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C DC Motors

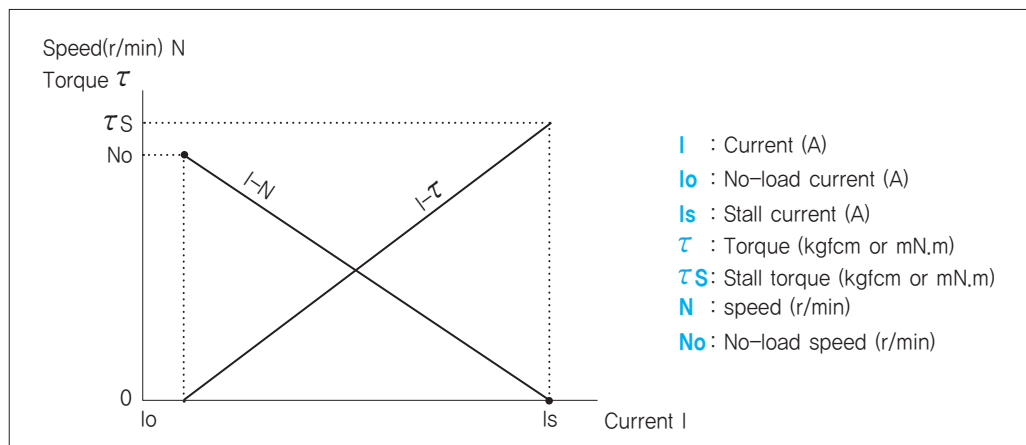
Technical Data of DC Motor

Features

- DC motor has a big starting torque and excellent mobility and when comparing with the same sized AC motor, the output is big and the efficiency is high.
- It is easy to control the speed and change the normal/reverse rotation.
- Comparing to AC motor, it is available to manufacture low voltage motor which can be applied to portable machine which uses various spec., especially battery power (12V, 24V).
- Due to the wear of brush, there is a limit in the service life.
- Due to brush and commutator, noise generates when starting.

Current, Torque and Speed (r/min)

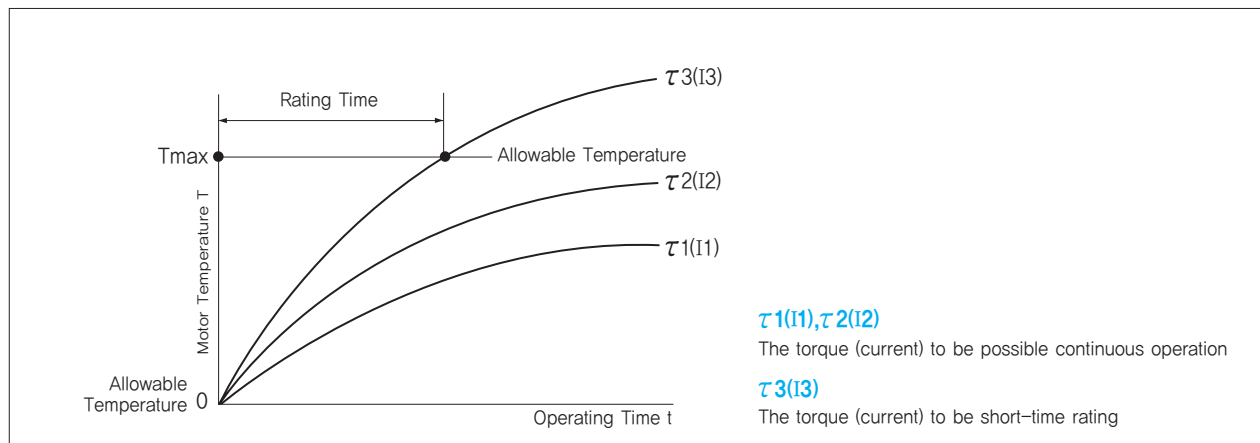
When the voltage of power supply is fixed, D.C. magnet motor shows the characteristic in the relationship between torque, speed and current as below. The relationship is almost linear show as the above, and the speed decreases, and current increases conversely when increasing the torque to the output shaft motor. It is same until the output shaft of motor is done a stall, when ignored heat generation in the motor. (It is possible to control the torque by controlling the current.)



Rating Time

According to increase of current (torque), heat generation in the motor increases. Generally, when the temperature of component parts in the motor is below than allowable temperature after it was saturated, it is possible to keep continuous operation.

