DODGE TRUCK

B-4 SERIES

SHOP MANUAL

MODELS: B-4-B, B-4-C, B-4-D, B-4-PW, B-4-DU, B-4-EU, B-4-F, B-4-G, B-4-GA, B-4-H, B-4-HA, B-4-HM, B-4-HMA, B-4-J, B-4-JA, B-4-JM, B-4-JMA, B-4-K, B-4-KA, B-4-KMA, B-4-R, B-4-RA, B-4-T, B-4-TA, B-4-V, B-4-VA, B-4-Y, B-4-YA, B-4-YX

SECTION 7

ELECTRICAL SYSTEM

DODGE DIVISION
CHRYSLER CORPORATION
DETROIT 31, MICHIGAN

LITHO IN U.S.A.
10M-CSD-3-53

D-14362

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SERVICE INFORMATION

SERVICE INFORMATION (CONTINUED)

SERVICE DIAGNOSIS

ELECTRICAL SYSTEM

SERVICE STANDARDS

MODEL DESIGNATION →	*B*	*C*	*D*	*PW*	*DU*	*EU*	*F, G, GA*	*H, HA, HM, HMA*	*J, JA, K, KA, JM, JMA, KMA*	*R, RA*	*T, TA, V, VA*	*Y, YA, YX*
Battery —												
Fully charged — hydrometer reading	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300	1.275 to 1.300
Terminal grounded..	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Positive
Capacity-amp. hours — 20 hours discharge rate	100	100	105	100	105	105	120	120	120	136	136	153
Voltage	6	6	6	6	6	6	6	6	6	6	6	6
Plates (per cell)	15	15	15	15	15	15	17	17	17	17	19	19
Location of battery..	Except C.O.E. models, B-4-PW, B-4-DU, B-4-EU — Under cab floor, outside left side rail. C.O.E. models, B-4-PW — Under hood, left side. B-4-DU, B-4-EU — Under cowl.											
Generator (Does not include extra equipment) — Model	GGW-6001	GGW-6001	GGW-6001	GGW-6001	GGW-6001	GGW-6001	GGW-6001	GGW-6001	GGW-6001	GGW-6002	GGW-6002	GGW-6002
Voltage	6	6	6	6	6	6	6	6	6	6	6	6
Maximum charging rate — Amps.	45	45	45	45	45	45	45	45	45	45	45	45
Watts	360	360	360	360	360	360	360	360	360	360	360	360
Brush spring tension (ounces)	32 to 53	32 to 53	32 to 53	32 to 53	32 to 53	32 to 53	32 to 53	32 to 53	32 to 53	32 to 53	32 to 53	32 to 53
Charging control....	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator	Current and Voltage Regulator
Pulley diameter	3½"	3½"	3½"	3½"	3½"	3½"	4½"	4½"	4½"	4"	4"	4"
Current and Voltage Regulator — Circuit breaker armature air gap.....	.031 to .034"	.031 to .034"	.031 to .034"	.031 to .034"	.031 to .034"	.031 to .034"	.031 to .034"	.031 to .034"	.031 to .034"	.031 to .034"	.031 to .034"	.031 to .034"

ELECTRICAL SYSTEM
SERVICE STANDARDS (Continued)

MODEL DESIGNATION →	*B*	*C*	*D*	*PW*	*DU*	*EU*	*F, G, GA*	*H, HA, HM, HMA*	*J, JA, K, KA, JM, JMA, KMA*	*R, RA*	*T, TA, V, VA*	*Y, YA, YX*
Distributor —												
Model	1AT-4101	1AT-4101	1AY-4003-1	1AY-4003-1	1AY-4003-1	1AY-4003-1	1AY-4004-1	1AY-4004-1	1AY-4004-1	1AO-4103A-1	1AO-4103-1	1AO-4103-1
Breaker point gap	.020″	.020″	.020″	.020″	.020″	.020″	.020″	.020″	.020″	.020″	.020″	.020″
Breaker arm spring tension (ounces)	17 to 20	17 to 20	17 to 20	17 to 20	17 to 20	17 to 20	17 to 20	17 to 20	17 to 20	17 to 20	17 to 20	17 to 20
Cam or dwell angle—(degrees)	38 to 40	38 to 40	38 to 40	38 to 40	38 to 40	38 to 40	38 to 40	38 to 40	38 to 40	38 to 40	38 to 40	38 to 40
Condenser capacity	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.	.025 to .028 m.f.
Maximum spark advance —												
Mechanical (degrees and max. rpm)	18 to 22 at 3200	18 to 22 at 3200	18 to 22 at 3200	18 to 22 at 3200	18 to 22 at 3200	18 to 22 at 3200	22 to 26 at 3080	22 to 26 at 3080	22 to 26 at 3080	20 to 40 at 2640	16 to 20 at 2240	16 to 20 at 2240
Vacuum	18 deg.	18 deg.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ignition timing	TDC	TDC	TDC	2 deg. BTDC	TDC	TDC	TDC	2 deg. TDC	2 deg. TDC	1 deg. ATC	TDC	2 deg. ATC
Spark Plugs (Resistor Type)												
Model	AR-8A	AR-8A	AR-8	AR-8	AR-8A	AR-8A	AR-5A	AR-5A	AR-5A	AR-5A	AR-5A	AR-5A
Size	14 mm.	14 mm.	14 mm.	14 mm.	14 mm.	14 mm.	14 mm.	14 mm.	14 mm.	14 mm.	14 mm.	14 mm.
Gap	.035″	.035″	.035″	.035″	.035″	.035″	.035″	.035″	.035″	.035″	.035″	.035″
Firing Order	1-5-3-6-2-4 ALL MODELS											
Lights —												
Headlights (watts)	45-35	45-35	45-35	45-35	45-35	45-35	45-35	45-35	45-35	45-35	45-35	45-35
Beam indicator (cp)	1	1	1	1	1	1	1	1	1	1	1	1
Parking (cp)	3	3	3	3	3	3	3	3	3	3	3	3
Tail and stop (cp)	21-3	21-3	21-3	21-3	21-3	21-3	21-3	21-3	21-3	21-3	21-3	21-3
Instrument panel (cp)	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½

(Continued on next page)

ELECTRICAL SYSTEM

SERVICE STANDARDS (Continued)

MODEL DESIGNATION →	*B*	*C*	*D*	*PW*	*DU*	*EU*	*F, G, GA*	*H, HA, HM, HMA*	*J, JA, K, KA, JM, JMA, KMA*	*R, RA*	*T, TA, V, VA*	*Y, YA, YX*
Min. circuit breaker points gap	.015″	.015″	.015″	.015″	.015″	.015″	.015″	.015″	.015″	.015″	.015″	.015″
Voltage and current armature air gap	.048 to .052″	.048 to .052″	.048 to .052″	.048 to .052″	.048 to .052″	.048 to .052″	.048 to .052″	.048 to .052″	.048 to .052″	.048 to .052″	.048 to .052″	.048 to .052″
Min. voltage and current points gap	.012″	.012″	.012″	.012″	.012″	.012″	.012″	.012″	.012″	.012″	.012″	.012″
Coil —												
Model	CR-4001	CR-4001	CR-4001	CR-4001	CR-4001	CR-4001	CR-4001	CR-4001	CR-4001	CR-4001	CR-4001	CR-4001
Location	On engine	On engine	On engine	On engine	On engine	On engine	On engine	On engine	On engine	On engine	On engine	On engine
Amperage draw — engine idling (amps)	2½	2½	2¼	2¼	2¼	2¼	2¼	2¼	2¼	2¼	2¼	2¼
Horn —												
Model	HA-4032	HA-4032	HA-4032	HA-4032	HA-4032	HA-4032	HA-4032	HA-4032	HA-4032	HA-4032	HA-4032	HA-4032
Location	On dash	On dash	On dash	On engine	On left front wheel housing	On left front wheel housing	On dash	On dash — COE on frame	COE — HA-4034 On dash — COE on frame	On dash	On dash	On dash
Amperage draw — engine idling (amps)	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½
Starting Motor —												
Model	MCH-6106	MCH-6106	MCH-6106	MCH-6106	MCH-6106	MCH-6106	MCL-6110	MCL-6110	MCL-6110	MCL-6111	MCL-6111	MCL-6111
Armature end play	.005″ to .030″	.005″ to .030″	.005″ to .030″	.005″ to .030″	.005″ to .030″	.005″ to .030″	.005″ to .030″	.005″ to .030″	.005″ to .030″	.005″ to .030″	.005″ to .030″	.005″ to .030″
Brush spring tension (ounces)	42 to 53	42 to 53	42 to 53	42 to 53	42 to 53	42 to 53	42 to 53	42 to 53	42 to 53	42 to 53	42 to 53	42 to 53
Pinion to housing clearance	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″	1/32″ to 1/16″
Type of engagement	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual
No. of teeth in gear	9	9	9	9	9	9	9	9	9	9	9	9

ELECTRICAL SYSTEM

(REFER TO FIGS. 2, 3, 4 AND 5 FOR WIRING DIAGRAMS)

STARTING MOTOR

1. DESCRIPTION

The starting motor is the positive shift type with a sliding gear and over-running clutch. Refer to Figure 1.

2. TESTING STARTING MOTOR (INSTALLED)

To test the starting motor (before it is removed from the truck), first make sure the battery is fully charged and in good condition. Then, connect an accurate ammeter (with 0 to 600 ampere scale) in series with the starter. An accurate voltmeter (with 0 to 10 volt scale and with .10 volt divisions) should be connected. To do this, attach one voltmeter lead to the starting motor terminal and the other voltmeter lead to the negative battery post.

a. Lock Torque Test

A lock torque test can be made after the voltmeter is connected. To perform test, shift the transmission to high gear and lock the hand brake. Depress the starter pedal and, very quickly, take ammeter and voltmeter readings. *Depressing the starter pedal for too long a period will damage the starter and battery.* For every 100 amperes current draw, the voltmeter should read .12 volts (with 550 amperes recorded in the ammeter, the voltmeter should read: 5.5 volts times .12 volt equals 6.6 volts). If the drop is found to exceed .12 volt per 100 amperes, examine all connections and check voltage drop, starting at the battery negative post. See Checking for Resistance in Starter and Generator Circuits.

b. Free Running Test

Before disconnecting the ammeter, connect the positive voltmeter lead to ground and the other to the starter terminal. Then, make a free-running test of the starting motor. To do this, depress the starter button on the starting motor without engaging the starter pinion. The following test meter readings should be obtained:

Ammeter....60 Voltmeter....5.5

If the foregoing readings cannot be obtained, remove the starting motor for further checking.

3. REMOVAL OF STARTING MOTOR AND STARTING MOTOR ARMATURE

To remove the starting motor, disconnect the terminals from the binding post. Then, tape the battery terminal, or disconnect it at the battery. Remove the oil filter and lines, if necessary. Then, remove the bolts from starter to flywheel housing and draw out the starting motor assembly.

The armature may be removed after removing the assembly screws from the frame and pinion housing.

4. TESTING STARTING MOTOR ARMATURE (ARMATURE REMOVED)

The armature should be tested in a growler. If the armature is shorted at an accessible point, it should be repaired. Otherwise, a new armature should be installed. Test for a grounded

(Continued on page 13)

TIGHTENING REFERENCE

Part Name	*Size (inch) and number of threads per inch*	*Torque (foot-pounds)*
Spark plugs (14 mm.)	———	26 to 32
Battery hold-down bolts	———	3 maximum

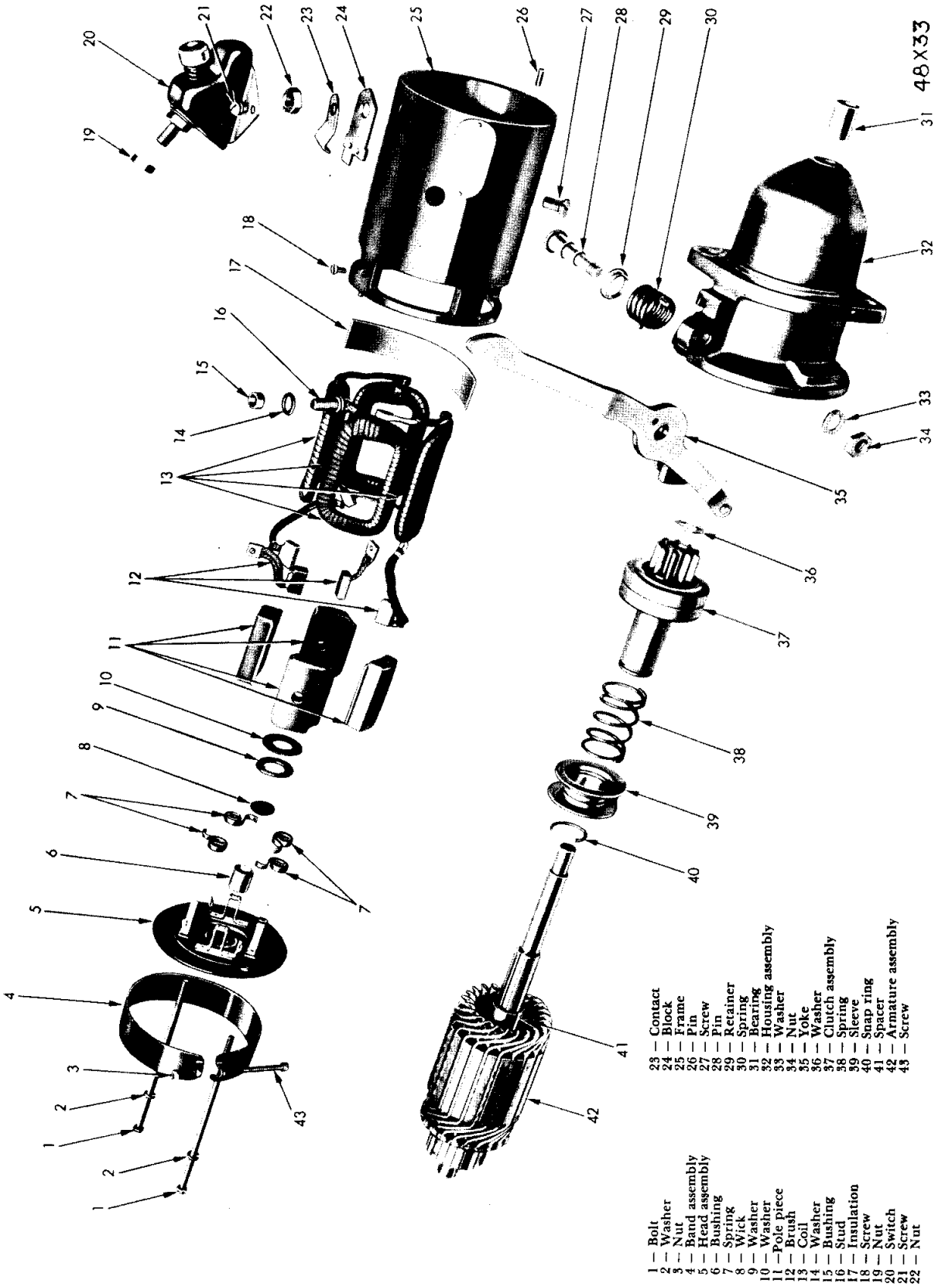


Fig. 1—Starting Motor (Disassembled View)

