

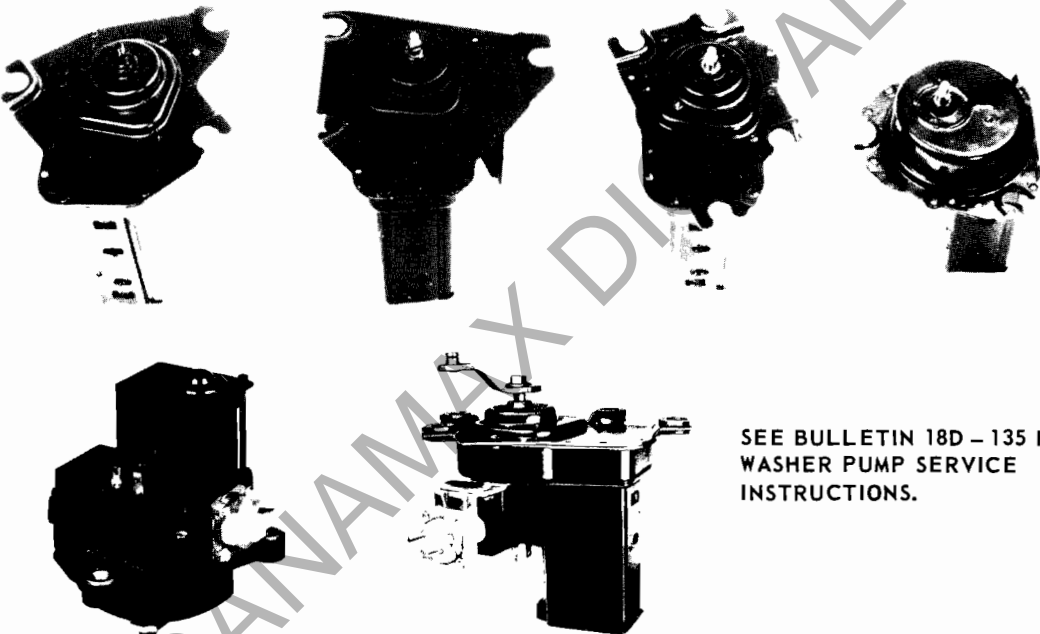


BULLETIN 18D - 125
 Supersedes:
 Sections 1 & 2 Bulletin 18D-121A
 Section 3 Bulletin 18D-121C

TYPE "E" WIPERS

Single And Two Speed

service instructions



SEE BULLETIN 18D - 135 FOR
 WASHER PUMP SERVICE
 INSTRUCTIONS.

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DELCO APPLIANCE DIVISION
GENERAL MOTORS CORPORATION
 Rochester 1, New York

GENERAL DESCRIPTION:

Type "E" Wipers (Single or Two Speed) first introduced in 1962 consist of a rectangular shaped motor attached to a gear box. Although two different gear boxes are used as shown in Figure 1, the basic gear system is the same.

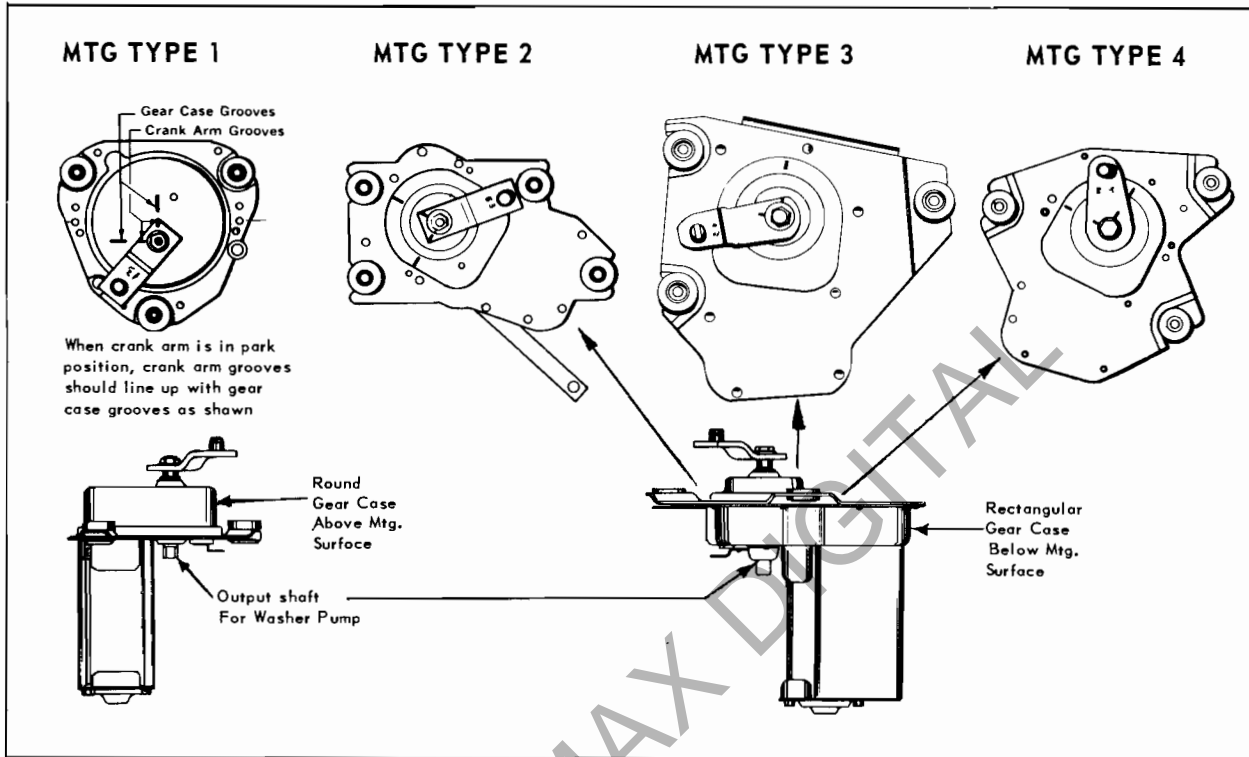


FIGURE 1

As with the other types of Delco Wipers, the gear box contains a parking switch in addition to the gear train. (Figure 2)

The gear train consists of a motor armature helical gear shaft which drives an intermediate gear and pinion assembly. The pinion gear of the intermediate gear and pinion drives an output gear and shaft assembly. (Figure 2)

The parking switch contacts, which are normally closed, are opened by a cam on the lower surface of the output gear when the wiper reaches the park position.

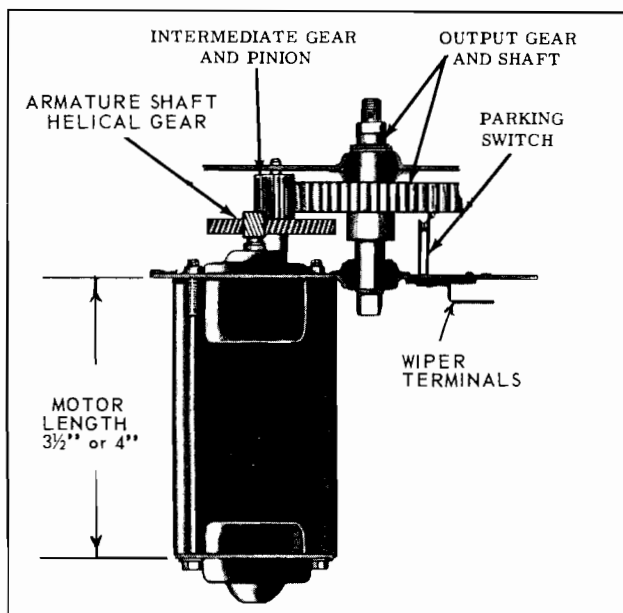


FIGURE 2

GENERAL DESCRIPTION (CONT'D.)

Contrary to other types of Delco Wipers (Types "C" and "D"), Type "E" Wipers are NOT equipped with automatic reset circuit breakers.

Type "E" wipers are supplied for original equipment with or without a washer pump. However, windshield washer kits containing a washer pump are available thru the car dealers for later installation. A typical wiper-washer pump combination is shown in Figure 3.

Service Instructions covering the washer pump are contained in Bulletin 18D-135.

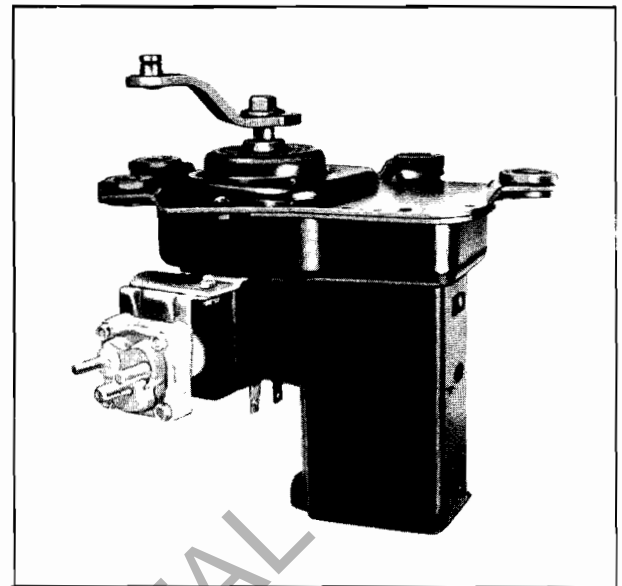


FIGURE 3

WIPER VARIATIONS:

(1) Mounting Variations -

Figure 1 shows the various mounting plates which are riveted to the gear box. Application of the various mounting types is shown in Table 1 Page 4.

(2) Crank Arms -

Table 1 on Page 4 shows the application and identification number of the various crankarms.

(3) Gear Ratios -

Gear trains are available in 3 ratios, 33:1, 36:1 and 40:1. Identification of gear ratios is shown in Figure 4. Application of gear ratios is shown in Table 1 Page 4.

(4) Motor Sizes -

Two motor sizes are used to power Type "E" wipers. The motor lengths vary as shown in Figure 2. Application of motor sizes is shown in Table on Page 4.

