1974 GENERAL MOTORS PULSE SYSTEM

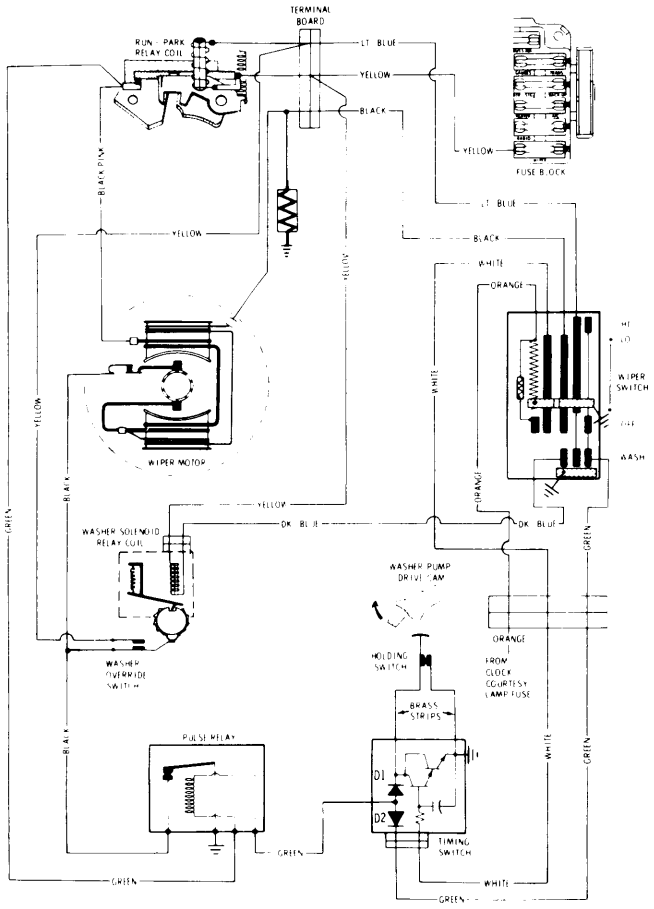
DESCRIPTION

Pulse wiper provides a variable delay action wipe cycle in addition to the standard two or three speed operation. With wiper in "DELAY" mode between minimum and maximum, delay time of wipe cycle ranges 0 to 12 seconds. Pulse wiper motor, similar to round motor, is externally grounded. Gearbox and pulse relays control starting and stopping of wiper motor in conjunction with switch.

OPERATION

Gearbox Relay – Relay switches feed current on and off to motor windings and pulse relay coil (see illustration). Ignition current energizes relay coil, and wiper switch completes circuit to ground. Relay contacts close completing feed circuit to motor and pulse relay coil.

Pulse Relay – Provides motor ground through relay contacts. Relay coil circuit is grounded by either wiper switch or timing circuit depending on switch mode.



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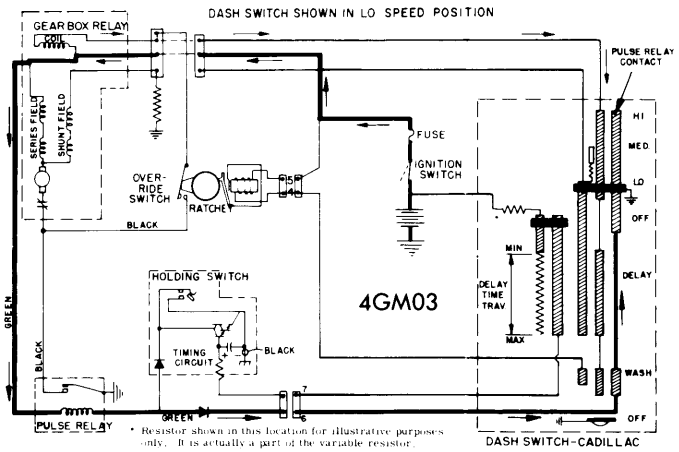
PULSE WIPER WIRING DIAGRAM (OLDSMOBILE)

Timing Circuit – Consists of a diode, capacitor, variable resistor (in wiper switch), transistor and holding switch. Voltage applied to capacitor charges it. At a preset charge, transistor is turned on like a switch completing ground circuit for pulse relay coil. Pulse contacts close, wiper starts. Holding switch contacts are held open by a fin on washer pump drive cam, but when wiper operates, fin is moved permitting holding switch to close. Closing switch discharges capacitor in preparation for next delay period and turns off transistor. Closing contacts also provides a ground circuit for pulse coil until wiper cycle is completed. Wiper shuts off when fin opens holding switch contacts.



