GROUP 8
ELECTRICAL AND INSTRUMENTS

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SPECIFICATIONS

BATTERY

Model Usage	VC-1 (With 361 Cu. In. Engines)	VC-1	VC-2 VC-3 VY-1 (With 413 Cu. In. Engines)
	Standard Equipment	Special Equipment	Standard Equipment
Capacity	59	70	70
Voltage	12	12	12
Number of Plates per Cell	11	13	13
Ground Terminal	Negative	Negative	Negative
Model Identification Number	MB-24-59	MB-27-70	MB-27-70

STARTING MOTOR

	GEAR REDUCTION STARTING MOTOR (All 1964 Models Except VC1, VC2 with Manual Trans.)	DIRECT DRIVE STARTING MOTOR VC1, VC2 with Manual Transmission
Starting Motor Identification Number	2095150	1889200
Make	Chrysler Built	Chrysler Built
Voltage	12	12
No. of Fields	4 (3 Series, 1 Shunt)	4
No. of Poles	4	4
Brushes	4	4
Spring Tension	32 to 48 Ounces	32 to 48 Ounces
Drive	Overrunning Clutch	Solenoid Shift—Overrunning Clutch
End Play	.010"—.035"	.005" Minimum
Free-Running Test		
Voltage	11	11
Amperage Draw Maximum	90	78 Amps. Maximum
Speed RPM	1925 to 2400	3800 Minimum
Lock-Resistance Test		
Voltage	4	4
Amperage Draw	400 to 450	350
Solenoid Switch		
Pull-In Coil	14.4—16.0 Amps. @ 6.0 Volts	20.0—22.2 Amps. @ 6.0 Volts
Hold-In Coil	11.5—12.6 Amps. @ 6.0 Volts	11.2—12.4 Amps. @ 6.0 Volts

SPECIFICATIONS—(Continued)

ALTERNATOR

Rotation	Clockwise at Drive End
Voltage	12 Volt System
Current Output	Design Controlled
Voltage Output	Limited by Voltage Regulator
Brushes (Field)	2
Condenser Capacity	.50 Microfarad Plus or minus 20%
Field Current Draw—	
Rotating Rotor by Hand @ 12 Volts	2.38 to 2.75 Amperes Maximum
Current Output—	
Standard	34.5 plus or minus 3 amperes
Special Equip., Heavy Duty and/or Air Conditioning (Both Single and Double Pulleys)	39 plus or minus 3 amperes

NOTE: Plus or minus three ampere tolerance is provided to allow for temperature variation. Current output is measured at1250 engine RPM and 15 volts. Voltage is controlled by variable load across the battery such as a carbon pile.

ALTERNATOR VOLTAGE REGULATOR

Alternator Voltage	
Regulator Identification Number	2098300
Volts	12
Ground Polarity	Negative
Point Gap	.014 inch plus or minus .002 inch
Air Gap	.048 to .052 inch nominal setting

Measure gap with gauge back of stop. Contacts close with .052 inch gauge installed. Contacts open with. 048 inch gauge installed.

Temperature in Degrees	70°F.	93°F.	117°F.	140°F.	163°F.
Minimum Setting	13.7 to	13.6 to	13.5 to	13.4 to	13.3 to
Maximum Setting	14.3	14.2	14.1	14.0	13.9

SPECIFICATIONS—(Continued)

IGNITION SYSTEM

Vehicle Model	VC2-300 K (with 2-4 Bore Carb.)		VC-1, VC-2 (with 4 Bore Carb.)	
Engine Displacement	413 cubic inch		413 cubic inch	
Distributor	Prestolite Built		Prestolite Built	
Identification No.	2444364 1BS—4011D with Tachometer Drive and Double Breaker		2444361 1BS—4011C with Tachometer Drive and Double Breaker	
Advance—Automatic (Distributor Degrees at Distributor rpm)	0° @ 525 to 675 0 to 3° @ 675 4.5 to 6.5° @ 910		0° @ 325 to 475 0 to 4.0° @ 475 4.5 to 6.5° @ 640 9 to 11° @ 2400	
Advance—Vacuum (Distributor Degrees at inches of Mercury)	0° @ 6" to 9" 4.5 to 7.5° @ 12" 7.5 to 10.5° @ 14.3"		0° @ 7.2" to 8.9" 4.5 to 7.5° @ 12" 7.5 to 10.5° @ 14.5"	
Breaker Point Gap	.014" to .019"		.014" to .019"	
Dwell Angle	27° to 32° (one set points) 34° to 40° (both sets points)		27° to 32° (one set points) 34° to 40° (both sets points)	
Breaker Arm Spring Tension	17 to 21.5 oz.		17 to 21.5 oz.	
Condenser Capacity	.25 to .285 mfd.		.25 to .285 mfd.	
Shaft Side Play	.000" to .003"*		.000" to .003"*	
Shaft End Play (After Assembly)	.003" to .010"		.003" to .010"	
Rotation	Counter-Clockwise		Counter-Clockwise	
Spark Plugs	XJ-10Y Champion		J-10Y Champion	
Size	14 MM—⅜ Reach		14 MM—⅜ Reach	
Gap	.035 inch		.035 inch	
Firing Order	1-8-4-3-6-5-7-2		1-8-4-3-6-5-7-2	
Ignition Timing	12½° BTC		10° BTC	
Coil	Chrysler	Prestolite	Chrysler	Essex
Identification No.	2444242	200759	2444241	67-160-4
Primary Resistance @ 70-80° F.	1.65-1.79 ohms		1.41-1.55 ohms	
Secondary Resistance @ 70-80° F.	9400-11700 ohms		9200-10600 ohms	
Ballast Resistor	2095501			
Resistance @ 70-80° F.	0.5-0.6 ohms			
Current Draw (Coil and Ballast Resistor in Circuit)				
Engine Stopped	3.0 Amperes			
Engine Idling	1.9 Amperes			

*Service Wear tolerance should not exceed .006 inch.

SPECIFICATIONS—(Continued)

IGNITION SYSTEM

Vehicle Model	VC-1, VC-2		VC-3, VY-1	
Engine Displacement	361, 383 cubic inch (with 2 bore Carb.)		413 cubic inch (with 4 bore Carb.)	
Distributor	Chrysler Built		Chrysler Built	
Identification No.	2444261		2444263	
Advance—Automatic (Distributor Degrees at Distributor RPM)	0° @ 250 to 450 0° to 2° @ 450 2.5° to 4.5° @ 700 10.5° to 12.5° @ 2150		0° @ 310 to 490 0° to 2° @ 490 3.5° to 5.5° @ 800 8.5° to 10.5° @ 2300	
Advance—Vacuum (Distributor Degrees at Inches of Mercury)	0° @ 4.5" to 8" 6° to 9° @ 12" 11.5° to 14.5° @ 16.5"		0° @ 6" to 9" 3° to 6° @ 11" 6° to 8.5° @ 13"	
Breaker Point Gap	.014" to .019"		.014" to .019"	
Dwell Angle	17 to 20 oz.		17 to 20 oz.	
Breaker Arm Spring Tension	28° to 33°		28° to 33°	
Condenser Capacity	.25 to .285 mfd.		.25 to .285 mfd.	
Shaft Side Play (New or Rebuilt)	.000" to .003"*		.000" to .003"*	
Shaft End Play (After Assembly)	.003" to .017"		.003" to .017"	
Rotation	Counter-Clockwise		Counter-Clockwise	
Spark Plug Type	J-12Y Champion		J-12Y Champion	
Size	14 MM—⅜ Reach		14 MM—⅜ Reach	
Gap	.035 inch		.035 inch	
Firing Order	1-8-4-3-6-5-7-2		1-8-4-3-6-5-7-2	
Ignition Timing	10° BTC		10° BTC	
Coil	Chrysler	Prestolite	Chrysler	Essex
Identification No.	2444242	200759	2444241	67-160-4
Primary Resistance	1.65-1.79 ohms		1.41-1.55 ohms	
Secondary Resistance	9400-11700 ohms		9200-11700 ohms	
Ballast Resistor	2095501			
Resistance	0.5-0.6 ohms			
Current Draw (Coil and Ballast Resistor in the Circuit)				
Engine Stopped	3.0 Amperes			
Engine Idling	1.9 Amperes			

*Service wear tolerance should not exceed .006 inch.

SPECIFICATIONS—(Continued)

BULB CHART

BULB	CHRYSLER	IMPERIAL
Sealed Beam—Lo-Beam	4002	4002
Sealed Beam—Hi-Beam	4001	4001
Tail, Stop & Turn Signal	1034	1034
Park & Turn Signal	1034	1034
Back-Up Lamps	1003	1142
License Lamp	67	67
Trunk and/or Under Hood Lamp	1004	1004
Glove Compartment	1891	1891
Radio	53 X-AM	53 X-AM
	57-FM	57-FM
Transmission Control Push Buttons	53 X	57
Handbrake Indicator	57	57
Dome Lamp	1004	1004
Map Lamp	1004	1004
Ash Receiver	53	53
Auto Pilot	1816	(a)
Ignition Switch	53 X	—
Switch Titles	—	57
Heater and/or A.C. Control P/B	57	57
Turn Signal Indicator	57	57
High Beam Indicator	57	57
Oil Pressure Indicator	57	—
Instrument Cluster Illumination	57	57

(a) Included in switch title lighting.

FUSE CHART

Circuit	Fuse Type	Ampere Rating
Radio	3 AG/AGC	7.5 AMP
Heater or Air Conditioning	3 AG/AGC	20 AMP
Accessories	3 AG/AGC	15 AMP
Rear Air Conditioning	3 AG/AGC	20 AMP
Cigar Lighter	3 AG/AGC	20 AMP
Tail, Stop, Dome	3 AG/AGC	20 AMP
Instrument Lamps	3 AG/AGC	*

*3 AMP—Chrysler
4 AMP—Imperial

CIRCUIT BREAKER CHART

Circuit	Circuit Breaker Location	Ampere Rating	
		Chrysler	Imperial
Windshield Wiper (Variable Speed)	Back of Wiper Switch	6	6
Windshield Wiper (Single Speed)	Integral with Wiper Switch	5	—
Lighting System	Integral with Headlamp Switch	15	15
Elec. Window Lifts, Elec. (Power) Seats, Top Lift, Power Vent Windows*	Behind left front kick panel	30	30

*Power Vent Windows—Imperial only

SPECIAL TOOLS
ELECTRICAL

C-707 ..... Point Gap Indicating Tool

C-744 ..... Test Lamp

C-770 ..... Commutator Undercutter

C-828 ..... Tool Kit—Generator Regulator

C-3041 ..... Distributor Drive Shaft Bushing—Remover and Installer

C-3296 ..... High Voltage Tester

C-3428 ..... Steering Wheel Puller

C-3674 ..... Headlamp Aimer Kit

C-3769 ..... Installer—Drive End Housing Bearing

C-3770 ..... Remover—Rectifier End Housing Bearing

C-3744 ..... Puller—Distributor Shaft Bushings

C-3826 ..... Gauge Tester

C-3824 ..... Spanner Wrench

C-3855 ..... Holders—Armature Brush Set

C-3900 ..... Slip Ring Installer

C-3921 ..... Installer and Locator—Alternator Bearing Grease Retainer

C-3925 ..... Support Alternator Rectifier End Shield Supporting—
End Shield Bearing Removing and Installing

C-3928 ..... Remover and Installer—Alternator Rectifier Diodes

C-3934 ..... Pulley Removing Tool (Power Steering Pump Pulley Removing Tool)

C-3944 ..... Remover and Installer—Starter Housing Bushings

SP-3375 ..... Adapters—Bearing Remover

SP-3381 ..... Installer—Rectifier End Housing Bearing

MT-379 ..... Battery Tester

MTU-36 ..... Spring Scale

MT-310 ..... Open Circuit Voltage Tester

MX-75 ..... Battery Terminal Cleaner Tool

ELECTRICAL

PART 1

BATTERY

1. BATTERY VISUAL INSPECTION

(1) Protect the fender paint finish with fender covers.

(2) Inspect the battery carrier and fender side panel for damage caused by loss of acid from the battery.

(3) Remove the battery hold-down clamp and clean the top of the battery with a solution of clean warm water and baking soda. Scrub areas with a stiff bristle brush being careful not to scatter corrosion residue with the bristles. Finally wipe off with a cloth moistened with ammonia or a baking soda and water solution.

CAUTION: Keep cleaning solution out of battery cells to eliminate weakening the electrolyte.

(4) Inspect the cables. Replace damaged or frayed cables.

(5) Inspect the terminal posts to see that they are not deformed nor broken. Clean the tapered battery terminals and the inside surfaces of the clamp terminals with the terminal cleaning tool, as shown in Figures 1 and 2.

(6) Examine the battery case for cracks and the top of battery for raised cells. Inspect sealing compound for leaks. Reseal as necessary.

(7) Tighten the battery hold-down screw nuts to 3 foot-pounds torque.

(8) **Observe the polarity of the terminals of battery to be sure the battery is not reversed** and connect the cable clamps to the battery posts and tighten securely. Coat all connections with light mineral grease or petrolatum.

(9) If the electrolyte level is low, fill to the recommended level with mineral-free water.

2. SPECIFIC GRAVITY TEST

A hydrometer is used to measure the specific gravity of the electrolyte in the battery cells. This gives an indication of how much unused sulphuric acid remains in the solution. **Hydrometer floats are calibrated to indicate correctly only at one fixed temperature.**

The specific gravity of the battery electrolyte varies not only with the quantity of acid in solution but also with temperature. Draw electrolyte in and out of the hydrometer barrel several times to bring the temperature of the hydrometer float to that of the acid in the cell and then measure the electrolyte temperature in the cell. The temperature correction amounts to .004 specific gravity points for each 10 degrees Fahrenheit change in temperature.

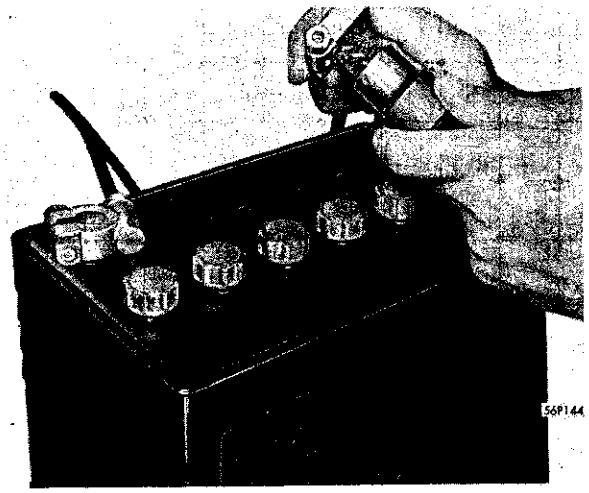

Fig. 1—Cleaning the inside of Cable Clamp

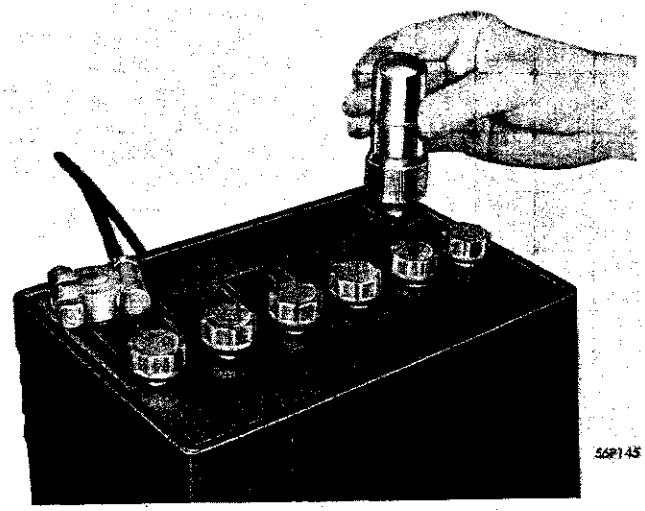

Fig. 2—Cleaning the Outside of Battery Post

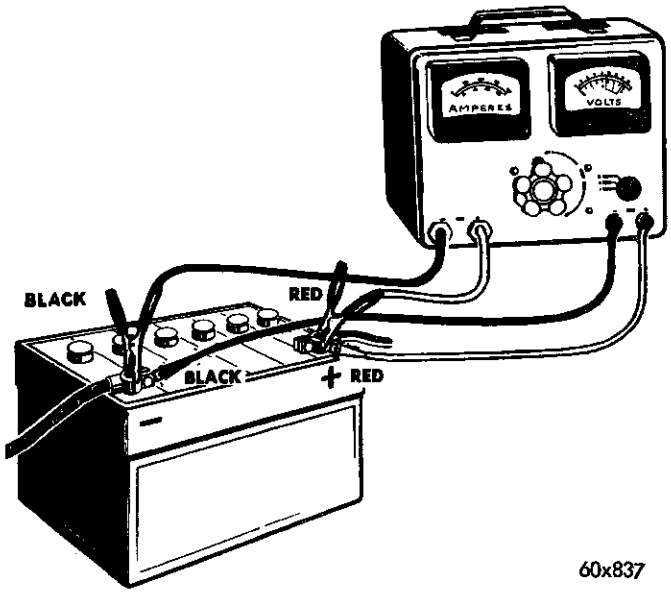

Fig. 3—High Rate Discharge Test

The liquid level of the battery cell should be at normal height and the electrolyte should be thoroughly mixed with any battery water which may have just been added by charging the battery before taking any hydrometer readings.

A fully charged battery has a specific gravity reading of 1.255 to 1.275 (all batteries for use in temperate climates).

If the battery specific gravity is below 1.220, recharge the battery to a full charge, then proceed with the battery "Voltage Tests" and "Battery Capacity Tests".

3. VOLTAGE TESTS (Open Circuit)

NOTE: Freshly charged batteries may have a "surface charge" which causes high and inaccurate readings unless properly dissipated. If battery is in the vehicle, turn the headlights on for one to three minutes to remove surface charge. Then turn lights off and wait several minutes before taking another reading.

To make a battery test, contact the meter prods (Tool MT-379) to the proper cell terminals (red to positive, black to negative), using caution not to connect across more than one cell. The point of prod will have to be pushed through sealing compound to make contact with buried link for each cell reading.

The individual cells readings should not vary more than .05 volt between any two cells. A battery varying more than .05 volt between any two cells should be **recharged** and "high rate discharge tester" should be used to test the battery before discarding the battery as unsuitable for use.

CAUTION: Do not use an open flame near the battery.

4. HIGH RATE DISCHARGE TEST OF BATTERY CAPACITY

Satisfactory capacity tests can be made only when

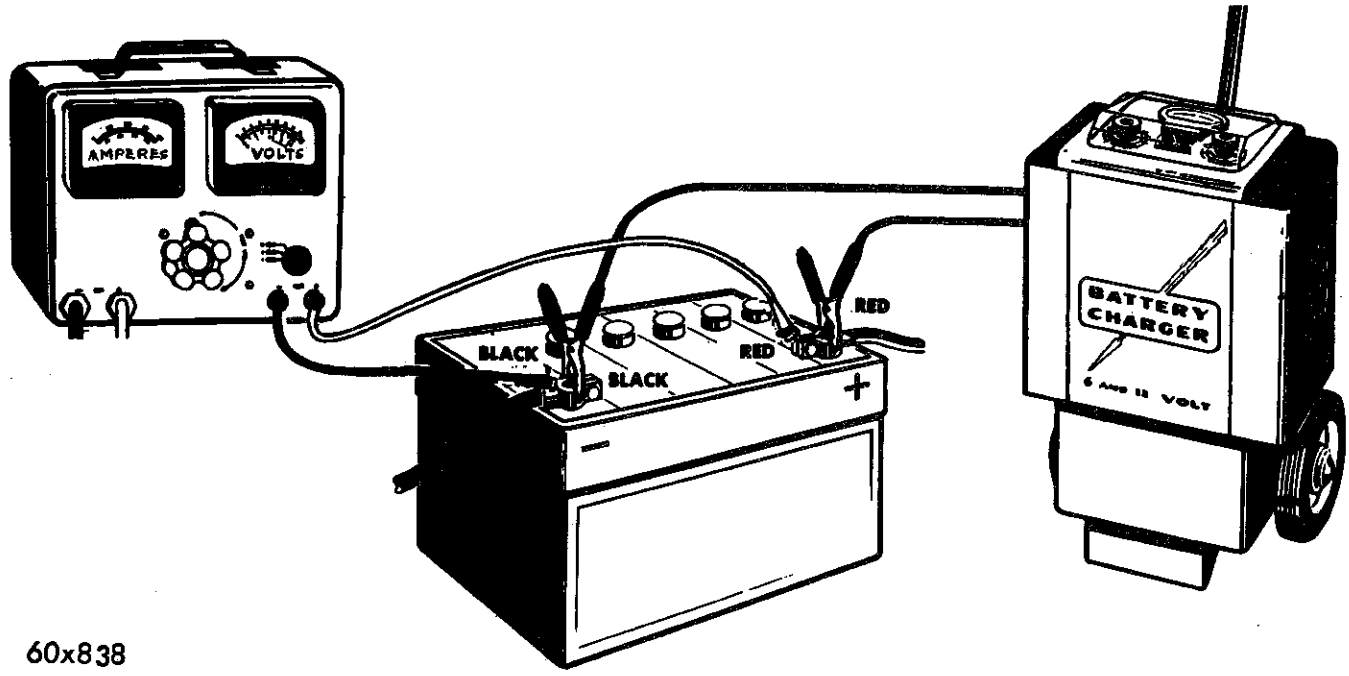

Fig. 4—Three Minute Charge Test

battery equals or exceeds 1.220 specific gravity at 80 degrees Fahrenheit. If reading is below 1.220, the battery should be slow charged until fully charged in order to secure proper test results.

(1) Turn the control knob of the battery starter tester to the **OFF** position.

(2) Turn the voltmeter selector switch to the 16 volt position (test units so equipped).

(3) Connect the test ammeter and voltmeter positive leads to the battery positive terminal and ammeter and voltmeter negative leads to the battery negative terminal (Fig. 3).

NOTE: The voltmeter clips must contact the battery posts or cable clamps and not the ammeter lead clips.

(4) Turn the control knob clockwise until the ammeter reading is equal to three times the ampere hour rating of the battery.

(5) Maintain the load for 15 seconds, voltmeter should read 9.5 volts or more, which will indicate that the battery has good output capacity.

(6) Turn the control knob to the OFF position.

5. CHARGING THE BATTERY

If the voltage in "High Rate Discharge Test" was under 9.5 volt, the battery should be test charged to determine whether the battery can be satisfactorily charged.

Three Minute Charge Test (Fig. 4)

NOTE: This test should not be used if battery temperature is below 60 degrees F.

(1) Connect the positive (+) charger lead to the battery positive terminal and the negative (—) charger lead to the battery negative terminal.

IMPORTANT: Be sure of the correct polarity when charging the batteries.

(2) Trip the charger power switch to the **ON** position. Turn the charger timer switch past "three minutes" then back to "three minutes".

(3) Adjust the charge switch to the highest possible rate not exceeding 40 amperes.

(4) When the timer switch cuts off at end of 3 minutes, turn the timer switch back to fast charge.

(5) Use the 4 volt scale of the battery starter tester voltmeter (on test units so equipped) and quickly measure the voltage across each cell while the battery is being fast charged. A faulty cell or cells will be detected by a cell voltage variation of more than .1 volt.

(6) If the cell voltages are even within .1 volt, use the 16 volt scale of the battery starter tester (on test units so equipped) and measure the total voltage of the battery posts while the battery is being fast charged. If the total voltage during the charge exceeds 15.5 volts, the battery is sulphated and should be cycled and slow-charged until specific gravity reaches 1.260 (See "Slowing Charging").

If the specific gravity remains constant after testing the battery at one hour intervals for three hours, the battery is at its highest state of charge.

(7) Make another capacity test. If the capacity test does not meet specifications, replace the battery.

NOTE: A slow charge is preferable to bring the battery up to a full charge.

Safe slow charging rates are determined by allowing one ampere per positive plate per cell. The proper slow charging rate would be 5 amperes for a 59 ampere hour battery, or 6 amperes for a 70 ampere hour battery.

Fast Charging the Battery (Fig. 5)

If adequate time for a slow charge is not available, a high rate (FAST) charge is permissible and will give a sufficient charge in one hour, enabling the battery and alternator to continue to carry the electrical load.

Connect the positive (+) battery charger lead to he battery positive terminal and the negative (—) battery charger lead to the battery negative terminal.

CAUTION: The battery can be damaged beyond repair unless the following precautions are taken:

(1) The battery electrolyte temperature must **NEVER** exceed 125 degrees Fahrenheit.

If this temperature is reached, the battery should be cooled by reducing the charging rate or remove the battery from the circuit.

(2) As the batteries approach full charge the electrolyte in each cell will begin to gas or bubble. Ex-

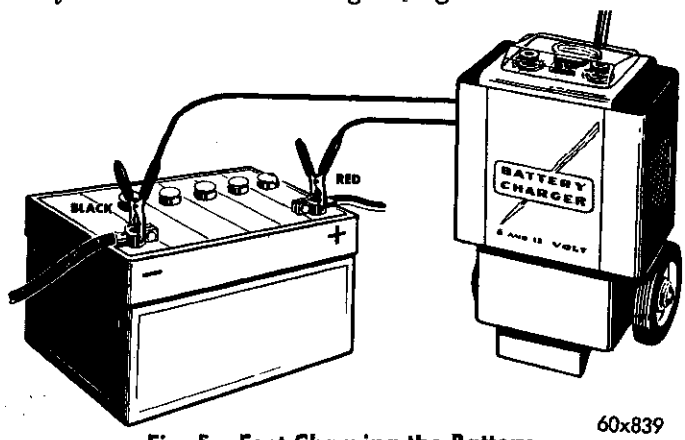

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Fig. 5—Fast Charging the Battery

cessive gassing must not be allowed.

(3) Do not fast charge longer than one hour.

If the battery does not show a significant change in the specific gravity after one hour of "FAST" charge, the slow charge method should be used.

NOTE: The manufacturers of high rate charging equipment generally outline the precautions and some models have thermostatic temperature limiting and time limiting controls.

WARNING: When batteries are being charged, an explosive gas mixture forms beneath the cover of each cell. Keep all sparks and open flames away from the battery.

Slow Charging Batteries to Remove Sulphation

To condition a battery that is sulphated, charge the battery for a minimum of 24 hours at a maximum charging rate of (4) amperes. As the battery approaches full charge, test the specific gravity at hourly intervals. The battery is fully-charged when three successive hourly hydrometer readings show no rise in specific gravity. Remember to use the temperature correction when testing specific gravity. With no rise in specific gravity for three successive readings, the battery is charged to its peak capacity.

SERVICE DIAGNOSIS

BATTERY TESTING CHART

Hydrometer Test (Corrected to 80° F.)	State of Charge or Battery Condition	Correction
Less than 1.220 SP. GR.	Battery low.	Recharge the battery. Give high rate discharge test for capacity. If the cells test O.K., recharge and adjust the gravity of all cells uniformly. Test the voltage regulator setting. Thoroughly test the electrical system for short circuits, loose connections, corroded terminals, etc.
Cells show more than 25 points (.025 Specific Gravity) variation.	Short circuit in low cell. Loss of electrolyte by leakage or excessive overcharge. Improper addition of acid. Natural or premature failure. Cracked case.	Try to recharge the battery. See "Charging the Battery". Test battery for capacity. Install a new battery if necessary.
Open Circuit Voltage Test	**State of Charge or Battery Condition**	**Correction**
Cells showing more than 1.220 specific gravity.	Satisfactory.	No correction required if variation among cells is not over .05 volts. If variation is more than .05 volts, recharge. Give high rate discharge capacity test, if cells test O.K., adjust gravity of all cells uniformly.
Cells showing less than 1.220 specific gravity, but not more than .05 volts variation.	Questionable.	Recharge battery. Give high rate discharge test for capacity. If cells test O.K., recharge. Test voltage regulator setting. Thoroughly test the electrical system for short circuits, loose connections, corroded terminals, etc.
Cells showing more than .05 volts variation.	Short circuit in low cell. Loss of electrolyte by leakage or excessive overcharge. Improper addition of acid or "Dopes". Natural or premature failure. Cracked case.	Recharge battery. See "Charging the Battery".

SERVICE DIAGNOSIS—(Continued)

BATTERY TESTING CHART

Cranking Test	Possible Cause	Correction
If the voltage drop is more than 0.3 volts (3/10) between the starting motor cable and the vehicle frame while cranking look for:	Poor contact between cable terminal and vehicle frame or between cable clamp terminal and battery post or starter switch contacts. Frayed, corroded or broken cable.	Locate the high resistance: repair or replace as necessary.
While operating the starting motor, ignition: "OFF" check the voltage of all cells. If the voltage varies more than 0.15 volt between cells, look for:	Faulty cell or cells.	Compare voltage readings with hydrometer reading—low voltage is usually accompanied by low gravity. Try to recharge the battery. See "Charging the Battery".

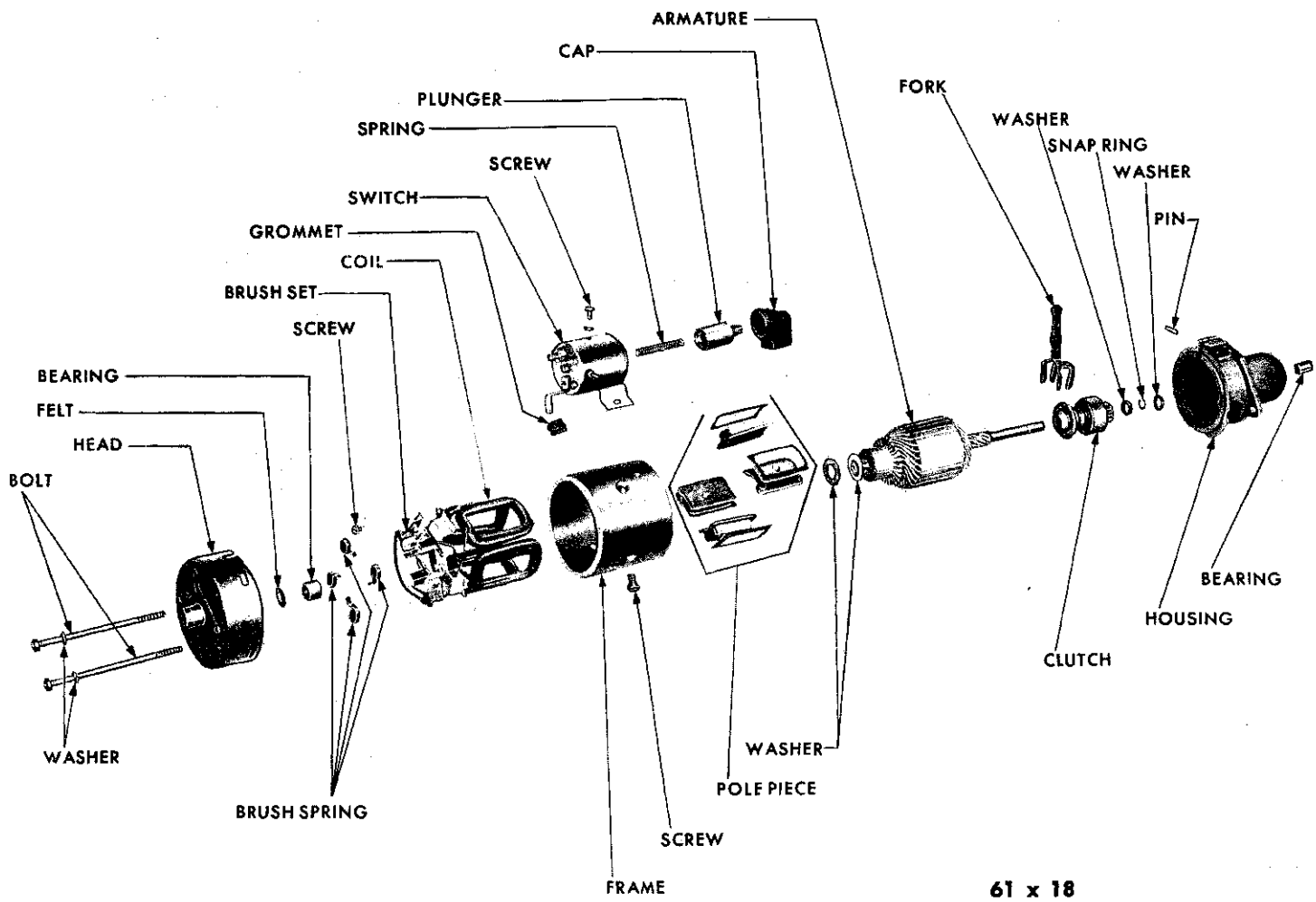

Fig. 1—Starting Motor

PART 2

STARTING MOTOR (DIRECT DRIVE)

The Chrysler built starting motor (Fig. 1) is a 12-volt, four coil assembly. The starter drive is an overrunning clutch type with a solenoid shift type switch mounted on the starting motor.

The brush holders are riveted to a separate brush plate and are not serviced individually. Brush replacement can be made by removing the commutator bearing end head.

SERVICE PROCEDURES

1. STARTING MOTOR CIRCUIT TESTS

Insulated Circuit Test

(1) Test the battery electrolyte specific gravity. The specific gravity should be 1.220 or above. If the battery specific gravity is below 1.220, recharge the battery to a full charge before proceeding with the test.

(2) Turn the voltmeter selector switch to the 4 volt position.

(3) Disconnect the ignition coil secondary cable.

(4) Connect the voltmeter positive lead to the battery positive post and the voltmeter negative lead to the solenoid connector which connects to the starter field coils.

NOTE: The voltmeter will read off the scale to the right until the starter is actuated.

(5) Connect the remote control starter switch to the battery and the solenoid terminal of the starter relay.

(6) Crank the engine with the remote control starter switch and observe the voltmeter reading. The voltmeter reading should not exceed .3 volt. A voltmeter reading of .3 volt or less indicates the voltage drop is normal in the cables, starter relay switch, solenoid switch and connections between the battery and the starting motor are normal. See "Starter Ground Circuit Test".

If the voltmeter reading is more than .3 volt, it indicates high resistance in the starter insulated circuit. Make the following test to isolate the point of excessive voltage loss.

(7) Remove the voltmeter lead from the solenoid connector and connect to the following points, repeating the test at each connection. The starter terminal of the solenoid, battery terminal of the solenoid, battery cable terminal at the solenoid, starter relay and the cable clamp at the battery.

(8) A small change will occur each time a normal portion of the circuit is removed from the test. A definite change in the voltmeter reading indicates that the last part eliminated in the test is at fault.

Maximum allowable voltage loss is as follows:

Battery insulated cable	.2 volt
Solenoid Switch	.1 volt
Each connection	.0 volt

Replace the faulty cables. Clean and tighten all connections.

Starter Ground Circuit Test

(1) Connect the voltmeter positive lead to the starter housing and the negative voltmeter lead to the battery negative post.

(2) Crank the engine with a remote control starter switch and observe the voltmeter reading. The voltmeter reading should not exceed .2 volt. A reading of .2 volt or less indicates voltage loss in the ground cable and connections are normal. If the voltmeter reading is more than .2 volt, it indicates excessive voltage loss in the starter ground circuit. Make the following tests to isolate the point of excessive voltage loss. Repeat the test at each connection.

(a) Starter drive housing.

(b) Cable terminal at the engine.

(c) Cable clamp at the battery.

A small change will occur each time a normal portion of the circuit is removed from the test. A definite change in the voltmeter reading indicates that the last part eliminated in the test is at fault.

Maximum allowable voltage loss is as follows:

Battery ground cable	.2 volt
Engine ground circuit	.1 volt
Each connection	.0 volt

2. STARTING MOTOR

Removal

(1) Disconnect the ground cable at the battery.

(2) Remove the starter cable at the starter.

(3) Disconnect the solenoid lead wire from the solenoid.

(4) Remove the bolts attaching the starting motor to the flywheel housing and remove the starting motor and housing removable seal.

3. TESTING THE STARTING MOTOR (Bench Test)

Free Running Test

(1) Place the starter in a vise equipped with soft jaws and connect a fully-charged, 12 volt battery to the starter.

(2) Connect a test ammeter (100 amperes scale) and carbon pile rheostat in series with the battery positive post and the starter terminal.

(3) Connect the voltmeter (15 volt scale) across the starter.

(4) Rotate the carbon pile to the full-resistance position.

(5) Connect the battery cable from the battery negative post to the starter frame.

(6) Adjust the rheostat until the battery voltage shown on the voltmeter reads 11 volts.

The current draw should be 78 amperes maximum at 3800 minimum rpm.

Stall Test

(1) Install the starting motor in the test bench.

(2) Follow the instructions of the test equipment manufacturer and check the stall torque of the starter against the following specifications.

(3) With the applied battery voltage adjusted to 4 volts, the stall torque should be 8.5 foot-pounds minimum with a current draw of 350 amperes.

4. STARTER DISASSEMBLY (Fig. 1)

(1) Remove the through bolts and tap the commutator end head from the field frame.

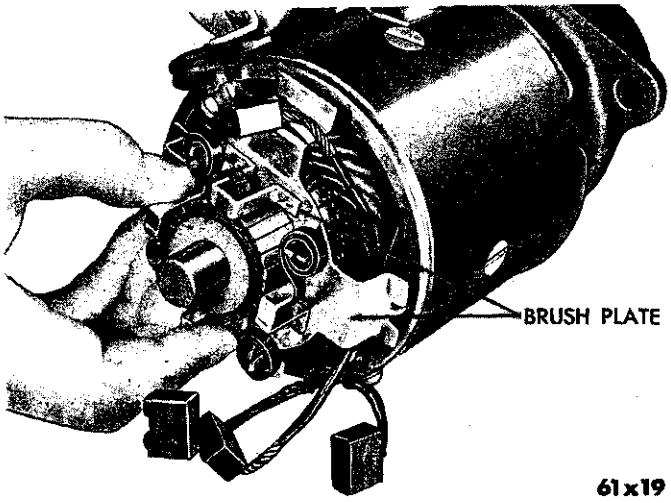

Fig. 2—Removing the Brush Ring

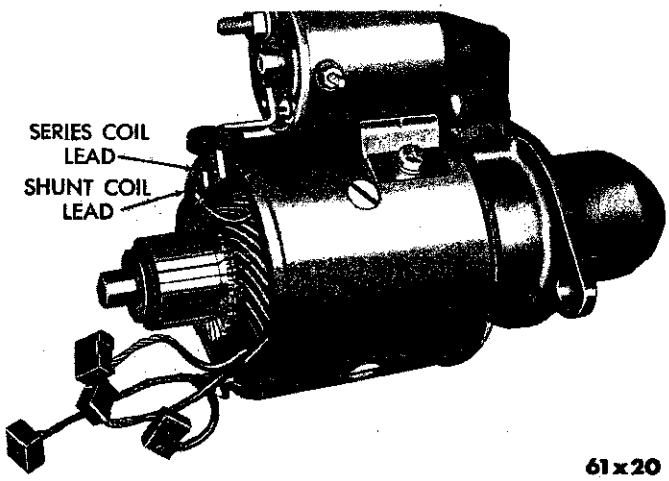

Fig. 3—Field Coil Leads Disconnected from the Solenoid Connector

(2) Remove the thrust washers from the armature shaft.

(3) Lift the brush holder springs and remove the brushes from the brush holders.

(4) Remove the brush plate (Fig. 2).

(5) Disconnect the field coil leads at the solenoid

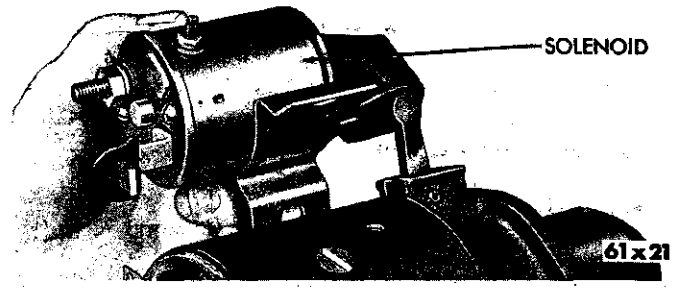

Fig. 4—Removing the Starter Solenoid

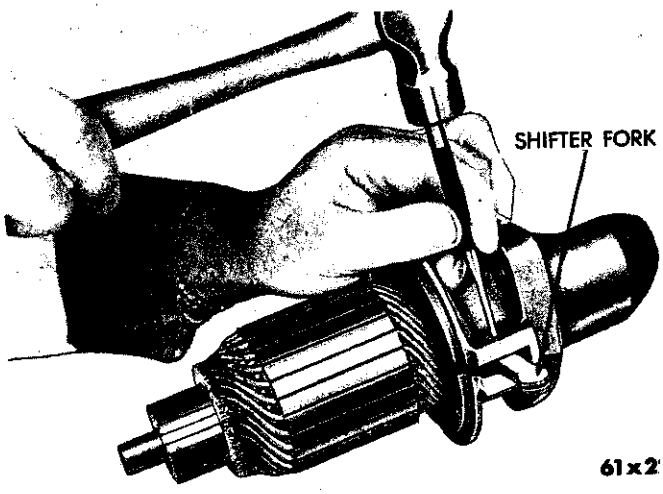

Fig. 5—Removing the Shifter Fork Pivot Pin

connector (Fig. 3).

(6) Remove the solenoid attaching screws and remove the solenoid and boot assembly (Fig. 4).

(7) Drive out the over-running clutch shift fork pivot pin (Fig. 5).

(8) Remove the drive end pinion housing and spacer washer.

(9) Note the position of the shifting fork on the starter and remove the shifter fork (Fig. 6).

(10) Slide the over-running clutch pinion gear toward the commutator end of the armature, drive the stop retainer toward the clutch pinion gear to expose the snap ring and remove the snap ring.

(11) Slide the over-running clutch drive from the armature shaft.

(12) If it is necessary to replace the field coils, remove the ground brushes terminal attaching screw and raise the brushes with the terminal and shunt wire up and away from the field frame (Fig. 7). Remove the pole shoe screws with a special pole shoe impact screwdriver, Tool C-3475.

Cleaning and Inspection

(1) Do not immerse the parts in a cleaning solvent. Immersing the field frame and coil assembly and/or armature will damage the insulation. Wipe these parts with cloth **only.**

(2) Do not immerse the drive unit in a cleaning solvent. The drive clutch is pre-lubricated at the factory and solvent will wash lubrication from the clutch.

(3) The drive unit may be cleaned with a brush moistened with cleaning solvent and wiped dry with a cloth.

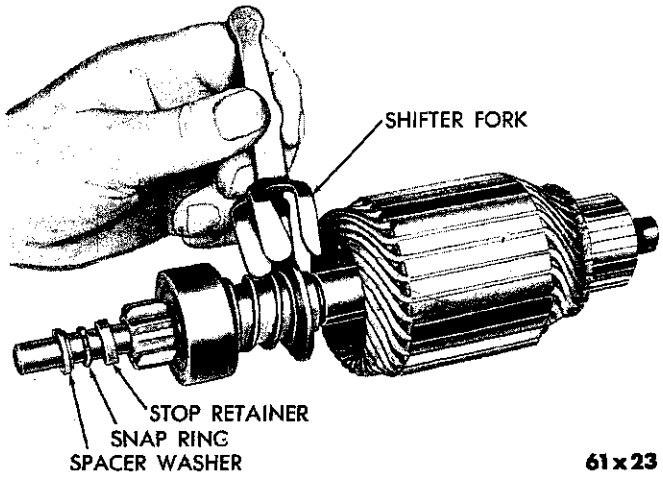

Fig. 6—Removing or Installing the Shifter Fork

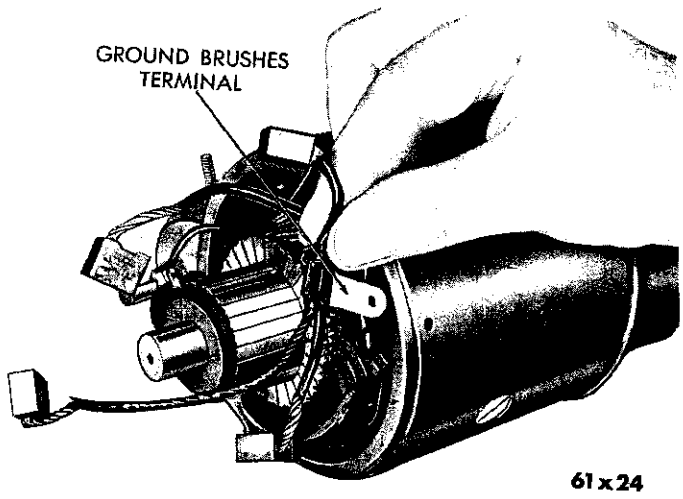

Fig. 7—Removing or Installing the Ground Brushes Terminal

5. BRUSHES AND SPRINGS—REPLACEMENT

(1) The brushes that are worn more than ½ the length of the new brush, or are oil-soaked, should be replaced. The brushes and springs can be replaced after removing the commutator end head and the brush plate.

(2) Lift the brushes; disengage the brushes from the brush holders and remove the brush plate.

(3) Disconnect the field lead wires at the solenoid connector (Fig. 3).

(4) Remove the screw attaching the ground brush terminal to the field frame and raise the brushes and terminal up and away from the field frame (Fig. 7).

(5) Remove the field terminal plastic covering and remove the old brushes. Use side cutters to break the weld by rolling the brush wire off the terminal.

(6) Drill a .174 to .184 inch hole, $\frac{3}{16}$ inch from the top of the field coil terminal. Use an $\frac{11}{64}$ inch drill.

CAUTION: DO NOT damage the field coil during the drilling operation.

(7) Position the new brushes and terminal and install the brush terminal retaining screw.

(8) The brush springs can be removed by spreading the retainers and disengaging the springs from the retainer legs.

(9) Measure the brush spring tension with a spring scale hooked under the spring near the end. Pull the scale on a line parallel to the edge of the brush and take a reading just as the spring end leaves the brush. The spring tension should be 32 to 48 ounces. Replace the springs that do not meet specifications.

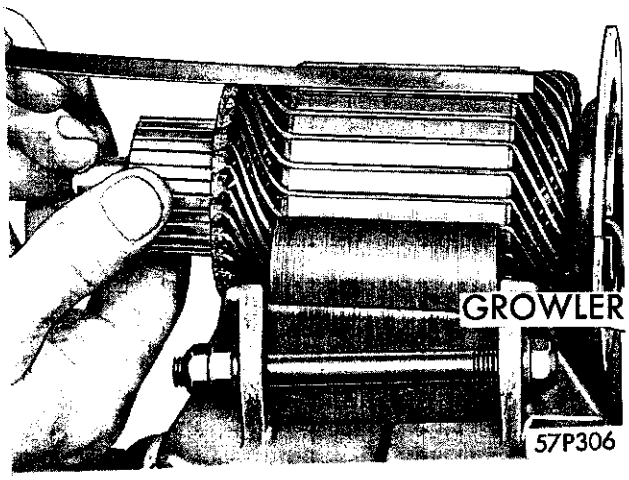

Fig. 8—Testing Armature for Short

6. TESTING THE ARMATURE

Testing the Armature for Short Circuit

Place the armature in the growler (Fig. 8) and hold a thin steel blade parallel to the core and just above it, while slowly rotating the armature in the growler. A shorted armature will cause the blade to vibrate and be attracted to the core. Replace a shorted armature.

Testing Armature for Ground

Touch the armature shaft and end of a commutator bar with a pair of test lamp test prods (Fig. 9). If the lamp lights, it indicates a grounded armature. Replace a grounded armature.

Testing Commutator Runout, Refacing and Undercutting

Place the armature in a pair of "V" blocks and measure the runout with a dial indicator. Test both the shaft and the commutator. A bent shaft requires replacement of the armature. When the commutator runout exceeds .003 inch, the commutator should be refaced. Remove only sufficient metal to provide a smooth, even surface.

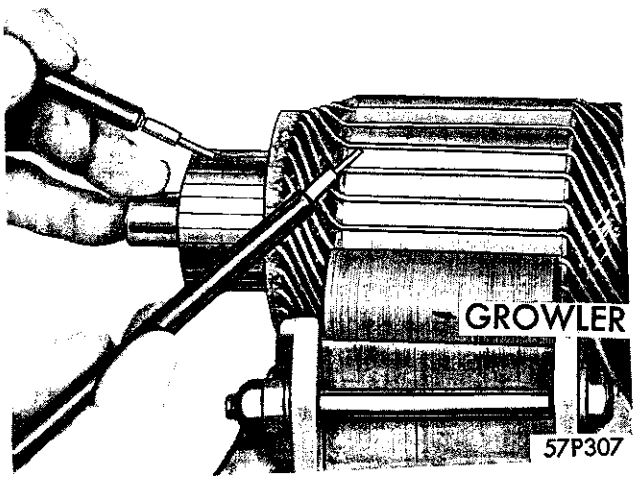

Fig. 9—Testing Armature for Ground

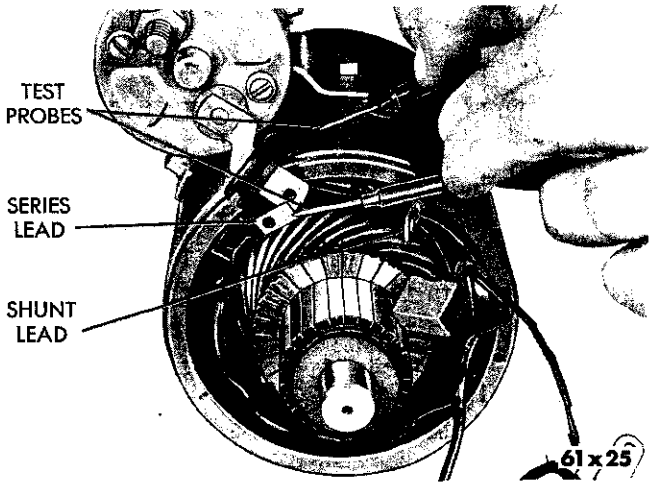

Fig. 10—Testing the Series Coil for Ground

7. TESTING THE FIELD COILS FOR GROUND

(1) Remove the through bolts and remove the commutator end frame.

(2) Remove the brushes from the brush holders and remove the brush ring (Fig. 2).

(3) Disconnect the field lead wires at the solenoid connector and separate the field leads to make sure they do not touch the solenoid connector (Fig. 3).

(4) Remove the ground brushes attaching screw and raise the brushes with the terminal and shunt wire up and away from the field frame (Fig. 7).

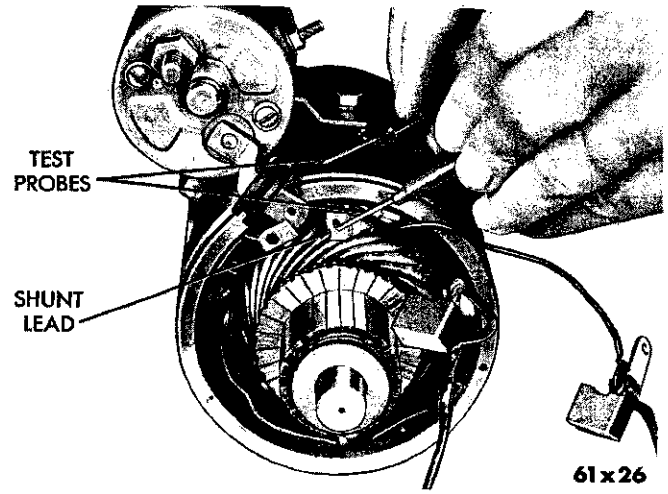

Fig. 11—Testing the Shunt Coil for Ground

(5) Touch one probe of the test lamp to the series field coil lead and the other probe to the field frame (Fig. 10). The lamp should not light.

