

ENGINEERING BULLETIN E-5

DC MOTOR APPLICATION INFORMATION

In most cases, the right motor for your application can be easily selected once these three requirements are defined:

1. The **supply voltage** to be used
2. The **speed** (rpm) at which the load must be driven
3. The **torque** (in.oz.) required to drive the load at that speed

Requirements may be readily determined by calculation, test, or "feel" from past experience. With over 35 years of motor application experience, Motor Technology can provide support. When the **voltage, speed and torque** requirements are identified, the DC online catalog can be searched for the corresponding DC motor that meets the requirements.

Here's a quick formula to calculate the horsepower requirement:

$$\text{H.P.} = T \times N \times 10^{-6}$$

Where: T = Torque in.oz. N = Speed rpm

Example:

$$4 \text{ oz. in. torque required at } 10,000 \text{ rpm H.P.} = 4 \times 10,000 \times 10^{-6} = .040 \text{ H.P.}$$

DC model #DML motor is rated at .040 H.P. continuous duty. For those engineers who want a motor to put out "x" many watts, the following alternative calculation is offered:

$$\text{H.P.} = \text{required output in watts} / 746$$

Example:

$$10 \text{ watts required output H.P.} = 10 / 746 = .013 \text{ H.P.}$$

With the H.P. requirement of .013, refer to either CML - rated at .017 for military applications or CIL - rated at .015 for industrial applications

One final determination is required before the appropriate DC motor is selected. Choose a torque or speed. Typically speed is the easier criteria. Not every application involves a neat office environment, a solid DC input voltage and an absolutely constant torque load. Any or all of the major three items can vary - voltage, speed and torque. Engineering Bulletin E-1 explains how performance varies as these parameters change.

Please see the checklist below to verify that all possibilities affecting motor performance and success of the application have been identified.

CHECKLIST

POWER SUPPLY

Filtered _____
Unfiltered _____ Volts _____
High Limit _____
Low Limit _____
Current Capability _____ amps

MECHANICAL CONSIDERATIONS

Life Required _____ hrs. Direction
of rotation: _____ cw _____ ccw
Thrust or Radial Load: _____ lbs.
Axial _____ lbs.
Radial Starting Torque _____
oz.in.
Acceleration Time Required
_____ sec.
Reversibility: _____ yes
_____ no
Weight _____ lbs.
Size Limitation _____ in. dia. x
_____ in.
Long Speed Variation _____ rpm
Type of Connection: _____
Lead _____
Terminal Inertial Loading _____ oz. in.sec²
Special Duty Cycle _____

ENVIRONMENTAL REQUIREMENTS

Temperature range: _____
High _____
Low Humidity _____
Shock _____
Vibration Fungus _____
Altitude _____
Explosion-Proof Surrounding
Gases _____
Special Military Requirements

OTHER SPECIAL REQUIREMENTS

Starting Voltage _____
Brake _____
Special Flange _____
Pinion _____
EMI Filter _____