Ezi-SPEED®

Modbus RTU

BLDC Motor Speed Control System

- Modbus-RTU-compatible BLDC Motor Speed Control System
- AC Power Supply Input (200 ~ 240 V AC)
- Compact · Light Weight · High Power · High Efficiency Brushless Motor
- Wide Speed Range (50 ~ 4,000 r/min)
- Stable Speed Regulation (±0.2%)
- BLDC Motor Line-up (30, 60, 120, 200, 400 W)

FASTECH

Fast Accurate Smooth Motion

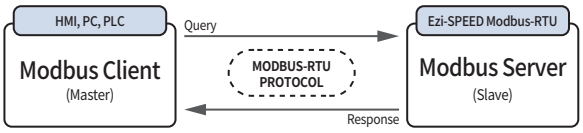
Ezi-SPEED®

Modbus RTU

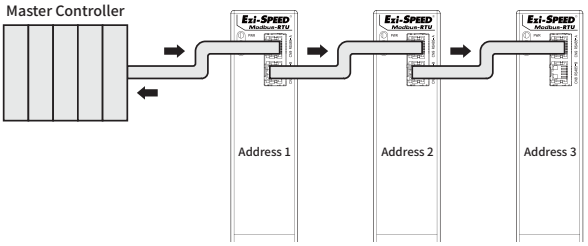
BLDC Motor Speed Control System

RS-485-compatible Modbus-RTU Control

Ezi-SPEED Modbus-RTU supports the Modbus-RTU protocol based on RS-485 communication. This enables application in both input / output signal control and RS-485-based control systems.
Modbus operates in a single-master / multi-slave configuration, where only the master can send commands, and each slave responds after executing the commands.
PLC, HMI, PC can function as modbus client(master) and control the system via RS-485 serial communication.

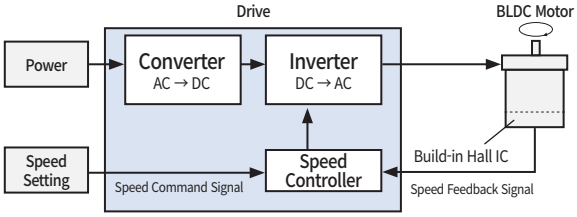


A single master controller can connect with up to 31 slaves (drives). The master controller can send commands to either a single slave or multiple slaves simultaneously



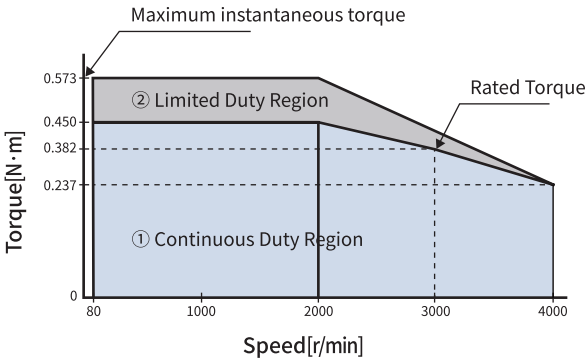
BLDC Motor Unit

A conventional DC motor rotates using brushes and a commutator, requiring regular maintenance. In contrast, a BLDC (Brushless DC) motor operates without mechanical contacts, utilizing a semiconductor-based drive circuit, resulting in a longer lifespan and reduced maintenance requirements. Embedded permanent magnets in the rotor enhance efficiency, while automatic motor current control ensures consistent torque characteristics across all speed ranges. Additionally, utilizing Hall IC for feedback control allows precise speed regulation from low to high speed.



< Control Block Diagram >

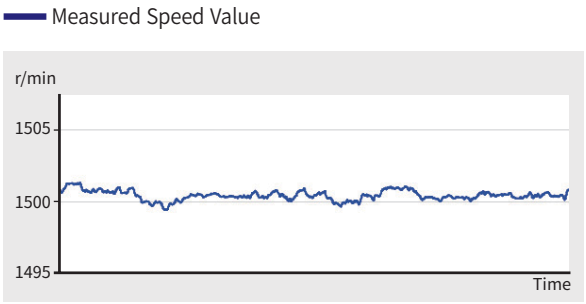
The BLDC motor can operate continuously with a constant torque from low speeds to its rated rotational speed. Within the rated torque range, it maintains a stable rotational speed even when the load varies.
BLDC motors have two operating regions: continuous duty region (①) and limited duty region (②). The limited duty region is used for acceleration torque when starting an inertial load. However, operating in this region more than 40s activates the built-in overload protection function, which automatically prevents overheating of the motor and drive.



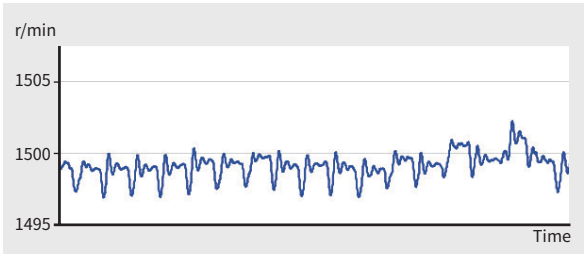
< Example of Torque Characteristics According to Speed of BLDC Motor >

High Precision Speed Control (Speed Regulation ±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 120 W



Inverter + AC Induction Motor 100 W

- Load Factor: 95 %
- Setting Speed : 1,500 r/min
- Resolution of External Encoder for Measuring Velocity Ripple : 32,000 P/R

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 [r/min]	Speed Ratio
Ezi-SPEED	50 ~ 4,000	1:80
Inverter + AC Induction Motor	200 ~ 2,400	1:12

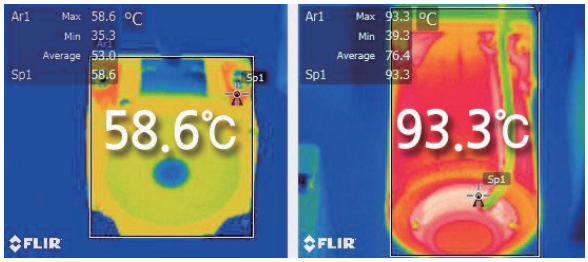
- Speed range of Inverter + AC Induction Motor varies depending on model type.

Compact / Light Weight / High Power /High Efficiency

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.

Ezi-SPEED 60 W AC Induction Motor 60 W

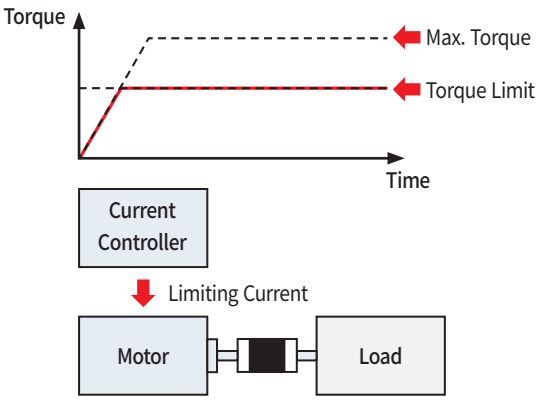
Comparison of motor temperature after 4 hours continuous operation when load factor is 100 % and Setting speed is 1,500 r/min.



Ezi-SPEED 60 W AC Induction Motor 60 W

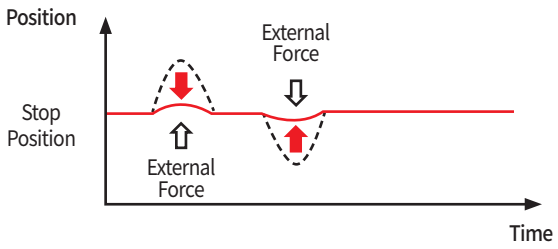
Torque Limit Function

Ezi-SPEED can control the torque limit by limiting the current flowing through the motor. Torque limit function can be used to prevent excessive force.



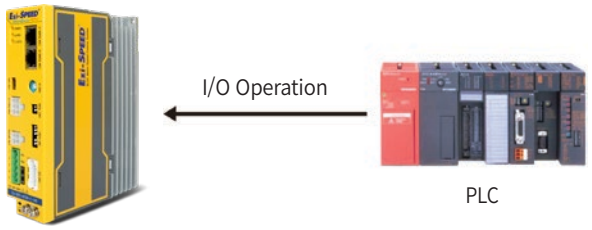
Load Holding Function

Load holding function can be used for an electrical retention brake at stop without the need for a mechanical brake. So, this function is suitable for applications that perform work while stopping the transportation conveyors.



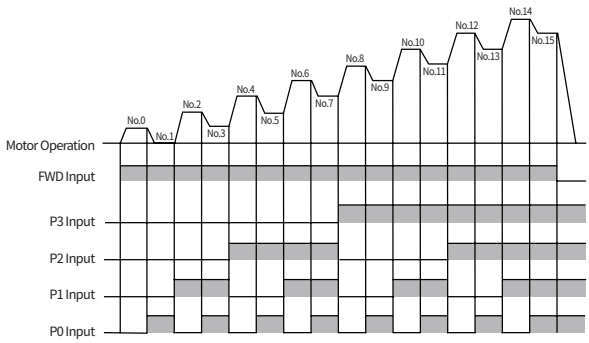
Operation by External I/O

A controller, such as a PLC, can perform operations such as starting, stopping, changing the direction of rotation and multi-speed operation by connecting external I/O. Additionally, the speed can be adjusted using analog input by connecting a potentiometer.



16-Speed Settings

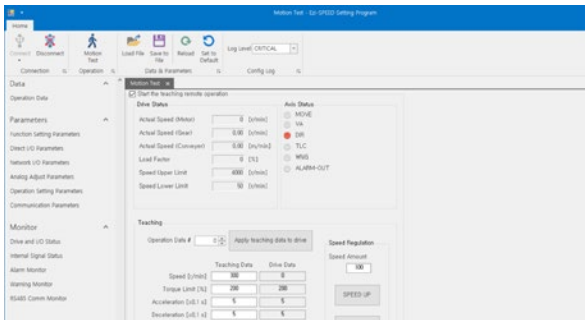
16-speed operation can be done by setting operation data No. 0 to No. 15. Operation data can be configured using Ezi-SPEED Setting program or through RS-485 communication.



Ezi-SPEED Setting program

Ezi-SPEED Modbus-RTU can perform various functions using the separately provided Ezi-SPEED Setting program.

- Parameter Setting Function: Easily modify and save various parameters.
- Monitoring Function: Easily monitor the internal status of the drive and motor, including speed, load factor, I/O signals, alarms, and warnings.
- Testing Function: Easily test whether the drive and motor are operating correctly.



