

# Reversible 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 — 30 Minute Rating

#### World K Series (General Purpose)



Model		Output Power	Voltage	Frequency	Current	Starting Torque	Rated Torque	Rated Speed	Capacitor			
Upper Model Name: Pinion Shaft Type	Lower Model Name( ): Round Shaft Type											
Lead Wire Type Dimension ①	Terminal Box Type Dimension ②	HP	W	VAC	Hz	A	oz-in	mN·m	oz-in	mN·m	r/min	μF
ⓉP	<b>5RK90GU-AWU</b> (5RK90A-AWU)	1/8	90	Single-Phase 110	60	1.81	83	590	83	585	1500	30
				Single-Phase 115								
ⓉP	<b>5RK90GU-CWE</b> (5RK90A-CWE)	1/8	90	Single-Phase 220	60	0.82	85	600	103	730	1200	7
				Single-Phase 220								
				Single-Phase 230								
				Single-Phase 230								

ⓉP 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.

- Values shown for rated torque and starting torque are measured for operation without the friction brake installed.
- 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-10
- Details of Safety Standards →Page G-2

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



Model Combination Type		Output Power	Voltage	Frequency	Current	Starting Torque	Rated Torque	Rated Speed	Capacitor			
Lead Wire Type Dimension ③	Terminal Box Type Dimension ④											
HP	W	VAC	Hz	A	oz-in	mN·m	oz-in	mN·m	r/min	μF		
ⓉP	<b>VHR590A-□U</b> (VHR590AT-□U)	1/8	90	Single-Phase 110	60	1.81	83	590	83	585	1500	30
				Single-Phase 115								
ⓉP	<b>VHR590C-□E</b> (VHR590CT-□E)	1/8	90	Single-Phase 220	60	0.82	85	600	103	730	1200	7
				Single-Phase 220								
				Single-Phase 230								
				Single-Phase 230								

ⓉP 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.

- Values shown for rated torque and starting torque are measured for operation without the brake applied.
- 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 types with motor and gearhead pre-assembled.
- Enter gear ratio in the box (□) within the model name.
- The values in the table are for the motor only.

### Gearheads for World K Series (Sold Separately)

#### Parallel Shaft

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

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

#### Right-Angle

Type	Gearhead Model	Gear Ratio
Hollow Shaft	<b>5GU□RH</b>	<b>3.6~180</b>
Solid Shaft	<b>5GU□RAA</b>	<b>3~180</b>

- 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:** 177 lb-in (20 N·m)

**5GU□KHA:** 260 lb-in (30 N·m)

#### ◆ Single-Phase 115/230 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	<b>3</b>	<b>3.6</b>	<b>5</b>	<b>6</b>	<b>7.5</b>	<b>9</b>	<b>12.5</b>	<b>15</b>	<b>18</b>	<b>25</b>	<b>30</b>	<b>36</b>	<b>50</b>	<b>60</b>	<b>75</b>	<b>90</b>	<b>100</b>	<b>120</b>	<b>150</b>	<b>180</b>
<b>5RK90GU-AWU</b> <b>5RK90GU-AWTU</b>	<b>5GU□KA</b>	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
	<b>5GU□KHA</b>	—	—	—	—	—	—	—	—	—	—	—	—	170 19.3	200 23.2	220 25.9	260 30	260 30	260 30	260 30	260 30
<b>5RK90GU-CWE</b> <b>5RK90GU-CWTE</b>	<b>5GU□KA</b>	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
	<b>5GU□KHA</b>	—	—	—	—	—	—	—	—	—	—	—	—	177 20	210 24	230 26.8	260 30	260 30	260 30	260 30	260 30

● **KA** type is standard gearhead. **KHA** type is high-powered 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	<b>3</b>	<b>3.6</b>	<b>5</b>	<b>6</b>	<b>7.5</b>	<b>9</b>	<b>12.5</b>	<b>15</b>	<b>18</b>	<b>25</b>	<b>30</b>	<b>36</b>	<b>50</b>	<b>60</b>	<b>75</b>	<b>90</b>	<b>100</b>	<b>120</b>	<b>150</b>	<b>180</b>
<b>5RK90GU-CWE</b> <b>5RK90GU-CWTE</b>	<b>5GU□KA</b>	15.9 1.8	18.5 2.1	26 3.0	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
	<b>5GU□KHA</b>	—	—	—	—	—	—	—	—	—	—	—	—	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-powered gearhead.

