# Ezi-SPEED®

## BLDC Motor Speed Control System

- AC Input (110V, 220V) BLDC Motor Speed Control System
- Wide Speed Control Range(50~4000rpm)
- Stable Speed Control by Vector Control(Speed Regulation 0.2%)
- Stable Low Speed(50rpm) by Velocity Observer
- High Efficiency with Low Heat Generation
- Easy Speed Control, Easy Wiring and Connecting(Front Panel and I/O)
- Product Line-Up : 30, 60, 120, 200, 400W


CE

FASTECH

Fast, Accurate, Smooth Motion

FASTECH

*Fast, Accurate, Smooth Motion*

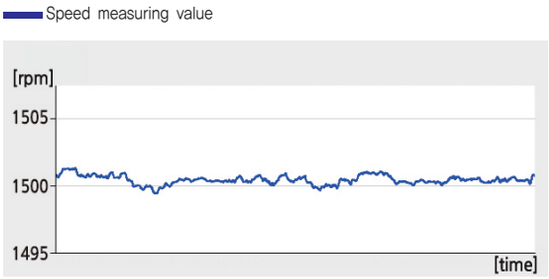
# Ezi-SPEED®

## BLDC Motor Speed Control System

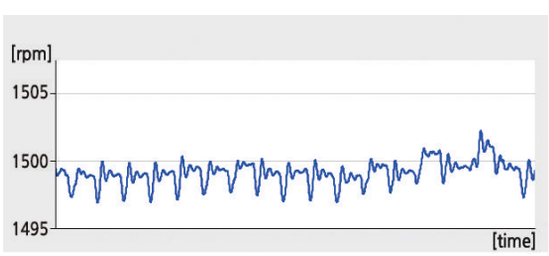
## 1 Stable Speed Control

### (Speed Regulation 0.2%)

Ezi-SPEED compares the setting speed with the speed feedback signals from the motor at all time, and adjusts the motor current using vector control algorithm. So, even if the load changes, stable rotation is maintained from low speed to high speed. Inverter controlled AC induction motor does not perform feedback control, so the speed will be reduced significantly when load increases.
Ezi-SPEED is recommended for applications that require stable speed.




Ezi-SPEED 120W




Inverter + AC induction motor 100W

* Load factor: 95%  * Setting speed: 1,500 [rpm]
* Resolution of external encoder for measuring velocity ripple : 32,000 [ppr]

## 2 Wide Speed Control Range

### (Speed Ratio: 1:80)

Ezi-SPEED has wide speed control range compared to AC induction motor with inverter. Because torque is not restricted at low speed, Ezi-SPEED is recommended for application that requires stable torque over from low to high speed.

| Product | Speed Control Range | Speed Ratio |
|---|---|---|
| Ezi-SPEED | 50~4,000 [rpm] | 1:80 |
| Inverter + AC induction motor | 200~2,400 [rpm] | 1:12 |

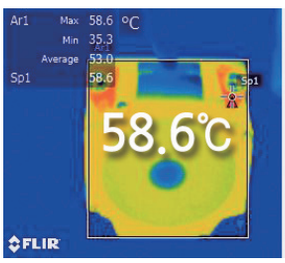
* Speed range of Inverter + AC induction motor varies depending on model type.

## 3 High Efficiency

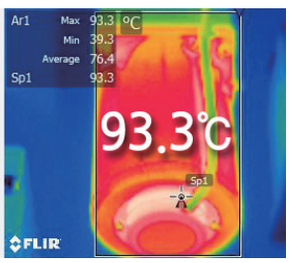
### (Energy Savings)

Unlike AC induction motors, BLDC motors use permanent magnets in the rotor so that it could prevent secondary loss from rotor.
Therefore, BLDC motors has higher efficiency than inverter controlled AC induction motor so that customers can save energy.

- Load factor : 100%, Setting speed: 1,500 [rpm]
- Comparison of motor temperature after 4 hours continuous operation.




Ezi-SPEED 60W




AC Induction Motor 60W

## 4 Compact, Light Weight, High Power

Compared to AC induction motor, BLDC motor has compact size, light weight and high power because of the permanent magnets in the rotor.


Ezi-SPEED 60W


AC Induction Motor 60W

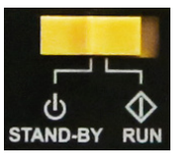
## 5 Easy Wiring

The motor and sensor connector can be easily connected to drive. There is no need for soldering or special tools when connecting the power and I/O cables. For power connector, just insert the lead wire and fix using screw driver. For IO connector, just insert the lead wire while pushing the orange button.

Motor Connector Wiring

## 6 Easy to Use

(Front Panel)




• Control of Operation and Stop

The motor starts when switch is in the "RUN" position, and stops after deceleration when it is moved to the "STAND-BY" position.


• Control of rotation direction

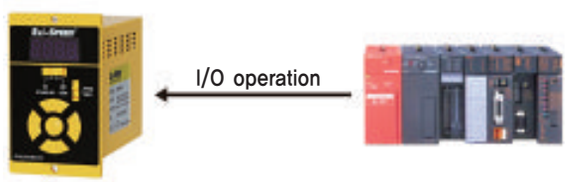
Changing the rotation direction is possible with the rotation direction switch. Changing the rotation to Forward or Reverse direction.

• Control of Speed

The speed control buttons allow you to use simple speed control and many functions. Pushing + button increases the speed and pushing − button reduces the speed. When the desired speed is reached, simply push the S button to set the speed value.

## 7 Operation by External I/O

External I/O can control Start/Stop, Changing rotation direction and Multi speed operation.




Ezi-SPEED PLC

## 8 Display Load Factor and Actual Speed

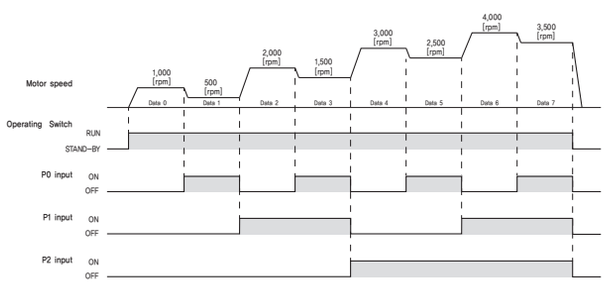
Load factor is displayed as percentage like 100% for rated torque. User can check the load during operating the motor and can maintain the motor in optimal condition by checking load changes due to the secular change. Also the actual speed can be displayed.
(Motor speed, Gearbox speed, Linear speed)


Indication at load factor of 100%


Actual speed at setting speed of 1,500 [rpm]

## 9 8-Speed Settings

8 steps speed operation can be done by setting No.0 ~ No.7 data using inputs P0, P1, P2. We can do this only with Ezi-SPEED without any extra controller.




## 10 Various Functions can be Set on the Drive

- Motor Start/Stop
- Setting the operation speed
- Changing the rotation direction
- Changing the indication
- Operation speed indication when the speed decreasing or increasing ratio is set
- Setting the acceleration/deceleration time
- Button operation lock
- Speed setting for 8-speed operation
- Speed limits setting
- Validating the external operation signals
- External I/O signal allocation
- Setting the overload alarm detection time

## 11 Lock the Setting and Operation

- Ezi-SPEED provides a lock function to prevents the unwanted changes in the speed. We can not change speed or data when it is in lock state.

- **Activating the lock function**

  Press the button for 5 seconds or more when "STAND-BY" mode.
  When "LOCK" appears, the lock function is activated.

- **Deactivationg the lock function**

  Press the button for 5 seconds or more.
  When "UnLk" appears, the lock function is cancelled.

## 12 Protection Function

- Ezi-SPEED detect abnormal situations like overload, over voltage etc. When this happens, the operation is stopped and alarm is displayed.

- A regenerative resistor can be used when the deceleration time is short or when the large inertia load is used. Also the protection function can be activated for the excessive external force acting on the motor shaft.

## ● Ezi-SPEED Part Numbering

**Ezi-SPEED-60-H-30-C-R5-P**

**Product Name**

**Motor Flange Size**

60 : 61×61mm
80 : 81×81mm
90 : 90×90mm
104 : 104.5×104.5mm

**Gearbox Size**

60 : 60×60mm
80 : 80×80mm
90 : 90×90mm
104 : 110×110mm

**Hollow Shaft Gearbox size**

60 : 60×120.5mm
80 : 80×160.5mm
90 : 90×180mm
104 : Not applicable

**Shaft Figuration**

S : Straight
H : High Strength

**Output Power**

30 : 30W
60 : 60W
120 : 120W
200 : 200W
400 : 400W

**Power Supply Voltage**

A : Single-Phase 100~120V
C : Single-Phase, Three-Phase 200~240V

**Gear Ratio**

Blank – Without Gear
R5 – 1:5
R10 – 1:10
R15 – 1:15
R20 – 1:20
R30 – 1:30
R50 – 1:50
R100 – 1:100
R200 – 1:200

**Gearbox**

Blank – Without Gear
P – Parallel Gearbox
H – Hollow Shaft Gearbox

## ● Standard Combination

| Output Power | Unit Part Number | Motor Model Number | Drive Model Number |
|---|---|---|---|
| 30W | Ezi-SPEED-60-S-30-A | ESM-60-S-30 | ESD-30-A |
| | Ezi-SPEED-60-S-30-C | | ESD-30-C |
| 60W | Ezi-SPEED-80-S-60-A | ESM-80-S-60 | ESD-60-A |
| | Ezi-SPEED-80-S-60-C | | ESD-60-C |
| 120W | Ezi-SPEED-90-S-120-A | ESM-90-S-120 | ESD-120-A |
| | Ezi-SPEED-90-S-120-C | | ESD-120-C |
| 200W | Ezi-SPEED-104-S-200-C | ESM-104-S-200 | ESD-200-C |
| 400W | Ezi-SPEED-104-S-400-C | ESM-104-S-400 | ESD-400-C |

## ● Combination with Gearbox

| Output Power | Unit Part Number | Motor Model Number | Drive Model Number | Gearbox Model Number | Gear Ratio |
|---|---|---|---|---|---|
| 30W | Ezi-SPEED-60-H-30-A-R5-P | ESM-60-H-30 | ESD-30-A | ESG-60-H-R5-P | 1:5 |
| | Ezi-SPEED-60-H-30-C-R5-P | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R5-H | | ESD-30-A | ESG-60-H-R5-H | |
| | Ezi-SPEED-60-H-30-C-R5-H | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R10-P | | ESD-30-A | ESG-60-H-R10-P | 1:10 |
| | Ezi-SPEED-60-H-30-C-R10-P | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R10-H | | ESD-30-A | ESG-60-H-R10-H | |
| | Ezi-SPEED-60-H-30-C-R10-H | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R15-P | | ESD-30-A | ESG-60-H-R15-P | 1:15 |
| | Ezi-SPEED-60-H-30-C-R15-P | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R15-H | | ESD-30-A | ESG-60-H-R15-H | |
| | Ezi-SPEED-60-H-30-C-R15-H | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R20-P | | ESD-30-A | ESG-60-H-R20-P | 1:20 |
| | Ezi-SPEED-60-H-30-C-R20-P | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R20-H | | ESD-30-A | ESG-60-H-R20-H | |
| | Ezi-SPEED-60-H-30-C-R20-H | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R30-P | | ESD-30-A | ESG-60-H-R30-P | 1:30 |
| | Ezi-SPEED-60-H-30-C-R30-P | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R30-H | | ESD-30-A | ESG-60-H-R30-H | |
| | Ezi-SPEED-60-H-30-C-R30-H | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R50-P | | ESD-30-A | ESG-60-H-R50-P | 1:50 |
| | Ezi-SPEED-60-H-30-C-R50-P | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R50-H | | ESD-30-A | ESG-60-H-R50-H | |
| | Ezi-SPEED-60-H-30-C-R50-H | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R100-P | | ESD-30-A | ESG-60-H-R100-P | 1:100 |
| | Ezi-SPEED-60-H-30-C-R100-P | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-A-R100-H | | ESD-30-A | ESG-60-H-R100-H | |
| | Ezi-SPEED-60-H-30-C-R100-H | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-C-R200-P | | ESD-30-A | ESG-60-H-R200-P | 1:200 |
| | Ezi-SPEED-60-H-30-C-R200-P | | ESD-30-C | | |
| | Ezi-SPEED-60-H-30-C-R200-H | | ESD-30-A | ESG-60-H-R200-H | |
| | Ezi-SPEED-60-H-30-C-R200-H | | ESD-30-C | | |

