GENERAL MOTORS – MULTIPLEX WIPER SYSTEM

Buick (Exc. Skylark & Skyhawk)
Cadillac
Chevrolet (Exc. Citation, Monza & Chevette)
Oldsmobile (Exc. Omega & Starfire)
Pontiac (Exc. Phoenix & Sunbird)

DESCRIPTION

The multiplex wiper system consists of a round wiper motor, washer pump, special delay circuit board (in wiper housing), and a unique switch. The system allows the driver to adjust the interval between wiper sweeps up to a maximum of 16 seconds. Some vehicles also have a "MIST" feature which operates the wipers as long as the switch is held.

OPERATION

DASHBOARD SWITCH

The switch grounds all motor circuits and has no direct power feed. It contains a variable resistor and several sets of switch contacts. The body of the switch must be grounded.

CONSTANT SPEED OPERATION

During constant speed operation, both the pulse and park relays are closed. Speed is controlled by connecting resistors between the shunt field and ground. In "LOW", the shunt field is grounded directly at the dash switch. In "MED" speed (some models) a 20 ohm resistor in the park relay and a 13 ohm resistor in the switch are connected in parallel to ground. In "HIGH", the 20 ohm resistor in the park relay connects the shunt field to ground.

DELAY OPERATION

During delay operation, the circuit board timer controls the pulse relay operation. An electronic timer and capacitor circuit determine the time between cycles. When the pulse contacts close, the motor begins to operate. The holding switch contacts close, and ground the motor for the rest of the sweep cycle. Then the motor cam allows the holding contacts to open and the motor to stop. When the slected time interval elapses, the timer closes the pulse relay and the cycle repeats.

SPARK OPERATION

When the switch is moved to the "OFF" position, the park relay coil is opened, the pulse relay is connected to ground, and the shunt field is grounded to continue low speed operation. The continuing rotation of the motor opens a relay latch arm. The output shaft and wiper arm are driven by cam action past their normal cycling point and move to the park position. The relay switch contacts are opened, and the motor stops.

WASHER OPERATION

The washer can be actuated with the wipers stopped, in a constant speed mode, or in delay. When the wipers are stopped and the washer switch is depressed, the motor starts and runs in "LOW" while the washer pump provides fluid for cleaning the windshield. When the wipers are operating in a constant speed mode, the washer will also operate with the wipers at that speed. If the washer is selected when the wipers are in the delay mode, the circuitry is bypassed and the motor will operate in "LOW". The delay operation will resume after the wash cycle is complete.