When it was not saturated in the allowable temperature, the time to exceed the temperature is rating time of motor and it is short-time rating specification. According to size and the specification, each motor model has different current (torque) value to be possible continuous operation.

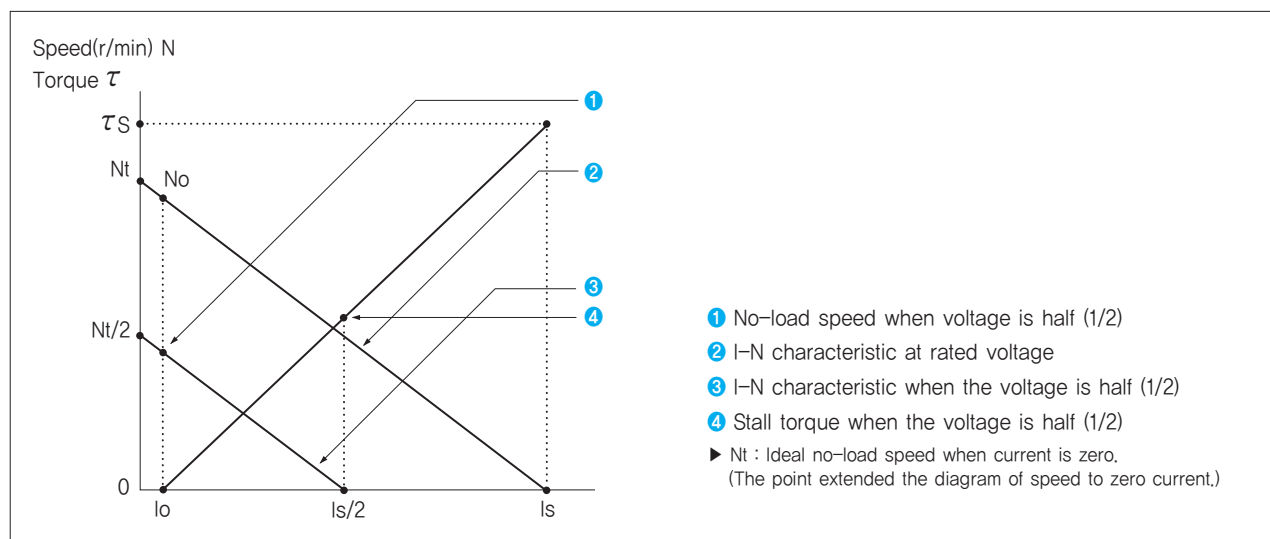


Performance of DC Motor in Case of Voltage Change at Power Supply

DC magnet motor can change speed by changing power supply voltage. The relationship between torque(τ), speed(N) and current(I) of motor when the voltage is half (1/2) is shown as below.

As the below figure, in the relationship between current and speed when power supply voltage was changed to half (1/2), ideal no-load speed "Nt" becomes "Nt/2" and it falls parallel to the performance of rated voltage.

The relationship between current and torque is same as the rated voltage, but the stall current " τ_s " falls accordingly as the stall current "Is" becomes "Is/2".



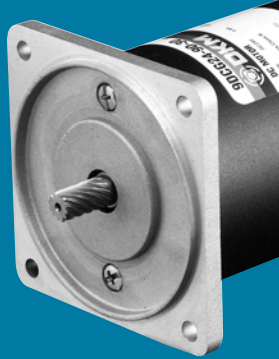
Input, Output and Efficiency of DC motor

The input, output and efficiency can be calculated with the next formula.

$$\begin{aligned} \text{Input(W)} &= \text{Power Supply Voltage (V)} \times \text{Current (A)} \\ \text{Output(W)} &= \text{Torque } \tau \text{ (kgfcm)} \times \text{Speed N (r/min)} \times 1.027 \times 10^{-2} \\ \text{Efficiency } \eta \text{ (\%)} &= \frac{\text{Output(W)}}{\text{Input(W)}} \times 100 \end{aligned}$$