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

#### ◆ Single-Phase 115/230 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	<b>5</b>	<b>6</b>	<b>9</b>	<b>15</b>	<b>18</b>	<b>30</b>	<b>36</b>	<b>60</b>	<b>90</b>	<b>120</b>	<b>180</b>
<b>VHR590A-□U</b> <b>VHR590AT-□U</b>		23	28	41	69	80	133	160	260	350	350	350
		2.6	3.2	4.7	7.9	9.1	15.1	18.1	30.2	40	40	40
<b>VHR590C-□E</b> <b>VHR590CT-□E</b>		23	29	43	72	83	138	165	270	350	350	350
		2.7	3.3	4.9	8.2	9.4	15.6	18.7	31.2	40	40	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	<b>5</b>	<b>6</b>	<b>9</b>	<b>15</b>	<b>18</b>	<b>30</b>	<b>36</b>	<b>60</b>	<b>90</b>	<b>120</b>	<b>180</b>
<b>VHR590C-□E</b> <b>VHR590CT-□E</b>		29	34	52	87	100	166	200	330	350	350	350
		3.3	3.9	5.9	9.9	11.3	18.8	22.6	37.7	40	40	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 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

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

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

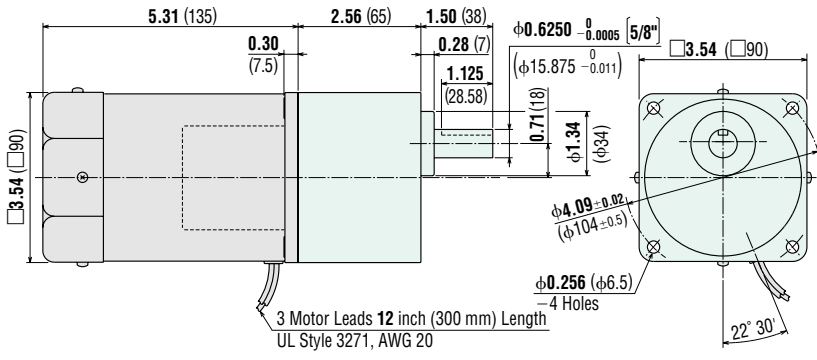
**World K Series**

**Lead Wire Type ①**

**Motor**  
5RK90GU-AWU  
5RK90GU-CWE  
Weight: 7.0 lb. (3.2 kg)

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

**DXF** A035U (5GU3KA~180KA)

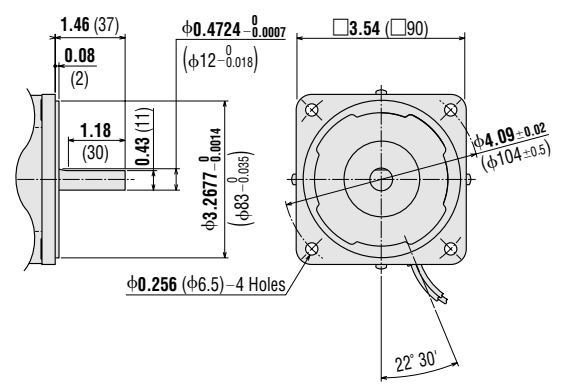


3 Motor Leads 12 inch (300 mm) Length  
UL Style 3271, AWG 20

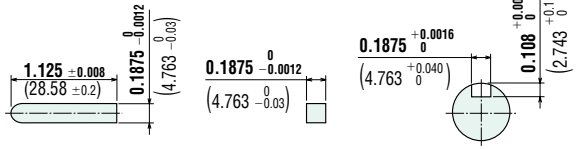
**Round Shaft Type**

5RK90A-AWU  
5RK90A-CWE  
Weight: 7.0 lb. (3.2 kg)

