

**Checking for Open Commutator Bars**

Contact adjacent commutator riser bars with a pair of test lamp probes. The lamp should light on each bar. If the lamp fails to light the wire to bar junction is open. Replace open armature.

**Inspection of Armature Shaft Gear Teeth**

Visually inspect armature shaft gear teeth. Replace both the armature and the gear box if armature gear has nicks or burrs.

(3) Reposition any brush springs not properly assembled behind brushes.

(4) File sides of any brushes that may be stuck in slots.

**Assembly**

(1) Lock gear box in bench vise by the flange—brush holder up.

(2) Clean commutator with ink eraser, install a flat

washer, spring washer and flat washer on armature shaft. Place armature in brush holder assembly.

(3) Release brush leads from brush holder notches (check to see brushes are spring loaded against the commutator).

(4) Align the window in the motor housing with the brush holder and install it quickly over the armature so the magnets in the motor housing do not pull the armature out of the brush holder. Make sure that the motor housing is flush with the gear housing and over the four detents.

(5) Install motor housing through bolts.

(6) Install resistor assembly and part number tag. Secure with screw (install tag atop resistor bracket with screw head against ground strap).

(7) Bench test wiper motor assembly. Tap the assembly gently with a mallet to align bearings in the motor housing and gear housing during the run period.

(8) Install bulkhead seal.

**THREE SPEED WINDSHIELD WIPER MOTOR****SERVICE PROCEDURES****VOLTAGE TEST WIPER SYSTEM**

Remove the blade and arm assemblies to simulate wet glass load.

Measure the voltage at the four motor terminals at the bulkhead disconnect while the motor is operated. Compare the measured voltages to those in the WIPER SYSTEM VOLTAGE CHART (THREE SPEED).

**WIPER SYSTEM VOLTAGE CHART**

Switch Position	Brown	Red	Green	Blue	Battery
Low	12	12	0	10 to 12	12
Medium	12	5	0	10 to 12	12
High	12	2.5	0	10 to 12	12
Off (While Parking)	10 to 12	0	10 to 12	12	12
Off (Parked)	0	0	0	12	12

Voltages less than 10 volts at the blue lead during run may indicate excessive current draw, voltage cycling to 0 volts indicates a cycling circuit breaker. Check the linkage for binding, the motor for excessive current and measure the armature current in the brown lead to ascertain that the circuit breaker is able to carry its continuous rated current.

A "0" volt reading at the blue lead in LOW, MEDIUM or HIGH speeds may indicate that the park switch is open, that the leads on the park switch are not soldered properly, or that the brown lead circuit to the series field is open or shorted. Check the leads

in the motor pigtail for damage to be repaired. See "Motor Testing", "Switch Testing", and "Service Diagnosis" to isolate defective components.

A 12 volt measurement at the red terminal at MEDIUM and HIGH speeds indicates that there is an open in the shunt field circuit. A 12 volt reading at the green lead indicates that the field circuit is open between the disconnect and the panel switch, the panel switch is defective or that the panel switch is not grounded, and the motor is usually undamaged.

A "0" volt measurement while running at the red terminal at LOW, MEDIUM or HIGH indicates that there is an open circuit from the panel switch to the disconnect or that the panel switch is defective.

When voltage remains on brown lead after motor has parked, a stall condition exists. Circuit breaker in panel switch should be cycling as indicated by brown lead voltage cycling from about 12 volts to zero volts. If circuit breaker is not cycling, replace panel switch and motor, since motor may have been damaged by previous stalls. If circuit breaker does cycle, check to find whether stall is fault of panel switch or motor park switch by unsoldering blue lead from motor park switch. If stall condition remains, investigate panel switch and wiring, if stall condition goes away see "Gear and Park Switch Replacement".

If wipers stop and then start again after a few moments, circuit breaker in panel switch is probably cycling. This can be checked by reading voltage at brown lead. If voltage drops to zero when wipers stop,