Power Off Activated Type Electromagnetic Brake Motors

90 W (1/8 HP)

Frame Size: □ 3.54 in. (□ 90 mm)

World **K** Series
(Gearhead Sold Separately)

V Series / Combination Type
(Pre-assembled Gearmotor)

■ Specifications

● Motor Specifications

◆ World K Series (General Purpose)

Model Pinion Shaft Type Round Shaft Type	Rating	Output Power HP	Output Power W	Voltage VAC	Frequency Hz	Current A	Starting Torque oz-in	Starting Torque mN·m	Rated Torque oz-in	Rated Torque mN·m	Rated Speed r/min	Capacitor μF
(TP) **5RK90GU-AWMU** **5RK90A-AWMU**	30 minutes	1/8	90	Single-Phase 110 Single-Phase 115	60	1.81	83	590	83	585	1500	30
(TP) **5RK90GU-CWME** **5RK90A-CWME**	30 minutes	1/8	90	Single-Phase 220	60	0.96	83	590	85	605	1450	7
				Single-Phase 230	50	0.82	85	600	103	730	1200	
				Single-Phase 230	60	0.96	83	590	85	605	1450	
(TP) **5IK90GU-SWM** **5IK90A-SWM**	Continuous	1/8	90	Three-Phase 200	50	0.64	120	850	96	680	1300	—
				Three-Phase 200	60	0.59	99	700	80	570	1550	
				Three-Phase 220	60	0.60	99	700	80	570	1600	
				Three-Phase 230	60	0.61	99	700	80	570	1600	

(TP) Contains a built-in thermal protector. If a motor overheats for any reason, the thermal protector is opened and the motor stops. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.

- This type of motor does not contain a built-in simple brake mechanism.
- The "**U**" and "**E**" at the end of the model name indicate that the unit includes a capacitor. These two letters are not listed on the motor nameplate. When the motor is approved under various safety standards, the model name on the nameplate is the approved model name.→Page G-11
- **Details of Safety Standards**→Page G-2

◆ V Series (Quiet Operation, High Strength, Long Life)

Model Combination Type	Rating	Output Power HP	Output Power W	Voltage VAC	Frequency Hz	Current A	Starting Torque oz-in	Starting Torque mN·m	Rated Torque oz-in	Rated Torque mN·m	Rated Speed r/min	Capacitor μF
(TP) **VHR590AM-□U**	30 minutes	1/8	90	Single-Phase 110 Single-Phase 115	60	1.81	83	590	83	585	1500	30
(TP) **VHR590CM-□E**	30 minutes	1/8	90	Single-Phase 220	60	0.96	83	590	85	605	1450	7
				Single-Phase 220	50	0.82	85	600	103	730	1200	
				Single-Phase 230	60	0.96	83	590	85	605	1450	
(TP) **VHI590SM-□**	Continuous	1/8	90	Three-Phase 200	50	0.64	120	850	96	680	1300	—
				Three-Phase 200	60	0.59	99	700	80	570	1550	
				Three-Phase 220	60	0.60	99	700	80	570	1600	
				Three-Phase 230	60	0.61	99	700	80	570	1600	

(TP) Contains a built-in thermal protector. If a motor overheats for any reason, the thermal protector is opened and the motor stops. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.

- This type of motor does not contain a built-in simple brake mechanism.
- The "**U**" and "**E**" at the end of the model name indicate that the unit includes a capacitor. These two letters are not listed on the motor nameplate. When the motor is approved under various safety standards, the model name on the nameplate is the approved model name.→Page G-12
- **Details of Safety Standards**→Page G-2
- Models above are provided as combination type with motor and gearhead pre-assembled.
- Enter the gear ratio in the box (□) within the model name.
- The values in the table are for the motor only.

