

DKM AC/DC SMALL PRECISION GEARED MOTOR



DKM

Product Coding System

Motor

9 I D G A - 90 F P - A T

Brand
D : DKM

Shaft Type
G : Pinion Shaft (For GEARHEAD)
S : Round Shaft ○
D : D-Cut Shaft ◐
K : Key Type Shaft ⊕

Motor
I : Induction motor
R : Reversible motor
S : Speed control motor
SR : Speed control Reversible motor
SB : Speed control Brake motor
B : Electro magnetic Brake motor
T : Torque motor
CI : Clutch&brake type Induction motor
CS : Clutch&brake type Speed control motor
V : Inverter Motor

Output
6 : 6W 90 : 90W
10 : 10W 120 : 120W
15 : 15W 150 : 150W
25 : 25W 180 : 180W
40 : 40W 200 : 200W
60 : 60W

Phase & Voltage
1 : Single phase 110V 60Hz
2 : Single phase 220V 60Hz
3 : Three phase 220V 60Hz
4 : Three phase 380V 60Hz
5 : Three phase 440V 60Hz
6 : Three phase 220V/380V 60Hz
7 : Three phase 220V/440V 60Hz
A : Single phase 110V 60Hz
B : Single phase 115V 60Hz
C : Single phase 220V 50Hz
D : Single phase 220V 60Hz
E : Single phase 230V 50Hz
F : Single phase 230V 60Hz
G : Three phase 220V 50Hz
H : Three phase 220V 60Hz
I : Three phase 230V 50Hz
J : Three phase 230V 60Hz
K : Three phase 380V 50Hz
L : Three phase 380V 60Hz
M : Three phase 400V 50Hz
N : Three phase 440V 50Hz
O : Three phase 440V 60Hz
P : Three phase 220V/380V 50Hz
Q : Three phase 220V/440V 50Hz
R : Three phase 220V/380V 60Hz
S : Three phase 220V/240V 60Hz
T : Single phase 110V 50Hz

Pole
A : 2 pole
No mark : 4 pole

Connection type
T : Terminal Box Type
No mark : Lead Wire Type

Attaching Gearhead Type
G : General Gearhead (6~60W)
& X 10 Inter-decimal Gearhead
P : Powerful Gearhead (over 60W, 15mm shaft)
H : High Powerful (18mm shaft)
W : Worm Solid type gear
WH : Worm Hollow type gearhead

Fan Type
F : General Fan (self cooling)
F2 : Powerful Fan (separate fan motor)
Separate from motor shaft with powerful cooling effect. Attachment is available in all kind of motors.
No mark : No fan

Motor Frame Size
6 : □60mm sq. (2.36 in.sq.) (6W)
7 : □70mm sq. (2.76 in.sq.) (6~15W)
8 : □80mm sq. (3.15 in.sq.) (15~25W)
9 : □90mm sq. (3.54 in.sq.) (40~200W)

For Korean domestic market
For overseas market

Parallel Gearhead

9 P B K 36 B H

Gear Ratio
(36 : 1/36)

Input Gear Type
H : Helical Gear

Bearing Type
B : Ball Bearing
BM : Ball Bearing + Metal Bearing
M : Metal Bearing

Output Shaft Type
K : Key Type ⊕
D : D-cut Type ◐
S : Round Type ○

Frame Type (G, P, H type gear)
B : Box Type(Square Box type) □
F : Flange Type(only available in 'P' type>'9PF-' ⊕

Gear Type
G : General Gear (for 6 ~ 40W) (permissible torque : 100KgfcM)
P : Powerful gear (for 60 ~ 200W) (permissible torque : 200KgfcM)
H : High powerful gear (for 90~200W) (permissible torque : 300KgfcM)

Frame Size
6 : □60mm sq. (2.36 in.sq.) (6W)
7 : □70mm square (2.76 in.sq.) (6~15W)
8 : □80mm square (3.15 in.sq.) (15~25W)
9 : □90mm square (3.54 in.sq.) (40~200W)

Worm Gearhead

9 W D 30 B L

Gear Ratio
(30 : 1/30)

