

ELECTRICAL

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ATION

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ATIONS

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GENERAL INFORMATION

SPECIFICATIONS

Description		Starter Motor	Alternator	Voltage Regulator	Igniter	Battery
U-engine	with M/T	0.9kW-12V	12V-45A	IC type	E.I.S.	NT80-S6 (For U.S.A.) N50Z (For Canada)
	with A/T	1.2kW-12V				
W-engine	with M/T	0.9kW-12V				NX100-S6 (For U.S.A.) NS70 (For Canada)
	with A/T	1.2kW-12V				

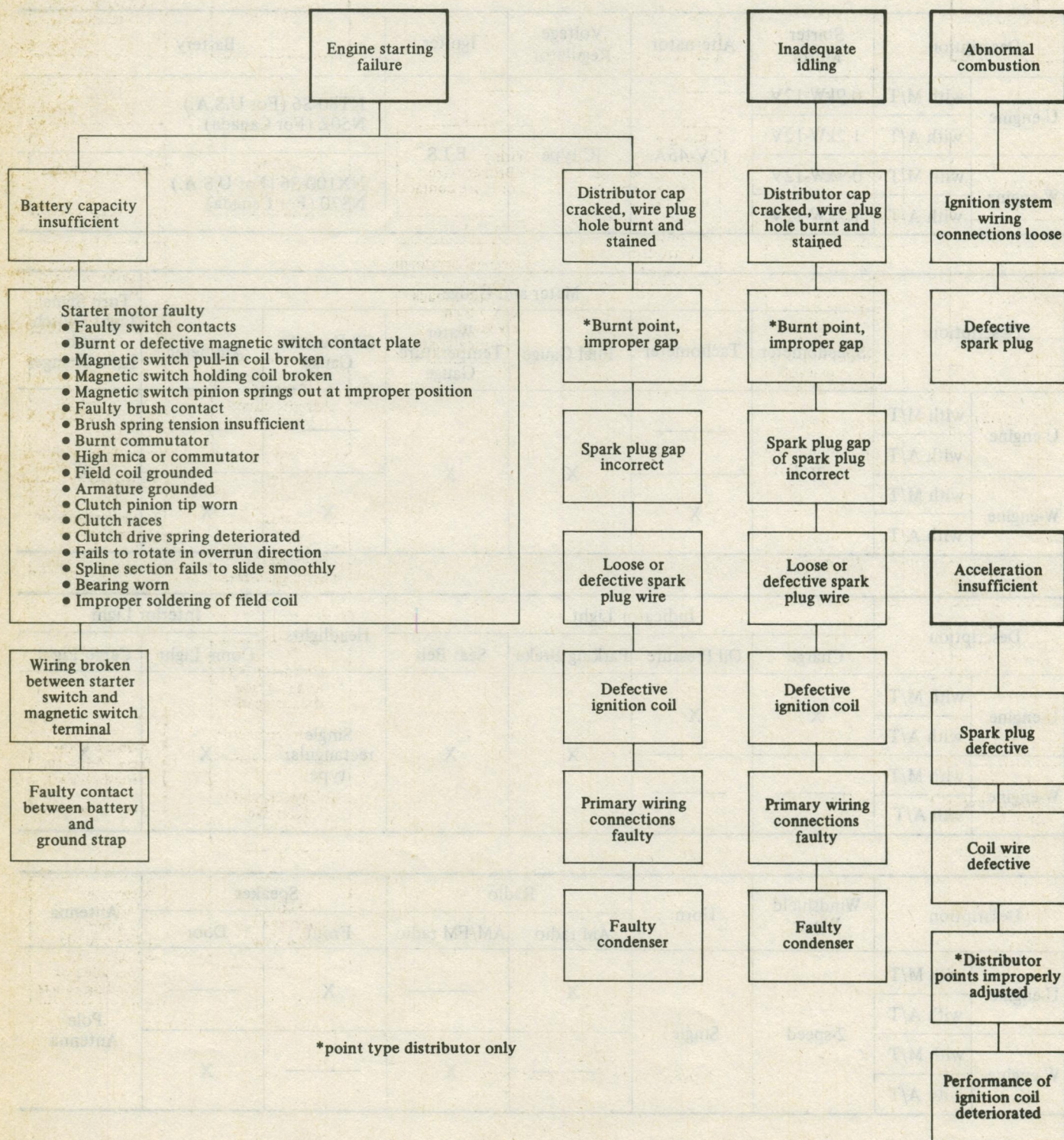
Description		Meter and Gauge						Turn Signal Light Switch with Lane Changer
		Speedometer	Tachometer	Fuel Gauge	Water Temperature Gauge	Oil Pressure Gauge	Ammeter	
U-engine	with M/T	X	—	X	X	—	—	X
	with A/T		—			—	—	
W-engine	with M/T		X			X	X	
	with A/T		X			X	X	

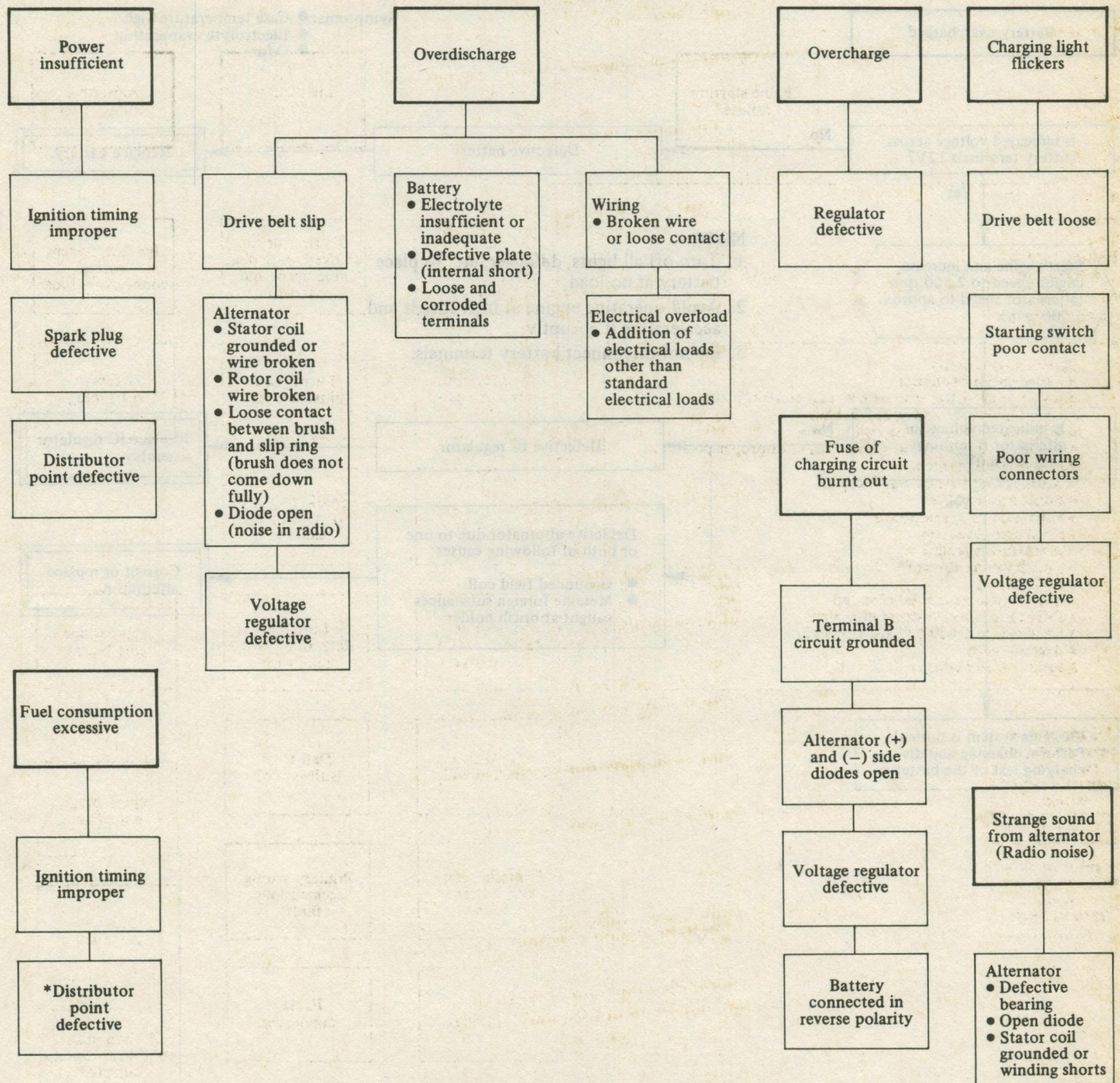
Description		Indicator Light				Headlights	Interior Light	
		Charge	Oil Pressure	Parking Brake	Seat Belt		Dome Light	Cargo Light
U-engine	with M/T	X	X	X	X	Single rectangular type	X	X
	with A/T							
W-engine	with M/T	—	—					
	with A/T	—	—					

Description		Windshield Wiper	Horn	Radio		Speaker		Antenna
				AM radio	AM/FM radio	Front	Door	
U-engine	with M/T	2-speed	Single	X	—	X	—	Pole Antenna
	with A/T			—	—	—	—	
W-engine	with M/T			—	X	—	X	
	with A/T			—	—	—	—	

M/T: Manual Transmission
 A/T: Automatic Transmission
 X: Available
 —: Not available

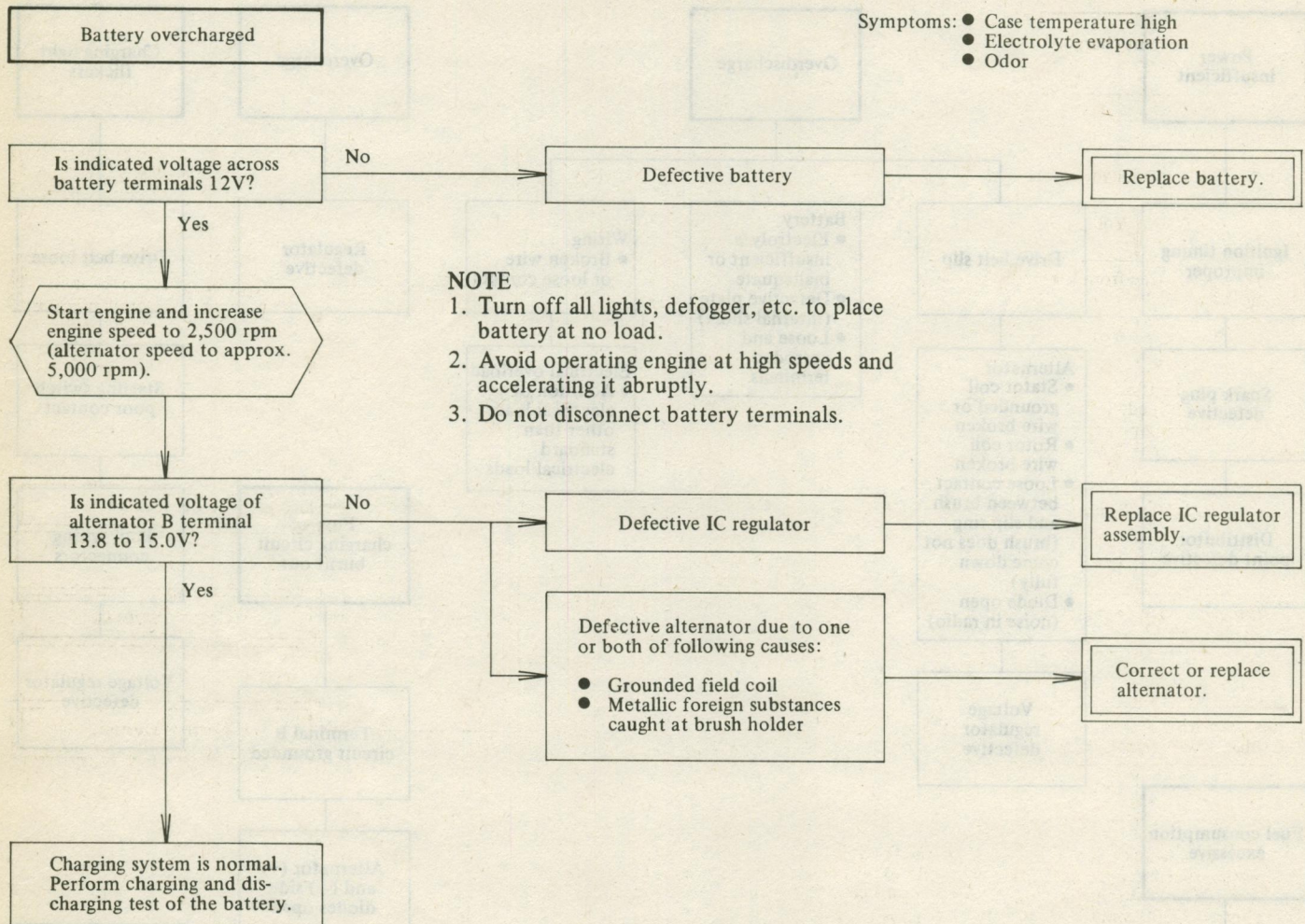
TROUBLE SHOOTING ENGINE

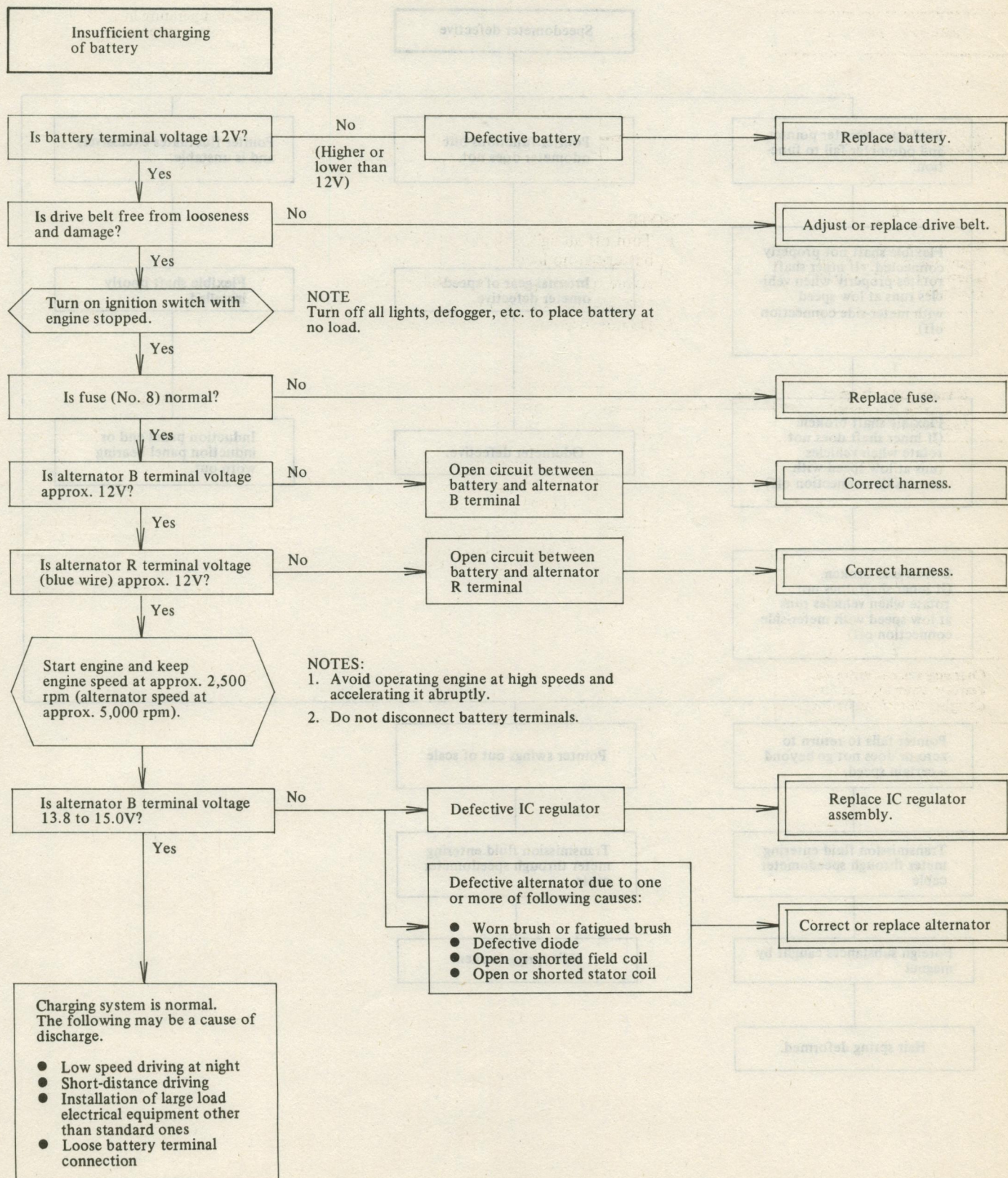




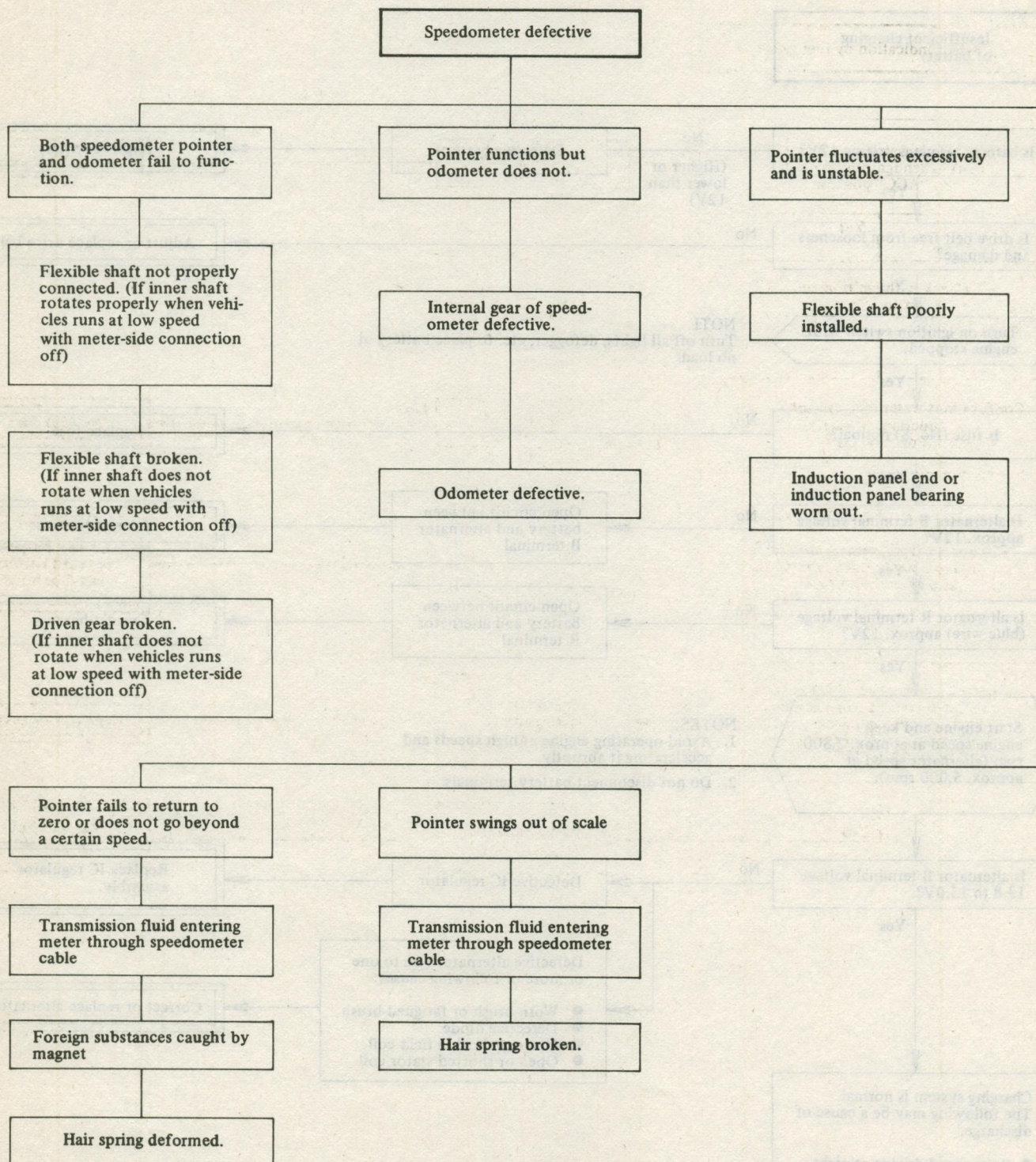
* point type distributor only

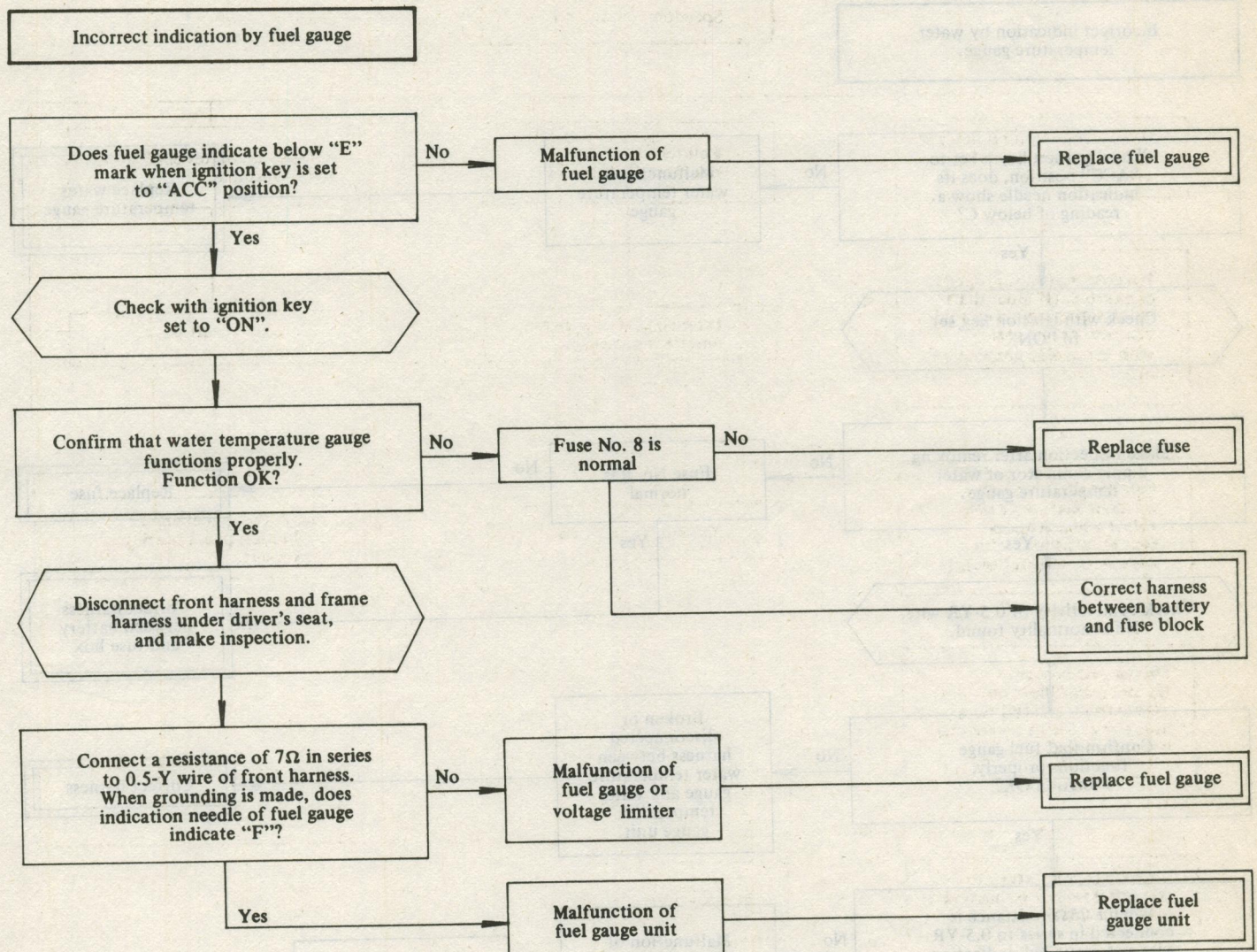
BATTERY

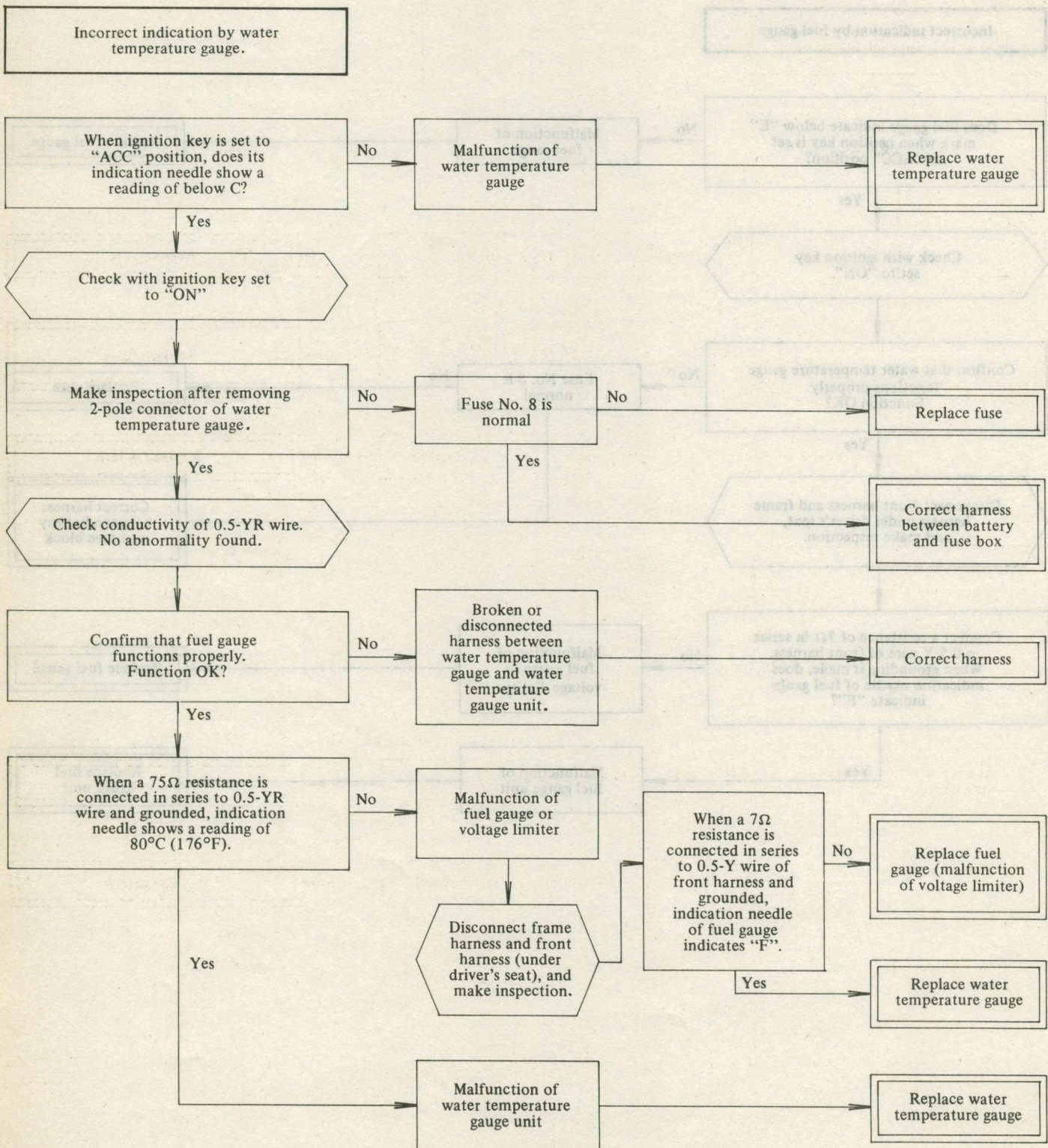


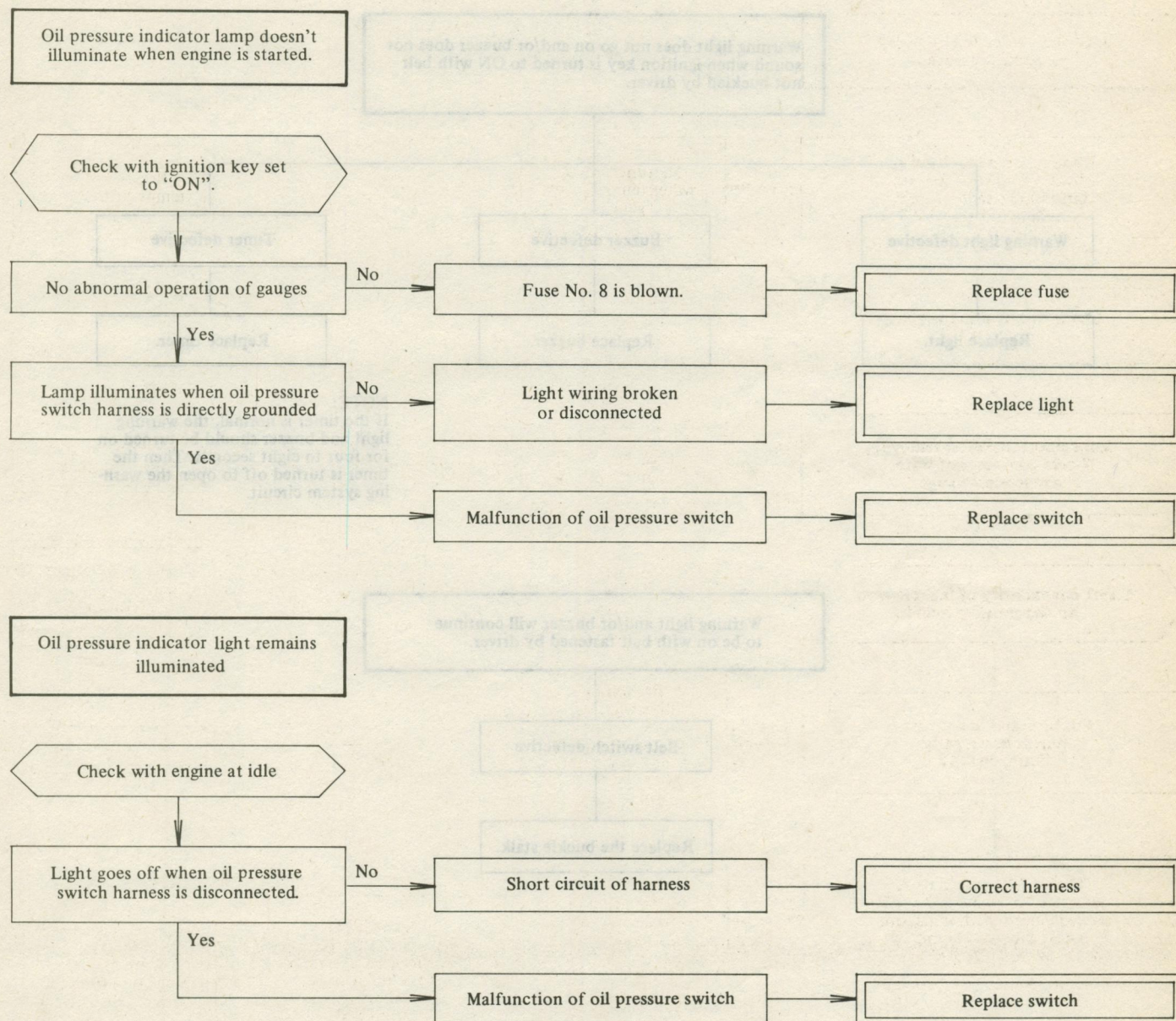


METERS AND GAUGES

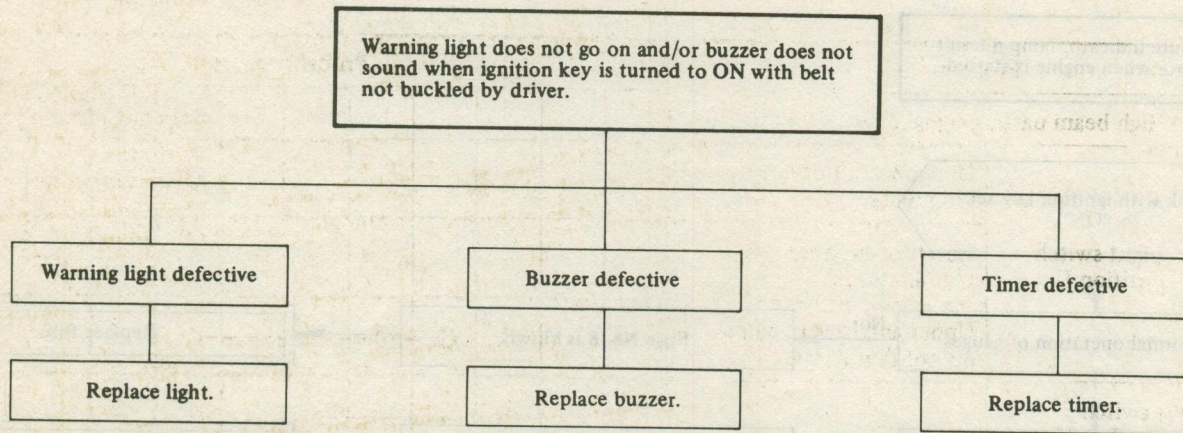




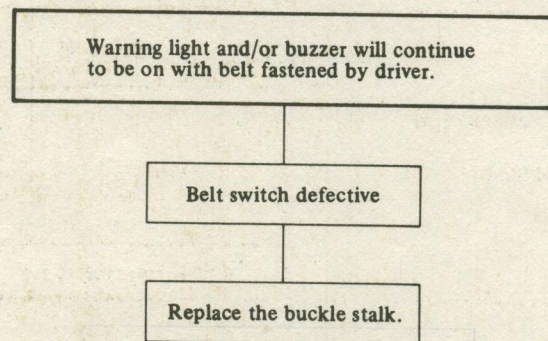




SEAT BELT SYSTEM



NOTE:
If the timer is normal, the warning light and buzzer should be turned on for four to eight seconds. Then the timer is turned off to open the warning system circuit.

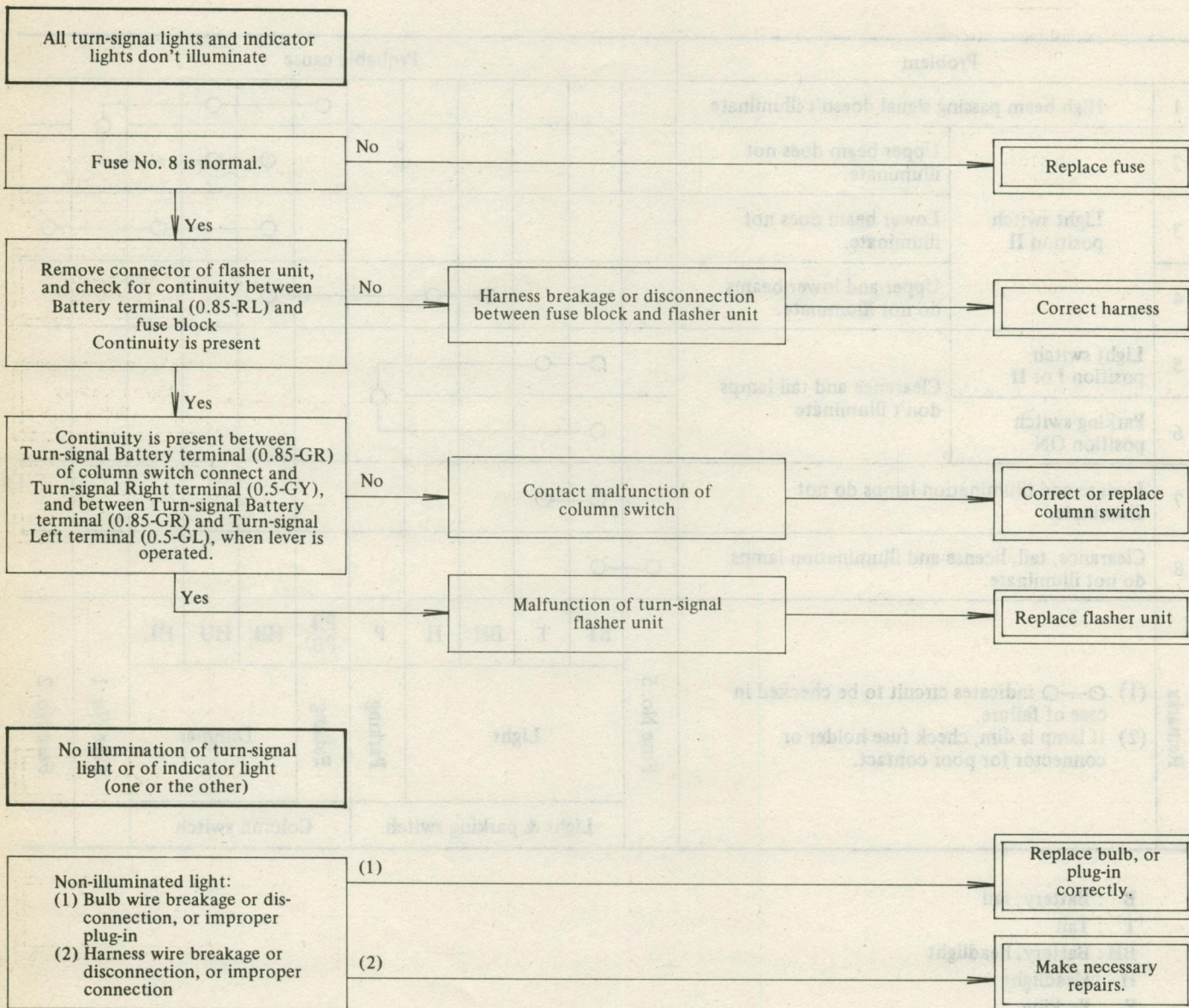


LIGHT SYSTEM

Problem			Probable cause																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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B : Battery, tail
 T : Tail
 BH : Battery, headlight
 H : Headlight
 P : Parking
 PB : Passing battery
 HB : Headlight battery
 HU : Headlight upper
 HL : Headlight lower

TURN-SIGNAL AND HAZARD WARNING LIGHTS



Irregular flashing of turn-signal light, or no flashing

Light bulb capacity is as specified.

No

Replace with standard bulb

Is battery terminal voltage 12V?

No

Incorrect battery voltage

Recharge or replace battery

Light grounding and bulb installation normal?

No

Make necessary repairs

Yes

Malfunction of turn signal flasher unit

Replace flasher unit

No hazard flasher light nor indicator lights

Fuse No. 7 is normal.

No

Replace fuse

Remove connector of hazard unit, and check for continuity between Battery terminal (0.85-GL) and fuse block.
Continuity is present

No

Harness breakage or disconnection between fuse block and hazard unit

Correct harness

Continuity is present between Hazard Battery terminal (0.85-G) of column switch connector and Turn-signal Right terminal (0.5-GY), and Hazard Battery terminal (0.85-G) and Turn-signal Left terminal (0.5-GL), when hazard switch is operated

No

Malfunction of contact point of hazard switch

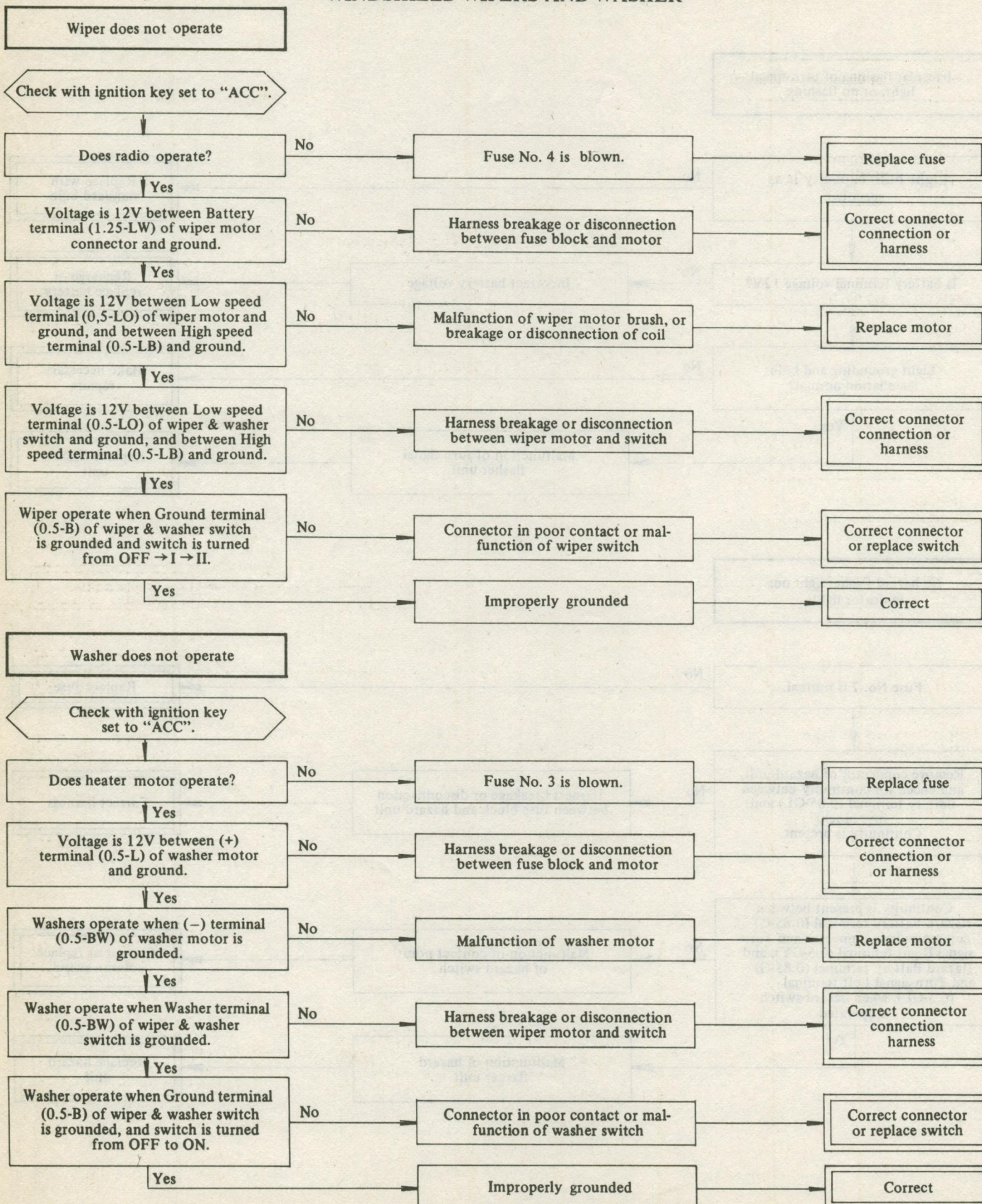
Correct or replace column switch

Yes

Malfunction of hazard flasher unit

Replace hazard unit

WINDSHIELD WIPERS AND WASHER



HORN

Horn sounds low or distorted, or chatters.

Check for loose horn mounting bolts and contact with other parts.

Start engine (to obtain normal battery voltage) and operate horn.

Low sound

Turn adjusting screw toward UP.

Chatters

Turn adjusting screw toward UP or DOWN.

Distorted sound

Turn adjusting screw toward DOWN.

Replace horn.

Horn does not sound.

Is No.3 fuse free from open circuit?

No

Fuse blown

Replace fuse.

Yes

Fuse holder in loose contact

Correct fuse holder.

Check voltage between horn terminal 0.85G wire and ground. Is 12V indicated?

No

Open circuit in harness between fuse block and horn

Correct harness.

Yes

Does horn sound with horn terminal GB wire grounded?

No

Horn defective

Replace horn.

Yes

Ground GB wire of column switch connector. Does horn sound?

No

Open circuit in harness between horn and column switch connector

Correct harness.

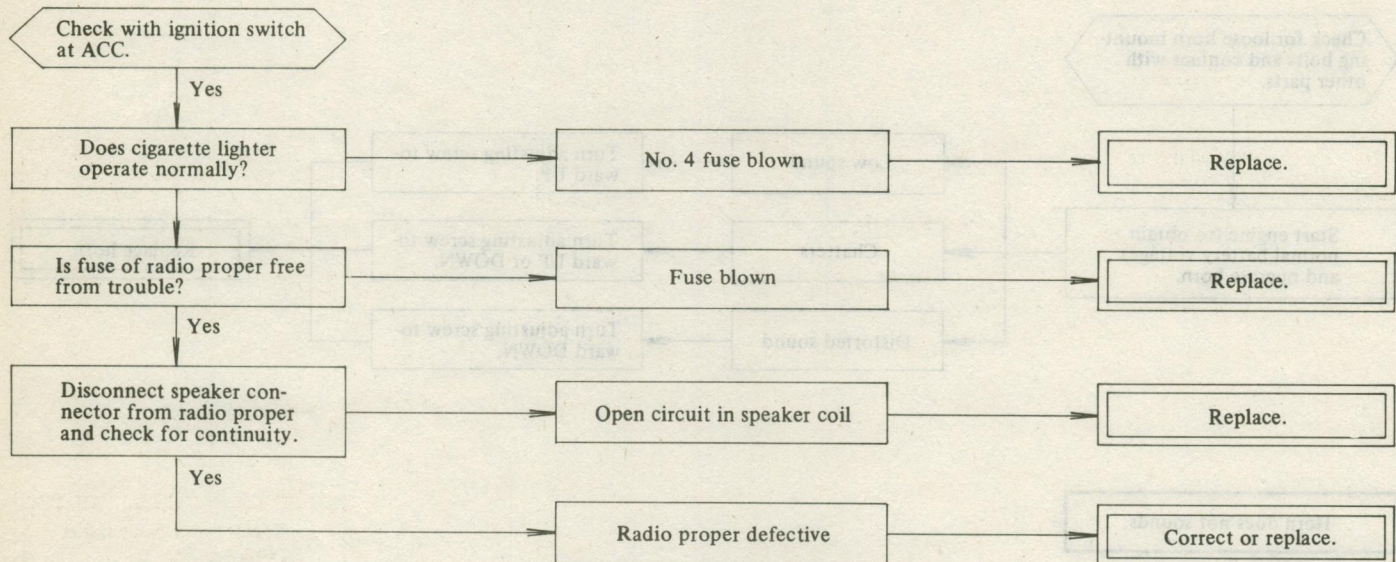
Yes

Horn switch defective or improperly grounded

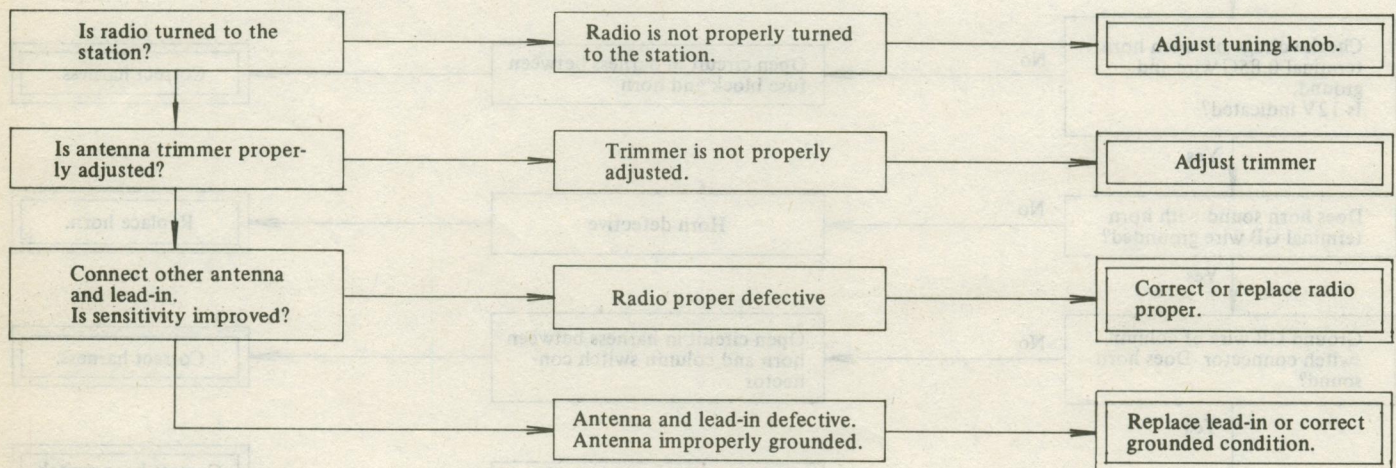
Correct horn switch or grounded condition.

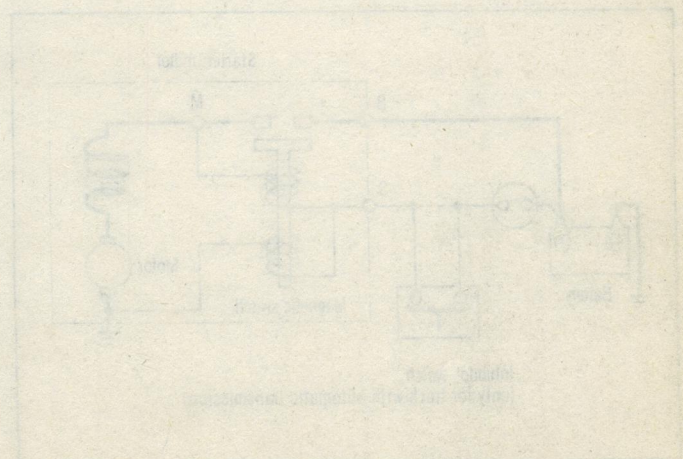
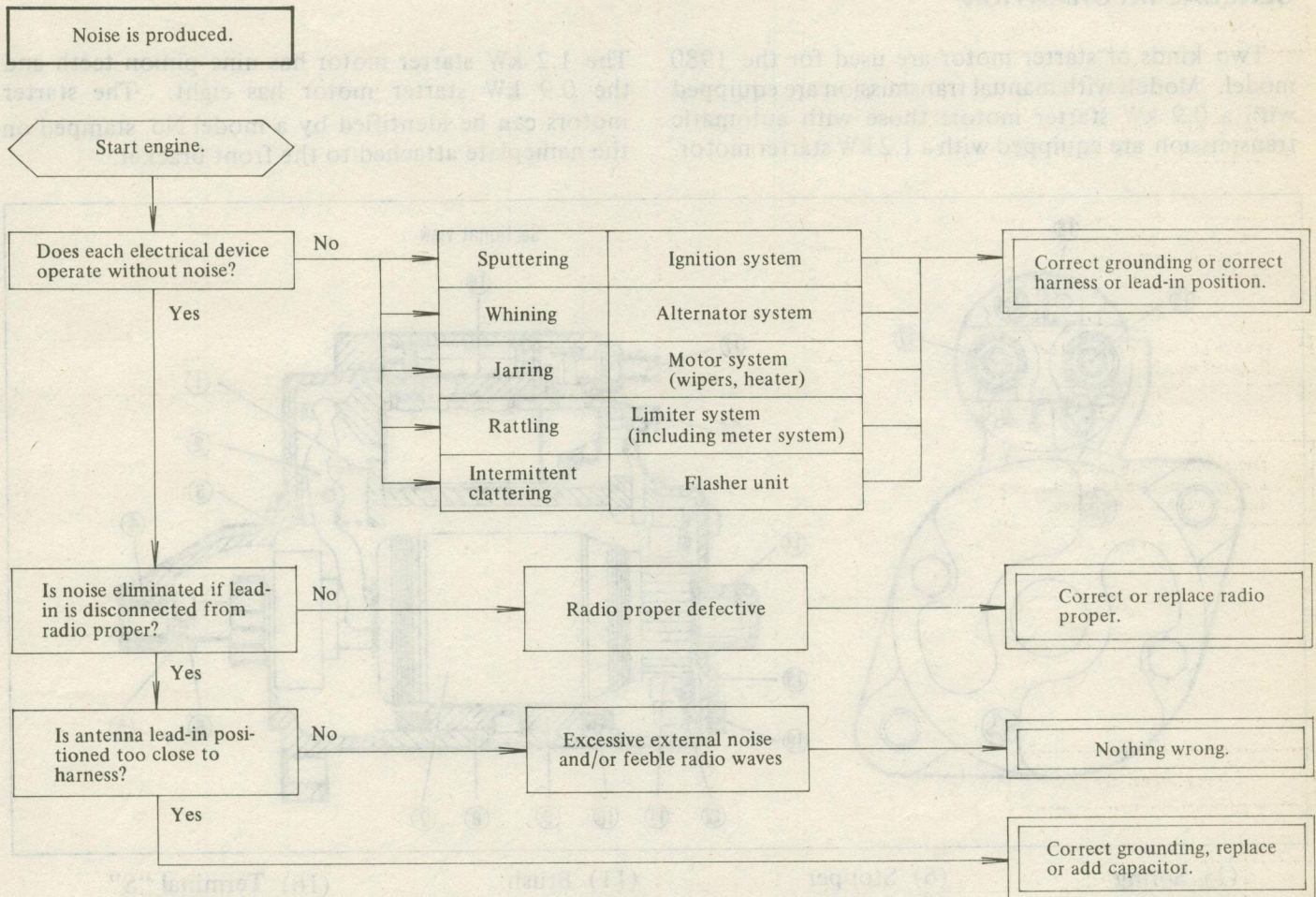
RADIO

No sound (noise) with switch at ON



Poor sensitivity



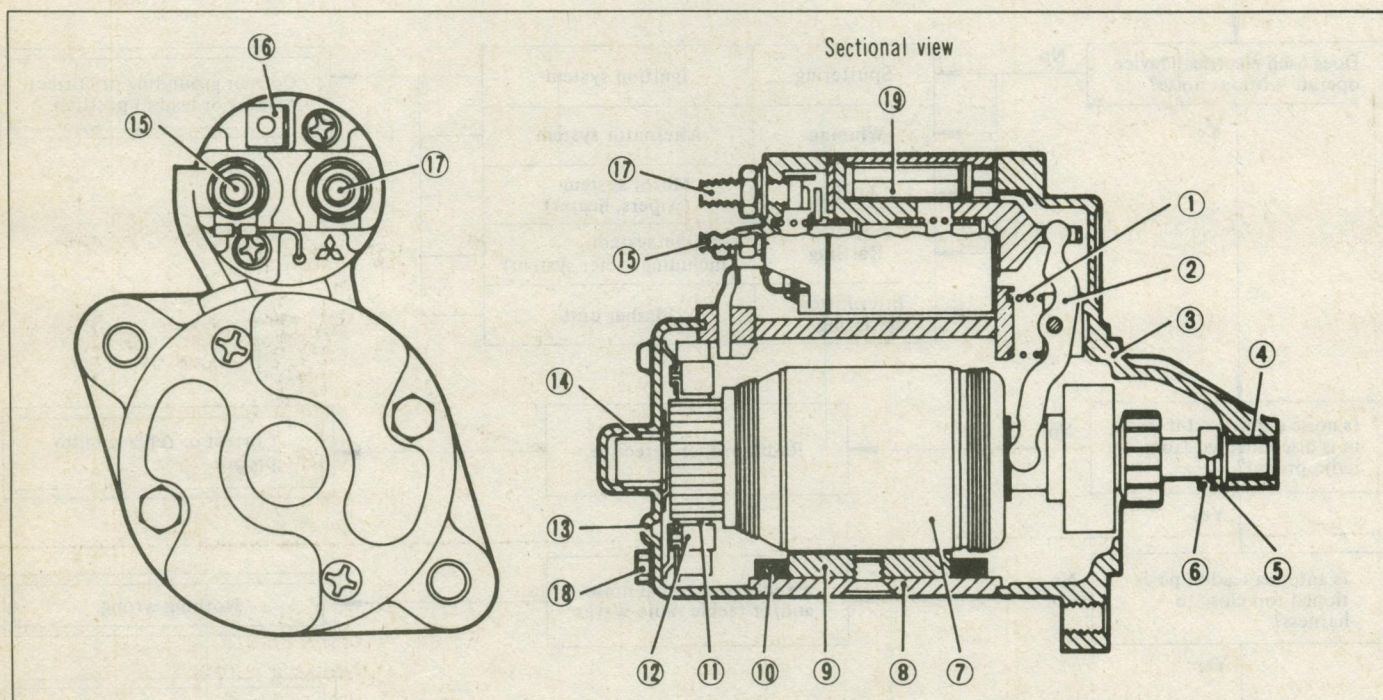


STARTER MOTOR -DIRECT DRIVE TYPE

GENERAL INFORMATION

Two kinds of starter motor are used for the 1980 model. Models with manual transmission are equipped with a 0.9 kW starter motor; those with automatic transmission are equipped with a 1.2 kW starter motor.

