Oriental motor

Speed Control Motor and Controller Package

US2 Series

US2
SERIES

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Speed Control Motor and Controller Package

US2 Series

Output Power: 6 W ～ 90 W

Advanced speed control motor.
Sophistication and high performance with greater usability.

One-class higher performance and reliability by advanced D-loop.

Easy-to-use functions and stylish look.

US2 Series, fully-redesigned from the **US** Series, has been greatly advanced in all aspects.

We strongly recommend this product to all the customers who uses speed control motors.

D-loop uses the AC motor for speed control and the speed controller implementing unique technology only from ORIENTAL MOTOR.

D-loop provides high reliability using closed loop control and compactness of the speed controller from the digitized phase control circuit.

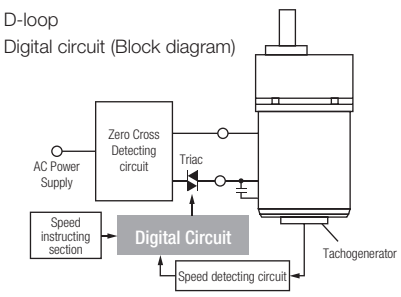
Digitization of control circuit

Digitization applied to most of the conventional analog circuit, which was then incorporated into the CPU, resulting in significant reduction of the circuit volume. This enables us to achieve compactness and competitive prices.

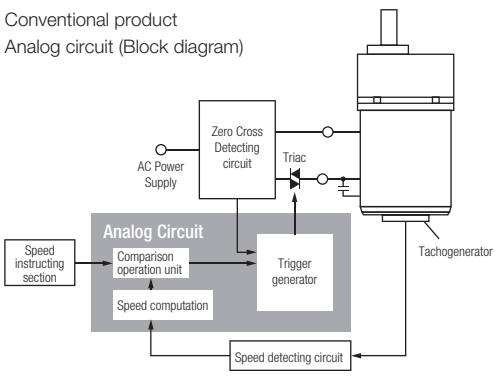
In addition, using the digitization, the deviation between the speed command value and the speed detection value can become closer to zero, improving the speed variation from −5% to ±1% (reference)*.

＊Between 0 and the permissible torque 1000 r/min

D-loop
Digital circuit (Block diagram)



Conventional product
Analog circuit (Block diagram)



Easy operation

With the digital display panel and setting dial installed, you can intuitively operate the motor, like "turn as needed and push".
The operation setting is simple to use without using manual.

Turn the dial to set desired value and the speed.

Variable Speed Range
50 Hz: 90～1400 r/min
60 Hz: 90～1600 r/min

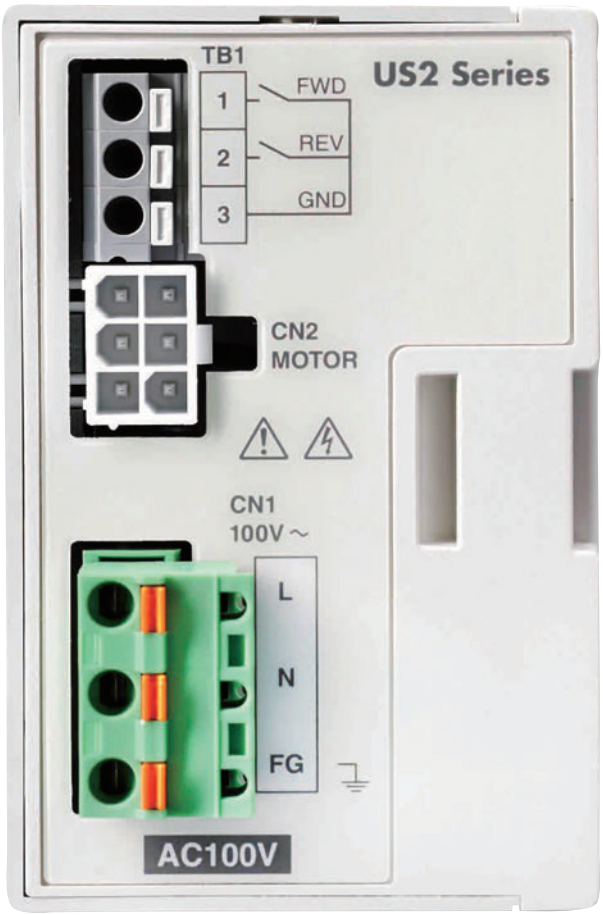
[Start/Stop]

[Switching the Rotation Direction]

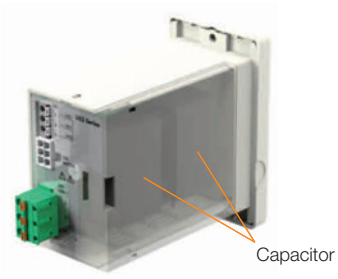
You can switch start/stop or rotation direction by just one switch operation.
No external switch is required.

Simple wiring

Simply connect the motor with the speed controller and the power supply, the controller will start right away.
The connectors and built-in capacitor of the speed controller save you from wiring problem.



Simple connection using the connector between the motor and the speed controller.
The distance between the motor and the speed controller can be extended up to 10.5 m.



The built-in capacitor do not require wire connection, hence saving space.

Advanced performance

Varies of improvements have been implemented including portions not clearly distinguished from the appearance.

This series adopts the motor gearhead with high permissible torque and high strength.

D-loop achieves stable operation with small speed fluctuation.

Less noise makes the system configuration simple.

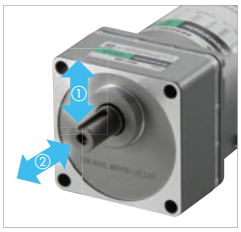
You will realize certain advancement once using the product.

Motor gearhead with high permissible torque and high strength

This series uses the motor and gearhead of the **KII** Series.

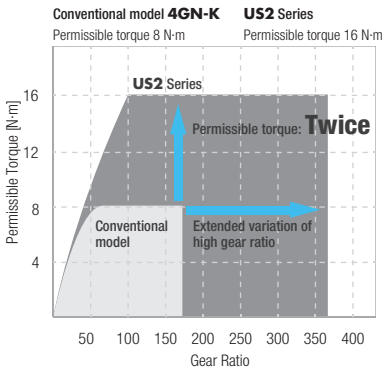
The gearhead has been strengthened by using a case with its rigidity enhanced with our unique side plate and heat-treated gear.

Parallel Shaft Combination Type "For Gearhead with holding angle of 80 mm"



① Permissible Radial Load 450 N
(10 mm from the tip of the output shaft)

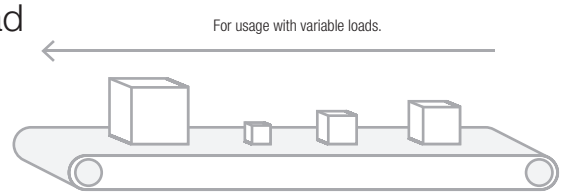
② Permissible Axial Load 100 N



Rated Life of Gearheads
10000 hours (Twice the hours of the conventional product)

Stable operation even with fluctuated load

The rate generator installed in the AC motor always check the speed, thus maintaining the set speed even when the load fluctuates.
In addition, digitization of the control circuit has improved the speed regulation from −5% to ±1% (reference value).

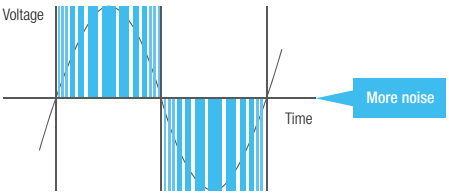


Speed Regulation (For load) ±1%※ (Reference value)
※Between 0 and the permissible torque 1000 r/min

Simple system configuration with low noises

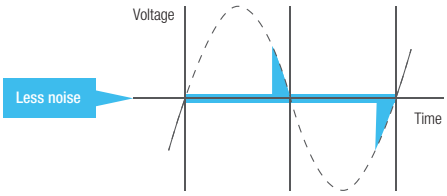
The motor and speed controller used for the **US2** Series can emit little inherent noises.
No peripherals require to reduce noise, hence able to achieve space saving and reduce installation work and cost.

Inverter + Three-Phase motor [PWM control]



Controlled voltage and frequency 300 times of switching per cycle
[Condition] ● Carrier frequency: 15 kHz
● Set frequency: 50 Hz

US2 Series [Phase control]



Controlled voltage 2 times of switching per cycle
[Condition] ● Power supply frequency: 50 Hz

Actual size

Useful functions

Open the front panel, you can set variety of functions.
For example, you can easily start or stop the motor,
or lock data setting to prevent the set speed from changing.
Useful functions will support customers from every perspective.

1 Main Functions

The functions can be set with the FUNCTION key.

Indication

You can set the display settings of the gear output shaft speed and conveyor transportation speed.

Selection of moving direction

You can select which one to use for operation: the switch on the front panel or external instructions.

Data protection (Lock)

The data setting can be locked to prevent the set speed from changing.

2 Smooth operation when starting/stopping

Acceleration/deceleration time can be set with the use of acceleration/deceleration time potentiometer.

Setting time: 0.1 ～ 15.0 seconds (By factory default, fixed to 1 second)

※ The acceleration/deceleration time potentiometer must be enabled in advance by the FUNCTION key.

● The instantaneous stop function is not available.

3 Protection of Speed Controller

When overheating, connection failure, or locking occurs in the motor, an alarm is displayed to protect the motor speed controller.

Lineup

Parallel Shaft Combination Type
Maximum Permissible Torque 40 N·m

Output Power	6 W/15 W/25 W/40 W/60 W/90 W
Power Supply Voltage	Single-Phase 110 VAC/115 VAC Single-Phase 220 VAC/230 VAC

Round Shaft Type
Maximum Permissible Torque 0.73 N·m

Output Power	6 W/15 W/25 W/40 W/60 W/90 W
Power Supply Voltage	Single-Phase 110 VAC/115 VAC Single-Phase 220 VAC/230 VAC

●For price and leadtime, please contact the nearest Oriental Motor sales office.

A motor and a gearhead pre-assembled

The combination type comes with a motor and a gearhead pre-assembled, providing the following advantages.

MERIT

01. Easy installation of Motor/Gearhead to Equipment

Do not require hands-on support when installing both motor and gearhead.