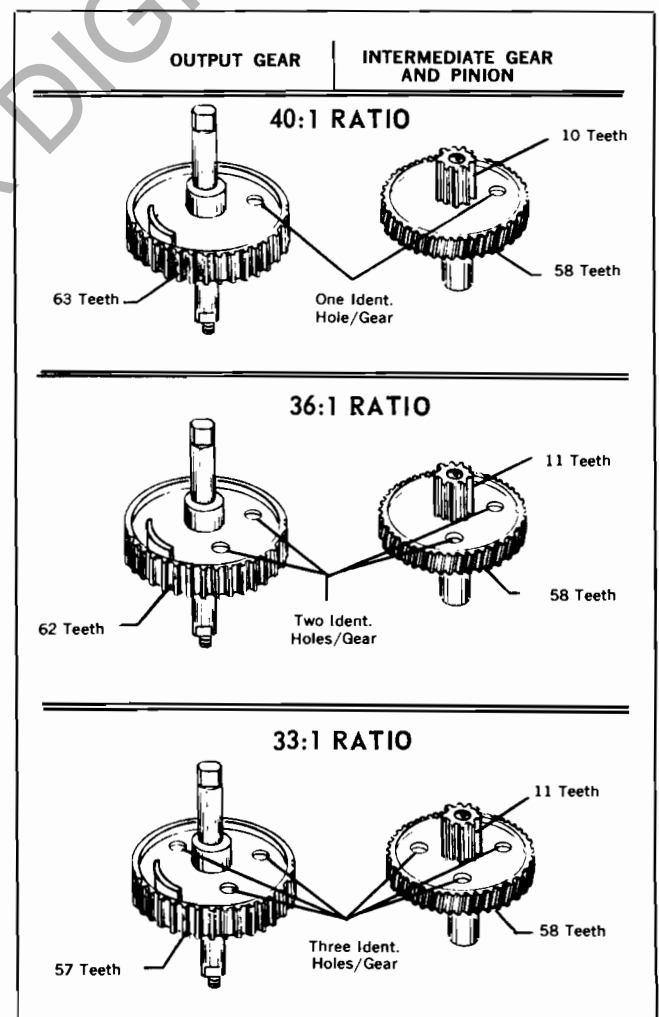


FIGURE 4

APPLICATION OF TYPE "E" WIPER VARIATIONS

(NOTE: Only those cars using Type "E" Wipers are listed)

	MTG. TYPE (FIG. 1)	MTR. LGTH. (Inches)	GEAR RATIO (FIG. 4)	CRANK ARM IDENT.NO.		MTG. TYPE (FIG. 1)	MTR. LGTH. (Inches)	GEAR RATIO (FIG. 4)	CRANK ARM IDENT.NO.
BUICK (La Sabre, Invicta) 1962 One Speed 1963-4 One Speed	2 3	3½ 4	40:1 36:1	56 08	CHEV. TRUCKS (Cont'd.) LDFC Models (Light Duty)(Rear Engine) 1962-4 One Speed Two Speed	1 1	3½ 4	40:1 36:1	42 67
BUICK SPECIAL (All) 1962-3 One Speed Two Speed 1964 One Speed Two Speed	4 4 1 1	3½ 4 3½ 4	40:1 36:1 40:1 36:1	13 79 83 78	Tilt Cab Model 1963 One & Two Speeds (RH) Pass Side Wiper (LH) Driver Side Wiper 1964 One & Two Speeds RH - Pass. Side Wiper LH - Driver Side Wiper * Single Speed Crank Arms.	1 1 1 1	3½ 3½ 3½ 3½	40:1 40:1 40:1 40:1	48 49 48* 49* 22
CHEVROLET (Biscayne, Bel Air, Impala) 1962 One Speed Two Speed (Export Models Only) 1963-4 One Speed Two Speed (Export Models Only)	2 2 3 3	3½ 4 3½ 4	40:1 36:1 40:1 36:1	53 56 05 11	GMC TRUCKS - See Chevrolet Standard & Tilt Cab Models. OLDSMOBILE (88 - Super 88) 1963-4 One Speed	3	4	33:1	05
CHEVROLET CORVAIR 1962-4 One Speed Two Speed	1 1	3½ 4	40:1 36:1	09 64	OLDS F-85 1963 One Speed Two Speed 1964 One Speed Two Speed	4 4 1 1	4 4 3½ 4	33:1 36:1 40:1 36:1	13 79 83 78
CHEVROLET II 1962-4 One Speed Two Speed (* No. 69 used on export models)	1 1	3½ 4	40:1 36:1	50 65, 69*	PONTIAC (Catalina & Starchief) 1962 One Speed 1963-4 One Speed	2 3	4 4	33:1 33:1	53 53
CHEVROLET "A" 1964 One Speed Two Speed	1 1	3½ 4	40:1 36:1	83 78	PONTIAC TEMPEST 1962-3 One Speed Two Speed 1964 One Speed Two Speed	4 4 1 1	4 4 3½ 4	33:1 36:1 40:1 36:1	13 79 83 78
CHEVROLET TRUCKS Standard Models: 1962-4 One Speed Two Speed G-10 Model: 1964 One Speed Two Speed	1 1 1 1	3½ 4 3½ 4	40:1 36:1 40:1 36:1	32 73 45 52	CANADIAN PONTIAC 1962 One Speed 1963-4 One Speed WILLY'S 1963-4 One Speed Two Speed	2 3 1 1	3½ 3½ 3½ 4	40:1 40:1 40:1 36:1	53 05 43 35

PRINCIPLE OF OPERATION:

The following three items should be kept in mind thru-out the explanations:

- (a) Ignition switch "ON" completes feed wire circuit to wiper motor.
- (b) The wiper dash switch completes certain wiper motor circuits to ground and therefore must be securely mounted.
- (c) The wiper motor is connected to the car chassis (frame) by means of a ground strap (i.e. wiper frame is actually connected to negative side of battery)

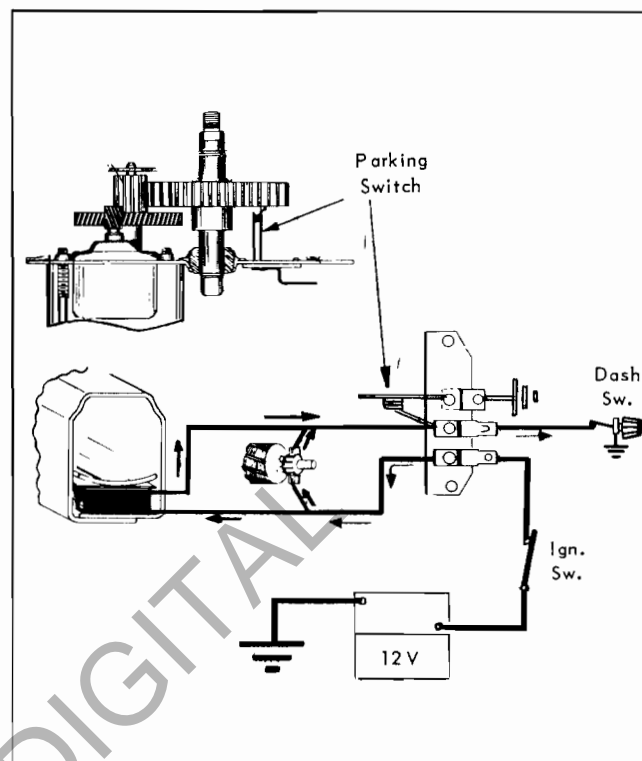


FIGURE 5

ONE SPEED WIPER OPERATION

(Assume Ign. Sw. Turned "On")

The One Speed Wiper has a shunt wound motor and operates as follows:

When the owner turns the wiper "ON" at the dash switch, the motor circuit is completed to ground at the dash. As long as the dash switch is in the "ON" position, the parking switch has no effect on the wiper operation.

Turning the dash switch "OFF", opens the wiper motor circuit to ground at the dash. However, if the wiper blades and/or crank arm are in any position other than the park position (park position of blades is 1 - 1/2" above lower windshield molding), the wiper motor circuit is still completed to ground thru the park switch. This allows the wiper to continue running until the blades reach the park position. When the park position is reached, a cam on the output gear opens the park switch contacts and the wiper is "OFF". Figure 6.

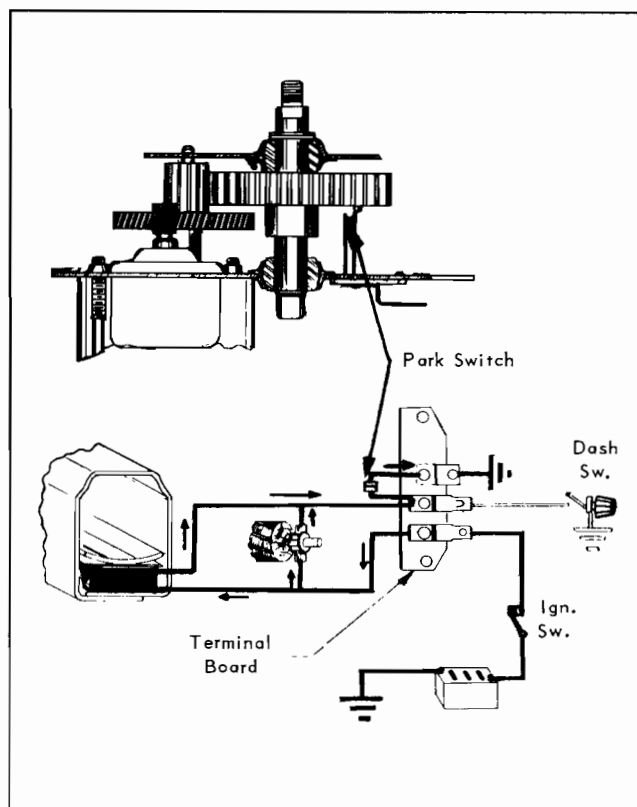


FIGURE 6

PRINCIPLE OF OPERATION (CONTINUED)

TWO SPEED WIPER OPERATION:

(Assume Ign. Sw. "ON")

Two speed Type "E" wipers are very similar to the single speed models except that a compound wound motor is used to power the gear box. The principle of operation is very similar to that of the single speed model i.e., the same type park switch is used to control the stopping of the wiper.

