

Standard AC Motors

Watertight, Dust-Resistant Motors

Overview,
Product
Series

Constant
Speed
Motors

Single-Phase
Induction
Motors

Three-Phase
Induction
Motors

Reversible
Motors

Electromagnetic
Brake Motors

Torque
Motors

**Watertight,
Dust-Resistant Motors**

Watertight,
Dust-Resistant
Motors

Brake Pack

Accessories

Installation

Watertight, Dust-Resistant Motors

FPW Series

Induction Type

<Additional Information>

- Technical reference → Page H-1
- Regulations & Standards → Page I-2



● For detailed information about regulations and standards, please see the Oriental Motor website.



- Geared motors that conform to IEC Standard IP67.
- Suitable for use in locations where the equipment is splashed or needs to be washed with water periodically.
- Output powers of 25 W, 40 W, 60 W and 90 W are available.

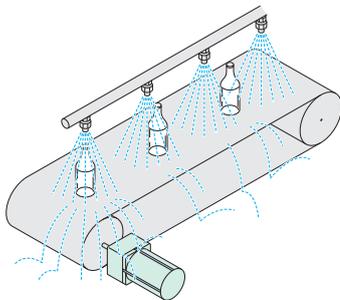
Features

● Watertight and Dust-Resistant Performance IP67

The **FPW** Series motors are watertight, dust-resistant geared induction motors which conform to the IEC Standard IP67. They can be used where they are splashed with water.

IP67: IP codes indicating the grade of dust-resistance and waterproofing are specified under IEC 60529 and IEC 60034-5.

FPW Series recognized by UL conforms to IP67 (UL File No. E166348).



● Improved Anti-Corrosion Properties

High corrosion resistance is achieved through special anti-corrosive coating and shaft material of stainless steel (SUS303 type).

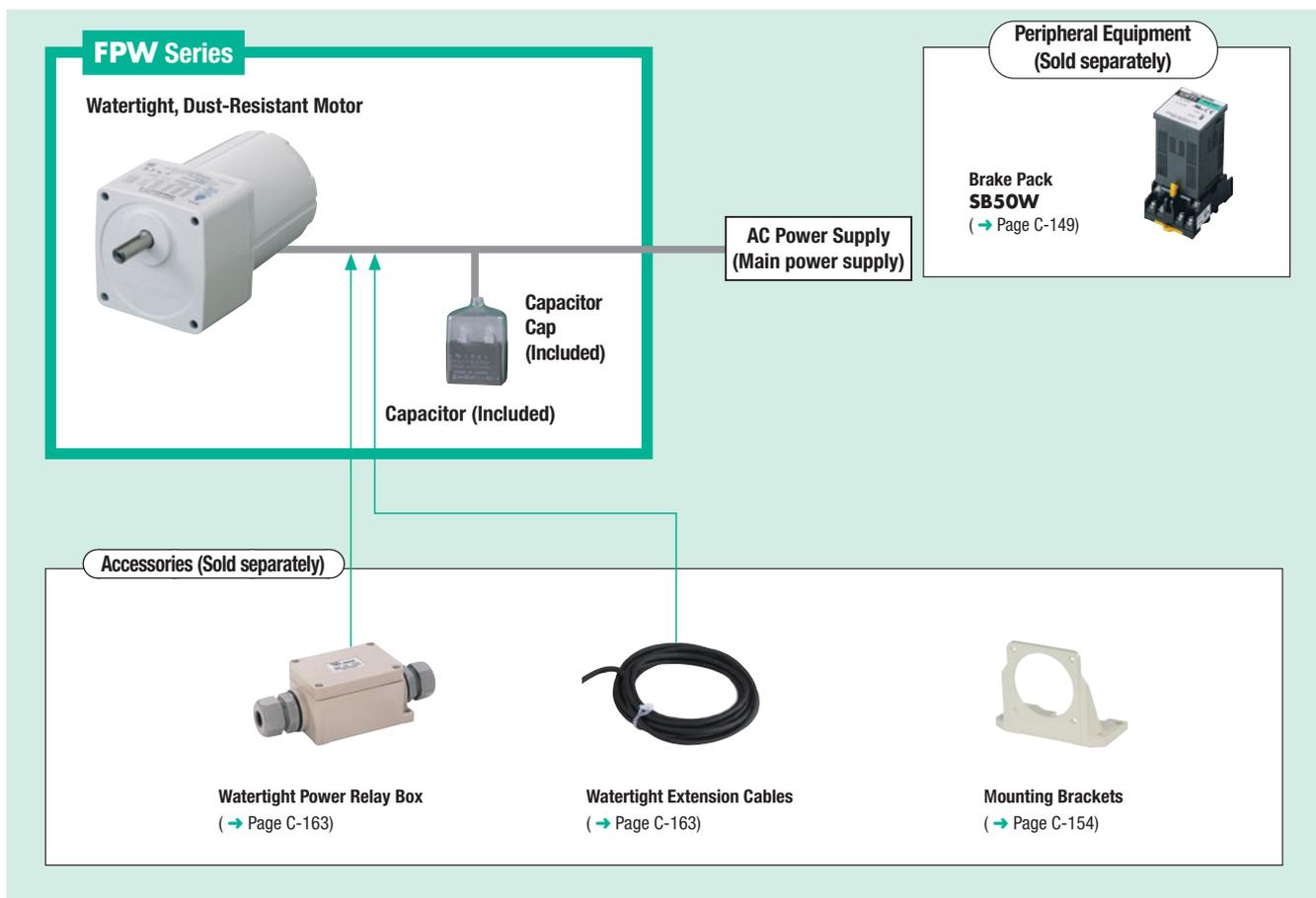
● Designed and Constructed for Watertight and Dust-Resistance