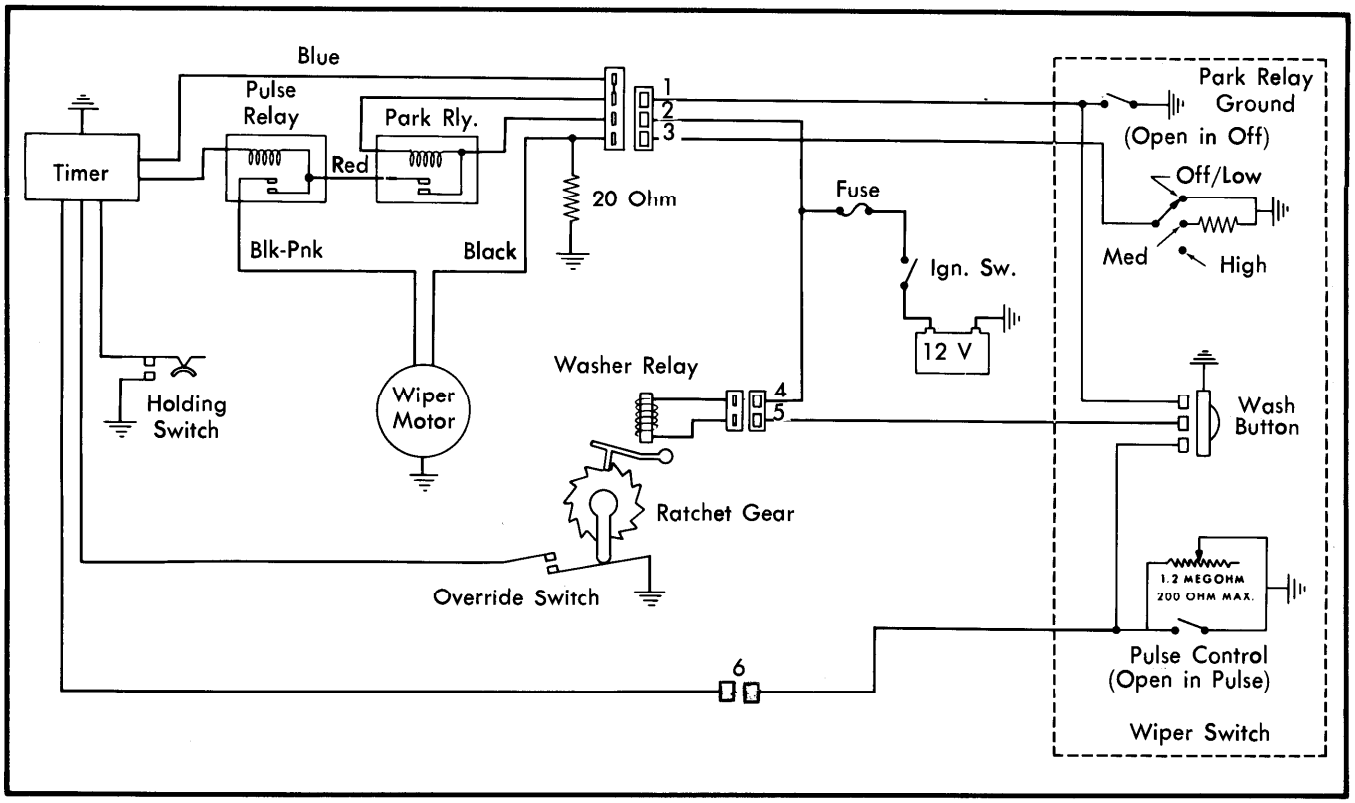

Fig. 1 General Motors Multiplex Wiper Wiring Diagram

GENERAL MOTORS – MULTIPLEX WIPER SYSTEM (Cont.)

SYSTEM TESTING

WIPER COMPLETELY INOPERATIVE

1) Connect test lamp between ground and motor terminal 2. If no power, check fuse and feed wire. If power is present, connect test lamp to terminal 1. If no power, replace park relay. If power is present at terminal 1, move wiper switch to "LO" and disconnect wiper plug from terminals 1, 2, 3.

2) Connect test lamp between sockets in connector for terminals 1 and 2. If lamp does not light, check for open circuit in terminal 1 wire to switch, then check switch ground and switch. Place dash switch in "HIGH" position.

3) Disconnect wiring from teminal 6. Connect one lead of test lamp to positive battery terminal or 12V source, and connect the other end to terminal 6 wire in connector. If no power, check for open in terminal 6 wire to switch and check switch. If power is present, remove washer pump cover and reconnect all wiring to motor.

4) Place dash switch in "LOW" position. Connect test lamp to ground and probe red wire at pulse relay. If no power, replace park relay. If power is present, connect a jumper wire from pulse relay orange wire terminal to ground. If motor runs, replace timer/switch assembly.

5) If motor did not run, leave jumper connected and connect test lamp to ground and probe black/pink wire at pulse relay. If power is present, motor is faulty and must be repaired. If no power, replace pulse relay.

WIPER WON'T SHUT OFF

1) If wipers works correctly in "DELAY", turn ignition "ON" and wiper switch "OFF". Disconnect terminal 1, 2, 3 connector. Connect test lamp between wires to terminals 1 and 2. If power is present terminal 1 wire is grounded or switch is defective. If no power, check park relay spring. If ok, replace park relay.

2) If wipers do not stop in "DELAY" mode, check to see if wipers park when ignition is turned "OFF". If so, clean wiper holding switch contacts or replace timer/switch assembly. If not, check override switch contacts, grounded blue wire, or replace timer/switch assembly.

