General Specifications

World K Series - 1 W, 3 W Type

Item	Specifications
Insulation Resistance	100 MΩ or more when 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	A gearhead or equivalent heat sink※1 is connected and the winding temperature rise is measured at 75°C or less using the resistance change method after rated operation under normal ambient temperature and humidity.
Insulation Class	UL/CSA Standards: 105(A), EN Standards: 120(E)
Overheat Protection Device	Impedance Protected
Operating Ambient Temperature	−10 to +40°C (non-freezing)
Operating Ambient Humidity	85% or less (non-condensing)
Degree of Protection	IP20

World K Series - 6 W to 90 W Type

Item	Specifications
Insulation Resistance	100 MΩ or more when 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 (2 kVAC for three-phase 380/400/415 VAC) 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	A gearhead or equivalent heat sink※1 is connected and 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.
Insulation Class	130 (B)
Overheat Protection Device	6 W Type Impedance Protected Other type Built-in Thermal Protector (Automatic return type) Open: 130±5°C, Close: 85±20°C
Operating Ambient Temperature	−10 to +40°C (Three-Phase 200 VAC: −10 to +50°C) (non-freezing)
Operating Ambient Humidity	85% or less (non-condensing)
Degree of Protection	Lead Wire Type :IP20 Terminal Box Type :IP54※2 (Except for the installation surface)

※1 Heat sink size (Material: Aluminum)

Motor Type	Size (mm)	Thickness (mm)
1 W, 3 W Type	80×80	5
6 W Type	115×115	
15 W Type	125×125	
25 W Type	135×135	
40 W Type	165×165	
60 W, 90 W Type	200×200	

※2 6 W Type: This classification applies when a cable with a diameter of ϕ8.5 is used. In other cases, the classification is IP40.

Permissible Overhung Load and Permissible Thrust Load of Motors

Permissible Overhung Load

Motor			Permissible Overhung Load N	
Frame Size □ (mm)	Output Shaft Diameter ϕ (mm)	Series Name	From the Shaft End 10 mm	From the Shaft End 20 mm
42	5	World **K**	40	–
60	6	World **K**	50	110
70	6	World **K**	40	60
80	8	World **K**	90	140
90	10	World **K**	140	200
	12	World **K**	240	270
104	14	**BH**	320	350

Permissible Thrust Load

Permissible Thrust Load: Avoid thrust loads as much as possible. If thrust load is unavoidable, keep it at half or less of the motor mass.

Permissible Overhung Load and Permissible Thrust Load of Gearheads

Product Name	Gear Ratio	Maximum Permissible Torque N·m	Permissible Overhung Load N		Permissible Thrust Load N
			10 mm from Shaft End	20 mm from Shaft End	
0GN□K	**3**–**180**	1.0	20	–	15
2GN□KF	**3**–**18**	3.0	50	80	30
	25–**180**		120	180	
3GN□KF	**3**–**18**	5.0	80	120	40
	25–**180**		150	250	
4GN□KF	**3**–**18**	8.0	100	150	50
	25–**180**		200	300	
5GN□KF	**3**–**18**	10	250	350	100
	25–**180**		300	450	
5GE□KBF	**3**–**9**	20	400	500	150
5GU□KB	**12.5**–**18**		450	600	
5GU□K	**25**–**180**		500	700	
5GU□KBH	**50**–**180**	30	400	600	150
BH6G2-□	**3**–**36**	40	550	800	200
	50–**180**		650	1000	
BH6G2-□RH	**5**–**36**	60	1200※	1100※	300
	50–**180**		2200※	2000※	
BH6G2-□RA	**5**–**36**	60	900	1000	300
	50–**180**		1700	1850	
FPW425□	**3**–**18**	8.0	100	150	50
	25–**180**		200	300	
FPW540□	**3**–**18**	10	250	350	100
	25–**180**		300	450	
FPW560□	**3**–**9**	15	400	500	150
	12.5–**18**		450	600	
	25–**180**		500	700	
FPW690□	**3**–**9**	30	550	800	200
	12.5–**180**		650	1000	

※A number indicating the gear ratio is specified in the box□ in the product name.

※With **BH6G2-□RH**, the permissible overhung load is for the distance measured from the flange-installation surface.
The permissible overhung load at each distance can also be calculated with a formula. → Page A-17

◇Calculating the Permissible Overhung Load for the Hollow Shaft Type

When one end of the load shaft is not supported by a bearing unit as shown in the figure to the right, calculate the permissible overhung load using the following formula. (This mechanism experiences the highest amount of overhung load.)

BH6G2-□RH

- Gear Ratio of **5** to **36**

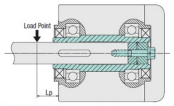
Permissible Overhung Load W [N] $= \dfrac{87.5}{87.5+L_P} \times 1350$ [N]

1350 [N]: Permissible overhung load at the flange-installation surface

- Gear Ratio of **50** to **180**

Permissible Overhung Load W [N] $= \dfrac{87.5}{87.5+L_P} \times 2450$ [N]

2450 [N]: Permissible overhung load at the flange-installation surface



Lp [mm]: Distance from flange-installation surface to overhung load point

Permissible Load Inertia: J of Gearhead

When a high load inertia is connected to a gearhead, high torque is exerted instantaneously on the gearhead during starting in frequent and intermittent operations (or during stopping by an electromagnetic brake or instantaneous stopping by a brake pack). Exposure to excessive impact can damage the gearhead or motor.
The table below gives values for the permissible load inertia at the motor shaft. Use the motor and gearhead within these parameters. The permissible load inertia for three-phase motors is the value when reversing after a stop.
The permissible load inertia at the output shaft of the gearhead is calculated with the formula below.
The life of a gearhead when operating at the permissible load inertia with instantaneous stopping for electromagnetic brake type motors, brake pack or speed control motors is approximately two million cycles.

Permissible Load Inertia at the Gearhead Output Shaft

Gear ratio of 1/3 to 1/50	$J_G = J_M \times i^2$	J_G : Permissible load inertia at the gearhead output shaft J ($\times 10^{-4}$ kg·m²)
Gear ratio of 1/60 or less	$J_G = J_M \times 2500$	J_M : Permissible load inertia at the motor shaft J ($\times 10^{-4}$ kg·m²)
		i : Gear ratio (Example: i=3 means a gear ratio of 1/3)

Permissible Load Inertia at the Motor Shaft

Number of Phases	Frame Size	Output Power (W)	Permissible Load Inertia at the Motor Shaft J ($\times 10^{-4}$ kg·m²)
Single-Phase	42 mm Sq.	1 W, 3 W	0.016
	60 mm Sq.	6 W	0.062
	70 mm Sq.	15 W	0.14
	80 mm Sq.	25 W	0.31
	90 mm Sq.	40 W	0.75
		60 W	1.1
		90 W	1.1
	104 mm Sq.	200 W	2
Three-Phase	60 mm Sq.	6 W	0.062
	70 mm Sq.	15 W	0.14
	80 mm Sq.	25 W	0.31
	90 mm Sq.	40 W	0.75
		60 W	1.1
		90 W	1.1
	104 mm Sq.	200 W	2