● Conforms to Standards

The **FPW** Series is recognized by UL/CSA Standards and conforms to CE Marking (Low Voltage Directive). These motors are also certified under the China Compulsory Certification System (CCC System).

System Configuration



System Configuration Example

FPW Series Geared Motor	Sold Separately		
	Watertight Power Relay Box	Watertight Extension Cable (5 m)	Mounting Bracket
FPW425C2-25E €210.00	TB4-0608 €34.00	CC05AC43P €87.00	SOL4AP €35.00

- 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

FPW 4 25 C 2 - 15 E

① ② ③ ④ ⑤ ⑥ ⑦

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

- The product name listed on the motor nameplate does not include the code **(E)** that indicates the type of capacitor. Certification regarding various safety standards is acquired for the product name on the motor nameplate, please visit www.orientalmotor.eu.
(Example) Product Name: **FPW425C2-15E**
→ Motor nameplate and product approved under various safety standards:
FPW425C2-15

Product Line

For the single-phase 100 VAC, the single-phase 110/115 VAC and the single-phase 200 VAC models, please contact the nearest Oriental Motor sales office.

Output Power	Power Supply Voltage	Product Name	Gear Ratio	List Price
25 W	Single-Phase 220/230 VAC	FPW425C2-□E	3~18	€203.00
			25~36	€210.00
			50~180	€217.00
	Three-Phase 200 VAC Three-Phase 220/230 VAC	FPW425S2-□	3~18	€203.00
			25~36	€210.00
			50~180	€217.00
40 W	Single-Phase 220/230 VAC	FPW540C2-□E	3~18	€247.00
			25~36	€254.00
			50~180	€262.00
	Three-Phase 200 VAC Three-Phase 220/230 VAC	FPW540S2-□	3~18	€247.00
			25~36	€254.00
			50~180	€262.00