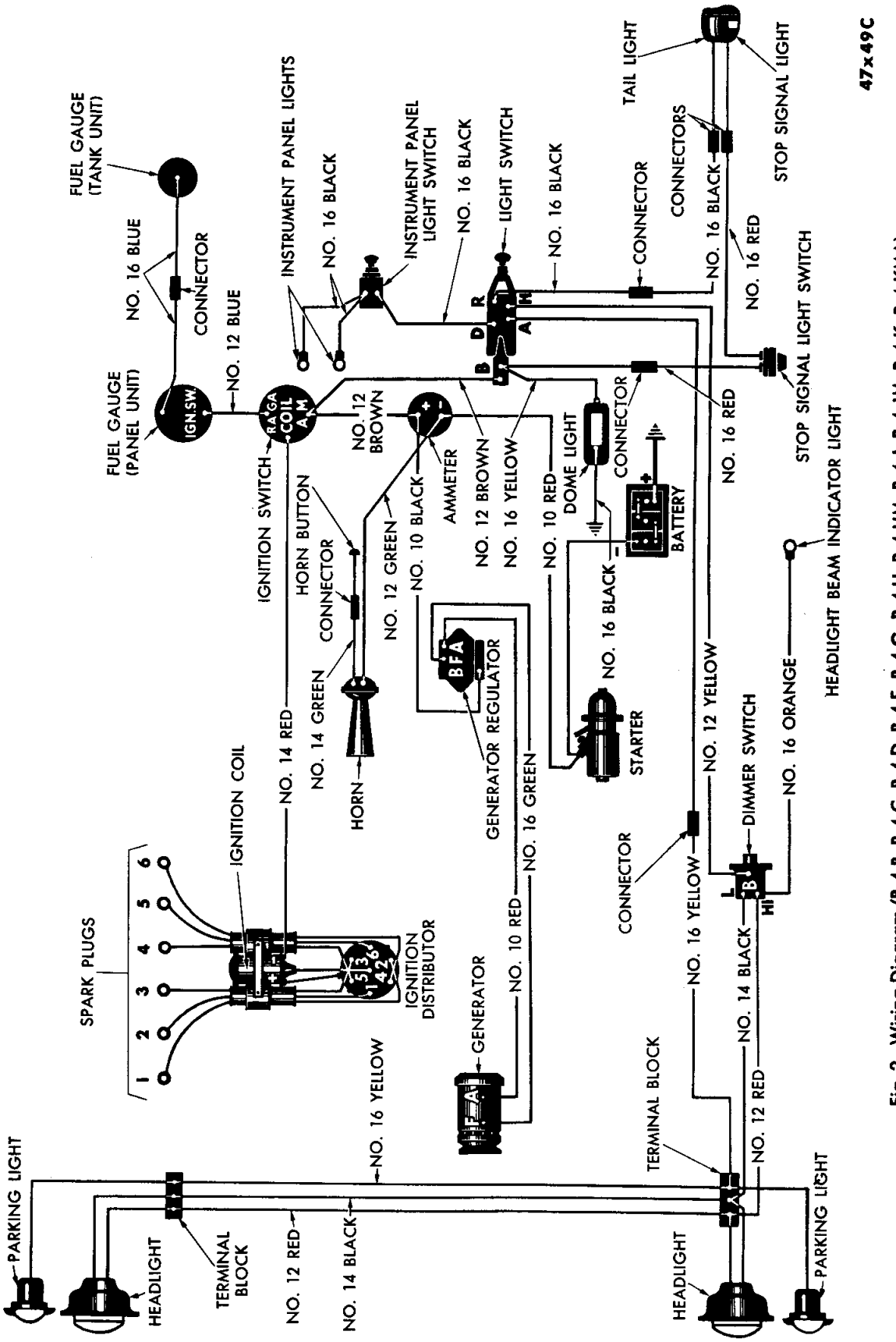


Fig. 2—Wiring Diagram (B-4-B, B-4-C, B-4-D, B-4-F, B-4-G, B-4-H, B-4-HM, B-4-J, B-4-JM, B-4-K, B-4-KMA)

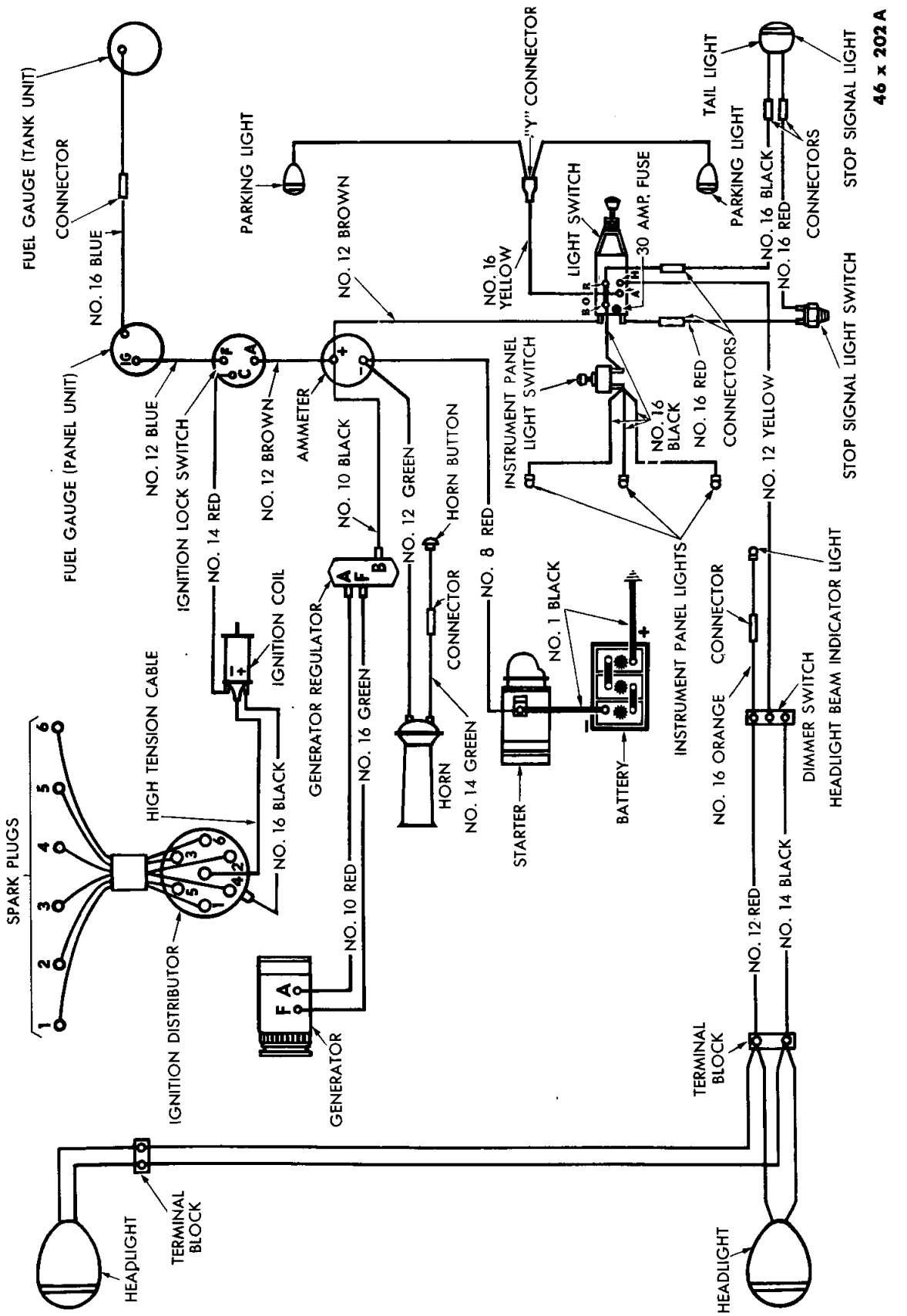


Fig. 3—Wiring Diagram (B-4-PW)

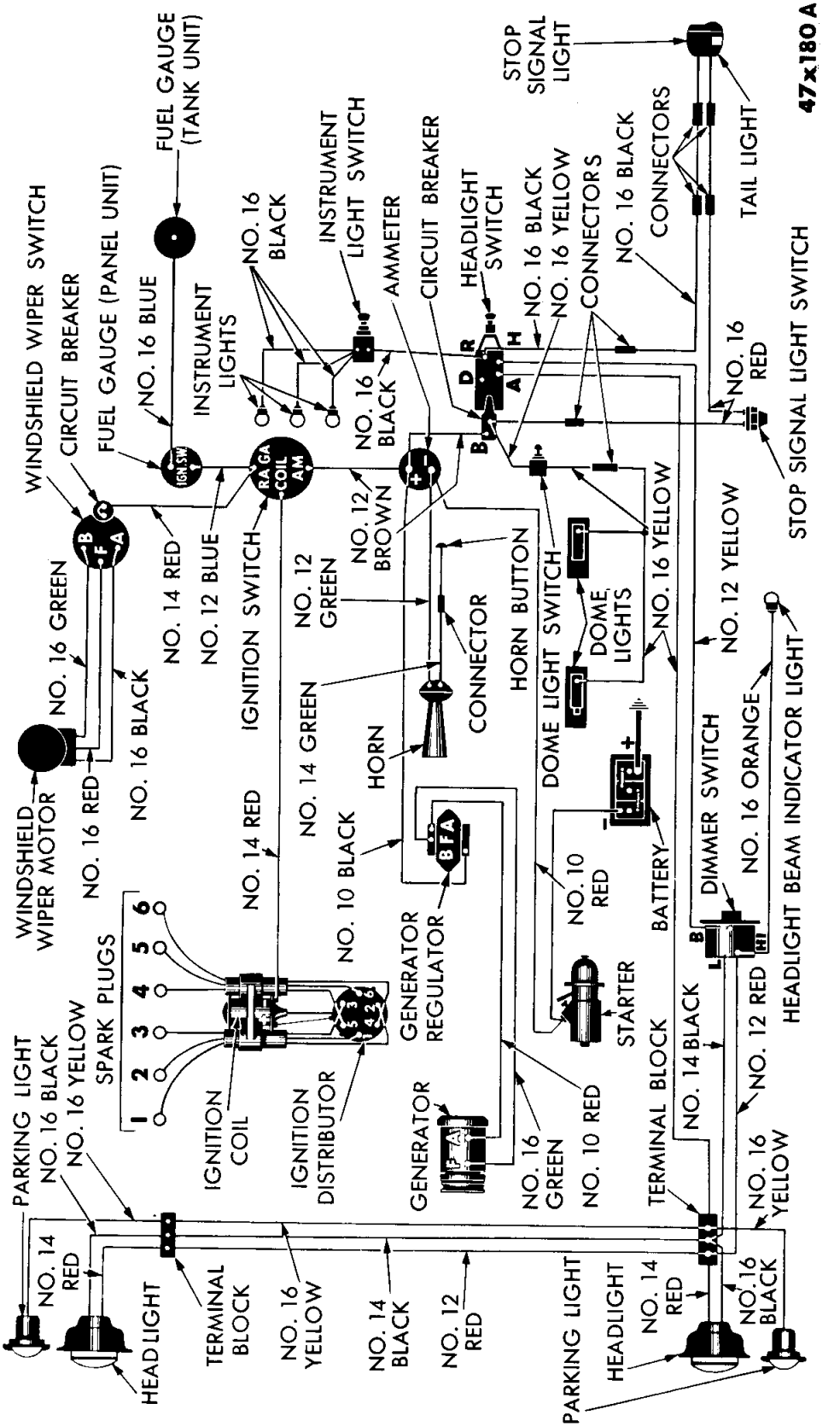


Fig. 4—Wiring Diagram (B-4-DU, B-4-EU)

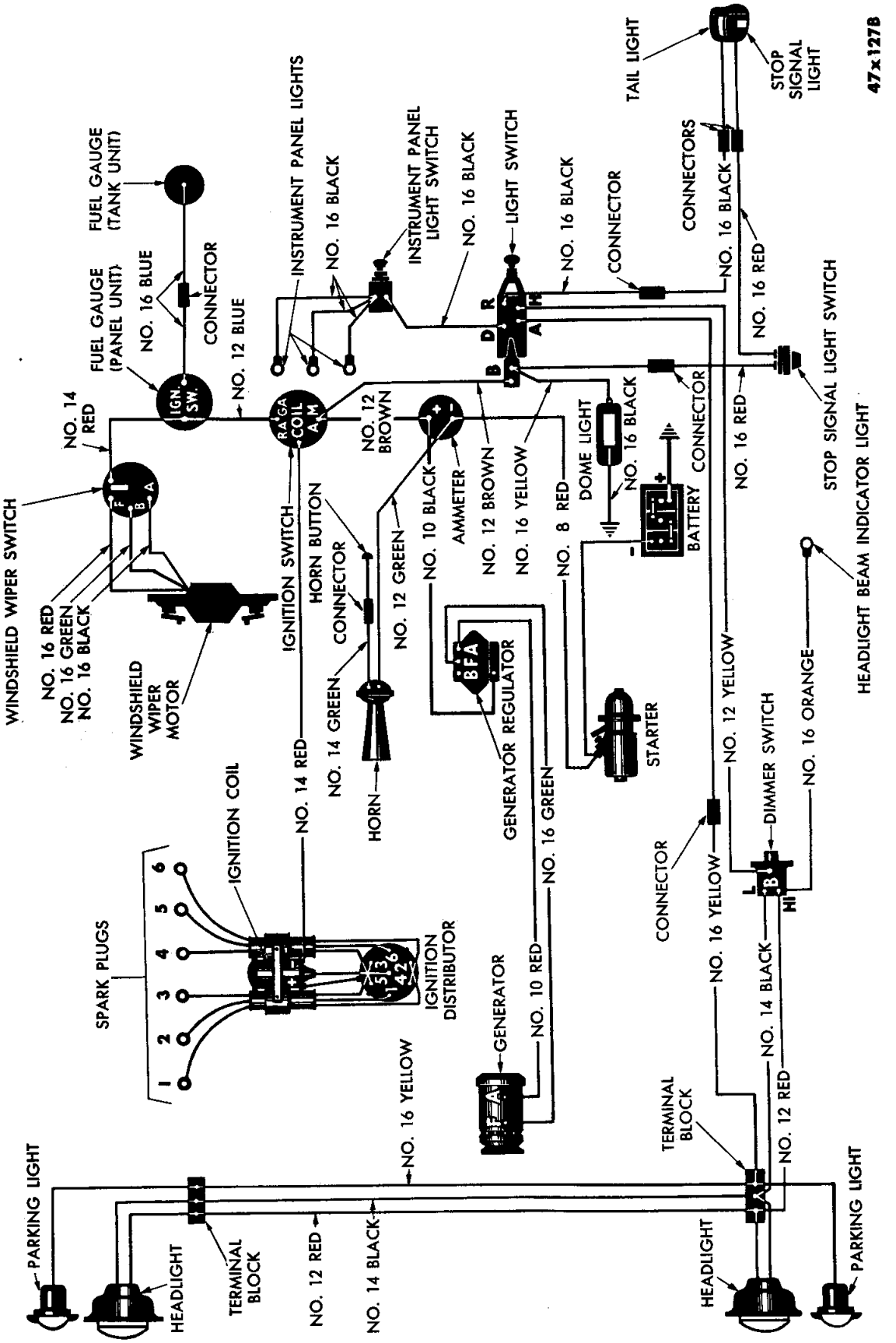


Fig. 5—Wiring Diagram (B-4-R, B-4-T, B-4-V and B-4-Y)

(Continued from page 7)

armature by using a 110-volt test lamp between the armature shaft and the commutator. If the armature is grounded, the test lamp will light.

The armature commutator should be cleaned, if covered with dirt or oil film. If the mica is high, or the commutator is out of round, it should be turned down in a lathe. Remove only sufficient material to correct the difficulty. Use No. 00 sandpaper to smoothly finish the commutator. Do not undercut the mica as undercutting allows dirt to collect in the grooves. This is undesirable.

a. Grounded Field or Switch

A shorted field can be detected after removing the brushes from the holders and supporting them so that they clear the frame. To make test, connect a 110-volt test lamp between the case and the switch terminal. Then, close the switch manually. If the field coil or switch is grounded, the test lamp will light. Remove switch and connect test lamp to starter terminal. If lamp now lights, the ground is in field coil. Otherwise, the trouble is in the switch. If the ground is accessible, insulate the field coil. If the ground is not accessible, replace the field coil. If the switch is at fault, install a new one.

b. Open Field

An open field can be detected by connecting a test lamp between the starter terminal (switch removed) and one of the insulated brushes. If an open field exists, the test lamp will not light. If the broken connection is accessible, solder it. If the broken connection is not accessible, make necessary repairs or replacements.

After overhauling the starter, perform all of the tests outlined in the foregoing instructions.

When assembling the starter, keep the round side of the shoe plates (on the shift yoke assembly) toward the starting motor pinion.

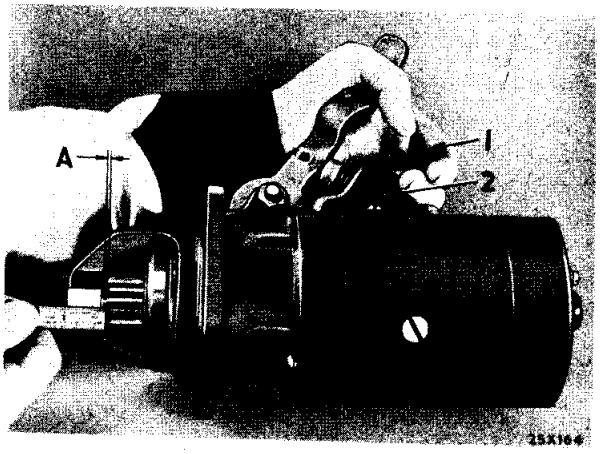


Fig. 6—Checking Starter Pinion Clearance

1 — Contact button 2 — Starter motor switch
A — Clearance between pinion and housing

5. ADJUSTING PINION CLEARANCE

When the starter is fully engaged, there should be 1/32 to 1/16 inch clearance between the pinion and the pinion housing.

To adjust or check the pinion for proper clearance, remove the starter from the engine. Then, push the yoke assembly (Fig. 6) to its extreme limit of travel. Measure the clearance between the end of the pinion and the pinion housing thrust washer.

