

ORIENTAL MOTOR CATALOG



Washdown Motors

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WASHDOWN MOTORS

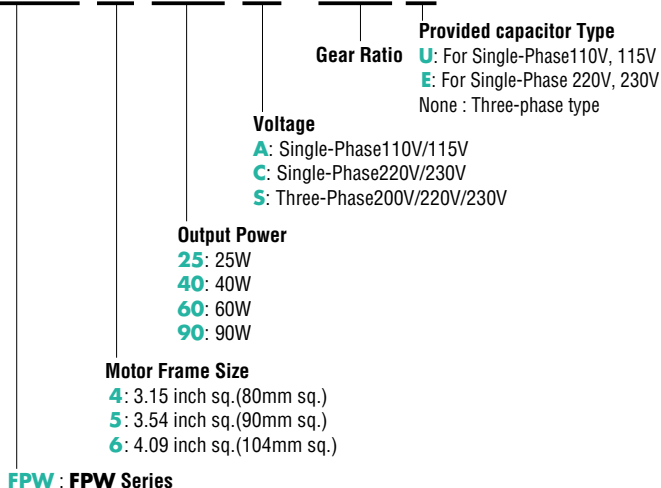
FPW Series

The **FPW Series** motors are splashproof, dust-resistant geared induction motors which conform to the IEC standard IP65. They can be used where they are periodically splashed or washed with water. These washdown induction motors, which are ideal for devices whose movement is in one direction, are available in 25W, 40W, 60W and 90W models.



■ Product Number Code

FPW 4 25 A - 15 U



The "U" and "E" at the end of the model name (ordering name) indicate that the unit includes a capacitor. These two letters are not inscribed on the motor nameplate.

■ Features

● Dust-resistant, Splashproof Geared Motors

Both the motor and gearhead are constructed to be splashproof. They are delivered together in a single unit as a geared motor in order to ensure a proper seal.

● Special Construction for Splashproof and Dust-resistant Performance

The construction provides dependable resistance against dust and water by using a specially constructed cable outlet, oil seals on the output shaft, an O-ring in the case/gearhead junction and no external screws.

A special coating and a stainless steel (SUS303 type) shaft provides better anticorrosion protection against both fresh and salt water. The paint is also water repellent.

IP65: The letters "IP" stand for "Ingress Protection" and are followed by two numerical digits which indicate degrees of protection against solid objects and moisture. They are part of the IEC and DIN standards.

FPW series IP65 protection are UL recognized (UL File No.E166348).

A grade of IP65 indicates total dust resistance (the highest grade for protection against contact and intrusion of foreign matter is a "6"), and protection against water jets from all directions (a "5"). This means the structure can be used even when the motor is splashed with water from any direction by a nozzle.

Testing Conditions : A nozzle with an internal diameter of 6.3 mm was used to douse the test specimen from all directions with water at a pressure of 30 kPa and flow of 12.5 l/min for three minutes at a distance of 3 meters. No abnormalities were found.

● Superb anti-corrosion properties

High corrosion resistance achieved through special paint coating and stainless shaft.