General Specifications

| Item | Specification |
|-----------------------|---|
| Insulation Resistance | 100M Ω or more when DC500V MEGA is applied between the windings and the frame after rated motor operation under normal ambient temperature and humidity. |
| Dielectric Strength | Sufficient to withstand 1.5KV at 50Hz and 60Hz applied between the windings and the frame for 1 minute after rated motor operation under normal ambient temperature and humidity. |
| Temperature Rise | Temperature rise of windings are 80°C or less measured by the resistance change method after rated motor operation with connecting a Gearbox or equivalent heat radiation plate. |
| Insulation Class | Class B [130°C] |
| Ambient Temperature | -10°C~+40°C |
| Ambient Humidity | 85% maximum |



DC Motor



DC Motor

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DC Motor 120W (□90mm)

C-15

DKM AC/DC Geared Motor and Gearbox **C-04**

C DC Motors

DC Motor 120W(□90mm)

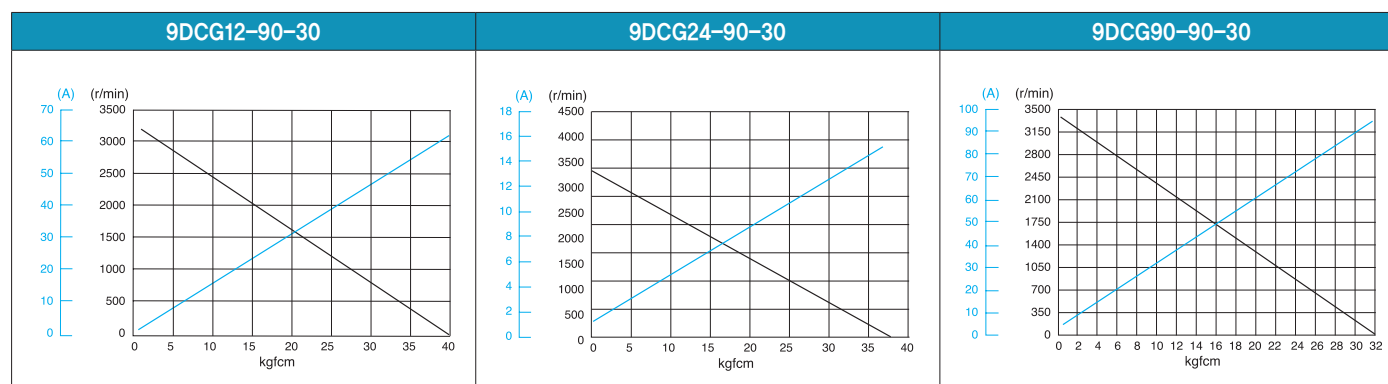
120W DC Motor 120W(□90mm)

Motor Specification

| Model 9DCP(W)□-120-30: Gear Type Shaft 9DCD□-120-30: D-Cut Type Shaft 9DCK□-120-30: Key Type Shaft | Output W | Voltage V | Starting Current A | Starting Torque | | No Load | | Rated Load | | | |
|---|-------------|--------------|-----------------------|-----------------|-------|--------------|----------------|--------------|----------------|---------------------|-------|
| | | | | kgfcm | N.m | Current A | Speed r/min | Current A | Speed r/min | Torque kgfcm N.m | |
| 9DCP(W)12-120-30 | 120 | 12 | 96.00 | 31.00 | 3.100 | 4.00 | 3400 | 15.00 | 3000 | 3.90 | 0.390 |
| 9DCP(W)24-120-30 | 120 | 24 | 64.00 | 39.00 | 3.900 | 1.50 | 3250 | 6.80 | 3000 | 3.90 | 0.390 |
| 9DCP(W)90-120-30 | 120 | 90 | 18.00 | 37.00 | 3.700 | 0.30 | 3400 | 2.00 | 3000 | 3.90 | 0.390 |

- 1) Enter the phase & voltage code in the in the box (□) within the motor model name.
2) Gear Type Shaft are for attaching Gearbox and D-Cut & Key Type Shafts are for using motor only.

