*The geared type has an integrated motor and gearhead. The combination of motor and gearhead cannot be changed.

● For the electromagnetic brake type **M** is entered where the box □ is located in the product code.

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

### ● 100 W



● The motor cable can also be connected directly to the driver without using a connection cable (Or a flexible connection cable).

● The maximum extension length between the motor and driver is 2 m (Including 0.5 m motor cable).

### ◇ Analogue Setting Type

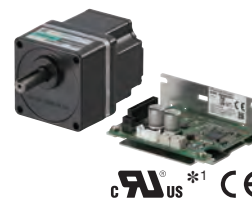
| Output Power [W] | Type                                      | Brushless Motor                 |                        |          | Driver          | Connection Cable<br>Flexible Connection Cable |
|------------------|-------------------------------------------|---------------------------------|------------------------|----------|-----------------|-----------------------------------------------|
|                  |                                           | Product Name                    | Component Product Name |          | Product Name    | Product Name                                  |
|                  |                                           | ①                               | ②                      | ③        | ④               | ⑤                                             |
| 100              | Parallel Shaft Gearhead <b>GFS</b> Gear   | <b>BLHM5100KC</b> □-□           | BLHM5100KC-GFS         | GFS5G□   | <b>BLHD100K</b> | <b>CC02AXH2<br/>CC02BLH2R</b>                 |
|                  | Hollow Shaft Flat Gearhead <b>FR</b> Gear | <b>BLHM5100KC</b> □-□ <b>FR</b> | BLHM5100KC-GFS         | GFS5G□FR |                 |                                               |
|                  | Round Shaft Type                          | <b>BLHM5100KC-A</b>             | —                      | —        |                 |                                               |

● For the electromagnetic brake type **M** is entered where the box □ is located in the product code.

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

# Parallel Shaft Gearhead GFS Gear

15 W, 30 W, 50 W, 100 W



## Specifications



| Product Name                    | Motor                     |                            | BLHM015K-□                                                                                                 | BLHM230KC-□  | BLHM450KC-□  | BLHM5100KC-□  |
|---------------------------------|---------------------------|----------------------------|------------------------------------------------------------------------------------------------------------|--------------|--------------|---------------|
|                                 | Driver                    | With Electromagnetic Brake | —                                                                                                          | BLHM230KCM-□ | BLHM450KCM-□ | BLHM5100KCM-□ |
|                                 |                           | Analogue Setting Type      | BLH2D15-K                                                                                                  | BLH2D30-K    | BLH2D50-K    | BLHD100K      |
|                                 |                           | Digital Setting Type       | BLH2D15-KD                                                                                                 | BLH2D30-KD   | BLH2D50-KD   | —             |
|                                 |                           | RS-485 Communication Type  | BLH2D15-KR                                                                                                 | BLH2D30-KR   | BLH2D50-KR   | —             |
| Rated Output Power (Continuous) |                           | W                          | 15                                                                                                         | 30           | 50           | 100           |
| Power Supply Input              | Rated Voltage             |                            | VDC24                                                                                                      |              |              |               |
|                                 | Permissible Voltage Range |                            | -10 ~ +10%                                                                                                 |              |              |               |
|                                 | Rated Input Current       |                            | A0.93                                                                                                      | 1.9          | 2.9          | 6.0           |
|                                 | Maximum Input Current     |                            | A2.3                                                                                                       | 4.1          | 5.4          | 9.8           |
| Rated Speed                     |                           | r/min                      | 3000                                                                                                       | 2500         |              |               |
| Speed Control Range             |                           |                            | 100 ~ 3000 r/min (Speed Ratio 1:30)<br>[80 ~ 3000 r/min (Speed Ratio 1:37.5)* <sup>2</sup> ]               |              |              |               |
| Speed Regulation * <sup>2</sup> | Load                      |                            | Max. ±0.5% (±0.2%): Conditions 0~rated torque, rated speed, rated voltage, normal ambient temperature      |              |              |               |
|                                 | Voltage                   |                            | Max. ±0.5% (±0.2%): Conditions Rated voltage ±10%, rated speed, no load, normal ambient temperature        |              |              |               |
|                                 | Temperature               |                            | Max. ±0.5% (±0.2%): Conditions Operating ambient temperature 0 ~+50°C, rated speed, no load, rated voltage |              |              |               |
| Electromagnetic Brake           | Type                      |                            | —Power Off Activated Type                                                                                  |              |              |               |
|                                 | Static Friction Torque Nm |                            |                                                                                                            | 0.12         | 0.2          | 0.4           |

\*<sup>1</sup> Only for motors without electromagnetic brake, analogue and digital setting type drivers.

\*<sup>2</sup> The values shown in brackets are specifications of the digital setting type (when **MEXE02** is used) and RS-485 communication.

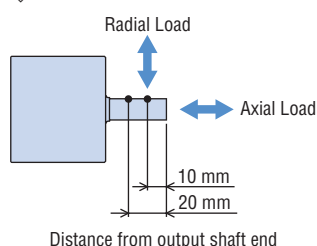
● Values shown correspond to the specifications and characteristics of the motor without a gearhead attached.

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

| Gear Ratio                                                    |            | 5                           | 10   | 15   | 20                              | 30   | 50                          | 100   | 200                         |
|---------------------------------------------------------------|------------|-----------------------------|------|------|---------------------------------|------|-----------------------------|-------|-----------------------------|
| Rotation Direction                                            | 15 W       | Same direction as the motor |      |      | Opposite direction to the motor |      | Same direction as the motor |       | —                           |
|                                                               | 30 W       | Same direction as the motor |      |      | Opposite direction to the motor |      | Same direction as the motor |       | Same direction as the motor |
|                                                               | 50 W       |                             |      |      |                                 |      |                             |       |                             |
|                                                               | 100 W      |                             |      |      |                                 |      |                             |       |                             |
| Output Shaft Speed [r/min]*                                   | 80 r/min   | 16                          | 8    | 5.3  | 4                               | 2.7  | 1.6                         | 0.8   | 0.4                         |
|                                                               | 2500 r/min | 500                         | 250  | 167  | 125                             | 83   | 50                          | 25    | 12.5                        |
|                                                               | 3000 r/min | 600                         | 300  | 200  | 150                             | 100  | 60                          | 30    | 15                          |
|                                                               |            |                             |      |      |                                 |      |                             |       |                             |
| Permissible Torque [Nm]                                       | 15 W       | 80 to 3000 r/min            | 0.22 | 0.43 | 0.65                            | 0.83 | 1.2                         | 1.9   | 2                           |
|                                                               | 30 W       | 80 to 2500 r/min            | 0.52 | 1.0  | 1.6                             | 2.1  | 3.0                         | 4.9   | 6                           |
|                                                               |            | 3000 r/min                  | 0.43 | 0.86 | 1.3                             | 1.7  | 2.5                         | 4.1   | 6                           |
|                                                               | 50 W       | 80 to 2500 r/min            | 0.86 | 1.7  | 2.6                             | 3.4  | 4.9                         | 8.2   | 16                          |
|                                                               |            | 3000 r/min                  | 0.72 | 1.4  | 2.1                             | 2.9  | 4.1                         | 6.8   | 13.7                        |
|                                                               | 100 W      | 100 to 2500 r/min           | 1.8  | 3.6  | 5.4                             | 7.2  | 10.3                        | 17.2  | 30                          |
|                                                               |            | 3000 r/min                  | 0.90 | 1.8  | 2.7                             | 3.6  | 5.2                         | 8.6   | 17.2                        |
|                                                               |            |                             |      |      |                                 |      |                             |       |                             |
| Permissible Radial Load [N]                                   | 15 W       | 50                          |      |      |                                 |      |                             |       | —                           |
|                                                               | 30 W       | 100                         | 150  |      |                                 | 200  |                             |       |                             |
|                                                               | 50 W       | 200                         | 300  |      |                                 | 450  |                             |       |                             |
|                                                               | 100 W      | 300                         | 400  |      |                                 | 500  |                             |       |                             |
|                                                               | 30 W       | 150                         | 200  |      |                                 | 300  |                             |       |                             |
|                                                               | 50 W       | 250                         | 350  |      |                                 | 550  |                             |       |                             |
|                                                               | 100 W      | 400                         | 500  |      |                                 | 650  |                             |       |                             |
|                                                               |            |                             |      |      |                                 |      |                             |       |                             |
| Permissible Axial Load [N]                                    | 15 W       | 30                          |      |      |                                 |      |                             |       |                             |
|                                                               | 30 W       | 40                          |      |      |                                 |      |                             |       |                             |
|                                                               | 50 W       | 100                         |      |      |                                 |      |                             |       |                             |
|                                                               | 100 W      | 150                         |      |      |                                 |      |                             |       |                             |
| Permissible Inertia J: [×10 <sup>-4</sup> kg·m <sup>2</sup> ] | 15 W       | 3                           | 14   | 30   | 50                              | 120  | 300                         | 600   | —                           |
|                                                               | 30 W       | 12                          | 50   | 110  | 200                             | 370  | 920                         | 2500  | 5000                        |
|                                                               | 50 W       | 22                          | 95   | 220  | 350                             | 800  | 2200                        | 6200  | 12000                       |
|                                                               | 100 W      | 45                          | 190  | 420  | 700                             | 1600 | 4500                        | 12000 | 25000                       |
|                                                               | 15 W       | 0.4                         | 1.7  | 3.9  | 7.0                             | 15.7 | 43.7                        |       | —                           |
|                                                               | 30 W       | 1.55                        | 6.2  | 14.0 | 24.8                            | 55.8 | 155                         |       |                             |
|                                                               | 50 W       | 5.5                         | 22   | 49.5 | 88                              | 198  | 550                         |       |                             |
|                                                               | 100 W      | 25                          | 100  | 225  | 400                             | 900  | 2500                        |       |                             |

\*The output shaft speed is calculated by dividing the speed by the gear ratio.

### ◇ Radial Load and Axial Load

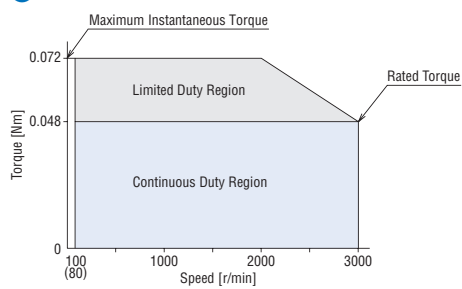


## Speed - Torque Characteristics

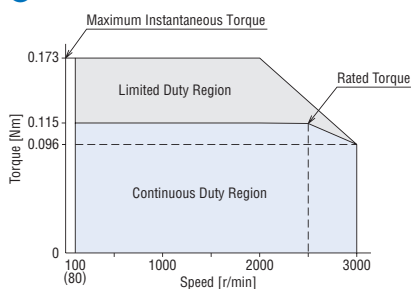
Continuous Duty Region: Continuous operation is possible in this region.

Limited Duty Region: This region is primarily used when accelerating.

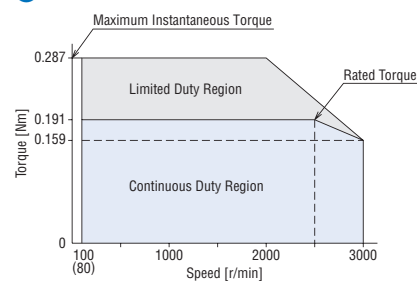
### 15 W



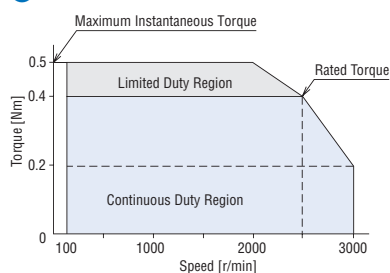
### 30 W



### 50 W



### 100 W



● Values shown correspond to the specifications and characteristics of the motor without a gearhead attached, without the use of an extension cable.

# Hollow Shaft Flat Gearhead FR Gear

## 30 W, 50 W, 100 W



### Specifications

| Product Name                    | Motor                     |                            | BLHM230KC-□FR                                                                                              | BLHM450KC-□FR  | BLHM5100KC-□FR  |     |
|---------------------------------|---------------------------|----------------------------|------------------------------------------------------------------------------------------------------------|----------------|-----------------|-----|
|                                 |                           | With Electromagnetic Brake | BLHM230KCM-□FR                                                                                             | BLHM450KCM-□FR | BLHM5100KCM-□FR |     |
|                                 | Driver                    | Analogue Setting Type      | BLH2D30-K                                                                                                  | BLH2D50-K      | BLHD100K        |     |
|                                 |                           | Digital Setting Type       | BLH2D30-KD                                                                                                 | BLH2D50-KD     | —               |     |
|                                 | RS-485 Communication Type |                            | BLH2D30-KR                                                                                                 | BLH2D50-KR     | —               |     |
| Rated Output Power (Continuous) |                           | W                          | 30                                                                                                         | 50             | 100             |     |
| Power Supply Input              | Rated Voltage             |                            | VDC                                                                                                        |                | 24              |     |
|                                 | Permissible Voltage Range |                            | -10 ~ +10%                                                                                                 |                |                 |     |
|                                 | Rated Input Current       |                            | A                                                                                                          | 1.9            | 2.9             | 6.0 |
|                                 | Maximum Input Current     |                            | A                                                                                                          | 4.1            | 5.4             | 9.8 |
| Rated Speed                     |                           | r/min                      | 2500                                                                                                       |                |                 |     |
| Speed Control Range             |                           |                            | 100 ~ 3000 r/min (Speed Ratio 1:30)<br>[80 ~ 3000 r/min (Speed Ratio 1:37.5)* <sup>2</sup> ]               |                |                 |     |
| Speed Regulation * <sup>2</sup> | Load                      |                            | Max. ±0.5% (±0.2%): Conditions 0~rated torque, rated speed, rated voltage, normal ambient temperature      |                |                 |     |
|                                 | Voltage                   |                            | Max. ±0.5% (±0.2%): Conditions Rated voltage ±10%, rated speed, no load, normal ambient temperature        |                |                 |     |
|                                 | Temperature               |                            | Max. ±0.5% (±0.2%): Conditions Operating ambient temperature 0 ~+50°C, rated speed, no load, rated voltage |                |                 |     |
| Electromagnetic Brake           | Type                      |                            | Power Off Activated Type                                                                                   |                |                 |     |
|                                 | Static Friction Torque    | Nm                         | 0.12                                                                                                       | 0.2            | 0.4             |     |

\*1 Only for motors without electromagnetic brake, analogue and digital setting type drivers.

\*2 The values shown in brackets are specifications of the digital setting type (when **MEXE02** is used) and RS-485 communication.

● Values shown correspond to the specifications and characteristics of the motor without a gearhead attached.

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

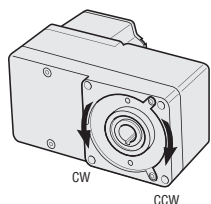
| Gear Ratio                                                       |                                                                  |                   | 5    | 10   | 15   | 20   | 30   | 50   | 100   | 200   |
|------------------------------------------------------------------|------------------------------------------------------------------|-------------------|------|------|------|------|------|------|-------|-------|
| Output Shaft Speed [r/min]* <sup>1</sup>                         | 80 r/min                                                         |                   | 16   | 8    | 5.3  | 4    | 2.7  | 1.6  | 0.8   | 0.4   |
|                                                                  | 2500 r/min                                                       |                   | 500  | 250  | 167  | 125  | 83   | 50   | 25    | 12.5  |
|                                                                  | 3000 r/min                                                       |                   | 600  | 300  | 200  | 150  | 100  | 60   | 30    | 15    |
| Permissible Torque [Nm]                                          | 30 W                                                             | 80 to 2500 r/min  | 0.46 | 0.98 | 1.5  | 2.0  | 2.9  | 4.9  | 9.8   | 17    |
|                                                                  |                                                                  | 3000 r/min        | 0.38 | 0.82 | 1.2  | 1.6  | 2.4  | 4.1  | 8.2   | 16.3  |
|                                                                  | 50 W                                                             | 80 to 2500 r/min  | 0.81 | 1.6  | 2.4  | 3.2  | 4.9  | 8.1  | 16.2  | 32.5  |
|                                                                  |                                                                  | 3000 r/min        | 0.68 | 1.4  | 2.0  | 2.7  | 4.1  | 6.8  | 13.5  | 27    |
|                                                                  | 100 W                                                            | 100 to 2500 r/min | 1.7  | 3.4  | 5.1  | 6.8  | 10.2 | 17   | 34    | 68    |
|                                                                  |                                                                  | 3000 r/min        | 0.85 | 1.7  | 2.6  | 3.4  | 5.1  | 8.5  | 17    | 34    |
| Permissible Radial Load [N]* <sup>2</sup>                        | 10 mm from Installation Surface                                  | 30 W              | 450  |      |      | 500  |      |      |       |       |
|                                                                  |                                                                  | 50 W              | 800  |      |      | 1200 |      |      |       |       |
|                                                                  |                                                                  | 100 W             | 900  |      |      | 1300 |      | 1500 |       |       |
|                                                                  | 20 mm from Installation Surface                                  | 30 W              | 370  |      |      | 400  |      |      |       |       |
|                                                                  |                                                                  | 50 W              | 660  |      |      | 1000 |      |      |       |       |
|                                                                  |                                                                  | 100 W             | 770  |      |      | 1110 |      | 1280 |       |       |
| Permissible Axial Load [N]                                       | 30 W                                                             |                   | 200  |      |      |      |      |      |       |       |
|                                                                  | 50 W                                                             |                   | 400  |      |      |      |      |      |       |       |
|                                                                  | 100 W                                                            |                   | 500  |      |      |      |      |      |       |       |
| Permissible Inertia J:<br>[×10 <sup>-4</sup> kg·m <sup>2</sup> ] | When Instantaneous Stop or Bi-Directional Operation is performed | 30 W              | 12   | 50   | 110  | 200  | 370  | 920  | 2500  | 5000  |
|                                                                  |                                                                  | 50 W              | 22   | 95   | 220  | 350  | 800  | 2200 | 6200  | 12000 |
|                                                                  |                                                                  | 100 W             | 45   | 190  | 420  | 700  | 1600 | 4500 | 12000 | 25000 |
|                                                                  |                                                                  | 30 W              | 1.55 | 6.2  | 14.0 | 24.8 | 55.8 | 155  |       |       |
|                                                                  |                                                                  | 50 W              | 5.5  | 22   | 49.5 | 88   | 198  | 550  |       |       |
|                                                                  |                                                                  | 100 W             | 25   | 100  | 225  | 400  | 900  | 2500 |       |       |

\*1 The output shaft speed is calculated by dividing the speed by the gear ratio.