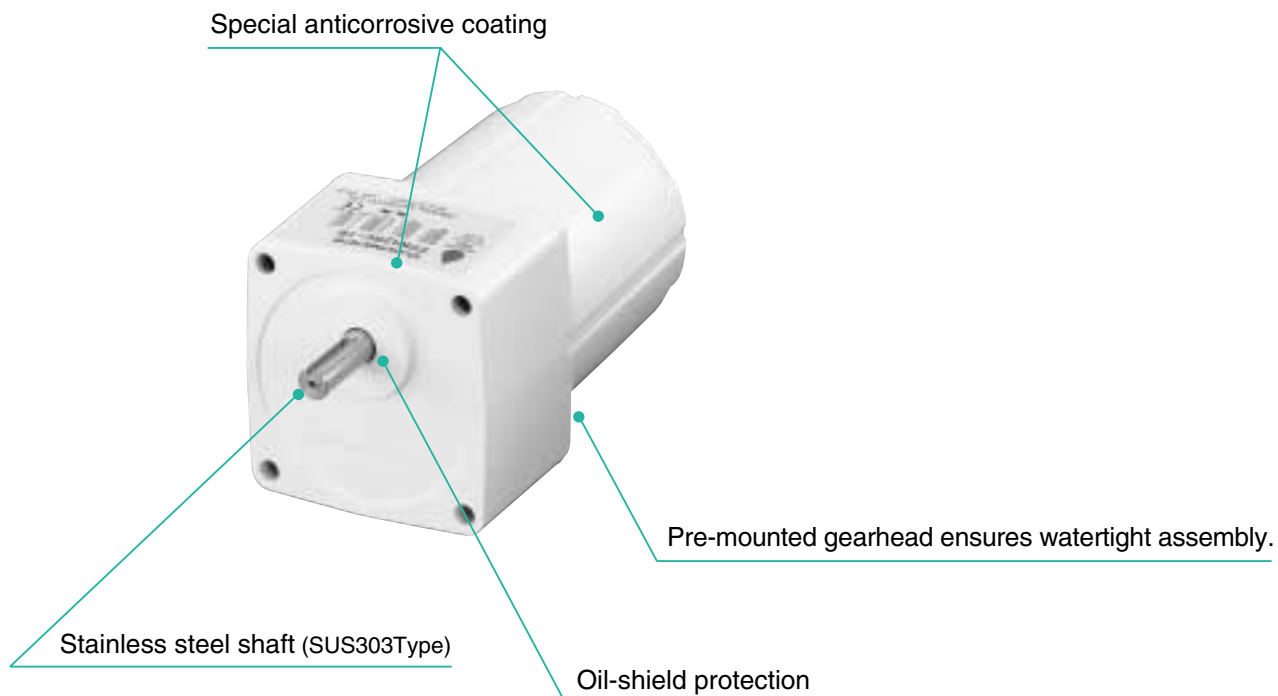
■ Precautions

- Cannot be used under water.
- Connect the ground wire to the ground.

■ Safety Standards and CE Marking

Standards	Certification Body	Standard File No.	CE Marking
UL1004			
UL2111	UL	E 64197	Low Voltage
CAN/CSA-C22.2No.100			Directives
CAN/CSA-C22.2No.77			

■ Designed and Constructed for Dust-and Water-Resistance



■ Construction



■ Types

Output Power	Voltage	Model
25W	Single-Phase 110V/115V	FPW425A-□U
	Single-Phase 220V/230V	FPW425C-□E
	Three-Phase 200V/220V/230V	FPW425S-□

Output Power	Voltage	Model
40W	Single-Phase 110V/115V	FPW540A-□U
	Single-Phase 220V/230V	FPW540C-□E
	Three-Phase 200V/220V/230V	FPW540S-□

Output Power	Voltage	Model
60W	Single-Phase 110V/115V	FPW560A-□U
	Single-Phase 220V/230V	FPW560C-□E
	Three-Phase 200V/220V/230V	FPW560S-□

Output Power	Voltage	Model
90W	Single-Phase 110V/115V	FPW690A-□U
	Single-Phase 220V/230V	FPW690C-□E
	Three-Phase 200V/220V/230V	FPW690S-□

● Enter the gear ratio in the box (□) within the model number. Eleven gear ratios are available.

■ General Specifications

Item	Specifications
Insulation Resistance	100MΩ or more when 500V DC is applied between the windings and the frame under normal ambient temperature and humidity.
Dielectric Strength	Sufficient to withstand 1.5kV at 50Hz and 60Hz applied between the windings and the frame under normal ambient temperature and humidity.
Temperature Rise	144°F (80°C) or less measured by the resistance change method after the temperature of the coil has stabilized under normal operation at the rated voltage and frequency.
Insulation Class	Class B (266°F [130°C])
Overheat Protection	Built-in thermal protector (Automatic return type) Operating temperature, open :266°F±9°F (130°C±5°C) close : 179.6°F±27°F (82°C±15°C)
Ambient Temperature Range	14°F~104°F(-10°C~+40°C), [Three-Phase 200V : 14°F-122°F(-10°~+50°C)]
Degree protection	IP65

- Since these are special splashproof, dust-resistant, geared motors, the motor and gear sections cannot be disassembled.
- The capacitors for the motors are neither dustproof nor waterproof.