(6) Touch one probe to the shunt field coil lead and the other probe to the field frame (Fig. 11).

If the lamp lights in either test steps (5) or (6), the field coils are grounded. If the field coils are grounded, test each coil separately after unsoldering the connector wires. Replace the grounded field coils.

(7) Touch each of the brush holders with one test probe, while holding the other test probe against the brush ring. Two brush holders that are 180 degrees apart should cause the test lamp to light as they are intentionally grounded. The other two brush holders (Fig. 12) should not cause the lamp to light when tested, as they are insulated. If the insulated brush holders cause the lamp to light when tested, it indicates that the brush holders on the brush ring are grounded. Replace the brush ring assembly if the brush holders are grounded.

8. REPLACING THE FIELD COILS

A pole shoe impact screw driver Tool C-3475 should be used to remove and install the field coils to prevent damage to the pole shoe screws and for proper tightening. The pole shoes that are loose and not properly seated may cause the armature core to rub the pole shoes. This will decrease the starter efficiency and damage the armature core.

9. SERVICING THE BRUSHES

Inspect the armature shaft bearing surfaces and bushings for wear by placing the armature core in a vise equipped with soft jaws. Do not squeeze tightly. Try the commutator end frame, the drive end frame, and armature support bushings for wear by placing them on shafts and inspecting for side play. Replace the commutator end frame and bushing assembly if the bushing is worn. Also, replace the drive end bushing if it is worn. The bushing should be well soaked in SAE 30W engine oil before it is installed.

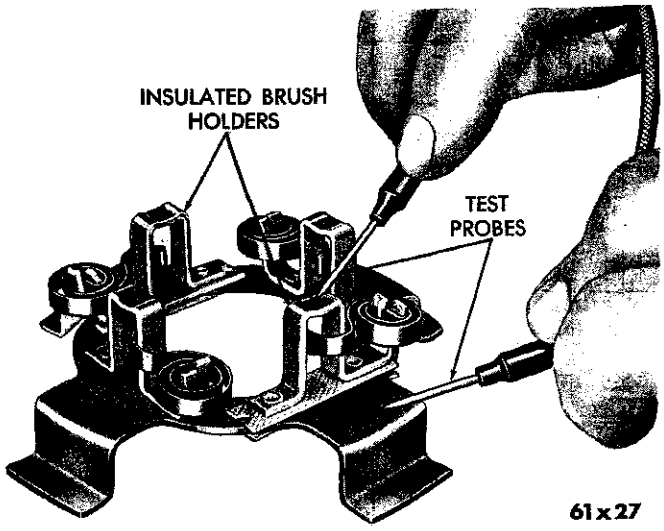

Fig. 12—Testing the Insulated Brush Holder for Ground

10. SERVICING THE DRIVE UNIT

Place the drive unit on the shaft and, while holding the armature, rotate the drive pinion. The drive pinion should rotate smoothly in one direction (not necessarily easily), but should not rotate in the opposite direction. If the drive unit does not function properly, or the pinion is worn or burred, replace the drive unit.

11. STARTER ASSEMBLY (Fig. 1)

(1) Lubricate the armature shaft and splines with SAE 10W oil or 30W rust preventive oil.

(2) Install the starter drive, stop collar (retainer), the lock ring and the spacer washer.

(3) Install the shifter fork over the starter drive spring retainer washer with the narrow leg of fork toward commutator (Fig. 6). This is important, if the fork is not properly positioned, the starter gear travel will be restricted causing a lockup in the clutch mechanism.

(4) Install the drive end (pinion) housing on the armature shaft, indexing the shifting fork with the slot in the drive end of the housing.

(5) Install the shifter fork pivot pin (Fig. 5).

(6) Install the armature with the clutch drive, shifter fork, and pinion housing; slide the armature into the field frame until the pinion housing indexes with the slot in the field frame.

(7) Install the solenoid and boot assembly (Fig. 9). Tighten bolts 60 to 70 inch-pounds torque.

(8) Install the ground brushes (Fig. 7).

(9) Connect the field coil leads at the solenoid connector (Fig. 3).

(10) Install the brush holder ring (Fig. 2) indexing the tang of the ring in the hole of the field frame.

(11) Position the brushes in the brush holders. Be sure the field coil lead wires are properly enclosed behind the brush holder ring and that they do not interfere with the brush operation.

(12) Install the thrust washers on the commutator end of the armature shaft to obtain .010 inch minimum end play.

(13) Install the commutator end head.

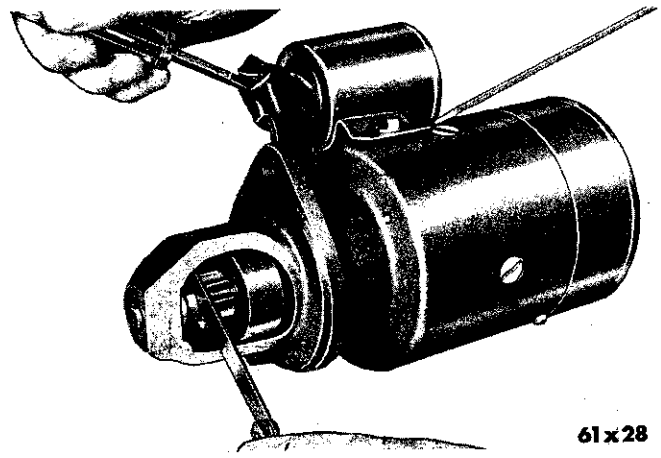

Fig. 13—Measuring the Starter Drive Pinion Clearance

(14) Install the through bolts and tighten 40 to 50 inch-pounds torque.

12. ADJUSTING STARTER DRIVE GEAR (PINION) CLEARANCE

(1) Place the starter assembly in a vise equipped with soft jaws and tighten the vise sufficiently to hold the starter.

NOTE: Place a wedge or screwdriver between the bottom of the solenoid and the starter frame to eliminate all deflection in the solenoid when making the pinion clearance check (Fig. 13).

(2) Push in on the solenoid plunger link (Fig. 13) (NOT THE FORK LEVER) until the plunger bottoms.

(3) Measure the clearance between the end of the pinion and pin stop with plunger seated and pinion pushed toward the commutator end. The clearance should be ⅛ inch. Adjust for proper clearance by loosening the solenoid attaching screws and move the solenoid fore and aft as required.

(4) Test the starter operation under a free running test.

13. STARTER INSTALLATION

(1) Before installing the starter, be sure the starter and flywheel housing mounting surfaces are free of dirt and oil. These surfaces must be clean to make good electrical contact.

(2) Position the starter to the flywheel housing removable seal (on units so equipped).

(3) Install the starter from beneath the engine.

(4) Tighten the attaching bolts securely.

(5) Attach the wires to the solenoid switch and the starter terminal.

(6) Install the battery ground cable and test operation of the starter for proper engine cranking.

STARTING MOTOR (REDUCTION GEAR TYPE)

The reduction-gear starting motor has an armature-to-engine crankshaft ratio of 45 to 1: a 3.5 to 1 reduction gear set is built into the motor assembly, which is housed in an aluminum die casting (Fig. 1). The starting motor utilizes a solenoid shift device. The housing of the solenoid is integral with the starting motor drive end housing.

SERVICE PROCEDURES

1. TESTING STARTER RESISTANCE AND CURRENT DRAW

(1) Test the battery electrolyte specific gravity. Specific gravity should be 1.220 or above. If the battery specific gravity is below 1.220, recharge the battery to full charge before proceeding with the test.

(2) Disconnect the positive battery lead from the battery terminal post. Connect an 0 to 300 scale ammeter between the disconnected lead and the battery terminal post.

(3) Connect a test voltmeter with 10 volt scale division between the battery positive post and the starter switch terminal at the starter solenoid.

(4) Crank the engine and observe the readings on the voltmeter and ammeter. The voltage should not exceed .3 volt. A voltage reading that exceeds .3

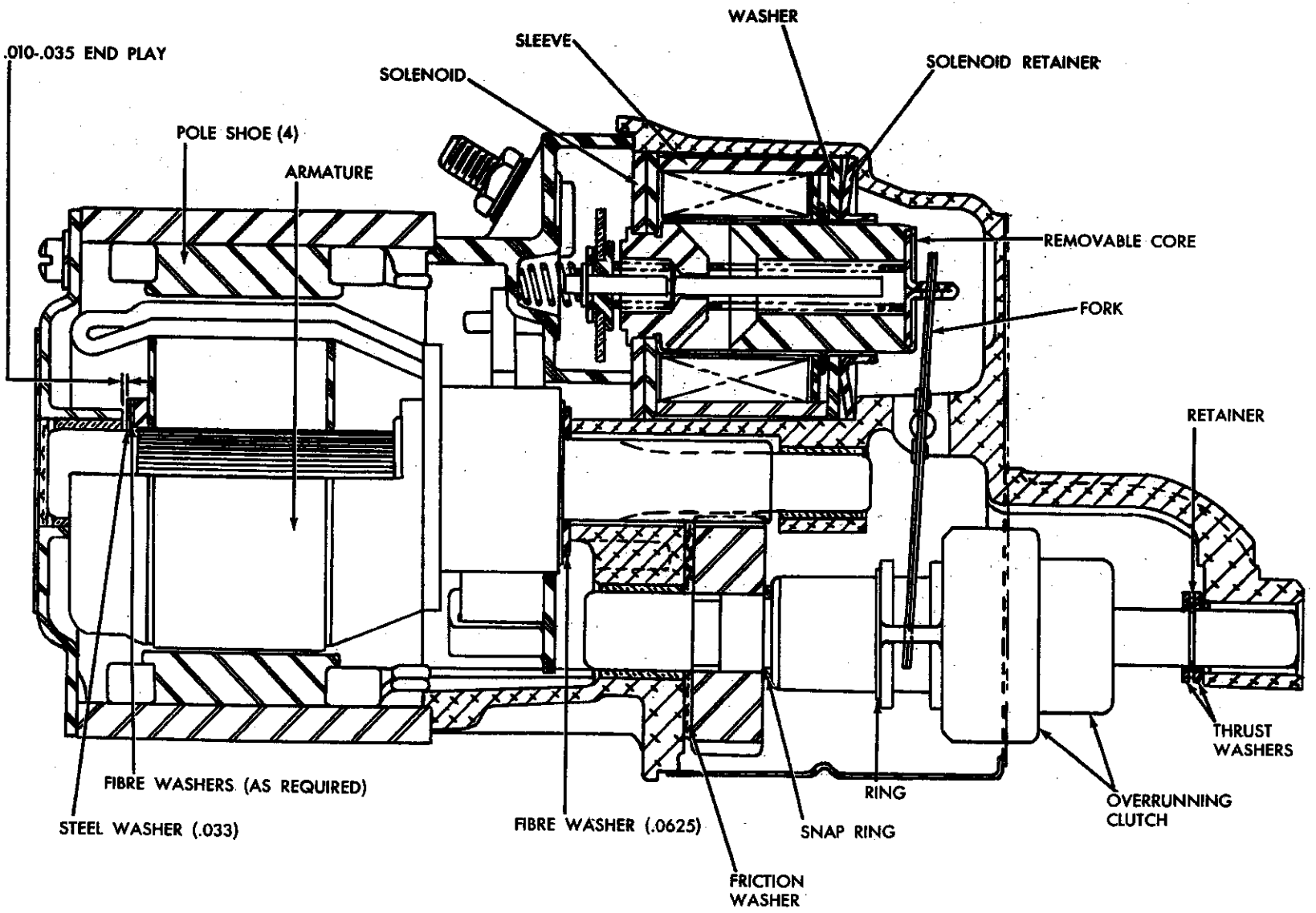

Fig. 1—Starting Motor Cross Section

volt indicates there is high resistance caused from loose circuit connections, a faulty cable, burned starter relay or solenoid switch contacts. A high current reading combined with slow cranking speed, indicates that the starter should be removed and repaired.

2. STARTER GROUND CIRCUIT TEST

(1) Connect the voltmeter positive lead to the starter housing and the negative voltmeter lead to the battery negative post.

(2) Crank the engine with a remote control starter switch and observe the voltmeter reading. The voltmeter reading should not exceed .3 volt. A reading of .3 volt or less indicates voltage in the ground cable and connections is normal. If the voltmeter reading is more than .3 volt, it indicates excessive voltage loss in the starter ground circuit. Make the following tests to isolate the point of excessive voltage loss. Repeat the test at each connection.

(a) Starter drive housing.

(b) Cable terminal at the engine.

(c) Cable clamp at the battery.

A small change will occur each time a normal portion of the circuit is removed from the test. A definite change in the voltmeter reading indicates that the last part eliminated in the test is at fault.

Maximum allowable voltage loss is as follows:

Battery ground cable	.2 volt
Engine ground circuit	.1 volt
Each connection	.0 volt

3. STARTING MOTOR

Removal

(1) Disconnect the ground cable at battery.

(2) Remove the cable at the starter.

(3) Disconnect the solenoid lead wire at the solenoid terminals.

(4) Remove the one stud nut and one bolt attaching the starter motor to the flywheel housing and remove the starting motor.

4. TESTING THE STARTING MOTOR (Bench Test)

Free Running Test

(1) Place the starter in a vise and connect a fully-charged, 12 volt battery to the starter as follows:

(2) Connect a test ammeter (100 amperes scale) and carbon pile rheostat in series with the battery positive post and the starter terminal.

(3) Connect a voltmeter (15 volt scale) across the starter.

(4) Rotate the carbon pile to a full-resistance position.

(5) Connect the battery cable from the battery negative post to the starter frame.

(6) Adjust the rheostat until the battery voltage shown on the voltmeter reads 11 volts.

(7) The amperage draw should be as shown in the specifications.

Locked Resistance Test

(1) Install the starter in a test bench.

(2) Follow the instructions of the test equipment manufacturer and test the locked resistance of the starter against the following specifications.

(3) With applied battery voltage adjusted to 4 volts, the amperage draw should be as shown in specifications.

Disassembly

(1) Place the gear housing of the starter in a vise equipped with soft jaws. Use the vise as a support fixture only. **DO NOT** clamp.

(2) Remove the two through bolts and the starter end head assembly.

(3) Carefully pull the armature up and out of the gear housing and the starter frame and field assembly. Remove the steel and fiber thrust washer.

NOTE: The wire of the shunt field coil is soldered to the brush terminal. One pair of brushes are connected to this terminal. The other pair of brushes is attached to the series field coils by means of a terminal screw. Carefully pull the frame and field assembly up just enough to expose the terminal screw

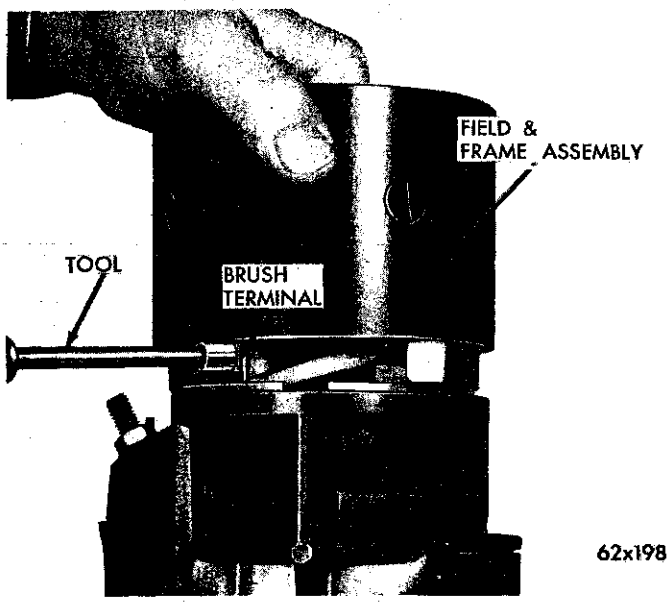

Fig. 2—Removing or Installing the Brush Terminal Screw

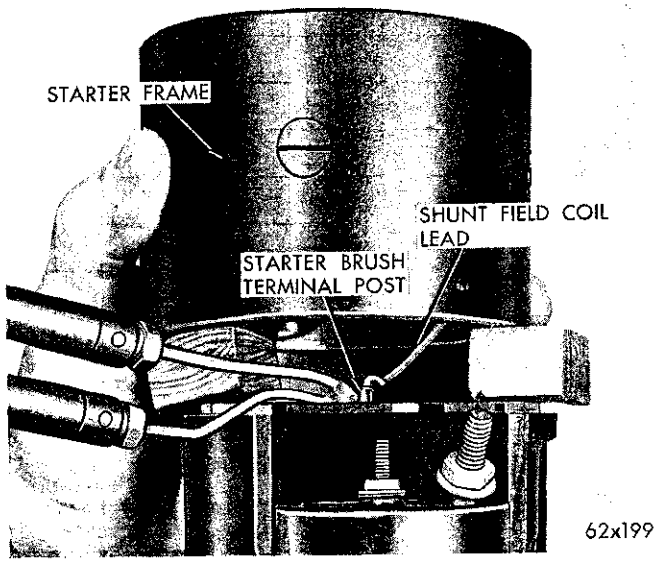

Fig. 3—Unsoldering the Shunt Coil Lead Wire

and the solder connection of the shunt field at the brush terminal. Place two wood blocks between the starter frame and starter gear housing (Fig. 2) to facilitate removal of the terminal screw and the unsoldering of the shunt field wire at the brush terminal.

(4) Support the brush terminal by placing a finger behind the terminal and remove the terminal screw (Fig. 2).

(5) Unsolder the shunt field coil lead from the starter brush terminal (Fig. 3).

(6) Remove the brush insulator which prevents contact between the brush terminal and the gear housing (Fig. 4).

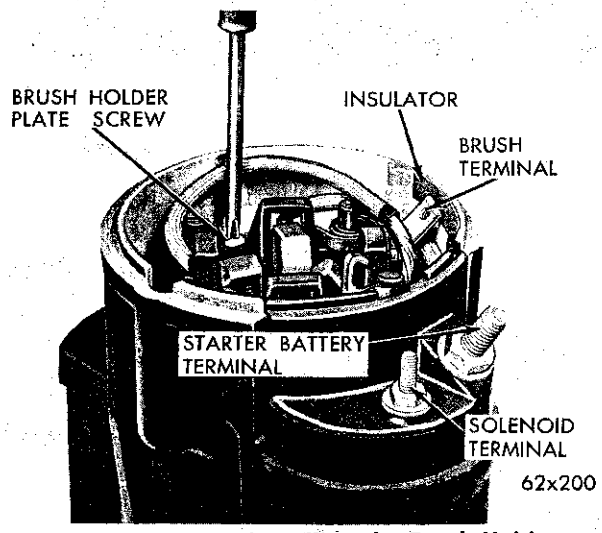

Fig. 4—Removing or Installing the Brush Holder Plate Screw

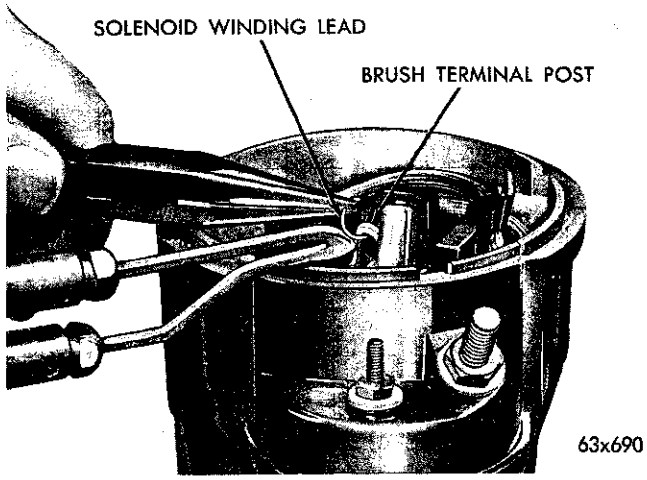

Fig. 5—Unsoldering the Solenoid Lead

NOTE: The brush holder plate with the brush terminal, contact and brushes is serviced as an assembly.

(7) Remove the sealer at the brush holder plate and gear housing.

(8) Remove the screw attaching the brush holder plate to the starter gear housing (Fig. 4).

(9) Unsolder the solenoid winding from the starter brush terminal (Fig. 5).

(10) Remove nut ($^{11}/_{32}$ wrench), steel washer and insulating washer from the solenoid terminal (Fig. 6).

(11) Straighten the solenoid wire and remove the brush holder plate with brushes as an assembly.

(12) Remove the ground screw from the starter gear housing.

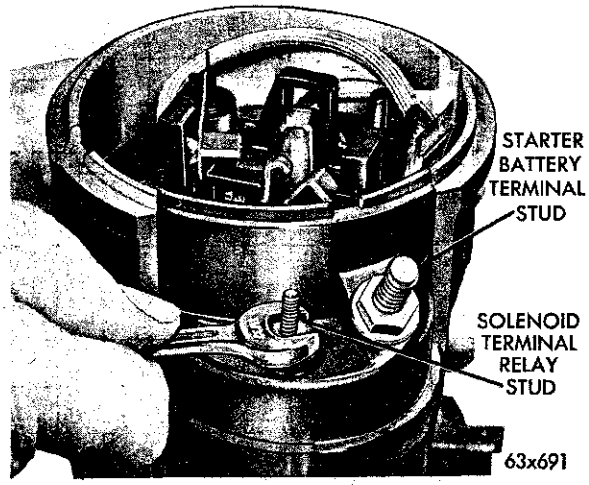

Fig. 6—Removing the Solenoid Terminal Nut

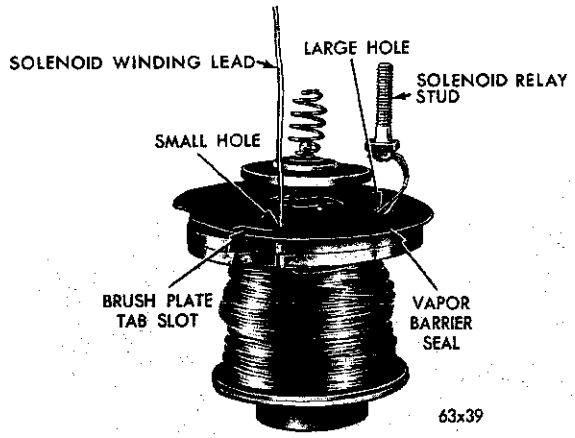

Fig. 7—Solenoid Assembly Removed

(13) Remove the solenoid assembly from the gear housing well (Fig. 7).

(14) Remove the nut, steel washer and sealing washer from starter battery terminal.

(15) Remove the starter battery terminal from the holder plate.

(16) Remove the solenoid contact and plunger assembly from the solenoid.

(17) Remove the solenoid coil sleeve (Fig. 8).

(18) Remove the solenoid return spring from the well of the solenoid housing moving core.

(19) Remove the solenoid coil retainer washer and solenoid coil retainer from the solenoid housing (Fig. 9).

(20) Remove the dust cover from the gear housing (Fig. 10).

(21) Release the snap ring that positions the driven gear on the pinion shaft (Fig. 11.)

CAUTION: The ring is under tension and a cloth should be placed over the ring to prevent the ring from springing away after removal.

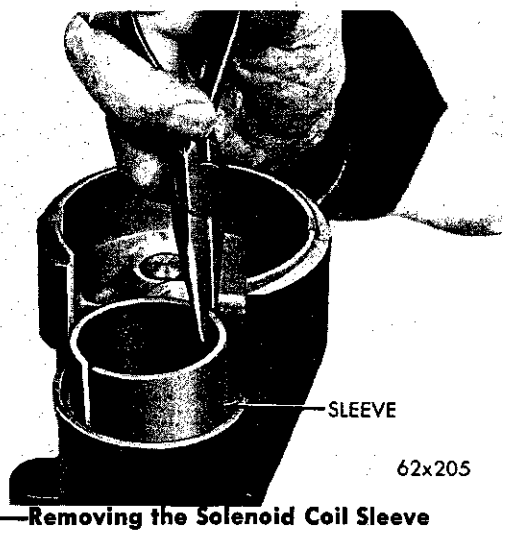

Fig. 8—Removing the Solenoid Coil Sleeve

Fig. 9—Identification of the Solenoid Coil Retainer and Retainer Washer

(22) Release the retainer ring at the front of the pinion shaft (Fig. 12).

NOTE: Do not spread the retainer ring any greater than the outside diameter of the pinion shaft otherwise the lock ring can be damaged.

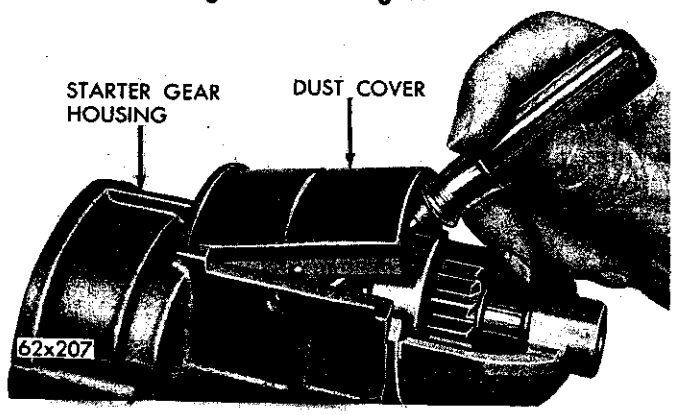

Fig. 10—Removing the Dust Cover

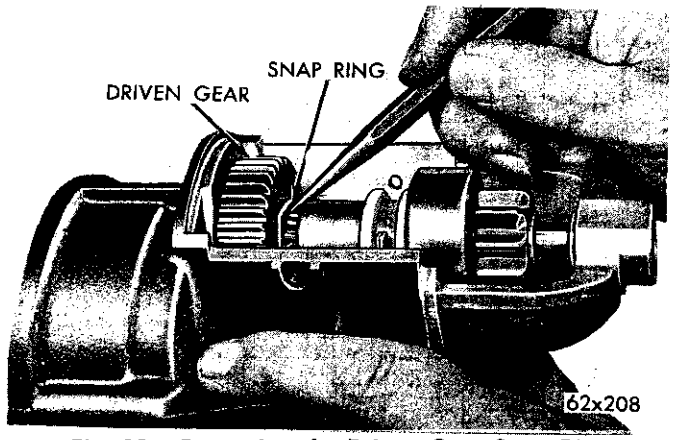

Fig. 11—Removing the Driven Gear Snap Ring

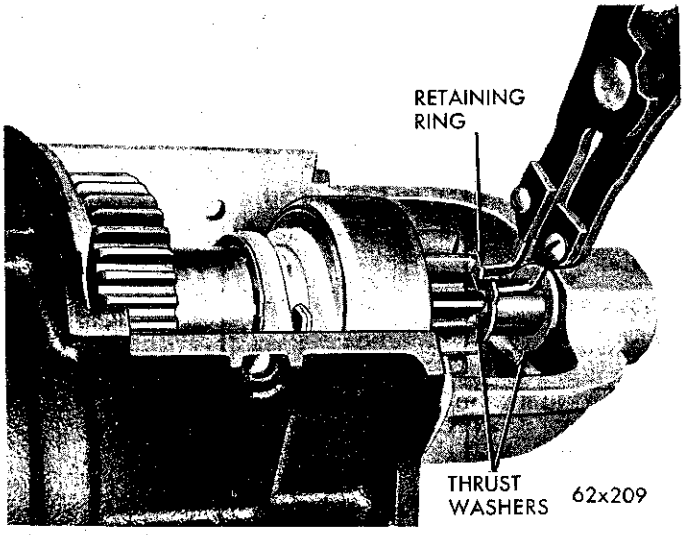

Fig. 12—Removing or Installing the Pinion Shaft Retainer Ring

(23) Push the pinion shaft towards the rear of the housing (Fig. 13) and remove the snap ring and thrust washers, clutch and pinion assembly, with the two shifter fork nylon actuators (Fig. 14).

(24) Remove the driven gear and friction washer.

(25) Pull the shifting fork forward and remove the solenoid moving core (Fig. 15).

(26) Remove the shifting fork retainer pin (Fig. 16) and remove the clutch shifting fork assembly.

NOTE: The gear housing is serviced with the pinion shaft and armature shaft bushings as an assembly. Bushings can be replaced withTool C-3944.

Cleaning and Inspection

(1) Do not immerse the parts in cleaning solvent. Immersing the field frame and coil assembly and/or armature will damage the insulation. Wipe these parts with a clean cloth **only.**

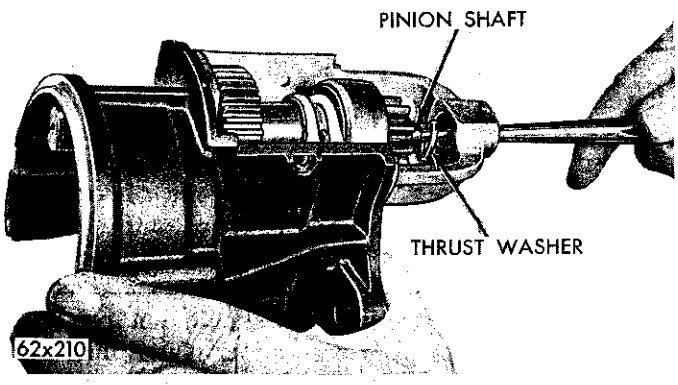

Fig. 13—Removing the Pinion Shaft

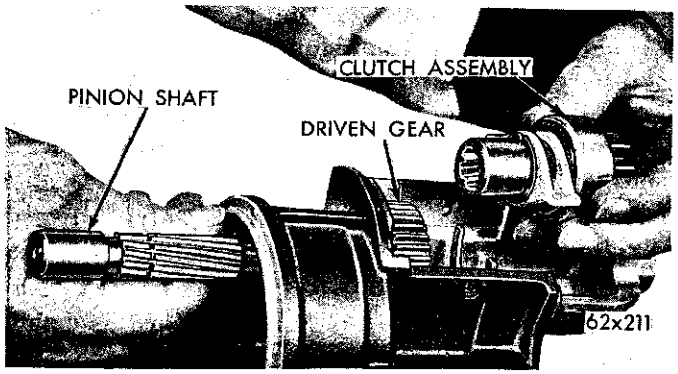

Fig. 14—Removing or Installing the Clutch Assembly

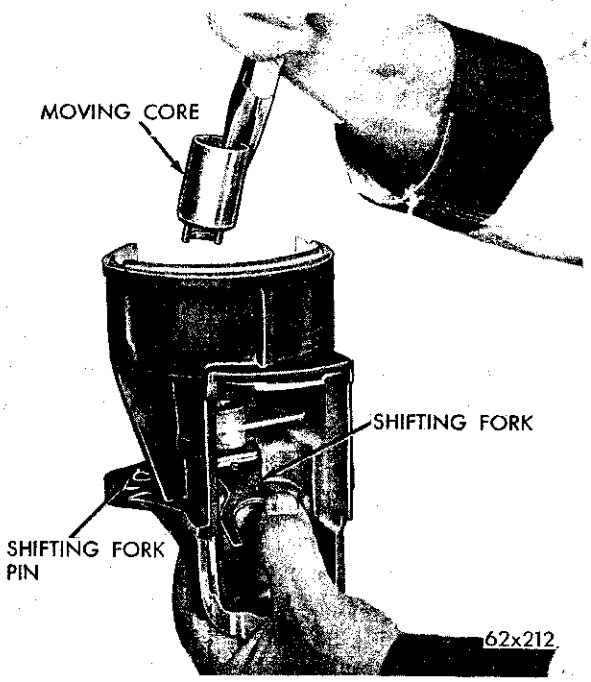

Fig. 15—Removing or Installing the Moving Core

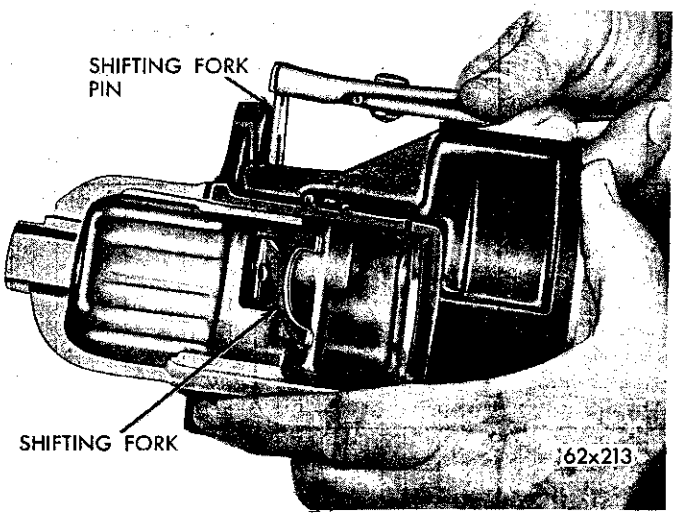

Fig. 16—Removing or Installing the Shifting Fork Pin

(2) Do not immerse the clutch unit in cleaning solvent. The clutch is pre-lubricated at the factory and solvent will wash the lubrication from the clutch.

(3) The starter clutch outer housing and pinion gear may be cleaned with a cloth moistened with cleaning solvent and wiped dry with a clean dry cloth.

(4) Unsolder the solenoid lead wires from the solenoid terminal relay stud.

(5) Clean all corrosion from the solenoid assembly (washers, sleeve and retainer and inside of the solenoid housing). These metal parts are part of the solenoid hold-in coil ground circuit and they must be clean.

(6) Clean the terminal contacts and contactor with crocus cloth.

(7) Thoroughly clean the outside area of the brush plate to remove all oil and dirt.

5. REPLACEMENT OF BRUSHES AND SPRINGS

(1) Brushes that are worn more than ½ the length of new brushes, or are oil-soaked, should be replaced.

(2) When resoldering the shunt field and solenoid lead, make a strong, low resistance connection using a high temperature solder and resin flux. **Do not use acid or acid core solder. Do not** break the shunt field wire when removing and installing the brushes.

(3) Measure the brush spring tension with a spring scale hooked under the spring near the end. Pull the scale on a line parallel to the edge of the brush and take a reading just as the spring end leaves the brush. The spring tension should be 32 to 48 ounces. Replace the springs that do not meet specifications.

6. TESTING THE ARMATURE

Testing the Armature for Short Circuit

Place the armature in the growler and hold a thin steel blade parallel to the core and just above it, while slowly rotating the armature in the growler. A shorted armature will cause the blade to vibrate and be attracted to the core. Replace any armature that is shorted.

Testing Armature for Ground

Contact the armature shaft and each of the commutator riser bars with a pair of test lamp test prods. If the lamp lights, it indicates a grounded armature. Replace any grounded armature.

Testing Commutator Runout, Refacing and Undercutting

Place the armature in pair of "V" blocks and measure the runout with a dial indicator; measure both the shaft and the commutator. A bent shaft requires replacement of the armature. When the commutator runout exceeds .003 inch, the commutator should be refaced and undercut using Tool C-770. Remove only sufficient metal to provide a smooth, even surface.

Testing Field Coils for Ground

(1) Remove the field frame assembly from the starter.

(2) Carefully drill out the rivet that attaches the series field coil (ground) lead and shunt field coil lead to the field frame.

(3) Insulate the field coil leads from the field frame.

(4) Test for ground using a 110 volt test lamp. Touch one prod of test lamp to series field coil lead and other prod to the field frame. The lamp should not light. Repeat procedure for the shunt field coil.

If the lamp lights, it indicates that the field coils are grounded and require replacement.

7. REPLACING THE FIELD COILS

A pole shoe impact screwdriver Tool C-3475 should be used to remove and install the field coils to prevent damage to the pole shoe screws and for proper tightening. The pole shoes that are loose and not properly seated may cause the armature core to rub the pole shoes. This will decrease starter efficiency and damage the armature core.

NOTE: Make sure the area between the leads and the field frame is clean. Peen a new rivet securely to insure a good electrical contact.

8. SERVICING THE BUSHINGS

Inspect the armature shaft bearing and pinion shaft surfaces and bushings for wear. Try the bushings for wear by placing them on shafts and testing for side play. Replace the commutator end head and bushing assembly if the bushing is worn. Replace the starter gear housing bushings if worn. Use Tool C-3944 to replace the bushings.

9. SERVICING THE STARTER CLUTCH UNIT

Do not immerse the starter clutch unit in a cleaning solvent. The starter clutch is pre-lubricated at the factory and the solvent will wash the lubrication from the clutch.

The starter clutch outer housing and pinion gear may be cleaned with a cloth moistened with cleaning solvent and wiped dry with a clean dry cloth.

Rotate the pinion. The pinion gear should rotate smoothly in one direction, but should not rotate in the opposite direction. If the starter clutch unit does not function properly, or the pinion is worn, chipped or burred, replace the starter clutch unit.

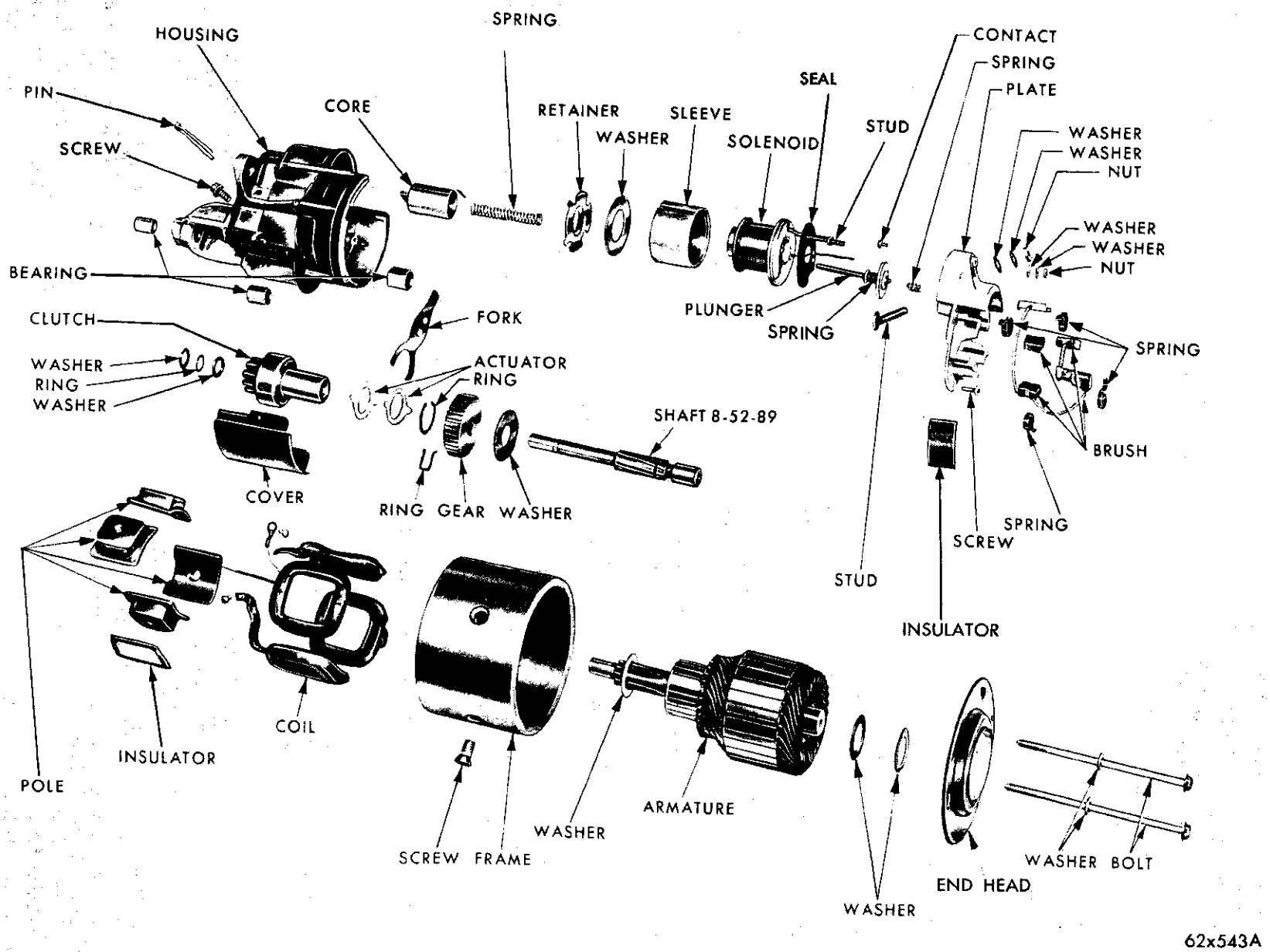

Fig. 17—Starting Motor (Disassembled View)

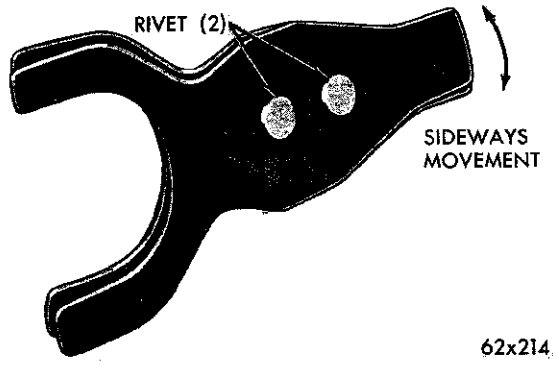

Fig. 18—Shifter Fork Assembly

Assembly (Fig. 17)

NOTE: The shifter fork consists of two spring steel plates assembled with two rivets (Fig. 18). There should be approximately 1/16 inch side movement, as shown in Figure 18 to insure proper pinion gear engagement. Lubricate between the plates sparingly with SAE 10 engine oil.

(1) Position the shifter fork in the drive housing and install the shifting fork retainer pin (Fig. 16). One tip of pin should be straight, the other tip should be bent at a 15 degree angle away from the housing. Fork and retainer pin should operate freely after bending the tip of pin.

(2) Install the solenoid moving core and engage the shifting fork (Fig. 15).

(3) Enter the pinion shaft into the drive housing, and install the friction washer and driven gear.

(4) Install the clutch and pinion assembly (Fig. 14), thrust washer, retaining ring and the thrust washer.

(5) Complete the installation of the pinion shaft engaging the shifting fork with the clutch actuators. Figure 19 shows the correct relation of the parts at the assembly.

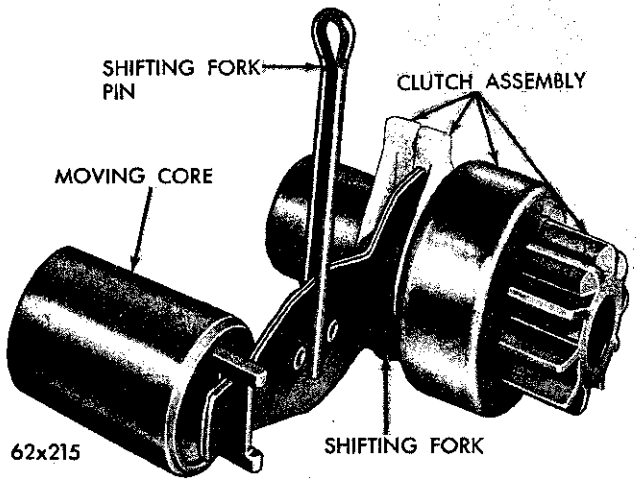

Fig. 19—Shifter Fork and Clutch Arrangement

NOTE: The friction washer must be positioned on the shoulder of the splines of the pinion shaft before the driven gear is positioned.

(6) Install the driven gear snap ring (Fig. 11).

(7) Install the pinion shaft retaining ring (Fig. 12). Make sure the ring fits tightly in the shaft groove.

(8) Bend the four (4) tangs of the coil retainer "up" to a measurement of $\frac{5}{32}$" to $\frac{3}{16}$" above the surface of the retainer (Fig. 20) to insure higher compression and a more positive ground.

(9) Install the solenoid coil retainer (Fig. 9) (with tangs down).

NOTE: Space the retainer in the housing bore so that the four tangs rest on the ridge in the housing bore and not in the recesses.

(10) Install the solenoid coil retainer washer.

(11) Install the starter solenoid return spring into the bore of the movable core.

(12) Straighten the solenoid lead wires and install the solenoid contact seal over the wires, inserting the double wires of the terminal stud into the large hole (Fig. 7) and the solenoid winding lead wire into the small hole.

(13) Insert the ends of the terminal stud wires into the groove of the terminal stud, crimp wires in place and solder with resin core solder.

NOTE: Inspect the condition of the starter solenoid switch contacting washer. If the top of washer is burned from arcing, disassemble the contact switch plunger assembly and reverse the washer.

(14) Install the solenoid contact plunger assembly into the solenoid and reform the double wires to allow for proper entry of the terminal stud into the brush holder with the double wires curved around the contactor.

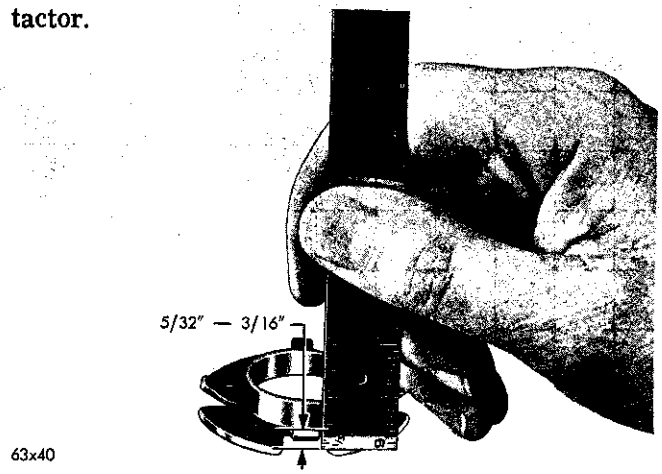

Fig. 20—Measuring the Height of the Solenoid Coil Retainer Tangs

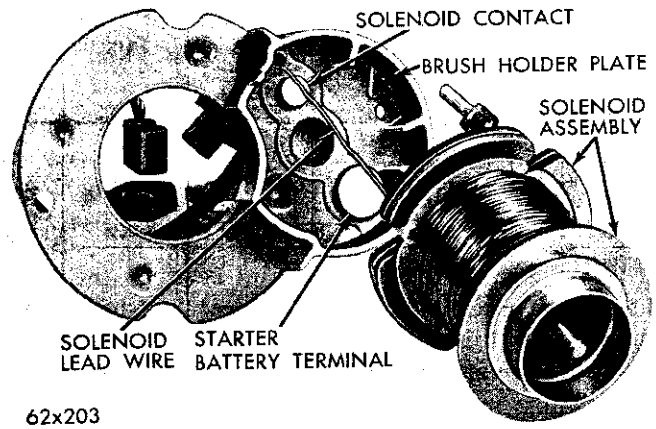

Fig. 21—Assembling the Solenoid to the Brush Holder Plate

CAUTION: The contactor must not touch the double wires when the solenoid is energized after the assembly is completed (Fig. 7). Make sure the contact spring is positioned on the solenoid contact assembly.

(15) Assemble the battery terminal stud in the brush holder placing the sealing washer under the plain washer.

NOTE: Inspect the condition of the contacts in the brush holder plate. If the contacts are badly burned, replace the brush holder, brushes and contacts as an assembly.

(16) Enter the solenoid lead wire through the hole in the brush holder (Fig. 21) and install the solenoid stud, insulating washer, flat washer and nut.

NOTE: Use care when installing the solenoid contact seal over the tab on the brush plate to prevent tearing the seal.

(17) Solder the solenoid lead wire to the brush terminal post (Fig. 22). Wrap the wire securely around the terminal, and solder securely with a high temperature solder and resin flux.

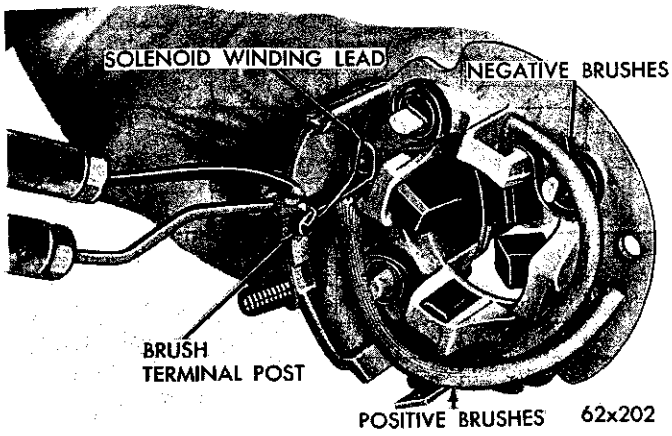

Fig. 22—Soldering the Solenoid Winding Lead

Fig. 23—Installing the Solenoid Coil, Sleeve and Brush Holder

(18) Carefully enter the solenoid coil and solenoid coil sleeve into the bore of the gear housing and position the brush plate assembly into the starter gear housing (Fig. 23). Align the tongue of the ground terminal with the notch in the brush holder.

(19) After the brush holder is bottomed in the housing, install the attaching screw (Fig. 4). Tighten the

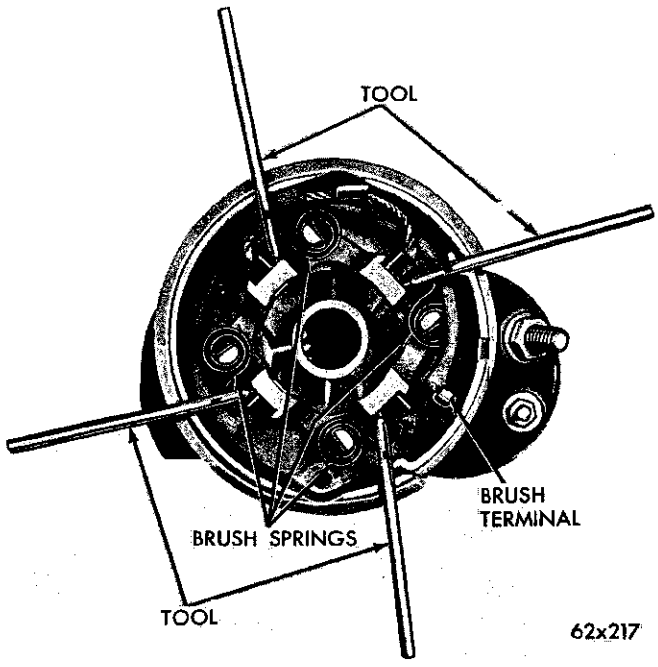

Fig. 24—Positioning the Brushes with Tool Set C-3855

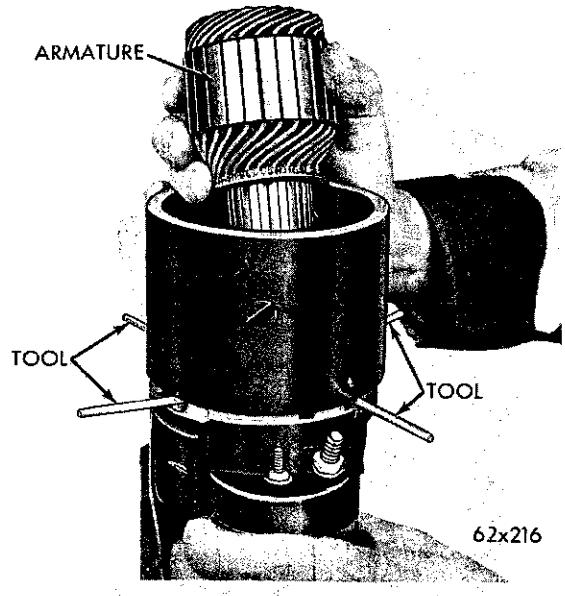

Fig. 25—Installing the Starter Armature

screw 10 to 15 inch pounds. Install the flat insulating washer and hold in place with friction tape.

