

**(RoHS) RoHS Directive-Compliant**  
**Watertight, Dust-Resistant Motors**  
**FPW Series**

Induction Type

● Connection Information ●  
 Technical reference → Page G-1  
 Safety standards → Page H-4

The **FPW** Series geared motor conforms to the IP67 rating under the IEC standards, which is recognized by UL. It is suitable for use in locations where equipment comes in contact with water or needs to be periodically washed with water. Models with outputs of 25 W, 40 W, 60 W, and 90 W are available, and these products confirm with the RoHS Directive.



● List of products conforming to safety standards (product name, applicable standards, file number, certification body) → Page H-12



## Features

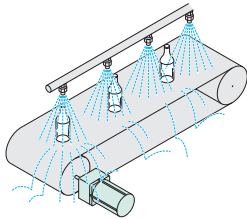
### ● Watertight and Dust-Resistant Performance – IP67

This geared motor is a watertight, dust-resistant type that can be used in locations that are splashed with water. These models conform to the IP67 rating for the degree of protection under the IEC Standards.

The motor is not available for use under high pressure jets of water or immersion in water.

IP67: The IP indication that shows the watertight and dust-resistant performance are specified under IEC 60529 and EN 60034-5.

The **FPW** Series has been recognized by UL for the IP67 rating. (UL File No. E166348)



### ● Improved Anti-Corrosion Properties

Improved anti-corrosion properties are achieved by employing special coating and a change in the shaft material [stainless steel (SUS303 type)].

### ● Designed and Constructed for Watertight and Dust-Resistant Performance

Special anti-corrosive coating

Oil-shield protection

Made of stainless steel  
(SUS303 type)

Watertight, dust-resistant geared motor  
O-ring employed at motor/gear case junction

### ● Conforms to Major Safety Standards

These products are recognized by UL/CSA and they also feature the CE Marking under the Low Voltage Directive. These motors also conform to the China Compulsory Certification System (CCC System).

### ● (RoHS) RoHS Directive-Compliant

The **FPW** Series conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium.

● RoHS Directive → Page H-2

## For Speed Control of the FPW Series

Combined use of inverters **FE100/FE200** and an **FPW** Series three-phase induction motor enables speed control.



**FE100/FE200** **FPW** Series

### ● Inverters **FE100/FE200** (Sold separately)

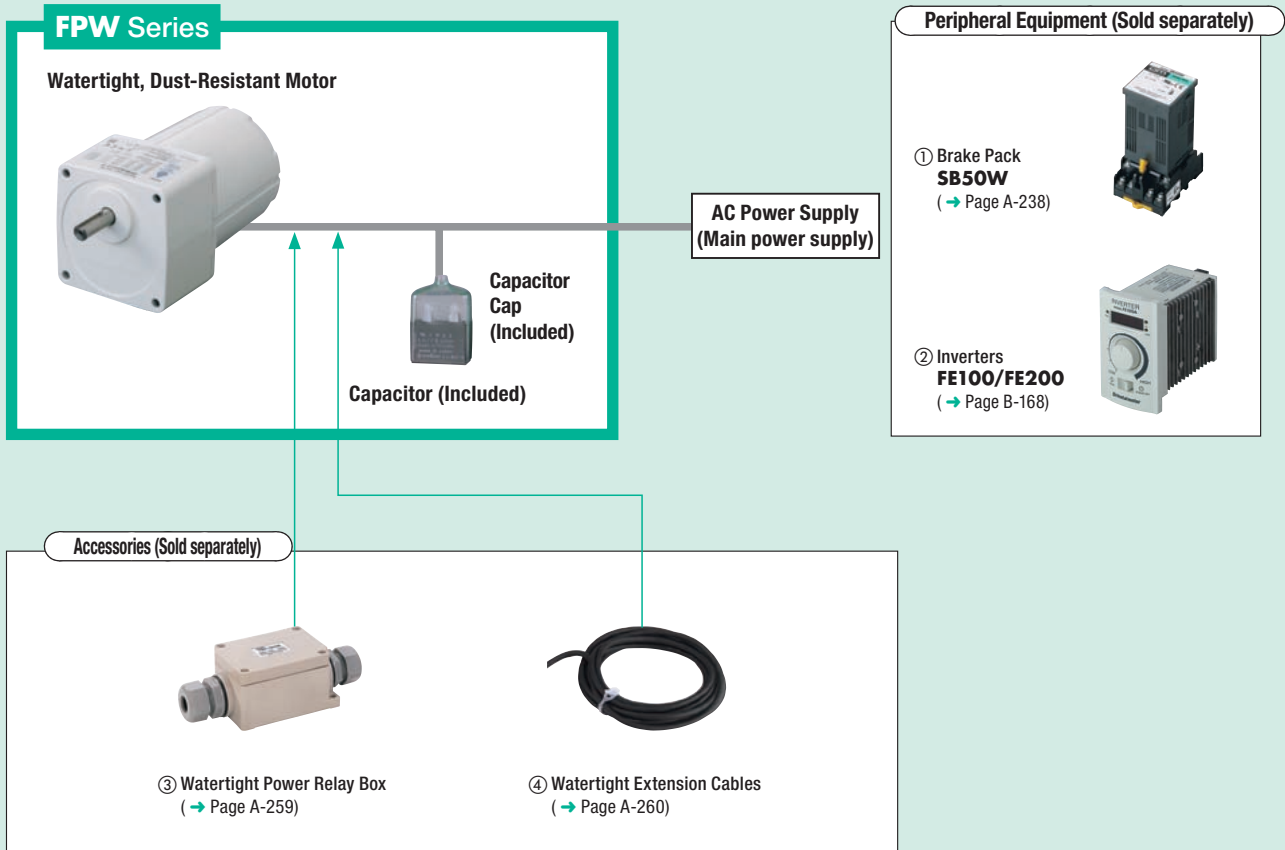
These products feature a digital display and enable easy settings for speed control.