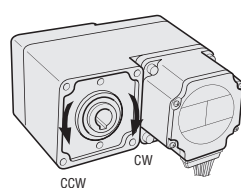
\*2 The radial load at each distance can be calculated with a formula. → Page 41

#### ◇ Rotation Direction

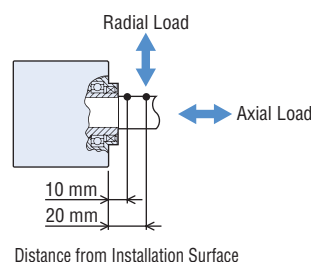
##### ● Front View



##### ● Rear View



#### ◇ Radial Load and Axial Load

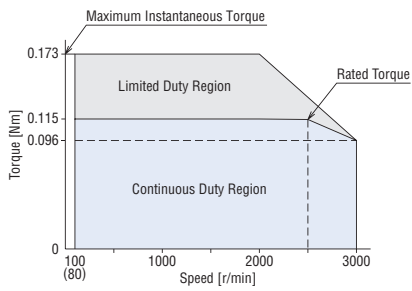


## Speed - Torque Characteristics

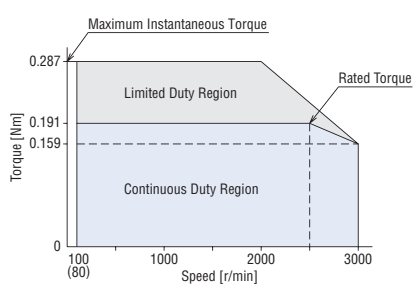
Continuous Duty Region: Continuous operation is possible in this region.

Limited Duty Region: This region is primarily used when accelerating.

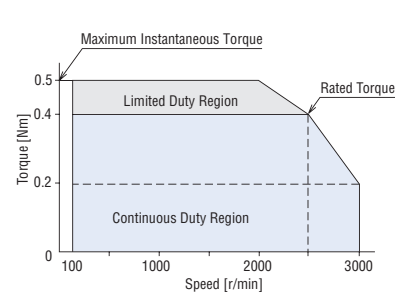
### 30 W



### 50 W



### 100 W



● Values shown correspond to the specifications and characteristics of the motor without a gearhead attached, without the use of an extension cable.

# Round Shaft 15 W, 30 W, 50 W, 100 W



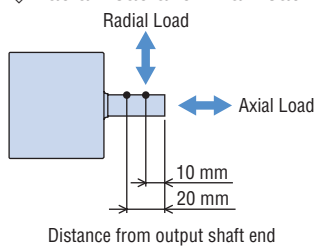
## Specifications

| Product Name                    | Motor                       |                                        | BLHM015K-A                                                                                                 | BLHM230KC-A | BLHM450KC-A | BLHM5100KC-A |     |
|---------------------------------|-----------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------|-------------|-------------|--------------|-----|
|                                 | Driver                      | Analogue Setting Type                  | BLH2D15-K                                                                                                  | BLH2D30-K   | BLH2D50-K   | BLHD100K     |     |
|                                 |                             | Digital Setting Type                   | BLH2D15-KD                                                                                                 | BLH2D30-KD  | BLH2D50-KD  | —            |     |
|                                 |                             | RS-485 Communication Type              | BLH2D15-KR                                                                                                 | BLH2D30-KR  | BLH2D50-KR  | —            |     |
| Rated Output Power (Continuous) |                             | W                                      | 15                                                                                                         | 30          | 50          | 100          |     |
| Power Supply Input              | Rated Voltage               |                                        | VDC                                                                                                        | 24          |             |              |     |
|                                 | Permissible Voltage Range   |                                        | - 10 ~ +10%                                                                                                |             |             |              |     |
|                                 | Rated Input Current         |                                        | A                                                                                                          | 0.93        | 1.9         | 2.9          | 6.0 |
|                                 | Maximum Input Current       |                                        | A                                                                                                          | 2.3         | 4.1         | 5.4          | 9.8 |
| Rated Speed                     |                             | r/min                                  | 3000                                                                                                       | 2500        |             |              |     |
| Speed Control Range             |                             |                                        | 100 ~ 3000 r/min (Speed Ratio 1:30)<br>[80 ~ 3000 r/min (Speed Ratio 1:37.5)*2 ]                           |             |             |              |     |
| Rated Torque                    |                             | Nm                                     | 0.048                                                                                                      | 0.115       | 0.191       | 0.4          |     |
| Maximum Instantaneous Torque    |                             | Nm                                     | 0.072                                                                                                      | 0.173       | 0.287       | 0.5          |     |
| Permissible Radial Load         | 10 mm from Output Shaft End | N                                      | 50                                                                                                         | 70          | 120         | 160          |     |
|                                 | 20 mm from Output Shaft End | N                                      | —                                                                                                          | 100         | 140         | 170          |     |
| Permissible Axial Load          |                             |                                        | Half of the motor mass or less                                                                             |             |             |              |     |
| Rotor Inertia                   |                             | J: ×10 <sup>-4</sup> kg·m <sup>2</sup> | 0.032                                                                                                      | 0.087       | 0.23        | 0.61         |     |
| Permissible Inertia             |                             | J: ×10 <sup>-4</sup> kg·m <sup>2</sup> | 0.5                                                                                                        | 1.8         | 3.3         | 5.6          |     |
| Speed Regulation *2             | Load                        |                                        | Max. ±0.5% (±0.2%): Conditions 0~rated torque, rated speed, rated voltage, normal ambient temperature      |             |             |              |     |
|                                 | Voltage                     |                                        | Max. ±0.5% (±0.2%): Conditions Rated voltage ±10%, rated speed, no load, normal ambient temperature        |             |             |              |     |
|                                 | Temperature                 |                                        | Max. ±0.5% (±0.2%): Conditions Operating ambient temperature 0 ~+50°C, rated speed, no load, rated voltage |             |             |              |     |

\*1 Only for analogue and digital setting type drivers.

\*2 The values shown in brackets are specifications of the digital setting type (when **MEXE02** is used) and RS-485 communication.

### ◇ Radial Load and Axial Load

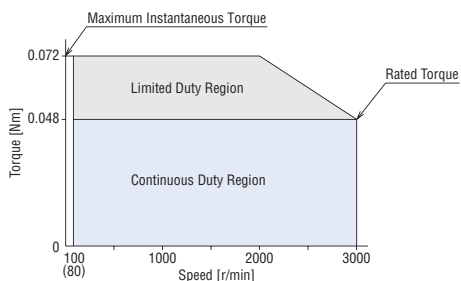


## Speed - Torque Characteristics

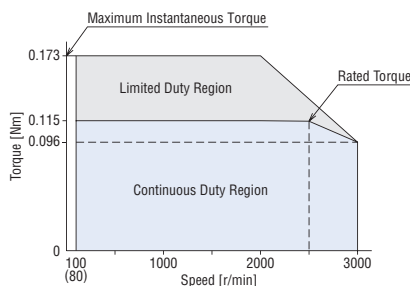
Continuous Duty Region: Continuous operation is possible in this region.

Limited Duty Region: This region is primarily used when accelerating.

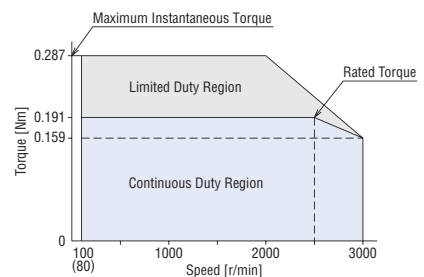
### ● 15 W



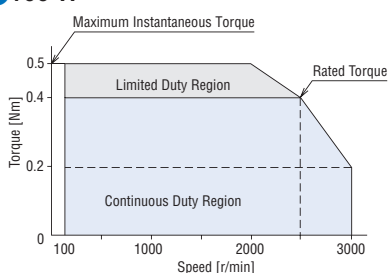
### ● 30 W



### ● 50 W



### ● 100 W



● Values shown correspond to the specifications and characteristics of the motor without a gearhead attached, without the use of an extension cable.

## Common Specifications

| Driver Type                        |                                     | Analogue Setting Type                                                                                     | Digital Setting Type                                                                                                                                                                      | RS-485 Communication Type                                                                                                                                       |
|------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operation setting                  |                                     | 2 Speeds                                                                                                  | 8 Speeds                                                                                                                                                                                  | 8 Speeds                                                                                                                                                        |
| Speed                              | Setting Range                       | 100 ~ 3000 r/min                                                                                          | 80 ~ 3000 r/min                                                                                                                                                                           | 80 ~ 3000 r/min                                                                                                                                                 |
|                                    | Setting Method                      | <ul style="list-style-type: none"> <li>External analogue setting device</li> <li>VR1</li> </ul>           | <ul style="list-style-type: none"> <li>Digital setting (<b>MEXE02</b> support software)</li> <li>External analogue setting device</li> <li>PWM input</li> <li>VR1</li> <li>VR2</li> </ul> | <ul style="list-style-type: none"> <li>Digital setting (<b>MEXE02</b> support software)</li> <li>External analogue setting device</li> <li>PWM input</li> </ul> |
| Acceleration/<br>Deceleration Time | Setting Range                       | 15 W, 30 W, 50 W: 0.1 ~ 12.0 s<br>100 W: 0.5 ~ 10 s<br>Acceleration/deceleration time is a common setting | 0.1 ~ 15.0 s                                                                                                                                                                              | 0.1 ~ 15.0 s                                                                                                                                                    |
|                                    | Setting Method                      | <ul style="list-style-type: none"> <li>VR2</li> </ul>                                                     | <ul style="list-style-type: none"> <li>Digital (<b>MEXE02</b> support software)</li> <li>VR1</li> <li>VR2</li> </ul>                                                                      | <ul style="list-style-type: none"> <li>Digital (<b>MEXE02</b> support software)</li> </ul>                                                                      |
| Torque Limiting *1                 | Setting Range                       | —                                                                                                         | 0 ~ 200%                                                                                                                                                                                  | 0 ~ 200%                                                                                                                                                        |
|                                    | Setting Method                      |                                                                                                           | <ul style="list-style-type: none"> <li>Digital (<b>MEXE02</b> support software)</li> <li>External analogue setting device</li> <li>PWM input</li> <li>VR1</li> <li>VR2</li> </ul>         | <ul style="list-style-type: none"> <li>Digital (<b>MEXE02</b> support software)</li> <li>External analogue setting device</li> <li>PWM input</li> </ul>         |
| I/O Functions                      | Direct Input                        | Method                                                                                                    | C-MOS Negative Logic Input                                                                                                                                                                | C-MOS Negative Logic Input                                                                                                                                      |
|                                    |                                     | Inputs                                                                                                    | 5                                                                                                                                                                                         | 6                                                                                                                                                               |
|                                    |                                     | Initial Assignment                                                                                        | 15 W, 30 W, 50 W: START/STOP, RUN/BRAKE, FWD/REV, M0, ALM-RST<br>100 W: START/STOP, RUN/BRAKE, CW/CCW, INT.VR/EX, ALARM-RESET                                                             | START/STOP, RUN/BRAKE, FWD/REV, M0, ALM-RST                                                                                                                     |
|                                    | Direct Output                       | Method                                                                                                    | Transistor and open-collector output                                                                                                                                                      | Transistor and open-collector output                                                                                                                            |
|                                    |                                     | Outputs                                                                                                   | 2                                                                                                                                                                                         | 4                                                                                                                                                               |
|                                    |                                     | Initial Assignment                                                                                        | 15 W, 30 W, 50 W: SPEED-OUT, ALM-B<br>100 W: SPEED, ALARM                                                                                                                                 | SPEED-OUT, ALM-B                                                                                                                                                |
|                                    | RS-485 Communication Remote Inputs  |                                                                                                           | —                                                                                                                                                                                         | 16                                                                                                                                                              |
|                                    | RS-485 Communication Remote Outputs |                                                                                                           | —                                                                                                                                                                                         | 16                                                                                                                                                              |
| Setting Tool                       | <b>MEXE02</b> Support Software      |                                                                                                           | —                                                                                                                                                                                         | ○                                                                                                                                                               |
| Information                        |                                     |                                                                                                           | —                                                                                                                                                                                         | ○                                                                                                                                                               |
| Alarm *2                           |                                     |                                                                                                           | ○                                                                                                                                                                                         | ○                                                                                                                                                               |
| Maximum Extension Length           |                                     |                                                                                                           | Motor and driver distance: 2 m [when a connection cable (sold separately) is used]                                                                                                        |                                                                                                                                                                 |
| Time Rating                        |                                     |                                                                                                           | Continuous                                                                                                                                                                                |                                                                                                                                                                 |

\*1 Regarding the torque limit, the variance between the set value and the generated torque is up to  $\pm 20\%$  (at rated torque and rated speed) depending on the set speed, power supply voltage and motor cable extension distance.

\*2 With the **BLH** Series, motor speed cannot be controlled in a gravitational operation or other applications where the motor shaft is turned by the load. When a load exceeding the permissible inertia is driven or a gravitational operation is performed, the protective function will be activated and the motor will coast to a stop.

## General Specifications

| Item                  |                     | Motor                                                                                                                                                                                                              | Driver                                                                                                                                                                                                                            |
|-----------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Insulation Resistance |                     | 100 MΩ or more when 500 VDC megger is applied between the windings and the case after continuous operation under normal ambient temperature and humidity.                                                          | 100 MΩ or more when 500 VDC megger is applied between the power supply input and the heat sink after continuous operation under normal ambient temperature and humidity.                                                          |
| Dielectric Strength   |                     | Sufficient to withstand 0.5 kVAC at 50 Hz applied between the windings and the case for 1 minute after continuous operation under normal ambient temperature and humidity.                                         | Sufficient to withstand 0.5 kVAC at 50 Hz applied between the power supply input and the heat sink for 1 minute after continuous operation under normal ambient temperature and humidity (RS-485 Communication Type is excluded). |
| Temperature Rise      |                     | The temperature rise of the windings is 50°C or less and that of the case surface is 40°C or less*1, measured by the thermocouple method after continuous operation under normal ambient temperature and humidity. | The temperature rise of the heat sink is 50°C or less, measured by the thermocouple method after continuous operation under normal ambient temperature and humidity.                                                              |
| Operating Environment | Ambient Temperature | 0 to +50°C (Non-freezing)                                                                                                                                                                                          |                                                                                                                                                                                                                                   |
|                       | Ambient Humidity    | 85% or less (Non-condensing)                                                                                                                                                                                       |                                                                                                                                                                                                                                   |
|                       | Altitude            | Up to 1000 m above sea level                                                                                                                                                                                       |                                                                                                                                                                                                                                   |
|                       | Atmosphere          | No corrosive gases or dust. Cannot be used in a radioactive area, magnetic field, vacuum, or other non-standard environments.                                                                                      |                                                                                                                                                                                                                                   |
|                       | Vibration           | Must not be subjected to continuous vibration or excessive shock.<br>Frequency Range: 10 to 55 Hz    Half Amplitude: 0.15 mm                                                                                       | Conforms to JIS C 60068-2-6, "Sine-Wave Vibration Test Method"<br>Sweep Direction: 3 Directions (X, Y, and Z)    Number of Sweeps: 20 Times                                                                                       |
| Storage Conditions*2  | Ambient Temperature | -25 to +70°C (Non-freezing)<br>Electromagnetic Brake Type: -20 to +70°C (Non-freezing)                                                                                                                             | -25 to +70°C (Non-freezing)                                                                                                                                                                                                       |
|                       | Ambient Humidity    | 85% or less (Non-condensing)                                                                                                                                                                                       |                                                                                                                                                                                                                                   |
|                       | Altitude            | Up to 3000 m above sea level                                                                                                                                                                                       |                                                                                                                                                                                                                                   |
|                       | Atmosphere          | No corrosive gases or dust. Not exposed to water and oil. Cannot be used in a radioactive area, magnetic field, vacuum, or other non-standard environments.                                                        |                                                                                                                                                                                                                                   |
| Insulation Class      |                     | UL/CSA Standards: 105 (A), EN Standards: 120 (E)                                                                                                                                                                   | —                                                                                                                                                                                                                                 |
| Degree of Protection  |                     | 15 W: IP40                                                                                                                                                                                                         | IP00                                                                                                                                                                                                                              |
|                       |                     | 30 W, 50 W, 100 W: IP65 (Excluding the installation surface of the round shaft type and connectors)                                                                                                                |                                                                                                                                                                                                                                   |

\*1 Install the round shaft type motor to a heat sink (Material: aluminum) of one of the following sizes to maintain a motor case surface temperature of 90°C or less. (15 W type is excluded.)  
30 W type: 115×115 mm thickness 5 mm, 50 W type: 135×135 mm thickness 5 mm, 100 W type: 200×200 mm thickness 5 mm

\*2 The storage condition applies to short periods such as the period during transportation.

### Note

● Do not measure the insulation resistance or perform a dielectric voltage withstand test while the motor and driver are connected.

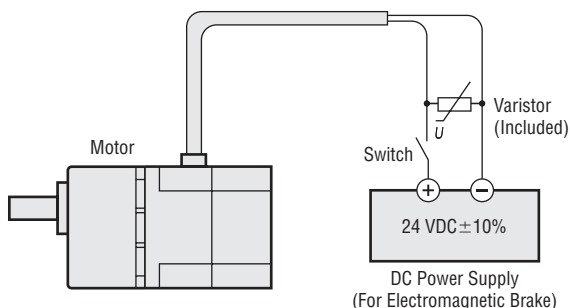
## RS-485 Communication Specification

|                            |                                                                                                                            |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Electrical Characteristics | EIA-485 Based<br>Use a shielded twisted pair cable and keep the total wiring distance including extension to 10 m or less. |
| Communication Mode         | Half duplex,<br>Asynchronous communication (data: 8 bits, stop bit: 1 bit or 2 bits, parity: none, even, or odd)           |
| Transmission Rate          | Select either from 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps, 230400 bps.                                      |
| Protocol                   | Modbus RTU Mode                                                                                                            |
| Connection Units           | Up to 15 drivers can be connected to a single programmable controller (master device).                                     |

## Electromagnetic Brake Specification

| Model                 |    | BLHM230                                | BLHM450 | BLHM5100 |
|-----------------------|----|----------------------------------------|---------|----------|
| Type                  |    | Power Off Activated Type (For holding) |         |          |
| Power Supply Voltage  |    | 24 VDC±10%                             |         |          |
| Power Supply Current  | A  | 0.084                                  | 0.31    | 0.31     |
| Brake Activation Time | ms | 100                                    |         |          |
| Brake Release Time    | ms | 100                                    |         |          |
| Time Rating           |    | Continuous                             |         |          |

## Connecting the Electromagnetic Brake



● Electromagnetic brake leads and varistor have no polarity.

### Note

● Before holding a load with an electromagnetic brake, make sure that the motor has stopped.  
If the brake is applied during rotation, it may be damaged.