The 1.2 kW starter motor has nine pinion teeth and the 0.9 kW starter motor has eight. The starter motors can be identified by a model No. stamped on the nameplate attached to the front bracket.



- | | | | |
|-------------------|-----------------|-------------------|----------------------|
| (1) Spring | (6) Stopper | (11) Brush | (16) Terminal "S" |
| (2) Lever | (7) Armature | (12) Brush holder | (17) Terminal "B" |
| (3) Front bracket | (8) Yoke | (13) Rear bracket | (18) Through bolt |
| (4) Bearing | (9) Pole | (14) Bearing | (19) Magnetic switch |
| (5) Ring | (10) Field coil | (15) Terminal "M" | |

Fig. 1 Starter Motor (0.9 kW Model)

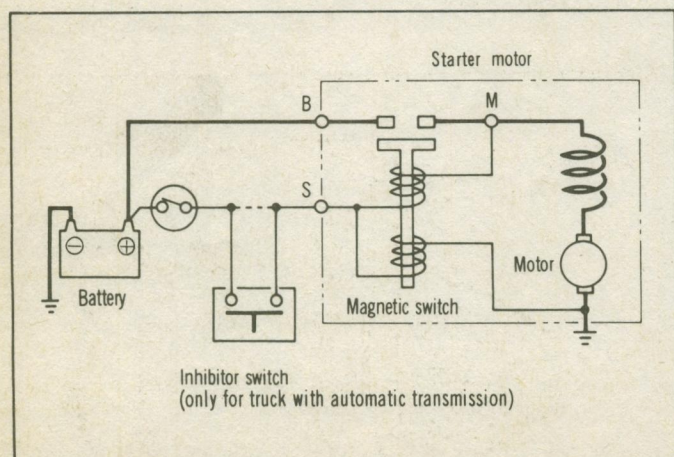
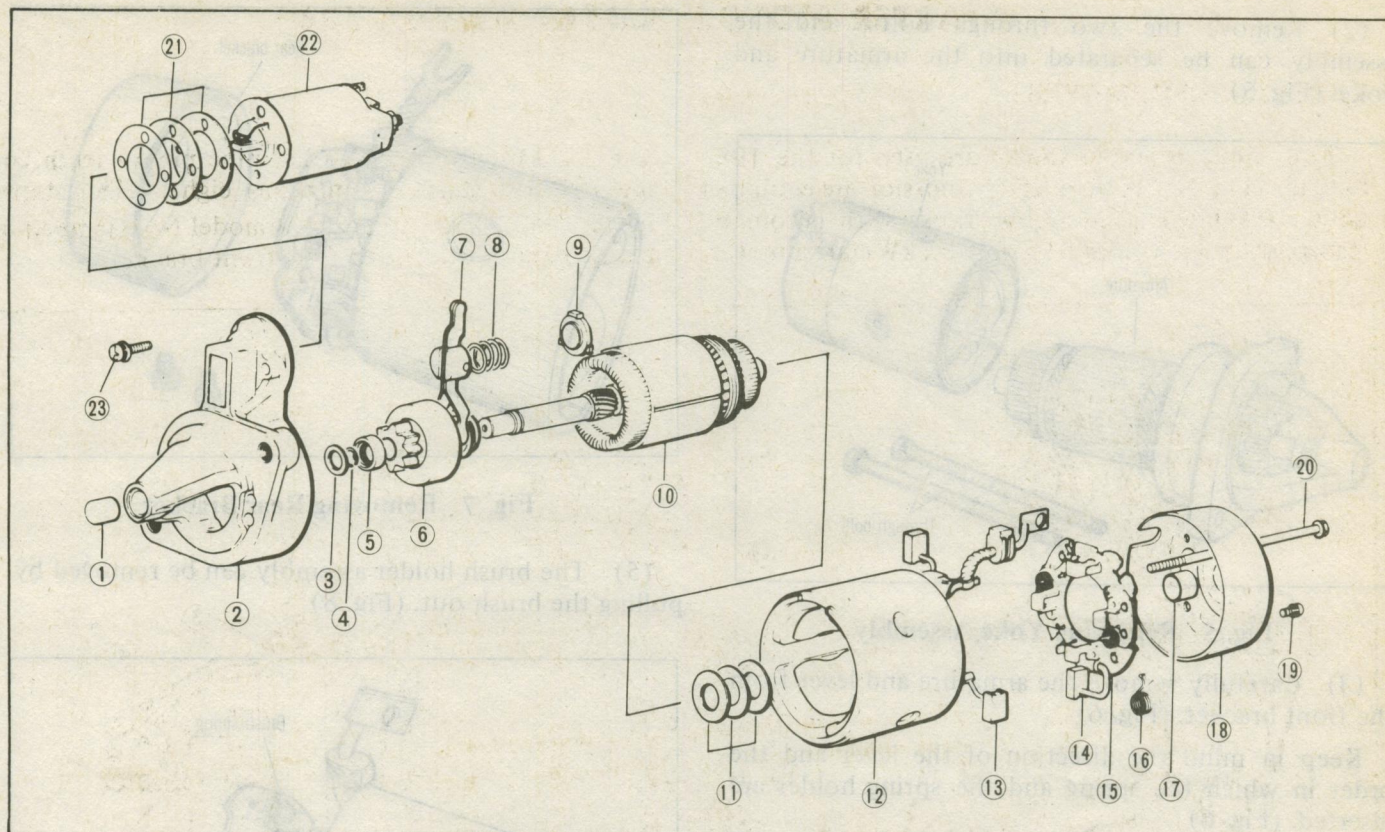


Fig. 2 Starter Motor Circuit

REMOVAL

To remove the starter motor:

- (1) Disconnect the battery ground cable.
- (2) Disconnect the starter motor wiring.
- (3) Loosen the two starter motor mounting bolts and remove the starter motor.



- | | | |
|------------------------|---------------------|----------------------|
| (1) Front bearing | (9) Spring retainer | (18) Rear bracket |
| (2) Front bracket | (10) Armature | (19) Brush holder |
| (3) Washer | (11) Washer set | tightening screw |
| (4) Snap ring | (12) Yoke | (20) Through bolt |
| (5) Stopper | (13) Brush | (21) Washer set |
| (6) Overrunning clutch | (14) Brush | (22) Magnetic switch |
| and pinion | (15) Brush holder | (23) Magnetic switch |
| (7) Lever | (16) Brush spring | tightening screw |
| (8) Lever spring | (17) Rear bearing | |

Fig. 3 Starter Motor (Exploded View)

DISASSEMBLY

(1) Remove the connector from the Terminal "M" and the two magnetic switch mounting screws. Now the magnetic switch can be removed. (Fig. 4)

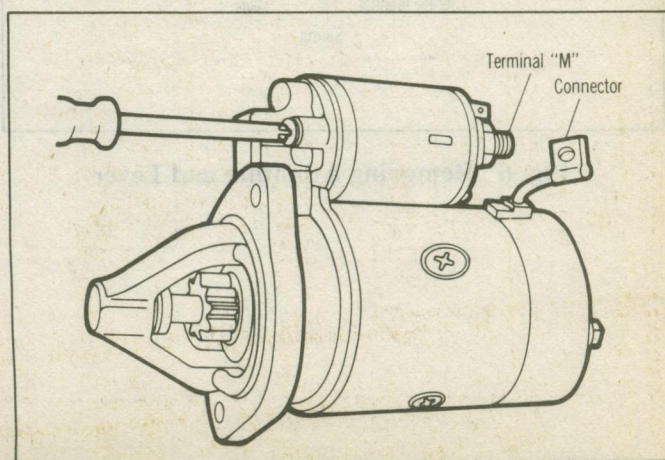


Fig. 4 Removing Magnetic Switch

(2) Remove the two through bolts, and the assembly can be separated into the armature and yoke. (Fig. 5)

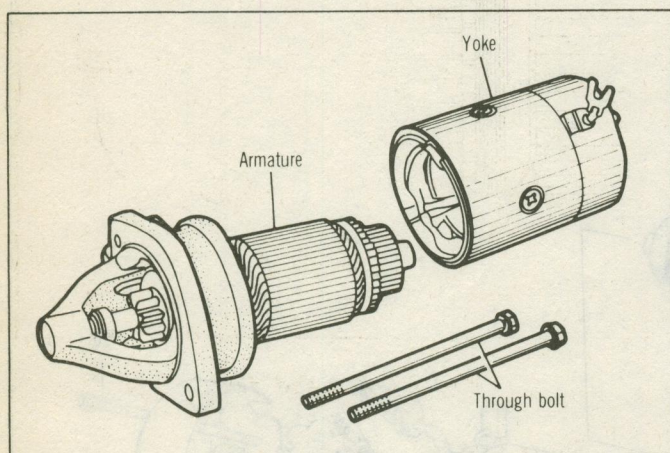


Fig. 5 Removing Yoke Assembly

(3) Carefully remove the armature and lever from the front bracket. (Fig. 6)

Keep in mind the direction of the lever and the order in which the spring and the spring holder are inserted. (Fig. 6)

(4) Loosen the two screws and remove the rear bracket. (Fig. 7)

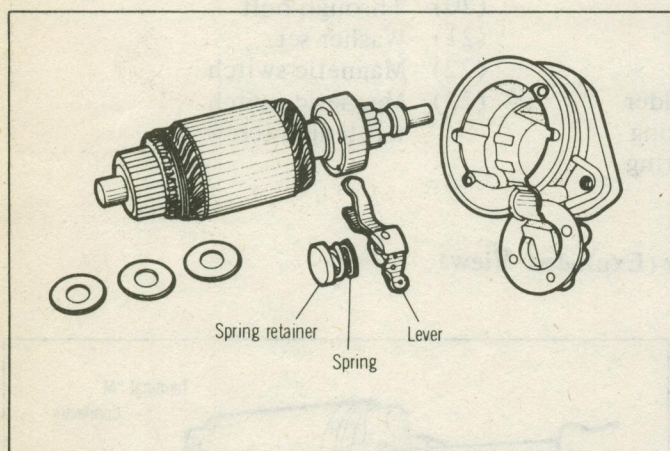


Fig. 6 Removing Armature and Lever

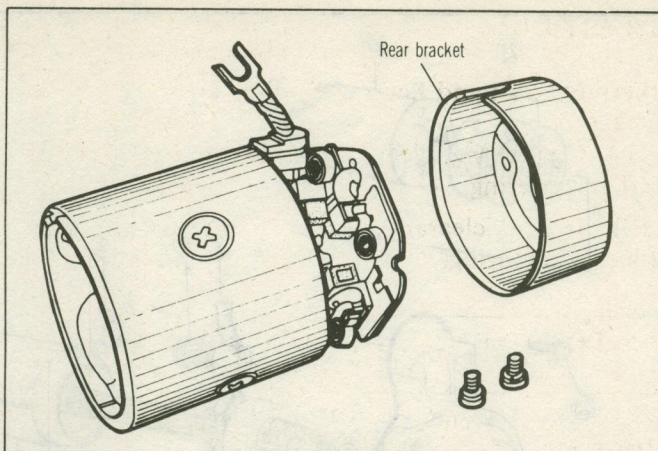


Fig. 7 Removing Rear Bracket

(5) The brush holder assembly can be removed by pulling the brush out. (Fig. 8)

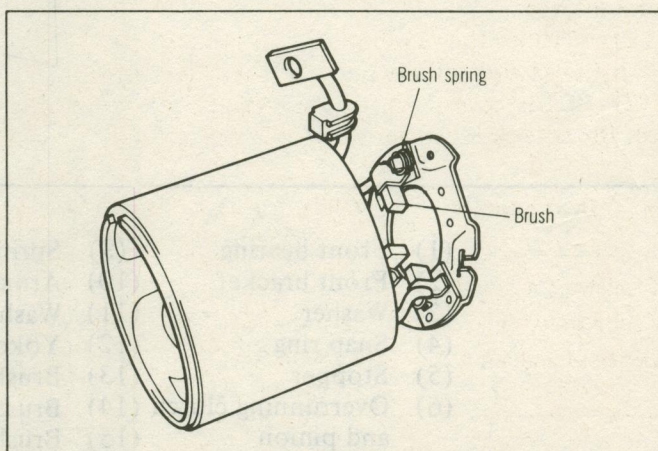


Fig. 8 Removing Brush Holder

(6) Push the stopper toward the pinion, remove the snap ring, and pull off the stopper and overrunning clutch from the armature shaft (Fig. 9)

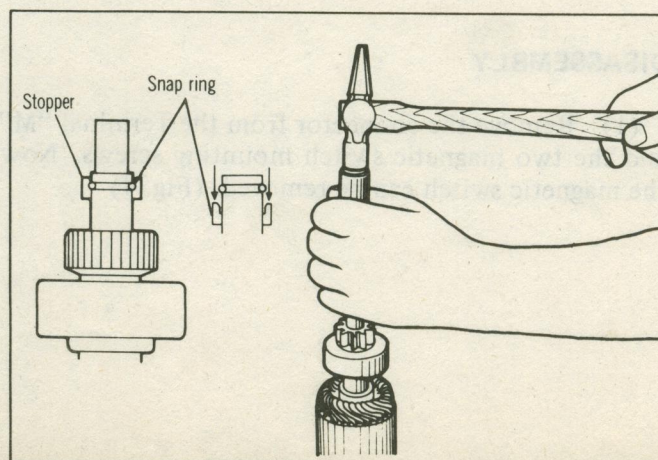


Fig. 9 Removing Overrunning Clutch

INSPECTION

Armature Shaft and Bearing

- (1) Check the clearance between the armature shaft and bearing.
- (2) If the clearance exceeds the service limit, replace the bearing.

Description		Standard value mm (in.)	Service limit mm (in.)
Clearance between armature shaft and bearing	Front	0.07 to 0.10 (.0028 to .0039)	0.2 (.008)
	Center	0.3 (.0118)	
	Rear	0.07 to 0.10 (.0028 to .0039)	0.2 (.008)

Commutator

- (1) Check the commutator outside periphery for dirtiness and seizure. Clean or grind as necessary.
- (2) If the commutator O.D. has decreased to less than the service limit, replace the armature.

Description	Standard value mm (in.)	Service limit mm (in.)
Commutator runout	0.01 (.004)	0.3 (.012)
Commutator O.D.	38.7 (1.5236)	37.7 (1.4842)
Depth of under cut.	0.4 to 0.6 (.016 to .024)	0.2 (.008)

Armature Coil

(1) Ground test

Using a circuit tester, check to ensure there is no continuity between the commutator and the armature coil core. If there is continuity, replace the armature assembly. (Fig. 10)

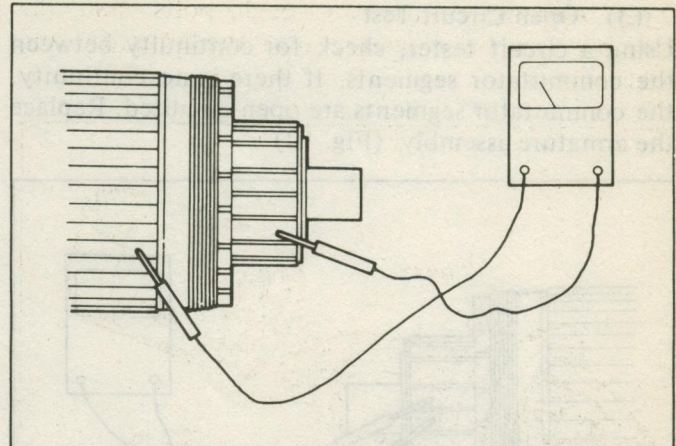


Fig. 10 Ground Test

(2) Short Test

Check the armature coil with a growler tester. Replace the coil if there are signs of a short. (Fig. 11)

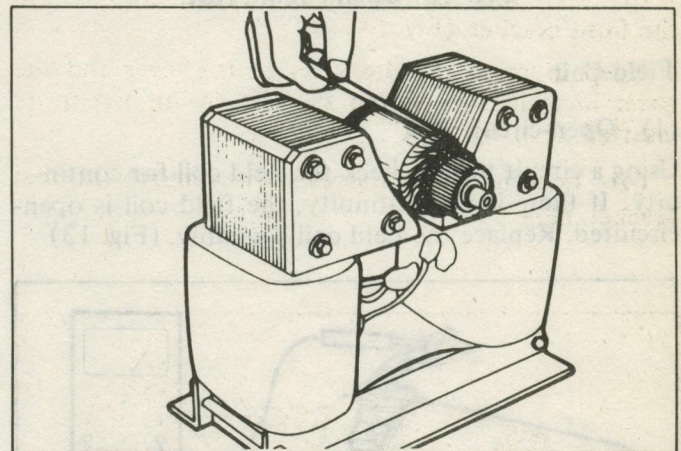


Fig. 11 Short Test

(3) Open Circuit Test

Using a circuit tester, check for continuity between the commutator segments. If there is no continuity, the commutator segments are open-circuited. Replace the armature assembly. (Fig. 12)

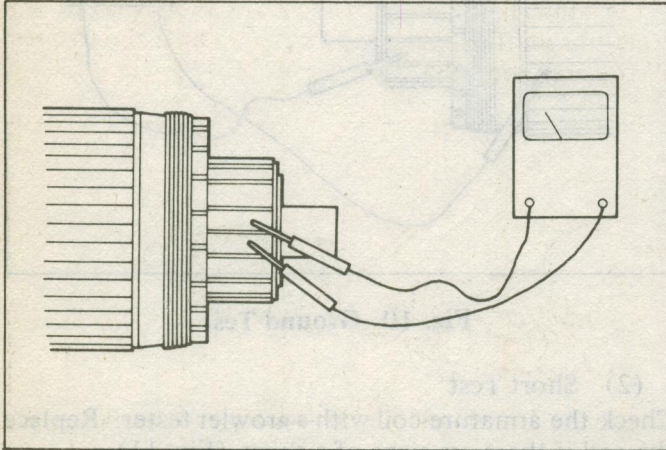


Fig. 12 Open-circuit Test

Field Coil

(1) Open-circuit Test

Using a circuit tester, check the field coil for continuity. If there is no continuity, the field coil is open-circuited. Replace the field coil assembly. (Fig. 13)

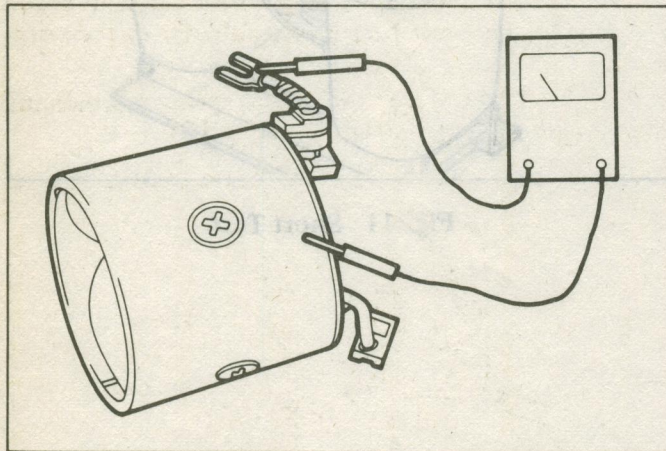


Fig. 13 Open-circuit Test

(2) Ground Test

With the field coil mounted to the yoke, check for continuity between the field coil and yoke, using a circuit tester. If there is continuity, replace the field coil. (Fig. 14)

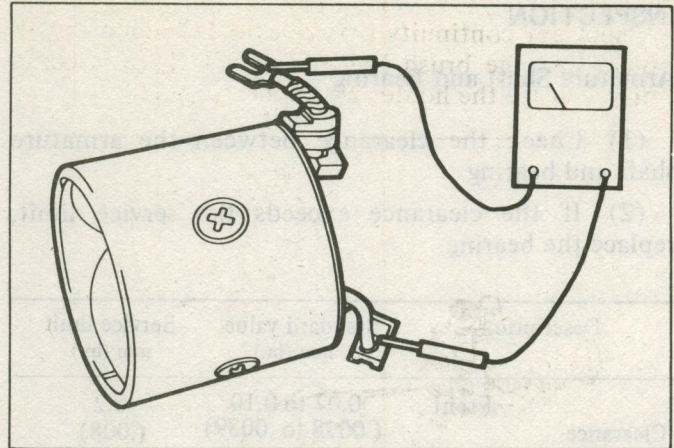


Fig. 14 Ground Test

Magnetic Switch

(1) Push the magnetic switch plunger in and release it. The plunger must return quickly to its original position.

(2) While pushing the plunger all the way in, check for continuity between the terminals (M) and (B). If there is no continuity, replace the magnetic switch.

Brushes

Measure the brush length. Replace if less than the service limit. (Fig. 15)

Description	Standard value mm (in.)	Service limit mm (in.)
Brush length	17 (.669)	11.5 (.453)

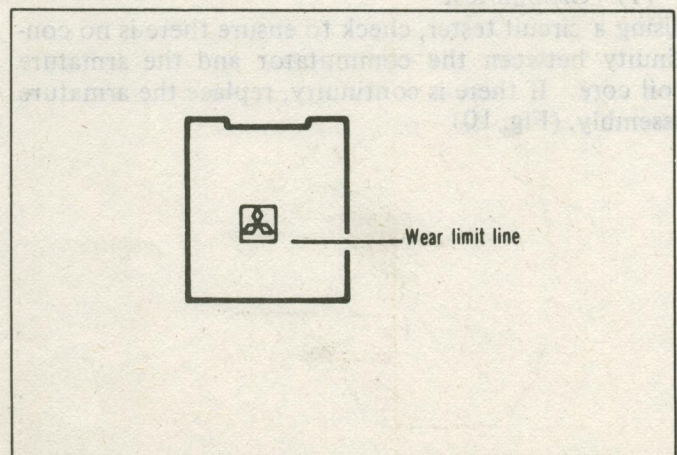


Fig. 15 Checking Brush

Brush Holder

Check for continuity between the (+) side of brush holder and the brush holder base. If there is continuity, replace the holder assembly. (Fig. 16)

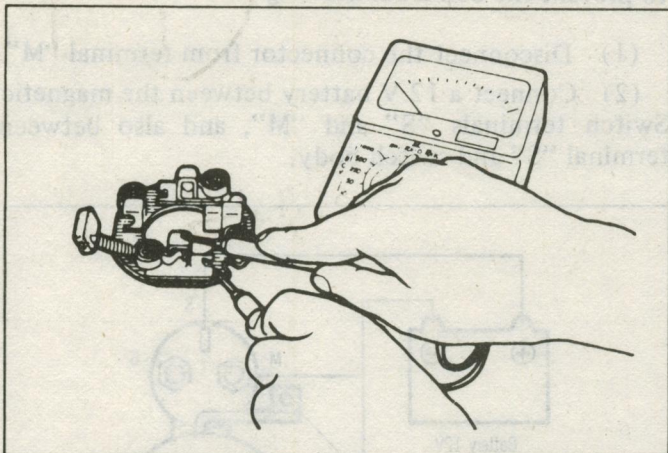


Fig. 16 Brush Holder Ground Test

Brush Spring

Measure the brush spring install load with a pull scale.

Description	Standard value	Service limit
Brush spring install load	13 to 17 N (2.9 to 3.7 lbs.)	7 N (1.5 lbs.)

Overrunning Clutch

(1) Inspect the pinion and spline teeth for wear or damage. Replace if damaged. If damaged, also inspect flywheel ring gear for wear or damage.

(2) Rotate pinion. It should turn free in clockwise direction and lock when turned counterclockwise. (Fig. 17)

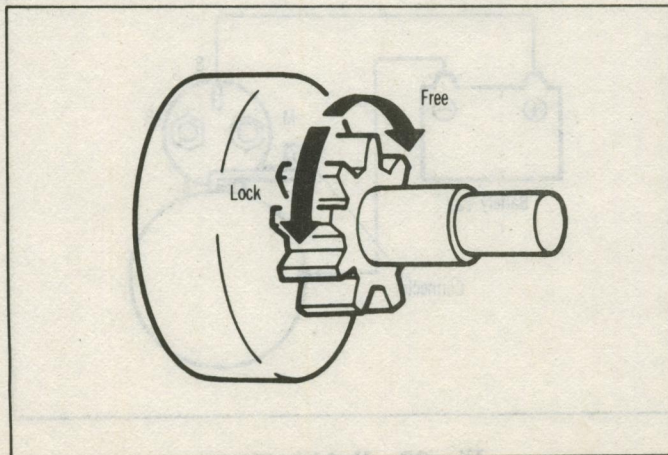


Fig. 17 Inspecting Overrunning Clutch

REASSEMBLY

(1) Install the spring retainer and spring to the armature shaft.

(2) Install the overrunning clutch onto the armature shaft.

(3) Install the stopper from the front end of the armature shaft, fit the snap ring, and push the stopper all the way over the snap ring. (Fig. 18)

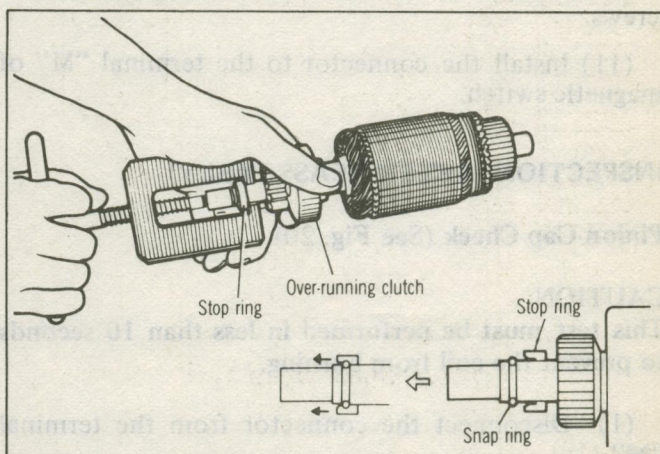


Fig. 18 Installing Stopper

(4) Install the small washer on the front end of the armature shaft.

(5) Fit the lever in the overrunning clutch and install into the front housing together with the armature.

(6) Install the lever spring and spring retainer and then install the yoke assembly. (Fig. 19)

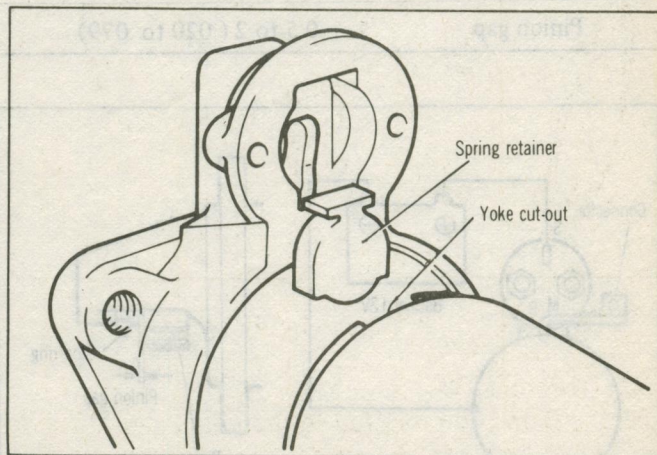


Fig. 19 Installing Yoke Assembly

(7) Install the brush holder. Fit the four brushes into brush holder, checking that the (+) lead wires are not grounded.

(8) Install the washer on the rear end of armature shaft.

(9) Install the rear bracket and tighten the two through bolts.

(10) Put the lever in the front end of magnetic switch plunger and tighten the two magnetic switch screws.

(11) Install the connector to the terminal "M" of magnetic switch.

INSPECTION (AFTER REASSEMBLY)

Pinion Gap Check (See Fig. 20)

CAUTION:

This test must be performed in less than 10 seconds to prevent the coil from burning.

(1) Disconnect the connector from the terminal "M".

(2) Connect a 12 V battery between the terminal "S" and the starter motor body. Connect the positive terminal of battery to the terminal "S". Connection of the battery will cause the pinion to move out.

(3) Check the pinion to stopper clearance (pinion gap). If the pinion gap is out of specification, adjust by adding or removing washers between the magnetic switch and the front bracket.

Description	Standard dimension	mm (in.)
Pinion gap	0.5 to 2	(.020 to .079)

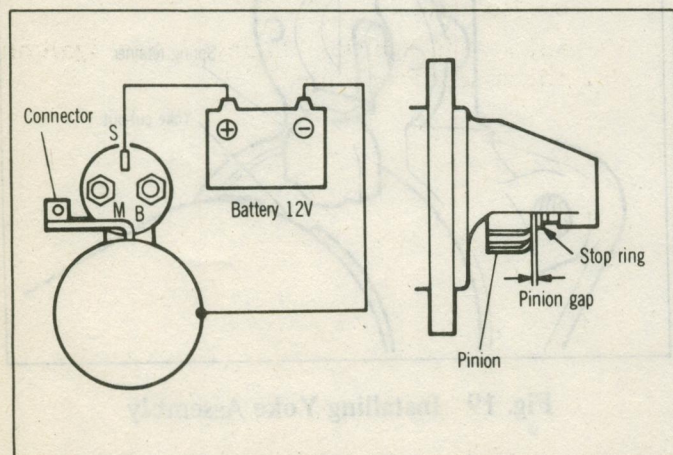


Fig. 20 Checking Pinion Gap

Pull-in Test of Magnetic Switch (See Fig. 21)

CAUTION:

This test must be performed in less than 10 seconds to prevent the coil from burning.

(1) Disconnect the connector from terminal "M".

(2) Connect a 12 V battery between the magnetic Switch terminals "S" and "M", and also between terminal "S" and switch body.

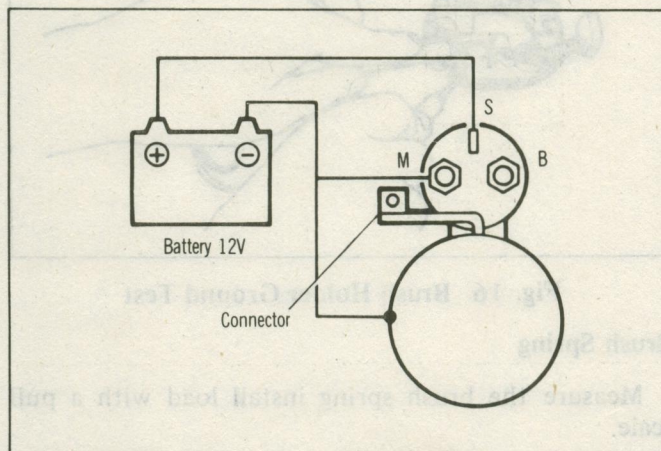


Fig. 21 Pull-in Test

(3) If the pinion moves out, the pull-in coil is good. If it doesn't, replace the magnetic switch.

Hold-in Test (See Fig. 22)

(1) Disconnect the cable from the terminal "M".

(2) If the pinion remains out, everything is in order. If the pinion moves in, the hold-in circuit is open-circuited. Replace the magnetic switch.

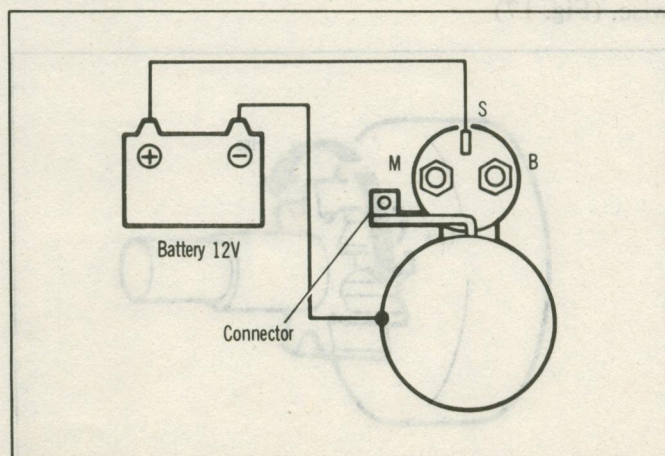
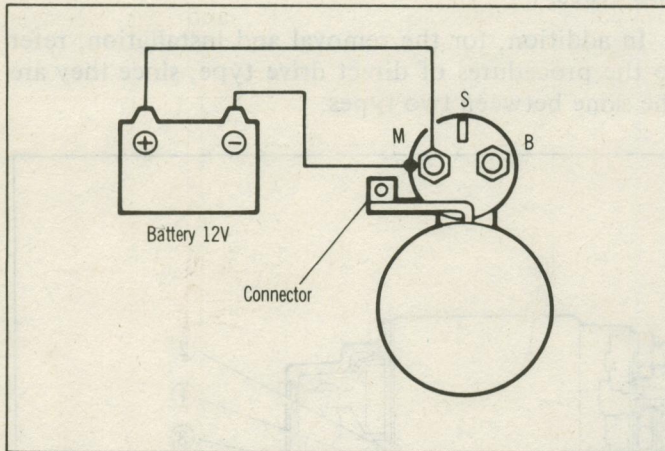


Fig. 22 Hold-in Test

Return Test (See Fig. 23)

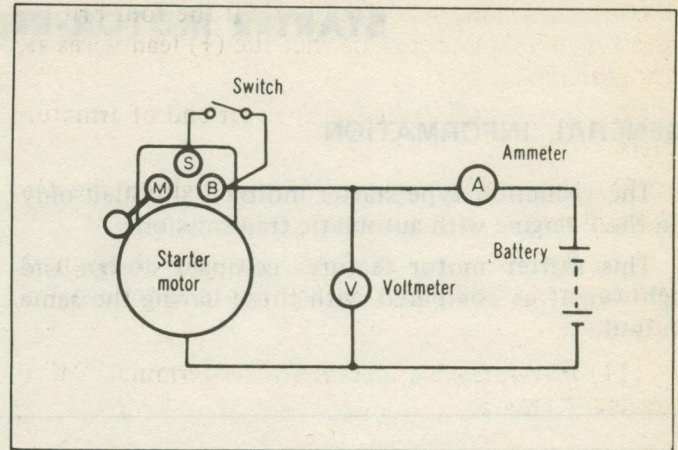
(1) Connect a 12V battery between the terminal "M" and the magnetic switch body.

(2) Pull the pinion out and release. If the pinion quickly returns to its original position, everything is in order. If it doesn't, replace the magnetic switch.

**Fig. 23 Return Test****Performance Test (No-load) (See Fig. 24)**

- (1) Connect starter motor to 12 V battery.
- (2) If the starter motor shows smooth and steady rotation with the pinion jumping out and draws less than specified current, it is satisfactory.

Description	Standard value	Remarks
Current at no load	Less than 60 A	0.9 kW motor
	Less than 62 A	1.2 kW motor

**Fig. 24 No-load Test Connection Diagram****INSTALLATION**

- (1) Clean the mounting surfaces on both the starter motor and the engine rear plate.
- (2) Install the starter motor and tighten the two mounting bolts to the specified torque.

Parts to be tightened	Torque Nm (ft.-lbs.)
Starter motor mounting bolts	22 to 31 (16 to 23)

- (3) Connect the wiring harness to the starter motor.
- (4) Connect the battery ground cable.
- (5) Install the distributor cap.
- (6) Connect the high tension cable and spark plug cables.
- (7) Connect the vacuum hoses. Make sure that the vacuum hoses are firmly fitted to the nipple of vacuum control unit.
- (8) Adjust the ignition timing. See Ignition Timing Adjustment Procedure.

STARTER MOTOR-REDUCTION DRIVE TYPE

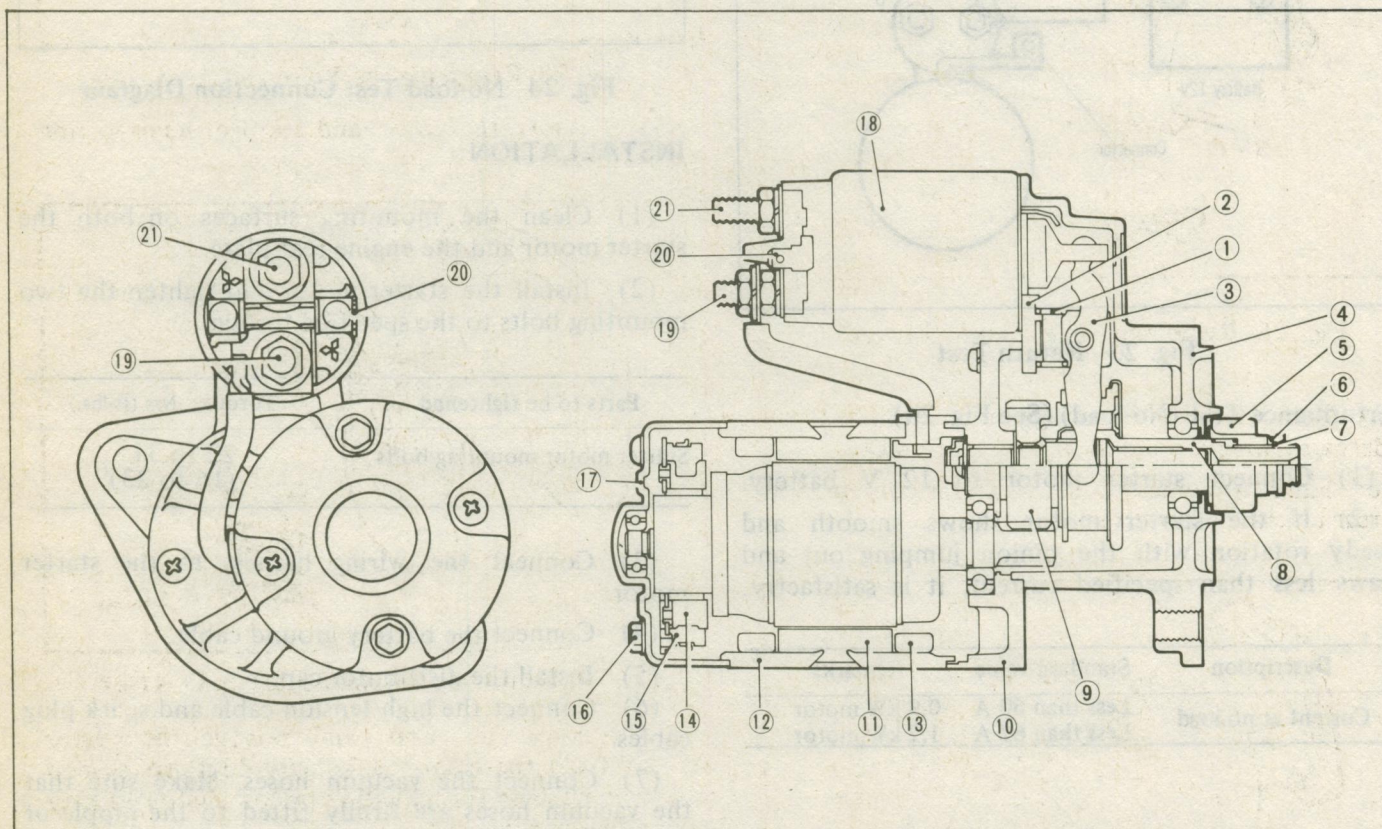
GENERAL INFORMATION

The reduction type starter motor is installed only on the F-engine with automatic transmission.

This starter motor features compact design and lightweight as compared with those having the same output.

The structure is different from that of direct drive type, but the electrical wiring is the same between two types.

In addition, for the removal and installation, refer to the procedures of direct drive type, since they are the same between two types.



- (1) Lever spring
- (2) Packing
- (3) Lever
- (4) Front bracket
- (5) Pinion
- (6) Stopper
- (7) Ring

- (8) Pinion shaft ass'y
- (9) Gear
- (10) Center bracket
- (11) Pole
- (12) Yoke
- (13) Field coil
- (14) Brush

- (15) Brush holder
- (16) Trough Bolt
- (17) Rear bracket
- (18) Magnetic switch
- (19) Terminal "M"
- (20) Terminal "S"
- (21) Terminal "B"

Fig. 25 Starter Motor-Reduction Drive Type

DISASSEMBLY

(1) Remove the "M" terminal nut of magnetic switch and remove the connector.

(2) Remove the two magnetic switch mounting screws and remove the magnetic switch.

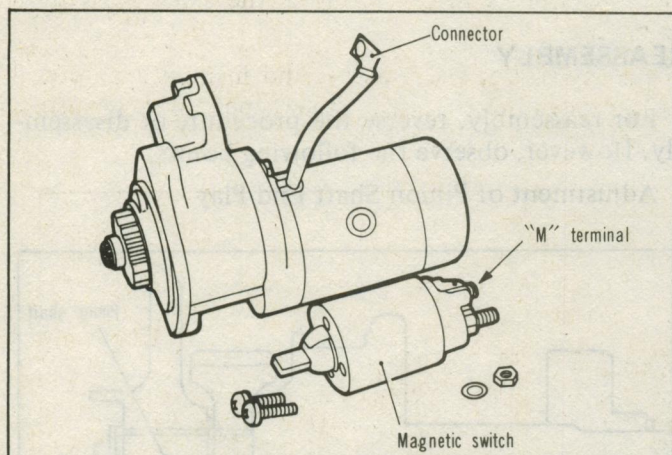


Fig. 26 Removing the Magnetic Switch

(3) Remove the two through bolts and two brush holder tightening screw and remove rear bracket.

Note: Since the conical spring washer is contained in the rear bracket, be sure to take it out.

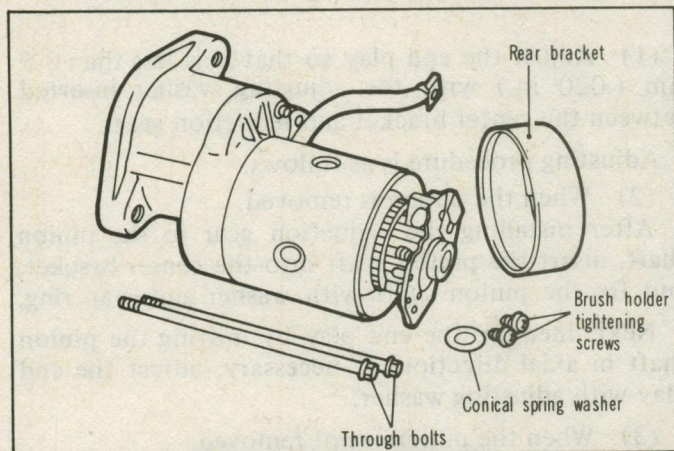


Fig. 27 Removing the Rear Bracket

(4) Remove the yoke and brush holder assembly while pulling the brush upward. Then remove the armature assembly.

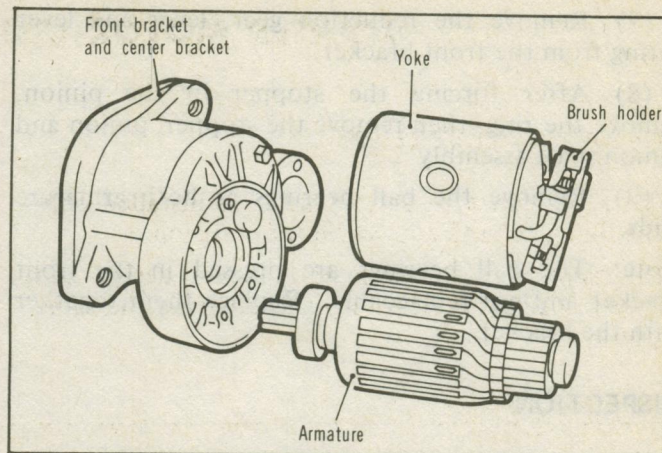


Fig. 28 Removing the Yoke and Armature

(5) Remove the cover, and remove the snap ring and washer.

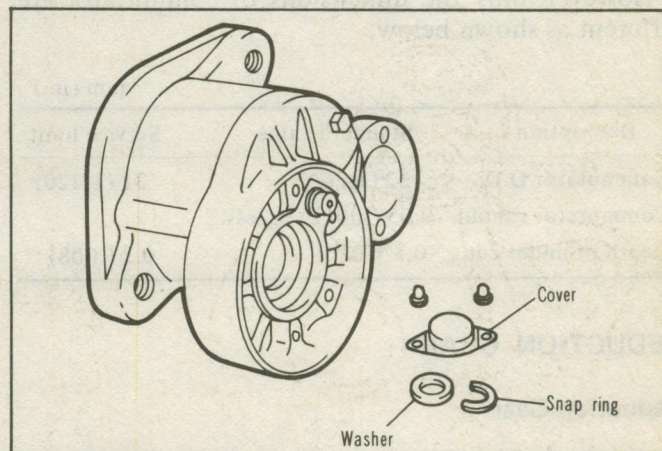


Fig. 29 Removing the Snap Ring and Washer

(6) Remove the bolt, and remove the center bracket from the front bracket. By doing so, several pieces of washers for adjusting pinion shaft end play can be free to remove.

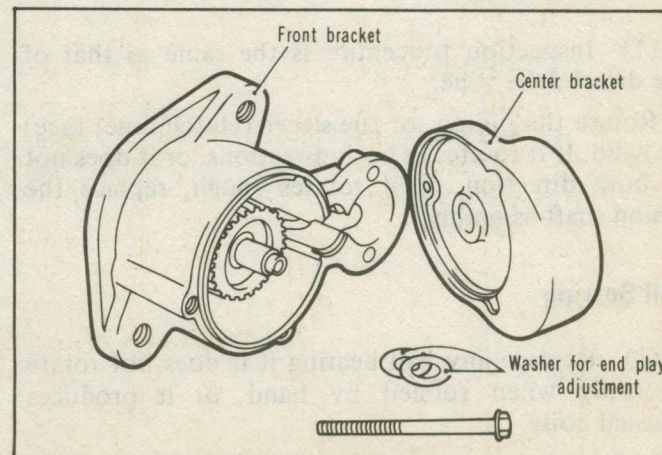


Fig. 30 Removing the Center Bracket

(7) Remove the reduction gear, lever and lever spring from the front bracket.

(8) After forcing the stopper in the pinion, remove the ring, then remove the stopper, pinion and pinion shaft assembly.

(9) Remove the ball bearings at both armature ends.

Note: The ball bearings are pressed in the front bracket and not replaceable. Replace them together with the bracket.

INSPECTION

For inspection procedure of the armature, yoke assembly (incl. field coil), magnetic switch and brush, refer to the section of "Direct Drive Type Starter Motor", since it is the same between two types.

However, only the dimensions of commutator are different as shown below.

Description	Standard value	mm (in.)
		Service limit
Commutator O.D.	32 (1.260)	31 (1.220)
Commutator runout	0.03 (.0012) or less	
Depth of under cut	0.5 (.020)	0.2 (.008)

REDUCTION GEAR

Reduction Gear

(1) Visually inspect the armature shaft gear, reduction gear and pinion shaft gear for any apparent wear and damage. Replace any part if worn or damaged remarkably.

Over Running Clutch

(1) Inspection procedure is the same as that of the direct drive type.

Rotate the pinion, or the sleeve (clutch inner race) by hand. If it rotates in both directions, or it does not in both direction, or it rotates rough, replace the pinion shaft assembly.

Ball Bearing

(1) Replace any ball bearing if it does not rotate smoothly when rotated by hand, or it produces unusual noise.

(2) The sleeve bearing is pressed in the ball bearing inner race of the front bracket. Anytime this sleeve bearing is worn or an abnormality is apparent in the ball bearing replace it together with front bracket. The ball bearing or the sleeve bearing alone can not be replaced.

REASSEMBLY

For reassembly, reverse the procedure of disassembly. However, observe the following points.

Adjustment of Pinion Shaft End Play

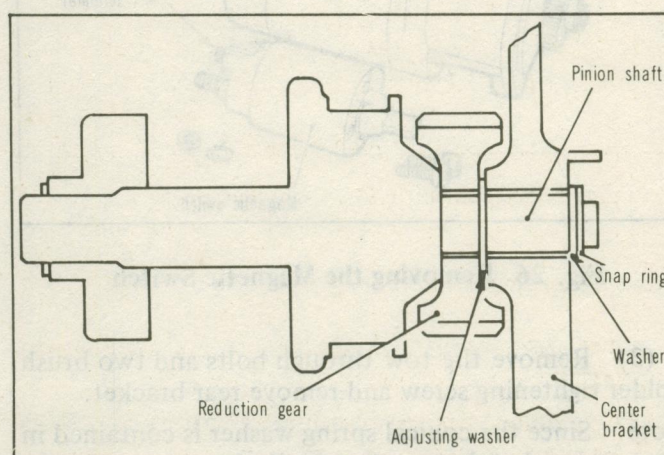


Fig. 31 Adjusting the Pinion Shaft End Play

(1) Adjust the end play so that it is less than 0.5 mm (.020 in.) with the adjusting washer inserted between the center bracket and reduction gear.

Adjusting procedure is as follows.

(2) When the pinion is removed.

After installing the reduction gear to the pinion shaft, insert the pinion shaft into the center bracket, and fix the pinion shaft with washer and snap ring.

Next, measure the end play by moving the pinion shaft in axial direction. If necessary, adjust the end play with adjusting washer.

(3) When the pinion is not removed.

Insert the pinion shaft and reduction gear between the front bracket and the center bracket. With the bolt tightened, move the pinion shaft in the axial direction, measure the end play, and adjust it.

Note: The lever spring should be removed. Installing the lever spring can cause the center bracket to lift, resulting in an inaccurate end play measurement.

(4) Installing direction of the conical spring washer

Insert the conical spring washer in the direction shown in the figure.

