(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 IFC 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 dustresistant 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



Watertight, dust-resistant geared motor 0-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.



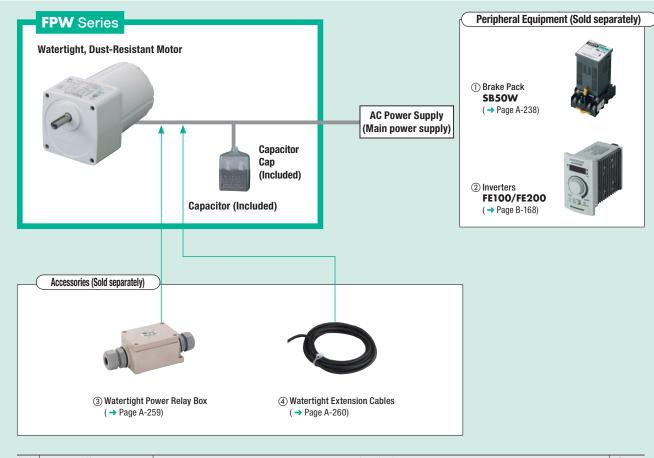
FE100/FE200 **FPW** Series

Inverters FE100/FE200 (Sold separately)

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

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 (TB4-0608).	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

FPW Series		Sold Separately								
Geared Motor	+	Watertight Power Relay Box	Watertight Extension Cable (5 m)							
FPW425A2-25U		TB4-0608	CC05AC43P							

- 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			6	

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	A : Single-Phase 110/115 VAC C : Single-Phase 220/230 VAC S : Three-Phase 200/220/230 VAC
(5)	2: RoHS Directive-Compliant	
6	Gear Ratio	
7	Included Capacitor	U: Capacitor for Single-Phase 110/115 VAC E: Capacitor for Single-Phase 220/230 VAC
- TI		

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
	Single-Phase 110/115 VAC	FPW425A2-□U	3~180
25 W	Single-Phase 220/230 VAC	FPW425C2-□E	3~180
	Three-Phase 200/220/230 VAC	FPW425S2-□	3~180
	Single-Phase 110/115 VAC	FPW540A2-□U	3~180
40 W	Single-Phase 220/230 VAC	FPW540C2-□E	3~180
	Three-Phase 200/220/230 VAC	FPW540S2-□	3~180

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

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



(W)	(

	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 Single-Phase 115	60	0.46	120	170	1450	6.5	
			0. 1 81 000	50	0.27	440	205	1200		
		0.5	Single-Phase 220	60	0.23	110	170	1450		
TP)	FPW425C2-□E	25		50	0.27		205	1200	1.5	
			Single-Phase 230	60	0.23	120	170	1450		
			TI Di 000	50	0.23	240	190	1300		
		0.5	Three-Phase 200	60	0.21	160	160	1550		
TP)	FPW425S2-□	25	Three-Phase 220	00	0.21	400	400	1000	_	
			Three-Phase 230	60	0.22	160	160	1600		
	FDW/5 40 40	40	Single-Phase 110	00	0.68	000	000	4500	0.0	
TB)	FPW540A2-□U	40	Single-Phase 115	60	0.67	200	260	1500	9.0	
				50	0.39		315	1250		
		40	Single-Phase 220	60	0.35		260	1500	0.0	
TP)	FPW540C2-□E	40	0'	50	0.39	200	300	1300	2.3	
			Single-Phase 230	60	0.34		260	1500		
TP)				50	0.32	400	300	1300		
			Three-Phase 200	60	0.30	260	260	1550		
	FPW540S2-□	40	Three-Phase 220		0.30	200	200	1000	_	
			Three-Phase 230	60	0.31	260	260	1600		
			Single-Phase 110		1.04		405	4450		
TP)	FPW560A2-□U	60	Single-Phase 115	60	1.02	300	405	1450	12	
		55	0' - I - Di 000	50	0.52		430	1250		
	FDW/F / 0.60 □F	60	Single-Phase 220	60	0.48	000	405	1450	3.0	
TP)	FPW560C2-□E	55	0. 1 81 000	50	0.51	300	430	1250		
		60	Single-Phase 230	60	0.47		405	1450		
				50	0.48	600	450	1300		
			Three-Phase 200	60	0.43	500	380	1550		
TP)	FPW560S2-□	60	Three-Phase 220		0.44			1000	_	
			Three-Phase 230	60	0.45	500	380	1600		
	FDW//0010 ==:		Single-Phase 110	0.0	1.54	463	565	4500		
TP)	FPW690A2-□U	90	Single-Phase 115	60	1.51	400	585	1500	18	
			0 1 81 555	50	0.82		700	1250		
	FDW/ 0060 ==		Single-Phase 220	60	0.73	400	605	1450	4 -	
TP)	FPW690C2-□E	90	a B	50	0.81	400	700	1250	4.5	
			Single-Phase 230	60	0.71	1	605	1450		
			TI Di 666	50	0.54	700	680	1300		
	FDW// 0050 -		Three-Phase 200	60	0.51	700	570	1550		
TP)	FPW690S2-□	90	Three-Phase 220		0.50	700				
			Three-Phase 230	60	0.49	700	570	1600		