(20) Position the brushes with Tool C-3855, as shown in Figure 24.

(21) Position the field frame to the exact position and resolder the field coil lead (Fig. 3).

(22) Install the brush terminal screw (Fig. 2).

(23) Install the armature thrust washer on the gear housing (Fig. 1) and enter the armature into the field frame and gear housing (Fig. 25); carefully engaging the splines of the shaft with the reduction gear.

(24) Remove the brush positioning Tools C-3855 (Fig. 26).

(25) Install the thrust washer (fibre) and washer (steel) on the armature shaft.

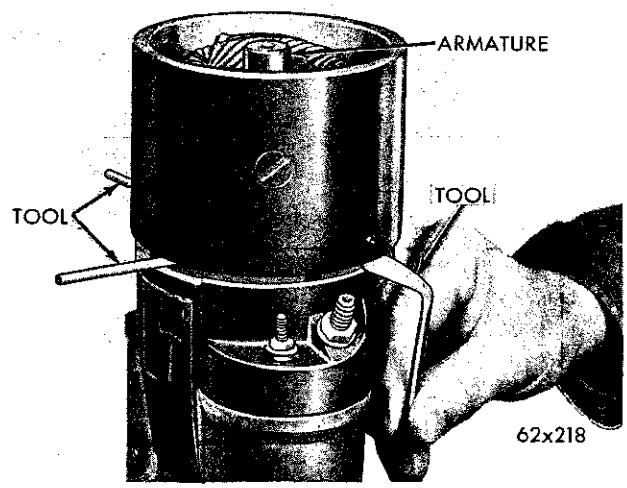

Fig. 26—Removing the Brush Positioning Tools

(26) Position the starter end head assembly and install the starter frame screws and lockwashers. Tighten the screws securely.

(27) Install the starter gear housing dust cover. Make sure the dimples on the cover are securely engaged in the holes provided in the gear housing.

(28) Install the ground screw in the gear housing.

(29) Clean the area at the joint between the brush holder plate to field frame and gear housing mating joint. Apply a bead of brush plate sealer MoPar Part No. 2421847 around the four sides of the joint (Fig. 27).

CAUTION: Sealer must be flowed continuously to avoid gaps. After bead has been flowed on, use a brush or small paddle moistened in mineral spirits to press adhesive into joint. Be sure not to get the adhesive on the battery and/or solenoid terminals.

Installation

(1) Before installing the starting motor, make sure the starter and flywheel housing mounting surfaces are free of dirt and oil to insure a good electrical contact.

(2) Position the starter to flywheel housing removable seal.

(3) Install the starting motor, washer and bolt and washer and nut.

NOTE: When tightening the attaching bolt and nut be sure to hold the starting motor pulled away from the engine to insure proper alignment.

(4) Attach the wire at the solenoid switch terminal and cable to starter terminal.

(5) Connect the battery ground cable and test the operation of the starting motor for proper engine cranking.

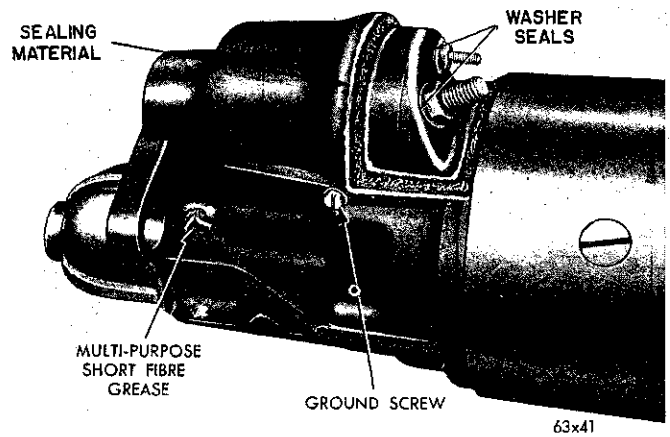

Fig. 27—Sealing the Brush Holder Plate

SERVICE DIAGNOSIS
STARTING MOTOR

Condition	Possible Cause	Correction
Starter Fails to Operate	(a) Weak battery.	(a) Test for specific gravity and test for dead cell. Replace or recharge the battery as required.
	(b) Ignition switch faulty.	(b) Test and replace the switch if necessary.
	(c) Loose or corroded battery cable terminals.	(c) Clean terminals and clamps, replace if necessary. Apply a light film of petrolatum to terminals. Tighten clamps securely.
	(d) Open circuit, wire between the ignition-starter switch and ignition terminal on the starter relay.	(d) Inspect and test all the wiring.
	(e) Inoperative clutch unit.	(e) Replace the clutch unit.
	(f) Faulty starting motor.	(f) Test and repair.
	(g) Armature shaft sheared.	(g) Test and repair.
Starter Fails and Lights Dim	(a) Weak battery.	(a) Test the specific gravity and test for dead cell. Replace or recharge the battery as required.
	(b) Loose or corroded battery cable terminals.	(b) Clean the terminals and clamps, replace if necessary. Apply a light film of petrolatum to the terminals. Tighten the clamps securely.
	(c) Internal ground in wiring.	(c) Test and repair the starter.
	(d) Grounded starter fields.	(d) Test and repair the starter.
	(e) Armature rubbing on pole shoes.	(e) Test and repair the starter.
Starter Turns, But Pinion Does Not Engage	(a) Starter clutch slipping.	(a) Replace the clutch unit.
	(b) Broken teeth on flywheel drive gear.	(b) Replace the flywheel ring gear. Also examine teeth on the starter clutch pinion gear.
	(c) Pinion shaft rusted, dirty or dry, due to lack of lubrication.	(c) Clean, test and lubricate.
	(d) Wrong starter pinion clearance.	(d) Adjust pinion clearance.
Starter Relay Does Not Close	(a) Battery discharged.	(a) Recharge or replace the battery.
	(b) Faulty wiring.	(b) Test for open circuit, wire between the starter relay ground terminal post and neutral starter switch (automatic transmission only). Also test for open circuit, wire between ignition-starter switch and ignition terminal and starter relay.
	(c) Neutral starter switch on automatic transmission faulty.	(c) Test and replace the switch if necessary.
	(d) Starter relay faulty.	(d) Test and replace if necessary.
	(e) Ignition-starter switch faulty.	(e) Test and replace switch if necessary.

STARTING MOTOR—(Continued)

Condition	Possible Cause	Correction
Relay Operates But Solenoid Does Not	(a) Faulty wiring, open circuit wire between the starter-relay and solenoid terminal and solenoid terminal post.	(a) Test for open circuit wire between the starter-relay solenoid terminal and solenoid terminal post.
	(b) Faulty solenoid switch or connections.	(b) Test for loose terminal connections between solenoid and starter field.
	(c) Solenoid switch contacts corroded.	(c) Test and replace the solenoid if necessary.
	(d) Broken lead or loose soldered connection inside solenoid switch cover (brush holder plate).	(d) Test and replace the solenoid if necessary.
Solenoid Plunger Vibrates Back and Forth When Switch is Engaged	(a) Weak battery.	(a) Test the specific gravity of the battery. Replace or recharge the battery.
	(b) Faulty wiring.	(b) Test for loose connections at relay, ignition-starter switch and solenoid. Repair as necessary.
	(c) Lead or connections broken inside solenoid switch cover (brush holder plate) or open hold-in winding	(c) Test and replace the solenoid if necessary.
	(d) Check for corrosion on solenoid contacts.	(d) Test and clean the contacts.
Starter Operates But Will Not Disengage When Ignition Starter is Released	(a) Broken solenoid plunger spring or spring out of position.	(a) Test and repair.
	(b) Faulty ignition-starter switch.	(b) Test and replace the switch if necessary.
	(c) Solenoid contact switch plunger stuck in solenoid.	(c) Remove the contact switch plunger, wipe clean of all dirt, place a film of SAE 10 oil on the plunger, wipe off excess.
	(d) Insufficient clearance between winding leads to solenoid terminal and main contactor in solenoid.	(d) Test and repair.
	(e) Faulty relay.	(e) Test and replace the relay if necessary.

PART 3

ALTERNATOR AND VOLTAGE REGULATOR

1. CONSTRUCTION AND OPERATION

The alternator (Fig. 1) is fundamentally an A.C. current generator, with six (6) built-in silicon rectifiers, that convert the A.C. current into D.C. current. D.C. current is available at the "output" "BAT" terminal. A voltage regulator (Fig. 2) is used in the field circuit to limit the output voltage.

The main components of the alternator are the rotor, the stator, the rectifiers, the two end shields and the drive pulley (See Fig. 3).

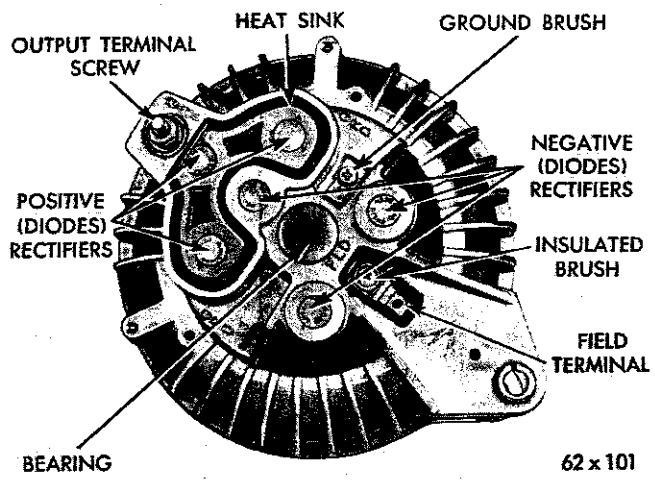

Fig. 1—Alternator Assembly

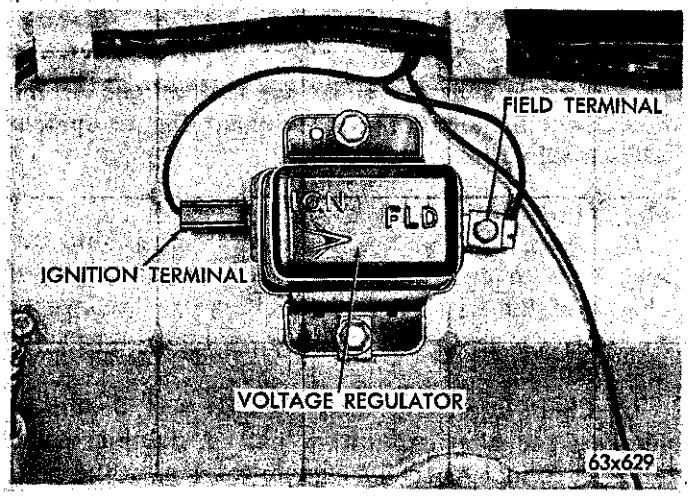

Fig. 2—Voltage Regulator Installed

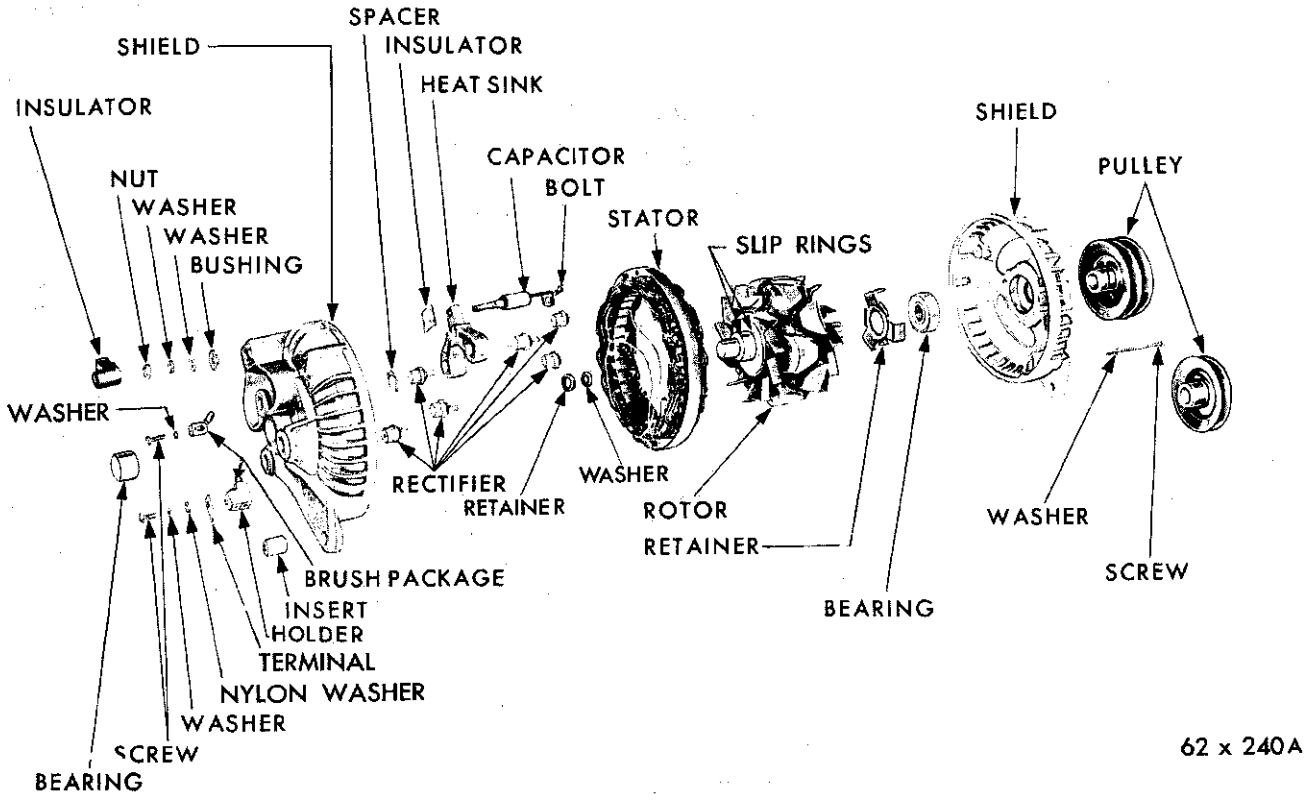

Fig. 3—Alternator (Disassembled View)

2. VOLTAGE REGULATOR

The only function of the regulator is to limit the output voltage.The voltage regulator accomplishes this by controlling the flow of current in the rotor field coil, and in effect controls the strength of the rotor magnetic field.

3. TESTING THE ALTERNATOR SYSTEM

(On the Vehicle using the Sun Volt Ampere Tester Model VAT-20C and Sun Battery Post Adapter)

NOTE: For the sake of uniformity, one type of equipment is shown. Follow the instructions of the equipment manufacturers on comparable equipment when making the following tests:

A. Preliminary Checks

(1) **Check Battery Condition.** Perform reliable battery tests to determine the condition and state of charge of the battery. If the battery is defective or not fully charged, install a fully charged battery for test purposes.

(2) **Check Alternator Belt Tension and Condition.** Replace the alternator drive belt if necessary and make sure that there is adequate tension on the belt.

(3) **Check Condition of Wires and their Connections.** Before performing the test on the system, correct any problem with the wiring, such as loose connections, burned wiring harness, etc.

B. Tester Controls and Switches

(1) Set Polarity Switch to the NEGATIVE position.

(2) Set tester control knob to the DIRECT position.

(3) Set voltage switch to the 2 VOLT position.

(4) Set field control to the OPEN position.

C. Tester Lead Connections (Fig. 4)

(1) Disconnect the positive battery cable from the battery post and install the BATTERY POST ADAPTER between the cable and post.

(2) Connect the "BAT" lead of the tester to the stud on the adapter.

(3) Connect the "REG" lead of the tester to the binding post on the adapter.

(4) Connect the "GRD" lead of the tester to a good ground on the vehicle.

(5) Connect the negative lead of the voltmeter to the field terminal of the regulator.

(6) Connect the positive lead of the voltmeter to the battery end of the positive battery cable.

NOTE: The Battery Post Adapter BY-PASS SWITCH must be open for all charging system tests. It is closed only for starting the engine.

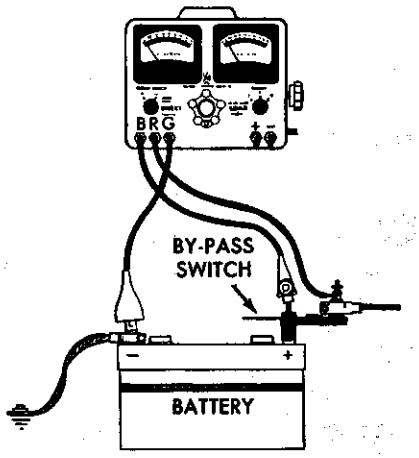

Fig. 4—Tester Lead Connections

D. Field Circuit Resistance Test (Fig. 5)

(1) Disconnect the slip-on connector from either end of the ignition ballast resistor.

(2) Turn the ignition switch on.

(3) With vehicle doors closed and all accessories turned off, observe the Voltmeter reading. The voltage should not exceed .55 volt. A reading in excess of .55 volt indicates high resistance in the field circuit between the battery and the voltage regulator field terminal.

(4) If high resistance is indicated, move the negative voltmeter lead to each connection along the circuit towards the battery. A sudden drop in voltage indicates a loose or corroded connection between that point and the last point tested. To test the terminals for tightness, attempt to move the terminal while

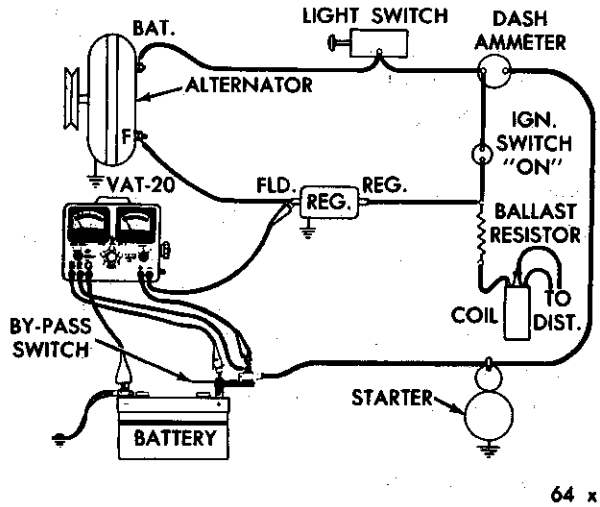

Fig. 5—Field Circuit Resistance and Field Current Drive Test

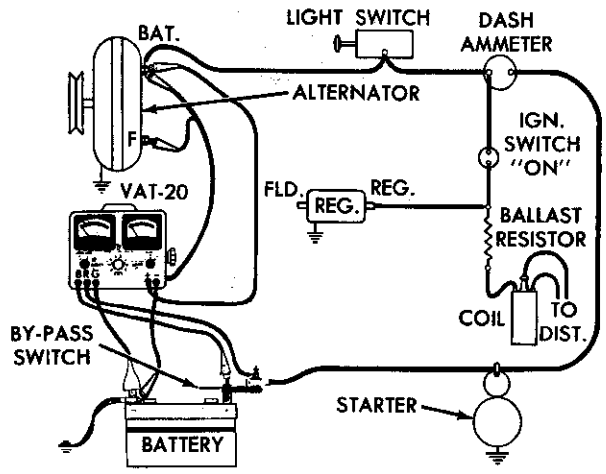

Fig. 6—Current Output Test

observing the voltmeter. Any movement of the meter pointer indicates looseness.

NOTE: Excessive resistance in the regulator wiring circuit will cause fluctuation in the ammeter, or a below normal charge rate.

E. Field Current Draw Test (Fig. 5)

With tester connections positioned as for the Field Circuit Resistance Test, observe the test ammeter. The test ammeter will indicate the field current draw. Refer to "Specifications".

F. Current Output Test (Fig. 6)

(1) With the ignition switch off, disconnect the field wire from "FLD" terminal of the alternator and at the regulator.

(2) Connect a special jumper from the "FLD" terminal of the alternator to one of the test leads of the tester field control.

(3) Connect the other lead of the tester field control to the "BAT" terminal of the alternator.

(4) Set the Tester Voltage Switch to the 16 volt position.

(5) Connect the positive lead of the test Voltmeter to the "BAT" terminal of the alternator.

(6) Connect the negative lead of the test Voltmeter to a good ground.

(7) Reconnect the slip-on connector at ignition ballast resistor.

(8) Close the BY-PASS switch of the Battery Post Adapter.

(9) With the tester Field Control in the OPEN position, start the engine and adjust to 1250 rpm.

(10) Open the BY-PASS switch of the Battery Post Adapter.

(11) Rotate the tester Control Knob to the LOAD position until the Voltmeter reads 6 volts.

(12) Rotate the tester Field Control to the DIRECT position and adjust the tester Control Knob until the Voltmeter reads exactly 15 volts.

(13) Observe ammeter. Ammeter now indicates maximum output of alternator. The current output should be within the limits as shown in "Specifications".

NOTE: The current output should be within 5 amperes of the rated output as there is a total of 5 amperes supplied by the alternator that will not appear on the test ammeter. This consists of ½ ampere approximate for the instruments, 1½ amperes for the engine ignition system, and 3 amperes for field current.

If the output is slightly less (5 to 7 amperes) than that specified above, it may be an indication of possible "open" rectifier or other alternator internal problem. If the output is considerable lower than that specified above, it may be an indication of a possible "shorted" rectifier or other alternator internal problem. In either case the alternator should be removed and tested on the bench before disassembly.

(14) Return the tester Field Control to the OPEN position.

(15) Return tester Control Knob to the DIRECT position.

G. Insulated Circuit Resistance Test (Fig. 7)

(1) Connect the negative lead of Voltmeter to battery end of positive battery cable.

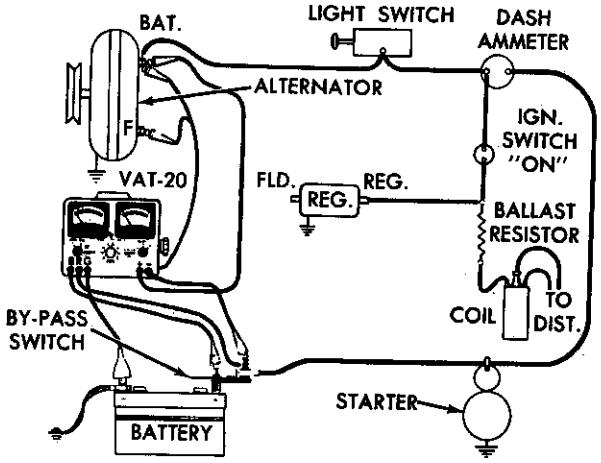

Fig. 7—Insulated Circuit Resistance Test

(2) Set Voltage Switch to 2 VOLT position.

(3) Adjust Field Control Unit until the tester ammeter reads exactly 10 amperes.

(4) Observe the Voltmeter reading. Voltmeter now indicates the amount of voltage loss across the insulated circuit. The voltage loss should not exceed .3 volt. If a higher voltage loss is indicated, inspect, clean and tighten all the connections in the charging circuit. A voltage loss test may be performed at each connection to locate the connection with excessive resistance.

H. Ground Circuit Resistance Test (Fig. 8)

(1) Connect the positive lead of the test Voltmeter to the negative terminal of battery.

(2) Connect the negative lead of the test Voltmeter to a good ground on the alternator.

(3) With the alternator charging 10 amps, observe the Voltmeter reading. Voltmeter now indicates the amount of voltage loss across the ground circuit. The voltage loss should not exceed .3 volt.

(4) Rotate the tester Field Control to the OPEN position.

I. Voltage Regulator Test (Fig. 9)

NOTE: Regulator temperature should be normalized by operating with a 10 ampere load for 15 minutes just prior to testing.

Upper Contacts Test

(1) Remove test lead of tester Field Control from the "BAT" terminal of alternator and connect to the disconnected field wire from regulator.

(2) Set Voltage Switch to 16 VOLT position.

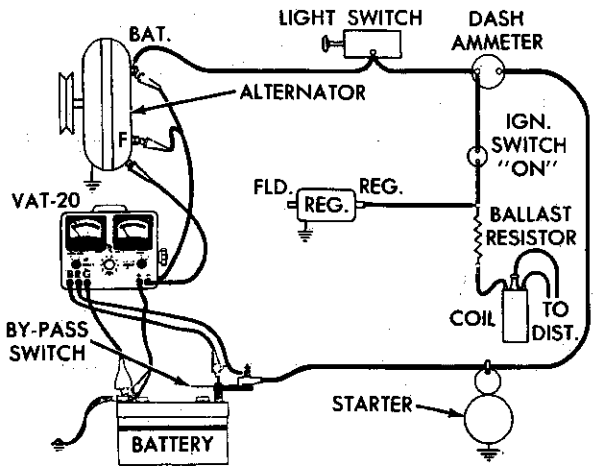

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Fig. 8—Ground Circuit Resistance Test

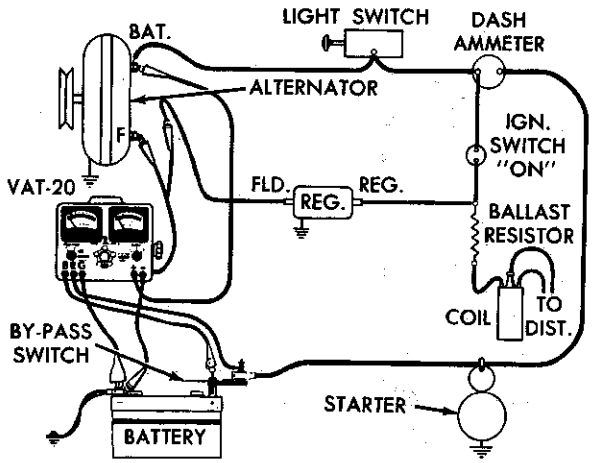

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Fig. 9—Voltage Regulator Test

(3) Connect positive lead of Voltmeter to "BAT" terminal of alternator.

(4) Rotate tester Field Control to DIRECT position.

(5) With the engine operating at 1250 rpm, rotate the tester Control Knob clockwise until the Ammeter reads exactly 15 amperes.

(6) Rotate the tester Field Control from the DIRECT position to the OPEN position and then back to the DIRECT position to cycle the system.

(7) Observe the test Voltmeter. The voltmeter now indicates the setting of the voltage regulator upper contacts. Refer to "Specifications".

(8) Rotate tester Control Knob to DIRECT position. If the regulator operates within specifications, proceed to the lower contact voltage test. If the upper contact voltage setting is not within specifications, remove the regulator cover and adjust the voltage setting as outlined in "Regulator Adjustments" test number (1).

Lower Contact Test

(1) Increase the engine speed to 2200 rpm.

(2) Rotate the tester Control Knob to the ¼ OHM position only if the tester Ammeter reads over 5 amperes.

(3) Rotate tester Field Control from DIRECT position to the OPEN position and then back to the DIRECT position to cycle the system.

(4) Observe Voltmeter. Voltmeter now indicates setting of voltage regulator lower contacts. Refer to specifications.

Voltage should increase not less than .2 volt or more than .7 volt above the previous operating voltage setting recorded in the upper contact set. A

voltage reading of less than .2 volt or more than .7 volt is an indication of a possible wrong air gap setting, refer to "Regulator Mechanical Adjustments".

(5) Rotate tester Field Control to OPEN position and Control Knob to DIRECT position.

Upon completion of the test, reduce engine speed to idle, stop engine, and disconnect all test leads and adaptors. Be sure that all vehicle's cables and wiring connections are secure before restarting engine.

CAUTION: Be sure the negative post of the battery is always connected to ground. Incorrect battery polarity may result in wiring harness damage and may damage the alternator rectifiers. Do not ground the alternator field circuit, as this may damage the regulator.

Adjusting the Voltage Setting to Driving Conditions

The specifications called for in the voltage regulator chart indicate a tolerance of .6 volt from the low setting to the high setting at the temperatures indicated.

To maintain the battery in a full state of charge, the voltage regulator should be adjusted to provide the proper voltage limiting setting according to the customer's driving and load requirement habits as follows:

(1) Test the entire charging system and battery (See "Battery" Part 1).

(2) If there are no defects in the charging system or in the battery and the battery was found to be in a low state of charge, increase the setting by .3 volt (do not exceed specified voltage limits) and retest for an improved battery condition after a reasonable service period (week or two). If the battery state of charge has increased to a satisfactory level, do not change the voltage setting. If the battery shows evidence of over-charge—(low electrolyte level, high water consumption, excessive dampness on top of battery), decrease the setting by .3 volt and retest for an improved battery condition after a reasonable service period (week or two).

CAUTION: Always adjust the settings in steps not to exceed .3 volt at a time. (Do not exceed specified voltage limits.)

(3) The proper setting of the voltage regulator is attained when the battery remains at least 1.225 specific gravity in the winter or 1.245 specified gravity in the summer, with a minimum water requirement (not more than an ounce of water per cell per one thousand miles).

Regulator Mechanical Adjustments

Step 1 — Adjust the upper contact voltage setting as necessary by bending the regulator lower spring hanger **down** to **increase** voltage setting, **up** to **decrease** voltage setting. Use an insulated **tool** to bend the spring hanger (Fig. 10). The regulator must be installed, correctly connected, and retested after each adjustment of the lower spring hanger.

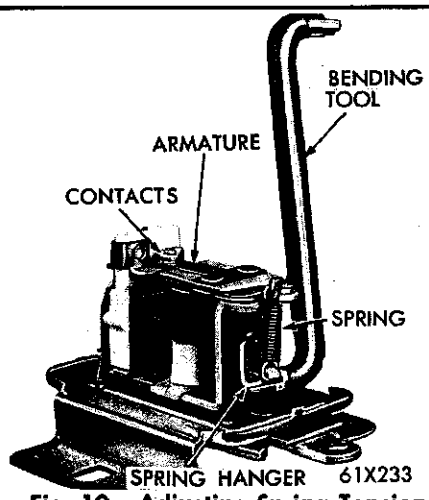


Fig. 10—Adjusting Spring Tension

NOTE: If repeated readjustment is required, it is permissible to use a jumper wire to ground the regulator base to the fender splash shield for testing, in lieu of reinstalling the regulator each time. However, it is important that the regulator cover be reinstalled, the regulator connections correctly connected, and the regulator satisfactorily insulated by the fender cover to prevent grounding the regulator terminals or resistances. When testing, the regulator must be at the same attitude (or angle) as when installed on the vehicle. If step (1) under "Mechanical Adjustments" does not bring the voltage regulator within specifications, proceed to Step (2) following:

Step 2 — Measure the lower contact point gap. The lower contact gap should be .014 inch plus or minus .002 inch. Adjust the lower contact gap as necessary by bending the lower stationary contact bracket making sure contacts are in alignment.

If the lower contact gap is correct and the voltage regulator setting is still outside the .2 to .7 volt increase, adjust the air gap as follows:

(a) Connect a small dry cell test lamp in series with the "IGN" and "FLD" terminal of the voltage regulator.

(b) Insert an .048 inch wire gauge between the regulator armature and the core of the voltage coil next to the stop pin on the armature (Fig. 11).

(c) Press down on the armature (not on the contact reed) until the armature contacts the wire gauge. The upper contacts should just **open** and the test lamp should be **dim.**

(d) Insert an .052 inch wire gauge between the

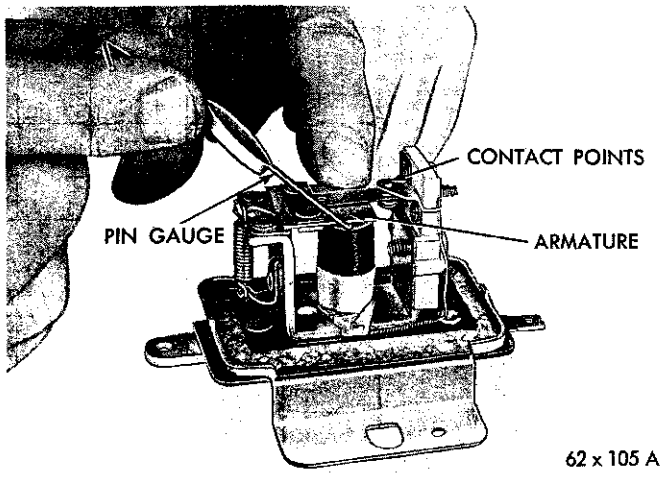


Fig. 11—Checking Air Gap

armature and the voltage coil core, next to the stop pin on the armature.

(e) Press down on the armature until it contacts the wire gauge. The upper contacts should remain **closed** and test lamp should remain **bright.**

If an adjustment is required to obtain the difference between the upper contact voltage and the lower contact voltage of .2 volt to .7 volt; adjust the air gap by loosening the stationary contact bracket screw and moving the bracket up or down as necessary to obtain the proper air gap setting as follows:

If the difference is above .7 volt, reduce the air gap to a minimum of .045 inch with the contacts open and the test lamp dim. At .048 inch the contacts should close and the test lamp should be bright.

If the difference is below .2 volt, increase the air gap to a maximum of .055 inch with the contacts closed and test lamp bright. At .052 inch contacts should be open and test lamp should be dim.

NOTE: Make sure the air gap is checked with the stationary contact bracket attaching screw fully tightened.

Voltage Regulator Fusible Wire Replacement

(1) Cut the fuse wire above the solder connection at the base and unwind the wire at the top bracket.

CAUTION: If an attempt is made to unsolder the old fuse, the very small wire from the voltage coil may be damaged.

(2) Tin the end of the fuse wire part number 2275242. **Use resin core solder only.**

(3) Holding the tinned end of the new fuse wire into the recessed rivet at the base of the regulator and against the old piece of fuse wire that remains, cause a drop of solder from a soldering iron to fall on these parts. Allow the solder to cool sufficiently for the fuse wires to make a good solder joint.

(4) Pull the new fuse wire up enough to remove the slack and wrap it around the bracket. Solder the coiled wire to the bracket and cut off surplus fuse wire.

NOTE: The original fuse wire is machine wound on the upper bracket. The replacement fuse should be soldered to the bracket to ensure a good electrical contact.

4. ALTERNATOR

Removal

If the alternator performance does not meet current output specification limits, it must be removed and disassembled for further test and servicing.

(1) Disconnect the battery ground cable.

(2) Disconnect the alternator output "BAT" and field "FLD" leads and disconnect the ground wire.

(3) Remove the alternator from the vehicle.

5. BENCH TESTS

Field Coil Draw

If the alternator field coil draw has not been tested on the vehicle it may be tested on the test bench as follows:

(1) Connect the positive lead of a test ammeter to the positive terminal of a fully charged battery. Connect a jumper wire to the negative terminal of the battery, and ground it to the alternator end shield. Connect the test ammeter negative lead to the field terminal of the alternator.

(2) Slowly rotate the alternator rotor by hand. Observe the ammeter reading. The field coil draw should be 2.3 amperes to 2.7 amperes at 12 volts.

NOTE: A low rotor coil draw is an indication of high resistance in the field coil circuit (brushes, slip rings, or rotor coil). A higher rotor coil draw indicates a possible shorted coil or a grounded rotor.

Testing Alternator Internal Field Circuit for a Ground

(1) To test the internal field circuit for a ground, remove the ground brush. Touch one test prod from a 110 volt test lamp to the alternator insulated brush terminal and the remaining test prod to the end shield. If the rotor assembly or insulated brush is not grounded, the lamp will not light.

(2) If the lamp lights, remove the insulated brush assembly (noting how the parts are assembled) and

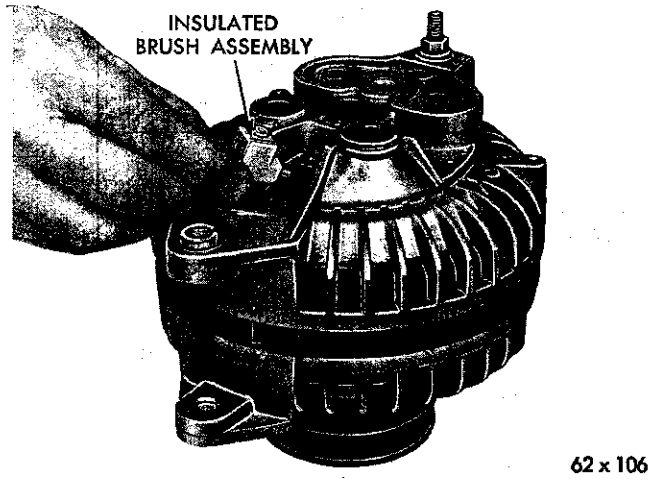


Fig. 12—Removing or Installing the Insulated Brush

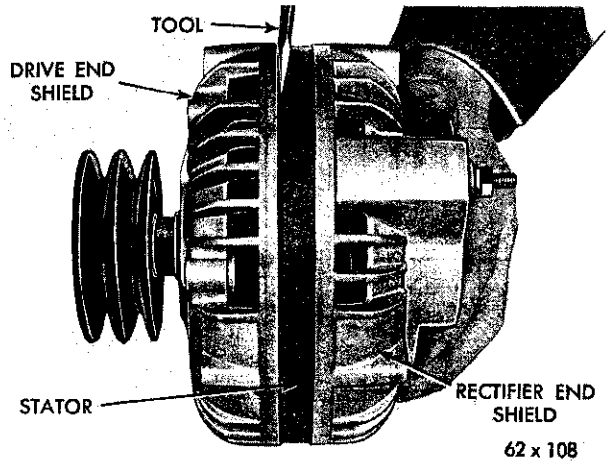


Fig. 14—Separating the Drive End Shield from the Stator

separate the end shields by removing the three thru bolts.

(3) Again test by placing one of the test prods to a slip ring and the remaining test prod to the end shield. If the lamp lights, the rotor assembly is grounded and requires replacement. If the lamp does not light after removing the insulated brush and separating the end shields the insulated brush is grounded.

(4) Examine the plastic insulator and the screw. The screw is a special size and must not be substituted by another size.

(5) Install the insulated brush holder, terminal, insulated washer, shake proof washer and screw. If the parts were not assembled in this order or if the wrong screw was used, this could be the cause of the ground condition.

Disassembly

To prevent possible damage to the brush assemblies, they should be removed before proceeding with the disassembly of the alternator. The insulated brush is mounted in a plastic holder that positions the brush vertically against one of the slip rings.

(1) Remove the retaining screw lockwasher, insulated washer, and field terminal, and carefully lift the plastic holder containing the spring and brush assembly from the end housing (Fig. 12).

(2) The ground brush is positioned horizontally against the remaining slip ring and is retained in a holder that is integral with the end shield. Remove the retaining screw and lift the clip, spring and brush assembly from the end shield (Fig. 13).

CAUTION: The stator is laminated, do not burr stator or the end shield.

(3) Remove the through bolts and pry between the stator and drive end shield with the blade of a screwdriver (Fig. 14). Carefully separate the drive end shield, pulley and rotor assembly away from the stator and the rectifier shield assembly.

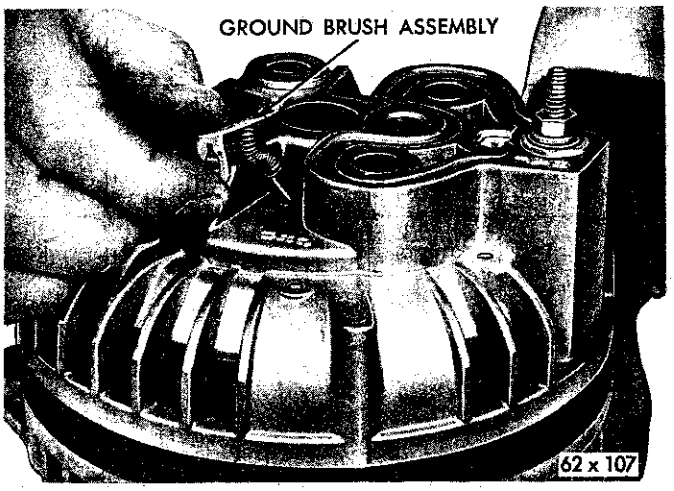


Fig. 13—Removing or Installing the Ground Brush

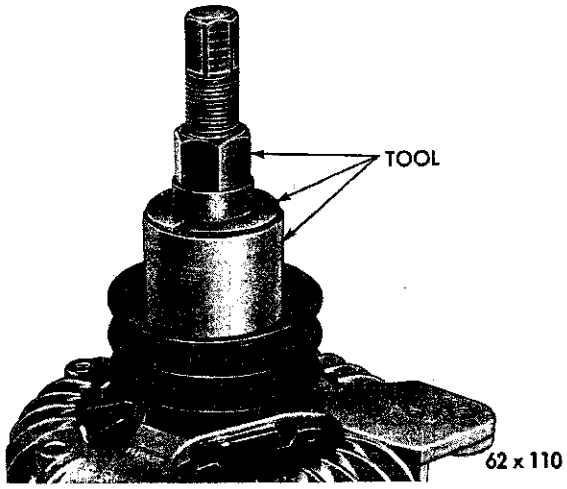


Fig. 15—Removing the Alternator Pulley

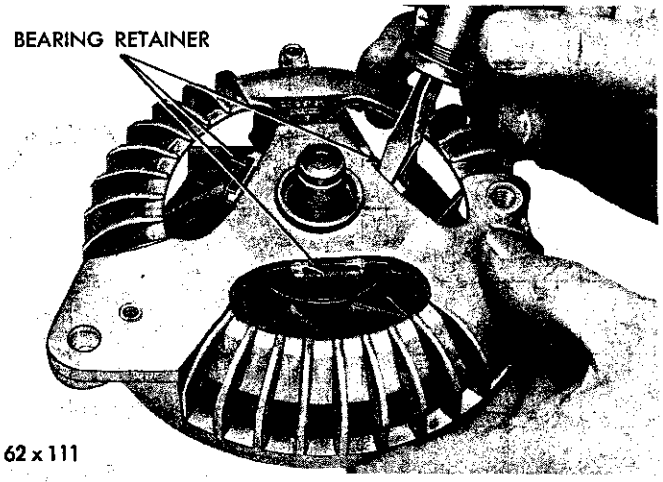


Fig. 16—Disengaging the Bearing Retainer from the End Shield

(4) The pulley is an interference fit on the rotor shaft. Remove the pulley with puller Tool C-3615 or C-3934 (Fig. 15).

(5) Pry the drive end bearing spring retainer from the end shield with a screwdriver (Fig. 16).

(6) Support the end shield and tap the rotor shaft with a plastic hammer to separate the rotor from the end shield.

NOTE: The new bearing is lubricated with a predetermined amount of special lubrication and does not require additional lubrication.

(7) The drive end ball bearing is an interference fit with the rotor shaft. Remove the bearing with puller Tool C-3615 or C-3934 and adapter as follows:

(a) Position the center screw of Tool C-3615 or C-3934 on the rotor shaft.

(b) Place the thin lower end of the adapters under the bearing equally spaced and the upper end of the adapters around the center screw.

(c) Hold the adapters and center screw in position with the tool sleeve.

CAUTION: The tool sleeve must bottom on the bearing, otherwise, the adapters may be damaged.

(d) Turning the center screw while holding the outer body of tool (Fig. 17) will withdraw the bearing from the rotor shaft.

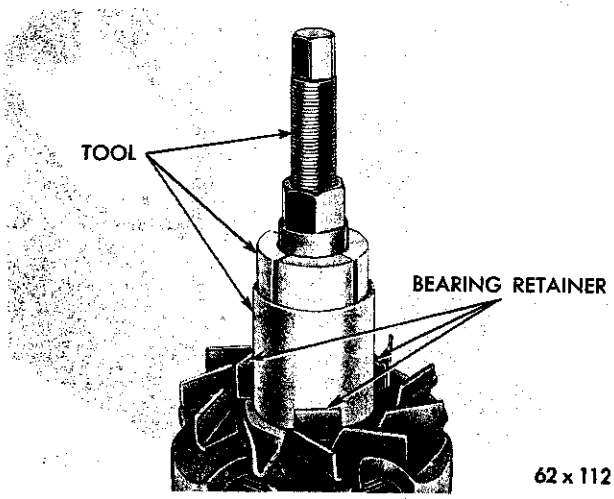


Fig. 17—Removing the Bearing from the Rotor Shaft

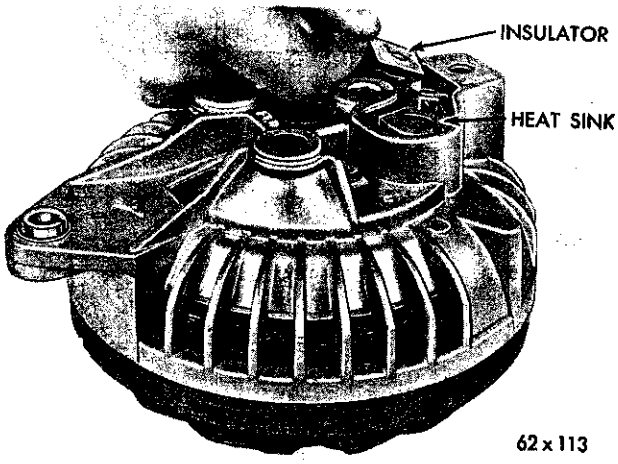


Fig. 18—Removing or Installing the Heat Sink Insulator

(8) Remove the D.C. output terminal nuts and washers and remove the terminal screw and inside capacitor.

NOTE: The heat sink is also held in place by the terminal screw.

(9) Remove the insulator (Fig. 18).

(10) The needle roller bearing in the rectifier end shield is a press fit. If it is necessary to remove the rectifier end frame needle bearing, protect the end shield by supporting the shield with Tool C-3925

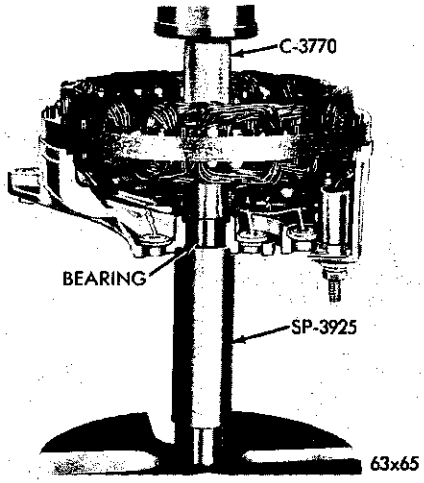


Fig. 19—Removing the Rectifier End Shield Bearing

when pressing the bearing out with Tool C-3770 (Fig. 19).

NOTE: The new bearing is prelubricated and no additional lubricant should be added, as an excessive amount of lubricant will contaminate the slip rings and cause premature brush and rotor failures.

6. TESTING THE RECTIFIERS WITH TOOL C-3829

Rectifier Tester Tool C-3829 provides a quick, simple and accurate method to test the alternator rectifiers without the necessity of disconnecting the soldered rectifier leads. With the alternator rectifier and end shield separated from the drive end housing proceed with the rectifier tests as follows:

Positive Case Rectifier Test (Fig. 20)

(a) Place the alternator on an insulated surface. Connect the test lead clip to the alternator ("BAT") output terminal.

(b) Plug in the Tool C-3829 power source lead into a 110 volt A.C. power supply. Touch the exposed metal connections of each of the positive case rectifiers with the test prod.

CAUTION: Do not break the sealing around the rectifier lead wire. The sealing material is for protection against corrosion. Always touch the test prod to the exposed metal connection nearest the rectifier.

The reading for satisfactory rectifiers will be 1¾ amperes or more. The reading should be approximately the same for the three rectifiers.

When two rectifiers are good and one is shorted, the reading taken at the good rectifiers will be low, and the reading at the shorted rectifier will be zero. Disconnect the lead to the rectifier reading zero and retest. The reading of the good rectifiers will now be within the satisfactory range.

When one rectifier is open it will read approximately one ampere, and the two good rectifiers will read within the satisfactory range.

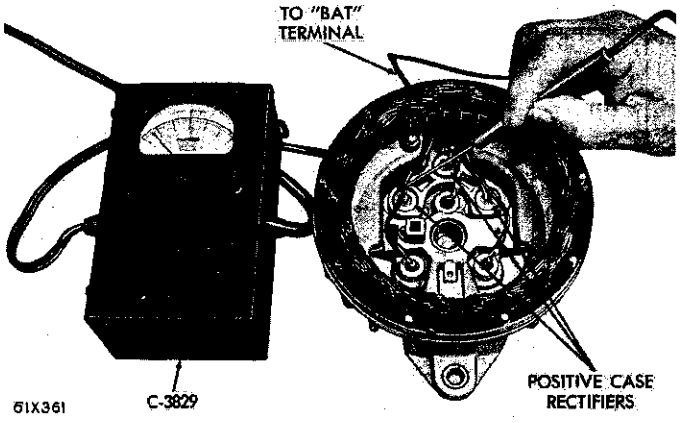


Fig. 20—Testing the Positive Rectifiers (Typical)

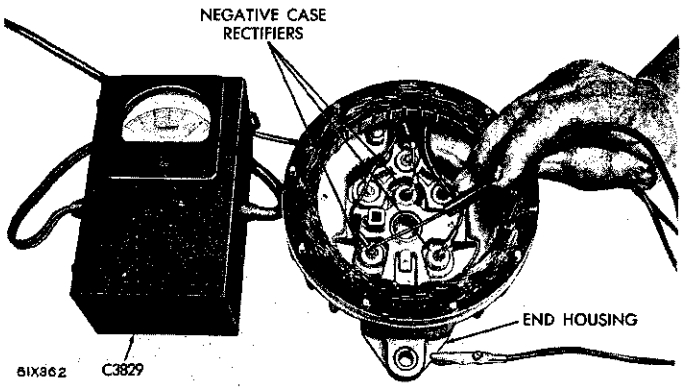


Fig. 21—Testing the Negative Rectifiers (Typical)

Negative Case Rectifier Test (Fig. 21)

(a) Connect the test lead clip to the rectifier end housing.

(b) Touch the exposed connection of each of the negative case rectifiers with the test prod.

The test specifications are the same, and the test results will be approximately the same as for the positive case rectifiers, except the meter will read on the opposite side of the scale.

7. TESTING THE RECTIFIERS AND STATOR (Without Tool C-3829)

(a) Separate the three (3) stator leads at the "Y" connection (Fig. 22).

NOTE: Cut the stator connections as close to the connector as possible because they will have to be soldered together again. If they are cut too short it may be difficult to get them together again for soldering.

