Section VI

ELECTRICAL SYSTEM

CONTENTS

SECTION VI
ELECTRICAL SYSTEM
DATA AND SPECIFICATIONS

BATTERY

	LC-1, LC-2	LC-3, LY-1
Voltage	12	12
Capacity	66 Plate 60 Amp hour	78 Plate 70 Amp hour
Terminal Ground	Negative	Negative

STARTER

	LC-1, LC-2, LC-3, LY-1
Model	MDT 6003
Voltage	12 Volts
Field Coils	4
Poles	4
Drive	Solenoid Shift Over-running Clutch
Brush Spring Tension (New Brushes)	32 to 48 ozs.
End Play	.005″ to .030″
Free Running Test	3800 Min. RPM—80 Amps at 11.0 Volts
Stall Torque Test	8.5 Min. Ft. Lbs.—350 Amps at 4 Volts
Solenoid Switch:	
Pull-in Coil Draw	28.6 to 32.9 Amps at 6 Volts
Hold-in Coil Draw	10.2 to 11.8 Amps at 6 Volts
Pinion Adjustment (Clearance Between Pinion and Stop) with armature end play removed	3/32″ + 1/32″ − 1/64″

ELECTRICAL LIGHT BULBS

	Number Required	Mazda Number	C.P. or Watts	Chrysler Part No.
Headlights Inner (High Beam Only)	2	4001	37½ W	1753435
Headlights Outer (High and Low Beam)	2	4002	50-37½ W	1753436
Headlight Beam Indicator Light	1	57	2	127934
Parking and Front Turn Signal	2	1034	32-4	151567
Rear Tail, Stop and Turn Signal Light	2	1034	32-4	151567
License Plate Light	2	67	3	142450
Glove Box Light	1	57	2	127934
Instrument Lights	4	57	2	127934
Map Light	1	1004	15	151578
Turn Signal Indicator Light	2	57	2	127934
Dome Light	1 or 2	1004	15	151578
Hand Brake Warning Light	1	90	6	142453
Back Up Light	2	1073	32	142456

ELECTRICAL LIGHT BULBS (Cont'd)

	Number Required	Mazda Number	C.P. or Watts	Chrysler Part No.
Transmission Push Button Light	1	57	2	127934
Radio Dial Light	2	1891		
Clock Light	1	57	2	127934
Trunk Light	1	1003	15	151577

CIRCUIT PROTECTORS

Circuit	Type	Rated Capacity	Location
Lighting System	Circuit Breaker	22½ AMP	Integral with Headlight Switch
Clock	Internally Protected		
Windshield Wiper	Circuit Breaker	6 AMP	Back of Wiper Switch
Radio	Fuse	7½ SPE	In Radio Lead Wire
Window Lifts	Circuit Breaker	20 AMP—30 AMP Spl. 4 Dr. Sedan	Behind Left Front Kick Panel
Six Way Seat	Circuit Breaker	40 AMP	Behind Left Front Kick Panel

GENERATOR

Car Model	LC-1, LC-2, LC-3	LY-1
Gen. Model		
Standard	(GJC-7012A; 1770754)	(GHM-6001E; 1753625)
With Air Conditioning	(GHM-6004C; 1704264)	(GHM-6004C; 1704264)
With Instant Heater	(GHM-6001E; 1753265)	(GHM-6001E; 1753265)
Rotation	Clockwise at Drive End	Clockwise at Drive End
Voltage	12	12
Output	Controlled by Vibrating Regulator	Controlled by Vibrating Regulator
Rated Current Output	30 Amperes	30 Amperes
Bearings		
Standard	Ball at drive end—Bushing at opposite end	Ball at drive end—Bushing at opposite end
With Air Conditioning	Ball—Both ends	Ball—Both ends
Ground Polarity	Negative	Negative
Poles	2	2
Brushes	2	2
Spring Tension	18 to 36 oz.	20 to 36 oz.
Field Coil Draw (Arm. to Field Term.)	1.2 to 1.3 amps at 10 volts	1.1 to 1.3 amps at 10 volts
Motorizing Draw	3.4 to 3.9 amps at 10 volts	2.3 to 2.6 amps at 10 volts
Test Bench Output Test (at 70° F)	20 amps, 14.3 volts at 1750 Max. RPM 30 amps, 15 volts at 2250 RPM	6 amps, 13.6 volts at 950 Max. RPM 30 amps, 15 volts at 1800 Max. RPM

REGULATOR

Car Model	LC-1, LC-2, LC-3, LY-1
Regulator Model	VRX-6201A—1642333
Rround Polarity	Negative
Gesistors	
Marked 100	
Marked 60	55.0 to 70.0 ohms
Marked 38	34.5 to 42 ohms
Marked 30	28.0 to 34.5 ohms

REGULATOR (Cont'd)

Car Model	LC-1, LC-2, LC-3, LY-1								
Voltage Regulator									
Voltage Winding Resistance	43.7 to 49.3 ohms								
*Armature Air Gap	.048 to .052 inch								
*Contacts are closed with high limit gauge installed and open with the low limit gauge installed. (Gauge on contact side and next to brass pin.)									
Voltage Setting (Operating Voltage after 15 minute run at 7 amperes)									
Temperature in degrees F	50°	60°	70°	80°	90°	100°	110°	120°	
	14.42 to 15.05	14.36 to 14.94	14.30 to 14.90	14.23 to 14.83	14.16 to 14.76	14.09 to 14.69	14.2 to 14.9	13.94 to 14.54	
	Where difficulty is encountered in keeping battery charged, it is suggested that the upper voltage limit for a given temperature be used to set regulator.								
Current Limiting Regulator									
*Armature Air Gap	.045 to .052 inch								
	*Contacts are closed with high limit gauge installed and open with the low limit gauge in place. (Gauge installed on contact side and next to brass pin).								
Current Setting	Current Regulator Setting after 15 minute run at 7 amperes. Then followed with a 15 minute run at rated regulator setting (.2 to .4 volt below the voltage regulator setting).								
Temperature in degrees F	40°	60°	70°	80°	100°	40°	60°	70°	80°	100°
Current at Specific Temperature	31–35	29–33	28–32	27–31	25–29	41–45	39–43	38–42	37–41	35–39
Cut-Out Relay:										
Voltage Winding Resistance	107 to 121 ohms									
Air Gap (Contacts Open)										
Measure Gap as near hinge as possible	.031 to .034 inch									
Contact Gap (Minimum)	.015 inch									
Contacts Close (Volts)	13.0 to 13.75 volts									
Contacts Open (After a charge of 10 amperes.)										
Discharge Amperes	0 to 6 amperes discharge									
Volts	8.2 to 9.3 volts									

DISTRIBUTOR

Car Model	LC-1, LC-2	LC-3, LY-1
Timing Mark Location	Vibration Damper	Vibration Damper
Distributor Model		
Standard	IBP 4002F; 1841514	IBS 4007A; 1841515
Contact Gap	.015 to .018 inch	.015 to .018 inch
Dwell	29° to 32°	(one set of points—29° to 32°) (both sets of points—36° to 39°)
Condenser Capacity	.25 to .285 mfd.	.25 to .285 mfd.
Breaker Arm Spring Tension	17 to 20 ounces	17 to 20 ounces
Drive	Camshaft	Camshaft
Side Play (shaft)	.005 inch max.	.005 inch max.
End Play (measured after assembly)	.003 to .010 inch	.003 to .010 inch
Firing Order	18436572	18436572
Timing	6° BTC	6° BTC
Timing Mark Location	Vibration Damper	Vibration Damper
Advance Curves	IBP 4002A; 1770750	IBK 4304; 1689325
Automatic (Distributor degrees and RPM)	0° at 250 to 450 0° to 2° at 450 2.75° to 4.75° at 750 6° to 8° at 1100 9° to 11° at 2200	0° at 220 to 490 0° to 2° at 490 2° to 4° at 750 3.5° to 4.5° at 850 8° to 11° at 2400

DISTRIBUTOR (Cont'd)

Car Model	LC-1, LC-2	LC-3, LY-1
Vacuum (Distributor degrees and inches of vacuum)	0°—8″—9″ 4.5°—6.5°—12″ 10°—12°—16″	0°—7.5″—8.5″ 4.5°—6.5°—11″ 10°—12°—16″

SPARK PLUGS AND COIL

Spark Plugs		
Type	AR-42	AGR-42
Size	14 mm.	14 mm.
Gap	.035 in.	.035 in.
Coil		
Model	CAH—4001 Chrysler Part No. (1688212)	
Output test should include resistor.		
Secondary resistance (ohms at 70° to 80° F.)	8000 to 9200	
Primary resistance (ohms at 70° to 80° F.)	1.65 to 1.79	
Ballast resistance (ohms at 70° to 80° F.)	.665 to .735	

HORNS

All Models

Make	Auto-Lite, Spartan, Jubilee
Current draw at 12.4 volts	9 to 10 amps

ELECTRIC WINDSHIELD WIPER

All Models

Variable Speed Motor	
Rated Volts	12
Resistor (ohms) (Variable speed wiper)	17-40
Field Current Draw at 13.5 volts	1½ to 2 amps
Motor Current Draw (with dry glass)	
High Speed	1½ amps at 66 to 75 rpm
Low Speed	3 amps at 35 to 40 rpm

POWER SEAT LIFTS

All Models

Type Motor	Series wound		
Rated Voltage	12		
Current Draw with Passenger Load	Pounds	Amps	Volts
Vertical Lift	500	50-60	10.5
	200	40-45	10.6
Horizontal Lift	600	60	10.4
	150	35	11.0

WINDOW LIFTS

All Models

Type Motor	Series wound
Rated Voltage	12
Maximum Stall Current	25 amps at 8.9 volts

Section VI
ELECTRICAL SYSTEM
BATTERIES

1. TESTING THE 12-VOLT BATTERY (FIG. 1)

NOTE: The battery cable terminals should be tight on battery posts to insure good contact. Battery posts and terminals that are corroded should be disconnected, terminals and clamp cleaned with a soda solution and a stiff brush. After cleaning, apply a thin coating of petrolatum.

a. Specific Gravity Test

Test specific gravity of battery with an accurate hydrometer. Where electrolyte level is too low to make a test, add battery water but do not attempt to test gravity until battery has been returned to service operation for at least four hours of normal driving.

The specific gravity of electrolyte will vary 4 points (.004) with every 10 degree F. change in temperature. Subtract 4 points (.004) for each 10 degrees below, and add .004 for each 10 degrees above 80 degrees F. Readings must be corrected to 80 degrees F. before interpreting as follows:

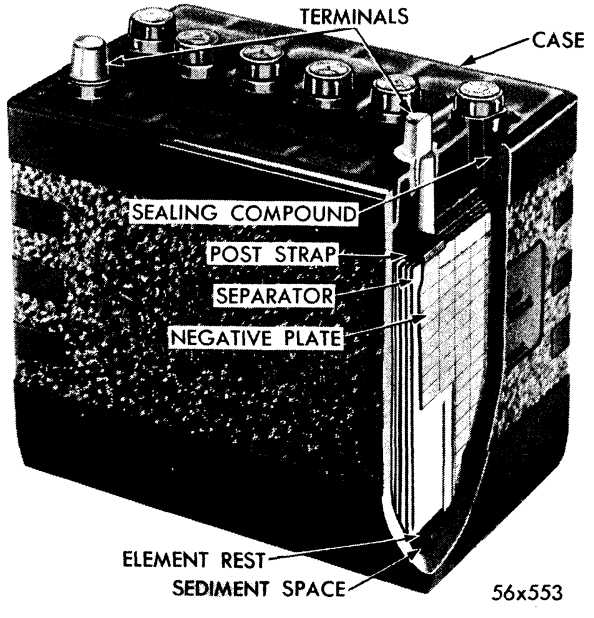


Fig. 1—Typical 12 Volt Battery (Cutaway View)

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

A battery that has a specific gravity reading of 1.225 or less, in cold temperature or 1.210 in warm temperature and all cells reading evenly within 15 specific gravity points (.015) of each other, requires recharging.

A battery that has a specific gravity reading which varies more than 15 points between any two cells should be recharged and high rate discharge tester or other suitable method used to check battery before discarding battery as unsuitable for use.

b. Voltage Tests

(1) Battery Cell Tester (Open-Circuit Voltmeter)

To make battery test, contact the meter prods (Tool MT-379) to 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.

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

The individual cell readings should not vary more than 0.05 volt between any two cells. A battery varying more than .05 volt between any two cells should be recharged and high rate discharge tester or other suitable method used to check battery before discarding battery as unsuitable for use.

(2) High Rate Discharge Test of Capacity (Fig. 2)

Satisfactory capacity tests can be made only

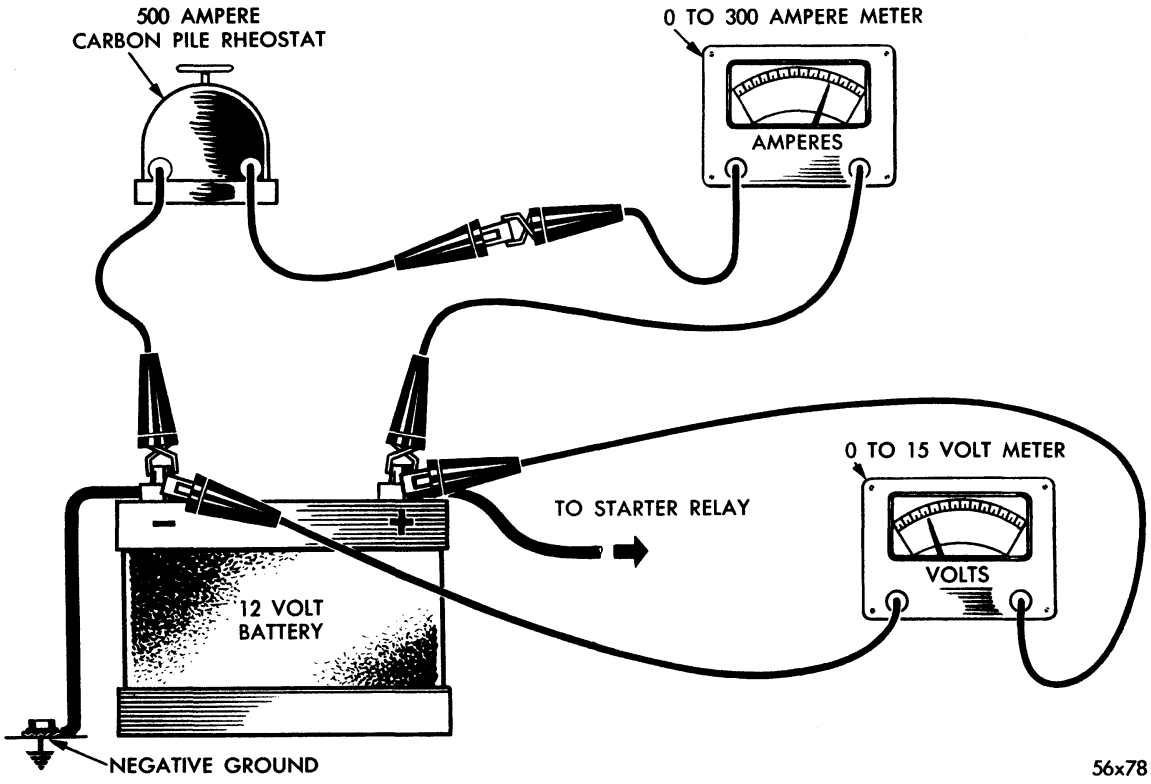


Fig. 2—Test Connections for Battery Capacity Test

when battery equals or exceeds 1.210 specific gravity at 80 degrees F.

Connect a carbon pile rheostat in series with an ammeter and battery, (Fig. 2). **Be sure the carbon pile control knob is rotated to full resistance position before connecting.** The voltmeter clips must contact battery posts **only** and not the high rate discharge tester clips. Unless this is done, the actual battery terminal voltage will not be indicated. Rotate carbon pile control knob until 200 amperes register on the meter. With battery under discharge for approximately 15 seconds, read terminal voltage. If terminal voltage shows 9.5 volts or more, battery has good output capacity.

2. CHARGING THE BATTERY

a. Slow Charging

NOTE: Slow charging is recommended wherever possible.

The slow chargers commonly used in service stations are suitable for charging both 6 and 12-volt batteries on the same circuit. Each 12-volt unit must be considered as equal to two 6-volt batteries, and charging rate must be adjusted to suit the smallest 12-volt battery on the line. Safe slow charging rates are determined by allowing one ampere per positive plate per cell. The proper slow charging rate for an 11 plate battery is five amperes.

Connect (positive +) charger lead to positive terminal and negative (—) charger lead to negative terminal of battery. If several batteries are to be charged in same circuit, due to charging voltage supply, batteries are connected in series for required number per circuit.

As batteries approach full charge, each cell will begin to gas or bubble freely. The battery temperature should not exceed 125 degrees F. during charge. If this temperature is reached, the battery should be cooled by reducing charge rate or removed from circuit. The battery is fully-charged when three successive hourly hydrometer readings show no rise in specific gravity.

b. Slow Charging Batteries to Remove Sulphation

To condition a battery that is sulphated, charge battery for minimum of 24 hours at a maximum charging rate of four (4) amperes. As battery

approaches full charge check specific gravity at hourly intervals. With no rise in specific gravity for three successive readings battery is charged to its peak capacity.

c. Fast Charging

Use **only** a 12-volt fast charger and adjust charging rates to maximum of 25 to 30 amperes for 60 or 70 ampere hour batteries.

CAUTION

Battery temperature should not exceed 125 degrees F. during charge. If charger is not equipped with thermostatic cut-off and battery has not received sufficient charging, turn charger off until battery has cooled to 100 degrees F. before starting high rate charge for continued charging.

d. Boosting Charge for Stock Batteries

Stock batteries should be boosted monthly or when specific gravity reaches 1.210 specific gravity corrected to 80 degrees F., or when open-circuit voltage drops to 2.05 volts per cell. **Battery should be fully-charged when installed.**

WARNING

When batteries are being charged an explosive gas mixture forms beneath cover of each cell. Do not smoke near batteries on charge or which have recently been charged. Do not break live circuits at terminals of batteries on charge. A spark will occur where the live circuit is broken. Keep all open flames away from battery.

STARTERS

The starter drive is engaged with flywheel by a solenoid mounted on starter. The relay is separated from solenoid and is mounted on left front fender splash shield. There is no cover band on starter, and brush arm supports are attached to starter frame.

3. TESTING STARTER RESISTANCE AND CURRENT DRAW

Test battery. If it tests 1.210 specific gravity or less, charge battery. Test circuit resistance and starter current draw at same time (Fig. 3).

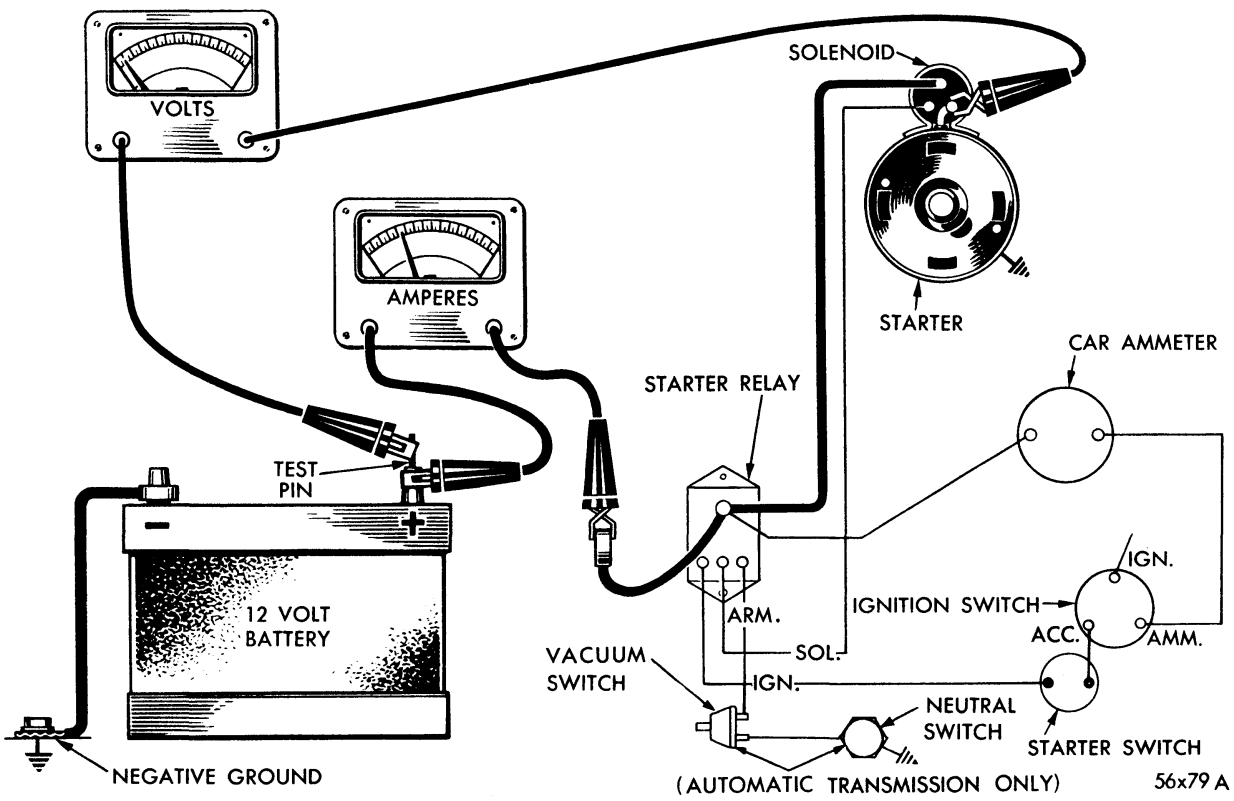


Fig. 3—Testing Starter Motor Circuit Resistance and Current Draw

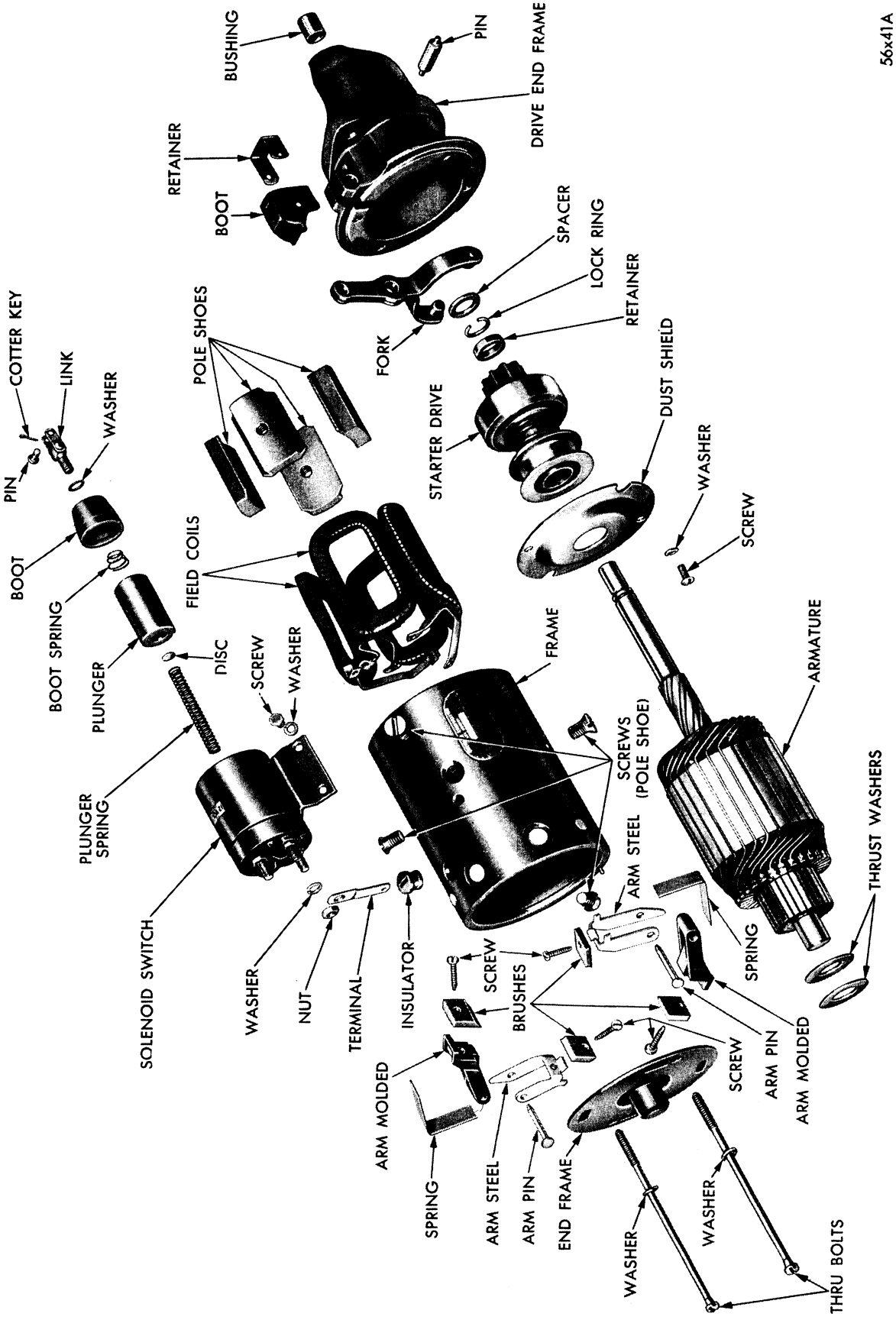


Fig. 4—12 Volt Starter Motor

Disconnect battery lead from positive battery terminal post. Connect 0 to 300 scale ammeter between disconnected lead and battery terminal post. Connect a test voltmeter with .10 volt scale divisions between the removed battery cable lug and solenoid switch motor terminal.