## ● Combination with Gearbox

| Output Power | Unit Part Number | Motor Model Number | Drive Model Number | Gearbox Model Number | Gear Ratio |
|---|---|---|---|---|---|
| 60W | Ezi-SPEED-80-H-60-A-R5-P | ESM-80-H-60 | ESD-60-A | ESG-80-H-R5-P | 1:5 |
| | Ezi-SPEED-80-H-60-C-R5-P | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R5-H | | ESD-60-A | ESG-80-H-R5-H | |
| | Ezi-SPEED-80-H-60-C-R5-H | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R10-P | | ESD-60-A | ESG-80-H-R10-P | 1:10 |
| | Ezi-SPEED-80-H-60-C-R10-P | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R10-H | | ESD-60-A | ESG-80-H-R10-H | |
| | Ezi-SPEED-80-H-60-C-R10-H | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R15-P | | ESD-60-A | ESG-80-H-R15-P | 1:15 |
| | Ezi-SPEED-80-H-60-C-R15-P | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R15-H | | ESD-60-A | ESG-80-H-R15-H | |
| | Ezi-SPEED-80-H-60-C-R15-H | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R20-P | | ESD-60-A | ESG-80-H-R20-P | 1:20 |
| | Ezi-SPEED-80-H-60-C-R20-P | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R20-H | | ESD-60-A | ESG-80-H-R20-H | |
| | Ezi-SPEED-80-H-60-C-R20-H | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R30-P | | ESD-60-A | ESG-80-H-R30-P | 1:30 |
| | Ezi-SPEED-80-H-60-C-R30-P | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R30-H | | ESD-60-A | ESG-80-H-R30-H | |
| | Ezi-SPEED-80-H-60-C-R30-H | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R50-P | | ESD-60-A | ESG-80-H-R50-P | 1:50 |
| | Ezi-SPEED-80-H-60-C-R50-P | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R50-H | | ESD-60-A | ESG-80-H-R50-H | |
| | Ezi-SPEED-80-H-60-C-R50-H | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R100-P | | ESD-60-A | ESG-80-H-R100-P | 1:100 |
| | Ezi-SPEED-80-H-60-C-R100-P | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R100-H | | ESD-60-A | ESG-80-H-R100-H | |
| | Ezi-SPEED-80-H-60-C-R100-H | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R200-P | | ESD-60-A | ESG-80-H-R200-P | 1:200 |
| | Ezi-SPEED-80-H-60-C-R200-P | | ESD-60-C | | |
| | Ezi-SPEED-80-H-60-A-R200-H | | ESD-60-A | ESG-80-H-R200-H | |
| | Ezi-SPEED-80-H-60-C-R200-H | | ESD-60-C | | |
| 120W | Ezi-SPEED-90-H-120-A-R5-P | ESM-90-H-120 | ESD-120-A | ESG-90-H-R5-P | 1:5 |
| | Ezi-SPEED-90-H-120-C-R5-P | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R5-H | | ESD-120-A | ESG-90-H-R5-H | |
| | Ezi-SPEED-90-H-120-C-R5-H | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R10-P | | ESD-120-A | ESG-90-H-R10-P | 1:10 |
| | Ezi-SPEED-90-H-120-C-R10-P | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R10-H | | ESD-120-A | ESG-90-H-R10-H | |
| | Ezi-SPEED-90-H-120-C-R10-H | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R15-P | | ESD-120-A | ESG-90-H-R15-P | 1:15 |
| | Ezi-SPEED-90-H-120-C-R15-P | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R15-H | | ESD-120-A | ESG-90-H-R15-H | |
| | Ezi-SPEED-90-H-120-C-R15-H | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R20-P | | ESD-120-A | ESG-90-H-R20-P | 1:20 |
| | Ezi-SPEED-90-H-120-C-R20-P | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R20-H | | ESD-120-A | ESG-90-H-R20-H | |
| | Ezi-SPEED-90-H-120-C-R20-H | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R30-P | | ESD-120-A | ESG-90-H-R30-P | 1:30 |
| | Ezi-SPEED-90-H-120-C-R30-P | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R30-H | | ESD-120-A | ESG-90-H-R30-H | |
| | Ezi-SPEED-90-H-120-C-R30-H | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R50-P | | ESD-120-A | ESG-90-H-R50-P | 1:50 |
| | Ezi-SPEED-90-H-120-C-R50-P | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R50-H | | ESD-120-A | ESG-90-H-R50-H | |
| | Ezi-SPEED-90-H-120-C-R50-H | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R100-P | | ESD-120-A | ESG-90-H-R100-P | 1:100 |
| | Ezi-SPEED-90-H-120-C-R100-P | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R100-H | | ESD-120-A | ESG-90-H-R100-H | |
| | Ezi-SPEED-90-H-120-C-R100-H | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R200-P | | ESD-120-A | ESG-90-H-R200-P | 1:200 |
| | Ezi-SPEED-90-H-120-C-R200-P | | ESD-120-C | | |
| | Ezi-SPEED-90-H-120-A-R200-H | | ESD-120-A | ESG-90-H-R200-H | |
| | Ezi-SPEED-90-H-120-C-R200-H | | ESD-120-C | | |

| Output Power | Unit Part Number | Motor Model Number | Drive Model Number | Gearbox Model Number | Gear Ratio |
|---|---|---|---|---|---|
| 200W | Ezi-SPEED-104-H-200-C-R5-P | ESM-104-H-200 | ESD-200-C | ESG-104-H-R5-P | 1:5 |
| | Ezi-SPEED-104-H-200-C-R10-P | | | ESG-104-H-R10-P | 1:10 |
| | Ezi-SPEED-104-H-200-C-R15-P | | | ESG-104-H-R15-P | 1:15 |
| | Ezi-SPEED-104-H-200-C-R20-P | | | ESG-104-H-R20-P | 1:20 |
| | Ezi-SPEED-104-H-200-C-R30-P | | | ESG-104-H-R30-P | 1:30 |
| | Ezi-SPEED-104-H-200-C-R50-P | | | ESG-104-H-R50-P | 1:50 |
| | Ezi-SPEED-104-H-200-C-R100-P | | | ESG-104-H-R100-P | 1:100 |
| | Ezi-SPEED-104-H-200-C-R200-P | | | ESG-104-H-R200-P | 1:200 |
| 400W | Ezi-SPEED-104-H-400-C-R5-P | ESM-104-H-400 | ESD-400-C | ESG-104-H-R5-P | 1:5 |
| | Ezi-SPEED-104-H-400-C-R10-P | | | ESG-104-H-R10-P | 1:10 |
| | Ezi-SPEED-104-H-400-C-R15-P | | | ESG-104-H-R15-P | 1:15 |
| | Ezi-SPEED-104-H-400-C-R20-P | | | ESG-104-H-R20-P | 1:20 |
| | Ezi-SPEED-104-H-400-C-R30-P | | | ESG-104-H-R30-P | 1:30 |
| | Ezi-SPEED-104-H-400-C-R50-P | | | ESG-104-H-R50-P | 1:50 |
| | Ezi-SPEED-104-H-400-C-R100-P | | | ESG-104-H-R100-P | 1:100 |
| | Ezi-SPEED-104-H-400-C-R200-P | | | ESG-104-H-R200-P | 1:200 |

# ● Specifications of Drive

## 1. Input Voltage 110V Specifications

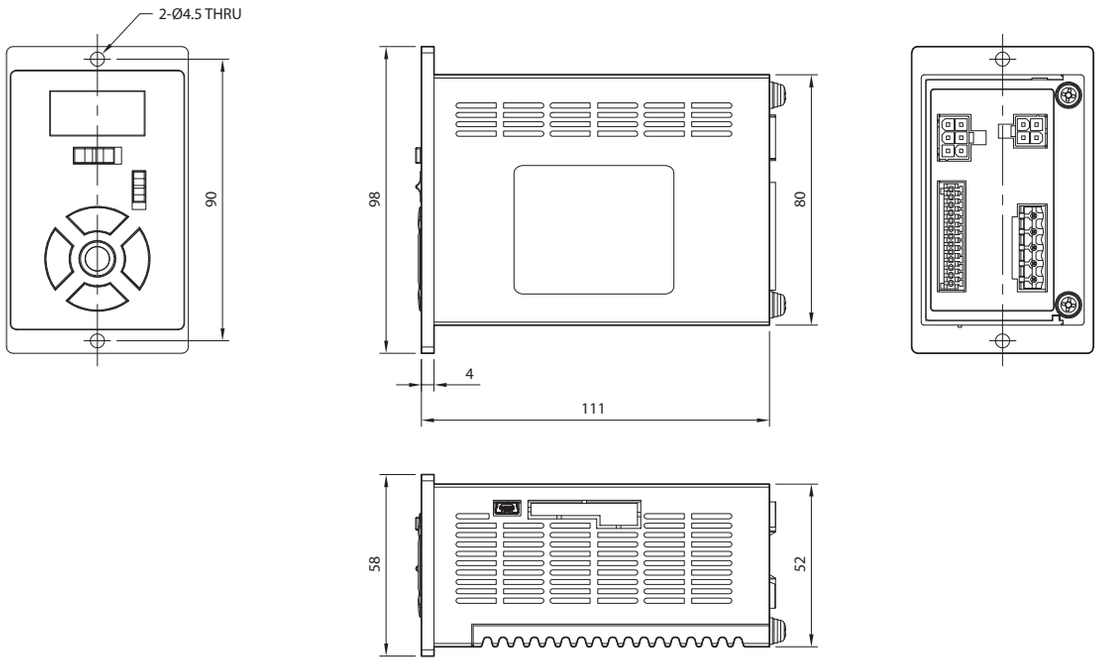
| Unit Part Number | | ESD-30-A | ESD-60-A | ESD-120-A |
|---|---|---|---|---|
| Rated Output Power | | 30W | 60W | 120W |
| Power Supply Input | Rated Voltage | Single-Phase 100~120V | | |
| | Frequency | 50/60Hz | | |
| | Permissible Frequency Range | ±5% | | |
| | Rated Input Current | 0.95A | 1.56A | 2.69A |
| | Maximum Input Current | 2.85A | 4.68A | 8.07A |
| Rated Output Current | | 0.21A | 0.36A | 0.85A |
| Rated Torque | | 0.096N·m | 0.192N·m | 0.382N·m |
| Maximum instantaneous Torque | | 0.288N·m | 0.576N·m | 1.146N·m |
| Rated Speed | | 3,000 [rpm] | | |
| Speed Control Range | | 50~4,000 [rpm] | | |
| Speed Regulation | | 0.2% or less / Conditions: 0~Rated Torque, Rated Speed, Rated Voltage, normal Temperature | | |
| Protection Functions | | Under voltage Error, Over voltage Error, Over heat Error, Over current Error, Speed feedback Error, Sensor Error, Over speed Error, Over load Error, Operation at power-on Error, External Error | | |
| Environment | Temperature | · In Use: 0~40℃<br>· In Storage: -20~70℃ | | |
| | Humidity | · In Use: 35~85% RH (Non-Condensing)<br>· In Storage: 10~90% RH (Non-Condensing) | | |
| | Vibration resistant | 0.5g | | |
| I/O Signal | Input Signal Function | 5 user inputs (Photocoupler) | | |
| | Output Signal Function | 3 user outputs (Photocoupler) | | |

## 2. Input Voltage 220V Specifications

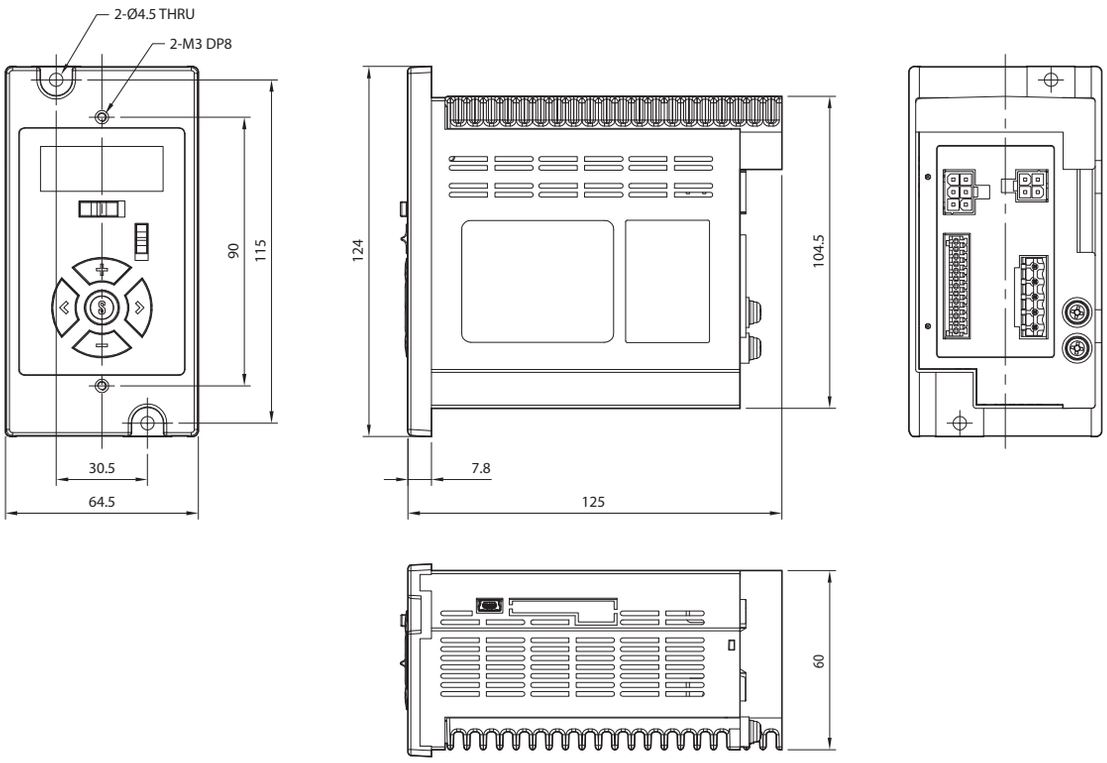
| Unit Part Number | | ESD-30-C | ESD-60-C | ESD-120-C | ESD-200-C | ESD-400-C |
|---|---|---|---|---|---|---|
| Rated Output Power | | 30W | 60W | 120W | 200W | 400W |
| Power Supply Input | Rated Voltage | Single-Phase 200~240V / Three-Phase 200~240V | | | | |
| | Frequency | 50/60Hz | | | | |
| | Permissible Frequency Range | ±5% | | | | |
| | Rated Input Current | Single-Phase : 0.55A<br>Three-Phase : 0.32A | Single-Phase : 0.92A<br>Three-Phase : 0.53A | Single-Phase : 1.61A<br>Three-Phase : 0.93A | Single-Phase : 2.34A<br>Three-Phase : 1.35A | Single-Phase : 3.88A<br>Three-Phase : 2.24A |
| | Maximum Input Current | Single-Phase : 1.65A<br>Three-Phase : 0.95A | Single-Phase : 2.76A<br>Three-Phase : 1.59A | Single-Phase : 4.83A<br>Three-Phase : 2.79A | Single-Phase : 7.02A<br>Three-Phase : 4.05A | Single-Phase : 11.64A<br>Three-Phase : 6.72A |
| Rated Output Current | | 0.21A | 0.36A | 0.85A | 1.65A | 2.37A |
| Rated Torque | | 0.096N·m | 0.192N · m | 0.382N · m | 0.637N · m | 1.272N · m |
| Maximum instantaneous Torque | | 0.288N · m | 0.576N · m | 1.146N · m | 1.911N · m | 3.816N · m |
| Rated Speed | | 3,000 [rpm] | | | | |
| Speed Control Range | | 50~4,000 [rpm] | | | | |
| Speed Regulation | | 0.2% or less / Conditions: 0~Rated Torque, Rated Speed, Rated Voltage, normal Temperature | | | | |
| Protection Functions | | Under voltage Error, Over voltage Error, Over heat Error, Over current Error, Speed feedback Error, Sensor Error, Over speed Error, Over load Error, Operation at power-on Error, External Error | | | | |
| Environment | Temperature | · In Use: 0~40℃<br>· In Storage: -20~70℃ | | | | |
| | Humidity | · In Use: 35~85% RH (Non-Condensing)<br>· In Storage: 10~90% RH (Non-Condensing) | | | | |
| | Vibration resistant | 0.5g | | | | |
| I/O Signal | Input Signal Function | 5 user inputs (Photocoupler) | | | | |
| | Output Signal Function | 3 user outputs (Photocoupler) | | | | |