■ Permissible Overhung Load-Permissible Thrust Load

Unit=lb(N)

Model	Gear Ratio	3.6	6	9	15	18	30	36	60	90	120	180	
		Permissible Thrust Load											
FPW425 type		11(50)											
	Permissible Overhung Load	22(100)					44(200)						
FPW540 type	Permissible Thrust Load	22(100)											
	Permissible Overhung Load	55(250)					66(300)						
FPW560 type	Permissible Thrust Load	33(150)											
	Permissible Overhung Load	88(400)			99(450)			110(500)					
FPW690 type	Permissible Thrust Load	44(200)											
	Permissible Overhung Load	121(550)			143(650)								
		176(800)			220(1000)								

- The condition of the distance from shaft end on Permissible Overhung Load;
The upper section=0.394 inch (10mm)
The lower section=0.787 inch (20mm)

■ Permissible Inertial Load (J)

Unit=Upper Values:lb-in²/Lower values:×10⁻⁴kgm²

Model	Gear Ratio	3.6	6	9	15	18	30	36	60	90	120	180
FPW425 type		1.3	3.6	8.1	22.5	32.4	90	130	250	250	250	250
		4.02	11.2	25.1	69.8	100	279	402	775	775	775	775
FPW540 type		3.24	9	20.3	56.3	81	225	324	625	625	625	625
		9.72	27	60.8	169	243	675	972	1875	1875	1875	1875
FPW560 type		5.05	14	31.6	87.8	126	351	505	975	975	975	975
		14.3	39.6	89.1	248	356	990	1426	2750	2750	2750	2750
FPW690 type		5.05	14	31.6	87.8	126	351	505	975	975	975	975
		14.3	39.6	89.1	248	356	990	1426	2750	2750	2750	2750

■ Specifications-Continuous Rating

Model	Output Power		Voltage V	Frequency Hz	Current A	Starting Torque		Rated Torque		Rated Speed r/min	Capacitor μ F
	HP	W				oz-in	mN•n	oz-in	mN•n		
ⓉP FPW425A-□U	1/30	25	Single-phase 110	60	0.46	16.7	120	23.6	170	1450	6.5
			Single-phase 115	60	0.46	16.7	120	23.6	170	1450	6.5
ⓉP FPW425C-□E	1/30	25	Single-phase 220	60	0.22	16.7	120	23.6	170	1450	1.5
			Single-phase 230	50	0.24	16.7	120	28.5	205	1200	1.5
			Single-phase 230	60	0.22	16.7	120	23.6	170	1450	1.5
ⓉP FPW425S-□	1/30	25	Three-phase 200	50	0.23	33.3	240	26.4	190	1300	—
			Three-phase 200	60	0.21	22.2	160	22.2	160	1550	—
			Three-phase 220	60	0.21	22.2	160	22.2	160	1600	—
			Three-phase 230	60	0.22	22.2	160	22.2	160	1600	—
ⓉP FPW540A-□U	1/18.5	40	Single-phase 110	60	0.68	27.8	200	36.1	260	1500	9
			Single-phase 115	60	0.67	27.8	200	36.1	260	1500	9
ⓉP FPW540C-□E	1/18.5	40	Single-phase 220	60	0.35	27.8	200	36.1	260	1500	2.3
			Single-phase 230	50	0.39	27.8	200	41.7	300	1300	2.3
			Single-phase 230	60	0.34	27.8	200	36.1	260	1500	2.3
ⓉP FPW540S-□	1/18.5	40	Three-phase 200	50	0.32	55.5	400	41.7	300	1300	—
			Three-phase 200	60	0.30	36.1	260	36.1	260	1550	—
			Three-phase 220	60	0.30	36.1	260	36.1	260	1600	—
			Three-phase 230	60	0.31	36.1	260	36.1	260	1600	—
ⓉP FPW560A-□U	1/12.5	60	Single-phase 110	60	1.04	41.7	300	56.2	405	1450	12
			Single-phase 115	60	1.02	41.7	300	56.2	405	1450	12
ⓉP FPW560C-□E	1/12.5	60	Single-phase 220	60	0.48	41.7	300	56.2	405	1450	3
	1/13.5	55	Single-phase 230	50	0.51	41.7	300	59.7	430	1250	3
	1/12.5	60	Single-phase 230	60	0.47	41.7	300	56.2	405	1450	3
ⓉP FPW560S-□	1/12.5	60	Three-phase 200	50	0.48	83.3	600	62.5	450	1300	—
			Three-phase 200	60	0.43	69.4	500	52.8	380	1550	—
			Three-phase 220	60	0.44	69.4	500	52.8	380	1600	—
			Three-phase 230	60	0.45	69.4	500	52.8	380	1600	—
ⓉP FPW690A-□U	1/8	90	Single-phase 110	60	1.54	55.5	400	81.2	585	1500	18
			Single-phase 115	60	1.51	55.5	400	81.2	585	1500	18
ⓉP FPW690C-□E	1/8	90	Single-phase 220	60	0.68	55.5	400	84.0	605	1450	4
			Single-phase 230	50	0.69	55.5	400	97.2	700	1250	4
			Single-phase 230	60	0.66	55.5	400	84.0	605	1450	4
ⓉP FPW690S-□	1/8	90	Three-phase 200	50	0.54	97.2	700	94.4	680	1300	—
			Three-phase 200	60	0.51	97.2	700	79.2	570	1550	—
			Three-phase 220	60	0.50	97.2	700	79.2	570	1600	—
			Three-phase 230	60	0.49	97.2	700	79.2	570	1600	—