**DXF** A333



**Key and Key Slot (Scale 1/2)**  
(The key is provided with the gearhead)

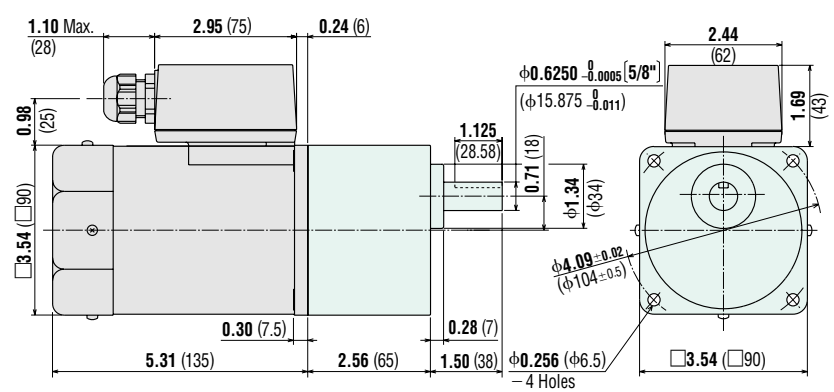


**Terminal Box Type ②**

**Motor**  
5RK90GU-AWTU  
5RK90GU-CWTE  
Weight: 7.3 lb. (3.3 kg)

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

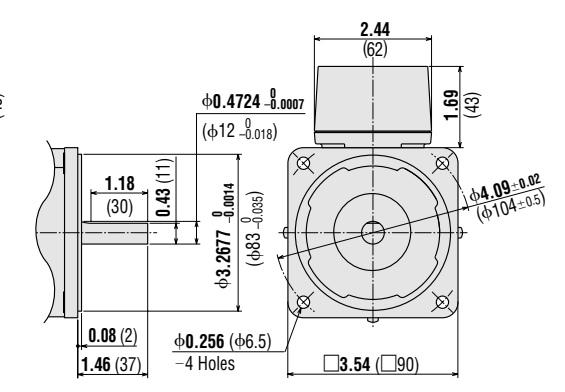
**DXF** A036U (5GU3KA~180KA)



**Round Shaft Type**

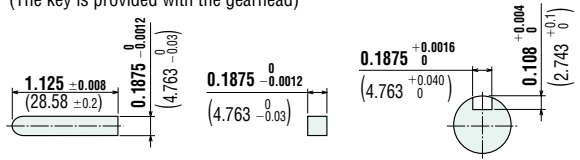
5RK90A-AWTU  
5RK90A-CWTE  
Weight: 7.3 lb. (3.3 kg)

**DXF** A334



- Use cable (VCTF) with a diameter of  $\phi 0.24$  inch ( $\phi 6$  mm) ~  $\phi 0.47$  inch ( $\phi 12$  mm).
- Details of Terminal Box → Page A-224

**Key and Key Slot (Scale 1/2)**  
(The key is provided with the gearhead)



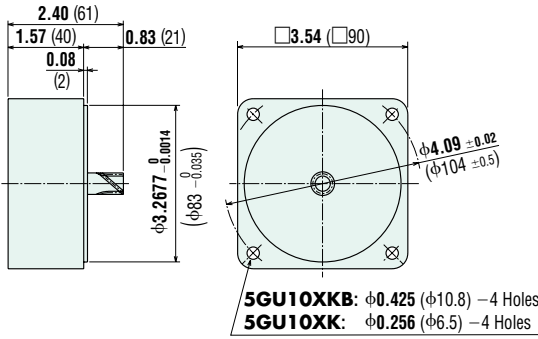
● **Decimal Gearhead (for World K Series)**

**5GU10XKB** (for 5GU□KA)

**5GU10XK** (for 5GU□KHA)

Weight: 1.3 lb. (0.6 kg)