Crank engine and observe readings on voltmeter and ammeter. The voltage should not exceed .20 volt per 100 amperes of current. The current should not exceed 150 amperes (warm engine and battery). A reading of voltage that exceeds .20 volt per 100 amperes indicates there is high resistance caused from loose circuit connections, defective cable or burned switch contacts. A current that is high (150 amperes or more), and is combined with slow cranking speed, indicates that starter should be removed and repaired. A current that is low, with slow cranking speed, indicates resistance in solenoid switch or loose brush pigtail or soldered lead starter such as burned commutator and worn brushes.

4. REMOVAL OF STARTER

Disconnect battery cable from battery. Raise car and disconnect cable and solenoid lead wire from solenoid switch. Remove starter attaching bolts and remove starter assembly.

5. TESTING THE STARTER MOTOR (ASSEMBLED)

a. Free-Running Test

Place starter in vise and connect a fully charged, 12 volt battery to starter as follows:

Connect a test ammeter (100 ampere scale) and carbon pile rheostat in series with battery positive post and starter terminal. Connect voltmeter (15 volt scale) across starter. Rotate carbon pile to full-resistance position. Connect battery cable from battery negative post to starter frame. Adjust rheostat until starter voltage shown on voltmeter reads 11 volts. The current draw should be 80 amperes, with a minimum armature speed of 3800 r.p.m.

b. Stall Test

Install starter motor in test bench. Follow instructions of equipment manufacturer and check stall torque of starter against following specifications. With applied battery voltage adjusted to 4 volts, stall torque should be 8.5 foot-pounds, minimum, with a current draw of 350 amperes.

6. DISASSEMBLING THE STARTER (FIG. 4)

Remove clevis pin from solenoid plunger linkage. Remove thru bolts and tap commutator end plate from field frame. Lift brush holder arms so brushes are raised from commutator. Hold brushes up by use of "U" shaped clips to outside of frame. Tap drive end housing free from dowel pin and remove drive end housing and armature assembly from field frame. Remove shield plate attaching screws and remove drive end housing from armature and drive assembly.

7. CLEANING THE STARTER PARTS

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

Do not immerse drive unit in cleaning solvent. The drive clutch is pre-lubricated at factory and solvent will wash lubrication from clutch. The drive unit may be cleaned with brush moistened with cleaning solvent and wiped dry with cloth.

8. REPLACING BRUSHES AND SPRINGS

Brushes that are worn more than ½ the length of a new brush, or are oil-soaked, should be replaced. The starter must be disassembled to install brushes and springs.

9. TESTING THE ARMATURE

a. Testing the Armature for Short Circuit

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

b. Testing Armature for Ground

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

c. Testing Commutator RunOut, Refacing and Undercutting

Place armature in pair of "Vee" blocks and

check runout with dial indicator. Check both shaft and commutator. A bent shaft requires replacement of armature. When commutator runout exceeds .003 inch, commutator should be refaced. Remove only sufficient metal to provide a smooth, even surface. After commutator is refaced, undercut insulation between bars to depth of $\frac{1}{32}$ inch with a thin, hacksaw blade, or Tool C-770. Undercut insulation square and full width of groove, and polish commutator with 000 sandpaper to remove burrs.

10. TESTING THE FIELD COILS FOR GROUND

Disconnect ground lead from the shunt field coil at terminal screw. Touch each of brush holders with a test lamp prod, while holding the other test prod against starter frame. Two of brush holders that are 180 degrees apart should cause test lamp to light, as they are intentionally grounded. The other two brush holders should not cause lamp to light when tested, as they are insulated. If these insulated brush holders cause lamp to light when tested, it indicates that the field coil is grounded. **Be sure brush pigtails or leads are not touching field frame.**

If field coils are grounded, inspect terminal insulation. If insulation is in good condition, test each coil separately after unsoldering connection wire. Replace grounded field coils. Test shunt field coil for continuity and for any ground, then reconnect ground lead.

11. REPLACING THE FIELD COILS

A pole shoe screwdriver should be used to remove and install field coils to prevent damage to pole shoe screws and for proper tightening. Pole shoes that are loose may cause armature core to rub pole shoes. This will decrease starter efficiency and damage the armature core and windings.

12. SERVICING THE BUSHINGS

Inspect armature shaft bearing surfaces and bearings for wear by placing core in vise equipped with soft jaws. Do not squeeze tightly. Try commutator end plate and the drive end nose casting by placing them on shafts and checking for side play. Replace commutator end plate assembly if bearing is worn. Also, replace drive end bearing if it is worn. The bearing should be well soaked in SAE 10-W Engine Oil before it is installed.

13. SERVICING THE DRIVE UNIT

To Remove drive from armature shaft, tap stop collar toward pinion and remove lock ring first. Place drive unit on shaft and, while holding armature, rotate pinion. The drive pinion should rotate smoothly in one direction (not necessarily easily), but should not rotate in opposite direction. If drive unit does not function properly or pinion is worn or burred, replace drive unit.

14. ASSEMBLING THE STARTER

(Refer to Fig. 4.) Lubricate armature shaft and splines with 10-W oil. Assemble drive end parts on armature using a new lock ring for stop collar. Install dust gravel shield, and slide assembly into field frame concentrically on nose casting, and slide assembly into field frame until end of commutator touches brushes. While holding armature against brushes with slight pressure, push brushes up and allow them to come to rest on commutator, slide armature assembly into place. Install commutator end plate and through bolts. Make sure end nose and plate are positioned on dowel pins, and tighten through bolts. Install solenoid plunger clevis pin and cotter key, but do not bend cotter key over until solenoid plunger travel and pinion clearance have been established. Be sure dust boot lip is over ring projection on solenoid unit.

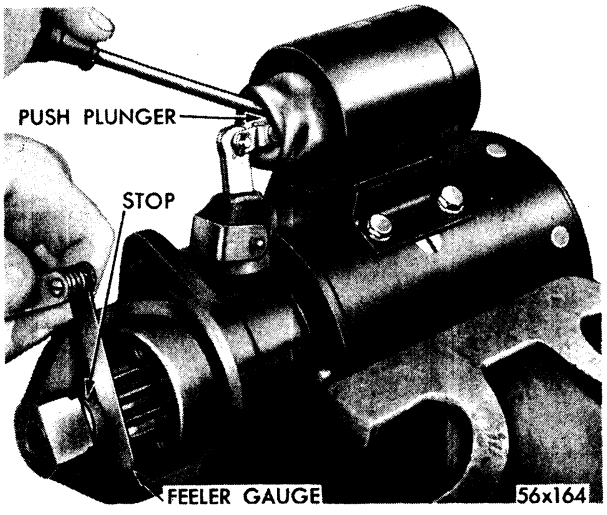


Fig. 5—Adjusting Starter Drive Pinion Clearance

15. ADJUSTING STARTER DRIVE GEAR (PINION) CLEARANCE (FIG. 5)

Place starter assembly in vise equipped with soft jaws and tighten vise sufficiently to hold starter. Push **in** on solenoid plunger link adjusting bolt (**NOT THE FORK LEVER**) until plunger bottoms. Measure clearance between end of pinion and pin stop with plunger seated and pinion pushed toward commutator end (Fig. 5). The clearance should be $\frac{3}{32}$ inch, plus $\frac{1}{32}$ inch or minus $\frac{1}{64}$ inch. Adjust for proper clearance by screwing link **in** or **out** of plunger as required. Bend cotter key and test starter operation under a free running test.

16. INSTALLING THE STARTER

Before installing starter in car, lubricate armature shaft ahead of pinion with 10-W oil and be sure starter and flywheel mounting surfaces are free of dirt and oil. These surfaces must be clean to make good electrical contact. Install starter from beneath car. Draw attaching bolts up tight and attach wires to solenoid switch. Lower car to floor; install battery cable and test operation of starter for proper engine cranking.

GENERATORS

17. REMOVAL

The generator is mounted on a bracket attached to engine and held in place by two bolts through end frames and bracket. It is secured at top by a bolt through drive end frame and the belt tightening strap. Disconnect battery ground terminal and wires at generator armature and field terminals. Loosen generator adjusting strap bolt, push generator to left to relieve belt tension and remove generator attaching bolts and generator.

18. CHARGING CIRCUIT RESISTANCE TEST (FIG. 6)

Before an output test of generator is made, charging unit should be tested for high resist-

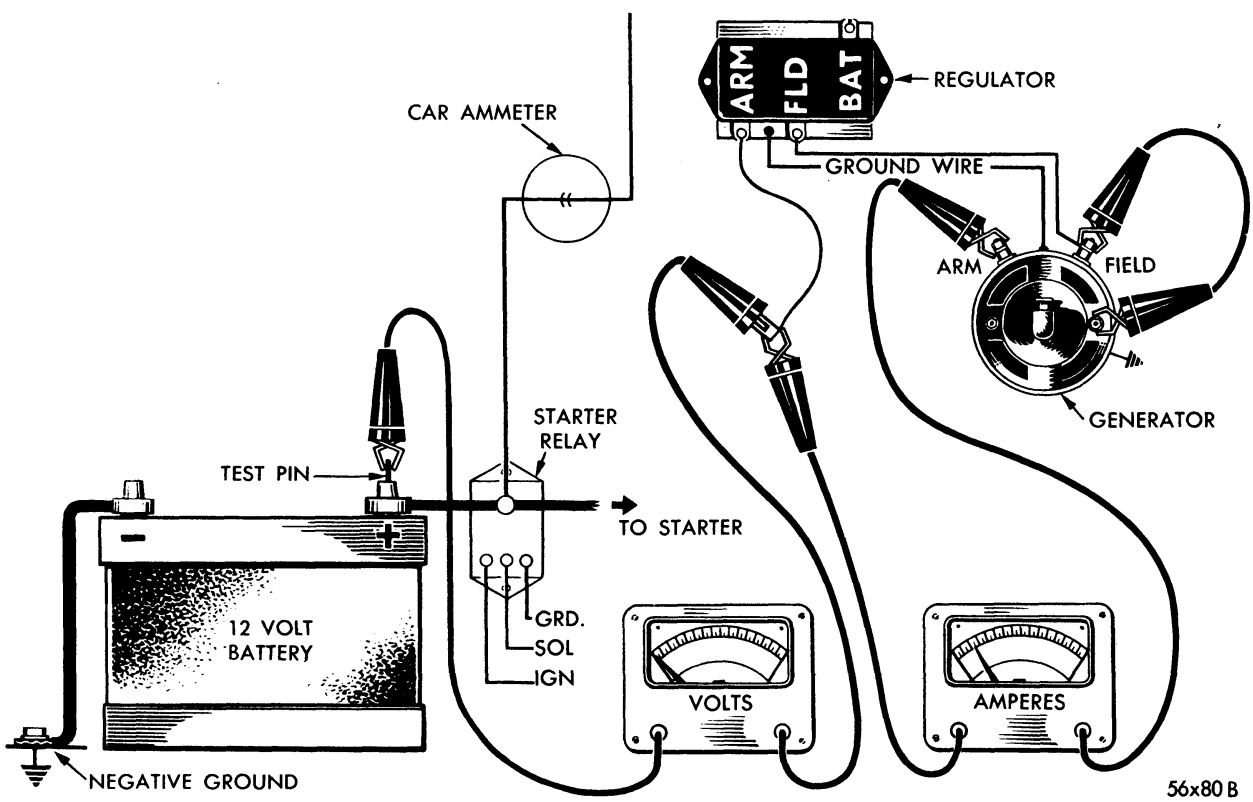


Fig. 6—Charging Circuit Resistance Test

ance due to loose connections, damaged wiring and burned relay contacts. The generator drive belt tension should also be checked and adjusted if tension is incorrect.

Connect test equipment, as shown in Figure 6. The ammeter is connected at generator and volt meter is attached to armature lead so that any voltage loss in test ammeter will not register on voltmeter. Start engine, increase engine speed until 10 amperes register on test ammeter, and read voltmeter. The voltage shown will be voltage drop of charging circuit and should not exceed .50 volt. A voltage drop that exceeds .50 volt indicates high resistance from a loose connection, burned relay contacts or a partially broken wire. Where voltage drop exceeds .50 volt, a-point-to-point check is required. Move one of voltmeter leads back along circuit toward other test lead connection, checking voltage at each terminal connection. A sudden drop in voltage indicates that high resistance is present between that point and last point tested. Clean relay contacts, tighten loose connections and replace damaged wiring.

Adjust belt tension by measuring with a scale applied at center of longest span between pulleys. The deflection should be ¼ inch with a 9 to 12 pound pressure. See Cooling System, Section V, (Fig. 4.)

19. GENERATOR OUTPUT TEST

Connect equipment, as shown in Figure 6, with exception of voltmeter leads. In output test, connect voltmeter from generator armature terminal post to ground. Increase engine speed while observing the meters. A generator that is in good condition should be capable of an output in amperes that will exceed rated output slightly: approximately 15 volts at 2,300 generator r.p.m.

CAUTION

The engine MUST NOT be running for more than few seconds while making above test to avoid damage to generator. Check generator. Check generator brushes for excessive arcing and/or bounce while high output is being delivered. A rough, burned or dirty commutator will cause arcing and bouncing at brushes.

20. DISASSEMBLY

To disassemble a standard type generator (Fig. 7), remove through bolts and pull end plate from field frame. Slide armature and drive end frame assembly from generator field frame. Place armature core in vise equipped with soft jaws, and remove pulley with Tool C-3505. Remove drive key and press end frame assembly from armature. Do not remove field coils from frame at this time.

Generators used on Air Conditioned cars (Fig. 8) have a ball bearing at commutator end. To remove drive end frame, remove through bolts. Pull end frame free of dowel pin and rotate end frame far enough so lugs are away from terminal posts.

Support generator in arbor press on plates against end frame lugs. Press end plate from shaft while supporting generator assembly to prevent it from falling when free. Complete disassembly operation in same manner as for a standard generator.

21. CLEANING AND INSPECTION

CAUTION

Do not immerse armature, field frame and field assembly, or bearing felts in cleaning solution. Never steam clean a generator.

Wipe above parts with a clean cloth. When cleaning ball bearings do not spin them with compressed air. Inspect field coils for burned or damaged insulation. Inspect commutator for wear and condition of soldered coil leads. An armature that has been overheated will show signs of throwing solder and will require resoldering or replacement. Inspect commutator for trueness.

Inspect bearings for wear or roughness. Replace worn or rough bearings. The bushing type bearing requires replacement of end frame assembly.

22. TESTING GENERATOR COMPONENTS

a. Testing Armature for Ground

Place one probe from 110-volt test lamp on armature shaft and other probe at end of any commutator bar. If test lamp lights, it indicates a ground. Do not touch shaft bearing surface or commutator bar brush surface with test probe as this will pit surfaces. Replace grounded armatures.

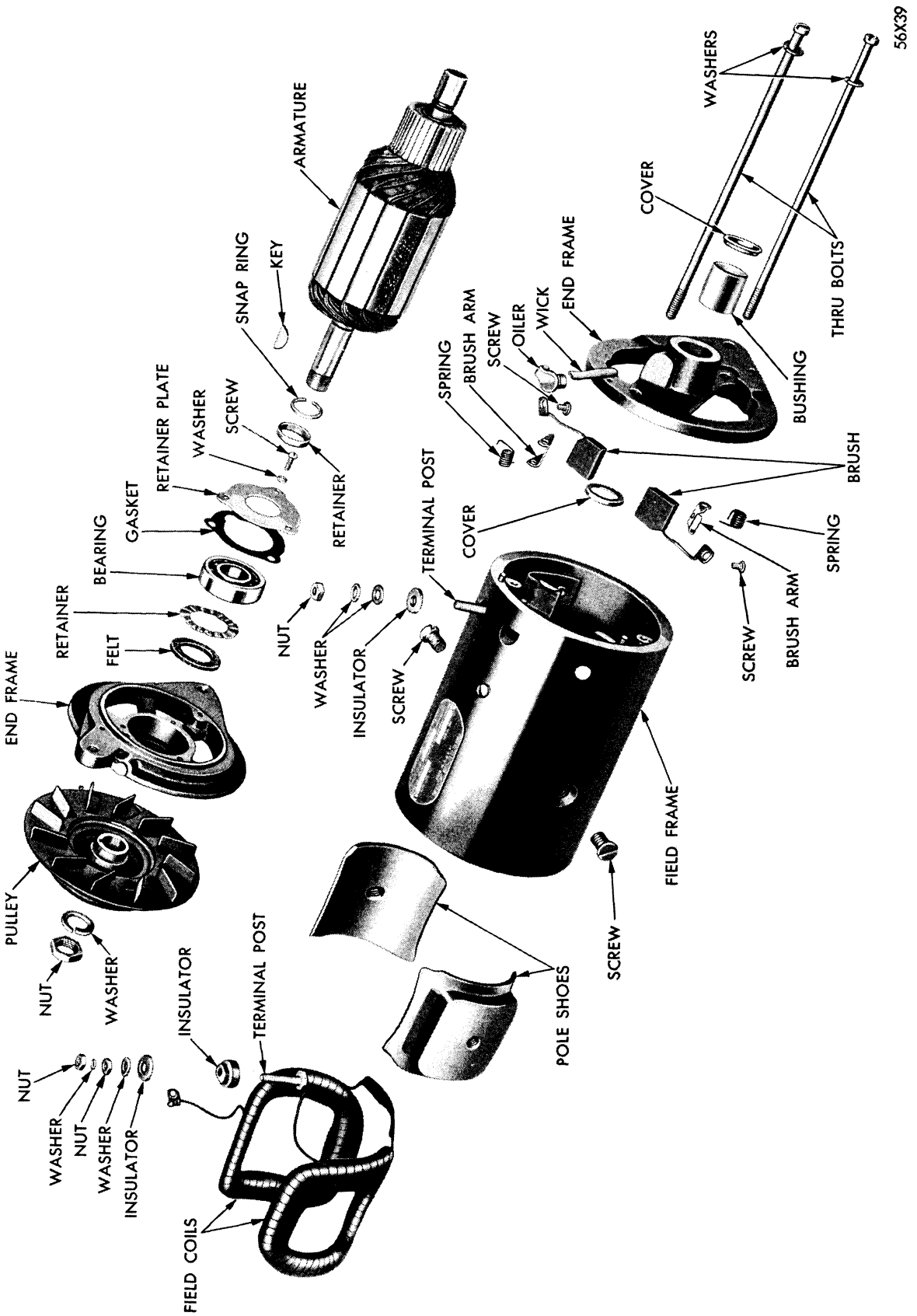


Fig. 7—12 Volt Generator (Standard Equipment)

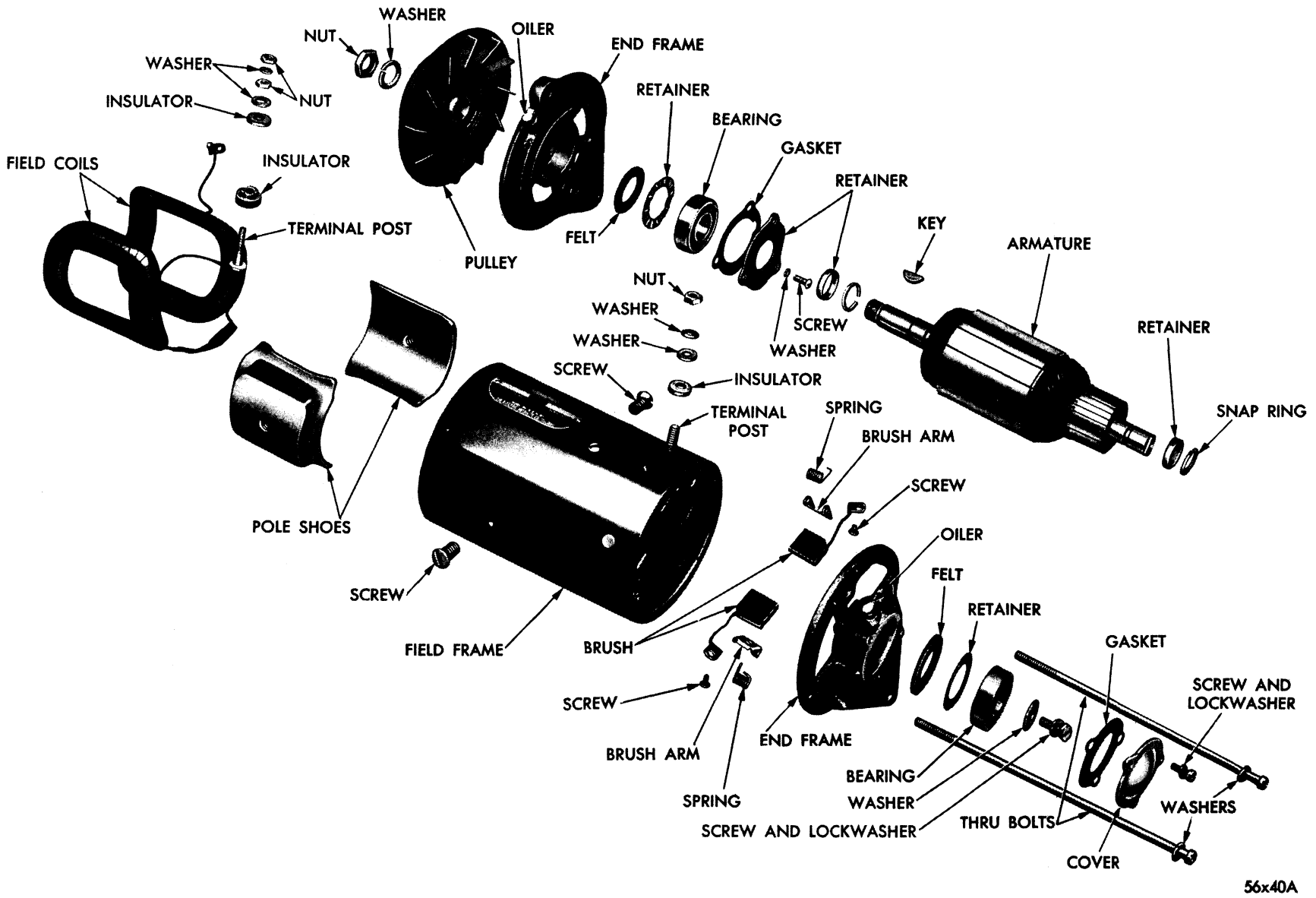


Fig. 8—12 Volt Generator (Air Conditioning Models)

b. Testing Armature for Short Circuit

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

c. Testing Field Frame Assembly for Ground

Disconnect "ARM" terminal field lead from insulated brush holder. Touch a 110-volt lamp probe to generator "FIELD" terminal post, while holding other probe against good ground on field frame (be sure brush lead terminals are not touching a ground). The lamp should not light. If lamp lights, a ground exists, and it will be necessary to determine whether ground is in field coils or field terminal post.

Remove terminal post from field frame and retest from field lead to ground. If lamp lights, field coils or connecting lead is grounded. Move connecting lead between two coils away from frame. If light still burns, ground is in field coils.