Protection Function

- Ezi-SPEED detects 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-MR-60-H-30-C-R5-P

Series Name

Type Name

MR: Modbus-RTU

Motor Flange Size

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

Parallel Shaft Gearbox Size

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

Hollow Shaft Gearbox Size

60 : 60×120.5 mm
80 : 80×160.5 mm
90 : 90×180 mm
104 : 104×218 mm

Shaft Figuration

S : Straight
(Single unit, D-cut shape)
H : High Strength
(Gearbox coupling, gear tooth shape)

Output Power

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

Power Supply Voltage

C : Single-Phase, Three-Phase 200 ~ 240 V

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
30 W	Ezi-SPEED-MR-60-S-30-C	ESM-60-S-30	ESD-MR-30-C
60 W	Ezi-SPEED-MR-80-S-60-C	ESM-80-S-60	ESD-MR-60-C
120 W	Ezi-SPEED-MR-90-S-120-C	ESM-90-S-120	ESD-MR-120-C
200 W	Ezi-SPEED-MR-104-S-200-C	ESM-104-S-200	ESD-MR-200-C
400 W	Ezi-SPEED-MR-104-S-400-C	ESM-104-S-400	ESD-MR-400-C

Combination with Gearbox

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

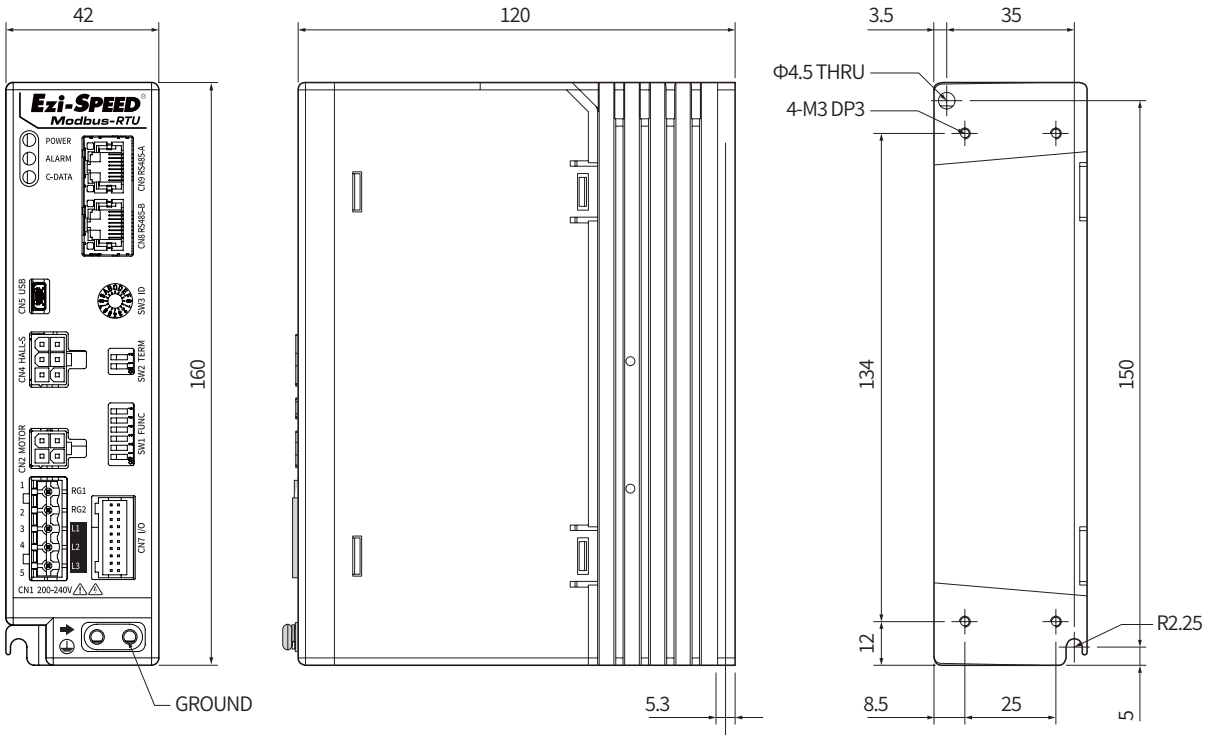
Output Power	Unit Part Number	Motor Model Number	Drive Model Number	Gearbox Model Number	Gear Ratio
200 W	Ezi-SPEED-MR-104-H-200-C-R5-P	ESM-104-H-200	ESD-MR-200-C	ESG-104-H-R5-P	1:5
	Ezi-SPEED-MR-104-H-200-C-R5-H			ESG-104-H-R5-H	
	Ezi-SPEED-MR-104-H-200-C-R10-P			ESG-104-H-R10-P	1:10
	Ezi-SPEED-MR-104-H-200-C-R10-H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

Specifications of Drive

□: Motor flange size
■: Shaft figuration

Model		Ezi-SPEED-MR-□-■-30	Ezi-SPEED-MR-□-■-60	Ezi-SPEED-MR-□-■-120	Ezi-SPEED-MR-□-■-200	Ezi-SPEED-MR-□-■-400
Rated Output Power (Continuous)		30 W	60 W	120 W	200 W	400 W
Power Supply	Rated Voltage	Single-phase 200 ~ 240 V / Three-phase 200 ~ 240 V				
	Rated Frequency	50/60 Hz ± 5 %				
	Rated Input Current	Single-Phase : 0.88 A Three-Phase : 0.51 A	Single-Phase : 1.55 A Three-Phase : 0.90 A	Single-Phase : 2.43 A Three-Phase : 1.41 A	Single-Phase : 3.42 A Three-Phase : 1.97 A	Single-Phase : 5.64 A Three-Phase : 3.26 A
	Maximum Input Current	Single-Phase : 1.9 A Three-Phase : 1.1 A	Single-Phase : 2.8 A Three-Phase : 1.7 A	Single-Phase : 4.5 A Three-Phase : 2.6 A	Single-Phase : 5.47 A Three-Phase : 3.16 A	Single-Phase : 7.85 A Three-Phase : 4.53 A
Rated Phase Current		0.21 A	0.36 A	0.85 A	1.65 A	2.37 A
Rated Torque		0.096 N·m	0.191 N·m	0.382 N·m	0.637 N·m	1.27 N·m
Maximum Instantaneous Torque		0.144 N·m	0.287 N·m	0.573 N·m	1.15 N·m	1.91 N·m
Rated Speed		3,000 r/min				
Speed Control Range		50 ~ 4,000 r/min				
Speed Regulation		±0.2 % or less / Conditions : 0~Rated Torque, Rated Speed, Rated Voltage, Normal Temperature				
Digital Input		7 programmable inputs				
Digital Output		2 programmable outputs				
Network		·RS-485 Modbus-RTU Communication ·Baudrate: 9,600 ~ 115,200 bps				

Dimensions of Drive [mm]

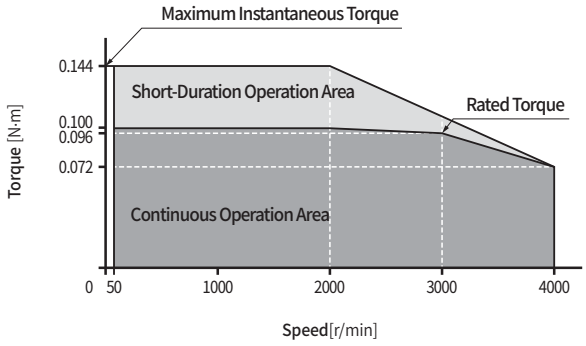


Specifications of Motor

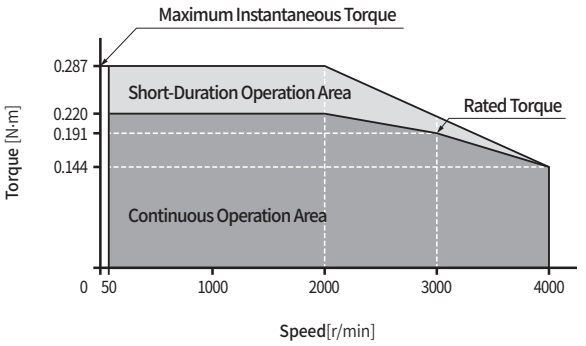
Model			UNIT	ESM-60-S-30	ESM-80-S-60	ESM-90-S-120	ESM-104-S-200	ESM-104-S-400
Rated Output Power (Continuous)			W	30	60	120	200	400
Rated Torque			N·m	0.096	0.192	0.382	0.637	1.272
Rated Input Phase Current			A	0.21	0.36	0.85	1.65	2.37
Rated Speed			r/min	3,000				
Permissible Load Inertia Moment			$10^{-4}kg·m^2$	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			mm	62	74	94	156	156
Permissible Radial Load	Distance from End of Shaft	10 mm	N	70	120	160	197	197
		20 mm		100	140	170	220	220

