WINDSHIELD WIPERS 3T

SECTION INDEX

	Page		Page
Cherokee-Wagoneer-Truck Windshield Wipers	3T-4	Tools	3T-19
CJ Windshield Wipers	3T-1		

CJ WINDSHIELD WIPER

	Page		Page
General	3T-1	Wiper and Washer Control	3T-2
Pivot Shaft Body and Linkage	3T-2	Wiper Arm Replacement	3T-2
Two-Speed Wiper Motor	3T-2	Wiper Blade Replacement	3T-1
Washer Pump	3T-3		

GENERAL

All CJ models are equipped with a two-speed, electric wiper motor.

The motor is mounted on the lower left corner of the windshield (fig. 3T-1).

WIPER BLADE REPLACEMENT

The wiper blade assembly is removed from the wiper arm by holding the blade away from the windshield, and pushing it firmly against the tip of the arm to compress the locking spring and disengage the retaining pin. At

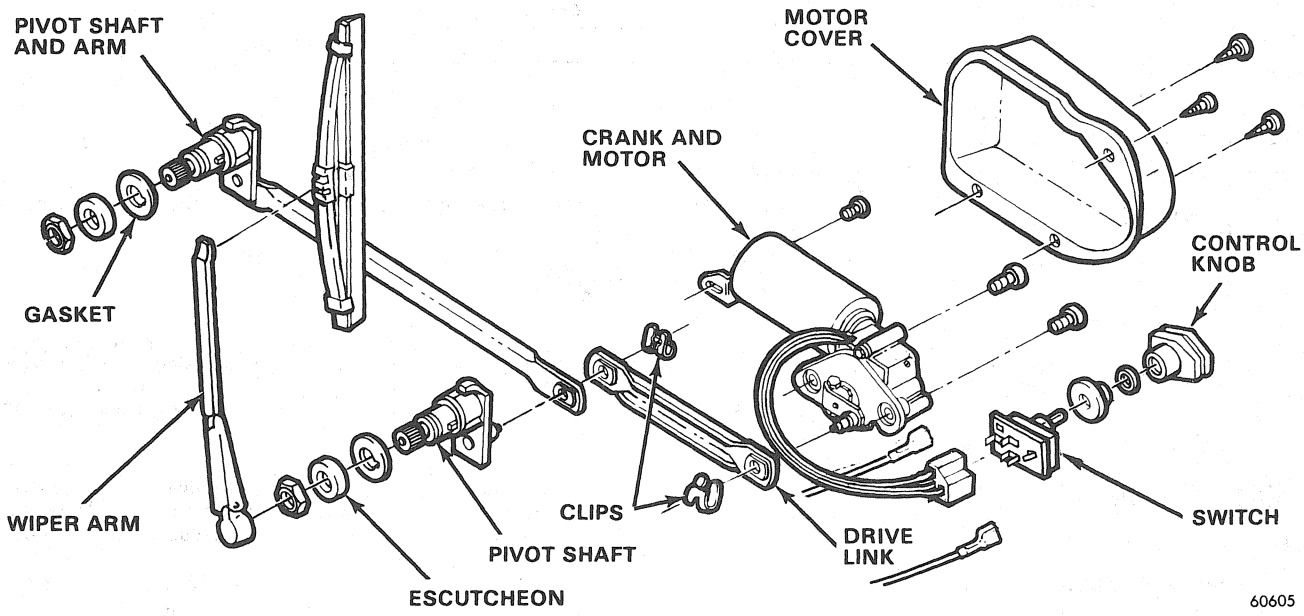


Fig. 3T-1 Windshield Wiper Components

the same time, pivot the blade clockwise to unhook it from the end of the arm.

To install, place blade assembly on wiper arm and snap blade assembly into position.

WIPER ARM REPLACEMENT

(1) Remove windshield wiper arm from pivot shaft body with Remover Tool J-22128 as shown in figure 3T-2.

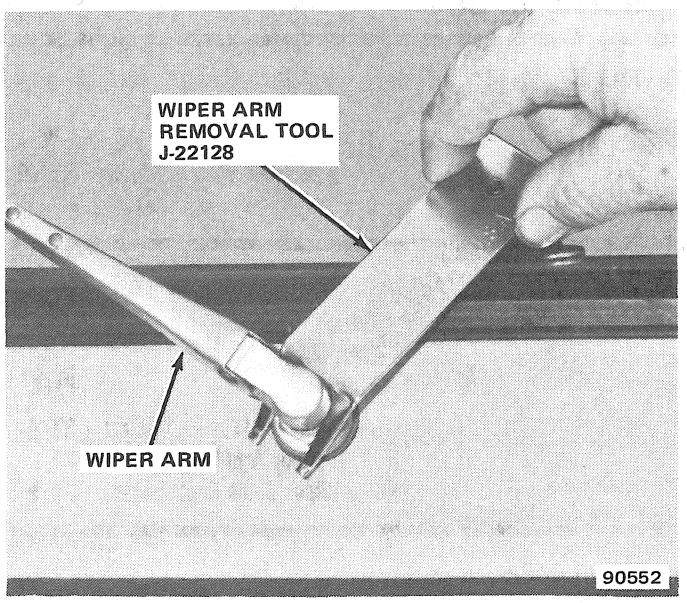


Fig. 3T-2 Wiper Arm Removal

(2) To install, push wiper arm over pivot shaft. Be sure pivot shaft is in Park position and wiper arm is positioned as shown in figure 3T-3.

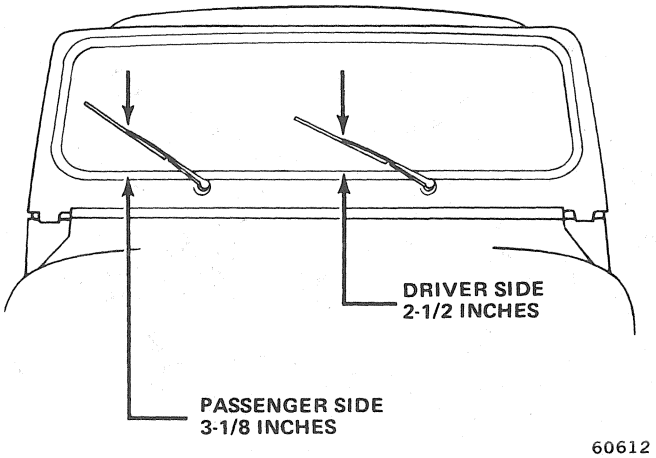


Fig. 3T-3 Wiper Arm Park Position

PIVOT SHAFT BODY AND LINKAGE

Removal

(1) Remove right and left wiper arms.

(2) Remove nuts attaching pivots to windshield frame.

(3) Remove necessary top components from windshield frame.

(4) Remove right and left windshield holddown knobs and fold windshield down.

(5) Remove right and left access hole covers.

(6) Disconnect wiper motor drive link from left wiper pivot.

(7) Remove pivot shaft body and linkage from access hole.

Installation

(1) Install pivot shaft body and linkage in windshield frame.

(2) Connect wiper motor drive link to left wiper pivot.

(3) Install right and left access hole covers.

(4) Raise windshield to upright position and install right and left windshield holddown knobs.

(5) Install nuts attaching pivots to windshield frame.

(6) Install right and left wiper arms.

(7) Install necessary top components on windshield frame.

WIPER AND WASHER CONTROL

The control switch is mounted on the instrument panel. The switch is a through-type multi-position switch which does not require grounding for proper operation.

The two-speed wiper motor is energized for continuous wiping action by turning the control knob in a clockwise direction.

The electric washer pump is operated by depressing the wiper control knob.

Removal

(1) On models with air conditioning, remove screws attaching evaporator assembly to instrument panel and lower evaporator assembly.

(2) Remove control knob.

(3) Remove nut and switch.

(4) Mark wire color locations on switch and disconnect wires.

Installation

(1) Connect wires to switch, in proper location as noted above.

(2) Position switch in instrument panel and install attaching nut.

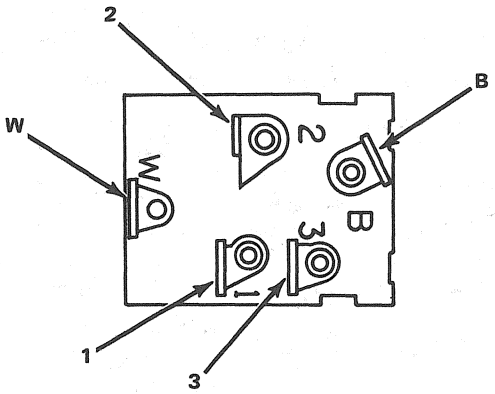
(3) Install control knob.

(4) Install evaporator assembly, if removed.

TWO-SPEED WIPER MOTOR

The wiper motor is protected by a 4.5-amp circuit breaker in the fuse panel.

When the wiper switch is moved to the low speed position, current flows from the fuse panel to terminal B (fig. 3T-4) of the wiper switch, through the wiper switch to terminal 2, then through the green wire to the motor low speed brush and through the armature to ground.



Selector Position	
Off or Park	B-1
Low Speed	B-2
High Speed	B-3
Wash	B-W

80343

Fig. 3T-4 Continuity Test for Wiper Switch

With the wiper switch in the high speed position, current flows from the fuse panel to terminal B of the wiper switch, through the wiper switch to terminal 3, then through the red wire to the motor high speed brush and through the armature to ground.

When the wiper switch is turned off, current flows from the fuse panel to terminal B of the wiper switch, through the wiper switch to terminal 1, then through the black wire to the park contact points to the motor low speed brush and through the armature to ground. When the cam on the wiper drive gear opens the park contact points, the feed circuit to the motor low speed brush is interrupted and the motor is in park.

Troubleshooting Procedures

The wiper motor may be operated independently of the switch to aid in determining defective components.

NOTE: *The wiper motor must be grounded for proper operation and during all wiper tests.*

With ignition switch on, check for 12-volts at switch terminal B. If 12-volt test lamp lights but wiper motor does not operate, connect a jumper wire from ground strap on motor to a good body ground. If motor still does not operate, disconnect wiring from switch. Using a jumper wire, connect switch terminals 2 and B. This connection should give low speed operation. If wiper motor does not operate in low speed, there is an open in the green wire, a defective internal motor connection or a stuck low speed brush.