"LO" SPEED CIRCUIT – Refer to Figure 7

Turning the wiper dash switch to the "LO" speed position completes the circuits from the wiper terminals 1 and 3 to ground at the dash switch. Current then flows from the battery via wiper terminal No. 2 thru the series field and divides; (1) Part passes thru the shunt field to ground via wiper terminal No. 3 to the dash switch and (2) part passes thru the armature to ground via wiper terminal No. 1 to the dash switch.

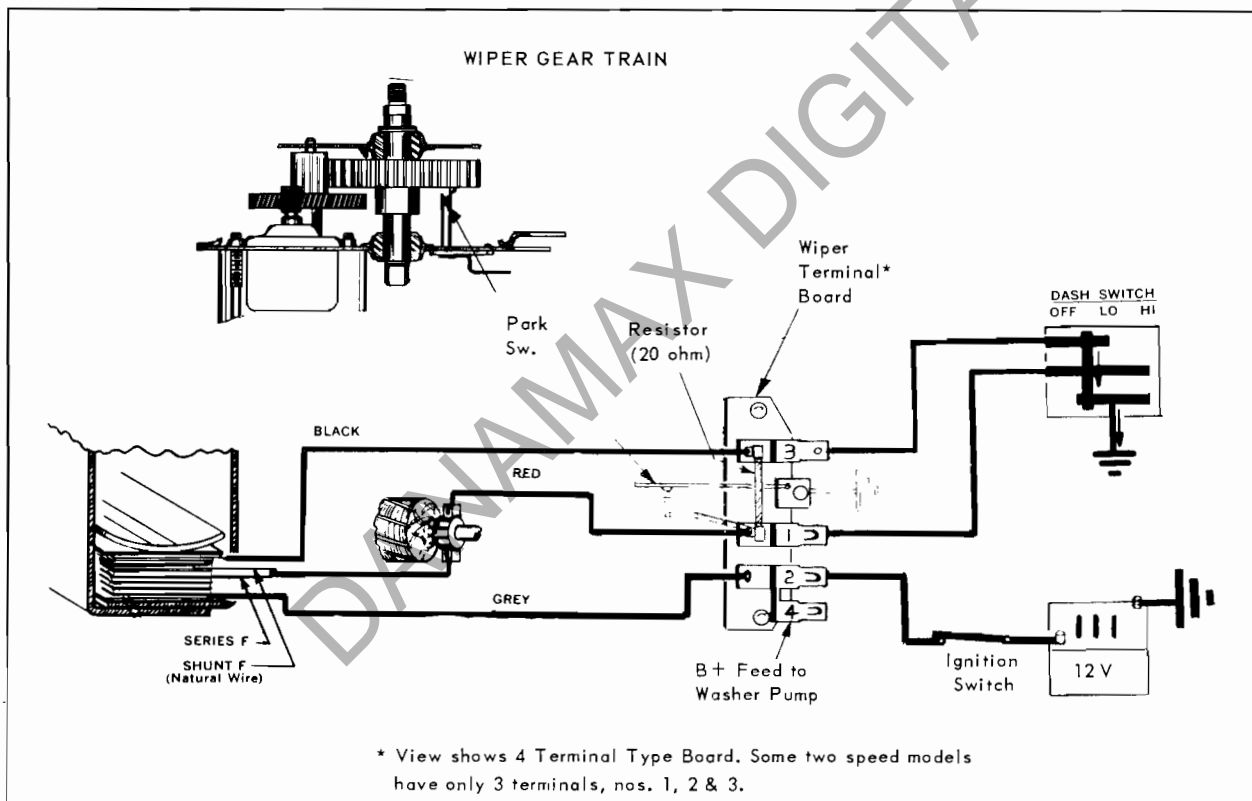


FIGURE 7

PRINCIPLE OF OPERATION – TWO SPEED MODELS (CONTINUED)

"HI" SPEED CIRCUIT : Refer to Figure 8

Moving the wiper dash switch to the "HI" speed position opens the shunt field circuit to ground at the dash. However, the shunt field is connected to a 20 ohm resistor which is connected across wiper terminals 1 and 3. The shunt field current then flows via terminal No. 3 thru the resistor to terminal No. 1 to the dash switch to ground.

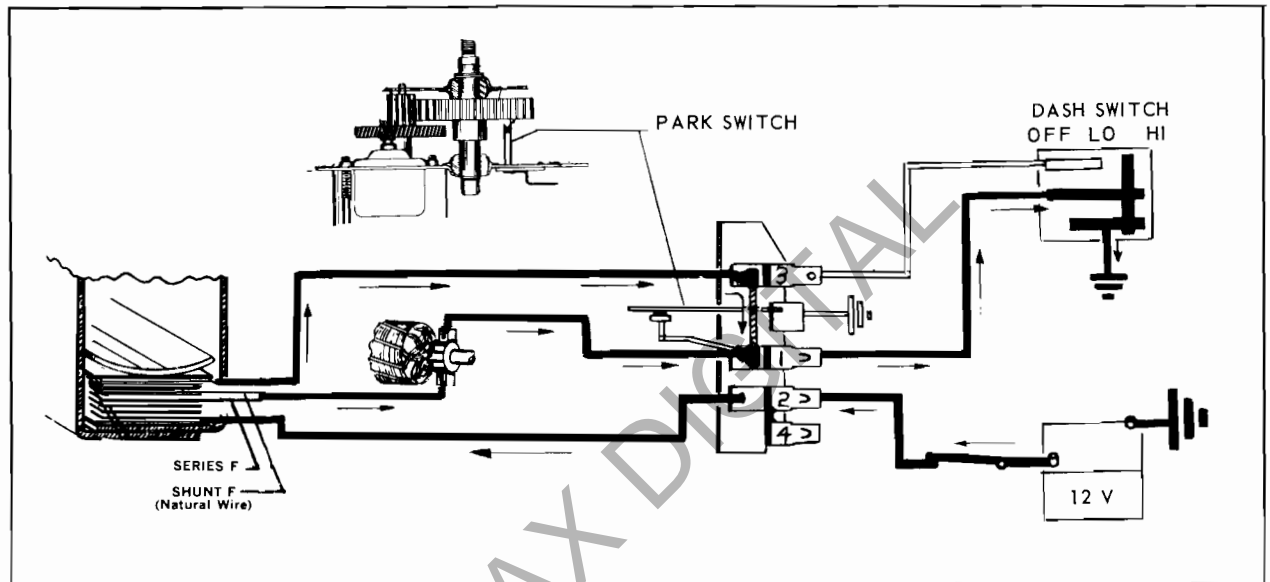


FIGURE 8

SHUTTING THE WIPER OFF – PARKING CIRCUIT – Refer to Figure 9

This circuit explanation covers that portion of wiper operation when the owner first turns the wiper "OFF" at the dash switch and the wiper blades have not reached the normal park or OFF position. (Park or OFF position of the blades is approximately 1" – 1½" above the lower windshield molding).

When the wiper blades are not in the normal "OFF" or park position, the parking switch contacts are still closed. The wiper will continue to operate until the wiper output gear is turned to a position where it's cam opens the park switch. Referring to Figure 9 it can be seen that the wiper motor circuits completed to ground thru the parking switch as follows:

TROUBLE SHOOTING PROCEDURE – WIPER INSTALLED IN CAR

- 1 – Visually and/or mechanically inspect the following items:
 - (a) Wiring harness is securely connected to wiper and dash switch.
 - (b) Wiper motor ground strap is securely connected to car chassis.
 - (c) Dash switch is securely mounted.
 - (d) Check Fuse.

- 2 – If items in step 1 check out, try operating wiper in both LO and HI speeds, then turn wiper OFF (Blades should return to park position). If wiper fails to operate correctly, proceed to step 3.

- 3 – Disconnect wiring harness from wiper and try operating wiper as shown in Figure 10.
 - (a) If wiper operates correctly independently of dash switch and car wiring, refer to the appropriate trouble chart (single or two speed) Page 10.

 - (b) If wiper still fails to operate correctly in step 3, remove body parts as required to disconnect wiper linkage from wiper crank arm and try operating wiper again. If wiper operates correctly independently of linkage, check linkage for cause of wiper malfunction.

 - (c) If wiper fails to operate correctly independently of linkage, remove wiper from car and check per instructions wiper data.