## ■ Dimensions (Unit = mm)

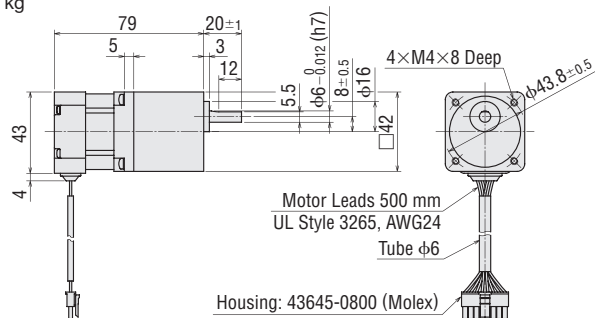
- Installation screws are included with the parallel shaft gearhead. Installation screws → Page 31
- A number indicating the gear ratio is specified where the box □ is located in the product name.

### ● Motor

#### ◇ Geared Type 15 W

**BLHM015K-□**

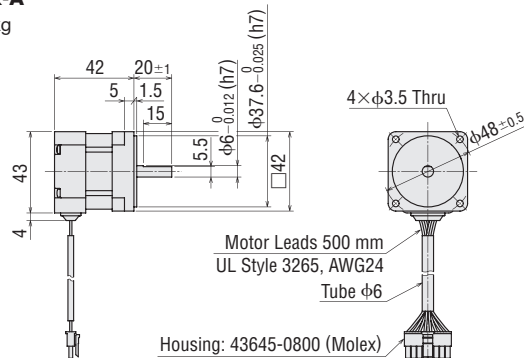
Mass: 0.5 kg



#### ◇ Round Shaft Type 15 W

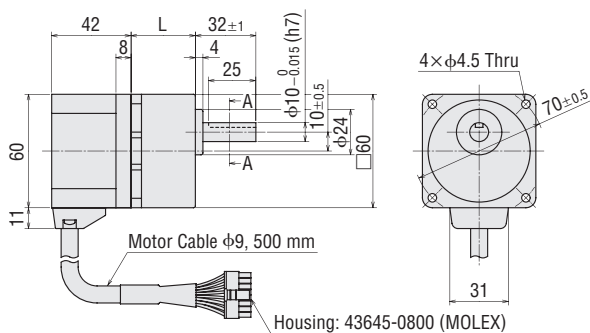
**BLHM015K-A**

Mass: 0.25 kg

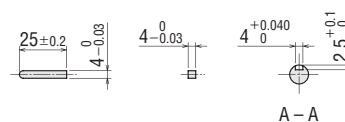


#### ◇ Parallel Shaft Gearhead **GFS** Gear 30 W

| Product Name       | Motor Product Name | Gearhead Product Name | Gear Ratio      | L  | Mass [kg] |
|--------------------|--------------------|-----------------------|-----------------|----|-----------|
| <b>BLHM230KC-□</b> | BLHM230KC-GFS      | GFS2G□                | <b>5 ~ 20</b>   | 34 | 1.0       |
|                    |                    |                       | <b>30 ~ 100</b> | 38 |           |
|                    |                    |                       | <b>200</b>      | 43 |           |



#### ◇ Key and Key Slot (Included)



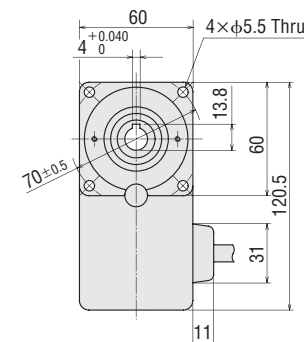
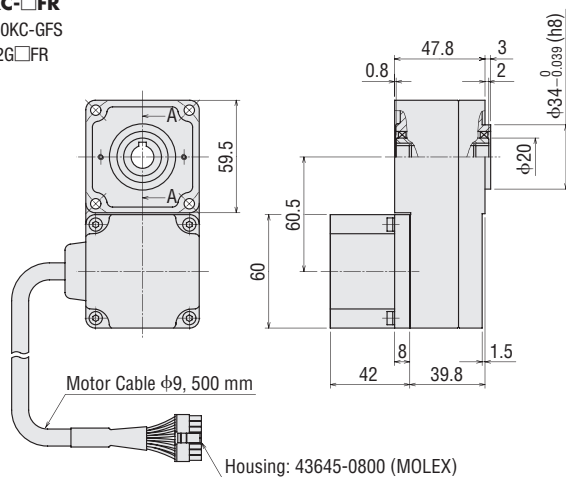
#### ◇ Hollow Shaft Flat Gearhead **FR** Gear 30 W

**BLHM230KC-□FR**

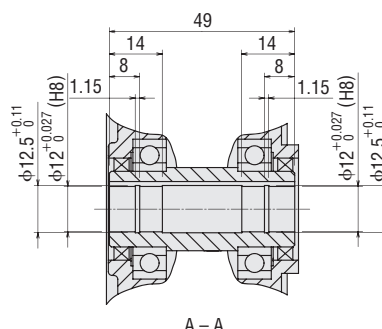
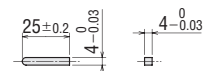
Motor: BLHM230KC-GFS

Gearhead: GFS2G□FR

Mass: 1.3 kg



#### ◇ Key (Included)



**BLHM230KC-A**

Technical drawing of the Molex 43645-0800 connector, showing dimensions in millimeters (mm).

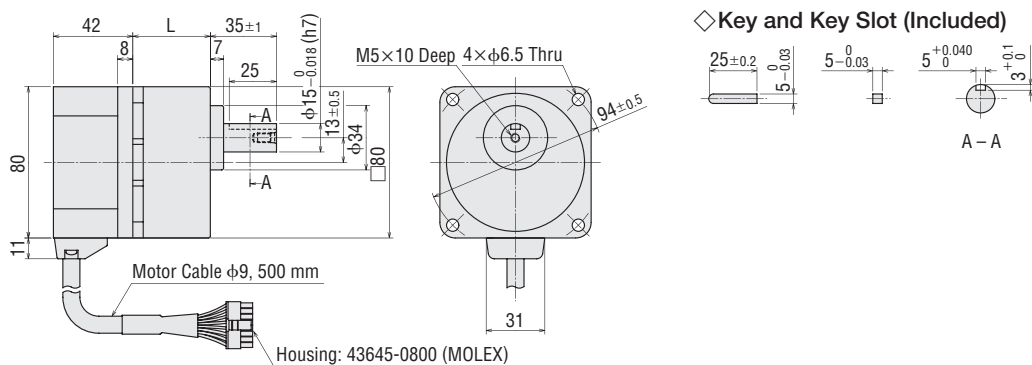
**Side View Dimensions:**

- Total Length: 60
- Mounting Tab Width: 42
- Central Pin Width:  $24 \pm 1$
- Pin Pitch: 8
- Pin Width: 2
- Pin Length: 7.5
- Pin Diameter:  $\varnothing 8 \pm 0.015$  (H7)
- Housing Width: 16
- Housing Mounting Hole Diameter:  $\varnothing 54 -0.030$  (H7)
- Motor Cable:  $\varnothing 9$ , 500 mm
- Housing: 43645-0800 (MOLEX)

**Top View Dimensions:**

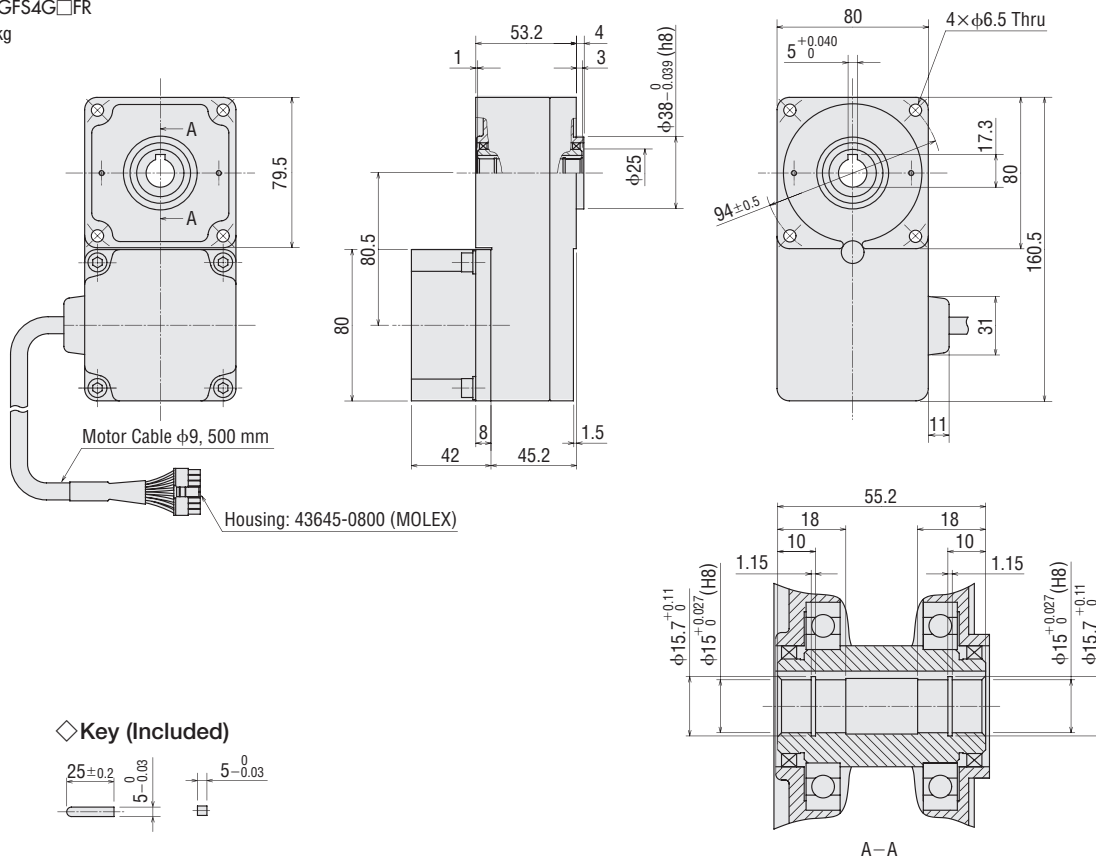
- Mounting Hole Diameter:  $4 \times \varnothing 4.5$  Thru
- Central Pin Diameter: 31
- Mounting Hole Position:  $70 \pm 0.5$

| Product Name       | Motor Product Name | Gearhead Product Name | Gear Ratio      | L  | Mass [kg] |
|--------------------|--------------------|-----------------------|-----------------|----|-----------|
| <b>BLHM450KC</b> □ | BLHM450KC-GFS      | GFS4G□                | <b>5 ~ 20</b>   | 41 | 1.8       |
|                    |                    |                       | <b>30 ~ 100</b> | 46 |           |
|                    |                    |                       | <b>200</b>      | 51 |           |



**BLHM450KC-□FR**

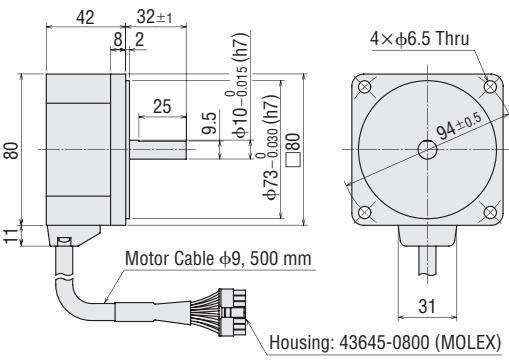
Mass: 2.4 kg



◇ Round Shaft Type 50 W

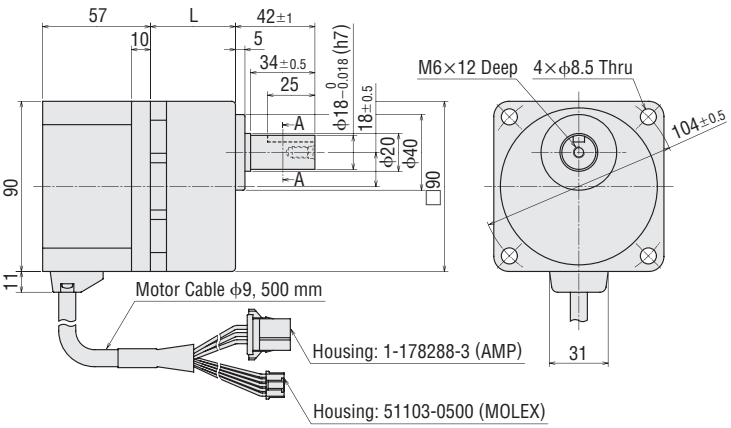
**BLHM450KC-A**

Mass: 0.8 kg

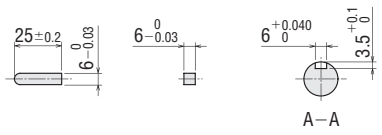


◇ Parallel Shaft Gearhead **GFS** Gear 100 W

| Product Name        | Motor Product Name | Gearhead Product Name | Gear Ratio      | L  | Mass [kg] |
|---------------------|--------------------|-----------------------|-----------------|----|-----------|
| <b>BLHM5100KC-□</b> | BLHM5100KC-GFS     | GFS5G□                | <b>5 ~ 20</b>   | 45 | 2.9       |
|                     |                    |                       | <b>30 ~ 100</b> | 58 |           |
|                     |                    |                       | <b>200</b>      | 64 |           |



◇ Key and Key Slot (Included)



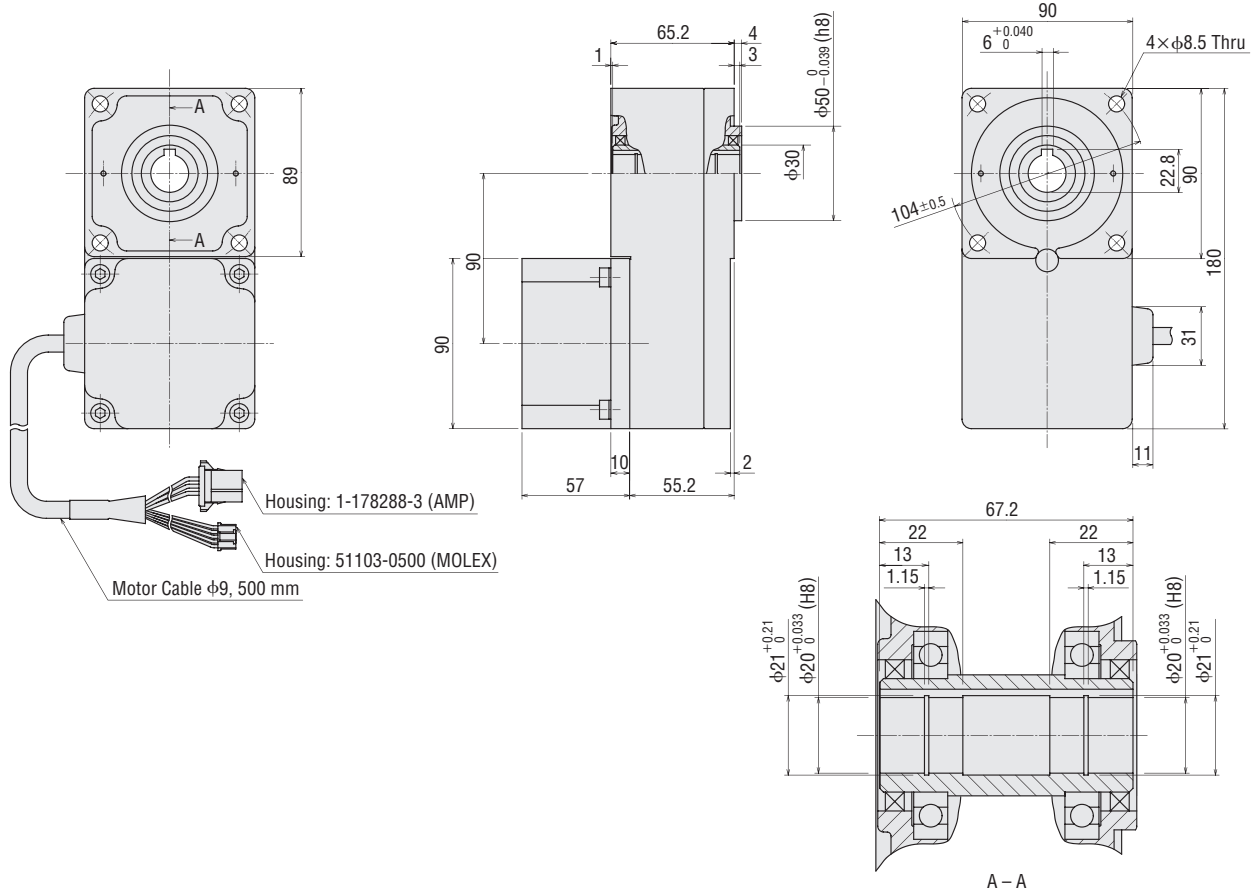
◇ Hollow Shaft Flat Gearhead **FR** Gear 100 W

**BLHM5100KC-□FR**

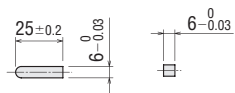
Motor: BLHM5100KC-GFS

Gearhead: GFS5G□FR

Mass: 3.6 kg



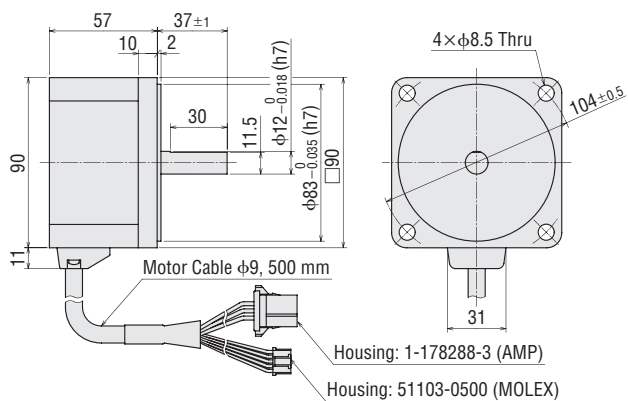
◇ Key and Key Slot (Included)