Speed Setting Range: 200 to 2400 r/min

(Set Frequency Range: 6.6 to 80 Hz)

● Inverter **FE100/FE200** → Page B-168

## System Configuration



Number	Name	Introduction	Page
①	Brake Pack	Used to stop the motor instantaneously and perform bi-directional operation.	A-238
②	Inverters	Combine this inverter with a three-phase motor for easy speed control. This part is equipped with a digital display.	B-168
③	Watertight Power Relay Box	When the cable of a watertight motor is extended, use this terminal block to connect cables ( <b>TB4-0608</b> ).	A-259
④	Watertight Extension Cables	This cable extends the wiring distance between the motor and power supply. Use it with the watertight power relay box (5 m, 10 m).	A-260

### System Configuration Example



- The system configuration shown above is an example. Other combinations are available.
- A capacitor is included with single-phase motors. The capacitors for the motors are neither watertight nor dust-resistant.

### Product Number Code

**FPW 4 25 A 2 - 15 U**

①    ②    ③    ④    ⑤    ⑥    ⑦

①	Series Name	<b>FPW: FPW Series</b>
②	Motor Frame Size	<b>4:</b> 80 mm <b>5:</b> 90 mm <b>6:</b> 104 mm
③	Output Power (W)	(Example) <b>25:</b> 25 W
④	Power Supply Voltage	<b>A:</b> Single-Phase 110/115 VAC <b>C:</b> Single-Phase 220/230 VAC <b>S:</b> Three-Phase 200/220/230 VAC
⑤	RoHS Directive-Compliant	<b>2:</b> RoHS Directive-Compliant
⑥	Gear Ratio	
⑦	Included Capacitor	<b>U:</b> Capacitor for Single-Phase 110/115 VAC <b>E:</b> Capacitor for Single-Phase 220/230 VAC

- The product name listed on the motor nameplate does not include the code (**U, E**) that indicates the type of capacitor. Certification regarding various safety standards is acquired for the product name on the motor nameplate. → Page H-12  
 (Example) Product Name: **FPW425A2-15U**  
 → Motor nameplate and product approved under various safety standards: **FPW425A2-15**