⁽T): 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.

Customer Support Centre

General Specifications

Specifications
The measured value is $100 \text{ M}\Omega$ or more when a 500 VDC megger is applied between the windings and the case after rated operation under normal ambient temperature and humidity.
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.
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.
Class B (130°C)
Built-in thermal protector (automatic return type) Open: 130±5°C, Close: 82±15°C
-10~+40°C (non-freezing) Three-Phase 200 VAC: -10~+50°C (non-freezing)
IP67

Notes
Since these are special watertight, dust-resistant geared motors, the motor and gearhead sections cannot be disassembled.

Permissible Torque

•	CIII	11133	IDIC	 que
- E0				

●50 Hz																				Uni	it = N∙m
Product Name	Speed r/min	500	417	300	250	200	167	120	100	83	60	50	42	30	25	20	17	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
FPW425C2-□E	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
220 VAC)	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	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
(230 VAC)	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 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	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
(220 VAC)	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	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
(230 VAC)	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 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
	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
FPW560C2-□E	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
FPW560\$2-□	Rated 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
FDW/40060 ==	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
FPW690C2-□E	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 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																				Uni	t = N·m
Product Name	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
FPW425A2-□U FPW425C2-□E	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
(230 VAC)	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	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
(220 VAC)	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 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
FPW540A2-□U	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
FPW540C2-□E	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 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
FPW560A2-□U	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
FPW560C2-□E	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 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
FDW/600A0	Rated	1.4	1.7	2.4	2.8	3.6	4.3	5.3	6.4	7.7	10.7	12.8	15.4	19.3	23.2	29.0	30	30	30	30	30
FPW690A2-□U	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
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
FFW07UCZ-	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 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

 $[\]blacksquare$ A number indicating the gear ratio is entered where the box \square is located within the product name.

The capacitors for the motors are neither watertight nor dust-resistant.

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 $2\sim\!20\%$ less than the displayed value, depending on the load.

Permissible Overhung Load and Permissible Thrust Load

Product Name		Permissible C	Permissible Thrust Load			
	Gear Ratio	10 mm from Shaft End	20 mm from Shaft End	Permissible mirusi Loau		
		N	N	N		
FPW425 Type	3~18	100	150	50		
	25~180	200	300	30		
FPW540 Type	3~18	250	350	100		
	25~180	300	450	100		
FPW560 Type	3~9	400	500			
	12.5~18	450	600	150		
	25~180	500	700			
FPW690 Type	3~9	550	800	000		
	12.5~180	650	1000	200		

Permissible Load Inertia: J

Unit = $J \times 10^{-4} \text{ kg} \cdot \text{m}^2$

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
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
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
FPW690 Type	18	25.9	50	72	113	162	313	450	648	1250	1800	2592	5000	5000	5000	5000	5000	5000	5000	5000

Dimensions (Unit = mm)

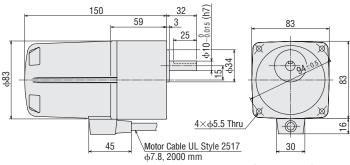
- Mounting screws are included. Dimensions of mounting screws → Page A-267
- lacktriangle A number indicating the gear ratio is entered where the box \Box is located within the product name.