To obtain high speed, connect a jumper wire between terminals 3 and B. If wiper motor fails to operate, there is an open in the red wire, a defective internal motor connection, or a stuck high speed brush.

With the wiper blades in a position other than park, connect a jumper wire between terminals 1 and B. The wiper blades should run on low speed and stop in the park position. If the motor does not run after making the jumper connection, there is an open in the black wire, a defective internal motor connection, a misaligned or damaged set of contact points or a bad connection through the park point set to the low speed brush. If the wiper motor runs but does not park, the cam on the drive gear is not sufficiently breaking the contact points.

If wiper motor operation is intermittent, a defective solder joint, wiring connection, body ground or worn brush may cause the condition.

Removal with Crash Pad

NOTE: *Without crash pad, remove wiper motor cover.*

(1) Remove necessary top components from windshield frame.

(2) Remove right and left windshield holddown knobs and fold windshield down.

(3) Remove left access hole cover.

(4) Disconnect drive link from left wiper pivot.

(5) Disconnect wiper motor wire harness from switch.

(6) Remove attaching screws and remove wiper motor.

Installation with Crash Pad

(1) Position wiper motor on windshield frame and install attaching screws.

(2) Connect wiper motor wire harness to switch.

(3) Connect drive link to left wiper pivot.

(4) Install left access hole cover.

(5) Raise windshield to upright position and install right and left windshield holddown knobs.

(6) Install necessary top components on windshield frame.

WASHER PUMP

The electric washer pump assembly is mounted in the water reservoir. The impeller motor case is grounded to the body sheet metal by a black ground wire. It is energized by a yellow feed wire from the single blade terminal on the control switch.

CHEROKEE - WAGONEER - TRUCK WINDSHIELD WIPER

	Page		Page
Control Switch	3T-15	Wiper Arm Replacement	3T-4
Diagnosis and Circuitry	3T-7	Wiper Blade Element Replacement	3T-4
General	3T-4	Wiper Blade Replacement	3T-4
Intermittent Governor	3T-16	Wiper Motor	3T-16
Specifications	3T-19	Wiper Pivot Shaft Body and Link Assembly	3T-5

GENERAL

The two-speed electric windshield wipers and electric washers are standard equipment. An optional intermittent wiper system provides a pause between wipe cycles for use during conditions of very light precipitation.

The controls for the windshield wipers are mounted on the instrument panel to the left of the steering column.

The electric wipers are operated by turning the control knob to the right. For intermittent operation, turn knob to the left. Electric washers are actuated by depressing the wiper control knob.

The wiper arms are actuated by a link and pivot assembly attached to the wiper motor.

The wiper motor is mounted to an adapter plate mounted to dash panel.

The wiper arms move in a tandem-like action and park to the right side of the car.

CAUTION: *The wiper arms and blades must not be moved manually from side to side or damage could result.*

WIPER BLADE REPLACEMENT

(1) To remove wiper blade from mounting pin on wiper arm, pull up on retainer spring and remove wiper blade (fig. 3T-5).

(2) To install, push blade frame onto mounting pin so that retainer spring engages pin. Be sure blade is securely attached to arm.

WIPER BLADE ELEMENT REPLACEMENT

(1) Place frame of wiper blade on a firm surface with notched end of blade element backing strip as shown in figure 3T-6.

(2) Pull up and twist counterclockwise plastic backing strip, unlocking backing strip from retaining tab.

(3) Slide backing strip down and align with next retaining tab, twist slightly and unlock backing strip from retaining tab.

(4) Repeat procedure for remaining tabs until blade element is detached from frame.

(5) To install, engage notched end of blade element backing strip with first wiper blade frame retaining tab.

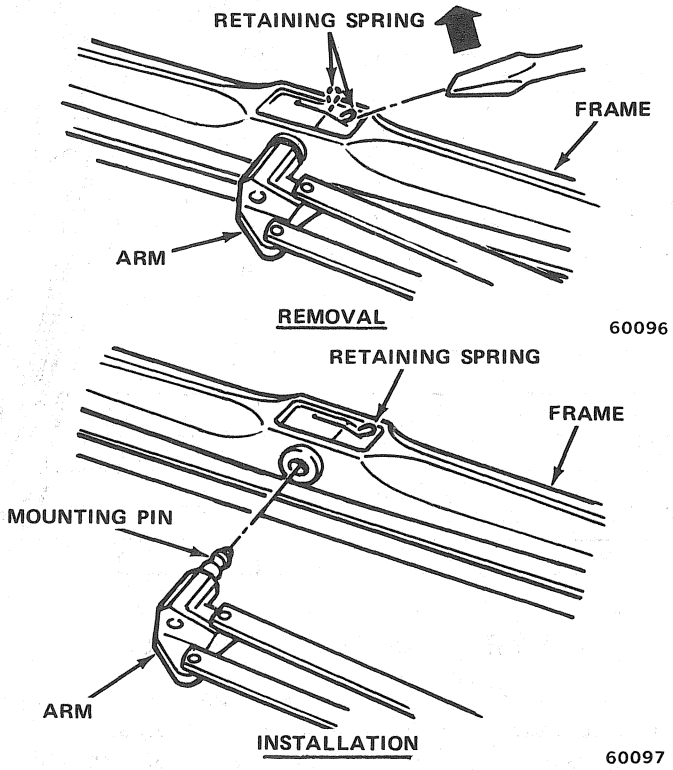


Fig. 3T-5 Wiper Blade Replacement

(6) Slide backing strip up and align with next backing strip.

(7) Repeat procedure for next three retaining tabs.

(8) For last retaining tab, place frame on firm surface, pull up and twist backing strip clockwise, locking strip into retaining tab.

WIPER ARM REPLACEMENT

(1) Raise blade end of arm from windshield and move spring tab away from pivot shaft. Disengage auxiliary arm retainer clip (driver's side only) from pivot pin and pull wiper arm from pivot shaft.

(2) To install, start wiper on pivot shaft, position auxiliary arm on pivot and slide retaining clip down to lock arm in position. Push wiper arm down on pivot shaft until it bottoms. Be sure that pivot shaft is in Park position and wiper arm is positioned as shown in figure 3T-7.

(3) Wet windshield and recheck Park position by operating wiper motor several times—ON and OFF.

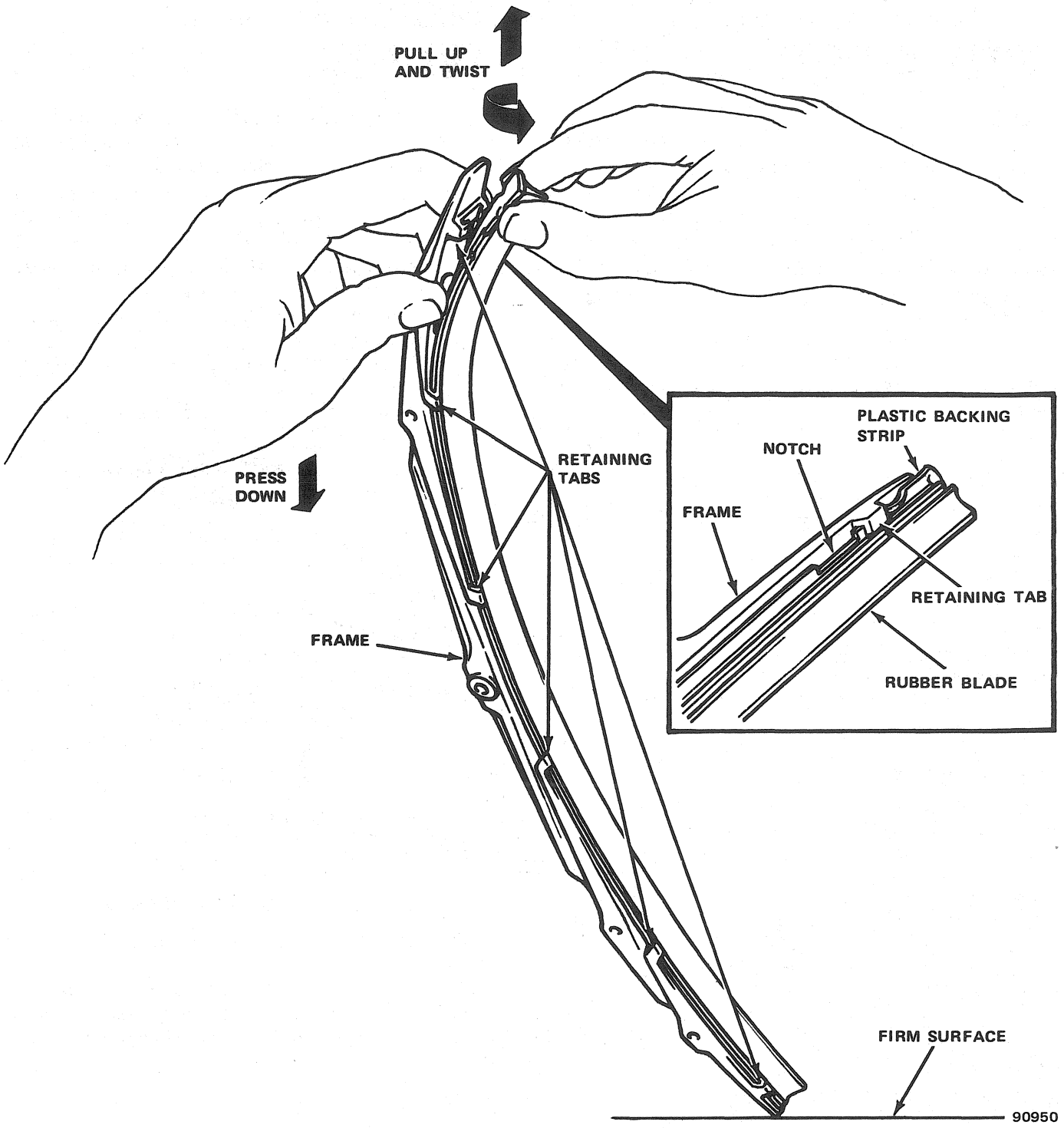


Fig. 3T-6 Wiper Blade Element Replacement

WIPER PIVOT SHAFT BODY AND LINKAGE

Removal without Air Conditioning

(1) Remove wiper arms, pivot shaft nuts, washers, escutcheons, and gaskets (fig. 3T-8).
(2) Disconnect drive arm from motor crank.
(3) Remove individual links where necessary to remove pivot shaft bodies without excessive interference.