## Product Line RoHS

Output Power	Power Supply Voltage	Product Name	Gear Ratio
25 W	Single-Phase 110/115 VAC	<b>FPW425A2-□U</b>	<b>3~180</b>
	Single-Phase 220/230 VAC	<b>FPW425C2-□E</b>	<b>3~180</b>
	Three-Phase 200/220/230 VAC	<b>FPW425S2-□</b>	<b>3~180</b>
40 W	Single-Phase 110/115 VAC	<b>FPW540A2-□U</b>	<b>3~180</b>
	Single-Phase 220/230 VAC	<b>FPW540C2-□E</b>	<b>3~180</b>
	Three-Phase 200/220/230 VAC	<b>FPW540S2-□</b>	<b>3~180</b>

Output Power	Power Supply Voltage	Product Name	Gear Ratio
60 W	Single-Phase 110/115 VAC	<b>FPW560A2-□U</b>	<b>3~180</b>
	Single-Phase 220/230 VAC	<b>FPW560C2-□E</b>	<b>3~180</b>
	Three-Phase 200/220/230 VAC	<b>FPW560S2-□</b>	<b>3~180</b>
90 W	Single-Phase 110/115 VAC	<b>FPW690A2-□U</b>	<b>3~180</b>
	Single-Phase 220/230 VAC	<b>FPW690C2-□E</b>	<b>3~180</b>
	Three-Phase 200/220/230 VAC	<b>FPW690S2-□</b>	<b>3~180</b>

The following items are included in each product.

Motor, Capacitor\*, Capacitor Cap\*, Mounting Screws, Parallel Key, Operating Manual  
\*Single-phase motors only

## Specifications – Continuous Rating RoHS



Product Name	Output Power W	Voltage VAC	Frequency Hz	Current A	Starting Torque mN-m	Rated Torque mN-m	Rated Speed r/min	Capacitor μF	
TP FPW425A2-□U	25	Single-Phase 110	60	0.46	120	170	1450	6.5	
		Single-Phase 115							
TP FPW425C2-□E	25	Single-Phase 220	50	0.27	110	205	1200	1.5	
			60	0.23		170	1450		
		Single-Phase 230	50	0.27	120	205	1200		
			60	0.23		170	1450		
TP FPW425S2-□	25	Three-Phase 200	50	0.23	240	190	1300	-	
			60	0.21	160	160	1550		
		Three-Phase 230	60	0.22	160	160	1600		
TP FPW540A2-□U	40	Single-Phase 110	60	0.68	200	260	1500	9.0	
				0.67					
TP FPW540C2-□E	40	Single-Phase 220	50	0.39	200	315	1250	2.3	
			60	0.35		260	1500		
		Single-Phase 230	50	0.39		300	1300		
			60	0.34		260	1500		
TP FPW540S2-□	40	Three-Phase 200	50	0.32	400	300	1300	-	
			60	0.30	260	260	1550		
		Three-Phase 230	60	0.31	260	260	1600		
TP FPW560A2-□U	60	Single-Phase 110	60	1.04	300	405	1450	12	
		Single-Phase 115		1.02					
TP FPW560C2-□E	55	Single-Phase 220	50	0.52	300	430	1250	3.0	
	60		60	0.48		405	1450		
	55		Single-Phase 230	50		0.51	430		1250
	60			60		0.47	405		1450
TP FPW560S2-□	60	Three-Phase 200	50	0.48	600	450	1300	-	
			60	0.43	500	380	1550		
		Three-Phase 220	60	0.44	500	380	1600		
Three-Phase 230	60	0.45							
TP FPW690A2-□U	90	Single-Phase 110	60	1.54	400	585	1500	18	
		Single-Phase 115		1.51					
TP FPW690C2-□E	90	Single-Phase 220	50	0.82	400	700	1250	4.5	
			60	0.73		605	1450		
		Single-Phase 230	50	0.81		700	1250		
			60	0.71		605	1450		
TP FPW690S2-□	90	Three-Phase 200	50	0.54	700	680	1300	-	
			60	0.51	700	570	1550		
		Three-Phase 230	60	0.49	700	570	1600		

TP: This indicates that there is 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 power supply off before inspecting.

● The values for each specification are the characteristics for when there is only a motor.

● In addition to the above products, single-phase 100 VAC and 200 VAC products are also available. Please contact the nearest Oriental Motor sales office.