02. Do not worry about motor pinion shaft been damaged

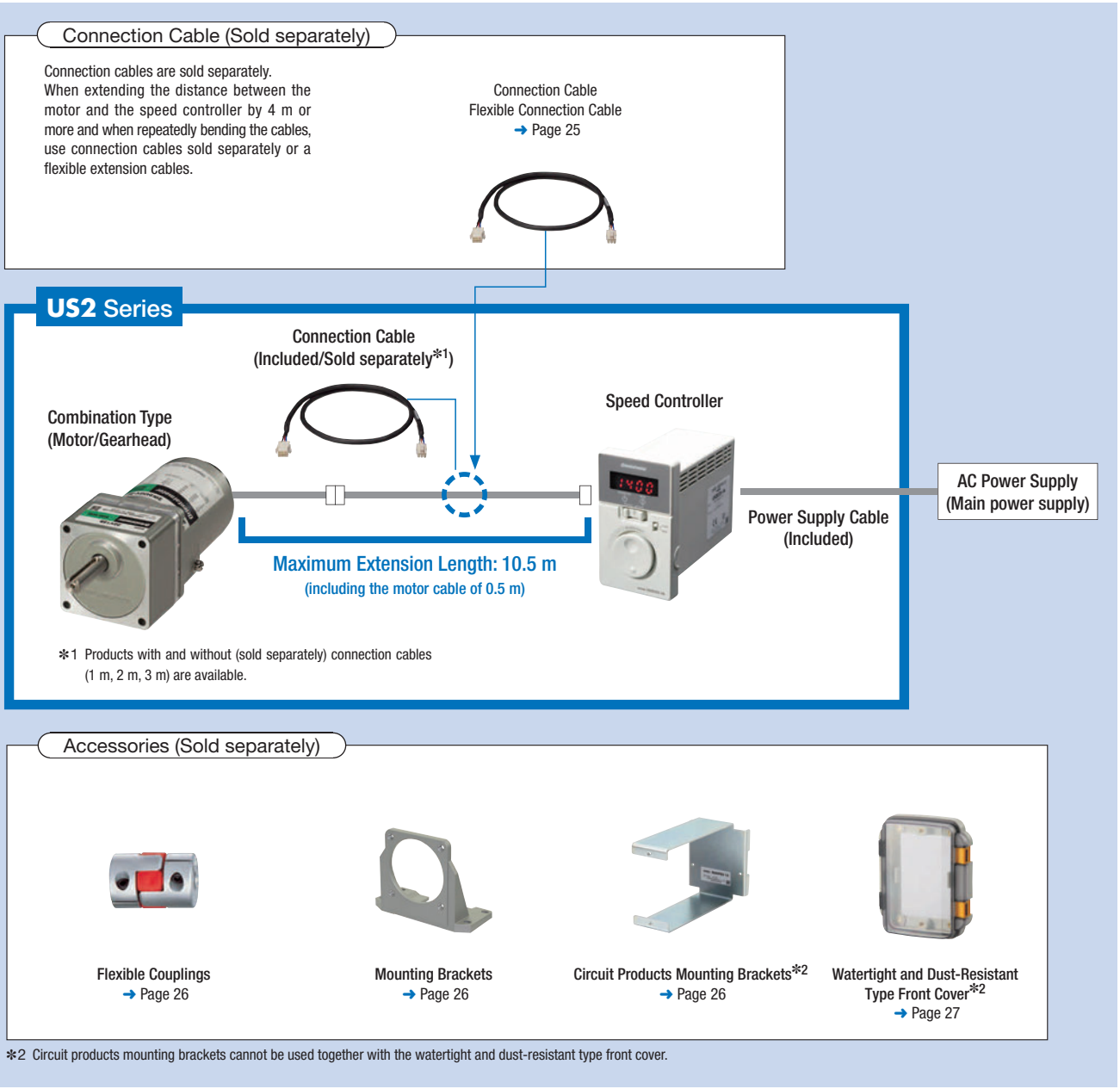
The motor pinion shaft will not be damage accidentally at the time of installation, thus no noise emitted from the gear teeth.

03. The gearhead can be replaced. (For Parallel Shaft Combination Type)

For the parallel shaft combination type, the gearhead can be easily replaced when changing the gear ratio.

System Configuration

Parallel Shaft Combination Type



*2 Circuit products mounting brackets cannot be used together with the watertight and dust-resistant type front cover.

System Configuration

US2 Series		Sold Separately			
		Connection Cable (5 m)	Mounting Bracket	Flexible Coupling	Circuit Products Mounting Bracket
US2-425EC-18-3	+	CC05SC	SOL4M6F	MCL401515	MADP05-15

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

Parallel Shaft Combination Type
Round Shaft Type

Parallel Shaft Combination Type

Types

Combination Type	The combination type comes with a motor and a gearhead pre-assembled. The combination of the motor and the gearhead can be changed. They are also available separately. You can remove the gearhead to change the installation position by 90°.

- Connection cable included: The price includes the prices of the motor, geared, speed controller, connection cable (1 m, 2 m and 3 m).
- Connection cable sold separately: The price includes the prices of the motor, gearhead, and speed controller.Connection cables are sold separately, and available with the combination type or the round shaft type.

Parallel Shaft Combination Type

Output Power	Power Supply Voltage	Product Name	Gear Ratio
6 W	Single-Phase 110/115 VAC	US2-26UA-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36
			50, 60, 75, 90, 100, 120, 150, 180
			250, 300, 360
	Single-Phase 220/230 VAC	US2-26EC-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36
			50, 60, 75, 90, 100, 120, 150, 180
			250, 300, 360
15 W	Single-Phase 110/115 VAC	US2-315UA-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36
			50, 60, 75, 90, 100, 120, 150, 180
			250, 300, 360
	Single-Phase 220/230 VAC	US2-315EC-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36
			50, 60, 75, 90, 100, 120, 150, 180
			250, 300, 360
25 W	Single-Phase 110/115 VAC	US2-425UA-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36
			50, 60, 75, 90, 100, 120, 150, 180
			250, 300, 360
	Single-Phase 220/230 VAC	US2-425EC-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36
			50, 60, 75, 90, 100, 120, 150, 180
			250, 300, 360
40 W	Single-Phase 110/115 VAC	US2-540UA-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36
			50, 60, 75, 90, 100, 120, 150, 180
			250, 300
	Single-Phase 220/230 VAC	US2-540EC-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36
			50, 60, 75, 90, 100, 120, 150, 180
			250, 300
60 W	Single-Phase 110/115 VAC	US2-560UA-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36, 50, 60, 75, 90, 100
			120, 150, 180
			250, 300
	Single-Phase 220/230 VAC	US2-560EC-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36, 50, 60, 75, 90, 100
			120, 150, 180
			250, 300
90 W	Single-Phase 110/115 VAC	US2-590UA-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36, 50, 60
			75, 90, 100, 120, 150, 180
	Single-Phase 220/230 VAC	US2-590EC-□■	5, 6, 7.5, 9, 12.5, 15, 18
			25, 30, 36, 50, 60
			75, 90, 100, 120, 150, 180

The following items are included in each product.

Motor, Gearhead, Speed controller, Installation screws, Parallel key, Connection cable*, Power supply cable (2 m), Operating manual, Startup guide

* Only with products supplied with a connection cable.

- A number in the box □ in the product name indicates the gear ratio. When the accessory connection cable is supplied, a number indicating the length of the cable, **-1** (1 m), **-2** (2 m), or **-3** (3 m), is specified in the box ■ in the product name.
- The product above comes with a power supply cable. Products without a power supply cable are also available. For details, please contact the nearest Oriental Motor sales office.

Round Shaft Type

Output Power	Power Supply Voltage	Product Name
6 W	Single-Phase 110/115 VAC	**US2-26UA-A□**
	Single-Phase 220/230 VAC	**US2-26EC-A□**
15 W	Single-Phase 110/115 VAC	**US2-315UA-A□**
	Single-Phase 220/230 VAC	**US2-315EC-A□**
25 W	Single-Phase 110/115 VAC	**US2-425UA-A□**
	Single-Phase 220/230 VAC	**US2-425EC-A□**
40 W	Single-Phase 110/115 VAC	**US2-540UA-A□**
	Single-Phase 220/230 VAC	**US2-540EC-A□**
60 W	Single-Phase 110/115 VAC	**US2-560UA-A□**
	Single-Phase 220/230 VAC	**US2-560EC-A□**
90 W	Single-Phase 110/115 VAC	**US2-590UA-A□**
	Single-Phase 220/230 VAC	**US2-590EC-A□**

The following items are included in each product.

Motor, Speed controller, Connection cable*, Power supply cable (2 m), Operating manual, Startup guide

* Only with products supplied with a connection cable.

- A number in the box □ in the product name indicates the gear ratio. When the accessory connection cable is supplied, a number indicating the length of the cable, **-1** (1 m), **-2** (2 m), or **-3** (3 m), is specified in the box ■ in the product name.
- The product above comes with a power supply cable. Products without a power supply cable are also available. For details, please contact the nearest Oriental Motor sales office.

Connection Cables (Sold separately)

Product Name	Length L (m)
CC01SC	1
CC02SC	2
CC03SC	3
CC05SC	5
CC10SC	10

Flexible Connection Cables (Sold separately)

Product Name	Length L (m)
CC01SCR	1
CC02SCR	2
CC03SCR	3
CC05SCR	5
CC10SCR	10

- Refer to page 25 for details on connection cables and flexible connection cables.

