

AC Speed Control Motors ES01/ES02

● Additional Information ●
 Technical reference → Page G-1
 Safety standards → Page H-2

ES01 and **ES02** are speed controllers designed for ultimate ease of use when operating and wiring, focusing on the functions required for speed control. A wide range of speed control motors from the **V** Series and the World **K** Series are available for use with this controller.



● For detailed product safety standard information including standards, file number and certification body, please visit www.orientalmotor.com.



Features

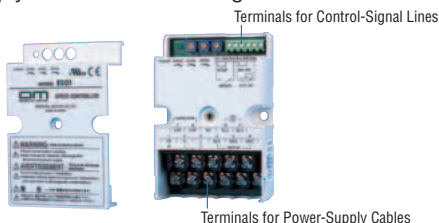
● Multi-Functions

Provide the functions necessary for speed control.

- Speed control 90 to 1400 r/min (50 Hz)
90 to 1600 r/min (60 Hz)
- Instantaneous stop
- Acceleration/deceleration function that enables smooth start and stop

● Simple Wiring

For easy wiring the new design provides separate terminals for power-supply cables and control-signal lines.



● Controlling 6 W (1/125 HP) to 90 W (1/8 HP) Motors with a Single Unit

One **ES01/ES02** unit is all you need to operate speed control motors with varying output of 6 W (1/125 HP) to 90 W (1/8 HP).

● Can be Used World-Wide

The **ES01/ES02** speed controller conforms to major power supply specifications world-wide. It is recognized by UL and CSA, while CE Marking is used in accordance with the EMC Directive and Low Voltage Directive.

● IP20-Compliant

Case design against electric shock and the IP20-compliant construction prevent the operator from touching the terminal block, thereby ensuring a high degree of safety.

Product Line

● Speed Controller (RoHS)

Model	Power Supply Voltage
ES01	Single-Phase 100-115 VAC
ES02	Single-Phase 200-230 VAC

The following items are included in each product.
 Speed Controller, External Speed Potentiometer, Operating Manual

Specifications of Speed Controller (RoHS)



Model	ES01	ES02
Power Supply Voltage	Single-Phase 100-115 VAC ±10%	Single-Phase 200-230 VAC ±10%
Power Supply Frequency	50/60 Hz	
Applicable Speed Control Motor Output Power	V Series: 6 W (1/125 HP), 15 W (1/50 HP), 25 W (1/30 HP), 40 W (1/19 HP), 60 W (1/12 HP), 90 W (1/8 HP) World K Series: 6 W (1/125 HP), 15 W (1/50 HP), 25 W (1/30 HP), 40 W (1/19 HP), 60 W (1/12 HP)	
Variable Speed Range	50 Hz: 90 ~ 1400 r/min 60 Hz: 90 ~ 1600 r/min	
Function	Speed control, Instantaneous stop, Acceleration/deceleration	
Insulation Resistance	100 MΩ or more when 500 VDC megger is applied between the case and all the pins, the FG terminal and the AC input terminals under normal ambient temperature and humidity.	
Dielectric Strength	Sufficient to withstand 1.5 kVAC at 50 Hz or 60 Hz applied between the FG terminal and the AC input terminals for 1 minute under normal ambient temperature and humidity. Sufficient to withstand 3.0 kVAC at 50 Hz or 60 Hz applied between all the pins and the case for 1 minute.	
Ambient Temperature	0 ~ +40°C (+32 ~ +104°F) (non-freezing)	
Ambient Humidity	85% or less (non-condensing)	
Degree of Protection	IP20 (with cover)	

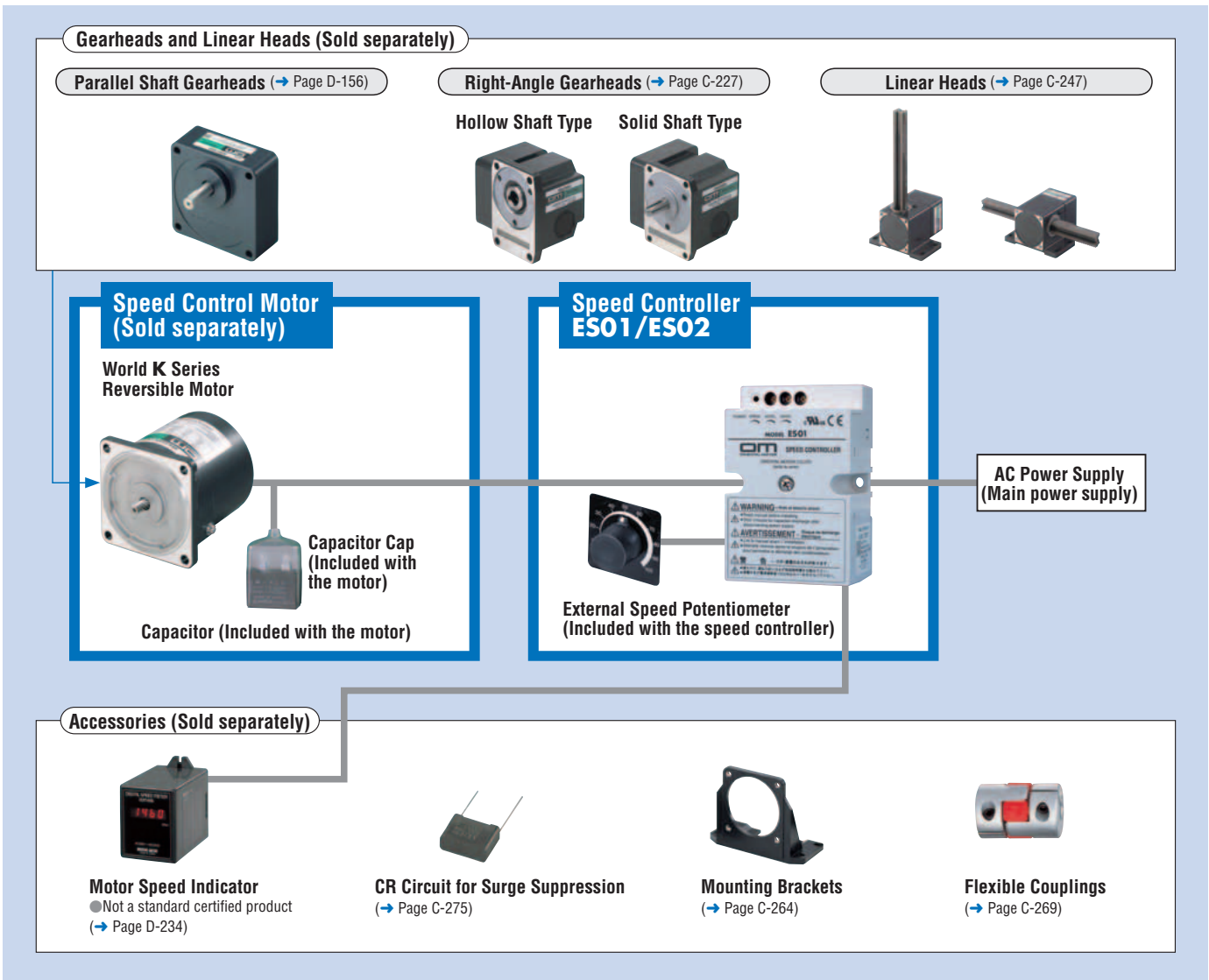
Notes

- These models cannot be used for applications requiring the control of more than one motor/controller set by the same external speed potentiometer.
- When instantaneous stop is activated, a large braking current will flow to the motor. Braking current → Page D-220

Dimensions → Page D-208

Connection and Operation → Page D-217

System Configuration



● Example of System Configuration

Speed Controller	Sold Separately		+	Sold Separately		
	Reversible Motor (Pinion shaft)	Long Life, Low Noise Gearhead		Motor Speed Indicator	Mounting Bracket	Flexible Coupling
ES01	4RK25RGN-AW2U	4GN25SA		SDM496	SOL4U10	MCL30F06F06

● Both of gearheads and linear heads cannot be combined with round shaft type motors.

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

Applicable Speed Control Motor (Sold separately)

● V Series

Speed Control Motor 6 W (1/125 HP) to 90 W (1/8 HP) (RoHS)

The V Series speed control motors provide low noise operation, long life and high strength performance. Combination types, which come with the motor and its gearhead pre-assembled, are available.

Product line → Page D-194



● World K Series

Speed Control Motor 6 W (1/125 HP) to 60 W (1/12 HP) (RoHS)

Conforming to major safety standards, the World K Series sets the standard for AC motors. These motors can be used in wide-ranging applications. The "long life, low noise GN-S gearhead" achieves a long rated life of 10000 hours, twice the level of a conventional gearhead, by adopting innovative technologies and structure. These gearheads are highly reliable and require less maintenance.

Product line → Page D-195



Product Number Code

● V Series Speed Control Motor

◇ Motor (Combination type, pinion shaft type)

V S I 4 25 A2 - □ U

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Series	V: V Series
②	Speed Control Motor	
③	Motor Type	I: Induction Motor R: Reversible Motor
④	Motor Frame Size	2: 60 mm (2.36 in.) 3: 70 mm (2.76 in.) 4: 80 mm (3.15 in.) 5: 90 mm (3.54 in.)
⑤	Output Power (W)	(Example) 25: 25 W (1/30 HP)
⑥	Power Supply Voltage	A2, A: Single-Phase 110/115 VAC, RoHS-Compliant C2, C: Single-Phase 220/230 VAC, RoHS-Compliant
⑦	Motor Shaft Type, Gear Ratio	Number: Gear Ratio (Combination Type) GV: GV Type Pinion Shaft GVH: GVH Type Pinion Shaft GVR: GVR Type Pinion Shaft
⑧	Included Capacitor	U: For Single-Phase 110/115 VAC E: For Single-Phase 220/230 VAC

◇ Gearhead

GV 4G 50

① ② ③

①	Type of Pinion	GV: GV Type Pinion GVH: GVH Type Pinion GVR: GVR Type Pinion
②	Gearhead Frame Size	2: 60 mm (2.36 in.) 3: 70 mm (2.76 in.) 4: 80 mm (3.15 in.) 5: 90 mm (3.54 in.)
③	Gear Ratio	(Example) 50: Gear Ratio of 50:1

Product Line

● V Series Speed Control Motor

◇ Combination Type [6 W (1/125 HP) to 25 W (1/30 HP)] (RoHS)

Type	Power Supply Voltage	□60 mm (2.36 in.) 6 W (1/125 HP)	□70 mm (2.76 in.) 15 W (1/50 HP)	□80 mm (3.15 in.) 25 W (1/30 HP)	Applicable Controller (Sold separately)
		Model	Model	Model	
Induction Motor	Single-Phase 110/115 VAC	VSI206A2-5~360U	VSI315A2-5~360U	VSI425A2-5~360U	ES01
	Single-Phase 220/230 VAC	VSI206C2-5~360E	VSI315C2-5~360E	VSI425C2-5~360E	ES02
Reversible Motor	Single-Phase 110/115 VAC	VSR206A2-5~360U	VSR315A2-5~360U	VSR425A2-5~360U	ES01
	Single-Phase 220/230 VAC	VSR206C2-5~360E	VSR315C2-5~360E	VSR425C2-5~360E	ES02

◇ Combination Type [40 W (1/19 HP) to 90 W (1/8 HP)] (RoHS)

Type	Power Supply Voltage	□90 mm (3.54 in.) 40 W (1/19 HP)	□90 mm (3.54 in.) 60 W (1/12 HP)	□90 mm (3.54 in.) 90 W (1/8 HP)	Applicable Controller (Sold separately)
		Model	Model	Model	
Induction Motor	Single-Phase 110/115 VAC	VSI540A2-5~300U	VSI560A-5~300U	VSI590A-5~180U	ES01
	Single-Phase 220/230 VAC	VSI540C2-5~300E	VSI560C-5~300E	VSI590C-5~180E	ES02
Reversible Motor	Single-Phase 110/115 VAC	VSR540A2-5~300U	VSR560A-5~300U	VSR590A-5~180U	ES01
	Single-Phase 220/230 VAC	VSR540C2-5~300E	VSR560C-5~300E	VSR590C-5~180E	ES02

◇ Pinion Shaft Type Motor/Gearhead [6 W (1/125 HP) to 25 W (1/30 HP)] (RoHS)

Type	Power Supply Voltage	□60 mm (2.36 in.) 6 W (1/125 HP)	□70 mm (2.76 in.) 15 W (1/50 HP)	□80 mm (3.15 in.) 25 W (1/30 HP)	Applicable Controller (Sold separately)
		Model	Model	Model	
Induction Motor	Single-Phase 110/115 VAC	VSI206A2-GVU	VSI315A2-GVU	VSI425A2-GVU	ES01
	Single-Phase 220/230 VAC	VSI206C2-GVE	VSI315C2-GVE	VSI425C2-GVE	ES02
Reversible Motor	Single-Phase 110/115 VAC	VSR206A2-GVU	VSR315A2-GVU	VSR425A2-GVU	ES01
	Single-Phase 220/230 VAC	VSR206C2-GVE	VSR315C2-GVE	VSR425C2-GVE	ES02
Gearhead (Sold separately)		GV2G5~360	GV3G5~360	GV4G5~360	-

◇ Pinion Shaft Type Motor/Gearhead [40 W (1/19 HP) to 90 W (1/8 HP)] (RoHS)

Type	Power Supply Voltage	□90 mm (3.54 in.) 40 W (1/19 HP)	□90 mm (3.54 in.) 60 W (1/12 HP)	□90 mm (3.54 in.) 90 W (1/8 HP)	Applicable Controller (Sold separately)
		Model	Model	Model	
Induction Motor	Single-Phase 110/115 VAC	VSI540A2-GVHU	VSI560A-GVHU	VSI590A-GVRU	ES01
	Single-Phase 220/230 VAC	VSI540C2-GVHE	VSI560C-GVHE	VSI590C-GVRE	ES02
Reversible Motor	Single-Phase 110/115 VAC	VSR540A2-GVHU	VSR560A-GVHU	VSR590A-GVRU	ES01
	Single-Phase 220/230 VAC	VSR540C2-GVHE	VSR560C-GVHE	VSR590C-GVRE	ES02
Gearhead (Sold separately)		GVH5G5~300	GVH5G5~300	GVR5G5~180	-

● Motor specifications, motor dimensions and gearhead dimensions are the same as those of the combination type.

The following items are included in each product.

- Combination Type
- Motor, Gearhead, Capacitor, Capacitor Cap, Mounting Screws, Parallel Key, Operating Manual

The following items are included in each product.

- Pinion Shaft Type
- Motor, Capacitor, Capacitor Cap, Operating Manual

The following items are included in each product.

- Gearhead
- Gearhead, Mounting Screws, Parallel Key, Operating Manual

Product Number Code

World K Series Speed Control Motor

◇ Motor

4 I K 25 R GN - AW2 U

①	Motor Frame Size	2: 60 mm (2.36 in.) 4: 80 mm (3.15 in.)	3: 70 mm (2.76 in.) 5: 90 mm (3.54 in.)
②	Motor Type	I: Induction Motor R: Reversible Motor	
③	Series	K: K Series	
④	Output Power (W)	(Example) 25: 25 W (1/30 HP)	
⑤	Speed Control Motor		
⑥	Motor Shaft Type, Type of Pinion	GN: GN Type Pinion Shaft GU: GU Type Pinion Shaft A: Round Shaft	
⑦	Power Supply Voltage	AW2, AW: Single-Phase 110/115 VAC, RoHS-Compliant CW2, CW: Single-Phase 220/230 VAC, RoHS-Compliant	
⑧	Included Capacitor	U: For Single-Phase 110/115 VAC E: For Single-Phase 220/230 VAC	

◇ Gearhead

4 GN 50 SA

①	Gearhead Frame Size	2: 60 mm (2.36 in.) 4: 80 mm (3.15 in.)	3: 70 mm (2.76 in.) 5: 90 mm (3.54 in.)
②	Type of Pinion	GN: GN Type Pinion GU: GU Type Pinion	
③	Gear Ratio	(Example) 50: Gear Ratio of 50:1 10X denotes the decimal gearhead of gear ratio 10:1	
④	GN Type Pinion	SA: Long Life, Low Noise GN-S Gearhead RH: Right-Angle, Hollow Shaft Gearhead RAA: Right-Angle, Solid Shaft Gearhead	
	GU Type Pinion	KA: GU Gearhead (Box Type) RH: Right-Angle, Hollow Shaft Gearhead RAA: Right-Angle, Solid Shaft Gearhead	

Product Line

World K Series Speed Control Motor

◇ Pinion Shaft Type [6 W (1/125 HP) to 60 W (1/12 HP)] (RoHS)

Type	Power Supply Voltage	□60 mm (2.36 in.) 6 W (1/125 HP)	□70 mm (2.76 in.) 15 W (1/50 HP)	□80 mm (3.15 in.) 25 W (1/30 HP)	□90 mm (3.54 in.) 40 W (1/19 HP)	□90 mm (3.54 in.) 60 W (1/12 HP)	Applicable Controller (Sold separately)
		Model	Model	Model	Model	Model	
Induction Motor	Single-Phase 110/115 VAC	2IK6RGN-AW2U	3IK15RGN-AW2U	4IK25RGN-AW2U	5IK40RGN-AW2U	5IK60RGU-AWU	ES01
	Single-Phase 220/230 VAC	2IK6RGN-CW2E	3IK15RGN-CW2E	4IK25RGN-CW2E	5IK40RGN-CW2E	5IK60RGU-CWE	ES02
Reversible Motor	Single-Phase 110/115 VAC	2RK6RGN-AW2U	3RK15RGN-AW2U	4RK25RGN-AW2U	5RK40RGN-AW2U	5RK60RGU-AWU	ES01
	Single-Phase 220/230 VAC	2RK6RGN-CW2E	3RK15RGN-CW2E	4RK25RGN-CW2E	5RK40RGN-CW2E	5RK60RGU-CWE	ES02

The following items are included in each product.
Motor, Capacitor, Capacitor Cap, Operating Manual

Parallel Shaft Gearhead (Sold separately)

◇ Long Life, Low Noise GN-S Gearhead (RoHS)

Output Power of Applicable Motor (Pinion shaft)	Gearhead Model	Gear Ratio
6 W (1/125 HP)	2GN□SA	3~180
	2GN10XS (Decimal gearhead)	
15 W (1/50 HP)	3GN□SA	3~180
	3GN10XS (Decimal gearhead)	
25 W (1/30 HP)	4GN□SA	3~180
	4GN10XS (Decimal gearhead)	
40 W (1/19 HP)	5GN□SA	3~180
	5GN10XS (Decimal gearhead)	

The following items are included in each product.
Gearhead, Mounting Screws, Operating Manual

◇ GU Gearhead (RoHS)

Output Power of Applicable Motor (Pinion shaft)	Gearhead Model	Gear Ratio
60 W (1/12 HP)	5GU□KA	3~180
	5GU10XKB (Decimal gearhead)	

The following items are included in each product.
Gearhead, Mounting Screws, Parallel Key, Operating Manual

● The following gearheads are also available. For details, please refer to website (www.orientalmotor.com) or contact the nearest Oriental Motor sales office.