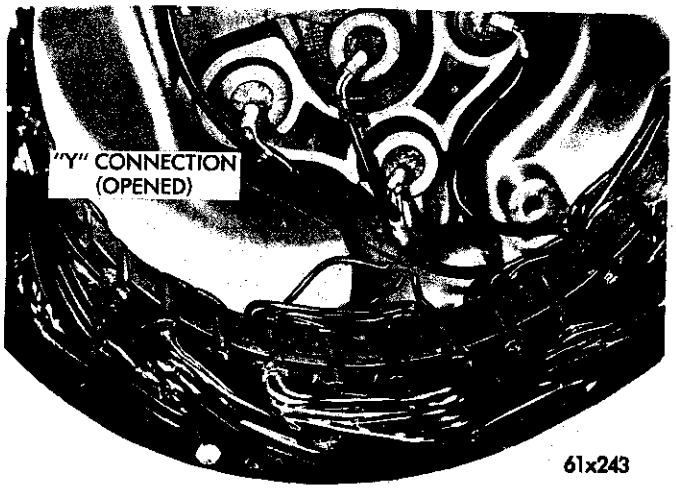


Fig. 22—Separating the Three Stator Leads (Typical)

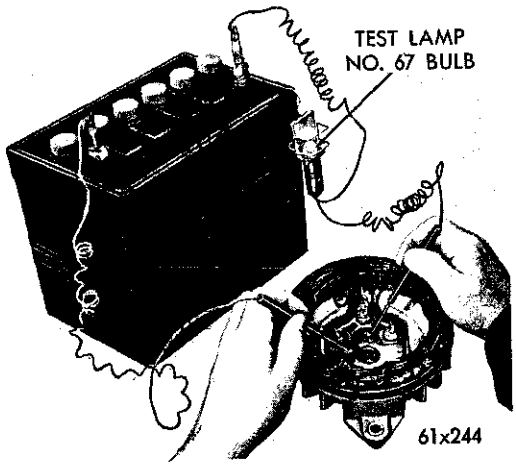


Fig. 23—Testing the Rectifiers with Test Lamp (Typical)

(b) Test the rectifiers with a 12 volt battery and a test lamp equipped with a number 67 bulb (4 candle power) by connecting one side of test lamp to the positive battery post and the other side of the test lamp to a test probe. Connect another test probe to the negative battery post.

(c) Contact the outer case of the rectifier with one probe and the other probe to the wire in the center of the rectifier (See Fig. 23).

(d) Reverse the probes, moving one probe from the rectifier outer case to the rectifier wire, and the other probe from the rectifier wire to the rectifier outer case.

If the test lamp "lights" in one direction but does "not light" in the other direction, the rectifier is satisfactory. If lamp lights in "both directions", the **rectifier** is "shorted". If the test lamp does "not light" in either direction, the rectifier is "open".

NOTE: Possible causes of an open or a blown rectifier is a faulty capacitor or a battery that has been installed in reverse polarity. If the battery is installed properly and the rectifiers are open, test the capacitor capacity .50 microfarad plus or minus 20%.

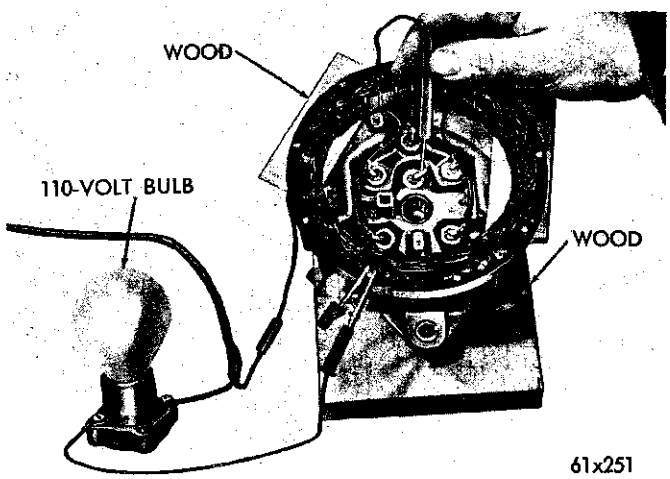


Fig. 24—Testing the Stator for Grounds (Typical)

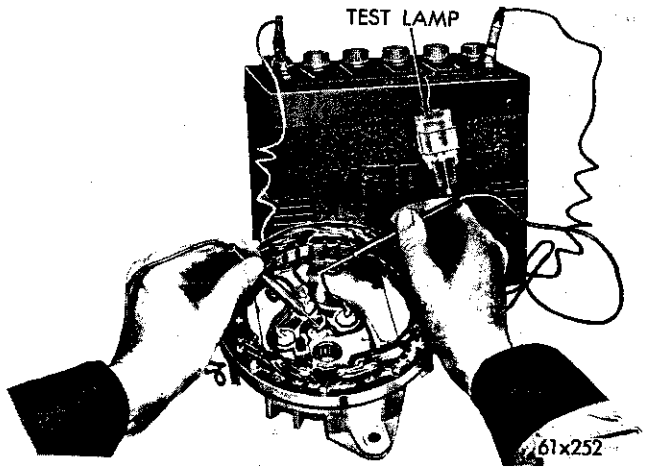


Fig. 25—Testing the Stator Windings for Continuity (Typical)

(e) Unsolder the rectifier leads from the stator leads.

(f) Test the stator for grounding using a 110 volt test lamp (Fig. 24). Use wood slats to insulate the stator from the rectifier shield. Contact one prod of the test lamp to the stator pole frame, and contact the other prod to each of the three stator leads. The test lamp should "not light". If the test lamp lights, the stator windings are "grounded".

(g) Test the stator winding for continuity, by contacting one prod of the test lamp to **all** three stator leads at the "Y" connection. Contact each of the three stator leads (disconnected from the rectifiers). The test lamp should "light" when the prod contacts each of the three leads. If the test lamp does not light the stator winding is "open" (See Fig. 25).

(h) Install a new stator if the one tested is "grounded" or "open". If the rectifiers must be replaced unsolder the rectifier wire at the soldered joint.

NOTE: Three rectifiers are pressed into the heat sink and three in the end shield. When removing the rectifiers, it is necessary to support the end shield and/or heat sink to prevent damage to these castings.

(i) Place the rectifier support adapter in the platform of Tool C-3928 and the remover adapter into the end of the tool pressure screw.

(j) Place the clamp tool in a vise and support the end shield on the support adapter under the rectifier to be removed (Fig. 26).

NOTE: The support tool adapter is cut-away and slotted to fit over the wires and around the bosses in

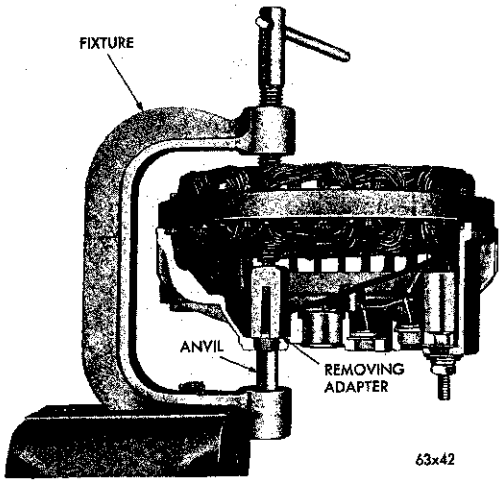


Fig. 26—Removing a Rectifier

the end shield. Make sure that the bore of the tool completely surrounds the rectifier.

(k) Carefully apply pressure with the tool pressure screw until the support tool rectifier end shield and remover pin are in alignment then press the rectifier out of the end shield.

8. REPLACING SLIP RINGS

Slip rings that are damaged can be replaced as follows:

(1) Cut through the rotor grease retainer with a chisel and remove the retainer and insulator.

(2) Unsolder the field coil leads at the solder lugs (Fig. 27).

(3) Cut through the copper of both slip rings at opposite points (180° apart) with a chisel (Fig. 28).

(4) Break the insulator and remove the old ring.

(5) Clean away dirt and particles of the old slip ring from the rotor.

(6) Scrape the ends of the field coil lead wires clean for good electrical contact.

(7) Scrape one end (about $\frac{3}{16}$ inch) of a piece of bare wire (approx. 18 gauge) three inches long (to be used as a guide wire).

(8) Tin the scraped area of the guide wire with resin core solder. Lap the tinned end of the wire over the field coil lead to the insulated ring and solder the two together.

(9) Position the new slip ring carefully over the guide wire and the rotor shaft so the wire will lay in the slip ring groove (Fig. 29). The groove in the slip ring must be in line with the insulated brush field lead to provide room for the lead without damaging it.

(10) Place installing Tool C-3900 over the rotor shaft with the guide wire protruding from the slot in the tool.

(11) Position the rotor, slip ring and tool assembly in an arbor press (Fig. 30). Pull upon the guide wire being careful to guide the insulated field lead into the slip ring groove. While guiding the insulated field lead through the groove, press the slip ring on the shaft. When the slip ring is bottomed on the rotor fan the end of the field lead should be visible at the solder lug (Fig. 27).

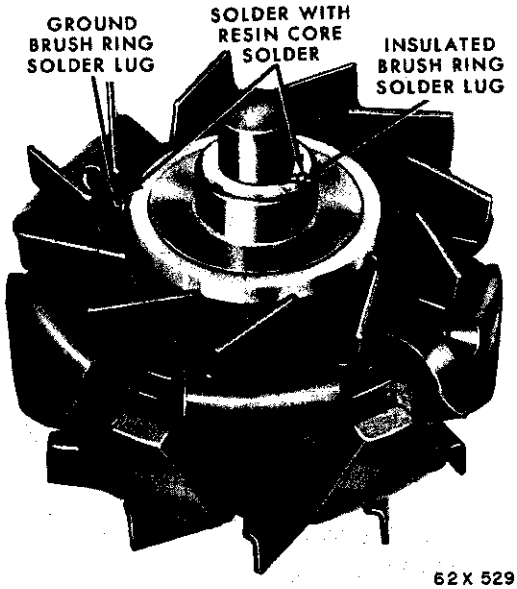


Fig. 27—Solder Points—Slip Ring Installed

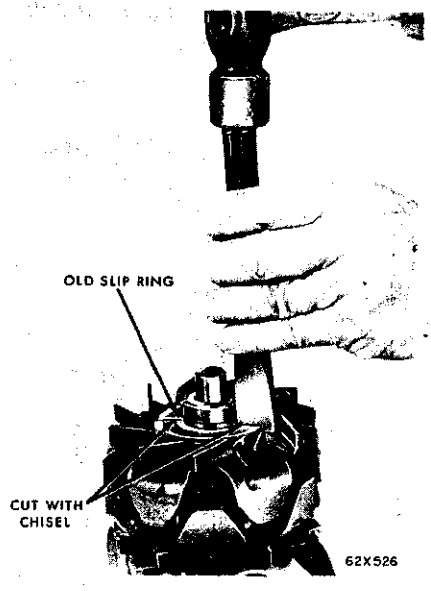


Fig. 28—Cutting the Old Slip Rings

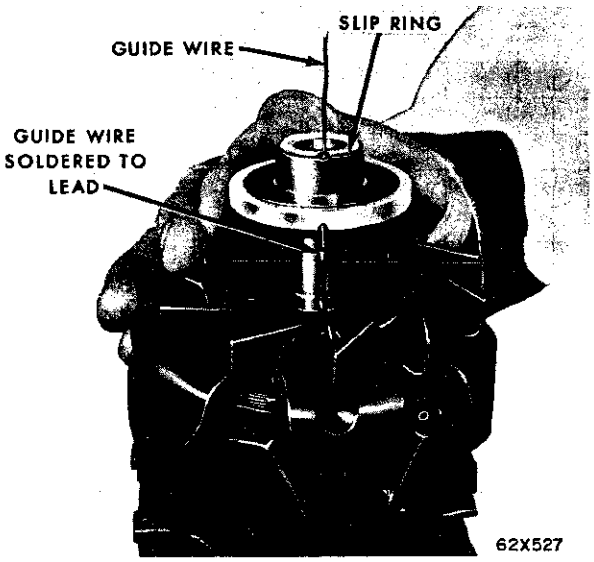


Fig. 29—Aligning the Slip Ring with the Field Wire and Guide Wire

(12) Unsolder the guide wire from the insulated brush slip ring lead. Press the field lead into the solder lug and solder the lead to the lug with resin core solder.

CAUTION: Be sure the solder bead does not protrude beyond the surface of the plastic material. Do not use acid core solder. A short circuit may result and corrosion will definitely occur.

(13) Coil the ground brush ring field lead around the solder lug (Fig. 27) and solder with resin core solder.

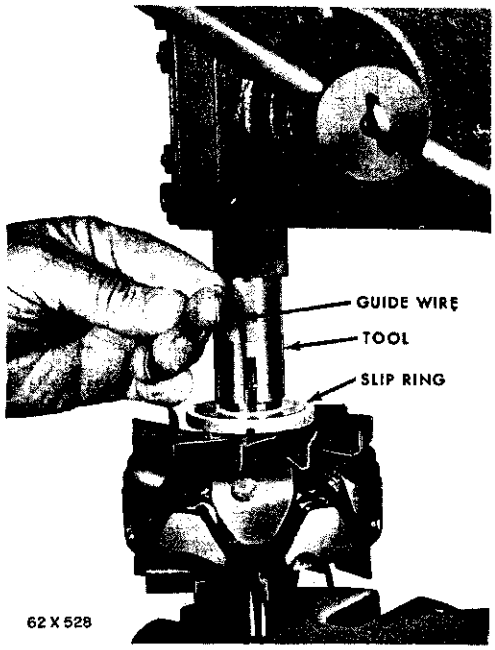


Fig. 30—Installing the Slip Ring

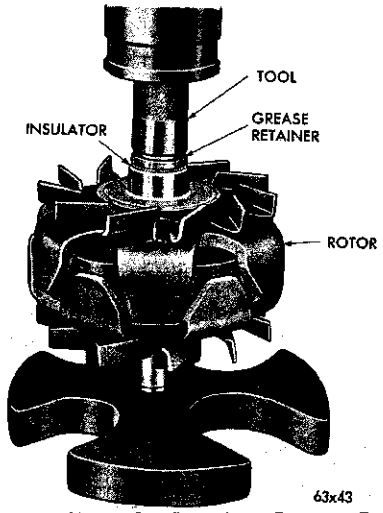


Fig. 31—Installing the Bearing Grease Retainer

(14) Test the slip rings for ground with a 110 volt test lamp by touching one test prod to the rotor pole shoe and the remaining prod to the slip rings. The test lamp should not light. If the lamp lights, the slip rings are shorted to ground, possibly due to grounding the insulated field lead when installing the slip ring.

If the rotor is not grounded, lightly clean the slip ring surfaces with -00- sand paper and assemble the alternator.

(15) Position the new grease retainer insulator and grease retainer on the rotor shaft and press the retainer on the shaft with installer Tool C-3921 (Fig. 31). The retainer is properly positioned when the inner bore of the installed tool bottoms on the rotor shaft.

Assembling the Alternator

(1) Confirm the rectifier identification to make sure the correct rectifier is being installed. Refer to the

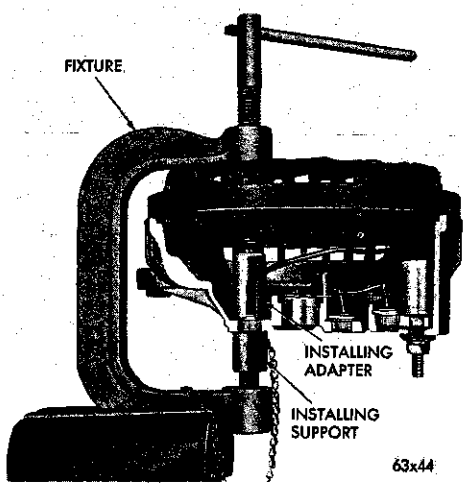


Fig. 32—Installing a Rectifier

Parts List for rectifier identification.

(2) Support the heat sink or rectifier end shield on the installer adapter SP-3820 of Tool C-3928. Carefully apply pressure with the tool pressure screw until the installer tool, rectifier, rectifier end shield or heat sink are in alignment and after determining that the rectifier is started squarely in the casting, slowly apply pressure with the tool pressure screw until you feel the collar of the rectifier bottom against the casting (Fig. 32).

NOTE: Make sure that the installer support adapter fits squarely around the rectifier inner boss and that pressure is applied on the outer rim of the rectifier.

CAUTION: DO NOT USE a hammer to start the rectifier into its bore in the end shield. DO NOT HAMMER OR SHOCK the rectifier in any manner as this will fracture the thin silicon wafer in the rectifier causing complete rectifier failure.

(3) If the stator leads were disconnected at disassembly; clean the leads and mate the stator lead with the rectifier wire loop and bend the loop snugly around the stator lead to provide a good electrical and mechanical connection. Solder the wires with resin core solder. Hold the rectifier lead wire with pliers just below the joint while soldering (Fig. 33). The pliers will absorb the heat from soldering and protect the rectifier.

NOTE: After soldering, quickly cool the soldered connection; touch a dampened cloth against it. This will aid in forming a solid joint.

(4) After soldering the stator leads must be pushed down into the slots that are cast into the end shield and cemented with MoPar Cement, Part Number 2299314 to protect the leads against possible interference with the rotor fans. Test each replacement rectifier to make certain the rectifier was not damaged by the soldering or pressing operations.

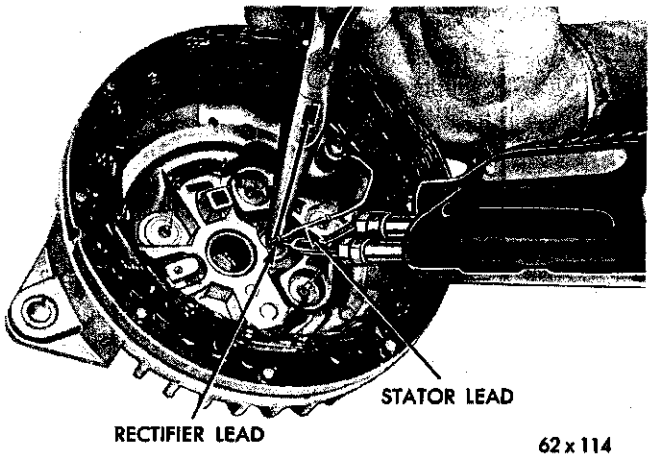


Fig. 33—Soldering the Rectifier and Stator Leads

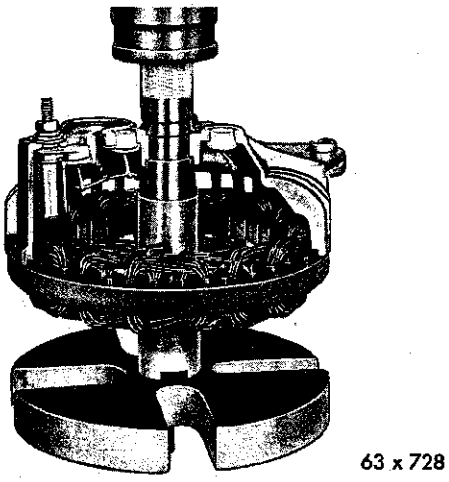


Fig. 34—Installing the Rectifier End Shield Bearing

(5) Support the end shield on Tool C-3925 so that the notch in support tool will clear the raised section of the heat sink and press the bearing into position with Tool SP-3381 (Fig. 34).

NOTE: New bearings are pre-lubricated and additional lubrication is not required.

(6) Insert the drive end bearing in the drive end shield and install the bearing retainer plate to hold the bearing in place.

(7) Position the bearing and drive end shield on the rotor shaft and, while supporting the base of the rotor shaft, press the bearing and shield into position on the rotor shaft with arbor press and Tool C-3769 (Fig. 35).

CAUTION: Make sure that the bearing is installed squarely at installation; otherwise, damage to the bearing will result. Press the bearing on the rotor shaft until the bearing contacts the shoulder on the rotor shaft.

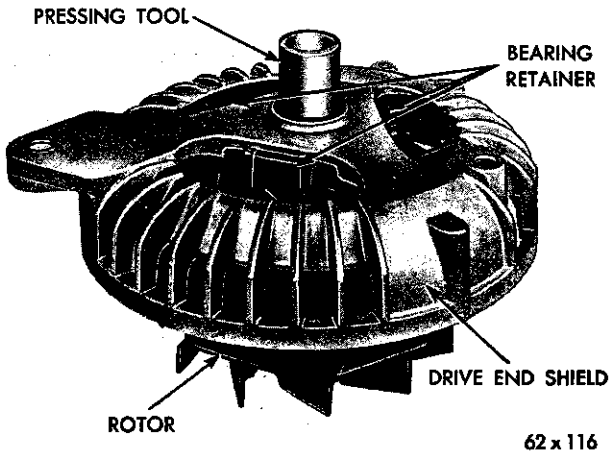


Fig. 35—Installing the Drive End Shield and Bearing

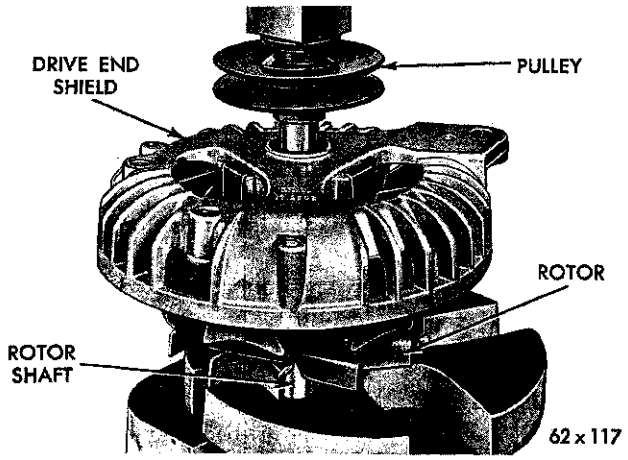


Fig. 36—Installing the Alternator Pulley

(8) Install the pulley on the rotor shaft. The shaft of the rotor must be supported in a manner so that all pressing force is on the pulley hub and motor shaft (Fig. 36).

NOTE: Do not exceed 6800 pounds pressure. Press the pulley on the rotor shaft until the pulley contacts the inner race of the drive end bearing.

(9) The alternators have the capacitor mounted internally. Make sure the heat sink insulator is in place (Fig. 18).

(10) Install the capacitor stud through the heat sink and end shield.

(11) Install the insulating washers, lockwashers and lock nuts.

(12) Make sure the heat sink and insulator are in position and tighten the lock nut.

(13) Position the stator on the rectifier end shield.

(14) Position the rotor end shield assembly on the stator and rectifier end shield. Align the through bolt holes in the stator, rectifier end shield and drive end shield.

(15) Compress the stator and both end shields by hand and install the through bolts, washers and nuts.

(16) Install the insulated brush in the rectifier end. Place the bronze terminal on the plastic holder with the tab of the terminal in the recess in the plastic holder.

(17) Place the nylon washer on the bronze terminal and install the lockwasher and attaching screws.

(18) Install the ground brush and attaching screw.

(19) Rotate the pulley slowly by hand to be sure that the rotor fans do not hit the rectifiers, capacitor lead, and stator connections.

(20) Install the alternator and adjust the drive belt.

(21) Connect the output "BAT" and the field "FLD" leads and connect the ground wire.

(22) Connect the battery ground cable.

(23) Start and operate the engine, and observe the alternator operation.

(24) Test the current output and regulator voltage setting, if necessary.

SERVICE DIAGNOSIS
ALTERNATOR

Condition	Possible Cause	Correction
Alternator Fails to Charge (No Output)	(a) Blown fusible wire in voltage regulator.	(a) Locate and correct the cause of the fuse blowing. Install a new fuse wire. Solder both ends of a new fusible wire securely.
	(b) Alternator drive belt loose.	(b) Adjust the drive belt according to Specifications under Cooling Group 7.
	(c) Worn brushes and/or slip rings.	(c) Install new brushes and/or rotor.
	(d) Sticking brushes.	(d) Clean the slip rings and brush holders. Install new brushes.
	(e) Open field circuit.	(e) Test all the field circuit connections, and correct as required.
	(f) Open charging circuit.	(f) Inspect all connections in the charging circuit, and correct as required.
	(g) Open circuit in stator windings.	(g) Remove the alternator and disassemble. Test the stator windings. Install a new stator if necessary.
	(h) Open rectifiers.	(h) Remove the alternator and disassemble. Test the rectifiers. Install new rectifiers if necessary.

SERVICE DIAGNOSIS—(Continued)

ALTERNATOR

Condition	Possible Cause	Correction
Low, Unsteady Charging Rate	(a) Alternator drive belt loose.	(a) Adjust the alternator drive belt. See Cooling Group 7.
	(b) High resistance at battery terminals.	(b) Clean and tighten the battery terminals.
	(c) High resistance in the charging circuit.	(c) Test the charging circuit resistance. Correct as required.
	(d) High resistance in the body to engine ground lead.	(d) Tighten the ground lead connections. Install a new ground lead if necessary.
	(e) Open stator winding.	(e) Remove and disassemble the alternator. Test the stator windings. Install a new stator if necessary.
Excessive Charging Rate to a Fully Charged Battery	(a) Regulator set too high.	(a) Reset the voltage regulator according to Specifications.
	(b) Regulator contacts stuck.	(b) Install a new voltage regulator.
	(c) Regulator voltage winding open.	(c) Install a new voltage regulator.
	(d) Regulator base improperly grounded.	(d) Correct the regulator base to the ground connection.
Regulator Contacts Burned	(a) High regulator setting.	(a) Reset the voltage regulator according to specifications.
	(b) Shorted rotor field coil windings.	(b) Test the rotor field coil current draw. If excessive install a new rotor.
Regulator Contacts Points Stuck	(a) Poor ground connection between the alternator and the regulator. Open resistor element.	(a) Correct the ground connection. Install a new regulator. Test the regulator setting, and reset if necessary.
Noisy Alternator	(a) Alternator mounting loose.	(a) Properly install and tighten the alternator mounting.
	(b) Worn or frayed drive belt.	(b) Install a new drive belt and adjust. See Cooling Group 7.
	(c) Worn bearings.	(c) Remove and disassemble the alternator. Install new bearings as required.
	(d) Interference between the rotor fan and stator leads or rectifiers.	(d) Remove and disassemble the alternator. Correct the interference as required.
	(e) Rotor or rotor fan damaged.	(e) Remove and disassemble the alternator. Install a new rotor.
	(f) Open or shorted rectifier.	(f) Remove and disassemble the alternator. Test the rectifiers. Install new rectifiers as required.
	(g) Open or shorted winding in the stator.	(g) Remove and disassemble the alternator. Test the stator windings. Install a new stator if necessary.

PART 4
IGNITION SYSTEM

The ignition system consists of two separate circuits. The battery, ammeter, ignition switch, ballast resistor, primary winding of the ignition coil, distributor contacts and condenser, vehicle frame, and the primary wiring make up the low voltage primary circuit. The secondary high voltage circuit includes the coil secondary winding, the distributor cap and rotor, the spark plug cables, the spark plugs and the vehicle frame.

SERVICE PROCEDURES

1. SECONDARY CIRCUIT INSPECTION

The coil to distributor cap wire and the spark plug wires should make good, clean contact in the ignition coil, the distributor cap towers and on the spark plugs. Wires that are loose or that are not inserted all the way into the towers or on the plugs will corrode and increase the resistance as well as cause carbon tracking of the coil or cap towers. Make sure the cap nipples and spark plug covers are in good condition and that they are tight on the cap towers and around the plug insulators.

The ignition coil tower, if oily or dirty, should be wiped clean and inspected for cracks, carbon tracking or oil leaks. Replace the coil if faulty.

Inspect the distributor cap for oil film, dirt or metal particles on the inside surface. Any contamination, however slight, can become conductive and cause hard starting in wet weather. Thoroughly wash the cap in a **weak** solution of liquid soap or detergent in warm water. Do not use a concentrated solution or soak the cap in the solution. Scrub the inner surfaces with a stiff bristle nylon brush to clean between the ribs and the crevices. Rinse well in hot water, shake out excess water and dry thoroughly. Do not use compressed air to dry or blow out the water. Carefully inspect for cracks or carbon tracking on the inner and outer surfaces. Replace the cap if faulty.

The secondary cables, cap and rotor should be tested, using Tool C-3296. This tester provides high voltage which is sufficient for testing secondary insulation. Test the resistance of the spark plug cables. Replace the cable if resistance is more than 30,000 ohms or if the terminal has pulled off the cable.

NOTE: Jerking the wires to disconnect them from the plugs can stretch them and increase secondary resistance. To remove the wire, grasp the boot at the end of the wire and rotate the boot slightly to break the adhesion between it and the spark plug insulator, then use a straight pull to remove the spark plug wire.

The rotor and distributor cap electrodes should be inspected for burning. Replace the rotor if the electrode is burned on the top or if the electrode is worn too short.

2. DISTRIBUTION RESISTANCE TEST

This test indicates the resistance of the ignition primary circuit from the distributor side of the coil, through the points and the distributor ground. Excessive resistance in this portion of the ignition system will prevent the coil from producing sufficient output for good over-all ignition. To perform test, proceed as follows:

(1) Turn the Selector Switch of a tach-dwell unit to the CALIBRATE position and adjust the Dwell Calibrator until the Dwell Meter reads on the set line (test leads separated).

(2) Leave the Selector Switch in the CALIBRATE position and connect the tach-dwell red lead to the distributor terminal of coil and the black lead to a good ground.

(3) Turn the ignition switch "ON". Observe dwell meter reading. Meter pointer should be well within the black bar marked "DISTRIBUTOR RESISTANCE". If reading is zero or outside of black bar, crank the engine with the starter until the meter pointer moves as far to right as possible (This will indicate that breaker points are closed). A reading now within the black indicates a normal distributor primary circuit.

If the reading is outside the black bar, high resistance is present in the distributor primary circuit.

(4) Remove the test lead from the distributor terminal of coil and connect to the following points:

(a) Distributor primary terminal (outside).

(b) Distributor primary terminal (inside).

(c) Breaker point terminal bracket (insulated bracket).

(d) Ground side of contact points.

(e) Distributor housing.

(5) Repeat the test at each connection until a noticeable change occurs in the meter reading. If a poor connection or faulty lead is indicated, clean, tighten or replace as necessary and repeat step (3).

If faulty contact points are indicated, remove distributor for complete inspection, service, testing and calibration.

3. IDLE RPM TEST

The engine idle rpm setting should be tested and recorded as it is when the vehicle is first brought into the shop for testing. This will assist in diagnosing complaints of engine stalling or complaints of creeping and hard shifting on vehicles equipped with automatic transmissions.

Test procedures are as follows:

(1) Turn the Selector Switch to the CALIBRATE position and adjust the Dwell Calibrator until the Dwell Meter reads on the SET line (test leads separated).

(2) Connect the red lead of the test unit to the distributor primary terminal at the coil and the black lead to a good ground.

(3) Turn the Selector Switch to the 8 LOBE position.

(4) Turn the tachometer rpm switch to the 1000 rpm position.

(5) With the engine at normal operating temperature (off fast idle), momentarily open the throttle and release to make sure there is no bind in the linkage and that the idle speed screw is against its stop.

(6) Note engine rpm on 1000 rpm scale and adjust carburetor idle speed to specifications. See "Fuel System" Group 14.

4. DISTRIBUTOR POINT DWELL

The degrees of distributor dwell are the degrees of rotation through which the breaker contact points remain closed. This is also commonly referred to as "dwell angle" or "cam angle".

The correct distributor point dwell is essential for good ignition performance and contact point life.

Test procedures are as follows:

(1) Connect the Tach-Dwell red lead to the distributor terminal of coil and black lead to a good ground.

(2) Turn the Selector Switch to the 8 LOBE position.

(3) Start the engine and operate at idle speed.

(4) Observe the dwell meter reading. If the dwell reading is within "Specifications", the point gap, cam rubbing block and breaker arm are all in satisfactory condition.

If the dwell reading is not within specifications, incorrect point gap, worn cam, worn rubbing block or distorted breaker arm may be indicated.

5. DUAL BREAKER POINTS

Block one set of contacts with a clean insulator and adjust the opposite set of contacts to specifications using the dwell meter.

NOTE: Loosen the stationary contact lock screw just enough, so that the stationary contact can be moved with a slight drag; otherwise it will de difficult to set the contact accurately.

When the one set of contacts has been adjusted for the correct clearance, tighten the stationary contact lock screw.

Block the adjusted set of contacts with an insulator and adjust the remaining set of contacts in the same manner as the first set. Remove insulator and recheck tightness of the stationary contact lock screw.

If the contacts have been properly adjusted, the dwell should be as specified for two contact sets.

6. DWELL VARIATION

This test indicates the mechanical condition of the distributor. Excessive wear in distributor mechanical parts cause dwell variations which will affect ignition timing.

Test procedures are as follows:

(1) With the engine at idle speed, the vacuum hose disconnected, and with the test leads connected as in Paragraph, "Point Dwell Test", turn the Tachometer rpm Switch to the 5000 rpm position.

(2) Slowly increase the engine speed to 1500 rpm, then slowly reduce to idle speed while observing the dwell meter reading.

If the dwell reading varies more than 2 degrees from the initial reading between idle speed and 1500 rpm, probable wear in the distributor shaft, bushings or breaker plate bearing or pivot pin is indicated. Remove distributor for complete inspection and testing on a distributor tester.

NOTE: Dwell variation at speeds above 1500 rpm does not necessarily indicate distributor wear.

IMPORTANT: Dwell and gap of the points must both be within their specified limits at the same time. If this cannot be accomplished, it is probable that wrong points are installed, the rubbing block or cam lobes are badly worn or contact arm is distorted.

7. IGNITION TIMING

To obtain maximum engine performance, the dis-

tributor must be correctly positioned on the engine to give the proper ignition timing.

The ignition timing test will indicate the timing of the spark at No. 1 cylinder at idle (only).

Test procedures are as follows:

(1) Disconnect the vacuum hose at the distributor.

(2) Connect the secondary lead of the Power Timing Light to the No. 1 spark plug, red primary lead to positive terminal of the battery and the black primary lead to the negative battery terminal.

NOTE: Do not puncture the wires, boots or nipples with test probes. Always use adapters. Puncturing spark plug wires with a probe will damage the wires. The probe can separate the conductor and cause high resistance. In addition, breaking the rubber insulation may permit secondary current to arc to ground.

(3) Start the engine and set the idle to specifications rpm, engine at normal operating temperature (transmission in neutral).

(4) Using a timing light, observe the position of timing mark on the crankshaft damper and check against the specifications.

(5) Loosen the distributor hold down clamp screw and rotate the distributor housing so that the specified timing mark on damper aligns with the specified "BTC" mark on the timing plate. Moving the distributor "clockwise" advances the timing and "counterclockwise" retards the timing.

NOTE: At low altitudes, with any good grade of recommended gasoline, either "regular" or "premium", the engine will give its best performance if timed according to specifications.

When using low grade fuels, or after carbon has accumulated, objectionable spark ping may occur with the specified timing. In this case, ignition timing should be retarded, but not to exceed 5 degrees of crankshaft rotation later than specified.

At high altitudes or when using higher quality gasoline, for example, "premuim" where "regular" is specified or "super premium" where "premium" is specified, there is less tendency for spark ping. In such cases, improved performance may be obtained by advancing the spark not to exceed 5 degrees of crankshaft rotation ahead of specified timing.

Within the foregoing limits, namely, from 5 degrees ahead to 5 degrees later than specified timing, a good rule to follow is to advance the spark until a slight ping is heard when accelerating to 15 mph in direct drive at wide open throttle, with a hot engine.

(6) Tighten the distributor hold down clamp screw after the timing has been set and recheck the timing adjustment with a Power Timing Light.

(7) When the ignition timing is correct, connect the vacuum hose to the distributor.

NOTE: As the engine speed is increased, the timing mark should move down on the vibration dampener below the pointer if advance units are functioning.

8. DISTRIBUTOR

Removal

(1) Disconnect the vacuum hose at the distributor.

(2) Disconnect the primary lead wire at the coil.

(3) Unfasten the distributor cap retaining clips and

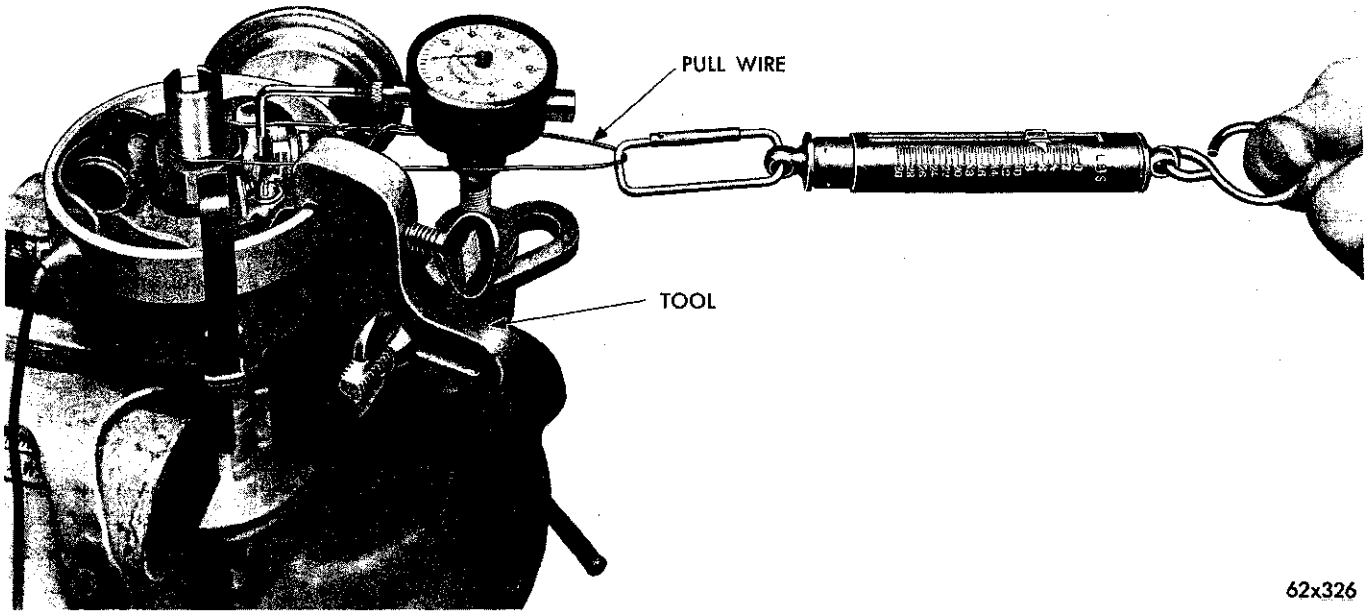


Fig. 1—Shaft and Bushing Wear Test

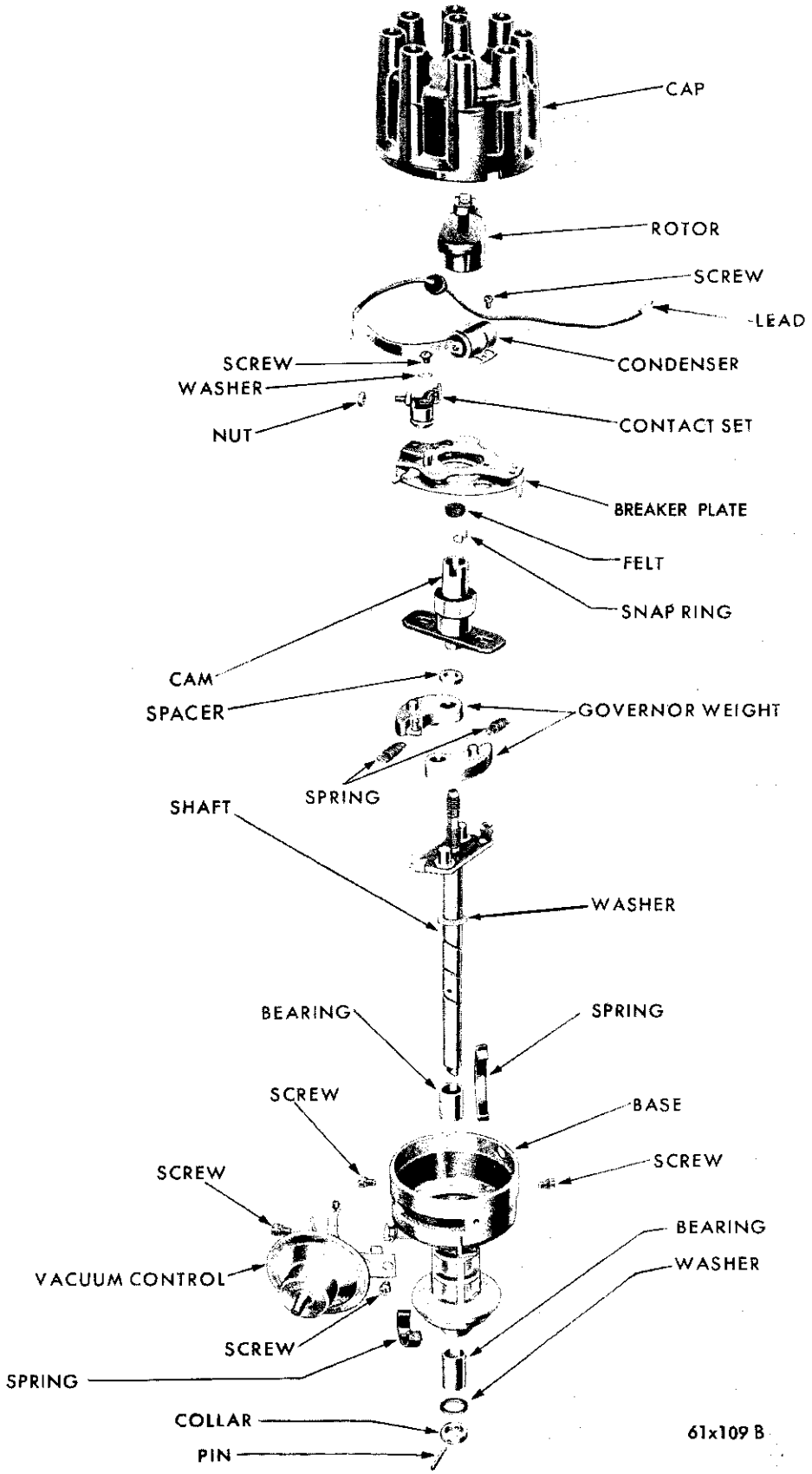


Fig. 2—Distributor (Disassembled View) Chrysler Built

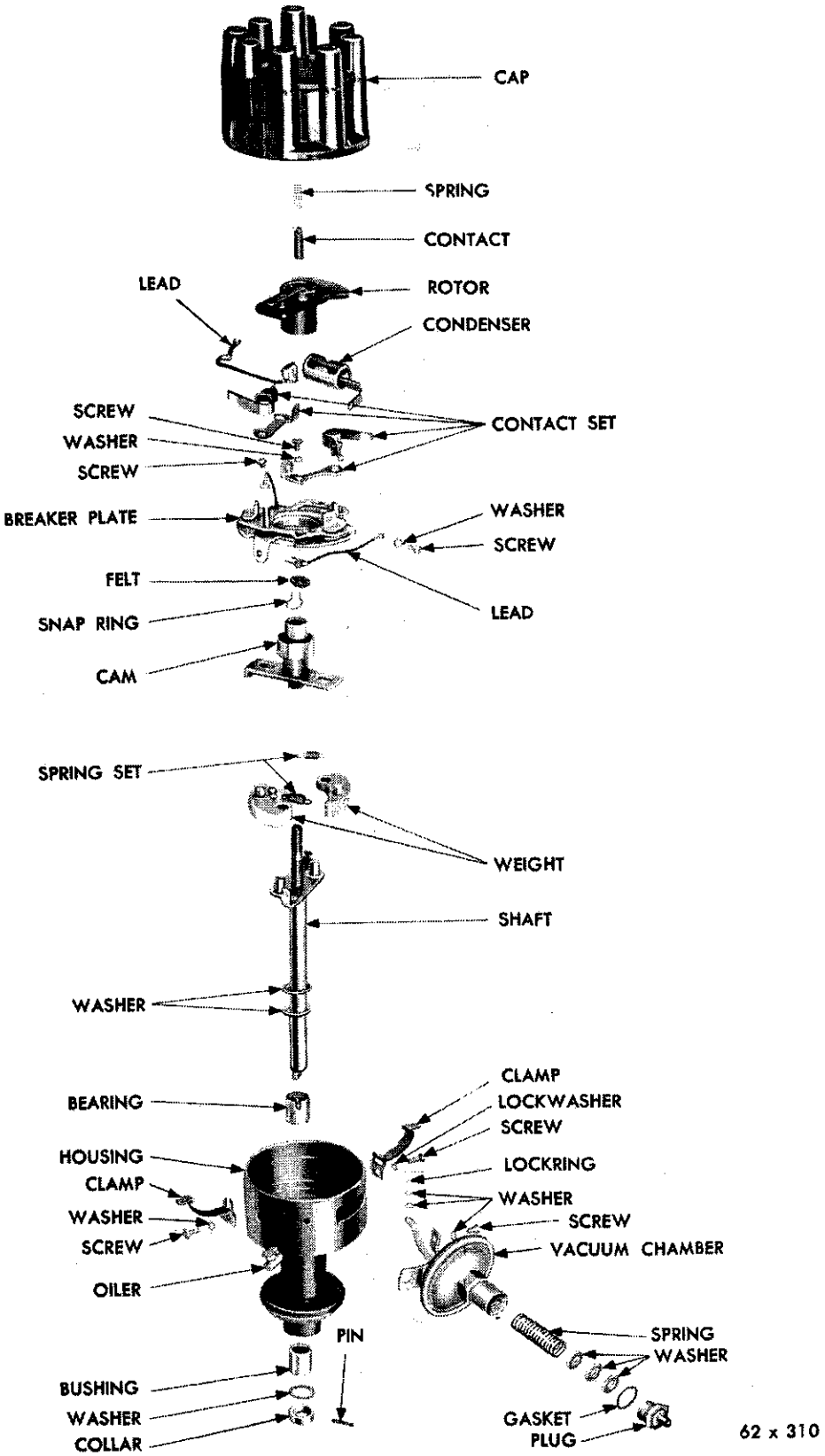


Fig 3—Distributor (Disassembled View) (Prestolite) (High Performance and Police Engines Only)

lift off the distributor cap.

(4) Scribe a mark on the edge of the distributor housing to indicate the position of the rotor as reference when reinstalling the distributor.

(5) Remove the distributor hold-down clamp screw and the clamp.

(6) Carefully lift the distributor from the engine.

Shaft and Bushing Wear Test

(1) Remove the distributor rotor.

(2) Clamp the ribbed section of the distributor housing lightly in a vise equipped with soft jaws and attach the dial indicator to the body of the distributor with the indicator plunger arm resting against the moveable breaker arm with the rubbing block of the breaker arm on the highest point of the cam lobe (Fig. 1).

(3) Place one end of a wire loop around the top of the distributor shaft. Hook a spring scale in the other end of the wire loop and pull on a line with the plunger of the indicator gauge. Be sure the wire loop on the shaft end is down on the shaft to insure a straight pull and also that the wire loop does not interfere with the indicator or holding bracket. Apply a five pound pull and read the movement of the plunger on the indicator dial. (Be sure the rubbing block of breaker arm is on the highest point of the cam lobe during this test.) If the plunger movement exceeds .006 inch, replace the bushings and/or distributor shaft, see "Distributor Disassembly".

Disassembly (Figs. 2 and 3)

(1) Remove the distributor rotor.

NOTE: The distributor cap clamp springs on Chrysler built distributors are held in place by peened metal around the openings and should not be removed.

(2) Remove the retainer attaching the vacuum advance unit to the breaker plate advance arm.

(3) Remove the two screws and lockwashers attaching the vacuum advance unit to the distributor housing and remove the unit.

(4) Remove the primary lead wire and rubber grommet as an assembly. Push the grommet towards the inside of distributor to remove. Do not pull on the wire.

(5) Remove the two screws and lockwashers attaching the breaker plate to the housing and lift out the breaker plate, points and condenser as an assembly.

(6) Remove the oil wick from the distributor cam (Fig. 4). Remove the spring clip from the oil well in the cam and remove the cam and yoke assembly and spacer.

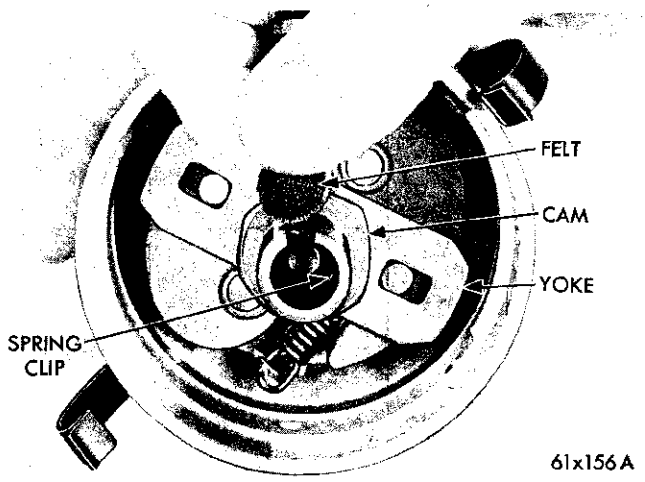


Fig. 4—Removing the Distributor Cam Felt Wick

If the side play exceeds .006 inch in the "Shaft and Bushing Wear Test", replace the bushings and/or distributor shaft as follows:

(a) Remove the distributor drive collar retaining pin and slide the collar off the end of the shaft.

(b) Use a fine file to clean the burrs from around the pin hole in the shaft and remove the lower thrust washer.

(c) Push the shaft up and remove it through the top of the distributor body. Remove the upper thrust washer.

(d) Remove the shaft oiler and lift out the oiler wick.

CAUTION: On Chrysler Built distributors, do not drive the bushings out of the housing.

(e) Remove the upper bushing with Tool C-3744 (Fig. 5) by threading the tap securely into the bush-

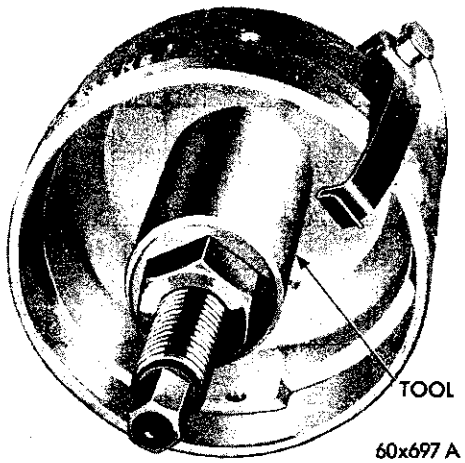


Fig. 5—Removing the Distributor Housing Upper Bushing

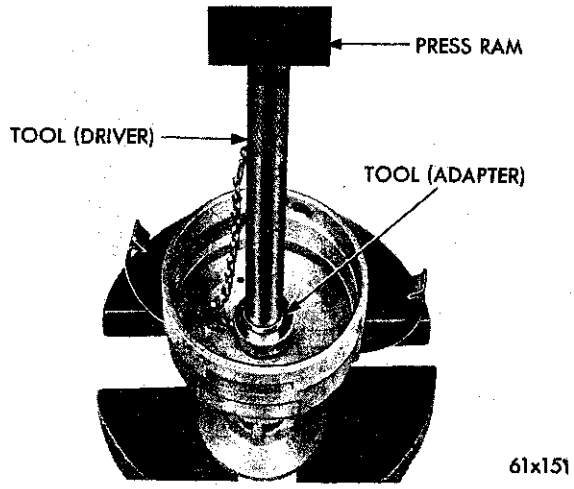


Fig. 6—Installing the Distributor Housing Upper Bushing

ing. Place the spacer over the tap. Install the tool nut and while holding the tap, tighten the tool nut to remove the bushing. Invert the housing and remove the lower bushing in the same manner.