## ● Dimensions of Drive [mm]

### 1. 30, 60, 120W Drive




### 2. 200, 400W Drive

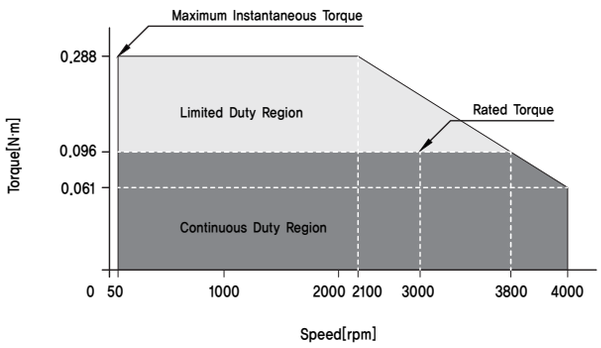


## ● Specifications of Motor

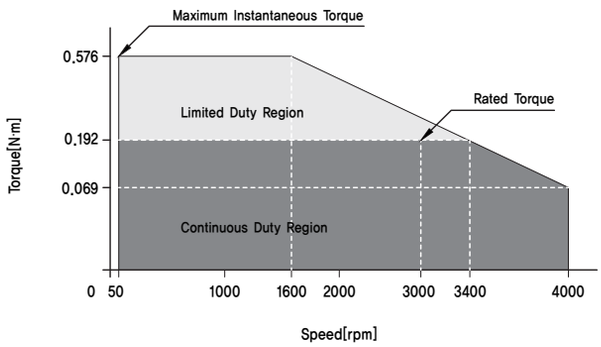
| MODEL | UNIT | ESM-60-S-30 | ESM-80-S-60 | ESM-90-S-120 | ESM-104-S-200 | ESM-104-S-400 |
|---|---|---|---|---|---|---|
| RATED OUTPUT POWER (CONTINUOUS) | W | 30 | 60 | 120 | 200 | 400 |
| RATED TORQUE | N·m | 0.096 | 0.192 | 0.382 | 0.637 | 1.272 |
| RATED INPUT CURRENT | A | 0.21 | 0.36 | 0.85 | 1.65 | 2.37 |
| RATED SPEED | rpm | 3,000 | | | | |
| PERMISSIBLE LOAD INERTIA MOMENT | $10^{-4}$kg·m$^2$ | 0.5 | 1.8 | 5.8 | 5.8 | 8.75 |
| INERTIA MOMENT | $10^{-4}$kg·m$^2$ | 0.086 | 0.234 | 0.61 | 0.61 | 0.66 |
| WEIGHT | kg | 0.5 | 0.8 | 1.3 | 2.4 | 2.4 |
| LENGTH(L) | mm | 62 | 74 | 94 | 156 | 156 |
| PERMISSIBLE OVERHUNG LOAD | 10mm from shaft end [N] | 70 | 120 | 160 | 160 | 160 |
| | 20mm from shaft end [N] | 100 | 140 | 170 | 170 | 170 |

# Torque Characteristics of Motor

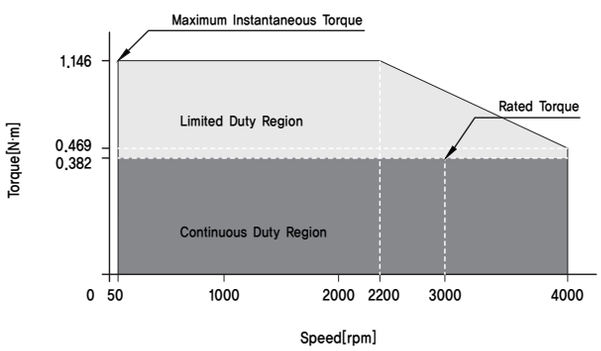
## Ezi-SPEED-30W



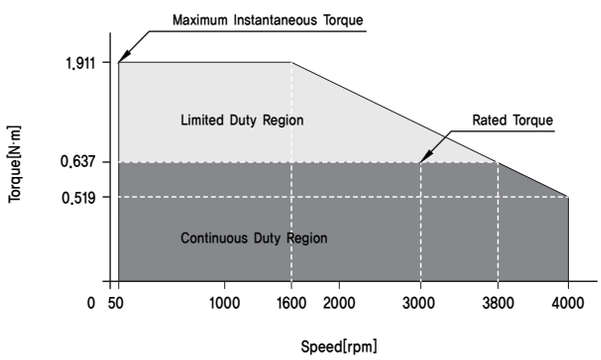

## Ezi-SPEED-60W



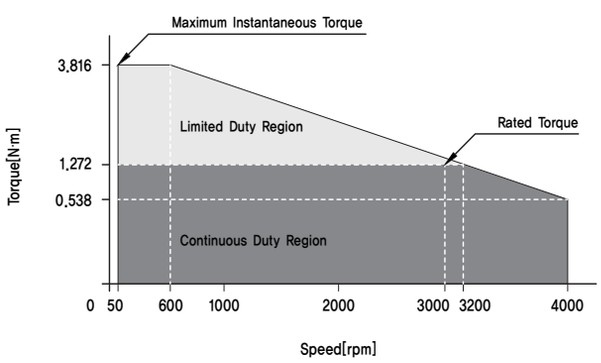

## Ezi-SPEED-120W



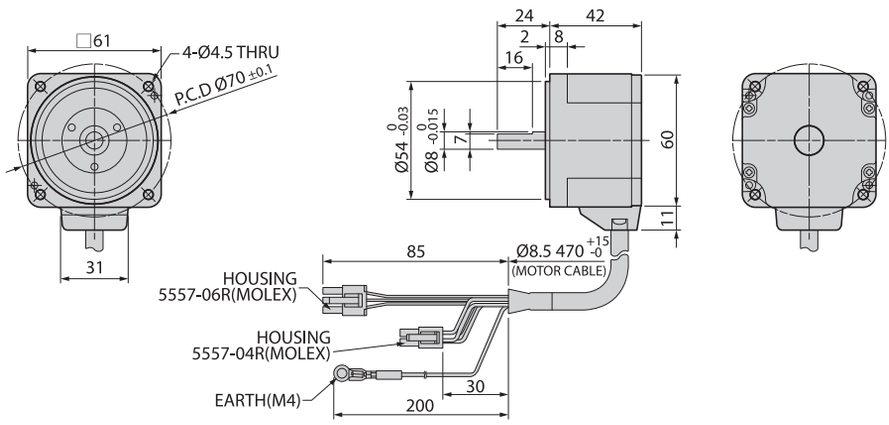

## Ezi-SPEED-200W



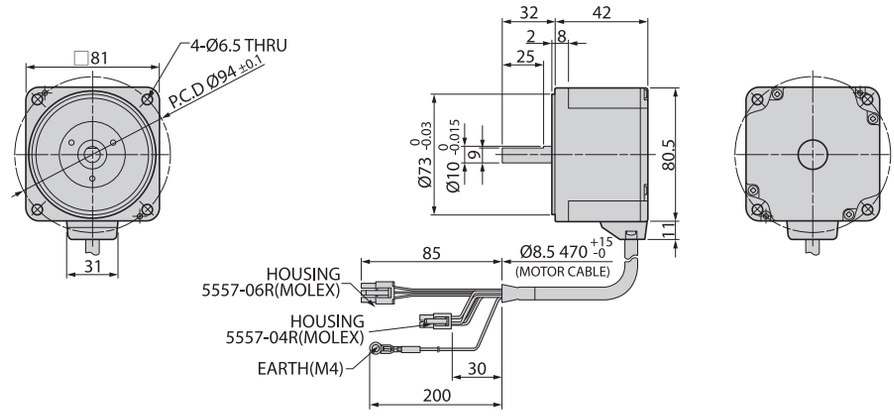

## Ezi-SPEED-400W



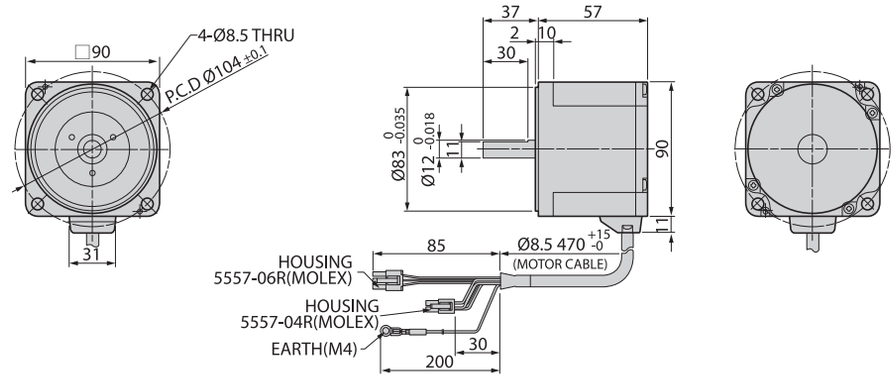
## ● Dimensions of Motor [mm]




**30W**
***ESM-60-S-30***

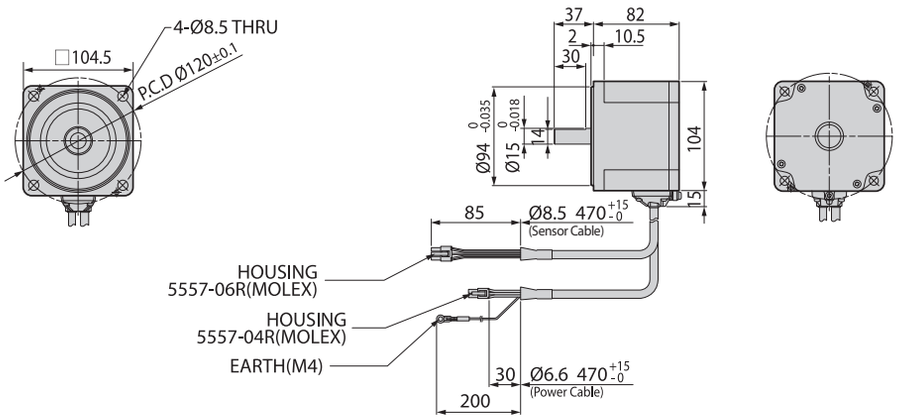



**60W**
***ESM-80-S-60***

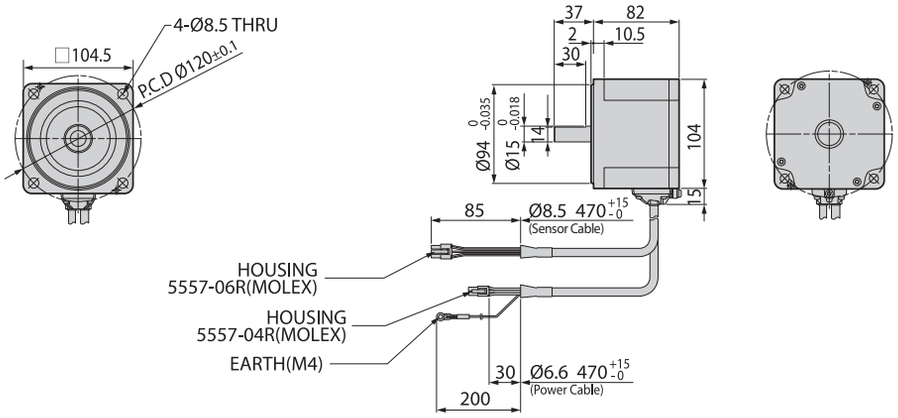



**120W**
***ESM-90-S-120***

## ● Dimensions of Motor [mm]




**200W**
**ESM-104-S-200**




**400W**
**ESM-104-S-400**

## ● Specifications of Motor with Gearbox

# 30w

| Unit Part Number | Gear Ratio | Permitted Torque [N·m] | | Permitted Speed Range [rpm] | Unit Weight [kg] | Permitted Overhung Load [N] | | Permitted Thrust Load [N] |
|---|---|---|---|---|---|---|---|---|
| | | 50~3,000 [rpm] | 4,000 [rpm] | | | 10mm from shaft end | 20mm from shaft end | |
| Ezi-SPEED-60-H-30-A-R5-P | 5 | 0.45 | 0.34 | 10~800 | 0.9 | 100 | 150 | 40 |
| Ezi-SPEED-60-H-30-C-R5-P | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R10-P | 10 | 0.9 | 0.68 | 5~400 | | 150 | 200 | |
| Ezi-SPEED-60-H-30-C-R10-P | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R15-P | 15 | 1.35 | 1 | 3.3~266.7 | | | | |
| Ezi-SPEED-60-H-30-C-R15-P | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R20-P | 20 | 1.8 | 1.4 | 2.5~200 | | | | |
| Ezi-SPEED-60-H-30-C-R20-P | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R30-P | 30 | 2.6 | 1.9 | 1.7~133.3 | | 200 | 300 | |
| Ezi-SPEED-60-H-30-C-R30-P | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R50-P | 50 | 4.3 | 3.2 | 1~80 | | | | |
| Ezi-SPEED-60-H-30-C-R50-P | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R100-P | 100 | 6 | 5.4 | 0.5~40 | | | | |
| Ezi-SPEED-60-H-30-C-R100-P | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R200-P | 200 | 6 | 5.4 | 0.25~20 | | | | |
| Ezi-SPEED-60-H-30-C-R200-P | | | | | | | | |

# 60w

| Unit Part Number | Gear Ratio | Permitted Torque [N·m] | | Permitted Speed Range [rpm] | Unit Weight [kg] | Permitted Overhung Load [N] | | Permitted Thrust Load [N] |
|---|---|---|---|---|---|---|---|---|
| | | 50~3,000 [rpm] | 4,000 [rpm] | | | 10mm from shaft end | 20mm from shaft end | |
| Ezi-SPEED-80-H-60-A-R5-P | 5 | 0.9 | 0.68 | 10~800 | 1.6 | 200 | 250 | 100 |
| Ezi-SPEED-80-H-60-C-R5-P | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R10-P | 10 | 1.8 | 1.4 | 5~400 | | 300 | 350 | |
| Ezi-SPEED-80-H-60-C-R10-P | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R15-P | 15 | 2.7 | 2 | 3.3~266.7 | | | | |
| Ezi-SPEED-80-H-60-C-R15-P | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R20-P | 20 | 3.6 | 2.7 | 2.5~200 | | | | |
| Ezi-SPEED-80-H-60-C-R20-P | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R30-P | 30 | 5.2 | 3.9 | 1.7~133.3 | | 150 | 550 | |
| Ezi-SPEED-80-H-60-C-R30-P | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R50-P | 50 | 8.6 | 6.5 | 1~80 | | | | |
| Ezi-SPEED-80-H-60-C-R50-P | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R100-P | 100 | 16 | 12.9 | 0.5~40 | | | | |
| Ezi-SPEED-80-H-60-C-R100-P | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R200-P | 200 | 16 | 14 | 0.25~20 | | | | |
| Ezi-SPEED-80-H-60-C-R200-P | | | | | | | | |