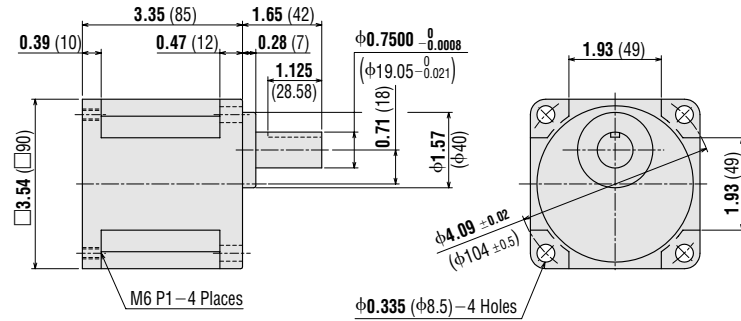
DXF A029



● **High-Power Type Gearhead (for World K Series)**

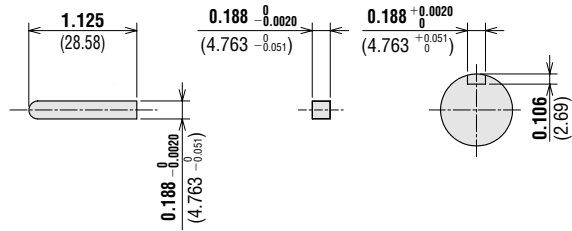
**5GU□KHA** Weight: 4.2 lb. (1.9 kg)

DXF A038U



● **Key and Key Slot (Scale 1/2)**

(The key is provided with the gearhead)



● **V Series**

◆ **Lead Wire Type ③**

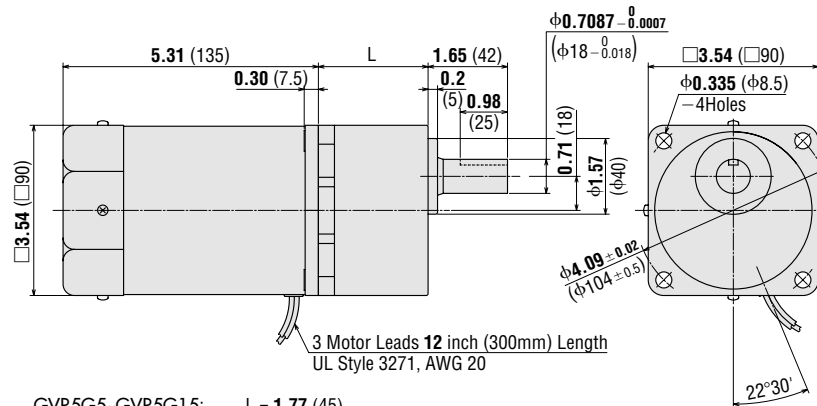
**VHR590A-□U, VHR590C-□E** (Combination Type)

Weight: 10 lb. (4.7 kg) including gearhead

Motor Model: VHR590A-GVR, VHR590C-GVR

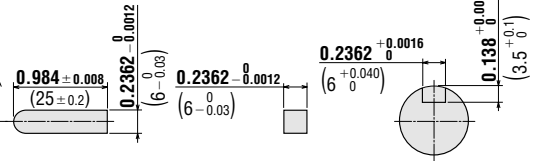
Gearhead Model: GVR5G□

DXF A397A (GVR5G5~15)  
 A397B (GVR5G18~36)  
 A397C (GVR5G60~180)



● **Key and Key Slot (Scale 1/2)**

(The key is provided with the gearhead)