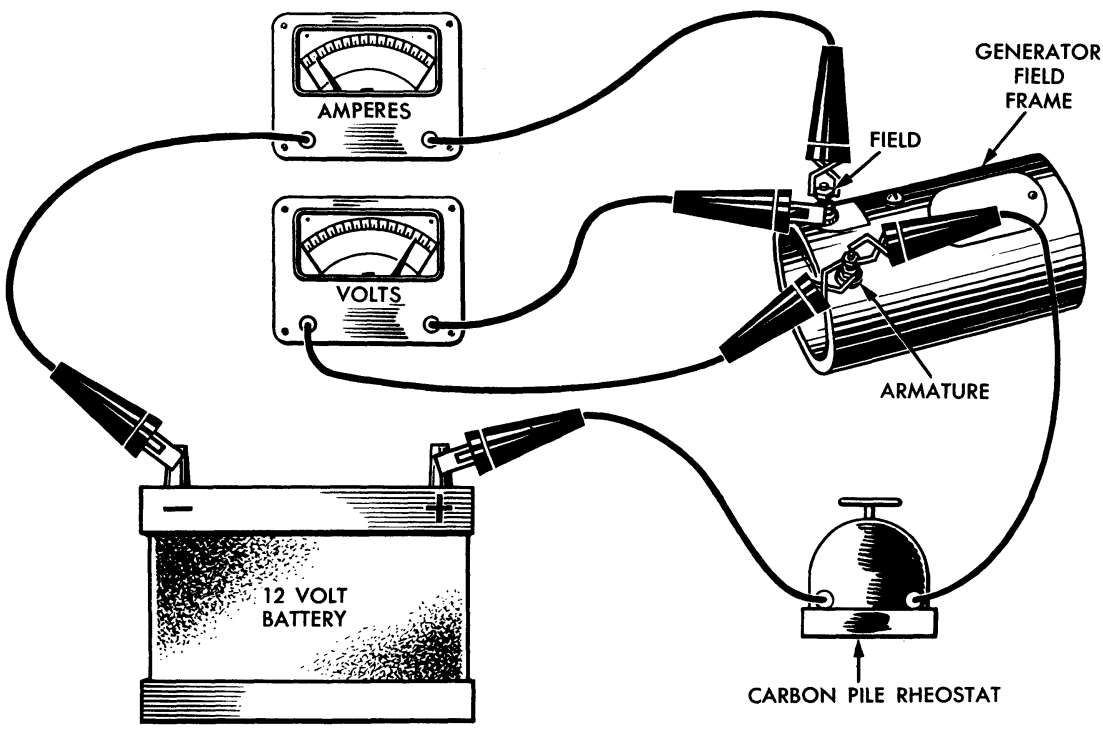
Touch one of 110-volt test lamp probes to "ARM" terminal post and field frame. If lamp lights, it indicates that either terminal post or brush holder is grounded. Remove terminal post and retest brush holder. If lamp lights, brush holder is grounded. Replace defective parts. It is necessary to replace field frame if, insulated brush holder is grounded.

d. Testing Field Current Draw (Fig. 9)

Test field coils for short circuits between windings, high resistance connections, or for improper coils, by connecting test equipment, as shown in Figure 9. Adjust battery voltage to specified voltage of 10-volts with rheostat. The reading on ammeter indicates field current draw. A current reading that exceeds 1.2 to 1.3 amperes indicates that coil windings are shorted, or that wrong coils have been installed. A current reading that is less than specified indicates poor electrical connections or wrong field coils. Replace short circuited or improper coils, or re-solder defective connections.

23. SERVICING THE ARMATURE

Reface commutator if runout exceeds .0005 inch, or if it is rough, burned, or worn so that insulation between bars is too high. Undercut insulation between commutators bars to depth



56x145

Fig. 9—Testing Field Current Draw

of 1/32 inch, the full width of insulation. Metal particles are sometimes embedded in grooves following undercutting and should be removed.

24. REPLACING FIELD COILS

To replace field coils, a pole shoe screwdriver, such as Tool C-3078, should be used to prevent damage to screws and to assure proper tightening when installing coils. Pole shoes that are loose will rub armature core, causing loss of efficiency and damage to armature.

25. REPLACING BRUSHES AND SPRINGS

Brushes that are oil soaked or worn to ½ length of a new brush should be replaced. Sand new generator brushes to fit contour of commutator. With new type brush holder, it is difficult to measure spring tension (which must be done after generator is assembled). It is suggested that new springs be installed when brushes are replaced.

26. ASSEMBLING THE GENERATOR

a. Standard Generators

Soak felt washers and Oilite bushing in clean engine oil. Pack ball bearing about half full with high temperature non-fiber bearing lubricant. Compress felt slightly to remove oil before installing.

(Refer to Figs. 7 and 8.) Assemble drive end parts on armature before installing it in generator. **Do not grip core too tightly in vise.** Install retainer over snap ring before pressing bearing and end frame assembly on shaft. Install suitable sleeve over armature shaft so that pressure is applied to inner race when pressing bearing on shaft.

b. Accessory Equipment Generators

On generators used with air conditioning equipment, install armature and drive end assembly in generator field frame. Install commutator end plate and through bolts. Place felt and shield in commutator end plate and press bearing on shaft, applying pressure to inner race. Install shield.

c. Testing After Assembly

The generator should be tested before it is installed on car. If proper bench test equipment is not available, it is possible to motor test generator. A generator that will motor freely with specified voltage applied will, in most cases, operate properly when driven as a generator.

27. MOTORING TEST

Connect a carbon pile rheostat and test ammeter in series with positive post of 12-volt battery and generator armature terminal post. Connect a jumper lead from field terminal post to ground. Connect a jumper lead to battery negative post and generator frame. This will cause armature to rotate as a motor. Adjust battery voltage to 10 volts. The reading on test ammeter should be 3.4 to 3.9 amperes with armature turning smoothly.

28. INSTALLATION

Place generator in position and install attaching bolts. Adjust drive belt tension at generating strap so there is a deflection of ¼ inch with 9 to 12 pounds pressure. Refer to Fig. 4, Cooling System, Section V.

CAUTION

Be sure condenser used for radio interference is properly attached to armature ("ARM") terminal post.

REGULATORS

The current and voltage regulator is designed to operate **only** in 12-volt, negative ground electrical system.

NOTE: Do not attempt to adjust unit unless proper procedures are thoroughly understood. Otherwise, damage to entire electrical system may result.

29. PREPARATIONS FOR TESTING

Disconnect battery before attempting to remove regulator assembly or to connect test equipment. Do not connect test equipment. Do not connect battery again until after regulator removal and/or installation has been completed. Do not connect battery when installing

test equipment until equipment is installed and all connections are protected against accidental ground. Failure to adopt these pre-cautions may result in damage to electrical circuit parts or wiring.

Before testing regulator assembly, make sure generator drive belt tension is correct. The battery specific gravity should be 1.210 or higher. Check charging circuit resistance. The voltage drop of insulated side of circuit should not exceed .50 volt, with 10 amperes of current flowing. The ground side of charging circuit should also be tested.

30. NORMALIZING THE REGULATOR TEMPERATURE

Connect a test ammeter in series between battery lead and regulator "Batt" terminal. Connect a test voltmeter from regulator "Batt" terminal to ground. Connect a variable resistance across battery. Start engine, adjust engine speed to 1,500 r.p.m., and observe test ammeter. Adjust variable resistance to obtain a load of 7 amperes. Maintain this 7 ampere load for 15 minutes to normalize regulator temperature.

31. TESTING REGULATOR TEMPERATURE

When testing regulator, keep cover in place and make sure temperature at regulator is known. The regulator armature hinges are temperature compensated and control will vary with temperature changes.

To measure temperature at regulator, hold an accurate Fahrenheit thermometer two inches from cover. The correct voltage setting of regulator for various temperatures with 7 amperes flowing is shown in Specifications.

32. TESTING THE VOLTAGE REGULATOR SETTING (FIG. 10)

Connect test equipment, start engine and operate at 1,500 r.p.m. Hold Fahrenheit thermometer 2 inches from regulator cover and note temperature reading. Observe voltage on test voltmeter. Compare voltage reading and temperature with those shown in Specifications. If adjustment is required, decrease engine speed to slow idle. Remove regulator cover and bend lower hanger of voltage regulator **down** to increase voltage or **up** to decrease voltage (Fig. 11). Replace regulator cover, increase engine speed to 1,500 r.p.m., and check temperature and voltage readings.

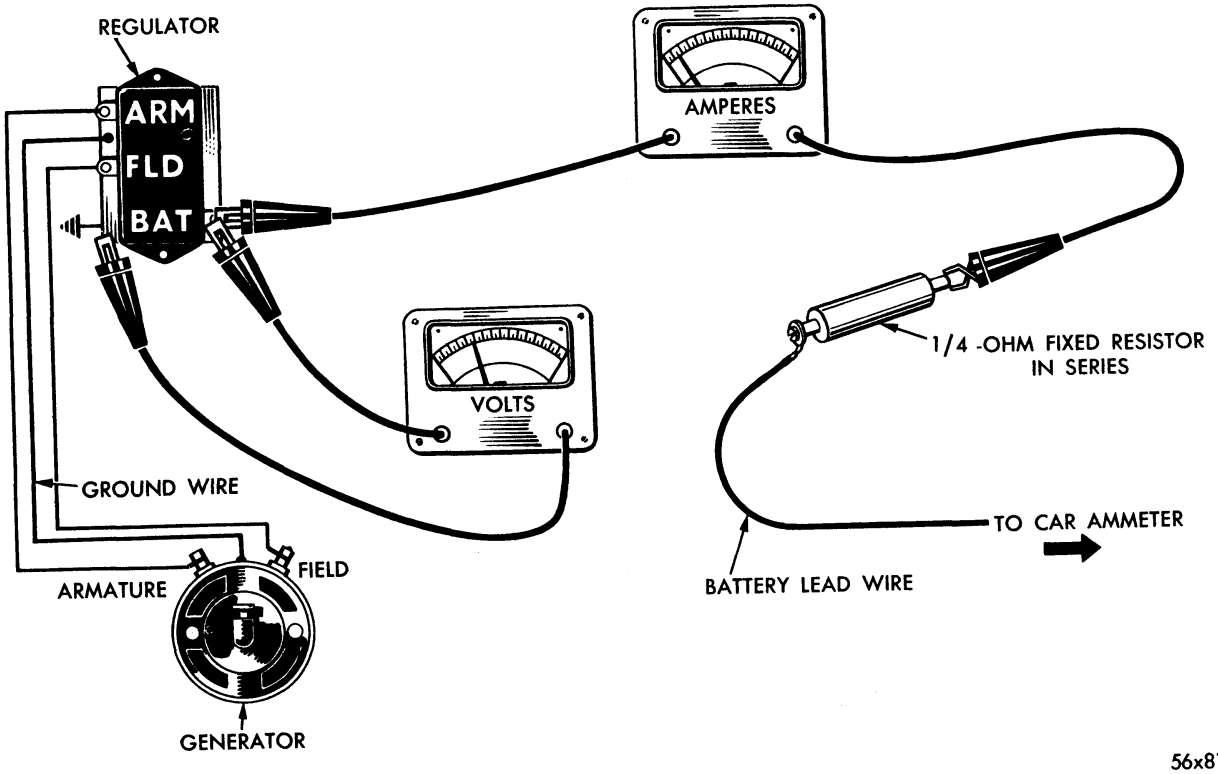


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Fig. 10—Voltage Regulator Test

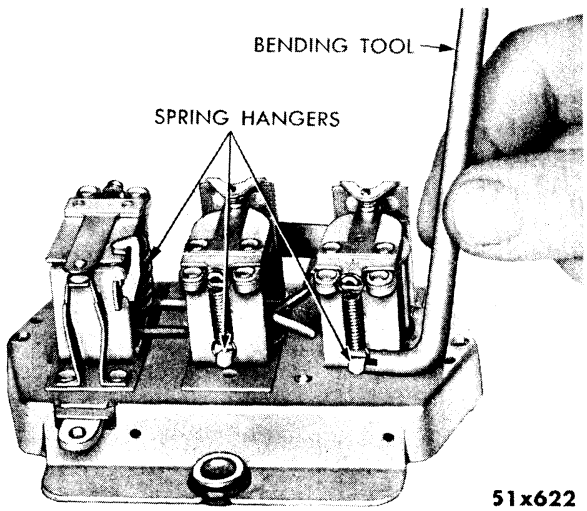


Fig. 11—Adjusting Armature Spring Tension

WARNING

The regulator must be cycled by reducing engine speed low enough for cut-out relay contacts to open, before increasing engine speed to 1,500 r.p.m. when retesting after each adjustment. The regulator cover must be in place when test is made.

33. TESTING THE CURRENT REGULATOR

The current regulator is temperature compensated and temperature must be considered in same manner as when testing voltage regulator. The test of current regulator would normally be made following test procedure for voltage regulator. When test of current regulator immediately follows voltage regulator test, generator should be run at its rated output of 30 amperes for 15 minutes (in addition to voltage regulator 15 minute run) before checking or adjusting current regulator. Test as follows:

Install test equipment (Fig. 12), start engine and increase speed to 2,000 r.p.m. Adjust variable resistance across battery until current settles to steady ampere output. The current regulator should limit current output as listed in Data and Specifications.

If adjustment is required, reduce engine speed to slow idle and remove cover from regulator. Bend lower current regulator spring hanger **down** to increase current output setting or **up** to decrease setting, (Fig. 13).

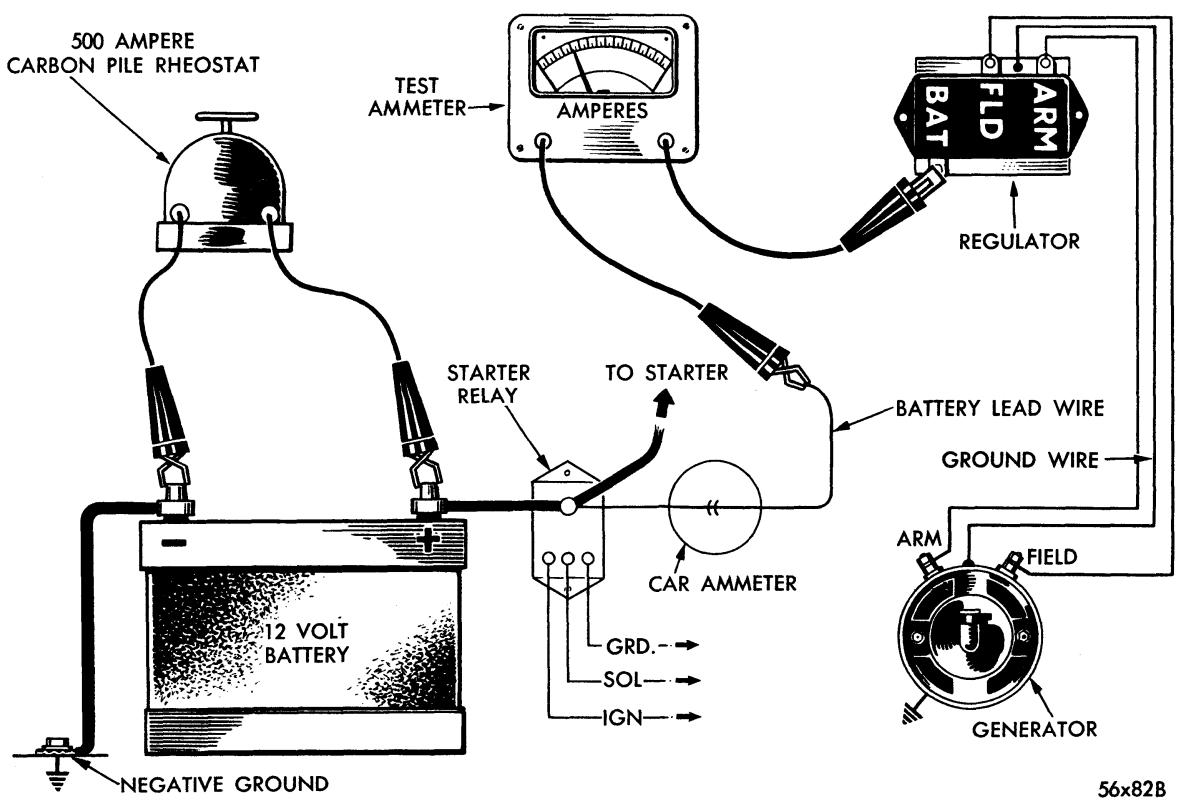


Fig. 12—Current Regulator Test

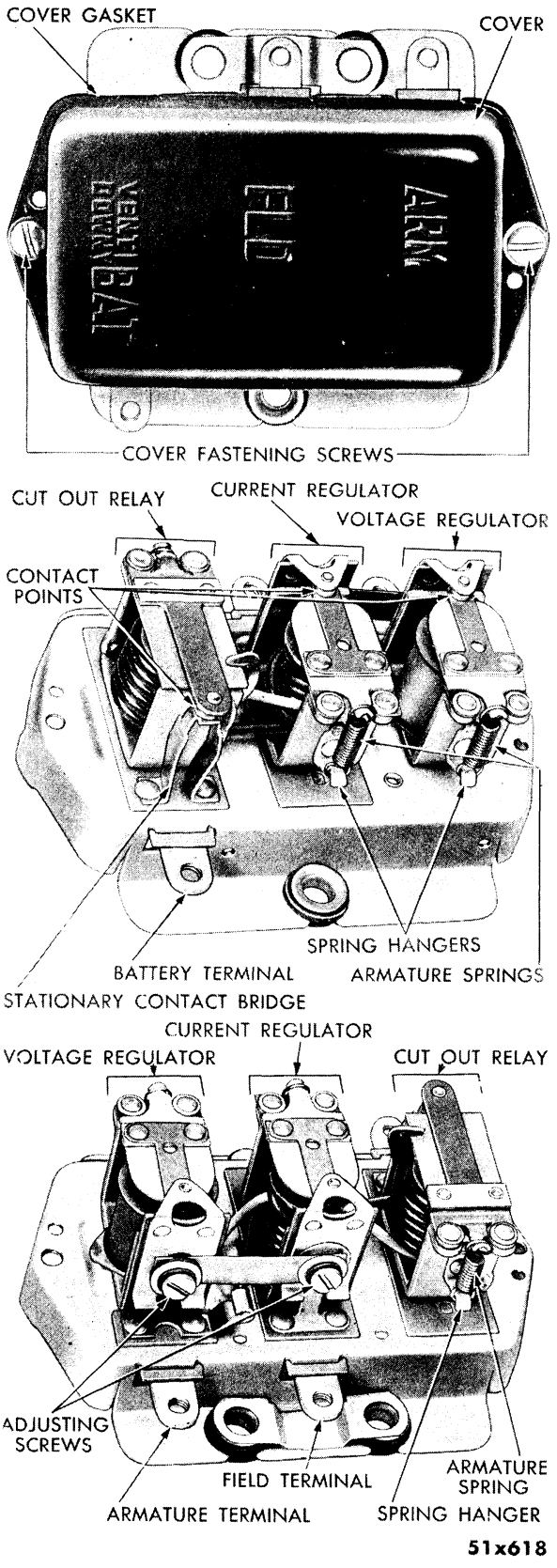


Fig. 13—Current and Voltage Regulator

WARNING

The current regulator must be cycled by reducing engine speed, low enough to open cut-out relay contacts after each adjustment. Retest the new setting after each adjustment with cover in place.

34. TESTING CUT-OUT RELAY (FIG. 14)

Connect test ammeter in series between regulator "Batt" terminal and battery lead wire. Connect variable resistance in series between regulator field terminal and generator field lead wire. Connect test voltmeter (0 to 15 — volts) from regulator "ARM" terminal to ground.

If the present test immediately follows tests of voltage and current regulators, it is not necessary to normalize regulator temperature. If regulator assembly is cold, normalize the temperature.

Start engine and adjust speed to slow idle. Rotate variable resistance control knob to full resistance position. Slowly rotate variable resistance control knob toward "no resistance" position, while carefully observing voltmeter. Increase engine speed slowly. The relay contacts close when voltmeter hand jumps back slightly. The closing voltage is highest reading in volts reached before hand jumps back and should be 13 to 13.75 volts. Rotate variable resistance control knob toward full "no resistance" position. Observe test ammeter. If charging rate of 10 amperes is not indicated, increase idle speed slightly until reading is indicated.

Slowly rotate rheostat control knob toward "full resistance" position, while observing test ammeter. The ammeter hand will drop toward zero and beyond, and suddenly return to zero. The discharge amperes noted, will be reverse current required to open relay contacts. The relay contacts should open at 0 to 6 amperes discharge current, or 8.2 to 9.3 volts after charge of 10 amperes. If adjustment is necessary, use bending tool from Tool-kit C-828. Bend lower spring hanger **down** to increase closing voltage, or bend it **up** to decrease.

NOTE: After each adjustment, it is essential that a complete retest be made to determine new values of closing voltage and discharge current required to open relay contacts. Regulator cover must be in place when test is made.

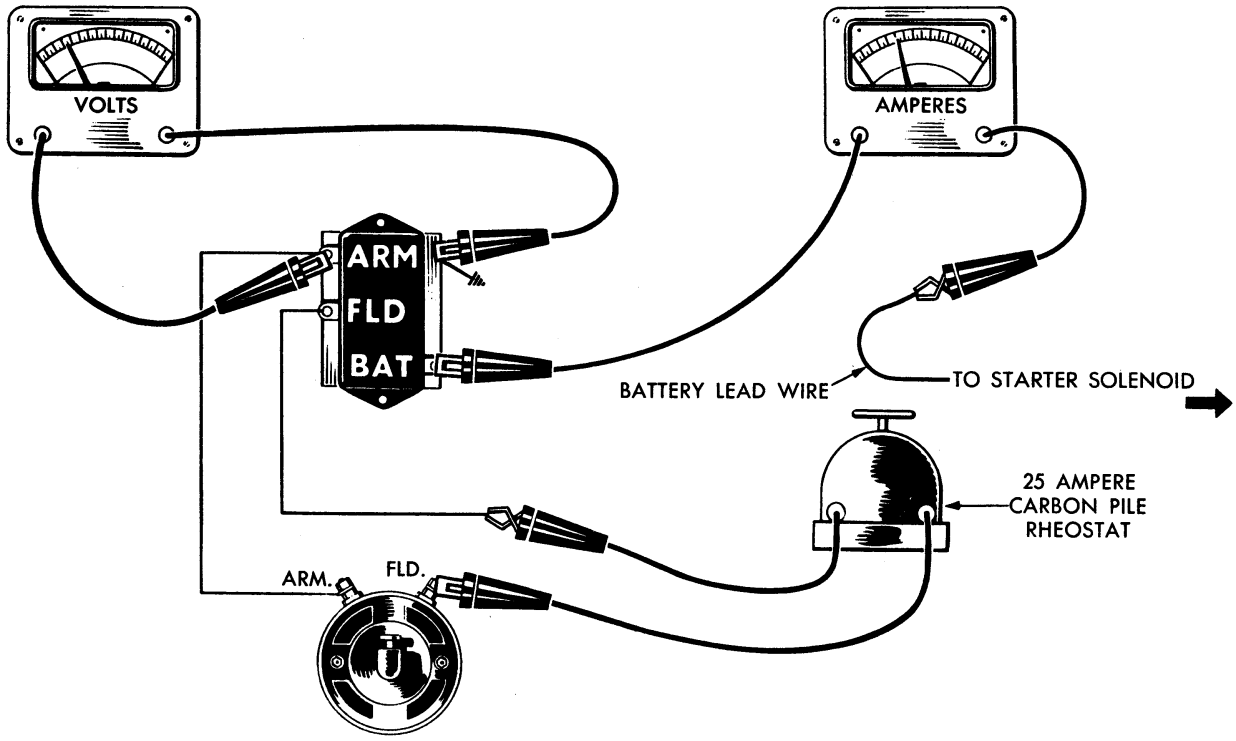


Fig. 14—Cut-Out Relay Test

35. SERVICING THE REGULATOR CONTACT POINTS

a. Inspecting and Cleaning Contacts

Inspect contact points of all three units. The contact points become silver gray during normal use. File burned and oxidized points with a clean contact point file. Do not remove too much material. Never use sandpaper, emery cloth or dirty file to clean contact points, as foreign material may become embedded in contacts and result in arcing or burning.

The filing should be done parallel to length of armatures. Cross filing will form grooves and result in contacts sticking and faulty operation. After contacts are clean and smooth, wipe them with piece of clean, lintless bond tape.

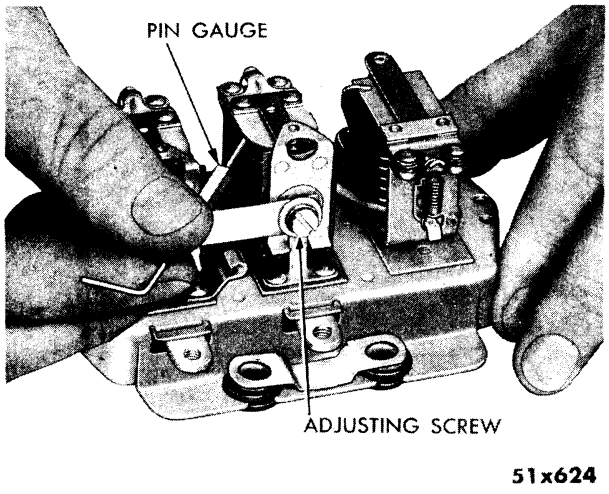


Fig. 15—Checking Regulator Air Gaps

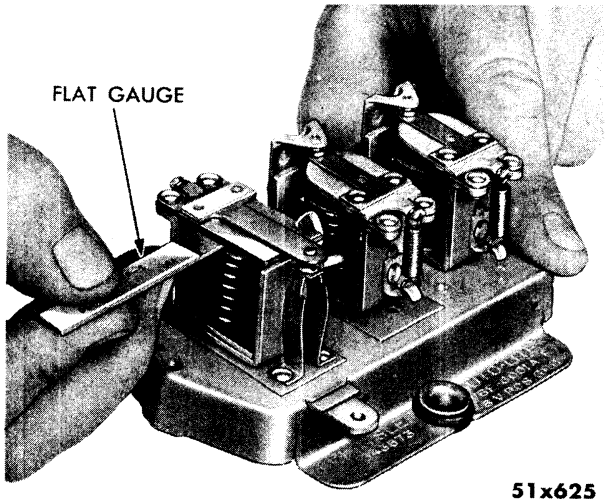


Fig. 16—Checking Cut-Out Relay Air Gaps

b. Adjusting Air Gaps (Regulator)

Place .052 inch wire gauge between armature and core at contact side of stop pin (Fig. 15). The contacts should open when armature is pressed down. Place .048 inch gauge in same position and press down on armature. The contacts should just open if air gap is properly adjusted. Adjust air gap by loosening screw and lowering or raising stationary contact.

c. Cut-Out Relay Air Gap

Place flat .031 inch gauge between lower side of armature and top of relay core as close to hinge as possible (Fig. 16). With relay armature against upper stop, .031 inch gauge should slide in freely, but .034 inch gauge should be too tight. Adjust air gap by bending upper stop **up** to increase air gap, or **down** to decrease it.

d. Cut-Out Relay Contact Clearance

Adjust contact clearance by expanding or contracting bridge (Fig. 17). The proper clearance is .015 inch.