◇ Round Shaft Type 100 W

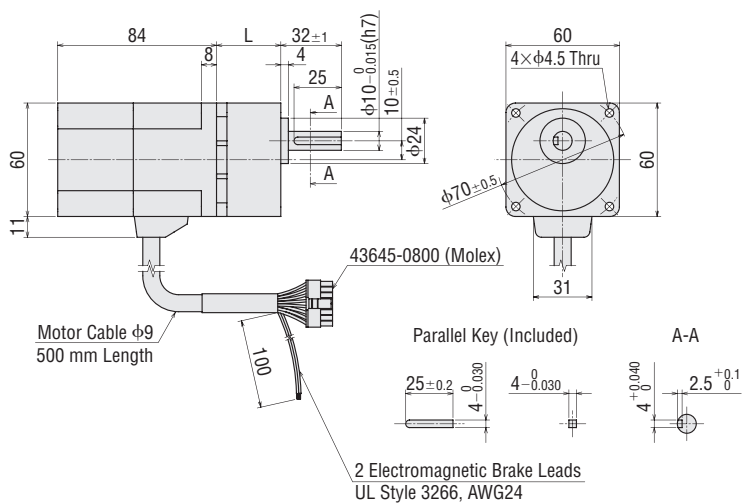
**BLHM5100KC-A**

Mass: 1.4 kg



### ◇ Parallel Shaft Gearhead **GFS** Gear 30 W

| Product Name        | Motor Product Name | Gearhead Product Name | Gear Ratio      | L  | Mass [kg] |
|---------------------|--------------------|-----------------------|-----------------|----|-----------|
| <b>BLHM230KCM</b> □ | BLHM230KCM-GFS     | GFS2G□                | <b>5 ~ 20</b>   | 34 | 1.1       |
|                     |                    |                       | <b>30 ~ 100</b> | 38 | 1.2       |
|                     |                    |                       | <b>200</b>      | 43 | 1.2       |



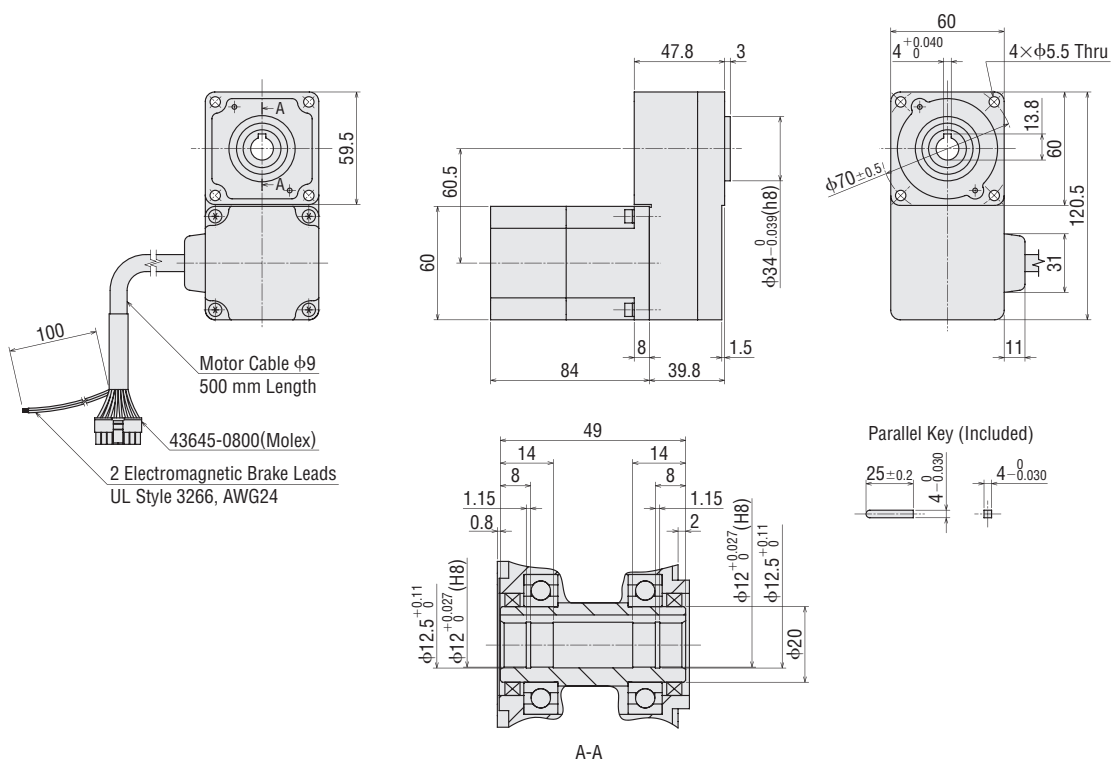
### ◇ Hollow Shaft Flat Gearhead **FR** Gear 30 W

**BLHM230KCM-□FR**

Motor: BLHM230KCM-GFS

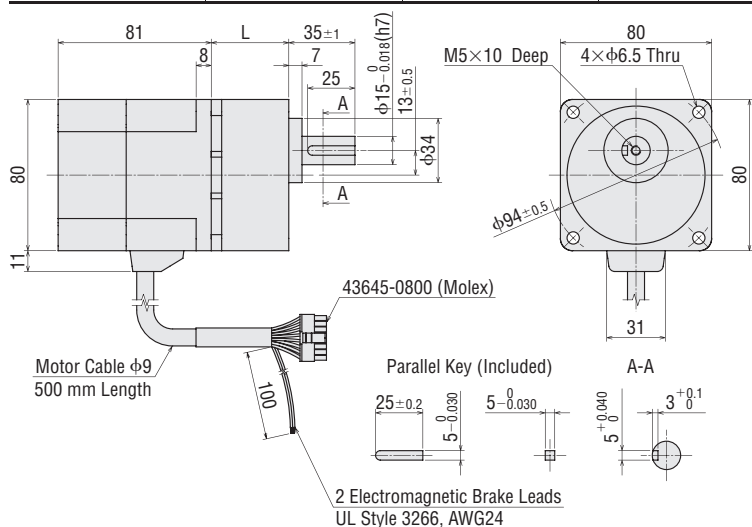
Gearhead: GFS2G□FR

Mass: 1.6 kg



◇ Parallel Shaft Gearhead **GFS** Gear 50 W

| Product Name        | Motor Product Name | Gearhead Product Name | Gear Ratio      | L  | Mass [kg] |
|---------------------|--------------------|-----------------------|-----------------|----|-----------|
| <b>BLHM450KCM-□</b> | BLHM450KCM-GFS     | GFS4G□                | <b>5 ~ 20</b>   | 41 | 2.0       |
|                     |                    |                       | <b>30 ~ 100</b> | 46 | 2.1       |
|                     |                    |                       | <b>200</b>      | 51 | 2.2       |



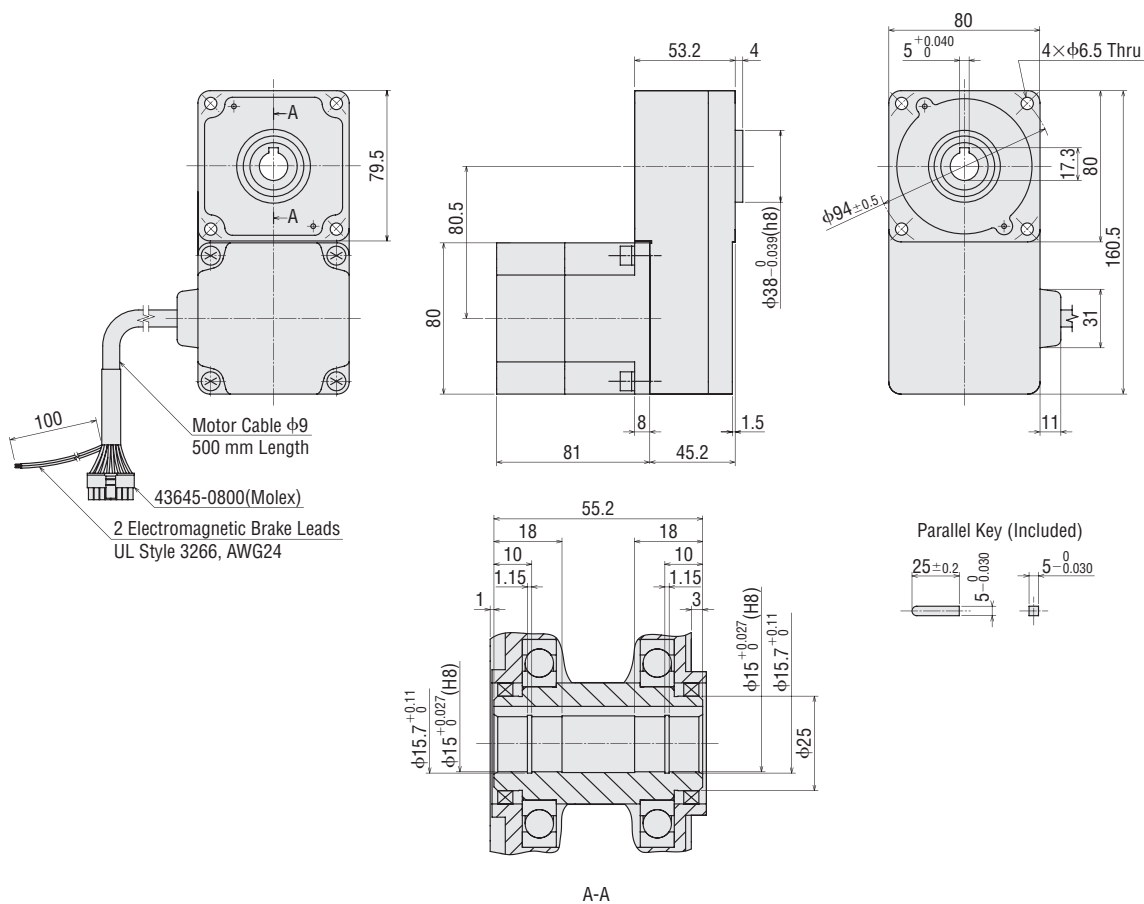
◇ Hollow Shaft Flat Gearhead **FR** Gear 50 W

**BLHM450KCM-□FR**

Motor: BLHM450KCM-GFS

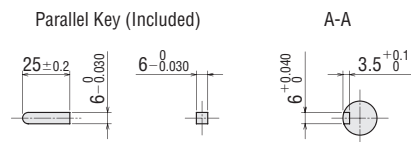
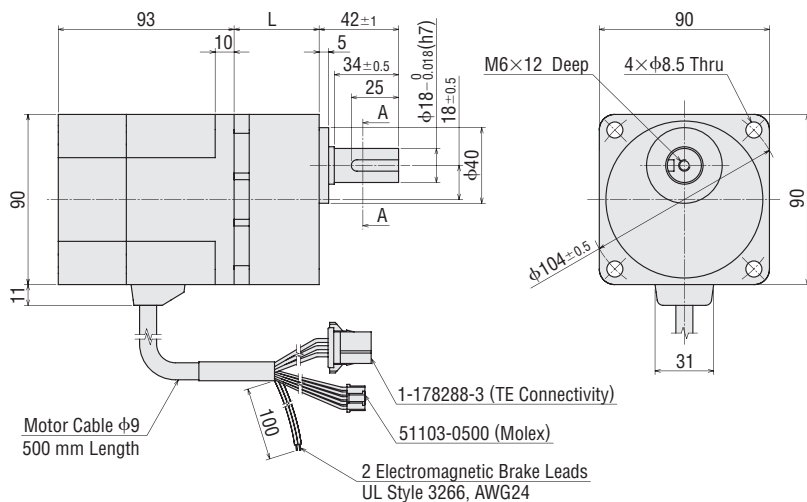
Gearhead: GFS4G□FR

Mass: 2.9 kg



### ◆ Parallel Shaft Gearhead GFS Gear 100 W

| Product Name         | Motor Product Name | Gearhead Product Name | Gear Ratio      | L  | Mass [kg] |
|----------------------|--------------------|-----------------------|-----------------|----|-----------|
| <b>BLHM5100KCM</b> □ | BLHM5100KCM-GFS    | GFS5G□                | <b>5 ~ 20</b>   | 45 | 3.0       |
|                      |                    |                       | <b>30 ~ 100</b> | 58 | 3.3       |
|                      |                    |                       | <b>200</b>      | 64 | 3.4       |



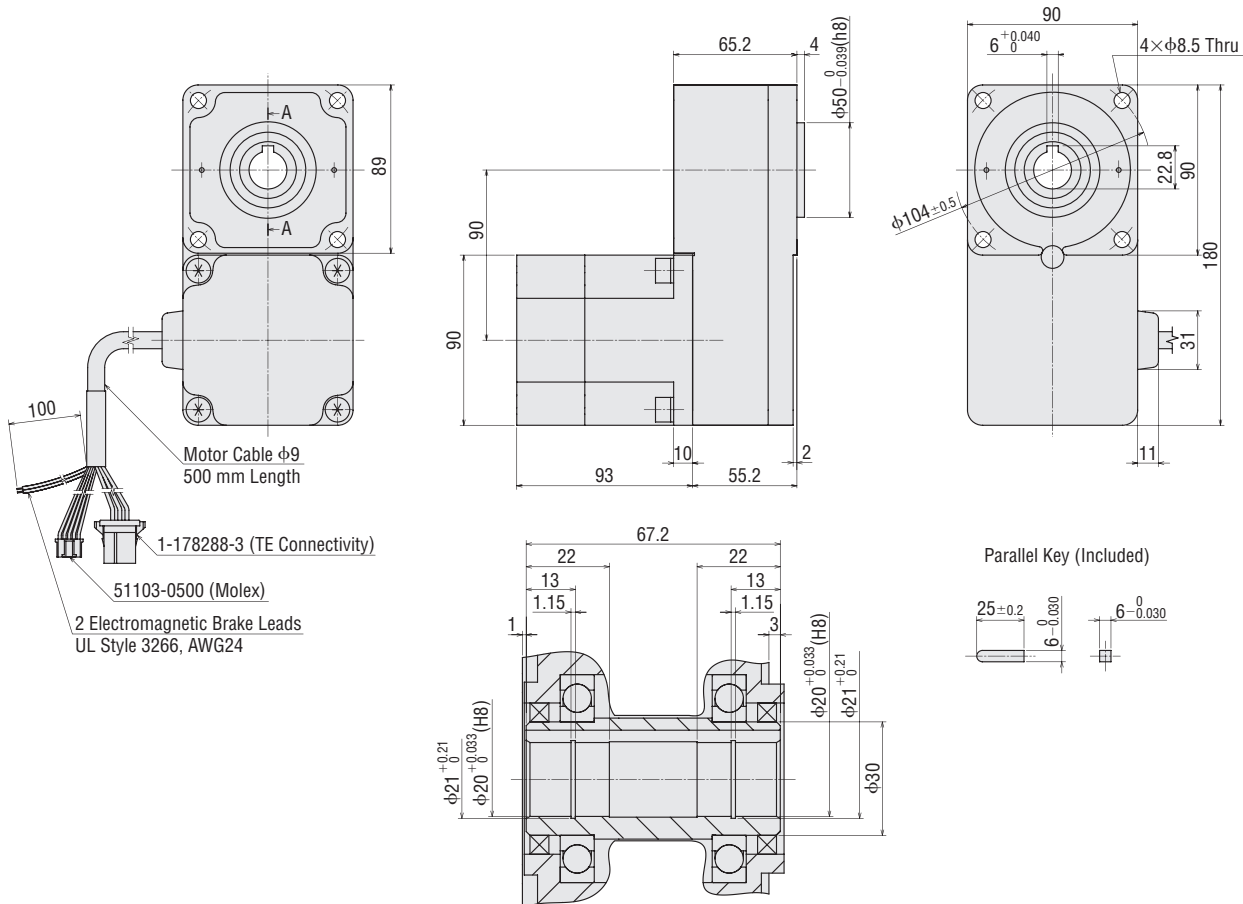
◇ Hollow Shaft Flat Gearhead FR Gear 100 W

**BLHM5100KCM-□FR**

Motor: BLHM5100KCM-GFS

Gearhead: GFS5G□FR

Mass: 4.2 kg



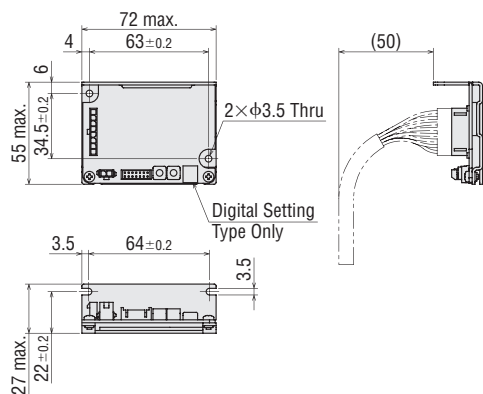
A-A

## ● Driver

◇ 15 W, 30 W, 50 W

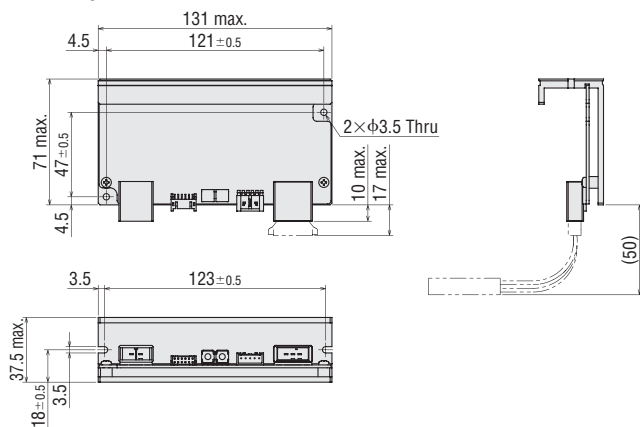
**BLH2D15-K, BLH2D30-K, BLH2D50-K**  
**BLH2D15-KD, BLH2D30-KD, BLH2D50-KD**  
**BLH2D15-KR, BLH2D30-KR, BLH2D50-KR**

Mass: 46 g



◇ 100 W  
**BLHD100K**

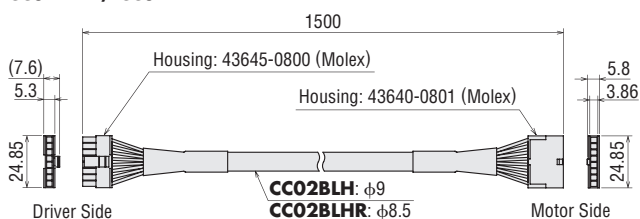
Mass: 0.3 kg



## ● Connection Cable, Flexible Connection Cable

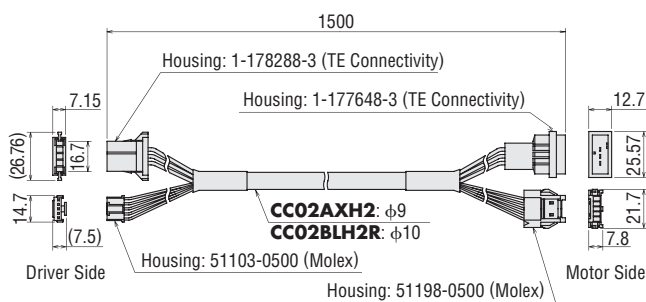
◇ 15 W, 30 W, 50 W

**CC02BLH / CC02BLHR**



◇ 100 W

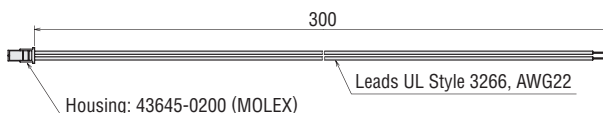
**CC02AXH2 / CC02BLH2R**



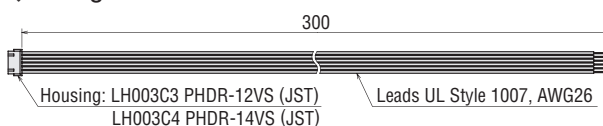
## ● Power Supply Cable and I/O Signal Cable Set (For 15 W, 30 W, 50 W)

| Length [m] | Driver Type               | Product Name    |
|------------|---------------------------|-----------------|
| 0.3        | Analogue Setting Type     | <b>LHS003CC</b> |
|            | RS-485 Communication Type | <b>LHS003CD</b> |
|            | Digital Setting Type      | <b>LHS003CD</b> |
| 1          | Analogue Setting Type     | <b>LHS010CC</b> |
|            | RS-485 Communication Type | <b>LHS010CC</b> |
|            | Digital Setting Type      | <b>LHS010CD</b> |

## ◇ Power Supply Cable

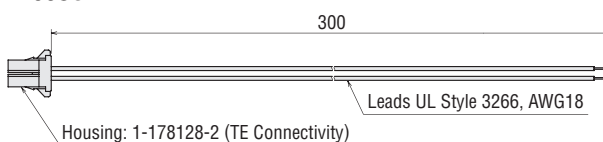


## ◇ I/O Signal Cable



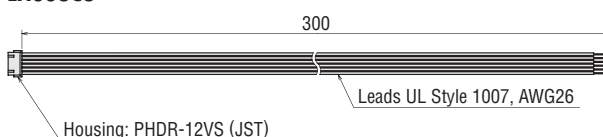
## ● Power Supply Cable (For 100 W, Included)

**LH003C2**



## ● I/O Signal Cable (For 100 W, Included)

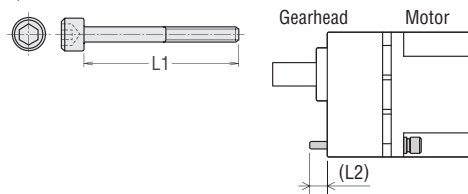
**LH003C3**



## ● Installation screw dimensions

L2 is the dimension when a plain washer and a spring washer are mounted on the screw head side.