Output Power	Power Supply Voltage	Product Name	Gear Ratio	List Price
60 W	Single-Phase 220/230 VAC	FPW560C2-□E	3~9	€291.00
			12.5~18	€301.00
			25~60	€311.00
	Three-Phase 200 VAC Three-Phase 220/230 VAC	FPW560S2-□	3~9	€291.00
			12.5~18	€301.00
			25~60	€311.00
90 W	Single-Phase 220/230 VAC	FPW690C2-□E	3~9	€359.00
			12.5~36	€368.00
			50~180	€378.00
	Three-Phase 200 VAC Three-Phase 220/230 VAC	FPW690S2-□	3~9	€359.00
			12.5~36	€368.00
			50~180	€378.00

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



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	Overheat Protection Device
FPW425C2-□E	25	Single-Phase 220	50	0.27	110	205	1200	1.5	TP
			60	0.23		170	1450		
		Single-Phase 230	50	0.27	120	205	1200		
			60	0.23		170	1450		
FPW425S2-□	25	Three-Phase 200	50	0.23	240	190	1300	-	TP
			60	0.21		160	1550		
		Three-Phase 220	60	0.21	160	160	1600		
			Three-Phase 230	60		0.22	160		
FPW540C2-□E	40	Single-Phase 220	50	0.39	200	315	1250	2.3	TP
			60	0.35		260	1500		
		Single-Phase 230	50	0.39	200	300	1300		
			60	0.34		260	1500		
FPW540S2-□	40	Three-Phase 200	50	0.32	400	300	1300	-	TP
			60	0.30		260	1550		
		Three-Phase 220	60	0.30	260	260	1600		
			Three-Phase 230	60		0.31	260		
FPW560C2-□E	60	Single-Phase 220	50	0.52	300	430	1250	3.0	TP
			60	0.48		405	1450		
		Single-Phase 230	50	0.51	300	430	1250		
			60	0.47		405	1450		
FPW560S2-□	60	Three-Phase 200	50	0.48	600	450	1300	-	TP
			60	0.43		500	380		
		Three-Phase 220	60	0.44	500	380	1600		
			Three-Phase 230	60		0.45	380		
FPW690C2-□E	90	Single-Phase 220	50	0.82	400	700	1250	4.5	TP
			60	0.73		605	1450		
		Single-Phase 230	50	0.81	400	700	1250		
			60	0.71		605	1450		
FPW690S2-□	90	Three-Phase 200	50	0.54	700	680	1300	-	TP
			60	0.51		570	1550		
		Three-Phase 220	60	0.50	700	570	1600		
			Three-Phase 230	60		0.49	570		

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.

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

General Specifications

Item	Specifications
Insulation Resistance	The measured value is 100 MΩ or more when a 500 VDC megger is applied between the windings and the case after rated operation under normal ambient temperature and humidity.
Dielectric Strength	No abnormality is judged even with application of 1.5 kVAC at 50 Hz or 60 Hz between the windings and the case for 1 minute after rated operation under normal ambient temperature and humidity.
Temperature Rise	The winding temperature rise is measured at 80°C or less (70°C or less for three-phase type) using the resistance change method after rated operation under normal ambient temperature and humidity.
Thermal Class	130 (B)
Overheat Protection	Built-in thermal protector (automatic return type) Open: 130±5°C, Close: 82±15°C
Operating Ambient Temperature	-10~+40°C (non-freezing) Three-Phase 200 VAC: -10~+50°C (non-freezing)
Degree of Protection	IP67

Note

- Since these are special watertight, dust-resistant geared motors, the motor and gearhead sections cannot be disassembled.
- The capacitors for the motors are neither watertight nor dust-resistant.