Torque Characteristics of Motor

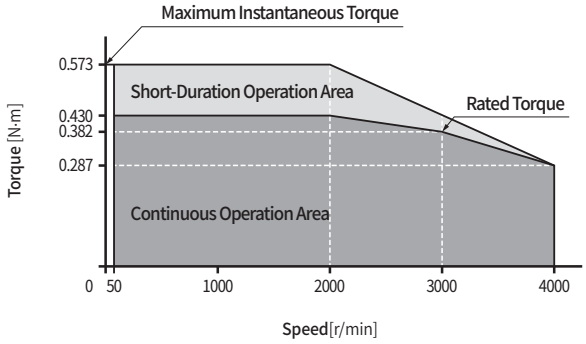
Ezi-SPEED-30 W



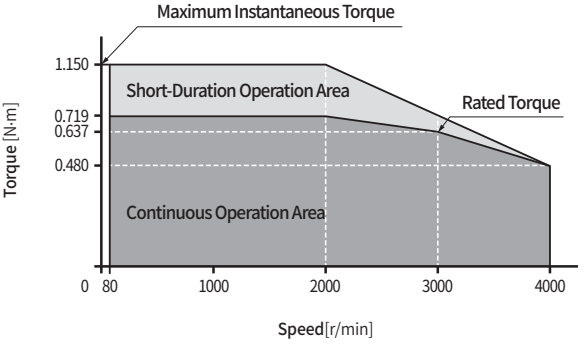
Ezi-SPEED-60 W



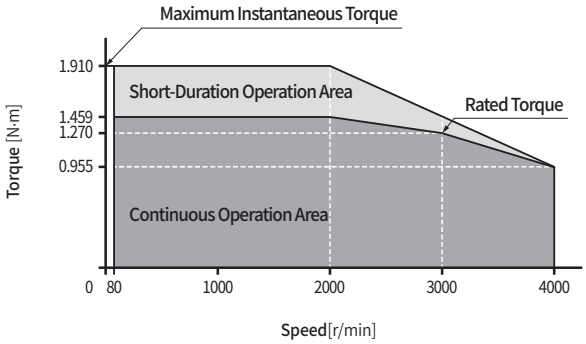
Ezi-SPEED-120 W



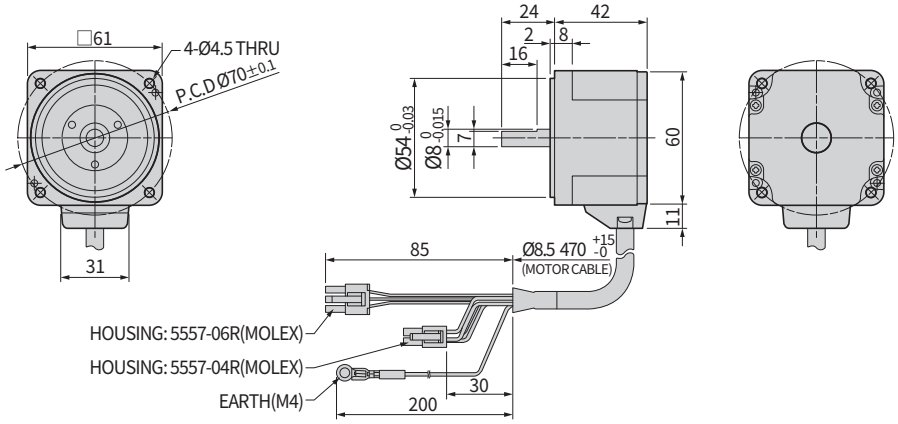
Ezi-SPEED-200 W



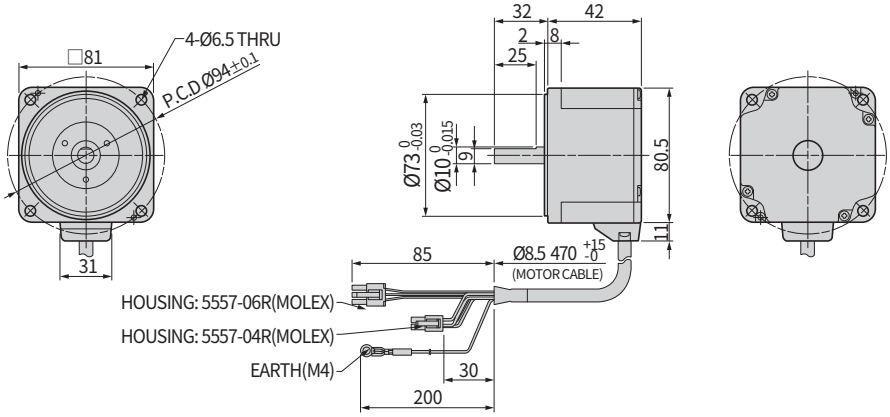
Ezi-SPEED-400 W



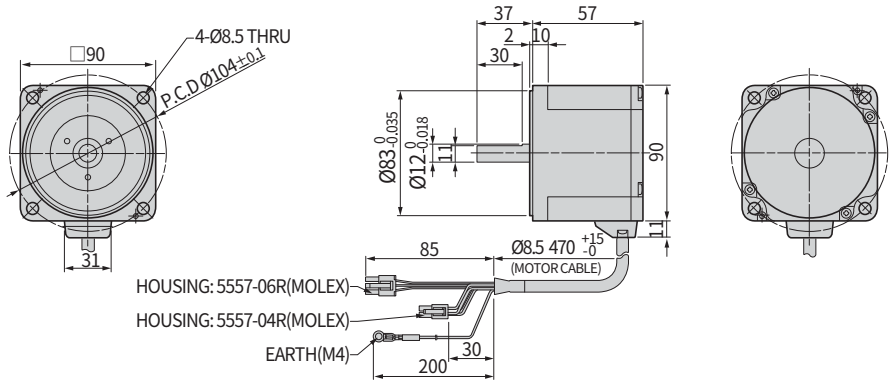
Dimensions of Motor [mm]



30 W
ESM-60-S-30

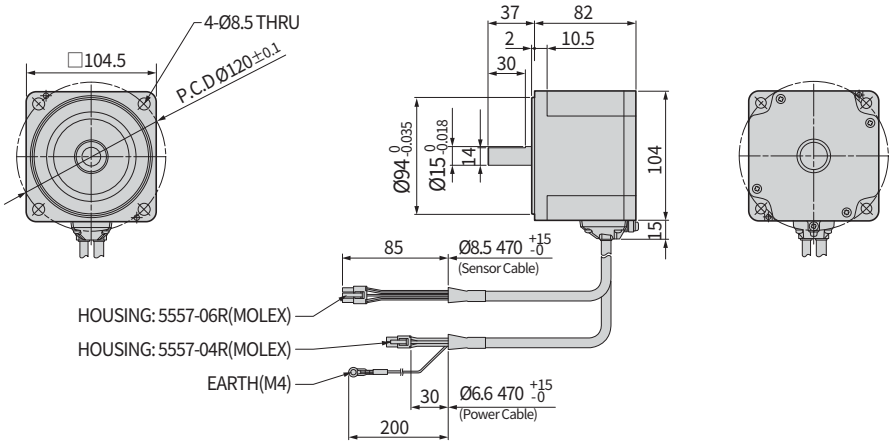


60 W
ESM-80-S-60

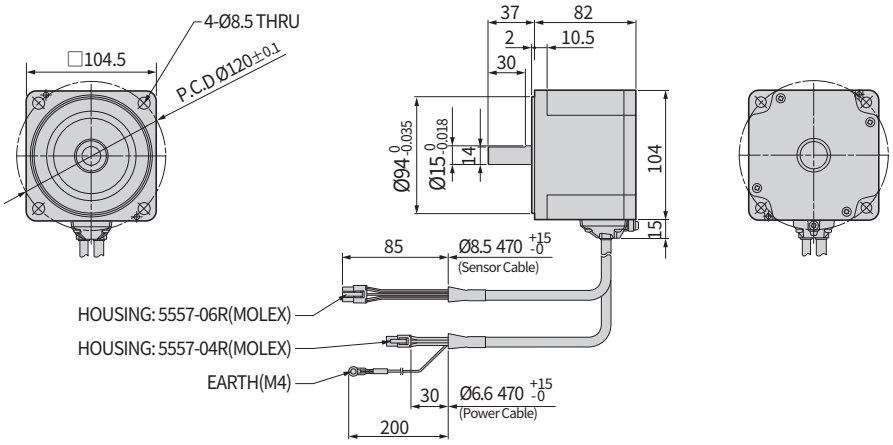


120 W
ESM-90-S-120

Dimensions of Motor [mm]



200 W
ESM-104-S-200



400 W
ESM-104-S-400

Specifications of Motor with Parallel Shaft Gearbox

30 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-60-H-30-C-R5-P	5	0.45	0.34	10 ~ 800	0.9	100	150	40
Ezi-SPEED-MR-60-H-30-C-R10-P	10	0.9	0.68	5 ~ 400		150	200	
Ezi-SPEED-MR-60-H-30-C-R15-P	15	1.35	1	3.3 ~ 266.7				
Ezi-SPEED-MR-60-H-30-C-R20-P	20	1.8	1.4	2.5 ~ 200				
Ezi-SPEED-MR-60-H-30-C-R30-P	30	2.6	1.9	1.7 ~ 133.3		200	300	
Ezi-SPEED-MR-60-H-30-C-R50-P	50	4.3	3.2	1 ~ 80				
Ezi-SPEED-MR-60-H-30-C-R100-P	100	6	5.4	0.5 ~ 40				
Ezi-SPEED-MR-60-H-30-C-R200-P	200	6	5.4	0.25 ~ 20				

60 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-80-H-60-C-R5-P	5	0.9	0.68	10 ~ 800	1.6	200	250	100
Ezi-SPEED-MR-80-H-60-C-R10-P	10	1.8	1.4	5 ~ 400		300	350	
Ezi-SPEED-MR-80-H-60-C-R15-P	15	2.7	2	3.3 ~ 266.7				
Ezi-SPEED-MR-80-H-60-C-R20-P	20	3.6	2.7	2.5 ~ 200				
Ezi-SPEED-MR-80-H-60-C-R30-P	30	5.2	3.9	1.7 ~ 133.3		450	550	
Ezi-SPEED-MR-80-H-60-C-R50-P	50	8.6	6.5	1 ~ 80				
Ezi-SPEED-MR-80-H-60-C-R100-P	100	16	12.9	0.5 ~ 40				
Ezi-SPEED-MR-80-H-60-C-R200-P	200	16	14	0.25 ~ 20				

Specifications of Motor with Parallel Shaft Gearbox

120 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-90-H-120-C-R5-P	5	2.2	1.4	10 ~ 800	2.7	300	400	150
Ezi-SPEED-MR-90-H-120-C-R10-P	10	4.4	2.7	5 ~ 400		400	500	
Ezi-SPEED-MR-90-H-120-C-R15-P	15	6.6	4.1	3.3 ~ 266.7				
Ezi-SPEED-MR-90-H-120-C-R20-P	20	8.8	5.4	2.5 ~ 200				
Ezi-SPEED-MR-90-H-120-C-R30-P	30	12.6	7.7	1.7 ~ 133.3		500	650	
Ezi-SPEED-MR-90-H-120-C-R50-P	50	21.1	12.9	1 ~ 80				
Ezi-SPEED-MR-90-H-120-C-R100-P	100	30	25.8	0.5 ~ 40				
Ezi-SPEED-MR-90-H-120-C-R200-P	200	30	27	0.25 ~ 20				

200 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-104-H-200-C-R5-P	5	2.9	2	10 ~ 800	4.2	550	800	200
Ezi-SPEED-MR-104-H-200-C-R10-P	10	5.9	4.1	5 ~ 400				
Ezi-SPEED-MR-104-H-200-C-R15-P	15	8.8	6.1	3.3 ~ 266.7				
Ezi-SPEED-MR-104-H-200-C-R20-P	20	11.7	8.1	2.5 ~ 200				
Ezi-SPEED-MR-104-H-200-C-R30-P	30	16.8	11.6	1.7 ~ 133.3		1,000	1,250	300
Ezi-SPEED-MR-104-H-200-C-R50-P	50	28	19.4	1 ~ 80				
Ezi-SPEED-MR-104-H-200-C-R100-P	100	52.7	36.5	0.5 ~ 40		1,400	1,700	400
Ezi-SPEED-MR-104-H-200-C-R200-P	200	70	63	0.25 ~ 20				