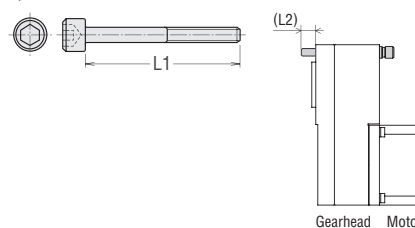
### ◇ Parallel Shaft Gearhead



| Product Name   | Gear Ratio      | Installation Screws |         | L2 [mm] |
|----------------|-----------------|---------------------|---------|---------|
|                |                 | Screw Size          | L1 [mm] |         |
| <b>GFS2G</b> □ | <b>5 ~ 20</b>   | M4                  | 50      | 6       |
|                | <b>30 ~ 100</b> |                     | 55      | 7       |
|                | <b>200</b>      |                     | 60      | 7       |
| <b>GFS4G</b> □ | <b>5 ~ 20</b>   | M6                  | 65      | 13      |
|                | <b>30 ~ 100</b> |                     | 70      | 13      |
|                | <b>200</b>      |                     | 75      | 13      |
| <b>GFS5G</b> □ | <b>5 ~ 20</b>   | M8                  | 75      | 16.5    |
|                | <b>30 ~ 100</b> |                     | 90      | 18.5    |
|                | <b>200</b>      |                     | 95      | 17.5    |

● Installation Screws: 4 pieces each of flat washers, spring washers, and hexagonal nuts are included.

### ◇ Hollow Shaft Flat Gearhead

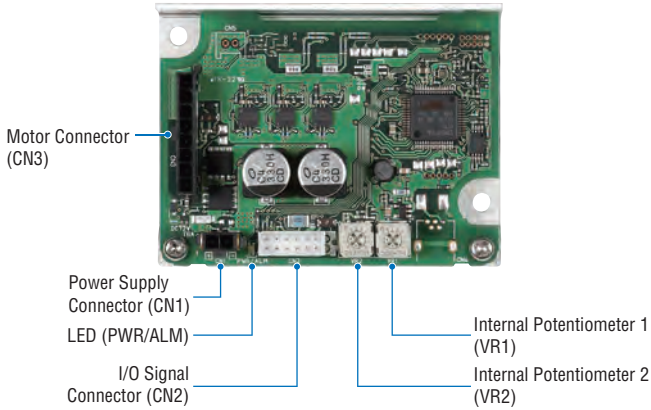


| Product Name             | Gear Ratio     | Installation Screws |         | L2 [mm] |
|--------------------------|----------------|---------------------|---------|---------|
|                          |                | Screw Size          | L1 [mm] |         |
| <b>GFS2G</b> □ <b>FR</b> | <b>5 ~ 200</b> | M5                  | 65      | 15      |
| <b>GFS4G</b> □ <b>FR</b> | <b>5 ~ 200</b> | M6                  | 70      | 14      |
| <b>GFS5G</b> □ <b>FR</b> | <b>5 ~ 200</b> | M8                  | 90      | 21      |

● Installation Screws: 4 pieces each of flat washers, spring washers, and hexagonal nuts are included.

## Connection and Operation Analogue Setting Type (15 W, 30 W, 50 W)

### Names and Functions of Driver Parts



| Name                   | Indication | Description                                                                                                                                                          |
|------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Supply Connector | CN1        | Connects the power supply cable.                                                                                                                                     |
| I/O Signal Connector   | CN2        | Connects the I/O signal cable with an external control device.                                                                                                       |
| Motor Connector        | CN3        | Connects the motor cable.                                                                                                                                            |
| LED                    | PWR/ALM    | Green<br>Lit in green while the power is supplied.                                                                                                                   |
|                        |            | Red (LED Blinks)<br>If an alarm is generated, this LED will blink in red. The generated alarm content can be checked by counting the number of times the LED blinks. |
|                        |            |                                                                                                                                                                      |
| Internal Potentiometer | VR1        | Uses to set the speed (M0 input: ON)                                                                                                                                 |
|                        | VR2        | Uses to set the acceleration time and deceleration time.                                                                                                             |

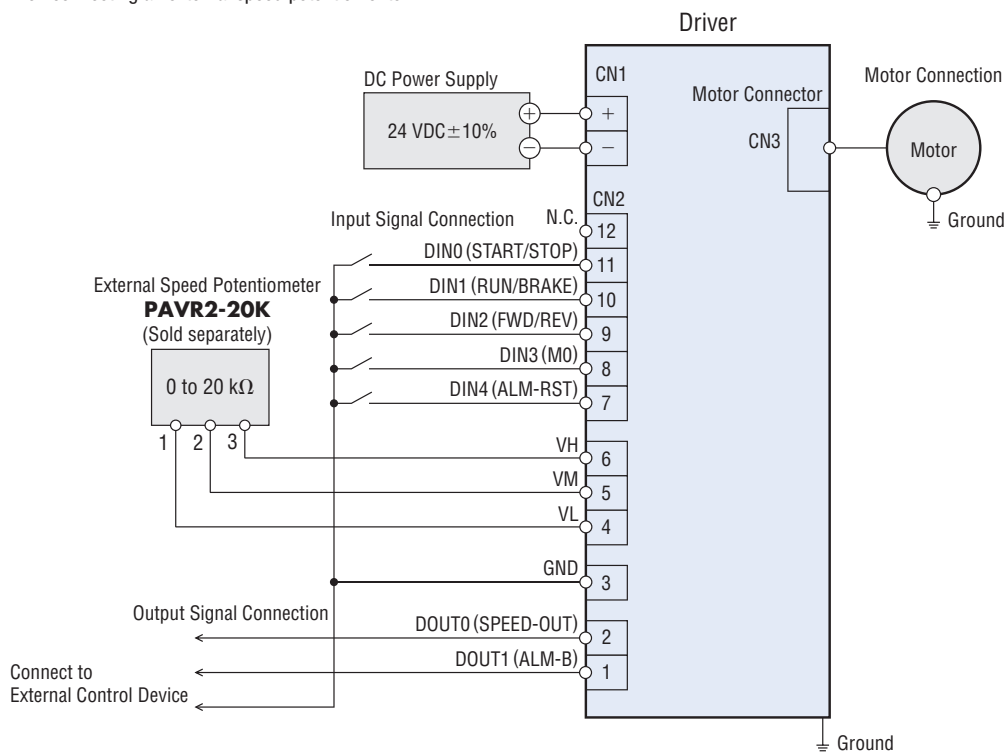
### I/O Signal Connector (CN2)

| Pin No. | Colour of Lead Wire | Terminal Name | Signal Name                      | Description                                                                                                                                                                                                                                                                                                                               |
|---------|---------------------|---------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12      | —                   | —             | —                                | N.C. (No Connection.)                                                                                                                                                                                                                                                                                                                     |
| 11      | Black               | DIN0          | START/STOP                       | These signals are used to operate the motor. The motor rotates according to the acceleration time when both the START/STOP input and the RUN/BRAKE input are turned ON. If the START/STOP input is turned OFF, the motor stops according to the deceleration time. If the RUN/BRAKE input is turned OFF, the motor stops instantaneously. |
| 10      | White               | DIN1          | RUN/BRAKE                        |                                                                                                                                                                                                                                                                                                                                           |
| 9       | Gray                | DIN2          | FWD/REV                          | This signal is used to change the motor rotation direction. The motor rotates in the CW direction when this signal is turned ON, and in the CCW direction when it is turned OFF.*                                                                                                                                                         |
| 8       | Light Blue          | DIN3          | M0                               | When the M0 input is ON, the setting speed of the internal potentiometer (VR1) is enabled. When it is OFF, the setting speed of the external analogue setting device (External speed potentiometer or external DC voltage) is enabled.                                                                                                    |
| 7       | Purple              | DIN4          | ALM-RST                          | This signal is used to reset the alarm. (The alarm will be reset at the OFF edge of the input.)                                                                                                                                                                                                                                           |
| 6       | Blue                | VH            | External Analogue Setting Device | These signals are used when the rotation speed is externally set using an external analogue setting device (External speed potentiometer or external DC voltage).                                                                                                                                                                         |
| 5       | Green               | VM            |                                  |                                                                                                                                                                                                                                                                                                                                           |
| 4       | Yellow              | VL            |                                  |                                                                                                                                                                                                                                                                                                                                           |
| 3       | Orange              | GND           | GND                              | I/O signals common                                                                                                                                                                                                                                                                                                                        |
| 2       | Red                 | DOUT0         | SPEED-OUT                        | 30 pulses are output while the motor output shaft makes one revolution in synchronization with the motor rotation. The pulse width of output pulse signals is 0.3 ms. The motor rotation speed can be calculated using the SPEED-OUT output.                                                                                              |
| 1       | Brown               | DOUT1         | ALM-B                            | This is a signal to output an alarm status. It is turned OFF when an alarm is generated. (Normally closed)<br>The generated alarm content can be checked by counting the number of times the LED blinks.                                                                                                                                  |

\*The rotation direction depends on the gear ratio of the gearhead.

### Connection Diagrams

Connection example when connecting an external speed potentiometer.



## Run/Stop

Operate the motor with the START/STOP and RUN/BRAKE inputs.

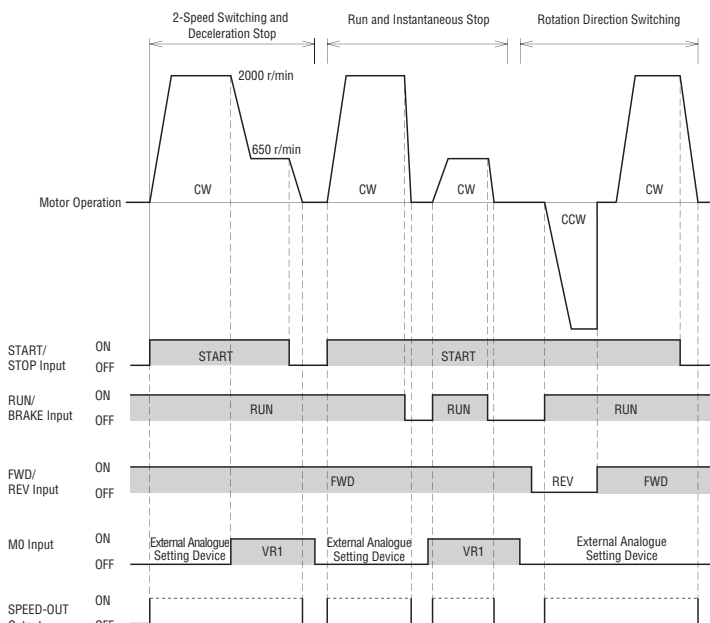
When the RUN/BRAKE Input is shut off during deceleration, the motor will stop instantaneously.

Decelerated Stop: Stopping in accordance with the set deceleration time.

Instantaneous Stop: Stopping in a very short time window regardless of the deceleration time.

|              | START/STOP Input | RUN/BRAKE Input | Motor Operation    |
|--------------|------------------|-----------------|--------------------|
| Signal Level | ON               | ON              | Operation          |
|              | ON               | OFF             | Instantaneous Stop |
|              | OFF              | ON              | Deceleration Stop  |

### Example of Operating Pattern



#### START/STOP Input, RUN/BRAKE Input

When the START/STOP and RUN/BRAKE inputs are both turned ON, the motor will run. When the START/STOP Input is shut OFF during operation, the motor will execute a decelerated stop in accordance with the settings on the internal potentiometer (VR2). When the RUN/BRAKE Input is shut OFF during operation, the motor will stop in the shortest window of time possible (Instantaneous stop).

#### FWD/REV Input

This signal is used to change the rotation direction of the motor. When ON, the motor will turn CW; when OFF, the motor will turn CCW. (The rotation direction varies according to the gear ratio of the gearhead.)

#### M0 Input

When the M0 input is turned ON, the motor will rotate in accordance with the internal potentiometer (VR1). When it shut OFF, the motor will rotate in accordance with the external analogue setting device.

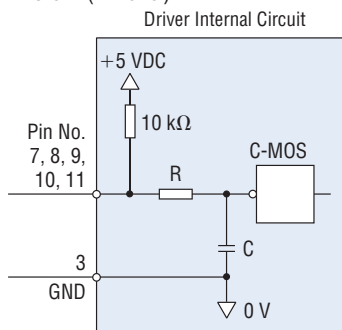
Please ensure that the ON and OFF durations for each output signal are 10 ms min.

## I/O Signal Circuits

### Input Signal Circuit

The driver's signal input uses the C-MOS input method.

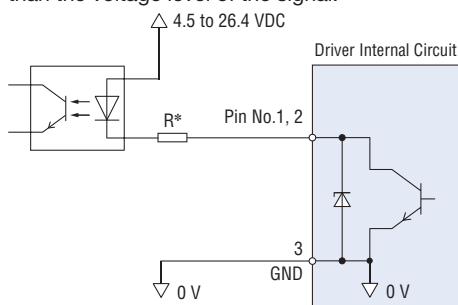
The signal status indicates "ON: 0 to 0.5 V (L Level)" or "OFF: 4 to 5 V (H Level)."



### Output Signal Circuit

Output signals of the driver are transistor open-collector outputs.

The signal state represents a state of "ON: Carrying current" or "OFF: Not carrying current" for the internal photocoupler rather than the voltage level of the signal.



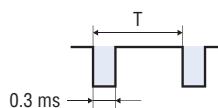
\* Recommended resistance value when current limiting resistor R is connected  
 24 VDC: 2.7 kΩ to 4.7 kΩ (1 W)  
 5 VDC: 560 Ω to 820 Ω (0.25 W)

### SPEED-OUT

30 pulses are output every revolution of the motor output shaft, synchronized with the rotation of the motor. The pulse width of output pulse signals is 0.3 ms. The motor rotation speed can be calculated using the SPEED-OUT output.

$$\text{Frequency of SPEED-OUT [Hz]} = \frac{1}{T [\text{s}]}$$

$$\text{Motor Speed [r/min]} = \frac{\text{Frequency of SPEED-OUT [Hz]} \times 60}{30}$$



### Alarm Reset

Before resetting an alarm using one of the following methods, be sure to resolve the cause of the alarm and ensure conditions are safe.

- Turn the ALM-RST input from ON to OFF. (The alarm will be reset at the OFF edge of the input.)
- Turn on the power again.

## Speed Setting Methods

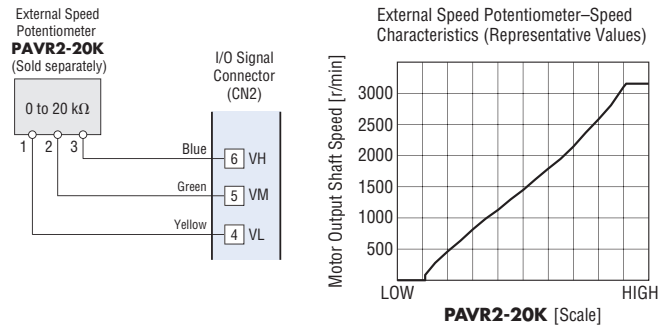
The motor speed can be set using an external analogue setting device (An external speed potentiometer or external DC voltage) or VR1.

It is possible to switch between external analogue speed setting and VR1, depending on whether the M0 input is ON or OFF.

| M0 Input      | OFF                              | ON  |
|---------------|----------------------------------|-----|
| Speed Setting | External Analogue Setting Device | VR1 |

### Setting by External Speed Potentiometer

Connect to pin No. 4 to 6 of CN2.

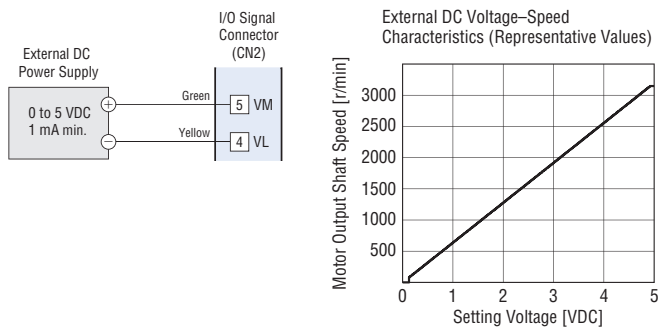


#### Note

The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

### Setting by External DC Voltage

Connect to pin No. 4 and 5 of CN2.