ⓉP : The motors contain built-in thermal protectors. 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.

● Enter the gear ratio in the box □ within the model number. There are 11 ratios available, ranging from 3.6 to 180.

The "U" and "E" at the end of the model name (ordering name) indicate that the unit includes a capacitor. These two letters are not inscribed on the motor nameplate.

■ Gearmotor-Torque Table

● Single-phase 115V / 230V 60Hz, Three-phase 230V 60Hz

Unit=Upper value : lb-in
Lower value : N•m

Model	Speed r/min Gear Ratio	500	300	200	120	100	60	50	30	20	15	10
		3.6	6	9	15	18	30	36	60	90	120	180
FPW425A-□U	Rated Torque	4.3	7.2	10.4	18.3	21.7	32.2	39.1	58.3	69.6	69.6	69.6
		0.5	0.83	1.2	2.1	2.5	3.7	4.5	6.7	8	8	8
FPW425C-□E	Starting Torque	3.0	5.0	7.6	13	14.8	22.6	27.8	41.7	61.7	69.6	69.6
		0.35	0.58	0.87	1.5	1.7	2.6	3.2	4.8	7.1	8	8
FPW425S-□	Rated Torque	4.1	6.8	10.4	16.5	20	30.4	36.5	54.8	69.6	69.6	69.6
	Starting Torque	0.47	0.78	1.2	1.9	2.3	3.5	4.2	6.3	8	8	8
FPW540A-□U	Rated Torque	6.6	11.3	16.5	27.8	33	49.6	59.1	87	87	87	87
		0.76	1.3	1.9	3.2	3.8	5.7	6.8	10	10	10	10
FPW540C-□E	Starting Torque	5.0	8.4	13	20.9	25.2	38.3	46.1	68.7	87	87	87
		0.58	0.97	1.5	2.4	2.9	4.4	5.3	7.9	10	10	10
FPW540S-□	Rated Torque	6.6	11.3	16.5	27.8	33	49.6	59.1	87	87	87	87
	Starting Torque	0.76	1.3	1.9	3.2	3.8	5.7	6.8	10	10	10	10
FPW560A-□U	Rated Torque	10.4	17.4	26.1	38.3	46.1	69.6	83.5	130.4	130.4	130.4	130.4
		1.2	2.0	3.0	4.4	5.3	8.0	9.6	15	15	15	15
FPW560C-□E	Starting Torque	7.6	13	19.1	28.7	34	51.3	61.7	103.5	130.4	130.4	130.4
		0.87	1.5	2.2	3.3	3.9	5.9	7.1	11.9	15	15	15
FPW560S-□	Rated Torque	9.6	15.7	24.3	36.5	43.5	65.2	78.3	130.4	130.4	130.4	130.4
	Starting Torque	1.1	1.8	2.8	4.2	5	7.5	9.0	15	15	15	15
FPW690A-□U	Rated Torque	14.8	24.3	37.4	55.5	67	111.3	133.9	201.7	260.9	260.9	260.9
		1.7	2.8	4.3	6.4	7.7	12.8	15.4	23.2	30	30	30
FPW690C-□E	Starting Torque	10.4	16.5	25.2	38.3	46.1	76.5	91.3	137.4	207	260.9	260.9
		1.2	1.9	2.9	4.4	5.3	8.8	10.5	15.8	23.8	30	30
FPW690S-□	Rated Torque	15.7	25.2	38.3	57.4	68.7	114.8	138.3	208.7	260.9	260.9	260.9
	Starting Torque	1.8	2.9	4.4	6.6	7.9	13.2	15.9	24	30	30	30
FPW690C-□E	Starting Torque	10.4	16.5	25.2	38.3	46.1	76.5	91.3	137.4	207	260.9	260.9
		1.2	1.9	2.9	4.4	5.3	8.8	10.5	15.8	23.8	30	30
FPW690S-□	Rated Torque	14.8	24.3	36.5	53.9	65.2	108.7	130.4	196.5	260.9	260.9	260.9
	Starting Torque	1.7	2.8	4.2	6.2	7.5	12.5	15	22.6	30	30	30

