

# ***NetGain Motors, Inc.***

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

## **Motor Information**

**NetGain Motors, Inc's. WarP™ Motors** are produced by Warfield Electric Company in Frankfort, Illinois, USA. Warfield is the nation's largest rebuilder of series wound DC motors. Matching their experience and knowledge with our engineering and racing experiences, makes a perfect team to design motors that will perform under the unusual operational dynamics of electric vehicles.

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

Electric motor components are very critical in an electric vehicle, as are voltage and amperage, range, bearings, shaft sizing, commutator and brush coordination, winding and temperature range. Assembly steps critical to performance are clearances, brush "break-in", lacquering/baking process and overall quality of workmanship.

One area of serious study has been temperature. Where many DC motors are made to meet class F temperature rating (155° C.), our **WarP™ 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.

**WarP™ Motors** are designed with an internal fan to provide cooling and motor protection during normal operation. All **WarP™ 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 open 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 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 **WarP™ Motors** offer distinctive standard features on every motor that we feel make it the best choice for an electric vehicle motor in the industry. Some of these features are:

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## Standard **WarP™ Motors** 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 fan
- ✓ Optimized, advanced brush timing for higher performance
- ✓ Oversize, high quality brushes, custom composition
- ✓ Fully 95% plus 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