On Prestolite built distributors, place the housing in an arbor press and press out the upper and lower bushings from the bottom of the housing using driver Tool C-3041.

(f) Soak the new bushings in light engine oil for approximately 15 minutes.

(g) Position the new upper bushing with the hole in the bushing **up** and in line with the oil hole in the housing, then press the bushing into the distributor housing with Tool C-3041 and adapter (Fig. 6). The bushing will measure .094 inch below the top of the housing bore for Prestolite distributors. For the Chrysler built distributors use Tool C-3041 with the flat face of adapter contacting the bushing then press the bushing into the distributor until top of

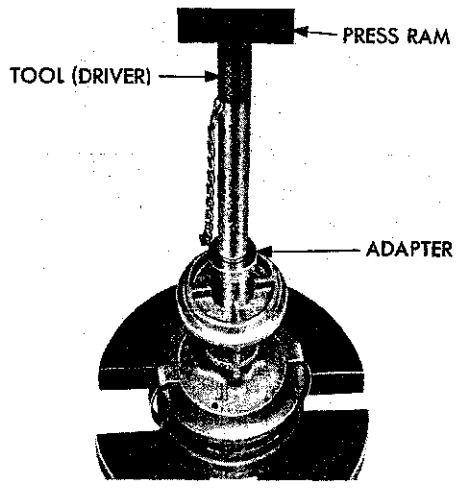


Fig. 7—Installing the Distributor Housing Lower Bushing

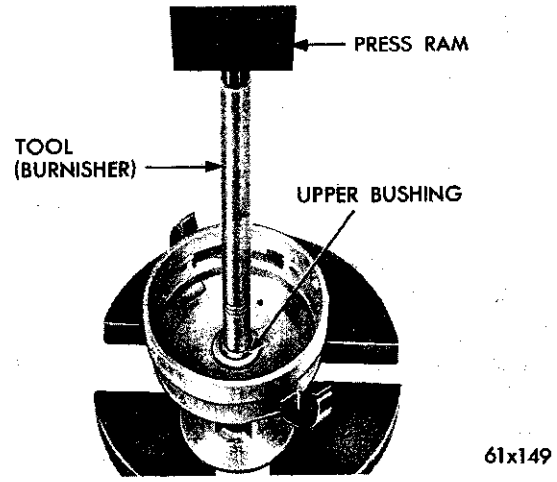


Fig. 8—Burnishing the Distributor Housing Bushings

bushing is 1.613 inches from top machined face of distributor housing. Place a straight-edge on machined surface of housing and measure from the bottom face of the straight-edge to the top of the bushing. Invert the housing and install the other bushing (Fig. 7) flush with the face of the distributor base.

(h) Insert a $\frac{3}{32}$ inch brass rod through the housing oiler hole to see if the hole in the bushing indexes with the oiler hole in the housing. If the rod cannot be inserted through the housing and the bushing, drill a $\frac{1}{8}$" hole through the upper bushing by drilling through the oil wick hole. Remove burrs caused by the drilling operation.

(i) Install the burnishing tool part of C-3041 Tool set and force the burnisher through both the bushings (Fig. 8). The correct bushing inside the diameter is .04995 to .5000 inch.

Assembly

(1) Test the operation of the centrifugal weight and inspect the weight springs for distortion. Lubricate the governor weights.

(2) Inspect all the bearing surfaces and pivot pins for roughness, binding or excessive looseness.

(3) Install the cam spacer, chamfered end down on the distributor shaft.

(4) Slide the cam and yoke on the distributor shaft, engage the weight lugs with the slots in the yoke. Install the cam retaining spring clip. Be sure it is properly seated in the groove of the distributor shaft.

(5) Lubricate and install the two concave upper thrust washers for Prestolite distributors or a single flat thrust washer for Chrysler-built distributors. Position the washers on the distributor shaft and slide the shaft into the distributor body. Position the

lower thrust washer and drive the collar on the lower end of the shaft. Install the retainer pin.

(6) Install the oiler wick and oiler.

(7) Install the breaker plate assembly. Align the condenser lead, breaker point spring, primary lead and install the attaching screws.

(8) Install the felt wick in the top of the distributor cam.

(9) Attach the vacuum advance unit arm to the breaker plate and install the retainer. Install the vacuum unit attaching screws and washers.

(10) Test the breaker arm spring tension, and adjust the contact gap.

(11) Lubricate the felt pad in the top of the distributor cam with 3 to 5 drops of light engine oil and install the rotor.

9. TESTING BREAKER ARM SPRING TENSION

(1) Hook a spring scale Tool MTU-36 on the breaker arm and pull in a straight line at right angles to the point surfaces (Fig. 9). Take a reading as the points start to separate under the slow and steady pull of the scale. The spring tension should be as shown in "Specifications". If the reading is outside these limits, loosen the screw which holds the end of the breaker arm spring, and slide the end of the spring in or out, as necessary.

(2) Tighten the screw and measure the spring tension.

NOTE: Spring tension that is too great, will cause excessive wear on the distributor cam and on the nylon block of the movable breaker arm. Spring tension that is too weak, is unable to keep the points in contact with each other when they close. This is particularly true as engine speed is increased, causing high-speed misfiring.

10. INSTALLING AND ALIGNING CONTACT POINTS

(1) Remove the old contact points and install a new set.

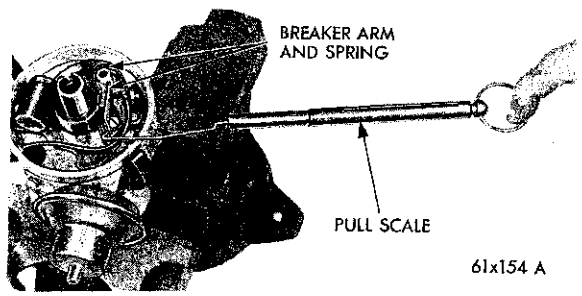


Fig. 9—Testing the Breaker Arm Spring Tension

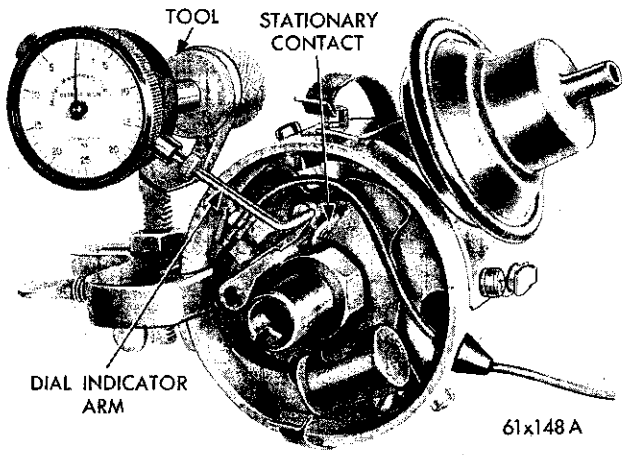


Fig. 10—Adjusting the Contact Point Clearance with a Dial Indicator

NOTE: Touching the contact point faces with fingers during installation will cause burning of points during operation.

(2) Align the contacts to obtain contact in the center of the points, by bending the stationary contact bracket only. **Never bend** the movable arm to obtain alignment.

(3) After aligning the contact points, readjust the point clearance to specifications using a dial indicator (Fig. 10).

(4) Test the dwell angle to show proper degree of closure. See Paragraph "Distributor Point Dwell". The lock screw should be loosened just enough so that the stationary bracket can be moved with a slight drag; otherwise, it will be difficult to set the points accurately. After setting the points to correct the gap, tighten the lock screw.

11. DISTRIBUTOR LUBRICATION

(1) Add 3 to 5 drops of SAE 10W oil to the oiler on the outside of distributor base.

(2) Lubricate the felt pad under the rotor in the top of the distributor cam with 3 to 5 drops of SAE 10W oil.

(3) Wipe all old grease from surface of the breaker cam. Apply a light film of new distributor cam lubricant number 1473595. **DO NOT over-lubricate. Excess grease will be thrown from the distributor cam when the engine is running. If this grease strikes the breaker points arcing and burning of the points will result.**

12. TESTING DISTRIBUTOR ADVANCE

Centrifugal Advance Curve

Note the model number of the distributor and

refer to the specifications before making this test.

Mount the distributor assembly (less cap and rotor) in a reliable-stroboscope-type distributor tester and proceed with tests as follows:

NOTE: Clamp around the rib section of the distributor housing. The bottom section of the distributor housing is not a machined surface and concentricity would be affected, causing a wobble.

(1) Turn the Tach-Dwell switch to the 8 "LOBE" position and the motor switch to the correct direction of rotation. Refer to "Distributor Advance Specifications".

(2) Turn the battery switch "ON".

(3) Regulate the tester speed control to operate the distributor at 200 distributor rpm.

(4) Hold the distributor breaker plate in the full retard position and align the "0" of the distributor tester degree ring with any one of the arrow flashes.

(5) Regulate the tester speed control to operate the distributor at speeds called for under "Specifications" and observe arrow flashes opposite tester degree ring to determine degrees of advance.

(6) If the advance is not according to specifications, corrections can be made by bending the primary and secondary spring tabs, to increase or decrease the spring tension. The governor spring tabs can be reached through the access hole at the breaker plate. Rotate the shaft until the proper spring and tab lines up with the access holes. Insert a screwdriver blade through the access hole and bend the spring tab toward the distributor cam to decrease spring tension and advance the park, or away from the distributor cam to increase the spring tension and retard the spark.

NOTE: The light tension spring controls the lower end of the advance curve, and the heavier spring controls the upper end of the advance curve.

Vacuum Diaphragm Leak Test

With the distributor mounted in the distributor tester and with the vacuum unit attached to the distributor, proceed as follows:

(1) Place the thumb over the end of the vacuum pump hose and adjust the regulator control knob to give a reading 20 inches with hose closed off to be sure tester hose does not leak.

(2) Attach the vacuum pump hose to the tube on the vacuum unit. The vacuum gauge should hold on maximum vacuum obtainable if no leaks exist.

(3) Observe the breaker plate while performing the leak test to test response of the breaker plate. There should be instant response to the pull of the diaphragm, moving the plate without a drag or bind.

(4) If leakage is indicated, replace the vacuum unit assembly.

Vacuum Advance Curve

Connect the tester vacuum pump hose to the distributor vacuum advance unit and perform operations 1 through 5 under "Centrifugal Advance Curve". Then proceed as follows:

(1) Turn the tester vacuum pump "ON". Adjust the vacuum pump regulator to vacuum test specifications. See "Specifications" and observe the arrow flashes on the tester degree ring to determine the degrees of advance.

(2) If the vacuum advance is above or below specifications, replace the vacuum advance unit. Retest the vacuum advance curve.

Installation (On the Engine)

(1) Position the distributor on the engine. Align the rotor with marks previously scribed on the distributor housing.

(2) Engage the tongue of the distributor shaft with the slot in the distributor and oil pump drive gear.

NOTE: If the engine has been cranked while the distributor is removed, it will be necessary to establish the proper relationship between the distributor shaft and the No. 1 piston position as follows:

(a) Rotate the crankshaft until the number one piston is at top of the compression stroke.

(b) Rotate the rotor to the position of the number one distributor cap terminal.

(c) Lower the distributor into the opening, connect the primary lead and install the distributor cap. Make sure all high tension wires "snap" firmly in the cap towers. Install the distributor hold-down clamp screw. Tighten the screw finger tight.

(3) Connect the secondary lead of a Power Timing Light to the No. 1 spark plug. **Do Not** puncture the cable cap nipples or spark plug covers with a sharp tool to make contact. Use proper adapters.

Connect the red primary lead to the positive terminal of the battery and the black primary lead to the negative battery terminal.

(4) With the distributor vacuum hose disconnected, start and operate the engine at 475-500 rpm. Rotate the distributor housing so that the specified timing mark and the pointer are in alignment (Moving the distributor housing "clockwise" advances the timing and "counter-clockwise" retards the timing.

(5) Tighten the distributor clamp screw after the timing has been set and recheck the timing adjustment with a Power Timing Light.

(6) If the timing is correct, connect the vacuum hose to the distributor and remove the timing light from the engine.

13. SPARK PLUGS

Cleaning and Inspection

Remove the spark plugs. Examine the firing ends of the plugs for evidence of oil fouling, gas fouling, burned or overheating conditions. Clean and reset the gaps to .035 inch.

NOTE: Before setting the spark plug gap, file center electrode flat. Make adjustment by bending the ground side electrode; never bend the center electrode.

Inspect the spark plug cables, coil secondary cable, nipples and cup for cracks, wear and fraying. Inspect for loose terminals. When installing spark plugs, tighten to 30 foot pounds torque.

14. IGNITION COIL

The ignition coil is designed to operate with an external ballast resistor.

The ballast resistor is a fixed resistance in the ignition primary circuit. During low speed operation, when the primary circuit current flow is high, the ballast resistor temperature rises, increasing the resistance. This reduces the current flow, thereby prolonging ignition point life. At high speed operation, when the primary current flow is low, the ballast resistance cools off allowing more current flow, which is required for high speed operation. During starter operation, the ballast resistor is bypassed, allowing full battery voltage to the ignition primary circuit.

When testing the coil for output, include the resistor in tests. Inspect the coil for external leaks and arcing. Always make two tests when checking the coil. One when coil is cold, the other after the coil has been warmed up.

Test the coil according to the coil tester Manufacturer's instructions. Test the coil primary resistance. Test the ballast resistor resistance. Test the coil secondary resistance. Replace any coil and ballast resistor that does not meet specifications.

SERVICE DIAGNOSIS
IGNITION SYSTEM

Condition	Possible Cause	Correction
Burned or Pitted Distributor Points	(a) Dirt or oil on points.	(a) If the oil is on contact face, determine the cause and correct the condition. Clean the distributor cam of all dirt and grease, apply a light film of distributor cam lubricant Number 1473595 to cam lobes; wipe off the excess. Replace the point set and adjust as necessary.
	(b) Alternator voltage regulator setting too high.	(b) Test the alternator voltage regulator setting, adjust as necessary. Replace and adjust the distributor contact points.
	(c) Points misaligned or gap too small.	(c) Align and adjust points.
	(d) Faulty coil.	(d) Test and replace coil if necessary. Replace and adjust contact points.
	(e) Ballast resistor not in circuit.	(e) Inspect conditions, and correctly connect the coil.
	(f) Wrong condenser or faulty condenser.	(f) Test the condenser and replace if necessary. Replace and adjust points.
	(g) Faulty ignition switch.	(g) Replace the ignition switch.
	(h) Bushings or distributor shaft worn.	(h) Recondition the distributor.
	(i) Touching of points with hands during installation.	(i) Replace and adjust the contacts.

SERVICE DIAGNOSIS—(Continued)

IGNITION SYSTEM

Condition	Possible Cause	Correction
Ignition Coil Failure	(a) Alternator voltage regulator setting too high.	(a) Test the alternator voltage regulator setting and adjust as necessary. Inspect the condition of the distributor contact points.
	(b) Coil damaged by excessive heat from engine.	(b) Replace coil. Inspect the condition of the distributor contact points.
	(c) Coil case or tower cracked.	(c) Replace the coil.
	(d) Oil leak at tower.	(d) Replace the coil.
	(e) Coil tower carbon-tracked.	(e) Wipe the tower clean. Test the coil, replace if necessary.
Condenser Failure	(a) Normal fatigue.	(a) Test and replace the condenser. Inspect distributor contact points for pitting.
	(b) Damaged by excessive engine heat or moisture.	(b) Test and replace the condenser. Inspect distributor contact points for pitting.
Fouled Spark Plugs	(a) Carburetor mixture over-rich.	(a) Adjust the carburetor. Refer to Group 14 "Fuel System".
	(b) Improper gap adjustment.	(b) Set the spark plug gap to .035 inch.
	(c) Improper plug heat range.	(c) Install the correct plugs.
Burned Spark Plugs	(a) Plugs loose or too tight in the cylinder head.	(a) Replace the spark plugs: Install new gaskets. Tighten spark plugs to 30 foot-pounds torque.
	(b) Carburetor mixture too lean.	(b) Adjust the carburetor. Refer to Group 14 "Fuel System".
	(c) Improper plug heat range.	(c) Install the correct plugs.
	(d) Improper ignition timing.	(d) Adjust the ignition timing.

PART 5
LIGHTING SYSTEM

1. DUAL HEADLAMPS

The dual headlamp system consists of four sealed beam headlamps.

The two outer lamps are of the two filament type for low and high beam and are marked by a numeral 2 moulded in the lamp lens.

The two inner lamps have only one filament and are marked with a numeral 1 molded in the glass.

The lamps cannot be installed wrong as the mounting lugs for the number one (1) and the number two (2) lamps are offset at different angles.

The number one (1) lamp provides the high intensity "reach" down the highway and the off focus filament in the number 2 lamp provides the "body" light which illumintes the side of the road, ditches, etc.

2. AIMING THE HEADLAMPS

Pre-Aiming Instructions

(1) Test the dimmer switch for faulty operation.

(2) **Test the high beam indicator:** Indicates that high beam is in operation when lighted.

(3) **For badly rusted or defective headlamp assemblies:** These conditions must be corrected before a satisfactory adjustment can be made.

(4) Place the vehicle on a level floor.

(5) **Measure the front suspension height:** Adjust to specifications as necessary.

(6) Inspect the tire inflation.

(7) Rock the vehicle sideways to allow the vehicle to assume its normal position.

(8) If the gasoline tank is not full, place a weight in the trunk of vehicle to simulate the weight of the gasoline normally carried in the tank (6¼ pounds per gallon).

(9) There should be no other load in the vehicle other than the driver or a substituted weight of approximately 150 pounds placed in the driver's position.

(10) Remove the headlamp front trim panel. Do not remove the seal beam retainer rims.

(11) Thoroughly clean the headlamp lenses.

Compensating the Aimers

(1) Place the transit on the floor in line with a vertical center line of the right front wheel (Fig. 1), Place the split image target in like position at the right rear wheel.

(2) Adjust the range screw on the transit until the target split image coincoides or merges into one unbroken line.

NOTE: Make sure that the line of sight is perpendicular from the eye to the viewing port of the transit and that target image is centered in the viewing port of the transit.

(3) Turn the dial on the side of the transit until the bubble in the spirit level is centered.

(4) When the bubble is centered, note "plus" or "minus" reading on the compensator scale. This figure indicates the degree of slope of the floor and must be transferred to each aimer as follows:

(5) With a screw driver, turn the adjusting slot of the floor level compensator in each aimer, until the correct plus or minus figure (or fractional part) appears in the proper window (Fig. 2).

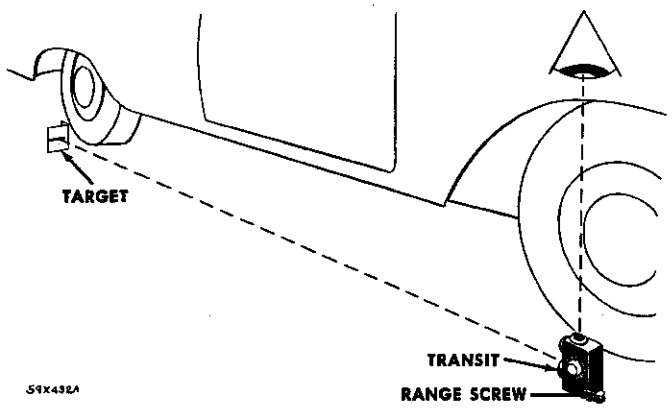


Fig. 1—Determining the Slope of the Floor

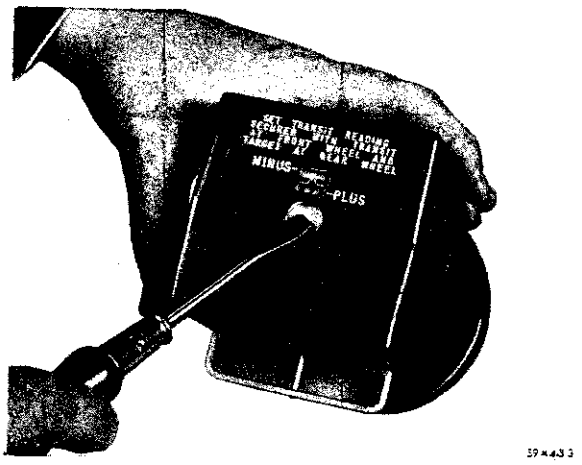


Fig. 2—Adjusting the Floor Level Compensator in the Aimers

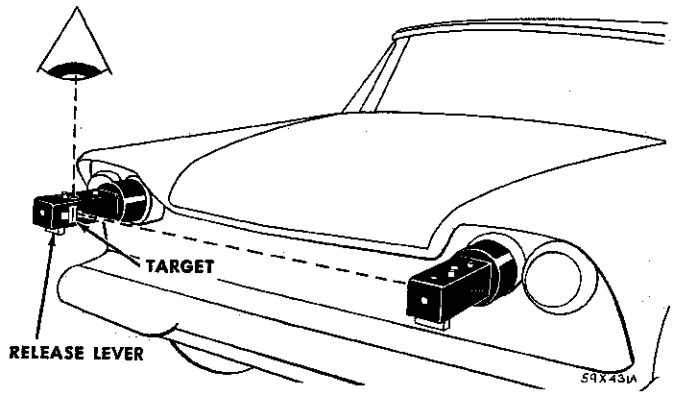


Fig. 3—Mounting and Adjusting the Aimers

Mounting and Adjusting the Aimers (Fig. 3)

If the aimers are suspected of being out of adjustment refer to Paragraph 2 "Aiming the Headlamps."

(1) While holding an aimer in alignment with the lens of one outer headlamp, bring the aimer up to and against the headlamp lens.

NOTE: Make certain that the headlamp lens pads are making full contact with the aimer mounting flange and that the aimer target is facing inboard.

(2) Push the release lever forward (to expel air from the suction cup) and while holding the aimer firmly against the headlamp aiming pads, pull the release lever back until the spring lock engages in the slot.

(3) Mount the second aimer on the other outer headlamp, in the same manner.

(4) On each aimer, set the pointer to the numeral 2 on the DOWN side of the **DOWN UP** scale.

(5) On each aimer position the pointer of the **RIGHT LEFT** scale at **2 RIGHT.**

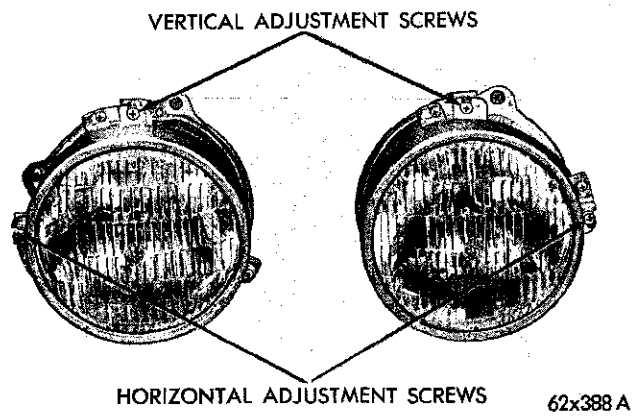


Fig. 4—Headlamp Adjustment Points

3. TESTING HEADLAMP AIM

Follow the instructions as outlined in Paragraph 2 "Aiming the Headlamps" and proceed as follows:

NOTE: Do not remove the headlamp rims.

Horizontal Test

Turn the **RIGHT LEFT** scale knob until the split images is in alignment. If the **RIGHT** or **LEFT** portion of the scale exceeds the following values, the lamps should be aimed.

NOTE: Values given represent inches at 25 feet.

	RIGHT	LEFT
No. 1 UNIT	4	4
No. 2 UNIT	4	0

Vertical Test

Turn **DOWN-UP** scale knob until the spirit level is centered. If **DOWN** or **UP** portion of the scale exceeds the following values, the lamps should be aimed.

	DOWN	UP
No. 1 UNIT	½ to 3½	0
No. 2 UNIT	½ to 3½	0

4. ADJUSTING THE HEADLAMPS (Figure 4)

Horizontal Adjustment

(1) With the pointer of the **RIGHT-LEFT** scale still set at ZERO, sight through the aimer viewing port.

NOTE: Make sure that the line of sight is perpendicular from the eye to the viewing port of the aimer and that the target image is centered in the viewing port of the aimer.

(2) While sighting through the viewing port of the aimer, turn the horizontal adjusting screw (Fig. 4) on the headlamp until the split image target line merges into one unbroken line.

NOTE: To remove the backlash, be sure to make a final adjustment by turning the headlamp horizontal adjusting screw in a clockwise direction.

(3) Make the horizontal adjustment on the other **outboard** headlamp in the same manner.

(4) Remove the aimers, from the outboard headlamps, by releasing the spring lock at the (bottom) of the aimer and pushing the release lever forward.

NOTE: Do not attempt to remove the aimers by pulling them away from the headlamp lens—slide the suction cup downward and away from the lens.

Vertical Adjustment

(1) Turn the vertical adjusting screw on the head-

lamp in a counter-clockwise direction to bring the bubble of the spirit level on the aimer to the vehicle side of center. Use care to avoid disturbing the installed position of the aimers. Then turn the screw clockwise until the bubble is centered for correct aim and elimination of backlash.

(2) Make the vertical adjustment on the other outer unit in the same manner.

(3) Recheck the target alignment on each side and readjust the horizontal aim, if necessary.

Proceed to adjust the inner units by following the instructions as outlined for the outer headlamps. Install the headlamp trim panels, when the adjustments have been performed.

Testing and Adjusting Aimer Calibration (Fig. 5)

(1) Using a carpenter or stone mason level of known accuracy, locate a true vertical plate glass window or smooth surface.

(2) Set the **DOWN-UP** pointer on **DOWN 2.**

(3) Set the **RIGHT-LEFT** pointer and floor level compensator at "O".

(4) Secure the aimers to the glass or smooth surface three to five feet apart so that the split image targets can be located in the viewing ports.

(5) If the bubble is centered in the vial, the vertical calibration is correct. If the bubble is not centered, make the down-up adjustment by rotating level adjusting screw until the bubble is centered in the spirit level.

(6) The horizontal aim is correct if the targets on opposite aimers are aligned in the viewing ports. If the targets are not aligned in the viewing ports, rotate the mirror adjusting screw until the target split image becomes aligned.

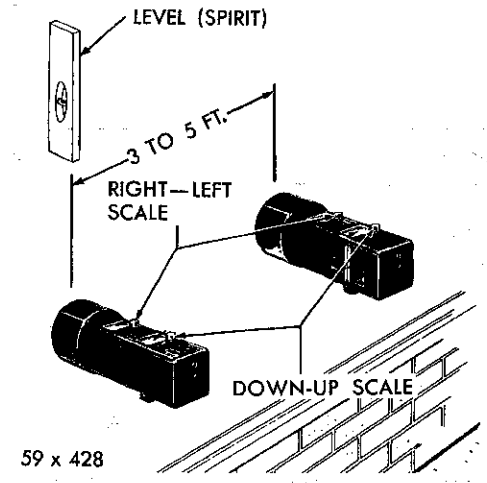


Fig. 5—Inspecting the Aimer for Calibration

5. HEADLAMP SEALED-BEAM REPLACEMENT

Lens, filament and reflector are sealed into one unit which can be removed as follows:

(1) Remove the screws from the headlamp panel and remove the panel.

(2) Remove the screw from the interior retaining ring, and remove the ring.

NOTE: Do not disturb the headlamp aiming screws.

(3) Pull out the sealed-beam unit and disconnect the connector, pulling it straight off.

(4) Install the new sealed-beam unit.

(5) Install the unit retaining ring and headlamp panel.

NOTE: Each lamp in the dual headlamp assembly can be removed in the above manner.

SERVICE DIAGNOSIS

HEADLAMPS

Condition	Possible Cause	Correction
Headlamps Dim (engine idling or shut off)	(a) Partly discharged battery.	(a) Charge the battery.
	(b) Faulty cells in the battery.	(b) Replace the battery.
	(c) High resistance in the headlamp circuit.	(c) Check headlamp circuit including ground connection. Make necessary repairs.
	(d) Faulty sealed beam units.	(d) Replace sealed beam units.
Headlamps Dim (engine running above idle)	(a) High resistance in the headlamp circuit.	(a) Test headlamp circuit including ground connection. Make necessary repairs.
	(b) Faulty sealed beam units.	(b) Replace the sealed beam units.
	(c) Faulty voltage control unit.	(c) Test voltage control and alternator. Make necessary repairs.
Headlamps Flicker	(a) Loose connections or damaged wires in the headlamp circuit.	(a) Tighten connections and inspect for damaged wiring.
	(b) Light wiring insulation damaged producing momentary short.	(b) Test light wiring and replace or tape damaged wires.
Headlamps Burn Out Frequently	(a) High voltage regulator setting.	(a) Adjust voltage regulator.
	(b) Loose connections in the headlamp circuit.	(b) Inspect circuit for loose connections.
Headlamps Will Not Light	(a) Discharged battery.	(a) Recharge battery and correct cause.
	(b) Loose connections in the headlamp circuit.	(b) Tighten connections.
	(c) Burned out lamps.	(c) Replace bulbs or sealed beam unit.
	(d) Open or corroded contacts in the headlamp switch.	(d) Replace the headlamp switch.
	(e) Open or corroded contact in the dimmer switch.	(e) Replace the dimmer switch.

PART 6

INSTRUMENTS—INDICATORS

INSTRUMENTS

The instruments and gauges are contained in the instrument cluster on the instrument panel in front of the driver.

The cluster contains the speedometer, fuel, temperature, ammeter (alternator), and oil gauges. Chrysler models use an oil warning lamp rather than an oil gauge. The clock (if so equipped) is contained in the instrument cluster.

The gauges in the cluster are the thermal type and operate on a principle of constant voltage being applied.

1. VOLTAGE LIMITER

The constant voltage is provided through the use of a voltage limiter contained inside the fuel gauge case.

The constant voltage is connected in parallel to the gauges and provides the same regulated voltage to the gauges.

The terminals on the fuel gauge are marked as follows:

"A"—is the output terminal for the controlled voltage from the limiter.

"I"—is the 12 volt input voltage terminal to the voltage limiter.

"S"—is the terminal for the connection to the sending unit.

The gauges (related to the thermal system) that do not contain the limiter will have only the controlled voltage terminal and the terminal for the connection to the sending unit.

Testing the Voltage Limiter in the Vehicle

A quick test to determine if the voltage limiter is operating is to connect one lead of a voltmeter or test lamp to the temperature sending unit and the other lead to a good ground (leave the sending unit lead wire attached to the sending unit). Turn the ignition switch to the **"on"** position. A fluctuating voltmeter or flashing lamp indicates the voltage limiter is operating.

Testing the Voltage Limiter—Instrument Cluster Removed

Connect a jumper wire from the positive post of a 12 volt battery to the I terminal of the fuel gauge. Connect another jumper wire from the battery negative post to the fuel gauge case (ground) on Chrysler Models or to the printed circuit ground strap on Imperial Models.

Connect the negative lead of a voltmeter to the battery negative post. Touch the positive lead of the voltmeter to the **"I"** terminal of the guel gauge. A reading of 12 volts should be shown on the voltmeter. Touch the positive lead of the voltmeter to the **"A"** terminal of the fuel gauge. A fluctuating reading between 0 and 7 volts should be shown on the voltmeter. The same fluctuating reading should be shown at the **"S"** terminal of the fuel gauge. Any other readings indicate the voltage limiter is not functioning properly and the fuel gauge should be replaced.

2. FUEL LEVEL INDICATING SYSTEM (Fig. 1)

Turning the key on connects the system to the battery or charging system voltage. The voltage from the battery or charging system is regulated by a constant voltage limiter to a constant voltage of approximately 5 volts D.C.

When the fuel level is low or empty, the resistance is increased which decreases the current flow and consequently positions the panel gauge pointer to low or empty.

When the tank is full, the float level is at the top, the minimum resistance is in the circuit and the flow of current in the circuit is high. The panel gauge pointer will be moved across the dial to indicate a full tank.

Tank Unit

A float arm is hinged to allow the float to raise or

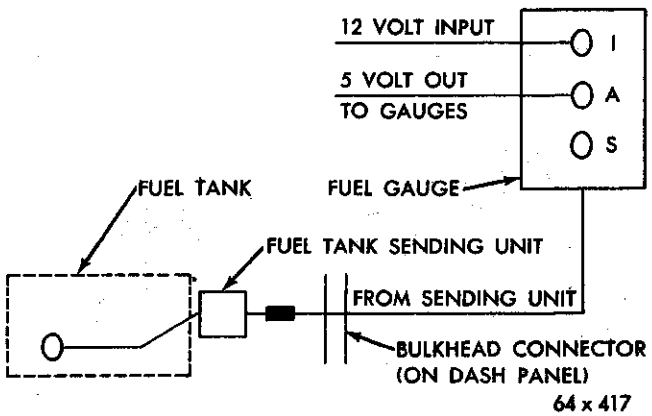


Fig. 1—Fuel Level Indicating System

lower dependent on the fuel level. The float connects to a variable resistance that provides a change in the resistance with any up or down motion of the float through a wiping contact in the gauge body.

Testing Fuel Level Indicating System in the Vehicle

Raise the vehicle on a lift. Disconnect the terminal from tank unit. Attach one lead of the Gauge Tester (Tool C-3826) to the disconnected terminal. Connect the other lead of the tester to a good ground.

With the ignition switch turned on and the gauge tester in the "L" position, the fuel gauge should show "E" or minus $\frac{3}{32}$ inch. This tolerance permits a small reserve of fuel at the "E" position.

With the gauge tester in the "M" position, the fuel gauge should slowly advance to the ½ position, plus or minus $\frac{1}{16}$ inch. With the gauge tester in the "H" position the fuel gauge should advance to "F" position, plus or minus $\frac{3}{32}$ inch.

Should the gauge respond to the above tests, but not operate when the terminal is attached to the sending unit, indications are of a defective sending unit and it should be replaced. Should the gauge fail to respond to the above tests, indications are of possible loose connections, broken wire, or defective gauge. The instrument cluster should be removed for further tests. See "Instrument Cluster" Paragraphs 6 and 7.

Testing Fuel Gauge—Instrument Cluster Removed (Figs. 2 and 3)

Place the instrument cluster (Chrysler models) or the printed circuit assembly (Imperial models) on a padded service bench to protect the assembly.

To prevent a possible error that might result in burning out the gauges the following test procedures must be closely followed.

CAUTION: A direct connection from a 12 volt battery to the gauges will burn them out.

(1) Connect a jumper wire to the voltage limiter input terminal on the fuel gauge. Connect the other end of the jumper wire to the positive (+) post of a 12 volt test battery.

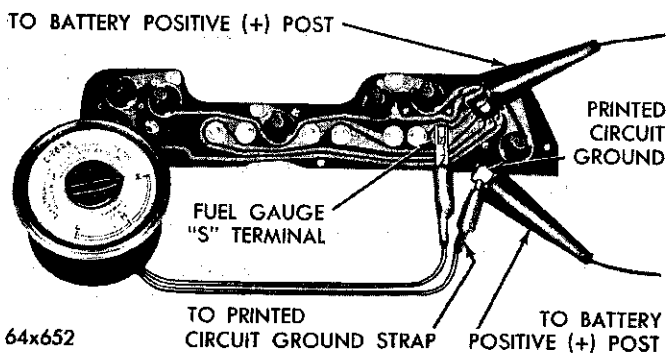


Fig. 2—Testing Fuel Gauge with Tool C-3826 (Imperial)

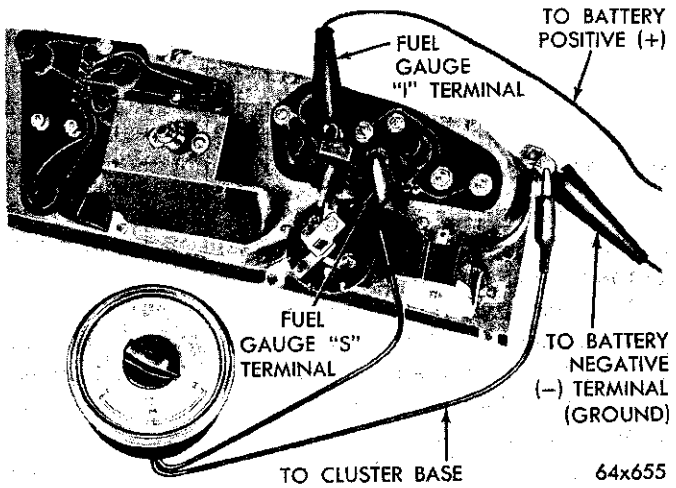


Fig. 3—Testing Fuel Gauge with Tool C-3826 (Chrysler)

(2) Connect a jumper wire from the negative (—) post of the battery to the instrument cluster base (Chrysler models) or to the printed circuit ground strap (Imperial models).

(3) Connect one lead of Gauge Tester C-3826 to the fuel gauge "S" terminal.

(4) Connect the remaining lead of the gauge tester to the instrument cluster base (Chrysler models) or to the printed circuit ground strap (Imperial models).

With the gauge tester in the "L" position the fuel gauge should show "E" or minus $\frac{3}{32}$ inch. **The minus tolerance provides a small fuel reserve when the fuel gauge is on the "E" position.**

With the gauge tester in the "M" position the fuel gauge should advance slowly to the ½ position. With the gauge tester in the "H" position the fuel gauge should slowly advance to the "F" position plus or minus $\frac{3}{32}$ inch. If the fuel gauge does not perform as above replace the gauge.

3. TEMPERATURE INDICATING SYSTEM (Fig. 4)

The operation of the temperature indicating system is identical in operation with the fuel system with the exception of the method of varying the resistance of the sending unit. In this system the resistance varies in direct relation to the temperature of the coolant.

Any change in the coolant temperature causes a like change in the resistor incorporated in the engine sending unit.

When the engine is cold the resistance of the disc in the temperature sending unit is high and a low temperature will be indicated.

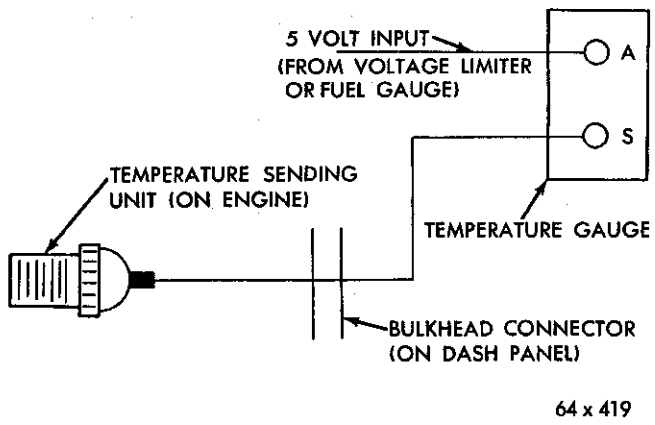


Fig. 4—Temperature Indicating System

As the engine temperature increases the resistance of the temperature sending unit disc starts to decrease. A resultant increase in the current flow will occur causing the gauge pointer to indicate the increase in engine temperature.

Testing Temperature Indicating System in the Vehicle

Disconnect the terminal from the temperature sending unit on the engine. Connect one test lead of Tester C-3826 to the terminal and the other test lead to a good ground. Place the pointer of the gauge tester on the "L" position and turn the ignition switch to "on". The temperature gauge should show "C" plus or minus ⅛ inch. **Thermal gauges are slow in operation. Allow time for gauge to heat up.**

Place the pointer on the tester on the "M" position and the temperature gauge should advance to the driving range of ½ position of the dial. Place the pointer of the tester in the "H" position and the gauge should advance to the "H" position of the dial.

Should the gauge respond to the above tests, but not operate when the terminal is attached to the sending unit, indications are of a defective sending unit and it should be replaced. Should the gauge fail to respond to the above tests, indications are of possible loose connections, broken wire, defective printed circuit board or defective gauge. The instrument cluster should be removed for further tests. See "Instrument Cluster" paragraphs 6 and 7.

Testing Temperature Gauge—Instrument Cluster Removed (Figs. 5 and 6)

The temperature gauge is tested in the same manner as the fuel gauge with the exception that Tester Tool C-3826 is connected to the temperature gauge "S" terminal.

With the gauge tester on "L" position, the temperature gauge should show "C" or cold. With the gauge tester on "M" position, the temperature gauge should show ½ of the operating scale of the dial. With the gauge tester on the "H" position, the temperature gauge should show "H". If the gauge does not respond to the above tests test for an open printed circuit or replace the temperature gauge.

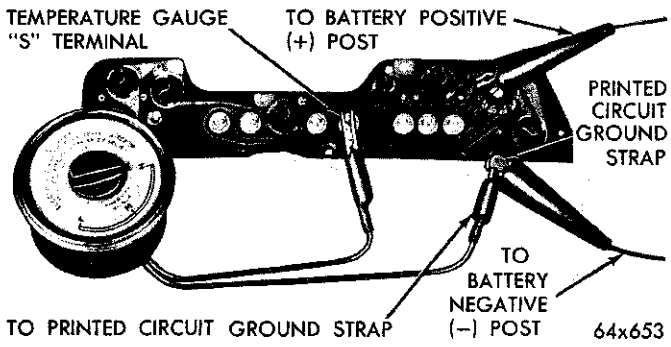


Fig. 5—Testing Temperature Gauge Tool C-3826 (Imperial)

4. OIL PRESSURE GAUGE—IMPERIAL (Fig. 7)

Disconnect the terminal and wire from the oil pressure sending unit on the engine. Connect one test lead of Tester Tool C-3826 to the removed terminal the other test lead to a good ground. Place the pointer of the gauge tester on the "L" position and turn the ignition switch to "on". The oil pressure gauge should show "L" plus or minus ⅛ inch. **Thermal gauges are slow in operation. Allow time for gauge to heat up.**

Place the pointer on the tester on the "M" position and the oil pressure gauge should advance to the ½ position of the dial. Place the pointer of the tester in the "H' position and the gauge should advance to the "H" position of the dial.

Should the gauge respond to the above tests, but not operate when the wire and terminal are attached to the sending unit, it should be replaced. Should the gauge fail to respond to the above tests indications

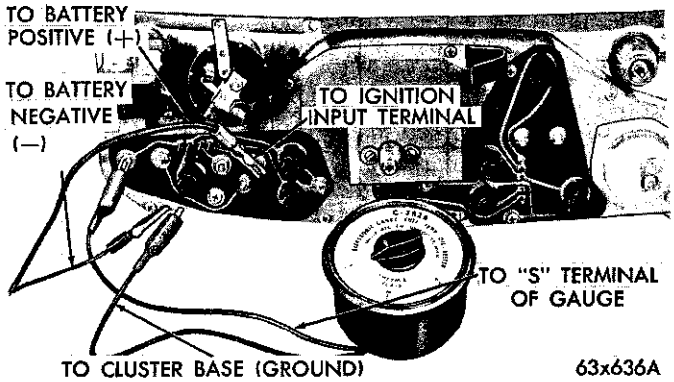


Fig. 6—Testing Temperature Gauge Tool C-3826 (Chrysler)

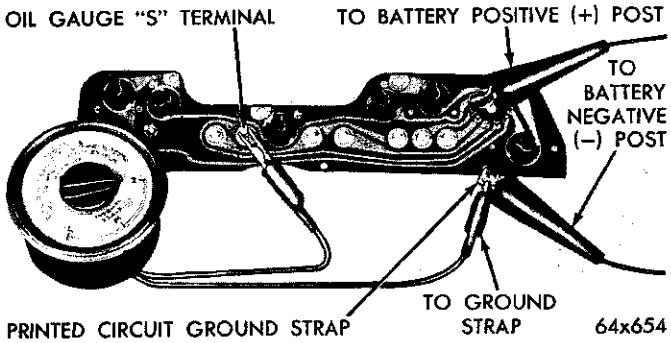


Fig. 7—Testing Oil Gauge Tool C-3826 (Imperial)

are of possible loose connections, broken wire, or defective gauge. The instrument cluster should be removed for further tests. See "Instrument Cluster", Paragraphs 6 and 7.

Oil Pressure Gauge Sending Unit

The sending unit, mounted on the engine, operates on a principle of varying engine oil pressure causing a resistance change in the sending unit.

When the engine oil pressure is high the resistance of the sending unit is low allowing a higher current to flow to the instrument panel gauge. This causes an indication of high oil pressure on the gauge.

When the engine oil pressure is low the resistance of the sending unit is high allowing a lower current to flow to the instrument panel gauge. This causes an indication of low oil pressure on the instrument panel gauge.

5. OIL PRESSURE WARNING LAMP—CHRYSLER

To test the oil pressure warning light, remove the terminal from the oil pressure sending unit. Connect one lead of the gauge tester to the terminal and the other test lead to a good ground.

With the ignition switch in the "on" position and the gauge tester in the "L" position, the indicator light should not light. With the gauge tester in the "M" position, the indicator light should show a dull glow. With the gauge tester in the "H" position, the indicator light should show full brilliance.

Should the oil pressure warning light fail to respond to the above tests, indications are of possible loose connections, broken wire, or burned out lamp.

Low Oil Pressure Warning Switch

The operation of the oil pressure warning switch, mounted on the engine, is dependent on variances in the engine oil pressure.

When the engine oil pressure is high (normal operating condition of the engine) the switch is held in the "OFF" or "OPEN" position allowing no current to flow to the oil pressure warning lamp on the instrument panel.

When the engine oil pressure is low, the switch is in the "ON" or "CLOSED" position allowing current to flow to the oil pressure warning lamp on the instrument panel. This causes the warning lamp to be illuminated.

6. INSTRUMENT CLUSTER—IMPERIAL

The instrument cluster is not serviced as an assembly. The cluster contains three separate main groups:

(1) Speedometer

(2) Printed Circuit Assembly

(3) Clock

When servicing the cluster, it is necessary to remove only the group containing the desired instrument or gauge.

Removal

CAUTION: Disconnect the battery negative cable before servicing the instrument cluster.

(1) Remove the screws that attach the instrument cluster chrome bezel to the instrument cluster. Remove the bezel.

(2) Remove the trip odometer and clock reset knobs and the temperature control level knob.

(3) Carefully remove the lens from the cluster.

NOTE: As the lens is removed take note of the small circular spacer around the trip odometer reset knob. This spacer must be installed before the lens is installed when the service operation on the instrument cluster is completed.

(4) Remove the screws that attach the cluster face plate to the cluster. Remove the face plate.

(5) Remove the desired main group of the cluster as follows:

Speedometer—Disconnect the speedometer cable from under the instrument panel. Remove the four screws that attach the speedometer to the cluster. Remove the speedometer.

Printed Circuit Assembly—Remove the screws that attach the printed circuit assembly to the instrument cluster. Pull the assembly forward slightly and disconnect the printed circuit multi-connector. Remove the assembly for service of the fuel, oil, temperature or ammeter gauges.

Clock—Remove the screws that attach the clock to the instrument cluster. Pull the clock forward and disconnect the feed wire to the clock. Remove the clock.

Installation

(1) Position the cluster assembly that has been

serviced into the instrument cluster. For the printed circuit assembly, connect the printed circuit multi-connector; for the clock connect the clock feed wire; and for the speedometer connect the cable. Install the assembly attaching screws.

(2) Position the cluster face plate in the cluster and install the attaching screws.

(3) Install the small circular spacer onto the trip odometer reset knob.

(4) Position the cluster lens on the cluster face plate.

(5) Position the cluster chrome bezel onto the cluster and install the attaching screws. Take care to have the lens properly positioned before tightening the bezel attaching screws.

(6) Install the clock and odometer reset and the temperature control lever knobs.

(7) Connect the battery negative cable.

7. INSTRUMENT CLUSTER—CHRYSLER

Removal

NOTE: The instruments and printed circuits can be serviced after the instrument cluster is removed from the instrument panel.

CAUTION: Disconnect the battery cable at the battery negative terminal before removing cluster.

(1) Cover the steering column jacket tube area between the steering wheel and the instrument panel with masking tape to avoid scratching the paint finish.

(2) Remove the screws attaching the upper and lower moulding at the center of the instrument panel. Remove the heater bezel and disconnect the Bowden cable, the vacuum lines, and the wiring to the heater control switch.

(3) Remove the screws attaching the instrument panel lower hood to the instrument panel and remove the panel hood.

(4) Loosen the Allen set screw and remove the wiper switch knob. Remove the wiper switch retaining bezel using spanner wrench Tool C-3824 and push the wiper switch out of the instrument cluster.

(5) Remove the six screws attaching the instrument cluster to the instrument panel. The six screws are all visible from the front of the instrument cluster. Three screws across the top of the instrument cluster and three screws in the instrument cluster lower chrome moulding.

(6) Pull the instrument cluster forward to expose the speedometer cable. Disconnect the speedometer cable at the speedometer.

(7) Roll the instrument cluster down onto the protected steering column jacket tube and disconnect the two printed circuit multi-connectors, the heater switch connectors, the cigar lighter wire, the headlamp switch connector, and lead wires to the ammeter.

(8) Remove the instrument cluster to the work bench for repairing or replacing of the instruments and printed circuits.

Installation

CAUTION: The battery cable to the battery negative terminal must be disconnected before installation of the cluster.

(1) Position the instrument cluster on the protected steering column jacket tube in front of the cluster opening in the instrument panel.

(2) Connect the heater or air conditioning vacuum hoses to the heater or air conditioning vacuum control switch.

(3) Connect the two printed circuit multi-connectors and the lead wires to the ammeter. Tighten the nuts on the ammeter studs securely. Connect the head lamp switch connector, cigar lighter connector and heater switch connectors.

(4) Seat the speedometer cable correctly in the speedometer and tighten the knurl securely. Connect the bowden cable to the heater or air conditioning control lever.

(5) Position the wiper switch in the instrument cluster and install the wiper switch retaining bezel, using spanner wrench Tool C-3824.

(6) Install the wiper switch knob. Tighten the Allen set screw in the switch knob securely.

(7) Roll the instrument cluster into position in the instrument panel and install the six attaching screws.

(8) Hold the instrument panel lower hood in position and install the four attaching screws.

(9) Install the screws attaching the upper and lower mouldings at the center of the instrument panel.

(10) Connect the battery cable to the battery negative terminal.

(11) Test instrument cluster operation.

8. SWITCHES—CHRYSLER

All switches on the instrument panel or in the instrument cluster can be serviced from under the instrument panel by removing the switch knob, mounting nut or bezel and disconnecting the wiring to the switch.