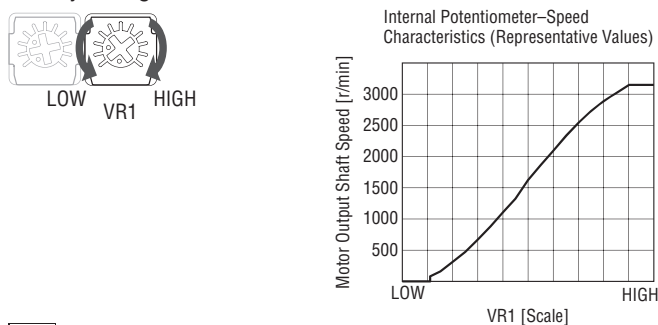


#### Note

The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

### Setting by VR1

Factory setting: 0 r/min



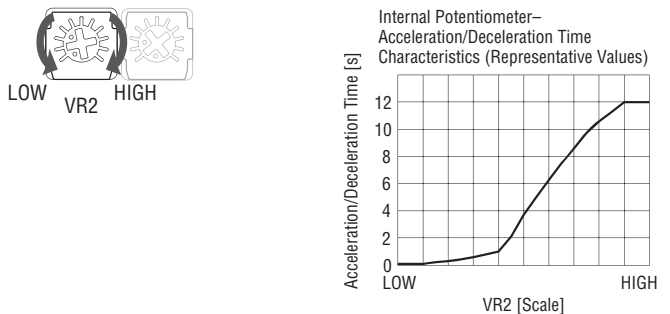
#### Note

The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

## Setting the Acceleration and Deceleration Times

The acceleration time is set as a time needed for the motor to reach the rated rotation speed from a standstill state. The deceleration time is set as a time needed for the motor to stop from the rated rotation speed. The actual acceleration time and deceleration time are affected by customer's conditions of use, load inertia, and load torque. The setting range is 0.1 s to 12.0 s. Factory setting: 0.1 s

### VR2 settings



## Multi-Motor Control

Two or more motors can be operated at the same speed using 1 external speed potentiometer or external DC voltage.

### When Using an External Speed Potentiometer

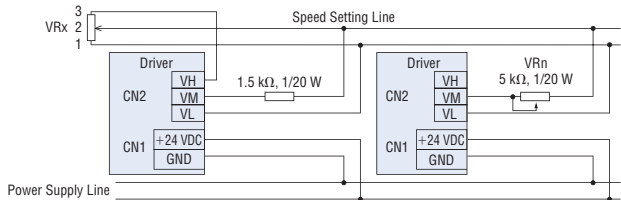
When using an external speed potentiometer (VRx), no more than ten motors should be operated simultaneously.

Resistance value when the number of drivers is n:

$$VRx (k\Omega) = 20 k\Omega / n,$$

$$\text{acceptable loss (W)} = n/4$$

Example: 10 k $\Omega$  , 1/2 W for 2 drivers.

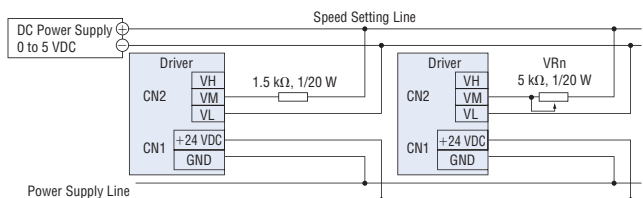


### When Using an External DC Voltage

The current capacity of the DC power supply is determined as follows.

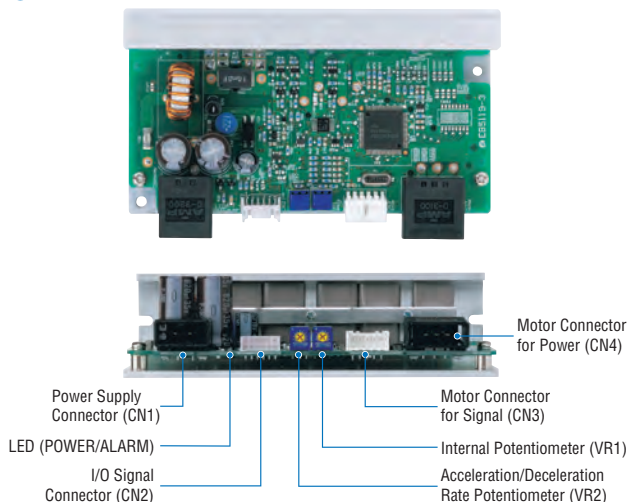
Current capacity (mA) when the number of drivers is n: 1 mA  $\times$  n

Example: When two drivers are used, the current capacity should be 2 mA min.



## Connection and Operation Analogue Setting Type (100 W)

### Names and Functions of Driver Parts



| Name                                         | Indication  | Description                                                               |                                                                                                                                                    |
|----------------------------------------------|-------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Supply Connector                       | CN1         | Connects the power supply cable.                                          |                                                                                                                                                    |
| I/O Signal Connector                         | CN2         | Connects the I/O signal cable to connect with an external control device. |                                                                                                                                                    |
| Motor Connector for Signal                   | CN3         | Connects the power supply cable.                                          |                                                                                                                                                    |
| Motor Connector for Power                    | CN4         |                                                                           |                                                                                                                                                    |
| LED                                          | POWER/ALARM | Green                                                                     | Lit in green while the power is supplied.                                                                                                          |
|                                              |             | Green (Blinks)                                                            | If an alarm is generated, this LED will blink in green. The generated alarm content can be checked by counting the number of times the LED blinks. |
| Internal Speed Potentiometer                 | VR1         | Used to set the speed (M0 input: ON)                                      |                                                                                                                                                    |
| Acceleration/Deceleration Rate Potentiometer | VR2         | Used to set the acceleration and deceleration rate.                       |                                                                                                                                                    |

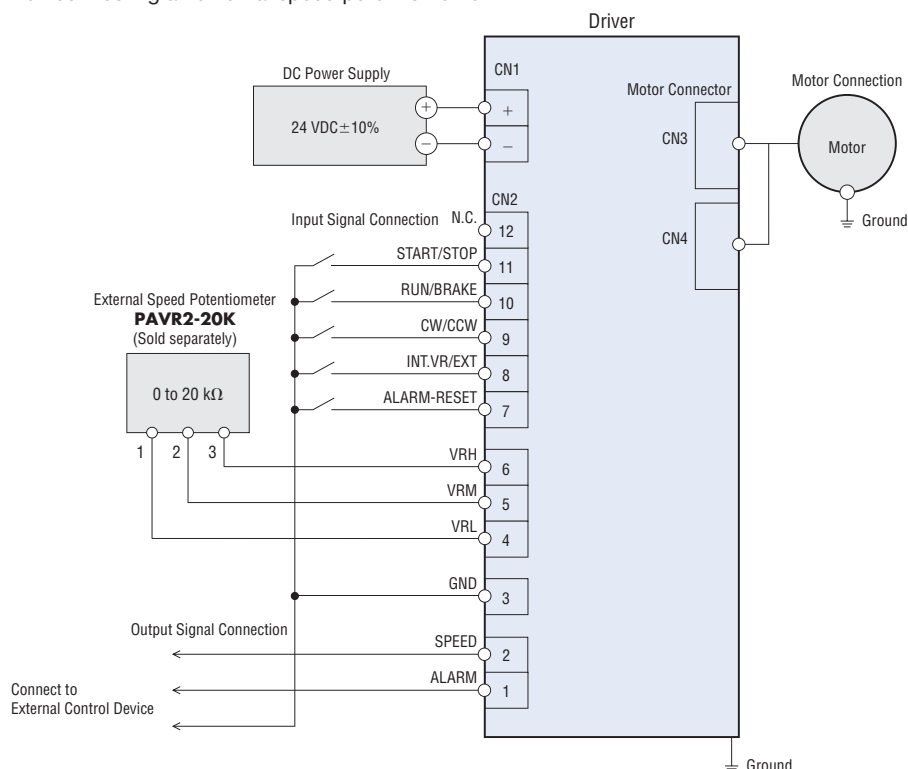
### ◇ I/O Signal Connector (CN2)

| Pin No. | Colour of Lead Wire | Terminal Name | Description                                                                                                                                                                                                                                                                                                                               |
|---------|---------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12      | —                   | —             | N.C. (No Connection.)                                                                                                                                                                                                                                                                                                                     |
| 11      | Black               | START/STOP    | These signals are used to operate the motor. The motor rotates according to the acceleration rate when both the START/STOP input and the RUN/BRAKE input are turned ON. If the START/STOP input is turned OFF, the motor stops according to the deceleration rate. If the RUN/BRAKE input is turned OFF, the motor stops instantaneously. |
| 10      | White               | RUN/BRAKE     |                                                                                                                                                                                                                                                                                                                                           |
| 9       | Gray                | CW/CCW        | This signal is used to change the motor rotation direction. When this signal is turned ON, the motor rotates in the CW direction, and when turned OFF, it rotates in the CCW direction.*                                                                                                                                                  |
| 8       | Light Blue          | INT.VR/EXT    | When the INT. VR/EXT input is ON, the setting speed of the internal speed potentiometer (VR1) is enabled. When OFF, the setting speed of the external speed potentiometer and the external DC voltage is enabled.                                                                                                                         |
| 7       | Purple              | ALARM-RESET   | This signal is used to reset the alarm. (The alarm will be reset at the OFF edge of the input.)                                                                                                                                                                                                                                           |
| 6       | Blue                | VRH           | These signals are used to set the speed externally using the external speed potentiometer or external DC voltage.                                                                                                                                                                                                                         |
| 5       | Green               | VRM           |                                                                                                                                                                                                                                                                                                                                           |
| 4       | Yellow              | VRL           |                                                                                                                                                                                                                                                                                                                                           |
| 3       | Orange              | GND           | I/O signals common                                                                                                                                                                                                                                                                                                                        |
| 2       | Red                 | SPEED         | 30 pulses are output while the motor output shaft makes one revolution, in synchronization with the motor rotation.                                                                                                                                                                                                                       |
| 1       | Brown               | ALARM         | This is a signal to output an alarm status. It is turned OFF when an alarm is generated, and the motor stops. The generated alarm content can be checked by counting the number of times the LED blinks.                                                                                                                                  |

\*The rotation direction depends on the gear ratio of the gearhead.

### ● Connection Diagrams

Connection example when connecting an external speed potentiometer.



## Run/Stop

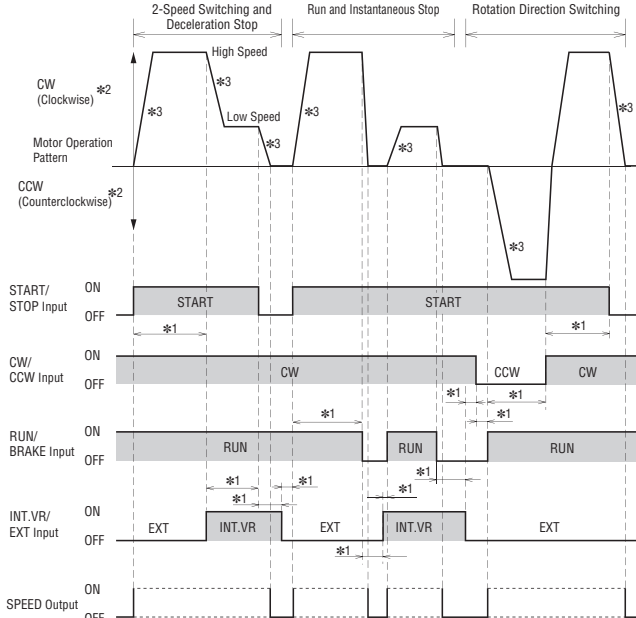
Operate the motor with the START/STOP and RUN/BRAKE inputs.

|              | START/STOP Input | RUN/BRAKE Input | Motor Operation    |
|--------------|------------------|-----------------|--------------------|
| Signal Level | ON               | ON              | Operation*1        |
|              | ON               | OFF             | Instantaneous Stop |
|              | OFF              | ON              | Stop*2             |

\*1 The operating speed of the motor is set by either one of the internal speed potentiometer, external speed potentiometer, or external DC voltage.  
Acceleration is performed at the rate set in the acceleration/deceleration time potentiometer.

\*2 Deceleration is performed at the rate set in the acceleration/deceleration time potentiometer.

### Example of Operating Pattern



\*1 10 ms min.

\*2 The direction of rotation applies to the motor only. Gearhead shaft rotation direction will vary depending on the gear ratio.

\*3 The motor will start and stop at the time set by the acceleration and deceleration rate potentiometer.

### START/STOP Input, RUN/BRAKE Input

When the START/STOP and RUN/BRAKE inputs are both turned ON, the motor will run.

When the START/STOP Input is shut OFF during operation, the motor will execute a decelerated stop in accordance with the settings on the acceleration and deceleration potentiometer (VR2).

When the RUN/BRAKE Input is shut OFF during operation, the motor will stop in the shortest window of time possible (Instantaneous stop).

### CW/CCW Input

This signal is used to change the rotation direction of the motor. When ON, the motor will turn CW; when OFF, the motor will turn CCW. (The rotation direction varies according to the gear ratio of the gearhead.)

### INT. VR/EXT Input

When the INT.VR/EXT Input is turned ON, the set speed for the internal potentiometer (VR1) is enabled. When it shut OFF, the set speed for the external speed potentiometer or the external DC voltage is enabled.

Please ensure that the ON and OFF durations for each output signal are 10 ms min.

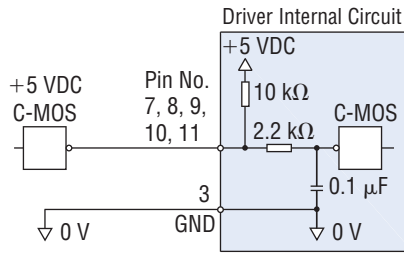
## I/O Signal Circuit

### Input Signal Circuit

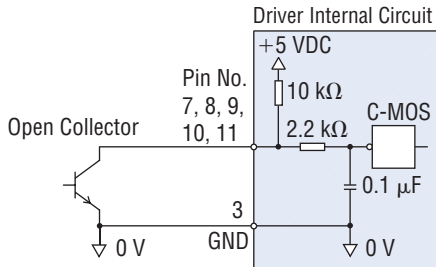
The driver's signal input uses the C-MOS input method.

The signal status indicates "ON: 0 to 0.5 V (L Level)" or "OFF: 4 to 5 V (H Level)."

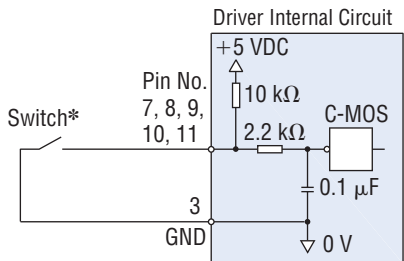
### External control device output: 5 VDC C-MOS



### External control device output: Open-collector output



### Switch Connection

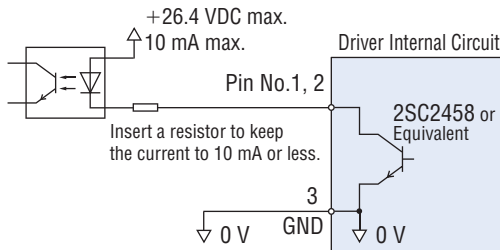


\*Please use a switch capable of opening/closing the current flow at 5 VDC, 1 mA max.

### Output Signal Circuit

Output signals of the driver are transistor open-collector outputs.

The signal state represents a state of "ON: Carrying current" or "OFF: Not carrying current" for the internal photocoupler rather than the voltage level of the signal.

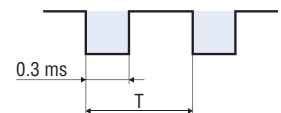


### SPEED-OUT

30 pulses are output every revolution of the motor output shaft, synchronized with the rotation of the motor. The pulse width of output pulse signals is 0.3 ms. The motor rotation speed can be calculated using the SPEED-OUT output.

$$\text{Motor Speed [r/min]} = \frac{\text{Frequency of SPEED-OUT [Hz]}}{30} \times 60$$

$$\text{Frequency of SPEED-OUT [Hz]} = \frac{1}{T [\text{s}]}$$



### ALARM-RESET

Before resetting an alarm using one of the following methods, be sure to resolve the cause of the alarm and ensure conditions are safe.

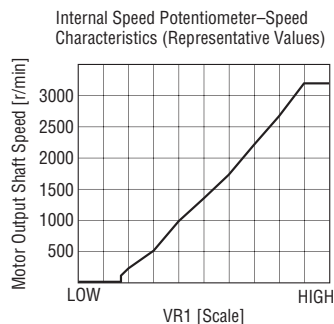
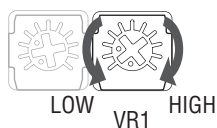
- Turn the ALM-RST input from ON to OFF. (The alarm will be reset at the OFF edge of the input.)
- Turn on the power again.

## Speed Setting Method

The motor speed can be set using any of the following: the internal speed potentiometer, the external speed potentiometer or the external DC voltage. The speed potentiometer can be switched by turning the INT.VR/EXT input ON or OFF.

### Setting by the Internal Speed Potentiometer

Factory setting: 0 r/min

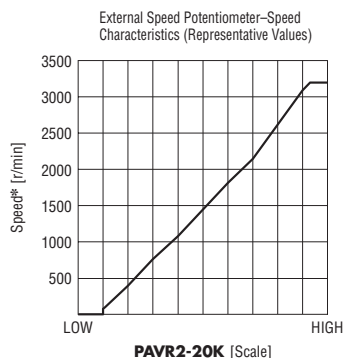
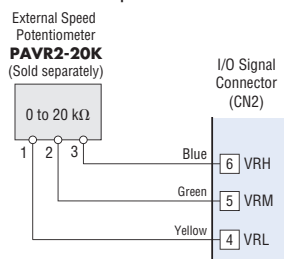


#### Note

- The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

### Setting by the External Speed Potentiometer

Connect to pin No. 4 to 6 of CN2.

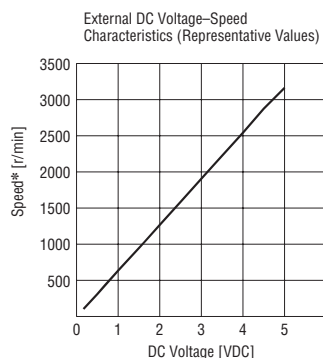
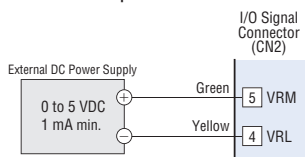


#### Note

- The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

### Setting by External DC Voltage

Connect to pin No. 4 and 5 of CN2.



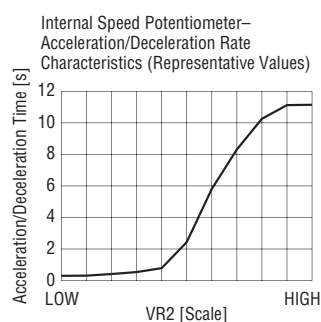
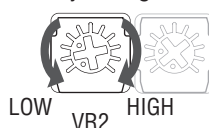
#### Note

- The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

## Setting the Acceleration and Deceleration Times

The acceleration time is set as a time needed for the motor to reach the rated rotation speed from a standstill state. The deceleration time is set as a time needed for the motor to stop from the rated rotation speed. The actual acceleration time and deceleration time are affected by customer's conditions of use, load inertia, and load torque. The setting range is 0.1 s to 12.0 s.