PULSE WIPER WIRING DIAGRAM (CADILLAC)

TESTING

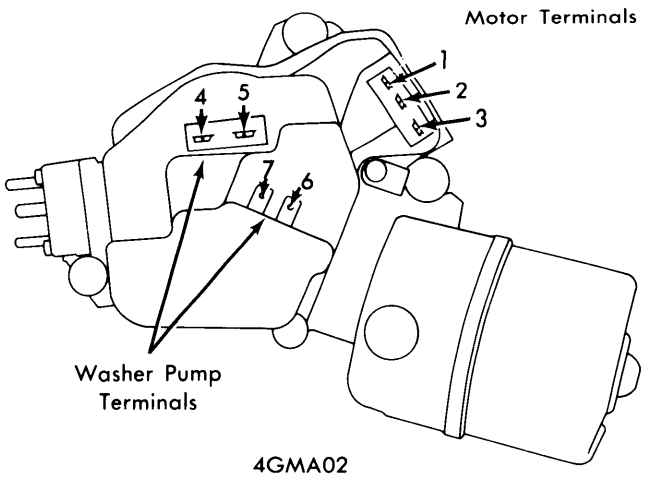
PULSE WIPER CIRCUITS

Wiper Inoperative, (All Modes) -1) Check motor center terminal voltage with ignition "ON". With no voltage, check fuse or open wire between fuse block and wiper.

2) With voltage, check problem in harness, wiper switch or motor. Set wiper switch to "LO", connect jumpers on motor grounding terminals "1" & "6" (see illustration). With ignition "ON", if wiper fails, problem is in wiper unit, proceed to step No. 3. If wiper operates, disconnect jumper from terminal "1", if wiper stops, trouble is in harness or switch. If wiper continues, disconnect jumper from terminal "6", if wiper stops, trouble is in harness or switch. If wiper now operates, and original problem was an inoperative motor, check for loose motor and/or wiper switch ground.

3) Determine if problem is in gearbox relay, motor and/or pulse relay. With motor wiring connected, ignition "ON" and wiper in "LO", connect test lamp between BLACK-PINK lead and ground. If lamp fails, gearbox relay is defective. If lamp lights, check motor section and pulse relay. Remove washer pump cover, reinstall wiring. Disconnect BLACK (cotton braid) lead from override switch terminal and connect it to ground. With ignition "ON", wiper in "LO", if wiper fails, problem is in motor gearbox, visually inspect gearbox. If wiper runs, check lead connections to pulse relay, if good, problem is in pulse relay.

1974 GENERAL MOTORS PULSE SYSTEM (Cont.)



PULSE WIPER MOTOR TERMINALS

Wiper Fails in "DELAY" & "LO" Modes (Buick-Olds) – 1) Determine if problem is a grounded wire to terminal "7". Remove connector from terminals "6" & "7". Connect test lamp from battery to wire connector socket for terminal "7". If lamp lights, wire is grounded.

2) If lamp fails, check problem in wiper switch or timing device. Disconnect battery ground cable. Remove wiring from terminals "1", "2", "3", "6" & "7". Connect ohmmeter to connector sockets that normally connect to terminals "2" & "7". Turn ignition "ON" and operate wiper switch in all modes observing meter reading. Meter should never read less than 400 ohms in any position. In "MAX" delay, ohms should be approximately 1 megohm (1,000,000 ohms). If resistance is less than 400 ohms, replace wiper switch. If resistance is satisfactory, the timing device is defective.

Wiper Operates In "DELAY" Mode Only – Check for an open condition in wire from wiper unit terminal 6 to wiper switch and/or a defective switch.

Wiper Will Not Pulse Correctly – 1) Determine if problem is in wiring, wiper switch or motor. Remove connector from terminals "6" & "7". Remove terminal "6" lead and reinstall connector. Set wiper switch in "DELAY" mode about halfway between "MIN" and "MAX". Turn ignition "ON", if wiper operates correctly in pulse mode, check for a grounded wire from terminal "6" to wiper switch. If wiper runs steady, but will not pulse, continue to step two.

2) Determine if problem is an internal ground in motor, pulse relay and/or timing device. Remove washer cover and reconnect all wiring. Disconnect BLACK (cotton braid) lead from override switch. Set wiper switch in "DELAY" mode, ignition "ON", if wiper runs, motor armature circuit is internally grounded. Check for grounded brush lead or BLACK (cotton braid) lead. If wiper fails, problem is in pulse relay, timing device or holding switch. Remove wiper unit from car and proceed to step three.

3) Check pulse relay. Disconnect washer pump unit from motor gearbox. Connect a test light in series with a 12V battery between ground and end terminal on relay closest center terminal. If lamp lights, replace pulse relay. If lamp fails, continue to step four.

4) Check problem in holding switch or timing device. Leave test lamp and battery connected as in step No. 3, and also connect a jumper between relay center terminal and battery positive terminal. Momentarily bridge across holding switch contacts with a screwdriver and discharge capacitor. Then manually rotate washer pump drive cam counterclockwise. Observe if switch contacts open and close and if lamp lights when contacts close. Contacts open and close, but lamp stays on, replace timing device. Contacts do not open and close properly, holding switch is defective or requires adjustment. If lamp fails when contacts are closed, contact continuity is poor, clean and recheck.