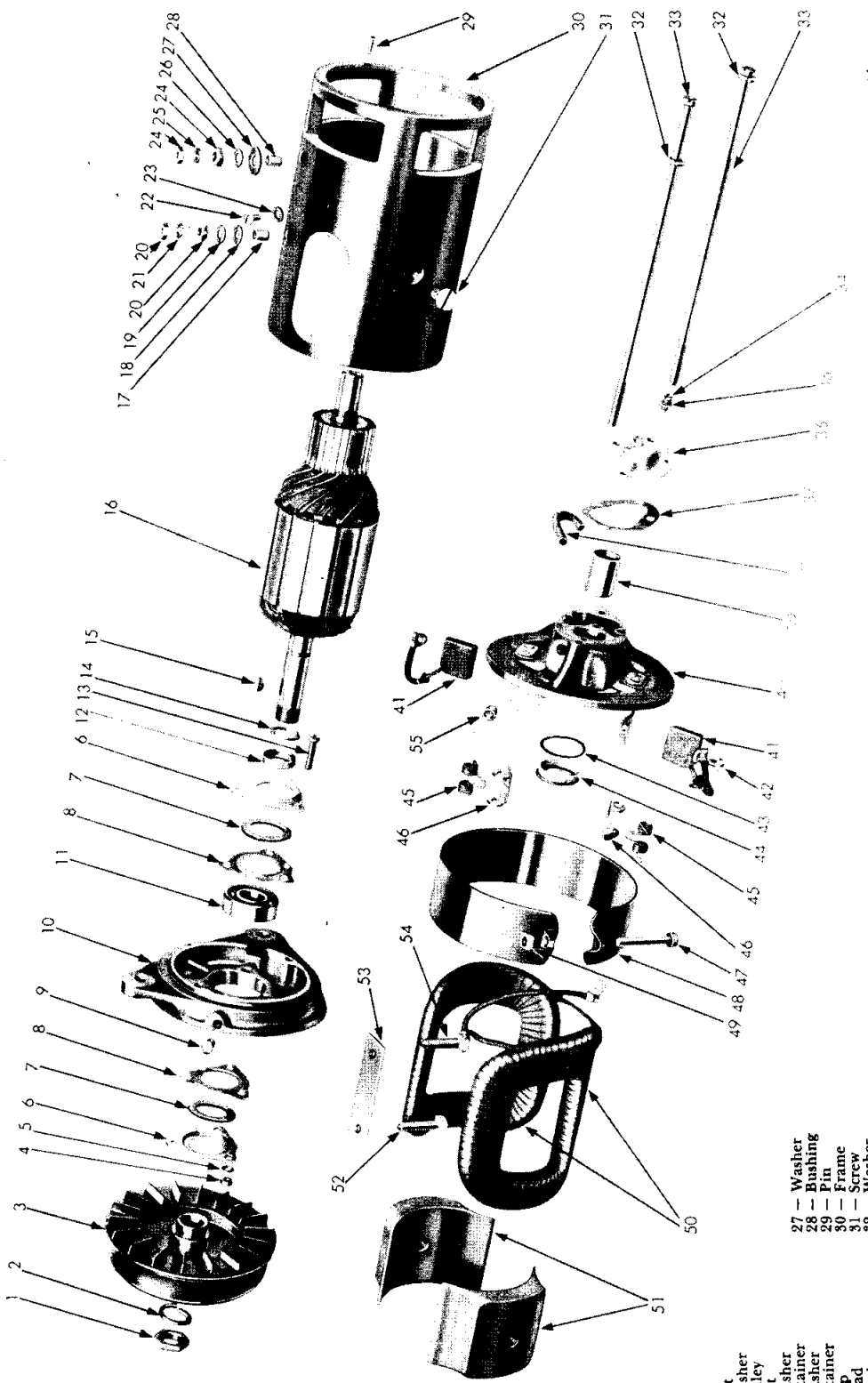
The starter switch button may be screwed into or out of the switch assembly, as required, for proper pinion adjustment.

The armature shaft end play should be within the limits of .005 to .030 inch. This end play is controlled by spacers on the shaft between the end housing and the shoulder on the armature shaft.

GENERATOR

6. DESCRIPTION (REFER TO GENERATOR CHART, PAGE 15)

The large capacity, air-cooled, shunt-type generator (Fig. 7) is equipped with automatic cut out and current and voltage regulation. The output of the generator (controlled according to the voltage requirements), keeps the battery fully charged and maintains proper voltage under normal driving conditions. This means that the ammeter hand may gradually approach



1 — Nut
2 — Washer
3 — Pulley
4 — Nut
5 — Washer
6 — Retainer
7 — Washer
8 — Retainer
9 — Cup
10 — Head
11 — Bearing
12 — Guard
13 — Screw
14 — Snap ring
15 — Key
16 — Armature assembly
17 — Bushing
18 — Washer
19 — Washer
20 — Nut
21 — Washer
22 — Screw
23 — Washer
24 — Nut
25 — Washer
26 — Washer
27 — Washer
28 — Bushing
29 — Pin
30 — Frame
31 — Screw
32 — Washer
33 — Screw
34 — Screw
35 — Washer
36 — Cover
37 — Gasket
38 — Wick
39 — Bearing
40 — Plate assembly
41 — Set
42 — Screw
43 — Gasket
44 — Guard
45 — Spring
46 — Arm
47 — Screw
48 — Band
49 — Nut
50 — Coil assembly
51 — Pole piece
52 — Stud
53 — Insulation
54 — Post
55 — Cover

Fig. 7—Generator (Disassembled View)

AVAILABLE GENERATORS

MODEL DESIGNATION →	*B-4-B, B-4-C, B-4-D, B-4-PW, B-4-DU, B-4-EU*			*B-4-F, B-4-G, B-4-H, B-4-HM, B-4-J, B-4-JM, B-4-K, B-4-KMA*			*B-4-R, B-4-T, B-4-V, B-4-Y*		
	Cut in Engine R.P.M.	Max. Charging Rate Engine R.P.M.	Pulley Diameter	Cut in Engine R.P.M.	Max. Charging Rate Engine R.P.M.	Pulley Diameter	Cut in Engine R.P.M.	Max. Charging Rate Engine R.P.M.	Pulley Diameter
Std. 45 Amp.....	550	1400	3½	760	1780	4½	585	1470	4
*50 Amp. (Extra Equipment)	465	1000	3½	590	1300	4½	490	1070	4
*55 Amp. (Extra Equipment)	395	970	3½	510	1000	4½	420	1020	4
32 Amp. Low Cut In (Extra Equipment)	290	730	3¼	345	870	4½			
	*Not available for Models B-4-DU and B-4-EU								

zero, indicating that the battery requires less current at that time. Thus, the voltage control feature of the generator prevents the battery from becoming overcharged.

Since heat is produced in normal operation, the generator is cooled by a built-in fan. This fan draws air into the rear of the generator and over the brushes and commutator. The hot air is forced out at the front end of the unit. This cooling keeps pace with generator operation. As generator speed increases, more air is forced through the generator to dispel heat.

7. REMOVAL AND INSTALLATION OF GENERATOR

To remove the generator, disconnect the lead wires, remove the adjusting strap bolt and the support bracket bolts.

When installing generator, adjust the fan belt (or belts) by pulling outward on generator until the belt (or belts) is just snug. Tighten generator in this position. Never use a pry bar to move the generator.

8. TESTING GENERATOR (REMOVED)

When testing the generator on a test bench, ground the field terminal to the frame, and drive the generator at 900 r.p.m. Then, connect the armature terminal (large terminal) to the negative post of a fully charged battery. Adjust the speed to obtain the ampere output at the specified voltage. Then, check the speed, which should be within the limits indicated in the above table.

When operating the generator on the test bench, do not run it at speeds which have higher output than the maximum noted in the foregoing table for any length of time. Otherwise, overheating and possible damage to the armature or the field coils may result.

9. INSPECTION OF BRUSHES

Inspect the brushes at 20,000 miles, 30,000 miles, and at 5,000 mile intervals thereafter. Make certain that the brushes are free in the holders, seating properly and not excessively worn. To avoid damage to armature, commutator and windings, replace brushes that are worn short or covered with oil.

If brushes are badly worn, or if the commutator is rough or worn so that the mica is even with the bars, perform the following operations, as necessary. Remove the generator from the truck, disassemble, inspect and clean. Turn down the commutator and undercut the mica, assemble and fit new brushes. Bench test the generator before installing it on the truck.

10. FITTING NEW GENERATOR BRUSHES

To fit new brushes after assembling the generator, use a strip of No. 00 sandpaper (as wide as the commutator and long enough to

lap two and a half times around the commutator). Slide the sandpaper strip (sand side up) around the commutator and under the brushes. Lap the end under, keeping the sandpaper tight on the commutator. Also, be sure to wrap the sandpaper so that it will not unwind when the armature is rotated in the direction in which the generator is driven in normal operation.

Rotate the armature and sandpaper slowly, being sure to keep the sandpaper tight until the brushes show at least 75% fit over the entire contact face. After obtaining the proper seat for all the brushes, carefully remove the sandpaper in order to prevent cutting the edge of a brush. Avoid excessive use of sandpaper because it shortens brush life. Blow all sand and carbon dust from the generator. Run the generator on the test stand long enough to obtain a highly polished fit over the entire contact face of each brush, before checking or adjusting the generator output.

11. RECONDITIONING GENERATOR ARMATURE (ARMATURE REMOVED)

Work carefully when turning the commutator. When finished, the commutator should not have more than .002 inch eccentricity when tested with a dial test indicator, with the armature shaft bearing seats resting on V-blocks.

To undercut the commutator, use the special undercutting tool. Or make a tool from a short piece of a fine-tooth hacksaw blade by grinding the offset of the teeth to fit the width of the mica slot. Be sure to undercut the mica square, the *full width* of the slot and $\frac{1}{32}$ inch deep. After undercutting, polish the commutator with No. 00 sandpaper to remove burred edges on the commutator bars.

CURRENT AND VOLTAGE REGULATOR

12. DESCRIPTION

The regulator assembly contains three units: the circuit breaker, voltage regulator and the current regulator. Refer to Figure 8.

The circuit breaker, an automatic switch between the generator and the battery, closes the charging circuit when the generator is charging and opens the circuit when it is not charging. Thus, it prevents the battery from discharging back through the generator.

The voltage regulator unit keeps the voltage of the electrical system constant within close limits. When the voltage rises to a predetermined point, the regulator contact points vibrate, cutting in and out a resistance in the generator field circuit.

The current regulator unit limits the maximum current output (in amperes). When the generator output reaches a predetermined maximum, the regulator points are opened. This cuts in a resistance in the generator field circuit, reducing the output. When the output drops, the points close (cutting out the resistance) and the output rises. These cycles occur so rapidly that the points vibrate at a high frequency. Thus, the output is held constant at a predetermined maximum.

CAUTION

Do not attempt to adjust the regulator assembly unless its operation is understood and accurate meters are available. A slight error in the setting of the unit may cause improper functioning — resulting in the battery becoming overcharged or run down.

13. REGULATOR INSPECTION AND TESTS

a. Inspection

Before removing the regulator cover, check the seal. If seal has been broken, an adjustment or repair has been made. If such is the case, carefully inspect the regulator for the following conditions:

(1) Loose or broken connections, resulting from poor soldering or rough handling.

(2) Burning or damage caused by abnormal high temperatures at the coils, contact points, insulation or flexible arm to which regulator contacts are mounted.

(3) Broken or altered carbon resistors.

(4) Improperly installed armature springs, distorted spring hangers, bent armatures, yokes or hinges.

(5) Moisture or corrosion in regulator.

Replace the regulator, if any of the above conditions are apparent, or if the regulator is in bad condition.

b. Tests

Before testing or adjusting regulator, perform the following tests:

(1) Test and check the wiring in the charging circuit (Fig. 9). Be sure that all connections are clean, tight and in good condition.

(2) Test the specific gravity and check the ground polarity and voltage of the battery. If the battery is not fully charged and in good condition, substitute (for test purposes only) a fully charged battery of the same type and capacity.

(3) Check generator for operation without the regulator in the circuit.

(4) Check the part numbers stamped on the name plates of the generator and regulator in order to make sure the correct regulator has been installed. Each regulator is designed for use with a generator having a specified field draw, output, internal connections and speed range. The regulator may not work properly if an incorrect substitution has been made.

14. TESTING CIRCUIT BREAKER

Disconnect wire from the "B" terminal of the regulator. Connect the positive (+) lead of a test ammeter to the wire removed and the negative (—) lead to the regulator "B" terminal, as shown in Figure 9.

Connect the negative (—) lead of a test voltmeter to the "A" terminal of the regulator and connect the positive (+) lead to the regulator housing ground, as shown in Figure 9.

Start the engine and be sure it idles smoothly. Then, increase engine speed slowly to determine when the circuit breaker points close. The hand on the voltmeter will kick back slightly when the circuit breaker points close. This should occur at 6.4 to 7.0 volts.

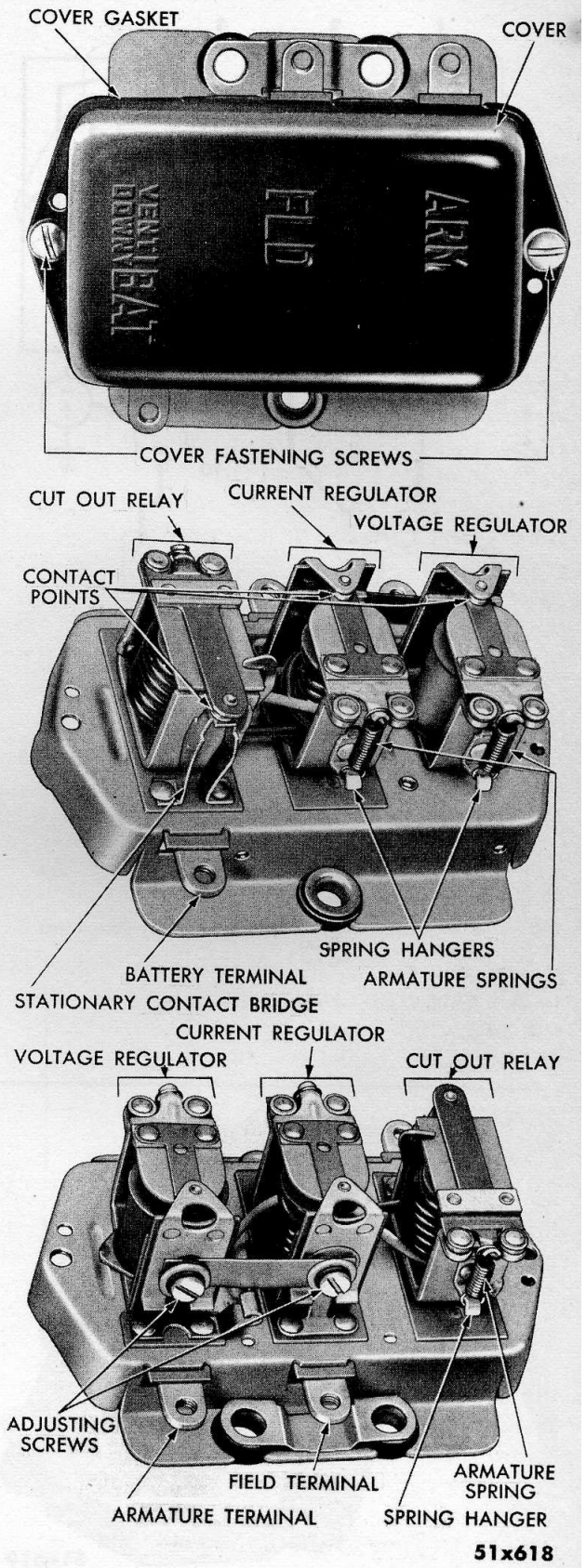


Fig. 8—Current and Voltage Regulator

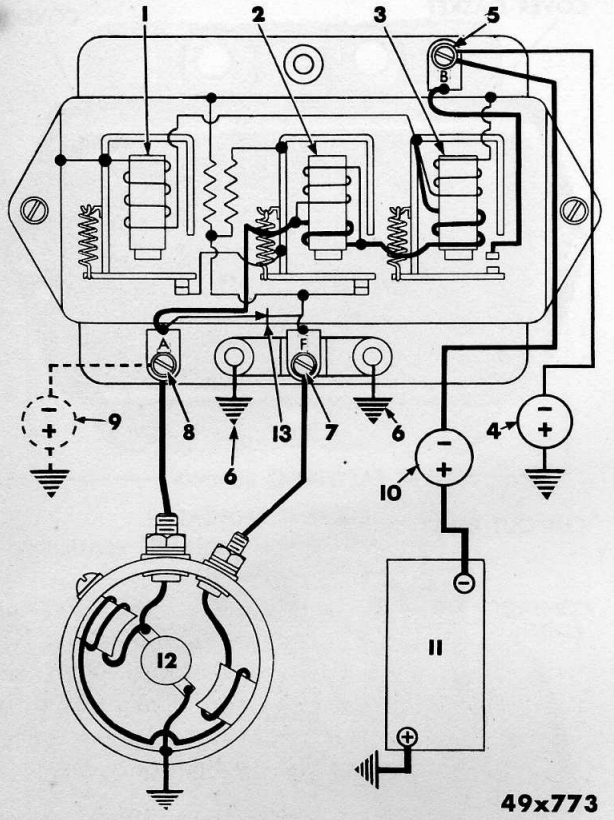


Fig. 9—Generator Regulator Wiring Diagram and Test Connections

1 — Voltage regulator coil
2 — Current regulator coil
3 — Circuit breaker coil
4 — Voltmeter connection for current and voltage regulator tests
5 — Regulator battery terminal
6 — Regulator ground screws
7 — Regulator field terminal
8 — Regulator armature terminal
9 — Voltmeter connection for circuit breaker test
10 — Test ammeter
11 — Battery
12 — Generator
13 — Resistor