Gearhead Type	Gearhead Model	Gear Ratio
Parallel Shaft (RoHS) GN-K Gearhead	2GN□KA	3~180
	2GN10XK (Decimal gearhead)	
	3GN□KA	3~180
	3GN10XK (Decimal gearhead)	
	4GN□KA	3~180
	4GN10XK (Decimal gearhead)	
	5GN□KA	3~180
5GN10XK (Decimal gearhead)		

● Enter the gear ratio in the box (□) within the model name.

Right-Angle Gearhead (Sold separately)

◇ Hollow Shaft Type (RoHS)

Output Power of Applicable Motor (Pinion shaft)	Gearhead Model	Gear Ratio
25 W (1/30 HP)	4GN□RH	3~180
40 W (1/19 HP)	5GN□RH	3~180
60 W (1/12 HP)	5GU□RH	3~180

The following items are included in each product.
Gearhead, Mounting Screws, Parallel Key, Safety Cover (with screws), Gasket, Operating Manual

◇ Solid Shaft Type (RoHS)

Output Power of Applicable Motor (Pinion shaft)	Gearhead Model	Gear Ratio
25 W (1/30 HP)	4GN□RAA	3~180
40 W (1/19 HP)	5GN□RAA	3~180
60 W (1/12 HP)	5GU□RAA	3~180

The following items are included in each product.
Gearhead, Mounting Screws, Parallel Key*, Gasket, Operating Manual
*Only for the products with a key slot on the output shaft

◇ Round Shaft Type [6 W (1/125 HP) to 60 W (1/12 HP)] (RoHS)

Type	Power Supply Voltage	<input type="checkbox"/> 60 mm (2.36 in.) 6 W (1/125 HP)	<input type="checkbox"/> 70 mm (2.76 in.) 15 W (1/50 HP)	<input type="checkbox"/> 80 mm (3.15 in.) 25 W (1/30 HP)	<input type="checkbox"/> 90 mm (3.54 in.) 40 W (1/19 HP)	<input type="checkbox"/> 90 mm (3.54 in.) 60 W (1/12 HP)	Applicable Controller (Sold separately)
		Model	Model	Model	Model	Model	
Induction Motor	Single-Phase 110/115 VAC	2IK6RA-AW2U	3IK15RA-AW2U	4IK25RA-AW2U	5IK40RA-AW2U	5IK60RA-AWU	ES01
	Single-Phase 220/230 VAC	2IK6RA-CW2E	3IK15RA-CW2E	4IK25RA-CW2E	5IK40RA-CW2E	5IK60RA-CWE	ES02
Reversible Motor	Single-Phase 110/115 VAC	2RK6RA-AW2U	3RK15RA-AW2U	4RK25RA-AW2U	5RK40RA-AW2U	5RK60RA-AWU	ES01
	Single-Phase 220/230 VAC	2RK6RA-CW2E	3RK15RA-CW2E	4RK25RA-CW2E	5RK40RA-CW2E	5RK60RA-CWE	ES02

The following items are included in each product.
Motor, Capacitor, Capacitor Cap, Operating Manual

■ Specifications

The following specifications assume combination with an applicable speed control motor.

● V Series Induction Motors – Continuous Rating

◇ Single-Phase 110/115 VAC Applicable Speed Controller: **ES01** (RoHS)



Model	Max. Output Power W (HP)	Voltage VAC	Frequency Hz	Variable Speed Range*1 r/min	Permissible Torque		Starting Torque mN-m (oz-in)	Current A	Power Consumption W	Capacitor μF
					1200 r/min mN-m (oz-in)	90 r/min mN-m (oz-in)				
ZP VS1206A2-□U	6 (1/125)	Single-Phase 110	60	90~1600	50 (7.1)	34 (4.8)	40 (5.6)	0.280	29	2.5
		Single-Phase 115								
TP VS1315A2-□U	15 (1/50)	Single-Phase 110	60	90~1600	125 (17.7)	42 (5.9)	65 (9.2)	0.48	46	4.5
		Single-Phase 115								
TP VS1425A2-□U	25 (1/30)	Single-Phase 110	60	90~1600	185 (26)	50 (7.1)	120 (17.0)	0.75	58	6.5
		Single-Phase 115							69	
TP VS1540A2-□U	40 (1/19)	Single-Phase 110	60	90~1600	225 (31)	67 (9.5)	180 (25)	1.1	107	9.0
		Single-Phase 115					200 (28)			
TP VS1560A-□U	60 (1/12)	Single-Phase 110	60	90~1600	490 (69)	210 (29)	320 (45)	2.0	180	18
		Single-Phase 115								
TP VS1590A-□U	90 (1/8)	Single-Phase 110	60	90~1600	730 (103)	210 (29)	410 (58)	2.6	240	20
		Single-Phase 115					450 (63)			

◇ Single-Phase 220/230 VAC Applicable Speed Controller: **ES02** (RoHS)



Model	Max. Output Power W (HP)	Voltage VAC	Frequency Hz	Variable Speed Range*1 r/min	Permissible Torque		Starting Torque mN-m (oz-in)	Current A	Power Consumption W	Capacitor μF
					1200 r/min mN-m (oz-in)	90 r/min mN-m (oz-in)				
ZP VS1206C2-□E	6 (1/125)	Single-Phase 220	50	90~1400	36 (5.1)	33 (4.6)	35 (4.9)	0.135	29	0.6
			60	90~1600	50 (7.1)					
		Single-Phase 230	50	90~1400	40 (5.6)					
			60	90~1600	50 (7.1)					
TP VS1315C2-□E	15 (1/50)	Single-Phase 220	50	90~1400	110 (15.6)	38 (5.3)	65 (9.2)	0.23	46	1.0
			60	90~1600	125 (17.7)					
		Single-Phase 230	50	90~1400	115 (16.3)					
			60	90~1600	125 (17.7)					
TP VS1425C2-□E	25 (1/30)	Single-Phase 220	50	90~1400	205 (29)	40 (5.6)	110 (15.6)	0.37	70	1.5
			60	90~1600	160 (22)					
		Single-Phase 230	50	90~1400	205 (29)					
			60	90~1600	150 (21)					
TP VS1540C2-□E	40 (1/19)	Single-Phase 220	50	90~1400	300 (42)	75 (10.6)	190 (26)	0.55	104	2.3
			60	90~1600	280 (39)					
		Single-Phase 230	50	90~1400	320 (45)					
			60	90~1600	260 (36)					
TP VS1560C-□E	60 (1/12)	Single-Phase 220	50	90~1400	460 (65)	200 (28)	320 (45)	0.84	175	4.0
			60	90~1600	490 (69)					
		Single-Phase 230	50	90~1400	490 (69)					
			60	90~1600	170 (24)					
TP VS1590C-□E	90 (1/8)	Single-Phase 220	50	90~1400	720 (102)	260 (36)	450 (63)	1.2	209	6.0
			60	90~1600	730 (103)					
		Single-Phase 230	50	90~1400	730 (103)					
			60	90~1600	245 (34)					

● Enter the gear ratio in the box (□) within the model name of the combination type. Enter the shaft type **GV**, **GVH** or **GVR** in the box (□) within the model name of the pinion shaft type.
The values for each specification apply to the motor only.

ZP: Impedance protected.

TP: Contains a built-in thermal protector (automatic return type). If a motor overheats for any reason, the thermal protector is activated and the motor is stopped.

When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.

*1 The variable speed ranges shown are under no load conditions.

*2 China Compulsory Certification System (CCC System) (CCC)

The 60 W (1/12 HP) type and 90 W (1/8 HP) type are not CCC certified products.

Brushless Motors/AC Speed Control Motors

● V Series Reversible Motors – 30 Minutes Rating

◇ Single-Phase 110/115 VAC Applicable Speed Controller: **ES01** (RoHS)



Model Combination Type	Max. Output Power W (HP)	Voltage VAC	Frequency Hz	Variable Speed Range*1 r/min	Permissible Torque		Starting Torque mN·m (oz-in)	Current A	Power Consumption W	Capacitor μF
					1200 r/min mN·m (oz-in)	90 r/min mN·m (oz-in)				
Ⓟ VSR206A2-□U	6 (1/125)	Single-Phase 110	60	90~1600	50 (7.1)	50 (7.1)	45 (6.3)	0.330	33	3.5
		Single-Phase 115								
Ⓟ VSR315A2-□U	15 (1/50)	Single-Phase 110	60	90~1600	125 (17.7)	85 (12.0)	100 (14.2)	0.60	60	6.0
		Single-Phase 115								
Ⓟ VSR425A2-□U	25 (1/30)	Single-Phase 110	60	90~1600	205 (29)	110 (15.6)	140 (19.8)	0.93	92	8.0
		Single-Phase 115								
Ⓟ VSR540A2-□U	40 (1/19)	Single-Phase 110	60	90~1600	320 (45)	155 (22)	240 (34)	1.47	145	12
		Single-Phase 115					260 (36)			
Ⓟ VSR560A-□U	60 (1/12)	Single-Phase 110	60	90~1600	490 (69)	270 (38)	380 (53)	2.2	201	20
		Single-Phase 115								
Ⓟ VSR590A-□U	90 (1/8)	Single-Phase 110	60	90~1600	730 (103)	320 (45)	590 (83)	3.0	272	30
		Single-Phase 115								

◇ Single-Phase 220/230 VAC Applicable Speed Controller: **ES02** (RoHS)



Model Combination Type	Max. Output Power W (HP)	Voltage VAC	Frequency Hz	Variable Speed Range*1 r/min	Permissible Torque		Starting Torque mN·m (oz-in)	Current A	Power Consumption W	Capacitor μF		
					1200 r/min mN·m (oz-in)	90 r/min mN·m (oz-in)						
Ⓟ VSR206C2-□E	6 (1/125)	Single-Phase 220	50	90~1400	42 (5.9)	50 (7.1)	45 (6.3)	0.155	34	0.8		
			60	90~1600	50 (7.1)							
			Single-Phase 230	50	90~1400						46 (6.5)	
				60	90~1600						50 (7.1)	
Ⓟ VSR315C2-□E	15 (1/50)	Single-Phase 220	50	90~1400	125 (17.7)	87 (12.3)	100 (14.2)	0.30	63	1.5		
			60	90~1600								
			Single-Phase 230	50							90~1400	
				60							90~1600	
Ⓟ VSR425C2-□E	25 (1/30)	Single-Phase 220	50	90~1400	205 (29)	115 (16.3)	140 (19.8)	0.50	95	2.5		
			60	90~1600								
			Single-Phase 230	50							90~1400	110 (15.9)
				60							90~1600	
Ⓟ VSR540C2-□E	40 (1/19)	Single-Phase 220	50	90~1400	320 (45)	180 (25)	270 (38)	0.75	140	3.5		
			60	90~1600								
			Single-Phase 230	50							90~1400	170 (24)
				60							90~1600	
Ⓟ VSR560C-□E	60 (1/12)	Single-Phase 220	50	90~1400	490 (69)	280 (39)	420 (59)	1.0	185	5.0		
			60	90~1600			380 (53)					
			Single-Phase 230	50			90~1400				380 (53)	
				60			90~1600					460 (65)
Ⓟ VSR590C-□E	90 (1/8)	Single-Phase 220	50	90~1400	670 (95)	360 (51)	600 (85)	1.3	240	7.0		
			60	90~1600			590 (83)					
			Single-Phase 230	50			90~1400				730 (103)	
				60			90~1600					600 (85)

● Enter the gear ratio in the box (□) within the model name of the combination type. Enter the shaft type **GV**, **GVH** or **GVR** in the box (□) within the model name of the pinion shaft type. The values for each specification apply to the motor only.

● The permissible torque and the starting torque of reversible motors are shown without the friction brake installed. Please keep in mind that you should select a suitable motor with enough torque, when designing the equipment.

Ⓟ: Impedance protected.

Ⓟ: Contains a built-in thermal protector (automatic return type). If a motor overheats for any reason, the thermal protector is activated and the motor is stopped.

When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.

*1 The variable speed ranges shown are under no load conditions.

*2 China Compulsory Certification System (CCC System) (CCC)

The 60 W (1/12 HP) type and 90 W (1/8 HP) type are not CCC certified products.

● World K Series Induction Motors – Continuous Rating

◇ Single-Phase 110/115 VAC Applicable Speed Controller: **ES01** (RoHS)



Model		Max. Output Power W (HP)	Voltage VAC	Frequency Hz	Variable Speed Range*1 r/min	Permissible Torque		Starting Torque mN-m (oz-in)	Current A	Power Consumption W	Capacitor μF
Pinion Shaft Type	Round Shaft Type					1200 r/min mN-m (oz-in)	90 r/min mN-m (oz-in)				
Ⓟ 2IK6RGN-AW2U	2IK6RA-AW2U	6 (1/125)	Single-Phase 110	60	90~1600	50 (7.1)	34 (4.8)	40 (5.6)	0.270	27	2.5
			Single-Phase 115								
Ⓟ 3IK15RGN-AW2U	3IK15RA-AW2U	15 (1/50)	Single-Phase 110	60	90~1600	125 (17.7)	42 (5.9)	65 (9.2)	0.48	46	4.5
			Single-Phase 115								
Ⓟ 4IK25RGN-AW2U	4IK25RA-AW2U	25 (1/30)	Single-Phase 110	60	90~1600	185 (26)	50 (7.1)	120 (17.0)	0.75	58	6.5
			Single-Phase 115							69	
Ⓟ 5IK40RGN-AW2U	5IK40RA-AW2U	40 (1/19)	Single-Phase 110	60	90~1600	225 (31)	67 (9.5)	180 (25)	1.1	107	9.0
			Single-Phase 115								
Ⓟ 5IK60RGU-AWU	5IK60RA-AWU	60 (1/12)	Single-Phase 110	60	90~1600	490 (69)	210 (29)	320 (45)	2.0	180	18
			Single-Phase 115								

◇ Single-Phase 220/230 VAC Applicable Speed Controller: **ES02** (RoHS)



Model		Max. Output Power W (HP)	Voltage VAC	Frequency Hz	Variable Speed Range*1 r/min	Permissible Torque		Starting Torque mN-m (oz-in)	Current A	Power Consumption W	Capacitor μF
Pinion Shaft Type	Round Shaft Type					1200 r/min mN-m (oz-in)	90 r/min mN-m (oz-in)				
Ⓟ 2IK6RGN-CW2E	2IK6RA-CW2E	6 (1/125)	Single-Phase 220	50	90~1400	36 (5.1)	33 (4.6)	35 (4.9)	0.130	27	0.6
				60	90~1600	50 (7.1)					
			Single-Phase 230	50	90~1400	40 (5.6)					
				60	90~1600	50 (7.1)					
Ⓟ 3IK15RGN-CW2E	3IK15RA-CW2E	15 (1/50)	Single-Phase 220	50	90~1400	110 (15.6)	38 (5.3)	65 (9.2)	0.23	43	1.0
				60	90~1600	125 (17.7)					
			Single-Phase 230	50	90~1400	115 (16.3)					
				60	90~1600	125 (17.7)					
Ⓟ 4IK25RGN-CW2E	4IK25RA-CW2E	25 (1/30)	Single-Phase 220	50	90~1400	205 (29)	40 (5.6)	110 (15.6)	0.37	70	1.5
				60	90~1600	160 (22)					
			Single-Phase 230	50	90~1400	205 (29)					
				60	90~1600	150 (21)					
Ⓟ 5IK40RGN-CW2E	5IK40RA-CW2E	40 (1/19)	Single-Phase 220	50	90~1400	300 (42)	75 (10.6)	190 (26)	0.55	96	2.3
				60	90~1600	280 (39)					
			Single-Phase 230	50	90~1400	320 (45)					
				60	90~1600	260 (36)					
Ⓟ 5IK60RGU-CWE	5IK60RA-CWE	60 (1/12)	Single-Phase 220	50	90~1400	460 (65)	200 (28)	320 (45)	0.84	155	4.0
				60	90~1600	490 (69)					
			Single-Phase 230	50	90~1400	490 (69)					
				60	90~1600	170 (24)					
									0.89	175	
									0.85	158	
									0.89	172	

Ⓟ: Impedance protected.