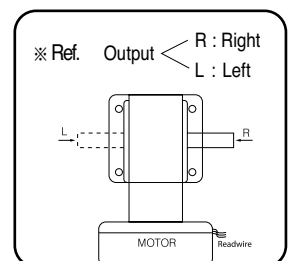
Direction of output
L : Left
R : Right
L/R : Bi-directional
※ No mark in Worm Hollow type

Bearing TYPE
B : Ball Bearing
※ No mark in Worm Hollow type

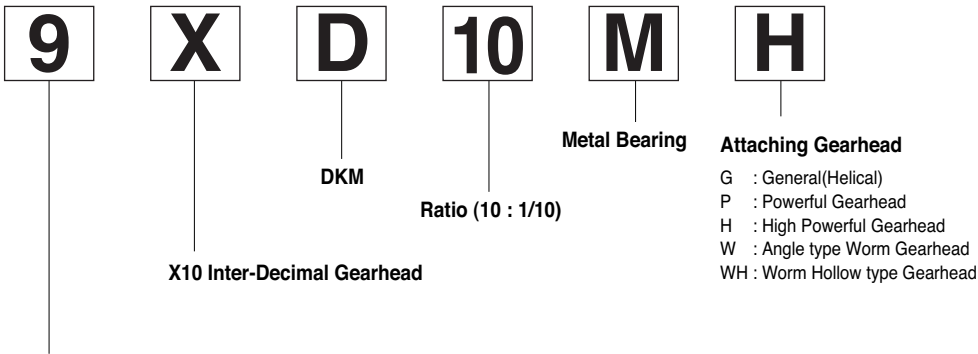
BRAND
D : DKM

Gearhead Type
W : Worm Solid type (6~60W)
WH : Worm Hollow type (60~200W)

Frame Size
8 : □80mm square (3.15 in.sq.) (15~25W)
9 : □90mm square (3.54 in.sq.) (40~200W)
※ Worm Hollow Gearhead is 90mm.



■ X10 Inter - Decimal Gearhead



Frame Size

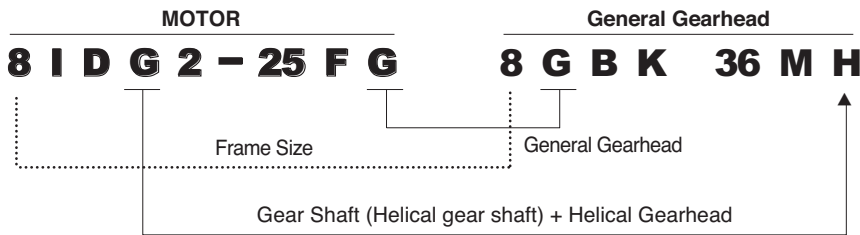
- 8 : □ 80mm sq. (3.15 in.sq.) (15~25W)
- 9 : □ 90mm sq. (3.54 in.sq.) (40~200W)

- In case of exceeding 200:1 ratio, please use X10 Inter-decimal gearhead with general gearhead. And please be advised that in this case only speed will reduce by 10:1 without torque increasing.

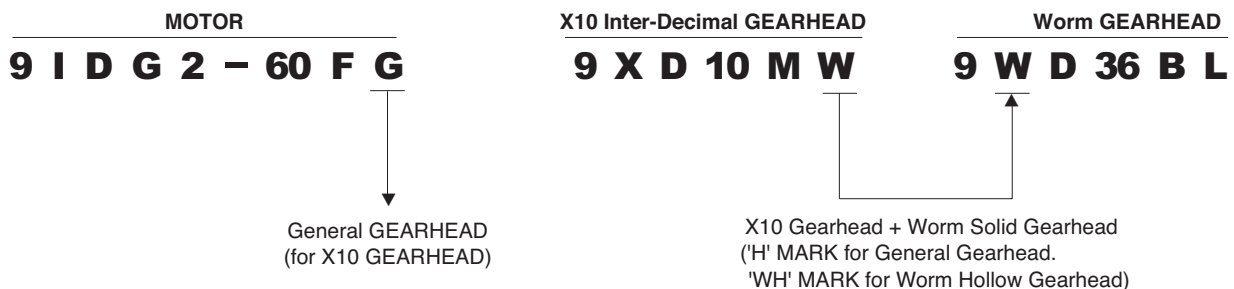
■ ASSEMBLY of MOTOR and GEARHEAD

Like below MOTOR and GEARHEAD could be assembled.
 Same frame size's motor and gearhead could be assembled.