## ● Specifications of Motor with Gearbox

# 120w

| Unit Part Number | Gear Ratio | Permitted Torque [N·m] | | Permitted Speed Range [rpm] | Unit Weight [kg] | Permitted Overhung Load [N] | | Permitted Thrust Load [N] |
|---|---|---|---|---|---|---|---|---|
| | | 50~3,000 [rpm] | 4,000 [rpm] | | | 10mm from shaft end | 20mm from shaft end | |
| Ezi-SPEED-90-H-120-A-R5-P | 5 | 1.8 | 1.4 | 10~800 | 2.7 | 300 | 400 | 150 |
| Ezi-SPEED-90-H-120-C-R5-P | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R10-P | 10 | 3.6 | 2.7 | 5~400 | | 400 | 500 | |
| Ezi-SPEED-90-H-120-C-R10-P | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R15-P | 15 | 5.4 | 4.1 | 3.3~266.7 | | | | |
| Ezi-SPEED-90-H-120-C-R15-P | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R20-P | 20 | 7.2 | 5.4 | 2.5~200 | | | | |
| Ezi-SPEED-90-H-120-C-R20-P | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R30-P | 30 | 10.3 | 7.7 | 1.7~133.3 | | 500 | 650 | |
| Ezi-SPEED-90-H-120-C-R30-P | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R50-P | 50 | 17.2 | 12.9 | 1~80 | | | | |
| Ezi-SPEED-90-H-120-C-R50-P | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R100-P | 100 | 30 | 25.8 | 0.5~40 | | | | |
| Ezi-SPEED-90-H-120-C-R100-P | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R200-P | 200 | 30 | 27 | 0.25~20 | | | | |
| Ezi-SPEED-90-H-120-C-R200-P | | | | | | | | |

# 200w

| Unit Part Number | Gear Ratio | Permitted Torque [N·m] | | Permitted Speed Range [rpm] | Unit Weight [kg] | Permitted Overhung Load [N] | | Permitted Thrust Load [N] |
|---|---|---|---|---|---|---|---|---|
| | | 50~3,000 [rpm] | 4,000 [rpm] | | | 10mm from shaft end | 20mm from shaft end | |
| Ezi-SPEED-104-H-200-C-R5-P | 5 | 2.9 | 2 | 10~800 | 4.2 | 300 | 400 | 150 |
| Ezi-SPEED-104-H-200-C-R10-P | 10 | 5.9 | 4.1 | 5~400 | | 400 | 500 | |
| Ezi-SPEED-104-H-200-C-R15-P | 15 | 8.8 | 6.1 | 3.3~266.7 | | | | |
| Ezi-SPEED-104-H-200-C-R20-P | 20 | 11.7 | 8.1 | 2.5~200 | | | | |
| Ezi-SPEED-104-H-200-C-R30-P | 30 | 16.8 | 11.6 | 1.7~133.3 | | 500 | 650 | |
| Ezi-SPEED-104-H-200-C-R50-P | 50 | 28 | 19.4 | 1~80 | | | | |
| Ezi-SPEED-104-H-200-C-R100-P | 100 | 52.7 | 36.5 | 0.5~40 | | | | |
| Ezi-SPEED-104-H-200-C-R200-P | 200 | 70 | 63 | 0.25~20 | | | | |

## ● Specifications of Motor with Gearbox

# 400w

| Unit Part Number | Gear Ratio | Permitted Torque [N·m] | | Permitted Speed Range [rpm] | Unit Weight [kg] | Permitted Overhung Load [N] | | Permitted Thrust Load [N] |
|---|---|---|---|---|---|---|---|---|
| | | 50~3,000 [rpm] | 4,000 [rpm] | | | 10mm from shaft end | 20mm from shaft end | |
| Ezi-SPEED-104-H-400-C-R5-P | 5 | 5.9 | 4.3 | 10~800 | 4.2 | 300 | 400 | 150 |
| Ezi-SPEED-104-H-400-C-R10-P | 10 | 11.7 | 8.6 | 5~400 | | 400 | 500 | |
| Ezi-SPEED-104-H-400-C-R15-P | 15 | 17.6 | 12.8 | 3.3~266.7 | | | | |
| Ezi-SPEED-104-H-400-C-R20-P | 20 | 23.4 | 17.1 | 2.5~200 | | | | |
| Ezi-SPEED-104-H-400-C-R30-P | 30 | 33.5 | 24.5 | 1.7~133.3 | | 500 | 650 | |
| Ezi-SPEED-104-H-400-C-R50-P | 50 | 55.9 | 40.9 | 1~80 | | | | |
| Ezi-SPEED-104-H-400-C-R100-P | 100 | 70 | 63 | 0.5~40 | | | | |
| Ezi-SPEED-104-H-400-C-R200-P | 200 | 70 | 63 | 0.25~20 | | | | |

## ● Specifications of Motor with Hollow Shaft Gearbox

# 30w

| Unit Part Number | Gear Ratio | Permitted Torque [N·m] | | Permitted Speed Range [rpm] | Unit Weight [kg] | Permitted Overhung Load [N] | | Permitted Thrust Load [N] |
|---|---|---|---|---|---|---|---|---|
| | | 50~3,000 [rpm] | 4,000 [rpm] | | | 10mm from shaft end | 20mm from shaft end | |
| Ezi-SPEED-60-H-30-A-R5-H | 5 | 0.4 | 0.3 | 10~800 | 1.2 | 450 | 370 | 200 |
| Ezi-SPEED-60-H-30-C-R5-H | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R10-H | 10 | 0.85 | 0.64 | 5~400 | | 500 | 400 | |
| Ezi-SPEED-60-H-30-C-R10-H | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R15-H | 15 | 1.3 | 0.96 | 3.3~266.7 | | | | |
| Ezi-SPEED-60-H-30-C-R15-H | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R20-H | 20 | 1.7 | 1.3 | 2.5~200 | | | | |
| Ezi-SPEED-60-H-30-C-R20-H | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R30-H | 30 | 2.6 | 1.9 | 1.7~133.3 | | | | |
| Ezi-SPEED-60-H-30-C-R30-H | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R50-H | 50 | 4.3 | 3.2 | 1~80 | | | | |
| Ezi-SPEED-60-H-30-C-R50-H | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R100-H | 100 | 8.5 | 6.4 | 0.5~40 | | | | |
| Ezi-SPEED-60-H-30-C-R100-H | | | | | | | | |
| Ezi-SPEED-60-H-30-A-R200-H | 200 | 17 | 12.8 | 0.25~20 | | | | |
| Ezi-SPEED-60-H-30-C-R200-H | | | | | | | | |

# 60w

| Unit Part Number | Gear Ratio | Permitted Torque [N·m] | | Permitted Speed Range [rpm] | Unit Weight [kg] | Permitted Overhung Load [N] | | Permitted Thrust Load [N] |
|---|---|---|---|---|---|---|---|---|
| | | 50~3,000 [rpm] | 4,000 [rpm] | | | 10mm from shaft end | 20mm from shaft end | |
| Ezi-SPEED-80-H-60-A-R5-H | 5 | 0.85 | 0.64 | 10~800 | 2.2 | 800 | 660 | 400 |
| Ezi-SPEED-80-H-60-C-R5-H | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R10-H | 10 | 1.7 | 1.3 | 5~400 | | 1,200 | 1,000 | |
| Ezi-SPEED-80-H-60-C-R10-H | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R15-H | 15 | 2.6 | 1.9 | 3.3~266.7 | | | | |
| Ezi-SPEED-80-H-60-C-R15-H | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R20-H | 20 | 3.4 | 2.6 | 2.5~200 | | | | |
| Ezi-SPEED-80-H-60-C-R20-H | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R30-H | 30 | 5.1 | 3.8 | 1.7~133.3 | | | | |
| Ezi-SPEED-80-H-60-C-R30-H | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R50-H | 50 | 8.5 | 6.4 | 1~80 | | | | |
| Ezi-SPEED-80-H-60-C-R50-H | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R100-H | 100 | 17 | 12.8 | 0.5~40 | | | | |
| Ezi-SPEED-80-H-60-C-R100-H | | | | | | | | |
| Ezi-SPEED-80-H-60-A-R200-H | 200 | 34 | 25 | 0.25~20 | | | | |
| Ezi-SPEED-80-H-60-C-R200-H | | | | | | | | |

## ● Specifications of Motor with Hollow Shaft Gearbox

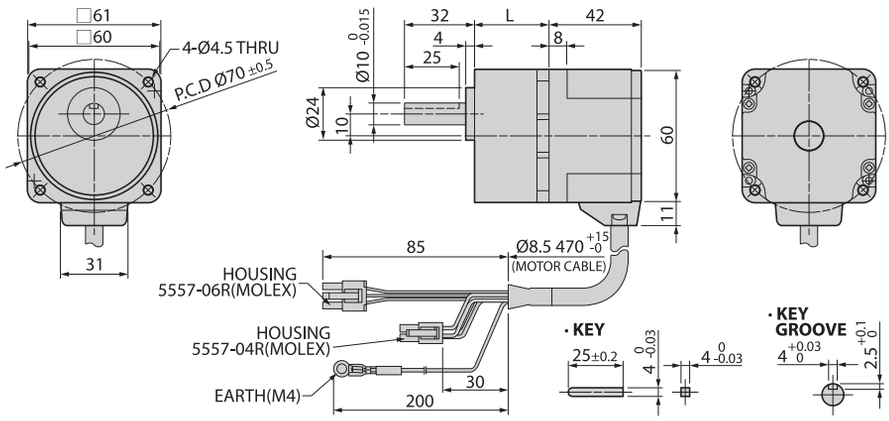
# 120w

| Unit Part Number | Gear Ratio | Permitted Torque [N·m] | | Permitted Speed Range [rpm] | Unit Weight [kg] | Permitted Overhung Load [N] | | Permitted Thrust Load [N] |
|---|---|---|---|---|---|---|---|---|
| | | 50~3,000 [rpm] | 4,000 [rpm] | | | 10mm from shaft end | 20mm from shaft end | |
| Ezi-SPEED-90-H-120-A-R5-H | 5 | 1.7 | 1.3 | 10~800 | 3.3 | 900 | 770 | 500 |
| Ezi-SPEED-90-H-120-C-R5-H | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R10-H | 10 | 3.4 | 2.6 | 5~400 | | 1,300 | 1,110 | |
| Ezi-SPEED-90-H-120-C-R10-H | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R15-H | 15 | 5.1 | 3.8 | 3.3~266.7 | | | | |
| Ezi-SPEED-90-H-120-C-R15-H | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R20-H | 20 | 6.8 | 5.1 | 2.5~200 | | | | |
| Ezi-SPEED-90-H-120-C-R20-H | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R30-H | 30 | 10.2 | 7.7 | 1.7~133.3 | | 1,500 | 1,280 | |
| Ezi-SPEED-90-H-120-C-R30-H | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R50-H | 50 | 17 | 12.8 | 1~80 | | | | |
| Ezi-SPEED-90-H-120-C-R50-H | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R100-H | 100 | 34 | 25.5 | 0.5~40 | | | | |
| Ezi-SPEED-90-H-120-C-R100-H | | | | | | | | |
| Ezi-SPEED-90-H-120-A-R200-H | 200 | 68 | 51 | 0.25~20 | | | | |
| Ezi-SPEED-90-H-120-C-R200-H | | | | | | | | |

## ● Dimensions of Motor with Gearbox [mm]

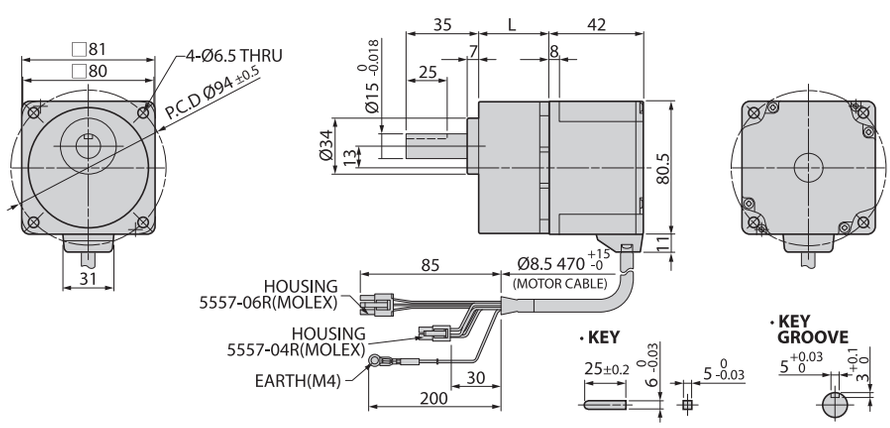
# 30W

| Unit Part Number | Gearbox Part Number | □Reduction Gear Ratio | Mounting Bolt | L Length [mm] |
|---|---|---|---|---|
| Ezi-SPEED-60-H-30-A-R□-P<br>Ezi-SPEED-60-H-30-C-R□-P | ESG-60-H-R□-P | 5, 10, 15, 20 | M4×50 | 34 |
| | | 30, 50, 100 | M4×55 | 38 |
| | | 200 | M4×60 | 43 |




# 60W

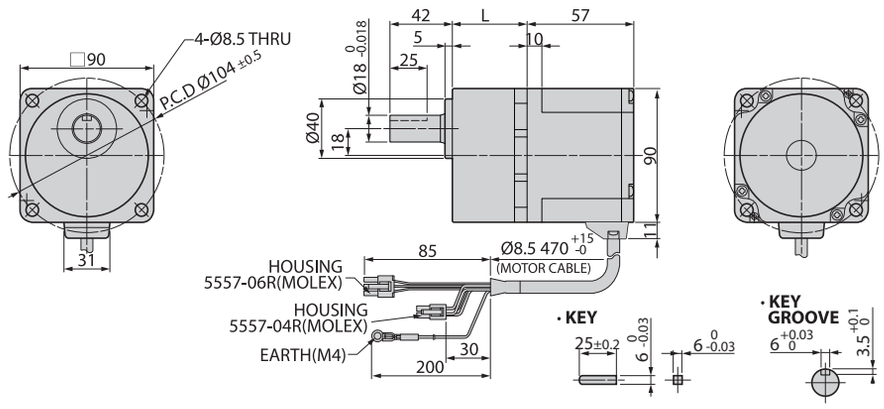
| Unit Part Number | Gearbox Part Number | □Reduction Gear Ratio | Mounting Bolt | L Length [mm] |
|---|---|---|---|---|
| Ezi-SPEED-80-H-60-A-R□-P<br>Ezi-SPEED-80-H-60-C-R□-P | ESG-80-H-R□-P | 5, 10, 15, 20 | M4×65 | 41 |
| | | 30, 50, 100 | M4×70 | 46 |
| | | 200 | M4×75 | 51 |