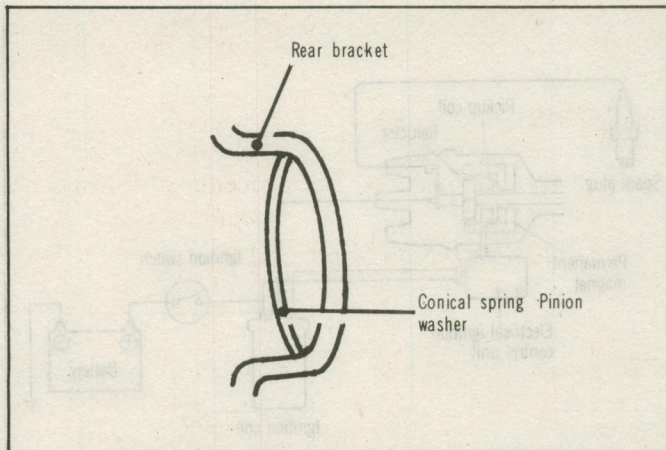


Fig. 32 Assembling the Conical Spring Washer

Pinion Gap Adjustment

After assembling the starter motor, adjust the pinion gap by the following procedure.

(1) Connect the (+) terminal of battery (12 V) to "S" terminal of starter motor, and the (-) terminal to the body of starter terminal. The pinion jumps out and stands stationary.

(2) Lightly push back the pinion jumped by finger, and measure the amount of travel, which represents the pinion gap. Adjust the thickness (number) of packing at switch area so that the gap becomes 0.5 to 2.0 mm (.020 to .079 in.). Increasing the thickness reduces the pinion gap.

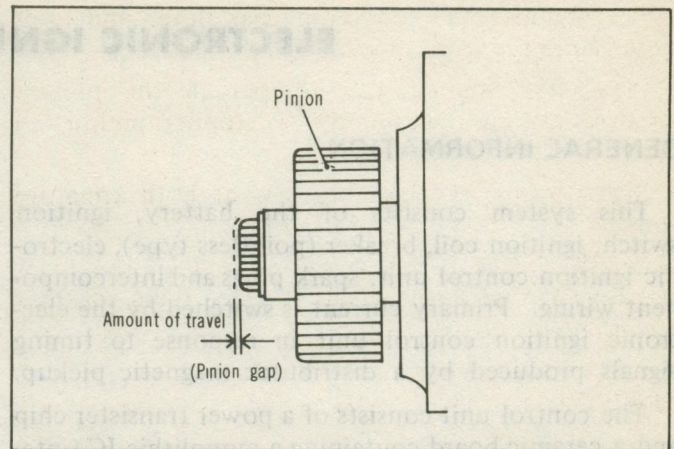


Fig. 33 Pinion Gap Adjustment

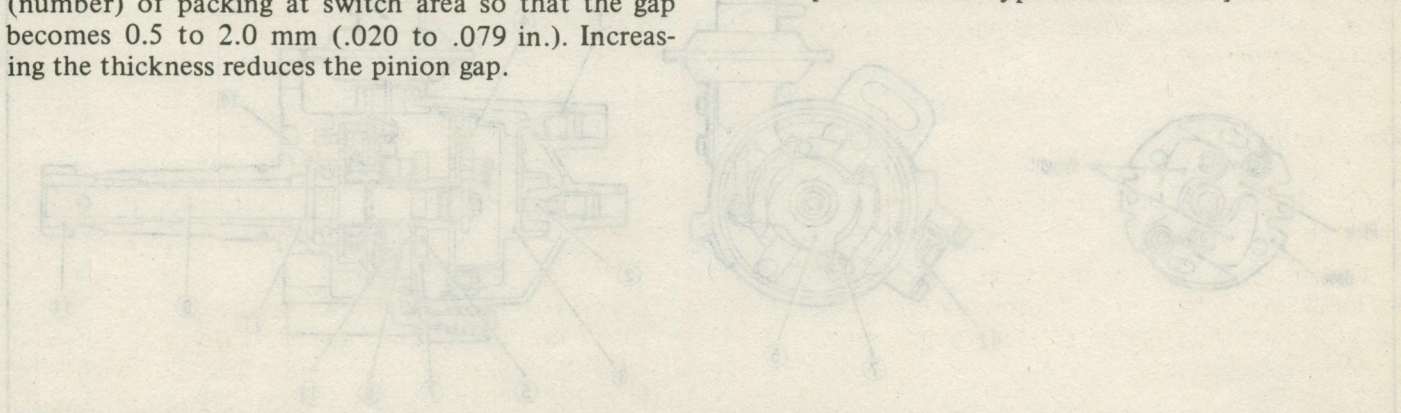
Lubrication

Anytime the starter motor is overhauled, apply grease to each sliding portion, gear, and bearing.

- Armature shaft gear
- Reduction gear
- Ball bearing (Both end of armature)
- Conical spring washer
- Stopper of pinion shaft
- Sleeve bearing
- Pinion
- Sliding portion of lever

Performance Test (No-load)

See [Direct Drive Type Starter Motor].



ELECTRONIC IGNITION SYSTEM (EIS)

GENERAL INFORMATION

This system consists of the battery, ignition switch, ignition coil, breaker (pointless type), electronic ignition control unit, spark plugs and intercomponent wiring. Primary current is switched by the electronic ignition control unit in response to timing signals produced by a distributor magnetic pickup.

The control unit consists of a power transistor chip and a ceramic board containing a monolithic IC (integrated circuit), several passive components and a thick film circuit. (See Fig. 34)

DISTRIBUTOR — Contact pointless type with electronic ignition control unit

The distributor is equipped with both centrifugal and vacuum advance mechanisms.

A centrifugal advance mechanism located below the rotor assembly, has governor weights that move inward or outward with changes in engine speed. As engine speed increases, the weights move outward and cause the reluctor to rotate ahead of the distributor shaft, thus advancing the ignition timing.

The vacuum advance has a spring-loaded diaphragm connected to the breaker assembly. The diaphragm is

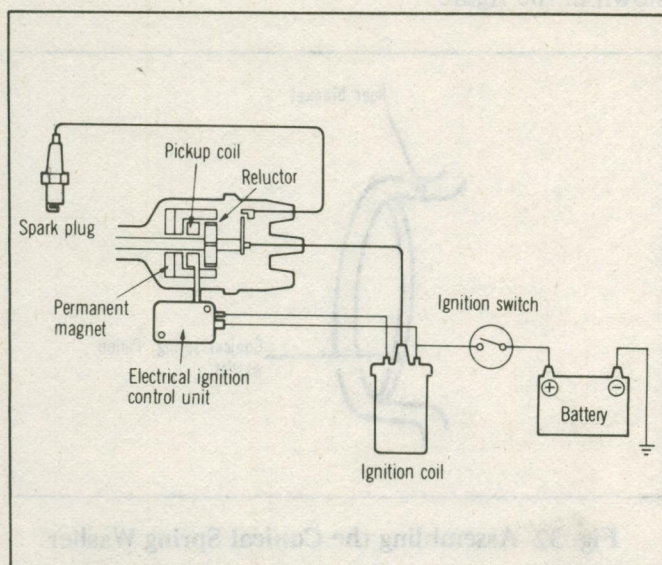
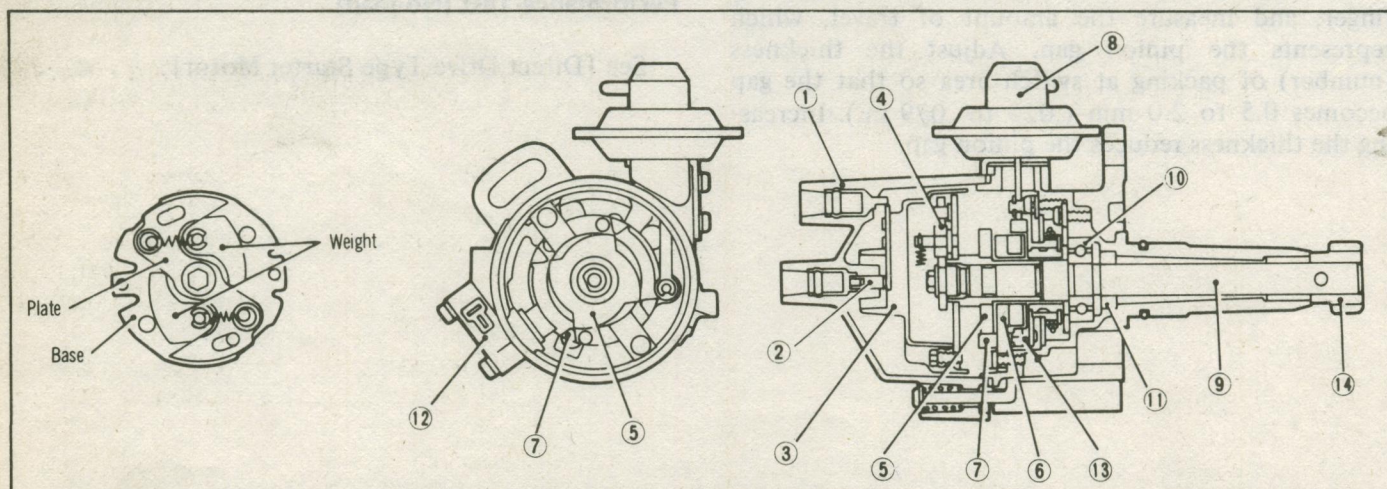


Fig. 34 Electronic Ignition System Circuit

actuated against the spring pressure by carburetor vacuum pressure. When the vacuum increases, the diaphragm causes the movable breaker assembly to pivot in a direction opposite to distributor rotation, advancing the ignition timing.



- | | | |
|-----------------------|-----------------------|-------------------|
| (1) Cap assembly | (6) Pickup coil | (11) Oil seal |
| (2) Contact carbon | (7) Breaker assembly | (12) Control unit |
| (3) Rotor assembly | (8) Vacuum controller | (13) Housing |
| (4) Governor assembly | (9) Shaft | (14) Drive gear |
| (5) Reluctor | (10) Ball bearing | |

Fig. 35 Distributor (Sectional View)

Ignition Timing Adjustment Procedure

NOTE: Place transmission in neutral and set parking brake. Turn the air conditioning compressor and lights off.

- (1) Set the tachometer and the timing light.
- (2) Start the engine and run at curb idle speed.

Engine	Trans. *	Curb idle speed	Ignition timing
Trucks for U.S.A.			
U-engine	M/T	650 ± 50 rpm	5° BTDC ± 1°
	A/T	700 ± 50 rpm	5° BTDC ± 1°
W-engine	M/T & A/T	750 ± 50 rpm	7° BTDC ± 1°

*M/T : Manual Transmission
A/T : Automatic Transmission

(3) Check the basic ignition timing and adjust if necessary. To adjust the ignition timing, loosen the distributor mounting nut and turn the distributor housing. (Fig. 36)

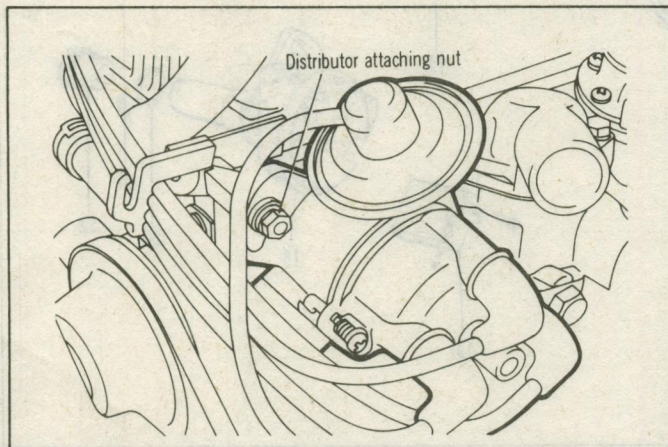


Fig. 36 Adjusting Ignition Timing

Secondary Ignition Test (See Fig. 37)

When normal ignition does not take place, perform the following test to determine whether the pickup coil and electronic ignition control unit are operating properly.

- (1) Check the ignition switch, wiring harness, spark plug cables and connector. Correct or replace as necessary.

(2) Remove the distributor cap and lift out the rotor assembly.

(3) Set the ignition switch to ON.

(4) Disconnect the high tension cable from the center terminal of the distributor cap and hold its end 5 or 6 mm (.2 to .24 in.) away from the ground surface (cylinder block, etc.). Insert a flatblade screwdriver between the reluctor and stator of the distributor to see if spark is produced. If a spark is not produced, a defective control unit, pickup coil, ignition coil or secondary cable is suspected. Check all these parts.

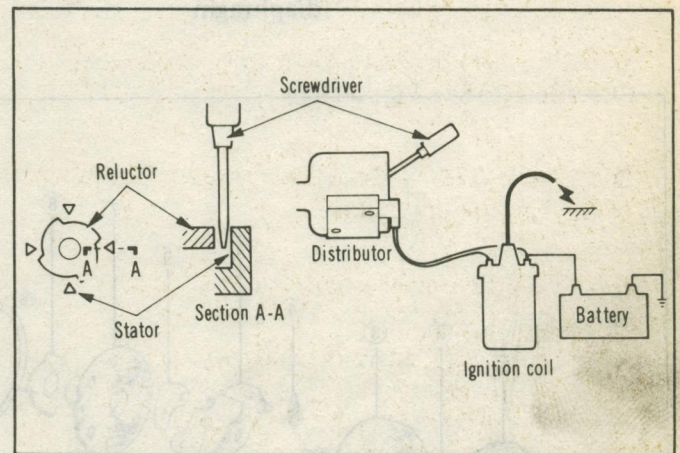


Fig. 37 Secondary Ignition Test

Check Operation of Advance Mechanism

Centrifugal Advance

(1) Run the engine at idle and remove the vacuum hose (non-striped hose) from the vacuum controller.

(2) Slowly accelerate the engine to check for advance.

Excessive advance Deteriorated governor spring (A broken governor spring will cause abrupt advance.)

Insufficient advance . . . Governor weight or cam operation faulty.

Vacuum advance

(1) Set engine speed at 2,500 rpm. Check for advance by disconnecting and then reconnecting the vacuum hose at the distributor.

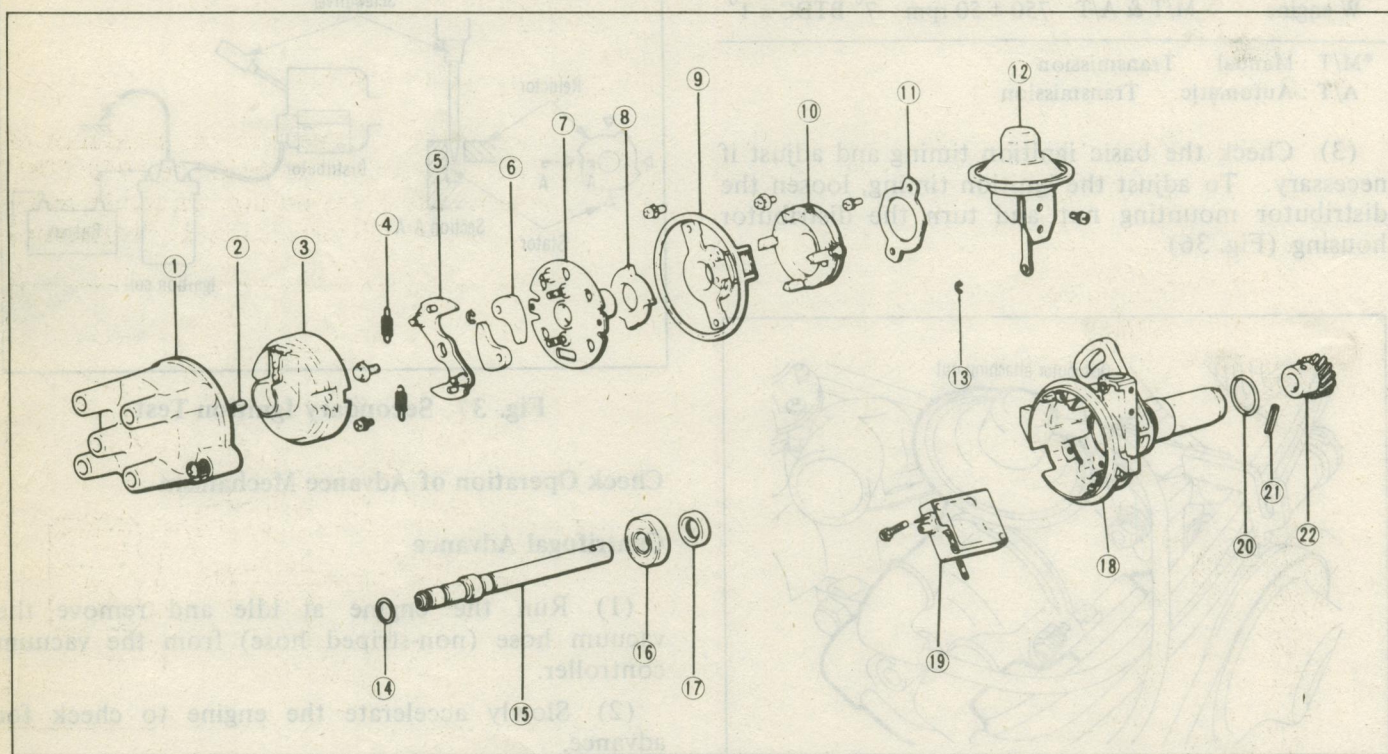
(2) For a more precise determination of whether the vacuum advance mechanism is operating properly, remove the vacuum hose from the distributor and connect a vacuum pump (tool No. C-4207, or equivalent.) Run the engine at idle and slowly apply vacuum pressure to check for advance.

Excessive advance Deteriorated (or sagging) vacuum controller spring (A broken spring will cause abrupt advance.)

Insufficient advance
or no advance Breaker plate in faulty operation or broken diaphragm

REMOVAL

- (1) Disconnect the battery ground cable.
- (2) Disconnect the wiring harness from the distributor control unit and the high tension cables from the distributor cap. Pull at the cable caps to remove the high tension cables.
- (3) Disconnect the vacuum hose from the vacuum control unit.
- (4) Remove the distributor mounting nut and lift off the distributor assembly.



- | | | |
|---------------------|--------------------------|-------------------|
| (1) Cap | (9) Pickup coil | (17) Oil seal |
| (2) Contact carbon | (10) Breaker | (18) Housing |
| (3) Rotor assembly | (11) Plate | (19) Control unit |
| (4) Governor spring | (12) Vacuum control unit | (20) O ring |
| (5) Governor plate | (13) E ring | (21) Spring pin |
| (6) Governor weight | (14) Washer | (22) Driven gear |
| (7) Governor base | (15) Shaft | |
| (8) Reluctor | (16) Ball bearing | |

Fig. 38 Distributor (Exploded View)

DISASSEMBLY

(1) To remove the control unit, remove the two screws, hold the control unit as shown (Fig. 39), and pull it out. The mating surfaces of the control unit and distributor are coated with silicone grease. Do not wipe it away.

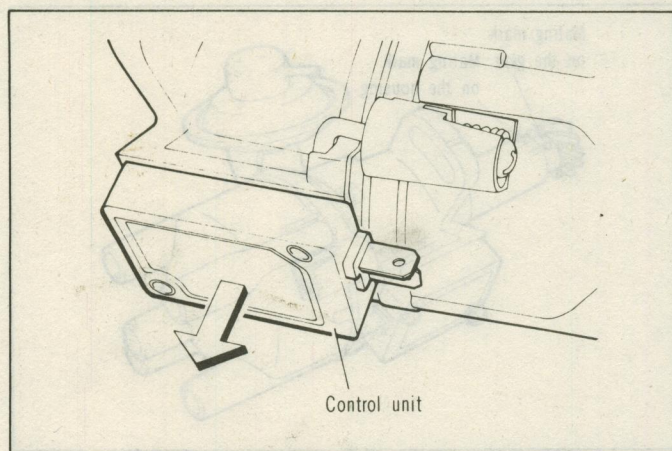


Fig. 39 Removing Control Unit

(2) To remove the cap, insert a screwdriver all the way in and turn.

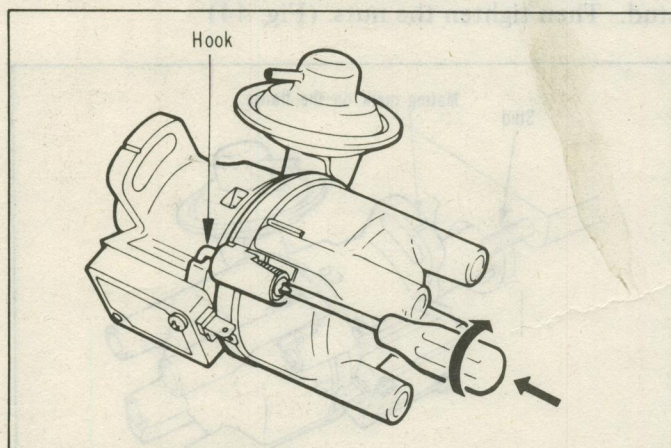


Fig. 40 Removing Cap

(3) Remove the mounting screws and lift out the rotor assembly.

(4) Remove the mounting screw and remove the governor assembly with reluctor.

(5) Remove the pickup coil.

(6) Remove the vacuum control unit tightening screws.

(7) Remove the E ring from the vacuum link and remove the vacuum control unit.

(8) Remove the breaker assembly.

(9) Remove the lock pin from the gear.

(10) Remove the plate and shaft.

INSPECTION

Pickup Coil Test (See Fig. 41)

Using a circuit tester, measure the resistance of the pickup coil. The resistance should be $1050 \pm 50\Omega$. (Note: The resistance of the pickup coil can be measured with the pickup coil installed in the distributor.)

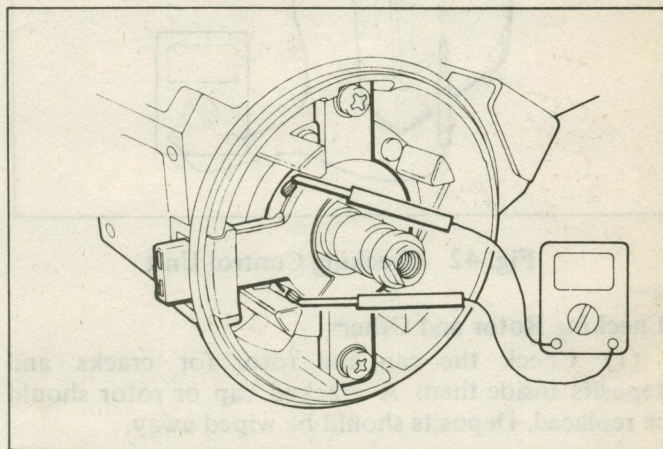


Fig. 41 Checking Pickup Coil

Control Unit Test (See Fig. 42)

Check for continuity between terminal "C" of the control unit and the reverse surface (metallic surface) of the control unit. If the control unit is installed in the distributor, check for continuity between terminal "C" and the distributor housing. The continuity test should be performed in the same way as a diode test: that is by alternately switching the leads of the circuit tester. If there is continuity or an open circuit in both directions, the control unit is defective and should be replaced.

Note: Only the transistors in the switching section of the control unit are evaluated by this test. Even if the transistors check good, the control unit may be defective.

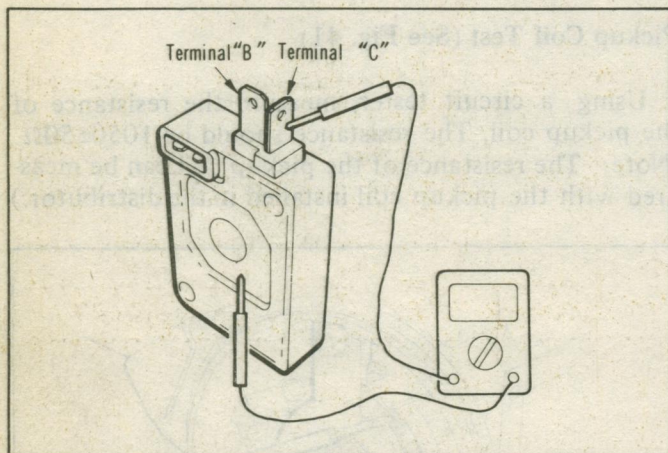


Fig. 42 Checking Control Unit

Checking Rotor and Others

(1) Check the cap and rotor for cracks and deposits inside them. A cracked cap or rotor should be replaced. Deposits should be wiped away.

(2) Check the gear for wear. Replace if necessary.

(3) Check the shaft for play in the thrust direction. Replace the shaft and ball bearing assembly if necessary.

REASSEMBLY

Reverse the disassembly procedure.

INSTALLATION

(1) Turn engine crankshaft until the position in No.1 cylinder is at top dead center on compression stroke.

(2) Align the mating mark (line) on the distributor housing with the mating mark (punch) on the distributor driven gear. (Fig. 43)

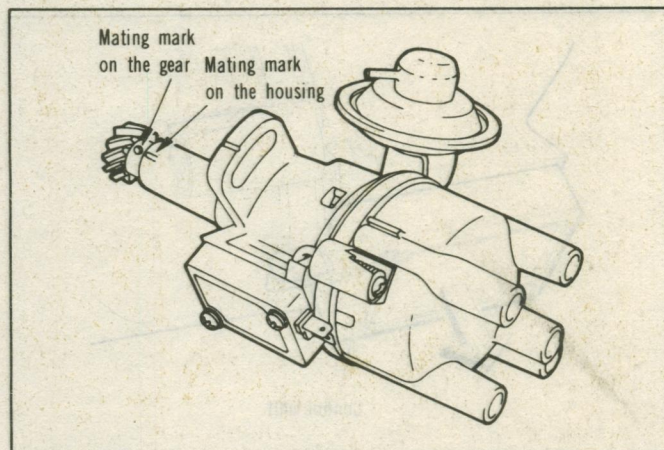


Fig. 43 Installing Distributor (1)

(3) Install the distributor on the cylinder head aligning the mating mark on the distributor-attaching-flange with the center of the distributor-installing-stud. Then tighten the nuts. (Fig. 44)

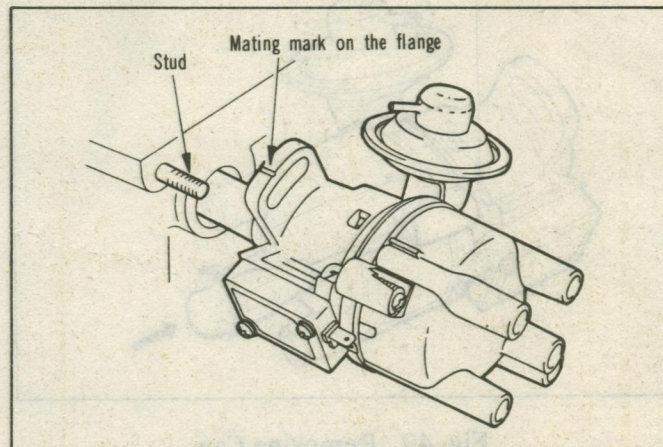


Fig. 44 Installing Distributor (2)

IGNITION COIL

INSPECTION

(1) Clean ignition coil. Check coil terminals for cleanliness, and exterior of body for cracks. Replace if necessary.

(2) Check for carbon deposit or corrosion in the high tension cable inserting hole. Repair or replace if necessary.

(3) Measure the resistance of the primary coil, secondary coil and external resistor. If the reading is not within the specified resistance, replace ignition coil.

Description	U- and W-engines
Type No.	LB-119
Primary coil resistance	0.7 to 0.85 Ω
Secondary coil resistance	9 to 11 k Ω
Insulation resistance at 500V	Over 50 M Ω

HIGH TENSION CABLE

CAUTIONS:

- When removing high tension cable, grasp cable rubber cap.
- Do not bend the cable. The conductor might break if bent.

INSPECTION

(1) Check the cable terminals. A corroded termi-

nal should be cleaned. A broken or distorted cable should be replaced.

(2) Check the resistance of each cable between both ends. If it exceeds the limit, replace the cable.

Description	Value
Resistance limit	Less than 22 k Ω

SPARK PLUG

REMOVAL AND INSTALLATION

At the time of removal or installation, pay heed to the following points.

- (1) When removing spark plug cables, grasp cable at cable cap.
- (2) Tighten the spark plugs to the specified torque.

Part to be tightened	Torque Nm (ft-lbs.)
Spark plug	25 to 28 (18 to 21)

(2) Worn electrodes.

(3) Damaged or worn gasket.

(4) Condition of burnt electrode and amount of carbon deposit.

SPARK PLUG GAP ADJUSTMENT

(1) Check the plug gap with plug gap gauge. If gap is not within the specified limit, adjust by bending the ground electrode.

Description	Standard value mm (in.)	Remarks
Spark plug gap	1.0 to 1.1 (.039 to .043)	Trucks for U.S.A.
	0.7 to 0.8 (.028 to .031)	Trucks for Canada

INSPECTION

Inspect the spark plugs for the following items. Clean or replace if necessary.

- (1) Cracked or damaged threads or insulator.

ALTERNATOR AND ELECTRONIC VOLTAGE REGULATOR

GENERAL INFORMATION

The charging system consists of an alternator, voltage regulator, battery and the wires linking them.

The 1980 model uses an electronic voltage regulator in place of the conventional turrill type (contact point type) voltage regulator.

Because of the use of IC's (integrated circuits), the electronic voltage regulator is very compact and is either built in the rear bracket of the alternator or externally mounted to the rear bracket. (Figs. 45 and 46)

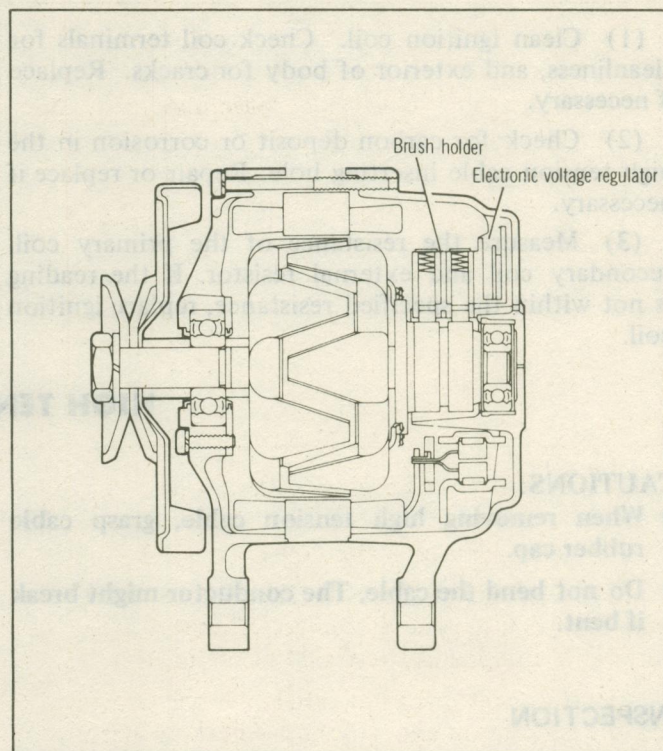


Fig. 45 Alternator and Voltage Regulator

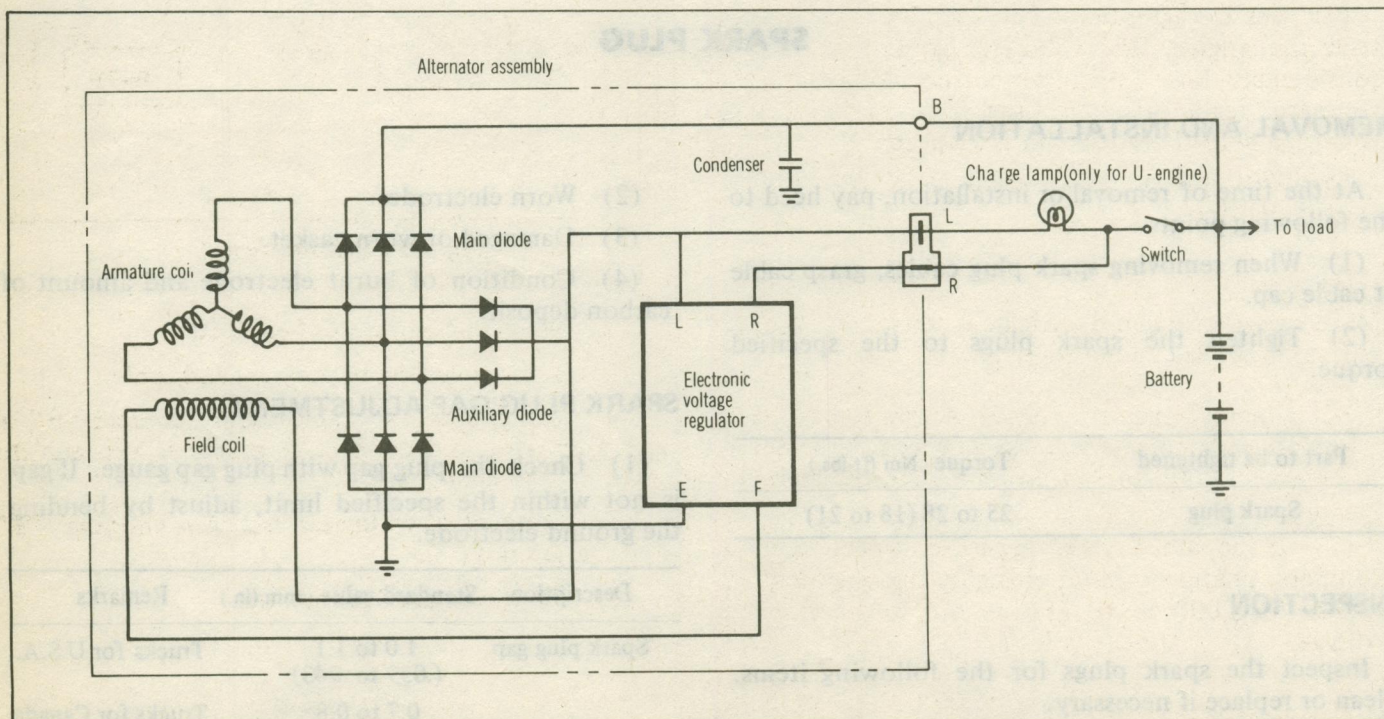


Fig. 46 Charging Circuit

CHARGING SYSTEM TEST (ON THE VEHICLE)

Charging Voltage Test

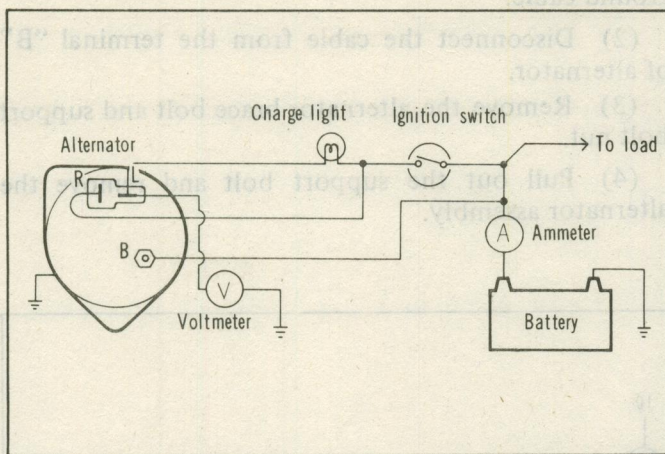


Fig. 47 Charging Voltage Test

- (1) Turn ignition switch OFF.
- (2) Disconnect the cable from the positive terminal of the battery and connect an ammeter between the cable and positive terminal of the battery.
- (3) Connect a voltmeter between the terminal "L" of the alternator and ground. Check to ensure that the voltmeter reading is "0" (zero). If the pointer of the voltmeter deflects (a voltage present), a defective alternator or wiring is suspected.
- (4) Set the ignition switch to "ON" but do not start the engine. The voltmeter reading should be considerably lower than the battery voltage. If the voltmeter reading is much the same as the battery voltage, a defective alternator is suspected.
- (5) With the ammeter terminals short-circuited, start the engine.

CAUTION:

Make sure that when the engine is started, no starting current is applied to the ammeter.

- (6) Remove the short circuit across the ammeter terminals and increase the engine speed immediately to approx. 2,000 to 3,000 rpm. Take the ammeter reading.
- (7) If the ammeter reading is 5A or less, take the voltmeter reading without changing the engine speed (2,000 to 3,000 rpm). The reading is the charging voltage.

Note: Since the electronic voltage regulator is a temperature compensation type, the charging voltage varies with temperature. Therefore, the temperature around the rear bracket of the alternator must be measured and the charging voltage corrected to the temperature.

Description	Standard value
Charging voltage	$14.4 \pm 0.3 \text{ V at } 20^\circ\text{C (68}^\circ\text{F)}$
Temperature compensation gradient	$-0.1 \text{ V/}10^\circ\text{C (50}^\circ\text{F)}$

- (8) If the ammeter reading is more than 5A, continue to charge the battery until the reading falls to less than 5A or replace the battery with a fully charged one. An alternative method is to limit the charging current by connecting a $1/4\Omega$ (25W) resistor in series with the battery.

Output Test

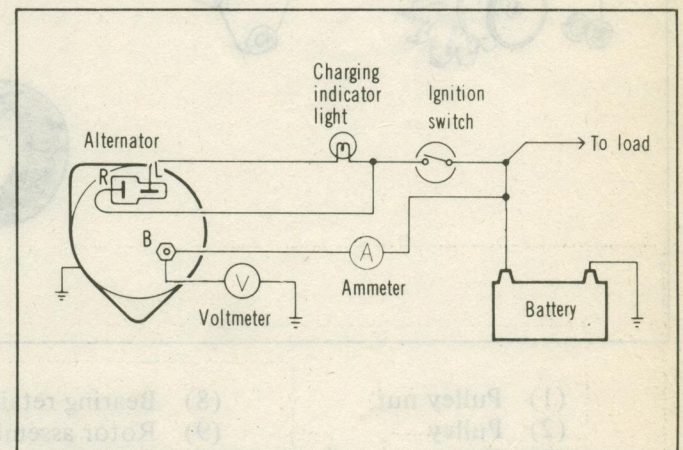


Fig. 48 Output Test

- (1) Place the ignition switch at OFF.
- (2) Disconnect the battery ground cable.
- (3) Disconnect the cable from terminal "B" of the alternator and connect an ammeter between the terminal "B" and cable.
- (4) Connect a voltmeter between terminal "B" (+) and ground (-).
- (5) Set the engine tachometer.

(6) Connect the battery ground cable to the battery. The voltmeter should indicate the battery voltage.

(7) Start the engine.

(8) Turn on the lamps, accelerate the engine to the specified speed and measure the output current. The output current should be close to specification.

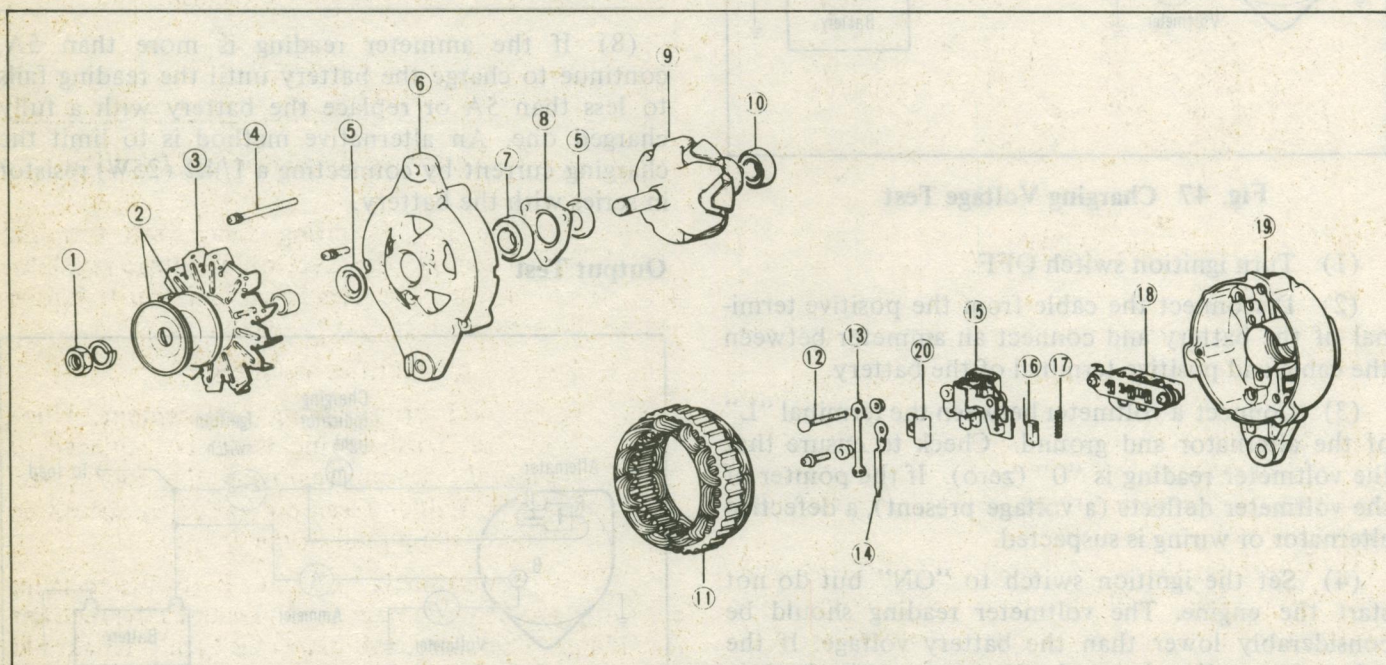
REMOVAL

(1) Ignition switch OFF. Disconnect battery ground cable.

(2) Disconnect the cable from the terminal "B" of alternator.

(3) Remove the alternator brace bolt and support bolt nut.

(4) Pull out the support bolt and remove the alternator assembly.



- | | | |
|-------------------|------------------------|--|
| (1) Pulley nut | (8) Bearing retainer | (15) Electronic voltage regulator and brush holder |
| (2) Pulley | (9) Rotor assembly | (16) Brush |
| (3) Fan | (10) Ball bearing | (17) Brush spring |
| (4) Through bolt | (11) Stator assembly | (18) Rectifier assembly |
| (5) Seal | (12) Terminal "B" bolt | (19) Rear bracket |
| (6) Front bracket | (13) Plate "B" | (20) Condenser |
| (7) Ball bearing | (14) Plate "L" | |

Fig. 49 Alternator (Exploded View)

DISASSEMBLY

(1) After removing the three through bolts, insert a screwdriver between the front bracket and the stator. While prying it, remove the front bracket and rotor.

NOTE: If the screwdriver is inserted too deep, the stator coil might be damaged.

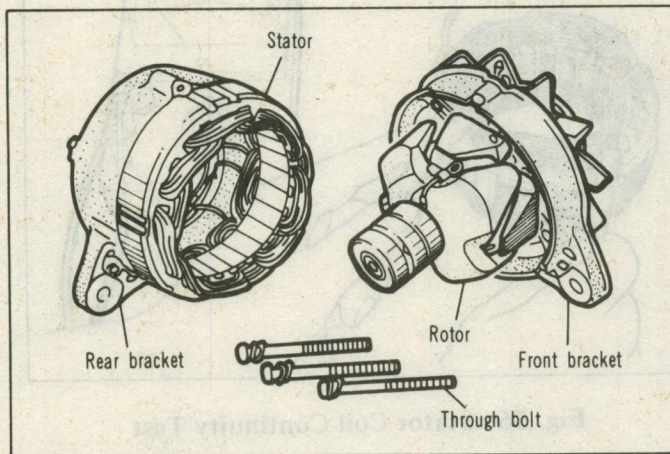


Fig. 50 Removing Front Bracket

(2) Hold the rotor in a vise and remove the pulley nut. Then remove the pulley, fan, spacer and seal. Next, remove the rotor from the front bracket and remove the seal.

(3) Unsolder the rectifier from the stator coil lead wires and remove the stator assembly.

NOTE: Make sure that the solder is removed quickly (in less than five seconds). If a diode is heated to more than 150°C, it might be damaged. (Fig. 51)

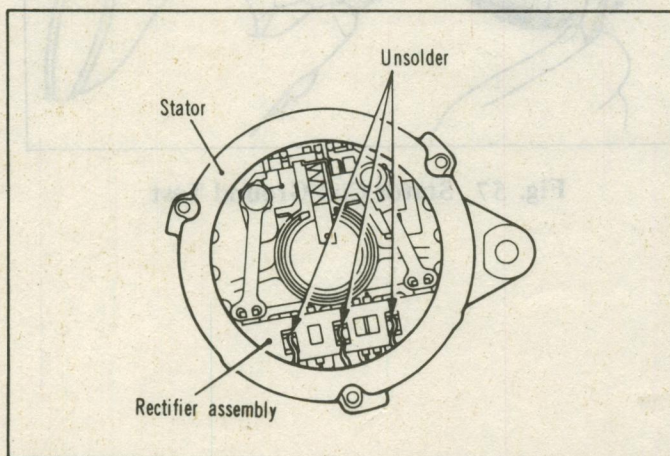


Fig. 51 Removing Stator Assembly

(4) Remove the condenser from the terminal "B"

(5) Unsolder the plates "B" and "L" from the rectifier assembly. (Fig. 52)

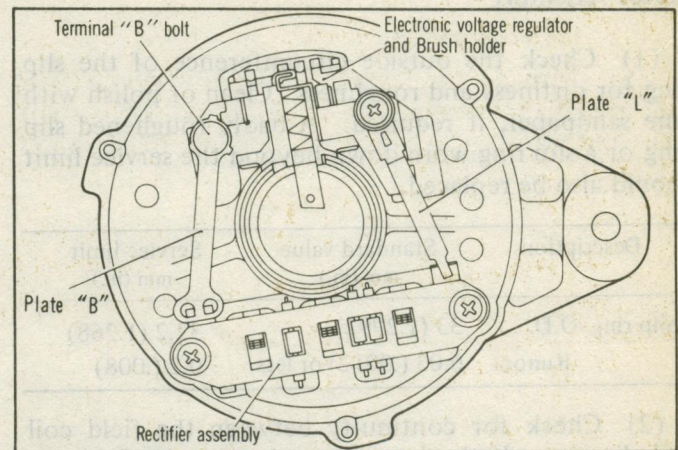


Fig. 52 Removing Regulator and Rectifier

(6) Remove the mounting screw and terminal "B" bolt and remove the electronic voltage regulator and brush holder. The regulator and brush holder cannot be separated. (Fig. 52)

(7) Remove the rectifier assembly.

(8) Brush and brush spring replacement. When only a brush or brush spring is to be replaced, it can be replaced without removing the stator, etc. With the brush holder assembly raised as shown in Fig. 53, unsolder the pigtail of the brush.

NOTE: If the terminals "L" and "B" of the rectifier assembly are bent, damage might result to the rectifier moulding. Therefore, the plates "B" and "L" should be gently bent at the center.

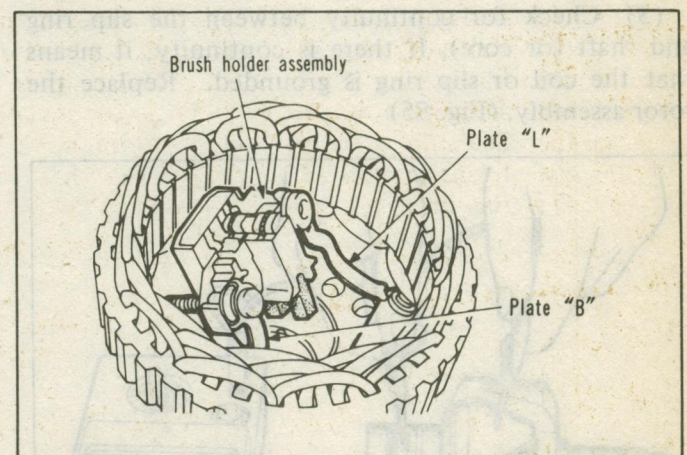


Fig. 53 Replacing Brush

INSPECTION

Rotor Assembly

(1) Check the outside circumference of the slip ring for dirtiness and roughness. Clean or polish with fine sandpaper, if required. A badly roughened slip ring or a slip ring worn down beyond the service limit should also be replaced.

Description	Standard value mm (in.)	Service limit mm (in.)
Slip ring O.D.	33 (1.2992)	32.2 (1.268)
Runout	0.03 (.0012) or less	0.2 (.008)

(2) Check for continuity between the field coil and slip ring. If there is no continuity, the field coil is defective. Replace the rotor assembly. (Fig. 54)

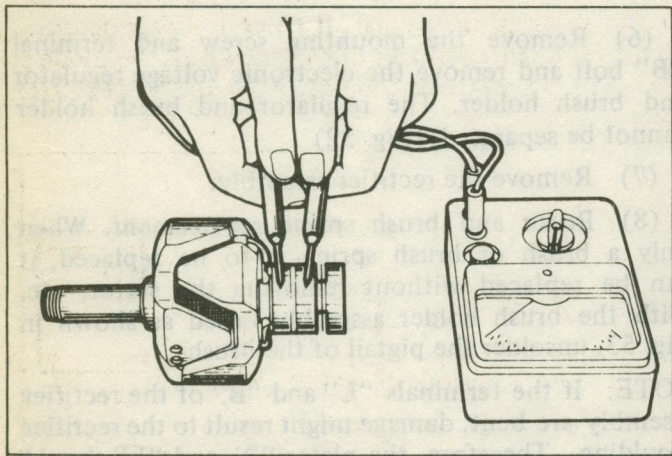


Fig. 54 Field Coil Continuity Test

(3) Check for continuity between the slip ring and shaft (or core). If there is continuity, it means that the coil or slip ring is grounded. Replace the rotor assembly. (Fig. 55)

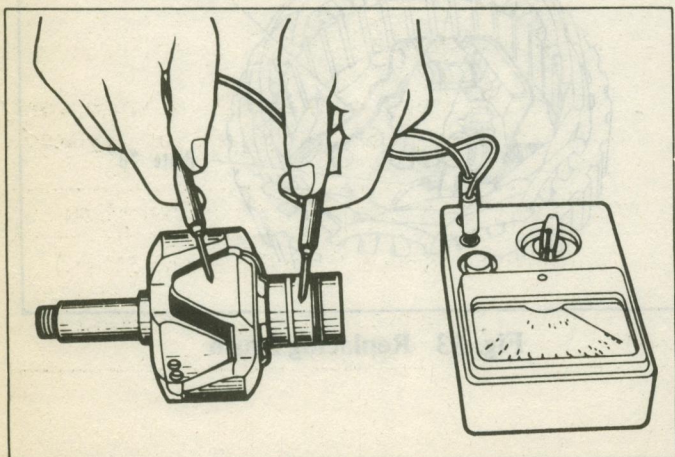


Fig. 55 Field Coil Ground Test

Stator Assembly

(1) Check for continuity between the leads of the stator coil. If there is no continuity, the stator coil is defective. Replace the stator assembly. (Fig. 56)

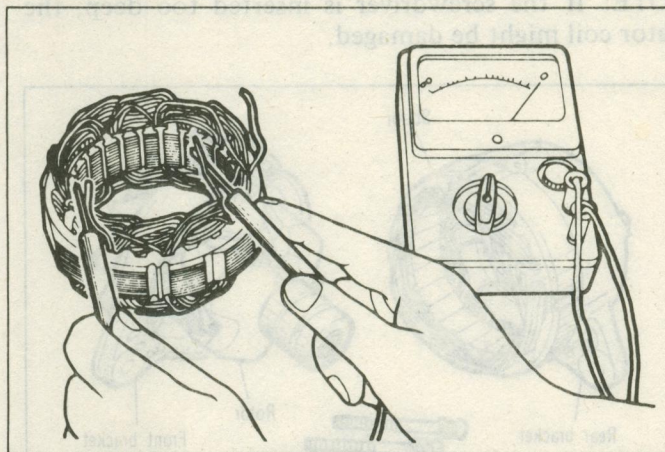


Fig. 56 Stator Coil Continuity Test

(2) Check for an open circuit between the stator coil leads and the stator core. (Fig. 57)

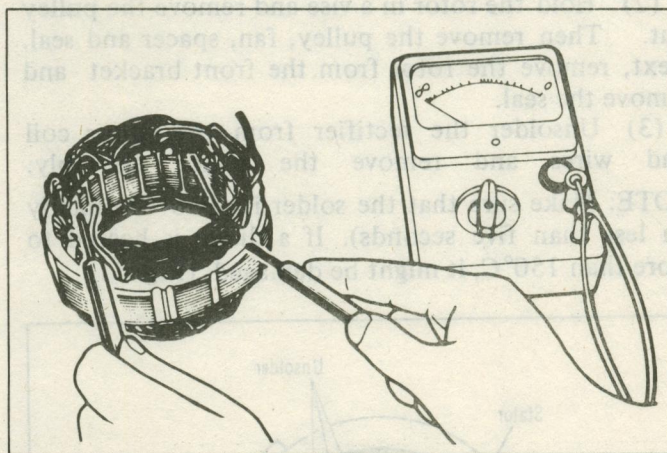


Fig. 57 Stator Coil Ground Test

Rectifier Assembly

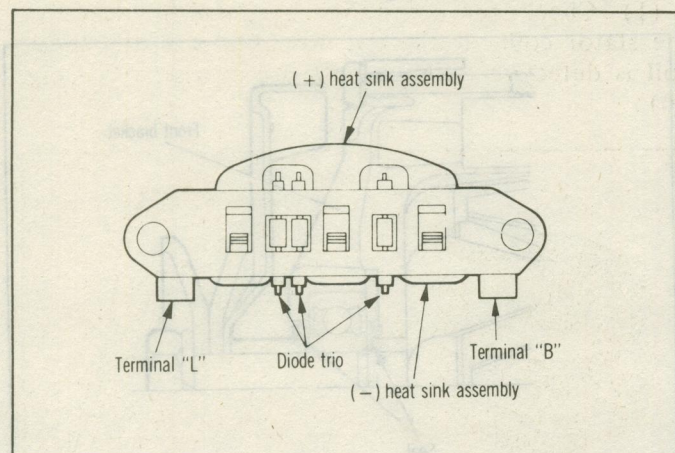


Fig. 58 Rectifier Assembly

(1) (+) Heatsink Assembly Test.