Product Number Code

US2 - 4 25 EC - 50 - 3

① ② ③ ④ ⑤ ⑥

①	Series Name	**US2**: **US2** Series
②	Motor Frame Size	**2**: 60 mm **3**: 70 mm **4**: 80 mm **5**: 90 mm
③	Output Power (W)	(e.g.) **25**: 25 W
④	Power Supply Voltage	**UA**: Single-Phase 110/115 VAC **EC**: Single-Phase 220/230 VAC
⑤	Gear Ratio/Shaft Configuration	Number: Gear Ratio for Combination Type **A**: Round Shaft Type
⑥	Connection Cable	Number: Motor Cable is included Length **-1**: 1 m **-2**: 2 m **-3**: 3 m None: Cable sold separately

- Examples of product names that indicate connection cable availability and length
  3 m connection cable included ➜ **US2-425EC-50-3**
  Connection cable sold separately ➜ **US2-425EC-50**

Specifications Continuous Rating

Single-Phase 110/115 VAC, Single-Phase 220/230 VAC

Product Name	Maximum Output Power W	Voltage VAC	Frequency Hz	Variable Speed Range r/min	Permissible Torque 1200 r/min (50 Hz) / 1450 r/min (60 Hz) mN·m	Permissible Torque 90 r/min mN·m	Starting Torque mN·m	Current A	Power Consumption W	Motor Overheat Protection Device
US2-26UA-□■	6	Single-Phase 110	60	90～1600	50	38	40	0.31	29	ZP
		Single-Phase 115								
US2-26EC-□■		Single-Phase 220	50	90～1400	42	40	44	0.17	29	ZP
			60	90～1600	46					
		Single-Phase 230	50	90～1400	46	37	44			
			60	90～1600	50	39	50			
US2-315UA-□■	15	Single-Phase 110	60	90～1600	120	45	84	0.51	46	TP
		Single-Phase 115			125		90			
US2-315EC-□■		Single-Phase 220	50	90～1400	125	40	67	0.26	43	TP
			60	90～1600	110				46	
		Single-Phase 230	50	90～1400	125		72		44	
			60	90～1600	120		81		47	
US2-425UA-□■	25	Single-Phase 110	60	90～1600	205	45	125	0.78	58	TP
		Single-Phase 115					135		69	
US2-425EC-□■		Single-Phase 220	50	90～1400	205	40	110	0.40	70	TP
			60	90～1600						
		Single-Phase 230	50	90～1400			120			
			60	90～1600						
US2-540UA-□■	40	Single-Phase 110	60	90～1600	320	70	180	1.1	107	TP
		Single-Phase 115					190			
US2-540EC-□■		Single-Phase 220	50	90～1400	320	65	190	0.58	96	TP
			60	90～1600		70			104	
		Single-Phase 230	50	90～1400		65			99	
			60	90～1600		70			105	
US2-560UA-□■	60	Single-Phase 110	60	90～1600	460	80	260	1.5	144	TP
		Single-Phase 115			490		280		145	
US2-560EC-□■		Single-Phase 220	50	90～1400	490	80	280	0.74	129	TP
			60	90～1600	460	75	290	0.77	143	
		Single-Phase 230	50	90～1400	490	85	290	0.75	132	
			60	90～1600		80	300	0.77	144	
US2-590UA-□■	90	Single-Phase 110	60	90～1600	730	85	400	2.4	224	TP
		Single-Phase 115					440	2.5	227	
US2-590EC-□■		Single-Phase 220	50	90～1400	730	95	490	1.2	201	TP
			60	90～1600			500	1.3	226	
		Single-Phase 230	50	90～1400			520	1.2	204	
			60	90～1600			530	1.3	228	

● The specifications apply to the motor only. The variable speed ranges shown are under no load conditions.

ZP: These products are impedance protected.

TP: This indicates that there is a built-in thermal protector (automatic return type).

● A number in the box □ in the combination type product name indicates the gear ratio. For the Round Shaft Type, **A** is entered.
When the accessory connection cable is supplied, a number indicating the length of the cable, **-1** (1 m), **-2** (2 m), or **-3** (3 m), is specified in the box ■ in the product name.

Common Specifications

Item		Specifications
Speed Setting Methods		Digital setting by the dial (Speed can be set in 1 r/min increments)
Variable Speed Range		50 Hz: 90～1400 r/min　60 Hz: 90～1600 r/min Default: 90 r/min
Acceleration/Deceleration Time		0.1～15.0 seconds (Default: Fixed to 1.0 second) Acceleration time/deceleration time varies with the load condition of the motor.
Function	Parameters	Gear ratio, Speed up ratio, Fixed display of the lower first digit, Prohibition alarm of operation at the initial setting, Upper and lower limits of speed, Acceleration and deceleration time, External operating signals, Data initialization
	Monitoring	Rotation speed, Input signals
	Others	Locking of data editing
Input Signals		Photocoupler Input　Input Resistance 2 kΩ Two input points: FWD input and REV input
Protective Functions		When the following protective functions are activated, the motor will coast to a stop, and the alarm code will appear on the control panel. Alarm types: Motor overheat, Motor lock, Improper motor connection, EEPROM error, Prohibition of operation at the initial setting
Maximum Extension Length		Motor and Speed Controller Distance　10.5 m (including 0.5 m of the motor cable)

General Specifications

Item		Motor	Speed Controller
Insulation Resistance		100 MΩ or more when 500 VDC megger is applied between the windings and the case after continuous operation under normal ambient temperature and humidity.	The value is 100 MΩ or more when measured by a 500 VDC megger between the main circuit terminal and the input signal terminal, between the main circuit terminal and the case, and between the main circuit and FG after continuous operation under normal ambient temperature and humidity.
Dielectric Strength		No abnormality is judged even with application of 1.5 kVAC at 50 Hz or 60 Hz between the windings and the case for 1 minute after continuous operation under normal ambient temperature and humidity.	No abnormality is judged even with application of 1.9 kVAC at 50 Hz or 60 Hz between the main circuit terminal and the input signal terminal and between the main circuit terminal and the case, and 1.5 kVAC at 50 Hz or 60 Hz between the main circuit terminal and FG for 1 minute after continuous operation under normal ambient temperature and humidity.
Temperature Rise		A gearhead or equivalent heat sink*1 is connected to the motor and the winding temperature rise is measured at 80˚C or less using the resistance change method after continuous operation with no load under normal ambient temperature and humidity.	—
Overheat Protection Device		The 6 W type is impedance protected. All other motors have a built-in thermal protector (automatic return type).	—
Operating Environment	Ambient Temperature	Single-Phase 110/115 VAC, Single-Phase 220/230 VAC: −10～+40 ˚C (Non-freezing)	0～+50 ˚C (Non-freezing)
	Ambient Humidity	85% or less (Non-condensing)	
	Altitude	Up to 1000 m above sea level	
	Atmosphere	No corrosive gases or dust. Not exposed to water or oil Cannot be used in a radioactive area, magnetic field, vacuum, or other special environments.	
	Vibration	Not subject to continuous vibration or excessive shock　Conforms to JIS C 60068-2-6　"Sine-wave vibration test method" Frequency range: 10～55 Hz　Pulsating amplitude: 0.15 mm　Sweep direction: 3 directions (X, Y, Z)　Number of sweeps: 20 times	
Storage Conditions*2	Ambient Temperature	−25～+70 ˚C (Non-freezing)	−25～+70 ˚C (Non-freezing)
	Ambient Humidity	85% or less (Non-condensing)	
	Altitude	Up to 3000 m above sea level	
	Atmosphere	No corrosive gases or dust. Not exposed to water or oil Cannot be used in a radioactive area, magnetic field, vacuum, or other special environments.	
Heat-resistant Class		130 (B)	—
Degree of Protection		IP20	IP20

*1 Heat sink size (Material: Aluminum)

Motor Output Power	Size (mm)	Thickness (mm)
6 W	115×115	5
15 W	125×125	
25 W	135×135	
40 W	165×165	
60 W	200×200	
90 W	200×200	

*2 The storage condition applies to a short period such as a period during transportation.

Note

● Do not measure insulation resistance or perform the dielectric strength test while the motor and speed controller are connected.

Output Shaft Speed of the Combination Type

Motor Shaft Speed

Low speed: 90 r/min, High speed 50 Hz: 1400 r/min, High speed 60 Hz: 1600 r/min

Unit: r/min

Gear Ratio		5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180	250	300	360
High Speed	50 Hz	280	233	186	155	112	93	77	56	46	38	28	23	18.6	15.5	14	11.6	9.3	7.7	5.6	4.6	3.8
	60 Hz	320	266	213	177	128	106	88	64	53	44	32	26	21	17.7	16	13.3	10.6	8.8	6.4	5.3	4.4
Low Speed		18	15	12	10	7.2	6	5	3.6	3	2.5	1.8	1.5	1.2	1	0.9	0.75	0.6	0.5	0.36	0.3	0.25

Permissible Torque of Combination Type

A colored background indicates gear shaft rotation in the same direction as the motor shaft. Others rotate in the opposite direction.

Single-Phase 110/115 VAC

Unit: N·m

Product Name	Gear Ratio / Motor Shaft Speed r/min		5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180	250	300	360
US2-26UA	1450		0.23	0.27	0.34	0.41	0.56	0.68	0.81	1.1	1.3	1.5	2.2	2.6	3.2	3.9	4.3	5.2	6	6	6	6	6
	90		0.17	0.21	0.26	0.31	0.43	0.51	0.62	0.86	0.98	1.2	1.6	2.0	2.5	2.9	3.3	3.9	4.6	5.5	6	6	6
US2-315UA	1450	110 V	0.54	0.65	0.81	0.97	1.4	1.6	1.9	2.7	3.1	3.7	5.2	6.2	7.7	9.3	10	10	10	10	10	10	10
		115 V	0.56	0.68	0.84	1.0	1.4	1.7	2.0	2.8	3.2	3.9	5.4	6.5	8.1	9.7	10	10	10	10	10	10	10
	90		0.20	0.24	0.30	0.36	0.51	0.61	0.73	1.0	1.2	1.4	1.9	2.3	2.9	3.5	3.9	4.6	5.5	6.6	9.1	10	10
US2-425UA	1450		0.92	1.1	1.4	1.7	2.3	2.8	3.3	4.6	5.3	6.3	8.8	10.6	13.2	15.9	16	16	16	16	16	16	16
	90		0.20	0.24	0.30	0.36	0.51	0.61	0.73	1.0	1.2	1.4	1.9	2.3	2.9	3.5	3.9	4.6	5.5	6.6	9.1	10.9	13.1
US2-540UA	1450		1.4	1.7	2.2	2.6	3.6	4.3	5.2	6.9	8.3	9.9	13.8	16.5	20.6	24.8	27.5	30	30	30	30	30	–
	90		0.32	0.38	0.47	0.57	0.79	0.95	1.1	1.5	1.8	2.2	3.0	3.6	4.5	5.4	6.0	6.8	8.5	10.2	14.2	17.0	–
US2-560UA	1450	110 V	2.1	2.5	3.1	3.7	5.2	6.2	7.5	9.9	11.9	14.2	19.8	23.7	29.7	30	30	30	30	30	30	30	–
		115 V	2.2	2.6	3.3	4.0	5.5	6.6	7.9	10.5	12.6	15.2	21.1	25.3	30	30	30	30	30	30	30	30	–
	90		0.36	0.43	0.54	0.65	0.90	1.1	1.3	1.7	2.1	2.5	3.4	4.1	5.2	6.2	6.9	7.8	9.7	11.7	16.2	19.4	–
US2-590UA	1450		3.3	3.9	4.9	5.9	8.2	9.9	11.3	15.7	18.8	22.6	31.4	37.7	40	40	40	40	40	40	–	–	–
	90		0.38	0.46	0.57	0.69	0.96	1.1	1.3	1.8	2.2	2.6	3.7	4.4	5.2	6.2	6.9	8.3	10.3	12.4	–	–	–