Specifications of Motor with Parallel Shaft Gearbox

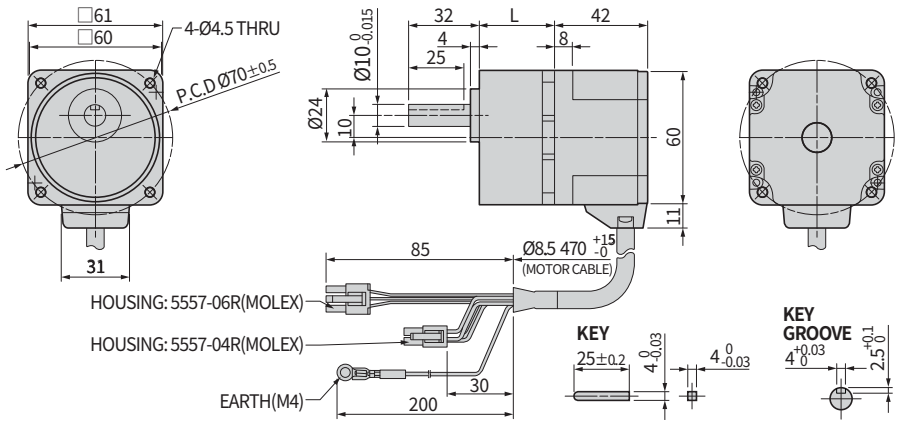
400 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-104-H-400-C-R5-P	5	5.9	4.3	10 ~ 800	4.2	550	800	200
Ezi-SPEED-MR-104-H-400-C-R10-P	10	11.7	8.6	5 ~ 400				
Ezi-SPEED-MR-104-H-400-C-R15-P	15	17.6	12.8	3.3 ~ 266.7				
Ezi-SPEED-MR-104-H-400-C-R20-P	20	23.4	17.1	2.5 ~ 200				
Ezi-SPEED-MR-104-H-400-C-R30-P	30	33.5	24.5	1.7 ~ 133.3		1,000	1,250	300
Ezi-SPEED-MR-104-H-400-C-R50-P	50	55.9	40.9	1 ~ 80				
Ezi-SPEED-MR-104-H-400-C-R100-P	100	70	63	0.5 ~ 40		1,400	1,700	400
Ezi-SPEED-MR-104-H-400-C-R200-P	200	70	63	0.25 ~ 20				

Dimensions of Motor with Parallel Shaft Gearbox [mm]

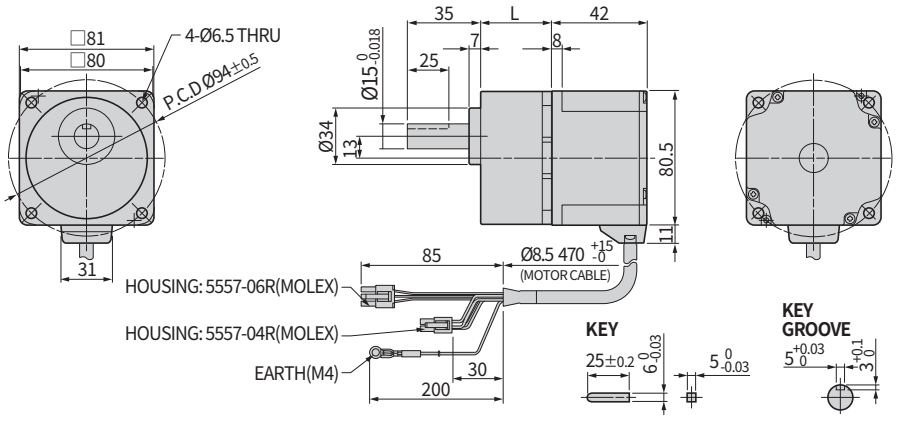
30 W

Unit Part Number	Gearbox Part Number	□Gear Ratio	Mounting Bolt	L [mm]
Ezi-SPEED-MR-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



60 W

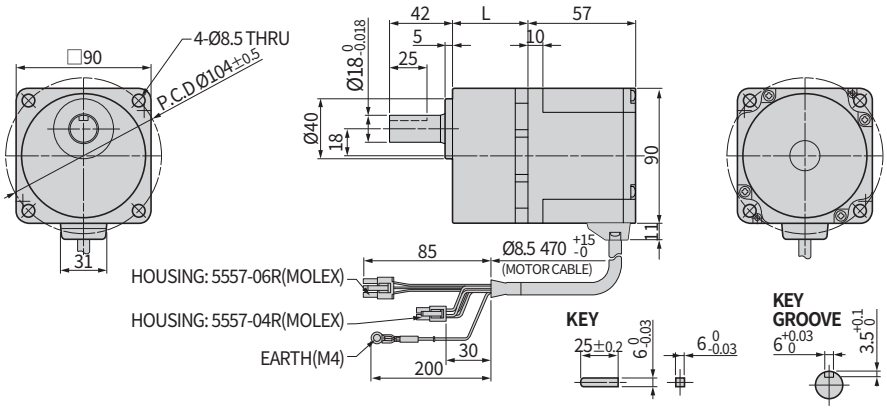
Unit Part Number	Gearbox Part Number	□Gear Ratio	Mounting Bolt	L [mm]
Ezi-SPEED-MR-80-H-60-C-R□-P	ESG-80-H-R□-P	5, 10, 15, 20	M4×65	41
		30, 50, 100	M4×70	46
		200	M4×75	51



Dimensions of Motor with Parallel Shaft Gearbox [mm]

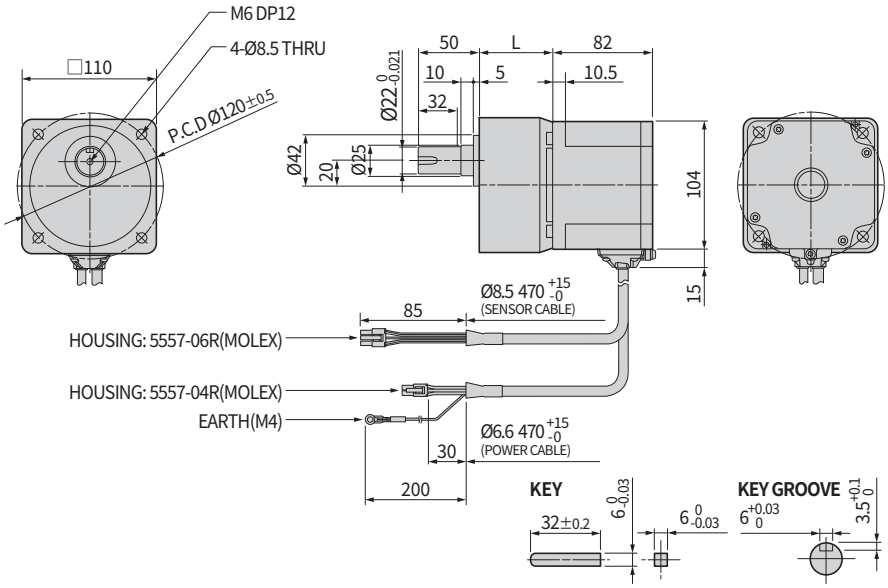
120 W

Unit Part Number	Gearbox Part Number	□Gear Ratio	Mounting Bolt	L [mm]
Ezi-SPEED-MR-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



200 W

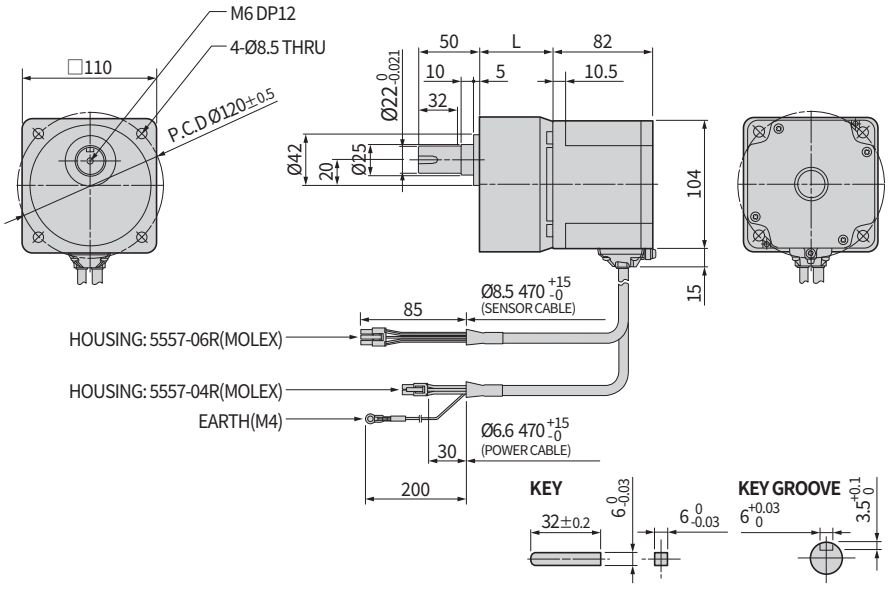
Unit Part Number	Gearbox Part Number	□Gear Ratio	Mounting Bolt	L [mm]
Ezi-SPEED-MR-104-H-200-C-R□-P	ESG-104-H-R□-P	5, 10, 15, 20	M8×95	60
		30, 50	M8×110	72
		100, 200	M8×120	86



Dimensions of Motor with Parallel Shaft Gearbox [mm]

400 W

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



Specifications of Motor with Hollow Shaft Gearbox

30 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-60-H-30-C-R5-H	5	0.4	0.3	10 ~ 800	1.2	450	370	200
Ezi-SPEED-MR-60-H-30-C-R10-H	10	0.85	0.64	5 ~ 400				
Ezi-SPEED-MR-60-H-30-C-R15-H	15	1.3	0.96	3.3 ~ 266.7		500	400	
Ezi-SPEED-MR-60-H-30-C-R20-H	20	1.7	1.3	2.5 ~ 200				
Ezi-SPEED-MR-60-H-30-C-R30-H	30	2.6	1.9	1.7 ~ 133.3				
Ezi-SPEED-MR-60-H-30-C-R50-H	50	4.3	3.2	1 ~ 80				
Ezi-SPEED-MR-60-H-30-C-R100-H	100	8.5	6.4	0.5 ~ 40				
Ezi-SPEED-MR-60-H-30-C-R200-H	200	17	12.8	0.25 ~ 20				

60 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-80-H-60-C-R5-H	5	0.85	0.64	10 ~ 800	2.2	800	660	400
Ezi-SPEED-MR-80-H-60-C-R10-H	10	1.7	1.3	5 ~ 400				
Ezi-SPEED-MR-80-H-60-C-R15-H	15	2.6	1.9	3.3 ~ 266.7		1,200	1,000	
Ezi-SPEED-MR-80-H-60-C-R20-H	20	3.4	2.6	2.5 ~ 200				
Ezi-SPEED-MR-80-H-60-C-R30-H	30	5.1	3.8	1.7 ~ 133.3				
Ezi-SPEED-MR-80-H-60-C-R50-H	50	8.5	6.4	1 ~ 80				
Ezi-SPEED-MR-80-H-60-C-R100-H	100	17	12.8	0.5 ~ 40				
Ezi-SPEED-MR-80-H-60-C-R200-H	200	34	25.5	0.25 ~ 20				