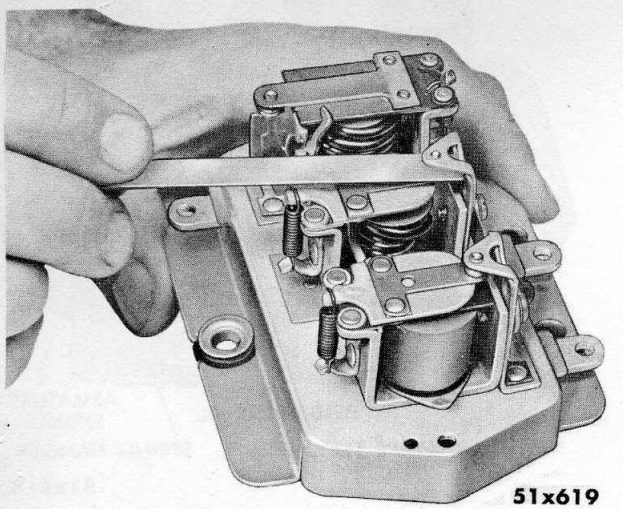


Fig. 10—Refacing Contact Points

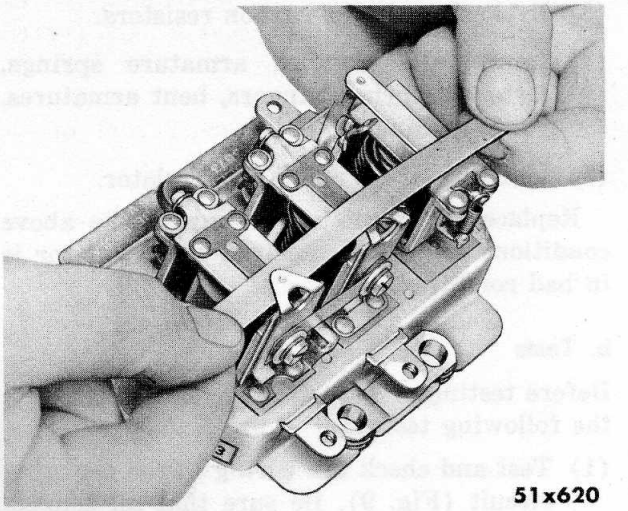


Fig. 11—Cleaning Contact Points

If an adjustment is necessary, remove the regulator cover and inspect the contact points of all three units. In normal use, the contact points will become gray. If the contact points are burned, dirty or pitted, service the points as outlined in Paragraph 17.

15. TESTING VOLTAGE REGULATOR

Change the voltmeter connection from the armature to the battery terminal of regulator, as shown in Figure 9. Then, connect a variable resistance across the battery posts.

Run the engine at a speed equivalent to 30 miles per hour for 15 minutes until voltage remains constant and the charging rate has dropped from its peak. The cover must be on regulator during this warm-up period and when taking test readings. The voltage regulator must control the voltage from 7.2 to 7.5 volts at 70 degrees F.

If an adjustment is necessary, remove the regulator cover and service the contact points, as outlined in Paragraph 17.

16. TESTING CURRENT REGULATOR

The voltmeter and ammeter must be connected in the same manner as when testing the voltage regulator.

Run the engine at a speed equivalent to 30 miles per hour for 15 additional minutes, applying enough resistance load across the bat-

tery to maintain the voltmeter reading of from 6.9 to 7.1 volts. At 70 degrees F., the current regulator should operate at the lower figure indicated on the regulator name plate, plus or minus 2 amperes, at the conclusion of the warm-up period.

If an adjustment is necessary, remove the regulator cover and service the points, as outlined in Paragraph 17.

NOTE

When removing or replacing regulator cover, do not touch the circuit breaker. This would cause a short circuit and damage the regulator assembly.

17. SERVICING REGULATOR CONTACT POINTS

Remove regulator cover and inspect the contact points of all three units. In normal use, the contacts will become gray. If the contact points are burned, dirty or pitted, reface with a clean fine file.

CAUTION

Never use sandpaper, emery cloth or a file that has been used on other metal when servicing the points. Particles of emery, sand or metal may become embedded in the points and cause them to burn rapidly—or cause an open circuit.

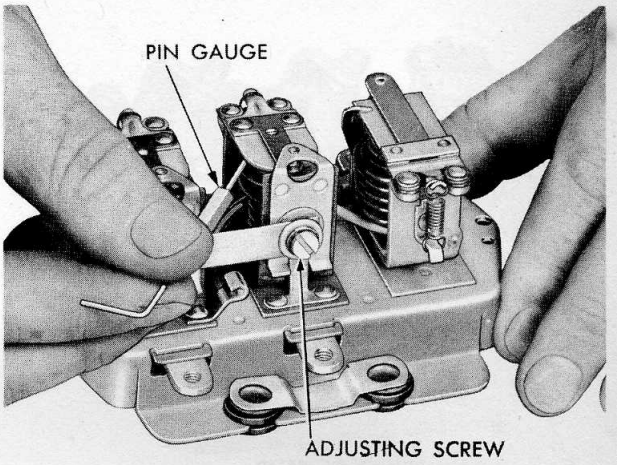
To reface contact points, file lengthwise and parallel to the armature (Fig. 10), until the contact points present a smooth, flat surface toward each other. It will not be necessary to remove all traces of pitting.

NOTE

Avoid filing crossways. This might form grooves which would tend to cause sticking and erratic operation.

Clean the contact points after filing with a strip of linen or lintless bond tape, as shown in Figure 11. Be sure no lint remains between the contacts after cleaning.

After refacing and cleaning the contact points, it will be necessary to readjust the armature air gaps to compensate for the metal removed from the contacts.



51x624

Fig. 12—Checking Air Gaps

To check the current and voltage regulator air gaps, use the pin type gap gauge from Kit C-828, which measures from .048 to .052 inch. Insert the gauge on the point side of the air gap and next to the armature stop pin (Fig. 12) with the contact points just separating.

To adjust air gap, loosen the bracket screws and raise or lower the contact point brackets until the desired clearance is obtained. Be sure these screws are tightened securely after adjustments are made. When the armature is held down so that the stop rivet rests on the magnet core, the point gap should be a minimum of .012 inch (when checked with a feeler gauge).

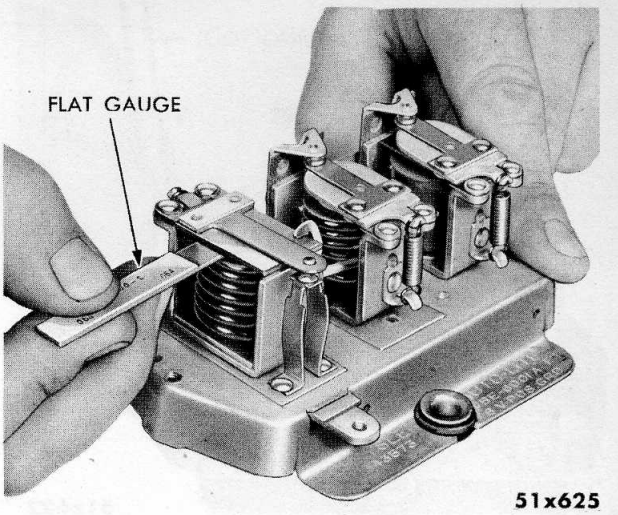


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Fig. 13—Checking Circuit Breaker Air Gap

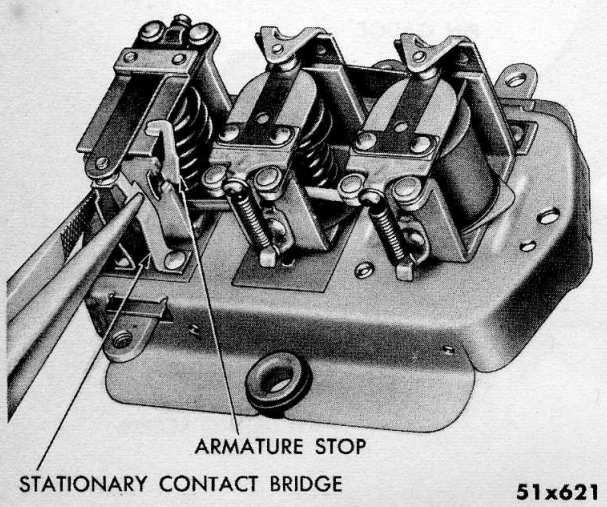


Fig. 14—Adjusting Circuit Breaker Contact Gap

To check the circuit breaker air gap, use the flat gauge from Kit C-828, which measures .031 to .034 inch. Insert gauge between armature and magnet core, as shown in Figure 13. Be sure gauge is placed near to the hinge.

To adjust the circuit breaker air gap, bend the armature stop so that the space between the core and armature is within the limits specified. Be sure that the stop does not interfere with the armature movement. Adjust the contact gap to .015 inch by expanding or contracting the stationary contact bridge, as shown in Figure 14. Be sure to keep contact points in alignment when adjusting the contact gap.

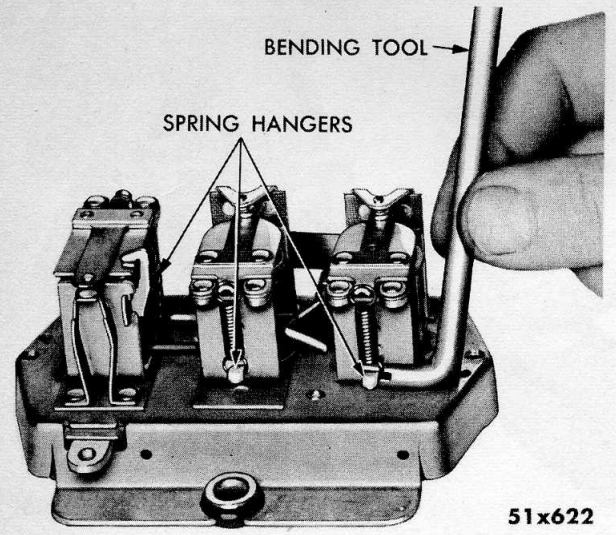


Fig. 15—Adjusting Spring Tension

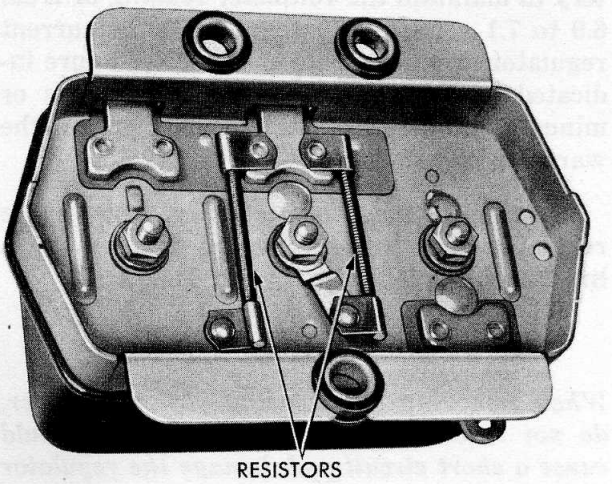


Fig. 16—Resistor Assemblies on Regulator

NOTE

Increasing the contact gap lowers the opening voltage and raises the opening reverse current.

To adjust armature for proper opening and closing voltages, use the bending tool from Kit C-828. With the slot in the end of tool placed over the lower spring hanger, as shown in Figure 15, bend the hanger to increase or decrease the spring tension, until the desired opening or closing voltage is obtained.

Checking Resistors—Refer to Figure 16.

Check the resistors with an ohmmeter. The resistor marked 38 should test from 36 to 40 ohms, while the one marked 7 should test from 6.5 to 7.5 ohms resistance.

18. CHECKING FOR RESISTANCE IN STARTER AND GENERATOR CIRCUITS

Whenever the starter, generator or voltage regulator require servicing, the wiring circuit should be checked for loose or defective connections and frayed or damaged wires. High resistance is frequently the underlying cause of many electrical failures.

a. Voltage Drop Testing Equipment

To check for resistance (voltage drop) in the starter and generator circuits, the following equipment is required:

(1) An accurately calibrated voltmeter with

the 10 volt scale graduated in .1 volt divisions, or a milli-volt meter of 500 milli-volt range.

(2) An ammeter with 0 to 50 ampere scale graduated in ampere divisions.

(3) A battery hydrometer.

The battery should be checked with the hydrometer to determine its specific gravity. If the battery is not fully charged, replace it temporarily with one that is fully charged.

The ammeter should be connected with heavy short leads between the "B" terminal of the voltage regulator and the lead removed from this terminal.

Connect the voltmeter across the "B" terminal of the voltage regulator and its base ground screw.

NOTE

All checks should be made with the engine running and the generator charging 10 amperes.

The voltage reading should remain stable.

b. Checking Wiring and Connections

The following checking procedure is divided into two steps:

(1) Testing the wiring and connections (negative side).

(2) Testing the ground connection (positive side).

To check the wiring and connections, first make a quick overall check of the circuit by connecting the positive voltmeter lead to the negative battery post and connecting the negative voltmeter lead to the armature terminal at the generator (2 and 7, Fig. 17). If the voltmeter reading is below .35 volt, the drop in voltage is normal. If the reading is above .35 volt, keep the positive voltmeter lead connected to the negative battery post, refer to Figure 17, and proceed as follows:

1 to 2—Connect the negative voltmeter lead to the negative battery terminal. The voltmeter reading should be zero.

1 to 3—Connect the negative voltmeter lead to the starter switch terminal. The voltmeter reading should be zero.

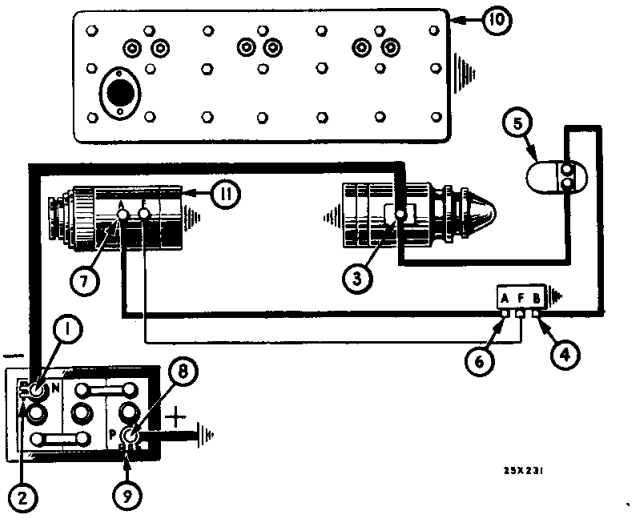


Fig. 17—Checking Diagram for Generator and Starter Circuits

1 — Negative battery post
2 — Negative battery terminal
3 — Starter motor terminal
4 — Voltage regulator "B" terminal
5 — Ammeter
6 — Voltage regulator "A" terminal
7 — Generator armature terminal
8 — Positive battery post
9 — Positive battery terminal
10 — Engine
11 — Generator frame

1 to 4—Connect the negative voltmeter lead to the battery lead (B) terminal at the voltage regulator. The voltmeter reading should not exceed .15 volt.

If the voltmeter reading exceeds .15 volt, clean and tighten the connections on the back of the ammeter (5, Fig. 17) and examine the soldered connections on the ends of the wires for poor connections or corrosion.

1 to 6—Connect the negative voltmeter lead to the armature (A) terminal at the voltage regulator. The voltmeter reading should not exceed .28 volt.

4 to 6—Connect the negative voltmeter lead to regulator "B" terminal and the positive voltmeter lead to regulator "A" terminal. The voltmeter reading should not exceed .12 volt. A higher reading indicates presence of burned contact points in the circuit breaker unit.

Next, check for resistance in the ground (positive) side of the circuit. Connect the negative voltmeter lead to the positive battery post and maintain this connection while the following checks are being made:

Make a quick, over-all check of the ground side of the circuit by connecting the positive voltmeter lead to the generator frame (11, Fig. 17).

The voltage reading should be approximately zero. If any reading can be obtained, refer to Figure 17 and make the following checks with the negative lead of voltmeter connected to positive or ground post of battery.

8 to 9—Connect the positive voltmeter lead to the positive battery terminal. The voltmeter reading should be zero.

If any reading can be obtained on the voltmeter, clean and tighten all ground connections, especially the generator frame bracket (where it is bolted to the engine and the battery ground strap).

BATTERY

19. BATTERY MAINTENANCE

Service Operations

In order to obtain long life and efficient service from the battery (Fig. 18), two important service operations must be done periodically:

(1) The electrolyte must be kept above the plates and separators. Add only pure distilled water, or water that is colorless, odorless and tasteless, or suitable for drinking purposes. NEVER ADD ELECTROLYTE, except when the electrolyte has spilled out of the case.