Installation without Air Conditioning

(1) Install wiper pivot shafts and linkage.
(2) Connect drive arm to motor crank.
(3) Install gaskets, escutcheons, washers, pivot shaft nuts, and wiper arms.

Removal with Air Conditioning

(1) Disconnect battery negative cable.

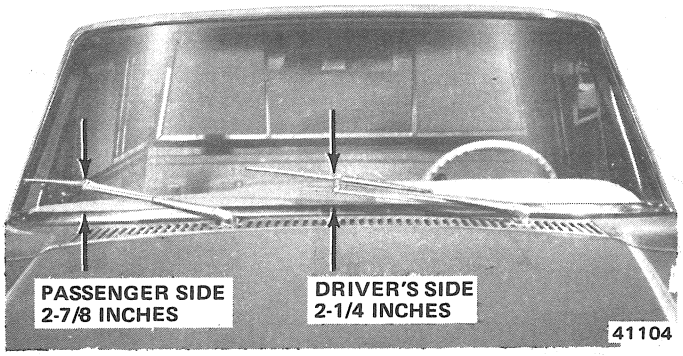


Fig. 3T-7 Wiper Arm Park Location Measurements (Inches)

(2) Remove left wiper arm, pivot shaft nut, washer, escutcheon and gasket.

(3) Remove instrument cluster as outlined in Chapter 3C.

(4) Remove left defroster duct.

(5) Disconnect drive arm from motor crank arm.

(6) Lower glove box to gain access to right linkage clip and remove clip.

(7) Remove screws attaching left pivot shaft body.

(8) Remove left pivot shaft body and linkage assembly through instrument cluster opening.

Installation with Air Conditioning

(1) Install left pivot shaft body and linkage assembly through instrument cluster opening.

(2) Position left pivot shaft body in opening and install attaching screws.

(3) Connect linkage to right pivot shaft body and install clip and glove box.

(4) Connect drive arm to motor crank arm.

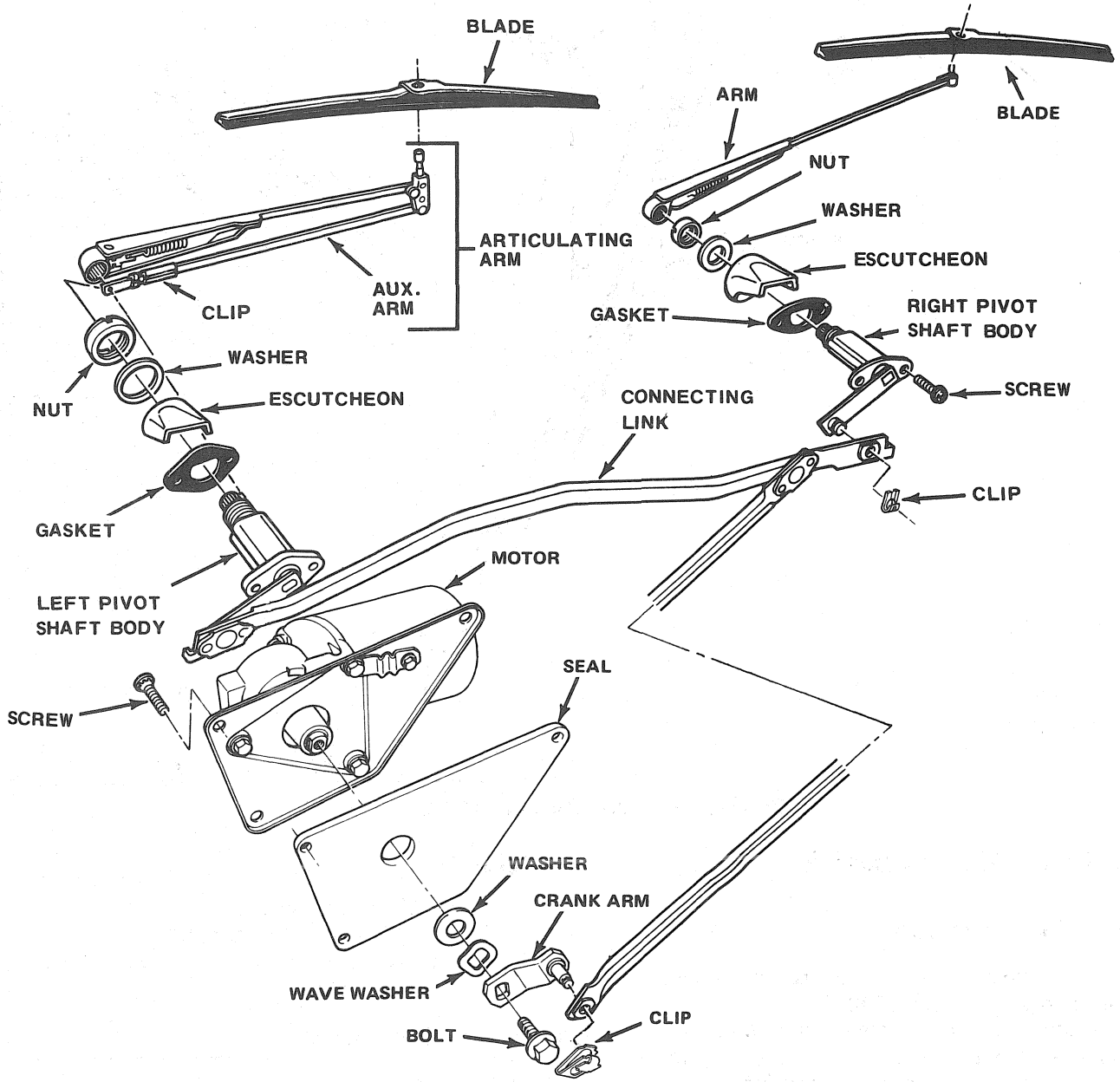


Fig. 3T-8 Windshield Wiper Components

(5) Install left defroster duct.

(6) Install instrument cluster as outlined in Chapter 3C.

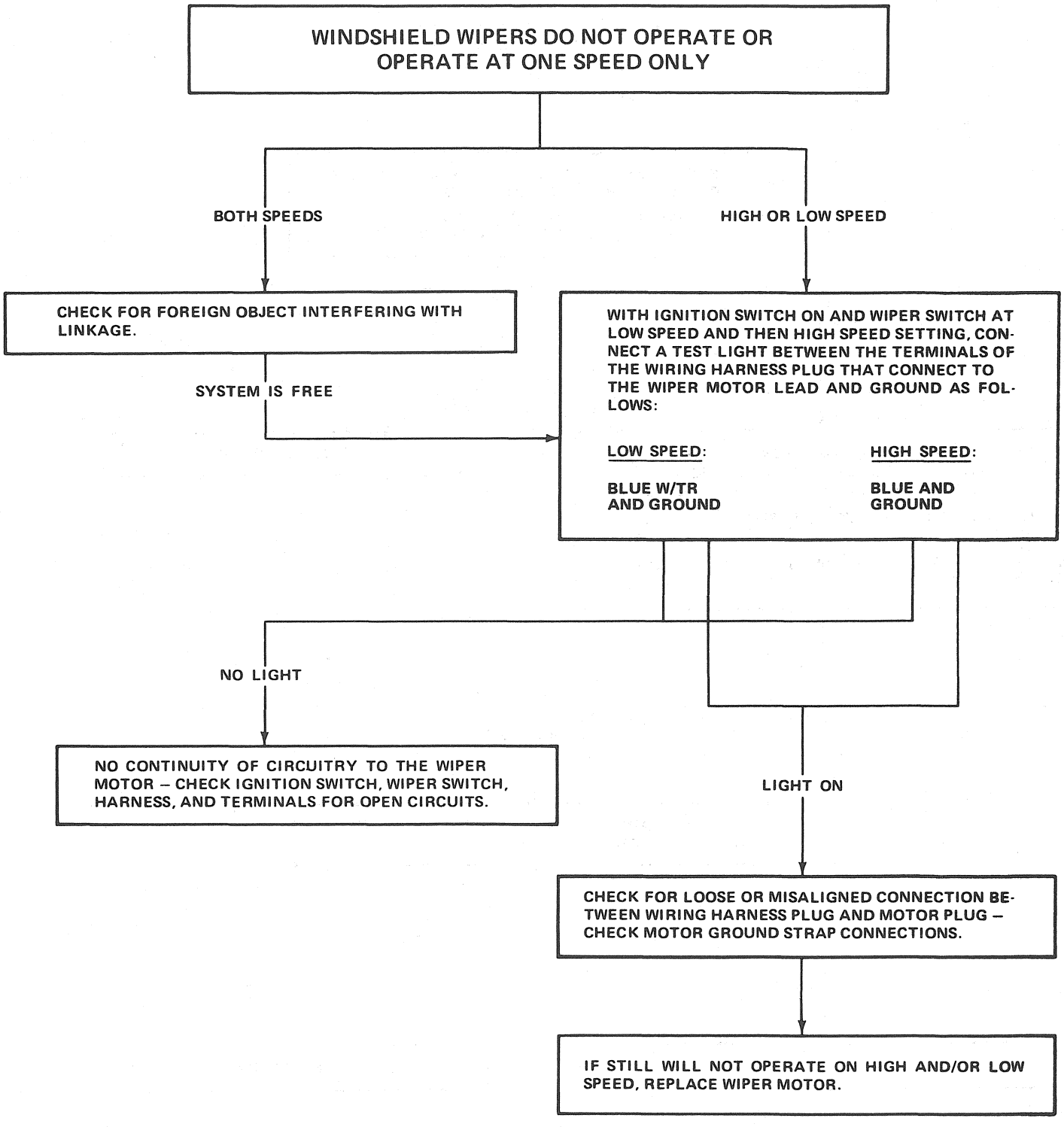
(7) Install gasket, escutcheon, washer, pivot shaft nut and left wiper arm.

(8) Connect battery negative cable.