● A number indicating the gear ratio is entered where the box □ is located within the product name.



## Permissible Overhung Load and Permissible Thrust Load

Product Name	Gear Ratio	Permissible Overhung Load		Permissible Thrust Load N
		10 mm from Shaft End N	20 mm from Shaft End N	
FPW425 Type	3~18	100	150	50
	25~180	200	300	
FPW540 Type	3~18	250	350	100
	25~180	300	450	
FPW560 Type	3~9	400	500	150
	12.5~18	450	600	
	25~180	500	700	
FPW690 Type	3~9	550	800	200
	12.5~180	650	1000	

## Permissible Load Inertia: J

Unit = J×10<sup>-4</sup> kg·m<sup>2</sup>

Product Name \ 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	
FPW425 Type	2.79	4.02	7.75	11.2	17.4	25.1	48.4	69.8	100	194	279	402	775	775	775	775	775	775	775	775	775
FPW540 Type	6.75	9.72	18.8	27	42.2	60.8	117	169	243	469	675	972	1875	1875	1875	1875	1875	1875	1875	1875	1875
FPW560 Type	9.9	14.3	27.5	39.6	61.9	89.1	172	248	356	688	990	1426	2750	2750	2750	2750	2750	2750	2750	2750	2750
FPW690 Type	18	25.9	50	72	113	162	313	450	648	1250	1800	2592	5000	5000	5000	5000	5000	5000	5000	5000	5000

## Dimensions (Unit = mm)

- Mounting screws are included. Dimensions of mounting screws → Page A-267
- A number indicating the gear ratio is entered where the box □ is located within the product name.

### 25 W

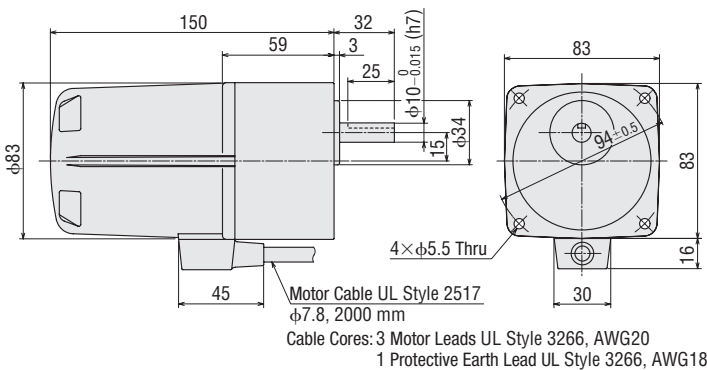
#### ◇ Geared Motor

FPW425A2-□U, FPW425C2-□E, FPW425S2-□

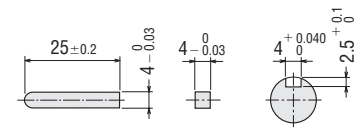
Motor: FPW425A2-□, FPW425C2-□, FPW425S2-□

Mass: 3.0 kg

CAD A226



#### ◇ Key and Key Slot (Included)



### 40 W

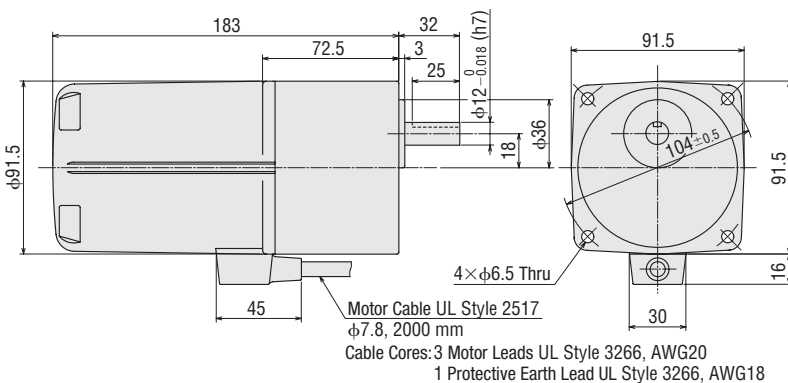
#### ◇ Geared Motor

FPW540A2-□U, FPW540C2-□E, FPW540S2-□

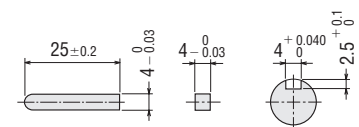
Motor: FPW540A2-□, FPW540C2-□, FPW540S2-□