● Enter the gear ratio in the box (□) within the model number.

● The speed is calculated by dividing the motor's synchronous speed (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.

● Single-phase 230V 50Hz

Unit=Upper value : lb-in
Lower value : N•m

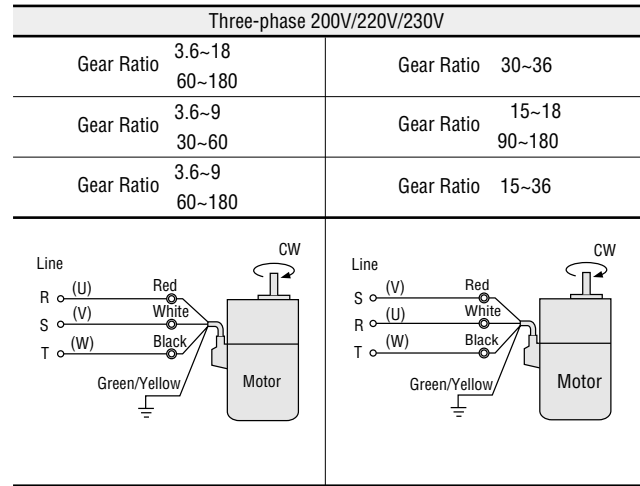
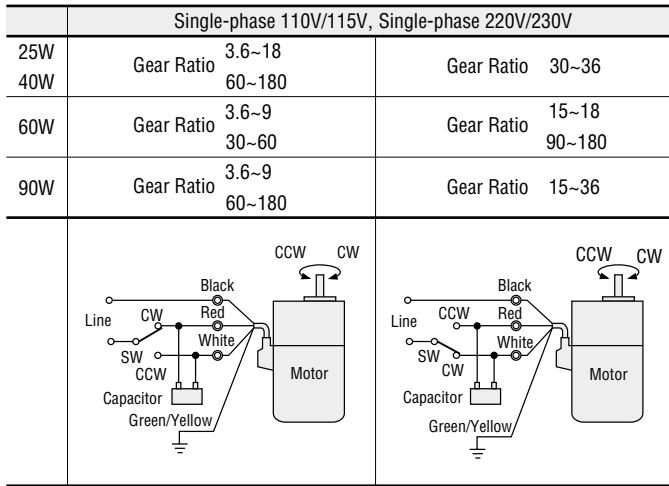
Model	Speed r/min Gear Ratio	417	250	167	100	83	50	42	25	17	12.5	8.3
		3.6	6	9	15	18	30	36	60	90	120	180
FPW425C-□E	Rated Torque	5.2	8.7	13	21.7	26.1	39.1	47	69.6	69.6	69.6	69.6
		0.6	1	1.5	2.5	3.0	4.5	5.4	8	8	8	8
FPW540C-□E	Starting Torque	3.0	5.0	7.6	13	14.8	22.6	27.8	41.7	61.7	69.6	69.6
		0.35	0.58	0.87	1.5	1.7	2.6	3.2	4.8	7.1	8	8
FPW540C-□E	Rated Torque	7.6	13	19.1	31.3	38.3	57.4	68.7	87	87	87	87
		0.87	1.5	2.2	3.6	4.4	6.6	7.9	10	10	10	10
FPW540C-□E	Starting Torque	5.0	8.4	13	20.9	25.2	38.3	46.1	68.7	87	87	87
		0.58	0.97	1.5	2.4	2.9	4.4	5.3	7.9	10	10	10
FPW560C-□E	Rated Torque	11.3	18.3	27	40.9	49.6	73.9	88.7	130.4	130.4	130.4	130.4
		1.3	2.1	3.1	4.7	5.7	8.5	10.2	15	15	15	15
FPW560C-□E	Starting Torque	7.6	13	19.1	28.7	33.9	51.3	61.7	103.5	130.4	130.4	130.4
		0.87	1.5	2.2	3.3	3.9	5.9	7.1	11.9	15	15	15
FPW690C-□E	Rated Torque	17.4	29.6	44.3	67	80	133	160	240.9	260.9	260.9	260.9
		2.0	3.4	5.1	7.7	9.2	15.3	18.4	27.7	30	30	30
FPW690C-□E	Starting Torque	10.4	16.5	25.2	38.3	46.1	76.5	91.3	137.4	207	260.9	260.9
		1.2	1.9	2.9	4.4	5.3	8.8	10.5	15.8	23.8	30	30