Check for continuity between the (+) heat sink and stator coil lead connection terminal with a circuit tester. If there is continuity in both directions, the diode is short-circuited. Replace the rectifier assembly. (Fig. 59)

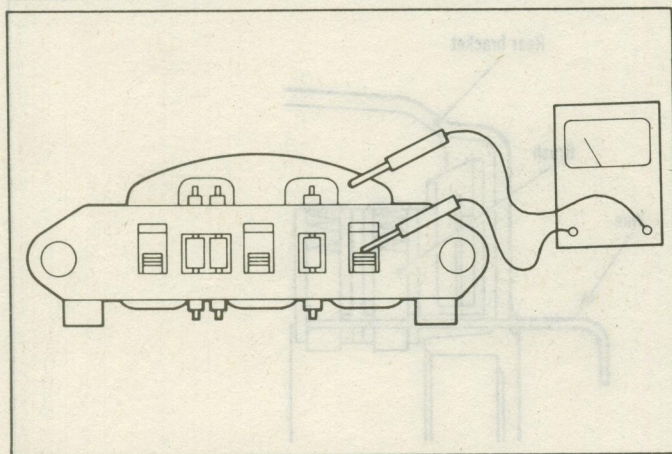


Fig. 59 (+) Heatsink Assembly Test

(2) (-) Heatsink Assembly Test.

Check for continuity between the (-) heatsink and the stator coil lead connection terminal with a circuit tester. If there is continuity in both directions, the diode is short-circuited. Replace the rectifier assembly. (Fig. 60)

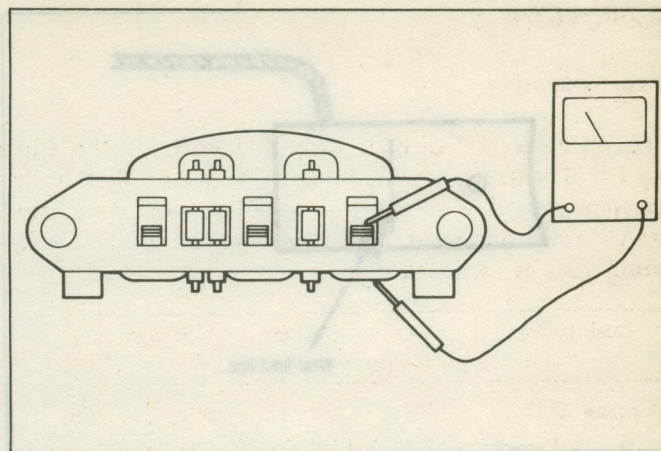


Fig. 60 (-) Heatsink Assembly Test

(3) Diode Trio Test.

Using a circuit tester, check the three diodes for continuity in both directions. If there is either continuity or an open circuit in both directions, the diode is defective. Replace the rectifier assembly. (Fig. 61)

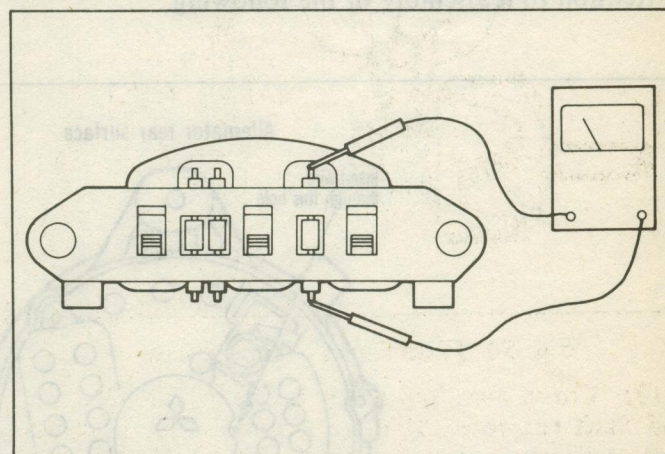


Fig. 61 Diode Trio Test

Brush and Brush Spring

(1) Check the length of the brush. A brush worn down to the wear limit line should be replaced. (Fig. 62)

Description	Standard value	Service limit
Length of brush	18 mm (.709 in.)	8 mm (.315 in.)
Load of brush spring	3.0 to 4.2 N (.7 to 1.0 lbs.)	2.1 N (.5 lbs.)

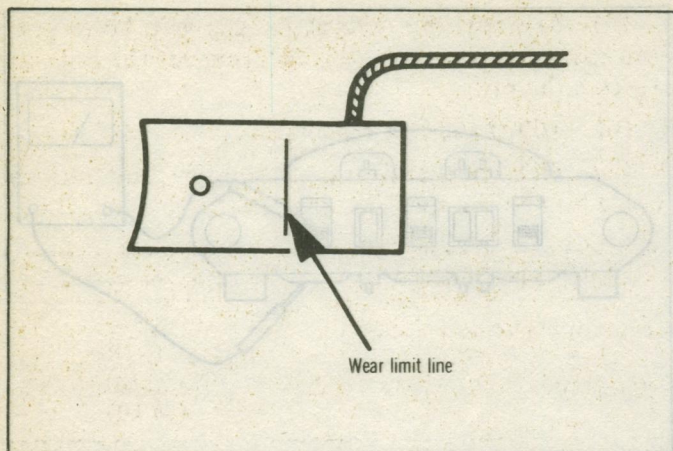


Fig. 62 Checking Brush Wear

(2) Check the brush spring pressure to make sure the brush moves smoothly in the brush holder.

REASSEMBLY

Reverse the disassembly procedure but pay special attention to reassembly of the following.

(1) Install seals before and behind the front bearing as shown in Fig. 63.

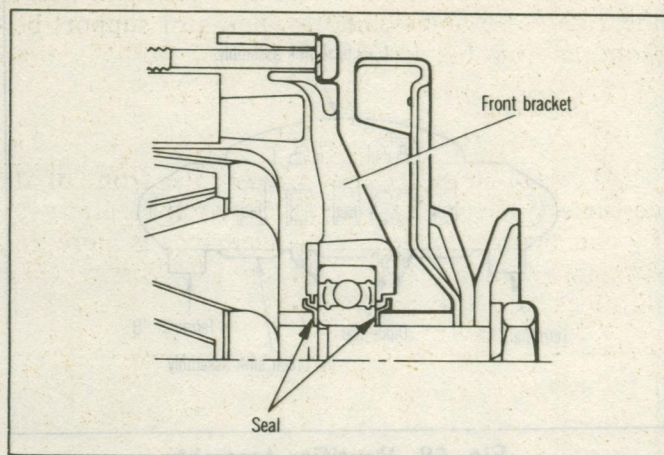


Fig. 63 Assembling Seals

(2) To install the rotor assembly in the rear bracket, push the brushes into the brush holder, insert a wire to hold them in raised position, and then install the rotor.

NOTE: After installation, remove the wire.

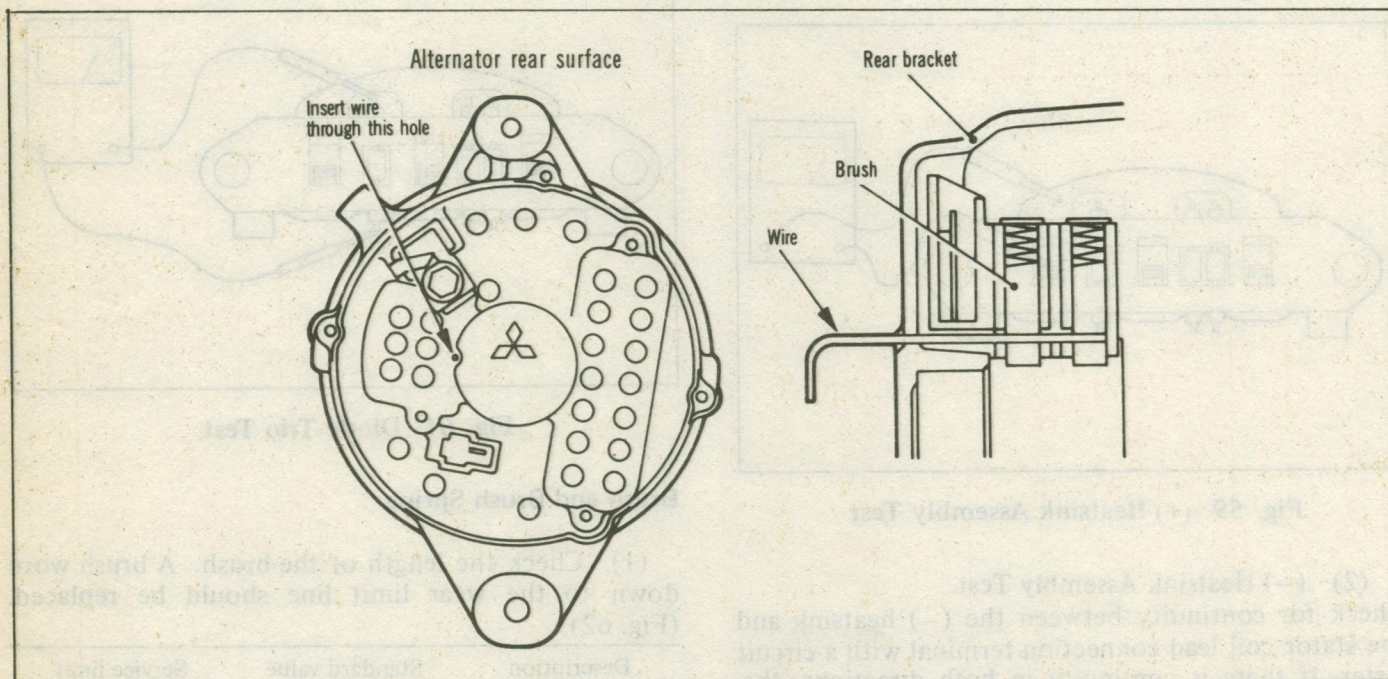


Fig. 64 Setting the Brush

INSTALLATION

- (1) Align the hole in alternator leg with hole in the front case and insert the alternator support bolt from the front bracket side.
- (2) Install the brace bolt.
- (3) Install the belt.
- (4) Push the alternator toward the front of the engine and check clearance (A) between the alternator leg and the front case. If the clearance is more than 0.2 mm (.008 in.), insert spacers [0.198 mm (.0078 in.) thick] as required. (Fig. 65)

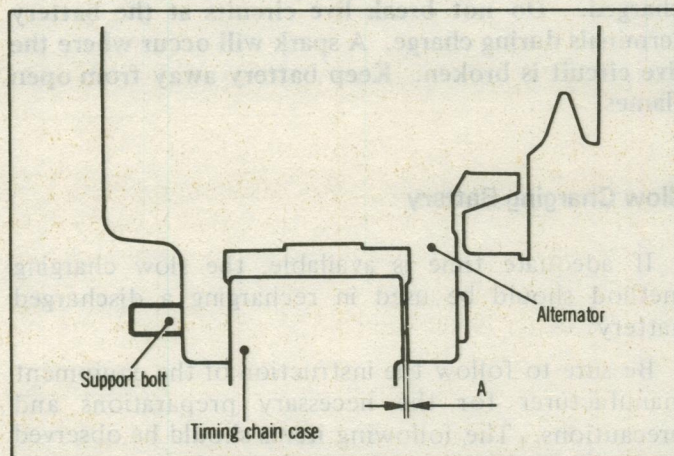


Fig. 65 Installing Alternator

- (5) Remove the alternator support bolt, insert the spacers selected in step (4), reinsert the bolt, and tighten the nut.

- (6) Adjust the belt tension.

- (7) Tighten the alternator support bolt nut and brace bolt to the specified torque.

Parts to be tightened	Torque Nm (ft-lbs.)
Alternator support bolt nut	20 to 24 (15 to 18)
Brace bolt	12 to 14 (9 to 10)

BATTERY

PRECAUTIONS

- (1) Do not disconnect battery with engine running, otherwise the voltage of electric source is raised abnormally and may break some electrical equipment.
- (2) Make sure that the terminals are firmly fitted to the studs after reinstallation of battery.

REMOVAL

- (1) Remove the cable terminals (negative first) from battery terminal studs. Twist the terminal with pliers if it is stuck to the terminal studs.
- (2) Remove the securing bar and lift up the battery.
- (3) Clean the battery with a brush and rinse it down with clean, lukewarm water.
- (4) Clean the battery shelf and the cable terminals. Use a special steel brush or pliers for the cable terminals.

INSPECTION

Inspect battery case and cover for cracks, deformation and electrolyte leakage. If cracks are present, replace battery.

INSTALLATION

- (1) Install battery in vehicle. Do not damage battery case and/or cover by overtightening.
- (2) Connect cable clamps to battery post making sure top of clamp is flush with top of post.
- (3) Tighten clamp nut securely.
- (4) Coat all connections with light mineral grease to retard corrosion.

CHARGING THE BATTERY

If the specific gravity reading is below 1.20 [as corrected at 27°C (80°F)], battery must be recharged or battery electrolyte concentration must be adjusted.

- (1) If the battery is to remain in the vehicle, disconnect the cables from battery to prevent damage to the electrical system during charging.

- (2) Make sure the electrolyte is at the normal level.

CAUTION:

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

Slow Charging Battery

If adequate time is available, the slow charging method should be used in recharging a discharged battery.

Be sure to follow the instruction of the equipment manufacturer for the necessary preparations and precautions. The following items should be observed when slow charging the battery with any type of equipment.

- (1) The battery is to be charged at a rate (amps) of 1/10 of its ampere hour capacity.
- (2) The average time necessary to charge a battery by the slow charge method at normal rates is from 12 to 16 hours.
- (3) Watch the temperature of the electrolyte during charge. If the cell temperature reaches 45°C (113°F), lower the charging rate.
- (4) Battery will be fully charged when it is gassing freely and there is not further rise in specific gravity after three successive readings taken at hourly intervals.

Quick Charging Battery

If adequate time for a slow charge is not available a high rate (quick) charge is permissible.

- (1) Battery electrolyte temperature must never exceed 45°C (113°F).

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

(2) As the battery approaches full charge, the electrolyte in each cell will begin to gas or bubble. Excessive gassing must not be allowed.

(3) Do not fast charge longer than one hour. If battery does not show a significant change in specific gravity after one hour of "quick" charge, the slow charge method should be used.

SULPHATED BATTERY

If voltage of battery exceeds 2.5V per cell just after start of charging, the battery may be sulphated. Check the electrolyte level.

Many lightly sulphated batteries can be reactivated by slow charging.

The rate of charge for a sulphated battery should be no more than 1/2 the normal slow charge rate, and the charging time should be from 60 to 100 hours. This long charging cycle is necessary to reconvert crystalline lead sulphate into active materials.

SPECIFIC GRAVITY CHECK

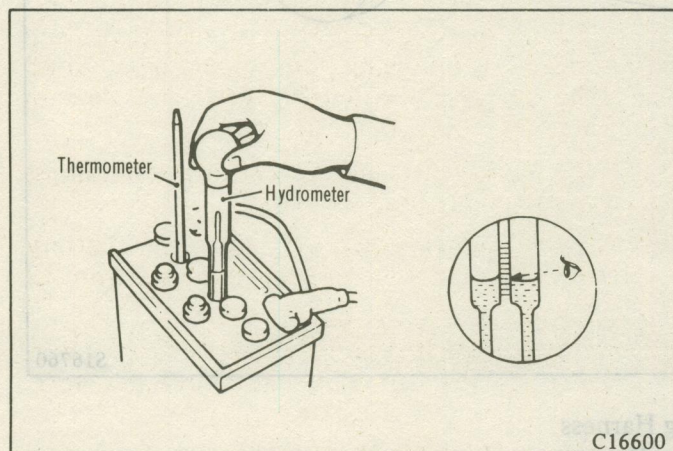


Fig. 66 Checking Specific Gravity

Specific gravity variations caused by temperatures must be considered and corrected to 27°C (80°F) in the battery, otherwise specific gravity readings will not indicate the true state of charge.

When reading a hydrometer the gauge barrel must be held vertically and only the minimum amount of fluid necessary to lift the float so it does not touch the sides top or bottom of the level (with liquid level in the gauge barrel) should be taken into the hydrometer. Do not tilt the hydrometer.

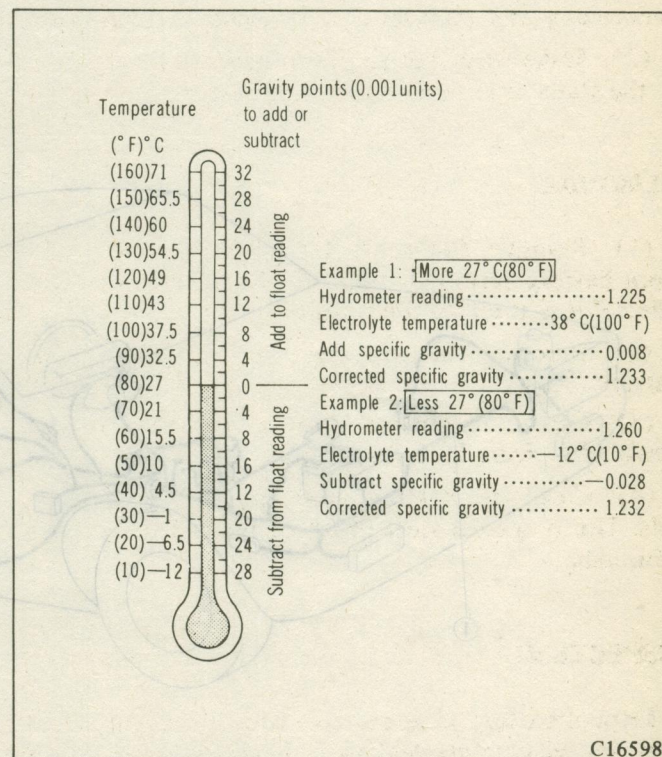


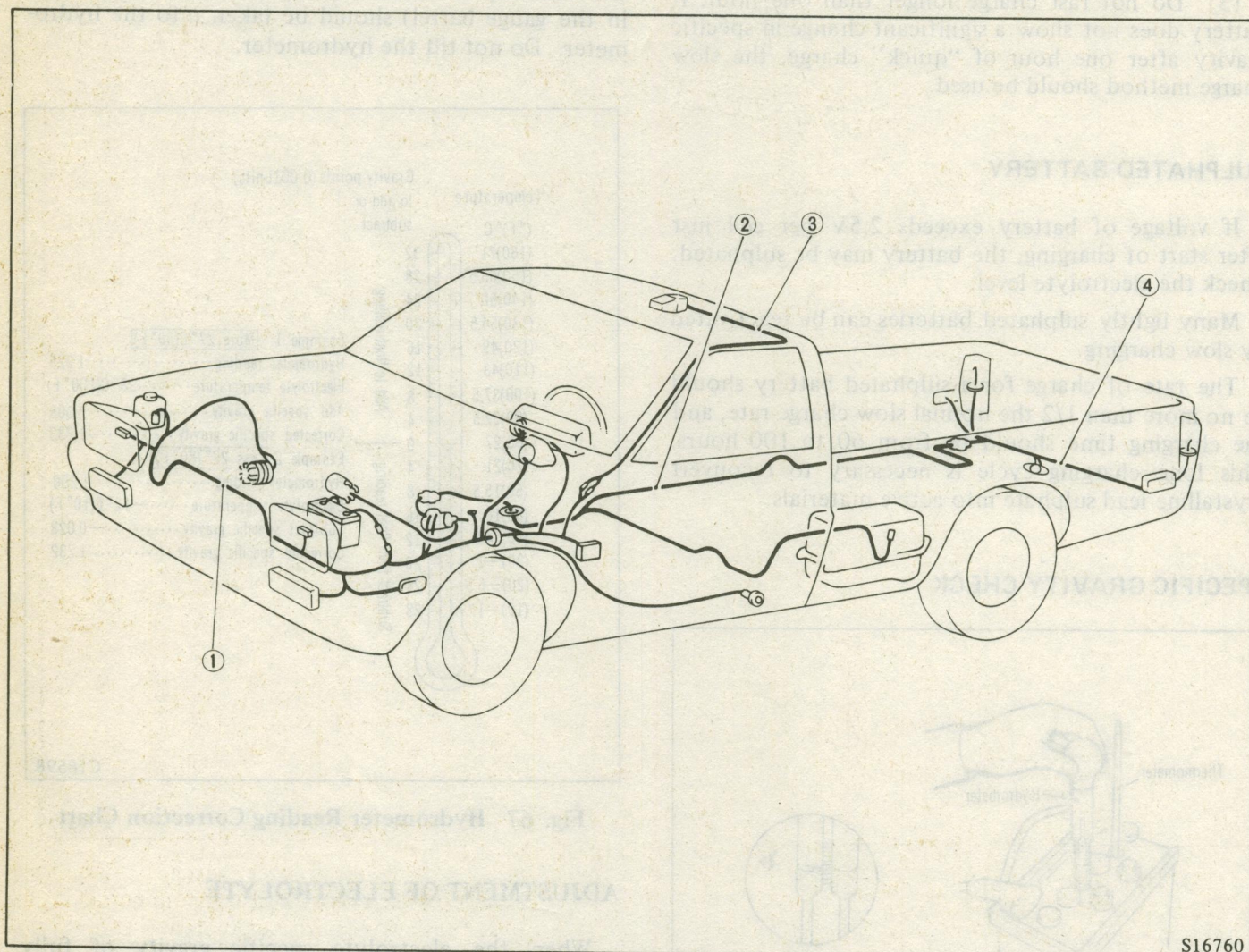
Fig. 67 Hydrometer Reading Correction Chart

ADJUSTMENT OF ELECTROLYTE

When the electrolyte specific gravity of fully charged battery is higher than 1.26 at 27°C (80°F) add distilled water. When lower, add diluted sulphuric acid [specific gravity of which is 1.400 at 27°C (80°F)]. Continue the charge so as to give the electrolyte a chance to mix and then read the specific gravity after another hour of charge to note the effect of the additions.

NOTE: Unless electrolyte is lost due to spillage or leakage, there is no necessity to add diluted sulphuric acid during the life of the battery.

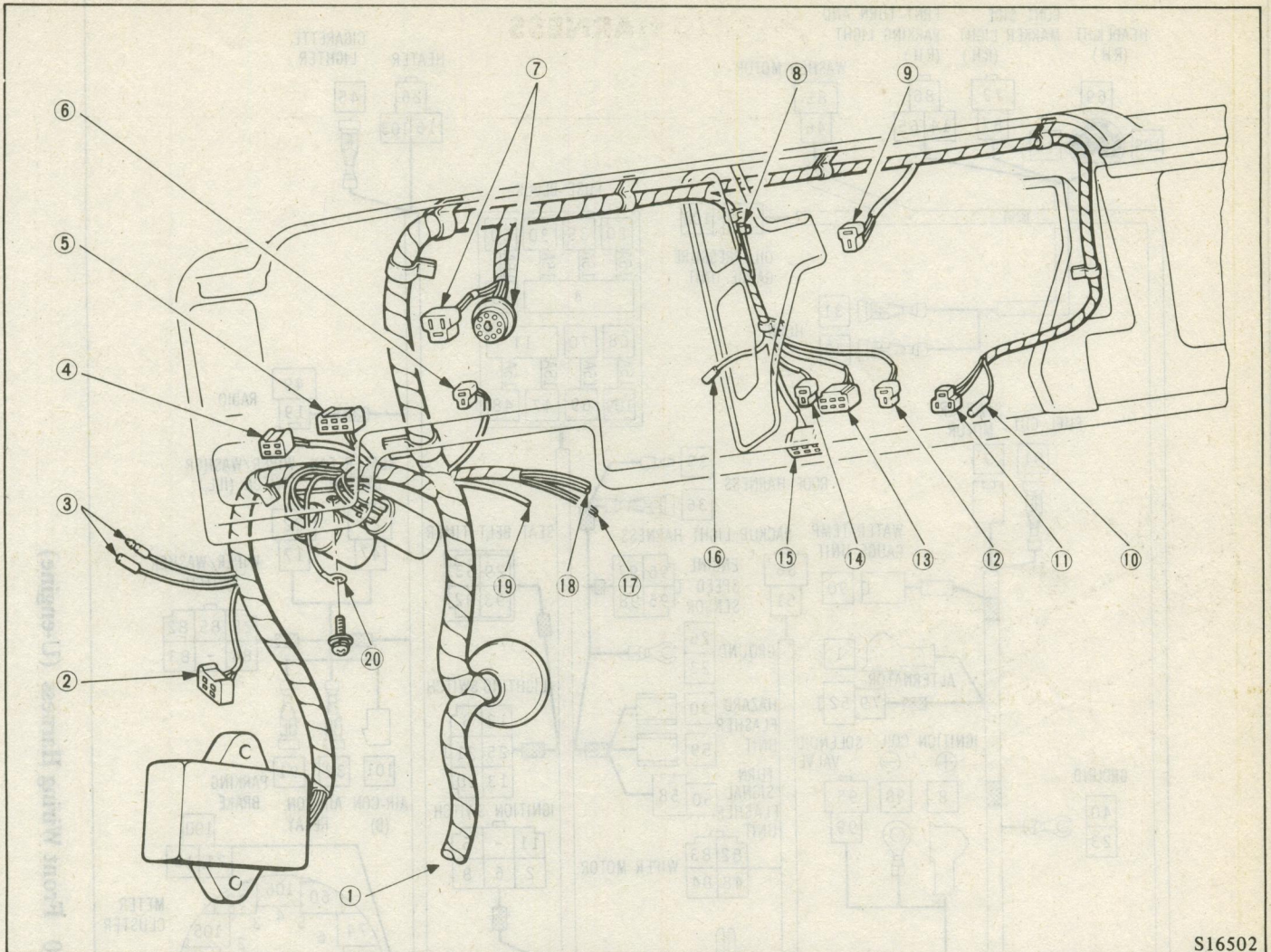
WIRING HARNESS



S16760

- (1) Front Wiring Harness
- (2) Frame Wiring Harness
- (3) Roof Wiring Harness
- (4) Rear Body Wiring Harness

Fig. 68 Wiring Harness Arrangement



S16502

- | | |
|--|---|
| (1) To Frame wiring harness | (12) Connect with Wiper/Washer switch illumination light (Blue colored connector) |
| (2) Connect with ESS relay | (13) Connect with Wiper/Washer switch |
| (3) Connect with Roof wiring harness | (14) Connect with Heater fan switch |
| (4) Connect with Timer | (15) Connect with Combination gauges |
| (5) Connect with Lighting switch | (16) To parking brake switch |
| (6) Connect with Belt warning buzzer | (17) To Stop light switch |
| (7) Connect with Combination meter | (18) To Column switch |
| (8) Spare terminal for Air conditioner | (19) To Ignition switch |
| (9) Connect with radio | (20) Grounding point |
| (10) Connect with Cigarette lighter | |
| (11) Connect with Heater panel light | |

Fig. 69 Wiring Harness Arrangement of Instrument Panel

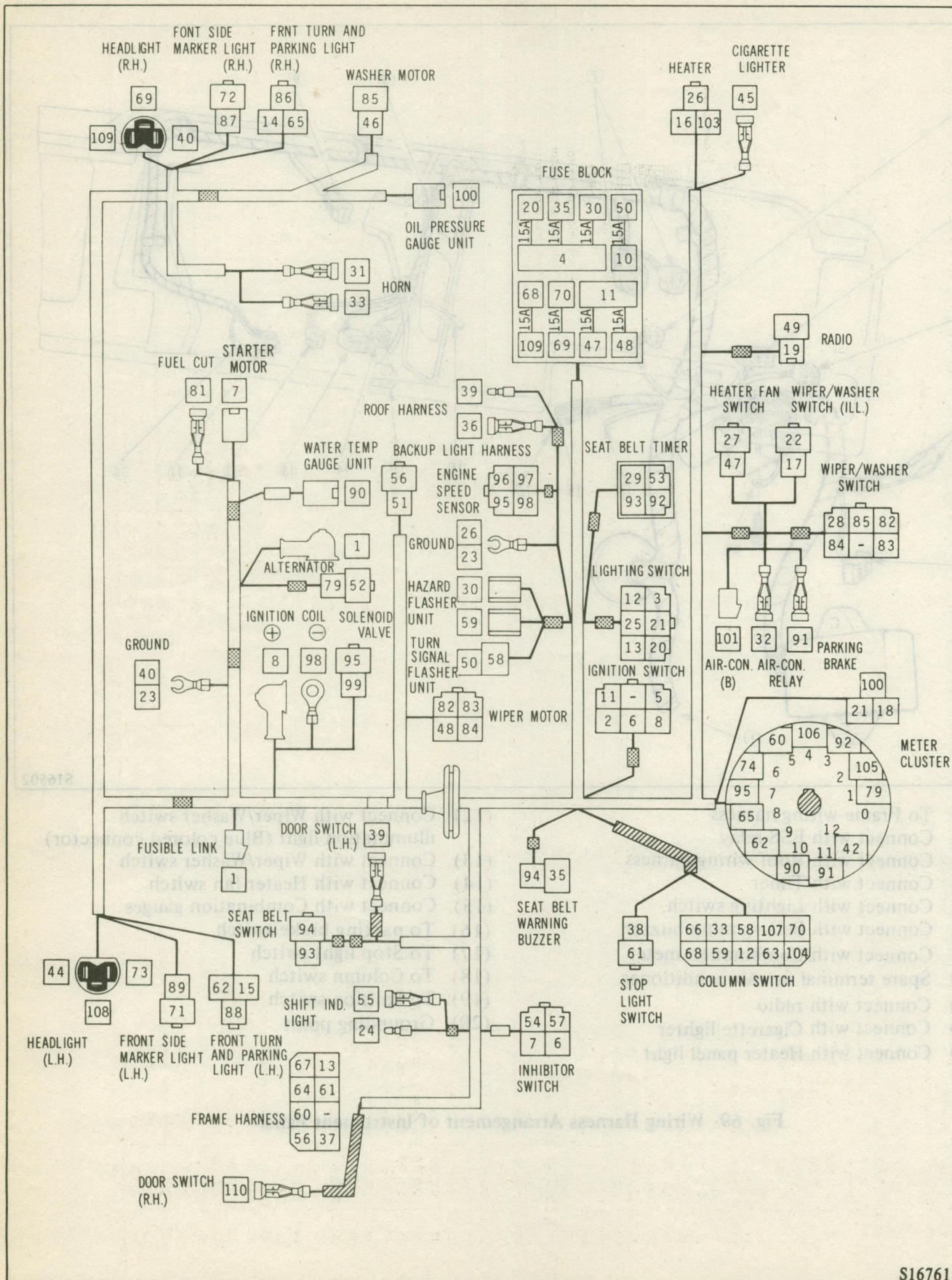


Fig. 70 Front Wiring Harness (U-engine)

Pin No.		Wire		Circuit		Pin No.		Wire		Circuit	
1	3 W	Alternator		Fusible link	1	55	0.5 GW	Shift indicator light		50	Rear harness (Back up light)
2	2 B	Ignition switch			1	56	0.5 RL	Backup light harness		56	Column switch
3	2 R	Light switch			3	57	0.5 RL	Inhibitor switch			Column switch
4	2 GR	Fuse block			8	58	0.85 GR	Turn signal flasher unit			Column switch
5	2 GR	Ignition switch				59	0.85 G	Hazard flasher unit			Meter cluster (Fuel gauge)
6	2 BY	Ignition switch				60	0.5 Y	Rear harness (Stop)			Stop light switch
7	2 BY	Starter motor				61	0.5 G	Rear harness (Fuel gauge)			Front turn signal light (L.H.)
8	2 BW	Ignition switch				62	0.5 GL	Turn signal indicator light (L.H.)		62	Front turn signal light (L.H.)
10	2 BW	Fuse block				63	0.5 GL	Column switch (Turn signal sw., L.H.)		62	Front turn signal light (L.H.)
11	2 L	Fuse block				64	0.5 GL	Rear harness (Fuel gauge)		62	Front turn signal light (R.H.)
12	2 RL	Lighting switch				65	0.5 GY	Turn signal indicator light (R.H.)		65	Front turn signal light (R.H.)
13	0.5 GW	Lighting switch				66	0.5 GY	Column switch (Turn signal sw. R.H.)		65	Front turn signal light (R.H.)
14	0.5 GW	Front parking light (R.H.)				67	0.5 GY	Column switch (Turn signal, R.H.)		65	Front turn signal light (R.H.)
15	0.5 GW	Front parking light (L.H.)				68	2 R	Fuse block			Column switch (HU)
16	0.5 RL	Heater panel ill. light (+)				69	0.85 RW	Fuse block			Headlight (R.H.) (Lower beam)
17	0.5 RY	Wiper/Washer switch ill. light (+)				70	2 RW	Fuse block			Column switch (HL)
18	0.5 RY	Meter cluster ill. lights (+)				71	0.5 B	Front side marker light (L.H.)		40	Front side marker light (R.H.)
19	0.5 RY	Radio dial ill. light				72	0.5 B	Front side marker light (R.H.)		40	Front side marker light (R.H.)
20	0.85 GR	Lighting switch				73	0.85 R	Headlight (L.H.) (Upper beam)		109	Headlight (L.H.) (Upper beam)
21	0.5 BW	Lighting switch				74	0.5 B	Meter cluster		26	Meter cluster
22	0.5 BW	Wiper/Washer switch ill. light (-)				79	0.5 YW	Alternator (E.V.R.)			Meter cluster (CHG)
23	1.25 B	Ground (Engine compartment)				81	2 BW	Fuel cut solenoid valve		8	Windshield wiper motor
24	0.5 B	Shift indicator light				82	0.5 LB	Wiper/Washer switch			Windshield wiper motor
25	0.5 B	Lighting switch				83	0.5 LO	Wiper/Washer switch			Windshield wiper motor
26	0.85 B	Cigarette lighter				84	0.5 L	Wiper/Washer switch			Windshield washer motor
27	0.5 B	Heater fan switch				85	0.5 BW	Wiper/Washer switch (Washer)		40	Windshield washer motor
28	0.5 B	Wiper/Washer switch				86	0.5 B	Front turn signal light (R.H.)		15	Front turn signal light (R.H.)
29	0.5 B	Seat belt timer				87	0.5 GW	Front side marker light (R.H.)		40	Front turn signal light (L.H.)
30	0.85 GL	Fuse block				88	0.5 B	Front turn signal light (L.H.)		40	Front turn signal light (L.H.)
31	0.85 G	Horn				89	0.5 GW	Front side marker light (L.H.)		15	Front turn signal light (L.H.)
32	0.5 L	Air-con. relay				90	0.5 YR	Water temp. gauge unit			Meter cluster (Water temp. gauge)
33	0.5 GB	Horn				91	0.5 YG	Parking brake switch			Parking brake ind. light
35	0.5 RB	Seat belt warning buzzer				92	0.5 YB	Seat belt timer			Seat belt indicator light
36	0.5 RB	Roof harness (Dome light)				93	0.5 RB	Seat belt switch			Seat belt timer
37	0.85 B	Frame harness				94	0.5 YW	Seat belt warning buzzer			Seat belt switch
38	0.5 G	Stop light switch				95	0.5 BW	Solenoid valve		50	E.S. sensor relay
39	0.5 GR	Roof harness (Dome light)				96	1.25 L	E.S. sensor relay		23	Ignition coil — point A
40	0.85 B	Ground				97	1.25 WB	Ground (E.S. sensor relay)		52	point B
42	0.5 R	Upper beam indicator light (+)				98	2 W	E.S. sensor relay			Combination gauge (Oil press.)
44	0.85 B	Headlight (L.H.)				99	2 L	Solenoid valve			
45	0.85 LW	Cigarette lighter				100	0.85 Y	Oil pressure gauge switch		2	Cooler
46	0.5 L	Windshield washer motor				101	0.5 LB	Heater panel ill. light (-)		22	Heater panel ill. light (-)
47	1.25 LR	Heater fan switch				103	0.5 BW	Column switch (Passing sw.)		3	Column switch (Passing sw.)
48	1.25 LW	Windshield wiper motor				104	2 RB	Column switch (Passing sw.)		35	Seat belt ind. light
49	0.5 LW	Radio				105	0.5 RB	Seat belt ind. light		50	Meter cluster power source
50	0.85 RL	Turn signal flasher unit				106	0.5 RL	Meter cluster power source		104	Column switch (Passing sw.)
51	0.5 R	Backup light harness				107	2 RB	Column switch (Passing sw.)		69	Headlight (L.H.) (Lower beam)
52	0.5 L	Alternator (E.V.R.)				108	0.85 RW	Headlight (L.H.) (Lower beam)			Headlight (R.H.) (Upper beam)
53	0.5 LR	Seat belt timer				109	1.25 R	Headlight (R.H.) (Upper beam)			Fuse block
54	0.5 R	Inhibitor switch				110	0.5 GR	Door switch (R.H.)		39	

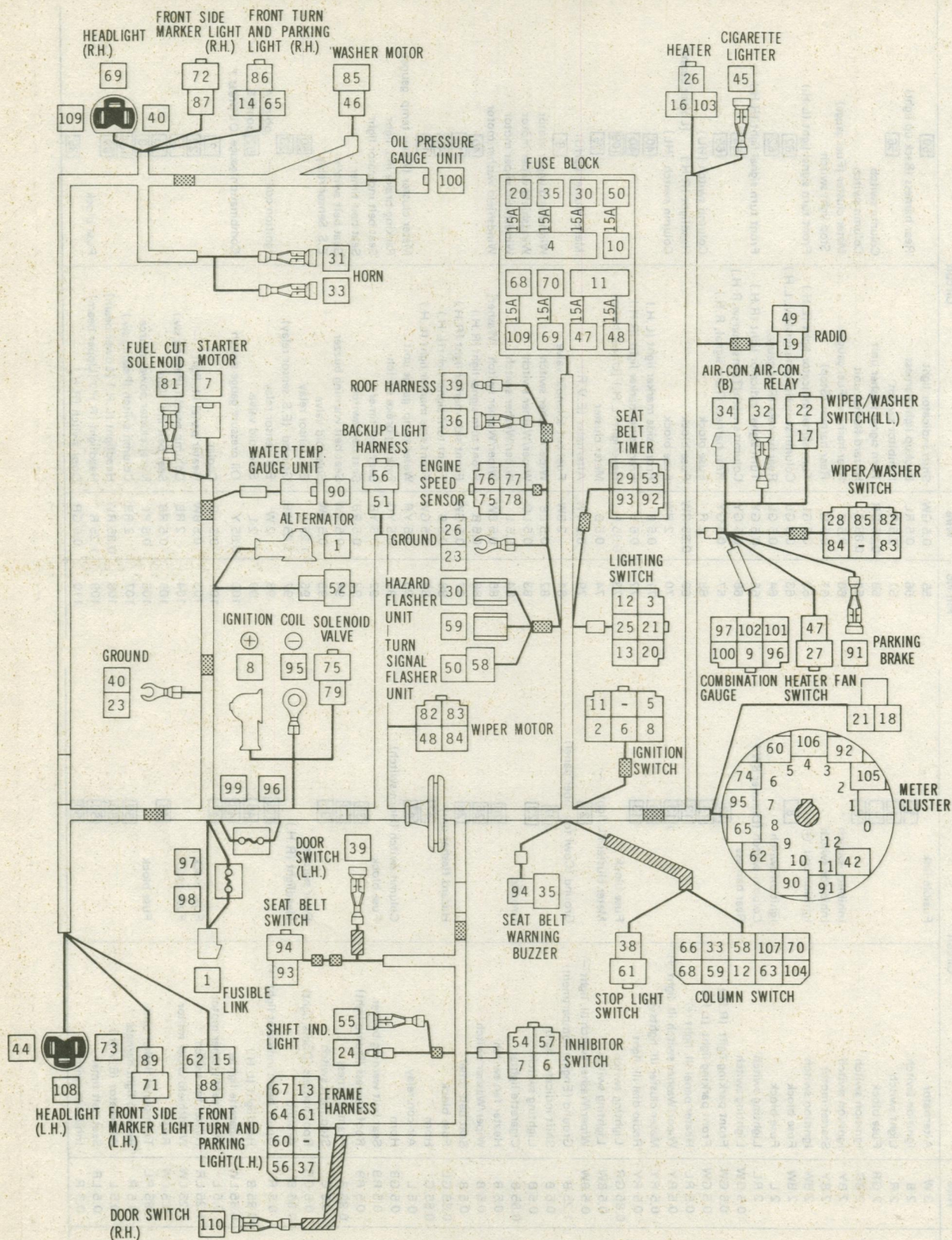


Fig. 71 Front Wiring Harness (W-engine)

Pin No.	Wire	Circuit	Fusible link	Pin No.	Wire	Circuit
1	3W	Alternator		57	0.5 RL	Inhibitor switch
2	2B	Ignition switch		58	0.85 GR	Turn signal flasher unit
3	2R	Light switch	1 point "B"	59	0.85 G	Hazard flasher unit
4	2GR	Fuse block	3	60	0.5 Y	Meter cluster (Fuel gauge)
5	2BR	Ignition switch	8	61	0.5 G	Stop light switch
6	2BY	Ignition switch		62	0.5 GL	Turn signal indicator light (L.H.)
7	2BY	Ignition switch		63	0.5 GL	Turn signal indicator light (Turn signal sw.)
8	2BW	Starter motor		64	0.5 GL	Column switch (Turn signal sw.)
9	0.85 LR	Combination gauge	50	65	0.5 GY	Rear harness
10	2BW	Fuse block	8	66	0.5 GY	Turn signal indicator light (R.H.)
11	2L	Fuse block		67	0.5 GY	Column switch (Turn signal sw.)
12	2RL	Lighting switch		68	2 R	Rear harness
13	0.5 GW	Lighting switch		69	0.85 RW	Fuse block
14	0.5 GW	Front parking light (R.H.)	13	70	2 RW	Fuse block
15	0.5 GW	Front parking light (L.H.)	14	71	0.5 B	Front side marker light (L.H.)
16	0.5 RL	Heater panel III, light (+)	13	72	0.5 B	Front side marker light (R.H.)
17	0.5 RY	Wiper/Washer switch III, light (+)	13	73	0.85 R	Headlight (L.H.) [Upper beam]
18	0.5 RY	Wiper/Washer switch III, light (+)	13	74	0.5 B	Meter cluster
19	0.5 RY	Radio III, light	13	75	0.5 BW	Solenoid valve
20	0.85 GR	Lighting switch		76	0.5 L	Engine speed sensor
21	0.5 BW	Lighting switch	[No. 5]	77	0.5 B	Ground [E.S. sensor relay]
22	0.5 BW	Wiper/Washer switch III, light (-)	21	78	0.5 W	E.S. sensor relay
23	1.25 B	Ground (Engine compartment)	21	79	0.5 L	Charging indicator light
24	0.5 B	Shift indicator light	37	81	2 BW	Fuel cut solenoid valve
25	0.5 B	Lighting switch	23	82	0.5 LB	Wiper/Washer switch
26	0.85 B	Cigarette lighter	23	83	0.5 LO	Wiper/Washer switch
27	0.5 B	Heater fan switch	26	84	0.5 L	Wiper/Washer switch
28	0.5 B	Wiper/Washer switch	26	85	0.5 BW	Wiper/Washer switch
29	0.5 B	Seat belt timer	26	86	0.5 B	Front turn signal light (R.H.)
30	0.85 GL	Fuse block		87	0.5 GW	Front side marker light (R.H.)
31	0.85 G	Horn "B"	47	88	0.5 B	Front turn signal light (L.H.)
32	0.5 L	Air-con relay "B"	47	89	0.5 GW	Front side marker light (L.H.)
33	0.5 GB	Horn	2	90	0.5 YR	Water temp. gauge unit
34	2 LB	Air-con "B"		91	0.5 YG	Parking brake switch
35	0.5 RB	Seat belt warning buzzer	35	92	0.5 YB	Seat belt timer
36	0.5 RB	Roof harness (Dome light)	23	93	0.5 RB	Seat belt timer
37	0.85 B	Frame harness	35	94	0.5 YW	Seat belt warning buzzer
38	0.5 G	Stop light switch	35	95	0.5 W	Ignition coil
39	0.5 GR	Roof harness (Dome light)		96	1.25 W	Fuse holder
40	0.85 B	Ground		97	1.25 WB	Fuse holder
42	0.5 R	Upper beam indicator light +	109	98	2 W	Fuse holder
44	0.85 B	Headlight (L.H.)	40	99	0.5 L	Fuse holder
45	0.85 LW	Cigarette lighter	48	100	0.85 Y	Oil press. indicator light
46	0.5 L	Windshield washer motor	47	101	0.56 W	Metercluster III, light (+)
47	1.25 LR	Heater fan switch		102	0.5 BW	Meter cluster III, light (-)
48	1.25 LW	Windshield wiper motor		103	0.5 BW	Heater panel III, light
49	0.5 LW	Radio	48	104	2 RB	Column switch (Passing sw.)
50	0.85 RL	Turn signal flasher unit		105	0.5 RB	Seat belt ind. light +
51	0.5 R	Backup light harness connector	50	106	0.5 RL	Meter cluster power source
52	0.5 L	Alternator (E.V.R.)	50	107	2 RB	Column switch
53	0.5 LR	Seat belt timer	50	108	0.85 RW	Headlight (L.H.) [Lower beam]
54	0.5 R	Inhibitor switch	50	109	1.25 R	Headlight (R.H.) [Upper beam]
55	0.5 GW	Shift indicator light	50	110	0.5 GR	Door switch (R.H.)
56	0.5 RL	Backup light harness				Fuse block

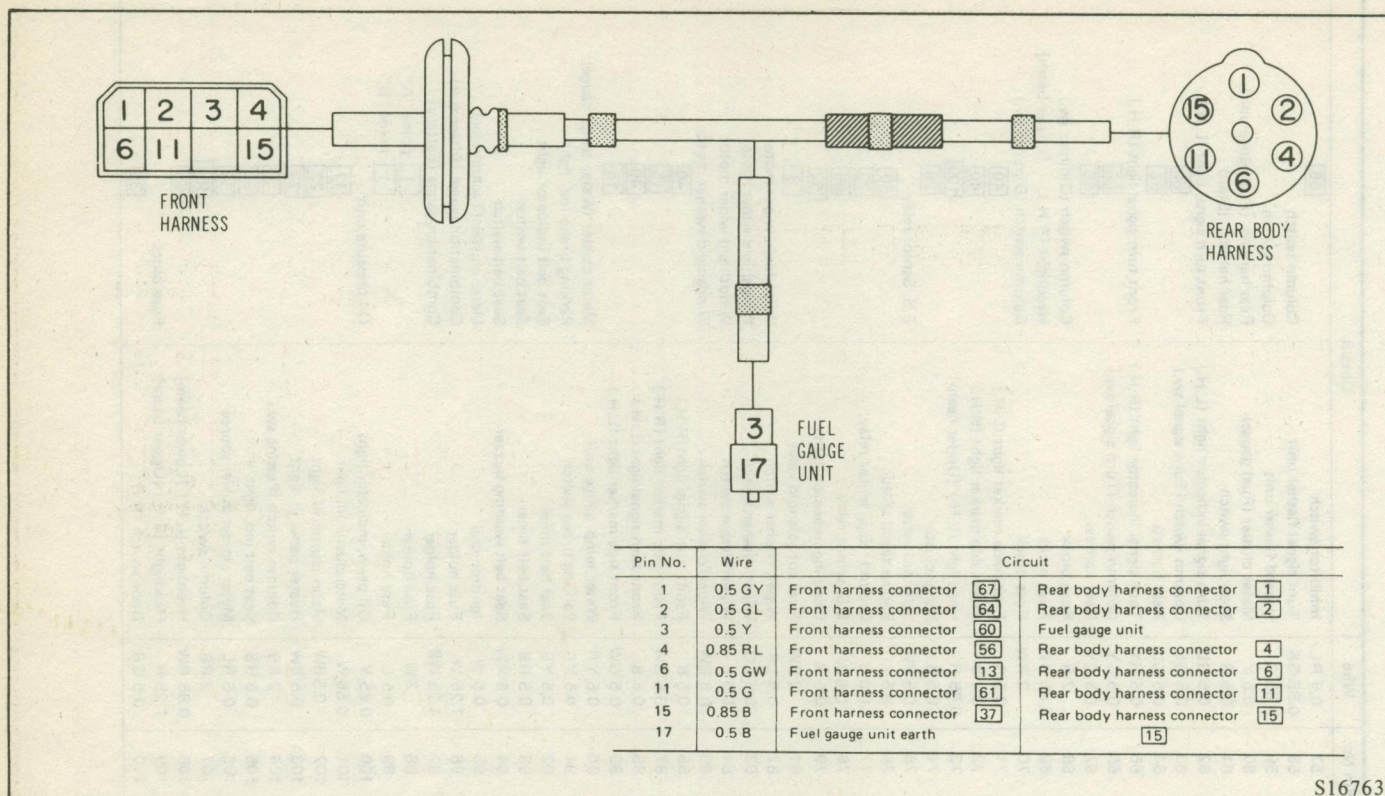


Fig. 72 Frame Wiring Harness

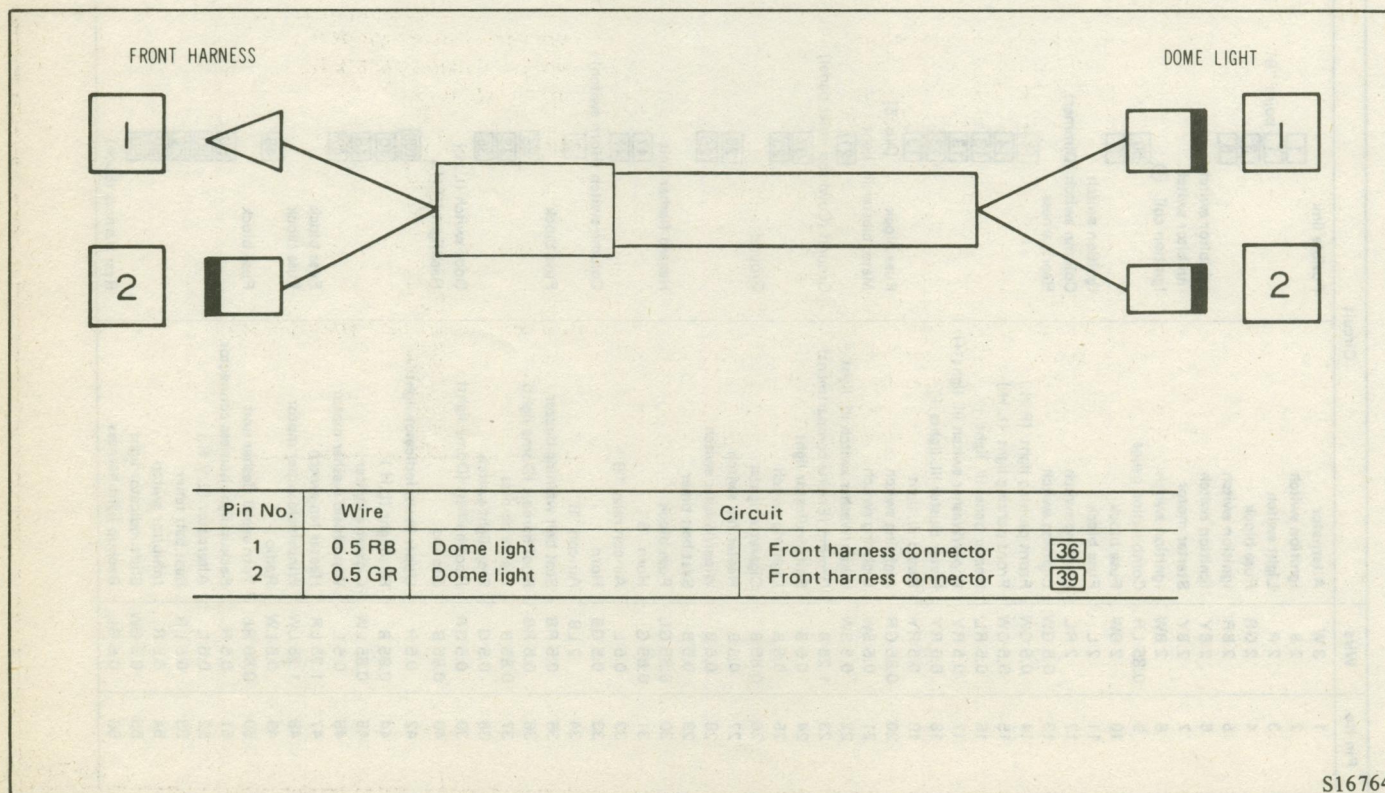
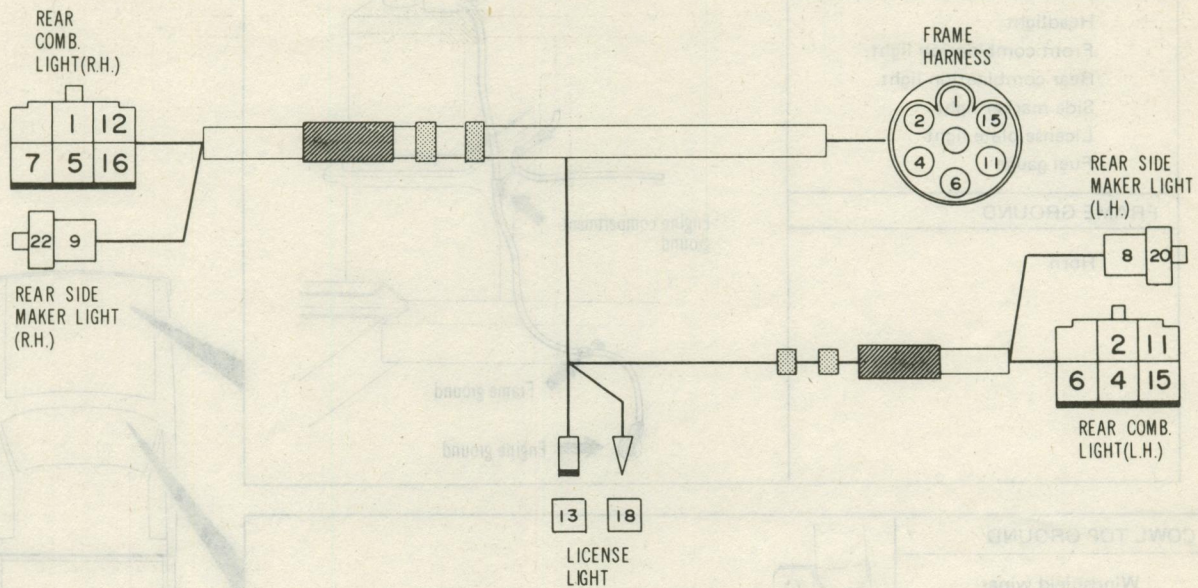


Fig. 73 Roof Wiring Harness



Pin No.	Wire	Circuit	
1	0.5 GY	Frame harness	Turn signal flasher light (R.H.)
2	0.5 GL	Frame harness	Turn signal flasher light (L.H.)
4	0.5 RL	Frame harness	Backup light (L.H.)
5	0.5 RL	Backup light (R.H.)	4
6	0.5 GW	Frame harness	Tail (Stop/Tail) light (L.H.)
7	0.5 GW	Tail (Stop/Tail) light (R.H.)	6
8	0.5 GW	Rear side marker light (R.H.)	6
9	0.5 GW	Rear side marker light (L.H.)	7
11	0.5 G	Frame harness	Stop (Stop/Tail) light (L.H.)
12	0.5 G	Stop (Stop/Tail) light (R.H.)	11
13	0.5 GW	Licence plate light	6
15	0.85 B	Frame harness	Rear combination light ground (L.H.)
16	0.5 B	Rear combination light ground (R.H.)	15
18	0.5 B	Licence plate light earth	15
20	0.5 B	Rear side marker light ground (L.H.)	15
22	0.5 B	Rear side marker light ground (R.H.)	16

S16765

Fig. 74 Rear Body Wiring Harness

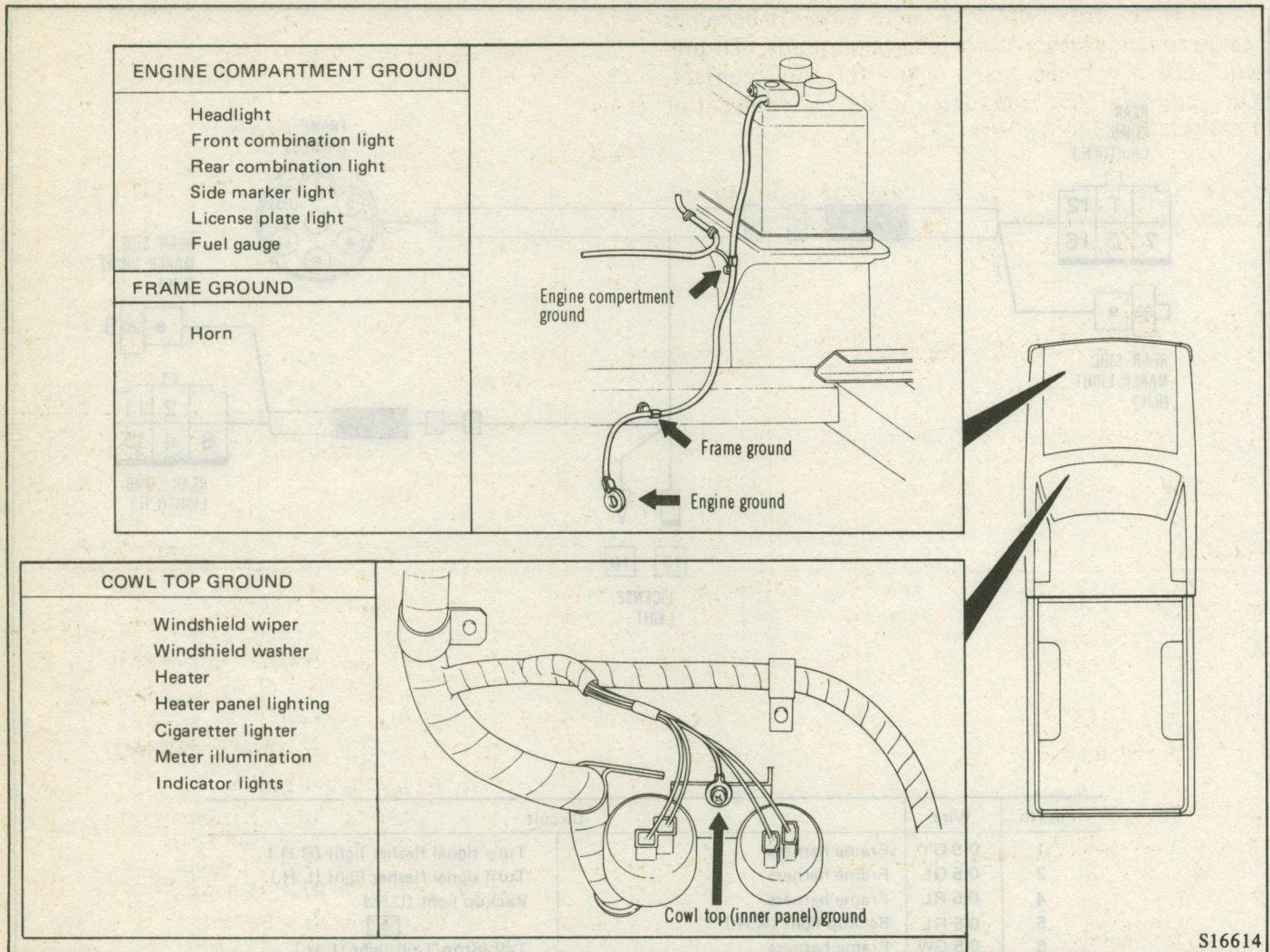


Fig. 75 Body Grounding Points

FUSE BLOCK

Inspection and Servicing

(1) When a fuse is burnt out, locate the cause, eliminate the defect entirely and replace the burnt-out fuse with a spare fuse.