● Electromagnetic Brake (Power Off Activated Type) Specifications

◆ World K Series

Model	Voltage VAC	Frequency Hz	Current A	Input W	Holding Brake Torque oz-in	Holding Brake Torque mN·m
5RK90GU-AWMU **5RK90A-AWMU**	Single-Phase 110 Single-Phase 115	60	0.13	10	71	500
5RK90GU-CWME **5RK90A-CWME**	Single-Phase 220 Single-Phase 230 Single-Phase 230	60 50 60	0.07	10	71	500
5IK90GU-SWM **5IK90A-SWM**	Single-Phase 200 Single-Phase 200 Single-Phase 220 Single-Phase 230	50 60 60 60	0.07	10	71	500

◆ V Series

Model	Voltage VAC	Frequency Hz	Current A	Input W	Holding Brake Torque oz-in	Holding Brake Torque mN·m
VHR590AM-□U	Single-Phase 110 Single-Phase 115	60	0.13	10	71	500
VHR590CM-□E	Single-Phase 220 Single-Phase 230 Single-Phase 230	60 50 60	0.07	10	71	500
VHI590SM-□	Single-Phase 200 Single-Phase 200 Single-Phase 220 Single-Phase 230	50 60 60 60	0.07	10	71	500

- The values in the table are for the motor only.

Dimensions A-160 | Connection Diagrams A-162 | List of Motor and Gearhead Combinations for **V** Series A-162

Gearheads for World K Series (Sold Separately)

Parallel Shaft

Gearhead Model	Gear Ratio
5GU□KA	**3～180**
5GU□KHA (High Power Type)	**50～180**
5GU10XKB (Decimal Gearhead) [for **5GU□KA**]	
5GU10XK (Decimal Gearhead) [for **5GU□KHA**]	

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

Right-Angle

Type	Gearhead Model	Gear Ratio
Hollow Shaft	**5GU□RH**	**3.6～180**
Solid Shaft	**5GU□RAA**	**3～180**

- Enter the gear ratio in the box (□) within the model name.
- **Right-Angle Gearheads**→Page A-189

Gearmotor — Torque Table

World K Series (General Purpose)

The maximum permissible torque when a decimal gearhead with a gear ratio of 10:1 is attached are as follows:
5GU□KA: 177lb-in (20N·m)
5GU□KHA: 260lb-in (30N·m)

Single-Phase 115/230 VAC 60 Hz, Three-Phase 230 VAC 60 Hz

Unit = Upper values: lb-in/Lower values: N·m

Model	Speed r/min	600	500	360	300	240	200	144	120	100	72	60	50	36	30	24	20	18	15	12	10
	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**
5RK90GU-AWMU	**5GU□KA**	12.3 1.4	15 1.7	21 2.4	24 2.8	31 3.6	38 4.3	46 5.3	56 6.4	68 7.7	85 9.7	102 11.6	123 13.9	170 19.3	177 20	177 20	177 20	177 20	177 20	177 20	177 20
	5GU□KHA	—	—	—	—	—	—	—	—	—	—	—	—	170 19.3	200 23.2	220 25.9	260 30	260 30	260 30	260 30	260 30
5RK90GU-CWME	**5GU□KA**	13.2 1.5	15.9 1.8	22 2.5	25 2.9	32 3.7	38 4.4	48 5.5	58 6.6	69 7.9	88 10.0	106 12.0	127 14.4	177 20	177 20	177 20	177 20	177 20	177 20	177 20	177 20
	5GU□KHA	—	—	—	—	—	—	—	—	—	—	—	—	177 20	210 24	230 26.8	260 30	260 30	260 30	260 30	260 30
5IK90GU-SWM	**5GU□KA**	12.3 1.4	15 1.7	20 2.3	24 2.8	30 3.5	37 4.2	46 5.2	54 6.2	66 7.5	83 9.4	100 11.3	119 13.5	166 18.8	177 20	177 20	177 20	177 20	177 20	177 20	177 20
	5GU□KHA	—	—	—	—	—	—	—	—	—	—	—	—	166 18.8	200 22.6	220 25.2	260 30	260 30	260 30	260 30	260 30

- **KA** type is standard gearhead. **KHA** type is high-powerd gearhead.

Single-Phase 230 VAC 50 Hz

Unit = Upper values: lb-in/Lower values: N·m

Model	Speed r/min	500	416	300	250	200	166	120	100	83	60	50	41	30	25	20	16	15	12.5	10	8.3
	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**
5RK90GU-CWME	**5GU□KA**	15.9 1.8	18.5 2.1	26 3	30 3.5	38 4.4	46 5.3	59 6.7	70 8.0	84 9.6	106 12.0	128 14.5	153 17.3	177 20	177 20	177 20	177 20	177 20	177 20	177 20	177 20
	5GU□KHA	—	—	—	—	—	—	—	—	—	—	—	—	210 24.1	250 28.9	260 30	260 30	260 30	260 30	260 30	260 30

- **KA** type is standard gearhead. **KHA** type is high-powerd gearhead.