Ⓟ: Contains a built-in thermal protector (automatic return type). If a motor overheats for any reason, the thermal protector is activated and the motor is stopped. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.

*1 The variable speed ranges shown are under no load conditions.

*2 China Compulsory Certification System (CCC System) CCC

The 60 W (1/12 HP) type is not a CCC certified product.

Brushless Motors/AC Speed Control Motors

● World K Series Reversible Motors – 30 Minutes Rating

◇ Single-Phase 110/115 VAC Applicable Speed Controller: **ES01** (RoHS)



Model		Max. Output Power W (HP)	Voltage VAC	Frequency Hz	Variable Speed Range*1 r/min	Permissible Torque		Starting Torque mN-m (oz-in)	Current A	Power Consumption W	Capacitor μF
Pinion Shaft Type	Round Shaft Type					1200 r/min mN-m (oz-in)	90 r/min mN-m (oz-in)				
Ⓟ 2RK6RGN-AW2U	2RK6RA-AW2U	6 (1/125)	Single-Phase 110	60	90~1600	42 (5.9)	50 (7.1)	45 (6.3)	0.320	32	3.5
			Single-Phase 115								
Ⓟ 3RK15RGN-AW2U	3RK15RA-AW2U	15 (1/50)	Single-Phase 110	60	90~1600	125 (17.7)	85 (12.0)	100 (14.2)	0.60	60	6.0
			Single-Phase 115								
Ⓟ 4RK25RGN-AW2U	4RK25RA-AW2U	25 (1/30)	Single-Phase 110	60	90~1600	205 (29)	110 (15.6)	140 (19.8)	0.93	92	8.0
			Single-Phase 115								
Ⓟ 5RK40RGN-AW2U	5RK40RA-AW2U	40 (1/19)	Single-Phase 110	60	90~1600	320 (45)	155 (22)	240 (34)	1.47	145	12
			Single-Phase 115					260 (36)			
Ⓟ 5RK60RGU-AWU	5RK60RA-AWU	60 (1/12)	Single-Phase 110	60	90~1600	490 (69)	270 (38)	380 (53)	2.2	201	20
		Single-Phase 115									

◇ Single-Phase 220/230 VAC Applicable Speed Controller: **ES02** (RoHS)



Model		Max. Output Power W (HP)	Voltage VAC	Frequency Hz	Variable Speed Range*1 r/min	Permissible Torque		Starting Torque mN-m (oz-in)	Current A	Power Consumption W	Capacitor μF
Pinion Shaft Type	Round Shaft Type					1200 r/min mN-m (oz-in)	90 r/min mN-m (oz-in)				
Ⓟ 2RK6RGN-CW2E	2RK6RA-CW2E	6 (1/125)	Single-Phase 220	50	90~1400	42 (5.9)	50 (7.1)	45 (6.3)	0.155	32	0.8
				60	90~1600						
			Single-Phase 230	50	90~1400	46 (6.5)	50 (7.1)				
				60	90~1600	50 (7.1)					
Ⓟ 3RK15RGN-CW2E	3RK15RA-CW2E	15 (1/50)	Single-Phase 220	50	90~1400	125 (17.7)	87 (12.3)	100 (14.2)	0.30	63	1.5
				60	90~1600						
			Single-Phase 230	50	90~1400	110 (15.6)					
				60	90~1600						
Ⓟ 4RK25RGN-CW2E	4RK25RA-CW2E	25 (1/30)	Single-Phase 220	50	90~1400	205 (29)	115 (16.3)	140 (19.8)	0.50	95	2.5
				60	90~1600		110 (15.6)				
			Single-Phase 230	50	90~1400	115 (16.3)	155 (22)				
				60	90~1600	110 (15.6)		140 (19.8)			
Ⓟ 5RK40RGN-CW2E	5RK40RA-CW2E	40 (1/19)	Single-Phase 220	50	90~1400	320 (45)	180 (25)	270 (38)	0.75	140	3.5
				60	90~1600		170 (24)				
			Single-Phase 230	50	90~1400	170 (24)	270 (38)				
				60	90~1600		260 (36)				
Ⓟ 5RK60RGU-CWE	5RK60RA-CWE	60 (1/12)	Single-Phase 220	50	90~1400	490 (69)	280 (39)	420 (59)	1.0	185	5.0
				60	90~1600			380 (53)		198	
			Single-Phase 230	50	90~1400	380 (53)	460 (65)	188			
				60	90~1600		380 (53)	202			

● The permissible torque and the starting torque of reversible motors are shown without the friction brake installed. Please keep in mind that you should select a suitable motor with enough torque, when designing the equipment.

Ⓟ: Impedance protected.

Ⓟ: Contains a built-in thermal protector (automatic return type). If a motor overheats for any reason, the thermal protector is activated and the motor is stopped. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.

*1 The variable speed ranges shown are under no load conditions.

*2 China Compulsory Certification System (CCC System) .
The 60 W (1/12 HP) type is not a CCC certified product.

General Specifications of Applicable Speed Control Motors

Item	Specifications
Insulation Resistance	100 MΩ or more when 500 VDC megger is applied between the windings and the case after rated operation under normal ambient temperature and humidity.
Dielectric Strength	Sufficient to withstand 1.5 kVAC at 50 Hz or 60 Hz applied between the windings and the case for 1 minute after rated operation under normal ambient temperature and humidity.
Temperature Rise	Temperature rise of windings is 80°C (144°F) or less measured by the resistance change method after rated operation with no load under normal ambient temperature and humidity with connecting a gearhead or equivalent heat radiation plate* to a motor.
Overheat Protection	6 W (1/125 HP) type has impedance protection. All others have built-in thermal protector (automatic return type). Open: 130±5°C (266±9°F), Close: 82±15°C (179.6±27°F)
Ambient Temperature	-10~+40°C (+14~+104°F) (non-freezing)
Ambient Humidity	85% or less (non-condensing)
Thermal Class	130 (B)
Degree of Protection	IP20 World K Series 60 W (1/12 HP): IP40

* Heat radiation plate (Material: Aluminum)

Motor Output Power	Size mm (in.)	Thickness mm (in.)
6 W (1/125 HP)	115×115 (4.53×4.53)	5 (0.20)
15 W (1/50 HP)	125×125 (4.92×4.92)	
25 W (1/30 HP)	135×135 (5.31×5.31)	
40 W (1/19 HP)	165×165 (6.50×6.50)	
60 W (1/12 HP)	200×200 (7.87×7.87)	

Variable Speed Range When Gearhead is Attached

V Series, World K Series

Unit = r/min

Series	World K Series																							
	V Series																							
Gear Ratio	3	3.6	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	467	389	280	233	187	156	112	93	78	56	47	39	28	23	19	16	14	12	9	8	6	5	4
	60 Hz	533	444	320	267	213	178	128	107	89	64	53	44	32	27	21	18	16	13	11	8.9	6.4	5.3	4.4
Low Speed		30	25	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	0.4	0.3	0.3

Gearmotor – Torque Table

- Gearheads of the World **K** Series are sold separately.
- With the World **K** Series, to reduce the speed beyond the gear ratio in the table, attach a decimal gearhead of gear ratio 10:1 (sold separately) between the gearhead and the motor. In that case, the permissible torques are as follows. (Decimal gearheads are not available for the **V** Series.)

2GN□**SA**: 3 N·m (26 lb-in), **3GN**□**SA**: 5 N·m (44 lb-in)

4GN□**SA**: 8 N·m (70 lb-in) [6 N·m (53 lb-in) when a gearhead of 25:1 to 36:1 is attached]

5GN□**SA**: 10 N·m (88 lb-in), **5GU**□**KA**: 20 N·m (177 lb-in)

- Enter the gear ratio in the box (□) within the model name.

- A colored background (□) indicates gear shaft rotation in the same direction as the motor shaft, while the others rotate in the opposite direction.

● V Series Induction Motors

◇ Single-Phase 110/115 VAC

Unit = N·m (lb-in)

Model	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
Combination Type	Motor Speed																					
VS1206A2 -□ U	1200 r/min	0.23 (2.0)	0.27 (2.3)	0.34 (3.0)	0.41 (3.6)	0.56 (4.9)	0.68 (6.0)	0.81 (7.1)	1.1 (9.7)	1.3 (11.5)	1.5 (13.2)	2.2 (19.4)	2.6 (23)	3.2 (28)	3.9 (34)	4.3 (38)	5.2 (46)	6 (53)	6 (53)	6 (53)	6 (53)	6 (53)
	90 r/min	0.15 (1.32)	0.18 (1.59)	0.23 (2.0)	0.28 (2.4)	0.38 (3.3)	0.46 (4.0)	0.55 (4.8)	0.67 (6.8)	0.88 (7.7)	1.1 (9.7)	1.5 (13.2)	1.8 (15.9)	2.2 (19.4)	2.6 (23)	2.9 (25)	3.5 (30)	4.1 (36)	5.0 (44)	6 (53)	6 (53)	6 (53)
VS1315A2 -□ U	1200 r/min	0.56 (4.9)	0.68 (6.0)	0.84 (7.4)	1.0 (8.8)	1.4 (12.3)	1.7 (15.0)	2.0 (17.7)	2.8 (24)	3.2 (28)	3.9 (34)	5.4 (47)	6.5 (57)	8.1 (71)	9.7 (85)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)
	90 r/min	0.19 (1.68)	0.23 (2.0)	0.28 (2.4)	0.34 (3.0)	0.47 (4.1)	0.57 (5.0)	0.68 (6.0)	0.95 (8.4)	1.1 (9.7)	1.3 (11.5)	1.8 (15.9)	2.2 (19.4)	2.7 (23)	3.3 (29)	3.6 (31)	4.3 (38)	5.1 (45)	6.1 (53)	8.5 (75)	10 (88)	10 (88)
VS1425A2 -□ U	1200 r/min	0.83 (7.3)	1.0 (8.8)	1.2 (10.6)	1.5 (13.2)	2.1 (18.5)	2.5 (22)	3.0 (26)	4.2 (37)	4.8 (42)	5.7 (50)	8.0 (70)	9.5 (84)	11.9 (105)	14.3 (126)	15.9 (140)	16 (141)	16 (141)	16 (141)	16 (141)	16 (141)	16 (141)
	90 r/min	0.23 (2.0)	0.27 (2.3)	0.34 (3.0)	0.41 (3.6)	0.56 (4.9)	0.68 (6.0)	0.81 (7.1)	1.1 (9.7)	1.3 (11.5)	1.5 (13.2)	2.2 (19.4)	2.6 (23)	3.2 (28)	3.9 (34)	4.3 (38)	5.2 (46)	6.1 (53)	7.4 (64)	10.1 (89)	12.2 (107)	14.6 (129)
VS1540A2 -□ U	1200 r/min	1.0 (8.8)	1.2 (10.6)	1.5 (13.2)	1.8 (15.9)	2.5 (22)	3.0 (26)	3.6 (31)	4.8 (42)	5.8 (51)	7.0 (61)	9.7 (85)	11.6 (102)	14.5 (128)	17.4 (153)	19.4 (171)	21.9 (193)	27.3 (240)	30 (260)	30 (260)	30 (260)	—
	90 r/min	0.30 (2.6)	0.36 (3.1)	0.45 (3.9)	0.54 (4.7)	0.75 (6.6)	0.90 (7.9)	1.1 (9.7)	1.4 (12.3)	1.7 (15.0)	2.1 (18.5)	2.9 (25)	3.5 (30)	4.3 (38)	5.2 (46)	5.8 (51)	6.5 (57)	8.1 (71)	9.8 (86)	13.6 (120)	16.3 (144)	—
VS1560A -□ U	1200 r/min	2.2 (19.4)	2.6 (23)	3.3 (29)	4.0 (35)	5.5 (48)	6.6 (58)	7.9 (69)	10.5 (92)	12.6 (111)	15.2 (134)	21.1 (186)	25.3 (220)	30 (260)	30 (260)	30 (260)	30 (260)	30 (260)	30 (260)	30 (260)	30 (260)	—
	90 r/min	0.95 (8.4)	1.1 (9.7)	1.4 (12.3)	1.7 (15.0)	2.4 (21)	2.8 (24)	3.4 (30)	4.5 (39)	5.4 (47)	6.5 (57)	9.0 (79)	10.8 (95)	13.5 (119)	16.3 (144)	18.1 (160)	20.4 (180)	25.5 (220)	30 (260)	30 (260)	30 (260)	—
VS1590A -□ U	1200 r/min	3.3 (29)	3.9 (34)	4.9 (43)	5.9 (52)	8.2 (72)	9.9 (87)	11.3 (100)	15.7 (138)	18.8 (166)	22.6 (200)	31.4 (270)	37.7 (330)	40 (350)	40 (350)	40 (350)	40 (350)	40 (350)	40 (350)	—	—	—
	90 r/min	0.95 (8.4)	1.1 (9.7)	1.4 (12.3)	1.7 (15.0)	2.4 (21)	2.8 (24)	3.3 (29)	4.5 (39)	5.4 (47)	6.5 (57)	9.0 (79)	10.8 (95)	12.8 (113)	15.3 (135)	17.0 (150)	20.4 (180)	25.5 (220)	30.6 (270)	—	—	—

◇ Single-Phase 220/230 VAC

Unit = N·m (lb-in)

Model	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	
Combination Type	Motor Speed																						
VS1206C2 -□ E	1200 r/min	220 VAC	0.16 (1.41)	0.19 (1.68)	0.24 (2.1)	0.29 (2.5)	0.41 (3.6)	0.49 (4.3)	0.58 (5.1)	0.81 (7.1)	0.93 (8.2)	1.1 (9.7)	1.5 (13.2)	1.9 (16.8)	2.3 (20)	2.8 (24)	3.1 (27)	3.7 (32)	4.4 (38)	5.2 (46)	6 (53)	6 (53)	6 (53)
		230 VAC	0.18 (1.59)	0.22 (1.94)	0.27 (2.3)	0.32 (2.8)	0.45 (3.9)	0.54 (4.7)	0.65 (5.7)	0.90 (7.9)	1.0 (8.8)	1.2 (10.6)	1.7 (15.0)	2.1 (18.5)	2.6 (23)	3.1 (27)	3.4 (30)	4.1 (36)	4.9 (43)	5.8 (51)	6 (53)	6 (53)	6 (53)
		50 Hz	0.23 (2.0)	0.27 (2.3)	0.34 (3.0)	0.41 (3.6)	0.56 (4.9)	0.68 (6.0)	0.81 (7.1)	1.1 (9.7)	1.3 (11.5)	1.5 (13.2)	2.2 (19.4)	2.6 (23)	3.2 (28)	3.9 (34)	4.3 (38)	5.2 (46)	6 (53)	6 (53)	6 (53)	6 (53)	6 (53)
	60 Hz	0.23 (2.0)	0.27 (2.3)	0.34 (3.0)	0.41 (3.6)	0.56 (4.9)	0.68 (6.0)	0.81 (7.1)	1.1 (9.7)	1.3 (11.5)	1.5 (13.2)	2.2 (19.4)	2.6 (23)	3.2 (28)	3.9 (34)	4.3 (38)	5.2 (46)	6 (53)	6 (53)	6 (53)	6 (53)	6 (53)	
	90 r/min	0.15 (1.32)	0.18 (1.59)	0.22 (1.94)	0.27 (2.3)	0.37 (3.2)	0.45 (3.9)	0.53 (4.6)	0.74 (6.5)	0.85 (7.5)	1.0 (8.8)	1.4 (12.3)	1.7 (15.0)	2.1 (18.5)	2.6 (23)	2.8 (24)	3.4 (30)	4.0 (35)	4.8 (42)	6 (53)	6 (53)	6 (53)	
VS1315C2 -□ E	1200 r/min	220 VAC	0.50 (4.4)	0.59 (5.2)	0.74 (6.5)	0.89 (7.8)	1.2 (10.6)	1.5 (13.2)	1.8 (15.9)	2.5 (22)	2.8 (24)	3.4 (30)	4.7 (41)	5.7 (50)	7.1 (62)	8.5 (75)	9.5 (84)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)
		230 VAC	0.52 (4.6)	0.62 (5.4)	0.78 (6.9)	0.93 (8.2)	1.3 (11.5)	1.6 (14.1)	1.9 (16.8)	2.6 (23)	3.0 (26)	3.6 (31)	4.9 (43)	5.9 (52)	7.4 (65)	8.9 (78)	9.9 (87)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)
		50 Hz	0.56 (4.9)	0.68 (6.0)	0.84 (7.4)	1.0 (8.8)	1.4 (12.3)	1.7 (15.0)	2.0 (17.7)	2.8 (24)	3.2 (28)	3.9 (34)	5.4 (47)	6.5 (57)	8.1 (71)	9.7 (85)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)
	60 Hz	0.56 (4.9)	0.68 (6.0)	0.84 (7.4)	1.0 (8.8)	1.4 (12.3)	1.7 (15.0)	2.0 (17.7)	2.8 (24)	3.2 (28)	3.9 (34)	5.4 (47)	6.5 (57)	8.1 (71)	9.7 (85)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)	10 (88)	
	90 r/min	0.17 (1.50)	0.21 (1.85)	0.26 (2.3)	0.31 (2.7)	0.43 (3.8)	0.51 (4.5)	0.62 (5.4)	0.86 (7.6)	0.98 (8.6)	1.2 (10.6)	1.6 (14.1)	2.0 (17.7)	2.5 (22)	2.9 (25)	3.3 (29)	3.9 (34)	4.6 (40)	5.5 (48)	7.7 (68)	9.2 (81)	10 (88)	