(2) Be sure that replacement fuses are the correct amperage.

Never use a larger capacity fuse. When additional electrical equipment is connected to the power source, add a protective fuse of the proper rating.

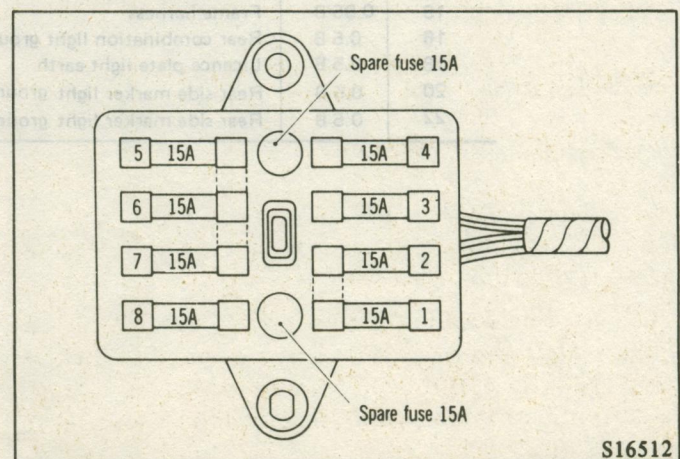


Fig. 76 Fuse Block

(3) If the fuse holder becomes loose, it becomes heated to a point that the fuse may burn out. To prevent this, check the fuse holders for good contact. When any fuse holder is found defective, replace it or the whole fuse block assembly.

NOTE: The fuse capacity and name of main circuits are shown on the cover.

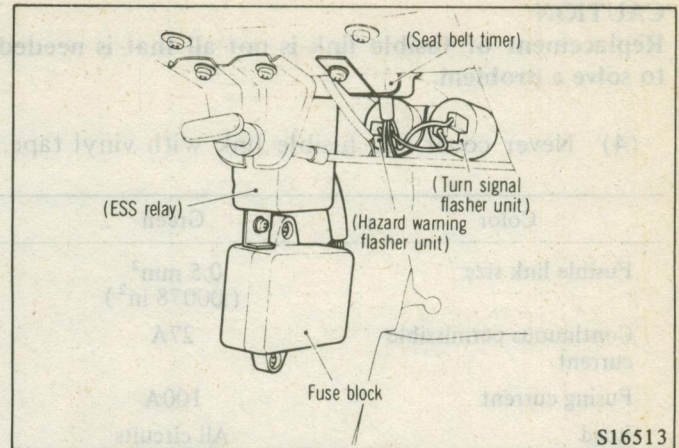


Fig. 77 Location of Fuse Block

Fuse Capacity Table

at 14.3V

Fuse No.	Fuse capacity (A)	Normal load (A)	Intermittent load (A)	Maximum load (A)	Remarks
1	15	12.1	—	12.1	Head lights (Upper beam), Upper beam indicator light
2	15	9.6	—	9.6	Head lights (Lower beam)
3	15	7.4	5.6	13.0	Horn, Washer, Heater (Air-Conditioning)
4	15	4.7	8.0	12.7	Wiper, Radio, Cigarette lighter
5	15	7.3	—	7.3	Parking lights, Tail lights, Rheostat Side marker lights (Front and Rear) License plate light, Meter ill. lights, Heater panel light, Wiper switch light
6	15	1.3	5.0	6.3	Dome light, Stop lights, Buzzer, Seat belt warning light
7	15	—	7.4	7.4	Hazard warning light, Indicator lights.
8	15	6.3	4.3	10.6	Turn signal lights, Back up lights, Belt timer, Inhibitor switch and light, Meter and Gauge (Tacho, Fuel, Water temp.) Indicator lights (Charging, Brake, Oilpressure, Turn signal)

FUSIBLE LINK

Inspection and Servicing

(1) Check fusible link for continuity with a tester. Visual inspection is not enough to detect a melted fusible link. (Fig. 78)

(2) If the fusible link is burnt out within 15 seconds after power is supplied, a current as high as about 100 to 150A is flowing through the circuit. Be sure not to use a fusible link beyond capacity or standard wire.

(3) When the fusible link is melted, a dead short may be the cause. Check for dead short very carefully, and eliminate it completely.

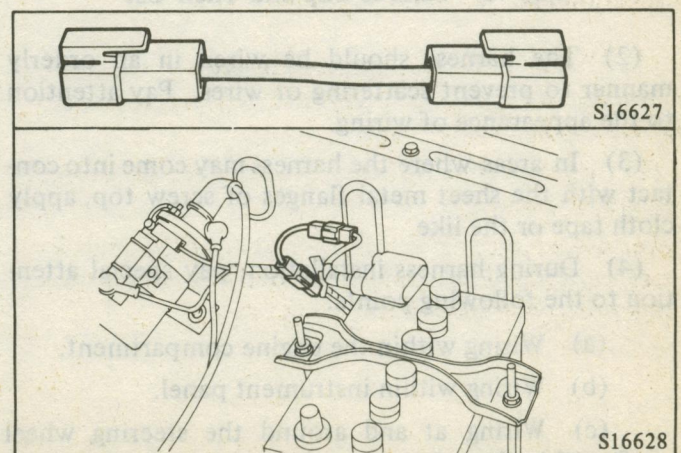


Fig. 78 Fusible Link

CAUTION:

Replacement of fusible link is not all that is needed to solve a problem.

- (4) Never cover the fusible link with vinyl tape.

Color	Green
Fusible link size	0.5 mm ² (.00078 in ²)
Continuous permissible current	27A
Fusing current	100A
Load	All circuits

WIRING HARNESS

(1) The harness should be clamped securely at specified locations. In addition, at positions where harness insulating coating is liable to be damaged due to contact with moving parts, vibration, sliding, sag, etc., provide clips as required and clamp the harness. (Fig. 79)

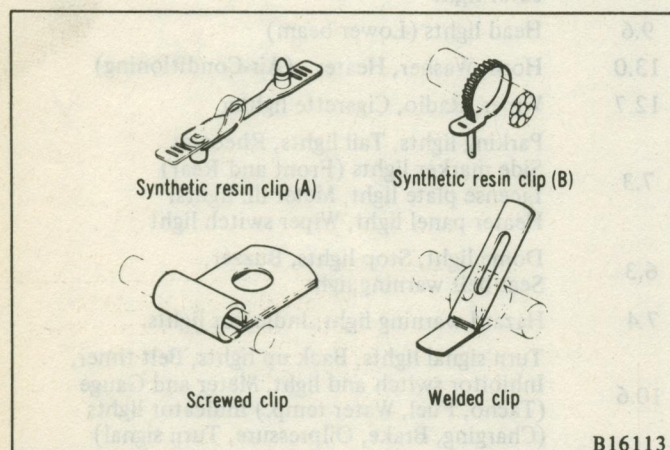


Fig. 79 Various Clip and Their Use

(2) The harness should be wired in an orderly manner to prevent scattering of wires. Pay attention to the appearance of wiring.

(3) In areas where the harness may come into contact with the sheet metal flanges of screw top, apply cloth tape or the like.

(4) During harness installation, pay special attention to the following points:

- Wiring within the engine compartment.
- Wiring within instrument panel.
- Wiring at and around the steering wheel shaft within the column cover.

(d) Wiring on the back side of the instrument cluster.

(e) Wiring around the top of the side shell.

(5) When connecting cables, hold the connector or terminal and insert the cable until firmly connected.

CAUTION:

When disconnecting cables, be sure to hold the connector. Do not pull on the cable directly.

(6) When an optional part is mounted later, pay attention to the following points as well as the mounting instructions.

(a) Determine the electrical load of the optional part and select a cable size appropriate to the optional load as specified below.

Nominal size (sectional area in mm ² of wire) [designated by SAE gauge No.]	Permissible current	
	Within engine compartment	Other areas
AWG 20 (0.5 mm ²)	7A	13A
AWG 18 (0.85 mm ²)	9A	17A
AWG 16 (1.25 mm ²)	12A	22A
AWG 14 (2.0 mm ²)	16A	30A
AWG 12 (3.0 mm ²)	21A	40A
AWG 10 (5.0 mm ²)	31A	54A

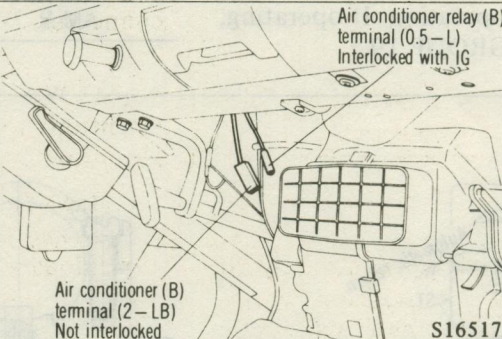
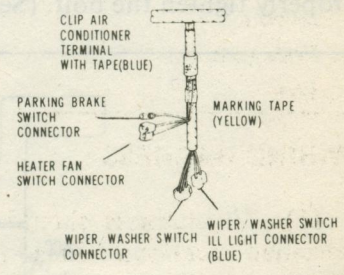
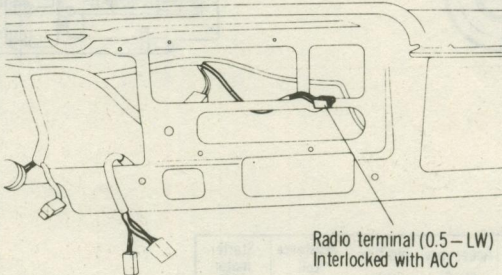
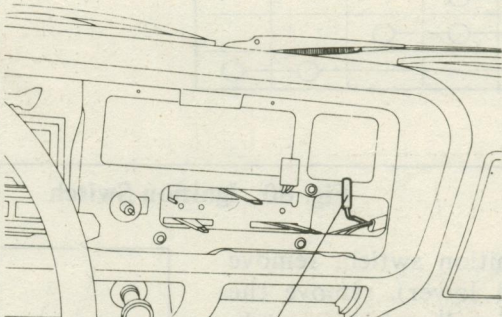
(b) It is preferable to rout the cable along the existing harnesses, taking cautions as specified under (1), (2) and (3) above.

(c) When an ammeter or other optional part is connected to a live circuit, clamp the cable or provide other protection to prevent its contact with other parts.

(d) Be sure to provide fuse protection for the optional part.

Spare Terminals

The vehicle is provided with spare terminals as shown in the following table. These terminals must be used properly and not overloaded. Overloading will cause open fuses and/or overheating of wire.

Spare terminal	Allowable current capacity	Location	Remarks
Air conditioner (B) terminal and air conditioner relay (B) terminal	Air-con (B) terminal: 16A or less In case the terminal is used for equipment other than air conditioner, the fuses appropriate for the respective purpose should be installed independently. Air-con relay (B) terminal: The terminal should be used only for air conditioner relay.	 S16517	 S16504
Radio terminal (interlocked with ACC)	1.5A or less The vehicle without radio, the terminal may be used for a car stereo or a CB.	 S16515	
Cigarette lighter (interlocked with ACC)	120W (12V) or less In case of the vehicle with cigarette lighter, the receptacle for cigarette lighter may be used for other various purposes. Even though the vehicle without cigarette lighter, the terminal for cigarette lighter may be used various purposes. In both cases, the terminal should not be applied more than above load.	 S16516	The specified load should be strictly observed, because overload could burn the ignition switch or wire harness.

IGNITION SWITCH (See Fig. 80)

Specifications

The ignition switch is a steering wheel lock type. When the key is turned to LOCK position and pulled out, a lock pin automatically ejects from the key cylinder and enters a groove in the steering shaft, locking the steering wheel.

(1) When installing the ignition switch to the column tube, attach it temporarily and insert the ignition key to check the lock operation. If operating properly tighten the bolt. (See GROUP 19.)

Description	Standard value	Remarks
Rated voltage	12V	Voltage drops to 200mV at 10A
Inter-terminal load capacity		
AM-IG	25A	
AM-ST	15A	
AM-ACC	10A	
AM-R	5A	

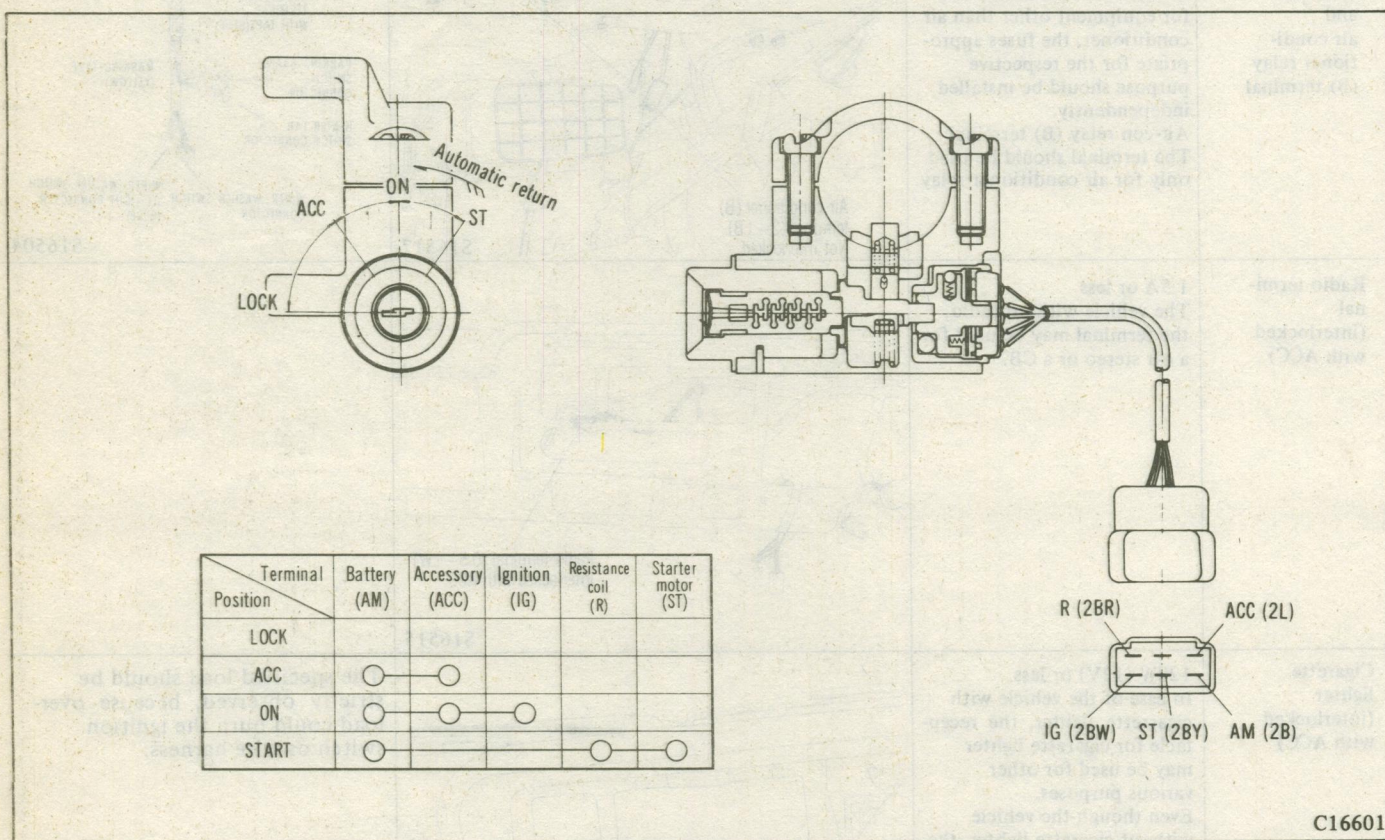


Fig. 80 Ignition Switch

(2) When replacing the ignition switch, remove the column cover (upper and lower), remove the screw holding the switch, and pull out the switch. (Fig. 81)

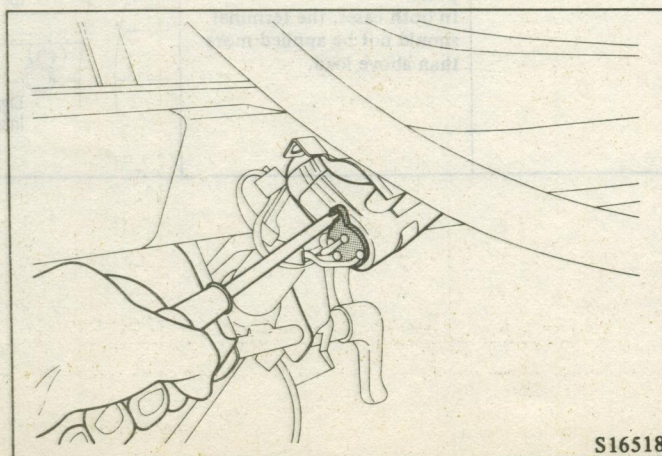
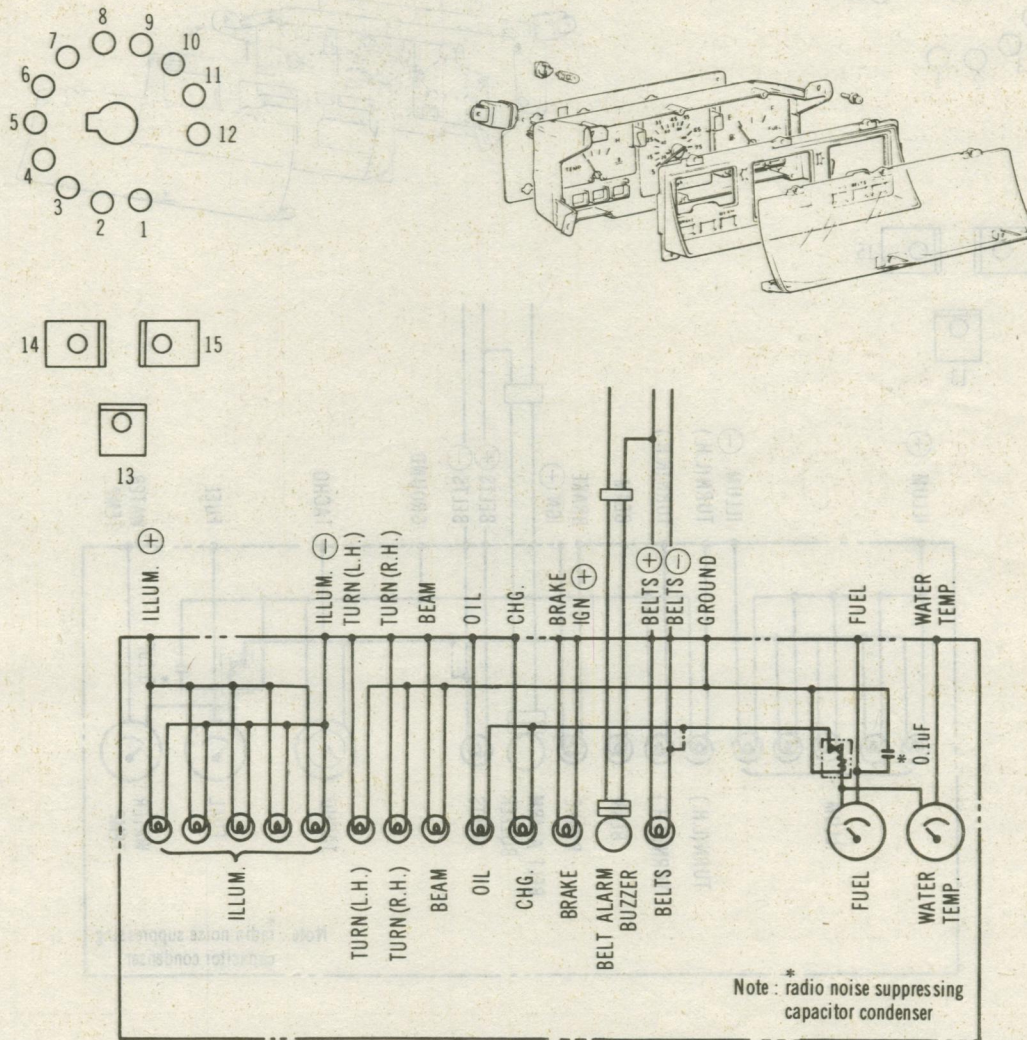


Fig. 81 Removing the Ignition Switch

METERS, GAUGES AND INDICATORS

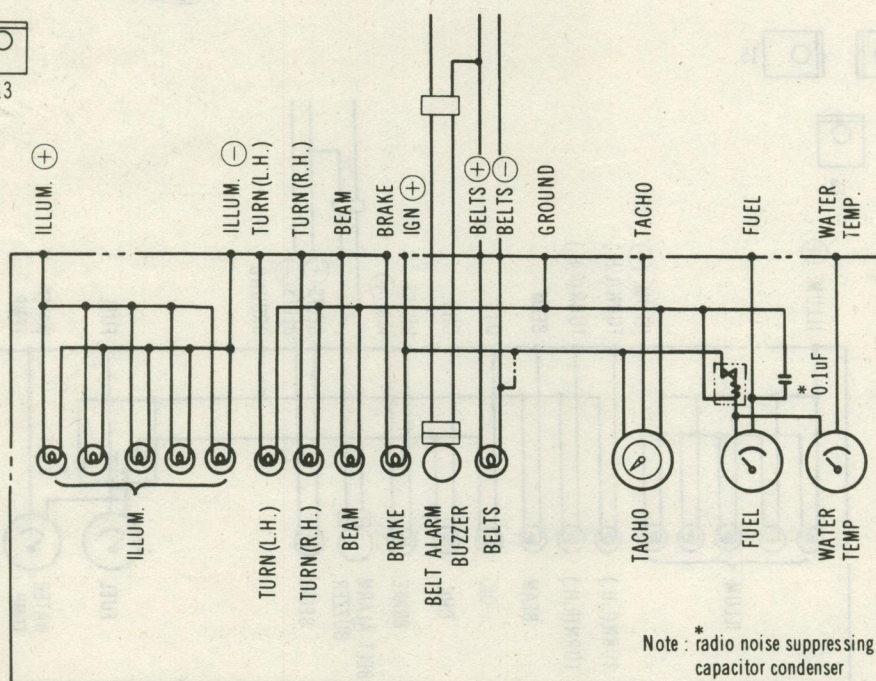
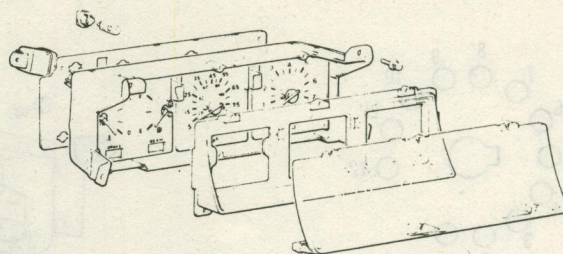
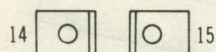
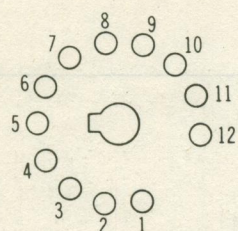
INSTRUMENT CLUSTER



S16766
S16767
S16632

Symbol	Terminal description		Symbol	Terminal description	
1	Charging	CHG	9	Turn signal (left)	TURN (L.H.)
2	Belt ⊕	BELT ⊕	10	Water temperature gauge unit	WATER TEMP.
3	Belt ⊖	BELT ⊖	11	Brake	BRAKE
4	Ignition ⊕	IGN ⊕	12	Upper beam	BEAM
5	Fuel gauge unit	FUEL	13	Oil pressure	OIL
6	Ground	GROUND	14	Meter illumination ⊖	ILLUM ⊖
7	—	—	15	Meter illumination ⊕	ILLUM ⊕
8	Turn signal (right)	TURN (R.H.)			

Fig. 82 Instrument Cluster Arrangement (with U-engine)



Note : * radio noise suppressing
capacitor condenser

S16769
S16768
S16632

Symbol	Terminal description		Symbol	Terminal description	
1	—	—	9	Turn signal (left)	TURN (L.H.)
2	Belt ⊕	BELT ⊕	10	Water temperature gauge unit	WATER TEMP.
3	Belt ⊖	BELT ⊖	11	Brake	BRAKE
4	Ignition ⊕	IGN ⊕	12	Upper beam	BEAM
5	Fuel gauge unit	FUEL	13	Oil pressure	OIL
6	Ground	GROUND	14	Meter illumination ⊖	ILLUM ⊖
7	Tachometer	TACHO	15	Meter illumination ⊕	ILLUM ⊕
8	Turn signal (right)	TURN (R.H.)			

Fig. 83 Instrument Cluster Arrangement (with W-engine)

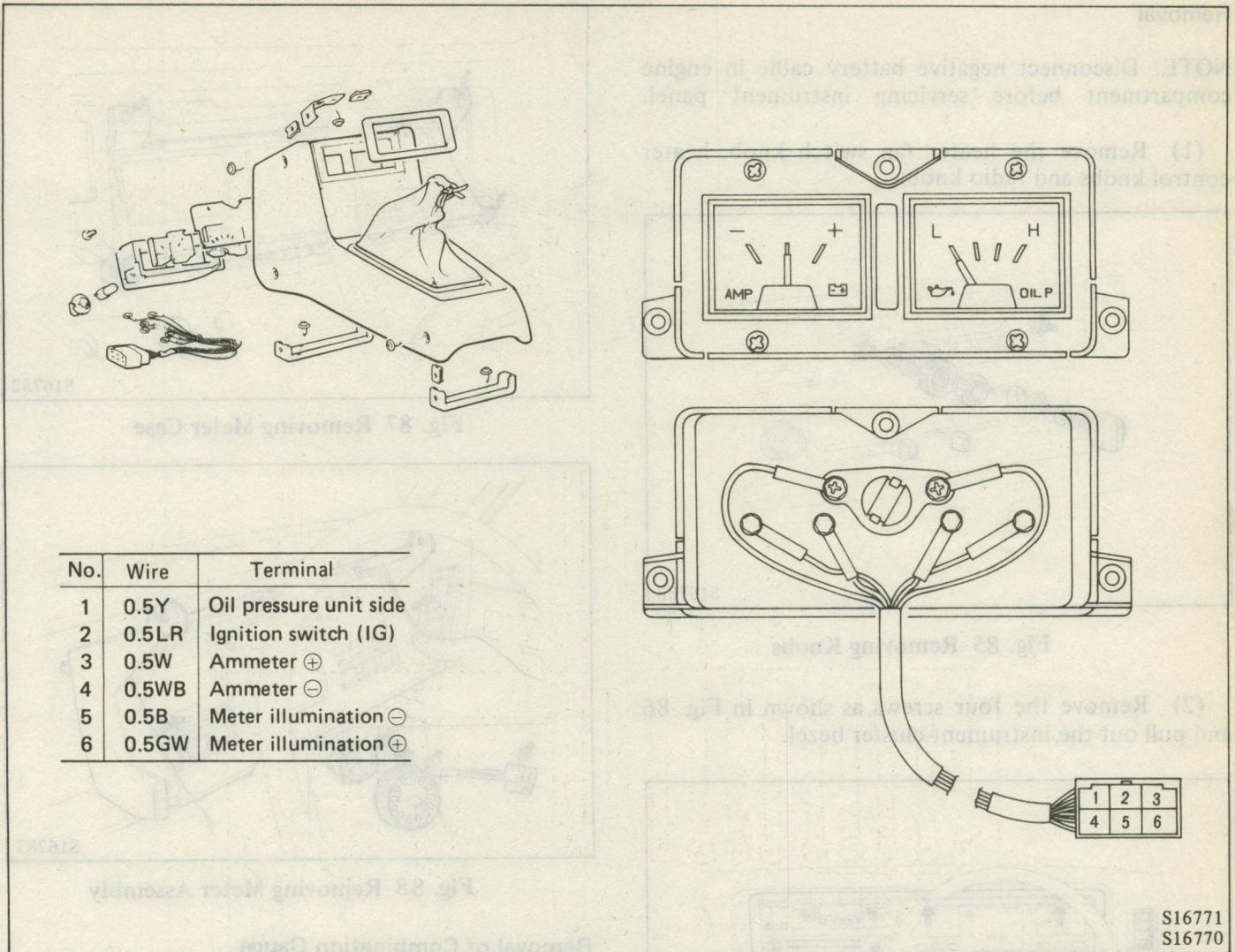
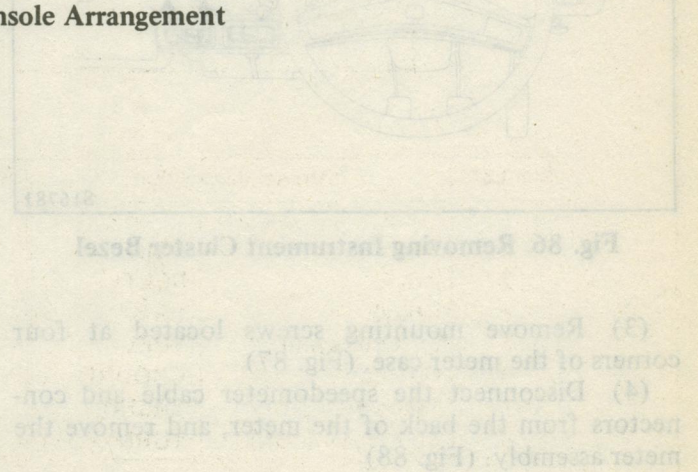
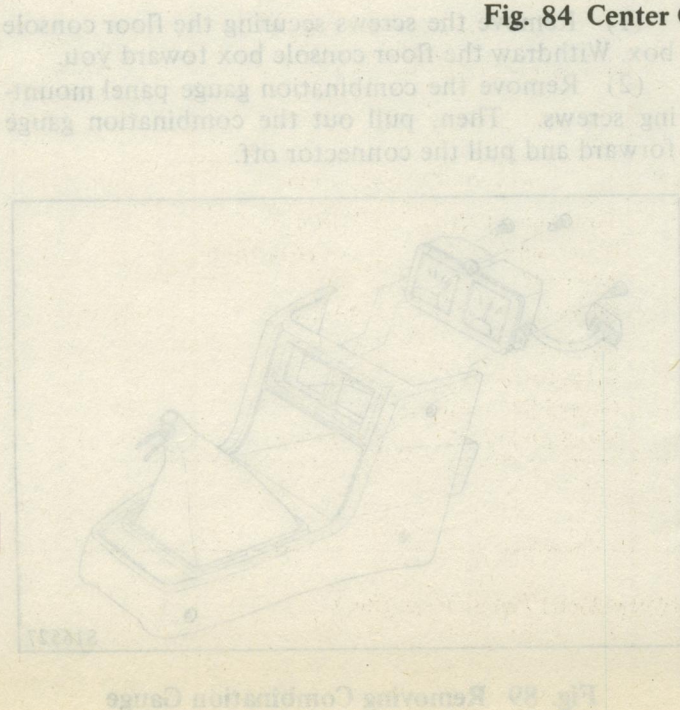


Fig. 84 Center Console Arrangement



Removal

NOTE: Disconnect negative battery cable in engine compartment before servicing instrument panel.

(1) Remove the heater fan switch knob, heater control knobs and radio knobs.

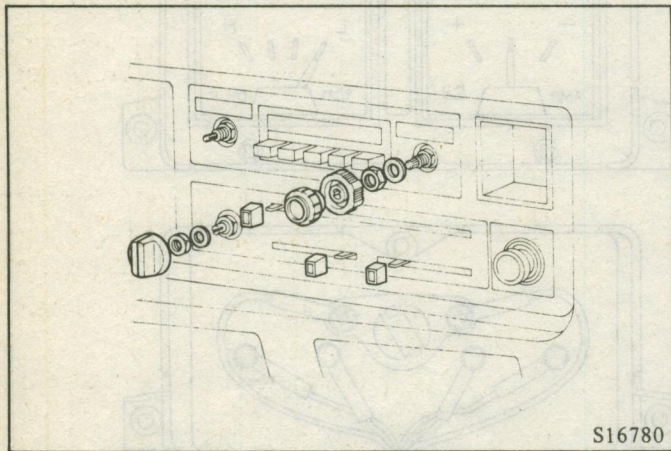


Fig. 85 Removing Knobs

(2) Remove the four screws as shown in Fig. 86 and pull out the instrument cluster bezel.

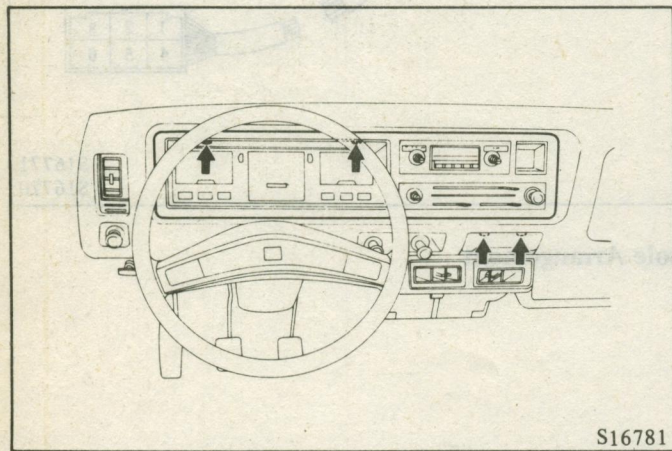


Fig. 86 Removing Instrument Cluster Bezel

(3) Remove mounting screws located at four corners of the meter case. (Fig. 87)

(4) Disconnect the speedometer cable and connectors from the back of the meter, and remove the meter assembly. (Fig. 88)

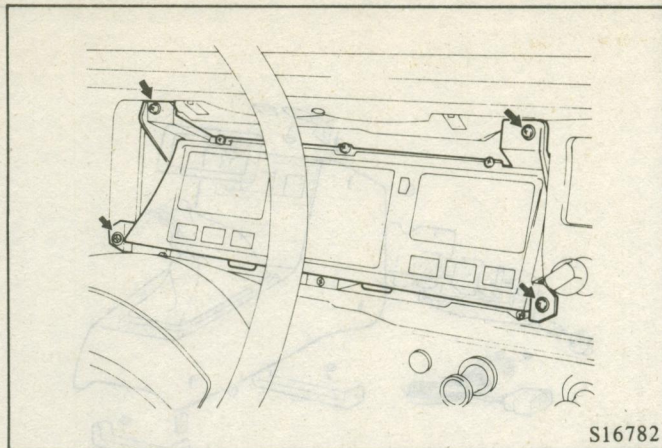


Fig. 87 Removing Meter Case

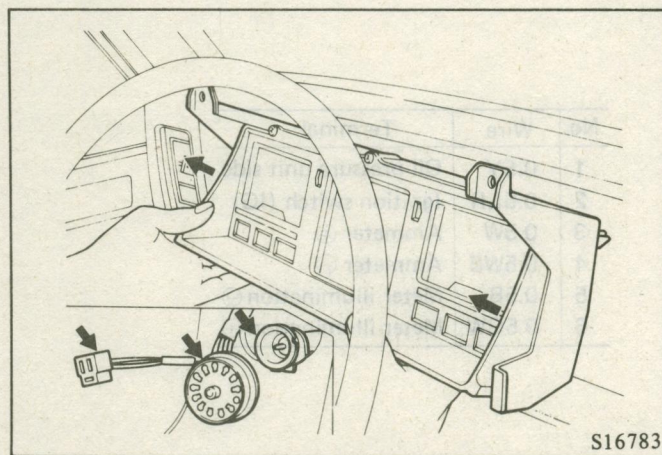


Fig. 88 Removing Meter Assembly

Removal of Combination Gauge

(1) Remove the screws securing the floor console box. Withdraw the floor console box toward you.

(2) Remove the combination gauge panel mounting screws. Then, pull out the combination gauge forward and pull the connector off.

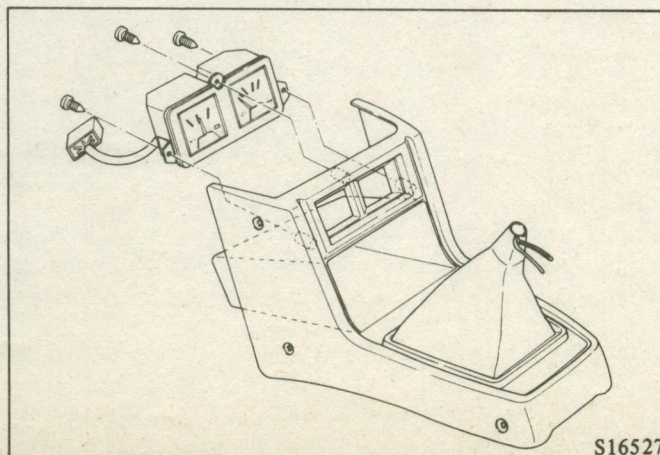


Fig. 89 Removing Combination Gauge

Disassembly

- (1) Remove the lens attaching screws from the meter case, and remove the lens and bezel.

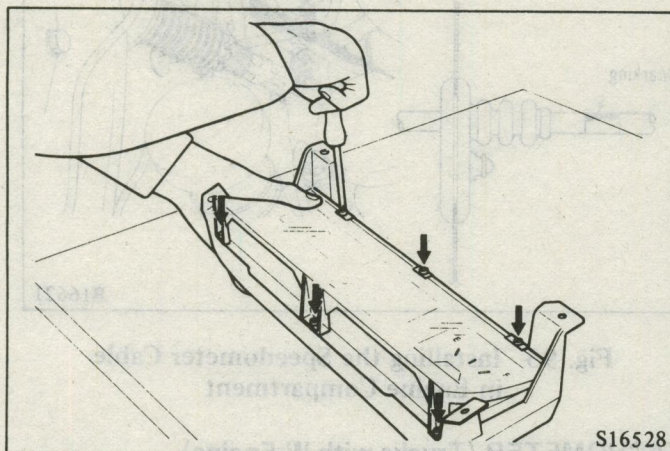


Fig. 90 Removing the Lens Attaching Screws

- (2) Remove fasteners from the printed circuit board, and remove the speedometer, tachometer and gauges.

Reassembly

- (1) When attaching the meter case, do not tighten screws too tight, otherwise damage will result.
- (2) Use care to prevent damage to the printed wiring on the surface of the printed circuit board.

Installation

When installing the instrument cluster, pay attention to the following points:

- (1) Securely clip the cable and harness with clip.
- (2) Make certain that harness does not interfere with the sliding parts.
- (3) Set up the speedometer cable so there is no looseness in the cabin.

SPEEDOMETER

Meter indication		mph indication (For U.S.A.)				km/h indication (For Canada)				
Description										
Speedometer	Type	Electromagnetic induction system rotating pointer type								
	Maximum scale	85 mph				140 km/h				
	Rpm vs. indication ratio	60 mph indicated with speedometer cable rotating at 1,000 rpm				60km/h indicated with speedometer cable rotating at 637 rpm				
Odometer	Integrating meter speed ratio	1 mile integrated every time the speedometer cable turns through 1,000 rotations				1 km integrated every time the speedometer cable turns through 637 rotations				
Speedometer indicating standard	Speed	10	25	50	75 mph	20	40	60	80	120 km/h
	Tolerance	+3 -0	+3.5 +0.3	+3.5 +0.3	+3.5 +0.3 mph	+5 0	+5.5 +0.5	+5.5 +0.5	+5.5 +0.5	+5.5 +0.5 km/h

* Last digit shows 0.1 mile (0.1 km) in unit.

Inspection

Using a speedometer tester, check the speedometer operation. If the meter shows a faulty indication or produces abnormal noise, inspect the speedometer and speedometer cable and repair or replace as found necessary.

Speedometer Cable

- (1) The speedometer cable should be replaced as an assembly. Note that cable length varies with type of transmission.

	Manual transmission	Automatic transmission
Overall cable length	1540 mm (60.63 in.)	1450 mm (57.09 in.)
Marking tape color	Green	Yellow

- (2) When connecting cable to the speedometer, insert the cable until its stopper properly fits in the speedometer side groove. After the cable has been installed, pull it to see if its stopper is properly in the groove. (Fig. 91)

CAUTION:

Poor installation of the cable may cause a fluctuating speedometer pointer, noise and damaged harness inside the instrument panel.

NOTE: When disconnecting the cable from the speedometer, withdraw the cable from the cluster during pacing down the cable stopper as shown in Fig. 91, and then pull out the cable.

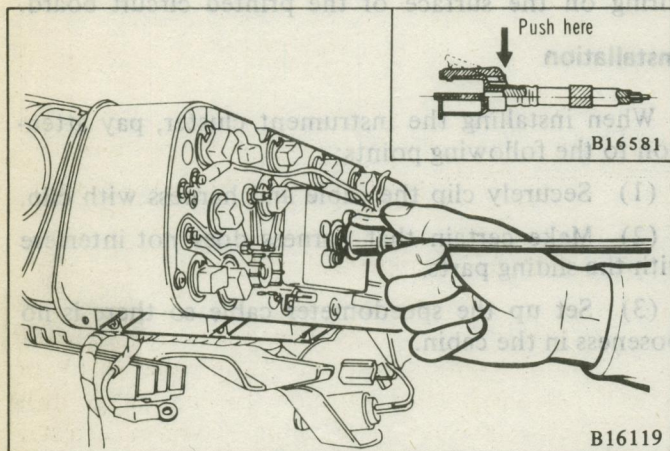


Fig. 91 Installing the Speedometer Cable

(3) A sharply bent cable will cause noise, pointer deflection and breakage of the cable itself. Use care when installing the cable.

(a) Bend the cable as round as possible with a minimum radius of 150 mm (6 in.).

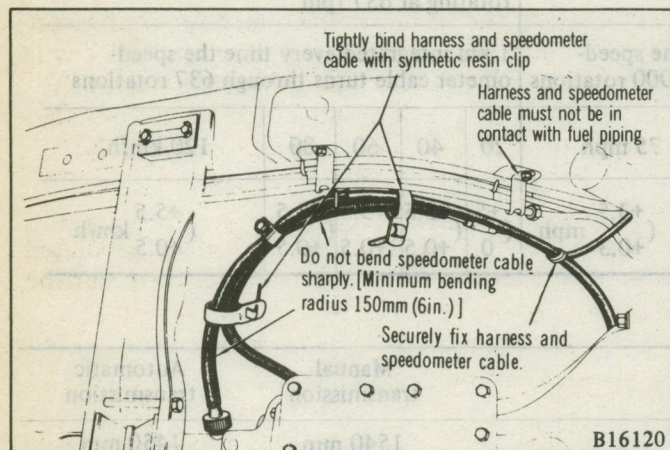


Fig. 92 Installing the Speedometer Cable Under Floor

(b) After the meter has been installed, draw out the cable from the grommet of the toe board until the cable markings (green or yellow) are visible in the engine compartment. This prevents slackness of the cable in the instrument panel. (Fig. 93)

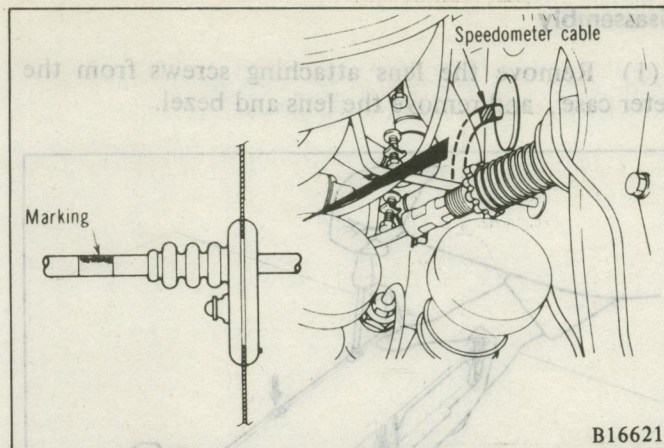


Fig. 93 Installing the Speedometer Cable in Engine Compartment

TACHOMETER (Trucks with W-Engine)

The tachometer is a pulse impact type meter that converts the rate of ignition coil pulses resulting from the switching of the distributor points to a DC current proportional to engine speed.

Inspection

Connect tachometer to a calibrated tune-up tester and compare tester and tachometer reading at different engine speeds. If the tachometer reading differs excessively from the tester reading, replace it.

Description	Specifications
Speed ratio (Indication/distributor)	5,000 rpm/2,500 rpm
Operational principle	Ignition coil pulse
Indication tolerance [at 13.5V, 25°C (77°F)]	
1,000 rpm	±100 rpm
2,000 rpm	±100 rpm
3,000 rpm	±150 rpm
4,000 rpm	±200 rpm
5,000 rpm	±250 rpm
6,000 rpm	±300 rpm
7,000 rpm	±350 rpm
6,000 to 8,000 rpm	Red zone

CAUTION:

The tachometer is (—) grounded. When the battery is connected, make certain the polarity is not reversed. Reverse polarity could cause damage to the transistor and diode.

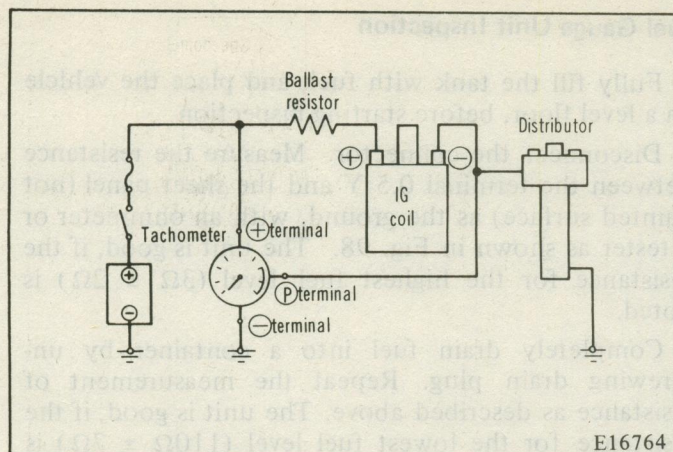


Fig. 94 Tachometer

FUEL GAUGE AND UNIT

The fuel gauge is the bimetal type, while the gauge unit is the variable resistance type. In order to prevent indication errors due to voltage fluctuation, the circuit has a voltage limiter, from which a voltage of $7.0 \pm 0.2V$ is applied to the fuel gauge and the gauge unit.

Description	Specifications
Fuel gauge	
Type	Bimetal type
Winding resistance	55Ω
Standard current	
E	46.7mA
½	80.0mA
F	112.9mA
Gauge unit	
Type	Variable resistance
Standard resistance	
E	110±7Ω
½	32.5±4Ω
F	3.0±2Ω
Float travel	205.5 mm (8.1 in.)