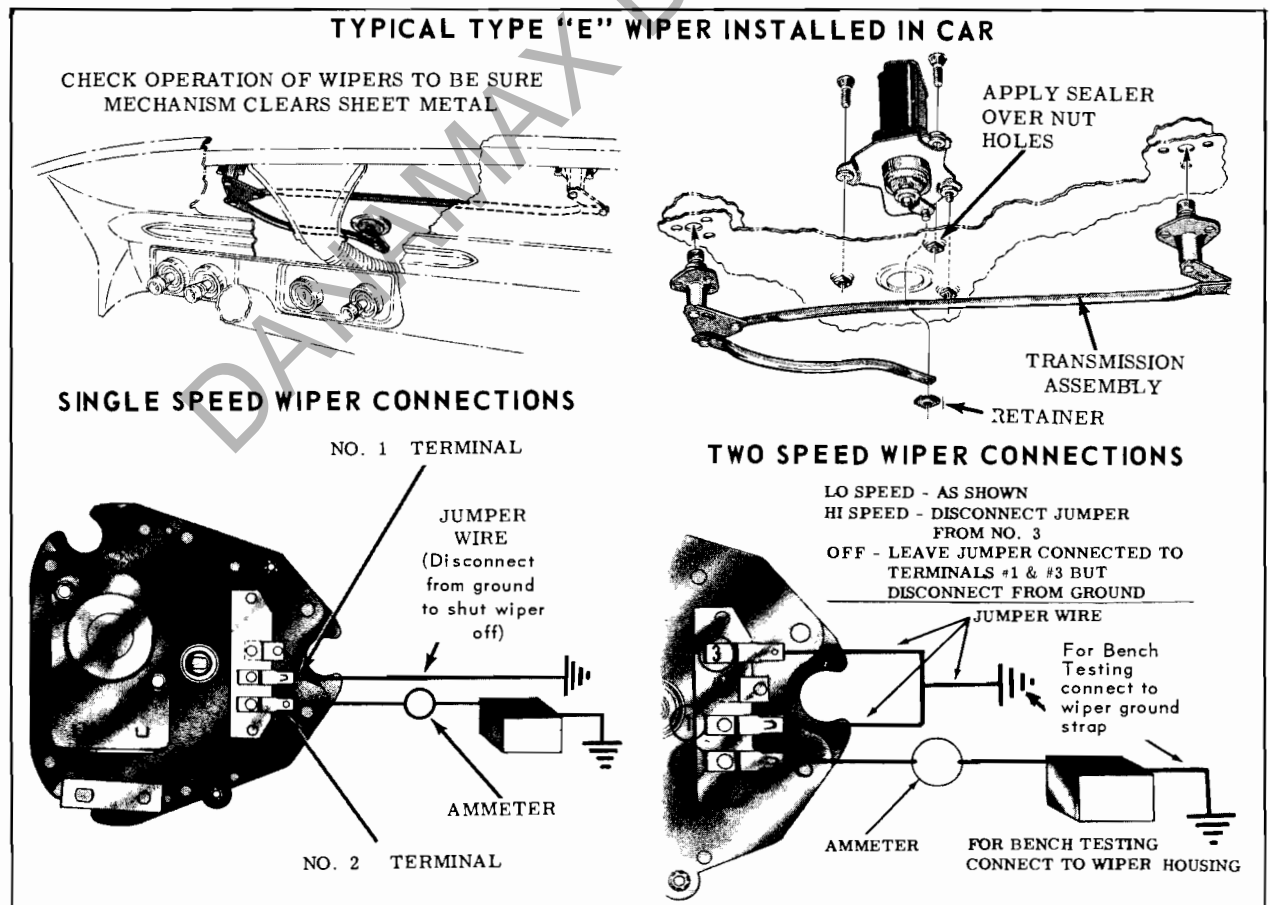
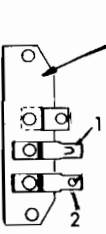
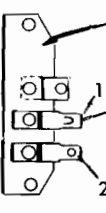


FIGURE 10

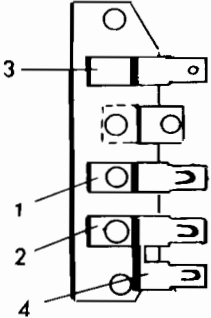
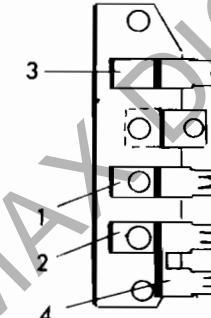
TROUBLE CHART - ONE SPEED MODELS (Wiper On Car)

(Note: Views show typical Type "E" Wiper - Terminal Board is common to all one Speed Models)

If wiper operated correctly independently of car wiring and dash switch but original trouble was:	Possible Cause of Trouble
<p>1. Wiper Inoperative</p>	 <p>WIPER TERMINAL BOARD</p> <ul style="list-style-type: none"> (a) Check for 12V at wiper terminal No. 2. If no voltage reading is obtained, re-check for worn fuse, and check for broken feed wire to wiper terminal No.2. (b) Loose dash switch mounting or defective dash switch. (c) Wire from wiper terminal No. 1 to dash switch broken.
<p>2. Wiper will not shut "OFF".</p>	 <p>WIPER TERMINAL BOARD</p> <ul style="list-style-type: none"> (a) Wire between Wiper Terminal No. 1 and dash switch grounded. (b) Dash Switch defective.
<p>3. Intermittent and/or erratic operation.</p>	<ul style="list-style-type: none"> (a) Check for loose dash switch mounting. (b) Loose wiring connections at wiper or dash switch
<p>4. Blades DO NOT return to park position when wiper is turned "OFF".</p>	<ul style="list-style-type: none"> (a) Re-check for loose wiper motor ground strap.

TROUBLE CHART – TWO SPEED MODELS (Wiper On Car)

IMPORTANT – Ignition Switch must be "ON" for all electrical tests.

If wiper operated correctly independently of car wiring and dash switch but original trouble was:	Possible Cause of Trouble
<p>1. Wiper Inoperative</p>	 <ul style="list-style-type: none"> (a) Check for 12V at harness terminal that connects to wiper terminal No. 2. If no voltage reading is obtained re-check fuse and check for broken feed wire to wiper terminal No. 2. (b) Loose dash switch mounting or defective dash switch. (c) Wire from wiper terminal No. 1 broken.
<p>2. Wiper will not shut "OFF".</p> <p>(a) Wiper had both LO and HI speeds.</p> <p>(b) Wiper had "LO" Speed only.</p> <p>(c) Wiper had "HI" Speed only.</p>	 <ul style="list-style-type: none"> - Lead between wiper terminal No. 1 and dash switch grounded. - Defective dash switch. - Lead between wiper terminal No. 3 and dash switch grounded. - Defective dash switch. - Lead between wiper terminal No. 3 and dash switch open. - Defective dash switch.
<p>3. Wiper has "HI" speed only.</p>	<p>See trouble condition 2 c</p>
<p>4. Wiper has "LO" speed only.</p>	<p>See trouble condition 2 b</p>
<p>5. Blades do not return to park position when wiper is turned "OFF".</p>	<p>Re-check for loose wiper ground strap connection.</p>
<p>6. Wiper speed normal in "LO" (70-90 wipes/min.) but too fast in "HI" (exceeds 160 wipes/min.)</p>	<p>Remove wiper from car and follow trouble shooting – Wiper Detached.</p>
<p>7. Intermittent Operation</p>	<p>Re-check dash switch mounting. Re-check harness connections to wiper motor and dash switch.</p>

TROUBLE SHOOTING – WIPER DETACHED

It is assumed that in many cases there is no information available to the repairman about the original wiper complaint. It is necessary, therefore, that wiper operation be checked according to the instructions shown in Figure 11. **IMPORTANT** – Be sure and use an ammeter capable of reading at least 30 amperes in the feed wire circuit.

- To determine trouble that exists, try operating wiper as shown in Figure 11, observe current draw in "LO" speed, then refer to the appropriate trouble chart (single or two speed models).

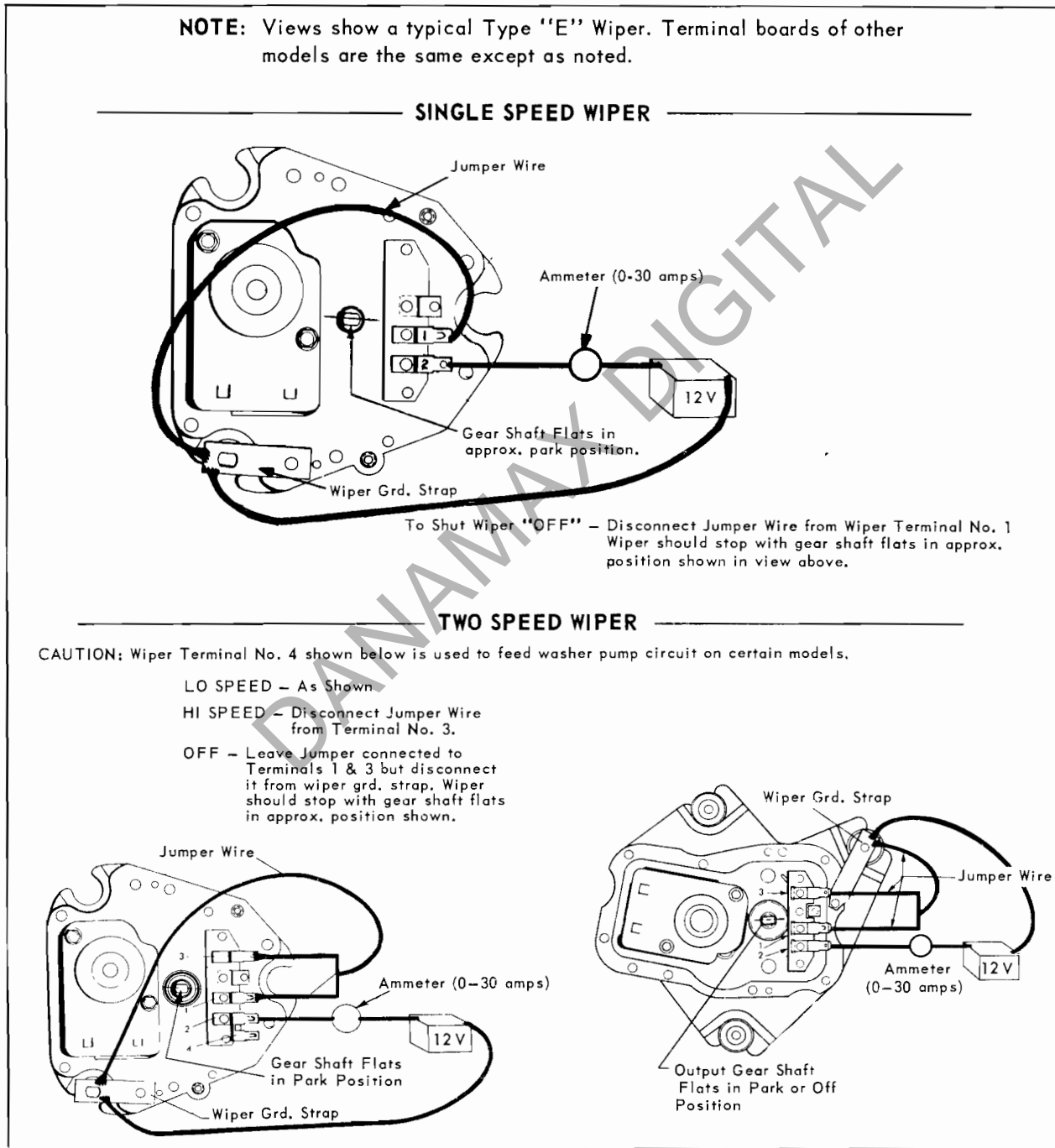
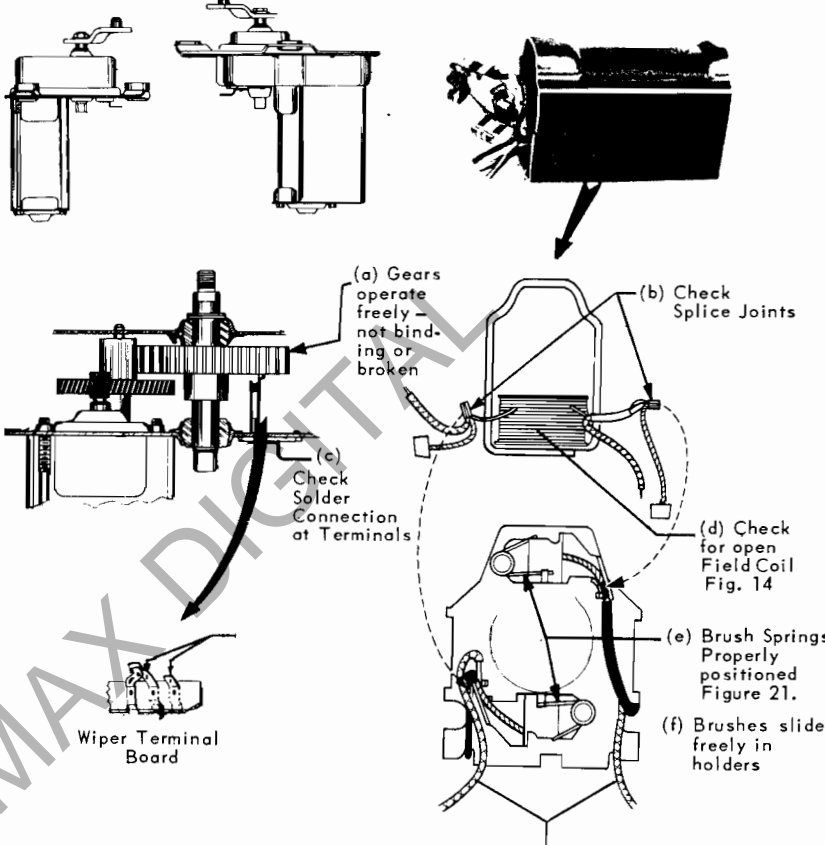
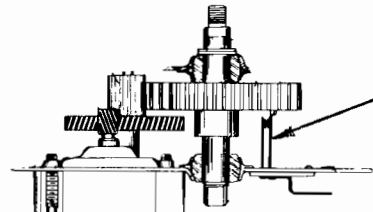
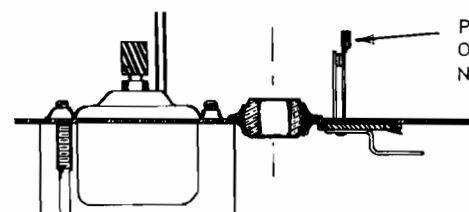