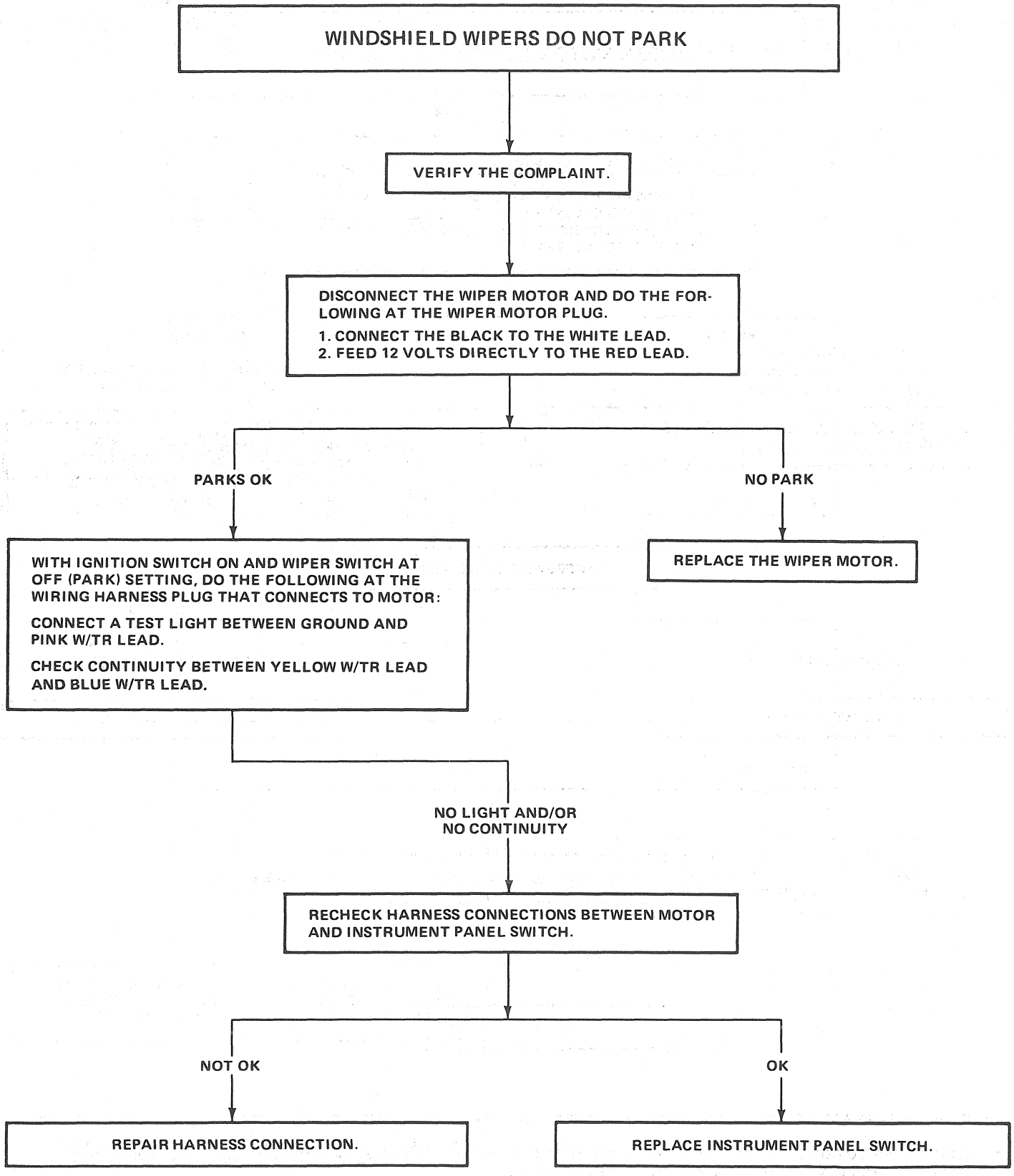
DIAGNOSIS AND CIRCUITRY

This section is a guide to troubleshooting the windshield wiper system used on Cherokee, Wagoneer and Truck models. It consists of two parts: Diagnosis Charts and Circuitry Illustrations (fig. 3T-9 and 3T-10).

Service Diagnosis

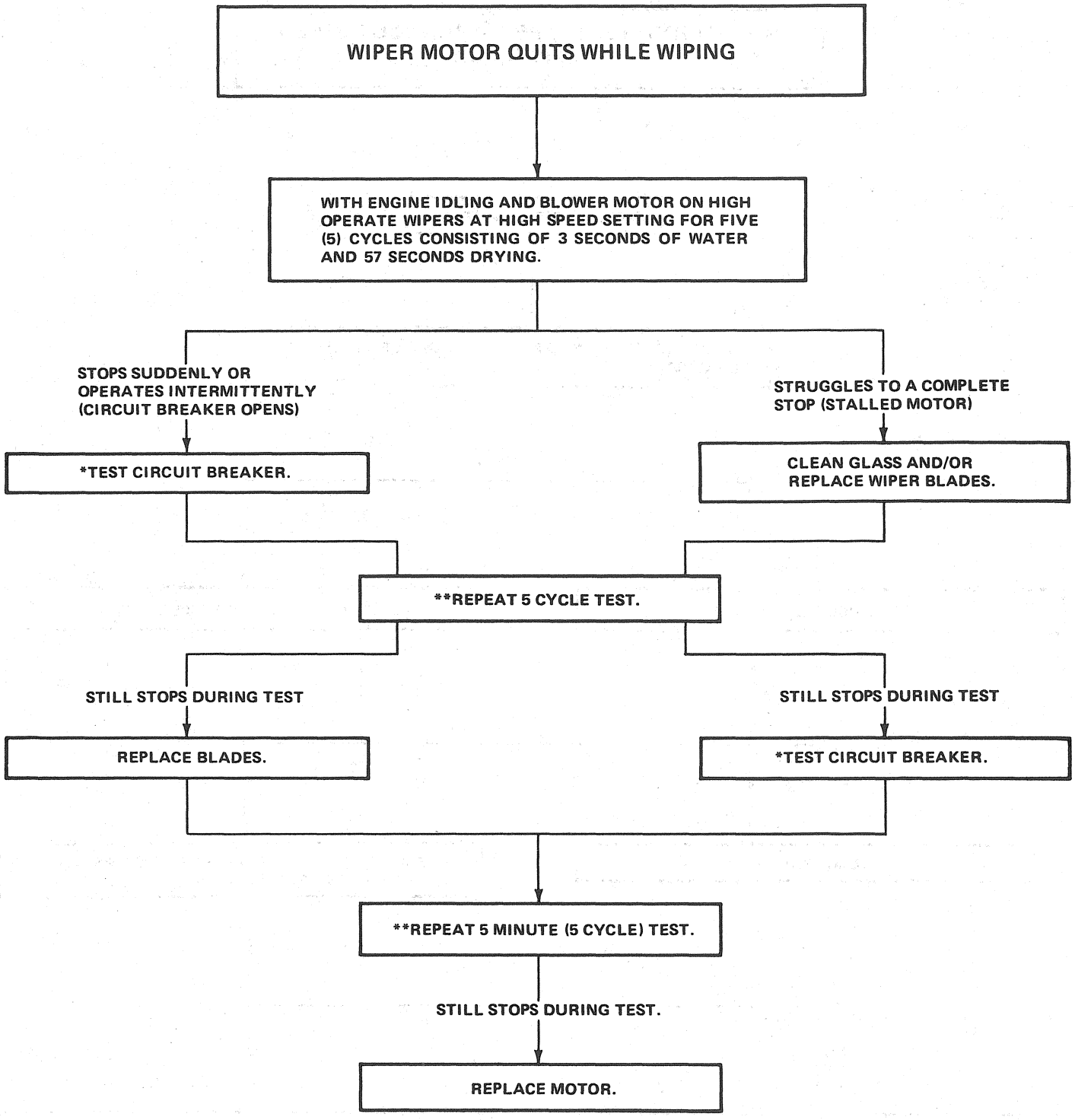


Service Diagnosis (Continued)



70260

Service Diagnosis (Continued)

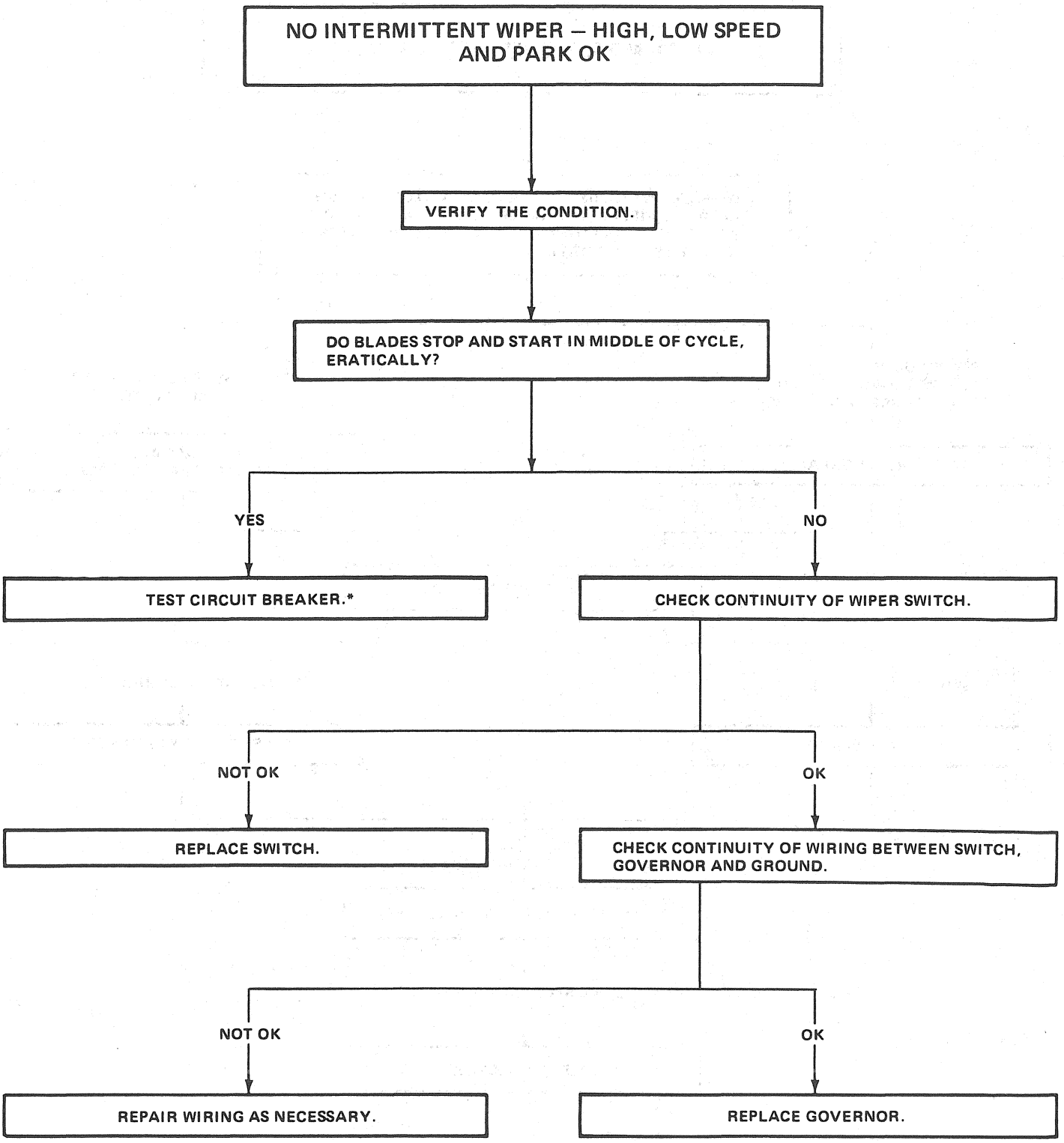


* CIRCUIT BREAKER IS INTEGRAL WITH INSTRUMENT PANEL SWITCH.