① MOTOR + General GEARHEAD



② MOTOR + X10 Inter-Decimal GEARHEAD + GEARHEAD (General, Worm Solid, Worm Hollow)



Features of DKM AC Motors

• Easy-to-use and Reliable

Just the connection of power supply and capacitor is needed for operating standard compact AC motors. Three-phase motors do not even require a capacitor. DKM developed small standard AC motors first time in Korea in 1987 so it has high reliability and service life.

• Conform to Safety Standards and Globalization

Many of DKM Motors have CE, TUV, CCC Marking and conform UL/EN standards in accordance with the low voltage directives. DKM Motors are available in power supply voltages that meet the requirements of the world. (50/60Hz, 100~440VAC)

• Variety of Functions

DKM Motors have very various specs ; Induction motors that run continuously and Reversible motors that allow for bi-directional operation. Additional functionality is available. Electromagnetic brake motors to hold loads in a power-off situation ; Clutch and brake motors for quick starts and stops ; torque motors for tension control and winding applications. And the combination of above functions is available.

• JIT (Just-In-Time) System

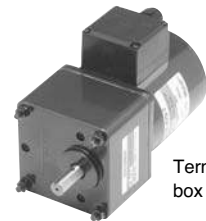
JIT System is available in DKM Motor for the best delivery time. DKM Motor realized user' s satisfaction with the world best delivery time.

Induction Motors for Continuous operation (Page 15)

Capacitor-run, single-phase and three-phase motors are available. Lead wire type, terminal box type (TB type) motors are available. They are depending on how the power source and the motors are connected.



Lead wire type



Terminal box type

2 pole Motors (Page 45)

Capacitor-run, single-phase motors are available. Lead wire type is available. Rated speed is 3,200 rpm.



Reversible Motors for Bi-directional operation (Page 63)

These are capacitor-run, single-phase motors. The outward appearance is the same as that of induction motors. These motors are suited for applications where the motor must frequently switch direction.



Lead wire type



Terminal box type

Electromagnetic Brake Motors for load holding (Page 85)

This product is a load-holding brake motor with a power off activated type electromagnetic brake.



Clutch and Brake Motors for high frequency starting and stop (Page 113)

This motor combines a clutch and brake mechanism with a induction motor. It is ideal for high frequency start and stop.



Torque Motors (Page 129)

This motor is suitable for controlling tension and pushing in winding operations. Torque can be set to any desired level by changing the Input voltage.



Speed control System (Page 143)

Speed control System allow you to easily set and adjust the speed of a motor.



Gearhead (Page 195)

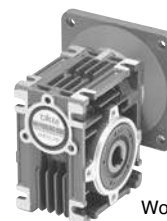
There are 3 kinds of Gearheads.
; Parallel type, Worm Solid type and Worm Hollow type.



Parallel type

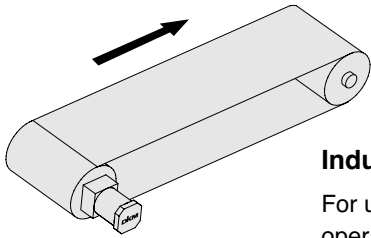


Worm Solid type



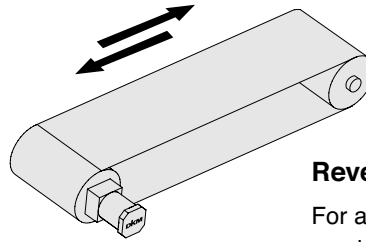
Worm Hollow type

Applications for DKM AC Motors



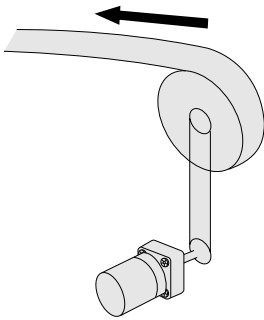
Induction Motors

For uni-directional continuous operation



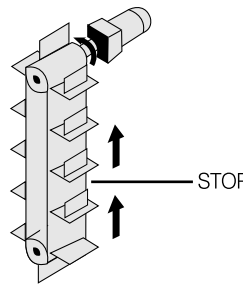
Reversible Motors

For applications where the motor must switch frequently from one direction to the next



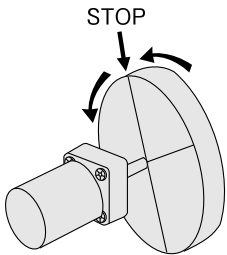
Torque Motors

For applications where a rolled object is released according to the amount of tension.



