

NetGain Motors, Inc.

800 South State Street / Suite 4 / Lockport, IL 60441 / 630-243-9100 / 630-685-4054 (FAX)

Motor Information

NetGain Motors, Inc. **WarP™ Motors**, **TransWarP™ Motors** and **ImPulse™ Motors** are contract manufactured for us by the nation's largest builders of series wound DC motors. Matching their experience and knowledge with our engineering and racing experience has made a perfect team to design new motors that will perform under the unusual operational dynamics of electric vehicles.

All aspects of an electric motor were considered - from the materials and components to the methodology of assembly - to make a motor that would perform in an electric vehicle.

Electric motor components such as insulation quality, bearings, shaft material, shaft sizing, commutators, brushes, brush springs, motor timing are very critical in an electric vehicle. as are voltage and amperage ranges. Assembly steps critical to performance are clearances, brush "break-in", lacquering/baking process, and overall quality of workmanship.

An area of serious study has been motor temperature. Where many DC motors are made to meet class F temperature rating (155° C.), our motors all exceed class H ratings (180° C.) (Our **WarP™ Motors** have been stress tested to 205° C). Whether using your DC motor for drag racing or for an everyday EV, temperatures will normally never approach 180° C. However, an external high volume fan or blower can be very effective in further dissipating motor heat, and additionally clears carbon dust from the brushes, which reduces risk of flash-over and would-be damage.

Our Motors are all designed with an internal aluminum fan to provide cooling and motor protection during normal operation. All **WarP™ Motors**, **TransWarP™ Motors** and **ImPulse™ Motors** are also configured with a temperature snap switch as a standard item (normally open) for early warning of an overheating situation. The normally open (NO) snap switch is set to close at 120° C (150° C for 11" & 13" motors) and can drive an indicator light or warning tone in your vehicle or automatically close a circuit in your vehicle if it indicates overheating.

Motor ratings are given for the normal range of the motor's operation under various voltages and loads. Ratings with forced air cooling have not been done since there are too many variables that cannot be controlled to allow the data to be useful. Needless to say, the motor will perform closest to its initial HP output the cooler one can keep it!

Lastly, please remember that NetGain Motors, Inc. offers distinctive standard features on every motor, which we feel make them the best choice for an electric vehicle motor in the EV industry. Some of these features are:

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Standard NetGain Motors, Inc. Features

- ✓ **Specifically designed for street and racing EVs**
- ✓ **Top quality, sealed, bearings with high temperature grease**
- ✓ **Motor temperature snap switch (normally open)**
- ✓ **Motor Temperature thermistor**
- ✓ **High efficiency aluminum fans**
- ✓ **Optimized, advanced brush timing for higher performance**
- ✓ **Oversize, high quality brushes, custom compositions**
- ✓ **Preliminary brush seating**
- ✓ **Heavy duty, vibration resistant, stainless steel brush springs**
- ✓ **Insulation that exceeds Class “H” temperature rating**
- ✓ **Best in class patented varnishing process**
- ✓ **Voltage ranges starting at 48 Volts**
- ✓ **Interlocking commutator construction**
- ✓ **High peak motor efficiency**