

G.M. 2-SPEED ELECTRIC — ROUND MOTOR

Chevrolet

All Models Exc. "P"

GMC

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DESCRIPTION

Two speed motor consists of a compound wound 12 volt motor, gear reduction mechanism and parking switch. Armature has a worm shaft which drives the gear and shaft assembly. Crank arm is attached externally to gear shaft and operates linkage which activates wiper blades. Circuit protection is through an internal circuit breaker mounted on motor brush plate and protects motor from overheating. Windshield washer pump is positive displacement type using piston arrangement.

TESTING & TROUBLE SHOOTING

WIPER (ON CAR)

Wiper Inoperative — Check wiring harness, wiper ground strap and dash switch for proper connections and mounting. Check fuse. With ignition switch on, check for 12 volts at center terminal (No. 2) of wiper connector body. Disconnect wiring at motor and connect jumper wire from No. 1 and 3 terminals to ground and a 12 volt source to No. 2 terminal. If wiper now operates correctly, lead from No. 1 terminal to dash switch is open, dash switch is defective or there is an open in lead to No. 2 terminal (causing no voltage supply to wiper). If wiper fails to operate correctly, remove from car and test unit. See *Wiper (Off Car)*.

Wiper Will Not Shut Off — Determine whether wiper has both speeds, low speed only or high speed only. If wiper has both speeds, lead to switch from No. 1 terminal is grounded or switch is faulty. If wiper has low speed only, lead to switch from No. 3 terminal is grounded or switch is faulty. If wiper has high speed only, lead to switch from No. 3 terminal is open or switch is faulty.

Wiper Operates Intermittently — Loose ground strap or dash switch mounting. Defective dash switch.

WIPER (OFF CAR)

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

Wiper Inoperative — Connect an ammeter and battery to No. 2 terminal and a jumper wire from No. 1 and 3 terminals to ground. Wiper should operate at low speed. If ammeter reading is 0, check solder connections and splice joints for loose connections. If reading is 2-3 amperes, check for loose splice joints, sticking or damaged brushes, loose solder connections or dirty circuit breaker contacts. If reading is 20 amperes or more, check for a condition which will stall wiper, such as broken gear or locked armature.

Wiper Will Not Shut Off — If wiper has both speeds, switch contacts are not opening or internal motor lead to No. 1 terminal is grounded. If wiper has low speed only, internal motor lead to No. 3 terminal is grounded or field coil is grounded. If wiper has high speed only, shunt field circuit is open.

Wiper Speed Excessive In High — Check for open resistor on back of wiper terminal board.

Wiper Operates Intermittently — If current draw is normal (3.5-5.0 amperes) check for loose splice joints and/or solder joints. Check for a defective circuit breaker. If current draw is 6-8 amperes (wiper runs slow and is noisy) check for shorted or grounded armature, armature end play (.002-.003") and gear shaft end play (.005" maximum).

WASHER (ON CAR)

Washer Inoperative — Check the following and repair as necessary: Sufficient solution in jar; hoses undamaged and connections tight; plugged screen at end of jar cover hose; loose electrical connection to washer pump or wiper switch; open circuit in feed wire to pump solenoid coil; defective switch; solenoid coil defective, washer nozzles plugged; ratchet wheel tooth missing; ratchet pawl spring missing; defective pump valve assembly.

Washer Pumps Continuously When Wiper Operates — Check the following and repair as necessary: Grounded wire from solenoid to switch; defective wiper switch; ratchet wheel tooth missing; ratchet wheel dog broken or not contacting ratchet wheel teeth; lock-out tang broken or bent on piston actuating plate.

REMOVAL & INSTALLATION

WIPER MOTOR (EXC. "G" MODELS)

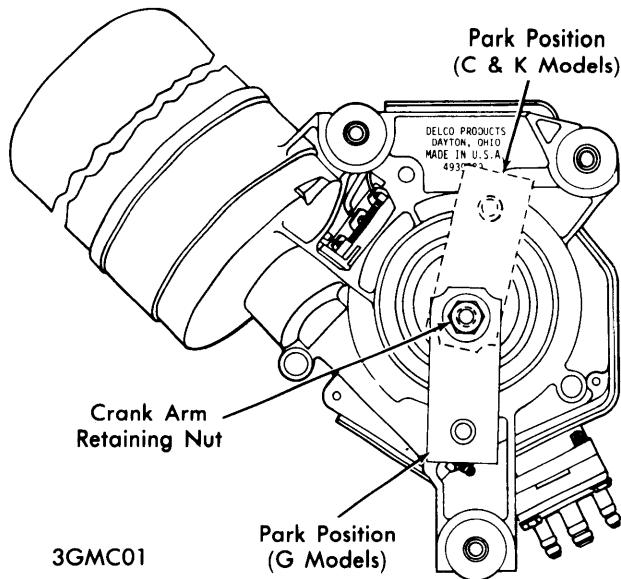
Removal & Installation — Ensure wiper motor is in park position, then disconnect ground cable from battery, electrical harness at motor and hoses at washer pump. Reach through access hole in cowl grille and loosen wiper drive rod attaching screws. Remove drive rod from wiper motor crank arm. Remove wiper motor-to-dash panel attaching screws and remove motor assembly. To install, reverse removal procedure while noting the following: Lubricate crank arm pivot prior to reinstallation.