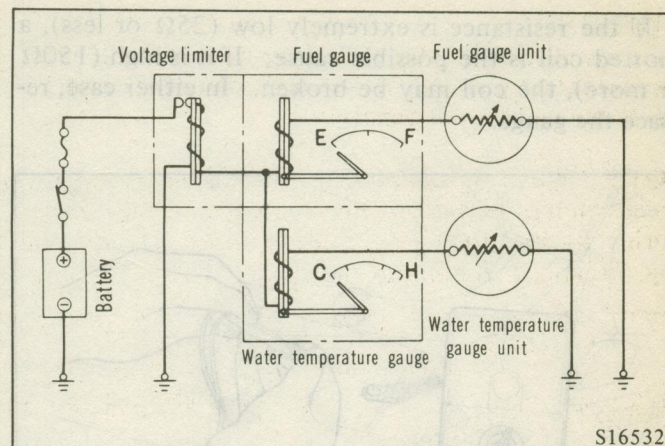


Fig. 95 Fuel and Water Temperature Gauge Circuit

Simple Check of Constant-Voltage Limiter

Turn ignition switch ON (Engine is not started). After 1 or 2 minutes, disconnect the cable (0.5Y or 0.5YR) from the connector of the fuel gauge unit or water temperature gauge unit. Connect a tester or voltmeter (10V range), with positive terminal to the cable, and negative terminal to the body as ground.

If the pointer swings in the range from around 1V to 7 (± 0.2) V at a high, and regular frequency, the constant voltage limiter is in a satisfactory condition.

Simple Check of Fuel Gauge

Disconnect the gauge unit connector or the connector at the instrument panel and ground 0.5Y wire directly to the body. If the pointer indicates "F", the fuel gauge may be considered to be in a satisfactory condition. If not, check the gauge assembly.

CAUTION:

Prolonged flow of current with the gauge grounded causes the coil to overheat. Therefore, carry out the check quickly.

Fuel Gauge Continuity Test

Roll up the floor mat outboard of passenger's seat to locate the connector. Disconnect the connector by depressing tab on the hook.

Measure resistance between terminals 0.5 Y and 0.5 RL as shown in Fig. 96 with an ohmmeter or a tester. A reading of around 55Ω will show the fuel gauge is in good condition.

If the resistance is extremely low (25Ω or less), a shorted coil is the possible cause; If it is high (150Ω or more), the coil may be broken. In either case, replace the gauge.

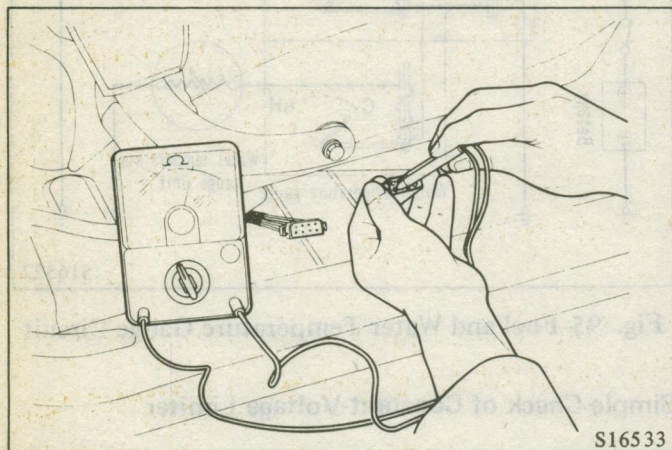


Fig. 96 Fuel Gauge Continuity Test

Fuel Gauge Indication Test

Turn ignition switch ON (Engine is not started). Disconnect the cable (0.5Y) from the connector of the fuel gauge unit shown in Fig. 97.

Connect a variable resistor between the terminal 0.5 Y and sheet panel (not painted surface) as shown in Fig. 97.

If fuel gauge indicates F and E respectively under the resistance of variable resistor as table below, the fuel gauge is normal. If the deviation is large, replace fuel gauge.

Resistance	Gauge reading
$7 \pm 0.38 \Omega$	Gauge indication : F
$95 \pm 3.8 \Omega$	E

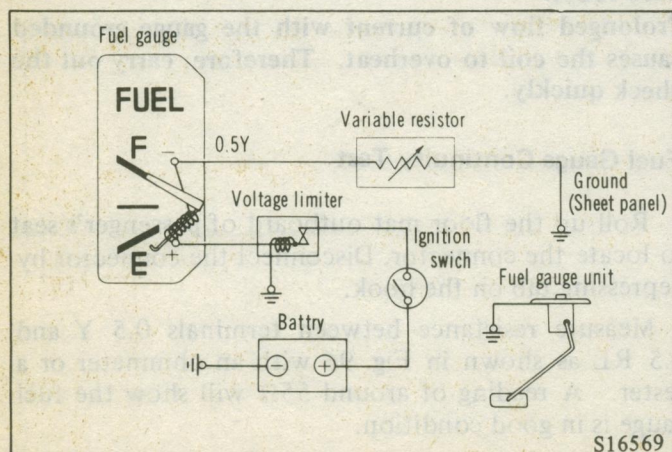


Fig. 97 Fuel Gauge Indication Test

Fuel Gauge Unit Inspection

Fully fill the tank with fuel, and place the vehicle on a level floor, before starting inspection.

Disconnect the connector. Measure the resistance between the terminal 0.5 Y and the sheet panel (not painted surface) as the ground, with an ohmmeter or a tester as shown in Fig. 98. The unit is good, if the resistance for the highest fuel level ($3\Omega \pm 2\Omega$) is noted.

Completely drain fuel into a container by unscrewing drain plug. Repeat the measurement of resistance as described above. The unit is good, if the resistance for the lowest fuel level ($110\Omega \pm 7\Omega$) is noted.

If deviation is large, remove fuel gauge unit for checkout.

Float position	Resistance	Remarks
At upper limit	$3 \pm 2\Omega$	(at full fill)
At lower limit	$110 \pm 7\Omega$	(at empty)

Cautions for Fuel Gauge Unit

(1) Since fuel gauge unit is hard to remove, the removal should not be attempted until constant-voltage limiter, fuel gauge, and gauge unit are thoroughly examined.

(2) When installing the gauge unit, coat both sides of the packing with a sealant to prevent gasoline leak. Also, use care so that the float arm will not be bent.

(3) After the gauge unit is installed, make certain that the unit is grounded properly.

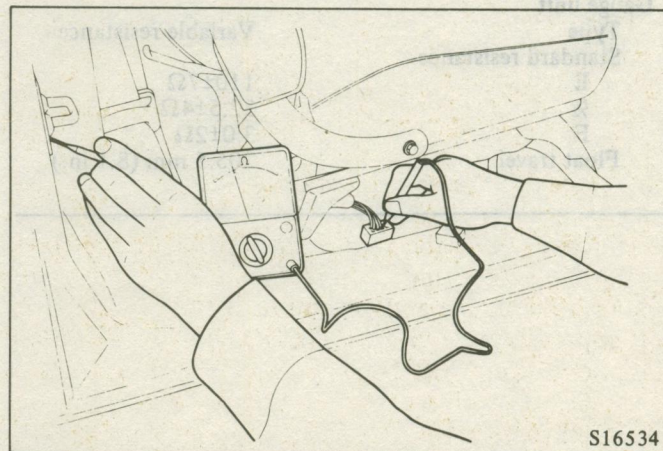


Fig. 98 Checking the Gauge Unit

WATER TEMPERATURE GAUGE AND UNIT

The water temperature gauge is the bimetal type, while the gauge unit is the thermistor type. To prevent gauge indication errors due to voltage fluctuations, the circuit has a voltage limiter which maintains a constant voltage of $7.0 \pm 0.2V$.

NOTE: The voltage limiter built in the fuel gauge serves both water temperature gauge and fuel gauge.

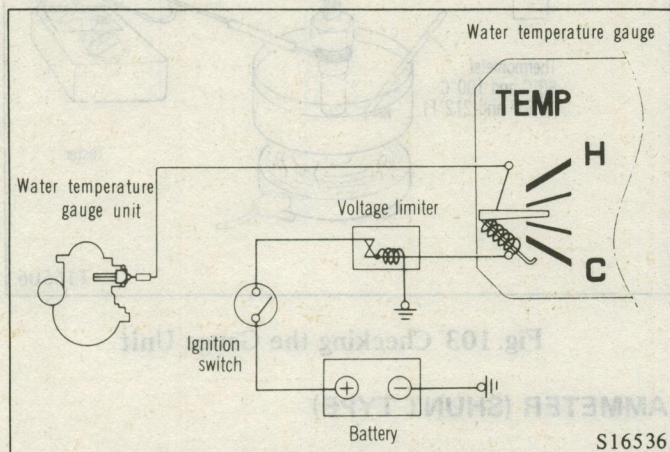


Fig. 99 Water Temperature Gauge Circuit

Description	Specifications
Water temperature gauge	
Type	Bimetal type
Winding resistance	55Ω
Standard current	
80°C (176°F)	53.7mA
100°C (212°F)	73.0 mA
Gauge unit	
Type	Thermistor type
Standard resistance	
80°C (176°F)	75.4Ω
100°C (212°F)	40.9Ω

Simple Check of Water Temperature Gauge

Disconnect the cable from the connector of the temperature gauge unit, connect a 75Ω resistor in series with the gauge and ground it. If the gauge indicates approximately 80°C (176°F), it is in a satisfactory condition. (Fig. 100)

CAUTION:

When checking the water temperature gauge, do not ground the terminal directly. Be sure to use a resistor in series to ground.

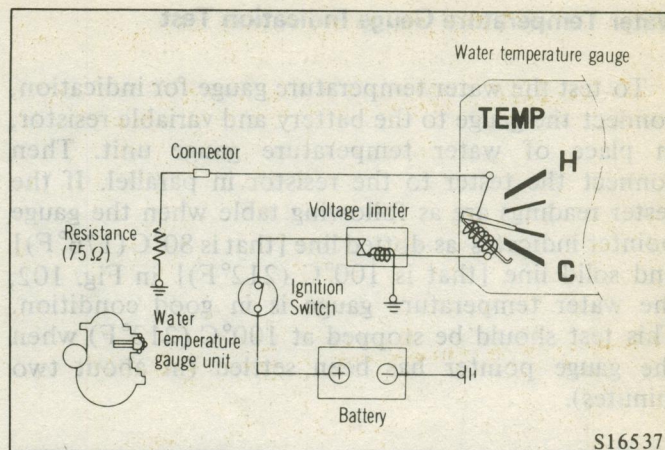


Fig. 100 Checking Water Temperature Gauge

Water Temperature Gauge Continuity Test

Disconnect negative terminal of the battery and the cable (0.5YR) from the connector of the water temperature gauge unit. Turn ignition switch ON.

Measure resistance between terminal of the connector (0.5YR) and positive terminal of the ignition coil as shown in Fig. 101 by an ohmmeter or a tester.

Description	Standard value
Resistance between "a" and "b"	55Ω

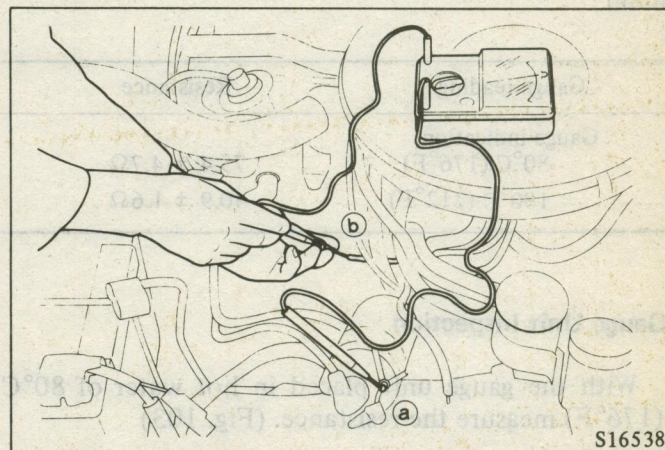


Fig. 101 Water Temperature Gauge Continuity Test

Water Temperature Gauge Indication Test

To test the water temperature gauge for indication, connect the gauge to the battery and variable resistor, in place of water temperature gauge unit. Then connect the tester to the resistor in parallel. If the tester readings are as following table when the gauge pointer indicates as dotted line [that is 80°C (176°F)] and solid line [that is 100°C (212°F)] in Fig. 102, the water temperature gauge is in good condition. This test should be stopped at 100°C (212°F) when the gauge pointer has been settled (in about two minutes).

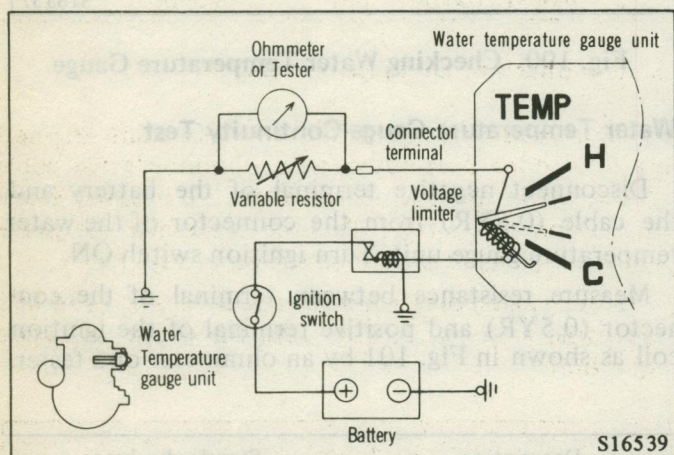


Fig. 102 Checking Water Temperature Gauge Indication

NOTE: Use variable resistor of 0.5W (1/2W) minimum.

Gauge reading	Resistance
Gauge indication 80°C (176°F)	75.4 ± 4.7Ω
100°C (212°F)	40.9 ± 1.6Ω

Gauge Unit Inspection

With the gauge unit placed in hot water of 80°C (176°F) measure the resistance. (Fig. 103)

CAUTIONS:

- The heat sensing section of the gauge unit and the thermometer should be maintained off the heated part of the hot water container.
- Stir the water until the temperature becomes uniform.

Measuring temperature

Standard resistance

80°C (176°F)

69.4Ω

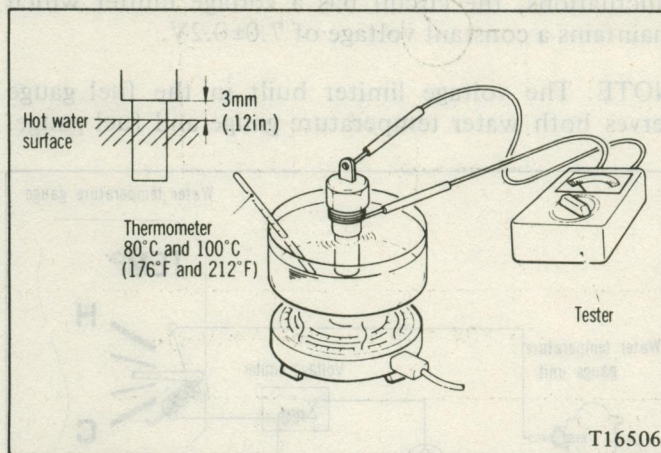


Fig. 103 Checking the Gauge Unit

AMMETER (SHUNT TYPE)

The ammeter circuit is of the shunt resistance type in which only one thirtieth of indicated current flows in the ammeter.

The ammeter consists of a permanent magnet accommodated in the meter case and a moving iron piece with a pointer. When current flows through the current circuit, the pointer swings in (+) or (-) direction, depending on the magnetic flux variation in the direction of current flow and the amount of the current.

Simple Check of Ammeter

Connect a 3.4W bulb in series with the shunt type ammeter. If the ammeter indicates approximately 6A, it is in a satisfactory condition. (Fig. 104)

CAUTION:

To protect the ammeter from burning, do not allow current over 1A to pass through the ammeter.

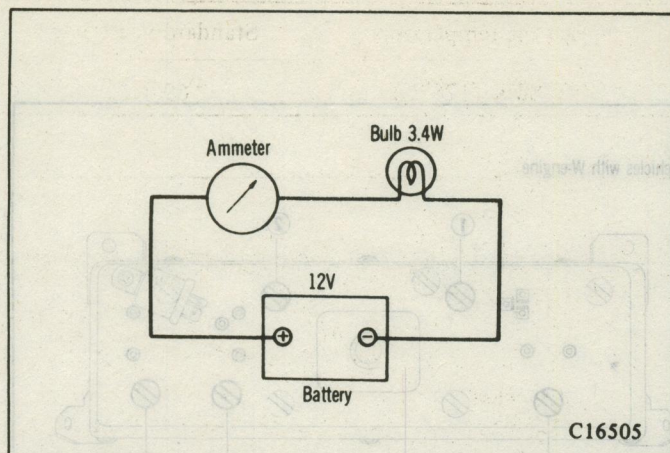


Fig. 104 Checking the Ammeter

Current	1A
Indication	$\pm 30A$
Internal resistance [at 20°C (68°F)]	$173 \pm 10 m\Omega$

OIL PRESSURE GAUGE

The oil pressure gauge and the gauge unit are both the bimetal type. The displacement of the diaphragm caused by changes in the oil pressure make the contact points close or open. The connecting pressure of the joint and the curling degree of the bimetal make the gauge pointer swing, depending on the amount of current (current value by time) flowing through the gauge.

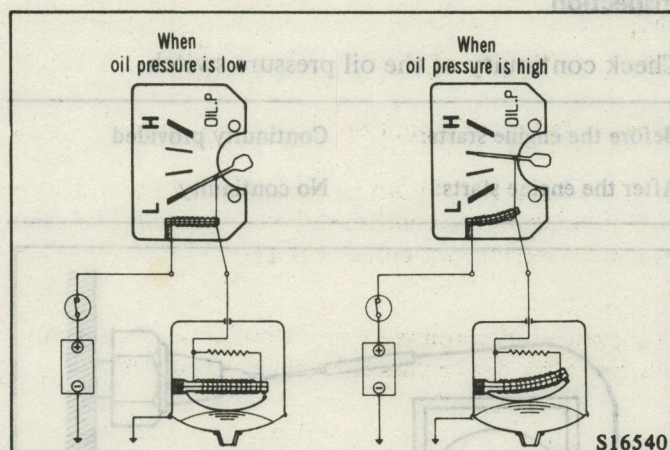


Fig. 105 Oil Pressure Gauge Operation

Description	Specifications
Oil pressure gauge	
Type	Bimetal type
Rated voltage (operating voltage)	12V
Internal resistance [at 20°C (68°F)]	38 to 42Ω
Reference current value	
0 kPa (0 psi)	0mA
414 kPa (60 psi)	83.5mA
Gauge unit	
Type	Bimetal type
Reference current value	
0 kPa (0 psi)	0mA
414 kPa (60 psi)	83.5mA

Simple Check of Oil Pressure Gauge

Turn ignition switch ON. (Do not start engine.) Wait for 1 or 2 minutes, then disconnect the cable (0.85Y) from the connector of the oil pressure gauge unit. Connect a 14V, 1.4W bulb in series to the gauge and sheet panel as ground as shown in Fig. 106.

If the gauge pointer indicates as solid line [414 kPa (60 psi.)] as shown in Fig. 106, the gauge is in good condition.

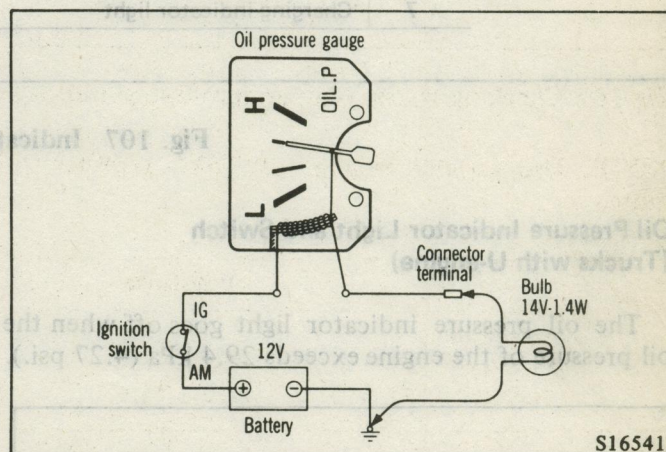


Fig. 106 Checking the Oil Pressure Gauge

Oil Pressure Gauge Unit Continuity Test

Disconnect the cable (0.85Y) from the connector of the oil pressure gauge unit. Measure the resistance between the terminal of gauge unit and cylinder block as the ground using an ohmmeter or a tester. If the pointer does not swing with engine at rest, or if the meter reads 0Ω as engine is started, the gauge unit is in good condition.

INDICATOR LIGHTS

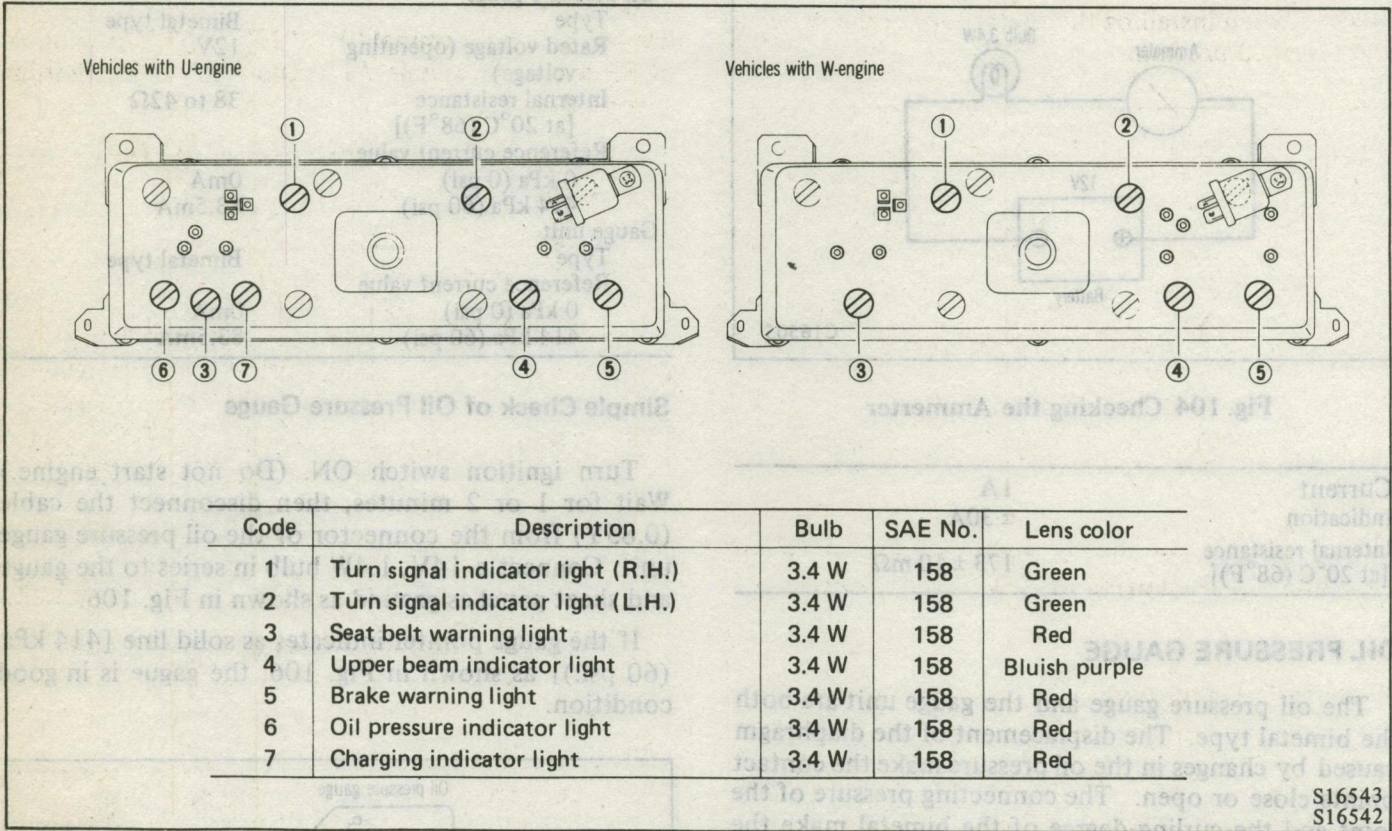


Fig. 107 Indicator Lights Arrangement

Oil Pressure Indicator Light and Switch
(Trucks with U-engine)

The oil pressure indicator light goes off when the oil pressure of the engine exceeds 29.4 kPa (4.27 psi.).

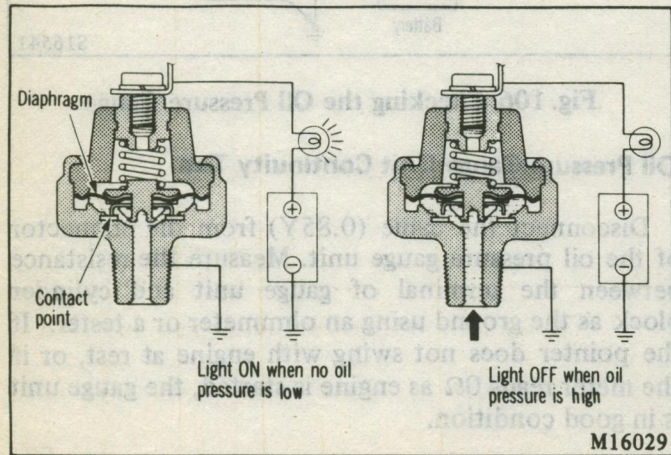


Fig. 108 Oil Pressure Switch

Inspection

Check continuity of the oil pressure switch.

Before the engine starts: Continuity provided

After the engine starts: No continuity

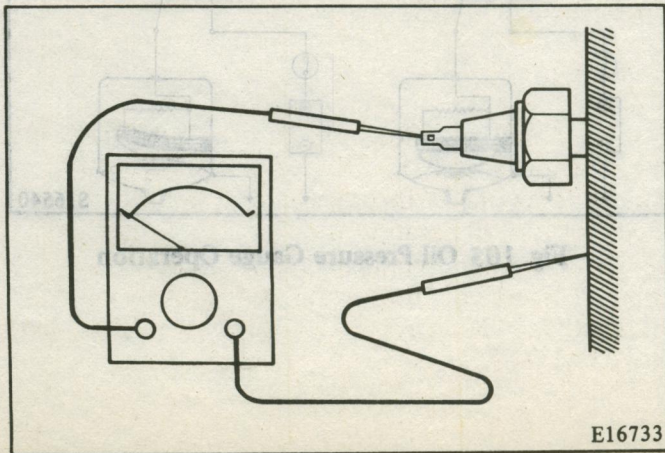


Fig. 109 Oil Pressure Switch Inspection

Removal and Installation

To remove and install the oil pressure switch, use the special tool (S-94).

NOTE: When installing the switch, apply the sealer to the threaded portion.

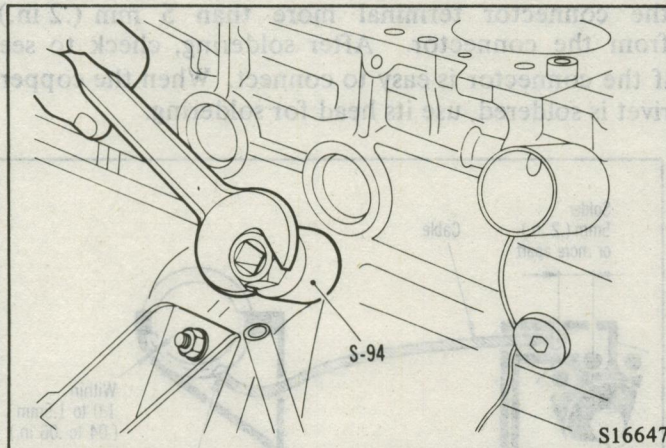


Fig. 110 Removing the Oil Pressure Switch

Charging Indicator Light (Trucks with U-engine)

The charging indicator light is actuated by three exciting diodes, instead of the relay in the electronic voltage regulator installed in the alternator.

The light illuminates with the supply of exciting current from battery to field coil of alternator through charging indicator light and initial exciting resistor.

The light goes out as the alternator starts to generate power with the start of engine, because voltage at terminal "L" rises as high as at terminal "B".

Then, detecting voltage at terminal "S", the voltage regulator automatically controls exciting current to stabilize power voltage. Now that exciting current is not supplied by battery, but directly by alternator, the light remains off.

Inspection

(1) If the indicator light turns off when turning the ignition switch to ON, or if the light goes on while the engine is in operation, a shorted or open diode of the alternator, or shorted or open circuit of the electronic voltage regulator is the possible cause. However, first refer to caution note on ALTERNATOR and ELECTRONIC VOLTAGE REGULATOR.

(2) If charging indicator light dims with engine running, check ignition switch for contact resistance, and fuse No. 8 for contact.

CAUTION:

Do not ground terminal "B", "L", or "S"; or connect wire across terminals "L" and "S", with ignition switch ON.

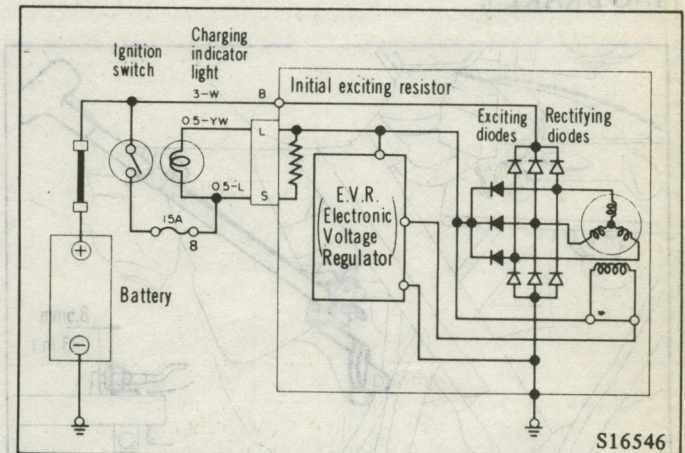


Fig. 111 Charging Indicator Light Circuit

Door Switch

Description	Standard value
Type	Push type
Rated voltage	12V
Rated load (Lamp load)	Max. 15W

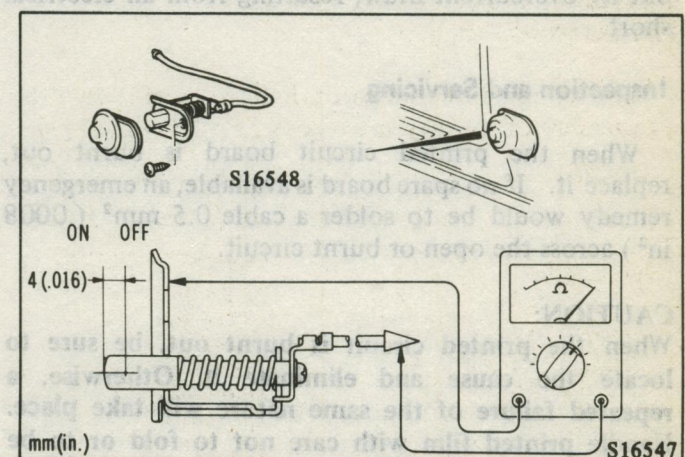


Fig. 112 Door Switch Continuity Test

Brake Warning Light and Switch

Brake warning light has been designed to illuminate with ignition switch ON, and parking brake applied.

To adjust the parking brake switch, move the switch clamp to a position where the warning light is on when the parking brake pull rod is pulled one notch up as shown in Fig. 113. Refer to GROUP 5 PARKING BRAKES.

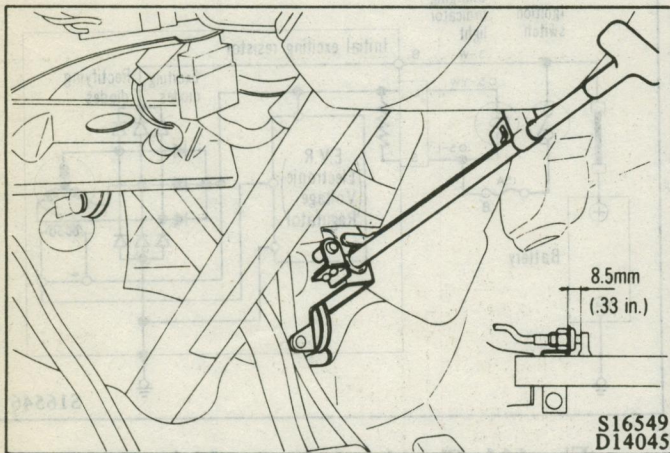


Fig. 113 Adjusting Parking Brake Switch

PRINTED CIRCUIT BOARD

Because the combination meter requires very complicated wiring, a printed circuit board is used to simplify the wiring. The printed circuit board contains thinly deposited copper [covered 0.03 to 0.05 mm (.0012 to .0020 in.)], which is instantaneously burnt out by overcurrent draw, resulting from an electrical short.

Inspection and Servicing

When the printed circuit board is burnt out, replace it. If no spare board is available, an emergency remedy would be to solder a cable 0.5 mm^2 (.0008 in²) across the open or burnt circuit.

CAUTION:

When the printed circuit is burnt out, be sure to locate the cause and eliminate it. Otherwise, a repeated failure of the same nature will take place. Handle printed film with care not to fold or to be brought near fire.

(1) Trace both ends of the burnt out circuit, and solder a cable (covered wire) to the copper deposited over a wide area around the light socket.

(2) Soldering should be done within 1.0 to 1.5 mm (.04 to .06 in.) from the circumference of the copper deposition around the light socket as shown in Fig. 114. Also, solder the cable to the copper around the connector terminal more than 5 mm (.2 in.) from the connector. After soldering, check to see if the connector is easy to connect. When the copper rivet is soldered, use its head for soldering.

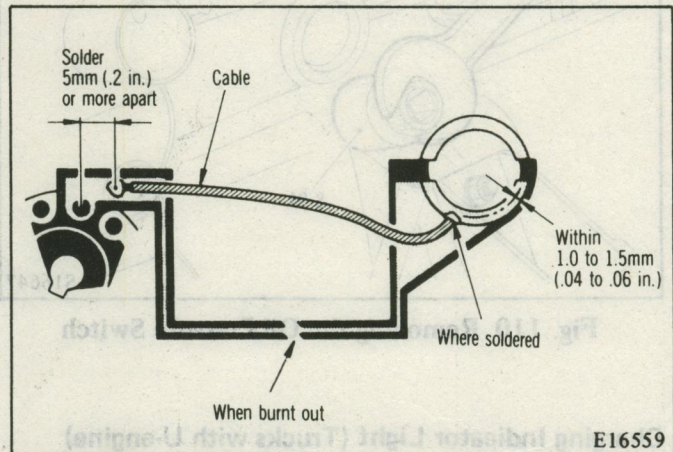


Fig. 114 Soldering Printed Wiring

(3) Polish the place to be soldered lightly with a fine-mesh sand paper. Polishing with coarse paper and extreme pressure would abrade the thin copper film.

(4) Cut off turned over copper film, if any, and bond the cut ends to the board.

(5) Insulate the soldered connections with lacquer (clear lacquer) or a similar substance.

SEAT BELT SYSTEM

SEAT BELT WARNING SYSTEM

If the driver, seated without his seat belt buckled, turns the ignition switch to ON position, the seat belt warning system is activated to provide an audible and visual reminder through a buzzer and light that the

seat belt must be fastened properly.

The seat belt warning system consists of a belt switch, buzzer, warning light, timer, etc.

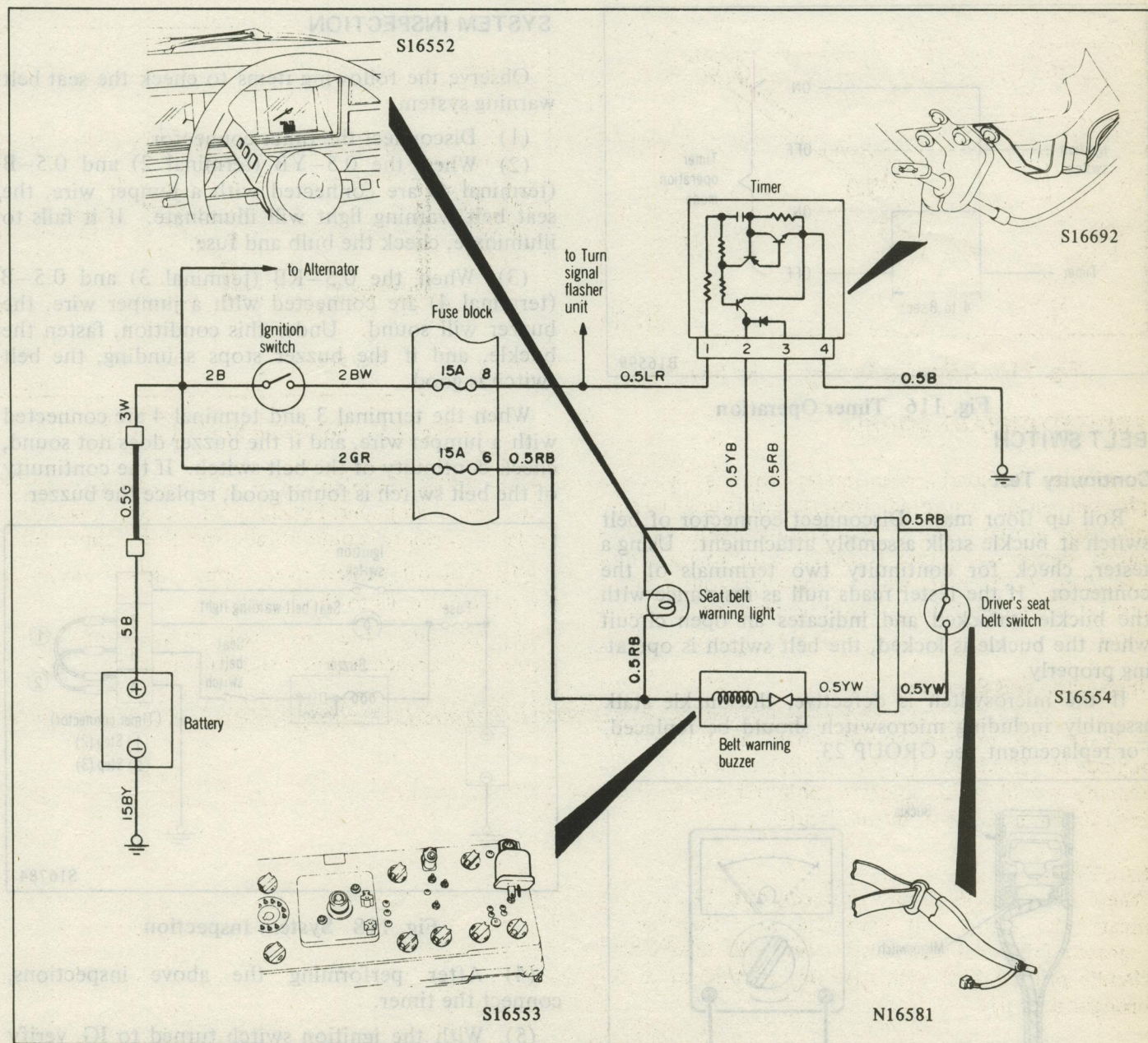


Fig. 115 Seat Belt Warning System Component Arrangement

TIMER

During timer operation, the ignition switch is in ON position and the terminals 2 and 3 are electrically connected to the terminal 4 (ground).

Description	Standard value
Rated load	3.4W (lamp) and $24 \frac{+10}{-0} \Omega$ (buzzer)
Operating temperature	-40 to 80°C (-40 to 176°F)
Operating voltage	8.0 to 16.0V

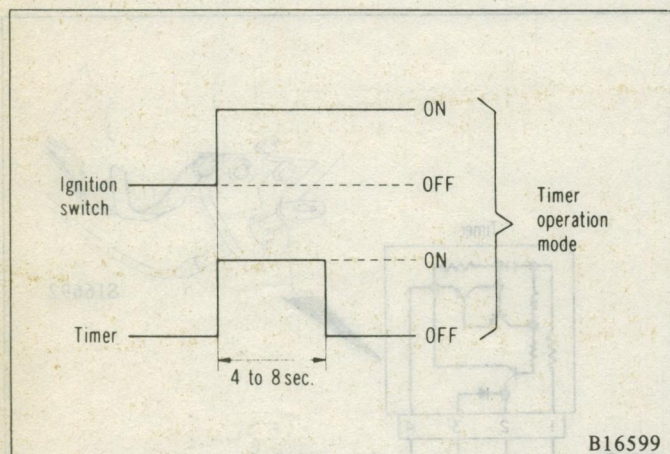


Fig. 116 Timer Operation

BELT SWITCH

Continuity Test

Roll up floor mat. Disconnect connector of belt switch at buckle stalk assembly attachment. Using a tester, check for continuity two terminals of the connector. If the tester reads null as resistance with the buckle unlocked and indicates an open circuit when the buckle is locked, the belt switch is operating properly.

If the microswitch is defective, the buckle stalk assembly including microswitch should be replaced. For replacement, see GROUP 23.

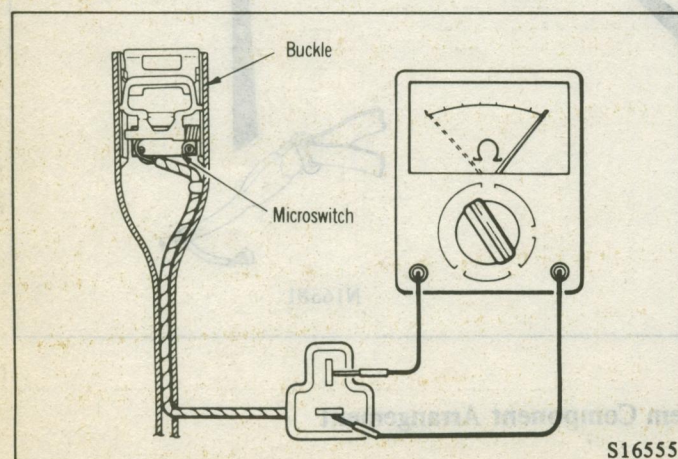


Fig. 117 Belt Switch Continuity Test

BUZZER AND WARNING LIGHT

Description	Standard value
Buzzer	
Rated voltage	12V
Operating voltage range	10 to 16V
While buzzing (Terminal voltage at 13V)	
Current	Less than 0.1A
Noise pressure	53±7dB [A scale 1m (3.3ft.)]
Fundamental frequency	900±150Hz
Warning light	3.4W

SYSTEM INSPECTION

Observe the following items to check the seat belt warning system.

(1) Disconnect the timer connector.

(2) When the 0.5-YB (terminal 2) and 0.5-B (terminal 4) are connected with a jumper wire, the seat belt warning light will illuminate. If it fails to illuminate, check the bulb and fuse.

(3) When the 0.5-RB (terminal 3) and 0.5-B (terminal 4) are connected with a jumper wire, the buzzer will sound. Under this condition, fasten the buckle, and if the buzzer stops sounding, the belt switch is good.

When the terminal 3 and terminal 4 are connected with a jumper wire, and if the buzzer does not sound, check continuity of the belt switch. If the continuity of the belt switch is found good, replace the buzzer.

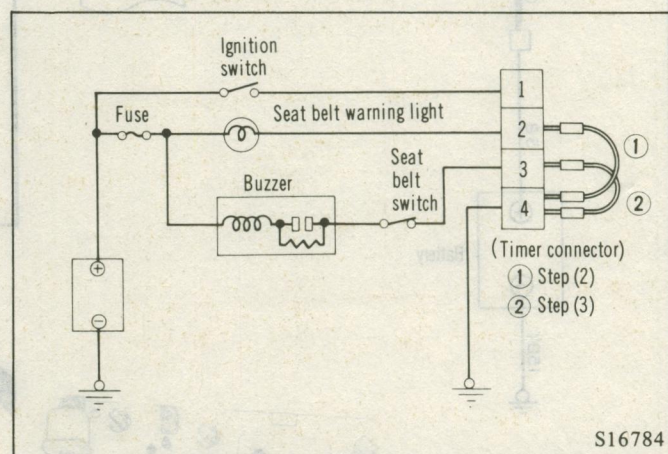


Fig. 118 System Inspection

(4) After performing the above inspections, connect the timer.

(5) With the ignition switch turned to IG, verify the function of the seat belt warning system.

Replace the timer if one of the following malfunctions shows up: the buzzer does not sound, the warning light does not illuminate, or the light does not go off even in 30 seconds.

LIGHTING SYSTEM

S16557

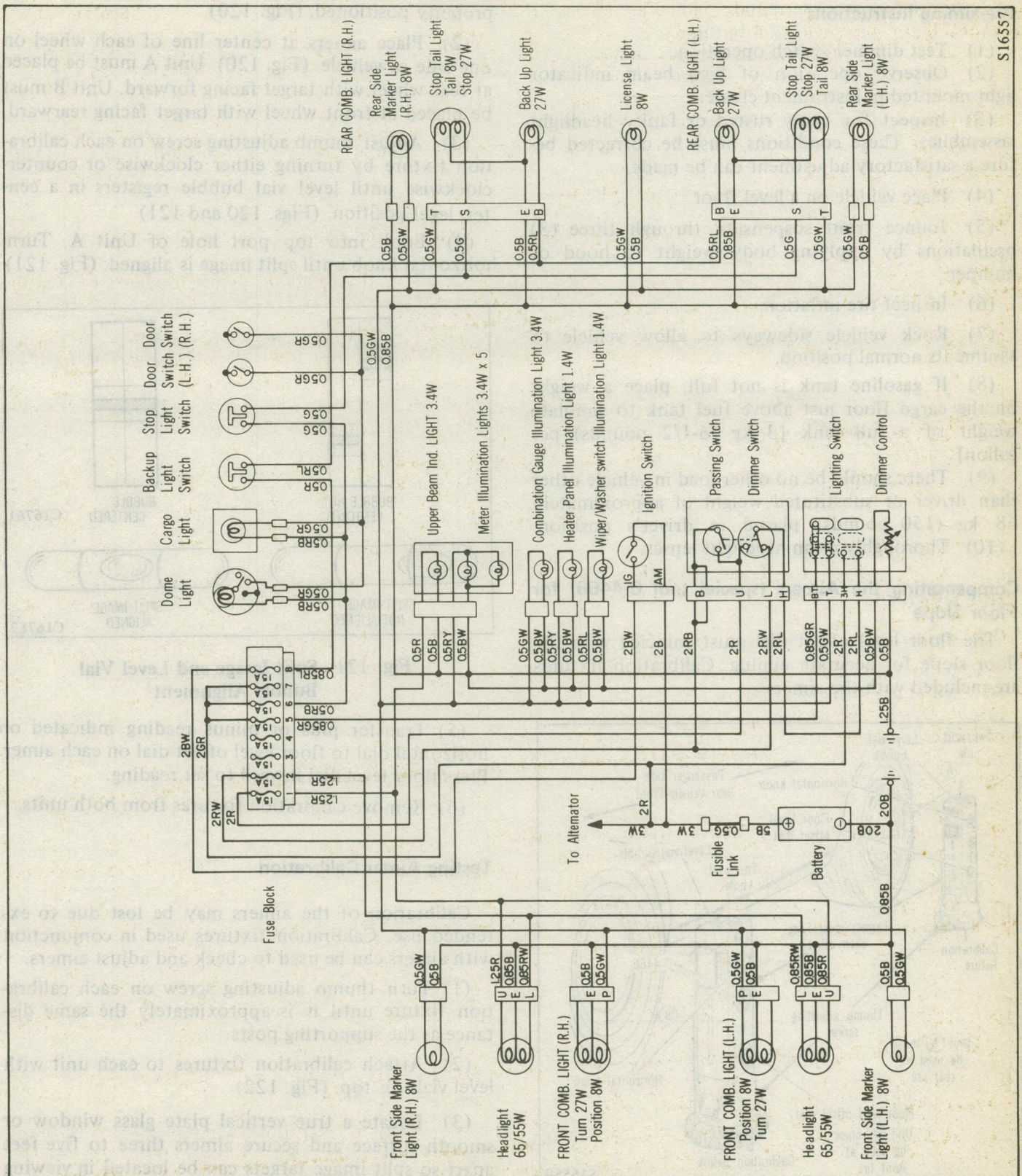


Fig. 119 Lighting System Circuits

HEADLIGHTS

Pre-aiming Instructions

- (1) Test dimmer switch operation.
- (2) Observe operation of high beam indicator light mounted in instrument cluster.
- (3) Inspect for badly rusted or faulty headlight assemblies. These conditions must be corrected before a satisfactory adjustment can be made.
- (4) Place vehicle on a level floor.
- (5) Jounce front suspension through three (3) oscillations by applying body weight to hood or bumper.
- (6) Inspect tire inflation.
- (7) Rock vehicle sideways to allow vehicle to assume its normal position.
- (8) If gasoline tank is not full, place a weight on the cargo floor just above fuel tank to simulate weight of a full tank [3 kg (6-1/2 pounds) per gallon].
- (9) There should be no other load in vehicle other than driver or substituted weight of approximately 68 kg (150 pounds) placed in driver's position.
- (10) Thoroughly clean headlight lenses.

Compensating the Aimers (special tool C-4466) for Floor Slope

The floor level offset dial must coincide with the floor slope for accurate aiming. Calibration fixtures are included with the aimers.

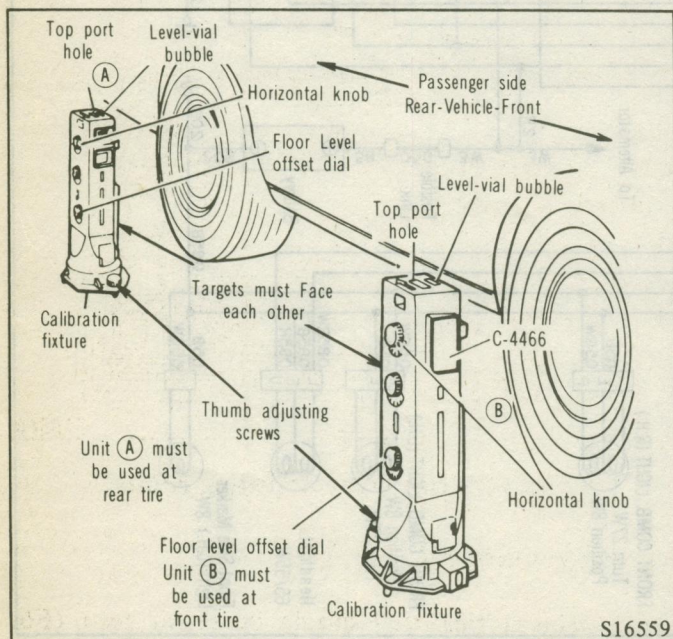


Fig. 120 Determining Slope of Floor

(1) Attach one calibration fixture to each aimer. Fixtures will easily snap into position on aimer when properly positioned. (Fig. 120)

(2) Place aimers at center line of each wheel on one side of vehicle. (Fig. 120) Unit A must be placed at rear wheel with target facing forward. Unit B must be placed at front wheel with target facing rearward.

(3) Adjust thumb adjusting screw on each calibration fixture by turning either clockwise or counter-clockwise until level vial bubble registers in a center, level position. (Figs. 120 and 121)

(4) Look into top port hole of Unit A. Turn horizontal knob until split image is aligned. (Fig. 121)

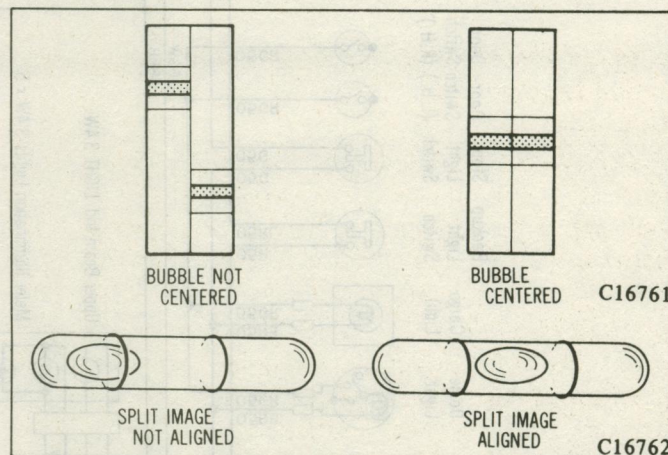


Fig. 121 Split Image and Level Vial Bubble Alignment

(5) Transfer plus or minus reading indicated on horizontal dial to floor level offset dial on each aimer. Press floor level dial inward to set reading.

(6) Remove calibration fixtures from both units.

Testing Aimer Calibration

Calibration of the aimers may be lost due to extended use. Calibration fixtures used in conjunction with aimers can be used to check and adjust aimers.

(1) Turn thumb adjusting screw on each calibration fixture until it is approximately the same distance as the supporting posts.

(2) Attach calibration fixtures to each unit with level vials on top. (Fig. 122)

(3) Locate a true vertical plate glass window or smooth surface and secure aimers three to five feet apart so split image targets can be located in viewing ports. (Fig. 122)

(4) Set floor level dial at zero.