Specifications of Motor with Hollow Shaft Gearbox

120 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-90-H-120-C-R5-H	5	2.1	1.3	10 ~ 800	3.3	900	770	500
Ezi-SPEED-MR-90-H-120-C-R10-H	10	4.2	2.6	5 ~ 400				
Ezi-SPEED-MR-90-H-120-C-R15-H	15	6.2	3.8	3.3 ~ 266.7		1,300	1,000	
Ezi-SPEED-MR-90-H-120-C-R20-H	20	8.3	5.1	2.5 ~ 200				
Ezi-SPEED-MR-90-H-120-C-R30-H	30	12.5	7.7	1.7 ~ 133.3		1,500	1,280	
Ezi-SPEED-MR-90-H-120-C-R50-H	50	21	12.8	1 ~ 80				
Ezi-SPEED-MR-90-H-120-C-R100-H	100	42	25.5	0.5 ~ 40				
Ezi-SPEED-MR-90-H-120-C-R200-H	200	68	51	0.25 ~ 20				

200 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-104-H-200-C-R5-H	5	2.8	1.9	10 ~ 800	4.2	1,230	1,070	800
Ezi-SPEED-MR-104-H-200-C-R10-H	10	5.5	3.8	5 ~ 400				
Ezi-SPEED-MR-104-H-200-C-R15-H	15	8.3	5.7	3.3 ~ 266.7		1,680	1,470	
Ezi-SPEED-MR-104-H-200-C-R20-H	20	11.1	7.7	2.5 ~ 200				
Ezi-SPEED-MR-104-H-200-C-R30-H	30	16.6	11.5	1.7 ~ 133.3		2,040	1,780	
Ezi-SPEED-MR-104-H-200-C-R50-H	50	27.6	19.1	1 ~ 80				
Ezi-SPEED-MR-104-H-200-C-R100-H	100	55.3	38.3	0.25 ~ 20				

Specifications of Motor with Hollow Shaft Gearbox

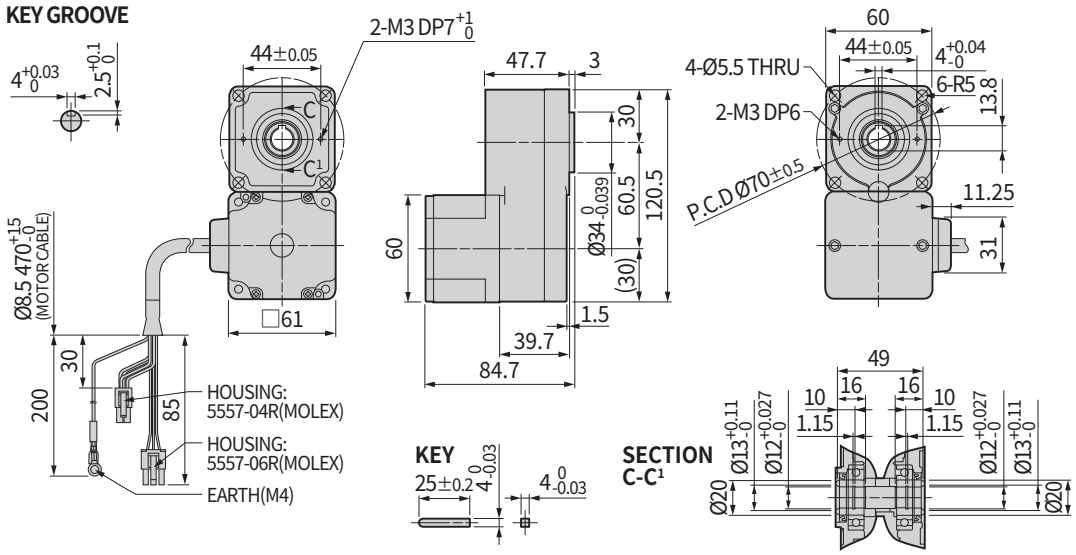
400 W

Unit Part Number	Gear Ratio	Permissible Torque [N·m]		Permissible Speed Range [r/min]	Unit Weight [kg]	Permissible Radial Load [N]		Permissible Axial Load [N]
		50 ~ 3,000 [r/min]	4,000 [r/min]			Distance from End of Shaft [mm]		
						10	20	
Ezi-SPEED-MR-104-H-400-C-R5-H	5	5.5	4.0	10 ~ 800	4.2	1,230	1,070	800
Ezi-SPEED-MR-104-H-400-C-R10-H	10	11.1	8.1	5 ~ 400				
Ezi-SPEED-MR-104-H-400-C-R15-H	15	16.6	12.1	3.3 ~ 266.7		1,680	1,470	
Ezi-SPEED-MR-104-H-400-C-R20-H	20	22.1	16.2	2.5 ~ 200				
Ezi-SPEED-MR-104-H-400-C-R30-H	30	33.2	24.2	1.7 ~ 133.3		2,040	1,780	
Ezi-SPEED-MR-104-H-400-C-R50-H	50	55.3	40.4	1 ~ 80				
Ezi-SPEED-MR-104-H-400-C-R100-H	100	110	80.8	0.5 ~ 40				

Dimensions of Motor with Hollow Shaft Gearbox [mm]

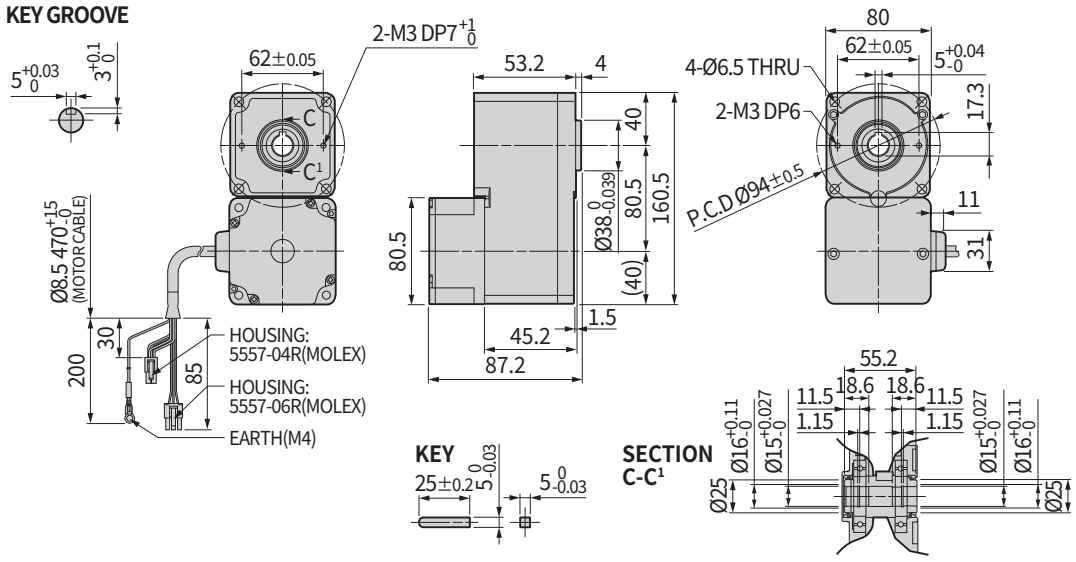
30 W

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



60 W

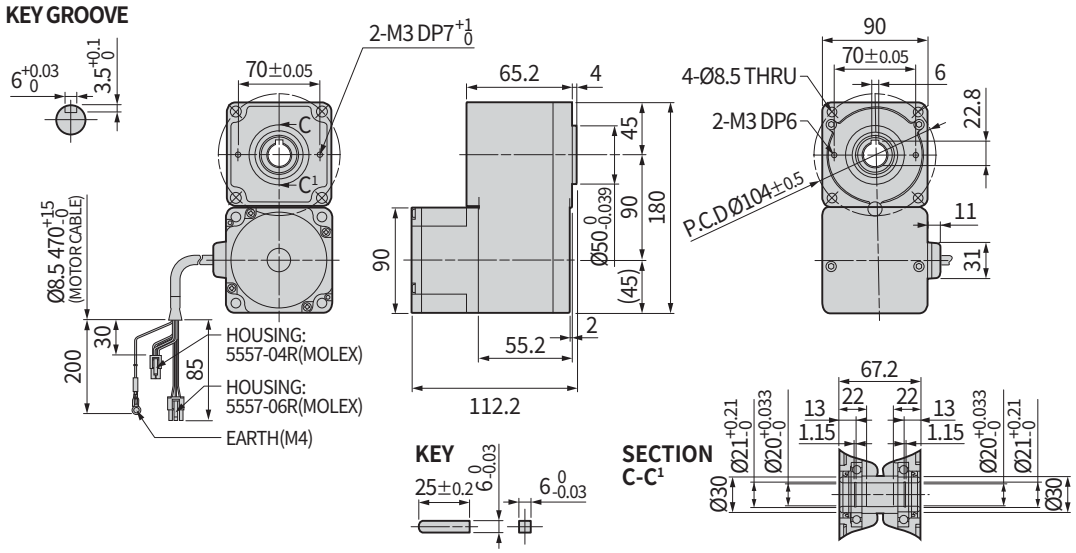
Unit Part Number	Gearbox Part Number	□Gear Ratio	Mounting Bolt
Ezi-SPEED-MR-80-H-60-C-R□-H	ESG-80-H-R□-H	5, 10, 15, 20, 30, 50, 100, 200	M6×70



Dimensions of Motor with Hollow Shaft Gearbox [mm]