Single-Phase 220/230 VAC

Unit = N·m (lb·in)

Model	Gear Ratio	3	3.6	5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180		
Motor/Gearhead	Motor Speed																						
2IK6RGN-CW2E /2GN SA	1200 r/min	220 VAC	0.087	0.10	0.15	0.17	0.22	0.26	0.36	0.44	0.52	0.66	0.79	0.95	1.2	1.4	1.8	2.1	2.4	2.9	3	3	
		50 Hz	(0.76)	(0.88)	(1.32)	(1.50)	(1.94)	(2.3)	(3.1)	(3.8)	(4.6)	(5.8)	(6.9)	(8.4)	(10.6)	(12.3)	(15.9)	(18.5)	(21)	(24)	(25)	(26)	(26)
		230 VAC	0.097	0.12	0.16	0.19	0.24	0.29	0.41	0.49	0.58	0.73	0.88	1.1	1.3	1.6	2.0	2.4	2.6	3	3	3	3
	90 r/min	50 Hz	(0.85)	(1.06)	(1.41)	(1.68)	(2.1)	(2.5)	(3.6)	(4.3)	(5.1)	(6.4)	(7.7)	(9.7)	(11.5)	(14.1)	(17.7)	(21)	(23)	(26)	(26)	(26)	(26)
		60 Hz	0.12	0.15	0.20	0.24	0.30	0.36	0.51	0.61	0.73	0.91	1.1	1.3	1.7	2.0	2.5	3	3	3	3	3	3
		(1.06)	(1.32)	(1.77)	(2.1)	(2.6)	(3.1)	(4.5)	(5.3)	(6.4)	(8.0)	(9.7)	(11.5)	(15.0)	(17.7)	(22)	(26)	(26)	(26)	(26)	(26)	(26)	(26)

World K Series Reversible Motors

Single-Phase 110/115 VAC

Unit = N·m (lb·in)

Model	Gear Ratio	3	3.6	5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180
Motor/Gearhead	Motor Speed																				
2RK6RGN-AW2U /2GN SA	1200 r/min	0.12	0.15	0.20	0.24	0.30	0.36	0.51	0.61	0.73	0.91	1.1	1.3	1.7	2.0	2.5	3	3	3	3	3
	(1.06)	(1.32)	(1.77)	(2.1)	(2.6)	(3.1)	(4.5)	(5.3)	(6.4)	(8.0)	(9.7)	(11.5)	(15.0)	(17.7)	(22)	(26)	(26)	(26)	(26)	(26)	(26)
3RK15RGN-AW2U /3GN SA	1200 r/min	0.30	0.36	0.51	0.61	0.76	0.91	1.3	1.5	1.8	2.3	2.7	3.3	4.1	5	5	5	5	5	5	5
	(2.6)	(3.1)	(4.5)	(5.3)	(6.7)	(8.0)	(11.5)	(13.2)	(15.9)	(20)	(23)	(29)	(36)	(44)	(44)	(44)	(44)	(44)	(44)	(44)	(44)
4RK25RGN-AW2U /4GN SA	1200 r/min	0.50	0.60	0.83	1.0	1.2	1.5	2.1	2.5	3.0	3.7	4.5	5.4	6.8	8	8	8	8	8	8	8
	(4.4)	(5.3)	(7.3)	(8.8)	(10.6)	(13.2)	(18.5)	(22)	(26)	(32)	(39)	(47)	(60)	(70)	(70)	(70)	(70)	(70)	(70)	(70)	(70)
5RK40RGN-AW2U /5GN SA	1200 r/min	0.78	0.93	1.3	1.6	1.9	2.3	3.2	3.9	4.7	5.8	7.0	8.4	10	10	10	10	10	10	10	10
	(6.9)	(8.2)	(11.5)	(14.1)	(16.8)	(20)	(28)	(34)	(41)	(51)	(61)	(74)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)
5RK60RGN-AWU /5GU KA	1200 r/min	1.2	1.4	2.0	2.4	3.0	3.6	4.5	5.4	6.4	8.1	9.7	11.6	16.2	19.4	20	20	20	20	20	20
	(10.6)	(12.3)	(17.7)	(21)	(26)	(31)	(39)	(47)	(56)	(66)	(71)	(85)	(102)	(143)	(171)	(177)	(177)	(177)	(177)	(177)	(177)

Brushless Motors/AC Speed Control Motors

◇ Single-Phase 220/230 VAC

Unit = N·m (lb·in)

Model	Gear Ratio		3	3.6	5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180	
Motor/Gearhead	Motor Speed																						
2RK6RGN-CW2E /2GN□SA	1200 r/min	220 VAC	0.10	0.12	0.17	0.20	0.26	0.31	0.43	0.51	0.61	0.77	0.92	1.1	1.4	1.7	2.1	2.5	2.8	3	3	3	
		50 Hz	(0.88)	(1.06)	(1.50)	(1.77)	(2.3)	(2.7)	(3.8)	(4.5)	(5.3)	(6.8)	(8.1)	(9.7)	(11.5)	(12.3)	(15.0)	(18.5)	(22)	(24)	(26)	(26)	(26)
		230 VAC	0.11	0.13	0.19	0.22	0.28	0.34	0.47	0.56	0.67	0.84	1.0	1.2	1.5	1.8	2.3	2.7	3	3	3	3	3
	90 r/min	50 Hz	(0.97)	(1.15)	(1.68)	(1.94)	(2.4)	(3.0)	(4.1)	(4.9)	(5.9)	(7.4)	(8.8)	(10.6)	(13.2)	(15.9)	(20)	(23)	(26)	(26)	(26)	(26)	(26)
		60 Hz	0.12	0.15	0.20	0.24	0.30	0.36	0.51	0.61	0.73	0.91	1.1	1.3	1.7	2.0	2.5	3	3	3	3	3	3
		(1.06)	(1.32)	(1.77)	(2.1)	(2.6)	(3.1)	(4.5)	(5.3)	(6.4)	(8.0)	(9.7)	(11.5)	(15.0)	(17.7)	(22)	(26)	(26)	(26)	(26)	(26)	(26)	(26)
3RK15RGN-CW2E /3GN□SA	1200 r/min	0.30	0.36	0.51	0.61	0.76	0.91	1.3	1.5	1.8	2.3	2.7	3.3	4.1	5	5	5	5	5	5	5	5	
	(2.6)	(3.1)	(4.5)	(5.3)	(6.7)	(8.0)	(11.5)	(13.2)	(15.9)	(20)	(23)	(29)	(36)	(44)	(44)	(44)	(44)	(44)	(44)	(44)	(44)	(44)	
4RK25RGN-CW2E /4GN□SA	1200 r/min	0.50	0.60	0.83	1.0	1.2	1.5	2.1	2.5	3.0	3.7	4.5	5.4	6.8	8	8	8	8	8	8	8	8	
	(4.4)	(5.3)	(7.3)	(8.8)	(10.6)	(13.2)	(18.5)	(22)	(26)	(32)	(39)	(47)	(60)	(70)	(70)	(70)	(70)	(70)	(70)	(70)	(70)	(70)	
90 r/min	50 Hz	0.28	0.34	0.47	0.56	0.70	0.84	1.2	1.4	1.7	2.1	2.5	3.0	3.8	4.6	5.7	6.8	7.6	8	8	8	8	
	(2.4)	(3.0)	(4.1)	(4.9)	(6.1)	(7.4)	(10.6)	(12.3)	(15.0)	(18.5)	(22)	(26)	(33)	(40)	(50)	(60)	(67)	(70)	(70)	(70)	(70)	(70)	
	60 Hz	0.27	0.32	0.45	0.53	0.67	0.80	1.1	1.3	1.6	2.0	2.4	2.9	3.6	4.4	5.4	6.5	7.3	8	8	8	8	
5RK40RGN-CW2E /5GN□SA	1200 r/min	220 VAC	0.78	0.93	1.3	1.6	1.9	2.3	3.2	3.9	4.7	5.8	7.0	8.4	10	10	10	10	10	10	10	10	
		50 Hz	(6.9)	(8.2)	(11.5)	(14.1)	(16.8)	(20)	(28)	(34)	(41)	(51)	(61)	(74)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)
		230 VAC	0.44	0.52	0.73	0.87	1.1	1.3	1.8	2.2	2.6	3.3	3.9	4.7	5.9	7.1	8.9	10	10	10	10	10	10
90 r/min	220 VAC	(3.8)	(4.6)	(6.4)	(7.6)	(9.7)	(11.5)	(15.9)	(19.4)	(23)	(29)	(34)	(41)	(52)	(62)	(78)	(88)	(88)	(88)	(88)	(88)	(88)	
	60 Hz	0.41	0.50	0.69	0.83	1.0	1.2	1.7	2.1	2.5	3.1	3.7	4.5	5.6	6.7	8.4	10	10	10	10	10	10	
5RK60RGU-CWE /5GU□KA	1200 r/min	220 VAC	1.2	1.4	2.0	2.4	3.0	3.6	4.5	5.4	6.4	8.1	9.7	11.6	16.2	19.4	20	20	20	20	20	20	
		(10.6)	(12.3)	(17.7)	(21)	(26)	(31)	(39)	(47)	(56)	(71)	(85)	(102)	(143)	(171)	(177)	(177)	(177)	(177)	(177)	(177)	(177)	(177)
90 r/min	220 VAC	0.68	0.82	1.1	1.4	1.7	2.0	2.6	3.1	3.7	4.6	5.5	6.7	9.2	11.1	12.4	14.9	16.5	19.8	20	20	20	
	(6.0)	(7.2)	(9.7)	(12.3)	(15.0)	(17.7)	(23)	(27)	(32)	(40)	(48)	(59)	(81)	(98)	(109)	(131)	(146)	(175)	(177)	(177)	(177)	(177)	

■ Gearmotor – Torque Table When Right-Angle Gearhead is Attached

A right-angle gearhead can be attached to 25 W (1/30 HP), 40 W (1/19 HP) and 60 W (1/12 HP) types of the World **K** Series.

→ Page C-230

■ Permissible Overhung Load and Permissible Thrust Load

Motor (Round shaft type) → Page C-17

Gearhead → Page C-17

■ Permissible Load Inertia J of Gearhead

→ Page C-18

Speed – Torque Characteristics

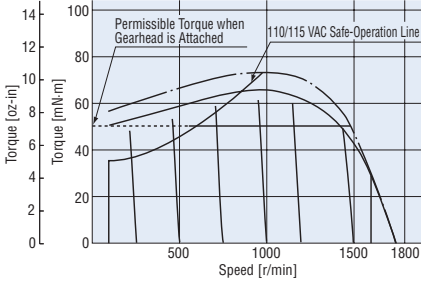
- Enter the gear ratio in the box (□) within the model name of the **V** Series combination type. Enter **GV**, **GVH** or **GVR** in the box (□) within the model name of the **V** Series pinion shaft type.
- The values for each specification of the **V** Series apply to the motor only.

● Induction Motors

◇ Single-Phase 110/115 VAC — 110 VAC 60 Hz - - - 115 VAC 60 Hz

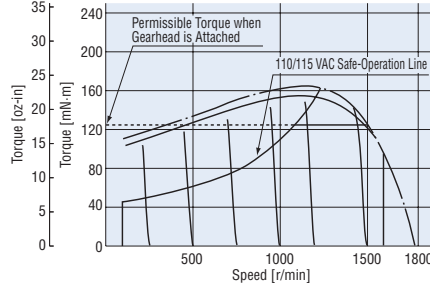
VSI206A2-□U/ES01

2IK6RGN(A)-AW2U/ES01



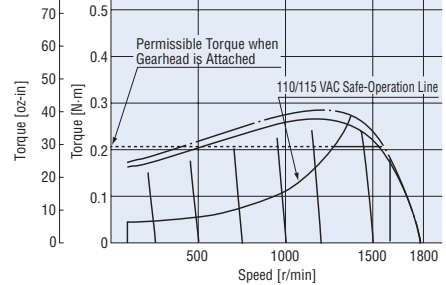
VSI315A2-□U/ES01

3IK15RGN(A)-AW2U/ES01



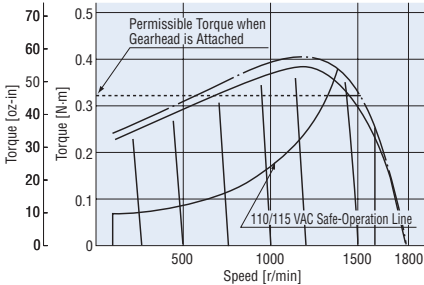
VSI425A2-□U/ES01

4IK25RGN(A)-AW2U/ES01



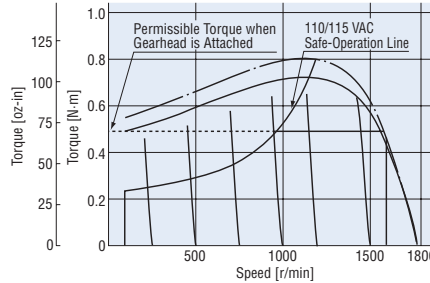
VSI540A2-□U/ES01

5IK40RGN(A)-AW2U/ES01

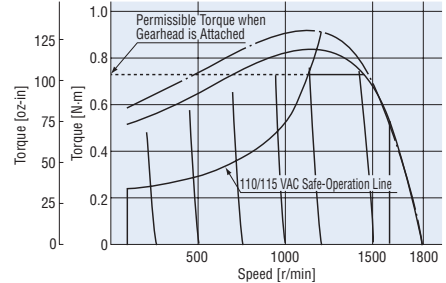


VSI560A-□U/ES01

5IK60RGU(A)-AWU/ES01



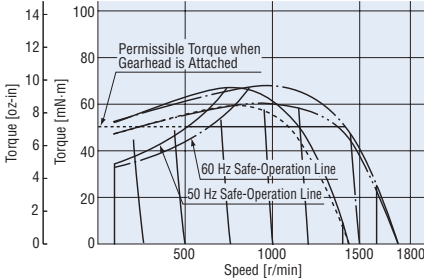
VSI590A-□U/ES01



◇ Single-Phase 220/230 VAC - - - - - 220 VAC 50 Hz — 230 VAC 50 Hz - - - - - 220 VAC 60 Hz - - - - - 230 VAC 60 Hz

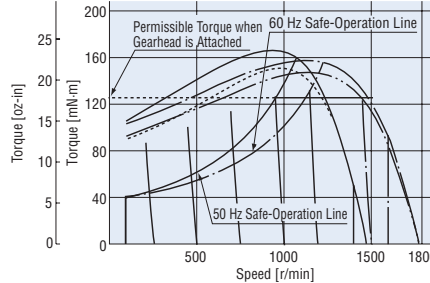
VSI206C2-□E/ES02

2IK6RGN(A)-CW2E/ES02



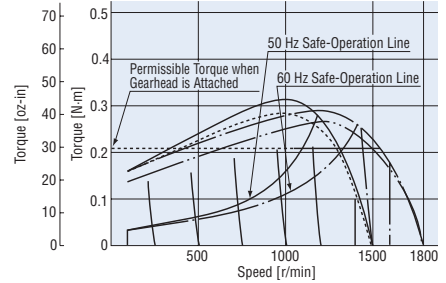
VSI315C2-□E/ES02

3IK15RGN(A)-CW2E/ES02



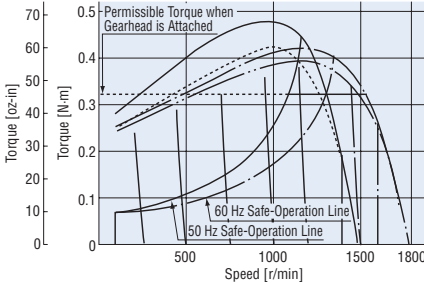
VSI425C2-□E/ES02

4IK25RGN(A)-CW2E/ES02



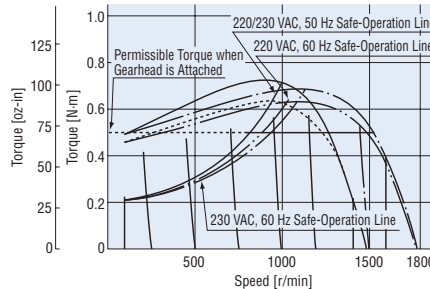
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5IK40RGN(A)-CW2E/ES02