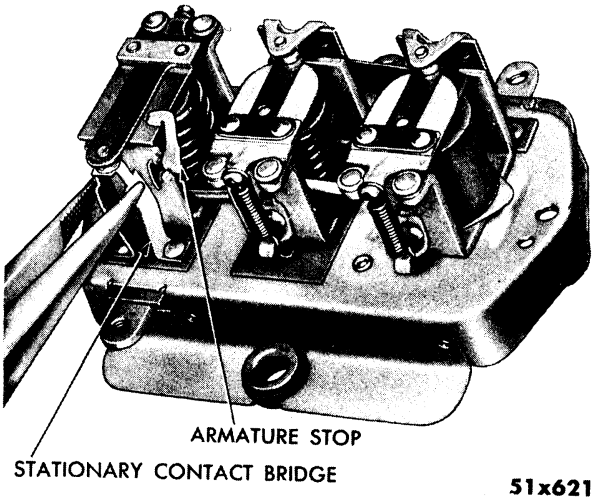


Fig. 17—Adjusting Cut-Out Relay Contact Clearance

IGNITION SYSTEM

36. TESTING PRIMARY CIRCUIT RESISTANCE (FIG. 18)

It is essential to good ignition that all primary connections be clean and tight. Connect jumper wire from distributor primary terminal to ground. This eliminates necessity of closing

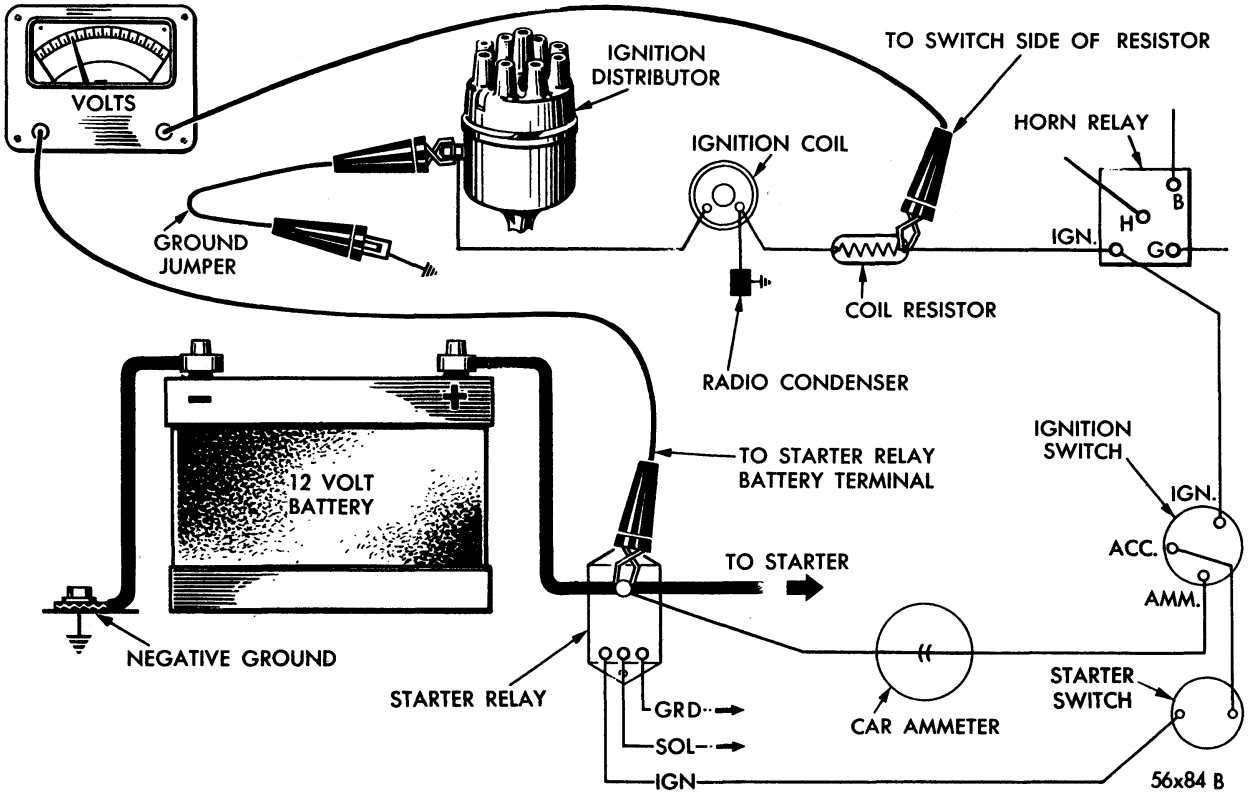


Fig. 18—Testing Primary Circuit Resistance

contacts. Connect low reading voltmeter (with scale divisions of $\frac{1}{10}$ volt) from switch side of resistor to battery connection at relay or junction block (Fig. 18).

Turn ignition switch on and observe voltmeter. A reading in volts that exceeds .2 volt indicates a loose connection in circuit between voltmeter leads or poor contact in ignition switch. Move key off and on while noting voltmeter. A reading that varies, also indicates poor contact in switch. Clean and tighten loose connections and/or replace defective switch.

SERVICING DISTRIBUTOR

37. REMOVAL AND INSTALLATION OF DISTRIBUTOR

a. Removal

Disconnect vacuum tube and primary lead wire. Lift off distributor cap and remove distributor hold down lock plate and distributor. (On cars equipped with power brakes remove vacuum line fitting in manifold.)

b. Installation

Make sure number one piston is at top dead center and install distributor so that rotor is pointing to number one firing position. Install lock plate and screw, but do not tighten. Rotate crankshaft to align specified degree mark on vibration damper with ignition timing indicator pointer. Rotate distributor until contacts are just opening and tighten hold down plate. Install vacuum tube, primary lead and distributor cap.

38. IGNITION TIMING (FIG. 19)

Make certain distributor is properly installed in engine. Install timing light and start engine. Allow engine to warm up sufficiently to enable carburetor fast idle mechanism to position for slow idle speed. Loosen distributor lock plate and rotate distributor clockwise or counterclockwise to align proper degree mark on vibration damper with ignition timing indicator points. Tighten lock plate.

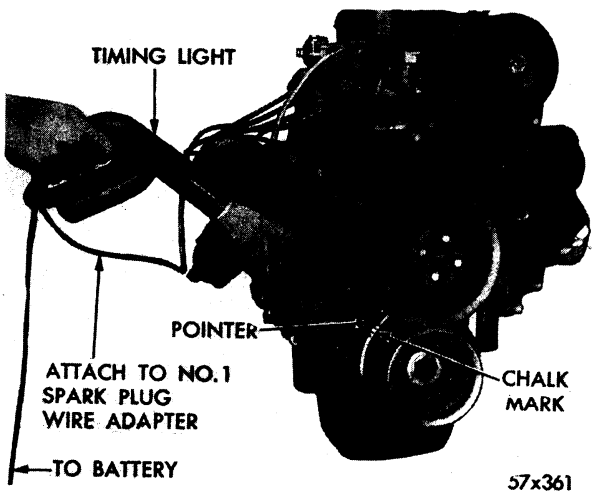


Fig. 19—Ignition Timing (Typical View)

39. CHECKING DISTRIBUTOR GOVERNOR ADVANCE

Install distributor assembly in test bench and check governor advance as recommended by equipment manufacturer.

Adjust governor advance by bending outer spring lug of light spring for low speed and outer lug of heavy spring for high speed operation.

40. CHECKING DISTRIBUTOR VACUUM ADVANCE

After checking governor advance check vacuum advance. If vacuum advance is out of specifications adjust by adding or removing washers as follows: Remove retaining plug and gasket

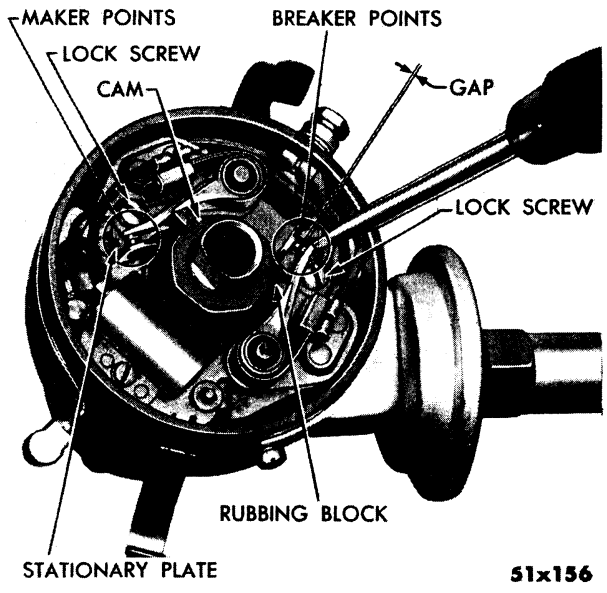


Fig. 20—Installing and Aligning Contacts (Typical View)

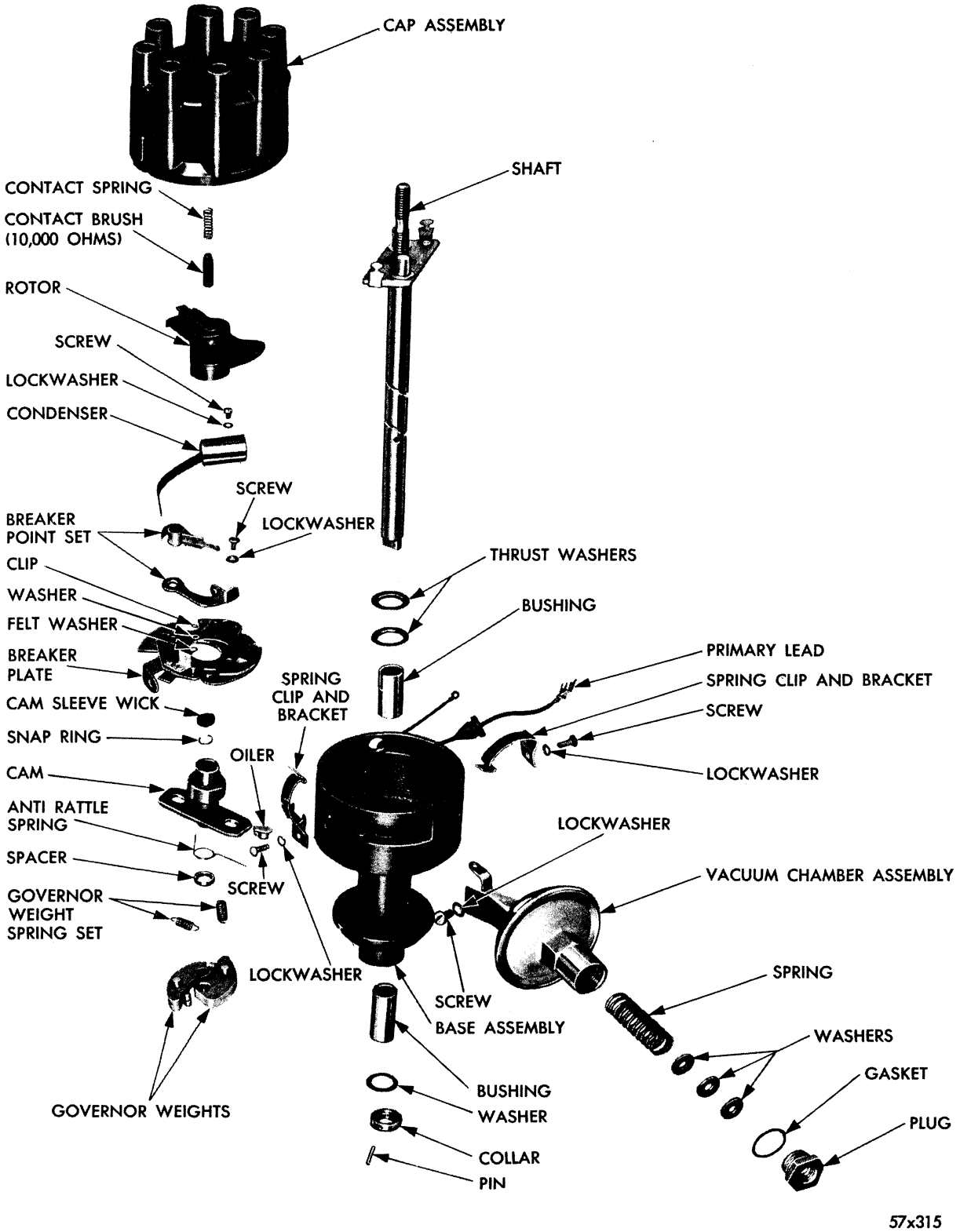


Fig. 21—Single Point LC-1, LC-2 Distributor (Disassembled)

and remove washers. Check thickness of removed washers and substitute thinner washer if specified advance requires more than required vacuum. Replace with thicker washer if vacuum required to move plate is less than specified.

In some cases it may be necessary to replace spring and then, adjust to Specifications by means of various combinations of washers. The right combination of washers are installed when distributor plate is rotated to its full position with specified vacuum applied.

41. INSTALLING AND ALIGNING CONTACTS (FIG. 20)

Remove old contacts and install new set. Adjust spring tension 17 to 20 ounces.

Align contacts to provide center contact by bending stationary contact only. Grip bracket next to contact and bend it away from breaker arm and then, bend it back to vertical. A new stationary contact is always lower than arm. It may be necessary to repeat bending process several times to provide perfect alignment that is absolutely necessary for efficient ignition and good contact life. It may be necessary to twist stationary contact to obtain alignment. **Never bend movable arm.** Following alignment of contacts; readjust clearance .015 to .018 inch.

42. ADJUSTING CONTACT POINT CLEARANCE

Measure clearance with feeler gauge, dial indicator or with a dwell meter .015 to .018 inch. New contacts should always be adjusted to .018 inch. This will allow rubbing block to wear into cam contour and still provides specified clearance when shaped.

Where dwell meter is used to check clearance it is essential to adjust clearance with feeler gauge or dial indicator. A dwell reading that varies from specified clearance indicates that one or more of following conditions are present and must be eliminated. (1) Worn rubbing block. (2) Rubbing block not square with cam. (3) Badly worn cam (old distributor). (4) Worn distributor bushings. (5) Movable contact arm that has been bent. On dual breaker arm distributors clearance should be same for both sets of contacts.

43. DISASSEMBLY OF DISTRIBUTOR (FIGS. 21 AND 22)

Remove vacuum chamber retaining screws,

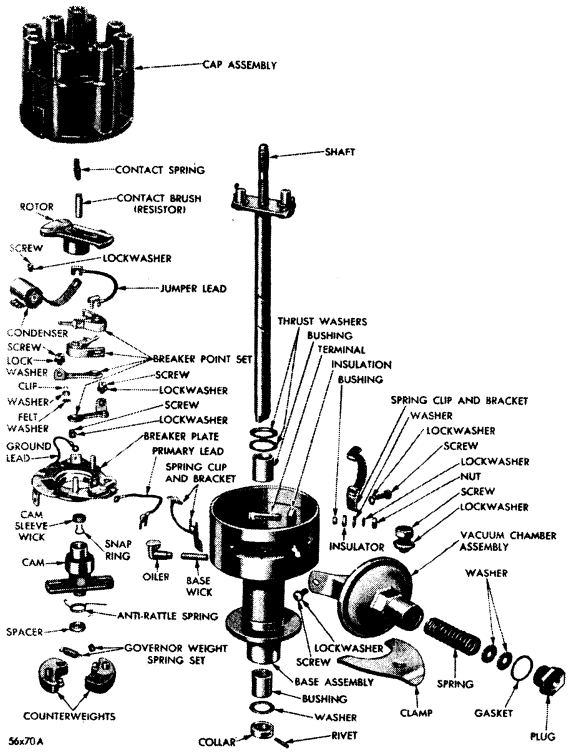


Fig. 22—Dual Point LC-3, LY-1 Distributor (Disassembled)

vacuum lever arm spring clip retainer, washer and felt. Remove vacuum unit and distributor cap clamp springs. On LC-3 and LY-1 loosen primary terminal post nut and remove primary lead. LC1-2—Push in rubber grommet and remove primary lead. Lift breaker plate assembly from distributor.

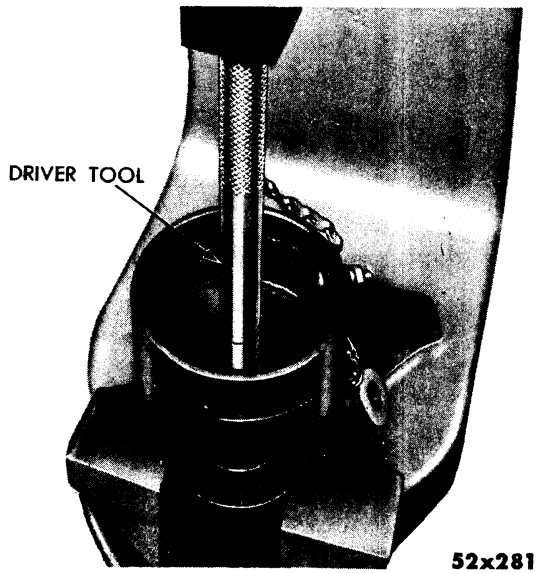


Fig. 23—Removing Drive Shaft Bushing

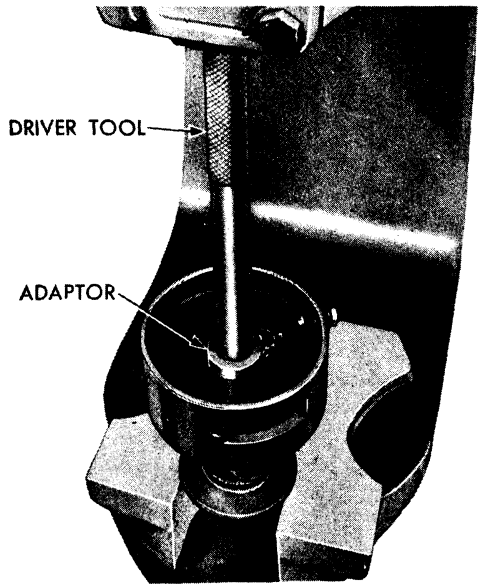


Fig. 24—Installing Upper Bushings (Typical View)

Remove cam felt and spring clip retainer from center of cam. Disengage anti-rattle spring and remove cam and yoke. Place distributor in vise and attach dial indicator to body. Move shaft **to** and **from** dial indicator with just enough force to indicate clearance. Replace bushings and/or shaft if side play exceeds .005 inch. Drive rivet from collar and shaft, and slide shaft from distributor body. Wash all parts in solvent, except breaker plate assembly and vacuum unit. Clean these parts with a brush moistened with solvent. Blow parts dry with compressed air.

44. REPLACING DISTRIBUTOR BODY BUSHINGS

With distributor disassembled, place housing in arbor press and remove the bushings with driver, Tool C-3041 (Fig. 23). Soak new bushings in light engine oil for approximately 15 minutes.

Place adapter over driver with shoulder down and slide new upper bushing over driver and down on adapter shoulder. Insert bushing and driver into bore (Fig. 24), and press bushing into position. The bushing, when properly installed, will measure .094 inch below top of bore.

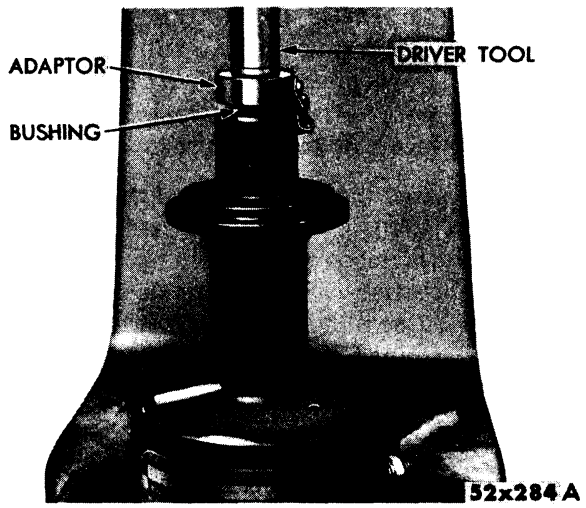


Fig. 25—Installing Intermediate Bushing (Typical View)

Place adapter over driver with shoulder down and slide new upper bushing over driver and down on adapter shoulder. Insert bushing and driver into bore (Fig. 24), and press bushing into position. The bushing, when properly installed, will measure .094 inch below top of bore.

Invert distributor housing, reverse adaptor driver and slide bushing on driver. Insert driver and bushing into housing and press bushing **in** until it is flush with bottom face of distributor base (Fig. 25). Drill 1/8 inch hole through upper bushing by drilling through oil wick hole. Remove burrs from hole after drilling. Install burnishing tool into upper bushing and force it through both bushings. The burnishing tool is designed to burnish hole to proper diameter of .4995 to .5000 inch.

SPARK PLUGS

45. SERVICING SPARK PLUGS

a. Removal

Remove single rocker shaft engine spark plugs with Tool C-3054. For double rocker shaft engine remove ignition cable cover, air cleaner on right side and heater blower. Loosen plug with Tool C-3054 and lift out tube and plug. No gaskets are used on double rocker shaft engines.

b. Cleaning and Adjusting

Spark plugs that are badly oxidized or have electrodes that show considerable wear should be replaced. Clean plugs in blast type cleaner.

Be sure all compound is removed from plug. Adjust gap with round gauge to .035 inch by bending side electrode only.

c. Installation

NOTE: Spitfire engines are equipped with ⅜ inch base plug, as shown in Figure 26, A. Fire Power engines have a ¾ inch base, as shown in Figure 26, B. Both plugs use an extended electrode for better efficiency and performance.

Where necessary to replace spark plugs, always use same type plug as one removed. Do not use short electrode plug in place of extended electrode or interchange ⅜ inch base plugs with ¾ inch base plugs.

To assure good heat transfer clean seats in head and also tube (double rocker shaft engines). Use new gaskets on plugs for single rocker shaft engines. **No gaskets are used on double rocker shaft engines.** When installing plugs in double rocker shaft engines, place plug in socket wrench and lower tube over plug, (Fig. 27), before installing. Tighten plugs 32 foot-pounds torque.

46. HIGH TENSION CABLES, DISTRIBUTOR CAP AND ROTOR

a. Cables

Clean high tension cables and inspect for cracks and chafed spots. Replace damaged cables. Fit terminals to spark plug caps so they will fit snugly when installed. Terminal clips should fit tight in cap towers.

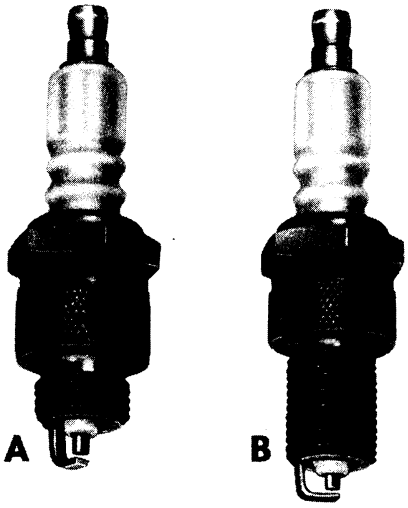


Fig. 26—Spark Plugs
a. Spitfire
b. Firepower
56x321A

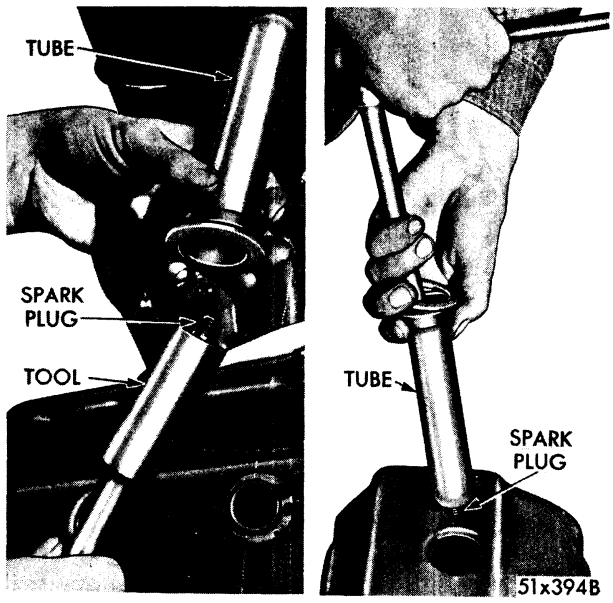


Fig. 27—Removing and Installing Spark Plugs

b. Distributor Cap and Rotor

Inspect cap for cracks and clean corrosion from towers. Inspect electrodes for excessive burning. Inspect rotor for cracks and burned tip. Inspect brush spring for distortion and be sure carbon brush moves freely in cap. Push cables all the way into towers.