Mass: 4.0 kg

CAD A227



#### ◇ Key and Key Slot (Included)



● 60 W

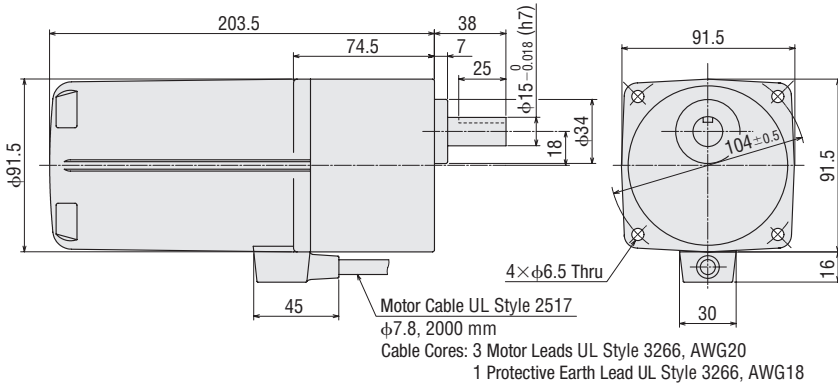
◇ Geared Motor

**FPW560A2-□U, FPW560C2-□E, FPW560S2-□**

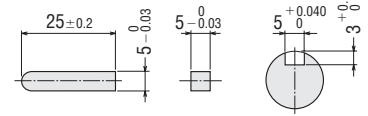
Motor: FPW560A2-□, FPW560C2-□, FPW560S2-□

Mass: 5.0 kg

CAD A228



◇ Key and Key Slot (Included)



● 90 W

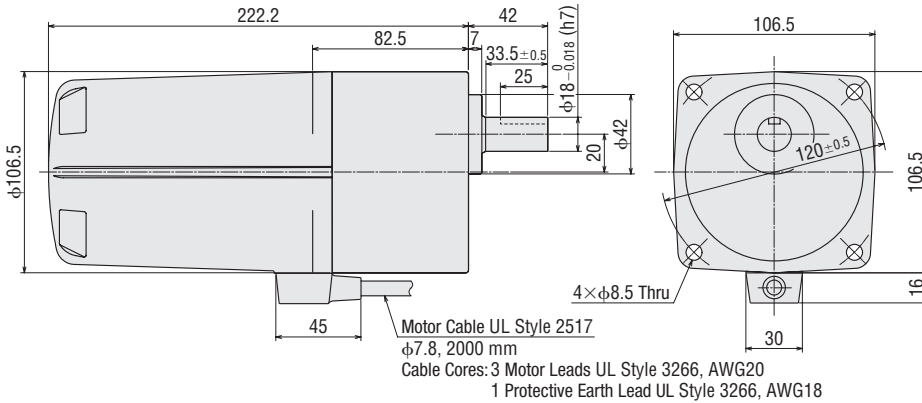
◇ Geared Motor

**FPW690A2-□U, FPW690C2-□E, FPW690S2-□**

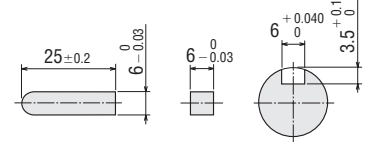
Motor: FPW690A2-□, FPW690C2-□, FPW690S2-□

Mass: 7.5 kg

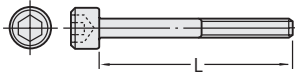
CAD A256



◇ Key and Key Slot (Included)