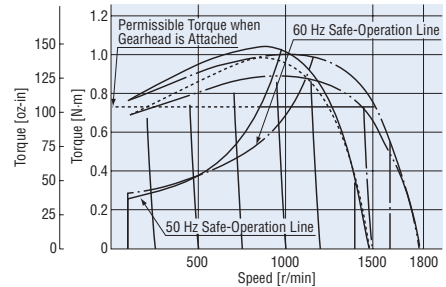


VSI560C-□E/ES02

5IK60RGU(A)-CWE/ES02



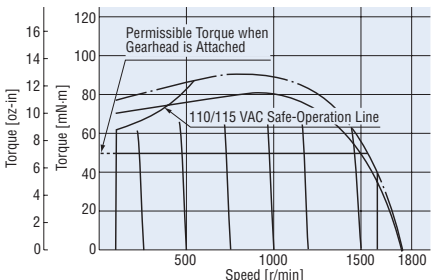
VSI590C-□E/ES02



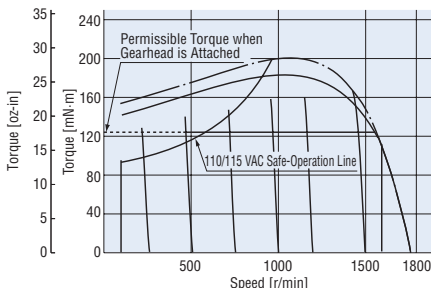
● Reversible Motors

◇ Single-Phase 110/115 VAC 110 VAC 60 Hz 115 VAC 60 Hz

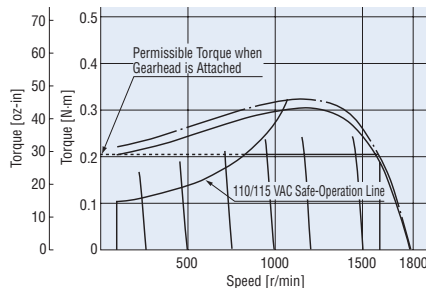
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2RK6RGN(A)-AW2U/ES01



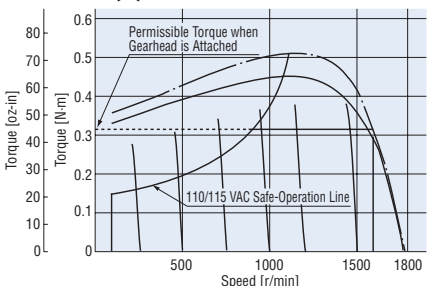
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3RK15RGN(A)-AW2U/ES01



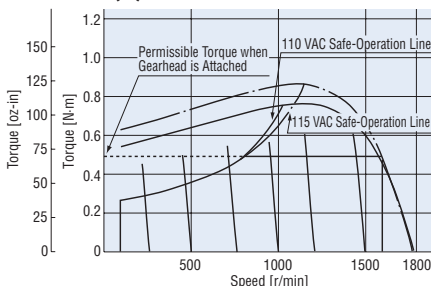
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4RK25RGN(A)-AW2U/ES01



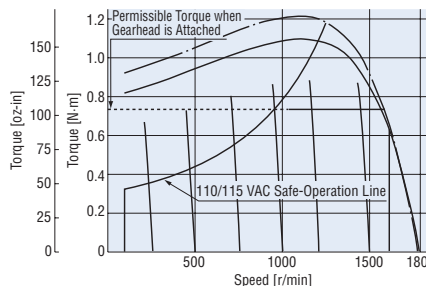
VSR540A2-□U/ES01
5RK40RGN(A)-AW2U/ES01



VSR560A-□U/ES01
5RK60RGU(A)-AWU/ES01

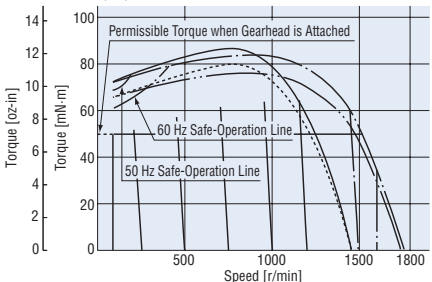


VSR590A-□U/ES01

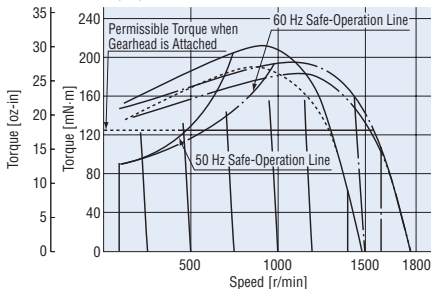


◇ Single-Phase 220/230 VAC 220 VAC 50 Hz 230 VAC 50 Hz 220 VAC 60 Hz 230 VAC 60 Hz

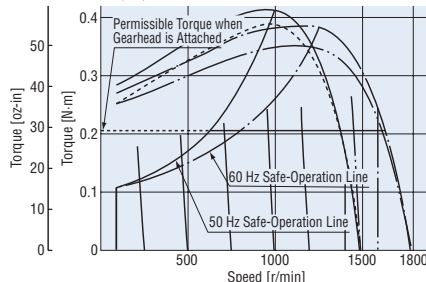
VSR206C2-□E/ES02
2RK6RGN(A)-CW2E/ES02



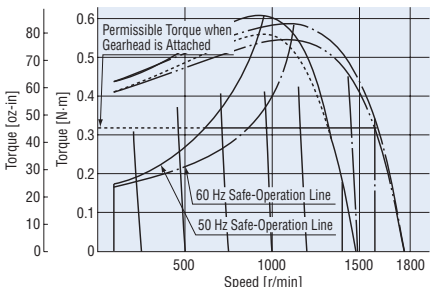
VSR315C2-□E/ES02
3RK15RGN(A)-CW2E/ES02



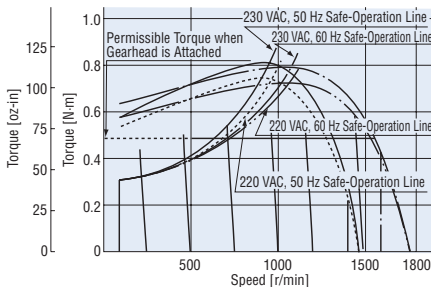
VSR425C2-□E/ES02
4RK25RGN(A)-CW2E/ES02



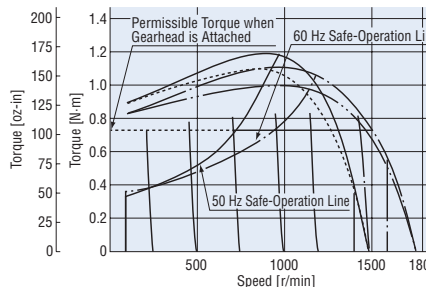
VSR540C2-□E/ES02
5RK40RGN(A)-CW2E/ES02



VSR560C-□E/ES02
5RK60RGU(A)-CWE/ES02



VSR590C-□E/ES02



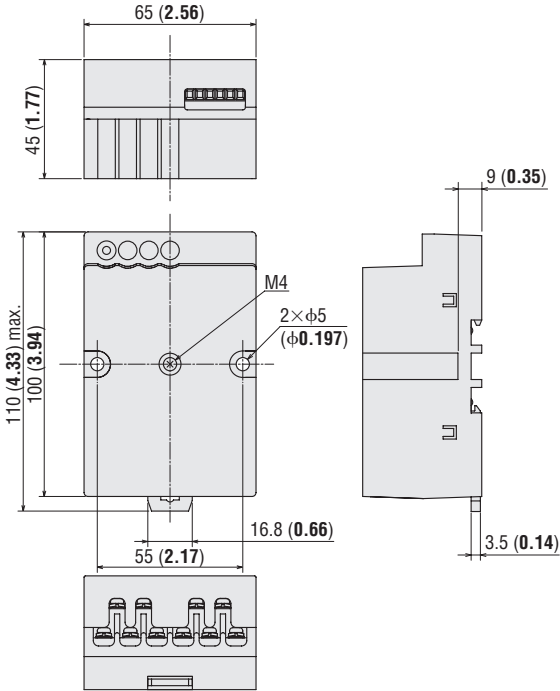
Dimensions Unit = mm (in.)

● **Speed Controller**

ES01, ES02

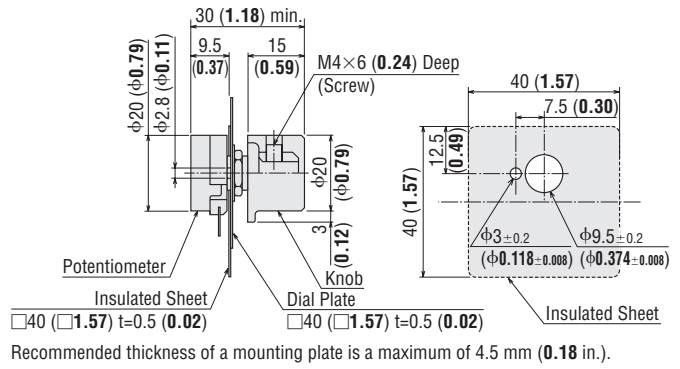
Mass: 0.18 kg (0.4 lb.)

DXF A394



◇ **External Speed Potentiometer**
(Included with the speed controller)

Mass: 20 g (0.71 oz.)



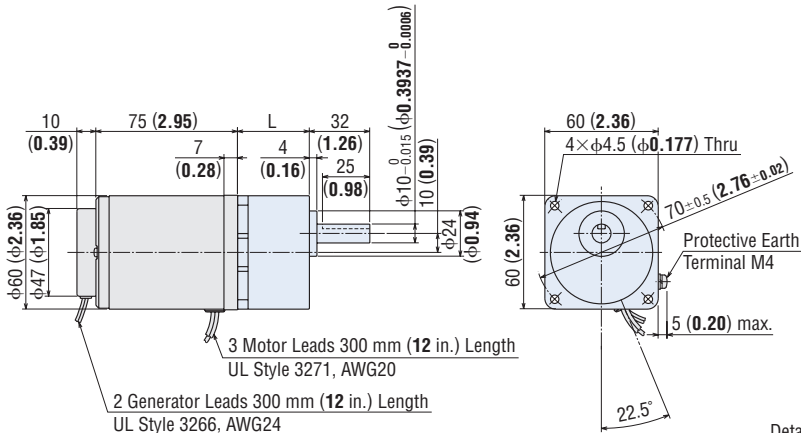
● **V Series**

● Mounting screws are included with the combination type. Dimensions for mounting screws → Page C-280

◇ **Motor/Gearhead (Combination type)**

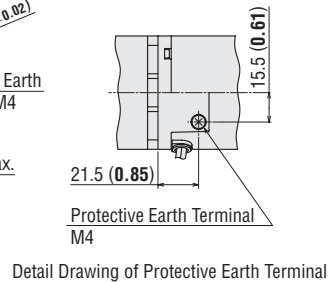
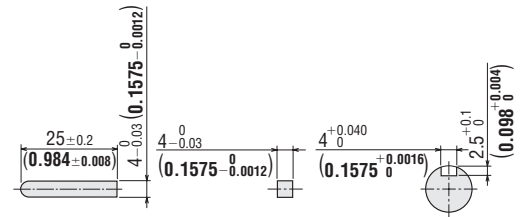
Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
VSI206A2-□U	VSI206A2-GV	GV2G□	5~25	34 (1.34)	A500A
VSI206C2-□E	VSI206C2-GV		30~120	38 (1.50)	A500B
VSR206A2-□U	VSR206A2-GV		150~360	43 (1.69)	A500C
VSR206C2-□E	VSR206C2-GV				

Mass: 1.3 kg (2.9 lb.) (Including gearhead)



◇ **Key and Key Slot**

(The key is included with the gearhead)



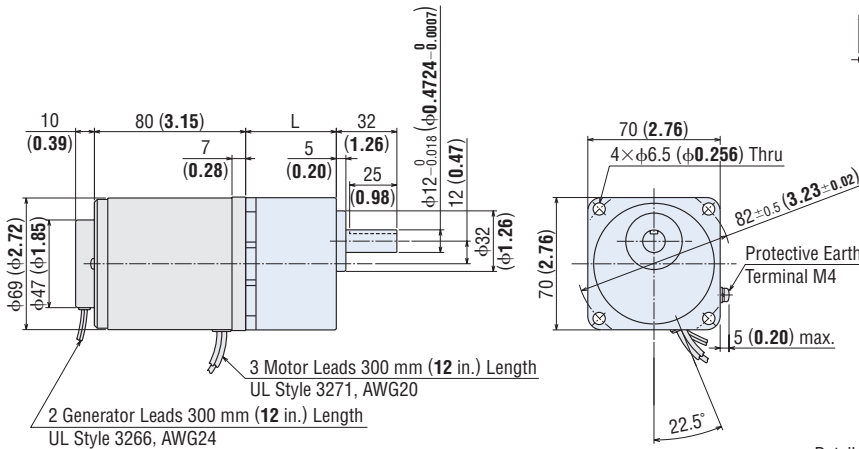
● Enter the gear ratio in the box (□) within the model name.

Brushless Motors/AC Speed Control Motors

◇ Motor/Gearhead (Combination type)

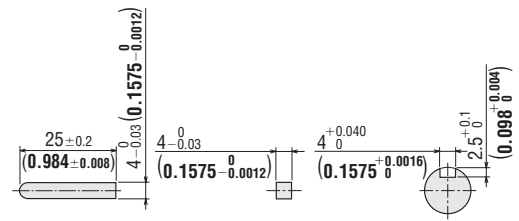
Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
VSI315A2-□U	VSI315A2-GV	GV3G□	5~25	38 (1.50)	A501A
VSI315C2-□E	VSI315C2-GV		30~120	43 (1.69)	A501B
VSR315A2-□U	VSR315A2-GV		150~360	48 (1.89)	A501C
VSR315C2-□E	VSR315C2-GV				

Mass: 1.8 kg (4.0 lb.) (Including gearhead)



◇ Key and Key Slot

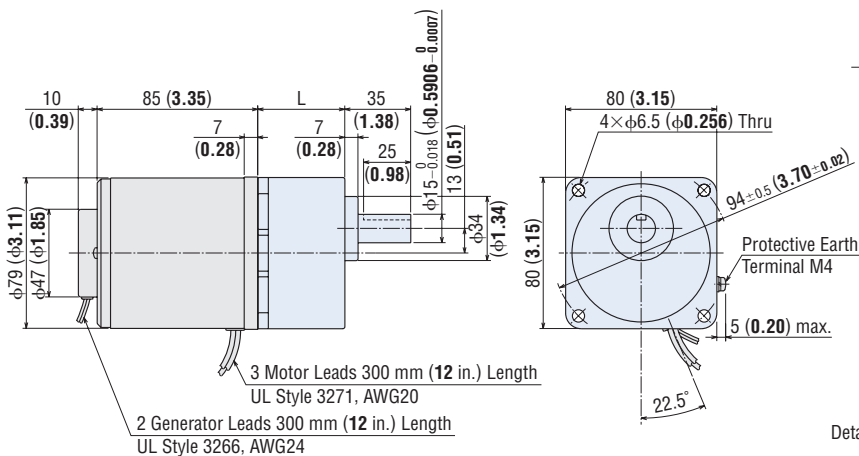
(The key is included with the gearhead)



◇ Motor/Gearhead (Combination type)

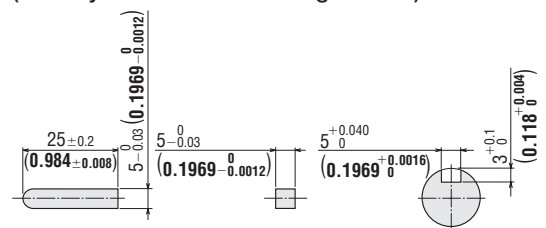
Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
VSI425A2-□U	VSI425A2-GV	GV4G□	5~25	41 (1.61)	A502A
VSI425C2-□E	VSI425C2-GV		30~120	46 (1.81)	A502B
VSR425A2-□U	VSR425A2-GV		150~360	51 (2.01)	A502C
VSR425C2-□E	VSR425C2-GV				

Mass: 2.6 kg (5.7 lb.) (Including gearhead)



◇ Key and Key Slot

(The key is included with the gearhead)

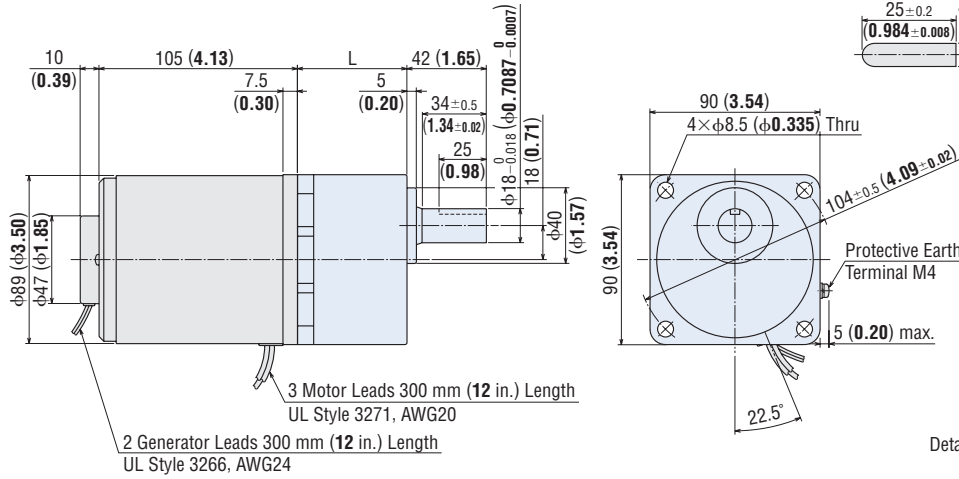


● Enter the gear ratio in the box (□) within the model name.