V Series (Quiet Operation, High Strength, Long Life)

Single-Phase 115 VAC/230 VAC 60 Hz, Three-Phase 230 VAC 60 Hz

Unit = Upper values: lb-in/Lower values: N·m

Model	Speed r/min	360	300	200	120	100	60	50	30	20	15	10
	Gear Ratio	**5**	**6**	**9**	**15**	**18**	**30**	**36**	**60**	**90**	**120**	**180**
VHR590AM-□U		23 2.6	28 3.2	41 4.7	69 7.9	80 9.1	133 15.1	160 18.1	260 30.2	350 40	350 40	350 40
VHR590CM-□E		23 2.7	29 3.3	43 4.9	72 8.2	83 9.4	138 15.6	165 18.7	270 31.2	350 40	350 40	350 40
VHI590SM-□		23 2.6	27 3.1	40 4.6	68 7.7	77 8.8	130 14.7	155 17.6	260 29.4	350 40	350 40	350 40

Single-Phase 230 VAC 50 Hz

Unit = Upper values: lb-in/Lower values: N·m

Model	Speed r/min	300	250	166	100	83	50	41	25	16	12.5	8.3
	Gear Ratio	**5**	**6**	**9**	**15**	**18**	**30**	**36**	**60**	**90**	**120**	**180**
VHR590CM-□E		29 3.3	34 3.9	52 5.9	87 9.9	100 11.3	166 18.8	200 22.6	330 37.7	350 40	350 40	350 40

- Gearheads and decimal gearheads are sold separately. Decimal gearheads are not available for **V** Series.
- 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; a white background indicates rotation in the opposite direction.
- The speed is calculated by dividing the motor's synchronous speed (50 Hz: 1500 r/min, 60 Hz: 1800 r/min) by the gear ratio. The actual speed is 2～20% less than the displayed value, depending on the size of the load.

Gearmotor — Torque Table when Right-Angle Gearhead is Attached

Right-Angle Gearheads are available for the World **K** Series only.

→Page A-196

Permissible Overhung Load and Permissible Thrust Load

Motor (Round shaft motor)→Page A-11

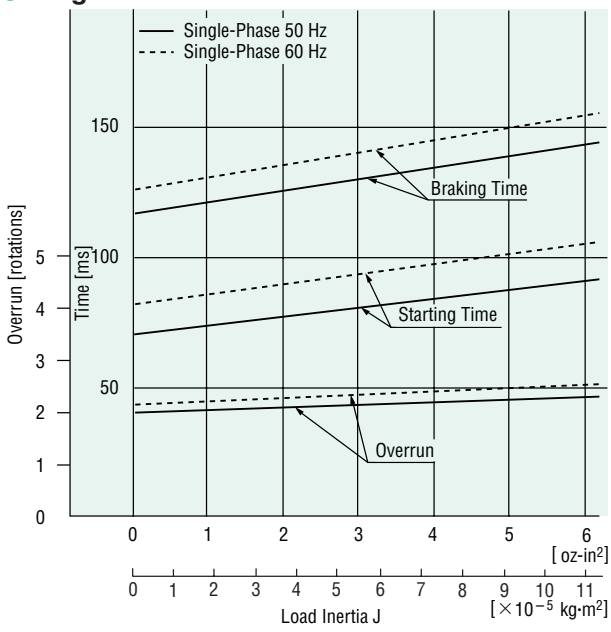
Gearhead→Page A-11

Permissible Load Inertia J for Gearhead

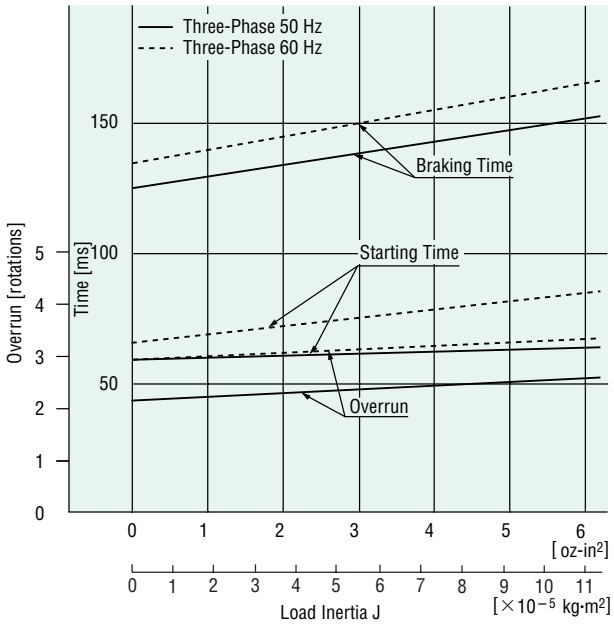
→Page A-12

Starting and Braking Characteristics Common to 90W Type (Reference Values)