(2) Be sure the battery is maintained in a charged condition. Test the specific gravity at frequent intervals in order to determine the state of charge. Should the specific gravity fall below 1.250, remove the battery and charge it.

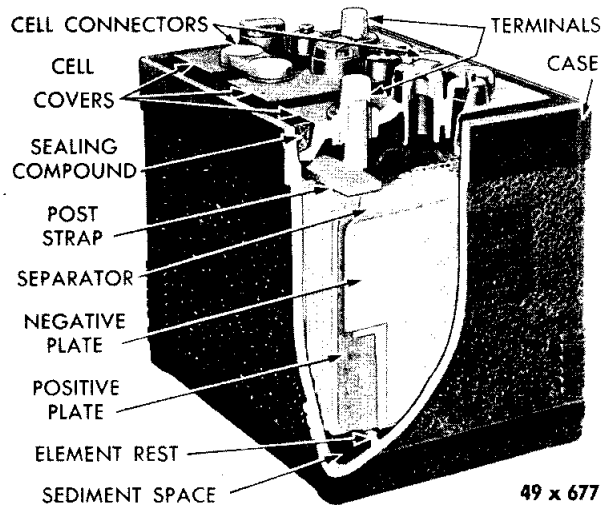


Fig. 18—Battery (Cutaway View)

Damage Resulting From Overcharging Battery

CAUTION

Avoid overcharging the battery. This is important. If the battery is overcharged, the following damage may result:

(1) High internal heat may be produced which speeds corrosion of the positive plate grids, damages separators and negative plates, may soften or distort the case and displace the sealing compound.

(2) The water and electrolyte may separate so that the acid is present in concentrated form. With the existence of high temperature, this can harm the separators and negative plate material (if condition persists over a period of time). The result could be charring of the separators and rapid corrosion of the positive grids.

(3) Overcharging of the battery may force liquid from the cells and result in corrosion of the cables, battery support and other vital electrical or engine parts.

(4) The water in the electrolyte may vaporize —form bubbles of hydrogen and oxygen gases. These gas bubbles have a tendency to wash active material from the plates, liberating moisture and acid from the cells in a fine mist.

(5) If overcharging alone (or after an undercharged condition) occurs, the result may be a severe warping or buckling of the positive plates and perforation of the separators. This may result in an internal "short."

Battery hold down bolts, if not properly tightened, may allow the battery to "bounce" or "jiggle" in the support, causing case and plate failure. If hold down bolts are drawn too tight, a cracked or distorted case may result. Either of these conditions will result in premature failure of the battery and should be avoided. Tighten battery hold down bolts with a torque wrench to the recommended maximum torque of 3 foot-pounds.

Cold Weather Care

A battery that is operated in an undercharged condition may f reeze during severe winter weather. The freezing point of electrolyte varies with specific gravity variations. A fully charged battery (with 1.285 specific gravity corrected to 80 degrees F.) will freeze at —90 degrees F. The following chart indicates the freezing points at various specific gravity readings:

Specific Gravity (Corrected to 80 degrees F.)	*Freezing Point of Battery*
1,280	—90 deg. F.
1,250	—62 deg. F.
1,200	—16 deg. F.
1,150	+ 5 deg. F.
1,100	+19 deg. F.

Keep battery charged in cold weather.

CAUTION

Never allow a flame or spark to be brought near the battery vent openings. Hydrogen gas, which forms in normal battery operation, may be present and explode. If it is necessary to use a flame near the battery, first remove the filler caps and blow out the cells gently enough to avoid splashing the acid.

20. TESTING BATTERY

The battery should be checked periodically with a hydrometer. The following readings show charge conditions:

Charge Condition	*Specific Gravity Reading*
Fully Charged	1.275 to 1.300
Half Charged	1.225
Dangerously Low	1.150

When reading a hydrometer, hold the barrel in a vertical position with sufficient amount of acid in it to lift the float freely. Take the reading at eye level, disregarding the curvature of the liquid at the edges.

The reading of a hydrometer will vary with temperature variations of the electrolyte. (An ordinary dairy thermometer may be used to take electrolyte temperature readings. Always take these readings from the center cell.) A hydrometer reading of a cell with electrolyte temperature above 80 degrees F. will indicate less than the reading with the electrolyte at 80 degrees F. The opposite holds true where the electrolyte temperature is below 80 degrees F. Hydrometer floats are calibrated to indicate a correct reading only at one temperature, 80 degrees F.

The Open Circuit Voltage Tester

This tester, tool MT-310, is an electrical instrument used to indicate the specific gravity of the electrolyte within the plates of the battery. The test is made when the circuit is open (when current is not being delivered to, or taken from the battery).

Two things can be determined by this voltage tester:

(1) State-of-charge in battery.

(2) Condition of battery.

To test battery with Open Circuit Voltage Tester, turn on the headlights for two minutes to eliminate surface charge. THIS IS IMPORTANT!

Hold tool MT-310 in a vertical position and press it FIRMLY into the battery post and intercell connector.

Be sure that the red prod contacts a positive (+) battery post or intercell connector, and the black prod contacts a negative (—) post or connector.

After reading No. 1 cell (starting at negative post of battery), reverse the prods for No. 2 cell and reverse them again for No. 3 cell. Take the reading from the gauge. This reading will indicate that the battery is either serviceable or rundown. If cell volts vary more than 6 divisions (as indicated by gauge), replacement of battery is recommended.

Fig. 19—Testing Battery Capacity

If readings indicate that the battery is less than ½ charged, it should be removed and recharged. If a battery has a variation in cell voltages of more than .05 volt, it should be charged and checked with a high rate discharge tester, or other suitable means, before discarding the battery and installing a new one.

The Battery Capacity Tester

This portable unit (tool MT-314), as shown in Figure 19, may be used to test for a worn-out battery when such a condition can not be determined before charging due to even cell wear which is not indicated by the Open Circuit Voltage Tester.

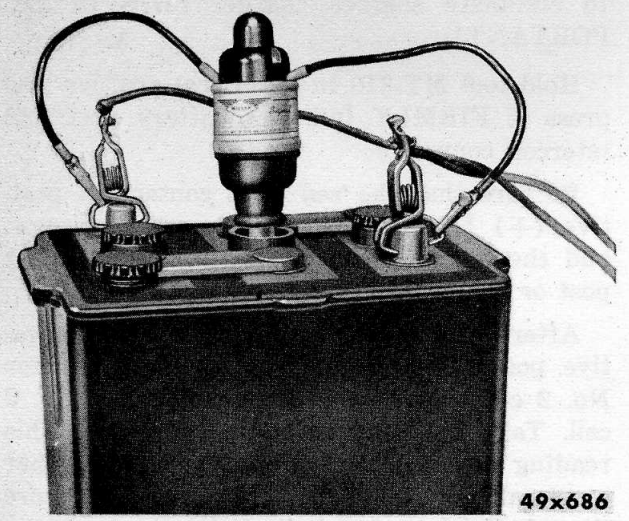


Fig. 20—Guarding Battery Temperature on Charge

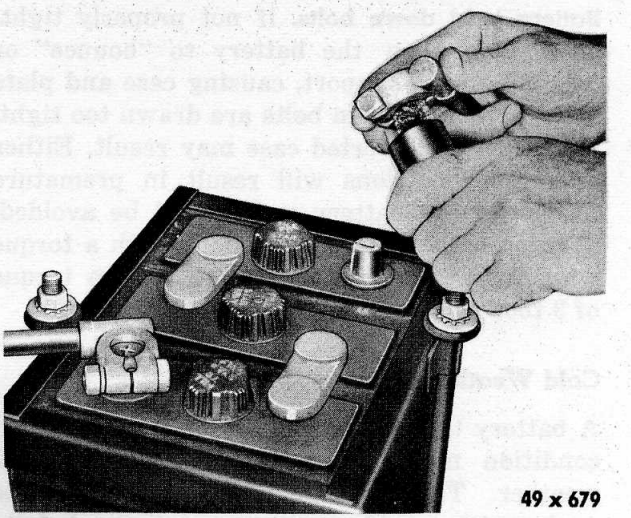


Fig. 21—Cleaning Inside of Cable Clamp

The Battery Capacity Tester is accurately calibrated for testing at 125 degrees F. (the shut-off temperature after a fast charge), or at 80 degrees F. after a slow charge. This instrument can be adjusted for the size of the battery —from 80 to 140 ampere hours.

The Thermo-Signal Tester

This instrument (tool MT-315), as shown in Figure 20, is available for converting any fast charger to thermostatic control. When placed in the battery at the start of the charge, the Thermo-Signal Tester will automatically signal (by means of a buzzer) when the battery has received its maximum safe fast charge (125 degrees F.). This tool provides a safety control to time clock chargers.

This tester also makes possible after-charge capacity testing since the temperature is the same for either slow or fast charging.

21. CORRODED BATTERY TERMINALS

The condition caused by corroded battery terminals has often been diagnosed as that resulting from a defective generator or voltage regulator. Therefore, before diagnosing the trouble as being caused by a generator or voltage regulator, examine the battery terminals for signs of corrosion.

The oxidation, which occurs between the post and cable clamp, forms a thin, black coating which is likely to be overlooked. Frequently,

this corrosion results in either high resistance, or complete open circuit. The condition is also very erratic and the circuit can be open one minute and closed the next.

The use of the battery terminal cleaning tool, MX-75, greatly facilitates the cleaning operation. This tool incorporates a male brush for cleaning the inside of the cable clamp (Fig. 21), and a female brush for cleaning the outside of the battery post (Fig. 22).

To clean the cable clamps, remove the cover and insert the male brush in the cable clamp. Exert pressure and turn the tool until a clean, bright surface is obtained.

To clean a battery terminal post, replace the cover over the male brush and place the female brush over the battery post. Exert pressure and force the brush down, over the post. Turn tool until a clean, bright surface is obtained.

Connect the cable clamps to the battery posts and tighten securely. Then, coat the connections with vaseline or grease to retard corrosion.

The cleaning operation should be done at least once a year, or at 10,000 mile intervals.

NOTE

If the positive battery post is equipped with a felt washer, soak the washer in medium engine oil and insert it over the post before attaching the ground cable clamp.

22. RESEALING BATTERY

Sealing compounds are used to form an acid tight joint between the covers and containers. To reseal a battery, proceed as follows:

(1) Remove the old sealing compound from the case and covers to approximately one inch beyond the leak, or until the sealing compound *is* forming a tight seal.

(2) Thoroughly dry the covers and all portions of the container where the sealing compound will make contact. **Since the sealing compound will not stick to a wet or dirty surface, special care should be taken in the cleaning process to assure a clean, dry surface.**

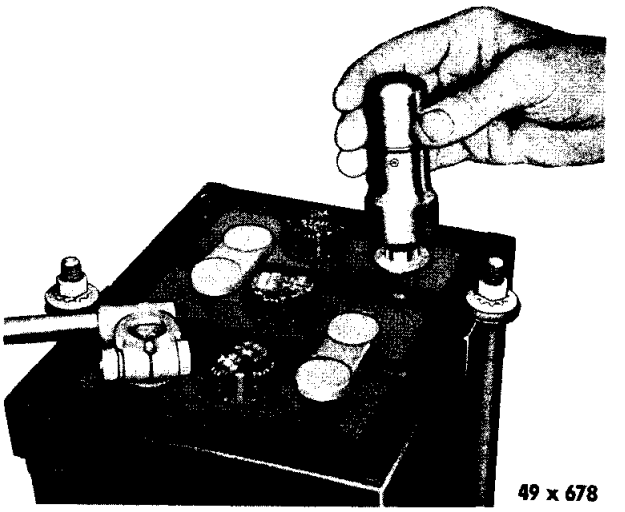


Fig. 22—Cleaning Outside of Battery Post

Using a torch, carefully heat the groove where the sealing compound is to be poured. Be careful not to scorch the case or cover. (The compound adheres best to a heated surface.)

The sealing compound should be quite hot (about 325 degrees F.), but must not be heated until it smokes. Inspect the covers and the groove where the hot compound will be poured, and make certain that the hot compound will not run into the cell.

Pour the hot compound into the groove until the proper level is obtained. If the seal should sink slightly, let the first pour cool. Then, level it with more hot seal.

NOTE

Always use new sealing compound when resealing a battery.

AMMETER

23. DESCRIPTION

The ammeter shows only the current flowing to or from the battery and does not indicate the entire generator output. The current supplied for ignition, lights and accessories is automatically deducted from the generator output reading.

Consequently, the ammeter should never be

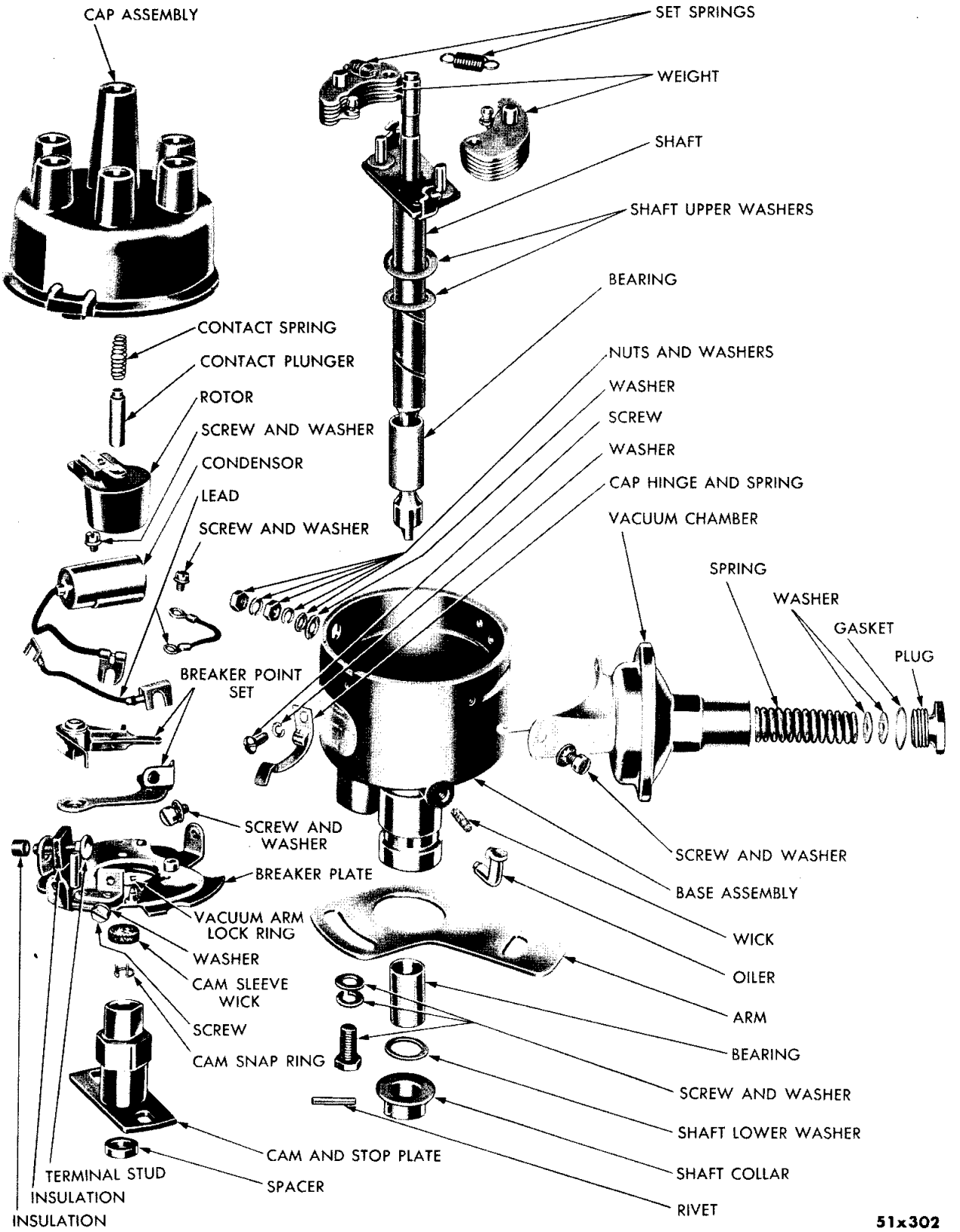


Fig. 23—Typical Distributor (B-4-B, B-4-C)

used as an accurate check for generator current.

The ammeter should not indicate more than 10 amperes charge above 30 m.p.h. after the first 30 minutes of continuous driving. If the reading is more than 10 amperes (with battery specific gravity of 1.275 or higher), the voltage control regulator should be checked.

IGNITION SYSTEM

24. DESCRIPTION OF DISTRIBUTOR (FIG. 23)

The distributor is splash proof and contains a set of contact points which are timed to open and close the circuits to the spark plugs, depending on engine speed and load. On some distributors, the opening and closing of the contacting points is controlled by two devices built into the distributor. One of these consists of a vacuum operated unit, which is attached to the side of the distributor body. The other consists of a governor, operated by centrifugal weights in the base of the distributor. This regulates the spark timing according to speed.