◇ Motor/Gearhead (Combination type)

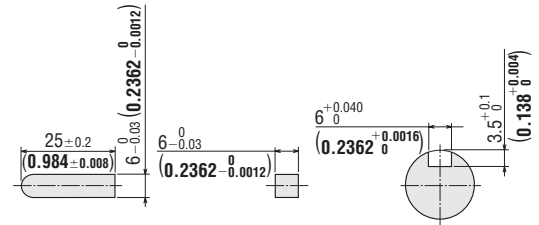
Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
VSI540A2-□U	VSI540A2-GVH	GVH5G□	5~18	45 (1.77)	A503A
VSI540C2-□E	VSI540C2-GVH		25~100	58 (2.28)	A503B
VSR540A2-□U	VSR540A2-GVH		120~300	64 (2.52)	A503C
VSR540C2-□E	VSR540C2-GVH				

Mass: 4.1 kg (9.0 lb.) (Including gearhead)



◇ Key and Key Slot

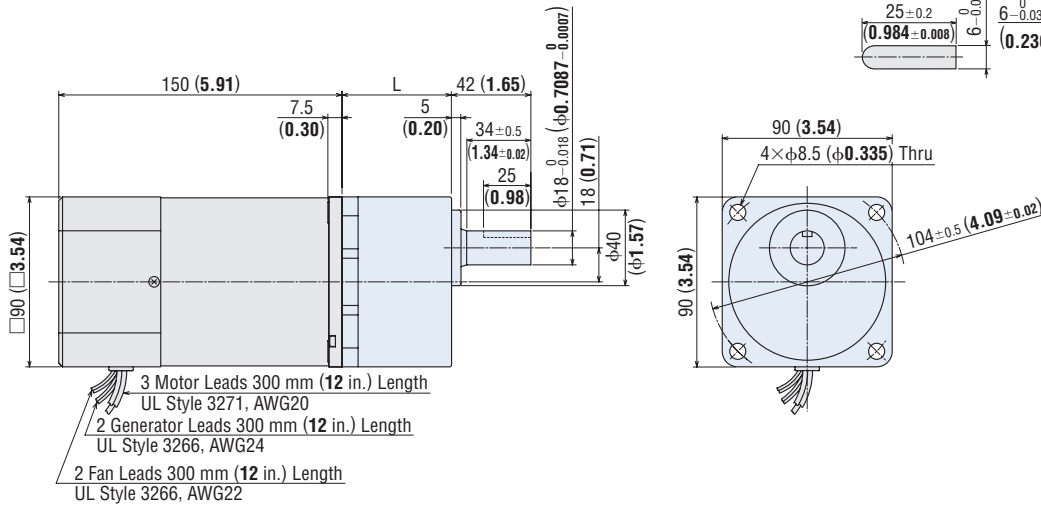
(The key is included with the gearhead)



◇ Motor/Gearhead (Combination type)

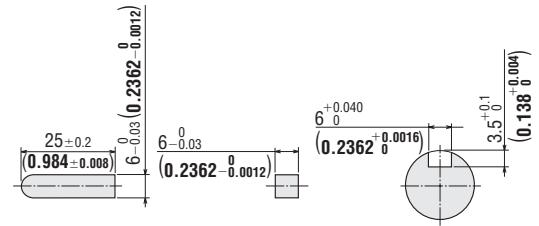
Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
VSI560A-□U	VSI560A-GVH	GVH5G□	5~18	45 (1.77)	A395A
VSI560C-□E	VSI560C-GVH		25~100	58 (2.28)	A395B
VSR560A-□U	VSR560A-GVH		120~300	64 (2.52)	A395C
VSR560C-□E	VSR560C-GVH				

Mass: 4.3 kg (9.5 lb.) (Including gearhead)



◇ Key and Key Slot

(The key is included with the gearhead)



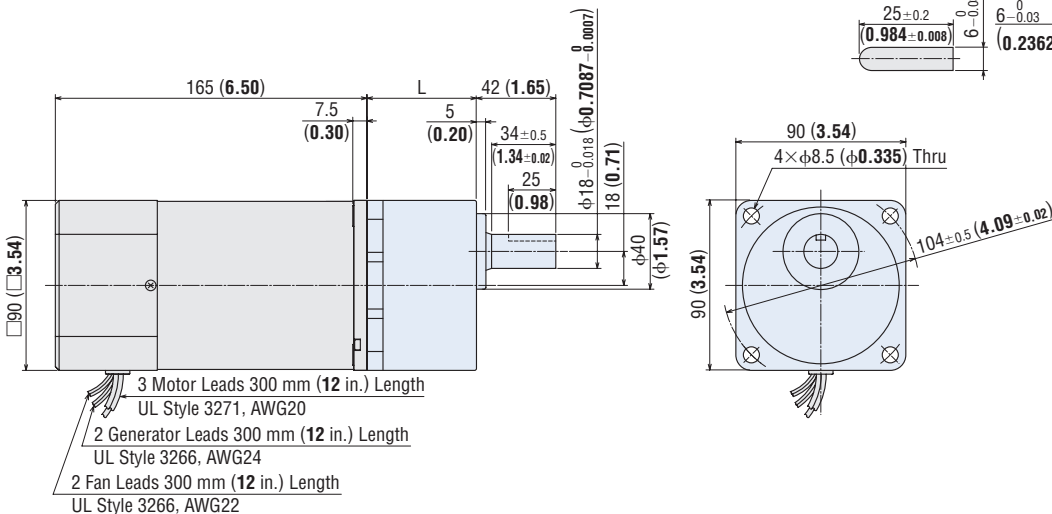
● Enter the gear ratio in the box (□) within the model name.

Brushless Motors/AC Speed Control Motors

◇ Motor/Gearhead (Combination type)

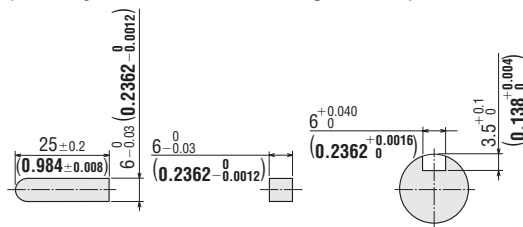
Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
VSI590A-□U	VSI590A-GVR	GVR5G□	5~15	45 (1.77)	A396A
VSI590C-□E	VSI590C-GVR		18~36	58 (2.28)	A396B
VSR590A-□U VSR590C-□E	VSR590A-GVR VSR590C-GVR		50~180	70 (2.76)	A396C

Mass: 4.8 kg (10.6 lb.) (Including gearhead)



◇ Key and Key Slot

(The key is included with the gearhead)



● World K Series

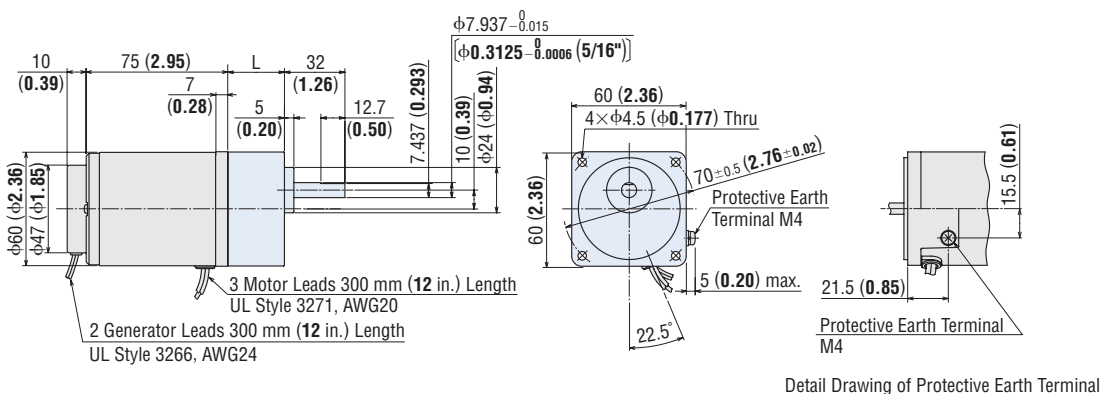
● Mounting screws are included with gearheads. Dimensions for mounting screws → Page C-280

◇ Motor/Gearhead

Model	Gearhead Model	Gear Ratio	L	DXF
2IK6RGN-AW2U 2IK6RGN-CW2E 2RK6RGN-AW2U 2RK6RGN-CW2E	2GN□SA	3~18	30 (1.18)	A504AU
		25~180	40 (1.57)	A504BU

Mass: Motor 0.8 kg (1.76 lb.)

Gearhead 0.4 kg (0.88 lb.)



Detail Drawing of Protective Earth Terminal

● Enter the gear ratio in the box (□) within the model name.

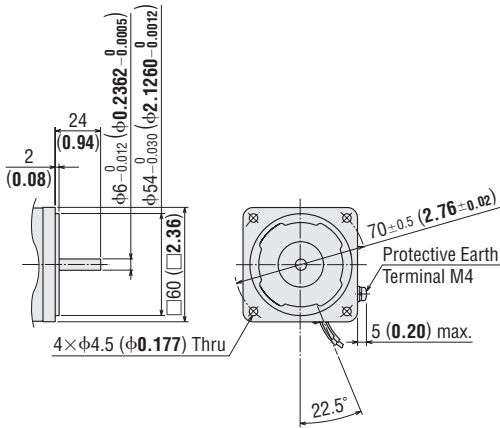
◇ Shaft Section of Round Shaft Type

The motor's dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

2IK6RA-AW2U, 2IK6RA-CW2E
2RK6RA-AW2U, 2RK6RA-CW2E

Mass: 0.8 kg (1.76 lb.)

DXF A505



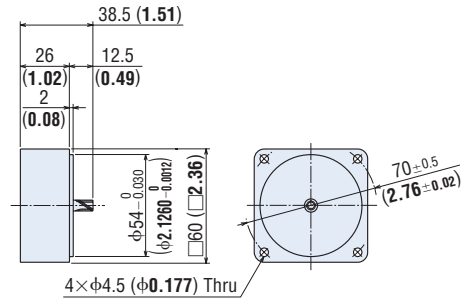
◇ Decimal Gearhead

Can be connected to **GN** pinion shaft type.

2GN10XS

Mass: 0.2 kg (0.44 lb.)

DXF A003

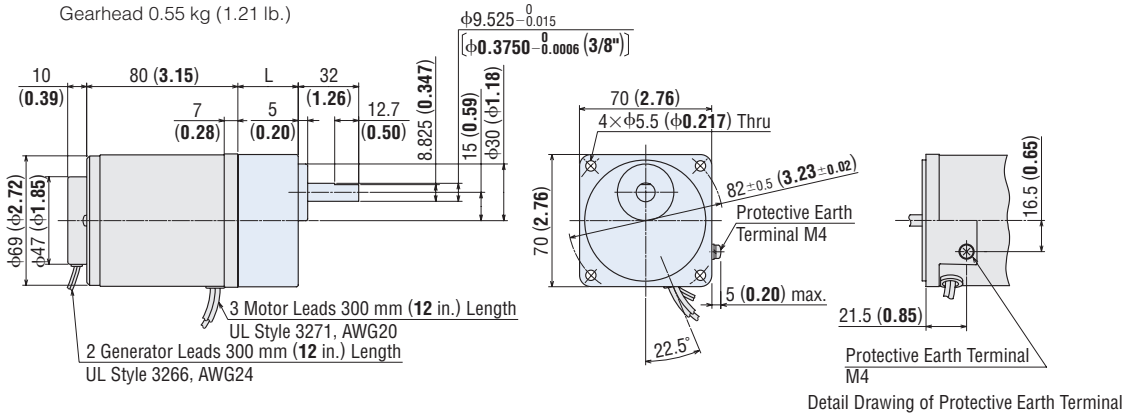


◇ Motor/Gearhead

Motor Model	Gearhead Model	Gear Ratio	L	DXF
3IK15RGN-AW2U 3IK15RGN-CW2E	3GN□SA	3~18	32 (1.26)	A506AU
3RK15RGN-AW2U 3RK15RGN-CW2E		25~180	42 (1.65)	A506BU

Mass: Motor 1.2 kg (2.6 lb.)

Gearhead 0.55 kg (1.21 lb.)



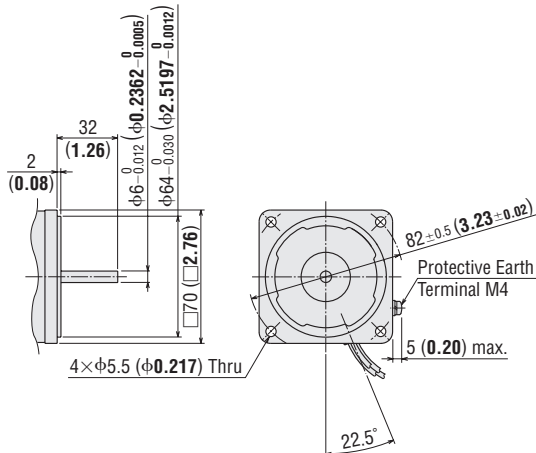
◇ Shaft Section of Round Shaft Type

The motor's dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

3IK15RA-AW2U, 3IK15RA-CW2E
3RK15RA-AW2U, 3RK15RA-CW2E

Mass: 1.2 kg (2.6 lb.)

DXF A507



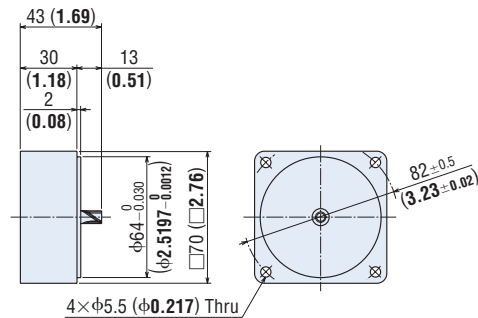
◇ Decimal Gearhead

Can be connected to **GN** pinion shaft type.

3GN10XS

Mass: 0.3 kg (0.66 lb.)

DXF A009

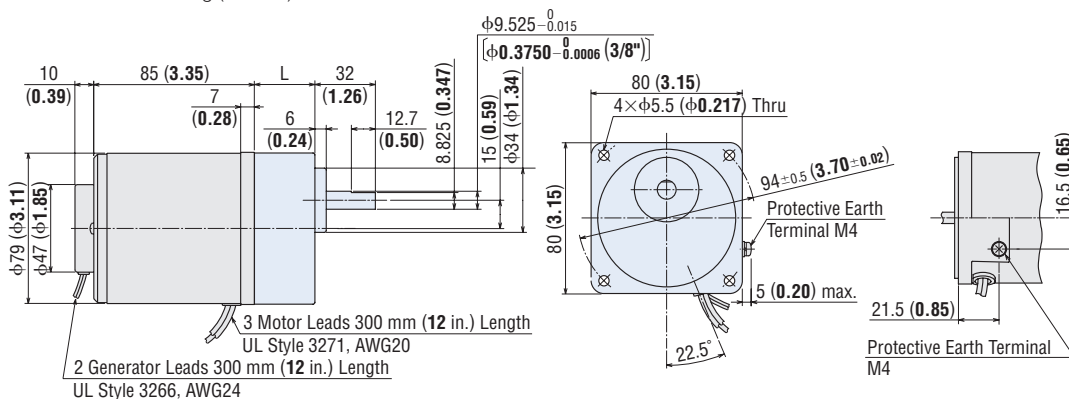


● Enter the gear ratio in the box (□) within the model name.

◇ Motor/Gearhead

Motor Model	Gearhead Model	Gear Ratio	L	DXF
4IK25RGN-AW2U 4IK25RGN-CW2E 4RK25RGN-AW2U 4RK25RGN-CW2E	4GN□SA	3~18	32 (1.26)	A508AU
25~180		42.5 (1.67)	A508BU	

Mass: Motor 1.6 kg (3.5 lb.)
Gearhead 0.65 kg (1.43 lb.)



Detail Drawing of Protective Earth Terminal

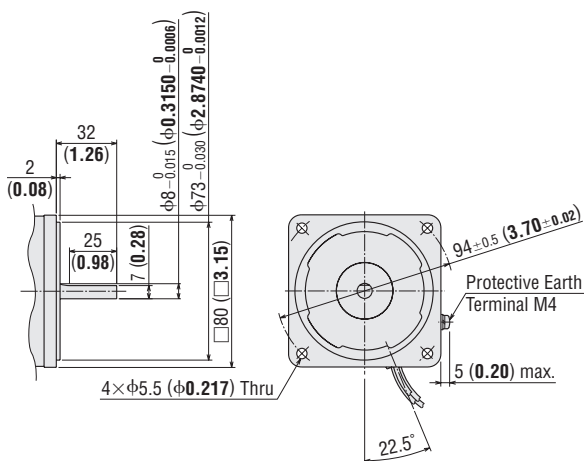
◇ Shaft Section of Round Shaft Type

The motor's dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

4IK25RA-AW2U, 4IK25RA-CW2E
4RK25RA-AW2U, 4RK25RA-CW2E

Mass: 1.6 kg (3.5 lb.)