Performance Curve



Max. Permissible Torque at Output Shaft of Gearbox

| Motor Model | Gearbox Model | Gear Ratio r/min | Gear Ratio | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|---------------|---------------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 2 | 3 | 3.6 | 5 | 6 | 7.5 | 9 | 12.5 | 15 | 18 | 20 | 25 | 30 | 36 | 40 | 50 | 60 | 75 | 90 | 100 | 120 | 150 | 180 | 200 | | |
| 9DCP□-120-30 | 9PBK□BH | Rated | kgfcm | 6.5 | 9.7 | 11.7 | 16.2 | 19.4 | 24.3 | 29.1 | 36.6 | 43.9 | 52.7 | 53.0 | 66.3 | 79.6 | 95.5 | 106.1 | 132.6 | 159.1 | 178.4 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | |
| | | N.m | 0.63 | 0.95 | 1.14 | 1.59 | 1.90 | 2.38 | 2.86 | 3.58 | 4.30 | 5.16 | 5.20 | 6.50 | 7.80 | 9.36 | 10.40 | 12.99 | 15.59 | 17.49 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | |
| | 9PFK□BH | 12V | kgfcm | 51.5 | 77.2 | 92.6 | 128.7 | 154.4 | 193.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 |
| | | N.m | 5.04 | 7.56 | 9.08 | 12.61 | 15.13 | 18.91 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 |
| | 24V | kgfcm | 64.7 | 97.1 | 116.5 | 161.9 | 194.2 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 |
| | | N.m | 6.34 | 9.52 | 11.42 | 15.86 | 19.03 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 |
| 90V | kgfcm | 61.4 | 92.1 | 110.6 | 153.6 | 184.3 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | |
| | N.m | 6.02 | 9.03 | 10.83 | 15.05 | 18.06 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | 19.60 | |

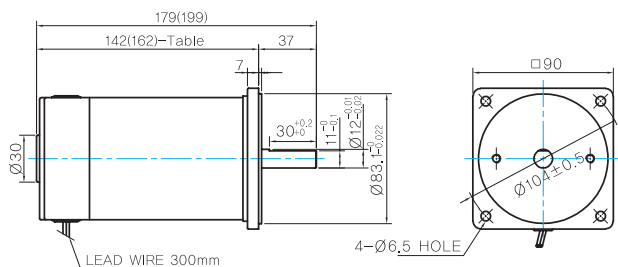
| Motor Model | Gearbox Model | Gear Ratio | | Gear Ratio | | | | | | | | | | | |
|--------------|-----------------|------------|-------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | r/min | r/min | 10 | 12 | 15 | 18 | 25 | 30 | 36 | 50 | 60 | | | |
| 9DCW□-120-30 | 9WD□BL/□BR/□BRL | Rated | kgfcm | 32.0 | 37.4 | 45.0 | 51.9 | 68.3 | 77.2 | 89.9 | 117.0 | 122.4 | | | |
| | | | N.m | 3.13 | 3.67 | 4.41 | 5.09 | 6.69 | 7.57 | 8.81 | 11.47 | 12.00 | | | |
| | | 12V | kgfcm | 163.3 | 153.1 | 163.3 | 153.1 | 142.9 | 163.3 | 153.1 | 142.9 | 163.3 | 153.1 | 142.9 | 122.4 |
| | | | N.m | 16.00 | 15.00 | 16.00 | 15.00 | 14.00 | 16.00 | 15.00 | 14.00 | 16.00 | 15.00 | 14.00 | 12.00 |
| | | 24V | kgfcm | 163.3 | 153.1 | 163.3 | 153.1 | 142.9 | 163.3 | 153.1 | 142.9 | 163.3 | 153.1 | 142.9 | 122.4 |
| | | | N.m | 16.00 | 15.00 | 16.00 | 15.00 | 14.00 | 16.00 | 15.00 | 14.00 | 16.00 | 15.00 | 14.00 | 12.00 |
| 90V | kgfcm | 163.3 | 153.1 | 163.3 | 153.1 | 142.9 | 163.3 | 153.1 | 142.9 | 163.3 | 153.1 | 142.9 | 122.4 | | |
| | N.m | 16.00 | 15.00 | 16.00 | 15.00 | 14.00 | 16.00 | 15.00 | 14.00 | 16.00 | 15.00 | 14.00 | 12.00 | | |

- 1) Enter the phase & voltage code in the box (□) within the motor model name.
2) Enter the gear ratio in the box (□) within the Gearbox model name.
3) A colored background indicates gear shaft rotation in the same direction as the motor shaft; a white background indicates rotation in the opposite direction.
4) The rotating speed is calculated by dividing the motor's synchronous speed (50Hz: 1,500r/min, 60Hz: 1,800r/min) by the gear ratio.
The actual speed is 2~20% less than the displayed value, depending on the size of the load.