FIGURE 11

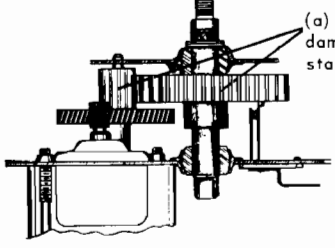
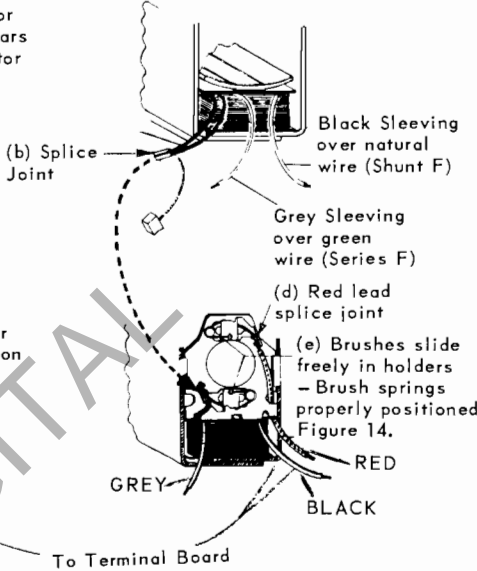
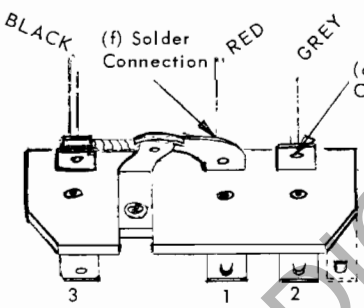
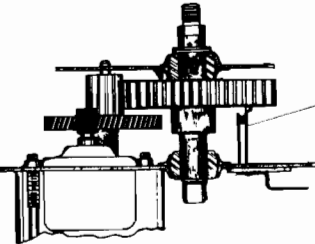
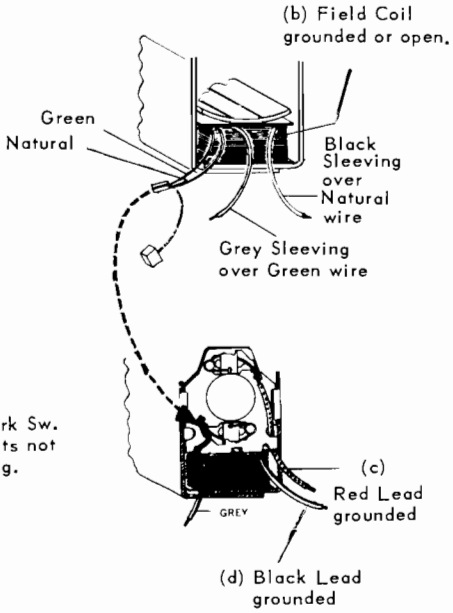
TROUBLE SHOOTING – WIPER DETACHED (CONT'D.)

TROUBLE CHART – SINGLE SPEED MODELS

Type of trouble diagnosed in step 1 page 11.	Possible Cause of Trouble
<p>1. Wiper Inoperative:</p> <p>(a) Current Draw – 0 amps. Check items b, c</p> <p>(b) Current Draw – 1.5–2.0 amps. Check items b, e, f</p> <p>(c) Current Draw – 10–12 amps. Check items a, b, d</p>	 <p>(a) Gears operate freely – not binding or broken</p> <p>(b) Check Splice Joints</p> <p>(c) Check Solder Connection at Terminals</p> <p>(d) Check for open Field Coil Fig. 14</p> <p>(e) Brush Springs Properly positioned Figure 21.</p> <p>(f) Brushes slide freely in holders</p> <p>TO WIPER TERMINAL BOARD</p> <p>Wiper Terminal Board</p>
<p>2. Wiper runs slow, vibrates, current draw 7–9 amps.</p>	<p>Shorted armature – check armature on growler and replace as required.</p>
<p>3. Wiper doesn't stop in park position – Stops immediately when jumper wire is disconnected (Figure 11).</p>	 <p>PARK SWITCH DAMAGED OR CONTACTS DIRTY</p> <p>CONTACTS NOT CLOSING</p>
<p>4. Wiper will not shut "OFF".</p>	 <p>PARK SWITCH TAB BENT OR BROKEN – CONTACTS NOT OPENING.</p>

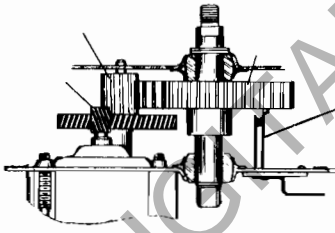
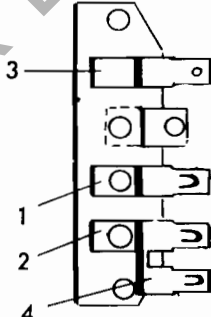
TROUBLE SHOOTING – WIPER DETACHED (CONT'D.)

TROUBLE CHART – TWO SPEED MODELS

Type of trouble Diagnosed in Step 1	What to Look For:
<p>1. Wiper Inoperative:</p> <p>(a) Current Draw – 0 amps. Check items b, c</p> <p>(b) Current Draw – 1–1.5 amps. Check items b, d, e, f</p> <p>(c) Current Draw – 11–12 amps Check items a (armature)</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>WIPER GEAR BOX</p>  </div> <div style="text-align: center;"> <p>WIPER MOTOR</p>  </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>WIPER TERMINAL BOARD</p>  </div>
<p>2. Wiper will not shut "OFF" and –</p> <p>(a) Has both LO and HI speeds. Check items a, c</p> <p>(b) Has "LO" speed only. Check items b, d (ground field coil)</p> <p>(c) Has "HI" speed only Check items b, e</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>(e) Solder Connection to Terminal No. 3</p> </div>

TROUBLE CHART – TWO SPEED MODELS (CONT'D.)

(Wiper Detached)

Types of Trouble Diagnosed in Step 1, Page 11	What to Look For:
3. Wiper has "HI" Speed Only.	See Trouble Condition 2 c
4. Wiper has "LO" Speed Only	See Trouble Condition 2 b
5. Wiper doesn't stop in park position – stops immediately when jumper wire is disconnected from ground (Fig.11)	<p>Check for dirty, bent or broken park switch contacts.</p> 
6. Wiper operation in "HI" speed range too fast – (Output gear shaft RPM's exceed 160)	<p>Check for open resistor (20 ohms)</p> 
7. Intermittent Operation	Check items b, c, d, e, f in view opposite trouble condition no. 1 this chart. Also check for open armature Figure 12.