Single-Phase 220/230 VAC

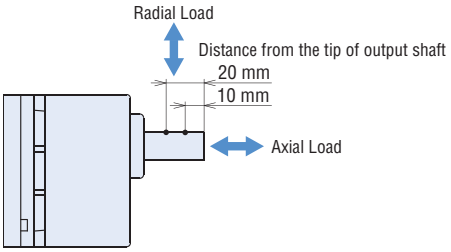
Unit: N·m

Product Name	Gear Ratio / Motor Shaft Speed r/min		5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180	250	300	360
US2-26EC	1200	220 V 50 Hz	0.19	0.23	0.28	0.34	0.47	0.57	0.68	0.95	1.1	1.3	1.8	2.2	2.7	3.3	3.6	4.3	5.1	6	6	6	6
		230 V 50 Hz	0.21	0.25	0.31	0.37	0.52	0.62	0.75	1.0	1.2	1.4	2.0	2.4	3.0	3.6	4.0	4.7	5.6	6	6	6	6
	1450	220 V 60 Hz	0.21	0.25	0.31	0.37	0.52	0.62	0.75	1.0	1.2	1.4	2.0	2.4	3.0	3.6	4.0	4.7	5.6	6	6	6	6
		230 V 60 Hz	0.23	0.27	0.34	0.41	0.56	0.68	0.81	1.1	1.3	1.5	2.2	2.6	3.2	3.9	4.3	5.2	6	6	6	6	6
	90	220 V 50/60 Hz	0.18	0.22	0.27	0.32	0.45	0.54	0.65	0.90	1.0	1.2	1.7	2.1	2.6	3.1	3.4	4.1	4.9	5.8	6	6	6
		230 V 50 Hz	0.17	0.20	0.25	0.30	0.42	0.50	0.60	0.83	0.95	1.1	1.6	1.9	2.4	2.9	3.2	3.8	4.5	5.4	6	6	6
		230 V 60 Hz	0.18	0.21	0.26	0.32	0.44	0.53	0.63	0.88	1.0	1.2	1.7	2.0	2.5	3.0	3.4	4.0	4.7	5.7	6	6	6
US2-315EC	1200	50 Hz	0.56	0.68	0.84	1.0	1.4	1.7	2.0	2.8	3.2	3.9	5.4	6.5	8.1	9.7	10	10	10	10	10	10	10
	1450	220 V 60 Hz	0.50	0.59	0.74	0.89	1.2	1.5	1.8	2.5	2.8	3.4	4.7	5.7	7.1	8.5	9.5	10	10	10	10	10	10
		230 V 60 Hz	0.54	0.65	0.81	0.97	1.4	1.6	1.9	2.7	3.1	3.7	5.2	6.2	7.7	9.3	10	10	10	10	10	10	10
	90		0.18	0.22	0.27	0.32	0.45	0.54	0.65	0.90	1.0	1.2	1.7	2.1	2.6	3.1	3.4	4.1	4.9	5.8	8.1	9.7	10
US2-425EC	1200	50 Hz	0.92	1.1	1.4	1.7	2.3	2.8	3.3	4.6	5.3	6.3	8.8	10.6	13.2	15.9	16	16	16	16	16	16	16
	1450	60 Hz																					
	90		0.18	0.22	0.27	0.32	0.45	0.54	0.65	0.90	1.0	1.2	1.7	2.1	2.6	3.1	3.4	4.1	4.9	5.8	8.1	9.7	11.7
US2-540EC	1200	50 Hz	1.4	1.7	2.2	2.6	3.6	4.3	5.2	6.9	8.3	9.9	13.8	16.5	20.6	24.8	27.5	30	30	30	30	30	–
	1450	60 Hz																					
	90	50 Hz	0.29	0.35	0.44	0.53	0.73	0.88	1.1	1.4	1.7	2.0	2.8	3.4	4.2	5.0	5.6	6.3	7.9	9.5	13.2	15.8	–
		60 Hz	0.32	0.38	0.47	0.57	0.79	0.95	1.1	1.5	1.8	2.2	3.0	3.6	4.5	5.4	6.0	6.8	8.5	10.2	14.2	17.0	–
US2-560EC	1200	50 Hz	2.2	2.6	3.3	4.0	5.5	6.6	7.9	10.5	12.6	15.2	21.1	25.3	30	30	30	30	30	30	30	30	–
	1450	220 V 60 Hz	2.1	2.5	3.1	3.7	5.2	6.2	7.5	9.9	11.9	14.2	19.8	23.7	29.7	30	30	30	30	30	30	30	–
		230 V 60 Hz	2.2	2.6	3.3	4.0	5.5	6.6	7.9	10.5	12.6	15.2	21.1	25.3	30	30	30	30	30	30	30	30	–
	90	220 V 50 Hz 230 V 60 Hz	0.36	0.43	0.54	0.65	0.90	1.1	1.3	1.7	2.1	2.5	3.4	4.1	5.2	6.2	6.9	7.8	9.7	11.7	16.2	19.4	–
		220 V 60 Hz	0.34	0.41	0.51	0.61	0.84	1.0	1.2	1.6	1.9	2.3	3.2	3.9	4.8	5.8	6.5	7.3	9.1	10.9	15.2	18.2	–
		230 V 50 Hz	0.38	0.46	0.57	0.69	0.96	1.1	1.4	1.8	2.2	2.6	3.7	4.4	5.5	6.6	7.3	8.3	10.3	12.4	17.2	20.7	–
US2-590EC	1200	50 Hz	3.3	3.9	4.9	5.9	8.2	9.9	11.3	15.7	18.8	22.6	31.4	37.7	40	40	40	40	40	40	–	–	–
	1450	60 Hz																					
	90		0.43	0.51	0.64	0.77	1.1	1.3	1.5	2.0	2.5	2.9	4.1	4.9	5.8	6.9	7.7	9.2	11.5	13.9	–	–	–

Permissible Radial Load/Permissible Axial Load

Combination Type

Product Name	Gear Ratio	Permissible Radial Load N Distance from the tip of the gearhead output shaft 10 mm	20 mm	Permissible Axial Load N
US2-26	**5~25**	150	200	40
	30~360	200	300	
US2-315	**5~25**	200	300	80
	30~360	300	400	
US2-425	**5~25**	300	350	100
	30~360	450	550	
US2-540 US2-560	**5~9**	400	500	150
	12.5~18	450	600	
	25~300	500	700	
US2-590	**5~9**	400	500	150
	12.5~18	450	600	
	25~180	500	700	



Round Shaft Type

Product Name	Permissible Radial Load N Distance from the tip of the motor output shaft 10 mm	20 mm	Permissible Axial Load
US2-26	50	110	Half of motor mass or less*
US2-315	40	60	
US2-425	90	140	
US2-540	140	200	
US2-560 US2-590	240	270	

*Avoid axial loads as much as possible.
If axial load is unavoidable, keep it at half or less of the motor mass.

Gearhead Transmission Efficiency

Product Name \ Gear Ratio	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180	250	300	360
2GV□B, 3GV□B, 4GV□B	90%						86%								81%				
5GV□B, 5GVH□B	90%						86%								81%				
5GVR□B	90%						86%						81%						

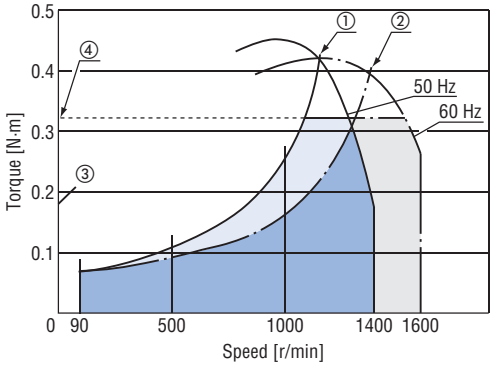
Permissible Load Inertia J of Combination Types

Unit: $\times 10^{-4}$kg·m^2

Product Name \ Gear Ratio	5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180	250	300	360
US2-26	12	18	28	40	78	110	160	260	370	540	920	1300	1700	2000	2500	3600	5000	5000	5000	5000	5000
US2-315	20	28	45	65	120	180	260	440	630	900	1500	2100	2800	3200	4000	5700	8000	8000	8000	8000	8000
US2-425	22	32	50	72	150	220	310	550	800	1100	2200	3200	4000	5000	6200	8900	12000	12000	12000	12000	12000
US2-540 US2-560	45	65	100	150	300	420	620	1100	1600	2300	4500	6000	8000	10000	12000	17000	25000	25000	25000	25000	–
US2-590	45	65	100	150	300	420	620	1100	1600	2300	4500	6000	8000	10000	12000	17000	25000	25000	–	–	–

How to Read Speed – Torque Characteristics

The characteristics diagram on the right shows the relationship between each setting speed and torque when a speed control motor is operated.



① 50 Hz Safe-Operation Line ② 60 Hz Safe-Operation Line

The safe-operation line is the permissible line of the torque that is limited according to the permissible temperature.

Motors can be operated at a continuous rating within the safe-operation line.

The safe-operation line is determined under the most severe condition where there is no heat conduction. Therefore, the motor can be operated depending on installation conditions of the motor.

Note

- When operating beyond the safe-operation line, make sure the motor case temperature is kept at 90°C or less.

③ Starting Torque

This refers to the size of torque with which the motor can start.

④ Combination Type Permissible Torque

This refers to the permissible value of the motor torque when operating with the gearhead installed.

The permissible torque of the combination type varies according to the gear ratio. Use the motor without exceeding the value on the list of permissible torques.

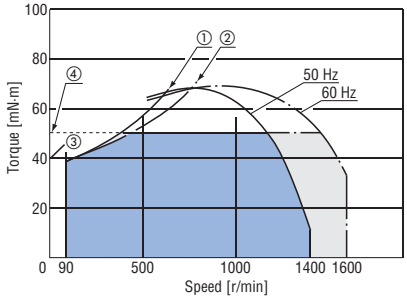
Speed – Torque Characteristics (Reference)

① 50 Hz Safe-Operation Line ② 60 Hz Safe-Operation Line ③ Starting Torque ④ Combination Type Permissible Torque

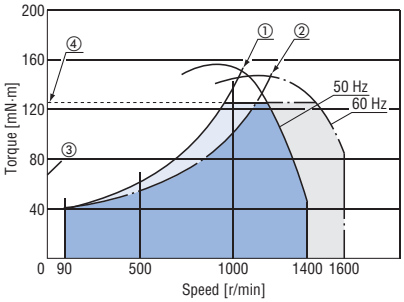
- The characteristics of each output are their representatives. (For motor only)

  The permissible torque and starting torque of the motor vary according to the voltage. Check the specifications and the permissible torque of the combination type when using the motor.