## ● Dimensions of Motor with Gearbox [mm]

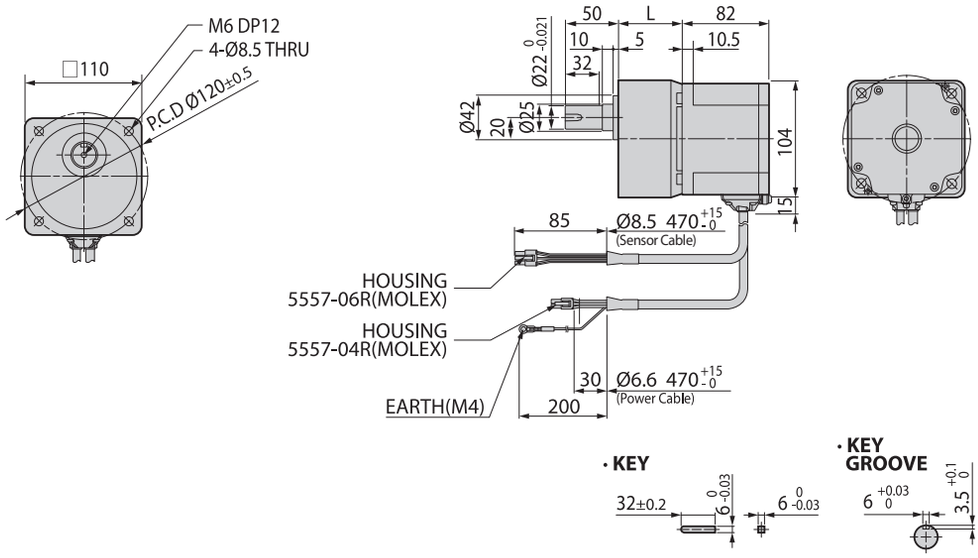
# 120w

| Unit Part Number | Gearbox Part Number | □Reduction Gear Ratio | Mounting Bolt | L Length [mm] |
|---|---|---|---|---|
| Ezi-SPEED-90-H-120-A-R□-P<br>Ezi-SPEED-90-H-120-C-R□-P | ESG-90-H-R□-P | 5, 10, 15, 20 | M8×75 | 45 |
| | | 30, 50, 100 | M8×90 | 58 |
| | | 200 | M8×95 | 64 |




# 200w

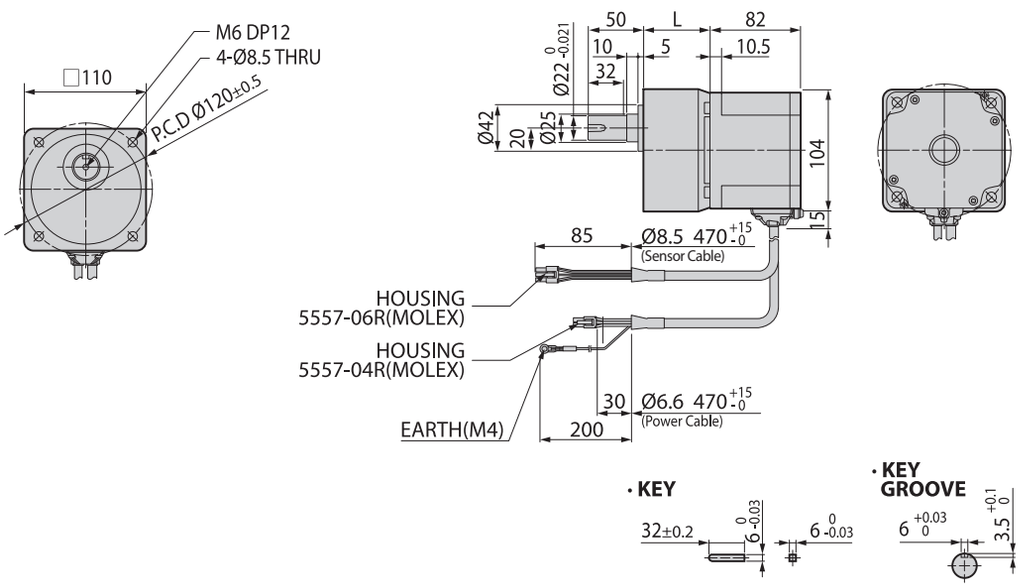
| Unit Part Number | Gearbox Part Number | □Reduction Gear Ratio | Mounting Bolt | L Length [mm] |
|---|---|---|---|---|
| Ezi-SPEED-104-H-200-C-R□-P | ESG-104-H-R□-P | 5, 10, 15, 20 | M8×95 | 60 |
| | | 30, 50, 100 | M8×110 | 72 |
| | | 200 | M8×120 | 86 |



## ● Dimensions of Motor with Gearbox [mm]

# 400w

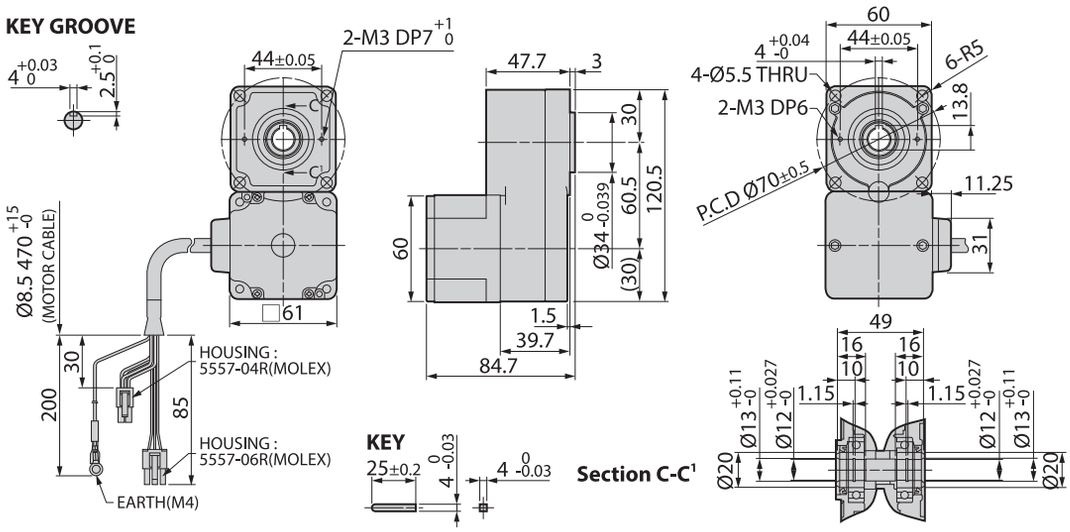
| Unit Part Number | Gearbox Part Number | □Reduction Gear Ratio | Mounting Bolt | L Length [mm] |
|---|---|---|---|---|
| Ezi-SPEED-104-H-400-C-R□-P | ESG-104-H-R□-P | 5, 10, 15, 20 | M8×95 | 60 |
| | | 30, 50, 100 | M8×110 | 72 |
| | | 200 | M8×120 | 86 |



## ● Dimensions of Motor with Hollow shaft Gearbox [mm]

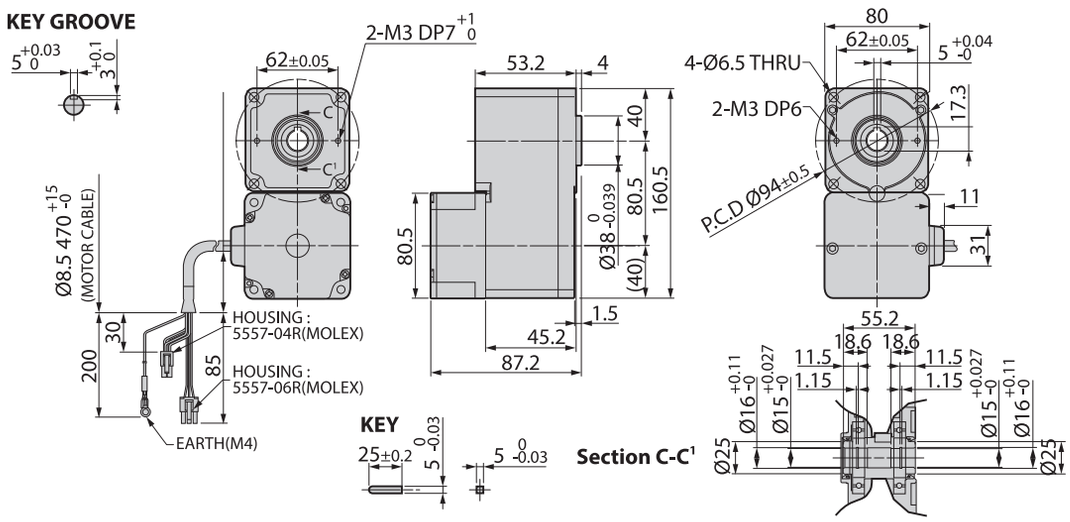
# 30W

| Unit Part Number | Gearbox Part Number | □Reduction Gear Ratio | Mounting Bolt |
|---|---|---|---|
| Ezi-SPEED-60-H-30-A-R□-H<br>Ezi-SPEED-60-H-30-C-R□-H | ESG-60-H-R□-H | 5, 10, 15, 20, 30, 50, 100, 200 | M5×65 |




# 60W

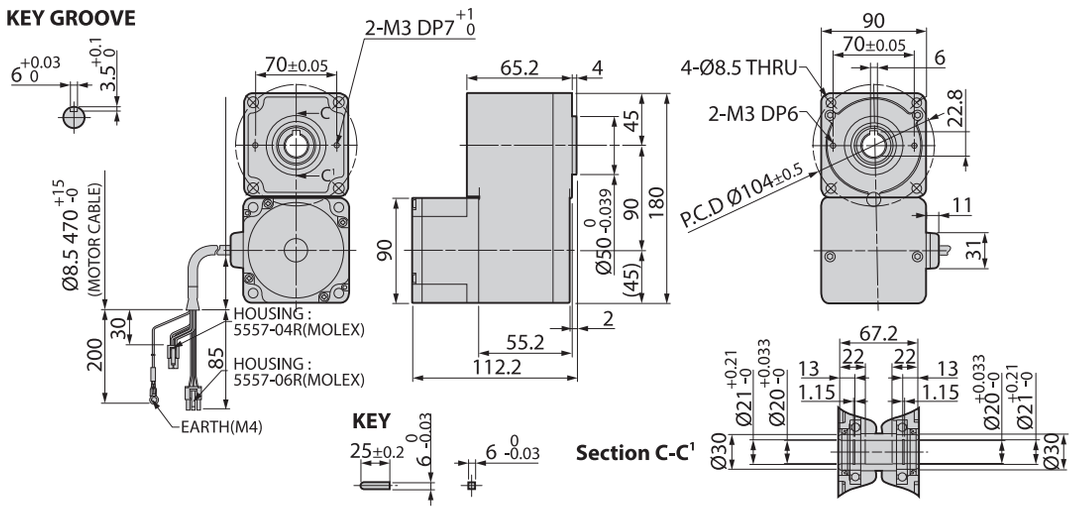
| Unit Part Number | Gearbox Part Number | □Reduction Gear Ratio | Mounting Bolt |
|---|---|---|---|
| Ezi-SPEED-80-H-60-A-R□-H<br>Ezi-SPEED-80-H-60-C-R□-H | ESG-80-H-R□-H | 5, 10, 15, 20, 30, 50, 100, 200 | M6×70 |



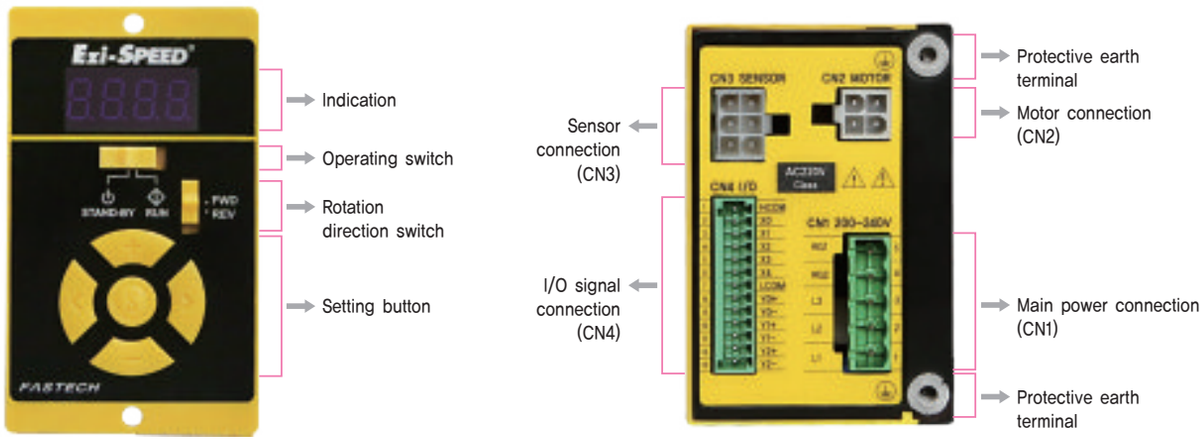
## ● Dimensions of Motor with Hollow shaft Gearbox [mm]

# 120w

| Unit Part Number | Gearbox Part Number | □Reduction Gear Ratio | Mounting Bolt |
|---|---|---|---|
| Ezi-SPEED-90-H-120-A-R□-H<br>Ezi-SPEED-90-H-120-C-R□-H | ESG-90-H-R□-H | 5, 10, 15, 20, 30, 50, 100, 200 | M8×90 |



# ● Settings and Operation




## 1. Setting

| Indication | Conditions |
|---|---|
| Indication | Display the monitoring items, parameter, alarm, warning, etc |
| Operating Switch | The motor is started by setting it to the "RUN" position<br>Setting it to the "STAND-BY" position stop the motor |
| Rotation Direction Switch | Change the rotation direction of the motor with rotation direction switch |
| Setting Button | Changes the speed and parameters<br>The value is set when the "S" button is pressed after changes are made |
| Protective Earth Terminal | Ground either one of the protective earth terminals |
| Sensor Connection (CN3) | Connects to the signal Connection of the motor |
| Motor Connection (CN2) | Connects to the power Connection of the motor |
| I/O Signal Connection (CN4) | Connects with the I/O signals |
| Main Power Connection (CN1) | Connects to the main power supply and regenerative resistor |

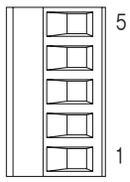
### • Extended Functions

Ezi-SPEED can be perform various setting by operation button

| Operating Mode | Conditions |
|---|---|
| Monitor Mode | Speed, Actual speed, Load factor, Alarm record and reset, Warning record and reset, Operating data number, I/O monitor |
| Data Mode | Data 8 points, Operating speed, Acceleration time, Deceleration time, Operating data reset |
| Parameter Mode | The acceleration/deceleration time, The overload alarm detection time, The speed upper limit and lower limit, Speed reduction ratio, Speed increasing ratio, Panel initial view, Alarm of "Run" condition at power on, External operation signal input, External input function, External output function, Speed attainment width, Parameter mode reset |
| NVM Saving Mode | Parameter save to NVM(Non-Volatile Memory) |

## 2. Main Power Connector(CN1)

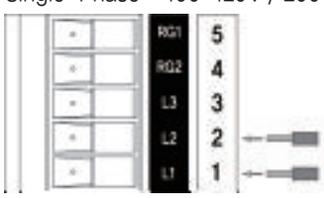
| NO. | Function | I/O |
|---|---|---|
| 1 | L1 | Input |
| 2 | L2 | Input |
| 3 | L3 | Input |
| 4 | RG2 | Input |
| 5 | RG1 | Input |




* Use RG1, RG2 terminals when connecting a regenerative resistor. A regenerative resistor can be used when the deceleration time is short or large inertia is used.
* Please refer to the manual for details of regenerative resister specification.