Permissible Torque

50 Hz

Unit: N·m

Product Name	Speed r/min	Gear Ratio																			
		500	417	300	250	200	167	120	100	83	60	50	42	30	25	20	17	15	12.5	10	8.3
FPW425C2-□E (220 VAC)	Rated	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
	Starting	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
FPW425C2-□E (230 VAC)	Rated	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
	Starting	0.29	0.35	0.49	0.58	0.73	0.87	1.2	1.5	1.7	2.2	2.6	3.2	4.0	4.8	5.9	7.1	7.9	8	8	8
FPW425S2-□	Rated	0.46	0.55	0.77	0.92	1.2	1.4	1.9	2.3	2.8	3.5	4.2	5.0	6.3	7.5	8	8	8	8	8	8
	Starting	0.46	0.55	0.77	0.92	1.2	1.4	1.9	2.3	2.8	3.5	4.2	5.0	6.3	7.5	8	8	8	8	8	8
FPW540C2-□E (220 VAC)	Rated	0.77	0.92	1.3	1.5	1.9	2.3	3.2	3.8	4.6	5.7	6.9	8.3	10	10	10	10	10	10	10	10
	Starting	0.49	0.58	0.81	0.97	1.2	1.5	2.0	2.4	2.9	3.7	4.4	5.3	6.6	7.9	9.9	10	10	10	10	10
FPW540C2-□E (230 VAC)	Rated	0.73	0.87	1.2	1.5	1.8	2.2	3.0	3.6	4.4	5.5	6.6	7.9	9.9	10	10	10	10	10	10	10
	Starting	0.49	0.58	0.81	0.97	1.2	1.5	2.0	2.4	2.9	3.7	4.4	5.3	6.6	7.9	9.9	10	10	10	10	10
FPW540S2-□	Rated	0.73	0.87	1.2	1.5	1.8	2.2	3.0	3.6	4.4	5.5	6.6	7.9	9.9	10	10	10	10	10	10	10
	Starting	0.73	0.87	1.2	1.5	1.8	2.2	3.0	3.6	4.4	5.5	6.6	7.9	9.9	10	10	10	10	10	10	10
FPW560C2-□E	Rated	1.0	1.3	1.7	2.1	2.6	3.1	3.9	4.7	5.7	7.1	8.5	10.2	14.2	15	15	15	15	15	15	15
	Starting	0.73	0.87	1.2	1.5	1.8	2.2	2.7	3.3	3.9	5.0	5.9	7.1	9.9	11.9	13.3	15	15	15	15	15
FPW560S2-□	Rated	1.1	1.3	1.8	2.2	2.7	3.3	4.1	4.9	5.9	7.4	8.9	10.7	14.9	15	15	15	15	15	15	15
	Starting	1.1	1.3	1.8	2.2	2.7	3.3	4.1	4.9	5.9	7.4	8.9	10.7	14.9	15	15	15	15	15	15	15
FPW690C2-□E	Rated	1.7	2.0	2.8	3.4	4.3	5.1	6.4	7.7	9.2	12.8	15.3	18.4	23.1	27.7	30	30	30	30	30	30
	Starting	0.97	1.2	1.6	1.9	2.4	2.9	3.7	4.4	5.3	7.3	8.8	10.5	13.2	15.8	19.8	23.8	26.4	30	30	30
FPW690S2-□	Rated	1.7	2.0	2.8	3.3	4.1	5.0	6.2	7.4	8.9	12.4	14.9	17.9	22.4	26.9	30	30	30	30	30	30
	Starting	1.7	2.0	2.8	3.3	4.1	5.0	6.2	7.4	8.9	12.4	14.9	17.9	22.4	26.9	30	30	30	30	30	30