** ALLOW MOTOR TO COOL TO 140° F OR LOWER BEFORE STARTING REPEAT TESTS. IF MOTOR IS 140° F OR LOWER, THE HAND CAN BE HELD AGAINST MOTOR WITHOUT DISCOMFORT.

70261

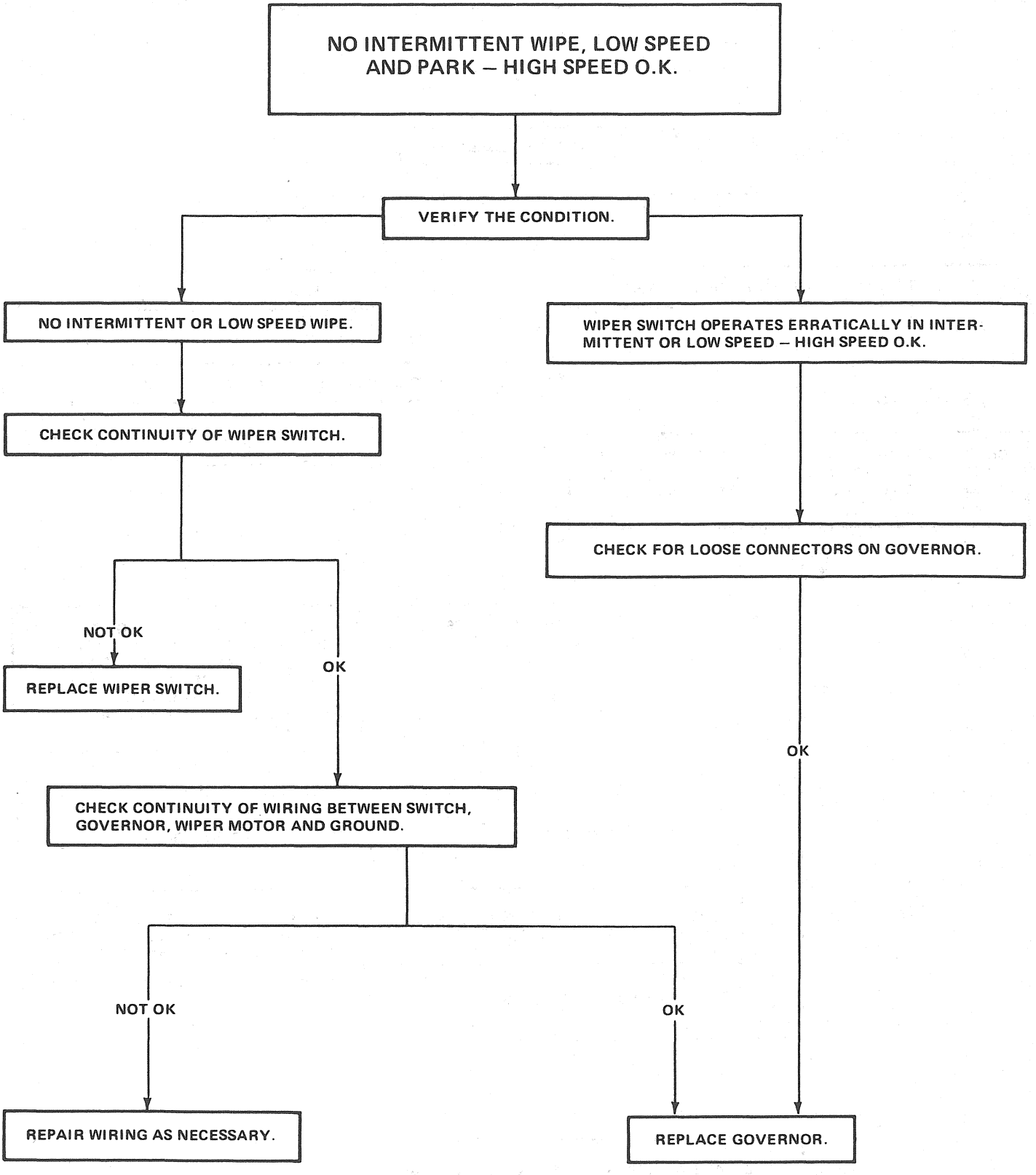
Service Diagnosis (Continued)



*WIPER SWITCHES HAVE INTERNAL CIRCUIT BREAKERS WHICH REQUIRE REPLACEMENT OF ENTIRE SWITCH.

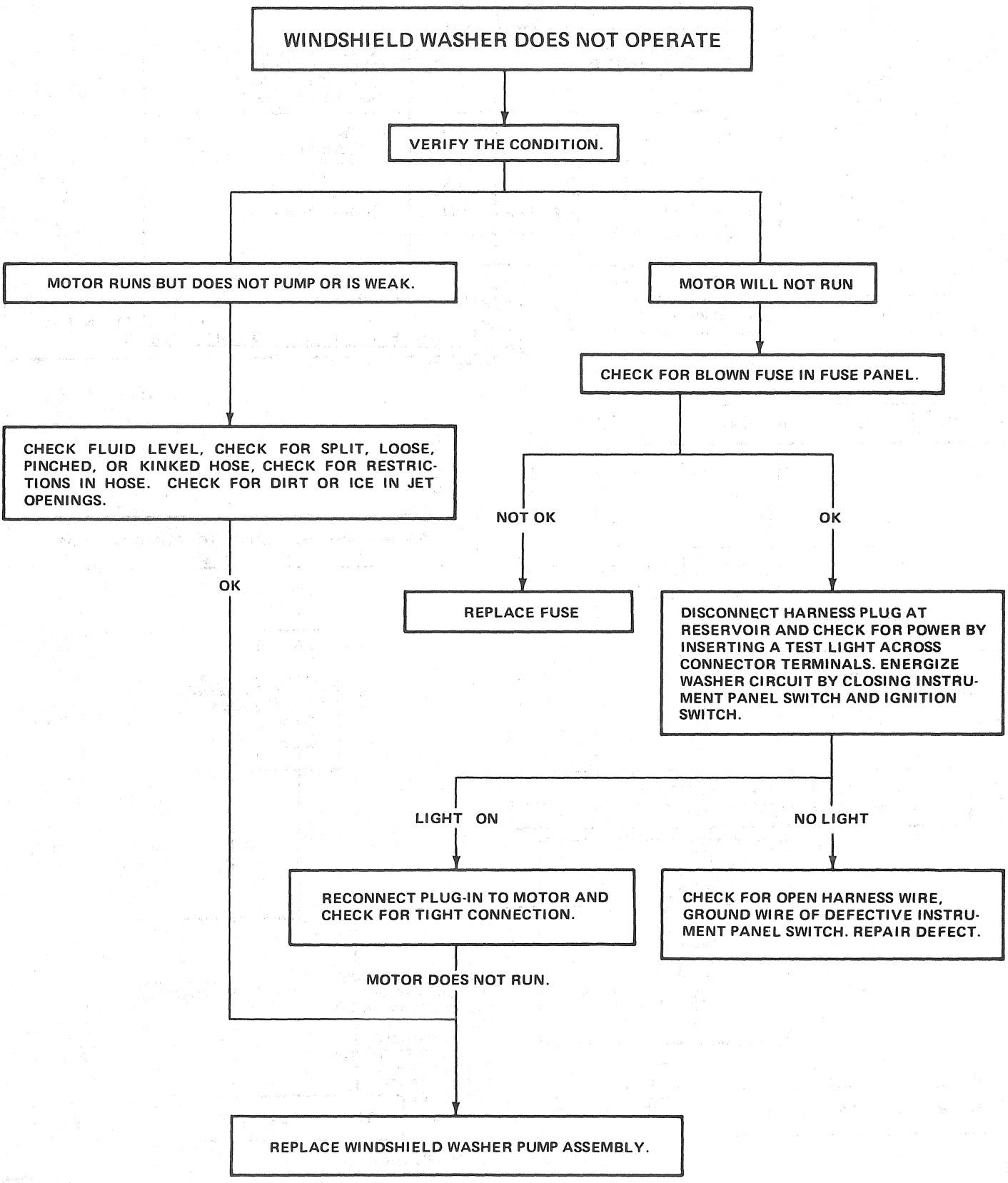
70262

Service Diagnosis (Continued)



70263

Service Diagnosis (Continued)