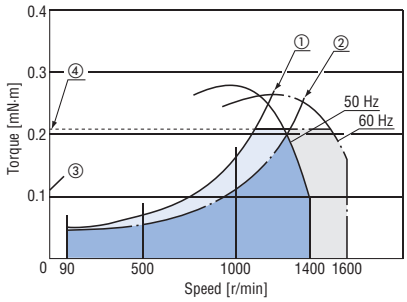
◇6 W



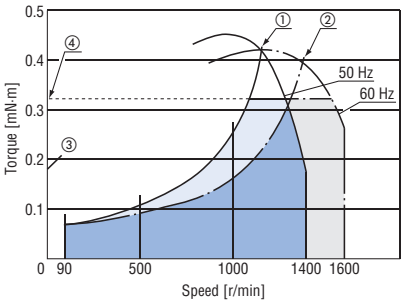
◇15 W



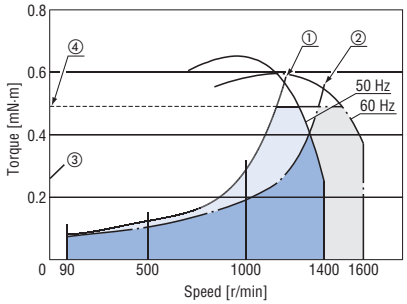
◇25 W



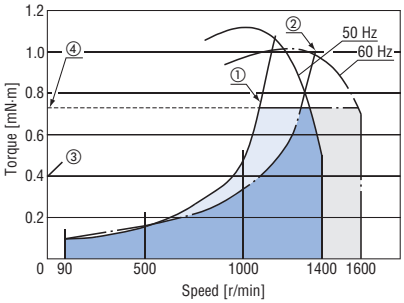
◇40 W



◇60 W



◇90 W



Dimensions (Unit: mm)

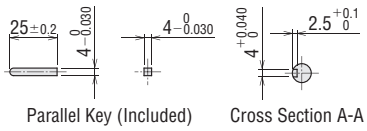
● "Installation screws" are included with the combination type. Dimensions of installation screws ➜ Page 22

● A number in the box □ in the product name indicates the gear ratio.
When the accessory connection cable is supplied, a number indicating the length of the cable, **-1** (1 m), **-2** (2 m), or **-3** (3 m), is specified in the box ■ in the product name.

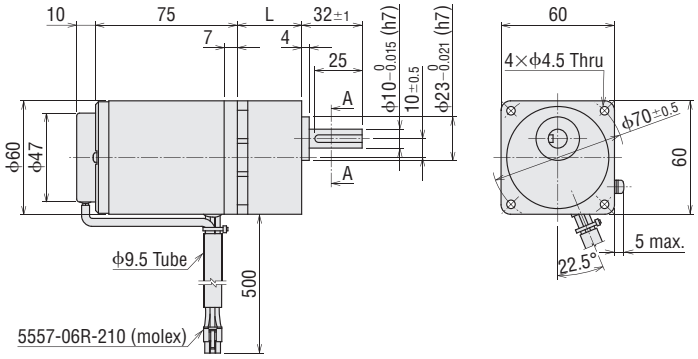
●Combination Type

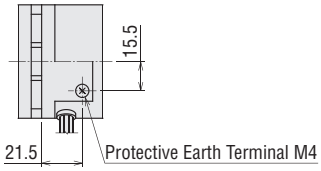
◇6 W

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg
US2-26UA-□■ **US2-26EC-□■**	SCM26GV-UA SCM26GV-EC	2GV□B	**5~25**	34	1.3
			30~120	38	
			150~360	43	



Parallel Key (Included) Cross Section A-A

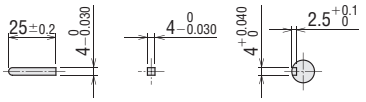




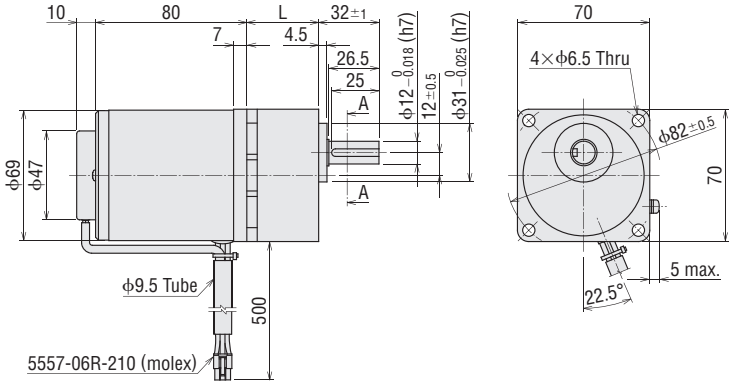
Detail Drawing of Protective Earth Terminal

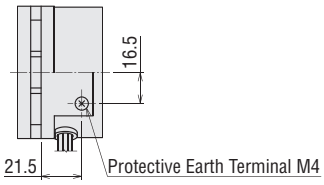
◇15 W

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg
US2-315UA-□■ **US2-315EC-□■**	SCM315GV-UA SCM315GV-EC	3GV□B	**5~25**	38	1.8
			30~120	43	
			150~360	48	



Parallel Key (Included) Cross Section A-A

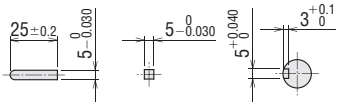




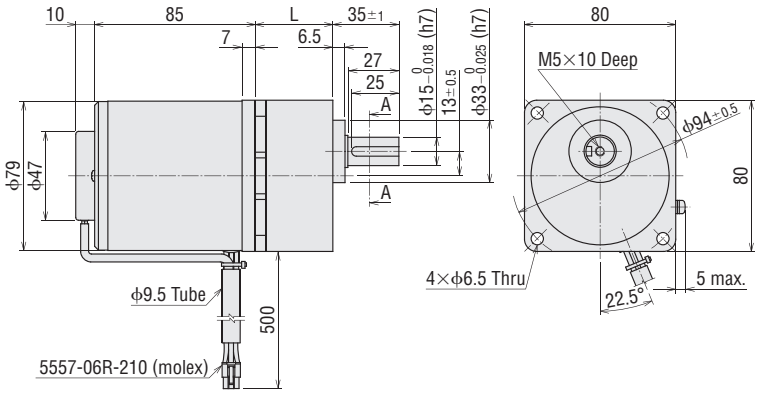
Detail Drawing of Protective Earth Terminal

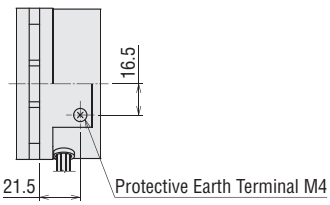
◇25 W

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg
US2-425UA-□■ **US2-425EC-□■**	SCM425GV-UA SCM425GV-EC	4GV□B	**5~25**	41	2.55
			30~120	46	
			150~360	51	



Parallel Key (Included) Cross Section A-A

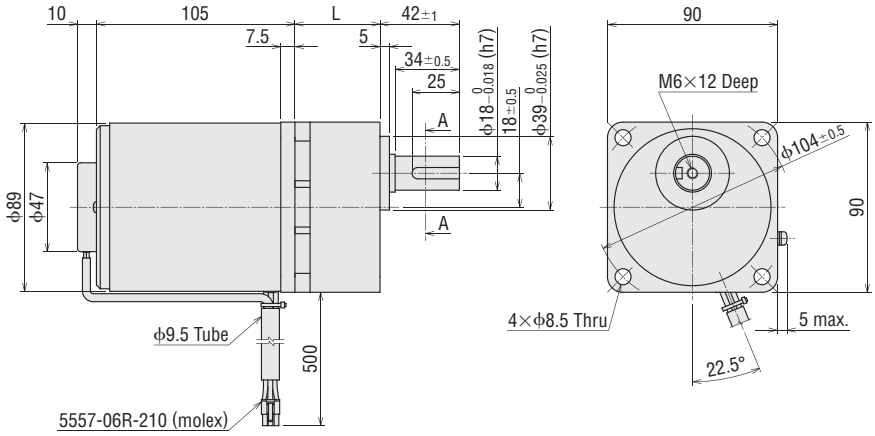


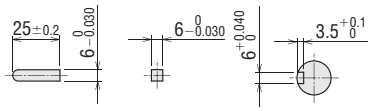


Detail Drawing of Protective Earth Terminal

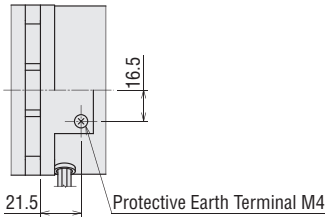
◇40 W

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg
US2-540UA-□■ **US2-540EC-□■**	SCM540GV-UA SCM540GV-EC	5GV□B	**5**~**18**	45	4.1
			25~**100**	58	
			120~**300**	64	





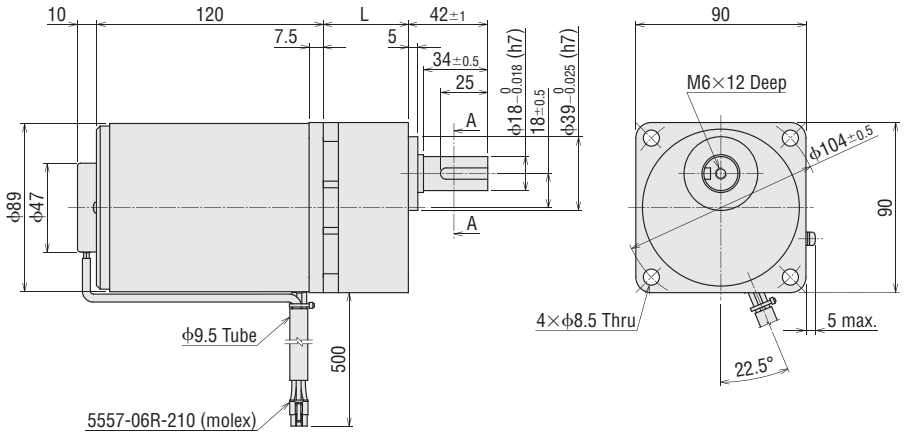
Parallel Key (Included) Cross Section A-A