60 Hz

Unit: N·m

Product Name	Speed r/min	Gear Ratio																			
		600	500	360	300	240	200	144	120	100	72	60	50	36	30	24	20	18	15	12	10
FPW425C2-□E (230 VAC)	Rated	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	8	8	8	8	8
	Starting	0.29	0.35	0.49	0.58	0.73	0.87	1.2	1.5	1.7	2.2	2.6	3.2	4.0	4.8	5.9	7.1	7.9	8	8	8
FPW425C2-□E (220 VAC)	Rated	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	8	8	8	8	8
	Starting	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
FPW425S2-□	Rated	0.39	0.47	0.65	0.78	0.97	1.2	1.6	1.9	2.3	2.9	3.5	4.2	5.3	6.3	7.9	8	8	8	8	8
	Starting	0.39	0.47	0.65	0.78	0.97	1.2	1.6	1.9	2.3	2.9	3.5	4.2	5.3	6.3	7.9	8	8	8	8	8
FPW540C2-□E	Rated	0.63	0.76	1.1	1.3	1.6	1.9	2.6	3.2	3.8	4.7	5.7	6.8	8.6	10	10	10	10	10	10	10
	Starting	0.49	0.58	0.81	0.97	1.2	1.5	2.0	2.4	2.9	3.7	4.4	5.3	6.6	7.9	9.9	10	10	10	10	10
FPW540S2-□	Rated	0.63	0.76	1.1	1.3	1.6	1.9	2.6	3.2	3.8	4.7	5.7	6.8	8.6	10	10	10	10	10	10	10
	Starting	0.63	0.76	1.1	1.3	1.6	1.9	2.6	3.2	3.8	4.7	5.7	6.8	8.6	10	10	10	10	10	10	10
FPW560C2-□E	Rated	0.98	1.2	1.6	2.0	2.5	3.0	3.7	4.4	5.3	6.7	8.0	9.6	13.4	15	15	15	15	15	15	15
	Starting	0.73	0.87	1.2	1.5	1.8	2.2	2.7	3.3	3.9	5.0	5.9	7.1	9.9	11.9	13.3	15	15	15	15	15
FPW560S2-□	Rated	0.92	1.1	1.5	1.8	2.3	2.8	3.5	4.2	5.0	6.3	7.5	9.0	12.5	15	15	15	15	15	15	15
	Starting	0.92	1.1	1.5	1.8	2.3	2.8	3.5	4.2	5.0	6.3	7.5	9.0	12.5	15	15	15	15	15	15	15
FPW690C2-□E	Rated	1.5	1.8	2.5	2.9	3.7	4.4	5.5	6.6	7.9	11.0	13.2	15.9	20.0	24.0	29.9	30	30	30	30	30
	Starting	0.97	1.2	1.6	1.9	2.4	2.9	3.7	4.4	5.3	7.3	8.8	10.5	13.2	15.8	19.8	23.8	26.4	30	30	30
FPW690S2-□	Rated	1.4	1.7	2.3	2.8	3.5	4.2	5.2	6.2	7.5	10.4	12.5	15.0	18.8	22.6	28.2	30	30	30	30	30
	Starting	1.4	1.7	2.3	2.8	3.5	4.2	5.2	6.2	7.5	10.4	12.5	15.0	18.8	22.6	28.2	30	30	30	30	30

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

Overview, Product Series

Constant Speed Induction Motors

Single-Phase Induction Motors

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Reversible Motors

Electromagnetic Brake Motors

Torque Motors

Watertight, Dust-Resistant Motors

Brake Pack

Accessories

Installation

Permissible Radial Load and Permissible Axial Load

Product Name	Gear Ratio	Permissible Radial Load		Permissible Axial Load
		10 mm from Output Shaft End	20 mm from Output Shaft End	
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 Inertia J

Unit: $\times 10^{-4}$ kg·m²

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 C-170
- A number indicating the gear ratio is entered where the box □ is located within the product name.

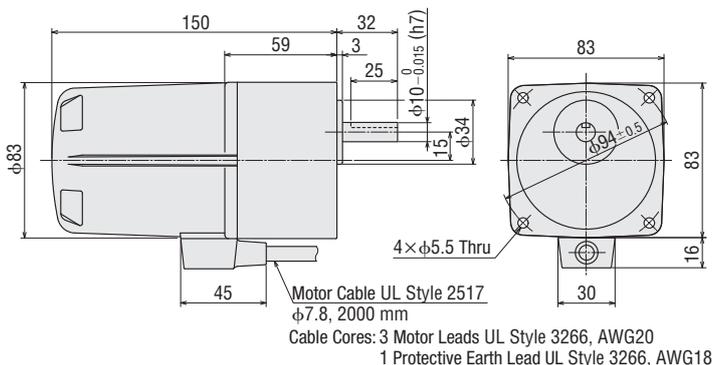
25 W

Geared Motor

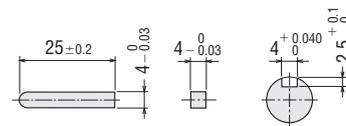
FPW425C2-□E, FPW425S2-□

Motor: FPW425C2-□, FPW425S2-□

Mass: 3.0 kg



Key and Key Slot (Included)