DXF A509



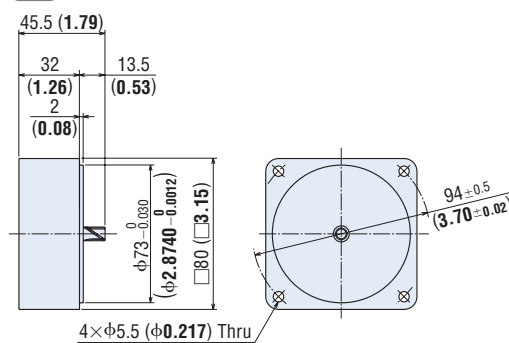
◇ Decimal Gearhead

Can be connected to **GN** pinion shaft type.

4GN10XS

Mass: 0.4 kg (0.88 lb.)

DXF A013



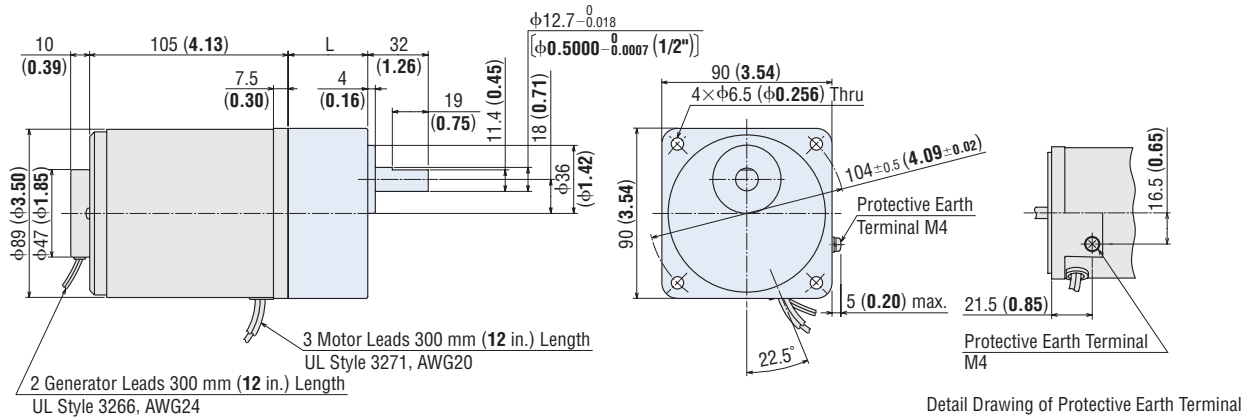
● Enter the gear ratio in the box (□) within the model name.

◇ Motor/Gearhead

Motor Model	Gearhead Model	Gear Ratio	L	DXF
5IK40RGN-AW2U 5IK40RGN-CW2E 5RK40RGN-AW2U 5RK40RGN-CW2E	5GN□SA	3~18	42 (1.65)	A510AU
25~180		60 (2.36)	A510BU	

Mass: Motor 2.6 kg (5.7 lb.)

Gearhead 1.5 kg (3.3 lb.)



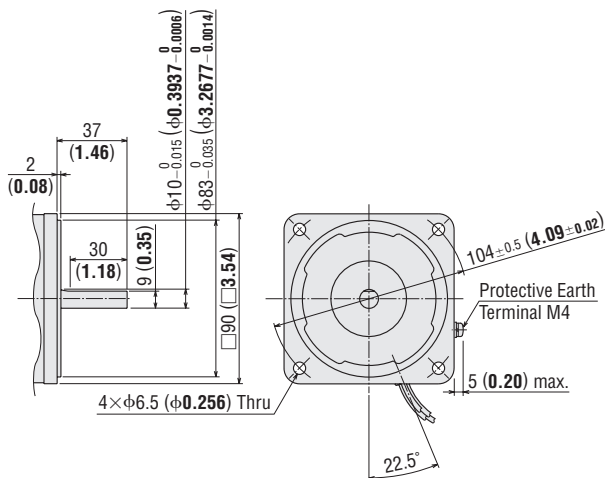
◇ Shaft Section of Round Shaft Type

The motor's dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

5IK40RA-AW2U, 5IK40RA-CW2E
5RK40RA-AW2U, 5RK40RA-CW2E

Mass: 2.6 kg (5.7 lb.)

DXF A511



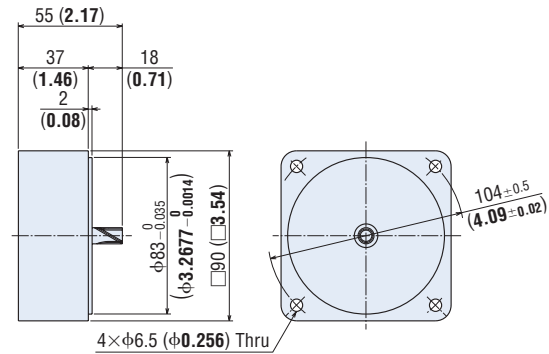
◇ Decimal Gearhead

Can be connected to **GN** pinion shaft type.

5GN10XS

Mass: 0.6 kg (1.32 lb.)

DXF A022

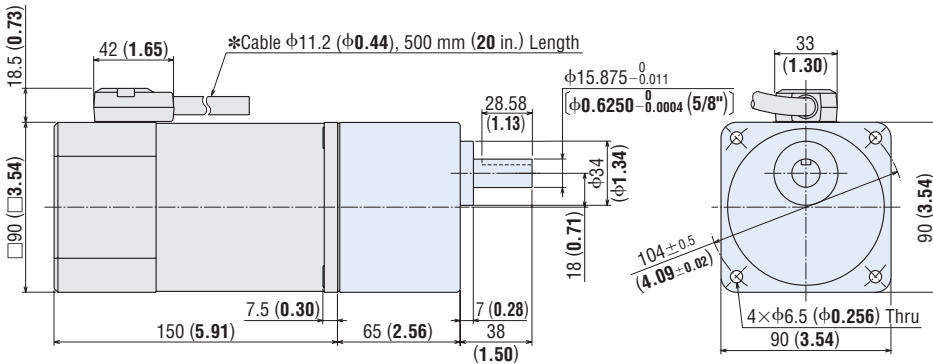


● Enter the gear ratio in the box (□) within the model name.

◇ Motor/Gearhead

Motor Model	Gearhead Model	Gear Ratio	DXF
5IK60RGU-AWU 5IK60RGU-CWE 5RK60RGU-AWU 5RK60RGU-CWE	5GU□KA	3~180	A069U

Mass: Motor 3.2 kg (7.0 lb.)
Gearhead 1.5 kg (3.3 lb.)



* Cable Cores

- 3 Motor Leads: UL Style 3266, AWG20
- 2 Cooling Fan Leads: UL Style 3266, AWG24
- 2 Generator Leads: UL Style 3266, AWG24

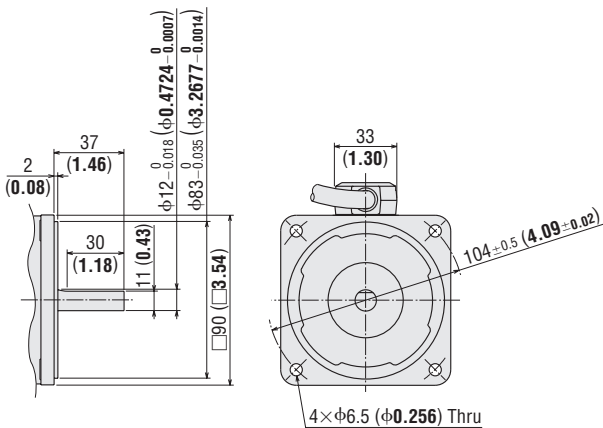
◇ Shaft Section of Round Shaft Type

The motor's dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

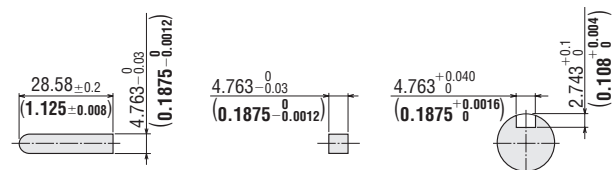
5IK60RA-AWU, 5IK60RA-CWE
5RK60RA-AWU, 5RK60RA-CWE

Mass: 3.2 kg (7.0 lb.)

DXF A655



◇ Key and Key Slot (The key is included with the gearhead)



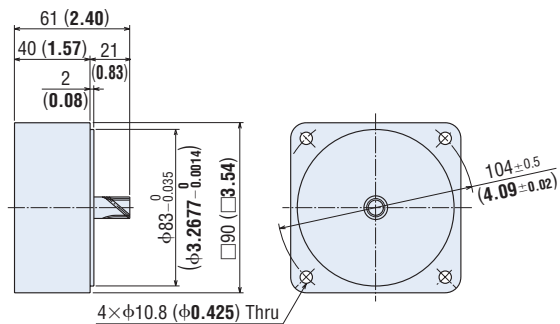
◇ Decimal Gearhead

Can be connected to **GU** pinion shaft type.

5GU10XKB

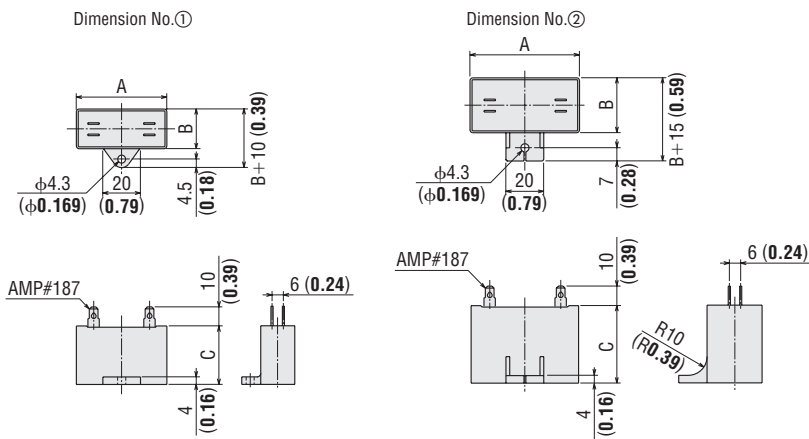
Mass: 0.6 kg (1.32 lb.)

DXF A029



● Enter the gear ratio in the box (□) within the model name.

◇ Capacitor (Included)



◇ Capacitor Dimensions Unit = mm (in.)

● Induction Motors

Model		Capacitor Model	A	B	C	Mass g (oz.)	Dimension No.	
V Series (Combination type)	World K Series (Pinion shaft type)							
VSI206A2-□U	2IK6RGN-AW2U	CH25FAUL2	31 (1.22)	17 (0.67)	27 (1.06)	21 (0.74)	①	
VSI206C2-□E	2IK6RGN-CW2E	CH06BFAUL	31 (1.22)	14.5 (0.57)	23.5 (0.93)	18 (0.64)		
VSI315A2-□U	3IK15RGN-AW2U	CH45FAUL2	37 (1.46)	18 (0.71)	27 (1.06)	26 (0.92)		
VSI315C2-□E	3IK15RGN-CW2E	CH10BFAUL	37 (1.46)	18 (0.71)	27 (1.06)	27 (0.95)		
VSI425A2-□U	4IK25RGN-AW2U	CH65CFAUL2	48 (1.89)	19 (0.75)	29 (1.14)	35 (1.24)		
VSI425C2-□E	4IK25RGN-CW2E	CH15BFAUL	38 (1.50)	21 (0.83)	31 (1.22)	37 (1.31)		
VSI540A2-□U	5IK40RGN-AW2U	CH90CFAUL2	48 (1.89)	22.5 (0.89)	31.5 (1.24)	45 (1.59)		
VSI540C2-□E	5IK40RGN-CW2E	CH23BFAUL	48 (1.89)	21 (0.83)	31 (1.22)	43 (1.52)		
VSI560A-□U	5IK60RGU-AWU	CH180CFAUL	58 (2.28)	23.5 (0.93)	37 (1.46)	70 (2.5)		②
VSI560C-□E	5IK60RGU-CWE	CH40BFAUL	58 (2.28)	23.5 (0.93)	37 (1.46)	73 (2.6)		
VSI590A-□U	—	CH200CFAUL	58 (2.28)	29 (1.14)	41 (1.61)	95 (3.4)		
VSI590C-□E	—	CH60BFAUL	58 (2.28)	29 (1.14)	41 (1.61)	92 (3.2)		

● A capacitor cap is included with a capacitor.

● The capacitors of the World **K** Series round shaft type are the same as those of pinion shaft type with the same output power and voltage.

● Reversible Motors

Model		Capacitor Model	A	B	C	Mass g (oz.)	Dimension No.	
V Series (Combination type)	World K Series (Pinion shaft type)							
VSR206A2-□U	2RK6RGN-AW2U	CH35FAUL2	31 (1.22)	17 (0.67)	27 (1.06)	22 (0.78)	①	
VSR206C2-□E	2RK6RGN-CW2E	CH08BFAUL	31 (1.22)	17 (0.67)	27 (1.06)	23 (0.81)		
VSR315A2-□U	3RK15RGN-AW2U	CH60CFAUL2	38 (1.50)	21 (0.83)	31 (1.22)	35 (1.24)		
VSR315C2-□E	3RK15RGN-CW2E	CH15BFAUL	38 (1.50)	21 (0.83)	31 (1.22)	37 (1.31)		
VSR425A2-□U	4RK25RGN-AW2U	CH80CFAUL2	48 (1.89)	21 (0.83)	31 (1.22)	41 (1.45)		
VSR425C2-□E	4RK25RGN-CW2E	CH25BFAUL	48 (1.89)	21 (0.83)	31 (1.22)	42 (1.48)		
VSR540A2-□U	5RK40RGN-AW2U	CH120CFAUL2	58 (2.28)	22 (0.87)	35 (1.38)	60 (2.1)		
VSR540C2-□E	5RK40RGN-CW2E	CH35BFAUL	58 (2.28)	22 (0.87)	35 (1.38)	59 (2.1)		
VSR560A-□U	5RK60RGU-AWU	CH200CFAUL	58 (2.28)	29 (1.14)	41 (1.61)	95 (3.4)		②
VSR560C-□E	5RK60RGU-CWE	CH50BFAUL	58 (2.28)	29 (1.14)	41 (1.61)	93 (3.3)		
VSR590A-□U	—	CH300CFAUL	58 (2.28)	35 (1.38)	50 (1.97)	140 (4.9)		
VSR590C-□E	—	CH70BFAUL	58 (2.28)	35 (1.38)	50 (1.97)	138 (4.9)		

● A capacitor cap is included with a capacitor.

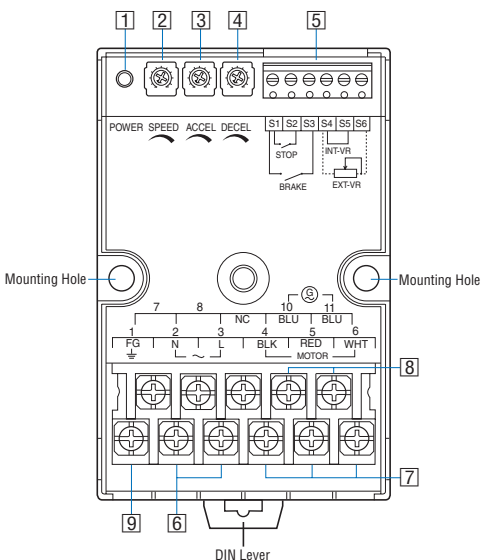
● The capacitors of the World **K** Series round shaft type are the same as those of pinion shaft type with the same output power and voltage.

● Enter the gear ratio in the box (□) within the model name.

Connection and Operation

Names and Functions of Speed Controller Parts

The illustration shows the controller with the cover removed. Install the cover after connection. Figures in parentheses represent pin numbers.



1 POWER LED (POWER)

Lights (green) while power is being supplied.

2 Internal speed potentiometer (SPEED)

Sets the motor's operating speed.

3 Acceleration time potentiometer (ACCEL)

Sets the acceleration time at starting of motor.

4 Deceleration time potentiometer (DECEL)

Sets the deceleration time at stopping of motor.

5 Control input terminals

S1: Common terminal for running and braking

S2: Run/Stop input

Runs (OFF) or stops (ON) the motor.

S3: Run/Brake input

Runs (OFF) or brakes (ON) the motor.

S4, S5, S6: Speed potentiometer inputs

When S4 and S5 are shorted, the speed can be set using the internal speed potentiometer (INT-VR).

When S4 and S5 are open, the speed can be set using an external speed potentiometer (EXT-VR).

When using an external speed potentiometer, connect it to S4 and S6.