Single-Phase Motor



Three-Phase Motor



Dimensions Scale 1/4, Unit = **inch** (mm)

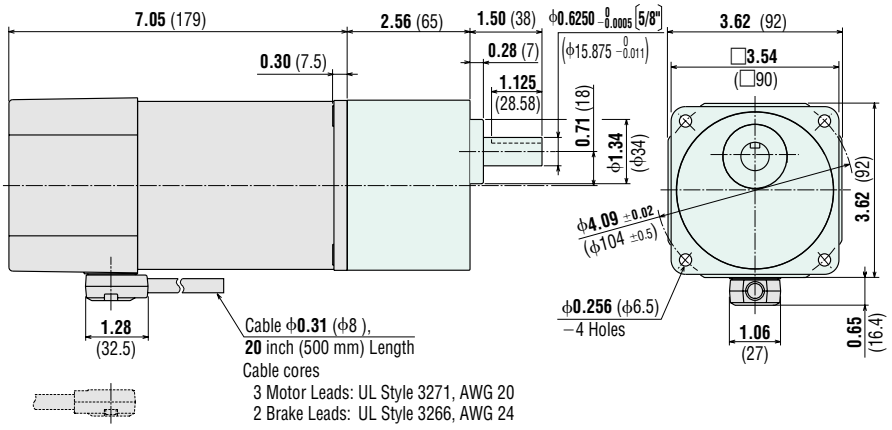
Mounting screws are included with gearheads. Dimensions for screws→A-223

World K Series

Motor
5RK90GU-AWMU
5RK90GU-CWME
5IK90GU-SWM
Weight: 8.6 lb. (3.9 kg)

Gearhead
5GU□KA
Weight: 3.3 lb. (1.5 kg)

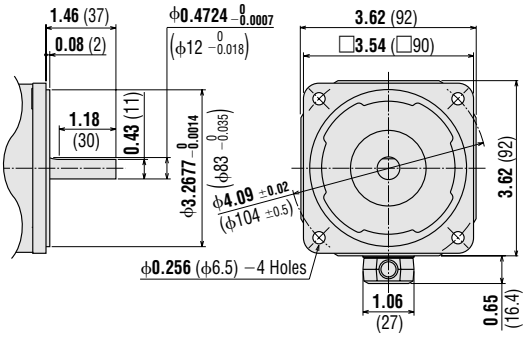
DXF A091U (**5GU3KA**~**180KA**)



Cable direction can be switched to the opposite direction.

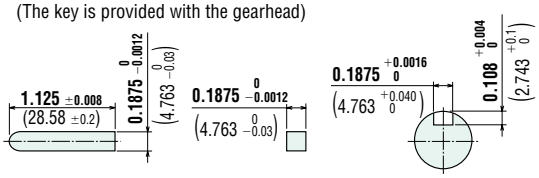
Round Shaft Type
5RK90A-AWMU
5RK90A-CWME
5IK90A-SWM
Weight: 8.6 lb. (3.9 kg)

DXF A351



●Key and Key Slot (Scale 1/2)

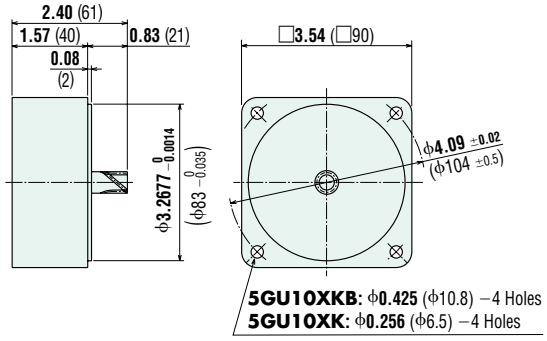
(The key is provided with the gearhead)