The vacuum for operating the vacuum operated unit is obtained through a drilled passage above the throttle valve in the carburetor.

When the engine is idling with the throttle closed, there is no vacuum present at the vacuum unit and the spark occurs at the timed position. With wide open throttle operation (such as on acceleration), the vacuum is insufficient to operate the vacuum unit, and the spark is advanced to the correct position by the centrifugal weights in the base of the distributor.

Under normal road load or part throttle operation, sufficient vacuum is created at the vacuum control unit to move the diaphragm and compress the spring in the unit. The arm of the vacuum unit is connected to the breaker plate, which rotates, causing the spark to occur at an earlier time for efficient engine operation. When the throttle is opened for fast acceleration or heavy load, the vacuum again decreases and the spring in the vacuum unit overcomes the vacuum pull. Then, the breaker plate returns to the position necessary for correct spark timing requirements.

25. CHECKING DISTRIBUTOR ADVANCE

The vacuum unit can be checked with a vacuum advance timing light (Fig. 24). With the engine idling, the marks on the crankshaft pulley can be compared with the timing pointer. At low speed, the pointer should line up with the specified mark as recommended in Ignition Timing. If the throttle is suddenly opened wide, the mark on the crankshaft pulley should advance approximately 10 degrees when the engine reaches a speed corresponding to about 25 miles per hour. If the throttle is then closed, the mark on the pulley should advance approximately another 10 degrees, depending on the amount of vacuum created. A further check of the operation of the vacuum unit may be made on the road. When driving at a steady speed of 30 to 40 miles per hour (if the throttle is suddenly opened wide), a sharp momentary *ping*, or detonation, will occur before the spring in the vacuum unit overcomes the sudden change in vacuum.

If the vacuum unit does not operate satisfactorily, install a new unit.

Figure 23 illustrates various thickness vacuum chamber washers. When replacing, use the

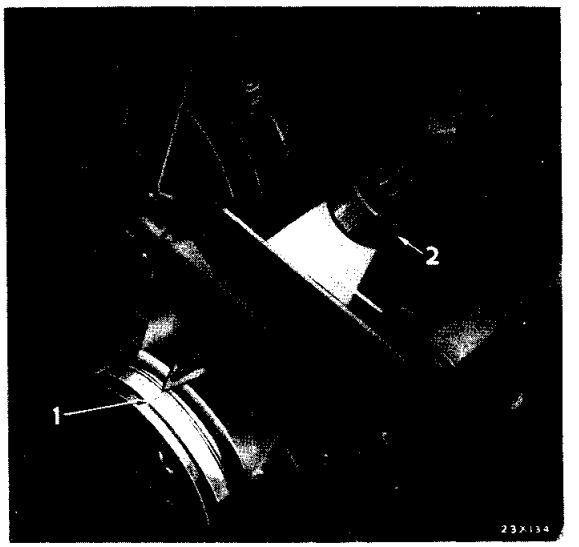


Fig. 24—Timing Light

1 — Chalk mark 2 — Tool C-693

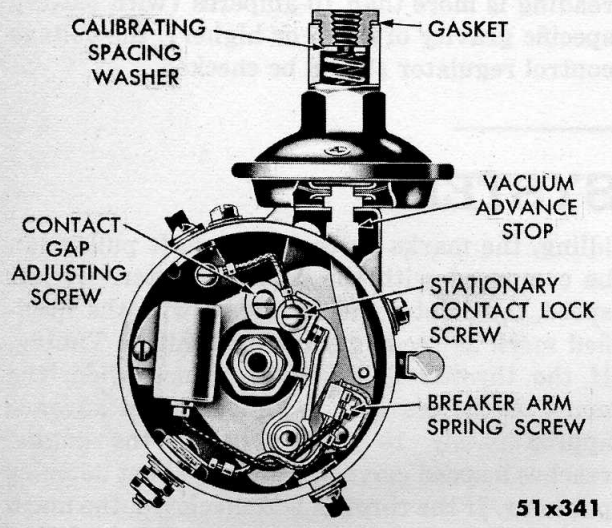


Fig. 25—Distributor Contact Points (Typical View) (B-4-B, B-4-C)

same thickness washers as originally installed in the unit at the factory.

CAUTION

No attempt should be made to change the original factory calibration of the vacuum unit by altering the spring or substituting thicker or thinner washers without using suitable testing equipment.

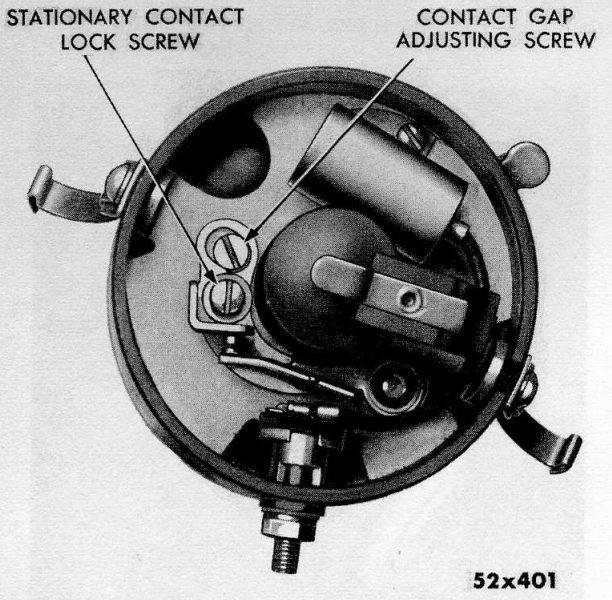


Fig. 26—Distributor Contact Points (B-4-D, B-4-PW, B-4-DU, B-4-EU, B-4-F, B-4-G, B-4-H, B-4-HM, B-4-J, B-4-JM, B-4-K, B-4-KMA)

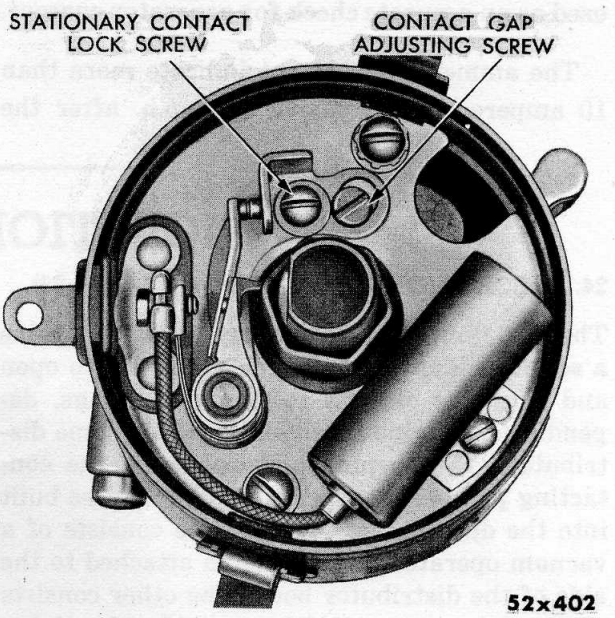


Fig. 27—Distributor Contact Points (B-4-R, B-4-T, B-4-V, B-4-Y)

26. SERVICING CONTACT POINTS (FIGS. 25, 26 AND 27)

If the contact points are a gray color and only slightly pitted, and if the gap is from .018 to .022 inch, the points need not be replaced. If it is necessary to set the gap, use a .020 inch wire feeler gauge or a dial indicator to measure the contact movement.

a. Adjustment of Gap (Figs. 25, 26 and 27)

Place the rubbing block on a high spot of the cam. Loosen the contact lock screw and turn the adjusting cam to obtain .020 inch gap. Then, tighten the lock screw and recheck the gap.

b. Replacement of Contact Points

Loosen the breaker arm spring about one turn, *but do not remove it entirely.* Lift off the condenser lead terminal and the primary lead terminal. Press the breaker arm and spring together to relieve the tension and lift off the breaker arm. Remove the stationary contact lock screw and lift off the stationary contact.

When reassembling, place the breaker arm spring on the outside of the bracket. Then, place the primary lead terminal over the spring and bracket and the condenser lead terminal in position under the plain washer. Press down on all

of these parts as the screw is tightened. Adjust the contact gap as described previously.

Hook a spring scale on the breaker arm at the contact and pull on a line perpendicular to the contact face. Take a reading just as the contacts separate. Adjust to 17 to 20 ounces by loosening the breaker arm spring screw and sliding the spring in or out as necessary.

27. DISASSEMBLY OF DISTRIBUTOR (REMOVED FROM ENGINE) (FIG. 23)

To remove the contact points (with distributor removed), lift off the rotor and remove the screw and clip which hold the primary lead wire, condenser lead wire and the breaker arm spring. Lift the breaker arm off the pivot shaft. Remove the retaining lock screw and lift up the stationary plate.

NOTE

Mechanical type advance (if engine is so equipped) should be checked with special equipment. Follow the equipment manufacturer's instructions.

To remove the governor weights and springs, first remove the vacuum unit (if so equipped). Then, remove the two breaker plate screws and bearing retainer clips (which are adjacent to the distributor cap clips), and lift out the breaker plate. The governor weights and springs will then be accessible. Governor springs must never be distorted. Use original equipment type springs.

If the contact points and the spark plugs are properly adjusted (and the engine misses at high speed), the breaker arm spring tension should be checked with a scale. The spring tension should be 17 to 20 ounces. Correct tension may be obtained by shifting the breaker arm spring in its slot. Make certain that the copper conductor strap is not tight against the spring. If the conductor strap is drawn too tight, it is likely to fracture.

The slightest trace of oil, grease or dirt on the contact surface of the points will aggravate pitting and burning. This will necessitate frequent replacement of contact points. Extreme care should be taken when lubricating the distributor cam. Refer to the Lubrication section. New contact arm rubbing blocks and pivot fiber require lubrication to prevent excessive wear.

When installing the distributor assembly on the engine, see that number one piston is in the proper position, as indicated in the Service Standards.

28. ENGINE TIMING

In low altitudes, with standard brands of non-premium gasoline, the engine will give its best performance if timed as indicated in the Service Standards.

With this timing, there will be a trace of spark ping from 10 to 30 miles per hour when accelerating with wide open throttle from 10 miles per hour.

When using lower grade fuels, or after carbon has accumulated, spark ping may be excessive with the specified timing. In such cases, the ignition should be retarded not to exceed 4 degrees later than the specified timing.

In high altitudes, there is less tendency for spark ping. The same thing is true in low altitudes when using premium gasolines. In such cases, improved performance may be obtained by advancing the spark not to exceed 4 degrees ahead of the specified setting.

Within the foregoing limits (from 4 degrees earlier to 4 degrees later than specified timing), a good rule to follow is to advance the spark until a slight ping is heard, when accelerating from 10 miles per hour with wide open throttle. Four degrees of crankshaft rotation is equivalent to 2 marks on the distributor adjusting plate.

The distributor should be moved clockwise to retard the ignition, or counter-clockwise to advance the ignition.

(1) Using a Timing Indicator over No. 6 cylinder (Fig. 28), bring the piston up on the compression stroke until the piston is in position. Refer to Service Standards.

(2) Loosen the clamp bolt and rotate the distributor body until the contact points just start to open. This may be checked with a test lamp connected between the distributor primary terminal and the battery

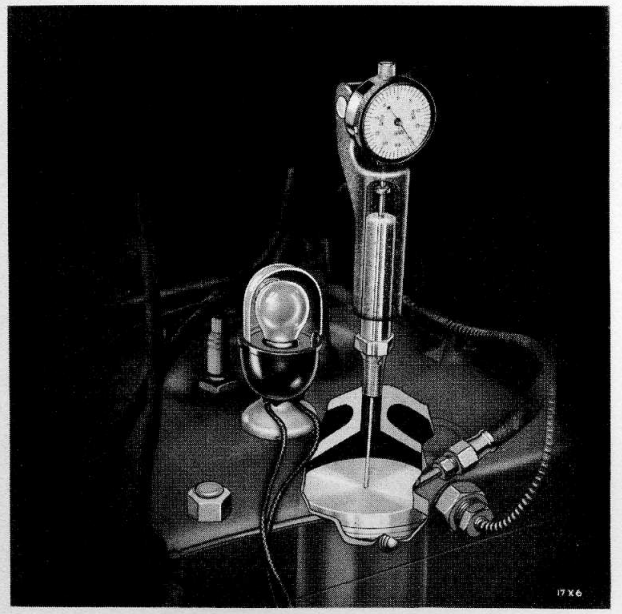


Fig. 28—Timing Indicator (Tool C-435)

terminal of the generator regulator. When the points are closed, the lamp will light. As soon as the points break, the light will go out. Press the distributor cam lightly against the direction of proper rotation to remove all backlash. Minor changes in ignition timing may be obtained by loosening the distributor lock plate hold-down screw and rotating the plate slightly in the proper direction.

29. IGNITION COIL

The ignition coil transforms battery voltage into high voltage for the spark plugs. If there are indications that the coil is not delivering a satisfactory spark, first make sure all connections at the ammeter, ignition switch, coil and distributor, are clean and tight.

A quick coil check may be made by removing the coil high tension wire at the distributor cap and by holding the wire near the cylinder head. With the ignition switch turned on and the starting motor cranking the engine, a spark should jump from the end of the high tension wire to the cylinder head. If the spark is less than ¼ inch long, the electrical system should be tested with accurate electrical testing equipment to determine the cause of the difficulty.

The ignition coil has been carefully designed to give maximum power and performance. No improvements can be obtained by the use of other than the original type of unit. If there is an indication that the coil is defective, install a new coil of the same make and model.

30. SPARK PLUGS

Resistor type spark plugs are used in the current model trucks. Specified gap is .035 inch. For best engine performance and economical operation, especially when gasoline with high lead content is used, the spark plugs should be cleaned frequently by sandblasting and regapped as necessary. This cleaning will remove the deposit formed by the use of chemically-treated fuels for high compression engines. If this deposit is not removed, the engine may miss under heavy load, or high speed driving. In addition, the electrodes, and the porcelains should also be cleaned every 2,500 to 3,000 miles. Even though a protective hood is used over each spark plug, a coating may accumulate on the porcelain which will affect engine performance.

After cleaning the spark plugs, adjust the gap to .035 inch using a *wire* gauge (Fig. 29). Make all adjustments on the side wire of the plug. If the center electrode is bent, the porcelain may crack, resulting in plug failure.

The spark plugs should be tested occasionally with a reliable tester and replaced if faulty. To insure maximum efficiency, replace the plugs at reasonable intervals, using the same type and make as originally installed at the factory.

When installing spark plugs, tighten them with a torque wrench from 30 to 32 foot-pounds.

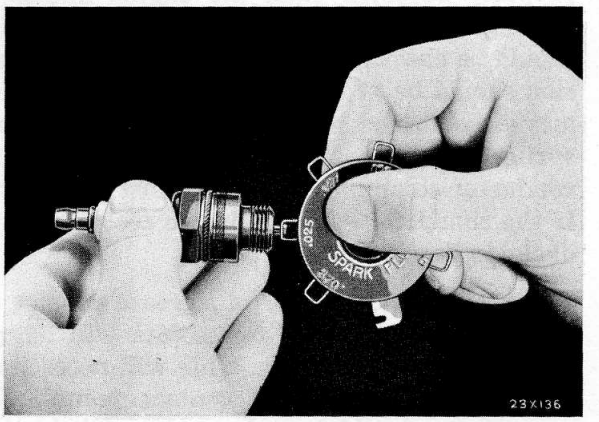


Fig. 29—Measuring Spark Plug Gap with Gauge

LIGHTING SYSTEM

31. DESCRIPTION

The parking lights, headlights and taillights are controlled by a push-pull knob on the lower edge of the instrument panel.

When the control knob is pushed in all the way, all the lights are off. Pulling the control knob out to the first stop turns on the parking lights and taillights. Pulling the control knob out to its last definite stop turns on the taillight and headlights through the dimmer switch on the toe-board. In this position, the headlight beam for driving is controlled by the foot switch. Pressing on the foot switch alternately raises and lowers the headlight beam.

A red indicator, provided on the instrument panel, is illuminated only when using the high beam.

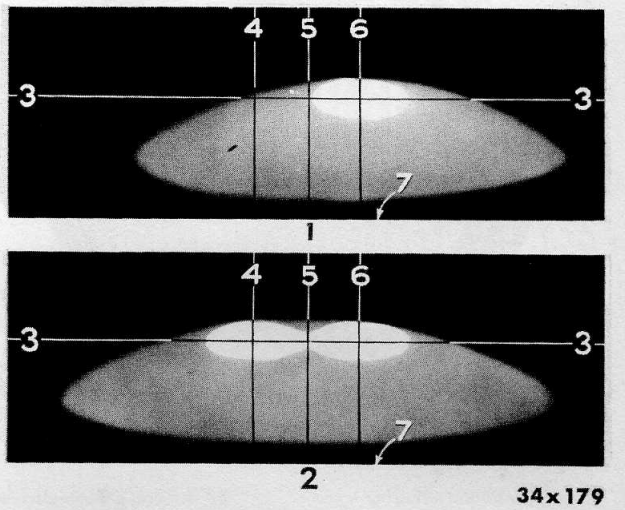


Fig. 30—Pattern of Properly Aimed Headlights

1 — Upper beam of right headlight
2 — Upper beam of both headlights
3 — Horizontal line 3 inches below headlight centers
4 — Vertical line, in line with center of left headlight
5 — Vertical line, in line with windshield center strip and radiator ornament
6 — Vertical line, in line with center of right headlight
7 — Floor level

32. CIRCUIT BREAKER

On all trucks of the B-4-Series, the lighting circuit is protected against the damage a short circuit or ground can cause by a circuit breaker which is located on the push-pull light switch, directly behind the instrument panel.