Factory setting: 0.1 s



## Multi-Motor Control

Two or more motors can be operated at the same speed using 1 external speed potentiometer or external DC voltage.

### When Using an External Speed Potentiometer

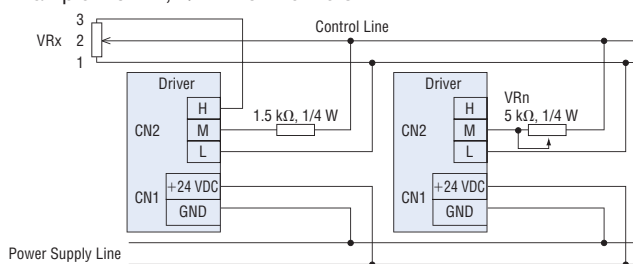
When using an external speed potentiometer (VRx), no more than five motors should be operated simultaneously.

Resistance value when the number of drivers is n:

$$VRx (k\Omega) = 20 k\Omega / n,$$

$$\text{acceptable loss (W)} = n/4$$

Example: 10 k $\Omega$ , 1/2 W for 2 drivers.

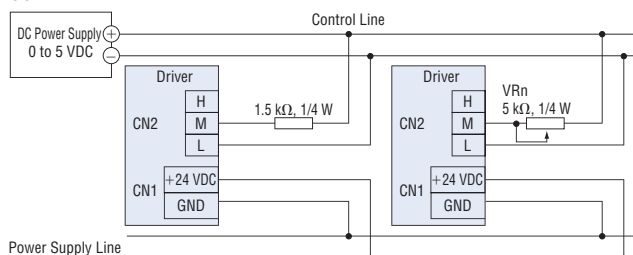


### When Using an External DC Voltage

The current capacity of the DC power supply is determined as follows.

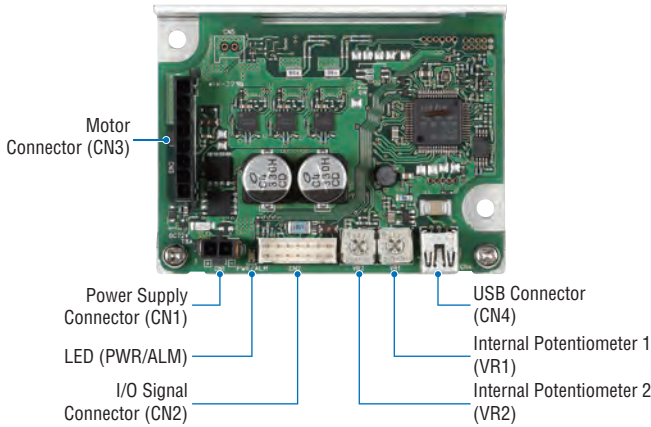
Current capacity (mA) when the number of drivers is n: 1 mA × n

Example: When two drivers are used, the current capacity should be 2 mA min.



## Connection and Operation Digital Setting Type (15 W, 30 W, 50 W)

### Names and Functions of Driver Parts



| Name                    | Indication | Description                                                                                                                                     |
|-------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Supply Connector  | CN1        | Connects the power supply cable.                                                                                                                |
| I/O Signal Connector    | CN2        | Connects the I/O signal cable to connect with an external control device.                                                                       |
| Motor Connector         | CN3        | Connects the motor cable.                                                                                                                       |
| USB Connector           | CN4        | Connects a PC in which <b>MEXE02</b> has been installed.                                                                                        |
| LED                     | PWR/ALM    | Green<br>Lit in green while the power is supplied.                                                                                              |
|                         |            | Red (Blinks)<br>If an alarm is generated, this LED will blink in red.                                                                           |
|                         |            | Orange (Blinks)<br>If information is generated, it will blink in orange.                                                                        |
| Internal Potentiometer* | VR1        | Used to set the operation data.<br>Factory setting: The rotation speed in the operation data No.1 can be set.                                   |
|                         | VR2        | Used to set the operation data.<br>Factory setting: The acceleration time and deceleration time in the operation data No.0 and No.1 can be set. |

\*The function can be changed using **MEXE02**.

### ◇ I/O Signal Connector (CN2)

| Pin No. | Color of Lead Wire | Terminal Name | Initial Assignment Signal*1        | Description                                                                                                                                                                                                                                                                                                                                  |
|---------|--------------------|---------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14      | Yellow/Black       | DIN0          | [START/STOP]                       | These signals are used to operate the motor.<br>The motor rotates according to the acceleration rate when both the START/STOP input and the RUN/BRAKE input are turned ON. If the START/STOP input is turned OFF, the motor stops according to the deceleration rate. If the RUN/BRAKE input is turned OFF, the motor stops instantaneously. |
| 13      | Orange/White       | DIN1          | [RUN/BRAKE]                        |                                                                                                                                                                                                                                                                                                                                              |
| 12      | Red/White          | DIN2          | [FWD/REV]                          | This signal is used to change the motor rotation direction.<br>The motor rotates in the forward direction when the signal is turned ON.*2                                                                                                                                                                                                    |
| 11      | Brown/White        | DIN3          | [M0]                               | The operation data number can be selected based on a combination of ON/OFF status of the M0 and M1 inputs.                                                                                                                                                                                                                                   |
| 10      | Black              | DIN4          | [M1]                               |                                                                                                                                                                                                                                                                                                                                              |
| 9       | White              | DIN5          | [ALM-RST]                          | This signal is used to reset the alarm. (The alarm will be reset at the ON edge of the input.)                                                                                                                                                                                                                                               |
| 8       | Gray               | VH            | External Analogue Setting Device*3 | These terminals are used when the rotation speed or torque limiting value is externally set using an external analogue setting device (External speed potentiometer or external DC voltage).                                                                                                                                                 |
| 7       | Purple             | VM            |                                    |                                                                                                                                                                                                                                                                                                                                              |
| 6       | Blue               | VL            |                                    |                                                                                                                                                                                                                                                                                                                                              |
| 5       | Green              | GND           | GND                                | I/O signals common                                                                                                                                                                                                                                                                                                                           |
| 4       | Yellow             | DOUT0         | [SPEED-OUT]                        | 30 pulses are output while the motor output shaft makes one revolution.                                                                                                                                                                                                                                                                      |
| 3       | Orange             | DOUT1         | [ALM-B]                            | This is a signal to output an alarm status.<br>It is turned OFF when an alarm is generated. (Normally closed)                                                                                                                                                                                                                                |
| 2       | Red                | DOUT2         | [TLC]                              | This is a signal to output when the motor output torque is limited.*4                                                                                                                                                                                                                                                                        |
| 1       | Brown              | DOUT3         | [DIR]                              | This is a signal to output information on the motor rotation direction. (It is turned ON when the motor rotates in the forward direction.)                                                                                                                                                                                                   |

\*1 Shown in brackets [ ] are signals assigned at the time of shipment. Functions for the pin No. 1 to No. 4 and No. 9 to No. 14 can be changed using **MEXE02**.

\*2 The rotation direction of the output shaft varies depending on the gear ratio of the gearhead.

\*3 If the "External setting method" parameter is changed, the speed and torque limiting value can be set with the PWM signal input.

\*4 The torque limiting value is set to 200% at the time of shipment and can be changed using **MEXE02**.

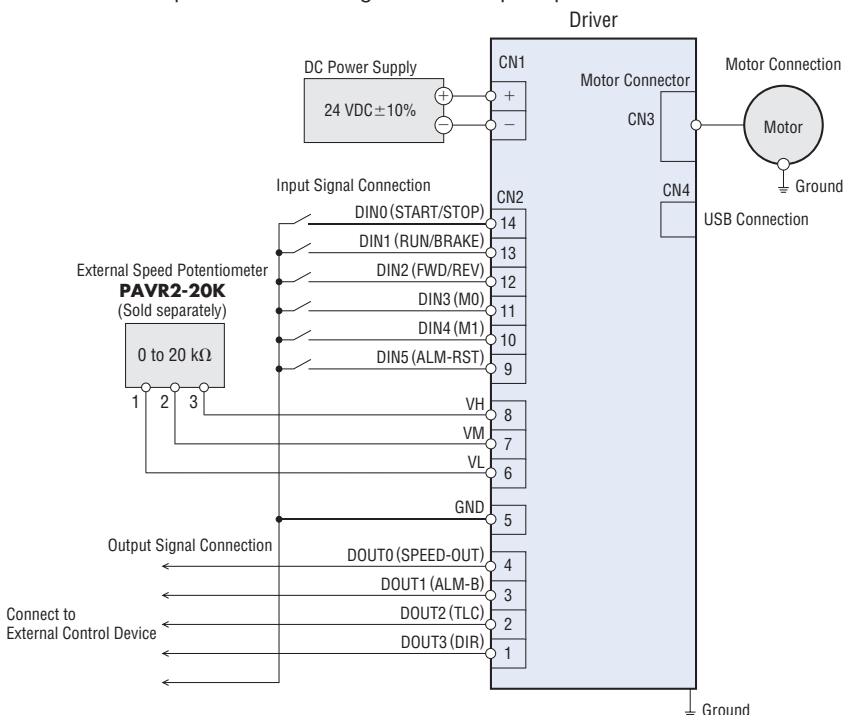
### ◇ USB Cable (CN4)

#### • USB Cable Specifications

| Specifications | USB 2.0 (Full Speed) |
|----------------|----------------------|
| Cable          | Length: 3 m max.     |
|                | Shape: A to mini-B   |

### ● Connection Diagrams

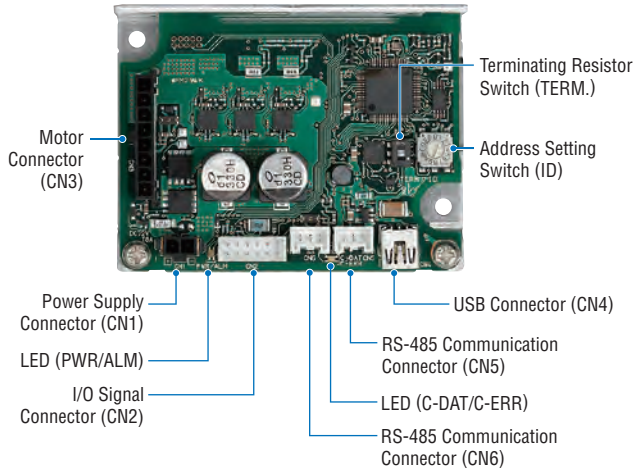
Connection example when connecting an external speed potentiometer.



For detailed information and handling precautions of this product, see the Operation Manual. The Operation Manual is available for download from the Oriental Motor website.

## Connection and Operation RS-485 Communication Type (15 W, 30 W, 50 W)

### Names and Functions of Driver Parts



| Name                           | Indication     | Description                                                                                                              |
|--------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------|
| Power Supply Connector         | CN1            | Connects the power supply cable.                                                                                         |
| I/O Signal Connector           | CN2            | Connects the I/O signal cable to connect with an external control device.                                                |
| Motor Connector                | CN3            | Connects the motor cable.                                                                                                |
| USB Connector                  | CN4            | Connects a PC in which <b>MEXE02</b> has been installed.                                                                 |
| RS-485 Communication Connector | CN5            | Connects the communication cable to connect with an external control device, or connect another driver with daisy chain. |
|                                | CN6            |                                                                                                                          |
| LED                            | PWR/ALM        | Green<br>Lit in green while the power is supplied.                                                                       |
|                                |                | Red (Blinks)<br>If an alarm is generated, this LED will blink in red.                                                    |
|                                |                | Orange (Blinks)<br>If information is generated, it will blink in orange.                                                 |
|                                | C-DAT<br>C-ERR | Green (Lighting)<br>When communication data is being sent or received.                                                   |
|                                |                | Red (Lighting)<br>When communication data is in error.                                                                   |
| Address Setting Switch         | ID             | Set the address number when RS-485 communication is used.<br>Factory setting: 1 (0 to F)                                 |
| Terminating Resistor Switch    | TERM.          | Set the terminal resistor (120 Ω) of RS-485 communication.<br>Factory setting: OFF (OFF: Disable, ON: Effective)         |

### I/O Signal Connector (CN2)

| Pin No. | Color of Lead Wire | Terminal Name | Initial Assignment Signal*1         | Description                                                                                                                                                                                                                                                                                                                                  |
|---------|--------------------|---------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12      | —                  | —             | —                                   | N.C. (No Connection.)                                                                                                                                                                                                                                                                                                                        |
| 11      | Black              | D-IN0         | START/STOP                          | These signals are used to operate the motor.<br>The motor rotates according to the acceleration time when both the START/STOP input and the RUN/BRAKE input are turned ON. If the START/STOP input is turned OFF, the motor stops according to the deceleration time. If the RUN/BRAKE input is turned OFF, the motor stops instantaneously. |
| 10      | White              | D-IN1         | RUN/BRAKE                           |                                                                                                                                                                                                                                                                                                                                              |
| 9       | Gray               | D-IN2         | FWD/REV                             | This signal is used to change the motor rotation direction.<br>The motor rotates in the FWD (CW) direction when the signal is turned ON.*2                                                                                                                                                                                                   |
| 8       | Light Blue         | D-IN3         | M0                                  | This signal is used to select the data number of motor operation.                                                                                                                                                                                                                                                                            |
| 7       | Purple             | D-IN4         | ALM-RST                             | This signal is used to reset the alarm. (The alarm will be reset at the ON edge of the input.)                                                                                                                                                                                                                                               |
| 6       | Blue               | VH            | External Analogue Setting Device *3 | Connect the external analogue setting device (external speed potentiometer or external DC voltage) to set the speed or torque limiting value externally.                                                                                                                                                                                     |
| 5       | Green              | VM            |                                     |                                                                                                                                                                                                                                                                                                                                              |
| 4       | Yellow             | VL            |                                     |                                                                                                                                                                                                                                                                                                                                              |
| 3       | Orange             | GND           | GND                                 | I/O signals common                                                                                                                                                                                                                                                                                                                           |
| 2       | Red                | D-OUT0        | SPEED-OUT                           | 30 pulses are output while the motor output shaft makes one revolution in synchronization with the motor rotation.                                                                                                                                                                                                                           |
| 1       | Brown              | D-OUT1        | ALM-B                               | This is a signal to output an alarm status.<br>It is turned OFF when an alarm is generated, and the motor stops (normally closed).                                                                                                                                                                                                           |

\*1 Functions for the pin No.1, No.2 and No.7 to No.11 can be changed using the **MEXE02** or RS-485 communication.

\*2 The rotation direction depends on the gear ratio of the gearhead.

\*3 If the "External setting method" parameter is changed, the speed and torque limiting value can be set with the PWM signal input.

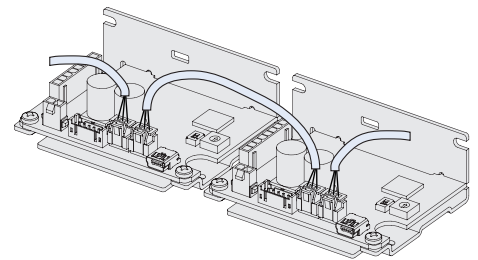
### USB Cable (CN4)

#### USB Cable Specifications

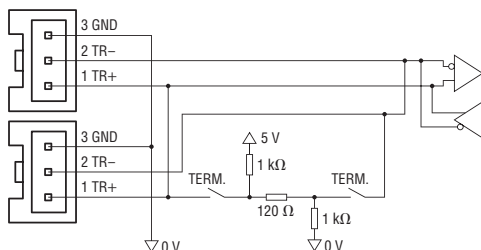
|                |                      |
|----------------|----------------------|
| Specifications | USB 2.0 (Full Speed) |
| Cable          | Length: 3 m max.     |
|                | Shape: A to mini-B   |

### RS-485 Communication Connector (CN5, CN6)

Connect the RS-485 communication cable to the CN5 connector or the CN6 connector on the driver. The vacant connector can be used to connect to a different driver. RS-485 communication cables for connection (sold separately) are available.



### Input Circuit and Sample Connection



| Pin No. | Signal Name | Descriptions                    |
|---------|-------------|---------------------------------|
| 1       | TR+         | RS-485 Communication Signal (+) |
| 2       | TR-         | RS-485 Communication Signal (-) |
| 3       | GND         | GND                             |

### ◇ Address Setting Switch (ID)

Set the address number (slave address) using the address setting switch. Set the address number (slave address) so that it does not overlap. Address number "0" is reserved by broadcast and should not be used.

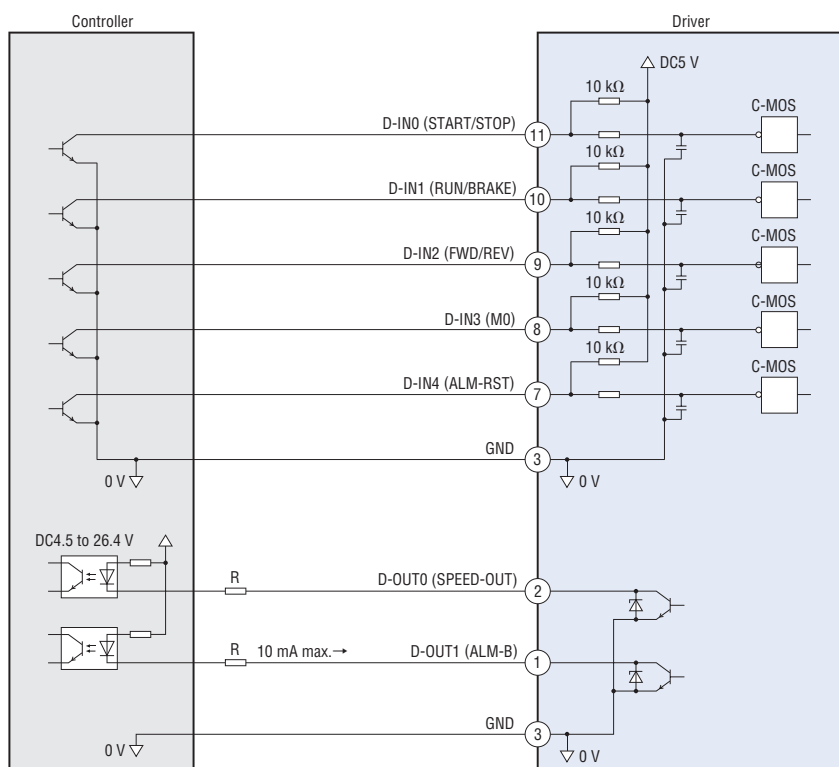
| ID Switch | Address Number      |
|-----------|---------------------|
| 0         | Not used            |
| 1         | 1 (Factory Setting) |
| 2         | 2                   |
| 3         | 3                   |
| 4         | 4                   |
| 5         | 5                   |
| 6         | 6                   |
| 7         | 7                   |

| ID Switch | Address Number |
|-----------|----------------|
| 8         | 8              |
| 9         | 9              |
| A         | 10             |
| B         | 11             |
| C         | 12             |
| D         | 13             |
| E         | 14             |
| F         | 15             |

### ● Connection Diagram

An example of I/O signal connection with the host controller is shown below.