47. IGNITION COIL

Clean oil and dust from coil. Clean corrosion from secondary tower and push cable all the way in. Be sure primary leads are connected to proper primary terminals according to polarity markings. The coil is designed to operate with a ballast resistor. The resistor is mounted on the coil bracket and must be included with coil when making a test of primary output. Coils that are tested without resistor will appear to be defective.

Check coil for external leaks and arcing. Always make two tests when checking coil. One when coil is cold, the other after coil has warmed up. The ballast resistor and coil must be tested together for output. To check the high tension circuit, pull secondary cable out of distributor cap. Hold end of cable about ¼ of an inch away from cylinder head and crank engine with engine ignition switch on. If spark jumps ¼ inch gap, coil can be considered satisfactory.

LIGHTING SYSTEM

48. HEADLIGHT AIMING AND ADJUSTMENT

The dual headlight system has **two** 5¾ inch Sealed Beams on each side of the front of the vehicle. (Fig. 29).

Identification on the 5¾ inch lamps is accomplished by the numeral "1" molded in the top of the lens of the inner or single filament lamps and by the numeral "2" molded in the top of the lens of the outer or double filament lamps.

The inner lamps only operate on the upper beam. The outer lamps operate on both upper and lower beams. When the upper beam switch is used for highway driving, all four lamps will be in operation.

a. Headlight Aiming Using Wall or Screen

Place car on level surface with screen 25 feet ahead of headlight lenses. The screen (or wall) should be painted a light color. The horizontal line on screen should be 2 inches below center line of headlights (Fig. 28). The center vertical line should be equi-distant from two outer lines which represent vertical center of headlights.

b. Headlamp—Horizontal Alignment

Car should be on a level floor, directly facing the screen, 25 feet from the headlight lenses. Locate the center line of the car with the center vertical line of the screen. By measuring from the floor to the center of the head lamps determine the horizontal center line of the lamps. Transfer this measurement to the screen; then, locate the horizontal aiming line two (2) inches below the head lamp horizontal center line (See Fig. 28).

c. Vertical Alignment

It will be necessary to determine vertical center lines of both inner and outer head lamps from the center of the car. Alignment should be made on the inner lamp on high beam as in Figure 28 (block off outer lamps). On low beam, adjust the outer lamp units in accordance with the low beam pattern as shown in Figure 30. Adjustment is obtained by screws at top and sides of headlights (Fig. 29).

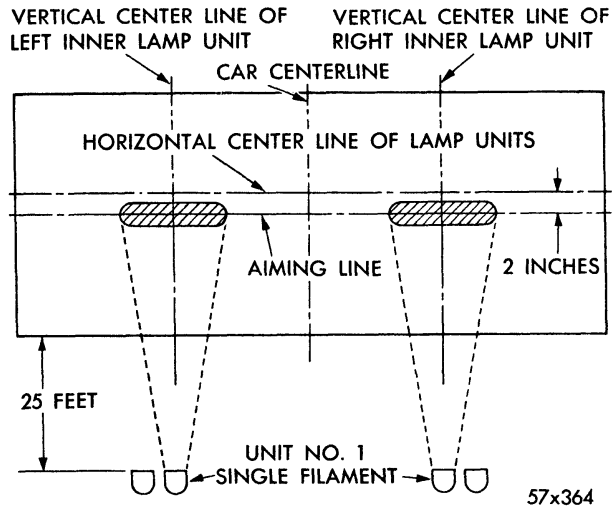


Fig. 28—Adjusting Single Filament Headlight

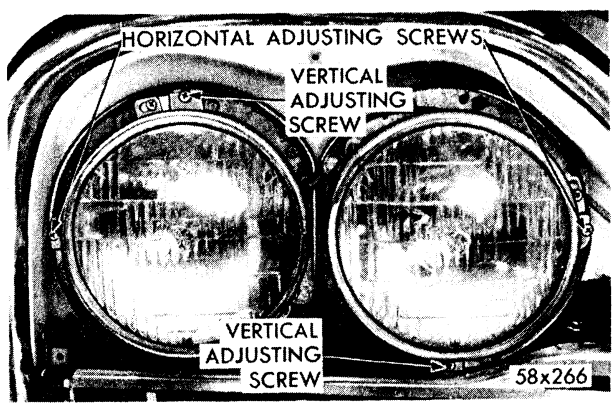


Fig. 29—Adjusting Dual Headlight

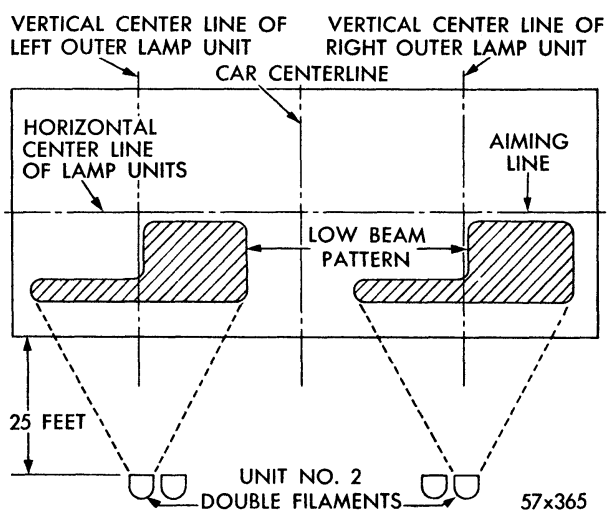


Fig. 30—Adjusting Double Filament Headlight

d. Tolerances (No. 1 units)

(a) A vertical tolerance of ± 2″ will be tolerated.

(b) A horizontal tolerance of ± 6″ will be tolerated.

The lower beam of the No. 2 unit will be aimed so that the top edge of the high intensity portion of the pattern is aimed at the level of the lamp center and the left edge of the high intensity portion of the pattern is aimed straight ahead.

e. Tolerances (No. 2 unit)

(a) A vertical tolerance of ± 2″ will be tolerated.

(b) A horizontal tolerance of 6″ to the right will be tolerated.

Upon aiming the lower beam of the No. 2 unit, the upper beam of the No. 2 unit will be automatically aimed.

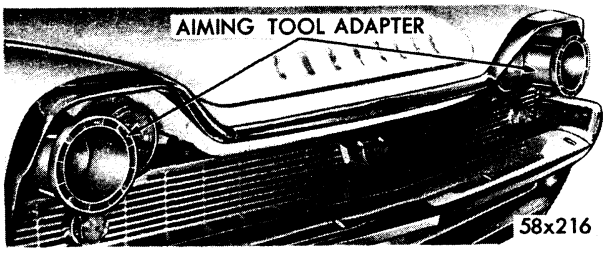


Fig. 31—Headlight Aiming Tool Adapters

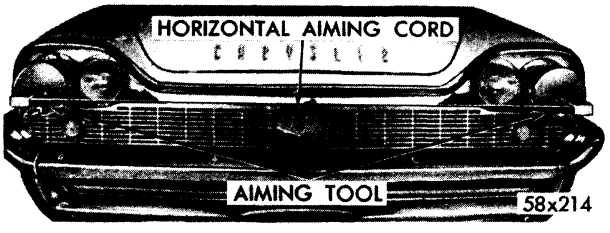


Fig. 32—Aiming Outer Headlights

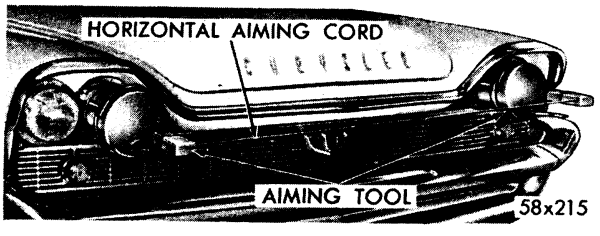


Fig. 33—Aiming Inner Headlights

f. Adjusting Headlights Using Tool C-3552

Headlight may be adjusted by using Tool C-3552. Refer to Figs. 31, 32 and 33. Use aiming tool according to manufacturers recommendations.

49. TESTING VOLTAGE AT HEADLIGHTS

One of factors affecting lighting efficiency is loss of voltage to light bulbs due to high resistance in circuit. Headlight voltage must be measured with lights burning and battery in fully-charged condition.

Remove headlight rim and, with Sealed-Beam unit partially removed from its mounting seat, attach leads of reliable voltmeter to prongs of Sealed-Beam unit while it is still inserted in connector socket. With Sealed-Beam unit in its correct position, top prong supplies current for low (traffic) beam. One of the side prongs supplies current for high beam and the other is ground connection.

With only lights burning, engine warmed up and running at speed equivalent to car speed of about 20 m.p.h., voltage at headlights should be not less than 13.25 volts, or more than 14.5 volts (with battery and generator at room temperature, approximately 70 degrees F.). If voltage is low at either headlight socket (with only standard equipment in the circuit), proceed as follows:

Test voltage output of battery which should be 12 to 12.5 volts. Clean and tighten battery terminals and ground cable. Check wires and connections to all lights, and check main headlight switch and dimmer switch for high resistance. When voltmeter is placed between ground and input side of switch and then between ground and output side of switch (with lights burning), difference in readings will represent the voltage drop in switch. The same method may be used in checking voltage drop in wires by taking reading at each end of wire. A switch showing voltage drop of more than one-tenth of a volt, or wire showing a voltage drop of one-tenth of a volt should be replaced. If any wire in lighting circuit has been replaced with other than standard equipment wire, it may lack capacity and cause voltage drop. The most important wire in entire primary circuit is wire that is connected from starter switch to ammeter, because it must carry full load of all branching circuits.

50. CIRCUIT BREAKERS

The Headlight circuit breaker (22½ amperes) is integral with light switch, and the Windshield Wiper circuit breaker (6 amperes) is on back of wiper switch on Imperial Models and on bracket behind clock of the LC-1-2-3 Models. The Convertible Coupe Top Lift circuit breaker (25 amperes) is on top light switch.

The Rear Compartment Cigar Lighter circuit breaker is 8 amperes on Four Door Sedans and Convertible Coupes, and the window lift circuit breaker, is 20 and 30 amperes. They are located behind left front kick panel on side cowl. The Seat Lift circuit breaker (40 amperes) is behind left kick panel on side of cowl.

51. DESCRIPTION AND OPERATION OF FUEL GAUGES

The fuel gauge system incorporates an electro-magnetic unit on all models. The system is connected to battery through ignition switch. The gauges operate only when ignition switch is in "Accessory" or "ON" position (Fig. 34).

A single wire connects electro-magnet and tank unit, and the tank unit case is grounded. As fuel in tank moves from "full" to "empty", a change in magnetic field surrounding variable field magnet (Fig. 34) takes place. This change in the magnetic field causes the gauge hand indicating the amount of fuel in the tank to move from "full" to "empty".

52. TESTING THE ELECTRO-MAGNETIC FUEL GAUGE

For following tests, ignition switch must be turned counter-clockwise to "Accessory", or extreme left hand position.

a. Testing Wire from Ignition Switch to Panel Unit

Connect one wire of test lamp to "SW" terminal on panel unit and connect other wire to a ground. If lamp lights when ignition switch is turned on, this circuit is in good condition.

b. Testing Panel and Tank Units for Ground

The panel unit and tank unit must have good grounds to operate properly. Use jumper wire to temporarily ground each unit at case. If gauge reading changes when temporary ground

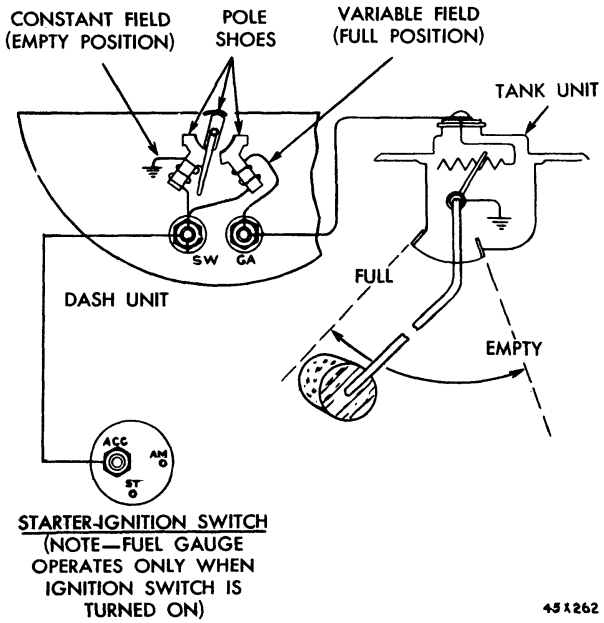


Fig. 34—Electro Magnetic Fuel Gauge Circuit

is made, make sure that case of unit under test is properly grounded. Clean and tighten mounting screws of panel unit. Clean contacting surface of tank unit, and make sure retainer is tight.

c. Testing Wire Between Panel Unit and Tank Unit

Disconnect wire at both ends. Connect test lamp between "AM" terminal of ignition switch and one end of wire. If lamp lights, wire is grounded and should be repaired. If lamp does not light, ground opposite end of wire. The lamp should light; if it does not, the wire is broken and should be replaced.

IMPORTANT

To get good electrical contact at terminals, place a shake-proof type washer on terminal stud before installing wire. The prongs of washer will dig into mounting and form a good contact.

d. Testing Panel Unit and Tank Unit

If previous tests indicate that panel unit is receiving current when ignition switch is turned on, panel and tank units are properly grounded, and wire between units is in good condition, test panel unit and tank unit as follows:

Use spare tank unit that is in good condition and same type. Some types of tank units may

appear to be similar, but may have "reverse action" which would cause a false indication. To use spare tank unit, disconnect wire at "GA" terminal of panel unit. Connect spare tank unit to "GA" terminal and ground case of spare tank unit with jumper wire. Move float arm of spare tank unit up and down. If panel unit registers correctly, tank unit in car is faulty and should be replaced. Remove tank unit, as shown in Figure 35. If panel unit does not register when float arm of spare tank unit is moved up and down, panel unit is faulty and should be replaced.

53. TESTING THE ELECTRO-MAGNETIC FUEL GAUGE TANK UNIT (REMOVED)

To test tank unit, connect jumper wire from 12-volt battery to 12-volt test lamp, and connect ground side of lamp to another jumper wire leading to tank unit terminal. Connect another jumper wire from tank unit case to other side of battery. With float in "full" position, lamp should light at almost full brilliance. When float is lowered, light in lamp should steadily decrease in brightness until it will just barely glow in a reasonably dark room.

This test will show whether or not tank unit is operating properly; but, it will not indicate exact calibration. If contact wiper does not contact wire cone resistor, the gauge will not function. In most cases of tank unit failure, unit should be replaced (Fig. 35). When installing unit in tank, do not bend float arm. Make sure that gasket is properly positioned and tighten lock ring.

54. ELECTRIC TEMPERATURE GAUGE

The electric (or magnetic) temperature gauge consists of two units, dash unit and engine unit. The gauge is connected to source of voltage through ignition switch.

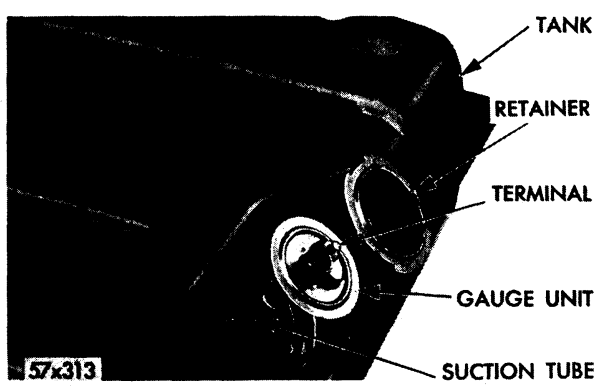


Fig. 35—Removing and Installing Fuel Gauge (Tank Unit)

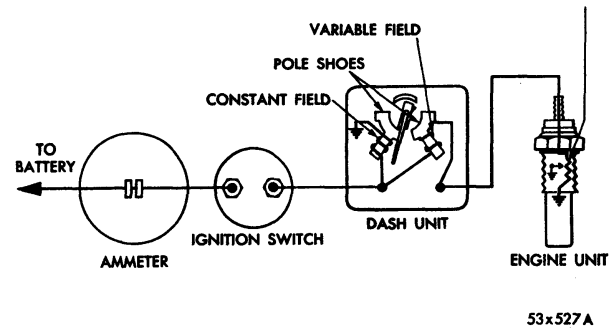


Fig. 36—Electric Temperature Gauge

a. Dash Unit

The dash unit (Fig. 36) has two magnetic poles. One of windings is connected to ignition switch and to ground. The other winding in dash unit connects to ground through engine unit.

b. Engine Unit

The engine unit changes resistance as its temperature varies causing a corresponding change in the strength of the variable field in the dash unit.

55. TESTING THE ELECTRIC TEMPERATURE GAUGE CIRCUIT

a. Test 1

Disconnect wire at engine unit and turn on ignition. The gauge hand should stay against left side stop pin.

b. Test 2

Ground wire disconnected from engine unit and turn on ignition. The gauge hand should swing across dial to right side stop pin.

c. Test Results and Corrective Measures

Item 1—If gauge hand does not stay on left hand stop pin in Test 1, wire is grounded between dash unit and engine unit or dash unit is defective. Test further by disconnecting wire at dash unit "GA" terminal and turn on ignition switch. If gauge hand now stays on left hand stop pin, replace wire. But, if gauge hand still moves, replace dash unit.

Item 2—If gauge hand does not swing across dial in Test 2, there is an open circuit in wire between dash unit and engine unit, dash unit is defective, or no power is reaching dash unit. Test further by grounding "GA" terminal on dash unit and turning on ignition switch. If gauge hand now moves, replace wire. If gauge hand still does not move, connect 12-volt test lamp from dash unit ignition terminal to ground. Turn on ignition switch. The test lamp should light. If test lamp lights, replace dash unit. But, if test lamp does not light, test wire between ignition switch and dash unit by connecting test lamp to "Accessory" terminal at ignition switch and to ground. When this is done, test lamp should light.

Item 3—If gauge hand operates correctly in Test 1 and Test 2, but gauge does not indicate temperature changes correctly, engine unit is defective, or dash unit is not calibrated properly. Use an engine unit that is in good condition. Then, if gauge is still not accurate, replace dash unit.

Item 4—If gauge hand is at right hand stop pin (maximum) at all times, and Test 1 and Test 2 indicate that wiring and dash unit are in good condition, the engine unit is defective. Install new engine unit. If gauge hand will not move, dash unit is damaged or incorrectly installed. Install unit correctly, or replace as necessary.

56. TESTING THE OIL PRESSURE GAUGE

Test oil pressure gauge by hooking up an accurate gauge and comparing readings. The hook up can be made by using "Tee" fitting at flexible hose connection. Warm up engine and compare readings for idle and normal driving pressures.

Be sure that oil level is checked before making this check. An oil gauge pointer that flutters is usually an indication that oil has entered oil tube connecting gauge to engine block. The tube should have air in it to cushion pulsations of oil pump and oil relief valve. The fluttering pointer may be result of leak in oil gauge tube or due to improper installation. To correct this condition, disconnect tubing at gauge and engine block and drain out oil. Connect tubing at gauge first and then at block.

Test for possible plugging by breaking connection at gauge. Hold gauge end of line over an empty, clean container and start engine. The oil should flow at a steady rate. If it does not flow steadily, tube may be kinked or plugged. Check $\frac{1}{32}$ inch hole in gauge tube nipple in block. If it is plugged, this hole can be cleaned with a fine pin.

If oil lines are open and gauge does not operate, small hole leading into tube may be plugged. The hole can also be cleaned out with a pin.

57. SPEEDOMETER

When speedometer fails to indicate speed or mileage, cable or housing is probably broken.

a. Speedometer Cable

Most cables are broken due to lack of lubrication, a sharp bend or kink in housing. A cable may break if speedometer head mechanism binds. If such is the case, speedometer head should be repaired or replaced before new cable or housing is installed.

A "jumpy" pointer condition (together with a sort of scraping noise) is due, in most instances, to dry or kinked speedometer cable. The kinked cable rubs on housing and winds up, slowing down pointer. The cable then unwinds and the pointer "jumps". To check for kinks, remove cable, lay it on flat surface, and twist one end with fingers. If it turns over smoothly, the cable is not kinked. But, if part of cable flops over as it is twisted, cable is kinked and should be replaced.

b. Lubricating Speedometer Cable

The speedometer cable should be lubricated with MOPAR All-Weather Speedometer Cable Lubricant every 10,000 miles. At the same time, put in a few drops of MOPAR Speedometer Oil on wick in speedometer head. Refer to Section XV, "Lubrication."

Fill ferrule on upper end of housing with MOPAR Speedometer Cable Lubricant. Insert cable in housing, starting at upper end. Turn cable around carefully while feeding it into housing. Repeat filling ferrule except for last six inches of cable. Too much lubricant at this point may cause lubricant to work into indicating head.

c. Installation of Speedometer Cable

If cable sticks when it is inserted into housing and will not pass through it, interior of housing is damaged or kinked. Be sure to check housing from one end to other. Straighten sharp bends by relocating clamps or elbows. Replace housing if it is badly kinked or broken. Position cable and housing so that they lead into head as straight as possible.

58. AMMETER

The ammeter shows only current flowing to or from battery, as case may be, and does not indicate entire generator output. The current supplied for ignition, lights and accessories is automatically deducted from generator output reading. Because of this, the ammeter should never be used as an accurate check for generator current output. Ammeter should not indicate more than 10 ampere charge above 30 miles per hour, after first 30 minutes of continuous driving. If more than a 10 ampere charge is indicated with a battery specific gravity of 1,260 or higher, check voltage control regulator.

SWITCHES

59. IGNITION STARTER SWITCH (STANDARD TRANSMISSION)

The following precautions must be followed when installing accessories such as heaters, radio, spot-light, etc. Use accessory terminal **only** on ignition switch and **not** the ammeter terminal post.

a. Starter Switch (Torque-Flite Transmission —Only)

The starter switch is mounted on the push button box and is actuated by the neutral push button.

b. Vacuum Switch is located on Engine Intake Manifold.

c. Neutral Switch is located on outside of Torque-Flite transmission.

60. REMOVAL AND INSTALLATION OF IGNITION LOCK CYLINDER

NOTE: Remove battery ground cable before removing ignition lock cylinder.

To remove ignition lockcylinder, turn ignition key clockwise to "on" position, and loosen set screw holding switch in instrument panel. Pull switch assembly out from instrument panel toward firewall far enough to allow lock cylinder locking pin to clear instrument panel. With ignition key in "on" position, use pointed punch to push in on cylinder locking pin, while pulling on cylinder. Remove ignition lock cylinder. To install lock cylinder in switch, line up locking pin with slot in switch housing. Press in on cylinder lock assembly. Install switch in instrument panel and tighten locking screw.

61. WINDSHIELD WIPER SWITCH

The windshield wiper switch has a 6 ampere circuit breaker for circuit protection. The armature resistor, windshield wiper, parking and battery terminals are located on outside of switch.

62. HEADLIGHT SWITCH (FIG. 37)

The headlight and panel light switches are combined into one unit, but are operated by separate controls. On all models, switch (or switches) is held in instrument panel by a threaded sleeve and hex nut. The panel light switch control encircles inner headlight switch and is indexed on its shaft by lugs in tabe plate and slots in shaft. The headlight switch knob is held on its shaft by a recessed hex screw. If a switch is unoperative or defective, replace complete unit.

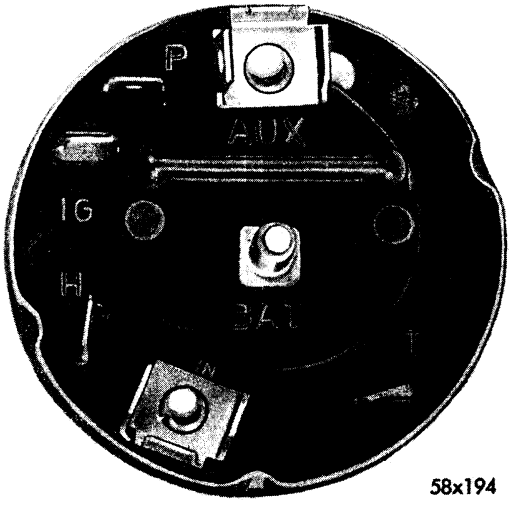


Fig. 37—Headlight Switch (Rear View)

63. TURN SIGNAL SWITCH AND CIRCUIT LY-1

The turn signal circuit used on the Imperial models consists of a manual canceling switch, an automatic canceling switch, a flasher unit, a relay and the necessary connecting wires and lamps.