Dimensions

MOTOR ONLY

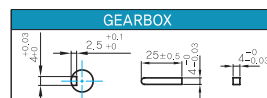
- MOTOR MODEL: 9DCD□-120-30



MOTOR OUTPUT SHAFT

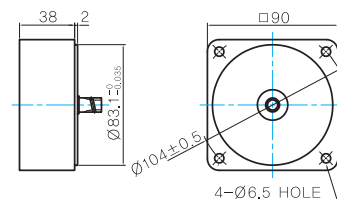
| MODEL | SPEC |
|--------------|--|
| D-CUT TYPE | 36,5 30 ^{+0,03} 11 ^{+0,03} Ø12 ^{+0,01} |
| 9DCD□-120-30 | |
| KEY TYPE | 36,5 25 ^{+0,03} Ø12 ^{+0,01} |
| 9DCK□-120-30 | |

KEY SPEC



INTER-DECIMAL GEARBOX

- MODEL: 9XD10□□



142(162)-Table1

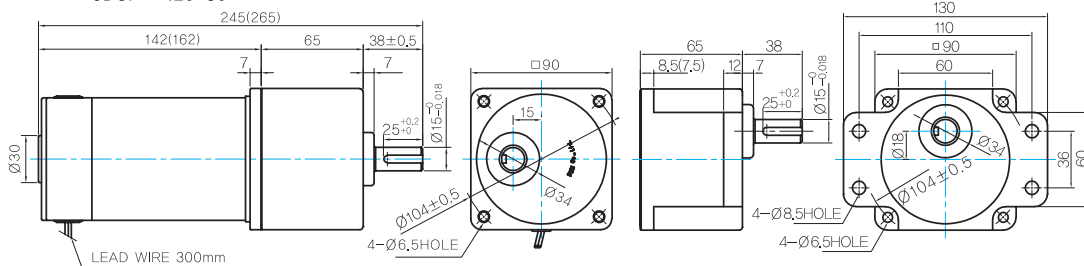
| SIZE(mm) | MOTOR VOLTAGE |
|----------|---------------|
| 142 | 24V,90V |
| 162 | 12V |

GEARED MOTOR

P TYPE GEARBOX

- MOTOR MODEL: 9DCP□-120-30

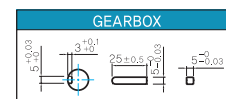
- GEARBOX MODEL: 9PBK□BH
- GEARBOX MODEL: 9PFK□BH



GEARBOX OUTPUT SHAFT

| MODEL | SPEC |
|----------|---|
| KEY TYPE | 38 38 25 ^{+0,2} Ø15 ^{+0,015} |
| 9PBK□BH | |
| 9PFK□BH | |

KEY SPEC

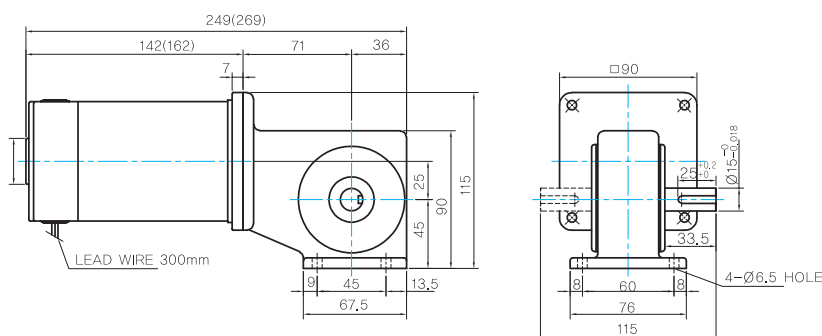


W TYPE GEARBOX

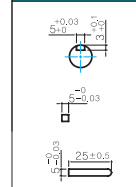
- MOTOR MODEL: 9DCW□-120-30

- GEARBOX MODEL: 9WD□BL/BR/BRL

KEY SPEC



GEARBOX



WEIGHT

| PART | WEIGHT(Kg) | |
|----------|-------------------------------|-----|
| MOTOR | 2,0 | |
| GEAR BOX | 9PB(F)K2BH ~ 9PB(F)K18BH | 1,3 |
| | 9PB(F)K20BH ~ 9PB(F)K180BH | 1,4 |
| | 9WD□BL/BR/BRL | 1,0 |
| 9XD10□□ | 0,5 | |

Motor Images