Electromagnetic Brake Motors

For applications in which loads must be held.



Clutch and Brake Motors(C-B Motors)

For applications where the motor must repeat frequent starting and stopping.

Product Line

(● = Available)

Frame Size	□ 60 mm (□ 2.36 in.)		□ 70 mm (□ 2.76 in.)		□ 80 mm (□ 3.15 in.)		□ 90 mm (□ 3.54 in.)						
	6W (1/125HP)	6W (1/125HP)	10W (1/75HP)	15W (1/50HP)	15W (1/50HP)	25W (1/30HP)	40W (1/19HP)	60W (1/12HP)	90W (1/8HP)	120W (1/6.25HP)	150W (1/5HP)	180W (1/4HP)	200W (1/3.75HP)
Induction Motors	●	●	●	●	●	●	●	●	●	●	●	●	●
Reversible Motors		●	●		●	●	●	●	●	●			
Torque Motors		●			●(10W)		●(20W)	●(30W)	●(40W)				
Electromagnetic Brake Motors		●	●		●	●	●	●	●	●	●	●	●
Clutch and Brake Motors					●	●	●	●	●	●			
Speed control Motors		●	●		●	●	●	●	●	●		●	
Inverter Motors								●	●	●	●		●
2 pole Motors					●	●	●	●	●	●	●		●

How to Read Motor Specifications

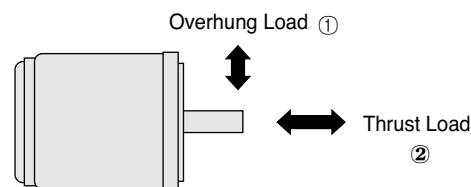
Motor Specifications Table (Example)

Model Upper Model Name:Pinion Shaft Type Lower Model Name():Round Shaft Type		① Output Power		Voltage	Freq.	② Current	③ Starting Torque		④ Rated Torque		⑤ Rated speed	Capacitor	
Lead Wire Type Dimension	Terminal Box Type Dimension	HP	W	VAC	Hz	A	mN.m	gfcm	mN.m	gfcm	r/min	μF	VAC
91DGA-90FP (91DSA-90FP)	91DGA-90FP-T (91DSA-90FP-T)	1/8	90	*Single phase 110	50/60	2.0	4.5	4500	5.7	5700	50Hz:1350 60Hz:1550	20	250
91DGC-90FP (91DSC-90FP)	91DGC-90FP-T (91DSC-90FP-T)	1/8	90	Single phase 220	50/60	1.0	4.5	4500	5.7	5700	50Hz:1350 60Hz:1550	5.0	400
91DGD-90FP (91DSD-90FP)	91DGD-90FP-T (91DSD-90FP-T)	1/8	90	Three phase 220	50/60	0.8	7.0	7000	5.7	5700	50Hz:1350 60Hz:1550	-	-

- ① Output Power : The amount of work that can be performed in a given period of time. It can be used as a criteria for motor capability.
- ② Current : The current value used by a motor when the motor is producing rated torque.
- ③ Starting Torque : This term refers to the torque generated the instant the motor starts.
If the motor is subjected to a friction load smaller than this torque, it will operate.
- ④ Rated Torque : This is the torque created when the motor is operating most efficiently. Though the maximum torque is far greater, rated torque should, from the standpoint of utility, be the highest torque.
- ⑤ Rated Speed : This is the speed of the motor when the motor is producing rated torque