CHECKING THE ARMATURE AND FIELD COILS:

Armature Tests:

- (a) **Shorted** – Check armature on growler.
- (b) **Open** – Refer to Fig. 12.
Bar to bar check
- (c) **Grounded** – Refer to Figure 12

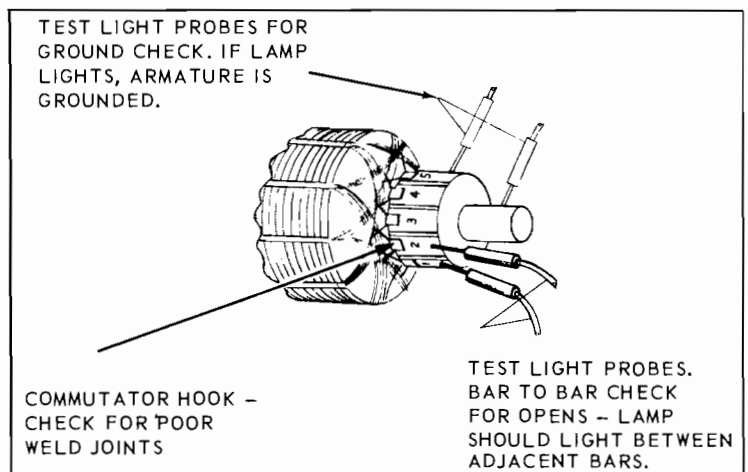


FIGURE 12

CHECKING THE ARMATURE AND FIELD COILS (CONT'D.)

FIELD COIL TESTS -

Use a test light such as shown in Figure 13 and refer to Figure 14 for test procedures.

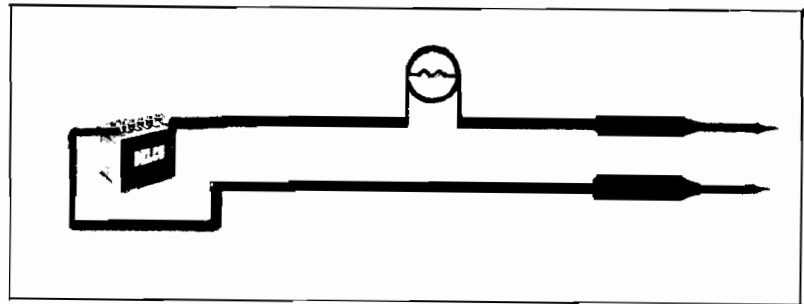


FIGURE 13

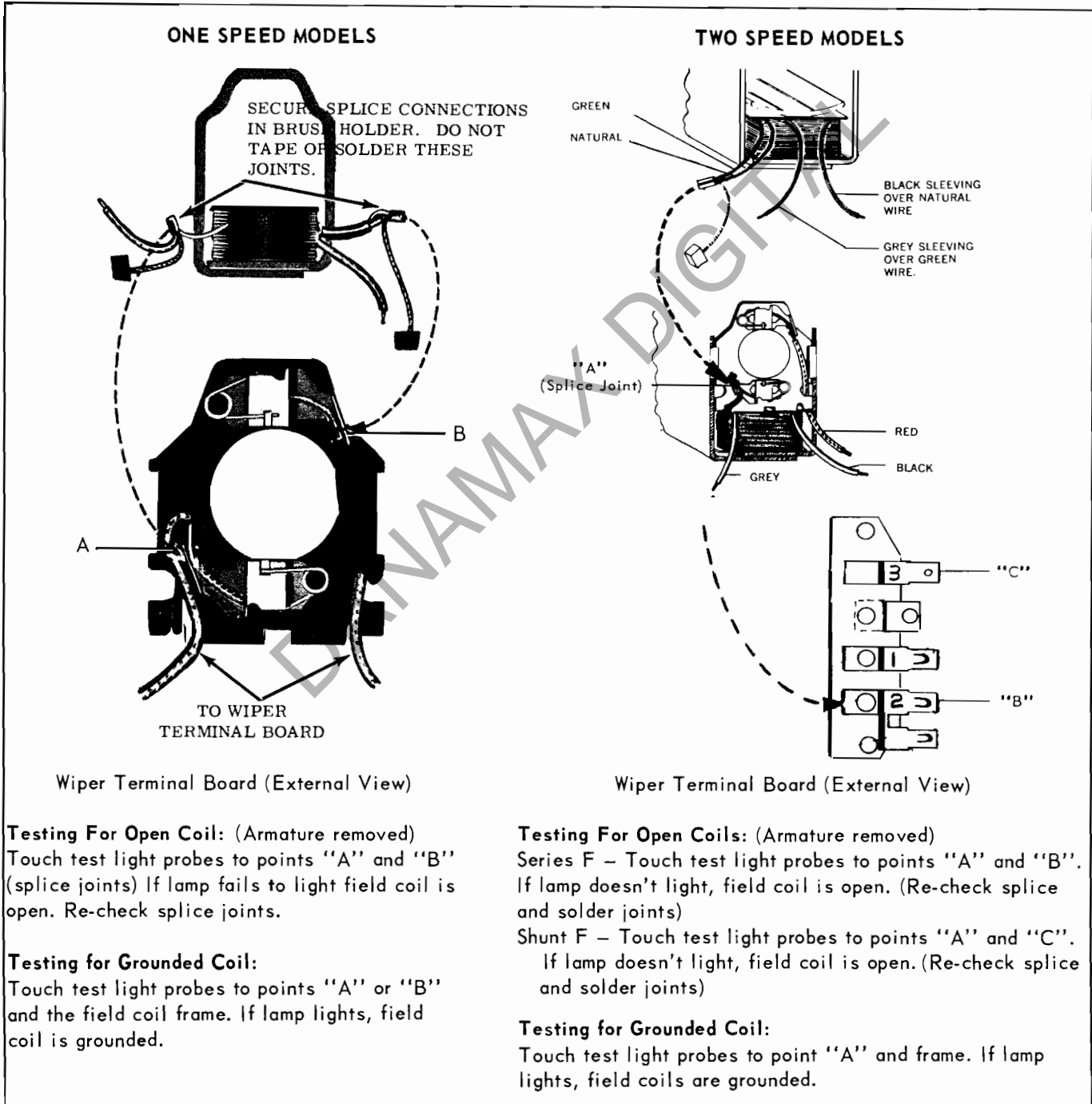


FIGURE 14

DISASSEMBLY – ASSEMBLY PROCEDURES (CONT'D.)

MOTOR DISASSEMBLY (Cont'd.)

5. Move brushes away from armature commutator and remove armature and end cap from frame and field assembly. (Figure 22)
6. Remove end cap from end of armature shaft.
CAUTION: Be careful not to lose the plastic thrust plug in end of armature.
7. Remove end play washers from commutator end of armature shaft. When re-assembling armature in wiper install washers as shown in Figure 23.
8. To replace brushes, cut brush pigtail approx. 1/4" from splicing clip. Splice the new brush pigtail to the 1/4" of pigtail left from the original brush.
Note: Splicing clips are provided in the replacement brush packages.

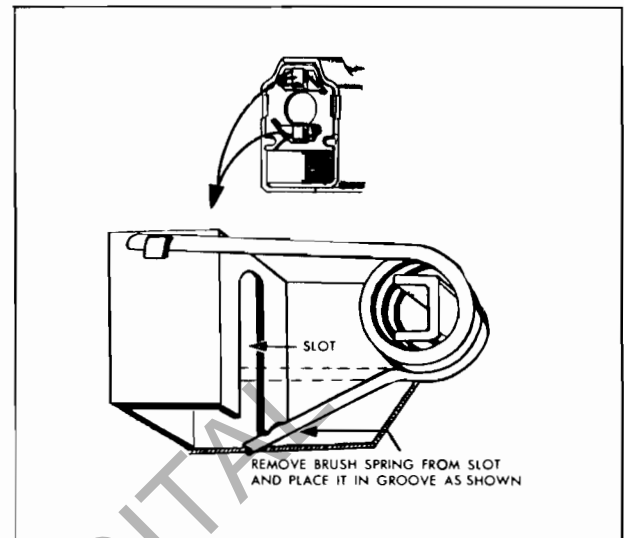


FIGURE 21

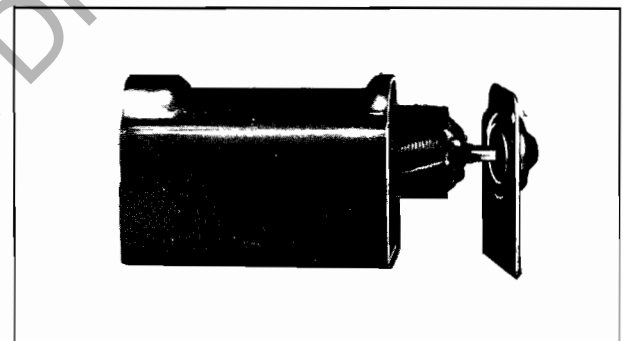


FIGURE 22

MOTOR RE-ASSEMBLY

Reverse disassembly steps 1 thru 7 and re-assemble gear box. See Lubrication specifications Page 22.

Check Wiper Operation (Figure 11).

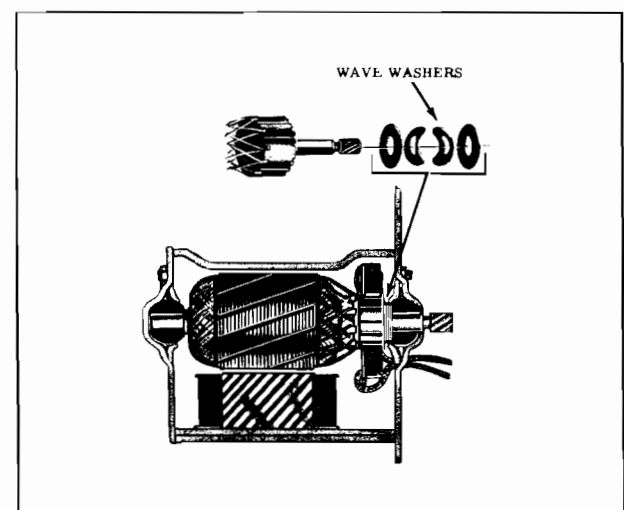


FIGURE 23

LUBRICATION CHART

Armature shafts and Bearings:
Light Grade Machine Oil.