25 W

FPW425A2-□U, FPW425C2-□E, FPW425S2-□

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

Mass: 3.0 kg **CAD** A226



Cable Cores: 3 Motor Leads UL Style 3266, AWG20 1 Protective Earth Lead UL Style 3266, AWG18

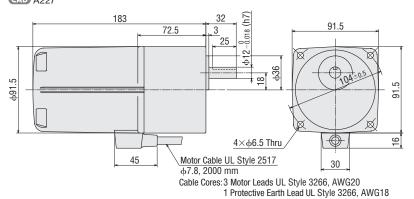
40 W

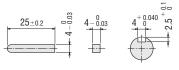
♦ Geared Motor

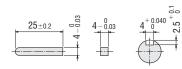
FPW540A2-□**U**, **FPW540C2-**□**E**, **FPW540S2-**□

Motor: FPW540A2- \square , FPW540C2- \square , FPW540S2- \square

Mass: 4.0 kg **CAD** A227





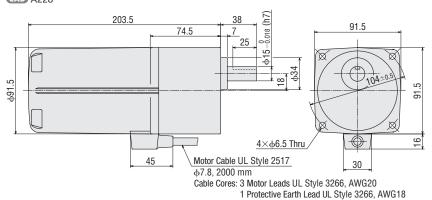


60 W

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

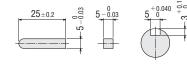
Motor: FPW560A2-□, FPW560C2-□, FPW560S2-□

Mass: 5.0 kg **CAD** A228



♦ Key and Key Slot (Included)

Customer Support Centre Singapore: \$\tilde{1}800-8420280\$, Malaysia: \$\tilde{1}800-806161\$, Others: \$\tilde{6}+65-6842-0280\$

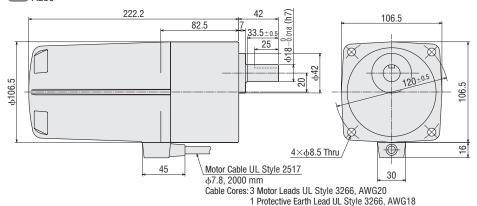


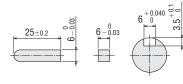
90 W

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

Motor: FPW690A2- \square , FPW690C2- \square , FPW690S2- \square

Mass: 7.5 kg **CAD** A256





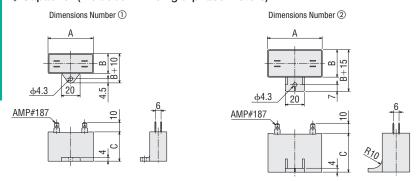
Mounting Screws (Material: Stainless Steel)



	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.

○Capacitor (Included with single-phase motors)



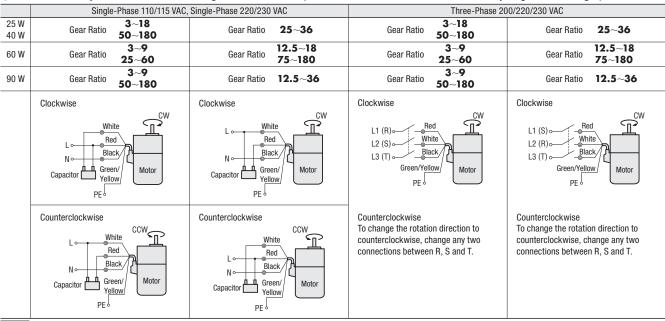
Capacitor Dimensions (mm)

Product Name	Capacitor Product Name	А	В	С	Mass (g)	Dimensions No.	
FPW425A2-□U	CH65CFAUL2	48	19	29	35	(1)	
FPW425C2-□E	CH15BFAUL	38	21	31	37		
FPW540A2-□U	CH90CFAUL2	48	22.5	31.5	45	(1)	
FPW540C2-□E	CH23BFAUL	48	21	31	43		
FPW560A2-□U	CH120CFAUL2	58	22	35	60	0	
FPW560C2-□E	CH30BFAUL	58	21	31	50	1	
FPW690A2-□U	CH180CFAUL2	58	29	41	92		
FPW690C2-□E	CH45BFAUL	58	23.5	37	73	2	

- A capacitor cap is included with the capacitor.
- lacksquare A number indicating the gear ratio is entered where the box \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.



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.