Decimal Gearheads (for World K Series)

5GU10XKB (for **5GU□KA**)
5GU10XK (for **5GU□KHA**)
Weight: 1.3 lb. (0.6 kg)

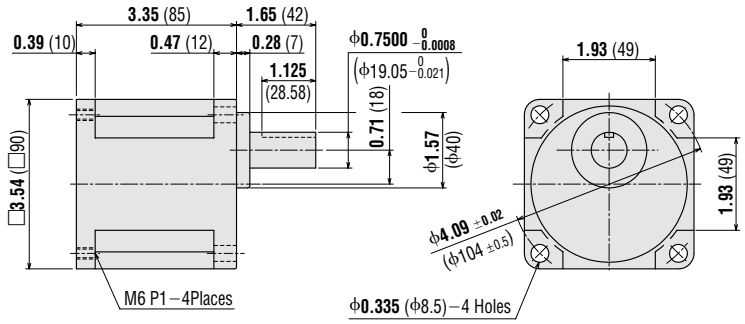
DXF A029



High-Power Type Gearhead (for World K Series)

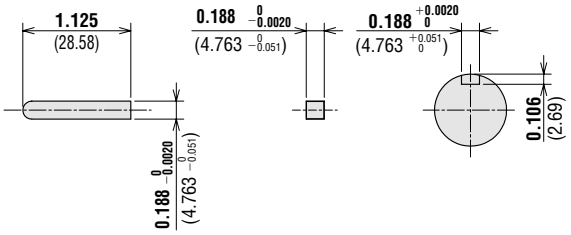
5GU□KHA Weight: 4.2 lb. (1.9 kg)

DXF A038U



●Key and Key Slot (Scale 1/2)

(The key is provided with the gearhead)

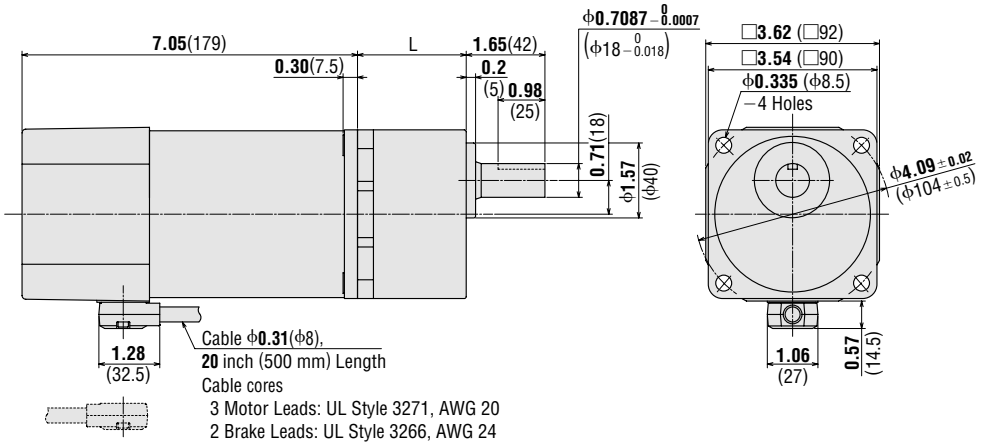


● V Series

◆ Lead Wire Type

VHR590AM-□U, **VHR590CM-□E**, **VHI590SM-□** (Combination Type)
Weight: 12 lb. (5.4 kg) including gearhead
Motor Model: VHR590AM-GVR, VHR590CM-GVR, VHI590SM-GVR
Gearhead Model: GVR5G□

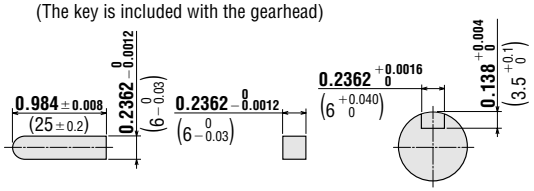
DXF A399A (GVR5G5~15)
A399B (GVR5G18~36)
A399C (GVR5G60~180)



Cable direction can be switched to the opposite direction.