Gear Teeth (All):
Delco Cam and Ball Bearing Lubricant.

WIPER SPECIFICATIONS

Specifications common to both One and Two Speed Models

Operating Volts 12 VDC

Crank Arm Rotation
(looking at Crank Arm) ... Counter Clock-wise

ONE SPEED MODELS

Current Draw (Amps.)

No Load 3 Max.
Dry windshield 3.5 Max.
Stall 12 Max.

Crank Arm Speed (RPMs)

Gear Ratio*

33:1	45 Min. @ 12V
36:1	43 Min. @ 12V
40:1	41 Min. @ 12V

TWO SPEED MODELS

Current Draw: (Amps)

No Load (Lo Speed) 3.6 Max.
Installed in Car - (Dry Glass) . . . 4.5 Max.
Stall 12 Max.

Crank Arm Speed: (RPMs) (No Load) (36:1 Ratio)*

Lo 31 Min. @ 12V
Hi 55 Min. @ 12V

40:1 Ratio*

Lo 35 Min. @ 12V
Hi 50 Min. @ 12V

* See Table on Page 4 for application of various gear ratios.

DISASSEMBLY – ASSEMBLY PROCEDURES

Except for the internal wiring connections, disassembly – assembly procedures are the same for both the one and two speed models.

The disassembly – assembly procedures are broken down into two general areas – **Gear Box** and **Motor Section**:

GEAR BOX DISASSEMBLY –

1. For wipers equipped with washer pump, remove washer pump as follows:
IMPORTANT – For detailed service instructions covering washer pump, refer to Bulletin 18D-135.
 - (a) Remove the two washer pump mounting screws (Figure 15) and carefully lift the washer pump off the wiper.
NOTE: Figure 15 shows washer pump with two piece cover. Pump with one piece cover disassembles in like manner.
 - (b) Remove the washer pump drive gear or 4 lobe cam (Figure 19). These parts are a press fit on the wiper gear shaft and it will be necessary to use a small puller.
 - (c) On those Type "E" Wipers equipped with the rectangular gear case, remove the two screws that secure the pump mounting bracket to the wiper gear case. Figure 15.
 - (d) Remove the felt lubricating washer from the wiper gear shaft.

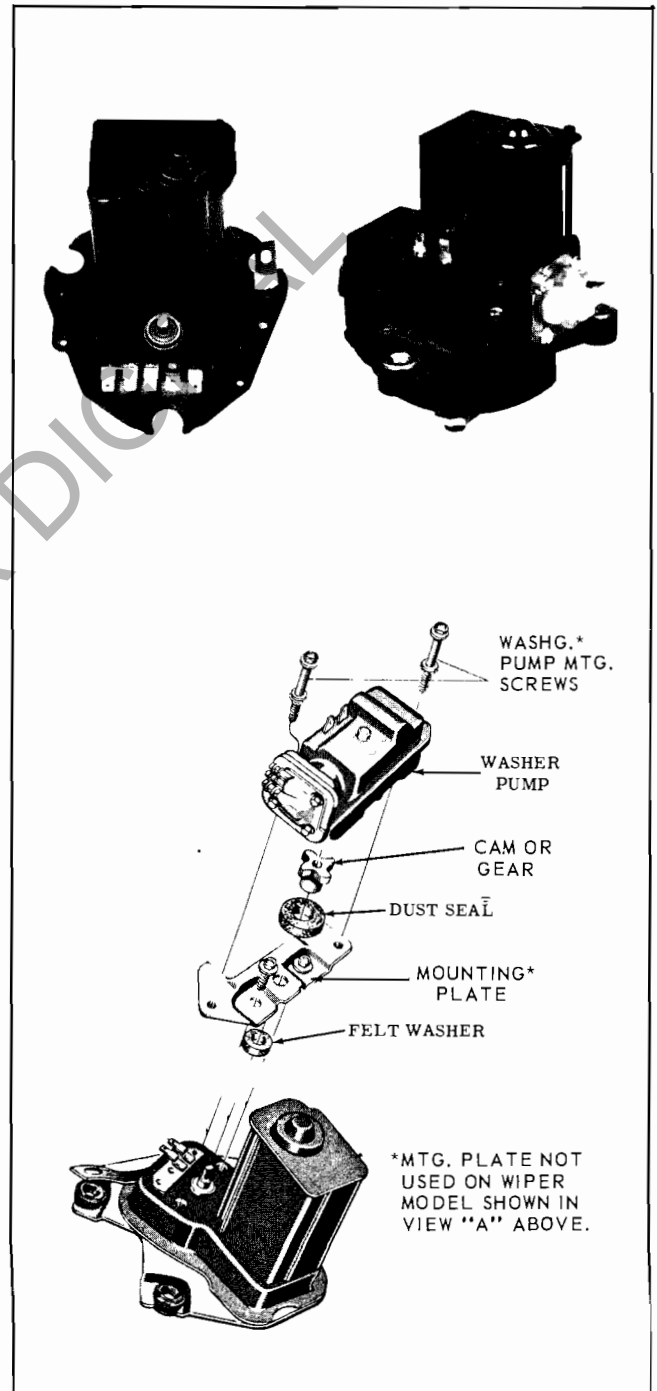


FIGURE 15

**DISASSEMBLY-ASSEMBLY PROCEDURES
(CONT'D.)**

GEAR BOX DISASSEMBLY (Cont'd.)

2. Clamp crank arm in a vise and remove crank arm retaining nut (Figure 16).

CAUTION: Failure to clamp crank arm may result in stripping of wiper gears!

3. Remove crank arm, seal cap*, Tru-Arc retaining ring, and end-play washers. (Fig. 16). *Seal cap used only on regular pass. car models and trucks.

NOTE: Seal cap should be cleaned and re-packed with a water-proof type grease before reassembly.

4. Drill or punch out rivets that secure gear box cover.

CAUTION: Mark ground strap location and save ground strap for re-assembly.

5. Remove output gear and shaft assembly, then slide intermediate gear and pinion assembly off shaft. (Figure 16)

6. If required, remove terminal board and park switch assembly as follows:

- a. Unsolder motor leads from terminals.
- b. Drill out rivets that secure terminal board and park switch ground strap to plate.

Note: Screws, nuts and washers for attaching a replacement terminal board-park switch assembly are included with the replacement assembly.

GEAR BOX RE-ASSEMBLY:

NOTE: Recommended lubrication of gears, bearings etc., is shown in table on Page 21.

1. If park switch and terminal board assembly was removed, re-install replacement assembly using the attaching screws and nuts included in the service package. Resolder leads to terminals. (Refer to Fig. 17 for single speed models; Fig. 18 for 2 speed.

2. Install wave washer and intermediate gear on immediate gear shaft. (Figure 17)

3. Install output gear and shaft assembly with cam in position shown in Fig. 17.

IMPORTANT: Check that output gear ratio identification matches with intermediate gear (Figure 4).

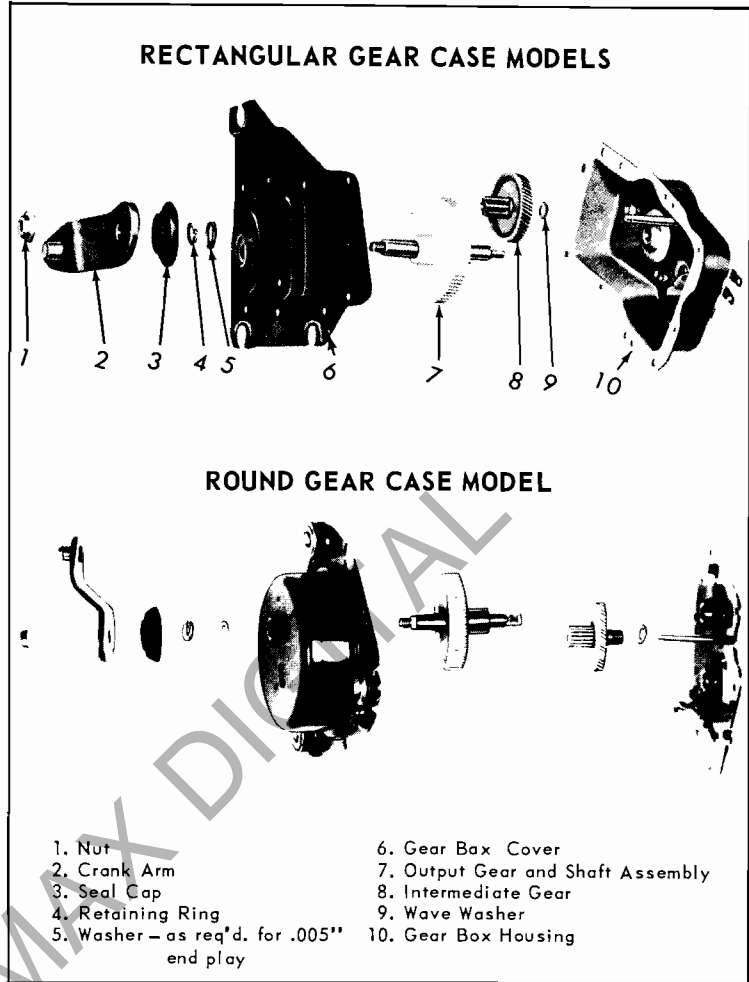


FIGURE 16

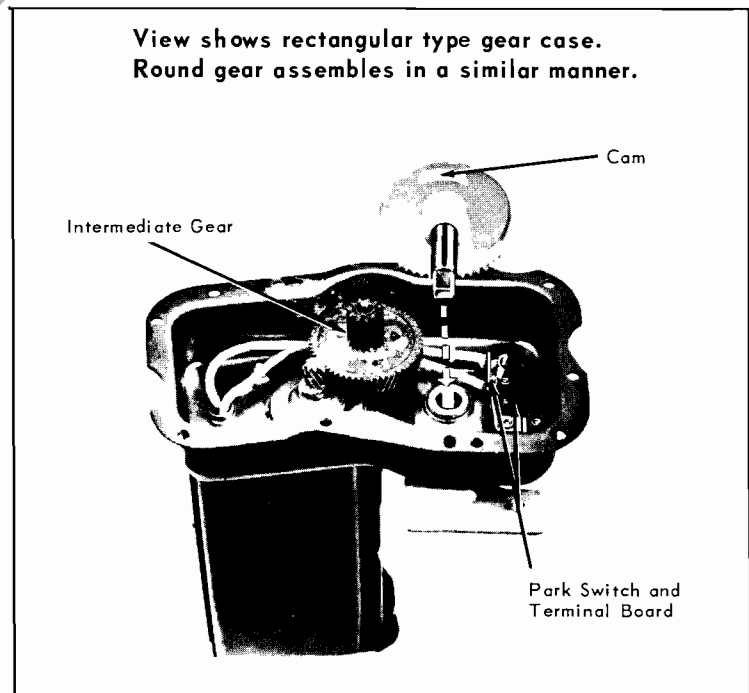


FIGURE 17

**DISASSEMBLY – ASSEMBLY PROCEDURES
(CONT'D.)**

GEAR BOX RE-ASSEMBLY: (Cont'd.)