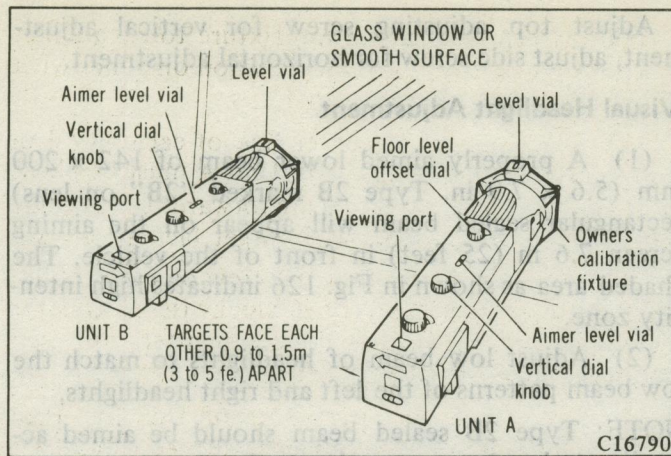


Fig. 122 Checking Aimer Calibration

(5) Rotate thumb adjusting screws on each calibration fixture until level vials on fixtures are centered. (Fig. 122)

(6) With both calibration level vials centered turn vertical dial knobs on each aimer until aimer level vials are centered. If aimer vertical dial pointers read between 1/2 up and 1/2 down, aimers are within allowable vertical tolerance. Re-calibrate units if beyond these limits. (Figs. 121 and 122)

(7) Adjust horizontal dial knob on each aimer until split image targets align. If aimer horizontal dial pointers read between 1 left and 1 right, the aimers are within allowable tolerance limits. Re-calibrate units if beyond these limits. (Figs. 121 and 122)

Description	Standard value Aimers (unit A and B)
Vertical dial pointer reading (on each aimer)	1/2 up to 1/2 down
Horizontal dial pointer reading (on each aimer)	1 left to 1 right

Mounting Aimers

(1) If necessary to expose adjusting screws remove headlight trim rings.

(2) Snap proper adaptor into position on each aimer.

(3) Position aimers on headlights by pushing piston handle forward, engaging rubber suction cup. Immediately pull back piston handle until it locks in place. (Fig. 123)

NOTE: Steel inserts are moulded into position on the adaptor to insure accuracy. These inserts must be in contact with the three guide points on the lights when the aimers are properly positioned.

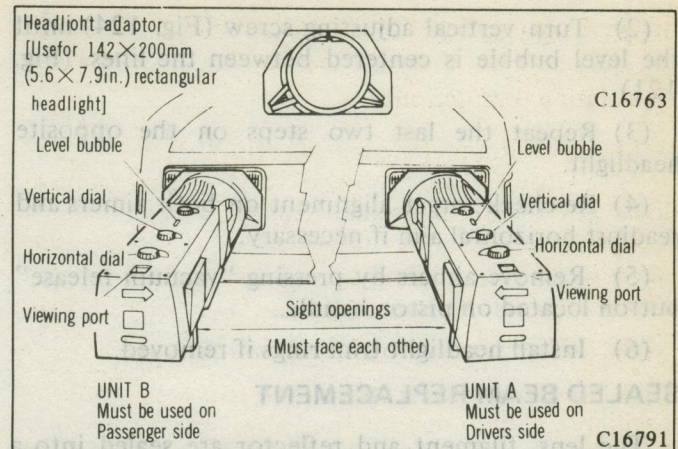


Fig. 123 Mounting and Adjusting Aimers

Horizontal Adjustment

- (1) Set horizontal dial to zero.
- (2) Check to see that the split image target lines are visible in the viewing port. If necessary, rotate each aimer slightly to locate the target. (Fig. 121)
- (3) Turn horizontal adjusting screw (Fig. 124) on side of headlight until split image of target line appears in mirrors as one solid line. (Fig. 121) To remove "backlash," make final adjustment by turning adjusting screw in a clockwise direction.
- (4) Repeat steps (1) through (3) on opposite headlight.

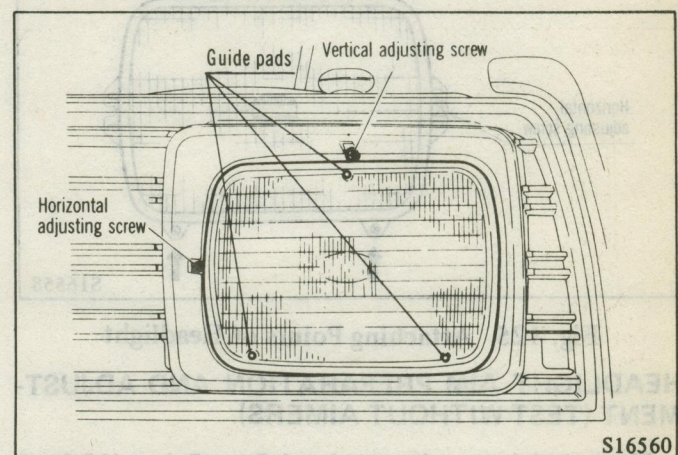


Fig. 124 Headlight Adjusting Points

Vertical Adjustment

- (1) The vertical dial should be set at zero. (For passenger vehicles, an "0" setting is generally required. For special settings, consult local state laws.)

(2) Turn vertical adjusting screw (Fig. 124) until the level bubble is centered between the lines. (Fig. 121)

(3) Repeat the last two steps on the opposite headlight.

(4) Re-check target alignment on both aimers and readjust horizontal aim if necessary.

(5) Remove aimers by pressing "vacuum release" button located on piston handle.

(6) Install headlight trim rings if removed.

SEALED BEAM REPLACEMENT

The lens, filament and reflector are sealed into a single unit which can be removed as follows:

(1) Remove screws from radiator grille and remove the grille.

(2) Remove screws from interior retaining ring, and remove ring. Do not disturb headlight adjusting screws. (Fig. 125)

(3) Pull out sealed beam unit and unplug connector, pulling straight off.

(4) Install new sealed beam unit.

(5) Install unit retaining ring.

(6) Aim the headlight and install headlight bezel.

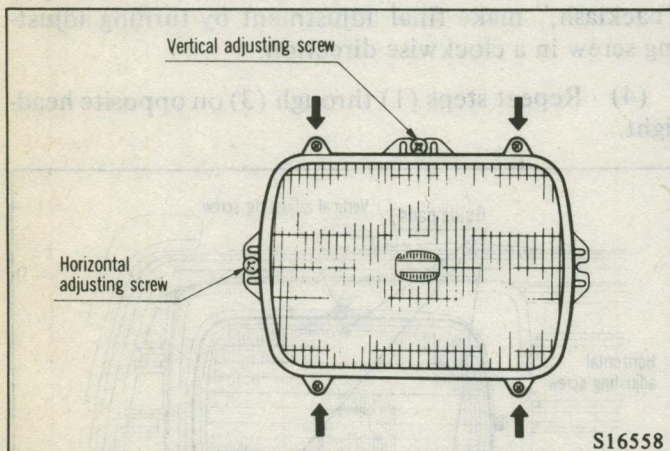


Fig. 125 Attaching Points of Headlight

HEADLIGHT AIM PREPARATION AND ADJUSTMENT (TEST WITHOUT AIMERS)

Place vehicle on a known level floor 7.6 m (25 feet) from aiming screen or other light colored area. Prepare aiming screen as follows:

(1) Position a vertical tape so that it is aligned with the vehicle centerline.

(2) Position a horizontal tape with reference to centerline of headlight.

(3) Position a vertical tape on the screen with reference to the centerline of each headlamp.

Adjust top adjusting screw for vertical adjustment, adjust side screw for horizontal adjustment.

Visual Headlight Adjustment

(1) A properly aimed lower beam of 142 x 200 mm (5.6 x 7.9 in. Type 2B marked "2B" on lens) rectangular sealed beam will appear on the aiming screen 7.6 m (25 feet) in front of the vehicle. The shaded area as shown in Fig. 126 indicates high intensity zone.

(2) Adjust low beam of headlights to match the low beam patterns of the left and right headlights.

NOTE: Type 2B sealed beam should be aimed according to low beam procedure only.

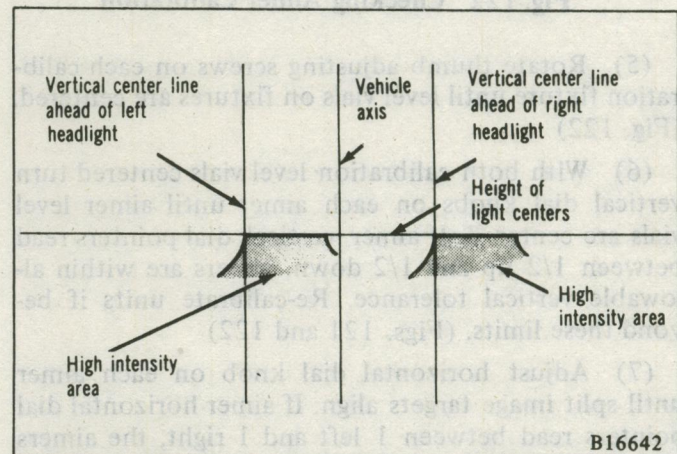


Fig. 126 Low Beam Adjust Pattern

STOP LIGHT SWITCH

Description	Specifications
Type	Mechanical type (also serves as pedal stop)
Maximum operating voltage and current	12V 15A (stop light load)
Voltage drop (at 15A)	Less than 0.15V

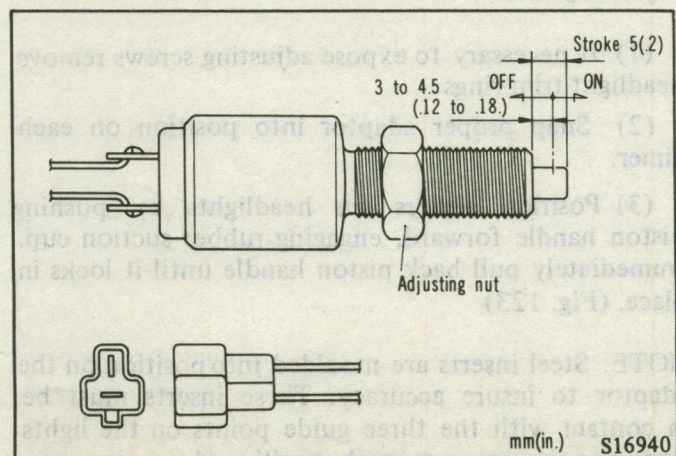


Fig. 127 Stop Light Switch

LIGHT COMPONENTS

Pay attention to the following to install front combination lights, front and rear side marker lights, rear combination lights and license plate light.

(1) Properly fit lens to light body without involving gasket packing between the light body and lens, or allowing no gap between the two components.

(2) Do not over tighten screws to avoid possible breakage of lens.

(3) Tighten six screws on rear combination lights in criss cross fashion. Fit long and short screws in proper positions.

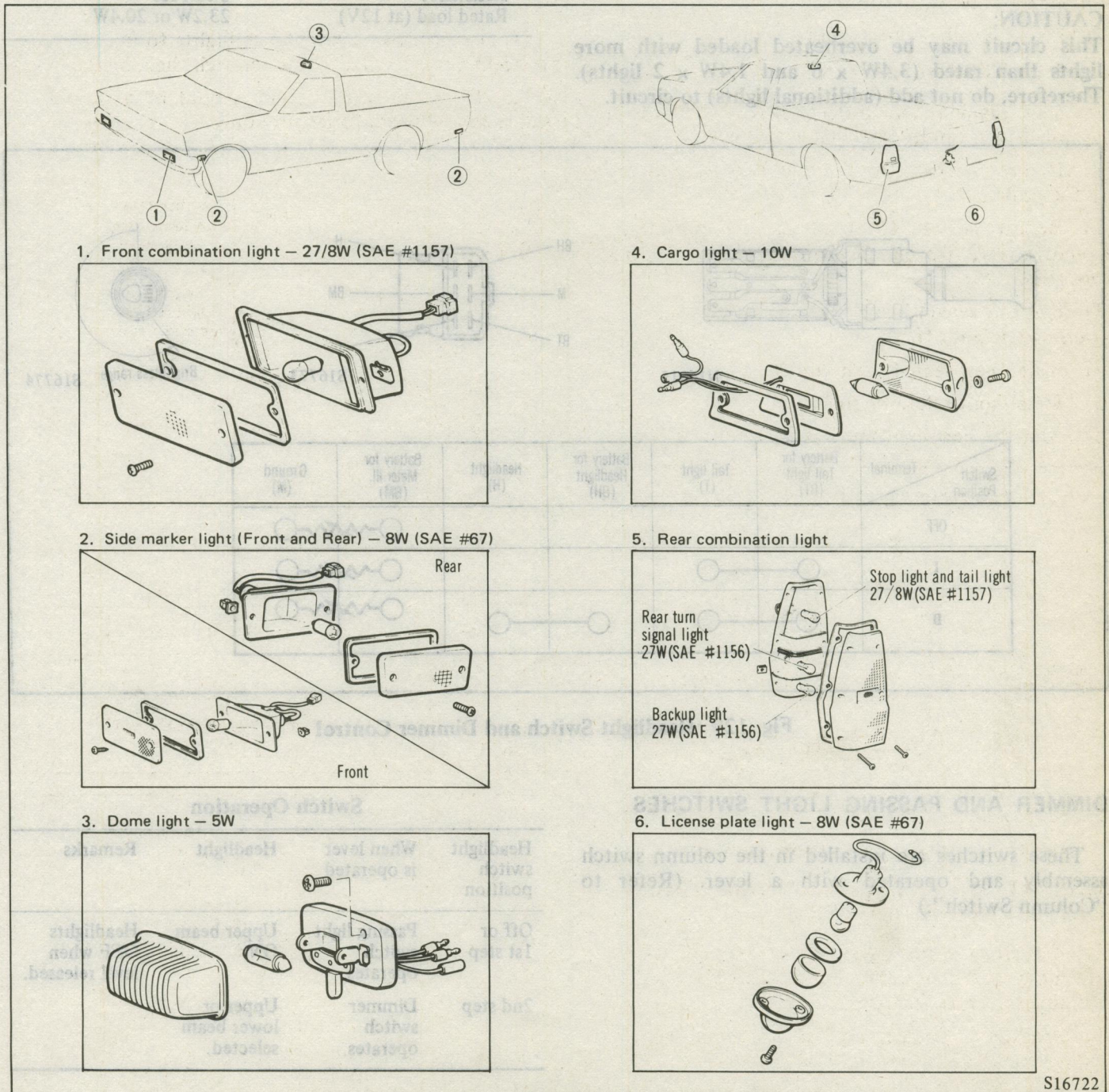


Fig. 128 Light components

HEADLIGHT SWITCH AND DIMMER CONTROL

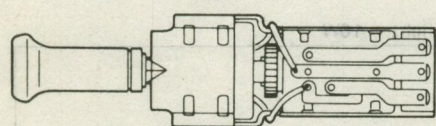
All models are provided with a headlight switch with a dimmer control.

The dimmer control is used to protect the driver against the bright glare of instrument panel lights while driving at night. It increases or decreases the intensity of light passing through illuminated instrument panel as desired.

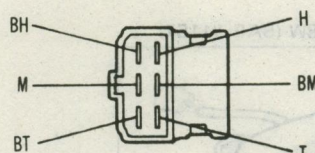
CAUTION:

This circuit may be overheated loaded with more lights than rated (3.4W x 6 and 1.4W x 2 lights). Therefore, do not add (additional lights) to circuit.

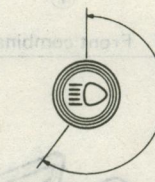
Description	Specifications
Switch	
Rated voltage	12V
Rated load (lamp load)	
Between BH and H	200W
Between BT and T	100W
Between BM and M	23.2W or 20.4W
Dimmer control	
Resistance	8 to 11Ω
Rated load (at 12V)	23.2W or 20.4W



N16515



S16773



Brightness range

S16774

Switch Position	Terminal	Battery for Tail light (BT)	Tail light (T)	Battery for Headlight (BH)	Headlight (H)	Battery for Meter ill. (BM)	Ground (M)
OFF							
I							
II							

Fig. 129 Headlight Switch and Dimmer Control

DIMMER AND PASSING LIGHT SWITCHES

These switches are installed in the column switch assembly and operated with a lever. (Refer to "Column Switch".)

Switch Operation

Headlight switch position	When lever is operated	Headlight	Remarks
Off or 1st step	Passing light switch operates.	Upper beam ON.	Headlights OFF when level released.
2nd step	Dimmer switch operates.	Upper or lower beam selected.	

TURN SIGNAL AND HAZARD WARNING LIGHTS

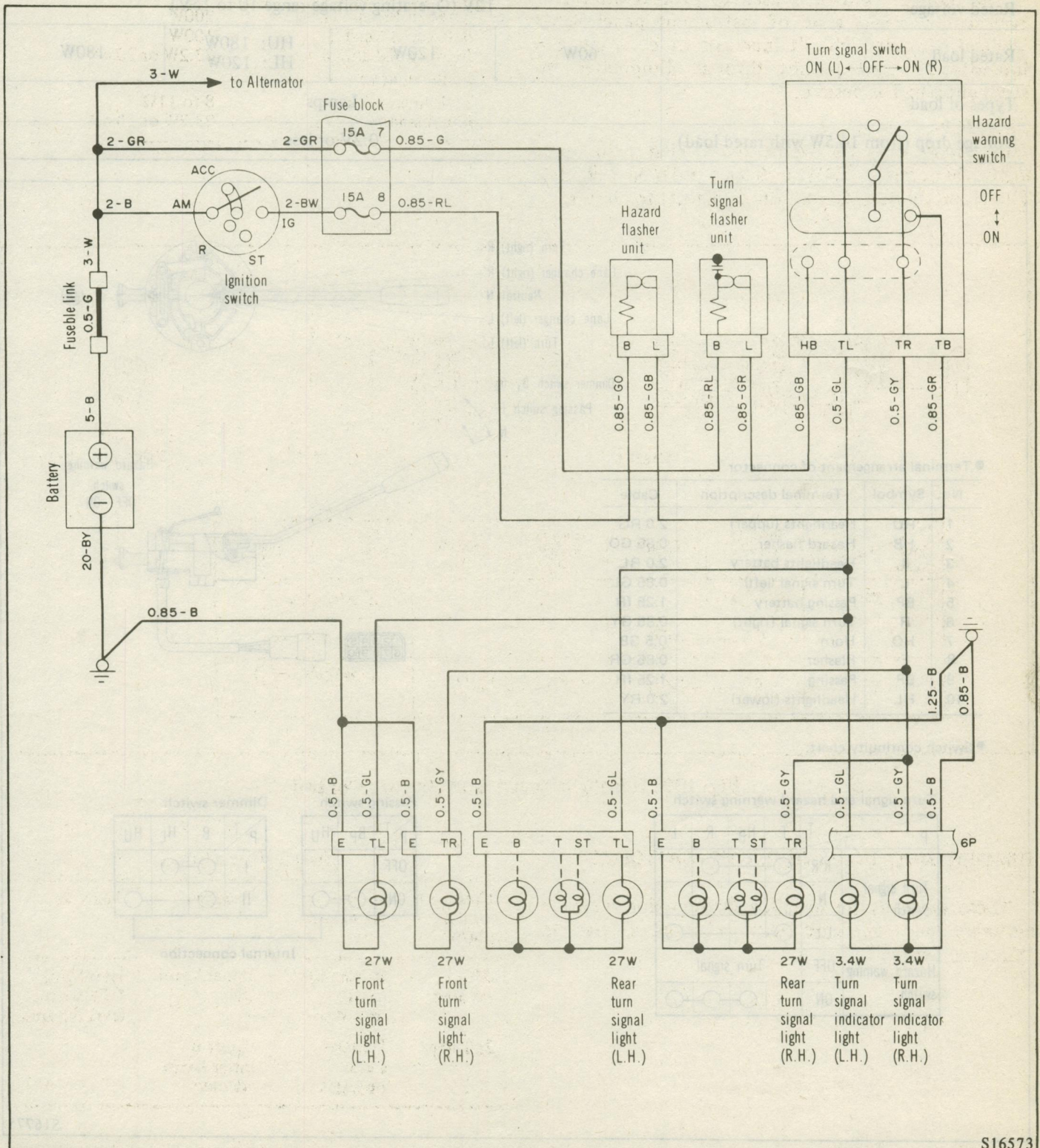


Fig. 130 Turn Signal and Hazard Warning Light Circuit

COLUMN SWITCH

Description	Turn signal	Hazard warning	Dimmer	Passing
Rated voltage	12V (Operating voltage range 10 to 15V)			
Rated load	60W	120W	HU: 180W HL: 120W	180W
Types of load	Lamps			
Voltage drop (from 14.5W with rated load)	0.2V or less			

● Terminal arrangement of connector

No.	Symbol	Terminal description	Cable
1	HU	Headlights (upper)	2.0 RG
2	HB	Hazard flasher	0.85 GO
3	B	Headlights battery	2.0 RL
4	L	Turn signal (left)	0.85 GL
5	BP	Passing battery	1.25 fR
6	R	Turn signal (right)	0.85 GY
7	HO	Horn	0.5 GB
8	F	Flasher	0.85 GR
9	BP	Passing	1.25 fR
10	HL	Headlights (lower)	2.0 RY

● Switch continuity chart.

Turn signal and hazard warning switch

P	T	F	H _B	R	L
Turn signal switch	R'R	○	○		
	N				
	L'L	○			○
Hazard warning switch	OFF	Turn signal			
	ON		○	○	○

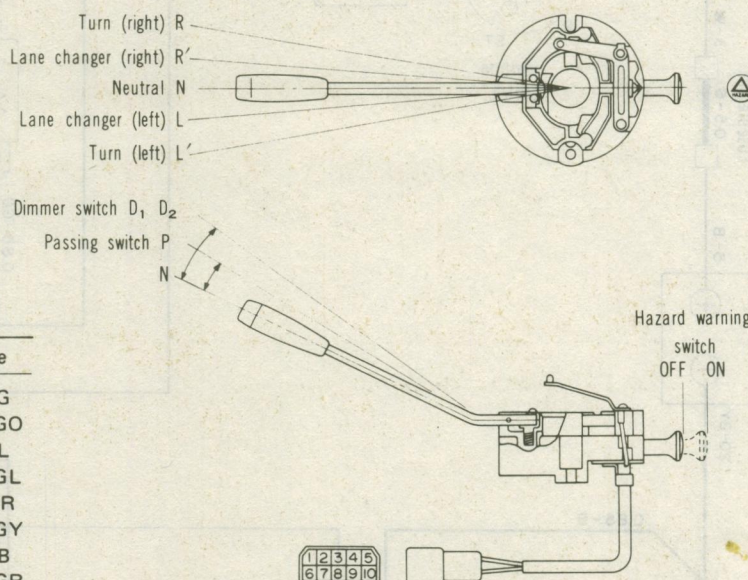
Passing switch

P	T	B _p	H _U
OFF			
ON	○	○	

Dimmer switch

P	T	B	H _L	H _U
I	○	○		
II	○	○		○

Internal connection

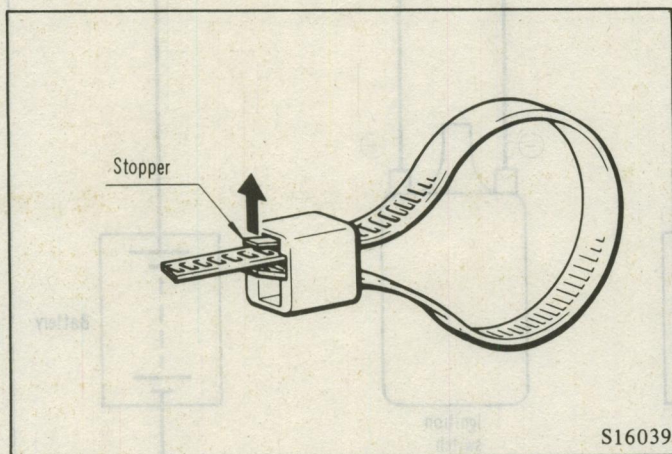


S16775

Fig. 131 Column Switch Assembly

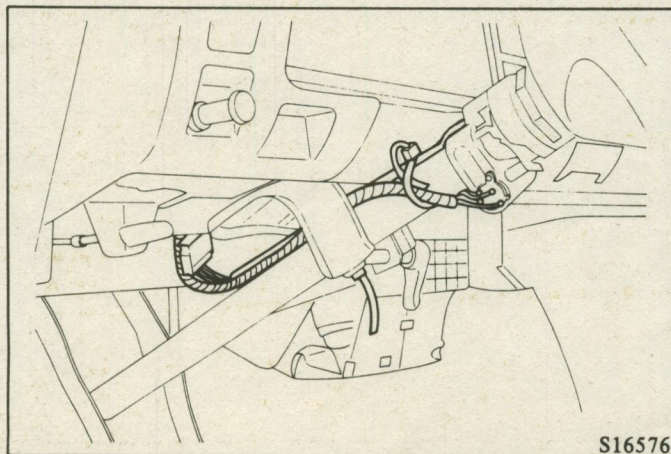
Removal

- (1) Remove the steering wheel, with tilt handle in the lowest position. (Refer to GROUP 19. STEERING.)
- (2) Remove the column cover (upper and lower).
- (3) Remove the band clip of the wiring and disconnect the connector. (Fig. 132)
- (4) Remove the column switch.

**Fig. 132 Removing Band Clip****Installation**

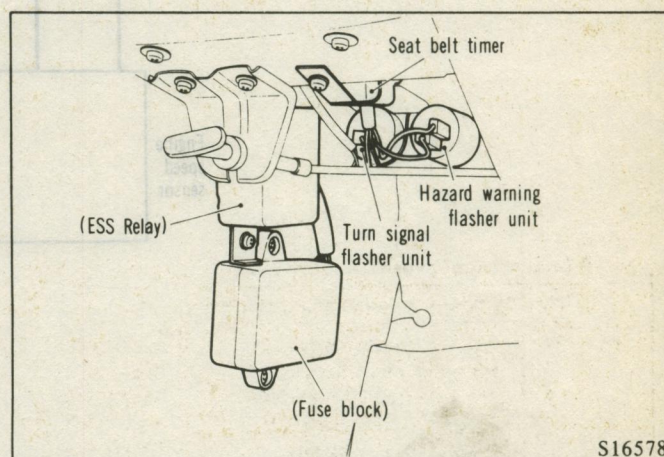
During installation, use the following cautions:

- (1) Install the column switch in complete alignment with the steering shaft center.
- (2) Place column switch wiring harness along the column tube as close as possible to the center line. Clip the wiring securely so as to prevent its contact with other parts.

**Fig. 133 Column Switch Harness Arrangement****RELAY UNITS**

The turn signal flasher unit and hazard warning flasher unit are installed (left side) underside the instrument panel.

Description	Specifications
Turn signal flasher unit	
Type	Capacitor type
Rated load	27Wx2+3.4W
Hazard warning flasher unit	
Type	Hot-band type
Rated load	23Wx2+3.4W to 27Wx6+3.4Wx2

**Fig. 134 Relay Units****E.S.S. RELAY (For U.S.A.)**

ESS relay is a pulse input type relay that converts the rate of ignition coil pulses resulting from switching of the distributor points to a D.C current proportional to engine speed.

On the vehicle decelerating from high speed running, if ESS relay detects engine speeds at or below specification, the solenoid valve connected to air switching valve will open the passage introducing the outside air.

Engine	Specified engine speed
F-engine	1,600 to 2,000 rpm
W-engine	1,400 to 1,800 rpm

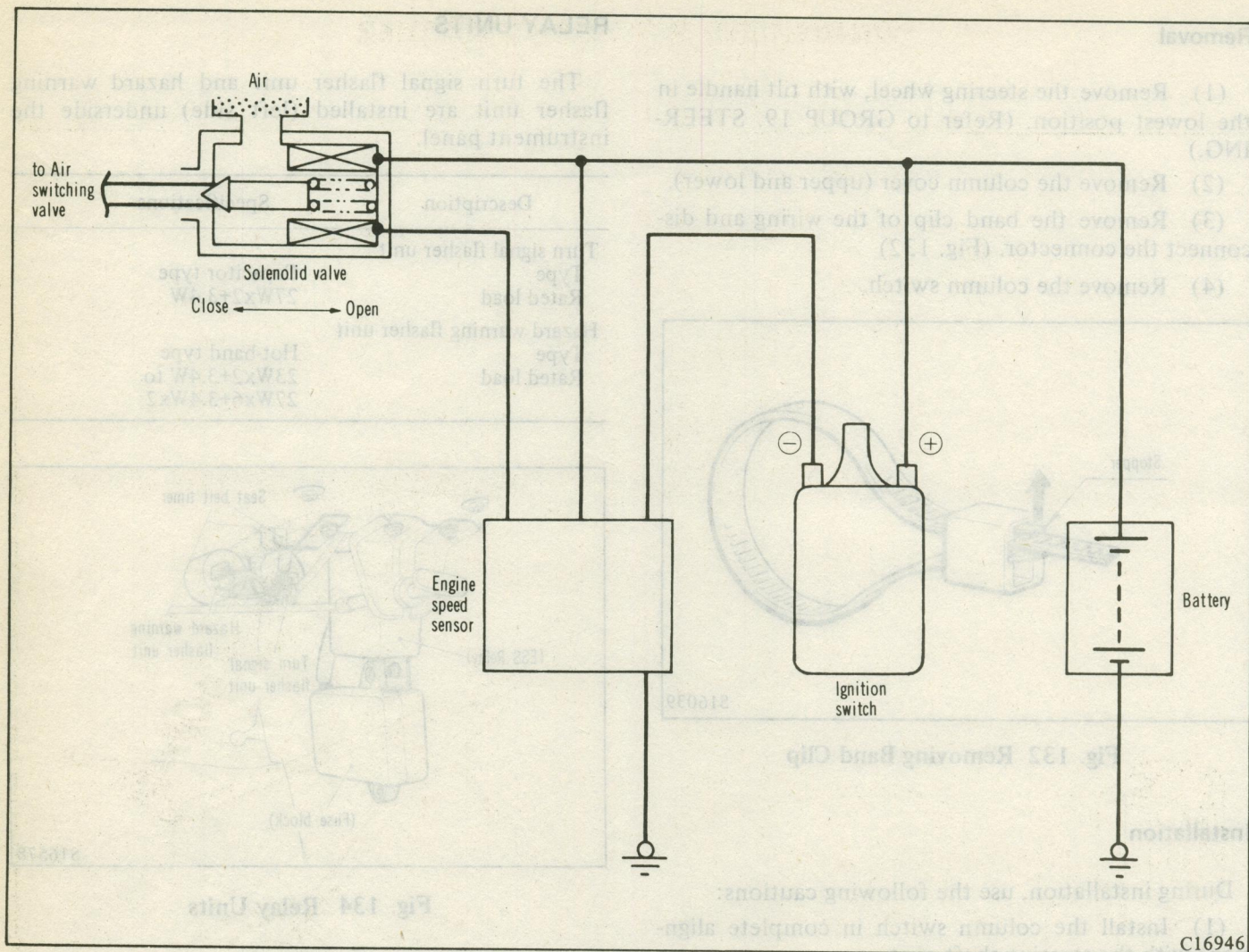


Fig. 135 E.S.S. Relay Circuit

(2) Place column switch wiring harness in column tube as close as possible to the center line. Clip the wiring securely so as to prevent its contact with other parts.

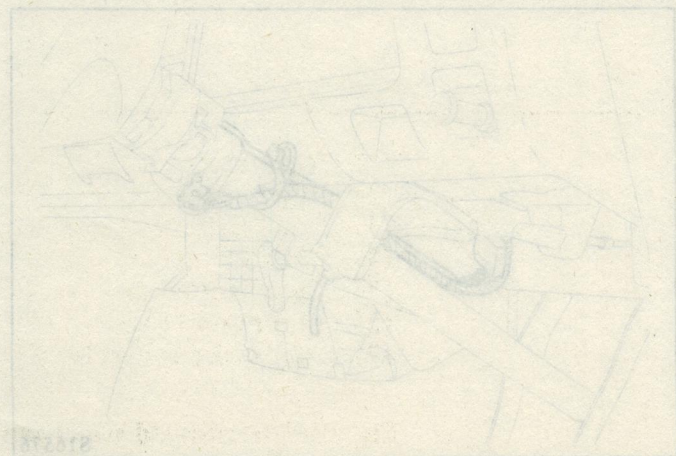
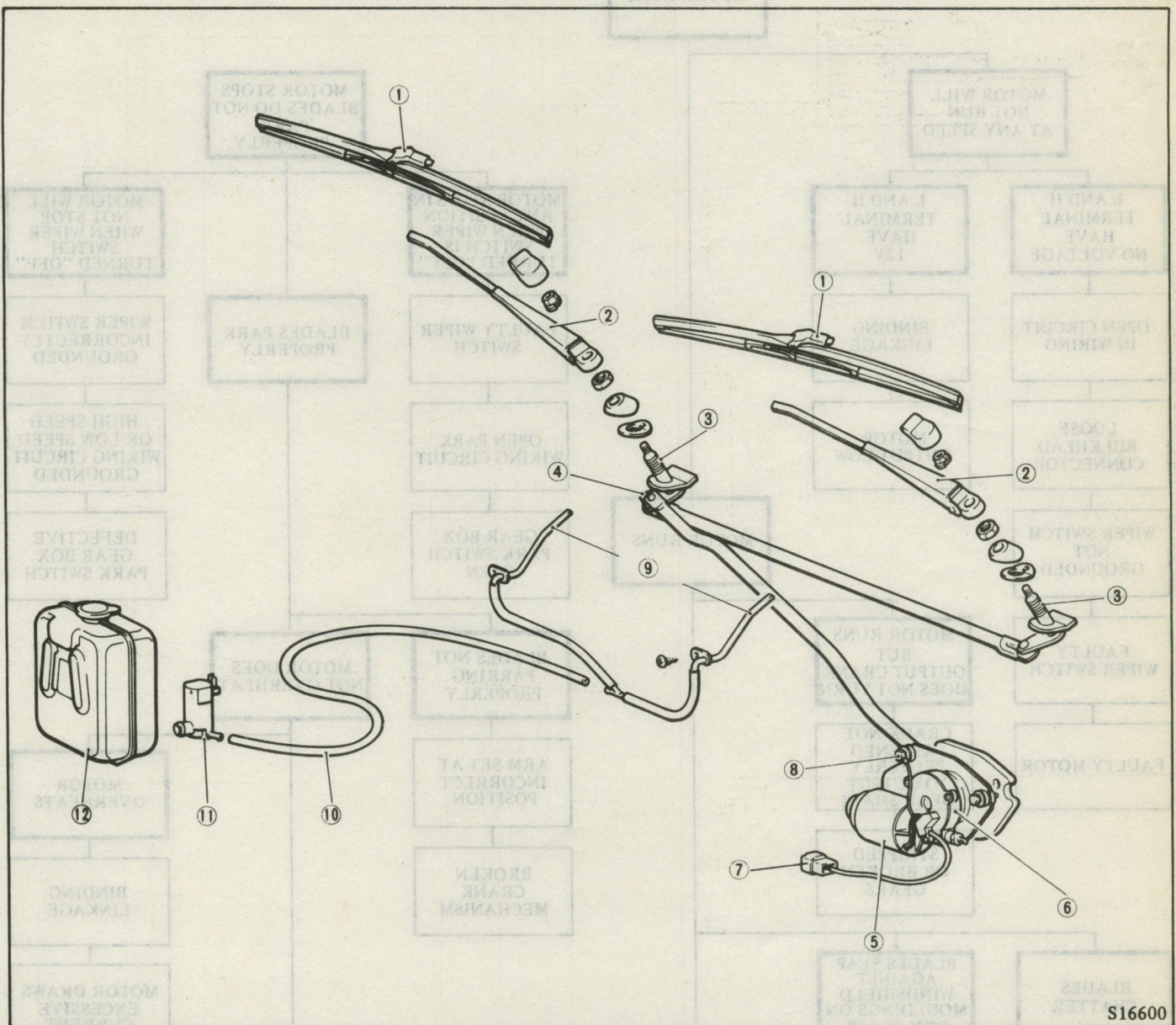


Fig. 133 Column Switch Harness Arrangement

On the vehicle decelerating from high speed running, if ESS relay detects engine speeds at or below specification, the solenoid valve connected to air switching valve will open the passage introducing the outside air.

Engine	Specified engine speed
P-engine	1,600 to 2,000 rpm
W-engine	1,400 to 1,800 rpm

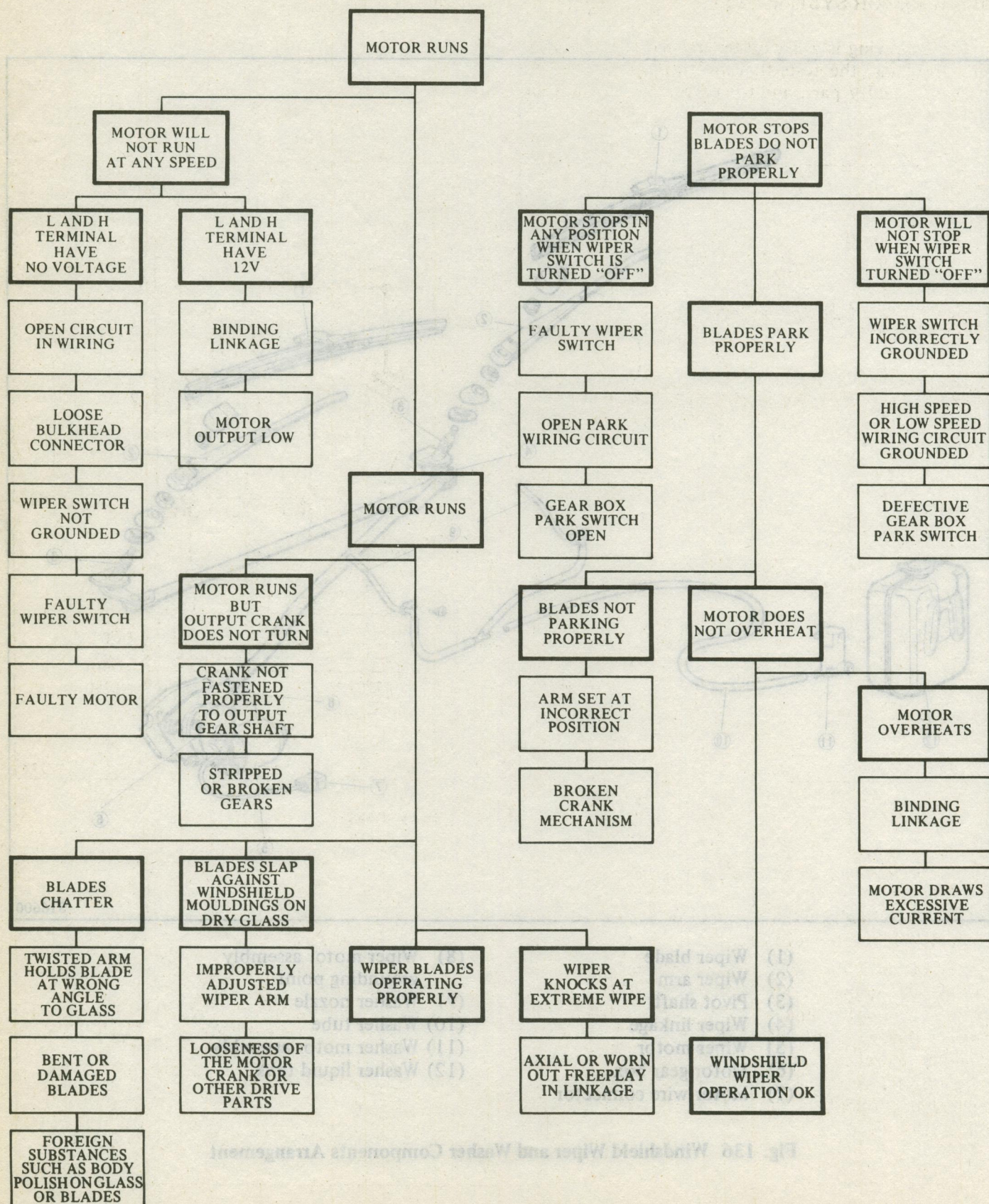
WINDSHIELD WIPER AND WASHER



- | | |
|--------------------------|--|
| (1) Wiper blade | (8) Wiper motor assembly grounding point |
| (2) Wiper arm | (9) Washer nozzle |
| (3) Pivot shaft | (10) Washer tube |
| (4) Wiper linkage | (11) Washer motor assembly |
| (5) Wiper motor | (12) Washer liquid tank |
| (6) Motor gear box | |
| (7) Motor wire connector | |

Fig. 136 Windshield Wiper and Washer Components Arrangement

WINDSHIELD WIPER DIAGNOSIS



WIPER MOTOR SYSTEM TEST

The following is a list of general wiper motor system problems, the tests that are to be performed to locate the faulty part, and the corrective action to be taken.

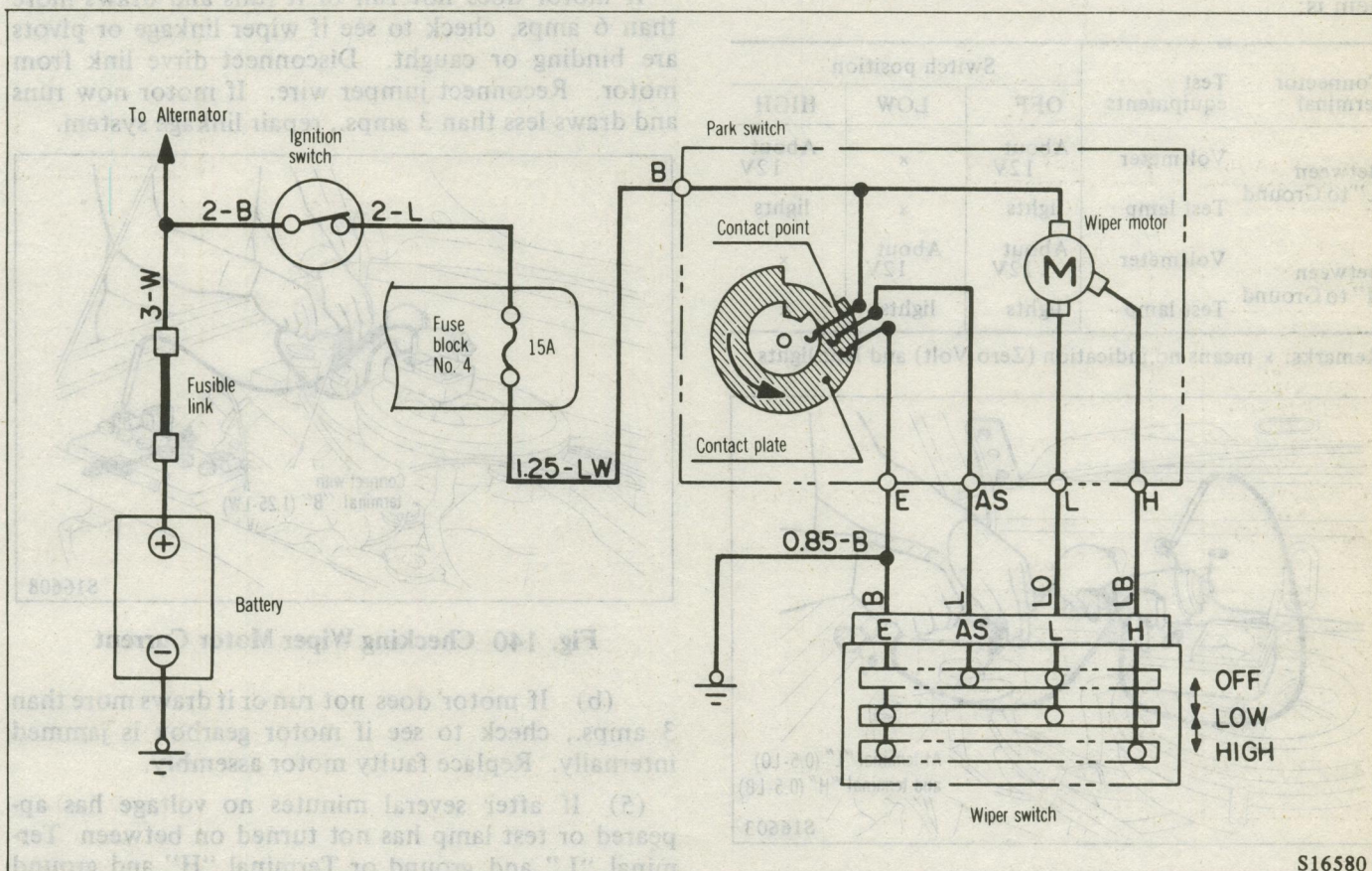


Fig. 137 Windshield Wiper Circuit

Motor Will Not Run in any Switch Position

(1) Place ignition switch in ACC position and wiper switch in low speed position.

(2) Listen to motor. If you cannot hear it running, proceed to Step (3). If you can hear it running, check to see wiper linkage through cowl panel grill. If wiper linkage is not operating, remove wiper motor assembly and check crank arm turning. If it is operating, drive link to pivot shaft or wiper arm is not connected properly. Replace worn parts and reconnect.

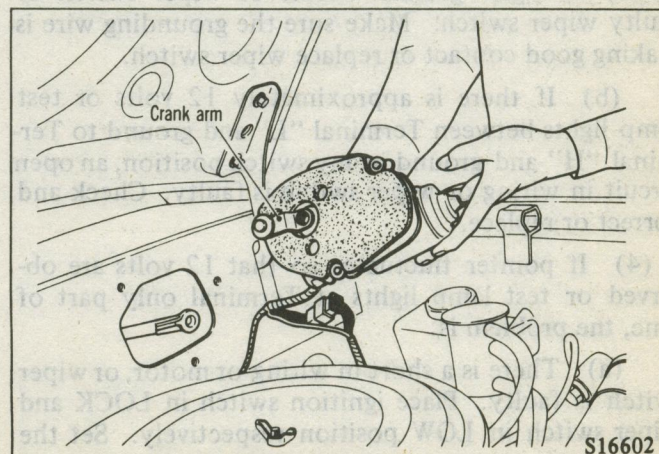


Fig. 138 Checking Crank Arm Turning

(3) Connect a voltmeter or a test lamp between motor Low speed Terminal ("L" : 0.5-LO) and ground. Turn wiper switch from OFF to LOW, and to HIGH. Read voltmeter or check test lamp. Then repeat above test for High speed Terminal ("H" : 0.5-LB).

If reading or test lamp is out of table below, the problem is:

Connector terminal	Test equipments	Switch position		
		OFF	LOW	HIGH
Between "L" to Ground	Voltmeter	About 12V	x	About 12V
	Test lamp	lights	x	lights
Between "H" to Ground	Voltmeter	About 12V	About 12V	x
	Test lamp	lights	lights	x

Remarks: x means no indication (Zero Volt) and Not lights.

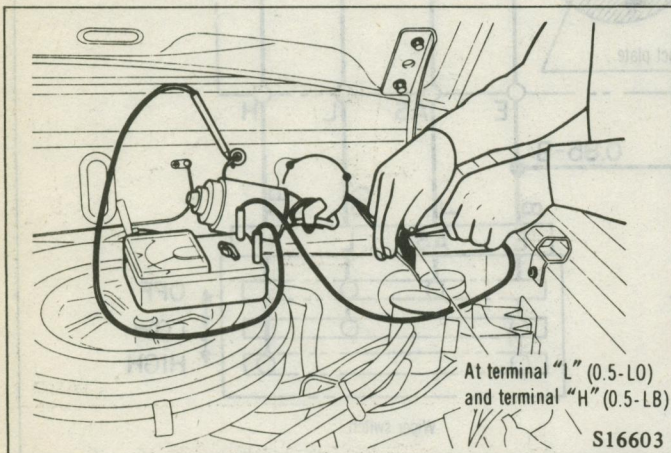


Fig. 139 Motor Terminal Voltage Check

(a) If there is 12 volts or test lamp lights at all times, an open ground circuit of wiper switch or faulty wiper switch. Make sure the grounding wire is making good contact or replace wiper switch.

(b) If there is approximately 12 volts or test lamp lights between Terminal "L" and ground to Terminal "H" and ground in any switch position, an open circuit in wiring or wiper switch is faulty. Check and correct or replace.

(4) If pointer fluctuates so that 12 volts are observed or test lamp lights at Terminal only part of time, the problem is:

(a) There is a short in wiring or motor, or wiper switch is faulty. Place ignition switch in LOCK and wiper switch in LOW position respectively. Set the

radio and cigarette lighter in OFF position, and take out the Fuse No. 4 (15A). Remove wiper arms and blades. Connect an ammeter between battery and Battery Terminal ("B" : 1.25-LW) on motor. (Fig. 140)

If motor now runs and average ammeter reading is less than 6 amps., motor is okay and problem is in wiper switch or wiring.

If motor does not run or it runs and draws more than 6 amps, check to see if wiper linkage or pivots are binding or caught. Disconnect drive link from motor. Reconnect jumper wire. If motor now runs and draws less than 3 amps., repair linkage system.

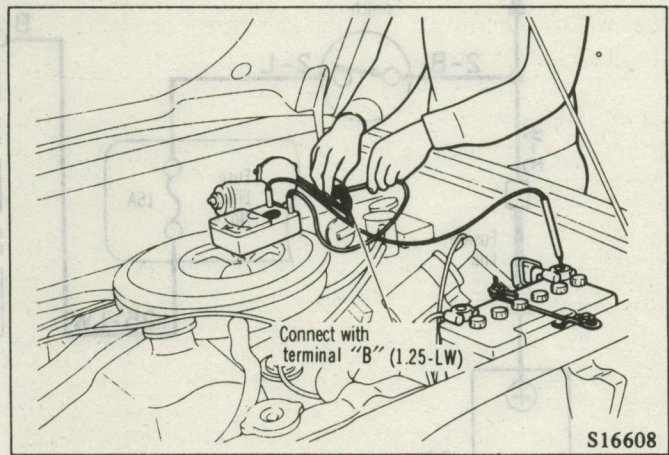


Fig. 140 Checking Wiper Motor Current

(b) If motor does not run or it draws more than 3 amps., check to see if motor gearbox is jammed internally. Replace faulty motor assembly.

(5) If after several minutes no voltage has appeared or test lamp has not turned on between Terminal "L" and ground or Terminal "H" and ground brushes are not making a good contact with commutator or armature has an open circuit. Replace wiper motor assembly.

**Motor Will Run at High Speed, But not at Low Speed.
Motor Will Run at Low Speed, But not at High Speed.**

(1) If motor will not run on high speed, put wiper switch in high position and connect a test lamp between motor Terminal "H" and ground (See Fig. 139)

If motor will not run on low speed, put wiper switch in low position and connect a test lamp between motor Terminal L and ground (See Fig. 139)

(2) If test lamp lights at motor Terminal, there is an open in wiring or switch.

Motor will Keep Running with Wiper Switch in Off Position.

Disconnect wiper switch connector. If motor stops, wiper switch is faulty. If motor does not stop, motor or wire harness is faulty. In this case, disconnect motor wire connector. Then connect jumper from battery positive terminal to motor terminal "B" (1.25 - LW): If motor does not run, wire harness is faulty. If motor runs, gearbox is faulty, correct gearbox or replace motor assembly.

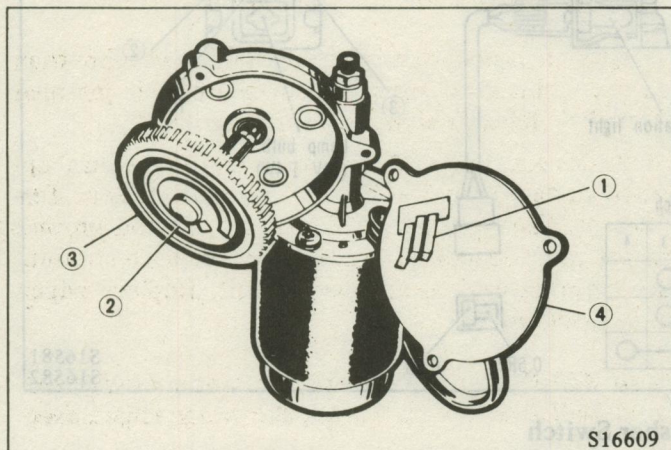
Motor will Stop Wherever it is When Wiper Switch is Put in Off Position. (Wipers do not Continue Running to Park Position.)

(1) Remove motor wiring connector and clean terminals. Reconnect connector and test motor. If problem persists, proceed to Step No. 2.

(2) Put wiper switch in off position.

(3) Connect a voltmeter or test lamp between Auto Stop Terminal ("AS": 0.5-L), and ground (Body).

If there is 12 volts or test lamp lights, the motor park switch is faulty and motor assembly must be replaced. If between Terminal "AS" and "L" is 12 volts or test lamp comes on, there is an open in the wiper switch or the wiring.



- (1) Park switch contact point
- (2) Park switch contact plate
- (3) Driver gear
- (4) Gear box cover

Fig. 141 Checking Motor Park Switch

WIPER MOTOR

Removal

(1) Remove wiper arm. Remove arm shaft lock nut and push in the shaft.

NOTE: Before proceeding, uncover the wiper removing hole located on the right-hand side of the front deck.

(2) Remove the bolts that hold motor bracket to the body and pull out the wiper motor assembly toward you.