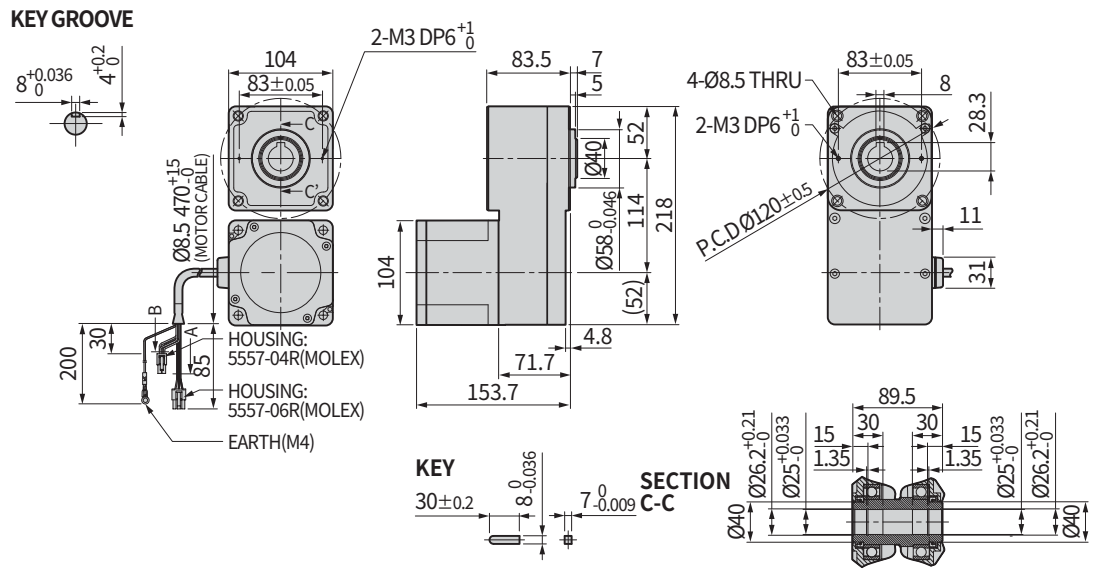
120 W

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



200 W

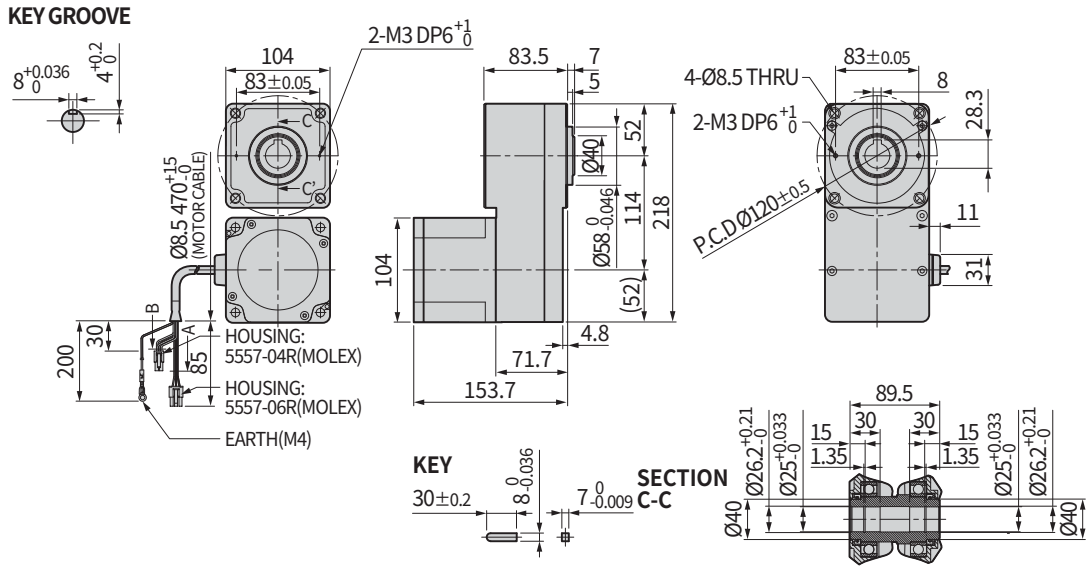
Unit Part Number	Gearbox Part Number	□Gear Ratio	Mounting Bolt
Ezi-SPEED-MR-104-H-200-C-R□-H	ESG-104-H-R□-H	5, 10, 15, 20, 30, 50, 100	M8×90



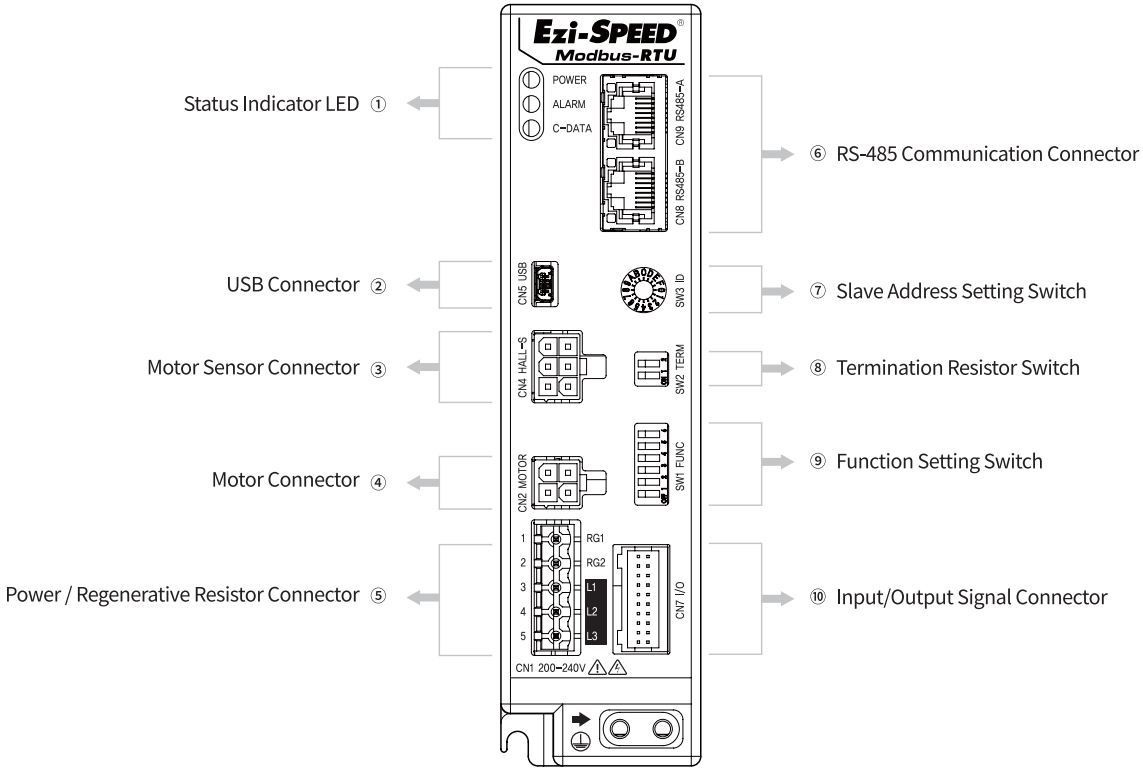
Dimensions of Motor with Hollow Shaft Gearbox [mm]

400 W

Unit Part Number	Gearbox Part Number	□Gear Ratio	Mounting Bolt
Ezi-SPEED-MR-104-H-400-C-R□-H	ESG-104-H-R□-H	5, 10, 15, 20, 30, 50, 100	M8×90



Settings and Operation



1. Name and Function of Parts

No.	Name	Function
①	Status Indicator LED	Indicates the status of the drive.
②	USB Connector (CN5)	Connects the drive to a PC.
③	Motor Sensor Connector (CN4)	Connects the motor sensor.
④	Motor Connector (CN2)	Connects the motor power.
⑤	Power / Regenerative Resistor Connector (CN1)	Connects the main power supply and the regenerative resistor.
⑥	RS-485 Communication Connector (CN8 / CN9)	Connects the RS-485 communication.
⑦	Slave Address Setting Switch (SW3)	Sets the network slave address. Max. 31 address can be set via combination with switch No.4 of Function Setting Switch(SW1).
⑧	Termination Resistor Switch (SW2)	Sets the termination resistor.
⑨	Function Setting Switch (SW1)	Sets the baudrate and additional functions.
⑩	Input/Output Signal Connector (CN7)	Connects input/output signals.

2. Status Indicator LED

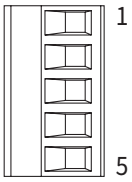
Item	Color	Function	Description
Power LED	Green	Power Status	Lights up when power is applied.
Error LED	Red	Error Status	Flashes when an error occurs.
Communication LED	Yellow	RS-485 Comm. Status	Flashes when the drive and the master communicate with RS-485.

List of Error Types by the Number of LED Blinking

No.	Error Type	Causes
1	Overcurrent	Excessive current has flown through the drive.
2	Overspeed	The rotation speed of the motor output shaft exceeds approx. 120 % of maximum speed.
5	Overtemperature	When the internal temperature of the drive exceeds the allowable temperature.
6	Overvoltage	When the back electromotive force of the motor increases and the motor driving voltage inside the drive exceeds the allowable rated voltage.
8	Hall sensor Error	There is a problem with the connection between the drive and the motor sensor.
9	Undervoltage	When the input power voltage is lower than allowable minimum voltage.
10	Initial Operation Inhibition	Power is applied while the FWD or REV input is on. The error will be activated only if the 'No Operation at Initial Run' parameter is set to 1.
11	System error	There is a problem in the internal circuit board.
12	ROM error	The stored data is damaged or the read/write of the EEPROM is failed.
13	Motor parameter error	When motor parameters are not set or are outside the normal range.
15	External stop error	When EXT-ERROR input is executed in direct IO (operates when EXT-ERROR input is set in direct IO).
18	RS-485 Comm. Error	The number of RS-485 comm. errors reaches the value set inn the 'comm error alarm' parameter.
19	RS-485 Comm. Time Out	Communication is not established for the time set in 'comm time out' parameter.

3. Power / Regenerative Resistor Connector (CN1)

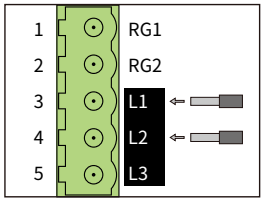
No.	Function
1	Regenerative Resistor Connection (RG1)
2	Regenerative Resistor Connection (RG2)
3	Power Input (L1)
4	Power Input (L2)
5	Power Input (L3)



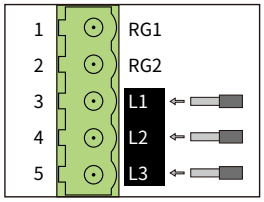
* Use RG1, RG2 terminals when connecting a regenerative resistor. A regenerative resistor can be used when the deceleration time is short or the load with large inertia is applied.
* Please refer to the manual for details of regenerative resistor specifications.

Connection Method

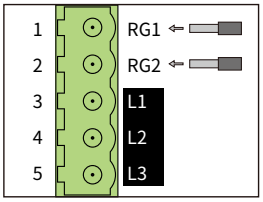
Single-Phase: 200 - 240 V



Three-Phase: 200 - 240 V



Regenerative Resistor

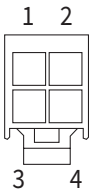


Wire Specifications

AWG18 ~ 14 (0.75 ~ 2.0 mm^2)

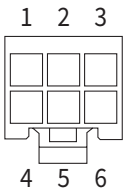
4. Motor Connector (CN2)

No.	Function	I/O
1	-	-
2	BLDC_U	Output Power
3	BLDC_W	Output Power
4	BLDC_V	Output Power



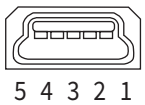
5. Motor sensor Connector (CN4)

No.	Function	I/O
1	5 V DC	Output Power
2	GND	Common
3	GND	Common
4	HALL_U	Input
5	HALL_V	Input
6	HALL_W	Input



6. USB Connector (CN5)

No.	Function
1	VBUS
2	D-
3	D+
4	-
5	GND

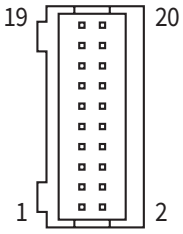


USB Connector (CN5)

Standard USB Cable (USB 2.0 Mini Type B)

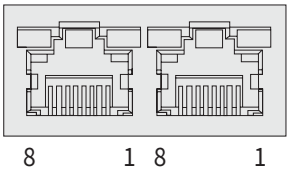
7. Input/Output Signal Connector (CN7)

No.	Function	I/O
1	HCOM	Input
2	IN0	Input
3	IN1	Input
4	IN2	Input
5	IN3	Input
6	IN4	Input
7	IN5	Input
8	IN6	Input
9	LCOM	Common
10	OUT0+	Output
11	OUT0-	Output
12	OUT1+	Output
13	OUT1-	Output
14	VH	Input
15	VM	Input
16	VL	Input
17	-	-
18	-	-
19	-	-
20	-	-

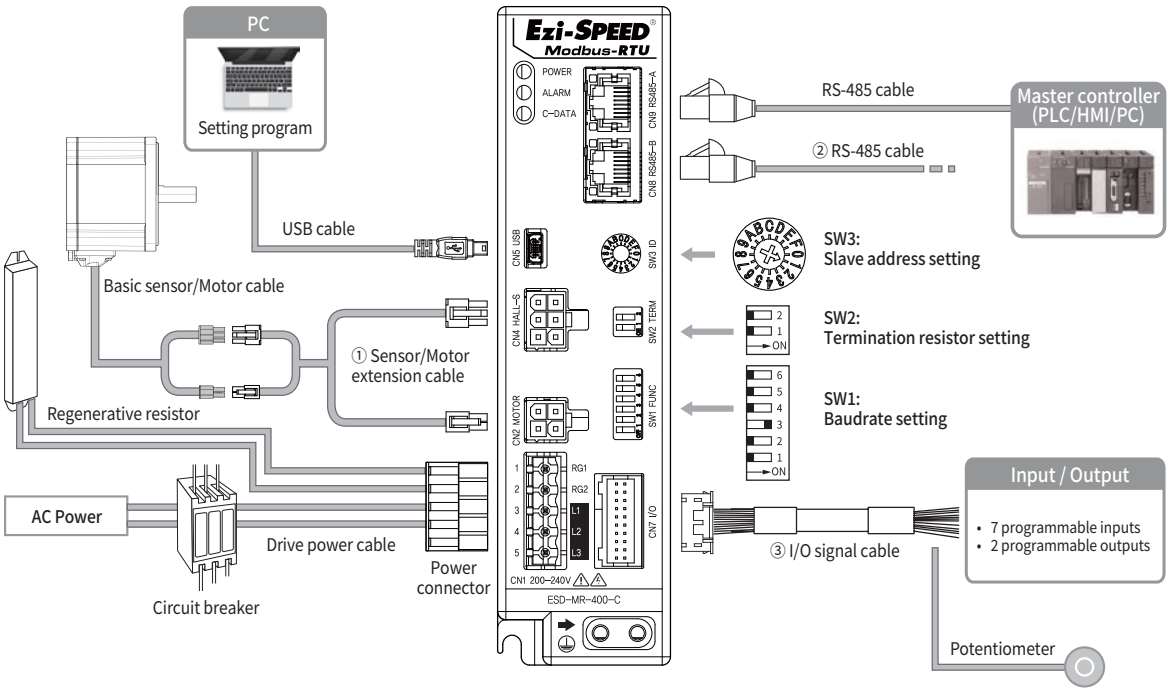


8. RS-485 Communication Connector (CN8, CN9)

No.	Function
1	GND
2	GND
3	Data+
4	GND
5	GND
6	Data-
7	GND
8	GND



System Configuration [30, 60, 120 W]



Cable Type	Max. Cable Length	Remarks
① Sensor / Motor Extension Cable	10 m	Options (Sold separately)
② RS-485 Cable	30 m	
③ I/O Signal Cable	20 m	
Sensor / Motor Cable	0.3 m	Basic cables are attached to motors.
Drive Power Cable	3 m	This cable is not provided by FASTECH.
USB Cable	5 m	* USB cables are not provided by FASTECH. We recommend using a standard USB cable (USB 2.0 Mini Type B).

1. Accessories

Connectors

These are connector specifications for drive cabling.

Purpose		Item	Part Number	Manufacturer
Power (CN1)		Terminal Block	CPF5.08-05P	STELVIO
Motor (CN2)	Drive Side (CN2)	Housing	5557-04R	MOLEX
		Terminal	5556T	
	Motor Side	Housing	5559-04P	MOLEX
		Terminal	5558T	
Sensor (CN4)	Drive Side (CN4)	Housing	5557-06R	MOLEX
		Terminal	5556T	
	Sensor Side	Housing	5559-06P	MOLEX
		Terminal	5558T	
Signal (CN7)		Housing	PADP-20V-1S	JST
		Terminal	SPH-002T-P0.5L	

2. Options

Sensor / Motor Extension Cable

These are the cables to connect the drive for 30 W, 60 W and 120 W to a sensor and a motor.

Purpose	Part Number	Length [m]	Cable Type	Remarks
1	CSPD-A-001F	1	Fixed Cable	Max. Cable Length: 10 m
2	CSPD-A-002F	2		
3	CSPD-A-003F	3		
5	CSPD-A-005F	5		
7	CSPD-A-007F	7		
10	CSPD-A-010F	10		

RS-485 Cable

These are the cables to connect the drive and the RS-485 master or the RS-485 converter.

Purpose	Part Number	Length [m]	Cable Type	Remarks
RS-485 Connection	CGNR-R-0R6F	0.6	Fixed Cable	Max. Cable Length: 30 m
	CGNR-R-001F	1		
	CGNR-R-1R5F	1.5		
	CGNR-R-002F	2		
	CGNR-R-003F	3		
	CGNR-R-005F	5		

※ If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

I/O Signal Cable

These are the cables to connect the drive and other input / output devices.

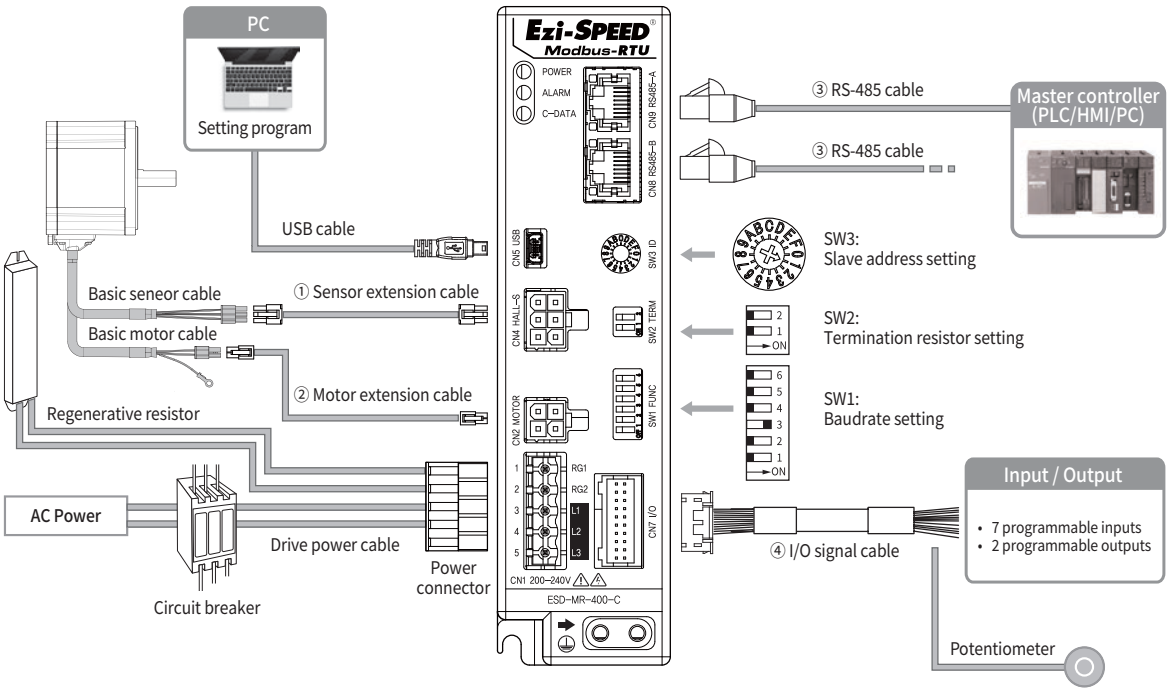
Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - I/O Device Connection	CSPD-IO-0R6F	0.6	Fixed Cable	Max. Cable Length: 20 m
	CSPD-IO-001F	1		
	CSPD-IO-002F	2		
	CSPD-IO-003F	3		
	CSPD-IO-005F	5		
	CSPD-IO-007F	7		
	CSPD-IO-010F	10		
	CSPD-IO-015F	15		
	CSPD-IO-020F	20		

Regenerative Resistor

It is used to prevent overvoltage alarms when driving a load with a short deceleration time or a large inertia.

Purpose	Part Number	Specifications		Product Image
Regenerative Resistor	BRM-A100W-400J	Resistance	400 Ω	
		Capacity	100 W	
		Cable Length	30 cm	

System Configuration [200, 400 W]



Cable Type	Max. Cable Length	Remarks
① Sensor Extension Cable	10 m	Options
② Motor Extension Cable	10 m	
③ RS-485 Cable	30 m	
④ I/O Signal Cable	20 m	
Sensor Cable	0.3 m	Basic cables are attached to motors.
Motor Cable	0.3 m	
Drive Power Cable	3 m	This cable is not provided by FASTECH.
USB Cable	5 m	* USB cables are not provided by FASTECH. We recommend using a standard USB cable (USB 2.0 Mini Type B).

1. Accessories

Connectors

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		Terminal	5556T	
	Motor Side	Housing	5559-04P	MOLEX
		Terminal	5558T	
Sensor (CN4)	Drive Side (CN4)	Housing	5557-06R	MOLEX
		Terminal	5556T	
	Sensor Side	Housing	5559-06P	MOLEX
		Terminal	5558T	
Signal (CN7)		Housing	PADP-20V-1S	JST
		Terminal	SPH-002T-P0.5L	

2. Options

Sensor Extension Cable

These are the cables to connect the drive for 200 W and 400 W to a sensor.

Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - Basic Sensor Cable Connection	CSPD-S-001F	1	Fixed Cable	Max. Cable Length: 10 m
	CSPD-S-002F	2		
	CSPD-S-003F	3		
	CSPD-S-005F	5		
	CSPD-S-007F	7		
	CSPD-S-010F	10		

Motor Extension Cable

These are the cables to connect the drive for 200 W and 400 W to a motor.

Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - Basic Motor Cable Connection	CSPD-M-001F	1	Fixed Cable	Max. Cable Length: 10 m
	CSPD-M-002F	2		
	CSPD-M-003F	3		
	CSPD-M-005F	5		
	CSPD-M-007F	7		
	CSPD-M-010F	10		

RS-485 Cable

These are the cables to connect the drive and the RS-485 master or the RS-485 converter.

Purpose	Part Number	Length [m]	Cable Type	Remarks
RS-485 Connection	CGNR-R-0R6F	0.6	Fixed Cable	Max. Cable Length: 30 m
	CGNR-R-001F	1		
	CGNR-R-1R5F	1.5		
	CGNR-R-002F	2		
	CGNR-R-003F	3		
	CGNR-R-005F	5		

※ If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

I/O Signal Cable

These are the cables to connect the drive and other input/output devices.

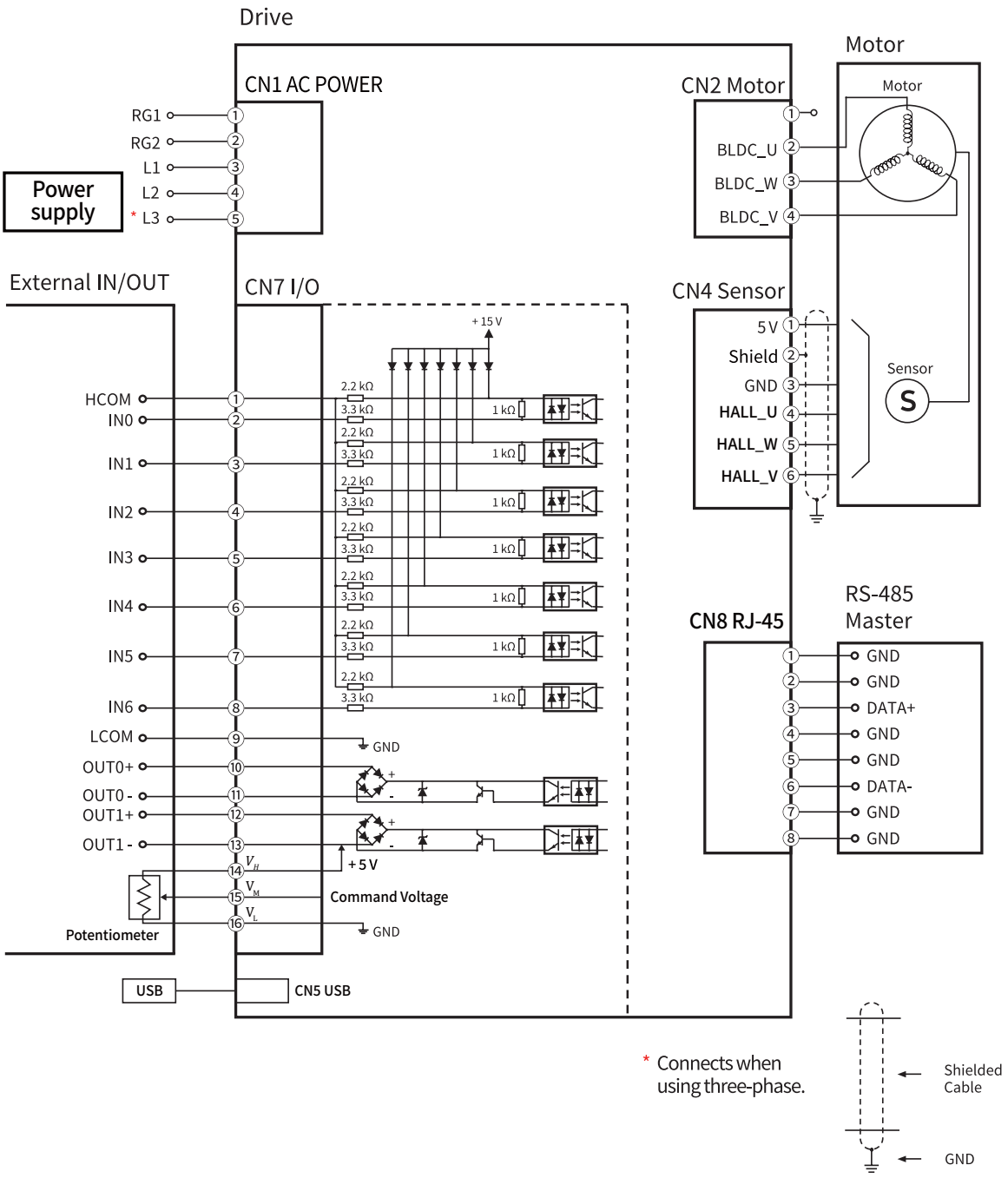
Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - I/O Device Connection	CSPD-IO-0R6F	0.6	Fixed Cable	Max. Cable Length: 20 m
	CSPD-IO-001F	1		
	CSPD-IO-002F	2		
	CSPD-IO-003F	3		
	CSPD-IO-005F	5		
	CSPD-IO-007F	7		
	CSPD-IO-010F	10		
	CSPD-IO-015F	15		
	CSPD-IO-020F	20		

Regenerative Resistor

It is used to prevent overvoltage alarms when driving a load with a short deceleration time or a large inertia.

Purpose	Part Number	Specifications		Product Image
Regenerative Resistor	BRM-A100W-400J	Resistance	400 Ω	
		Capacity	100 W	
		Cable Length	30 cm	

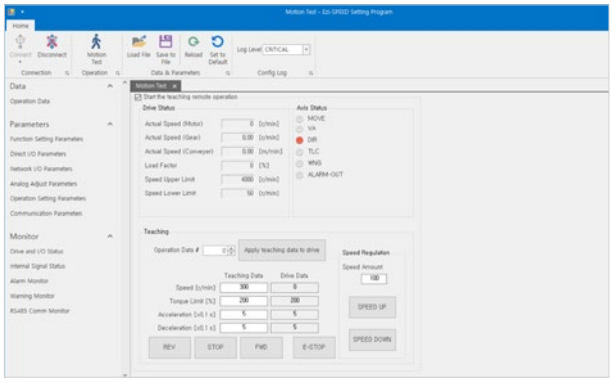
External Wiring Diagram



In order to use the products listed in this catalog safely and correctly,
be sure to read the instruction manual before using the product.

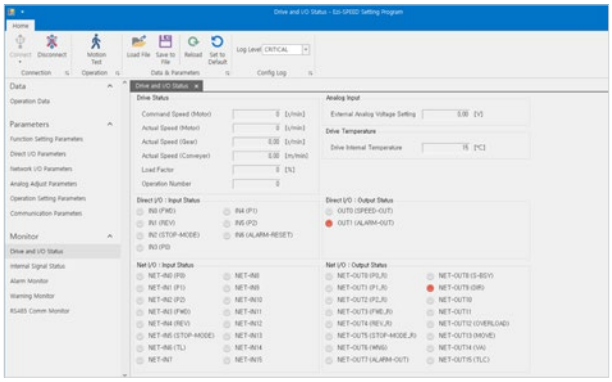
When connecting I/O cable between controller and drive, please turn of the power of both controller and drive to prevent electric shock or to protect the drive from any damage.

Ezi-SPEED Setting Program



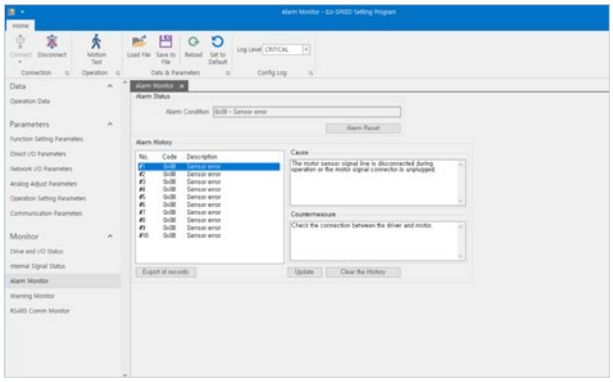
Motion Test

The operation of the drive can be easily tested.



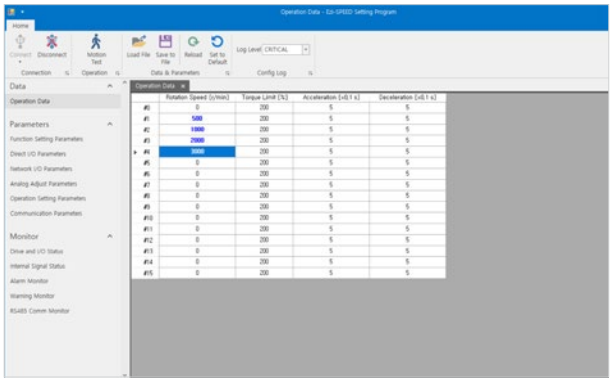
Drive and I/O Status

The drive status, input/output status, and NET command & NET status can be checked.



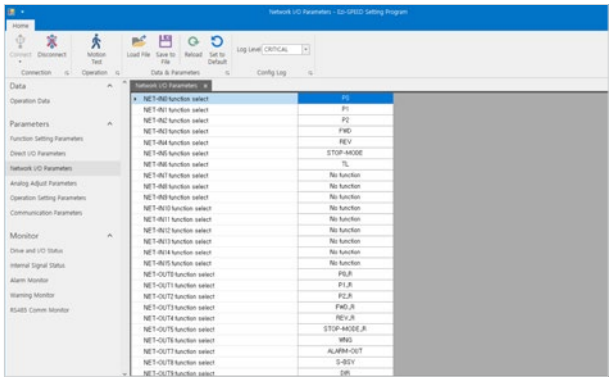
Alarm Monitor

Alarm, warning, and communication errors can be monitored.



Operation Data

Up to 16 motor operation data can be set, and the changes are automatically saved to the drive.



Parameters

Various parameters can be configured, and the changes are automatically saved to the drive.

※ Ezi-SPEED Setting program can be downloaded from the website (www.fastech-motions.com).
※ Ezi-SPEED Setting program supports Windows 7/8/10.
※ Ezi-SPEED Setting program may change without notice for performance improvement.

MEMO

MEMO

MEMO

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