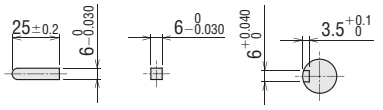


Detail Drawing of Protective Earth Terminal

◇60 W

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg
US2-560UA-□■ **US2-560EC-□■**	SCM560GVH-UA SCM560GVH-EC	5GVH□B	**5**~**18**	45	4.6
			25~**100**	58	
			120~**300**	64	





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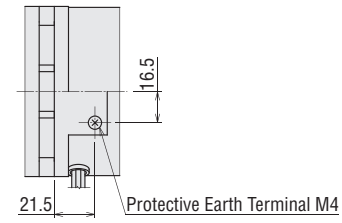
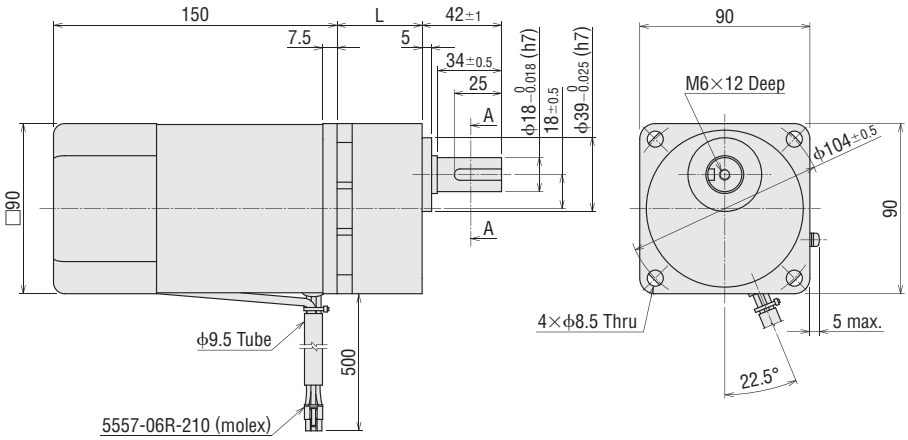
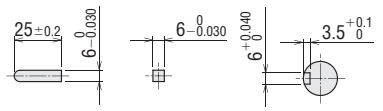


Detail Drawing of Protective Earth Terminal

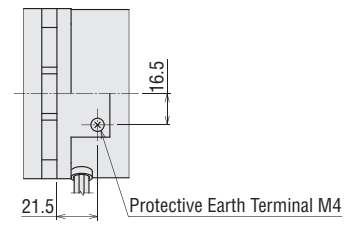
◇90 W

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg
US2-590UA-□■ **US2-590EC-□■**	SCM590GVR-UA SCM590GVR-EC	5GVR□B	**5**~**15**	45	4.8
			18~**36**	58	
			50~**180**	70	





Parallel Key (Included) Cross Section A-A



Detail Drawing of Protective Earth Terminal

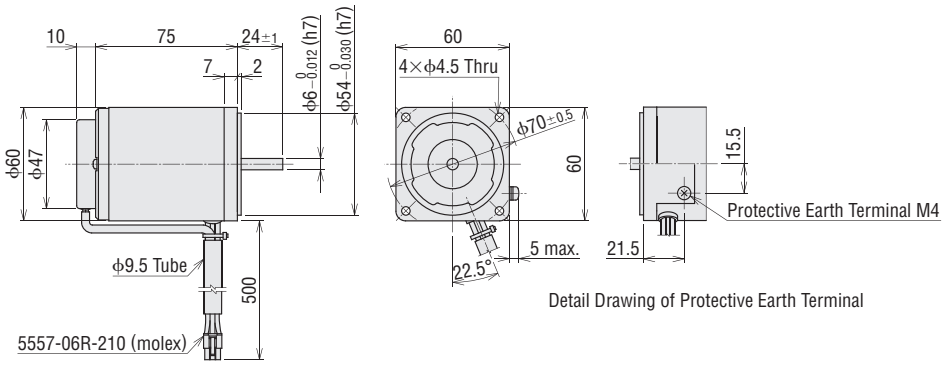
●Round Shaft Type

◇6 W

US2-26UA-A■, US2-26EC-A■

Motor: SCM26A-UA, SCM26A-EC

Mass: 0.8 kg



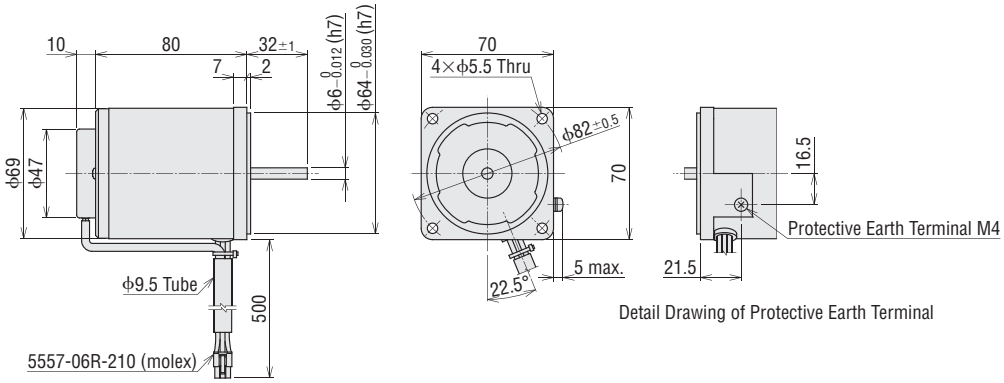
Detail Drawing of Protective Earth Terminal

◇15 W

US2-315UA-A■, US2-315EC-A■

Motor: SCM315A-UA, SCM315A-EC

Mass: 1.2 kg



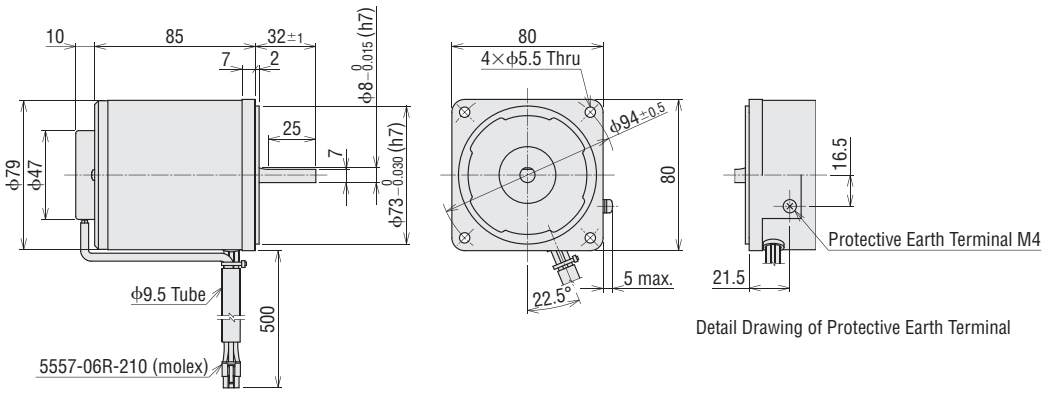
Detail Drawing of Protective Earth Terminal

◇25 W

US2-425UA-A■, US2-425EC-A■

Motor: SCM425A-UA, SCM425A-EC

Mass: 1.6 kg



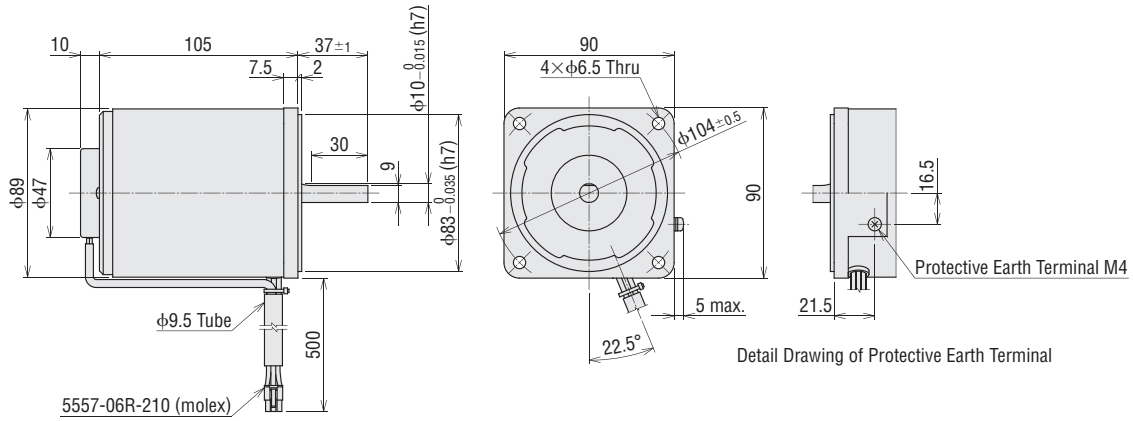
Detail Drawing of Protective Earth Terminal

