Wiper/Washer Systems

GENERAL MOTORS — SQUARE MOTOR

"P" Models

DESCRIPTION

Two speed motor is a compound wound (series and shunt) type. Gear train consists of a helical gear at end of armature shaft, driving an intermediate gear and pinion assembly. Pinion drives output gear and shaft. The crank arm, which is attached to output gear shaft, drives wiper transmissions through connecting link arms.

Circuit protection for wipers is through a fuse on fuse block. Windshield washer pump is a positive displacement type using a piston arrangement. Pump is mounted on shaft of wiper output gear.

TESTING & TROUBLE SHOOTING

WIPER ON CAR

Wiper Inoperative

1) Check wiring harness, wiper ground strap and dash switch connections and mounting. Check fuse. With ignition switch "ON", check for 12 volts at harness terminal which connects to No. 2 terminal.

2) To by-pass switch, disconnect wiring at motor and connect jumper wire from No. 1 and No. 3 terminals to ground. Connect a 12 volt source to No. 2 terminal. If wiper does not operate, disconnect transmissions from crank arm. If wiper still does not operate, remove motor from vehicle and test. *See Wiper Off Car.*

Wiper Will Not Shut Off

1) Determine whether wiper has both speeds, low speed only or high speed only. Operate wiper by by-passing switch as previously outlined. *See Wiper Inoperative.* If wiper operates correctly and has both speeds, lead to switch from No. 1 terminal is grounded or switch is faulty.

2) If wiper has low or high speed only, lead to switch from No. 3 terminal is open or switch is faulty. If wiper still does not operate, remove motor from vehicle and test. *See Wiper Off Car.*

Operates Low Speed Only & Shuts Off With Dash Switch In High Position

Reverse harness leads connected to No. 1 and 3 terminals.

Does Not Return To Park With Wiper Off

Check ground strap connection. Park switch contacts may be dirty, bent or broken.

Speed Normal In Low, But Too Fast In High

Terminal board resistor may be open. Remove from vehicle to test terminal board.

Wiper Operates Intermittently

Loose ground strap or dash switch mounting.

WIPER OFF CAR

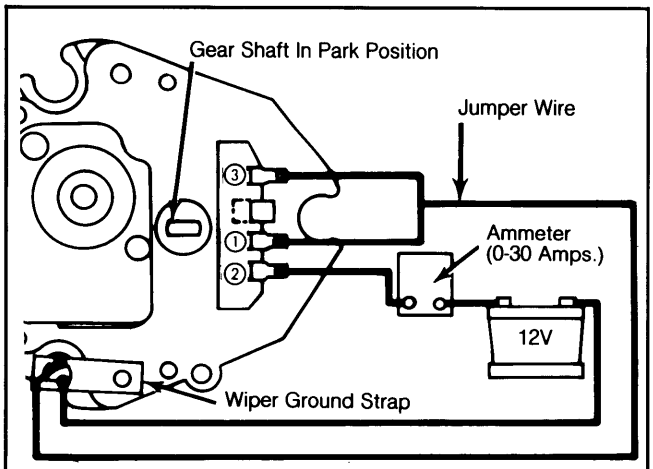
NOTE: Use ammeter with reading of 30 amperes (minimum) in feed wire circuit.

Wiper Inoperative

1) Connect an ammeter and battery to No. 2 terminal and a jumper wire from No. 1 and No. 3 terminals to ground. Wiper should operate at low speed. If ammeter reading is zero, check for loose splice joints or loose solder connection at No. 2 terminal.

2) If reading is 1.0-1.5 amperes, check for sticking brushes, open armature or loose splice joint. If reading is 11.0 amperes, check for broken gear or other stalling condition.

Fig. 1: Jumper Wire Testing Connections



"LO" Speed — As Shown.

"HI" Speed — Disconnect Jumper Wire From Terminal No. 3.

"OFF" — Leave Jumper Connected to Terminals No. 1 and No. 3, But Disconnect It From Ground Strap. Wiper Should Stop with Gear Shaft Flats as Shown.

Wiper Will Not Shut Off

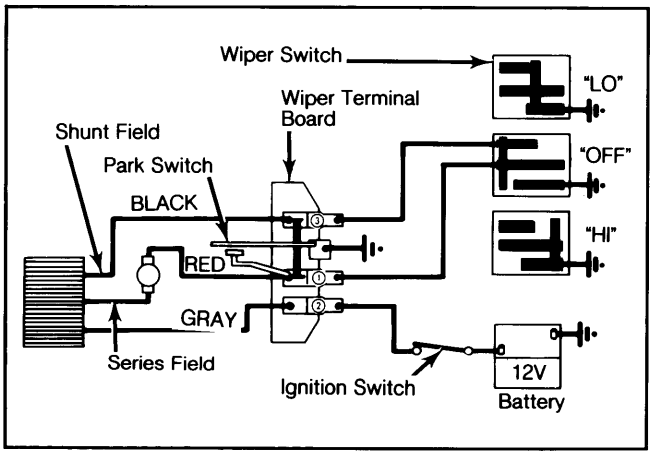
1) If wiper has both speeds, park switch contacts may not be opening or internal motor lead to No. 1 terminal is grounded. If wiper has low speed only, shunt field coil may be grounded or internal wiper lead to No. 3 terminal is grounded.

2) If wiper has high speed only, shunt field is open or internal lead to No. 3 terminal is open.