Use a sink connection for the I/O signal connection method between the **BLH** Series RS-485 communication type and the host controller. (Source connection is not supported.)



#### Note

Make sure that the current value of the output signal is 10 mA or less. When the current value exceeds 10 mA, connect an external current limiting resistor R.

For detailed information and handling precautions of this product, see the Operation Manual. The Operation Manual is available for download from the Oriental Motor website.

## Installing a Load to the Hollow Shaft

### How to Install a Load Shaft

- Install the load shaft to the hollow output shaft by aligning the center of the hollow shaft with that of the load shaft.
- The hollow output shaft has a key slot. Machine a matching key slot on the load shaft and use the supplied key to affix the two shafts across the slots.
- The recommended tolerance of the load shaft is h7.
- If the motor is intended to receive large impacts due to frequent instantaneous stops or carry a large radial load, use a stepped load shaft.
- The load shaft can be installed from both the front and rear faces of the hollow shaft flat gearheads.

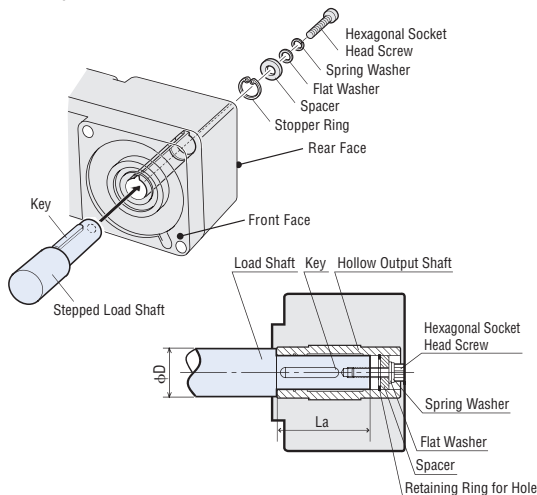
#### Note

- When installing the load shaft to the hollow output shaft, be careful not to damage the hollow output shaft or bearing.
- To prevent seizing, apply a coat of molybdenum disulfide grease on the exterior surface of the load shaft and interior surface of the hollow output shaft.
- Do not attempt to modify or machine the hollow output shaft. Doing so may damage the bearing and cause the hollow shaft flat gearhead to break.

### Stepped Load Shaft

Install a hexagonal socket head screw over a stopper ring, spacer, flat washer and spring washer and tighten the screw to affix the load shaft.

Example of Front Face Installation

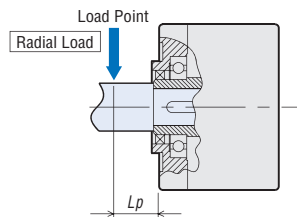


### Permissible Radial Load Calculation of the Hollow Shaft Type

The formula for permissible radial load varies depending on the mechanism.

#### When End of Shaft being Driven is Not Supported by a Bearing

This mechanism experiences the highest amount of radial load. The stepped type is recommended for the load shaft.



$F_0$  [N]: Permissible Radial Load at the Flange-Mounting Surface

$L_p$  [mm]: Distance from Flange-Mounting Surface to Radial Load Point

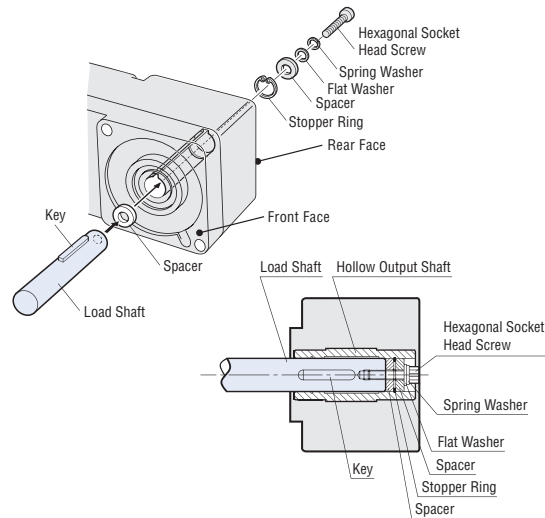
$B$  [mm]: Distance from Flange-Mounting Surface to Bearing Unit

| Product Name    | Permissible Radial Load $W$ [N]              |
|-----------------|----------------------------------------------|
| <b>GFS2G□FR</b> | $W [N] = \frac{36}{36 + L_p} \times F_0 [N]$ |
| <b>GFS4G□FR</b> | $W [N] = \frac{40}{40 + L_p} \times F_0 [N]$ |
| <b>GFS5G□FR</b> | $W [N] = \frac{50}{50 + L_p} \times F_0 [N]$ |

### Straight Load Shaft

Install a hexagonal socket head screw over a stopper ring, spacer, flat washer and spring washer, with a spacer also inserted underneath the load shaft, and tighten the screw to affix to the load shaft.

Example of Front Face Installation



### Recommended Load Shaft Installation Dimensions

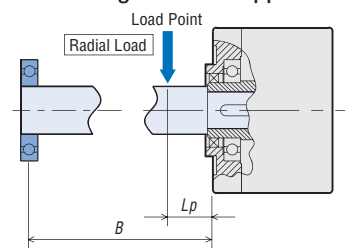
Unit: mm

| Product Name                             | GFS2G□FR                | GFS4G□FR                | GFS5G□FR                |
|------------------------------------------|-------------------------|-------------------------|-------------------------|
| Inner Diameter of Hollow Shaft (H8)      | $\phi 12^{+0.027}_0$    | $\phi 15^{+0.027}_0$    | $\phi 20^{+0.033}_0$    |
| Shaft Diameter of Load Shaft (h7)        | $\phi 12^{+0.018}_0$    | $\phi 15^{+0.018}_0$    | $\phi 20^{+0.021}_0$    |
| Screw Size                               | M4                      | M5                      | M6                      |
| Spacer Thickness*                        | 3                       | 4                       | 5                       |
| Nominal Hole Diameter of Retaining Ring  | $\phi 12$<br>(C-Shaped) | $\phi 15$<br>(C-Shaped) | $\phi 20$<br>(C-Shaped) |
| Outer Diameter of Stepped Shaft $\phi D$ | 20                      | 25                      | 30                      |
| Stepped Shaft $L_a$ Length               | 39                      | 43                      | 52                      |

\*Determine the spacer thickness in line with the table. If the spacer is thicker than the specified dimensions, the screw head may protrude outside of the gear case and the safety cover may not be installed.

- Retaining rings for holes, spacers, screws and other parts used to install the load shaft are not included. The customer must supply these.

#### When End of Shaft being Driven is Supported by a Bearing



| Product Name                                          | Permissible Radial Load $W$ [N]            |
|-------------------------------------------------------|--------------------------------------------|
| <b>GFS2G□FR</b><br><b>GFS4G□FR</b><br><b>GFS5G□FR</b> | $W [N] = \frac{B}{B - L_p} \times F_0 [N]$ |

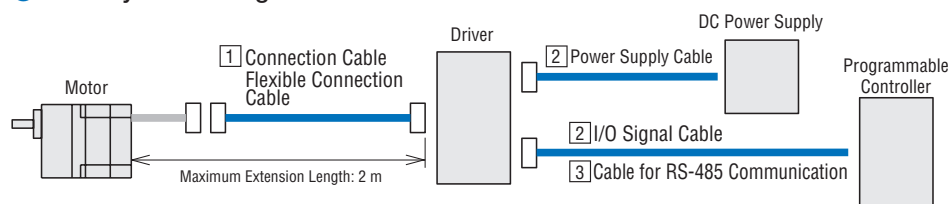
  

| Product Name    | Gear Ratio       | $F_0$ [N] |
|-----------------|------------------|-----------|
| <b>GFS2G□FR</b> | <b>5, 10</b>     | 570       |
|                 | <b>15 to 200</b> | 630       |
| <b>GFS4G□FR</b> | <b>5, 10</b>     | 1000      |
|                 | <b>15 to 200</b> | 1500      |
| <b>GFS5G□FR</b> | <b>5, 10</b>     | 1080      |
|                 | <b>15, 20</b>    | 1550      |
|                 | <b>30 to 200</b> | 1800      |

- A number indicating the gear ratio is specified where the box □ is located within the product name..

# Accessories (Sold Separately)

## Cable System Configuration



## 1 Connection Cables, Flexible Connection Cables

These cables are used to connect the motor and the driver. When using after extending the cables included with the product, the overall length of the cables should not exceed 2 m. Use the flexible connection cable in applications where the cable is bent and flexed.

### Product Line

#### Connection Cables

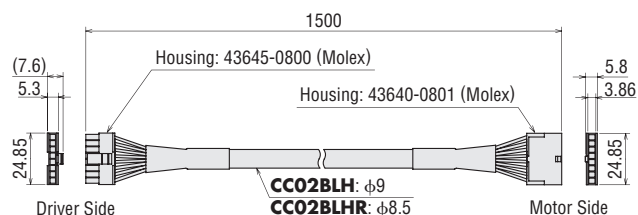



|                |                 |
|----------------|-----------------|
| <b>CC02BLH</b> | <b>CC02AXH2</b> |
|----------------|-----------------|

| Output Power [W] | Product Name    | Length [m] |
|------------------|-----------------|------------|
| 15               | <b>CC02BLH</b>  | 1.5        |
| 30               |                 |            |
| 50               |                 |            |
| 100              | <b>CC02AXH2</b> |            |

### Dimensions (Unit: mm)

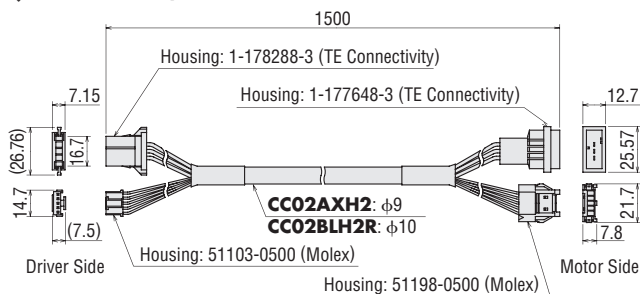
#### CC02BLH / CC02BLHR



#### Flexible Connection Cables

|  |  |            |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------|
| <b>CC02BLHR</b>                                                                   | <b>CC02BLH2R</b>                                                                   |            |
| Output Power [W]                                                                  | Product Name                                                                       | Length [m] |
| 15                                                                                | <b>CC02BLHR</b>                                                                    | 1.5        |
| 30                                                                                |                                                                                    |            |
| 50                                                                                |                                                                                    |            |
| 100                                                                               | <b>CC02BLH2R</b>                                                                   |            |

#### CC02AXH2 / CC02BLH2R



## 2 Power Supply Cable and I/O Signal Cable Set (For 15 W, 30 W, 50 W)

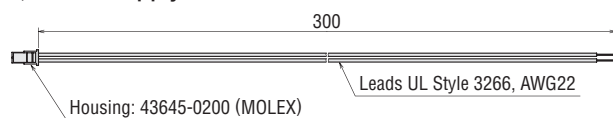
Power supply cable is used to connect the driver and the power supply. I/O signal cable is used to connect the driver and programmable controller. Cables come as a set of power supply cable and I/O signal cable.

### Product Line

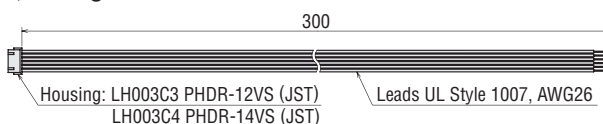
| I/O Signal Cable |                           |                 | Power Supply Cable |
|------------------|---------------------------|-----------------|--------------------|
| Length [m]       | Driver Type               | Product Name    |                    |
| 0.3              | Analogue Setting Type     | <b>LH5003CC</b> |                    |
|                  | RS-485 Communication Type | <b>LH5003CD</b> |                    |
|                  | Digital Setting Type      | <b>LH5003CC</b> |                    |
| 1                | Analogue Setting Type     | <b>LH5010CC</b> |                    |
|                  | RS-485 Communication Type | <b>LH5010CC</b> |                    |
|                  | Digital Setting Type      | <b>LH5010CD</b> |                    |

### Dimensions (Unit: mm)

#### Power Supply Cable



#### I/O Signal Cable



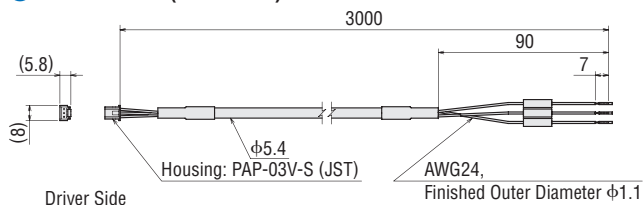
### 3 Cables for RS-485 Communication Set

This cable is used to connect the driver and the master device.



| Length [m] | Type                          | Product Name    |
|------------|-------------------------------|-----------------|
| 3          | For RS-485 Communication Type | <b>CC030-RS</b> |

#### ● Dimensions (Unit: mm)

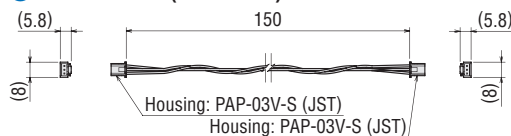


This cable is used to connect two drivers.



| Length [m] | Type                          | Product Name      |
|------------|-------------------------------|-------------------|
| 0.15       | For RS-485 Communication Type | <b>LH0015-RWN</b> |

#### ● Dimensions (Unit: mm)



### Flexible Couplings

This is a clamp type coupling for connecting the motor and gearhead shaft with a driven shaft.

- It can be used on a round shaft type as well.  
Please select a coupling with an inner diameter that matches the motor shaft's diameter.

#### ● MCL Couplings

| Applicable Product | Load Type    | Coupling Type |
|--------------------|--------------|---------------|
| <b>BLHM015</b>     | Uniform Load | <b>MCL20</b>  |
|                    | Impact Load  |               |
| <b>BLHM230</b>     | Uniform Load | <b>MCL30</b>  |
|                    | Impact Load  |               |
| <b>BLHM450</b>     | Uniform Load | <b>MCL40</b>  |
|                    | Impact Load  |               |
| <b>BLHM5100</b>    | Uniform Load | <b>MCL55</b>  |
|                    | Impact Load  |               |



### Motor / Gearhead Mounting Brackets

Dedicated mounting brackets are convenient for installing and securing motors and gearheads.



| Product Name  | Applicable Product                  |
|---------------|-------------------------------------|
| <b>SOL0B</b>  | <b>BLHM015K-□</b>                   |
| <b>SOL0M3</b> | <b>BLHM015K-A</b>                   |
| <b>SOL2M4</b> | <b>BLHM230KC □-□, BLHM230KC-A</b>   |
| <b>SOL4M6</b> | <b>BLHM450KC □-□, BLHM450KC-A</b>   |
| <b>SOL5M8</b> | <b>BLHM5100KC □-□, BLHM5100KC-A</b> |

- A number indicating the gear ratio is specified where the box □ is located in the product name.  
For the electromagnetic brake type **M** is entered where the box □ is located in the product code.

### DIN Rail Mounting Plates

Use these mounting plates to mount the driver to a DIN rail.

#### ● Product Line

| Product Name  | Applicable Product       |
|---------------|--------------------------|
| <b>MADP01</b> | 15 W, 30 W, 50 W Drivers |
| <b>MADP02</b> | 100 W Driver             |



### External Speed Potentiometer

#### ● Features

- A Potentiometer that can adjust speed and torque.
- Easy installation  
Simply insert it into the installation hole. It can also be removed easily.
- Easy wiring  
It uses terminal blocks. It requires no soldering for connecting lead wires. This improves the work efficiency of the wiring.



Front Face



Rear Face

#### ● Product Line

| Product Name     |
|------------------|
| <b>PAVR2-20K</b> |

The following items are included with the product. \_\_\_\_\_  
External Speed Potentiometer, Operating Manual

#### Note

- When connecting the potentiometer with an I/O signal cable, attach crimp terminals to the I/O signal cable.

#### ● Specifications

Resistance: 0 to 20 kΩ  
Rated Power: 0.05 W  
Resistance Variation Characteristics: B curve

- Applicable Lead Wire Size  
AWG22 to 16 (0.3 to 1.25 mm<sup>2</sup>)

## Related Products

### Brushless DC motor for DC power supply BLV Series

Battery-powered operation is possible and communication control is available.

- Output 200 W / 400 W
- Motor with electromagnetic brake available
- Supports battery power
- Supports software **MEXE02**
- Supports RS-485 communication



#### Safety Precautions

- To ensure correct operation, carefully read the Operating Manual before using it.
- The products listed in this catalogue are for industrial use and for built-in component. Do not use for any other applications.

- **Orientalmotor** is registered trademark or trademark of Oriental Motor in Japan and other countries.

# Orientalmotor

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

Specifications are subject to change without notice. This catalogue was published in June 2022.

#### ORIENTAL MOTOR (EUROPA) GmbH

[www.orientalmotor.de](http://www.orientalmotor.de)

##### European Headquarters

Schiesstraße 44  
40549 Düsseldorf, Germany  
Tel: 0211-520 670 0 Fax: 0211-520 670 99

##### Spanish Office

C/Caléndula 93 - Ed. E - Miniparc III  
28109 El Soto de La Moraleja,  
Alcobendas (Madrid), Spain  
Tel: +34 918 266 565  
[www.orientalmotor.es](http://www.orientalmotor.es)



#### ORIENTAL MOTOR (UK) LTD.

[www.oriental-motor.co.uk](http://www.oriental-motor.co.uk)

##### UK Headquarters

Unit 5, Faraday Office Park,  
Rankine Road, Basingstoke,  
Hampshire RG24 8AH, U.K.  
Tel: 01256-347 090 Fax: 01256-347 099



#### ORIENTAL MOTOR SWITZERLAND AG

[www.orientalmotor.ch](http://www.orientalmotor.ch)

##### Switzerland Headquarters

Badenerstrasse 13  
5200 Brugg AG, Switzerland  
Tel: 056-560 504 5 Fax: 056-560 504 7



#### ORIENTAL MOTOR ITALIA s.r.l.

[www.orientalmotor.it](http://www.orientalmotor.it)

##### Italy Headquarters

Via XXV Aprile 5  
20016 Pero (MI), Italy  
Tel: 02-939 063 46 Fax: 02-939 063 48



#### ORIENTAL MOTOR (FRANCE) SARL

[www.orientalmotor.fr](http://www.orientalmotor.fr)

##### France Headquarters

56, Rue des Hautes Pâtures  
92000 Nanterre, France  
Tel: 01-478 697 50 Fax: 01-478 245 16



For more information please contact: