SUPER TUNER (before SUPER²)

(Motor Commutation Analyzer)

OPERATING INSTRUCTIONS

Good commutation is a must for peak performance and optimum life expectancy of any commutator type motor. SUPER TUNER will turn any HI-IQ with any software configuration into a Commutation Analyzer.

INSTALLATION & SET-UP

Using the four banana type prongs on the bottom of the module, with the label reading right side up (the wire leads to the right), plug the unit into METER and MOTOR jacks on the HI-IQ face panel. Plug a known good, well charged 6 cell pack into the NICAD jacks on the HI-IQ. Connect Motor Under Test to the SUPER TUNER wire leads with alligator clips. Select and run the Motor Current Test (in Special Functions). The HI-IQ display will read real time current in the upper line, elapsed time and the actual average **commutation ripple voltage** in the bottom line.

COMMUTATION NEUTRAL ADJUSTMENT

This adjustment is needed for proper motor BREAK-IN. Neutral is a point of zero timing advance with the smoothest commutation, minimum arcing and heating up. Unfortunately while it is the best adjustment for breaking in itis not the point of the best performance so the timing will have to be readjusted after Break-In. NEUTRAL is found by rotating the end bell of the motor until the Current (Amps) and Commutation Ripple (Volts) readings are simultaneously the lowest. Note the word "simultaneously". The readings may or may not be the "absolute" lowest at that point. Mark this point on the motor. After the break-in mark down both readings for future reference.

PERFORMANCE TIMING ADJUSTMENT

After the Break-in (use the HI-IQ Break-in option) the timing has to be adjusted for the best performance with sufficient run time and lifetime expectancy. UPPER TIMING LIMIT point is found by SLOWLY rotating the motorend bell CCW watching both readings slowly rising until a sudden rise in either or both readings (current Amps and ripple Volts) is noticed (typically about 1/4" from Neutral - make sure not to go far beyond this point). This is the beginning of a zone of maximum performance but unfortunately of very low brush and comm lifetime expectancy and most likely also a low run time. Mark this point and turn the end bell back CW a few degrees and mark that point, too. Mark down the current and ripple voltage for future reference.

PERIODIC COMMUTATION CHECK

Before testing, set the timing back to Neutral using the mark you previously made. The readings will generally increase after every race - meaning the condition of the commutator and brushes gets worse. When conditioning by useof sprays make sure the spray liquid is fully evaporated before retesting otherwise the readings will be too optimistic. If conditioning by spraying or using a commutator stick fails to bring the readings down significantly and the readings remain twice or more the original magnitude, it is time to adjust the spring tension or change the brushes or reface the commutator (run Break-in afterwards). Reset the timing back to the advanced position afterthe recheck. It is typical for commutator type motors to be relatively electrically unstable. You will notice that readings change depending on a position of the motor. Testing in one position is therefore recommended. Testing motors with fixed timing (Stock) is limited to a test in advanced position which does not show the commutator / brush deterioration as clearly as in Neutral. However, it is still very well detectable.