Wipers Operate Intermittently

Check for sticking brushes, loose splice joints or other loose connections.

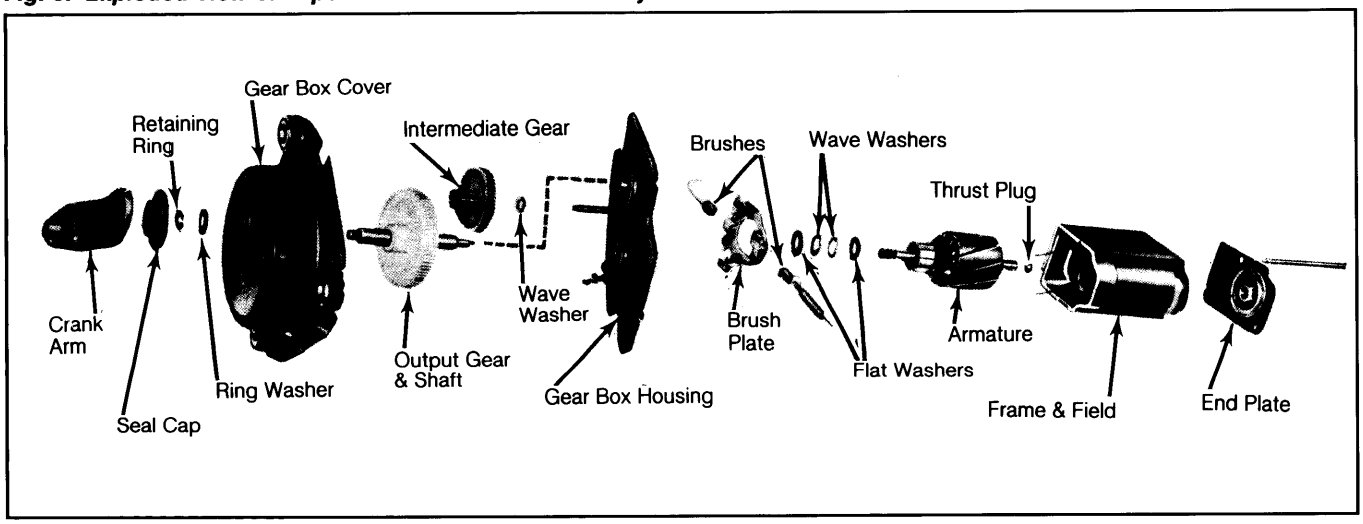
Fig. 2: General Motors Square Motor Wiper System Wiring Diagram



Wiper/Washer Systems

GENERAL MOTORS — SQUARE MOTOR (Cont.)

Fig. 3: Exploded View of Wiper Motor and Drive Assembly



OVERHAUL

GEAR BOX

Disassembly

1) Remove washer pump. Remove pump drive cam by wedging shaft with 2 screwdrivers. Clamp crank arm in vise and remove retaining nut. Arm must be secure in vise to avoid stripping wiper gears.

2) Remove crank arm, seal cap, retaining ring and end play washers. Drill out gear box cover rivets and remove cover.

3) Remove output gear and shaft assembly. Slide intermediate gear and pinion off shaft. Remove terminal board and park switch by unsoldering motor leads and drilling out rivets holding terminal board and park switch ground strap to plate.

Reassembly

1) Lubricate gear teeth with suitable cam lubricant. Position cover over locating dowel pins. Reconnect ground strap.

2) Place wiper in park position, and install crank arm on output shaft so identification marks line up with marks in cover. Clamp crank in vise and tightening retaining nut. To complete reassembly, reverse disassembly procedure.

WIPER MOTOR

Disassembly

Disassemble gear box, remove through bolts, tap motor frame lightly and remove motor from mounting plate. Release brush spring tension and slide armature and end plate from motor frame. Pull end plate from armature. Remove end play adjusting washers and note arrangement for proper reassembly.

NOTE: A thrust plug is located between armature shaft and end plate.

Reassembly

Lubricate armature shaft bushings with light machine oil. Install washers with concave side of washers toward each other. End play is automatically controlled by proper installation of washers. To complete reassembly, reverse disassembly procedure.

WASHER PUMP

Disassembly

1) Squeeze solenoid cover and remove. Remove ratchet dog retaining screw. Hold solenoid plunger in position and lift solenoid assembly and ratchet dog from pump frame. Separate ratchet dog from solenoid mounting plate.

2) Disconnect ratchet pawl spring, remove pawl retaining ring and slide ratchet pawl off cam follower shaft. Remove ratchet dog from pump frame, move ratchet wheel spring out of shaft groove and slide ratchet wheel off its shaft.

3) Separate pump and pump actuator plate from frame by pulling pump housing until grooves in housing clear the frame. Remove actuator plate from ratchet wheel and cam follower shafts. Remove screws attaching valve assembly to pump housing and remove valve.

Reassembly

Position gasket between housing and valve plate in the housing and valve plate grooves. Install triple "O" ring between valve body and pipe assembly. To complete reassembly, reverse disassembly procedure.

MOTOR SPECIFICATIONS

Application	Specification
Operating Voltage	12 Volts
Current Draw (No Load Max.)	
"LO" Speed	4.0 Amps.
"HI" Speed	3.5 Amps.
Current Draw (Stall, Cold)	12.0 Amps.
Crank Arm Speed (Minimum)	
"LO" Speed	31 RPM
"HI" Speed	55 RPM