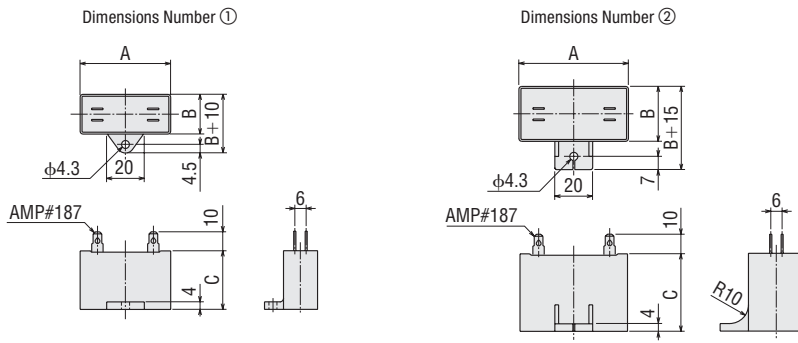
◇ Mounting Screws (Material: Stainless Steel)



	Length: L (mm)	Screw Size
<b>FPW425</b> Type	80	M5 P0.8
<b>FPW540</b> Type	90	M6 P1.0
<b>FPW560</b> Type	90	M6 P1.0
<b>FPW690</b> Type	100	M8 P1.25

● 4 flat washers and hexagonal nuts are included.

◇ Capacitor (Included with single-phase motors)



◇ Capacitor Dimensions (mm)

Product Name	Capacitor Product Name	A	B	C	Mass (g)	Dimensions No.
<b>FPW425A2-□U</b>	CH65CFAUL2	48	19	29	35	①
<b>FPW425C2-□E</b>	CH15BFAUL	38	21	31	37	
<b>FPW540A2-□U</b>	CH90CFAUL2	48	22.5	31.5	45	①
<b>FPW540C2-□E</b>	CH23BFAUL	48	21	31	43	
<b>FPW560A2-□U</b>	CH120CFAUL2	58	22	35	60	①
<b>FPW560C2-□E</b>	CH30BFAUL	58	21	31	50	
<b>FPW690A2-□U</b>	CH180CFAUL2	58	29	41	92	②
<b>FPW690C2-□E</b>	CH45BFAUL	58	23.5	37	73	

- A capacitor cap is included with the capacitor.
- A number indicating the gear ratio is entered where the box □ is located within the product name.

## Connection and Operation

- The rotation direction of the motor is as viewed from the output shaft of the motor. CW represents the clockwise direction, while CCW represents the counterclockwise direction.
- The connection method varies with the output power or the gear ratio.
- For added safety, it is advisable to use a ground fault interrupter in situations where the motor is likely to get wet during operation.

	Single-Phase 110/115 VAC, Single-Phase 220/230 VAC		Three-Phase 200/220/230 VAC	
25 W 40 W	Gear Ratio <b>3~18</b> <b>50~180</b>	Gear Ratio <b>25~36</b>	Gear Ratio <b>3~18</b> <b>50~180</b>	Gear Ratio <b>25~36</b>
60 W	Gear Ratio <b>3~9</b> <b>25~60</b>	Gear Ratio <b>12.5~18</b> <b>75~180</b>	Gear Ratio <b>3~9</b> <b>25~60</b>	Gear Ratio <b>12.5~18</b> <b>75~180</b>
90 W	Gear Ratio <b>3~9</b> <b>50~180</b>	Gear Ratio <b>12.5~36</b>	Gear Ratio <b>3~9</b> <b>50~180</b>	Gear Ratio <b>12.5~36</b>
	<p>Clockwise</p>	<p>Clockwise</p>	<p>Clockwise</p>	<p>Clockwise</p>
	<p>Counterclockwise</p>	<p>Counterclockwise</p>	<p>Counterclockwise</p> <p>To change the rotation direction to counterclockwise, change any two connections between R, S and T.</p>	<p>Counterclockwise</p> <p>To change the rotation direction to counterclockwise, change any two connections between R, S and T.</p>

**Notes**

- Change the direction of single-phase motor rotation only after bringing the motor to a stop. If an attempt is made to change the direction of rotation while the motor is rotating, the motor may ignore the reversing command or change its direction of rotation after some delay.
- How to connect a capacitor → Page A-269

● **Notes on Wiring**

The terminals of the motor cable are not waterproofed. Be sure not to splash water on the cable terminal. If water is splashed here, water could seep inside the motor through the lead wire or the cotton yarn, resulting in damage to the motor.