If a short circuit or ground occurs, the circuit breaker opens the circuit before damage can occur and then continues to open and close until the trouble is corrected. Under normal operating conditions, the circuit breaker remains in its closed position.

33. AIMING HEADLIGHT BEAMS

Before aiming the headlight beams, the vehicle should be placed (without load) on a level surface, with the headlights locatd 25 feet from a light-colored wall or screen.

A horizontal line (3, Fig. 30) should be drawn on the surface of the wall or screen at a height 3 inches below the headlight centers. Locate center point (5) on this line in this manner. Sight through the center of the rear window of the vehicle, in line with the top center of the hood and the windshield center strip. Using this as a center point, draw two vertical lines (4 and 6, Fig. 30) at equal distances from the center point. The distance between these lines should equal the distance between the centers of the headlights. These two lines will be immediately ahead of and in line with the headlights.

Sometimes it is difficult to place the truck on a level floor for locating the horizontal line and aiming the lights. If such a condition exists, locate the line in this manner. Mark two sticks or rods. Each mark should be exactly the same distance from one end of each stick as from the floor up to the center of the headlight. Then, stand both sticks against the fenders (one front and one rear) on one side of the truck. Stand back of the rear stick and sight forward at the marks on the sticks (similar to sighting a gun). Have someone mark the point on the wall or aiming screen where the line of vision strikes the wall or screen. Then, move the sticks to the other side of the truck and repeat the sighting operation. Again, a mark should be placed on the wall or screen at the end of the line of vision. Measure 3 inches downward from these marks and connect the two low marks with a straight line. Then, this lower horizontal line will be exactly the right height. It will also be parallel to the plane of the headlight filaments, regardless whether the

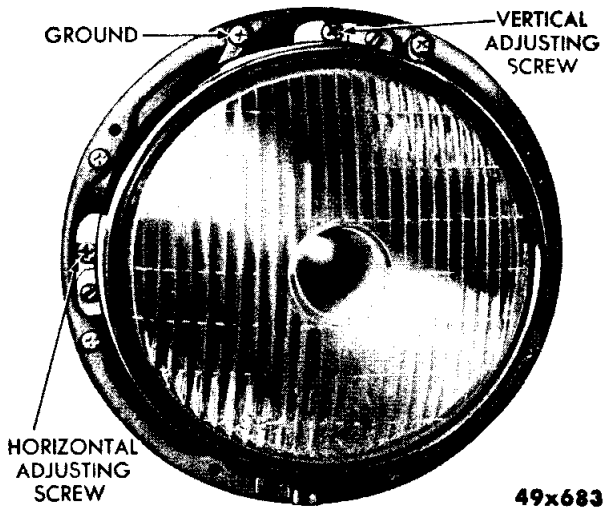


Fig. 31—Headlight Adjustment

1 — Horizontal adjusting screw 2 — Vertical adjusting screw

truck is standing up grade or down grade, or whether the wheels on one side are higher than the wheels on the other side.

The intersections of the horizontal line and the two vertical lines (Fig. 30) are directly ahead of the light filaments and should mark the center of the bright spot of each light. Cover one headlight and adjust the other headlight. Then, cover the properly adjusted light and adjust the one which was covered. Adjustment should be made with high beam turned on. The city beam, or passing beam of light, will be in the proper position. The city beam must not be used when aiming headlight beams.

Adjusting Headlight Beams

To adjust headlight beams, proceed as follows:

(1) Remove screw at bottom of headlight rim and unhook rim at top by pulling it outward.

(2) To raise or lower beam, turn adjusting screw in center at top of headlight frame.

(3) To move beam to right or left, turn adjusting screw at left side of headlight frame, as shown in Figure 31.

34. HEADLIGHTS

The headlights are the Sealed Beam type. The complete Sealed Beam unit must be replaced when the light fails. Refer to Service Standards for headlight specifications.

35. REMOVAL OF HEADLIGHT UNIT

(1) Remove screw at the bottom of the headlight rim and unhook the rim at the top by pulling it outward.

(2) Lift out the Sealed Beam unit and disconnect.

36. LIGHT BULBS

If light bulbs burn out frequently, check for the following:

(1) Loose connection at generator, ammeter or battery.

(2) Corroded battery terminals.

(3) Poor ground connection.

(4) Improper adjustment of generator regulator.

Bulbs, which have been damaged, burned out, or blackened in service, should be replaced.

HORN

37. HORN ADJUSTMENT (VIBRATOR TYPE)

Loosen the lock nut and turn the adjusting screw counter-clockwise until the motor is actuated, but the horn does not vibrate. Then, turn the screw approximately ¼ turn clockwise and tighten the lock nut. Do not loosen the lock nut in the center of the horn because this may cause the diaphragm to break.

38. HORN ADJUSTMENT (ELECTRIC AIR TYPE —EXTRA EQUIPMENT)

Remove covers (Fig. 32) from both horns after disconnecting horn leads. Connect the lead to the high note horn. The low note horn lead must be disconnected while adjusting high note horn. Turn adjusting screw counter-clockwise, as shown in Figure 32 until there is no vibra-

tion. Then, turn the adjusting screw approximately ¼ turn clockwise, or until a clear mellow pitch is obtained. Then, tighten the lock nut. Adjust the low note horn in the same manner after disconnecting the high note horn.

If a clear mellow pitch can not be obtained, dress down the horn contact points with a clean file and then readjust.

CAUTION

Do not loosen the lock nut in the center of either horn, as damage to the diaphragm may result.

39. TESTING HORN RELAY

Ground the horn "SW" terminal at the relay. If the horns operate, the horns and relay are in good operating condition. But, the horn button or wiring is "open." Connect a jumper lead from the starting switch battery terminal to the relay "B" terminal. Then, operate the horn button. If the horns blow, check for faulty wiring between the battery, ammeter, ignition switch and relay. If the horns do not blow (with both of these jumper leads connected to the relay), check for faulty wiring from the relay to the horns, or for a defective horn relay.

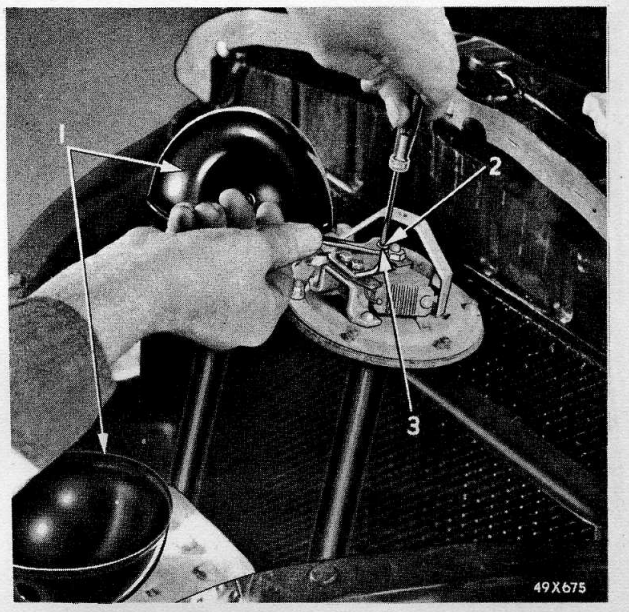


Fig. 32—Adjusting Pitch of High Note Horn

RADIO

40. INSTALLATION

Detailed instructions for the installation of radio equipment are furnished with each set. By carefully following them in every detail, the best radio performance will be assured with a minimum amount of installation labor.

41. ELIMINATION OF STATIC ELECTRICITY DUE TO IMITATION LEATHER UPHOLSTERY

If the interior of the truck is upholstered and trimmed with imitation leather or other like material, there is a tendency for radio interference to occur due to the production of static electricity.

In order to completely eliminate radio noise under such circumstances, it may be necessary to completely shield the antenna lead wire over approximately its entire length, or from a point about 3 inches from where the wire leaves the antenna. This should be done with a very low capacity, shielded conductor in which the conductor is spaced from the shield by several layers of cotton braid and impregnated with wax.

ELECTRIC WINDSHIELD WIPER

42. DESCRIPTION

Dual arms are used on the Route Van windshield wipers. The motors are located under the front grille (Fig. 33).

43. REMOVAL AND INSTALLATION

Perform the operations as follows:

(1) Disconnect the lead wires to motor. When a new field resistance is used, the wires to the resistance unit will need to be soldered.

(2) Remove the linkage clip.

(3) Remove the mounting nuts. The motor and bracket will come off as a unit. When the

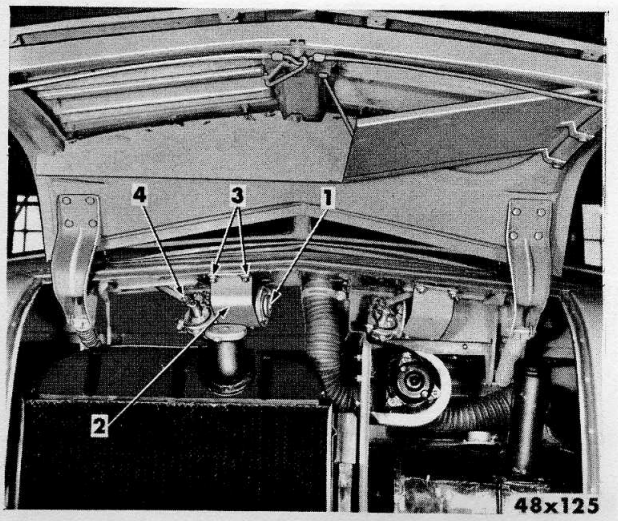


Fig. 33—Location of Wiper Motor (Route Van)

1 — Motor
2 — Mounting bracket
3 — Mountain bolts
4 — Linkage clip

motor has been replaced, it should be tested for proper performance.

44. SERVICE DIAGNOSIS

a. Testing Control Switch

The electric windshield wiper control switch can be tested in the following manner:

(1) Turn the control switch to the "off" position and slide the control switch knob off the shaft.

(2) Remove the mounting nut and push the switch out of the mounting hole.

(3) Disconnect the four wires from the switch and connect a test light between a test battery and terminal "A" on the control switch. Then, connect the other battery post to terminal "F." The circuit should be complete in the "off" position.

(4) Turn the control switch to the low speed position. Connect a test light between the test battery and terminal "B" and connect a wire to terminal "A" from the other battery post. This circuit should be complete. Next, connect the wire from the battery post to terminal "F." This circuit should also be complete.

The thermostatic circuit breaker should open and close under a 12 ampere load. The field resistance is mounted on the wiper motor.

b. Checking Motor

The windshield wiper motor can be checked in the following manner:

(1) Check the circuit at the following points, using a test light:

(a) Ignition switch

(b) Gasoline gauge

(c) Windshield wiper switch

(d) Wiper motor ground

(2) If motor does not "park" properly, it may be due to the following causes:

(a) If the motor stops at whatever point the manual switch is turned off, look for an open circuit in the green wire circuit to the parking switch.

(b) If the motor continues to run after the manual switch is turned off, the parking switch is not properly adjusted. Loosen the screw on the parking switch mounting plate and rotate the switch in the direction of the crank to make it "park" later. Rotate the switch in the opposite direction of crank to make it "park" earlier.

(c) If the motor will not "park", the cam may be bent down too far towards the crank bearing housing.

(3) Disconnect at the switch the wires leading from the switch to the motor.

(4) Connect the negative wire of a 6-volt test battery to the black wire and connect the positive wire to the motor case. If the motor is mounted in the cab, a jumper from the ammeter to the black wire can be used. The motor should run at full speed. If the motor does not run, the field circuit may be open, the armature circuit may be open, the armature or gears may be jammed (they should turn freely), or the brushes may be stuck or worn out. Check the commutator slots for dirt and clean if necessary. Install new brushes if this condition exists.

SERVICE DIAGNOSIS

CONDITIONS — POSSIBLE CAUSES — REMEDIES

45. STARTER FAILS TO OPERATE

Possible Causes

a. Weak battery.

b. Loose battery cables.

c. Dead battery cell.

d. Defective starter.

e. Corrosion at battery posts.

Remedies

a. Test specific gravity of battery and check for dead cell. Replace or recharge battery as required.

b. Clean battery posts and cable clamps. Tighten clamps securely for good contact.

c. Replace defective battery. Check voltage regulator and generator output.

d. Remove and test starting motor. Replace parts or the the complete unit, as required.

e. Remove battery cables and clean terminals and clamps. Check clamps for corrosion and replace if necessary. Tighten clamps securely, coating with vaseline or cup grease to retard corrosion.

46. STARTER FAILS AND LIGHTS DIM

Possible Causes

a. Weak battery.

b. Loose connections.

c. Dead battery cell.

d. Battery terminals corroded.

e. Internal ground in windings.

Remedies

a. Test specific gravity of battery and check for dead cell. Replace or recharge battery as required.

b. Tighten loose connections as required. Check terminals for corrosion. Clean as necessary to form good contact.

c. Replace defective battery. Check voltage regulator and generator output, which, if improper, may have contributed to the battery failure.

d. Remove battery cables and clean terminals and clamps. Check clamps for corrosion and replace if necessary. Tighten securely and coat with vaseline or cup grease to retard corrosion.

e. Remove starting motor and test. Replace parts as required.

47. STARTER TURNS BUT DOES NOT ENGAGE

Possible Causes

a. Broken drive spring.

b. Broken teeth on flywheel ring gear.

c. Grease or dirt on screw shaft.

Remedies

a. Remove starting motor and install new drive spring. Check screw shaft for excessive wear or burring. Replace if necessary.

b. Replace flywheel ring gear. Be sure to check the teeth on mating pinion for wear. Replace if necessary.

c. Remove starting motor and clean screw shaft in clean kerosene. Upon reassembly, lubricate shaft with SAE 10-W Engine Oil.

48. STARTER LOCKS

Possible Causes

a. Broken or chipped teeth on flywheel ring gear.

b. Loose starter mounting bolts.

Remedies

a. Replace flywheel ring gear. Be sure to check the teeth on mating pinion for wear. Replace if necessary.

b. Remove starting motor and check for possible damage to pinion teeth. Remount starter and tighten bolts securely.

49. BURNED OR PITTED DISTRIBUTOR CONTACT POINTS

Possible Causes

a. Dirt or oil on points.

b. Improperly adjusted points.

c. Defective condenser.

d. Defective coil.

e. Worn bushings on distributor shaft.

f. Regulator setting high.

g. Extremely high voltage.

Remedies

a. Clean breaker points and check for pitting. If the contact surfaces are badly burned, replace points and condenser.

b. Adjust points to .020 inch. Excessive flashing or burning may be caused by chattering or rebound of the contact points. Test breaker arm spring tension.

c. Replace condenser and check contacts for pitting or burning. Replace parts as required.

d. Replace defective coil. Check points for burned or pitted contact surface. Replace parts as required.

e. Replace bushings on distributor drive shaft.

f. Check regulator setting. Check points for excessive burning. Replace parts as required.

g. Damage to the coil by extremely high voltages may be caused by improper operation of the voltage regulator. This will be indicated by overcharged condition of the battery. Check voltage regulator. Replace defective coil and points, if the contacts are burned or pitted.

50. IGNITION COIL FAILURE

Possible Causes

a. Extremely high voltages.

b. Moisture formation.

c. Excessive heat from engine.

d. Open circuit at soldered connection on primary studs.

Remedies

a. Damage to the coil by extreme high voltages may be caused by improper operation of the voltage regulator. This will be indicated by overcharged condition of the battery. Check voltage regulator. Replace defective coil and points, if the contacts are burned or pitted.

b. Replace defective coil and points, if the contact surfaces are burned or pitted. (The failure of the ignition coil may be caused by moisture entering through a break in the soldered joints of the can.)

c. Replace defective coil and points if the contact surfaces are burned or pitted. If engine heat is excessive, check for cause and correct as necessary.

d. Resolder connections in primary studs, allowing solder to flow into each stud cavity. Be very careful; do not overheat the bakelite tower. If unable to make satisfactory connection, replace coil and points.

51. CONDENSER FAILURE

Possible Causes

a. Normal fatigue.

b. Excessive heat.

c. Moisture.

Remedies

a. Replace condenser and check points for burning or pitting. Replace if necessary.

b. Replace condenser and check points for burning or pitting. If engine heat is excessive, check for cause and correct as necessary.

c. Replace condenser and check points for burning or pitting. Replace parts as required.