9. SWITCHES—IMPERIAL

The instrument panel switches are located in two groups, one group on each side of the steering col-

umn. On the left of the steering column are located the headlamp and windshield wiper switches. On the right of the steering column are located the accessory and the ignition switches. To service the switches proceed as follows:

Left Group

(1) Remove the lower steering column cover plate.

(2) Remove the headlamp switch knob and stem assembly and the windshield wiper switch knob.

(3) Remove the screw that attaches the right end of the switch bezel to the instrument panel. This screw can be reached from inside the steering column opening.

(4) Remove the headlamp switch retaining nut using spanner wrench Tool C-3824.

(5) Lift off the switch bezel.

(6) Remove the headlamp and windshield wiper stem light seals.

(7) Remove the mounting nut from the desired switch (headlamp or windshield wiper).

(8) From under the instrument panel pull the switch down and disconnect the wiring.

(9) Remove the switch from under the instrument panel.

Right Group

(1) Remove the lower steering column cover plate.

(2) Remove the accessory switch knobs.

(3) Remove the screw that attaches the left end of the switch bezel to the instrument panel. This screw can be reached from inside the steering column opening.

(4) Remove the screw in the ignition switch well.

(5) Lift off the switch bezel.

(6) Remove the mounting nut from the desired switch (accessory or ignition).

(7) From under the instrument panel pull the switch down and disconnect the wiring.

(8) Remove the switch from under the instrument panel.

10. INSTRUMENT CLUSTER BULBS

All bulbs in the instrument cluster area can be serviced from under the instrument panel. As an aid to service on Imperial models drop the fuse block from the instrument panel lower reinforcement.

11. SWITCH TITLE LIGHTING—IMPERIAL

The switch title lenses are illuminated by bulbs located next to the switches. The bulbs can be serviced after removing the switch bezel.

Left Group

(1) Perform steps 1-5 of **Left Group** in Paragraph 9.

(2) Remove the screw that attaches the bulb diffuser to the instrument panel.

(3) Remove the diffuser.

(4) Remove the bulb from the socket.

Right Group

(1) Perform steps 1-5 of **Right Group** in Paragraph 9.

(2) Remove the screw that attaches the bulb diffuser to the instrument panel.

(3) Remove the diffuser.

(4) Remove the bulb from the socket.

12. FUSE BLOCK (Fig. 8)

The fuse block is located at approximately the center, forward edge of the instrument panel and is retained to the instrument panel lower reinforcement by a self tapping screw.

In the fuse block are mounted the radio, cigar lighter, air-conditioner or heater, tail-stop-dome light, and accessory fuses. The fuse capacity is printed on the fuse block as an aid to replacement requirements.

13. CIRCUIT BREAKERS

As a safety precaution, circuit breakers are used for the headlamps and wiper circuits. They insure that these essential services will continue to function if an intermittent short circuit occurs. Use only identical type and amperage value circuit breakers as replacements for service.

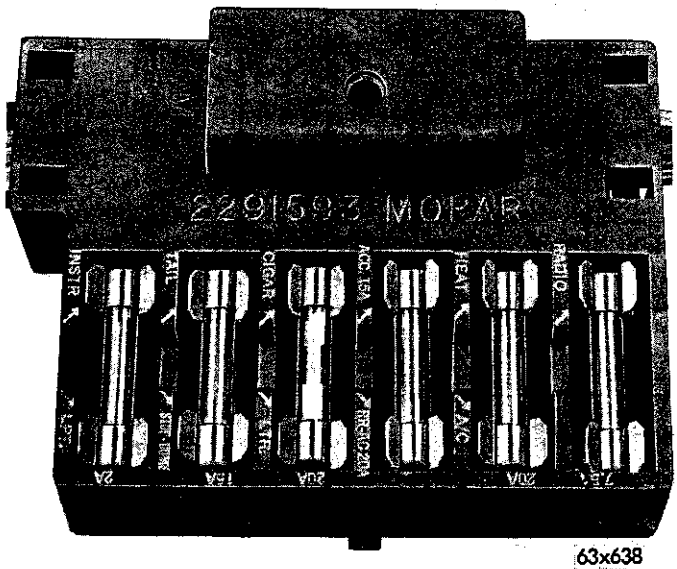


Fig. 8—Fuse Block

SERVICE DIAGNOSIS

INSTRUMENTS

Condition	Possible Cause	Correction
All Gauges Read High ("against the peg") After Ignition Switch is Turned "ON"	(a) Faulty constant voltage limiter (stuck points or an open heater coil).	(a) Test the voltage limiter.
	(b) Cluster not properly grounded to panel.	(b) Tighten cluster mounting screws.
Gauge Pointers Do Not Move When Ignition Switch is Turned "ON"	(a) Faulty constant voltage limiter or an open circuit on battery side (input of limiter).	(a) Test voltage limiter. Test wiring, repair or replace as necessary.
Temperature and Oil Gauges* Indicate Normal Operation But the Fuel Gauge Indicates a Higher or Lower Fuel Level than Actually Exists	(a) Fuel tank sending unit or instrument panel fuel gauge is faulty.	(a) Test sending unit and gauge.
	(b) Fuel tank is improperly grounded.	(b) Test fuel tank for a good ground. **NOTE: Testing the system with the tank sending unit positioned for both "empty" and "full" is usually sufficient to determine the calibration in the range between these positions.**
Fuel and Oil Gauges* Indicate Correctly But Temperature Gauge Indicates Higher or Lower Temperature than Actual Engine Temperature	(a) Faulty instrument panel temperature gauge, wiring or faulty temperature sending unit in engine.	(a) Test wiring, repair or replace as necessary. Test gauge and sending unit.
Erratic Temperature Gauge Operation	(a) Loose or dirty electrical connections.	(a) Clean and tighten all electrical connections and test the gauge operation.
Erratic Operation of Fuel Gauge	(a) Loose or dirty electrical connections or faulty fuel tank sending unit.	(a) Test the fuel gauge sending unit, and proceed as follows: (1) Clean and tighten all electrical connections. (2) Make sure that the fuel tank sending unit is grounded to the tank and that the tank is grounded to the frame.
Erratic Oil Gauge Operation.*	(a) Loose or dirty electrical connections.	(a) Clean and tighten all electrical connections and test the gauge operation.

*Oil Gauge—Imperial only.

DIRECTIONAL INDICATORS

SERVICE PROCEDURES

1. DIRECTIONAL INDICATOR SWITCH—IMPERIAL

Removal

(1) Disconnect the battery negative cable.

(2) Remove the two screws from the underside of the steering wheel and remove the horn blowing actuator and steering wheel cover.

(3) Loosen the steering wheel nut several turns and install steering wheel puller Tool C-3428 and remove the steering wheel nut and steering wheel.

(4) Remove the directional switch lever.

(5) Remove the steering column lower cover.

(6) Remove the two screws and disconnect the switch wires at the connection and remove the directional switch and wires.

Installation

(1) Position the directional switch on the steering column and install the attaching screws and wire connections.

(2) Install the steering column lower cover.

(3) Install the directional switch lever.

(4) Install the steering wheel and steering wheel nut, tighten the nut to 24 foot-pounds torque. Test the operation of the cancelling lever.

(5) Install the horn blowing actuator, steering wheel cover and attaching screws.

(6) Connect the battery negative cable.

2. DIRECTIONAL INDICATOR SWITCH—CHRYSLER

Removal

(1) Disconnect the battery cable at the battery negative terminal.

(2) Compress and turn the horn button ¼ turn counter-clockwise to release the button from the retainer.

(3) Disconnect the horn wire at the horn blowing switch.

(4) Remove the three screws and insulators attaching the horn ring and horn blowing switch to the steering column. Remove the horn ring and switch.

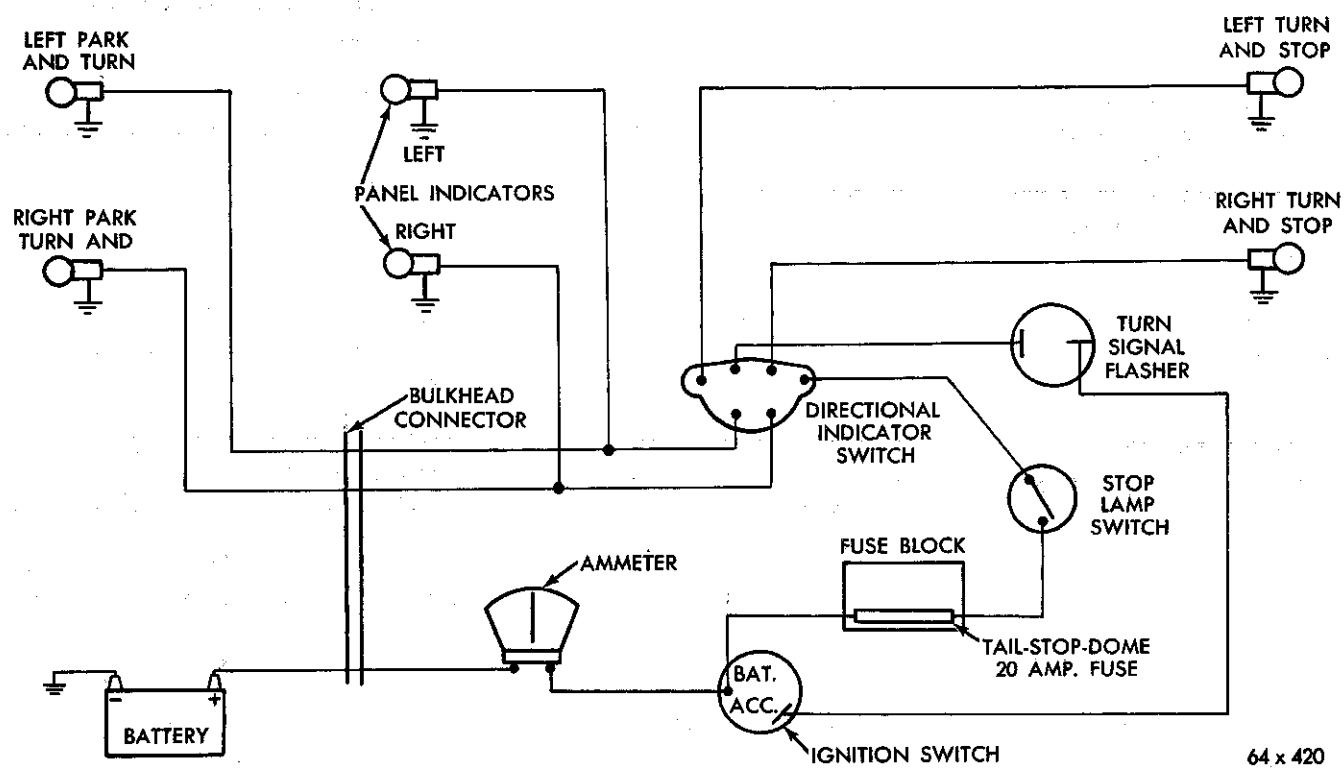


Fig. 1—Directional Indicator Wiring Diagram

(5) Loosen the steering wheel nut several turns and install the Steering Wheel Puller **Tool C-3428** and remove the steering wheel nut and steering wheel.

(6) Remove the screw attaching the directional switch lever to the directional switch and remove the lever.

(7) Disconnect the directional switch wiring at the steering column jacket tube below the instrument panel.

NOTE: Attach a piece of string or fine wire to the directional switch wiring before removing the switch from the steering column. When the switch is removed leave the string or wire in the steering column jacket tube as an aid to replacement of the wiring.

(8) Remove the screws attaching the directional switch to the steering column and remove the switch from the top of the steering column.

Installation

(1) Attach the string or wire, that was left in the steering column jacket tube during removal, to the directional switch wiring and carefully pull the string or wire down through the column jacket tube until the directional switch wires can be connected. Position the directional switch in the steering column jacket tube and install the attaching screws and connect all wire connections.

(2) Install the directional switch lever.

(3) Install the steering wheel and the steering wheel nut. Tighten to 24 foot-pounds torque. Test the operation of the cancelling lever.

(4) Install the horn blowing switch, horn ring, insulators and attaching screws. Connect the horn wire.

(5) Install the horn button by compressing and turning ¼ turn clockwise to lock the horn button on the retainer.

(6) Connect the battery cable at the battery negative terminal.

3. WIRING DIAGRAM

Refer to Figure 1 for the wiring of the directional indicator system for Chrysler and Imperial models.

SERVICE DIAGNOSIS

DIRECTIONAL INDICATORS

Condition	Possible Cause	Correction
External Lamps Operate Normally, No Indications on Instrument Cluster	(a) Faulty pilot bulb in instrument cluster.	(a) Replace bulb.
System Does Not Flash	(a) Faulty flasher unit. (b) Faulty external bulb. (c) Faulty contact in switch.	(a) Replace flasher. (b) Replace faulty bulb. (c) Replace switch.
System Does Not Cancel After Completion of Turn	(a) Broken or loose cancelling finger. (b) Improperly aligned cancelling finger. (c) Broken or faulty switch.	(a) Replace cancelling finger. (b) Align cancelling finger properly. (c) Replace switch.
Entire System Does Not Operate	(a) Open circuit in feed wire to switch. (b) Faulty fuse.	(a) Check wiring circuits. Refer to "Wiring Diagrams" (b) Replace fuse.
Pilot Lamp Illuminates Brightly, External Lamps Glows Dimly with No Flash	(a) Loose or corroded external lamp ground connection.	(a) Clean and tighten ground connection.

PART 7

WINDSHIELD WIPERS—HORNS

WIPERS

The single speed wiper motor, as shown in Figure 1 is connected to the wiper switch and from the wiper switch "B" terminal to the "Acc" accessory terminal of the ignition-starter switch. The wiper motor is actuated only when the ignition switch key is turned to the right or left position. The variable speed wiper motor is connected from the wiper motor to the wiper switch and then through a circuit breaker to the ignition switch. Refer to the "Wiring Diagrams". The single speed wiper motor is protected by a circuit breaker built into the wiper switch. The variable speed motor is protected by a circuit breaker which is attached to the "B" terminal of the switch.

The variable speed system Figures 1 and 2 has a depressed parking feature (against the windshield mouldings) which is accomplished by reversing the motor and using parking cams at the pivot pins of the intermediate crank arm. When the switch is turned to the "off" position, the motor reverses direction and at the same time the parking cams rotate 180 degrees, lengthening the linkage slightly to park the blades against the windshield moulding. The linkage shortens when the motor runs in the wiper direction.

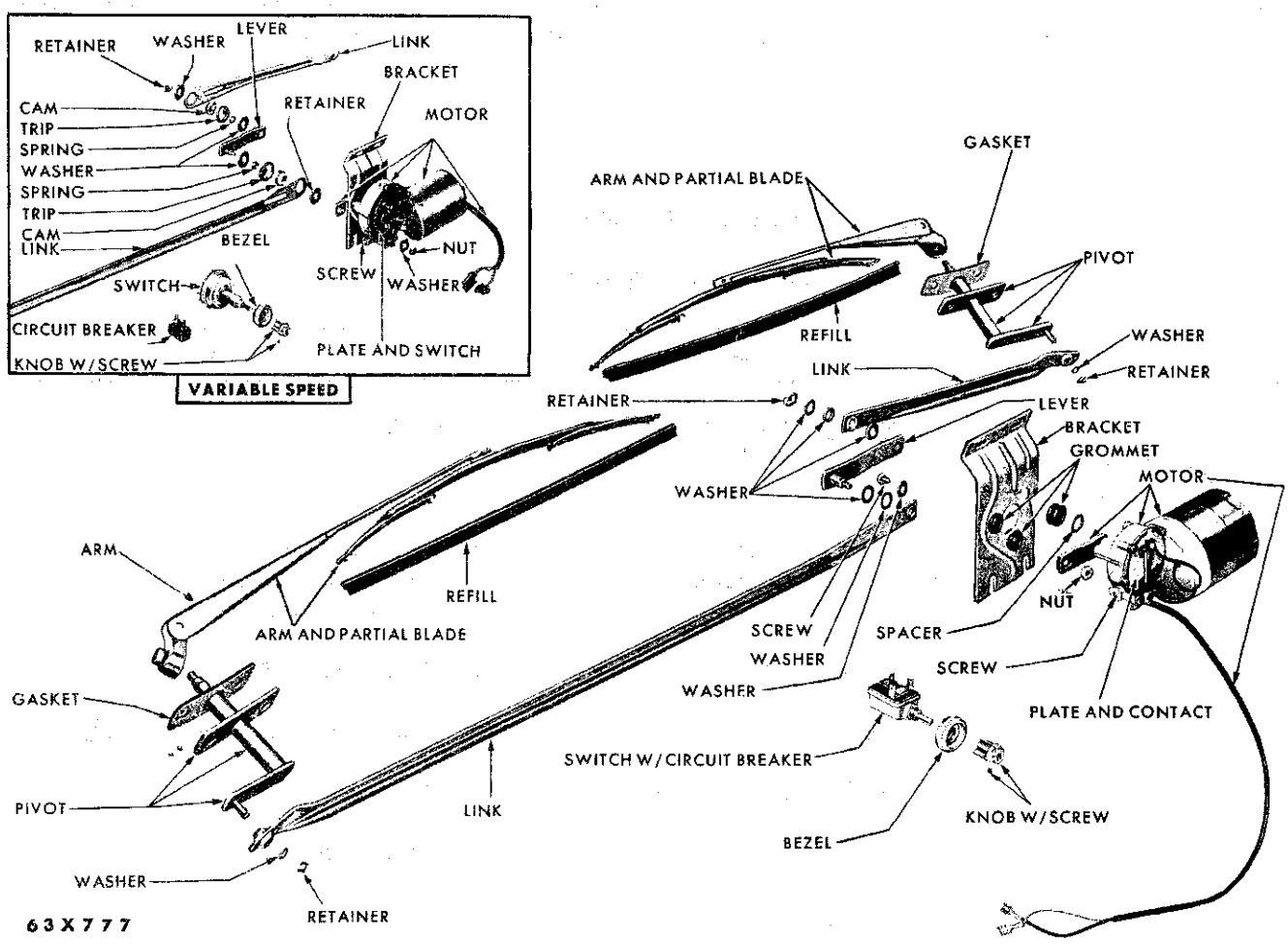


Fig. 1—Windshield Wiper Variable and Single Speed (Disassembled View) Chrysler

SERVICE PROCEDURES

1. WIPER ARM ADJUSTMENT

NOTE: The wiper arm is equipped with a three-jaw clutch which provides infinitely fine adjustment of the wiper arm position. The serrations which key the clutch jaws to the tapered portion of the wiper pivot shaft do not restrict or control angular positioning of the wiper arm. This system differs from other types of arms which provide stepped positioning by means of the attaching serrations.

Variable Speed

To determine if an adjustment is required apply an upward force, parallel to the windshield glass, at the end of the wiper arm (where the wiper blade is attached to the arm). Measure the force necessary to pull the tip of the wiper blade out of contact with the windshield moulding. If this separation force is not between 10 and 40 ounces loosen the wiper arm nut and change the arm position to bring the separation force into the 10 to 40 ounce range for both wiper arms.

Single Speed

To determine if an adjustment is required, apply a constant downward force of 24 ounces, parallel to the windshield glass, at the end of the wiper arm (where the wiper blade is attached to the arm). With the 24 ounce force applied pull the wiper blade away from the windshield glass once or twice to prevent glass friction from affecting downward movement of the wiper arm and blade. With this force applied the clearance between the tip of the wiper blade and the windshield moulding should be between ¼ and 1 inch. If the clearance is not in the specified range loosen the wiper arm nut and change the arm position to bring the clearance into the correct position for both wiper blades.

2. WIPER MOTOR PARK SWITCH TIMING

The timing of the motor park switch must be:

(a) late enough that the wiper arms come to rest at the extreme lower limit of travel on dry glass.

(b) early enough that the wiper arms do not rise appreciably beyond the lower limit of travel on completely wet glass.

Adjust the timing of the park switch on the wiper motor to provide "shut off" at the lowest point of wiper blade travel under both wet and dry glass conditions.

When adjusting the timing of the variable speed park switch, note that the variable speed motor rotates in reverse at the time the park switch opens. "Early" and "Late" directions are therefore opposite to single speed motors.

3. WIPER PARKING OPERATION TEST—VARIABLE SPEED

(1) Turn the instrument panel wiper switch to

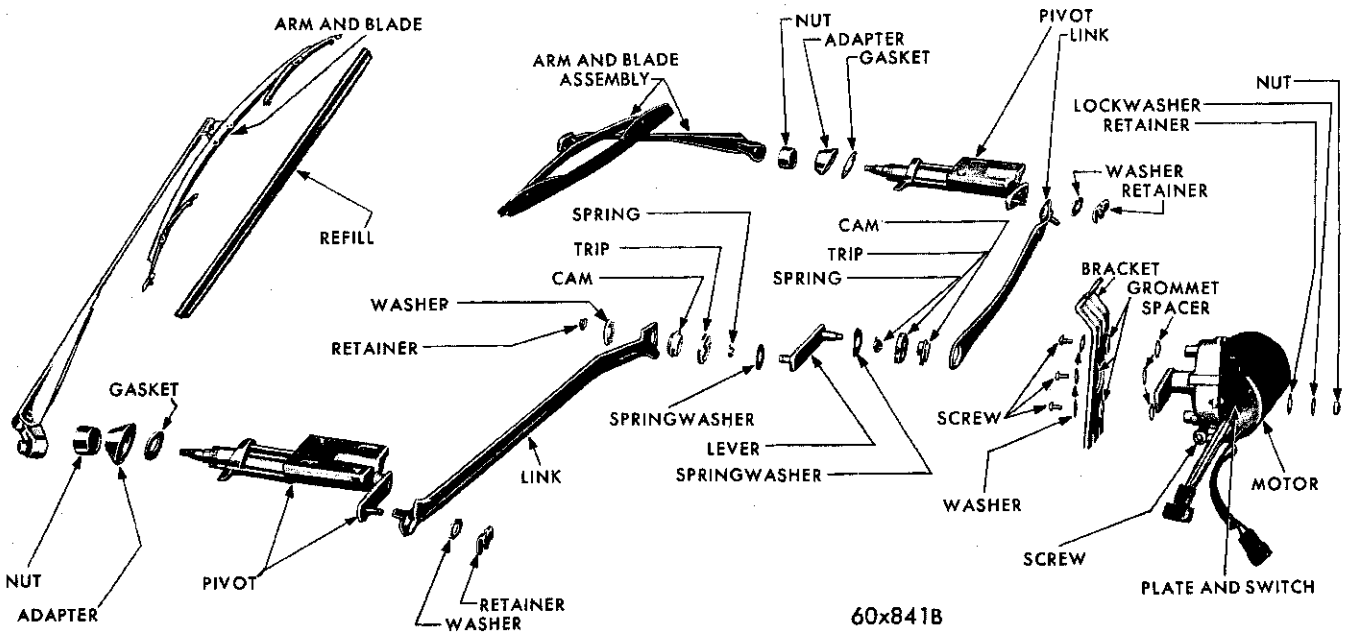


Fig. 2—Windshield Wiper Variable Speed (Disassembled View) Imperial

ON and allow the wiper system to run through several cycles of operation.

(2) Very slightly, after the wiper blades reach the top of the wipe pattern, turn the wiper switch to **OFF** to cause the blades to park in a one-half cycle of wiper motor operation.

If the blades do not park in the desired ½ cycle but require 1½ cycles to park, the procedure of going through the switching operation must be repeated as follows:

(a) Turn the switch to the "ON" position and allow the wiper system to operate for a few cycles.

(b) Turn the switch to the "OFF" position, only this time allowing the timing of operating the switch to occur at a position in respect to wiper blade travel that is slightly later than the first operation. Again, note cycle requirement to reach park.

Having parked the wiper system in ½ cycle of motor operation, note whether the wiper blades have traveled well below the normal wipe pattern. If they have not, replacement of the parking cam, spring and spring trip is indicated. If they have, but have not reached the windshield moulding, wiper arm adjustment is required. See Paragraph 1.

4. PARKING SPRING LUBRICATION—VARIABLE SPEED

To insure satisfactory life of the parking mechanism use only Led-Plate, MoPar Part No. 2275437, to lubricate the parking spring during service. It is essential to thoroughly coat all rubbing surfaces of the spring and pin area. Use of any other lubricant than Led-Plate (such as lubriplate, etc.) will result in noisy operation, rapid wear of components and premature failure of the parking mechanism.

5. WIPER MOTOR—IMPERIAL

Removal

(1) Disconnect the battery negative cable.

(2) From under the instrument panel remove the left spot cooler hose (air conditioning only).

(3) Remove the right defroster hose.

(4) From under the instrument panel remove the right instrument panel lower reinforcement to windshield wiper motor mounting bracket pencil brace.

(5) Remove the remote trunk lock switch from inside the glove box. Remove the eight screws that attach the glove box to the instrument panel and remove the glove box out through the glove box opening, (air-conditioning only).

(6) From under the instrument panel remove the two nuts that attach the defroster heat vacuum actuator to the mounting bracket and pivot the actuator down out of the way.

(7) Disconnect the wiring leads at the wiper motor.

(8) Disconnect the right and left wiper links at the wiper pivots.

(9) Remove the nuts that attach the wiper motor mounting bracket to the cowl panel.

(10) Remove the wiper motor, motor mounting bracket and wiper links as an assembly from under the instrument panel.

Installation

(1) Install the wiper motor, motor mounting bracket and wiper links as an assembly under the instrument panel. Position the motor mounting bracket on the studs on the cowl panel. Install the motor bracket mounting nuts.

(2) Connect the right and left wiper links at the pivot.

(3) Connect the wiring leads at the wiper motor.

(4) Position the defroster heat vacuum actuator on the actuator mounting bracket and install the mounting nuts.

(5) Install the glove box and the remote trunk lock switch (air conditioning only).

(6) From under the instrument panel install the right instrument panel lower reinforcement to wiper motor mounting bracket pencil brace.

(7) Install the right defroster hose.

(8) Install the left spot cooler hose (air conditioning only).

(9) Connect the battery negative cable.

6. WIPER MOTOR—CHRYSLER

Removal

(1) Disconnect the battery cable at the battery negative terminal.

(2) Remove the screws attaching the upper and lower mouldings to the center of the instrument panel. Slip the mouldings out from behind the passenger assist handle and remove the mouldings.

(3) Loosen the screws attaching the heater bezel to the instrument cluster. Do not remove the bezel.

(4) Remove the screws attaching the die cast speaker grille to the instrument panel and remove the grille.

(5) Remove the screws attaching the radio speaker mounting plate to the instrument panel and remove the radio speaker and mounting plate as a unit.

(6) Remove the screws attaching the glove box to the instrument panel and remove the glove box.

(7) Disconnect the wiper links at the pivots.

(8) Remove the panel support bracket from the wiper motor mounting bracket to the instrument panel lower reinforcement.

(9) Disconnect the lead wires at the wiper motor.

(10) Remove the three nuts attaching the wiper motor bracket to the cowl panel.

(11) Remove the wiper motor assembly, with both links attached, out through the glove box opening and out the right side of the vehicle.

Installation

(1) Install the wiper motor and bracket assembly, with both links attached through the glove box opening from the right side of the vehicle. Position the motor mounting bracket on the studs on the cowl panel and install the mounting nuts.

(2) Connect the lead wires to the wiper motor.

(3) Install the panel support bracket from the wiper motor mounting bracket to the instrument panel lower reinforcement.

(4) Install the wiper links to the wiper pivots.

(5) Install the glove box in the instrument panel opening and install the attaching screws.

(6) Install the radio speaker and mounting plate in the instrument panel opening and install the attaching screws.

(7) Position the radio speaker die cast grille in the instrument panel and install the attaching screws.

(8) Tighten the heater bezel attaching screws.

(9) Position the instrument panel center upper and lower mouldings under the passenger assist handle and install the attaching screws.

(10) Connect the battery cable at the battery negative terminal.

7. DISASSEMBLY OF WIPER LINKS

(1) Remove the clip holding the link to the crank arm.

(2) Remove bevel washers and link.

(3) Remove the parking cam and spring release. (Variable Speed).

(4) Remove coil spring by spreading the ends. (Variable Speed).

(5) Disassemble the right-hand link in same manner after removing crank arm to lever nut, spacing washers between the link crank arm and lever.

8. WIPER MOTOR DISASSEMBLY

Variable Speed

(1) Remove switch plate and cover plate.

(2) Remove crank arm nut, washers, crank arm, and gear in that order.

(3) Remove end head through bolts and pull out end head using care so as not to break the lead wire to the brush holder. Remove the armature.

Single Speed

(1) Remove the switch plate.

(2) Remove the motor crank nut, washers and motor crank arm, noting sequence of washers and position of park switch components.

(3) Lift out nylon gear. Note position of gear.

(4) Remove end head through bolts and carefully pull off the head. Remove the armature.

9. INSPECTING WIPER MOTOR

(1) Thoroughly inspect the motor parts for wear, corrosion or damage.

(2) Clean the armature commutator with 00 or 000 sandpaper or if necessary due to excessive wear replace the windshield wiper motor.

(3) Replace worn or oil soaked brushes.

(4) Check the armature and crankshaft in their respective bushings and replace worn parts if any looseness is detected.

(5) Inspect gears for worn or broken teeth and replace those showing damage or excessive wear.

10. WIPER SWITCH (Instrument Panel Mounted)

Variable Speed

The swtich contains a bar resistance plate which provides a means of controlling the amount of current flow to the motor. The switch is designed to provide a circuit to the motor to reverse the direction of the current to the field winding thus providing a means of reversing the armature. A separate circuit breaker is attached to the "B" terminal of the switch to protect the motor.

To test the switch, refer to the proper wiring diagram, disconnect the lead wires and remove the switch. Connect a jumper wire from the battery positive terminal to the case of the switch and another wire from the battery positfve terminal to the "FI" terminal of the switch. Connect a test lamp between the battery negative terminal and the "B" terminal of the switch. Lamp should light when switch is turned on and gradually dim as switch is rotated clockwise.

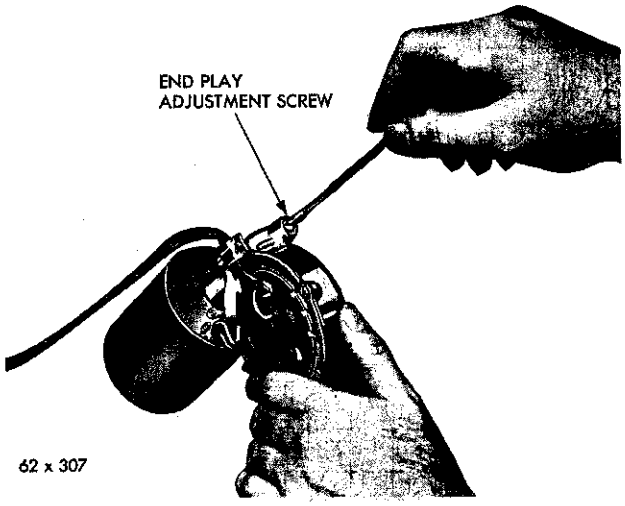


Fig. 3—End Play Adjustment

Lamp should go out when switch is turned "off". The switch is serviced only as an assembly.

Single Speed

The switch contains a built-in circuit breaker to protect the motor and is serviced only as an assembly. To test the switch, refer to the proper wiring diagram, disconnect the lead wires and remove the switch from the instrument panel. Connect a test lamp between "B" terminal of the switch and the negative battery post. Connect the positive battery terminal to the "P" terminal of the post. Lamp should remain lighted in either "ON" or "OFF" position. Failure to light indicates a faulty circuit breaker.

Connect the positive battery to the "R" terminal of the switch. The lamp should light when the switch is turned "ON" and go out when turned "OFF".

11. END PLAY ADJUSTMENT

To adjust the armature shaft end play turn the adjustment screw in until it bottoms, then back-off ¼ turn, as shown in Figure 3.

12. WIPER MOTOR BENCH TESTING

Variable Speed

(1) Connect a jumper wire between the wiper motor yellow wire and the wiper motor ground strap. Connect another jumper wire between the battery negative terminal and the wiper motor ground strap. Connect another jumper wire between the wiper motor red and black wires and the battery positive terminal. The wiper motor should run continously in the wipe direction.

(2) Connect a jumper wire between the wiper motor blue and yellow wires and the battery positive terminal. Connect another jumper wire between the wiper motor red wire and the wiper motor ground strap. The wiper motor should run in reverse and stop at the park position.

Single Speed

(1) Connect a jumper wire between the battery negative terminal and the wiper motor ground strap. Connect another jumper wire between the black and blue wires of the wiper motor and the battery positive terminal. The motor should run continuously.

(2) With the jumper wires connected, as in Step 1, disconnect the black wire from the jumper wire leaving the blue wire connected to the battery positive terminal. The wiper motor should park.

13. ASSEMBLING WIPER MOTOR

Make sure the gear teeth are adequately covered with long fibre grease.

Correct indexing of the contact plate (single speed motor) or the contact follower (variable speed motor) on the nylon gear is important. After the armature, nylon gear, and crank arm are installed, index the contact plate (single speed motor) on the nylon gear with the slot pointing in the same direction as the motor crank arm. Install the contact follower (variable speed motor) with open end pointing in same direction as motor crank arm.

14. WIPER LINK ASSEMBLY

Variable Speed

Install spring washer, concave surface toward crank arm. Install the crank pivot coil spring on the pivot. Install the spring release.

Install the parking cam to index with spring release and engage spring ends, between the release and parking cam in openings at point of index, as shown in Figure 4.

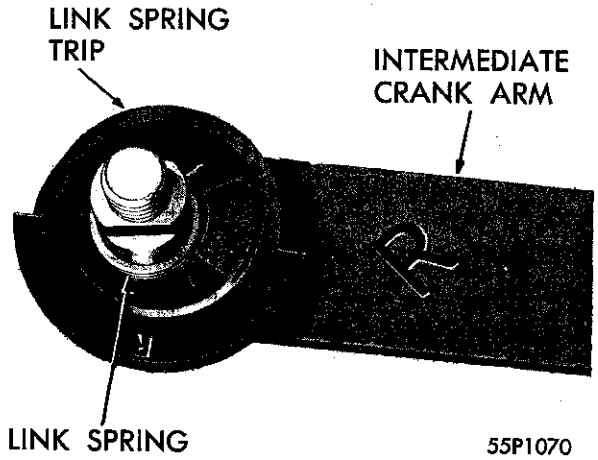


Fig. 4—Link Spring Trip Installed (Variable Speed)

When assembling to the left link the "L" on the left crank and on the parking cam should be seen. The cam marked "R" is installed in the same manner.

NOTE: If the intermediate crank is held so that the letter "L" is visible install the cam release so that the letter "L" can be seen from this position. The opposite side will show three letters "R".

Install the link arm with the stop projection on the link arm toward the cam assembly. Install the spring washer, convex surface toward the cam assembly.

Install the retaining bolt and nut, as shown in Figure 5.

Assemble the left link and cam assembly in the same manner locking in place with a clip.

Single Speed

(1) Install a felt washer over the intermediate crank arm stud; follow with the right hand link and another felt washer. Install the intermediate crank stud (with link installed) on the wiper motor crank and install the attaching nut.

(2) Install a felt washer, the left hand link, another felt washer and a shim washer over the remaining pin of the intermediate crank and retain with the retaining clip.

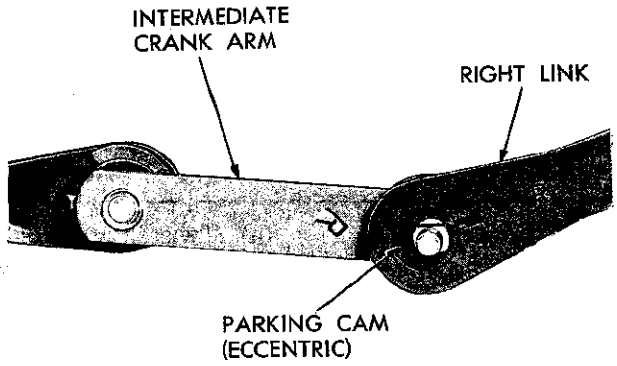


Fig. 5—Link Arm Installed (Variable Speed)

15. REPLACING WIPER PIVOT

(1) Remove the wiper arm.

(2) Disconnect the link from the pivot.

(3) Remove the pivot and gasket.

(4) Install a new gasket and pivot.

(5) Tighten the retaining stud nuts 75 inch-pounds torque.

(6) Reconnect link to pivot crank pin and install washer and retainer clip.

(7) Install the wiper arm.

SERVICE DIAGNOSIS

WINDSHIELD WIPERS

Condition	Possible Cause	Correction
Wiper Fails to Operate	(a) Binding linkage.	(a) Relieve the binding condition.
	(b) Faulty instrument panel switch.	(b) Test Switch. See "Wiper Switch (Instrument Panel Mounted)."
	(c) Faulty Motor.	(c) Test motor. See "Wiper Motor Bench Testing."
	(d) Open or Grounded wiring.	(d) Test wiring for continuity. Repair as necessary.
Wiper Blades Not Parking Properly	(a) Arm set at incorrect position.	(a) Adjust arm. See "Wiper Arm Adjustment."
	(b) Motor park switch timing incorrect.	(b) Time park switch. See "Wiper Motor Park Switch Timing."
	(c) Broken link spring. (Variable Speed)	(c) Replace Spring. See "Wiper Link Assembly".
	(d) Link spring trip not engaging stop on linkage. (Variable Speed)	(d) Inspect "Wiper Link Assembly."
Blades Slap Windshield Mouldings	(a) Improperly adjusted wiper arm.	(a) See "Wiper Arm Adjustment"
	(b) Looseness of the motor crank or other drive parts.	(b) Replace the defective part.

SERVICE DIAGNOSIS—(Continued)

WINDSHIELD WIPERS

Condition	Possible Cause	Correction
Blades Chatter	(a) Twisted arm holds blade at wrong angle to glass. (b) Wrong type blades used. (c) Foreign substances such as body polish on glass.	(a) Replace wiper arm. **Do not attempt to straighten bent or twisted arm.** (b) Install correct wiper blades. (c) Clean the glass.
Motor will not Stop when Instrument Panel Switch is Turned "OFF"	(a) Motor park switch failure in the "closed" position.	(a) Repair or replace motor park switch.
Motor Stops in any Position when Instrument Panel Switch is Turned "OFF"	(a) Motor park switch failure in the "open" position.	(a) Repair or replace motor park switch.

HORNS

SERVICE PROCEDURES

1. TESTING HORNS

Touch a jumper wire from relay "S" terminal to ground. If horn blows, difficulty is in the horn button contact ring, the grounding of the steering column or in the wire from "S" terminal to the horn button. If the horn fails to blow, connect a jumper wire from "B" to "H" terminal. Now if horns operate the relay is defective. If horns fail to operate difficulty is in wire to the horns, in the horns, the wire to horn relay "B" terminal or in the grounding of the steering column.

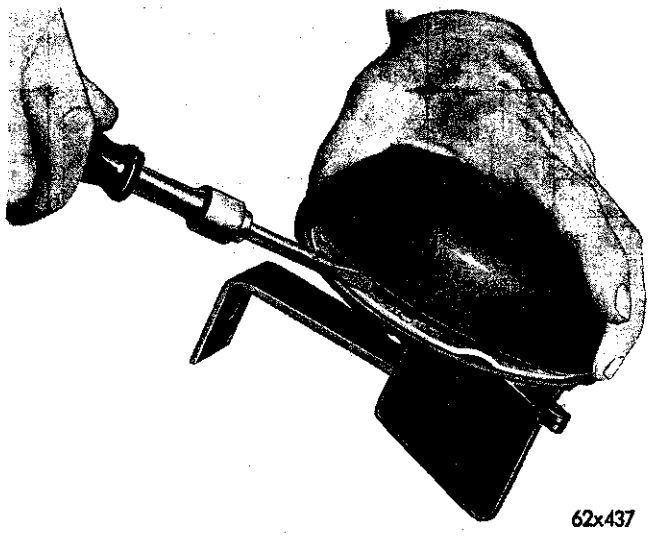


Fig. 1—Removing the Cover (AutoLite Horn)

2. ADJUSTING HORNS

Autolite Horn

(1) Disconnect connections at each horn to determine which horn is not operating.

(2) Remove horn and bracket assembly. Do not remove horn from bracket. (The bracket is retained to the horn by a self-threading screw).

(3) Pry cover off, as shown in Figure 1.

(4) Turn the adjusting nut counter-clockwise until there is no vibration (sound) (see Fig. 2).

(5) Turn the adjusting nut clockwise, approximately ¼ turn at a time until the tone has a clear mellow sound. Do not turn nut while horn is blowing.

NOTE: Adjustment will only clear up sound and cannot change horn tone frequency.

(6) Check horn solenoid coil leads, make sure they are securely wrapped on horn coil terminals. If lead wires are loose, solder them securely to the coil terminals. Use resin core solder.

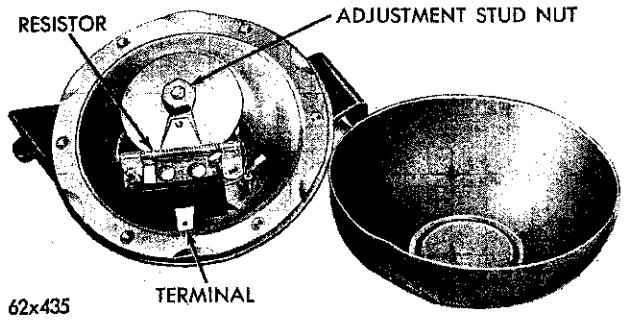


Fig. 2—Cover Removed (AutoLite Horn)

(7) Check horn contacts. If contacts are badly burned, check resistor for continuity. If contacts are separated, when adjusting nut is removed from the adjusting stud; contacts have taken a permanent set and horn should be replaced.

(8) Connect a test ammeter between the positive post of a 12 volt battery and horn terminal post. Connect a jumper lead from the negative battery post to the horn base. Clean the paint from the horn bracket where the connection is made. Turn the adjusting screw to obtain a reading of eight amperes minimum to ten amperes maximum at 12.5 volts.

NOTE: Must not exceed ten amperes maximum.

Sparton Horn

(1) Disconnect connections at each horn to determine which horn is not operating.

(2) Remove horn and bracket assembly.

(3) With a suitable spanner wrench (Fig. 3), turn the tone adjuster counter-clockwise until there is no vibration (sound).

(4) Turn the tone adjuster clockwise, approximately ¼ turn at a time until the tone has a clear mellow sound. Do not turn tone adjuster while horn is blowing.

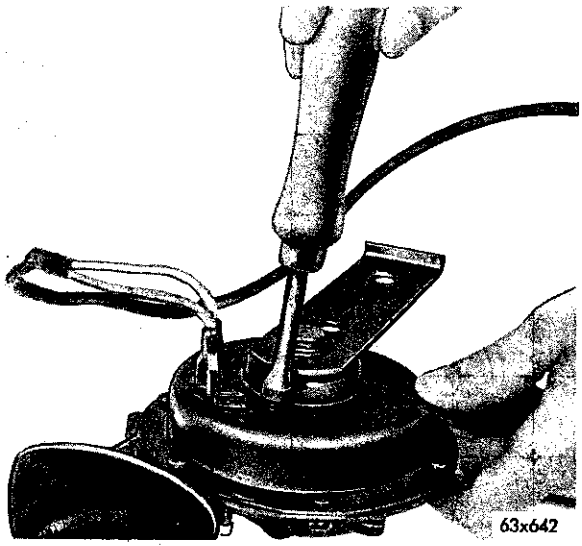


Fig. 3—Adjusting Sparton Horn

NOTE: Adjustment will only clear up sound and cannot change horn tone frequency.

(5) Connect a test ammeter between the positive post of a 12 volt battery and horn terminal post. Connect a jumper lead from the negative battery post to the horn base. Clean the paint from the horn bracket where the connection is made. Turn the adjusting screw to obtain a reading of six amperes minimum to eight amperes maximum at 12.5 volts.

NOTE: Must not exceed eight amperes maximum.

SERVICE DIAGNOSIS

HORNS

Condition	Possible Cause	Correction
Horns Will Not Blow	(a) Improper adjustment.	(a) See "Adjusting Horns".
	(b) Broken or faulty wiring.	(b) See "Testing Horns".
	(c) Faulty horn.	(c) See "Testing Horns". Replace horn if necessary.
	(d) Faulty relay.	(d) See "Testing Horns". Replace relay if necessary.
Horns Blow Continuously	(a) Shorted wiring.	(a) See "Testing Horns".
	(b) Horn button sticking.	(b) Disconnect battery ground cable. Release horn button. After correction, reconnect battery ground cable.
	(c) Relay sticking.	(c) Replace relay.

PART 8

POWER EQUIPMENT

ELECTRIC DOOR LOCKS

The electric door lock is operated by a push-pull double action solenoid attached by a connecting rod to the door latch locking lever. By pressing the single pole double throw switch mounted on the right and left front door trim panel, a solenoid in each of the four doors is actuated, moving the latch locking lever into the lock or unlock position.

All doors may be locked or unlocked either mechanically or electrically. To lock mechanically push the front door handle to the forward position and depress the rear door locking button. To lock electrically depress the switch to lock or lift upward to unlock the doors.

SERVICE PROCEDURES

1. SOLENOID

Removal

Remove the door trim panel. Disconnect the lock to solenoid connecting rod at the solenoid. Disconnect wires and remove solenoid.

Installation

Fasten the solenoid to the door and connect the wires. Tighten the solenoid mounting screws finger tight. Reconnect the lock connecting the rod to the solenoid. Adjust the solenoid by moving the solenoid up or down in the slotted holes, so that the solenoid will push and pull the lever far enough to accomplish locking and unlocking. Reinstall the trim panel.

SERVICE DIAGNOSIS

ELECTRIC DOOR LOCKS

Condition	Possible Cause	Correction
All doors not locking or unlocking properly	(a) Defective control switch.	(a) Test the switch for continuity. Replace if necessary.
	(b) Defective wiring.	(b) Test the wiring for continuity. Repair or replace as necessary.
Individual door not locking or unlocking properly	(a) Defective solenoid.	(a) Test the solenoid for continuity. Replace if necessary.
	(b) Defective wiring.	(b) Test the wiring for continuity. Repair or replace as necessary.
	(c) Improperly adjusted solenoid.	(c) Adjust the solenoid to allow sufficient travel of the solenoid lever to operate the door lock.

SIX-WAY POWER SEATS

The power seat can be removed six ways-forward, back, up, down and tilt. The horizontal travel is five inches and horizontal plane of seat track is inclined eleven degrees. The vertical travel is one inch at front and two inches at rear. The available tilt is 8 degrees forward and 7½ degrees rearward from neutral.

SERVICE PROCEDURES

1. OPERATION (Fig. 1)

The motor operates a gear drive train which supplies power to the slave units, located in the seat tracks, through flexible cables. The control switch is on the left side of front seat and is wired through a relay to a 30 ampere circuit breaker, located above the left cowl panel.

The wire from the bulkhead disconnect supplies power to the circuit breaker.

Power is supplied to the relay from the circuit breaker.

Six wires go to the switch. One used for power, two for motor field current, which also actuates the relay for motor armature current, and three wires attach to solenoids controlling the movement of the front riser, rear riser and horizontal movement.

The right and left tracks are each replaced as an assembly only. They cannot be adjusted and are not interchangeable.

2. FRONT SEAT ASSEMBLY AND ADJUSTER

Removal

(1) Disconnect the battery ground cable.

(2) Remove the four mounting stud nuts which hold the front seat to the adjuster and tilt the complete seat back assembly forward.

(3) Disconnect the switch control wires.

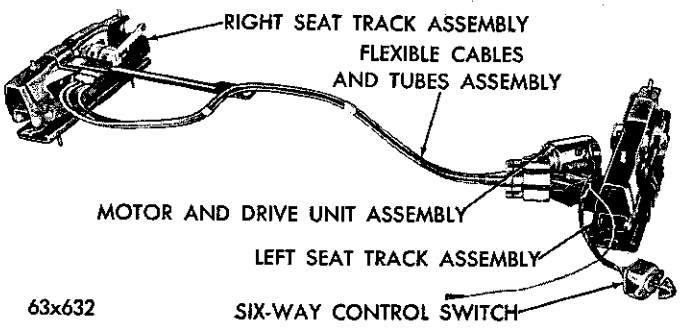


Fig. 1—Power Seat Arrangement

(4) Remove the front seat and cushion assembly.

(5) Disconnect the seat adjuster red feed wire.

(6) Remove the seat guide attaching stud nuts and remove the adjuster.

Installation

(1) Install the adjuster and seat guide stud nuts.

(2) Reconnect the seat adjuster red feed wire.

(3) Install the front seat assembly.

(4) Reconnect the control wires to the switch and tighten the mounting stud nuts securely.

(5) Reconnect the battery ground cable.

3. FLEXIBLE CABLES

Removal

(1) Remove the front seat assembly.

(2) Disconnect the red feed wire.

(3) Remove the retainer plate that holds the right side tubes to the drive assembly.

(4) Remove the left seat guide attaching stud nuts and remove the guide and the drive assembly (Fig. 2).

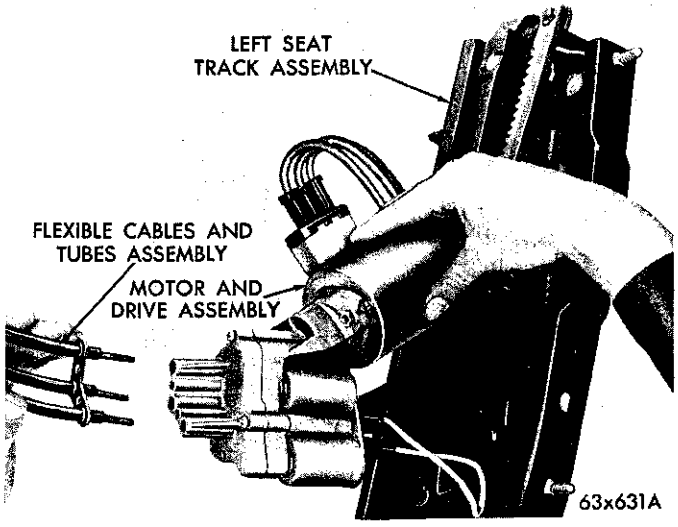


Fig. 2—Removing Cables from Drive Assembly

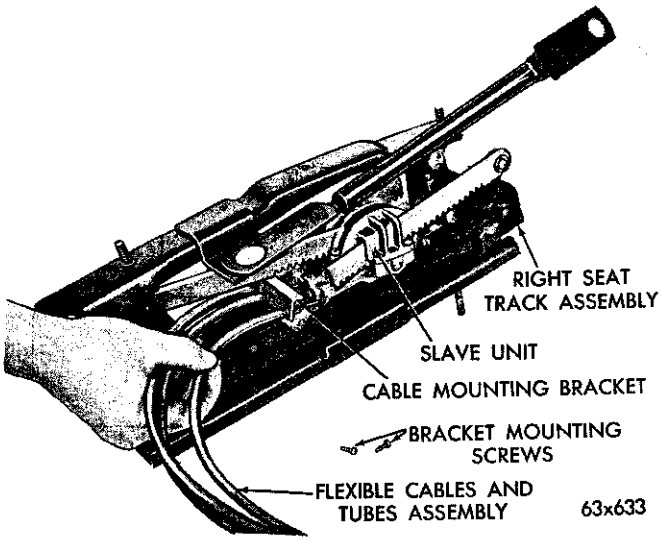


Fig. 3—Removing Cables From Right Slave Unit

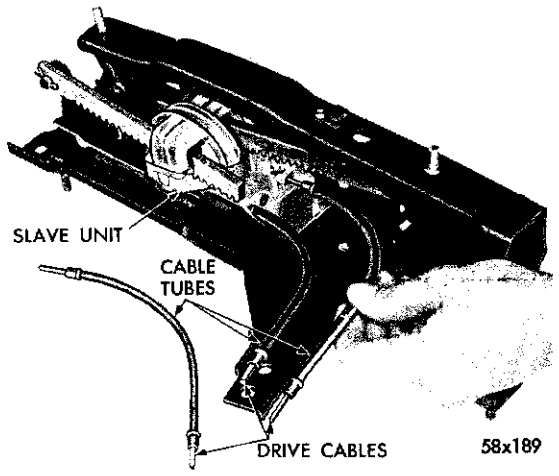


Fig. 5—Installing Left Cable Tubes in Slave Unit

CAUTION: Be careful not to bend or damage right side tubes when sliding tubes out of drive assembly.