● Enter the gear ratio in the box within (□) the model number.

● The speed is calculated by dividing the motor's synchronous speed (50 Hz : 1500 r/min) by the gear ratio.
The actual speed is 2~20% less than the displayed value, depending on the size of the load.

■ Wiring Diagrams

Direction of rotation shown is for the motor shaft rotation as seen from the motor shaft side.



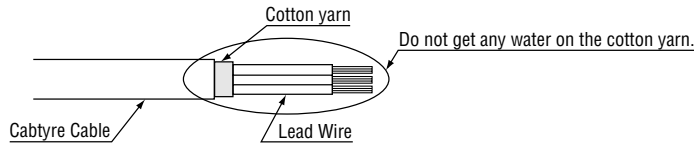
To rotate the motor in a clockwise (CW) direction, flip switch SW to CW.
To rotate it in a counterclockwise (CCW) direction, flip switch SW to CCW.

To change the rotation, change any two connections between U, V and W.

Note : Change the direction of 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.
For added safety, it is advisable to use a ground fault interrupt circuit (GFI) in situations where the motor is likely to get wet during operation.

Wiring precautions

The terminals of the cabtyre cable are not waterproofed.



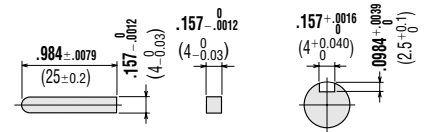
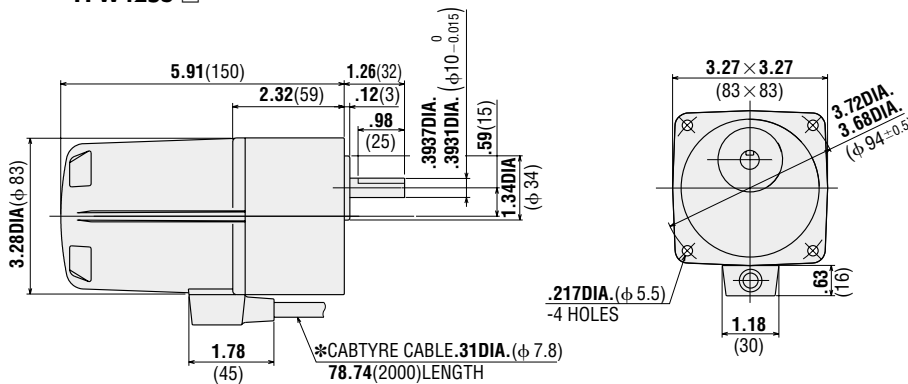
■ Dimensions

Scale 1/4, Unit = inch (mm)

FPW425A-□U
FPW425C-□E
FPW425S-□

Weight (Mass) : 6.6 lb. (3.0kg)