◇40 W

US2-540UA-A■, US2-540EC-A■

Motor: SCM540A-UA, SCM540A-EC

Mass: 2.6 kg

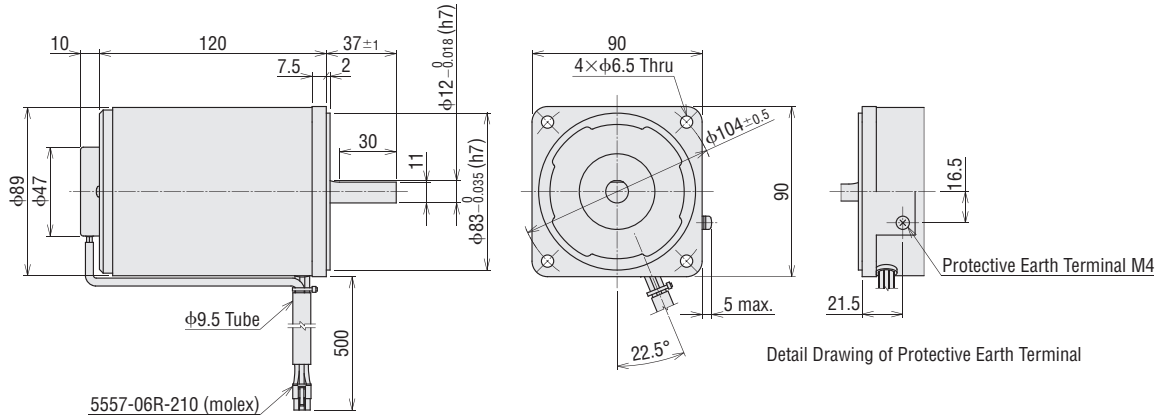


◇60 W

US2-560UA-A■, US2-560EC-A■

Motor: SCM560A-UA, SCM560A-EC

Mass: 3.1 kg

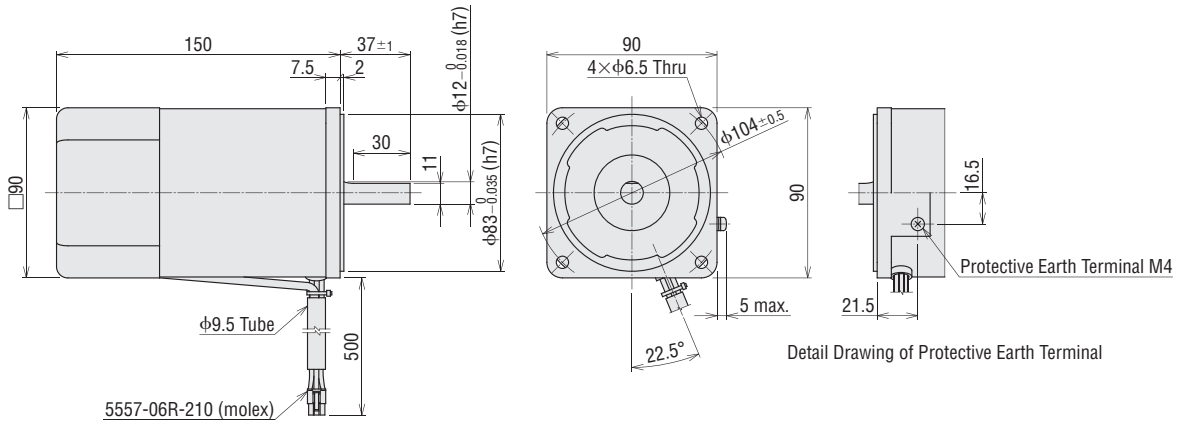


◇90 W

US2-590UA-A■, US2-590EC-A■

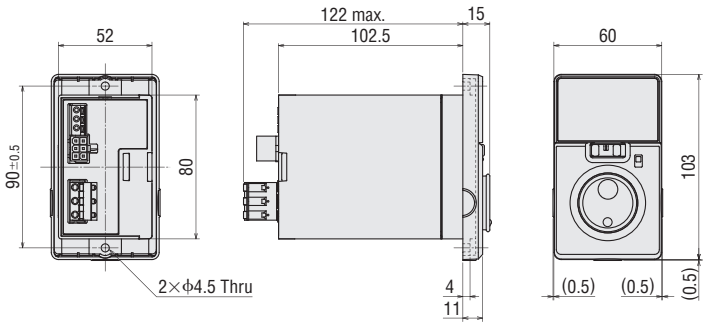
Motor: SCM590A-UA, SCM590A-EC

Mass: 3.3 kg

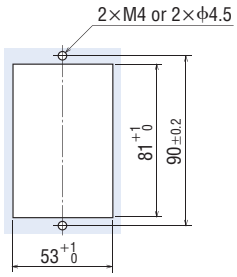


Speed Controller (Common to all types)

US2D6-UA, US2D6-EC, US2D15-UA, US2D15-EC,
US2D25-UA, US2D25-EC, US2D40-UA, US2D40-EC
Mass: 0.3 kg
US2D60-UA, US2D60-EC, US2D90-UA, US2D90-EC
Mass: 0.4 kg



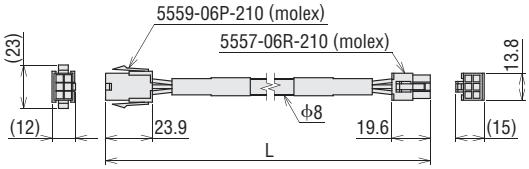
◇Panel Cut-Out for Speed Controller



Connection Cables (Included)

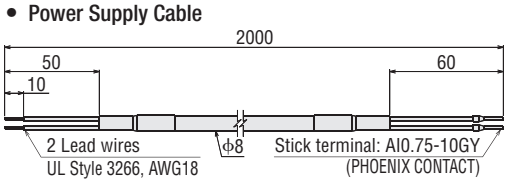
Only with types supplied with a connection cable

Cable Type	Length L (m)
1 m	1
2 m	2
3 m	3

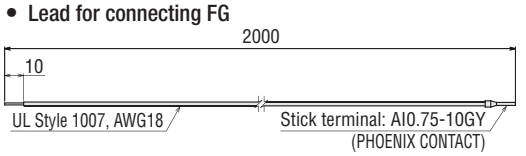


Power Supply Cable (Included)

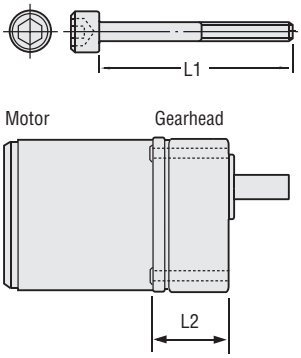
- **Power Supply Cable**



- **Lead for connecting FG**



Dimensions of Installation Screws



Product Name	Installation Screws		L2 (mm)
	L1 (mm)	Screw Size	
2GV5B~25B	50	M4 P0.7	41
2GV30B~120B	55		45
2GV150B~360B	60		50
3GV5B~25B	60	M6 P1.0	45
3GV30B~120B	65		50
3GV150B~360B	70		55
4GV5B~25B	60		48
4GV30B~120B	65		53
4GV150B~360B	70		58
5GV5B~18B, 5GVH5B~18B	70	M8 P1.25	52.5
5GV25B~100B, 5GVH25B~100B	85		65.5
5GV120B~300B, 5GVH120B~300B	90		71.5
5GVR5B~15B	70		52.5
5GVR18B~36B	85		65.5
5GVR50B~180B	95		77.5

- Installation screws: 4 plain washers and 4 spring washers are included.
- The installation screw material is stainless steel.

Combination List

Parallel Shaft Combination Type

Output Power	Product Name	Combination Motor Product Name*	Motor Product Name	Gearhead Product Name	Speed Controller Product Name
6 W	**US2-26UA-□■**	SCM26UA-□	SCM26GV-UA	2GV□B	US2D6-UA
	US2-26EC-□■	SCM26EC-□	SCM26GV-EC		US2D6-EC
15 W	**US2-315UA-□■**	SCM315UA-□	SCM315GV-UA	3GV□B	US2D15-UA
	US2-315EC-□■	SCM315EC-□	SCM315GV-EC		US2D15-EC
25 W	**US2-425UA-□■**	SCM425UA-□	SCM425GV-UA	4GV□B	US2D25-UA
	US2-425EC-□■	SCM425EC-□	SCM425GV-EC		US2D25-EC
40 W	**US2-540UA-□■**	SCM540UA-□	SCM540GV-UA	5GV□B	US2D40-UA
	US2-540EC-□■	SCM540EC-□	SCM540GV-EC		US2D40-EC
60 W	**US2-560UA-□■**	SCM560UA-□	SCM560GVH-UA	5GVH□B	US2D60-UA
	US2-560EC-□■	SCM560EC-□	SCM560GVH-EC		US2D60-EC
90 W	**US2-590UA-□■**	SCM590UA-□	SCM590GVR-UA	5GVR□B	US2D90-UA
	US2-590EC-□■	SCM590EC-□	SCM590GVR-EC		US2D90-EC

*For combination motors, the product name applies to the motor and gearhead combination.

Round Shaft Type

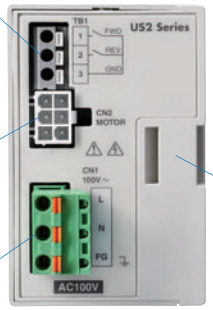
Output Power	Product Name	Motor Product Name	Speed Controller Product Name
6 W	**US2-26UA-A■**	SCM26A-UA	US2D6-UA
	US2-26EC-A■	SCM26A-EC	US2D6-EC
15 W	**US2-315UA-A■**	SCM315A-UA	US2D15-UA
	US2-315EC-A■	SCM315A-EC	US2D15-EC
25 W	**US2-425UA-A■**	SCM425A-UA	US2D25-UA
	US2-425EC-A■	SCM425A-EC	US2D25-EC
40 W	**US2-540UA-A■**	SCM540A-UA	US2D40-UA
	US2-540EC-A■	SCM540A-EC	US2D40-EC
60 W	**US2-560UA-A■**	SCM560A-UA	US2D60-UA
	US2-560EC-A■	SCM560A-EC	US2D60-EC
90 W	**US2-590UA-A■**	SCM590A-UA	US2D90-UA
	US2-590EC-A■	SCM590A-EC	US2D90-EC

● A number in the box □ in the product name indicates the gear ratio.
When the accessory connection cable is supplied, a number indicating the length of the cable, **-1** (1 m), **-2** (2 m), or **-3** (3 m), is specified in the box ■ in the product name.

Connection and Operation

Names and Functions of Speed Controller Parts

[Front]



[Back]

◇When Front Panel is Removed

Extended Functions

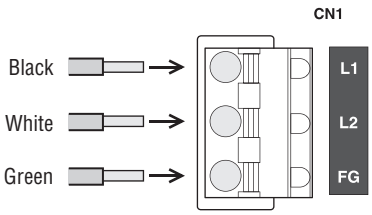
Remove the front panel to be able to perform various settings by operating the keys.

Operating Mode	Details
Monitoring	Rotation speed, Input signals
Parameters	Gear ratio, Speed up ratio, Fixed display of the lower first digit, Prohibition alarm of operation at the initial setting, Upper and lower limits of speed, Acceleration and deceleration time, External operating signals, Data initialization
Others	Locking of data editing

◇Main Power Connector (CN1)

Connect the AC power supply to CN1. Use the FG terminal to connect to a ground.
(The colors in the following figures apply when using the power supply cable.)

•Single-Phase 110/115 VAC, Single-Phase 220/230 VAC



•Applicable Lead Wire Size

AWG18~14 (0.75~2.0 mm²)

Operation with the Driver only

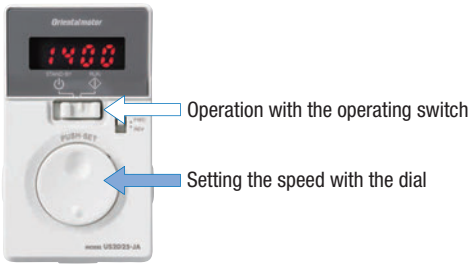
◇Run/Stop

When the operating switch is set to the "RUN" position, the motor will start.
When it is returned to the "STAND-BY" position, the motor decelerates to a stop.