(3) Disconnect the wiper motor and linkage in such a manner that the motor shaft and linkage are positioned at right angles with each other and linkage is removed while holding the shaft right by hand. (Fig. 142)

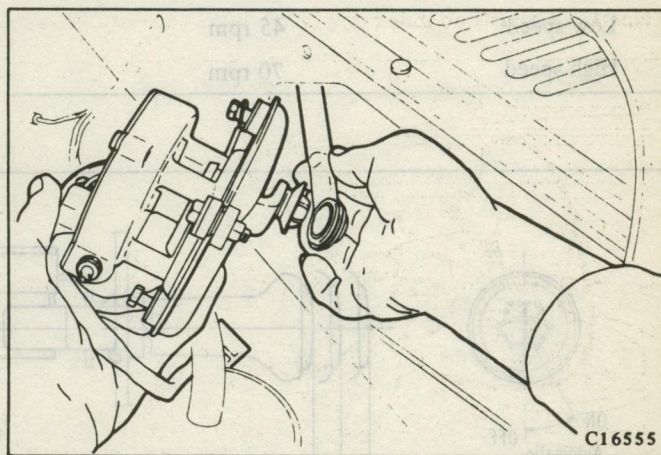


Fig. 142 Removing Wiper Motor

CAUTION:

The crank arm and the motor have been installed so that the wiper blades will stop at a preset automatic stop angle. Therefore, they should not be separated unless so required. If they are taken apart, provide match markings on both of them beforehand.

Inspection

If wiper motor assembly is internally checked, perform following operation check before reusing.

(1) Connect an ammeter (D.C. 10A range or more) between Terminal “B” (1.25 – LW) and battery position terminal with wiper motor assembly as a separate unit. Then connect a jumper from ground (body) to Terminal “L” (0.5 – LO), and next to Terminal “H” (0.5 – LB).

(2) Run the motor under no load and test it for number of revolutions. If the current value is less than 3A in both low-speed and high-speed runnings as below, the motor is okay.

Description	Number of revolutions
Low speed	45 rpm
High speed	70 rpm

Installation

When installing the wiper motor, pay attention to the following item:

(1) Adjust the stop position of the wiper blades and tighten the wiper arm to the standard torque. (Refer to “Wiper Linkage”.)

WIPER SWITCH

To test the switch, place the ignition switch in LOCK position and disconnect the motor wire connector. Then using a continuity tester or an ohmmeter, test for continuity (no resistance) between the terminals of the switch side connector as shown in Fig. 143. The identity of each terminal is shown in Figure.

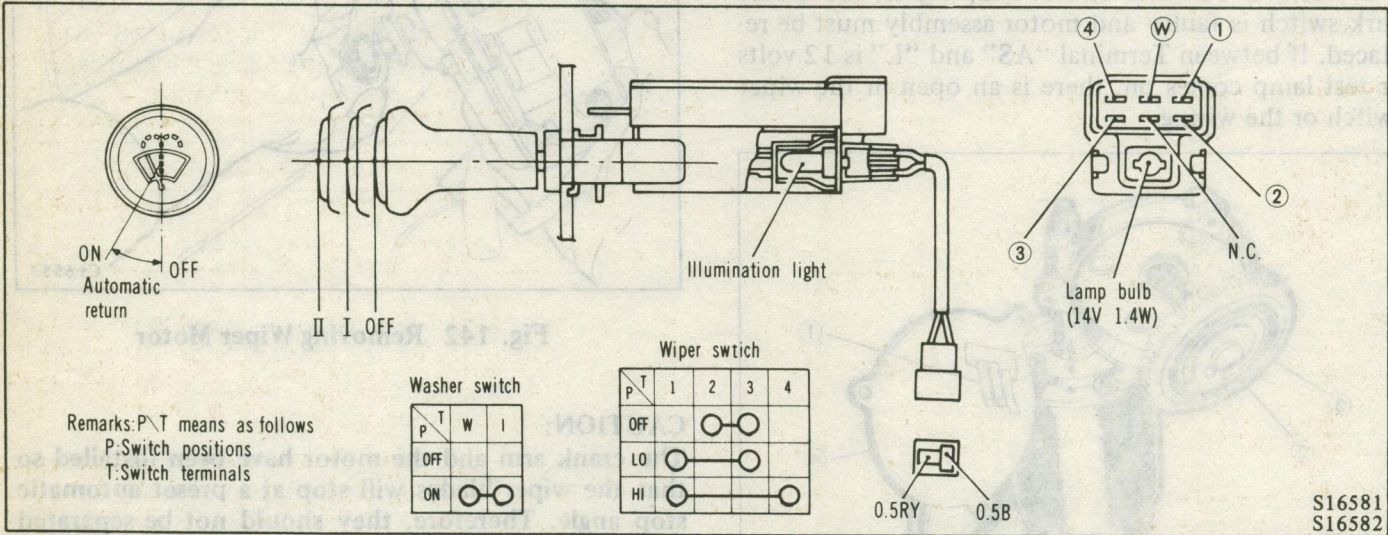


Fig. 143 Wiper/Washer Switch

WIPER LINKAGE

Removal

(1) After removing the wiper motor, separate the wiper and linkage. To do so, position the wiper motor shaft at right angles with the linkage, and remove the linkage while holding the shaft tight by hand.

Installation

When installing the wiper linkage, observe the following items:

(1) When installing the wiper arm shaft to the body, insert the shaft bracket positioning boss positively in the hole provided in the body.

(2) After installing the linkage and related parts, adjust the wiper blade stop position as illustrated. Then securely tighten the wiper arm nut to the standard torque. (Fig. 144)

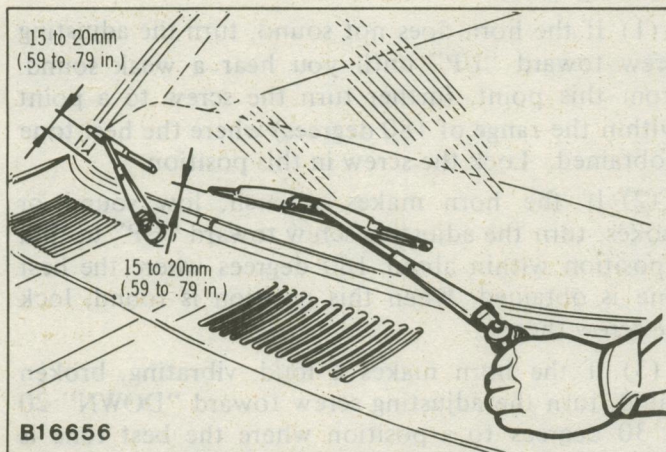


Fig. 144 Wiper Blade Adjustment

Parts to be tightened	Torque Nm (ft-lbs.)
Wiper arm	10 to 15 (7 to 11)
Pivot shaft	10 to 15 (7 to 11)

WINDSHIELD WASHER

Inspection and Adjustment

(1) Adjust the washer nozzle position by bending the nozzle bracket so that the central height of ejected liquid will be as shown in Fig. 145.

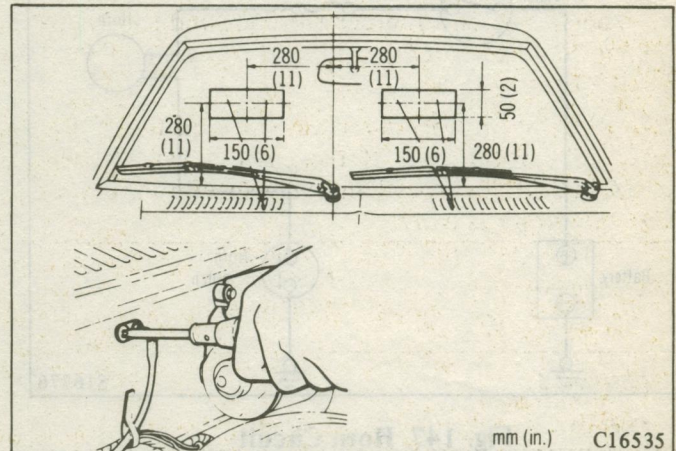


Fig. 145 Nozzle Ejection Angle Adjustment

(2) Check the washer liquid tank for liquid level. If the liquid level is low, mix the washer liquid with water in the ratio shown below and replenish.

Washer liquid : Water

Mixing ratio
(All season)

4 : 1

(3) If the windshield washer discharges low, check for a clogged, bent or crushed tube. The tube may be crushed by a clip; check for possible defects in the area where the tube is clipped.

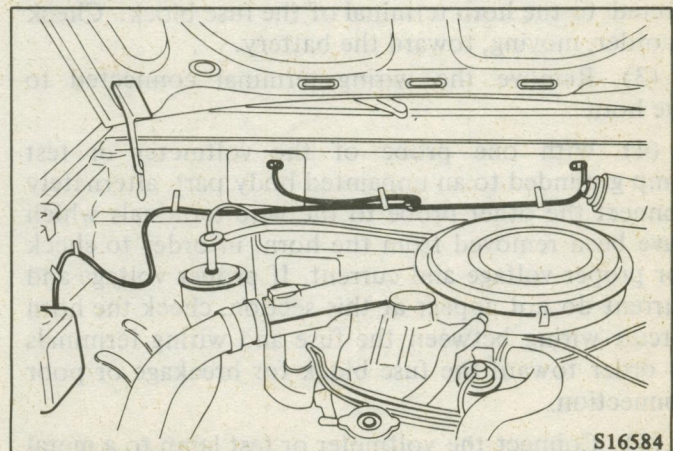


Fig. 146 Windshield Washer Plumbing

HORN

INSPECTION

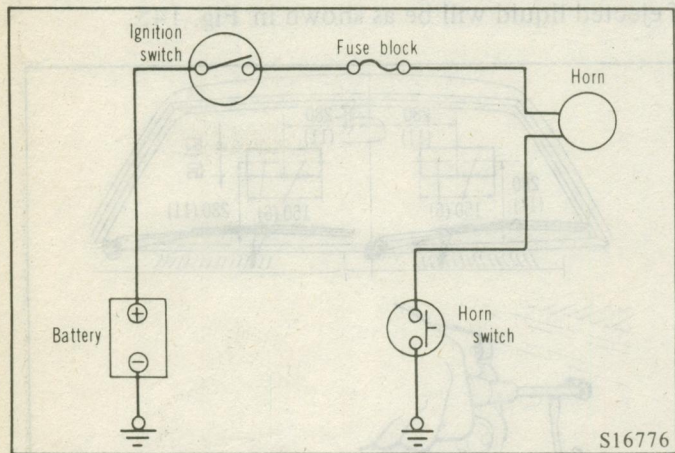


Fig. 147 Horn Circuit

(1) Operate the starter, etc., and check the battery condition. If the starter shows strong operation, the battery is normal.

(2) Check the fuse for the horn circuit. Be sure to check for fusing, of course, and faulty connection of the fuse holder. Using a voltmeter or test lamp, ground one probe to an unpainted body part, and touch the other probe to both sides (A and B) of the horn fuse holder alternately to check for proper voltage and current. If proper voltage and current do not appear at this section, there is a problem in the wiring between the battery and the "Accessory" or "Battery" terminal of the ignition switch, or the wiring between the battery and cord terminal connected to the horn terminal of the fuse block. Check in order, moving, toward the battery.

(3) Remove the wiring terminal connected to the horn.

(4) With one probe of the voltmeter or test lamp grounded to an unpainted body part, alternately connect the other probe to the wire terminals which have been removed from the horn, in order to check for proper voltage and current. If proper voltage and current do not appear at this section, check the horn circuit wiring between the fuse and wiring terminals in order toward the fuse block for breakage or poor connection.

(5) Connect the voltmeter or test lamp to a metal part of the wiring terminals at which voltage or current does not appear and those at which voltage or current appears according to the previously mentioned check (4), and press the horn button. The

voltage meter needle will indicate the voltage of the vehicle, or the test lamp will illuminate brightly if the situation is normal. If the previously mentioned test (4) shows proper voltage and current, and this test does not, there is either a disconnection or poor connection in the wiring between the horn button and the negative side of the horn.

(6) Reconnect to the horn the wiring terminal at which current or voltage appears according to the previously mentioned check (4), then connect one end of a jumper wire to the negative terminal, and ground the other end. If the horn then sounds, it is normal. If not, the trouble is in the horn itself.

INSPECTION AND ADJUSTMENT OF SOUND

Sound the horn and adjust it by turning the adjusting screw.

(1) If the horn does not sound, turn the adjusting screw toward "UP" until you hear a weak sound. From this point, further turn the screw to a point (within the range of 180 degrees) where the best tone is obtained. Lock the screw in this position.

(2) If the horn makes a harsh, low sound or chokes, turn the adjusting screw toward "UP" to find a position within about 180 degrees where the best tone is obtained. When this position is found, lock the screw there.

(3) If the horn makes a loud, vibrating, broken sound, turn the adjusting screw toward "DOWN" 20 to 30 degrees to a position where the best tone is obtained. Lock the screw in this position.

(4) After the adjustment, apply lacquer to the screw to prevent the adjusting screw from loosening.

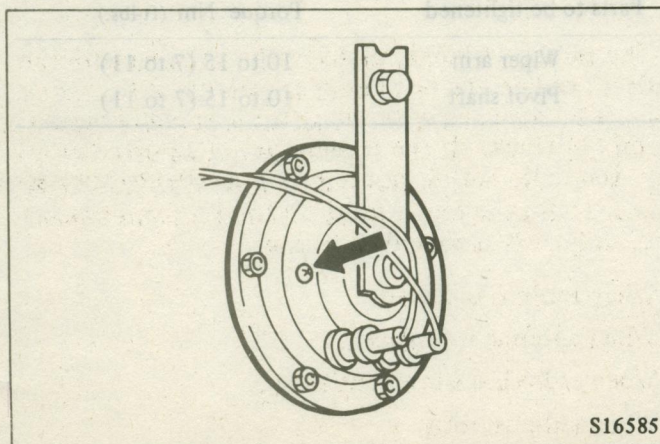
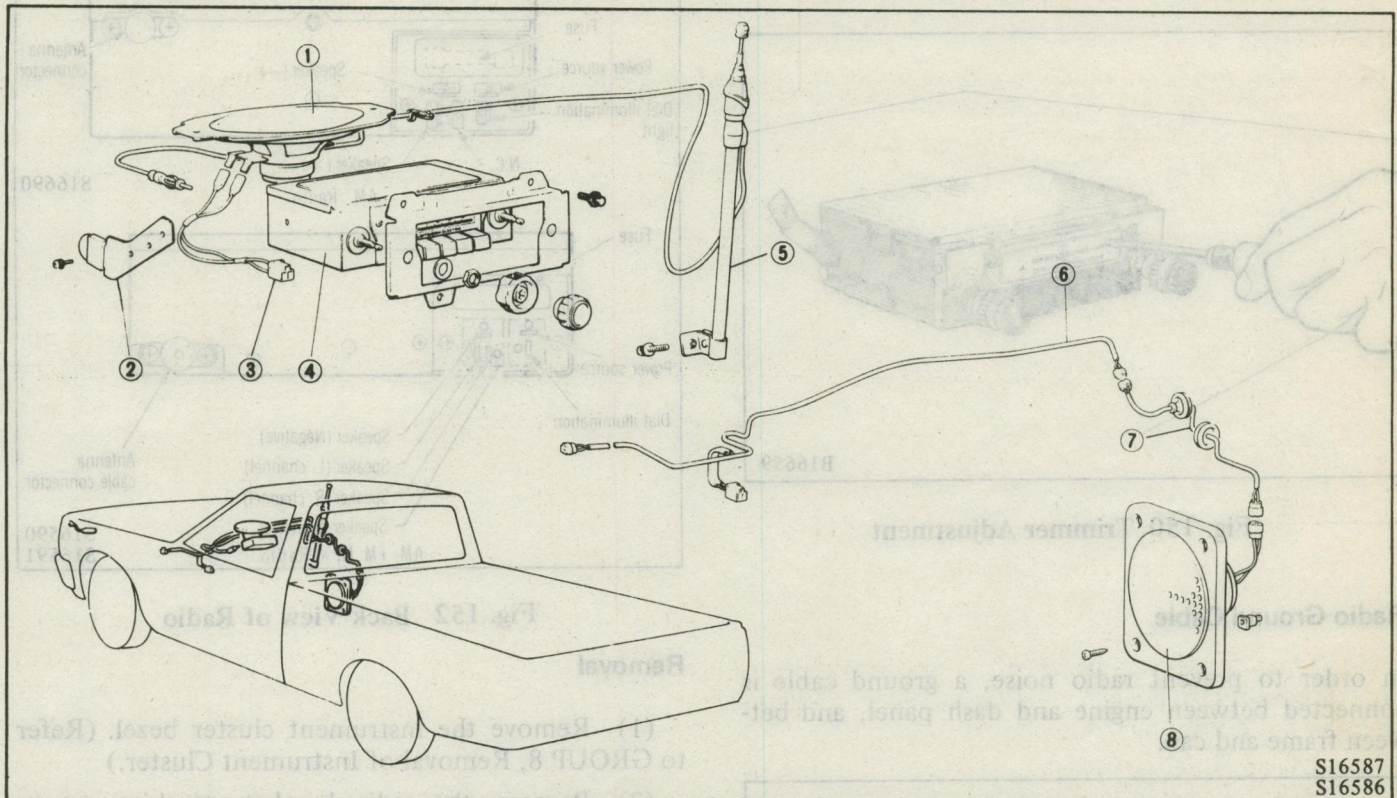


Fig. 148 Adjusting Horn

RADIO



[For U-engine]

- (1) Speaker
- (2) Radio stay
- (3) Speaker wiring harness
- (4) AM radio
- (5) Antenna

[For W-engine]

- (2) Radio stay
- (4) AM/FM MPX radio
- (5) Antenna
- (6) Speaker wiring harness
- (7) Door wiring harness
- (8) Speaker

Fig. 149 Radio Component Arrangement

TRIMMER ADJUSTMENT

The antenna trimmer matches the antenna with the radio to obtain the maximum sensitivity of the radio. It must be adjusted with the antenna actually mounted on the truck. If the trimmer is not adjusted properly, the radio suffers not only low sensitivity but also noises, such as external noise and noise from passing caes. Adjust it as described below:

- When radio is installed.
- When antenna is replaced.
- When radio has a low sensitivity.
- When radio is noisy.

(1) Turn ignition switch to ACC to cut off engine.

(2) Tune radio in accurately on a station near 1,400 KHz; that is, a weak station that barely can be received. If no station near 1,400 KHz is available, use any high-frequency station (over 1,000 KHz) available. (If there are two or more stations near 1,400 KHz, pick the noisier one.)

(3) Adjust the antenna (pole antenna) as short as possible so that a broadcasting station is barely received.

(4) Set volume control dial for maximum.

(5) Set tone control dial to H (high-pitched tone).

(6) With settings (1) to (5) done properly, insert a screwdriver in the trimmer adjusting screw located at the left of the dial plate. Turn the screwdriver clockwise or counterclockwise for maximum sensitivity (maximum broadcast wave sound). If optimum

sensitivity point cannot be found, a malfunction of the antenna or broken wire may be the cause, and appropriate checks should be made. (Fig. 150)

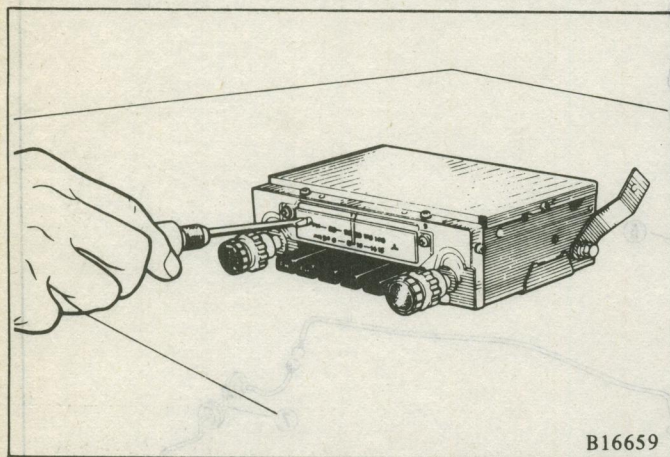


Fig. 150 Trimmer Adjustment

Radio Ground Cable

In order to prevent radio noise, a ground cable is connected between engine and dash panel, and between frame and cab.

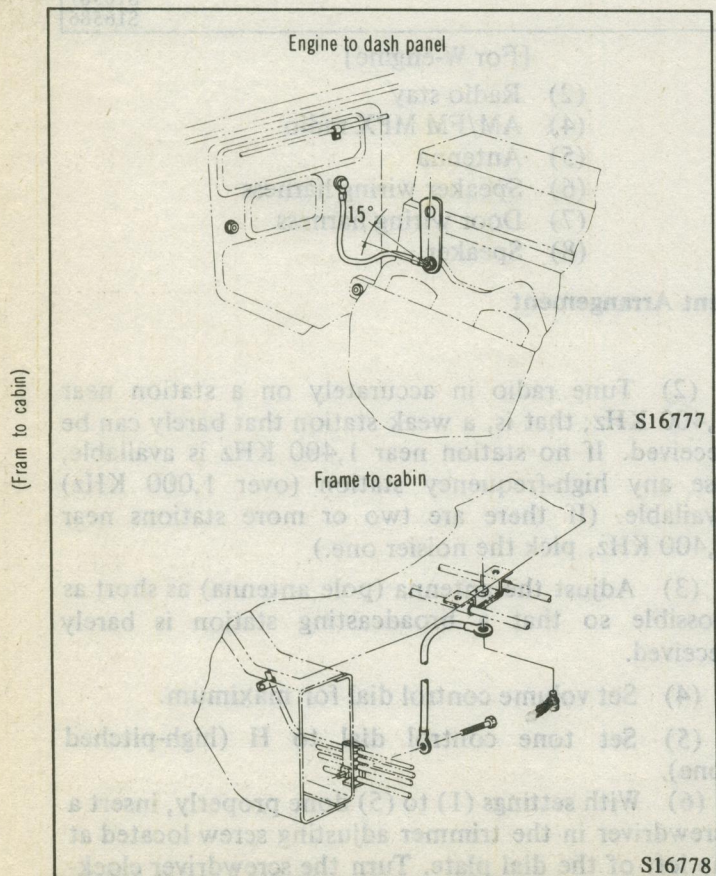


Fig. 151 Ground Cable

RADIO

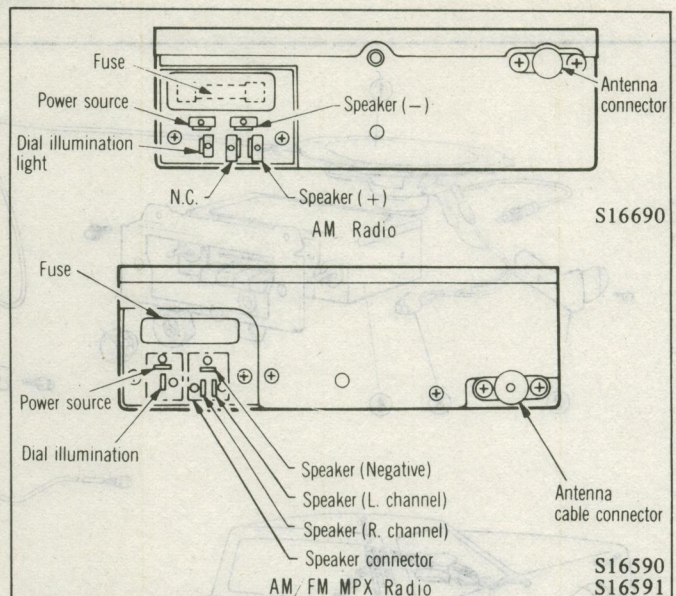


Fig. 152 Back View of Radio

Removal

- (1) Remove the instrument cluster bezel. (Refer to GROUP 8, Removal of Instrument Cluster.)
- (2) Remove the radio bracket attaching screws from the instrument panel, and remove the radio bracket. (Fig. 153)

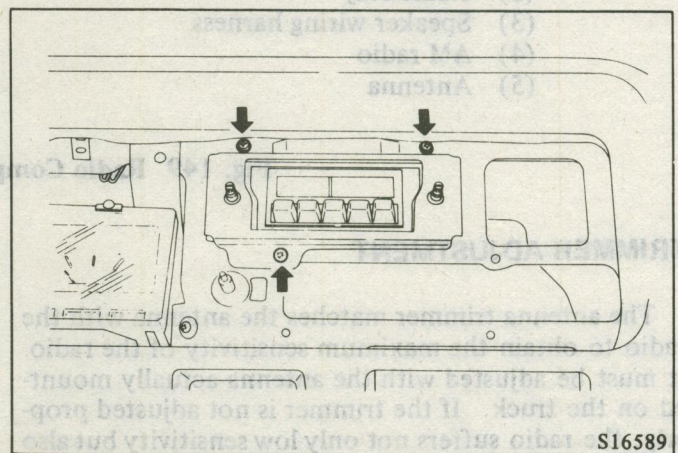


Fig. 153 Removal of the Radio

- (3) Pull the radio outward slightly, disconnect the antenna lead-in, speaker connector and power-supply connector.
- (4) Take out the radio.

NOTE: The fuse block of the radio circuit is provided at the right rear of the radio. When replacing a fuse, remove the glove box and reach through the opening.

Installation

(1) Note the radio mounting stay is attached in a different manner, depending on whether an AM radio or AM/FM MPX radio is mounted on the radio mounting stay.

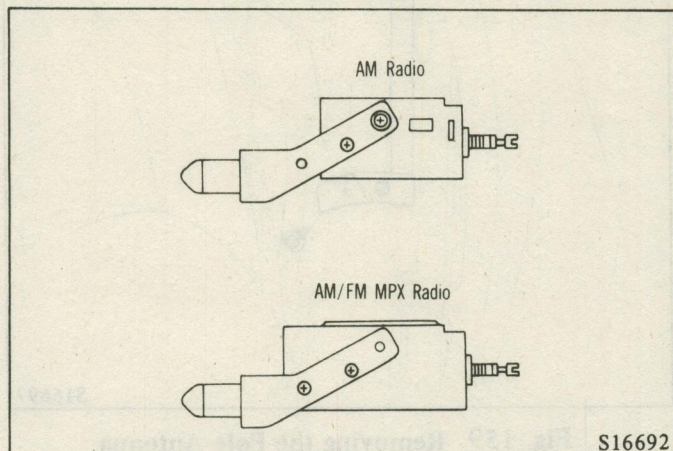


Fig. 154 Attaching Radio Mounting Stay

(2) Make sure the radio mounting stay has been fitted into the hole in the reinforcement, before installing radio set. (Fig. 155)

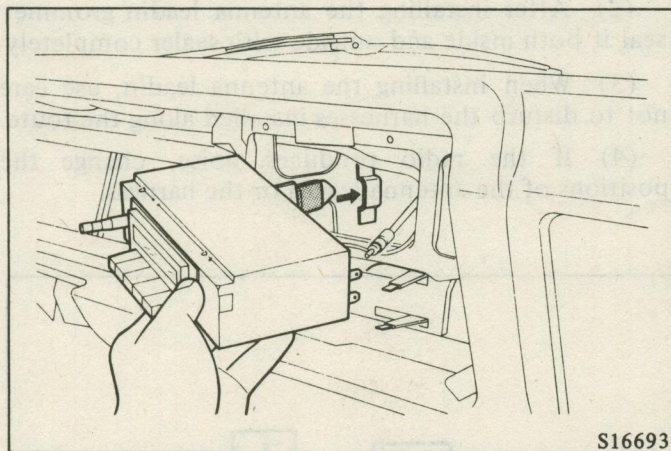


Fig. 155 Radio Stay and Holding Bracket

SPEAKER

Front Speaker

Removal

- (1) Remove the glove box (Refer to GROUP 23).
- (2) Disconnect speaker lead wire (both radio side and speaker side).

(3) Remove speaker attaching nuts and take out the speaker downward. (Fig. 156)

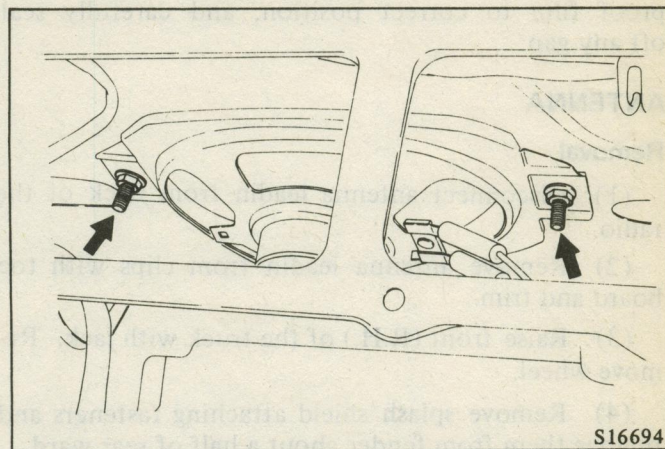


Fig. 156 Removing the Front Speaker

Installation

(1) Check the speaker for dust or foreign substance on cone paper. Take care to prevent damage to the cone paper when the speaker is installed.

(2) Install speaker with terminal oriented toward passenger seat.

Door Speakers

Removal

- (1) Remove the screws and take out the speaker with bezel. (Fig. 157)
- (2) Disconnect speaker lead wire.

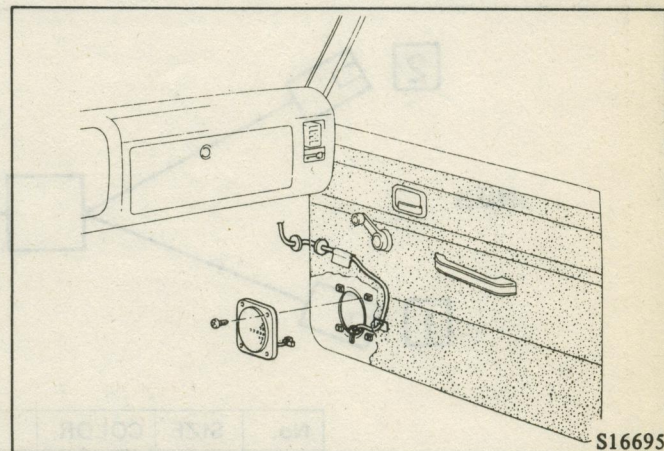


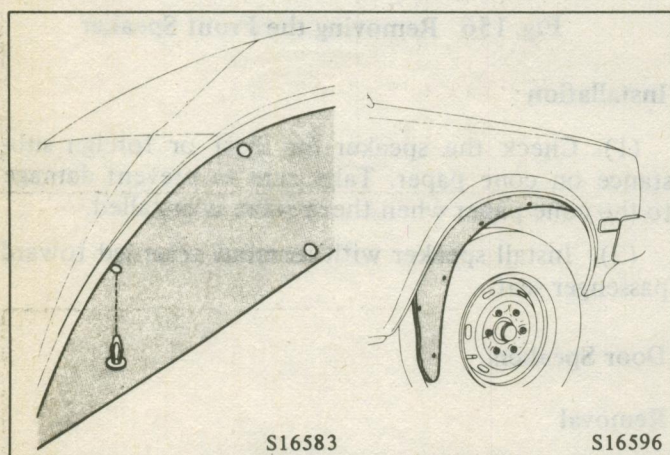
Fig. 157 Removing the Door Speaker

Installation

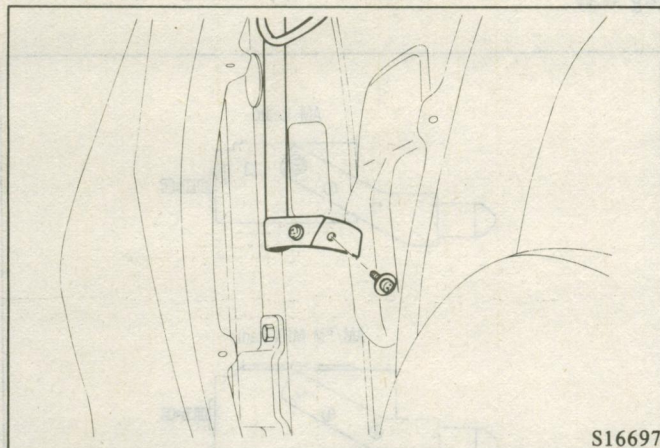
(1) To protect interior from rain, apply water proof film to correct position, and carefully seal off any gap.

ANTENNA**Removal**

- (1) Disconnect antenna leadin from back of the radio.
- (2) Remove antenna leadin from clips with toe board and trim.
- (3) Raise front (R.H.) of the truck with jack. Remove wheel.
- (4) Remove splash shield attaching fasteners and remove them from fender about a half of rear ward.

**Fig. 158 Removing the Splash Shield**

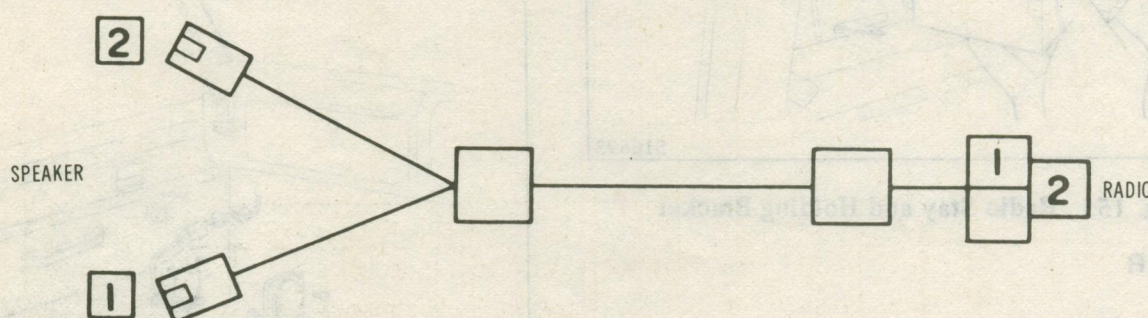
- (5) Remove mounting nut on the antenna.
- (6) Remove the antenna-bracket attaching screw to body inside the fender.
- (7) Take out the antenna with a downward motion.

**Fig. 159 Removing the Pole Antenna****Installation of Pole Antenna**

- (1) Install the antenna so that it can be securely grounded from under the mounting nut.

NOTE: If the grounding is incomplete, the antenna sensitivity is considerably degraded.

- (2) After installing the antenna leadin grommet, seal it both inside and outside with sealer completely.
- (3) When installing the antenna leadin, use care not to disturb the harnesses installed along the route.
- (4) If the radio produces noise, change the positions of the antenna leadin or the harness.

WIRING HARNESS

No.	SIZE	COLOR	CIRCUIT	
1	0.5	B	RADIO	SPEAKER
2	0.5	B or BW	RADIO	SPEAKER

Fig. 160 Speaker Wiring Harness

S16779

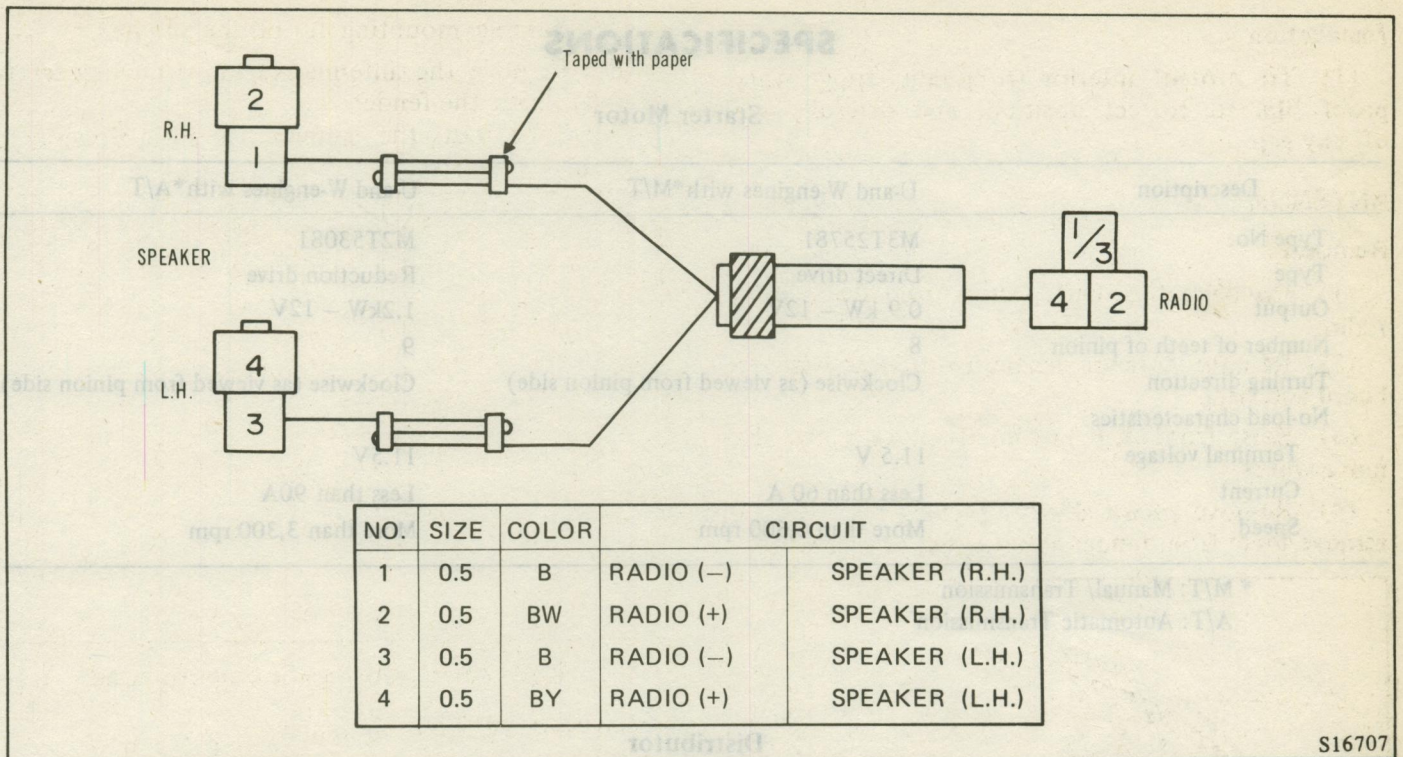


Fig. 161 Speaker Wiring Harness

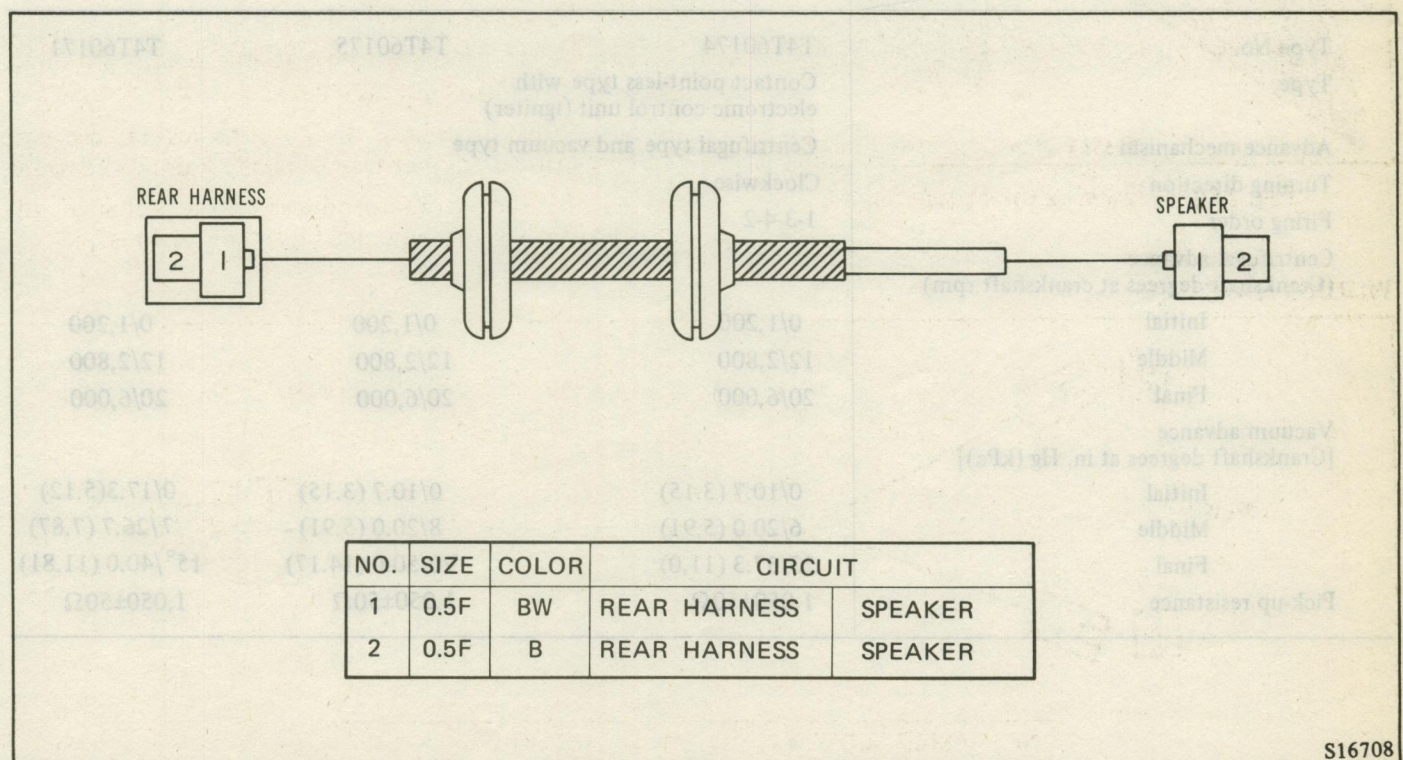


Fig. 162 Door Wiring Harness

SPECIFICATIONS

Starter Motor

Description	U-and W-engines with *M/T	U-and W-engines with *A/T
Type No.	M3T25781	M2T53081
Type	Direct drive	Reduction drive
Output	0.9 kW - 12V	1.2kW - 12V
Number of teeth of pinion	8	9
Turning direction	Clockwise (as viewed from pinion side)	Clockwise (as viewed from pinion side)
No-load characteristics		
Terminal voltage	11.5 V	11.5V
Current	Less than 60 A	Less than 90A
Speed	More than 6,600 rpm	More than 3,300 rpm

* M/T: Manual/ Transmission

A/T: Automatic Transmission

Distributor

Description	Engine	U-engine with M/T for 49-state	U-engine	W-engine
Type No.		T4T60174	T4T60175	T4T60171
Type		Contact point-less type with electronic control unit (igniter)		
Advance mechanism		Centrifugal type and vacuum type		
Turning direction		Clockwise		
Firing order		1-3-4-2		
Centrifugal advance (Crankshaft degrees at crankshaft rpm)				
Initial		0/1,200	0/1,200	0/1,200
Middle		12/2,800	12/2,800	12/2,800
Final		20/6,000	20/6,000	20/6,000
Vacuum advance [Crankshaft degrees at in. Hg (kPa)]				
Initial		0/10.7 (3.15)	0/10.7 (3.15)	0/17.3(5.12)
Middle		6/20.0 (5.91)	8/20.0 (5.91)	7/26.7 (7.87)
Final		23/37.3 (11.0)	20/50.0 (14.17)	15°/40.0 (11.81)
Pick-up resistance		1,050±50Ω	1,050±50Ω	1,050±50Ω

Ignition Coil

Description \ Engine	U and W
Type No.	LB-119
Primary coil resistance	0.7 to 0.85 Ω
Secondary coil resistance	9 to 11 k Ω
Insulation resistance at 500 V	Over 50M Ω

Spark Plug

	U. S. A.		Canada		Manufacturer	Plug gap mm (in.)			
	U-engine	W-engine	U-engine	W-engine		U.S.A.	Canada		
Factory installed plug	BPR6ES-11	BPR5ES-11	BPR6ES	BPR5ES	NGK	1.0 ~ 1.1 $\left(\begin{smallmatrix} .039 \\ .043 \end{smallmatrix} \right)$	0.7 ~ 0.8 $\left(\begin{smallmatrix} .028 \\ .031 \end{smallmatrix} \right)$		
	BUR6EA	BUR6EA	_____	_____					
	BP6ES-11	BP6ES-11	_____	_____					
Alternate plug	Part Number 2098379-P -62PR	Part Number 2098360-P -67P	_____	_____	MOPAR				
	Part Number 2098379-P -62PR	Part Number 3874490-P -65PR	Part Number 3874490-P -65PR	Part Number 2642493-P -62P					
	W20EPR- U10	W16EPR- U10	_____	_____		NIPPON DENSO	0.9 ~ 1.0 (.035~.039)	_____	

Alternator and Electronic Voltage Regulator

Description \ Engine	U- and W-engines
Type No.	A2T16471
Output	12V-45A
Turning direction	Clockwise
Pulley ratio (vs Crank pulley)	2.2 : 1
Output current (Hot/Cold) — Indicated rpm is alternator speed	16A/18A at 13.5 V, 1,300 rpm 37A/42A at 13.5 V, 2,500 rpm 44A/ — at 13.5 V, 5,000 rpm
Voltage regulator	14.1 to 14.7 V at 20°C (68°F)
Temperature compensation gradient	—0.1 V/10°C (18°F)
Voltage Regulator Type	Electronic HIC, Built-in the brush holder

Battery

Type	Ampere Hours	Cranking Rating [at -17.8°C (0°F)]	Reserve Capacity	Application
NT80-S6	45Ah	375A	65 min.	U-engine for U.S.A.
N50Z	60Ah	320A	95 min.	U-engine for Canada
NX100-S6	45Ah	460A	65 min.	W-engine for U.S.A.
NS70	65Ah	370A	110 min.	W-engine for Canada

Notes: **CRANKING RATING** is the current a battery can deliver for 30 seconds and maintain a terminal voltage of 7.2 or greater at a specified temperature.

RESERVE CAPACITY RATING is the amount of time a battery can deliver 25A and maintain a minimum terminal voltage of 10.5 at 27°C (80°F).

Indicator Lights

Description	Specifications	Color of lens
Oil pressure indicator light (with U-engine only)	3.4W (158) \times 1	Red
Charging indicator light (with U-engine only)	3.4W (158) \times 1	Red
Seat belt warning light	3.4W (158) \times 1	Red
Parking brake indicator light	3.4W (158) \times 1	Red
Upper beam indicator light	3.4W (158) \times 1	Bluish purple
Turn signal indicator lights	3.4W (158) \times 2	Green (Common to hazard light)

Note: The values in parentheses denote SAE trade numbers.

Main and Auxiliary Lights

Description	Specification	Remarks
Main lights		
Headlights	65/55 W (6052) × 2	Rectangular headlight 5.6 × 7.9 in.
Front turn signal and parking lights	27/8 W (1157) × 2	27W: For turn signal light 8W: For parking light
Front side marker lights	8W (67) × 2	
Stop and tail lights	27/8W (1157) × 2	27W: For stop light 8W: For taillight
Rear turn signal lights	27W (1156) × 2	
Backup lights	27W (1156) × 2	
Rear side marker lights	8W (67) × 2	
License plate light	8W (67)	
Auxiliary lights		
Dome light	5W × 1	
Cargo light	10W × 1	Option
Meter illumination lights	3.4W (158) × 5	
Combination gauge ill. light	3.4W (158) × 1	With W-engine only
Heater panel light	1.4W × 1	
Wiper/Washer switch light	1.4W × 1	
Shift position illumination light	24V, 3.4W × 1	With automatic transmission only

Note: The values in parentheses denote SAE trade numbers.

Wiper and Washer

Description	Specifications
Wiper motor	
Motor	Permanent magnet type
Speed control	Third brush type
Damping	Alternator damping type
Loaded speed 0.78 Nm (6.94 in.-lbs.) at 13.5V (w/wiper linkage, in wet state)	Low 40 to 50 rpm High 63 to 77 rpm
Motor output torque (at 13V)	14.7 Nm (130 in.-lbs.)
No-load speed (at 13V)	
Low	48 rpm
High	75 rpm
No-load current (at 13V)	Less than 3A
Crank arm auto stop position (from driven gear level position)	$5^{\circ}+5^{\circ}$ -10°
Wiper blade	
Wiping angle Right Left	104 to 108° 79 to 83°
Wiper blade stop position (at blade tip just above windshield weatherstrip)	20 mm (.79 in.)
Wiper blade length	400 mm (15.75 in.)
Wiper arm holding pressure	5.6N (1.21 lbs.)
Wiper switch	
Load current (at 14.5V)	6A
Operating system	Pull-on/ Push-off type, 2 steps
Operating force	4.9 to 24.5N (1.10 to 5.51 lbs.)
Windshield washer	
Motor	Permanent magnet type
Pump	Centrifugal type
Power consumption	Less than 3.5A
Time rating	Max. 20 sec.
Nozzle jet pressure	More than 78.6 kPa (11.4 psi.)
Nozzle jet rate	More than 15.9 cu.in./10 sec. (260 c.c./10 sec.)
Nozzle jet hole	$\phi 1\text{mm}$ (.04 in.) $\times 4$
Washer liquid tank capacity	1.5 liters (.40 U.S. gal/.33 Imp. gal)
Washer switch	
Rated current (at 14.5V)	5A
Operating system	Twist type
Operating force	4.9 to 9.8N (1.10 to 2.20 lbs.)
Stroke	Approx. 30° (to clockwise)

Horn

Description	Specifications
Horn	
Type	Flat type (Soft sound)
Rated voltage	12V
Effective sounding voltage	10 to 14.5V
Power consumption	$2.0^{+1.0}_{-0.5}$ A
Sound pressure	100^{+10}_{-5}
Fundamental frequency	350 ± 15
Switch	
Horn sounding stroke (vehicle with U-engine)	0.7 to 5 mm (.03 to .20 in.)
Horn sounding stroke (vehicle with W-engine)	0.8 to 1.8 mm (.03 to .07 in.)

Radio

Description	AM radio (For trucks with U-engine)	AM/FM radio (For trucks with W-engine)
Radio		
Type	AR-3300SU	AR-1775SUK
Power voltage	13.2V	13.2V
Receiving frequency		
AM	525 to 1605 KHz	525 to 1605 KHz
FM	—	88 to 108 MHz
Circuit system	Super-heterodine RF 1 stage/IF 1 stage amplification	Super-heterodine RF 1 stage/IF 1 stage amplification FM tuner: MPX stereo Audio circuit: 2 channel
Max. output	4.8W (or more)	4.8W + 4.8W (or more)
Power consumption	0.15 to 0.6A	0.45 to 1.5A
Adaptable speaker	4 Ω	4 Ω x 2
Speaker		
Type	SG-50R4	SG-3K4-2
Cone size (Diameter)	150 x 100 mm (6 x 4 in.)	ϕ 140 mm (5.5 in.)
Max. input	5W	5W
Voice coil impedance	3.4 to 4.6 Ω	3.2 to 4.8 Ω
Min. resonance frequency (fo)	100 to 160Hz	90 to 150 Hz
Output sound pressure level	92 to 96 dB	82 to 86 dB
Frequency range	fo to 7,000 Hz	fo to 15,000 Hz
Antenna		
Type	Pole antenna (Fender)	Pole antenna (Fender)
Leadin capacity	72 to 88 pF	72 to 88 pF
Leadin overall length	1,000 mm (3.3 ft)	1,000 mm (3.3 ft)

SERVICING STANDARD

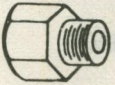
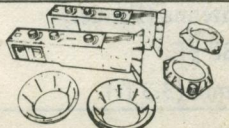
Unit: mm (in.)

Description	Standard value	Service limit	Remarks
STARTER MOTOR			
Clearance between armature shaft and bearing			
Front	0.07 to 0.10 (.0028 to .0039)	0.2 (.008)	
Center	0.3 (.0118)		
Rear	0.07 to 0.10 (.0028 to .0039)	0.2 (.008)	
Commutator runout	0.01 (.0004)	0.3 (.012)	
Commutator O.D.	38.7 (1.5236)	37.7 (1.4842)	
Depth of under cut	0.4 to 0.6 (.016 to .024)	0.2 (.008)	
Brush length	17 (.669)	11.5 (.453)	
Brush spring install lead	13 to 17 N (2.9 to 3.7 lbs.)	7 N (1.5 lbs.)	
Pinion gap	0.5 to 2.0 (.020 to .079)		
Current at no-load	Less than 50A		
SPARK PLUG CABLE	Less than 22 k Ω		
Resistance limit			
SPARK PLUG GAP	1.0 to 1.1 (.039 to .043)		Trucks for U.S.A.
	0.7 to 0.8 (.028 to .031)		Trucks for Canada
ALTERNATOR			
Charging voltage	14.4 \pm 0.3 V		at 20°C (68°F)
Temperature compensation gradient	-0.1 V/10°C (50°F)		
Slip ring O.D.	33 (1.2992)	32.2 (1.268)	
Slip ring runout	0.03 (.0012) or less	0.2 (.008)	
Length of brush	18 (.709)	8 (.315)	
Load of brush spring	3.0 to 4.2 N (.7 to 1 lbs.)	2.1 N (.5 lbs.)	

TIGHTENING TORQUE

Description	Torque Nm (ft.-lbs.)
Starter motor attaching bolt	22 to 31 (16 to 23)
Spark plug	25 to 28 (18 to 21)
Alternator Support bolt nut	20 to 24 (15 to 18)
Brace bolt	12 to 14 (9 to 10)
Windshield wiper arm	10 to 15 (7 to 11)
Windshield wiper pivot shaft	10 to 15 (7 to 11)

SPECIAL TOOLS

Tool No.	Name of tool	Illustration	Use	Remarks
S-94	Adapter		For engine oil pressure	
C-4466	Aimer		For headlights aiming	