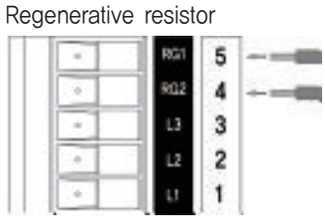
### • Main Power Connection(CN1)

Single-Phase : 100-120V / 200-240V




Three-Phase : 200-240V


Regenerative resistor

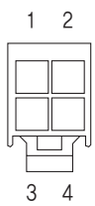



### • Applicable Lead Wire Size

AWG18~14 (0.75~2.0mm$^2$)

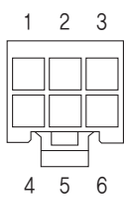
## 3. Motor Connector(CN2)

| NO. | Function | I/O |
|---|---|---|
| 1 | – | – |
| 2 | BLDC_U | Output |
| 3 | BLDC_W | Output |
| 4 | BLDC_V | Output |



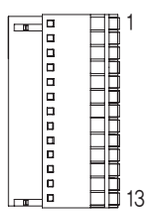

## 4. Sensor Connector(CN3)

| NO. | Function | I/O |
|---|---|---|
| 1 | 5VDC | Output |
| 2 | GND | – |
| 3 | GND | Output |
| 4 | HALL_U | Input |
| 5 | HALL_V | Input |
| 6 | HALL_W | Input |




## 5. I/O Signal Connector(CN4)

| NO. | Function | I/O |
|---|---|---|
| 1 | HCOM | Common |
| 2 | X0 | Input |
| 3 | X1 | Input |
| 4 | X2 | Input |
| 5 | X3 | Input |
| 6 | X4 | Input |
| 7 | LCOM | Common |
| 8 | Y0+ | Output |
| 9 | Y0– | Output |
| 10 | Y1+ | Output |
| 11 | Y1– | Output |
| 12 | Y2+ | Output |
| 13 | Y2– | Output |




### • Applicable Lead Wire Size

AWG26~20 (0.14~0.5mm$^2$)

## 6. Operating with Drive


• Running the motor

Set the operation switch to the "RUN", the motor to start rotating.

• Adjust the speed

Pressing the + button, the speed increase by 1 [rpm]
Pressing the − button, the speed decrease by 1 [rpm]

• Determining the speed

· Set
Pressing the S button, the rotation speed is determined.
When the display is blinking, the rotation speed has not set.

· Confirmation
To prevent unwanted changes of the speed, press S
for 5 seconds until "LOCK" displayed in the STAND–BY mode.

• Stopping the motor

Setting the operation switch to the "STAND–BY" side causes the motor to decelerate to a stop.
Setting the operation switch again to the "RUN" side causes the motor to start rotating at the set rotation speed.

• Changing the rotation direction

Change the rotation direction of the motor (gearbox) using the rotation direction switch. The rotation direction can be changed while operating. With the combination type, the rotation direction of the gearbox output shaft varies depending on the rear ratio of the gearbox.

## 7. Operation by I/O Signals

### • Operation Method

- Using the built-in power supply in the driver, the motor is operated through external signals.
- Connect Pins the I/O signal connector as in the figure of the right.
- When operating using external signals, change the parameter setting in the "external operation signal input" to "on". Refer to Manual.
- Using the external I/O signals, the motor can be operated 8-Speeds data.

| Pin No. | Terminal Name | Input/Output | Signal Name | Description |
|---|---|---|---|---|
| 1 | HCOM | Common | - | Input signal common: Sink Logic +24V, Source Logic 0V(GND) |
| 2 | X0 | Input | FWd | The motor rotates is FWD direction during signal "ON" |
| 3 | X1 | Input | rEv | The motor rotates is REV direction during signal "ON" |
| 4 | X2 | Input | P0 | Select the operating data |
| 5 | X3 | Input | P1 | Select the operating data |
| 6 | X4 | Input | A.rSt | Reset the alarm |
| 7 | LCOM | Common | - | Input signal common |
| 8 | Y0+ | Output | SPd | For every rotation of the motor, 30 pulses are output |
| 9 | Y0- | Output | | |
| 10 | Y1+ | Output | AL.on | It turns off when an alarm is generated (Normally closed) |
| 11 | Y1- | Output | | |
| 12 | Y2+ | Output | nouE | It turns on when the motor is operated (Normally opened) |
| 13 | Y2- | Output | | |

※ [ ] Function in [ ] is assigned at shipment

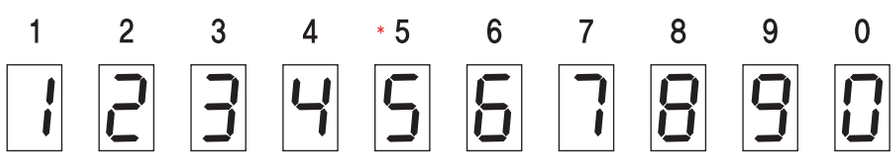
※ Can be assigned required functions to 5 input signals(X0~X4) and 3 output signals(Y0~Y2)

- Input signals: Can be used 5 functions out of FWd(CW rotation), rEv(CCW rotation), P0(Operation data 1), P1(Operation data 2), P2(Operation data 2), A.rst(Alarm reset), E.Err(External alarm), H-Fr(Motor activation/deactivation)
- Output signals: Can be used 3 functions out of SPd(Speed output), AL.on(Alarm output), AL.ov(Overvoltage alarm output), OvLd(Overload alarm output), Mov(Motor operation output), vA(Speed attainment alarm), WnG(Warning alarm)

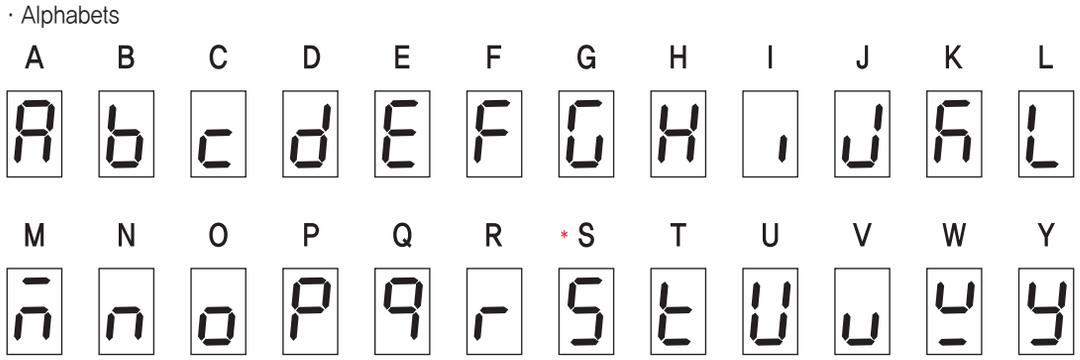
### • Reading of 7-Segment

Can read the Arabic numerals and alphabets displayed on the 7-segemant as follows.

- Arabic numerals



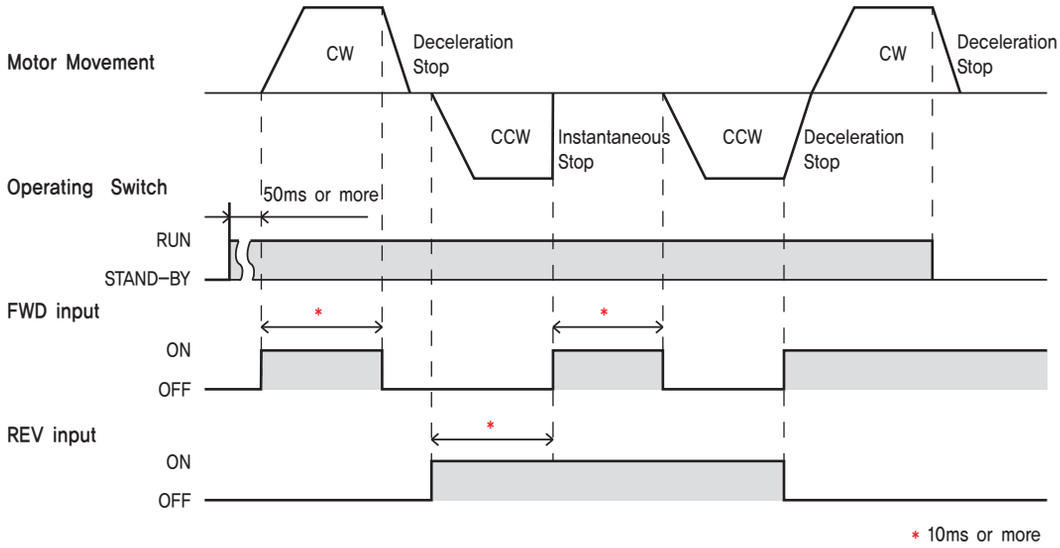

- Alphabets




* Please note that the Arabic numerals "5" and the letter "S" shown above are displayed identically.

## • Timing Chart

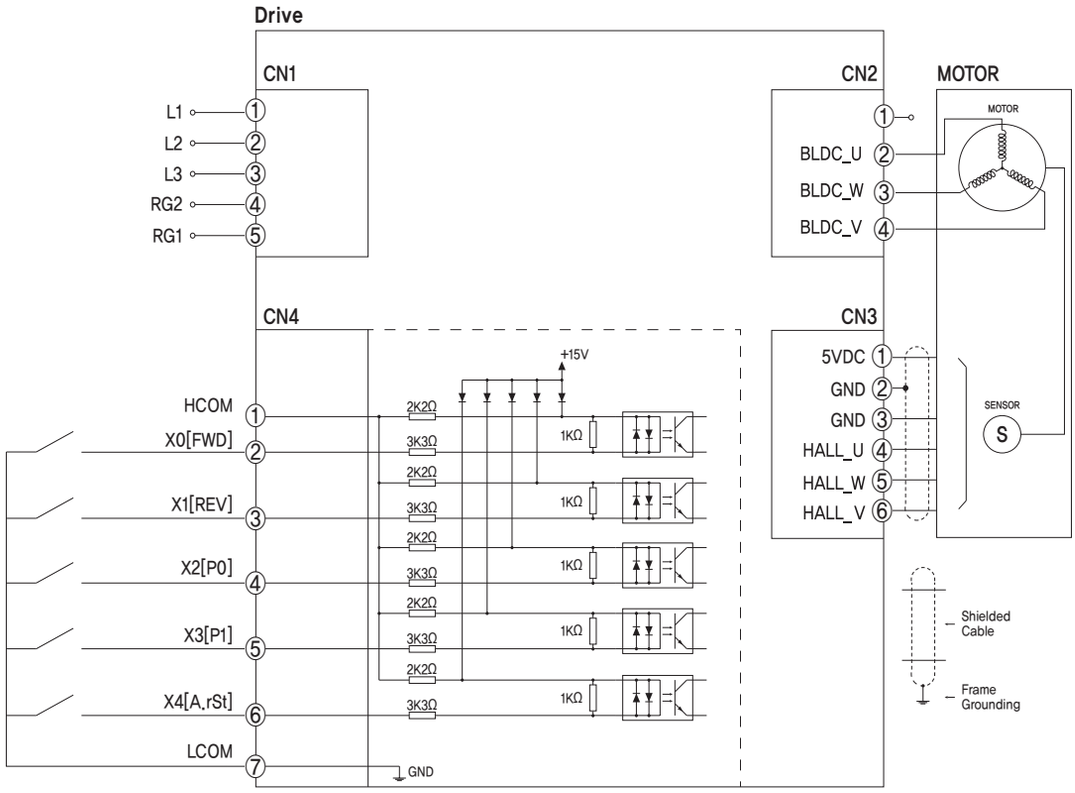
In case of parameter “external operation signal input” to “on” and the rotation direction switch is set to “FWD”.




· The motor rotates when either FWD input or REV input is set to “ON”.
· The motor instantaneous stop when FWD input and REV input is set to “ON” at the same time.
· Stop movement can differ according to gear box and load inertia.

## • Example of connection using Switches or Relays

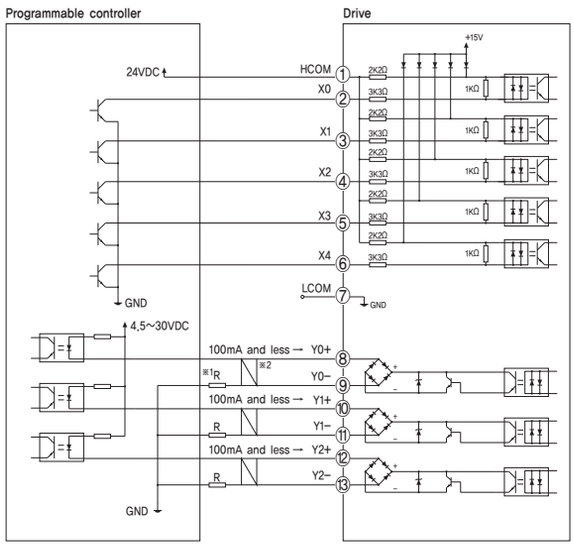
This is an example of connection when operating Ezi-SPEED using contact switches such as switches or relays.