6 Power connection terminals (terminals 2 and 3)

7 Motor connection terminals (terminals 4, 5 and 6)

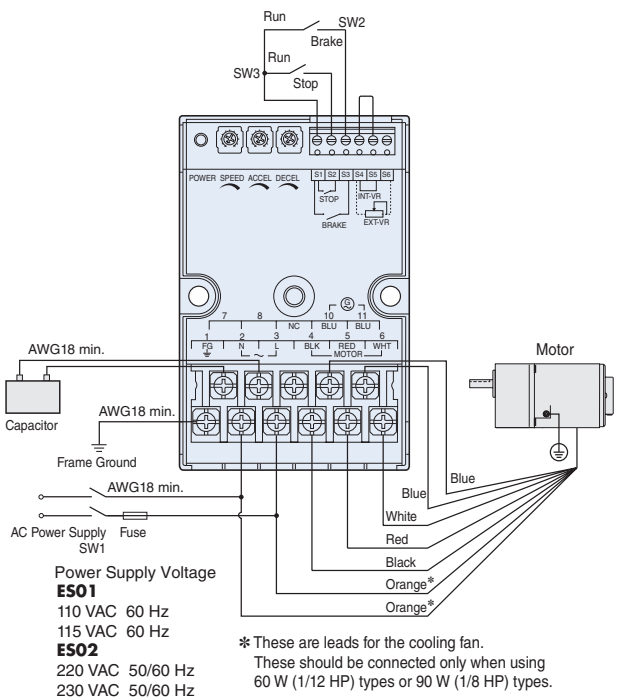
8 Generator connection terminals (terminals 10 and 11)

9 FG terminal (terminal 1)

Connection Diagrams

Uni-Directional Operation

(When using internal speed potentiometer)



For uni-directional operation, connect the red lead to motor connection terminal 5, and the white lead to terminal 6. In this case, the motor rotates in the clockwise direction, as viewed from the motor output shaft.

If you connect the white lead to terminal 5 and the red lead to terminal 6, the motor rotates in the counterclockwise direction, as viewed from the motor output shaft.

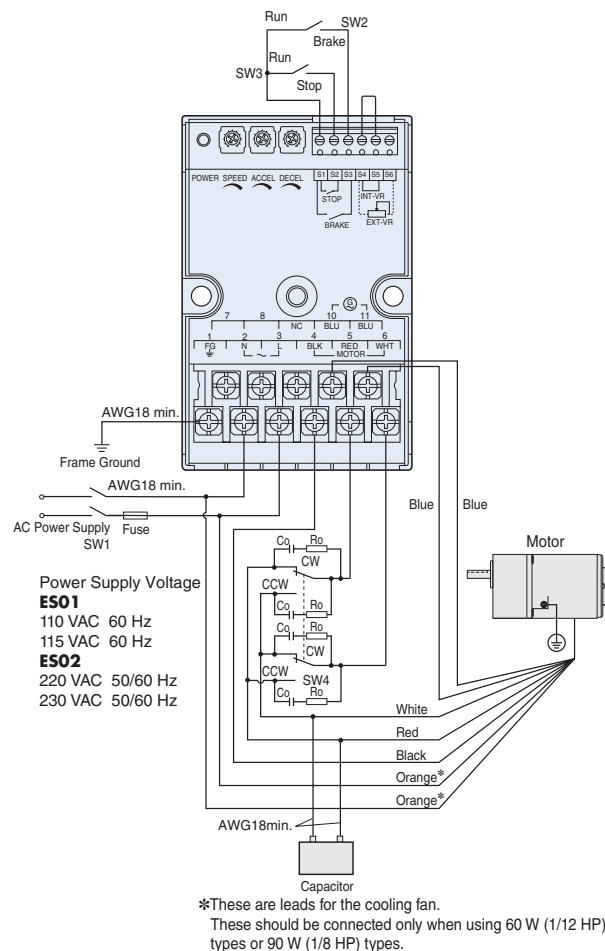
When using an external speed potentiometer, refer to page D-219

How to connect a capacitor → Page C-282

Specifications of the switches and fuse → Page D-218

Bi-Directional Operation

(When using internal speed potentiometer)



● Specifications of the Switches and Fuse

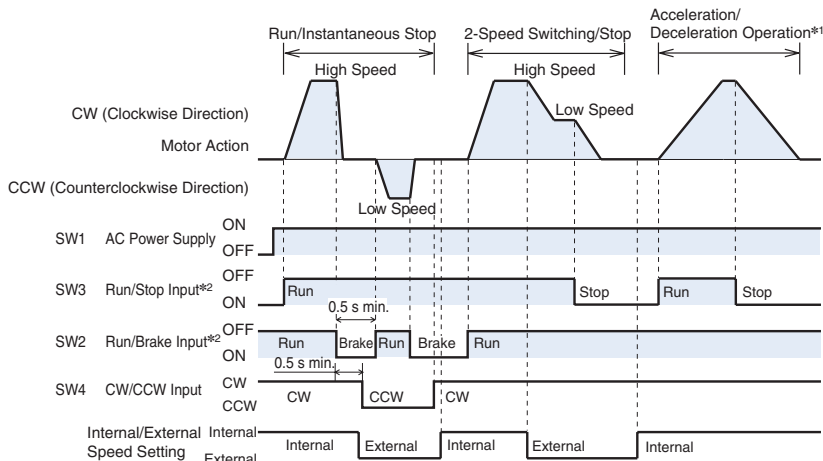
Power Supply Voltage	110/115 VAC (ES01)	220/230 VAC (ES02)
SW1	125 VAC 10 A	250 VAC 5 A
SW2, SW3	18 VDC 1 mA	
SW4	125 VAC 10 A	250 VAC 5 A
Ro, Co (CR circuit for surge suppression)	Ro=5~200 Ω, Co=0.1~0.2 μF, 200 WV	Ro=5~200 Ω, Co=0.1~0.2 μF, 400 WV
Fuse	Product recognized by UL/CSA in accordance with UL/CSA 248-14 or equivalent, 250 VAC 10 A	Product recognized by UL/CSA in accordance with UL/CSA 248-14 or equivalent, 250 VAC 5 A

Notes

- The control input terminals are not insulated from the AC power supply. Any equipment (programmable controller, relay and switch) that will be connected to the control input terminals must have contact ratings of 18 VDC and 1 mA minimum. Do not use a transistor output type controller.
- The length of the cable connecting the motor and speed controller should be 10 m (32.8 ft.) or less. The length of the control cable should be 2 m (6.6 ft.) or less and as short as possible.
- Be sure to connect a surge suppressor to SW4. **EPCR1201-2** CR circuit for surge suppression is available as an accessory. → Page C-275

● Timing Chart

The timing chart below shows an example of two-level speed control operation when the high speed and low speed are selected via the internal and external speed potentiometers, respectively.



- *1 Case where the acceleration and deceleration times are set longer by turning each potentiometer clockwise.
- *2 In case SW2 and SW3 are turned on at the same time, brake input (SW2) is given priority.

◇ Run/Brake, Stop

Setting SW2/SW3 to "Run" (OFF) causes the motor to rotate at the speed set via the speed potentiometers.

Setting SW2 to "Brake" (ON) during operation causes the motor to stop instantaneously.

Setting SW3 to "Stop" (ON) during operation causes the motor to coast to a stop.

Run/Stop Input	Run/Brake Input	Motor Operation
OFF	OFF	Run
OFF	ON	Instantaneous stop
ON	OFF	Coast to a stop*

*When the deceleration time set with a potentiometer is longer than the time which motor coasts to a stop, motor will stop with deceleration time.

The braking function (current through the motor) is only active for approximately 0.4 second after the Run/Brake input is turned ON. Do not switch SW2, SW3, SW4 within 0.5 second after Run/Brake input is turned ON.

◇ Switching the Rotation Direction

SW4 is used to switch the rotation direction of motor. When SW4 is set to CW, the motor rotates in the clockwise direction, as viewed from the motor output shaft. When SW4 is set to CCW, the motor rotates in the counterclockwise direction, as viewed from the motor output shaft.

- Be sure to connect a surge suppressor to SW4. **EPCR1201-2** CR circuit for surge suppression is available as an accessory. → Page C-275
- Instantaneous bi-directional operation is possible with a reversible motor.
- For bi-directional operation of an induction motor, switch the rotation direction after the motor has come to a complete stop.

● Speed Setting Methods

The following two methods of setting speed can be used. Multi-motor control or DC voltage control cannot be used.

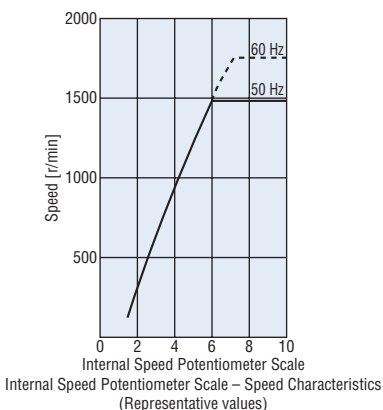
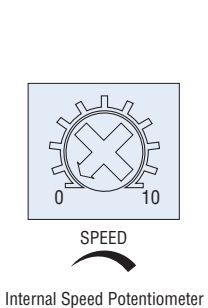
◇ Internal Speed Potentiometer

The setting speed range is 90 to 1400 r/min at 50 Hz, or 90 to 1600 r/min at 60 Hz.

Short the speed potentiometer input terminals S4 and S5.

When the dial on the internal speed potentiometer is turned in the clockwise direction, the set speed will be faster.

The factory setting is 0 r/min.



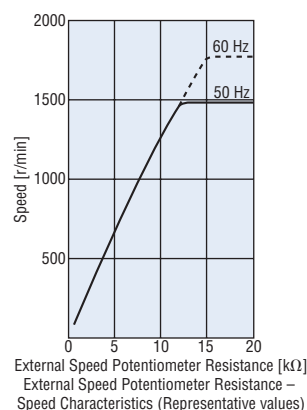
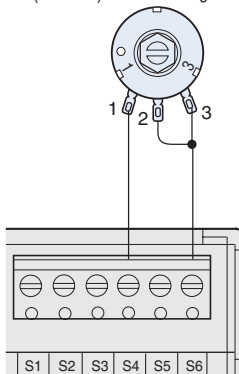
◇ External Speed Potentiometer (Included)

Open the speed potentiometer input terminals S4 and S5.

Before connecting, turn the dial on the external speed potentiometer in the counterclockwise direction to set the speed to 0 r/min.

When the dial on the external speed potentiometer is turned in the clockwise direction, the set speed will be faster.

External Speed Potentiometer (Included) 20 kΩ 1/4 W, with a linear resistance vs. angle curve



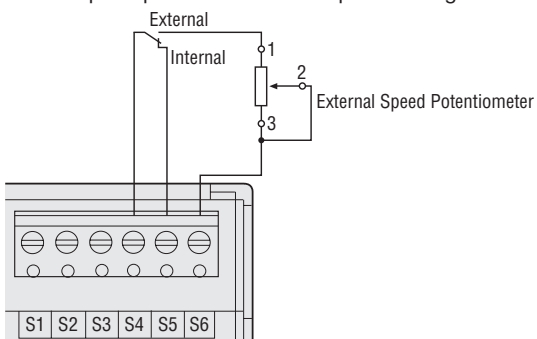
Note

- Do not operate multiple speed controllers with a single external speed potentiometer. This may damage the speed controllers.

● Two-Level Speed Control

The motor can be controlled over two-level speed by switching between the internal and external speed potentiometers.

Select the internal speed potentiometer or external speed potentiometer with speed setting switch.



Note

- The control input terminals are not insulated from the AC power supply. Any equipment (programmable controller, relay and switch) that will be connected to the control input terminals must have contact ratings of 18 VDC and 1 mA or more. Do not use a transistor output type programmable controller.

● Acceleration (ACCEL) and Deceleration (DECEL) Operation

Equipment and loads are subject to large acceleration/deceleration force when starting, stopping, and changing speed. When you want to accelerate/decelerate without any accompanying shock, the acceleration/deceleration time can be extended using the acceleration/deceleration function. The acceleration/deceleration time can be set using acceleration/deceleration time potentiometers built in the controller. The setting range is approximately 0.5 to 10 seconds (at 1000 r/min, with no inertial load).

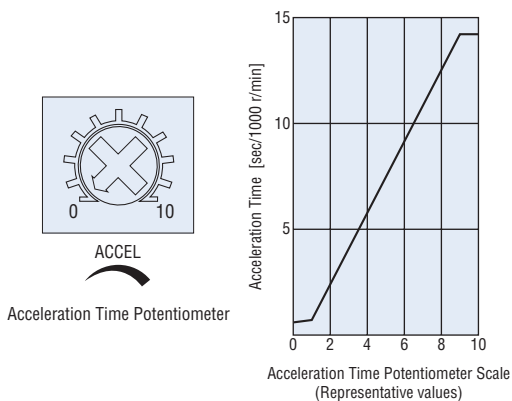
However, when the load inertia is large, the deceleration time cannot be set at a shorter time than when the motor is coasted to a stop.

◇ Acceleration (ACCEL)

The acceleration function is activated at starting or when the speed is switched to the higher setting in a two-level speed control.

When the dial on the acceleration time potentiometer is turned in the clockwise direction, the set time will be longer.

The factory setting is 0 (no acceleration).

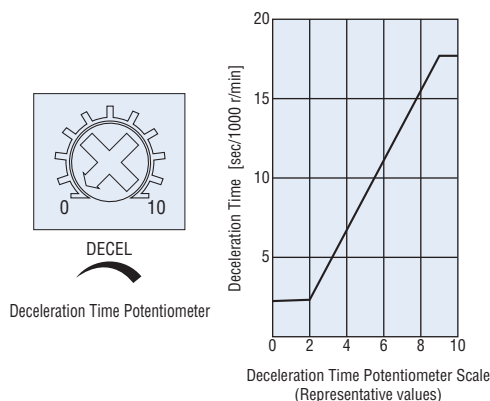


◇ Deceleration (DECEL)

The deceleration function is activated at coast to a stop or when the speed is switched to the lower setting in a two-level speed control.

When the dial on the deceleration time potentiometer is turned in the clockwise direction, the set time will be longer.

The factory setting is 0 (no deceleration).



● Repeated Running/Braking Cycle

When running/braking of the motor is repeated in short cycles, the motor temperature rise will increase and the continuous operation time will be limited. Use the following values shown below.

The motor may generate heat depending on drive conditions. Ensure that the temperature of the motor case does not exceed 90°C (194°F).

Motor Output Power	Repetition Cycle
6 W (1/125 HP) to 40 W (1/19 HP)	2 seconds min. (Running 1 second, stopping 1 second)
60 W (1/12 HP), 90 W (1/8 HP)	4 seconds min. (Running 2 seconds, stopping 2 seconds)

● Braking Current

● When the motor is stopped instantaneously, a large braking current flows through the motor. When connecting a circuit breaker (or fuse), refer to the table below for the braking current (peak value) and select its current capacity.

● Be careful as repeated motor running and braking may cause the motor's temperature to rise.

Motor Output Power	Braking Current (Peak value) [A]	
	Single-Phase 110/115 VAC	Single-Phase 220/230 VAC
6 W (1/125 HP)	1.5	1.0
15 W (1/50 HP)	3.5	2.0
25 W (1/30 HP)	5.5	4.0
40 W (1/19 HP)	8.5	6.0
60 W (1/12 HP)	15.5	8.0
90 W (1/8 HP)	20.5	12.0

■ List of Motor and Gearhead Combinations

● Model names for motor and gearhead combinations are shown below.

● Induction Motors

Model	Motor Model	Gearhead Model
VSI206A2-□U	VSI206A2-GV	GV2G□
VSI206C2-□E	VSI206C2-GV	
VSI315A2-□U	VSI315A2-GV	GV3G□
VSI315C2-□E	VSI315C2-GV	
VSI425A2-□U	VSI425A2-GV	GV4G□
VSI425C2-□E	VSI425C2-GV	
VSI540A2-□U	VSI540A2-GVH	GVH5G□
VSI540C2-□E	VSI540C2-GVH	
VSI560A-□U	VSI560A-GVH	GVH5G□
VSI560C-□E	VSI560C-GVH	
VSI590A-□U	VSI590A-GVR	GVR5G□
VSI590C-□E	VSI590C-GVR	

● Enter the gear ratio in the box (□) within the model name.

● Reversible Motors

Model	Motor Model	Gearhead Model
VSR206A2-□U	VSR206A2-GV	GV2G□
VSR206C2-□E	VSR206C2-GV	
VSR315A2-□U	VSR315A2-GV	GV3G□
VSR315C2-□E	VSR315C2-GV	
VSR425A2-□U	VSR425A2-GV	GV4G□
VSR425C2-□E	VSR425C2-GV	
VSR540A2-□U	VSR540A2-GVH	GVH5G□
VSR540C2-□E	VSR540C2-GVH	
VSR560A-□U	VSR560A-GVH	GVH5G□
VSR560C-□E	VSR560C-GVH	
VSR590A-□U	VSR590A-GVR	GVR5G□
VSR590C-□E	VSR590C-GVR	

● Enter the gear ratio in the box (□) within the model name.

Introduction	
BX	Brushless Motors
BLF	
BLE	
BLU	
BLH	DC Input
BLV	
BHF	AC Speed Control Motors
FE100/ FE200	
ES01/ ES02	
US	
Accessories	
Installation	