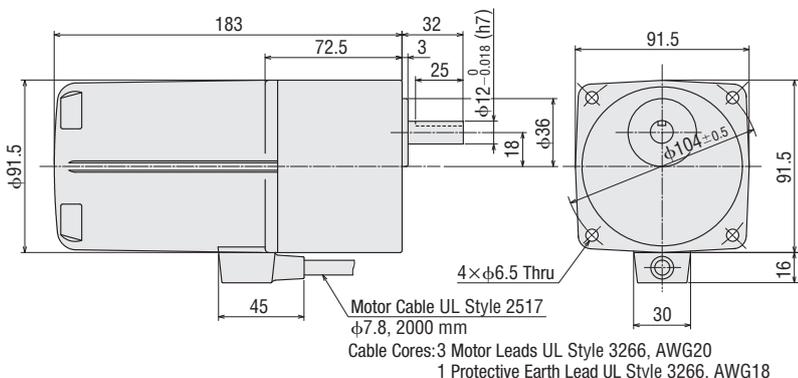
40 W

Geared Motor

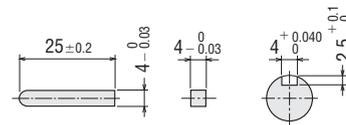
FPW540C2-□E, FPW540S2-□

Motor: FPW540C2-□, FPW540S2-□

Mass: 4.0 kg



Key and Key Slot (Included)



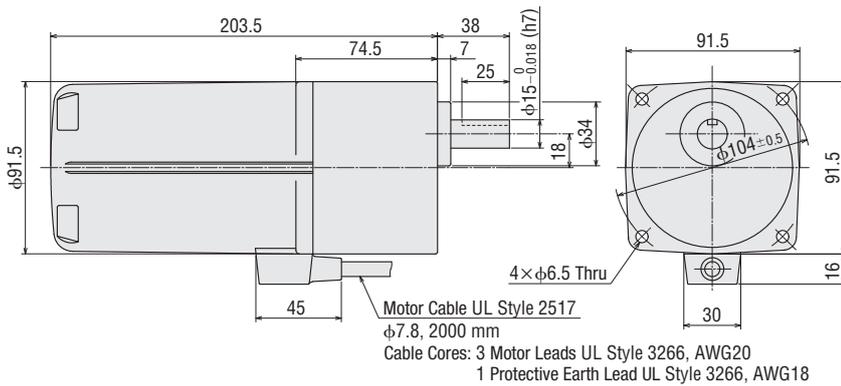
● 60 W

◇ Geared Motor

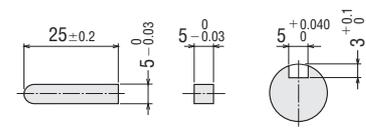
FPW560C2-□E, FPW560S2-□

Motor: FPW560C2-□, FPW560S2-□

Mass: 5.0 kg



◇ Key and Key Slot (Included)