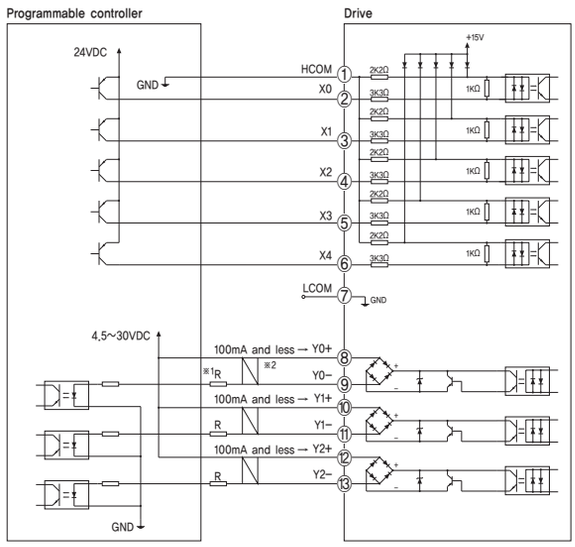
• Connection example for I/O signals and programmable controller

This is connection example when the motor is operated using a transistor output type programmable controller.

SINK LOGIC




SOURCE LOGIC




※1) Limited resistance
In the case of 24VDC : 680Ω~2.7kΩ(2W)
In the case of 5VDC : 150Ω~560Ω(0.5W)

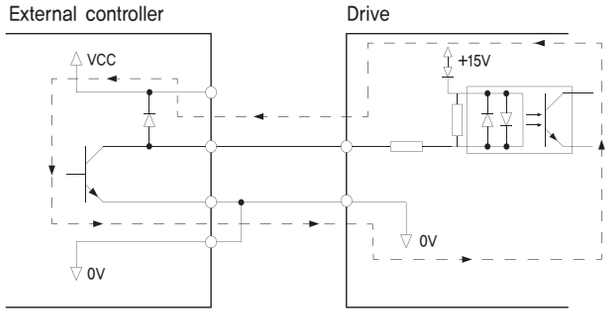
※2) Twisted Pair Shield Cable

**Warning**

For the Y0, Y1 and Y2, be sure to keep the current value at 100mA or less. If the current exceeds this value, connect the limiting resistor R.

• In the case of using a external controller with a built-in clamp diode

If a external controller with a built-in clamp diode is used, a leakage path may form and cause the motor to operate even when the external controller power is off, as long as the drive power is on.
Since the power capacity of the controller is different from that of the drive, the motor may operate when the external controller and drive powers ate turned on or off simultaneously.
When power off, turn off the drive power first, followed by the external controller power.
When power on, turn off the external controller power first, followed by the drive power.



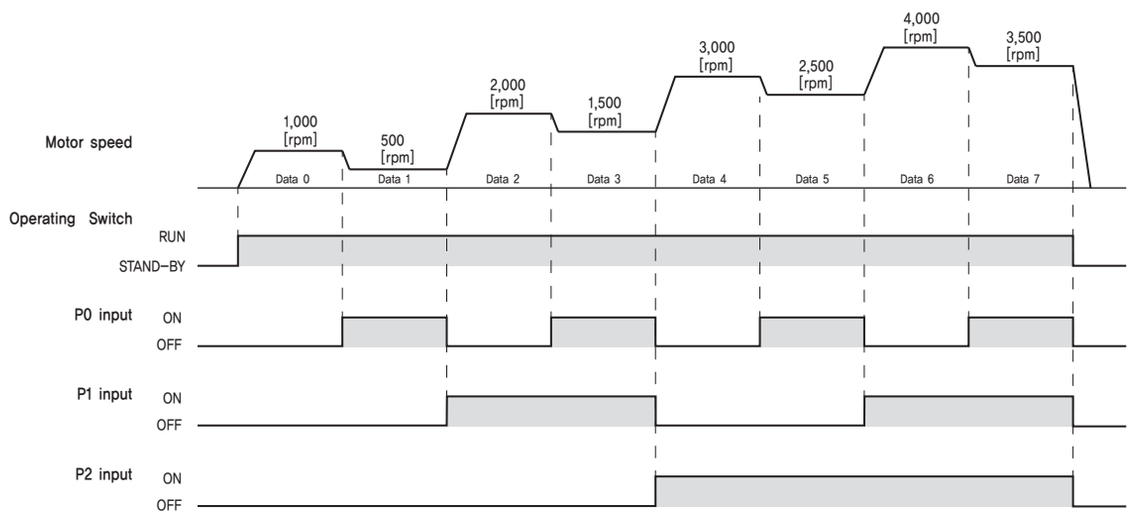
• 8-Speed Operation(In the case of the "external operation signal input" parameter is set to "ON")

1. Set the operation switch to the "RUN" side.
2. Select the operation data number using the P0, P1 and P2 inputs.
3. When either of the FWD input or REV input is turned ON, the motor will rotate.
4. Change the operation data number using the P0, P1 and P2 inputs.
5. When the FWD input or REV input which has been turned ON is turned OFF, the motor will stop.

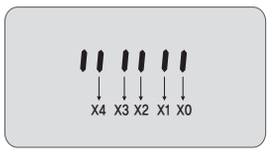
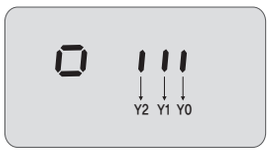
| Operation data No. | P0 | P1 | P2 | Rotation speed [rpm] |
|---|---|---|---|---|
| Data 0 | OFF | OFF | OFF | 1,000 |
| Data 1 | ON | OFF | OFF | 500 |
| Data 2 | OFF | ON | OFF | 2,000 |
| Data 3 | ON | ON | OFF | 1,500 |
| Data 4 | OFF | OFF | ON | 3,000 |
| Data 5 | ON | OFF | ON | 2,500 |
| Data 6 | OFF | ON | ON | 4,000 |
| Data 7 | ON | ON | ON | 3,500 |

* Setting speed value is just example, user can change to any speed value.

When changing from the present speed to the new speed, the acceleration time and deceleration time set in the next operation data number are used.



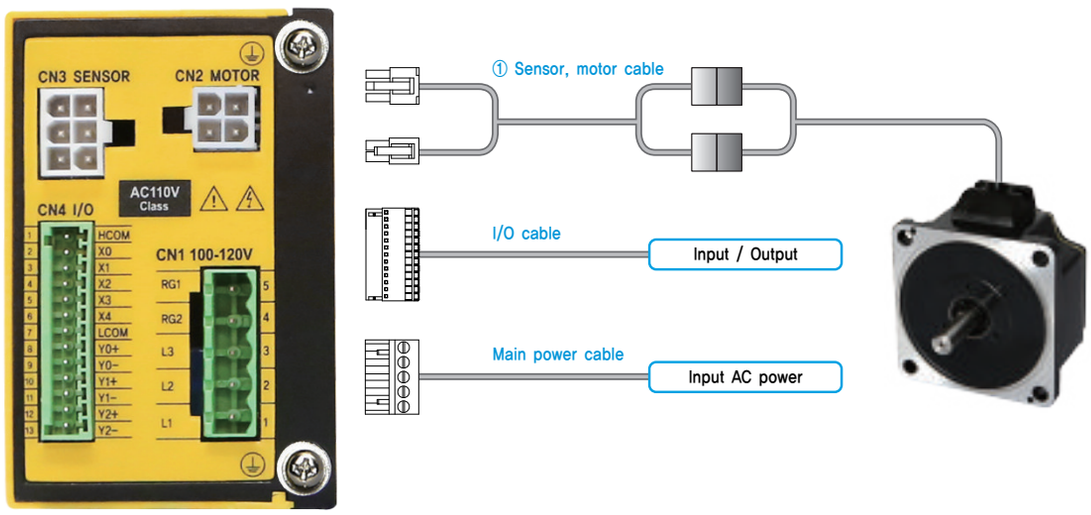
## 8. Monitor Mode Display

| Item | Display | Description |
|---|---|---|
| Setting speed display and speed adjustment [rpm] | 50 | Display the motor setting speed |
| Actual speed [rpm] | 0. | Monitors the actual speed of motor.<br>Monitors the rotation speed of gear output shaft or conveyor transfer speed when the “speed reduction ratio” parameter is set.<br>When the “speed increasing ratio” parameter is set, the actual rotation speed will be increased by external mechanism. |
| Load factor [%] | L. 0 | Monitors the current load factor based on the rated torque being 100%.<br>Displaying value is load factor of motor shaft not gearbox shaft.<br>In case of gearbox mounted motor type, permissible torque is different by reduction ratio of gearbox. Please use checking permissible torque limit of gearbox. |
| Alarm record display and record reset | AL.rc | Monitors the alarm record.<br>You can check alarm record or delete alarm record. |
| Warning record display and record reset | Wrn.rc | Monitors the warning record.<br>You can check warning record or delete warning record. |
| Operation data number | oPd- | Monitors the operation data No. which is currently selected. |
| I/O monitor | io | You can check the ON/OFF status of I/O signal of drive.<br>If the signal is ON, the corresponding LED is ON. if the signal is OFF, the LED is OFF.<br>Input signals  <br>Output signals  |

## 9. Protection functions and LED display

| Alarm Code | Alarm type | Cause | Remedial action | Alarm reset |
|---|---|---|---|---|
| AL.-- | No alarm record | – | – | – |
| AL.Uu. | Under voltage | The power supply voltage became lower than approximately 60% of the rated voltage | 1. Check the power supply voltage<br>2. Check the wiring of the power supply cable | Available |
| AL.ou. | Over voltage | 1. The power supply voltage exceeded approximately 120% of the rated voltage.<br>2. Vertical load (gravitational operation) was driven load inertia was driven. | 1. Check the power supply voltage<br>2. If this alarm occurs during operation, reduce the load or make the acceleration/deceleration time longer. | Available |
| AL.ot. | Over heat | The temperature inside drive exceeded the alarm detection temperature. | Check the ambient temperature | Available |
| AL.oc | Over current | Excessive current has flown through the drive due to ground fault. etc | Check the damage of wiring between the drive and motor. | Not available |
| AL.SF | Speed feedback | Actual speed and set speed are different. | 1. Check the power supply voltage<br>2. Check the load | Available |
| AL.SS | Sensor error (Hall sensor) | The motor sensor signal line experienced an open circuit during operation or the motor sensor connection. | Check the wiring between the drive and motor. | Available |
| AL.oS | Over speed | The rotation speed of the motor output shaft exceeded approximately 4,800 [rpm] | 1. Reduce the load<br>2. Review the operation pattern such as acceleration/ deceleration time. | Available |
| AL.oL | Over load | 1. A load exceeding the continuous duty region was applied to the motor for the time exceeded the value set in the "The overload alarm detection time" parameter.<br>2. The motor was started running under the state that the motor temperature was low. | | Available |
| AL.oP | Operation at power-on | When the "external operation signal input" parameter was set to "OFF", while the operation switch was set to the "RUN" side and the power was turned on again. | Set the operation switch to the "STAND-BY" side from the "RUN" side.<br>Next press "S" button. | Available |
| | | When the "external operation signal input" parameter was set to "ON", while the FWD input or REV input was turned ON, the power was turned on again. | 1. Set the operation switch to the "STAND-BY" side from the "RUN" side.<br>2. Turn the FWD input or REV input from ON to OFF. | |
| AL.Et | External Error (From external input signal) | The motor instantaneous stop when EXT-ERROR(Stop) input. | 1. Check the EXT-ERROR input.<br>2. Change status from activated to deactivated. | Available |

## ● System Configuration [30, 60, 120W - 110V]




| Type | I/O Cable | Sensor Cable | Motor Cable | Main Power Cable |
|---|---|---|---|---|
| Length supplied | – | 50cm | 50cm | – |
| Max. Length | 20m | 10m | 10m | 3m |

### 1. Options

#### Sensor, Motor Cable of 30, 60, 120W

This cable is used connect the wiring between the motor (30W, 60W and 120W) and drive.
This cable is single cable with the motor relay cable and sensor relay cable.

① Sensor, Motor Cable

| Item | Length [m] | Remark |
|---|---|---|
| CSPD-A-□□□F | 1, 2, 3, 5, 7, 10 | Normal Cable |

□ is for Cable Length. The unit is 1m and Max. 10m length.

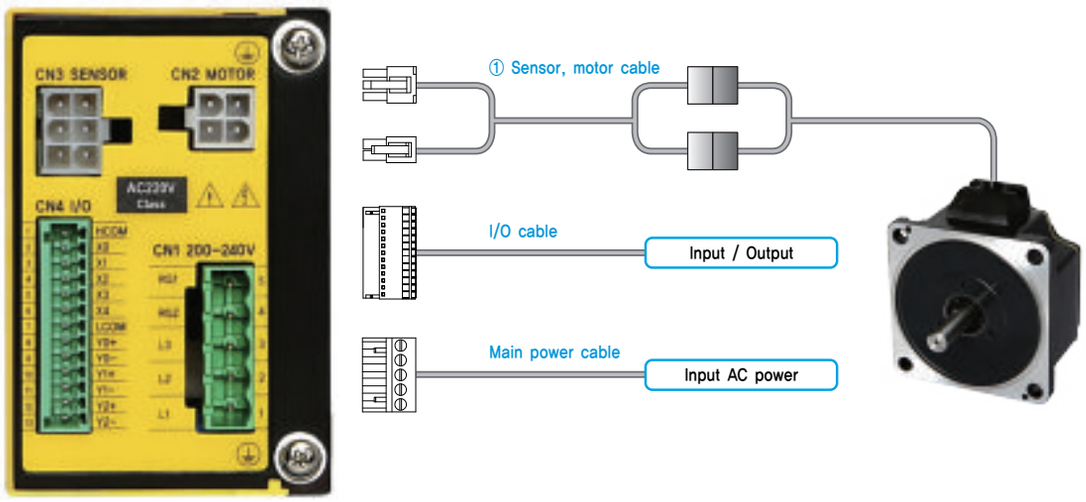
### 2. Connector Specifications

Connector specifications for cabling to drive.

| Purpose | | Item | Part Number | Manufacturer |
|---|---|---|---|---|
| Power (CN1) | | Terminal Block | CPF5.08-05P | STELVIO |
| Motor (CN2) | Drive side (CN2) | Housing<br>Terminal | 5557-04R<br>5556T | MOLEX |
| | Motor side | Housing<br>Terminal | 5559-04P<br>5558T | MOLEX |
| Sensor (CN3) | Drive side (CN3) | Housing<br>Terminal | 5557-06R<br>5556T | MOLEX |
| | Sensor side | Housing<br>Terminal | 5559-06P<br>5558T | MOLEX |
| I/O (CN4) | | Terminal Block | 15EDGKD-13P | DEGSON |

※ Above connector is the most suitable product for the drive applied. Another equivalent connector can be used.