4. Assemble gear box cover to wiper – **Be careful to locate cover over locating dowels and intermediate gear shaft.**
5. Secure cover to gear housing or plate. Be sure to re-install ground strap.

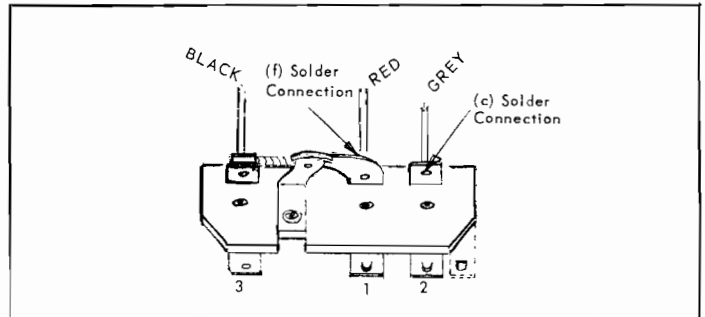


FIGURE 18

NOTE: Screws, nuts and lockwashers for reassembling cover to wiper are contained in a service repair pkg., Part No. 4910591.

6. Re-assemble end-play washers and retaining ring over output gear shaft (Figure 16). Use end play washers as required to obtain .005" maximum end play.
7. Install seal cap as required. See Step 3 under gear box disassembly.
8. To re-assemble crank arm in proper position, operate wiper to "park" or "off" position (Figure 11) and install crank arm so that index marks on crank arm line up with those on the gear box cover (Figure 1). **CAUTION: Clamp crank arm in vise before securing the retaining nut.**
9. Operate wiper (Figure 11) and check performance per data in specification table, Page 22.
10. **Washer pump to wiper re-assembly:**
Re-assembly washer pump to wiper reversing disassembly steps 1(a) thru 1(d). Observe precautions listed below.
 - (a) **Assembly of washer pump drive gear or lobe cam.**
Support crank arm end of wiper output shaft (threaded end), and using a suitable mallet drive the washer pump drive gear or 4 lobe cam on the wiper output shaft until it bottoms against the shoulders of the shaft flats. Figure 19.

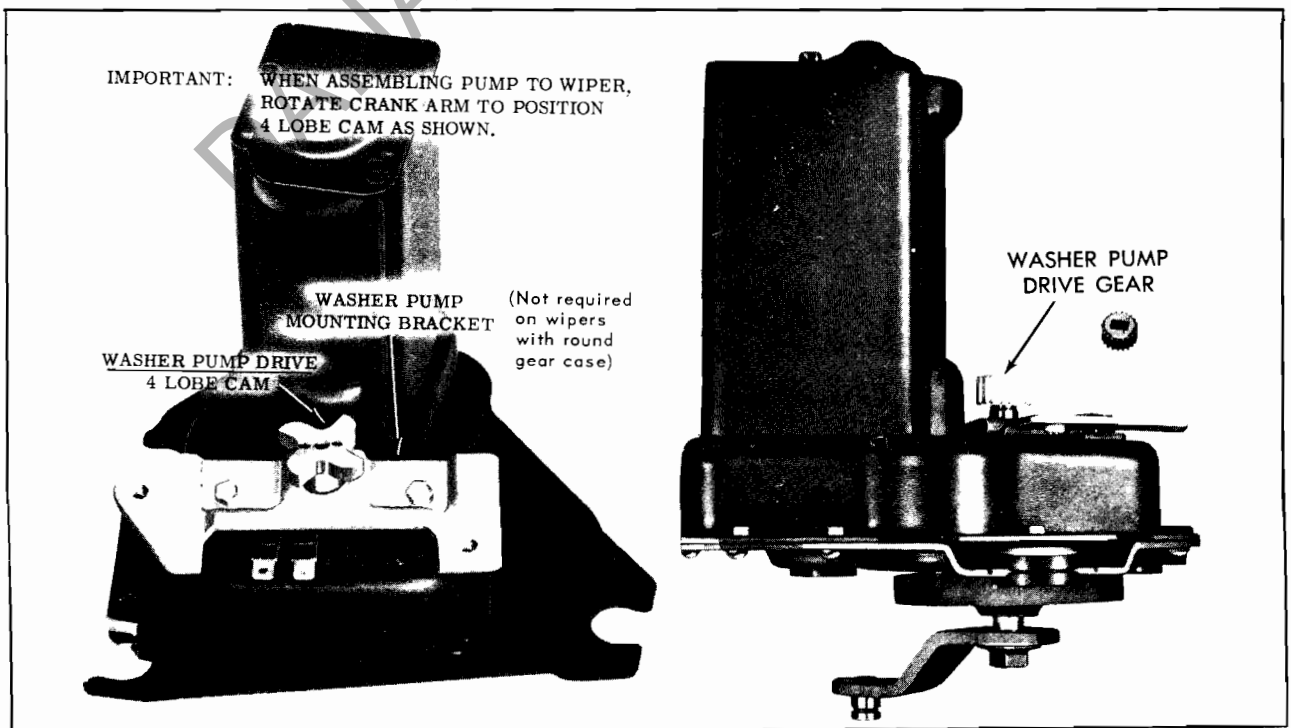


FIGURE 19

DISASSEMBLY – ASSEMBLY PROCEDURES (CONT'D.)
WASHER PUMP TO WIPER RE-ASSEMBLY (Cont'd.)

- (b) When washer pump is gear driven (1962 Model), washer pump should be positioned on wiper to obtain maximum gear mesh. To accomplish this, position washer pump over drive gear, install washer pump mounting screws loosely, move washer pump as required to obtain as tight a mesh as possible, then tighten mounting screws. **Note:** It may be necessary to manually rotate the crank arm to obtain proper gear mesh.
- (c) When washer pump is cam (4 lobe) driven, position cam as shown in Figure 19. (It may be necessary to manually rotate crank arm).

MOTOR DISASSEMBLY: Refer to Figure 20 unless otherwise specified.

NOTE: It is possible to disassemble the motor section without disturbing the gear box but re-assembly is somewhat difficult. Therefore, the instructions in this booklet will recommend disassembly of the gear box to insure a reliable repair procedure.

1. Disassemble gear box as required to gain access to internal solder connections at wiper terminal board. Unsolder motor leads from terminals.
2. Remove motor tie bolts.
3. Hold end cap against frame and field and disengage complete motor section from gear box.
4. Turn motor section as required to gain access to brush plate assembly and release brush spring pressure against brushes. Figure 21.

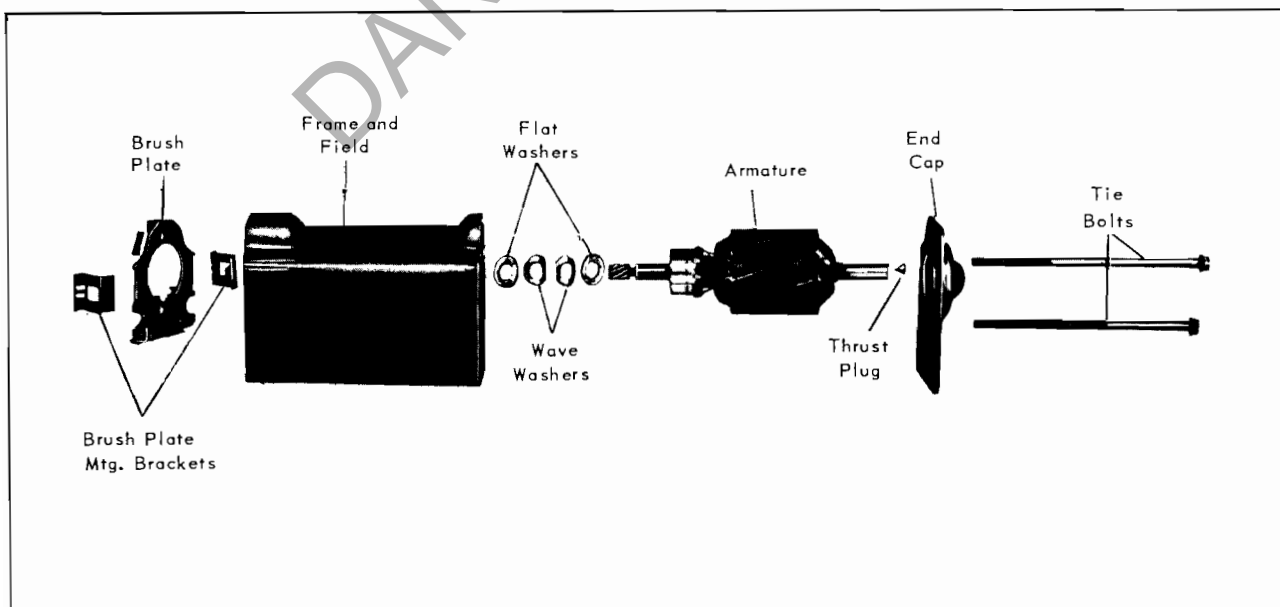


FIGURE 20