MIDWEST MOTION PRODUCTS

ENGINEERING NOTES FOR ALL 90V (and above) DC MOTOR APPLICATIONS:

The information found below was collected from an independent source.
At MMP, we pride ourselves in producing only Quality, Robust and Reliable DC Motors & Gearmotors.
When sizing and quoting a Gearmotor for any application, we assume (and rightly so) that the DC Source that supplies our Motor or Gearmotor is one of "Pure DC" in nature, or nearly so, and, if you please, not a "dirty" source, meaning one of high AC Ripple content. The following 'article' explains in more detail the risks involved when employing a Drive, typically an "SCR" type control, which may have a high AC ripple content. This can damage a Permanent Magnet DC Motor, in various ways, most prominently in terms of ultra-rapid brush wear. **USE OF AN SCR DRIVE WITH A FORM FACTOR ABOVE 1.1 IS NOT RECOMMENDED, AND, SUBSEQUENTLY, VOIDS ALL "MMP" MOTOR WARRANTIES.**
At MMP, we offer no SCR Drives whatsoever, and, conversely, we recommend only "PURE DC" such as Battery Power, or Pulse Width Modulation which successfully mimics Pure DC, for operation with all of our DC Motors and Gearmotors. Please contact us directly with any questions regarding this information. The article follows.

How do you power DC motors?

DC motors can be fed from a variety of DC power sources, such as batteries. Typically, though, industrial DC motors are driven from DC drives. The quality of output power from different types of DC drives varies dramatically. This quality can be measured by how much (AC) ripple current is produced by the drive. The ripple current is designated by a drive's Form Factor, which is the relationship of the ripple current to the primary supply of DC current. High ripple current results in increased motor heating and, almost always, premature brush failure.

A battery, widely considered the ideal DC Power source, has a Form Factor of 1.0. With a battery, there is a constant voltage (and current) to power the motor. A Pulse Width Modulated (PWM) DC drive emulates pure DC so well, that it generally produces a Form Factor of 1.05 (only 5% ripple) This too, is widely accepted as "nearly pure" DC Power.

90 Volt DC DRIVES: FORM FACTOR TABLE & EXAMPLES

Form Factor	DC Voltage Source
1.0	Battery (Pure DC)
1.05	Pulse Width Modulation (PWM)
1.35	Full Wave Rectification (Single Phase)**
1.9 and above	Half Wave Rectification (Single Phase)**

** Not Recommended with MMP DC Motors and Gearmotors
Notes: Single Phase Full Wave Rectification is the most common form of DC Drives,
In the 0.25 to 2 HP Range.

One of the more common drives for small horsepower DC motors is the Single-Phase Full-Wave Rectified DC Drive. This drive takes an AC voltage and passes the positive half of the wave and rectifies the negative part of the wave to produce a waveform with a Form Factor of 1.4 (40% current ripple). These drives are commonly referred to as SCR (Silicon Controlled Rectifier) drives.
Another type of drive has a much worse Form Factor: Single-Phase Half-Wave Rectified DC drives. These drives only pass the positive half of the AC sine wave. These drives have a form factor of 1.9 and are not recommended for use with DC motors. **BOTTOM LINE: IT'S SIMPLE – AC POWER IS MEANT FOR AC MOTORS, NOT DC MOTORS!**