Motor Specifications for Permissible Overhung Load and Permissible Thrust Load

Motor		① Permissible Overhung Load N (kgf) lb.					
Frame Size □mm (inch)	Output Shaft Diameter ∅ mm (inch)	Distance from shaft end mm (inch)					
		10 (0.39)			20 (0.79)		
60 (2.36)	6 (0.24)	50	(5)	11.2	110	(11)	24.7
70 (2.76)	6 (0.24)	40	(4)	9	60	(6)	13.5
80 (3.15)	8 (0.31)	90	(9)	20	140	(14)	31
90 (3.54)	10 (0.39)	140	(14)	31	200	(20)	45
	12 (0.47)	240	(24)	54	270	(27)	60



- ① Permissible Overhung Load : The value ① shown in the table above is the value for the permissible overhung load. As shown in the figure above, permissible overhung load is the permissible value of the load applied in a direction perpendicular to the gearhead output shaft.
- ② Permissible Thrust Load : As shown in the figure above, this term refers to the permissible value of load applied in the axial direction to the gearhead output shaft. Keep the thrust load to no more than half the motor weight.

The calculating method of overhung load applied on the output shaft is the same as for a gearhead.

How to Read Gearhead Specifications

Torque table ; 60Hz (Example)

Unit : Upper values : N.m / Middle : kgfcm / Lower : lb-in

Model	speed RPM (r/min)	500	300	200	120	100	60	50	30	20	15	10	unit
Motor/ Gearhead	Gear Ratio	3.6	6	9	15	18	30	36	60	90	120	180	
9IDG2-90FP	9PBK□BH	17	28	41	62	75	112	134	200	200	200	200	kgfcm
	9PFK□BH	1.7	2.8	4.1	6.2	7.5	11.2	13.4	20	20	20	20	N.m
		15	25	36	55	66	99	118	177	177	177	177	lb-in

① Permissible Torque : It refers to the value of load torque driven by the gearhead's output shaft. Each value is shown for the corresponding gear ratio.

Permissible torque when a gearhead is connected can be calculated with the equation below.

Permissible Torque $TG = TM \times i \times n$
 $TG =$ Permissible Torque of Gearhead
 $TM =$ Motor Torque
 $i =$ Gear Ratio of Gearhead
 $n =$ Gearhead Efficiency

Gearhead Efficiency

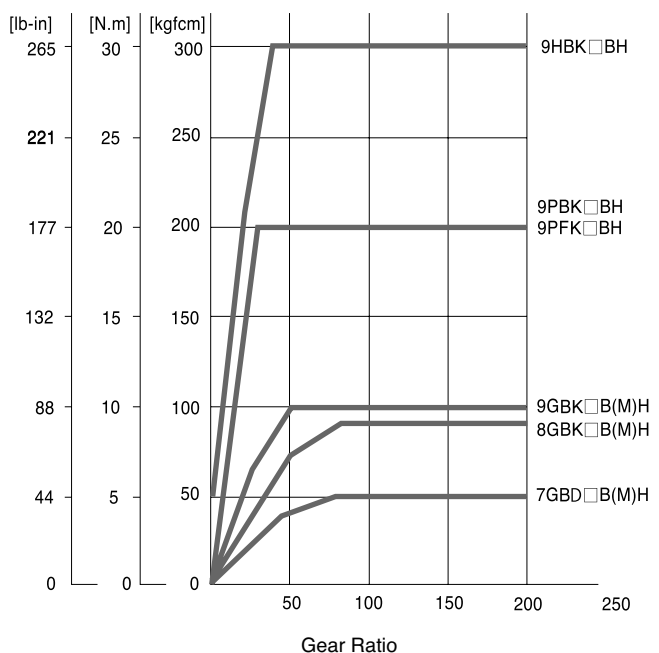
Ratio	3	3.6	5	6	7.5	9	10	13	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250
6GBD□B(M)H	81%											73%					66%								
7GBK□B(M)H	81%											73%					66%								
8GBK□B(M)H	81%											73%					66%								
9GBK□B(M)H	81%											73%					66%								
9PBK□BH	81%											73%					66%								
9PFK□BH	81%											73%					66%								
9HBK□BH	81%											73%					66%								

- The efficiency of decimal gearhead is 81%.
- In case of worm gearhead, please refer to their pages. (Page 189)

Maximum Permissible Torque

The gearhead output torque increases proportionally as the gear ratio increases. But, factors affecting the gearhead mechanical strength such as gear construction and materials etc., limit size of the load which can be applied to the gearhead.