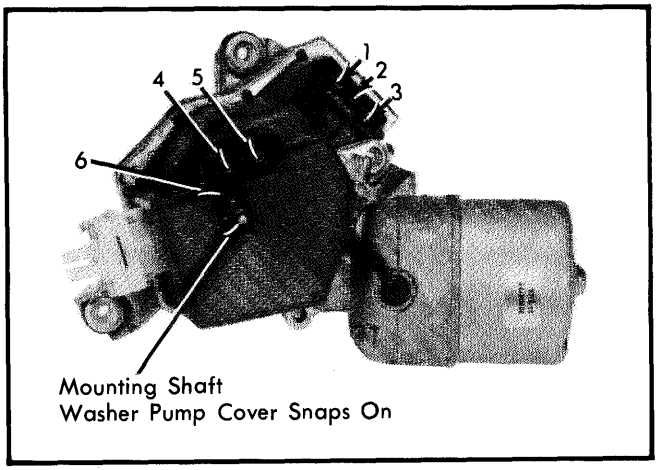

Fig. 2 Multiplex Wiper Connections

BLADES CYCLE IN AND OUT OF PARK OR ONLY HIGH SPEED OPERATES

1) If wiper has both speed operational, replace park relay. If only the "HIGH" speed works, check connection at terminal 3. If ok, connect a jumper from terminal 3 to ground (with regular wiring connected).

2) If wiper operates correctly, repair terminal 3 wire between motor and dash switch, or check dash switch. If wiper still does not operate, remove motor and check for intermittent open in shunt field.

ONLY LOW SPEED OPERATES

Turn ignition "ON" and wipers to "HIGH". Disconnect 1, 2, 3 connector. Connect test lamp between terminal 2 and 3 wires in connector. If no power, repair wiper motor. If power is present, repair terminal 3 wire or dash switch.

WIPER DELAY INOPERATIVE

1) If wiper is completely inoperative in "DELAY" position, place switch in "DELAY", adjust to middle of delay position, and disconnect terminal 6 wiring. Connect an ohmmeter between terminal 6 wire and ground. Resistance should be measured on 1 megohm scale. If so, replace timer/switch assembly. If not, replace dash switch.

2) If wiper operates but does not delay, place switch in middle of "DELAY" position and disconnect terminal 6 wire with wipers operating. If wipers stop, problem is a grounded terminal 6 wire or dash switch.

3) If wipers do not stop with terminal 6 wire disconnected, remove washer pump cover and reconnect all wiring. Disconnect orange wire from pulse relay terminal while wipers are running. If wipers stop, replace timer/switch assembly. If not, replace pulse relay.

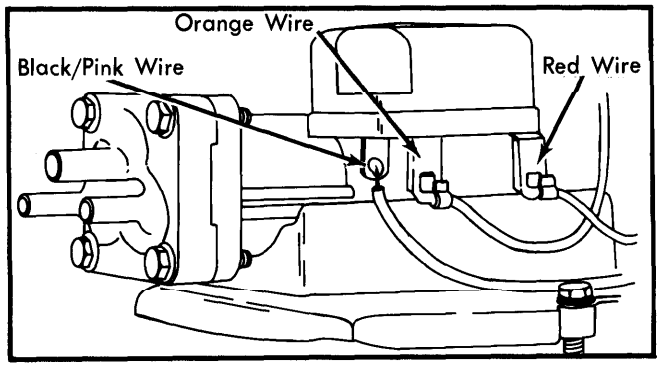

Fig. 3 Multiplex Wiper Testing Pulse Relay Connections

WIPER STOPS INTERMITTENTLY IN HIGH OR LOW

Remove wiper fuse and connect ammeter between terminals. With switch in "LOW", current draw. If lowest draw is less than 6.5 amps, repair motor brushes or circuit breaker. If higher, replace wiper blades, check linkage for binding, or repair motor.

REMOVAL & INSTALLATION

NOTE – *Removal and installation procedures for wiper motor and dash switch are the same as the General Motors Round Motor in this Section.*