70264

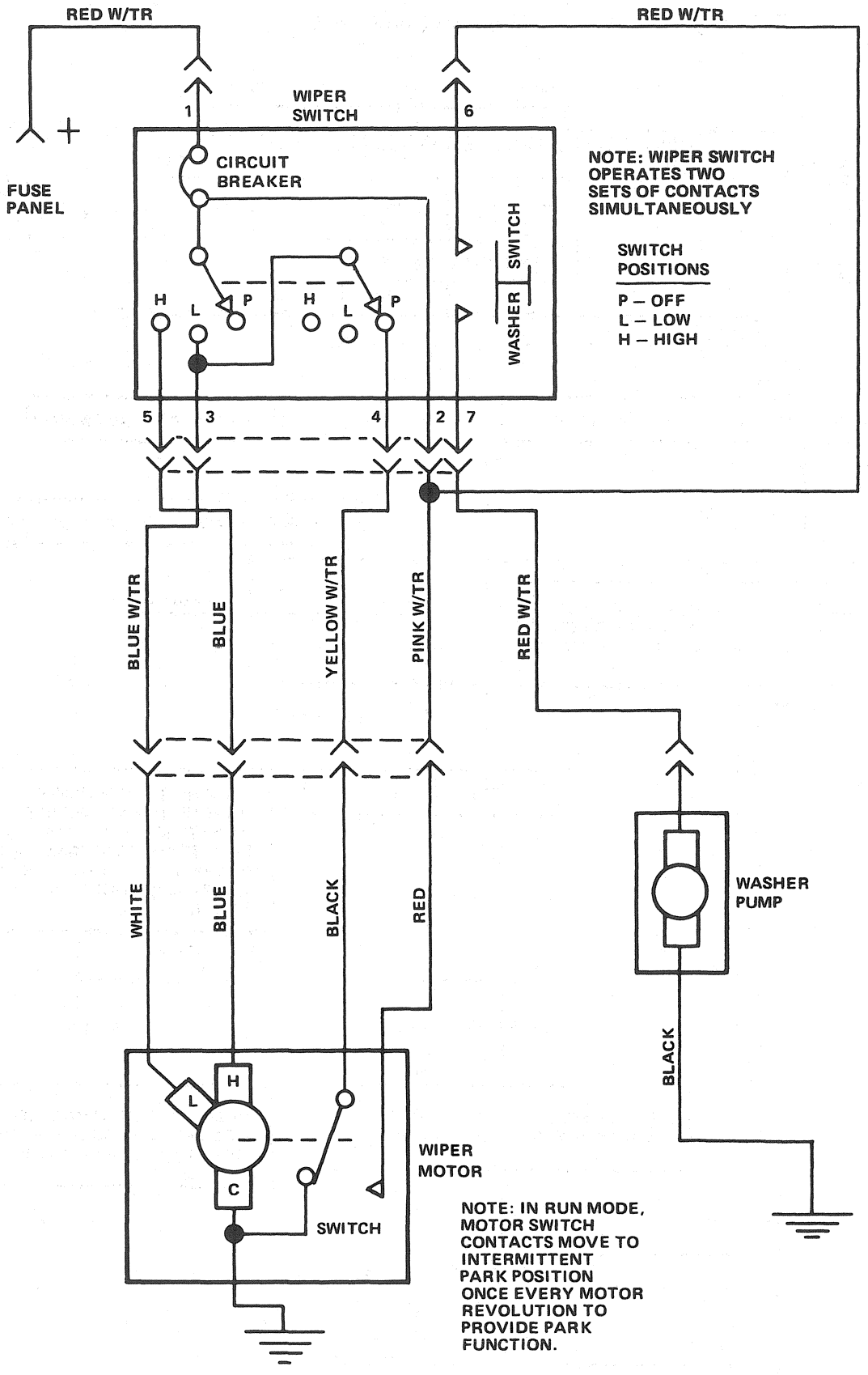


Fig. 3T-9 Windshield Wiper Circuitry

70265

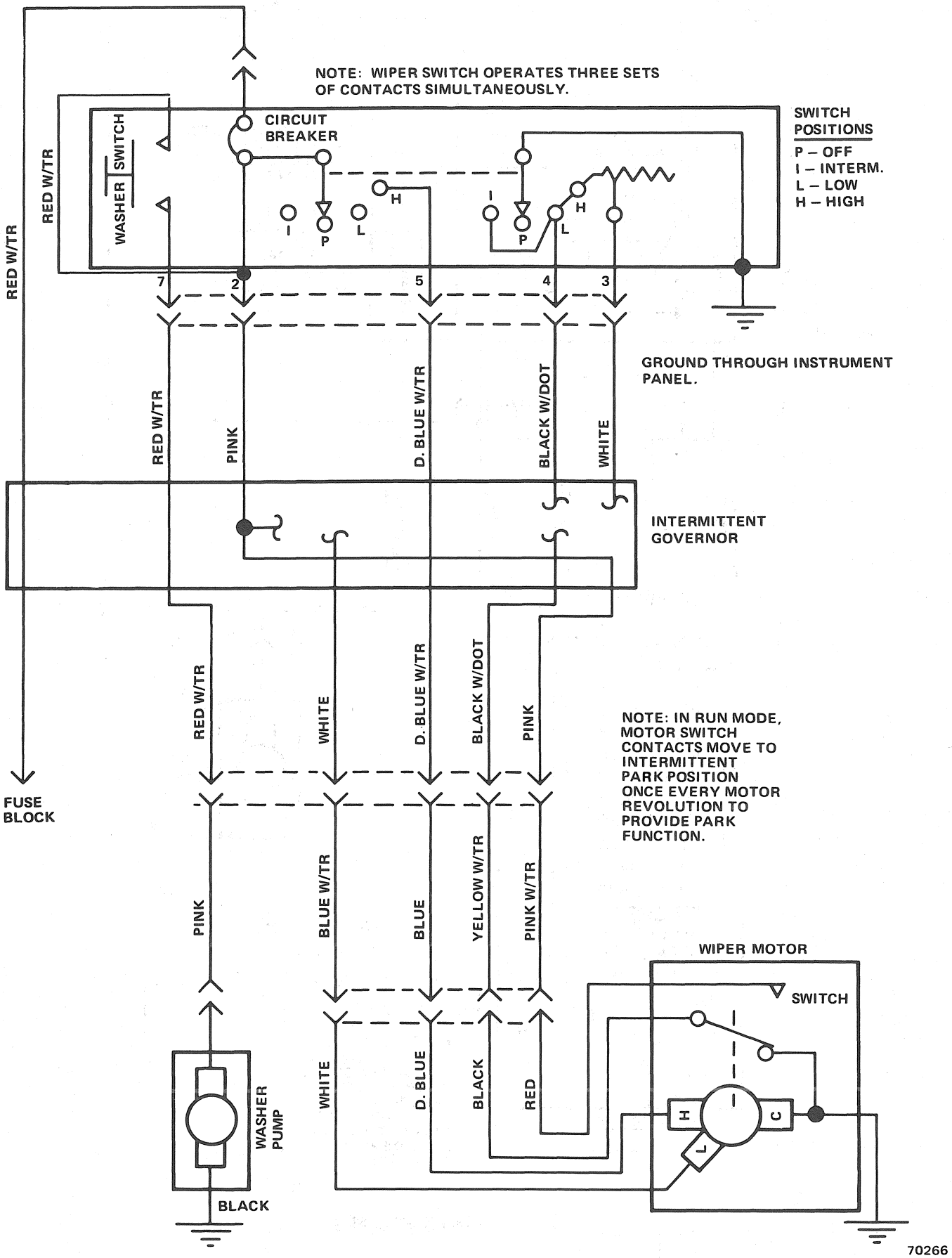


Fig. 3T-10 Windshield Wiper with Intermittent Governor Circuitry

CONTROL SWITCH

Removal

A one-way friction spring in the control knob retains it to control switch shaft. This one-way spring allows knob to be installed but prevents its removal unless spring tension is released.

(1) Disconnect battery negative cable.

(2) To remove, locate small notch at base of knob and insert a small screwdriver at that point. Apply pressure to release spring and pull knob from shaft.

(3) Remove slotted trim nut from front of switch.

(4) Push switch through instrument panel, disconnect from harness and remove.

Installation

(1) Connect switch to harness and push through instrument panel.

(2) Install slotted trim nut on front of switch and tighten.

(3) Align control knob and push on shaft.

(4) Connect battery negative cable.

Switch Test

(1) Check wiper switch continuity using Continuity Light J-21008 or an ohmmeter. Continuity should exist between terminals at various switch positions as shown in figure 3T-11.

(2) Variable resistance between number 4 and 5 terminals of an intermittent wiper system must be checked with an ohmmeter. This resistance controls governor operation for intermittent wiping. If intermittent wipe cycle is not operating, but system does operate at both low and high speed, resistance between number 4 and 5 terminals should be checked. With switch control knob rotated to full counterclockwise position, ohmmeter should indicate 5600 to 8400 ohms. As control knob is rotated in a clockwise direction, resistance should decrease to a minimum of 100 to 900 ohms.

(3) If continuity and resistance do not check out as specified, switch must be replaced. Check wiring for proper continuity if switch tests indicate proper operation.

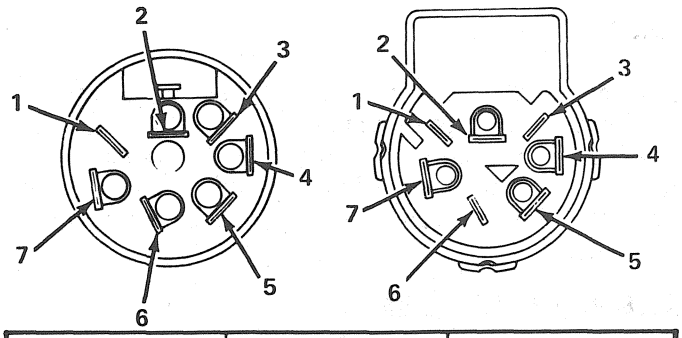
Circuit Breaker Test

The circuit breaker is located in the wiper control switch and has a rating of 7 amps.

Two separate tests are necessary to check for correct circuit breaker operation.

Test 1

Connect switch to tester as shown in figure 3T-12. Adjust current draw until it equals circuit breaker rating. Leave switch connected to tester for ten minutes. Current reading on ammeter should remain at rated current. If circuit breaker opens during ten minute period, replace wiper switch assembly.