This torque is called the maximum permissible torque. The maximum permissible torques of typical gearheads are shown in the figure to the right.



Torque table ; 60Hz (Example)

Model	Speed RPM (r/min)	①											unit
Motor/ Gearhead	Gear Ratio	500	300	200	120	100	60	50	30	20	15	10	
9IDG2-90FP	9PBK□BH 9PFK□BH	17	28	41	62	75	112	134	200	200	200	200	kgfcm
		1.7	2.8	4.1	6.2	7.5	11.2	13.4	20	20	20	20	N.m
		15	25	36	55	66	99	118	177	177	177	177	lb-in

① Speed : This refers to the speed of rotation in the gearhead output shaft. The speeds, depending on gear ratio, are shown in the permissible torque table when the gearhead is attached. The speed is calculated by dividing the motor's synchronous speed by the gear ratio. The actual speed, according to the load condition, is 2~20% less than the displayed value.

The speed is calculated with the following equation.

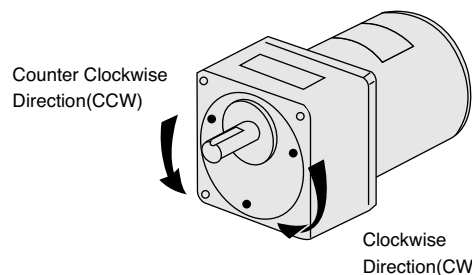
$$\text{Speed NG} = \frac{\text{NM}}{i}$$

NG : Speed of Gearhead [r/min]

NM : Speed of Motor [r/min]

i : Gear Ratio of Gearhead

② Direction of rotation : This refers to the direction of rotation viewed from the output shaft. The colored background areas indicate rotation in the same direction as the motor shaft, while the others rotate in the opposite direction. The direction of gearhead shaft rotation may differ from motor shaft rotation depending on the gear ratio of the gearhead. The gear ratio and rotation direction of each gearhead is shown in the table below.



GEARHEAD LINE-UP

(● = Available)

ITEM	WATT	MODEL	RATIO																													
			2	3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	80	90	100	120	150	180	250	300	360		
PARALLEL TYPE	6W	6GBD□BMH	×	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	×	●	●	●	●	●	●	×	×
	6,10 15W	7GBD□BMH	×	×	●	×	●	×	●	×	●	●	●	×	●	●	●	●	●	●	●	●	×	●	●	●	●	●	●	×	×	×
	15, 25W	8GBK□BMH	×	×	●	●	●	●	●	×	●	●	●	×	●	●	●	●	●	●	●	●	×	●	●	●	●	●	●	●	●	●
	40W	9GBK□BMH	●	×	●	●	●	●	●	●	●	●	●	×	●	●	●	●	●	●	●	●	×	●	●	●	●	●	●	×	×	×
P TYPE	60~200W	9PBK□BH	●	×	●	●	●	●	×	●	●	●	●	●	●	●	●	●	●	●	●	×	●	●	●	●	●	●	×	×	×	
		9PFK□BH	●	×	●	●	●	●	×	●	●	●	●	●	●	●	●	●	●	●	●	×	●	●	●	●	●	●	×	×	×	
H TYPE	90~200W	9HBK□BH	×	×	●	×	●	×	●	×	●	●	●	×	●	●	●	×	●	●	●	×	●	●	●	●	●	●	×	×	×	
WORM TYPE	SOLID	25~60W	8/9WD□BL	×	×	×	×	×	×	●	●(12)	●	●	×	●	●	●	×	●	●	×	×	×	×	×	×	×	×	×	×	×	
			8/9WD□BR	×	×	×	×	×	×	×	●	●(12)	●	●	×	●	●	●	×	●	●	×	×	×	×	×	×	×	×	×	×	×
	HOLLOW	60~200W	9WHD□	×	×	×	×	×	●	×	●	×	●	×	●	●	●	×	●	●	×	●	×	×	×	×	×	×	×	×	×	

• Enter the gear ratio in the box(□) within the model name. A colored background indicates gear shaft rotation in the same direction as the motor shaft ; white background indicates rotation in the opposite direction.

• For exceeding above ratio, use inter-decimal gearhead of ratio 10:1 ; 8XD10BMH, 9XD10BMH.