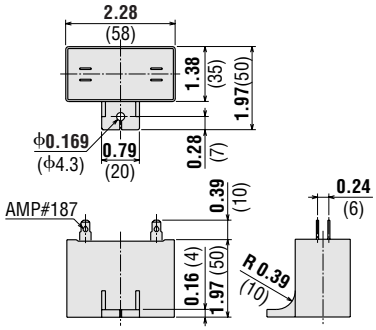
●Key and Key Slot (Scale 1/2)

(The key is included with the gearhead)



GVR5G5~GVR5G15: L = **1.77** (45)
GVR5G18~GVR5G36: L = **2.28** (58)
GVR5G60~GVR5G180: L = **2.76** (70)

● Capacitor (included with single-phase motors)



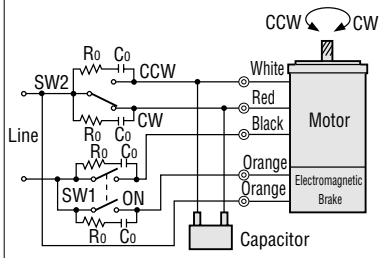
Motor Model	Capacitor Model	Weight oz. (g)
5RK90GU-AWMU **5RK90A-AWMU** **VHR590AM-□U**	CH300CFAUL	4.9 (140)
5RK90GU-CWME **5RK90A-CWME** **VHR590CM-□E**	CH70BFAUL	4.6 (130)

- If you need to order a capacitor without a motor, add "-C" to the capacitor model name shown.
  A capacitor cap is included with a capacitor.

Connection Diagrams

Single-Phase Motor

5RK90GU-AWMU
5RK90GU-CWME
VHR590AM-□U
VHR590CM-□E



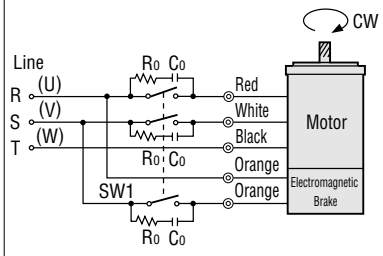
SW1 operates both motor and electromagnetic brake action. The motor will rotate when SW1 is switched simultaneously to ON (short circuit). When SW1 is switched simultaneously to OFF (open), the motor stops immediately with the electromagnetic brake and holds the load.
(To release the brake while the motor is stopped, apply voltage between the two brake lead wires (orange).)

Direction of Rotation
To rotate the motor in a clockwise (CW) direction, flip SW2 to CW.
To rotate the motor in a counterclockwise (CCW) direction, flip SW2 to CCW.

Switch No.	Specifications		Note
	Single-Phase 110 VAC Input Single-Phase 115 VAC Input	Single-Phase 220 VAC Input Single-Phase 230 VAC Input	
SW1	125 VAC 5 A minimum (Inductive Load)	250 VAC 5 A minimum (Inductive Load)	Switched Simultaneously
SW2			—

Three-Phase Motor

5IK90GU-SWM
VHI590SM-□



SW1 operates both motor and electromagnetic brake action. The motor will rotate when SW1 is switched simultaneously to ON (short circuit). When SW1 is switched simultaneously to OFF (open), the motor stops immediately with the electromagnetic brake and holds the load.
(To release the brake while the motor is stopped, apply voltage between the two brake lead wires (orange).)

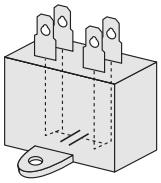
Direction of Rotation
To rotate the motor in a counterclockwise direction, change any two connections between U, V and W.

Switch No.	Specifications	Note
SW1	250 VAC 5 A minimum (Inductive Load)	Switched Simultaneously

- The direction of motor rotation is as viewed from the shaft end of the motor.
- CW represents the clockwise direction, while CCW represents the counterclockwise direction.
- Connection diagrams are also valid for the equivalent round shaft motors.
- Ro and Co indicates surge absorber circuit. [Ro = 5～200Ω, Co = 0.1～0.2μF, 200WV (400WV)]
  EPCR1201-2 is available as an optional surge absorber. →Page A-218
- **How to connect a capacitor**→Page A-225

Inner Connection Diagram for 4-Terminal Capacitor

Terminals of the capacitor are connected as shown in the figure. For lead wire connection, use one lead wire per terminal.



List of Motor and Gearhead Combinations for V Series

Model numbers for motor and gearhead combinations are shown below.

Model	Motor Model	Gearhead Model
VHR590AM-□U	VHR590AM-GVR	GVR5G□
VHR590CM-□E	VHR590CM-GVR	
VHI590SM-□	VHI590SM-GVR	

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