The manual canceling switch is of the "rocker button" or "teeter" type, with the letter "R" at the top for a right turn, and the letter "L" at the bottom for a left turn. It is located at the bottom of the row of push buttons for the Torque-Flite transmission. To operate the switch, merely push the "R" or "L" end of the rocker button. If an error has been made and you wish to turn the signal off, merely press the center of the rocker button and the signal becomes inoperative.

The automatic canceling switch is mounted on the steering column, and automatically cancels the signal when the steering wheel returns to the straight-ahead position.

The flasher unit is mounted on the back of the speedometer, behind the instrument panel.

The relay is mounted at the top of the left cowl side panel. It contains the latching relays which hold the circuits closed until they are broken either by the automatic or manual canceling switches.

HORNS

Three makes of horns are used. Sparton, Auto-Lite, and Jubilee. The horn circuits are tested in the same manner for all three makes. The tone adjustment however, is different for each type. The horn relay is electrically connected to ignition switch and does not operate when switch is in "OFF" position.

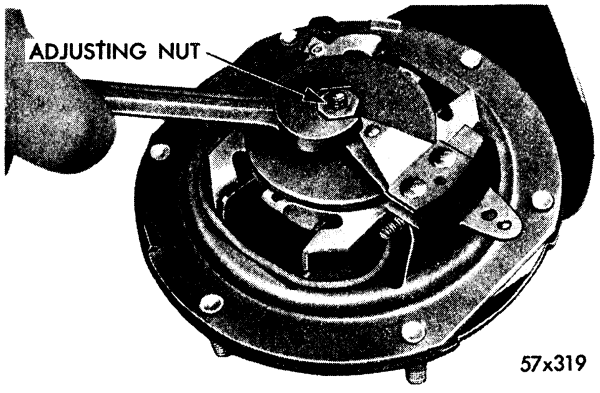


Fig. 38—Adjusting (Sparton) Horn

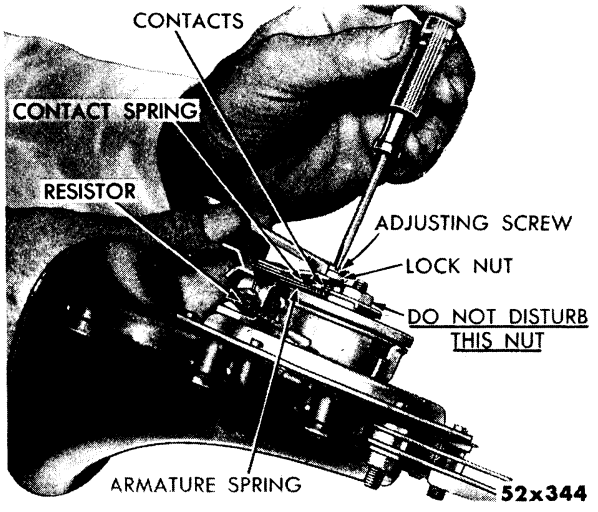


Fig. 39—Adjusting (Auto-Lite) Horn

64. TESTING HORN CIRCUITS

When horns fail to blow, test circuit as follows. Touch jumper wire from Relay "SW" terminal to ground. If horn blows, it is an indication that trouble is in wire from "SW" terminal to horn button, or in horn button contact ring. If horns do not blow, connect jumper from "B" terminal to "H" terminal. If horns operate, relay is defective. If horns do not blow, trouble is in wire to horns, in horns, or in the wire from starter relay to horn relay "B" terminal.

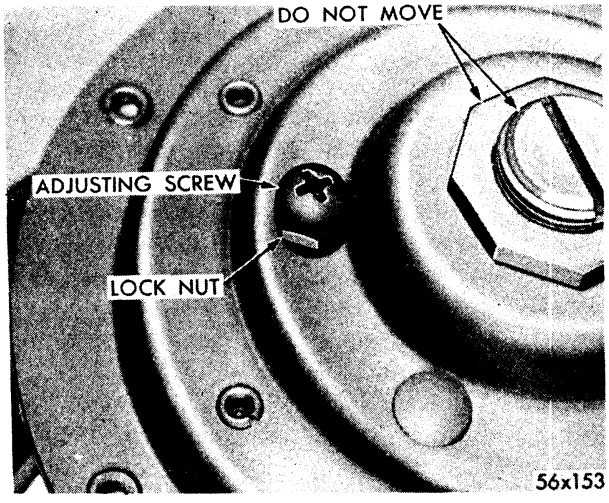


Fig. 40—Adjusting (Jubilee) Horn

65. SERVICING THE HORNS

a. Adjusting the Sparton Horns

Pry cover from horn. Remove contact adapter, turn adjusting nut counter-clockwise (Fig. 38) until there is no vibration. Turn adjusting nut clockwise approximately ¼ turn, or until tone has clear, mellow sound.

b. Adjusting the Auto-Lite Horns

Pry cover retaining clips up, and remove cover. Loosen lock nut and turn adjusting screw (Fig. 39) clockwise until vibration stops. Then, turn adjusting screw back counter-clockwise, approximately ¼ turn until tone is clear and mellow, and tighten lock nut.

c. Adjusting the Jubilee Horn (High and Low)

To adjust Jubilee horn tone, connect test ammeter between positive post of 12-volt battery and horn terminal post. Connect jumper lead from negative battery post to horn base. Observe test ammeter and rotate adjusting screw (Fig. 40) to right or left to obtain reading of 8 or 9 amperes at 12.4 volts. Tighten adjusting screw lock nut.

WINDSHIELD WIPERS

66. VARIABLE SPEED, OFF-GLASS PARKING WINDSHIELD WIPERS

(Refer to Figure 44). The variable speed motor is a compound wound, reversible type unit which makes possible off-glass parking feature. The wiper also contains a Geneva Wheel in gear box for actuating off-glass parking switch, and an eccentric in connecting link at wiper crank pivot which automatically lengthens links making off-glass parking position possible.

67. REMOVAL DISASSEMBLY AND ASSEMBLY OF VARIABLE SPEED WINDSHIELD WIPERS (Fig. 41)

a. Removal

To facilitate assembly or disassembly of eccen-

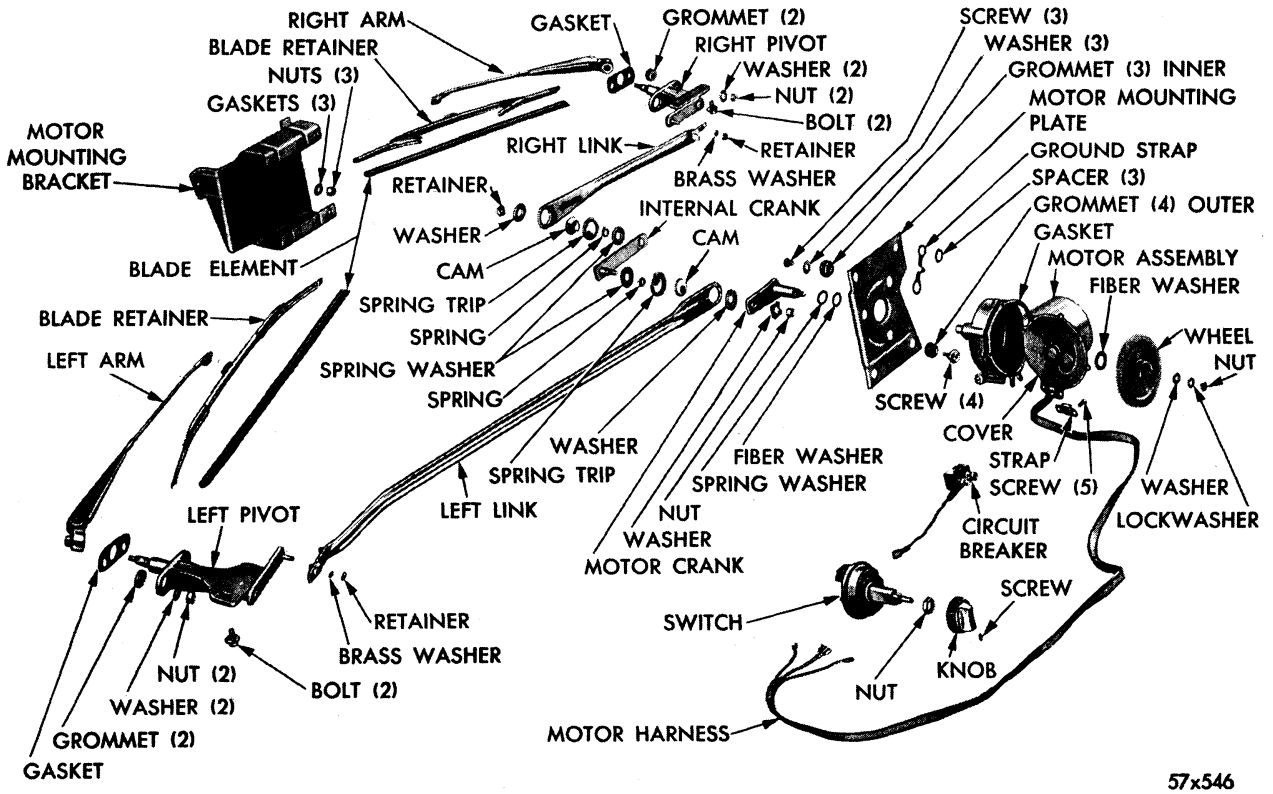


Fig. 41—Windshield Wipers (Disassembled)

trics at the motor crank and link ends, remove windshield wiper assembly as a unit whenever wiper or links are to be serviced.

I. **Cars that are not equipped with heater and defroster ducts:** Disconnect the wiper leads at switch. Disconnect wiper links at pivot cranks by removing clips and brass washer. Remove three (3) nuts which hold the large wiper motor bracket to firewall. The complete unit may now be removed by moving the bracket back far enough to clear the studs and lowering unit down from under instrument panel.

NOTE: Care should be taken not to bend the links and battery should be disconnected to eliminate the possibility of shorts.

II. **Cars equipped with Heater and Defroster ducts.** Remove glove box and door. If car is equipped with a radio that removes from front of instrument panel, time will be saved by removing it. Disconnect wiper leads from the switch. Disconnect links from pivot cranks by removing clip and washer. While holding unit in place, remove four (4) self-tapping stud bolt assemblies from motor plate to motor bracket which is attached to firewall. The unit may now be moved horizontally towards passenger side and then down from under instrument panel. The motor bracket can be removed by taking off three attaching nuts and bringing it straight down after clearing the studs.

b. Disassembly of Windshield Wiper Link (Fig. 41)

With motor and link assembly laying on clean bench, remove clip that holds right-hand link to crank arm. Remove bevel washers, and carefully remove link. The pivot end of link is provided with a stop to prevent wipers from going over center and locking. Remove parking cam and spring release. Remove coil spring from around pin by spreading the springs ends apart, and remove spring washer. The left-hand link is disassembled in same manner, after removing crank arm to crank lever retaining nut. To replace wiper switch or Geneva Wheel remove switch plate.

c. Assembly of Motor Switch

Make sure gear box contains lubricant. Install switch plate. Be sure Geneva Wheel follower pin engages smoothly with top of gear.

d. Assembly of Windshield Wiper Link

Install spring washer, with concave surface toward crank arm. Expand ends of crank pin coil spring and install on crank pin. Install spring release.

NOTE: The spring releases are identical but must be installed in accordance with the following letter code; looking directly at the crank, the spring release, and the link, have the same code letter visible.

Install parking cam so that it will index with spring release, and engage ends of spring between release and parking cam in openings at point of index. Install washer with convex surface toward cam and link assembly. Install retaining bolt and nut. Assemble right link and cam assembly to crank lever pivot in same manner, locking in place with a clip instead of retaining bolt.

e. Pivot Removal

Remove the wiper arms and blades. Remove two (2) front stud and washer bolts (on the Imperial models the front of pivot is held in place by an exterior spanner nut, bezel, and sealing gasket). Remove the back two (2) bolts. The pivot can now be removed from inside of car.

f. Installing New Pivot

Install new gasket and pivot. The use and proper installation of Belleville Type washers and bolts is important. Hand tighten bolts. Draw up front two nuts and washers 65 inch pounds torque, tighten back bolts, 75 inch-pounds torque, to insure a good seal.

g. Installation of Windshield Wiper Motor Bracket and Link Assembly

Install three rubber gaskets on bracket studs. Reinstall in reverse order given for removal in preceding section. All nuts and bolts should be tightened 75 inch-pounds torque, except wiper arm is tightened 85 inch-pounds torque. To readjust wiper arms: Loosen wiper arm nut until a definite click is head. Move arm to desired position and tighten 85 inch-pounds torque.

NOTE: All wiper arms are capable of infinite adjustment with respect to the pivot shaft.

h. Switch Color Code

Red Lead—field lead—switch terminal F-1.

Yellow Lead—field lead—switch terminal F-2.

Black Lead—armature lead—switch terminal "A".

Blue Lead—Park Lead—switch terminal "P".

Heavy Lead—hot lead from battery—connect to circuit breaker.

68. PUSH PEDAL CONTROL

When the pedal is depressed, a stream of washer fluid will spray the windshield, also the windshield wipers will start to operate as long as the pedal is depressed. The electrical pedal control is standard on Models LC-3 and all Imperial Models. It is optional equipment on the LC-1-LC-2 Models. Figure 42 show the wiring diagram.

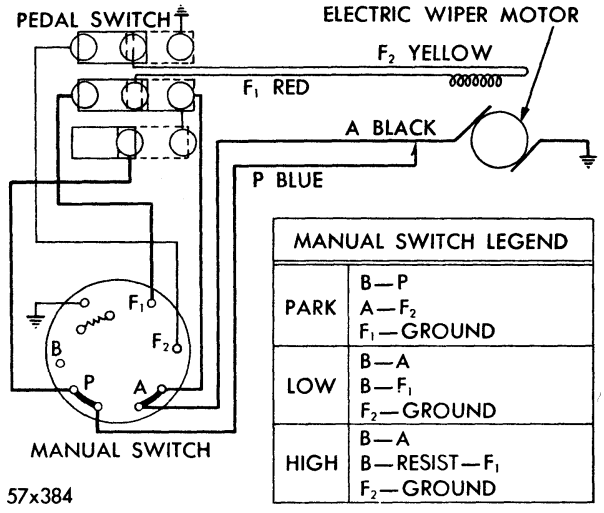


Fig. 42—Pedal Control—Electric Windshield Washer—Wiring Diagram

ELECTRIC WINDOW LIFTS

The three component parts in basic circuit are circuit breaker, motor, and switch. There is no relay, and switch carries full amperage load of motor.

The power window lift motors have an individual, built-in circuit breaker. All models, except four door special, use one 20 amp. circuit breaker on left cowl side to protect wiring to both front and rear motors. The four door special uses one 30 amp. circuit breaker for same purpose. Four switches are used to control window lifts—a master switch located on left front door, and an individual door switch for each of other doors. The individual switch feeds are brought out to circuit breaker on cowl side. The harness for right door is carried across upper firewall. The motors require no lubrication.

When operating a window, normal amperage draw is 12 to 16 amperes for all cars, except rear doors of four door Nassau, Newport and St. Regis models which draw approximately 18 to 22 ampere. This will vary with voltage.

69. REMOVAL OF WINDOW LIFT

Disconnect battery and remove garnish molding. Remove door handle control, escutcheon plate. Remove door trim panel, arm rest bracket, and window lift control switch. Disconnect wires from motor. Remove clips from regulator pins which hold lower glass channel. On Imperial models remove studs and rollers from regulator arms.

Raise glass manually and prop glass in up position. Raise glass before loosening cap screws so that it is out of working area. Remove four regulator to door attaching cap screws and pivot guide retaining pin. Lower motor and regulator assembly through opening in door.

If gear box is to be replaced, remove regulator counter-balance spring before removing unit. The counter-balance spring has approximately 360 degrees of wrap.

CAUTION

Use large pair of pliers when removing. Be sure to remove spring before disassembling gear box.

The gear box, which is replaced as an assembly, consists of worm and worm gear. The worm gear drives a pinion which is meshed with regulator sector gear. The gear box is lubricated at assembly and should not require further lubrication. Use MOPAR Lubriplate, 105 light-weight on all other moving parts.

70. INSTALLATION OF WINDOW LIFT

Place motor and regulator assembly through opening in door and insert intermediate pivot arm pin into guide inside of door shell. There is no clip. Install four regulator attaching screws, finger tight.

After installing regulator retaining screws, check to make certain that intermediate pivot arm did not slip out of guide during installation. Remove window prop and lower glass. Insert control arms into glass channel, using leather washer on each side of channel, and secure with clip. On Imperial Models, install rollers and pins in regulator arms. The control arms can be inserted into glass channel only when glass is in lowered position.

Connect wires to motor and connect battery. On Hard-Top Models—adjust regulator in slotted holes. Allowing both pins to contact glass channel when glass frame is flush with vent wing. On Sedan—adjust regulator so that glass runs free in channel. Check glass for alignment. Connect an ammeter into electrical circuit and operate window. The ammeter reading should be constant without fluctuation as follows: Approximately 14 amperes, all models except rear doors of four-door Nassau, Newport and St. Regis models. If ammeter reading fluctuates, there is a bind in glass or in linkage. The down stop should be adjusted so window is flush with garnish molding, and other parts.

ELECTRIC LOCKING DOOR LOCKS

The electric door lock is operated by a push-pull double acting solenoid, attached by a connecting rod to the door lock actuating 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 lock slide member into the lock or unlock position. (Fig. 48)

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.

71. REMOVAL AND INSTALLATION OF SOLENOID

a. Removal

Remove the door trim panel. Disconnect the lock to solenoid connecting rod at the solenoid. Disconnect wires and remove solenoid.

b. Installation

Fasten solenoid to door and connect up wires. Connect lock connecting rod to solenoid. The front doors connecting rod is adjustable. Adjust the rod by turning the turn buckle in or out until the solenoid will just pull the locking lever into the lock. Check to make sure the solenoid will pull the lever far enough out to unlock the door. Install the trim panel.

POWER SEATS

The power seat can be moved six ways—forward, backward, upward and downward and tilt. (Refer to Fig. 43). The power seat is driven by one motor located under front seat.

The motor operates a gear drive train which supplies power through flexible cables to the slave units located in the seat track. The control switch assembly is on left side of front seat and is wired through a relay to a 40 ampere circuit breaker. This circuit breaker is located adjacent to window lift circuit breakers behind left front kick panel.

The wire from starter relay supplies power to circuit breaker. If car is also equipped with electric window lifts, power is supplied by a brass jumper parallel with electric window lift circuit breakers.

Power is supplied to relay from circuit breaker. Six wires go to switch. One used for power, two used for motor field current which also actuates relay for motor armature current. Three wires attach to solenoids which control movement of front riser, rear riser and hor-

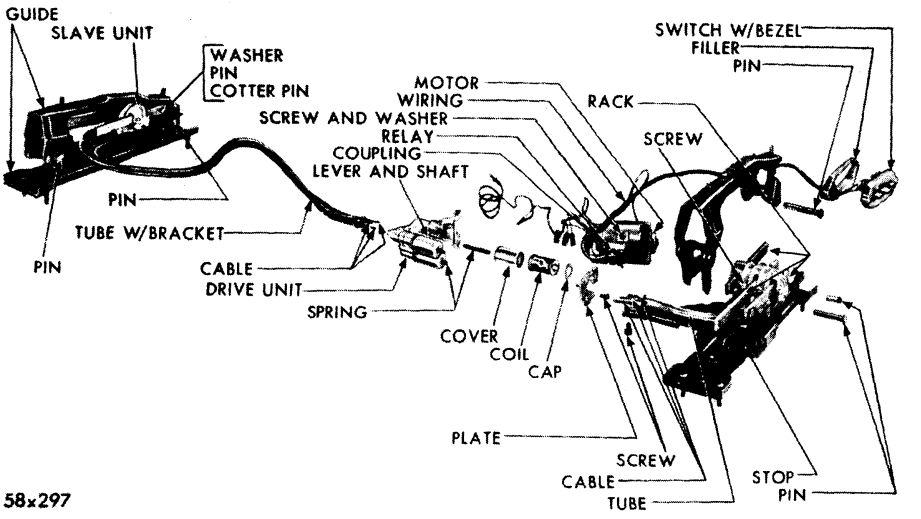


Fig. 43—Power Seat Assembly (Exploded View)

izontal movement. The wiring harness to motor is looped to permit up and down movement.

The wire harness should be clipped securely so wires will not be pinched when track is in extreme forward position. The tracks are replaced only as an assembly, and are not interchangeable from left to right. Tracks cannot be adjusted. The horizontal travel is five inches and horizontal plane of seat track is inclined 11 degrees. Vertical travel is 2 inches at front and 2 inches at rear. Available tilt is 7½ degrees forward and 8 degrees rearward from neutral.

72. REMOVAL AND INSTALLATION OF FRONT SEAT ASSEMBLY AND ADJUSTER

a. Removal

Remove front seat cushion—four-door only, and disconnect battery. Remove control wires from switch. Remove front seat assembly. On Hard-Top-Models—remove front seat and cushion as an assembly. Remove nuts from seat guide attaching studs and remove adjuster from car.

NOTE: Do not damage flexible tubing during removal.

b. Installation

Install adjuster and attaching nuts. Connect seat adjuster battery wire to circuit breaker in cowl. Allow loop from relay to clip on floor for horizontal travel. Install front seat assembly. Connect control wires to switch and install front seat cushion on four-door models.

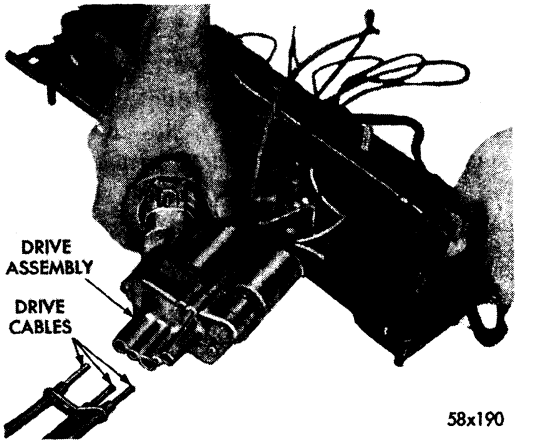


Fig. 44—Removing Left Guide and Drive Assembly

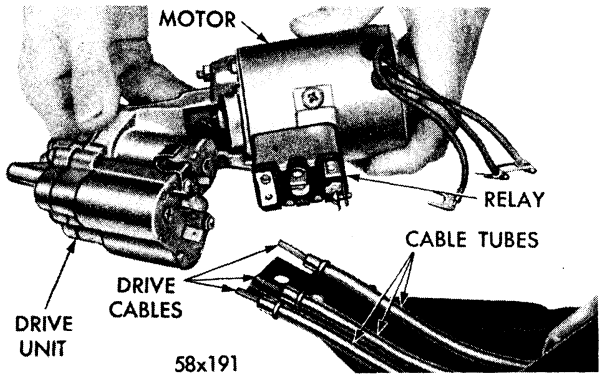


Fig. 45—Removing Drive Assembly from Left Slave Unit

73. REMOVAL AND INSTALLATION OF FLEXIBLE CABLES

a. Removal

Remove the front seat assembly. Disconnect battery wires at motor relay. Remove retainer plate that holds right side tubes to drive assembly. Remove the left seat guide attaching studs nuts and remove the guide and drive assembly (Fig. 44). Be careful not to bend or damage right side tubes when sliding tubes out of drive assembly. Pull flexible cables from right side tubes.

Remove the bolts that hold the motor and drive assembly to the left guide bracket. Remove drive assembly with tubes from left slave unit (Fig. 45). Remove flexible cables from tubes.

b. Installation

Place the three left cable tubes into the left slave unit (Fig. 46).

(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. Position drive unit on left side tubes. Make sure flexible cables seat in slot in drive unit. Bolt drive unit to guide bracket.

Place the right side flexible cables in the right side tubes. Position left guide and drive assembly on the right side tubes. Make sure the cables seat in the drive assembly. Install the right side tubes retainer plate. Bolt left guide assembly to floor. Connect wire to relay and check operation of seat. (Fig. 47)

See Figures 49 through 57 for electrical wiring diagrams.