WIPER MOTOR ("G" MODELS ONLY)

Removal — Ensure wiper motor is in park position, then disconnect battery ground cable and remove wiper arms. Remove cowl panel cover. Loosen nuts holding linkage to crank arm and lift linkage off arm. Disconnect wiring to motor. Remove left dash defroster outlet from flex hose and position hose to one side. Remove screw securing left hand heater duct to engine cover shroud and slip heater duct down and out. Remove washer hoses, then remove screws securing wiper motor to cowl and lift wiper motor out from under dash.

Installation — To install, reverse removal procedures while noting the following: Ensure wiper motor is in park position before installing. Lube wiper motor crank arm pivot prior to installation.

G.M. 2-SPEED ELECTRIC – ROUND MOTOR (Cont.)



WIPER MOTOR PARK POSITION

OVERHAUL

GEAR ASSEMBLY

Disassembly – Remove washer pump, screw retaining park switch, spacer, then unsolder lead and remove switch. Clamp crank arm in vise and loosen crank arm retaining nut. Remove nut and crank arm. Remove seal cap, retaining ring, washer, end play washers and outer spacer. Slide gear assembly out of housing and remove inner spacer washer. Slide drive plate and shaft assembly out of gear and tube assembly (if equipped).

Reassembly – Reverse disassembly procedure while noting the following: Operate wiper gear to park position (see illustration), position crank arm on gear shaft flats and install retaining nut finger tight. Clamp crank arm in vise and tighten retaining nut.

WIPER MOTOR

Disassembly – 1) **NOTE** – Motor section may be disassembled independently of gear box. Scribe reference line along side of casting and end cap to insure proper reassembly and remove two motor through bolts. Feed exposed excess

length of motor leads through casting grommet and back case and field assembly, plus armature, away from casting. **NOTE** – It may be necessary to remove armature end play adjusting screw and insert rod through opening to apply pressure against end of armature.

2) Unsolder black lead from circuit breaker and straighten out four tabs securing brush plate to field coil retainers. Install "U" shaped brush retainer clip over brush holder which has brush lead attached to circuit breaker. Hold the other brush and carefully lift brush holder off mounting tabs enough to clear armature commutator. Allow brush to move out of its holder, remove spring and lift brush holder from armature shaft.

3) Lift armature from case and field assembly. If armature is being replaced, remove thrust ball from end of defective armature shaft (using a magnet) and install it in new armature. End case and field assembly is serviced as a unit. To free field and case assembly, cut solid black plastic insulation and black with pink stripe leads in a location convenient for splicing. Remove steel thrust plate and rubber disc from case bearing (as required).

Reassembly – 1) If new field and case assembly is being installed, splice new leads of field to corresponding leads of terminal board. Install rubber thrust disc, steel thrust disc and felt lubricating washer in case assembly bearing. Lubricate end of armature shaft which fits in case bearing, install thrust ball in end of shaft and assemble armature to field and case assembly.

2) Position partially assembled brush plate over armature shaft and place other brush in its holder, then position brush plate on mounting tabs. **NOTE** – Circuit breaker should be opposite field cross over splice connections. Bend tabs toward brush holders to secure brush plate in position while making sure tabs are centered in brush plate mounting holes. Remove brush retainer clips and resolder black cotton covered lead to circuit breaker.

3) If new case and field assembly is used, scribe a line on it in same location as one scribed on old case. Position armature worm shaft inside housing and line up scribe mark on field and case with housing. Start armature worm shaft through bearing until it starts to mesh with worm gear while pulling excess leads through housing grommet. **NOTE** – It may be necessary to rotate armature slightly before worm will engage with worm gear teeth. Rotate case as required to align bolt holes and install two through bolts, then tighten. Adjust armature endplay by tightening adjusting screw until finger tight and then tighten lock nut.