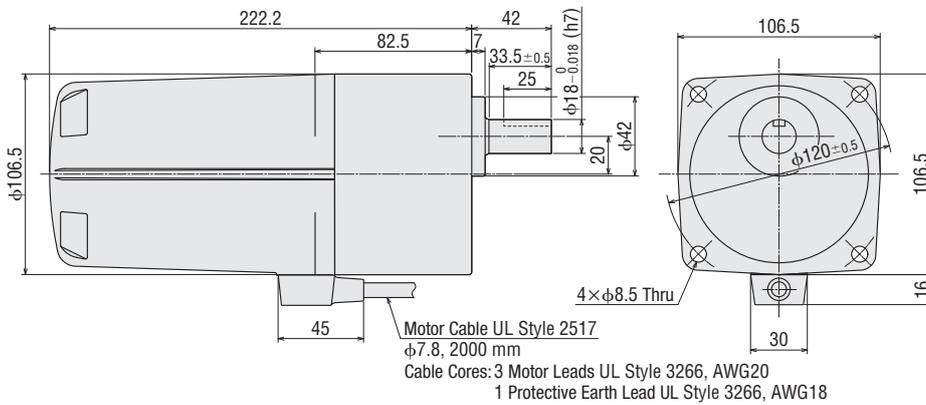
● 90 W

◇ Geared Motor

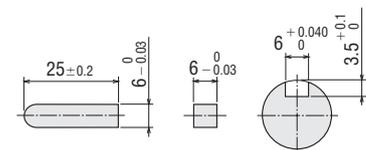
FPW690C2-□E, FPW690S2-□

Motor: FPW690C2-□, FPW690S2-□

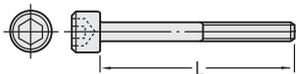
Mass: 7.5 kg



◇ Key and Key Slot (Included)



◇ Mounting Screws (Material: Stainless Steel)



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

● 4 flat washers and hexagonal nuts are included.

Overview,
Product
Series

Constant
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Single-Phase
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Electromagnetic
Brake Motors

Torque
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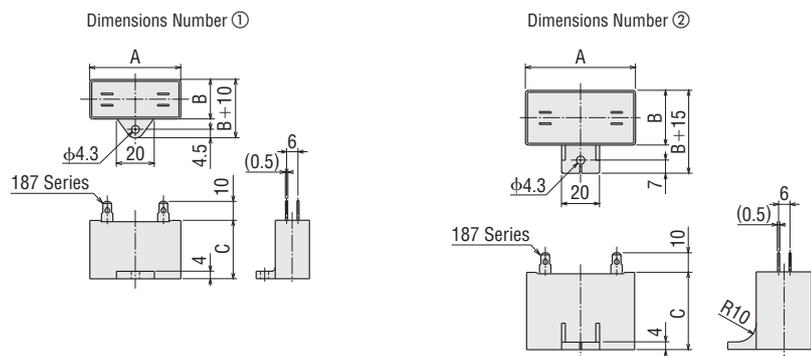
Watertight,
Dust-Resistant
Motors

Brake Pack

Accessories

Installation

◇ Capacitor (Included with single-phase motors)



◇ Capacitor Dimensions (mm)

Product Name	Capacitor Product Name	A	B	C	Mass (g)	Dimensions No.
FPW425C2-□E	CH15BFAUL	38	21	31	37	①
FPW540C2-□E	CH23BFAUL	48	21	31	43	①
FPW560C2-□E	CH30BFAUL	58	21	31	50	①
FPW690C2-□E	CH45BFAUL	58	23.5	37	73	②

- 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.

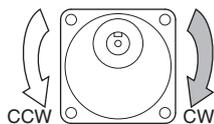
		Single-Phase 220/230 VAC		Three-Phase 200/220/230 VAC		
25 W 40 W	Gear Ratio	3~18 50~180	Gear Ratio	25~36	Gear Ratio 25~36	
60 W	Gear Ratio	3~9 25~60	Gear Ratio	12.5~18 75~180	Gear Ratio 12.5~18 75~180	
90 W	Gear Ratio	3~9 50~180	Gear Ratio	12.5~36	Gear Ratio 12.5~36	
	Clockwise		Clockwise		Clockwise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

Note

- 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 C-168

● Rotation Direction

The rotation direction of the motor is indicated when viewed from the output shaft side of the motor. CW is used to indicate clockwise rotation and CCW is used for counterclockwise rotation.



The rotation direction when viewed from the output shaft side of the motor

● 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.