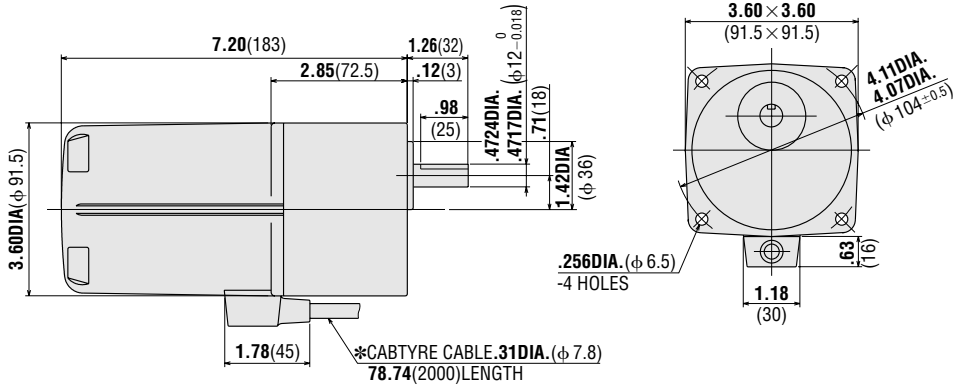
● **Key and Key Slot** (Scale 1/2)
(The key is provided with motor.)
For 25W, 40W type



* Cable cores
Motor Lead wire × 3 UL Style 3266, AWG20
Ground Lead wire × 1 UL Style 3266, AWG18

FPW540A-□U
FPW540C-□E
FPW540S-□

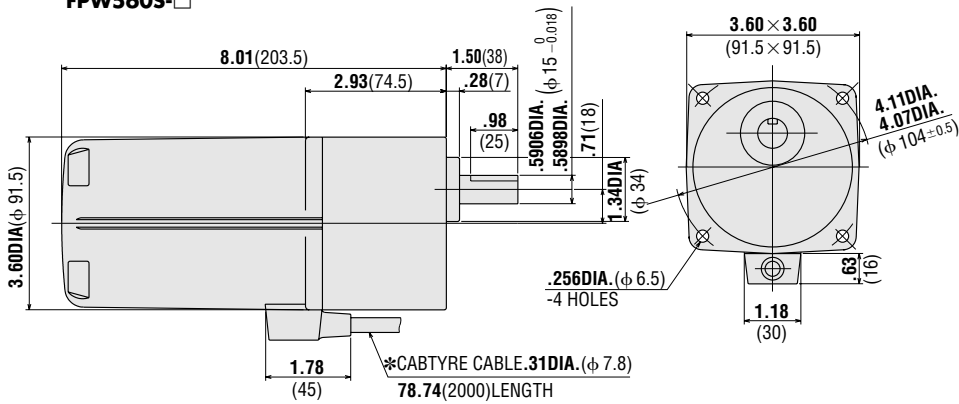
Weigh (Mass): 8.8lb.(4.0kg)



* Cable cores
 Motor Lead wire × 3 UL Style 3266, AWG20
 Ground Lead wire × 1 UL Style 3266, AWG18

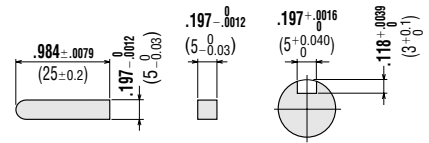
FPW560A-□U
FPW560C-□E
FPW560S-□

Weigh (Mass): 11lb.(5.0kg)