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

◆ Terminal Box Type ④

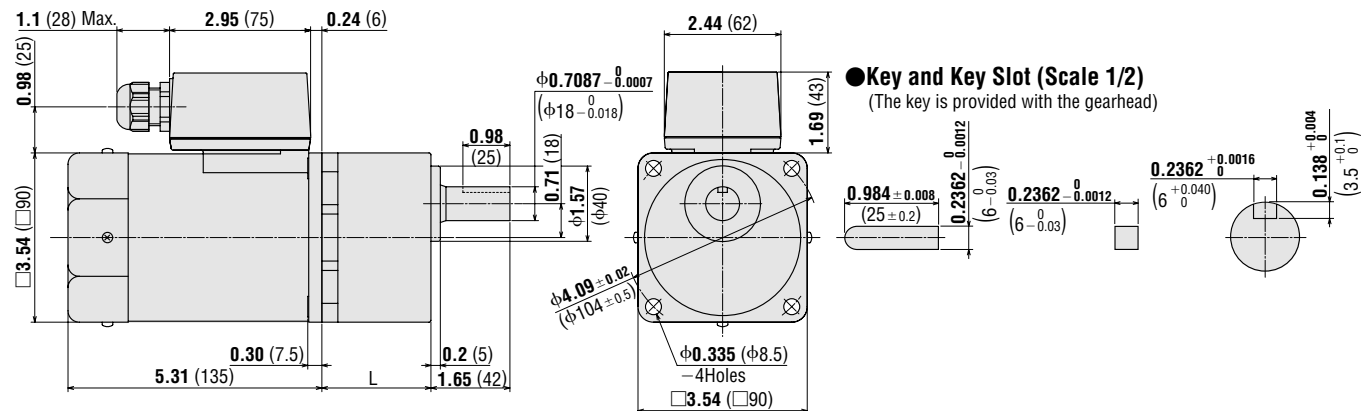
VHR590AT-□U, VHR590CT-□E (Combination Type)

Weight: 11 lb. (4.8 kg) including gearhead

Motor Model: VHR590AT-GVR, VHR590CT-GVR

Gearhead Model: GVR5G□

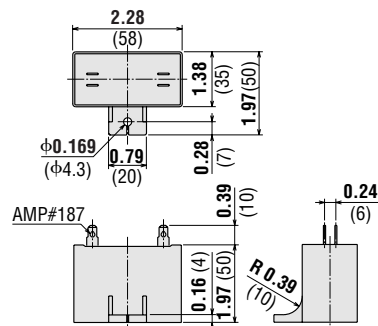
- DXF A398A (GVR5G5~15)
- A398B (GVR5G18~36)
- A398C (GVR5G60~180)



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

- Use cable (VCTF) with a diameter of φ0.24 inch (φ6 mm)~φ0.47 inch (φ12 mm).
- Details of Terminal Box →Page A-224

● Capacitor (included with the motors)

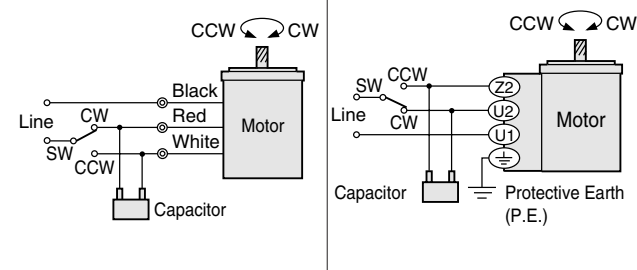


Motor Model	Capacitor Model	Weight oz. (g)
5RK90GU-AW(T)U 5RK90A-AW(T)U VHR590A(T)-□U	CH300CFAUL	4.9 (140)
5RK90GU-CW(T)E 5RK90A-CW(T)E VHR590C(T)-□E	CH70BFAUL	4.6 (130)

- 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

Lead Wire Type	Terminal Box Type
5RK90GU-AWU 5RK90GU-CWE VHR590A-□U VHR590C-□E	5RK90GU-AWTU 5RK90GU-CWTE VHR590AT-□U VHR590CT-□E



- 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 type.

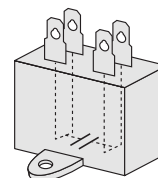
● How to connect a capacitor →Page A-225

Note:

- Connect a CR circuit to the forward/reverse select switch (SW) to protect the contact. Connecting CR circuit, contact capacity →Page A-226

● 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
<b>VHR590A-□U</b>	VHR590A-GVR	GVR5G□
<b>VHR590C-□E</b>	VHR590C-GVR	
<b>VHR590AT-□U</b>	VHR590AT-GVR	
<b>VHR590CT-□E</b>	VHR590CT-GVR	

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

1/750 HP  
1 W1/125 HP  
6 W1/50 HP  
15 W1/30 HP  
25 W1/19 HP  
40 W1/12 HP  
60 W1/8 HP  
90 W