	Standard	Intermittent
Off or Park	1-2 3-4	1-2 4-5
Low Speed	1-2-3	1-2 4-5 to Case 4-5
High Speed	1-2-5	1-2-3 4-5 to Case 4-5
Intermittent		1-2 4-5 to Case 4-5 Variable Resist. 1-9K to 7 K
Wash	1-2 6-7	1-2 6-7

41528

Fig. 3T-11 Continuity Test for Wiper Switches

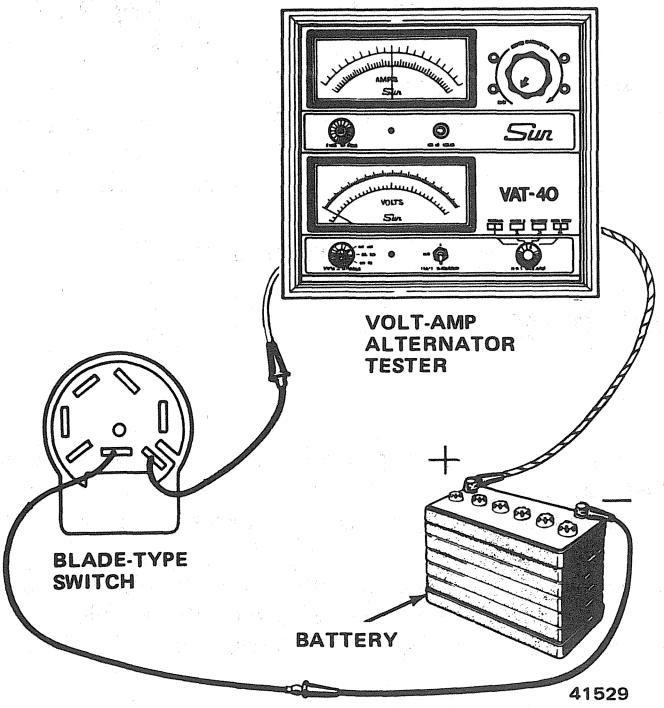


Fig. 3T-12 Circuit Breaker Test

Test 2

Connect switch as shown in figure 3T-12. Adjust current draw until it is twice switch rating. Current reading on ammeter should drop to zero within 15 seconds. If it takes longer than 15 seconds for circuit breaker to open (current reading drops to zero), replace wiper switch assembly.

INTERMITTENT GOVERNOR

To check the intermittent governor accurately requires electronic testing equipment. However, if the intermittent wipe cycle is not satisfactory, check related components such as the motor, control switch, and connecting wires. If all components function properly, install a new governor.

The electronic governor assembly is contained in a two-inch cube which is attached to an instrument panel bracket adjacent to the wiper control switch. The 6-inch governor lead plugs into the wiper control switch and the shorter, 4-inch lead plugs into the instrument panel harness (fig. 3T-13).

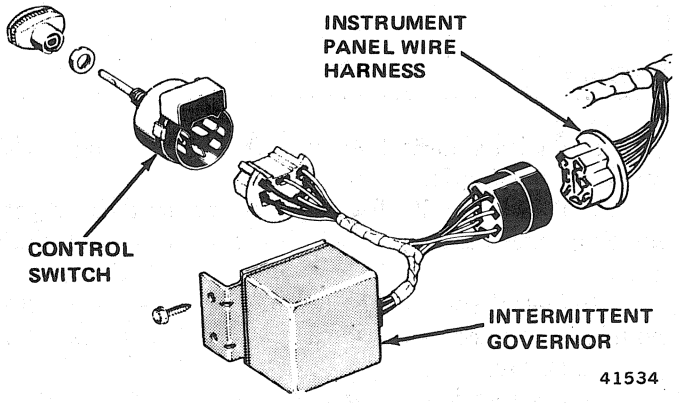


Fig. 3T-13 Intermittent Governor

WIPER MOTOR

Removal

(1) Remove screws attaching motor adapter plate to dash panel.

(2) Separate wiper wiring harness connector at motor.

(3) Pull motor and linkage out of opening to expose drive link-to-crank stud retaining clip. Raise up lock tab of clip with a flat blade screwdriver and slide clip off stud.

(4) Remove wiper motor assembly.

Installation

(1) Position wiper motor assembly and insert crank stud into drive link bushing.

(2) Press retaining clip onto stud and slide it in place in stud groove (fig. 3T-14). Check for positive retention.

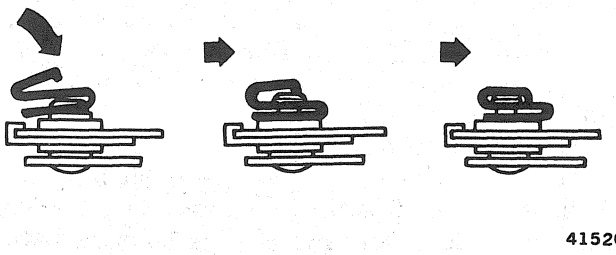


Fig. 3T-14 Linkage Retainer Clip Installation Sequence

(3) Install wiper motor attaching screws. Tighten attaching screws to 25 inch-pounds (3 N•m) torque.

Current Draw Test—On Vehicle

(1) Remove wiper arms and blades and disconnect motor lead.

(2) Connect negative lead of ammeter to positive battery post (fig. 3T-15).

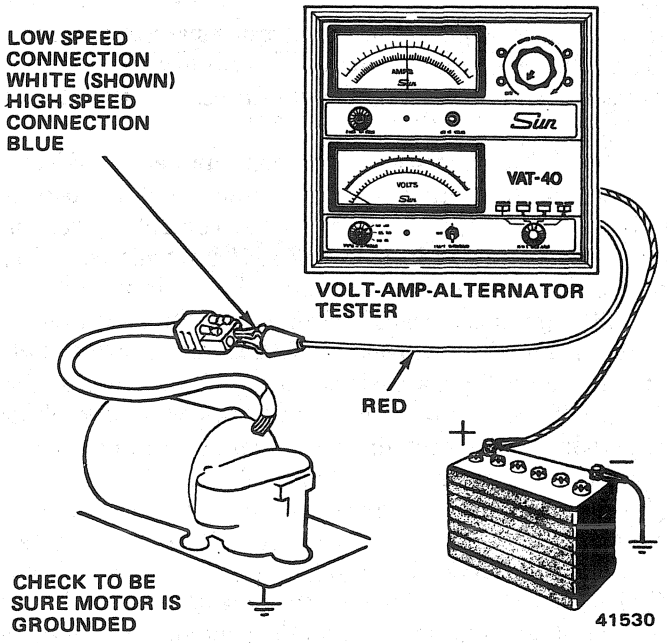


Fig. 3T-15 Wiper Motor Current Draw Test Connections

(3) Connect other ammeter test lead to blue wire w/tracer terminal (low speed) of motor harness. Current draw should be approximately one amp but not more than three amps.

(4) Connect blue wire terminal (high speed). Current draw should remain about the same. In either case, current draw should not exceed three amps.

Park Test

(1) Disconnect motor from harness connection. Temporarily contact a battery feed to either blue or blue w/tracer wire to move wiper arms and blades away from normal park position.

(2) Insert jumper wire from white to black wire terminals (fig. 3T-16).

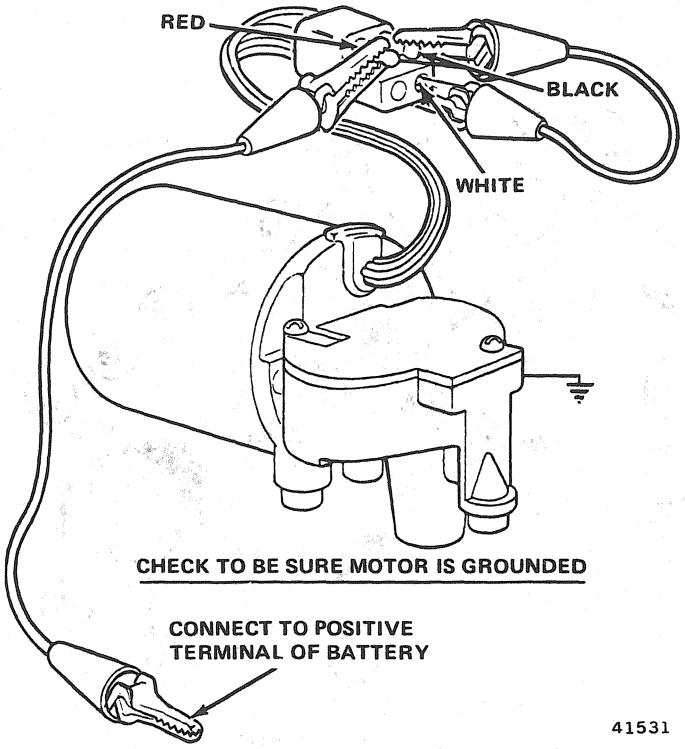


Fig. 3T-16 Park Test

(3) Contact a battery feed to red wire terminal of motor harness. Motor should operate until wipers have reached normal park position.

(4) If wiper motor does not park correctly, replace or repair wiper motor.

Disassembly

CAUTION: *The motor field consists of two permanent ceramic-type magnets which can be damaged by pounding on the motor housing or the magnets.*

NOTE: *Mark position of drive crank with respect to output shaft for correct assembly.*

(1) Remove drive crank attaching nut, drive crank, spring washer, and plain washer (fig. 3T-17).

(2) Remove screws attaching mounting bracket to motor. Separate bracket from motor and remove screw attaching ground strap to bracket.

(3) Remove screws attaching gear housing cover to housing. Remove cover and gasket.

(4) Remove idler gear and pinion by pressing shaft (with push nut) out of gear housing.

(5) Remove motor through-bolts and motor housing.

NOTE: *The field magnets will hold the armature in the motor housing as it is removed from the gear housing.*

(6) Remove end play spring, output gear and shaft, switch lever, switch washer, and seal from gear housing.

(7) Remove brushes, harness, and springs from end head.

(8) Remove end head assembly.

(9) Remove parking lever pin from gear housing.

(10) Remove all old lubricant from gear housing and components.

(11) Inspect gear housing and all components for damage or excessive wear. Replace damaged or excessively worn components.

(12) Apply a coating of American Motors All Purpose Lubricant, or equivalent, to all bearing surfaces and gears.

Assembly

(1) Position gear housing on a flat surface with inside of housing facing up.

(2) Position switch washer and switch lever in gear housing with cam rider pointing toward output shaft hole.

(3) Install seal and output gear and shaft in gear housing. Make certain switch lever is clear of cam and gear assembly.