◇Speed Setting Method

Set the motor speed by using the dial.
Setting range: 90~1400 r/min (50 Hz)
90~1600 r/min (60 Hz)

Turning the dial slowly to the right increases the speed by 1 r/min increments, while turning it to the left reduces the speed by 1 r/min increments.
Turning the dial fast produces a great variation in speed.
Pressing the dial sets the speed.



•Operating Switch

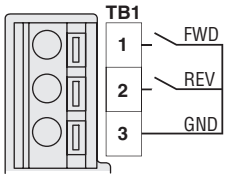
Operation by External Signals

◇Operating Method

• To perform run/stop by external signals, connect input signals to TB1.

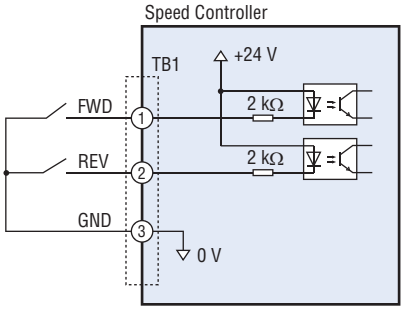
• **Input Signal Terminal (TB1)**

Indication	Signal Name	Description
1	FWD	Forward input
2	REV	Reverse input
3	GND	Input signal common



◇Example for connection using switches, relays, etc.

The figure shows a connection example for the operation of the motor using relays or switches.



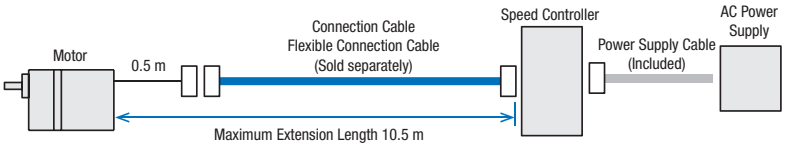
• **Applicable Lead Wire**

AWG24～16 (0.2～1.25 mm²)

Connection Cables/ Flexible Connection Cables (Sold separately)

This is a connection cable for connecting the motor and the speed controller.
Use the flexible connection cable in applications where the cable is bent and flexed.

Cable System Configuration



Note

● You can connect connection cables or flexible connection cables sold separately to a product with connection cables. In this case, the total length of these cables must be within 10.5 m (including 0.5 m of the motor cable) and up to 3 cables connected.

Types

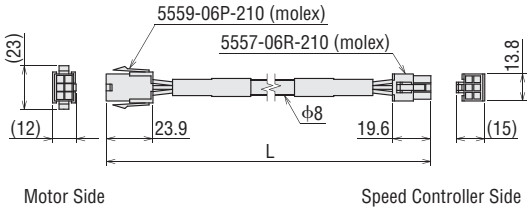
◇Connection Cables

Product Name	Length L (m)
CC01SC	1
CC02SC	2
CC03SC	3
CC05SC	5
CC10SC	10

◇Flexible Connection Cables

Product Name	Length L (m)
CC01SCR	1
CC02SCR	2
CC03SCR	3
CC05SCR	5
CC10SCR	10

Dimensions (Unit: mm)



Accessories (Sold separately)

Circuit Products Mounting Brackets

Mounting brackets for installing the driver are available.
Mounting brackets have product lines for different applications such as for DIN rail installation, installation on the wall surface, and for conveyor guide installation.

Types

Material: SPCC Surface treatment: Trivalent chromate

Product Name	Application
MADP05-15	For DIN Rail Installation
MAFP04-15	For Wall Surface Installation
MAFP05V	For Conveyor Guide Installation
MAFP05H	

Note

Circuit products mounting brackets cannot be used together with the watertight and dust-resistant type front cover.

MADP05-15 <Application example>

MAFP04-15 <Application example>

MAFP05V <Application example>

MAFP05H <Application example>

Flexible Couplings

These are clamp type couplings for connecting the motor and gearhead shaft with the driven shaft.
Once the gearhead is determined, the coupling can be selected.

● Couplings can also be used with round shaft types. Select a coupling with the same inner diameter size as the motor shaft diameter.

Parallel Shaft Combination Type

Applicable Product	Load Type	Coupling Type
US2-26	Uniform load	**MCL30**
	Shock load	
US2-315	Uniform load	**MCL30**
	Shock load	**MCL40**
US2-425	Uniform load	**MCL40**
	Shock load	**MCL55**
US2-540 **US2-560** **US2-590**	Uniform load	**MCL55**
	Shock load	

Motor and Gearhead Mounting Brackets

These dedicated mounting brackets are for mounting motors and gearheads.

Product Name	Applicable Product
SOL2M4F	**US2-26** Round Shaft Type **US2-26** Parallel Shaft Combination Type
SOL3M5F	**US2-315** Round Shaft Type
SOL3M6F	**US2-315** Parallel Shaft Combination Type
SOL4M5F	**US2-425** Round Shaft Type
SOL4M6F	**US2-425** Parallel Shaft Combination Type
SOL5M6F	**US2-540**, **US2-560**, **US2-590** Round Shaft Type
SOL5M8F	**US2-540**, **US2-560**, **US2-590** Parallel Shaft Combination Type

For details, check the Oriental Motor website or contact the Oriental Motor sales office.

Watertight and Dust-Resistant Type Front Cover

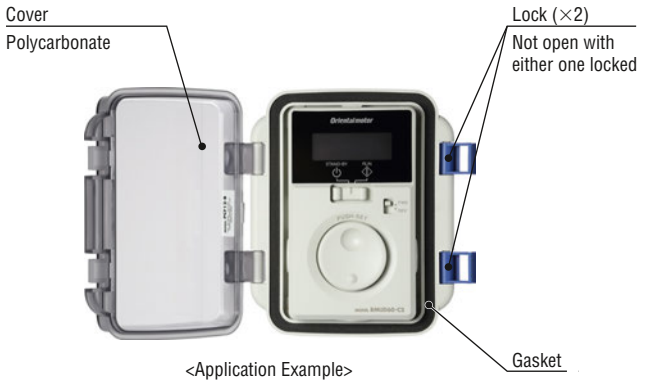
This cover protects the front panel of the speed controller. The degree of protection conforms to the IP64 specification.
The cover can also be used to prevent operation errors on the front panel.

Types

Product Name
PCF12-B

Note
The watertight and dust-resistant type front cover cannot be used together with Circuit products mounting bracket.

Names of Parts



<Application Example>

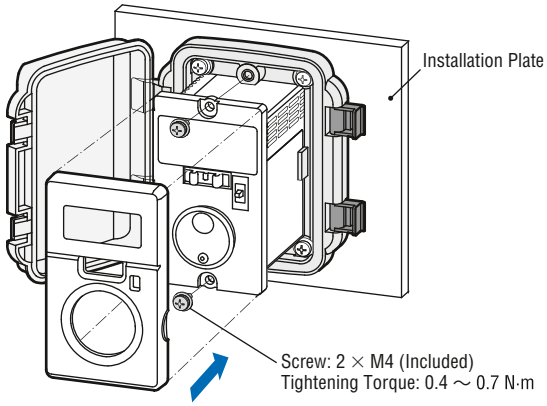
Specifications

Degree of Protection	IP64 (Conforms to IEC 60529)	
Material	Cover	Polycarbonate
	Gasket	Polyethylene (foam)
	Frame	Polybutylene terephthalate Acrylonitrile, Butadiene, Styrene
	Lock	Polyacetal

Installation Condition

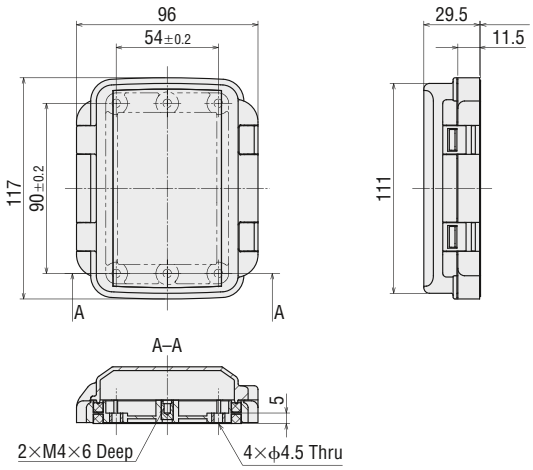
Install the front cover to a flat and smooth metal plate.

- Indoors
- Operating Ambient Temperature: 0～+50˚C
- Operating Ambient Humidity: 85% or less
- Not exposed to an explosive atmosphere, strong acid/strong alkali, organic solvent (chloroethane, chloromethane, cresol, etc.)
- Not exposed to radioactive materials
- Not exposed to moisture or ozone
- Not exposed to direct sunlight
- Not exposed to continuous vibration or excessive shock

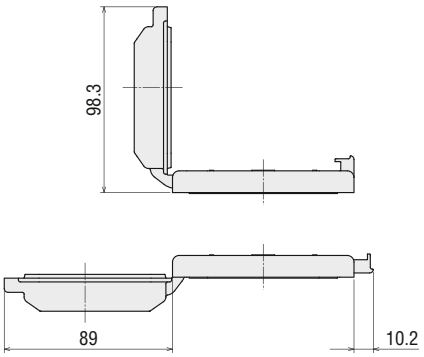


Dimensions (Unit: mm)

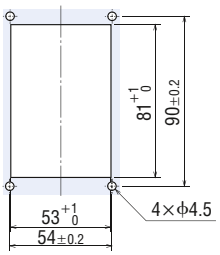
Mass: 90 g



● When the cover is open



◇Installation Hole Cut-Out



Related Products

Speed Control Motor and Controller Package

DSC Series

These are high-performance D-loop speed control motor units at an affordable prices.
This series will meet your needs, which include functions such as – "multistep speed-change operation", "speed setting from an external device", "vertical operation", and so on.

● Characteristics

- Multistep speed-change operation (4-speed gear) is available.
- Speed can be set from an external device.
- Vertical operation is available (with electromagnetic brake)
- Speed regulation (For load) ±1%* (Reference value)
- **KII** Series motor with High-performance gear installed is used.

＊Between 0 and the permissible torque at 1000 r/min

⚠ Safety Precautions

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

Oriental motor

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

Specifications are subject to change without notice. Published in September 2016.

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