## ● System Configuration [30, 60, 120W - 220V]




| Type | I/O Cable | Sensor Cable | Motor Cable | Main Power Cable |
|---|---|---|---|---|
| Length supplied | – | 50cm | 50cm | – |
| Max. Length | 20m | 10m | 10m | 3m |

### 1. Options

#### Sensor, Motor Cable of 30, 60, 120W

This cable is used connect the wiring between the motor (30W, 60W and 120W) and drive.
This cable is single cable with the motor relay cable and sensor relay cable.

① Sensor, Motor Cable

| Item | Length [m] | Remark |
|---|---|---|
| CSPD-A-□□□F | 1, 2, 3, 5, 7, 10 | Normal Cable |

□ is for Cable Length. The unit is 1m and Max. 10m length.

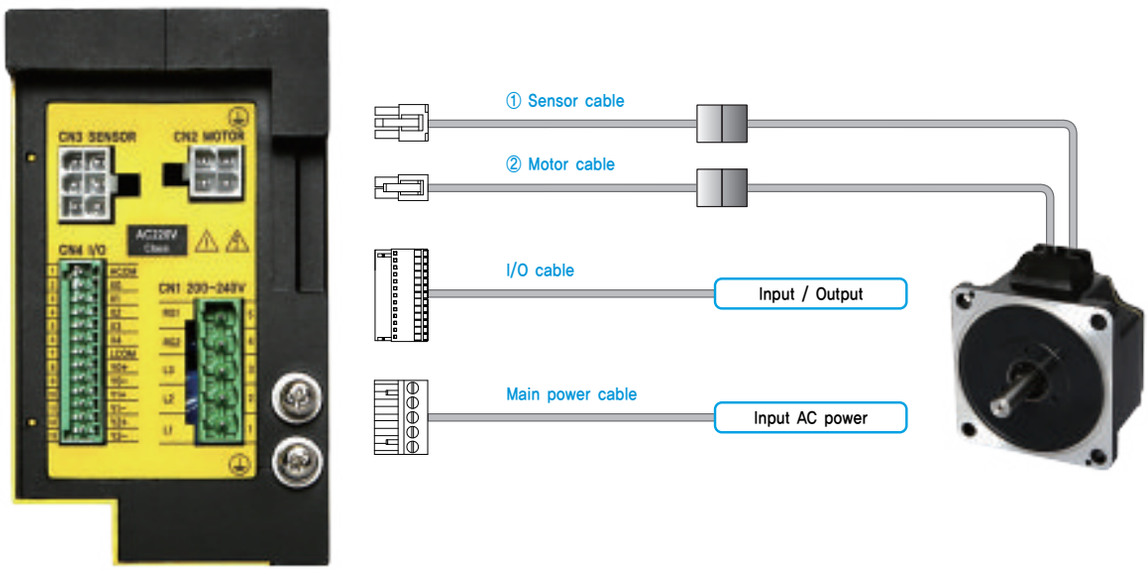
### 2. Connector Specifications

Connector specifications for cabling to drive.

| Purpose | | Item | Part Number | Manufacturer |
|---|---|---|---|---|
| Power (CN1) | | Terminal Block | CPF5.08-05P | STELVIO |
| Motor (CN2) | Drive side (CN2) | Housing<br>Terminal | 5557-04R<br>5556T | MOLEX |
| | Motor side | Housing<br>Terminal | 5559-04P<br>5558T | MOLEX |
| Sensor (CN3) | Drive side (CN3) | Housing<br>Terminal | 5557-06R<br>5556T | MOLEX |
| | Sensor side | Housing<br>Terminal | 5559-06P<br>5558T | MOLEX |
| I/O (CN4) | | Terminal Block | 15EDGKD-13P | DEGSON |

※ Above connector is the most suitable product for the drive applied. Another equivalent connector can be used.

## ● System Configuration [200, 400W - 220V]




| Type | I/O Cable | Sensor Cable | Motor Cable | Main Power Cable |
|---|---|---|---|---|
| Length supplied | – | 50cm | 50cm | – |
| Max. Length | 20m | 10m | 10m | 3m |

### 1. Options

#### Sensor, Motor Cable of 200, 400W

This cable is used connect the wiring between the motor (200W, 400W) and drive.
This cable is each cable (Two line) with the motor relay cable and sensor relay cable.

① Sensor Cable

| Item | Length [m] | Remark |
|---|---|---|
| CSPD-S-□□□F | 1, 2, 3, 5, 7, 10 | Normal Cable |

□ is for Cable Length. The unit is 1m and Max. 10m length.

② Motor Cable

| Item | Length [m] | Remark |
|---|---|---|
| CSPD-M-□□□F | 1, 2, 3, 5, 7, 10 | Normal Cable |

□ is for Cable Length. The unit is 1m and Max. 10m length.

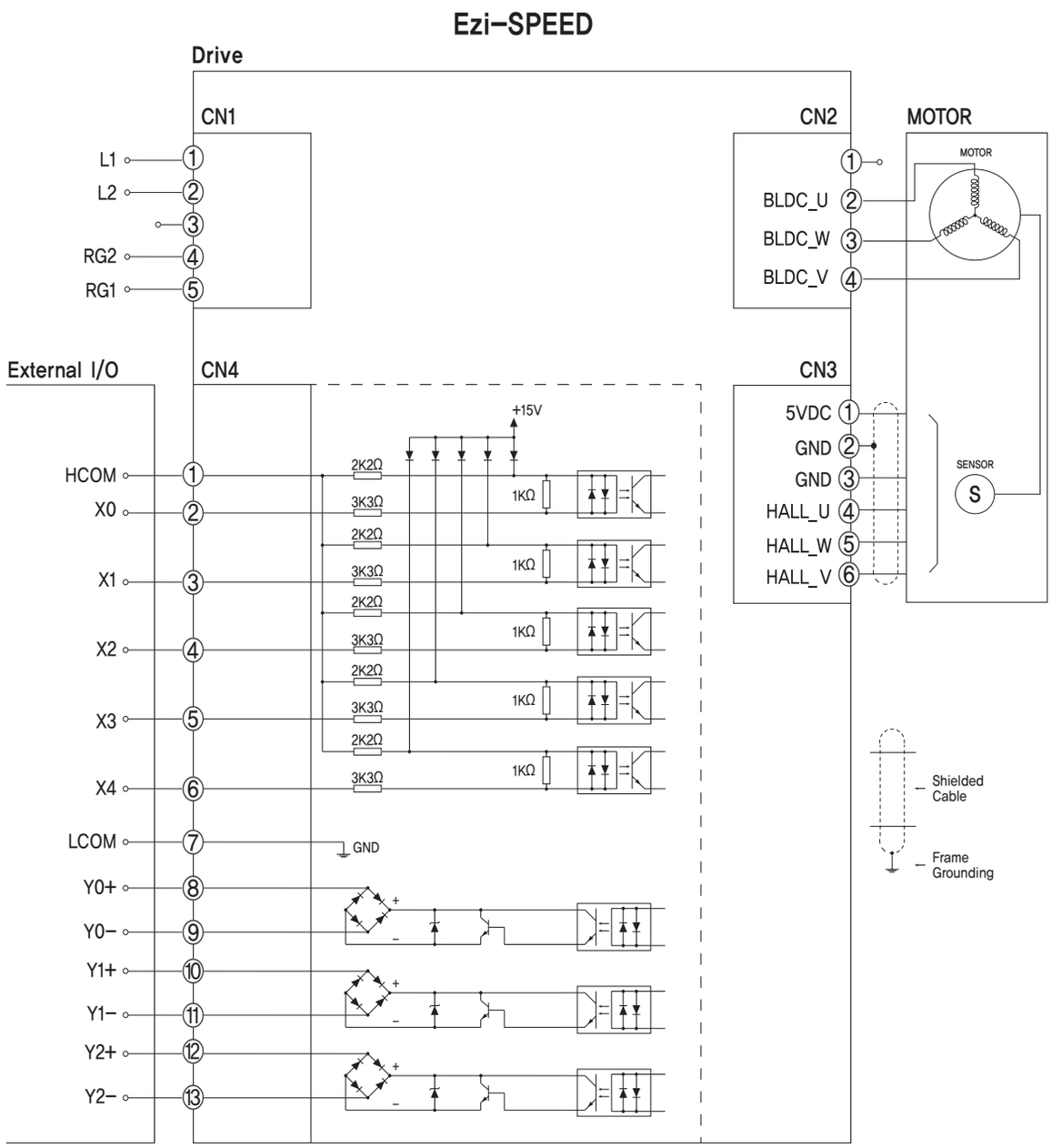
### 2. Connector Specifications

Connector specifications for cabling to drive.

| Purpose | | Item | Part Number | Manufacturer |
|---|---|---|---|---|
| Power (CN1) | | Terminal Block | CPF5.08-05P | STELVIO |
| Motor (CN2) | Drive side (CN2) | Housing<br>Terminal | 5557-04R<br>5556T | MOLEX |
| | Motor side | Housing<br>Terminal | 5559-04P<br>5558T | MOLEX |
| Sensor (CN3) | Drive side (CN3) | Housing<br>Terminal | 5557-06R<br>5556T | MOLEX |
| | Sensor side | Housing<br>Terminal | 5559-06P<br>5558T | MOLEX |
| I/O (CN4) | | Terminal Block | 15EDGKD-13P | DEGSON |

※ Above connector is the most suitable product for the drive applied. Another equivalent connector can be used.

## ● External Wiring Diagram [110V Drive]



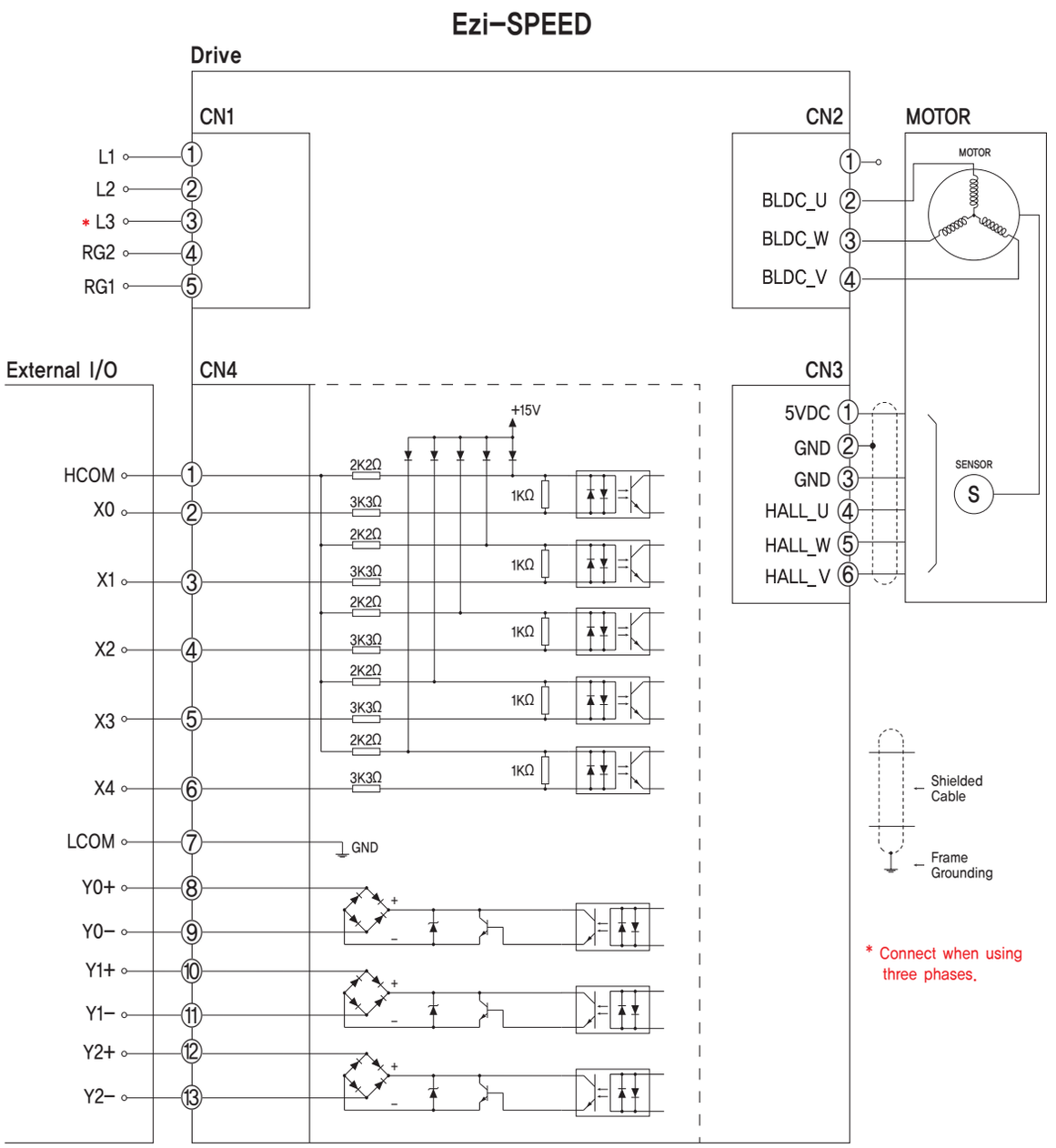

※ When connects I/O cable between controller and drive, please turn off the power of both controller and drive, in order to protect the drive from any damage.

**CAUTION**

Please refer to the Manual when connects motor extension cable.

Careful connection will be required to protect the drive from any damages.

## ● External Wiring Diagram [220V Drive]




※ When connects I/O cable between controller and drive, please turn off the power of both controller and drive, in order to protect the drive from any damage.

**CAUTION**

Please refer to the Manual when connects motor extension cable.

Careful connection will be required to protect the drive from any damages.

## MEMO

FASTECH

*Fast, Accurate, Smooth Motion*

**FASTECH Co., Ltd.**
Rm#1202, 401-dong, Bucheon Techno-Park,
655, Pyeongcheon-ro, Bucheon-si Gyeonggi-do,
Republic of Korea (Zip:14502)
TEL : +82-32-234-6300 FAX : +82-32-234-6302
E-mail : sales2@fastech.co.kr
Homepage : www.fastech.co.kr