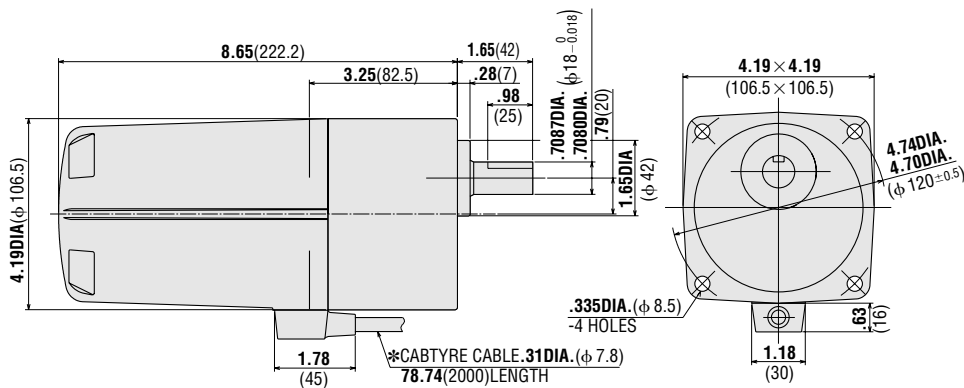
* Cable cores
 Motor Lead wire × 3 UL Style 3266, AWG20
 Ground Lead wire × 1 UL Style 3266, AWG18

● Key and Key Slot (Scale 1/2)
 (The key is provided with motor.)
 For 60W



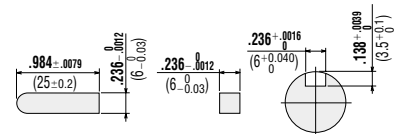
FPW690A-□U
FPW690C-□E
FPW690S-□

Weigh (Mass): 16.5lb.(7.5kg)

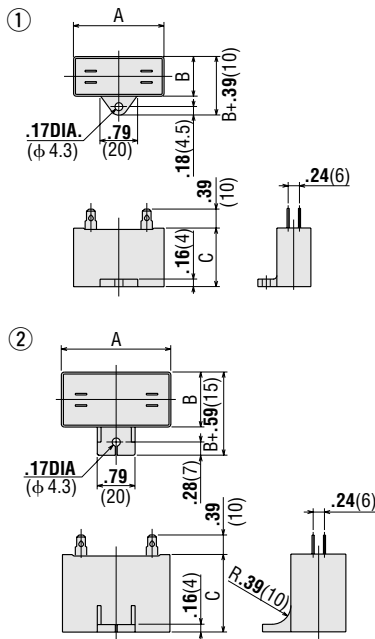


* Cable cores
 Motor Lead wire × 3 UL Style 3266, AWG20
 Ground Lead wire × 1 UL Style 3266, AWG18

● Key and Key Slot (Scale 1/2)
 (The key is provided with motor.)
 For 90W



● **Capacitor** (included with the motor)

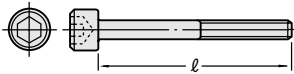


Unit=inch(mm)

Model	Capacitor Model	A	B	C	Mass oz(g)	No.
FPW425A-□U	CH65CFAUL	1.50 (38)	.83 (21)	1.22 (31)	1.23 (35)	①
FPW425C-□E	CH15BFAUL	1.50 (38)	.83 (21)	1.22 (31)	1.23 (35)	
FPW540A-□U	CH90CFAUL	1.89 (48)	.83 (21)	1.22 (31)	1.41 (40)	①
FPW540C-□E	CH23BFAUL	1.89 (48)	.83 (21)	1.22 (31)	1.41 (40)	
FPW560A-□U	CH120CFAUL	2.28 (58)	.83 (21)	1.22 (31)	1.76 (50)	①
FPW560C-□E	CH30BFAUL	2.28 (58)	.83 (21)	1.22 (31)	1.76 (50)	
FPW690A-□U	CH180CFAUL	2.28 (58)	.93 (23.5)	1.46 (37)	2.47 (70)	②
FPW690C-□E	CH40BFAUL	2.28 (58)	.93 (23.5)	1.46 (37)	2.47 (70)	

* Capacitor cap is provided with the capacitor.

● **Screws** (material: stainless steel)



	l	Size of Screws
FPW425 Type	3.15 inch(80mm)	M5 P0.8
FPW540 Type	3.54 inch(90mm)	M6 P1.0
FPW560 Type	3.54 inch(90mm)	M6 P1.0
FPW690 Type	3.94 inch(100mm)	M8 P1.25

4 washes and 4 hexagonal nuts are provided with the screws.

■ **Accessories (sold separately)**

● **Power Relay Box and Extension cables**

A power relay box and a water-resistant extension cable are available. See page [A-272] for more information.



● Power relay box **TB4-0608**

● Extension cable **CC05AC43P** (4cores, 5m)
CC10AC43P (4cores, 10m)