(5) Pull the flexible cables from the right side tubes (Fig. 3).

(6) Remove the bolts that hold the motor and drive assembly to the left guide bracket.

(7) Remove the drive assembly with tubes from left slave unit (Fig. 4).

(8) Remove the flexible cables from the tubes.

Installation

CAUTION: Seat guides should be in the up and forward position when installing cables. Make sure both guides are at the same position (in alignment).

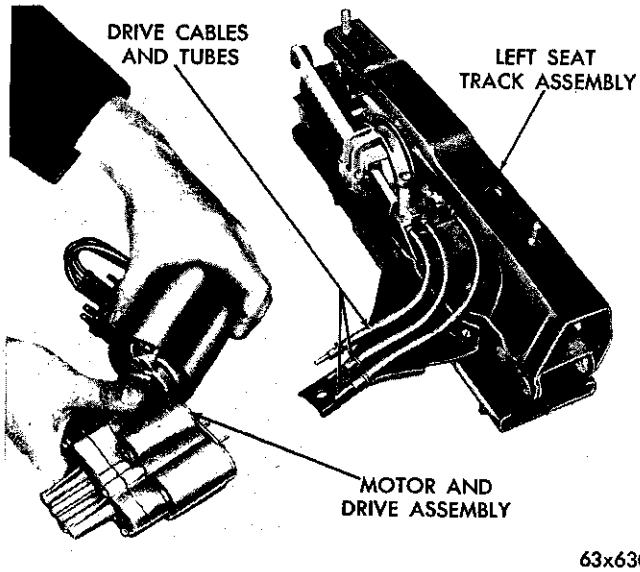


Fig. 4—Removing Drive Assembly from Left Slave Unit

(1) Place the three left cable tubes into the left slave unit (Fig. 5).

(2) With the shortest tube on the inside and longest on the outside, install the flexible cables in the tubes. Make sure the cables seat in the slave unit.

(3) Position the drive unit on the left side tubes. Make sure the flexible cables seat in the slot in the drive unit.

(4) Bolt the drive unit to the guide bracket.

(5) Place the right side flexible cables in the right side tubes.

(6) Position the left guide and drive assembly on the right side tubes. Make sure the cables seat in the drive assembly.

(7) Install the right side tubes retainer plate.

(8) Bolt the left guide assembly to the floor.

(9) Install the seat and cushion assembly.

(10) Reconnect the red feed wire and test the operation of the seat.

4. SEAT MOTOR (Fig. 6)

Removal

(1) Remove the two mounting stud attaching nuts that hold the left side of the front seat to the seat adjuster.

(2) Prop-up the left side of the seat cushion approximately six inches.

(3) Disconnect the control switch wires from the relay on the motor.

(4) Remove the two nuts that attach the motor to the drive unit.

(5) Remove the motor and rubber coupling from the drive unit.

(6) Disconnect the motor wires from the relay.

(7) Remove the relay from the motor.

Installation

(1) Position the relay on the motor and install the attaching screw.

(2) Connect the motor wires to the relay.

(3) Install the motor and rubber coupling to the drive unit. Install the two attaching nuts.

(4) Connect the control switch wires to the relay on the motor.

(5) Remove the prop from the left side of the seat cushion. Position the seat on the seat adjuster and install the two mounting stud attaching nuts.

5. DRIVE UNIT AND SOLENOID ASSEMBLY

Disassembly

(1) Remove the drive unit from the seat assembly. Refer to "Removal of Flexible Cables" operations 1-4.

(2) Remove the two screws holding the plate and solenoids to the drive unit (Fig. 6).

(3) Remove the plate and solenoid assembly. Be careful not to lose the three springs under the solenoid.

(4) To remove the solenoid coils, bend back on the tabs of the solenoid cover. Unsolder the coil ground wire at the cover tab and remove the coil cover from the coil.

(5) Remove the screws holding the cover on the drive unit.

(6) Remove the cover and lift out the clutch lever and shaft.

Assembly

(1) Install the clutch lever and shaft. Make sure the lever is properly seated on the collar.

(2) Install the cover and screws.

(3) Install the coil in the coil cover with the coil ground wire next to one of the cover tabs.

(4) Position the cover tabs in the slots on the coil plate.

(5) Bend over the tabs and resolder the coil ground wire to the tab and plate.

(6) Install the three solenoid springs and position the solenoids over the springs.

(7) Fasten the solenoids to the drive unit.

(8) Install the drive unit. Refer to "Installation of Flexible Cables", steps 6 through 9.

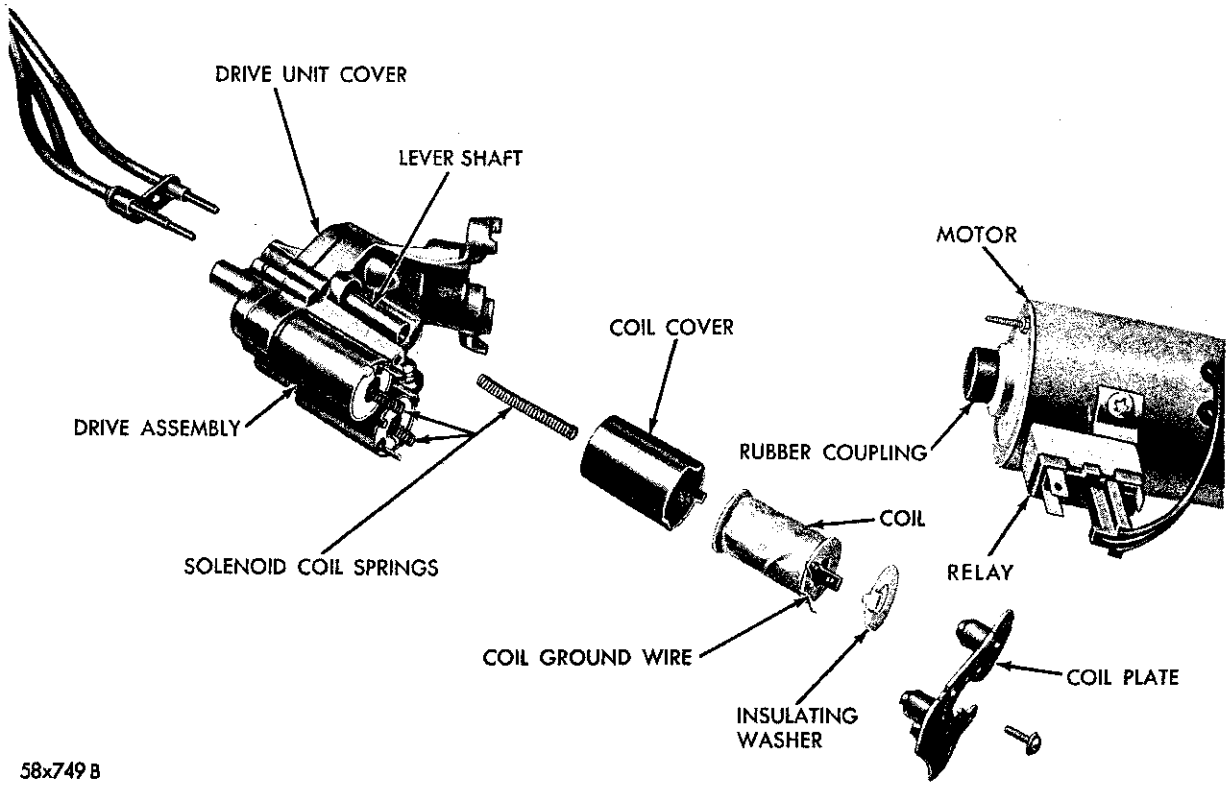


Fig. 6—Solenoid and Coil (Disassembled View)

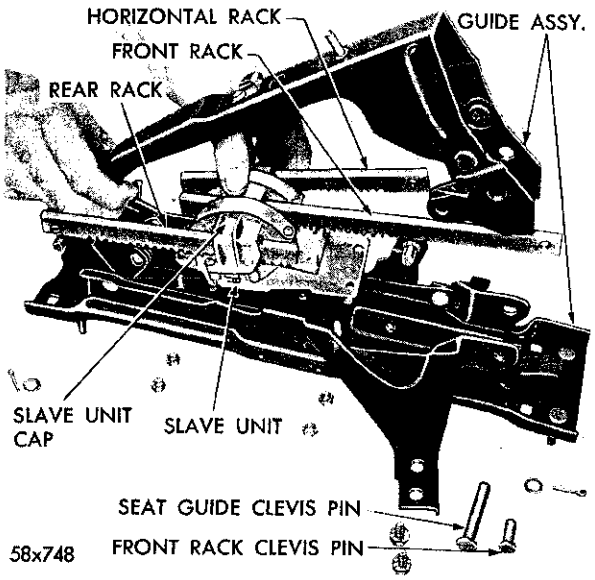


Fig. 7—Removing the Left Slave Unit

6. SLAVE UNIT

Removal

(1) Remove the drive unit and the cables. Refer to "Removal of Flexible Cables", operations 1-4. The seat guide should be in the up and forward position.

(2) Remove the long clevis pin from the front of the guide (Fig. 7).

(3) Remove the front rack clevis pin.

(4) To facilitate the removal of the slave unit, remove the slave unit cap. **Be careful not to lose the springs under the cap. The springs are between the racks and the slave cap.**

(5) Remove the nuts holding the slave unit to the guide.

(6) Remove the slave unit.

Installation

(1) Position the slave unit over the studs on the guide base.

(2) Position the racks in the slave unit so they will be in the up and forward position.

(3) Fasten the racks to the guide assembly.

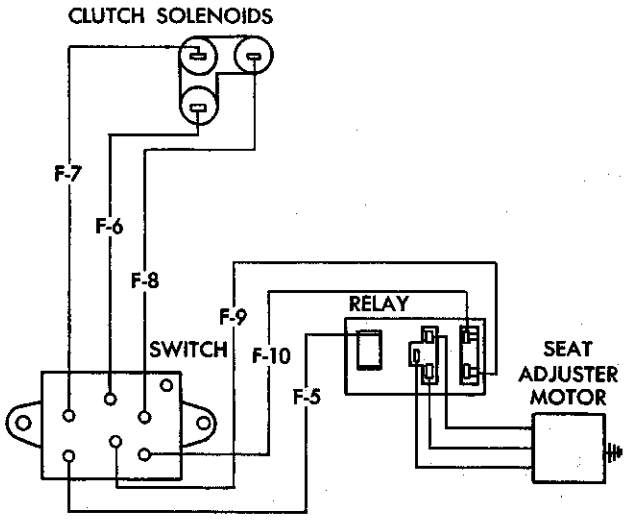
(4) Position the springs on the racks and install the slave unit cap.

(5) Install the slave unit mounting nuts.

(6) Install the front guide clevis pin.

(7) Install the cables in their slots and try operation of guide.

Install the drive unit and cables. Refer to "Installation of Flexible Cables" Paragraph 3 steps 6 through 9.



NO.	COLOR	CIRCUIT
F-5	RED	FEED
F-6	BROWN	FRONT ELEVATOR
F-7	DARK GREEN	HORIZONTAL
F-8	YELLOW	REAR ELEVATOR
F-9	WHITE	DOWN AND REARWARD
F-10	DARK BLUE	UP AND FORWARD

64 x 416

Fig. 8—Six-way Power Seat Wiring Diagram

7. POWER SEAT WIRING

Refer to Figure 8 for the wiring of the power seat assembly.

SERVICE DIAGNOSIS
SIX-WAY POWER SEATS

Condition	Possible Cause	Correction
Excessive Free Play in the Unit (Seat has a Rocking Motion. Excessive Movement between the Slide and the Base of the Track assembly)	(a) Possibly due to the roller Fig. 9, being out of position.	(a) Repair as follows: (1) Remove the power seat from the vehicle. (2) Remove the seat drive tubes from the slave unit. **CAUTION: Do not run the seat motor with the drive cables and tubes disassembled or the unit will be placed out of synchronization.** (3) Remove the seat support (B) and the rear clevis pin. (4) Remove the seat slave unit from the seat track slide (C). (5) Remove the horizontal stops located on the slide at (D). (6) Separate the seat slide (C) from the base (N) by pressing the slide rearward which will allow the rollers (A) to jump the retaining rivets (E, F, G, H), thereby separating the slide from the base. (7) Remove the rivet (F) and replace with 5/16-18 x ½" bolt (1) as shown to retain the rollers in the proper position. To reassemble, reverse the above sequence. **In reassembly, frayed drive cable may occur. Such a cable may be repaired by applying a light coating of solder and then grinding to cable size.**
Seat Track Excessively Loose	(a) Loose rivet joints.	(a) Disassemble the upper track seat support (B) by removing the cotter keys and pins. Remove the seat support and tighten all the riveted joints (J) by peening with a ball peen hammer. (Fig. 9).
Loose Front Levers	(a) Movement between the two sections comprising the front lever assembly (Fig. 9).	(a) Arc weld the front levers (K) to prevent movement between the two sections. (Fig. 9).
Seat Chuck Fore and Aft	(a) Loose horizontal rack support arm to lower track base.	(a) Repair as follows: (1) Remove the seat track from the vehicle and arc weld as shown (L.) (Fig. 9). (2) Tighten the rack attaching pins (M) by arc welding. (Fig. 9).
	(b) Loose horizontal rack in slave unit gear train.	(b) Test and replace slave unit if necessary.

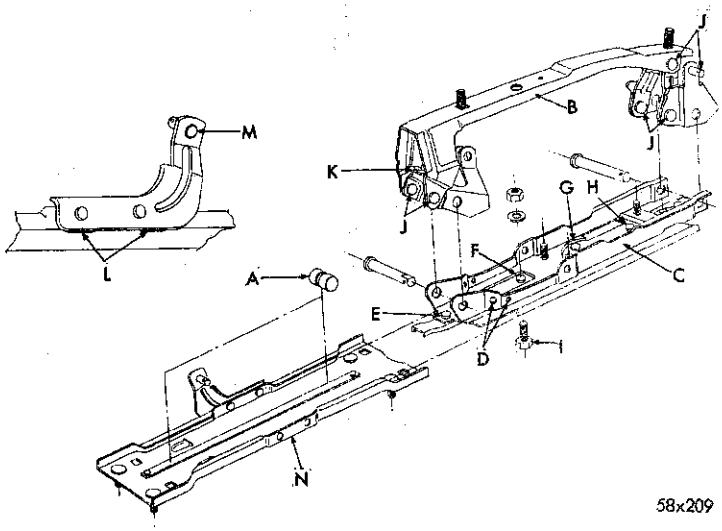


Fig. 9—Seat Guide (Disassembled View)

SERVICE DIAGNOSIS—(Continued)

SIX-WAY POWER SEATS—(Continued)

Condition	Possible Cause	Correction
Entire Unit Inoperative	(a) Broken wire or loose connections in any part of motor control circuit.	(a) Test electrical continuity of the system. Repair as necessary.
Motor Inoperative	(a) Short or open circuit between power source, faulty relay, switch or motor.	(a) Test the red wire at relay with a test light. If the test light does not light, test for continuity in the red feed wire, a faulty circuit breaker or a poor connection between the circuit breaker and alternator (ammeter). If the test light lights, connect the red feed wire with the red and black or red and green wires from the motor. If motor runs, relay is faulty.
	(b) Faulty Motor.	(b) Repair or replace motor.
Seat Inoperative (Motor Runs)	(a) Short or open circuit between the switch and affected solenoid.	(a) Jump the wire from the red feed wire to each solenoid terminal on the clutch assembly. Each solenoid should "Click" as the jumper is connected. If solenoid does not click: Test the wire in the harness for an open circuit. Repair. Test for a possible seized solenoid armature in the coil. Replace the coil. Test for a possible burned-out solenoid. Replace the solenoid.
Seat Inoperative (Motor Runs and Solenoid Clicks)	(a) Possible stripped or broken gear in the drive unit.	(a) Inspect and replace the drive unit if necessary.
Slave Unit Inoperative (Motor, Solenoids and Drive Unit O.K.)	(a) Possible broken drive cable.	(a) Inspect and replace the parts as necessary.

FOUR-WAY POWER SEATS

The electric single seat for the Chrysler and Imperial models uses two electric motors (Fig. 1) to produce a front-back travel of 5 inches and an up-down travel of 1½ inches. The control switch is a two button switch, the vertical button for front-back travel and the horizontal button for up-down travel. The switch is located on the bottom edge of the left side of the driver's seat. Power is supplied to the control switch from the 30 ampere circuit breaker mounted behind the left kick panel.

SERVICE PROCEDURES

1. SEAT AND CUSHION ASSEMBLY

Removal

(1) Remove the two nuts attaching the seat assembly to the seat track at the rear of the seat track rails.

(2) Operate the seat to the extreme forward position to allow access to the two Phillips head screws attaching the seat assembly to the seat track at the front of the seat track rails.

(3) Lift the seat assembly up off of the rear studs on the seat track rails and remove the seat and cushion assembly.

Installation

(1) With the seat track in the extreme forward position, place the seat and cushion assembly on the seat track making certain the studs at the rear of the seat track protrude through the clearance holes at the rear of the seat assembly.

(2) Install the two Phillips head screws that attach the seat and cushion assembly to the seat track at the front of the seat track and rails assembly.

(3) Install the two nuts that mount the seat assembly to the seat track at the rear of the seat rack. Tighten the nuts securely.

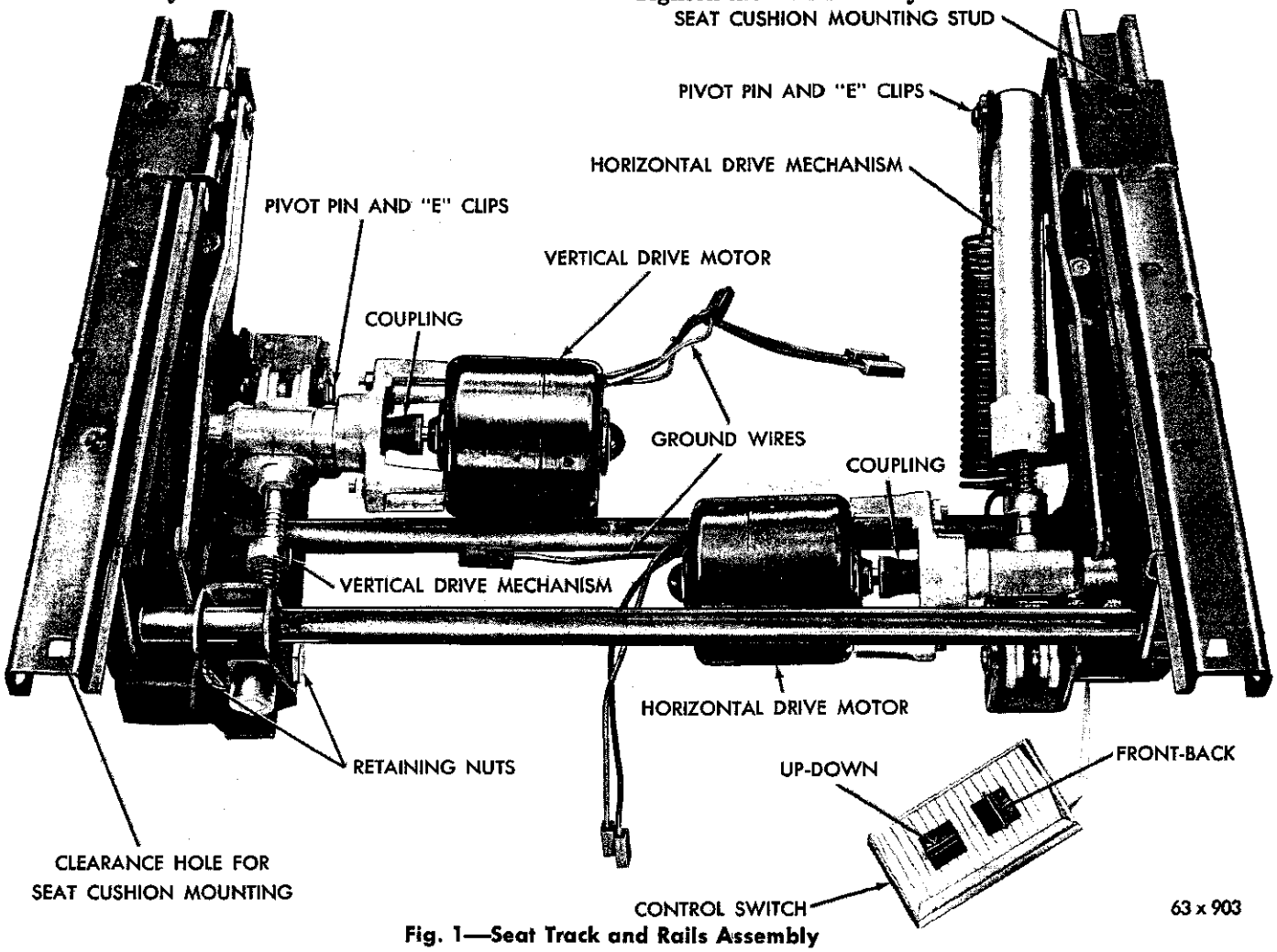


Fig. 1—Seat Track and Rails Assembly

2. SEAT TRACK AND RAILS ASSEMBLY

Removal

(1) Remove the seat and cushion assembly.

(2) From underneath the vehicle, remove the four nuts attaching the seat track mounting studs to the floor pan of the vehicle.

(3) Disconnect the wiring terminals from the lead wires of the two electric motors.

(4) Lift the seat track and rails assembly up from the floor pan and remove from the vehicle.

Installation

(1) Position the seat track and rails assembly in the vehicle making certain the four mounting studs protrude through the clearance holes in the floor pan.

(2) From underneath the vehicle install the four nuts that attach the seat track and rails assembly to the floor pan. Tighten the nuts securely.

(3) Install the seat and cushion assembly.

3. ELECTRIC DRIVE MOTORS

Service of the drive motors does not require removal of the seat and cushion assembly. Service procedures for both the vertical and horizontal drive motors are identical. See Wiring Diagram (Fig. 2) for complete electrical circuit.

Removal

(1) Disconnect the wiring terminals at the motor lead wires.

(2) Remove the two nuts attaching the motor to the gear housing.

(3) Pull the motor out of the coupling between the motor and the gear housing and remove the motor.

Installation

(1) Position the motor on the coupling on the gear housing making certain the studs on the motor protrude through the clearance holes in the gear housing.

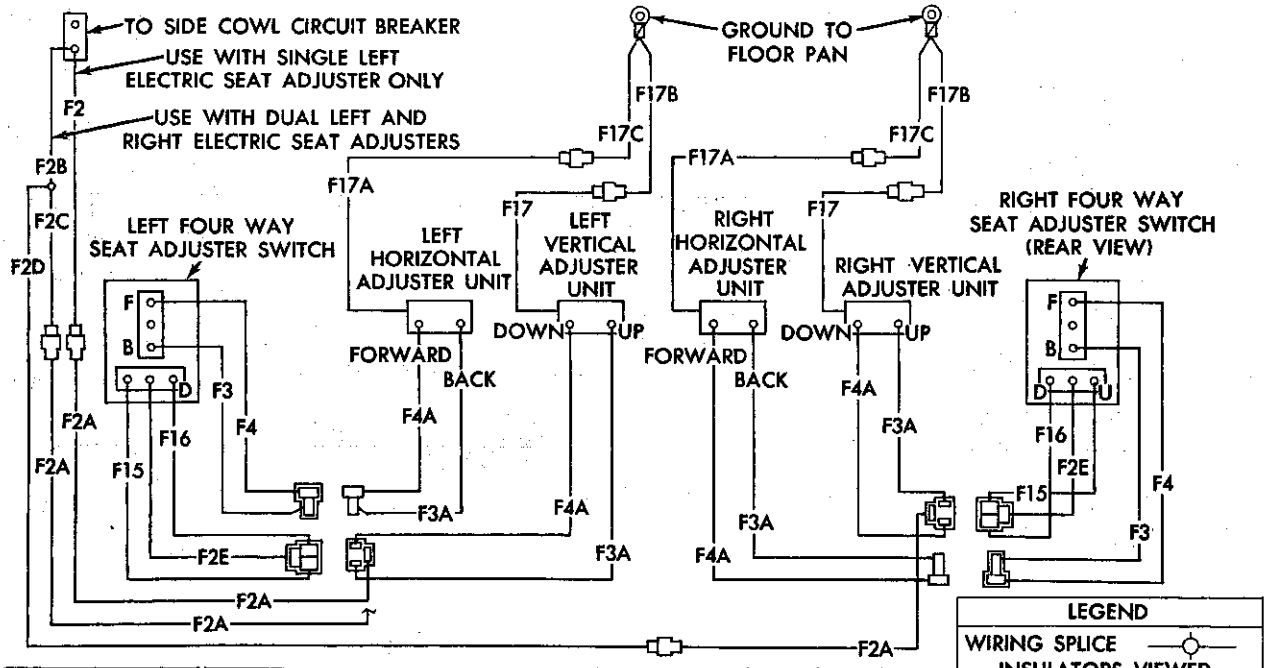
(2) Install the two nuts that attach the motor to the gear housing. Tighten the nuts securely.

(3) Connect the wiring terminals to the lead wires on the motor. Make certain the ground lead from the motor (brown wire) has a good electrical connection.

4. CONTROL SWITCH

The control switch is retained to the seat assembly lower side panel by a spring clip. Inserting a screwdriver on each side of the switch will release the spring clip and allow removal of the switch.

There are two terminals connected to the control switch. A two wire terminal and a three wire terminal. The circuits of the five wires are as follows:



CIRCUITS	GAUGE	COLOR	CIRCUITS	GAUGE	COLOR	CIRCUITS	GAUGE	COLOR	CIRCUITS	GAUGE	COLOR
F2	12	RED	F2D	12	RED	F4	14	DARK GREEN	F17	14	BROWN
F2A	12	RED	F2E	12	RED	F4A	14	DARK GREEN	F17A	14	BROWN
F2B	12	RED	F3	14	BLACK	F15	14	BLACK WITH TRACER	F17B	14	BROWN
F2C	12	RED	F3A	14	BLACK	F16	14	DARK GREEN WITH TRACER	F17C	14	BROWN

63 x 904

Fig. 2—Four-way Power Seat Wiring Diagram

Red Wire—12 volt feed from the 30 ampere circuit breaker behind the left kick panel.

Dark Green Wire—"down" feed to the vertical drive motor.

Black Wire—"up" feed to the vertical drive motor.

Dark Green Wire—"forward" feed to the horizontal drive motor.

Black Wire—"back" feed to the horizontal drive motor.

Since the drive motors are interchangeable, a duplication of wire colors occurs. The three wire terminal to the control switch (Dark Green, Black, Red) contains the feed wires for the vertical drive motor. The two wire terminal to the control switch (Dark Green, Black) contains the feed wires for the horizontal drive motor (Fig. 2).

5. COUPLING—MOTOR TO GEAR HOUSING (Fig. 1)

The coupling transmits the power from the drive motor to the gear housing. A coupling is used on both the horizontal and vertical drive mechanisms.

Removal of the motor allows the coupling to be serviced by pulling the coupling off the end of the drive shaft of the gear housing.

Service procedures are the same for the coupling on both the horizontal and vertical drive mechanisms.

6. HORIZONTAL DRIVE MECHANISM

Removal

(1) Remove the seat and cushion assembly.

(2) Remove the two "E" clips from the track bracket pivot pin at the rearward end of the horizontal worm gear.

(3) Remove the pivot pin.

(4) Remove the two "E" clips from the track bracket pivot pin at the gear housing end of the horizontal worm gear.

(5) Remove the pivot pin.

(6) Disconnect the wiring terminals at the motor lead wire connectors.

(7) Remove the motor from the gear housing and remove the motor. The drive mechanism can then be removed.

Installation

(1) Position the horizontal drive mechanism and gear housing assembly into the track bracket.

(2) Install the pivot pins and the two "E" clips at both ends of the drive mechanism.

(3) Install the motor on the gear housing.

(4) Connect the wiring terminals to the motor lead wire connectors.

(5) Install the seat and cushion assembly.

7. VERTICAL DRIVE MECHANISM

Removal

(1) Remove the seat and cushion assembly.

(2) Remove the two nuts at the gear housing end of the vertical worm gear.

(3) Remove the two "E" clips from the track bracket pivot pin at the rearward end of the vertical worm gear.

(4) Remove the pivot pin.

(5) Disconnect the wiring terminals at the motor lead wire connectors.

(6) Remove the motor from the gear housing and remove the motor. The drive mechanism can then be removed.

Installation

(1) Position the vertical drive mechanism and gear housing assembly into the track bracket.

(2) Install the retaining nuts at the gear housing end of the drive mechanism and the pivot pin and the two "E" clips at the rearward end of the drive mechanism.

(3) Install the motor on the gear housing.

(4) Connect the wiring terminals to the motor lead wire connectors.

(5) Install the seat and cushion assembly.

SERVICE DIAGNOSIS
FOUR-WAY POWER SEATS

Condition	Possible Cause	Correction
Entire Unit Inoperative	(a) Broken or loose wire from the circuit breaker to the control switch. (b) Faulty control switch.	(a) Test for electrical continuity between the circuit breaker and the control switch. Repair or replace as necessary. (b) Test the control switch. Repair or replace as necessary.

SERVICE DIAGNOSIS—(Continued)

FOUR-WAY POWER SEATS

Condition	Possible Cause	Correction
Seat Operates Horizontally But Will Not Operate Vertically	(a) Broken or loose wire between the control switch and the vertical drive motor.	(a) Test wiring for continuity between the control switch and the vertical drive motor. Repair or replace as necessary.
	(b) Faulty motor.	(b) Repair or replace the motor.
	(c) Faulty or mis-aligned coupling between the motor and the vertical drive mechanism.	(c) Inspect coupling for wear or mis-alignment. Repair or replace as necessary.
	(d) Faulty vertical drive mechanism.	(d) Inspect the drive mechanism. Repair or replace as necessary.
Seat Operates Vertically But Will Not Operate Horizontally	(a) Broken or loose wire between the control switch and the horizontal drive motor.	(a) Test wiring for continuity between the control switch and the horizontal drive motor. Repair or replace as necessary.
	(b) Faulty motor.	(b) Repair or replace the motor.
	(c) Faulty or mis-aligned coupling between the motor and the horizontal drive mechanism.	(c) Inspect coupling for wear or mis-alignment. Repair or replace as necessary.
	(d) Faulty horizontal drive mechanism.	(d) Inspect the drive mechanism. Repair or replace as necessary.

ELECTRIC WINDOW LIFTS

A master switch group, on the left front door, operates all the windows and the individual switches are located on their respective doors. The circuit breaker is above the left front cowl panel.

SERVICE PROCEDURES

1. WIRING TEST

Disconnect the cable at the battery negative post and remove the two window lift feed wires from the circuit breaker. **Do not** remove the battery feed wire. Reconnect the battery negative cable at battery and replace the feed wires one at a time as follows:

(1) One feed wire feeds the left front door.

(2) The other feed wire feeds the right front door and both rear doors.

(3) Test the wiring to the doors one at a time to locate the short.

NOTE: When testing for faulty wiring, inspect the wiring harness control wires for a break behind the plate and sector or the regulator in each door.

2. MOTOR

Removal

(1) Remove the garnish moulding and trim panel.

(2) Remove the two nuts that attach the motor to the gearbox assembly.

(3) Drop the motor down off the gearbox assembly.

(4) Ground the motor through bolt to the body inner panel.

(5) Test the operation of the motor using the window lift switch. If the motor is defective replace the motor. **Do not** attempt any internal service on the motor.

(6) Disconnect the lead wires to the motor and remove the motor.

Installation

(1) Position the motor on the gearbox assembly and install the two mounting nuts.

(2) Connect the wiring to the motor.

(3) Test operation of the motor using the window lift switch.

(4) Install the trim panel and garnish moulding.

3. WINDOW LIFT—CHRYSLER

Removal

(1) Disconnect the battery cable at the battery negative terminal.

(2) Remove the garnish moulding, the door trim panel and disconnect the wires from the switch.

(3) Remove the clips from the regulator pins holding the lower glass channel.

(4) Raise the glass manually and prop in the up position.

(5) Remove the regulator attaching screws, pivot arm from the guide on the inner panel and remove the motor and regulator through the opening in the door.

(6) If it is necessary to replace the gear box, remove the regulator counter-balance spring.

NOTE: Be sure to remove the counter-balance spring before disassembling the gear box.

The gear box is replaced as an assembly only and is lubricated at assembly. No further lubrication is required.

Installation

(1) Place the motor and regulator through the door opening and insert the pivot arm into the guide on the inner panel.

(2) Install the regulator screws finger tight. **DO NOT** tighten at this time.

(3) Remove the window prop and lower the glass.

(4) Insert the control arms into the glass channel, using a leather washer on each side of the channel and secure with a clip.

(5) Connect the wires to the motor and connect the battery.

(6) Operate the window several times and stop the glass halfway.

(7) Tighten the regulator screws.

(8) Check the glass alignment.

(9) Connect a test ammeter into the electrical circuit and operate the window. The ammeter reading should be constant without fluctuation as follows: approximately 14 amperes, all models except rear doors of four-door hard top models, and approximately 20 amperes for the rear doors of the four-door hard top models.

If the ammeter reading fluctuates, there is a bind in the glass or in the linkage. The down stop should be adjusted so that the window is flush with the garnish moulding.

(10) Install the trim panel, switch and garnish moulding.

4. WINDOW LIFT—IMPERIAL

Removal

(1) Remove the trim panel and garnish moulding.

(2) Remove the window glass retaining clips. Push the regulator arm pins out of the window glass frame.

(3) Push the glass and frame assembly to the "UP" position and prop the glass securely.

(4) Remove the regulator attaching bolts. The bottom bolt can be removed using a socket and extension.

(5) Remove the regulator pivot arms from the regulator channels.

(6) Disconnect the wiring to the motor.

(7) Remove the regulator and motor as an assembly out through the access opening in the inner panel.

(8) The motor can then be serviced on the bench.

Installation

(1) Install the motor and regulator as an assembly in through the access opening in the inner panel and install the three regulator mounting bolts.

(2) Install the regulator pivot arms into the channels.

(3) Remove the prop that held the window glass and frame in the "UP" position and lower the assembly down until the regulator pins are in line with the openings in the window glass frame.

(4) Install the regulator pins into the window glass frame and install the retaining clips.

(5) Connect the wiring to the motor.

(6) Install the trim panel and garnish moulding.

SERVICE DIAGNOSIS
ELECTRIC WINDOW LIFTS

Condition	Possible Cause	Correction
A Window Will Not Operate from the Master Switch, But Can be Operated from the Individual Door Switch	(a) Faulty switch in the master switch group.	(a) Replace master switch.
	(b) Break in the wire at the door opening, or at the door holding the master switch group.	(b) Test for continuity, see "Wiring Diagrams". Repair wiring. Avoid making a splice in the flexing sections of the wiring harness.
None of the Windows Will Operate from the Master Switch or from the Individual Door Switch	(a) Faulty circuit breaker—located above left cowl panel.	(a) Replace circuit breaker and test the new circuit breaker to determine if voltage is present at the terminal opposite the battery feed.
	(b) Open in the battery feed wire from the circuit breaker to the alternator (ammeter).	(b) Test for continuity and repair as necessary.
A Window Cannot be Operated from Either the Master Switch or the Individual Door Switch	(a) Test for faulty circuit breaker located above left cowl panel.	(a) Replace circuit breaker.
	(b) Master switch and door switch inoperative.	(b) Test the master switch and door switch for continuity.
	(c) Open in wire between motor and switch.	(c) Test for continuity between the motor and the switch. Repair wiring as necessary.
	(d) Jammed gear box.	(d) Test and repair. Inspect motor to gear box alignment.
	(e) Coupling broken between the motor and the gear box.	(e) Replace coupling and test motor and gear box alignment.
	(f) Lift motor burned out.	(f) Repair or replace lift motor. Test for sticking door switch as possible cause of motor failure
	(g) Short in the wiring circuit.	(g) Inspect and test wiring. See "Wiring Diagrams".
A Window Will Operate in One Direction Only When Controlled by Either the Master Switch or by the Individual Door Switch	(a) Faulty circuit between master switch and door switch.	(a) Test the master switch and door switch for continuity. Test for continuity between the motor leads and the switch.
	(b) If the window can be moved by rotating the coupling between the motor and the gear box.	(b) Remove the window lift motor and test on bench with battery voltage. See "Wiring Diagrams".
	(c) Lift motor burned out.	(c) Test for sticking switch.
	(d) Short in wiring circuit.	(d) Inspect and test all wiring. See "Wiring Diagrams".
Circuit Breaker Clicks "On" and "Off" Continuously and Window Does Not Operate	(a) Short in the feed wire that feeds the right front and rear doors.	(a) Test the wiring, repair or replace as necessary.
	(b) A faulty switch.	(b) Replace the switch if necessary.

ELECTRIC DECK LID LOCK

IMPERIAL MODELS

The electric deck lid lock allows unlocking of the rear deck lid from inside the passenger compartment of the vehicle. The system consists of a push-button switch in the glove compartment, a solenoid mounted on the underside of the deck lid and the push-button switch from the 10 ampere circuit breaker behind the left kick panel. The deck lid is locked automatically when the lid is closed securely.

SERVICE PROCEDURES

1. OPERATION

To unlock the deck lid open the glove compartment and push "in" on the switch located on the left side of the glove box. When the switch is pushed "in" voltage is fed through the switch to the solenoid which releases the deck lid locking mechanism.

2. TESTS

If the deck lid fails to unlock when the switch is pushed "in" test for good wire connections at the switch and the circuit breaker. If the wire connections are good, test the switch for electrical continuity. If the switch is good, test for "open" or "grounded" wires in the system. If the wiring is good, test for a faulty solenoid. If the solenoid is faulty the deck lid can be opened manually by using the luggage compartment key. Repair or replace the faulty component as necessary. Refer to Figure 1 for wiring of the system.

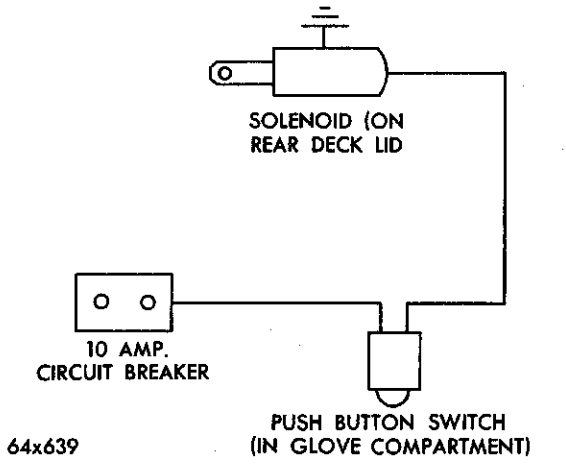
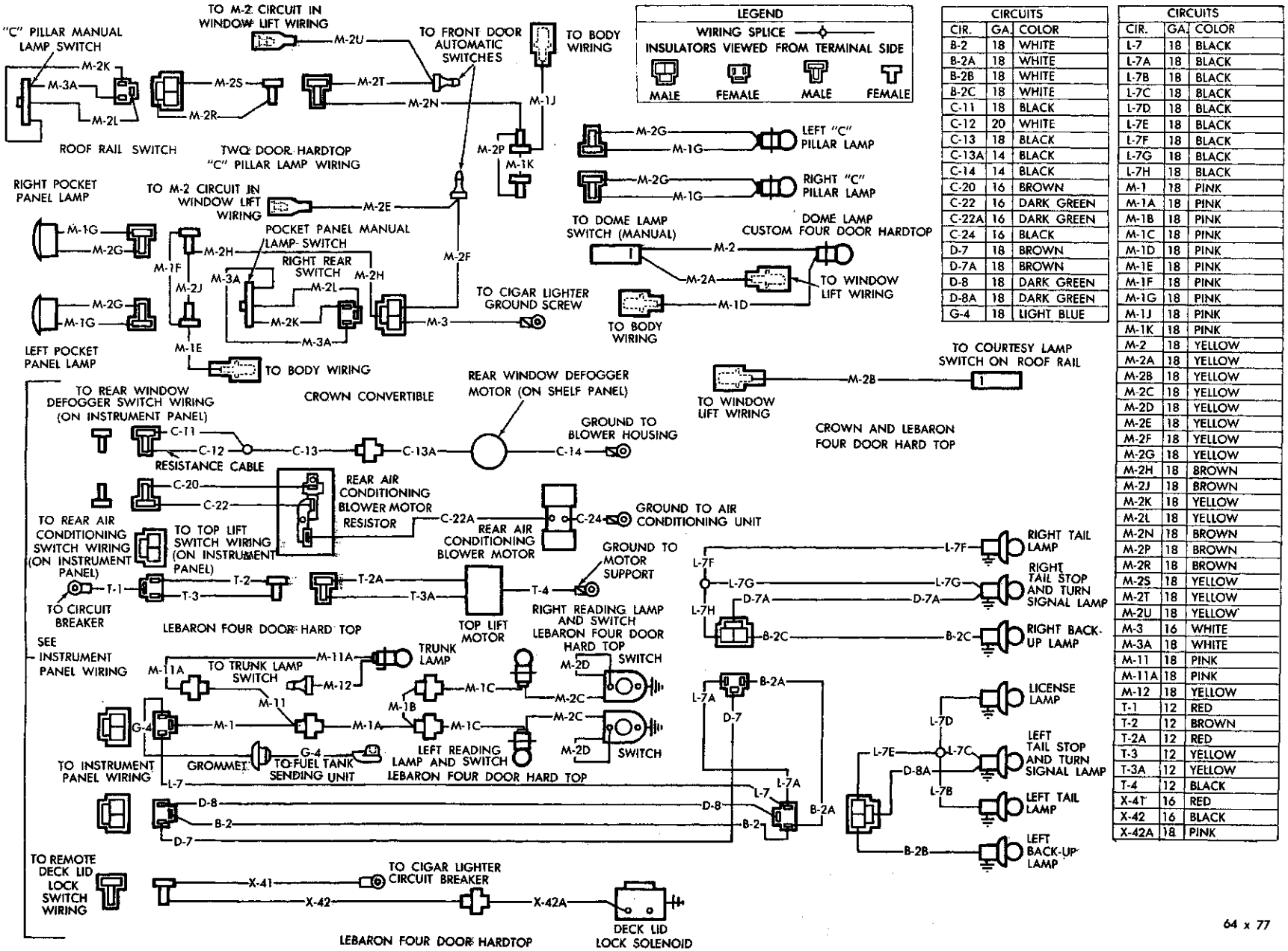


Fig. 1—Electric Deck Lid Lock Wiring Diagram

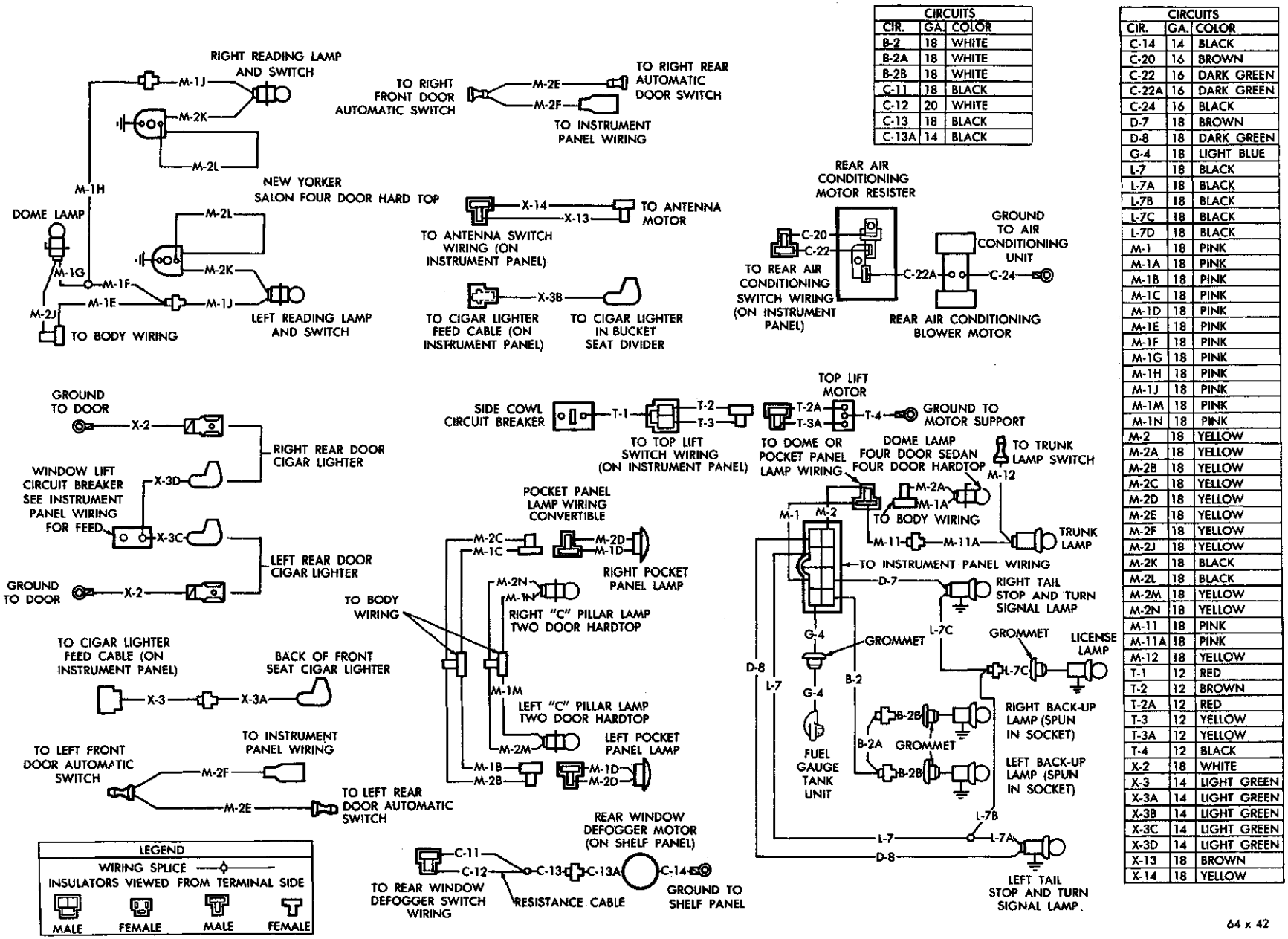


CIRCUITS		
CIR.	GA.	COLOR
B-2	18	WHITE
B-2A	18	WHITE
B-2B	18	WHITE
B-2C	18	WHITE
C-11	18	BLACK
C-12	20	WHITE
C-13	18	BLACK
C-13A	14	BLACK
C-14	14	BLACK
C-20	16	BROWN
C-22	16	DARK GREEN
C-22A	16	DARK GREEN
C-24	16	BLACK
D-7	18	BROWN
D-7A	18	BROWN
D-8	18	DARK GREEN
D-8A	18	DARK GREEN
G-4	18	LIGHT BLUE

CIRCUITS		
CIR.	GA.	COLOR
L-7	18	BLACK
L-7A	18	BLACK
L-7B	18	BLACK
L-7C	18	BLACK
L-7D	18	BLACK
L-7E	18	BLACK
L-7F	18	BLACK
L-7G	18	BLACK
L-7H	18	BLACK
M-1	18	PINK
M-1A	18	PINK
M-1B	18	PINK
M-1C	18	PINK
M-1D	18	PINK
M-1E	18	PINK
M-1F	18	PINK
M-1G	18	PINK
M-1J	18	PINK
M-1K	18	PINK
M-2	18	YELLOW
M-2A	18	YELLOW
M-2B	18	YELLOW
M-2C	18	YELLOW
M-2D	18	YELLOW
M-2E	18	YELLOW
M-2F	18	YELLOW
M-2G	18	YELLOW
M-2H	18	BROWN
M-2J	18	BROWN
M-2K	18	YELLOW
M-2L	18	YELLOW
M-2N	18	BROWN
M-2P	18	BROWN
M-2R	18	BROWN
M-2S	18	YELLOW
M-2T	18	YELLOW
M-2U	18	YELLOW
M-3	16	WHITE
M-3A	18	WHITE
M-11	18	PINK
M-11A	18	PINK
M-12	18	YELLOW
T-1	12	RED
T-2	12	BROWN
T-2A	12	RED
T-3	12	YELLOW
T-3A	12	YELLOW
T-4	12	BLACK
X-41	16	RED
X-42	16	BLACK
X-42A	18	PINK

64 x 77

Fig. 1—Body Wiring—Imperial



CIRCUITS		
CIR.	GA.	COLOR
B-2	18	WHITE
B-2A	18	WHITE
B-2B	18	WHITE
C-11	18	BLACK
C-12	20	WHITE
C-13	18	BLACK
C-13A	14	BLACK

CIRCUITS		
CIR.	GA.	COLOR
C-14	14	BLACK
C-20	16	BROWN
C-22	16	DARK GREEN
C-22A	16	DARK GREEN
C-24	16	BLACK
D-7	18	BROWN
D-8	18	DARK GREEN
G-4	18	LIGHT BLUE
L-7	18	BLACK
L-7A	18	BLACK
L-7B	18	BLACK
L-7C	18	BLACK
L-7D	18	BLACK
M-1	18	PINK
M-1A	18	PINK
M-1B	18	PINK
M-1C	18	PINK
M-1D	18	PINK
M-1E	18	PINK
M-1F	18	PINK
M-1G	18	PINK
M-1H	18	PINK
M-1J	18	PINK
M-1M	18	PINK
M-1N	18	PINK
M-2	18	YELLOW
M-2A	18	YELLOW
M-2B	18	YELLOW
M-2C	18	YELLOW
M-2D	18	YELLOW
M-2E	18	YELLOW
M-2F	18	YELLOW
M-2J	18	YELLOW
M-2K	18	BLACK
M-2L	18	BLACK
M-2M	18	YELLOW
M-2N	18	YELLOW
M-11	18	PINK
M-11A	18	PINK
M-12	18	YELLOW
T-1	12	RED
T-2	12	BROWN
T-2A	12	RED
T-3	12	YELLOW
T-3A	12	YELLOW
T-4	12	BLACK
X-2	18	WHITE
X-3	14	LIGHT GREEN
X-3A	14	LIGHT GREEN
X-3B	14	LIGHT GREEN
X-3C	14	LIGHT GREEN
X-3D	14	LIGHT GREEN
X-13	18	BROWN
X-14	18	YELLOW