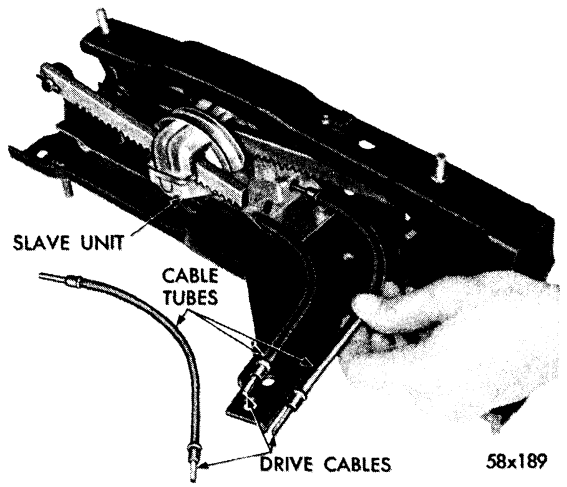


Fig. 46—Installing Cable Tubes in Slave Unit

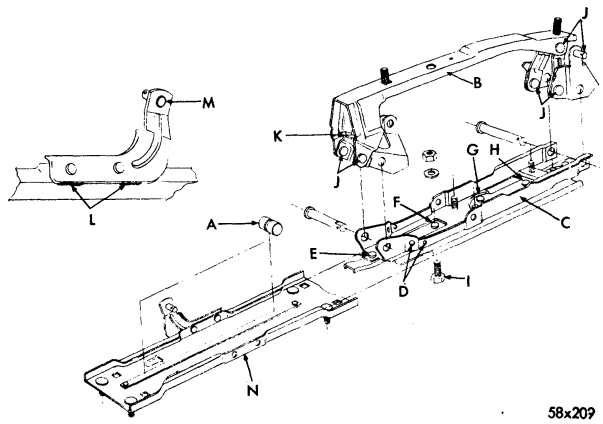


Fig. 47—Seat Guide Assembly

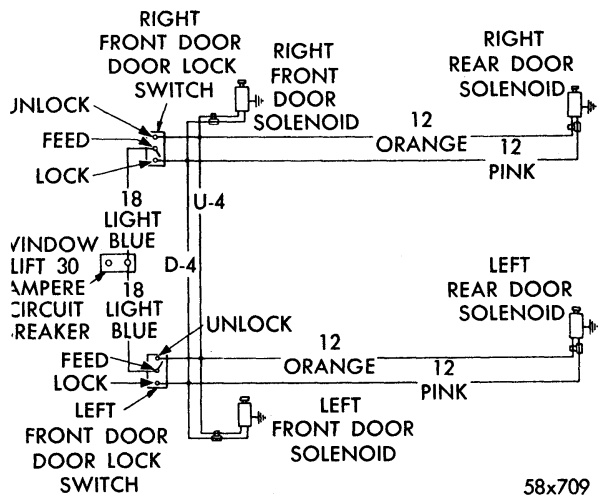


Fig. 48—Electric Door Locks (Imperial)

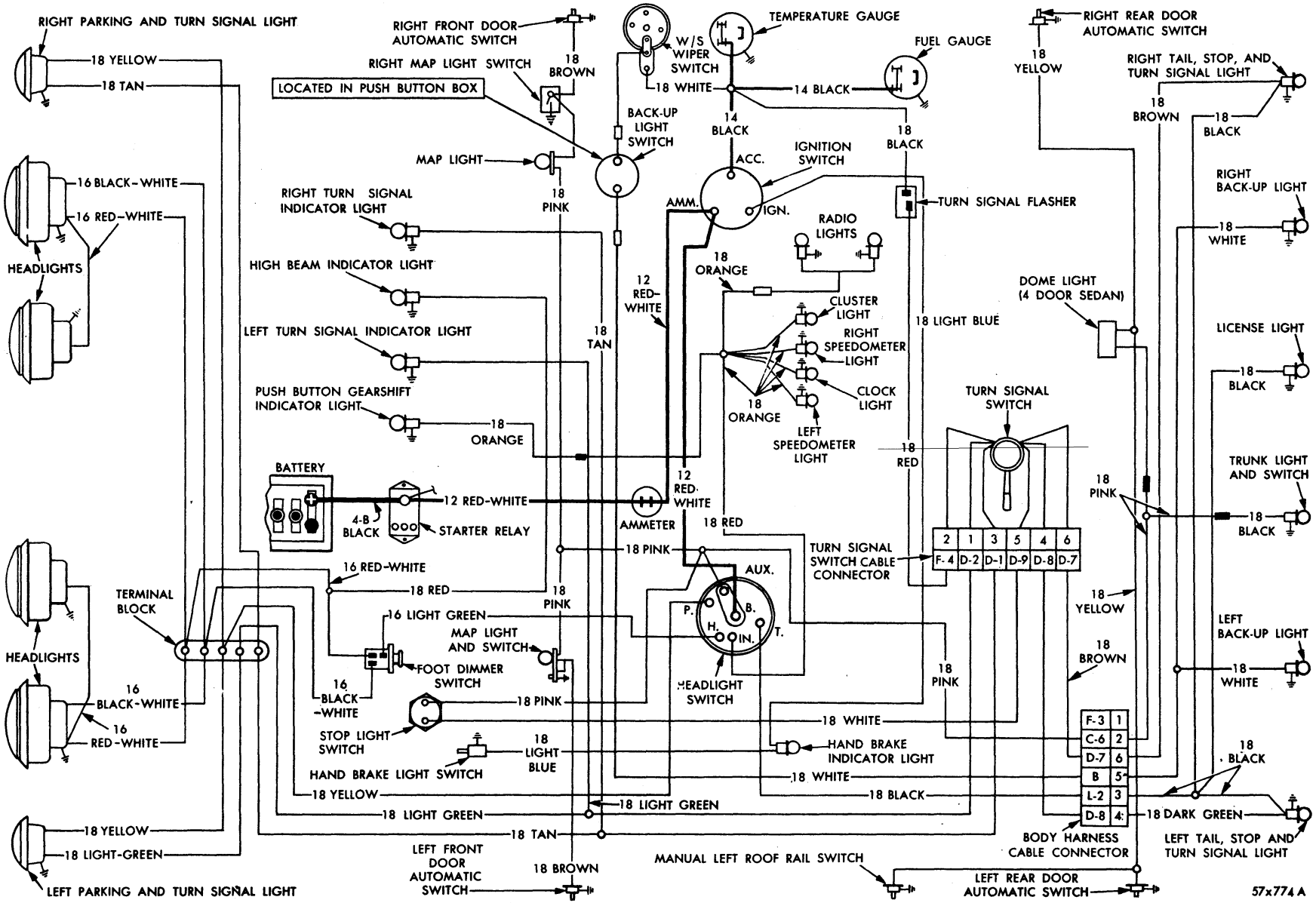


Fig. 49—Lighting and Turn Signals (Chrysler) Wiring Diagram

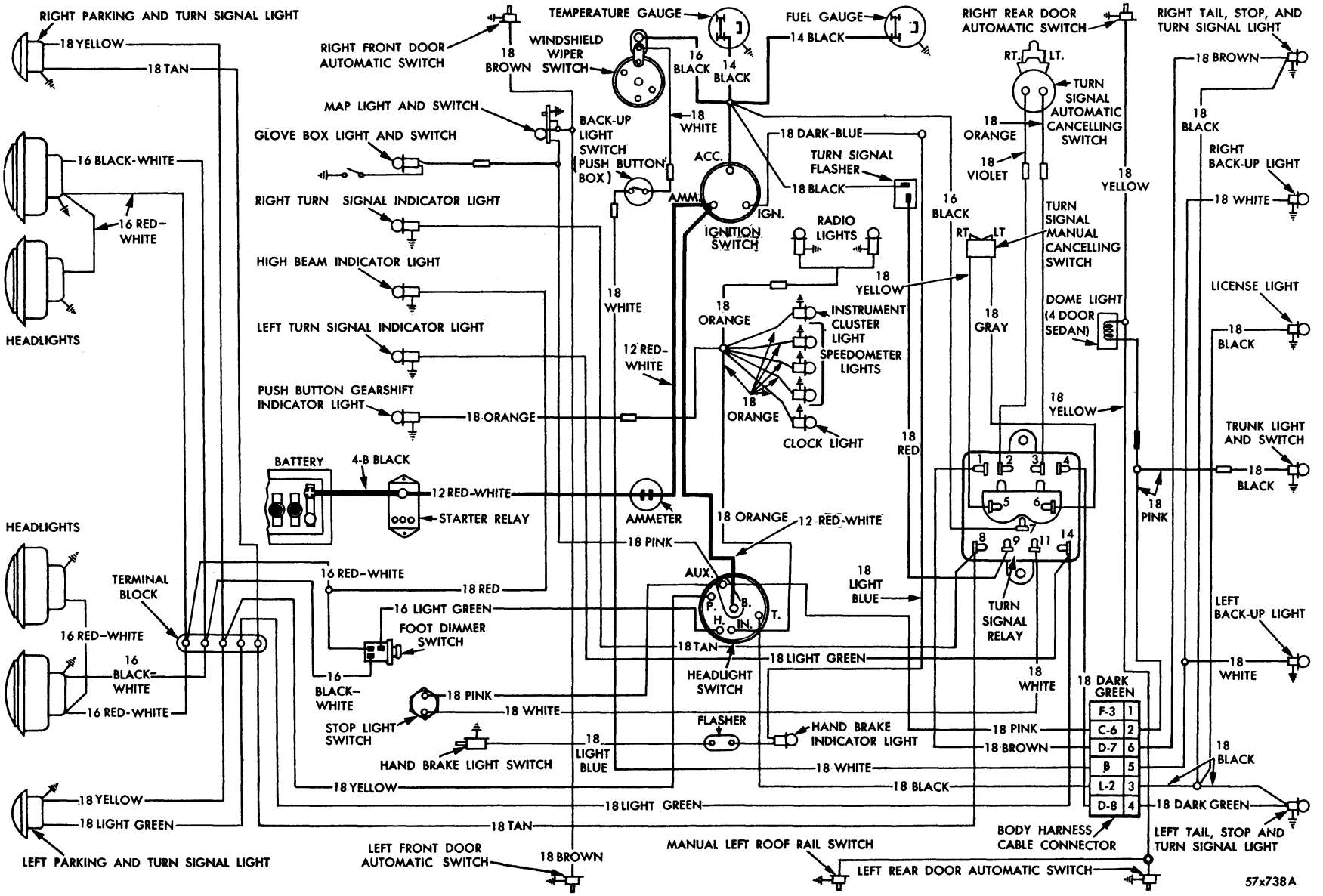


Fig. 50—Lighting and Turn Signals (Imperial) Wiring Diagram

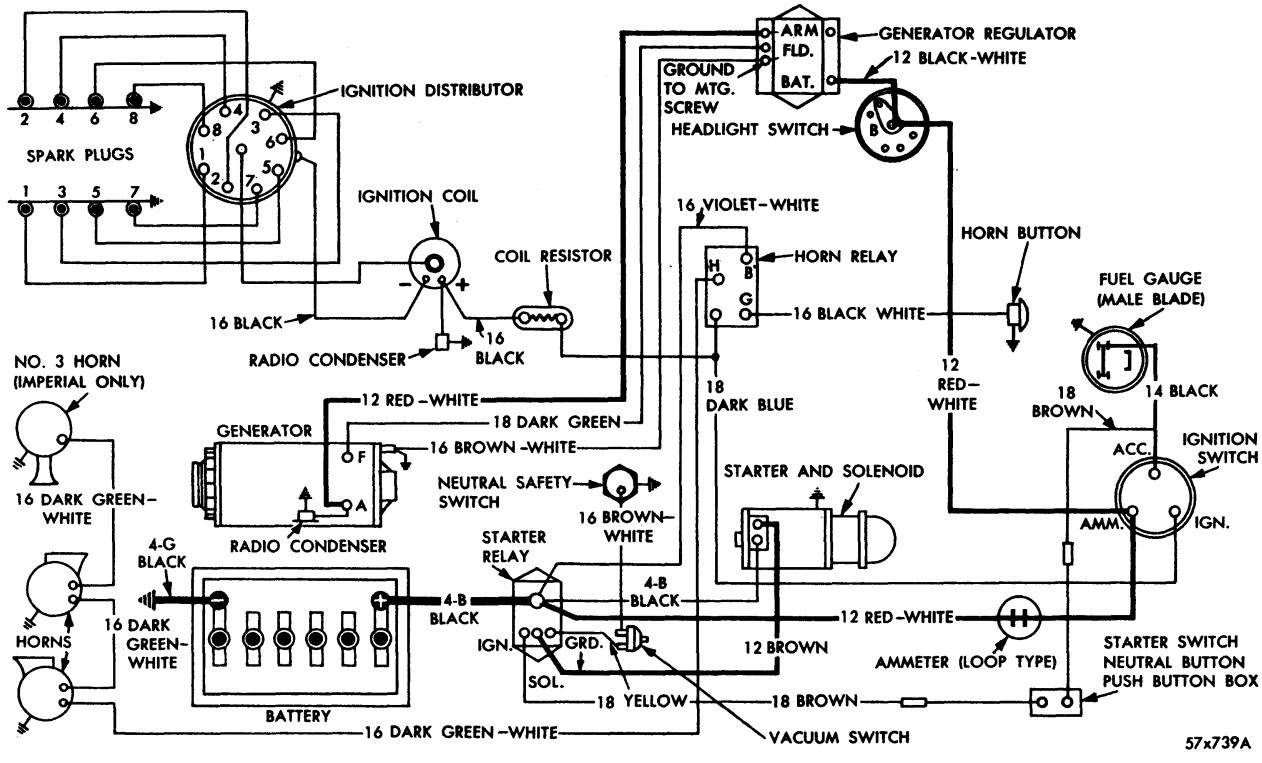


Fig. 51—Starter, Generator, Ignition and Horns Wiring Diagram

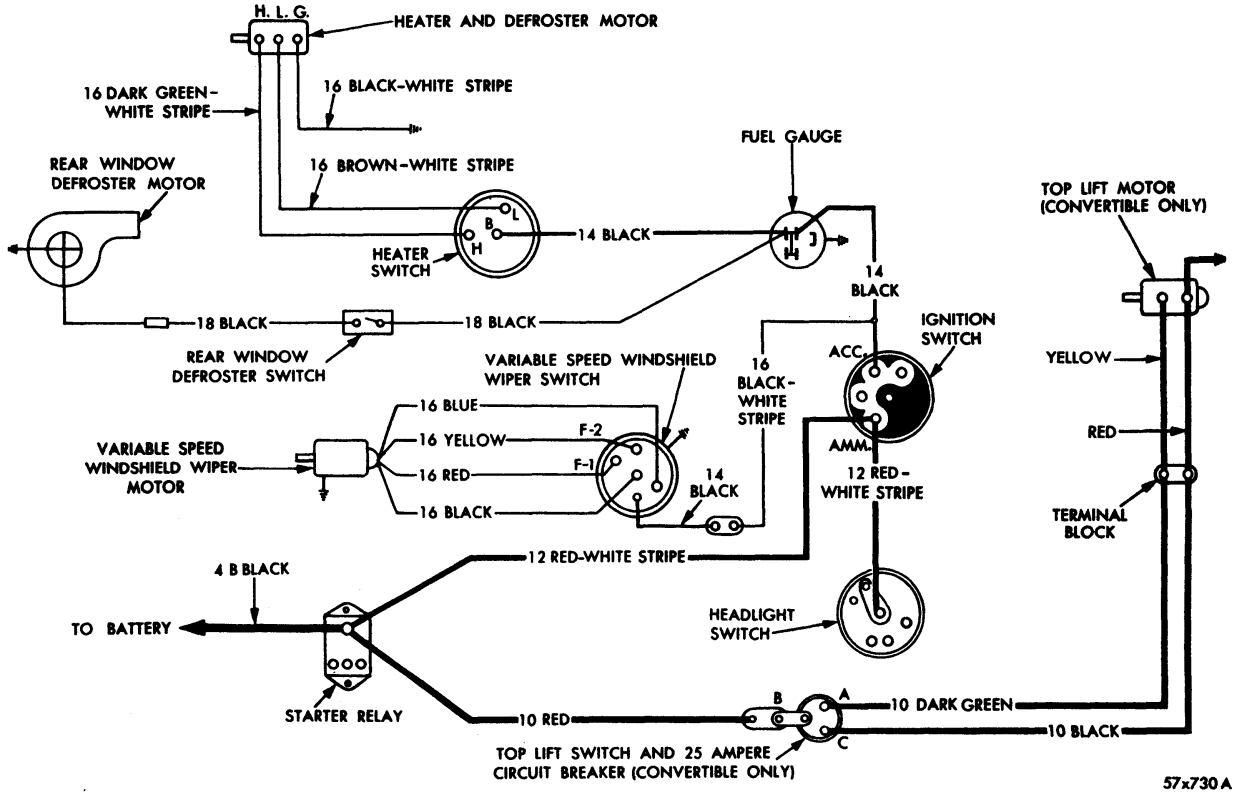


Fig. 52—Windshield Wipers, Heater and Convertible Top (Chrysler) Wiring Diagram

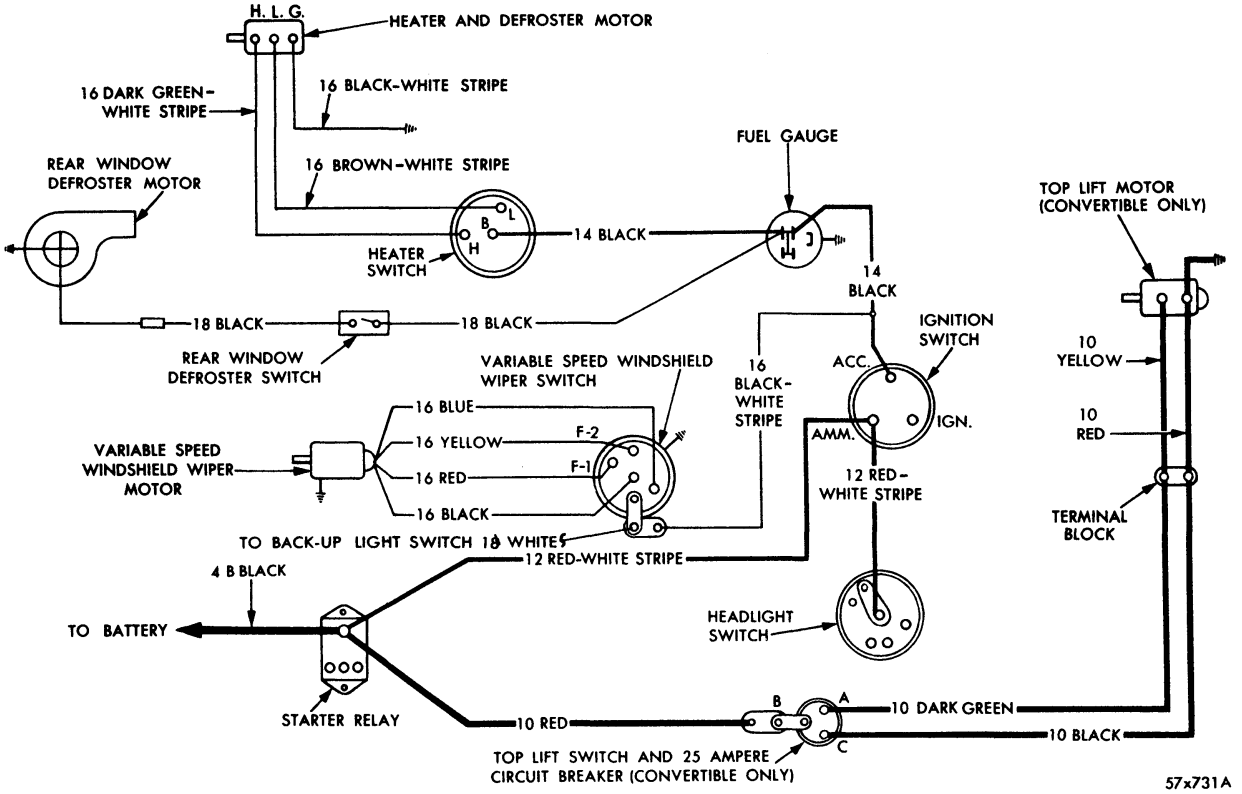


Fig. 53—Windshield Wipers, Heater and Convertible Top (Imperial) Wiring Diagram

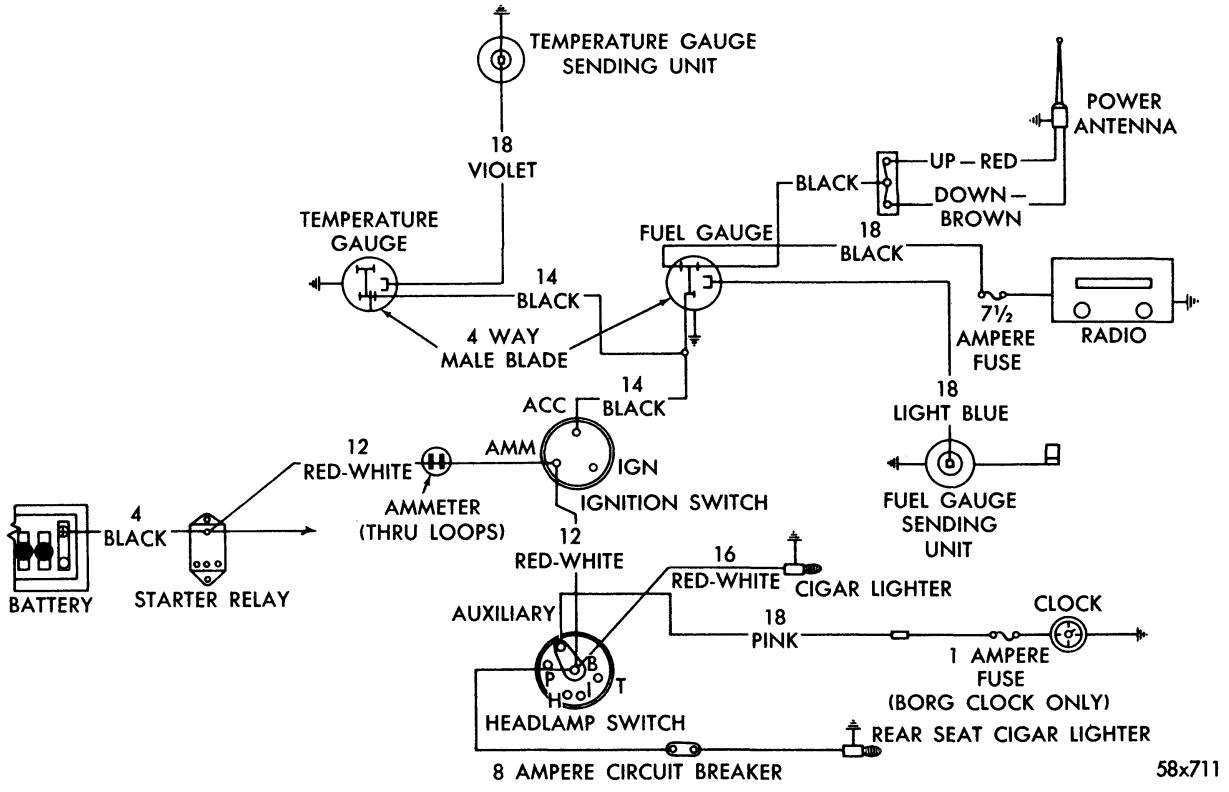
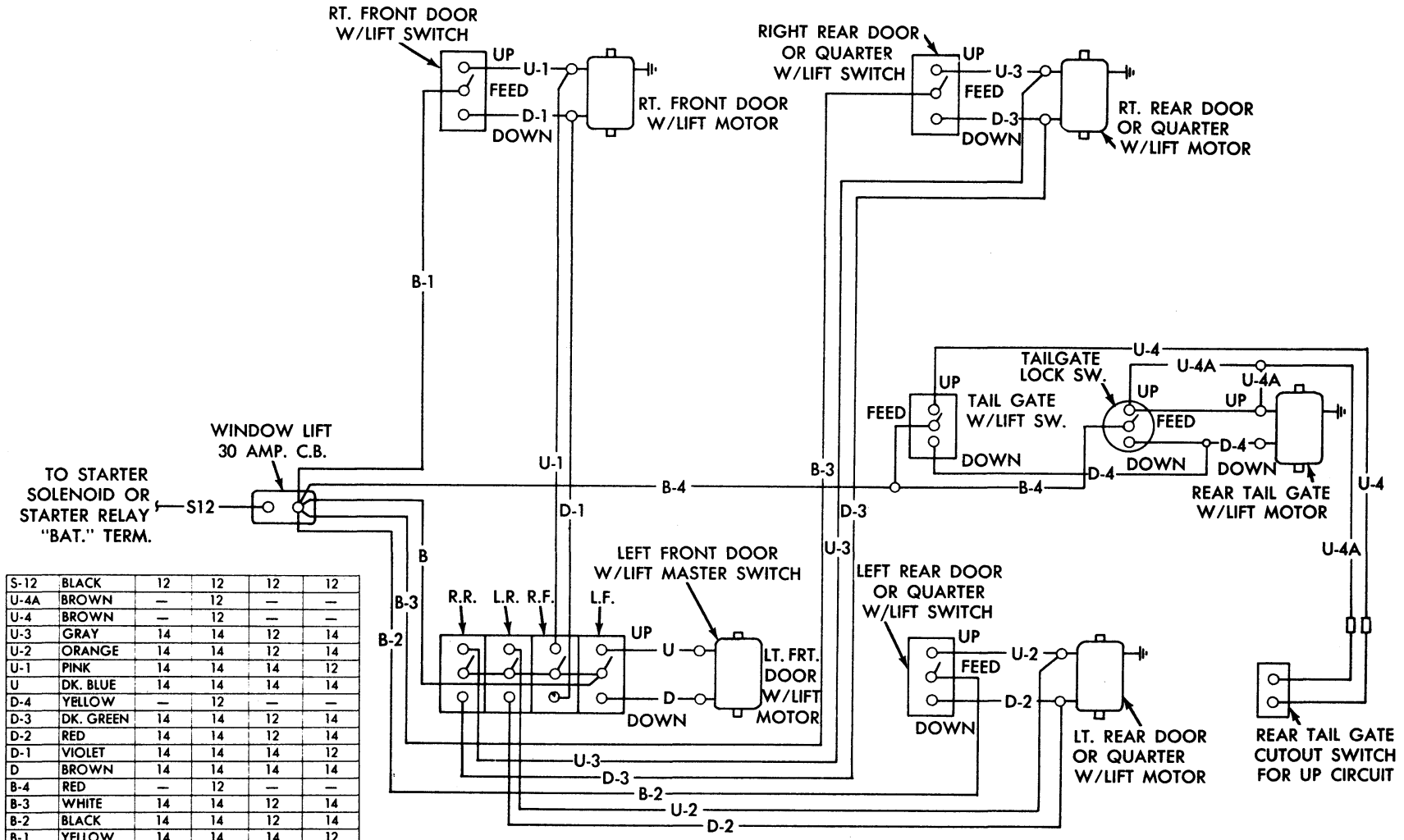


Fig. 54—Instruments and Accessories Wiring Diagram



S-12	BLACK	12	12	12	12
U-4A	BROWN	—	12	—	—
U-4	BROWN	—	12	—	—
U-3	GRAY	14	14	12	14
U-2	ORANGE	14	14	12	14
U-1	PINK	14	14	14	12
U	DK. BLUE	14	14	14	14
D-4	YELLOW	—	12	—	—
D-3	DK. GREEN	14	14	12	14
D-2	RED	14	14	12	14
D-1	VIOLET	14	14	14	12
D	BROWN	14	14	14	14
B-4	RED	—	12	—	—
B-3	WHITE	14	14	12	14
B-2	BLACK	14	14	12	14
B-1	YELLOW	14	14	14	12
B	TAN	12	12	12	12
SYM.	COLOR	SIZE	SIZE	SIZE	SIZE
CIRCUIT		4 D. SED.	4 D. SUB.	4 D. H.T.	2 D. H.T. CV. CPE.