(4) Position idler gear and pinion on shaft, and insert shaft through switch lever and switch washer into gear housing. Use a drift and hammer to lightly tap shaft to proper depth. **A 0.001 to 0.007-inch clearance between push nut and gear must be maintained to prevent preloading the idler gear.**

(5) Install end play spring in gear housing.

(6) Install parking lever pin in gear housing.

(7) Attach brush terminals and switch terminals to end head.

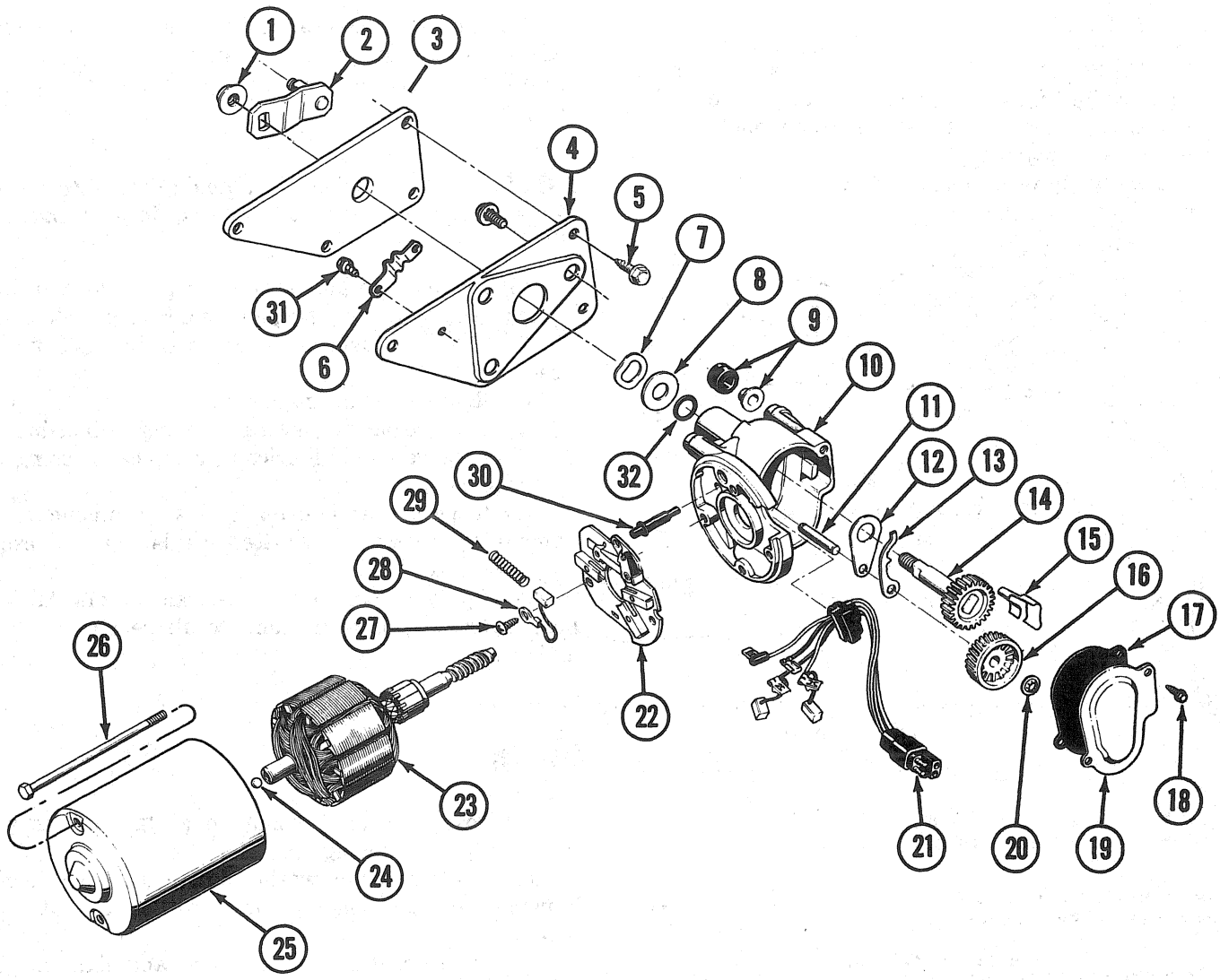
(8) Position end head on gear housing and secure with attaching screws.

(9) Install springs and brushes in end head. Hold each brush in the fully retracted position with tag wire as shown in figure 3T-18.

(10) Apply a small amount of lubricant to armature end shaft and ball.

(11) Install armature in gear housing and remove tag wire brush retainers.

NOTE: *Make certain plastic thrust button in end play spring is bearing against end of armature shaft.*



1. NUT
2. DRIVE CRANK
3. SEAL
4. BRACKET
5. SCREW
6. GROUND STRAP
7. SPRING WASHER
8. PLAIN WASHER
9. GROMMET
10. GEAR HOUSING
11. SHAFT
12. SWITCH WASHER
13. SWITCH LEVER
14. OUTPUT GEAR AND SHAFT
15. END PLAY SPRING
16. IDLER GEAR AND PINION
17. GASKET
18. SCREW
19. COVER
20. PUSH NUT
21. BRUSHES AND HARNESS
22. END HEAD
23. ARMATURE
24. BALL
25. MOTOR HOUSING
26. BOLT
27. SCREW
28. BRUSH
29. SPRING
30. PARKING LEVER PIN
31. SCREW
32. SEAL

41532

Fig. 3T-17 Wiper Motor and Transmission Components

(12) Install motor housing on armature, holding armature worm gear to prevent magnetic field from pulling armature out of position in gear housing.

(13) Align indicator marks on motor housing and gear housing before inserting through-bolts.

(14) Install through-bolts securing motor housing to gear housing.

(15) Apply generous amount of lubricant to gear housing cavity.

(16) Position gasket and cover on gear housing and install two attaching screws.

(17) Position motor assembly and ground strap on mounting bracket and install ground strap attaching screw.

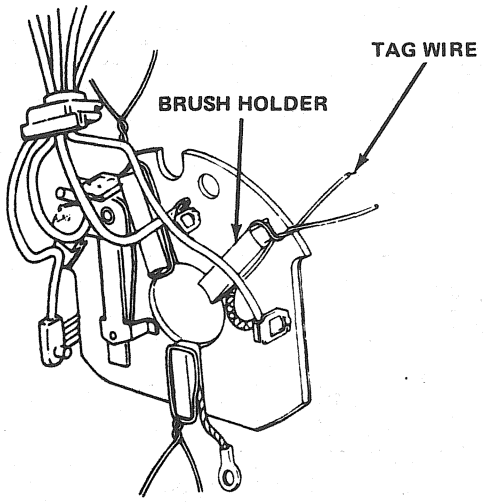


Fig. 3T-18 Tag Wire Brush Retainers

(18) Install grommets in mounting bracket and secure motor assembly to bracket with attaching screws. Tighten attaching screws to 23 inch-pounds (3 N•m) torque.

(19) Install plain washer and spring washer on output shaft, position drive crank on output shaft in the marked position from which it was removed, and install nut. Tighten nut to 120 inch-pounds (14 N•m) torque.

WINDSHIELD WASHERS

The electric pump assembly is mounted in the bottom of the water reservoir. The impeller motor case is grounded to the car body by a ground wire. It is energized by a feed wire from the number 6 and 7 terminals on the control switch.

SPECIFICATIONS

Torque Specifications

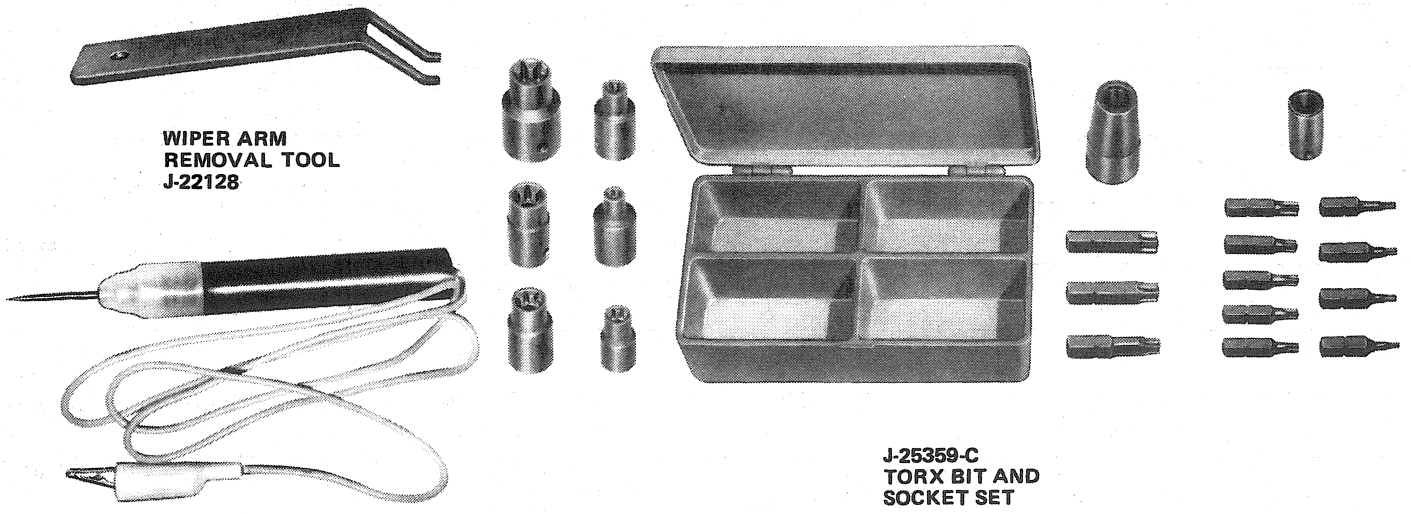
Service Set-To Torques should be used when assembling components. Service In-Use Recheck Torques should be used for checking a pre-torqued item.

	USA (in-lbs)		Metric (N·m)	
	Service Set-To Torque	In-Use Recheck Torque	Service Set-To Torque	In-Use Recheck Torque
Wiper Motor MTG. Plate to Cowl	23	15-35	3	2-4
Windshield Wiper Pivot to Cowl	118	100-135	13	11-15

All Torque values given in newton-meters and inch-pounds with dry fits unless otherwise specified.

70269

Tools



70119