Wiper Will Not Shut Off, Wipe Pattern Normal – 1) Determine if problem is a grounded wire leading from terminal 7. Disconnect terminals "1", "2" & "3". Remove lead from terminal "1" and reinstall connector. With wiper "OFF", ignition "ON", if wiper stops, check for a ground in wire from terminal "1" and check switch. If wiper continues to operate, continue to step 2.

2) Determine if problem is internal in motor gearbox relay or override switch circuit. Remove washer pump cover, reconnect terminals and disconnect YELLOW lead from terminal "1". With igntion "ON" and wiper "OFF", if wiper continues to run, gearbox relay is defective. If wiper shuts off, continue to step three.

3) Check problem in washer pump programming mechanism. Observe if washer pump ratchet gear has rotated far enough to position projection on rim of ratchet gear lifting override switch contacts. If ratchet gear is in correct position, but switch contacts are closed, adjust contact gap to .025". If ratchet gear is in correct position and contacts are open, check YELLOW lead connection for grounding, if no ground can be found, replace switch and timing device. If ratchet gear is not rotated far enough to open override switch, check ratchet relay armature position. Relay armature leg should be in slot area of gear rim.

Wiper Will Not Shut Off, Blades Cycle 15-20° – If wiper has "LO" and "HI" speeds, the gearbox relay is defective. If wiper operates only in "HI" speed, continue to next test.

Wiper Operates Only In "HI" Speed – Check for problem in wiper unit, harness and/or wiper switch. Connect a jumper from wiper terminal "3" to ground, turn ignition switch "ON" and wiper "OFF". If wiper still has "HI" speed only, trouble is in motor. Remove unit from car and inspect motor windings and gearbox. If wiper has "LO" speed and shuts off, trouble is in harness or switch. Check for an open in wire from terminal "3" to switch.

1974 GENERAL MOTORS PULSE SYSTEM (Cont.)

Wiper Operates Only In "LO" Speed – Determine if problem is in harness, switch or wiper unit. Remove wire from connector and terminal "3". If wiper still has "LO" speed only, trouble is in wiper motor, remove unit from car and check internal wiring. If wiper has "HI" speed, look for a ground condition in wire from terminal "3" to switch.

Wiper Stops Intermittently During Run Modes – 1) Remove wiper system fuse and connect an ammeter (0-30 Amps.) across fuse block terminals. On Oldsmobile and Buick models, remove connector from wiper terminals "6" & "7", and connect a jumper from terminal "6" to ground. Operate wiper in "LO" speed and cycle washer system. About two minutes after completion of wash cycle, with wiper still operating, observe lowest current draw reading.

2) If lowest current draw is 5 to 6.5 Amps., a weak motor circuit breaker is indicated, replace breaker and recheck wiper. If lowest current draw exceeds 6.5 Amps., replace blade elements and repeat test. If lowest current draw is below 6.5 Amps., system is operating correctly.

3) If lowest current reading still exceeds 6.5 Amps., disconnect wiper arm linkage and repeat current draw test. If current draw is now below 6.5 Amps., check for binding in wiper linkage. If current draw still exceeds 6.5 Amps., remove wiper unit from car and check armature end play, gear binding, armature binding and/or shorted.

PULSE WINDSHIELD WASHER SYSTEM

Washer Inoperative – 1) Determine if problem is in pump, wiring or switch. With ignition "ON", disconnect wiring from washer terminals "4" & "5" (see illustration). Connect battery positive jumper to either terminal "4" or "5", and momentarily connect other terminal to ground with wiper switch in "LO". If washer operates, check for an open wire or a defective switch. If washer does not operate, continue to step two.

2) Check washer pump relay coil. With washer wiring connected and ignition "ON", check for voltage at terminals "4" & "5". No voltage at either terminal, check for an open in power feed wire between terminal "2" and washer pump terminal. Voltage at one terminal only, ratchet relay coil open. Voltage at both terminals, proceed to next test.

Operational Check – Remove washer pump cover and reconnect wiring. With wiper switch "OFF" and ignition "ON", actuate wiper-washer system by momentarily grounding washer pump instrument panel switch terminal. Observe if ratchet pawl moves back and forth with motor operating. If pawl is inoperative, check pawl spring. If spring is satisfactory, remove pump and check for a binding condition in cam follower pivot. If ratchet pawl moves back and forth, check ratchet gear for proper rotation. If satisfactory, observe piston movement within housing. Replace piston and pump housing or valve assembly if necessary. If ratchet gear does not rotate, check relay armature leg on ratchet gear ramp. Pawl must engage ratchet gear teeth.

Washer Operates Whenever Wiper Is Operated – Determine if problem is in wiring, switch or washer pump. With ignition "ON" and wiper in "LO", disconnect wiring from terminals "4" & "5" (see illustration). Observe is washer pump completes cycle correctly. If pump completes cycle, check for a ground in wire from washer to wiper switch.

REMOVAL & INSTALLATION

Wiper motor removal and gearbox service procedures are same as the standard Round Motor System. *See General Motors – ROUND MOTOR Removal & Installation.*