58x212

Fig. 55—Electric Window Lifts Wiring Diagram

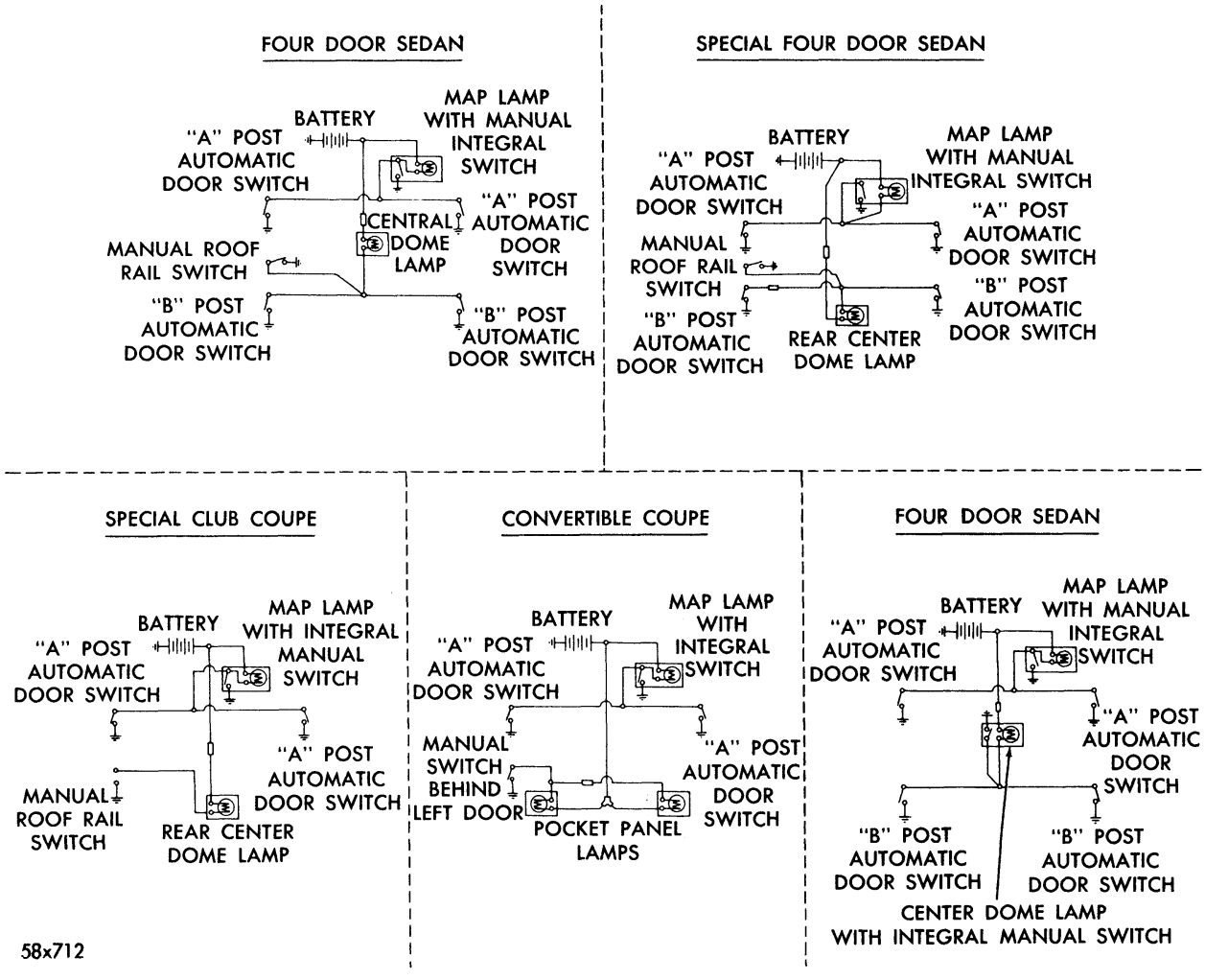


Fig. 56—Interior Lamps and Switches Wiring Diagram (Chrysler)

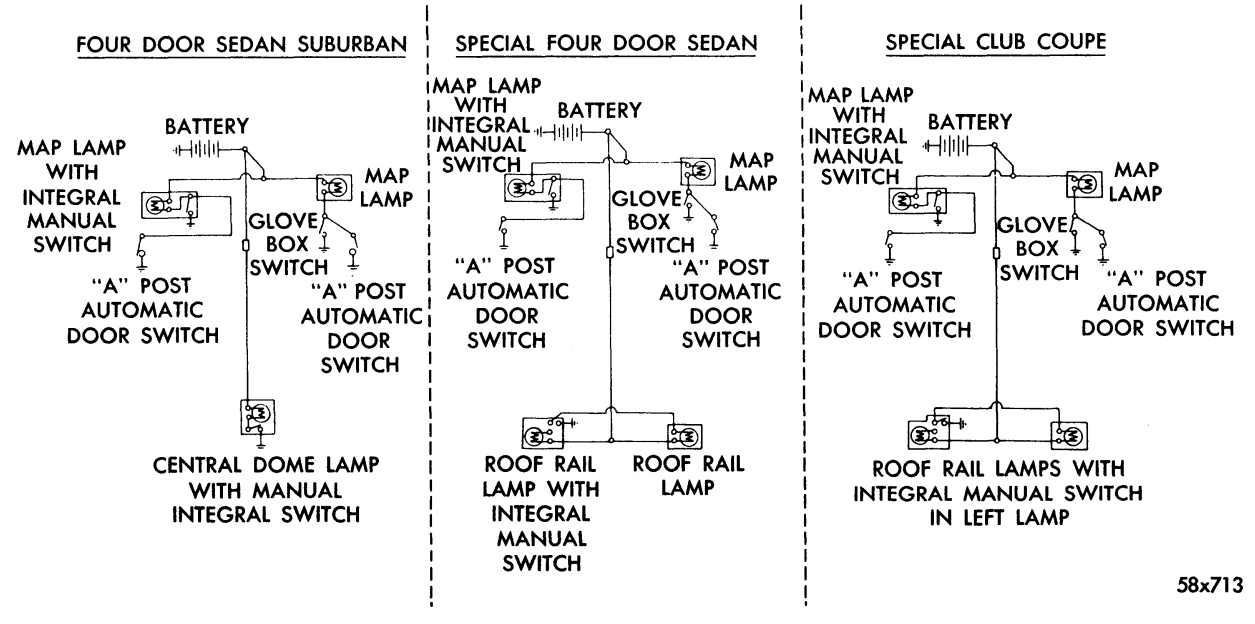


Fig. 57—Interior Lamps and Switches Wiring Diagram (Imperial)

SERVICE DIAGNOSIS

BATTERIES

74. BATTERY DISCHARGED

a. Charge battery by slow charging. Test circuit resistance and regulator.

b. Investigate use of accessories and type of driving car is subjected to.

c. Check for short circuits.

75. BATTERY DOES NOT RETAIN WATER

a. Check voltage regulator.

b. Check for broken case.

c. Reseal joints between cell covers and case.

76. BATTERY DOES NOT TAKE CHARGE

a. Add water to adjust electrolite to proper level.

b. Test battery capacity after 24 hours charge at four amperes.

c. Dissolve sulphated condition by charging at one ampere per positive plate per cell (or for 24 hours at four amperes) until charging rate does not rise for two successive readings taken at hourly intervals.

STARTERS

77. STARTER RELAY DOES NOT CLOSE

Check all relay, ignition-starter switch connections and neutral.

a. Replace open circuit wire between starter relay arm (or ground) terminal post and neutral switch (T.F. trans. only).

b. Replace open circuit wire between ignition-starter switch and ignition terminal on starter relay.

c. Replace neutral switch (TF trans. only).

d. Replace starter relay.

e. Replace ignition-starter switch.

f. Recharge battery.

78. RELAY OPERATES BUT SOLENOID DOES NOT

a. Replace open circuit wire between starter-relay solenoid terminal and solenoid actuating terminal post.

b. Check and clean up solenoid switch contacts.

c. Clean and tighten terminal connections on terminal bus bar between solenoid and starter fields.

d. Turn and under cut armature. Replace brushes.

e. Check for broken lead or loose soldered connection inside solenoid switch cover.

f. Replace solenoid.

g. Replace starter relay.

79. SOLENOID PLUNGER VIBRATES BACK AND FORTH WHEN SWITCH IS ENGAGED

a. Recharge battery. Replace defective battery. Clean and tighten cable connections.

b. Check for loose connections at relay, ignition starter switch and solenoid.

c. Check and repair any broken leads or soldered connections inside solenoid switch cover.

d. Replace solenoid.

80. STARTER OPERATES BUT PLUNGER DOES NOT RETURN WHEN IGNITION-STARTER SWITCH IS RELEASED

a. Replace broken solenoid plunger return.

b. Check ignition starter switch opening.

c. Replace solenoid.

d. Adjust pinion clearance.

81. SOLENOID OPERATES BUT STARTER DOES NOT

a. Recharge or replace battery.

b. Clean and tighten cable connections.

c. Check solenoid switch for closing (contacts jumper).

d. Adjust pinion clearance with plunger adjusting screw, with starter on bench.

e. Repair starter.

82. STARTER FAILS AND LIGHTS DIM

a. Recharge or replace battery.

b. Clean and tighten cable connections.

c. Check brush pigtails and coil leads for grounds.

d. Replace grounded starter fields.

e. Check for armature rubbing on field poles.

83. STARTER ARMATURE ROTATES BUT PINION DOES NOT ENGAGE

a. Check arm shaft for rusting.

b. Replace starter drive and adjust pinion clearance.

c. Check solenoid plunger linkage.

d. Replace engine flywheel ring gear if bad.

84. STARTER PINION JAMS IN RING GEAR

a. Replace drive. Replace flywheel ring gear. Tighten starter mounting bolts securely when replacing starter.

b. Armature shaft bent. Replace armature and check pinion and flywheel teeth.

GENERATORS

85. GENERATOR FAILS TO CHARGE

a. Ground generator field terminal with engine running at 1500 R.P.M. If it still fails to charge, remove generator and repair. If generator charges with field grounded, remove regulator, clean and adjust contacts or replace regulator.

b. Test for open circuit in field lead from generator to regulator.

c. Test for grounded armature lead from generator to regulator.

86. LOW UNSTEADY CHARGING RATE

a. Adjust or replace drive belt.

b. Test charging circuit resistance, cleaning and tightening all loose connections.

c. Inspect generator brushes and commutator for wear, grease or commutator out of round.

d. Test car ammeter.

87. EXCESSIVE CHARGING RATE

a. Check regulator contacts for sticking and for high setting of voltage regulator.

b. Check for grounded field lead between generator and regulator or for grounded field terminal post by disconnecting field lead at regulator with engine running at 1200 R.P.M. This should cause generator to quit charging if it does, regulator field circuit is grounded or contacts stuck. If charge stops with field open, disconnect field lead at generator. If charge stops, field lead is grounded, if not, remove generator and repair ground in generator field terminal post or field lead to post.

88. NOISY GENERATOR

a. Check pulley alignment.

b. Check for electrical noise by grounding armature terminal; if noise stops remove generator and inspect commutator and brushes.

c. Inspect bearing for wear or roughness.

d. Tighten pole shoe screws.

89. PREMATURE FAILURE OF ARMATURE

a. Test regulator.

b. Test for shorted cell in battery by using capacity test.

REGULATORS

90. REGULATOR CONTACTS OXIDIZED

a. Check resistance of ground circuit.

b. Check field coils for short circuit.

c. Check for misalignment or improper air gap adjustment of regulator contacts.

91. REGULATOR CONTACTS PITTED

a. File contacts. Reset air gaps and adjust regulator setting to specifications.

b. Check battery for proper ground polarity (negative post grounded). Clean and adjust contacts and reset output to specifications.

c. Wrong regulator polarity. Replace regulator.

92. BURNED COIL WINDINGS

a. Replace regulator after checking for high voltage regulator setting.

b. Check for grounded field circuit. Repair ground and replace regulator.

93. BURNED CONTACT ARM

a. Replace regulator and connect wires to proper terminal.

b. Never short between the battery lead and the regulator field terminal. If this is done accidentally clean contacts and adjust regulator.

94. REGULATOR CONTACTS STUCK

a. Reset air gaps and adjust settings. Replace regulator if contacts are badly burned or pitted.

b. Check battery polarity (negative ground). Remove field lead from regulator and touch battery lead to polarize generator after battery is properly installed.

c. Install regulator of proper polarity. A negative ground regulator has NEG stamped on base.

IGNITION

95. BURNED CONTACTS

a. File contacts that are not excessively burned. Align contacts and adjust gap to specifications. Adjust breaker arm spring tension.

b. Replace contacts that are badly burned. Check for presence of oil or grease on and around contacts; eliminate cause if present. Check voltage regulator. Check condenser.

96. PITTED CONTACTS

a. Replace condenser with one of proper capacity.

97. FOULED SPARK PLUGS

a. Check plugs for proper heat range.

b. Eliminate excessive oil consumption.

c. Check carburetor for rich mixture.

d. Adjust gaps to .035 inch.

98. BURNED SPARK PLUGS

a. Check for proper heat range.

b. Tighten plugs to specified torque, using new gaskets (engines so equipped).

c. Check voltage regulator setting.

d. Check carburetor for lean mixture.

e. Adjust ignition timing.

f. Check for leaking head gasket or cracked cylinder head.

99. DISTRIBUTOR CAP BLOWS OFF

a. Check for ruptured diaphragm in vacuum advance unit.

LIGHTING

100. LIGHTS BURN OUT

a. Replace damaged bulbs after adjusting voltage regulator.

101. LIGHTS DO NOT LIGHT

a. Test voltage at headlights and replace bulbs or repair wiring.

b. Replace or repair dimmer or light switch.

c. Recharge or replace battery and test generator and voltage regulator.

d. Test voltage drop of circuit. Clean and tighten all loose connections.

102. LIGHTS FLICKER

a. Test voltage drop of circuit. Clean and tighten all loose connections.

b. Test battery. Recharge or replace battery. Test voltage regulator.

c. Check bulb contacts for corrosion or being loose. Clean and tighten ground connections.

103. EXCESSIVE FLARE AT ACCELERATION

a. Recharge or replace battery.

b. Adjust voltage regulator.

c. Clean and tighten engine to body ground connection.

104. INTERMITTENT OPERATION OF HEADLIGHTS

a. Check circuit breaker.

b. Test voltage drop of circuit. Clean and tighten all loose connections. Replace defective dimmer or headlight switch.

FUEL GAUGE

105. GAUGE POINTER STICKS AT EMPTY MARK

a. Clean paint from indicator pointer where it contacts empty stop.

106. GAUGE POINTER DOES NOT MOVE TO FULL MARK (FULL TANK)

a. Clean and tighten loose connections, in fuel system electrical circuit.

b. Check tank unit for good ground connection.

c. Check tank to frame ground connection.

d. Check tank unit for open coil. Replace tank unit.

e. Replace dash unit.

107. GAUGE POINTER FLICKERS

a. Clean and tighten all loose connections (including ground).

b. Check tank unit arm contact to rheostat.

108. GAUGE POINTER STAYS AT FULL

a. Check both dash and tank units for short circuit.

HORNS

109. HORNS DO NOT BLOW

a. Short from relay "SW" terminal to ground (IGN SW ON). If horns now blow repair wiring from "SW" terminal to horn contact ring.

b. Connect jumper relay IGN. terminal to B terminal and depress button. If horn blows repair wiring IGN. terminal to IGN. switch.

c. If horns do not blow after above tests, connect jumper from "B" to "H" terminal. If horns blow replace relay. If horns do not blow check wiring from battery to B terminal and H terminal to horn.

d. If horns still do not blow after tests above, repair or replace horns.

110. HORNS BLOW CONTINUOUSLY

a. Disconnect wire from relay "SW" terminal. If horns stop blowing check for ground in wiring from "SW" terminal to horn button, contact plate. If horns still blow when wire is removed from "SW" terminal, replace relay.

b. Check for grounded horn button.

WIPERS

111. WIPERS OPERATE SLOWLY

a. Replace brushes. Turn and undercut armature commutator.

b. Check for loose connections in ground and wiring circuit. Clean and tighten.

c. Free up and lubricate pivot shaft.

d. Replace control switch.

e. Replace motor.

112. WIPERS FAIL TO OPERATE

a. Free up and lubricate linkage.

b. Test control switch and wire from motor to switch by connecting jumper wire from ammeter to motor, and across switch terminals. (Refer to Figure 49).

c. Remove motor and test on bench.

113. WIPER BLADES NOT PARKING OFF GLASS

a. Repair or replace link spring.

b. Adjust parking switch plate on motor gear box.

114. BLADES CHATTER

a. Replace arm.

b. Install blades that have proper pressure.

115. MOTOR WILL NOT PARK

a. Check wiring and panel switch.

b. Install new parking switch.

c. Replace motor.

POWER WINDOWS

116. WINDOW DOES NOT OPERATE FROM MASTER SWITCH, BUT WILL FROM DOOR SWITCH

a. Replace wire between circuit breaker and master control switch.

b. Replace master control switch.

c. Replace broken wire at door containing master switch group.

117. WINDOW DOES NOT OPERATE FROM EITHER MASTER OR INDIVIDUAL SWITCH

a. Replace burned out motor and check for grounded sticking or defective switch.

b. Check voltage of circuit for broken wiring between circuit breaker and motor terminals.

c. Replace circuit breaker if voltage is present at terminal opposite battery feed, if all windows do not operate.

d. Check motor ground wire for good ground.

e. Motor is thermal protected and will not operate when warm, allow to cool and recheck.

118. WINDOW OPERATES IN ONE DIRECTION ONLY FROM EITHER MASTER OR DOOR SWITCH

a. Check switch.

b. Check connections at motor junction block and leads from junction block to motor. Replace motor if connections at junction are clean and tight.

119. CIRCUIT BREAKER "CLICK" ON AND OFF CONTINUOUSLY AND WINDOW DOES NOT OPERATE

a. Check for ground between circuit breaker and switches by disconnecting one wire at a time from circuit breaker to locate circuit containing ground. Replace wire or grounded switch.

120. WINDOW OPERATES IN WRONG DIRECTION

a. Reverse switch lead to switch involved.

TURN SIGNAL SWITCHES

121. LIGHTS WON'T FLASH

a. Test the manual switch. Turn the ignition switch on. To check the right turn signal push the manual switch for a right turn and connect the test lamp between the relay No. 5 terminal and ground. If the test light flashes but the right turn lamps don't flash, it indicates the bulbs or wiring between the lamps and relay is faulty and should be repaired or replaced. If the test light doesn't flash, test the flasher.

The left turn signal is checked in the same manner except that the test light is connected between the relay No. 6 terminal and ground.

b. Test the flasher. Connect the test light between the relay No. 9 terminal and ground. If the test light fails to light, it indicates the wiring between the flasher and relay, or the flasher or relay is faulty and should be replaced.

c. Test the relay. Connect the test light between the relay No. 7 terminal and ground. If the test light fails to light, it indicates the wiring from the fuel gauge to the relay, or the relay is faulty and should be replaced.

POWER SEATS

122. ENTIRE UNIT INOPERATIVE

Remove all wires from seat switch and connect together as shown for the six various control operations, if operation is normal, by connecting wires as shown. Replace switch.

For Forward Horizontal
Connect Red, White, Green

For Forward Tilt
Connect Red, White, Yellow

For Straight Up
Connect Red, White, Yellow, Brown

For Rearward Horizontal
Connect Red, Blue, Green

For Rearward Tilt
Connect Red, White, Brown

For Straight Down
Connect Red, Blue, Yellow, Brown

123. MOTOR INOPERATIVE

Check red wire at relay with test light. If test-light does not light, check for continuity in number 10 red feed wire, faulty circuit breaker or poor connection between circuit breaker and starter relay. If test light lights, connect number 10 red feed wire with red and black or red and green wires from motor. If motor runs, relay was faulty.

124. SEAT INOPERATIVE (MOTOR RUNS)

Jump wire from number 10 feed wire to each solenoid terminal on clutch assembly. Solenoids should each "click" as jumper is connected. If solenoid does not click:

a. Check wire in harness for open circuit. Repair.

b. Possible seized solenoid armature in coil. Replace coil.

c. Possible burned-out solenoid. Replace solenoid.

125. SEAT INOPERATIVE (MOTOR RUNS AND SOLENOIDS CLICK)

Check drive unit for stripped or broken gear. Replace drive unit if necessary.

126. SLAVE UNIT INOPERATIVE (MOTOR, SOLENOIDS AND DRIVE UNIT O. K.)

Check for broken drive cable. Replace as necessary.

127. EXCESSIVE FREEPLAY IN UNIT (SEAT HAS ROCKING MOTION EXCESSIVE MOVEMENT BETWEEN SLIDE AND BASE OF TRACK ASSEMBLY)

This condition is possibly due to roller (A), Fig. 1) being out of position.

a. Remove power seat assembly from vehicle.

b. Remove seat drive tubes from slave unit.

CAUTION

Do not run motor with drive cables and tubes disassembled or unit will be placed out of synchronization.

c. Remove seat support (B).

d. Remove seat slave unit from seat track slide (C).

e. Remove horizontal stops located on slide at (D).

f. Separate seat slice (C) from base (N) by pressing slide rearward which will allow rollers (A) to jump retaining rivets (E F G H), thereby separating slide from base.

g. Remove rivet (F) and replace with 5/16—18 x 1/2" cap screw (1) as shown to retain in proper position. To reassemble, reverse the above sequence.

NOTE: In reassembly, a frayed drive cable may occur. Such a cable may be repaired by applying a light coating of solder and then grinding to cable size.

128. SEAT TRACK EXCESSIVELY LOOSE (CAUSED BY LOOSE RIVET JOINTS)

To correct:

a. Disassemble upper track seat support (B) by removing cotter keys and pins.

b. Remove seat support and tighten all riveted joints (J) by peening with a ball peen hammer.

129. LOOSE FRONT LEVERS

To correct:

a. Arc weld front levers (K) to prevent movement between the two sections comprising the front lever assembly as shown.

130. SEAT CHUCK FORE AND AFT (CAUSED BY LOOSE HORIZONTAL TRACK SUPPORT TO LOWER TRACK BASE

To correct:

a. Remove seat track assembly from vehicle and arc weld as shown (L).

b. Tighten rack attaching pins (M) by arc welding.

c. Check for loose horizontal rack in slave unit gear train. If loose, replace slave unit.