52. FOULED OR BURNED SPARK PLUGS

Possible Causes

a. Use of incorrect type of plug.

b. Plugs not sufficiently tight in head.

c. Improperly seating valves.

d. Excessively lean air-fuel mixture.

e. Ignition timing improperly adjusted.

f. Water leaking into combustion chamber.

Remedies

a. Remove incorrect plugs and replace with specified type. Refer to Service Standards. Gap should be .035 inch.

b. Tighten plugs to a torque of 30 to 32 foot-pounds after installing NEW plug gaskets.

NOTE

It is advisable to clean the spark plug seat and use a new gasket each time a plug is removed for cleaning, inspection or replacement. Maintenance of the temperature of the spark plug depends largely on the proper installation and tightness of the plug in the cylinder head. This insures the proper heat transfer from the plug nose through the shell and seat gasket to the engine cooling system.

c. Refer to Engine section for correction of this condition.

d. Refer to Fuel System section for adjustment of the carburetor to correct this condition.

e. Adjust ignition timing.

f. Replace cylinder head or gasket.

53. DISTRIBUTOR CAP BLOWS OFF

Possible Cause

Ruptured diaphragm in the vacuum advance unit. (This will allow fuel vapor to enter the distributor.)

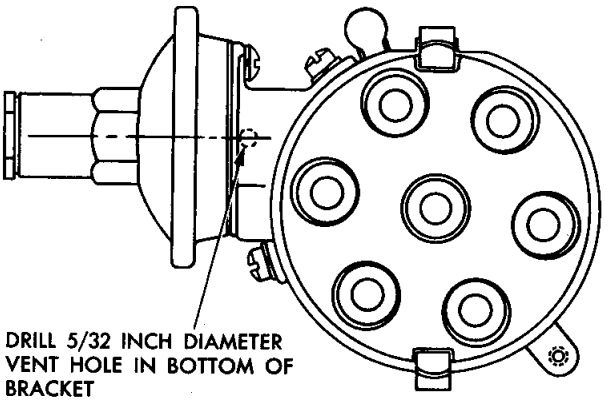
Remedy

Install new vacuum chamber. Be sure that a ventilating hole is in the bracket, as shown in Figure 34. If necessary, drill a $\frac{5}{32}$ inch hole in the bracket, as shown.

54. GENERATOR FAILS TO CHARGE

Possible Causes

a. Open charging circuit.



50 x 133

Fig. 34—Vacuum Chamber Vent Hole (Typical View)

b. Sticking brushes.

c. Dirty or burned commutator.

d. Grounded commutator.

e. Grounded field coil.

f. Open circuit in field.

g. Poor soldering on armature and field studs.

Remedies

a. Test generator for open charging circuit.

b. Free up or replace generator brushes.

c. Check commutator and brushes. If the commutator is dirty, rough, or worn so that the mica is even with the bars, recondition armature. At reassembly, install new brushes, if they are worn.

d. Check armature for grounded commutator.

e. Check generator for grounded field coil.

f. Check generator for open circuit in field.

g. Check armature and field stud connections for poor contacts. Resolder to form good contact surface.

55. LOW, UNSTEADY CHARGING RATE

Possible Causes

a. Slipping fan belt (or belts).

b. Defective ammeter.

c. Improperly seated brushes.

d. Weak brush spring tension.

e. Poor bond between brush and pigtail.

f. Out-of-round commutator.

g. Resistance in charging circuit.

h. High mica between commutator bars.

i. Open armature winding.

j. High resistance at battery terminal posts.

Remedies

a. Tighten fan belt (or belts) after checking the driving surfaces. If a belt is frayed, cracked or greasy (on the sides or bottom), replace belt and adjust.

b. Replace defective ammeter after checking to determine cause of failure.

c. Replace generator brushes and seat. Check armature commutator for roughness or high mica. Recondition commutator if necessary.

d. Check brush spring tension. Discard springs that do not meet minimum requirements.

e. Check pigtails for discoloration which indicates burned condition. Replace brushes as necessary. Tighten pigtails securely to form a good contact.

f. Recondition armature commutator. Install new brushes and check spring tension.

g. Check charging circuit.

h. Undercut mica.

i. Test armature for open winding. If unable to correct as indicated, replace armature and install new brushes.

j. Remove battery cables and clean terminals and clamps. Check clamps for corrosion and replace if necessary. Tighten clamps securely, coating with vaseline or cup grease to retard corrosion.

56. EXCESSIVE CHARGING RATE

Possible Causes

a. Defective regulator.

b. Overheated battery.

c. Shorted field.

d. Grounded field — external type (wiring harness).

e. Shorted cell in battery.

Remedies

a. Replace defective regulator. Check to determine cause of failure.

b. Test battery. Test voltage regulator for high voltage setting. Adjust or replace to correct this condition.

c. Test field coil for short. Replace coil as necessary.

d. Check for external ground and repair as necessary.

e. Test specific gravity of battery and replace if the specific gravity reading of a cell is below 1.150.

57. GENERATOR NOISY

Possible Causes

a. Misaligned fan belt or pulley.

b. Improperly seated brushes.

c. Worn bushing or bearing.

d. Loose generator drive pulley.

e. Loose field pole shoes.

f. Excessive voltage output.

g. High wedges in armature slots.

h. Bent flange on pulley.

i. Generator fan blades striking.

Remedies

a. Check fan belt and pulley for true running. Replace parts as necessary.

b. Check brushes for excessive wear and for looseness in holders. Replace brushes if necessary.

c. Replace bearing or bushing. Check armature assembly for possible damage and replace if necessary.

d. Tighten drive pulley and check for true running.

e. Tighten pole shoes and check armature for possible damage.

f. Refer to Paragraph 56 for possible causes.

g. Replace or sand down armature slot wedges.

h. Check fan belt for possible damage. Straighten or replace pulley as required.

i. Test generator fan pulley for true running. If unable to straighten, replace pulley.

58. NOISE AND ARCING AT GENERATOR BRUSHES

Possible Causes

a. High mica between commutator bars.

b. Out-of-round commutator.

c. Sprung armature shaft.

d. Dirty, glazed commutator.

e. Hard spots on brushes.

f. Weak brush springs.

g. Worn or loose brushes.

h. Loose wiring at brush pigtails.

i. Excessive voltage output.

Remedies

a. Undercut mica. Inspect and replace brushes, if necessary.

b. Recondition commutator. Check brushes and replace if necessary.

c. Replace armature assembly and install new brushes and seat them.

d. Recondition commutator. Check brushes for excessive wear and replace as required.

e. Replace brushes.

f. Check tension of brush springs. Discard springs that do not meet minimum requirements.

g. Replace brushes

h. Refer to Paragraph 55, remedy *e* for correction of this condition.

i. Refer to Paragraph 56 for possible causes and remedies.

59. ARMATURE FAILURE (PREMATURE)

Possible Causes

a. Excessive charging rate.

b. Failure of voltage regulator.

c. Use of improper type of brushes.

d. Worn shaft bearing (pole rub).

e. Short between armature coils.

f. Shorted battery cell.

Remedies

a. Replace armature assembly after checking regulator setting. Check and adjust regulator.

b. Replace armature assembly. Then, check voltage regulator for proper adjustment. If unable to adjust, replace voltage regulator.

c. Replace armature assembly and install new brushes.

d. Replace armature assembly and install new bearing and bushing.

e. Replace armature assembly and install new brushes.

f. Replace battery and check voltage regulator for proper adjustment.

60. REGULATOR POINTS OXIDIZED

Possible Causes

a. Poor ground connections.

b. Misaligned contact points.

c. Improper air gap setting.

d. Shorted field in generator.

Remedies

a. Check for poor connections on ground side of circuit. File down contact points.

b. File down contact points, align and adjust.

c. File down contact points. Set air gap on circuit breaker, current and voltage regulators.

d. Check for shorted field in generator and file down the contact points.

61. REGULATOR POINTS PITTED

Possible Causes

a. Long usage, normal wear.

b. High current output of generator.

c. Insufficient point spring tension.

d. Reversed polarity in generator.

Remedies

a. File down contact points. Reset air gaps to required specifications and adjust points.

b. Check regulator for burned coil windings or contact arms. If condition exists, replace regulator assembly. Otherwise, file down contact points, check air gap and contact point setting. Check generator for a grounded or shorted field, or high resistance in ground circuit.

c. File down contact points. Then, with special tool (from Kit C-828) placed over the lower spring hanger, bend slightly to increase tension. Increasing spring tension raises the closing voltage.

d. File down contact points, reset air gaps and adjust contact points. Check generator polarity and correct as necessary.

62. BURNED COIL WINDINGS

Possible Causes

a. High voltage regulator setting.

b. High current regulator setting.

c. Grounded generator field.

Remedies

a. Replace regulator assembly.

b. Replace regulator assembly.

c. Check and correct grounded condition in generator field and replace regulator assembly.

63. BURNED CONTACT ARM

Possible Causes

a. Regulator connected incorrectly.

b. Accidental momentary short between battery terminal and field terminal of regulator.

c. Wrong procedure followed in connecting generator, causing a build-up.

Remedies

a. Replace regulator assembly. Check wiring diagram before installation.

b. Replace regulator assembly. Be careful when working around regulator to avoid dead shorts.

c. Replace regulator assembly. Polarize generator after making all connections, by causing a momentary connection from the starting switch or regulator battery terminal to the generator armature terminal.

64. STUCK CUTOUT POINTS

Possible Causes

a. Reversed polarity.

b. Long usage.

c. Foreign material.

Remedies

a. File down contact points. Polarize generator as described in *c* above.

b. File down contact points. If condition still exists, replace regulator assembly.

c. Clean interior of regulator, inspect contact points, align and clean. Check cover gasket. If it does not seal properly, replace gasket.

65. STICKING CONTACT POINTS

Possible Causes

a. Misaligned points.

b. Poor ground connection between generator and regulator.

c. Wrong polarity on regulator.

d. Pitted or oxidized points.

e. Defective winding in regulator.

Remedies

a. Free up, reset air gaps and adjust contact points.

b. Free up, reset air gaps, clean and adjust contact points. Check connections between generator and regulator for indications of poor ground. Clean or tighten faulty connections.

c. Negative polarity regulators have "NEG" stamped in red on the cover and should be used on negative ground systems only. Replace with proper positive ground regulator.

d. Refer to Paragraph 60 for possible causes and remedies for correction of this condition.

e. Replace regulator assembly after checking to determine cause of failure.

66. BATTERY RUN DOWN

Possible Causes

a. Low regulator setting.

b. Loose fan belt.

c. Corroded battery terminals.

d. Short in charging circuit.

e. Stuck cutout in regulator.

f. Excessive use of electrical units.

g. Faulty stop light switch.

h. Faulty door light switch.

i. Insufficient driving.

Remedies

a. Recharge battery. Then, test current regulator for proper amperage setting. Adjust as necessary.

b. Recharge battery. Adjust fan belt and check driving surfaces.

c. Recharge battery, clean terminals and clamps. Check clamps for corrosion and replace as necessary.

d. Recharge battery. Then, test generator, voltage regulator and charging circuit wiring for shorts. Replace parts as necessary.

e. Recharge battery. Refer to Possible Causes listed in Paragraphs 64 and 65. Service as indicated.

f. Recharge battery. Avoid excessive use of electrical units whenever possible.

g. Recharge battery. Then, replace faulty stop light switch and bleed lines. Refer to Brakes section in this manual.

h. Recharge battery. Then, replace faulty door switch to correct this condition. In most cases, shimming the switch to make it project out farther will correct the condition.

i. Recharge battery. Then, either drive truck more often or use a trickle charger.

67. BATTERY WILL NOT RETAIN WATER

Possible Causes

a. Too high charging rate.

b. Cracked battery case.

c. Leaking battery cell.

d. Defective current regulation.

e. Defective sealing compound.

Remedies

a. Fill battery to correct level. Then, check voltage regulator. Adjust or replace regulator.

b. Replace battery after checking to determine cause of case failure.

c. Replace battery after checking to determine cause of cell failure.

d. Fill battery to correct level. Then, check current regulator. Adjust or replace regulator.

e. Replace battery, or if possible, reseal old one.

68. BATTERY WILL NOT TAKE CHARGE

Possible Causes

a. Low water level.

b. Worn out battery.

c. Spilled electrolyte.

d. Internal short circuit.

e. Impure electrolyte.

Remedies

a. Fill battery to correct level and charge battery. The plates are unable to take full part in the battery action unless completely covered by electrolyte.

b. Replace worn out battery with a new battery of the same type and capacity. Test generator and voltage regulator for correct operation.

c. Recharge battery at 15 ampere hour maximum rate until specific gravity of all cells remains constant for two successive readings (taken at least one hour apart). Remove a quantity of electrolyte from each cell and mix with new electrolyte, adding water or electrolyte until 1.280 specific gravity is reached.

d. Replace shorted battery with a new battery of the same type and capacity. Test generator and regulator for correct operation.

e. Pour impure electrolyte from battery, fill with fresh water and pour out again. Repeat several times. Then, fill with 1.350 specific gravity sulphuric acid electrolyte only, recharge battery and adjust fully charged specific gravity to the desired value.

69. HORNS WILL NOT BLOW

Possible Causes

a. Improper adjustment.

b. Defective relay.

c. Faulty button contact.

d. Broken or defective wiring.

e. Defective horn.

Remedies

a. Ajust horns.

b. Replace horn relay after inspection of the old one to determine cause of failure.

c. Check horn button for operation by grounding the relay control terminal. If horns now blow, inspect button and wiring. Replace parts as required.

d. Inspect horn blowing circuit for breaks, high resistance or grounds. Replace or repair wiring as necessary.

e. Replace horn assembly after checking to determine cause of failure.

70. HORNS BLOW CONTINUOUSLY

Possible Causes

a. Shorted horn relay.

b. Shorted wiring.

c. Grounded horn button.

d. Stuck contact points in relay

Remedies

a. Remove horn button lead from relay ("SW" terminal). If horns still blow, replace relay.

b. Remove horn button lead ("SW" terminal) from relay. If horns now stop blowing, look for ground in this lead, or in horn button contact plate. See *c.* below.

c. Check horn button contact plate screws for looseness. Tighten as required.

d. Replace horn relay.

71. LIGHTS DO NOT BURN

Possible Causes

a. Burned out bulb or unit.

b. Defective wiring.

c. Defective light switch.

d. Loose connections.

e. Run down battery.

Remedies

a. Replace burned out bulbs or Sealed Beam units after checking voltage at socket.

b. Check for defective wiring. Replace as required.

c. Replace defective light switch after inspection and testing to determine cause of failure.

d. Clean and tighten connections as necessary to correct the condition (note especially the connections at the various junction blocks).

e. Test specific gravity of battery, recharge, and then test voltage regulator for output. Adjust as necessary.

72. LIGHTS FLICKER

Possible Causes

a. Loose connections.

b. Poor ground at light socket.

Remedies

a. Clean and tighten connections as necessary.

b. Inspect bulb sockets for dirt or corrosion. Check ground connections. Clean and tighten as required and test ground connections for voltage drop.

73. LIGHT BULBS BURN OUT FREQUENTLY

Possible Causes

a. Excessive battery voltage.

b. High charging rate.

c. Poor ground at light socket.

d. Short in light circuit.

e. Use of incorrect type of bulb.

f. Corroded battery terminals.

Remedies

a. Replace burned out bulbs. Then, test battery.

b. Replace burned out bulbs if required. Then test voltage regulator. Adjust as necessary.

c. Inspect bulb sockets for dirt or corrosion. Check ground connection and clean and tighten as required. Test ground connection for voltage drop.

d. Check for defective wiring. Replace wiring as required.

NOTE

When replacing a wire in the lighting circuit, always use standard equipment wire.

e. When replacing burned out bulbs, use only those recommended in the Service Standards.

f. Clean and tighten battery terminals.

74. WIPER OPERATES SLOWLY

Possible Causes

a. High resistance in brush to commutator contact, or carbon deposits in slots.

b. High resistance in ground connection.

c. Pivot shaft binding.

d. Defective control switch.

e. Worn or damaged motor.

Remedies

a. Check armature commutator and brushes. Repair and test as necessary.

b. Check for high resistance in ground connection and/or wiring circuit. Repair as necessary.

c. Free up pivot shaft and lubricate as required to prevent a reoccurrence of this condition.

d. Replace defective control switch after testing.

e. Remove and service motor. Replace parts as required.

75. WIPER FAILS TO OPERATE

Possible Causes

a. Binding linkage.

b. Defective switch.

c. Defective motor.

d. Open or grounded wiring.

Remedies

a. Free up linkage and lubricate as required to prevent a reoccurrence of this condition.

b. Test for defective switch by connecting a jumper wire from the ammeter terminal post to the windshield wiper motor terminal "A" on switch. If wiper motor operates, replace switch.

c. Remove wiper motor and test. If motor does not operate, disassemble and inspect for worn or damaged parts. Replace parts as needed.

d. Inspect wiring circuit and check ground connection. Replace parts as required.

SECTION 7

ELECTRICAL SYSTEM

SERVICE BULLETIN REFERENCE

NUMBER	DATE	SUBJECT	CHANGES