64 x 42

Fig. 2—Body Wiring (Except Town and Country) Chrysler

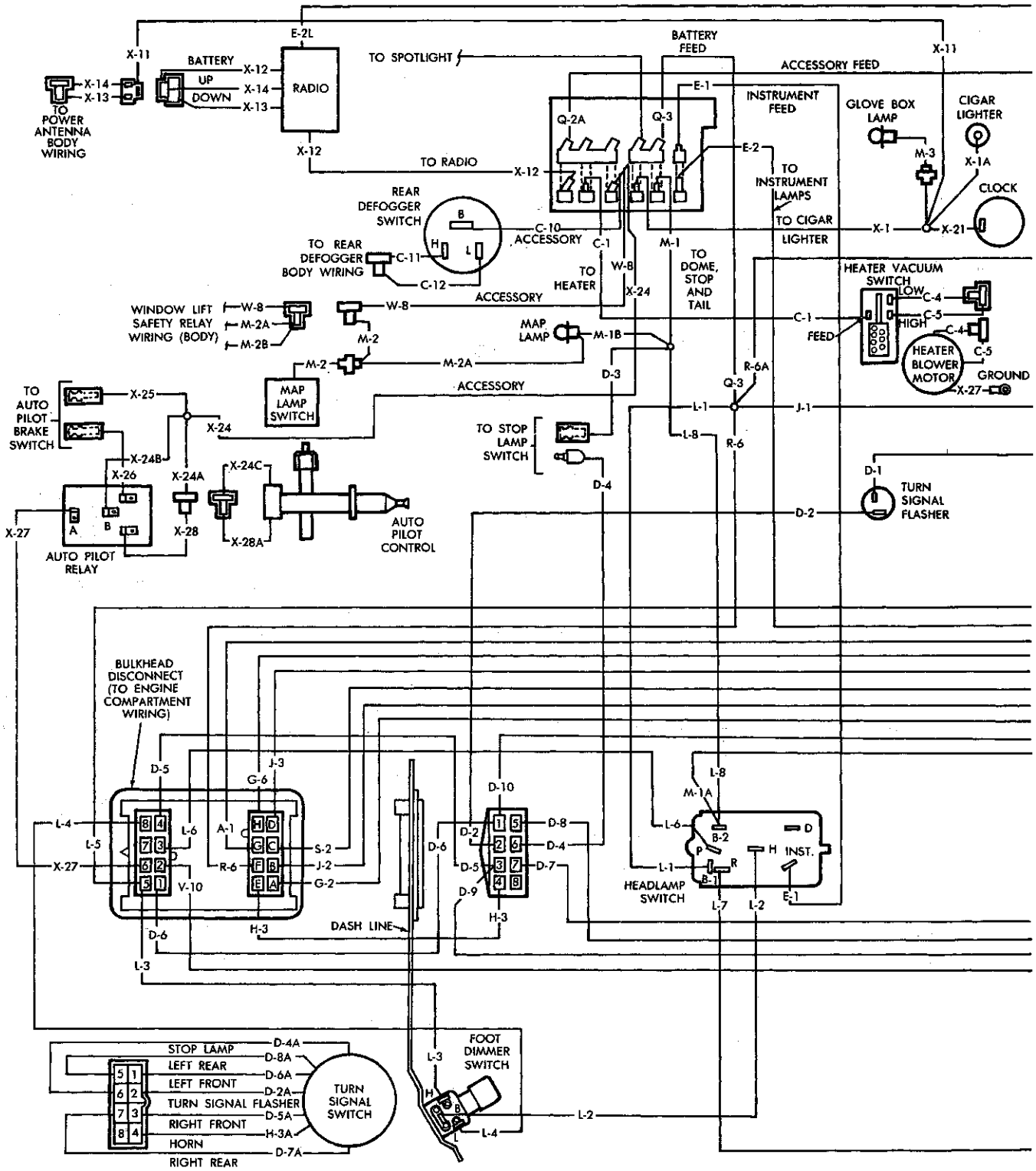
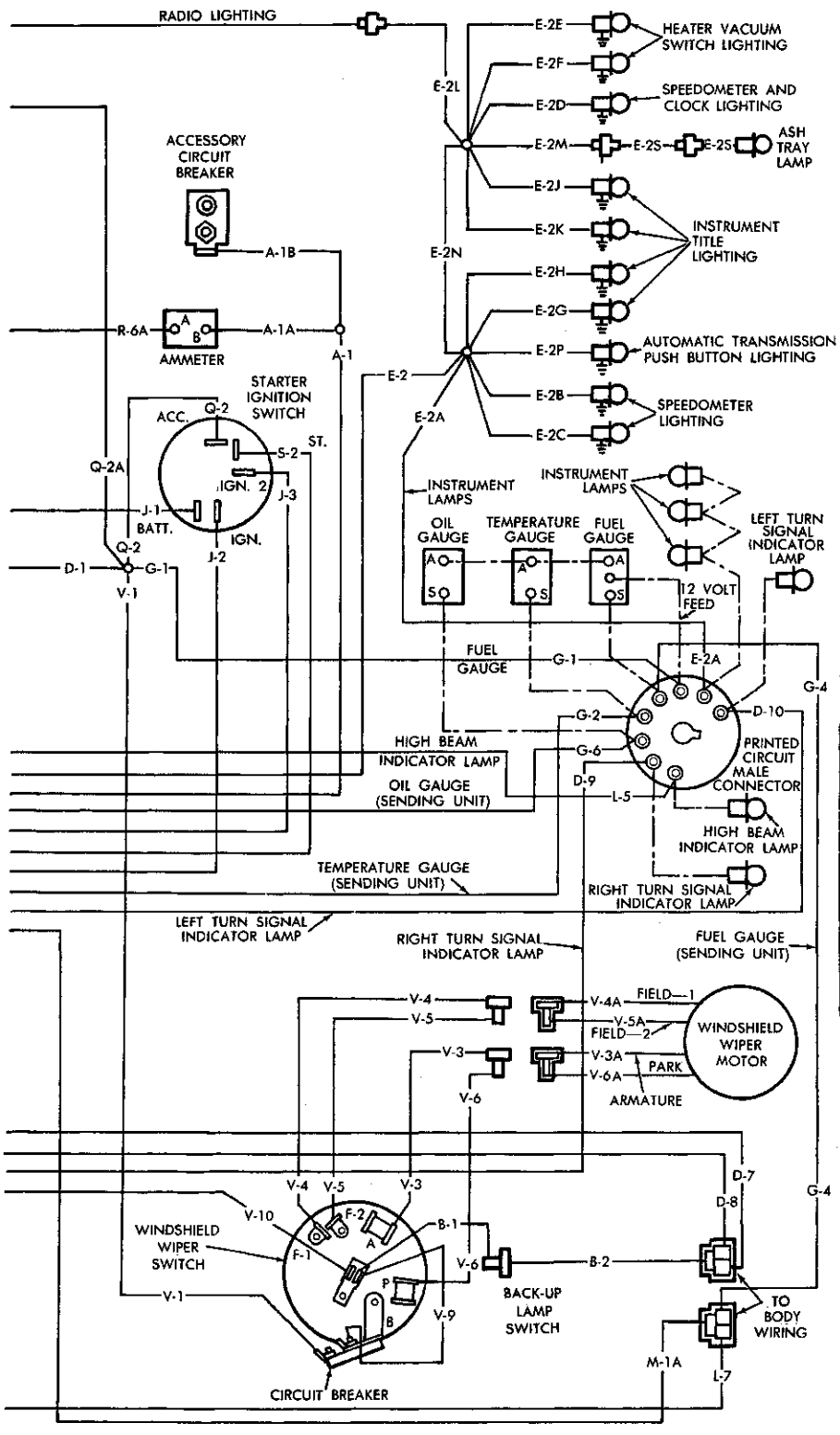


Fig. 3—Instrument Panel Wiring—Imperial



CIRCUITS		
CIR.	GA.	COLOR
A-1	12	RED
A-1A	12	RED
A-1B	12	RED
B-1	18	WHITE
B-2	18	WHITE
C-1	14	BLACK WITH TRACER
C-4	16	BROWN
C-5	16	DARK GREEN
C-10	18	LIGHT GREEN
C-11	18	BLACK
C-12	18	WHITE
D-1	18	BLACK
D-2	18	RED
D-2A	18	RED
D-3	18	PINK
D-4	18	WHITE
D-4A	18	WHITE
D-5	18	TAN
D-5A	18	TAN
D-6	18	LIGHT GREEN
D-6A	18	LIGHT GREEN
D-7	18	BROWN
D-7A	18	BROWN
D-8	18	DARK GREEN
D-8A	18	DARK GREEN
D-9	18	TAN
D-10	18	LIGHT GREEN
E-1	18	TAN
E-2	18	ORANGE
E-2A	18	ORANGE
E-2B	18	ORANGE
E-2C	18	ORANGE
E-2D	18	ORANGE
E-2E	18	ORANGE
E-2F	18	ORANGE
E-2G	18	ORANGE
E-2H	18	ORANGE
E-2J	18	ORANGE
E-2K	18	ORANGE
E-2L	18	ORANGE
E-2M	18	ORANGE
E-2N	18	ORANGE
E-2P	18	ORANGE
E-2S	18	ORANGE
G-1	18	BLACK
G-2	18	VIOLET
G-4	18	LIGHT BLUE
G-6	18	GRAY
H-3	18	BLACK WITH TRACER
H-3A	18	BLACK
J-1	12	RED

CIRCUITS		
CIR.	GA.	COLOR
J-2	16	DARK BLUE
J-3	18	BROWN
L-1	16	BLACK WITH TRACER
L-2	16	LIGHT GREEN
L-3	16	RED
L-4	16	BLACK
L-5	18	RED
L-6	18	YELLOW WITH TRACER
L-7	18	BLACK
L-8	18	PINK
M-1	18	PINK
M-1A	18	PINK
M-1B	18	PINK
M-2	18	YELLOW
M-2A	18	YELLOW
M-3	18	PINK
Q-2	12	BLACK
Q-2A	12	BLACK
Q-3	12	RED WITH TRACER
R-6	12	BLACK
R-6A	12	BLACK
S-2	18	YELLOW
V-1	16	PINK
V-3	16	BLACK WITH TRACER
V-3A	16	BLACK
V-4	16	RED
V-4A	16	RED
V-5	16	YELLOW
V-5A	16	YELLOW
V-6	16	DARK BLUE
V-6A	16	DARK BLUE
V-9	16	BLACK
V-10	18	TAN WITH TRACER
W-8	18	TAN
X-1	16	RED
X-1A	16	RED
X-11	18	BLACK
X-12	18	BLACK
X-13	18	BROWN
X-14	18	YELLOW
X-21	18	GRAY
X-24	16	RED
X-24A	16	RED
X-24B	16	RED
X-24C	16	RED
X-25	16	RED
X-26	16	LIGHT BLUE
X-27	16	BLACK
X-28	16	BROWN
X-28A	16	BROWN

LEGEND

WIRING SPLICE

INSULATORS VIEWED FROM TERMINAL SIDE

MALE FEMALE MALE FEMALE

64 x 47

Fig. 3—Instrument Panel Wiring—Imperial

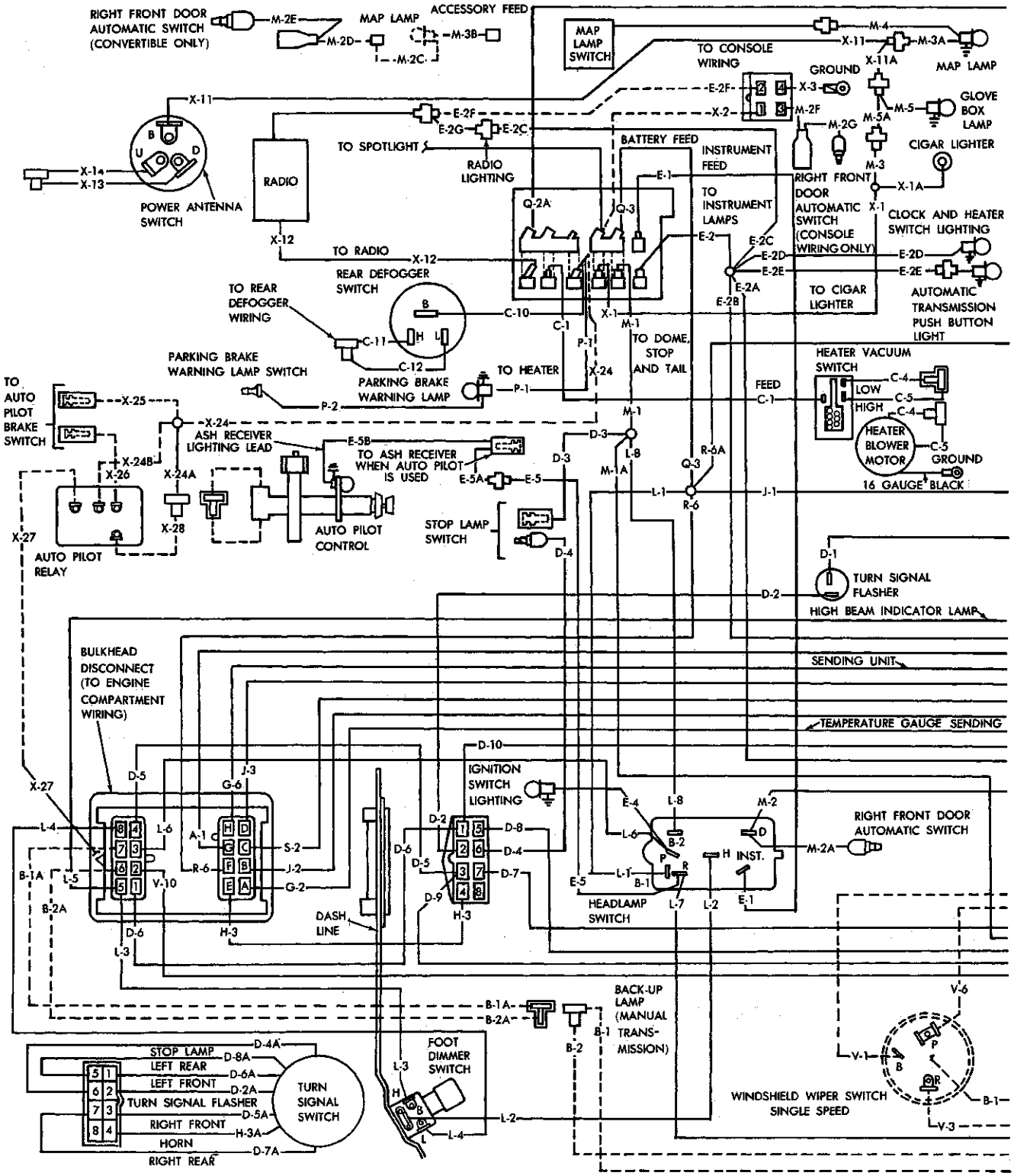
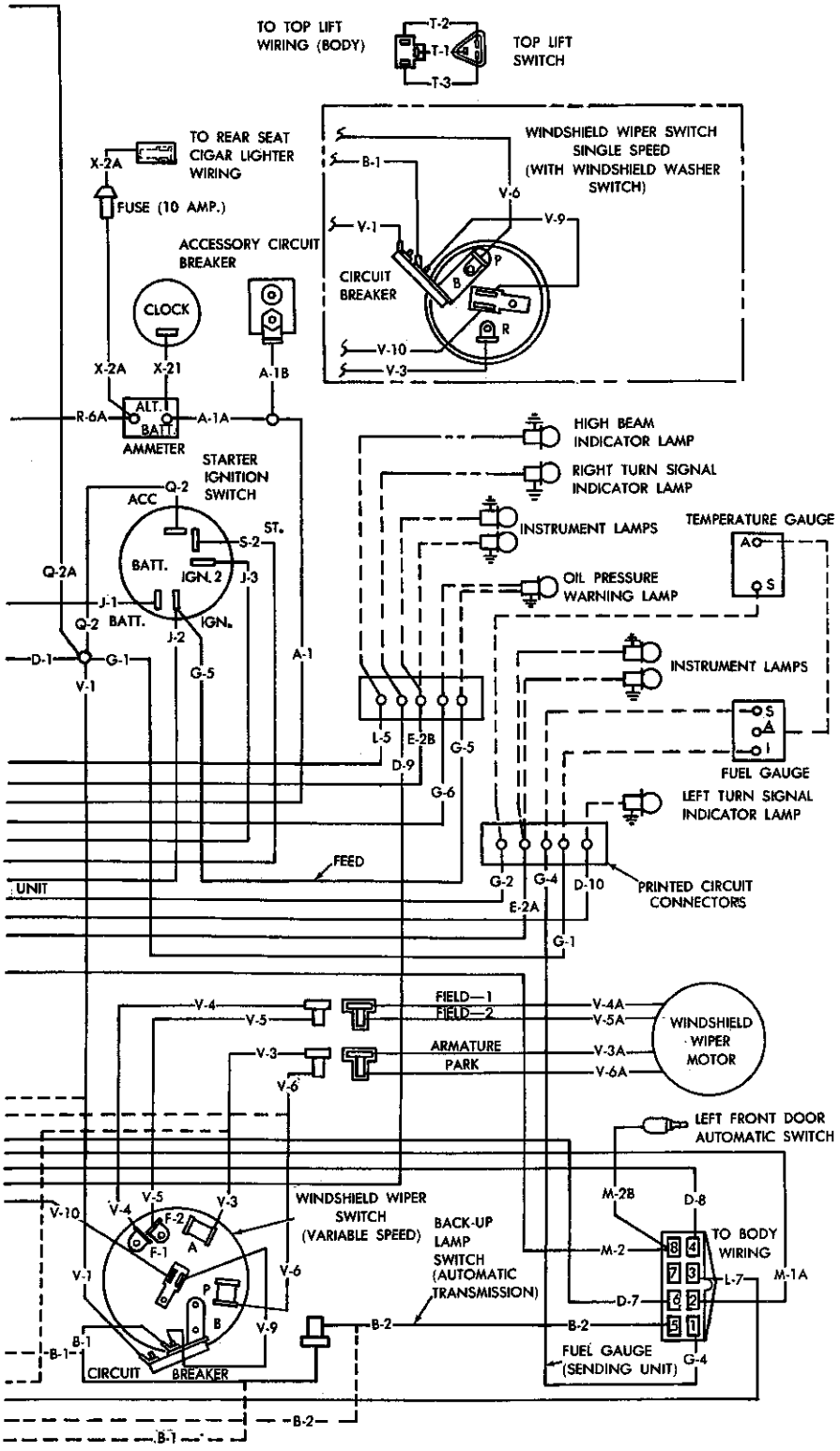


Fig. 4—Instrument Panel Wiring—Chrysler



CIRCUITS		
CIR.	GA.	COLOR
A-1	12	RED
A-1A	12	RED
A-1B	12	RED
B-1	18	WHITE
B-1A	18	WHITE
B-2	18	WHITE
B-2A	18	WHITE
C-1	14	BLACK WITH TRACER
C-4	16	BROWN
C-5	16	DARK GREEN
C-10	18	LIGHT GREEN
C-11	18	BLACK
C-12	18	WHITE
D-1	18	BLACK
D-2	18	RED
D-2A	18	RED
D-3	18	PINK
D-4	18	WHITE
D-4A	18	WHITE
D-5	18	TAN
D-5A	18	TAN
D-6	18	LIGHT GREEN
D-6A	18	LIGHT GREEN
D-7	18	BROWN
D-7A	18	BROWN
D-8	18	DARK GREEN
D-8A	18	DARK GREEN
D-9	18	TAN
D-10	18	LIGHT GREEN
E-1	18	TAN
E-2	18	ORANGE
E-2A	18	ORANGE
E-2B	18	ORANGE
E-2C	18	ORANGE
E-2D	18	ORANGE
E-2E	18	ORANGE
E-2F	18	ORANGE
E-2G	18	ORANGE
E-4	18	YELLOW WITH TRACER
E-5	18	ORANGE WITH TRACER
E-5A	18	ORANGE WITH TRACER
E-5B	18	ORANGE WITH TRACER
G-1	18	BLACK
G-2	18	VIOLET
G-4	18	LIGHT BLUE
G-5	18	DARK BLUE
G-6	18	GRAY
H-3	18	BLACK WITH TRACER
H-3A	18	BLACK
J-1	12	RED
J-2	16	DARK BLUE
J-3	18	BROWN
L-1	16	BLACK WITH TRACER
L-2	16	LIGHT GREEN
L-3	16	RED
L-4	16	BLACK
L-5	18	RED

CIRCUITS		
CIR.	GA.	COLOR
L-6	18	YELLOW WITH TRACER
L-7	18	BLACK
L-8	18	PINK
M-1	18	PINK
M-1A	18	PINK
M-2	18	YELLOW
M-2A	18	YELLOW
M-2B	18	YELLOW
M-2C	18	YELLOW
M-2D	18	YELLOW
M-2E	18	YELLOW
M-2F	18	YELLOW
M-2G	18	YELLOW
M-3	18	PINK
M-3A	18	PINK
M-3B	18	PINK
M-4	18	YELLOW
M-5	18	ORANGE
M-5A	18	ORANGE
P-1	18	LIGHT BLUE
P-2	18	LIGHT BLUE
Q-2	12	BLACK
Q-2A	12	BLACK
Q-3	12	RED WITH TRACER
R-6	12	BLACK
R-6A	12	BLACK
S-2	18	YELLOW
T-1	12	RED
T-2	12	BROWN
T-3	12	YELLOW
V-1	16	PINK
V-3	16	BLACK WITH TRACER
V-3A	16	BLACK
V-4	16	RED
V-4A	16	RED
V-5	16	YELLOW
V-5A	16	YELLOW
V-6	16	DARK BLUE
V-6A	16	DARK BLUE
V-9	16	BLACK
V-10	18	TAN WITH TRACER
X-1	16	RED
X-1A	16	RED
X-2	16	RED
X-2A	14	GREEN
X-3	18	BLACK
X-11	18	BLACK
X-11A	18	BLACK
X-12	18	BLACK
X-13	18	BROWN
X-14	18	YELLOW
X-21	18	GRAY
X-24	16	RED
X-24A	16	RED
X-24B	16	RED
X-25	16	RED
X-26	16	LIGHT BLUE
X-27	16	BLACK
X-28	16	BROWN

LEGEND

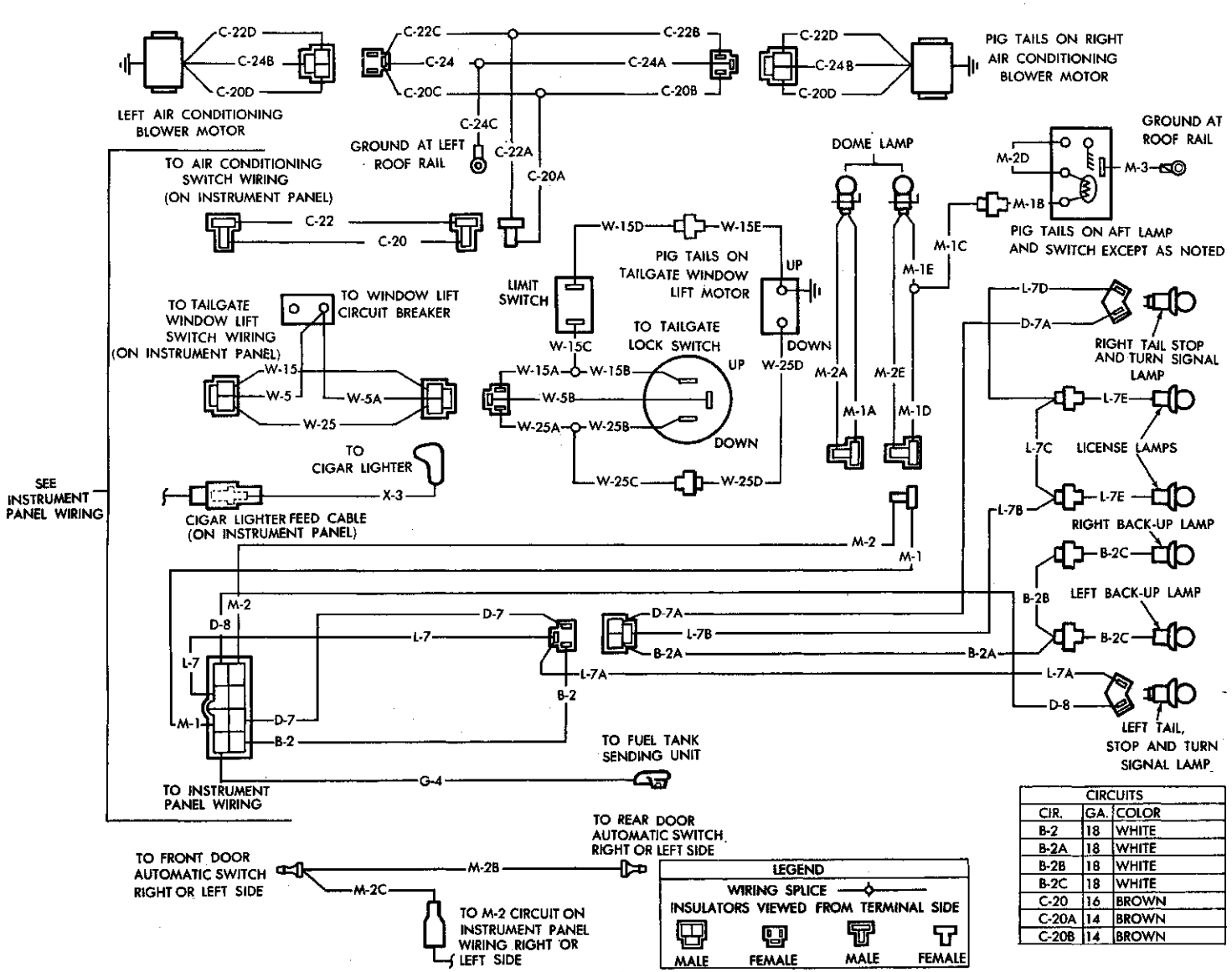
WIRING SPLICE

INSULATORS VIEWED FROM TERMINAL SIDE

MALE FEMALE MALE FEMALE

64x39

Fig. 4—Instrument Panel Wiring—Chrysler

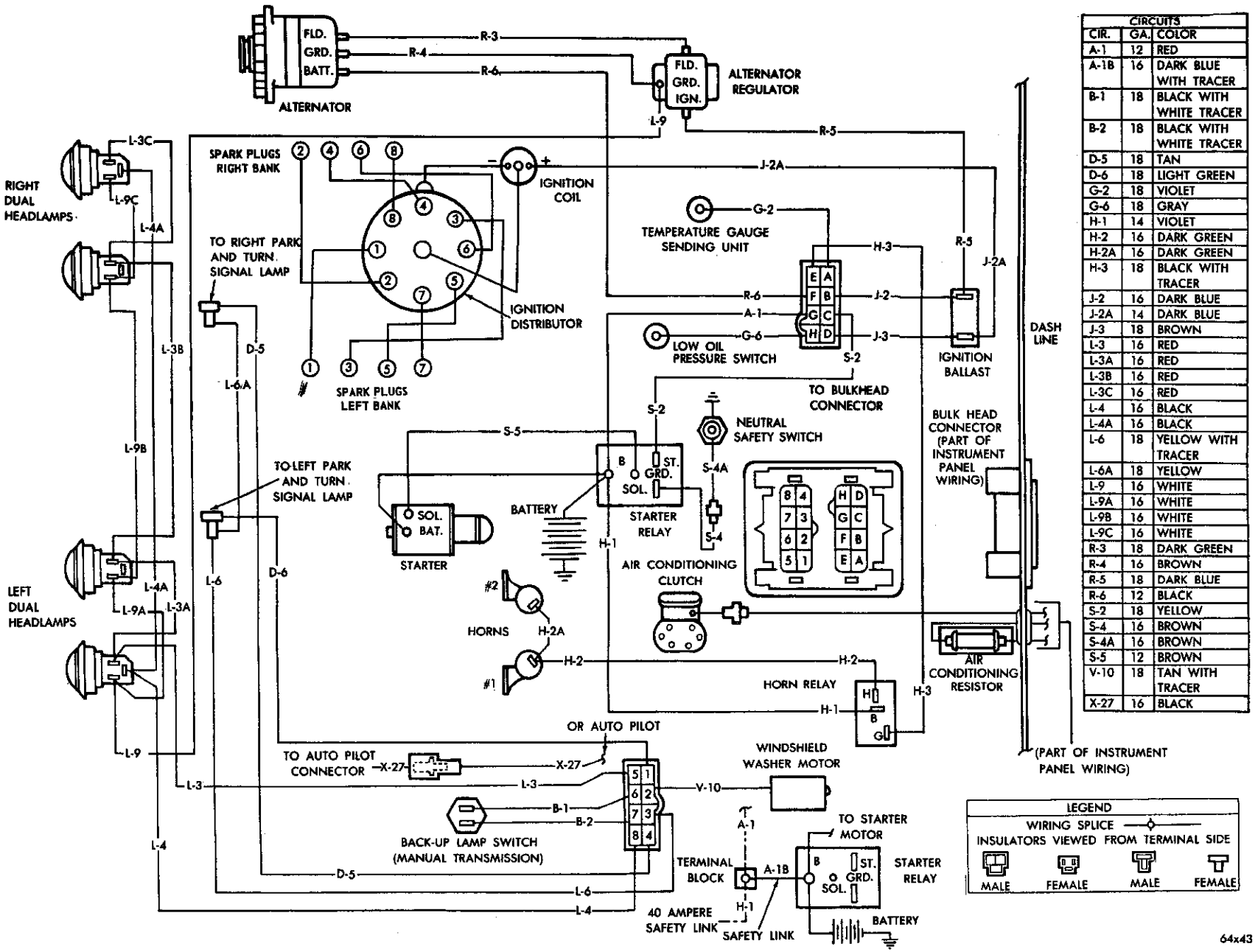


CIRCUITS		
CIR.	GA.	COLOR
C-20C	14	BROWN
C-20D	14	BROWN
C-22	16	DARK GREEN
C-22A	14	DARK GREEN
C-22B	14	DARK GREEN
C-22C	14	DARK GREEN
C-22D	14	DARK GREEN
C-24	14	BLACK
C-24A	14	BLACK
C-24B	14	BLACK
C-24C	14	BLACK
D-7	18	BROWN
D-7A	18	BROWN
D-8	18	DARK GREEN
D-8A	18	DARK GREEN
G-4	18	LIGHT BLUE
L-7	18	BLACK
L-7A	18	BLACK
L-7B	18	BLACK
L-7C	18	BLACK
L-7D	18	BLACK
L-7E	18	BLACK
L-7F	18	BLACK
M-1	18	PINK
M-1A	18	PINK
M-1B	18	PINK
M-1C	18	PINK
M-1D	18	PINK
M-1E	18	PINK
M-2	18	YELLOW
M-2A	18	YELLOW
M-2B	18	YELLOW
M-2C	18	YELLOW
M-2D	18	YELLOW
M-2E	18	YELLOW
M-3	18	BROWN
W-5	12	RED
W-5A	12	RED
W-5B	12	RED
W-15	12	BROWN
W-15A	12	BROWN
W-15B	12	BROWN
W-15C	12	BROWN
W-15D	12	BROWN
W-15E	14	DARK GREEN
W-25	12	YELLOW
W-25A	12	YELLOW
W-25B	12	YELLOW
W-25C	12	YELLOW
W-25D	14	BLACK
X-3	14	LIGHT GREEN

CIRCUITS		
CIR.	GA.	COLOR
B-2	18	WHITE
B-2A	18	WHITE
B-2B	18	WHITE
B-2C	18	WHITE
C-20	16	BROWN
C-20A	14	BROWN
C-20B	14	BROWN

64 x 76

Fig. 5—Body Wiring (Town and Country) Chrysler



CIRCUITS

CIR.	GA.	COLOR
A-1	12	RED
A-1B	16	DARK BLUE WITH TRACER
B-1	18	BLACK WITH WHITE TRACER
B-2	18	BLACK WITH WHITE TRACER
D-5	18	TAN
D-6	18	LIGHT GREEN
G-2	18	VIOLET
G-6	18	GRAY
H-1	14	VIOLET
H-2	16	DARK GREEN
H-2A	16	DARK GREEN
H-3	18	BLACK WITH TRACER
J-2	16	DARK BLUE
J-2A	14	DARK BLUE
J-3	18	BROWN
L-3	16	RED
L-3A	16	RED
L-3B	16	RED
L-3C	16	RED
L-4	16	BLACK
L-4A	16	BLACK
L-6	18	YELLOW WITH TRACER
L-6A	18	YELLOW
L-9	16	WHITE
L-9A	16	WHITE
L-9B	16	WHITE
L-9C	16	WHITE
R-3	18	DARK GREEN
R-4	16	BROWN
R-5	18	DARK BLUE
R-6	12	BLACK
S-2	18	YELLOW
S-4	16	BROWN
S-4A	16	BROWN
S-5	12	BROWN
V-10	18	TAN WITH TRACER
X-27	16	BLACK

Fig. 6—Engine Compartment Wiring—Chrysler

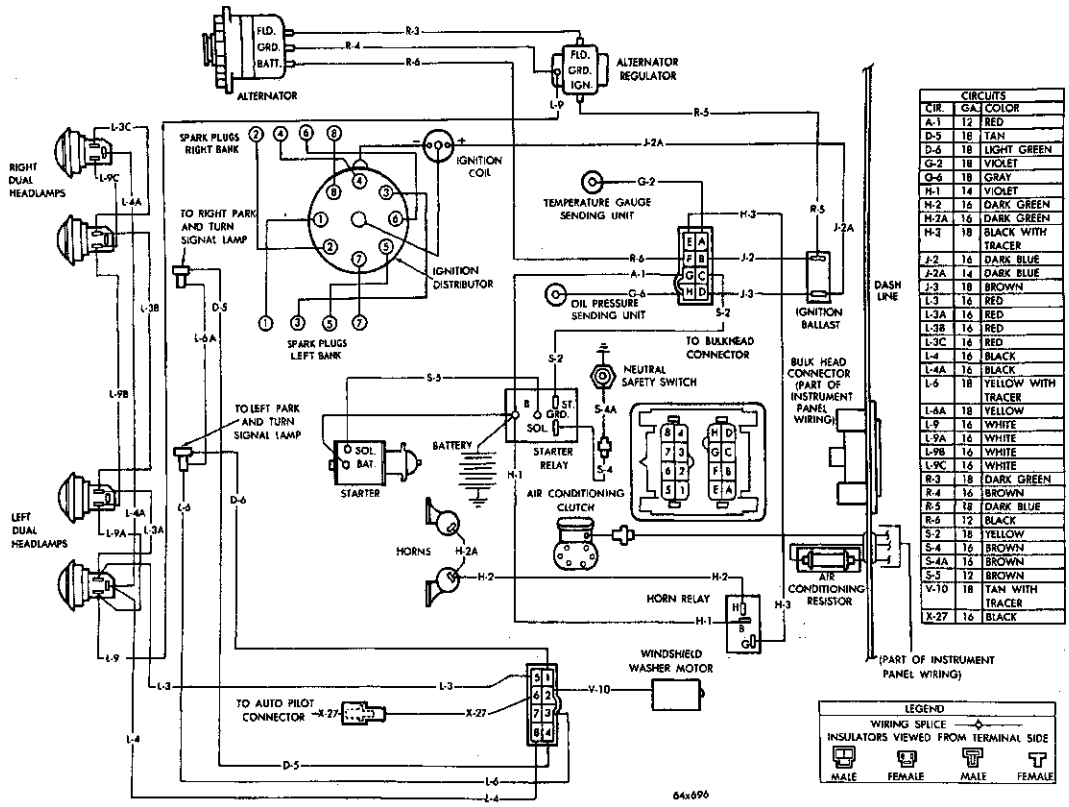


Fig. 7—Engine Compartment Wiring—Imperial

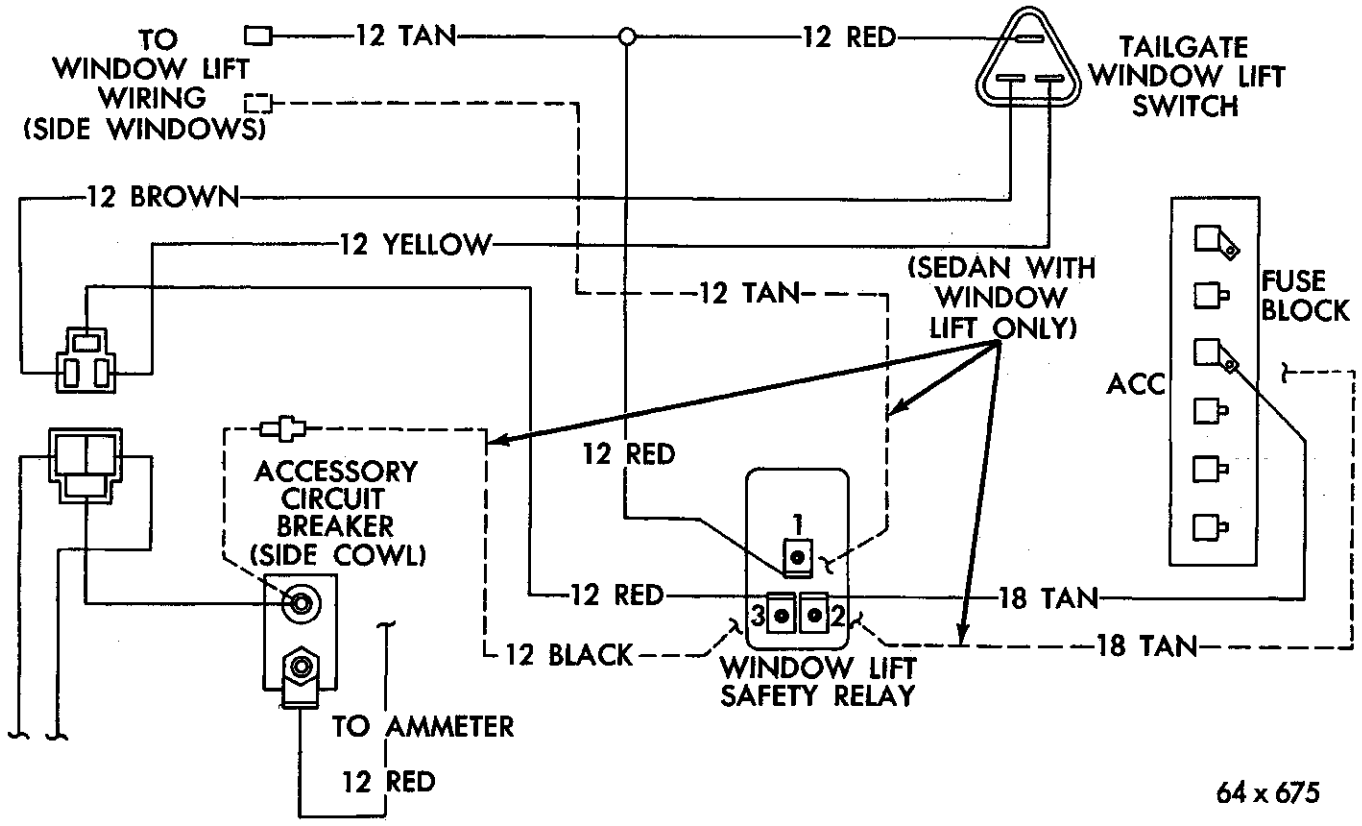


Fig. 8—Tail Gate Window Lift Switch Wiring—Chrysler

CIRCUITS		
CIR	GA	COLOR
W-1	12	TAN
W-2	14	YELLOW
W-2A	12	YELLOW
W-3	14	BLACK
W-4	14	WHITE
W-11	14	DARK BLUE
W-11A	14	BLACK
W-12	14	PINK
W-12A	14	PINK
W-13	14	ORANGE
W-13A	14	ORANGE
W-13B	14	ORANGE
W-14	14	GRAY
W-14A	14	GRAY
W-21	14	BROWN
W-21A	14	LIGHT GREEN
W-22	14	VIOLET
W-22A	14	VIOLET
W-22B	14	VIOLET
W-23	14	RED
W-23A	14	RED
W-23B	14	RED
W-24	14	DARK GREEN
W-24A	14	DARK GREEN
W-24B	14	DARK GREEN

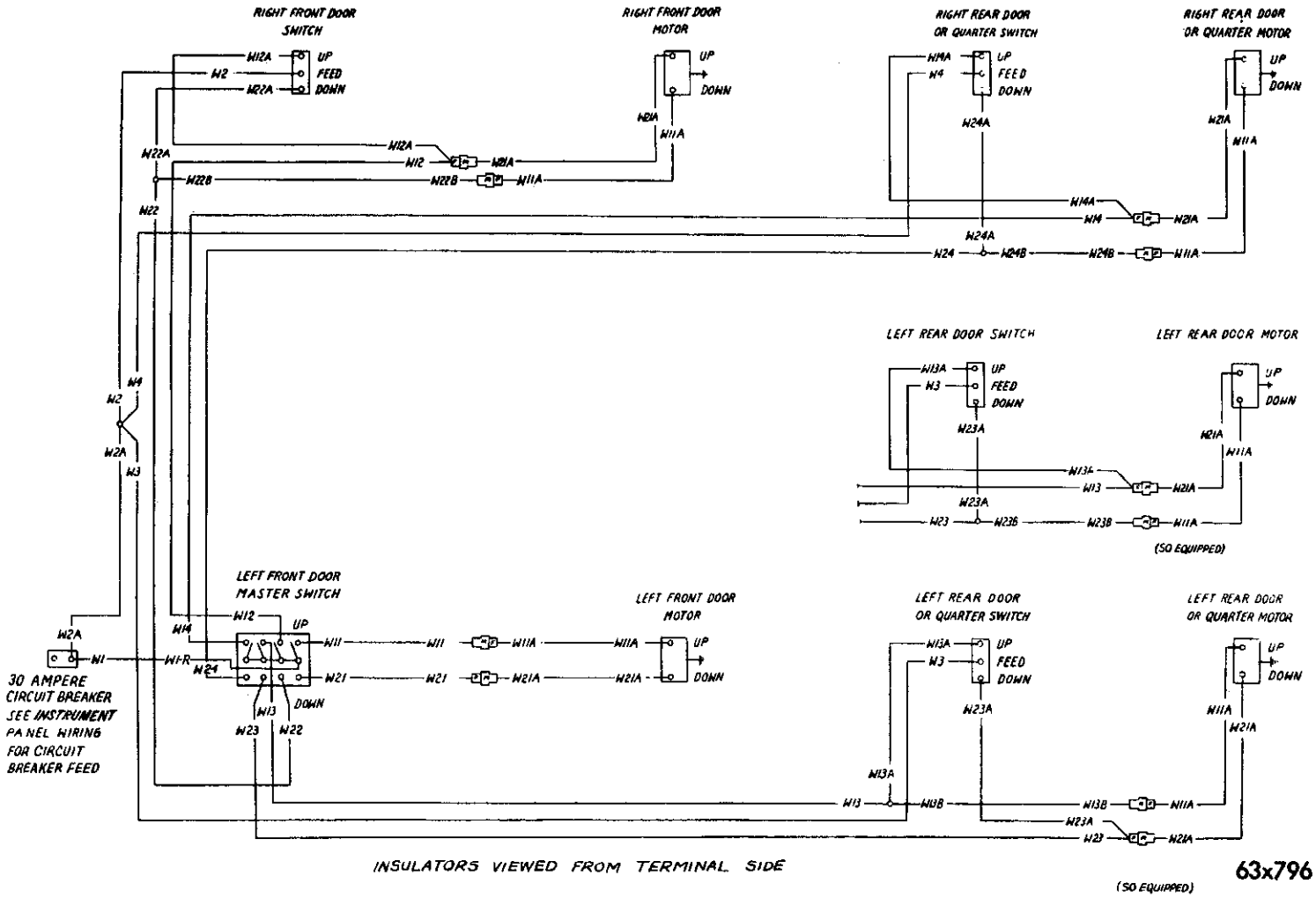


Fig. 9—Electric Window Lift—Chrysler

CIRCUITS		
CIR.	GA.	COLOR
M-1	18	PINK
M-1A	18	PINK
M-1B	18	PINK
M-2	18	YELLOW
M-2A	18	YELLOW
M-2B	18	YELLOW
M-2C	18	YELLOW
M-2D	18	YELLOW
M-2E	18	YELLOW
M-2F	18	YELLOW
M-2G	18	YELLOW
M-2H	18	YELLOW
W-1	12	TAN
W-1A	12	TAN
W-1B	14	TAN
W-2	12	YELLOW
W-2A	14	YELLOW
W-2B	12	YELLOW
W-3	14	BLACK
W-4	14	WHITE
W-11	14	DARK BLUE
W-11A	14	BLACK
W-12	14	PINK
W-12A	14	PINK
W-13	14	ORANGE
W-13A	14	ORANGE
W-14	12	GRAY
W-14A	14	GRAY
W-14B	12	GRAY
W-21	14	BROWN
W-21A	14	GREEN
W-22	14	VIOLET
W-22A	14	VIOLET
W-22B	14	VIOLET
W-23	14	RED
W-23A	14	RED
W-23B	14	RED
W-24	12	DARK GREEN
W-24A	14	DARK GREEN
W-24B	12	DARK GREEN
W-30	14	DARK BLUE
W-30A	14	DARK BLUE
W-30B	14	DARK BLUE
W-31	14	RED
W-40	14	LIGHT GREEN
W-40B	14	LIGHT GREEN
W-41	14	DARK GREEN
X-3	14	LIGHT GREEN
X-3A	14	LIGHT GREEN
X-3B	14	LIGHT GREEN
X-3C	14	LIGHT GREEN
X-3D	14	LIGHT GREEN
X-32	12	LIGHT BLUE
X-32B	16	LIGHT BLUE
X-32D	16	LIGHT BLUE
X-33	12	ORANGE
X-33A	14	ORANGE
X-33B	14	ORANGE
X-33C	18	ORANGE
X-33D	14	ORANGE
X-33E	14	ORANGE
X-33F	14	ORANGE
X-33G	14	ORANGE
X-33H	14	ORANGE
X-34	12	PINK
X-34A	14	PINK
X-34B	14	PINK
X-34C	18	PINK

CIRCUITS		
CIR.	GA.	COLOR
X-34D	14	PINK
X-34E	14	PINK
X-34F	14	PINK
X-34G	14	PINK
X-34H	14	PINK
X-35	16	ORANGE
X-35A	16	ORANGE
X-36	16	PINK
X-36A	16	PINK

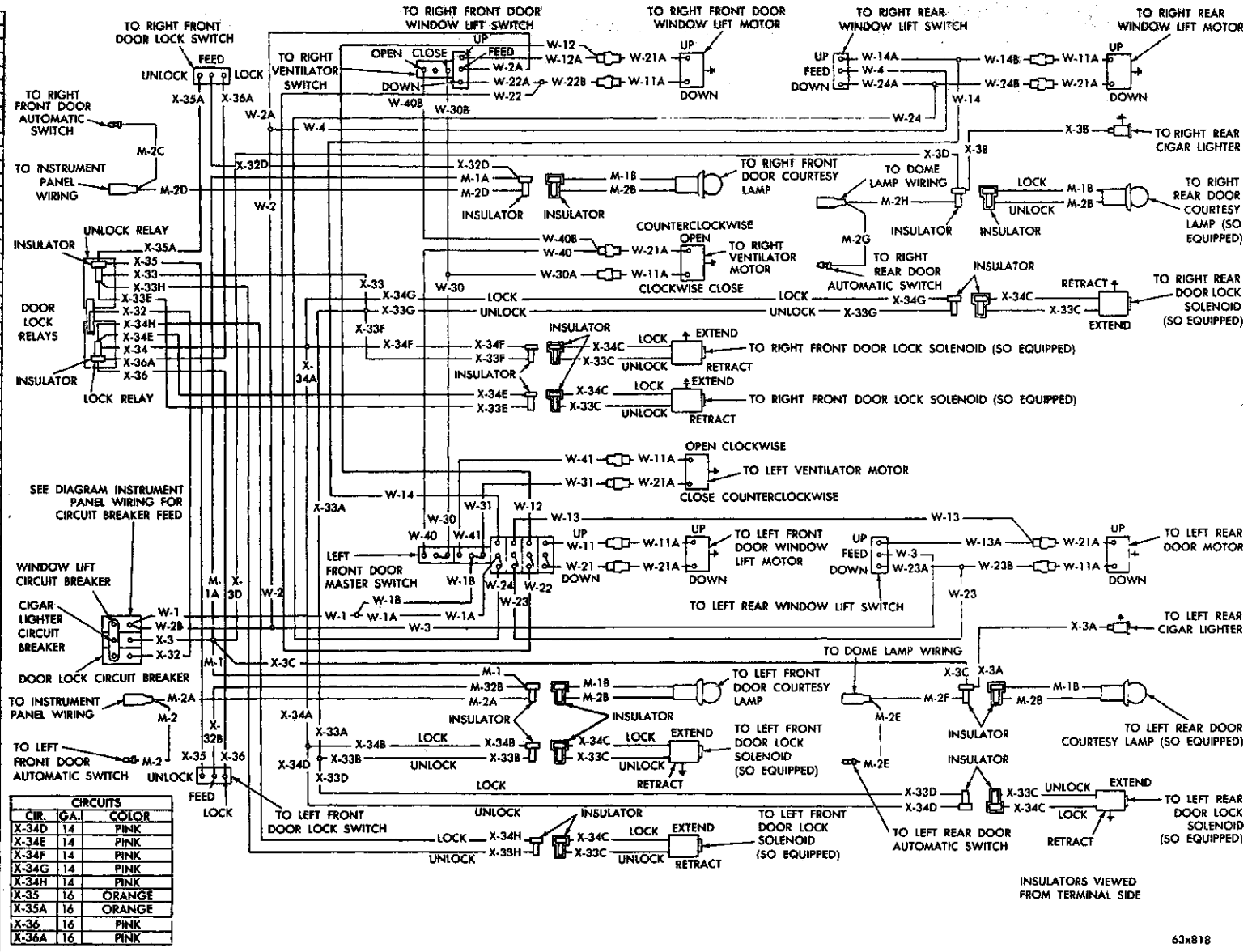


Fig. 10—Electric Window Lift, Power Vent, Door Locks and Cigar Lighter—Imperial